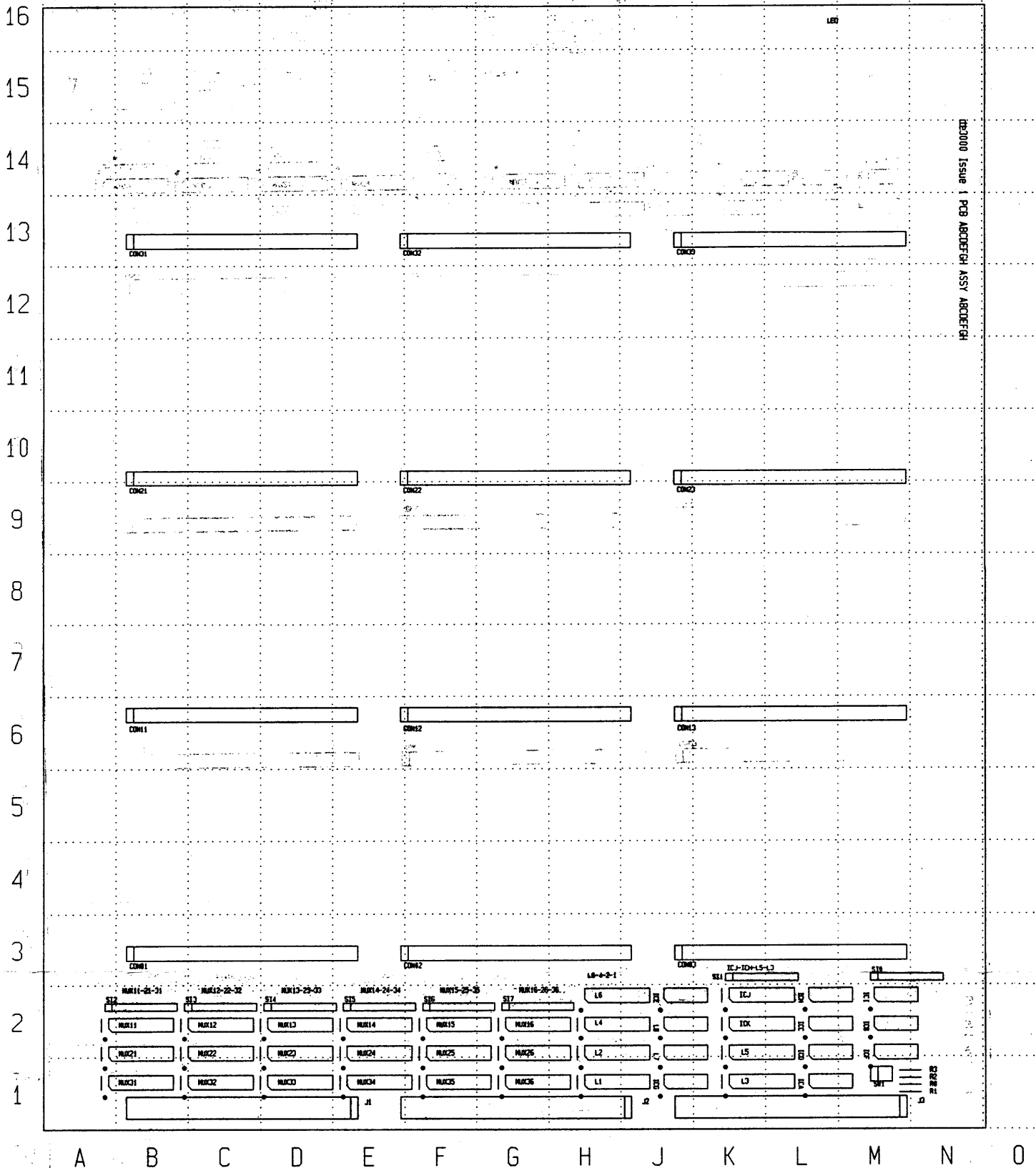
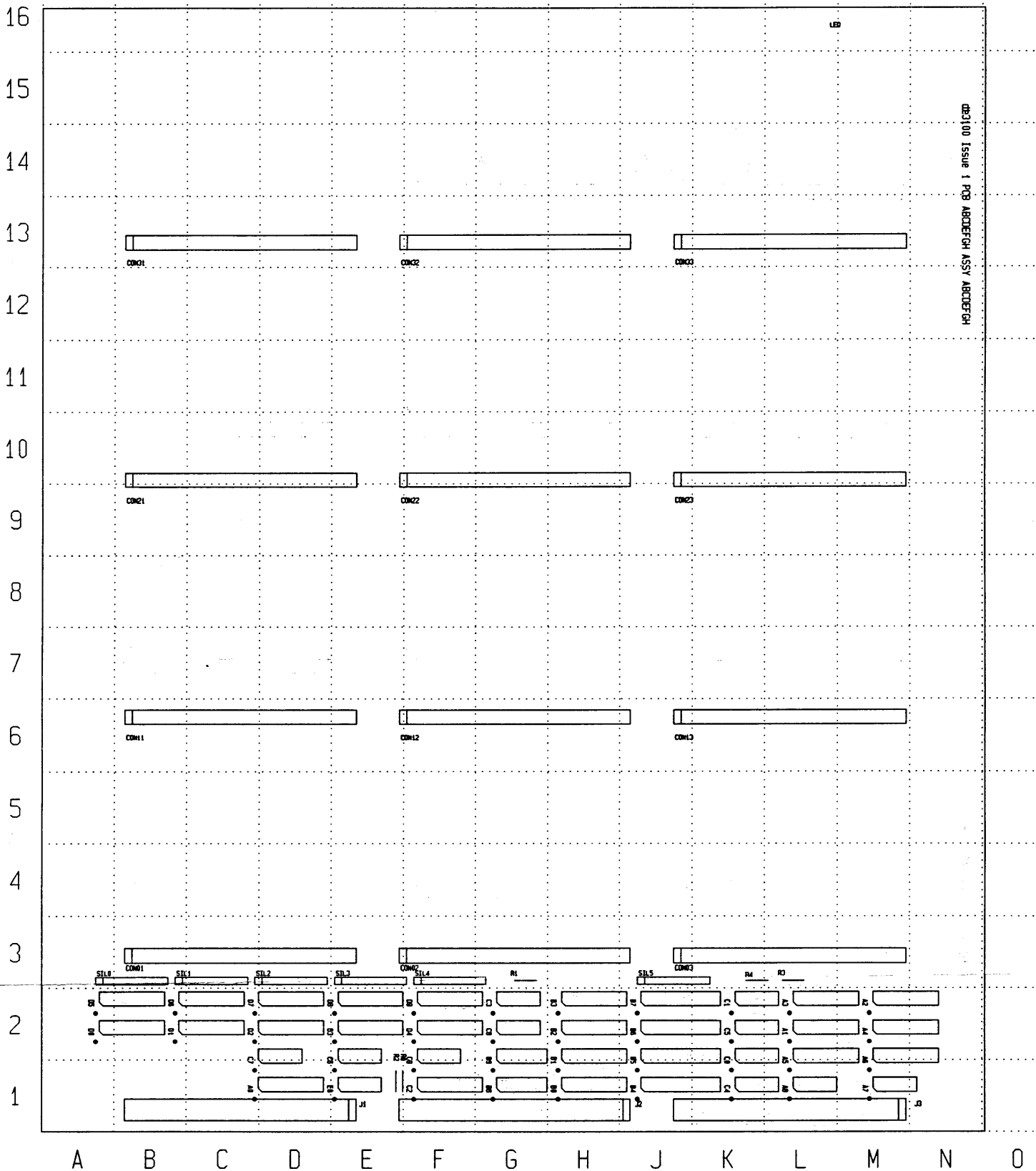


PRELIMINARY



Component locations		
PCB: Memory	Issue:	Date:
		dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

PRELIMINARY



Dansk Data Elektronik A/S

**Technical
Data Sheet**

Updated 01st August 1993 Vers. 1.5

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SUPERMAX technical data sheet.
Module: CIOC 0900

Type: CIOC 0900

Data sheet no.: 7

Revision no.: 0

Date: 851008

General description:

The CIOC is the intelligent Communication IO Controller in a SUPERMAX system. The CIOC is built around a microprocessor and contains the following interfaces:

- 2 serial interface channels with RS-232 or RS-422 interface.
- Asynchronous or byte-synchronous transmission.
- HDLC or SDLC transmission.

Interface to I/O bus:

The CIOC has a standard interface to the common SUPERMAX I/O bus. The local memory bus is not used.

Active cycles : Byte read and write.
Dobbelt word read and write.

Passive cycles: Byte read and write.
Word read and write.
Read modify write.

Interface to peripheral equipment:

Serial Channels:

The selection of interface standard and type is programmable.

All interface signals are situated in a 50 pin flatcable header.

PIN	SIGNAL	SIGNAL	PIN
01	T(B)0	T(B)1	02
03	T(A)0	T(A)1	04
05	C(B)0	C(B)1	06
07	C(A)0	C(A)1	08
09	S(B)0	S(B)1	10
11	S(A)0	S(A)1	12
13	I(B)0	I(B)1	14
15	I(A)0	I(A)1	16
17	R(B)0	R(B)1	18
19	R(A)0	R(A)1	20
21	GND	GND	22
23	GND	GND	24
25	GND	GND	26
27	GND	GND	28
29	+12V	+12V	30
31	-12V	-12V	32
33	DTR0	DTR1	34
35	RTS0	RTS1	36
37	RXC0	RXC1	38
39	TXC0	TXC1	40
41	TXD0	TXD1	42
43	RXD0	RXD1	44
45	CTS0	CTS1	46
47	DSR0	DSR1	48
49	CDO	CD1	50

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage		Typ. current
+ 5	+5%	6.5 A
+12	+5%	0.1 A
-12	+5%	0.1 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.

Depth : 415 mm.

Height: 14 mm.

Installation:

Before a CIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Flat cables for the serial channels.
- Firmware.

These items are described in details in the following text.

SUPERMAX technical data sheet.
Module: CIOC 0900

4

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number. The unit number of the CIOC module is coded in a PAL located in position 11. This PAL is called the unit PAL.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CIOC module uses two priorities. The priorities of the CIOC module are coded in two PALs located in position N1 and N3. This PALs are called the priority PALs.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are placed in position Q3.

Firmware:

The firmware is situated in an EPROM mounted in position E4.

CIOCBOOT, V. 0100, 840618.

The CIOC with the this firmware will be able to be bootstrapped of another module in a Supermax system.

Straps and jumpers:

+ designates factory installed position.

Strap 1.

Function: Real time clock.

Position: A 7,11

Name: SK3 and SK4

1 2 3 4 5

<u>Jumper</u>	<u>Clock</u>
1	1.28 milliseconds
2	6.4 milliseconds
+ 3	12.8 milliseconds
4	64.0 milliseconds
5	128.0 milliseconds

Strap 2.

Function: Baud rate to service port. Connected to both Txclk and Rxclk.

Position: A 9,10

Name: SK1 and SK2

1 2 3 4

<u>Jumper</u>	<u>Clock</u>
+ 1	9600 x 16 baud.
2	4800 x 16 baud.
3	2400 x 16 baud.
4	1200 x 16 baud.

Strap 3.

Function: Special option for hardware service.

Position: B 5,1

Name: SM1

Under normal circumstances, the jumper must be in position two.

Strap 4.

Function: Transmitter/receiver clocks to the HDLC controller.
Data-communication port 0.

Position: B 6,8

Name: SV1 and SV2

```
*****  
*****  
1 2 3 4 5 6
```

Jumper

- 1 HDLC-C pin 32xC1k grounded.
- 2 HDLC-C pin 32xC1k connected to counter output OUT02
- 3 HDLC-C pin DPLL connected to RxC input pin on HDLC-C
- 4 HDLC-C pin DPLL connected to TxC input pin on HDLC-C
- + 5 HDLC-C pin RxC connected to line interface signal.
- + 6 HDLC-C pin TxC connected to line interface signal.

Jumper 3 and 5 may not both be mounted.
Jumper 4 and 6 may not both be mounted.

Strap 5.

Function: Transmitter/receiver clocks to the HDLC controller.
Data-communication port 1.

Position: B 9,9

Name: SW1 and SW2

```
*****  
*****  
1 2 3 4 5 6
```

Jumper

- 1 HDLC-C pin 32xC1k grounded.
- 2 HDLC-C pin 32xC1k connected to counter output OUT12
- 3 HDLC-C pin DPLL connected to RxC input pin on HDLC-C
- 4 HDLC-C pin DPLL connected to TxC input pin on HDLC-C
- + 5 HDLC-C pin RxC connected to line interface signal.
- + 6 HDLC-C pin TxC connected to line interface signal.

Jumper 3 and 5 may not both be mounted.
Jumper 4 and 6 may not both be mounted.

Strap 6.

Function: Transmitter-clock to data communication port 0.

Position: C 3,7

Name: STX0

* * *
1 2 3

Jumper

- + 1-2 The TxC signal is an input to the CIOC.
- 2-3 The CIOC drives the TxC signal.

Strap 7.

Function: Receiver-clock to data communication port 0.

Position: C 3,7

Name: SRX0

* * *
1 2 3

Jumper

- + 1-2 The RxC signal is an input to the CIOC.
- 2-3 The CIOC drives the RxC signal.

Strap 8.

Function: Transmitter-clock to data communication port 1.

Position: C 3,7

Name: STX1

* * *
1 2 3

Jumper

- + 1-2 The TxC signal is an input to the CIOC.
- 2-3 The CIOC drives the TxC signal.

Strap 9.

Function: Receiver-clock to data communication port 1.

Position: C 3,7

Name: SRX1

* * *
1 2 3

Jumper

- + 1-2 The RxC signal is an input to the CIOC.
- 2-3 The CIOC drives the RxC signal.

Strap socket 1.

Function: Possible to connect two switches: One is able to generate an internal reset pulse and the other is able to generate a hardware interrupt. (TRAP)

Position: C 3,1

Name: S11

Under normal circumstances the strap socket is mounted as follows:

* *_* * * * *

1. * *_* * * * *

An internal reset pulse is generated if the connection between pin 2 and 3 is removed, and pins 1 and 2 are connected together.

A non-maskable interrupt TRAP is generated if the connection between pin 14 and 15 is removed, and pins 15 and 16 are connected together.

Strap socket 2.

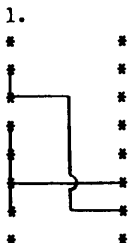
Function: Interrupts from data-communication port 0.

Position: B 3,7

Name: A13

1.
* * RST7
Rxdy X0 * * RST6
Txdy X0 * * RST5
Rxdy D0 * * RST4
Txdy D0 * * RST3
Rxl 0 * * RST2
Txl 0 * * RST1
* * RST0

Factory installed strap:

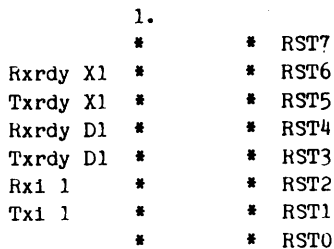


Strap socket 3.

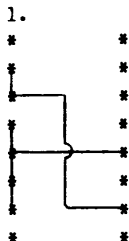
Function: Interrupts from data-communication port 1.

Position: B 6,6

Name: A14



Factory installed strap:



Cables and connectors:

The connection between the CIOC module and the CIOC backplane is made with one flat cable.

The header is mounted in position: C 4,8. 50 pin.
Service port : C 5,3. 20 pin

The flat cable is connected to the CIOC back panel. The CIOC back panel is mounted on the rear of the SUPERMAX card cabinet.

Indicator Leds:

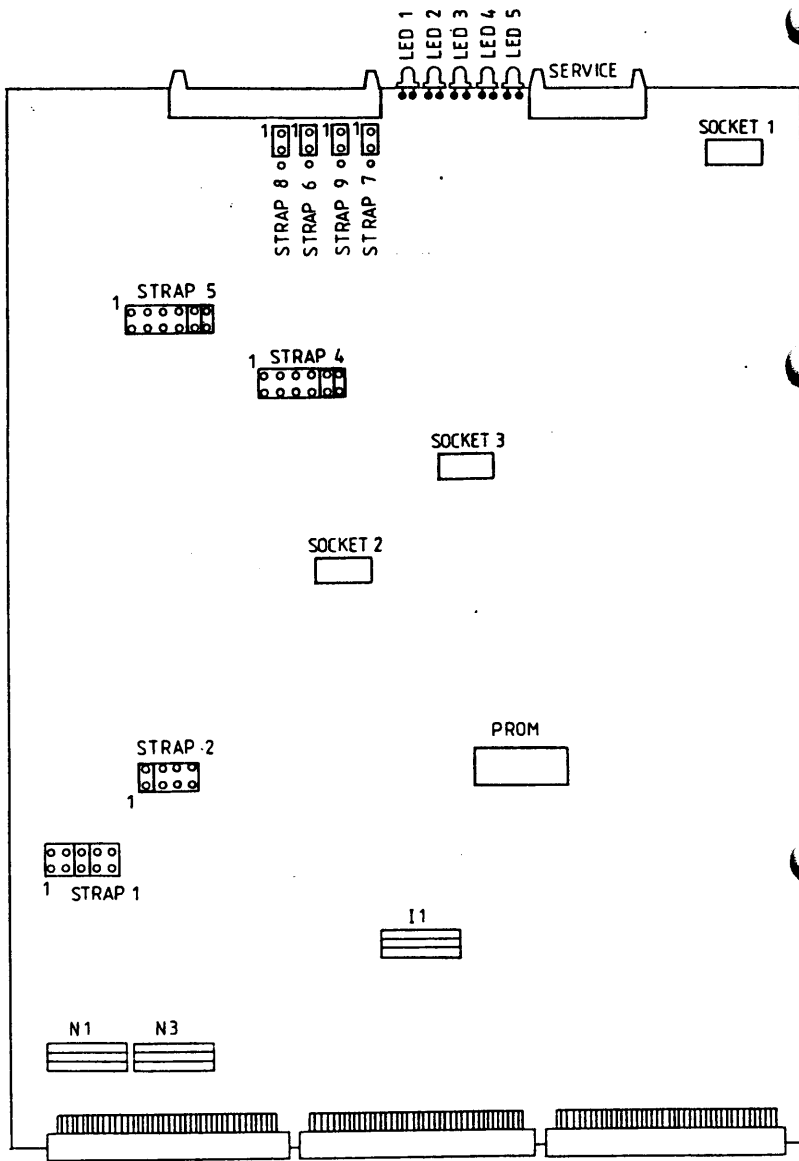
LED1: On: The boot prom is enabled.
Off: The boot prom is disabled.
Upon power up: On

LED2: On: A time out is pending.
Off: No time out.
Upon power up: Off.

LED3: On: A buserror is received.
Off: No buserror.
Upon power up: Off.

LED4: On: The ERROR line is active. The error line is set
by the program or because of a parity error.
Off: No error.
Upon power up: On

LED5: On: The CIOC has activated the buserror signal.
Off: No error.
Upon power up: Off.



SUPERMAX technical data sheet.
Module: CPU 0100

1

Type: CPU 0100

Data sheet no.: 3

Revision no.: 0

Date: 851015

General description:

The CPU 0100 is the CPU module in a SUPERMAX system. The CPU module contains a 10 Mhz 68000 and the following interfaces:

- Interface to I/O bus.
- Interface to memory modules.
- Front pannel display.
- Service port.

Interface to I/O bus:

The CPU has a standard interface to the common SUPERMAX I/O bus.

Active cycles : Byte read and write.
Word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Interface to memory modules:

The CPU module controls memory modules type 0200 and type 1400.

Memory modules are connected to the CPU module via the local memory bus. The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
Word read cycle
Word write cycle
double word read cycle
double word write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between CPU module and memory modules.

Interface to front panel display:

The front panel display consists of two seven segment displays, a red LED, and a green LED. The seven segment displays are under program control and used by the operating system to display various error information. The red LED is on, when the CPU performs a cycle in supervisor mode. The green LED is on, when the CPU performs a cycle in user mode. If both LED's are off the CPU has entered the HALT state. The CPU module is connected to the front panel display via a 20 pin flat cable.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage	Typ. current
+ 5 +-5%	9.5 A
+12 +-5%	200 mA
-12 +-5%	200 mA

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a CPU module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Pull up resistors.
- Bus clock.
- Pull down resistors.
- Straps.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number. The unit number of the CPU module is coded in a PAL located in position B8. This PAL is called the unit PAL.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CPU module uses one priority. The priority of the CPU module is coded in a PAL located in position B9. This PAL is called the priority PAL.

SUPERMAX technical data sheet.
Module: CPU 0100

5

Current lables on Unit and Priority PALs:

Unit number	Unit PAL	Priority PAL	Priority
0	U000	P000	00
1	U010	P010	01
2	U020	P020	02
3	U030	P030	03
4	U040	P040	04
5	U050	P100	10
6	U060	P110	11
7	U070	P120	12

Older lables on Unit and Priority PALs

Unit number	Unit PAL	Priority PAL	Priority
0	C170	C160	00
1	C171	C161	01
2	C172	C162	02
3	C173	C163	03
4	C174	C164	14
5	C175	C165	10
6	C176	C166	11
7	C177	C167	12

Unit PALs marked C17x is identical to unit PALs marked U0x0
Priority PALs marked C16x belong to an older family of
priority PALs. This old family must not be mixed with priority
PALs marked Pxy0

Pull up resistors:

One and only one CPU module in a Supermax system must contain pull up resistors for various signals in the I/O bus. These resistors are:

SI25: 150 ohms. 10 pins single in line.
SI26: 150 ohms. 10 pins single in line.
SI27: 1000 ohms. 10 pins single in line.

Bus clock:

The arbitrating scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

The BUS CLOCK is strapped in the clock strap. See below.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are placed in position Z9.

Straps and jumpers:

+ designates factory installed position.

Clock strap:

Clock strap position Z6:

6 Mhz	0	0	CPU CLOCK (PIN 16)
8 Mhz	0	0	CPU CLOCK
10 Mhz	0	0	CPU CLOCK
10 Mhz	0	0	BUS CLOCK
12 Mhz	0	0	BUS CLOCK
16 Mhz	0	0	BUS CLOCK
16 Mhz	0	0	INTERNAL CLOCK
20 Mhz	0	0	INTERNAL CLOCK

Clock rates selected from factory:

CPU CLOCK:	10 MHz
INTERNAL CLOCK:	16 Mhz
BUS CLOCK:	8 Mhz

Factory installed clock strap:

6 Mhz	0	0	CPU CLOCK (PIN 16)
8 Mhz	0	0	CPU CLOCK
10 Mhz	0	0	CPU CLOCK
10 Mhz	0	0	BUS CLOCK
12 Mhz	0	0	BUS CLOCK
16 Mhz	0	0	BUS CLOCK
16 Mhz	0	0	INTERNAL CLOCK
20 Mhz	0	0	INTERNAL CLOCK

TIMER STRAP.

Position Z4

Function: Selects baud rate for the service port.
Selects time between timer interrupts.

Baud rate input	0	0	5 ms output (PIN 16)
9600 baud output	0	0	interrupt input
4800 baud output	0	0	10 ms output
2400 baud output	0	0	20 ms output
1200 baud output	0	0	interrupt input
600 baud output	0	0	40 ms output
300 baud output	0	0	80 ms output
	0	0	interrupt input

Factory strapping:

Baud rate: 9600 baud
Timer interrupt: 40 ms

Baud rate input	0	0	5 ms output (PIN 16)
9600 baud output	0	0	interrupt input
4800 baud output	0	0	10 ms output
2400 baud output	0	0	20 ms output
1200 baud output	0	0	interrupt input
600 baud output	0	0	40 ms output
300 baud output	0	0	80 ms output
	0	0	interrupt input

Interrupt strap:

Position Z5

Function: Connects interrupt sources to interrupt levels.

Power failure	0	0 not used(PIN 16)
Error in unit	0	0 interrupt level 6
Protection violation	0	0 interrupt level 5
Memory fault	0	0 interrupt level 4
Timer interrupt	0	0 interrupt level 3
Service port	0	0 interrupt level 2
XINT0	0	0 interrupt level 1
XINT1	0	0 not used

Factory installed interrupt strap:

Timer interrupt connected to level 6
Service port connected to level 1

Power failure	0	0 not used(PIN 16)
Error in unit	0	0 interrupt level 6
Protection violation	0	0 interrupt level 5
Memory fault	0	0 interrupt level 4
Timer interrupt	0	0 interrupt level 3
Service port	0	0 interrupt level 2
XINT0	0	0 interrupt level 1
XINT1	0	0 not used



Type: CPU 0101

Data sheet no.: 2

Revision no.: 0

Date: 850827

General description:

The CPU 0101 is the CPU module in a SUPERMAX system. The CPU module contains a 12 Mhz 68000 and the following interfaces:

- Interface to I/O bus.
- Interface to memory modules.
- Front pannel display.
- Service port.

The CPU 0101 is an enhanced version of CPU 0100. The two modules are program compatible. CPU 0101 has a 2 Kb cache memory and an optional floating point unit.

Interface to I/O bus:

The CPU has a standard interface to the common SUPERMAX I/O bus.

Active cycles : Byte read and write.
Word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Interface to memory modules:

The CPU module controls memory modules type 0200 and type 1400.

Memory modules are connected to the CPU module via the local memory bus. The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

- Refresh cycle
- Word read cycle
- Word write cycle
- double word read cycle
- double word write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between CPU module and memory modules.

Interface to front pannel display:

The front panel display consists of two seven segment displays, a red LED, and a green LED. The seven segment displays are under program control and used by the operating system to display various error information. The red LED is on, when the CPU performs a cycle in supervisor mode. The green LED is on, when the CPU performs a cycle in user mode. If both LED's are off the CPU has entered the HALT state. The CPU module is connected to the front panel display via a 20 pin flat cable.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units i a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage	Typ. current
+ 5 +-5%	10.5 A
+12 +-5%	200 mA
-12 +-5%	200 mA

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.

Depth : 415 mm.

Height: 14 mm.

Installation:

Before a CPU module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Pull up resistors.
- Bus clock.
- Pull down resistors.
- Straps.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CPU module uses one priority. The CPU module is equipped with a unit number switch. The switch gives the module a unit number and one priority.

Switch position Unit number Priority

0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12

8	0x08	13
9	0x09	14
A	0x0a	20
B	0x0b	21
C	0x0c	22
D	0x0d	23
E	0x0e	24
F	0x0f	30

Pull up resistors:

One and only one CPU module in a Supermax system must contain pull up resistors for various signals in the I/O bus. These resistors are:

SI25: 150 ohms. 10 pins single in line.
SI26: 150 ohms. 10 pins single in line.
SI27: 1000 ohms. 10 pins single in line.

Bus clock:

The arbitrating scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

If jumper ST1 is installed the CPU module drives the bus clock.

If jumper ST1 is removed the CPU module does not drive the bus clock.

Jumper ST1 is installed from the factory.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are placed in position Z9.

Straps and jumpers:

+ designates factory installed position.

Strap 2: ST2

Function: Number of wait states in cache.
ST2 is located between ZD and ZC.

ST2: * * *
 1 2 3

+ Jumper between pin 1 and pin 2: zero wait state in cache.
 Jumper between pin 2 and pin 3: one wait state in cache.

STRAP 3: ST3

Function: Controls enable/disable of cache.
ST3 is located between N8 and C6.

ST3: * * *
 1 2 3

Jumper between pin 1 and pin 2: Cache enabled by bit 11
in command register

+ Jumper between pin 2 and pin 3: Cache enabled by bit 6 in
command register: boot PROM disable.

Clock strap:

Clock strap position Z6:

10 Mhz	0	0	CPU CLOCK (PIN 16)
12 Mhz	0	0	CPU CLOCK
16 Mhz	0	0	20 Mhz
16 Mhz	0	0	INTERNAL CLOCK
8 Mhz	0	0	BUS CLOCK
6 Mhz	0	0	10 Mhz
8 Mhz	0	0	
10 Mhz	0	0	

Clock rates selected from factory:

CPU CLOCK:	12 MHz
INTERNAL CLOCK:	20 Mhz
BUS CLOCK:	8 Mhz

Factory installed clock strap:

10 Mhz	0	0	CPU CLOCK (PIN 16)
12 Mhz	0	0	CPU CLOCK
16 Mhz	0	0	20 Mhz
16 Mhz	0	0	INTERNAL CLOCK
8 Mhz	0	0	BUS CLOCK
6 Mhz	0	0	10 Mhz
8 Mhz	0	0	
10 Mhz	0	0	

TIMER STRAP.

Position Z4

Function: Selects baud rate for the service port.
Selects time between timer interrupts.

Baud rate input	0	0	5 ms output(PIN 16)
9600 baud output	0	0	interrupt input
4800 baud output	0	0	10 ms output
2400 baud output	0	0	20 ms output
1200 baud output	0	0	interrupt input
600 baud output	0	0	40 ms output
300 baud output	0	0	80 ms output
	0	0	interrupt input

Factory strapping:

Baud rate: 9600 baud
Timer interrupt: 40 ms

Baud rate input	0	0	5 ms output(PIN 16)
9600 baud output	0	0	interrupt input
4800 baud output	0	0	10 ms output
2400 baud output	0	0	20 ms output
1200 baud output	0	0	interrupt input
600 baud output	0	0	40 ms output
300 baud output	0	0	80 ms output
	0	0	interrupt input

Interrupt strap:

Position Z5

Function: Connects interrupt sources to interrupt levels.

Power failure	0	0 not used(PIN 16)
Error in unit	0	0 interrupt level 6
Protection violation	0	0 interrupt level 5
Memory fault	0	0 interrupt level 4
Timer interrupt	0	0 interrupt level 3
Service port	0	0 interrupt level 2
XINT0	0	0 interrupt level 1
XINT1	0	0 not used

Factory installed interrupt strap:

Timer interrupt connected to level 6
Service port connected to level 1

Power failure	0	0 not used(PIN 16)
Error in unit	0	0 interrupt level 6
Protection violation	0	0 interrupt level 5
Memory fault	0	0 interrupt level 4
Timer interrupt	0	0 interrupt level 3
Service port	0	0 interrupt level 2
XINT0	0	0 interrupt level 1
XINT1	0	0 not used

Basic CPU module:

Supermax systems are delivered with one basic CPU module 0101.

The basic CPU module differs from the standard CPU modules described above on the following points:

Unit number cannot be changed. It is fixed to unit number three.

Priority cannot be changed. It is fixed to priority 03.

Pull up resistors SI25, SI26, and SI27 are installed.

The basic module drives the bus clock.

Pull down resistors to the service port are installed.



SUPERMAX technical data sheet.
Module: CPU 3400

1

Type: CPU 3400

Data sheet no.: 12

Revision no.: 1

Date: 870623

General description:

The CPU 3400 is a CPU module in a Supermax system. The CPU module contains a 68020 CPU, a 68881 FPU, and the following interfaces:

- Interface to I/O bus.
- Interface to memory modules.
- Front pannel display.
- Service port.

The CPU 3400 is not compatible with CPU 0101. CPU 3400 has a program cache and a data cache. Each cache contains 8 kb.

Interface to I/O bus:

The CPU has a standard interface to the common Supermax I/O bus.

Active cycles : Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Interface to memory modules:

The CPU 3400 module is designed to control memory modules type RAM 3100. As an option CPU 3400 can be strapped to control memory modules of type 0200, 1400, and 3000.

Memory modules are connected to the CPU module via the local memory bus. The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
Double word read cycle
Double word write cycle
Burst mode read cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between CPU module and memory modules. In a burst mode read cycle one block of data is read from memory and written in cache. A block is one, two, or four double words depending upon the block size in the cache.

Interface to front pannel display:

The front panel display consists of two seven segment displays, a red LED, and a green LED. The seven segment displays are under program control and used by the operating system to display various error information. The red LED is on, when the CPU performs a cycle in supervisor mode. The green LED is on, when the CPU performs a cycle in user mode. If both LED's are off the CPU has entered the HALT state. The CPU module is connected to the front panel display via a 20 pin flat cable.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units i a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage		Typ. current
+ 5	+ -5%	11.0 A
+12	+ -5%	200 mA
-12	+ -5%	200 mA

Installation:

Before a CPU module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Pull up resistors.
- Bus clock.
- Pull down resistors.
- Straps.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. This address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CPU module uses one priority. The CPU module is equipped with a unit number switch. The switch gives the module a unit number and one priority. Notice that unit number X and unit number X+8 has the same priority.

Switch position Unit number Priority

0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12

8	0x08	00
9	0x09	01
A	0x0a	02
B	0x0b	03
C	0x0c	04
D	0x0d	10
E	0x0e	11
F	0x0f	12

Pull up resistors:

One and only one CPU module in a Supermax system must contain pull up resistors for various signals in the I/O bus. All these pull up resistors on CPU 3400 are connected to signals in the IO bus by switches. The pull up resistors and the corresponding switches are:

S10 : 150 ohms. 10 pins single in line.
Connected by switch Z10.

S11 : 150 ohms. 10 pins single in line.
Connected by switch Z11.

S12 : 1000 ohms. 10 pins single in line.
Connected by switch Y17.

Bus clock:

The arbitrating scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

The CPU module drives the bus clock when switch Y17 bit 7 is in the ON position.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are connected to output signals in the service port when all switches in Q10 are in the ON position.

Block Size in Caches:

Block sizes in cache 0 and cache 1 are set by a number of straps.

Block size in cache 0, program cache, is set by the following straps: ST2, ST3, and ST15.

Cache 0 disabled:

ST2 : don't care

ST3 : don't care

ST15: pin 1 connected to pin 2 and pin 3 connected to pin 4.

Cache 0: Block size: 1 double word.

ST2 : pin 1 connected to pin 2.

ST3 : pin 1 connected to pin 2.

ST15: pin 1 not connected to pin 2 and
pin 3 connected to pin 4.

Cache 0: Block size: 2 double words.

ST2 : pin 1 connected to pin 2.

ST3 : pin 2 connected to pin 3.

ST15: pin 1 connected to pin 2 and
pin 3 not connected to pin 4.

Cache 0: Block size: 4 double words. Factory setting.

ST2 : pin 2 connected to pin 3.

ST3 : pin 2 connected to pin 3.

ST15: pin 1 not connected to pin 2 and
pin 3 not connected to pin 4.

Block size in cache 1, data cache, is set by the following straps: ST4, ST5, ST6, ST7, ST15, ST17, and ST18.

Cache 1 disabled.

ST4 : don't care.
ST5 : don't care.
ST6 : don't care.
ST7 : don't care.
ST15: pin 5 connected to pin 6 and
pin 7 connected to pin 8.
ST17: don't care.
ST18: don't care.

Cache 1: Block size: 1 double word.

ST4 : pin 1 connected to pin 2.
ST5 : pin 1 connected to pin 2.
ST6 : pin 1 connected to pin 2.
ST7 : pin 1 connected to pin 2.
ST15: pin 5 not connected to pin 6 and
pin 7 connected to pin 8.
ST17: pin 1 connected to pin 2.
ST18: pin 1 connected to pin 2.

Cache 1: Block size: 2 double words.

ST4 : pin 1 connected to pin 2.
ST5 : pin 2 connected to pin 3.
ST6 : pin 1 connected to pin 2.
ST7 : pin 2 connected to pin 3.
ST15: pin 5 connected to pin 6 and
pin 7 not connected to pin 1.
ST17: pin 1 connected to pin 2.
ST18: pin 2 connected to pin 3.

Cache 1: Block size: 4 double words. Factory setting.

- ST4 : pin 2 connected to pin 3.
- ST5 : pin 2 connected to pin 3.
- ST6 : pin 2 connected to pin 3.
- ST7 : pin 2 connected to pin 3.
- ST15: pin 5 not connected to pin 6 and
pin 7 not connected to pin 1.
- ST17: pin 2 connected to pin 3.
- ST18: pin 2 connected to pin 3.

Straps and jumpers:

+ designates factory installed position.

ST1

Function: Controls the use of the two caches.

ST1: * * *
 1 2 3

+ Pin 1 connected to pin 2:

Cache 0 is used for program and cache 1 is used for data.

Pin 2 connected to pin 3:

The use of the two caches is controlled by address bit 13. This position is for test purpose and will only work with a non standard population of PALs on the board.

ST2

Function: Controls the block size in cache 0.

ST2: * * *
 1 2 3

Pin 1 connected to pin 2:

Address bit 3 is used as an address index bit to cache 0.

+ Pin 2 connected to pin 3:

Address bit 12 is used as an address index bit to cache 0.

ST3

Function: Controls the block size in cache 0.

ST3: * * *
 1 2 3

Pin 1 connected to pin 2:

Address bit 2 is used as an address index bit to cache 0.

+ Pin 2 connected to pin 3:

Address bit 11 is used as an address index bit to cache 0.

ST4

Function: Controls the block size in cache 1.

ST4: * * *
 1 2 3

pin 1 connected to pin 2:

Address bit 3 is used as an address index bit to cache 1.

+ pin 2 connected to pin 3:

Address bit 12 is used as an address index bit to cache 1.

ST5

Function: Controls the block size in cache 1.

ST5: * * *
 1 2 3

Pin 1 connected to pin 2:

Address bit 2 is used as an address index bit to cache 1.

+ Pin 2 connected to pin 3:

Address bit 11 is used as an address index bit to cache 1.

ST6

Function: Controls the block size in physical cache comparator. Must be strapped as ST4.

ST6: * * *
 1 2 3

Pin 1 connected to pin 2:

Address bit 3 is used as an address index bit to the physical cache comparator.

+ Pin 2 connected to pin 3:

Address bit 12 is used as an address index bit to the physical cache comparator.

ST7

Function: Controls the block size in the physical cache comparator. Must be strapped as ST5.

ST7: * * *
 1 2 3

Pin 1 connected to pin 2:

Address bit 2 is used as an address index bit to the physical cache comparator.

+ Pin 2 connected to pin 3:

Address bit 11 is used as an address index bit to the physical cache comparator.

ST8

Function: Controls the size of the boot PROM.

ST8: * * *
 1 2 3

Pin 1 connected to pin 2:

Pin 1 on the boot PROM is pulled up.
This position is used, when the boot prom is of type 27256.

+ Pin 2 connected to pin 3:

Pin 1 on the boot prom is connected to address bit 15.
This position is used, when the boot prom is of type 27512.

ST9

Function: Controls the clock frequency to 68020.

 2 4 6 8
ST9: * * * *
 * * * *
 1 3 5 7

68020 clock frequency.

Pin 1 connected to pin 2: 25 MHz
+ Pin 3 connected to pin 4: 20 MHz
Pin 5 connected to pin 6: 16 MHz
Pin 7 connected to pin 8: 12.5 MHz

ST10

Function: Controls the clock frequency to 68881.

	2	4	6	8
ST10:	*	*	*	*
	*	*	*	*
	1	3	5	7

68881 clock frequency.

Pin 1 connected to pin 2: 25 MHz
Pin 3 connected to pin 4: 20 MHz
+ Pin 5 connected to pin 6: 16 MHz
Pin 7 connected to pin 8: 12.5 MHz

ST11

Function: Controls the frequency of the bus clock.

	2	4	6	8
ST11	*	*	*	*
	*	*	*	*
	1	3	5	7

IO bus clock frequency.

Pin 1 connected to pin 2: 12.5 MHz
Pin 3 connected to pin 4: 10 MHz
+ Pin 5 connected to pin 6: 8 MHz

ST12

Function: Controls the baud rate of the service port.

2 4 6 8 10 12 14

ST12: * * * * * * *
* * * * * * *
1 3 5 7 9 11 13

Baud rate.

Pin 1 connected to pin 2 : Not used
+ Pin 3 connected to pin 4 : 9600
Pin 5 connected to pin 6 : 4800
Pin 7 connected to pin 8 : 2400
Pin 9 connected to pin 10: 1200
Pin 11 connected to pin 12: 600
Pin 13 connected to pin 14: 300

ST13

Function: Controls the clock frequency of the internal logic on the CPU module.

2 4 6
ST13: * * *
* * *
1 3 5

Clock for internal logic

Pin 1 connected to pin 2: CPU clock. Frequency set by ST9.
+ Pin 3 connected to pin 4: 20 MHz
Pin 5 connected to pin 5: 16 MHz

ST15

Function: Controls the block size in cache 0 and cache 1.

2 4 6 8
ST15: * * * *
* * * *
1 3 5 7

Jumpers between pin 1 and pin 2 and between pin 3 and pin 4 control the block size in cache 0.

Pin 1 connected to pin 2 and pin 3 connected to pin 4:
cache 0 disabled.

Pin 1 not connected to pin 2 and pin 3 connected to pin 4:
block size in cache 0: 1 double word.

Pin 1 connected to pin 2 and pin 3 not connected to pin 4:
block size in cache 0: 2 double words.

+ Pin 1 not connected to pin 2 and pin 3 not connected to pin 4:
block size in cache 0: 4 double words.

Jumpers between pin 5 and pin 6 and between pin 7 and pin 8 control the block size in cache 1.

Pin 5 connected to pin 6 and pin 7 connected to pin 8:
cache 1 disabled.

Pin 5 not connected to pin 6 and pin 7 connected to pin 8:
block size in cache 1: 1 double word.

Pin 5 connected to pin 6 and pin 7 not connected to pin 8:
block size in cache 1: 2 double words.

+ Pin 5 not connected to pin 6 and pin 7 not connected to pin 8:
block size in cache 1: 4 double words.

ST16

Function: Controls the internal cache in 68020.

ST16: * *
1 2

Pin 1 connected to pin 2: The internal cache is disabled.

+ Pin 1 not connected to pin 2: The internal cache is enabled.

ST17

Function: Controls the block size in the physical cache comparator. Must be strapped as ST4.

ST17: * * *
1 2 3

Pin 1 connected to pin 2:

Physical address bit 12 is used as a tag bit in the physical cache comparator.

+ Pin 2 connected to pin 3:

Physical address bit 28 is used as a tag bit in the physical cache comparator.

ST18

Function: Controls the block size in the physical cache comparator. Must be strapped as ST5.

ST18: * * *
1 2 3

Pin 1 connected to pin 2:

Physical address bit 11 is used as a tag bit in the physical cache comparator.

+ Pin 2 connected to pin 3:

Physical address bit 27 is used as a tag bit in the physical cache comparator.

CPU 3400 and memory modules type 0200, 1400, and 3000.

If CPU 3400 is used together with memory modules type 0200, 1400, or 3000 the following changes must be made on CPU 3400:

Block size in cache 0 must be strapped to one double word.

Block size in cache 1 must be strapped to one double word.

PAL in position F1 must be changed from CP1x to CP16x.

PAL in position F4 must be changed from CP12x to CP17x.

x is the current revision level.

Basic CPU module:

Supermax systems are delivered with one basic CPU module 3400.

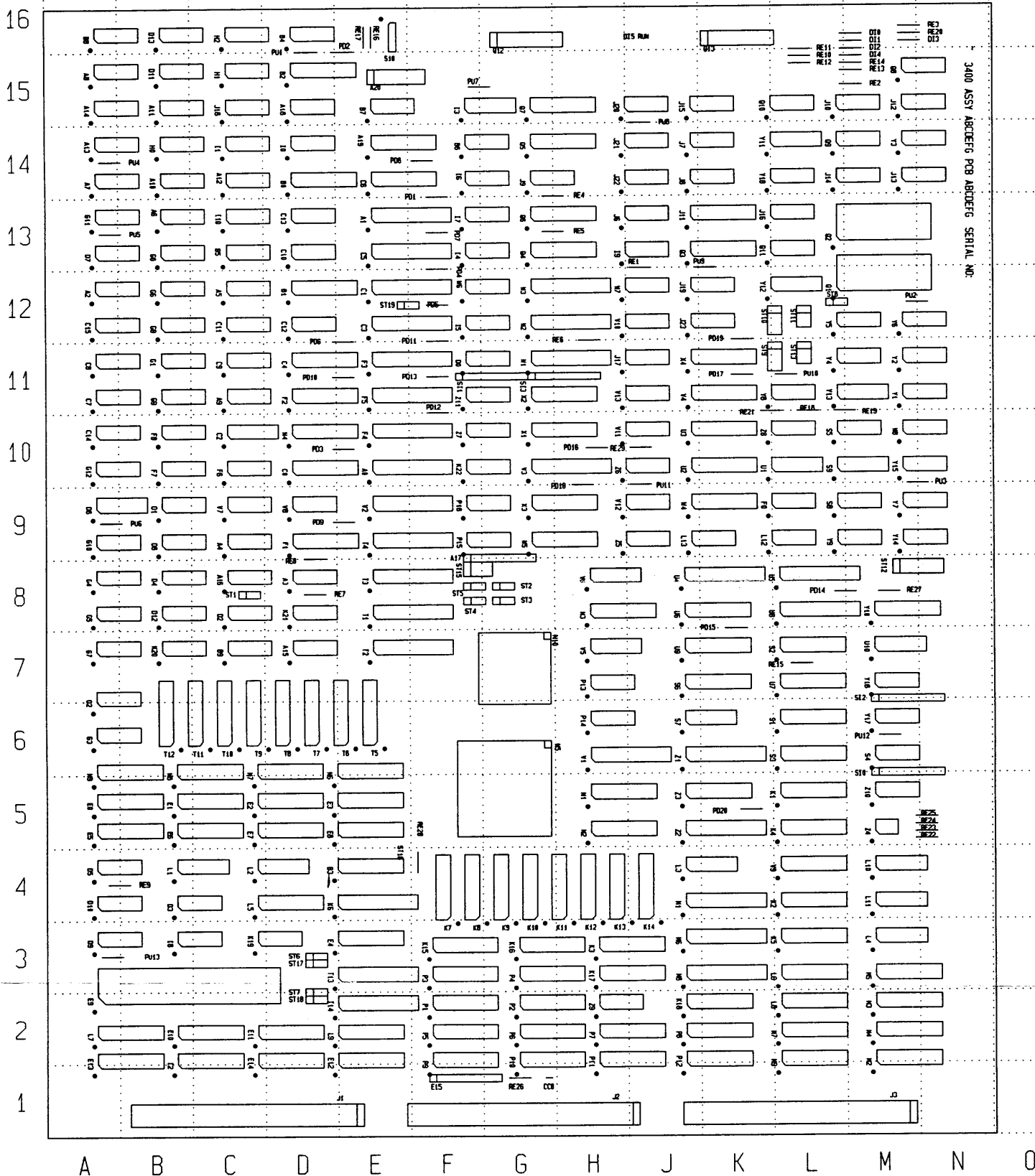
The basic CPU module differs from the standard CPU modules described above on the following points:

Unit number cannot be changed. It is fixed to unit number three.

Priority cannot be changed. It is fixed to priority 03.



PRELIMINARY



PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A0	PAL20L8	E10	E10	74ALS645	B2	K16	74ALS645	G3
A1	PAL20R8	E13	E11	74ALS645	C2	K17	74ALS645	H3
A2	74AS20	A12	E12	74ALS645	D1	K18	74ALS645	J2
A3	74AS20	D8	E13	74ALS645	A1	K19	74AS08	C3
A4	74AS20	C9	E14	74ALS645	C1	K20	74AS32	B7
A5	74AS20	C12	E15	SIL	F1	K21	74AS32	D8
A6	74AS74	B13	F0	74AS74	K9	K22	74AS00	F10
A7	74AS74	A14	F1	PAL16R8	D9	L1	74S283	B4
A8	74AS74	A15	F2	PAL16R8	D11	L2	74S283	C4
A9	74AS27	C11	F3	PAL20R8	E11	L3	74S283	J4
A10	74S32	B14	F4	PAL20R8	E10	L4	74S283	M3
A11	74S04	B15	F5	PAL20R8	E11	L5	74ALS573	C4
A12	74S00	C14	F6	74AS04	C10	L6	74ALS573	L3
A13	74S08	A14	F7	74AS04	B10	L7	74ALS573	A2
A14	74S11	A15	F8	74AS08	B10	L8	74ALS573	L2
A15	74S08	D7	G0	74AS32	B13	L9	74ALS573	D2
A16	74S04	C8	G1	74AS08	B11	L10	74S85	M4
A17	SIL	F9	G2	74AS32	A6	L11	74S85	M4
A18	74AS74	D15	G3	74AS08	A6	L12	74AS08	K9
A19	PAL16R8	E14	G4	74AS32	A8	L13	74AS04	J9
A20	CON	E15	G5	74AS08	A8	M1	74ALS873	J4
B0	74AS573	D14	G6	74AS32	B12	M2	74ALS573	M1
B1	74AS573	D12	G7	74AS04	A7	M3	74ALS573	M2
B2	PAL16R6	D15	G8	74AS11	B12	M4	74ALS573	M2
B3	74ALS574	D4	G9	74AS11	B11	M5	74ALS573	M3
B4	74AS74	D16	G10	74AS32	A9	M6	74ALS873	J3
B5	74AS04	C13	G11	74AS10	A13	M7	74ALS574	L2
B6	74AS74	F14	G12	74AS02	A10	M8	74ALS873	J3
B7	74AS02	E15	H0	74AS10	B14	M9	74ALS573	L1
B8	74AS32	A16	H1	74AS00	C15	N1	74ALS573	H5
B9	74AS74	C7	H2	74AS74	C16	N2	74ALS573	H5
CC0	Capacitor	G1	I0	74AS20	D14	N3	74ALS573	H8
C0	PAL16R8	D10	I1	74AS74	C14	N4	74ALS573	D10
C1	PAL20R8	E12	I2	74LS541	B1	N5	68020	G6
C2	74S158	C10	I3	74S112	F15	N6	74ALS645	D5
C3	PAL20R8	E12	I4	74AS20	F13	N7	74ALS645	C5
C4	PAL16R8	D11	I5	74AS10	F12	N8	74ALS645	B5
C5	PAL20R8	E13	I6	74AS00	F14	N9	74ALS645	A5
C6	PAL16R8	E14	I7	74AS08	F13	N10	68881	G7
C7	74AS74	A11	I8	74AS04	B3	PD1		F14
C8	74AS00	A11	I9	74LS14	H13	PD2		D16
C9	74AS10	C11	I10	74AS21	C13	PD3		D10
C10	74AS08	D13	J1	CON	E1	PD4		F13
C11	74AS04	C12	J2	CON	J1	PD5		F12
C12	74AS32	D12	J3	CON	M1	PD6		D12
C13	74AS04	D13	J6	74AS74	H13	PD7		F13
C14	74AS32	A10	J7	74AS74	J14	PD8		E14
C15	74AS08	A12	J8	74AS74	J14	PD9		D9
D10	DIODE	L16	J9	74AS21	G14	PD10		D11
D11	DIODE	L16	J10	74AS09	L15	PD11		F12
D12	DIODE	L16	J11	74ALS244	J13	PD12		F11
D13	DIODE	N16	J12	74AS04	M15	PD13		F11
D14	DIODE	L15	J13	74LS14	M14	PD14		L8
D15	LED	H16	J14	74AS00	L14	PD15		K8
D0	74AS20	F11	J15	74AS32	J15	PD16		H10
D1	74AS00	B9	J16	74AS74	K13	PD17		K11
D2	74AS32	C8	J17	74AS00	H11	PD18		H10
D3	74AS04	B4	J18	74AS20	C15	PD19		K12
D4	74AS00	B8	J19	74AS30	J12	PD20		K5
D5	74AS20	A4	J20	74AS32	H15	PU1		D16
D6	74S112	A9	J21	74AS74	H14	PU2		M12
D7	74AS74	A13	J22	74AS74	H14	PU3		M10
D8	74AS74	B9	J23	74AS74	J12	PU4		A14
D9	74AS74	A3	K1	74ALS574	L5	PU5		A13
D10	74AS10	A4	K2	74ALS573	L4	PU6		A9
D11	74AS08	B15	K3	74ALS244	H3	PU7		F15
D12	74AS08	B8	K4	74ALS573	L5	PU8		H15
D13	74AS74	B16	K5	74ALS573	L3	PU9		J13
E0	74ALS573	A5	K6	74ALS873	D4	PU10		K11
E1	74ALS573	B5	K7	6168-45	F4	PU11		H10
E2	74ALS573	C5	K8	6168-45	F4	PU12		M6
E3	74ALS573	D5	K9	6168-45	G4	PU13		A3
E4	74ALS574	D3	K10	6168-45	G4	P1	74ALS573	F2
E5	74ALS573	A5	K11	6168-45	H4	P2	74ALS573	G2
E6	74ALS573	B5	K12	6168-45	H4	P3	74ALS573	F3
E7	74ALS573	C5	K13	6168-45	H4	P4	74ALS573	G3
E8	74ALS573	D5	K14	6168-45	J4	P5	74ALS573	F2
E9	74ALS632	A2	K15	74ALS645	F3	P6	74ALS573	G2

Component locations

PCB: 3400 / 68020

Issue: Date:



dansk data elektronik a/s

herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
P7	74ALS573	H2	S4	74LS38	M6	Z5	74AS74	H9
P8	74ALS573	J2	S5	74LS38	L10	Z6	74AS74	H10
P9	74ALS573	F1	S6	74ALS574	J7	Z7	74LS14	F10
P10	74ALS573	G1	S7	74LS148	J6	Z8	74AS32	K10
P11	74ALS573	H1	S8	74LS74	L9	Z9	74LS14	H2
P12	74ALS573	J1	S9	74LS353	L10	Z10	SWITCH	M5
P13	74AS32	H7	S10	SWITCH	E16	Z11	SWITCH	F11
P14	74AS08	H6	T1	TMS2150-4	E8			
P15	74AS08	F9	T2	TMS2150-4	E7			
P16	74AS32	F9	T3	TMS2150-4	E8			
Q1	27512	L12	T4	TMS2150-4	E9			
Q2	8251	L13	T5	6168-45	E6			
Q3	74ALS645	J13	T6	6168-45	E6			
Q4	74ALS574	G13	T7	6168-45	D6			
Q5	74LS641-1	G14	T8	6168-45	D6			
Q6	74ALS574	G13	T9	6168-45	C6			
Q7	74LS641-1	G15	T10	6168-45	C6			
Q8	75188	M15	T11	6168-45	C6			
Q9	75189	L14	T12	6168-45	B6			
Q10	SWITCH	K15	T13	TMS2150-4	D3			
Q11	74LS32	K13	T14	TMS2150-4	D2			
Q12	3M20	G16	U1	74LS590	K10			
Q13	3M20	K16	U2	74ALS574	J10			
RE1	RES4M	H13	U3	74ALS573	J10			
RE2	RES4M	L15	U4	TMM2018D-35	J8			
RE3	RES4M	M16	U5	PAL20R8A	L8			
RE4	RES4M	G14	U6	74ALS573	J8			
RE5	RES4M	G13	U7	74ALS573	L7			
RE6	RES4M	H12	U8	PAL20R8A	L8			
RE7	RES4M	D8	U9	PAL16R6A	J7			
RE8	RES4M	D9	U10	74LS353	M7			
RE9	RES4M	A4	V1	PAL20L8A	H6			
RE10	RES4M	L15	V2	PAL20L8A	E9			
RE11	RES4M	L16	V3	PAL20R8A	G10			
RE12	RES4M	L15	V4	PAL16R8A	J11			
RE13	RES4M	L15	V5	74AS138	H7			
RE14	RES4M	L15	V6	74AS138	H8			
RE15	RES4M	L7	V7	74AS30	C9			
RE16	RES4M	E16	V8	74AS02	D9			
RE17	RES4M	E16	V9	74ALS642	L4			
RE18	RES4M	L11	V10	74AS74	H12			
RE19	RES4M	L11	V11	74AS20	H10			
RE20	RES4M	M16	V12	74AS32	H9			
RE21	RES4M	K11	V13	74AS32	H11			
RE22	RES4M	N5	W1	PAL20R6A	G11			
RE23	RES4M	N5	W2	PAL20R6A	G12			
RE24	RES4M	N5	W3	PAL20R6A	G12			
RE25	RES4M	N5	W4	74LS273	J9			
RE26	RES4M	G1	W5	74LS273	G9			
RE27	RES4M	M8	W6	74AS74	F12			
RE28	RES4M	F4	W7	74AS11	H12			
RE29		J10	W8	74AS74	M10			
RUN	LED	J16	X1	PAL16R8A	G10			
S10	RESISTOR	M6	X2	PAL16R8A	G11			
S11	RESISTOR	F11	X3	PAL16R8A	G9			
S12	RESISTOR	M7	X4	PAL16R8A	J11			
S13	RESISTOR	G11	Y1	XOSC40M	M11			
ST1	STRAP	C8	Y2	XOSC33M	M11			
ST2	STRAP	G8	Y3	XOSC50M	M14			
ST3	STRAP	G8	Y4	74AS74	L11			
ST4	STRAP	F8	Y5	74AS74	L12			
ST5	STRAP	F8	Y6	74AS74	M12			
ST6	STRAP	D3	Y7	74AS74	M9			
ST7	STRAP	D3	Y8	74AS74	K11			
ST8	STRAP	L12	Y9	74LS14	L9			
ST9	STRAP	K11	Y10	74ALS642	M8			
ST10	STRAP	K12	Y11	74LS390	K14			
ST11	STRAP	L12	Y12	74LS390	K12			
ST12	STRAP	M8	Y13	74LS390	L11			
ST13	STRAP	L11	Y14	74LS393	M9			
ST15	STRAP	F8	Y15	74LS393	M10			
ST16	STRAP	E5	Y16	74S140	M7			
ST17	STRAP	D3	Y17	SWITCH	M6			
ST18	STRAP	D2	Y18	74AS04	K14			
ST19	STRAP	E12	Z1	PAL20L8A	J6			
S1	74ALS580	L6	Z2	PAL20R8A	J5			
S2	74ALS573	L7	Z3	74ALS641-1	J5			
S3	74ALS574	L6	Z4	SWITCH	M5			

Component locations

PCB: 3400 / 68020

Issue: Date:



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Supermax Technical Data Sheet

Type:	DIOC Module. PCB 4000.)
Data sheet no:	17
Revision no:	1
Date:	91-11-29

General Description

The DIOC is a high performance Disk IO Controller for the Supermax system. The DIOC is built around a 32 bit microprocessor and contains an interface to floppy disk drives, two Small Computer Standard Interfaces, SCSI, and 4, 8 or 32 Mbyte disk cache memory. The floppy disk interface accepts two drives.

The DIOC is based on a 20 MHz Motorola MC68020 processor. The memory system consists of:

1. 1 Mbyte high speed local DRAM with byte parity for the MC68020 program and data. The organisation is 256k × 36 bit.
2. 4 Mbyte high speed multiport DRAM with byte parity used as disk cache and data buffer. The organisation is 1M × 36 bit.
3. Additional 4 Mbyte high speed multiport DRAM with byte parity used as disk cache. The organisation is 1M × 36 bit.
4. Based on 4 Mbit DRAM technology the disk cache can be further expanded to hold 32 Mbyte. The organisation is 4M × 36 bit.

Three fully independent DMA channels transfer data between the disk interfaces and the disk cache memory. The SCSI ports are 8 bit wide and data are packed to 32 bit words before data are transferred through a pipeline to and from the disk cache memory.

Data are transferred between the disk cache memory and the main memory modules with a Block Transfer Unit, BTU. The BTU is a device used to move blocks of data. Data are transferred through a pipeline in 32 bit words and the BTU uses single word or burst transfers on the Supermax I/O bus. Burst transfers are used for high speed and small I/O bus load.

The DIOC contains firmware for bootstrapping, self test and diagnostics.

Interface to the I/O bus

The DIOC has a standard interface to the common Supermax I/O bus. The local memory bus is not used.

Active cycles	Passive cycles
8 bit read/write	8 bit read/write
16 bit read/write	16 bit read/write
32 bit read/write	32 bit read/write
Read-modify-write	Read-modify-write
Burst read/write	Burst read/write

TABLE 1. I/O bus cycles

Interface to peripheral equipment

The floppy disk drive interface is a 34 pin flat cable header, DIN-41651. The interface input signals are terminated with 150 ohm resistors to 5 Volt. The interface holds drive select signals for interface to a maximum of two floppy disk drives. The floppy disk controller supports 250 kbit/s and 500 kbit/s data rate.

Pin	Signal	Signal	Pin
1	GND	-DENS	2
3	GND	-HDL	4
5	GND	NC	6
7	GND	-INDX	8
9	GND	-DS0	10
11	GND	-DS1	12
13	GND	NC	14
15	GND	-MOTOR	16
17	GND	-DIR	18
19	GND	-STEP	20
21	GND	-WD	22
23	GND	-WG	24
25	GND	-TR00	26
27	GND	-WP	28
29	GND	-RD	30
31	GND	-SIDE	32
33	GND	-DSKC	34

TABLE 2. Floppy interface pin assignment
 - designates active low signals.
 NC designates not connected signals.

The disk interface is the Small Computer Standard Interface ANSI X3T9.2, SCSI. The interfaces are based on a VLSI design and supports the optional features like arbitration, disconnect, reconnect and parity.

The two connectors are 50 pin flat cable headers. DIN-41651.

Pin	Signal	Signal	Pin
1	GND	-DB(0)	2
3	GND	-DB(1)	4
5	GND	-DB(2)	6
7	GND	-DB(3)	8
9	GND	-DB(4)	10
11	GND	-DB(5)	12
13	GND	-DB(6)	14
15	GND	-DB(7)	16
17	GND	-DB(P)	18
19	GND	GND	20
21	GND	GND	22
23	GND	GND	24
25	GND	TPOW	26
27	GND	GND	28
29	GND	GND	30
31	GND	-ATN	32
33	GND	GND	34
35	GND	-BSY	36
37	GND	-ACK	38
39	GND	-RST	40
41	GND	-MSG	42
43	GND	-SEL	44
45	GND	-C/D	46
47	GND	-REQ	48
49	GND	-I/O	50

TABLE 3. SCSI pin assignment
- designates active low signals.

Interface to service port

The interface to the service port is a modified RS-232C interface. All output signals are *open collector* signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 V when not driven by an output.

Power Requirements

Voltage	Typical current
+5 V $\pm 5\%$	15.0 A
+12 V $\pm 5\%$	0.1 A
-12 V $\pm 5\%$	0.1 A

TABLE 4. Power requirements

Physical dimension

Standard Supermax module.	
Width	331 mm
Length	415 mm
Height	14 mm

TABLE 5. Physical dimension

Installation

Before a DIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/priority.
- Straps.
- Flat cables for the interfaces.

These items are described in detail in the following text.

Unit number/Priority

Each intelligent Supermax module connected to the common I/O bus has a unique address. This address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The DIOC module uses two priorities. The DIOC module is equipped with a unit number switch. The switch gives the module a unit number and two priorities.

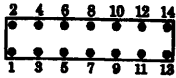
Switch position	Unit number	Priority 1	Priority 0
0	0x00	14	20
1	0x01	21	22
2	0x02	23	24
3	0x03	30	31
4	0x04	32	33
5	0x05	34	40
6	0x06	41	42
7	0x07	43	44
8	0x08	14	20
9	0x09	21	22
A	0x0a	23	24
B	0x0b	30	31
C	0x0c	32	33
D	0x0d	34	40
E	0x0e	41	42
F	0x0f	43	44

TABLE 6. Unit number switch, SW1

Straps

- designates factory installed position.

ST2:



Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

TABLE 7. Strap ST2

ST3:



Disable internal MC68020 cache		
*	NC	Controlled by software
	1-2	Disabled

TABLE 8. Strap ST3

ST8:



Termination power to SCSI connector CNL		
	1-2	No termination power.
*	2-3	Termination power to the cable.

TABLE 9. Strap ST8

ST10:



Termination power to SCSI connector CN3.		
	1-2	No termination power.
*	2-3	Termination power to the cable.

TABLE 10. Strap ST10

ST21:



Broadcast bus cycles enable/disable		
	1-2	Disabled
*	2-3	Enabled

TABLE 11. Strap ST21

Broadcast cycles are not used in systems with CPU modules based on the MC68000 and MC68020 processors. The broadcast bus cycles must be disabled.

Indicator LED's

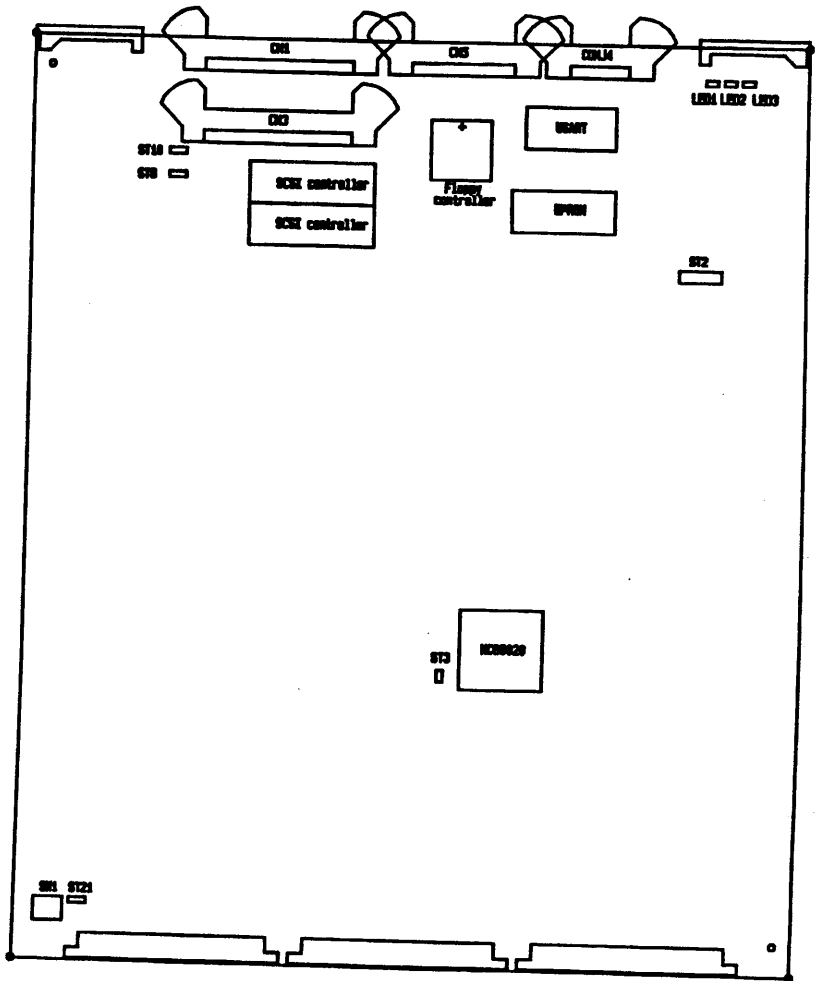
There are 3 LED's on the DIOC module. They have the following functions.

- LED1 Off: No error.
 On: Parity error in program memory.
- LED2 Off: The processor is halted.
 On: The processor is running.
- LED3 Off: No error.
 On: The program has detected a fault condition.

Cables and connectors

The headers mounted on the PCB are positioned as follows:

- Connector CN1 SCSI interface 0.
- Connector CN3 SCSI interface 1.
- Connector CN5 Floppy disk interface.
- Connector CONJ4 Service port.





Type: CPU 4100

Data sheet no.: 18

Revision no.: 1

Date: 881013

General description:

The CPU 4100 is a CPU module in a Supermax system. The CPU module contains a 68030 CPU, a 68882 FPC, and the following interfaces:

- Interface to I/O bus.
- Interface to memory modules.
- Front pannel display.
- Service port.

The CPU 4100 is not compatible with earlier CPU modules. The CPU 4100 has a physical cache that contains 128 Kb.

Interface to I/O bus:

The CPU has a standard interface to the common Supermax I/O bus.

Active cycles : Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.
Burst mode read and write.

Interface to memory modules:

The CPU 4100 module is designed to control memory modules type RAM 3100. The CPU 4100 module cannot control memory modules of type 0200, 1400, and 3000.

Memory modules are connected to the CPU module via the local memory bus. The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
Double word read cycle
Double word write cycle
Burst mode read cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers the data between CPU module and the memory modules. In a burst mode read cycle one block of data is read from the memory and written in the cache. The block size is four double words that is 16 bytes.

Interface to front panel display:

The front panel display consists of two seven segment displays, a red LED, and a green LED. The seven segment displays are under program control and used by the operating system to display various error information. The red LED and the green LED are also under program control. The operating system will turn the red LED on, when it is running, and the green LED on when a user program is running. The front panel display is connected to the CPU module via a 20 pin flat cable.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage	Typ. current
+ 5 +-5%	13.0 A
+12 +-5%	200 mA
-12 +-5%	200 mA

Installation:

Before a CPU module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Pull up resistors.
- Bus clock.
- Pull down resistors.
- Straps.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. This address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CPU module uses one priority. The CPU module is equiped with a unit number switch. The switch gives the module a unit number and one priority.

Switch position Unit number Priority

0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12

8	0x08	13
9	0x09	14
A	0x0a	20
B	0x0b	21
C	0x0c	22
D	0x0d	23
E	0x0e	24
F	0x0f	30

Pull up resistors:

One and only one CPU module in a Supermax system must contain pull up resistors for various signals in the I/O bus. All these pull up resistors on CPU 4100 are connected to signals in the IO bus by switches. The switches are:

T20

W14

U6

P10

Bus clock:

The arbitration scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

The CPU module drives the bus clock when switch T20 bit 7 is in the ON position.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are connected to output signals in the service port when all switches in P10 are in the ON position.

Straps and jumpers:

+ designates factory installed position.

STEL

Function: Controls the size of the external cache.

	2	4	6
STEL:	*	*	*
	*	*	*
	1	3	5

+ Pin 1 connected to pin 3 and pin 2 connected to pin 4:

The size of the external cache is 128 Kb.

Pin 3 connected to pin 5 and pin 4 connected to pin 6:

The size of the external cache is 64 Kb.

STP1

Function: Must be strapped according to the size of the EPROM.

	1	2	3
STP1:	*	*	*
	4	*	*
	7	*	*
	10	*	*
	13	*	*
	*	*	*
	16	17	18

+ Pin 4 connected to pin 5: Corresponds to EPROM type 27512.

STQ1

Function: Not used.

STQ1: * * *
1 2 3

+ No connections.

STR1

Function: Inhibits the internal caches.

STR1: * *
1 2

+ pin 1 not connected to pin 2:

The use of the internal caches is controlled by software.

pin 1 connected to pin 2:

The content of the internal caches is not changed.

STI1

Function: Controls the frequency of the clock to the 68030.

2 4 6 8
STI1: * * * *
* * * *
1 3 5 7

Pin 1 connected to pin 2: 33.3 MHz
+ Pin 3 connected to pin 4: 25.0 MHz
Pin 5 connected to pin 6: 20.0 MHz
Pin 7 connected to pin 8: 16.6 Mhz

STT2

Function: Controls the frequency of the clock to the 68882.

	2	4	6	8
STT2:	*	*	*	*
	*	*	*	*
	1	3	5	7

Pin 1 connected to pin 2:	33.3 MHz
Pin 3 connected to pin 4:	25.0 MHz
+ Pin 5 connected to pin 6:	20.0 MHz
Pin 7 connected to pin 8:	16.6 MHz

STT3

Function: Controls the frequency of the clock to the control logic.

	2	4	6
STT3:	*	*	*
	*	*	*
	1	3	5

Pin 1 connected to pin 2:	25.0 MHz
+ Pin 3 connected to pin 4:	20.0 MHz
Pin 5 connected to pin 6:	16.6 MHz

STT4

Function: Controls the frequency of the bus clock.

STT4: 2 4
 * *
 * *
 1 3

Pin 1 connected to pin 2: 10.0 MHz
+ Pin 3 connected to pin 4: 8.3 MHz

STT5

Function: Controls the frequency of the time out clock.

STT5: * * *
 1 2 3

Pin 1 connected to pin 2: 100 KHz (10 us)
+ Pin 2 connected to pin 3: 10 KHz (100 us)

STT6

Function: Controls the baud rate of the service port.

STT6: 2 4 6 8 10 12 14
 * * * * * * *
 * * * * * * *
 1 3 5 7 9 11 13

Baud rate.

Pin 1 connected to pin 2 : 19200

- + Pin 3 connected to pin 4 : 9600
- Pin 5 connected to pin 6 : 4800
- Pin 7 connected to pin 8 : 2400
- Pin 9 connected to pin 10: 1200
- Pin 11 connected to pin 12: 600
- Pin 13 connected to pin 14: 300

STZ1

Function: Disables the internal caches.

STZ1: * *
1 2

- + Pin 1 not connected to pin 2:

The use of the internal caches is controlled by software.

Pin 1 connected to pin 2:

The internal caches are disabled.

STZ2

Function: Disables the PMMU.

STZ2: * *
1 2

- + Pin 1 not connected to pin 2:

The use of PMMU is controlled by software.

Pin 1 connected to pin 2:

The PMMU is disabled.

Basic CPU module:

Supermax systems are delivered with one basic CPU module 4100.

The basic CPU module differs from the standard CPU modules described above on the following points:

Unit number cannot be changed. It is fixed to unit number three.

Priority cannot be changed. It is fixed to priority 03.

Supermax Technical Data Sheet

Type:	CPU 68030 Module. PCB 4101.
Data sheet no:	21
Revision no:	0
Date:	90-10-15

General Description

The CPU 68030 is a CPU module in a Supermax system. The CPU module contains a 68030 CPU, a 68882 FPC, and the following interfaces:

- Interface to I/O bus.
- Interface to memory modules.
- Front panel display.
- Service port.

The CPU 68030 is not compatible with earlier CPU modules. The CPU 68030 has a physical cache that contains 128 Kb.

Interface to I/O bus

The CPU has a standard interface to the common Supermax I/O bus.

Active cycles	Passive cycles
8 bit read/write	8 bit read/write
16 bit read/write	16 bit read/write
32 bit read/write	32 bit read/write
Read-modify-write	Read-modify-write
	Burst read/write

Interface to memory modules

The CPU 68030 module is designed to control memory modules type RAM 3100. Memory modules are connected to the CPU module via the local memory bus. The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

- Refresh cycle
- Double word read cycle
- Double word write cycle
- Burst mode read cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers the data between CPU module and the memory modules. In a burst mode read cycle one block of data is read from the memory and written in the cache. The block size is four double words that is 16 bytes.

Interface to front panel display

The front panel display consists of two seven segment displays, a red LED, and a green LED. The seven segment displays are under program control and used by the operating system to display various error information. The red LED and the green LED are also under program control. The operating system will turn the red LED on, when it is running, and the green LED on when a user program is running. The front panel display is connected to the CPU module via a 20 pin flat cable.

Interface to service port

The interface to the service port is a modified RS-232C interface. All output signals are *open collector* signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 V when not driven by an output.

Power Requirements

Voltage	Typical current
+ 5 V $\pm 5\%$	13.0 A
+12 V $\pm 5\%$	0.2 A
-12 V $\pm 5\%$	0.2 A

Installation

Before a CPU module is installed in a Supermax system the following items must be selected or checked:

- Unit number/priority.
- Pull-up resistors.
- Bus clock.
- Pull-down resistors.
- Straps.

These items are described in detail in the following text.

Unit number/Priority

Each intelligent Supermax module connected to the common I/O bus has a unique address. This address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The CPU module uses one priority. The CPU module is equipped with a unit number switch. The switch gives the module a unit number and one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0A	20
B	0x0B	21
C	0x0C	22
D	0x0D	23
E	0x0E	24
F	0x0F	30

Pull-up resistors

One and only one CPU module in a Supermax system must contain pull-up resistors for various signals and drive the bus clock in the I/O bus. In a 24 position Supermax system that CPU should be placed in the first position in the second cabinet. In a 24 position Supermax system an additional CPU module must have pull-up resistors for the arbitration signals only. The position of that CPU module is not significant. All the pull-up resistors are connected to the signals through a switch. The switches are:

U6 Contains the pull-up resistors for the arbitration signals

W14 Contains the pull-up resistors for other signals

T20 Contains the pull-up resistors for other signals

Pull-down resistors

Output signals from the service port are open collector signals. These signals must be pulled down to -12V by one module in a Supermax system. Pull-down resistors are connected to output signals when all switches in P10 are in the **ON** position.

Bus clock

The arbitration scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

The CPU module drives the bus clock when switch P10 bit 7 is in the ON position.

Straps

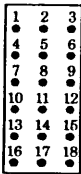
* designates factory installed position.

STE1:



Size of external cache		
*	1-3	128 Kb
*	2-4	128 Kb
	3-5	64 Kb
	4-6	64 Kb

STP1:



Size of the EPROM.		
*	4-5	27512

STQ1:



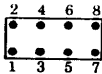
Start-up		
	1-2	Debug operation
*	2-3	Normal operation

STR1:



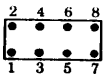
Inhibit the internal caches.		
*	NC	Cache content is controlled by software
	1-2	Cache content is not changed

STT1:



Clock frequency, 68030		
	1-2	33.3 MHz
*	3-4	25.0 MHz
	5-6	20.0 MHz
	7-8	16.6 MHz

STT2:



Clock frequency, 68882		
	1-2	33.3 MHz
	3-4	25.0 MHz
*	5-6	20.0 MHz
	7-8	16.6 MHz

STT3:



Clock frequency, control logic		
	1-2	25.0 MHz
*	3-4	20.0 MHz
	5-6	16.6 MHz

STT4:



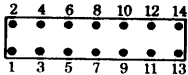
Clock frequency, bus clock		
	1-2	10.0 MHz
*	3-4	8.3 MHz

STT5:



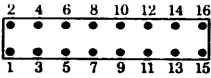
Clock frequency, time out clock		
	1-2	100 kHz (10 μs)
*	2-3	10 kHz (100 μs)

STT6:



Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

STT7:



Delay time in clock circuitry		
*	1-3	Do not change
*	5-7	Do not change
*	9-10	Do not change
*	11-12	Do not change
*	13-15	Do not change

STT8:



Cache enable, external cache		
*	1-2	Control register bit 6
	2-3	Address bit 20

STZ1:



Disable internal caches		
*	NC	Controlled by software
	1-2	Disabled

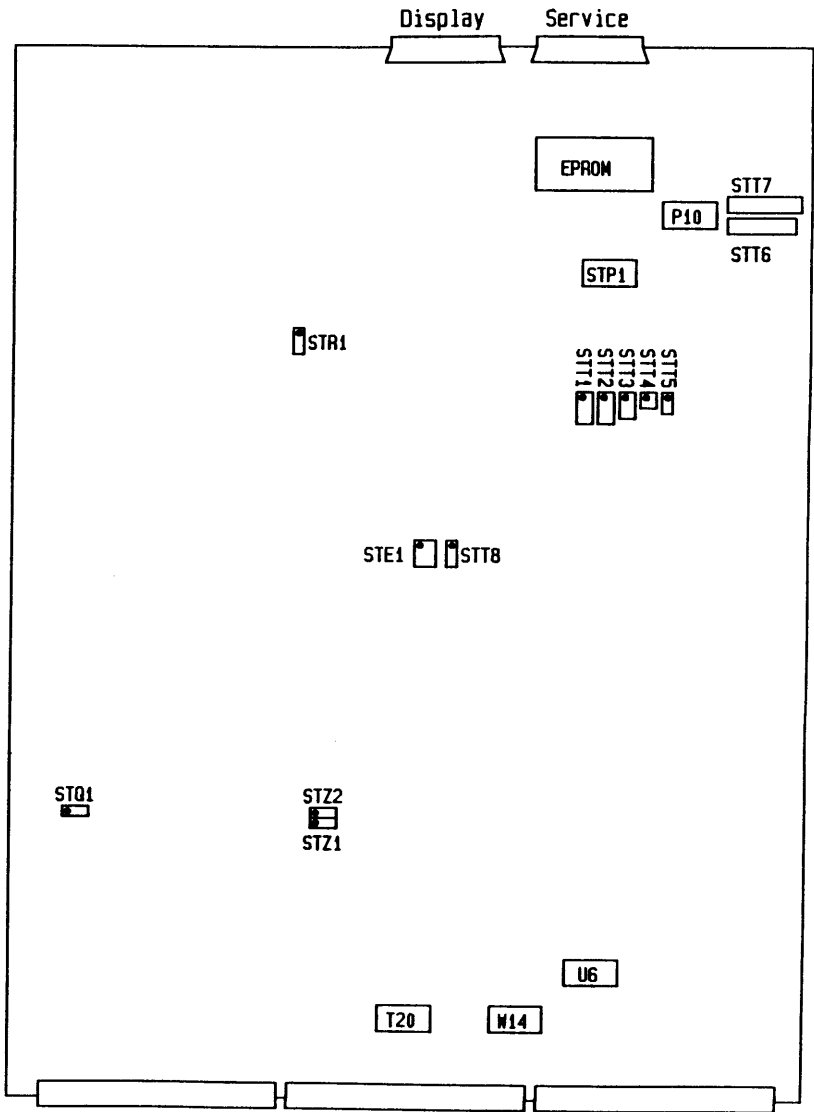
STZ2:

Disable PMMU		
*	NC	Controlled by software
	1-2	Disabled

Basic CPU module

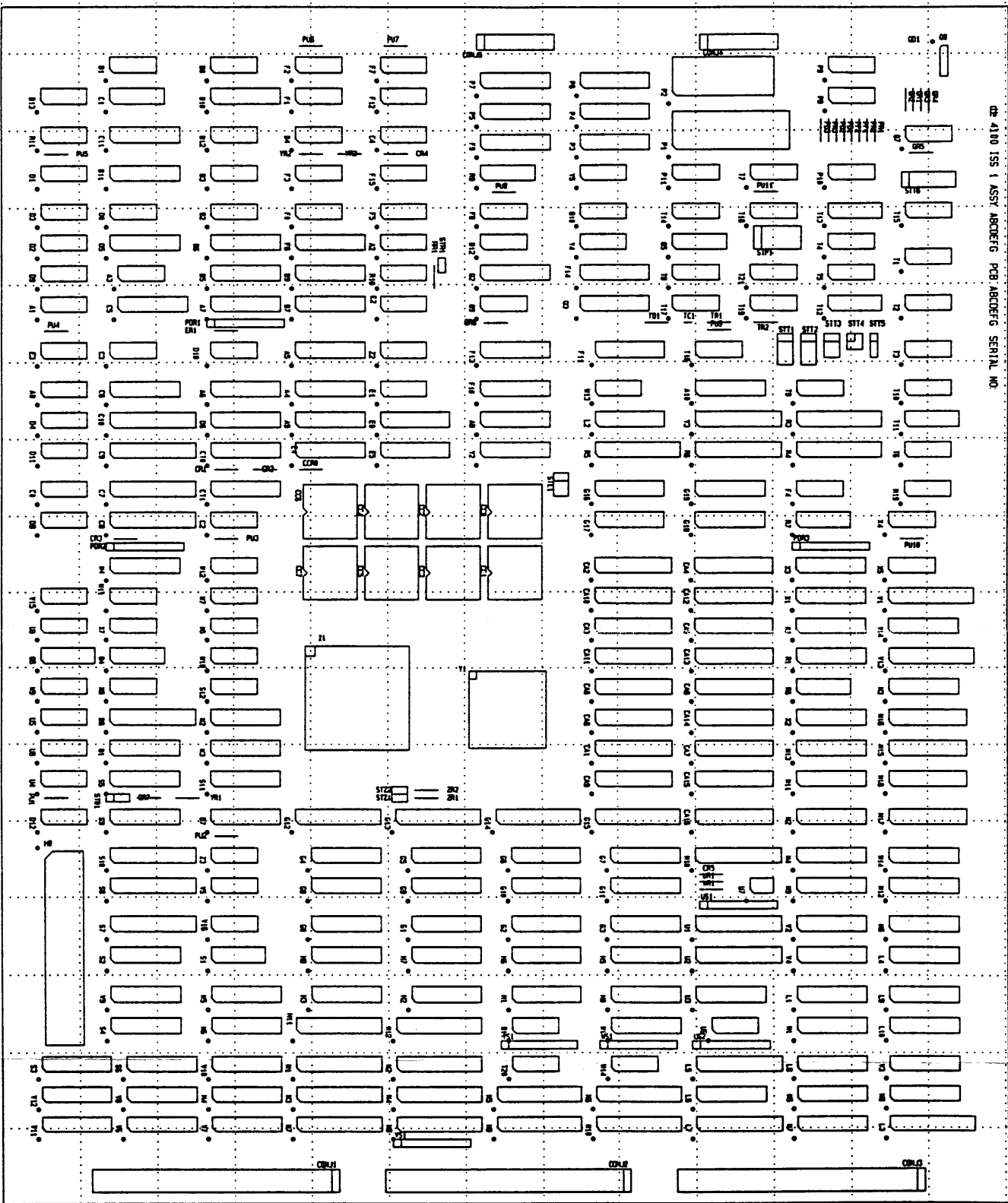
Supermax systems are delivered with one basic CPU 68030 module. The basic CPU module differs from the standard CPU modules described above on the following points:

- Unit number cannot be changed. It is fixed to unit number 0x03.
- Priority cannot be changed. It is fixed to priority 03.





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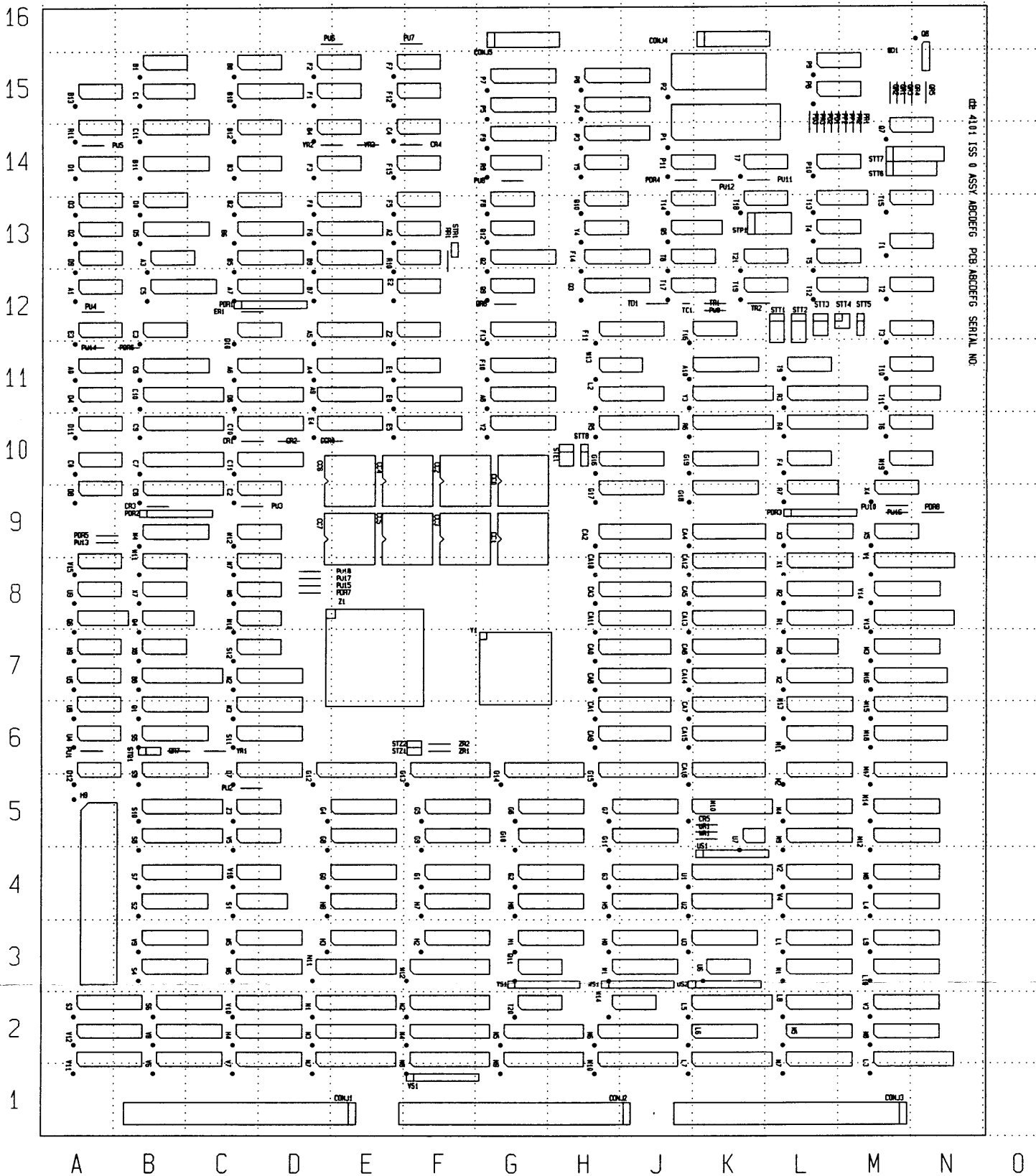


db 4100 ISS 1 ASSY ABCDEF6 PCB ABCDEF6 SERIAL NO.

A B C D E F G H J K L M N O

db		dansk data elektronik a/s	
Issue		Date	
0	880312	db 4100 Component-ID	
1	880617		
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5		Part no.	
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PRELIMINARY



DB 4101 ISS 0 ASSY ABCDEFG PCB ABCDEFG SERIAL NO

PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A0	74F74	A11	D3	74F74	A13	M5	74ALS573	L2
A1	74F74	A12	D4	74F74	A11	M6	74ALS573	M4
A2	74F74	E13	D5	C3320	B13	M7	74ALS573	L1
A3	74AS04	B13	D6	C3330	C11	M8	74ALS573	M2
A4	74AS573	D11	D7	C3340	C5	M9	74ALS573	L5
A5	74AS573	D12	D8	74AS08	A9	M10	74ALS873	J5
A6	C3240	C11	D9	74AS00	A13	M11	74ALS645	L6
A7	C3200	C12	D10	74AS11	C12	M12	74ALS645	M5
A8	C3233	G11	D11	74AS20	A10	M13	74ALS573	L6
A9	C3210	D11	D12	74AS00	A5	M14	74ALS573	M5
A10	C3220	J11	ER1	res270	C12	M15	SSM7188-25	M6
B0	74F74	C15	E0	74FCT573	E11	M16	SSM7188-25	M7
B1	74F74	B15	E1	74AS32	E11	M17	SSM7188-25	M5
B2	74F74	C13	E2	74AS32	E12	M18	SSM7188-25	M6
B3	74AS04	C14	E3	74AS30	A12	M19	74AS00	M10
B4	74F74	D14	E4	C3360	D10	N1	74ALS646	D2
B5	74AS573	C13	E5	C3351	E10	N2	74ALS646	F2
B6	74AS573	C13	F0	74F74	D13	N3	74ALS646	D2
B7	C3280	D12	F1	74F74	D15	N4	74ALS646	F2
B8	C3290	B7	F2	74F74	D15	N5	74ALS646	G2
B9	C3252	D13	F3	74AS08	D14	N6	74ALS646	H2
B10	C3262	C15	F4	74AS10	L10	N7	74ALS646	D1
B11	C3271	B14	F5	74AS30	E13	N8	74ALS646	F1
B12	74AS02	C14	F6	C3371	D13	N9	74ALS646	G1
B13	74AS08	A15	F7	74F74	E15	N10	74ALS646	H1
CA0	HM6788HP-15	H7	F8	74F74	G13	N11	74ALS646	D3
CA1	HM6788HP-15	H6	F9	74ALS573	G14	N12	74ALS646	F3
CA2	HM6788HP-15	H9	F10	74LS273	G11	PDR1	res10x-1-101	C12
CA3	HM6788HP-15	H8	F11	74LS273	H12	PDR2	res10x-1-101	B9
CA4	HM6788HP-15	J9	F12	74F74	E15	PDR3	res10x-1-101	L9
CA5	HM6788HP-15	J8	F13	74ALS573	G12	PDR4	NOT USED	J14
CA6	HM6788HP-15	J7	F14	74ALS573	H13	PDR5	NOT USED	B9
CA7	HM6788HP-15	J6	F15	74F74	E14	PDR6	NOT USED	A11
CA8	HM6788HP-15	H7	G0	74AS645	D4	PDR7	NOT USED	D8
CA9	HM6788HP-15	H6	G1	74AS645	F4	PDR8	NOT USED	N9
CA10	HM6788HP-15	H8	G2	74AS645	G4	PD1	4148	L15
CA11	HM6788HP-15	H8	G3	74AS645	H4	PD2	4148	L15
CA12	HM6788HP-15	J8	G4	74AS574	D5	PD3	4148	L15
CA13	HM6788HP-15	J8	G5	74AS574	F5	PF1	Micro fuse 0.5A	M15
CA14	HM6788HP-15	J7	G6	74AS574	G5	PF2	Micro fuse 0.5A	L15
CA15	HM6788HP-15	J6	G7	74AS574	H5	PR1	res4k7	M15
CA16	HM6788HP-15	J5	G8	74AS574	D5	PR2	res4k7	M15
CCRO	res270	D10	G9	74AS574	F5	PR3	res4k7	L15
CC0	TACT2152-25	G10	G10	74AS574	G5	PU1	res1k	A6
CC1	TACT2152-25	G9	G11	74AS574	H5	PU2	res1k	C5
CC2	TACT2152-25	F10	G12	74FCT646	D5	PU3	res1k	C9
CC3	TACT2152-25	F9	G13	74FCT646	F5	PU4	res1k	A12
CC4	TACT2152-25	E10	G14	74FCT646	G5	PU5	res1k	A14
CC5	TACT2152-25	E9	G15	74FCT646	H5	PU6	res1k	D16
CC6	TACT2152-25	E10	G16	74FCT573	H10	PU7	res1k	E16
CC7	TACT2152-25	E9	G17	74FCT573	H9	PUB	res1k	G14
CONJ1	DIN96	E1	G18	74FCT573	J9	PU9	res1k	K12
CONJ2	DIN96	J1	G19	74FCT573	J10	PU10	res1k	M9
CONJ3	DIN96	M1	H0	74AS574	H3	PU11	res1k	K14
CONJ4	3M20	K16	H1	74AS574	G3	PU12	res150	K14
CONJ5	3M20	G16	H2	74AS574	F3	PU13	res150	A9
CR1	NOT USED	C10	H3	74AS574	D3	PU14	res150	A11
CR2	NOT USED	D10	H4	74ALS574	C2	PU15	res150	D8
CR3	res270	B9	H5	74AS573	H4	PU16	res150	M9
CR4	res330	E14	H6	74AS573	G4	PU17	res1k	D8
CR5	res1k	J5	H7	74AS573	F4	PU18	res1k	D8
CT0	C3301	C10	H8	74AS573	D4	P1	27C512-15	J14
CT1	C3311	C10	H9	74AS632	A5	P2	8251A	J15
CU	74F74	A10	LABEL		O-1	P3	74ALS645	H14
C1	74S112	B15	L1	74ALS574	L3	P4	74ALS574	H15
C2	74AS04	C9	L2	74ALS573	H11	P5	74ALS574	G15
C3	74AS04	B12	L3	74ALS873	M1	P6	74LS641-1	H15
C4	74LS14	E14	L4	74ALS573	M4	P7	74LS641-1	G15
C5	C3390	B12	L5	TMM2018D-25	J2	P8	75188	L15
C6	C3400	B11	L6	74ALS645	J2	P9	75189A	L15
C7	C3410	B10	L7	74ALS873	J1	P10	dipswitch14pin	L14
C8	C3420	B9	L8	74ALS573	L2	P11	74AS1004	J14
C9	C3430	B10	L9	74ALS573	M3	QD1	red-led	M16
C10	C3440	B11	L10	74ALS573	M3	QR1	res150	M15
C11	C3380	B14	M1	74ALS573	L3	QR2	res4k7	M15
D0	74F74	B13	M2	74ALS573	L5	QR3	res4k7	M15
D1	74F74	A14	M3	74ALS573	M7	QR4	res1k	M15
D2	74F74	A13	M4	74ALS573	L5	QR5	res1k	N15

Component locations

PCB: 4101 / 68030

Issue:
0

Date:
881021



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PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
QR6	res1k	G12	UR1	res1k	J5			
QR7	res4k7	B6	US1	res10x-1-103	K4			
Q1	74ALS580	B6	US2	res10x-1-151	J3			
Q2	74ALS573	G13	U1	UPXX	J4			
Q3	74ALS574	H12	U2	PPAX	J4			
Q4	74LS148	B8	U3	74AS641	J3			
Q5	74LS353	J13	U4	74F74	A6			
Q6	74S175	A8	U5	74F74	A7			
Q7	74S38	M14	U6	dipswitch14pin	K3			
Q8	debugswitch	N16	U7	hexswitch	K5			
Q9	74S38	G12	U8	74AS32	A6			
Q10	74S38	H13	U9	74AS74	A8			
Q11	74LS14	G3	VS1	res10x-1-102	F1			
Q12	74F74	G13	V1	74ALS873	M8			
RR1	res10k	F13	V2	74ALS573	L4			
R1	C3070	L8	V3	74ALS573	M2			
R2	C3080	L8	V4	74ALS573	L4			
R3	C3100	L11	V5	74F74	C5			
R4	C3000	L10	V6	74ALS574	B1			
R5	C3090	H10	V7	74ALS645	C1			
R6	C3190	J10	V8	74ALS645	B2			
R7	74ALS138	L9	V9	74ALS645	B3			
R8	74ALS138	L7	V10	74ALS645	C2			
R9	74ALS138	G14	V11	74ALS645	A1			
R10	74AS21	E13	V12	74ALS573	A2			
R11	74AS04	A14	V13	74AS873	M8			
STE1	JUMPER (2x3)	H10	V14	C3181	M8			
STP1	JUMPER (3x6)	K13	V15	74AS08	A8			
STQ1	JUMPER (1x3)	B6	V16	74AS04	C4			
STR1	JUMPER (1x2)	F13	WR1	res100	J5			
STT1	JUMPER (2x4)	L12	WS1	res10x-1-151	H3			
STT2	JUMPER (2x4)	L12	W1	74LS541	H3			
STT3	JUMPER (2x4)	L12	W2	74ALS573	C7			
STT4	JUMPER (2x2)	L12	W3	C3060	C6			
STT5	JUMPER (1x3)	M12	W4	C3170	B9			
STT6	JUMPER (2x7)	M14	W5	C3160	C3			
STT7	JUMPER (2x8)	M14	W6	74S240	C3			
STT8	JUMPER (1x3)	H10	W7	74F74	C8			
STZ1	JUMPER (2x2)	F6	W8	74F74	C8			
STZ2	JUMPER	F6	W9	74F74	A7			
S1	74LS590	C4	W10	74AS00	C8			
S2	74ALS574	B4	W11	74AS08	B8			
S3	74ALS573	A2	W12	74AS32	C9			
S4	74ALS573	B3	W13	74S38	H11			
S5	74ALS573	B6	W14	dipswitch14pin	H2			
S6	C3110	B2	X1	C3010	L8			
S7	TMM2018D-25	B4	X2	C3020	L7			
S8	C3150	B5	X3	C3032	L9			
S9	C3131	B5	X4	74F74	M9			
S10	C3140	B5	X5	74AS02	M9			
S11	C3121	C6	X6	74AS04	B7			
S12	74AS04	C7	X7	74AS08	B8			
TC1	10uF/25V (Tantal)	J12	YR1	res10k	C6			
TD1	4148	J12	YR2	res2k2	D14			
TR1	res100k	K12	YR3	res2k2	E14			
TR2	res1k	K12	Y1	MC68882-25	G7			
TS1	res10x-1-103	G3	Y2	C3040	G10			
T1	OSC-66.667Mhz	M13	Y3	C3050	J11			
T2	osc50M	M12	Y4	74F74	H13			
T3	osc40M	M12	Y5	74AS08	H14			
T4	74F74	L13	ZR1	res10k	F6			
T5	74F74	L13	ZR2	res10k	F6			
T6	74F74	M10	Z1	MC68030RC-33	D8			
T7	74F74	K14	Z2	74AS04	E12			
T8	74AS1004	J13	Z3	74AS08	C5			
T9	74AS1004	L11						
T10	74S140	M11						
T11	74LS390	M11						
T12	74LS390	L12						
T13	74LS390	L13						
T14	74LS393	J13						
T15	74LS393	M13						
T16	74F74	J12						
T17	74LS14	J12						
T18	74LS74	K13						
T19	74S05	K12						
T20	dipswitch	G2						
T21	74AS32	K13						

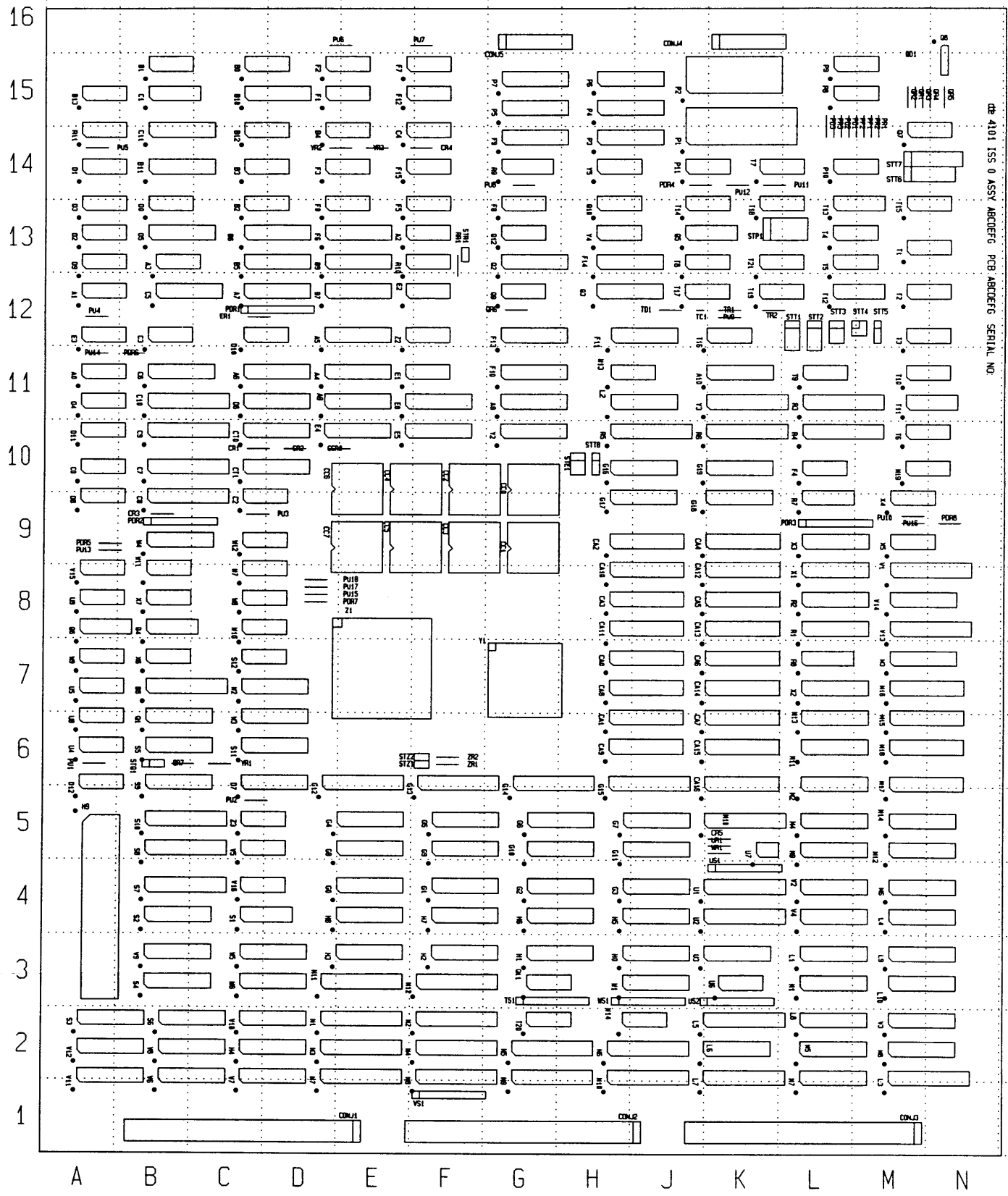
Component locations

PCB: 4101 / 68030

Issue: 0 Date: 881021



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Component locations		Issue: 0		Date: 881021		dansk data elektronik a/s	
PCB: 4101 / CPU3						herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A0	74F74	A11	D3	74F74	A13	M6	74ALS573	M4
A1	74F74	A12	D4	74F74	A11	M7	74ALS573	L1
A2	74F74	E13	D5	C332v (P16L8-10)	B13	M8	74ALS573	M2
A3	74AS04	B13	D6	C333v (P16L8-10)	C11	M9	74ALS573	L5
A4	74AS573	D11	D7	C334v (P16L8-10)	C5	M10	74ALS873	J5
A5	74AS573	D12	D8	74AS08	A9	M11	74ALS645	L6
A6	C324v (P16L8-10)	C11	D9	74AS00	A13	M12	74ALS645	M5
A7	C320v (P16R8-10)	C12	D10	74AS11	C12	M13	74ALS573	L6
A8	C323v (P16L8-10)	G11	D11	74AS20	A10	M14	74ALS573	M5
A9	C321v (P16L8-10)	D11	D12	74AS00	A5	M15	SSM7188-25	M6
A10	C322v (P16L8-10)	J11	ER1	res270	C12	M16	SSM7188-25	M7
B0	74F74	C15	E0	74FCT573	E11	M17	SSM7188-25	M5
B1	74F74	B15	E1	74AS32	E11	M18	SSM7188-25	M6
B2	74F74	C13	E2	74AS32	E12	M19	74AS00	M10
B3	74AS04	C14	E3	74AS30	A12	N1	74ALS646	D2
B4	74F74	D14	E4	C336v (P16L8-10)	D10	N2	74ALS646	F2
B5	74AS573	C13	E5	C335v (P16L8-10)	E10	N3	74ALS646	D2
B6	74AS573	C13	F0	74F74	D13	N4	74ALS646	F2
B7	C328v (P16R4-10)	D12	F1	74F74	D15	N5	74ALS646	G2
B8	C329v (P20R6-25)	B7	F2	74F74	D15	N6	74ALS646	H2
B9	C325v (P16R8-10)	D13	F3	74AS08	D14	N7	74ALS646	D1
B10	C326v (P16R8-25)	C15	F4	74AS10	L10	N8	74ALS646	F1
B11	C327v (P16R8-25)	B14	F5	74AS30	E13	N9	74ALS646	G1
B12	74AS02	C14	F6	C337v (P16L8-25)	D13	N10	74ALS646	H1
B13	74AS08	A15	F7	74F74	E15	N11	74ALS646	D3
CA0	HM6788HP-15	H7	F8	74F74	G13	N12	74ALS646	F3
CA1	HM6788HP-15	H6	F9	74ALS573	G14	PDR1	res10x-1-101	C12
CA2	HM6788HP-15	H9	F10	74LS273	G11	PDR2	res10x-1-101	B9
CA3	HM6788HP-15	H8	F11	74LS273	H12	PDR3	res10x-1-101	L9
CA4	HM6788HP-15	J9	F12	74F74	E15	PDR4	NOT USED	J14
CA5	HM6788HP-15	J8	F13	74ALS573	G12	PDR5	NOT USED	B9
CA6	HM6788HP-15	J7	F14	74ALS573	H13	PDR6	NOT USED	A11
CA7	HM6788HP-15	J6	F15	74F74	E14	PDR7	NOT USED	D8
CAB	HM6788HP-15	H7	G0	74AS645	D4	PDR8	NOT USED	N9
CA9	HM6788HP-15	H6	G1	74AS645	F4	PD1	1N4148	L15
CA10	HM6788HP-15	H8	G2	74AS645	G4	PD2	1N4148	L15
CA11	HM6788HP-15	H8	G3	74AS645	H4	PD3	1N4148	L15
CA12	HM6788HP-15	J8	G4	74AS574	D5	PF1	Micro fuse 0.5A	M15
CA13	HM6788HP-15	J8	G5	74AS574	F5	PF2	Micro fuse 0.5A	L15
CA14	HM6788HP-15	J7	G6	74AS574	G5	PR1	res4k7	M15
CA15	HM6788HP-15	J6	G7	74AS574	H5	PR2	res4k7	M15
CA16	HM6788HP-15	J5	G8	74AS574	D5	PR3	res4k7	L15
CCR0	res270	D10	G9	74AS574	F5	PU1	res1k	A6
CC0	TACT2152-25	G10	G10	74AS574	G5	PU2	res1k	C5
CC1	TACT2152-25	G9	G11	74AS574	H5	PU3	res1k	C9
CC2	TACT2152-25	F10	G12	74FCT646	D5	PU4	res1k	A12
CC3	TACT2152-25	F9	G13	74FCT646	F5	PU5	res1k	A14
CC4	TACT2152-25	E10	G14	74FCT646	G5	PU6	res1k	D16
CC5	TACT2152-25	E9	G15	74FCT646	H5	PU7	res1k	E16
CC6	TACT2152-25	E10	G16	74FCT573	H10	PUB	res1k	G14
CC7	TACT2152-25	E9	G17	74FCT573	H9	PU9	res1k	K12
CONJ1	DIN96	E1	G18	74FCT573	J9	PU10	res1k	M9
CONJ2	DIN96	J1	G19	74FCT573	J10	PU11	res1k	K14
CONJ3	DIN96	M1	H0	74AS574	H3	PU12	res150	K14
CONJ4	3M20	K16	H1	74AS574	G3	PU13	res150	A9
CONJ5	3M20	G16	H2	74AS574	F3	PU14	res150	A11
CR1	NOT USED	C10	H3	74AS574	D3	PU15	res150	D8
CR2	NOT USED	D10	H4	74ALS574	C2	PU16	res150	M9
CR3	res270	B9	H5	74AS573	H4	PU17	res1k	D8
CR4	res330	E14	H6	74AS573	G4	PU18	res1k	D8
CR5	res1k	J5	H7	74AS573	F4	P1	27C512-15	J14
CT0	C330v (P16R8-10)	C10	H8	74AS573	D4	P2	8251A	J15
CT1	C331v (P16R8-25)	C10	H9	74AS632	A5	P3	74ALS645	H14
CO	74F74	A10	L1	74ALS574	L3	P4	74ALS574	H15
C1	74S112	B15	L2	74ALS573	H11	P5	74ALS574	G15
C2	74AS04	C9	L3	74ALS873	M1	P6	74LS641-1	H15
C3	74AS04	B12	L4	74ALS573	M4	P7	74LS641-1	G15
C4	74LS14	E14	L5	TMM2018D-25	J2	P8	75188	L15
C5	C339v (P16R8-10)	B12	L6	74ALS645	J2	P9	75189A	L15
C6	C340v (P16R8-25)	B11	L7	74ALS873	J1	P10	dipswitch14pin	L14
C7	C341v (P20R8-25)	B10	L8	74ALS573	L2	P11	74AS1004	J14
C8	C342v (P20R8-25)	B9	L9	74ALS573	M3	QD1	red-led	M16
C9	C343v (P20R8-25)	B10	L10	74ALS573	M3	QR1	res150	M15
C10	C344v (P20R8-25)	B11	M1	74ALS573	L3	QR2	res4k7	M15
C11	C338v (P16L8-10)	B14	M2	74ALS573	L5	QR3	res4k7	M15
DO	74F74	B13	M3	74ALS573	M7	QR4	res1k	M15
D1	74F74	A14	M4	74ALS573	L5	QR5	res1k	N15
D2	74F74	A13	M5	74ALS573	L2	QR6	res1k	G12

Component locations

PCB: 4101 / CPU3

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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
QR7	res4k7	B6	US1	res10x-1-103	K4			
Q1	74ALS580	B6	US2	res10x-1-151	J3			
Q2	74ALS573	G13	U1	UPXX (P20L8)	J4			
Q3	74ALS574	H12	U2	PPAX (P20R8)	J4			
Q4	74LS148	B8	U3	74AS641	J3			
Q5	74LS353	J13	U4	74F74	A6			
Q6	74S175	A8	U5	74F74	A7			
Q7	74S38	M14	U6	dipswitch14pin	K3			
Q8	debugswitch	N16	U7	hexswitch	K5			
Q9	74S38	G12	U8	74AS32	A6			
Q10	74S38	H13	U9	74AS74	A8			
Q11	74LS14	G3	VS1	res10x-1-102	F1			
Q12	74F74	G13	V1	74ALS873	M8			
RR1	res10k	F13	V2	74ALS573	L4			
R1	C307v (P16R8-25)	L8	V3	74ALS573	M2			
R2	C308v (P16R8-25)	L8	V4	74ALS573	L4			
R3	C310v (P20R8-25)	L11	V5	74F74	C5			
R4	C300v (P20R8-25)	L10	V6	74ALS574	B1			
R5	C309v (P20L8-15)	H10	V7	74ALS645	C1			
R6	C319v (P20L8-15)	J10	V8	74ALS645	B2			
R7	74ALS138	L9	V9	74ALS645	B3			
R8	74ALS138	L7	V10	74ALS645	C2			
R9	74ALS138	G14	V11	74ALS645	A1			
R10	74AS21	E13	V12	74ALS573	A2			
R11	74AS04	A14	V13	74AS873	M8			
STE1	JUMPER (2x3)	H10	V14	C318v (P16L8-10)	M8			
STP1	JUMPER (3x6)	K13	V15	74AS08	A8			
STQ1	JUMPER (1x3)	B6	V16	74AS04	C4			
STR1	JUMPER (1x2)	F13	WR1	res100	J5			
STT1	JUMPER (2x4)	L12	WS1	res10x-1-151	H3			
STT2	JUMPER (2x4)	L12	W1	74LS541	H3			
STT3	JUMPER (2x3)	L12	W2	74ALS573	C7			
STT4	JUMPER (2x2)	L12	W3	C306v (P16R8-10)	C6			
STT5	JUMPER (1x3)	M12	W4	C317v (P16R8-25)	B9			
STT6	JUMPER (2x7)	M14	W5	C316v (P16L8-25)	C3			
STT7	JUMPER (2x8)	M14	W6	74S240	C3			
STT8	JUMPER (1x3)	H10	W7	74F74	C8			
STZ1	JUMPER (1x2)	F6	W8	74F74	C8			
STZ2	JUMPER (1x2)	F6	W9	74F74	A7			
S1	74LS590	C4	W10	74AS00	C8			
S2	74ALS574	B4	W11	74AS08	B8			
S3	74ALS573	A2	W12	74AS32	C9			
S4	74ALS573	B3	W13	74S38	H11			
S5	74ALS573	B6	W14	dipswitch14pin	H2			
S6	C311v (P16L8-25)	B2	X1	C301v (P16R4-10)	L8			
S7	TMM2018D-25	B4	X2	C302v (P16L8-25)	L7			
S8	C315v (P20R8-25)	B5	X3	C303v (P16R8-10)	L9			
S9	C313v (P16L8-25)	B5	X4	74F74	M9			
S10	C314v (P20R8-25)	B5	X5	74AS02	M9			
S11	C312v (P16R6-25)	C6	X6	74AS04	B7			
S12	74AS04	C7	X7	74AS08	B8			
TC1	10uF/25V (Tantal)	J12	YR1	res10k	C6			
TD1	1N4148	J12	YR2	res2k2	D14			
TR1	res100k	K12	YR3	res2k2	E14			
TR2	res1k	K12	Y1	MC68882-25	G7			
TS1	res10x-1-103	G3	Y2	C304v (P16L8-25)	G10			
T1	OSC-66.667Mhz	M13	Y3	C305v (P20R4-25)	J11			
T2	OSC-50.000Mhz	M12	Y4	74F74	H13			
T3	OSC-40.000Mhz	M12	Y5	74AS08	H14			
T4	74F74	L13	ZR1	res10k	F6			
T5	74F74	L13	ZR2	res10k	F6			
T6	74F74	M10	Z1	MC68030RC-33	D8			
T7	74F74	K14	Z2	74AS04	E12			
T8	74AS1004	J13	Z3	74AS08	C5			
T9	74AS1004	L11						
T10	74S140	M11						
T11	74LS390	M11						
T12	74LS390	L12						
T13	74LS390	L13						
T14	74LS393	J13						
T15	74LS393	M13						
T16	74F74	J12						
T17	74LS14	J12						
T18	74LS74	K13						
T19	74S05	K12						
T20	dipswitch	G2						
T21	74AS32	K13						
UR1	res1k	J5						

Component locations

PCB: 4101 / CPU3

Issue: 0 Date: 881021



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herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Supermax Technical Data Sheet

Type:	CPU R3000 Module
Data sheet no:	20
Revision no:	0
Date:	90-05-07

General Description

CPU modules are the main processing elements in a Supermax system.

