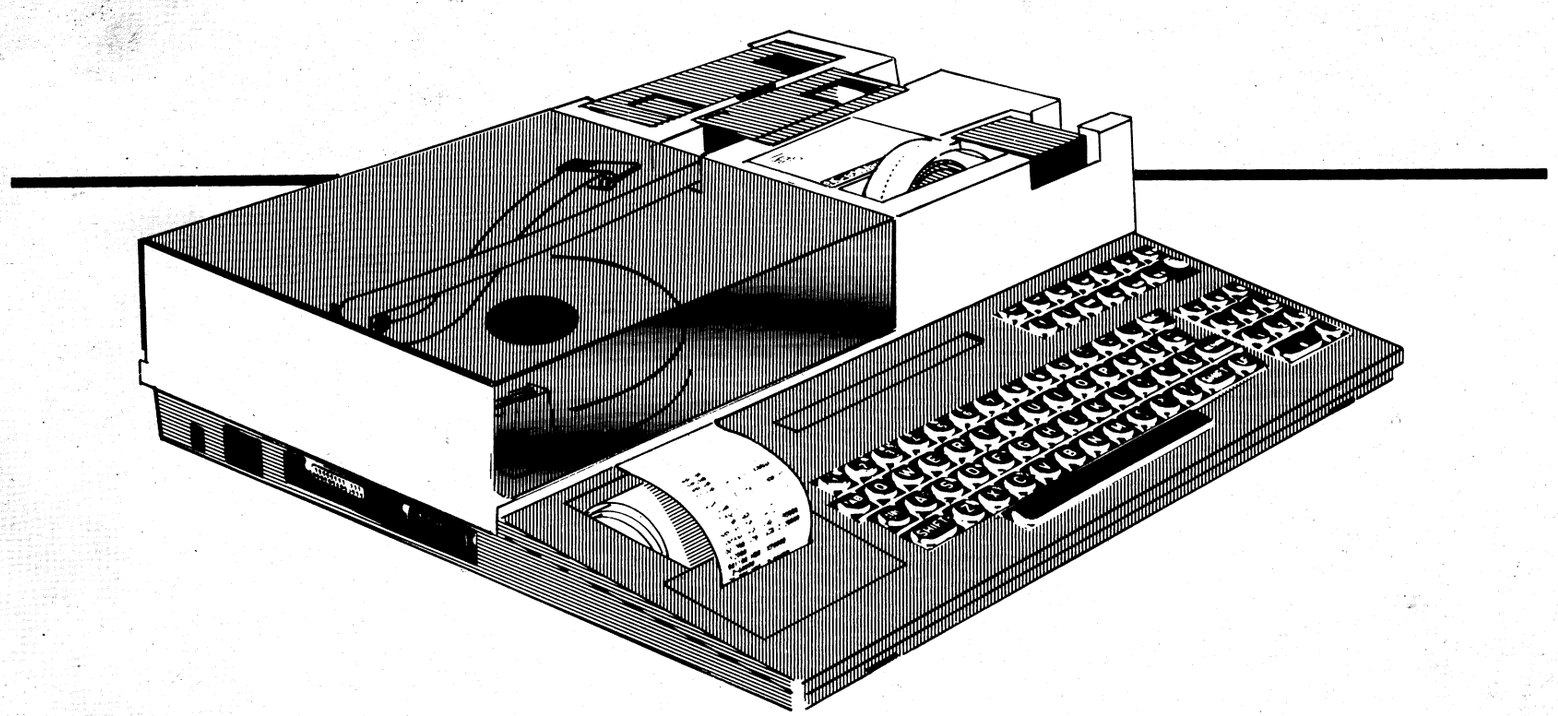
GNT AUTOMATIC A/S

GNT 5601
NC-editMaster
Instruction Manual



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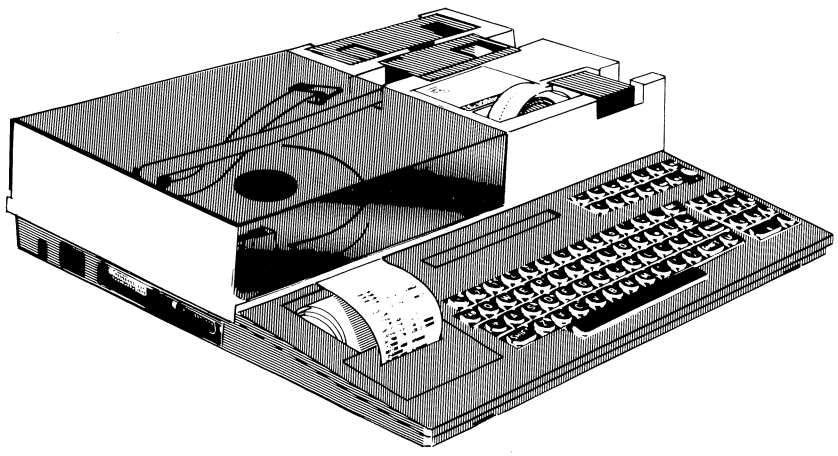


GNT 5601 NC-editMaster • Instruction Manual

Rev. 1

ADDENDUM To The GNT 5601 NC editMaster Instruction Manual

By the end of the year a new software (called version 2.0) will be supplied in the NC editMaster.

On request from some customers some facilities are added to the program, and at the same time we have reduced the noise sensitivity by inserting some filters in the software.

