RC 700 USER GUIDE

piccolo®

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USER GUIDE

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1. INTRODUCTION

These directions for use describe how to use your new PICCOLO Microcomputer system.

Chapter 2 describes how the system is installed and assembled, whereas the flexible disc drive, the display unit, and the keyboard are described in the chapters 3 to 5.There is a separate description of the matrix printer.

Chapter 6 describes how to use the system in the day's work, i.e. how to start up and how to change from one programming language to another.

The actual programming is dealt with in special manuals.

We recommend you to read the first 6 chapters carefully, before you begin to use the system.

Chapter 7 gives instructions about how to start up the microcomputer if it is to be used primarily as a terminal.

Chapter 8 describes some of the situations in which errors may occur.

The chapters 9 to 11 contain technical data and charts.

RC COMPUTER hope that your new microcomputer system will be very useful to you, and should any problems arise, you are welcome to write to your distributor.

2. MICROCOMPUTER, INSTALLATION

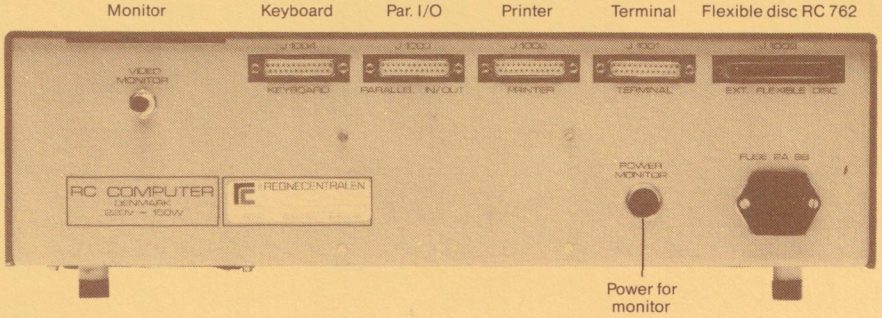
2.1 The location of the system
Place the system on a solid table, not over a radiator or in strong sunshine. Make sure that the ventholes are not covered. Dust, damp and tobacco smoke should be avoided. Reflections in the display surface can be tiring, so try to place the unit in various ways to find out which one is the best.

2.2 Connection to the electric supply mains

The microcomputer is connected to a socket outlet with earth (3-pole). Apart from increasing the security, the earth connection serves to protect the electronic equipment against electric noise.

2.3 Coaxial cables

The coaxial cable is connected to the socket "VIDEO MONITOR" and the antenna socket. The keyboard is connected to the socket "KEYBOARD". Put the plug carefully in the socket, and screw up the two screws, but not too tight. The highest voltage in these cables and the other plugs and sockets is 15 Volts.



2.4 Fuses

The fuse (+ one spare one) is placed behind the power connection socket in a small drawer. A blown fuse should only be replaced once. If the second fuse blows too, there is something wrong, and the computer should be repaired by your distributor.

3. FLEXIBLE DISC DRIVES (MINI AND MAXI)

Flexible disc drive or Floppy Disc. The latter name is the one generally used, although it is actually a slang phrase for the flexible disc.

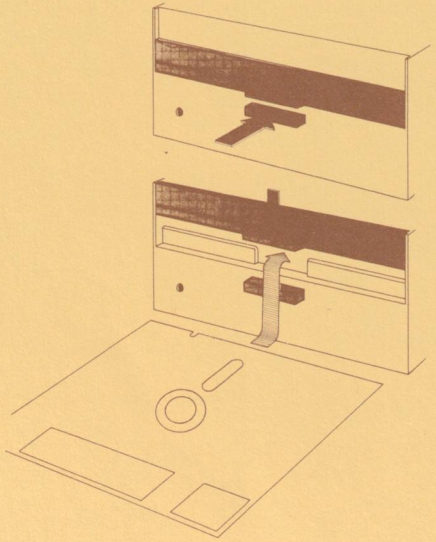
There are 2 types: MINI, which is built into the cabinet of the microcomputer, and MAXI, which is detached. The maximum number that can be installed is 2, marked 1 and 2.

