Dansk Data Elektronik A/S

Technical Data Sheet

Part 1

Updated 28th November 1994

Stock no.: 93700101

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SECTION 1.0

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 and contains the following interfaces:

- 2 seriel 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:

Seriel 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	CD0	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 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%	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.

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 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 used 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 bootstraped 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
```

Jumper	Clock
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
```

Jumper	Clock
+ 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 32xClk grounded.
2	HDLC-C pin 32xClk 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 32xClk grounded.
2	HDLC-C pin 32xClk 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: STXO

```
* * *
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: SRXO

```
* * *
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.

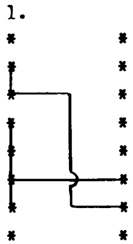
Function: Interrupts from data-communication port 0.

Position: B 3,7

Name: A13

```
           1.
           *      *  RST7
Rxrdy X0   *      *  RST6
Txrdy X0   *      *  RST5
Rxrdy D0   *      *  RST4
Txrdy D0   *      *  RST3
Rxi 0      *      *  RST2
Txi 0      *      *  RST1
           *      *  RST0
```

Factory installed strap:



<u>Strap socket 3.</u>

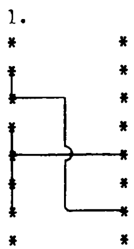
Function: Interrupts from data-communication port 1.

Position: B 6,6

Name: A14

	1.		
	*	*	RST7
Rxrdy X1	*	*	RST6
Txrdy X1	*	*	RST5
Rxrdy D1	*	*	RST4
Txrdy D1	*	*	RST3
Rxi 1	*	*	RST2
Txi 1	*	*	RST1
	*	*	RST0

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:

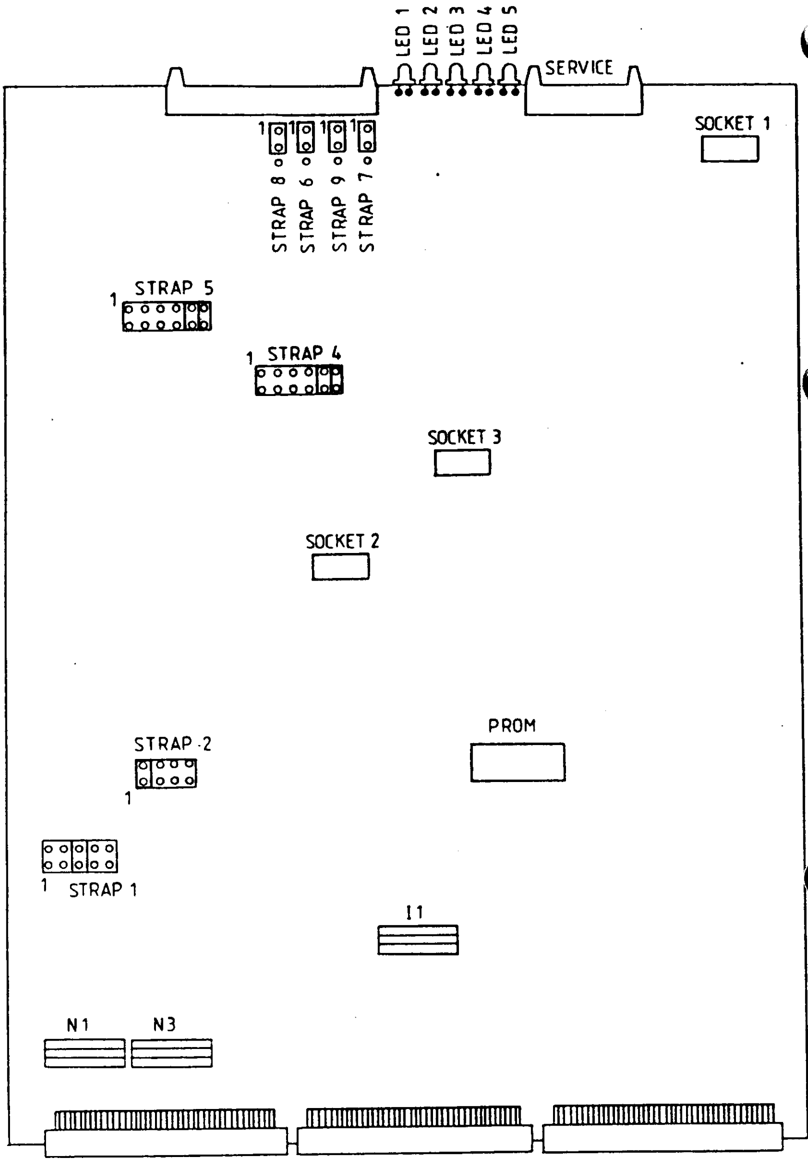
LED1: On: The boot prom is enabled.
Off: The boot prom is disabled.
Upon power up: On

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.


LED 1
LED 2
LED 3
LED 4
LED 5
SERVICE
SOCKET 1
STRAP 8
STRAP 6
STRAP 9
STRAP 7
STRAP 5
STRAP 4
SOCKET 3
SOCKET 2
PROM
STRAP 2
STRAP 1
I1
N1
N3

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 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%	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 used 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.

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

SUPERMAX technical data sheet.
Module: CPU 0101

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 used 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. 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 wati state in cache.

STRAP 3: ST3

Function: Controls enable/disable of cache.
ST3 is loacated 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

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 used 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. 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:

SI0 : 150 ohms. 10 pins single in line.
Connected by switch Z10.

SI1 : 150 ohms. 10 pins single in line.
Connected by switch Z11.

SI2 : 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
```

<u>ST13</u>

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
```

<u>ST15</u>

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.

<u>ST16</u>

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:

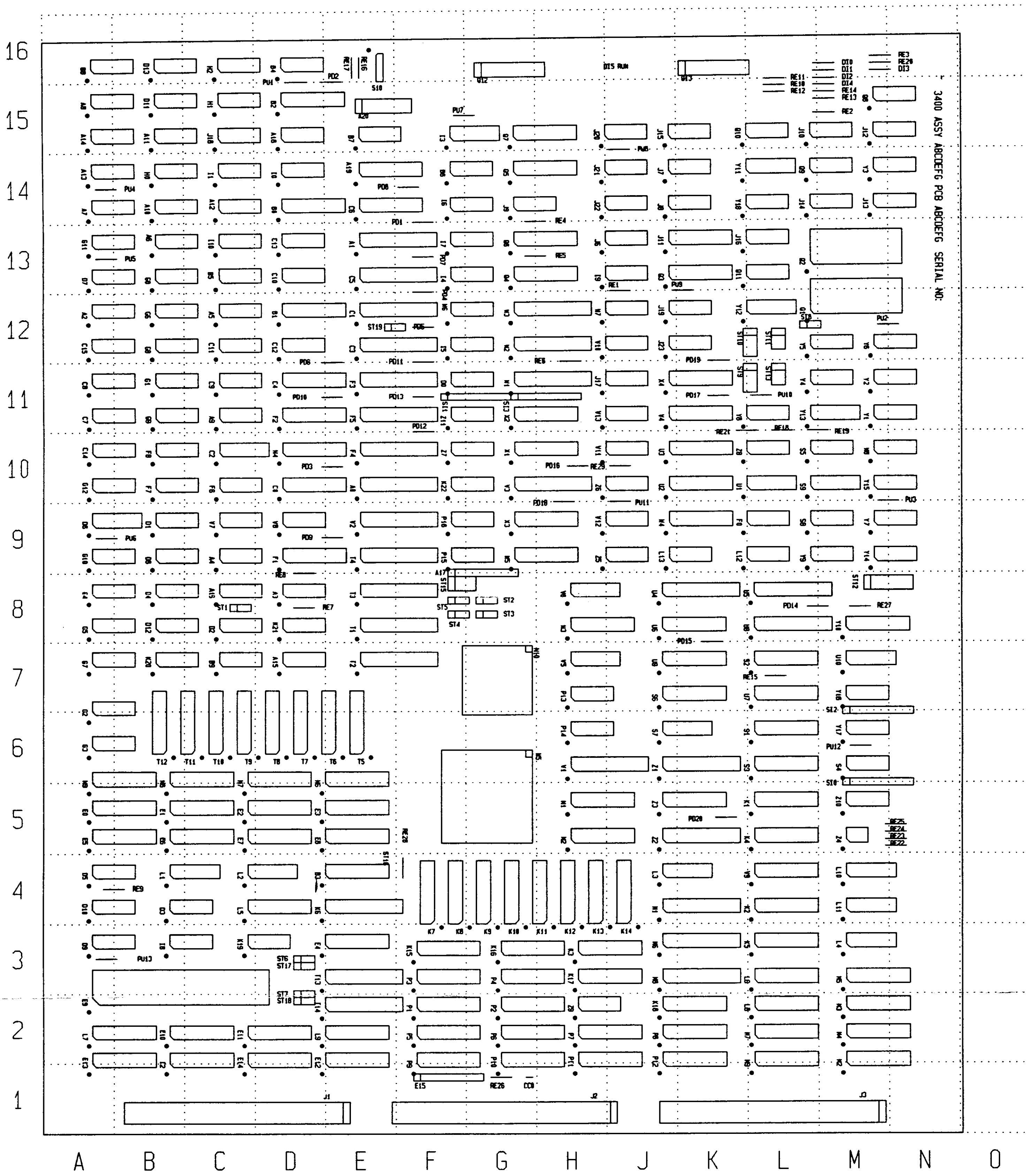
Supermax systems are delivered with one basic CPU module 3400.

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



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
A0	PAL20L8	E10
A1	PAL20R8	E13
A2	74AS20	A12
A3	74AS20	D8
A4	74AS20	C9
A5	74AS20	C12
A6	74AS74	B13
A7	74AS74	A14
A8	74AS74	A15
A9	74AS27	C11
A10	74S32	B14
A11	74S04	B15
A12	74S00	C14
A13	74S08	A14
A14	74S11	A15
A15	74S08	D7
A16	74S04	C8
A17	SIL	F9
A18	74AS74	D15
A19	PAL16R8	E14
A20	CON	E15
B0	74AS573	D14
B1	74AS573	D12
B2	PAL16R6	D15
B3	74ALS574	D4
B4	74AS74	D16
B5	74AS04	C13
B6	74AS74	F14
B7	74AS02	E15
B8	74AS32	A16
B9	74AS74	C7
CC0	Capacitor	G1
C0	PAL16R8	D10
C1	PAL20R8	E12
C2	74S158	C10
C3	PAL20R8	E12
C4	PAL16R8	D11
C5	PAL20R8	E13
C6	PAL16R8	E14
C7	74AS74	A11
C8	74AS00	A11
C9	74AS10	C11
C10	74AS08	D13
C11	74AS04	C12
C12	74AS32	D12
C13	74AS04	D13
C14	74AS32	A10
C15	74AS08	A12
DI0	DIODE	L16
DI1	DIODE	L16
DI2	DIODE	L16
DI3	DIODE	N16
DI4	DIODE	L15
DI5	LED	H16
D0	74AS20	F11
D1	74AS00	B9
D2	74AS32	C8
D3	74AS04	B4
D4	74AS00	B8
D5	74AS20	A4
D6	74S112	A9
D7	74AS74	A13
D8	74AS74	B9
D9	74AS74	A3
D10	74AS10	A4
D11	74AS08	B15
D12	74AS08	B8
D13	74AS74	B16
E0	74ALS573	A5
E1	74ALS573	B5
E2	74ALS573	C5
E3	74ALS573	D5
E4	74ALS574	D3
E5	74ALS573	A5
E6	74ALS573	B5
E7	74ALS573	C5
E8	74ALS573	D5
E9	74ALS632	A2

Name	Type	Pos
E10	74ALS645	B2
E11	74ALS645	C2
E12	74ALS645	D1
E13	74ALS645	A1
E14	74ALS645	C1
E15	SIL	F1
F0	74AS74	K9
F1	PAL16R8	D9
F2	PAL16R8	D11
F3	PAL20R8	E11
F4	PAL20R8	E10
F5	PAL20R8	E11
F6	74AS04	C10
F7	74AS04	B10
F8	74AS08	B10
G0	74AS32	B13
G1	74AS08	B11
G2	74AS32	A6
G3	74AS08	A6
G4	74AS32	A8
G5	74AS08	A8
G6	74AS32	B12
G7	74AS04	A7
G8	74AS11	B12
G9	74AS11	B11
G10	74AS32	A9
G11	74AS10	A13
G12	74AS02	A10
H0	74AS10	B14
H1	74AS00	C15
H2	74AS74	C16
I0	74AS20	D14
I1	74AS74	C14
I2	74LS541	B1
I3	74S112	F15
I4	74AS20	F13
I5	74AS10	F12
I6	74AS00	F14
I7	74AS08	F13
I8	74AS04	B3
I9	74LS14	H13
I10	74AS21	C13
J1	CON	E1
J2	CON	J1
J3	CON	M1
J6	74AS74	H13
J7	74AS74	J14
J8	74AS74	J14
J9	74AS21	G14
J10	74AS09	L15
J11	74ALS244	J13
J12	74AS04	M15
J13	74LS14	M14
J14	74AS00	L14
J15	74AS32	J15
J16	74AS74	K13
J17	74AS00	H11
J18	74AS20	C15
J19	74AS30	J12
J20	74AS32	H15
J21	74AS74	H14
J22	74AS74	H14
J23	74AS74	J12
K1	74ALS574	L5
K2	74ALS573	L4
K3	74ALS244	H3
K4	74ALS573	L5
K5	74ALS573	L3
K6	74ALS873	D4
K7	6168-45	F4
K8	6168-45	F4
K9	6168-45	G4
K10	6168-45	G4
K11	6168-45	H4
K12	6168-45	H4
K13	6168-45	H4
K14	6168-45	J4
K15	74ALS645	F3

Name	Type	Pos
K16	74ALS645	G3
K17	74ALS645	H3
K18	74ALS645	J2
K19	74AS08	C3
K20	74AS32	B7
K21	74AS32	D8
K22	74AS00	F10
L1	74S283	B4
L2	74S283	C4
L3	74S283	J4
L4	74S283	M3
L5	74ALS573	C4
L6	74ALS573	L3
L7	74ALS573	A2
L8	74ALS573	L2
L9	74ALS573	D2
L10	74S85	M4
L11	74S85	M4
L12	74AS08	K9
L13	74AS04	J9
M1	74ALS873	J4
M2	74ALS573	M1
M3	74ALS573	M2
M4	74ALS573	M2
M5	74ALS573	M3
M6	74ALS873	J3
M7	74ALS574	L2
M8	74ALS873	J3
M9	74ALS573	L1
N1	74ALS573	H5
N2	74ALS573	H5
N3	74ALS573	H8
N4	74ALS573	D10
N5	68020	G6
N6	74ALS645	D5
N7	74ALS645	C5
N8	74ALS645	B5
N9	74ALS645	A5
N10	68881	G7
PD1		F14
PD2		D16
PD3		D10
PD4		F13
PD5		F12
PD6		D12
PD7		F13
PD8		E14
PD9		D9
PD10		D11
PD11		F12
PD12		F11
PD13		F11
PD14		L8
PD15		K8
PD16		H10
PD17		K11
PD18		H10
PD19		K12
PD20		K5
PU1		D16
PU2		M12
PU3		M10
PU4		A14
PU5		A13
PU6		A9
PU7		F15
PU8		H15
PU9		J13
PU10		K11
PU11		H10
PU12		M6
PU13		A3
P1	74ALS573	F2
P2	74ALS573	G2
P3	74ALS573	F3
P4	74ALS573	G3
P5	74ALS573	F2
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
P7	74ALS573	H2
P8	74ALS573	J2
P9	74ALS573	F1
P10	74ALS573	G1
P11	74ALS573	H1
P12	74ALS573	J1
P13	74AS32	H7
P14	74AS08	H6
P15	74AS08	F9
P16	74AS32	F9
Q1	27512	L12
Q2	8251	L13
Q3	74ALS645	J13
Q4	74ALS574	G13
Q5	74LS641-1	G14
Q6	74ALS574	G13
Q7	74LS641-1	G15
Q8	75188	M15
Q9	75189	L14
Q10	SWITCH	K15
Q11	74LS32	K13
Q12	3M20	G16
Q13	3M20	K16
RE1	RES4M	H13
RE2	RES4M	L15
RE3	RES4M	M16
RE4	RES4M	G14
RE5	RES4M	G13
RE6	RES4M	H12
RE7	RES4M	D8
RE8	RES4M	D9
RE9	RES4M	A4
RE10	RES4M	L15
RE11	RES4M	L16
RE12	RES4M	L15
RE13	RES4M	L15
RE14	RES4M	L15
RE15	RES4M	L7
RE16	RES4M	E16
RE17	RES4M	E16
RE18	RES4M	L11
RE19	RES4M	L11
RE20	RES4M	M16
RE21	RES4M	K11
RE22	RES4M	N5
RE23	RES4M	N5
RE24	RES4M	N5
RE25	RES4M	N5
RE26	RES4M	G1
RE27	RES4M	M8
RE28	RES4M	F4
RE29		J10
RUN	LED	J16
SI0	RESISTOR	M6
SI1	RESISTOR	F11
SI2	RESISTOR	M7
SI3	RESISTOR	G11
ST1	STRAP	C8
ST2	STRAP	G8
ST3	STRAP	G8
ST4	STRAP	F8
ST5	STRAP	F8
ST6	STRAP	D3
ST7	STRAP	D3
ST8	STRAP	L12
ST9	STRAP	K11
ST10	STRAP	K12
ST11	STRAP	L12
ST12	STRAP	M8
ST13	STRAP	L11
ST15	STRAP	F8
ST16	STRAP	E5
ST17	STRAP	D3
ST18	STRAP	D2
ST19	STRAP	E12
S1	74ALS580	L6
S2	74ALS573	L7
S3	74ALS574	L6

Name	Type	Pos
S4	74LS38	M6
S5	74LS38	L10
S6	74ALS574	J7
S7	74LS148	J6
S8	74LS74	L9
S9	74LS353	L10
S10	SWITCH	E16
T1	TMS2150-4	E8
T2	TMS2150-4	E7
T3	TMS2150-4	E8
T4	TMS2150-4	E9
T5	6168-45	E6
T6	6168-45	E6
T7	6168-45	D6
T8	6168-45	D6
T9	6168-45	C6
T10	6168-45	C6
T11	6168-45	C6
T12	6168-45	B6
T13	TMS2150-4	D3
T14	TMS2150-4	D2
U1	74LS590	K10
U2	74ALS574	J10
U3	74ALS573	J10
U4	TMM2018D-35	J8
U5	PAL20R8A	L8
U6	74ALS573	J8
U7	74ALS573	L7
U8	PAL20R8A	L8
U9	PAL16R6A	J7
U10	74LS353	M7
V1	PAL20L8A	H6
V2	PAL20L8A	E9
V3	PAL20R8A	G10
V4	PAL16R8A	J11
V5	74AS138	H7
V6	74AS138	H8
V7	74AS30	C9
V8	74AS02	D9
V9	74ALS642	L4
V10	74AS74	H12
V11	74AS20	H10
V12	74AS32	H9
V13	74AS32	H11
W1	PAL20R6A	G11
W2	PAL20R6A	G12
W3	PAL20R6A	G12
W4	74LS273	J9
W5	74LS273	G9
W6	74AS74	F12
W7	74AS11	H12
W8	74AS74	M10
X1	PAL16R8A	G10
X2	PAL16R8A	G11
X3	PAL16R8A	G9
X4	PAL16R8A	J11
Y1	XOSC40M	M11
Y2	XOSC33M	M11
Y3	XOSC50M	M14
Y4	74AS74	L11
Y5	74AS74	L12
Y6	74AS74	M12
Y7	74AS74	M9
Y8	74AS74	K11
Y9	74LS14	L9
Y10	74ALS642	M8
Y11	74LS390	K14
Y12	74LS390	K12
Y13	74LS390	L11
Y14	74LS393	M9
Y15	74LS393	M10
Y16	74S140	M7
Y17	SWITCH	M6
Y18	74AS04	K14
Z1	PAL20L8A	J6
Z2	PAL20R8A	J5
Z3	74ALS641-1	J5
Z4	SWITCH	M5

Name	Type	Pos
Z5	74AS74	H9
Z6	74AS74	H10
Z7	74LS14	F10
Z8	74AS32	K10
Z9	74LS14	H2
Z10	SWITCH	M5
Z11	SWITCH	F11

Component locations

PCB: 3400 / 68020 | Issue: | Date:

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

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 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%	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.

STE1

Function: Controls the size of the external cache.

```
       2  4  6
STE1:  *  *  *
       *  *  *
       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.

STT1

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

```
        2  4  6  8
STT1:   *  *  *  *
        *  *  *  *
        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.

```
        2  4
STT4:   *  *
        *  *
        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.

```
        2  4  6  8 10 12 14
STT6:   *  *  *  *  *  *  *
        *  *  *  *  *  *  *
        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.

<u>Basic CPU module:</u>

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 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	Typical current
+ 5 V ±5%	13.0 A
+12 V ±5%	0.2 A
−12 V ±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

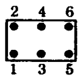
The arbitration scheme in the I/O bus uses a clock. One and only one CPU module in a Supermax system must drive the bus clock.

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

Straps

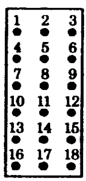
* designates factory installed position.

STE1:



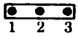
Size of external cache		
*	1-3	128 Kb
*	2-4	128 Kb
	3-5	64 Kb
	4-6	64 Kb

STP1:



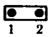
Size of the EPROM.		
*	4-5	27512

STQ1:



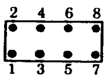
Start-up		
	1-2	Debug operation
*	2-3	Normal operation

STR1:



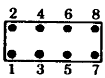
Inhibit the internal caches.		
*	NC	Cache content is controlled by software
	1-2	Cache content is not changed

STT1:



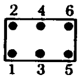
Clock frequency, 68030		
	1-2	33.3 MHz
*	3-4	25.0 MHz
	5-6	20.0 MHz
	7-8	16.6 MHz

STT2:



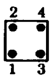
Clock frequency, 68882		
	1-2	33.3 MHz
	3-4	25.0 MHz
*	5-6	20.0 MHz
	7-8	16.6 MHz

STT3:



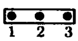
Clock frequency, control logic		
	1-2	25.0 MHz
*	3-4	20.0 MHz
	5-6	16.6 MHz

STT4:



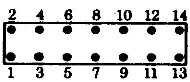
Clock frequency, bus clock		
	1-2	10.0 MHz
*	3-4	8.3 MHz

STT5:



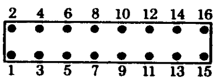
Clock frequency, time out clock		
	1-2	100 kHz (10 μs)
*	2-3	10 kHz (100 μs)

STT6:



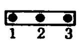
Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

STT7:



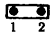
Delay time in clock circuitry		
*	1-3	Do not change
*	5-7	Do not change
*	9-10	Do not change
*	11-12	Do not change
*	13-15	Do not change

STT8:



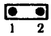
Cache enable, external cache		
*	1-2	Control register bit 6
	2-3	Address bit 20

STZ1:



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

STZ2:

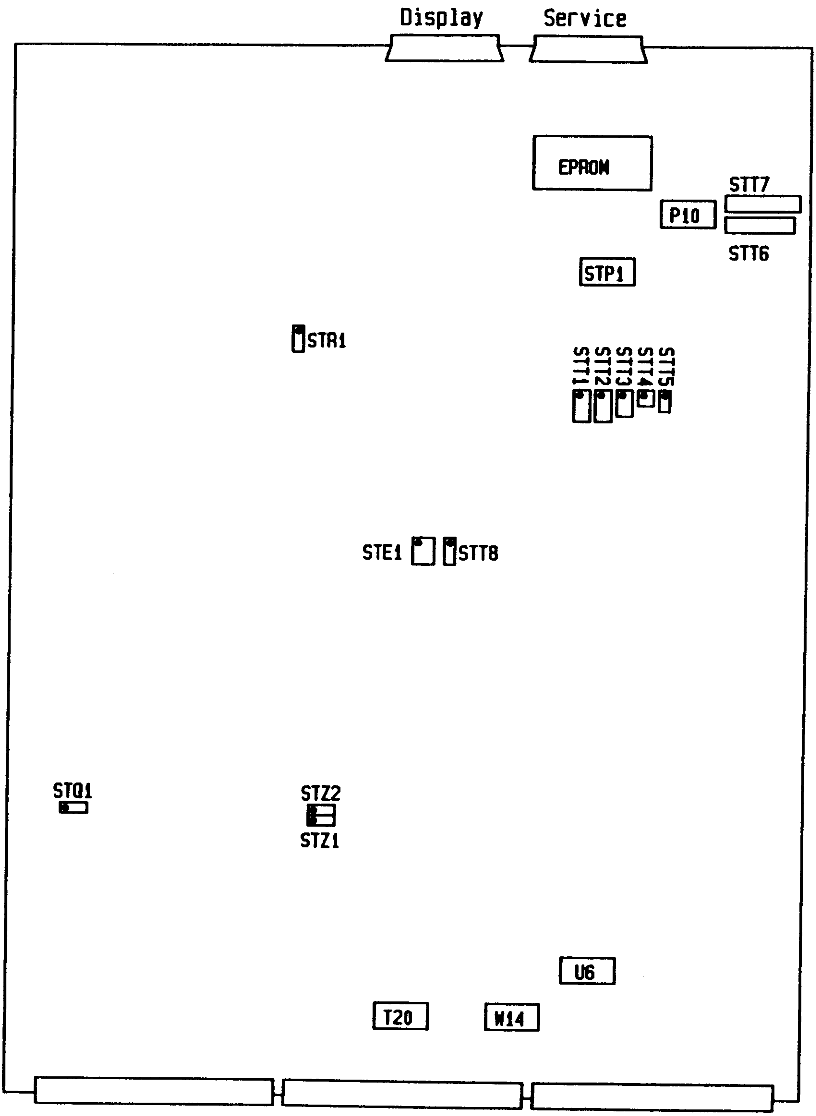


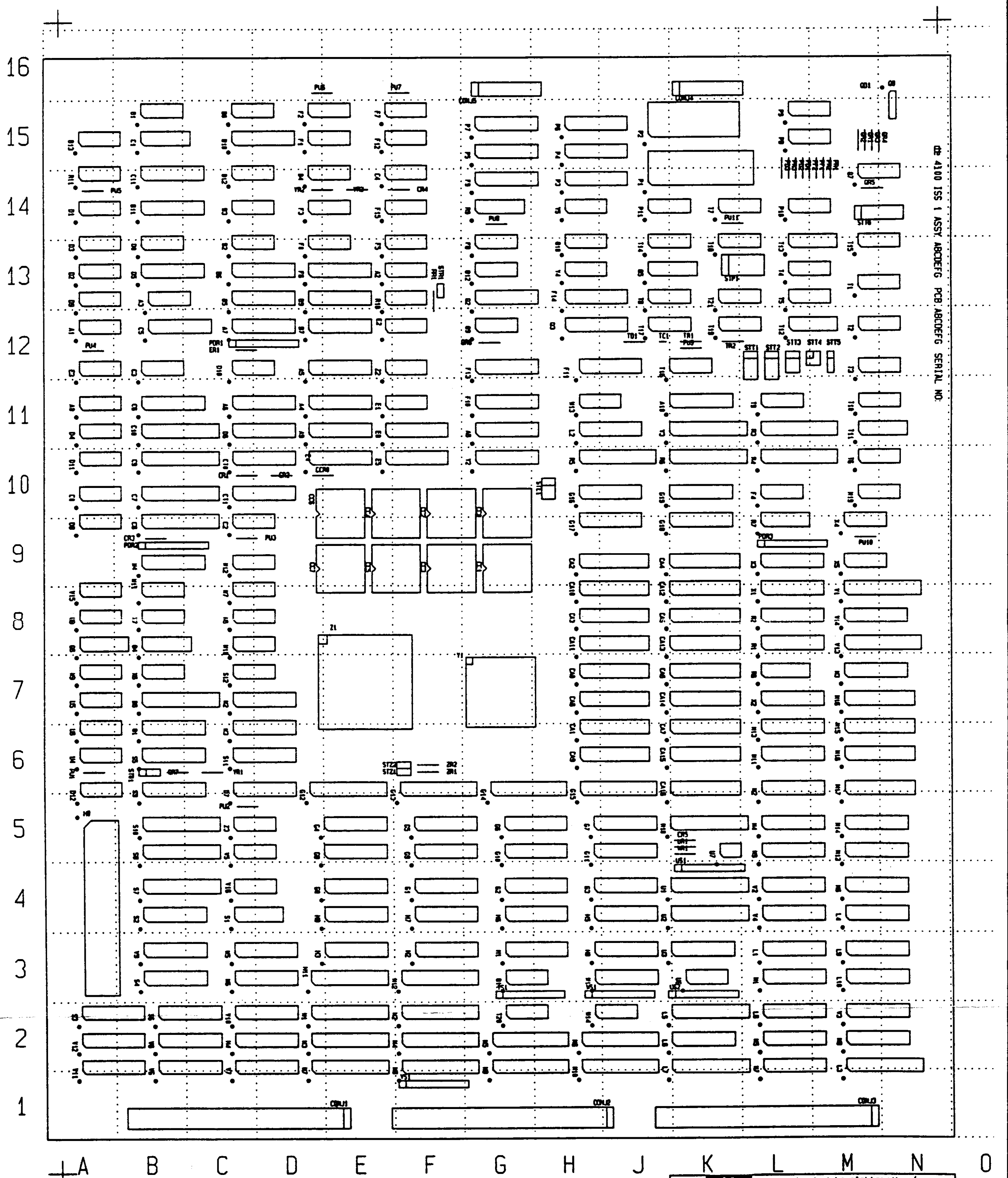
Disable PMMU		
*	NC	Controlled by software
	1-2	Disabled

Basic CPU module

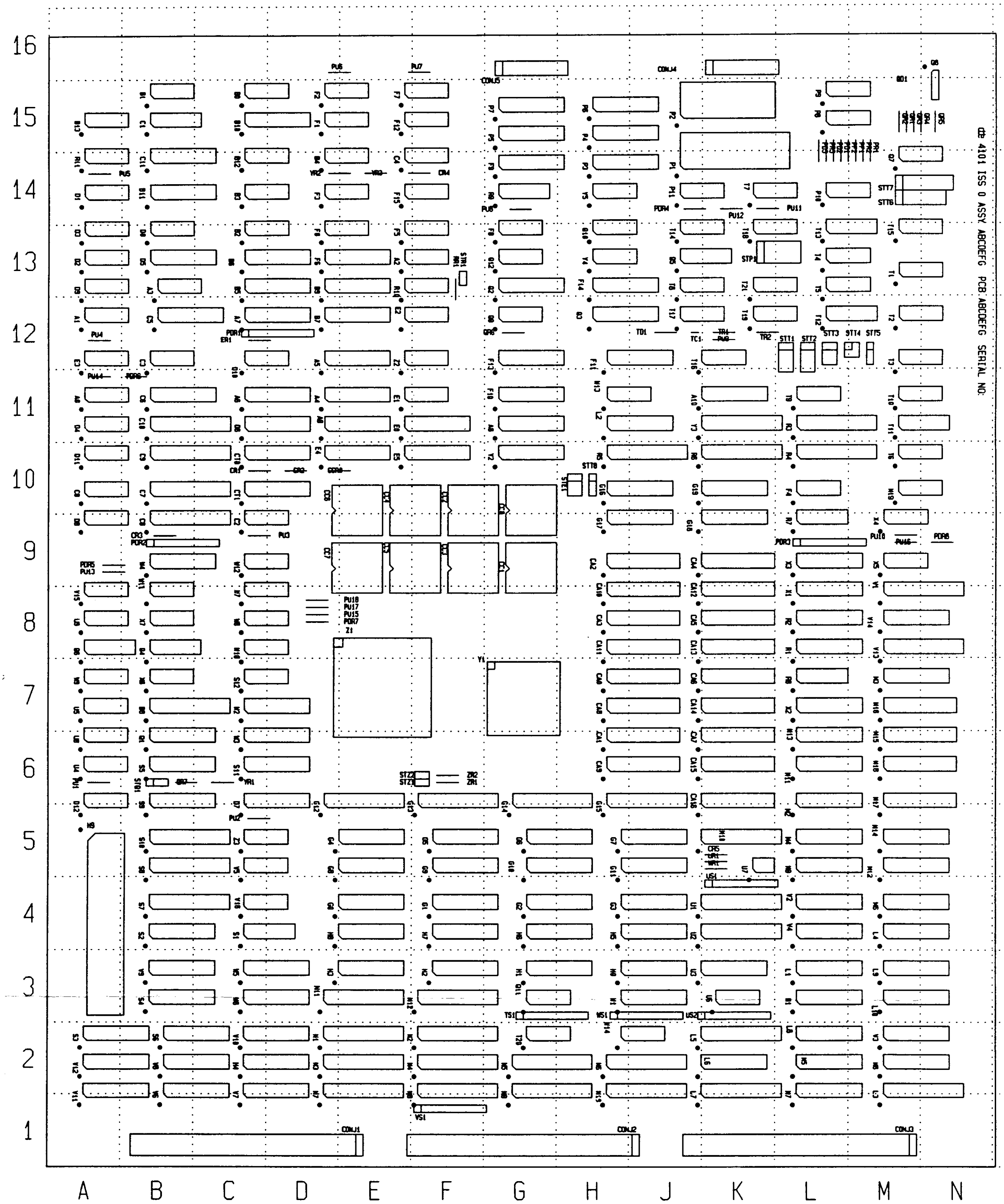
Supermax systems are delivered with one basic CPU 68030 module. The basic CPU module differs from the standard CPU modules described above on the following points:

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


Display
Service
EPROM
STT7
P10
STT6
STP1
STR1
STT1
STT2
STT3
STT4
STT5
STE1
STT8
STQ1
STZ2
STZ1
U6
T20
W14



	dde	dansk data elektronik a/s
Issue	Date	dde 4100
0	880312	
1	880617	
2		Component-ID
3		
4		Parts no.
5		Dwg. no.



Component locations

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

Name	Type	Pos
A0	74F74	A11
A1	74F74	A12
A2	74F74	E13
A3	74AS04	B13
A4	74AS573	D11
A5	74AS573	D12
A6	C324v (P16L8-10)	C11
A7	C320v (P16R8-10)	C12
A8	C323v (P16L8-10)	G11
A9	C321v (P16L8-10)	D11
A10	C322v (P16L8-10)	J11
B0	74F74	C15
B1	74F74	B15
B2	74F74	C13
B3	74AS04	C14
B4	74F74	D14
B5	74AS573	C13
B6	74AS573	C13
B7	C328v (P16R4-10)	D12
B8	C329v (P20R6-25)	B7
B9	C325v (P16R8-10)	D13
B10	C326v (P16R8-25)	C15
B11	C327v (P16R8-25)	B14
B12	74AS02	C14
B13	74AS08	A15
CA0	HM6788HP-15	H7
CA1	HM6788HP-15	H6
CA2	HM6788HP-15	H9
CA3	HM6788HP-15	H8
CA4	HM6788HP-15	J9
CA5	HM6788HP-15	J8
CA6	HM6788HP-15	J7
CA7	HM6788HP-15	J6
CA8	HM6788HP-15	H7
CA9	HM6788HP-15	H6
CA10	HM6788HP-15	H8
CA11	HM6788HP-15	H8
CA12	HM6788HP-15	J8
CA13	HM6788HP-15	J8
CA14	HM6788HP-15	J7
CA15	HM6788HP-15	J6
CA16	HM6788HP-15	J5
CCR0	res270	D10
CC0	TACT2152-25	G10
CC1	TACT2152-25	G9
CC2	TACT2152-25	F10
CC3	TACT2152-25	F9
CC4	TACT2152-25	E10
CC5	TACT2152-25	E9
CC6	TACT2152-25	E10
CC7	TACT2152-25	E9
CONJ1	DIN96	E1
CONJ2	DIN96	J1
CONJ3	DIN96	M1
CONJ4	3M20	K16
CONJ5	3M20	G16
CR1	NOT USED	C10
CR2	NOT USED	D10
CR3	res270	B9
CR4	res330	E14
CR5	res1K	J5
CT0	C330v (P16R8-10)	C10
CT1	C331v (P16R8-25)	C10
C0	74F74	A10
C1	74S112	B15
C2	74AS04	C9
C3	74AS04	B12
C4	74LS14	E14
C5	C339v (P16R8-10)	B12
C6	C340v (P16R8-25)	B11
C7	C341v (P20R8-25)	B10
C8	C342v (P20R8-25)	B9
C9	C343v (P20R8-25)	B10
C10	C344v (P20R8-25)	B11
C11	C338v (P16L8-10)	B14
D0	74F74	B13
D1	74F74	A14
D2	74F74	A13

Name	Type	Pos
D3	74F74	A13
D4	74F74	A11
D5	C332v (P16L8-10)	B13
D6	C333v (P16L8-10)	C11
D7	C334v (P16L8-10)	C5
D8	74AS08	A9
D9	74AS00	A13
D10	74AS11	C12
D11	74AS20	A10
D12	74AS00	A5
ER1	res270	C12
E0	74FCT573	E11
E1	74AS32	E11
E2	74AS32	E12
E3	74AS30	A12
E4	C336v (P16L8-10)	D10
E5	C335v (P16L8-10)	E10
F0	74F74	D13
F1	74F74	D15
F2	74F74	D15
F3	74AS08	D14
F4	74AS10	L10
F5	74AS30	E13
F6	C337v (P16L8-25)	D13
F7	74F74	E15
F8	74F74	G13
F9	74ALS573	G14
F10	74LS273	G11
F11	74LS273	H12
F12	74F74	E15
F13	74ALS573	G12
F14	74ALS573	H13
F15	74F74	E14
G0	74AS645	D4
G1	74AS645	F4
G2	74AS645	G4
G3	74AS645	H4
G4	74AS574	D5
G5	74AS574	F5
G6	74AS574	G5
G7	74AS574	H5
G8	74AS574	D5
G9	74AS574	F5
G10	74AS574	G5
G11	74AS574	H5
G12	74FCT646	D5
G13	74FCT646	F5
G14	74FCT646	G5
G15	74FCT646	H5
G16	74FCT573	H10
G17	74FCT573	H9
G18	74FCT573	J9
G19	74FCT573	J10
H0	74AS574	H3
H1	74AS574	G3
H2	74AS574	F3
H3	74AS574	D3
H4	74ALS574	C2
H5	74AS573	H4
H6	74AS573	G4
H7	74AS573	F4
H8	74AS573	D4
H9	74AS632	A5
L1	74ALS574	L3
L2	74ALS573	H11
L3	74ALS873	M1
L4	74ALS573	M4
L5	TMM2018D-25	J2
L6	74ALS645	J2
L7	74ALS873	J1
L8	74ALS573	L2
L9	74ALS573	M3
L10	74ALS573	M3
M1	74ALS573	L3
M2	74ALS573	L5
M3	74ALS573	M7
M4	74ALS573	L5
M5	74ALS573	L2

Name	Type	Pos
M6	74ALS573	M4
M7	74ALS573	L1
M8	74ALS573	M2
M9	74ALS573	L5
M10	74ALS873	J5
M11	74ALS645	L6
M12	74ALS645	M5
M13	74ALS573	L6
M14	74ALS573	M5
M15	SSM7188-25	M6
M16	SSM7188-25	M7
M17	SSM7188-25	M5
M18	SSM7188-25	M6
M19	74AS00	M10
N1	74ALS646	D2
N2	74ALS646	F2
N3	74ALS646	D2
N4	74ALS646	F2
N5	74ALS646	G2
N6	74ALS646	H2
N7	74ALS646	D1
N8	74ALS646	F1
N9	74ALS646	G1
N10	74ALS646	H1
N11	74ALS646	D3
N12	74ALS646	F3
PDR1	res10x-1-101	C12
PDR2	res10x-1-101	B9
PDR3	res10x-1-101	L9
PDR4	NOT USED	J14
PDR5	NOT USED	B9
PDR6	NOT USED	A11
PDR7	NOT USED	D8
PDR8	NOT USED	N9
PD1	1N4148	L15
PD2	1N4148	L15
PD3	1N4148	L15
PF1	Micro fuse 0.5A	M15
PF2	Micro fuse 0.5A	L15
PR1	res4k7	M15
PR2	res4k7	M15
PR3	res4k7	L15
PU1	res1k	A6
PU2	res1k	C5
PU3	res1k	C9
PU4	res1k	A12
PU5	res1k	A14
PU6	res1k	D16
PU7	res1k	E16
PU8	res1k	G14
PU9	res1k	K12
PU10	res1k	M9
PU11	res1k	K14
PU12	res150	K14
PU13	res150	A9
PU14	res150	A11
PU15	res150	D8
PU16	res150	M9
PU17	res1k	D8
PU18	res1k	D8
P1	27C512-15	J14
P2	8251A	J15
P3	74ALS645	H14
P4	74ALS574	H15
P5	74ALS574	G15
P6	74LS641-1	H15
P7	74LS641-1	G15
P8	75188	L15
P9	75189A	L15
P10	dipswitch14pin	L14
P11	74AS1004	J14
QD1	red-led	M16
QR1	res150	M15
QR2	res4k7	M15
QR3	res4k7	M15
QR4	res1k	M15
QR5	res1k	N15
QR6	res1k	G12

Component locations

PCB: 4101 / CPU3

Issue: 0

Date: 881021

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

Component locations

PCB: 4101 / CPU3

Issue: 0

Date: 881021

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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 appx. 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 ±5%	17.0 A
+12 V ±5%	0.2 A
—12 V ±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:

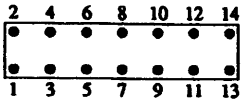
MCU4700 Basic	A basic version, which has a fixed unit number (3) and a fixed priority (03). It will always drive the bus clock and hold the pull-up resistors for the I/O bus signals.
MCU4700 Add-on	An add-on version, which contains all the switches for unit number selection and pull-up resistors.