The CPU R3000 module is based on a 25 MHz MIPS R3000 microprocessor and contains this microprocessor and the following elements:

- Cache memory
- Write Buffers
- Boot loader PROM
- Service port
- Interrupt unit
- Floating Point Accelerator, FPA
- Memory control circuitry
- Interface to the local memory bus
- Interface to the I/O bus

Cache Memory

The cache memory is a fast static RAM that stores frequently used instructions and data. The cache memory consists of two independent caches, one for instructions and one for data. Each cache contains 2048 entries and each entry contains 8 double words, that is a total of 2×64 Kb.

When the R3000 executes an instruction fetch cycle, the content of the instruction cache is examined. If the address is found in the cache, the cache content is sent to the R3000 with one double word per clock cycle. During the same clock cycle the R3000 can execute a data read cycle and then the content of the data cache is examined. If the address is found in the cache, the cache content is sent to the R3000 with one double word per clock cycle. The total transfer rate will be two double words per clock cycle.

If the address is not found in the instruction cache, eight double words are read from the main memory in burst mode. The eight instructions will be executed by the R3000 and at the same time stored in the instruction cache.

If the address is not found in the data cache, eight double words are read from the main memory in burst mode. The eight double words will be read by the R3000 and stored in the data cache.

In burst mode the transfer rate will be:

- Memory to cache – 100 Mb/s.
- Cache to R3000 – 200 Mb/s

The performance of the CPU module is approx. 20 mips (million instructions per second).

Write Buffers

When the R3000 executes a write cycle, data will be written in the four R3020 Write Buffers, which are able to receive a write access in one clock cycle. The Write Buffers will then write the data to the *slower* main memory. In this case the R3000 will not be hung up by the memory cycle. The Write Buffers can hold up to four pending write cycles.

Boot Loader PROM

The boot loader PROM consists of 256Kb of UV erasable memory. This memory is used for a boot load program and a diagnostic program. The starting address of the PROM is 0x1fc0000. After reset, the R3000 starts executing instructions in that address in the PROM. The PROM is always enabled.

Service Port

Like all other units in the Supermax the CPU module has a service port. The interface to the service port is a modified RS-232C interface. All output signals are *open collector* signals and may be wired together with the corresponding output signals from other units of a Supermax system. Pull down resistors are used to pull the signals down to -12V when they are not driven by an output.

Interrupt Unit

The interrupt unit generates interrupts to the R3000. Interrupts are caused by events on the CPU module itself, internal interrupts, or generated by the I/O bus, external interrupts. The R3000 has one interrupt level, but six interrupt inputs. The CPU module has 10 interrupt sources, so more than one source is connected to each input.

Units connected to the I/O bus may interrupt the CPU by writing in a certain part of its main memory. The interrupt unit decodes the write address and generates an interrupt on the corresponding level.

Interrupts are enabled and disabled by a mask register.

Floating Point Accelerator

The Floating Point Accelerator, FPA, is a 25 Mhz MIPS R3010. The FPA fully conforms to the requirements of ANSI/IEEE Standard 754-1985, "IEEE Standard for Binary Floating- Arithmetic", including all recommendations. The operands are 64 bits, of which 53 bits are used as mantissa.

Memory Control Circuitry

This circuitry controls the memory modules connected to the CPU module. It generates and checks ECC bit, corrects single bit errors, detects double bit errors, implements byte write, word write and burst read/write, refreshes the memory modules etc.

The CPU module is designed to control memory mother modules type 4400 only. This module must contain an even number of memory daughter modules. A maximum of four mother modules can be connected to the CPU module.

Interface to the local Memory Bus

A CPU module has its own private memory consisting of one or more memory mother modules. The local memory bus is the connection between a CPU module and its main memory. The local memory bus is 39 bits wide. It is used for both address and data transfers. In the first part of a memory cycle the address is transferred to the memory modules and in the second part the local memory bus is used for data transfer.

The maximum amount of memory that can be connected to a CPU module is 256 Mb.

Interface to the I/O Bus

The interface to the I/O bus consists of two different interfaces. One interface is used by the CPU module when it addresses other units on the I/O bus. Here the CPU module is the active part in a bus transfer. This interface drives the full 34 bit wide address bus and the full 32 bit data bus.

The other interface is used when units connected to the I/O bus address the main memory of the CPU module. Here the CPU module is the passive part in a bus transfer.

The active and the passive part of these interfaces implements the following bus cycles:

Active cycles	Passive cycles
8 bit read/write	8 bit read/write
16 bit read/write	16 bit read/write
32 bit read/write	32 bit read/write
Read-modify-write	Read-modify-write
	Burst read/write

Indicators

The CPU module has a 20 pin flat cable connector located near the front edge of the module. This connector drives a front panel display. The front panel display consists of two seven segment displays, a red LED and a green LED. They are all controlled by the operating system.

The seven segment displays are used for status and error codes. The red LED is turned on by the operating when it is running, and the green LED is turned on when a user program is running.

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	14.5 A
+12 V \pm 5%	0.2 A
-12 V \pm 5%	0.2 A

Installation

Before a CPU module is installed in a Supermax system, the following items must be selected or checked.

- Unit number/priority.
- Pull-up resistors.
- Bus clock.
- Pull-down resistors.
- Straps.

These items are described in detail in the following text.

Unit number/Priority

The unit number and the priority of the CPU module is selected by turning a hexadecimal switch. The CPU R3000 module uses one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0A	20
B	0x0B	21
C	0x0C	22
D	0x0D	23
E	0x0E	24
F	0x0F	30

Pull-up resistors

One and only one CPU module in a Supermax system must contain pull-up resistors for various signals and drive the bus clock in the I/O bus. In a 24 position Supermax system that CPU should be placed in the first position in the second cabinet. In a 24 position Supermax system an additional CPU module must have pull-up resistors for the arbitration signals only. The position of that CPU module is not significant. All the pull-up resistors are connected to the signals through a switch. The switches are:

H11 Contains the pull-up resistors for the arbitration signals

H14 Contains the pull-up resistors for other signals

G25 Contains the pull-up resistors for other signals

Pull-down resistors

Output signals from the service port are open collector signals. These signals must be pulled down to $-12V$ by one module in a Supermax system. Pull-down resistors are connected to output signals when all switches in F12 are in the **ON** position.

Straps

Straps T1, T2, T3, T4, T8 are installed for factory testing only. Do not short circuit any of those straps.

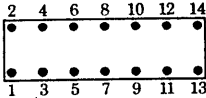
* designates factory installed position.

ST1:



EPROM size		
*	1-2	512 Kbit
	2-3	1 Mbit

ST5:

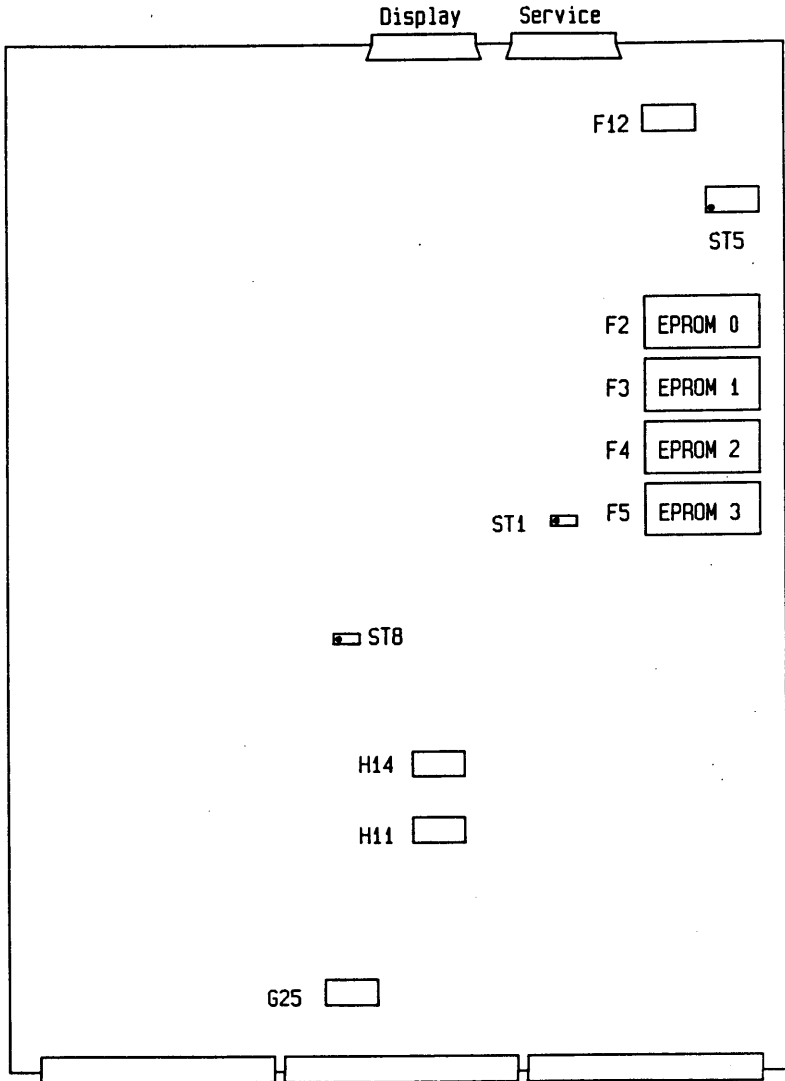


Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

ST8:



Self test output mode		
*	1-2	No output from self test on service port
	NC	Output from self test on service port





Supermax Technical Data Sheet

Type:	MCU4700 - R4000MCU Module
Data sheet no:	36
Revision no:	1
Date:	93-02-10

General Description

MCU modules are the main processing elements in a Supermax system.

The MCU4700 module is based on a 50 MHz MIPS R4000SC microprocessor and contains the following elements:

- MIPS R4000SC microprocessor
- Secondary cache memory
- Boot loader EPROM
- Service port
- Interrupt unit
- Memory control circuitry
- Interface to the local memory bus
- Interface to the I/O bus

MIPS R4000SC microprocessor

The MIPS R4000SC microprocessor is a 50 Mhz microprocessor, which internally runs at a 100 MHz clock rate. The processor implements the following major items:

- Full 32-bit and 64-bit operation.
- 8 stage pipeline.
- On-chip MMU, that translates 4 Gbyte user virtual address space into physical addresses.
- Primary cache. 8 kb primary instruction cache and 8 kb primary data cache. Both caches contain 512 entries and each entry is 16 bytes wide.
- On-chip secondary cache control.
- On-chip floating point unit, which implements the ANSI/IEEE Standard 754—1985, "IEEE Standard for Binary Floating— Arithmetic", including all recommendations.

Secondary cache memory

The MCU4700 module contains 1 Mb secondary cache memory shared between instructions and data. The secondary cache memory is protected using Error Correcting Code, ECC. The 128 bits data field is protected by 2×8 bits of ECC and the 26 bits tag field is protected by 6 bits of ECC. The secondary cache contains 32768 entries and each entry contains 32 bytes, that is a total of 1 Mb.

When the R4000SC executes an instruction fetch cycle, the content of the primary instruction cache is examined. If the address is found in the cache, the cache content is sent to the processor with one 64 bit word per clock cycle. During the same clock cycle the R4000SC executes a data read cycle and then the content of the primary data cache is examined. If the address is found in the cache, the cache content is sent to the processor with one 64 bit word per clock cycle. The total transfer rate will be two 64 bit words per clock cycle.

If the address is not found in the primary instruction cache or in the primary data cache, the secondary cache is examined. If the address is found in the cache, the cache content is sent to the processor with one 128 bit word per 4 clock cycles. If the address is not found in the secondary cache, eight 32 bit words are read from the main memory in burst mode. The eight words are sent to the processor and stored in the secondary cache with one 32 bit word per 2 clock cycles.

The transfer rates are as follows:

- Primary cache to R4000SC — 1600 Mb/s
- Secondary cache to primary cache — 400 Mb/s.
- Main memory to secondary cache — 100 Mb/s.

The performance of the MCU4700 module is approx. 50 mips (million instructions per second).

Boot Loader EPROM

The boot loader EPROM consists of 256Kb of UV erasable memory. This memory is used for a boot load program and a diagnostic program. The starting address of the EPROM is 0x1fc0000. After reset, the R4000SC starts executing instructions in that address in the EPROM. The EPROM is always enabled.

Service Port

Like all other units in the Supermax the MCU4700 module has a service port. The interface to the service port is a modified RS-232C interface. All output signals are *open collector* signals and may be wired together with the corresponding output signals from other units of a Supermax system. Pull down resistors are used to pull the signals down to $-12V$ when they are not driven by an output.

Interrupt Unit

The interrupt unit generates interrupts to the R4000SC. Interrupts are caused by events on the MCU4700 module itself, internal interrupts, or generated by the I/O bus, external interrupts. The R4000SC has one maskable interrupt input and one non-maskable interrupt input. A push button switch is connected to the non-maskable interrupt and all other interrupts are connected to the maskable interrupt input. Most of the interrupts can be enabled and disabled by a mask register. Units connected to the I/O bus may interrupt the MCU4700 by writing in a certain part of its main memory. The interrupt unit decodes the write address and generates an interrupt.

Memory Control Circuitry

This circuitry controls the memory modules connected to the MCU4700 module. It generates and checks ECC bit, corrects single bit errors, detects double bit errors, implements byte write, word write and burst read/write, refreshes the memory modules etc.

The MCU4700 module is designed to control memory mother modules type MEM4400 only. This module must contain an even number of memory daughter modules. A maximum of four mother modules can be connected to the MCU4700 module.

Interface to the local Memory Bus

A MCU4700 module has its own private memory consisting of one or more memory mother modules. The local memory bus is the connection between a MCU4700 module and its main memory. The local memory bus is 39 bits wide. It is used for both address and data transfers. In the first part of a memory cycle the address is transferred to the memory modules and in the second part the local memory bus is used for data transfer.

The maximum amount of memory that can be connected to a MCU4700 module is 256 Mb.

Interface to the I/O Bus

The interface to the I/O bus consists of two different interfaces. One interface is used by the MCU4700 module when it addresses other units on the I/O bus. Here the MCU4700 module is the active part in a bus transfer. This interface drives the full 34 bit wide address bus and the full 32 bit data bus.

The other interface is used when units connected to the I/O bus address the main memory of the MCU4700 module. Here the MCU4700 module is the passive part in a bus transfer. The active and the passive part of these interfaces implements the following bus cycles:

Active cycles	Passive cycles
8 bit read/write	8 bit read/write
16 bit read/write	16 bit read/write
32 bit read/write	32 bit read/write
Read-modify-write	Read-modify-write
	Burst read/write

Indicators

The MCU4700 module has a 20 pin flat cable connector located near the front edge of the module. This connector drives a front panel display. The front panel display consists of two seven segment displays, a red LED and a green LED. They are all controlled by the operating system.

The seven segment displays are used for status and error codes. The red LED is turned on by the operating when it is running, and the green LED is turned on when a user program is running.

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	17.0 A
+12 V \pm 5%	0.2 A
-12 V \pm 5%	0.2 A

Installation

Before a MCU4700 module is installed in a Supermax system, the following items must be selected or checked.

- Unit number/priority.
- Pull-up resistors.
- Bus clock.
- Pull-down resistors.
- Straps.

These items are described in detail in the following text.

Unit number/Priority

The unit number and the priority of the MCU4700 module is selected by turning a hexadecimal switch. The MCU4700 module uses one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0A	20
B	0x0B	21
C	0x0C	22
D	0x0D	23
E	0x0E	24
F	0x0F	30

Pull-up resistors

One and only one MCU4700 module in a Supermax system must contain pull-up resistors for various signals and drive the bus clock in the I/O bus. In a Supermax 24, that MCU4700 must be placed in board position 13 in the cabinet. In a Supermax 24 an additional MCU4700 module must have pull-up resistors for the arbitration signals only. The position of that MCU4700 module is not significant. All the pull-up resistors are connected to the signals through a switch. The switches are:

H11 Contains the pull-up resistors for the arbitration signals

H14 Contains the pull-up resistors for other signals

G25 Contains the pull-up resistors for other signals

Pull-down resistors

Output signals from the service port are open collector signals. These signals must be pulled down to —12V by one module in a Supermax system. Pull-down resistors are connected to output signals when all switches in F12 are in the ON position.

MCU4700 Basic/Add-on

The MCU4700 module comes in two different versions:

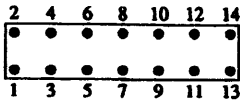
- | | |
|-----------------------|--|
| MCU4700 Basic | A basic version, which has a fixed unit number (3) and a fixed priority (03). It will always drive the bus clock and hold the pull-up resistors for the I/O bus signals. |
| MCU4700 Add-on | An add-on version, which contains all the switches for unit number selection and pull-up resistors. |

Straps

Straps T1, T2, T3, T4, T5 are installed for factory testing only. Do not short circuit any of those straps.

* designates factory installed position.

ST5:

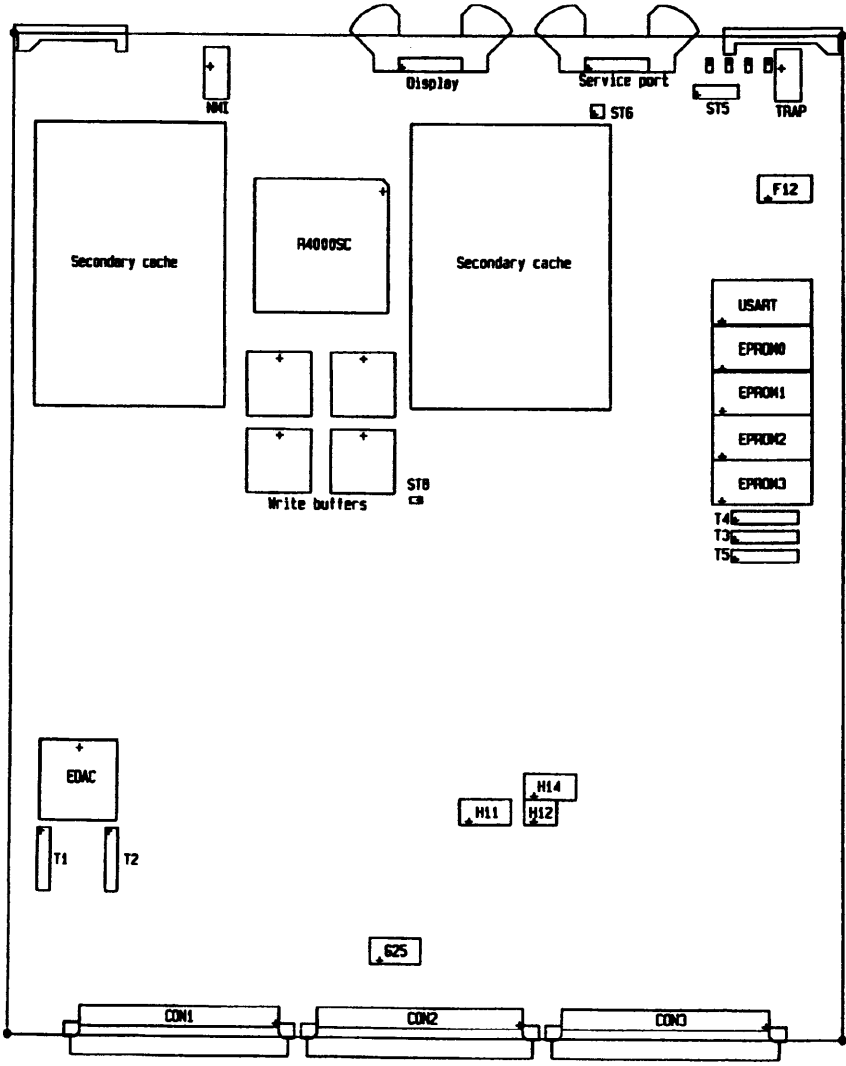


Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

ST8:



Self test output mode		
*	1-2	No output from self test on service port
	NC	Output from self test on service port





SUPERMAX technical data sheet.
Module: DIOC 0400

Type: DIOC 0400

Data sheet no.: 6

Revision no.: 0

Date: 851008

General description:

The DIOC is the intelligent Disk IO Controller in a SUPERMAX system. The DIOC is built around a microprocessor and contains the following interfaces:

- floppy disk interface
- streaming tape interface
- winchester disk interface

Interface to I/O bus:

The DIOC has a standard interface to the common SUPERMAX I/O bus. The local memory bus is not used.

Active cycles : Byte read and write.
Dobbel word read and write.

Passive cycles: Byte read and write.
Word read and write.
Read modify write.

Interface to peripheral equipment:

Winchester disk interface:

The winchester disk interface is the Small Computer System Interface ANSI X3T9.2, SCSI.

The connector is a 50 pin flatcable header. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	-DB(0)	02
03	GND	-DB(1)	04
05	GND	-DB(2)	06
07	GND	-DB(3)	08
09	GND	-DB(4)	10
11	GND	-DB(5)	12
13	GND	-DB(6)	14
15	GND	-DB(7)	16
17	GND	-DB(P)	18
19	GND	GND	20
21	GND	GND	22
23	GND	GND	24
25	open	open	26
27	GND	GND	28
29	GND	GND	30
31	GND	-atn	32
33	GND	GND	34
35	GND	-bsy	36
37	GND	-ack	38
39	GND	-rst	40
41	GND	-msg	42
43	GND	-sel	44
45	GND	-c/d	46
47	GND	-req	48
49	GND	-i/o	50

- designates active low signals.

Streaming tape interface:

The streaming tape interface is Quarter-inch Interchange
Committee interface, QIC II.

The connector is a 50 pin flatcable header. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	open	02
03	GND	open	04
05	GND	open	06
07	GND	open	08
09	GND	open	10
11	GND	-DB(7)	12
13	GND	-DB(6)	14
15	GND	-DB(5)	16
17	GND	-DB(4)	18
19	GND	-DB(3)	20
21	GND	-DB(2)	22
23	GND	-DB(1)	24
25	GND	-DB(0)	26
27	GND	-onl	28
29	GND	-req	30
31	GND	-rst	32
33	GND	-tfer	34
35	GND	-ack	36
37	GND	-rdy	38
39	GND	-exc	40
41	GND	-dir	42
43	GND	open	44
45	GND	open	46
47	GND	open	48
49	GND	open	50

- designates active low signals.

SUPERMAX technical data sheet.
Module: DIOC 0400

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Floppy disk drive interface:

The DIOC module is mounted with components for interface to an 8 or 5.25 inch floppy disk drive.

The connector is a 50 pin flatcable header for 8 inch disk drive interface. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	open	02
03	GND	open	04
05	GND	open	06
07	GND	-tg43	08
09	GND	open	10
11	GND	open	12
13	GND	side sel	14
15	GND	open	16
17	GND	-head load	18
19	GND	-index	20
21	GND	-ready	22
23	GND	open	24
25	GND	-sel0	26
27	GND	-sel1	28
29	GND	-sel2	30
31	GND	-sel3	32
33	GND	direction	34
35	GND	-step	36
37	GND	-write data	38
39	GND	-write gate	40
41	GND	-track 00	42
43	GND	-write prt	44
45	GND	-read data	46
47	GND	open	48
49	GND	open	50

- designates active low signals.

SUPERMAX technical data sheet.
Module: DIOC 0400 .

5

The connector is a 34 pin flatcable header for 5.25 inch disk drive interface. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	-head load	02
03	GND	-open	04
05	GND	nc	06
07	GND	-index	08
09	GND	-sel0	10
11	GND	-sel1	12
13	GND	-sel2	14
15	GND	-motor on	16
17	GND	direction	18
19	GND	-step	20
21	GND	-write data	22
23	GND	-write gate	24
25	GND	-track 00	26
27	GND	-write prt	28
29	GND	-read data	30
31	GND	side sel	32
33	GND	-ready	34

- designates active low signals.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage		Typ. current
+ 5	+5%	7.0 A
+12	+5%	0.06 A
-12	+5%	0.06 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.

Depth : 415 mm.

Height: 14 mm.

Installation:

Before a DIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Flat cables for the disks.
- Firmware.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number. The unit number of the DIOC module is coded in a PAL located in position I1. This PAL is called the unit PAL.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The DIOC module uses two priorities. The priorities of the DIOC module are coded in two PALs located in position N1 and N3. This PALs are called the priority PALs.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are placed in position DILJ.

Firmware:

The firmware is situated in an EPROM mounted in position D7.

1. DBOOT, V. 0100, 830401.

The DIOC with the this firmware will bootstrap all other modules in a Supermax system from an 8 or from a 5.25 inch floppy disk drive.

Notice: The firmware will not activate the motor on signal in the 5.25 inch floppy disk interface.

2. DCDRONE.

The DIOC with the this firmware will not bootstrap a Supermax system. The DIOC will be able to be bootstrapped of another DIOC.

Straps and jumpers:

+ designates factory installed position.

Strap 1.

Function: Real time clock. Position: C 3,2

```
* * * * *  
* * * * *  
1 2 3 4 5
```

<u>Jumper</u>	<u>Clock</u>
1	1.28 milliseconds
2	6.40 milliseconds
3	12.80 milliseconds
4	64.00 milliseconds
+ 5	128.00 milliseconds

Strap 2.

Function: Baud rate to service port. Connected to both TxClk and RxClk.

Position: B 7,3

```
* * * * *  
* * * * *  
1 2 3 4
```

<u>Jumper</u>	<u>Clock</u>
+ 1	9600 x 16 baud.
2	4800 x 16 baud.
3	2400 x 16 baud.
4	1200 x 16 baud.

Strap socket 1.

Function: Possible to connect two swithes. One is able to generate an internal reset pulse and one is able to generate a hardware "TRAP" interrupt to the 8085.

Position: C 4,1.

Factory installed strapssocket:

* *_* * * * *

* *_* * * * *

1.

Testpoints:

Testpoints for adjustment of floppy disk controller.

4
*
* * *
1 2 3

PIN

1	TP1	
2	TP2	
3	TP3	
4	TPGND	GND reference point.

Adjustments:

The PPL in the floppy disk interface can be adjusted with multiturn resistor PU1 and PU2. For further details see Supermax technical note no. 1.

Cables and connectors:

The connection between the DIOC module and the disks is made with three flat cable connectors.

The headers mounted on the PCB are positioned as follows:

Winchester disk : C 1,8. 50 pin
Floppy disk : C 3,8. 50 pin or 34 pin.
Streaming tape : C 5,8 50 pin
Service port : C 5,3 20 pin

Indicator Leds:

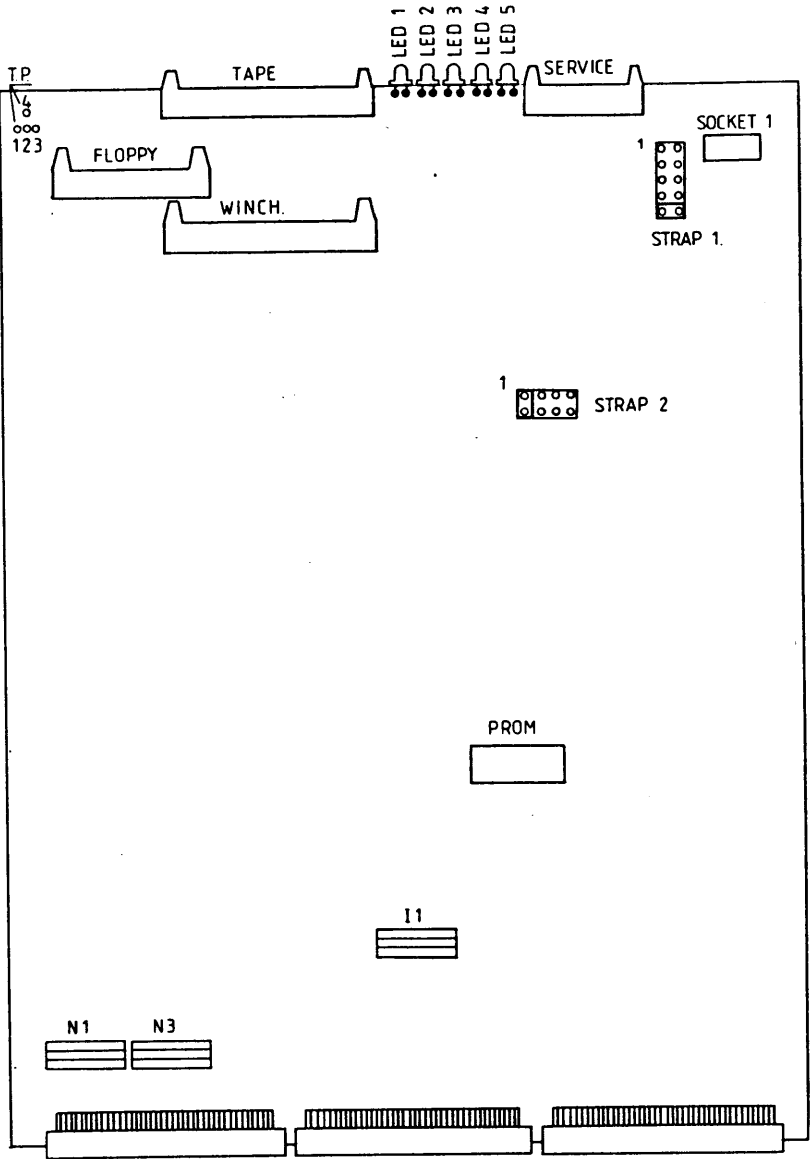
LED1: On: The boot prom is enabled.
Off: The boot prom is disabled.
Upon power up: On

LED2: On: A time out is pending.
Off: No time out.
Upon power up: Off.

LED3: On: A buserror is received.
Off: No buserror.
Upon power up: Off.

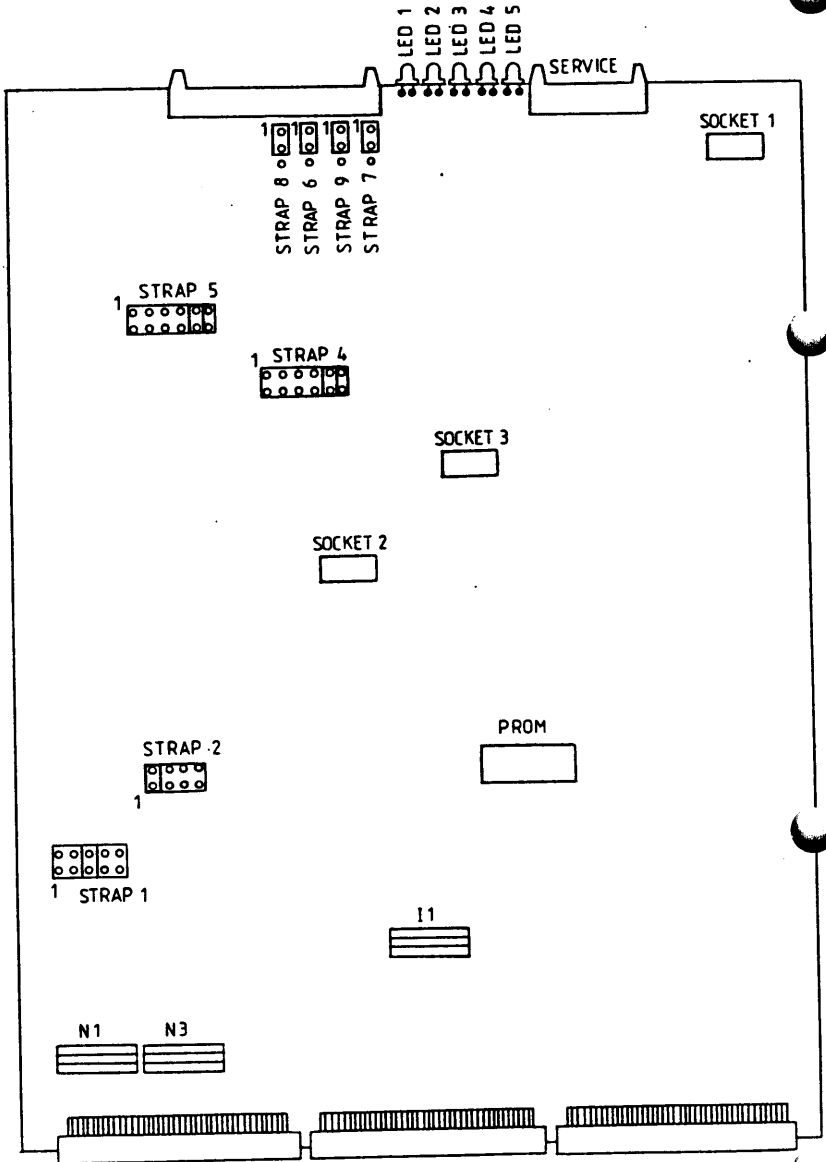
LED4: On: The ERROR line is active. The error line is set by the program or because of a parity error.
Off: No error.
Upon power up: On

LED5: On: The DIOC has activated the buserror signal.
Off: No error.
Upon power up: Off.



SUPERMAX technical data sheet.
Module: CIOC 0900

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Type: DIOC 1100

Data sheet no.: 8

Revision no.: 0

Date: 851008

General description:

The DIOC is the intelligent Disk IO Controller in a SUPERMAX system. The DIOC is built around a microprocessor and contains the following interfaces:

- floppy disk interface
- streaming tape interface
- winchester disk interface
- 4 serial RS-232 channels

Interface to I/O bus:

The DIOC has a standard interface to the common SUPERMAX I/O bus. The local memory bus is not used.

Active cycles : Byte read and write.
Dobbelt word read and write.

Passive cycles: Byte read and write.
Word read and write.
Read modify write.

Interface to peripheral equipment:

Winchester disk interface:

The winchester disk interface is the Small Computer System Interface ANSI X3T9.2, SCSI.

The connector is a 50 pin flatcable header. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	-DB(0)	02
03	GND	-DB(1)	04
05	GND	-DB(2)	06
07	GND	-DB(3)	08
09	GND	-DB(4)	10
11	GND	-DB(5)	12
13	GND	-DB(6)	14
15	GND	-DB(7)	16
17	GND	-DB(P)	18
19	GND	GND	20
21	GND	GND	22
23	GND	GND	24
25	open	open	26
27	GND	GND	28
29	GND	GND	30
31	GND	-atn	32
33	GND	GND	34
35	GND	-bsy	36
37	GND	-ack	38
39	GND	-rst	40
41	GND	-msg	42
43	GND	-sel	44
45	GND	-c/d	46
47	GND	-req	48
49	GND	-i/o	50

- designates active low signals.

Streaming tape interface:

The streaming tape interface is Quarter-inch Interchange Committee interface, QIC II.

The connector is a 50 pin flatcable header. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	open	02
03	GND	open	04
05	GND	open	06
07	GND	open	08
09	GND	open	10
11	GND	-DB(7)	12
13	GND	-DB(6)	14
15	GND	-DB(5)	16
17	GND	-DB(4)	18
19	GND	-DB(3)	20
21	GND	-DB(2)	22
23	GND	-DB(1)	24
25	GND	-DB(0)	26
27	GND	-onl	28
29	GND	-req	30
31	GND	-rst	32
33	GND	-tfer	34
35	GND	-ack	36
37	GND	-rdy	38
39	GND	-exc	40
41	GND	-dir	42
43	GND	open	44
45	GND	open	46
47	GND	open	48
49	GND	open	50

- designates active low signals.

SUPERMAX technical data sheet.
Module: DIOC 1100

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Floppy disk drive interface:

The DIOC module is equipped with a 50 pin flatcable header for connection to the floppy disk drives. DIN-41651. The module is strapped for interface to either 8 or 5.25 inch disk drives.

Connector when strapped for 8 inch interface:

PIN	Signal	Signal	PIN
01	GND	-tg43	02
03	GND	open	04
05	GND	open	06
07	GND	open	08
09	GND	open	10
11	GND	open	12
13	GND	side sel	14
15	GND	open	16
17	GND	-head load	18
19	GND	-index	20
21	GND	-ready	22
23	GND	open	24
25	GND	-sel0	26
27	GND	-sel1	28
29	GND	-sel2	30
31	GND	-sel3	32
33	GND	direction	34
35	GND	-step	36
37	GND	-write data	38
39	GND	-write gate	40
41	GND	-track 00	42
43	GND	-write prt	44
45	GND	-read data	46
47	GND	side sel	48
49	GND	open	50

- designates active low signals.

When a 5.25 inch disk drive is used the connection between the module and the drive is made with a 34 pin flat cable. The cable is connected to the 50 pin header with pin 34 in the cable connected to pin 50 in the header, see the table.

Connector when strapped for 5.25 inch interface:

PIN	Signal	Signal	PIN	
01	GND	tg43	02	
03	GND	open	04	
05	GND	open	06	
07	GND	open	08	
09	GND	open	10	
11	GND	open	12	
13	GND	side sel	14	Cable:
15	GND	open	16	
17	GND	-head load	18	2
19	GND	-in use	20	4
21	GND	nc	22	6
23	GND	-index	24	8
25	GND	-sel0	26	10
27	GND	-sel1	28	12
29	GND	-sel2	30	14
31	GND	-motor on	32	16
33	GND	direction	34	18
35	GND	-step	36	20
37	GND	-write data	38	22
39	GND	-write gate	40	24
41	GND	-track 00	42	26
43	GND	-write prt	44	28
45	GND	-read data	46	30
47	GND	side sel	48	32
49	GND	-ready	50	34

- designates active low signals.

SUPERMAX technical data sheet.
Module: DIOC 1100

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Serial channels:

The four serial channels are RS-232 compatible. The connector is a 34 pin flatcable header. DIN-41651.

PIN	Signal	Signal	PIN
01	TxD0	RTS0	02
03	GND	DTR0	04
05	RxD0	CTS0	06
07	GND	DSR0	08
09	TxD1	RTS1	10
11	GND	DTR1	12
13	RxD1	CTS1	14
15	GND	DSR1	16
17	TxD2	RTS2	18
19	GND	DTR2	20
21	RxD2	CTS2	22
23	GND	DSR2	24
25	TxD3	RTS3	26
27	GND	DTR3	28
29	RxD3	CTS3	30
31	GND	DSR3	32
33	+12V	-12V	34

Line receivers and transmitters:

	Receiver	Transmitter
Channel 0:	D5	D4
Channel 1:	D5,D7	D4,D6
Channel 2:	D7,D9	D6,D8
Channel 3:	D9	D8

Receiver type : TI 75189 or MC1489

Transmitter type: TI 75188 or MC1488

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage Typ. current

+ 5	+ -5%	9.5 A
+12	+ -5%	0.1 A
-12	+ -5%	0.1 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a DIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Flat cables for the disks.

These items are described in details in the following text.

Unit number/priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The DIOC module use two priorities. The DIOC module is equipped with a unit number switch. The switch gives the module a unit number and two priorities. The priorities are compatible with priority PALs marked Pxy0.

Basic DIOC module:

Supermax systems are delivered with one basic DIOC module. The basic module differs from the standard module on the following points:

The unit number is fixed to number 14.

The priorities are fixed to 41 and 42.

SUPERMAX technical data sheet.
Module: DIOC 1100

Switch position	Unit number	Priority 1	Priority 0
0	0x00	14	20
1	0x01	21	22
2	0x02	23	24
3	0x03	30	31
4	0x04	32	33
5	0x05	34	40
6	0x06	41	42
7	0x07	43	44

8	0x08	14	20
9	0x09	21	22
A	0x0a	23	24
B	0x0b	30	31
C	0x0c	32	33
D	0x0d	34	40
E	0x0e	41	42
F	0x0f	43	44

Straps and jumpers:

+ designates factory installed position.

Strap 1.

Function: Real time clock. Position: C 3,2

```
* * * *  
* * * *  
1 2 3 4
```

<u>Jumper</u>	<u>Clock</u>
1	10.0 milliseconds
2	20.0 milliseconds
3	40.0 milliseconds
+ 4	80.0 milliseconds

Strap 2.

Function: Baud rate to service port. Connected to both TxClk and RxClk.

Position: B 7,3

```
* * * * * * * *  
* * * * * * * *  
1 2 3 4 5 6 7 8
```

<u>Jumper</u>	<u>Clock</u>
+ 1	9600 x 16 baud.
2	4800 x 16 baud.
3	2400 x 16 baud.
4	1200 x 16 baud.
5	600 x 16 baud.

6	300 x 16 baud.
7	150 x 16 baud.
8	75 x 16 baud.

Strap 3.

Function: Use of the RS-232-C "open collector" service port.

Position: C 3,2

```
  * * *
  * * *
  1 2 3
```

Jumper 1-3 Function

installed	RS-232-C interface
+ open	Open collector RS-232-C

Strap 4.

Function: Choice of 8 inch or 5.25 inch floppy interface.

Position: C 3,2

8 inch floppy disk interface:

```
  1 *] *] *] *] *] *] *] *]
  2 *] *] *] *] *] *] *] *]
+  3 * * * * * * * *
```

5.25 inch floppy disk interface:

```
  1 * * * * * * * *
  2 *] *] *] *] *] *] *] *]
  3 *] *] *] *] *] *] *] *]
```

Strap 5.

Function: Adjustment of floppy disk controller.

Position: C 3,2

<u>Jumper</u>	<u>Function</u>
mounted	Adjustment.
+ open	Normal use.

Strap 6.

Testpoints for adjustment of floppy disk controller.

* * * * *
1 2 3 4 5

PIN

1	GND
2	WD
3	TG43
4	DIRC
5	GND

Strap 7.

Function: EPROM size.

Position: A 11,3

* * *
1 2 3

<u>Jumper</u>	<u>Function</u>
+ 1-2	EPROM 2764-3 or 27128-3.
2-3	EPROM 27256-3.

Cables and connectors:

The connection between the DIOC module and the disks and serial channels is made with four flat cable connectors.

The headers mounted on the PCB are positioned as follows:

Winchester disk : C 5,7. 50 pin

Floppy disk : C 4,7. 50 pin

Streaming tape : C 3,7. 50 pin

Serial interface : C 5,4 34 pin

Service port : C 5,2 20 pin

Adjustments:

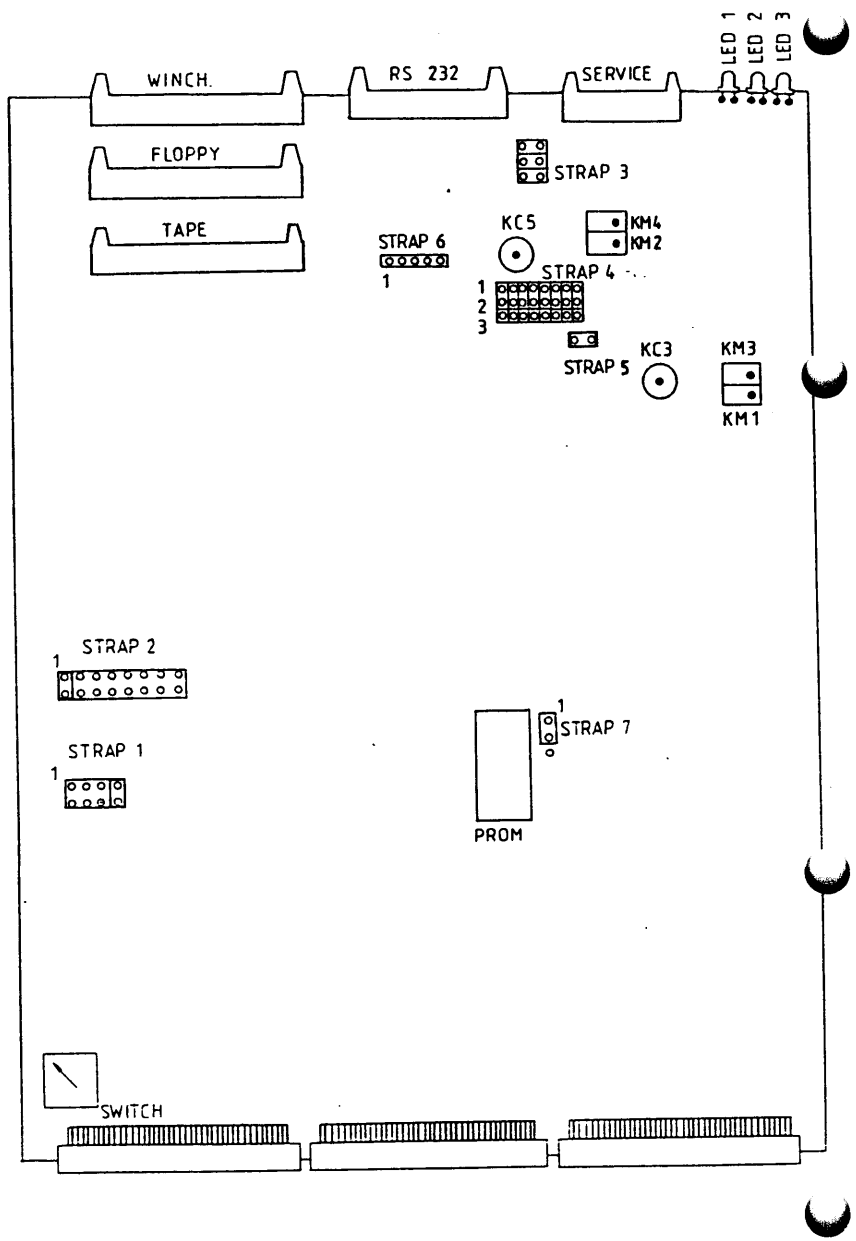
Adjustment of PPL in the floppy interface see supermax technical note 3, revision 1.

Indicator LEDs.

LED1: Off: No error. Upon power up.
On: DIOC program loaded. Waiting for first command.

LED2: Off: No error. Upon power up.
On: Hard error on disk during bootstrap.

LED3: Off: Selftest completed.
On: Upon power up reset.



Type: DIOC 4000

Data sheet no.: 17

Revision no.: 0

Date: 880916

General description:

The DIOC is a high performance Disk IO Controller for the Supermax system. The DIOC is built around a 32 bit microprocessor and contains two Small Computer Standard Interfaces, SCSI, and 4 or 8 Mbyte disk cache memory.

Architecture:

The DIOC is based on a 20 MHz Motorola 68020 processor. The memory system consists of three parts.

1. 1 Mbyte high speed local DRAM with byte parity for the MC68020 program and data. The organisation is 256k by 36 bit.
2. 4 Mbyte high speed multiport DRAM with byte parity used as disk cache and data buffer. The organisation is 1M by 36 bit.
3. Additional 4 Mbyte high speed multiport DRAM with byte parity used as disk cache. The organisation is 1M by 36 bit.

Two fully independent DMA channels transfer data between the SCSI interfaces and the disk cache memory. The SCSI ports are 8 bit wide and data are packed to 32 bit words before data are transferred through a pipeline to and from the disk cache memory.

Data are transferred between the disk cache memory and the main memory modules with a Block Transfer Unit, BTU. The BTU is a device used to move blocks of data. Data are transferred through a pipeline in 32 bit words and the BTU uses single word or burst transfers on the Supermax I/O bus. Burst transfers are used for high speed and small I/O bus load.

The DIOC contains firmware for bootstrapping, selftest and diagnostics.

Interface to I/O bus:

The DIOC has a standard interface to the common Supermax I/O bus. The local memory bus is not used.

Active cycles : Byte (8 bit) read and write.
Word (16 bit) read and write.
Double word (32 bit) read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Interface to peripheral equipment:

The interface is the Small Computer Standard Interface ANSI X3T9.2, SCSI. The interfaces are based on a VLSI design and supports the optional features like arbitration, disconnect, reconnect and parity.

The two connectors are 50 pin flatcable headers. DIN-41651.

PIN	Signal	Signal	PIN
01	GND	-DB(0)	02
03	GND	-DB(1)	04
05	GND	-DB(2)	06
07	GND	-DB(3)	08
09	GND	-DB(4)	10
11	GND	-DB(5)	12
13	GND	-DB(6)	14
15	GND	-DB(7)	16
17	GND	-DB(P)	18
19	GND	GND	20
21	GND	GND	22
23	GND	GND	24
25	GND	TPOW	26
27	GND	GND	28
29	GND	GND	30
31	GND	-atn	32
33	GND	GND	34
35	GND	-bsy	36
37	GND	-ack	38
39	GND	-rst	40
41	GND	-msg	42
43	GND	-sel	44
45	GND	-c/d	46
47	GND	-req	48
49	GND	-i/o	50

- designates active low signals.

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system.

Power requirements:

Voltage		Typ. current
+ 5	+ -5%	15.0 A
+12	+ -5%	0.1 A
-12	+ -5%	0.1 A

Physical dimension:

Standard Supermax module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a DIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Flat cables for the interfaces.

These items are described in details in the following text.

Unit number/priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The DIOC module uses two priorities. The DIOC module is equipped with a unit number switch. The switch gives the module a unit number and two priorities. The priorities are compatible with priority PALS marked Pxy0.

Supermax technical data sheet.
Module: DIOC 4000

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Switch position	Unit number	Priority 1	Priority 0
0	0x00	14	20
1	0x01	21	22
2	0x02	23	24
3	0x03	30	31
4	0x04	32	33
5	0x05	34	40
6	0x06	41	42
7	0x07	43	44

8	0x08	14	20
9	0x09	21	22
A	0x0a	23	24
B	0x0b	30	31
C	0x0c	32	33
D	0x0d	34	40
E	0x0e	41	42
F	0x0f	43	44

Straps and jumpers:

+ designates factory installed position.

Strap 1.

Function: Baud rate to service port. Connected to both TxClk
and RxClk.

Name : ST2

Position: L-12

*	*	*	*	*	*	*	*
*	*	*	*	*	*	*	*
1	2	3	4	5	6	7	

Jumper

Clock

1	19200 baud.
+ 2	9600 baud.
3	4800 baud.
4	2400 baud.
5	1200 baud.
6	600 baud.
7	300 baud.

Strap 2.

Function: MC68020 internal cache disable.

Name : ST3

Position: H-6

Jumper

Function

installed	Cache disable.
+ open	Cache enable.

Strap 3.

Function: Termination power to SCSI interface connector CN1.
Name : ST8
Position: C-14

* * *
1 2 3

Jumper

Function

1-2 No termination power.
+ 2-3 Termination power to the cable.

Strap 4.

Function: Termination power to SCSI interface connector CN3.
Name : ST10
Position: C-14

* * *
1 2 3

Jumper

Function

1-2 No termination power.
+ 2-3 Termination power to the cable.

Cables and connectors:

The headers mounted on the PCB are positioned as follows:

SCSI interface 0 :
Connector name CN1, position C-16.

SCSI interface 1 :
Connector name CN3, position C-14.

Service port
Connector name CONJ4, position K-16.

Indicator LEDs.

LED1, position M-16.

Off: No error.

On: Parity error in program memory.

LED2, position M-16.

Off: The processor is halted.

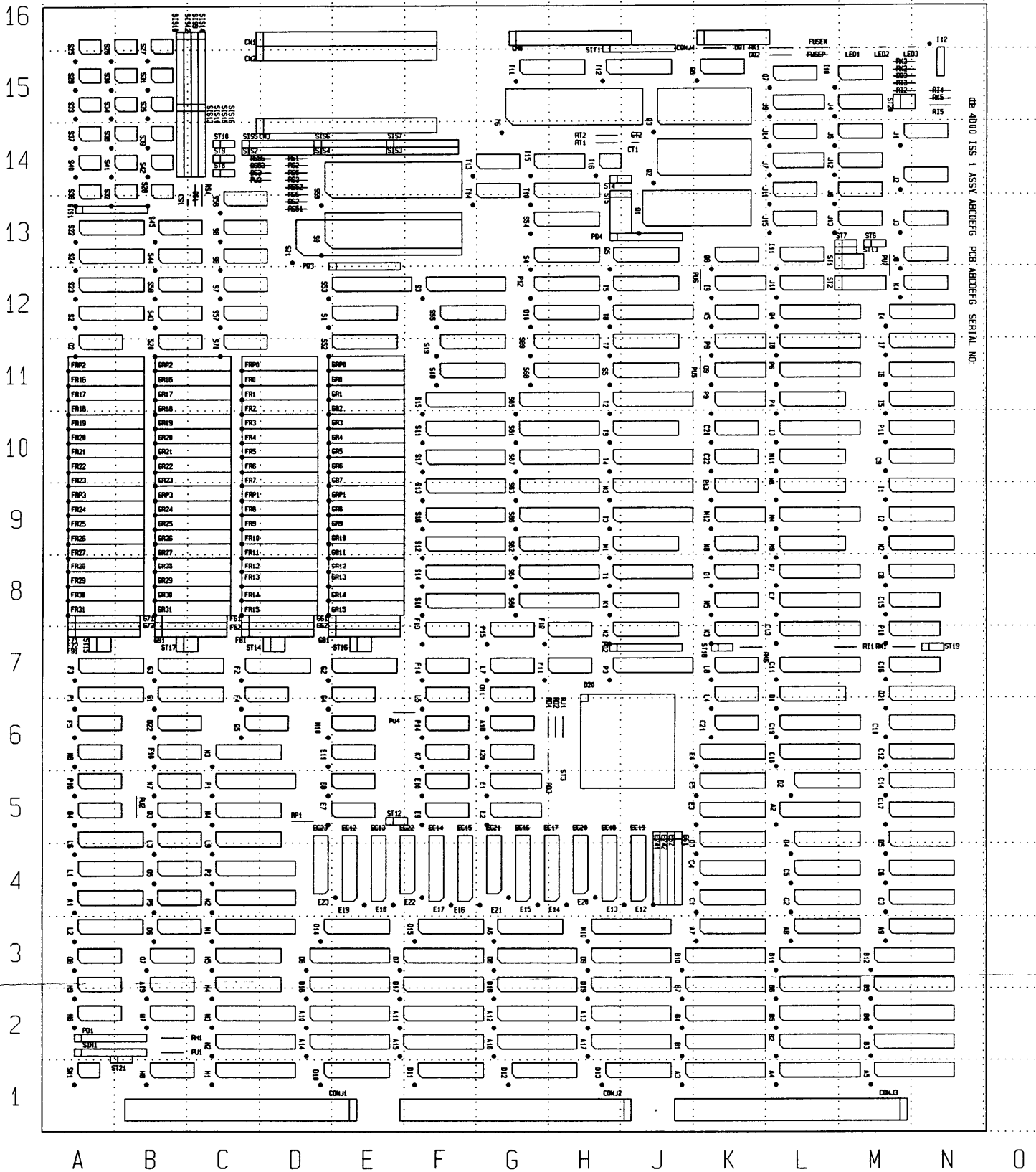
On: The processor is running.

LED3, position M-16.

Off: No error.

On: The program has detected a fault condition.

PRELIMINARY



DE 4000 ISS 1 ASSY ABCDEFG PCB ABCDEFG SERIAL NO.

Component locations

PCB: 4000 / DIOC3

Issue: 1
Date: 880112



dansk data elektronik a/s
herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

PRELIMINAR

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A1	74ALS574	A4	D7	74ALS646	E3	FR20	81C1000-12PSZ	A10
A2	74LS461	L5	D8	74ALS646	G3	FR21	81C1000-12PSZ	A10
A3	74LS461	J1	D9	74ALS646	H3	FR22	81C1000-12PSZ	A10
A4	74LS461	L1	D10	74ALS645	D1	FR23	81C1000-12PSZ	A10
A5	74LS461	M1	D11	74ALS645	F1	FR24	81C1000-12PSZ	A9
A6	74LS593	G3	D12	74ALS645	G1	FR25	81C1000-12PSZ	A9
A7	74LS593	K3	D13	74ALS645	H1	FR26	81C1000-12PSZ	A9
A8	74LS593	L3	D14	74ALS645	D3	FR27	81C1000-12PSZ	A9
A9	74LS593	M3	D15	74ALS645	F3	FR28	81C1000-12PSZ	A8
A10	74ALS646	D2	D16	74ALS646	D2	FR29	81C1000-12PSZ	A8
A11	74ALS646	E2	D17	74ALS646	E2	FR30	81C1000-12PSZ	A8
A12	74ALS646	G2	D18	74ALS646	G2	FR31	81C1000-12PSZ	A8
A13	74ALS646	H2	D19	74ALS646	H2	FUSEM	MICROFUSE	L16
A14	74ALS646	D2	D20	mc68020	H7	FUSEP	MICROFUSE	L15
A15	74ALS646	E2	D21	74ALS573	M6	F1	74AS244	A6
A16	74ALS646	G2	D22	74AS04	B6	F2	74AS244	C7
A17	74ALS646	H2	EC12	220nfdip	E5	F3	74AS244	A7
A18	74LS32	G6	EC13	220nfdip	E5	F4	74AS32	C6
A19	74LS08	B2	EC14	220nfdip	F5	F5	74AS32	A6
A20	74LS32	G6	EC15	220nfdip	F5	F10	74AS08	B6
B1	74LS461	J2	EC16	220nfdip	G5	F11	74AS280	G7
B2	74LS461	L2	EC17	220nfdip	G5	F12	74AS280	G7
B3	74LS461	M2	EC18	220nfdip	H5	F13	74AS280	F7
B4	74LS461	J2	EC19	220nfdip	J5	F14	74AS280	F7
B5	74LS461	L2	EC20	220nfdip	H5	F61	SIL 10-2-330	C8
B6	74LS461	M2	EC21	220nfdip	G5	F62	SIL 10-2-330	C8
B7	74LS461	J2	EC22	220nfdip	E5	F71	SIL 10-2-330	A8
B8	74LS461	L2	EC23	220nfdip	D5	F72	SIL 10-2-330	A8
B9	74LS461	M2	E1	74LS590	G5	F81	SIL 10-2-330	C7
B10	74LS461	J3	E2	74LS590	G5	F91	SIL 10-2-330	A7
B11	74LS461	L3	E3	74ALS244	K5	GRP0	81C1000-12PSZ	D11
B12	74LS461	M3	E4	74ALS244	K6	GRP1	81C1000-12PSZ	D9
CN1	3M50	C16	E5	74ALS244	K5	GRP2	81C1000-12PSZ	B11
CN2	NOT USED	C15	E7	74AS280	D5	GRP3	81C1000-12PSZ	B9
CN3	3M50	C14	E8	74AS280	D5	GRO	81C1000-12PSZ	D11
CN5	3M34	G16	E9	74AS280	F5	GR1	81C1000-12PSZ	D11
CONJ1	DIN C96	E1	E10	74AS280	F5	GR2	81C1000-12PSZ	D11
CONJ2	DIN C96	J1	E11	74AS08	D6	GR3	81C1000-12PSZ	D10
CONJ3	DIN C96	M1	E12	81C256-10	J4	GR4	81C1000-12PSZ	D10
CONJ4	3M20	K16	E13	81C256-10	H4	GR5	81C1000-12PSZ	D10
CS1	NOT USED	B14	E14	81C256-10	H4	GR6	81C1000-12PSZ	D10
CT1	NOT USED	J14	E15	81C256-10	G4	GR7	81C1000-12PSZ	D10
CT2	NOT USED	J14	E16	81C256-10	F4	GR8	81C1000-12PSZ	D9
C1	74ALS573	K4	E17	81C256-10	F4	GR9	81C1000-12PSZ	D9
C2	74ALS573	L4	E18	81C256-10	E4	GR10	81C1000-12PSZ	D9
C3	74ALS573	M4	E19	81C256-10	E4	GR11	81C1000-12PSZ	D9
C4	74ALS573	K4	E20	81C256-10	H4	GR12	81C1000-12PSZ	D8
C5	74ALS573	L4	E21	81C256-10	G4	GR13	81C1000-12PSZ	D8
C6	74ALS573	M4	E22	81C256-10	F4	GR14	81C1000-12PSZ	D8
C7	74ALS873	L8	E23	81C256-10	D4	GR15	81C1000-12PSZ	D8
C8	74ALS573	M8	E61	SIL 10-2-330	J5	GR16	81C1000-12PSZ	B11
C9	74ALS645	M10	E62	SIL 10-2-330	J5	GR17	81C1000-12PSZ	B11
C10	74ALS645	M6	E241	SIL 10-2-330	J5	GR18	81C1000-12PSZ	B11
C11	74ALS873	L7	E242	SIL 10-2-330	J5	GR19	81C1000-12PSZ	B10
C12	74ALS573	M6	FRP0	81C1000-12PSZ	C11	GR20	81C1000-12PSZ	B10
C13	74ALS873	L7	FRP1	81C1000-12PSZ	C9	GR21	81C1000-12PSZ	B10
C14	74AS573	M5	FRP2	81C1000-12PSZ	A11	GR22	81C1000-12PSZ	B10
C15	74LS590	M8	FRP3	81C1000-12PSZ	A9	GR23	81C1000-12PSZ	B10
C16	74LS590	M7	FR0	81C1000-12PSZ	C11	GR24	81C1000-12PSZ	B9
C17	74AS573	M5	FR1	81C1000-12PSZ	C11	GR25	81C1000-12PSZ	B9
C18	SDT6116SA35TP	L6	FR2	81C1000-12PSZ	C11	GR26	81C1000-12PSZ	B9
C19	SDT6116SA35TP	L6	FR3	81C1000-12PSZ	C10	GR27	81C1000-12PSZ	B9
C20	74AS32	K10	FR4	81C1000-12PSZ	C10	GR28	81C1000-12PSZ	B8
C21	74AS32	K6	FR5	81C1000-12PSZ	C10	GR29	81C1000-12PSZ	B8
C22	74F74	K10	FR6	81C1000-12PSZ	C10	GR30	81C1000-12PSZ	B8
DQ1	1N4148	K16	FR7	81C1000-12PSZ	C10	GR31	81C1000-12PSZ	B8
DQ2	1N4148	K15	FR8	81C1000-12PSZ	C9	G1	74AS244	B6
DQ3	1N4148	M15	FR9	81C1000-12PSZ	C9	G2	74AS244	D7
DS1	NOT USED	C14	FR10	81C1000-12PSZ	C9	G3	74AS244	B7
DS2	1N4002	D13	FR11	81C1000-12PSZ	C9	G4	74AS32	D6
DS3	1N4002	C14	FR12	81C1000-12PSZ	C8	G5	74AS32	C6
DS53	1N4002	C14	FR13	81C1000-12PSZ	C8	G61	SIL 10-2-330	D8
D1	74ALS574	L6	FR14	81C1000-12PSZ	C8	G62	SIL 10-2-330	D8
D2	74ALS573	L5	FR15	81C1000-12PSZ	C8	G71	SIL 10-2-330	B8
D3	74ALS573	K4	FR16	81C1000-12PSZ	A11	G72	SIL 10-2-330	B8
D4	74ALS573	L4	FR17	81C1000-12PSZ	A11	G81	SIL 10-2-330	D7
D5	74ALS573	M4	FR18	81C1000-12PSZ	A11	G91	SIL 10-2-330	B7
D6	74ALS646	D3	FR19	81C1000-12PSZ	A10	H1	UPXX	C1

Component locations

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PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
H2	PPE0	C2	O7	74F74	B3	SIS11	NOT USED	B15
H3	PPF0	C2	O8	74AS00	A3	SIS12	NOT USED	B16
H4	74AS641	C2	O9	74S133	K11	SIS13	NOT USED	B15
H5	74AS641	C3	O10	D3360	G12	SIS14	NOT USED	C16
H6	74F74	A2	O11	74F74	G6	SIS15	NOT USED	C15
H7	74F74	B2	PD1	SIL 10-1-101	A2	SIS16	NOT USED	C15
H8	74LS14	B1	PD2	SIL 10-1-101	H7	SIT1	SIL 10-1-151	H16
H9	74AS32	A2	PD3	SIL 10-1-101	D13	ST1	JUMPER (1x2)	L13
H10	74AS04	D6	PD4	SIL 10-1-101	H13	ST2	JUMPER (2x7)	L12
I1	74LS642	M9	PU1	1kohm	B2	ST3	JUMPER (1x2)	H6
I2	74LS642	M9	PU2	1kohm	B5	ST4	NOT USED	H14
I3	D3040	L10	PU3	1kohm	C14	ST5	JUMPER (1x2)	H14
I4	74ALS574	M12	PU4	1kohm	E6	ST6	JUMPER (1x2)	M13
I5	74ALS573	M11	PU5	1kohm	K11	ST7	JUMPER (1x2)	L13
I6	74AS574	M11	PU6	1kohm	K13	ST8	JUMPER (1x3)	C14
I7	D3370	M11	PU7	1kohm	M13	ST9	JUMPER	C14
I8	D3051	L11	P1	D3132	C5	ST10	JUMPER	C14
I9	74LS163	K12	P2	D3153	C4	ST12	JUMPER	E5
I10	7438	L15	P3	D3180	H7	ST13	JUMPER	L13
I11	74LS74	L13	P4	D3200	L11	ST14	JUMPER	D7
I12	debugswitch	N16	P5	74F74	B4	ST15	JUMPER	A7
J1	osc. 32mHz	M14	P6	D3330	L11	ST16	JUMPER	E7
J2	osc. 40MHz	M14	P7	D3340	L8	ST17	JUMPER	B7
J3	osc. 50MHz	M13	P8	74AS138	K11	ST18		K7
J4	74F74	L15	P9	74AS138	K11	ST19		N7
J5	74F74	L14	P10	74S139	M7	ST20	JUMPER	M15
J6	74F74	L13	P11	74LS273	M10	ST21	JUMPER	A2
J7	74LS390	L14	P12	74ALS573	G12	SW1	Hexswitch	A1
J8	74LS393	M13	P13	74AS04	K9	S1	D3260	D12
J9	74LS390	L15	P14	74AS08	F6	S2	D3250	A12
J10	74F74	L12	P15	74AS10	G7	S3	D3221	F12
J11	74AS1004	L13	P16		A5	S4	D3230	G13
J12	74AS1004	L14	Q1	27C512-15	J13	S5	D3240	H11
J13	74AS32	L13	Q2	SOCKET/EEPROM	J14	S6	74AS32	C13
J14	74AS00	L14	Q3	8251A	J14	S7	74AS08	C12
J15	74F74	L13	Q4	D3210	L12	S8	74LS14	C13
K1	D3090	H8	Q5	74ALS645	H13	S9	WD33C93	D13
K2	D3030	H7	Q6	74AS32	K13	S10	74ALS646	F8
K3	74F74	K7	Q7	75188	L15	S11	74ALS646	F10
K4	74F74	M12	Q8	75189	K15	S12	74ALS646	F9
K5	74F74	K12	RD1	10kohm	G6	S13	74ALS646	F9
K7	74AS20	F6	RD2	10kohm	H6	S14	74ALS646	F8
K8	74AS32	K9	RD3	10kohm	G6	S15	74ALS646	F11
LABEL		O-1	RH1	1kohm	B2	S16	74ALS646	F9
LED1	LEDred	M16	RI1	220ohm	L7	S17	74ALS646	F10
LED2	LEDgreen	M16	RI2	10kohm	M15	S18	74ALS573	F11
LED3	LEDred	M16	RI3	10kohm	M15	S19	74ALS645	F11
L1	D3161	A4	RI4	10kohm	N15	S20	74AS32	B11
L2	D3170	A3	RI5	10kohm	N15	S21	WD33C92	D13
L3	74F74	B4	RJ1	1kohm	H6	S22	74ALS576	A13
L4	74LS74	K6	RK1	150ohm	K16	S23	16L8A	A12
L5	74F74	F6	RK2	150ohm	M15	S24	16L8A	A13
L6	74ALS244-1	A4	RK3	150ohm	M15	S25	75176B	A15
L7	74AS00	G7	RK5	10kohm	N15	S26	75176B	A15
L8	74AS08	K7	RK6	10kohm	K7	S27	75176B	B15
L9	D3380	C4	RM1		M7	S28	75176B	B13
M1	D3070	H9	RP1	1kohm	D5	S29	75176B	A15
M2	D3060	M9	RS1	1kohm	D14	S30	75176B	A15
M3	D3080	H9	RS2	1kohm	D14	S31	75176B	B15
M4	D335140	L9	RS3	1kohm	D14	S32	75176B	A13
M5	74F74	K8	RS4	NOT USED	C14	S33	75176B	A15
M6	74AS32	A6	RS5	NOT USED	D14	S34	75176B	A15
M7	74AS32	B5	RS6	Microfuse 1A	D14	S35	75176B	B15
M8	D3300	L9	RS51	1kohm	D13	S36	75176B	A13
M9	D3190	L9	RS52	2k7ohm	D14	S37	75176B	A14
M10	D3310	H3	RS56	Microfuse 1A	C14	S38	75176B	A14
M11	74ALS580	L10	RT1	NOT USED	H14	S39	75176B	B14
M12	74AS175	K9	RT2	NOT USED	H14	S40	75176B	A14
N1	D3101	C3	SIH1	SIL 10-1-103	A2	S41	75176B	A14
N2	D3111	C4	SIS1	NOT USED	A13	S42	75176B	B14
N3	D3142	C6	SIS2	SIL 10-4-221/331	C14	S43	74F74	B12
N4	74LS541	C5	SIS3	SIL 10-4-221/331	E14	S44	7438	B13
O1	74AS21	K8	SIS4	SIL 10-4-221/331	D14	S45	74LS08	B13
O2	74AS11	A11	SIS5	SIL 10-4-221/331	C14	S52	D3250	D11
O3	74AS08	B5	SIS6	SIL 10-4-221/331	D14	S53	D3221	D12
O4	74F74	A5	SIS7	SIL 10-4-221/331	E14	S54	D3230	G13
O5	74F74	B4	SIS9	NOT USED	C16	S55	D3240	F12
O6	74F74	B3	SIS10	NOT USED	B16	S56	74AS32	C13

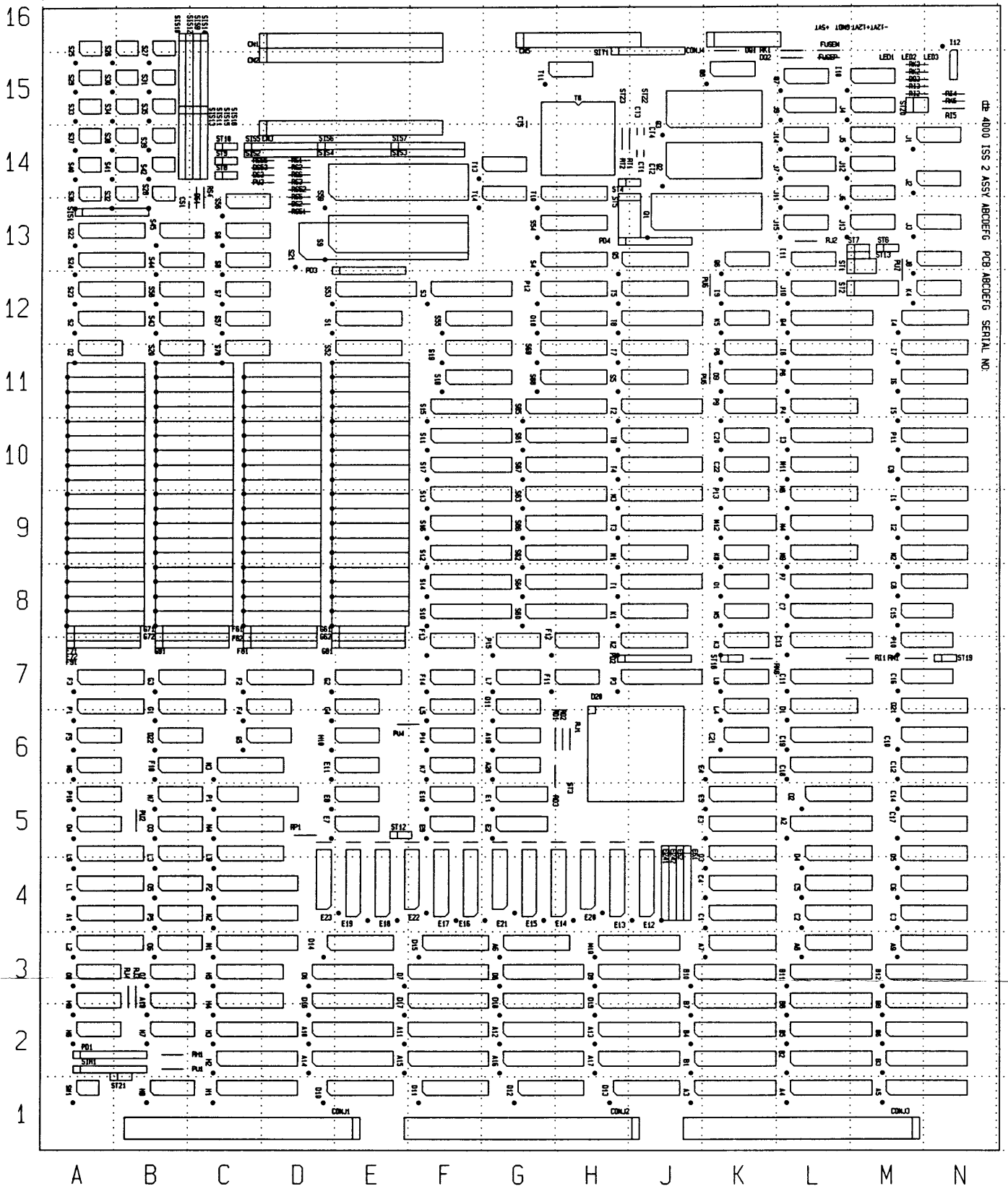
Component locations

PCB: 4000 / DIOC3

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DB 4800 ISS 2 ASSY AB00E6 PCB AB00E6 SERIAL NO.

Component locations

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Issue: 2
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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+5VT	TESTPOINT	L16	D1	74ALS574	L6	FR14	81C1000-12PSZ	C8
+12VT	TESTPOINT	M16	D2	74ALS573	L5	FR15	81C1000-12PSZ	C8
-12VT	TESTPOINT	M16	D3	74ALS573	K4	FR16	81C1000-12PSZ	A11
A1	74ALS574	A4	D4	74ALS573	L4	FR17	81C1000-12PSZ	A11
A2	74LS461	L5	D5	74ALS573	M4	FR18	81C1000-12PSZ	A11
A3	74LS461	J1	D6	74ALS646	D3	FR19	81C1000-12PSZ	A10
A4	74LS461	L1	D7	74ALS646	E3	FR20	81C1000-12PSZ	A10
A5	74LS461	M1	D8	74ALS646	G3	FR21	81C1000-12PSZ	A10
A6	74LS593	G3	D9	74ALS646	H3	FR22	81C1000-12PSZ	A10
A7	74LS593	K3	D10	74ALS645	D1	FR23	81C1000-12PSZ	A10
A8	74LS593	L3	D11	74ALS645	F1	FR24	81C1000-12PSZ	A9
A9	74LS593	M3	D12	74ALS645	G1	FR25	81C1000-12PSZ	A9
A10	74ALS646	D2	D13	74ALS645	H1	FR26	81C1000-12PSZ	A9
A11	74ALS646	E2	D14	74ALS645	D3	FR27	81C1000-12PSZ	A9
A12	74ALS646	G2	D15	74ALS645	F3	FR28	81C1000-12PSZ	A8
A13	74ALS646	H2	D16	74ALS646	D2	FR29	81C1000-12PSZ	A8
A14	74ALS646	D2	D17	74ALS646	E2	FR30	81C1000-12PSZ	A8
A15	74ALS646	E2	D18	74ALS646	G2	FR31	81C1000-12PSZ	A8
A16	74ALS646	G2	D19	74ALS646	H2	FUSEM	Microfuse	L16
A17	74ALS646	H2	D20	MC68020	H7	FUSEP	Microfuse	L15
A18	74LS32	G6	D21	74ALS573	M6	F1	74AS244	A6
A19	74LS08	B2	D22	74AS04	B6	F2	74AS244	C7
A20	74LS32	G6	EC12	220nF dip	E5	F3	74AS244	A7
B1	74LS461	J2	EC13	220nF dip	E5	F4	74AS32	C6
B2	74LS461	L2	EC14	220nF dip	F5	F5	74AS32	A6
B3	74LS461	M2	EC15	220nF dip	F5	F10	74AS08	B6
B4	74LS461	J2	EC16	220nF dip	G5	F11	74AS280	G7
B5	74LS461	L2	EC17	220nF dip	G5	F12	74AS280	G7
B6	74LS461	M2	EC18	220nF dip	H5	F13	74AS280	F7
B7	74LS461	J2	EC19	220nF dip	J5	F14	74AS280	F7
B8	74LS461	L2	EC20	220nF dip	H5	F61	SIL 10-2-330	C8
B9	74LS461	M2	EC21	220nF dip	G5	F62	SIL 10-2-330	C8
B10	74LS461	J3	EC22	220nF dip	E5	F71	SIL 10-2-330	A8
B11	74LS461	L3	EC23	220nF dip	D5	F72	SIL 10-2-330	A8
B12	74LS461	M3	E1	74LS590	G5	F81	SIL 10-2-330	C7
CN1	3M50	C16	E2	74LS590	G5	F91	SIL 10-2-330	A7
CN2	NOT USED	C15	E3	74ALS244	K5	GNDT	TESTPOINT	L16
CN3	3M50	C14	E4	74ALS244	K6	GRPO	81C1000-12PSZ	D11
CN5	3M34	G16	E5	74ALS244	K5	GRP1	81C1000-12PSZ	D9
CONJ1	DIN C96	E1	E7	74AS280	D5	GRP2	81C1000-12PSZ	B11
CONJ2	DIN C96	J1	E8	74AS280	D5	GRP3	81C1000-12PSZ	B9
CONJ3	DIN C96	M1	E9	74AS280	F5	GRO	81C1000-12PSZ	D11
CONJ4	3M20	K16	E10	74AS280	F5	GR1	81C1000-12PSZ	D11
CS1	NOT USED	B14	E11	74AS08	D6	GR2	81C1000-12PSZ	D11
CT1	1nF	J14	E12	81C256-10	J4	GR3	81C1000-12PSZ	D10
CT2	15nF	J14	E13	81C256-10	H4	GR4	81C1000-12PSZ	D10
CT3	33nF	J14	E14	81C256-10	H4	GR5	81C1000-12PSZ	D10
CT4	12nF	J14	E15	81C256-10	G4	GR6	81C1000-12PSZ	D10
CT5	1nF	G15	E16	81C256-10	F4	GR7	81C1000-12PSZ	D10
C1	74ALS573	K4	E17	81C256-10	F4	GR8	81C1000-12PSZ	D9
C2	74ALS573	L4	E18	81C256-10	E4	GR9	81C1000-12PSZ	D9
C3	74ALS573	M4	E19	81C256-10	E4	GR10	81C1000-12PSZ	D9
C4	74ALS573	K4	E20	81C256-10	H4	GR11	81C1000-12PSZ	D9
C5	74ALS573	L4	E21	81C256-10	G4	GR12	81C1000-12PSZ	D8
C6	74ALS573	M4	E22	81C256-10	F4	GR13	81C1000-12PSZ	D8
C7	74ALS873	L8	E23	81C256-10	D4	GR14	81C1000-12PSZ	D8
C8	74ALS573	M8	E61	SIL 10-2-330	J5	GR15	81C1000-12PSZ	D8
C9	74ALS645	M10	E62	SIL 10-2-330	J5	GR16	81C1000-12PSZ	B11
C10	74ALS645	M6	E241	SIL 10-2-330	J5	GR17	81C1000-12PSZ	B11
C11	74ALS873	L7	E242	SIL 10-2-330	J5	GR18	81C1000-12PSZ	B11
C12	74ALS573	M6	FRPO	81C1000-12PSZ	C11	GR19	81C1000-12PSZ	B10
C13	74ALS873	L7	FRP1	81C1000-12PSZ	C9	GR20	81C1000-12PSZ	B10
C14	74AS573	M5	FRP2	81C1000-12PSZ	A11	GR21	81C1000-12PSZ	B10
C15	74LS590	M8	FRP3	81C1000-12PSZ	A9	GR22	81C1000-12PSZ	B10
C16	74LS590	M7	FRO	81C1000-12PSZ	C11	GR23	81C1000-12PSZ	B10
C17	74AS573	M5	FR1	81C1000-12PSZ	C11	GR24	81C1000-12PSZ	B9
C18	IDT6116SA35TP	L6	FR2	81C1000-12PSZ	C11	GR25	81C1000-12PSZ	B9
C19	IDT6116SA35TP	L6	FR3	81C1000-12PSZ	C10	GR26	81C1000-12PSZ	B9
C20	74AS32	K10	FR4	81C1000-12PSZ	C10	GR27	81C1000-12PSZ	B9
C21	74AS32	K6	FR5	81C1000-12PSZ	C10	GR28	81C1000-12PSZ	B8
C22	74F74	K10	FR6	81C1000-12PSZ	C10	GR29	81C1000-12PSZ	B8
DQ1	1N4148	K16	FR7	81C1000-12PSZ	C10	GR30	81C1000-12PSZ	B8
DQ2	1N4148	K15	FR8	81C1000-12PSZ	C9	GR31	81C1000-12PSZ	B8
DQ3	1N4148	M15	FR9	81C1000-12PSZ	C9	G1	74AS244	B6
DS1	NOT USED	C14	FR10	81C1000-12PSZ	C9	G2	74AS244	D7
DS2	1N4002	D13	FR11	81C1000-12PSZ	C9	G3	74AS244	B7
DS3	1N4002	C14	FR12	81C1000-12PSZ	C8	G4	74AS32	D6
DS53	1N4002	C14	FR13	81C1000-12PSZ	C8	G5	74AS32	C6

Component locations

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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
G61	SIL 10-2-330	D8	O1	74AS21	K8	SIS1	NOT USED	A13
G62	SIL 10-2-330	D8	O2	74AS11	A11	SIS2	SIL 10-4-221/331	C14
G71	SIL 10-2-330	B8	O3	74AS08	B5	SIS3	SIL 10-4-221/331	E14
G72	SIL 10-2-330	B8	O4	74F74	A5	SIS4	SIL 10-4-221/331	D14
G81	SIL 10-2-330	D7	O5	74F74	B4	SIS5	SIL 10-4-221/331	C14
G91	SIL 10-2-330	B7	O6	74F74	B3	SIS6	SIL 10-4-221/331	D14
H1	UPXX	C1	O7	74F74	B3	SIS7	SIL 10-4-221/331	E14
H2	PPEv (P20R8-25)	C2	O8	74AS00	A3	SIS9	NOT USED	C16
H3	PPFv (P20R8-25)	C2	O9	74S133	K11	SIS10	NOT USED	B16
H4	74AS641	C2	O10	D336v (P16R6-25)	G12	SIS11	NOT USED	B15
H5	74AS641	C3	O11	74F74	G6	SIS12	NOT USED	B16
H6	74F74	A2	PD1	SIL 10-1-101	A2	SIS13	NOT USED	B15
H7	74F74	B2	PD2	SIL 10-1-101	H7	SIS14	NOT USED	C16
H8	74LS14	B1	PD3	SIL 10-1-101	D13	SIS15	NOT USED	C15
H9	74AS32	A2	PD4	SIL 10-1-101	H13	SIS16	NOT USED	C15
H10	74AS04	D6	PU1	1Kohm	B2	SIT1	SIL 10-1-151	H16
I1	74LS642	M9	PU2	1Kohm	B5	ST1	JUMPER (1x2)	L13
I2	74LS642	M9	PU3	1Kohm	C14	ST2	JUMPER (2x7)	L12
I3	D304v (P20R4-25)	L10	PU4	1Kohm	E6	ST3	JUMPER (1x2)	H6
I4	74ALS574	M12	PU5	1Kohm	K11	ST4	NOT USED	H14
I5	74ALS573	M11	PU6	1Kohm	K13	ST5	JUMPER (1x2)	H14
I6	74AS574	M11	PU7	1Kohm	M13	ST6	JUMPER (1x2)	M13
I7	D337v (P16R8-10)	M11	P1	D313v (P22V10-15)	C5	ST7	JUMPER (1x2)	L13
I8	D305v (P22V10ACN)	L11	P2	D315v (P22V10ACN)	C4	ST8	JUMPER (1x3)	C14
I9	74LS163	K12	P3	D318v (P20L8-15)	H7	ST9	JUMPER	C14
I10	7438	L15	P4	D320v (P16L8-25)	L11	ST10	JUMPER	C14
I11	74LS74	L13	P5	74F74	B4	ST12	JUMPER	E5
I12	Debugswitch	N16	P6	D333v (P20R8-15)	L11	ST13	JUMPER	L13
J1	OSC.32MHz	M14	P7	D334v (P20R8-25)	L8	ST18	JUMPER	K7
J2	OSC.40MHz	M14	P8	74AS138	K11	ST19	JUMPER	N7
J3	OSC.50MHz	M13	P9	74AS138	K11	ST20	JUMPER	M15
J4	74F74	L15	P10	74S139	M7	ST21	JUMPER (1x3)	A2
J5	74F74	L14	P11	74LS273	M10	ST22	JUMPER (1x2)	J15
J6	74F74	L13	P12	74ALS573	G12	ST23	JUMPER (1x2)	H15
J7	74LS390	L14	P13	74AS04	K9	SW1	Hexswitch	A1
J8	74LS393	M13	P14	74AS08	F6	S1	D326v (P16R8-10)	D12
J9	74LS390	L15	P15	74AS10	G7	S2	D325v (P16R8-25)	A12
J10	74F74	L12	P16		A5	S3	D322v (P20R8-25)	F12
J11	74AS1004	L13	Q1	D3BOOT	J13	S4	D323v (P16R8-25)	G13
J12	74AS1004	L14	Q2	Socket	J14	S5	D324v (P16L8-25)	H11
J13	74AS32	L13	Q3	8251A	J14	S6	74AS32	C13
J14	74AS00	L14	Q4	D321v (P20R8-25)	L12	S7	74AS08	C12
J15	74F74	L13	Q5	74ALS645	H13	S8	74LS14	C13
K1	D309v (P16R8-10)	H8	Q6	74AS32	K13	S9	WD33C93	D13
K2	D303v (P16L8-25)	H7	Q7	75188	L15	S10	74ALS646	F8
K3	74F74	K7	Q8	75189	K15	S11	74ALS646	F10
K4	74F74	M12	RD1	10Kohm	G6	S12	74ALS646	F9
K5	74F74	K12	RD2	10Kohm	H6	S13	74ALS646	F9
K7	74AS20	F6	RD3	10Kohm	G6	S14	74ALS646	F8
K8	74AS32	K9	RH1	1Kohm	B2	S15	74ALS646	F11
LED1	LED (red)	M16	RI1	220ohm	L7	S16	74ALS646	F9
LED2	LED (green)	M16	RI2	10Kohm	M15	S17	74ALS646	F10
LED3	LED (red)	M16	RI3	10Kohm	M15	S18	74ALS573	F11
L1	D316v (P16R8-25)	A4	RI4	10Kohm	N15	S19	74ALS645	F11
L2	D317v (P16R8-25)	A3	RI5	10Kohm	N15	S20	74AS32	B11
L3	74F74	B4	RJ1	1Kohm	H6	S21	WD33C92	D13
L4	74LS74	K6	RJ2	100ohm	L13	S22	74ALS576	A13
L5	74F74	F6	RJ3	150ohm	B2	S23	NOT USED	A12
L6	74ALS244-1	A4	RJ4	330ohm	B2	S24	NOT USED	A13
L7	74AS00	G7	RK1	150ohm	K16	S25	OPT (75176B)	A15
L8	74AS08	K7	RK2	150ohm	M15	S26	OPT (75176B)	A15
L9	D338v (P16R8-10)	C4	RK3	150ohm	M15	S27	OPT (75176B)	B15
M1	D307v (P16R8-10)	H9	RK5	10Kohm	N15	S28	OPT (75176B)	B13
M2	D306v (P16R8-10)	M9	RK6	10Kohm	K7	S29	OPT (75176B)	A15
M3	D308v (P20R8-25)	H9	RM1	10Kohm	M7	S30	OPT (75176B)	A15
M4	D335vvv (P20R4-25)	L9	RP1	1Kohm	D5	S31	OPT (75176B)	B15
M5	74F74	K8	RS1	1Kohm	D14	S32	OPT (75176B)	A13
M6	74AS32	A6	RS2	1Kohm	D14	S33	OPT (75176B)	A15
M7	74AS32	B5	RS3	1Kohm	D14	S34	OPT (75176B)	A15
M8	D330v (P16R6-10)	L9	RS4	NOT USED	C14	S35	OPT (75176B)	B15
M9	D319v (P16R8-25)	L9	RS5	NOT USED	D14	S36	OPT (75176B)	A13
M10	D331v (P20R4-25)	H3	RS6	1A Microfuse	D14	S37	OPT (75176B)	A14
M11	74ALS580	L10	RS51	1Kohm	D13	S38	OPT (75176B)	A14
M12	74AS175	K9	RS52	2K7ohm	D14	S39	OPT (75176B)	B14
N1	D310v (P20R4-25)	C3	RS56	1A Microfuse	C14	S40	OPT (75176B)	A14
N2	D311v (P22V10ACN)	C4	RT1	5K6	H14	S41	OPT (75176B)	A14
N3	D314v (P16R8-25)	C6	RT2	560	H14	S42	OPT (75176B)	B14
N4	74LS541	C5	SIH1	SIL 10-1-103	A2	S43	74F74	B12

Component locations

PCB: 4000 / DIOC 3

Issue: 2
Date: 890807



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SECTION 1.1

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Type: NIOC 1600

Data sheet no.: 9

Revision no.: 0

Date: 860827

General description:

The NIOC 1600 is an intelligent Local Area Network Controller in a SUPERMAX system. The NIOC is built around a MC68000 microprocessor and contains the following IO interfaces:

- Ethernet interface. IEEE 802.3.
- 8 asynchronous serial RS-232 interfaces.
- Parallel printer interface.
- Service port interface.

Interface to I/O bus:

The NIOC has a standard interface to the common SUPERMAX I/O bus.

Active cycles : Byte read and write.
Word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Ethernet interface.

The NIOC contains the Ethernet transceiver interface. The transceiver cable is connected to a 16 pin flat cable connector CN3.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01		GND	02
03	C-	C+	04
05	TX-	TX+	06
07	GND	GND	08
09	RX-	RX+	10
11	+12 V	GND	12
13	GND		14
15			16

RS-232 Channels.

The serial interface includes the following programmable options:

- Baudrates from 50 to 38400 baud.
- Character length from 5 to 8 bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.

All RS-232 interface signals are connected to a 60 pin flat cable connector CN1.

SUPERMAX technical data sheet.
Module: NIOC 1600

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Cable description:

PIN	SIGNAL	SIGNAL	PIN
01		GND	02
03		GND	04
05	DTR7	DSR7	06
07	CTS7	RTS7	08
09	RXD7	TXD7	10
11			12
13	DTR6	DSR6	14
15	CTS6	RTS6	16
17	RXD6	TXD6	18
19	GND	GND	20
21	GND	+12V	22
23	GND	-12V	24
25	DTR5	DSR5	26
27	CTS5	RTS5	28
29	RXD5	TXD5	30
31	DSR4	DTR4	32
33	RTS4	CTS4	34
35	TXD4	RXD4	36
37	RTS3	DTR3	38
39	TXD3	DSR3	40
41	DSR2	CTS3	42
43	RTS2	RXD3	44
45	TXD0	DTR2	46
47	RXD0	CTS2	48
49	RTS0	RTS1	50
51	CTS0	CTS1	52
53	DSR0	DSR1	54
55	DTR0	DTR1	56
57	TXD1	TXD2	58
59	RXD1	RXD2	60

Parallel Printer Interface.

The NIOC contains an interface to a parallel printer. The interface is located in a 20 pin flat cable connector CN2. Polarity of handshake signals is selected by straps on the NIOC.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	ACK	GND	02
03	DATA(0)	STROBE	04
05	DATA(1)	GND	06
07	DATA(2)	GND	08
09	DATA(3)	GND	10
11	DATA(4)	GND	12
13	DATA(5)	GND	14
15	DATA(6)	GND	16
17	DATA(7)	GND	18
19	BUSY	GND	20

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

The interface to the service port is located in a 20 pin flat cable connector CN0.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND		02
03	TXD		04
05	RXD		06
07	RTS		08
09	CTS		10
11	DSR		12
13	GND	DTR	14
15			16
17			18
19			20

Power requirements:

Voltage		Typ. current
+ 5	+5%	9.0 A
+12	+5%	0.7 A
-12	+5%	0.2 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.

Depth : 415 mm.

Height: 14 mm.

Installation:

Before a NIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Transceiver cable.
- Flat cables for the serial channels and the parallel printer.
- Firmware.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The NIOC module uses one priority. The NIOC module is equipped with a unit number switch, SWU. The switch gives the module a unit number and one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0a	20
B	0x0b	21
C	0x0c	22
D	0x0d	23
E	0x0e	24
F	0x0f	30

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. When the NIOC is installed in a Supermax system pull down resistors are placed on the basic CPU module in the system. If the NIOC is used outside a Supermax system pull down resistors must be placed in position I9.

Firmware:

The firmware is situated in an EPROMs mounted in position Q1, even bytes, and Q2, odd bytes.

The PROMs contain a test program that is executed after power up reset. After the testprogram has been executed the firmware enables the NIOC to be booted in a Supermax system.

Straps and jumpers:

+ designates factory installed position.

AJ1

Function: Controls polarity of the Acknowledge input from the parallel printer port.

+ PIN 1 connected to PIN 2: Acknowledge is an active high input.

PIN 2 connected to PIN 3: Acknowledge is an active low input.

AJ2

Function: Controls polarity of the Busy input from the parallel printer port.

PIN 1 connected to PIN 2: Busy is an active low input.

+ PIN 2 connected to PIN 3: Busy is an active high input.

AJ3

Function: Controls the size of the PROMs:

PROM type 2764:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

PROM type 27128:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

+ PROM type 27256:

PIN 2 connected to PIN 3 and PIN 6 connected to PIN 5.

PROM type 27512:

PIN 2 connected to PIN 3 and PIN 5 connected to PIN 4.

AJ4

Function: Controls the baud rate of the service port.

+ PIN 1 connected to PIN 14: 9600 baud
PIN 2 connected to PIN 13: 4800 baud
PIN 3 connected to PIN 12: 2400 baud
PIN 4 connected to PIN 11: 1200 baud
PIN 5 connected to PIN 10: 600 baud
PIN 6 connected to PIN 9 : 300 baud

AJ5

Function: Controls the time between timer interrupts.

- PIN 1 connected to PIN 14: 5 ms
- + PIN 2 connected to PIN 13: 10 ms
- PIN 3 connected to PIN 12: 20 ms
- PIN 4 connected to PIN 11: 40 ms
- PIN 5 connected to PIN 10: 80 ms

AJ6

Function: Controls polarity of the Strobe signal in the parallel printer interface.

- + PIN 1 connected to PIN 2: Strobe is an active low pulse.
- PIN 2 connected to PIN 3: Strobe is an active high pulse.

AJ7

Function: Controls the reset signal to the NIOC.

- PIN 1 connected to PIN 2: The RESET is generated on the NIOC itself by power up.
- + PIN 2 connected to PIN 3: The RESET signal is taken from the IO bus.

AJ8

Function: Controls the BUS CLOCK signal to the NIOC.

PIN 1 connected to PIN 2: The BUS CLOCK is driven by the NIOC itself. The NIOC does not drive the BUS CLOCK line in the IO bus.

+ PIN 2 connected to PIN 3: The BUS CLOCK on the NIOC is driven by the BUS CLOCK line in the IO bus.

Indicator Leds:

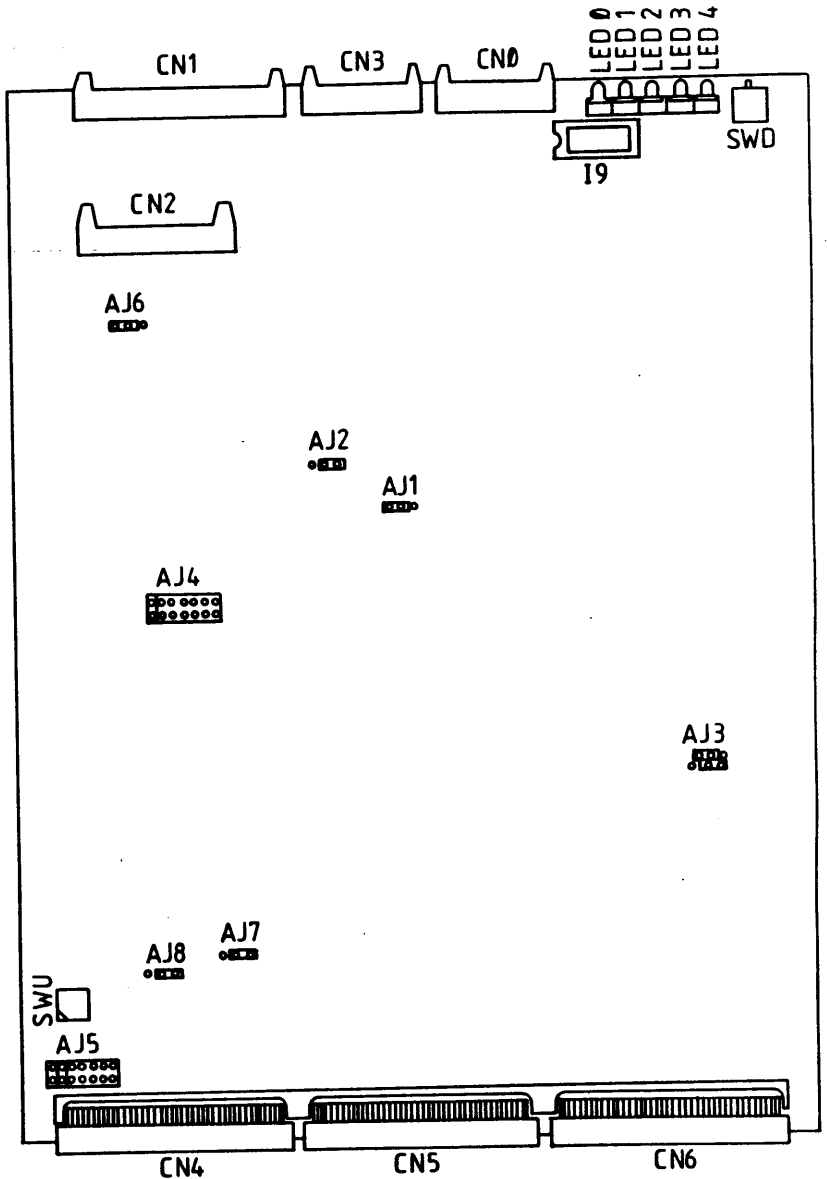
LED0: Indicates activity of the LAN.

LED1: Parity error in memory. Even byte.

LED2: Parity error in memory odd byte.

LED3: The 68000 is in the HALT state.

LED4: The NIOC has activated the error in unit line.





Type: NIOC 3600

Data sheet no.: 15

Revision no.: 0

Date: 870622

General description:

The NIOC 3600 is an intelligent Local Area Network Controller in a SUPERMAX system. The pcb can be used either as a NIOC or as a SIOC2 depending on the components in the board, all straps and capabilities denoted by brackets relates to the SIOC2 version of the board. The NIOC is built around a MC68000 microprocessor and contains the following IO interfaces:

- Ethernet interface. IEEE 802.3.
- (- External i/O bus for serial RS-232 interfaces.)
- (- Parallel printer interface.)
- Service port interface.

Interface to I/O bus:

The NIOC has a standard interface to the common SUPERMAX I/O bus.

Active cycles : Byte read and write.
Word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

Ethernet interface.

The NIOC contains the Ethernet transceiver interface. The transceiver cable is connected to a 16 pin flat cable connector CN3.

Signals denoted GNDS can be strapped to ground by AJ0.
Signals denoted term are just terminated otherwise they are not used.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01		GNDS	02
03	C-	C+	04
05	TX-	TX+	06
07	GNDS	GNDS	08
09	RX-	RX+	10
11	+12 V	GND	12
13	GND	term	14
15	term	GNDS	16

(EXTERNAL BUS SERIAL CHANNELS.)

The serial interface includes the following programmable options:

- Baudrates from 50 to 38400 baud.
- Character length from 5 to 8 bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.

All RS-232 interface boards are connected to a 50 pin flat cable connector CN1.