The new facilities can especially be found in the set-up.

On the display you will find that the text "set up" has disappeared to give space for more set-up functions.

The following pages are corrected to correspond to the new software and can be used as an addendum to the manual, i.e. it covers both the "old" and the "new" software, or the pages can replace the "old" pages with the same page numbers.

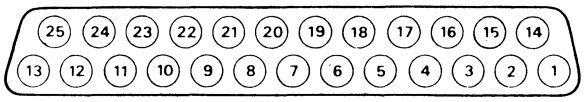
The software change is made in the 4 EPROMs on the CPU board. The EPROMs are marked "R2A".

The software change is independent of the hardware and can be used with all existing modifications of the printed circuit boards.

In the near future the interface board will become a new lay-out. At that time a current loop circuit will be added to COMM 1 connector in parallel to the TD and RD circuits, and at the same time the voltage on pin 25 will be changed from 5V to 12V limited through a resistor (see page 2-5 for the new connections). Interface boards with +5V on pin 25 are marked with a red label beside the COMM 1 connector. When the new lay-out comes into production the red label will disappear.

1984.11.13
MTS/BS-PKH

2.6.1 COMM1 revised Oct. 84



DB-25P

Pin No.	RS232C	V24	Name	Description	Remark
1	AA	101	PG	Protective Ground	
2	BA	103	TD	Transmitted Data	output
3	BB	104	RD	Received Data	input
4	CA	105	RTS	Request To Send	output
5	CB	106	CTS	Clear To Send	input
6	CC	107	DSR	Data Set Ready	input
7	AB	102	SG	Signal Ground	common return
8		109	RLSD	Received Line Signal Detect	input
20	CD	108.2	DTR	Data Terminal Ready	output
22				Must not be used	
7			TX-	Current loop transmit	minus
9			TX+	Current loop transmit	plus
13			RX-	Current loop receive	minus
18			RX+	Current loop receive	plus
24			-12V	-12V limited by 560 ohm	
25			+12V	+12V limited by 560 ohm	

NOTES:

Pin 4, RTS: Handshaking signal to peripheral indicating that COMM1 is ready to receive data.

Pin 5, CTS: Handshaking signal from the peripheral which indicates that it is ready to receive data from COMM1.

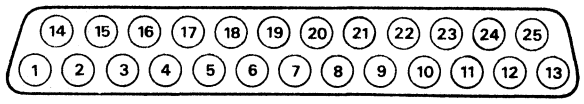
Pin 6, DSR: Must be high or floating to enable transmission from COMM1.

Pin 8, RLSD: Must be high or floating to enable transmission from COMM1.

Pin 20, DTR: Always high when COMM1 is in use.

2.6.2 COMM2

revised Sept. 83



DB-25S

Pin No.	RS232C	V24	Name	Description	Remark
1	AA	101	PG	Protective Ground	
2	BA	103	TD	Transmitted Data	input
3	BB	104	RD	Received Data	output
4	CA	105	RTS	Request To Send	input
5	CB	106	CTS	Clear To Send	output
6	CC	107	DSR	Data Set Ready	output
7	AB	102	SG	Signal Ground	common return
9,11			ERR1	Error Signal	output
12			CH1	Data Channel 1	input
13			CH2	Data Channel 2	input
14			CH3	Data Channel 3	input
15			CH4	Data Channel 4	input
16			CH5	Data Channel 5	input
17			CH6	Data Channel 6	input
18			TO	Tape Out Signal	output
19			CH7	Data Channel 7	input
20	CD	108.2	DTR	Data Terminal Ready	input
21			CH8	Data Channel 8	input
22				Must not be used	
23			PI	Punch Instruction	input
24			PR	Punch Ready	output
25			+5V	DC voltage	output

NOTES:

RS232C/V24 Signals

Pin 4, RTS: Data request from peripheral.

Pin 5, CTS: Data request from COMM2.

Pin 6, DSR: Always high when port is in use.

Pin 20, DTR: Must be high or floating to enable operation.

TTL Parallel Signals (FACIT compatible when adaptor cable is used)

Pins 9,11, ERR1: Error signal to parallel data source indicating that the NC editMaster can no longer accept data

Pins 12-17,19, DATA: TTL Data lines from parallel source

Pin 23, PI: The parallel channel reads data in when this signal goes high.

Pin 24, PR: This line is high when COMM2 is ready to receive data and goes low when it is busy.

3.5 COMM1

Entering [2nd][COMM1] causes the prompt:

```
**************************************************
* FROM: COMM1**     TO: COMM1**                  *
*                                                *
**************************************************
```

which indicates that COMM1 has started up in ON-LINE mode which can be used for manual communication between the GNT 5601 and an external device, for example when accessing a data base via modem. Typically the remote computer sends a sign-on and then expects a logon command before data can be exchanged.

In the ON-LINE mode all entries from the keybaord are transmitted to COMM1 and are not displayed. All characters received from COMM1 are displayed except those designated as control characters (00H-19H). Control characters are shown as "CT", except for 09 which is shown as "HT" (horizontal tab). Pressing [CTRL][E] will send a 350 ms break.

At any time during ON-LINE operation, a data source or destination can be specified by pressing [2nd] and then the desired key. After this, pressing [RETURN] will initiate the new communication.

The usual error messages for tape out and not ready apply.