Straps

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

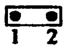
* designates factory installed position.

ST5:

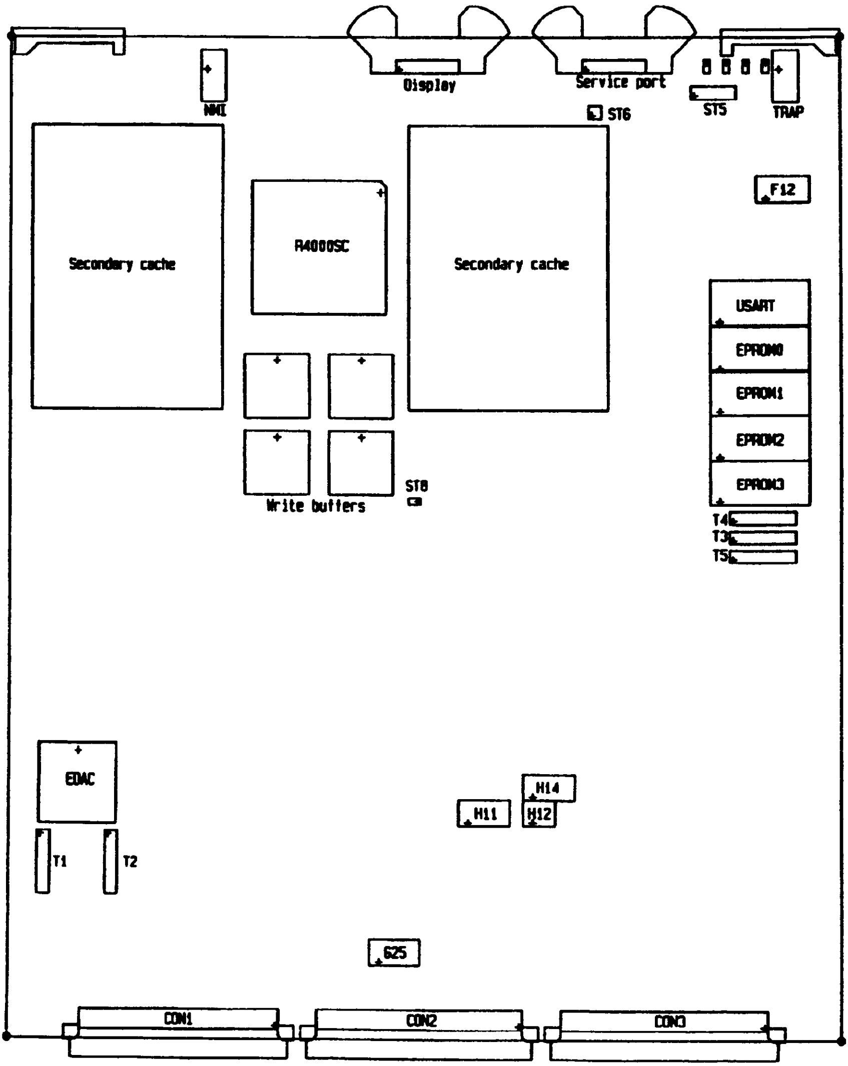


Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

ST8:



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


Display
Service port
NMI
ST6
ST5
TRAP
F12
Secondary cache
R4000SC
Secondary cache
USART
EPROM0
EPROM1
EPROM2
EPROM3
ST8
Write buffers
T4
T3
T5
EDAC
H14
H11
H12
T1
T2
625
CON1
CON2
CON3

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 appx. 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 ±5%	14.5 A
+12 V ±5%	0.2 A
−12 V ±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

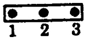
Output signals from the service port are open collector signals. These signals must be pulled down to −12V by one module in a Supermax system. Pull-down resistors are connected to output signals when all switches in F12 are in the **ON** position.

Straps

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

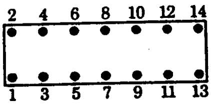
* designates factory installed position.

ST1:



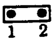
EPROM size		
*	1-2	512 Kbit
	2-3	1 Mbit

ST5:

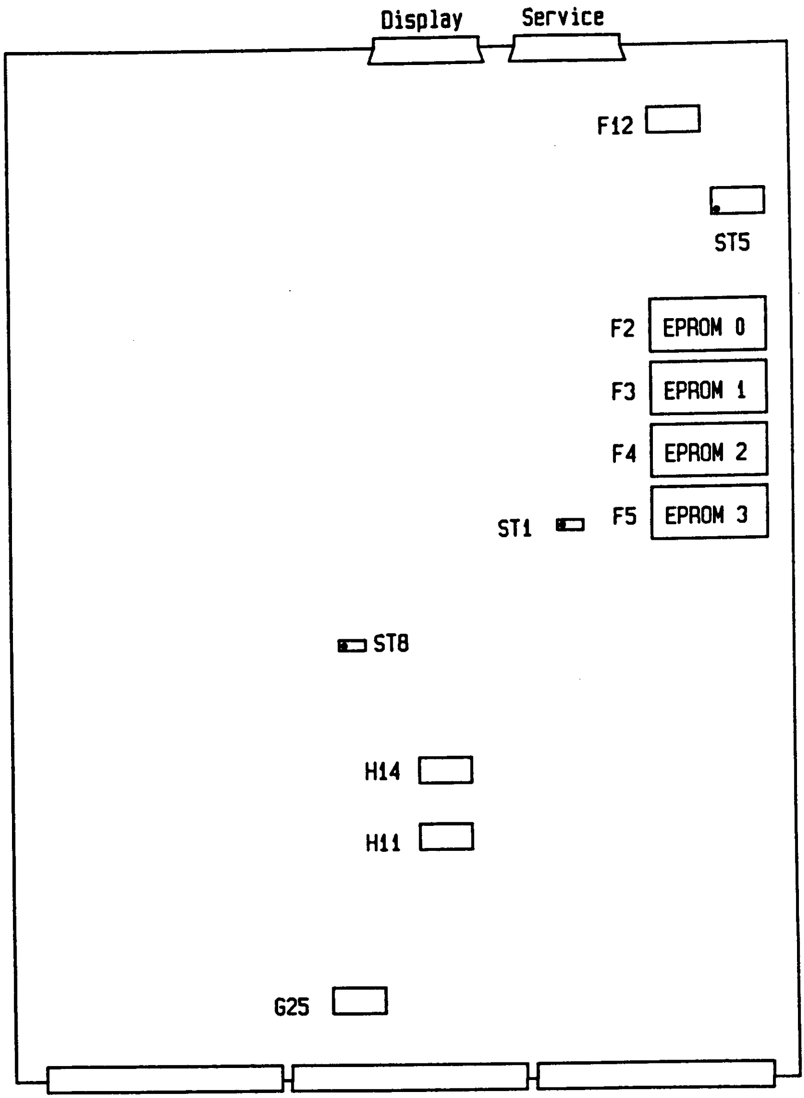


Baud rate service port		
	1-2	19200
*	3-4	9600
	5-6	4800
	7-8	2400
	9-10	1200
	11-12	600
	13-14	300

ST8:



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


Display
Service
F12
ST5
F2
EPROM 0
F3
EPROM 1
F4
EPROM 2
ST1
F5
EPROM 3
ST8
H14
H11
G25

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.
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.

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.

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 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%	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 used 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 bootstraped 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
```

Jumper	Clock
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
```

Jumper	Clock
+ 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 strapsocket:

```
    * *_* * * * * *

    * *_* * * * * *
 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:

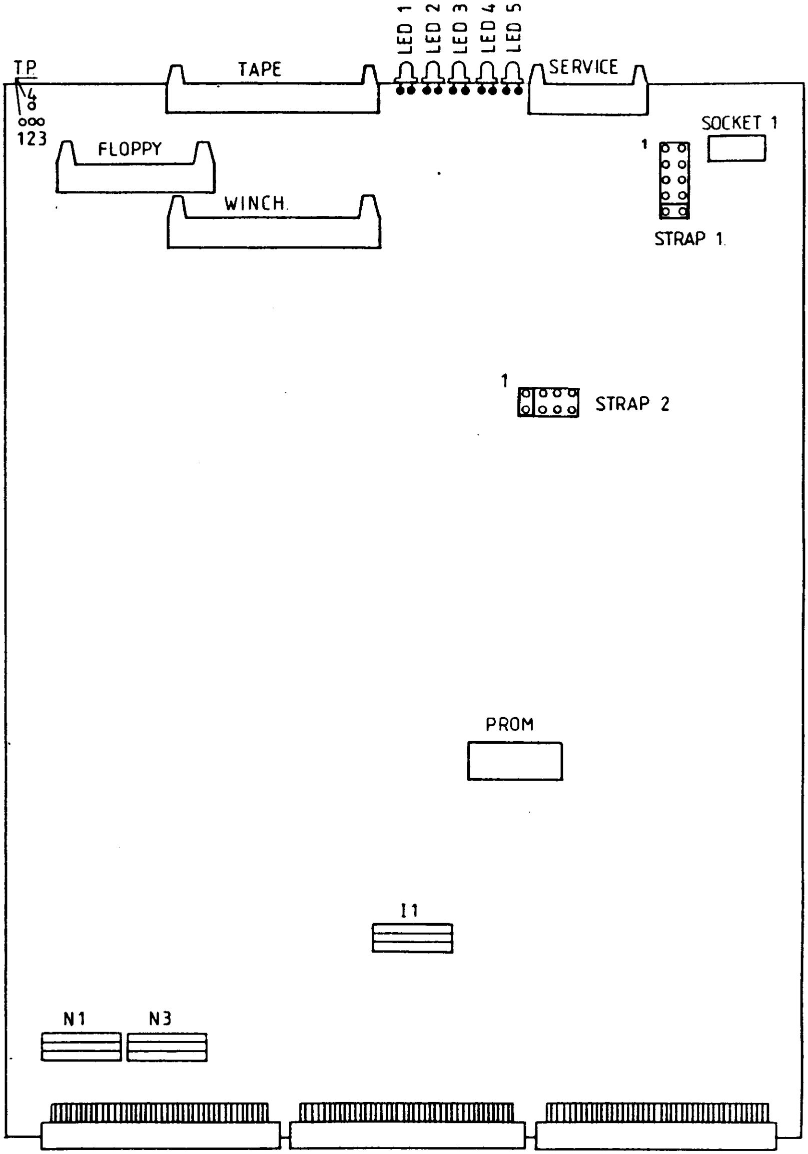
LED1: On: The boot prom is enabled.
Off: The boot prom is disabled.
Upon power up: On

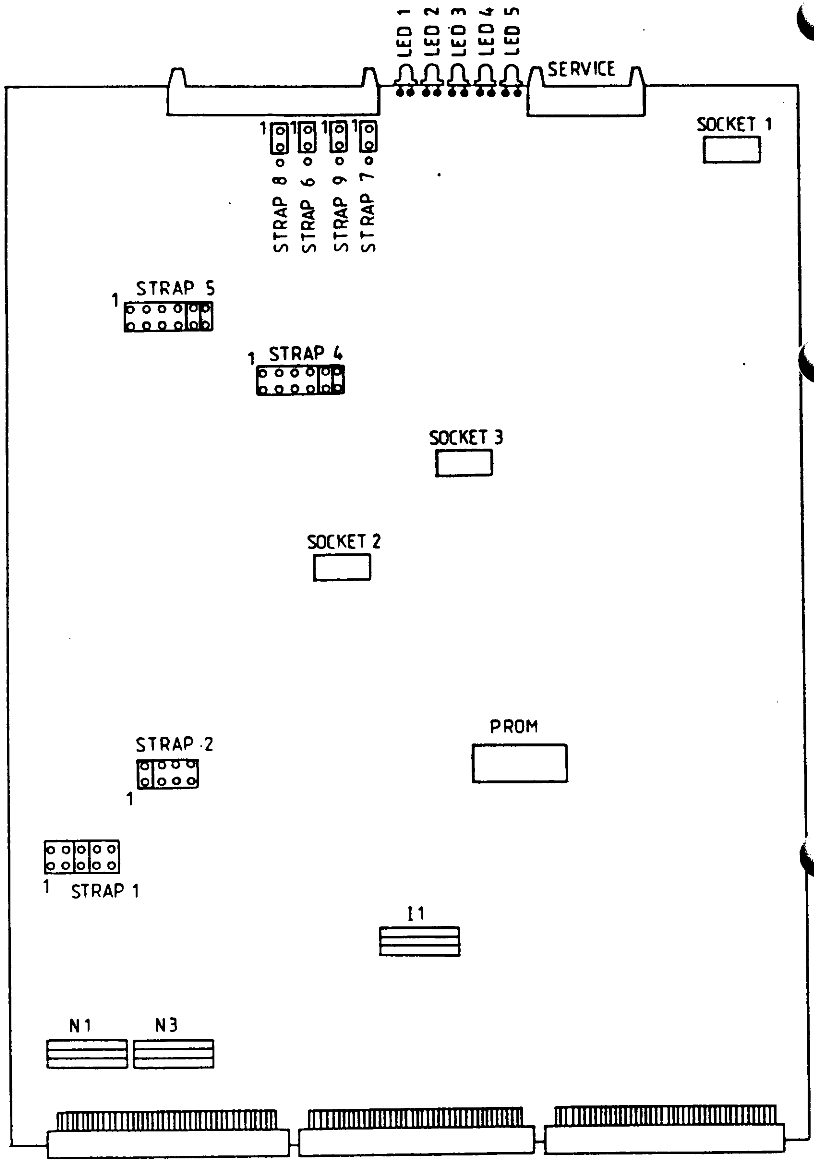
LED2: On: A time out is pending.
Off: No time out.
Upon power up: Off.

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.


LED 1
LED 2
LED 3
LED 4
LED 5
TP
4
123
TAPE
SERVICE
SOCKET 1
FLOPPY
WINCH.
1
STRAP 1.
1
STRAP 2
PROM
I1
N1
N3


LED 1
LED 2
LED 3
LED 4
LED 5
SERVICE
SOCKET 1
1
STRAP 8
STRAP 6
STRAP 9
STRAP 7
STRAP 5
STRAP 4
SOCKET 3
SOCKET 2
PROM
STRAP 2
STRAP 1
I1
N1
N3

SUPERMAX technical data sheet.
Module: DIOC 1100

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 seriel 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.

Floppy disk drive interface:

The DIOC module is equiped 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 conncetion 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.

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 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%	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 used the same priority. The DIOC module use two priorities. The DIOC module is equiped 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.

:

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
```

Jumper	Clock
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
```

Jumper	Clock
+ 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

Jumper	Function
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
```

Jumper	Function
+ 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
Seriel interface	:	C 5,4	34 pin
Service port	:	C 5,2	20 pin

Adjustments:

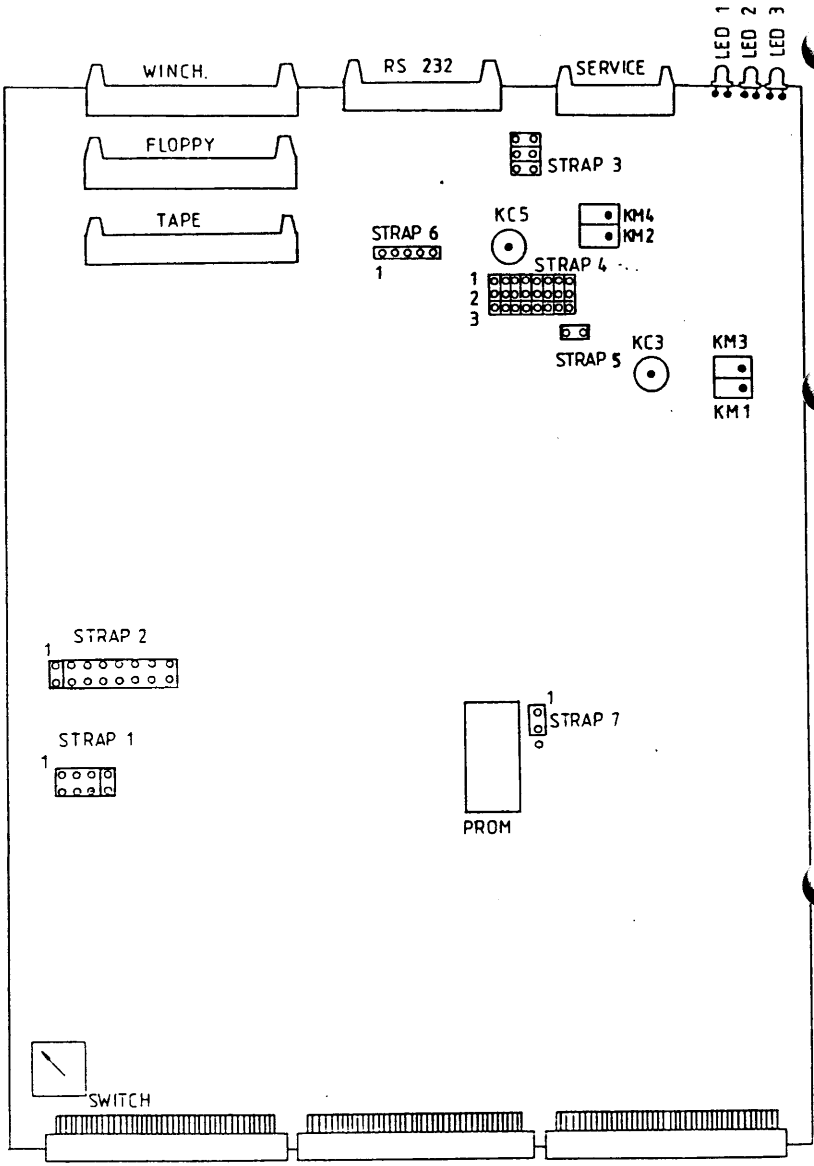
Adjustment of PPL in the floppy interface see supermax technical note 3, revision 1.

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.


WINCH.
RS 232
SERVICE
LED 1
LED 2
LED 3
FLOPPY
STRAP 3
TAPE
KC5
KM4
KM2
STRAP 6
1
STRAP 4
1
2
3
STRAP 5
KC3
KM3
KM1
STRAP 2
1
1
STRAP 7
STRAP 1
1
PROM
SWITCH

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 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	Typical current
+5 V ±5%	15.0 A
+12 V ±5%	0.1 A
−12 V ±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.

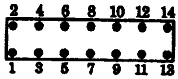
Switch position	Unit number	Priority 1	Priority 0
0	0x00	14	20
1	0x01	21	22
2	0x02	23	24
3	0x03	30	31
4	0x04	32	33
5	0x05	34	40
6	0x06	41	42
7	0x07	43	44
8	0x08	14	20
9	0x09	21	22
A	0x0a	23	24
B	0x0b	30	31
C	0x0c	32	33
D	0x0d	34	40
E	0x0e	41	42
F	0x0f	43	44

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 CN1.		
	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

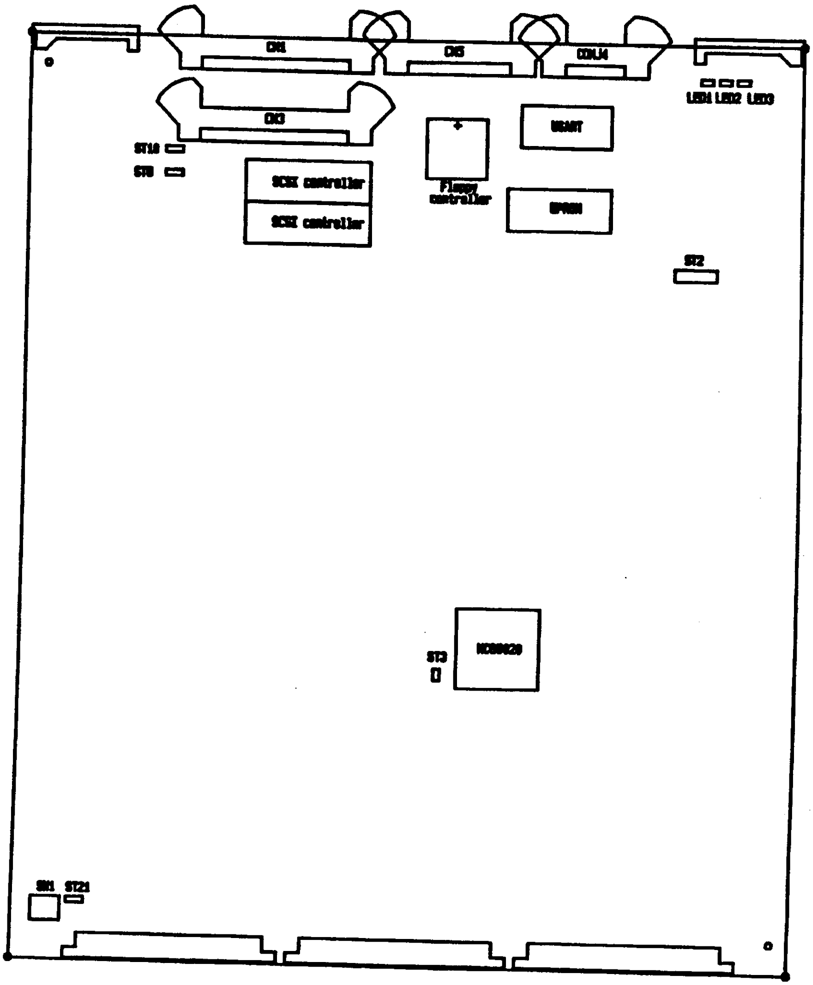
The headers mounted on the PCB are positioned as follows:

Connector CN1 SCSI interface 0.

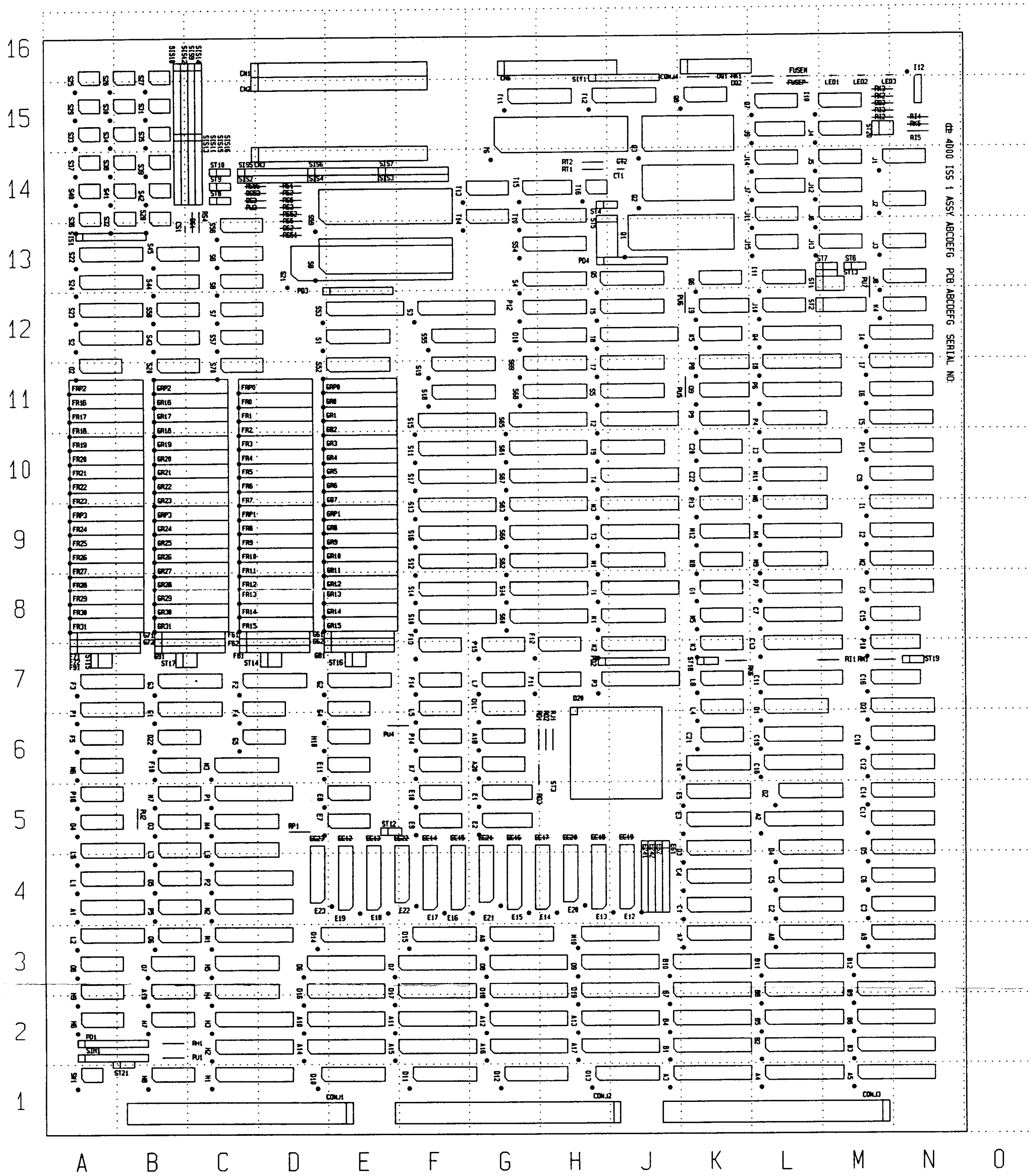
Connector CN3 SCSI interface 1.

Connector CN5 Floppy disk interface.

Connector CONJ4 Service port.


LED1 LED2 LED3
ST10
ST8
SCSI controller
SCSI controller
Floppy
controller
USART
EPROM
ST2
ST3
MC68020
SW1
ST21

PRELIMINARY



Component locations				
PCB: 4000 / DIOC3	Issue: 1	Date: 880112	dde	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

PRELIMINARY

Name	Type	Pos
A1	74ALS574	A4
A2	74LS461	L5
A3	74LS461	J1
A4	74LS461	L1
A5	74LS461	M1
A6	74LS593	G3
A7	74LS593	K3
A8	74LS593	L3
A9	74LS593	M3
A10	74ALS646	D2
A11	74ALS646	E2
A12	74ALS646	G2
A13	74ALS646	H2
A14	74ALS646	D2
A15	74ALS646	E2
A16	74ALS646	G2
A17	74ALS646	H2
A18	74LS32	G6
A19	74LS08	B2
A20	74LS32	G6
B1	74LS461	J2
B2	74LS461	L2
B3	74LS461	M2
B4	74LS461	J2
B5	74LS461	L2
B6	74LS461	M2
B7	74LS461	J2
B8	74LS461	L2
B9	74LS461	M2
B10	74LS461	J3
B11	74LS461	L3
B12	74LS461	M3
CN1	3M50	C16
CN2	NOT USED	C15
CN3	3M50	C14
CN5	3M34	G16
CONJ1	DIN C96	E1
CONJ2	DIN C96	J1
CONJ3	DIN C96	M1
CONJ4	3M20	K16
CS1	NOT USED	B14
CT1	NOT USED	J14
CT2	NOT USED	J14
C1	74ALS573	K4
C2	74ALS573	L4
C3	74ALS573	M4
C4	74ALS573	K4
C5	74ALS573	L4
C6	74ALS573	M4
C7	74ALS873	L8
C8	74ALS573	M8
C9	74ALS645	M10
C10	74ALS645	M6
C11	74ALS873	L7
C12	74ALS573	M6
C13	74ALS873	L7
C14	74AS573	M5
C15	74LS590	M8
C16	74LS590	M7
C17	74AS573	M5
C18	SDT6116SA35TP	L6
C19	SDT6116SA35TP	L6
C20	74AS32	K10
C21	74AS32	K6
C22	74F74	K10
DQ1	1N4148	K16
DQ2	1N4148	K15
DQ3	1N4148	M15
DS1	NOT USED	C14
DS2	1N4002	D13
DS3	1N4002	C14
DS53	1N4002	C14
D1	74ALS574	L6
D2	74ALS573	L5
D3	74ALS573	K4
D4	74ALS573	L4
D5	74ALS573	M4
D6	74ALS646	D3

Name	Type	Pos
D7	74ALS646	E3
D8	74ALS646	G3
D9	74ALS646	H3
D10	74ALS645	D1
D11	74ALS645	F1
D12	74ALS645	G1
D13	74ALS645	H1
D14	74ALS645	D3
D15	74ALS645	F3
D16	74ALS646	D2
D17	74ALS646	E2
D18	74ALS646	G2
D19	74ALS646	H2
D20	mc68020	H7
D21	74ALS573	M6
D22	74AS04	B6
EC12	220nfdip	E5
EC13	220nfdip	E5
EC14	220nfdip	F5
EC15	220nfdip	F5
EC16	220nfdip	G5
EC17	220nfdip	G5
EC18	220nfdip	H5
EC19	220nfdip	J5
EC20	220nfdip	H5
EC21	220nfdip	G5
EC22	220nfdip	E5
EC23	220nfdip	D5
E1	74LS590	G5
E2	74LS590	G5
E3	74ALS244	K5
E4	74ALS244	K6
E5	74ALS244	K5
E7	74AS280	D5
E8	74AS280	D5
E9	74AS280	F5
E10	74AS280	F5
E11	74AS08	D6
E12	81C256-10	J4
E13	81C256-10	H4
E14	81C256-10	H4
E15	81C256-10	G4
E16	81C256-10	F4
E17	81C256-10	F4
E18	81C256-10	E4
E19	81C256-10	E4
E20	81C256-10	H4
E21	81C256-10	G4
E22	81C256-10	F4
E23	81C256-10	D4
E61	SIL 10-2-330	J5
E62	SIL 10-2-330	J5
E241	SIL 10-2-330	J5
E242	SIL 10-2-330	J5
FRP0	81C1000-12PSZ	C11
FRP1	81C1000-12PSZ	C9
FRP2	81C1000-12PSZ	A11
FRP3	81C1000-12PSZ	A9
FR0	81C1000-12PSZ	C11
FR1	81C1000-12PSZ	C11
FR2	81C1000-12PSZ	C11
FR3	81C1000-12PSZ	C10
FR4	81C1000-12PSZ	C10
FR5	81C1000-12PSZ	C10
FR6	81C1000-12PSZ	C10
FR7	81C1000-12PSZ	C10
FR8	81C1000-12PSZ	C9
FR9	81C1000-12PSZ	C9
FR10	81C1000-12PSZ	C9
FR11	81C1000-12PSZ	C9
FR12	81C1000-12PSZ	C8
FR13	81C1000-12PSZ	C8
FR14	81C1000-12PSZ	C8
FR15	81C1000-12PSZ	C8
FR16	81C1000-12PSZ	A11
FR17	81C1000-12PSZ	A11
FR18	81C1000-12PSZ	A11
FR19	81C1000-12PSZ	A10

Name	Type	Pos
FR20	81C1000-12PSZ	A10
FR21	81C1000-12PSZ	A10
FR22	81C1000-12PSZ	A10
FR23	81C1000-12PSZ	A10
FR24	81C1000-12PSZ	A9
FR25	81C1000-12PSZ	A9
FR26	81C1000-12PSZ	A9
FR27	81C1000-12PSZ	A9
FR28	81C1000-12PSZ	A8
FR29	81C1000-12PSZ	A8
FR30	81C1000-12PSZ	A8
FR31	81C1000-12PSZ	A8
FUSEM	MICROFUSE	L16
FUSEP	MICROFUSE	L15
F1	74AS244	A6
F2	74AS244	C7
F3	74AS244	A7
F4	74AS32	C6
F5	74AS32	A6
F10	74AS08	B6
F11	74AS280	G7
F12	74AS280	G7
F13	74AS280	F7
F14	74AS280	F7
F61	SIL 10-2-330	C8
F62	SIL 10-2-330	C8
F71	SIL 10-2-330	A8
F72	SIL 10-2-330	A8
F81	SIL 10-2-330	C7
F91	SIL 10-2-330	A7
GRP0	81C1000-12PSZ	D11
GRP1	81C1000-12PSZ	D9
GRP2	81C1000-12PSZ	B11
GRP3	81C1000-12PSZ	B9
GR0	81C1000-12PSZ	D11
GR1	81C1000-12PSZ	D11
GR2	81C1000-12PSZ	D11
GR3	81C1000-12PSZ	D10
GR4	81C1000-12PSZ	D10
GR5	81C1000-12PSZ	D10
GR6	81C1000-12PSZ	D10
GR7	81C1000-12PSZ	D10
GR8	81C1000-12PSZ	D9
GR9	81C1000-12PSZ	D9
GR10	81C1000-12PSZ	D9
GR11	81C1000-12PSZ	D9
GR12	81C1000-12PSZ	D8
GR13	81C1000-12PSZ	D8
GR14	81C1000-12PSZ	D8
GR15	81C1000-12PSZ	D8
GR16	81C1000-12PSZ	B11
GR17	81C1000-12PSZ	B11
GR18	81C1000-12PSZ	B11
GR19	81C1000-12PSZ	B10
GR20	81C1000-12PSZ	B10
GR21	81C1000-12PSZ	B10
GR22	81C1000-12PSZ	B10
GR23	81C1000-12PSZ	B10
GR24	81C1000-12PSZ	B9
GR25	81C1000-12PSZ	B9
GR26	81C1000-12PSZ	B9
GR27	81C1000-12PSZ	B9
GR28	81C1000-12PSZ	B8
GR29	81C1000-12PSZ	B8
GR30	81C1000-12PSZ	B8
GR31	81C1000-12PSZ	B8
G1	74AS244	B6
G2	74AS244	D7
G3	74AS244	B7
G4	74AS32	D6
G5	74AS32	C6
G61	SIL 10-2-330	D8
G62	SIL 10-2-330	D8
G71	SIL 10-2-330	B8
G72	SIL 10-2-330	B8
G81	SIL 10-2-330	D7
G91	SIL 10-2-330	B7
H1	UPXX	C1

Component locations

PCB: 4000 / DIOC3 | Issue: 1 | Date: 880112

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

PRELIMINARY

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

Component locations

PCB: 4000 / DIOC3	Issue: 1	Date: 880112	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 02-84 50 11

PRELIMINARY

Name	Type	Pos
S57	74AS08	C12
S58	74LS14	B12
S59	WD33C93	D13
S60	74ALS646	G8
S61	74ALS646	G10
S62	74ALS646	G9
S63	74ALS646	G9
S64	74ALS646	G8
S65	74ALS646	G11
S66	74ALS646	G9
S67	74ALS646	G10
S68	74ALS573	G11
S69	74ALS645	G11
S70	74AS32	C11
T1	74als646	H8
T2	74als646	H11
T3	74als646	H9
T4	74als646	H10
T5	74als645	H12
T6	NS8272	G14
T7	D3010	H11
T8	D3290	H12
T9	D3020	H10
T10	D3320	G13
T11	74ls642-1	G15
T12	74ls540	H15
T13	7438	F14
T14	74AS08	F13
T15	74LS175	G14
T16	X9103	H14

Component locations

PCB: 4000 / DIOC3 | Issue: 1 | Date: 880112

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SECTION 1.1

SUPERMAX technical data sheet.
Module: NIOC 1600

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 asynchrounous 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.

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 i 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%	0.7 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 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.

Indicator Leds:

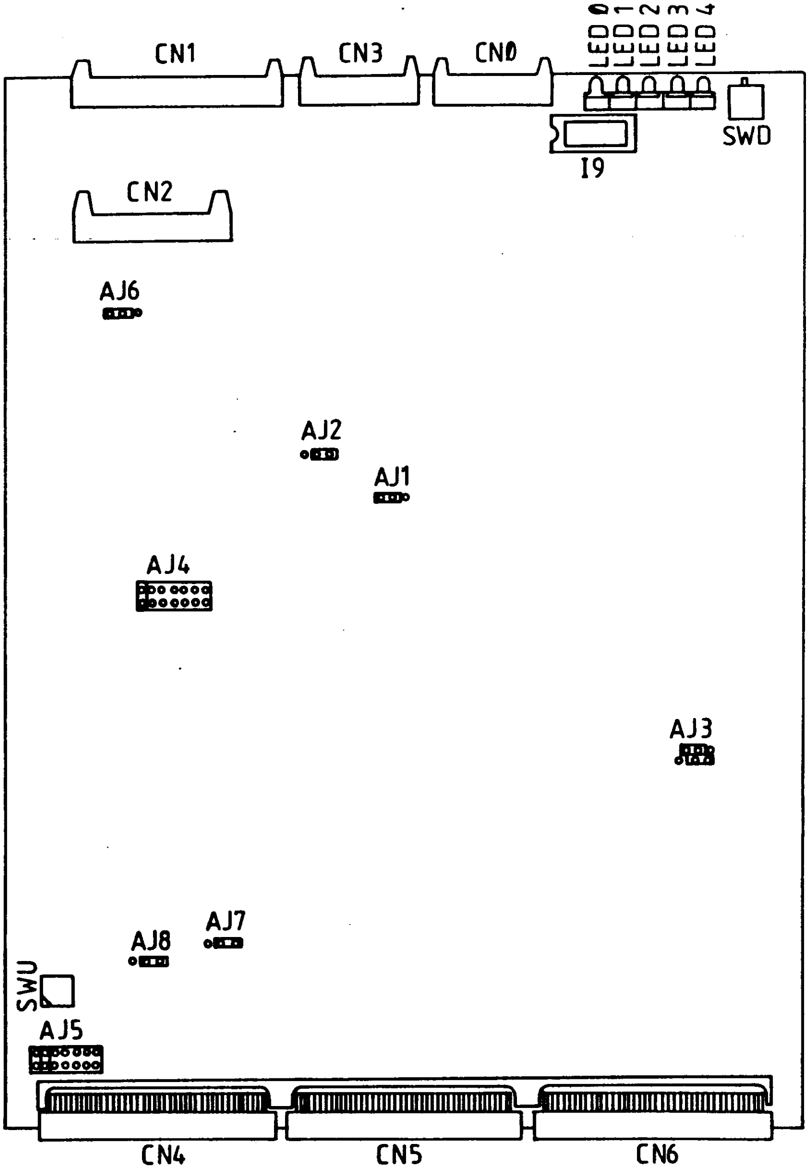
LED0: Indicates activity of the LAN.