SUPERMAX technical data sheet.
Module: NIOC 3600

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Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND	D0	02
03	GND	D1	04
05	GND	D2	06
07	GND	D3	08
09	GND	D4	10
11	GND	D5	12
13	GND	D6	14
15	GND	D7	16
17	GND	A10	18
19	GND	A9	20
21	GND	A8	22
23	GND	A7	24
25	GND	A6	26
27	GND	A5	28
29	GND	A4	30
31	GND	A3	32
33	GND	A2	34
35	GND	A1	36
37	GND	A0	38
39	GND	FINT1	40
41	GND	FINT0	42
43	GND	FAS	44
45	GND	FW	46
47	GND	CSD	48
49	GND	RTS1	50

(Parallel Printer Interface.)

The SIOC2 contains an interface to a parallel printer. The interface is located in a 26 pin flat cable connector CN2. Polarity of handshake signals is selected by straps on the SIOC2.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	DS	GND	02
03	DATA(0)	GND	04
05	DATA(1)	GND	06
07	DATA(2)	GND	08
09	DATA(3)	GND	10
11	DATA(4)	PSENSE	12
13	DATA(5)	GND	14
15	DATA(6)	GND	16
17	DATA(7)	GND	18
19	ACK	GND	20
21	BUSY	GND	22
23	CALL(PE)		24
25	SLCT		26

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

The interface to the service port is located in a 20 pin flat cable connector CNO.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND		02
03	TXD		04
05	RXD		06
07	RTS		08
09	CTS		10
11	DSR		12
13	GND	DTR	14
15			16
17			18
19			20

Power requirements:

Voltage	Typ. current	
+ 5	+/-5%	9.0 A
+12	+/-5%	0.1 A
-12	+/-5%	0.1 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a NIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Transceiver cable.
- (- Flat cables for the serial channels and the parallel)
printer.
- Firmware.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot used the same priority. The NIOC module uses one priority. The NIOC module is equiped with a unit number switch, SWU. The switch gives the module a unit number and one priority.

Switch position Unit number Priority

0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12

8	0x08	13
9	0x09	14
A	0x0a	20
B	0x0b	21
C	0x0c	22
D	0x0d	23
E	0x0e	24
F	0x0f	30

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. When the NIOC is installed in a Supermax system pull down resistors are placed on the basic CPU module in the system. If the NIOC is used outside a Supermax system pull down resistors must be placed in position I9.

Firmware:

The firmware is situated in an EPROMs mounted in position Q1, even bytes, and Q2, odd bytes.

The PROMs contain a test program that is executed after power up reset. After the testprogram has been executed the firmware enables the NIOC to be booted in a Supermax system.

Straps and jumpers:

+ designates factory installed position.

(AJ1)

Function: Controls polarity of the Acknowledge input from the parallel printer port.

+ PIN 1 connected to PIN 2: Acknowledge is an active high input.

PIN 2 connected to PIN 3: Acknowledge is an active low input.

(AJ2)

Function: Controls polarity of the Busy input from the parallel printer port.

PIN 1 connected to PIN 2: Busy is an active low input.

+ PIN 2 connected to PIN 3: Busy is an active high input.

AJ3

Function: Controls the size of the PROMs:

PROM type 2764:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

PROM type 27128:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

+ PROM type 27256:

PIN 2 connected to PIN 3 and PIN 6 connected to PIN 5.

PROM type 27512:

PIN 2 connected to PIN 3 and PIN 5 connected to PIN 4.

AJ4

Function: Controls the baud rate of the service port.

+ PIN 1 connected to PIN 14: 9600 baud

PIN 2 connected to PIN 13: 4800 baud

PIN 3 connected to PIN 12: 2400 baud

PIN 4 connected to PIN 11: 1200 baud

PIN 5 connected to PIN 10: 600 baud

PIN 6 connected to PIN 9 : 300 baud

AJ5

Function: Controls the time between timer interrupts.

- PIN 1 connected to PIN 14: 5 ms
- + PIN 2 connected to PIN 13: 10 ms
- PIN 3 connected to PIN 12: 20 ms
- PIN 4 connected to PIN 11: 40 ms
- PIN 5 connected to PIN 10: 80 ms

(AJ6)

Function: Controls polarity of the Strobe signal in the parallel printer interface.

- + PIN 1 connected to PIN 2: Strobe is an active low pulse.
- PIN 2 connected to PIN 3: Strobe is an active high pulse.

AJ7

Function: Controls the reset signal to the NIOC.

- PIN 1 connected to PIN 2: The RESET is generated on the NIOC itself by power up.
- + PIN 2 connected to PIN 3: The RESET signal is taken from the IO bus.

AJ8

Function: Controls the BUS CLOCK signal to the NIOC.

PIN 1 connected to PIN 2: The BUS CLOCK is driven by the NIOC itself. The NIOC does not drive the BUS CLOCK line in the IO bus.

+ PIN 2 connected to PIN 3: The BUS CLOCK on the NIOC is driven by the BUS CLOCK line in the IO bus.

AJ9

Function: Controls the CLOCK signal to the MANCHESTER encoder.

+ PIN 1 connected to PIN 2: The CLOCK is supplied to pin 14 of the manchester encoder.

PIN 2 connected to PIN 3: pin 134 of the manchester encoder is grounded.

AJA

Function: Controls the Manchester encoder.

PIN 1 connected to PIN 2: Pin 13 of the manchester encoder is left floating.

PIN 2 connected to PIN 3: The CLOCK is supplied to pin 13 of the manchester encoder.

AJB

Function: Controls pin 2 of the manchester encoder.

PIN 1 connected to PIN 2: Pin 2 is connected to pin 1 by AC6.

PIN 2 connected to PIN 3: pin 2 is grounded.

(AJC)

Function: Controls the handshake in the external bus.

PIN 1 connected to PIN 2: Timing controlled by external bus.
+ PIN 2 connected to PIN 3: Timing controlled by the SIOC2.

(AJD)

Function: Polarity of write signal (external bus).

+ PIN 1 connected to PIN 2: Internal logic, factory installed.
PIN 2 connected to PIN 3: NA.

(AJE)

Function: Controls enabeling of data drivers (external bus).

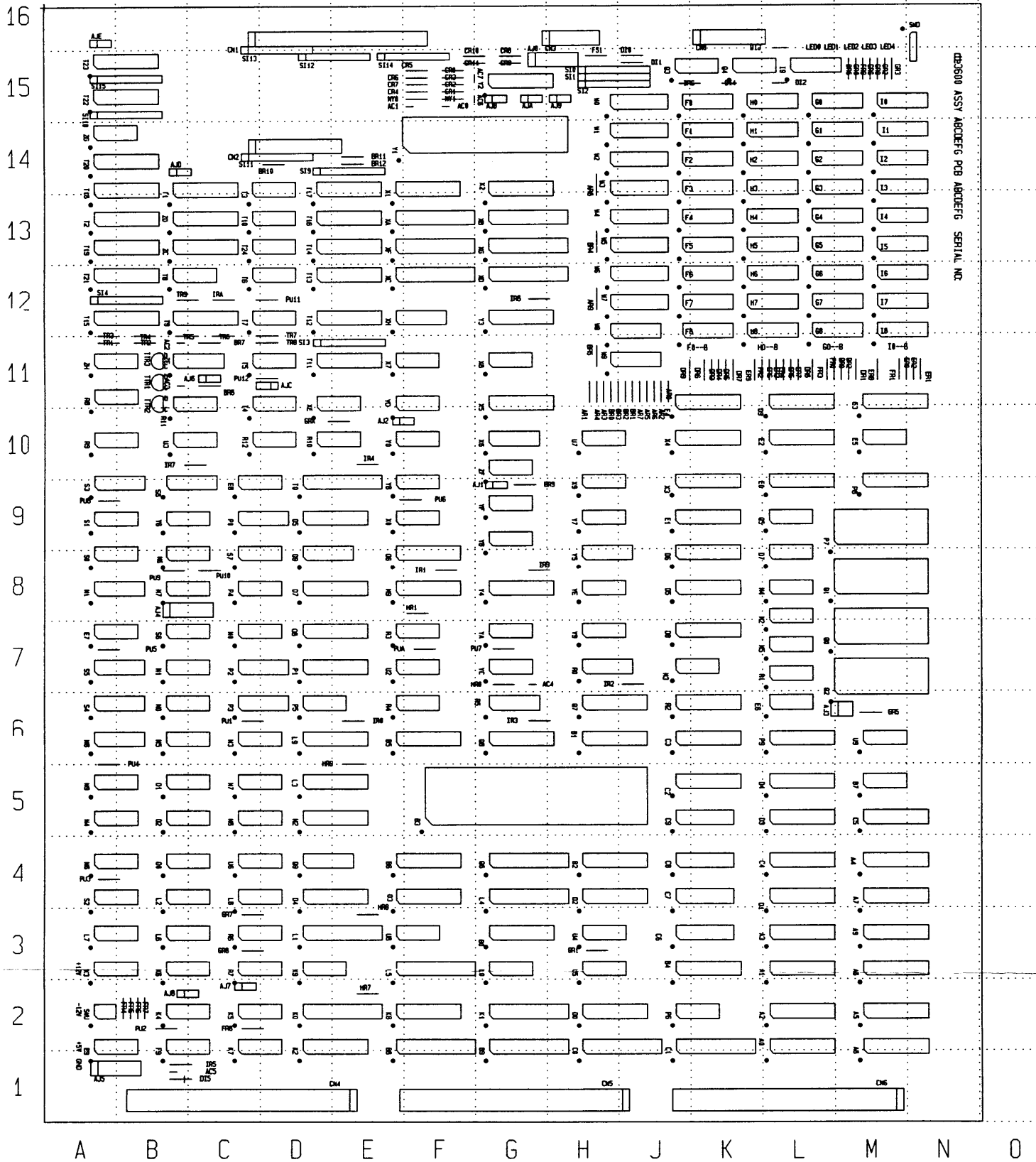
PIN 1 connected to PIN 2:
+ PIN 2 connected to PIN 3: Factory installed.

Indicator Leds:

LED0: Indicates activity of the LAN.
LED1: Parity error in memory. Even byte.
LED2: Parity error in memory odd byte.
LED3: The 68000 is in the HALT state.
LED4: The NIOC has activated the error in unit line.



PRELIMINARY



Component locations

PCB: NIOC / SIOC

Issue: Date:



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PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+5V		A2	CR2		F15	F1		J14
+12V		A3	CR3		F15	F2		J14
-12V		A2	CR4		F15	F3		J13
ACO		F15	CR5		E15	F4		J13
AC1		E15	CR6		E15	F5		J13
AC2		B11	CR7		E15	F6		J12
AC3		B11	CR8		G15	F7		J12
AC4		G7	CR9		G15	F8		J11
AC5		B1	CR10		F15	F9		B1
AC6		F15	CR11		F15	GND		A1
AC7		F15	C0		H1	GRA		E10
AJA		G15	C1		J1	GRO		M15
AJB		G15	C2		J5	GR1		H3
AJC		D11	C3		J6	GR2		M15
AJD		B14	C4		L4	GR3		M15
AJE		A16	C5		M5	GR5		M6
AJO		G15	C6		J3	GR6		M15
AJ1		G9	C7		J4	GR7		D3
AJ2		E10	C8		J4	GR8		C3
AJ3		L6	C9		J5	GR9		M15
AJ4		B8	D10		H15	GO		L15
AJ5		A1	DI1		H15	G1		L14
AJ6		C11	DI2		L15	G2		L14
AJ7		C2	DI3		L16	G3		L13
AJ8		B2	DI4		K15	G4		L13
AJ9		H15	DI5		C1	G5		L13
ARO		J11	DR0		M11	G6		L12
AR1		H11	DR1		M11	G7		L12
AR2		J11	DR2		M11	G8		L11
AR3		H11	DR3		K11	HRO		G7
AR4		H11	DR4		K11	HR1		E8
AR5		J11	DR5		K11	HR7		E2
AR6		J11	DR6		K11	HR8		E3
AR7		J11	DR7		K11	HR9		E6
AR8		H13	DR8		L11	H0		K15
AR9		H12	DR9		J11	H1		K14
A0		L1	D0		H2	H2		K14
A1		L3	D1		L4	H3		K13
A2		L2	D2		H4	H4		K13
A3		L3	D3		L5	H5		K13
A4		M4	D4		L5	H6		K12
A5		M2	D5		J8	H7		K12
A6		M3	D6		J8	H8		K11
A7		M4	D7		L8	IRA		C12
A8		M1	D8		J7	IRO		E6
A9		M3	D9		L10	IR1		F8
BR0		H11	ERO		M11	IR2		H7
BR1		J11	ER1		N11	IR3		G6
BR2		J11	ER2		N11	IR4		E10
BR3		H11	ER3		L11	IR5		C1
BR4		H13	ER4		L11	IR6		K15
BR5		H11	ER5		L11	IR7		B10
BR6		M15	ER6		L11	IR8		G12
BR7		C11	ER7		L11	IR9		G8
BR8		C11	ER8		M11	I0		M15
BR9		G9	ER9		K11	I1		M14
BR10		C14	E0		L9	I2		M14
BR11		E14	E1		J9	I3		M13
BR12		E14	E2		L10	I4		M13
B0		G3	E3		M10	I5		M13
B1		H6	E4		J10	I6		M12
B2		H4	E5		M10	I7		M12
B3		F5	E6		L6	I8		M11
B4		J3	E7		A7	I9		L15
B5		E6	E8		C9	K0		D2
B6		E4	E9		A1	K1		G2
B7		M5	FRO		L11	K2		D1
B8		E1	FR1		M11	K3		A3
B9		G1	FR2		K11	K4		B2
CN0		K16	FR3		L11	K5		C2
CN1		C16	FR4		B2	K6		B3
CN2		C14	FR5		B2	K7		C1
CN3		G16	FR6		B2	K8		E2
CN4		E1	FR7		B2	K9		D3
CN5		J1	FR8		C2	LEDO		L16
CN6		M1	FR9		M15	LED1		L16
CR0		F15	FS1		H15	LED2		M16
CR1		F15	FO		J15	LED3		M16

Component locations

PCB: NIOC / SIOC

Issue: Date:



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PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
LED4		M16	R2		J6	U9		M6
L0		G3	R3		E7	W0		H15
L1		D3	R4		E6	W1		H14
L2		B4	R5		G6	W2		H14
L3		D5	R6		C3	W3		H13
L4		G4	R7		C3	W4		H13
L5		E3	R8		A11	W5		H13
L6		B3	R9		A10	W6		H12
L7		A3	R10		D10	W7		H12
L8		C4	R11		B10	W8		H11
L9		D6	R12		C10	W9		H11
M0		C7	SI0		H15	XA		E13
M1		A8	SI1		H15	XB		G13
M2		L7	SI2		H15	XC		E12
M3		J7	SI3		D11	XD		G12
M4		L8	SI4		A12	XE		D10
M5		L7	SI9		D14	XF		E13
M6		B8	SI10		A15	XG		G13
M7		B8	SI11		C14	XH		E12
M8		A6	SI12		D15	XO		E9
M9		E8	SI13		C16	X1		E13
NY0		F15	SI14		E15	X2		G13
NY1		F15	SI15		A15	X3		J9
NO		B6	SWD		M16	X4		J10
N1		B7	SWU		A2	X5		G10
N2		D5	S0		A8	X6		G10
N3		C6	S1		A9	X7		E11
N4		A5	S2		A4	X8		G11
N5		B6	S3		A9	X9		H9
N6		A4	S4		A6	YA		G7
N7		C5	S5		A7	YB		E9
N8		C5	S6		B7	YC		G7
N9		A5	S7		C8	YD		E10
O0		B4	S8		B9	YE		H8
O1		B5	TR1		A11	YF		G9
O2		B5	TR2		B11	Y0		E10
O3		E4	TR3		A12	Y1		E14
O4		D4	TR4		B12	Y2		G15
O5		D9	TR5		C12	Y3		G12
O6		E8	TR6		C12	Y4		G8
O7		D8	TR7		C12	Y5		H8
O8		D7	TR8		D11	Y6		B9
O9		D8	TR9		B12	Y7		H9
PUA		F7	TTR1		B11	Y8		G9
PU1		C6	TTR2		B11	Y9		H7
PU2		B2	TTR3		B11	ZC		B13
PU3		A4	TO		D9	ZD		B13
PU4		A6	T1		B13	ZE		B11
PU5		A7	T2		A13	ZF		G10
PU6		E9	T3		C13	ZG		A14
PU7		G7	T4		C10	ZH		A11
PU8		A9	T5		C11			
PU9		B8	T6		C12			
PU10		C8	T7		C12			
PU11		C12	T8		B12			
PU12		D11	T9		B12			
P0		C9	T10		C13			
P1		D7	T11		D11			
P2		C7	T12		D12			
P3		C6	T13		D12			
P4		C8	T14		D13			
P5		D6	T15		A12			
P6		J2	T16		D13			
P7		L9	T17		D13			
P8		M9	T18		A13			
P9		L6	T19		A13			
Q0		L7	T20		A14			
Q1		L8	T21		A12			
Q2		L6	T22		A15			
Q3		J15	T23		A15			
Q4		K15	T24		C13			
Q5		L9	U2		E7			
Q6		G4	U3		B10			
Q7		H6	U4		H3			
Q8		G6	U5		H3			
Q9		D4	U6		C4			
R0		H7	U7		H10			
R1		L7	U8		E3			

Component locations

PCB: NIOC / SIOC

Issue: Date:



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Supermax Technical Data Sheet

Type:	MIOC 4600 Module. PCB 4600.
Data sheet no:	23
Revision no:	0
Date:	91-05-01

General Description

The MIOC 4600 is an I/O module in a Supermax system. The MIOC module contains a MC68030 CPU, a maximum of 16Mb local memory, and the following interfaces:

- Interface to the I/O bus.
- Interface to two submodules.
- One RS-232 asynchronous channel (console).
- Service port.

Interface to the I/O bus

The MIOC has a standard interface to the common Supermax I/O bus.

Active cycles	Passive cycles
8 bit read/write	8 bit read/write
16 bit read/write	16 bit read/write
32 bit read/write	32 bit read/write
Read-modify-write	Read-modify-write
	Burst read/write

TABLE 1. I/O bus cycles

Interface to submodules

The MIOC 4600 module is designed to control submodules, which contains the actual I/O interface. Submodules are connected to the MIOC module via the two local connectors. The MIOC 4600 module controls the submodules and will allow

submodules to access the local memory. The submodules may execute the following cycles in the local memory:

- 32 bit read or write cycle
- 16 bit read or write cycle
- 8 bit read or write cycle

The submodule bus is multiplexed between address and data. In the first part of a cycle the bus transfers the address to/from the MIOC module from/to the submodules, and in the second part the bus transfers the data between the MIOC module and the submodules.

Submodule VSB0 connector

Pin	Row a	Row b	Row c
1	AD00	+5V	AD01
2	AD02	GND	AD03
3	AD04	TXDA-	AD05
4	AD06	RTSA	AD07
5	AD08	DTRA	AD09
6	AD10	RXDA-	AD11
7	AD12	CTSA	AD13
8	AD14	DSRA	AD15
9	AD16	+12V	AD17
10	AD18	+12V	AD19
11	AD20	-12V	AD21
12	AD22	GND	AD23
13	AD24	+5V	AD25
14	AD26	Reserved	AD27
15	AD28	Reserved	AD29
16	AD30	Reserved	AD31
17	GND	Reserved	GND
18	IRQ-	Reserved	GND
19	DS-	RESET-	GND
20	WR-	Reserved	GND
21	SP0	FAULT-	SIZE0
22	SP1	GND	PAS-
23	LOCK-	TRIP	SIZE1
24	ERR-	TRAP	GND
25	GND	Reserved	ACK-
26	GND	Reserved	AC
27	GND	Reserved	ASAK1-
28	HIGH	Reserved	ASAK0-
29	LOW	Reserved	CACHE-
30	LOW	Reserved	WAIT-
31	BGIN-	GND	BUSY-
32	BREQ-	+5V	BGOUT-

TABLE 2. Pin assignment, VSB0.

Submodule VSB1 connector

Pin	Row a	Row b	Row c
1	AD00	+5V	AD01
2	AD02	GND	AD03
3	AD04	TXDB-	AD05
4	AD06	RTSB	AD07
5	AD08	DTRB	AD09
6	AD10	RXDB-	AD11
7	AD12	CTSB	AD13
8	AD14	DSRB	AD15
9	AD16	+12V	AD17
10	AD18	+12V	AD19
11	AD20	-12V	AD21
12	AD22	GND	AD23
13	AD24	+5V	AD25
14	AD26	Reserved	AD27
15	AD28	Reserved	AD29
16	AD30	Reserved	AD31
17	GND	Reserved	GND
18	IRQ-	Reserved	GND
19	DS-	RESET-	GND
20	WR-	Reserved	GND
21	SP0	FAULT-	SIZE0
22	SP1	GND	PAS-
23	LOCK-	Reserved	SIZE1
24	ERR-	Reserved	GND
25	GND	Reserved	ACK-
26	GND	Reserved	AC
27	GND	Reserved	ASAK1-
28	LOW	Reserved	ASAK0-
29	HIGH	Reserved	CACHE-
30	LOW	Reserved	WAIT-
31	BGIN-	GND	BUSY-
32	BREQ-	+5V	BGOUT-

TABLE 3. Pin assignment, VSB1.

Interface to service port

The interface to the service port is a modified RS-232C interface. All output signals are *open collector* signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 V when not driven by an output. All signals to the service port are connected to the submodule through the VSB0 connector.

Interface to RS-232 channel

In addition to the service port a second RS-232 asynchronous channel is available. The interface is identical to that of the service port, except that signals are normal RS-232D, the interface is available at the second submodule. All signals to this channel are connected to the submodule through the VSB1 connector.

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	7.0 A
+12 V \pm 5%	0.1 A
-12 V \pm 5%	0.1 A

TABLE 4. Power requirements

Installation

A Supermax MIOC consist of one MIOC module and two submodules. To make the two submodules and the MIOC 4600 into one rigid Supermax module, two mounting brackets must be used.

- One to make a rigid mechanical connection between the MIOC 4600 and the two submodules.
- One to make a stable mechanical connection between the front of the two submodules.

Before a MIOC module is installed in a Supermax system the following items must be selected or checked:

- Unit number/priority.
- Straps.

These items are described in detail in the following text.

Unit number/Priority

Each intelligent Supermax module connected to the common I/O bus has a unique address. This address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot use the same priority. The MIOC module uses one priority. The MIOC module is equipped with a unit number switch. The switch UNSW gives the module a unit number and one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0A	20
B	0x0B	21
C	0x0C	22
D	0x0D	23
E	0x0E	24
F	0x0F	30

TABLE 5. UNSW. Unit number switch

Straps

* designates factory installed position.

BAUDSW:

	Position	Baud rate	Data bits	Stop bits
	0	300	7	2
	1	600	7	2
	2	1200	7	2
	3	2400	7	2
	4	4800	7	2
*	5	9600	7	2
	6	19200	7	2
	7	9600	7	2
	8	300	8	1
	9	600	8	1
	A	1200	8	1
	B	2400	8	1
	C	4800	8	1
	D	9600	8	1
	E	19200	8	1
	F	9600	8	1

TABLE 6. BAUDSW. Baud rate switch for service port.

The size of the local memory is determined by:

- The memory chip size in accordance with strap ST1.
- X34 and X41 controlling bank 0-1.
- X35 and X42 controlling bank 2-3.
- X31 activating the select signals to the appropriate memory bank.

ST1:



Size of memory chips		
	1-3	4 Mbit bank 0-1
	2-4	4 Mbit bank 2-3
*	3-5	1 Mbit bank 0-1
*	4-6	1 Mbit bank 2-3

TABLE 7. Strap ST1

STCDIS:



Disable internal caches		
*	NC	Controlled by software
	1-2	Disabled

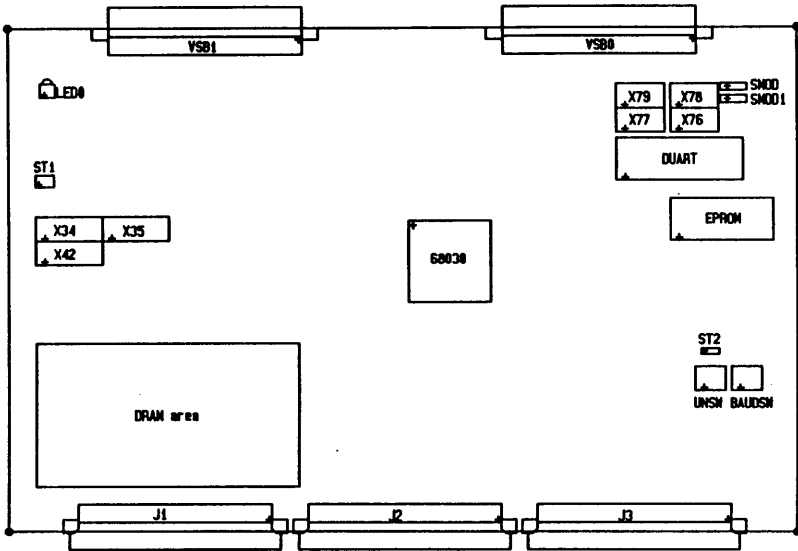
TABLE 8. Strap STCDIS

ST2:



Broadcast handshake		
	1-2	Enabled
*	2-3	Disabled

TABLE 9. Strap ST2



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SUPERMAX technical data sheet.
Module: SIOC 0300

Type: SIOC 0300

Data sheet no.: 1

Revision no.: 0

Date: 851008

General description:

The SIOC is the intelligent Serial IO Controller in a SUPERMAX system. The SIOC is built around a microprocessor and contains the following interfaces:

- 6 asynchronous RS-232 channels.
- 2 asynchronous RS-232 or RS-422 channels.
- Parallel printer port.

Interface to I/O bus:

The SIOC has a standard interface to the common SUPERMAX I/O bus. The local memory bus is not used.

Active cycles : Byte read and write.

Passive cycles: Byte read and write.
Word read and write.
Read modify write.

Interface to peripheral equipment:

Serial Channels:

The serial interface includes the following programmable options:

- Baudrates from 50 to 19200 baud.
- Character length from 5 to 8 bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.
- For two channels: Choice of RS-232 or RS-422 interface.

SUPERMAX technical data sheet.
Module: SIOC 0300

3

The RS-232 interface signals are all situated in a 60 pin flatcable header.

PIN	SIGNAL	SIGNAL	PIN
01	TXC7	GND	02
03	RXC7	GND	04
05	DTR7	DSR7	06
07	CTS7	RTS7	08
09	RXD7	TXD7	10
11	TXC6	RXC6	12
13	DTR6	DSR6	14
15	CTS6	RTS6	16
17	RXD6	TXD6	18
19	GND	GND	20
21	GND	+12V	22
23	GND	-12V	24
25	DTR5	DSR5	26
27	CTS5	RTS5	28
29	RXD5	TXD5	30
31	DSR4	DTR4	32
33	RTS4	CTS4	34
35	TXD4	RXD4	36
37	RTS3	DTR3	38
39	TXD3	DSR3	40
41	DSR2	CTS3	42
43	RTS2	RXD3	44
45	TXD0	DTR2	46
47	RXD0	CTS2	48
49	RTS0	RTS1	50
51	CTS0	CTS1	52
53	DSR0	DSR1	54
55	DTR0	DTR1	56
57	TXD1	TXD2	58
59	RXD1	RXD2	60

SUPERMAX technical data sheet.
Module: SIOC 0300

4

The RS-422 signals and the parallel printer signals are all situated in a 50 pin flatcable header.

PIN	SIGNAL	SIGNAL	PIN
01	I(A)0	C(A)0	02
03	GND	R(A)0	04
05	S(A)0	T(A)0	06
07	GND	GND	08
09	I(B)0	S(B)0	10
11	C(B)0	R(B)0	12
13	ACK	T(B)0	14
15	CD(0)	DS	16
17	CD(1)	GND	18
19	CD(2)	GND	20
21	CD(3)	GND	22
23	CD(4)	GND	24
25	CD(5)	GND	26
27	CD(6)	GND	28
29	CD(7)	GND	30
31	BUSY	R(A)1	32
33	open	GND	34
35	I(A)1	GND	36
37	S(A)1	GND	38
39	S(B)1	GND	40
41	R(B)1	I(B)1	42
43	C(B)1	GND	44
45	T(B)1	GND	46
47	T(A)1	GND	48
49	C(A)1	GND	50

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

Power requirements:

Voltage		Typ. current
+ 5	+5%	4.6 A
+12	+5%	0.2 A
-12	+5%	0.2 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a SIOC module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Flat cables for the serial channels and the parallel printer.
- Firmware.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number. The unit number of the SIOC module is coded in a PAL located in position I2. This PAL is called the unit PAL.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot used the same priority. The SIOC module uses one priority. The priority of the SIOC module are coded in a PAL located in position M1. This PAL is called the priority PAL.

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. Pull down resistors are placed in position Q3.

Firmware:

The firmware is situated in an EPROM mounted in position E4.

SBOOT, V. 0100, 830401.

The SIOC with the this firmware will be able to be bootstrapped of another module in a Supermax system.

Straps and jumpers:

+ designates factory installed position.

Strap socket 1.

Function: USART interrupt, Rxrdy.

Position: A 2,10

Name : A6

1.
Rxdy(0) * * RST0
Rxdy(1) * * RST1
Rxdy(2) * * RST2
Rxdy(3) * * RST3
Rxdy(4) * * RST4
Rxdy(5) * * RST5
Rxdy(6) * * RST6
Rxdy(7) * * RST7

Factory installed:

1.
Rxdy(0) * * RST0
Rxdy(1) * * RST1
Rxdy(2) * * RST2
Rxdy(3) * * RST3
Rxdy(4) * * RST4
Rxdy(5) * * RST5
Rxdy(6) * * RST6
Rxdy(7) * * RST7

Strap socket 2.

Function: USART interrupt, Txdy.

Position: A 1,10

Name : A7

1.
Txdy(0) * * RST0
Txdy(1) * * RST1
Txdy(2) * * RST2
Txdy(3) * * RST3
Txdy(4) * * RST4
Txdy(5) * * RST5
Txdy(6) * * RST6
Txdy(7) * * RST7

Not installed from factory.

Strap socket 3.

Function: RS-422 Indicator interrupt.

Position: A 1,9

Name : A8

1.
IINT1 * * RST7
IINT1 * * RST6
IINT2 * * RST5
IINT2 * * RST4
IINT3 * * RST3
IINT3 * * RST2
IINT4 * * RST1
IINT4 * * RST0

Not installed from factory.

Strap socket 4.

Function: Possible to connect two swithes. One is able to generate an internal reset pulse and one is able to generate a hardware "TRAP" interrupt to the 8085.

Position: C 4,1.

Factory installed strapssocket:

* *_ * * * * *

* *_ * * * * *

1.

Strap 1.

Function: Baud rate to service port. Connected to both Txclk and Rxclk.

Position: B 7,1

* * * *
* * * *
1 2 3 4

<u>Jumper</u>	<u>Clock</u>
+ 1	9600 x 16 baud.
2	4800 x 16 baud.
3	2400 x 16 baud.
4	1200 x 16 baud.

Strap 2.

Function: Special option for hardware service.

Position: B 8,3

Under normal circumstances, the jumper must be in position one.

Strap 3.

Function: Polarity of the parallel printer port signal "DATA STROBE".
The data strobe signal is an output signal.

Position: C 3,4

Name : SP2

* * *
1 2 3

<u>Jumper</u>	<u>Function</u>
1-2	Active high data strobe.
+ 2-3	Active low data strobe.

Strap 4.

Function: Polarity of the parallel printer port signal "BUSY".
The BUSY signal is an input.

Position: C 2,4
Name : SP3

* * *
1 2 3

<u>Jumper</u>	<u>Function</u>
+ 1-2	Active high BUSY signal.
2-3	Active low BUSY signal.

Strap 5.

Function: Polarity of the parallel printer port signal "ACKNOWLEDGE".
The ACK signal is an input.

Position: C 2,4
Name : SP1

* * *
1 2 3

<u>Jumper</u>	<u>Function</u>
+ 1-2	Active low ACK signal.
2-3	Active high ACK signal.

Strap 6.

Function: Transmitter clock to USART(6). RS-232-C interface.

Position: B 6,10
Name : SS1

* * *
1 2 3

<u>Jumper</u>	<u>Function</u>
+ 1-2	The SIOC drives the RS-232-C interface signal Txclk with

baud rate counter(2,0).

The clock is an input to USART(6).

2-3 The RS-232-C interface signal Txclk is an input to USART(6).

Strap 7.

Function: Receiver clock to USART(6). RS-232-C interface.

Position: B 6,10

Name : SS2

* * *

1 2 3

Jumper Function

+ 1-2 The SIOC drives the RS-232-C interface signal Rxclk with baud rate counter(2,0).
The clock is an input to USART(6).

2-3 The RS-232-C interface signal Rxclk is an input to USART(6).

Strap 8 and 9.

Function: Receiver/transmitter clock to USART(6). RS-422 interface.

Position: B 6,7

Name : SS3 and SS4.

* * *

1 2 3

Jumper Function

+ 1-2 The SIOC drives the RS-422 interface signal element timing with baud rate counter(2,0).
The clock is an input to USART(6).

2-3 The RS-422 interface signal Signal element timing is an input to USART(6). (Rxclk and Txclk)

Note that SS3 and SS4 jumpers must be in the same position.

Strap 10.

Function: Transmitter clock to USART(7). RS-232-C interface.

Position: B 9,6

Name : ST1

* * *

1 2 3

Jumper Function

+ 1-2 The SIOC drives the RS-232-C interface signal Txclk with baud rate counter(2,1).

The clock is an input to USART(7).

2-3 The RS-232-C interface signal Txclk is an input to USART(7).

Strap 11.

Function: Receiver clock to USART(7). RS-232-C interface.

Position: B 9,6

Name : ST2

* * *

1 2 3

Jumper Function

+ 1-2 The SIOC drives the RS-232-C interface signal Rxclk with baud rate counter(2,1).

The clock is an input to USART(7).

2-3 The RS-232-C interface signal Rxclk is an input to USART(7).

Strap 12 and 13.

Function: Receiver/transmitter clock to USART(7). RS-422 interface.

Position: B 6,6

Name : ST3 and ST4.

* * *

1 2 3

Jumper Function

+ 1-2	The SIOC drives the RS-422 interface signal Signal element timing with baud rate counter(2,1). The clock is an input to USART(7).
2-3	The RS-422 interface signal Signal element timing is an input to USART(7). (Rxclk and Txclk)

Note that ST3 and ST4 jumpers must be in the same position.

Cables and connectors:

The connection between the SIOC module and the peripherals is made with two flat cable connectors.

The headers mounted on the PCB are positioned as follows:

RS-232 interface signals : C 4,8. 60 pin

RS-422 and the parallel printer : C 3,8. 50 pin or 34 pin.

Service port : C 5,3. 20 pin

Indicator Leds:

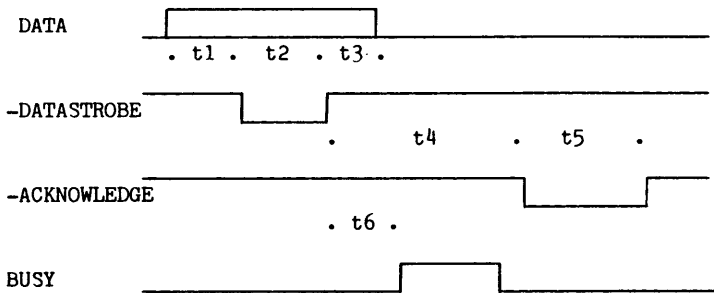
- LED1: On: The boot prom is enabled.
Off: The boot prom is disabled.
Upon power up: On
- LED2: On: A time out is pending.
Off: No time out.
Upon power up: Off.
- LED3: On: A buserror is received.
Off: No buserror.
Upon power up: Off.
- LED4: On: The ERROR line is active. The error line is set
by the program or because of a parity error.
Off: No error.
Upon power up: On
- LED5: On: The SIOC has activated the buserror signal.
Off: No error.
Upon power up: Off.

Parallel printer interface specifications:

The parallel port is a Centronics compatible printer interface. The interface is a 8 bit data interface with three control signals. The control signals are:

1. Data strobe. An output from the SIOC.
2. Acknowledge. An input to the SIOC.
3. Busy. An input to the SIOC.

Interface timing:

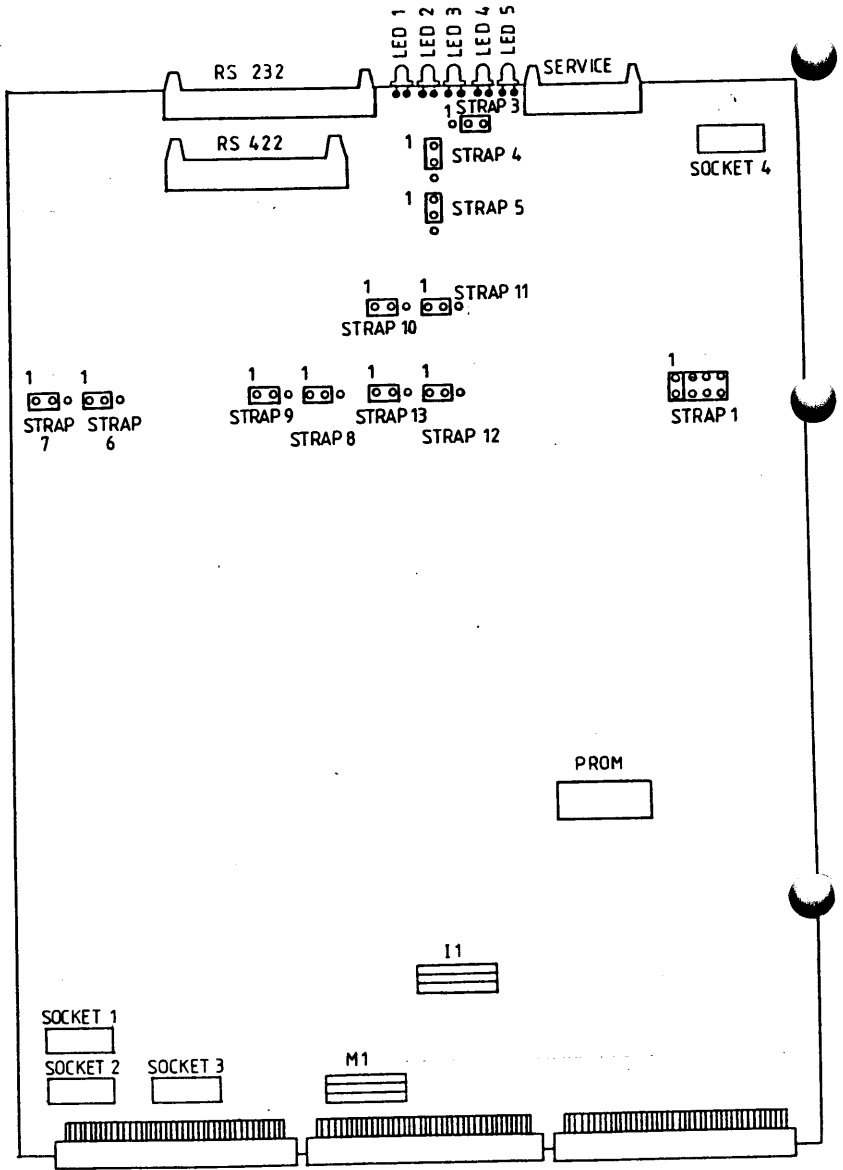


- designates active low signals.

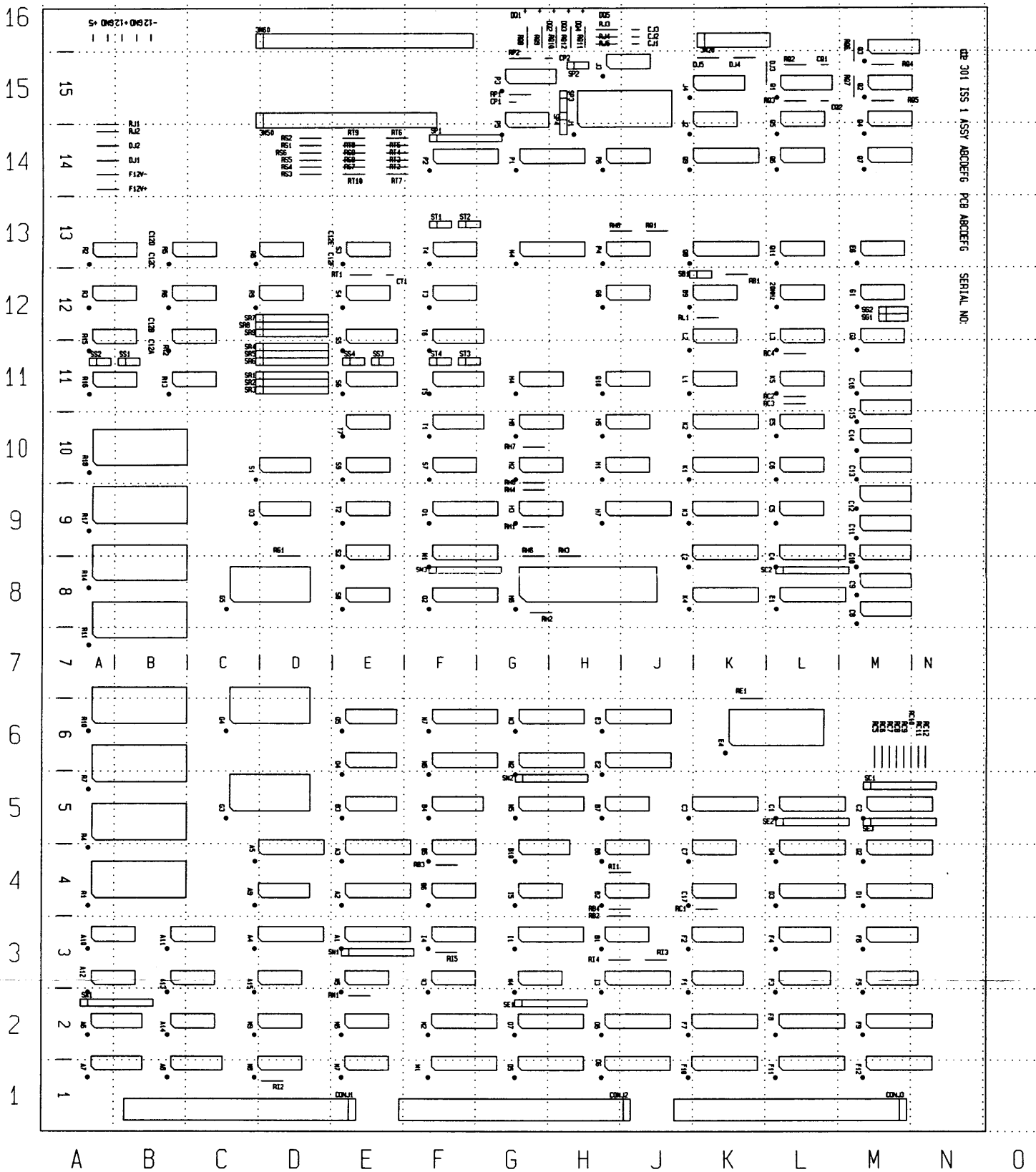
- t1: Data stable to datastrobe: min. 1.0 usec.
t2: Datastrobe width : min. 1.0 usec. max. 2.0 usec.
t3: Data hold from datastrobe: min. 1.0 usec.
t4: Datastrobe to acknowledge: min. 0.1 usec.
t5: Acknowledge width : min. 0.1 usec.
t6: Datastrobe to busy : min. 0

SUPERMAX technical data sheet.
Module: SIOC 0300

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PRELIMINARY



Component locations		Issue:	Date:		dansk data elektronik a/s	
PCB: SIOC					herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11	

PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A1		E3	E2		H6	Q1		L15
A2		E4	E3		H6	Q2		M15
A3		E4	E4		K6	Q3		M15
A4		C3	E5		L10	Q4		M14
A5		C4	E6		M13	Q5		L14
A6		A2	F1		J3	Q6		L14
A7		A1	F2		J3	Q7		M14
A8		B1	F3		L3	Q8		J13
A9		C4	F4		L3	Q9		J14
A10		A3	F5		M3	Q10		H11
A11		B3	F6		M3	Q11		L13
A12		A3	F7		J2	RB1		K12
A13		B3	F8		L2	RB2		H4
A14		B2	F9		M2	RB3		F4
A15		C3	F10		J1	RB4		H4
B1		H3	F11		L1	RC1		K4
B2		H4	F12		M1	RC2		L11
B3		E5	F12V+		A14	RC3		L11
B4		F5	F12V-		A14	RC4		L11
B5		F4	G1		M12	RC5		M6
B6		F4	G2		M11	RC6		M6
B7		H5	G3		C5	RC7		M6
B8		H4	G4		C6	RC8		M6
B9		J12	G5		C8	RC9		M6
B10		G4	G6		H12	RC10		M6
CJ1		J16	H1		H10	RC11		N6
CJ2		J16	H2		G10	RC12		N6
CJ3		J16	H3		G9	RE1		K7
CONJ1		E1	H4		G11	RG1		D9
CONJ2		J1	H5		H10	RH1		G9
CONJ3		M1	H6		G8	RH2		H8
CP1		G15	H7		H9	RH3		H9
CP2		G15	H8		G10	RH4		G9
CQ1		L15	I1		G3	RH5		G10
CQ2		L15	I2		J8	RH6		G9
CT1		E12	I3		H3	RH7		G10
C1		L5	I4		F3	RH8		H13
C2		M5	I5		G4	RI1		H4
C3		J5	J1		H14	RI2		D1
C4		L8	J2		J14	RI3		J3
C5		L9	J3		H15	RI4		H3
C6		L10	J4		J15	RI5		F3
C7		J4	K1		J10	RJ1		A15
C8		M8	K2		J10	RJ2		A14
C9		M8	K3		J9	RJ3		H16
C10		M8	K4		J8	RJ4		H16
C11		M9	K5		L11	RJ5		H16
C12		M9	LABEL		O-1	RL1		J12
C12A		B12	L1		J11	RM1		E2
C12B		B12	L2		J11	RP1		G15
C12C		B13	L3		L11	RP2		G15
C12D		B13	M1		F1	RQ1		J13
C12E		D13	M2		F2	RQ2		L15
C12F		D13	M3		F3	RQ3		L15
C13		M10	M4		G3	RQ4		M15
C14		M10	M5		E3	RQ5		M15
C15		M10	M6		E2	RQ6		M16
C16		M11	M7		E1	RQ7		M15
C17		J4	M8		C1	RQ8		G16
DJ1		A14	M9		C2	RQ9		G16
DJ2		A14	N1		F8	RQ10		H16
DJ3		K15	N2		G6	RQ11		H16
DJ4		K15	N3		G6	RQ12		H16
DJ5		J15	N4		G13	RS1		D14
DQ1		G16	N5		G5	RS2		D14
DQ2		G16	N6		F6	RS3		D14
DQ3		H16	N7		F6	RS4		D14
DQ4		H16	O1		F9	RS5		D14
DQ5		H16	O2		F8	RS6		D14
D1		M4	O3		C9	RS7		E14
D2		M4	O4		E6	RS8		E14
D3		L4	O5		E6	RS9		E14
D4		L4	P1		G14	RT1		E12
D5		G1	P2		F14	RT2		E14
D6		H1	P3		G15	RT3		E14
D7		G2	P4		H13	RT4		E14
D8		H2	P5		G14	RT5		E14
E1		L8	P6		H14	RT6		E14

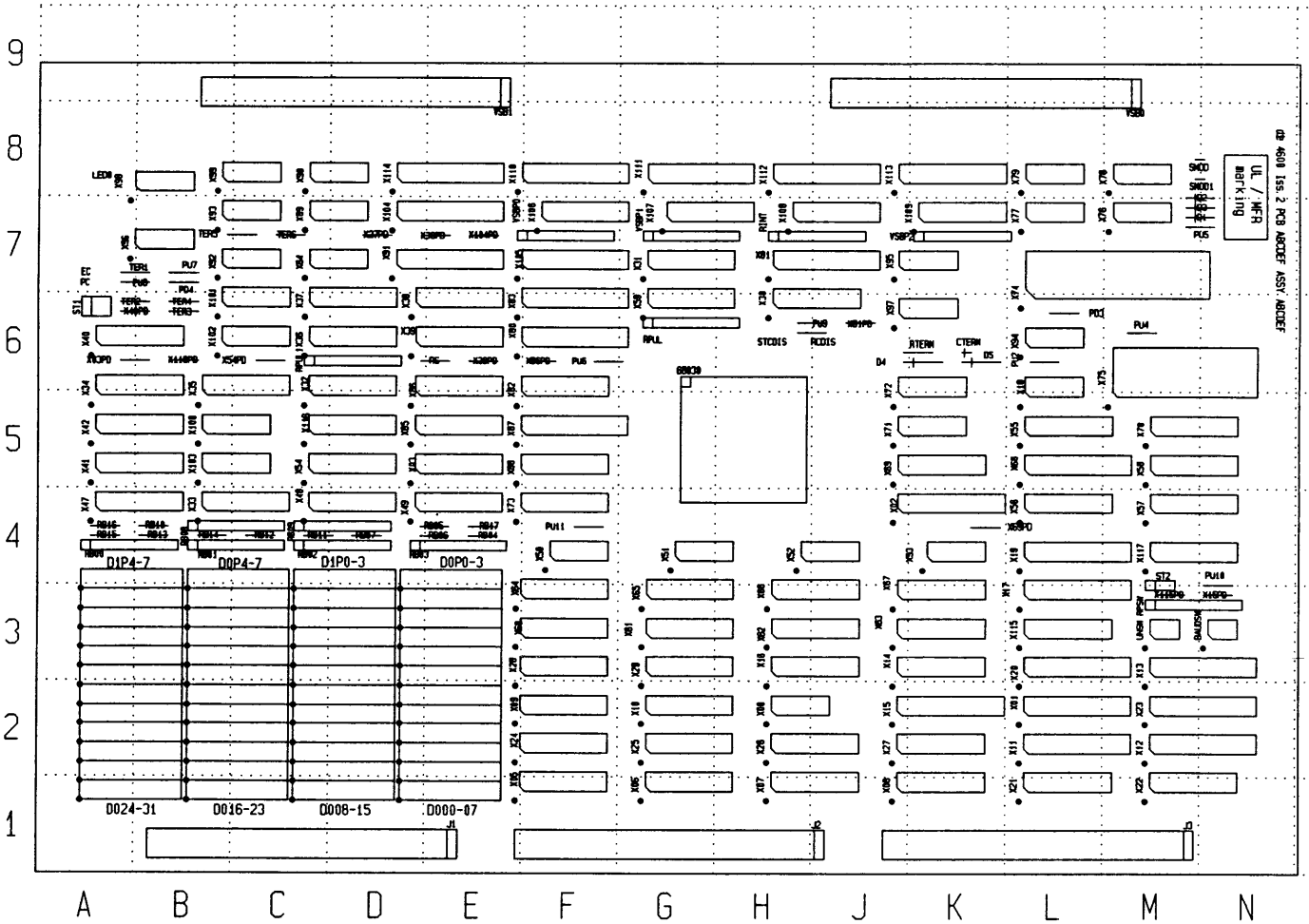
Component locations

PCB: SIOC

Issue: Date:



dansk data elektronik a/s
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Component locations

PCB: 4600 / MIOC

Issue: 2
Date: 90/08/21



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herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
BAUDSW	unit	N3	RB06	33ohm	D4	X39	16L8-7	D6
CTERM	10uF25V	K6	RB07	33ohm	D4	X39PD	39ohm	E6
DOP0	1Mx1	D3	RB08	10x-2-330	B4	X40	16R8-10	A6
DOP1	1Mx1	D3	RB09	10x-2-330	C4	X40PD	39ohm	B6
DOP2	1Mx1	D3	RB10	33ohm	A4	X41	74ALS6311	A5
DOP3	1Mx1	D4	RB11	33ohm	D4	X42	74ALS6311	A5
DOP4	1Mx1	B3	RB12	33ohm	C4	X47	16L8-10	A4
DOP5	1Mx1	B3	RB13	33ohm	A4	X48	16L8-10	C4
DOP6	1Mx1	B3	RB14	33ohm	B4	X49	16L8-10	D4
DOP7	1Mx1	B4	RB15	33ohm	A4	X50	74AS280	F4
D1	1n4448	M7	RB16	33ohm	A4	X51	74AS280	G4
D1P0	1Mx1	C3	RB17	33ohm	E4	X52	74AS280	H4
D1P1	1Mx1	C3	RCDIS	1kohm	J6	X53	74AS280	K4
D1P2	1Mx1	C3	RINT	10-1-102	H7	X54	16R4-7	C5
D1P3	1Mx1	C4	RPSW	10-1-102	M3	X54PD	39ohm	C6
D1P4	1Mx1	A3	RPUL	10-1-102	G6	X55	74AS573	L5
D1P5	1Mx1	A3	RPUL1	10-1-102	C6	X56	74AS573	L4
D1P6	1Mx1	A3	RS	10ohm	D6	X57	74AS573	M4
D1P7	1Mx1	A4	RTERM	220ohm	K6	X58	74AS573	M5
D2	1n4448	M8	SMOD	0.5ohm	M8	X59	16L8-10	G6
D3	1n4448	M7	SMOD1	0.5ohm	M8	X60	74AS573	E3
D4	1n4001	J6	STCDIS	strap	H6	X61	74AS573	G3
D5	1n4001	K6	ST1	strap	A6	X62	74AS573	H3
D000	256X4	D1	ST2	strap	M4	X63	74AS573	J3
D001	256X4	D2	TER1	220ohm	B7	X64	74ALS573	E3
D002	256X4	D2	TER2	470ohm	A6	X65	74ALS573	G3
D003	256X4	D2	TER3	220ohm	B6	X66	74ALS573	H3
D004	256X4	D2	TER4	470ohm	B6	X67	74ALS573	J3
D005	256X4	D2	TER5	220ohm	B7	X68	20L8-25	L5
D006	256X4	D3	TER6	470ohm	C7	X69	16R6-15	J5
D007	256X4	D3	UNSW	unit	M3	X69PD	39ohm	K4
D008	256x4	C1	VSBP0	10-1-331	E7	X70	74ALS573	M5
D009	256x4	C2	VSBP1	10-1-331	G7	X71	74ALS138	J5
D010	256x4	C2	VSBP2	10-1-102	K7	X72	74ALS138	J5
D011	256x4	C2	VSB0	DIN96	M9	X73	74ALS645	E4
D012	256x4	C2	VSB1	DIN96	E9	X74	2681	L6
D013	256x4	C2	X00	74LS14	H2	X75	271001	M5
D014	256x4	C3	X01	22V10-15	L2	X76	75C188	M7
D015	256x4	C3	X02	22V10-15	J4	X77	75C189	L7
D016	256x4	B1	X03	16R4-25	D5	X78	75C188	M8
D017	256x4	B2	X03PD	39ohm	B6	X79	75C189	L8
D018	256x4	B2	X05	74ALS645	E1	X80	74ALS992	E6
D019	256x4	B2	X06	74ALS645	G1	X81	20R8-25	H7
D020	256x4	B2	X07	74ALS645	H1	X81PD	39ohm	J6
D021	256x4	B2	X08	74ALS645	J1	X82	74ALS573	E5
D022	256x4	B3	X09	74ALS645	E2	X83	20L8-25	E6
D023	256x4	B3	X10	74ALS645	G2	X84	74AS1004	C7
D024	256x4	A1	X11	29C841a	L2	X85	16L8-10	D5
D025	256x4	A2	X12	29C841a	M2	X86	16R4-25	D5
D026	256x4	A2	X13	29C841a	M3	X86PD	39ohm	E6
D027	256x4	A2	X14	74AS641	J3	X87	74ALS992	E5
D028	256x4	A2	X15	20R8	J2	X88	74ALS573	E5
D029	256x4	A2	X15PD	39ohm	M3	X89	74LS393	C7
D030	256x4	A3	X16	74AS645	H3	X90	74ALS14	C8
D031	256x4	A3	X17	22V10-15	L3	X91	20L8-25	D7
EC	strap	A7	X18	74F74	L5	X92	74AS1004	B7
J1	DIN96	E1	X19	20R4-25	L4	X93	74F74	B7
J2	DIN96	J1	X20	20R4-25	L3	X94	74LS393	L6
J3	DIN96	M1	X21	74ALS573	L1	X95	74LS393	J7
LED0	lysd1	A8	X22	74ALS573	M1	X96	xtal	A7
PC	strap	A7	X23	29C841a	M2	X97	xtal	J6
PD3	39ohm	L6	X24	74ALS645	E2	X98	xtal	A8
PD4	39ohm	B7	X25	74ALS645	G2	X99	74F74	B8
PU2	1kohm	L6	X26	74ALS645	H2	X100	74LS390	B5
PU4	1kohm	M6	X27	74ALS645	J2	X101	74LS390	B6
PU5	1kohm	N7	X28	74ALS645	E3	X102	74LS390	B6
PU6	1kohm	F6	X29	74ALS645	G3	X103	74LS390	B5
PU7	1kohm	B7	X30	16L8-7	H6	X104	22V10-15	D7
PU8	1kohm	A7	X31	16L8-7	G7	X104PD	39ohm	E7
PU9	1kohm	J6	X32	16L8-7	C5	X105	22V10-15	E7
PU10	1kohm	M4	X33	16L8-7	B4	X106	74ALS645	F7
PU11	1kohm	F4	X34	16R6-7	A5	X107	74ALS645	G7
RB00	10x-2-330	A4	X35	16R6-7	B5	X108	74ALS645	H7
RB01	10x-2-330	B4	X36	16L8-7	C6	X109	74ALS645	K7
RB02	10x-2-330	C4	X37	16R6-7	C6	X110	74ALS646	E8
RB03	10x-2-330	D4	X37PD	39ohm	D7	X111	74ALS646	G8
RB04	33ohm	E4	X38	16R8-7	D6	X112	74ALS646	H8
RB05	33ohm	D4	X38PD	39ohm	E7	X113	74ALS646	J8

Component locations

PCB: 4600 / MIOC

Issue: 2 Date: 90/08/21



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Supermax Technical Data Sheet

Type:	ISDN4690 submodule. PCB 4690, ISDN4340 Basic Rate I/O. PCB 4340, and ISDN4350 Primary Rate I/O. PCB 4350.
Data sheet no:	37
Revision no:	0
Date:	93-04-07

General Description

The ISDN4690 submodule is an I/O submodule for the MIOC 4600. The ISDN4690 submodule contains a T7115A synchronous protocol data formatter using linked lists in the on-board buffer memory for receive and transmit data exchange with the MIOC module. The T7115A is used to interface to an Amd79C32A BR Data Controller when in Basic Rate Mode or to a T7230 Primary Access Framer/T7290 CEPT line interface in Primary Rate mode.

When the submodule is connected to the ISDN4340 line interface module, Basic Rate communication (two 64kbit/s B-channels and one 16kbit/s D-channel) is supported, while when connected to the ISDN4350 line interface module, Primary Rate communication (30 64kbit/s B-channels and one 64kbit/s D-channel) is supported.

The transmitting rate is 192kbit/s for Basic Rate and 2Mbit/s for Primary Rate.

For Basic Rate the submodule is to be used with the ISDN4340 Basic Rate line interface board and is connected to the interface board via a twisted pair flat cable. The line interface board is located on the Supermax back panel and has one ISO 8877 connector for the 8 wire S cable. A point-to-point connection to the NT or a short S-bus connection (max. 150 meter and max. 8 devices) is supported.

For Primary Rate the submodule is to be used with the ISDN4350 Primary Rate line interface board and is connected to the interface board via a twisted pair flat cable. The line interface board is located on the Supermax back panel and has one ISO 8877 connector for the 8 wire T cable. The Primary Rate line interface is using only point to point cabling.

The submodule has the following interfaces:

- One submodule interface.
- One interface to Basic Rate or Primary Rate I/O interface board via twisted pair flat cable.
- One RS-232 asynchronous channel (console or service port).

The I/O interface board has the following interfaces:

- One interface to submodule via twisted pair flat cable.

- One 8 pin ISO 8877 or ISO 10173 connector for ISDN line cable.

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB connector and the "X2" connector. The following signals are used:

"X2"	Signal	VSB pin no.
1	GND	
2	NC	
3	TXD-	b3
4	NC	
5	RXD-	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 1. Interface to RS-232 channel

Interface to I/O interface board

The connector to the interface board is located at the edge of the submodule. The connector is labeled X and contains the following signals:

X	SIGNAL	Circuit Use
1	GND	Supply GND
2	GND	Supply GND
3	T2P	PR TX Pos
4	R2N	PR TX Neg
5	GND	Supply GND
6	GND	Supply GND
7	T1P	PR RX Pos
8	R1N	PR RX Neg
9	BPLT	Back panel type
10	VCC	Power Out
11	VCC	Power Out
12	BPLM	Backpanel not mounted
13	LOUT2	BR TX Pos
14	LOUT1	BR TX Neg
15	GND	Supply GND
16	GND	Supply GND
17	LIN2	BR RX Pos
18	LIN1	BR RX Neg
19	GND	Supply GND
20	GND	Supply GND

TABLE 2. Interface to I/O interface board

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	2.4 A
+12 V \pm 5%	not used
-12 V \pm 5%	not used

TABLE 3. Power requirements

Installation

No user straps need to be selected or checked before a ISDN4690 submodule is installed in a system. The ISDN4690 submodule is installed as an I/O submodule on the MIOC 4600 and connected to the service port cable via connector X2. A twisted pair flat cable connects the line interface module to connector X on the submodule. When using Basic Rate communication, the line interface must be the ISDN4340 module, and when using Primary Rate communication the line interface must be the ISDN4350 module. The line interface module is mounted on the Supermax kabinet backpanel.

The ISDN4340 BR line interface has two straps to connect a terminating resistor across the transmit and receive lines. When a strap is inserted, the line is terminated with a 100 ohm resistor. ST1 corresponds to the transmit line, while ST2 corresponds to the receiver line. When used in an S-bus configuration only one unit may have a termination, i.e. the unit most distant from the NT. Both ST1 and ST2 must be strapped to terminate both the transmit and receive circuits.

The ISDN4350 PR line interface is always used in a point to point configuration and has permanently installed terminating resistors.

Trap Switch

If the ISDN4690 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

Light Emitting Diodes

The ISDN4690 submodule carries two light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
V2	Red	MIOC 4600	Future use.
V1	Red	MIOC 4600	Fault condition on the MIOC.

TABLE 4. Light Emitting Diodes

Supermax Technical Data Sheet

Type:	HDLC submodule. PCB 4640 and PCB 4310.
Data sheet no:	32
Revision no:	1
Date:	92-04-30

General Description

The HDLC submodule is a communication I/O submodule for the MIOC 4600. The HDLC back panel splits the signals from the HDLC submodule into four DB25S plugs. The HDLC submodule contains two SAB82532 HDLC controllers and the following interfaces:

- One submodule interface.
- One RS-232 asynchronous channel (console or service port).
- Two interfaces to back panel.

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB0 connector and the J3 connector. The following signals are used:

J3	Signal	VSB0 pin no.
1	GND	
2	NC	
3	TxD	b3
4	NC	
5	RxD	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 1. Interface to RS-232 channel

Interface to back panel

The connectors for the interface to the back panel are labeled J1 and J2 and they contain the following signals:

Pin	Signal	Circuit
1	TxD(1)	Transmit data
2	RI(1)	Ring indicator
3	TxCt(1)	Transmit clock (DCE)
4	TxCr(1)	Transmit clock (DTE)
5	NC	Not connected
6	RTS(1)	Request to send
7	NC	Not connected
8	NC	Not connected
9	CTS(1)	Clear to send
10	NC	Not connected
11	DCD(1)	Data carrier detect
12	NC	Not connected
13	DSR(1)	Data set ready
14	RxD(1)	Receive data
15	GND	Signal ground
16	RxCt(1)	Receive clock (DCE)
17	RxCr(1)	Receive clock (DTE)
18	DTR(1)	Data terminal ready
19	GND	Signal ground
20	GND	Signal ground
21	TxD(0)	Transmit data
22	RI(0)	Ring indicator
23	TxCt(0)	Transmit clock (DCE)
24	TxCr(0)	Transmit clock (DTE)
25	NC	Not connected
26	RTS(0)	Request to send
27	NC	Not connected
28	NC	Not connected
29	CTS(0)	Clear to send
30	NC	Not connected
31	DCD(0)	Data carrier detect
32	NC	Not connected
33	DSR(0)	Data set ready
34	RxD(0)	Receive data
35	GND	Signal ground
36	RxCt(0)	Receive clock (DCE)
37	RxCr(0)	Receive clock (DTE)
38	DTR(0)	Data terminal ready
39	GND	Signal ground
40	GND	Signal ground

TABLE 2. Interface to V.24/V.28, J1

Pin	Signal V.36	Signal V.11	Circuit
1	TxD(3)+	T(B)	Transmit data +
2	TxD(3)-	T(A)	Transmit data -
3	TxC(3)-	NC	Transmit clock -
4	TxC(3)+	NC	Transmit clock +
5	RTS(3)-	NC	Request to send -
6	RTS(3)+	NC	Request to send +
7	DTR(3)-	C(A)	Data terminal ready -
8	CTS(3)-	NC	Clear to send -
9	CTS(3)+	NC	Clear to send +
10	DCD(3)-	I(A)	Data carrier detect -
11	DCD(3)+	I(B)	Data carrier detect +
12	DSR(3)-	NC	Data set ready -
13	DSR(3)+	NC	Data set ready +
14	RxD(3)+	R(B)	Receive data +
15	RxD(3)-	R(A)	Receive data -
16	RxC(3)-	S(A)	Receive clock -
17	RxC(3)+	S(B)	Receive clock +
18	DTR(3)+	C(B)	Data terminal ready +
19	GND	GND	Signal ground
20	GND	GND	Signal ground
21	TxD(2)+	T(B)	Transmit data +
22	TxD(2)-	T(A)	Transmit data -
23	TxC(2)-	NC	Transmit clock -
24	TxC(2)+	NC	Transmit clock +
25	RTS(2)-	NC	Request to send -
26	RTS(2)+	NC	Request to send +
27	DTR(2)-	C(A)	Data terminal ready -
28	CTS(2)-	NC	Clear to send -
29	CTS(2)+	NC	Clear to send +
30	DCD(2)-	I(A)	Data carrier detect -
31	DCD(2)+	I(B)	Data carrier detect +
32	DSR(2)-	NC	Data set ready -
33	DSR(2)+	NC	Data set ready +
34	RxD(2)+	R(B)	Receive data +
35	RxD(2)-	R(A)	Receive data -
36	RxC(2)-	S(A)	Receive clock -
37	RxC(2)+	S(B)	Receive clock +
38	DTR(2)+	C(B)	Data terminal ready +
39	GND	GND	Signal ground
40	GND	GND	Signal ground

TABLE 3. Interface to V.36/V.11, J2

HDLC back panel

The back panel contains 4 DB25S plugs and two 40 pin half pitch flat cable connectors. The DB25S plugs J0 and J1 contain the signals for the V.24/V.28 interface and J2 and J3 contain the signals for the V.36/V.11 interface. The pin assignment is as follows:

Pin	Signal	Circuit
1	Chas	Frame ground
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	DCD	Data carrier detect
14	TxCt	Transmit clock (DCE)
15	TxCr	Transmit clock (DTE)
16	RxCt	Receive clock (DCE)
17	RxCr	Receive clock (DTE)
20	DTR	Data terminal ready
22	RI	Ring indicator
Others	NC	Not connected

TABLE 4. HDLC back panel. Pin assignment J0 and J1

Pin	Signal V.36	Signal V.11	Circuit
1	Chas	Chas	Frame ground
2	TxD +	T(B)	Transmit data +
3	TxC-	NC	Transmit clock -
4	RxD +	R(B)	Receive data +
5	RTS +	NC	Request to send +
6	RxC-	S(A)	Receive clock -
7	GND	GND	Signal ground
8	CTS +	NC	Clear to send +
10	DSR +	NC	Data set ready +
11	DTR +	C(B)	Data terminal ready +
12	DCD +	I(B)	Data carrier detect +
14	TxD-	T(A)	Transmit data -
15	TxC +	NC	Transmit clock +
16	RxD-	R(A)	Receive data -
17	RTS-	NC	Request to send -
18	RxC +	S(B)	Receive clock +
20	CTS-	NC	Clear to send -
22	DSR-	NC	Data set ready -
23	DTR-	C(A)	Data terminal ready -
24	DCD-	I(A)	Data carrier detect -
Others	NC	NC	Not connected

TABLE 5. HDLC back panel. Pin assignment J2 and J3

Line drivers/receivers

The following shows the relationship between line drivers/receivers and channel numbers. IC20, IC21, IC22 and IC23 are drivers/receivers for channel 0. IC24, IC25, IC26 and IC27 are drivers/receivers for channel 1. IC28, IC29, IC31 and IC32 are drivers/receivers for channel 2. IC29, IC30, IC32 and IC33 are drivers/receivers for channel 3.

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	1.1 A
+12 V \pm 5%	0.2 A
-12 V \pm 5%	0.2 A

TABLE 6. Power requirements

Installation

No user straps need to be selected or checked before a HDLC submodule is installed in a system. The HDLC submodule and the HDLC back panel must be connected using two 40 pin half pitch flat cables. J1 on 4640 connects to J4 on 4310 and J2 on 4640 connects to J5 on 4310.

Depending upon the external peripheral, which is connected to the HDLC module, the following pull up resistors should be removed.

- Pull up resistors RS2, RS3, RS4 and RS5 for channel 2 V.11 interface.
- Pull up resistors RS6, RS7, RS8 and RS9 for channel 3 V.11 interface

Debug Switch

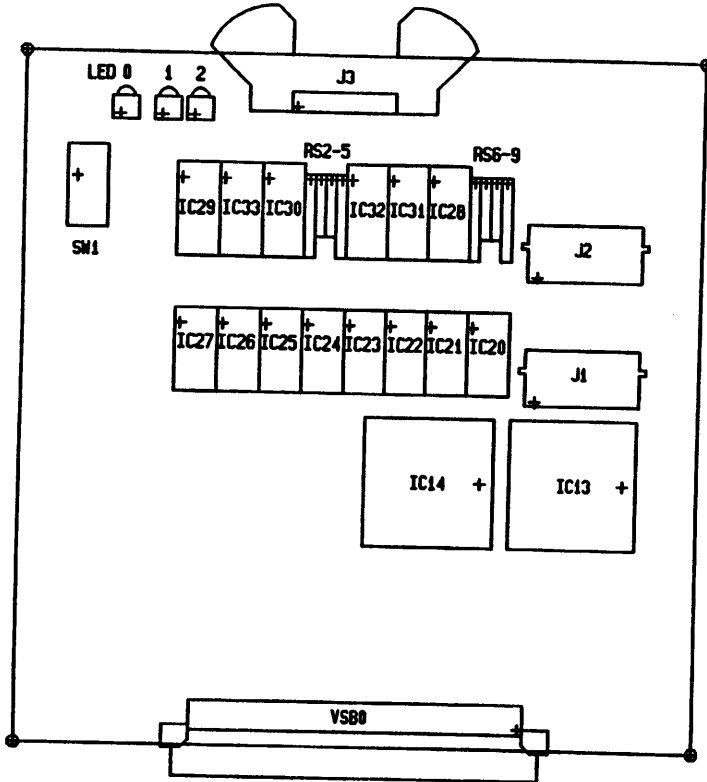
If the 4640 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the SW1 switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

Light Emitting Diodes

The 4640 submodule contains 3 light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
LED2	Red	MIOC 4600	Future use.
LED1	Red	MIOC 4600	Fault condition on the MIOC.
LED0	Red	Submodule	Software controlled.

TABLE 7. Light Emitting Diodes



Board layout HDLC submodule 4640.

88806 Ser. cable. HDLC V.11. Version 1

Part number:	88806L0		
Version:	1	Cable:	LYCY 12 × 0.25 mm ²
Subject:	Ser. cable. HDLC V.11.		
Description:	Serial cable. Used to connect the HDLC sub-module to a modem using V.11 interface.		

Con. 1: DB25			Con. 2: DA15		
Pin	Signal	Direction	Colour	Signal	Pin
1	Chassis	↔	White	Chassis	1
14	T(A)	→	Red	T(A)	2
23	C(A)	→	Grey	C(A)	3
16	R(A)	←	Yellow	R(A)	4
24	I(A)	←	Green	I(A)	5
6	S(A)	←	Blue	S(A)	6
7	GND	↔	Brown	GND	8
2	T(B)	→	Pink	T(B)	9
11	C(B)	→	Black	C(B)	10
4	R(B)	←	Violet	R(B)	11
12	I(B)	←	Grey/Pink	I(B)	12
18	S(B)	←	Blue/Red	S(B)	13
5	RTS+	↷			
8	CTS+	↷			
17	RTS-	↷			
20	CTS-	↷			

Examples:

88806050: A cable with 1 male DB25 plug and 1 male DA15 plug and a length of 5 meter.



Supermax Technical Data Sheet

Type:	Term320 submodule. PCB 4670. and Term321 Optical fiber I/O. PCB 4656.
Data sheet no:	33
Revision no:	0
Date:	92-04-13

General Description

The Term320 submodule is an I/O submodule for the MIOC 4600. The Term320 submodule contains four SCC2698 octal UART's and circuitry for multiplexing/demultiplexing all UART I/O signals into one serial datastream to/from the optical fiber interface board Term321. An embedded protocol is used to synchronize the datastream. The UART's support baudrates from 150 to 19200 baud.

The submodule is to be used with the Term321 Optical fiber interface board and is connected to the optical fiber I/O board via a twisted pair flat cable.

The optical fiber I/O board is located on the Supermax back panel, has one FST connector for the transmitter fiber, and has one FST connector for the receiver fiber. The LED transmitter emits signals at a wavelength of 830 nm and the baudrate of the signal is 44 Mbps. Fiber lengths up to 1000 meters are supported.

The submodule has the following interfaces:

- One submodule interface.
- One interface to optical fiber board via twisted pair flat cable.
- One RS-232 asynchronous channel (console or service port).

The optical fiber I/O board has the following interfaces:

- One interface to submodule via twisted pair flat cable.
- One FST connector for fiber transmitter (LED).
- One FST connector for fiber receiver.

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB connector and the "serv" connector. The following signals are used:

"serv"	Signal	VSB pin no.
1	GND	
2	NC	
3	TXD-	b3
4	NC	
5	RXD-	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 1. Interface to RS-232 channel

Interface to optical fiber board

The connector to the optical fiber board is located at the edge of the submodule. The connector is labeled X and contains the following signals:

X	SIGNAL	Circuit Use
1	GND	Supply GND
2	VCC	Power Out
3	GND	Supply GND
4	VCC	Power OUT
5	TXD-	Data Out circuit B
6	TXD +	Data Out circuit A
7	GND	Data Out circuit GND
8	GND	Data Out circuit GND
9	VCC	Power Out
10	GND	Supply GND
11	GND	Supply GND
12	VCC	Power Out
13	GND	Data In circuit GND
14	GND	Data In circuit GND
15	RXD-	Data In circuit B
16	RXD +	Data In circuit A
17	VCC	Power Out
18	GND	Supply GND
19	VCC	Power Out
20	GND	Supply GND

TABLE 2. Interface to fiber optic board

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	1.8 A
+12 V \pm 5%	not used
-12 V \pm 5%	not used

TABLE 3. Power requirements

Installation

No user straps need to be selected or checked before a Term320 submodule is installed in a system.

Trap Switch

If the Term320 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

Light Emitting Diodes

The Term320 submodule carries two light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
LED2	Red	MIOC 4600	Future use.
LED1	Red	MIOC 4600	Fault condition on the MIOC.

TABLE 4. Light Emitting Diodes



Supermax Technical Data Sheet

Type:	Term8 submodule. PCB 4660 and PCB 4290.
Data sheet no:	34
Revision no:	0
Date:	92-04-13

General Description

The Term8 submodule is an I/O submodule for the MIOC 4600. The Term8 submodule contains one SCC2698 octal UART's and circuitry for interfacing all UART I/O signals to RS-232 lines. It supports baudrates from 150 to 19200 bps. The board has the following interfaces:

- One submodule interface.
- Two interfaces to the two back panels via flat cables.
- One RS-232 asynchronous channel (console or service port).

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB connector and the "serv" connector. The following signals are used:

"serv"	Signal	VSB pin no.
1	GND	
2	NC	
3	TXD-	b3
4	NC	
5	RXD-	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 1. Interface to RS-232 channel

Interface to back panels

The connectors to the back panels are labeled P1 and P2 and they contain the following signals:

Pin	Signal	Circuit
1	GND	Signal ground
2	DSR3	Data Set Ready Channel 3
3	RTS3	Request To Send Channel 3
4	TXD3	Transmit Data Channel 3
5	GND	Signal ground
6	CTS3	Clear To Send Channel 3
7	RXD3	Receive Data Channel 3
8	DTR3	Data Terminal Ready Channel 3
9	DCD3	Data Carrier Detect Channel 3
10	GND	Signal ground
11	GND	Signal ground
12	DSR2	Data Set Ready Channel 2
13	RTS2	Ready To Send Channel 2
14	TXD2	Transmit Data Channel 2
15	GND	Signal ground
16	CTS2	Clear To Send Channel 2
17	RXD2	Receive Data Channel 2
18	DTR2	Data Terminal Ready Channel 2
19	DCD2	Data Carrier Detect Channel 2
20	GND	Signal ground
21	GND	Signal ground
22	DSR1	Data Set Ready Channel 1
23	RTS1	Request To Send Channel 1
24	TXD1	Transmit Data Channel 1
25	GND	Signal ground
26	CTS1	Clear To Send Channel 1
27	RXD1	Receive Data Channel 1
28	DTR1	Data Terminal Ready Channel 1
29	DCD1	Data Carrier Detect Channel 1
30	GND	Signal ground
31	GND	Signal ground
32	DSR0	Data Set Ready Channel 0
33	RTS0	Request To Send Channel 0
34	TXD0	Transmit Data Channel 0
35	GND	Signal ground
36	CTS0	Clear To Send Channel 0
37	RXD0	Receive Data Channel 0
38	DTR0	Data Terminal Ready Channel 0
39	DCD0	Data Carrier Detect Channel 0
40	GND	Signal ground

TABLE 2. Interface to V.24/V.28, P1

Pin	Signal	Circuit
1	GND	Signal ground
2	DSR7	Data Set Ready Channel 7
3	RTS7	Request To Send Channel 7
4	TXD7	Transmit Data Channel 7
5	GND	Signal ground
6	CTS7	Clear To Send Channel 7
7	RXD7	Receive Data Channel 7
8	DTR7	Data Terminal Ready Channel 7
9	DCD7	Data Carrier Detect Channel 7
10	GND	Signal ground
11	GND	Signal ground
12	DSR6	Data Set Ready Channel 6
13	RTS6	Ready To Send Channel 6
14	TXD6	Transmit Data Channel 6
15	GND	Signal ground
16	CTS6	Clear To Send Channel 6
17	RXD6	Receive Data Channel 6
18	DTR6	Data Terminal Ready Channel 6
19	DCD6	Data Carrier Detect Channel 6
20	GND	Signal ground
21	GND	Signal ground
22	DSR5	Data Set Ready Channel 5
23	RTS5	Request To Send Channel 5
24	TXD5	Transmit Data Channel 5
25	GND	Signal ground
26	CTS5	Clear To Send Channel 5
27	RXD5	Receive Data Channel 5
28	DTR5	Data Terminal Ready Channel 5
29	DCD5	Data Carrier Detect Channel 5
30	GND	Signal ground
31	GND	Signal ground
32	DSR4	Data Set Ready Channel 4
33	RTS4	Request To Send Channel 4
34	TXD4	Transmit Data Channel 4
35	GND	Signal ground
36	CTS4	Clear To Send Channel 4
37	RXD4	Receive Data Channel 4
38	DTR4	Data Terminal Ready Channel 4
39	DCD4	Data Carrier Detect Channel 4
40	GND	Signal ground

TABLE 3. Interface to V.24/V.28, P2

Line drivers/receivers

The following shows the relationship between line drivers/receivers and channel numbers.
 IC14 and IC15 are drivers/receivers for channel 0.
 IC16 and IC17 are drivers/receivers for channel 1.
 IC18 and IC19 are drivers/receivers for channel 2.
 IC20 and IC21 are drivers/receivers for channel 3.
 IC22 and IC23 are drivers/receivers for channel 4.
 IC24 and IC25 are drivers/receivers for channel 5.
 IC26 and IC27 are drivers/receivers for channel 6.
 IC28 and IC29 are drivers/receivers for channel 7.

Term8 back panel

Each back panel contains 4 DB25S sockets and one 40 pin half pitch flat cable connector. The pin assignment for each connector is as follows:

Pin	Signal	Circuit
1	N.C.	Not connected
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	DCD	Data carrier detect
20	DTR	Data terminal ready
Others	N.C.	Not connected

TABLE 4. Term8 back panel. Pin assignment X0 to X3

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	1.2 A
+12 V \pm 5%	0.3 A
-12 V \pm 5%	0.1 A

TABLE 5. Power requirements

Installation

No user straps need to be selected or checked before a Term8 submodule is installed in a system. The Term8 submodule and the Term8 back panels must be interconnected using two 40 pin half pitch flat cables.

Trap Switch

If the Term8 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

Light Emitting Diodes

The Term8 submodule carries two light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
LED2	Red	MIOC 4600	Future use.
LED1	Red	MIOC 4600	Fault condition on the MIOC.

TABLE 6. Light Emitting Diodes



Supermax Technical Data Sheet

Type:	Term322 Serial Port Panel. PCB 4680. and Term321 Optical fiber I/O. PCB 4656.
Data sheet no:	35
Revision no:	0
Date:	92-04-13

General Description

The Term322 port panel is an interface board for demultiplexing and multiplexing the signals of 32 RS-232 ports into one serial datastream to/from the optical fiber interface board 4656. An embedded protocol is used to synchronize the datastream. The front panel carries 32 RS-232 port connectors.

The Term322 port panel contains drivers and receivers for each of the 32 ports, demultiplexer/multiplexer circuitry, and a power supply circuit to power the drivers, the internal circuitry, and the optical fiber board.

The port panel is to be used with the Term321 Optical fiber interface board and is connected to the optical fiber I/O board via a twisted pair flat cable.

The optical fiber I/O board is located on the transformer chassis, has one FST connector for the transmitter fiber, and has one FST connector for the receiver fiber. The LED transmitter emits signals at a wavelength of 830 nm and the baudrate of the signal is 44 Mbps. Fiber lengths up to 1000 meters are supported.

The Serial Port Panel is used with the Term320 submodule for the MIOC 4600. The Serial Port Panel and the Supermax are interconnected using optical fiber (two fibers, one for transmit and one for receive).

The port panel has the following interfaces:

- One interface to optical fiber board via twisted pair flat cable.
- 32 RS-232 asynchronous ports.

The optical fiber I/O board has the following interfaces:

- One interface to submodule via twisted pair flat cable.
- One FST connector for fiber transmitter (LED).
- One FST connector for fiber receiver.

Term32 port connectors

The front panel contains 32 DB25S sockets. The pin assignment for each connector is as follows:

Pin	Signal	Circuit
1	N.C.	Not connected
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	DCD	Data carrier detect
20	DTR	Data terminal ready
Others	N.C.	Not connected

TABLE 1. Term32 ports. Pin assignment P1 to P32

Interface to optical fiber board

The connector to the optical fiber board is located in the middle of the PCB next to the power supply. The connector is labeled X and contains the following signals:

X	SIGNAL	Circuit Use
1	GND	Supply GND
2	VCC	Power Out
3	GND	Supply GND
4	VCC	Power OUT
5	TXD-	Data Out circuit B
6	TXD+	Data Out circuit A
7	GND	Data Out circuit GND
8	GND	Data Out circuit GND
9	VCC	Power Out
10	GND	Supply GND
11	GND	Supply GND
12	VCC	Power Out
13	GND	Data In circuit GND
14	GND	Data In circuit GND
15	RXD-	Data In circuit B
16	RXD+	Data In circuit A
17	VCC	Power Out
18	GND	Supply GND
19	VCC	Power Out
20	GND	Supply GND

TABLE 2. Interface to fiber optic board

Port drivers/receivers

All drivers/receivers for one port are located in one IC right next to the port connector.

Power Requirements

Voltage	Typical consumption
220 V AC \pm 20%	15 W

TABLE 3. Power requirements

Installation

No user straps need to be selected or checked before a Term322 Serial Port Panel is installed in a system.

Light Emitting Diodes

The Term322 module carries two light emitting diodes (LED's) located at the edge of the board. The table below describes their function:

Label	Colour	Origin	Function
LED2	Red	Power supply	Power ON.
LED1	Green	Receiver	Link OK. (Rx and Tx).

TABLE 4. Light Emitting Diodes



Supermax Technical Data Sheet

Type:	Dummy 4630 submodule. PCB 4630.
Data sheet no:	25
Revision no:	0
Date:	91-05-01

General Description

The Dummy 4630 submodule is an I/O submodule for the MIOC 4600. The submodule contains the following interfaces:

- Submodule interface.
- One RS-232 asynchronous channel (console or service port).

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB0 connector and the "serv" connector. The following signals are used:

"serv"	Signal	VSB pin no.
1	GND	
2	NC	
3	TXD-	b3
4	NC	
5	RXD-	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 1. Pin assignment, serv.

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	10 mA

TABLE 2. Power requirements

Installation

No user straps need to be selected or checked before a 4630 submodule is installed in a system.

Trap Switch

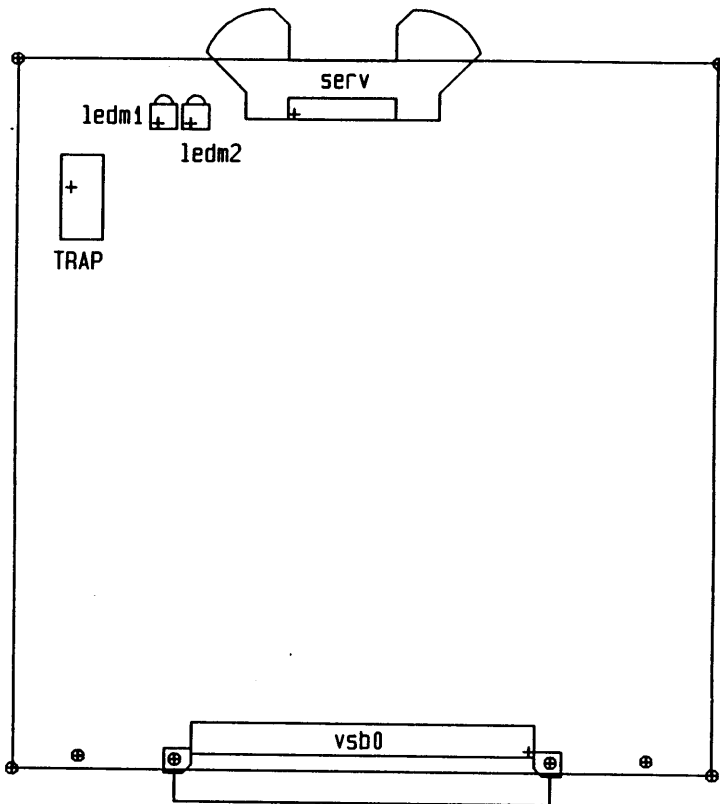
If the 4630 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

Light Emitting Diodes

The 4630 submodule carries two light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
LEDM2	Red	MIOC 4600	Future use.
LEDM1	Red	MIOC 4600	Fault condition on the MIOC.

TABLE 3. Light Emitting Diodes





Supermax Technical Data Sheet

Type:	Ethernet 4621 submodule. PCB 4621.
Data sheet no:	24
Revision no:	0
Date:	91-05-01

General Description

The Ethernet 4621 submodule is an I/O submodule for the MIOC 4600. The Ethernet 4621 submodule contains a 82C596 Local Area Network controller and the following interfaces:

- One submodule interface.
- One interface to an IEEE 802.3 AUI cable.
- One RS-232 asynchronous channel (console or service port).

Interface to IEEE 802.3

The connector to IEEE 802.3 is located at the edge of the submodule. The connector is labeled DROP and contains the following signals:

DROP	SIGNAL	DA15	Circuit	Use
1	GND			
2	GND	1	CI-S	Control In circuit Shield
3	COLL-	9	CI-B	Control In circuit B
4	COLL	2	CI-A	Control In circuit A
5	TXD-	10	DO-B	Data Out circuit B
6	TXD	3	DO-A	Data Out circuit A
7	GND	11	DO-S	Data Out circuit Shield
8	GND	4	DI-S	Data In circuit Shield
9	RXD-	12	DI-B	Data In circuit B
10	RXD	5	DI-A	Data In circuit A
11	+12V	13	VP	Voltage Plus
12	GND	6	Vc	Voltage Common
13	GND	14	VS	Voltage Shield
14	TERM	7	CO-A	Control Out circuit A
15	TERM	15	CO-B	Control Out circuit B
16	GND	8	CO-S	Control Out circuit Shield

TABLE 1. Interface to IEEE 802.3

Interface to RS-232 channel

The RS-232 interface signals are used on the MIOC and the submodule only connects the signals between the VSB0 connector and the "serv" connector. The following signals are used:

"serv"	Signal	VSB0 pin no.
1	GND	
2	NC	
3	TXD-	b3
4	NC	
5	RXD-	b6
6	NC	
7	RTS	b4
8	NC	
9	CTS	b7
10	NC	
11	DSR	b8
12	NC	
13	GND	
14	DTR	b5
15-20	NC	

TABLE 2. Interface to RS-232 channel

Power Requirements

Voltage	Typical current
+ 5 V \pm 5%	1.1 A
+12 V \pm 5%	0.3 A
-12 V \pm 5%	0.0 A

TABLE 3. Power requirements

Installation

No user straps need to be selected or checked before a 4621 submodule is installed in a system.

Trap Switch

If the 4621 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC.

IEEE 802.3 Node address

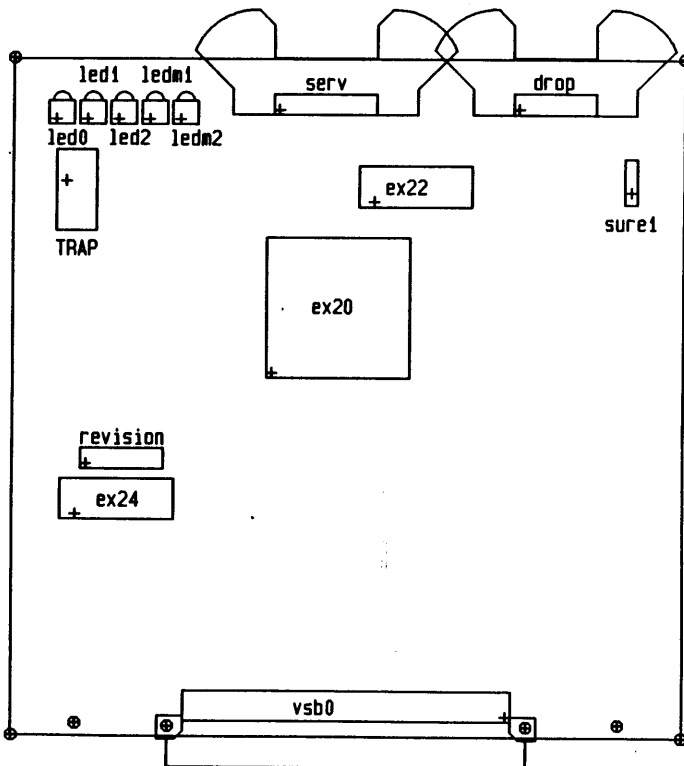
The PAL in position ex24 contains the last three hexadecimal numbers of the node address. The address is marked on the label of the PAL.

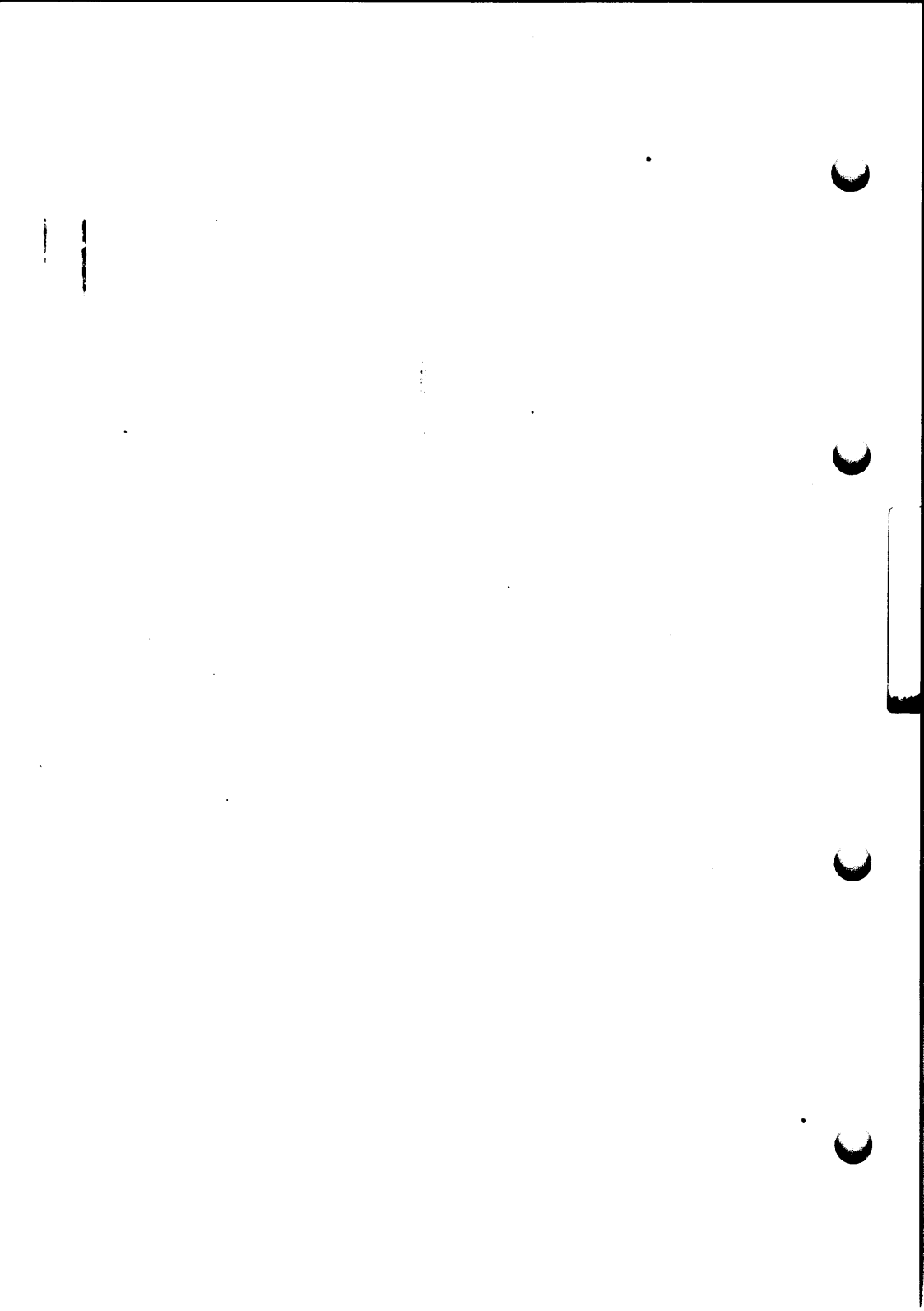
Light Emitting Diodes

The 4621 submodule carries five light emitting diodes (LED's) located at the edge of the board. The table below describes their function, with the leftmost LED at the top of the table:

Label	Colour	Origin	Function
LEDM2	Red	MIOC 4600	Future use.
LEDM1	Red	MIOC 4600	Fault condition on the MIOC.
LED2	Red	Submodule	Fault condition on the submodule.
LED1	Green	Submodule	Activity LED.
LED0	Red	Submodule	Software controlled.

TABLE 4. Light Emitting Diodes





Type: SIOC2 3600

Data sheet no.: 16

Revision no.: 1

Date: 880311

General description:

The SIOC2 3600 is an intelligent asynchronous peripheral controller in a SUPERMAX system. The pcb can be used either as a NIOC or as a SIOC2 depending on the components in the board, all straps and capabilities denoted by brackets relates to the NIOC version of the board. The SIOC2 is built around a MC68000 microprocessor and contains the following IO interfaces:

- (- Ethernet interface. IEEE 802.3.)
- External I/O bus for serial RS-232 interfaces.
- Parallel printer interface.
- Service port interface.

Interface to I/O bus:

The SIOC2 has a standard interface to the common SUPERMAX I/O bus.

Active cycles : Byte read and write.
Word read and write.
Read modify write.

Passive cycles: Byte read and write.
Word read and write.
Double word read and write.
Read modify write.

(Ethernet interface.)

The NIOC contains the Ethernet transceiver interface. The transceiver cable is connected to a 16 pin flat cable connector CN3.

Signals denoted GNDS can be strapped to ground by AJ0.
Signals denoted term are just terminated otherwise they are not used.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01		GNDS	02
03	C-	C+	04
05	TX-	TX+	06
07	GNDS	GNDS	08
09	RX-	RX+	10
11	+12 V	GND	12
13	GND	term	14
15	term	GNDS	16

EXTERNAL BUS SERIAL CHANNELS.

The serial interface includes the following programmable options:

- Baudrates from 50 to 38400 baud.
- Character length from 5 to 8 bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.

All RS-232 interface boards are connected to a 50 pin flat cable connector CN1.

SUPERMAX technical data sheet.
Module: SIOC2 3600

4

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND	D0	02
03	GND	D1	04
05	GND	D2	06
07	GND	D3	08
09	GND	D4	10
11	GND	D5	12
13	GND	D6	14
15	GND	D7	16
17	GND	A10	18
19	GND	A9	20
21	GND	A8	22
23	GND	A7	24
25	GND	A6	26
27	GND	A5	28
29	GND	A4	30
31	GND	A3	32
33	GND	A2	34
35	GND	A1	36
37	GND	A0	38
39	GND	FINT1	40
41	GND	FINT0	42
43	GND	FAS	44
45	GND	FW	46
47	GND	CSD	48
49	GND	RTS1	50

Parallel Printer Interface.

The SIOC2 contains an interface to a parallel printer. The interface is located in a 26 pin flat cable connector CN2. Polarity of handshake signals is selected by straps on the SIOC2.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	DS	GND	02
03	DATA(0)	GND	04
05	DATA(1)	GND	06
07	DATA(2)	GND	08
09	DATA(3)	GND	10
11	DATA(4)	PSENSE	12
13	DATA(5)	GND	14
15	DATA(6)	GND	16
17	DATA(7)	GND	18
19	ACK	GND	20
21	BUSY	GND	22
23	CAL(P E)		24
25	SLCT		26

Interface to service port:

The interface to the service port is a modified RS 232C interface. All output signals are "open collector" signals and may be wired together with the corresponding output signals from other units in a Supermax system. Pull down resistors are used to pull the signals down to -12 v when not driven by an output.

The interface to the service port is located in a 20 pin flat cable connector CN0.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND		02
03	TXD		04
05	RXD		06
07	RTS		08
09	CTS		10
11	DSR		12
13	GND	DTR	14
15			16
17			18
19			20

Power requirements:

Voltage	Typ. current
+ 5 +-5%	9.0 A
+12 +-5%	0.1 A
-12 +-5%	0.1 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

Installation:

Before a SIOC2 module is installed in a Supermax system the following items must be selected/checked:

- Unit number/Priority.
- Straps.
- Pull down resistors for the service port.
- Transceiver cable.
- Flat cables for the serial channels and the parallel printer.
- Firmware.

These items are described in details in the following text.

Unit number/Priority:

Each intelligent Supermax module connected to the common I/O bus has a unique address. The address is called the unit number.

The arbitration scheme used in the common I/O bus is based on fixed priorities. Two units connected to the the I/O bus cannot used the same priority. The NIOC module uses one priority. The SIOC2 module is equiped with a unit number switch, SWU. The switch gives the module a unit number and one priority.

Switch position	Unit number	Priority
0	0x00	00
1	0x01	01
2	0x02	02
3	0x03	03
4	0x04	04
5	0x05	10
6	0x06	11
7	0x07	12
8	0x08	13
9	0x09	14
A	0x0a	20
B	0x0b	21
C	0x0c	22
D	0x0d	23
E	0x0e	24
F	0x0f	30

Pull down resistors for the service port:

Output signals from the service port are open collector signals. These signals must be pulled down to -12v by one and only one module in a Supermax system. When the NIOC is installed in a Supermax system pull down resistors are placed on the basic CPU module in the system. If the SIOC2 is used outside a Supermax system pull down resistors must be placed in position I9.

Firmware:

The firmware is situated in an EPROMs mounted in position Q1, even bytes, and Q2, odd bytes.

The PROMs contain a test program that is executed after power up reset. After the testprogram has been executed the firmware enables the SIOC2 to be booted in a Supermax system.

Straps and jumpers:

+ designates factory installed position.

AJ1

Function: Controls polarity of the Acknowledge input from the parallel printer port.

+ PIN 1 connected to PIN 2: Acknowledge is an active high input.

PIN 2 connected to PIN 3: Acknowledge is an active low input.

AJ2

Function: Controls polarity of the Busy input from the parallel printer port.

PIN 1 connected to PIN 2: Busy is an active low input.

+ PIN 2 connected to PIN 3: Busy is an active high input.

AJ3

Function: Controls the size of the PROMs:

PROM type 2764:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

PROM type 27128:

PIN 1 connected to PIN 2 and PIN 6 connected to PIN 5.

+ PROM type 27256:

PIN 2 connected to PIN 3 and PIN 6 connected to PIN 5.

PROM type 27512:

PIN 2 connected to PIN 3 and PIN 5 connected to PIN 4.

AJ4

Function: Controls the baud rate of the service port.

+ PIN 1 connected to PIN 14: 9600 baud

PIN 2 connected to PIN 13: 4800 baud

PIN 3 connected to PIN 12: 2400 baud

PIN 4 connected to PIN 11: 1200 baud

PIN 5 connected to PIN 10: 600 baud

PIN 6 connected to PIN 9 : 300 baud

AJ5

Function: Controls the time between timer interrupts.

- PIN 1 connected to PIN 14: 5 ms
- + PIN 2 connected to PIN 13: 10 ms
- PIN 3 connected to PIN 12: 20 ms
- PIN 4 connected to PIN 11: 40 ms
- PIN 5 connected to PIN 10: 80 ms

AJ6

Function: Controls polarity of the Strobe signal in the parallel printer interface.

- + PIN 1 connected to PIN 2: Strobe is an active low pulse.
- PIN 2 connected to PIN 3: Strobe is an active high pulse.

AJ7

Function: Controls the reset signal to the SIOC2.

- PIN 1 connected to PIN 2: The RESET is generated on the NIOC itself by power up.
- + PIN 2 connected to PIN 3: The RESET signal is taken from the IO bus.

AJ8

Function: Controls the BUS CLOCK signal to the SIOC2.

PIN 1 connected to PIN 2: The BUS CLOCK is driven by the SIOC2 itself. The SIOC2 does not drive the BUS CLOCK line in the IO bus.

+ PIN 2 connected to PIN 3: The BUS CLOCK on the SIOC2 is driven by the BUS CLOCK line in the IO bus.

(AJ9)

Function: Controls the CLOCK signal to the MANCHESTER encoder.

+ PIN 1 connected to PIN 2: The CLOCK is supplied to pin 14 of the manchester encoder.

PIN 2 connected to PIN 3: pin 134 of the manchester encoder is grounded.

(AJA)

Function: Controls the Manchester encoder.

PIN 1 connected to PIN 2: Pin 13 of the manchester encoder is left floating.

PIN 2 connected to PIN 3: The CLOCK is supplied to pin 13 of the manchester encoder.

(AJB)

Function: Controls pin 2 of the manchester encoder.

PIN 1 connected to PIN 2: Pin 2 is connected to pin 1 by AC6.

PIN 2 connected to PIN 3: pin 2 is grounded.

AJC

Function: Controls the handshake in the external bus.

PIN 1 connected to PIN 2: Timing controlled by external bus.

+ PIN 2 connected to PIN 3: Timing controlled by the SIOC2.

AJD

Function: Polarity of write signal (external bus).

+ PIN 1 connected to PIN 2: Internal logic, factory installed.

PIN 2 connected to PIN 3: NA.

AJE

Function: Controls enabeling of data drivers (external bus).

PIN 1 connected to PIN 2:

+ PIN 2 connected to PIN 3: Factory installed.

Indicator Leds:

LED0: Indicates activity of the LAN.

LED1: Parity error in memory. Even byte.

LED2: Parity error in memory odd byte.

LED3: The 68000 is in the HALT state.

LED4: The SIOC2 has activated the error in unit line.

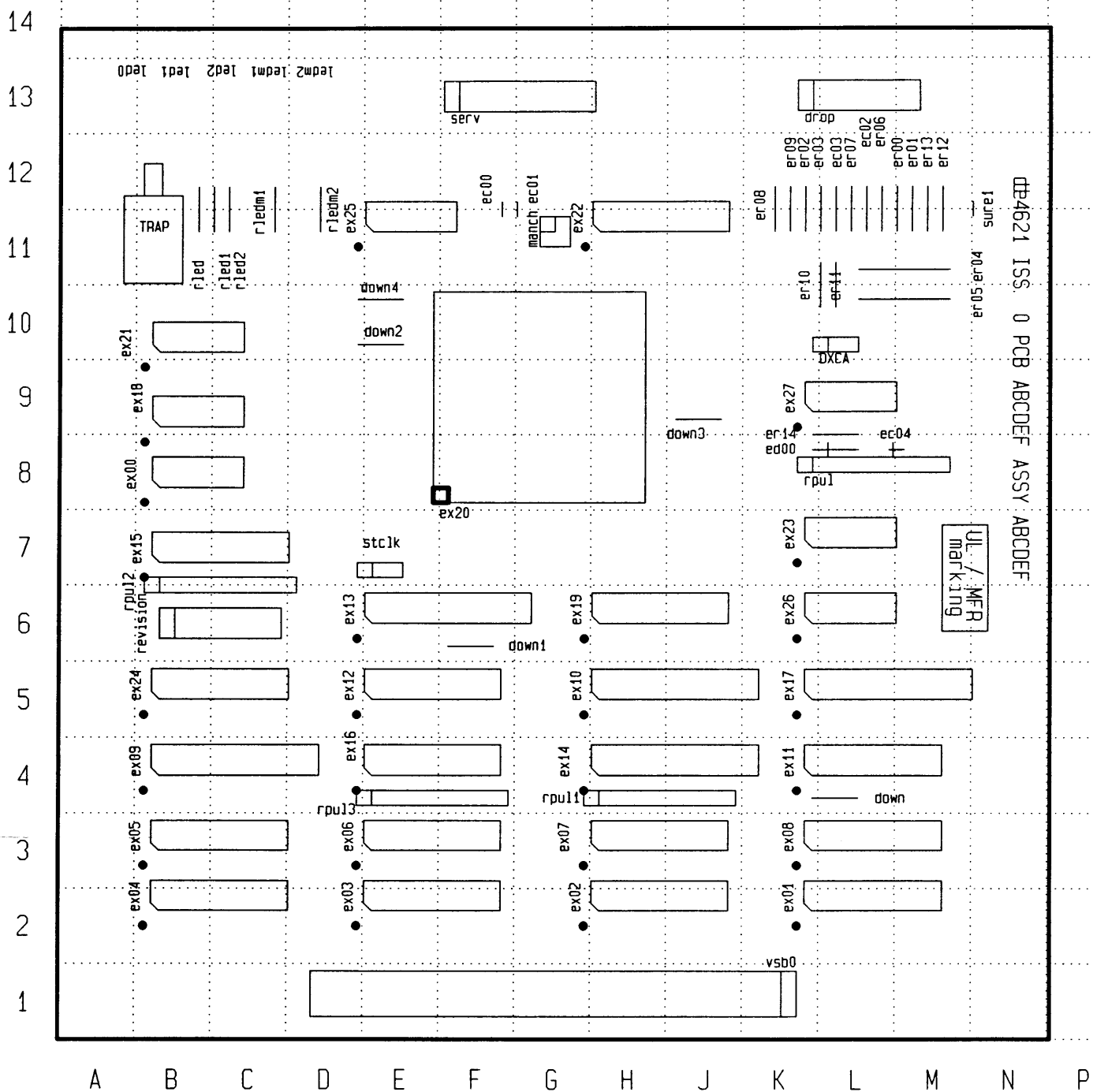
SIOC2 SUB MODULES.