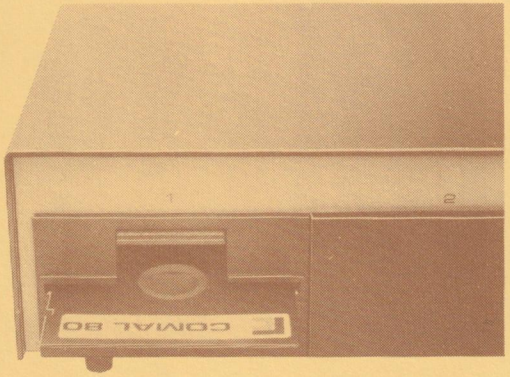
NB: It is not possible to have both MINI and MAXI drives on the same central processing unit at the same time.

3.1 How to insert the flexible disc

MAXI: When the oblong button is pressed, the door flies open. If there is already a flexible disc in the drive, it will be pushed out a few centimetres, ready to be removed.

MINI: The door is tipped upwards. Place a new flexible disc in the opening with the label upwards as shown on the picture and press it into the opening until it is locked. All this can be done no matter whether the motor is running or not. The red lamp will be alight when data is transferred to or from the flexible disc.



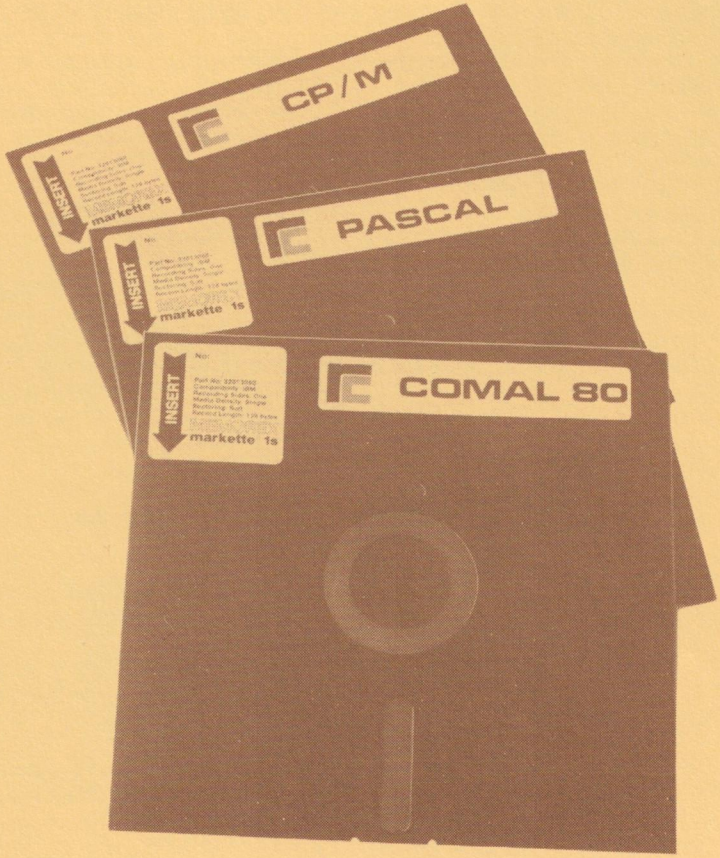


3.2 The flexible disc

The flexible disc is a thin, plastic coated disc and the surface can be magnetised. This disc is contained in a closed cardboard envelope. Reading and writing is done in the oblong slit while the disc rotates. Do not touch or damage the coating visible in the slit.

3.2.1 Care of the discs

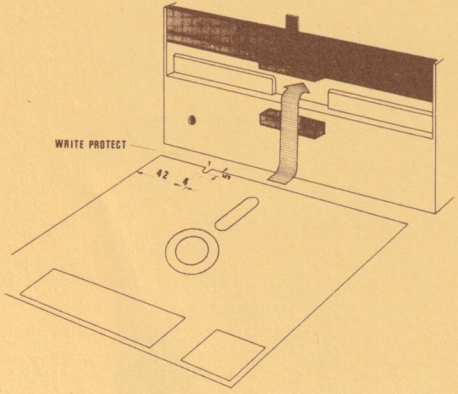
Flexible discs should always be kept in protective covers. They must not be subjected such as writing done with a ballpoint pen on the cover when the disc is inside.