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.



LED 0
LED 1
LED 2
LED 3
LED 4
CN1
CN3
CN0
SWD
I9
CN2
AJ6
AJ2
AJ1
AJ4
AJ3
AJ7
AJ8
SWU
AJ5
CN4
CN5
CN6

SUPERMAX technical data sheet.
Module: NIOC 3600

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.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND	D0	02
03	GND	D1	04
05	GND	D2	06
07	GNS	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 i 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.

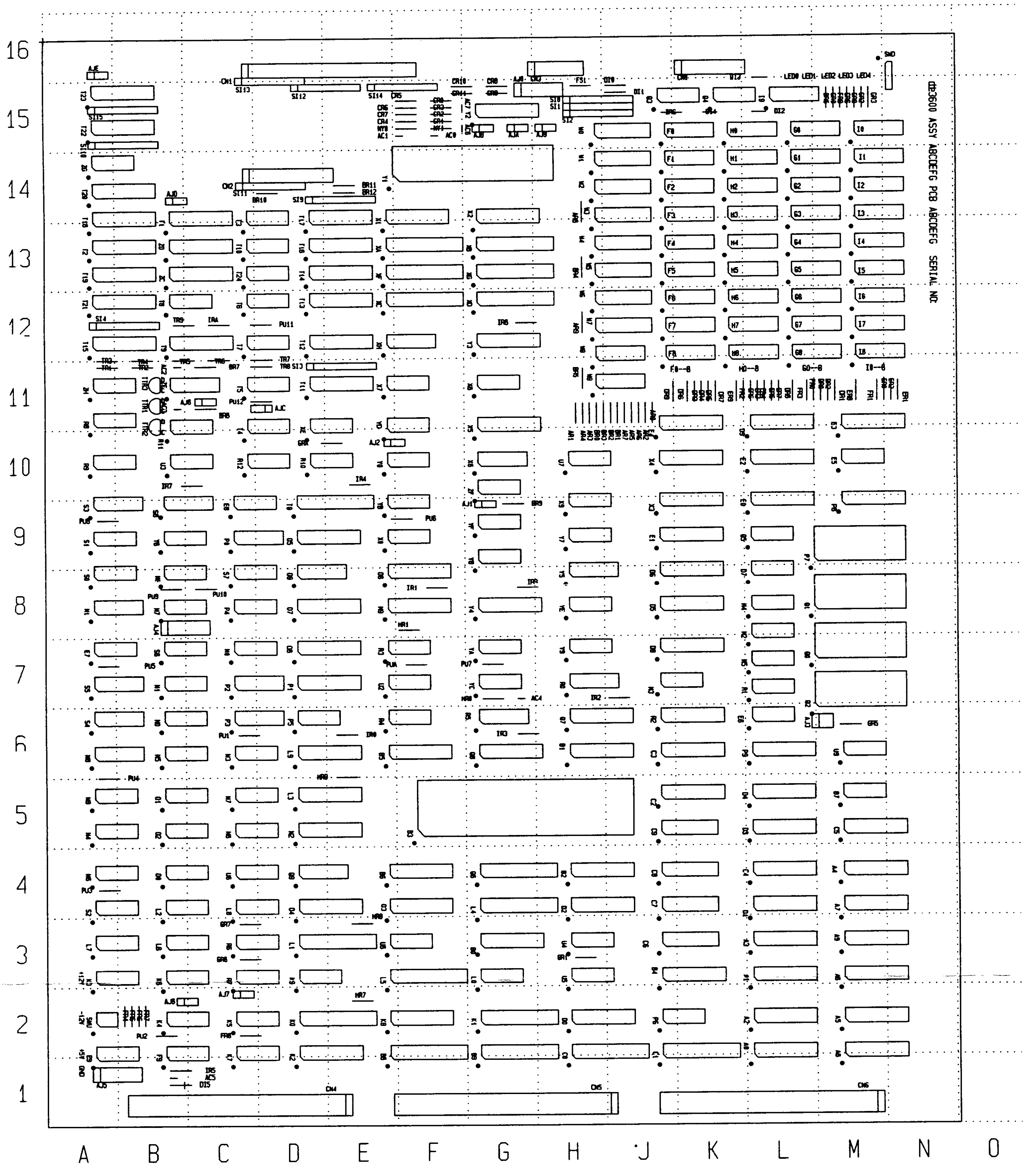
LED1: Parity error in memory. Even byte.

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

PRELIMINARY

Name	Type	Pos
+5V		A2
+12V		A3
-12V		A2
AC0		F15
AC1		E15
AC2		B11
AC3		B11
AC4		G7
AC5		B1
AC6		F15
AC7		F15
AJA		G15
AJB		G15
AJC		D11
AJD		B14
AJE		A16
AJ0		G15
AJ1		G9
AJ2		E10
AJ3		L6
AJ4		B8
AJ5		A1
AJ6		C11
AJ7		C2
AJ8		B2
AJ9		H15
AR0		J11
AR1		H11
AR2		J11
AR3		H11
AR4		H11
AR5		J11
AR6		J11
AR7		J11
AR8		H13
AR9		H12
A0		L1
A1		L3
A2		L2
A3		L3
A4		M4
A5		M2
A6		M3
A7		M4
A8		M1
A9		M3
BR0		H11
BR1		J11
BR2		J11
BR3		H11
BR4		H13
BR5		H11
BR6		M15
BR7		C11
BR8		C11
BR9		G9
BR10		C14
BR11		E14
BR12		E14
B0		G3
B1		H6
B2		H4
B3		F5
B4		J3
B5		E6
B6		E4
B7		M5
B8		E1
B9		G1
CN0		K16
CN1		C16
CN2		C14
CN3		G16
CN4		E1
CN5		J1
CN6		M1
CR0		F15
CR1		F15

Name	Type	Pos
CR2		F15
CR3		F15
CR4		F15
CR5		E15
CR6		E15
CR7		E15
CR8		G15
CR9		G15
CR10		F15
CR11		F15
C0		H1
C1		J1
C2		J5
C3		J6
C4		L4
C5		M5
C6		J3
C7		J4
C8		J4
C9		J5
DI0		H15
DI1		H15
DI2		L15
DI3		L16
DI4		K15
DI5		C1
DR0		M11
DR1		M11
DR2		M11
DR3		K11
DR4		K11
DR5		K11
DR6		K11
DR7		K11
DR8		L11
DR9		J11
D0		H2
D1		L4
D2		H4
D3		L5
D4		L5
D5		J8
D6		J8
D7		L8
D8		J7
D9		L10
ER0		M11
ER1		N11
ER2		N11
ER3		L11
ER4		L11
ER5		L11
ER6		L11
ER7		L11
ER8		M11
ER9		K11
E0		L9
E1		J9
E2		L10
E3		M10
E4		J10
E5		M10
E6		L6
E7		A7
E8		C9
E9		A1
FR0		L11
FR1		M11
FR2		K11
FR3		L11
FR4		B2
FR5		B2
FR6		B2
FR7		B2
FR8		C2
FR9		M15
FS1		H15
F0		J15

Name	Type	Pos
F1		J14
F2		J14
F3		J13
F4		J13
F5		J13
F6		J12
F7		J12
F8		J11
F9		B1
GND		A1
GRA		E10
GR0		M15
GR1		H3
GR2		M15
GR3		M15
GR5		M6
GR6		M15
GR7		D3
GR8		C3
GR9		M15
G0		L15
G1		L14
G2		L14
G3		L13
G4		L13
G5		L13
G6		L12
G7		L12
G8		L11
HR0		G7
HR1		E8
HR7		E2
HR8		E3
HR9		E6
H0		K15
H1		K14
H2		K14
H3		K13
H4		K13
H5		K13
H6		K12
H7		K12
H8		K11
IRA		C12
IR0		E6
IR1		F8
IR2		H7
IR3		G6
IR4		E10
IR5		C1
IR6		K15
IR7		B10
IR8		G12
IR9		G8
I0		M15
I1		M14
I2		M14
I3		M13
I4		M13
I5		M13
I6		M12
I7		M12
I8		M11
I9		L15
K0		D2
K1		G2
K2		D1
K3		A3
K4		B2
K5		C2
K6		B3
K7		C1
K8		E2
K9		D3
LED0		L16
LED1		L16
LED2		M16
LED3		M16

Component locations

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

Name	Type	Pos
S44	7438	B13
S45	OPT (74LS08)	B13
S52	D325v (P16R8-25)	D11
S53	D322v (P20R8-25)	D12
S54	D323v (P16R8-25)	G13
S55	D324v (P16L8-25)	F12
S56	74AS32	C13
S57	74AS08	C12
S58	74LS14	B12
S59	WD33C93	D13
S60	74ALS646	G8
S61	74ALS646	G10
S62	74ALS646	G9
S63	74ALS646	G9
S64	74ALS646	G8
S65	74ALS646	G11
S66	74ALS646	G9
S67	74ALS646	G10
S68	74ALS573	G11
S69	74ALS645	G11
S70	74AS32	C11
T1	74ALS646	H8
T2	74ALS646	H11
T3	74ALS646	H9
T4	74ALS646	H10
T5	74ALS645	H12
T6	DP8273V	H15
T7	D301v (P16R8-25)	H11
T8	D329v (P20R8-25)	H12
T9	D302v (P16L8-25)	H10
T10	D332v (P16R8-10)	G13
T11	osc.24MHz	G15
T13	7438	F14
T14	74AS08	F13

Name	Type	Pos

Name	Type	Pos

Component locations

PCB: 4000 / DIOC 3

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

Component locations

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Name	Type	Pos
+5VT	TESTPOINT	L16
+12VT	TESTPOINT	M16
-12VT	TESTPOINT	M16
A1	74ALS574	A4
A2	74LS461	L5
A3	74LS461	J1
A4	74LS461	L1
A5	74LS461	M1
A6	74LS593	G3
A7	74LS593	K3
A8	74LS593	L3
A9	74LS593	M3
A10	74ALS646	D2
A11	74ALS646	E2
A12	74ALS646	G2
A13	74ALS646	H2
A14	74ALS646	D2
A15	74ALS646	E2
A16	74ALS646	G2
A17	74ALS646	H2
A18	74LS32	G6
A19	74LS08	B2
A20	74LS32	G6
B1	74LS461	J2
B2	74LS461	L2
B3	74LS461	M2
B4	74LS461	J2
B5	74LS461	L2
B6	74LS461	M2
B7	74LS461	J2
B8	74LS461	L2
B9	74LS461	M2
B10	74LS461	J3
B11	74LS461	L3
B12	74LS461	M3
CN1	3M50	C16
CN2	NOT USED	C15
CN3	3M50	C14
CN5	3M34	G16
CONJ1	DIN_C96	E1
CONJ2	DIN_C96	J1
CONJ3	DIN_C96	M1
CONJ4	3M20	K16
CS1	NOT USED	B14
CT1	1nF	J14
CT2	15nF	J14
CT3	33nF	J14
CT4	12nF	J14
CT5	1nF	G15
C1	74ALS573	K4
C2	74ALS573	L4
C3	74ALS573	M4
C4	74ALS573	K4
C5	74ALS573	L4
C6	74ALS573	M4
C7	74ALS873	L8
C8	74ALS573	M8
C9	74ALS645	M10
C10	74ALS645	M6
C11	74ALS873	L7
C12	74ALS573	M6
C13	74ALS873	L7
C14	74AS573	M5
C15	74LS590	M8
C16	74LS590	M7
C17	74AS573	M5
C18	IDT6116SA35TP	L6
C19	IDT6116SA35TP	L6
C20	74AS32	K10
C21	74AS32	K6
C22	74F74	K10
DQ1	1N4148	K16
DQ2	1N4148	K15
DQ3	1N4148	M15
DS1	NOT USED	C14
DS2	1N4002	D13
DS3	1N4002	C14
DS53	1N4002	C14

Name	Type	Pos
D1	74ALS574	L6
D2	74ALS573	L5
D3	74ALS573	K4
D4	74ALS573	L4
D5	74ALS573	M4
D6	74ALS646	D3
D7	74ALS646	E3
D8	74ALS646	G3
D9	74ALS646	H3
D10	74ALS645	D1
D11	74ALS645	F1
D12	74ALS645	G1
D13	74ALS645	H1
D14	74ALS645	D3
D15	74ALS645	F3
D16	74ALS646	D2
D17	74ALS646	E2
D18	74ALS646	G2
D19	74ALS646	H2
D20	MC68020	H7
D21	74ALS573	M6
D22	74AS04	B6
EC12	220nF dip	E5
EC13	220nF dip	E5
EC14	220nF dip	F5
EC15	220nF dip	F5
EC16	220nF dip	G5
EC17	220nF dip	G5
EC18	220nF dip	H5
EC19	220nF dip	J5
EC20	220nF dip	H5
EC21	220nF dip	G5
EC22	220nF dip	E5
EC23	220nF dip	D5
E1	74LS590	G5
E2	74LS590	G5
E3	74ALS244	K5
E4	74ALS244	K6
E5	74ALS244	K5
E7	74AS280	D5
E8	74AS280	D5
E9	74AS280	F5
E10	74AS280	F5
E11	74AS08	D6
E12	81C256-10	J4
E13	81C256-10	H4
E14	81C256-10	H4
E15	81C256-10	G4
E16	81C256-10	F4
E17	81C256-10	F4
E18	81C256-10	E4
E19	81C256-10	E4
E20	81C256-10	H4
E21	81C256-10	G4
E22	81C256-10	F4
E23	81C256-10	D4
E61	SIL 10-2-330	J5
E62	SIL 10-2-330	J5
E241	SIL 10-2-330	J5
E242	SIL 10-2-330	J5
FRP0	81C1000-12PSZ	C11
FRP1	81C1000-12PSZ	C9
FRP2	81C1000-12PSZ	A11
FRP3	81C1000-12PSZ	A9
FR0	81C1000-12PSZ	C11
FR1	81C1000-12PSZ	C11
FR2	81C1000-12PSZ	C11
FR3	81C1000-12PSZ	C10
FR4	81C1000-12PSZ	C10
FR5	81C1000-12PSZ	C10
FR6	81C1000-12PSZ	C10
FR7	81C1000-12PSZ	C10
FR8	81C1000-12PSZ	C9
FR9	81C1000-12PSZ	C9
FR10	81C1000-12PSZ	C9
FR11	81C1000-12PSZ	C9
FR12	81C1000-12PSZ	C8
FR13	81C1000-12PSZ	C8

Name	Type	Pos
FR14	81C1000-12PSZ	C8
FR15	81C1000-12PSZ	C8
FR16	81C1000-12PSZ	A11
FR17	81C1000-12PSZ	A11
FR18	81C1000-12PSZ	A11
FR19	81C1000-12PSZ	A10
FR20	81C1000-12PSZ	A10
FR21	81C1000-12PSZ	A10
FR22	81C1000-12PSZ	A10
FR23	81C1000-12PSZ	A10
FR24	81C1000-12PSZ	A9
FR25	81C1000-12PSZ	A9
FR26	81C1000-12PSZ	A9
FR27	81C1000-12PSZ	A9
FR28	81C1000-12PSZ	A8
FR29	81C1000-12PSZ	A8
FR30	81C1000-12PSZ	A8
FR31	81C1000-12PSZ	A8
FUSEM	Microfuse	L16
FUSEP	Microfuse	L15
F1	74AS244	A6
F2	74AS244	C7
F3	74AS244	A7
F4	74AS32	C6
F5	74AS32	A6
F10	74AS08	B6
F11	74AS280	G7
F12	74AS280	G7
F13	74AS280	F7
F14	74AS280	F7
F61	SIL 10-2-330	C8
F62	SIL 10-2-330	C8
F71	SIL 10-2-330	A8
F72	SIL 10-2-330	A8
F81	SIL 10-2-330	C7
F91	SIL 10-2-330	A7
GNDT	TESTPOINT	L16
GRP0	81C1000-12PSZ	D11
GRP1	81C1000-12PSZ	D9
GRP2	81C1000-12PSZ	B11
GRP3	81C1000-12PSZ	B9
GR0	81C1000-12PSZ	D11
GR1	81C1000-12PSZ	D11
GR2	81C1000-12PSZ	D11
GR3	81C1000-12PSZ	D10
GR4	81C1000-12PSZ	D10
GR5	81C1000-12PSZ	D10
GR6	81C1000-12PSZ	D10
GR7	81C1000-12PSZ	D10
GR8	81C1000-12PSZ	D9
GR9	81C1000-12PSZ	D9
GR10	81C1000-12PSZ	D9
GR11	81C1000-12PSZ	D9
GR12	81C1000-12PSZ	D8
GR13	81C1000-12PSZ	D8
GR14	81C1000-12PSZ	D8
GR15	81C1000-12PSZ	D8
GR16	81C1000-12PSZ	B11
GR17	81C1000-12PSZ	B11
GR18	81C1000-12PSZ	B11
GR19	81C1000-12PSZ	B10
GR20	81C1000-12PSZ	B10
GR21	81C1000-12PSZ	B10
GR22	81C1000-12PSZ	B10
GR23	81C1000-12PSZ	B10
GR24	81C1000-12PSZ	B9
GR25	81C1000-12PSZ	B9
GR26	81C1000-12PSZ	B9
GR27	81C1000-12PSZ	B9
GR28	81C1000-12PSZ	B8
GR29	81C1000-12PSZ	B8
GR30	81C1000-12PSZ	B8
GR31	81C1000-12PSZ	B8
G1	74AS244	B6
G2	74AS244	D7
G3	74AS244	B7
G4	74AS32	D6
G5	74AS32	C6

Component locations

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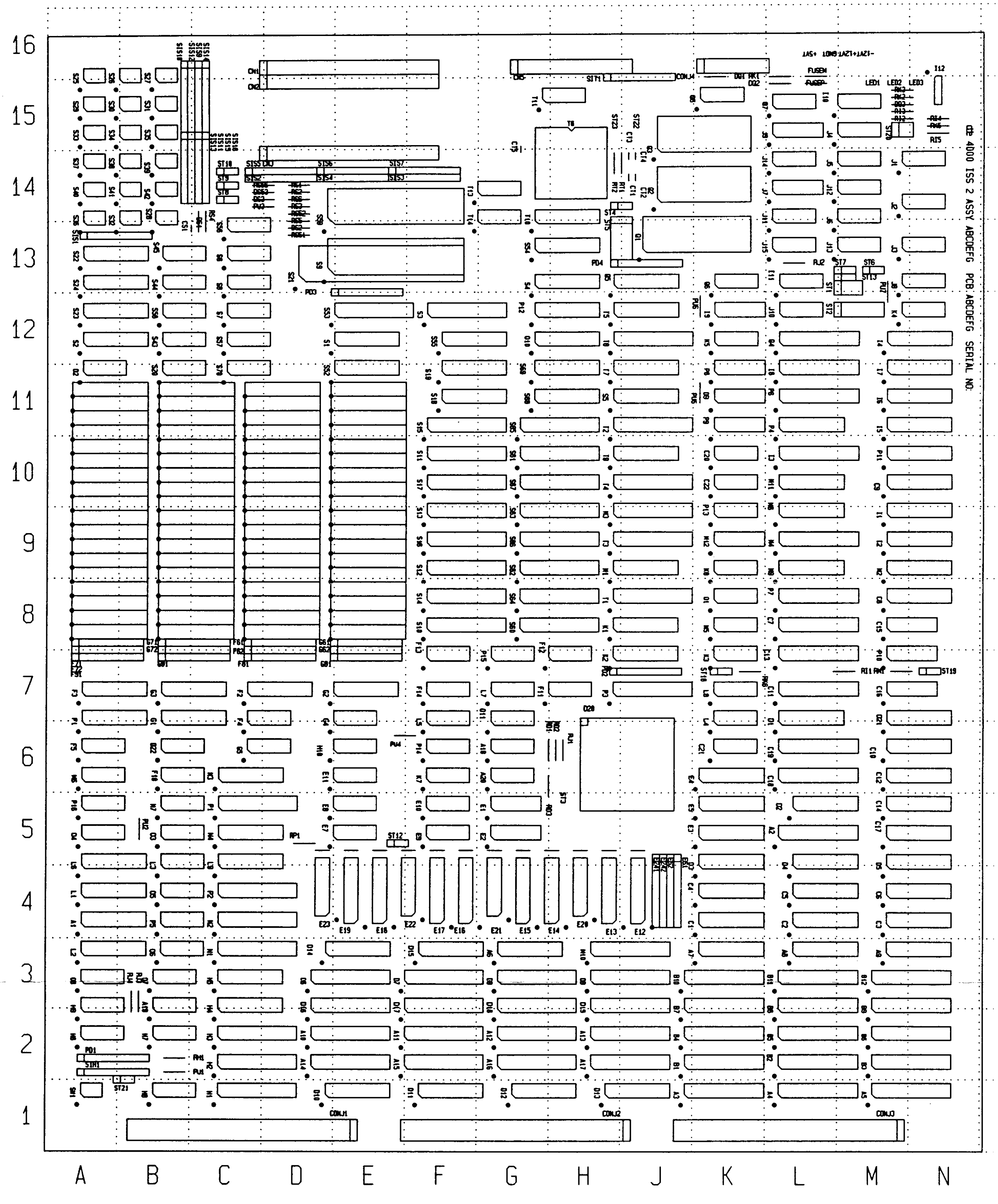

Component locations

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PRELIMINARY

Name	Type	Pos
LED4		M16
L0		G3
L1		D3
L2		B4
L3		D5
L4		G4
L5		E3
L6		B3
L7		A3
L8		C4
L9		D6
M0		C7
M1		A8
M2		L7
M3		J7
M4		L8
M5		L7
M6		B8
M7		B8
M8		A6
M9		E8
NY0		F15
NY1		F15
N0		B6
N1		B7
N2		D5
N3		C6
N4		A5
N5		B6
N6		A4
N7		C5
N8		C5
N9		A5
O0		B4
O1		B5
O2		B5
O3		E4
O4		D4
O5		D9
O6		E8
O7		D8
O8		D7
O9		D8
PUA		F7
PU1		C6
PU2		B2
PU3		A4
PU4		A6
PU5		A7
PU6		E9
PU7		G7
PU8		A9
PU9		B8
PU10		C8
PU11		C12
PU12		D11
P0		C9
P1		D7
P2		C7
P3		C6
P4		C8
P5		D6
P6		J2
P7		L9
P8		M9
P9		L6
Q0		L7
Q1		L8
Q2		L6
Q3		J15
Q4		K15
Q5		L9
Q6		G4
Q7		H6
Q8		G6
Q9		D4
R0		H7
R1		L7

Name	Type	Pos
R2		J6
R3		E7
R4		E6
R5		G6
R6		C3
R7		C3
R8		A11
R9		A10
R10		D10
R11		B10
R12		C10
SI0		H15
SI1		H15
SI2		H15
SI3		D11
SI4		A12
SI9		D14
SI10		A15
SI11		C14
SI12		D15
SI13		C16
SI14		E15
SI15		A15
SWD		M16
SWU		A2
S0		A8
S1		A9
S2		A4
S3		A9
S4		A6
S5		A7
S6		B7
S7		C8
S8		B9
TR1		A11
TR2		B11
TR3		A12
TR4		B12
TR5		C12
TR6		C12
TR7		C12
TR8		D11
TR9		B12
TTR1		B11
TTR2		B11
TTR3		B11
T0		D9
T1		B13
T2		A13
T3		C13
T4		C10
T5		C11
T6		C12
T7		C12
T8		B12
T9		B12
T10		C13
T11		D11
T12		D12
T13		D12
T14		D13
T15		A12
T16		D13
T17		D13
T18		A13
T19		A13
T20		A14
T21		A12
T22		A15
T23		A15
T24		C13
U2		E7
U3		B10
U4		H3
U5		H3
U6		C4
U7		H10
U8		E3

Name	Type	Pos
U9		M6
W0		H15
W1		H14
W2		H14
W3		H13
W4		H13
W5		H13
W6		H12
W7		H12
W8		H11
W9		H11
XA		E13
XB		G13
XC		E12
XD		G12
XE		D10
XF		E13
XG		G13
XH		E12
X0		E9
X1		E13
X2		G13
X3		J9
X4		J10
X5		G10
X6		G10
X7		E11
X8		G11
X9		H9
YA		G7
YB		E9
YC		G7
YD		E10
YE		H8
YF		G9
Y0		E10
Y1		E14
Y2		G15
Y3		G12
Y4		G8
Y5		H8
Y6		B9
Y7		H9
Y8		G9
Y9		H7
ZC		B13
ZD		B13
ZE		B11
ZF		G10
ZG		A14
ZH		A11

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 i 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 ±5%	7.0 A
+12 V ±5%	0.1 A
−12 V ±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:

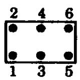
	Position	Baud rate	Data bits	Stop bits
	0	300	7	2
	1	600	7	2
	2	1200	7	2
	3	2400	7	2
	4	4800	7	2
*	5	9600	7	2
	6	19200	7	2
	7	9600	7	2
	8	300	8	1
	9	600	8	1
	A	1200	8	1
	B	2400	8	1
	C	4800	8	1
	D	9600	8	1
	E	19200	8	1
	F	9600	8	1

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.

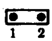
ST1:



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

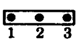
STCDIS:



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

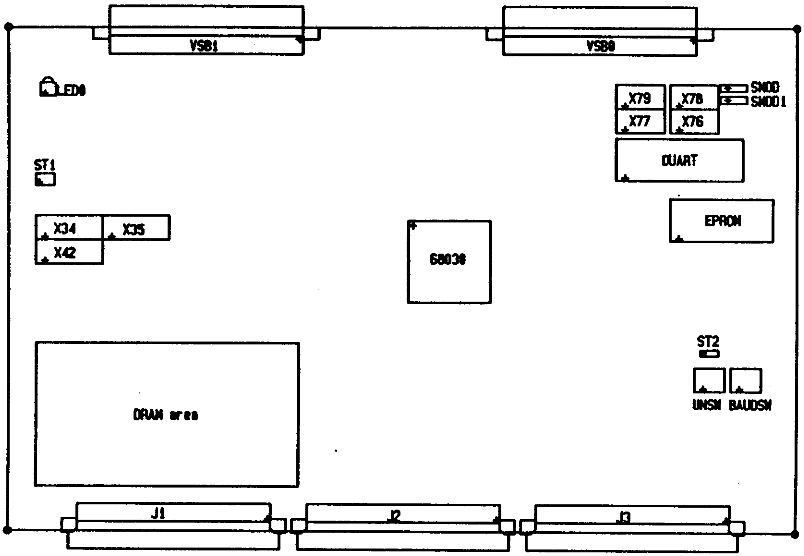
TABLE 8. Strap STCDIS

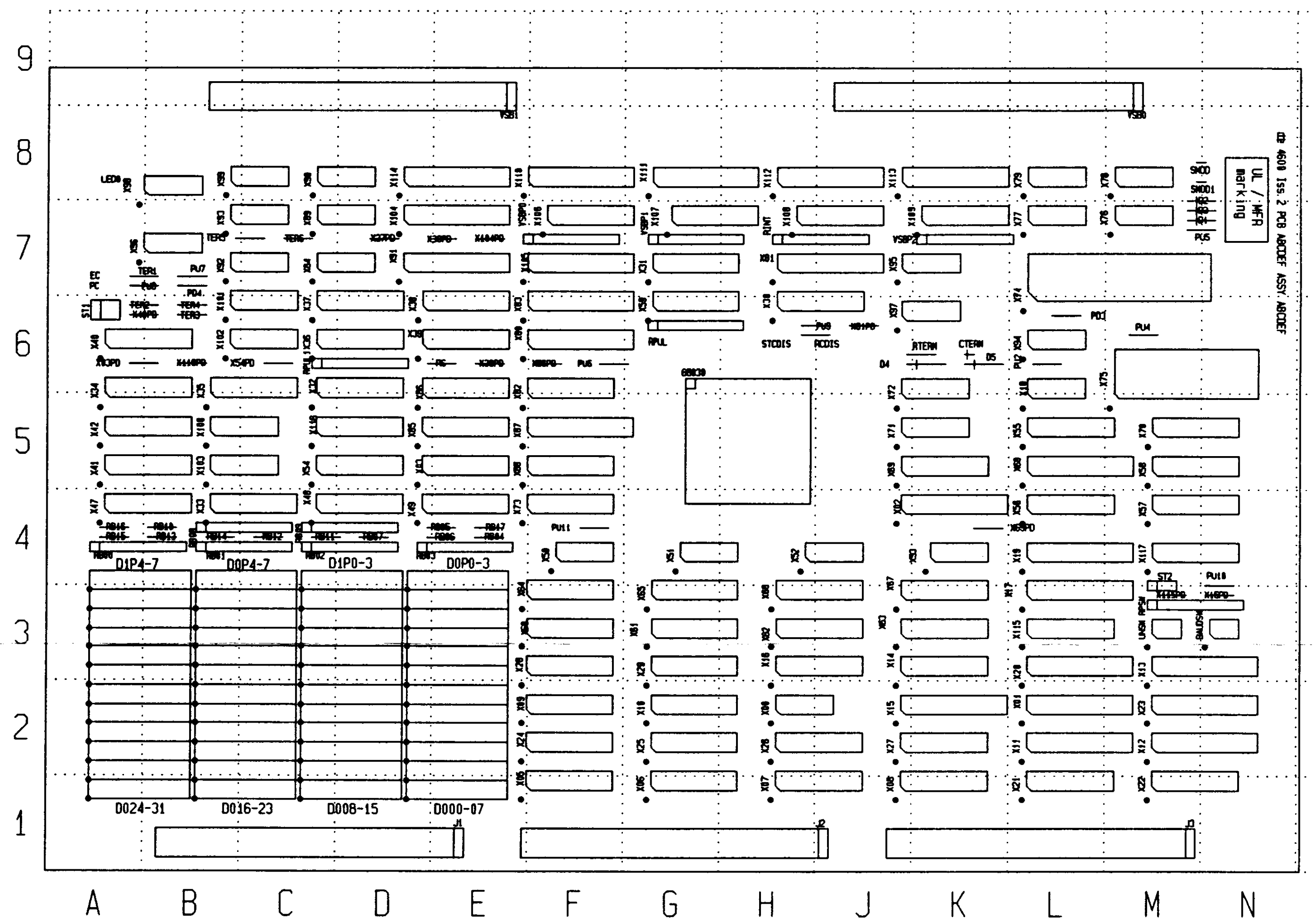
ST2:



Broadcast handshake		
	1-2	Enabled
*	2-3	Disabled

TABLE 9. Strap ST2


VSB1
VSB0
LED0
SMOD
SMOD1
X79
X78
X77
X76
DUART
ST1
EPROM
X34
X35
X42
68030
ST2
UNSW
BAUDSW
DRAM area
J1
J2
J3



Component locations

PCB: **4600 / MIOC**	Issue: 2	Date: 90/08/21	dde	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Name	Type	Pos
BAUDSW	unit	N3
CTERM	10uF25V	K6
DOPO	1Mx1	D3
DOP1	1Mx1	D3
DOP2	1Mx1	D3
DOP3	1Mx1	D4
DOP4	1Mx1	B3
DOP5	1Mx1	B3
DOP6	1Mx1	B3
DOP7	1Mx1	B4
D1	1n4448	M7
D1P0	1Mx1	C3
D1P1	1Mx1	C3
D1P2	1Mx1	C3
D1P3	1Mx1	C4
D1P4	1Mx1	A3
D1P5	1Mx1	A3
D1P6	1Mx1	A3
D1P7	1Mx1	A4
D2	1n4448	M8
D3	1n4448	M7
D4	1n4001	J6
D5	1n4001	K6
D000	256X4	D1
D001	256X4	D2
D002	256X4	D2
D003	256X4	D2
D004	256X4	D2
D005	256X4	D2
D006	256X4	D3
D007	256X4	D3
D008	256x4	C1
D009	256x4	C2
D010	256x4	C2
D011	256x4	C2
D012	256x4	C2
D013	256x4	C2
D014	256x4	C3
D015	256x4	C3
D016	256x4	B1
D017	256x4	B2
D018	256x4	B2
D019	256x4	B2
D020	256x4	B2
D021	256x4	B2
D022	256x4	B3
D023	256x4	B3
D024	256x4	A1
D025	256x4	A2
D026	256x4	A2
D027	256x4	A2
D028	256x4	A2
D029	256x4	A2
D030	256x4	A3
D031	256x4	A3
EC	strap	A7
J1	DIN96	E1
J2	DIN96	J1
J3	DIN96	M1
LEDO	lysdi	A8
PC	strap	A7
PD3	39ohm	L6
PD4	39ohm	B7
PU2	1kohm	L6
PU4	1kohm	M6
PU5	1kohm	N7
PU6	1kohm	F6
PU7	1kohm	B7
PU8	1kohm	A7
PU9	1kohm	J6
PU10	1kohm	M4
PU11	1kohm	F4
RB00	10x-2-330	A4
RB01	10x-2-330	B4
RB02	10x-2-330	C4
RB03	10x-2-330	D4
RB04	33ohm	E4
RB05	33ohm	D4

Name	Type	Pos
RB06	33ohm	D4
RB07	33ohm	D4
RB08	10x-2-330	B4
RB09	10x-2-330	C4
RB10	33ohm	A4
RB11	33ohm	D4
RB12	33ohm	C4
RB13	33ohm	A4
RB14	33ohm	B4
RB15	33ohm	A4
RB16	33ohm	A4
RB17	33ohm	E4
RCDIS	1kohm	J6
RINT	10-1-102	H7
RPSW	10-1-102	M3
RPUL	10-1-102	G6
RPUL1	10-1-102	C6
RS	10ohm	D6
RTERM	220ohm	K6
SMOD	0.5ohm	M8
SMOD1	0.5ohm	M8
STCDIS	strap	H6
ST1	strap	A6
ST2	strap	M4
TER1	220ohm	B7
TER2	470ohm	A6
TER3	220ohm	B6
TER4	470ohm	B6
TER5	220ohm	B7
TER6	470ohm	C7
UNSW	unit	M3
VSBP0	10-1-331	E7
VSBP1	10-1-331	G7
VSBP2	10-1-102	K7
VSB0	DIN96	M9
VSB1	DIN96	E9
X00	74LS14	H2
X01	22V10-15	L2
X02	22V10-15	J4
X03	16R4-25	D5
X03PD	39ohm	B6
X05	74ALS645	E1
X06	74ALS645	G1
X07	74ALS645	H1
X08	74ALS645	J1
X09	74ALS645	E2
X10	74ALS645	G2
X11	29C841a	L2
X12	29C841a	M2
X13	29C841a	M3
X14	74AS641	J3
X15	20R8	J2
X15PD	39ohm	M3
X16	74AS645	H3
X17	22V10-15	L3
X18	74F74	L5
X19	20R4-25	L4
X20	20R4-25	L3
X21	74ALS573	L1
X22	74ALS573	M1
X23	29C841a	M2
X24	74ALS645	E2
X25	74ALS645	G2
X26	74ALS645	H2
X27	74ALS645	J2
X28	74ALS645	E3
X29	74ALS645	G3
X30	16L8-7	H6
X31	16L8-7	G7
X32	16L8-7	C5
X33	16L8-7	B4
X34	16R6-7	A5
X35	16R6-7	B5
X36	16L8-7	C6
X37	16R6-7	C6
X37PD	39ohm	D7
X38	16R8-7	D6
X38PD	39ohm	E7

Name	Type	Pos
X39	16L8-7	D6
X39PD	39ohm	E6
X40	16R8-10	A6
X40PD	39ohm	B6
X41	74ALS6311	A5
X42	74AlS6311	A5
X47	16L8-10	A4
X48	16L8-10	C4
X49	16L8-10	D4
X50	74AS280	F4
X51	74AS280	G4
X52	74AS280	H4
X53	74AS280	K4
X54	16R4-7	C5
X54PD	39ohm	C6
X55	74AS573	L5
X56	74AS573	L4
X57	74AS573	M4
X58	74AS573	M5
X59	16L8-10	G6
X60	74AS573	E3
X61	74AS573	G3
X62	74AS573	H3
X63	74AS573	J3
X64	74ALS573	E3
X65	74ALS573	G3
X66	74ALS573	H3
X67	74ALS573	J3
X68	20L8-25	L5
X69	16R6-15	J5
X69PD	39ohm	K4
X70	74ALS573	M5
X71	74ALS138	J5
X72	74ALS138	J5
X73	74ALS645	E4
X74	2681	L6
X75	271001	M5
X76	75C188	M7
X77	75C189	L7
X78	75C188	M8
X79	75C189	L8
X80	74ALS992	E6
X81	20R8-25	H7
X81PD	39ohm	J6
X82	74ALS573	E5
X83	20L8-25	E6
X84	74AS1004	C7
X85	16L8-10	D5
X86	16R4-25	D5
X86PD	39ohm	E6
X87	74ALS992	E5
X88	74ALS573	E5
X89	74LS393	C7
X90	74ALS14	C8
X91	20L8-25	D7
X92	74AS1004	B7
X93	74F74	B7
X94	74LS393	L6
X95	74LS393	J7
X96	xtal	A7
X97	xtal	J6
X98	xtal	A8
X99	74F74	B8
X100	74LS390	B5
X101	74LS390	B6
X102	74LS390	B6
X103	74LS390	B5
X104	22V10-15	D7
X104PD	39ohm	E7
X105	22V10-15	E7
X106	74ALS645	F7
X107	74ALS645	G7
X108	74ALS645	H7
X109	74ALS645	K7
X110	74ALS646	E8
X111	74ALS646	G8
X112	74ALS646	H8
X113	74ALS646	J8

Component locations

PCB: 4600 / MIOC

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Name	Type	Pos
X114	22V10-15	D8
X115	16R4-25	L3
X115PD	39ohm	M3
X116	16R4-15	C5
X116PD	39ohm	B6
X117	74ALS580	M4
68030	MC68030	G6

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 syncronous 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 ±5%	2.4 A
+12 V ±5%	not used
−12 V ±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:	**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 syncronize 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 ±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:	**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 syncronize 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 ±5%	1.8 A
+12 V ±5%	not used
−12 V ±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 ±5%	1.2 A
+12 V ±5%	0.3 A
−12 V ±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:	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 J2

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 ±5%	1.1 A
+12 V ±5%	0.2 A
−12 V ±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

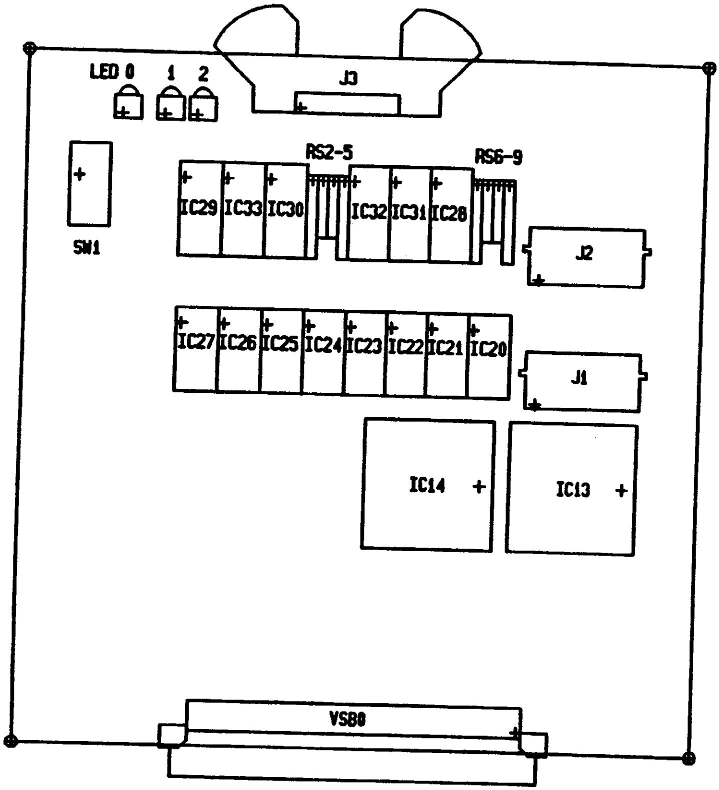
If the 4640 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the SW1 switch will activate the level 7 interrupt to the MC68030 processor on the MIOC .