A SIOC2 sub module is connected to the SIOC2 by the cni 50 pin flatcable connector.

The 50 pin flatcable contains 11 address, 8 data, interrupt and control signals nescesary to place peripherals outside the supermax cardcage.

Eatch sub module contains eight serial channels, the sub modules place in the external bus address space is decided by a rotary switch, ei the first module should have the switch in position zero, the second in position one. The last module (the module at the end of the cabbie) should have terminations resistors for the cabbie, three single in line resistor networks with nine 100 ohms resistors to one commen pin.

The flat cabbie for the external bus is a shielded cabbie, with a maximum lenght of 15 feet.



Component locations

PCB: 4621 / SUB-E

Issue: 0
Date: 90/12/19



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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
DXCA	strap	L10						
TRAP	trap	B12						
down	39ohm5%	K4						
down1	39ohm5%	F6						
down2	39ohm5%	E10						
down3	39ohm5%	J9						
down4	39ohm5%	E10						
drop	net	K13						
ec00	10pF20%	F12						
ec01	10pF20%	G12						
ec02	10nF20%	L11						
ec03	10nF20%	L11						
ec04	47uF16V	L8						
ed00	1N4448	K8						
er00	39ohm1%	M12						
er01	39ohm1%	M11						
er02	39ohm1%	K12						
er03	39ohm1%	L11						
er04	243ohm1%1W	L11						
er05	243ohm1%1W	M10						
er06	5k6ohm5%	L12						
er07	2k7ohm5%	L11						
er08	5k6ohm5%	K12						
er09	2k7ohm5%	K11						
er10	18kohm5%	L11						
er11	18kohm5%	L10						
er12	39ohm1%	M12						
er13	39ohm1%	M11						
er14	47Kohm5%	K9						
ex00	74als1004	B8						
ex01	74als573	K2						
ex02	74als573	H2						
ex03	74als573	E2						
ex04	74als573	B2						
ex05	74als645	B3						
ex06	74als645	E3						
ex07	74als645	H3						
ex08	74als645	K3						
ex09	22v10-15	B4						
ex10	22v10-15	H5						
ex11	74als574	K4						
ex12	16r4-15	E5						
ex13	22v10-15	E6						
ex14	22v10-15	H4						
ex15	74als580	B7						
ex16	74als580	E4						
ex17	74als992	K5						
ex18	74f74	B9						
ex19	16r4-15	H6						
ex20	INT82C596	F8						
ex21	osc. 40MHz	B10						
ex22	manch	H11						
ex23	74LS393	K7						
ex24	1618-35	B5						
ex25	osc. 20.0MHz	E11						
ex26	74LS393	K6						
ex27	741s132	K9						
ledm1	550-0405	C13						
ledm2	550-0405	D13						
led0	550-0405	A13						
led1	550-0205	B13						
led2	550-0405	C13						
manch	strap	G11						
revision	rev	B6						
rled	1kohm5%	B12						
rledm1	2k2ohm5%	C12						
rledm2	2k2ohm5%	D12						
rled1	330ohm5%	C12						
rled2	1kohm5%	C12						
rpul	10-1-182	K8						
rpul1	10-1-182	H4						
rpul2	10-1-182	B7						
rpul3	10-1-182	E4						
serv	serv	F13						
stclk	strapclk	E7						
sure1	smodstand	N11						
vsb0	din96	K1						

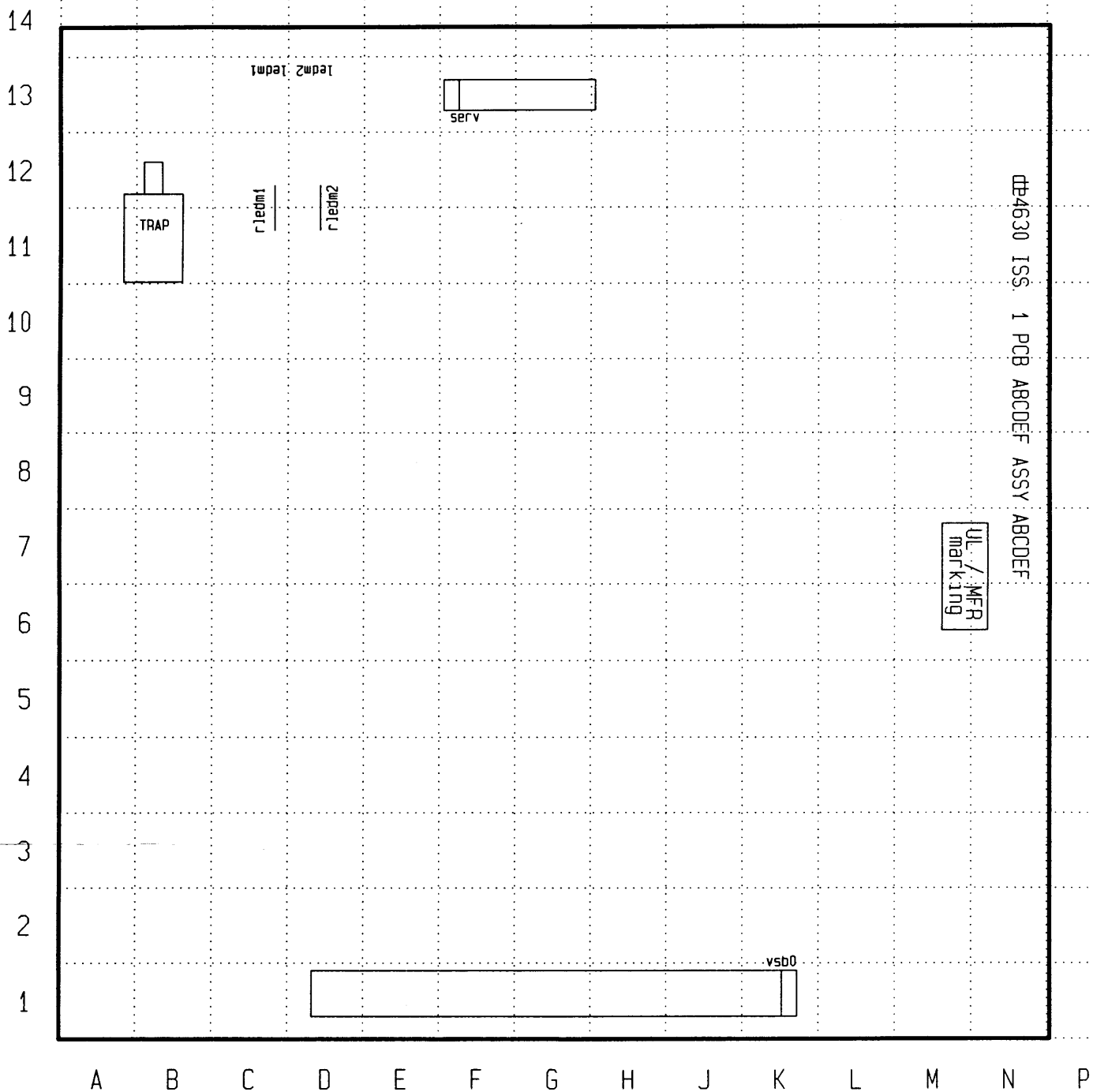
Component locations

PCB: 4621 / SUB-E

Issue: 0 Date: 90/12/19



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DB4630 ISS. 1 PCB ABCDEF ASSY: ABCDEF

UL-MFR
marking

Component locations

PCB: 4630 / SUB-D

Issue: 1 Date: 91/01/02



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Type: RAM 0200

Data sheet no.: 4

Revision no.: 0

Date: 851015

General description:

The RAM 0200 is a 1 Mb dynamic RAM module with error correcting code ECC. RAM 0200 is controlled by CPU modules 0100 and 0101. RAM 0200 is organized as four blocks of memory each block 256 kb. The RAM is delivered with 1, 2 or 4 blocks of memory installed.

Interface to CPU modules:

In a Supermax system each CPU has its own private main memory. The main memory of a CPU consists of one or more RAM modules. The RAM modules are connected together with the associated CPU module by the local memory bus. The local memory busses are implemented in the mother board. RAM modules are placed in adjacent slots below their associated CPU module. Each time a memory module is added to the main memory the local memory bus is extended to the next lower slot. The order in which the memory modules are placed is arbitrary.

The RAM module is organized as 256 k double words of four bytes each. A double word consists of two words each 16 bit wide. A 16 bit word is extended with 6 ECC bits.

SUPERMAX technical data sheet.
Module: RAM 0200

2

The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
Word read cycle
Word write cycle
double word read cycle
double word write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between CPU module and memory modules.

Board lay out:

Board lay out is shown on page 5. The numbering of bits in a word is also shown on the drawing. Bit 16 to bit 21 is the error correcting code.

The rows contain the following addresses:

ADDRESS RANGE (Byte addresses)

ROW 0	000000-03FFFC	Even word addresses only
ROW 1	000002-03FFFE	Odd word addresses only
ROW 2	040000-07FFFC	Even word addresses only
ROW 3	040002-07FFFE	Odd word addresses only
ROW 4	080000-0BFFFC	Even word addresses only
ROW 5	080002-0BFFFE	Odd word addresses only
ROW 6	0C0000-0FFFFC	Even word addresses only
ROW 7	0C0002-0FFFFE	Odd word addresses only

SUPERMAX technical data sheet.
Module: RAM 0200

3

Power requirements:

Voltage	Typ. current
+ 5 +5%	1.0 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

SUPERMAX technical data sheet.
Module: RAM 0200

4

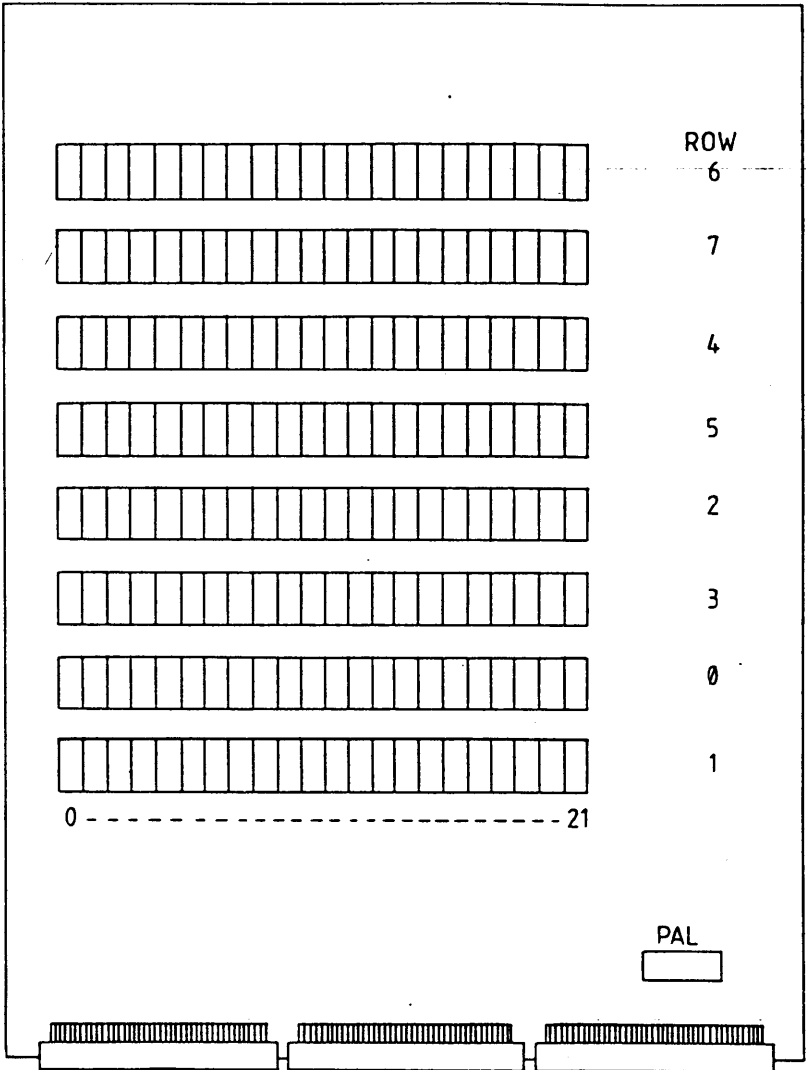
Installation:

Before a RAM module is installed in a Supermax system the starting address of the module must be selected. The starting address of the module is coded in a PAL together with the amount of memory installed on the module.

Labels on address PALs

Starting address Size: 1 Mb Size: 1/2 Mb

0 Mb	C180	C180H
1 Mb	C181	C181H
2 Mb	C182	C182H
3 Mb	C183	C183H
4 Mb	C184	C184H
5 Mb	C185	C185H
6 Mb	C186	C186H
7 Mb	C187	C187H
8 Mb	C188	C188H
9 Mb	C189	C189H
10 Mb	C18A	C18AH
11 Mb	C18B	C18BH
12 Mb	C18C	C18CH
13 Mb	C18D	C18DH
14 Mb	C18E	C18EH
15 Mb	C18F	C18FH





ROW
6



7



4



5



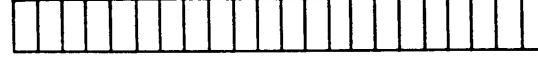
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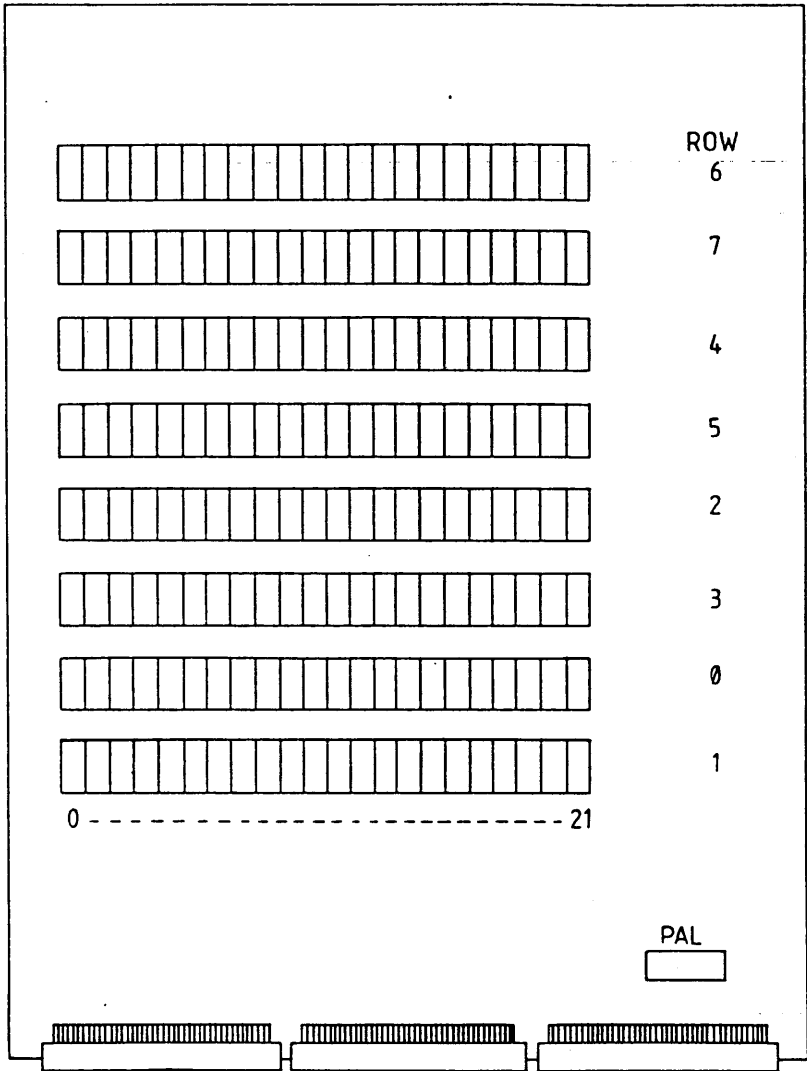


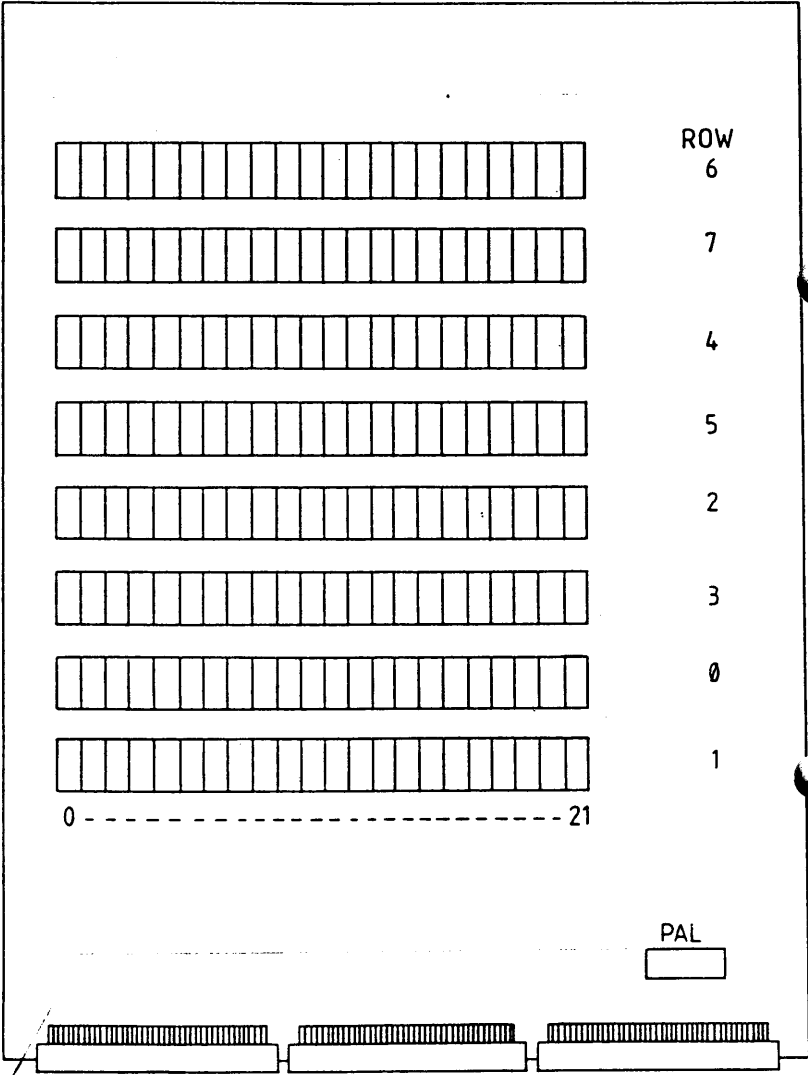
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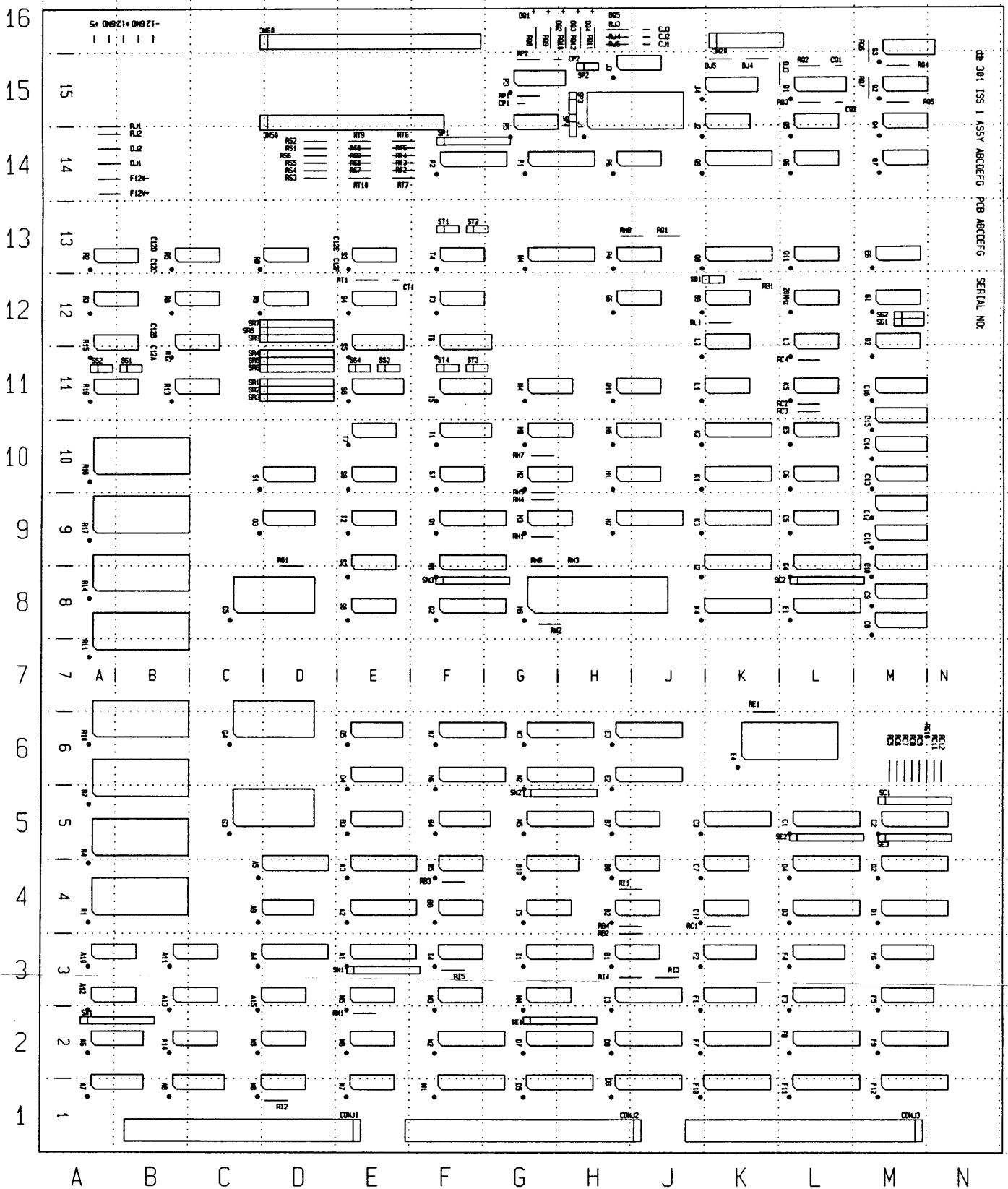
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PAL







db 301 ISS 1 ASSY ABCDEFG PCB ABCDEFG SERIAL NO.

Component locations

PCB: 301 / SIOC

Issue: 1
Date: 871030



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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
A1	74ALS574	E3	E2	74ALS573	H6	Q2	74LS00	M15
A2	74ALS574	E4	E3	74ALS645	H6	Q3	STRAP	M15
A3	74ALS576	E4	E4	SBOOT (2764)	K6	Q4	74LS74	M14
A4	74ALS573	C3	E5	74LS00	L10	Q5	74LS74	L14
A5	74LS541	C4	E6	74LS32	M13	Q6	74LS74	L14
A6	STRAP	A2	F1	74LS189	J3	Q7	74LS74	M14
A7	STRAP	A1	F2	74LS189	J3	Q8	74LS642	J13
A8	STRAP	B1	F3	74LS189	L3	Q9	74LS642	J14
A9	74LS148	C4	F4	74LS189	L3	Q10	74LS00	H11
A10	74LS03	A3	F5	74LS189	M3	Q11	74LS08	L13
A11	74LS03	B3	F6	74LS189	M3	RB1	1K ohm	K12
A12	74LS03	A3	F7	74LS540	J2	RB2	820 ohm	H4
A13	74LS03	B3	F8	74LS540	L2	RB3	1K ohm	F4
A14	74LS32	B2	F9	74LS540	M2	RB4	1K ohm	H4
A15	74LS32	C3	F10	74ALS580	J1	RC1	1K ohm	K4
B1	74LS05	H3	F11	74ALS580	L1	RC2	33 ohm	L11
B2	74LS05	H4	F12	74ALS580	M1	RC3	33 ohm	L11
B3	74LS257	E5	F12V+	JUMPER	A14	RC4	33 ohm	L11
B4	74LS259	F5	F12V-	JUMPER	A14	RC5	33 ohm	M6
B5	74LS03	F4	G1	5404	M12	RC6	33 ohm	M6
B6	74LS05	F4	G2	74LS393	M11	RC7	33 ohm	M6
B7	74LS21	H5	G3	M82C53-5	C5	RC8	33 ohm	M6
B8	74LS74	H4	G4	M82C53-5	C6	RC9	33 ohm	M6
B9	74LS74	J12	G5	M82C53-5	C8	RC10	33 ohm	M6
B10	74LS175	G4	G6	74ALS74	H12	RC11	33 ohm	N6
CJ1	100pF	J16	H1	74S04	H10	RC12	33 ohm	N6
CJ2	100pF	J16	H2	74S04	G10	RE1	1K ohm	K7
CJ3	100pF	J16	H3	74S08	G9	RG1	1K ohm	D9
CONJ1	CONNECTOR	E1	H4	74S08	G11	RH1	470 ohm	G9
CONJ2	CONNECTOR	J1	H5	74LS74	H10	RH2	470 ohm	H8
CONJ3	CONNECTOR	M1	H6	P8085AH-2	G8	RH3	4K7 ohm	H9
CP1	100pF	G15	H7	S3v (PAL16L8)	H9	RH4	4K7 ohm	G9
CP2	100pF	G15	H8	74LS32	G10	RH5	1K ohm	G10
CQ1	100pF	L15	I1	U08v (PAL16L8)	G3	RH6	4K7 ohm	G9
CQ2	100pF	L15	I2	74AS574	J8	RH7	1K ohm	G10
CT1	NOT USED	E12	I3	74ALS244	H3	RH8	1K ohm	H13
C1	74ALS573	L5	I4	74S74	F3	RI1	1K ohm	H4
C2	74ALS573	M5	I5	74LS00	G4	RI2	1K ohm	D1
C3	74ALS573	J5	J1	D8251AFC	H14	RI3	1K ohm	J3
C4	74ALS573	L8	J2	75188	J14	RI4	1K ohm	H3
C5	74LS280	L9	J3	75189	H15	RI5	1K ohm	F3
C6	74LS280	L10	J4	JUMPER (X x X)	J15	RJ1	NOT USED	A15
C7	74LS393	J4	K1	S7v (PAL16R8)	J10	RJ2	NOT USED	A14
C8	TMS4164	M8	K2	S4v (PAL16R8)	J10	RJ3	4K7 ohm	H16
C9	TMS4164	M8	K3	S5v (PAL16R8)	J9	RJ4	4K7 ohm	H16
C10	TMS4164	M8	K4	S6v (PAL16L8)	J8	RJ5	4K7 ohm	H16
C11	TMS4164	M9	K5	74S04	L11	RL1	1K ohm	J12
C12	TMS4164	M9	L1	74S00	J11	RM1	1K ohm	E2
C12A	100nF	B12	L2	74S74	J11	RP1	2K2 ohm	G15
C12B	100nF	B12	L3	74S74	L11	RP2	3K3 ohm	G15
C12C	100nF	B13	M1	P13v (PAL16R8)	F1	RQ1	470 ohm	J13
C12D	100nF	B13	M2	74AS641	F2	RQ2	22K ohm	L15
C12E	100nF	D13	M3	74LS74	F3	RQ3	22K ohm	L15
C12F	100nF	D13	M4	74S74	G3	RQ4	1K ohm	M15
C13	TMS4164	M10	M5	74LS74	E3	RQ5	1K ohm	M15
C14	TMS4164	M10	M6	74ALS37	E2	RQ6	1K ohm	M16
C15	TMS4164	M10	M7	74LS14	E1	RQ7	1K ohm	M15
C16	TMS4164	M11	M8	74LS21	C1	RQ8	150 ohm	G16
C17	74S00	J4	M9	74LS32	C2	RQ9	150 ohm	G16
DJ1	1N4007	A14	N1	74LS541	F8	RQ10	150 ohm	H16
DJ2	1N4007	A14	N2	74LS645	G6	RQ11	150 ohm	H16
DJ3	1N4448	K15	N3	74LS645	G6	RQ12	150 ohm	H16
DJ4	1N4448	K15	N4	74LS273	G13	RS1	3K9 ohm	D14
DJ5	1N4448	J15	N5	74LS273	G5	RS2	270 ohm	D14
DQ1	LED	G16	N6	74LS541	F6	RS3	3K9 ohm	D14
DQ2	LED	G16	N7	74ALS574	F6	RS4	3K9 ohm	D14
DQ3	LED	H16	O1	S2v (PAL16L8)	F9	RS5	270 ohm	D14
DQ4	LED	H16	O2	S1v (PAL16L8)	F8	RS6	3K9 ohm	D14
DQ5	LED	H16	O3	74LS138	C9	RS7	3K9 ohm	E14
D1	74LS541	M4	O4	74LS138	E6	RS8	270 ohm	E14
D2	74ALS574	M4	O5	74LS138	E6	RS9	3K9 ohm	E14
D3	74LS541	L4	P1	74ALS574	G14	RT1	NOT USED	E12
D4	74ALS574	L4	P2	74LS641	F14	RT2	3K9 ohm	E14
D5	74LS541	G1	P3	74LS123	G15	RT3	270 ohm	E14
D6	74ALS573	H1	P4	74LS74	H13	RT4	3K9 ohm	E14
D7	74ALS573	G2	P5	74LS14	G14	RT5	3K9 ohm	E14
D8	74ALS573	H2	P6	74S38	H14	RT6	270 ohm	E14
E1	74ALS541	L8	Q1	74LS123	L15	RT7	3K9 ohm	E14

Component locations

PCB: 301 / SIOC

Issue: 1

Date: 871030



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SUPERMAX technical data sheet.
Module: RAM 1400

1

Type: RAM 1400

Data sheet no.: 5

Revision no.: 0

Date: 851015

General description:

The RAM 1400 is a 4 Mb dynamic RAM module with error correcting code ECC. RAM 1400 is controlled by CPU modules 0100 and 0101. RAM 1400 is organized as four blocks of memory each block 1 Mb. The RAM is delivered with 1, 2, 3 or 4 blocks of memory installed.

Interface to CPU modules:

In a Supermax system each CPU has its own private main memory. The main memory of a CPU consists of one or more RAM modules. The RAM modules are connected together with the associated CPU module by the local memory bus. The local memory busses are implemented in the mother board. RAM modules are placed in adjacent slots below their associated CPU module. Each time a memory module is added to the main memory the local memory bus is extended to the next lower slot. The order in which the memory modules are placed is arbitrary. RAM modules type 1400 may be mixed with RAM modules type 0200 to implement the main memory of a CPU.

The RAM module is organized as 1 M double words of four bytes each. A double word consists of two words each 16 bit wide. A 16 bit word is extended with 6 ECC bits.

SUPERMAX technical data sheet.
Module: RAM 1400

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The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
Word read cycle
Word write cycle
double word read cycle
double word write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between CPU module and memory modules.

Board lay out:

Board lay out is shown on page 5. The numbering of bits in a word is also shown on the drawing. Bit 16 to bit 21 is the error correcting code.

The rows contain the following addresses:

ADDRESS RANGE (Byte addresses)

ROW 0	000000-0FFFFC	Even word addresses only
ROW 1	000002-0FFFFE	Odd word addresses only
ROW 2	100000-1FFFFC	Even word addresses only
ROW 3	100002-1FFFFE	Odd word addresses only
ROW 4	200000-2FFFFC	Even word addresses only
ROW 5	200002-2FFFFE	Odd word addresses only
ROW 6	300000-3FFFFC	Even word addresses only
ROW 7	300002-3FFFFE	Odd word addresses only

SUPERMAX technical data sheet.
Module: RAM 1400

3

Power requirements:

Voltage Typ. current

+ 5 +-5% 2.0 A

Physical dimension:

Standard SUPERMAX module.

Width : 331 mm.

Depth : 415 mm.

Height: 14 mm.

SUPERMAX technical data sheet.
Module: RAM 1400

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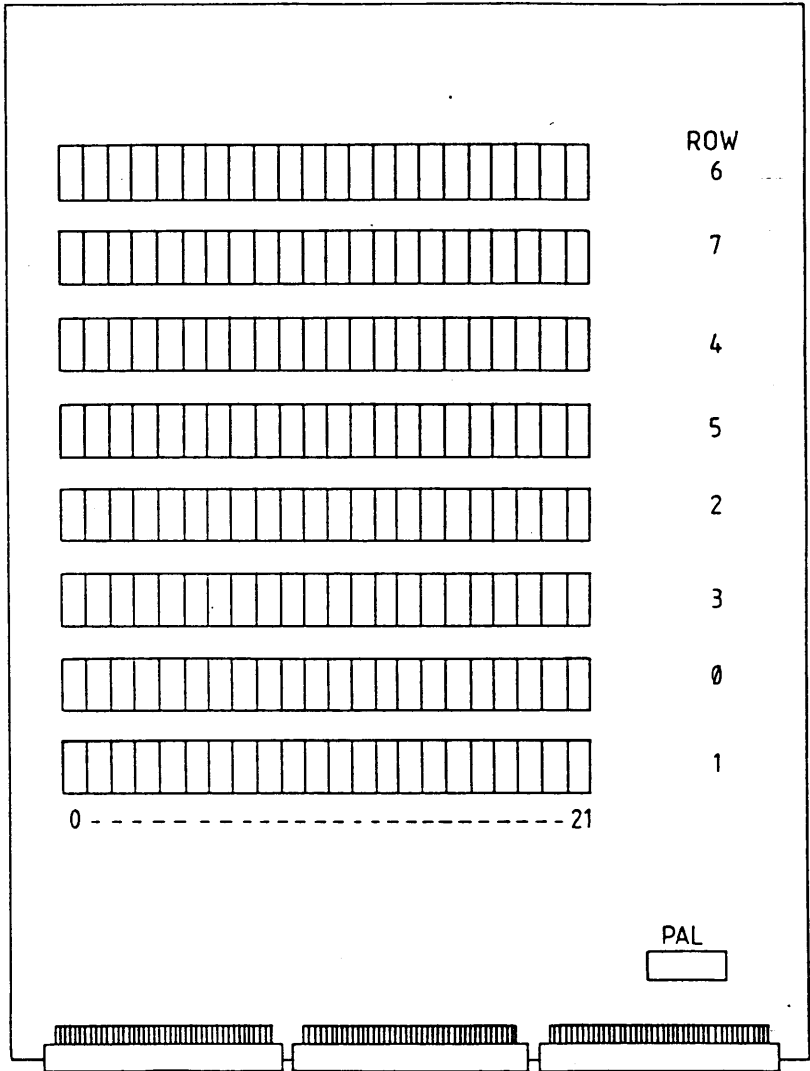
Installation:

Before a RAM module is installed in a Supermax system the starting address of the module must be selected. The starting address of the module is coded in a PAL together with the amount of memory installed on the module.

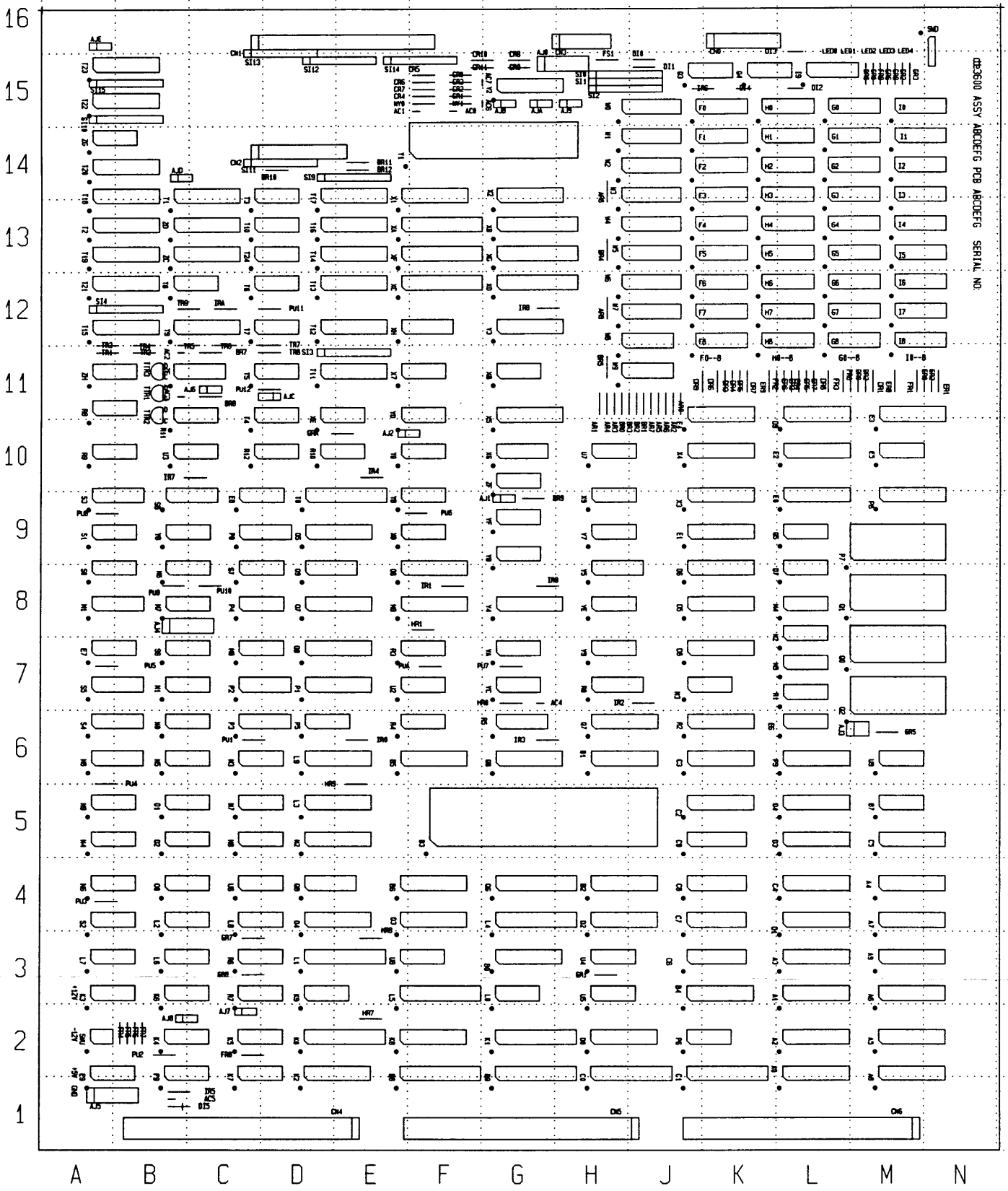
Labels on address PALs

Starting address Size: 1 Mb Size: 2 Mb Size: 3 Mb Size: 4 Mb

0 Mb	M01	M02	M03	M04
4 Mb	M41	M42	M43	M44
8 Mb	M81	M82	M83	M84
12 Mb	MC1	MC2	MC3	MC4







Component locations		Issue: 0 Date: 870327			dansk data elektronik a/s	
PCB: 3600 / SNIOC					herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+5V		A2	CR2	390HM	F15	F1	41256	J14
+12V		A3	CR3	5K6	F15	F2	41256	J14
-12V		A2	CR4	2K4	F15	F3	41256	J13
ACO	10nF	F15	CR5	390HM	E15	F4	41256	J13
AC1	10nF	E15	CR6	390HM	E15	F5	41256	J13
AC2	1nF	B11	CR7	2K4	E15	F6	41256	J12
AC3	1nF	B11	CR8	390HM	G15	F7	41256	J12
AC4	1nF	G7	CR9	390HM	G15	F8	41256	J11
AC5	6u8F	B1	CR10	2K4OHM	F15	F9	74HC14	B1
AC6	22nF	F15	CR11	5K6OHM	F15	GND		A1
AC7	10nF	F15	C0	74ALS646	H1	GRA	1K	E10
AJA	3P-strap	G15	C1	74ALS646	J1	GR0	330OHM	M15
AJB	3P-strap	G15	C2	74ALS574	J5	GR1	1K	H3
AJC	3P-strap	D11	C3	74LS541	J6	GR2	10K	M15
AJD	3P-strap	B14	C4	74LS541	L4	GR3	10K	M15
AJE	3P-strap	A16	C5	74LS541	M5	GR5	10K	M6
AJO	14P-strap	G15	C6	2148-45	J3	GR6	330OHM	M15
AJ1	3P-strap	G9	C7	2148-45	J4	GR7	4K7OHM	D3
AJ2	3P-strap	E10	C8	2148-45	J4	GR8	4K7OHM	C3
AJ3	6P-strap	L6	C9	2148-45	J5	GR9	330OHM	M15
AJ4	14P-strap	B8	D10	1N4001	H15	G0	41256	L15
AJ5	14P-strap	A1	D11	1N4001	H15	G1	41256	L14
AJ6	3P-strap	C11	D12	1N4448	L15	G2	41256	L14
AJ7	3P-strap	C2	D13	1N4448	L16	G3	41256	L13
AJ8	3P-strap	B2	D14	1N4448	K15	G4	41256	L13
AJ9	3P-strap	H15	D15	1N4448	C1	G5	41256	L13
ARO	56OHM	J11	DR0	33OHM	M11	G6	41256	L12
AR1	56OHM	H11	DR1	33OHM	M11	G7	41256	L12
AR2	56OHM	J11	DR2	33OHM	M11	G8	41256	L11
AR3	56OHM	H11	DR3	33OHM	K11	HRO	2K2OHM	G7
AR4	56OHM	H11	DR4	33OHM	K11	HR1	1K	E8
AR5	56OHM	J11	DR5	33OHM	K11	HR7	100OHM	E2
AR6	56OHM	J11	DR6	33OHM	K11	HR8	100OHM	E3
AR7	56OHM	J11	DR7	33OHM	K11	HR9	100OHM	E6
AR8	56OHM	H13	DR8	33OHM	L11	H0	41256	K15
AR9	56OHM	H12	DR9	33OHM	J11	H1	41256	K14
A0	74ALS573	L1	D0	74ALS645	H2	H2	41256	K14
A1	74ALS573	L3	D1	74ALS645	L4	H3	41256	K13
A2	74ALS573	L2	D2	74ALS244	H4	H4	41256	K13
A3	74ALS573	L3	D3	16L8A	L5	H5	41256	K13
A4	74ALS573	M4	D4	16L8A	L5	H6	41256	K12
A5	74ALS573	M2	D5	74ALS240	J8	H7	41256	K12
A6	74ALS573	M3	D6	74ALS240	J8	H8	41256	K11
A7	74ALS573	M4	D7	74LS393	L8	IRA	100OHM	C12
A8	74ALS573	M1	D8	74ALS240	J7	IRO	100OHM	E6
A9	74ALS573	M3	D9	74ALS240	L10	IR1	100OHM	F8
BR0	56OHM	H11	ERO	33OHM	M11	IR2	100OHM	H7
BR1	56OHM	J11	ER1	33OHM	N11	IR3	100OHM	G6
BR2	56OHM	J11	ER2	33OHM	N11	IR4	100OHM	E10
BR3	56OHM	H11	ER3	33OHM	L11	IR5	100KOHM	C1
BR4	56OHM	H13	ER4	33OHM	L11	IR6	3K3	K15
BR5	56OHM	H11	ER5	33OHM	L11	IR7	10K	B10
BR6	150OHM	M15	ER6	33OHM	L11	IR8	100OHM	G12
BR7	5K6OHM	C11	ER7	33OHM	L11	IR9	100OHM	G8
BR8	5K6OHM	C11	ER8	33OHM	M11	I0	41256	M15
BR9	4K7	G9	ER9	33OHM	K11	I1	41256	M14
BR10	3K3OHM	C14	E0	74ALS240	L9	I2	41256	M14
BR11	3K3OHM	E14	E1	74ALS240	J9	I3	41256	M13
BR12	3K3OHM	E14	E2	74ALS240	L10	I4	41256	M13
B0	74ALS573	G3	E3	74ALS573	M10	I5	41256	M13
B1	74ALS573	H6	E4	74ALS573	J10	I6	41256	M12
B2	74ALS573	H4	E5	74LS280	M10	I7	41256	M12
B3	68000L10	F5	E6	74LS280	L6	I8	41256	M11
B4	74ALS573	J3	E7	74S74	A7	I9	PULLDOWN	L15
B5	74ALS645	E6	E8	74S74	C9	K0	20R8A	D2
B6	74ALS645	E4	E9	74LS393	A1	K1	20L8A	G2
B7	74S00	M5	FRO	33OHM	L11	K2	74LS641-1	D1
B8	74ALS646	E1	FR1	33OHM	M11	K3	74ALS74	A3
B9	74ALS646	G1	FR2	33OHM	K11	K4	74ALS74	B2
CN0	SERVICEPORT	K16	FR3	33OHM	L11	K5	74S74	C2
CN1	FBUS	C16	FR4	10K	B2	K6	74S74	B3
CN2	P-PRINTER	C14	FR5	10K	B2	K7	74S32	C1
CN3	ETHERNET	G16	FR6	10K	B2	K8	74ALS244	E2
CN4	IO-BUS	E1	FR7	10K	B2	K9	74S04	D3
CN5	IO-BUS	J1	FR8	330OHM	C2	LEDO	LED	L16
CN6	IO-BUS	M1	FR9	330OHM	M15	LED1	LED	L16
CR0	2K4	F15	FS1	5AT	H15	LED2	LED	M16
CR1	390HM	F15	FO	41256	J15	LED3	LED	M16

Component locations

PCB: 3600 / SNIOC

Issue: 0

Date: 870327



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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
LED4	LED	M16	R2	74LS541	J6	U9	74S11	M6
L0	74LS14	G3	R3	74LS05	E7	W0	4464-15	H15
L1	20R8A	D3	R4	74LS00	E6	W1	4464-15	H14
L2	74S04	B4	R5	74LS123	G6	W2	4464-15	H14
L3	16R8A	D5	R6	74LS05	C3	W3	4464-15	H13
L4	20L8A	G4	R7	74LS14	C3	W4	4464-15	H13
L5	20L8A	E3	R8	20MHZ	A11	W5	4464-15	H13
L6	74S74	B3	R9	7.3728MHZ	A10	W6	4464-15	H12
L7	74S04	A3	R10	74LS33	D10	W7	4464-15	H12
L8	74S00	C4	R11	74ALS74	B10	W8	4256-15	H11
L9	16R8A	D6	R12	74ALS74	C10	W9	4256-15	H11
M0	74S74	C7	S10	3K3	H15	XA	74ALS646	E13
M1	74ALS112	A8	SI1	3K3	H15	XB	74ALS646	G13
M2	74S32	L7	SI2	3K3	H15	XC	74ALS646	E12
M3	74S04	J7	SI3	1K	D11	XD	74ALS646	G12
M4	74S32	L8	SI4	1K	A12	XE	74ALS74	D10
M5	74S00	L7	SI9	TERM.	D14	XF	74ALS646	E13
M6	7438	B8	SI10	TERM.	A15	XG	74ALS646	G13
M7	74S08	B8	SI11	1K	C14	XH	74LS139	E12
M8	74S157	A6	SI12	TERM.	D15	X0	74S10	E9
M9	16R8A	E8	SI13	TERM.	C16	X1	74ALS573	E13
NY0	10KOHM	F15	SI14	TERM.	E15	X2	74ALS573	G13
NY1	10KOHM	F15	SI15	TERM.	A15	X3	74ALS573	J9
N0	74S74	B6	SWD	debug-switch	M16	X4	74ALS573	J10
N1	74S00	B7	SWU	unit-switch	A2	X5	74ALS573	G10
N2	16L8A	D5	S0	74S04	A8	X6	75LS590	G10
N3	74S30	C6	S1	74S74	A9	X7	74S280	E11
N4	74S20	A5	S2	74LS74	A4	X8	74S280	G11
N5	74S30	B6	S3	74LS390	A9	X9	74S32	H9
N6	74S74	A4	S4	74LS390	A6	YA	74F74	G7
N7	74S74	C5	S5	74LS390	A7	YB	74F74	E9
N8	74S74	C5	S6	74LS393	B7	YC	74F74	G7
N9	74S74	A5	S7	74LS74	C8	YD	74S08	E10
O0	74S38	B4	S8	74LS163	B9	YE	74S32	H8
O1	74S00	B5	TR1	INFOHM	A11	YF	74S10	G9
O2	74S04	B5	TR2	3K3OHM	B11	Y0	7438	E10
O3	73LS273	E4	TR3	0OHM	A12	Y1	82586	E14
O4	16R8A	D4	TR4	330OHM	B12	Y2	DQ8023	G15
O5	74LS541	D9	TR5	100OHM	C12	Y3	16R8A	G12
O6	74LS541	E8	TR6	220OHM	C12	Y4	16R8A	G8
O7	74LS541	D8	TR7	820OHM	C12	Y5	74LS257	H8
O8	74LS273	D7	TR8	3K3OHM	D11	Y6	16MHZ	B9
O9	74LS259	D8	TR9	33KOHM	B12	Y7	74S32	H9
PUA	1KOHM	F7	TTR1	nnp	B11	Y8	74S04	G9
PU1	1KOHM	C6	TTR2	pnp	B11	Y9	74ALS74	H7
PU2	1KOHM	B2	TTR3	pnp	B11	ZC	74ALS574	B13
PU3	1KOHM	A4	T0	20R8A	D9	ZD	74LS641-1	B13
PU4	1KOHM	A6	T1	16L8A	B13	ZE	74LS123	B11
PU5	1KOHM	A7	T2	74ALS573	A13	ZF	74LS14	G10
PU6	1KOHM	E9	T3	74LS393	C13	ZG	74LS14	A14
PU7	1KOHM	G7	T4	74F74	C10	ZH	74LS00	A11
PU8	1KOHM	A9	T5	74F74	C11			
PU9	1KOHM	B8	T6	74ALS74	C12			
PU10	1KOHM	C8	T7	74F74	C12			
PU11	1KOHM	C12	T8	74LS14	B12			
PU12	1KOHM	D11	T9	DS3862	B12			
P0	74LS157	C9	T10	74S04	C13			
P1	74ALS574	D7	T11	74ALS573	D11			
P2	74LS348	C7	T12	74ALS573	D12			
P3	74LS175	C6	T13	74ALS640	D12			
P4	74LS00	C8	T14	DS3862	D13			
P5	74LS00	D6	T15	74ALS580	A12			
P6	7406	J2	T16	74ALS645	D13			
P7	8251A	L9	T17	DS3862	D13			
P8	74ALS645	M9	T18	74ALS573	A13			
P9	74ALS645	L6	T19	74ALS573	A13			
Q0	EEPROM	L7	T20	74ALS573	A14			
Q1	EPROM	L8	T21	74ALS573	A12			
Q2	EPROM	L6	T22	74ALS640	A15			
Q3	75188	J15	T23	DS3862	A15			
Q4	75189	K15	T24	74ALS74	C13			
Q5	74LS32	L9	U2	74LS04	E7			
Q6	20L8A	G4	U3	74S04	B10			
Q7	16R8A	H6	U4	74LS04	H3			
Q8	16R8A	G6	U5	74LS10	H3			
Q9	74LS138	D4	U6	74S10	C4			
R0	74LS138	H7	U7	74S08	H10			
R1	74S32	L7	U8	74S08	E3			

Component locations

PCB: 3600 / SNIOC

Issue: 0 Date: 870327



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Type: RAM 3000

Data sheet no.: 11

Revision no.: 0

Date: 861101

General description:

The RAM 3000 is a RAM mother module on which up to four RAM daughter modules can be placed. RAM 3000 contains data bus drivers/registers, refresh counter, address decoding logic, and connectors for RAM daughter modules. A data word in RAM 3000 contains 32 data bits. A 32 bit data word is organized as two 16 bit words, each with 6 check bits for the error correcting code, ECC. RAM 3000 is designed for 1 MB, 4 MB, and future 16 MB RAM daughter modules. RAM daughter modules of different sizes may be placed on the same RAM 3000 module. A daughter module signals its size to the mother module which calculates the starting address for the next following daughter module. The maximum amount of RAM on a RAM 3000 module is 16 MB. The maximum amount of RAM with RAM 3000 modules is also 16 MB.

RAM 3000 is controlled by CPU module 0100, 0101 or 3400.

Interface to CPU modules:

In a Supermax system each CPU has its own private main memory. The main memory of a CPU consists of one or more RAM modules. The RAM modules are connected to the associated CPU module by the local memory bus. The local memory bus is implemented in the mother board. RAM modules are placed in adjacent slots below their associated CPU module. Each time a memory module is added to the main memory the local memory bus is extended to the next lower slot.

The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
16 bit read cycle
16 bit write cycle
32 bit read cycle
32 bit write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between the CPU module and the memory modules.

Board layout:

The daughter module board layout is shown on the last page.

When the board is used with CPU module 0100 and 0101 the following RAMs are used:

RAM0 - RAM15 : The first 16 bit word. Data bits D0 through D15.
RAM16 - RAM21 : ECC bits of the first 16 bit word.
RAM22 - RAM37 : The second 16 bit word. Data bits D16 through D23.
RAM38 - RAM43 : ECC bits of the second 16 bit word.

When the board is used with CPU module 3400 the following RAMs are used:

RAM0 - RAM31 : Data bits D0 through D31.
RAM32 - RAM38 : ECC bits.
RAM39 - RAM43 : Not used.

Power requirements:

Voltage	Typ. current
+ 5 Volt +-5%	2.0 A, including RAM daughter modules.

Installation:

The maximum amount of RAM on a RAM 3000 module is 16 MB.

The maximum amount of RAM with RAM 3000 modules is 16 MB.

The starting address of a RAM 3000 module is selected by a strap. Available start addresses are 0, 4, 8 and 12 MB. The strap is located between the bus connector and ICF. The strap is called SW1 and pin 6 is near ICF pin 1.

Four RAM daughter modules can be placed on a RAM 3000 module. The position closest to the motherboard is called position 0. In the following table a "1" indicates that a RAM 3200 daughter modules is installed. A RAM 3200 module holds 1 Mbyte of memory. A "4" indicates that a RAM 3300 daughter module is installed. RAM 3300 holds 4 Mbyte of memory. A "0" indicates that no module is installed.

When the board is strapped to start address 0 Mbyte, the board can be mounted with the following RAM daughter modules:

Position 0:	4	4	4	4
Position 1:	0 or 1	4	4	4
Position 2:	0 or 1	0 or 1	4	4
Position 3:	0 or 1	0 or 1	0 or 1	4

or

Position 0:	1	1	1	1
Position 1:	0	1	1	1
Position 2:	0	0	1	1
Position 3:	0	0	0	1

Pin numbers:

Pin 6	* * *
Pin 1	* * *
	SW1

Start address: 0 MB, pin 4 connected to 5 and
pin 2 connected to 3.

	* * - *
Pin 1	* * - *
	SW1

When the board is strapped to start address 4 Mbyte, the board can be mounted with the following RAM daughter modules:

Position 0:	4	4
Position 1:	0	4
Position 2:	0	0
Position 3:	0	0

or

Position 0:	1	1	1	1
Position 1:	0	1	1	1
Position 2:	0	0	1	1
Position 3:	0	0	0	1

Pin numbers:

Pin 6	* * *
Pin 1	* * *
	SW1

Start address: 4 MB, pin 5 connected to 6 and
pin 2 connected to 3.

	*_*_*
Pin 1	*_*_*
	SW1

When the board is strapped to start address 8 Mbyte, the board can be mounted with the following RAM daughter modules:

Position 0: 4
Position 1: 0
Position 2: 0
Position 3: 0

or

Position 0:	1	1	1	1
Position 1:	0	1	1	1
Position 2:	0	0	1	1
Position 3:	0	0	0	1

Pin numbers:

Pin 6 * * *
Pin 1 * * *
SW1

Start address: 8 MB, pin 4 connected to 5 and
pin 1 connected to 2.

* *_*
Pin 1 *_* *

When the board is strapped to start address 12 Mbyte, the board can be mounted with the following RAM daughter modules:

Position 0:	1	1	1	1
Position 1:	0	1	1	1
Position 2:	0	0	1	1
Position 3:	0	0	0	0

No 4 Mbyte daughter modules.

Pin numbers:

Pin 6	* * *
Pin 1	* * *
	SW1

Start address: 12 MB, pin 5 connected to 6 and
pin 1 connected to 2.

	- *
Pin 1	*-* *
	SW1



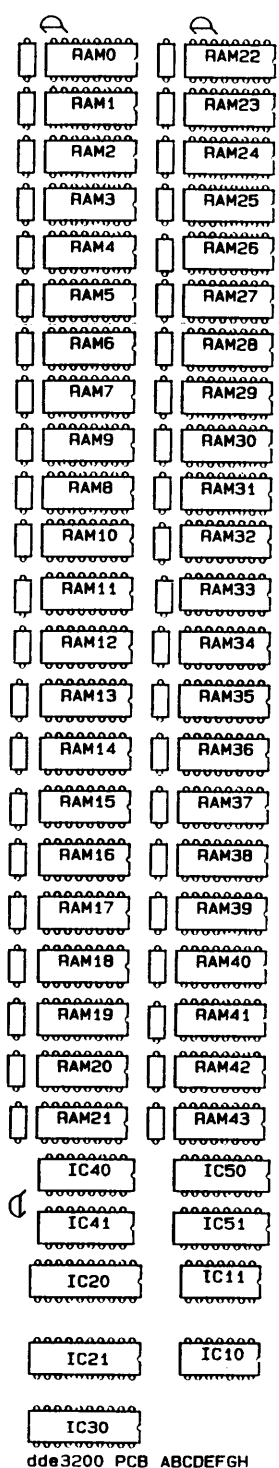
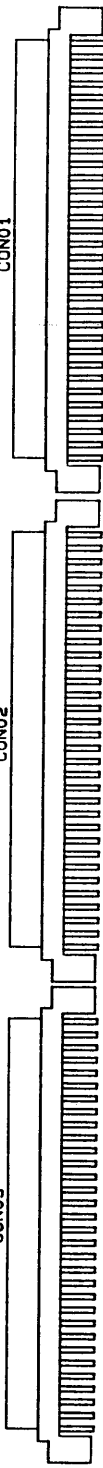
DDE3200 Date : 04.12.1986

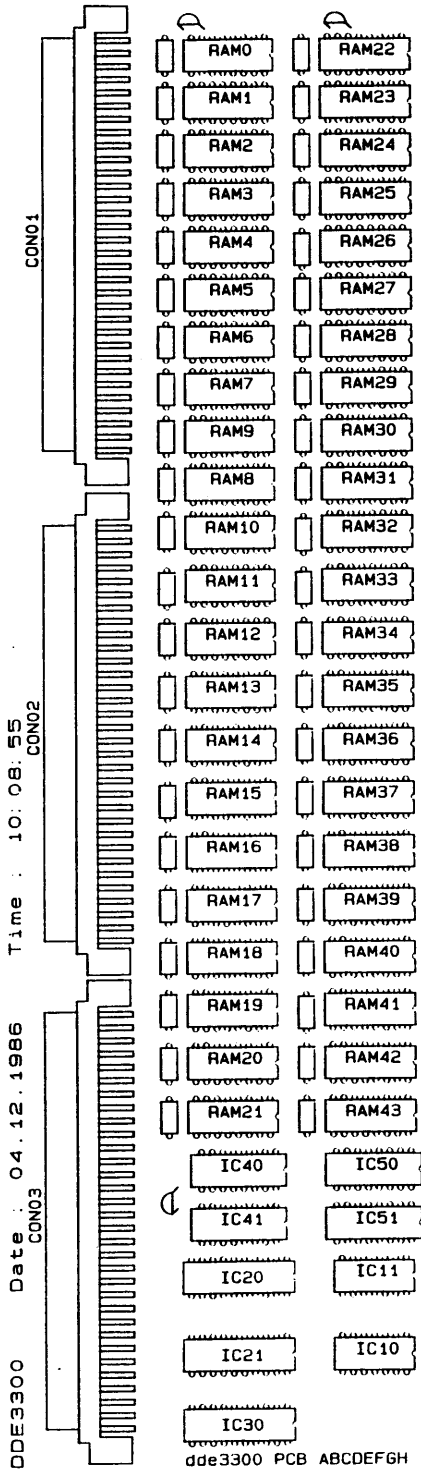
Time : 09:57:57

CON01

CON02

CON03





DDE3300 Date : 04.12.1986 Time : 10:08:55

CON01

CON02

CON03

- | | |
|-------|-------|
| RAM0 | RAM22 |
| RAM1 | RAM23 |
| RAM2 | RAM24 |
| RAM3 | RAM25 |
| RAM4 | RAM26 |
| RAM5 | RAM27 |
| RAM6 | RAM28 |
| RAM7 | RAM29 |
| RAM9 | RAM30 |
| RAM8 | RAM31 |
| RAM10 | RAM32 |
| RAM11 | RAM33 |
| RAM12 | RAM34 |
| RAM13 | RAM35 |
| RAM14 | RAM36 |
| RAM15 | RAM37 |
| RAM16 | RAM38 |
| RAM17 | RAM39 |
| RAM18 | RAM40 |
| RAM19 | RAM41 |
| RAM20 | RAM42 |
| RAM21 | RAM43 |
| IC40 | IC50 |
| IC41 | IC51 |
| IC20 | IC11 |
| IC21 | IC10 |
| IC30 | |

Type: RAM 3100

Data sheet no.: 10

Revision no.: 0

Date: 861029

General description:

The RAM 3100 is a RAM mother module on which up to four RAM daughter modules can be placed. RAM 3100 contains data bus drivers/registers, refresh counter, address decoding logic, and connectors for RAM daughter modules. A data word in RAM 3100 contains 32 data bits and 7 check bits for the error correcting code, ECC. RAM 3100 is designed for 1 MB, 4 MB, and future 16 MB RAM daughter modules. RAM daughter modules of different sizes may be placed on the same RAM 3100 module. A daughter module signals its size to the mother module which calculates the starting address for the next following daughter module. The starting address of a module must be divisible with the size of the module which is easily achieved by placing the largest modules first. The first RAM daughter module is placed closest to the bus connectors on RAM 3100.

RAM 3100 is controlled by CPU module 3400. RAM 3400 cannot be controlled by CPU modules 0100 and 0101.

Interface to CPU modules:

In a Supermax system each CPU has its own private main memory. The main memory of a CPU consists of one or more RAM modules. The RAM modules are connected to the associated CPU module by the local memory bus. The local memory bus is implemented in

the mother board. RAM modules are placed in adjacent slots below their associated CPU module. Each time a memory module is added to the main memory the local memory bus is extended to the next lower slot. The starting address of RAM module number N is calculated by RAM module N-1 as the starting address of RAM module N-1 plus the sum of the sizes of all daughter modules placed on RAM module N-1. The starting address is transferred on the local memory bus from module N-1 to module N. The starting address for the first memory module, closest to the CPU module, is zero.

The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
32 bit read cycle
32 bit write cycle
nibble mode read cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers address from the CPU module to the memory modules, and in the second part the bus transfers data between the CPU module and the memory modules.

Board layout:

The daughter module board layout is shown on the last page.

RAM0 - RAM31 : Data bits D0 through D31.
RAM32 - RAM38 : ECC bits.
RAM39 - RAM43 : Not used.

Power requirements:

Voltage	Typ. current
+ 5 Volt +-5%	2.0 A, including RAM daughter modules.

Installation:

The starting address of a RAM 3100 module is calculated by the preceding RAM 3100 modules in a memory system, so there is no need to change address switches, straps or address decoding PALs. If a memory system is implemented with RAM 3100 and RAM daughter modules of different sizes, the RAM daughter modules should be placed in the order of decreasing size, that is with the largest modules first.



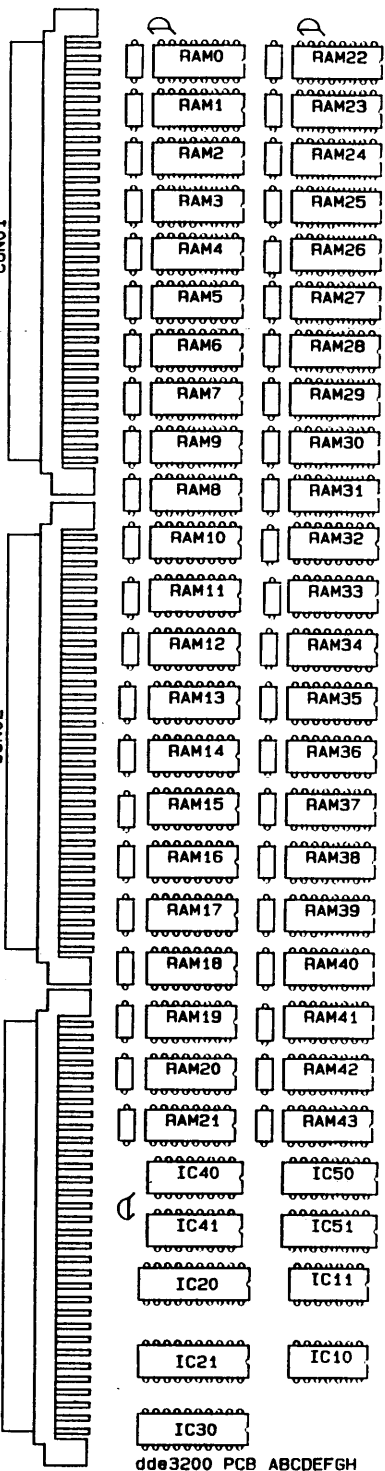
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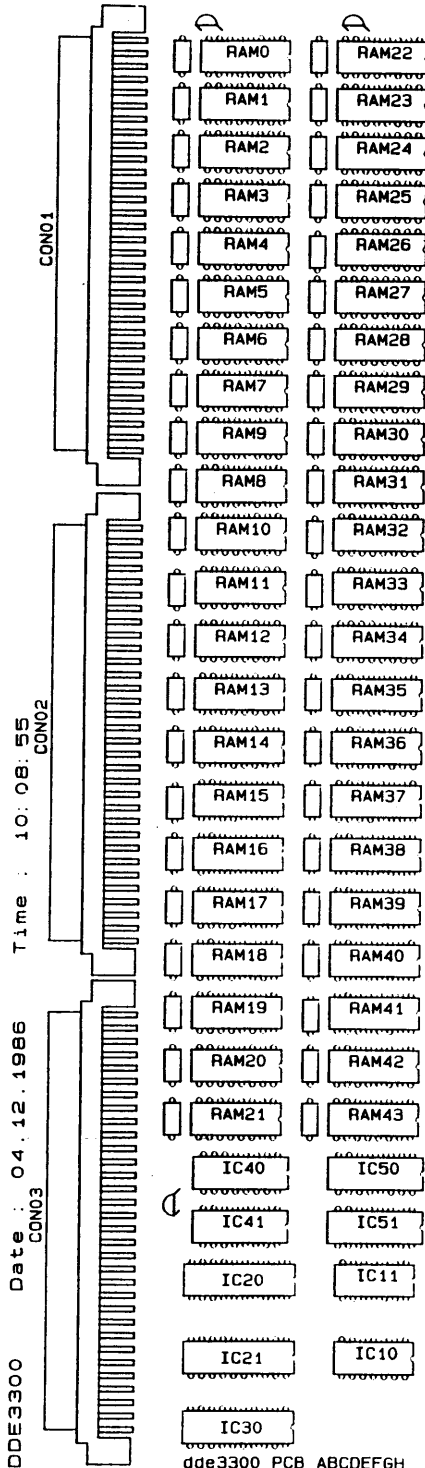
Time : 09:57:57

CON01

CON02

CON03





Supermax Technical Data Sheet

Type:	Memory mother module 4400
Data sheet no:	19
Revision no:	0
Date:	90-05-07

General Description

The memory mother module 4400 is a module on which up to four daughter modules can be placed. The module contains data bus drivers/registers, refresh counter, address decoding logic, and connectors for daughter modules. A data word in the mother module contains 32 data bits and 7 check bits for the error correcting code, ECC.

The mother module is designed for 1 Mb, 4 Mb and 16 Mb daughter modules. Because of the memory layout of mother module 4400, called **Two-way Interleave**, an even number of daughter modules must be mounted. Two consecutive daughter modules must have the same size, and are called a memory block. Two memory blocks of different sizes may be placed on the same mother module. A memory block signals its size to the mother module which calculates the starting address for the next following memory block. The starting address of a memory block must be divisible with the size of the memory block which is easily achieved by placing the largest memory blocks first. The first memory block is placed closest to the bus connectors on mother module 4400.

NOTE: Memory mother module 4400 is controlled by the CPU R3000 module only and must be mounted with at least two daughter modules.

Interface to CPU modules

In a Supermax system each CPU has its own main memory. The main memory of a CPU consists of one or more memory mother modules. The memory mother modules are connected to the CPU module by the local memory bus. The local memory bus is implemented in the mother board. Memory mother modules are placed in adjacent slots below their CPU module. Each time a memory mother module is added to the main memory the local memory bus is extended to the next lower slot.

The CPU module controls the memory modules and takes care of error detection and correction. The CPU module executes the following cycles in memory modules:

Refresh cycle
32 bit read cycle
32 bit write cycle
Read-modify-write cycle
Burst mode read cycle
Burst mode write cycle

The local memory bus is multiplexed between address and data. In the first part of a memory cycle the bus transfers the address from the CPU module to the memory modules, and in the second part the bus transfers the data between the CPU module and the memory modules.

Switches

The starting address for the first memory module, closest to the CPU module, must be zero. Memory mother module 4400 decodes 28 address bits corresponding to 256 Mb. The starting address of a mother module 4400 is set by rotating two 4 bit hexadecimal switches, SW1 and SW2.

SW2 Sets bit (27:24) of the starting address. Corresponds to 16 Mb increments.

SW1 Sets bit (23:20) of the starting address. Corresponds to 1 Mb increments.

Example: SW2 is set to 1 and SW1 is set to 8. The starting address will be $1 \times 16 \text{ Mb} + 8 \times 1 \text{ Mb}$, which is 24 Mb.

Power requirements

Voltage	Typical current
+ 5 Volt $\pm 5\%$	3.0 A. including daughter modules.

Type: RAM module 3200

Data sheet no.: 13

Revision no.: 0

Date: 861201

General description:

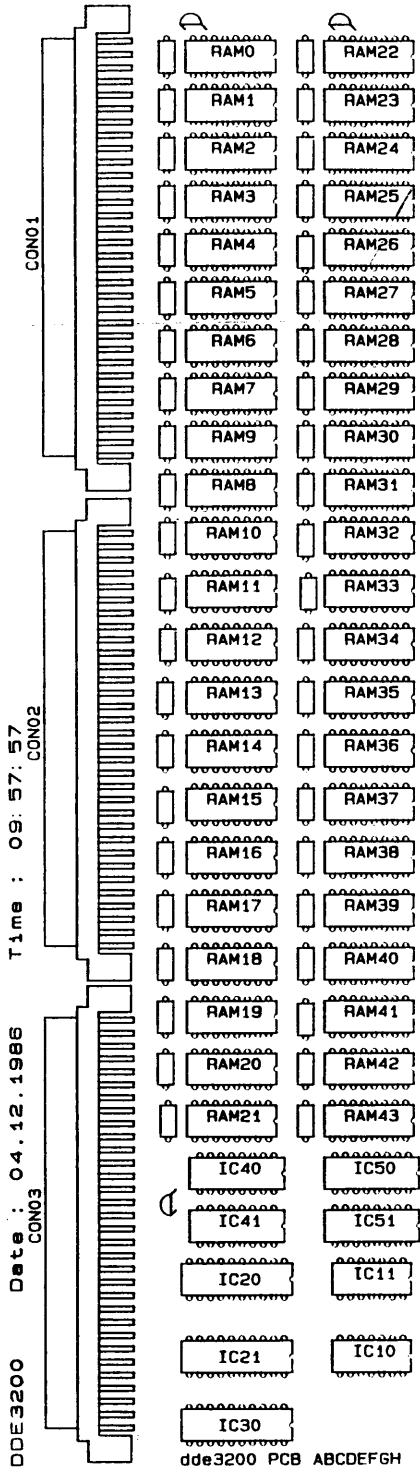
The RAM 3200 is a RAM daughter module. The module contains 44 256 kbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as two words each 22 bits wide including error correcting bits. The total amount of RAM is 1 Mbyte.

1 to 4 RAM 3200 modules fit into RAM mother module 3000 or 3100.

Installation:

A daughter module signals its size to the mother module which calculates the starting address for the next following daughter module. No strapping is needed.





CON01

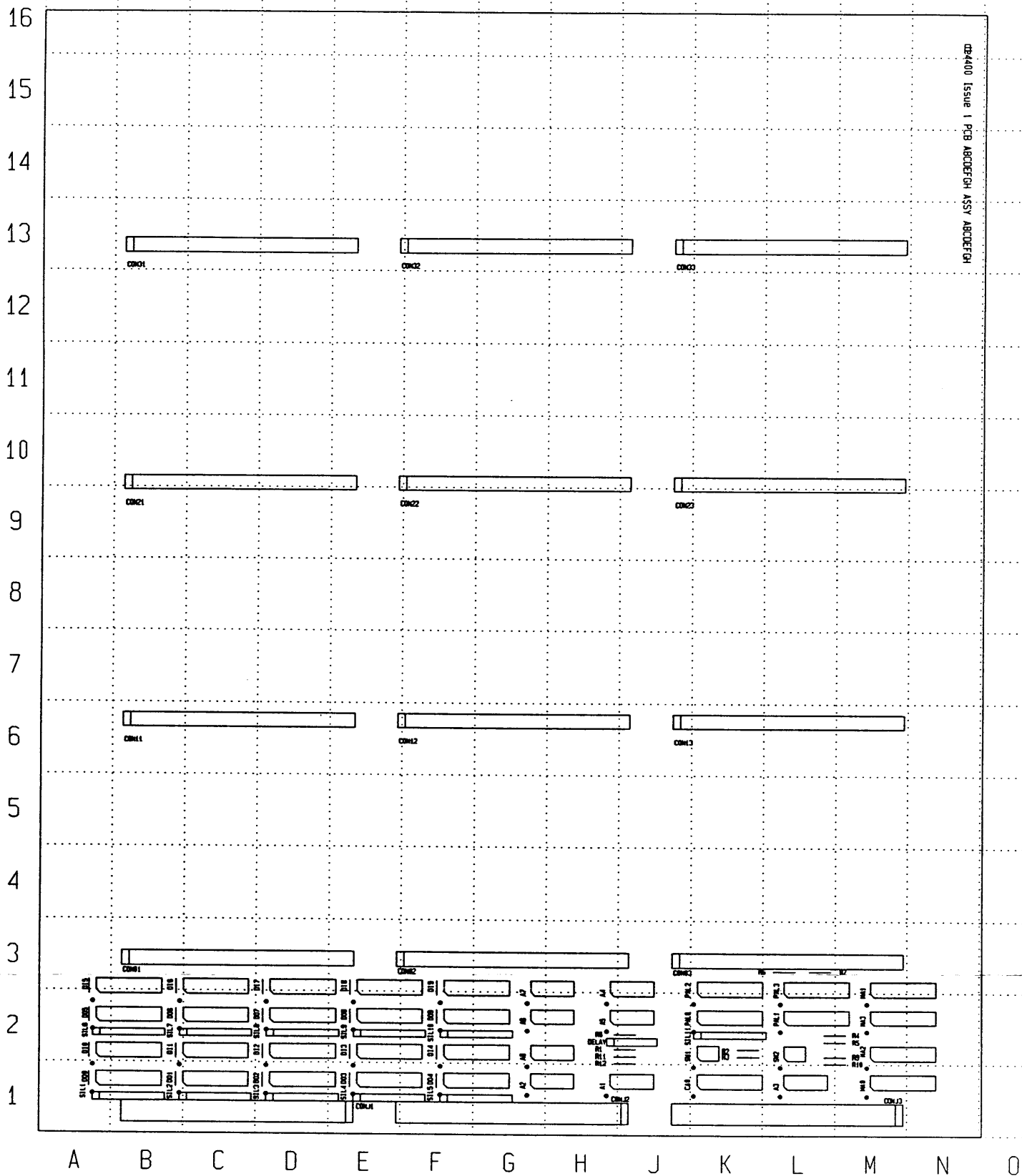
CON02

CON03

Time : 09:57:57

Date : 04.12.1986

DDE3200



Component locations

PCB: 4400 / Memory

Issue: 1 Date: 890914



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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
:LABEL		O-1	SW1	HEXSWITCH	K2			
:LAYID		N12	SW2	HEXSWITCH	L2			
A1	74AS04	H1						
A2	74AS32	G1						
A3	74AS11	H1						
A4	74AS00	H2						
A5	74AS08	H2						
A6	74AS02	G2						
A7	74AS74	G2						
A8	74AS00	G2						
CA0	74AS573	K1						
CONJ1	CON96	E1						
CONJ2	CON96	J1						
CONJ3	CON96	M1						
CON01	CON64	B3						
CON02	CON64	E3						
CON03	CON64	J3						
CON11	CON64	B6						
CON12	CON64	E6						
CON13	CON64	J6						
CON21	CON64	B10						
CON22	CON64	E10						
CON23	CON64	J10						
CON31	CON64	B13						
CON32	CON64	E13						
CON33	CON64	J13						
DELAY		H2						
D10	74AS574	A2						
D11	74AS574	B2						
D12	74AS574	D2						
D13	74AS574	E2						
D14	74AS574	F2						
D15	74AS574	A2						
D16	74AS574	B2						
D17	74AS574	D2						
D18	74AS574	E2						
D19	74AS574	F2						
DO0	74AS574	A1						
DO1	74AS574	B1						
DO2	74AS574	D1						
DO3	74AS574	E1						
DO4	74AS574	F1						
DO5	74AS574	A2						
DO6	74AS574	B2						
DO7	74AS574	D2						
DO8	74AS574	E2						
DO9	74AS574	F2						
MA0	74AS573	M1						
MA1	74AS573	M2						
MA2	74AS573	M2						
MA3	74AS573	M2						
PAL0	MEM0	K2						
PAL1	MEM1	L2						
PAL2	MEM0	K2						
PAL3	MEM2	L2						
R1	100R	H2						
R2	1K	K2						
R3	1K	K2						
R4	1K	L2						
R5	1K	L2						
R6	1K	L3						
R7	1K	L3						
R8	1K	H2						
R9	1K	L2						
R10	1K	L2						
R11	10K	H2						
R12	10K	H2						
SIL1	9x1K	A1						
SIL2	9x1K	B1						
SIL3	9x1K	D1						
SIL4	9x1K	E1						
SIL5	9x1K	F1						
SIL6	9x1K	A2						
SIL7	9x1K	B2						
SIL8	9x1K	D2						
SIL9	9x1K	E2						
SIL10	9x1K	F2						
SIL11	9x10K	K2						

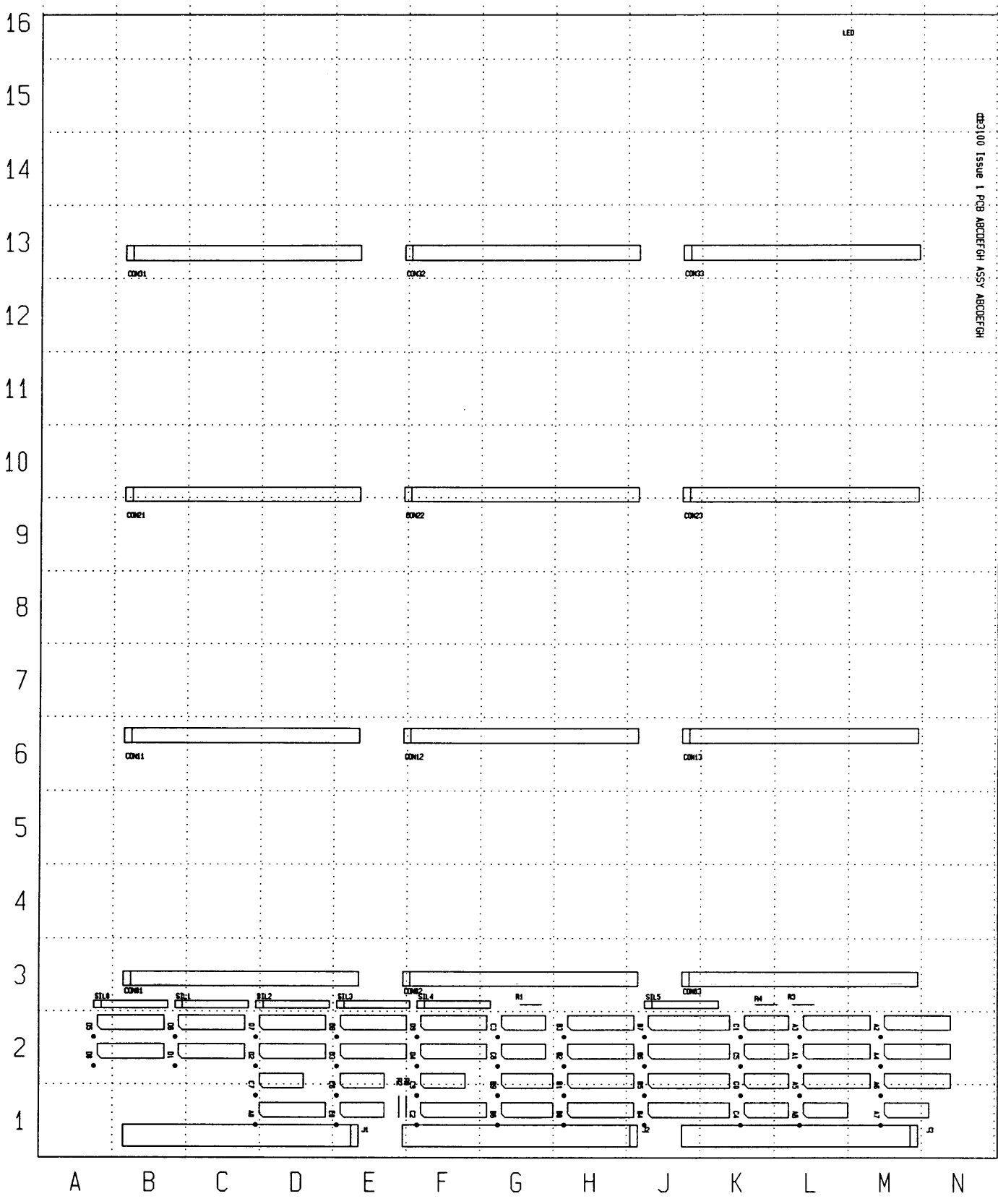
Component locations

PCB: 4400 / Memory

Issue: Date:
1 890914



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Component locations			
PCB: 3100 / MEM-MB	Issue: 1	Date: 880726	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11

Supermax Technical Data Sheet

Type:	Memory daughter module 4410
Data sheet no:	22
Revision no:	0
Date:	91-05-01

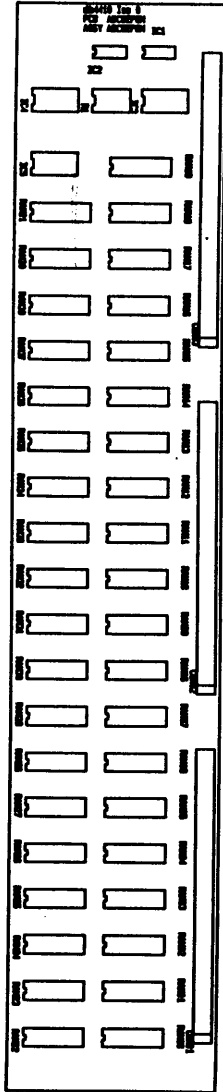
General Description

The RAM 4410 is a RAM daughter module. The module contains 39 4 Mbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as one 32 bit word and 7 error correcting bits. The total amount of RAM is 16 Mbyte.

1 to 4 RAM 4410 modules fit into RAM mother module 3100 or 4400.

Installation

A daughter module signals its size to the mother module which calculates the starting address for the next following daughter module. No strapping is needed.



Type: RAM module 3300

Data sheet no.: 14

Revision no.: 0

Date: 861201

General description:

The RAM 3300 is a RAM daughter module. The module contains 44 1 Mbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as two words each 22 bits wide including error correcting bits. The total amount of RAM is 4 Mbyte.

1 to 4 RAM 3300 modules fit into RAM mother module 3000 or 3100.

Installation:

A daughter module signals its size to the mother module which calculates the starting address for the next following daughter module. No strapping is needed.



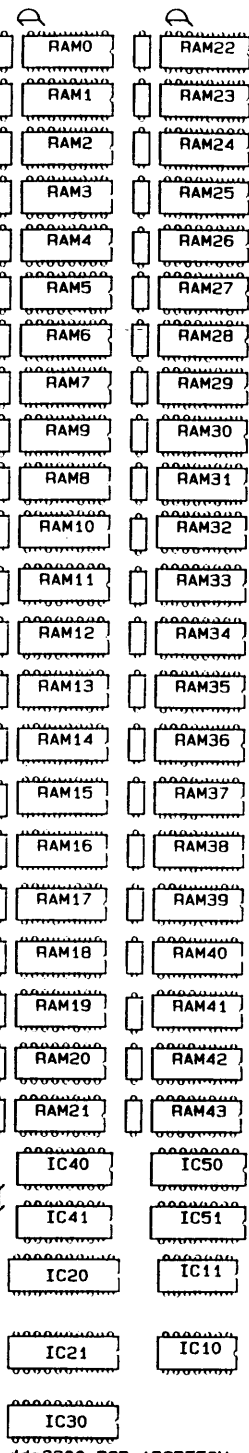
DDE3300 Date : 04.12.1986

Time : 10:08:55

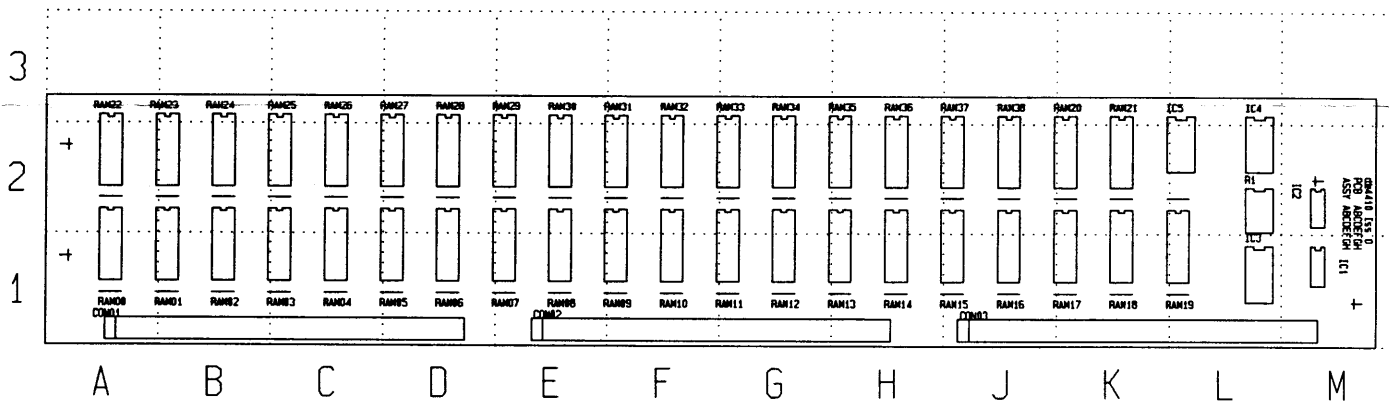
CON01

CON02

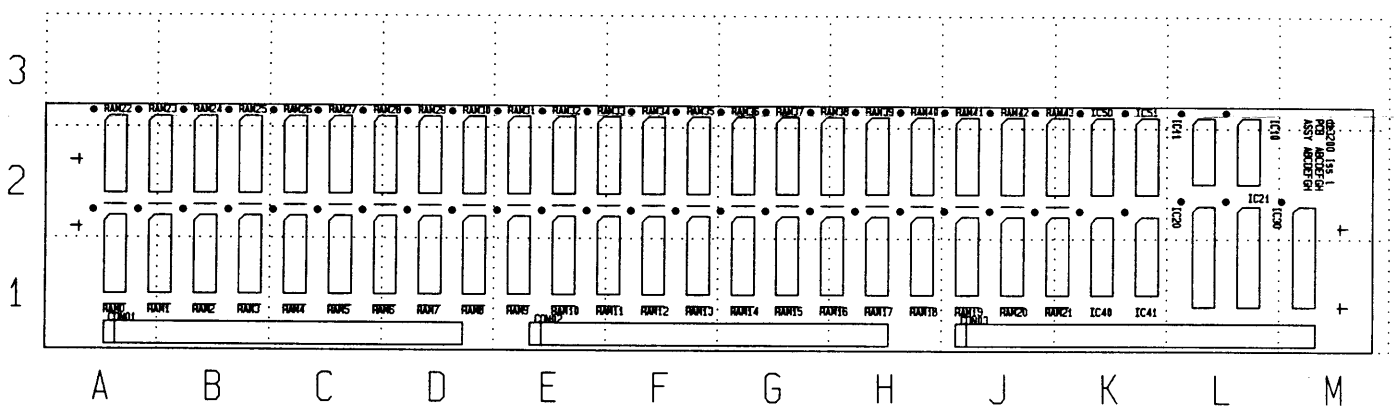
CON03







Component locations					
PCB: 4410 / MEM-16Mb	Issue: 0	Date: 90/02/01		dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11	



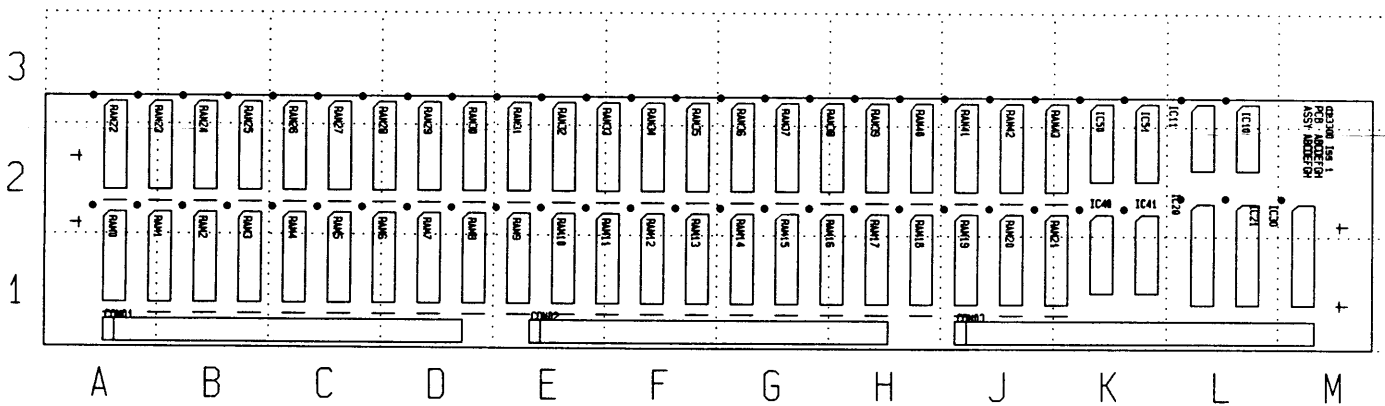
Component locations

PCB: 3200 / MEM-1Mb

Issue: 1 Date: 880726



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Component locations

PCB: **3300 / MEM-4Mb**

Issue: 1

Date: 880726



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SECTION 1.2

Supermax Technical Data Sheet

SUPERMAX CABINETS	1
NTC 1300.....	2
NTC2 1310	3
SGD 2500.....	4
SGD 2510	5
SGD 2600.....	6
SGD.....	7
.....	8
OTHERS	9
SECTION 2	10

Supermax Technical Data Sheet

Type:	Supermax 24
Data sheet no:	26
Revision no:	1
Date:	91-11-01

1. Supermax 24

1.1 General description

The Supermax 24 is a cabinet in the Supermax family. The cabinet can hold a maximum of 24 Supermax modules, a maximum of 16 half-height or 8 full-height winchester disks and a maximum of 8 half-height or 4 full-height front mounted peripherals (floppy disk drives, streaming tape drives, optical disk drives, video tape drives, etc.). The cabinet has been designed to be extremely easy to maintain and to upgrade. One side of the cabinet consists of one large removable service cover. Removing that cover gives the field service technician access to all serviceable parts inside the Supermax 24. Replacement of a winchester disk or a Supermax module is only a matter of a few minutes.

1.2 Installation

The Supermax 24 must be installed by qualified personnel only. Do not attempt to connect the equipment to the mains without consulting the electrical installation guide.

1.2.1 Mechanical

The Supermax 24 is delivered in a transport frame. The computer should stay in this frame for as long time as possible. When the installation location is reached the frame can be removed and the computer unpacked. The Supermax 24 is equipped with four wheels for easy transportation. A certain free space around the Supermax 24 must be present, in order to secure sufficient air flow and to ensure enough working space for maintenance and service. In order to secure sufficient airflow do not place any objects on top of the Supermax 24.

Refer to Figure 1 for details on the space required. When the Supermax 24 is placed on the final location, it must be secured by lowering the four adjustable feet, located beneath the bottom of the cabinet, near the wheels. Use the attached tool to lower the feet until the wheels no longer touch the ground. Remove the protection sheets from the peripheral units and keep them for eventual later transportation of the Supermax 24. This concludes the mechanical installation.

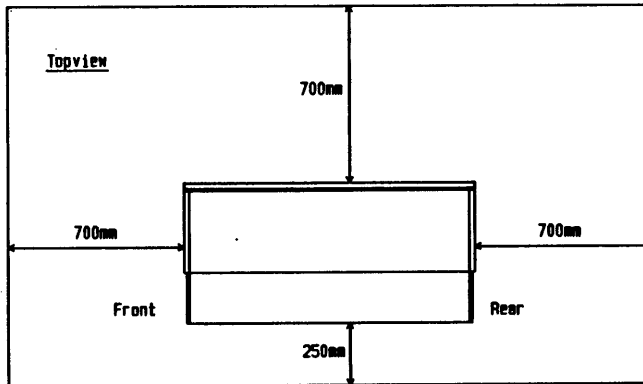


Figure 1. Free space

1.2.2 Electrical

The electrical installation must be made by qualified personnel only.

The Supermax 24 is equipped with one or two power supplies depending upon the configuration. If the Supermax 24 is delivered with only 12 slots for Supermax modules and peripheral units corresponding to less than half the maximum amount, only one power supply is installed. Otherwise two power supplies are installed.

The Supermax 24 can be connected to the mains supply in two different ways. Refer to local national regulations on the legality of the two possibilities.

1. The Supermax 24 must be connected to the mains supply, by using the attached power cable. The connection is made by applying 2 separate phases L1 and L2, neutral N, and ground E. The connections must be made according to Table 1.

Wire colour	Name
Brown	L1
Black	L2
Blue	N
Yellow/green	E

TABLE 1. Mains connection 1

2. The Supermax 24 must be connected to the mains supply, by using the attached power cable. The connection is made by applying one phase L, neutral N, and ground E. The connections must be made according to Table 2.

Wire colour	Name
Brown	L
Blue	N
Yellow/green	E

TABLE 2. Mains connection 2

Access to the mains circuit breaker of the Supermax 24 is made by opening the two doors on the rear side of the cabinet (see Figure 2). AC power is applied to the system by turning the switch to the "I" position. Before applying the AC power, the Supermax 24 should be inspected for eventual mechanical damage. Remove the service cover and the card cover and make sure that all Supermax modules and winchester disk drives are in the correct position. Set the power switch on the power supplies in the ON position and set the margin switch in the center position. AC power can now be applied. This will not start the system, because DC power from the power supplies is disabled by the key switch on the front panel. The system will be in stand-by mode.

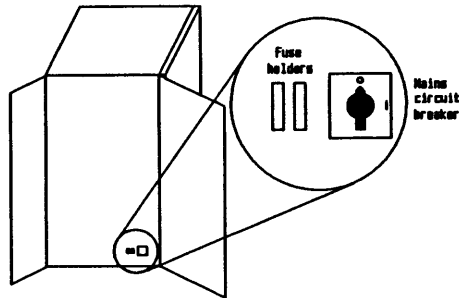


Figure 2. Rear side

1.3 Operation

When the installation procedure of the Supermax 24 is completed the system can be switched on. Located behind the front door is the operator panel (see Figure 3). This includes a 3-position key switch, two push button switches and a 2×24 character LCD display for the Service Computer.

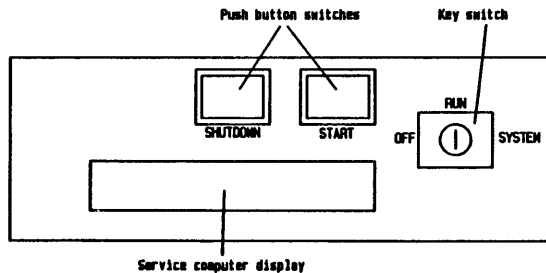


Figure 3. Operator panel

The key switch has the following functions:

Key switch	
Position	Function
OFF	The DC power is OFF.
RUN	The system is enabled.
SYSTEM	The system is in the system administrator mode.

TABLE 3. Key switch

The two push button switches have the following functions:

Push button switch START		
Key position	System state	Function
OFF	Any	No function
RUN	Power OFF	DC power will be applied to the system.
	Power ON	No function
	System crash	The system will be rebooted.
SYSTEM	Power OFF	DC power will be applied to the system.
	Power ON	A hardware reset of the system will take place.

TABLE 4. Push button switch START

Push button switch SHUTDOWN		
Key position	System state	Function
OFF	Any	No function
RUN	Any	No function
SYSTEM	Power OFF	No function
	Power ON	The system will perform a shutdown. When this procedure is completed, system power will be switched off.
	System crash	No predictable function.

TABLE 5. Push button switch SHUTDOWN

When DC power is applied to the system the push button switch START will light.

WARNING!

When the key switch is in position OFF, AC power is still present at the power supplies. In order to completely disconnect the power, turn the mains circuit breaker on the rear side of the computer to its "O" position.

1.4 Configuration

1.4.1 Supermax modules

In the Supermax 24 there are 24 slots for Supermax modules. Three of those slots are occupied by a CPU module, a memory module and a DIOC module. It is possible to expand the Supermax 24 with Supermax modules following the limitations mentioned below:

Type	Max. amount
CPU modules	8
I/O modules	15
CIOC modules	6
DIOC modules	8
SIOC modules	8
Units	16
Modules	24

TABLE 6. Maximum configuration

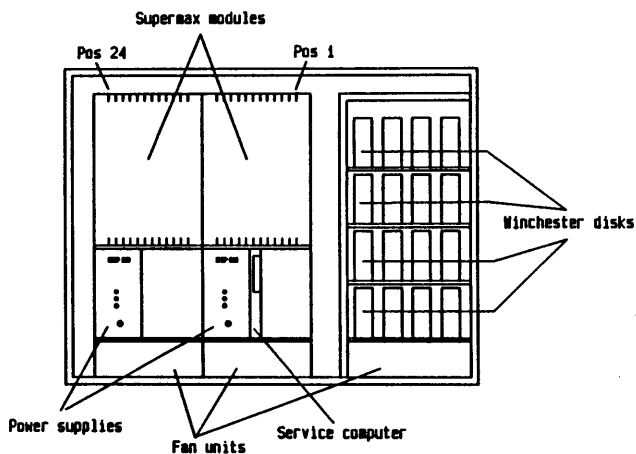


Figure 4. Internal view

Further restrictions on the placement of Supermax modules exists. Refer to Figure 4.

- DIOC modules interfacing to internal drives must be mounted starting in position 1.
- DIOC modules interfacing to external drives must be mounted in position 13 to 24 and always to the left of the last CPU module.
- CPU modules should be mounted in position 2 to 22 and always to the right of the I/O modules in the left card cage and to the left of the DIOC modules in the right card cage.
- I/O modules must be mounted starting in position 24.

1.4.2 Peripheral units

The Supermax 24 can house a maximum of 24 peripheral units. Peripheral units can be winchester disk drives, floppy disk drives, streaming tape drives, video tape drives, optical disk drives, etc. A front mounted peripheral is any of the above mentioned, which has removable media. The configuration must follow the limitations mentioned below.

Type	Size	Amount
Winchester disk drives	Half-height (HH)	16
	Full-height (FH)	8
	2 × FH + HH	16
Front mounted peripherals	Half-height (HH)	8
	Full-height (FH)	4
	2 × FH + HH	8

TABLE 7. Peripheral units

All front mounted peripherals **must** be connected to one SCSI cable (floppy disk drives not included).

1.5 I/O panel

Located on the rear side of the Supermax 24 behind the two doors is the I/O panel. The I/O panel is divided into four sections. See Figure 5 for details.

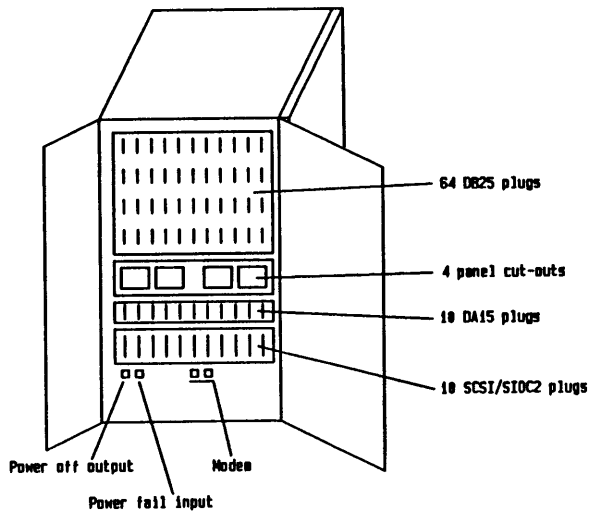


Figure 5. I/O panel

- The upper part contains mounting holes for up to 64 DB25 plugs. I/O subpanels are provided with the Supermax I/O Controllers and come in one of two sizes. The first one contains up to 4 plugs and occupies 4 mounting holes. This size is considered to be the smallest I/O panel available and is called single size. The second one contains from 5 to 8 plugs and occupies 8 mounting holes. This is called double size. Two single size subpanels fit into the frame of one double size subpanel. The following table shows the connection between the I/O controllers and the size of the corresponding subpanels.

I/O Controller	Size	Number of plugs
SIOC1 RS - 232C	Double	8
SIOC1 RS - 422/Parallel	Single	3
DIOC2 RS - 232C	Single	4
CIOC	Single	4
MIOC - SIO 8 submodule	Double	8
MIOC - HDLC submodule	Single	4
Service Computer	Single	3

TABLE 8. Subpanel size

- The second part contains 4 cutouts in which four single size or two double size subpanels can be mounted. This is currently used for the fiber optical interface module used by the MIOC - SIO 32 submodule.
-
- The third part contains 10 mounting holes for DA15 plugs. These connections are mainly used for the Ethernet transceiver cables from the NIOC and the MIOC.
- The fourth part contains 10 mounting holes for 50 pin shielded flat cable plugs. These connections are used for the SCSI interface to external disk cabinets and for the SIOC2 interface to the SIOC2 wall panel.

Below these four parts are some general I/O connections.

- One power fail input signal.
- One power off output signal.
- One connection of the internal modem to the telephone line.
- One connection of a telephone, when the modem is installed.

1.6 Subpanels

1.6.1 SIOC1 RS - 232C subpanel

The SIOC1 RS - 232C subpanel consists of 8 DB25S plugs and a 60 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables below for interface connections.

1.6.2 SIOC1 RS - 422/Parallel subpanel

The SIOC1 RS - 422/Parallel subpanel consists of 3 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 1 is RS - 422 and the interface in plug 2 is a parallel printer interface. Refer to the tables below for interface connections.

1.6.3 DIOC2 RS - 232C subpanel

The DIOC2 subpanel consists of 4 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables

below for interface connections.

1.6.4 CIOC subpanel

The CIOC subpanel consists of 4 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 2 is synchronous RS-232C and the interface in plug 1 and 3 is RS-422. Refer to the tables below for interface connections.

1.6.5 MIOC - SIO 8 subpanel

The MIOC - SIO 8 subpanel consists of 8 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.6 MIOC - HDLC subpanel

The MIOC - HDLC subpanel consists of 4 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in plug 0 and 1 is V.24/V.28 and the interface in plug 2 and 3 is V.36/V.11. Refer to the tables below for interface connections.

1.6.7 Service Computer subpanel

The Service Computer subpanel consists of 3 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.7 Interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
20	DTR	Data terminal ready

TABLE 9. Asynchronous RS-232C interface signals

DB25S		
Pin	Signal	Function
1	Gnd	Signal ground
2	T(A)	Transmit data A
3	C(A)	Control A
4	R(A)	Receive data A
5	I(A)	Interrupt A
6	S(A)	Status A
8	Gnd	Signal ground
14	T(B)	Transmit data B
15	C(B)	Control B
16	R(B)	Receive data A
17	I(B)	Interrupt B
18	S(B)	Status B

TABLE 10. RS-422 and V.36/V.11 interface signals

DB25S		
Pin	Signal	Function
1	STB	Data strobe
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	ACK	Acknowledge
11	BUSY	Printer busy
18-25	Gnd	Signal ground

TABLE 11. Parallel printer interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
8	CD	Carrier detect
9	-12V	-12V power
15	TxC	Transmit clock
17	RxC	Receive clock
20	DTR	Data terminal ready
21	+12V	+12V power

TABLE 12. Synchronous RS-232C and V.24/V.28 interface signals

DA15S		
Pin	Signal	Function
1	GND	Signal ground
2	C+	Collision detect +
3	TX+	Transmit data +
4	GND	Signal ground
5	RX+	Receive data +
6	GND	Signal ground
7	NC	Terminator
8	GND	Signal ground
9	C-	Collision detect -
10	TX-	Transmit data -
11	GND	Signal ground
12	RX-	Receive data -
13	+12V	Voltage plus
14	GND	Signal ground
15	NC	Terminator

TABLE 13. Ethernet transceiver port connector

Pin	Signal	Function
1	Gnd	Signal ground
2	NC	Not connected
3	PF	Power fail

TABLE 14. Power fail input connector

The activation of the power fail signal must be done using a potential free contact, short circuiting pin 1 and 3.

Pin	Signal	Function
1	Gnd	Signal ground
2	POFF	Power off
3	NC	Not connected

TABLE 15. Power off output connector

The activation of the power off signal is done using a potential free contact, short circuiting pin 1 and 2.

SCSI 50 pin flat cable		
Pin	Signal	Function
2	-DB(0)	Data bit 0
4	-DB(1)	Data bit 1
6	-DB(2)	Data bit 2
8	-DB(3)	Data bit 3
10	-DB(4)	Data bit 4
12	-DB(5)	Data bit 5
14	-DB(6)	Data bit 6
16	-DB(7)	Data bit 7
18	-DB(P)	Data bit parity
20	GND	Signal ground
22	GND	Signal ground
24	GND	Signal ground
26	TPOW	Terminator power
28	GND	Signal ground
30	GND	Signal ground
32	-ATN	Attention
34	GND	Signal ground
36	-BSY	Busy
38	-ACK	Acknowledge
40	-RST	Reset
42	-MSG	Message
44	-SEL	Select
46	-C/D	Control/Data
48	-REQ	Request
50	-I/O	Input/Output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.
The minus sign (-) next to the signals indicates active low.

TABLE 16. SCSI port pin assignments

SIOC2 50 pin flat cable		
Pin	Signal	Function
2	DB(0)	Data bit 0
4	DB(1)	Data bit 1
6	DB(2)	Data bit 2
8	DB(3)	Data bit 3
10	DB(4)	Data bit 4
12	DB(5)	Data bit 5
14	DB(6)	Data bit 6
16	DB(7)	Data bit 7
18	AB(10)	Address bit 10
20	AB(9)	Address bit 9
22	AB(8)	Address bit 8
24	AB(7)	Address bit 7
26	AB(6)	Address bit 6
28	AB(5)	Address bit 5
30	AB(4)	Address bit 4
32	AB(3)	Address bit 3
34	AB(2)	Address bit 1
36	AB(1)	Address bit 1
38	AB(0)	Address bit 0
40	-FINT1	Interrupt pin 1
42	-FINT0	Interrupt pin 0
44	-FAS	Address strobe
46	-FW	Write signal
48	-CSD	Card selected
50	-RTS1	Reserved output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.
 The minus sign (-) next to the signals indicates active low.