3.6 COMM2

Entering [2nd][COMM2] first causes a prompt for I (Input) or O (Output) and then a prompt for source or destination. Like COMM1, COMM2 is a bi-directional port, but there are certain restrictions on it: Depending on the way it has been configured at SET-UP, input is either serial or parallel.

The parallel input is designed to be FACIT TTL compatible when used with the interconnecting cable (supplied as standard equipment).

COMM2's configuration is indicated on the display as either COMM2/P or COMM2/S when the port has been specified as input.

When specified as output, the display will always write COMM2/S.

3.7 TFEED

When [2nd][TFEED] is pressed, the tape will be advanced and punched with feed holes only or with feed holes plus delete (all channels) or with a SPACE character according to the type of leader selected at SETUP. See Section 3.8. Tape feed continues as long as the button is held down.

3.8 SETUP

The SETUP mode is used to display and specify all of the parameters used by the NC-editMaster. These parameters are assigned default values from the factory as follows:

READER

No file mark check	:	Reader starts on first character.
Parity check	:	Even
Input	:	ASCII

PUNCH

Leader, Trailer and Tape Feed	:	Feed holes only
Length of Leader and Trailer	:	9 inches
Comments	:	will be punched
Comment delimiters	:	( )
Manreadables	:	enabled
Parity punched	:	Even
Output	:	ASCII

COMM1

Hardware handshaking disabled	:	XON/XOFF always enabled
1200 Baud, Even parity, 2 stop bits, 7 bits/char.		
Input	:	ASCII
Output	:	ASCII

COMM2

Parallel input enabled		
Hardware handshaking disabled	:	XON/XOFF always enabled
1200 Baud, Even parity,		
2 stop bits, 7 bits/char		
Input	:	ASCII
Output	:	ASCII

CODES

Output line terminator	:	CR LF
Transmission-end character	:	Enabled, Ctrl-D

EDITOR

Automatic sequencing enabled	:	First sequence N100
	:	Increment 1

MISC.

Line numbers	:	Sent to printer
Internal printer	:	Enabled
Capslock	:	ON
Reset character	:	Ctrl-C

The SETUP mode is initiated by first pressing [2nd] and then [SETUP]. The parameters are displayed on 8 lines. Using the cursor in the usual way, you can move up and down, thereby displaying 2 of the 8 lines at a time. You also use the cursor controls to move back and forth within a particular line when you want to change a parameter.

The SETUP parameters can be changed in two different ways. When the cursor is correctly positioned you either:

1) Press the space bar to roll the display through the various values, or

2) Enter the desired value directly using the keyboard. Illegal values will be ignored.

In the figures below, those parameters which must be typed in directly are marked "T".

The parameters themselves are of two types:

1) Those which are saved in the EEPROM and need not be re-entered each time the machine is turned on, and

2) Those which must be entered each time. Note however, that default values are assigned to these by the editMaster at power-on.

In the figures below, parameters which are NOT saved are marked "N". The values shown are the default values which are installed at the factory.

When you have selected the values you want, exit SET-UP by pressing [2nd] and then [ABORT].

If you do not STORE the parameters, they will be valid as long as the machine is in use, but when it is turned off and on again, the previous set of parameters will be restored.

To save the new values you have chosen, type [ECMD], and when the display prompts for a command, answer as shown below:

```
**********************************************
*                                            *
* COMMAND: STORE                             *
**********************************************
```

When [RETURN] is hit, the display will ask you to *WAIT* a moment, and the new values will be stored.

You can, at any time, return to the factory settings by typing [ECMD] and answering DEF (default) to the prompt. When you type [RETURN], the display will again show *WAIT*, and after a moment the default values will be restored.

3.8.1 Line 1: READER

```
                    1  2   3   4  5 6 7
*************************************************
*  .READER.      NO  %. NO. \\ .E.A.  *
*                                     *
*************************************************
                       T       T  T
```

1) Should the reader start reading on a special FILE MARK character?
Use the space bar to roll YES/NO.
NOTE that the READER has to detect at least 5 TAPE FEED characters if the FILE MARK character is not used.

2) If so, what is the character?
Type in the character.
The file mark character itself will also be read.

3) Should any characters be ignored (max. 2 chars.)?
Roll between YES/NO.

4,5) If so, type in the characters. If you only want 1 character type it in twice.

6) What PARITY should the reader check for?
Roll through E/O/N (Even/Odd/None).
In this case, parity means the 8th data bit as punched on the tape.
Note that the parity selected applies only when using ASCII. EIA parity is always odd.
If an incorrect parity bit is read, the display will show:

```
*************************************************
* FROM: READER        TO: PUNCH          *
* *HALTED*  READER PARITY ERROR          *
*************************************************
```

and the reader will stop. It can be started again by pressing the SPACE bar. The incorrect character will be transmitted as " \ " (5C Hex). Note that 00 is not read.

7) Do you want the INPUT to be in ASCII or EIA code?
Roll through A/E.

3.8.2 Line 2: PUNCH

```
                1 2 3 4 5  6  7  8  9  10 11
*************************************************
* .PUNCH.   0 0 0.9 9.YES (  ).YES. E.A  *
*                                               *
*************************************************
                              T  T
```

1) What LEADER character should be punched before each job?
Use the space bar to roll through 0/D/S.

0 = Feed holes only
D = Delete characters (all channels punched)
S = "Space" character (20 Hex ASCII or 10 Hex EIA)

2) What TRAILER character should be punched after each job?
Again, use the space bar to roll through 0/D/S.