3.2.2 Write protection

MAXI: Write Protect. If you wish to protect what has already been written on the flexible disc from being over-written (this automatically deletes the "old" data), you can make a notch in the envelope, as shown below. A hole puncher and a pair of scissors can be used for this (measurements in millim-etres).
If, later on, you want to write on the flexible disc, the notch can be covered by a piece of opaque tape.

MINI: Write Protect. Is protected by covering the notch on the edge with tape (please notice that the opposite is the case with MAXI).



3.2.3 Flexible disc types

MAXI 8" single density,
IBM-formatted.

The flexible discs used are either single sided, as e.g. IBM 1, No. 2305830, or reversible single sided (with two symmetrically placed index holes) as e.g. 3M SCOTCH, 740/2-0.

MAXI 8" dual density,
IBM-formatted.

All standard types of flexible discs with a sector length of up to 512 bytes can be used in the COMAL80 systems. We can recommend a dual density, dual sided flexible disc as e.g. 3M SCOTCH 743-0-512 or a similar type, in order to get the largest possible background storage capacity.

MINI 5¼" dual sided,
Unformatted.

VERBATIM MD 550-01 or a similar flexible disc is used.

In the COMAL80 systems the standard for the formatting of flexible discs is dual density with 512 bytes per sector.

In other cases the standard is single density with 128 bytes per sector.

4. DISPLAY UNIT

4.1 Control buttons and plugs

Front:

OFF-ON:
(a red lamp will be alight)

BRIGHT = picture brightness

CONT. = contrast

Back:

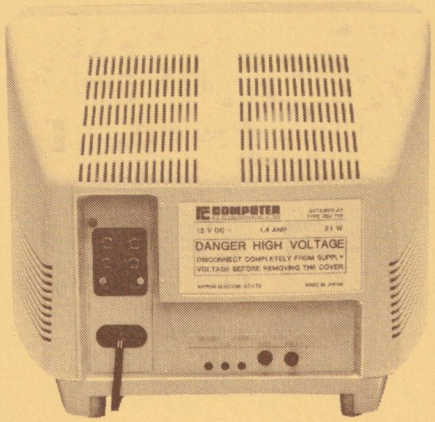
V. HOLD = Vertical Hold

H. HOLD = Horizontal Hold

Power connection plug:
put the plug in the socket MONITOR POWER on the back of the microcomputer (15 V direct current).

VIDEO IN:
is by means of the coaxial cable connected to MONITOR VIDEO on the back of the microcomputer, the change-over switch is set at 75 OHM.

VIDEO OUT:
Is used if you wish to connect an extra display unit (e.g. in connection with a demonstration to a group of people). The cable must be a coaxial cable with an impedance of 75 ohm, and the VIDEO IN on the extra machine must also be marked 75 ohm. The change-over switch at VIDEO OUT should now be switched to HIGH.



4.2 How to use the display unit

Turn on the unit and adjust the picture brightness and the contrast. A dimly luminous background gives the most pleasant display. Turn down the picture brightness or turn off the unit if it is not to be used for a long period of time. As the text is always written in the same place, the internal coating of the picture tube may in the course of time be impaired in these places.

4.3 Cleaning

Wipe the picture tube with a soft cloth moistened with a solution of a window cleaning preparation. Do not scratch the antireflection coating with a sharp instrument.

5. KEYBOARD

Besides the functions shown on the drawing, the following additional functions are available.