TABLE 17. SIOC2 port pin assignments

1.8 Specifications

1.8.1 Input power requirements

The Supermax 24 can be delivered with different AC input voltages. This option is installed at the factory and must be specified at time of purchase. It is not possible to change the AC input voltage between 400/230V and 200/115V, using the same power supplies. The different AC input requirements for the Supermax 24 cabinet is shown below:

Voltage V~	Current A	Frequency Hz	Voltage range V~	Cable dimension mm ²	Fuse A
400 2N 230	2 × 6 12	47-63 47-63	330-456 192-264	4 × 1.5 3 × 2.5	T6.3 T12
200 2N 115	2 × 12 24	47-63 47-63	165-228 96-132	4 × 2.5 3 × 4	T12 T25

TABLE 18. AC input requirements

1.8.2 Environmental requirements

The following environment must be provided for proper operation of the Supermax 24:

Temperature	10-35°C
Humidity	20-80%, non condensing

TABLE 19. Environment

1.8.3 Power supply specifications

Each of the power supplies in the Supermax 24 has the following specifications.

Voltage	Current	Peak
+ 5 V	150 A	
+12 V	20 A	30 A
-12 V	4 A	

TABLE 20. Power supply specifications

1.8.4 Physical dimensions

The overall dimension and weight of the Supermax 24 are as follows:

Height	890 mm
Width	550 mm
Depth	1140 mm
Weight	max. 220 kg

TABLE 21. Physical dimensions

1.8.5 EMC

The Supermax 24 is designed to meet the requirements specified in EN 55022, VDE 0871 class B and FCC Part 15 Subpart J class B.

1.8.6 Safety

The Supermax 24 is designed to meet the requirements specified in IEC 950, EN 60950 and UL 1950.

1.9 Service and maintenance

The maintenance of the Supermax 24 must be left to qualified personnel only. There are no user serviceable parts inside the cabinet.

1.9.1 Removing the service cover

Loosen the 8 M4 unbraco screws in the service cover.
Tilt the cover backwards.
Lift the cover away.

1.9.2 Mounting the service cover

Put the cover in place.
Tighten the 8 M4 unbraco screws.

1.9.3 Removing the card cover

Loosen the 4 M3 finger screws in the card cover.
Lift the cover away.

1.9.4 Mounting the card cover

Put the cover in place.
Tighten the 4 M3 finger screws.

1.9.5 Installing new I/O subpanels

Open the two doors at the rear side of the cabinet.
Loosen the 8 M4 screws on the I/O panel.
Open the I/O panel.
Remove the cover plate from the position where the new I/O subpanel is to be mounted.
Mount the new I/O subpanel.
Install the necessary flat cable.
Close the I/O panel.
Tighten the 8 M4 screws on the I/O panel.
Close the two doors.

1.9.6 Adding/replacing Supermax modules

Remove the service cover.
Remove the card cover.
Remove the necessary flat cables from the Supermax modules.
Pull out the Supermax module.
Add the new Supermax module with the components to the right.
Press it firmly into the back plane.
If required install the new I/O subpanel.
Install the necessary flat cables on the Supermax modules.
Mount the card cover(s).
Mount the service cover.

1.9.7 Adding/replacing winchester disk drives

Remove the service cover.
Remove the necessary flat cables from the winchester disk drives.
Remove the necessary power cables from the winchester disk drives.
Loosen the M4 unbraco screw in the winchester mounting frame.
Remove the mounting frame including the winchester.

Remove the frame from the winchester.
Mount the frame on the new winchester.
Install the mounting frame including the winchester.
Tighten the M4 unbraco screw in the winchester mounting frame.
Install the necessary power cables on the winchester disk drives.
Install the necessary flat cables on the winchester disk drives.
Mount the service cover.

1.9.8 Adding/replacing front mounted peripherals

Open the front door.
Loosen the 2 (4) M4 unbraco screws between and/or below the units and remove the cover plate(s).
Pull out the mounting frame and the unit.
Remove the power cable from the unit.
Remove the flat cable from the unit
Loosen the two screws holding the unit and the frame.
Mount the frame on the new unit.
Install the power cable on the unit.
Install the flat cable on the unit.
Install the mounting frame including the unit.
Mount the cover plate(s) and tighten the 2 (4) M4 unbraco screws between and/or below the units.
Close the front door.

1.9.9 Adding/replacing power supplies

Remove the service cover.
Loosen the 4 M3 finger screws at the front of the power supply.
Pull out the power supply.
Add the new power supply.
Press it firmly into the back plane.
Tighten the 4 M3 finger screws at the front of the power supply.
Mount the service cover.

1.9.10 Adding/replacing fan units

Remove the service cover.
Loosen the 2 M4 unbraco screws at the front of the fan unit.
Pull out the fan unit.
Unplug the cable from the fan unit.
Plug the cable into the new fan unit.
Install the new fan unit.
Tighten the 2 M4 unbraco screws at the front of the fan unit.
Mount the service cover.

1.9.11 Adding/replacing service computer

Remove the service cover.
Loosen the 2 M3 finger screws at the front of the service computer.
Pull out the service computer.
Add the new service computer.
Press it firmly into the back plane.
Tighten the 2 M3 finger screws at the front of the service computer.
Mount the service cover.

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Supermax Technical Data Sheet

Type:	Supermax 12
Data sheet no:	27
Revision no:	1
Date:	91-11-01

1. Supermax 12

1.1 General description

The Supermax 12 is a cabinet in the Supermax family. The cabinet can hold a maximum of 12 Supermax modules, a maximum of 8 half-height or 4 full-height winchester disks and a maximum of 8 half-height or 4 full-height front mounted peripherals (floppy disk drives, streaming tape drives, optical disk drives, video tape drives, etc.). The cabinet has been designed to be extremely easy to maintain and to upgrade. One side of the cabinet consists of one large removable service cover. Removing that cover gives the field service technician access to all serviceable parts inside the Supermax 12. Replacement of a winchester disk or a Supermax module is only a matter of a few minutes.

1.2 Installation

The Supermax 12 must be installed by qualified personnel only. Do not attempt to connect the equipment to the mains without consulting the electrical installation guide.

1.2.1 Mechanical

The Supermax 12 is delivered in a transport frame. The computer should stay in this frame for as long time as possible. When the installation location is reached the frame can be removed and the computer unpacked. The Supermax 12 is equipped with four wheels for easy transportation. A certain free space around the Supermax 12 must be present, in order to secure sufficient air flow and to ensure enough working space for maintenance and service. In order to secure sufficient airflow do not place any objects on top of the Supermax 12.

Refer to Figure 1 for details on the space required. When the Supermax 12 is placed on the final location, it must be secured by lowering the four adjustable feet, located beneath the bottom of the cabinet, near the wheels. Use the attached tool to lower the feet until the wheels no longer touch the ground. Remove the protection sheets from the peripheral units and keep them for eventual later transportation of the Supermax 12. This concludes the mechanical installation.

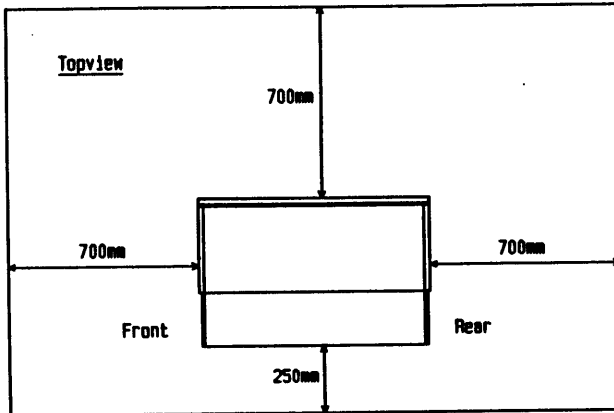


Figure 1. Free space

1.2.2 Electrical

The electrical installation must be made by qualified personnel only.

The Supermax 12 must be connected to the mains supply, by using the attached power cable. The connection is made by applying one phase L, neutral N, and ground E. The connections must be made according to Table 1.

Wire colour	Name
Brown	L
Blue	N
Yellow/green	E

TABLE 1. Mains connection

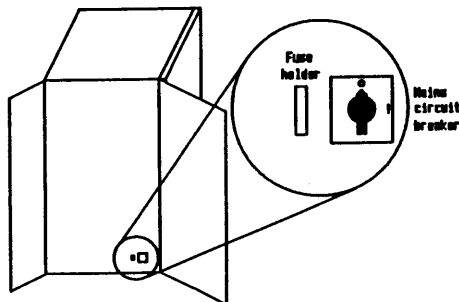


Figure 2. Rear side

Access to the mains circuit breaker of the Supermax 12 is made by opening the two doors on the rear side of the cabinet (see Figure 2). AC power is applied to the system by turning the switch to the "I" position. Before applying the AC power, the Supermax 12 should be inspected for eventual mechanical damage. Remove the service cover and the card cover and make sure that all Supermax modules and winchester disk drives are in the correct position. Set the power switch on the power supply in the ON position and set the margin switch in the center position. AC power can now be applied. This will not start the system, because DC power from the power supply is disabled by the key switch on the front panel. The system will be in stand-by mode.

1.3 Operation

When the installation procedure of the Supermax 12 is completed the system can be switched on. Located behind the front door is the operator panel (see Figure 3). This includes a 3-position key switch, two push button switches and a 2 x 24 character LCD display for the Service Computer.

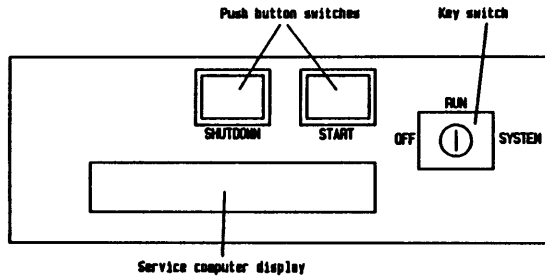


Figure 3. Operator panel

The key switch has the following functions:

Key switch	
Position	Function
OFF	The DC power is OFF.
RUN	The system is enabled.
SYSTEM	The system is in the system administrator mode.

TABLE 2. Key switch

The two push button switches have the following functions:

Push button switch START		
Key position	System state	Function
OFF	Any	No function
RUN	Power OFF	DC power will be applied to the system.
	Power ON	No function
	System crash	The system will be rebooted.
SYSTEM	Power OFF	DC power will be applied to the system.
	Power ON	A hardware reset of the system will take place.

TABLE 3. Push button switch START

Push button switch SHUTDOWN		
Key position	System state	Function
OFF	Any	No function
RUN	Any	No function
SYSTEM	Power OFF	No function
	Power ON	The system will perform a shutdown. When this procedure is completed, system power will be switched off.
	System crash	No predictable function.

TABLE 4. Push button switch SHUTDOWN

When DC power is applied to the system the push button switch START will light.

WARNING!

When the key switch is in position OFF, AC power is still present at the power supply. In order to completely disconnect the power, turn the mains circuit breaker on the the rear side of the computer to its "O" position.

1.4 Configuration

1.4.1 Supermax modules

In the Supermax 12 there are 12 slots for Supermax modules. Three of those slots are occupied by a CPU module, a memory module and a DIOC module. It is possible to expand the Supermax 12 with Supermax modules following the limitations mentioned below:

Type	Max. amount
CPU modules	4
I/O modules	10
CIOC modules	6
DIOC modules	6
SIOC modules	8
MIOC modules	8
Units	11
Modules	12

TABLE 5. Maximum configuration

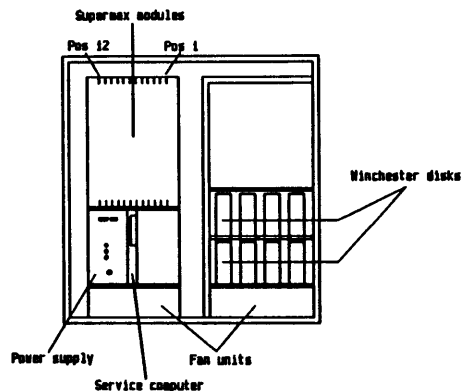


Figure 4. Internal view

Further restrictions on the placement of Supermax modules exists. Refer to Figure 4.

- DIOC modules interfacing to internal drives must be mounted starting in position 1.
- DIOC modules interfacing to external drives must be mounted in position 6 to 12 and always to the left of the last CPU module.
- CPU modules should be mounted in position 2 to 10 and always in the center of the card cage.
- I/O modules must be mounted starting in position 12.

1.4.2 Peripheral units

The Supermax 12 can house a maximum of 16 peripheral units. Peripheral units can be winchester disk drives, floppy disk drives, streaming tape drives, video tape drives, optical disk drives, etc. A front mounted peripheral is any of the above mentioned, which has removable media. The configuration must follow the limitations mentioned below.

Type	Size	Amount
Winchester disk drives	Half-height (HH)	8
	Full-height (FH)	4
	2 × FH + HH	8
Front mounted peripherals	Half-height (HH)	8
	Full-height (FH)	4
	2 × FH + HH	8

TABLE 6. Peripheral units

All front mounted peripherals **must** be connected to one SCSI cable (floppy disk drives not included).

1.5 I/O panel

Located on the rear side of the Supermax 12 behind the two doors is the I/O panel. The I/O panel is divided into four sections. See Figure 5 for details.

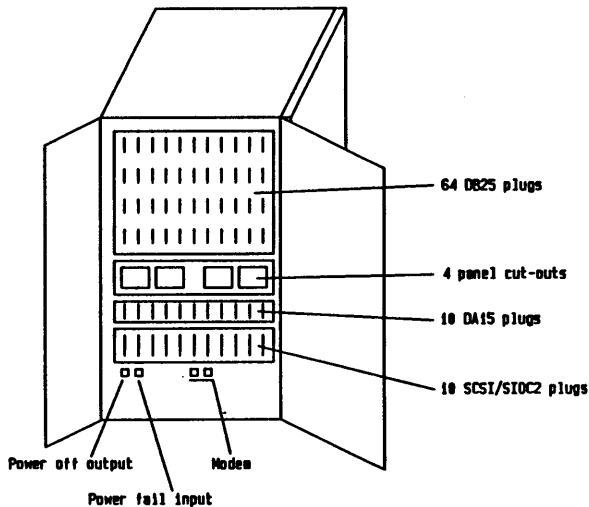


Figure 5. I/O panel

- The upper part contains mounting holes for up to 64 DB25 plugs. I/O subpanels are provided with the Supermax I/O Controllers and come in one of two sizes. The first one contains up to 4 plugs and occupies 4 mounting holes. This size is considered to be the smallest I/O panel available and is called single size. The second one contains from 5 to 8 plugs and occupies 8 mounting holes. This is called double size. Two single size subpanels fit into the frame of one double size subpanel. The following table shows the relation between the I/O controllers and the size of the corresponding subpanels.

I/O Controller	Size	Number of plugs
SIOC1 RS - 232C	Double	8
SIOC1 RS - 422/Parallel	Single	3
DIOC2 RS - 232C	Single	4
CIOC	Single	4
MIOC - SIO 8 submodule	Double	8
MIOC - HDLC submodule	Single	4
Service Computer	Single	3

TABLE 7. Subpanel size

- The second part contains 4 cutouts in which four single size or two double size subpanels can be mounted. This is currently used for the fiber optical interface module used by the MIOC - SIO 32 submodule.
-
- The third part contains 10 mounting holes for DA15 plugs. These connections are mainly used for the Ethernet transceiver cables from the NIOC and the MIOC.
- The fourth part contains 10 mounting holes for 50 pin shielded flat cable plugs. These connections are used for the SCSI interface to external disk cabinets and for the SIOC2 interface to the SIOC2 wall panel.

Below these four parts are some general I/O connections.

- One power fail input signal.
- One power off output signal.
- One connection of the internal modem to the telephone line.
- One connection of a telephone, when the modem is installed.

1.6 Subpanels

1.6.1 SIOC1 RS - 232C subpanel

The SIOC1 RS - 232C subpanel consists of 8 DB25S plugs and a 60 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables below for interface connections.

1.6.2 SIOC1 RS - 422/Parallel subpanel

The SIOC1 RS - 422/Parallel subpanel consists of 3 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 1 is RS - 422 and the interface in plug 2 is a parallel printer interface. Refer to the tables below for interface connections.

1.6.3 DIOC2 RS - 232C subpanel

The DIOC2 subpanel consists of 4 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables

below for interface connections.

1.6.4 CIOC subpanel

The CIOC subpanel consists of 4 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 2 is synchronous RS-232C and the interface in plug 1 and 3 is RS-422. Refer to the tables below for interface connections.

1.6.5 MIOC - SIO 8 subpanel

The MIOC - SIO 8 subpanel consists of 8 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.6 MIOC - HDLC subpanel

The MIOC - HDLC subpanel consists of 4 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in plug 0 and 1 is V.24/V.28 and the interface in plug 2 and 3 is V.36/V.11. Refer to the tables below for interface connections.

1.6.7 Service Computer subpanel

The Service Computer subpanel consists of 3 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.7 Interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
20	DTR	Data terminal ready

TABLE 8. Asynchronous RS-232C interface signals

DB25S		
Pin	Signal	Function
1	Gnd	Signal ground
2	T(A)	Transmit data A
3	C(A)	Control A
4	R(A)	Receive data A
5	I(A)	Interrupt A
6	S(A)	Status A
8	Gnd	Signal ground
14	T(B)	Transmit data B
15	C(B)	Control B
16	R(B)	Receive data A
17	I(B)	Interrupt B
18	S(B)	Status B

TABLE 9. RS-422 and V.36/V.11 interface signals

DB25S		
Pin	Signal	Function
1	STB	Data strobe
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	ACK	Acknowledge
11	BUSY	Printer busy
18-25	Gnd	Signal ground

TABLE 10. Parallel printer interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
8	CD	Carrier detect
9	-12V	-12V power
15	TrC	Transmit clock
17	RxC	Receive clock
20	DTR	Data terminal ready
21	+12V	+12V power

TABLE 11. Synchronous RS-232C and V.24/V.28 interface signals

DA15S		
Pin	Signal	Function
1	GND	Signal ground
2	C+	Collision detect +
3	TX+	Transmit data +
4	GND	Signal ground
5	RX+	Receive data +
6	GND	Signal ground
7	NC	Terminator
8	GND	Signal ground
9	C-	Collision detect -
10	TX-	Transmit data -
11	GND	Signal ground
12	RX-	Receive data -
13	+12V	Voltage plus
14	GND	Signal ground
15	NC	Terminator

TABLE 12. Ethernet transceiver port connector

Pin	Signal	Function
1	Gnd	Signal ground
2	NC	Not connected
3	PF	Power fail

TABLE 13. Power fail input connector

The activation of the power fail signal must be done using a potential free contact, short circuiting pin 1 and 3.

Pin	Signal	Function
1	Gnd	Signal ground
2	POFF	Power off
3	NC	Not connected

TABLE 14. Power off output connector

The activation of the power off signal is done using a potential free contact, short circuiting pin 1 and 2.

SCSI 50 pin flat cable		
Pin	Signal	Function
2	-DB(0)	Data bit 0
4	-DB(1)	Data bit 1
6	-DB(2)	Data bit 2
8	-DB(3)	Data bit 3
10	-DB(4)	Data bit 4
12	-DB(5)	Data bit 5
14	-DB(6)	Data bit 6
16	-DB(7)	Data bit 7
18	-DB(P)	Data bit parity
20	GND	Signal ground
22	GND	Signal ground
24	GND	Signal ground
26	TPOW	Terminator power
28	GND	Signal ground
30	GND	Signal ground
32	-ATN	Attention
34	GND	Signal ground
36	-BSY	Busy
38	-ACK	Acknowledge
40	-RST	Reset
42	-MSG	Message
44	-SEL	Select
46	-C/D	Control/Data
48	-REQ	Request
50	-I/O	Input/Output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.

The minus sign (-) next to the signals indicates active low.

TABLE 15. SCSI port pin assignments

SIOC2 50 pin flat cable		
Pin	Signal	Function
2	DB(0)	Data bit 0
4	DB(1)	Data bit 1
6	DB(2)	Data bit 2
8	DB(3)	Data bit 3
10	DB(4)	Data bit 4
12	DB(5)	Data bit 5
14	DB(6)	Data bit 6
16	DB(7)	Data bit 7
18	AB(10)	Address bit 10
20	AB(9)	Address bit 9
22	AB(8)	Address bit 8
24	AB(7)	Address bit 7
26	AB(6)	Address bit 6
28	AB(5)	Address bit 5
30	AB(4)	Address bit 4
32	AB(3)	Address bit 3
34	AB(2)	Address bit 2
36	AB(1)	Address bit 1
38	AB(0)	Address bit 0
40	-FINT1	Interrupt pin 1
42	-FINT0	Interrupt pin 0
44	-FAS	Address strobe
46	-FW	Write signal
48	-CSD	Card selected
50	-RTS1	Reserved output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.

The minus sign (-) next to the signals indicates active low.

TABLE 16. SIOC2 port pin assignments

1.8 Specifications

1.8.1 Input power requirements

The Supermax 12 can be delivered with different AC input voltages. This option is installed at the factory and must be specified at time of purchase. It is not possible to change the AC input voltage between 230V and 115V, using the same power supply. The different AC input requirements for the Supermax 12 cabinet is shown below:

Voltage V~	Current A	Frequency Hz	Voltage range V~	Cable dimension mm ²	Fuse A
230	6	47-63	192-264	3 × 1.5	T6.3
115	12	47-63	96-132	3 × 2.5	T12

TABLE 17. AC input requirements

1.8.2 Environmental requirements

The following environment must be provided for proper operation of the Supermax 12:

Temperature	10-35°C
Humidity	20-80%, non condensing

TABLE 18. Environment

1.8.3 Power supply specifications

The power supply in the Supermax 12 has the following specifications.

Voltage	Current	Peak
+ 5 V	150 A	30 A
+12 V	20 A	
-12 V	4 A	

TABLE 19. Power supply specifications

1.8.4 Physical dimensions

The overall dimension and weight of the Supermax 12 are as follows:

Height	890 mm
Width	550 mm
Depth	840 mm
Weight	max. 160 kg

TABLE 20. Physical dimensions

1.8.5 EMC

The Supermax 12 is designed to meet the requirements specified in EN 55022, VDE 0871 class B and FCC Part 15 Subpart J class B.

1.8.6 Safety

The Supermax 12 is designed to meet the requirements specified in IEC 950, EN 60950 and UL 1950.

1.9 Service and maintenance

The maintenance of the Supermax 12 must be left to qualified personnel only. There are no user serviceable parts inside the cabinet.

1.9.1 Removing the service cover

Loosen the 8 M4 unbraco screws in the service cover.
Tilt the cover backwards.
Lift the cover away.

1.9.2 Mounting the service cover

Put the cover in place.
Tighten the 8 M4 unbraco screws.

1.9.3 Removing the card cover

Loosen the 4 M3 finger screws in the card cover.
Lift the cover away.

1.9.4 Mounting the card cover

Put the cover in place.
Tighten the 4 M3 finger screws.

1.9.5 Installing new I/O subpanels

Open the two doors at the rear side of the cabinet.
Loosen the 8 M4 screws on the I/O panel.
Open the I/O panel.
Remove the cover plate from the position where the new I/O subpanel is to be mounted.
Mount the new I/O subpanel.
Install the necessary flat cable.
Close the I/O panel.
Tighten the 8 M4 screws on the I/O panel.
Close the two doors.

1.9.6 Adding/replacing Supermax modules

Remove the service cover.
Remove the card cover.
Remove the necessary flat cables from the Supermax modules.
Pull out the Supermax module.
Add the new Supermax module with the components to the right.
Press it firmly into the back plane.
If required install the new I/O subpanel.
Install the necessary flat cables on the Supermax modules.
Mount the card cover(s).
Mount the service cover.

1.9.7 Adding/replacing winchester disk drives

Remove the service cover.
Remove the necessary flat cables from the winchester disk drives.
Remove the necessary power cables from the winchester disk drives.
Loosen the M4 unbraco screw in the winchester mounting frame.
Remove the mounting frame including the winchester.

Remove the frame from the winchester.
Mount the frame on the new winchester.
Install the mounting frame including the winchester.
Tighten the M4 unbraco screw in the winchester mounting frame.
Install the necessary power cables on the winchester disk drives.
Install the necessary flat cables on the winchester disk drives.
Mount the service cover.

1.9.8 Adding/replacing front mounted peripherals

Open the front door.
Loosen the 2 (4) M4 unbraco screws between and/or below the units and remove the cover plate(s).
Pull out the mounting frame and the unit.
Remove the power cable from the unit.
Remove the flat cable from the unit
Loosen the two screws holding the unit and the frame.
Mount the frame on the new unit.
Install the power cable on the unit.
Install the flat cable on the unit.
Install the mounting frame including the unit.
Mount the cover plate(s) and tighten the 2 (4) M4 unbraco screws between and/or below the units.
Close the front door.

1.9.9 Adding/replacing power supply

Remove the service cover.
Loosen the 4 M3 finger screws at the front of the power supply.
Pull out the power supply.
Add the new power supply.
Press it firmly into the back plane.
Tighten the 4 M3 finger screws at the front of the power supply.
Mount the service cover.

1.9.10 Adding/replacing fan units

Remove the service cover.
Loosen the 2 M4 unbraco screws at the front of the fan unit.
Pull out the fan unit.
Unplug the cable from the fan unit.
Plug the cable into the new fan unit.
Install the new fan unit.
Tighten the 2 M4 unbraco screws at the front of the fan unit.
Mount the service cover.

1.9.11 Adding/replacing service computer

Remove the service cover.
Loosen the 2 M3 finger screws at the front of the service computer.
Pull out the service computer.
Add the new service computer.
Press it firmly into the back plane.
Tighten the 2 M3 finger screws at the front of the service computer.
Mount the service cover.

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Supermax Technical Data Sheet

Type:	Supermax 6
Data sheet no:	29
Revision no:	0
Date:	91-11-01

1. Supermax 6

1.1 General description

The Supermax 6 is a cabinet in the Supermax family. The cabinet can hold a maximum of 6 Supermax modules, a maximum of 6 half-height or 3 full-height winchester disks and a maximum of 4 half-height or 2 full-height front mounted peripherals (floppy disk drives, streaming tape drives, optical disk drives, video tape drives, etc.). The cabinet has been designed to be extremely easy to maintain and to upgrade. One side of the cabinet consists of one removable service cover. Removing that cover and the I/O panel gives the field service technician access to all serviceable parts inside the Supermax 6. Replacement of a winchester disk or a Supermax module is only a matter of a few minutes.

1.2 Installation

The Supermax 6 must be installed by qualified personnel only. Do not attempt to connect the equipment to the mains without consulting the electrical installation guide.

1.2.1 Mechanical

The Supermax 6 is delivered in a transport frame. The computer should stay in this frame for as long time as possible. When the installation location is reached the frame can be removed and the computer unpacked. The Supermax 6 is equipped with four wheels for easy transportation. A certain free space around the Supermax 6 must be present, in order to secure sufficient air flow and to ensure enough working space for maintenance and service. In order to secure sufficient airflow do not place any objects on top of the Supermax 6. Refer to Figure 1 for details on the space required. When the Supermax 6 is placed on the final location, it must be secured by lowering the four adjustable feet, located beneath the bottom of the cabinet, near the wheels. Use the attached tool to lower the feet until the wheels no longer touch the ground. Remove the protection sheets from the peripheral units and keep them for eventual later transportation of the Supermax 6. This concludes the mechanical installation.

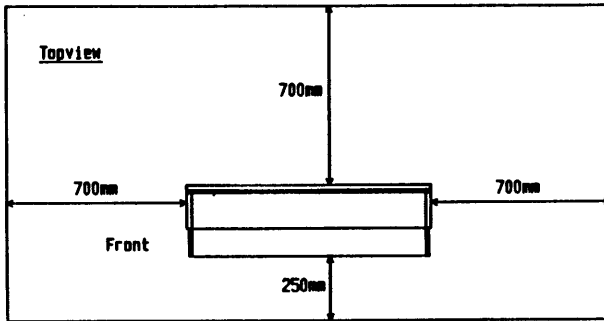


Figure 1. Free space

1.2.2 Electrical

The electrical installation must be made by qualified personnel only. The Supermax 6 must be connected to the mains supply, by using the attached power cable. The connection is made by applying one phase L, neutral N, and ground E. The connections must be made according to Table 1.

Wire colour	Name
Brown	L
Blue	N
Yellow/green	E

TABLE 1. Mains connection

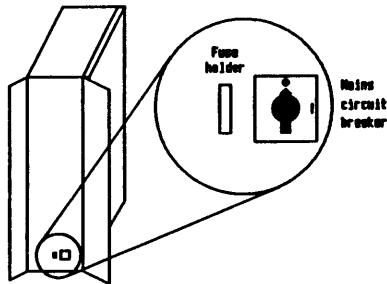


Figure 2. Rear side

Access to the mains circuit breaker of the Supermax 6 is made by opening the two doors on the rear side of the cabinet (see Figure 2). AC power is applied to the system by turning the switch to the "I" position. Before applying the AC power, the Supermax 6 should be inspected for eventual mechanical damage. Remove the service cover and the I/O panel and make sure that all Supermax modules and winchester disk drives are in the correct position. Set the power switch on the power supply in the ON position and set the margin switch in the center position. AC power can now be applied. This will not start the system, because DC power from the power supply is disabled by the key switch on the front panel. The system will be in stand-by mode.

1.3 Operation

When the installation procedure of the Supermax 6 is completed the system can be switched on. Located behind the front door is the operator panel (see Figure 3). This includes a 3-position key switch, two push button switches and a 2 x 24 character LCD display for the optional Service Computer.

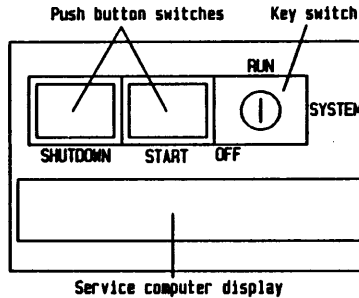


Figure 3. Operator panel

The key switch has the following functions:

Key switch	
Position	Function
OFF	The DC power is OFF.
RUN	The system is enabled.
SYSTEM	The system is in the system administrator mode.

TABLE 2. Key switch

The two push button switches have the following functions:

Push button switch START		
Key position	System state	Function
OFF	Any	No function
RUN	Power OFF	DC power will be applied to the system.
	Power ON	No function
	System crash	The system will be rebooted.
SYSTEM	Power OFF	DC power will be applied to the system.
	Power ON	A hardware reset of the system will take place.

TABLE 3. Push button switch START

Push button switch SHUTDOWN		
Key position	System state	Function
OFF	Any	No function
RUN	Any	No function
SYSTEM	Power OFF	No function
	Power ON	The system will perform a shutdown. When this procedure is completed, system power will be switched off.
	System crash	No predictable function.

TABLE 4. Push button switch SHUTDOWN

When DC power is applied to the system the push button switch START will light.

WARNING!

When the key switch is in position OFF, AC power is still present at the power supply. In order to completely disconnect the power, turn the mains circuit breaker on the the rear side of the computer to its "O" position.

1.4 Configuration

1.4.1 Supermax modules

In the Supermax 6 there are 6 slots for Supermax modules. Three of those slots are occupied by a CPU module, a memory module and a DIOC module. It is possible to expand the Supermax 6 with Supermax modules following the limitations mentioned below:

Type	Max. amount
CPU modules	2
I/O modules	4
CIOC modules	3
DIOC modules	3
SIOC modules	3
MIOC modules	3
Units	5
Modules	6

TABLE 5. Maximum configuration

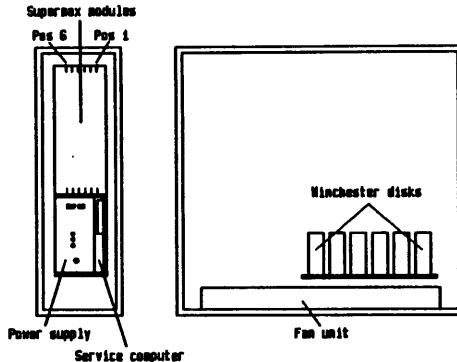


Figure 4. Internal view

Further restrictions on the placement of Supermax modules exist. Refer to Figure 4.

- DIOC modules must be mounted starting in position 1.
- CPU modules should be mounted in position 2, 3 or 4 and always in the middle of the card cage.
- I/O modules must be mounted starting in position 6.

1.4.2 Peripheral units

The Supermax 6 can house a maximum of 10 peripheral units. Peripheral units can be winchester disk drives, floppy disk drives, streaming tape drives, video tape drives, optical disk drives, etc. A front mounted peripheral is any of the above mentioned, which has removable media. The configuration must follow the limitations mentioned below.

Type	Size	Amount
Winchester disk drives	Half-height (HH)	6
	Full-height (FH)	3
	2 × FH + HH	6
Front mounted peripherals	Half-height (HH)	4
	Full-height (FH)	2
	2 × FH + HH	4

TABLE 6. Peripheral units

All front mounted peripherals **must** be connected to one SCSI cable (floppy disk drives not included).

1.5 I/O panel

Located on the rear side of the Supermax 6 behind the two doors is the I/O panel. The I/O panel is divided into four sections. See Figure 5 for details.

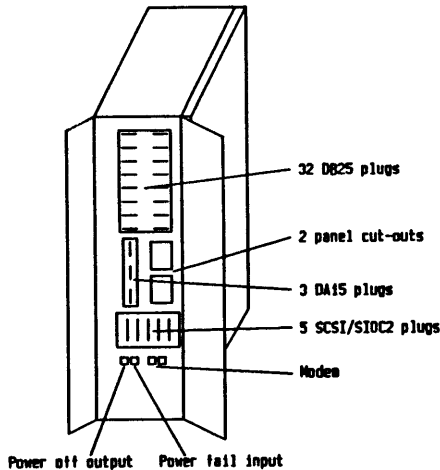


Figure 5. I/O panel

- The upper part contains mounting holes for up to 32 DB25 plugs. I/O subpanels are provided with the Supermax I/O Controllers and come in one of two sizes. The first one contains up to 4 plugs and occupies 4 mounting holes. This size is considered to be the smallest I/O panel available and is called single size. The second one contains from 5 to 8 plugs and occupies 8 mounting holes. This is called double size. Two single size subpanels fit into the frame of one double size subpanel. The following table shows the connection between the I/O controllers and the size of the corresponding subpanels.

I/O Controller	Size	Number of plugs
SIOC1 RS - 232C	Double	8
SIOC1 RS - 422/Parallel	Single	3
DIOC2 RS - 232C	Single	4
CIOC	Single	4
MIOC - SIO 8 submodule	Double	8
MIOC - HDLC submodule	Single	4
Service Computer	Single	3

TABLE 7. Subpanel size

- The second part contains 2 cutouts in which two single size or one double size subpanels can be mounted. This is currently used for the fiber optical interface module used by the MIOC - SIO 32 submodule.
- The third part contains 3 mounting holes for DA15 plugs. These connections are mainly used for the Ethernet transceiver cables from the NIOC and the MIOC.
- The fourth part contains 5 mounting holes for 50 pin shielded flat cable plugs. These connections are used for the SCSI interface to external disk cabinets and for the SIOC2 interface to the SIOC2 wall panel.

Below these four parts are some general I/O connections.

- One power fail input signal.
- One power off output signal.
- One connection of the internal modem to the telephone line.
- One connection of a telephone, when the modem is installed.

1.6 Subpanels

1.6.1 SIOC1 RS - 232C subpanel

The SIOC1 RS - 232C subpanel consists of 8 DB25S plugs and a 60 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables below for interface connections.

1.6.2 SIOC1 RS - 422/Parallel subpanel

The SIOC1 RS - 422/Parallel subpanel consists of 3 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 1 is RS - 422 and the interface in plug 2 is a parallel printer interface. Refer to the tables below for interface connections.

1.6.3 DIOC2 RS - 232C subpanel

The DIOC2 subpanel consists of 4 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS - 232C asynchronous. Refer to the tables below for interface connections.

1.6.4 CIOC subpanel

The CIOC subpanel consists of 4 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 2 is synchronous RS-232C and the interface in plug 1 and 3 is RS-422. Refer to the tables below for interface connections.

1.6.5 MIOC - SIO 8 subpanel

The MIOC - SIO 8 subpanel consists of 8 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.6 MIOC - HDLC subpanel

The MIOC - HDLC subpanel consists of 4 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in plug 0 and 1 is V.24/V.28 and the interface in plug 2 and 3 is V.36/V.11. Refer to the tables below for interface connections.

1.6.7 Service Computer subpanel

The Service Computer subpanel consists of 3 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.7 Interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
20	DTR	Data terminal ready

TABLE 8. Asynchronous RS-232C interface signals

DB25S		
Pin	Signal	Function
1	Gnd	Signal ground
2	T(A)	Transmit data A
3	C(A)	Control A
4	R(A)	Receive data A
5	I(A)	Interrupt A
6	S(A)	Status A
8	Gnd	Signal ground
14	T(B)	Transmit data B
15	C(B)	Control B
16	R(B)	Receive data A
17	I(B)	Interrupt B
18	S(B)	Status B

TABLE 9. RS - 422 and V.36/V.11 interface signals

DB25S		
Pin	Signal	Function
1	STB	Data strobe
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	ACK	Acknowledge
11	BUSY	Printer busy
18-25	Gnd	Signal ground

TABLE 10. Parallel printer interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
8	CD	Carrier detect
9	-12V	-12V power
15	TxC	Transmit clock
17	RxC	Receive clock
20	DTR	Data terminal ready
21	+12V	+12V power

TABLE 11. Synchronous RS-232C and V.24/V.28 interface signals

DA15S		
Pin	Signal	Function
1	GND	Signal ground
2	C+	Collision detect +
3	TX+	Transmit data +
4	GND	Signal ground
5	RX+	Receive data +
6	GND	Signal ground
7	NC	Terminator
8	GND	Signal ground
9	C-	Collision detect -
10	TX-	Transmit data -
11	GND	Signal ground
12	RX-	Receive data -
13	+12V	Voltage plus
14	GND	Signal ground
15	NC	Terminator

TABLE 12. Ethernet transceiver port connector

Pin	Signal	Function
1	Gnd	Signal ground
2	NC	Not connected
3	PF	Power fail

TABLE 13. Power fail input connector

The activation of the power fail signal must be done using a potential free contact, short circuiting pin 1 and 3.

Pin	Signal	Function
1	Gnd	Signal ground
2	POFF	Power off
3	NC	Not connected

TABLE 14. Power off output connector

The activation of the power off signal is done using a potential free contact, short circuiting pin 1 and 2.

SCSI 50 pin flat cable		
Pin	Signal	Function
2	-DB(0)	Data bit 0
4	-DB(1)	Data bit 1
6	-DB(2)	Data bit 2
8	-DB(3)	Data bit 3
10	-DB(4)	Data bit 4
12	-DB(5)	Data bit 5
14	-DB(6)	Data bit 6
16	-DB(7)	Data bit 7
18	-DB(P)	Data bit parity
20	GND	Signal ground
22	GND	Signal ground
24	GND	Signal ground
26	TPOW	Terminator power
28	GND	Signal ground
30	GND	Signal ground
32	-ATN	Attention
34	GND	Signal ground
36	-BSY	Busy
38	-ACK	Acknowledge
40	-RST	Reset
42	-MSG	Message
44	-SEL	Select
46	-C/D	Control/Data
48	-REQ	Request
50	-I/O	Input/Output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.
The minus sign (-) next to the signals indicates active low.

TABLE 15. SCSI port pin assignment

SIOC2 50 pin flat cable		
Pin	Signal	Function
2	DB(0)	Data bit 0
4	DB(1)	Data bit 1
6	DB(2)	Data bit 2
8	DB(3)	Data bit 3
10	DB(4)	Data bit 4
12	DB(5)	Data bit 5
14	DB(6)	Data bit 6
16	DB(7)	Data bit 7
18	AB(10)	Address bit 10
20	AB(9)	Address bit 9
22	AB(8)	Address bit 8
24	AB(7)	Address bit 7
26	AB(6)	Address bit 6
28	AB(5)	Address bit 5
30	AB(4)	Address bit 4
32	AB(3)	Address bit 3
34	AB(2)	Address bit 1
36	AB(1)	Address bit 1
38	AB(0)	Address bit 0
40	-FINT1	Interrupt pin 1
42	-FINT0	Interrupt pin 0
44	-FAS	Address strobe
46	-FW	Write signal
48	-CSD	Card selected
50	-RTS1	Reserved output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.

The minus sign (-) next to the signals indicates active low.

TABLE 16. SIOC2 port pin assignment

1.8 Specifications

1.8.1 Input power requirements

The Supermax 6 can be delivered with different AC input voltages. This option is installed at the factory and must be specified at time of purchase. It is not possible to change the AC input voltage between 230V and 115V, using the same power supply. The different AC input requirements for the Supermax 6 cabinet is shown below:

Voltage V~	Current A	Frequency Hz	Voltage range V~	Cable dimension mm ²	Fuse A
230	3	47-63	192-264	3 × 1.5	T3.15
115	6	47-63	96-132	3 × 1.5	T6.3

TABLE 17. AC input requirements

1.8.2 Environmental requirements

The following environment must be provided for proper operation of the Supermax 6:

Temperature	10 - 35°C
Humidity	20 - 80%, non condensing

TABLE 18. Environment

1.8.3 Power supply specifications

The power supply in the Supermax 6 has the following specifications.

Voltage	Current	Peak
+ 5 V	80 A	22 A
+12 V	15 A	
-12 V	2 A	

TABLE 19. Power supply specifications

1.8.4 Physical dimensions

The overall dimension and weight of the Supermax 6 are as follows:

Height	890 mm
Width	280 mm
Depth	940 mm
Weight	max. 110 kg

TABLE 20. Physical dimensions

1.8.5 EMC

The Supermax 6 is designed to meet the requirements specified in EN 55022, VDE 0871 class B and FCC Part 15 Subpart J class B.

1.8.6 Safety

The Supermax 6 is designed to meet the requirements specified in IEC 950, EN 60950 and UL 1950.

1.9 Service and maintenance

The maintenance of the Supermax 6 must be left to qualified personnel only. There are no user serviceable parts inside the cabinet.

1.9.1 Removing the service cover

Loosen the 8 M4 unbraco screws in the service cover.
Tilt the cover backwards.
Lift the cover away.

1.9.2 Mounting the service cover

Put the cover in place.
Tighten the 8 M4 unbraco screws.

1.9.3 Installing new I/O subpanels

Open the two doors at the rear side of the cabinet.
Loosen the 10 M4 screws on the I/O panel.
Open the I/O panel.
Remove the cover plate from the position where the new I/O subpanel is to be mounted.
Mount the new I/O subpanel.
Install the necessary flat cable.
Close the I/O panel.
Tighten the 10 M4 screws on the I/O panel.
Close the two doors.

1.9.4 Adding/replacing Supermax modules

Open the two doors at the rear side of the cabinet.
Loosen the 10 M4 screws on the I/O panel.
Open the I/O panel.
Remove the necessary flat cables from the Supermax modules.
Pull out the Supermax module.
Add the new Supermax module with the components to the right.
Press it firmly into the back plane.
If required install the new I/O subpanel.
Install the necessary flat cables on the Supermax modules.
Close the I/O panel.
Tighten the 10 M4 screws on the I/O panel.
Close the two doors.

1.9.5 Adding/replacing winchester disk drives

Remove the service cover.
Remove the necessary flat cables from the winchester disk drives.
Remove the necessary power cables from the winchester disk drives.
Loosen the M4 unbraco screw in the winchester mounting frame.
Remove the mounting frame including the winchester.
Remove the frame from the winchester.
Mount the frame on the new winchester.
Install the mounting frame including the winchester.
Tighten the M4 unbraco screw in the winchester mounting frame.
Install the necessary power cables on the winchester disk drives.
Install the necessary flat cables on the winchester disk drives.
Mount the service cover.

1.9.6 Adding/replacing front mounted peripherals

Open the front door.

Loosen the 2 (4) M4 unbraco screws between and/or below the units and remove the cover plate(s).

Pull out the mounting frame and the unit.

Remove the power cable from the unit.

Remove the flat cable from the unit

Loosen the two screws holding the unit and the frame.

Mount the frame on the new unit.

Install the power cable on the unit.

Install the flat cable on the unit.

Install the mounting frame including the unit.

Mount the cover plate(s) and tighten the 2 (4) M4 unbraco screws between and/or below the units.

Close the front door.

1.9.7 Adding/replacing power supply

Open the two doors at the rear side of the cabinet.

Loosen the 10 M4 screws on the I/O panel.

Open the I/O panel.

Loosen the 4 M3 finger screws at the front of the power supply.

Pull out the power supply.

Add the new power supply.

Press it firmly into the back plane.

Tighten the 4 M3 finger screws at the front of the power supply.

Close the I/O panel.

Tighten the 10 M4 screws on the I/O panel.

Close the two doors.

1.9.8 Adding/replacing fan unit

Remove the service cover.

Loosen the 2 M4 unbraco screws at the front of the fan unit.

Pull out the fan unit.

Unplug the cable from the fan unit.

Plug the cable into the new fan unit.

Install the new fan unit.

Tighten the 2 M4 unbraco screws at the front of the fan unit.

Mount the service cover.

1.9.9 Adding/replacing service computer

Open the two doors at the rear side of the cabinet.

Loosen the 10 M4 screws on the I/O panel.

Open the I/O panel.

Loosen the 2 M3 finger screws at the front of the service computer.

Pull out the service computer.

Add the new service computer.

Press it firmly into the back plane.

Tighten the 2 M3 finger screws at the front of the service computer.

Close the I/O panel.

Tighten the 10 M4 screws on the I/O panel.

Close the two doors.

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Supermax Technical Data Sheet

Type:	Supermax 4
Data sheet no:	31
Revision no:	0
Date:	91-11-01

1. Supermax 4

1.1 General description

The Supermax 4 is a cabinet in the Supermax family. The cabinet can hold a maximum of 4 Supermax modules, a maximum of 2 half-height or 1 full-height winchester disk(s) and a maximum of 4 half-height or 2 full-height front mounted peripherals (floppy disk drives, streaming tape drives, optical disk drives, video tape drives, etc.). The cabinet has been designed to be easy to maintain and to upgrade. One side of the cabinet consists of one removable service cover. Removing that cover and the I/O panel gives the field service technician access to all serviceable parts inside the Supermax 4. Replacement of a winchester disk or a Supermax module is only a matter of a few minutes.

1.2 Installation

The Supermax 4 must be installed by qualified personnel only. Do not attempt to connect the equipment to the mains without consulting the electrical installation guide.

1.2.1 Mechanical

The Supermax 4 is delivered in a transport frame. The computer should stay in this frame for as long time as possible. When the installation location is reached the frame can be removed and the computer unpacked. In order to secure sufficient air flow and to ensure enough working space for maintenance and service, a certain free space around the Supermax 4 must be present. In order to secure sufficient airflow do not place any objects on top of the Supermax 4. Refer to Figure 1 for details on the space required. The space indicated by the unshaded area is used during normal operation and the space indicated by the shaded area must be established during service and maintenance.

Adjust the four feet, located beneath the bottom of the cabinet, by using the attached tool. Remove the protection sheets from the peripheral units and keep them for eventual later transportation of the Supermax 4. This concludes the mechanical installation.

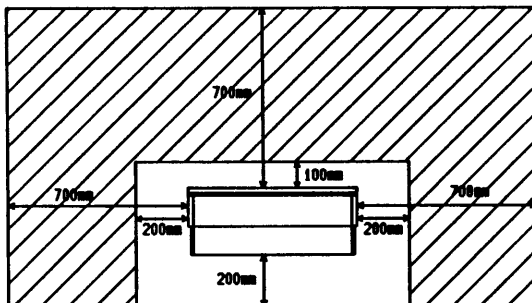


Figure 1. Free space

1.2.2 Electrical

The electrical installation must be made by qualified personnel only. The Supermax 4 must be connected to the mains supply, by using the attached power cable. The connection is made by applying one phase L, neutral N, and ground E. The connections must be made according to Table 1.

Wire colour	Name
Brown	L
Blue	N
Yellow/green	E

TABLE 1. Mains connection

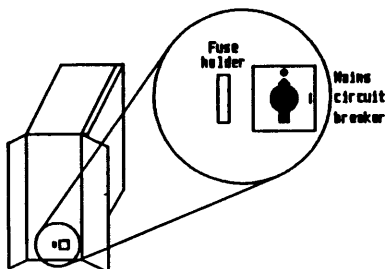


Figure 2. Rear side

Access to the mains circuit breaker of the Supermax 4 is made by opening the two doors on the rear side of the cabinet (see Figure 2). AC power is applied to the system by turning the switch to the "I" position. Before applying the AC power, the Supermax 4 should be inspected for eventual mechanical damage. Remove the service cover and the I/O panel and make sure that all Supermax modules and winchester disk drives are in the correct position. AC power can now be applied. This will not start the system, because DC power from the power supply is disabled by the key switch on the front panel. The system will be in stand-by mode.

1.3 Operation

When the installation procedure of the Supermax 4 is completed the system can be switched on. Located behind the front door is the operator panel (see Figure 3). This includes a 3-position key switch and two push button switches.

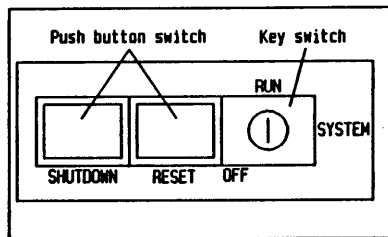


Figure 3. Operator panel

The key switch has the following functions:

Key switch	
Position	Function
OFF	The DC power is OFF.
ON	The DC power is ON.
SYSTEM	The system is in the system administrator mode.

TABLE 2. Key switch

The two push button switches have the following functions:

Push button switch RESET		
Key position	System state	Function
OFF	Any	No function
ON	Any	No function
SYSTEM	Any	A hardware reset of the system will take place.

TABLE 3. Push button switch RESET

Push button switch SHUTDOWN		
Key position	System state	Function
OFF	Any	No function
ON	Any	No function
SYSTEM	Any	The system will perform a shutdown.

TABLE 4. Push button switch SHUTDOWN

When DC power is applied to the system the push button switch RESET will light.

WARNING!

When the key switch is in position OFF, AC power is still present at the power supply. In order to completely disconnect the power, turn the mains circuit breaker on the rear side of the computer to its "O" position.

1.4 Configuration

1.4.1 Supermax modules

In the Supermax 4 there are 4 slots for Supermax modules. Three of those slots are occupied by a CPU module, a memory module and a DIOC module. The fourth module is either a SIOC or a MIOC.

The placement of Supermax modules is as follows. Refer to Figure 4.

- The DIOC module is mounted in position 1.
- The CPU module is mounted in position 2.
- The memory module is mounted in position 3.
- The I/O module is mounted in position 4.

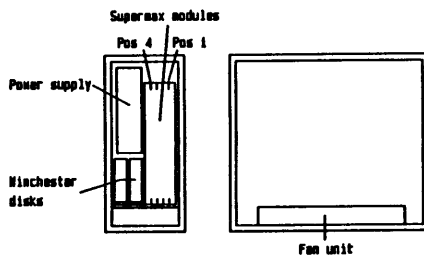


Figure 4. Internal view

1.4.2 Peripheral units

The Supermax 4 can house a maximum of 6 peripheral units. Peripheral units can be winchester disk drives, floppy disk drives, streaming tape drives, video tape drives, optical disk drives, etc. A front mounted peripheral is any of the above mentioned, which has removable media. The configuration must follow the limitations mentioned below.

Type	Size	Amount
Winchester disk drives	Half-height (HH)	2
	Full-height (FH)	1
	$2 \times FH + HH$	2
Front mounted peripherals	Half-height (HH)	4
	Full-height (FH)	2
	$2 \times FH + HH$	4

TABLE 5. Peripheral units

All front mounted peripherals **must** be connected to one SCSI cable (floppy disk drives not included).

1.5 I/O panel

Located on the rear side of the Supermax 4 behind the two doors is the I/O panel. The I/O panel is divided into four sections. See Figure 5 for details.

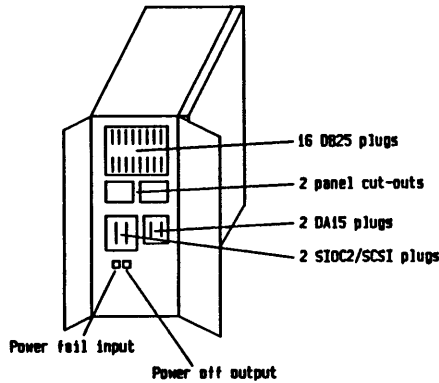


Figure 5. I/O panel

- The upper part contains mounting holes for up to 16 DB25 plugs. I/O subpanels are provided with the Supermax I/O Controllers and come in one of two sizes. The first one contains up to 4 plugs and occupies 4 mounting holes. This size is considered to be the smallest I/O panel available and is called single size. The second one contains from 5 to 8 plugs and occupies 8 mounting holes. This is called double size. Two single size subpanels fit into the frame of one double size subpanel. The following table shows the relation between the I/O controllers and the size of the corresponding subpanels.

I/O Controller	Size	Number of plugs
SIOC1 RS - 232C	Double	8
SIOC1 RS - 422/Parallel	Single	3
DIOC2 RS - 232C	Single	4
CIOC	Single	4
MIOC - SIO 8 submodule	Double	8
MIOC - HDLC submodule	Single	4
Service Computer	Single	3

TABLE 6. Subpanel size

- The second part contains 2 cutouts in which two single size or one double size subpanels can be mounted. This is currently used for the fiber optical interface module used by the MIOC - SIO 32 submodule.
- The third part contains 2 mounting holes for DA15 plugs. These connections are mainly used for the Ethernet transceiver cables from the NIOC and the MIOC.
- The fourth part contains 2 mounting holes for 50 pin shielded flat cable plugs. These connections are used for the SCSI interface to external disk cabinets and for the SIOC2 interface to the SIOC2 wall panel.

Below these four parts are some general I/O connections.

- One power fail input signal.
- One power off output signal.

1.6 Subpanels

1.6.1 SIOC1 RS-232C subpanel

The SIOC1 RS-232C subpanel consists of 8 DB25S plugs and a 60 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.2 SIOC1 RS-422/Parallel subpanel

The SIOC1 RS-422/Parallel subpanel consists of 3 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 1 is RS-422 and the interface in plug 2 is a parallel printer interface. Refer to the tables below for interface connections.

1.6.3 DIOC2 RS-232C subpanel

The DIOC2 subpanel consists of 4 DB25S plugs and a 34 pin flat cable connector mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.4 CIOC subpanel

The CIOC subpanel consists of 4 DB25S plugs and a 50 pin flat cable connector mounted on a PCB. The interface in plug 0 and 2 is synchronous RS-232C and the interface in plug 1 and 3 is RS-422. Refer to the tables below for interface connections.

1.6.5 MIOC - SIO 8 subpanel

The MIOC - SIO 8 subpanel consists of 8 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in the DB25S plugs are RS-232C asynchronous. Refer to the tables below for interface connections.

1.6.6 MIOC - HDLC subpanel

The MIOC - HDLC subpanel consists of 4 DB25S plugs and two 40 pin flat cable connectors mounted on a PCB. The interface in plug 0 and 1 is V.24/V.28 and the interface in plug 2 and 3 is V.36/V.11. Refer to the tables below for interface connections.

1.7 Interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
20	DTR	Data terminal ready

TABLE 7. Asynchronous RS-232C interface signals

DB25S		
Pin	Signal	Function
1	Gnd	Signal ground
2	T(A)	Transmit data A
3	C(A)	Control A
4	R(A)	Receive data A
5	I(A)	Interrupt A
6	S(A)	Status A
8	Gnd	Signal ground
14	T(B)	Transmit data B
15	C(B)	Control B
16	R(B)	Receive data A
17	I(B)	Interrupt B
18	S(B)	Status B

TABLE 8. RS - 422 and V.36/V.11 interface signals

DB25S		
Pin	Signal	Function
1	STB	Data strobe
2	D0	Data bit 0
3	D1	Data bit 1
4	D2	Data bit 2
5	D3	Data bit 3
6	D4	Data bit 4
7	D5	Data bit 5
8	D6	Data bit 6
9	D7	Data bit 7
10	ACK	Acknowledge
11	BUSY	Printer busy
18-25	Gnd	Signal ground

TABLE 9. Parallel printer interface signals

DB25S		
Pin	Signal	Function
2	TxD	Transmit data
3	RxD	Receive data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	Gnd	Signal ground
8	CD	Carrier detect
9	-12V	- 12V power
15	TxC	Transmit clock
17	RxC	Receive clock
20	DTR	Data terminal ready
21	+12V	+ 12V power

TABLE 10. Synchronous RS-232C and V.24/V.28 interface signals

DA15S		
Pin	Signal	Function
1	GND	Signal ground
2	C+	Collision detect +
3	TX+	Transmit data +
4	GND	Signal ground
5	RX+	Receive data +
6	GND	Signal ground
7	NC	Terminator
8	GND	Signal ground
9	C-	Collision detect -
10	TX-	Transmit data -
11	GND	Signal ground
12	RX-	Receive data -
13	+12V	Voltage plus
14	GND	Signal ground
15	NC	Terminator

TABLE 11. Ethernet transceiver port connector

Pin	Signal	Function
1	Gnd	Signal ground
2	NC	Not connected
3	PF	Power fail

TABLE 12. Power fail input connector

The activation of the power fail signal must be done using a potential free contact, short circuiting pin 1 and 3.

Pin	Signal	Function
1	Gnd	Signal ground
2	POFF	Power off
3	NC	Not connected

TABLE 13. Power off output connector

The activation of the power off signal is done using a potential free contact, short circuiting pin 1 and 2.

SCSI 50 pin flat cable		
Pin	Signal	Function
2	-DB(0)	Data bit 0
4	-DB(1)	Data bit 1
6	-DB(2)	Data bit 2
8	-DB(3)	Data bit 3
10	-DB(4)	Data bit 4
12	-DB(5)	Data bit 5
14	-DB(6)	Data bit 6
16	-DB(7)	Data bit 7
18	-DB(P)	Data bit parity
20	GND	Signal ground
22	GND	Signal ground
24	GND	Signal ground
26	TPOW	Terminator power
28	GND	Signal ground
30	GND	Signal ground
32	-ATN	Attention
34	GND	Signal ground
36	-BSY	Busy
38	-ACK	Acknowledge
40	-RST	Reset
42	-MSG	Message
44	-SEL	Select
46	-C/D	Control/Data
48	-REQ	Request
50	-I/O	Input/Output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.
The minus sign (-) next to the signals indicates active low.

TABLE 14. SCSI port pin assignment

SIOC2 50 pin flat cable		
Pin	Signal	Function
2	DB(0)	Data bit 0
4	DB(1)	Data bit 1
6	DB(2)	Data bit 2
8	DB(3)	Data bit 3
10	DB(4)	Data bit 4
12	DB(5)	Data bit 5
14	DB(6)	Data bit 6
16	DB(7)	Data bit 7
18	AB(10)	Address bit 10
20	AB(9)	Address bit 9
22	AB(8)	Address bit 8
24	AB(7)	Address bit 7
26	AB(6)	Address bit 6
28	AB(5)	Address bit 5
30	AB(4)	Address bit 4
32	AB(3)	Address bit 3
34	AB(2)	Address bit 2
36	AB(1)	Address bit 1
38	AB(0)	Address bit 0
40	-FINT1	Interrupt pin 1
42	-FINT0	Interrupt pin 0
44	-FAS	Address strobe
46	-FW	Write signal
48	-CSD	Card selected
50	-RTS1	Reserved output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.

The minus sign (-) next to the signals indicates active low.

TABLE 15. SIOC2 port pin assignment

1.8 Specifications

1.8.1 Input power requirements

The Supermax 4 can be delivered with different AC input voltages. This option is installed at the factory and must be specified at time of purchase. The different AC input requirements for the Supermax 4 cabinet is shown below:

Voltage V~	Current A	Frequency Hz	Voltage range V~	Cable dimension mm ²	Fuse A
230	2	47-63	192-264	3 × 0.75	T2
115	4	47-63	96-132	3 × 0.75	T4

TABLE 16. AC input requirements

1.8.2 Environmental requirements

The following environment must be provided for proper operation of the Supermax 4:

Temperature	10-35°C
Humidity	20-80%, non condensing

TABLE 17. Environment

1.8.3 Power supply specifications

The power supply in the Supermax 4 has the following specifications.

Voltage	Current	Peak
+ 5 V	50 A	
+12 V	15 A	22 A
-12 V	2 A	

TABLE 18. Power supply specifications

1.8.4 Physical dimensions

The overall dimension and weight of the Supermax 4 are as follows:

Height	580 mm
Width	260 mm
Depth	650 mm
Weight	max. 45 kg

TABLE 19. Physical dimensions

1.8.5 EMC

The Supermax 4 is designed to meet the requirements specified in EN 55022, VDE 0871 class B and FCC Part 15 Subpart J class B.

1.8.6 Safety

The Supermax 4 is designed to meet the requirements specified in IEC 950, EN 60950 and UL 1950.

1.9 Service and maintenance

The maintenance of the Supermax 4 must be left to qualified personnel only. There are no user serviceable parts inside the cabinet.

1.9.1 Removing the service cover

- Loosen the 6 M4 unbraco screws in the service cover.
- Tilt the cover backwards.
- Lift the cover away.

1.9.2 Mounting the service cover

- Put the cover in place.
- Tighten the 8 M4 unbraco screws.

1.9.3 Installing new I/O subpanels

- Remove the service cover.
- Open the two doors at the rear side of the cabinet.
- Loosen the 10 M4 screws on the I/O panel.
- Remove the I/O panel.
- Remove the cover plate from the position where the new I/O subpanel is to be mounted.
- Mount the new I/O subpanel.
- Install the necessary flat cable.
- Mount the I/O panel.
- Tighten the 10 M4 screws on the I/O panel.
- Close the two doors.
- Mount the service cover.

1.9.4 Adding/replacing Supermax modules

- Remove the service cover.
- Open the two doors at the rear side of the cabinet.
- Loosen the 10 M4 screws on the I/O panel.
- Remove the I/O panel.
- Remove the necessary flat cables from the Supermax modules.
- Pull out the Supermax module.
- Add the new Supermax module with the components to the right.
- Press it firmly into the back plane.
- If required install the new I/O subpanel.
- Install the necessary flat cables on the Supermax modules.
- Mount the I/O panel.
- Tighten the 10 M4 screws on the I/O panel.
- Close the two doors.
- Mount the service cover.

1.9.5 Adding/replacing winchester disk drives

- Remove the service cover.
- Open the two doors at the rear side of the cabinet.
- Loosen the 10 M4 screws on the I/O panel.
- Remove the I/O panel.
- Remove the necessary flat cables from the winchester disk drives.
- Remove the necessary power cables from the winchester disk drives.
- Loosen the M4 unbraco screw in the winchester mounting frame.
- Remove the mounting frame including the winchester.

Remove the frame from the winchester.
Mount the frame on the new winchester.
Install the mounting frame including the winchester.
Tighten the M4 unbraco screw in the winchester mounting frame.
Install the necessary power cables on the winchester disk drives.
Install the necessary flat cables on the winchester disk drives.
Mount the I/O panel.
Tighten the 10 M4 screws on the I/O panel.
Close the two doors.
Mount the service cover.

1.9.6 Adding/replacing front mounted peripherals

Open the front door.
Loosen the 2 (4) M4 unbraco screws between and/or below the units and remove the cover plate(s).
Pull out the mounting frame and the unit.
Remove the power cable from the unit.
Remove the flat cable from the unit
Loosen the two screws holding the unit and the frame.
Mount the frame on the new unit.
Install the power cable on the unit.
Install the flat cable on the unit.
Install the mounting frame including the unit.
Mount the cover plate(s) and tighten the 2 (4) M4 unbraco screws between and/or below the units.
Close the front door.

1.9.7 Adding/replacing power supply

Remove the service cover.
Open the two doors at the rear side of the cabinet.
Loosen the 10 M4 screws on the I/O panel.
Remove the I/O panel.
Loosen the 2 M3 screws at the front of the power supply.
Pull out the power supply.
Add the new power supply.
Press it firmly into the back plane.
Tighten the 2 M3 screws at the front of the power supply.
Mount the I/O panel.
Tighten the 10 M4 screws on the I/O panel.
Close the two doors.
Mount the service cover.

1.9.8 Adding/replacing fan unit

Remove the service cover.
Loosen the 2 M4 unbraco screws at the front of the fan unit.
Pull out the fan unit.
Unplug the cable from the fan unit.
Plug the cable into the new fan unit.
Install the new fan unit.
Tighten the 2 M4 unbraco screws at the front of the fan unit.
Mount the service cover.



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SECRET



Supermax Technical Data Sheet

Type:	Supermax Disk
Data sheet no:	30
Revision no:	0
Date:	91-11-01

1. Supermax Disk

1.1 General description

The Supermax Disk is a cabinet in the Supermax family. The cabinet can hold a maximum of 32 half-height or 16 full-height winchester disks and a maximum of 4 half-height or 2 full-height front mounted peripherals (floppy disk drives, streaming tape drives, optical disk drives, video tape drives, etc.). The cabinet has been designed to be extremely easy to maintain and to upgrade. One side of the cabinet consists of one large removable service cover. Removing that cover gives the field service technician access to all serviceable parts inside the Supermax Disk. Replacement of a winchester disk or a power supply is only a matter of a few minutes.

1.2 Installation

The Supermax Disk must be installed by qualified personnel only. Do not attempt to connect the equipment to the mains without consulting the electrical installation guide.

1.2.1 Mechanical installation

The Supermax Disk is delivered in a transport frame. The cabinet should stay in this frame for as long time as possible. When the installation location is reached the frame can be removed and the cabinet unpacked. The Supermax Disk is equipped with four wheels for easy transportation. A certain free space around the Supermax Disk must be present, in order to secure sufficient air flow and to ensure enough working space for maintenance and service.

In order to secure sufficient airflow do not place any objects on top of the Supermax Disk. Refer to Figure 1 for details on the space required. When the Supermax Disk is placed on the final location, it must be secured by lowering the four adjustable feet, located beneath the bottom of the cabinet, near the wheels. Use the attached tool to lower the feet until the wheels no longer touch the ground. Remove the protection sheets from the peripheral units and keep them for eventual later transportation of the Supermax Disk. This concludes the mechanical installation.

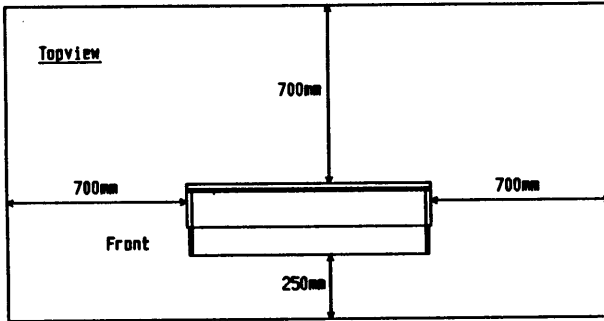


Figure 1. Free space

1.2.2 Electrical

The electrical installation must be made by qualified personnel only.

The Supermax Disk is equipped with a number of power supplies (1-4) depending upon the configuration. When mirrored disks are installed the Supermax Disk will be delivered with two or four power supplies. This is to further improve the data safety because each disk in a mirrored pair will be connected to different power supplies. Another advantage is that each of those power supplies will be connected to two separate phases of the mains supply. If for any reason this is not desired, the Supermax Disk can be delivered for single phase connection also.

The Supermax Disk can be connected to the mains supply in two different ways.

1. The Supermax Disk must be connected to the mains supply, by using the attached power cable. The connection is made by applying 2 separate phases L1 and L2, neutral N, and ground E. The connections must be made according to Table 1.

Wire colour	Name
Brown	L1
Black	L2
Blue	N
Yellow/green	E

TABLE 1. Mains connection 1

2. The Supermax Disk must be connected to the mains supply, by using the attached power cable. The connection is made by applying one phase L, neutral N, and ground E. The connections must be made according to Table 2.

Wire colour	Name
Brown	L
Blue	N
Yellow/green	E

TABLE 2. Mains connection 2

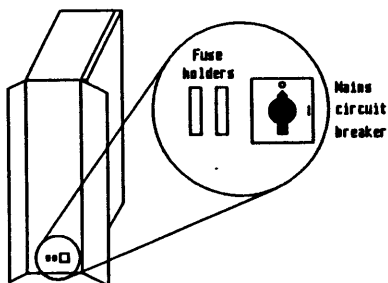


Figure 2. Rear side

Access to the mains circuit breaker of the Supermax Disk is made by opening the two doors on the rear side of the cabinet (see Figure 2). AC power is applied to the system by turning the switch to the "I" position. Before applying the AC power, the Supermax Disk should be inspected for eventual mechanical damage. Remove the service cover and make sure that all winchester disk drives and power supplies are in the correct position. Set the power switch on the power supplies in the REMOTE position. Then the connections to the main Supermax should be made. Under normal operating conditions power OFF and power ON to the Supermax Disk is controlled from the main Supermax. The enclosed interface cable should be connected to the plug marked POWER OFF INPUT on the Supermax Disk and to the plug marked POWER OFF on the main Supermax. AC power can now be applied. This operation will not start the system, because DC power from the power supplies is disabled by the key switch on the front panel of the Supermax controlling the Supermax Disk. The system will be in stand-by mode.

1.3 Operation

When the installation procedure of the Supermax Disk is completed the remaining connections to the main Supermax should be made. All other enclosed interface cables (depends on the configuration) should be connected and the system will be ready. Refer to the operating instructions for the main Supermax on how to proceed.

WARNING

When the key switch on the main Supermax is in position OFF, AC power is still present at the power supplies in the Supermax Disk. In order to completely disconnect the power, turn the mains circuit breaker on the the rear side of the cabinet to its "O" position.

1.4 Configuration

The Supermax Disk can house a maximum of 36 peripheral units. Peripheral units can be winchester disk drives, floppy disk drives, streaming tape drives, video tape drives, optical disk drives, etc. A front mounted peripheral is any of the above mentioned, which has removable media. The configuration must follow the limitations mentioned below.

Type	Size	Amount
Winchester disk drives	Half-height (HH)	32
	Full-height (FH)	16
	2 × FH + HH	32
Front mounted peripherals	Half-height (HH)	4
	Full-height (FH)	2
	2 × FH + HH	4

TABLE 3. Peripheral units

The Supermax Disk is equipped with from 1 to 4 power supplies. Each power supply supplies power to one shelf in the cabinet, power supply 1 supplies shelf 1 and so on (see Figure 4 for details). Power supply 1 and 3 is connected to phase L1 of the mains supply and power supply 2 and 4 is connected to phase L2. This means that the first pair of mirrored disks in the disk cabinet will be mounted on shelf 1 and shelf 2 and power supply 1 and 2 will be installed.

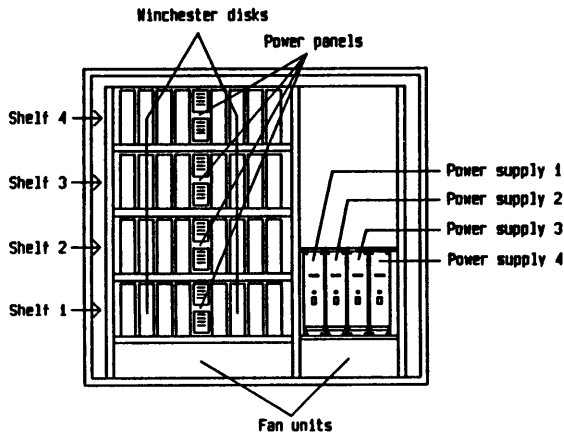


Figure 3. Internal view

1.5 I/O panel

Located on the rear side of the Supermax Disk behind the two doors is the I/O panel. See Figure 4 for details.

The I/O panel contains 12 mounting holes for 50 pin shielded flat cable plugs. These connections are used for the SCSI interface to the main Supermax and/or extension to further disk cabinets.

In addition there are the following general I/O connections.

- One remote power off input signal.
- One remote power off output signal.

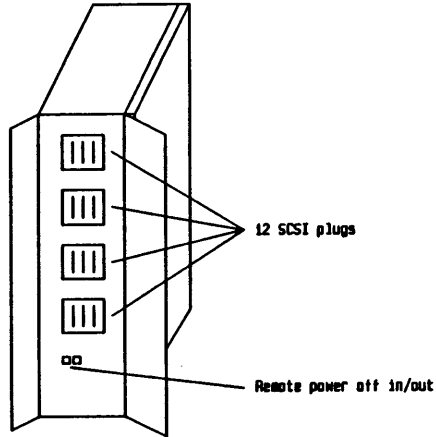


Figure 4. I/O panel

1.6 Interface signals

Pin	Signal	Function
1	Gnd	Signal ground
2	POFF	Power off
3	NC	Not connected

TABLE 4. Power off input/output connector

The activation of the power off signal is done using a potential free contact, short circuiting pin 1 and 2.

SCSI 50 pin flat cable		
Pin	Signal	Function
2	-DB(0)	Data bit 0
4	-DB(1)	Data bit 1
6	-DB(2)	Data bit 2
8	-DB(3)	Data bit 3
10	-DB(4)	Data bit 4
12	-DB(5)	Data bit 5
14	-DB(6)	Data bit 6
16	-DB(7)	Data bit 7
18	-DB(P)	Data bit parity
20	GND	Signal ground
22	GND	Signal ground
24	GND	Signal ground
26	TPOW	Terminator power
28	GND	Signal ground
30	GND	Signal ground
32	-ATN	Attention
34	GND	Signal ground
36	-BSY	Busy
38	-ACK	Acknowledge
40	-RST	Reset
42	-MSG	Message
44	-SEL	Select
46	-C/D	Control/Data
48	-REQ	Request
50	-I/O	Input/Output

NOTE:

All odd pins (1 - 49) connected to signal ground, GND.
The minus sign (-) next to the signals indicates active low.

TABLE 5. SCSI port pin assignment

1.7 Specifications

1.7.1 Input power requirements

The Supermax Disk can be delivered with different AC input voltages. This option is installed at the factory and must be specified at time of purchase. The different AC input requirements for the Supermax Disk cabinet is shown below:

Voltage V~	Current A	Frequency Hz	Voltage range V~	Cable dimension mm ²	Fuse A
400 2N	2 × 3	47-63	330-456	4 × 1.5	T3.15
230	6	47-63	192-264	3 × 1.5	T6.3
230	3	47-63	192-264	3 × 1.5	T3.15
200 2N	2 × 6	47-63	165-228	4 × 1.5	T6.3
115	12	47-63	96-132	3 × 1.5	T12
115	6	47-63	96-132	3 × 1.5	T6.3

TABLE 6. AC input requirements

1.7.2 Environmental requirements

The following environment must be provided for proper operation of the Supermax Disk:

Temperature	10-35°C
Humidity	20-80% non-condensing

TABLE 7. Environment

1.7.3 Power supply specifications

Each of the power supplies in the Supermax Disk have the following specifications.

Voltage	Current	Peak
+ 5 V	12 A	
+12 V	15 A	22 A

TABLE 8. Power supply specifications

1.7.4 Physical dimensions

The overall dimension and weight of the Supermax Disk are as follows:

Height	890 mm
Width	280 mm
Depth	940 mm
Weight	max. 135 kg

TABLE 9. Physical dimensions

1.8 EMC

The Supermax Disk is designed to meet the requirements specified in EN 55022, VDE 0871 class B and FCC Part 15 Subpart J class B.

1.9 Safety

The Supermax Disk is designed to meet the requirements specified in IEC 950, EN 60950 and UL 1950.

1.10 Service and maintenance

The maintenance of the Supermax Disk must be left to qualified personnel only. There are no user serviceable parts inside the cabinet.

1.10.1 Removing the service cover

- Loosen the 8 M4 unbraco screws in the service cover.
- Tilt the cover backwards.
- Lift the cover away.

1.10.2 Mounting the service cover

- Put the cover in place.
- Tighten the 8 M4 unbraco screws.

1.10.3 Installing new SCSI plugs

- Open the two doors at the rear side of the cabinet.
- Loosen the 10 M4 screws on the I/O panel.
- Open the I/O panel.
- Remove the cover plate from the position where the new SCSI plug is to be mounted.
- Mount the new SCSI plug.
- Install the necessary flat cable.
- Close the I/O panel.
- Tighten the 10 M4 screws on the I/O panel.
- Close the two doors.

1.10.4 Adding/replacing winchester disk drives

- Remove the service cover.
- Remove the necessary flat cables from the winchester disk drives.
- Remove the necessary power cables from the winchester disk drives.
- Loosen the M4 unbraco screw in the winchester mounting frame.
- Remove the mounting frame including the winchester.
- Remove the frame from the winchester.
- Mount the frame on the new winchester.
- Install the mounting frame including the winchester.
- Tighten the M4 unbraco screw in the winchester mounting frame.
- Install the necessary power cables on the winchester disk drives.
- Install the necessary flat cables on the winchester disk drives.
- Mount the service cover.

1.10.5 Adding/replacing front mounted peripherals

Open the front door.

Loosen the 2 (4) M4 unbraco screws between and/or below the units and remove the cover plate(s).

Pull out the mounting frame and the unit.

Remove the power cable from the unit.

Remove the flat cable from the unit

Loosen the two screws holding the unit and the frame.

Mount the frame on the new unit.

Install the power cable on the unit.

Install the flat cable on the unit.

Install the mounting frame including the unit.

Mount the cover plate(s) and tighten the 2 (4) M4 unbraco screws between and/or below the units.

Close the front door.

1.10.6 Adding/replacing power supply

Remove the service cover.

Loosen the 4 M2.5 screws at the front of the power supply.

Pull out the power supply.

Add the new power supply.

Press it firmly into the back plane.

Tighten the 4 M2.5 screws at the front of the power supply.

Mount the service cover.

1.10.7 Adding/replacing fan unit

Remove the service cover.

Loosen the 2 M4 unbraco screws at the front of the fan unit.

Pull out the fan unit.

Unplug the cable from the fan unit.

Plug the cable into the new fan unit.

Install the new fan unit.

Tighten the 2 M4 unbraco screws at the front of the fan unit.

Mount the service cover.

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Introduktion.

Denne manual beskriver hardwaredelen af Network Terminal Controller'en (NTC) samt giver en programmeringsoversigt. Kredsløbet beskrives i hovedtræk og den detaljerede beskrivelse fremgår af diagrammerne.

NTC'en er opbygget omkring to 8085 processorer, en Seeq 8003 ethernet controller samt en tre-port data buffer-memory. Kortet indeholder al elektronikken til NTC'en (powersupply dog undtaget).

Seeq controlleren implementerer Data Link laget i OSI (Open Systems Interconnect) modellens syv-lags struktur. Der benyttes en CSMA/CD protokol (Carrier Sense Multiple Acces/ Collision Detect). Det nederste lag, Physical Layer, udgøres af et 50 ohm baseband coaxial kabel, hvortil NTC'en forbindes via en transceiverboks og et standard transceiverekabel.

NTC'ens software implementerer OSI modellens Network Layer, Transport Layer samt Session Layer.

NTC'en giver tilkoblingsmulighed til et Lokalnet (Ethernet IEEE 802.3) via de otte RS 232 C (V24) porte.





Network Solutions Via Standards

While computer networks have existed for sometime, proprietary networks from different suppliers could not be used to inter-communicate. The open systems concept was developed to solve this compatibility problem. An open system is built using widely accepted standards. Open systems allow end users to select equipment from a number of suppliers to realize an optimal solution for their application.

As a standard gets widely accepted, manufacturers of VLSI integrated circuits can incorporate the standard into silicon, thereby lowering the overall system cost.

THE ISO MODEL

The International Standard Organization (ISO), in an effort to encourage "open" networks, developed the Open Systems Interconnect (OSI) reference model. In simple terms, the model logically groups the functions and sets of rules, called protocols, necessary to establish and conduct communication between two or more parties. The model consists of seven functions, often referred to as layers. The OSI model describes the functions of each layer in broad terms, not specific implementations.

This layered model approach affords two key advantages. First, layers allow a clear division of the design task making specifications clean. Second, systems based on a layered architecture are flexible. Flexibility is achieved because each layer functions independently of the layer preceding or after it. Thus, specific layer implementations can be changed easily. For example, layers 1 and 2 of a network can be changed to be either CSMA/CD based (e.g. IEEE 802.3) or token ring based (e.g. IEEE 802.5), without affecting layers 3 through 7.

The layer functions of the OSI model are summarized in Figure 1-1.

The Physical Layer describes the physical media over which the bit stream is to be transmitted. This Layer specifies type of cable (coax, twisted pair, etc.) signal levels, bit rate, data encoding method, modulation method, and method for detecting collisions in contention networks. In short, this Layer describes the actual physical media over which the bit stream is transmitted and the method of transmission, i.e. baseband or broadband.

The Data Link Layer describes the rules for transmitting on the channel (made up of the encoder/decoder, transceiver cable, and transmission medium). Such items as the format of the information (frame) and procedures for gaining control of the channel (access method), transmitting the frame, and releasing the physical media are specified by the Data Link Layer.

The Network Layer controls switching between links in a multihop network. The Network Layer is not necessary for a single LAN system because all stations connected onto a LAN share the same channel. This Layer is critical in gateway, communication server, and dial-up communication applications.

The Transport Layer ensures end-to-end message integrity and provides for the required quality of service for exchanged information. For example, end-to-end acknowledgements and flow control are performed by the Transport Layer.

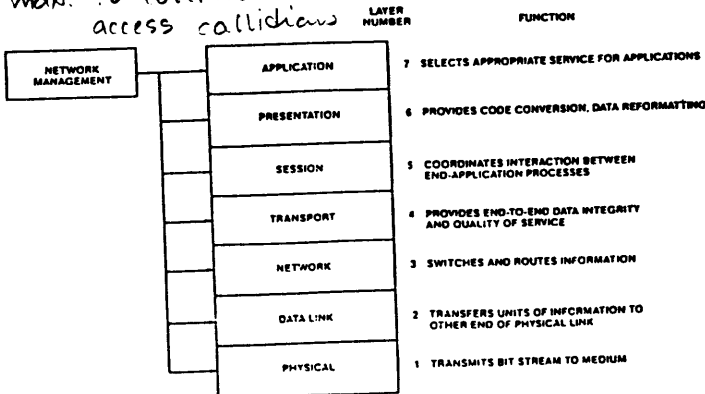
The Session Layer establishes and terminates logical connections between network entities. This Layer is also responsible for the mapping of logical names into network addresses.

The Presentation Layer provides for any necessary translation, format conversion, or code conversion to put the information into a recognizable form.

The Application Layer provides network based services to the end user. Examples of network services are distributed data bases and electronic mail. The Application Layer is not to be confused with the end user application itself.

Network Management is responsible for operation planning, which includes the gathering of operational statistics such as errors and traffic. It is also responsible for network initialization and maintenance (fault isolation). Network Management interfaces to each Layer.

*min of 9.6µs pause
frame gap" mellem pakkerne
max. 16 collisions
access collisions*



CSMA/CD Overview

Carrier Sense Multiple Access with Collision Detection (CSMA/CD) is a simple and efficient means of determining how a station transmits information over common medium that is shared with other stations. CSMA/CD is the access method used by the IEEE 802.3 standard.

Carrier Sense (CS) means that any station wishing to transmit 'listens' first. When the channel is busy (i.e. some other station is transmitting), the station waits (defers) until the channel is clear before transmitting.

Multiple Access (MA) means that any station wishing to transmit can do so. No central controller is needed to decide who is able to transmit and in what order. The environment in which all stations on the network are peers with equal access is commonly referred to as distributed control.

Collision Detection (CD) means that when the channel is idle (no other station is transmitting), a station can start transmitting. It is possible for two stations to start transmitting simultaneously causing a 'collision.' In the event of a collision, the transmitting stations will continue transmitting for a fixed time to ensure that all transmitting stations detect the collision. This is known as the jamming. After the jam, the stations stop transmitting and wait a random period of time before retrying. The range of random wait times increases with the number of successive collisions such that collisions can be resolved even if a large number of stations are colliding.

IEEE 802.3

Local area networks, LANs, are communication networks extending from several hundred to several thousand feet within a building or other facility. As seen from Figure 1-2, LANs are a means of connecting various types of equipment for the purpose of sharing resources and communicating in a distributed processing environment. Although LANs using a range of speeds (from 3400 bits/sec up to 2 Mbits/sec) exist today, the trend is clearly towards networks between 1 and 10 million bits per second.

IEEE 802.3/Ethernet has gained wide acceptance by both large and small corporations as a high speed (10 Mbps) LAN. The main components of the IEEE 802.3/Ethernet network are as follows:

The cable is a low noise, shielded 50 ohm coaxial cable. Over which information is transmitted at 10 million bits per second. Segments of the cable can be up to 500 meters in length and can be connected into longer network lengths using repeaters, which regenerate the signal.

The transceiver transmits and receives signals on the coaxial cable. In addition, it isolates the node from the channel in case of a failure within the node, and detects

electrical interference (called collisions) on the cable. It is connected to the cable using a simple tap and to the station by means of a transceiver cable which consists of four individual twisted pairs and may be up to 50 meters in length.

The terminator is a passive device which fits at both ends of each cable segment (or the ends of segments connected by repeaters), providing proper electrical termination (to eliminate reflections).

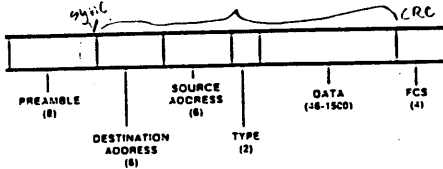
Finally, the interface provides the connection to the user or the server station and performs the following principle functions:

- Frame assembly/disassembly
- Handling of source and destination addressing
- Detection of physical channel transmission errors
- Network link management
 - Collision avoidance
 - Collision handling
- Encoding and decoding of the signal to and from the transceiver.



Frame Format

On an Ethernet communication network, information is transmitted and received in packets or frames. An Ethernet frame consists of a preamble, two address fields, a type field, a data field, and a frame check sequence (FCS). Each field has a specific format which is described in detail below. An Ethernet frame has a minimum length of 64 bytes and a maximum length of 1518 bytes exclusive of the preamble. The Ethernet frame format is shown below.



NOTE:
Field length in bytes in parentheses.

Preamble: The preamble is a 64-bit field consisting of 62 alternating "1"s and "0"s followed by a "11" End-of-Preamble indicator.

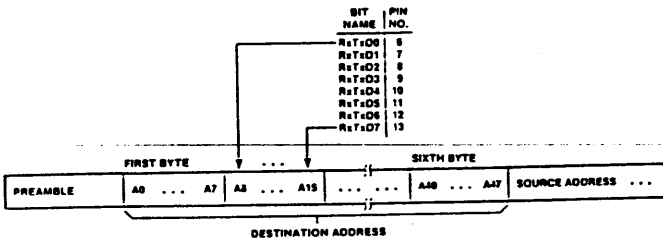
Destination Address: The Destination Address is a 6-byte field containing either a specific Station Address, a Broadcast Address, or a Multicast Address to which this frame is directed.

Source Address: The Source Address is a 6-byte field containing the specific Station Address from which this frame originated.

Type Field: The Type Field consists of two bytes. This field is uninterpreted at the Data Link Layer, and is passed through the EDLC chip to be handled at the Client Layer.

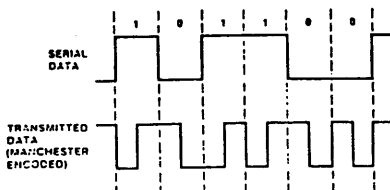
Data Field: The Data Field consists of 46 to 1500 bytes of information which are fully transparent in the sense that any arbitrary sequence of bytes may occur.

Frame Check Sequence: The Frame Check Sequence (FCS) field is a 32-bit cyclic redundancy check (CRC) value computed as a function of the Destination Address Field, Source Address Field, Type Field, and Data Field. The FCS is appended to each transmitted frame, and used at reception to determine if the received frame is valid.



BITS WITHIN A BYTE ARE TRANSMITTED/RECEIVED BIT NO. "0" FIRST THROUGH BIT NO. "7" LAST.

Bit Serialization/Deserialization



Manchester Coding

← CONTROLLER DATA

← LAN CABLE DATA



Funktionel beskrivelse.

Blokdiagrammet for NTC'en er vist på side 9.

Kortet er opbygget omkring to 8085 processorer og en Seeq 8003 ethernet controller, og kan indeles i fem blokke:

- 1) Ethernet controller med DMA kredsløb til overførsel af data mellem controller og buffermemory (diagram side 1).
- 2) Den centrale timing-generering og back-up kontrol (diagram side 2).
- 3) Tre-port buffermemory med mapping kredsløb for hver port (diagram side 3).
- 4) CPU 1 m. eget program- og data-lager, serviceport samt FIFO til kommunikation mellem CPU 1 og CPU 2 (diagram side 4).
- 5) CPU 2 m. eget program- og data-lager samt 8 UART porte (diagram side 5).

Buffermemoryarealet skal kunne accesses fra såvel controller som CPU1 og CPU2, således at controlleren skal kunne opnå en middelaccestid på under 800 nS.

Tilgangen er derfor lavet med to timeslices på 350 nS:

- I den første deles controller RX og TX om acces (RX har højest prioritet, men når først TX er startet, kan RX ikke komme til, før TX er færdig; d.v.s. modtagning af egen transmission stoppes ikke).
- I den anden timeslice deles CPU1 og CPU2 om acces, således at CPU1 har første prioritet.

Bufferen har tre uafhængige porte, en for controller RX/TX, en for CPU1 samt en for CPU2. Selve memoryarealet er 40 k hhv. 80

k bytes afhængigt af, om der benyttes 1 k eller 2 k bufferstørrelse, d.v.s. der er 40 buffere til rådighed (kan evt. udvides til 64 buffere, når der anvendes 1 k bufferstørrelse).

Ved hjælp af mapping kredsløbet kan en vilkårlig af disse buffere mappes ind på den ønskede adresse i portvinduet. Således kan en hel buffer flyttes ved ændring af en enkelt byte i mapping-listen.

CPU1 har et vindue på 8 k ind til bufferarealet, CPU2 ser 32 k og controlleren ser en RX- samt TX-buffer ad gangen.

CPU1 tager sig af styring af controller kreds, bufferallokering, øvre netværksprotokol, serviceport samt videregiver meddelelser til CPU2.

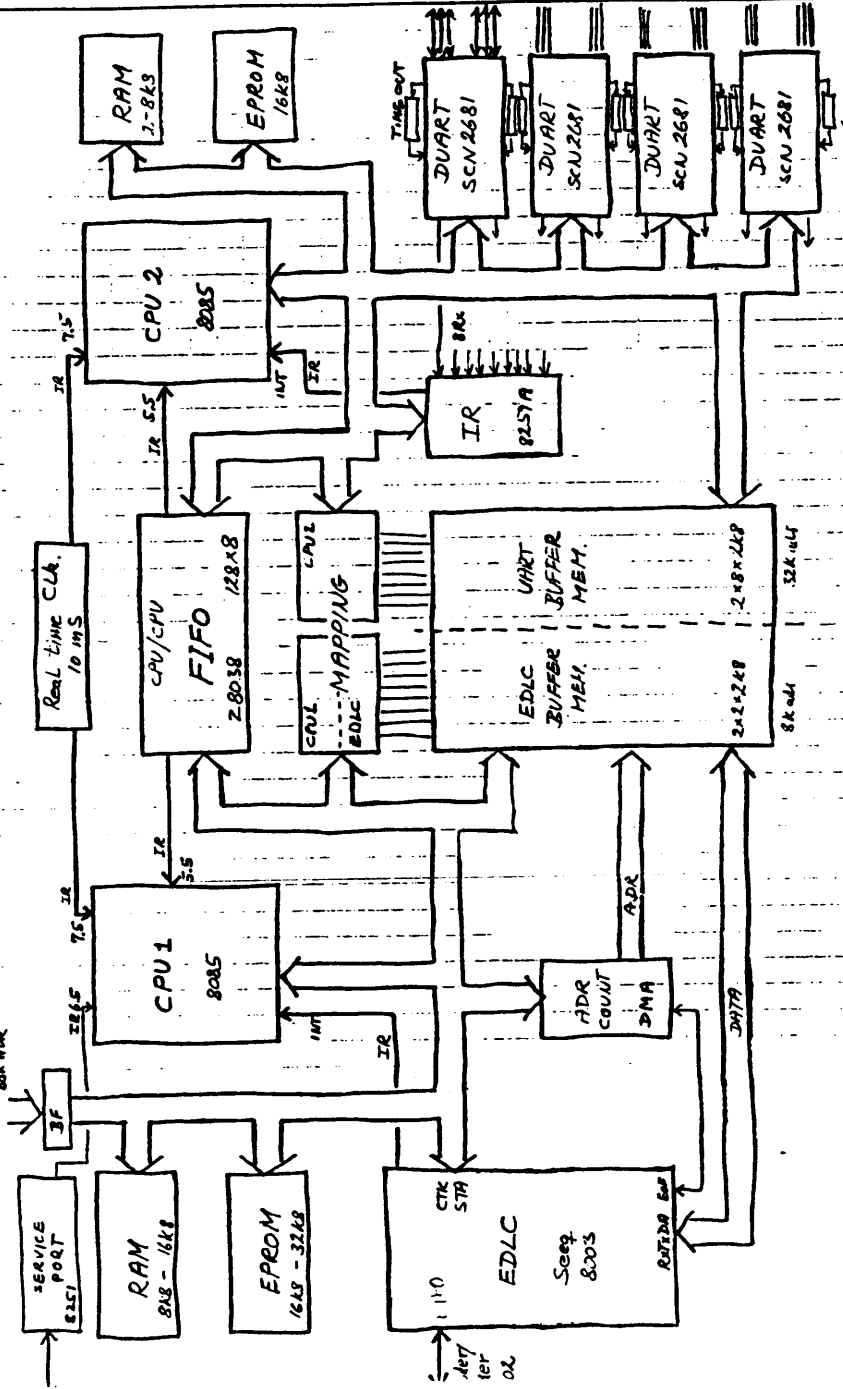
CPU2 betjener de otte asynkrone brugerporte.

Kommunikationen mellem de to CPU'er foregår via en FIFO; det er dog også muligt at anvende en fælles, fast indmappet buffer (udnyttes i testprogrammet).

BLOK DIAGRAM:

NTC

Initialiseringsdato	19-9-83	Side	9
Revideret	24-11-83	Projekt	
	11-11-83		



ALSY 114

RAK 435
11

E7 HJ 0 NCT



STRAP SETTINGS PÅ ETHERBOARD:

- S1: .* * Reset til SIA. (Er normalt ikke forbundet).
 1 2
- S2: .* * Indsætter wait-state for controller kreds.
 1 2 Forbindes, hvis EDLC = Seeq 8001.
- S3: .* * * Valg af EPROM eller RAM for IC 19.
 1 2 3 Anbragt ved IC 19.
 Forbindes: 1 - 2 for EPROM;
 2 - 3 for RAM.
- S4: .* * * Valg af EPROM eller RAM for IC 20.
 1 2 3 Anbragt ved IC 20.
 Forbindes: 1 - 2 for EPROM;
 2 - 3 for RAM.
- S5: .* * * Valg af 2764 eller 27128 for IC 19.
 1 2 3 Anbragt ved IC 19; (Se også S7/S8).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.
- S6: .* * * Valg af 2764 eller 27128 for IC 20.
 1 2 3 Anbragt ved IC 20; (Se også S7/S8).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.
- S7: .* * * Valg af 2764 eller 27128 for IC 20.
 1 2 3 Anbragt ved IC 13; (Se også S5/S6).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.
- S8: .* * * Valg af 2764 eller 27128 for IC 19.
 1 2 3 Anbragt ved IC 13; (Se også S5/S6).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.

S9: . * * * Valg af 2764 eller 27128 for IC B9.
 1 2 3 Anbragt ved IC B9; (Se også S19).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.

S10: . * * * Valg af EPROM eller RAM for IC B9.
 1 2 3 Anbragt ved IC B9.
 Forbindes: 1 - 2 for EPROM;
 2 - 3 for RAM.

S11: . * * * * * Valg af antal clock-cycles
 1 2 3 4 5 6 for timeout på port 0.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S12: . * * * * * Valg af antal clock-cycles
 1 2 3 4 5 6 for timeout på port 1.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S13: . * * * * * Valg af antal clock-cycles
 1 2 3 4 5 6 for timeout på port 2.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S14: . * * * * * Valg af antal clock-cycles
1 2 3 4 5 6 for timeout på port 3.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S15: . * * * * * Valg af antal clock-cycles
1 2 3 4 5 6 for timeout på port 4.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S16: . * * * * * Valg af antal clock-cycles
1 2 3 4 5 6 for timeout på port 5.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S17: . * * * * * Valg af antal clock-cycles
1 2 3 4 5 6 for timeout på port 6.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S18: . * * * * * Valg af antal clock-cycles
 1 2 3 4 5 6 for timeout på port 7.

Antal:	Forbindelse:
32	1 - 2
64	1 - 3
128	1 - 4
256	1 - 5
512	1 - 6

S19: . * * * Valg af 2764 eller 27128 for IC B9.
 1 2 3 Anbragt ved IC B3; (Se også S9).
 Forbindes: 1 - 2 for 2764;
 2 - 3 for 27128.

S20: . * * * Valg af bufferstørrelse 1k8/2k8.
 1 2 3 Anbragt ved IC 83.
 Forbindes: 1 - 2 for 1k8;
 2 - 3 for 2k8.

S21: . * * * Valg af bufferstørrelse 1k8/2k8.
 1 2 3 Anbragt ved IC 76.
 Forbindes: 1 - 2 for 2k8;
 2 - 3 for 1k8.

NB: Se MAP settings ang. buffer nr.

S22: . * * * Valg af CPU 2 RAM størrelse 2k8/8k8.
 1 2 3 Anbragt ved IC C0.
 Forbindes: 1 - 2 for 8k8;
 2 - 3 for 2k8.

S23: . * * Valg af CPU 1 reset fra CPU 2.
 1 2 Anbragt ved IC B5.
 (C1 udelades, når S23 forbindes).

IC F1: Strapfelt for RTC til CPU1 og CPU2;

		1	14	
1 mS	.*	*	*	+5 V
5 mS	*	*	*	1 mS
10 mS	*	*	*	5 mS
20 mS	*	*	*	10 mS
50 mS	*	*	*	20 mS
til CPU1	*	*	*	50 mS
GND	*	*	*	til CPU2
		7	8	

IC F2: Strapfelt for clock til DUART time-out
tællere, kanal 7 - 4;

		1	16	
N.C.	.*	*	*	+5 V
1 mS	*	*	*	1 mS
CLK to 6	*	*	*	CLK to 4
RxTxC ch6	*	*	*	RxTxC ch4
1 mS	*	*	*	1 mS
CLK to 7	*	*	*	CLK to 5
RxTxC ch7	*	*	*	RxTxC ch5
GND	*	*	*	N.C.
		8	9	

IC F3:

Strapfelt for clock til DUART time-out
tællere, kanal 3 - 0;

	1	16	
N.C.	.*	*	+5 V
1 mS	*	*	1 mS
CLK to 2	*	*	CLK to 0
RxTxC ch2	*	*	RxTxC ch0
1 mS	*	*	1 mS
CLK to 3	*	*	CLK to 1
RxTxC ch3	*	*	RxTxC ch1
GND	*	*	N.C.
	8	9	

IC F4:

Strapfelt for Net-interface modstande:

	1	16	
N.C.	.*	*	+5 V
C+	*	*	C-
Res C+	*	*	Res C-
T+	*	*	T-
Res T+	*	*	Res T-
R+	*	*	R-
Res R+	*	*	Res R-
GND	*	*	N.C.
	8	9	

NORMALT FORBINDES FØLGENDE STRAPS:

S 1:	---	(Ingen forbindelse)
S 2:	1-2.	1 waitstate
S 3:	1-2.	EPR0M
S 4:	1-2.	EPR0M
S 5:	2-3.	27128
S 6:	2-3.	27128
S 7:	2-3.	27128
S 8:	2-3.	27128
S 9:	2-3.	27128
S10:	1-2.	EPR0M
S11:	1-5.	256 cycles
S12:	1-5.	256 cycles
S13:	1-5.	256 cycles
S14:	1-5.	256 cycles
S15:	1-5.	256 cycles
S16:	1-5.	256 cycles
S17:	1-5.	256 cycles
S18:	1-5.	256 cycles
S19:	2-3.	27128
S20:	1-2.	1k buffer

S21: 2-3. 1k8 buffer
S22: 2-3. 2k8 RAM
S23: 1-2. CPU1 reset fra CPU2

IC F1: 3-6 og 8-11.
IC F2: 2-3, 5-6, 11-12 og 14-15.
IC F3: 2-3, 5-6, 11-12 og 14-15.
IC F4: 2-3, 4-5, 6-7, 10-11, 12-13 og 14-15.

Desuden gælder følgende for "normaludgaven" af printet:

IC 21 udelades; men sokkel monteres (CPU 1 RAM)
IC 82 udelades; men sokkel monteres (dekoder f buff RAM)
IC 89-90-91-92-93 udelades; sokler monteres (buffer RAM)
IC C0 monteres med 2k8 RAM (CPU 2 RAM)

De tre stk. 96 p EURO-konnektorer udelades;

FØLGENDE POSITIONER MONTERES MED IC-SOKLER:

IC 1	IC 99	IC D2
IC 2	IC A0	IC D3
IC 19	IC A6	IC D4
IC 20	IC B6	IC D5
IC 22	IC B7	IC D6
IC 23	IC B9	IC D7
IC 26	IC C0	IC F1
IC 27	IC C1	IC F2
IC 84	IC C3	IC F3
IC 88	IC C6	IC F4
IC 86	IC C7	IC FB
IC 87	IC C8	IC FD
IC 88	IC C9	IC FE
IC 94	IC D0	
IC 95	IC D1	

Desuden monteres sokler, men ikke kredse i følgende positioner:

IC 21, IC 82, IC 89-90-91-92-93.

Konnektorbeskrivelse:

CN og CE: Stik til Ethernet transceiver;
 To parallelforbundne 3M20 konnektorer til
 hhv. transceiver og serviceport.
 Forbindelser:

3M20		Cannon	
1	Shield		
2	Shield	1	
3	C-	9	
4	C+	2	
5	T-	10	
6	T+	3	
7	N.C.	11	
8	N.C.	4	
9	R-	12	
10	R+	5	
11	+12 V (ikke CE)	13	
12	GND	6	
13	N.C.	14	
14	(7) GND (på CE)	7	N.C.
15	(6) N.C.	15	N.C.
16	(5) CTS (på CE)	8	N.C.
17	(4) RTS (på CE)		
18	(3) RxD (på CE)		
19	(2) TxD (på CE)		
20	(1) N.C.		

Pin 14 til 20 på konnektor CE anvendes
 desuden som serviceport-konnektor.
 Fremtidigt anvendes kun CN til transceiver.

CP: Etherboks port konnektor, RS-232-C signaler
(Som 3M60 konnektor på SIOC, men med
krydsede signal/kontrol-ledninger):

PIN	SIGNAL	PIN	SIGNAL
01	N.C.	02	GND
03	N.C.	04	GND
05	DSR7	06	DTR7
07	RTS7	08	CTS7
09	TXD7	10	RXD7
11	N.C.	12	N.C.
13	DSR6	14	DTR6
15	RTS6	16	CTS6
17	TXD6	18	RXD6
19	GND	20	GND
21	GND	22	N.C.
23	GND	24	N.C.
25	DSR5	26	DTR5
27	RTS5	28	CTS5
29	TXD5	30	RXD5
31	DTR4	32	DSR4
33	CTS4	34	RTS4
35	RXD4	36	TXD4
37	CTS3	38	DSR3
39	RXD3	40	DTR3
41	DTR2	42	RTS3
43	CTS2	44	TXD3
45	RXDO	46	DSR2
47	TXDO	48	RST2
49	CTS0	50	CTS1
51	RST0	52	RTS1
53	DTR0	54	DTR1
55	DSR0	56	DSR1
57	RXD1	58	RXD2
59	TXD1	60	TXD2

CV: NTC Spændingskonnektor:

1	2	3	4	5
.*	*	*	*	*
GND	+5	-12	+12	NC

Strømforbrug:	+5 V	≈ 6 A max (3 A typ)
	+12 V	≈ 1 A max
	-12 V	≈ 0.5 A max

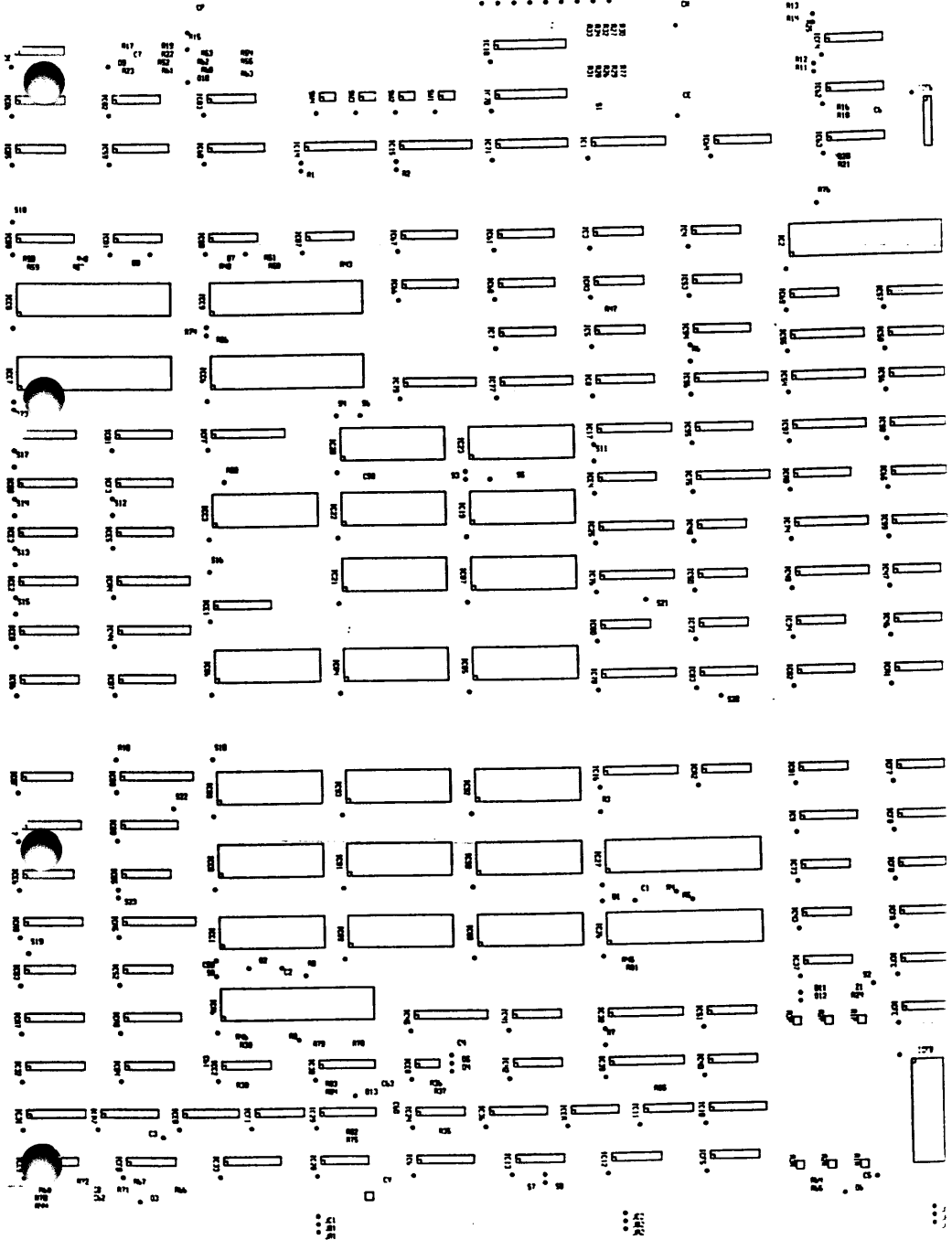
Evt. loddes powerledningerne til printet, idet der er aftagelig stikforbindelse på netdelen.