3) What character should be punched when TAPE FEED is activated?
Roll through 0/D/S.

4) How many inches long should the leader be?
Use the Space Bar to roll through 0 - 9.
Note that 1 inch = 10 characters.

5) How many inches long should the trailer be?
Roll through 0 - 9.

6) Should COMMENTS be punched on the tape?
Roll YES/NO

7) What character is to be used as START DELIMITER for a comment?
Type in the desired character.

8) What character is to used as END DELIMITER for a comment?
Type in the desired character. (Must be different from the START DELIMITER). You may use [RETURN].

9) Do you want to include MANREADABLES?
Roll through YES/NO.
If you answer YES, then use the cursor to move to line 8, and type in the desired message. Now, each time a job is punched, the tape will look like this:

MANREADABLES-LEADER-JOB-TRAILER.

10) What PARITY should be punched on the tape?
Applies to ASCII only. EIA parity is always odd.
Roll through E/O/N (Even/Odd/None)
The parity bit is the 8th bit on the tape. If No Parity is selected, the 8th channel will be blank.

11) Do you want the OUTPUT to be in ASCII or EIA code.
Roll through A/E.

3.8.3 Line 3: COMM1 (Signal Connections, See Section 2.6.1)

```
                  1   2   3  4  5 6 7
*************************************************
*  .COMM1.     0. 1200. E. 2. 7.A.A.     *
*                                                *
*************************************************
```

1) How should the port be configured?
   Roll through 0/1/2/3.
   See the table and figure below. Note that DC codes (XON/XOFF) are always enabled.

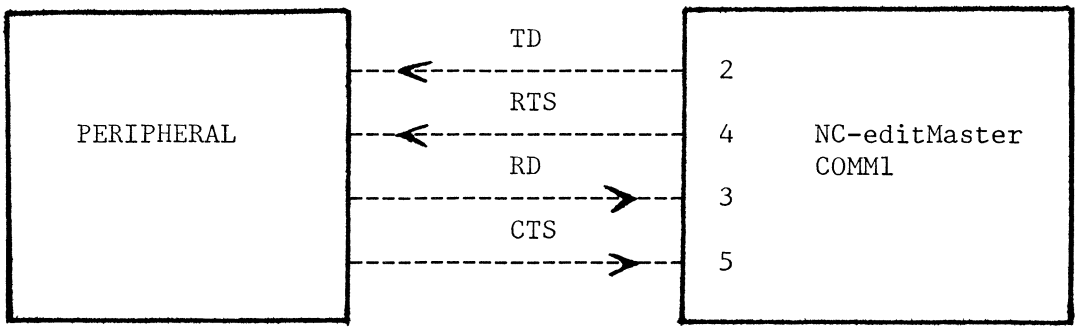
   0 = Hardware handshaking disabled. In this mode, the NC-editMaster sends XON before each transmission. When transmission ends, XOFF is sent.

   1 = RS491 Handshaking. At the start of transmission RTS=1. When transmission ends, RTS=0.

   2 = Full Duplex. At the start of transmission, RTS=1. When transmission ends, RTS=0.

   3 = Half Duplex. At the start of transmissin, RTS=1 if COMM1 is defined as output or if COMM1 is in ON-LINE mode. If COMM1 is defined as input, RTS=0. When transmission ends, RTS=0.

	TD active	TD halted	RD active	RD halted
0)	until XOFF received	XOFF received waits for XON	until buffer full then sends XOFF	sends XON when ready
1)	CTS=1	CTS=0	RTS=1	RTS=0
2)	RTS=1 CTS=1	CTS=0 RTS=0 and waits for CTS=1	RTS=1	RTS=0 CTS must = 0 before RTS=1
3)	RTS=1 CTS=1	CTS=0 RTS=0 and waits for CTS=1	RTS=0 CTS=0 CTS must=0 before RTS=1	



2) What BAUD RATE is to be used?
Roll the display through the following values:
110/150/200/300/600/1200/2400/4800/9600

3) Which type of PARITY is to be used?
Applies only when using ASCII. EIA parity is always odd.
Roll the display through E/O/N (Even/Odd/None).
Note that this is transmission parity. It is not the 8th data bit and will not, for example, be punched on the tape.

4) How many STOP BITS should be used?
Rolls through 1/2.
Note that this refers to transmitted stop bits only. The NC-editMaster requires only 1 stop bit on received data.

5) When using ASCII code, how many BITS/WORD do you require?
Roll through 7/8.

Note that when selecting COMM1, the editMaster will first enter the ON-LINE mode in which all communication is in ASCII, with a configuration corresponding to questions 1,2,3,4 and 5. There is no line terminator, as such. If you press RETURN, a carriage return is sent. If you press LINE FEED, a line feed character is sent.
When the actual data transmission is initiated, COMM1 will then respect the protocol chosen in answer to questions 1-5, Section 3.8.5.

6) Do you want the INPUT to be in ASCII or EIA code?
Roll through A/E.

7) Do you want the OUTPUT to be in ASCII or EIA code?
Roll through A/E.

3.8.4 Line 4: COMM2 (Signal connections, See Section 2.6.2)

```
          1 2  3   4 5 6  7  8   9 10 11 12
*************************************************
* .COMM2.P.0.1200.E.2.7. NO.55.080.A.A.A.*
*                                               *
*************************************************
                                T   T
                                N   N
```

1) When using COMM2 as input, what type of data is to used?
Roll through S/P (Serial/Parallel)
Use the adaptor cable if you specify P, and the parallel input is Facit TTL compatible.