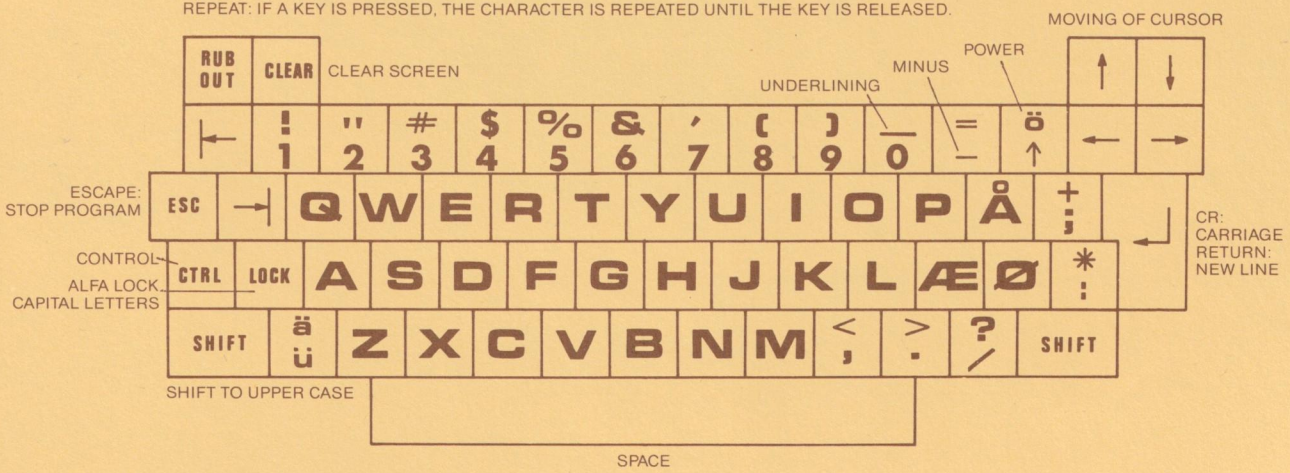
CTRL + E: (ESCAPE) = ESC
+ L: (CLEAR SCREEN) = CLEAR
+ M: (CARRIAGE RETURN) = ↵
+ J: (NEW LINE/ CURSOR DOWN) = ↓
+ H: (CURSOR LEFT) = ←
+ X: (CURSOR RIGHT) = →
+ Z: (CURSOR UP) = ↑

CTRL - key is pressed while the other key (the key following +) is activated.

CTRL + other characters and ← → may have different meanings depending on the software, why you are asked to verify in the appropriate user manuals.

If a key is pressed for more than 0.7 sec., the character is repeated with 0.1 sec. intervals until the key is released.

CURSOR: BLINKING UNDERLINE OR FIELD SHOWING WHERE THE NEXT CHARACTER WILL BE PLACED
REPEAT: IF A KEY IS PRESSED, THE CHARACTER IS REPEATED UNTIL THE KEY IS RELEASED.



UPPER CASE: CAPITAL LETTER OR UPPER CHARACTER
LOWER CASE: SMALL LETTER OR LOWER CHARACTER

6. HOW TO USE THE COMPUTER

6.1 Introduction

When the computer is working, the memory contains 4 different programs, which means that the computer can be used in 4 different ways.
The 4 programs are:

- COMAL, which is a program that permits the user to type, correct, and execute his COMAL-programs.
- TERM, which is a program that makes the computer function as an ordinary terminal that can be connected to a larger computer, e.g. RC3600, RC7000, or RC8000.
- CATALOG, and
- SYSTEM, which are used for the formatting of flexible discs, so that they can be used to store COMAL-programs and data. CATALOG generates a catalog on the flexible disc.

When this has been done, programs and data can be stored in files that are described in the catalog. If a mini flexible disc is used CATALOG will start with the formatting of the flexible discs. SYSTEM only generates a catalog on flexible discs that do not have such a catalog already. NB: If mini flexible discs are used, no catalog will be generaed. Part of the memory (among other things the 4 programs mentioned) is, furthermore, written out in a number of files on the flexible disc. This means that the user has a possibility of producing system flexible discs which can be used when starting up the system.

Apart from these 4 programs, which can be used by the user directly, the memory contains a program, the supervisory system, which, among other things, controls the peripheral units (flexible disc drive, printer, etc.). Furthermore, the supervisory system is responsible for starting and stopping the 4 programs mentioned above (in accordance with the instructions given by the user).

6.2 How to start up the computer
When the computer system has been assembled and connected to the electric supply mains (see chapter 2) the system is started in the following way:

1) Turn on the display unit and the microcomputer.

2) Place the system flexible disc in the drive as described in chapter 3. The system flexible discs supplied by RC COMPUTER is marked:

   RC 700 COMAL
   80.10.23
   SYSM 1.12
   SYSC 1.10

3) Activate the RESET-button on the microcomputer.

The system programs (i.e. the supervisory system, COMAL, TERM, CATALOG, and SYSTEM will now be read into the memory from the system flexible disc. The supervisory system will start COMAL, and when this has been done the text RC700 COMAL REV. XX.XX will appear on the display unit.