LED indikeringer på NTC:

LED:	NAVN:	Forbundet til:
L1:	POWER	+5 V
L2:	NET ACTIVITY	Carrier Sense
L3:	TRANSMIT	TxEN
L4:	RECEIVE	Rx enabled (RFENDN)
L5:	STATUS 1	CPU1 I/O register
L6:	STATUS 2	CPU2 I/O register
L7:	-	(Monteres ikke)
L8:	ERROR	CPU1 I/O register
L9:	TEST	CPU1 I/O register
L10:	PORT ACTIVITY (Inp)	RxRDY interrupt



17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1



1300

1300

1300



KOMPONENTLISTE FOR NETWORK TERMINAL CONTROLLER:

>>>>>>> FØLGENDE ER EN SUMMERET KOMPONENTLISTE
 FOR NTC PRINTET;
 EGENTLIG STYKLISTE MED KOMPONENTNUMMERERING
 FINDES PÅ SIDE 54.

IC'ER:

74ALS00N	4 STK	ALS	
74LS03	1 STK		LS
74ALS08N	2 STK	ALS	
74ALS10N	4 STK	ALS	
74S10N	1 STK		SCHOTTKY
74ALS11N	2 STK	ALS	
74S11N	1 STK		SCHOTTKY
74ALS28N	4 STK	ALS	
74ALS32N	6 STK	ALS	
74ALS74N	11 STK	ALS	
74ALS112	5 STK	ALS	
74ALS138N	12 STK	ALS	
74ALS169BN	3 STK	ALS	
74S189A	6 STK		SCHOTTKY
74LS193N	9 STK		LS
74ALS244N	1 STK	ALS	
74ALS257N	5 STK	ALS	
74LS273N	3 STK		LS
74LS390N	3 STK		LS
74ALS540N	3 STK	ALS	
74ALS541N	10 STK	ALS	
74ALS573N	2 STK	ALS	
74ALS574N	6 STK	ALS	
74ALS580N	1 STK	ALS	
74ALS645N	1 STK	ALS	

HEF 4040 BP 8 STK LOC MOS

HEF 4066 BP	2 STK	LOCMOS
HEF 4093 BP	1 STK	LOCMOS
H6900 20 MHZ	1 STK	XTAL OSC
H6500 7,37 MHZ	1 STK	XTAL OSC
AD1403N	1 STK	LINEAR
LM339N	1 STK	LINEAR
75188N	5 STK	LINEAR
75189AN	5 STK	LINEAR
8085A-2	2 STK	
27128-25	3 STK	
HM6264R-15	14 STK	(heraf 6 stk som option)
TC5517APL	1 STK	
2681 DUART	4 STK	
8003 EDLC	1 STK	
8023 SIA	1 STK	
8038 FIO	1 STK	
8251A USART	1 STK	
8259A IRC	1 STK	

ANDRE KOMP.:

MULTILAYER PRINT (4 LAGS), STØRRELSE SOM SIOC	1 stk
CONNECTOR 3M 20 polet	2 stk
CONNECTOR 3M 60 polet	1 stk
CONNECTOR 96 p EURO	3 stk
CONNECTOR Molex 5 polet	1 stk
Hex DIP switch	4 stk
LYSDIODE 3 mm RED	9 stk
DIODE 1N4148	11 stk
DIODE 1N5817	2 stk
ZENER 5V6	1 stk
NiCd 180 mAh	3 stk
MODSTAND 9x1 k	1 stk SIL
MODSTAND 9x3k3	5 stk SIL
MODSTAND 9x10k	13 stk SIL
MODSTAND 39 ohm	4 stk
MODSTAND 47 ohm	3 stk

MODSTAND	150 ohm	10 stk	
MODSTAND	470 ohm	2 stk	
MODSTAND	680 ohm	2 stk	
MODSTAND	1 k	3 stk	
MODSTAND	1k8	2 stk	
MODSTAND	2k2	8 stk	
MODSTAND	2k4	2 stk	
MODSTAND	4k7	1 stk	
MODSTAND	5k6	3 stk	
MODSTAND	10k	8 stk	
MODSTAND	100k	1 stk	
MODSTAND	10k0	4 stk	4e
MODSTAND	750 ohm	1 stk	4e
MODSTAND	61k9	1 stk	4e
KONDS.	10uF/16	5 stk	
KONDS.	10 nF	3 stk	
KONDS.	100 nF	2 stk	
KONDS.	afkob1.	52 stk	

UBENYTTEDTE GATES:

IC	4	PIN 3	2 INPUT OR	ALS32
IC	29	PIN 9	FLIP FLOP N.E.	ALS112
IC	A3	PIN 3	2 INPUT NAND	ALS00
IC	B3	PIN 8	2 INPUT AND	ALS08
IC	DF	PIN 6	2 INPUT NAND	ALS00
IC	DF	PIN 8	2 INPUT NAND	ALS00
IC	E7	PIN 9	FLIP FLOP N.E.	ALS112
IC	EA	PIN 8	FLIP FLOP P.E.	ALS74

stykliste for

NETWORK TERMINAL CONTROLLER:

Navn	Komponent	Pins	Fabrikat
IC1	8023 SIA	20	Seeq
IC2	8003 EDLC	40	Seeq
IC3	SN74ALS74N	14	Texas
IC4	SN74ALS32N	14	Texas
IC5	SN74LS03N	14	Texas
IC6	SN74ALS138N	16	Texas
IC7	SN74ALS138N	16	Texas
IC8	SN74ALS138N	16	Texas
IC9	SN74ALS138N	16	Texas
IC10	SN74ALS112N	16	Texas
IC11	SN74S11N	14	Texas
IC12	SN74S10N	14	Texas
IC13	SN74ALS08N	14	Texas
IC14	SN74ALS541N	20	Texas
IC15	SN74ALS541N	20	Texas
IC16	SN74ALS541N	20	Texas
IC17	SN74LS273N	20	Texas
IC18	SN74LS273N	20	Texas
IC19	MBM2712B-25	28	Fujitsu
IC20	MBM2712B-25	28	Fujitsu
>OPTION IC21	HM6264PL-15	28	Hitachi
IC22	HM6264PL-15	28	Hitachi
IC23	HM6264PL-15	28	Hitachi
IC24	HEF4066BP	14	Philips
IC25	SN74ALS573N	20	Texas
IC26	P8085A-2	40	Intel
IC27	Z8038	40	Zilog
IC28	H6900 20 MHZ OSC	14	NEL
IC29	SN74ALS112N	16	Texas
IC30	SN74ALS1698N	16	Texas
IC31	SN74LS390N	16	Texas
IC32	SN74LS390N	16	Texas
IC33	SN74LS390N	16	Texas

IC34	SN74ALS74N	14	Texas
IC36	SN74ALS112N	16	Texas
IC37	SN74ALS10N	14	Texas
IC38	SN74ALS541N	20	Texas
IC39	SN74ALS574N	20	Texas
IC40	SN74ALS74N	14	Texas
IC41	SN74ALS74N	14	Texas
IC42	SN74ALS32N	14	Texas
IC43	SN74ALS10N	14	Texas
IC44	SN74ALS541N	20	Texas
IC45	SN74ALS574N	20	Texas
IC46	SN74ALS74N	14	Texas
IC47	SN74ALS74N	14	Texas
IC48	SN74ALS10N	14	Texas
IC49	SN74ALS645N	20	Texas
IC50	SN74ALS28N	14	Texas
IC51	SN74ALS28N	14	Texas
IC52	SN74ALS32N	14	Texas
IC53	SN74ALS11N	14	Texas
IC54	SN74ALS574N	20	Texas
IC55	SN74ALS574N	20	Texas
IC56	SN74LS193N	16	Texas
IC57	SN74LS193N	16	Texas
IC58	SN74LS193N	16	Texas
IC59	SN74LS193N	16	Texas
IC60	SN74LS193N	16	Texas
IC61	SN74LS193N	16	Texas
IC62	SN74LS193N	16	Texas
IC63	SN74LS193N	16	Texas
IC64	SN74LS193N	16	Texas
IC65	SN74ALS257N	16	Texas
IC66	SN74ALS257N	16	Texas
IC67	SN74ALS257N	16	Texas
IC68	SN74ALS257N	16	Texas
IC69	SN74ALS74N	14	Texas
IC70	SN74ALS574N	20	Texas
IC71	SN74ALS574N	20	Texas
IC72	SN74ALS28N	14	Texas
IC73	SN74ALS00N	14	Texas
IC74	SN74ALS541N	20	Texas
IC75	SN74ALS541N	20	Texas

	IC76	SN74ALS244N	20	Texas
	IC77	SN74ALS541N	20	Texas
	IC78	SN74ALS541N	20	Texas
	IC79	SN74ALS541N	20	Texas
	IC80	SN74ALS32N	14	Texas
	IC81	SN74ALS11N	14	Texas
>OPTION	IC82	SN74ALS138N	16	Texas
	IC83	SN74ALS138N	16	Texas
	IC84	HM6264PL-15	28	Hitachi
	IC85	HM6264PL-15	28	Hitachi
	IC86	HM6264PL-15	28	Hitachi
	IC87	HM6264PL-15	28	Hitachi
	IC88	HM6264PL-15	28	Hitachi
>OPTION	IC89	HM6264PL-15	28	Hitachi
>OPTION	IC90	HM6264PL-15	28	Hitachi
>OPTION	IC91	HM6264PL-15	28	Hitachi
>OPTION	IC92	HM6264PL-15	28	Hitachi
>OPTION	IC93	HM6264PL-15	28	Hitachi
	IC94	SN74S189AN	16	Texas
	IC95	SN74S189AN	16	Texas
	IC96	SN74ALS540N	20	Texas
	IC97	SN74ALS580N	20	Texas
	IC98	SN74ALS257N	16	Texas
	IC99	SN74S189AN	16	Texas
	ICA0	SN74S189AN	16	Texas
	ICA1	SN74ALS74N	14	Texas
	ICA2	SN74ALS32N	14	Texas
	ICA3	SN74ALS00N	14	Texas
	ICA4	SN74ALS573N	20	Texas
	ICA5	SN74ALS273N	20	Texas
	ICA6	P8085A-2	40	Intel
	ICA7	SN74ALS138N	16	Texas
	ICA8	SN74ALS138N	16	Texas
	ICA9	SN74ALS138N	16	Texas
	ICB0	SN74ALS138N	16	Texas
	ICB1	SN74ALS138N	16	Texas
	ICB2	SN74ALS112N	16	Texas
	ICB3	SN74ALS08N	14	Texas
	ICB4	SN74ALS00N	14	Texas
	ICB5	SN74ALS28N	14	Texas
	ICB6	SN74S189AN	16	Texas

	ICB7	SN74S189AN	16	Texas
	ICB8	SN74ALS540N	20	Texas
	ICB9	MM627128-25	28	Fujitsu
>OPTION	ICCO	HM6264PL -15	28	Hitachi
	<u>ELLER</u>	TC5517APL (se S22)	24	Toshiba
	ICC1	HM6264PL -15	28	Hitachi
	ICC2	HEF4066BP	14	Philips
	ICC3	P8259A	28	Intel
	ICC6	SCN2681ACIN40	40	Signetics
	ICC7	SCN2681ACIN40	40	Signetics
	ICC8	SCN2681ACIN40	40	Signetics
	ICC9	SCN2681ACIN40	40	Signetics
	ICD0	SN75188N	14	Texas
	ICD1	SN75188N	14	Texas
	ICD2	SN75188N	14	Texas
	ICD3	SN75188N	14	Texas
	ICD4	SN75189AN	14	Texas
	ICD5	SN75189AN	14	Texas
	ICD6	SN75189AN	14	Texas
	ICD7	SN75189AN	14	Texas
	ICD8	HEF4040BP	16	Philips
	ICD9	HEF4040BP	16	Philips
	ICDF	SN74ALS00N	14	Texas
	ICE0	HEF4040BP	16	Philips
	ICE1	HEF4040BP	16	Philips
	ICE2	HEF4040BP	16	Philips
	ICE3	HEF4040BP	16	Philips
	ICE4	HEF4040BP	16	Philips
	ICE5	HEF4040BP	16	Philips
	ICE6	H6500 7,3728 MHZ OSC	14	NEL
	ICE7	SN74ALS112N	16	Texas
	ICE8	AD1403N	8	An. Dev.
	ICE9	LM339N	14	Texas
	ICEA	SN74ALS74N	14	Texas
	ICEB	SN74ALS138N	16	Texas
	ICF0	HEF4093BP	14	Philips
	ICF1	(Strap-sokkel RTC)	14	
	ICF2	(Strap-sokkel TOC)	16	
	ICF3	(Strap-sokkel TOC)	16	
	ICF4	(Strap-sokkel NET)	16	
	ICF5	SN74ALS74N	14	Texas

ICF6	SN74ALS10N	14	Texas
ICF7	SN74ALS74N	14	Texas
ICF8	SN74ALS169BN	16	Texas
ICFA	SN74ALS169BN	16	Texas
ICFB	8251A	28	NEC
ICFC	SN74ALS32N	14	Texas
ICFD	SN75188N	14	Texas
ICFE	SN75189AN	14	Texas
ICFF	SN74ALS540N	20	Texas
Z1	Zener, 5V6 400mW		
D1	Diode 1N4148		
D2	Diode 1N4148		
D3	Diode 1N4148		ORIENTERING
D4	Diode 1N4148		AF
D5	Diode 1N4148	evt.	DIODER
D6	Diode 1N4148	1N4448	AFMÆRKET
D7	Diode 1N4148		MED
D8	Diode 1N4148		GUL PRIK
D9	Diode 1N4148		VED
D10	Diode 1N4148		<u>KATODE.</u>
D11	Diode 1N5817	Schottky	
SE BEM. D12	Diode 1N5817	Schottky	
D13	Diode 1N4148		
L1 til L10	Lysdiode, 3 mm RØD	(L7 monteres ikke)	
SE BEM. A1	NiCd Element 180 mAh	Varta 180 RS	
SE BEM. A2	NiCd Element 180 mAh	Varta 180 RS	
SE BEM. A3	NiCd Element 180 mAh	Varta 180 RS	
SW1 til SW4	Hex switch, EECO Micro DIP	230057	
CN (Net)	3M Konnektor 20 pin,	dobbeltrække	
CE (Extend)	3M Konnektor 2 pin,	dobbeltrække	
CP (Port)	3M Konnektor 60 pin,	dobbeltrække	
>OPTION A1-B1-C1	EURO-konnektor,	96 pin	
>OPTION JA2-B2-C2	EURO-konnektor,	96 pin	
>OPTION JA3-B3-C3	EURO-konnektor,	96 pin	
>OPTION CV (Power)	Konnektor 5 pin	Molex 2391	

Desuden straps og strap-sokler.

R1	SIL Modstand, 9 modstande	10 k ohm	
R2	SIL Modstand, 9 modstande	10 k ohm	
R3	SIL Modstand, 9 modstande	10 k ohm	
R4	SIL Modstand, 9 modstande	10 k ohm	
R5	SIL Modstand, 9 modstande	10 k ohm	
R6	SIL Modstand, 9 modstande	10 k ohm	
R7	SIL Modstand, 9 modstande	3k3	
R8	SIL Modstand, 9 modstande	10 k ohm	
R9	SIL Modstand, 9 modstande	10 k ohm	
R10	SIL Modstand, 9 modstande	10 k ohm	
R11	SIL Modstand, 9 modstande	3k3	
R12	SIL Modstand, 9 modstande	3k3	
R13	SIL Modstand, 9 modstande	3k3	
R14	SIL Modstand, 9 modstande	3k3	
R15	SIL Modstand, 9 modstande	1k ohm	
R16	Modstand	5k6	
R17	Modstand	5k6	
R18	Modstand	2k4	
R19	Modstand	2k4	
R20	Modstand	39 ohm	
R21	Modstand	39 ohm	
R22	Modstand	39 ohm	
R23	Modstand	39 ohm	
R24	Modstand	1k ohm	
R25	Modstand	150 ohm	
R26	Modstand	150 ohm	
R27	Modstand	150 ohm	
R28	Modstand	150 ohm	
R29	Modstand	150 ohm	
R30	Modstand	150 ohm	
(R31	Modstand	150 ohm	Monteres ikke)
R32	Modstand	150 ohm	
R33	Modstand	150 ohm	
R34	Modstand	150 ohm	
R35	Modstand	10 k	
R36	Modstand	10 k	
R37	Modstand	10 k	
R38	Modstand	10 k	
R39	Modstand	10 k	

R43	Modstand	10 k		
R44	Modstand	10 k		
R45	Modstand	470 ohm		
R46	Modstand	470 ohm		
R47	Modstand	1k		
R48	Modstand	3k3		
R49	Modstand	3k3		
R50	Modstand	3k3		
R51	Modstand	3k3		
R52	Modstand	3k3		
R53	Modstand	3k3		
R54	Modstand	3k3		
R55	Modstand	3k3		
R56	Modstand	2k2		
R57	Modstand	2k2		
R58	Modstand	2k2		
R59	Modstand	2k2		
R60	Modstand	2k2		
R61	Modstand	2k2		
R62	Modstand	2k2		
R63	Modstand	2k2		
R64	Modstand	1k8		
R65	Modstand	1k8		
R66	Modstand	10k		
R67	Modstand	10k0	MR 25	Metalfilm
R68	Modstand	10k0	MR 25	Metalfilm
R69	Modstand	10k0	MR 25	Metalfilm
R70	Modstand	750R	MR 25	Metalfilm
R71	Modstand	10k0	MR 25	Metalfilm
R72	Modstand	61k9	MR 25	Metalfilm
R73	SIL Modstand,	9 modstande	10 k ohm	
R74	SIL Modstand,	9 modstande	10 k ohm	
R75	Modstand	47 ohm		
R76	SIL Modstand,	9 modstande	10 k ohm	
R77	Modstand	1 k ohm		
R78	Modstand	47 ohm		
R79	Modstand	47 ohm		
R80	SIL Modstand,	9 modstande	10 k ohm	
R81	Modstand	680 ohm		
R82	Modstand	680 ohm		
R83	Modstand	100 k ohm		

R84 Modstand 5k6
R85 Modstand 4k7

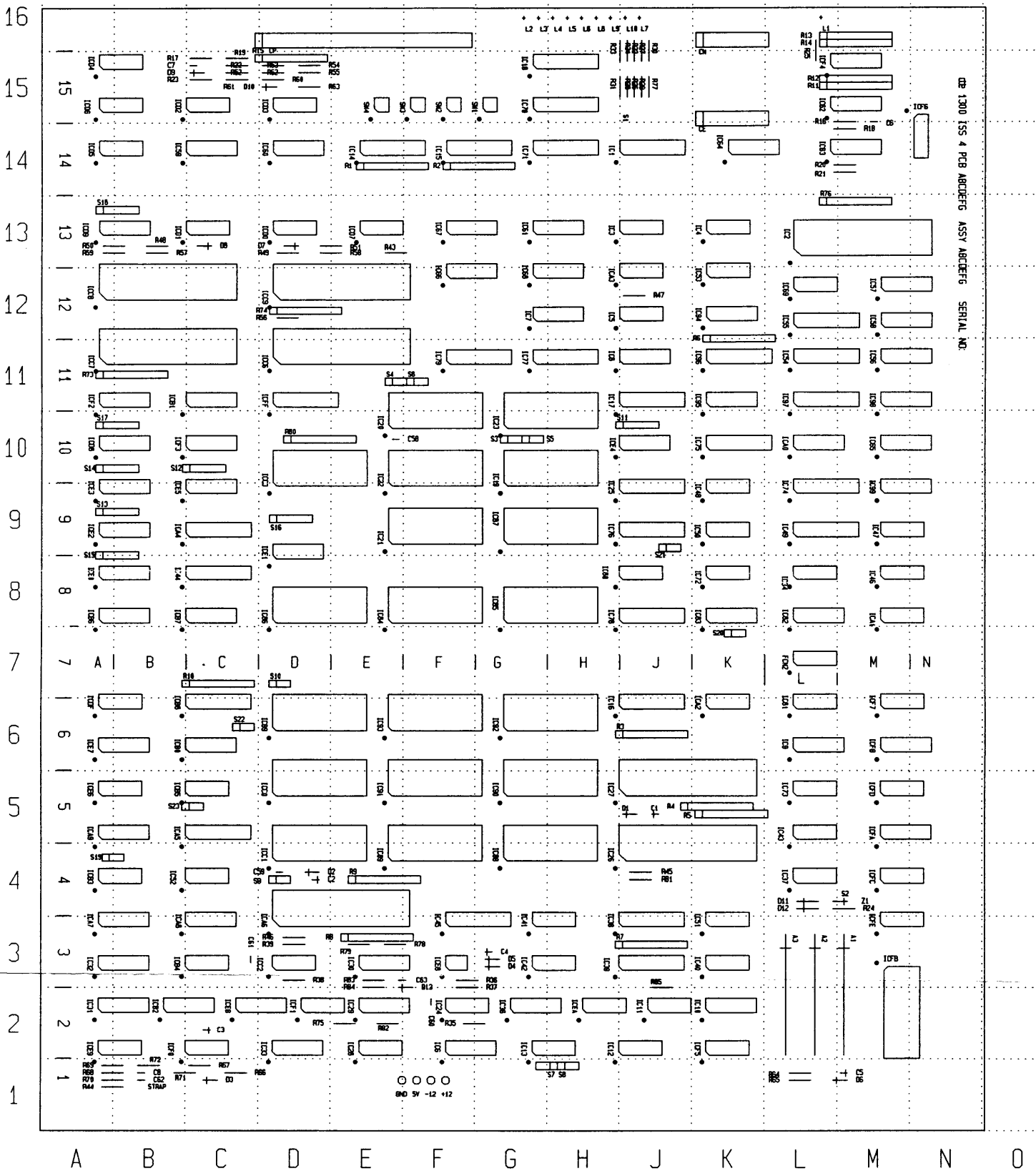
>OPTION C1 (Ellyt 10 uF/16 V Sol.Al. Philips)
 C1 monteres ikke, hvis S23 forbindes.
C2 Ellyt 10 uF/16 V Sol.Al. Philips
C3 Ellyt 10 uF/16 V Sol.Al. Philips
C4 Ellyt 10 uF/16 V Sol.Al. Philips
C5 Ellyt 10 uF/16 V Sol.Al. Philips
C6 Konds. 10 nF 2e
C7 Konds. 10 nF 2e
C8 Konds. 10 nF 2e
C9 til C61 Afkobling 100 nF 2e eller 4e
C62 Konds. 100 nF 2e
C63 Konds. 100 nF 2e

>>>> Bemærkninger:

> NiCd akkumulatorer og D12 monteres ikke
> før det færdige print er testet.
> Tåler ikke loddebadet!!!!!!!!!!!!!!!!!!!!!!
> D12 monteres til sidst, efter montage
> af akkumulatorer (EVT. FØRST EFTER
> ENDELIG INSTALLATION).
> Efter montage af akkumulatorer må
> printet ikke lægges på ledende underlag.



PRELIMINARY



DE 1300 ISS 4 PCB ARBEJDSG ASSY ARBEJDSG SERIAL NO.

Component locations

PCB:NTC	Issue:	Date:		dansk data elektronik a/s
				herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+12		F1	ICE0		A8	IC55		L12
-12		F1	ICE1		D8	IC56		M11
A1		M3	ICE2		A9	IC57		M12
A2		L3	ICE3		A9	IC58		M12
A3		L3	ICE4		H10	IC59		B14
CE		K15	ICE5		B9	IC60		D14
CN		K16	ICE6		A5	IC61		G13
CP		C16	ICE7		A6	IC62		L15
C1		J5	ICE8		F3	IC63		L14
C2		D4	ICE9		A2	IC64		K14
C3		C2	ICFA		M5	IC65		M10
C4		G3	ICFB		M3	IC66		F12
C5		M1	ICFC		M4	IC67		F13
C6		M15	ICFD		M5	IC68		G12
C7		B15	ICFE		M3	IC69		L12
C8		B1	ICFF		D11	IC70		G15
C58		E10	ICFO		B2	IC71		G14
C59		D4	ICF1		D2	IC72		K8
C60		F2	ICF2		A11	IC73		L5
C61		C3	ICF3		B10	IC74		L9
C62		B1	ICF4		L15	IC75		K10
C63		E3	ICF5		K2	IC76		H9
D1		H5	ICF6		M15	IC77		G11
D2		D4	ICF7		M6	IC78		H8
D3		C1	ICF8		M6	IC79		F11
D4		G3	IC1		H14	IC80		H8
D5		G3	IC2		L13	IC81		L6
D6		L1	IC3		H13	IC82		L8
D7		D13	IC4		K13	IC83		K8
D8		C13	IC5		H12	IC84		E8
D9		B15	IC6		F2	IC85		G8
D10		C15	IC7		G12	IC86		D8
D11		L4	IC8		H11	IC87		G9
D12		L4	IC9		L6	IC88		G4
D13		E3	IC10		K2	IC89		E4
FCN2		L7	IC11		J2	IC90		G5
GND		E1	IC12		H2	IC91		E5
ICA0		L10	IC13		G2	IC92		G6
ICA1		M8	IC14		E14	IC93		E6
ICA2		K6	IC15		F14	IC94		K12
ICA3		H12	IC16		H6	IC95		K11
ICA4		B9	IC17		H11	IC96		K11
ICA5		B5	IC18		G15	IC97		L11
ICA6		D3	IC19		G9	IC98		M11
ICA7		A3	IC20		E10	IC99		M9
ICA8		B3	IC21		E9	LABEL		O-1
ICA9		A5	IC22		E9	LAYID		N11
ICB0		B6	IC23		G10	L1		L16
ICB1		B11	IC24		F2	L2		G16
ICB2		B2	IC25		H9	L3		G16
ICB3		A4	IC26		H4	L4		H16
ICB4		B3	IC27		H5	L5		H16
ICB5		B5	IC28		E2	L6		H16
ICB6		A8	IC29		E2	L7		J16
ICB7		B8	IC30		E3	L8		H16
ICB8		B6	IC31		A2	L9		H16
ICB9		D6	IC32		A3	L10		J16
ICCO		D5	IC33		D2	R1		E14
ICC1		D4	IC34		L8	R2		F14
ICC2		D3	IC36		G2	R3		H6
ICC3		D9	IC37		L4	R4		J5
ICC6		D11	IC38		H3	R5		K5
ICC7		A11	IC39		H3	R6		K12
ICC8		A12	IC40		K3	R7		H3
ICC9		D12	IC41		G3	R8		E3
ICDF		A6	IC42		G3	R9		E4
ICDO		D13	IC43		L5	R10		B7
ICD1		B13	IC44		B8	R11		L15
ICD2		B15	IC45		F3	R12		L15
ICD3		D15	IC46		M8	R13		L16
ICD4		A15	IC47		M9	R14		L16
ICD5		A14	IC48		K9	R15		C15
ICD6		A15	IC49		L9	R16		L15
ICD7		E13	IC50		K9	R17		B15
ICD8		A10	IC51		K3	R18		L14
ICD9		A13	IC52		B4	R19		C15
ICEA		H2	IC53		K12	R20		L14
ICEB		C2	IC54		L11	R21		L14

Component locations

PCB: NTC

Issue: Date:



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PRELIMINARY

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
R22		C15	S13		A9			
R23		B15	S14		A10			
R24		M4	S15		A9			
R25		L16	S16		D9			
R26		J15	S17		A10			
R27		J16	S18		A13			
R28		J15	S19		A4			
R29		J15	S20		K7			
R30		J16	S21		J9			
R31		H15	S22		C6			
R32		J16	S23		B5			
R33		H16	Z1		M4			
R34		J16	5V		F1			
R35		G2						
R36		G3						
R37		F3						
R38		D3						
R39		D3						
R43		E13						
R44		B1						
R45		J4						
R46		D3						
R47		H12						
R48		B13						
R49		D13						
R50		B13						
R51		E13						
R52		C15						
R53		C15						
R54		D15						
R55		D15						
R56		D12						
R57		B13						
R58		D13						
R59		A13						
R60		C15						
R61		C15						
R62		D15						
R63		D15						
R64		L1						
R65		L1						
R66		C1						
R67		C1						
R68		A1						
R69		B1						
R70		B1						
R71		C1						
R72		B1						
R73		A11						
R74		D12						
R75		E2						
R76		L13						
R77		J15						
R78		E3						
R79		E3						
R80		D10						
R81		J4						
R82		E2						
R83		E3						
R84		E3						
R85		J3						
STRAP		B1						
SW1		G15						
SW2		F15						
SW3		F15						
SW4		E15						
S1		H15						
S2		L4						
S3		G10						
S4		E11						
S5		G10						
S6		F11						
S7		H1						
S8		H1						
S9		D4						
S10		D7						
S11		H10						
S12		B10						

Component locations

PCB: NTC

Issue: Date:



dansk data elektronik a/s
herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

Supermax NTC2

Technical Data

This chapter is a detailed description of the following items:

- Straps and jumpers.
- Switches.
- Connections.
- Serial drivers/receivers.
- Other components.
- Power specifications.
- Physical dimensions.
- Back panel plugs.

Straps and jumpers

The following tables indicate the use of the various straps and jumpers used in the NTC2. The factory installed position is marked with an '* '.

MC68000 clock frequency		
	1 - 2	8 MHz
*	2 - 3	10 MHz

Table 4-1: Strap ST1

Extern clock or crystal on 82C501		
*	1 - 2	20 MHz extern
	2 - 3	NC. (Crystal)

Table 4-2: Strap ST2

Supermax NTC2

Extern clock or crystal on 82C501		
	1 - 2	20 MHz extern
*	2 - 3	NC. (Crystal)

Table 4-3: Strap ST3

Mode select on 82C501		
*	1 - 2	Ethernet 1.0
	2 - 3	NON standard

Table 4-4: Strap ST4

Parallel printer output select		
*	1 - 2	Controlled by AUX3
	2 - 3	Controlled by on board logic

Table 4-5: Strap ST5

Clock for parallel interface		
	1 - 2	MC68000 clock
*	2 - 3	4 MHz

Table 4-6: Strap ST6

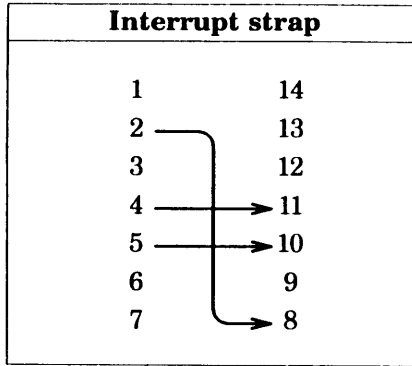


Table 4-7: Strap ISTRAP

Switches

The debug switch **SWD** is connected to interrupt level 7 on the MC68000 and is used to abort program execution for debugging and diagnostic purposes.

Connections

The following connections are made to and from the NTC2.

Power connection		
Pin	Signal	Text
1	6.3VAC	Input Phase 1 from transformer
2	GND	
3	6.3VAC	Input Phase 2 from transformer
4	6.3VAC	Output Phase 1 to pin 5
5	6.3VAC	Input Phase 1 from pin 4
6	GND	
7	6.3VAC	Input Phase 2 from pin 8
8	6.3VAC	Output Phase 2 to pin 7

Table 4-8: Connector PWR

Ethernet connection			
Pin	Signal	Pin	Signal
1	GND	NC	2
3	C-	C+	4
5	TX-	TX+	6
7	NC	NC	8
9	RX-	RX+	10
11	12V	GND	12
13	←78Ω→		14
15	NC	NC	16

Table 4-9: Connector CN

Serial connection			
Pin	Signal	Pin	Signal
1	PGND	2	NC
3	TxD	4	NC
5	RxD	6	NC
7	RTS	8	NC
9	CTS	10	NC
11	DSR	12	NC
13	GND	14	DTR
15	CD	16	+12V
17	-8V	18	NC
19	NC	20	NC

Table 4-10: Connectors CAN0 - CAN7

40

Parallel connection			
Pin	Signal	Pin	Signal
1	STROBE	2	AUTOFEED
3	DATA(0)	4	ERROR
5	DATA(1)	6	INIT
7	DATA(2)	8	SELECT IN
9	DATA(3)	10	GND
11	DATA(4)	12	GND
13	DATA(5)	14	GND
15	DATA(6)	16	GND
17	DATA(7)	18	GND
19	ACK	20	GND
21	BUSY	22	GND
23	PE	24	GND
25	SELECT	26	NC

Table 4-11: Connector CENTRO

Serial drivers/receivers

The serial drivers and receivers are mounted in sockets in order to make replacement easier. There is 1 driver chip and 1 receiver chip for each of the 8 channels.

Mnemonic	Channel	Function	Component
U30	0	Driver	14C88 or 75C188
U50	1	Driver	14C88 or 75C188
U31	2	Driver	14C88 or 75C188
U51	3	Driver	14C88 or 75C188
U32	4	Driver	14C88 or 75C188
U52	5	Driver	14C88 or 75C188
U33	6	Driver	14C88 or 75C188
U53	7	Driver	14C88 or 75C188
U40	0	Receiver	14C89 or 75C189
U60	1	Receiver	14C89 or 75C189
U41	2	Receiver	14C89 or 75C189
U61	3	Receiver	14C89 or 75C189
U42	4	Receiver	14C89 or 75C189
U62	5	Receiver	14C89 or 75C189
U43	6	Receiver	14C89 or 75C189
U63	7	Receiver	14C89 or 75C189

Table 4-12: Serial drivers/receivers

Other components

There are a few other *need-to-know* components on the NTC2.

Mnemonic	Function	Component
3AFUSE	Fuse + 5 Volt	3 A Picofuse
1AFUSE	Fuse + 12 Volt	1 A Picofuse
1AFUSE	Fuse - 8 Volt	1 A Picofuse
IC19	EPROM Odd	27C512 - 20 or 27C1001 - 20
IC20	EPROM Even	27C512 - 20 or 27C1001 - 20
IC21	SRAM Odd	MB8464 - 15 or equivalent
IC21A	SRAM Even	MB8464 - 15 or equivalent
IC54	Ethernet address	PROM EP320
L0	Status LED	Red LED
L1	Status LED	Red LED
L2	Status LED	Red LED
L3	Status LED	Red LED
L4	Status LED	Green LED
L5	Status LED	Green LED

Table 4-13: Other components

Supermax NTC2

Power specifications

Input voltage	180 – 264 VAC or 90 – 127 VAC (Strapable)
Frequency	50 (60) Hz
Power consumption	20W
Fuse	1 A (slow blow)

Table 4-14: AC specifications

5 V	1.6 A
12 V	0.5 A*
- 8 V	0.1 A

Table 4-15: DC specifications

Environment

Temperature	10 – 35 ° C
Humidity	10 – 90 % non condensing

Table 4-16: Environment

Physical dimensions

Length	440 mm
Height	300 mm
Depth	100 mm (including fixing plate)
Weight	6 kg

Table 4-17: Physical dimensions

Back panel plugs

Pin	Signal	Pin	Signal
1	PGND	14	NC
2	TXD	15	NC
3	RXD	16	NC
4	RTS	17	NC
5	CTS	18	NC
6	DSR	19	NC
7	GND	20	DTR
8	CD	21	+12V
9	-8V	22	NC
10	NC	23	NC
11	NC	24	NC
12	NC	25	NC
13	NC		

Table 4-18: RS-232C pin assignments

Pin	Signal	Pin	Signal
1	STROBE	14	AUTOFEED
2	DATA(0)	15	ERROR
3	DATA(1)	16	INIT
4	DATA(2)	17	SELECT IN
5	DATA(3)	18	GND
6	DATA(4)	19	GND
7	DATA(5)	20	GND
8	DATA(6)	21	GND
9	DATA(7)	22	GND
10	ACK	23	GND
11	BUSY	24	GND
12	PE	25	GND
13	SELECT		

Table 4-19: Centronics port pin assignments

Supermax NTC2

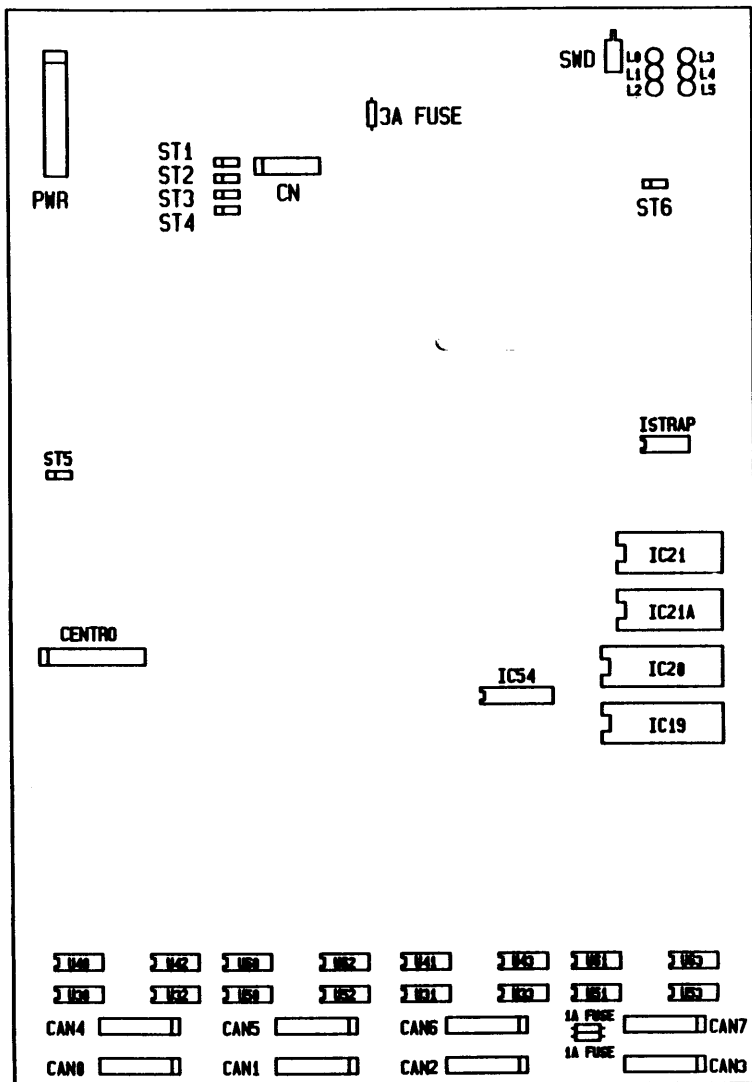


Figure 4-1: Component layout

Type: SGD Alpha board 2500

Data sheet no.:

Revision no.: 1

Date: 882101

2.1.1: General description:

The SGD is an intelligent Graphic Display Controller in a Supermax system. The SGD consists of two boards: A CPU board (alpha board), and a bit mapped graphic board with a graphic co-processor. This technical data sheet describes the SGD 2500 alfa board.

The alpha board contains the CPU, and is built around a MC68000 microprocessor. It also has implemented the following IO interfaces:

- IEEE 802.3 Ethernet interface.
- Serial RS-232 interfaces.
- Service port interface.
- Extension bus.

2.1.2: Ethernet interface:

The alpha board contains a Ethernet transceiver interface. The transceiver cable is connected to a 16 pin flat cable connector CN. Termination and bias to the different signals are provided by CEO6 strapping.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND	GND	02
03	C-	C+	04
05	TX-	TX+	06
07	GND	GND	08
09	RX-	RX+	10
11	+12 V	GND	12
13	GND	term	14
15	term	GND	16

2.1.3: Serial channels:

The serial interface includes the following programmable options:

- Baud rates from 50 to 38400 baud.
- Character length from 5 to 8 data bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.

All RS-232 interface ports are connected to a 60 pin flat cable connector CH1.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	TXD1A	RXD1A	02
03	RTS1A	CTS1A	04
05	DSR1A	DTR1A	06
07	GND	GND	08
09	+12V	-12V	10
11	TXD1B	RXD1B	12
13	RTS1B	CTS1B	14
15	GND	DTR1B	16
17	+12V	-12V	18
19	TXD2A	RXD2A	20
21	RTS2A	CTS2A	22
23	DSR2A	DTR2A	24
25	GND	GND	26
27	+12V	-12V	28
29	TXD2B	RXD2B	30
31	RTS2B	CTS2B	32
33	GND	DTR2B	34
35	+12V	-12V	36
37	TXD3A	RXD3A	38
39	RTS3A	CTS3A	40
41	DSR3A	DTR3A	42
43	GND	GND	44
45	TXC3A	RXC3A	46
47	+12V	-12V	48
49	TXD3B	RXD3B	50
51	RTS3B	CTS3B	52
53	DSR3B	DTR3B	54
55	GND	GND	56
57	TXC3B	RXC3B	58
59	+12V	-12V	60

2.1.4: Interface to RS232 channels:

A 60 pin flat cable is run from CH1 to a small back panel, where the six serial channels are split out to six 25 pin connectors. Channel 0 to 3 contain the following signals:

PIN	SIGNAL	SIGNAL	PIN
01	GND	NC	14
02	TXD	NC	15
03	RXD	NC	16
04	RTS	NC	17
05	CTS	NC	18
06	DSR	NC	19
07	GND	DTR	20
08	NC	+12V	21
09	-12V	NC	22
10	NC	NC	23
11	NC	NC	24
12	NC	NC	25
13	NC		

Connector
description:

CHANNEL 0-3

PIN	SIGNAL	SIGNAL	PIN
01	GND	NC	14
02	TXD	TXC	15
03	RXD	NC	16
04	RTS	RXC	17
05	CTS	NC	18
06	DSR	NC	19
07	GND	DTR	20
08	NC	+12V	21
09	-12V	NC	22
10	NC	NC	23
11	NC	NC	24
12	NC	NC	25
13	NC		

Connector
description:

CHANNEL 4-5

2.1.5: Bus connector:

J1

Pin number:	ROW a Signal mnemonic:	ROW b	ROW c
1	BD00	NC	BD08
2	BD01	NC	BD09
3	BD02	NC	BD10
4	BD03	NC	BD11
5	BD04	NC	BD12
6	BD05	NC	BD13
7	BD06	NC	BD14
8	BD07	NC	RESS
9	GND	NC	GND
10	BSYSCLK -	NC	NC
11	GND	NC	BERR- **
12	UDS-	NC	BRESET* (slow)
13	LDS-	NC	NC
14	R-W	NC	NC
15	GND	NC	BA23
16	DTACK-	NC	BA22
17	GND	AM1 **	BA21
18	AS-	AM2 **	BA20
19	NC	AM3 **	BA19
20	BIACK **	GND	BA18
21	NC	NC	BA17
22	NC	NC	BA16
23	AM4 **	GND	BA15
24	BA07	IRQ7-	BA14
25	BA06	IRQ6-	BA13
26	BA05	IRQ5-	BA12
27	BA04	IRQ4-	BA11
28	BA03	IRQ3-	BA10
29	BA02	IRQ2-	BA09
30	BA01	IRQ1-	BA08
31	-12V	NC	+12V
32	+5V	+5V	+5V

Bus connector: J2

Pin number:	ROW a Signal mnemonic:	ROW b	ROW c
1		-5V	GND
2	CAN3	-5V	GND
3	CAN2	-5V	GND
4	CAN1	-5V	GND
5	CAN0	-5V	GND
6	VID2	-5V	GND
7	VID1 **	-5V	GND
8	HSYNC	-5V	GND
9	VSYNC	-5V	GND
10	CAN3-	-5V	GND
11	CAN2-	-5V	GND
12	CAN1-	-5V	GND
13	CAN0-	-5V	GND
14	VID2-	-5V	GND
15	VID1-	-5V	GND
16	HSYNC-	-5V	GND
17	VSYNC-	-5V	GND
18	BCLK2-	-5V	GND
19	BCLK1-	-5V	GND
20	ESYNC-	-5V	GND
21	RSTT	-5V	GND
22	BLANK	-5V	GND
23		-5V	GND
24		-5V	GND
25	RESET-X2-	-5V	GND
26	DCLK	-5V	GND
27	+5V	-5V	GND
28	+5V	-5V	GND
29	+5V	-5V	GND
30	+5V	-5V	GND
31	+5V	-5V	GND
32	+5V	-5V	GND

2.1.6: Power requirements:

Voltage	Typ. current	
+ 5 +-5%	5.0 A	
+12 +-5%	0.4 A	(excl. transceiver)
-12 +-5%	0.1 A	

2.1.7: Physical dimension:

Elongated Double Europa module.

Width : 234 mm.

Depth : 340 mm.

Height: 20 mm.

2.1.8: Installation:

Before the alpha board is used in SGD the following items must be selected/checked:

- Straps.
- Transceiver cable.
- Flat cables for the serial channels.
- Version of firmware.

These items are described in details in the following text.

2.1.9: Firmware:

The firmware is situated in EPROM's mounted in position CL41, CL43, CL45 and CL47 (even bytes); CL40, CL42, CL44 and CL46 (odd bytes).

The EPROM's also contain a test program that is executed after power up reset. After the test program has been executed, the SGD firmware is automatically started and are ready to receive commands.

2.1.10: Straps and jumpers:

+ designates factory installed position.

Strap CE06:

Function: Controls termination of LAN cable.

- + PIN 1 connected to PIN 14: Ethernet drop cable.
- + PIN 2 connected to PIN 12
- + PIN 3 connected to PIN 12
- + PIN 4 connected to PIN 11
- + PIN 5 connected to PIN 10
- + PIN 6 connected to PIN 9
- PIN 7 connected to PIN 8

Strap SEPR:

Function: Controls address input to EPROM memory.

- + PIN 1 connected to PIN 2 : 512kb EPROMs used.
- PIN 2 connected to PIN 3 : 256kb EPROMs used.

Changing the strap position will also require a PAL change.

Strap ST1:

Function: Controls address input to character RAM.

PIN 1 connected to PIN 2 : CA13 connected to pin 26 of
CS17, CS18, CS19 and CS20.

Strap ST2:

Function: Controls delay of pixel clock relative to character
clock.

+ PIN 1 connected to PIN 2: Maximum delay selected, adjustable
by potentiometer PS02.

PIN 2 connected to PIN 3: No delay selected.

Strap ST3:

Function: Controls GREY level for analog screen output.

+ PIN 1 connected to PIN 2

PIN 2 connected to PIN 3

Strap ST5:

Function: Controls the CLOCK signal to the MANCHESTER encoder.

+ PIN 1 connected to PIN 2: The CLOCK is supplied to pin
14 of the manchester encoder.

PIN 2 connected to PIN 3: Pin 14 of the manchester encoder
is grounded.

Strap ST6:

Function: Controls the Manchester encoder.

PIN 1 connected to PIN 2: The CLOCK is supplied to pin 13 of the manchester encoder.

PIN 2 connected to PIN 3: Pin 13 of the manchester encoder is left floating.

Strap ST7:

Function: Controls pin 2 of the manchester encoder.

PIN 1 connected to PIN 2: Pin 2 is grounded.

PIN 2 connected to PIN 3: Pin 2 is connected to pin 1 by KE02

Strap SWCO:

Function: Software select strap and extra baud rate select.
(Applies only to versions earlier than 1.7)

Strappings for SWCO:

Monitor timing for *-* * * * * * *
80 MHz pixel rate: * * * * * * * *
 .* * * * * * * * *

Monitor timing for * * * * * * * *
70 MHz pixel rate: I * * * * * * * *
 .I * * * * * * * * *

Monitor timing for * * * * * * * *
64 MHz pixel rate: * I * * * * * * * *
 .* I * * * * * * * * *

The next strappings are independant of the abovementioned:

68020 accelerator * * * * * * * *
board installed: * * * * * * * I *
 .* * * * * * * I * *

Initialize via printer * * * * * * * *
port on versions earlier * * * * * * * I
than 1.6: .* * * * * * * I

I
The symbol I denotes strap position.

14

13

12

11

10

9

8

7

6

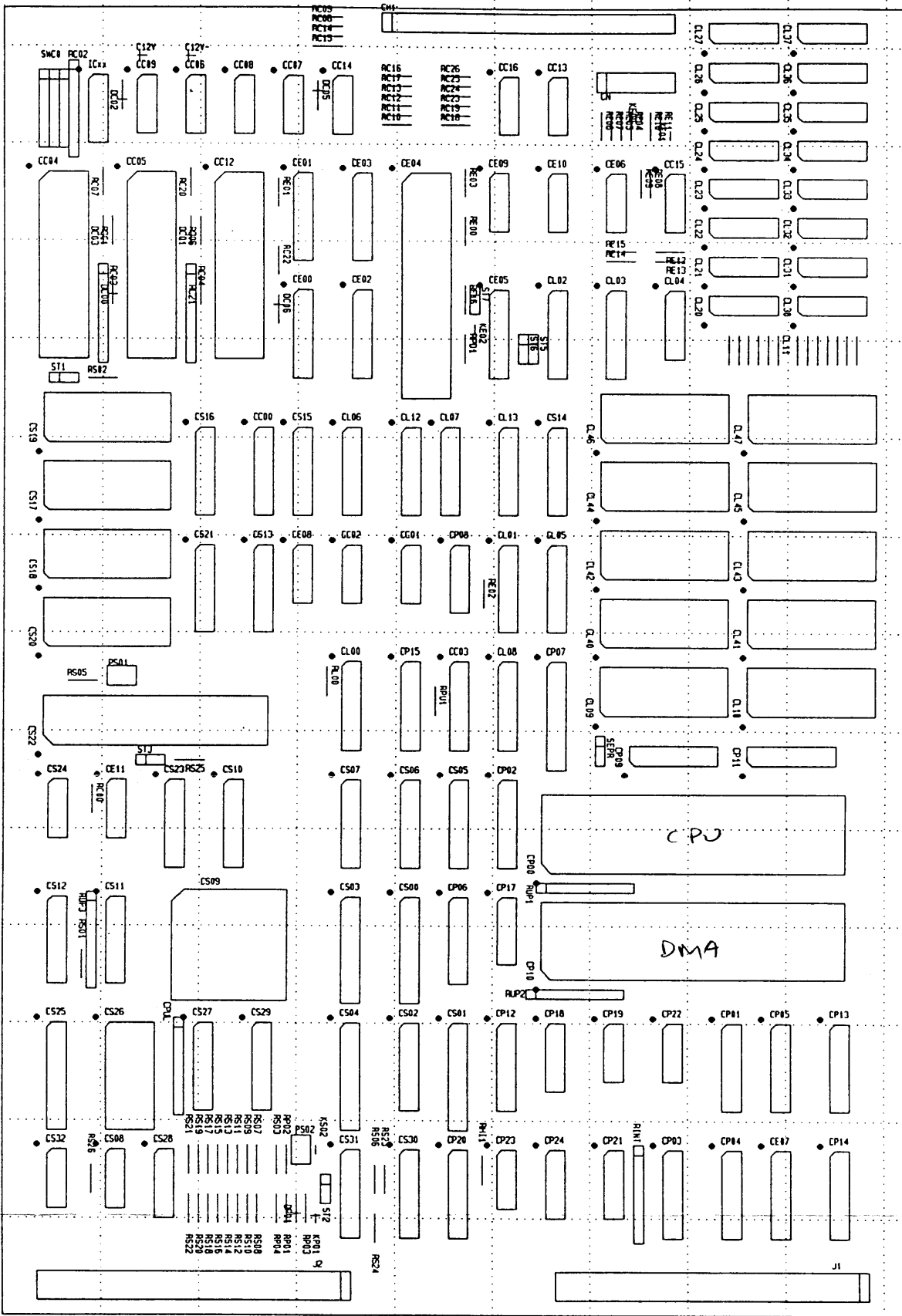
5

4



3

2



1



A B C D E F G H J K

 dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf 02-84 50 11		 2500	
		Component-ID	
Issue	Date		
0	-----		
1	-----		
2	861122		
3	-----		
4	-----	Parts no	
5	-----	Dwg no	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+5V	Terminal	E1	CN	16P-HEADER	G13	ICxx	74LS163	A13
+12V	Terminal	E1	CPUL	SIL-9x1K5	B4	J1	96P-DIN	J1
-5V	Terminal	E1	CP00	MC68000L10	F5	J2	96P-DIN	D1
-12V	Terminal	E1	CP01	PAL-16L8A	H4	KE00	10nF	G13
CC00	74ALS645	C10	CP02	PAL-16R8A	F6	KE01	10nF	G13
CC01	OSC. 7. 3728MHZ	E8	CP03	74ALS574	G2	KE02	22nF	E11
CC02	74ALS74	D8	CP04	PAL-16L8A	H2	KP01	68uF/6V3-Sol. Al	D2
CC03	PAL-16R4A	E7	CP05	74ALS573	H4	KS02	Capacitor	D2
CC04	SCN2681ACIN40	A12	CP06	74ALS573	E5	PS01	TR. POT-50R	B7
CC05	SCN2681ACIN40	B12	CP07	PAL-20L8A	F7	PS02	TR. POT-500R	D2
CC06	75189AN	B13	CP08	74ALS138N	E8	RC00	1K	A6
CC07	75188AN	C13	CP09	74ALS573	G6	RC01	2K2	B11
CC08	75189AN	C13	CP10	MC68450-10	F4	RC02	SIL-9x3K3	A13
CC09	75188AN	B13	CP11	74ALS573	H6	RC03	SIL-9x3K3	B11
CC12	Z8530APC	C12	CP12	74ALS573	F4	RC04	SIL-9x3K3	B11
CC13	75189AN	F13	CP13	74ALS645	J4	RC06	2K2	C11
CC14	75188AN	D13	CP14	74ALS645	J2	RC07	3K3	B12
CC15	75189AN	G12	CP15	PAL-16R4A	E7	RC08	1K	D14
CC16	75188AN	F13	CP17	74LS390	F5	RC09	1K	D14
CE00	74ALS645	C11	CP18	74LS390	F4	RC10	FUSE-0.5A	D13
CE01	74ALS645	C12	CP19	74AS74	G4	RC11	FUSE-0.5A	D13
CE02	74ALS573	D11	CP20	74ALS240	E2	RC12	FUSE-0.5A	D13
CE03	74ALS573	D12	CP21	16P-STRAP	G2	RC13	FUSE-0.5A	D13
CE04	82586	E12	CP22	OSC. 20MHZ	G4	RC14	1K	D14
CE05	8023A	E11	CP23	74ALS74	F2	RC15	1K	D14
CE06	14P-STRAP	G12	CP24	74LS390	F2	RC16	FUSE-0.5A	D13
CE07	PAL-16L8A	H2	CS00	PAL-GSAS	E5	RC17	FUSE-0.5A	D13
CE08	74ALS74	C8	CS01	PAL-GSAS	E4	RC18	FUSE-0.5A	E13
CE09	OSC. 8MHZ	E12	CS02	74ALS573	E4	RC19	FUSE-0.5A	E13
CE10	OSC. 20MHZ	F12	CS03	74ALS646	D5	RC20	3K3	B12
CE11	74ALS74	B6	CS04	74ALS646	D4	RC21	10K	C11
CH1	60P-HEADER	D14	CS05	PAL-16L8A	E6	RC22	10K	C12
CL00	74ALS574	D7	CS06	PAL-16L8A	E6	RC23	FUSE-0.5A	E13
CL01	PAL-16R8A	F8	CS07	PAL-16R8A	D6	RC24	FUSE-0.5A	E13
CL02	74AS573	F11	CS08	74ALS74	B2	RC25	Not-Used	E13
CL03	74AS573	G11	CS09	AM8052-6LC	B5	RC26	Not-Used	E13
CL04	74LS590	G11	CS10	74ALS573	C6	RE00	3K3	E12
CL05	PAL-16L8A	F8	CS11	74ALS573	B5	RE01	3K3	C12
CL06	74AS645	D10	CS12	74ALS573	A5	RE02	3K3	E8
CL07	74AS645	E10	CS13	74ALS573	C8	RE03	3K3	E12
CL08	PAL-16L8A	F7	CS14	74ALS645	F10	RE04	39R	G13
CL09	DQ28C64-250	G7	CS15	74ALS645	C10	RE05	39R	G13
CL10	DQ28C64-250	H7	CS16	74ALS574	B10	RE06	5K6	G13
CL11	33R	H11	CS17	HM6264LP-10	A9	RE07	2K43	G13
CL12	74AS645	E10	CS18	HM6264LP-10	A8	RE08	39R	G12
CL13	74AS645	F10	CS19	HM6264LP-10	A9	RE09	39R	G12
CL20	HMS0257P-15	H11	CS20	HM6264LP-10	A7	RE10	2K43	G13
CL21	HMS0257P-15	H11	CS21	PAL-16L8A	B8	RE11	5K6	G13
CL22	HMS0257P-15	H12	CS22	AM8152ADC	A6	RE12	470R	H11
CL23	HMS0257P-15	H12	CS23	16P-STRAP	B6	RE13	470R	H11
CL24	HMS0257P-15	H12	CS24	14P-STRAP	A6	RE14	470R	G11
CL25	HMS0257P-15	H13	CS25	PAL-20L8A	A4	RE15	470R	G11
CL26	HMS0257P-15	H13	CS26	MB8128-10	B4	RE16	560R	E11
CL27	HMS0257P-15	H14	CS27	74ALS574	B4	RH11	1K	E2
CL30	HMS0257P-15	J11	CS28	74S158	B2	RINT	SIL-9x3K3	G2
CL31	HMS0257P-15	J11	CS29	74ALS640	C4	RL00	47R	D7
CL32	HMS0257P-15	J12	CS30	74AS240	E2	RPD1	pull-dwn	E11
CL33	HMS0257P-15	J12	CS31	74AS240	D2	RPU1	1K	E7
CL34	HMS0257P-15	J12	CS32	OSC. 80MHz	A2	RPO1	1K	C2
CL35	HMS0257P-15	J13	C12V	Capacitor	B13	RPO2	10K	C2
CL36	HMS0257P-15	J13	C12V-	Capacitor	B13	RPO3	47R	D2
CL37	HMS0257P-15	J14	DC00	1N4148	B11	RP04	10K	C2
CL40	MBM27C512-20	G7	DC01	1N4148	B11	RS01	1K	A4
CL41	MBM27C512-20	H7	DC02	1N4148	B13	RS02	47R	A10
CL42	MBM27C512-20	G8	DC03	1N4148	B11	RS03	10R	C2
CL43	MBM27C512-20	H8	DC05	1N4148	D13	RS05	10R	A7
CL44	MBM27C512-20	G9	DC06	1N4148	C11	RS06	4K7	D2
CL45	MBM27C512-20	H9	DP01	1N4148	D1	RS07	68R	C2
CL46	MBM27C512-20	G9	GND	Terminal	E1	RS08	Not-Used	C2
CL47	MBM27C512-20	H9	GND. 1	Terminal	F1	RS09	68R	C2

		dansk data elektronik a/s	
		herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11	
Issue	Date	 2500 Component Locations	
0	-----		
1	-----		
2	861122		
3			
4		Parts no.	2
5		Dwg. no.	

Type: SGD 2510

Data sheet no.: SGD

Revision no.: 1

Date: 880812

General description:

The SGD 2510 is an intelligent Graphical Display Controller in a SUPERMAX system. The SGD consist of two boards a CPU board and a bit mapped graphics board with on board graphical processor. This technical data sheet is only concerned with the CPU board. The CPU board is built around a MC68020 microprocessor and contains the following IO interfaces:

- Ethernet interface. IEEE 802.3.
- serial RS-232 interfaces.)
- Service port interface.
- Extension bus.

Ethernet interface.

The SGD contains the Ethernet transceiver interface. The transceiver cable is connected to a 16 pin flat cable connector CN.

Extra ground can be provided by strapping CE06 to accomodate IEEE 802.3.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01		GNDS	02
03	C-	C+	04
05	TX-	TX+	06
07	GNDS	GNDS	08
09	RX-	RX+	10
11	+12 V	GND	12
13	GND	term	14
15	term	GNDS	16

E1 signals designated GNDS can be strapped to ground by CE06.
Signals designated term are only terminated not used.

SERIAL CHANNELS.

The serial interface includes the following programmable options:

- Baud rates from 50 to 38400 baud.
- Character length from 5 to 8 bits.
- Odd, even or no parity.
- 1, 1.5 or 2 stop bits.

All RS-232 interface boards are connected to a 60 pin flat cable connector CH1.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	TXD1A	RXD1A	02
03	RTS1A	CTS1A	04
05	DSR1A	DTR1A	06
07	GND	GND	08
09	+12V	-12V	10
11	TXD1B	RXD1B	12
13	RTS1B	CTS1B	14
15	GND	DTR1B	16
17	+12V	-12V	18
19	TXD2A	RXD2A	20
21	RTS2A	CTS2A	22
23	DSR2A	DTR2A	24
25	GND	GND	26
27	+12V	-12V	28
29	TXD2B	RXD2B	30
31	RTS2B	CTS2B	32
33	GND	DTR2B	34
35	+12V	-12V	36
37	TXD3A	RXD3A	38
39	RTS3A	CTS3A	40
41	DSR3A	DTR3A	42
43	GND	GND	44
45	TXC3A	RXC3A	46
47	+12V	-12V	48
49	TXD3B	RXD3B	50
51	RTS3B	CTS3B	52
53	DSR3B	DTR3B	54
55	GND	GND	56
57	TXC3B	RXC3B	58
59	+12V	-12V	60

Interface to RS232 channels.

A 60 pin flat cable is led from CH1 to a small back print where the six serial channels are split up on 6 25 pin connectors. Channel 0 to 3 contain the following signals.

Connector description: CHANNEL 0-3

<u>PIN</u>	<u>SIGNAL</u>	<u>SIGNAL</u>	<u>PIN</u>
01	GND	NC	14
02	TXD	NC	15
03	RXD	NC	16
04	RTS	NC	17
05	CTS	NC	18
06	DSR	NC	19
07	GND	DTR	20
08	NC	+12V	21
09	-12V	NC	22
10	NC	NC	23
11	NC	NC	24
12	NC	NC	25
13	NC		

Connector description: CHANNEL 4-5

<u>PIN</u>	<u>SIGNAL</u>	<u>SIGNAL</u>	<u>PIN</u>
01	GND	NC	14
02	TXD	TXC	15
03	RXD	NC	16
04	RTS	RXC	17
05	CTS	NC	18
06	DSR	NC	19
07	GND	DTR	20
08	NC	+12V	21
09	-12V	NC	22
10	NC	NC	23
11	NC	NC	24
12	NC	NC	25
13	NC		

Power requirements:

Voltage		Typ. current
+ 5	+/-5%	7.0 A
+12	+/-5%	0.1 A
-12	+/-5%	0.1 A

Physical dimension:

Elongated Double Europa module.

Width : 234 mm.

Depth : 340 mm.

Height: 20 mm.

Installation:

Before a SGD module is used in a Supermax system the following items must be selected/checked:

- Straps.
- Transceiver cable.
- Flat cables for the serial channels.
- Firmware.

These items are described in details in the following text.

Firmware:

The firmware is situated in EPROM mounted in position CP34.

The PROM contain a test program that is executed after power up reset. After the test program has been executed the firmware are ready to receive commands.

Straps and jumpers:

+ designates factory installed position.

CE06

Function: Controls ground connections of LAN cable.

PIN 1 connected to PIN 2 drop cable pin 1 grounded.
PIN 3 connected to PIN 4 drop cable pin 11 grounded.
PIN 5 connected to PIN 6 drop cable pin 4 grounded.
PIN 7 connected to PIN 8 drop cable pin 8 grounded.

ST1

Function: Controls rw input to cache comparator.

PIN 1 connected to PIN 2 : read and write accesses are separately cached.
+ PIN 2 connected to PIN 3 : read and write accesses are cached together.

ST2

Function: Controls delay of pixel clock versus character clock.

+ PIN 1 connected to PIN 2: Maximum delay selected, adjustable
at potentiometer PS02.
PIN 2 connected to PIN 3: No delay selected.

ST3

Function: Controls GREY level for analog screen output.

+ PIN 1 connected to PIN 2

PIN 2 connected to PIN 3

ST4

Function: Controls CDIS signal to 68020.

PIN 1 connected to PIN 2 internal cache disabled.

ST5

Function: Controls the CLOCK signal to the MANCHESTER encoder.

+ PIN 1 connected to PIN 2: The CLOCK is supplied to pin 14 of the manchester encoder.

PIN 2 connected to PIN 3: pin 14 of the manchester encoder is grounded.

ST6

Function: Controls the Manchester encoder.

PIN 1 connected to PIN 2: The CLOCK is supplied to pin 13 of the manchester encoder.

PIN 2 connected to PIN 3: Pin 13 of the manchester encoder is left floating.

ST7

Function: Controls pin 2 of the manchester encoder.

PIN 1 connected to PIN 2 pin 2 is grounded.

PIN 2 connected to PIN 3: Pin 2 is connected to pin 1 by KE02

SWCO

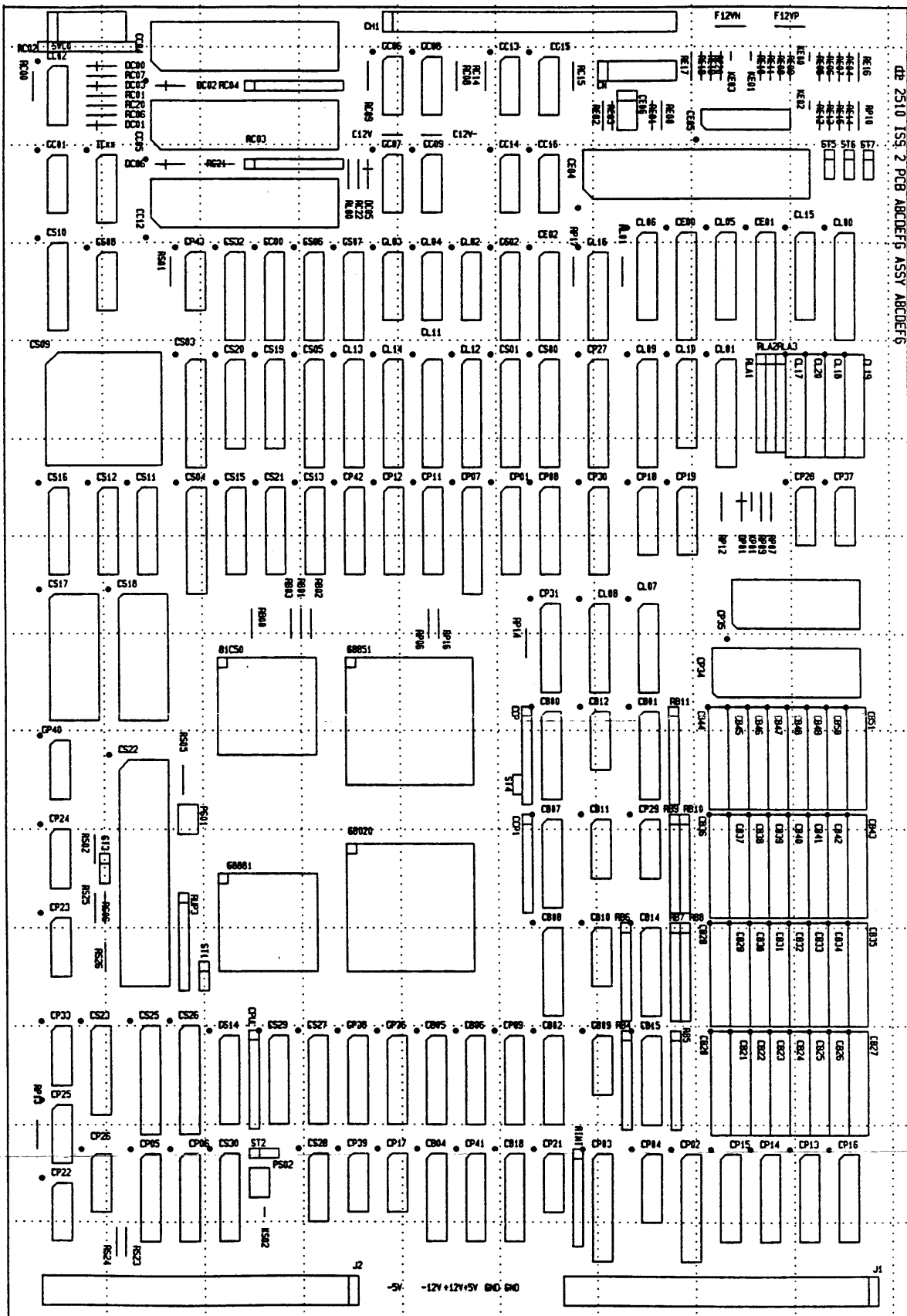
Function: Software select strap and extra baud rate select.

there are eight straps in sw with pin 1,2 and 3.
strap 0 and 1 work in conjunction

- 0 PIN 2 not connected Selection of 80MHZ monitor initialization
- 1 PIN 2 not connected
- 0 PIN 2 connected to pin 1 Selection of 64MHZ monitor initialization
- 1 PIN 2 not connected
- 0 PIN 2 not connected Selection of 70MHZ monitor initialization
- 1 PIN 2 connected to pin 1
- 2 currently not used
- 3 currently not used
- 4 currently not used
- 5 currently not used
- 6 currently not used
- 7




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1



DB 2510 ISS 2 PCB ABCDEFG ASSY ABCDEFG

A B C D E F G H J K

Component locations					
PCB: 2510 / SGD Alpha	Issue: 2	Date: 880524		dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 02-84 50 11	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
+5V	terminal	E1	CL03	74S139	D11	CS18	SRAM32KX8-10	B8
+12V	terminal	E1	CL04	74S151	E11	CS19	74ALS645	C10
-5V	terminal	E1	CL05	74AS573	H12	CS20	74ALS645	C10
-5V.1	terminal	E1	CL06	74AS573	G12	CS21	16L8A	C9
-12V	terminal	E1	CL07	74AS573	G8	CS22	8052A	B6
CB00	16L8D	F7	CL08	74AS573	F8	CS23	16R4A	A4
CB01	16L8B	G7	CL09	20L8A	G10	CS25	20L8A	B4
CB02	16L8B	F3	CL10	74AS573	G10	CS26	HM6116ASP-10	B4
CB04	16L8A	E2	CL11	74ALS646	E10	CS27	74AS574	D3
CB05	16R8B	E3	CL12	74ALS646	E10	CS28	74S158	D2
CB06	16R8B	E3	CL13	74ALS646	D10	CS29	74ALS640	C3
CB07	16R8B	F6	CL14	74ALS646	D10	CS30	74S240	C2
CB08	16R8B	F5	CL15	74ALS645	J12	CS32	16R4A	C11
CB09	74S32	F3	CL16	16R4A	F11	C12V	10uF-TANTAL	E13
CB10	74S32	F5	CL17	MB81C4256-12PSZ	J10	C12V-	10uF-TANTAL	E13
CB11	74S32	F6	CL18	MB81C4256-12PSZ	J10	DC00	1N4148	A13
CB12	74S32	F7	CL19	MB81C4256-12PSZ	J10	DC01	1N4148	A13
CB14	74S241	G5	CL20	MB81C4256-12PSZ	J10	DC02	1N4148	B13
CB15	74S241	G3	CN	LAN-I/O	G13	DC03	1N4148	A13
CB18	74S241	F2	CPUL	10-1-152	C3	DC05	1N4148	D12
CB20	MB81C4256-12PSZ	H3	CP01	16L8D	F9	DC06	1N4148	B12
CB21	MB81C4256-12PSZ	H3	CP02	20L8A	G2	DP01	1N4148	H9
CB22	MB81C4256-12PSZ	H3	CP03	20R8A	F2	F12VN	FUSE-1.5A	H14
CB23	MB81C4256-12PSZ	H3	CP04	74LS148	G2	F12VP	FUSE-1.5A	H14
CB24	MB81C4256-12PSZ	J3	CP05	74ALS645	B2	GND	terminal	E1
CB25	MB81C4256-12PSZ	J3	CP06	74ALS645	B2	GND.1	terminal	F1
CB26	MB81C4256-12PSZ	J3	CP07	20L8A	E9	ICxx	74ALS163	A12
CB27	MB81C4256-12PSZ	J3	CP08	16L8A	F9	J1	BUS-96p-DIN	J1
CB28	MB81C4256-12PSZ	H5	CP09	74AS573	F3	J2	BUS-96p-DIN	D1
CB29	MB81C4256-12PSZ	H5	CP11	74AS573	E9	KE00	10nF-CERAMIC	J14
CB30	MB81C4256-12PSZ	H5	CP12	74AS573	D9	KE01	10nF-CERAMIC	H14
CB31	MB81C4256-12PSZ	H5	CP13	74ALS645	J2	KE02	10nF-CERAMIC	J13
CB32	MB81C4256-12PSZ	J5	CP14	74ALS645	H2	KE03	10nF-CERAMIC	H14
CB33	MB81C4256-12PSZ	J5	CP15	74ALS645	H2	KP01	10uF-TANTAL	H9
CB34	MB81C4256-12PSZ	J5	CP16	74ALS645	J2	KS02	10nF-CERAMIC	C2
CB35	MB81C4256-12PSZ	J5	CP17	74LS393	D2	PS01	trim	B6
CB36	MB81C4256-12PSZ	H6	CP18	74LS390	G9	PS02	TRIM-500R	C2
CB37	MB81C4256-12PSZ	H6	CP19	74LS390	G9	RB4	10-2-330	G3
CB38	MB81C4256-12PSZ	H6	CP21	STRAP	F2	RB5	10-2-330	G3
CB39	MB81C4256-12PSZ	H6	CP22	STRAP	A2	RB6	10-2-330	G5
CB40	MB81C4256-12PSZ	J6	CP23	OSC. 50MHZ	A5	RB7	10-2-330	G5
CB41	MB81C4256-12PSZ	J6	CP24	OSC. 40MHZ	A6	RB8	10-2-330	G5
CB42	MB81C4256-12PSZ	J6	CP25	74S74	A3	RB9	10-2-330	G6
CB43	MB81C4256-12PSZ	J6	CP26	74S00	A2	RB00	330R	C8
CB44	MB81C4256-12PSZ	H7	CP27	20L8A	F10	RB01	330R	D8
CB45	MB81C4256-12PSZ	H7	CP28	74LS14	J9	RB02	33R	D7
CB46	MB81C4256-12PSZ	H7	CP29	74LS07	G6	RB03	470R	C8
CB47	MB81C4256-12PSZ	H7	CP30	16L8A	F9	RB10	10-2-330	G6
CB48	MB81C4256-12PSZ	J7	CP31	16R6D	F8	RB11	10-2-330	G7
CB49	MB81C4256-12PSZ	J7	CP33	74AS1004	A4	RC00	1KR	A13
CB50	MB81C4256-12PSZ	J7	CP34	271001	H7	RC01	2K2R	A13
CB51	MB81C4256-12PSZ	J7	CP35	2764 <i>Do 2867</i>	H8	RC02	10-1-332	A14
CCP	10-1-102	F7	CP36	16L8B	D3	RC03	10-1-332	C12
CCP1	10-1-102	F6	CP37	74LS393	J9	RC04	10-1-332	C13
CC00	74ALS645	C11	CP38	16R8B	D3	RC06	2K2R	A13
CC01	OSC. 7M3728HZ	A12	CP39	74S260	D2	RC07	3K3R	B13
CC02	74S74	A13	CP40	OSC. 16MHZ	A6	RC08	1K0R	E13
CC04	2681	B13	CP41	16L8A	E2	RC09	1K0R	D13
CC05	2681	B12	CP42	74AS573	D9	RC14	1K0R	E13
CC06	75189	D13	CP43	74S10	B11	RC15	1K0R	F13
CC07	75188	D12	CS00	20R8A	F10	RC20	3K3R	B13
CC08	75189	E13	CS01	20R8A	F10	RC21	10KR	C12
CC09	75188	E12	CS02	16L8A	F11	RC22	10KR	D12
CC12	8530	B12	CS03	74ALS646	B10	RE00	3K3R	G13
CC13	75189	F13	CS04	74ALS646	B9	RE01	3K3R	G13
CC14	75188	F12	CS05	20L8A	D10	RE02	3K3R	G13
CC15	75189	F13	CS06	16R8A	D11	RE03	3K3R	G13
CC16	75188	F12	CS07	74AS574	D11	RE04	39R0	J14
CE00	74ALS646	G12	CS08	74S74	A11	RE05	39R0	J14
CE01	74ALS646	H12	CS09	8052	A10	RE06	5K6R	J14
CE02	16R4A	F11	CS10	74ALS574	A12	RE07	2K43R	J13
CE04	82586	F12	CS11	74ALS574	B9	RE08	39R0	H14
CE05	8023A	H13	CS12	74ALS573	A9	RE09	39R0	J14
CE06	STRAP	G13	CS13	74ALS573	D9	RE10	2K43R	H13
CH1	Serial-I/O	D14	CS14	74ALS645	C3	RE11	5K6R	H14
CL00	20R8A	J12	CS15	74ALS645	C9	RE12	470R	J13
CL01	20R6A	H10	CS16	74ALS574	A9	RE13	470R	J13
CL02	74S138	E11	CS17	SRAM32KX8-10	A8	RE14	470R	J13

Component locations

PCB: 2510 / SGD Alpha

Issue: 2
Date: 880524



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herlev hovedgade 199. 2730 herlev. tlf. 02-84 50 11

Type: SGD Graphic Board 2600

Data sheet no.:

Revision no.: 1

Date: 871125

2.2: General description:

The Graphic Board contains the following elements:

- Graphic controller
- Frame buffer memory
- RGB colour palettes
- Crosshair control
- Local zoom
- Alpha overlay
- Optional math slave processor

The graphic board in the SGD is implemented using the Hitachi HD63484 ACRTC, 64k by 4 bits VideoDRAM's, and AmD's Am8151 8 bit Graphic Color Palettes as the key components.

The board contains a frame buffer memory of 1 M bytes VRAM (where each pixel is 8 bits wide), three 8 bit palettes (R, G, and B) with D/A converters, and hardware for crosshair, local zoom, and alpha overlay.

The frame buffer is seen as 512 k words of 16 bits from the graphic controller. On the serial (display) side of the frame buffer, data are read out 32 bits once every fourth pixel clock. The word is then converted to ECL levels and serialized into 8 bits for every pixelclock. These bits are then used to address the palettes.

Maximum resolution is 1024 by 1024 pixel's of 8 bits, 256 simultaneous colours from a palette of 16 million colours.

All datasignals to and from the board are latched. This is necessary as the graphic controller does not end its cycles synchronously to the CPU.

The video timing can be adapted to various monitors by selecting an appropriate pixel frequency crystal oscillator and change the settings of those registers in the controller that influences the video timing (firmware change). The pixel frequency should be in the range of 60 to 80 MHz.

As the ACRTC only provides information for the crosshair position with a resolution of one character clock, the position by pixel within the character cell must be generated by hardware. The dot position is output in the attribute word from the ACRTC and latched each frame.

The crosshair may have one of 8 colours as specified in the attribute word.

VSYNC from the alphaboard is resynchronized before it is presented to the ACRTC. The ACRTC then generates the timing (hsync, vsync and blanking) for the monitor.

The -2 volt reference voltage for all the ECL signal termination resistors is generated internally on the board.

2.2.1: Interface to bus:

Bus connector J1:

Signal names:

Pin nr.	Row a	Row b	Row c
1	BD00	NC	BD08
2	BD01	NC	BD09
3	BD02	NC	BD10
4	BD03	NC	BD11
5	BD04	NC	BD12
6	BD05	NC	BD13
7	BD06	NC	BD14
8	BD07	NC	BD15
9	GND	NC	GND
10	*	DREQ-	RES
11	GND	DONE-	*
12	UDS-	NC	*
13	LDS-	NC	NC
14	R-W	NC	NC
15	GND	NC	BA23
16	DTACK-	*	BA22
17	GND	*	BA21
18	AS-	*	BA20
19	GND	*	BA19
20	*	GND	BA18
21	NC	NC	BA17
22	NC	NC	BA16
23	*	GND	BA15
24	BA07	IRQ7-	BA14
25	BA06	IRQ6-	BA13
26	BA05	IRQ5-	BA12
27	BA04	IRQ4-	BA11
28	BA03	IRQ3-	BA10
29	BA02	IRQ2-	BA09
30	BA01	IRQ1-	BA08
31	*	*	*

32 +5V +5V +5V

 *) Signal may be present, but is not used on graphic board.

Bus connector J2: Signal names:

Pin nr.	Row a	Row b	Row c
1	NC	*	GND
2	CAN3	*	GND
3	CAN2	*	GND
4	CAN1	*	GND
5	CAN0	*	GND
6	*	*	GND
7	*	*	GND
8	*	*	GND
9	*	*	GND
10	*	*	GND
11	*	*	GND
12	*	*	GND
13	*	*	GND
14	*	*	GND
15	*	*	GND
16	*	*	GND
17	VSNC-	*	GND
18	*	*	GND
19	BCLK1-	*	GND
20	*	*	GND
21	*	*	GND
22	*	*	GND
23	*	*	GND
24	NC	*	GND
25	*	*	GND
26	DCLK	*	GND
27	+5V	-5V	GND

28	+5V	-5V	GND
29	+5V	-5V	GND
30	+5V	-5V	GND
31	+5V	-5V	GND
32	+5V	-5V	GND

*) Signal may be present, but is not used on graphic board.

2.2.2: Interface to monitor:

The video monitor interface signals are situated in a 20 pin flatcable header.

The cable is twisted pair flatcable.

PIN	SIGNAL	COLOUR	DESCRIPTION:	COAX:
01	TSYN-	BROWN	TTL H+V SYNC (ACTIVE LOW)	
02	GND	L. BROWN		
03	B OUT	RED	ANALOG BLUE (75 OHM)	***
04	GND	L. BROWN		
05	G OUT	ORANGE	ANALOG GREEN (75 OHM)	***
06	GND	L. BROWN		
07	R OUT	YELLOW	ANALOG RED (75 OHM)	***
08	GND	L. BROWN		
09	TH	GREEN	TTL HALF-INTENSITY	
10	GND	L. BROWN		
11	THSYN-	BLUE	TTL HSYNC (ACTIVE LOW)	***
12	GND	L. BROWN		
13	TVSYN-	PURPLE	TTL VSYNC (ACTIVE LOW)	***
14	GND	L. BROWN		
15	TB	GRAY	TTL BLUE (OPTION)	
16	GND	L. BROWN		
17	TG	WHITE	TTL GREEN (OPTION)	
18	GND	L. BROWN		
19	TR	BLACK	TTL RED (OPTION)	
20	GND	L. BROWN		

WHEN USING A TTL MONITOR, R16 SHOULD BE CHANGED FROM 150 OHM PULL-DOWN TO 10K PULL-UP.

2.2.3: Physical dimensions:

Elongated Double Europe Card module.

Width: 234 mm.
Length: 340 mm.
Height: 20 mm.

2.2.4: Power Requirements:

Voltage		Typ. current
+ 5 V	+5%	2.2 A
- 5.2 V	+5%	5.3 A
+12 V		not used
-12 V		not used

2.2.5: Straps and pins:

+ designates factory installed position.

STRAPO:

Function: ACRTC interrupt level.
STRAPO is located between Vbbreg and CG08.

STRAPO: . * * * * * * * * * *
1 2 3 4 5 6 7 8 9 10

Jumper between pin 1 and pin 2: ACRTC int. to CPU int.req 7
Jumper between pin 1 and pin 3: ACRTC int. to CPU int.req 6
Jumper between pin 1 and pin 4: ACRTC int. to CPU int.req 5

- + Jumper between pin 1 and pin 5: ACRTC int. to CPU int.req 4
- Jumper between pin 1 and pin 6: ACRTC int. to CPU int.req 3
- Jumper between pin 1 and pin 7: ACRTC int. to CPU int.req 2
- Jumper between pin 1 and pin 8: ACRTC int. to CPU int.req 1
- Pin 9 and pin 10 is not connected.

STRAP1:

Function: Memory bank organisation; present board only supports one organisation as mentioned below.
STRAP1 is located between CG35 and CG78.

STRAP1: . * *- *
1 2 3

- Jumper between pin 1 and pin 2: (not supported)
- + Jumper between pin 2 and pin 3: 1 M bytes Frame Buffer

SP:

Function: Palette adr. latch option; present board only supports normal palette addressing.
SP is located between CG80 and CG05.

SP: . * *- *
1 2

- + Jumper between pin 1 and pin 2: Normal palette mode.

STRAP3:

Function:

Function: Memory bank organisation; present board only supports one organisation corresponding to no strap connection.
STRAP3 is located between CG17 and CG33.

STRAP3: . * * *
 1 2 3

No connections should be made on STRAP3.

CG69:

Function: Graphic start position coarse adjust and alpha sync adjust.

CG69 is located between CG39 and CG79.

lsb	CG39-3	. * 1		14 *	GND	CG39:
	CG39-4	* 2	CG69	13 *	GND	Graphic start
	CG39-5	* 3		12 *	GND	CG79:
msb	CG39-6	* 4		11 *	GND	Sync. adj.
lsb	CG79-3	* 5		10 *	N.C.	
	CG79-4	* 6		9 *	CG79-5	
	GND	* 7		8 *	CG79-6	msb

Factory installed strap: Connections between 1,2,3,12,13,14 and between 5,6,7,8,9.

STR1:

Function: Memory bank organisation; present board only supports one organisation corresponding to the shown connection.

STR1 is located between CG34 and CG49.

STR1: . * - * * 1 - 2
 1 2 3

Jumper between pin 1 and pin 2: (not supported)
 + Jumper between pin 2 and pin 3: 1 M bytes Frame Buffer

S3:

Function: Graphic start fine adjust.
S3 ic located between IC1 and IC32.

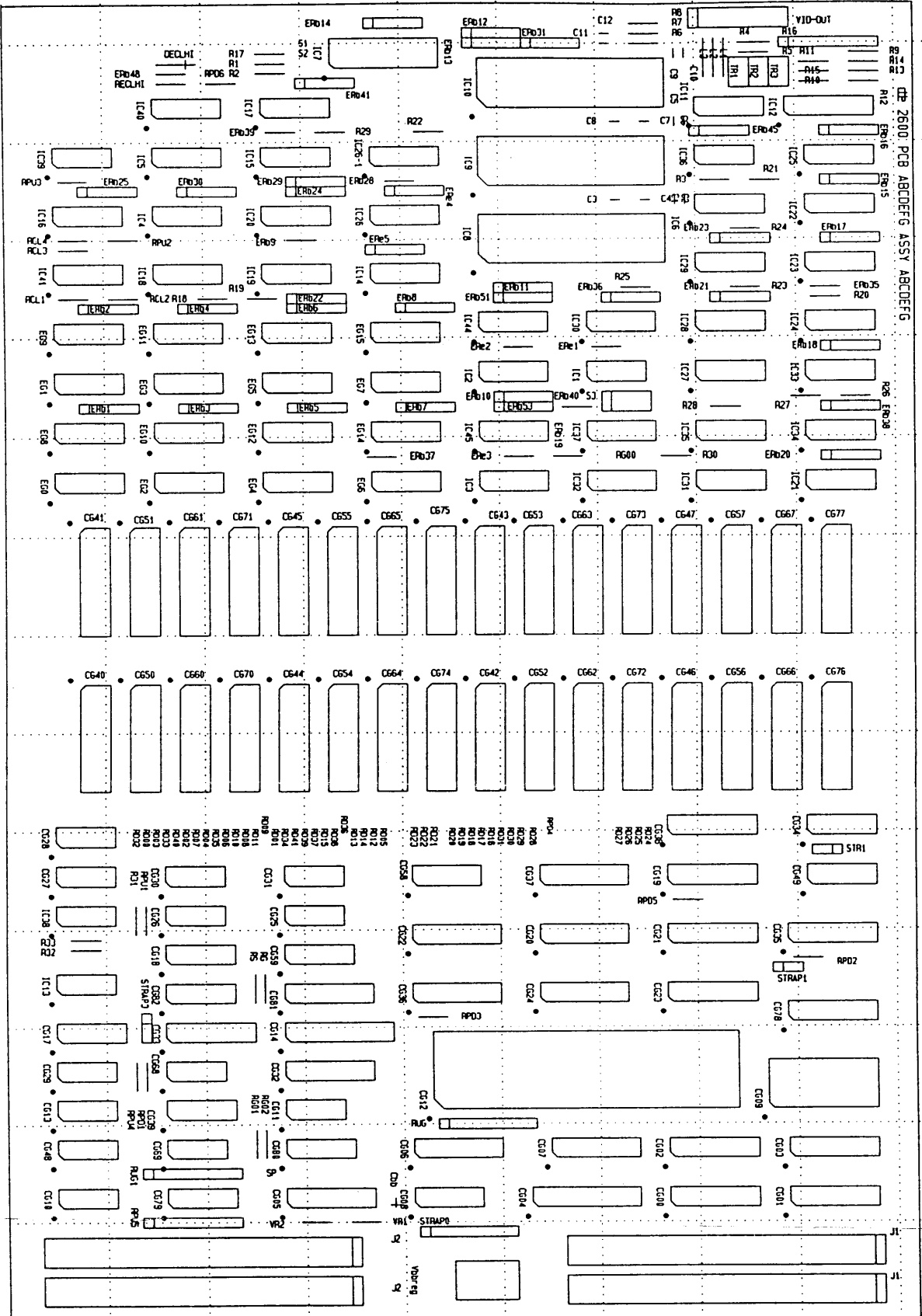
S3: * * * * *
 ,* * * * *
 1 3 5 7 9

Jumper between pin 1 and pin 2: delay of 4 pixel clock
Jumper between pin 3 and pin 4: delay of 3 pixel clock
Jumper between pin 5 and pin 6: delay of 2 pixel clock
Jumper between pin 7 and pin 8: delay of 1 pixel clock
+ Jumper between pin 9 and pin 10: no additional delay



Pals:

CG04 (20L8): Addr. decode for graphic board.
CG05 (16R4): DTACK generation and select signals.
CG06 (16R4): Math chip control signals (not used).
CG14 (20R8): DRAM control for frame memory.
CG32 (16R4): Control for attr. latch and addr. mux.
CG81 (16R8): Blanking resynchronizing.



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A B C D E F G H J K

		dansk data elektronik a/s	
		her lev hovedgade 199, 2730 her lev, tlf 02-84 50 11	
Issue	Date	 2600	
0	861101		
1			
2			
3			
4		Component-ID	
5		Parts no	
		Dwg no	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
CG00	74ALS573	G2	CG72	uPD41256-12	G7	Erb35	82R	J11
CG01	74ALS573	H2	CG73	uPD41256-12	G9	ERb36	SIL-5x82R	G11
CG02	74ALS573	G2	CG74	uPD41256-12	E7	ERb37	82R	D9
CG03	74ALS573	H2	CG75	uPD41256-12	E9	ERb38	SIL-5x82R	J10
CG04	PAL-20L8A	F2	CG76	uPD41256-12	J7	ERb39	82R	C13
CG05	PAL-16R4A	C2	CG77	uPD41256-12	J9	ERb40	560R	F10
CG06	PAL-16R4A	E2	CG78	74ALS645	H4	ERb41	SIL-5x82R	D13
CG07	74ALS573	F2	CG79	74LS169B	B2	ERb45	SIL-5x82R	H13
CG08	74ALS138	E2	CG80	74LS169B	C2	ERb48	560R	B13
CG09	NS16081-6	H3	CG81	PAL-16R8A	C4	ERb51	SIL-5x82R	F11
CG10	OSC.6MHz	A2	CG82	74ALS112	B4	ERb53	SIL-5x82R	F10
CG11	7407	C3	Cbb	10uF/16V-Sol.A1	D2	Ere1	560R	F10
CG12	HD63484-8	E3	C1	100nF	G12	Ere2	560R	F10
CG13	74ALS11	A3	C2	150pF	G12	Ere3	560R	F9
CG14	PAL-20R8A	C3	C3	100nF	G12	Ere4	560R	E12
CG17	74ALS138	A3	C4	150pF	G12	Ere5	SIL-5x470R	D11
CG18	74ALS138	B4	C5	100nF	G13	IC1	74AS04	F10
CG19	74ALS645	G5	C6	150pF	G13	IC2	10H124P	E10
CG20	74ALS645	F4	C7	100nF	G13	IC3	10H124P	E9
CG21	74ALS573	G4	C8	150pF	G13	IC4	10H424P	B12
CG22	74ALS573	E4	C9	100nF	G14	IC5	10H424P	B12
CG23	74ALS573	G4	C10	150pF	G14	IC6	10H124P	H12
CG24	74ALS573	F4	C11	100nF	G14	IC7	MCM422L10	D13
CG25	74AS32	C5	C12	150pF	G14	IC8	AM8151DC	E11
CG26	74AS32	B5	DECLHI	1N4002	C13	IC9	AM8151DC	E12
CG27	74AS08	A5	EG0	10H424P	A9	IC10	AM8151DC	E13
CG28	74AS08	A5	EG1	10H424P	A10	IC11	10H125P	H13
CG29	74AS08	A3	EG2	10H424P	B9	IC12	74ALS541	H13
CG30	74AS08	B5	EG3	10H424P	B10	IC13	OSC.80MHz	A4
CG31	74AS08	C5	EG4	10H424P	C9	IC14	10H124P	D11
CG32	PAL-16R4B	C3	EG5	10H424P	C10	IC15	10H136P	C12
CG33	74ALS573	B3	EG6	10H424P	D9	IC16	10H125P	A12
CG34	74ALS138	J5	EG7	10H424P	D10	IC17	10H113P	C13
CG35	74ALS573	H4	EG8	10H141P	A9	IC18	10H136P	B11
CG36	74ALS573	E4	EG9	10H141P	A10	IC19	10H141P	C11
CG37	74ALS573	F5	EG10	10H141P	B9	IC20	10H103P	C12
CG38	74ALS573	G5	EG11	10H141P	B10	IC21	10H424P	J9
CG39	74S163	B3	EG12	10H141P	C9	IC22	10H136P	J12
CG40	uPD41264-12	A7	EG13	10H141P	C10	IC23	10H104P	J11
CG41	uPD41256-12	A9	EG14	10H141P	D9	IC24	10H103P	J11
CG42	uPD41256-12	E7	EG15	10H141P	D10	IC25	10H103P	J12
CG43	uPD41256-12	E9	ERb1	SIL-5x82R	A10	IC26	10H131P	D12
CG44	uPD41256-12	C7	ERb2	SIL-5x82R	A11	IC26-1	10H113P	D12
CG45	uPD41256-12	C9	ERb3	SIL-5x82R	B10	IC27	10H124P	H10
CG46	uPD41256-12	G7	ERb4	SIL-5x82R	B11	IC28	10H113P	H11
CG47	uPD41256-12	G9	ERb5	SIL-5x82R	C10	IC29	10H131P	H11
CG48	74AS04	A2	ERb6	SIL-5x82R	C11	IC30	10H131P	F11
CG49	74S163	J5	ERb7	SIL-5x82R	E10	IC31	10H124P	H9
CG50	uPD41256-12	B7	ERb8	SIL-5x82R	E11	IC32	10H124P	F9
CG51	uPD41256-12	B9	ERb9	82R	D12	IC33	10H136P	J10
CG52	uPD41256-12	F7	ERb10	SIL-5x82R	F10	IC34	10H136P	J9
CG53	uPD41256-12	F9	ERb11	SIL-5x82R	F11	IC35	10H141P	H9
CG54	uPD41256-12	D7	ERb12	SIL-5x82R	E14	IC36	74AS08	H12
CG55	uPD41256-12	D9	ERb13	SIL-5x82R	E14	IC37	10H141P	F9
CG56	uPD41256-12	H7	ERb14	SIL-5x82R	D14	IC38	74S00	A5
CG57	uPD41256-12	H9	ERb15	SIL-5x82R	J12	IC39	74ALS32	A12
CG58	74S163	E5	ERb16	SIL-5x82R	J13	IC40	10H124P	B13
CG59	74S163	C4	ERb17	SIL-5x82R	J12	IC41	10H125P	A11
CG60	uPD41256-12	B7	ERb18	SIL-5x82R	J10	IC44	10H158P	E11
CG61	uPD41256-12	B9	ERb19	82R	F9	IC45	10H158P	E9
CG62	uPD41256-12	F7	ERb20	SIL-5x82R	J9	J1	INT. BUS-96p-DIN	J1
CG63	uPD41256-12	F9	ERb21	SIL-5x82R	H11	J1.1	INT. BUS-96p-DIN	J1
CG64	uPD41256-12	D7	ERb22	SIL-5x82R	C11	J2	INT. BUS-96p-DIN	D1
CG65	uPD41256-12	D9	ERb23	SIL-5x82R	H12	J2.1	INT. BUS-96p-DIN	D1
CG66	uPD41256-12	H7	ERb24	SIL-5x82R	C12	L1	COIL	H13
CG67	uPD41256-12	H9	ERb25	SIL-5x82R	A12	L2	COIL	H13
CG68	74ALS74	B3	ERb28	SIL-5x82R	D12	L3	COIL	H13
CG69	14P-STRAP	B2	ERb29	SIL-5x82R	C12	RCL1	47R	A11
CG70	uPD41256-12	C7	ERb30	SIL-5x82R	B12	RCL2	47R	B11
CG71	uPD41256-12	C9	ERb31	SIL-5x82R	F14	RCL3	47R	A11

		dansk data elektronik a/s	
		herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11	
Issue	Date	 2600 Component Locations	
0	-----		
1	-----		
2	861101		
3			
4		Parts no	2
5		Dwg. no.	

Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
RCL4	47R	A12	R9	68R	J13	cxx4	100nF-Cer	A4
RD00	33R	B5	R10	68R	J13	cxx5	100nF-Cer	A4
RD01	33R	C5	R11	68R	J13	cxx6	100nF-Cer	A5
RD02	33R	B5	R12	68R	J13	cxx7	100nF-Cer	A5
RD03	33R	B5	R13	68R	J13	cxx8	100nF-Cer	A6
RD04	33R	C5	R14	68R	J13	cxx9	100nF-Cer	A7
RD05	33R	D5	R15	68R	J13	cxx10	100nF-Cer	A7
RD06	33R	C5	R16	SIL-9x150R	H14	cxx12	100nF-Cer	A8
RD07	33R	B5	R17	560R	C13	cxx13	100nF-Cer	A9
RD08	33R	C5	R18	560R	B11	cxx14	100nF-Cer	A10
RD09	33R	C5	R19	560R	C11	cxx15	100nF-Cer	A10
RD10	33R	C5	R20	560R	J11	cxx16	100nF-Cer	A11
RD11	33R	C5	R21	560R	H12	cxx17	100nF-Cer	A11
RD12	33R	D5	R22	560R	E13	cxx18	100nF-Cer	A12
RD13	33R	D5	R23	560R	H11	cxx19	100nF-Cer	A13
RD14	33R	D5	R24	560R	H12	cxx20	100nF-Cer	A13
RD15	33R	D5	R25	560R	G11	cxx23	100nF-Cer	K13
RD16	33R	E5	R26	560R	J10	cxx24	100nF-Cer	K13
RD17	33R	E5	R27	560R	J10	cxx25	100nF-Cer	K12
RD18	33R	E5	R28	560R	H10	cxx26	100nF-Cer	K11
RD19	33R	E5	R29	560R	D13	cxx27	100nF-Cer	K11
RD20	33R	E5	R30	560R	G9	cxx28	100nF-Cer	K10
RD21	33R	E5	R31	1K	B4	cxx29	100nF-Cer	K10
RD22	33R	E5	R32	33R	A4	cxx30	100nF-Cer	K9
RD23	33R	E5	R33	33R	A4	cxx31	100nF-Cer	K8
RD24	33R	G5	SP	STRAP	C2	cxx33	100nF-Cer	K7
RD25	33R	G5	STRAP0	STRAP	E1	cxx34	100nF-Cer	K7
RD26	33R	G5	STRAP1	STRAP	H4	cxx35	100nF-Cer	K6
RD27	33R	G5	STRAP3	STRAP	B4	cxx36	100nF-Cer	K5
RD28	33R	F5	STR1	STRAP	J5	cxx37	100nF-Cer	K5
RD29	33R	F5	S1	STRAP	D13	cxx38	100nF-Cer	K4
RD30	33R	F5	S2	STRAP	D13	cxx39	100nF-Cer	K4
RD31	33R	F5	S3	STRAP	G10	cxx40	100nF-Cer	K3
RD32	33R	B5	TR1	TR. POT-500R	H13	cxx41	100nF-Cer	K2
RD33	33R	B5	TR2	TR. POT-500R	H13	cxx42	100nF-Cer	K2
RD34	33R	C5	TR3	TR. POT-500R	H13	cyy2	100nF-Cer	C9
RD35	33R	C5	VID-OUT	20P-HEADER	H14	cyy3	100nF-Cer	D9
RD36	33R	D5	VR1	301R-1*-MR25	D2	cyy4	100nF-Cer	E9
RD37	33R	D5	VR2	562R-1*-MR25	C2	cyy5	100nF-Cer	F9
RD38	33R	D5	Vbbreg	LM337KC	E1	cyy6	100nF-Cer	G9
RD39	33R	D5	cbb1	100nF-Cer	B11	cyy7	100nF-Cer	H9
RD40	33R	B6	cbb2	100nF-Cer	A11	cyy9	100nF-Cer	C10
RD41	33R	C6	cbb3	100nF-Cer	A10	cyy10	100nF-Cer	D10
RECLHI	1K2	B13	cbb4	100nF-Cer	B10	cyy11	100nF-Cer	E10
RG	47R	C4	cbb5	100nF-Cer	C10	cyy12	100nF-Cer	F10
RG00	1K	G9	cbb6	100nF-Cer	D10	cyy13	100nF-Cer	G10
RG01	270R	C2	cbb7	100nF-Cer	D11	cyy14	100nF-Cer	H10
RG02	2K7	C3	cbb8	100nF-Cer	C11	cyy16	100nF-Cer	C10
RPD1	33R	B3	cbb9	100nF-Cer	A12	cyy17	100nF-Cer	D10
RPD2	33R	J4	cbb10	100nF-Cer	B12	cyy18	100nF-Cer	E10
RPD3	33R	E4	cbb11	100nF-Cer	C12	cyy19	100nF-Cer	F10
RPD4	33R	F6	cbb12	100nF-Cer	D12	cyy20	100nF-Cer	G10
RPD5	33R	H5	cbb13	100nF-Cer	J10	cyy21	100nF-Cer	H10
RPD6	33R	C13	cbb14	100nF-Cer	J12	cyy22	100nF-Cer	E12
RPU1	1K	B5	cbb15	100nF-Cer	J13	cyy23	100nF-Cer	C11
RPU2	1K	B12	cbb16	100nF-Cer	G12	cyy24	100nF-Cer	D11
RPU3	1K	A12	cbb17	100nF-Cer	J9	cyy25	100nF-Cer	E11
RPU4	1K	B3	cbb18	100nF-Cer	E10	cyy26	100nF-Cer	F11
RPU5	SIL-9x3K3	B2	cbb19	100nF-Cer	E11	cyy27	100nF-Cer	G11
RS	47R	C4	cbb20	100nF-Cer	F11	cyy28	100nF-Cer	H11
RUG	SIL-9x3K3	E3	cbb21	100nF-Cer	J12	cyy29	100nF-Cer	E13
RUG1	SIL-9x3K3	B2	cbb22	100nF-Cer	J10	cyy30	100nF-Cer	C11
R1	Not-mounted	C13	cbb23	100nF-Cer	G11	cyy31	100nF-Cer	D11
R2	Not-mounted	C13	cbb24	100nF-Cer	D14	cyy32	100nF-Cer	H11
R3	1K96-1*-MR25	H12	cbb25	100nF-Cer	F14	cyy33	100nF-Cer	E13
R4	1K96-1*-MR25	H14	cbb26	100nF-Cer	E14	cyy34	100nF-Cer	C12
R5	1K96-1*-MR25	H13	cbb27	100nF-Cer	C13	cyy35	100nF-Cer	D12
R6	Not-mounted	G14	cxx1	10uF/16V-Sol. Al	A2	cyy36	100nF-Cer	H12
R7	Not-mounted	G14	cxx2	100nF-Cer	A2	cyy37	100nF-Cer	C13
R8	Not-mounted	G14	cxx3	100nF-Cer	A3	cyy38	100nF-Cer	D13

		dansk data elektronik a/s	
		her lev hovedgade 199, 2730 herlev, tlf. 02-84 50 11	
Issue	Date	 2600 Component Locations	
0	-----		
1	-----		
2	861101		
3			
4		Parts no.	3
5		Dwg. no.	

Type: SGD Backpanel

Data sheet no.:

Revision no.: 1

Date: 882101

2.4: General description:

2.4.1: Backpanel:

The panel contains six DB25 connectors used for printer/debug port, tablet/mouse, keyboard, host serial connection, and two aux connections. The panel also has one DB15 connector for an ethernet transceiver cable. The DB9 connector is not used in the present version of the SGD.

The panel is connected to the alpha board through a flatcable:

60 pin flatcable:

The 60 pin flatcable connector is used for the interconnection to the alpha board. All the serial communication signals and the +/- 12 V connections are routed via this flatcable. Refer to the technical data sheet for the alpha board for pin assignment for this connector.

The six RS-232 interface ports (DB25) each have the signals:

PIN	SIGNAL

1	Protective GND
2	TxD

3	RxD
4	RTS
5	CTS
6	DSR
7	GND
8	nc
9	-12 V (fuse 0.5 A)
10	nc
11	nc
12	nc
13	nc
14	nc
15	nc (TxC on aux ports)
16	nc
17	nc (RxC on aux ports)
18	nc
19	nc
20	DTR
21	+12 V (fuse 0.5 A)
22	nc
23	nc
24	nc
25	nc

The Ethernet transceiver cable connector (DB15) carries the signals:

PIN	SIGNAL
1	GND (collision pair shield)
2	CD+ (collision detect +)
3	DO+ (transmit pair +)
4	GND (receive pair shield)
5	DI+ (receive pair +)

6	GND	(12 V RETURN)
7	NC	
8	GND	(optional shield)
9	CD-	(collision detect -)
10	DO-	(transmit pair -)
11	GND	(transmit pair shield)
12	DI-	(receive pair -)
13	+12 V	(power to transceiver)
14	GND	(power pair shield)
15	NC	

Shell is protective GND

On the rear side of the cabinet are also a power connector and a fuse, a power outlet for the monitor, an auxiliary power outlet and five coax connectors for monitor signals (see: "interface to monitor" in graphic board technical data sheet).



Supermax Technical Data Sheet

Type:	Service Computer. PCB 4250. Back plane. PCB 4260.
Data sheet no:	28
Revision no:	0
Date:	91-05-06

General Description

The Service Computer (SC) is a stand-alone micro computer, intended for installation in a Supermax. The back plane is always installed in the Supermax. The SC is plugged into the back plane. The Service Computer features:

- Real Time Clock.
- Fan control logic.
- Temperature monitoring.
- Power supply voltage monitoring.
- Supermax statistics.
- Extended error logging.

The Service Computer contains the following parts:

- A MC68000 CPU.
- 512 kB dynamic memory.
- 128 Kb EPROM memory.
- 4 serial channels.
- A battery backed real time clock.
- One 3.5" floppy disk drive.
- Two 8 bit A/D converters.
- One 2400 BPS modem.
- One 9600 BPS Sendfax (optional)

The Service Computer Back Plane contains the following parts.

- Service port amplifier.
- Fan control logic.
- Service port bypass relays.

The Service Computer Back Plane contains the following interfaces.

- Interface to Supermax motherboard.
- Interface to 8 temperature sensors.
- Interface to 8 voltage measurement points.
- Interface to 2 power supplies.
- Interface to one telephone line and one telephone.
- Interface to the Supermax service port.
- Interface to serial back panel.
- Interface to 3 fan units.
- Interface to front panel LCD display.

Adjustment of the Real Time Clock (RTC).

The RTC must be adjusted at the time of production. This adjustment is made with capacitor C03. Wait for the operating temperature to stabilise, before making the adjustment. Connect a counter to the test point CLTST and adjust the frequency to be in the range, 32767.9 Hz – 32768.0 Hz

CLTST		
Pin	Signal	Description
1	Clock	32.768 kHz
2	Gnd	Signal ground

Front panel

Located on the front panel of the SC are two push buttons and a red LED.