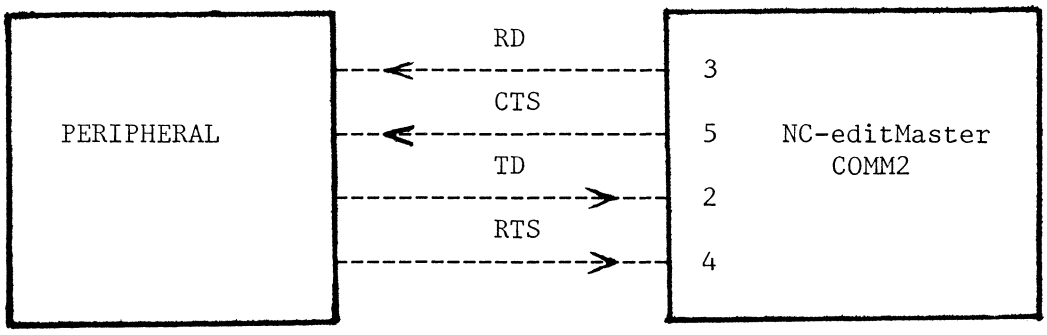
2) How should the port be configured for serial data?
Roll through 0/1/2.
See the table and figure below. Note that DC codes (XON/XOFF) are always enabled.

0 = Hardware handshaking disabled.
In this mode, the NC-editMaster sends XON before each transmission. When transmission ends, XOFF is sent.

1 = RS491 Handshaking. At the start of transmission CTS=1. When transmission ends, CTS=0.

2 = Full Duplex. At the start of transmission, CTS=1. When transmission ends, CTS=0.

	RD active	RD halted	TD active	TD halted
0)	until XOFF received	XOFF received waits for XON	until buffer full then sends XOFF	sends XON when ready
1)	RTS=1	RTS=0	CTS=1	CTS=0
2)	CTS=1 RTS=1	RTS=0 CTS=0 and waits for RTS=1	CTS=1	CTS=0



3,4,5,6) Choice of BAUD RATE, PARITY, number of STOP BITS transmitted and 7 or 8 bit ASCII code.
See the previous section.

7) Do you want to format the output?
Rolls through YES/NO.
If you answer YES, the next two questions should be answered.

8) What is the PAGE LENGTH of your printer?
Type in the number of lines you want printed out for each page. A form feed will be inserted after this number of lines.

9) What is the PRINTER LINE LENGTH?
Type in the number of characters per line (including spaces). The editMaster will send the pre-selected line terminator (See Section 3.8.5) to the printer after this number of characters.

10) Do you want the serial INPUT in ASCII or EIA code?
Roll through A/E.

11) Do you want the serial OUTPUT in ASCII or EIA code?
Roll through A/E.

12) Do you want the parallel INPUT in ASCII or EIA code?
Roll through A/E.

3.8.5 Line 5: CODES

```
                  1     2     3    4   5
*****************************************************
* .CODES.     CR LF.00 00.7F 7F.YES  ^D.  *
*                                         *
*****************************************************
                       T     T        T
                       N     N
```

1) Which character or character sequence shall be transmitted as LINE TERMINATOR. Applies to ASCII only. The EIA line terminator is always EOB.
Roll through CR/LF/CR LF/LF CR.
The line terminator selected here will be sent to COMM1, COMM2 and also to the punch or external printer.

2,3) Are there any characters which you want converted to non-standard values when making an ASCII/EIA or EIA/ASCII conversion?
First enter the hex value of an ASCII character and then the hex value of the desired EIA conversion. See the conversion tables, Section 8. Then enter the 2nd ASCII hex value and the desired EIA conversion.
If standard conversion is desired, leave the values as they are.

4) **Do you want to terminate a data transfer to the editMaster via the COMM1/COMM2 by sending a control character after the data? Roll through YES/NO.**

5) If you answer YES, then type in the desired control character.
The control character itself will pass on to the MEMORY.

3.8.6 Line 6: EDITOR

```
                    1      2    3
*************************************************
* .EDITOR.       YES. 00N100. 01.        *
*                                        *
*************************************************
                           T    T
```

1) Do you want to enable AUTOMATIC SEQUENCING?
(automatic block numbering).
Roll through YES/NO.
If you answer yes to this, the editor will automatically supply sequence (block) numbers. You start a line by typing the first letter of the sequence (N, for example). The editor fills in the number. Each time this is done, the sequence number is incremented. Note that the editor does not distinguish between upper and lower case regarding the first letter of the sequence.

2) Type in the FIRST SEQUENCE NUMBER (block number).
If you want more than 999 sequence numbers, type "N" one or two positions to the left.

3) What sequence number (block number) INCREMENT is desired?
Type in an increment from 1 to 99.

3.8.7 Line 7: MISC

```
                    1   2   3    4   5   6
*****************************************************
*   .MISC..      NO. YES. NO. YES. NO. ^C *
*                                                   *
*****************************************************
                                          T
```

1) Do you want LINE NUMBERS sent from the MEMORY.
Roll through YES/NO. If you answer YES to this question, line numbers will be sent to ALL output devices.
If you answer NO, you can still choose to send line numbers to the list device by answering YES to the next question.