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:	888060L0		
Version:	1	**Cable:**	LiYCY 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 8	RTS+ CTS+	⊃			
17 20	RTS- CTS-	⊃			

Example:

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

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 ±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

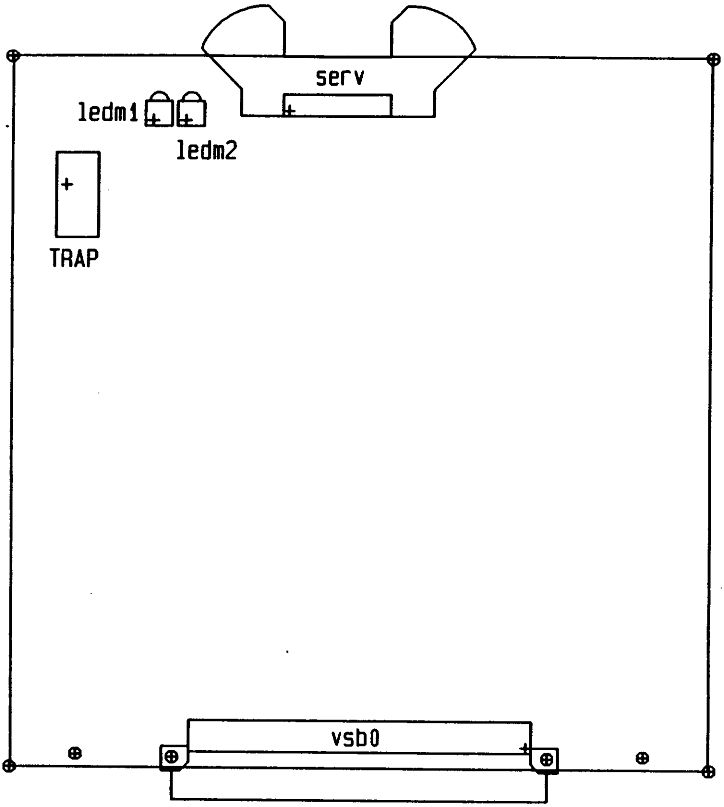
If the 4630 submodule is connected to the VSB0 connector on the MIOC 4600 module, pressing the TRAP switch will activate the level 7 interrupt to the MC68030 processor on the MIOC .

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

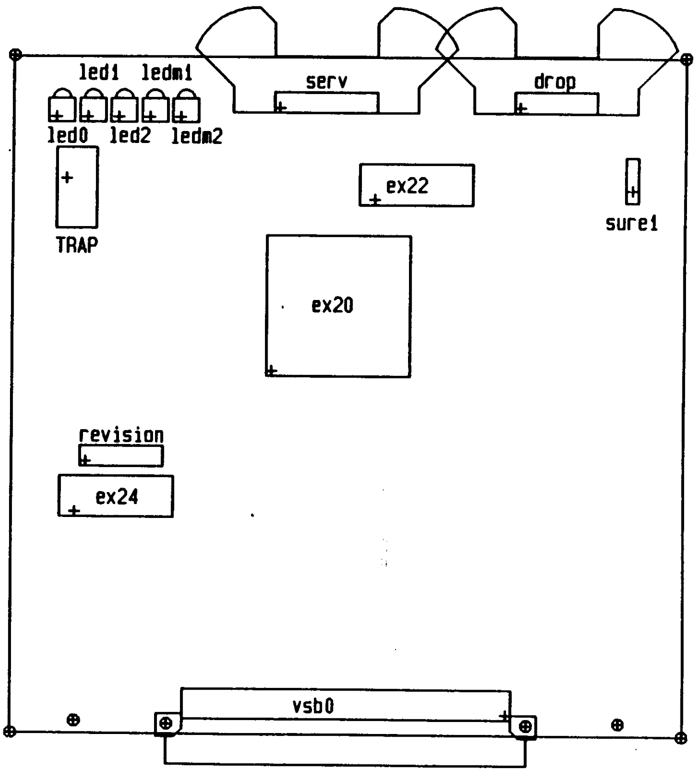

serv
ledm1
ledm2
TRAP
vsb0

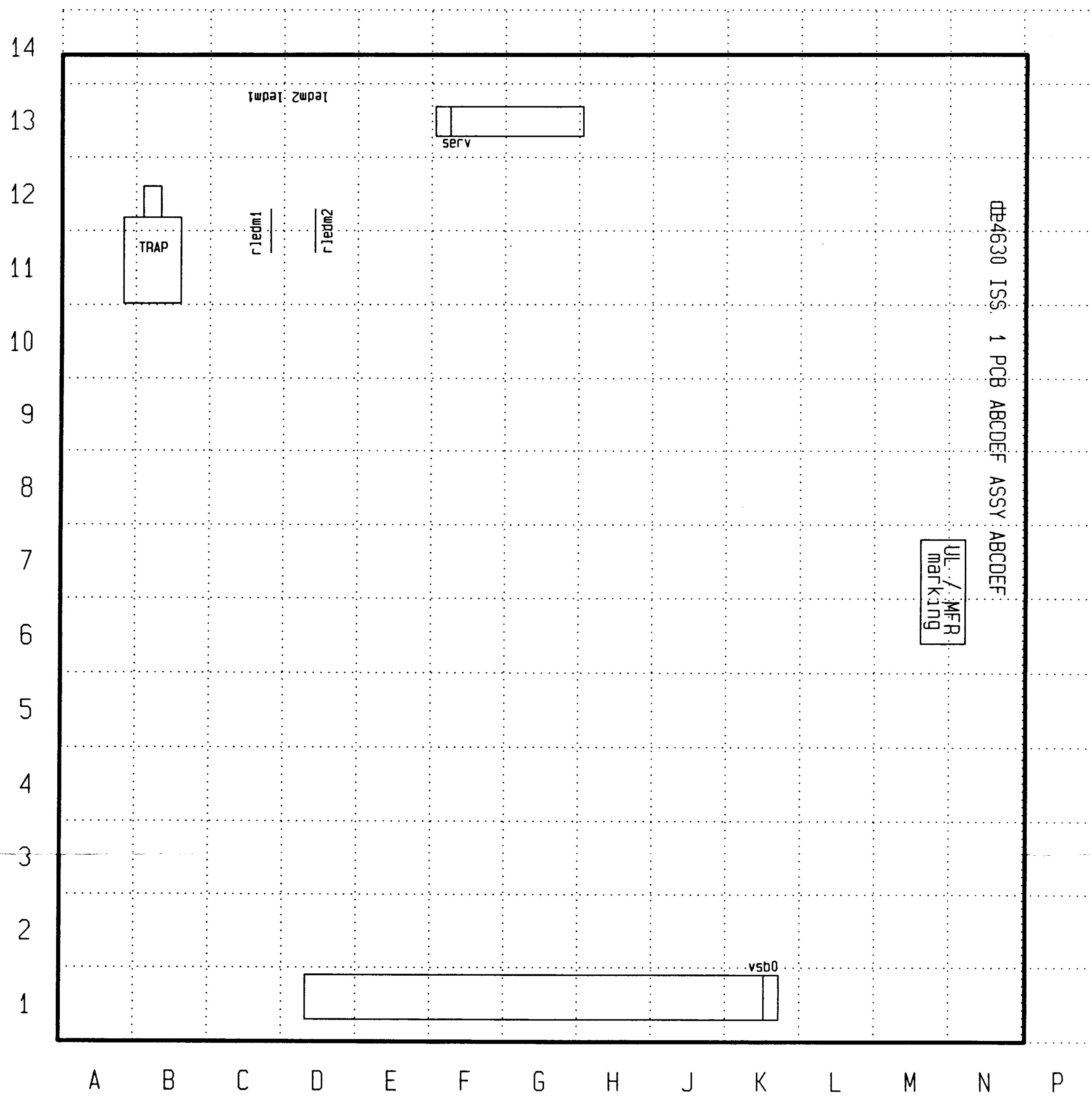
Light Emitting Diodes

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





Component locations

PCB: 4630 / SUB-D	Issue: 1	Date: 91/01/02	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11

Name	Type	Pos
TRAP	trap	B12
ledm1	550-0405	C13
ledm2	550-0405	D13
rledm1	1kohm5%	C12
rledm2	1kohm5%	D12
serv	serv	F13
vsb0	din96	K1

Component locations

PCB: 4630 / SUB-D

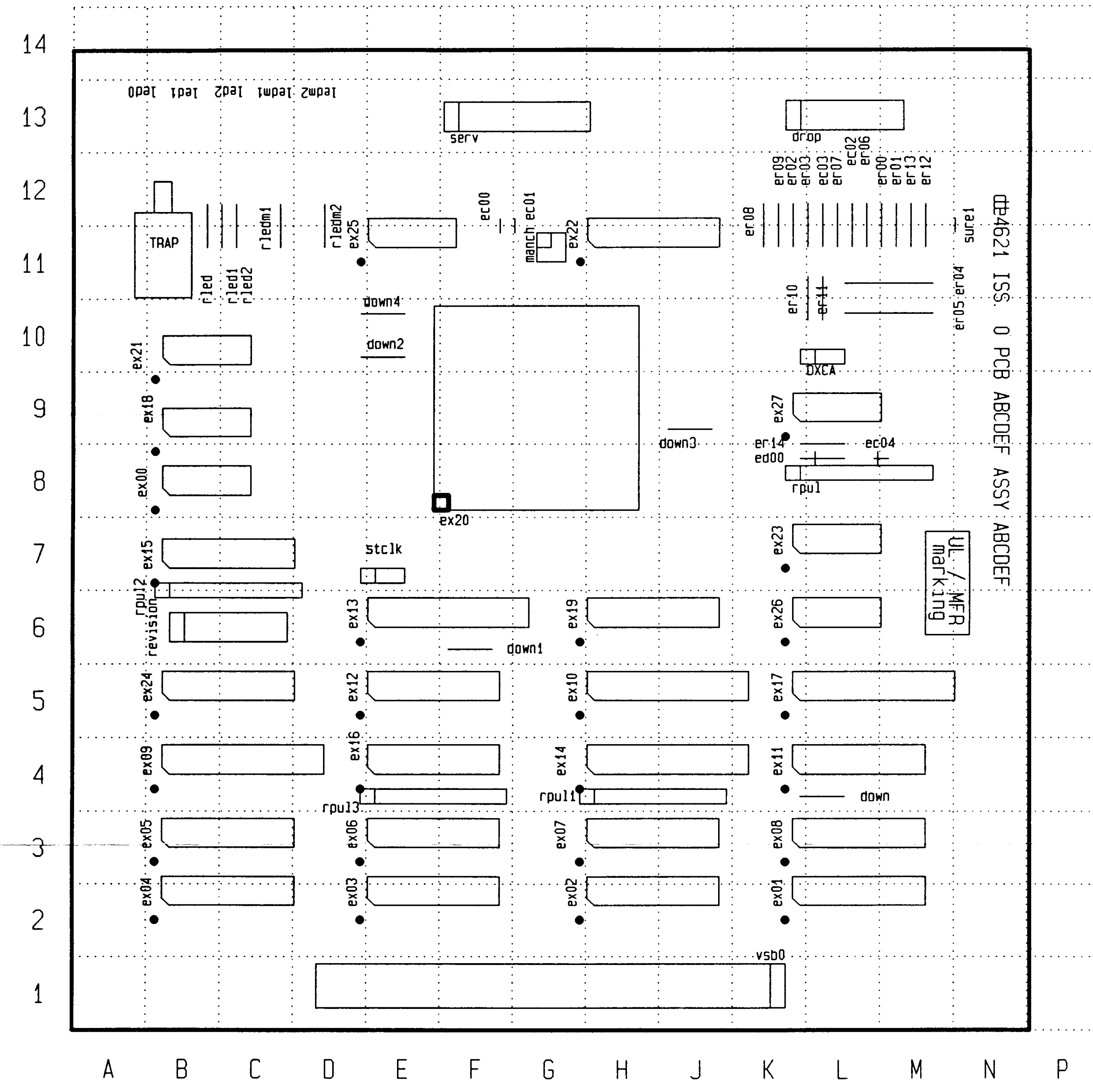
Issue: 1

Date: 91/01/02

dde

dansk data elektronik a/s

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



Component locations

PCB: **4621 / SUB-E**	Issue: 0	Date: 90/12/19	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

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	74ls132	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
surel	smodstand	N11
vsb0	din96	K1

Component locations

PCB: 4621 / SUB-E | Issue: 0 | Date: 90/12/19

dansk data elektronik a/s
herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

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:

Seriel Channels:

The seriel 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

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

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

Factory installed:

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

<u>Strap socket 2.</u>

Function: USART interrupt, Txrdy.

Position: A 1,10
Name   : A7

```
                1.
Txrdy(0)   *         *   RST0
Txrdy(1)   *         *   RST1
Txrdy(2)   *         *   RST2
Txrdy(3)   *         *   RST3
Txrdy(4)   *         *   RST4
Txrdy(5)   *         *   RST5
Txrdy(6)   *         *   RST6
Txrdy(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 strapsocket:

```
    * *_* * * * * *

    * *_* * * * * *
 1.
```

Strap 1.

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

Position: B 7,1

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

Jumper	Clock
+ 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
```

Jumper	Function
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
```

Jumper	Function
+ 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
```