The system is now ready to be used, which means that the user can type, correct, and have his COMAL-programs executed. The use of COMAL is described in a separate manual and will therefore not be described in detail here.

When the RESET button on the microcomputer is activated, the computer will be restarted provided that a system flexible disc has been placed in the drive.

6.3 How to change from one program to another

When you wish to change from one program to another (i.e. to/from the 4 programs COMAL, TERM, CATALOG, and SYSTEM) you must first of all make the supervisory system stop the program that is running.
COMAL is stopped by typing BYE "RETURN" ("RETURN" means that the user must press the key marked ↵).

TERM is stopped by typing "CTRL" and "ESC" at the same time.

CATALOG and SYSTEM stop automatically when a catalog has been generated (and the system programs have been written out, if desired).

When a program has been stopped, the text
PROGRAM?
appears on the display unit, and the user can now start another program by typing the name of the program and then press the "RETURN"-key.

6.4 How to use TERM, CATALOG and SYSTEM

The TERM program is used when the computer is to be used as a terminal. Before the computer can be used in this way, it must be connected to another computer (via the socket marked "TERMINAL" on the microcomputer). If the connection is effected via a modem, the modem must be turned on and the connection established. When the program has been started, the text
TRANSMISSION SPEED?
appears on the display unit. The user replies by typing one of the numbers
50-110-300-1200-2400
depending on the speed of transmission used on the connection to/from the host computer. The number typed must be followed by "RETURN".

The terminal is now ready to be used, and the host computer can be informed of the terminal being connected. Before the TERM-program is stopped (by typing "SHIFT" and "ESC" at the same time) the host computer should be informed of the terminal closing down.

CATALOG and SYSTEM

As mentioned in section 6.1 the program CATALOG generates a catalog on a flexible disc, whereas the program SYSTEM writes the system programs on the flexible disc, so that it can be used as a system flexible disc. When one of the two programs is started the following text appears on the display unit
PLACE THE FLEXIBLE DISC IN THE DRIVE, TYPE "RETURN".

The user must now place either a new flexible disc or a flexible disc that may be overwritten, in the drive (see chapter 3). When this has been done "RETURN" is typed, and the CATALOG- or SYSTEM program will now perform its function, and the user can then start another program when the text PROGRAM? appears.

NOTICE!

1) It is only the system on the flexible disc that will be overwritten, i.e. programs and data will not be changed.

2) We advise you to make 2-3 system flexible discs as "spare discs" as soon as you have received the computer.

3) The flexible disc drive is provided with two read/write heads. However, in some versions of the system programs only one of them is used.

There are 3 different types of flexible discs.

1) Single Sided: Can only contain data on one side.

2) Reversible Single Sided: Can contain data on both sides, but it is only possible to use one side at a time.

3) Dual Sided: Can contain data on both sides, and they can be used at the same time.

All three types of flexible discs can be used in the present version of the microcomputer. If you wish to use the entire capacity of type 2), cataloges must be generated on both sides of the flexible disc, and when it has been placed in the drive with "page 1" up, files generated on "page 2" can not be read (and vice versa).

NB: Write protection of the flexible disc only affects page 1.

6.5 How to close down the system
Before the user leaves the system, the procedure mentioned below must be followed:

1) Stop the program running (press the ESC-key and type "BYE" if COMAL is used, press CTRL and "ESC" if TERM is used).

2) Remove the flexible disc from the drive and place it in its cover.

3) If the computer is not to be used within the next 10-15 minutes, the microcomputer and the display unit should be turned off.

7. STARTING UP THE COMPUTER AS A TERMINAL

If the microcomputer is to be used as a terminal, this can, as mentioned in chapter 6, be done by starting the program TERM.

It is, however, possible to make the microcomputer function as a terminal without the user starting the program TERM. In this case the system flexible disc used during the start-up must have a file, SYSA, that contains the word TERM. During the stat-up the supervisory system will try to find the file SYSA, and if that file does exist, the supervisory system will start the program stated in that file.

The file must only contain the word TERM, otherwise the supervisory system will start COMAL.

The file SYSA can be generated, initialized, and deleted by means of COMAL.