2) Do you want to send LINE NUMBERS to the PRINTER?
Roll through YES/NO.

3) Do you want to use the EXTERNAL PRINTER as the primary list device.?
Roll through YES/NO.
If you answer YES, the external printer will be selected instead of the built-in printer when you fill in PRINT as destination.
It is recommended that an external printer be used where possible. This will give a longer line length, higher speed, and increase the life of the built-in printer.

4) Do you want upper-case letters only?
Roll YES/NO.
If you answer YES, the CAPSLOCK function is enabled.

5) Do you want to make an exact DUPLICATE TAPE when reading from the reader and punching on the punch?
Roll YES/NO.
If you answer YES to this, you will get a exact copy of the tape in the reader, including manreadables, leader, trailer and tape feed.

6) What control character is to be used as the RESET CHARACTER?
Type in the desired control character.

3.8.8 Line 8: Manreadables

```
**************************************************
*                                                *
*MANREADABLES.                                   *
**************************************************
```

If you have answered YES to the manreadables enable, Section 3.8.2, you can now type in the desired text. This will be punched out on the tape immediately preceding the leader and can consist of both upper and lower-case letters which are punched as a 5 x 7 matrix vertically along the tape.

The desired text must start immediately after the dot.
Typing [RETURN] defines the end of the manreadables regardless of what letters remain on the line. Manreadables are not STORED, and must be re-entered for each session.

3.9 PFEED

When [2nd][PFEED] is pressed, the printer paper will be advanced one line. Paper feed continues if the button is held down.

3.10 CONTROL KEY

This key can be used to enter the CONTROL mode in the same way as the other control keys, the only difference being that neither source nor destination will be defined.
Its main function, however, is to return to the CONTROL mode when you have exited to the editor and then want to come back to the same CONTROL configuration you had before.
The message CANCELLED appears on the display if a CONTROL command is stopped by hitting [2nd] [ABORT]. See Section 3.11.

3.11 ABORT

A CONTROL command can be stopped at any time by hitting [2nd][ABORT].

After abort, the editMaster remains in CONTROL mode, and the user may redefine the command; for example, which line numbers are to be read from memory. If ABORT is pressed a second time, the station returns to EDITOR MODE.

ABORT is also used to exit the SET-UP mode. This does not invalidate any changes you have made to the set-up parameters.

7. TROUBLE SHOOTING

In almost all cases, the source of the trouble will be pin-pointed by an error message on the display. For a complete list and explanation of these messages, see below. In the remaining cases, where the error message does not reveal the source of the trouble, the problem is almost certainly a parameter mismatch, for example, Baud rate, framing or code.
If the problem is lost characters, you should choose a lower Baud rate or implement handshaking, either software (XON/XOFF) or hardware (RTS/CTS).

7.1 READER Error Messages

INSERT TAPE, TYPE [SPACE]

This message appears if you have forgotten to load the reader. Load tape according to Section 2.4, and then press the SPACE bar to start the reader

READER PARITY ERROR

The tape in the reader has the wrong parity. Change reader parity as described in SETUP, Section 3.8.

7.2 PUNCH Error Messages

TAPE OUT, INSERT TAPE

If the tape runs out while the PUNCH is running, this message will appear. ABORT the command, load a new roll of tape (See Section 2.5), and re-run the command.

7.3 COMM1 Error Messages

COMM1 PARITY ERROR

Parity mismatch on the incoming signal. Redefine parity according to Section 3.8.

COMM1 FRAMING ERROR

The incoming signal is not framed correctly. This is most probably caused by a Baud rate or word-length mismatch.

COMM1 BREAK INTERRUPT

The external data source has sent a "break". This is considered an ABORT by the editMaster.

COMM1 OVERRUN

Data is coming in too fast. Use software or hardware handshaking See Section 3.8.

DC-CODES NOT ALLOWED WITH EIA

Software handshaking cannot be used with EIA codes. Use hardware handshaking, or if this is impossible, go to a lower Baud rate and run without handshaking.

ERROR: DSR LOW
ERROR: RLSD LOW

These two signals must be high or floating to enable communication. See Section 2.6.1.

7.4 COMM2 Error Messages

COMM2 PARITY ERROR
COMM2 FRAMING ERROR
COMM2 BREAK INTERRUPT
COMM2 OVERRUN
DC-CODES NOT ALLOWED WITH EIA

See the corresponding explanations above, Section 7.3.

ERROR: DTR LOW

DTR must be high or floating to enable communication. See Section 2.6.2.

PARALLEL OVERRUN

Parallel data is coming in too fast. The handshaking protocol is not being observed. Check the signal connections in Section 2.6.2. Remember to use the adaptor cable for FACIT TTL compatability.

7.5 EDITOR/MEMORY Error Messages

MEMORY FULL

The user memory has a capacity of 24 kilobytes (about 60 meters of tape), more than enough for most NC applications.
However, if the memory capacity is exceeded, this message will appear.

MEMORY NEARLY FULL

This message appears if there are less than 300 bytes left in the memory and will be displayed each time you hit [RETURN]. If the message appears within a MACRO, execution will be terminated with the message.