Jumper	Function
+ 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
```

Jumper	Function
+ 1-2	The SIOC drives the RS-232-C interface signal Txclk wi

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 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

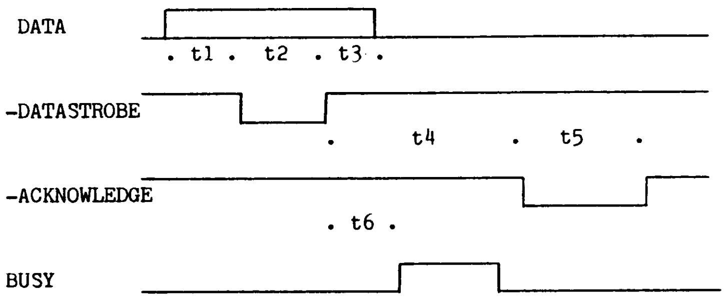
LED5: On: The SIOC has activated the buserror signal.
Off: No error.
Upon power up: Off.

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:

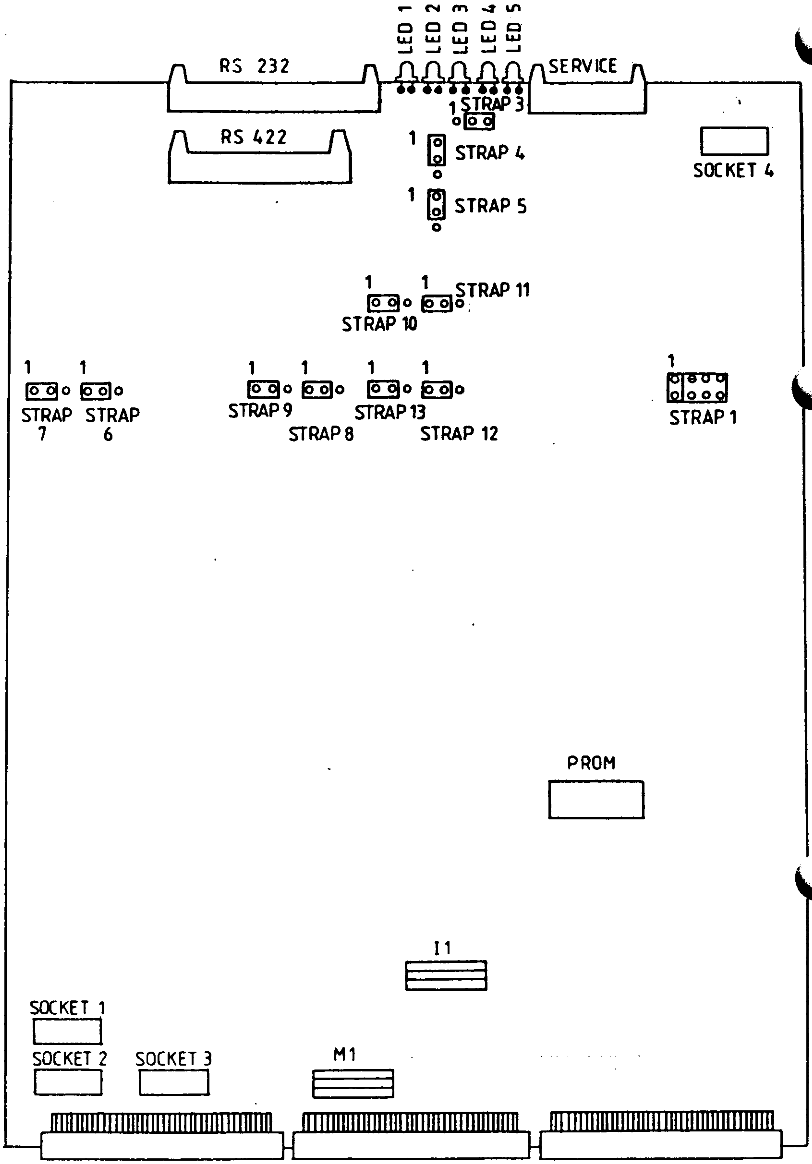
1. Data strobe. An output from the SIOC.
2. Acknowledge. An input to the SIOC.
3. Busy. An input to the SIOC.

Interface timing:

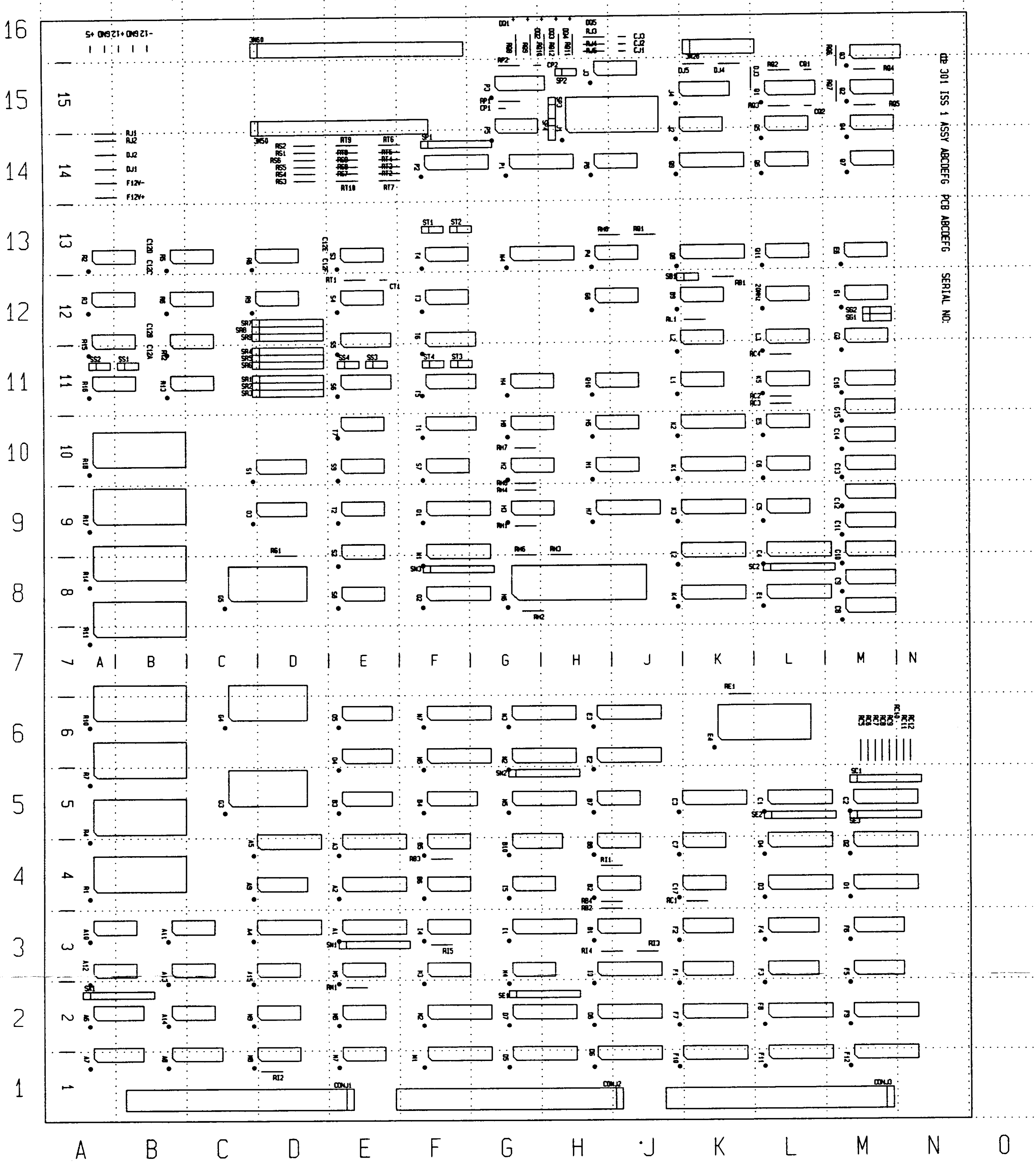


- designates active low signals.

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


LED 1
LED 2
LED 3
LED 4
LED 5
RS 232
SERVICE
STRAP 3
RS 422
STRAP 4
SOCKET 4
STRAP 5
STRAP 11
STRAP 10
STRAP 7
STRAP 6
STRAP 9
STRAP 8
STRAP 13
STRAP 12
STRAP 1
PROM
I1
SOCKET 1
SOCKET 2
SOCKET 3
M1

PRELIMINARY



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

PRELIMINARY

Name	Type	Pos
A1		E3
A2		E4
A3		E4
A4		C3
A5		C4
A6		A2
A7		A1
A8		B1
A9		C4
A10		A3
A11		B3
A12		A3
A13		B3
A14		B2
A15		C3
B1		H3
B2		H4
B3		E5
B4		F5
B5		F4
B6		F4
B7		H5
B8		H4
B9		J12
B10		G4
CJ1		J16
CJ2		J16
CJ3		J16
CONJ1		E1
CONJ2		J1
CONJ3		M1
CP1		G15
CP2		G15
CQ1		L15
CQ2		L15
CT1		E12
C1		L5
C2		M5
C3		J5
C4		L8
C5		L9
C6		L10
C7		J4
C8		M8
C9		M8
C10		M8
C11		M9
C12		M9
C12A		B12
C12B		B12
C12C		B13
C12D		B13
C12E		D13
C12F		D13
C13		M10
C14		M10
C15		M10
C16		M11
C17		J4
DJ1		A14
DJ2		A14
DJ3		K15
DJ4		K15
DJ5		J15
DQ1		G16
DQ2		G16
DQ3		H16
DQ4		H16
DQ5		H16
D1		M4
D2		M4
D3		L4
D4		L4
D5		G1
D6		H1
D7		G2
D8		H2
E1		L8

Name	Type	Pos
E2		H6
E3		H6
E4		K6
E5		L10
E6		M13
F1		J3
F2		J3
F3		L3
F4		L3
F5		M3
F6		M3
F7		J2
F8		L2
F9		M2
F10		J1
F11		L1
F12		M1
F12V+		A14
F12V-		A14
G1		M12
G2		M11
G3		C5
G4		C6
G5		C8
G6		H12
H1		H10
H2		G10
H3		G9
H4		G11
H5		H10
H6		G8
H7		H9
H8		G10
I1		G3
I2		J8
I3		H3
I4		F3
I5		G4
J1		H14
J2		J14
J3		H15
J4		J15
K1		J10
K2		J10
K3		J9
K4		J8
K5		L11
LABEL		O-1
L1		J11
L2		J11
L3		L11
M1		F1
M2		F2
M3		F3
M4		G3
M5		E3
M6		E2
M7		E1
M8		C1
M9		C2
N1		F8
N2		G6
N3		G6
N4		G13
N5		G5
N6		F6
N7		F6
O1		F9
O2		F8
O3		C9
O4		E6
O5		E6
P1		G14
P2		F14
P3		G15
P4		H13
P5		G14
P6		H14

Name	Type	Pos
Q1		L15
Q2		M15
Q3		M15
Q4		M14
Q5		L14
Q6		L14
Q7		M14
Q8		J13
Q9		J14
Q10		H11
Q11		L13
RB1		K12
RB2		H4
RB3		F4
RB4		H4
RC1		K4
RC2		L11
RC3		L11
RC4		L11
RC5		M6
RC6		M6
RC7		M6
RC8		M6
RC9		M6
RC10		M6
RC11		N6
RC12		N6
RE1		K7
RG1		D9
RH1		G9
RH2		H8
RH3		H9
RH4		G9
RH5		G10
RH6		G9
RH7		G10
RH8		H13
RI1		H4
RI2		D1
RI3		J3
RI4		H3
RI5		F3
RJ1		A15
RJ2		A14
RJ3		H16
RJ4		H16
RJ5		H16
RL1		J12
RM1		E2
RP1		G15
RP2		G15
RQ1		J13
RQ2		L15
RQ3		L15
RQ4		M15
RQ5		M15
RQ6		M16
RQ7		M15
RQ8		G16
RQ9		G16
RQ10		H16
RQ11		H16
RQ12		H16
RS1		D14
RS2		D14
RS3		D14
RS4		D14
RS5		D14
RS6		D14
RS7		E14
RS8		E14
RS9		E14
RT1		E12
RT2		E14
RT3		E14
RT4		E14
RT5		E14
RT6		E14

Component locations

PCB: SIOC | Issue: | Date:

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PRELIMINARY

Name	Type	Pos
RT7		E14
RT8		E14
RT9		E14
RT10		E14
R1		A4
R2		A13
R3		A12
R4		A5
R5		B13
R6		B12
R7		A5
R8		C13
R9		C12
R10		A6
R11		A7
R12		B11
R13		B11
R14		A8
R15		A11
R16		A11
R17		A9
R18		A10
SA1		A2
SB1		J12
SC1		M5
SC2		L8
SE1		G2
SE2		L5
SE3		M5
SG1		M12
SG2		M12
SN1		E3
SN2		G5
SN3		F8
SP1		F14
SP2		H15
SP3		H15
SP4		H15
SR1		C11
SR2		C11
SR3		C11
SR4		C11
SR5		C11
SR6		C11
SR7		C12
SR8		C12
SR9		C12
SS1		B11
SS2		A11
SS3		E11
SS4		E11
ST1		F13
ST2		F13
ST3		F11
ST4		F11
S1		C10
S2		E8
S3		E13
S4		E12
S5		E11
S6		E11
S7		F10
S8		E8
S9		E10
T1		F10
T2		E9
T3		F12
T4		F13
T5		F11
T6		F11
T7		E10
3M20		K16
3M50		C15
3M60		C16
20MHz		L12

Component locations

PCB: SIOC | Issue: | Date:

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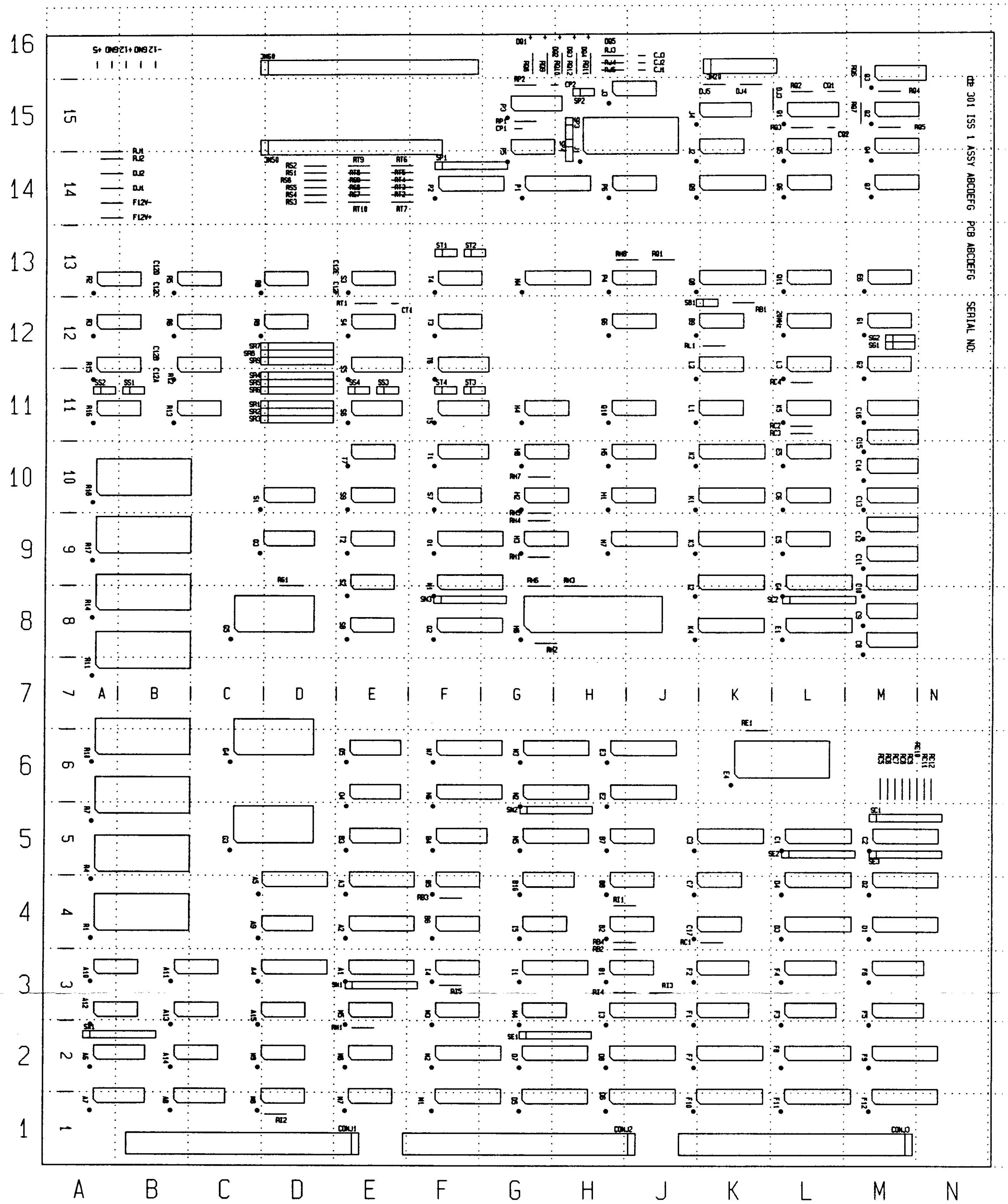
herlev hovedgade 199. 2730 herlev. tlf. 02-84 50 11



Component locations

PCB: **301 / SIOC**	Issue: 1	Date: 871030	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Name	Type	Pos
A1	74ALS574	E3
A2	74ALS574	E4
A3	74ALS576	E4
A4	74ALS573	C3
A5	74LS541	C4
A6	STRAP	A2
A7	STRAP	A1
A8	STRAP	B1
A9	74LS148	C4
A10	74LS03	A3
A11	74LS03	B3
A12	74LS03	A3
A13	74LS03	B3
A14	74LS32	B2
A15	74LS32	C3
B1	74LS05	H3
B2	74LS05	H4
B3	74LS257	E5
B4	74LS259	F5
B5	74LS03	F4
B6	74LS05	F4
B7	74LS21	H5
B8	74LS74	H4
B9	74LS74	J12
B10	74LS175	G4
CJ1	100pF	J16
CJ2	100pF	J16
CJ3	100pF	J16
CONJ1	CONNECTOR	E1
CONJ2	CONNECTOR	J1
CONJ3	CONNECTOR	M1
CP1	100pF	G15
CP2	100pF	G15
CQ1	100pF	L15
CQ2	100pF	L15
CT1	NOT USED	E12
C1	74ALS573	L5
C2	74ALS573	M5
C3	74ALS573	J5
C4	74ALS573	L8
C5	74LS280	L9
C6	74LS280	L10
C7	74LS393	J4
C8	TMS4164	M8
C9	TMS4164	M8
C10	TMS4164	M8
C11	TMS4164	M9
C12	TMS4164	M9
C12A	100nF	B12
C12B	100nF	B12
C12C	100nF	B13
C12D	100nF	B13
C12E	100nF	D13
C12F	100nF	D13
C13	TMS4164	M10
C14	TMS4164	M10
C15	TMS4164	M10
C16	TMS4164	M11
C17	74S00	J4
DJ1	1N4007	A14
DJ2	1N4007	A14
DJ3	1N4448	K15
DJ4	1N4448	K15
DJ5	1N4448	J15
DQ1	LED	G16
DQ2	LED	G16
DQ3	LED	H16
DQ4	LED	H16
DQ5	LED	H16
D1	74LS541	M4
D2	74ALS574	M4
D3	74LS541	L4
D4	74ALS574	L4
D5	74LS541	G1
D6	74ALS573	H1
D7	74ALS573	G2
D8	74ALS573	H2
E1	74ALS541	L8

Name	Type	Pos
E2	74ALS573	H6
E3	74ALS645	H6
E4	SBOOT (2764)	K6
E5	74LS00	L10
E6	74LS32	M13
F1	74LS189	J3
F2	74LS189	J3
F3	74LS189	L3
F4	74LS189	L3
F5	74LS189	M3
F6	74LS189	M3
F7	74LS540	J2
F8	74LS540	L2
F9	74LS540	M2
F10	74ALS580	J1
F11	74ALS580	L1
F12	74ALS580	M1
F12V+	JUMPER	A14
F12V-	JUMPER	A14
G1	5404	M12
G2	74LS393	M11
G3	M82C53-5	C5
G4	M82C53-5	C6
G5	M82C53-5	C8
G6	74ALS74	H12
H1	74S04	H10
H2	74S04	G10
H3	74S08	G9
H4	74S08	G11
H5	74LS74	H10
H6	P8085AH-2	G8
H7	S3v (PAL16L8)	H9
H8	74LS32	G10
I1	U08v (PAL16L8)	G3
I2	74AS574	J8
I3	74ALS244	H3
I4	74S74	F3
I5	74LS00	G4
J1	D8251AFC	H14
J2	75188	J14
J3	75189	H15
J4	JUMPER (X x X)	J15
K1	S7v (PAL16R8)	J10
K2	S4v (PAL16R8)	J10
K3	S5v (PAL16R8)	J9
K4	S6v (PAL16L8)	J8
K5	74S04	L11
L1	74S00	J11
L2	74S74	J11
L3	74S74	L11
M1	P13v (PAL16R8)	F1
M2	74AS641	F2
M3	74LS74	F3
M4	74S74	G3
M5	74LS74	E3
M6	74ALS37	E2
M7	74LS14	E1
M8	74LS21	C1
M9	74LS32	C2
N1	74LS541	F8
N2	74LS645	G6
N3	74LS645	G6
N4	74LS273	G13
N5	74LS273	G5
N6	74LS541	F6
N7	74ALS574	F6
O1	S2v (PAL16L8)	F9
O2	S1v (PAL16L8)	F8
O3	74LS138	C9
O4	74LS138	E6
O5	74LS138	E6
P1	74ALS574	G14
P2	74LS641	F14
P3	74LS123	G15
P4	74LS74	H13
P5	74LS14	G14
P6	74S38	H14
Q1	74LS123	L15

Name	Type	Pos
Q2	74LS00	M15
Q3	STRAP	M15
Q4	74LS74	M14
Q5	74LS74	L14
Q6	74LS74	L14
Q7	74LS74	M14
Q8	74LS642	J13
Q9	74LS642	J14
Q10	74LS00	H11
Q11	74LS08	L13
RB1	1K ohm	K12
RB2	820 ohm	H4
RB3	1K ohm	F4
RB4	1K ohm	H4
RC1	1K ohm	K4
RC2	33 ohm	L11
RC3	33 ohm	L11
RC4	33 ohm	L11
RC5	33 ohm	M6
RC6	33 ohm	M6
RC7	33 ohm	M6
RC8	33 ohm	M6
RC9	33 ohm	M6
RC10	33 ohm	M6
RC11	33 ohm	N6
RC12	33 ohm	N6
RE1	1K ohm	K7
RG1	1K ohm	D9
RH1	470 ohm	G9
RH2	470 ohm	H8
RH3	4K7 ohm	H9
RH4	4K7 ohm	G9
RH5	1K ohm	G10
RH6	4K7 ohm	G9
RH7	1K ohm	G10
RH8	1K ohm	H13
RI1	1K ohm	H4
RI2	1K ohm	D1
RI3	1K ohm	J3
RI4	1K ohm	H3
RI5	1K ohm	F3
RJ1	NOT USED	A15
RJ2	NOT USED	A14
RJ3	4K7 ohm	H16
RJ4	4K7 ohm	H16
RJ5	4K7 ohm	H16
RL1	1K ohm	J12
RM1	1K ohm	E2
RP1	2K2 ohm	G15
RP2	3K3 ohm	G15
RQ1	470 ohm	J13
RQ2	22K ohm	L15
RQ3	22K ohm	L15
RQ4	1K ohm	M15
RQ5	1K ohm	M15
RQ6	1K ohm	M16
RQ7	1K ohm	M15
RQ8	150 ohm	G16
RQ9	150 ohm	G16
RQ10	150 ohm	H16
RQ11	150 ohm	H16
RQ12	150 ohm	H16
RS1	3K9 ohm	D14
RS2	270 ohm	D14
RS3	3K9 ohm	D14
RS4	3K9 ohm	D14
RS5	270 ohm	D14
RS6	3K9 ohm	D14
RS7	3K9 ohm	E14
RS8	270 ohm	E14
RS9	3K9 ohm	E14
RT1	NOT USED	E12
RT2	3K9 ohm	E14
RT3	270 ohm	E14
RT4	3K9 ohm	E14
RT5	3K9 ohm	E14
RT6	270 ohm	E14
RT7	3K9 ohm	E14

Component locations

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Name	Type	Pos
RT8	3K9 ohm	E14
RT9	270 ohm	E14
RT10	3K9 ohm	E14
R1	D8251AFC	A4
R2	75188	A13
R3	75189	A12
R4	D8251AFC	A5
R5	75188	B13
R6	75189	B12
R7	D8251AFC	A5
R8	75188	C13
R9	75189	C12
R10	D8251AFC	A6
R11	D8251AFC	A7
R12	75188	B11
R13	75189	B11
R14	D8251AFC	A8
R15	75188	A11
R16	75189	A11
R17	D8251AFC	A9
R18	D8251AFC	A10
SA1	SIL 9x 10K ohm	A2
SB1	JUMPER (1 x 3)	J12
SC1	SIL 9x 1K ohm	M5
SC2	SIL 9x 3K3 ohm	L8
SE1	SIL 9x 1K ohm	G2
SE2	SIL 9x 1K ohm	L5
SE3	SIL 9x 1K ohm	M5
SG1	JUMPER (X x X)	M12
SG2	JUMPER (X x X)	M12
SN1	SIL 9x 1K ohm	E3
SN2	SIL 9x 3K3 ohm	G5
SN3	SIL 9x 3K3 ohm	F8
SP1	SIL 9x 1K ohm	F14
SP2	JUMPER (1 x 3)	H15
SP3	JUMPER (1 x 3)	H15
SP4	JUMPER (1 x 3)	H15
SR1	NOT USED	C11
SR2	NOT USED	C11
SR3	NOT USED	C11
SR4	NOT USED	C11
SR5	NOT USED	C11
SR6	NOT USED	C11
SR7	NOT USED	C12
SR8	NOT USED	C12
SR9	NOT USED	C12
SS1	JUMPER (1 x 3)	B11
SS2	JUMPER (1 x 3)	A11
SS3	JUMPER (1 x 3)	E11
SS4	JUMPER (1 x 3)	E11
ST1	JUMPER (1 x 3)	F13
ST2	JUMPER (1 x 3)	F13
ST3	JUMPER (1 x 3)	F11
ST4	JUMPER (1 x 3)	F11
S1	74LS157	C10
S2	74LS74	E8
S3	75188	E13
S4	75189	E12
S5	AM26LS31	E11
S6	AM26LS32	E11
S7	74LS10	F10
S8	74LS05	E8
S9	74LS14	E10
T1	74LS10	F10
T2	74LS74	E9
T3	75189	F12
T4	75168	F13
T5	AM26LS32	F11
T6	AM26LS31	F11
T7	74LS10	E10
3M20	CONNECTOR	K16
3M50	CONNECTOR	C15
3M60	CONNECTOR	C16
20MHz	OSC 20MHz	L12

Component locations

PCB: 301 / SIOC

Issue: 1

Date: 871030

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Type: SIOC2 3600

Data sheet no.: 16

Revision no.: 1

Date: 880311

General description:

The SIOC2 3600 is an intelligent asyncronius 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.

Cable description:

PIN	SIGNAL	SIGNAL	PIN
01	GND	D0	02
03	GND	D1	04
05	GND	D2	06
07	GNS	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 i 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 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.

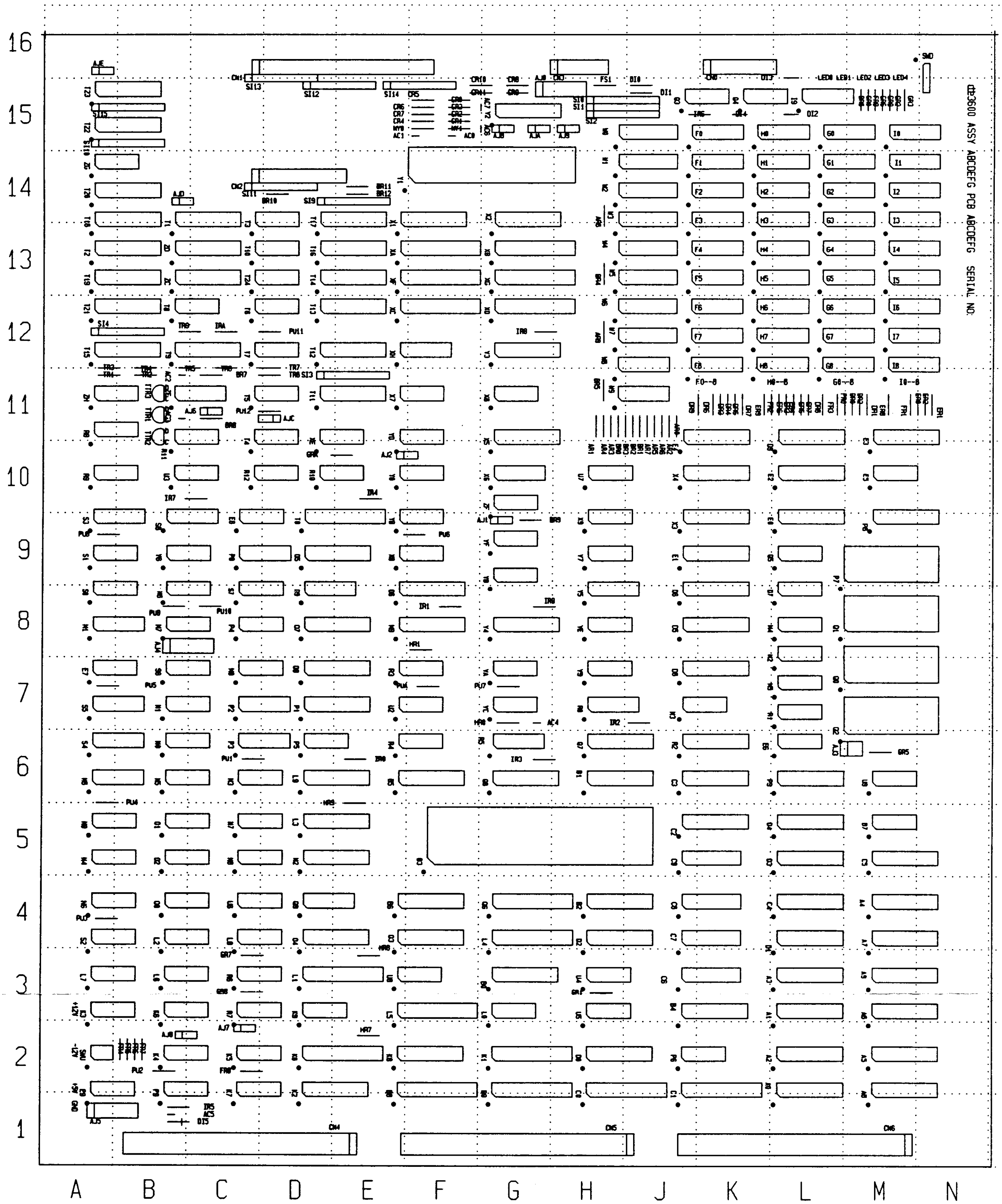
LED2: Parity error in memory odd byte.

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 cn1 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 cabble) should have terminations resistors for the cabble, three single in line resistor networks with nine 100 ohms resistors to one commen pin.
The flat cabble for the external bus is a shielded cabble, with a maximum lenght of 15 feet.



Component locations				
PCB: **3600 / SNIOC**	Issue: 0	Date: 870327	dde	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11

Name	Type	Pos
+5V		A2
+12V		A3
-12V		A2
AC0	10nF	F15
AC1	10nF	E15
AC2	1nF	B11
AC3	1nF	B11
AC4	1nF	G7
AC5	6u8F	B1
AC6	22nF	F15
AC7	10nF	F15
AJA	3P-strap	G15
AJB	3P-strap	G15
AJC	3P-strap	D11
AJD	3P-strap	B14
AJE	3P-strap	A16
AJ0	14P-strap	G15
AJ1	3P-strap	G9
AJ2	3P-strap	E10
AJ3	6P-strap	L6
AJ4	14P-strap	B8
AJ5	14P-strap	A1
AJ6	3P-strap	C11
AJ7	3P-strap	C2
AJ8	3P-strap	B2
AJ9	3P-strap	H15
AR0	56OHM	J11
AR1	56OHM	H11
AR2	56OHM	J11
AR3	56OHM	H11
AR4	56OHM	H11
AR5	56OHM	J11
AR6	56OHM	J11
AR7	56OHM	J11
AR8	56OHM	H13
AR9	56OHM	H12
A0	74ALS573	L1
A1	74ALS573	L3
A2	74ALS573	L2
A3	74ALS573	L3
A4	74ALS573	M4
A5	74ALS573	M2
A6	74ALS573	M3
A7	74ALS573	M4
A8	74ALS573	M1
A9	74ALS573	M3
BR0	56OHM	H11
BR1	56OHM	J11
BR2	56OHM	J11
BR3	56OHM	H11
BR4	56OHM	H13
BR5	56OHM	H11
BR6	150OHM	M15
BR7	5K6OHM	C11
BR8	5K6OHM	C11
BR9	4K7	G9
BR10	3K3OHM	C14
BR11	3K3OHM	E14
BR12	3K3OHM	E14
B0	74ALS573	G3
B1	74ALS573	H6
B2	74ALS573	H4
B3	68000L10	F5
B4	74ALS573	J3
B5	74ALS645	E6
B6	74ALS645	E4
B7	74S00	M5
B8	74ALS646	E1
B9	74ALS646	G1
CN0	SERVICEPORT	K16
CN1	FBUS	C16
CN2	P-PRINTER	C14
CN3	ETHERNET	G16
CN4	IO-BUS	E1
CN5	IO-BUS	J1
CN6	IO-BUS	M1
CR0	2K4	F15
CR1	39OHM	F15

Name	Type	Pos
CR2	39OHM	F15
CR3	5K6	F15
CR4	2K4	F15
CR5	39OHM	E15
CR6	39OHM	E15
CR7	2K4	E15
CR8	39OHM	G15
CR9	39OHM	G15
CR10	2K4OHM	F15
CR11	5K6OHM	F15
C0	74ALS646	H1
C1	74ALS646	J1
C2	74ALS574	J5
C3	74LS541	J6
C4	74LS541	L4
C5	74LS541	M5
C6	2148-45	J3
C7	2148-45	J4
C8	2148-45	J4
C9	2148-45	J5
DI0	1N4001	H15
DI1	1N4001	H15
DI2	1N4448	L15
DI3	1N4448	L16
DI4	1N4448	K15
DI5	1N4448	C1
DR0	33OHM	M11
DR1	33OHM	M11
DR2	33OHM	M11
DR3	33OHM	K11
DR4	33OHM	K11
DR5	33OHM	K11
DR6	33OHM	K11
DR7	33OHM	K11
DR8	33OHM	L11
DR9	33OHM	J11
D0	74ALS645	H2
D1	74ALS645	L4
D2	74ALS244	H4
D3	16L8A	L5
D4	16L8A	L5
D5	74ALS240	J8
D6	74ALS240	J8
D7	74LS393	L8
D8	74ALS240	J7
D9	74ALS240	L10
ER0	33OHM	M11
ER1	33OHM	N11
ER2	33OHM	N11
ER3	33OHM	L11
ER4	33OHM	L11
ER5	33OHM	L11
ER6	33OHM	L11
ER7	33OHM	L11
ER8	33OHM	M11
ER9	33OHM	K11
E0	74ALS240	L9
E1	74ALS240	J9
E2	74ALS240	L10
E3	74ALS573	M10
E4	74ALS573	J10
E5	74LS280	M10
E6	74LS280	L6
E7	74S74	A7
E8	74S74	C9
E9	74LS393	A1
FR0	33OHM	L11
FR1	33OHM	M11
FR2	33OHM	K11
FR3	33OHM	L11
FR4	10K	B2
FR5	10K	B2
FR6	10K	B2
FR7	10K	B2
FR8	330OHM	C2
FR9	330OHM	M15
FS1	5AT	H15
F0	41256	J15

Name	Type	Pos
F1	41256	J14
F2	41256	J14
F3	41256	J13
F4	41256	J13
F5	41256	J13
F6	41256	J12
F7	41256	J12
F8	41256	J11
F9	74HC14	B1
GND		A1
GRA	1K	E10
GR0	330OHM	M15
GR1	1K	H3
GR2	10K	M15
GR3	10K	M15
GR5	10K	M6
GR6	330OHM	M15
GR7	4K7OHM	D3
GR8	4K7OHM	C3
GR9	330OHM	M15
G0	41256	L15
G1	41256	L14
G2	41256	L14
G3	41256	L13
G4	41256	L13
G5	41256	L13
G6	41256	L12
G7	41256	L12
G8	41256	L11
HR0	2K2OHM	G7
HR1	1K	E8
HR7	100OHM	E2
HR8	100OHM	E3
HR9	100OHM	E6
H0	41256	K15
H1	41256	K14
H2	41256	K14
H3	41256	K13
H4	41256	K13
H5	41256	K13
H6	41256	K12
H7	41256	K12
H8	41256	K11
IRA	100OHM	C12
IR0	100OHM	E6
IR1	100OHM	F8
IR2	100OHM	H7
IR3	100OHM	G6
IR4	100OHM	E10
IR5	100KOHM	C1
IR6	3K3	K15
IR7	10K	B10
IR8	100OHM	G12
IR9	100OHM	G8
I0	41256	M15
I1	41256	M14
I2	41256	M14
I3	41256	M13
I4	41256	M13
I5	41256	M13
I6	41256	M12
I7	41256	M12
I8	41256	M11
I9	PULLDOWN	L15
K0	20R8A	D2
K1	20L8A	G2
K2	74LS641-1	D1
K3	74ALS74	A3
K4	74ALS74	B2
K5	74S74	C2
K6	74S74	B3
K7	74S32	C1
K8	74ALS244	E2
K9	74S04	D3
LED0	LED	L16
LED1	LED	L16
LED2	LED	M16
LED3	LED	M16

Component locations

PCB: 3600 / SNIOC

Issue: 0

Date: 870327

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

Name	Type	Pos
LED4	LED	M16
L0	74LS14	G3
L1	20R8A	D3
L2	74S04	B4
L3	16R8A	D5
L4	20L8A	G4
L5	20L8A	E3
L6	74S74	B3
L7	74S04	A3
L8	74S00	C4
L9	16R8A	D6
M0	74S74	C7
M1	74ALS112	A8
M2	74S32	L7
M3	74S04	J7
M4	74S32	L8
M5	74S00	L7
M6	7438	B8
M7	74S08	B8
M8	74S157	A6
M9	16R8A	E8
NY0	10KOHM	F15
NY1	10KOHM	F15
N0	74S74	B6
N1	74S00	B7
N2	16L8A	D5
N3	74S30	C6
N4	74S20	A5
N5	74S30	B6
N6	74S74	A4
N7	74S74	C5
N8	74S74	C5
N9	74S74	A5
O0	74S38	B4
O1	74S00	B5
O2	74S04	B5
O3	73LS273	E4
O4	16R8A	D4
O5	74LS541	D9
O6	74LS541	E8
O7	74LS541	D8
O8	74LS273	D7
O9	74LS259	D8
PUA	1KOHM	F7
PU1	1KOHM	C6
PU2	1KOHM	B2
PU3	1KOHM	A4
PU4	1KOHM	A6
PU5	1KOHM	A7
PU6	1KOHM	E9
PU7	1KOHM	G7
PU8	1KOHM	A9
PU9	1KOHM	B8
PU10	1KOHM	C8
PU11	1KOHM	C12
PU12	1KOHM	D11
P0	74LS157	C9
P1	74ALS574	D7
P2	74LS348	C7
P3	74LS175	C6
P4	74LS00	C8
P5	74LS00	D6
P6	7406	J2
P7	8251A	L9
P8	74ALS645	M9
P9	74ALS645	L6
Q0	EEPROM	L7
Q1	EPROM	L8
Q2	EPROM	L6
Q3	75188	J15
Q4	75189	K15
Q5	74LS32	L9
Q6	20L8A	G4
Q7	16R8A	H6
Q8	16R8A	G6
Q9	74LS138	D4
R0	74LS138	H7
R1	74S32	L7

Name	Type	Pos
R2	74LS541	J6
R3	74LS05	E7
R4	74LS00	E6
R5	74LS123	G6
R6	74LS05	C3
R7	74LS14	C3
R8	20MHZ	A11
R9	7.3728MHz	A10
R10	74LS33	D10
R11	74ALS74	B10
R12	74ALS74	C10
SI0	3K3	H15
SI1	3K3	H15
SI2	3K3	H15
SI3	1K	D11
SI4	1K	A12
SI9	TERM.	D14
SI10	TERM.	A15
SI11	1K	C14
SI12	TERM.	D15
SI13	TERM.	C16
SI14	TERM.	E15
SI15	TERM.	A15
SWD	debug-switch	M16
SWU	unit-switch	A2
S0	74S04	A8
S1	74S74	A9
S2	74LS74	A4
S3	74LS390	A9
S4	74LS390	A6
S5	74LS390	A7
S6	74LS393	B7
S7	74LS74	C8
S8	74LS163	B9
TR1	INFOHM	A11
TR2	3K3OHM	B11
TR3	0OHM	A12
TR4	330OHM	B12
TR5	100OHM	C12
TR6	220OHM	C12
TR7	820OHM	C12
TR8	3K3OHM	D11
TR9	33KOHM	B12
TTR1	npn	B11
TTR2	pnp	B11
TTR3	pnp	B11
T0	20R8A	D9
T1	16L8A	B13
T2	74ALS573	A13
T3	74LS393	C13
T4	74F74	C10
T5	74F74	C11
T6	74ALS74	C12
T7	74F74	C12
T8	74LS14	B12
T9	DS3862	B12
T10	74S04	C13
T11	74ALS573	D11
T12	74ALS573	D12
T13	74ALS640	D12
T14	DS3862	D13
T15	74ALS580	A12
T16	74ALS645	D13
T17	DS3862	D13
T18	74ALS573	A13
T19	74ALS573	A13
T20	74ALS573	A14
T21	74ALS573	A12
T22	74ALS640	A15
T23	DS3862	A15
T24	74ALS74	C13
U2	74LS04	E7
U3	74S04	B10
U4	74LS04	H3
U5	74LS10	H3
U6	74S10	C4
U7	74S08	H10
U8	74S08	E3

Name	Type	Pos
U9	74S11	M6
W0	4464-15	H15
W1	4464-15	H14
W2	4464-15	H14
W3	4464-15	H13
W4	4464-15	H13
W5	4464-15	H13
W6	4464-15	H12
W7	4464-15	H12
W8	4256-15	H11
W9	4256-15	H11
XA	74ALS646	E13
XB	74ALS646	G13
XC	74ALS646	E12
XD	74ALS646	G12
XE	74ALS74	D10
XF	74ALS646	E13
XG	74ALS646	G13
XH	74LS139	E12
X0	74S10	E9
X1	74ALS573	E13
X2	74ALS573	G13
X3	74ALS573	J9
X4	74ALS573	J10
X5	74ALS573	G10
X6	75LS590	G10
X7	74S280	E11
X8	74S280	G11
X9	74S32	H9
YA	74F74	G7
YB	74F74	E9
YC	74F74	G7
YD	74S08	E10
YE	74S32	H8
YF	74S10	G9
Y0	7438	E10
Y1	82586	E14
Y2	DQ8023	G15
Y3	16R8A	G12
Y4	16R8A	G8
Y5	74LS257	H8
Y6	16MHZ	B9
Y7	74S32	H9
Y8	74S04	G9
Y9	74ALS74	H7
ZC	74ALS574	B13
ZD	74LS641-1	B13
ZE	74LS123	B11
ZF	74LS14	G10
ZG	74LS14	A14
ZH	74LS00	A11

Component locations

PCB: 3600 / SNIOC | Issue: 0 | Date: 870327

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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.

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

Power requirements:

Voltage	Typ. current
+ 5 +-5%	1.0 A

Physical dimension:

Standard SUPERMAX module.

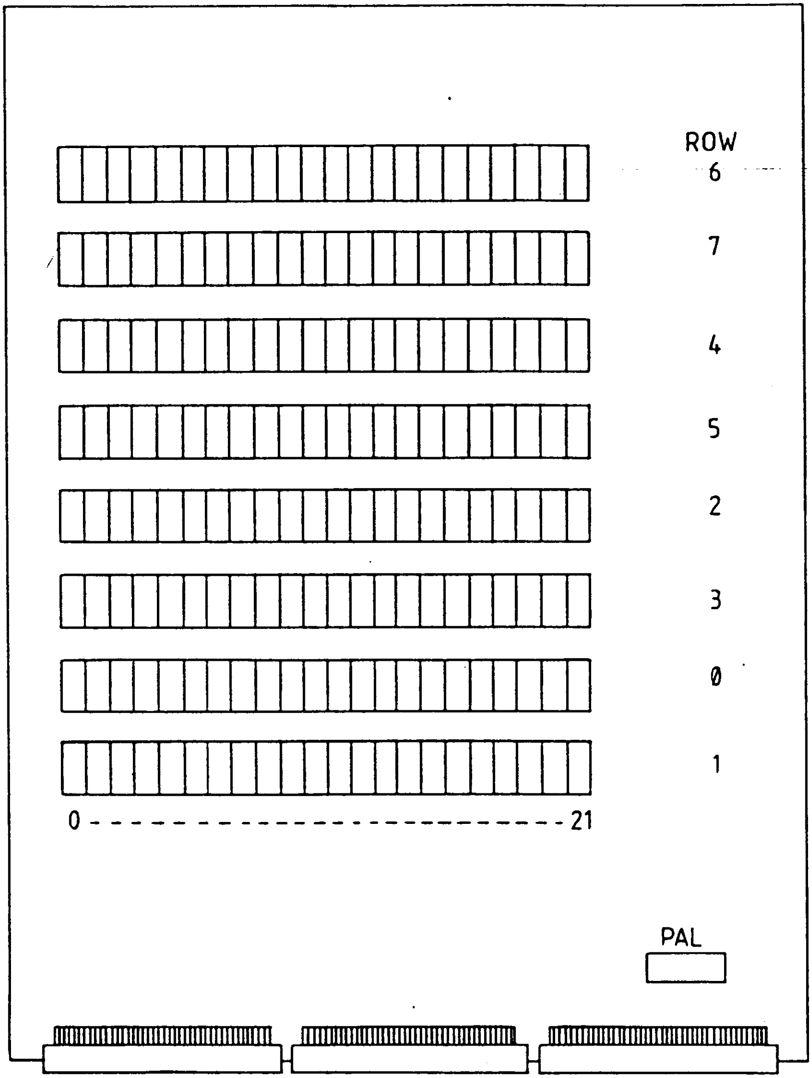
Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

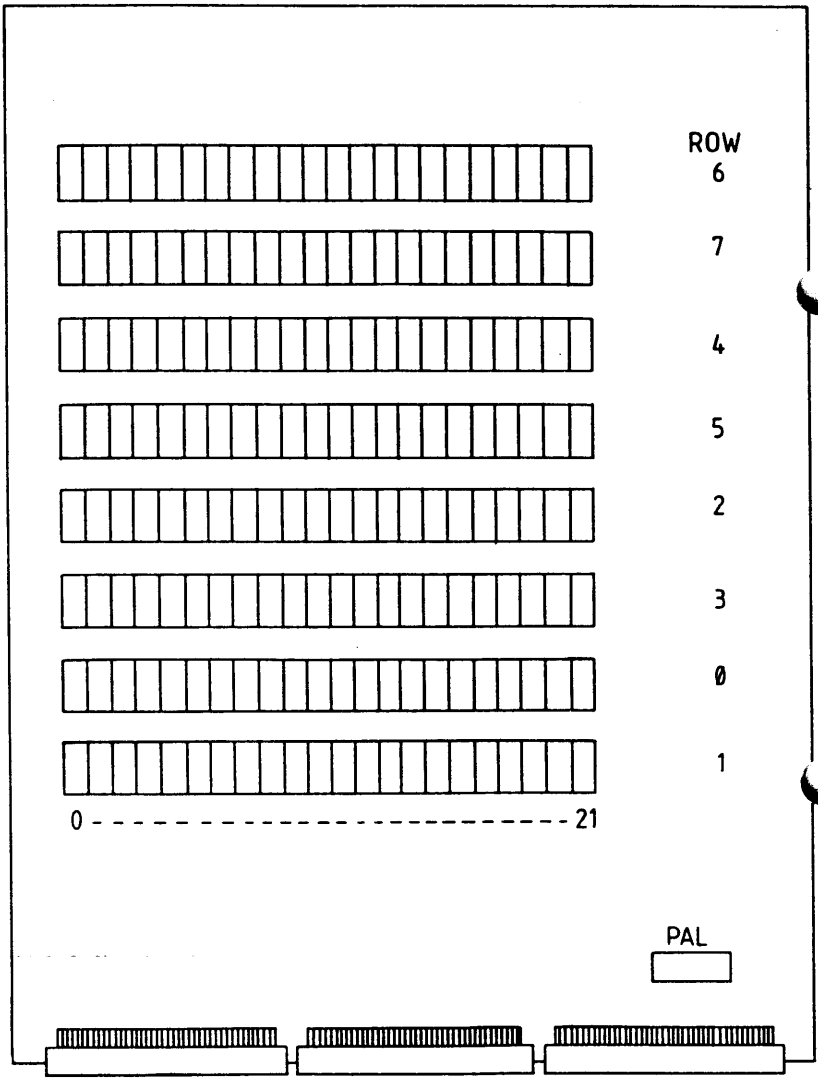
Installation:

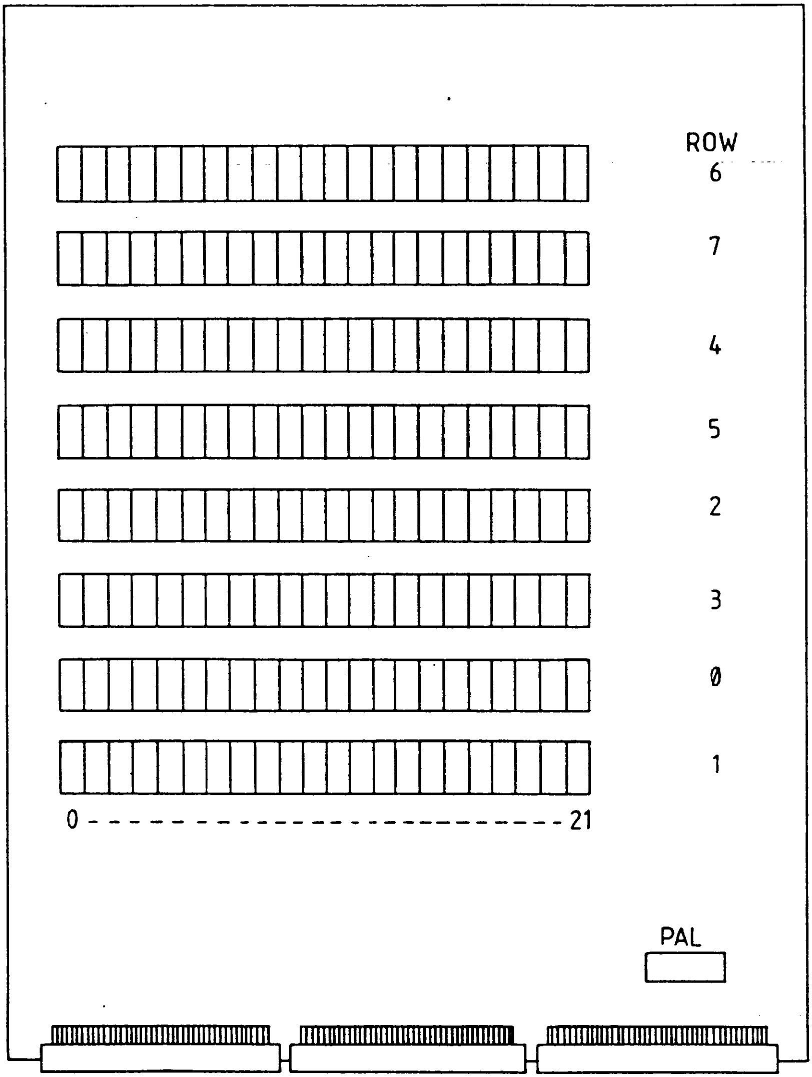
Before a RAM module is installed in a Supermax system the starting address of the module must be selected. The starting address of the module is coded in a PAL together with the amount of memory installed on the module.

Lables on address PALs

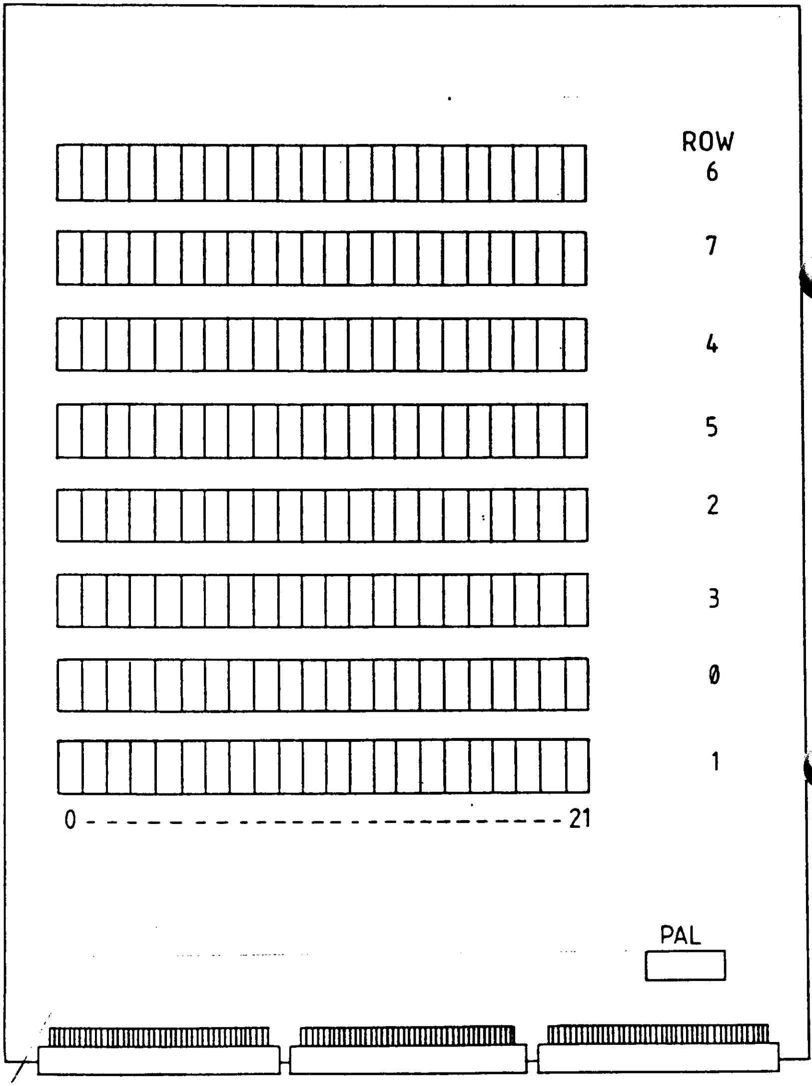
Starting address	Size: 1 Mb	Size: 1/2 Mb
0 Mb	C180	C180H
1 Mb	C181	C181H
2 Mb	C182	C182H
3 Mb	C183	C183H
4 Mb	C184	C184H
5 Mb	C185	C185H
6 Mb	C186	C186H
7 Mb	C187	C187H
8 Mb	C188	C188H
9 Mb	C189	C189H
10 Mb	C18A	C18AH
11 Mb	C18B	C18BH
12 Mb	C18C	C18CH
13 Mb	C18D	C18DH
14 Mb	C18E	C18EH
15 Mb	C18F	C18FH


ROW
6
7
4
5
2
3
0
1
0 - 21
PAL


ROW
6
7
4
5
2
3
0
1
0
21
PAL



ROW
6
7
4
5
2
3
0
1
0 ---- 21
PAL


ROW
6
7
4
5
2
3
0
1
0
21
PAL

SUPERMAX technical data sheet.
Module: RAM 1400

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.

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

Power requirements:

Voltage	Typ. current
+ 5 +-5%	2.0 A

Physical dimension:

Standard SUPERMAX module.

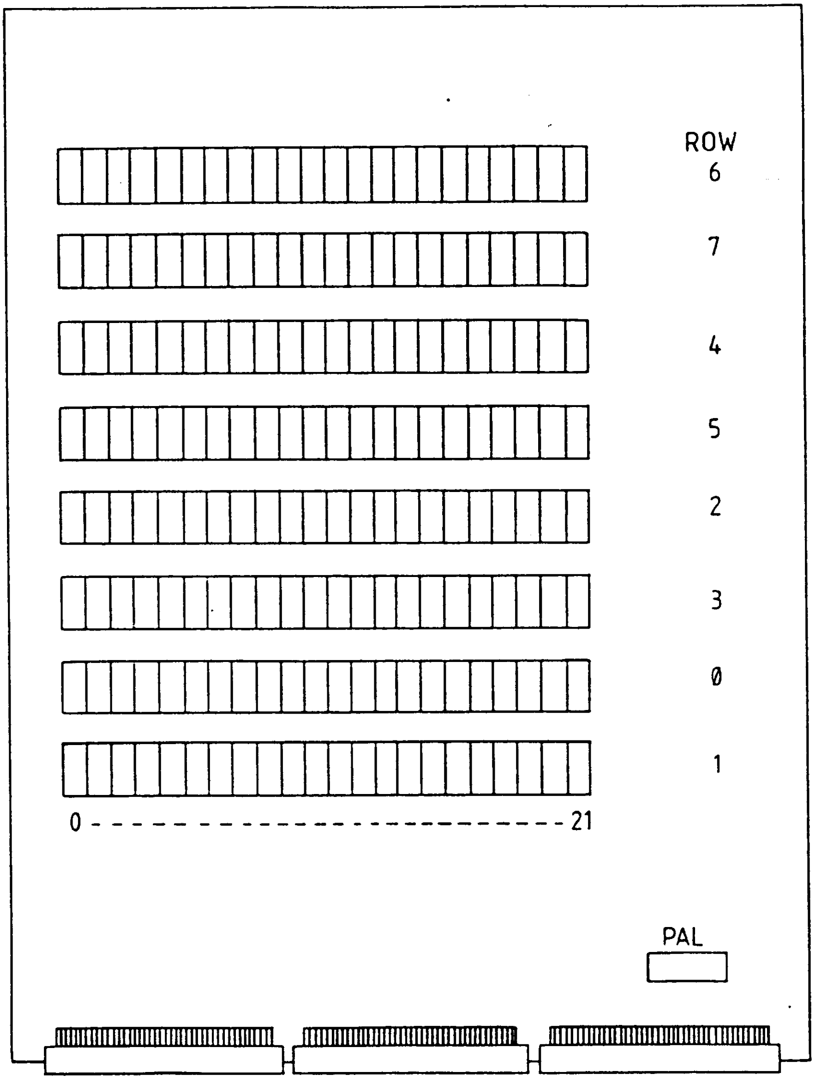
Width : 331 mm.
Depth : 415 mm.
Height: 14 mm.

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.

Lables 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


ROW
6
7
4
5
2
3
0
1
0 - 21
PAL

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.

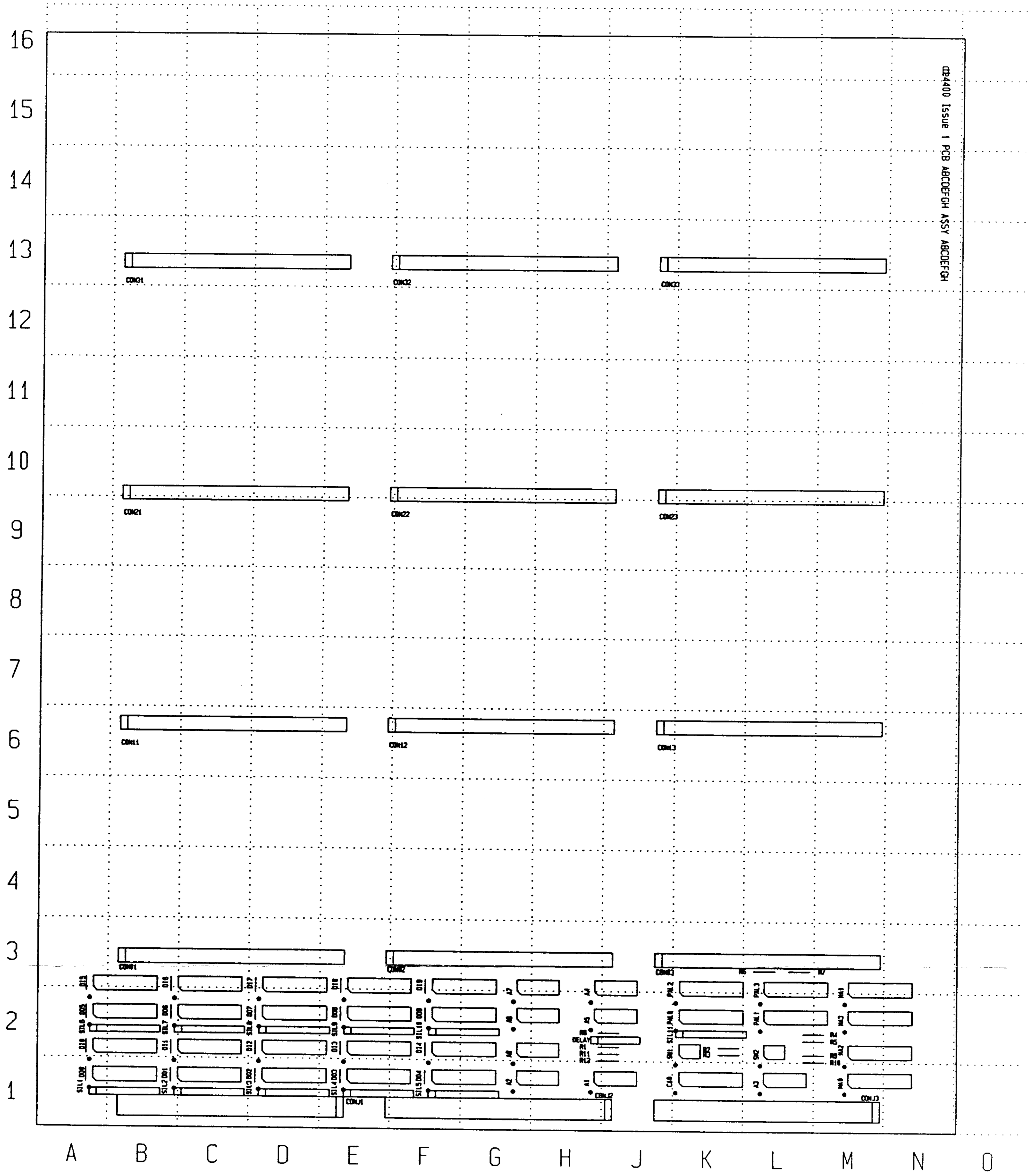
SW2 Sets bit (27:24) of the starting address. Corresponds to 16 Mb increments.

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 × 16 Mb + 8 × 1 Mb, which is 24 Mb.

Power requirements

Voltage	Typical current
+ 5 Volt ±5%	3.0 A. including daughter modules.



Component locations

PCB: 4400 / Memory	Issue: 1	Date: 890914	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 02-84 50 11

Name	Type	Pos
:LABEL		O-1
:LAYID		N12
A1	74AS04	H1
A2	74AS32	G1
A3	74AS11	L1
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
DI0	74AS574	A2
DI1	74AS574	B2
DI2	74AS574	D2
DI3	74AS574	E2
DI4	74AS574	F2
DI5	74AS574	A2
DI6	74AS574	B2
DI7	74AS574	D2
DI8	74AS574	E2
DI9	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

Name	Type	Pos
SW1	HEXSWITCH	K2
SW2	HEXSWITCH	L2

Name	Type	Pos

Component locations

PCB: 4400 / Memory | Issue: 1 | Date: 890914

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

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.

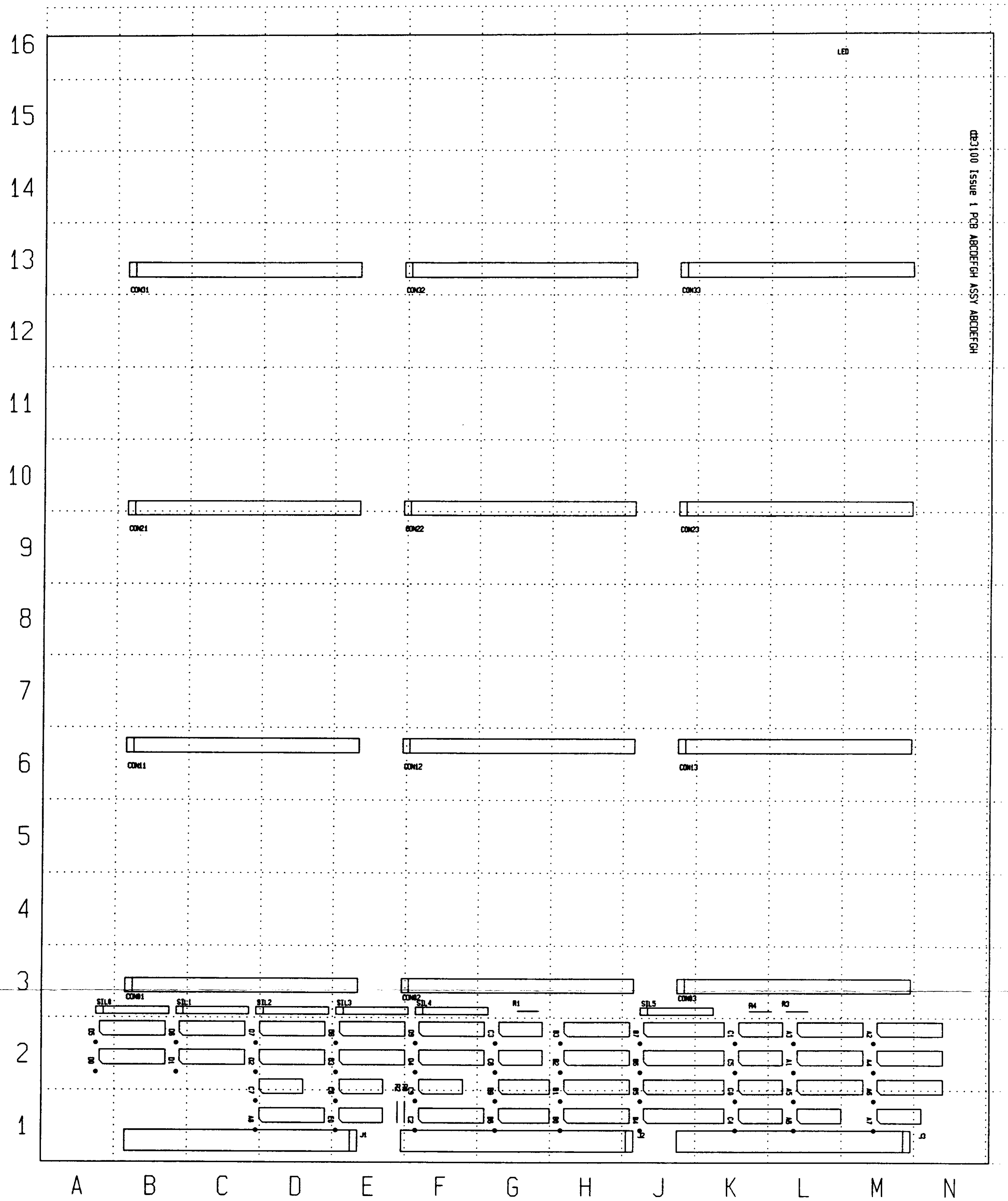
RAM0 - RAM31 : Data bits D0 through D31.
RAM32 - RAM38 : ECC bits.
RAM39 - RAM43 : Not used.

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.



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

Name	Type	Pos
A0	74AS573	C1
A1	74AS573	L2
A2	74AS573	M2
A3	74AS573	L2
A4	74AS573	M2
A5	74ALS244	L1
A6	74ALS244	M1
A7	74LS393	M1
A8	74LS393	L1
B0	PAL16L8	H1
B1	PAL16L8	H1
B2	PAL16L8	H2
B3	PAL16L8	H2
B4	PAL20L8	J1
B5	PAL20L8	J1
B6	PAL20L8	J2
B7	PAL20L8	J2
B8	74LS175	G1
B9	74LS175	G1
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
C0	74S20	K1
C1	74S20	K2
C2	74ALS240	F1
C3	74S38	G2
C4	74S20	K1
C5	74S00	K2
C6	74S00	E1
C7	74S02	C1
C8	74LS14	G2
C9	74LS14	F1
D0	74AS573	A2
D1	74AS573	B2
D2	74AS573	C2
D3	74AS573	E2
D4	74AS573	F2
D5	74ALS244	A2
D6	74ALS244	B2
D7	74ALS244	C2
D8	74ALS244	E2
D9	74ALS244	F2
E0	74LS74	E1
J1	CON96	E1
J2	CON96	J1
J3	CON96	M1
LED	LED	L16
R0	RES4M	E1
R1	RES4M	G3
R2	RES4M	E1
R3	RES4M	L3
R4	RES4M	K3
SIL0	SIL10	A3
SIL1	SIL10	B3
SIL2	SIL10	C3
SIL3	SIL10	E3
SIL4	SIL10	F3
SIL5	SIL10	J3

Name	Type	Pos	Name	Type	Pos

Component locations

PCB: 3100 / MEM-MB | Issue: 1 | Date: 880726

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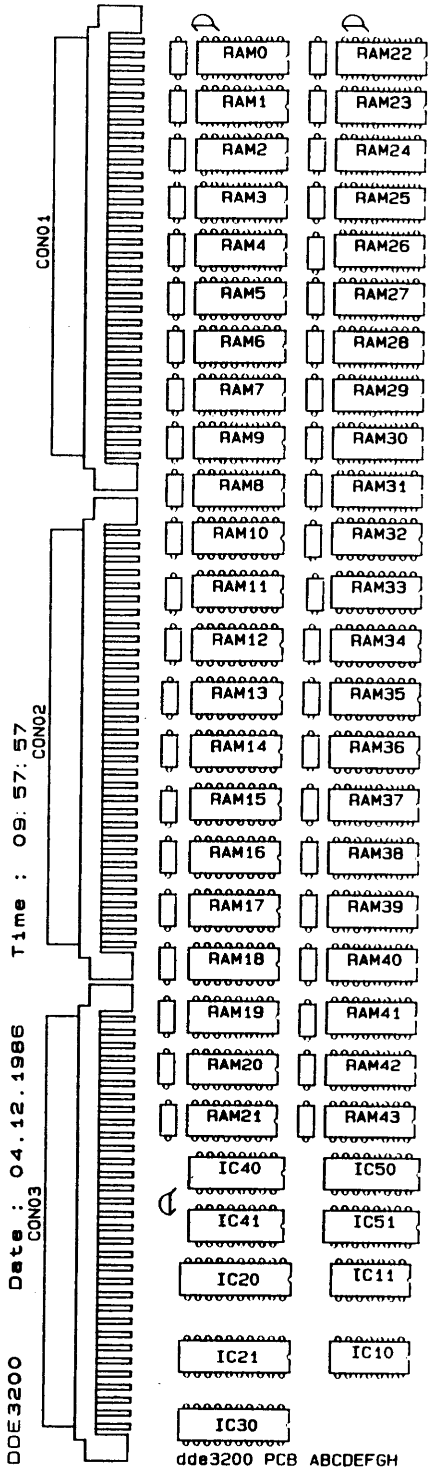
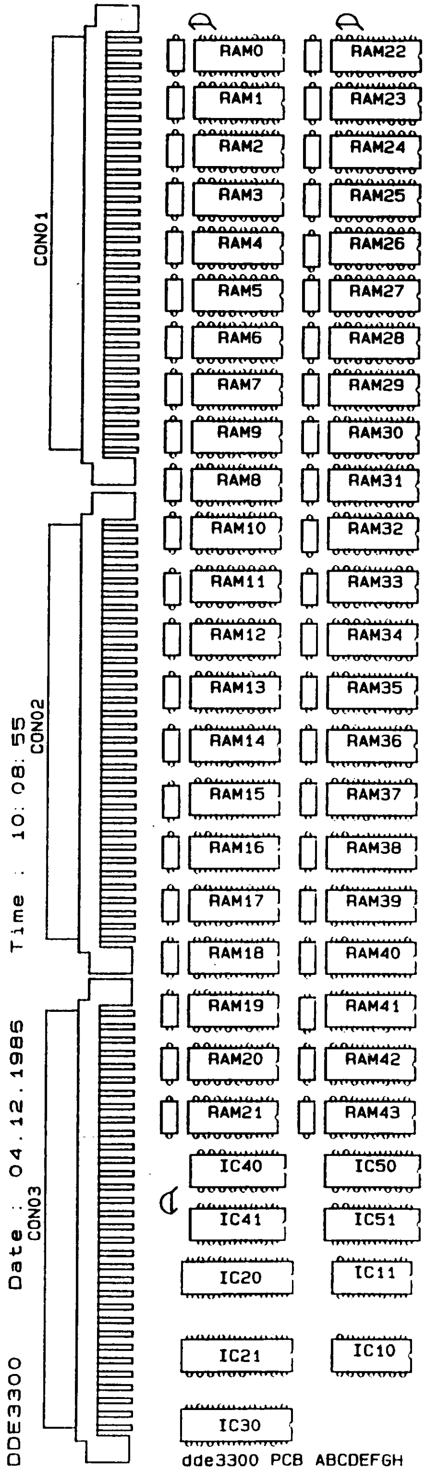
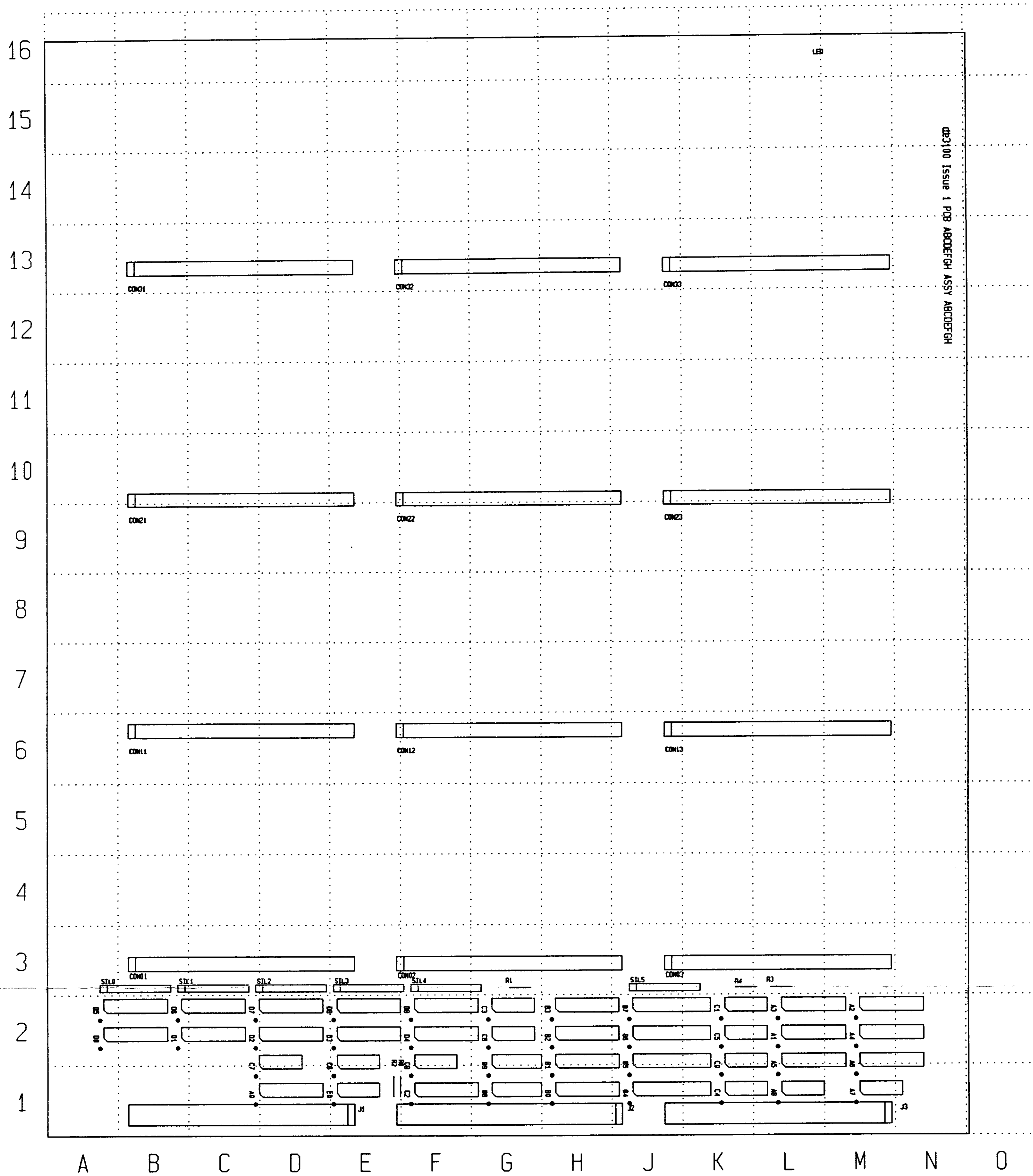


DDE3200 Date : 04.12.1986 Time : 09:57:57
CON01
CON02
CON03
RAM0
RAM1
RAM2
RAM3
RAM4
RAM5
RAM6
RAM7
RAM9
RAM8
RAM10
RAM11
RAM12
RAM13
RAM14
RAM15
RAM16
RAM17
RAM18
RAM19
RAM20
RAM21
RAM22
RAM23
RAM24
RAM25
RAM26
RAM27
RAM28
RAM29
RAM30
RAM31
RAM32
RAM33
RAM34
RAM35
RAM36
RAM37
RAM38
RAM39
RAM40
RAM41
RAM42
RAM43
IC40
IC50
IC41
IC51
IC20
IC11
IC21
IC10
IC30
dde3200 PCB ABCDEFGH


DDE3300 Date : 04.12.1985 Time : 10:08:55
CON01
CON02
CON03
RAM0
RAM1
RAM2
RAM3
RAM4
RAM5
RAM6
RAM7
RAM9
RAM8
RAM10
RAM11
RAM12
RAM13
RAM14
RAM15
RAM16
RAM17
RAM18
RAM19
RAM20
RAM21
RAM22
RAM23
RAM24
RAM25
RAM26
RAM27
RAM28
RAM29
RAM30
RAM31
RAM32
RAM33
RAM34
RAM35
RAM36
RAM37
RAM38
RAM39
RAM40
RAM41
RAM42
RAM43
IC40
IC50
IC41
IC51
IC20
IC11
IC21
IC10
IC30
dde3300 PCB ABCDEFGH

PRELIMINARY



Component locations

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

PRELIMINARY

Name	Type	Pos
:LABEL		O-1
A0	74AS573	C1
A1	74AS573	L2
A2	74AS573	M2
A3	74AS573	L2
A4	74AS573	M2
A5	74ALS244	L1
A6	74ALS244	M1
A7	74LS393	M1
A8	74LS393	L1
B0	PAL16L8	H1
B1	PAL16L8	H1
B2	PAL16L8	H2
B3	PAL16L8	H2
B4	PAL20L8	J1
B5	PAL20L8	J1
B6	PAL20L8	J2
B7	PAL20L8	J2
B8	74LS175	G1
B9	74LS175	G1
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
C0	74S20	K1
C1	74S20	K2
C2	74ALS240	F1
C3	74S38	G2
C4	74S20	K1
C5	74S00	K2
C6	74S00	E1
C7	74S02	C1
C8	74LS14	G2
C9	74LS14	F1
D0	74AS573	A2
D1	74AS573	B2
D2	74AS573	C2
D3	74AS573	E2
D4	74AS573	F2
D5	74ALS244	A2
D6	74ALS244	B2
D7	74ALS244	C2
D8	74ALS244	E2
D9	74ALS244	F2
E0	74LS74	E1
J1	CON96	E1
J2	CON96	J1
J3	CON96	M1
LED	LED	L16
R0	RES4M	E1
R1	RES4M	G3
R2	RES4M	E1
R3	RES4M	L3
R4	RES4M	K3
SIL0	SIL10	A3
SIL1	SIL10	B3
SIL2	SIL10	C3
SIL3	SIL10	E3
SIL4	SIL10	F3
SIL5	SIL10	J3

Name	Type	Pos

Name	Type	Pos

Component locations

PCB: Memory | Issue: | Date:

dansk data elektronik a/s
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SUPERMAX technical data sheet.
Module: RAM 3000

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:

RAMO - RAM15 : The first 16 bit word. Data bits DO 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:

RAMO - RAM31 : Data bits DO 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 adresses 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 daugther 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

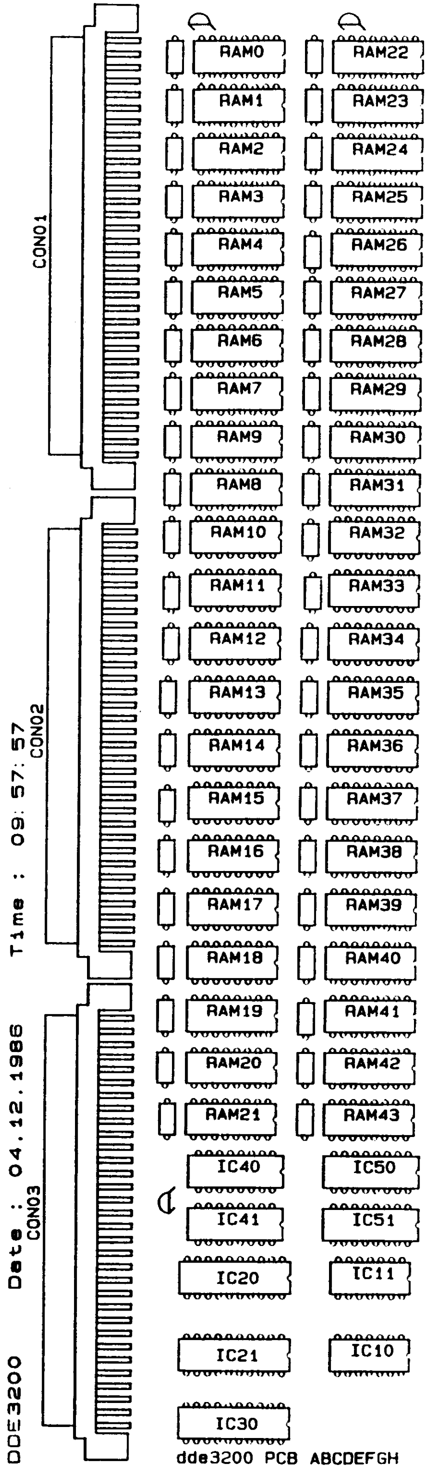
No 4 Mbyte daughter modules.

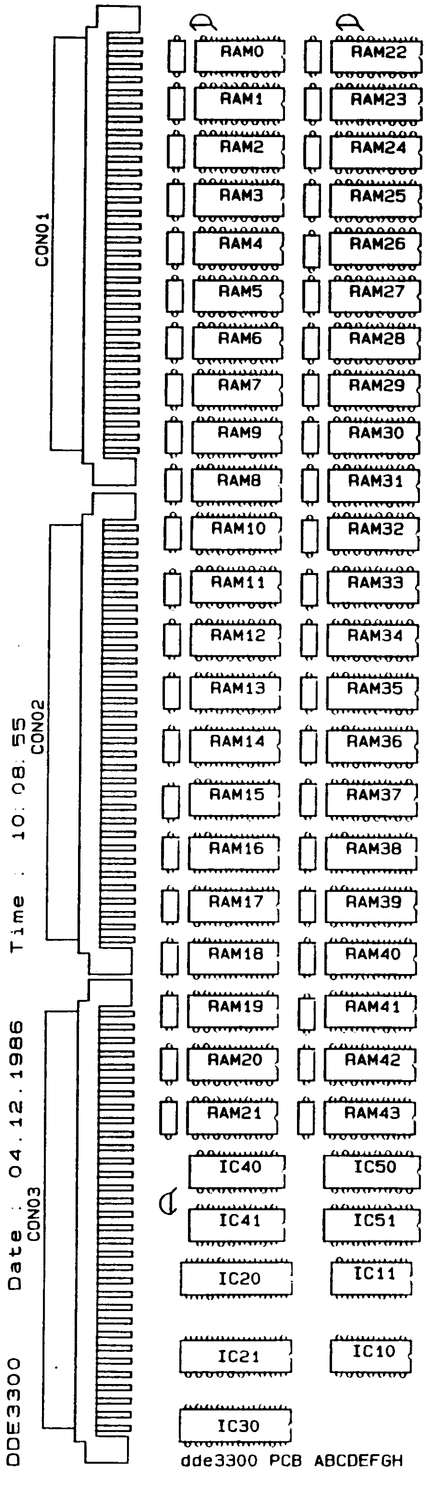
Pin numbers:

```
Pin 6   * * *
Pin 1   * * *
          SW1
```

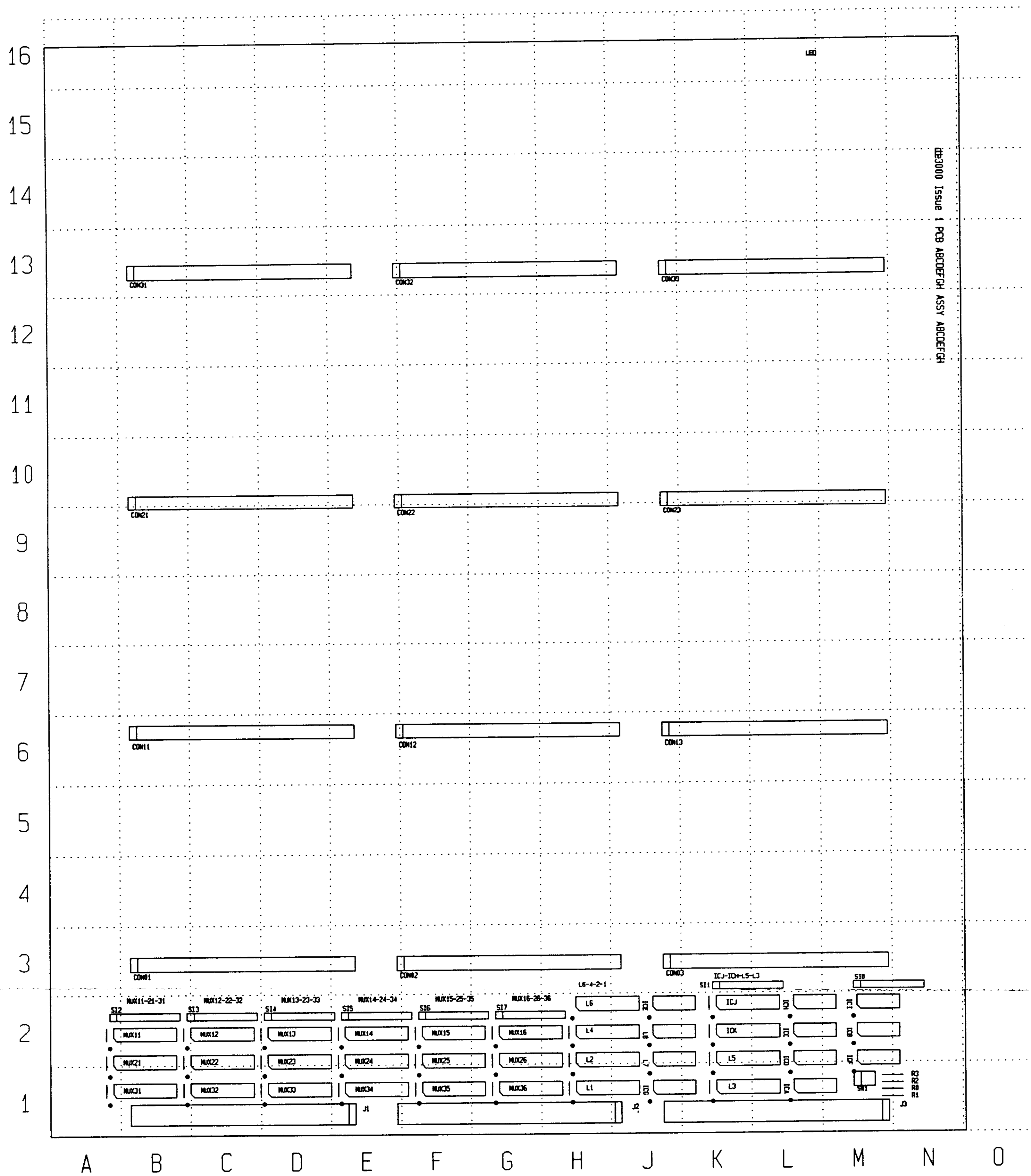
Start address: 12 MB, pin 5 connected to 6 and
pin 1 connected to 2.