- The upper push button is a reset switch. When activated the SC will be reset. It will not reset the Supermax.
- The lower push button is a debug switch. When activated the SC will enter a debug monitor program.
- During normal operation the red LED will be OFF. During any abnormal operation, (boot, self test, error, etc.) the LED will be ON.

Interface to Supermax motherboard

This interface is used to connect various control signals between the SC, the Supermax motherboard and the key switch arrangement on the front panel of the Supermax. The interface is as follows:

J9		
Pin	Signal	Description
1	-KEY	Reset input for the Supermax
2	GND	Ground
3	-INT0	Interrupt input 0
4	GND	Ground
5	-INT1	Interrupt input 1
6	-POWINT	Power fail interrupt from UPS
7	-RESET	Reset output from the Supermax
8	NC	Not used
9	-PSOFF	Power OFF signal for power supplies
10	NC	Not used
11	-RELOFF	Control signal for relay
12	+12V	Power for ON indication
13	-RELON	Control signal for relay
14	GND	Ground
15	REL8	Control signal for relay
16	GND	Ground

Interface to temperature sensors

This interface is used to connect temperature sensors of the type LM35. Temperatures between 0 °C and 120 °C can be measured. The interface is as follows:

JT0 - 7		
Pin	Signal	Description
1	Vcc	Supply voltage
2	Vout	Measured voltage
3	AGND	Analog ground
4	GND	Shield

Interface to voltage measurement points

This interface is used to measure the output voltages of the power supplies. The interface is as follows:

JV1-2		
Pin	Signal	Description
1	+5V	Measured voltage
2	AGND	Analog ground
3	+12V	Measured voltage
4	AGND	Analog ground
5	-12V	Measured voltage
6	AGND	Analog ground
7	+5V	Not used
8	AGND	Analog ground

Interface to power supplies

This interface is used to connect various control signals between the SC and the power supplies. The interface is as follows:

JPS1-2		
Pin	Signal	Description
1	5Vmag	Margin control
2	GND	Ground
3	PF	Power fail interrupt
4	PSOFF	Power OFF signal
5	Ovtmp	Over temperature interrupt
6	NC	Not used
7	Trans	Transient interrupt
8	GND	Ground

Interface to one telephone line and one telephone

The line interface is used to connect the internal modem to the telephone line using a modular jack connector. A telephone can be connected to the phone interface, which is bypassed to the line interface, when the modem is not using the line.

JTLF		
Pin	Signal	Description
1	Phone A	Interface to phone
2	Phone B	Interface to phone
3	Line A	Interface to line
4	Line B	Interface to line

Interface to service port

The interface to the service port is a RS-232C interface, which incorporates a service port amplifier. The service port of all the modules in the Supermax is connected to this port. The SC will take care of any communication with the Supermax modules. If the SC is not installed, the signals from the service port are bypassed to port 1 of the serial back panel.

The line driver IC31 and line receiver IC32 are for the service port.

J3		
Pin	Signal	Description
1	Gnd	Signal ground
3	TxD	Transmit data
5	RxD	Receive data
7	RTS	Request to send
9	CTS	Clear to send
11	DSR	Data set ready
13	Gnd	Signal ground
14	DTR	Data terminal ready

Interface to serial back panel

The interface to the serial back panel can connect up to three serial devices to the SC. Port 1 is used to connect the terminal controlling the SC. This terminal also works as the service port terminal, when the SC is making a transparent connection between port 1 and the service port.

The line driver IC34 and line receiver IC33 are for port 1.

The line driver IC36 and line receiver IC39 are for port 2.

The line driver IC37 and line receiver IC38 are for port 3.

Interface to front panel LCD display

The front panel display consists of a 2 x 24 character LCD display and is used by the SC to display various information. The front panel display is connected to the SC via a 16 pin flat cable.

JF1-3		
Pin	Signal	Description
1	+12V	Positive supply
2	FAN	Fan control
3	GND	Ground

J8		
Pin	Signal	Description
1	+5V	Positive supply
2	Gnd	Signal ground
3	RS	Display control
4	V0	Display control
5	E	Display enable
6	R/-W	Read/write
7	D1	Data bit 1
8	D0	Data bit 0
9	D3	Data bit 3
10	D2	Data bit 2
11	D5	Data bit 5
12	D4	Data bit 4
13	D7	Data bit 7
14	D6	Data bit 6
15	Gnd	Signal ground
16	LED	LED back light

Power Requirements

Voltage		Typical current
+ 5 V ± 5%	3.0 A	
+12 V ± 5%	0.2 A	
-12 V ± 5%	0.2 A	

The power requirements above does not include fan power consumption.

Installation

Before a Service Computer is installed in a Suprmax the following items must be selected or checked:

- Configuration switch.
- Straps on 4250.
- Straps on 4260.

These items are described in detail in the following text.

Configuration switch

The configuration switch SW2 is a 8 position DIP switch, which must be set according to the following.

SW2		
Pin	Setting	Description
1	On	2 power supplies
1	Off	1 power supply
2	On	2 mother boards
2	Off	1 mother board
3	-	Not used
4	On	5.25" floppy disk
4	Off	3.5" floppy disk
5	-	Not used
6	-	Not used
7	On	Check facilities disabled
7	Off	Check facilities enabled
8	On	Diagnose mode
8	Off	Normal mode

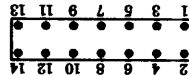
The standard setting for some standard configurations is shown in the following table.

Suprmax 24	On	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Suprmax 12	On	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off
Suprmax 6	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off	Off

Straps on 4250

* designates factory installed position.

ST1:



Watchdog frequency		
	1-2	400 ms
	3-4	800 ms
*	5-6	1600 ms
Timer interrupt frequency		
*	7-8	12.8 ms
	9-10	25.6 ms
	11-12	51.2 ms
	13-14	102.4 ms

ST2:



*	1-2	Battery power is ON
	NC	Battery power is OFF

ST3:



Direction of CD signal on port 1		
	1-2	Output
	2-3	Input
*	NC	Not used

ST4:



	1-2	Output	
	2-3	Input	
*	NC	Not used	

Direction of CD signal on port 2

ST5:



	1-2	Output	
	2-3	Input	
*	NC	Not used	

Direction of CD signal on port 3

ST6:



*	1-2	Connected	
	NC	Disconnected	

Disk change signal from floppy

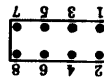
ST7:



*	1-2	External, see ST8	
	NC	Internal	

Clock select, watchdog

• ST8:



Clock select, watchdog		
1-2	12.8 ms	
3-4	26.6 ms	*
5-6	51.2 ms	
7-8	Internal	

ST9, ST10, ST11, ST12, ST13:



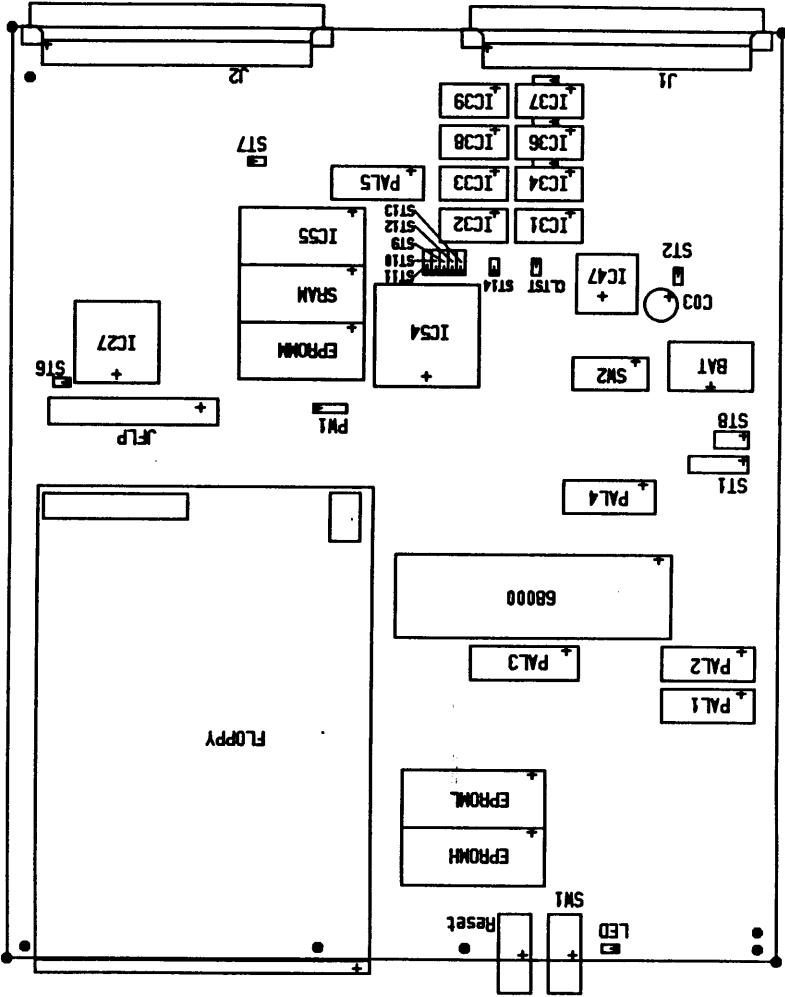
Modem controller select		
1-2	SCH1091	
2-3	SCH1011	*

ST14:



Modem controller select		
1-2	SCH1011	*
	NC	
	SCH1091	

Board layout 4250.



• Straps on 4260

* designates factory installed position.

ST11:



*	1-2	ON
		OFF

ST12:



*	1-2	Active high
		Active low

ST13:



*	1-2	Active high
		Active low

RP1:

The resistor RP1 should be adjusted until the LCD display has the highest possible readability.

11



COMMUNICATION COMMANDS :

```
remsh <host2> [l username] [n] # connection to host2, without login-procedure
remsh <host2> cat <remotefile> >> <localfile>
# copy localfile to remotefile
remsh <host2> cat <localfile> | lp
# printout localfile on remote spooler-printer
ping <host2> # connection-check on host2
arp -g # list of participates on internet
netd [nt] # start netd driver
netstat [-aAn] #
rcp <host1.user1:file> <host2.user2:file>
# remotecopy
rlogin <host2> # remotellogin to host2
ruptime [altu] # status line of each machine on the network
rwho [au] # who's logged on machines on the network
net [start | status | stop] # start-, status on- or stop TCP on machine
```

Cioc - communication :

```
/alib/cioc/oc line.d # file with line-names and protocols
/alib/cioc/addon # installing passwd and license
```

SNA/BSC communication :

```
/alib/cioc/config line=<linename> # configuration of the line
/alib/cioc/mount line=<linename> # mounting the communications line
/alib/cioc/umount line=<linename> # unmounting the communication line
/alib/cioc/status # status on the cioc-communication
/alib/cioc/boot # CIOC software boot
/alib/bsc3270/3270 [statusline-on] [terminal=<terminalno.>] # starting terminal-emulation
/alib/[bsc3270] ; [sna]>/start.print line=<linename> # starting all printer-emulations
/alib/[bsc3270] ; [sna]>/stop.print printer=<printerno.> line=<linename> # stopping printer-emulation
/alib/[bsc3270] ; [sna]>/reset.printer printer=<printerno.> line=<linename> # resetting printer-emulation
```

X.25 - communication :

```
/alib/cioc/config line=x25 # starting x.25-line configuration
/alib/cioc/mount line=x25 # mounting x.25-line
/alib/cioc/umount line=x25 # unmounting x.25-line
/alib/cioc/status line=x25 # status on x.25-line
/alib/x3/startx29 [-v] [-q x25-queue] [-Q x29-queue] [-l logfile]
[line=<linename>] [setupfile] # starting x.29
/alib/x3/stopx29 [-v] [-Q x29-queue] [line=<linename>] [setupfile] # stopping x.29
/alib/x3/pad # start the pad (x.25 user-interface)
```

DDE Data Sheet for Hard Disks

ATASI.....	1
HITACHI	2
MAXTOR.....	3
MICROPOLIS	4
NEC.....	5
PERTEC.....	6
PRIAM.....	7
VERTEX	8
OTHERS	9
SECTION2.1.....	10

DDE Data Sheet for Winchester Disk Drives.

WD 1 REV. 0

MANUFACTURER: ATASI

TYPE: 3046

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:

+5 VDC +- 5 pct., 1.0 Amp typ.

+12 VDC +- 5 pct., 2.5 Amp typ. Starting current 4.5 A typ.

Operating temperature range: 10 to 50 deg. celsius.

CAPACITY:

Unformatted capacity: 46.3 Mb

Number of cylinders: 645

Number of heads: 7

ACCESS TIMES:

Track to track: 3.0 ms

Average: 30.0 ms

Maximum: 60.0 ms

Write precompensation from cylinder: 320

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses buffered mode: Min. 2.5 us. Max. 500 us.

Delay between step pulses non buffered mode: Min. 3 ms.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF STRAPS AND CONNECTORS:

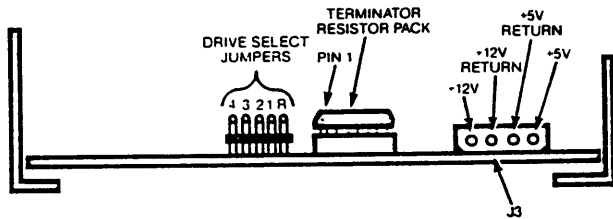


Figure 7 SELECT JUMPER, TERMINATOR AND J3 LOCATIONS

SECTION 5 — PHYSICAL INTERFACE

The interface between the disk drive and the host controller consists of four connections:

- J1 — CONTROL SIGNALS
- J2 — READ/WRITE SIGNALS
- J3 — DC POWER
- J4 — FRAME GROUND

(see Figure 14 for connector locations).

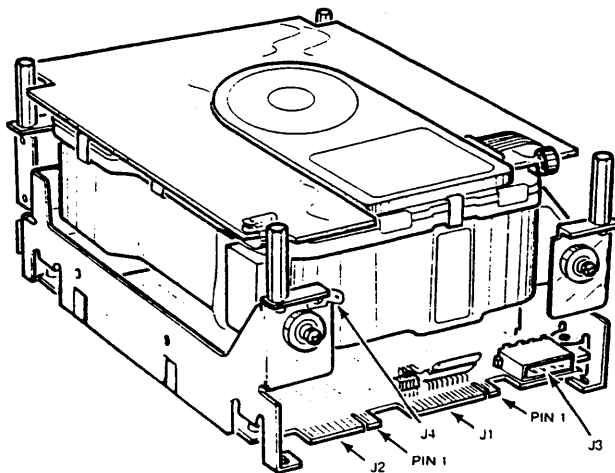


Figure 14 CONNECTOR LOCATIONS

DDE Data Sheet for Winchester Disk Drives.

WD 2 REV. 0

MANUFACTURER: HITACHI

TYPE: DK511-5

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:

+5 VDC +- 5 pct., 2.0 Amp typ.

+12 VDC +-10 pct., 2.5 Amp typ. Starting current 5.0 A typ.

Operating temperature range: 5 to 45 deg. celsius.

CAPACITY:

Unformatted capacity: 51.0 Mb

Number of cylinders: 699

Number of heads: 7

ACCESS TIMES:

Track to track: 8.0 ms

Average: 30.0 ms

Maximum: 55.0 ms

Write precompensation from cylinder: 256

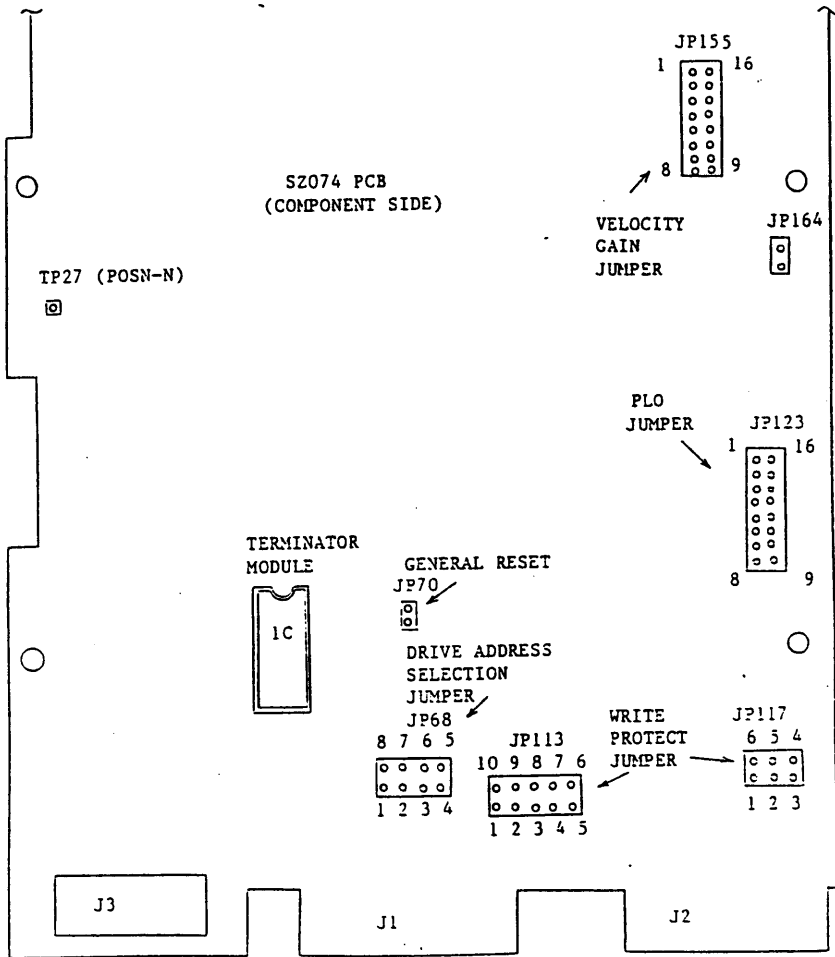
Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses: Min. 0.3 us. Max. 100 us.

HEAD LOCK MECHANISM: None.

LOCATION OF STRAPS AND CONNECTORS:



J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.
J3: POWER CABLE.

1C: TERMINATOR MODULE.

If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

JP68: Drive address selection jumper.

drive address 0:	pin 1 connected to pin 8
drive address 1:	pin 2 connected to pin 7
drive address 2:	pin 3 connected to pin 6
drive address 3:	pin 4 connected to pin 5

JP70: General RESET: Not installed.

JP113: Write protect: Jumper between pin 2 and pin 9.

JP117: Write protect: Jumper between pin 2 and pin 3.

JP164: Not installed.

JP123: Adjustment of PLO free running frequency: DO NOT CHANGE.

JP155: Adjustment of velocity gain: DO NOT CHANGE.



DDE Data Sheet for Winchester Disk Drives.

WD 3 REV. 0

MANUFACTURER: HITACHITYPE: DK511-8FORM FACTOR: 5.25 inch.ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:

+5 VDC +- 5 pct., 2.0 Amp typ.

+12 VDC +- 5 pct., 2.5 Amp typ. Starting current 5.0 A typ.

Operating temperature range: 5 to 45 deg. celsius.

CAPACITY:

Unformatted capacity: 85.7 Mb

Number of cylinders: 823

Number of heads: 10

ACCESS TIMES:

Track to track: 6.0 ms

Average: 25.0 ms

Maximum: 45.0 ms

Write precompensation from cylinder: not specified.

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo.

Delay between step pulses: Min. 0.3 us. Max. 100 us.

HEAD LOCK MECHANISM: None.

LOCATION OF STRAPS AND CONNECTORS:

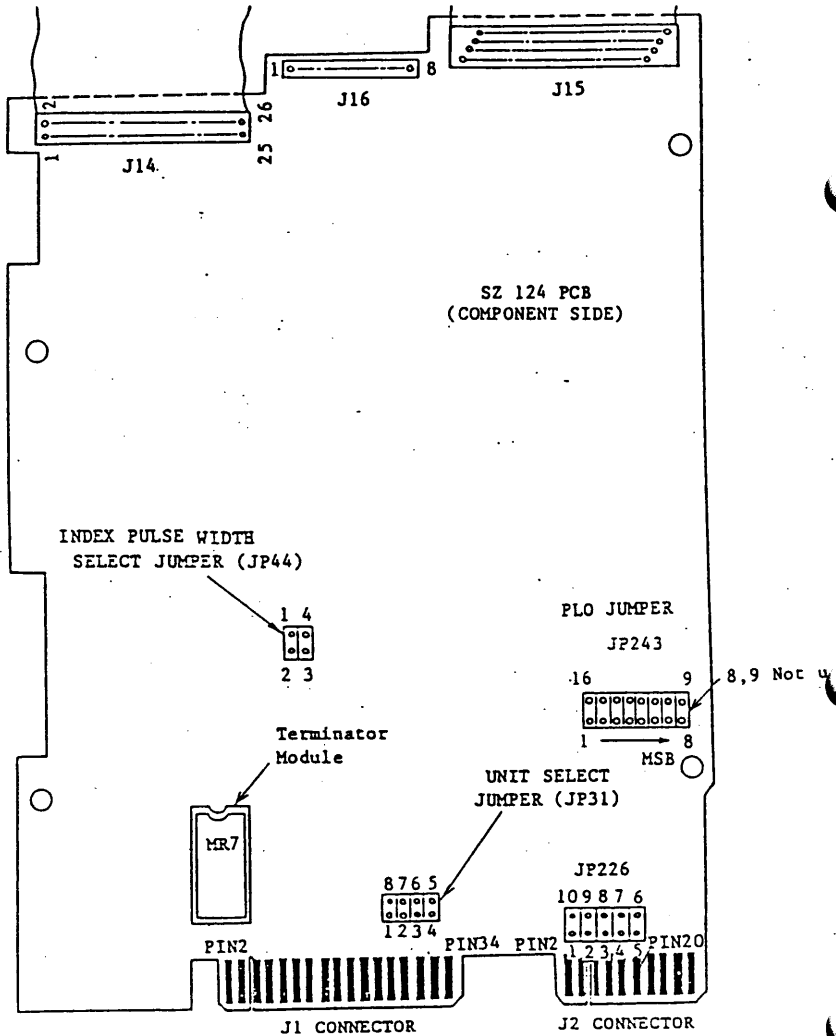


Fig. 1 DK511-8 JUMPERS ON SZ124 PCB

NOTE. The other jumpers unless stated setting-up method in this manual must not be removed.

J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.

MR7: TERMINATOR MODULE.

If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

JP31: Drive address selection jumper.

drive address 0:	pin 2 connected to pin 7
drive address 1:	pin 3 connected to pin 6
drive address 2:	pin 4 connected to pin 5
drive address 3:	pin 1 connected to pin 8

JP44: Index pulse with: Jumper between pin 1 and pin 2.

JP226: Write protect: Jumper between pin 8 and pin 9.
 Jumper between pin 5 and pin 6.

JP243: Ajustment of PLO free running frequency: DO NOT CHANGE.



DDE Data Sheet for Winchester Disk Drives. WD10 REV. 0

MANUFACTURER: MAXTOR TYPE: XT-3280

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:
+5 VDC +- 5 pct., 1.7 Amp typ.
+12 VDC +- 5 pct., 1.8 Amp max. Starting current 4.5 A max.

Power dissipation: 30 W typ. 35 W max.

Operating temperature range: 10 to 45 deg. celsius.

Maximum temperature gradient: 10 deg. celsius/hour.

Operating humidity: 8 pct. - 95 pct. no condensation.

CAPACITY:

Unformatted capacity: 286 Mb

Number of cylinders: 1224

Number of data heads: 15

ACCESS TIMES (including settling time):

Track to track: 4.0 ms

Average: 30.0 ms

Maximum: 54.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindle is stopped using dynamic braking.

CONNECTORS:

J1: SCSI connector.

J2: Power connector.

Pin 1: +12 VDC.

Pin 2: +12 Return.

Pin 3: + 5 Return.

Pin 4: + 5 VDC.

+ designates factory installed position.

CONTROLLER ID:

Controller ID is set by three straps: JP 83, JP 84, JP 85.

ID	JP 85	JP 84	JP 83
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN83, RN82, and RN81 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL MOTOR JUMPER, JP 44:

+ When JP 44 is installed, the spindel motor will start as soon as power is applied.

When JP 44 is removed, the spindel motor will start after a delay time when power is applied. The delay time is 13 seconds multiplied by the the controller ID.

BUS PARITY CHECK, JP 86:

If JP 86 is not installed, the disk drive does not generate or check parity on the SCSI cable.

+ If JP 86 is installed, the disk drive generates and checks parity on the SCSI cable.

DRIVE TYPE, JP 87:

If JP 87 is installed the drive reports its type as XT-3170.

+ If JP 87 is not installed the drive reports its size as XT-3280.

BUS TERMINATOR POWER JUMPERS JP 81, JP 82:

+ If JP 81 is installed the terminator power comes from the disk drive.

If JP 82 is installed the terminator power comes from the SCSI interface.

Write Data Jumper JP 21:

Must be installed.

Write Unsafe Enable Jumper JP 43:

Must be installed.

Off-track Write Disable Jumper JP 41:

Must be installed.

Write Protect Jumper JP 42:

When JP 42 is installed, data cannot be written on the drive.

CAUTION:

Mounting screw lengths must be chosen such that no more than .125" of the screw is available to enter the frame mounting hole.

Torque applied to mounting screws must be between 9 inch*pounds and 12 inch*pounds. (1 - 1.3 Nm).

Data Sheet for Winchester Disks

Supernax Technical Data Sheet, Micropolis 2112S 1.2GB.

Manufacturer: Micropolis

Sheet number: WD 18 revision 1

Type: 3112-15 Series

Form Factor: 3.5" Full-Height

Date: 93-05-04

Interface: SCSI-2, A-cable

General Drive Description.

The Micropolis 2112S 1.2GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 1000 M byte mass storage in a 3.5" full height form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 1.5 msec.

Average: 10 msec.

Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24 to 40 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)

Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 1771

Number of heads: 15

Unformatted capacity: 1209 Mbytes

Formatted capacity: 1000 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V \pm 5% maximum	0.95A	1.05A	0.95A	1.05A	0.95A	1.05A	2%
+12 \pm 5% typical maximum	1.8A 2.0A	2.0A 2.2A	0.6A 0.75A	0.75A 0.9A	0.7A 0.85A	1.6A 2.2A	2%

Average power dissipation: 13 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: -40 to 65 °C.

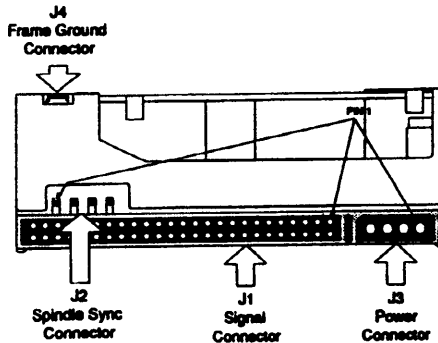
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

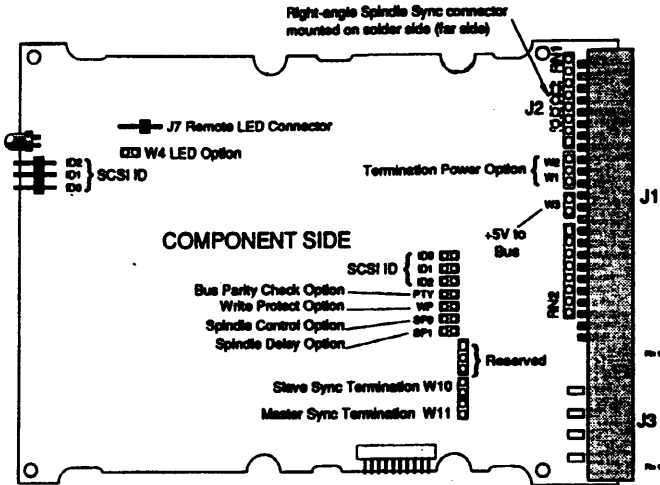
J1: SCSI connector

J2: Spindle Sync connector

J3: Power connector
 Pin 1: +12 VDC
 Pin 2: +12 Return
 Pin 3: +5 Return
 Pin 4: +5 VDC

Configuration options.

Note: There are two identical groups of address jumpers on the Device Electronics board; one group is near the LED, and the other group is in line with SP0, SP1, WP, and PTY. Use either group for address selection but not both at the same time.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

The remote SCSI ID straps (located close to LED) are not used.

Terminator resistors.

Interface terminator pack RN1 and RN2 provide termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

- When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W3 and W1, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.

- Not installed.
- designates factory installed position.

BUS parity check.

When a jumper is installed at PTY, the disk drive does not generate or check parity on the SCSI cable.

- When a jumper is not installed at PTY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at SP0 the disk drive must wait for a Start motor command to start the spindle motor.

- When a jumper is not installed in SP0, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.

When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.

On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.

It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 2112.

SCSI Implementation in Micropolis "MZR" Products.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Micropolis 2105S 640MB

Manufacturer: Micropolis

Sheet number: WD 19 revision 0

Type: 2105 Series

Form Factor: 3.5" Full-Height

Date: 93-04-02

Interface: SCSI-2, A-cable

General Drive Description.

The Micropolis 2105S 640MB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 512 Megabyte mass storage in a 3.5" full height form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 1.5 msec.

Average: 10 msec.

Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 24 to 40 MHz.

Transfer rate at interface: 5 Mbyte/s. (asynchronous)

Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 1728

Number of heads: 8

Unformatted capacity 640 Mbytes

Formatted capacity 512 Mbytes

MTBF: 300.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V \pm 5% maximum	0.95A	1.05A	0.95A	1.05A	0.95A	1.05A	2%
+12 \pm 5% typical maximum	1.8A 2.0A	2.0A 2.2A	0.6A 0.75A	0.75A 0.9A	0.7A 0.85A	1.6A 2.2A	2%

Average power dissipation: 13 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: -40 to 65 °C.

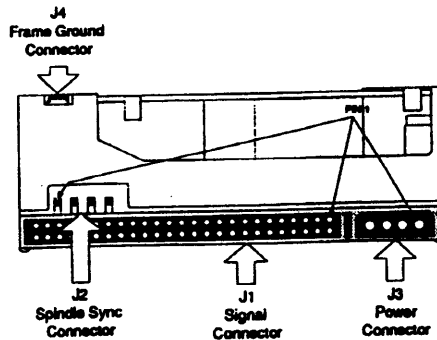
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

J1: SCSI connector

J2: Spindle Sync connector

J3: Power connector

Pin 1: +12 VDC

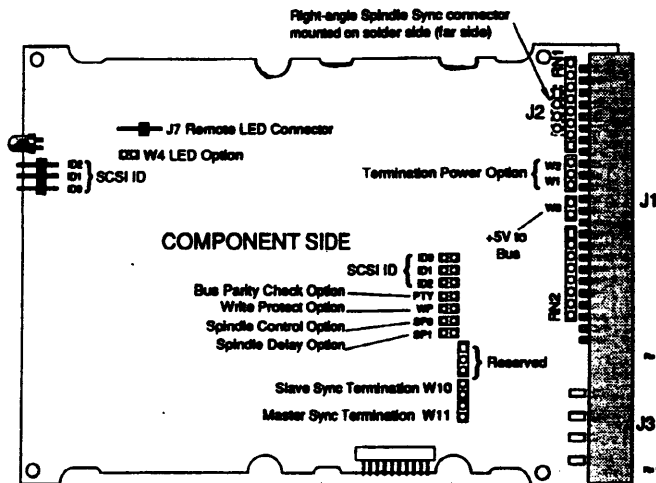
Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.

Note: There are two identical groups of address jumpers on the Device Electronics board; one group is near the LED, and the other group is in line with SP0, SP1, WP, and PTY. Use either group for address selection but not both at the same time.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

The remote SCSI ID straps (located close to LED) are not used.

Terminator resistors.

Interface terminator pack RN1 and RN2 provide termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

- When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W3 and W1, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.

- Not installed.

- designates factory installed position.

BUS parity check.

When a jumper is installed at PTY, the disk drive does not generate or check parity on the SCSI cable.

- When a jumper is not installed at PTY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at SP0 the disk drive must wait for a Start motor command to start the spindle motor.

- When a jumper is not installed in SP0, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperatur and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.

When the disk is to be installed in a cabinet that has been designed for only 5.25" disk drives, an adaptor kit from 3.5" form factor to 5.25" form factor is available.

On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.

It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialise the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenances.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 2105.

SCSI Implementation in Micropolis "MZR" Products.

Data Sheet for Winchester Disks

Supermax Technical Data Sheet, Micropolis 1924S 2.4GB.

Manufacturer: Micropolis

Sheet number: WD 20 revision 0

Type: 1924 Series

Form Factor: 5.25" Full-Height

Date: 93-04-02

Interface: SCSI-2, A-cable

General Drive Description.

The Micropolis 1924S 2.4GB hard disk drive is a random access mass storage device for data and program storage external to main memory. The drive offers 2 Giga byte mass storage in a 5.25" full height form factor.

General performance specifications.

Electrical interface: SCSI-2.

Seek time (including settling time)

Track-to-track (read): 2 msec.

Average: 11.5 msec.

Maximum: 25 msec.

Rotational Latency Average: 5.56 msec.

Media transfer rate: 30 to 40 MHz.

Transfer rate at interface: 4 Mbyte/s. (asynchronous)

Transfer rate at interface: 10 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 2467

Number of heads: 21

Unformatted capacity 2440 Mbytes

Formatted capacity 2047 Mbytes

MTBF: 250.000 POH

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V \pm 5% maximum	1.0A	1.25A	1.0A	1.25A	1.0A	1.25A	2%
+12 \pm 5% typical	4.0A	4.1A	2.1A	2.4A	2.35A	3.5A	2%
maximum	4.2A	4.35A	2.3A	2.8A	2.65A	3.7A	

Average power dissipation: 30 W.

Environment.

Operating temperature range: 5 to 50 °C.

Storage temperature range: -40 to 65 °C.

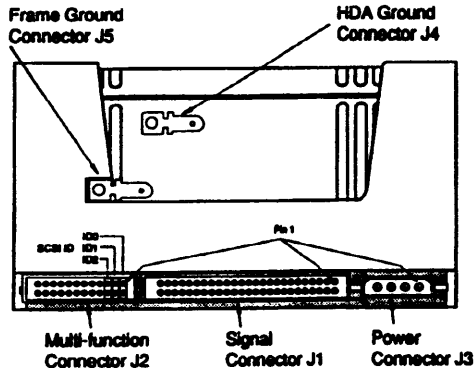
Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

J1: SCSI connector

J2: Multi-function Connector

J3: Power connector

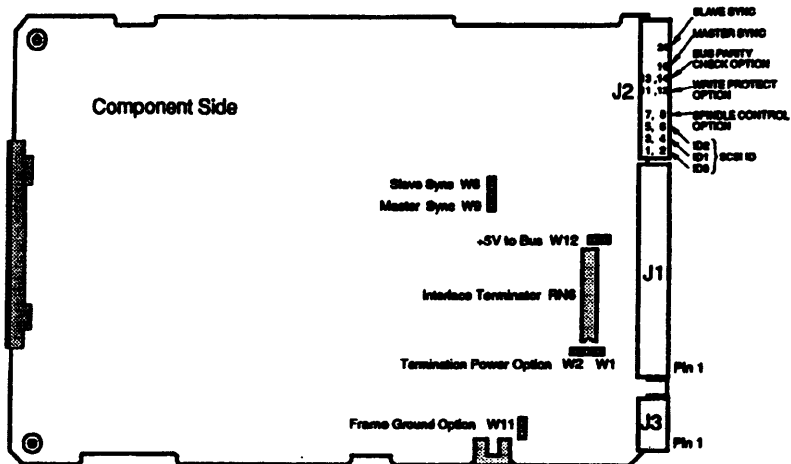
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers are located in J2, ID0 pin 1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN6 provides termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

- When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 28.

When a jumper is installed at both W2 and W12, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 28.

- Not installed.
- designates factory installed position.

BUS parity check.

When a jumper is installed at PARITY, the disk drive does not generate or check parity on the SCSI cable.

- When a jumper is not installed at PARITY, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at Spindle Control, the disk drive must wait for a Start motor command to start the spindle motor.

- When a jumper is not installed in Spindle Control, the drive starts the spindle motor at power up.

Handling and shipping.

When not installed, the disk should be handled observing usual static-discharge procedures and should preferably be kept in the original static shielded bag until it is to be installed in a system. During transportation or shipping the original container should be used in case the disk is not mounted in the computer cabinet. When transported to a customer site the disk must be allowed to adjust to the temperature and humidity conditions of the installation before power is applied to the disk (refer to environment specifications above).

Installation.

The drive has been low level formatted at the factory and need not be reformatted during installation.

On installation, set the ID straps, mount the disk drive, and connect the power and signal cables.

It is recommended to run a short test (e.g. a seek test) using the Diagnostic Programs to ensure that the disk has been correctly connected and can be accessed by the disk controller. The Diagnostic Program is also used to initialize the disk for disk array/dual host systems. Finally the disk configuration is carried out by means of the chhw program.

Preventive Maintenance.

The disk drive does not require any preventive maintenance.

Documentation.

Publications available from Micropolis:
Product Description Micropolis 1924.
SCSI Implementation in Micropolis "MZR" Products.

MISCELLANEOUS FIELD CHANGE NOTICE NO. 27

DATE: 891127

MODULE: Supermax Graphics Display. 2510

CATEGORY: PRODUCTION CHANGE.

IN THE FIELD: TO BE MADE IN CASE OF ERROR.

CORRECTS THE ERROR:

The 2510 board exhibits faults in the test of the alfa palette (test C).

NEEDED TOOLS:

Hand tools.
One pal SG081.

DESCRIPTION:

Replace SG080 (CP08) with SG081.

NO change in PCB revision .
Change ASSY revision to C by removing the letter B.



MISCELLANEOUS FIELD CHANGE NOTICE NO. 20

DATE: 881128

MODULE: Supermax Graphics Display. 2510

CATEGORY: PRODUCTION CHANGE.

IN THE FIELD: TO BE MADE AT A SUITABLE OCCASION.

CORRECTS THE ERROR:

Test program reports error on serial channels 4 and 5.
Altered memory layout for the 1Mbyte version of the 2510.
The test program reports error on the EEPROM.
Missing VCC connection to 81C51.

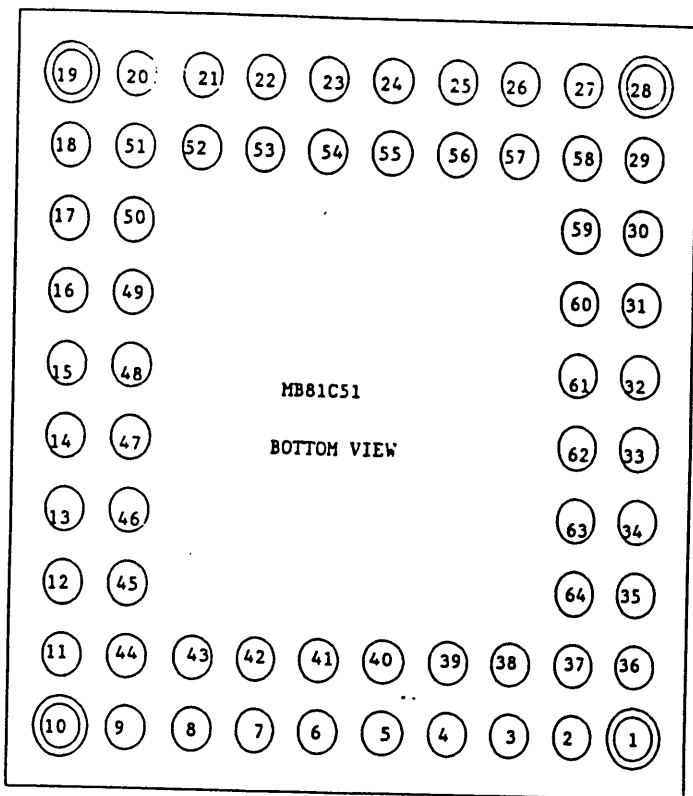
NEEDED TOOLS:

Hand tools.
Solder iron.
One eprom containing firmware 2510-1.0 .
One pal SG271.
One pal SG311.
One pal SG011.
One 3K3 ohm resistor.
Insulated wire.
mfcn21.

DESCRIPTION:

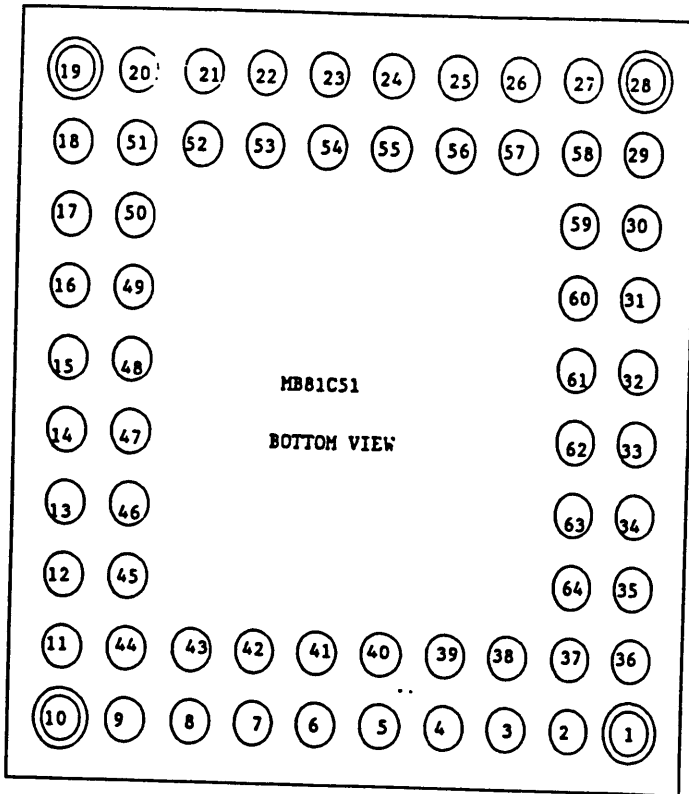
Solder wire from 81C51 pin 61 to 81C51 pin 47.
Solder a 3K3 resistor from CC12 pin 8 to CS32 pin 20 (VCC).
Change current firmware (CP34) to revision 1.0.
Replace SG270 with SG271 (CP27).
Replace SG310 with SG311 (CP31).
Replace SG010 with SG011 (CP01).
Change strapping of ST2 pin 1 and 2 should be short circuited.
perform adjustment procedure .

Remove the letter A in the PCB revision.
Remove the letter A ind the Assy revision.



PIN FUNCTION:

PIN No.	FUNCTION	PIN No.	FUNCTION	PIN No.	FUNCTION
1	N.C.	23	A4	45	TD6
2	MHIT	24	A5	46	TD9
3	HIT0/REP0	25	A7	47	VCC
4	HIT2/REP2	26	A9	48	TD13
5	HIT3/REP3	27	N.C.	49	TD15
6	TD0	28	N.C.	50	TD17
7	TD2	29	FINV	51	TD19
8	EXTH	30	SELK	52	A0
9	MHENBL	31	SE1	53	A2
10	N.C.	32	INR	54	GND
11	TD7	33	INVL	55	A6
12	TD8	34	SET	56	A8
13	TD10	35	H/R	57	PURGE
14	TD11	36	HIT	58	MODE
15	TD12	37	HCO/RCO	59	VINV
16	TD14	38	HC1/RC1	60	SBO
17	TD16	39	HIT1/REP1	61	VCC
18	TD18	40	GND	62	WRITE
19	N.C.	41	TD1	63	RLATCH
20	N.C.	42	TD3	64	PERR
21	A1	43	TD4		
22	A3	44	TD5		



PIN FUNCTION:

PIN No.	FUNCTION	PIN No.	FUNCTION	PIN No.	FUNCTION
1	N.C.	23	A4	45	TD6
2	MHIT	24	A5	46	TD9
3	HIT0/REP0	25	A7	47	VCC
4	HIT2/REP2	26	A9	48	TD13
5	HIT3/REP3	27	N.C.	49	TD15
6	TD0	28	N.C.	50	TD17
7	TD2	29	FINV	51	TD19
8	EXTH	30	SELK	52	A0
9	MHENBL	31	SE1	53	A2
10	N.C.	32	YK	54	GND
11	TD7	33	INVL	55	A6
12	TD8	34	SET	56	A8
13	TD10	35	H/R	57	PURGE
14	TD11	36	HIT	58	MODE
15	TD12	37	HCO/RC0	59	VINV
16	TD14	38	HC1/RC1	60	SBO
17	TD16	39	HIT1/REP1	61	VCC
18	TD18	40	GND	62	WRITE
19	N.C.	41	TD1	63	RLATCH
20	N.C.	42	TD3	64	PERR
21	A1	43	TD4		
22	A3	44	TD5		



Data Sheet for Winchester Disks

Manufacturer: Micropolis

Sheet number: WD 17 revision 0

Type: 1528-15 Series

Form Factor: 5 $\frac{1}{4}$ " Full-Height

Environment.

Electrical interface: SCSI.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V \pm 5% maximum	1.5A	1.5A	1.5A	1.5A	1.5A	1.5A	2%
+12 \pm 5% typical maximum	4.25A 4.35A	4.25A 4.35A	1.80A 2.00A	1.90A 2.10A	2.25A 2.45A	3.10A 3.30A	2%

Average power dissipation: 30 W.

Operating temperature range: 5 to 50 °C.

Storage temperature range: -40 to 65 °C.

Maximum temperature gradient: 24 °C/hour.

Operating humidity : 10 to 90 %, non condensing.

General performance specifications.

Seek time (including settling time)

Track-to-track: 4 msec.

Average: 14.5 msec.

One-Third Strike (maximum): 15.5 msec.

Maximum: 32 msec.

Rotational Latency Average: 8.33 msec.

Media transfer rate: 23.33 Mhz.

Transfer rate at interface: 1.8 Mbyte/s. (asynchronous)

Transfer rate at interface: 4.8 Mbyte/s. (synchronous)

General functional specifications.

Number of cylinders: 2106

Number of heads: 15

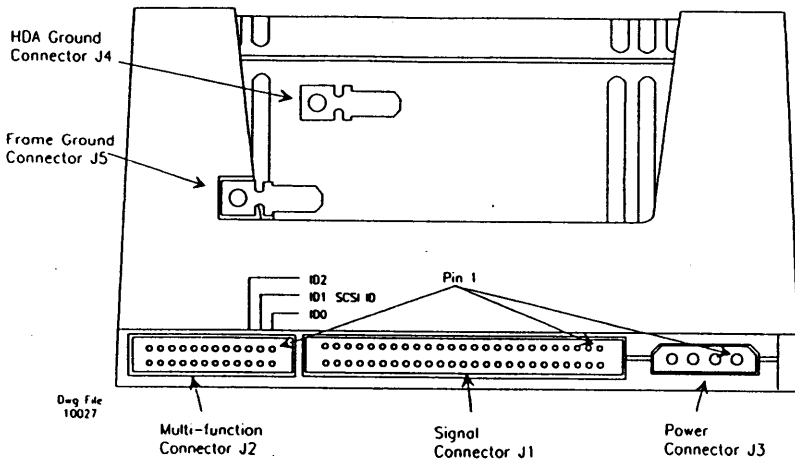
Unformatted capacity 1535 Mbytes

The positioner automatically retracts and locks in a data-free landing zone on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and interface connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector

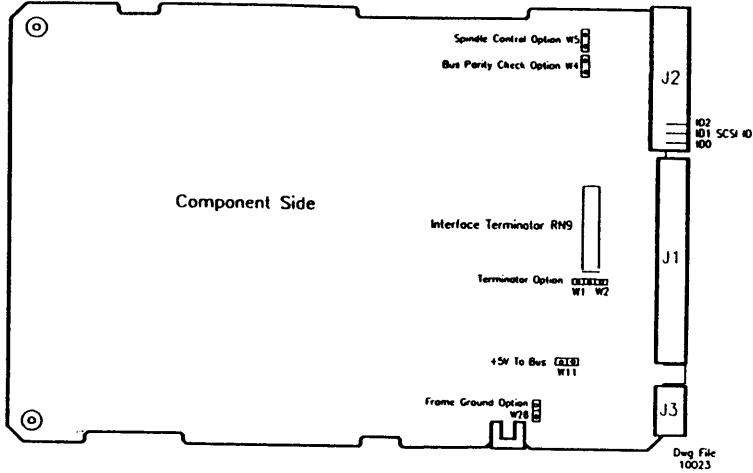
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers are located in J2, ID0 pin 1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provides termination for the interface lines. When more than one disk drive is connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

- * When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W2 and W1, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26.

- * Not installed.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.

- * When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.

- * When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1528-15.

Technical Manual Micropolis 1528-15.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis

Sheet number: WD 16 rev. 0

Type: 1680 Series

Form Factor: 5¼" Half-Height

Environment.

Electrical Interface: SCSI.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ±5% maximum	1.0A	1.1A	1.0A	1.1	1.0A	1.1A	2%
+12 ±5% typical maximum	1.40A	2.00A	0.80A	1.10	0.90A	2.10A	2%
	2.00A	2.20A	1.10A	1.40	1.20A	2.50A	

Average power dissipation: 15 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.

Average: 14 msec.

One-Third Strike (maximum): 15 msec.

Maximum: 30 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 15Mhz.

Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

cylinders: 1780

heads: 7

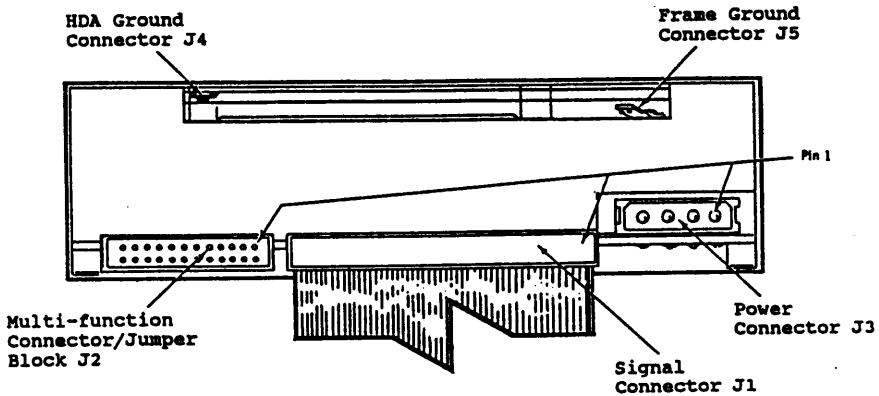
Unformatted capacity 389 Mbytes

The positioner automatically retracts and locks, in a data-free landing zone, on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector

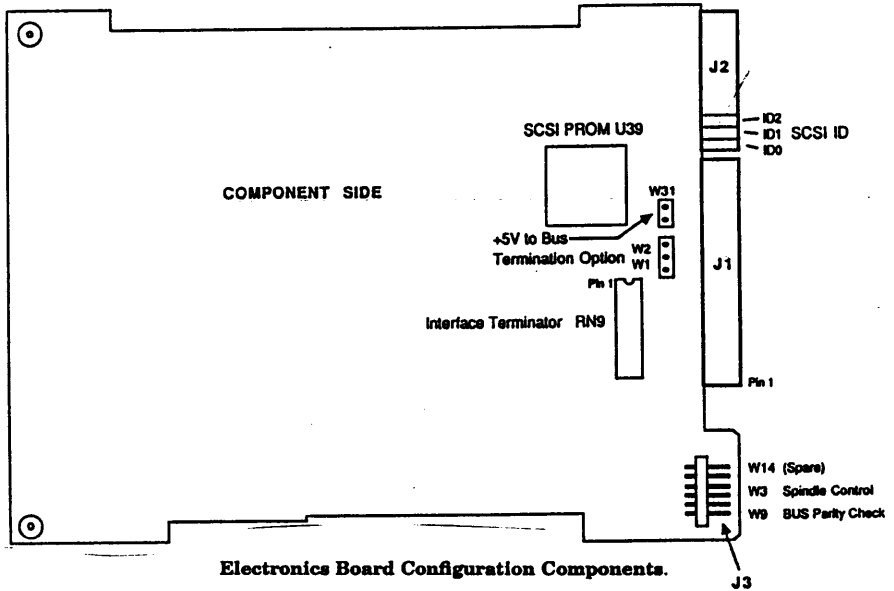
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

(Power connector J3 is on the solder side of the board)

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers is located in J2, ID0 pin1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

* When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

When a jumper is installed at both W2 and W31, the drive provides terminator power to its own terminators, and also to the SCSI cable J1 pin 26. * Not installed.

BUS parity check.

When a jumper is installed at W9, the disk drive does not generate or check parity on the SCSI cable.

* When a jumper is not installed at W9, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W3 the disk drive must wait for a Start motor command to start the spindle motor.

* When a jumper is not installed in W3, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1680 Series.

Tecnical Manual Micropolis 1680 Series.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	Sheet number: WD 15 rev. 0
Type: 1670 Series	Form Factor: 5¼" Half-Height

Environment.

Electrical Interface: SCSI.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ± 5% maximum	2.3A	2.3A	2.3A	2.3	2.3A	2.3A	2%
+12 ± 5% typical maximum	1.75A	2.00A	0.60A	0.90	0.90A	1.80A	2%
	2.00A	2.00A	0.88A	1.00	1.10A	2.00A	

Average power dissipation: 22 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.

Average: 16 msec.

One-Third Strike (maximum): 18 msec.

Maximum: 37 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 10Mhz.

Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

cylinders: 1245

heads: 7

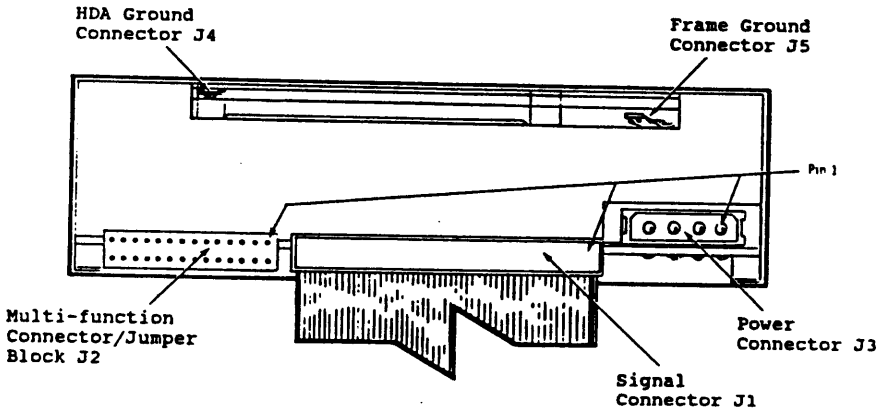
Unformatted capacity 182 Mbytes

The positioner automatically retracts and locks, in a data-free landing zone, on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector

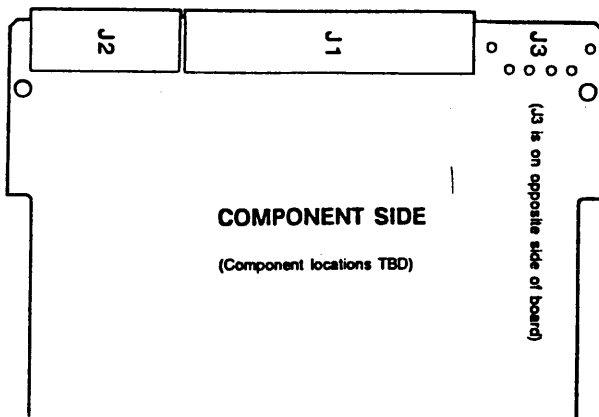
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

SCSI jumpers is located in J2, ID0 pin1-2, ID1 pin 3-4, ID2 pin 5-6.

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

* When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W9, the disk drive does not generate or check parity on the SCSI cable.

* When a jumper is not installed at W9, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W3 the disk drive must wait for a Start motor command to start the spindle motor.

* When a jumper is not installed in W3, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1670 Series.

Tecnical Manual Micropolis 1670 Series.

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis	Sheet number: WD 14 rev. 0
Type: 1580 Series	Form Factor: 5¼"

Environment.

Electrical Interface: SCSI.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ±5% maximum	2.0A	2.0A	2.0A	2.0	2.0A	2.0A	2%
+12 ±5% typical maximum	4.25A	4.25A	1.80A	1.90	2.25A	3.10A	2%
	4.35A	4.35A	2.00A	2.10	2.45A	3.30A	

Average power dissipation: 33 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 %. no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.

Average: 16 msec.

One-Third Strike (maximum): 17 msec.

Maximum: 35 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 15Mhz.

Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

cylinders: 1632

heads: 15

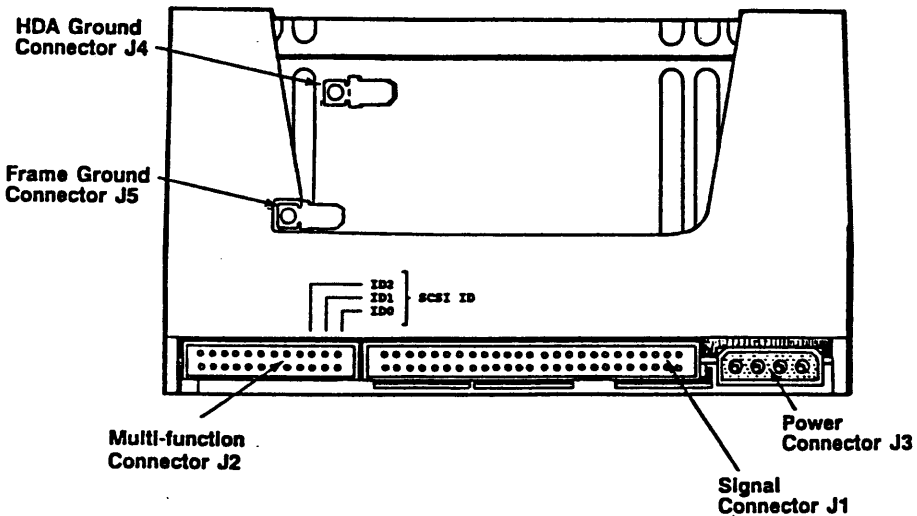
Unformatted capacity 765 Mbytes

The positioner automatically retracts and locks, in a data-free landing zone, on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector

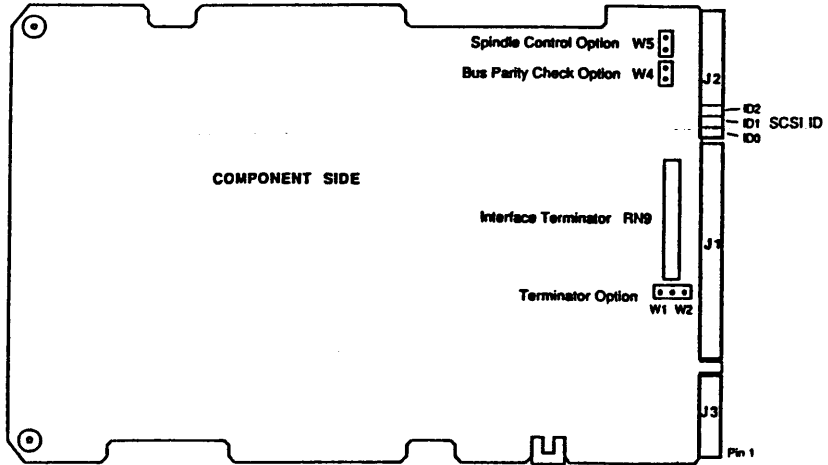
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

SCSi controller ID			
SCSi ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator pack RN9 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminator installed.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

* When a jumper is installed in W1, the drive provides terminator power.

When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.

* When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.

* When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1580 Series.

Tecnical Manual Micropolis 1580 Series.

DDE Data Sheet for Winchester Disk Drives.

WD 13 REV. 0

MANUFACTURER: MICROPOLISTYPE: 1373FORM FACTOR: 5.25"ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:

+5 VDC +- 5 pct., 2.0 Amp max.

+12 VDC +- 5 pct., 3.3 Amp max. Starting current 4.35 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity: 10 pct. - 90 pct. no condensation.

CAPACITY:

Unformatted capacity: 85 Mb

NNumber of cylinders: 1016

Number of heads: 4

ACCESS TIMES (including settling time):

Track to track: 5.0 ms

Average: 23.0 ms

One-Third stroke: 25.0 ms

Maximum: 50.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindle motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J2: Multi function connector.

J3: Power connector.

Pin 1: +12 VDC.

Pin 2: +12 Return.

Pin 3: + 5 Return.

Pin 4: + 5 VDC.

J4: Head Disk Assembly ground connector.

J5: Outer Frame ground connector.

+ designates factory installed position.

CONTROLLER ID:

The controller ID is set by three straps in J2.

Strap between pin 1 and pin 2 in J2: ID0

Strap between pin 3 and pin 4 in J2: ID1

Strap between pin 5 and pin 6 in J2: ID2

ID	ID2	ID1	ID0
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN1, RN7, and RN8 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL CONTROL OPTION:

If J2 pin 7 is connected to J2 pin 8, the disk drive will wait for a Start Spindle Command to start the spindle motor.

+ If J2 pin 7 and J2 pin 8 are not connected, the disk drive starts the spindle motor at power up.

BUS PARITY CHECK:

If J2 pin 9 and J2 pin 10 are connected, the disk drive does not generate or check parity on the SCSI cable.

+ If J2 pin 9 and J2 pin 10 are not connected, the disk drive generates and checks parity on the SCSI cable.

BUS TERMINATION POWER:

A jumper must be installed at W1 or W2 to select the source of power to the terminator packs RN1, RN7, and RN8.

+ When the jumper is installed at W1, the disk drive provides terminator power.

When the jumper is installed at W2, terminator power is provided by the host system via interface cable J1 pin 26.

Note: The maximum torque applied to mounting screws must not exceed 10 inch*lbs. (1.1 Nm).

DDE Data Sheet for Winchester Disks

Manufacturer: Micropolis

Sheet number: WD 12 rev. 1

Type: 1570 Series

Form Factor: 5¼"

Environment.

Electrical Interface: SCSI.

DC Power Requirements							
Voltage	Start-up		Idle		Seeking		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ±5% maximum	2.0A	2.0A	2.0A	2.0	2.0A	2.0A	2%
+12 ±5% typical maximum	4.25A 4.35A	4.25A 4.35A	1.80A 2.00A	1.90 2.10	2.25A 2.45A	3.10A 3.30A	2%

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Storage temperature range: -40 to 65 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity : 10 to 90 % . no condensation.

General Performance Specifications.

Seek time (including settling time)

Track-to-track: 4 msec.

Average: 18 msec.

One-Third Strike (maximum): 19 msec.

Maximum: 40 msec.

Rotational Latency Average 8.33 msec.

Media transfer rate 10Mhz.

Transfer rate at interface 1.6 Mbyte/s. (maximum)

General Functional Specifications.

cylinders: 1224

heads: 15

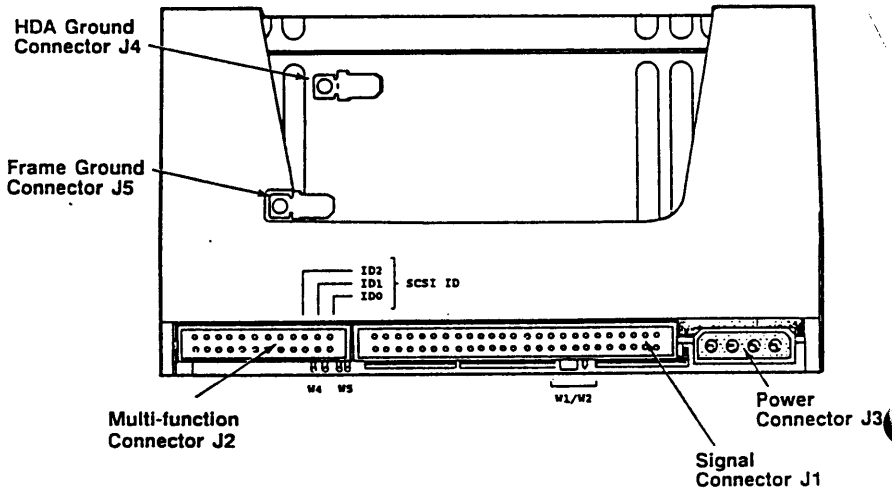
Unformatted capacity 382 Mbytes

The positioner automatically retracts and locks, in a data-free landing zone, on spin-down.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the device electronics board down.

Connectors.



Power and Interface Connections.

J1: SCSI connector

J2: Multi-function connector

J3: Power connector

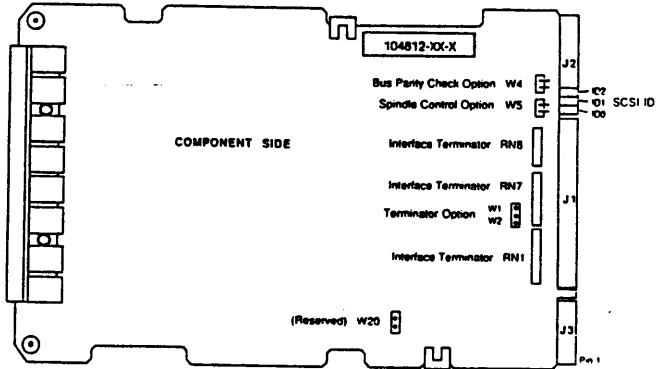
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

* designates factory installed position.

SCSI controller ID			
SCSI ID	ID2	ID1	ID0
ID0	-	-	-
ID1	-	-	x
ID2	-	x	-
ID3	-	x	x
ID4	x	-	-
ID5	x	-	x
ID6	x	x	-
ID7	x	x	x

Terminator resistors.

Interface terminator packs RN1, RN7, and RN8 provide termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

Please note that the orientation of the terminators differs on different versions of the board. Pin 1 is marked on the board.

BUS termination power.

A jumper must be installed at W1 or W2 to select the source of power to the termination.

- * When a jumper is installed in W1, the drive provides terminator power.
- * When a jumper is installed in W2, terminator power is provided by the host system via interface cable J1 pin 26.

BUS parity check.

When a jumper is installed at W4, the disk drive does not generate or check parity on the SCSI cable.

- * When a jumper is not installed at W4, the disk drive generates and checks parity on the SCSI cable.

Spindle control.

When a jumper is installed at W5 the disk drive must wait for a Start motor command to start the spindle motor.

- * When a jumper is not installed in W5, the drive starts the spindle motor at power up.

Documentation.

Publications available from Micropolis:

Product Description Micropolis 1570 Series.
Technical Manual Micropolis 1570 Series.

DDE Data Sheet for Winchester Disk Drives.

WD 9 REV. 0

MANUFACTURER: MICROPOLISTYPE: 1375FORM FACTOR: 5.25"ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:

+5 VDC \pm 5 pct., 2.0 Amp max.
+12 VDC \pm 5 pct., 3.3 Amp max. Starting current 4.35 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 24 deg. celsius/hour.

Operating humidity: 10 pct. - 90 pct. no condensation.

CAPACITY:

Unformatted capacity: 170 Mb

Number of cylinders: 1016

Number of heads: 8

ACCESS TIMES (including settling time):

Track to track: 5.0 ms

Average: 23.0 ms

One-Third stroke: 25.0 ms

Maximum: 50.0 ms

HEAD MOVE MECHANISM:

Rotary voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindle motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J2: Multi function connector.

J3: Power connector.

Pin 1: +12 VDC.

Pin 2: +12 Return.

Pin 3: + 5 Return.

Pin 4: + 5 VDC.

J4: Head Disk Assembly ground connector.

J5: Outer Frame ground connector.

+ designates factory installed position.

CONTROLLER ID:

The controller ID is set by three straps in J2.

Strap between pin 1 and pin 2 in J2: ID0

Strap between pin 3 and pin 4 in J2: ID1

Strap between pin 5 and pin 6 in J2: ID2

ID	ID2	ID1	ID0
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

TERMINATOR RESISTORS:

Interface terminator packs RN1, RN7, and RN8 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

SPINDEL CONTROL OPTION:

If J2 pin 7 is connected to J2 pin 8, the disk drive will wait for a Start Spindle Command to start the spindle motor.

+ If J2 pin 7 and J2 pin 8 are not connected, the disk drive starts the spindle motor at power up.

BUS PARITY CHECK:

If J2 pin 9 and J2 pin 10 are connected, the disk drive does not generate or check parity on the SCSI cable.

+ If J2 pin 9 and J2 pin 10 are not connected, the disk drive generates and checks parity on the SCSI cable.

BUS TERMINATION POWER:

A jumper must be installed at W1 or W2 to select the source of power to the terminator packs RN1, RN7, and RN8.

+ When the jumper is installed at W1, the disk drive provides terminator power.

When the jumper is installed at W2, terminator power is provided by the host system via interface cable J1 pin 26.

Note: The maximum torque applied to mounting screws must not exceed 10 inch*lbs. (1.1 Nm).

DDE Data Sheet for Winchester Disk Drives.

WD 5 REV. 0

MANUFACTURER: MICROPOLIS

TYPE: 1325

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:

+5 VDC +- 5 pct., 0.9 Amp average.

+12 VDC +- 5 pct., 3.3 Amp average. Peak current 3.9 A.

Operating temperature range: 10 to 46 deg. celsius.

Thermal Shock: max. 24 deg. celcius/hour.

This gradient should not be exceeded when moving drive from storage to operation.

CAPACITY:

Unformatted capacity: 85.3 Mb

Number of cylinders: 1024

Number of heads: 8

Maximum number of defective tracks: 85

ACCESS TIMES (including settling time):

Track to track: 6.0 ms

Average: 28.0 ms

Maximum: 62.0 ms

Write precompensation must NOT be used.

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo. Rotary voice coil.

Delay between step pulses: 2 us to 200 us or > 1ms.

Step periods exceeding 20 us will extend access times.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF AND CONNECTORS: Figure 3-1.

J1: COMMAND CABLE. 34 PINS.
J2: DATA CABLE. 20 PINS.
J3: DC POWER INPUT.
J4: FRAME GROUND.

LOCATION OF STRAPS: Figure 3-2.

RN1: TERMINATOR MODULE.

If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

J6: Drive address selection jumper. SHUNT BLOCK Figure 6-1.

DS4 installed: Drive address 4.
DS3 installed: Drive address 3.
DS2 installed: Drive address 2.
DS1 installed: Drive address 1.

Only one connection must be installed.

W2: installed.
W1: Not installed

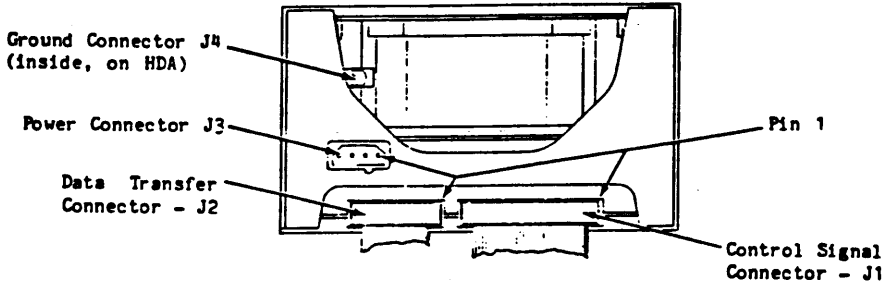
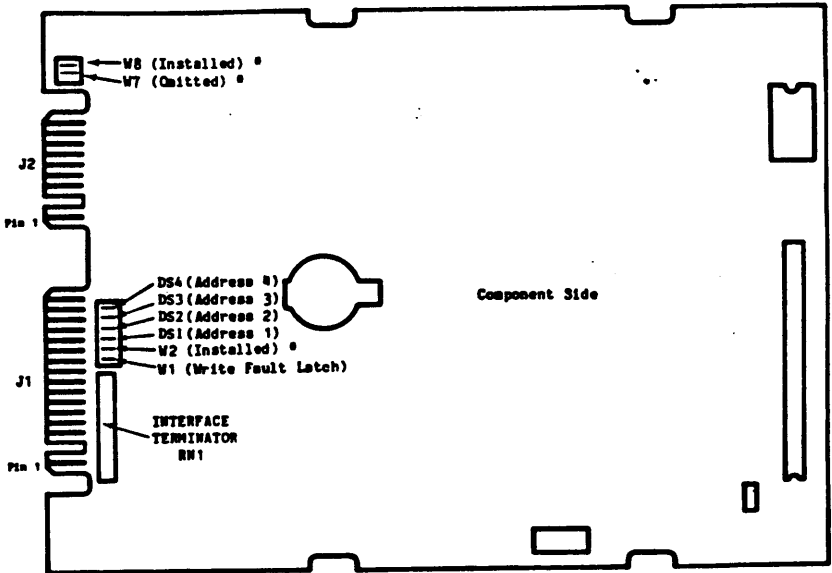


Figure 3-1. Power and Interface Connections



* Options. See Maintenance Manual Micropolis No. 101420.

Figure 3-2. Drive-Address Jumpers and Interface Terminator



DDE Data Sheet for Winchester Disk Drives.

WD 7 REV. 0

MANUFACTURER: NEC

TYPE: D5126

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: ST 506

Power requirements:

+5 VDC +- 5 pct., 1.0 Amp max.

+12 VDC +- 5 pct., 1.8 Amp max. Starting current 2.5 A max.

Temperature range: 5 to 50 deg. celsius.

Humidity: 8 pct. - 80 pct. no condensation.

CAPACITY:

Unformatted capacity: 25.6 Mb

Number of cylinders: 615

Number of heads: 4

ACCESS TIMES (including settling time):

Track to track: 18.0 ms

Average: 85.0 ms

Maximum: 215.0 ms

Write precompensation from cylinder: 128

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: Stepper motor.

Delay between step pulses buffered mode: Min. 3 us. Max. 200 us.

Delay between step pulses non buffered mode: Min. 3 ms.

HEAD LOCK MECHANISM: Automatic.

Before power off, for transportation, it is recommended that the controller commands the drive to seek to cylinder 664.

SWITCHES:

Disk drive number:

DIP switch located in position 02:

SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 1:	ON	OFF	OFF	OFF	OFF	OFF	OFF	OFF

SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 2:	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF

SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 3:	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF

SWITCH NUMBER :	1	2	3	4	5	6	7	8
drive number 4:	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF

TERMINATOR RESISTORS:

Terminator resistors are switched on/off by a DIP switch located in position 2D. When the switches are ON the terminator resistors are connected to the disk drive. When more than one disk drive are connected to a controller in daisy chain only the last disk drive in the chain must have the terminator resistors connected.

DDE Data Sheet for Winchester Disk Drives.

WD 6 REV. 0

MANUFACTURER: NEC

TYPE: D2257

FORM FACTOR: 8"

ENVIRONMENT:

Electrical Interface: SMD

Power requirements:

- +5 VDC +- 5 pct., 4.0 Amp typ.
- 12 VDC +- 5 pct., 1.0 Amp typ.
- +24 VDC +-10 pct., 3.0 Amp typ. Starting current 5.5 Amp.

Temperature range: 5 to 40 deg. celsius.

Relative humidity: 20 pct. - 80 pct without condensation.

CAPACITY:

Unformatted capacity: 167.7 Mb

Number of cylinders: 1024

Number of heads: 8

ACCESS TIMES:

Track to track: 5.0 ms

Average: 20.0 ms

Maximum: 40.0 ms

HEAD MOVE MECHANISM: Track following servo. Rotary actuator.

HEAD LOCK MECHANISM: MANUAL.

SWITCHES:INSTALLATION MODE DIP SWITCH. Position 14A.

BIT(1:4): Binary coded unit number. BIT(1): MSB. BIT(4): LSB.
 BIT(5): Address mode switch.
 BIT(6): Servo offset control
 BIT(7): Motor start delay.
 BIT(8): Motor start mode.

Bit no. 1 2 3 4 5 6 7 8

DDE factory setting: 0 0 0 0 0 0 0 0

If two disk drives are connected to the same controller,
 switch setting on the second disk drive must be changed to:

Bit no. 1 2 3 4 5 6 7 8

0 0 0 1 0 0 1 0

Do not change bit 5, 6, and 8.

CONTROL MODE DIP SWITCH. DO NOT CHANGE. Position 13M.

BIT(1:3): Device type.
 BIT(4): AM mode select.
 BIT(5): RPS mode select.
 BIT(6): FWRP mode select
 BIT(7): TAG4 control
 BIT(8): Interface control.

Bit no. 1 2 3 4 5 6 7 8

DDE factory setting: 0 0 0 1 0 0 0 1

SECTOR SELECT SWITCHES. Position 14M. /

Bit no. 1 2 3 4 5 6 7 8

DDE factory setting 0 1 0 0 0 0 0 0

This switch setting must be used when the disk drive is controlled by NEC DS800B

If the disk drive is controlled by XEBEC S1490 the switch setting must be changed to:

Bit no. 1 2 3 4 5 6 7 8

0 1 1 1 0 0 0 0

Disk drive number

TERMINATOR RESISTORS:

Terminator resistors must only be installed in the last disk drive in the daisy chain, when more than one disk drive are connected to the the same controller.

The terminator resistors are four dual-in-line packages palced in positions 17F, 17G, 17H, and 17J close to connector P1 on board G9QSV.



DDE Data Sheet for Winchester Disk Drives.

WD 8 REV. 0

MANUFACTURER: PERTECTYPE: DX332FORM FACTOR: 8"ENVIRONMENT:

Electrical Interface: SMD.

Power requirements:

+24 VDC \pm 10 pct., 4.5 Amp typ. Maximum current 12 Amp.
+24 VDC \pm 10 pct., 1.0 Amp typ. Maximum current 3 Amp.
+ 5 VDC \pm 3 pct., 2.2 Amp typ. Maximum current 3 Amp.
- 5.2 VDC \pm 3 pct., 2.9 Amp typ. Maximum current 3 Amp.

Temperature range: 10 to 40 deg. celsius operating.

Relative humidity 10 pct. - 80 pct. operating.

Maximum shipping an storage altitude: 6096 meters.

NOTE: "It is recommended that power be applied to the drive 30 minutes prior to recording of data."

CAPACITY:

Unformatted capacity: 332.4 Mb

Number of cylinders: 1649

Number of heads: 10

ACCESS TIMES:

Track to track: 5 ms

Average: 22 ms

Maximum: 45 ms

HEAD MOVE MECHANISM: track following servo.

HEAD LOCK MECHANISM: Automatic.

SWITCHES:

SW3(1): 1 = disable write
0 = enable write

SW3(2): Not used.

SW3(3:4): Drive type. 0 0 for DX332.

SW3(5:8): Sector clock switches

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW3:	0	0	0	0	0	0	0	1

SW2(1:8): Sector clock switches

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW2:	1	0	1	1	0	0	0	0

SW1(1:8): Not used

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
SW1:	1	0	0	0	0	0	0	0

0 = switch open
1 = switch closed

DISK DRIVE NUMBER:

DIP switch position U20

BIT(4:1): binary coded unit number. BIT(4) MSB, BIT(1) LSB.

DDE factory switch setting:

BIT number:	1	2	3	4	5	6	7	8
U20:	0	0	0	0	0	0	0	1

TERMINATOR RESISTORS:

Terminator resistors are mounted on a printed circuit board J3 placed in connector J1A2. When two or more disk drives are connected in a daisy chain, only the last disk drive must contain pull up resistors.



DDE Data Sheet for Winchester Disk Drives.

WD 11 REV. 1

MANUFACTURER: PRIAMTYPE: 717, 728, 738FORM FACTOR: 5.25"ENVIRONMENT:

Electrical Interface: SCSI

Power requirements:

+5 VDC +- 5 pct., 2.1 Amp max.

+12 VDC +- 5 pct., 4.0 Amp max. Starting current 4.5 A max.

Average power dissipation: 38 W.

Operating temperature range: 10 to 50 deg. celsius.

Maximum temperature gradient: 15 deg. celsius/hour.

Operating humidity: 8 pct. - 80 pct. no condensation.

<u>CAPACITY:</u>	<u>717</u>	<u>728</u>	<u>738</u>
Unformatted capacity:	170 Mbyte	280 Mbyte	380 Mbyte
Number of cylinders:	1225	1225	1225
Number of heads:	7	11	15

ACCESS TIMES (including settling time):

Track to track: 5.0 ms

Average (1/3 stroke): 20.0 ms

Maximum: 30.0 ms

HEAD MOVE MECHANISM:

Linear voice coil controlled by track following servo.

HEAD LOCK MECHANISM:

Upon spin down the positioner is retracted and locked and the spindle motor brake is applied.

CONNECTORS:

J1: SCSI connector.

J3: Power connector.

Pin 1: +12 VDC.

Pin 2: +12 Return.

Pin 3: + 5 Return.

Pin 4: + 5 VDC.

J11: Jumper settings.

J14: Frame ground connector.

+ designates factory installed position.

JUMPER SETTING:

controller ID:

The controller ID is set by three straps in J11.

Strap between pin 1 and pin 2 in J11: ID1

Strap between pin 3 and pin 4 in J11: ID2

Strap between pin 5 and pin 6 in J11: ID4

ID	ID4	ID2	ID1
0 +	out	out	out
1	out	out	in
2	out	in	out
3	out	in	in
4	in	out	out
5	in	out	in
6	in	in	out
7	in	in	in

J11 pin 7-8:

in+ : auto sequence up

J11 pin 9-10

in+ : parity enable

J11 : pin 11-12, 13-14:

out+ : blocksize selected by software.

J11 : pin 15-16

out+ : unit attention enabled

J11 : pin 17-18

output: drive ready (not used)

J11 : pin 19-20

out+ : disable write protect

Jumper W3:

out+: soft scsi bus reset

Jumper W5:

out+: no delay on motor start (this jumper is not mounted
on all versions of the
controller board)

Jumper W6:

int+: terminator power to j1-26

TERMINATOR RESISTORS:

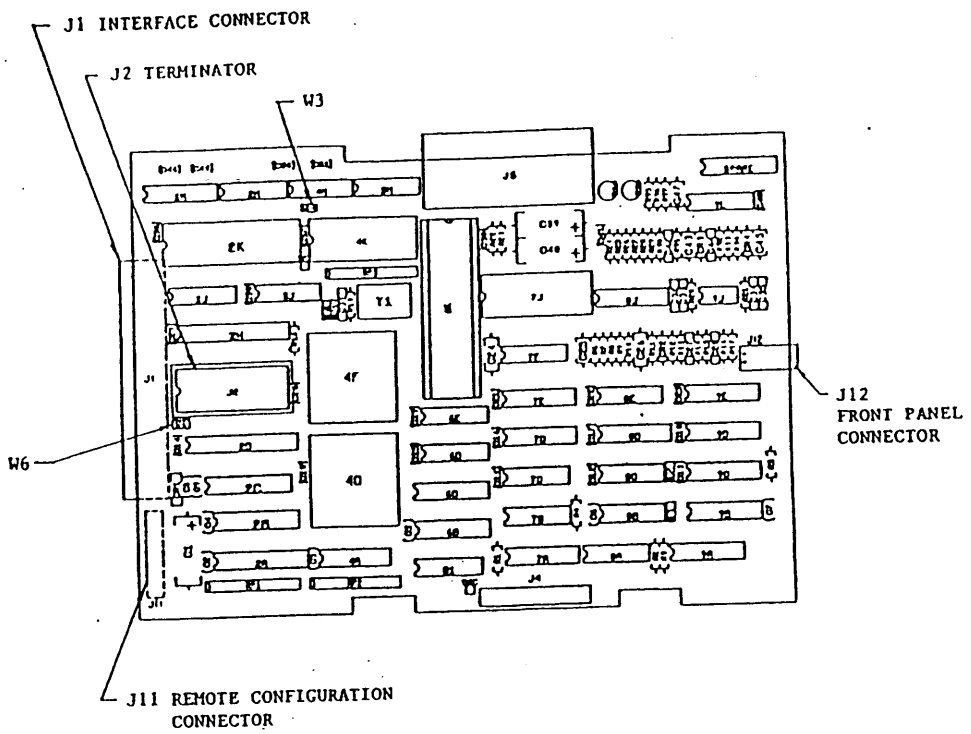
Interface terminator pack J2 provide proper termination for the interface lines. When more than one disk drive are connected to the SCSI cable the last disk drive and only the last disk drive on the cable must have terminators installed.

DOCUMENTATION:

Publications available from PRIAM:

OEM/service manual 717/728/738 winchester disk drives.
P/N 308080

Priam specification models 717, 728, and 738 SCSI interface.
P/N 300971



SCSI interface connector/switch placement



DDE Data Sheet for Winchester Disk Drives.

WD 4 REV. 0

MANUFACTURER: VERTEX

TYPE: V185

FORM FACTOR: 5.25 inch.

ENVIRONMENT:

Electrical Interface: ST 506.

Power requirements:

+5 VDC +- 5 pct., 1.5 Amp typ.
+12 VDC +-10 pct., 2.8 Amp typ. Starting current 4.5 A typ.

Operating temperature range: 4 to 50 deg. celsius.

CAPACITY:

Unformatted capacity: 85.0 Mb

Number of cylinders: 1166

Number of heads: 7

Maximum number of defective tracks: 85

ACCESS TIMES:

Track to track: 5.0 ms

Average: 30.0 ms

Maximum: 65.0 ms

Write precompensation must NOT be used.

Reduced write current from cylinder: not used.

HEAD MOVE MECHANISM: track following servo. Rotary voice coil.

Delay between step pulses: Min. 5 us.

Step periods exceeding 39 us will extend access times.

HEAD LOCK MECHANISM: Automatic.

LOCATION OF STRAPS AND CONNECTORS: Figure 6-1.

- J1: COMMAND CABLE. 34 PINS.
- J2: DATA CABLE. 20 PINS.
- J3: DC POWER INPUT.
- J4: FRAME GROUND.

RP1: TERMINATOR MODULE. Figure 11-3.

If multiple drives are connected in daisy chain mode, only the last drive must be terminated.

J6: Drive address selection jumper. SHUNT BLOCK Figure 6-1.

- pin 1 - pin 16 open
- pin 2 - pin 15 open
- pin 3 - pin 14 open
- pin 4 - pin 13 open
- pin 5 - pin 12 drive address 3 if shorted
- pin 6 - pin 11 drive address 2 if shorted
- pin 7 - pin 10 drive address 1 if shorted
- pin 8 - pin 9 drive address 0 if shorted

Only one connection must be installed.

J12: PCB Option Pads. Figure 6-1.

No connections installed.

6.1 Physical Interface Overview

The electrical interface between the V100 and the host controller is via four connectors:

1. J1—Control signals (multiplexed)
2. J2—Read/write signals (radial)
3. J3—DC power input
4. J4—Frame ground

Refer to Figure 6-1 for connector locations.

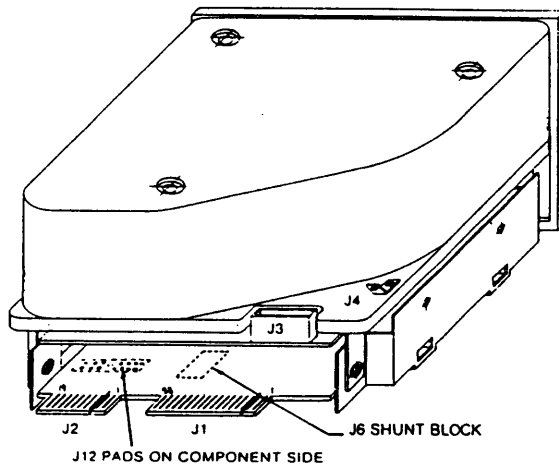


Figure 6-1
Interface Connector Physical Locations

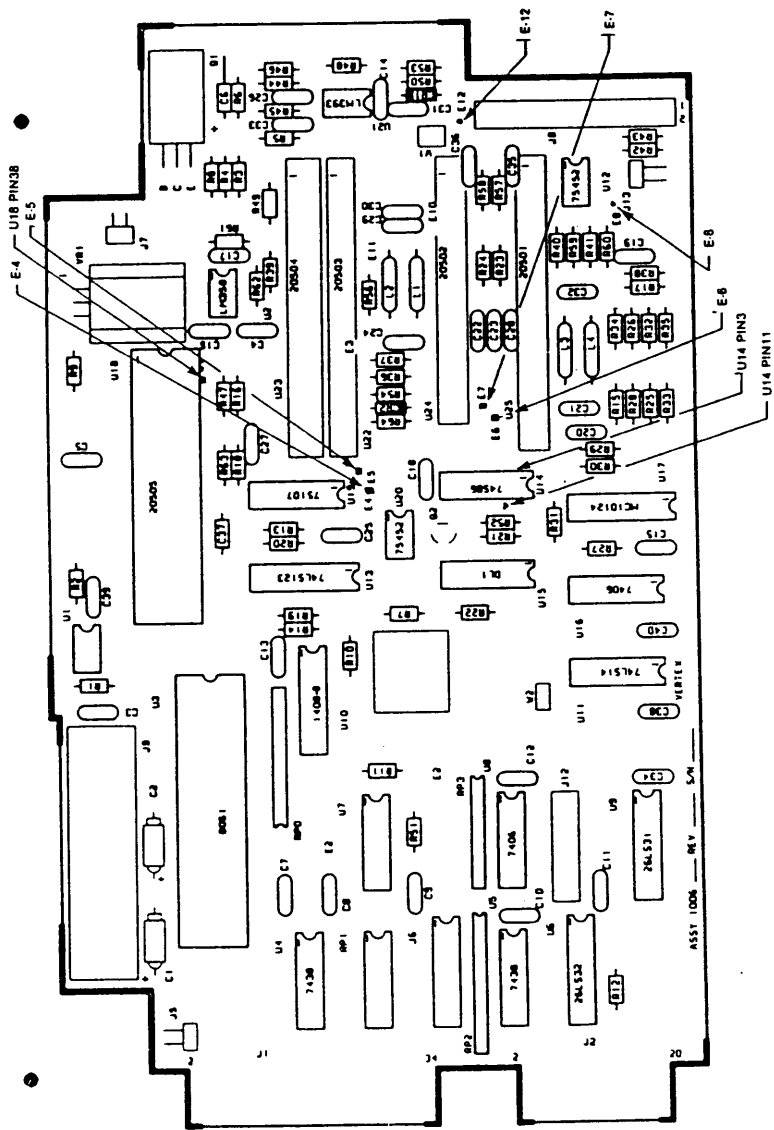


Figure 12-3
M.L.C.2.X Test Point Locations
Data PCB

Adaptec ACB 4000

The Adaptec ACB 4000 controller can control up to two 5.25 inch winchester disk drives with ST-506 interface.

The controller is not initialized by the program. At reset time the controller reads the disk parameters from the disk. Therefore, the program is able to read the disk parameters from the controller. If the controller is unable to read the parameters, the program will report an error. The following disk parameters are read by the program from the controller or typed in by the user:

Number of cylinders
Number of heads
Starting reduced write current
Starting write precompensation
Step period

If the user wants to modify these parameters, it will only affect the controller if the drive is formatted.

The control byte must always be set to 00 Hex. Error correction and retries cannot be disabled.

Adaptec controller has 33 sectors/track when using interleave factor 2 or more, but only 32 sectors/track using interleave factor 1.



3.0 HARDWARE INSTALLATION

3.1 INTRODUCTION

This section describes the steps necessary to install the ACB-4000A and 4070 hardware. First the operating environment, unpacking procedure, and board layout are described. This section also describes the integration of the drive, controller, and host adapter.

3.2 ENVIRONMENTAL REQUIREMENTS

The ACB-4000 Series Controllers will perform properly over the following range of conditions:

	<u>Operating</u>	<u>Storage</u>
Temperature (F/C)	32/0 to 131/55	-40/-40 to 167/75
Humidity	10% to 95%	10% to 95%
Altitude, feet	Sea level to 10,000	Sea level to 20,000
MTBF, Hours	20,000 POH @ 55 C	

3.3 UNPACKING

The carrier is responsible for damage incurred during shipment. In case of damage, have the carrier note the damage on both the delivery receipt and the freight bill, then notify your freight company representative so that the necessary insurance claims can be initiated.

After opening the shipping container, use the packing slip to verify receipt of the individual items listed on the slip. Retain the shipping container and packing material for possible later reuse should return of the equipment to the factory be necessary.

NOTE:

THE ACB-4000A AND 4070, LIKE ALL ELECTRONIC EQUIPMENT, ARE STATIC SENSITIVE. PLEASE TAKE THE PROPER PRECAUTIONS WHEN HANDLING THE BOARD. KEEP THE BOARD IN ITS CONDUCTIVE WRAPPING UNTIL IT IS CONFIGURED AND READY TO BE INSTALLED IN YOUR SYSTEM.

3.4 BOARD LAYOUT

The ACB-4000A is shown in Figure 3-1. The ACB-4070 is shown in Figure 3-2. These figures show the location of the firmware, key components, terminators, jumpers and connectors.

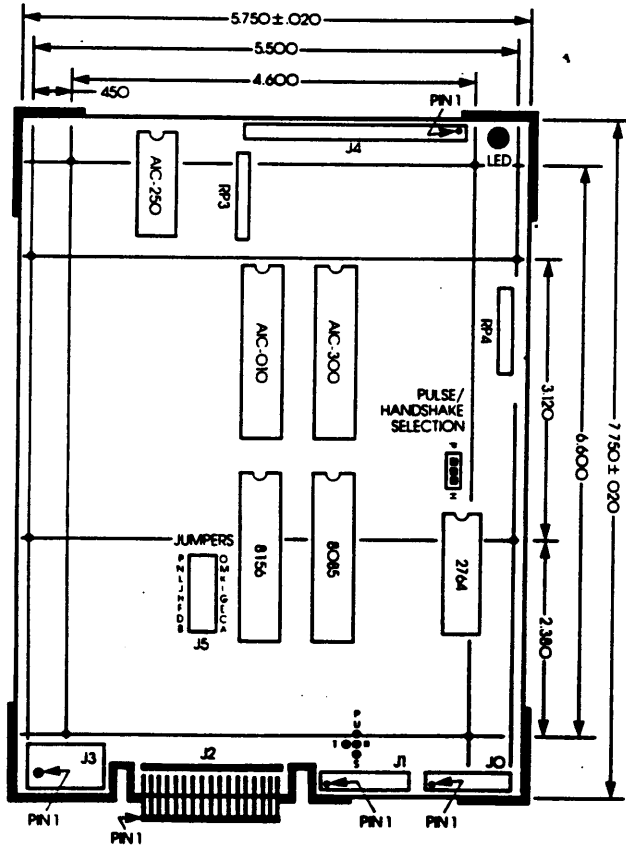


FIGURE 3-1. ACB-4866A BOARD LAYOUT

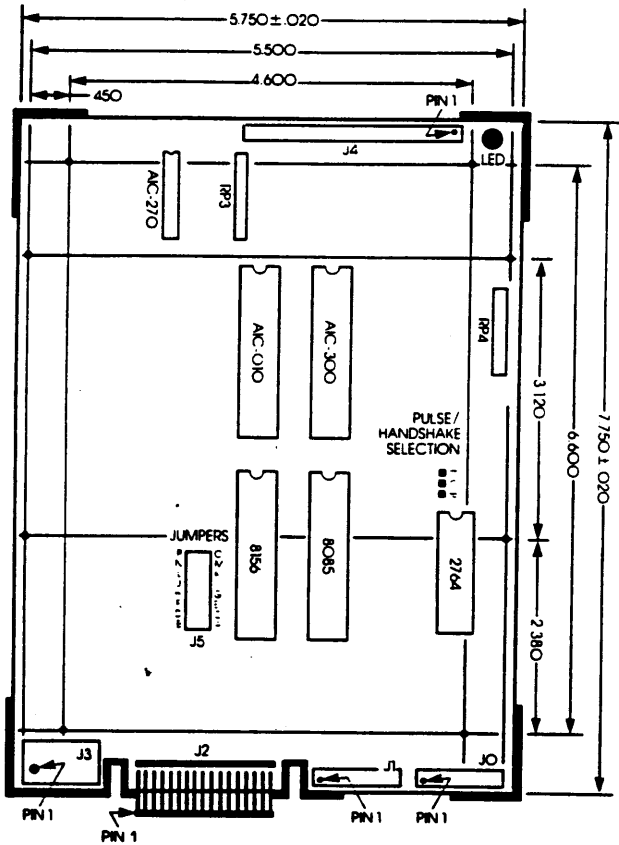


FIGURE 3-2. ACB-4070 BOARD LAYOUT

3.5 INTEGRATION OF CONTROLLER AND DRIVE

To install the Adaptec ACB-4000A or 4070 board into your system you must first configure the drive(s), set the controller jumpers and connect the drive cables properly. This section describes all the necessary steps needed to successfully install this hardware.

In order to configure the drives, you need the Disk Drive OEM Manual that was supplied with your drive. (If you do not have this manual call your Drive vendor for assistance.) This manual is required to obtain the drive characteristics for your particular drive.

3.5.1 DRIVE SELECTION AND TERMINATION

The drive changeable parameters are the drive selection switches (or jumpers) and the drive termination. These parameters allow a drive to be selected as drive 0, 1, 2 or 3. This is accomplished by changing the drive address selection switches or jumpers.

NOTE:

SOME DRIVE MANUFACTURERS HAVE DESIGNATED THE DRIVE ADDRESSES TO BE 1,2,3,4 INSTEAD OF 0,1,2,3. DO NOT SET THE DRIVE AS A RADIAL SELECTED DRIVE. RADIAL SELECTION WILL SET ALL DRIVE OUTPUT SIGNALS TO BE ACTIVE, EVEN IF THE DRIVE IS NOT SELECTED. IN THIS CASE, THE DRIVE LED WILL BE ON AT ALL TIMES.

Use the two lowest drive addresses available as drive "0" and drive "1" to be seen by the controller.

Before the drives can be cabled to the controller the drive cable terminator must be properly set. The terminator is used to reduce signal "ringing" in the cables. The terminator, as its name implies, must be at the end of each cable in order to have the controller and drive communicate properly. The controller has a permanent terminator built-in. The disk drives, since they can be connected in a daisy chain configuration have a removable terminator. This is usually a 16-pin DIP resistor package. The last physical drive in the chain must have its terminator installed (see Figures 3-3 and 3-4).

Example 1: When one drive and one controller are used, both must be terminated.

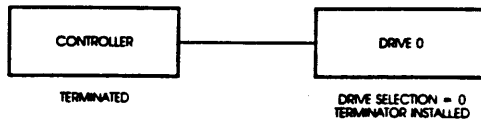


FIGURE 3-3. ONE DRIVE, ONE CONTROLLER TERMINATION EXAMPLE

Example 2: When two drives and one controller are used, only the last one in the chain is terminated.

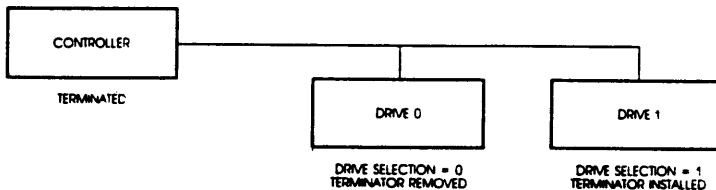


FIGURE 3-4. TWO DRIVES, ONE CONTROLLER TERMINATION EXAMPLE

Now select the proper drive addresses and remove or install the required terminators for your configuration.

3.5.2 CONTROLLER JUMPER SELECTION

The controller changeable parameters are defined as the variables that can be changed on the controller to accommodate the different drive characteristics. These parameters can easily be changed by use of the MODE SELECT command and by the use of the jumpers defined in Table 3-1.

TABLE 3-1. DEFINITION OF JUMPERS

<u>Jumper</u>	<u>Definition</u>	<u>Installed</u>	<u>Removed</u>
A-B	LSB of Controller's SCSI Address	bit = 1	bit = 0
C-D	Controller's SCSI Address	bit = 1	bit = 0
E-F	MSB of Controller's SCSI Address	bit = 1	bit = 0
G-H	DMA Transfer Rate	SYSCLOCK/4	DATALOCK/2
I-J	Extended Command Set (See Appendix D)	Enabled	Disabled
K-L	Not Used		
M-N	Support of Syquest 312, DMA 360 and drives that drop SEEK COMPLETE signal during head switching	Enabled	Disabled
O-P	Self Diagnostics	Enabled	Disabled
R-PU *	Write Precompensation turned off for both drives	Enabled	Disabled
R-S *	Write Precomp starts at same cylinder as reduced write current for both drives	Enabled	Disabled
R-T *	Write Precomp is applied to all tracks for both drives	Enabled	Disabled

NOTE: * denotes that these jumpers are for the ACB-4000A only, they are not present on the ACB-4070.

The jumpers are divided into five categories: SCSI address, host adapter options, drive options, write precompensation options and self diagnostics.

Jumpers A-B, C-D and E-F are used to select the controller's SCSI device ID or address. They determine how the controller will be identified when installed in the SCSI bus.

Jumper G-H is used to select two DMA transfer rates on the SCSI bus. When removed, the controller will transfer data at the maximum rate allowed by the controller, equal to $\text{DATA\!CLOCK}/2$. Some host adapters cannot support this data rate. When this jumper is installed, the data transfer rate is reduced to run at a rate of $\text{SYSCLOCK}/4$ on single sector transfers. This is one-half of the controller's maximum DMA speed. Multisector transfers are always made at the maximum rate of $\text{DATA\!CLOCK}/2$, with or without this jumper.

Jumper I-J is used to enable the extended command set. This is used only when replacing SASI-type controllers. See Appendix D for details.

Jumper M-N is installed to support drives that drop the SEEK COMPLETE line on the ST506/412 interface during head switches. Soft-sectored removable media drives that have wedge servo information of all surfaces require this jumper to be installed. Syquest 312 10 MB and DMA 360 10 MB drives require this jumper to be installed. The installation of this jumper does not affect operation of drives that do not drop SEEK COMPLETE between head switches.

Jumpers R-PU, R-S and R-T are used to select write precompensation for both drives. Only one of these options can be used at a time. This hardware jumper overrides any software selection made in the MODE SELECT command (see Section 5). The write precompensation used is 12ns. The ACB-4070 controller does not have these jumpers since 2,7 RLL encoding does not use write precompensation. Please see Figure 3-1 for location of these jumpers.

NOTE:

ON THE ACB-4000A, THESE JUMPERS ARE ORIENTED DIFFERENTLY THAN ON THE ACB-4000.

Jumper O-P is used to enable the ACB-4000 Series Controllers' Self Diagnostics. These diagnostics test the internal circuitry of the controller and can be used for incoming inspection of boards and test the internal circuitry of the controller. See Section 6 for operation and associated error codes.

Configure the jumpers at this time to meet your drive and system requirements.

3.5.3 CONTROLLER AND DRIVE CABLING

Now that the drive and controller are configured, they can be connected together. The controller has three drive cable connectors J0, J1, and J2. These are described in Table 3-2.

TABLE 3-2. CONTROLLER TO ST506/412 CONNECTOR DEFINITIONS

<u>Connector</u>	<u>Signals</u>	<u>Cable</u>
J0	Data	20-pin flat ribbon cable Connected to drive 0
J1	Data	20-pin flat ribbon cable Connected to drive 1
J2	Control	34-pin flat ribbon cable Connected to both drives 0 and 1

<u>Connector</u>	<u>Recommended Plug</u>	<u>Maximum Length</u>
J0	3M Part # 3421	20 feet (6 meters)
J1	3M Part # 3421	20 feet (6 meters)
J2	3M Part # 3414	20 feet (6 meters)

The connector locations and pin orientation for the ACB-4000A connectors are shown in Figure 3-1, and for the ACB-4070 in Figure 3-2.

NOTE:
PIN 1 OF J0, J1 AND J2 IS LOCATED ON THE SIDE CLOSEST TO THE POWER CONNECTOR.

Connect the cables as shown in Figure 3-5.

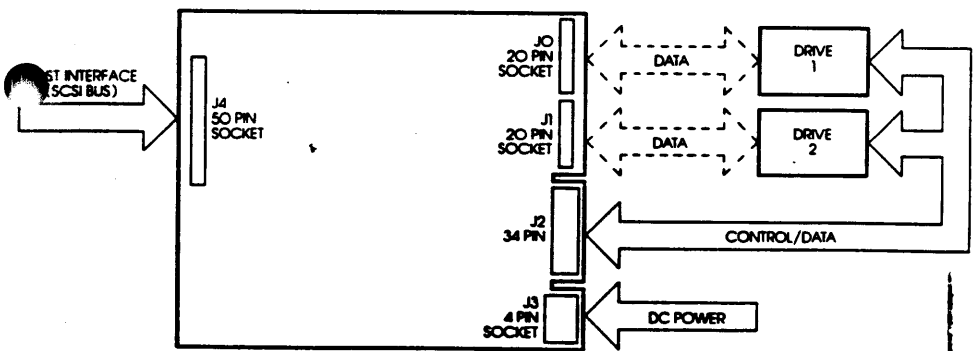


FIGURE 3-5. CONTROLLER CABLING

3.5.4 CONTROLLER POWER REQUIREMENTS AND GROUNDING

The power requirements for the ACB-4000 Series Controllers are shown in Table 3-3.

TABLE 3-3. POWER REQUIREMENTS

<u>Voltage</u> (Volts)	<u>Tolerance</u>	<u>Current</u> (Max. Amps)	<u>Ripple</u> (Volts, RMS)
+5 VDC	+/- 5%	1.5 A	150 mV
+12 VDC	+/- 10%	300 mA	150 mV

The power is applied through the 4-pin connector J3. The recommended mating connector is AMP Part # 1-480424-0. Connector J3 pin assignments are shown in Figure 3-6.

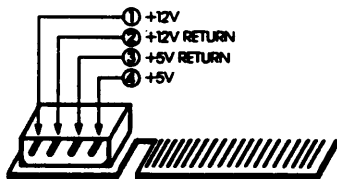


FIGURE 3-6. POWER CONNECTOR J3

The ACB-4000 Series Controller and attached Disk Drives should be grounded using a Single Point Grounding Scheme. This scheme connects all grounds from controller, drives, plus all other major components within the cabinet to one point that is then connected to the chassis ground. See Figure 3-7.

NOTE:

IF PROPER GROUNDING IS NOT FOLLOWED, RANDOM FORMAT, WRITE AND READ ERRORS MAY OCCUR.

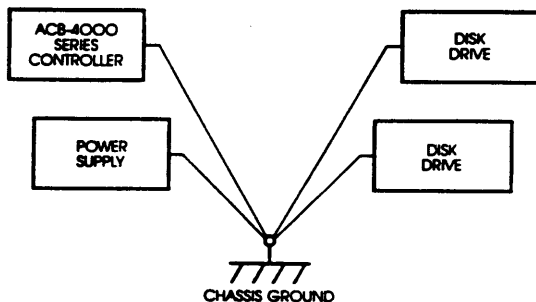


FIGURE 3-7. SINGLE POINT GROUNDING SCHEME

3.6 INTEGRATION OF CONTROLLER AND HOST ADAPTER

Now that the controller and drive have been configured, the controller must now be attached to the SCSI host adapter. The successful integration of controller and host adapter must take into account controller addressing, termination, cabling and the correct implementation of SCSI used by the host adapter and controller. This section addresses these topics.

NOTE:

IF A SASI-TYPE HOST ADAPTER IS USED, OR IF YOU ARE REPLACING A SASI-TYPE CONTROLLER WITH THE ACB-4000 SERIES CONTROLLERS, PLEASE SEE APPENDIX D FOR TIMING AND SOFTWARE CONSIDERATIONS.

3.6.1 ACB-4000 SERIES SCSI HARDWARE IMPLEMENTATION

The ACB-4000 Series Controllers support the proposed ANSI Standard X3T9.2/82-2 Revision 14, Small Computer System Interface (SCSI).

The ACB-4000 Series supports 17 active lines and 25 ground lines in a 50-pin flat cable. All odd number pins are ground. This is known as an unbalanced SCSI bus. The bus has open-collector drivers and is terminated at both ends by a 220 ohm pull-up resistor to +5V and a 330 ohm pull-down resistor to ground. The bus is low-active, thus a grounded line is considered active or asserted.

Eight of the lines are the byte-wide bi-directional data bus. The ACB-4000 Series supports DB7-0 data lines and does not support the data parity line. The data parity line is not terminated at the controller.

Nine of the lines are the control and status lines. The ACB-4000 Series supports all nine lines including BSY, SEL, C/D, I/O, MSG, REQ, ACK, ATN AND RST.