NOT IN CREATE

This message appears when the editor is in EXAMINE mode (after power-on for example) and you press a key which tries to write in the memory (e.g. INSLI). To write in the memory, you must first enter CREATE mode. This is done by hitting [ECMD] and then filling in [C][R] when the display prompts:

```
**************************************************
*                                                *
* COMMAND: CR                                    *
**************************************************
```

ILLEGAL KEY

This message appears when an incorrect response is given to a prompt. For example, when using REPT, the display looks as follows:

```
**************************************************
*                                                *
* REPEAT:                                        *
**************************************************
```

If you press a key which is not a number (maybe you have entered the letter "O" instead of zero), the editor considers this an illegal key.

ILLEGAL COM.

This means that you have filled in a command that is unknown to the editor after [ECMD]. See Section 5.

NOT FOUND

If you have entered a string in the FIND buffer that the editor cannot find (when EXC F is invoked), this message will appear on the display. Check that the search has taken place in the right direction (forwards or backwards in the program). You can specify the search direction by pressing either [right arrow] or [left arrow]. This error can occur when using either FIND or REPL. See Sections 4.8 and 4.9. It can also occur when using GOTO N or GOTO L if a non-existent line number is specified.

LINE TOO LONG

The editor cannot accept lines longer than 239 characters.

TOO MANY!

The FIND buffer and the REPLACE buffer each have room for 25 characters.

MAX 255!

The MACRO command can consist of a string of up to 255 commands, but no more. REPEAT also has a maximum of 255.

6485-1283

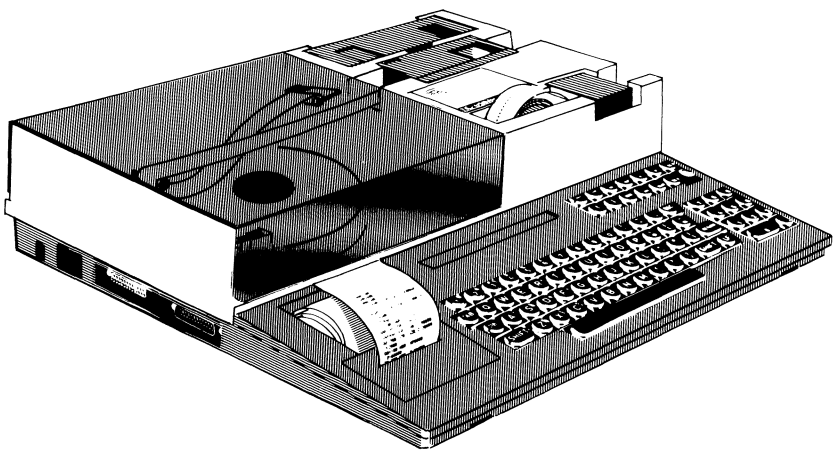


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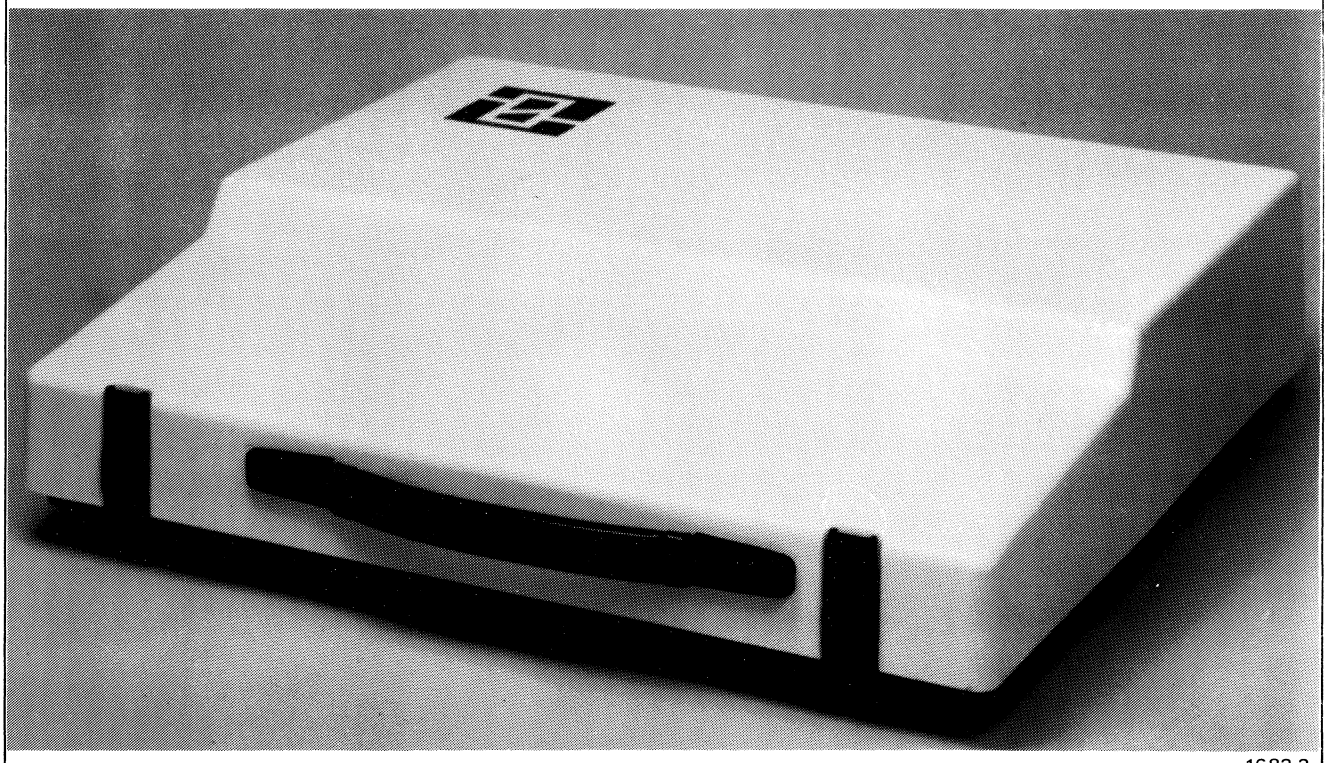
Fig. 1.1 GNT 5601 NC-editMaster