The following program generates the SYSA file:

```
10 DIM BUF$ (128), PROG$ (4)
20 CREATE "SYSA", SYSFIL, BUF$,
   128,1.
30 LET PROG$ ="TERM"
40 PUT SYSFIL, 1:PROG$
50 CLOSE SYSFIL
```

8. ERRORS

During the start-up and when the programs TERM, CATALOG, and SYSTEM are used, the errors described below may occur. Errors that occur when using COMAL are described in the COMAL manual.

Errors will normally show themselves in that an error message appears on the display unit.

This chapter deals with the error messages that may occur, the reason why they may occur, and describes how to correct them. If it is not possible for the user to correct the error by following the instructions, an error report can be forwarded to RC COMPUTER or your distributor.

The error report must contain information of how the error shows itself, of what has been done to correct it, and the effect of this.

The forms to be used when reporting an error can be obtained from RC COMPUTER or your distributor.

If the user is sure that there is a defect in the hardware, it can be repaired by the distributor.

8.1 Errors during start-up

1) If "nothing happens" when starting up, please find out
   - whether the microcomputer and the display unit have been turned on.
   - whether the right connection between the microcomputer and the display unit has been established (see chapter 2).
   - whether the contrast and picture brightness of the display unit have been correctly adjusted (see chapter 4).
   - whether a system flexible disc has been placed in the drive.
   - whether connection to another PICCOLO, if any, has been correctly established. This applies to the use of line selector as well as autoload from another flexible disc.

2) If the text
   NO SYSTEM FILES
   appears during the start-up, it means that the flexible disc placed in the drive is not a system flexible disc. Maybe a system flexible disc or a catalog disc has not been placed correctly in the drive. The user must try to start up by using the flexible disc supplied by RC COMPUTER.

8.2 Errors in connection with TERM

The text
LINE NOT READY
may appear when the TERM program is started up. This may mean that there is something wrong with the transmission line to the host computer, i.e. that the correct connection between the microcomputer and the host computer has not been established. The reason for this may be that wrong cables have been used, or that a modem has not been turned on or does not function.

If the connection to the host computer is interrupted, the text
LINE BROKEN
appears. If an error occurs during the running of the program TERM, the program will be disconnected, and the user can choose another program.

8.3 Errors in connection with CATALOG and SYSTEM

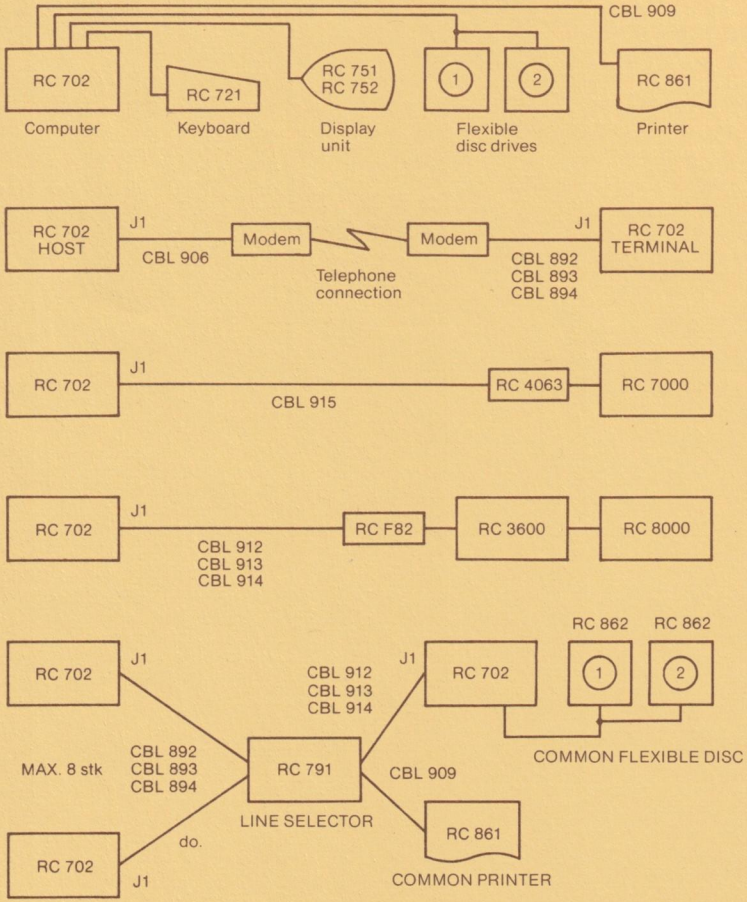
When the CATALOG or SYSTEM program is running, the text
FLEXIBLE DISC ERROR
may appear. This is caused by errors that have occured when writing on the flexible disc. The reason may be:

- that the flexible disc has been damaged - try a couple of times with other flexible discs.
- that a wrong type of flexible disc is used (see section 6.4.2).
- that the flexible disc has not been placed correctly in the drive (see chapter 3).
- that the flexible disc is write protected (see section 3.2.2).

9. TECHNICAL DATA

9.1 Signal cables, connections

Cable No.	Length in m.	RC order No.
CBL 892	5	MF 003 S
CBL 893	12	MF 003 M
CBL 894	25	MF 003 L
CBL 906	5	MF 004 S
CBL 909	5	Delivered with printer
CBL 912	5	MF 009 S
CBL 913	12	MF 009 M
CBL 914	25	MF 009 L
CBL 915	25	MF 010 L



9.2 Dimension, Weight, Consumption

MICROCOMPUTER	RC702: w = 460. h = 140. d = 290 (mm). Weight: 10.5 kg
DISPLAY UNIT	RC752: w = 360. h = 300. d = 330 (mm). Weight: 6.5 kg
KEYBOARD	RC721: w = 380. h = 50. d = 235 (mm). Weight: 3.0 kg
FLEXIBLE DISC DRIVE	RC762: w = 290. h = 140. d = 460 (mm). Weight: 13.5 kg

VOLTAGE AND CONSUMPTION:

MICROCOMPUTER	100W, 220V + EARTH, 50 Hz
DISPLAY UNIT	21W, 15V DC
FLEXIBLE DISC DRIVE	80W, 220V, + EARTH, 50 Hz
Ambient temperature:	10-30°C

9.3 Microcomputer
Z80A microprocessor, 8 bits, 4MHz

ROM: 2KB
RAM: 48KB (max. 64KB)
Access time: 480 nanoseconds
Plugs:

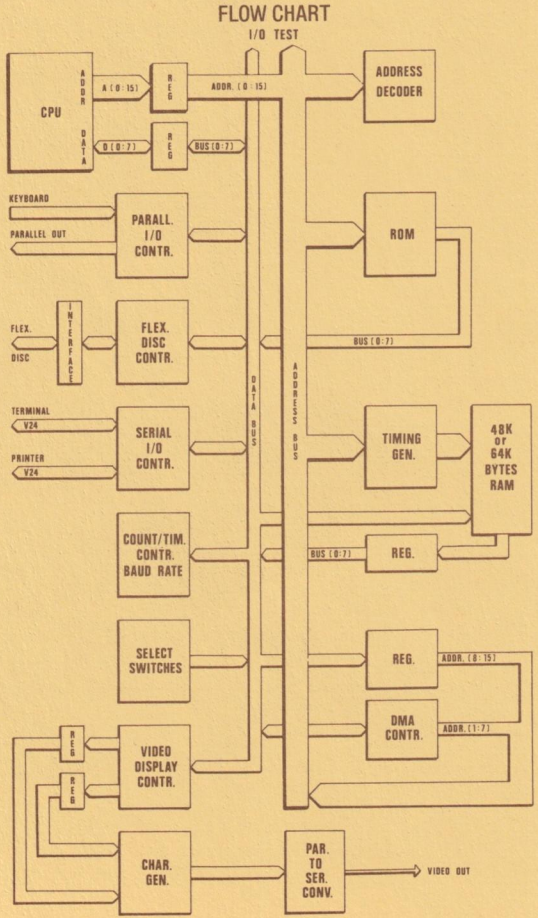
Printer V24	25p D-plug (1200 bit/sec)
Terminal V24	25p D-plug
Keyboard	25p D-plug
Parallel In/Out	25p D-plug (8 bits parallel in/out)
Display unit	75 ohm BNC