The RST, reset line, is a "hard" reset and causes the controller to abort its current operation and to get off of the bus. Any outstanding operation is aborted. The SCSI specification has a minimum RST pulse width of 25 microseconds. The ACB-4000 Series allows a minimum RST pulse width of 50 nanoseconds to accommodate older SASI-type host adapters.

3.6.2 SASI AND SCSI HOST ADAPTER CONSIDERATIONS

When using a SASI or SCSI host adapter the following areas must be considered: SCSI handshake timing, transfer rate of controller, use of ATN line, and I/O driver design termination. Appendices A, B, C, and D address these topics.

3.6.3 CONTROLLER ADDRESSING AND TERMINATION

In order for the ACB-4000 Series Controllers to operate properly in a system environment, the controller must be properly selected and terminated. The controller can be jumpered to be selected as SCSI device ID or address 0 through 7. See Table 3-1 for the definition of these jumpers and install any that are needed.

In a single controller system use the controller SCSI ID = 0 which requires no jumpers for locations A-B, C-D and E-F on the controller.

The SCSI bus is a daisy chained bus between host adapter and I/O controllers. In order to reduce signal ringing, the two ends of the bus must be terminated. This termination consists of a 220-ohm resistor to +5 Volts and a 330-ohm resistor to ground for each signal line. Check your host adapter to see if it is terminated. The ACB-4000 Series Controllers have socketed terminator packs located at RP3 and RP4 for this termination as noted in Figures 3-1 and 3-2.

In a single controller system both must be terminated, i.e. RP3 and RP4 must be installed. In a multiple I/O controller system the last controller must be terminated, i.e. RP3 and RP4 must be installed only if the ACB-4000 Series Controller is the last one in the chain.

3.6.4 CONTROLLER AND HOST ADAPTER CABLING

Now that the controller and host adapter are addressed and terminated properly, they can be cabled together.

The controller 50-pin connector J4 is the SCSI bus connector. A 50-pin flat ribbon cable with a maximum length of 20 feet (6 meters) is required. A 3M Part # 3425-3000 cable connector is recommended.

POWER UP OPERATION

If the drive is correctly formatted, the controller will seek the drive to the last cylinder and read the largest block address present. The parameter information and largest block address are saved on the ACB-4000 Series Controller.

Once the last block address has been read, the controller will seek the drive back to Track 0, stopping several times in 'zones' on the way back to read the defect count at that point. This defect count is also saved in the controller to allow the controller to better predict the location of the block on the disk.

In addition to the drive seeks and reads, the Adaptec ACB-4000 Series Controllers do a series of self-diagnostics after power-up. Immediate selection of the disk and movement of the heads during this period is a sign of properly functioning Adaptec ACB-4000 Series Controllers.

When power is supplied to the system, the controller will enter power-up mode and wait for a minimum of 18 seconds for the drive to become ready. During the 18 second power-on sequence, the controller is checking for drive 0 and drive 1 to become ready (nine sec/drive). If the host senses a command requiring access to a drive before it has become ready (and before 18 seconds have elapsed) the controller will accept the command and continue to check for a ready status. Once the drive comes ready, the controller will then execute the command; if 18 seconds elapse and the drive does not come ready, a DRIVE NOT READY (04 hex) error will result. The controller will then check for a ready status on the next command requiring access to that drive.

Once a drive comes ready, the controller will recalibrate the head to track 0 if needed. If the drive started at track 0, the controller will step the head off of track 0 to confirm that the drive can seek and that the track 0 signal was valid. With the drive's ability to seek confirmed, the controller then seeks back to track 0. The drive actuator (if it can be seen) appears to make a short 'blip.'

The controller then attempts to read from track 0 parameter information which is written during formatting. If the drive is unformatted or had been formatted by another vendor's controller, the parameter information is not present so the controller then sets a bit in its memory called 'blown format' to warn the user that the drive is unuseable. If the drive format is blown, the reset sequence is stopped and the controller is ready for a command. The drive must be formatted to allow a READ or WRITE access to disk data.

NOTE:

IF THE CONTROLLER DOES NOT OPERATE AS DESCRIBED, PLEASE SEE SECTION 6 FOR TROUBLESHOOTING PROCEDURES.

6.0 TROUBLESHOOTING

6.1 INTRODUCTION

This section describes the procedures needed to troubleshoot problems that may arise when installing the Adaptec ACB-4000 Series Controller boards. These are the most commonly found problems and are not inclusive of every application.

NOTE:

WHEN TROUBLESHOOTING PROBLEMS, USE THE MOST BASIC SYSTEM CONFIGURATION. THAT IS, ONE HARD DISK DRIVE ON THE ACB-4000A AND ALL OTHER CONTROLLERS SUCH AS TAPE, ETC., REMOVED. ONCE THE SYSTEM WORKS FOR THE BASIC CONFIGURATION, ADD DRIVES AND CONTROLLERS TO THE SYSTEM ONE AT A TIME AND RETEST AFTER EACH ADDITION.

If these procedures fail to give a solution to your problem, recheck your steps, read the entire manual, document the problem, and check with the technical support department where you bought the controller.

ADAPTEC ACB-4000A/4070 TROUBLESHOOTING CHECKLIST

- CHECK JUMPERS ON THE DISK DRIVE, BE SURE THAT IT IS NOT SET FOR A RADIAL SELECTED DRIVE.
- CHECK JUMPERS ON CONTROLLER, BE SURE THAT JUMPERS AND PULSE OR HANDSHAKING SELECTION (SEE APPENDIX D) HAVE BEEN DONE PROPERLY.
- CHECK CABLES, BE SURE THAT J0 GOES TO DRIVE 0, J1 GOES TO DRIVE 1 AND J2 GOES TO BOTH DRIVES. BE SURE THAT PIN 1 ON THE CONTROLLER IS CONNECTED TO PIN 1 OF THE DRIVE. BE SURE THAT THE SCSI CABLE IS CONNECTED PROPERLY, NOTING THE LOCATION OF PIN 1.
- CHECK THAT THE DRIVE PARAMETERS AND STEP PULSE RATE ARE IN AGREEMENT WITH THE DRIVE VENDOR.
- CHECK THAT THE TERMINATORS ON THE DRIVE AND SCSI BUS ARE SET PROPERLY.
- CHECK THAT THE POWER SUPPLY CAN SUPPORT THE ADDED CURRENT REQUIRED BY THE DRIVE. BE SURE THAT THE +5V AND +12V VOLTAGES ARE CORRECT. VERIFY WITH THE DRIVE VENDOR HIS REQUIREMENTS.
- CHECK THE DRIVE'S WRITE PRE-COMPENSATION AND REDUCED WRITE CURRENT VALUES IF SOFT READ ERRORS OCCUR. ALSO IF THESE ARE NOT BEING USED BE SURE THAT THE CORRECT JUMPER IS INSTALLED. THERE MUST BE A JUMPER FROM "R" TO ANOTHER PIN.
- CHECK TO SEE THAT YOU ARE MEETING THE SCSI BUS SIGNAL PARAMETERS SUCH AS SETUP, HOLD , MINIMUM AND MAXIMUM TIMES.

SECTION 2.1

DDE Data Sheet for Power Supplies

DDE 001/6/9/13/14/
16/17/18/19/201

NO-BREAK
SYSTEM 1000VA..... 2

NO-BREAK
SYSTEM 2000VA 3

OTHERS 4

SECTION 2.2 5

DDE Data Sheet for Power Supplies.

PS 12 REV. 0 DATE 880222

MANUFACTURER: CoutantNAME: dde020TYPE: Switching modularENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Max. current	Peak. current
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
 Maximum output power is 300 W.

dde019

1

DDE Data Sheet for Power Supplies.

PS 9 REV. 0 DATE 860609

MANUFACTURER: Coutant

NAME: dde019

TYPE: Switching modular ML 150

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	
L	-5.2	5	y	10.0	
C	12	5	n	3.0	
C	-12	5	n	3.0	

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 150 W.

DDE Data Sheet for Power Supplies.

PS 8 REV. 0 DATE 860117

MANUFACTURER: CoutantNAME: dde018TYPE: Switching modularENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	V	+/- %		A	A in 10 sec.
L	5	5	y	10.0	
L	-5.2	5	y	10.0	
S	24	5	n	5.0	16.0
S	24	5	n	5.0	16.0
G	-24	5	n	3.0	8.0
G	12	5	n	4.0	8.0
G	-12	5	n	3.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
 Maximum output power is 400 W.

dde017

1

DDE Data Sheet for Power Supplies.

PS 7 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde017

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	24	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 300 W.

dde016

1

DDE Data Sheet for Power Supplies.

PS 6 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde016

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	V	+/- %		A	A in 10 sec.
X	+ 5	5	y	40.0	-
M	+ 5	5	y	20.0	-
S	+12	5	n	8.0	16.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module.

X and M modules connected in parallel in order to get 60 A on +5V.
This connection must NOT be removed.

Maximum power is 400 W when fan is mounted.

dde014

1

DDE Data Sheet for Power Supplies.

PS 5 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde014

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	<u>V</u>	<u>+/- %</u>		<u>A</u>	<u>A in 10 sec.</u>
X	+ 5	5	y	40.0	-
S	+12	5	n	8.0	16.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module

Maximum power is 330 W when fan is mounted.

dde013

1

DDE Data Sheet for Power Supplies.

PS 4 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde013

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	<u>V</u>	<u>+/- %</u>		<u>A</u>	<u>A in 10 sec.</u>
X	+ 5	5	y	40.0	-
G	+12	5	n	4.0	8.0
G	+12	5	n	4.0	8.0
BT	+24	2	n	1.0	-
BT	-12	2	n	0.5	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module

Maximum power is 330 W when fan is mounted.

dde009

1

DDE Data Sheet for Power Supplies.

PS 3 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde009

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	<u>V</u>	<u>+/- %</u>		<u>A</u>	<u>A in 10 sec.</u>
M	5	5	y	20.0	-
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
S	24	5	n	8.0	16.0
C	5	5	n	3.0	-

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module

Maximum output power is 400 W when fan is mounted.

dde006

1

DDE Data Sheet for Power Supplies.

PS 2 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde006

TYPE: Switching modular

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 2.5% / deg. C

AC SPECIFICATIONS:

187-264 V or 99-132 V (strapable)

47-440 Hz

Inrush current: < 18 A peak

DC SPECIFICATIONS:

<u>Modul</u>	<u>Volt</u>	<u>Tolerance</u>	<u>Adjustment</u>	<u>Max. current</u>	<u>Peak. current</u>
	V	+/- %		A	A in 10 sec.
M	5	5	y	20.0	20.0
G	12	5	n	4.0	8.0
G	12	5	n	4.0	8.0
G	24	5	n	4.0	8.0

EFFICIENCY:

70 - 85 %

NOTES:

No minimum load on any module
Maximum output power is 300 W.

dde001

1

DDE Data Sheet for Power Supplies.

PS 1 REV. 0 DATE 851218

MANUFACTURER: Coutant

NAME: dde001

TYPE: Switching

ENVIRONMENT:

Temperature range: 0 to 70 deg. C in free air.

Output power derating above 50 deg. C. 1.0% / deg. C

AC SPECIFICATIONS:

166-264 V or 85-132 V (strapable)

47-63 Hz

Inrush current: < 30 A peak

DC SPECIFICATIONS:

Modul	Volt	Tolerance	Adjustment	Min. current	Max. current
	V	+/- %		A	A
-	5	0.5	y	10.0	100.0
-	12	0.5	y	0.0	13.0
-	12	0.5	y	0.0	5.0
-	24	0.5	y	0.0	7.0
-	5	0.5	y	0.0	2.5

EFFICIENCY:

> 65 %

NOTES:

All outputs protected

Max. output power 850W.

DDE Data Sheet for Power Supplies.**PS10.**

Revision 0

Date 870601

Name: No-Break System 1000VA

Manufacturer: SILCON A/S, Denmark.

Type: Uninterruptable Power Supply (UPS)

Mains input

Voltage	220 VAC \pm 10%
Frequency	50 Hz \pm 5%
Efficiency at rated load	typ. 82%
Power factor at nominal conditions	0.93
Input current	sinusoidal
Max. current with discharged battery	9 ARMS
External fuse	16 A

Output

Voltage, static	220 VAC \pm 2%
Distortion, at linear load	< 5%
Voltage, dynamic for 100% load change	\pm 5%
Recovery time	< 20ms
Frequency locked to mains	
Output power at load P.F. 0.7 lag to 0.9 lead	1000 VA
Output current limited to	4.5 ARMS
Over current 50% for 30 sec. on mains operation	
Short circuit proof	
System shut down for:	
$I_{peak} > 3 \times$ max. IRMS for > 30 sec. I peak 13.5 A	
$V_{batt} < 39$ VDC	
$V_{out} > 245$ VAC	
High temperature	

Charger

Current limit	6 ADC
Charge voltage, adjustable	54-57 VDC

Battery operation

Battery voltage for rated output	40.8-57.6 VDC
Battery current at 48 VDC, full load	28 ADC
Battery current at 40.8 VDC, full load	33 ADC
Output frequency	50 Hz \pm 0.5%
Efficiency at rated load	typ. 75%
Battery MCB (magnetic circuit breaker)	35 A
Inv. shut down for V_{batt} outside	39-60 VDC
Change to battery operation for:	
V_{mains} outside specification	
f_{mains} outside specification	
Overload	

General data

Ambient temperature	-10/ + 40 °C
RFI according to	VDE0875-N
Acoustic noise	appr. 50 dB(A)
Dimensions H x W x D	695x200x795 mm
Weight	appr. 75 kg

LED indicators

Mains operation	green
Battery operation	yellow
Overload	red
Output voltage	green

Alarm for battery operation and overload:

Acoustic alarm
Potential free contact

DDE Data Sheet for Power Supplies.**PS 11.**

Revision 0

Date 870601

Name: No-Break System 2000VA

Manufacturer: SILCON A/S, Denmark.

Type: Uninterruptable Power Supply (UPS)

Mains input

Voltage	220 VAC \pm 10%
Frequency	50 Hz \pm 5%
Efficiency at rated load	typ. 83%
Power factor at nominal conditions	0.93
Input current	sinusoidal
Max. current with discharged battery	18.5 ARMS
External fuse	20 A

Output

Voltage, static	220 VAC \pm 2%
Distortion, at linear load	< 5%
Voltage, dynamic for 100% load change	\pm 5%
Recovery time	< 20ms
Frequency locked to mains	
Output power at load P.F. 0.7 lag to 0.9 lead	2 kVA
Output current limited to	9.1 ARMS
Over current 50% for 30 sec. on mains operation	
Short circuit proof	
System shut down for:	
$I_{peak} > 3 \times \text{max. IRMS}$ for > 30 sec. I peak 27 A	
$V_{batt} < 39 \text{ VDC}$	
$V_{out} > 245 \text{ VAC}$	
High temperature	

Charger

Current limit	12 ADC
Charge voltage, adjustable	54-57 VDC

Battery operation

Battery voltage for rated output	40.8-57.6 VDC
Battery current at 48 VDC, full load	56 ADC
Battery current at 40.8 VDC, full load	66 ADC
Output frequency	50 Hz \pm 0.5%
Efficiency at rated load	typ. 76%
Battery MCB (magnetic circuit breaker)	75 A
Inv. shut down for V_{batt} outside	39-60 VDC
Change to battery operation for:	
V_{mains} outside specification	
f_{mains} outside specification	
Overload	

General data

Ambient temperature	-10/ +40 °C
RFI according to	VDE0875-N
Acoustic noise	appr. 50 dB(A)
Dimensions H x W x D	695x200x795 mm
Weight	appr. 105 kg

LED indicators

Mains operation	green
Battery operation	yellow
Overload	red
Output voltage	green

Alarm for battery operation and overload:
 Acoustic alarm
 Potential free contact

SECTION 2.2

DDE Data Sheet for: Video Tape Drives
Streaming tape Drives
Floppy Disk Drives

ARCHIVE.....1

TANDBERG.....2

EXERBYTE.....3

CIPHER.....4

TEAC.....5

DDE Data Sheet for Streaming Tape Cartridge Drive SD3 REV. 0MANUFACTURER: ARCHIVETYPE: 2060L and 2150LGENERAL DRIVE DESCRIPTION:

The VIPER is a streaming 1/4" tape cartridge drive. The VIPER contains an embedded controller in a half-high package.

The VIPER 2060 stores 45 megabytes on 9 tracks, using a DC300 cartridge.

The VIPER 2150 stores 125 Mbyte on 15 tracks, or 150 Mbyte on 18 tracks, using a DC600 cartridge.

FORM FACTOR: 5.25"ENVIRONMENT:

Electrical Interface: QIC-02

Power requirements:

+5 VDC +- 5 pct., 0.7 Amp
+12 VDC +-10 pct., 0.2 Amp motor not running.
0.8 Amp typ motor running max. 1.5 amp
2.5 Amp tape start surge(up to 300ms)

Power dissipation: 20.0 W typical
35.0 W max.

Operating temperature range: 5 to 45 deg. celsius.

Maximum temperature gradient: -----

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT AND MEDIA:

<u>2060L:</u>	QUALIFIED TAPE	FUNCTION
	3M DC600A	read/write QIC-24
	3M DC300XLP	read/write QIC-24
<u>2150L:</u>	QUALIFIED TAPE	FUNCTION
	3M DC600XTD	read/write QIC-150
		read/write QIC-120
		read QIC-24
	3M DC600A	read/write QIC-120
		read QIC-24
	3M DC300XLP	read QIC-24

PREVENTIVE MAINTENANCE:

The only preventive maintenance required for the VIPER is that the head and sensor holes must be kept clean.

The recording head should be cleaned after each initial pass with a new tape.

The recording head should be cleaned after every 8 hours of read/write activity.

The sensor openings and cartridge cavity should be cleaned whenever dirt or dust become visible.

Information about cleaning procedure is available in the product manual.

CONNECTORS AND STRAPS:

1: QIC-02 connector.

2: Power connector.

Pin 1: +12 VDC.

Pin 2: +12 Return.

Pin 3: + 5 Return.

Pin 4: + 5 VDC.

Factory strapping: no straps installed

DOCUMENTATION:

Publications available from ARCHIVE:

Product manual QIC02 models 2060L and 2150L
Manual part number 21494-001.



Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg

Sheet number: SD 4 revision 0

Type: 3610/3630/3650

Form Factor: 5¼" Half-Height

General Drive Description.

The Tandberg Data TDC 3610/30/50 is a streaming ¼" tape cartridge drive.

The TDC 3610 records and reads on 9 tracks and can store 45 Mbytes on a 450 foot cartridge. With a 600 foot cartridge the capacity is increased to 60 Mbyte.

The TDC 3630 records and reads on 15 tracks and can store 120 Mbytes on a 600 foot cartridge.

The TDC 3650 records and reads on 18 tracks and can store 150 Mbytes on a 600 foot cartridge.

Environment.

Electrical Interface: QIC-02.

DC Power Requirements					
Voltage	Start-up		Running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	
+5V ±5% typical		0.25A	0.25A	0.25A	200mV
+12 ±10% typical		3.9A	1.20A	0.25A	200mV

Average power dissipation: 2.25 W. (motor not running)

Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-11		QIC-24		QIC-120		QIC-150	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3610	+	+	+	+	-	-	-	-
TDC 3630	+	-	+	-	+	+	-	-
TDC 3650	+	-	+	-	+	+	+	+

Type of Media.

For the 3610 use DC 300XLP, DC 600A or DC 6150 cartridge.

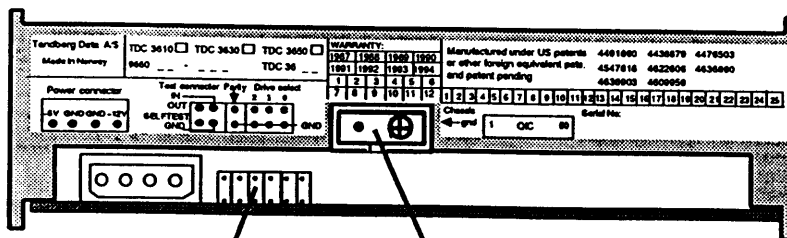
For the 3630 use DC 600A or DC 6150 cartridge.

For the 3650 use DC 6150 cartridge.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.



Jumper Field/
Test Connector

Ground Connector

Power and Interface Connections.

J1: QIC connector

J2: Power connector

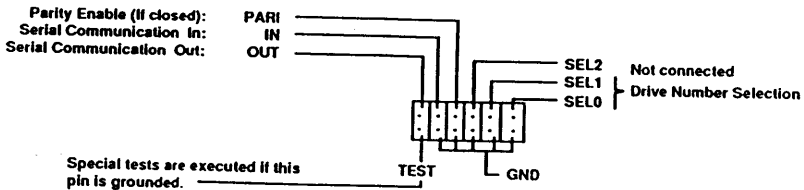
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Factory strapping: no straps installed.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

- Publications available from Tandberg:
 - TDC 3610/30/50 Reference Manual.
 - TDC 3600 Series QIC-02 Maintenance Manual.

11



Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg

Sheet number: SD 5 revision 0

Type: 3620/3640/3660

Form Factor: 5¼" Half-Height

General Drive Description.

The Tandberg Data TDC 3620/40/60 is a streaming ¼" tape cartridge drive.

The TDC 3620 records and reads on 9 tracks and can store 45 Mbytes on a 450 foot cartridge. With a 600 foot cartridge the capacity is increased to 60 Mbyte.

The TDC 3640 records and reads on 15 tracks and can store 120 Mbytes on a 600 foot cartridge.

The TDC 3660 records and reads on 18 tracks and can store 150 Mbytes on a 600 foot cartridge.

Environment.

Electrical Interface: SCSI.

DC Power Requirements

Voltage	Start-up		Running		Not running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ±5% typical	0.25A		0.25A		0.25A		200mV
+12 ±10% typical	3.9A		1.20A		0.25A		200mV

Average power dissipation: 2.25 W. (motor not running)

Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-11		QIC-24		QIC-120		QIC-150	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3620	+	+	+	+	-	-	-	-
TDC 3640	+	-	+	-	+	+	-	-
TDC 3660	+	-	+	-	+	+	+	+

Type of Media.

For the 3620 use DC 300XLP, DC 600A or DC 6150 cartridge.

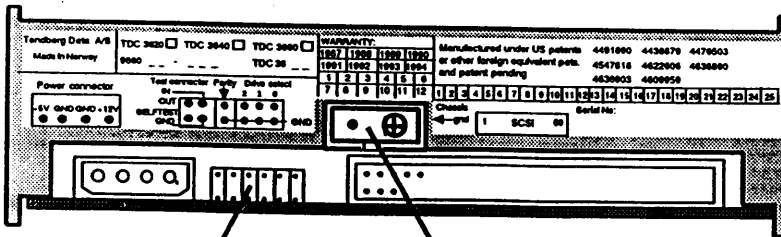
For the 3640 use DC 600A or DC 6150 cartridge.

For the 3660 use DC 6150 cartridge.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.



Jumper Field/
Test Connector

Ground Connector

Power and Interface Connections.

J1: SCSI connector

J2: Power connector

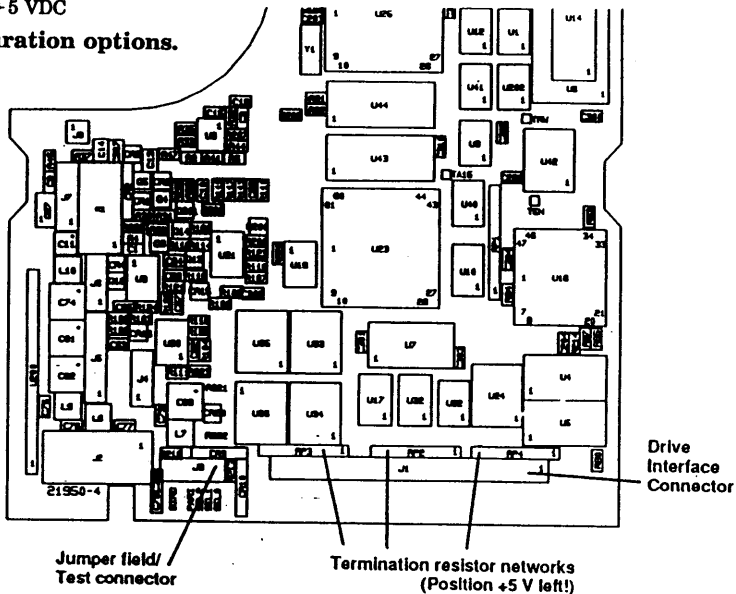
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	SEL2	SEL1	SEL0
ID0	-	-	-
ID1	-	-	X
ID2	-	X	-
ID3	-	X	X
ID4	X	-	-
ID5	X	-	X
ID6	X	X	-
ID7	X	X	X

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

- * designates factory installed position.

BUS parity check.

* When a jumper is installed in PARI, the tape drive generates and checks parity on the SCSI cable.

When a jumper is not installed in PARI, the tape drive does not generate or check parity on the SCSI cable.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:

TDC 3620/40/60 Reference Manual.

TDC 3600 Series SCSI Maintenance Manual.

Data Sheet for Streaming Tape Drives

Manufacturer: Tandberg

Sheet number: SD 6 revision 0

Type: 3800

Form Factor: 5¼" Half-Height

General Drive Description.

The Tandberg Data TDC 3800 is a streaming ¼" tape cartridge drive.

The TDC 3800 records and reads on 26 tracks and can store 525 Mbytes on a 1020 foot cartridge. Using a 600 foot cartridge the capacity is decreased to 320 Mbyte.

Environment.

Electrical Interface: SCSI.

DC Power Requirements						
Voltage	Start-up		Running		Not running	Ripple (maximum)
	Avg.	Peak	Avg.	Peak		
+5V ±5% typical	0.50A		0.50A		0.50A	200mV
+12 ±10% typical	3.3A		1.45A		0.70A	200mV

Average power dissipation: 3.1 W. (motor not running)

Average power dissipation: 15.00 W. (motor running)

Operating temperature range: 5 to 40 °C.

Storage temperature range: -30 to 60 °C.

Maximum temperature gradient: 6 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Tape Formats.

Tape Formats								
Drive	QIC-24		QIC-120		QIC-150		QIC-525	
	Read	Write	Read	Write	Read	Write	Read	Write
TDC 3800	+	-	+	+	+	+	+	+

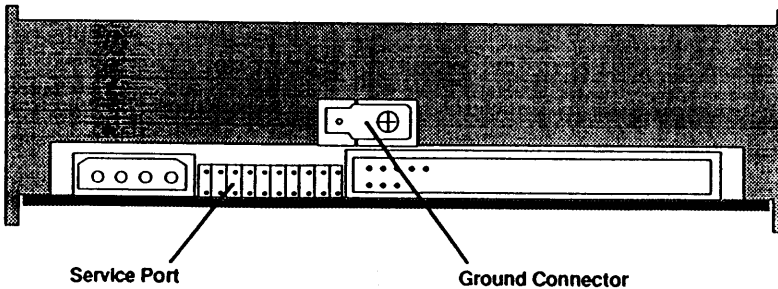
Type of Media.

For the 3800 use DC 600A, DC 6150, DC 6320 or DC 6525.

The drive will automatically select a suitable density code for the inserted medium. If DC 600A is inserted the drive writes in QIC-120 format. If DC 6150 is inserted the drive writes in QIC-150 format. If DC 6320 or DC 6525 is inserted the drive writes in QIC-525 format.

Mounting.

Recommended mounting position is either horizontal with the indicator to the left, or vertical with the indicator down.

Connectors.**Power and Interface Connections.**

J1: SCSI connector

J2: Power connector

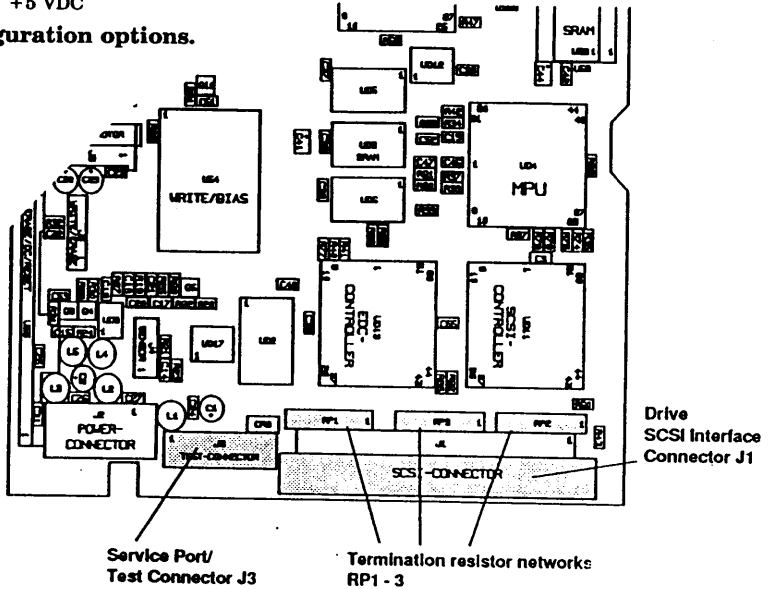
Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.



Electronics Board Configuration Components.

SCSI controller ID			
SCSI ID	SEL2	SEL1	SEL0
ID0	-	-	-
ID1	-	-	X
ID2	-	X	-
ID3	-	X	X
ID4	X	-	-
ID5	X	-	X
ID6	X	X	-
ID7	X	X	X

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

- * designates factory installed position.

BUS parity check.

* When a jumper is installed in PARI, the tape drive generates and checks parity on the SCSI cable.

When a jumper is not installed in PARI, the tape drive does not generate or check parity on the SCSI cable.

Preventive Maintenance.

The only maintenance normally required is to clean the read/write head. Recommended equipment for head cleaning is *TDC Cleaning Cartridge Kit*. Always clean the head immediately after using a new cartridge. If the streamer is used daily, the head must be cleaned once a week.

Documentation.

Publications available from Tandberg:

TDC 3800 Reference Manual.

TDC 3800 Series Maintenance Manual.

DDE Data Sheet for Streaming Tape Cartridge Drive SD2 REV. 0

MANUFACTURER: TANDBERG

TYPE: TDC 3319

GENERAL DRIVE DESCRIPTION:

The TDC 3319 is a streaming 1/4" tape cartridge drive comprising the TDC 3309 (basic drive) and the TDC 3350 MK-II (intelligent formatter). It records and reads serially on 9 tracks, and can store 45 Mbytes on a 450-foot cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface:

formatter to DIOC: QIC-02

drive to formatter: QIC-36

Power requirements:

+5 VDC +- 5 pct., 1.9 Amp

+12 VDC +-10 pct., 0.3 Amp motor not running.

1.0 Amp typ motor running max. 1.4 amp

Power dissipation: 12.5 W motor not running

21.5 W typical, motor running

Operating temperature range: 5 to 40 deg. celsius.

Maximum temperature gradient: 6 deg. celsius/hour

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT:

The tape format conforms with the QIC-24 standard for data interchange.

The drive is able to read QIC-11 and QIC-24 tape formats, but it is unable to write other formats than the QIC-24.

MEDIA:

Type of media:

- DC300XLP (450-foot), certified for 10.000 frpi.
- DC600A (600-foot), certified for 10.000 frpi.
- DC600XTD (600-foot), certified for 10.000 frpi.

It is recommended to use tapes certified for 10.000 frpi.

PREVENTIVE MAINTENANCE:

It is required to clean the read/write head.

Recommended equipment for head cleaning are:

- a) The Tandberg Data 'TDC cleaning cartridge kit'.
- b) Isopropyl-alcohol and cotton-tipped swabs, i.e. the 'CK-90' kit from 3M.

The cleaning interval depends on three main factors:

- a) How much the drive is used.
- b) The quality of the tape.
- c) The quality of the environment

However, the following can be used as a recommended guideline:

<u>Usage</u>	<u>Clean</u>
8 hours a day	Daily
Daily	Weekly
Weekly	Monthly

Always clean the head immediately after using a new cartridge, and if a large number of rewrite- or reread operations are performed.

CONNECTORS AND STRAPS:

J1: Signal connector formatter board/basic drive.

J2: Power connector.

- Pin 1: +12 VDC.
- Pin 2: +12 Return.
- Pin 3: + 5 Return.
- Pin 4: + 5 VDC.

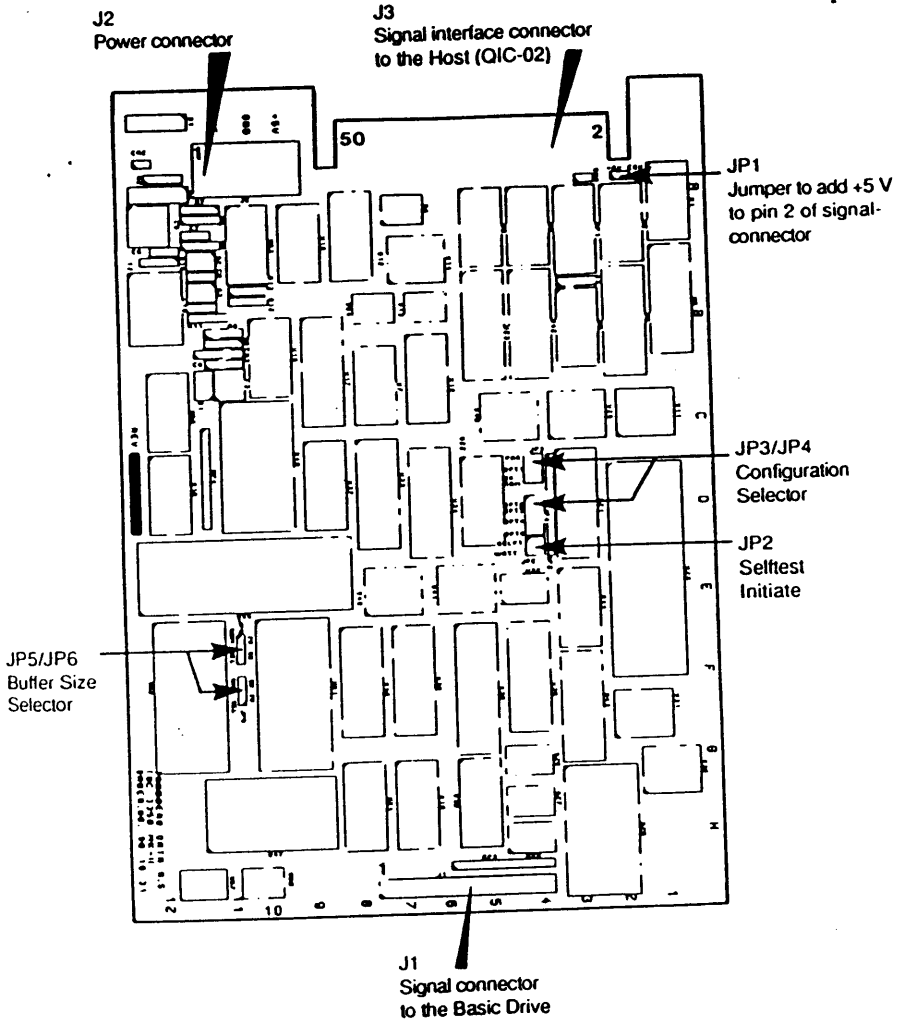
J3: QIC-02 connector to the host.

Factory strapping: no straps installed

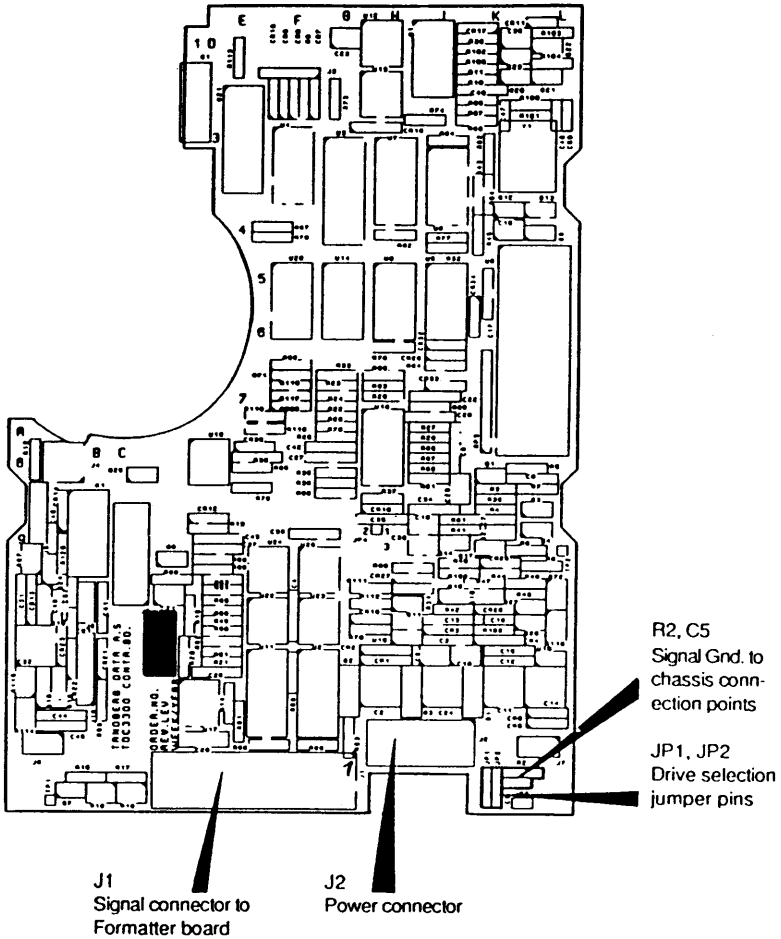
DOCUMENTATION:

Publications available from Tandberg Data:

- TDC 3319 Reference Manual
- TDC 3319 Maintenance Manual



Location of jumper positions and connectors
on the TDC 3309 controller board.



Location of jumper positions and connectors
on the TDC 3350 formatter board.



Data Sheet for Video Tape Drives

Manufacturer: Exabyte

Sheet number: VD 2 revision 0

Type: EXB-8500

Form Factor: 5 $\frac{1}{4}$ " Full-Height

General Drive Description.

The EXABYTE EXB-8500 CTS is a high capacity 8 mm cartridge drive. The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores more than 5000 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI.

DC Power Requirements					
Voltage	Start-up		Running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	
+5V \pm 5% typical			0.7A	1.8A	125mV
+12 \pm 5% typical			0.40A	0.75A	125mV

Minimum power dissipation: 8.30 W.

Maximum power dissipation: 17.00 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

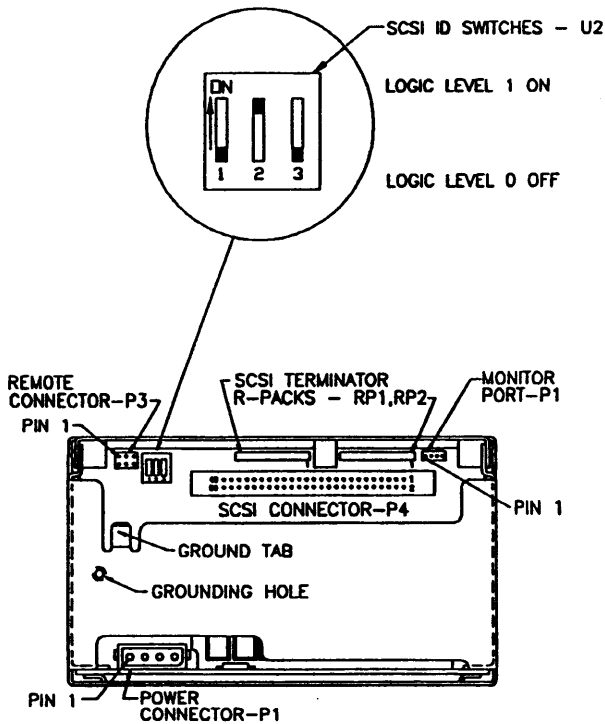
Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

Mounting.

The EXB-8200 may be mounted either horizontally or vertically, as follows:
 In the horizontal configuration, the drive door opens down from the top of the unit. In the vertical configuration, the drive may be mounted so that the door opens to either the right or left.

Connectors.



Power and Interface Connections.

P4: SCSI connector**P1: Power connector**

Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8500 tape head/path requires cleaning once a month or after 60 Gigabytes of data transfer.

To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used.

Documentation.

Publications available from Exabyte:

EXB-8500 Product Specification.

EXB-8500 User's Manual.



Data Sheet for Video Tape Drives

Manufacturer: Exabyte

Sheet number: VD 1 revision 1

Type: EXB-8200

Form Factor: 5¼" Full-Height

General Drive Description.

The EXABYTE EXB-8200 CTS is a high capacity 8 mm cartridge drive. The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge. The cartridge stores more than 2000 Mbytes of formatted user data.

Environment.

Electrical Interface: SCSI.

DC Power Requirements					
Voltage	Start-up		Running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	
+5V ± 5% typical			1.2A	2.8A	125mV
+12 ± 5% typical			0.17A	0.4A	125mV

Average power dissipation: 15.00 W.

Operating temperature range: 5 to 40 °C.

Storage temperature range: -40 to 60 °C.

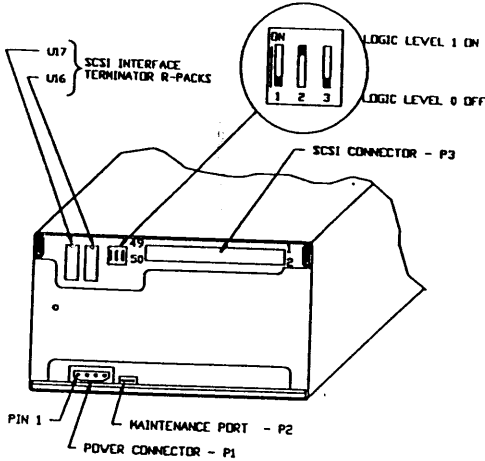
Maximum temperature gradient: 10 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

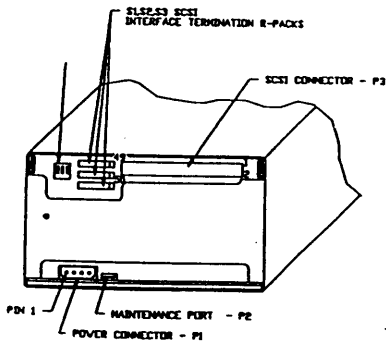
Mounting.

The EXB-8200 may be mounted either horizontally or vertically, as follows: In the horizontal configuration, the drive door opens down from the top of the unit. In the vertical configuration, the drive may be mounted so that the door opens to either the right or left.

Connectors.



Power and Interface Connections(Level 1 DB Card).



Power and Interface Connections(Level 2 DB Card).

P3: SCSI connector

P1: Power connector

Pin 1: +12 VDC

Pin 2: +12 Return

Pin 3: +5 Return

Pin 4: +5 VDC

Configuration options.

SCSI controller ID			
SCSI ID	SEL3	SEL2	SEL1
ID0	off	off	off
ID1	off	off	on
ID2	off	on	off
ID3	off	on	on
ID4	on	off	off
ID5	on	off	on
ID6	on	on	off
ID7	on	on	on

Terminator resistors.

Interface terminator packs provides termination for the interface lines. When more than one device are connected to the SCSI cable the last device and only the last device on the cable must have terminator installed.

Preventive Maintenance.

The EXB-8200 tape head/path requires cleaning once a month or after 30 Gigabytes of data transfer.

To clean the tape head/path, the *EXABYTE 8mm Cartridge Tape Subsystem Cleaning Kit* should be used.

Documentation.

Publications available from Exabyte:

EXB-8200 Product Specification.

EXB-8200 User's Manual.



DDE Data Sheet for Streaming Tape Cartridge Drive SD1 REV. 0

MANUFACTURER: TANDBERG

TYPE: TDC 3320

GENERAL DRIVE DESCRIPTION:

The TDC 3320 is a streaming 1/4" tape cartridge drive comprising the TDC 3315 (basic drive) and the TDC 3350 MK-II (intelligent formatter). It records and reads serially on 15 tracks, and can store 125 Mbytes on a 600-foot cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface:

formatter to DIOC: QIC-02

drive to formatter: QIC-36

Power requirements:

+5 VDC +- 5 pct., 1.8 Amp

+12 VDC +-10 pct., 0.3 Amp motor not running.

1.0 Amp typ motor running max. 1.4 amp

Power dissipation: 12.6 W motor not running

21.0 W typical, motor running

Operating temperature range: 5 to 40 deg. celsius.

Maximum temperature gradient: 6 deg. celsius/hour

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT:

The tape format conforms with the QIC-120 standard for data interchange.

The drive is able to read QIC-11 and QIC-24 tape formats, but it is unable to write other formats than the QIC-120.

MEDIA:

Type of media:

- DC600A (600-foot), certified for 10.000 frpi.
- DC600XTD (600-foot), certified for 10.000 frpi.

From other manufacturers than 3M, it is recommended to use only DC600XTD.

PREVENTIVE MAINTENANCE:

It is required to clean the read/write head.

Recommended equipment for head cleaning are:

- a) The Tandberg Data 'TDC cleaning cartridge kit'.
- b) Isopropyl-alcohol and cotton-tipped swabs, i.e. the 'CK-90' kit from 3M.

The cleaning interval depends on three main factors:

- a) How much the drive is used.
- b) The quality of the tape.
- c) The quality of the environment

However, the following can be used as a recommended guideline:

<u>Usage</u>	<u>Clean</u>
8 hours a day	Daily
Daily	Weekly
Weekly	Monthly

Always clean the head immediately after using a new cartridge, and if a large number of rewrite- or reread operations are performed.

CONNECTORS AND STRAPS:

J1: Signal connector formatter board/basic drive.

J2: Power connector.

- Pin 1: +12 VDC.
- Pin 2: +12 Return.
- Pin 3: + 5 Return.
- Pin 4: + 5 VDC.

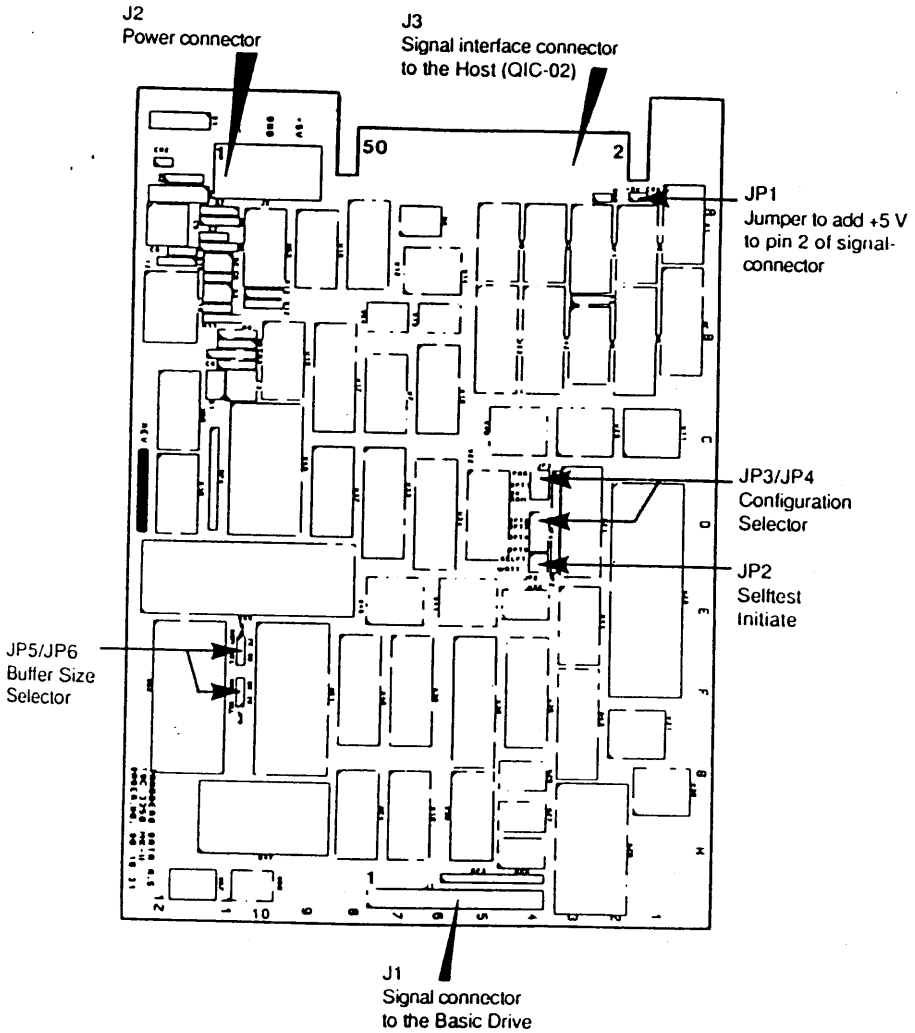
J3: QIC-02 connector to the host.

Factory strapping: no straps installed

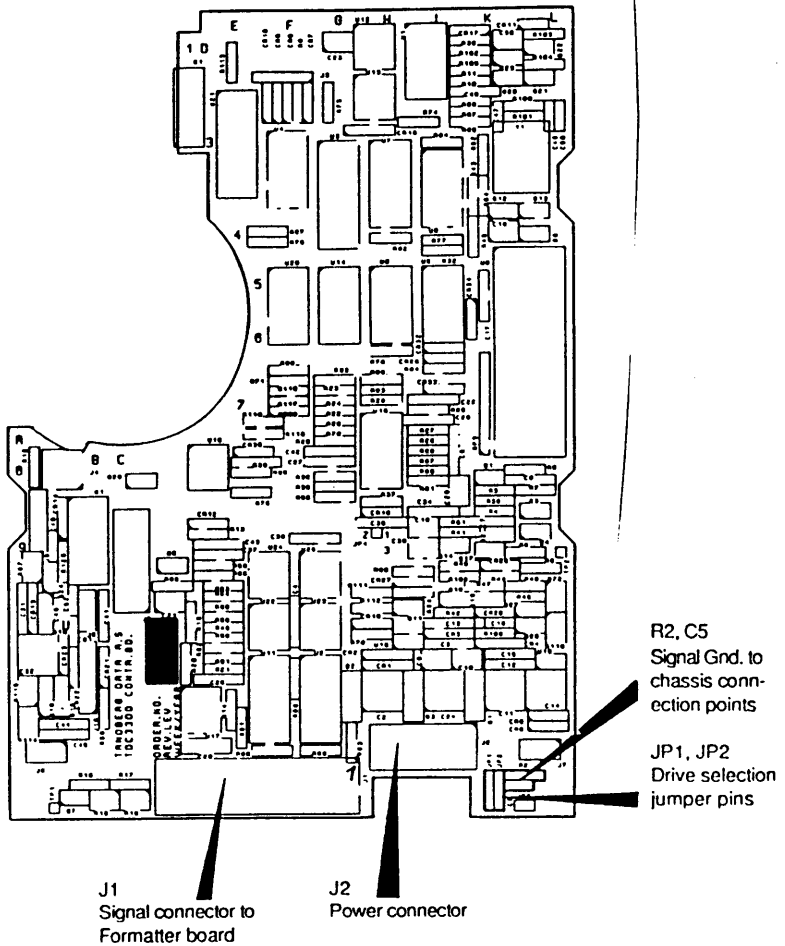
DOCUMENTATION:

Publications available from Tandberg Data:

- TDC 3320 Reference Manual
- TDC 3320 Maintenance Manual



Location of jumper positions and connectors
on the TDC 3315 controller board.



Location of jumper positions and connectors
on the TDC 3350 formatter board.



DDE Data Sheet for Video Tape Cartridge Drive VDI REV. 0

MANUFACTURER: EXERBYTE

TYPE: 8200

GENERAL DRIVE DESCRIPTION:

The EXERBYTE EXB-8200 CTS is a high capacity 8 mm cartridge drive. The drive contains an embedded controller with SCSI interface. It uses helical scan technology, to record on an industry standard 8 mm cartridge.

FORM FACTOR: 5.25"

ENVIRONMENT:

Electrical Interface: SCSI

power requirements:

+5 VDC +- 4 pct., 4.0 Amp max.

+12 VDC +- 4 pct., 1.2 Amp max.

Power dissipation: 20.0 W typical

Operating temperature range: 5 to 40 deg. celsius.

Maximum temperature gradient: 1 c/minute max 10 c/hour

Operating humidity: 20 pct. - 80 pct. non-condensing.

DATA FORMAT AND MEDIA:

Standard 8mm tape cartridge.

Cartridge size length(ft.) max formatted capacity (Mbyte)

256	45	250
512	90	500
1024	180	1000
1536	270	1500
2048	360	2000

PREVENTIVE MAINTENANCE:

To be provided.

CONNECTORS AND STRAPS:

1: Power connector.

Pin 1: +12 VDC.
 Pin 2: +12 Return.
 Pin 3: + 5 Return.
 Pin 4: + 5 VDC.

3: SCSI connector.

Straps: SCSI id; factory strapped: ON,ON,ON (id=7)

DOCUMENTATION:

Publications available from EXERBYTE:

Product specification EXB-8200 Cartridge Tape Subsystem.
 Interface Users Manual.

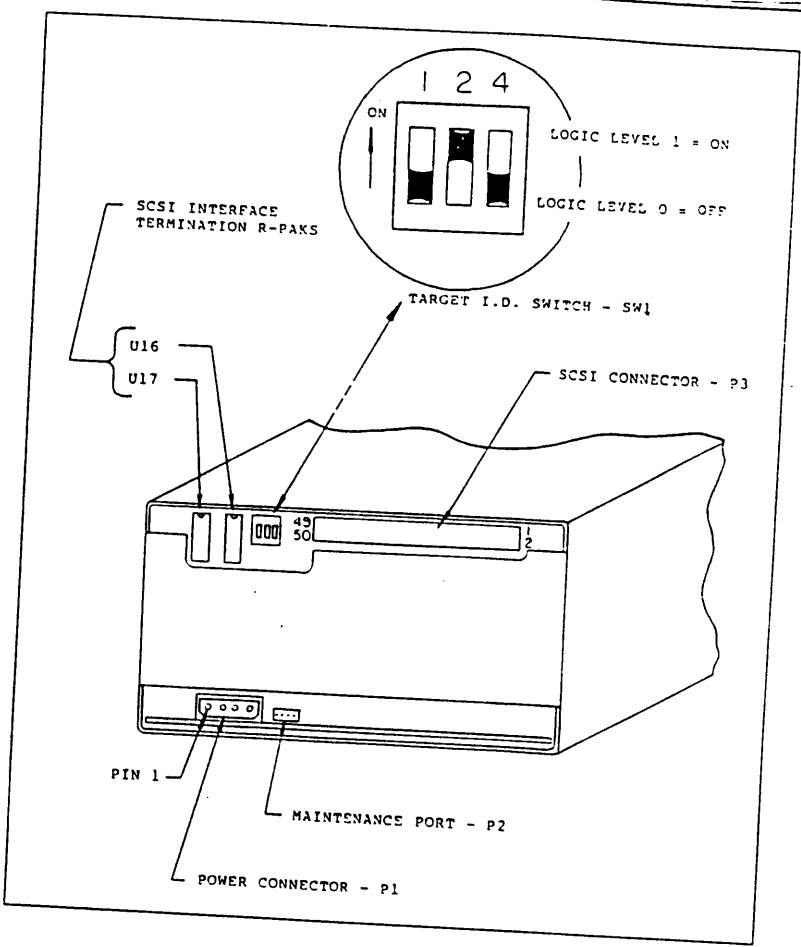


Figure 7-1. Rear Panel Connectors and Controls



Section I

DESCRIPTION

GENERAL DESCRIPTION

This manual describes the Small Computer System Interface (SCSI) installed on the Microstreamer®, CacheTape®, and the GCR CacheTape®. The Cipher SCSI-to-Tape Drive Controller (CSC) incorporates all the components and circuitry on a multi-layered printed wiring board. The two CSC models which are usable on the tape drives specified are:

- o CSC 100 -- Single-Ended Drivers and Receivers
- o CSC 200 -- Differential Drivers and Receivers

The CSC dimensions are:

- o Height - 6.80 inches
- o Width - 16.50 inches
- o Depth - 2.67 inches with non-shielded connector;
3.0 inches with shielded connector
- o Weight - 7.5 lbs.

The major modules of the CSC are:

- o SCSI Protocol Controller Chip
- o Memory Array Controller
- o 64K Byte Buffer Memory
- o 8085 Microprocessor
- o 2K X 8-Bit Scratch Pad RAM
- o 24K X 8-Bit EPROM
- o 5V Power Supply

The SCSI bus capabilities are:

- o Transfer Rate: 1.5 Mbytes/sec. maximum - asynchronous
- o Organization: 8-Bit Parallel with Parity

Power for the controller is supplied from the tape drive to a switching voltage regulator on the SCSI PWB. The CSC requires no preventive maintenance.

PHYSICAL DESCRIPTION

The CSC assembly (Figure 1-1) is designed to be field-installable (by a technician) onto the rear of the tape drive housing. The SCSI controller is integrated onto a 6.3" X 16" multi-layered printed wiring board. When the CSC enclosure is securely anchored, it hinges open to allow access to the controller PWB and to facilitate interconnecting the CSC to the tape drive interface connectors and the input power connector. There is no operator access to the CSC assembly once installed on the tape drive. Access is restricted to trained maintenance personnel for repair and replacement purposes only.

FUNCTIONAL DESCRIPTION

The CSC provides the required control functions and interface signals to accommodate the operation of Microstreamer, CacheTape and GCR CacheTape on ANSI standard SCSI bus. The two interfaces which the controller provides are the standard Cipher interface and SCSI. The controller will perform standard SCSI tape functions including the COPY command. Its circuitry includes all logic required to operate as a target device when executing the standard tape functions, and as an initiator device when executing the COPY command to another device on the SCSI bus. The microprocessor and associated memory are used to control communication over the SCSI bus, manage the controller buffer memory, queue tape functions, and control the tape interface protocol.

Figure 1-2 is a system block diagram. Data transfer to tape is accomplished by data coming in from the SCSI interface and being temporarily stored in the buffer memory. From the buffer memory data is sent to the tape interface. Reading from the tape occurs by data coming in from the tape interface and being held in the buffer memory. From there, bytes are transferred out to the SCSI interface.

REFERENCE MANUALS

This addendum is designed to be used in conjunction with the technical manuals for Cipher's 1/2" reel-to-reel tape drives:

TAPE DRIVE	MANUAL P/N
F880 Microstreamer	799816-003
M890/M891 CacheTape	799816-006
M990 GCR CacheTape	799891-001

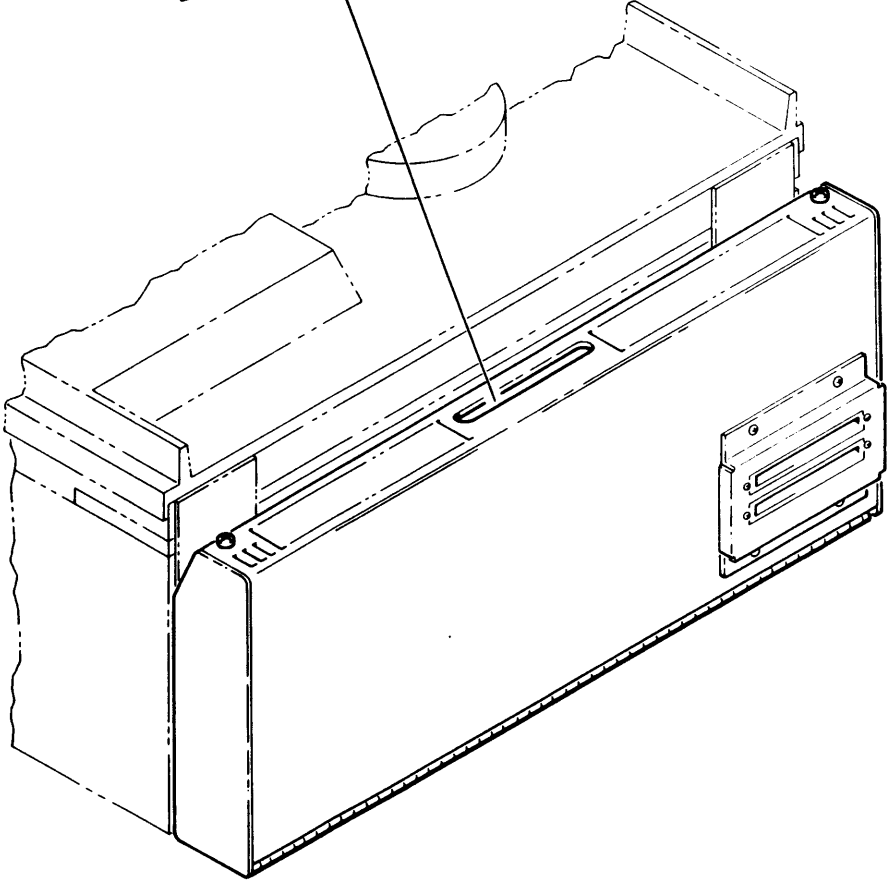
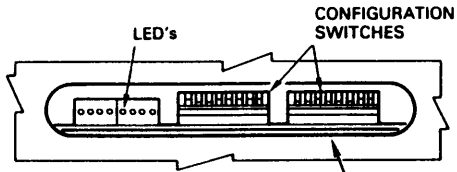


Figure 1-1. SCSI Controller Assembly

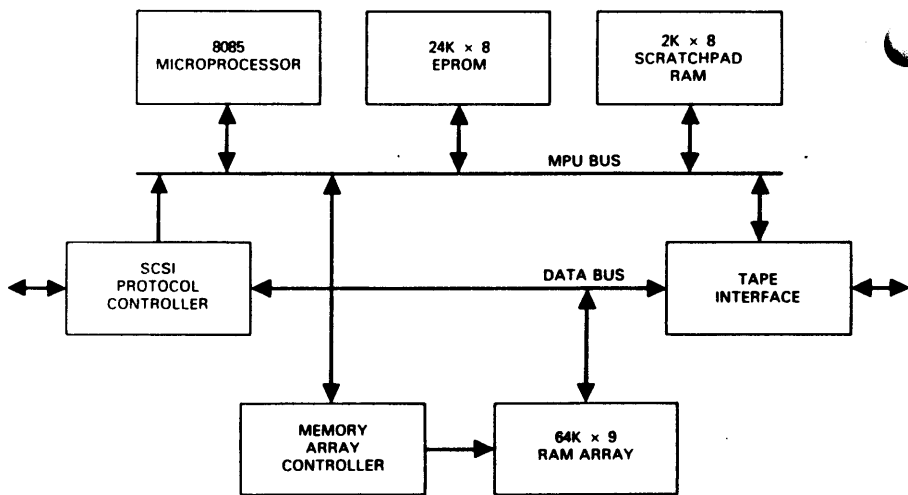


Figure 1-2. System Block Diagram

SECTION II
INSTALLATION, RETROFIT
INSTALLATION, SWITCH SETTINGS,
AND INTERFACE CONNECTIONS

Notice: If installation is for a retrofit kit, disregard this procedure and refer to retrofit installation instructions, page 2-6.

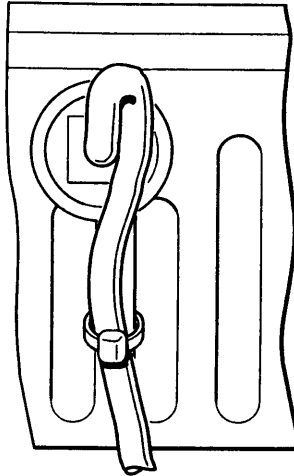
INSTALLATION

The CSC assembly should be installed by a qualified technician. It is designed to attach on tape drives that are rack-mounted or mounted inside a Cipher enclosure. The CSC enclosure opens to allow access to the controller PWB and to facilitate connecting the CSC to the tape drive interface and the input power. If it is to be installed on a rack-mounted tape drive, the CSC assembly must be attached to the tape drive before installation in the equipment rack. On an enclosed tape drive, the tape drive must be removed from the enclosure before installation can be attempted. The installation of the CSC assembly requires a pair of diagonal pliers, cutters and a phillips screw driver. Refer to Figure 2-1.

To install, proceed as follows:

1. Open the top cover of the tape drive and loosen the two screws on either side of the top plate behind the front panel.
2. Open the top plate by lifting the sides directly behind the front panel. Place the safety pin in the hole provided in the top plate support arm. See Figure 2-1, sheet 1.
3. Disconnect the main harness from the PWB.
4. Locate the small male connector tie-wrapped to the main harness; this is the SCSI power and ground harness. Cut and remove the three tie wraps that secure it to the main harness. See Figure 2-1, sheet 1.
5. Route the SCSI harness to the back of the tape drive. Loosely attach an adhesive backed tie wrap anchor to the SCSI harness. Attach the anchor to the back wall of the chassis as shown in Figure 2-1, sheet 1.
6. Route the male end of the SCSI harness through the large opening in the back of the chassis. Connect the male connector to the female connector of the SCSI power cable. See Figure 2-1, sheet 2.
7. Reconnect the main harness assembly to the PWB.
8. Assemble the mounting screw, bracket, and well nut to the CSC chassis. Install the well nut through the bracket hole on the front side of the CSC from the inside out. Slide the bracket into the front slot, lip down, facing away from the CSC chassis for Microstreamer and CacheTape drives (facing toward the CSC chassis for GCR's), between the well nut and inner hole. Insert the screw through the bracket and into the well nut.

9. Route the power cable through the chassis slot (bottom) of the CSC housing.
10. Hook the CSC assembly onto the back of the tape drive. Route the power cord down the back of the drive. Provide a service loop in the cord and secure the cord with a tie-wrap as shown below.



11. Tighten the well nut, while applying pressure on the bracket, until the CSC assembly is securely fastened to the tape drive chassis.
12. Plug the power cable into J4 on the CSC board. Secure it to the CSC housing with the provided tie wrap anchor.
13. Plug the interface cables to the PWB assembly and to the CSC assembly board. J1 and J2 plug into P1 and P2, respectively. Loop the cable.
14. Close the CSC enclosure and refer to Figure 2-1, sheet 3. Fasten one end of each ground strap to each screw on top of the CSC housing. Tighten the screws.
15. Fasten the other end of each ground strap onto the back of the top plate using one hinge screw on each end of the top plate.
16. Check that the drive passes the power-up tests.
17. Install the drive in rack or enclosure. Remove the window on an enclosure - for I/O cable access - before reinstalling the tape drive unit.

SERVICE ACCESS

Service access to the CSC PWB on a rack-mounted tape drive can be done without removing the drive from the slides. The tape drive must be removed from an enclosure for service.

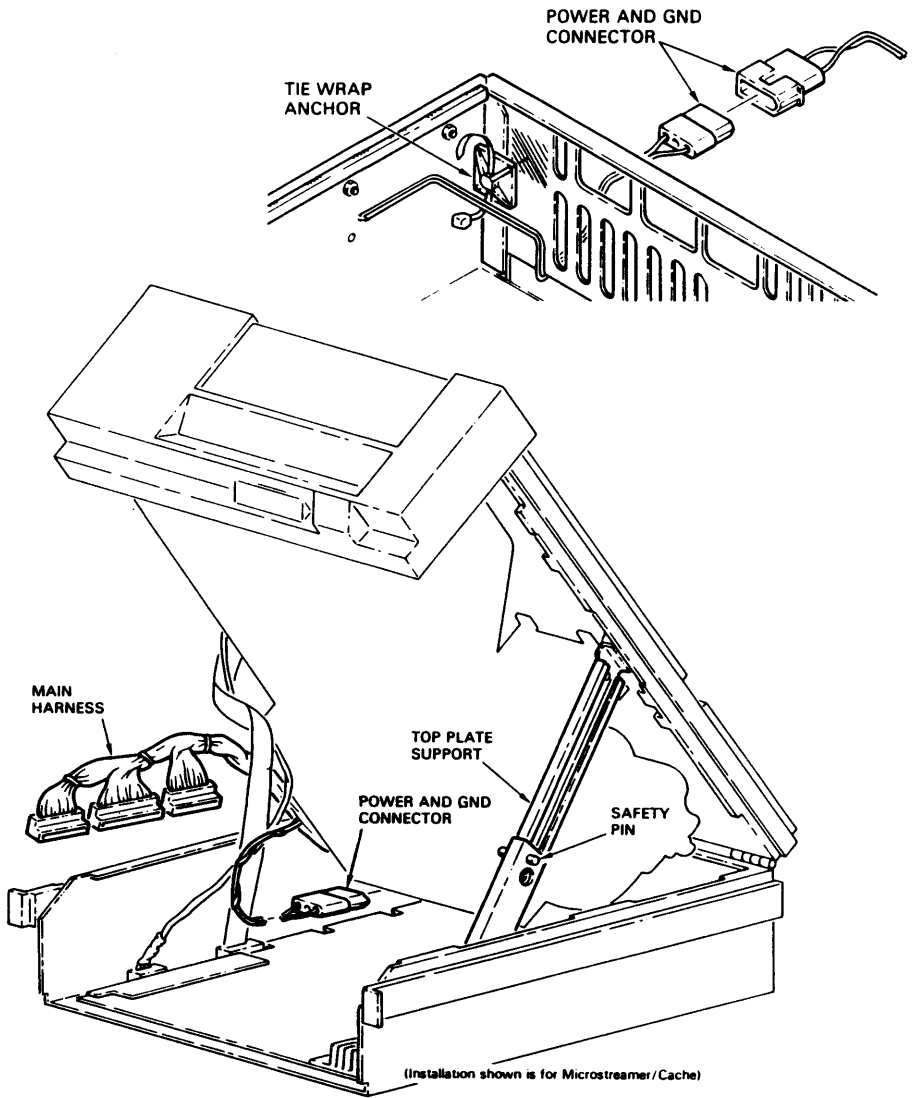


Figure 2-1. CSC Assembly Installation

Sheet 1 of 3

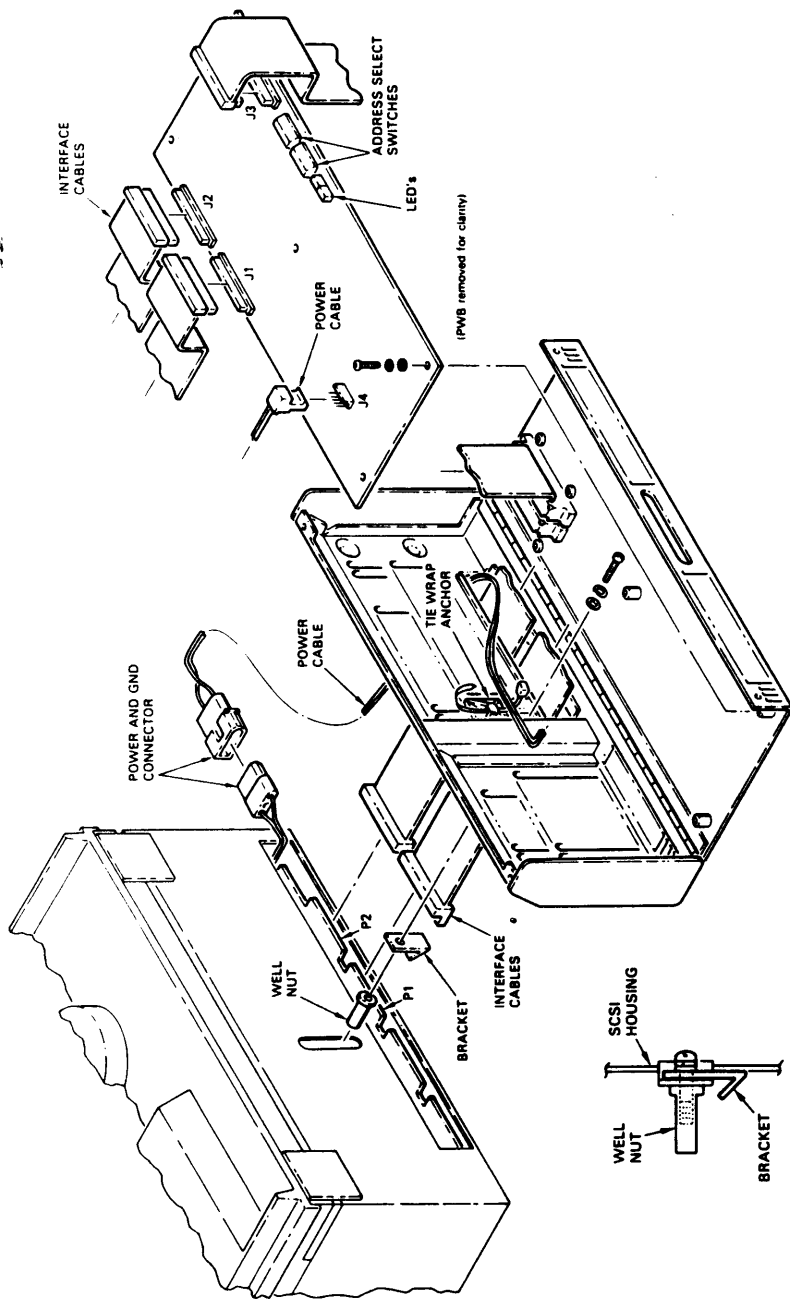


Figure 2-1. CSC Assembly Installation

Sheet 2 of 3

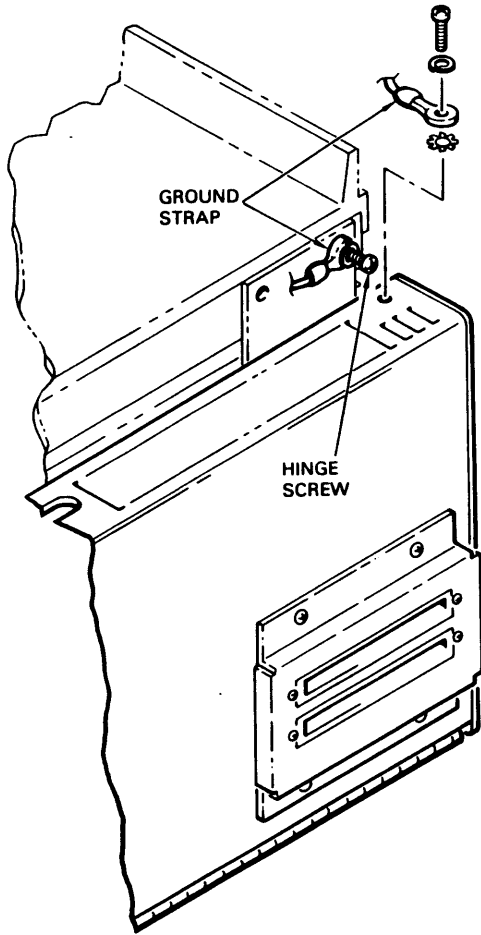


Figure 2-1. CSC Assembly Insatllation

Sheet 3 of 3

RETROFIT INSTALLATION

INSTALLATION

The CSC assembly should be installed by a qualified technician. It is designed to attach on tape drives that are rack-mounted or mounted inside a Cipher enclosure. The CSC enclosure opens to allow access to the controller PWB and to facilitate connecting the CSC to the tape drive interface and the input power. If it is to be installed on a rack-mounted tape drive, the drive must be fully extended and removed from the rack slides prior to installation. On an enclosed tape drive, the tape drive must be removed from the enclosure before installation can be attempted. The installation of the CSC assembly requires a pair of diagonal pliers, pliers, and a Phillips screw driver. Refer to Figure 2-1A.

To install, proceed as follows:

1. Turn power off and remove tape drive power cord from outlet.
2. Place the top cover in the Maintenance Access position. Open top plate by lifting sides directly behind front panel. Place safety pin in hole provided in top plate support arm. See Figure 2-1A, sheet 1.
3. Disconnect cable harness from the PWB.
4. Install line tap connectors to main harness assembly by crimping onto wire as follows (connect to the top board, Sense/Servo board, on the GCR):

MAIN HARNESS	POWER CONNECTIONS
(GCR)	
P1-3	White wire--P2
P1-1	Black wire--P3
Microstreamer/Cache)	
P3-10	White wire--P2
P3-9	Black wire--P3

5. Plug the black and white wires of the SCSI Harness adapter cable into the taps according to step 4.
6. Route the male end of the SCSI Harness through the back of the chassis.
7. Connect the female plug of the SCSI Harness to the male plug.
8. Reconnect main harness assembly to PWB.
9. Power up the tape drive

CAUTION -

CSC 100 only: Connect a voltmeter between pins 1 (gnd) and 5 (voltage) of J4. The value of the input should be $+35\pm 6$ Vdc for Microstreamer and CacheTape, and $+57\pm 6$ or $+37\pm 5$ Vdc for GCR. Turn drive power off before continuing and remove power cord. **Warning** - If voltages don't check correctly, do not reconnect harness. Go back to step 4 and repeat steps 4-9 after turning power off.

10. Close top plate and place power cord on top.
11. Route the power cable through the CSC housing bottom slot and anchor with tie wrap as shown in Figure 2-1A.
12. Hook CSC assembly onto the back of the tape drive housing and tighten the well nut.
13. Plug power cable to J4 on the CSC board.
14. Plug interface cables to PWB assembly and to CSC assembly board. J1 and J2 plug into P1 and P2, respectively. Loop the cable.
15. Close CSC enclosure and refer to Figure 2-1A, sheet 3. Fasten one end of each ground strap to both screws located on top of enclosure and tighten the screws.
16. Fasten the other end of each ground strap onto the back of the top plate by loosening one hinge screw located on each end of the top plate. Retighten the screws.
17. Turn drive on and check that drive powers up correctly.
18. Power drive off and reinstall in rack or enclosure. Remove the window on an enclosed Microstreamer for I/O cable access, before reinstalling the tape drive unit.

SERVICE ACCESS

Service access to the CSC PWB on a rack-mounted tape drive can be done without removing the drive from the slides. The tape drive must be removed from an enclosure for service.

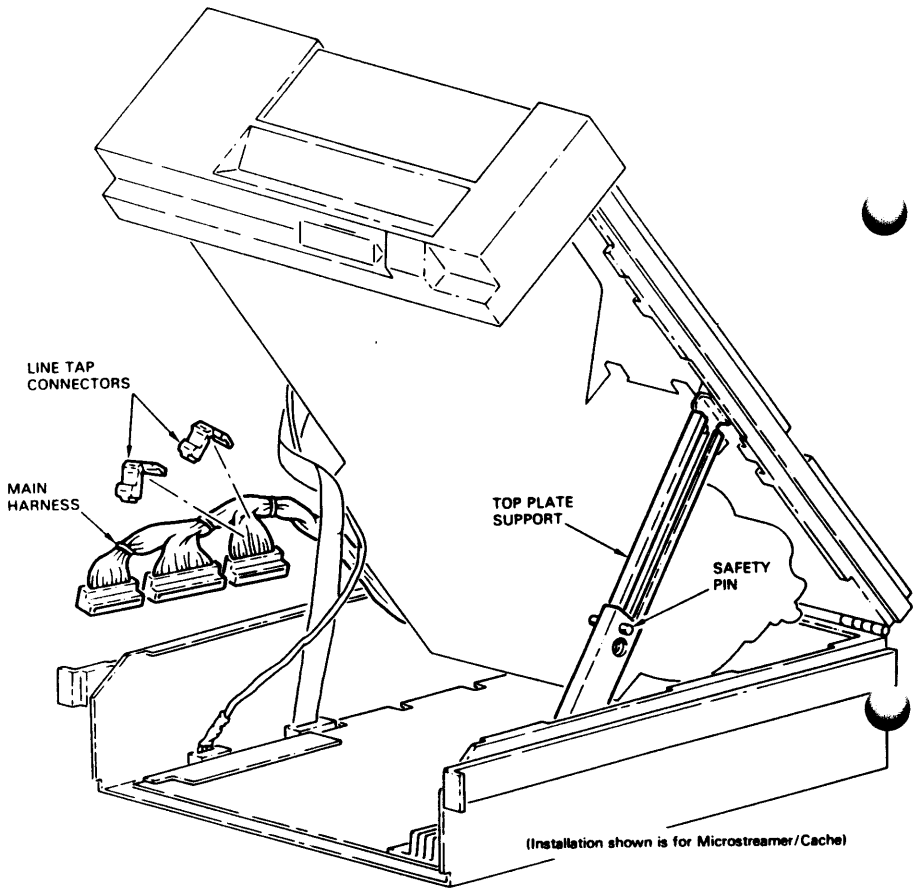


Figure 2-1a. CSC Retrofit Assembly Installation
Sheet 1 of 4

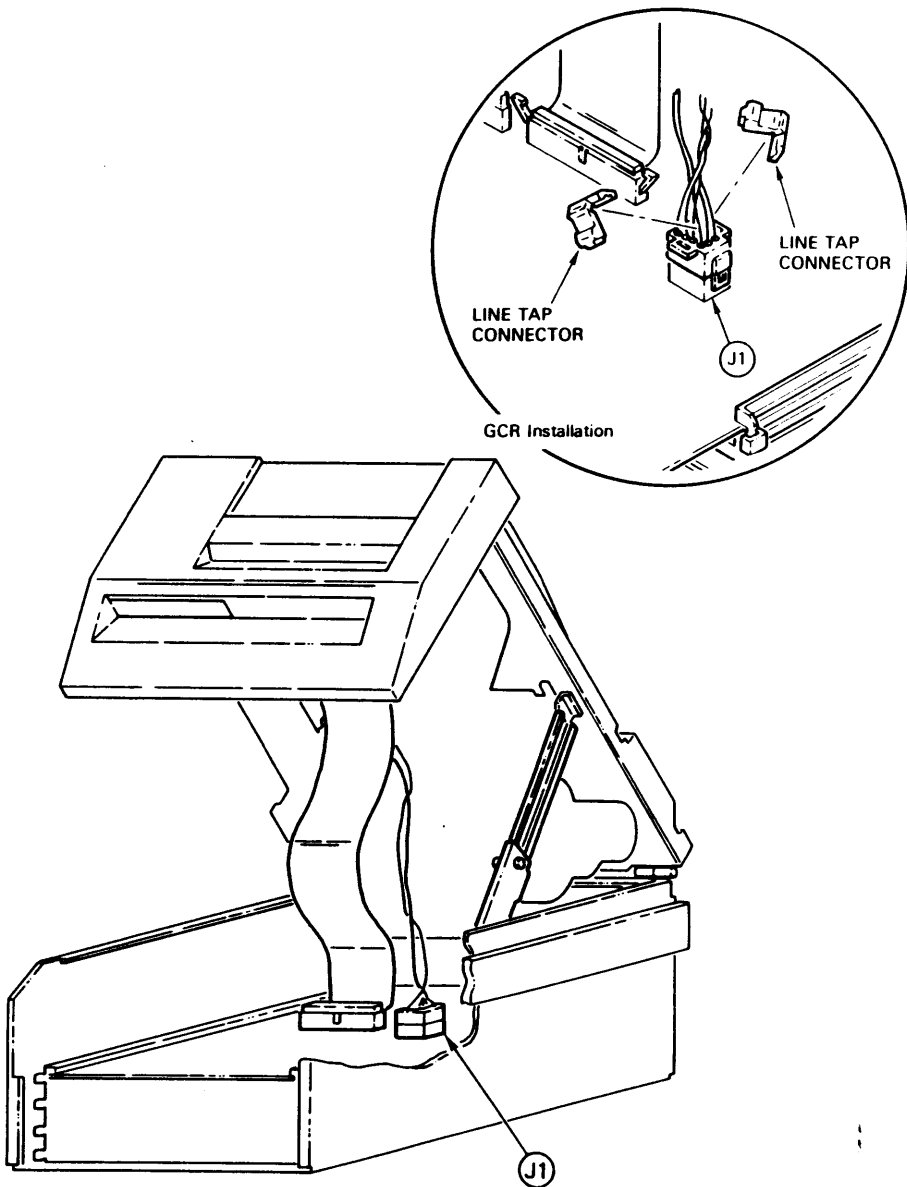


Figure 2-1a. CSC Retrofit Assembly Installation,
Sheet 2 of 4

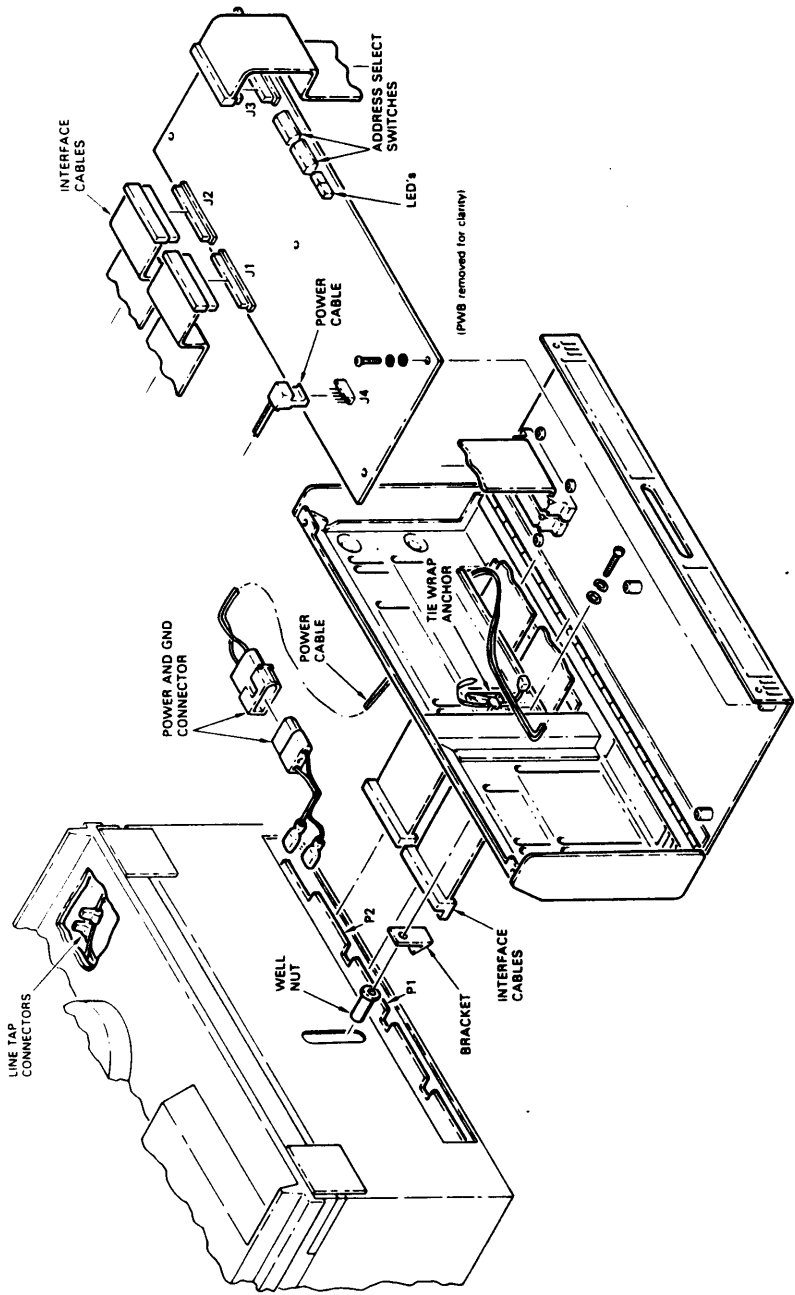


Figure 2-1a. CSC Retrofit Assembly Installation

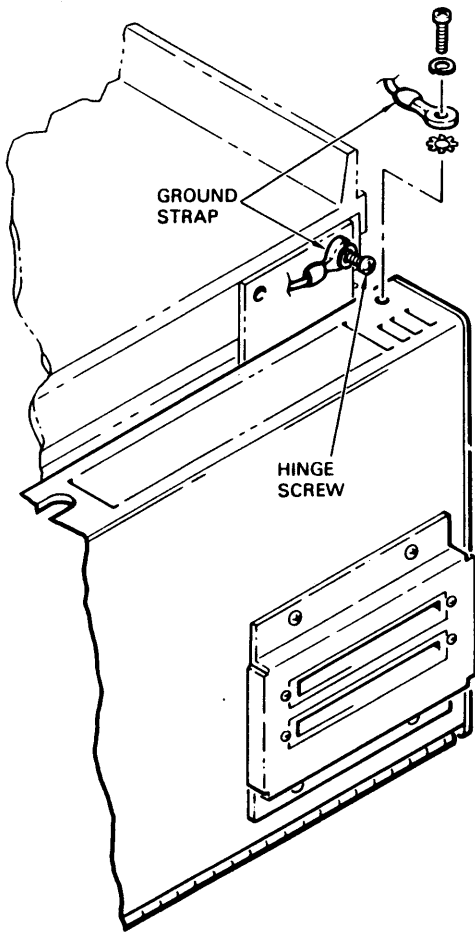


Figure 2-1a. CSC Retrofit Assembly Installation
Sheet 4 of 4

SCSI ID SWITCHES

A DIP switch is used to select the SCSI ID as shown on Table 2-1. Note: Refer to the silkscreen on the board for these switches.

	2	1	0	SCSI ID
	Open	Open	Open	0
	Open	Open	Closed	1
	Open	Closed	Open	2
*	Open	Closed	Closed	3
	Closed	Open	Open	4
	Closed	Open	Closed	5
	Closed	Closed	Open	6
	Closed	Closed	Closed	7

Table 2-1. SCSI ID

Silkscreen position S, between 0 and C of switch position 4 is the hardware reset switch; its normal operating position is open. Toggle this to reset the board. Switches 5 through 7 are not used and should be closed.

CONFIGURATION SWITCHES

The switches, labeled 0 through 7, and their functions are listed in Table 2-2.

SWITCH	POSITION		FUNCTION
SW1	0	1	1 Unit available on controller 2 Units available on controller 3 Units available on controller 4 Units available on controller
	* Closed	Closed	
	Open	Closed	
	Closed	Open	
	Open	Open	
*	2	3	Normal Loop on power-up routines Loop on RAM data dump Allow execution after power-up failure
	Closed	Closed	
	Open	Closed	
	Closed	Open	
	Open	Open	
6	4	5	880 890/891 990 (up to 32K data blocks; data recoverable after fatal drive error) 990 (up to 64K data blocks; data not recoverable after fatal drive error)
	Closed	Closed	
	Open	Closed	
	Closed	Open	
	Open	Open	
7	* Closed		Parity checked
	Open		Non-parity checked
7	* Closed		Arbitrating Model
	Open		Non-arbitrating Model

Table 2-2. Configuration Switches

* Factory settings

CSC 100 ONLY

There are a number of jumpers on the CSC 100 PWB. Only jumper W7 can be altered. An installed jumper causes the controller to issue a hard reset of the SCSI bus at power-up. A hard reset is not issued if the jumper is removed.

CSC 200 ONLY

The CSC 200 has two DIP switches not found on the CSC 100, at locations 5A and 6T. All switches at 5A should be closed. They are for test purposes only. All switches at 6T except 4 and 5 should be closed. The following table provides the function of switches 4 and 5.

POSITION	FUNCTION	
4	5	
Closed	Open	*Hard reset of SCSI bus issued at power-up.
Open	Closed	No hard reset of SCSI bus issued at power-up.

* Factory Setting

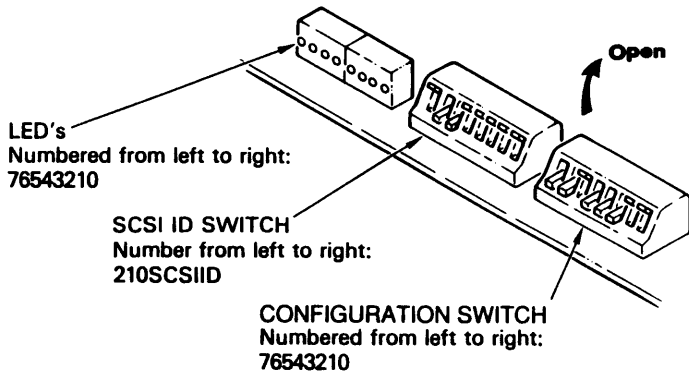


Figure 2-2. Controller Board Switches

INTERFACE CONNECTIONS

SCSI controllers are daisy-chained together using a common cable. A minimum conductor size of 28 AWG is used to minimize noise effects and ensure proper distribution of terminator power. For both models, a 50-conductor flat cable or 25 twisted-pair cable is used. Shielded or non-shielded cable connectors are available.

The CSC 100 can use terminator power supplied by the SCSI bus in the event the drive and interface are at the end of the bus and not turned on.

Figure 2-3 shows the termination scheme for CSC 100 and CSC 200. For CSC 100, the ribbon cable connecting the peripherals in a daisy-chained manner is limited to 6.0 meters. All SCSI signals in the cable are terminated at each end by 220/330 Ohm termination resistors. The CSC 200 is recommended for SCSI connections exceeding 6.0 meters and ranging up to 15.0 meters, primarily for interconnection outside of a cabinet. All SCSI bus signals consist of two lines denoted (+)signal and (-)signal. Each differential pair must be terminated at each end of the SCSI bus with 330 Ohms to +5V, 330 Ohms to ground, and 150 Ohms between the signal pairs. Terminations are made by inserting terminators into the sockets: on the CSC 100 PWB at locations 2A and 2B and on the CSC 200 at locations 2A, 2H, and 3G. Only two devices at each physical end of the bus require terminators; if the controller is not at either physical end of the bus, remove the terminators.

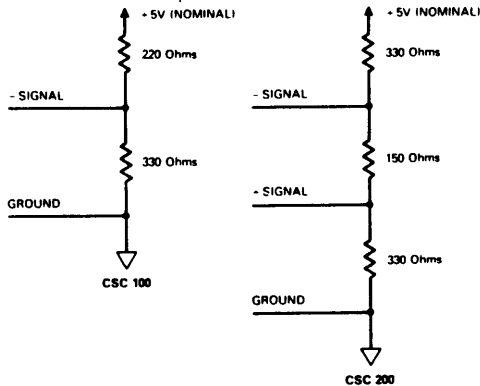


Figure 2-3. SCSI Bus Signal Termination

SCSI Bus Terminator Power. The controller supplies terminator power through a diode to its socketed SCSI bus terminators. This power is also supplied to SCSI bus connection J3 pin 26 for powering a terminator on the opposite end of the bus. This provides for signal integrity if that device loses internal power. Additionally, external terminator power into the controller can be provided through a diode in SCSI bus connector J3 pin 26.

Connectors. Two 50-pin connectors, J1 and J2, are provided to connect the controller to the tape drive. Also mounted on this board is a 50-pin connector, J3, which is provided to connect the CSC 100 to the SCSI bus in a daisy-chain configuration. For the model CSC 200, two 50-pin connectors, J3 and J4, are provided for daisy-chaining.

Pin Assignments. The signals, mnemonics and pin assignments for connectors J1 and J2 are presented in Table 2-3. See Section III for command definitions. Table 2-4 shows the single-ended pin assignments for ANSI unshielded and Alternative 1 shielded connectors. Table 2-5 shows the single-ended pin assignments for ANSI Alternative 2 shielded connectors. Table 2-6 shows the differential pin assignments for ANSI unshielded and Alternative 1 shielded connectors, Table 2-7 for Alternative 2 shielded connectors.

Connector	Signal Pin	Signal	
J1 Controller to Tape Drive	2	Formatter Busy (IFBY)	
	4	Last Word (ILWD)	
	6	Write Data 4 (IW4)	
	8	Initiate Command (IGO)	
	10	Write Data 0 (IWO)	
	12	Write Data 1 (IW1)	
	14	---	
	16	---	
	18	Reverse (IREV)	
	20	Rewind (IREW)	
	22	Write Data Parity (IWP)	
	24	Write Data 7 (IW7)	
	26	Write Data 3 (IW3)	
	28	Write Data 6 (IW6)	
	30	Write Data 2 (IW2)	
	32	Write Data 5 (IW5)	
	34	Write (IWRT)	
	36	---	
	38	Edit (IEDIT)	
	40	Erase (IERASE)	
	42	Write File Mark (IWFM)	
	44	---	
	46	Transport Address 0 (ITAD0)	
	48	Read Data 2 (IRD2)	
	50	Read Data 3 (IRD3)	
	J2 Controller to Tape Drive	1	Read Data Parity (IRDP)
		2	Read Data 0 (IRD0)
		3	Read Data 1 (IRD1)
4		Load Point (ILDLP)	
6		Read Data 4 (IRD4)	
8		Read Data 7 (IRD7)	
10		Read Data 6 (IRD6)	
12		Hard Error (IHER)	
14		File Mark (IFMK)	
16		Identification (IIDENT)	
18		Formatter Enable (IFEN)	
20		Read Data 5 (IRD5)	
22		End of Tape (IEOT)	
24		Rewind/Unload (IRWU)	
26	---		
28	Ready (IRDY)		

Table 2-3. Interface Connections,
Controller to Tape Drive

Connector	Signal Pin	Signal
J2 Controller to Tape Drive	30	Rewinding (IRWD)
	32	File Protected (IFPT)
	34	Read Strobe (IRSTR)
	36	Write Strobe (IWSTR)
	38	Data Busy (IDBY)
	40	High Speed Status (ISPEED)
	42	Corrected Error (ICER)
	44	On Line (IONL)
	46	Transport Address (ITAD1)
	48	Formatter Address (IFAD)
	50	Select Speed (IHISP)

NOTE: All other pins on J1 and J2 are grounded.

Table 2-3. Interface Connections,
Controller to Tape Drive (Cont'd.)

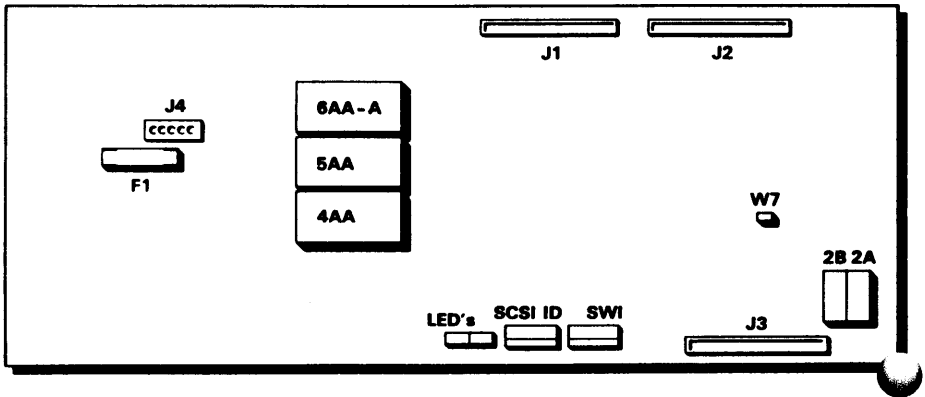


Figure 2-4. CSC PWB Component Locations

Signal Pin	Signal
2	-DB0
4	-DB1
6	-DB2
8	-DB3
10	-DB4
12	-DB5
14	-DB6
16	-DB7
18	-DBP
20	Ground
22	Ground
24	Ground
26	Terminator Power
28	Ground
30	Ground
32	-ATN
34	Ground
36	-BSY
38	-ACK
40	-RST
42	-MSG
44	-SEL
46	-C/D
48	-REQ
50	-I/O

All odd-numbered pins except 25 are connected to ground. Pin 25 left open.

Table 2-4. Model CSC 100 Connector J3 Pin Assignments.

Signal	Pin Number
-DB (0)	26
-DB (1)	27
-DB (2)	28
-DB (3)	29
-DB (4)	30
-DB (5)	31
-DB (6)	32
-DB (7)	33
-DB (P)	34
GROUND	35
GROUND	36
GROUND	37
TERMPWR	38
GROUND	39
GROUND	40
-ATN	41
GROUND	42
-BSY	43
-ACK	44
-RST	45
-MSG	46
-SEL	47
-C/D	48
-REQ	49
-I/O	50

Pins 1-12 and 14-25 are connected to ground. Pin 13 left open.

Table 2-5. Model CSC 100 Connector J3 Pin Assignments (Alternative 2).

Signal Name	Pin Number		Signal Name
SHIELD GROUND	1	2	GROUND
+DB (0)	3	4	-DB (0)
+DB (1)	5	6	-DB (1)
+DB (2)	7	8	-DB (2)
+DB (3)	9	10	-DB (3)
+DB (4)	11	12	-DB (4)
+DB (5)	13	14	-DB (5)
+DB (6)	15	16	-DB (6)
+DB (7)	17	18	-DB (7)
+DB (P)	19	20	-DB (P)
DIFFSENS	21	22	GROUND
GROUND	23	24	GROUND
TERMPWR	25	26	TERMPWR
GROUND	27	28	GROUND
+ATN	29	30	-ATN
GROUND	31	32	GROUND
+BSY	33	34	-BSY
+ACK	35	36	-ACK
+RST	37	38	-RST
+MSG	39	40	-MSG
+SEL	41	42	-SEL
+C/D	43	44	-C/D
+REQ	45	46	-REQ
+I/O	47	48	-I/O
GROUND	49	50	GROUND

Table 2-6. Model CSC 200 Connector J3 Pin Assignments.

Signal Name	Pin Number		Signal Name
SHIELD GROUND	1	26	GROUND
+DB (0)	2	27	-DB (0)
+DB (1)	3	28	-DB (1)
+DB (2)	4	29	-DB (2)
+DB (3)	5	30	-DB (3)
+DB (4)	6	31	-DB (4)
+DB (5)	7	32	-DB (5)
+DB (6)	8	33	-DB (6)
+DB (7)	9	34	-DB (7)
+DB (P)	10	35	-DB (P)
DIFFSENS	11	36	GROUND
GROUND	12	37	GROUND
TERMPWR	13	38	TERMPWR
GROUND	14	39	GROUND
+ATN	15	40	-ATN
GROUND	16	41	GROUND
+BSY	17	42	-BSY
+ACK	18	43	-ACK
+RST	19	44	-RST
+MSG	20	45	-MSG
+SEL	21	46	-SEL
+C/D	22	47	-C/D
+REQ	23	48	-REQ
+I/O	24	49	-I/O
GROUND	25	50	GROUND

Table 2-7. Model CSC 200 Connector J3 Pin Assignments (Alternative 2).

Data Sheet for Floppy Disk Drives

Manufacturer: Teac

Sheet number: FD 1 revision 0

Type: 55GFR-141

Form Factor: 5½" Half-Height

General Drive Description.

The Teac FD-55 is a 5½" floppy disk drive.

The FD-55 is a dual mode drive, that is able to run in normal density mode, or in high density mode. In high density mode the storage capacity is 1200 Kbytes. The drive handles both 48 tpi and 96 tpi floppy disks.

Environment.

Electrical Interface: Floppy.

DC Power Requirements							
Voltage	Start-up		Running		Not running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ±5% typical	0.53A		0.47A		0.23A		100mV
+12 ±5% typical	1.0A		0.24A	0.58A	0.01A	0.02A	200mV

Average power dissipation: 1.0 W. (motor not running)

Average power dissipation: 4.8 W. (motor running)

Operating temperature range: 4 to 46 °C.

Storage temperature range: -22 to 60 °C.

Maximum temperature gradient: 15 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

General Performance Specifications.

Settling time 15 msec.

Track-to-track: 3 msec (excludes settling time).

Average: 94 msec (includes settling time).

Rotational Latency Average 100 msec(low density), 83 msec(high density).

Media transfer rate 250 Kbit(low density), 500 Kbit(high density).

Type of Media.

5¼" soft sectored high density flexible disks for high density mode, or 5¼" soft sectored normal density flexible disks for normal density mode.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the indicator(LED) up.

Connectors.

Power connector.

- Pin 1: +12 VDC
- Pin 2: +12 Return
- Pin 3: +5 Return
- Pin 4: +5 VDC

Signal connector.

34 pin connector. 17 pins on both sides, even number pins are bottom side of the floppy disk drive.

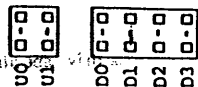
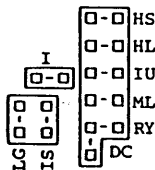
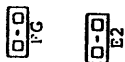
Configuration options.

Terminator resistors.

Interface terminator pack provide termination for the interface lines. The terminator resistors are mounted on the PCB with soldering joint (unremovable). For the multiplex connection of floppy disk drives by daisy chaining, multiple terminator resistors are connected to the input signals.

The total cable length should be less than 3 meters.

* designates factory installed position.



Assignment of straps.

All straps are mounted on the main PCBA of the floppy disk drive. Insertion of a short bar onto the post pin is defined as the on-state of the strap.

D0 - D3 straps.

- * D1 installed.

U0, U1 and IU straps.

Straps to select the turn-on condition of the front bezel indicator.

- * No straps installed, turn on condition is drive select.

HS and HL straps.

Straps to select head load condition.

- * No straps installed, head load on ready state.

ML strap.

Strap to select the rotational condition of the spindle motor.

- * No strap installed, the motor rotates only by the **MOTOR ON** signal.

RY/DC straps.

Straps to select the function of the **READY/DISK CHANGE** signal.

- * DC strap installed, the function of the signal is **DISK CHANGE**.

LG strap.

Straps to select the function of the **HIGH/NORMAL DENSITY** signal.

- * No strap installed, the low level of the signal designates the normal density mode.

I and IS straps.

Straps to select the speed mode of the floppy disk drive.

- * I and IS straps installed, dual speed mode is designated. The floppy disk drive maintains the ready state with no relation to a level change of the **HIGH/NORMAL DENSITY** signal.

E2 strap.

Strap to select the output condition of the index and read data pulses.

- * E2 strap not installed.

FG strap.

Strap to connect the floppy disk drive frame electrically to DC 0 V.

- * FG strap installed.

Documentation.

Publications available from Teac.

TEAC FD-55GFR-141/041 mini flexible disk drive specification.

Data Sheet for Floppy Disk Drives

Manufacturer: Teac

Sheet number: FD 2 revision 0

Type: 235HF

Form Factor: 3½"

General Drive Description.

The Teac FD-235 is a 3½" floppy disk drive.

The FD-235 is a dual mode drive, that is able to run in normal density mode, or in high density mode. In high density mode the storage capacity is 1.44 Mbytes. The drive can read and write standard 135 tpi 3½" floppy disks.

Environment.

Electrical Interface: Floppy.

DC Power Requirements

Voltage	Start-up		Running		Not running		Ripple (maximum)
	Avg.	Peak	Avg.	Peak	Avg.	Peak	
+5V ± 5% typical	0.66A	0.80A	0.30A	0.40A	0.07A		100mV

Average power dissipation: 50mW (motor not running)

Average power dissipation: 4.4 W. (motor running)

Operating temperature range: 4 to 50 °C.

Storage temperature range: -22 to 60 °C.

Maximum temperature gradient: 15 °C/hour. (operating)

Operating humidity : 20 to 80 %, non condensing.

General Performance Specifications.

Settling time: 15 msec.

Track-to-track: 3 msec (excluding settling time).

Average: 94 msec (including settling time).

Rotational latency average: 100 msec.

Media transfer rate 250 Kbit(low density), 500 Kbit(high density).

Type of Media.

High density and normal density 3½" micro floppy disks.

Mounting.

Recommended orientation is vertical on either side, or horizontal with the spindle motor down.

Connectors.**Power connector.**

Pin 1: +5 VDC

Pin 2: 0 VDC

Pin 3: 0 VDC

Pin 4: N.C.

Signal connector.

34 pin connector. 17 pins on both sides, even number pins are upper side of the floppy disk drive.

Configuration options.**Terminator resistors.**

Interface terminator pack provide termination for the interface lines. The terminator resistors are mounted on the PCB with soldering joint (unremovable). For the multiplex connection of floppy disk drives by daisy chaining, multiple terminator resistors are connected to the input signals.

The total cable length should be less than 3 meters.

- designates factory installed position.

□-□	HHO
□-□	OP
□-□	LHI
□-□	HHI
□-□	D1
□-□	D0

Assignment of straps.

All straps are mounted on the main PCBA of the floppy disk drive. Insertion of a short bar onto the post pin is defined as the on-state of the strap.

D0 and D1 straps.

- D0 installed.

HHI, LHI, OP and HHO straps.

Straps to select the designating method of the density mode.

- HHI installed. The floppy disk drive switches the density mode according to the HD IN

input signal. HIGH level corresponds to high density mode.

Frame grounding.

Strap to connect the floppy disk drive frame electrically to DC 0 V.

- * FG jumper wire installed.

5¼ adaptor

The TEAC FD-235 can be integrated with a TEAC CS-235 adaptor kit.

The ST strap on the PCBA of the 5¼" adaptor must set in position ST.

Documentation.

Publications available from Teac.

TEAC FD-235HF micro floppy disk drive specification.