```
        *_* *
Pin 1   *_* *
         SW1
```


DDE3200 Date : 04.12.1986 Time : 09: 57: 57
CON01
CON02
CON03
RAM0
RAM1
RAM2
RAM3
RAM4
RAM5
RAM6
RAM7
RAM9
RAM8
RAM10
RAM11
RAM12
RAM13
RAM14
RAM15
RAM16
RAM17
RAM18
RAM19
RAM20
RAM21
RAM22
RAM23
RAM24
RAM25
RAM26
RAM27
RAM28
RAM29
RAM30
RAM31
RAM32
RAM33
RAM34
RAM35
RAM36
RAM37
RAM38
RAM39
RAM40
RAM41
RAM42
RAM43
IC40
IC41
IC20
IC21
IC30
IC50
IC51
IC11
IC10
dde3200 PCB ABCDEFGH


DDE3300 Date : 04.12.1986 Time : 10:08:55
CON01
CON02
CON03
RAM0
RAM1
RAM2
RAM3
RAM4
RAM5
RAM6
RAM7
RAM9
RAM8
RAM10
RAM11
RAM12
RAM13
RAM14
RAM15
RAM16
RAM17
RAM18
RAM19
RAM20
RAM21
RAM22
RAM23
RAM24
RAM25
RAM26
RAM27
RAM28
RAM29
RAM30
RAM31
RAM32
RAM33
RAM34
RAM35
RAM36
RAM37
RAM38
RAM39
RAM40
RAM41
RAM42
RAM43
IC40
IC41
IC50
IC51
IC20
IC21
IC30
IC11
IC10
dde3300 PCB ABCDEFGH

PRELIMINARY



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

PRELIMINARY

Name	Type	Pos
:LABEL		O-1
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
ICA	74LS14	L1
ICB	74S00	M2
ICC	74S02	L2
ICD	74S10	L1
ICE	74LS14	J2
ICF	74S10	M1
ICG	74LS14	J1
ICH	74S10	L2
ICI	74S05	M2
ICJ	PAL20L8	K2
ICK	74ALS576	K2
J1	CON96	E1
J2	CON96	J1
J3	CON96	M1
LED	LED	L16
L1	74ALS244	H1
L2	74ALS244	H1
L3	74ALS573	K1
L4	74ALS573	H2
L5	74ALS573	K1
L6	74ALS573	H2
L7	74LS393	J1
L8	74LS393	J2
MUX11	74ALS244	A2
MUX12	74ALS244	B2
MUX13	74ALS244	D2
MUX14	74ALS244	E2
MUX15	74ALS244	F2
MUX16	74ALS244	G2
MUX21	74ALS244	A1
MUX22	74ALS244	B1
MUX23	74ALS244	D1
MUX24	74ALS244	E1
MUX25	74ALS244	F1
MUX26	74ALS244	G1
MUX31	74ALS244	A1
MUX32	74ALS244	B1
MUX33	74ALS244	D1
MUX34	74ALS244	E1
MUX35	74ALS244	F1
MUX36	74ALS244	G1
R0	RES4M	M1
R1	RES4M	M1
R2	RES4M	M1
R3	RES4M	M1
SI0	SIL10	M3
SI1	SIL10	K3
SI2	SIL10	A2
SI3	SIL10	B2
SI4	SIL10	D2
SI5	SIL10	E2
SI6	SIL10	F2
SI7		G2
SW1		M1

Name	Type	Pos

Name	Type	Pos

Component locations

PCB: Memory | Issue: | Date:

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Supermax Technical Data Sheet

Type:	Memory daughter module 4410
Data sheet no:	22
Revision no:	0
Date:	91-05-01

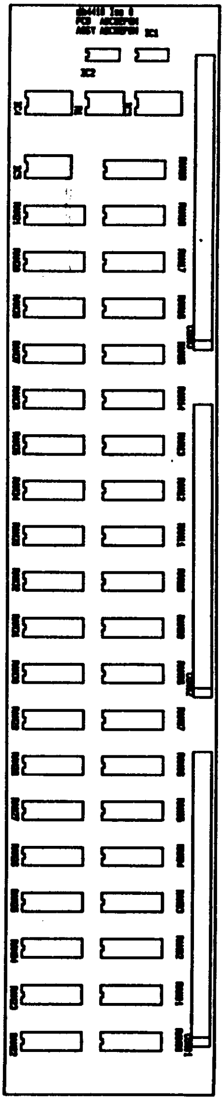
General Description

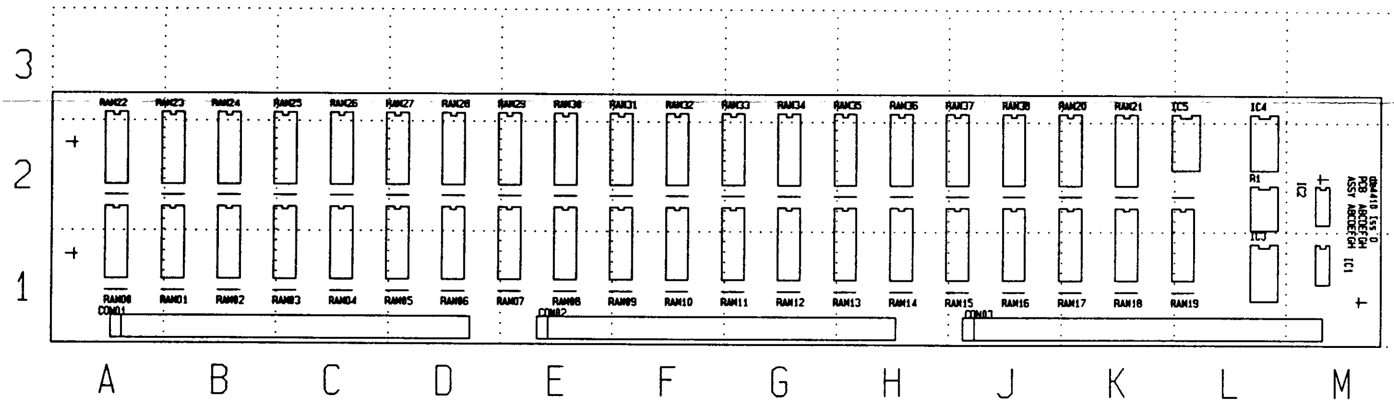
The RAM 4410 is a RAM daughter module. The module contains 39 4 Mbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as one 32 bit word and 7 error correcting bits. The total amount of RAM is 16 Mbyte.

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.





Component locations

PCB: **4410 / MEM-16Mb**	Issue: 0	Date: 90/02/01	dde	dansk data elektronik a/s herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Name	Type	Pos
CON01	CON64	A1
CON02	CON64	E1
CON03	CON64	J1
IC1	74AS00	M1
IC2	74AS00	M2
IC3	74BCT2244	L1
IC4	74BCT2244	L3
IC5	74BCT2244	K3
RAM00	TC514101J	A2
RAM01	TC514101J	A2
RAM02	TC514101J	B2
RAM03	TC514101J	B2
RAM04	TC514101J	C2
RAM05	TC514101J	C2
RAM06	TC514101J	D2
RAM07	TC514101J	D2
RAM08	TC514101J	E2
RAM09	TC514101J	E2
RAM10	TC514101J	F2
RAM11	TC514101J	F2
RAM12	TC514101J	G2
RAM13	TC514101J	G2
RAM14	TC514101J	H2
RAM15	TC514101J	H2
RAM16	TC514101J	J2
RAM17	TC514101J	J2
RAM18	TC514101J	K2
RAM19	TC514101J	K2
RAM20	TC514101J	J3
RAM21	TC514101J	K3
RAM22	TC514101J	A3
RAM23	TC514101J	A3
RAM24	TC514101J	B3
RAM25	TC514101J	B3
RAM26	TC514101J	C3
RAM27	TC514101J	C3
RAM28	TC514101J	D3
RAM29	TC514101J	D3
RAM30	TC514101J	E3
RAM31	TC514101J	E3
RAM32	TC514101J	F3
RAM33	TC514101J	F3
RAM34	TC514101J	G3
RAM35	TC514101J	G3
RAM36	TC514101J	H3
RAM37	TC514101J	H3
RAM38	TC514101J	J3
R1		L2

Name	Type	Pos

Name	Type	Pos

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

<u>Type:</u> RAM module 3300

<u>Data sheet no.:</u> 14

<u>Revision no.:</u> 0

<u>Date:</u> 861201

General description:

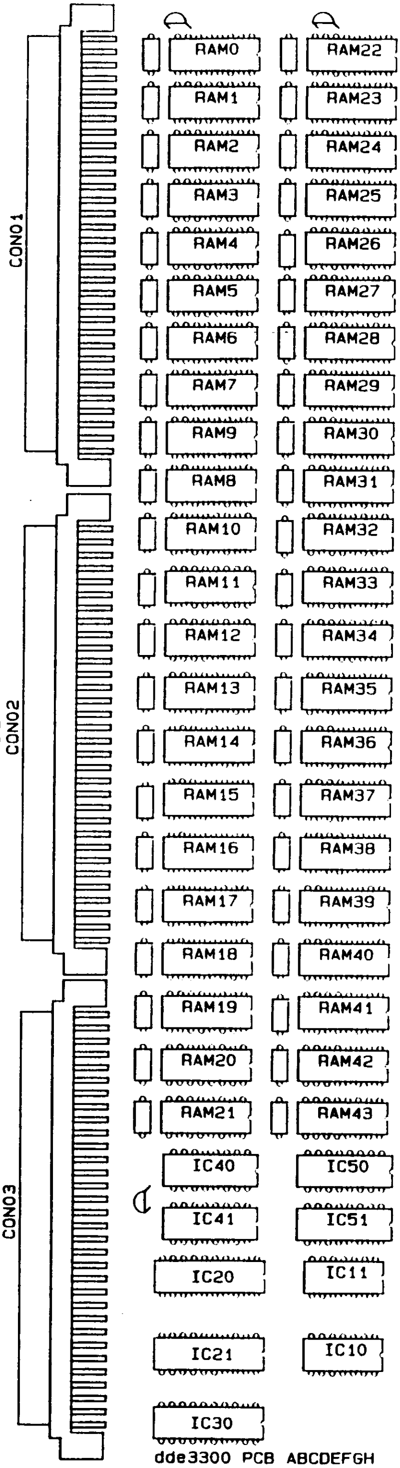
The RAM 3300 is a RAM daughter module. The module containes 44 1 Mbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as two words each 22 bits wide including error correcting bits. The total amount of RAM is 4 Mbyte.

1 to 4 RAM 3300 modules fit into RAM mother module 3000 or 3100.

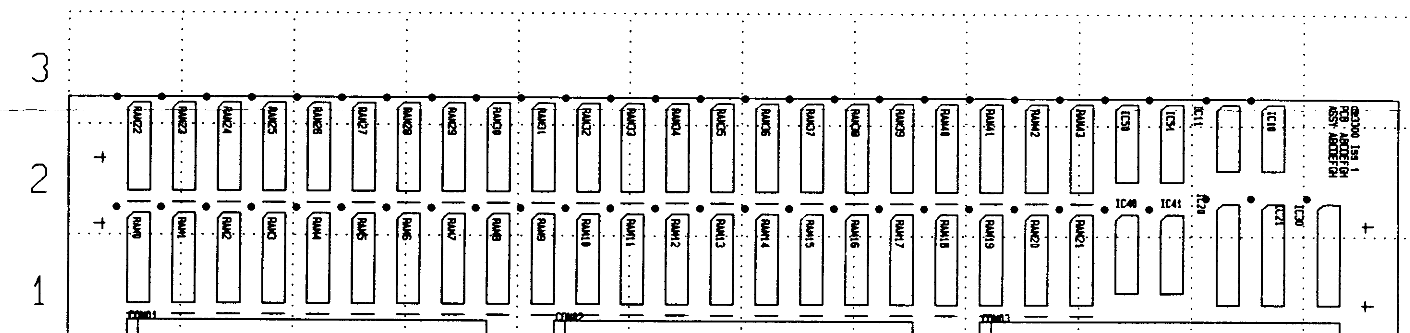
Installation:

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



dde3300 PCB ABCDEFGH



Component locations

PCB: **3300 / MEM-4Mb**	Issue: 1	Date: 880726	dde	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11

Name	Type	Pos
CON01	CON64	A1
CON02	CON64	E1
CON03	CON64	J1
IC10		L3
IC11		L3
IC20		L2
IC21		L2
IC30		M2
IC40	DIL16	K2
IC41	DIL16	K2
IC50	DIL16	K3
IC51	DIL16	K3
RAM0	411000	A2
RAM1	411000	A2
RAM2	411000	B2
RAM3	411000	B2
RAM4	411000	C2
RAM5	411000	C2
RAM6	411000	C2
RAM7	411000	D2
RAM8	411000	D2
RAM9	411000	E2
RAM10	411000	E2
RAM11	411000	E2
RAM12	411000	F2
RAM13	411000	F2
RAM14	411000	G2
RAM15	411000	G2
RAM16	411000	G2
RAM17	411000	H2
RAM18	411000	H2
RAM19	411000	J2
RAM20	411000	J2
RAM21	411000	J2
RAM22	411000	A3
RAM23	411000	A3
RAM24	411000	B3
RAM25	411000	B3
RAM26	411000	C3
RAM27	411000	C3
RAM28	411000	C3
RAM29	411000	D3
RAM30	411000	D3
RAM31	411000	E3
RAM32	411000	E3
RAM33	411000	E3
RAM34	411000	F3
RAM35	411000	F3
RAM36	411000	G3
RAM37	411000	G3
RAM38	411000	G3
RAM39	411000	H3
RAM40	411000	H3
RAM41	411000	J3
RAM42	411000	J3
RAM43	411000	J3

Name	Type	Pos

Name	Type	Pos

Component locations

PCB: 3300 / MEM-4Mb

Issue: 1

Date: 880726

dansk data elektronik a/s
herlev hovedgade 199, 2730 herlev, tlf. 42-84 50 11

Type: RAM module 3200

Data sheet no.: 13

Revision no.: 0

Date: 861201

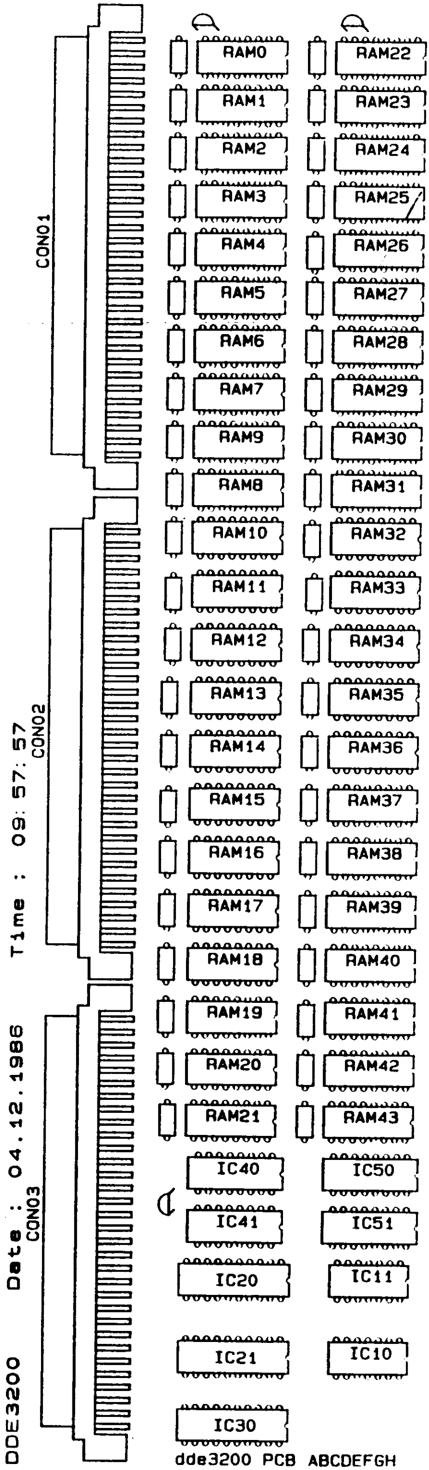
General description:

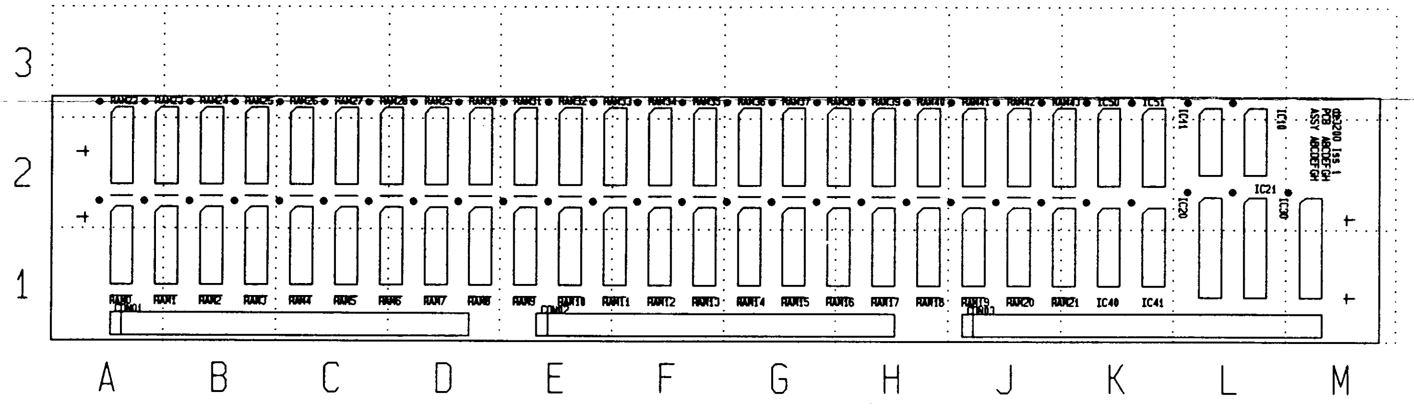
The RAM 3200 is a RAM daughter module. The module containes 44 256 kbit nibble mode dynamic RAMs and drivers for address and control signals. The RAM is organized as two words each 22 bits wide including error correcting bits. The total amount of RAM is 1 Mbyte.

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.


DDE3200 Date : 04.12.1986 Time : 09:57:57
CON01
CON02
CON03
RAM0
RAM1
RAM2
RAM3
RAM4
RAM5
RAM6
RAM7
RAM9
RAM8
RAM10
RAM11
RAM12
RAM13
RAM14
RAM15
RAM16
RAM17
RAM18
RAM19
RAM20
RAM21
RAM22
RAM23
RAM24
RAM25
RAM26
RAM27
RAM28
RAM29
RAM30
RAM31
RAM32
RAM33
RAM34
RAM35
RAM36
RAM37
RAM38
RAM39
RAM40
RAM41
RAM42
RAM43
IC40
IC41
IC20
IC21
IC30
IC50
IC51
IC11
IC10
dde3200 PCB ABCDEFGH



Component locations			
PCB: **3200 / MEM-1Mb**	Issue: 1	Date: 880726	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 42-84 50 11

Name	Type	Pos
CON01	CON64	A1
CON02	CON64	E1
CON03	CON64	J1
IC10	74ALS1010	L3
IC11	74ALS1010	L3
IC20	74ALS244	L2
IC21	74ALS244	L2
IC30	74ALS244	M2
IC40	DIL16	K2
IC41	DIL16	K2
IC50	DIL16	K3
IC51	DIL16	K3
RAM0	42257	A2
RAM1	42257	A2
RAM2	42257	B2
RAM3	42257	B2
RAM4	42257	C2
RAM5	42257	C2
RAM6	42257	C2
RAM7	42257	D2
RAM8	42257	D2
RAM9	42257	E2
RAM10	42257	E2
RAM11	42257	E2
RAM12	42257	F2
RAM13	42257	F2
RAM14	42257	G2
RAM15	42257	G2
RAM16	42257	G2
RAM17	42257	H2
RAM18	42257	H2
RAM19	42257	J2
RAM20	42257	J2
RAM21	42257	J2
RAM22	42257	A3
RAM23	42257	A3
RAM24	42257	B3
RAM25	42257	B3
RAM26	42257	C3
RAM27	42257	C3
RAM28	42257	C3
RAM29	42257	D3
RAM30	42257	D3
RAM31	42257	E3
RAM32	42257	E3
RAM33	42257	E3
RAM34	42257	F3
RAM35	42257	F3
RAM36	42257	G3
RAM37	42257	G3
RAM38	42257	G3
RAM39	42257	H3
RAM40	42257	H3
RAM41	42257	J3
RAM42	42257	J3
RAM43	42257	J3

Component locations

PCB: 3200 / MEM-1Mb

Issue: 1

Date: 880726

dansk data elektronik a/s
herlev hovedgade 199, 2730 herlev. tlf 42-84 50 11

SECTION 1.2

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.

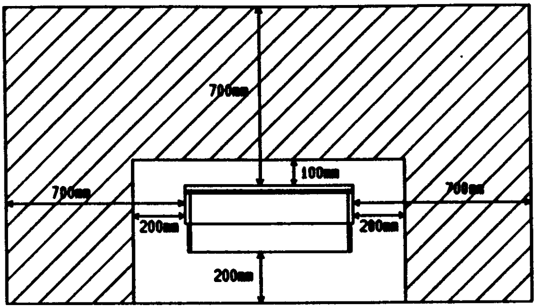


Figure 1. Free space

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

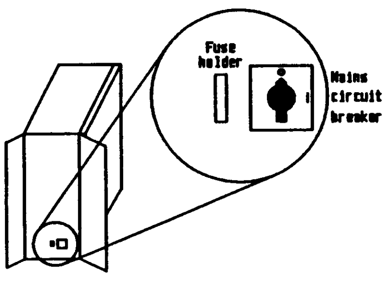


Figure 2. Rear side

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 "|" 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.

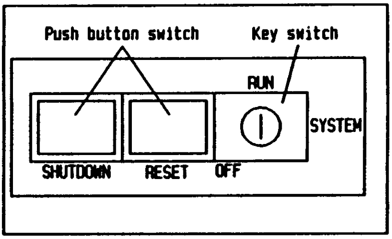


Figure 3. Operator panel

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 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.

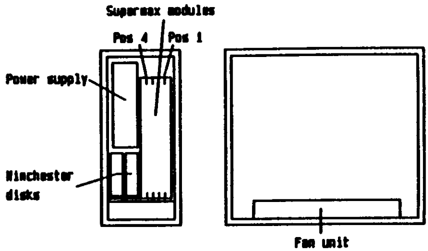


Figure 4. Internal view

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) Full-height (FH) 2 × FH + HH	2 1 2
Front mounted peripherals	Half-height (HH) Full-height (FH) 2 × FH + HH	4 2 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.

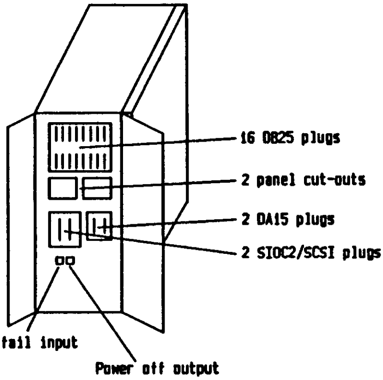


Figure 5. I/O panel

- 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 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 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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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.

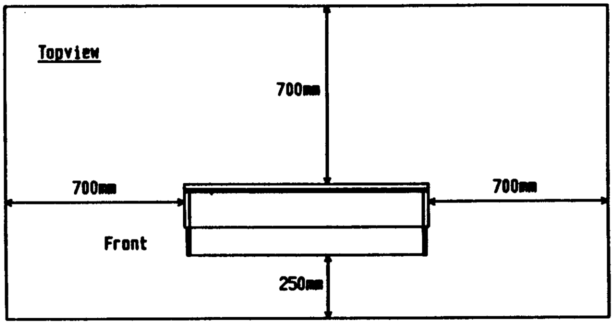

Figure 1. Free space

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

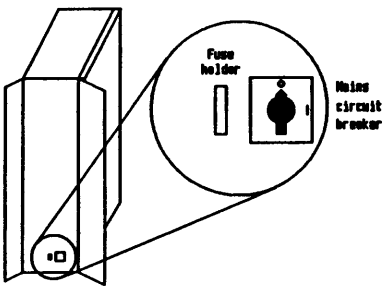

Figure 2. Rear side

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 "|" 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 × 24 character LCD display for the optional Service Computer.

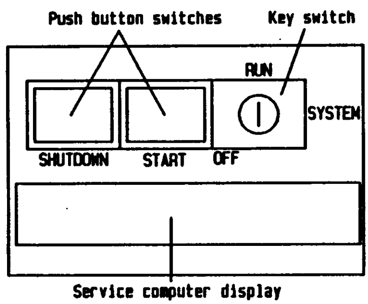

Figure 3. Operator panel

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

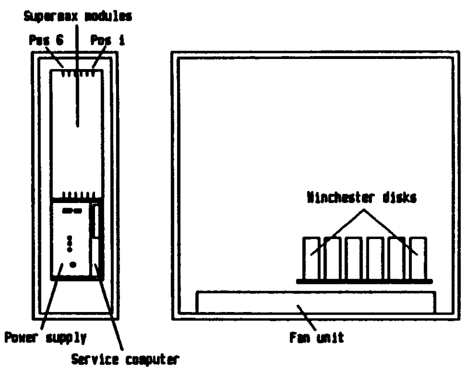

Figure 4. Internal view

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.

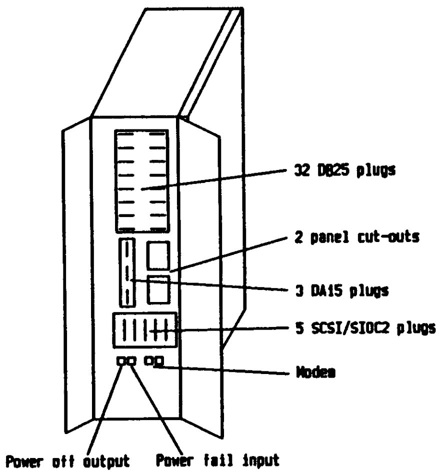

Figure 5. I/O panel

- 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	
+12 V	15 A	22 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 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.

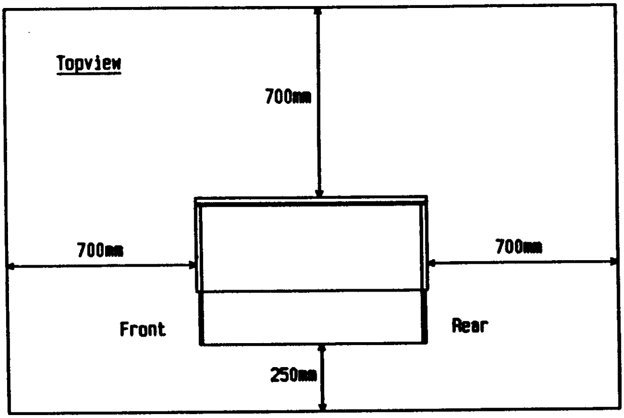

Figure 1. Free space

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

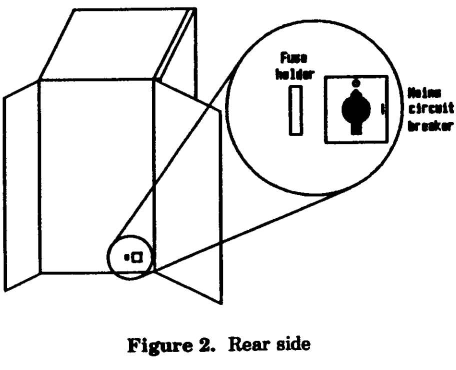

Figure 2. Rear side

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 "|" 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 × 24 character LCD display for the Service Computer.

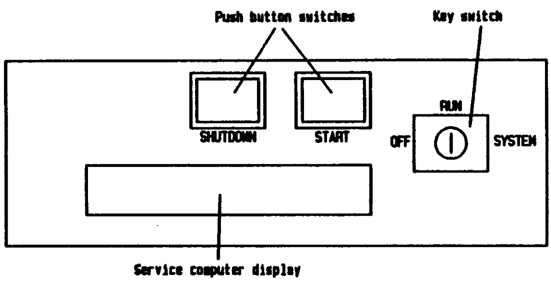

Figure 3. Operator panel

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

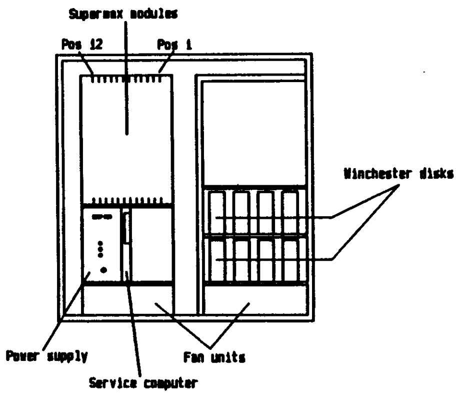

Figure 4. Internal view

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.

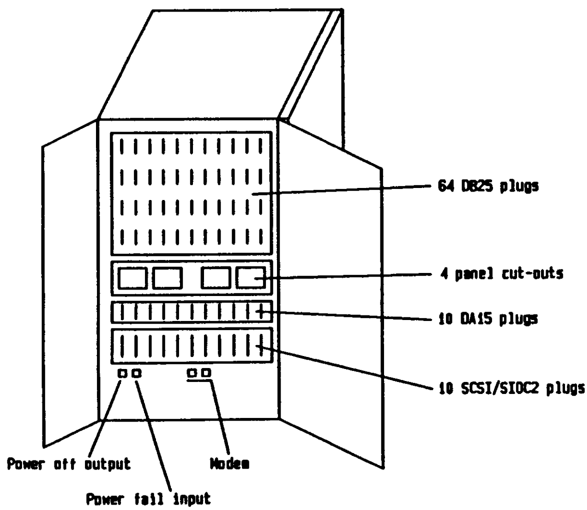

Figure 5. I/O panel

- 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	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 ouput 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 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 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	
+12 V	20 A	30 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.

CONTENTS

LIST OF FIGURES

LIST OF TABLES

TPP Field Change Notice No. 47

DATE: 09.09.91

MODULE: DDE 460/Wyse 185

CATEGORY:

production change : Check new units for version no.
In the field: Replace FW, if ass. print is to be used.

CORRECTS THE ERROR: Control sequence is sent to printer, not executed.

TOOLS NEEDED:

- Screwdriver.
- IC-extractor.

DESCRIPTIONS: The sequence CSI "4i" (Controller print mode off) is sent to the printer, instead of being interpreted. It will happen only now and then, not all the time.

Replace the FW PROM with the one from the service kit.

SERVICE KIT: Stock No. 95140470 contains:

- PROM, type 27512, marked: "WY-185 STD 150891"

ESTIMATED REPAIR TIME: 20 min.

NOTE:

The FW version 150891 will correct the problem above. At the same time it is now possible to read the FW version number in the SETUP menu. If no version number is present, the terminal contains older FW.

lea/MUDV

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.

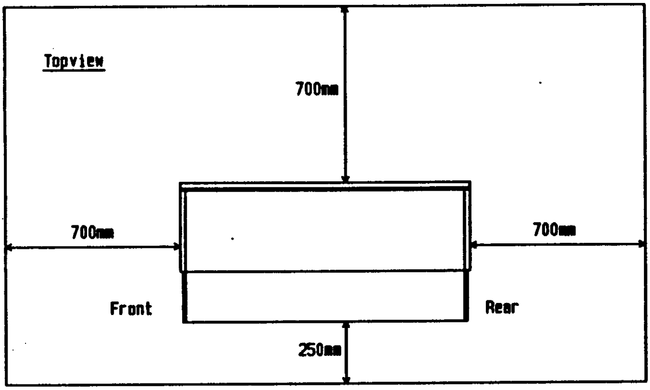

Figure 1. Free space

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 off 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 "|" 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.

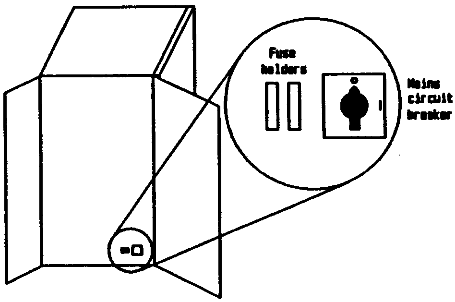

Figure 2. Rear side

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.

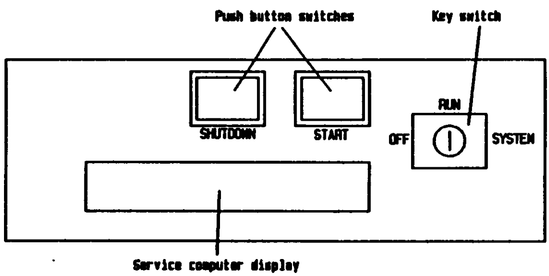

Figure 3. Operator panel

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 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

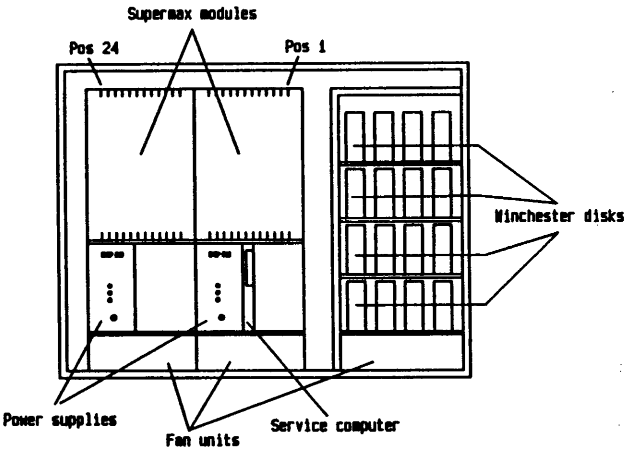

Figure 4. Internal view

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.

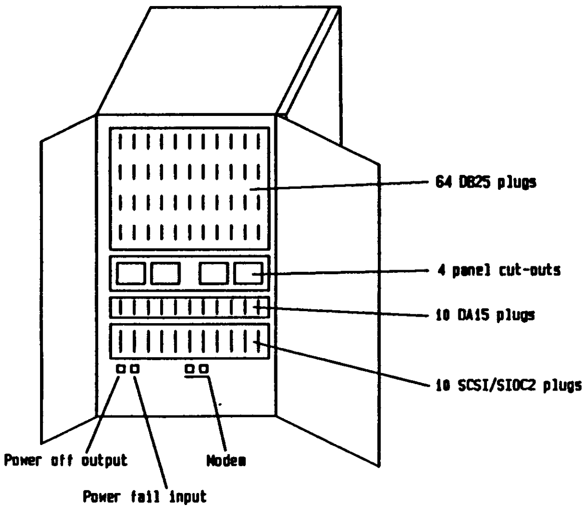

Figure 5. I/O panel

- 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 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.

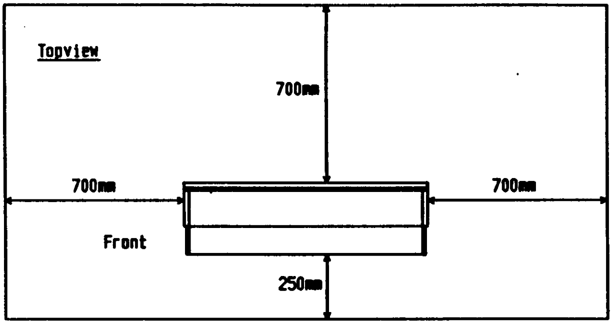

Figure 1. Free space

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

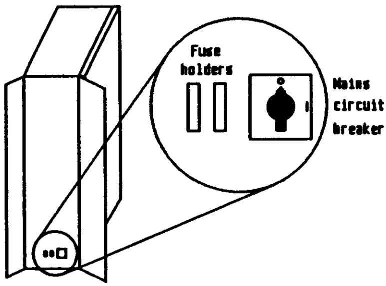

Figure 2. Rear side

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 "|" 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 posit[illegible] 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) Full-height (FH) 2 × FH + HH	32 16 32
Front mounted peripherals	Half-height (HH) Full-height (FH) 2 × FH + HH	4 2 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.

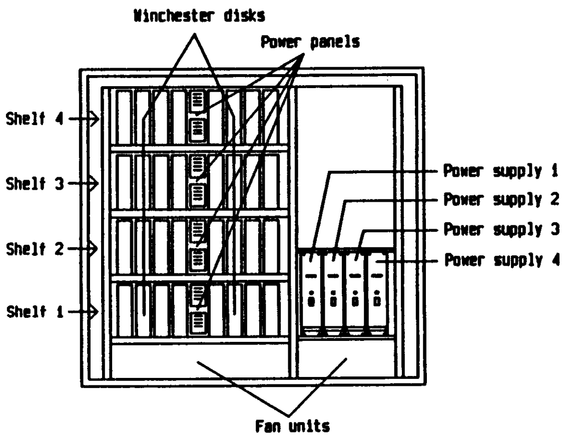

Figure 3. Internal view

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.

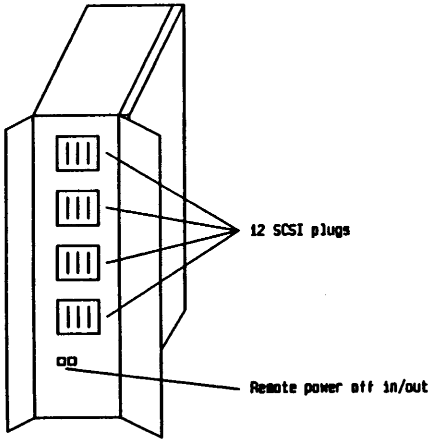

Figure 4. I/O panel

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 implememterer 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 transceiverkabel.

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.

"inter frame gap" 9,6 µs pause mellem pakkerne
max. 16 collitions
access collisions

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.

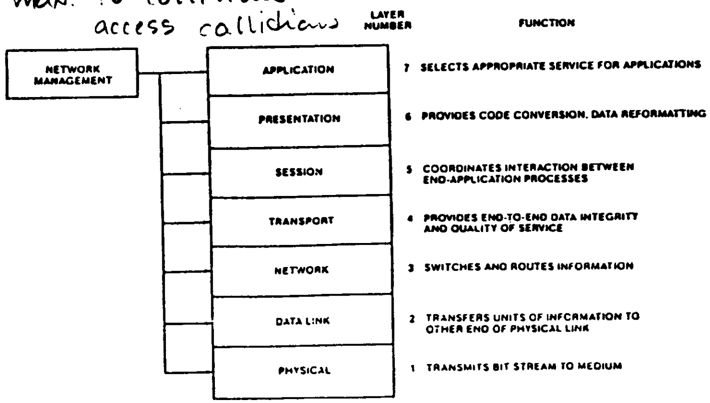
The Transport Layer ensures end-to-end message integrity and provides for the required quality of service for exchanged information. For example, end-to-end acknowledgements and flow control are performed by the Transport Layer.

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.



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 2400 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.

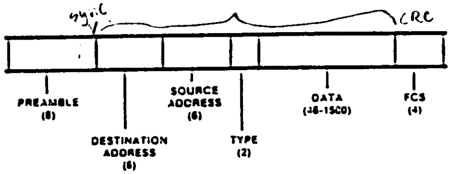
The terminator is a passive device which fits at both ends of each cable segment (or the ends of segments connected by repeaters), providing proper electrical termination (to eliminate reflections).

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.*

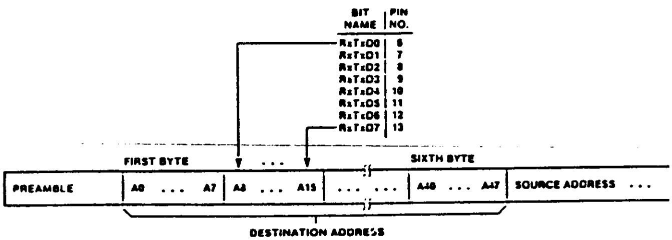
***Destination Address:** The Destination Address is a 6-byte field containing either a specific Station Address, a Broadcast Address, or a Multicast Address to which this frame is directed.*

***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.*

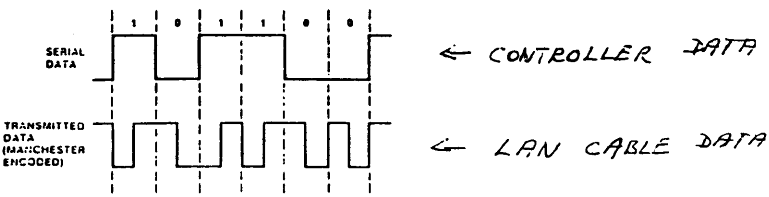
***Data Field:** The Data Field consists of 46 to 1500 bytes of information which are fully transparent in the sense that any arbitrary sequence of bytes may occur.*

***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

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 inddeles 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 supportes 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.

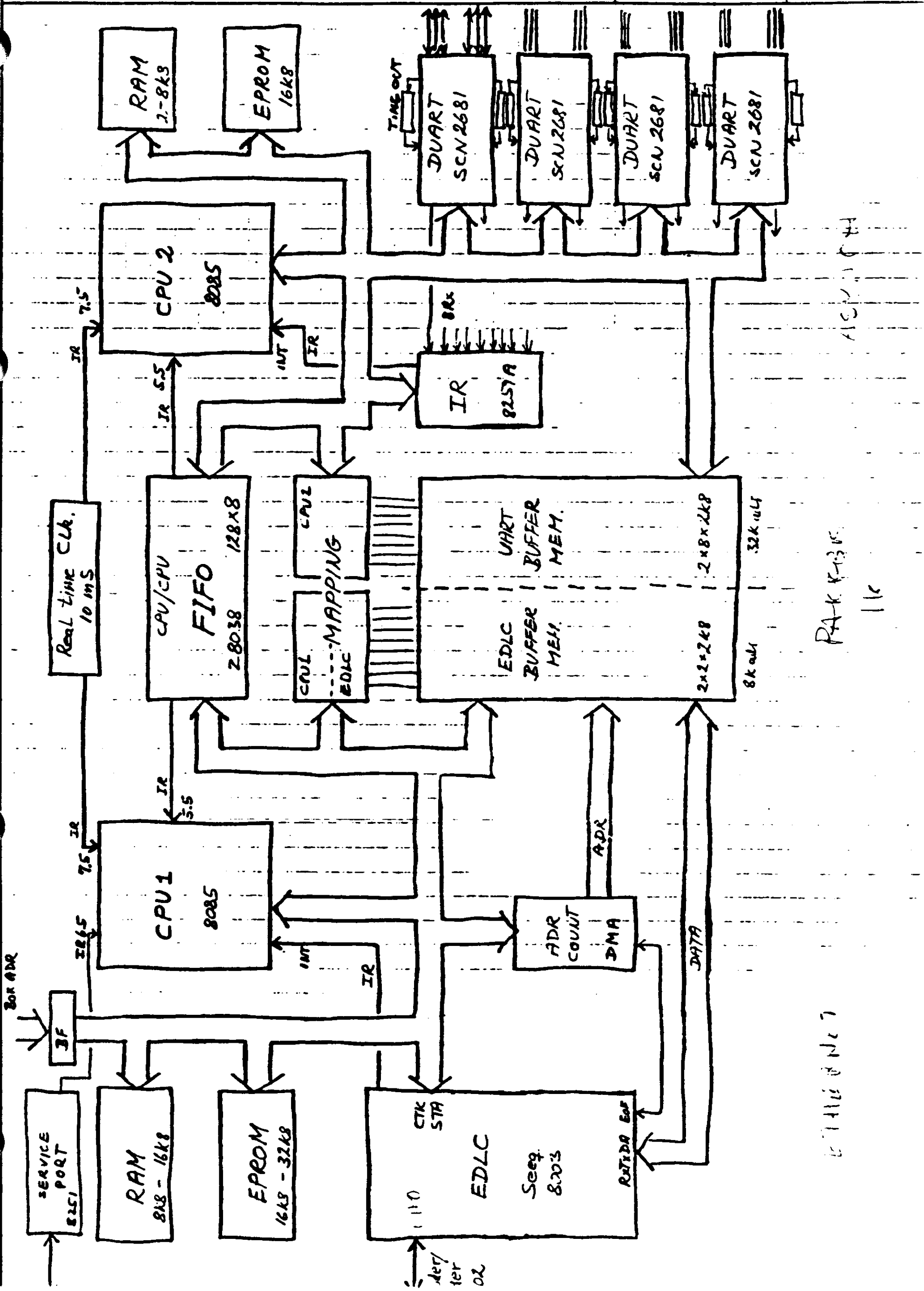
CPU1 tager sig af styring af controller kreds, bufferallokering, øvre netværksprotokol, serviceport samt videregiver meddelelser til CPU2.

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).

dansk data elektronik a/s

BLOKDIAGRAM: NTC	Initialer/dato 19-9-83	Side 9
	Revideret 11-11-83 24-11-83 20-4-85	Projekt



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.	EPROM
S 4:	1-2.	EPROM
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.	EPROM
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	RXD0	46	DSR2
47	TXD0	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

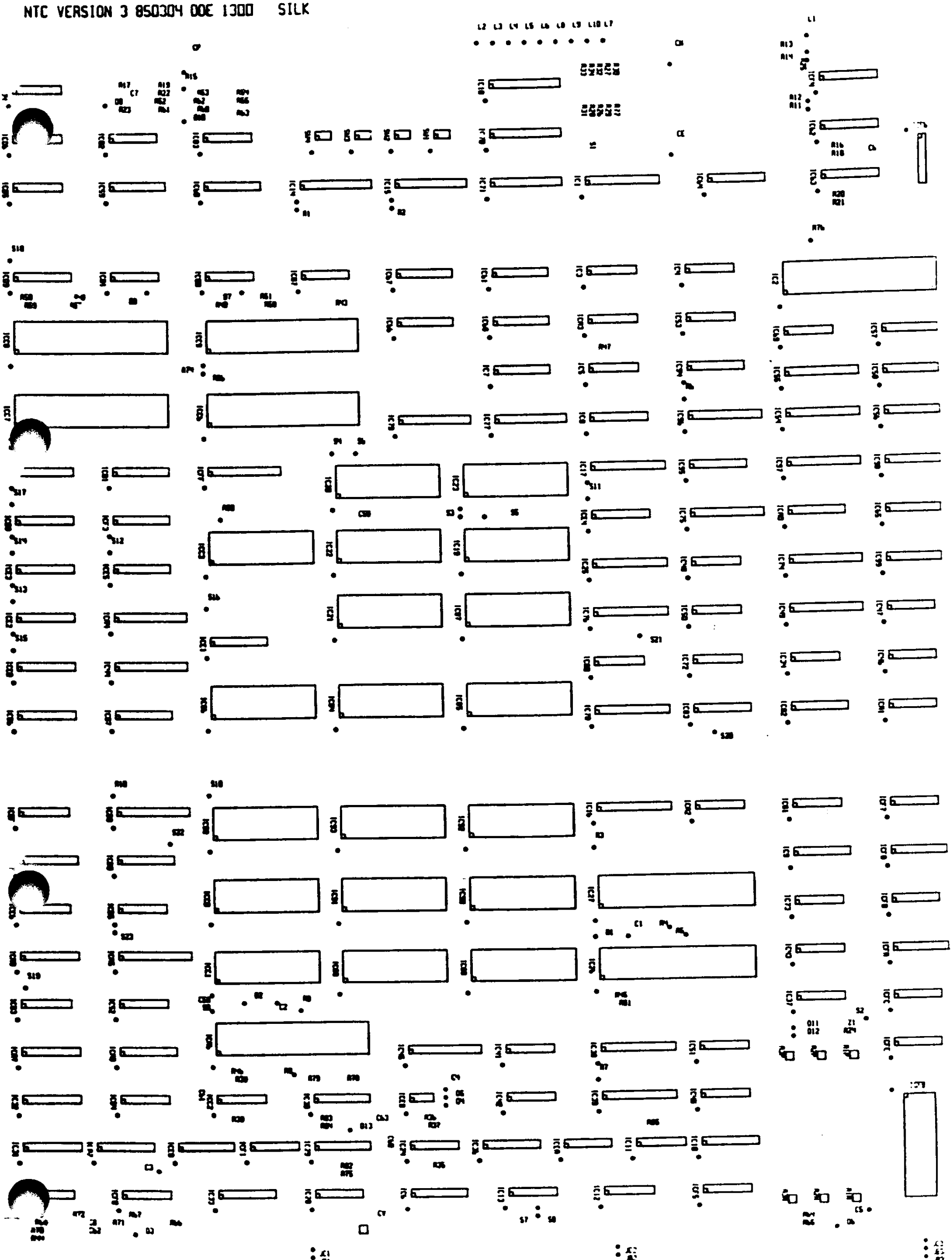
Strømforbrug:	+5 V	∝ 6 A max (3 A typ)
	+12 V	∝ 1 A max
	-12 V	∝ 0.5 A max

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

NTC VERSION 3 850304 DOE 1300 SILK



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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	LOCMOS

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	
HM6264PL-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.	afkobl.	52 stk	

UBENYTTEDE 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:

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	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	MBM27128-25	28	Fujitsu
	IC20	MBM27128-25	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	SN74ALS169BN	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	SN74LS273N	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	MBM27128-25	28	Fujitsu
>OPTION	ICC0	HM6264PL-15	28	Hitachi
	ELLER	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		KATODE.
	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

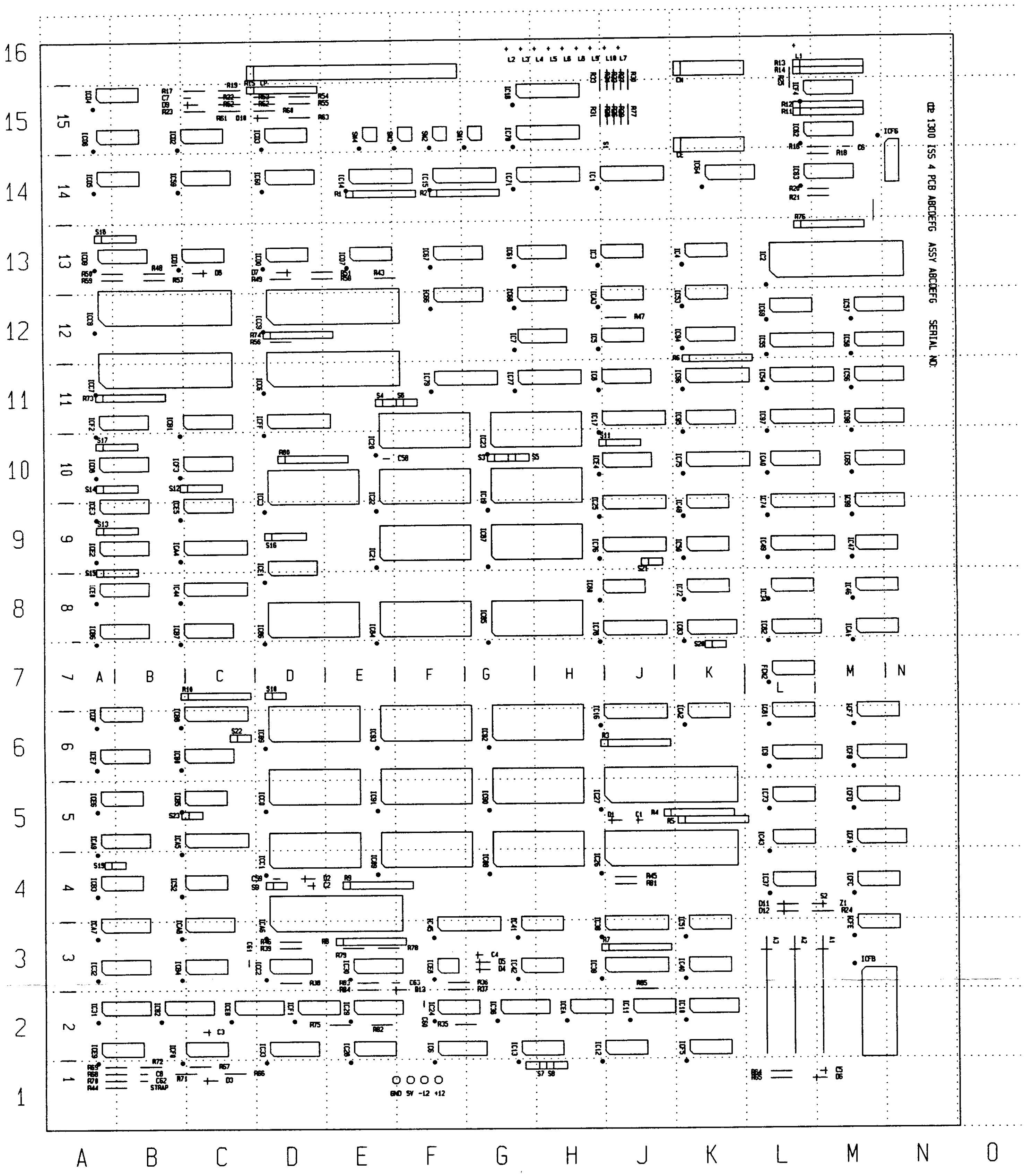
****

>>>> 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



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	ICF0		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
ICC0		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
ICD0		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:

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

PRELIMINARY

Name	Type	Pos
R22		C15
R23		B15
R24		M4
R25		L16
R26		J15
R27		J16
R28		J15
R29		J15
R30		J16
R31		H15
R32		J16
R33		H16
R34		J16
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
S13		A9
S14		A10
S15		A9
S16		D9
S17		A10
S18		A13
S19		A4
S20		K7
S21		J9
S22		C6
S23		B5
Z1		M4
5V		F1

Component locations

PCB: NTC

Issue:

Date:

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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

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

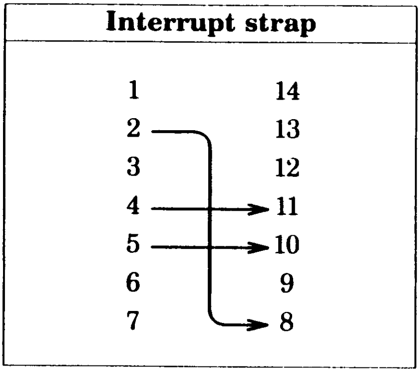

Table 4-7: Strap ISTRAP

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

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

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

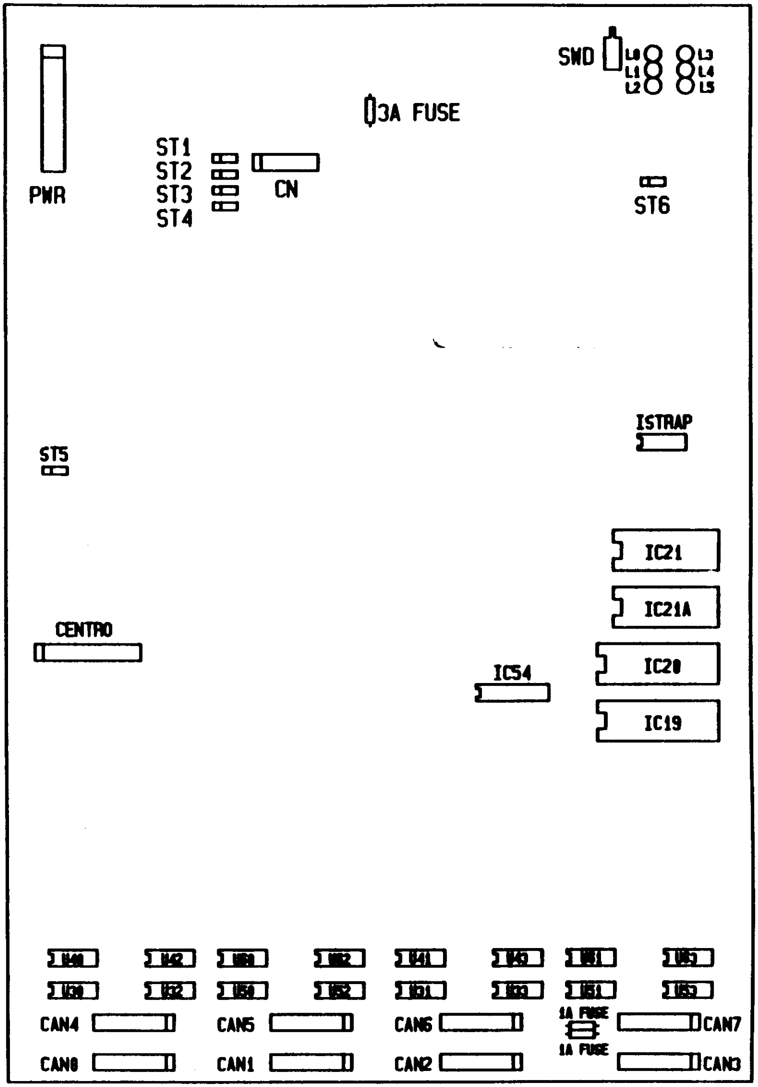

Figure 4-1: Component layout

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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 CE06 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 channals:

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	ROW b	ROW c
	Signal mnemonic:		
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 SWC0:

Function: Software select strap and extra baud rate select.
(Applies only to versions earlier than 1.7)

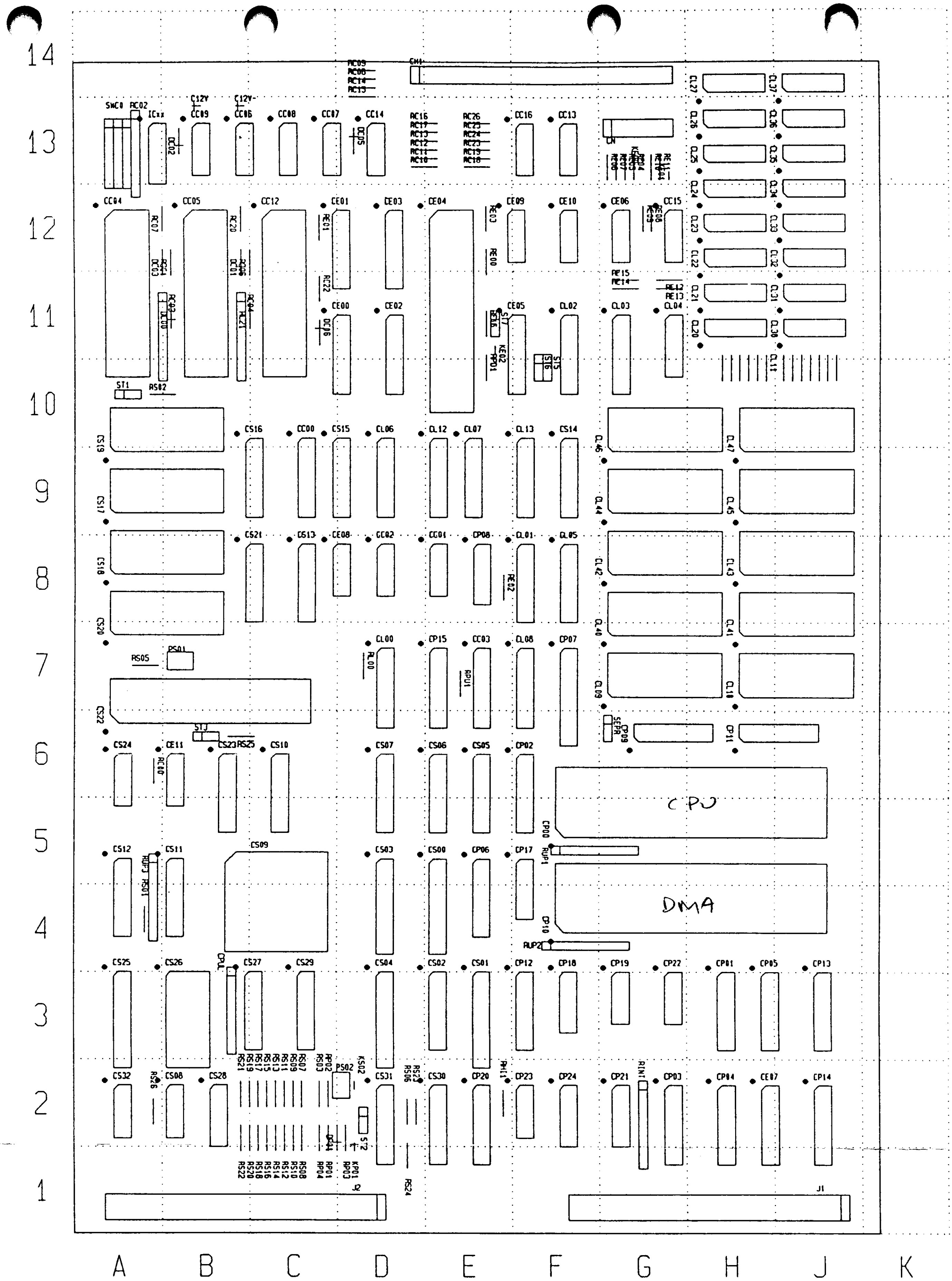
Strappings for SWC0:

```
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         * * * * * * I *
board installed:         .* * * * * * I *


Initialize via printer    * * * * * * * *
port on versions earlier  * * * * * * * I
than 1.6:                .* * * * * * * I
```

```
            I
The symbol  I   denotes strap position.
```



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dde 2500

Component-ID

Issue	Date
0	------
1	------
2	861122
3	
4	
5	

Parts no

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	HM50257P-15	H11	CS20	HM6264LP-10	A7	RE10	2K43	G13
CL21	HM50257P-15	H11	CS21	PAL-16L8A	B8	RE11	5K6	G13
CL22	HM50257P-15	H12	CS22	AM8152ADC	A6	RE12	470R	H11
CL23	HM50257P-15	H12	CS23	16P-STRAP	B6	RE13	470R	H11
CL24	HM50257P-15	H12	CS24	14P-STRAP	A6	RE14	470R	G11
CL25	HM50257P-15	H13	CS25	PAL-20L8A	A4	RE15	470R	G11
CL26	HM50257P-15	H13	CS26	MB8128-10	B4	RE16	560R	E11
CL27	HM50257P-15	H14	CS27	74ALS574	B4	RHI1	1K	E2
CL30	HM50257P-15	J11	CS28	74S158	B2	RINT	SIL-9x3K3	G2
CL31	HM50257P-15	J11	CS29	74ALS640	C4	RL00	47R	D7
CL32	HM50257P-15	J12	CS30	74AS240	E2	RPD1	pull-dwn	E11
CL33	HM50257P-15	J12	CS31	74AS240	D2	RPU1	1K	E7
CL34	HM50257P-15	J12	CS32	OSC.80MHz	A2	RP01	1K	C2
CL35	HM50257P-15	J13	C12V	Capacitor	B13	RP02	10K	C2
CL36	HM50257P-15	J13	C12V-	Capacitor	B13	RP03	47R	D2
CL37	HM50257P-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

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Issue	Date
0	------
1	------
2	861122
3	
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Component Locations

Parts no.

Dwg. no.

2

Name	Type	Pos
RS10	Not-Used	C2
RS11	68R	C2
RS12	Not-Used	C2
RS13	68R	C2
RS14	Not-Used	C2
RS15	68R	C2
RS16	Not-Used	C2
RS17	68R	C2
RS18	Not-Used	C2
RS19	68R	C2
RS20	Not-Used	C2
RS21	68R	B2
RS22	Not-Used	B2
RS23	100R	D2
RS24	4K7	D2
RS25	1K	C6
RS26	1K2	A2
RUP1	SIL-9x3K3	F5
RUP2	SIL-9x3K3	F4
RUP3	SIL-9x3K3	A5
SEPR	3P-STRAP	G6
ST1	3P-STRAP	A10
ST2	3P-STRAP	D2
ST3	3P-STRAP	B6
ST5	3P-STRAP	F11
ST6	3P-STRAP	F11
ST7	3P-STRAP	E11
SWC0	STRAP	A13
cxx1	10uF/16V-Sol.Al	A2
cxx2	100nF	A2
cxx3	100nF	A3
cxx4	100nF	A4
cxx5	100nF	A4
cxx6	100nF	A5
cxx7	100nF	A5
cxx8	100nF	A6
cxx9	100nF	A7
cxx10	100nF	A7
cxx12	100nF	A8
cxx13	100nF	A9
cxx14	100nF	A10
cxx15	100nF	A10
cxx16	100nF	A11
cxx17	100nF	A11
cxx18	100nF	A12
cxx19	100nF	A13
cxx20	100nF	A13
cxx23	100nF	K13
cxx24	100nF	K13
cxx25	100nF	K12
cxx26	100nF	K11
cxx27	100nF	K11
cxx28	100nF	K10
cxx29	100nF	K10
cxx30	100nF	K9
cxx31	100nF	K8
cxx33	100nF	K7
cxx34	100nF	K7
cxx35	100nF	K6
cxx36	100nF	K5
cxx37	100nF	K5
cxx38	100nF	K4
cxx39	100nF	K4
cxx40	100nF	K3
cxx41	100nF	K2
cxx42	100nF	K2

Name	Type	Pos

Name	Type	Pos

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Issue	Date
0	------
1	------
2	861122
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Component Locations

Parts no.

Dwg. no.

3

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

Ei 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

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 4-5

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		

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 seperately 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.

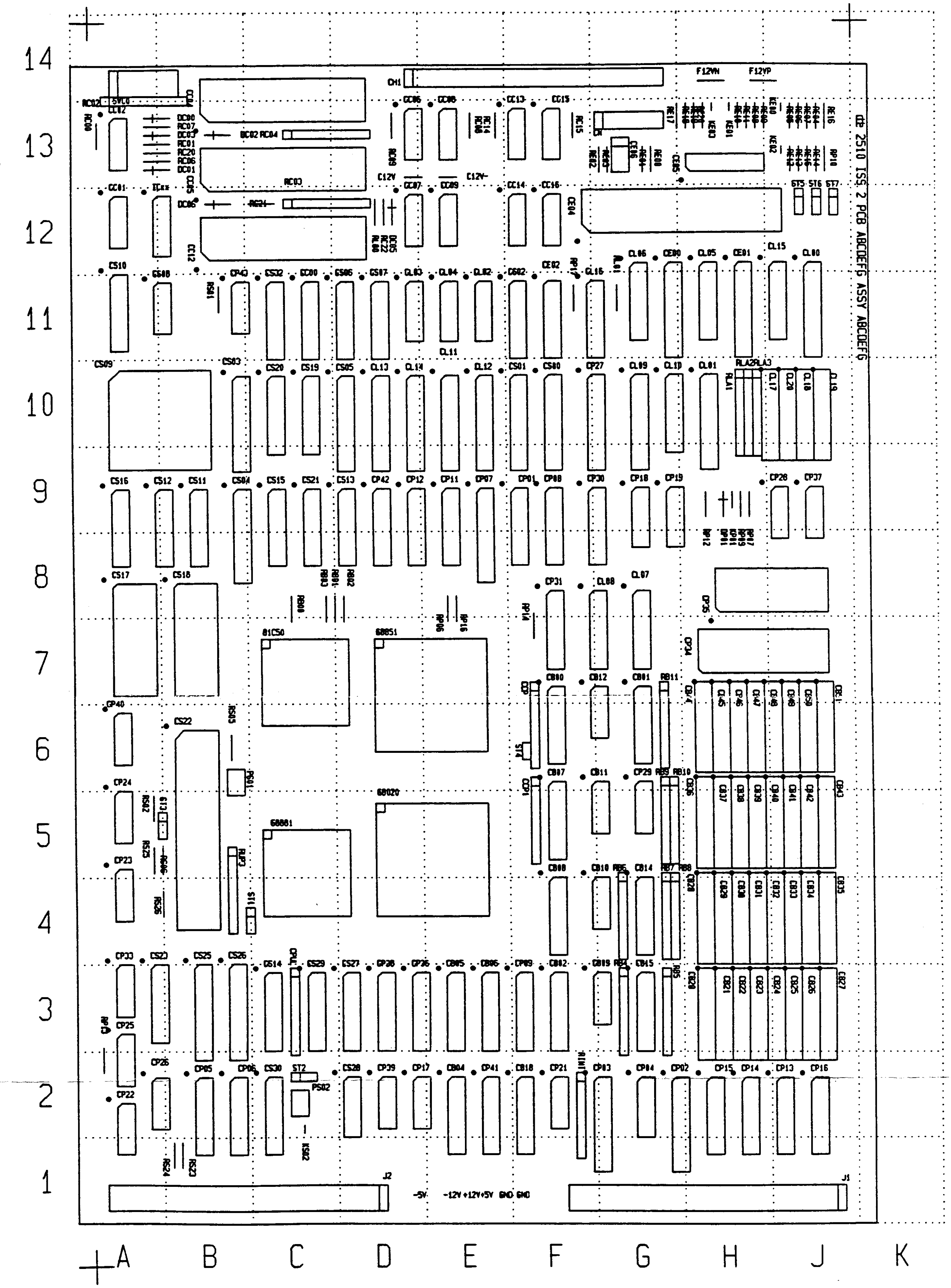
PIN 2 connected to PIN 3: Pin 2 is connected to pin 1 by KE02

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		



Component locations

PCB: **2510 / SGD Alpha**	Issue: 2	Date: 880524	dde	dansk data elektronik a/s herlev hovedgade 199. 2730 herlev. tlf. 02-84 50 11

Name	Type	Pos
+5V	terminal	E1
+12V	terminal	E1
-5V	terminal	E1
-5V.1	terminal	E1
-12V	terminal	E1
CB00	16L8D	F7
CB01	16L8B	G7
CB02	16L8B	F3
CB04	16L8A	E2
CB05	16R8B	E3
CB06	16R8B	E3
CB07	16R8B	F6
CB08	16R8B	F5
CB09	74S32	F3
CB10	74S32	F5
CB11	74S32	F6
CB12	74S32	F7
CB14	74S241	G5
CB15	74S241	G3
CB18	74S241	F2
CB20	MB81C4256-12PSZ	H3
CB21	MB81C4256-12PSZ	H3
CB22	MB81C4256-12PSZ	H3
CB23	MB81C4256-12PSZ	H3
CB24	MB81C4256-12PSZ	J3
CB25	MB81C4256-12PSZ	J3
CB26	MB81C4256-12PSZ	J3
CB27	MB81C4256-12PSZ	J3
CB28	MB81C4256-12PSZ	H5
CB29	MB81C4256-12PSZ	H5
CB30	MB81C4256-12PSZ	H5
CB31	MB81C4256-12PSZ	H5
CB32	MB81C4256-12PSZ	J5
CB33	MB81C4256-12PSZ	J5
CB34	MB81C4256-12PSZ	J5
CB35	MB81C4256-12PSZ	J5
CB36	MB81C4256-12PSZ	H6
CB37	MB81C4256-12PSZ	H6
CB38	MB81C4256-12PSZ	H6
CB39	MB81C4256-12PSZ	H6
CB40	MB81C4256-12PSZ	J6
CB41	MB81C4256-12PSZ	J6
CB42	MB81C4256-12PSZ	J6
CB43	MB81C4256-12PSZ	J6
CB44	MB81C4256-12PSZ	H7
CB45	MB81C4256-12PSZ	H7
CB46	MB81C4256-12PSZ	H7
CB47	MB81C4256-12PSZ	H7
CB48	MB81C4256-12PSZ	J7
CB49	MB81C4256-12PSZ	J7
CB50	MB81C4256-12PSZ	J7
CB51	MB81C4256-12PSZ	J7
CCP	10-1-102	F7
CCP1	10-1-102	F6
CC00	74ALS645	C11
CC01	OSC.7M3728HZ	A12
CC02	74S74	A13
CC04	2681	B13
CC05	2681	B12
CC06	75189	D13
CC07	75188	D12
CC08	75189	E13
CC09	75188	E12
CC12	8530	B12
CC13	75189	F13
CC14	75188	F12
CC15	75189	F13
CC16	75188	F12
CE00	74ALS646	G12
CE01	74ALS646	H12
CE02	16R4A	F11
CE04	82586	F12
CE05	8023A	H13
CE06	STRAP	G13
CH1	Serial-I/O	D14
CL00	20R8A	J12
CL01	20R6A	H10
CL02	74S138	E11

Name	Type	Pos
CL03	74S139	D11
CL04	74S151	E11
CL05	74AS573	H12
CL06	74AS573	G12
CL07	74AS573	G8
CL08	74AS573	F8
CL09	20L8A	G10
CL10	74AS573	G10
CL11	74ALS646	E10
CL12	74ALS646	E10
CL13	74ALS646	D10
CL14	74ALS646	D10
CL15	74ALS645	J12
CL16	16R4A	F11
CL17	MB81C4256-12PSZ	J10
CL18	MB81C4256-12PSZ	J10
CL19	MB81C4256-12PSZ	J10
CL20	MB81C4256-12PSZ	J10
CN	LAN-I/O	G13
CPUL	10-1-152	C3
CP01	16L8D	F9
CP02	20L8A	G2
CP03	20R8A	F2
CP04	74LS148	G2
CP05	74ALS645	B2
CP06	74ALS645	B2
CP07	20L8A	E9
CP08	16L8A	F9
CP09	74AS573	F3
CP11	74AS573	E9
CP12	74AS573	D9
CP13	74ALS645	J2
CP14	74ALS645	H2
CP15	74ALS645	H2
CP16	74ALS645	J2
CP17	74LS393	D2
CP18	74LS390	G9
CP19	74LS390	G9
CP21	STRAP	F2
CP22	STRAP	A2
CP23	OSC.50MHZ	A5
CP24	OSC.40MHZ	A6
CP25	74S74	A3
CP26	74S00	A2
CP27	20L8A	F10
CP28	74LS14	J9
CP29	74LS07	G6
CP30	16L8A	F9
CP31	16R6D	F8
CP33	74AS1004	A4
CP34	271001	H7
CP35	~~2764~~ D228C67	H8
CP36	16L8B	D3
CP37	74LS393	J9
CP38	16R8B	D3
CP39	74S260	D2
CP40	OSC.16MHZ	A6
CP41	16L8A	E2
CP42	74AS573	D9
CP43	74S10	B11
CS00	20R8A	F10
CS01	20R8A	F10
CS02	16L8A	F11
CS03	74ALS646	B10
CS04	74ALS646	B9
CS05	20L8A	D10
CS06	16R8A	D11
CS07	74AS574	D11
CS08	74S74	A11
CS09	8052	A10
CS10	74ALS574	A12
CS11	74ALS574	B9
CS12	74ALS573	A9
CS13	74ALS573	D9
CS14	74ALS645	C3
CS15	74ALS645	C9
CS16	74ALS574	A9
CS17	SRAM32KX8-10	A8

Name	Type	Pos
CS18	SRAM32KX8-10	B8
CS19	74ALS645	C10
CS20	74ALS645	C10
CS21	16L8A	C9
CS22	8[illegible]52A	B6
CS23	16R4A	A4
CS25	20L8A	B4
CS26	HM6116ASP-10	B4
CS27	74AS574	D3
CS28	74S158	D2
CS29	74ALS640	C3
CS30	74S240	C2
CS32	16R4A	C11
C12V	10uF-TANTAL	E13
C12V-	10uF-TANTAL	E13
DC00	1N4148	A13
DC01	1N4148	A13
DC02	1N4148	B13
DC03	1N4148	A13
DC05	1N4148	D12
DC06	1N4148	B12
DP01	1N4148	H9
F12VN	FUSE-1.5A	H14
F12VP	FUSE-1.5A	H14
GND	terminal	E1
GND.1	terminal	F1
ICxx	74ALS163	A12
J1	BUS-96p-DIN	J1
J2	BUS-96p-DIN	D1
KE00	10nF-CERAMIC	J14
KE01	10nF-CERAMIC	H14
KE02	10nF-CERAMIC	J13
KE03	10nF-CERAMIC	H14
KP01	10uF-TANTAL	H9
KS02	10nF-CERAMIC	C2
PS01	trim	B6
PS02	TRIM-500R	C2
RB4	10-2-330	G3
RB5	10-2-330	G3
RB6	10-2-330	G5
RB7	10-2-330	G5
RB8	10-2-330	G5
RB9	10-2-330	G6
RB00	330R	C8
RB01	330R	D8
RB02	33R	D7
RB03	470R	C8
RB10	10-2-330	G6
RB11	10-2-330	G7
RC00	1KR	A13
RC01	2K2R	A13
RC02	10-1-332	A14
RC03	10-1-332	C12
RC04	10-1-332	C13
RC06	2K2R	A13
RC07	3K3R	B13
RC08	1K0R	E13
RC09	1K0R	D13
RC14	1K0R	E13
RC15	1K0R	F13
RC20	3K3R	B13
RC21	10KR	C12
RC22	10KR	D12
RE00	3K3R	G13
RE01	3K3R	G13
RE02	3K3R	G13
RE03	3K3R	G13
RE04	39R0	J14
RE05	39R0	J14
RE06	5K6R	J14
RE07	2K43R	J13
RE08	39R0	H14
RE09	39R0	J14
RE10	2K43R	H13
RE11	5K6R	H14
RE12	470R	J13
RE13	470R	J13
RE14	470R	J13

Component locations

PCB: **2510 / SGD Alpha** | Issue: 2 | Date: 880524

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Name	Type	Pos	Name	Type	Pos	Name	Type	Pos
RE15	470R	J13						
RE16	560R	J14						
RE17	39R0	H14						
RE18	39R0	H14						
RE19	2K43R	H13						
RE20	5K6R	H14						
RINT	10-1-332	F2						
RLA1	10-2-470	H10						
RLA2	10-2-470	H10						
RLA3	10-2-470	H10						
RL00	33R	D12						
RL01	470R	G11						
RP06	1KR	E8						
RP07	5K6R	H9						
RP09	27KR	H9						
RP10	470R	J13						
RP12	33R	H9						
RP13	470R	A2						
RP14	470R	F8						
RP16	1KR	E8						
RP17	470R	F11						
RS01	470R	B11						
RS02	33R	A6						
RS05	10R	B6						
RS06	100R	B5						
RS23	1KR	B2						
RS24	100R	B2						
RS25	1KR	A5						
RS26	1KR	B4						
RUP3	10-1-332	B5						
ST1	STRAP	C4						
ST2	STRAP	C2						
ST3	STRAP	B5						
ST4	STRAP	F6						
ST5	STRAP	J12						
ST6	STRAP	J12						
ST7	STRAP	J12						
SWC0	switch	A14						
81C50	MB81C50	C7						
68020	68020	D5						
68851	68851	D7						
68881	68881	C5						

Component locations

PCB: **2510 / SGD Alpha** | Issue: 2 | Date: 880524

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<u>Type:</u> SGD Graphic Board 2600

<u>Data sheet no.:</u>

<u>Revision no.:</u> 1

<u>Date:</u> 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 syncronously 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 resyncronized 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	VSYNC-	*	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.
Lenght:	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 pals:

+ 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.

<u>STRAP1:</u>

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

<u>SP:</u>

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.

<u>STRAP3:</u>

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:

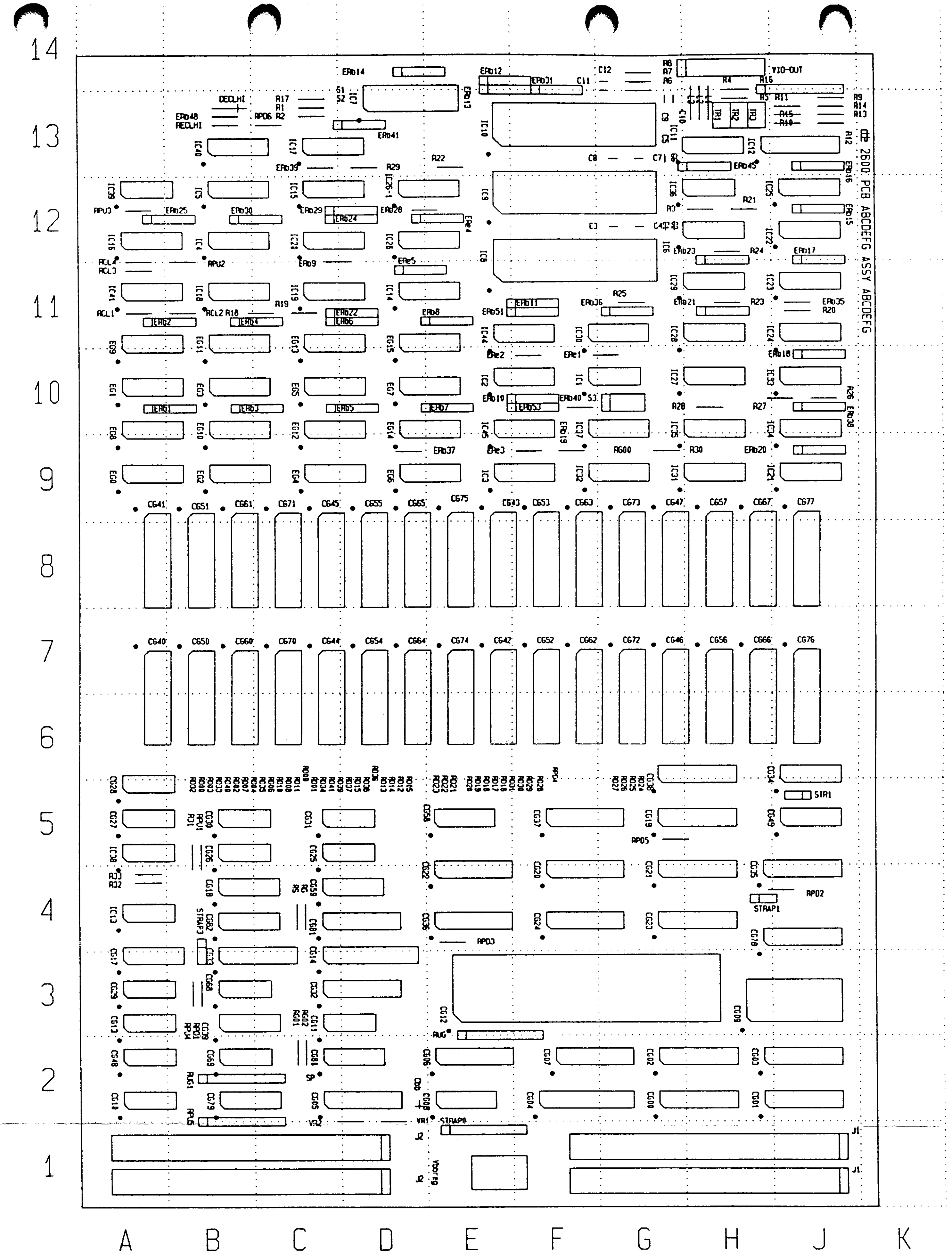
Function: Graphic start fine adjust.
S3 ic located between IC1 and IC32.

```
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 resyncronizing.



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Issue	Date	
0	861101	dde 2600
1		
2		Component-ID
3		
4		Parts no
5		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.Al	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

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Issue	Date
0	------
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Component Locations

Parts no

Dwg. no.

2

Name	Type	Pos
RCL4	47R	A12
RD00	33R	B5
RD01	33R	C5
RD02	33R	B5
RD03	33R	B5
RD04	33R	C5
RD05	33R	D5
RD06	33R	C5
RD07	33R	B5
RD08	33R	C5
RD09	33R	C5
RD10	33R	C5
RD11	33R	C5
RD12	33R	D5
RD13	33R	D5
RD14	33R	D5
RD15	33R	D5
RD16	33R	E5
RD17	33R	E5
RD18	33R	E5
RD19	33R	E5
RD20	33R	E5
RD21	33R	E5
RD22	33R	E5
RD23	33R	E5
RD24	33R	G5
RD25	33R	G5
RD26	33R	G5
RD27	33R	G5
RD28	33R	F5
RD29	33R	F5
RD30	33R	F5
RD31	33R	F5
RD32	33R	B5
RD33	33R	B5
RD34	33R	C5
RD35	33R	C5
RD36	33R	D5
RD37	33R	D5
RD38	33R	D5
RD39	33R	D5
RD40	33R	B6
RD41	33R	C6
RECLHI	1K2	B13
RG	47R	C4
RG00	1K	G9
RG01	270R	C2
RG02	2K7	C3
RPD1	33R	B3
RPD2	33R	J4
RPD3	33R	E4
RPD4	33R	F6
RPD5	33R	H5
RPD6	33R	C13
RPU1	1K	B5
RPU2	1K	B12
RPU3	1K	A12
RPU4	1K	B3
RPU5	SIL-9x3K3	B2
RS	47R	C4
RUG	SIL-9x3K3	E3
RUG1	SIL-9x3K3	B2
R1	Not-mounted	C13
R2	Not-mounted	C13
R3	1K96-1%-MR25	H12
R4	1K96-1%-MR25	H14
R5	1K96-1%-MR25	H13
R6	Not-mounted	G14
R7	Not-mounted	G14
R8	Not-mounted	G14

Name	Type	Pos
R9	68R	J13
R10	68R	J13
R11	68R	J13
R12	68R	J13
R13	68R	J13
R14	68R	J13
R15	68R	J13
R16	SIL-9x150R	H14
R17	560R	C13
R18	560R	B11
R19	560R	C11
R20	560R	J11
R21	560R	H12
R22	560R	E13
R23	560R	H11
R24	560R	H12
R25	560R	G11
R26	560R	J10
R27	560R	J10
R28	560R	H10
R29	560R	D13
R30	560R	G9
R31	1K	B4
R32	33R	A4
R33	33R	A4
SP	STRAP	C2
STRAP0	STRAP	E1
STRAP1	STRAP	H4
STRAP3	STRAP	B4
STR1	STRAP	J5
S1	STRAP	D13
S2	STRAP	D13
S3	STRAP	G10
TR1	TR.POT-500R	H13
TR2	TR.POT-500R	H13
TR3	TR.POT-500R	H13
VID-OUT	20P-HEADER	H14
VR1	301R-1%-MR25	D2
VR2	562R-1%-MR25	C2
Vbbreg	LM337KC	E1
cbb1	100nF-Cer	B11
cbb2	100nF-Cer	A11
cbb3	100nF-Cer	A10
cbb4	100nF-Cer	B10
cbb5	100nF-Cer	C10
cbb6	100nF-Cer	D10
cbb7	100nF-Cer	D11
cbb8	100nF-Cer	C11
cbb9	100nF-Cer	A12
cbb10	100nF-Cer	B12
cbb11	100nF-Cer	C12
cbb12	100nF-Cer	D12
cbb13	100nF-Cer	J10
cbb14	100nF-Cer	J12
cbb15	100nF-Cer	J13
cbb16	100nF-Cer	G12
cbb17	100nF-Cer	J9
cbb18	100nF-Cer	E10
cbb19	100nF-Cer	E11
cbb20	100nF-Cer	F11
cbb21	100nF-Cer	J12
cbb22	100nF-Cer	J10
cbb23	100nF-Cer	G11
cbb24	100nF-Cer	D14
cbb25	100nF-Cer	F14
cbb26	100nF-Cer	E14
cbb27	100nF-Cer	C13
cxx1	10uF/16V-Sol.Al	A2
cxx2	100nF-Cer	A2
cxx3	100nF-Cer	A3

Name	Type	Pos
cxx4	100nF-Cer	A4
cxx5	100nF-Cer	A4
cxx6	100nF-Cer	A5
cxx7	100nF-Cer	A5
cxx8	100nF-Cer	A6
cxx9	100nF-Cer	A7
cxx10	100nF-Cer	A7
cxx12	100nF-Cer	A8
cxx13	100nF-Cer	A9
cxx14	100nF-Cer	A10
cxx15	100nF-Cer	A10
cxx16	100nF-Cer	A11
cxx17	100nF-Cer	A11
cxx18	100nF-Cer	A12
cxx19	100nF-Cer	A13
cxx20	100nF-Cer	A13
cxx23	100nF-Cer	K13
cxx24	100nF-Cer	K13
cxx25	100nF-Cer	K12
cxx26	100nF-Cer	K11
cxx27	100nF-Cer	K11
cxx28	100nF-Cer	K10
cxx29	100nF-Cer	K10
cxx30	100nF-Cer	K9
cxx31	100nF-Cer	K8
cxx33	100nF-Cer	K7
cxx34	100nF-Cer	K7
cxx35	100nF-Cer	K6
cxx36	100nF-Cer	K5
cxx37	100nF-Cer	K5
cxx38	100nF-Cer	K4
cxx39	100nF-Cer	K4
cxx40	100nF-Cer	K3
cxx41	100nF-Cer	K2
cxx42	100nF-Cer	K2
cyy2	100nF-Cer	C9
cyy3	100nF-Cer	D9
cyy4	100nF-Cer	E9
cyy5	100nF-Cer	F9
cyy6	100nF-Cer	G9
cyy7	100nF-Cer	H9
cyy9	100nF-Cer	C10
cyy10	100nF-Cer	D10
cyy11	100nF-Cer	E10
cyy12	100nF-Cer	F10
cyy13	100nF-Cer	G10
cyy14	100nF-Cer	H10
cyy16	100nF-Cer	C10
cyy17	100nF-Cer	D10
cyy18	100nF-Cer	E10
cyy19	100nF-Cer	F10
cyy20	100nF-Cer	G10
cyy21	100nF-Cer	H10
cyy22	100nF-Cer	E12
cyy23	100nF-Cer	C11
cyy24	100nF-Cer	D11
cyy25	100nF-Cer	E11
cyy26	100nF-Cer	F11
cyy27	100nF-Cer	G11
cyy28	100nF-Cer	H11
cyy29	100nF-Cer	E13
cyy30	100nF-Cer	C11
cyy31	100nF-Cer	D11
cyy32	100nF-Cer	H11
cyy33	100nF-Cer	E13
cyy34	100nF-Cer	C12
cyy35	100nF-Cer	D12
cyy36	100nF-Cer	H12
cyy37	100nF-Cer	C13
cyy38	100nF-Cer	D13

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Component Locations

Parts no.

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 auxilary 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.

JF1−3		
Pin	**Signal**	**Description**
1	+12V	Positive supply
2	FAN	Fan control
3	GND	Ground

Interface to front panel LCD display

The front panel display consists of a 2 × 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.

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

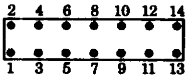
Voltage	Typical current
+ 5 V ±5%	3.0 A
+12 V ±5%	0.2 A
−12 V ±5%	0.2 A

The power requirements above does not include fan power consumption.

Straps on 4250

* designates factory installed position.

ST1:

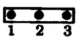


Watchdog frequency		
	1-2	400 ms
	3-4	800 ms
*	5-6	1600 ms
Timer interrupt frequency		
*	7-8	12.8 ms
	9-10	25.6 ms
	11-12	51.2 ms
	13-14	102.4 ms

ST2:

Battery power for real time clock		
*	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

Installation

Before a Service Computer is installed in a Supermax 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

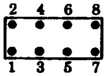
The configuration switch SW2 is a 8 position DIP switch, which must be set according to the following.

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.

	1	2	3	4	5	6	7	8
Supermax 24	On	On	Off	Off	Off	Off	Off	Off
Supermax 12	Off	Off	Off	Off	Off	Off	Off	Off
Supermax 6	Off	Off	Off	Off	Off	Off	Off	Off

• **ST8:**



Clock select, watchdog		
	1-2	12.8 ms
*	3-4	25.6 ms
	5-6	51.2 ms
	7-8	Internal

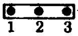
ST9, ST10, ST11, ST12, ST13:

Modem controller select		
	1-2	SC11091
*	2-3	SC11011

ST14:

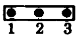
Modem controller select		
*	1-2	SC11011
	NC	SC11091

ST4:



Direction of CD signal on port 2		
	1-2	Output
	2-3	Input
*	NC	Not used

ST5:

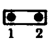


Direction of CD signal on port 3		
	1-2	Output
	2-3	Input
*	NC	Not used

ST6:

Disk change signal from floppy		
*	1-2	Connected
	NC	Disconnected

ST7:

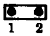


Clock select, watchdog		
*	1-2	External, see ST8
	NC	Internal

. Straps on 4260

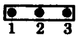
* designates factory installed position.

ST11:



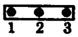
LED back light for LCD display		
*	1-2	ON
	NC	OFF

ST12:



Power fail signal from power supply 1		
	1-2	Active high
*	2-3	Active low

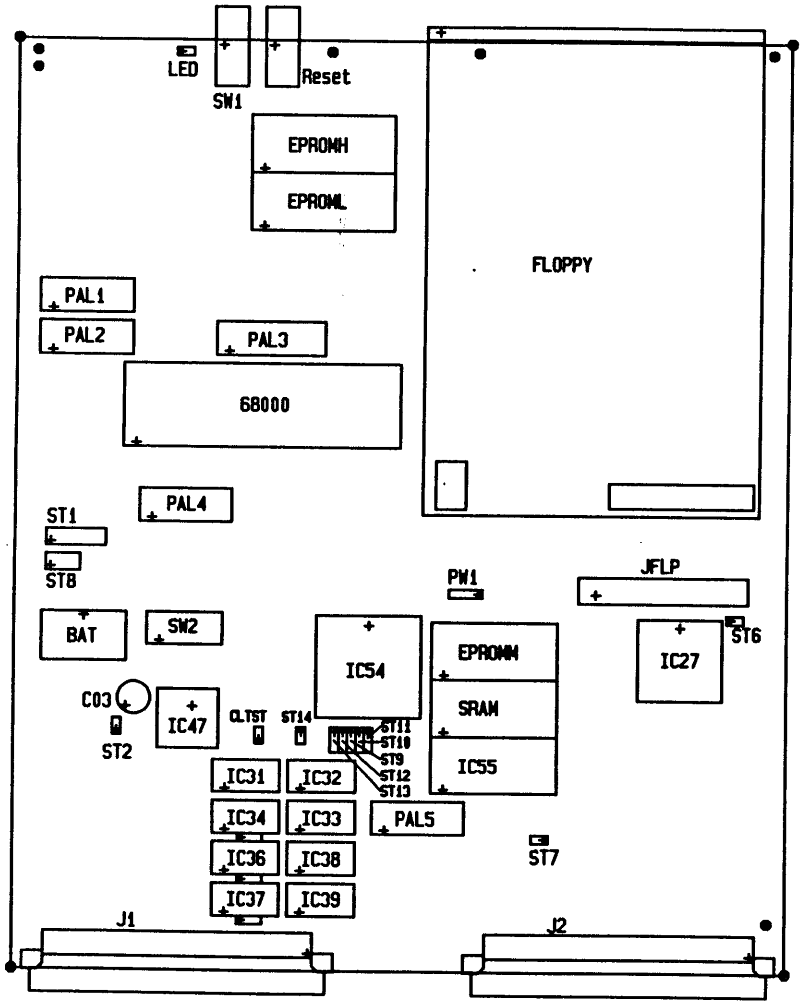
ST13:



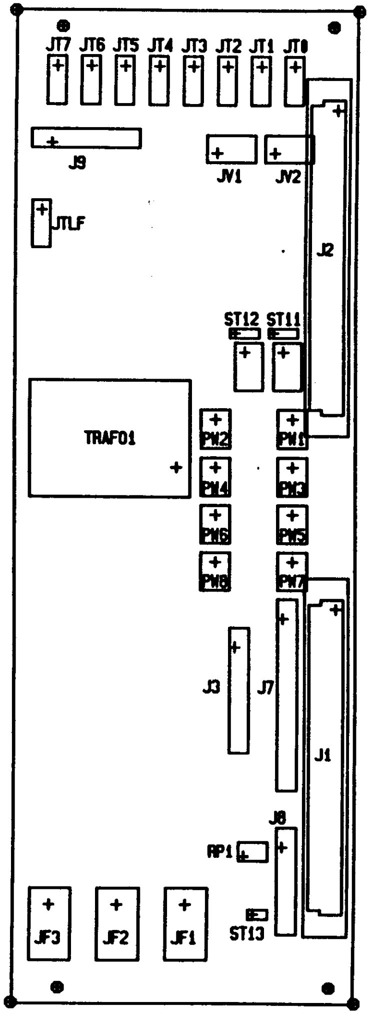
Power fail signal from power supply 2		
	1-2	Active high
*	2-3	Active low

RP1:

The resistor RP1 should be adjusted until the LCD display has the highest possible readability.



Board layout 4250.



Board layout 4260.