Flexible disc drive, built-in (max. 2)
Flexible disc: 5¼" single density, dual sided, 128 bytes/sector, 0.12MB
or 5¼" dual density, dual sided, 512 bytes/sector, 0.32MB

Flexible disc drive, detached (max. 2)
Flexible disc: 8" single density, single sided, 128 bytes/sector, 0.25MB
or 8" dual density, dual sided, 512 bytes/sector, 1.2MB

10. FLOW CHART ABBREVIATION

ABBREVIATION	FULL NAME
CPU	Central Processing Unit
	Address Decoder
REG	Register
ROM	Read Only Memory
	Bus
	Keyboard
Contr.	Controller
I/O	Input/Output
	Interface
	Printer
	Baud Rate
	Terminal
RAM	Random Access Memory
K	Kilo = 1024
B	Byte
Char.Gen	Character Generator
DMA	Direct Memory Access
Par.to.Ser.	Parallel to Serial
Conv.	Converter
A (0:15)	Address, bit 0 til 15
D (0: 7)	Data, bit 0 til 7
V24	Internationally adopted rules for signal transmission over the telephone network. Also used for connection to printers and the like.



Signals V24:

Pin 2 TRANSMITTED DATA
Pin 3 RECEIVED DATA
Pin 4 REQUEST TO SEND
Pin 5 CLEAR TO SEND
Pin 7 SIGNAL GROUND
Pin 8 DATA CARRIER DETECTED
Pin 20 DATA TERMINAL READY

11. PARALLEL IN/OUT PLUGS

This is a parallel input/output port that can transfer data to or from a peripheral unit, under program control.

The following pin connections have been used:

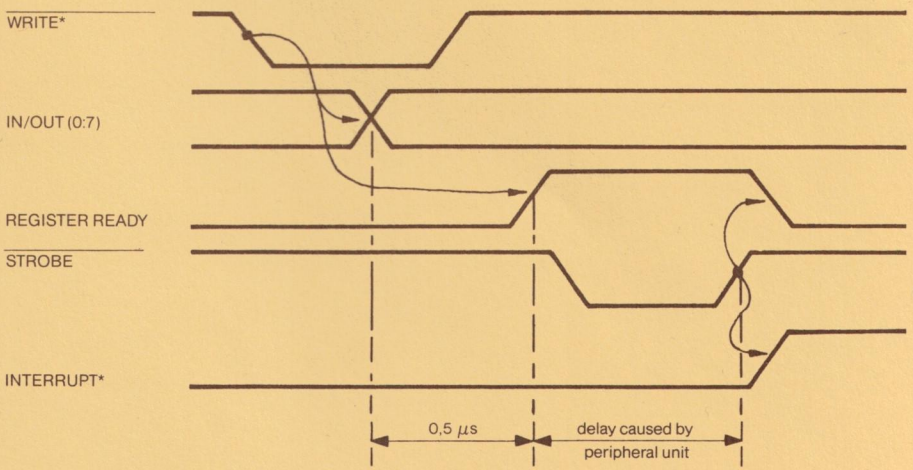
J3 pin 22	IN/OUT 0
J3 pin 23	IN/OUT 1
J3 pin 24	IN/OUT 2
J3 pin 21	IN/OUT 3
J3 pin 17	IN/OUT 4
J3 pin 18	IN/OUT 5
J3 pin 19	IN/OUT 6
J3 pin 20	IN/OUT 7
J3 pin 12	REGISTER READY
J3 pin 2	STROBE
J3 pin 3	0 VOLT
J3 pin 13	0 VOLT
J3 pin 14	0 VOLT

IN/OUT 0 is the least significant data bit, and IN/OUT 7 is the most significant data bit. REGISTER READY is a signal from RC702 and STROBE is the peripheral unit's reply to REGISTER READY.

Electrical specification of the output signals:
Logical 0: 0.0V to 0.4V. Load current max. 2.0mA
Logical 1: 2.4V to 5.0V. Load current max. 250uA

The output signals can be used to supply current to transistors in a Darlington coupler, and can supply a base current of at least 1.5mA with an output voltage of 1.5V.

TIMING DIAGRAM, for data to peripheral unit



*Internal signals in RC702

FOR YOUR NOTES:

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