1682-3

Fig. 1.2 The NC-editMaster in its carrying case

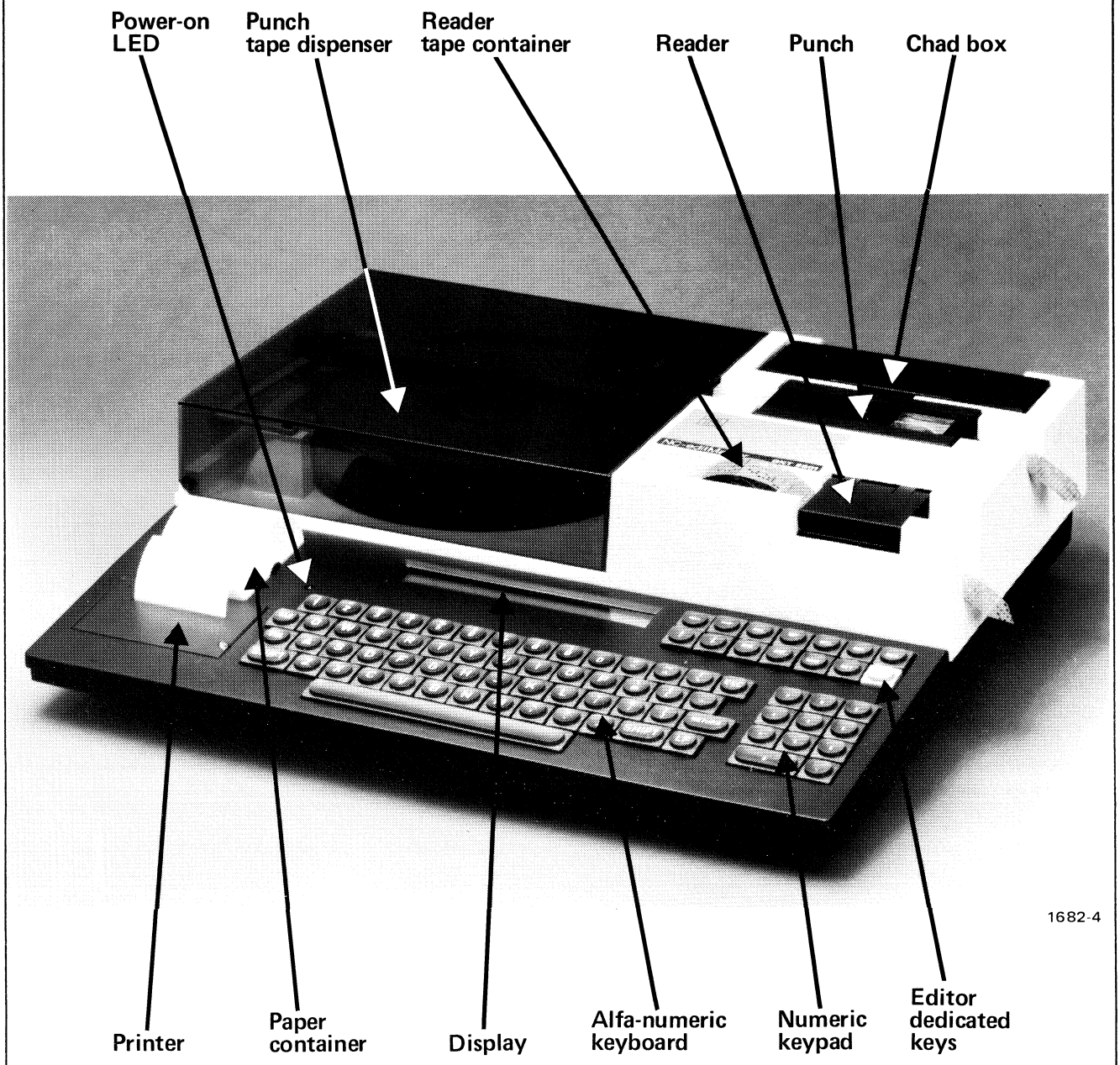


Fig. 1.3 Physical description

1. GENERAL

1.1 Scope

This manual is a guide to operating the GNT 5601 NC editMaster.

1.2 Introduction (Fig. 1.1)

The GNT NC-editMaster is a dedicated computer especially designed for the complete handling of NC programs and paper tapes.

NC programs can be created and edited using the keyboard and LCD display. The editor features powerful commands such as RENUMBER, COPY, MOVE and MACRO and is tailored for NC applications.

Paper tapes can be read, punched, copied and converted with the built-in reader and punch. The printer can list a program from the memory, from tape or from either of two communication channels.

Programs are easily transferred to and from NC machinery or other peripherals.

The entire unit is portable and comes in a handy carrying case. (See Fig. 1.2.)

1.3 Physical Description (See Fig. 1.3)

Dimensions (in carrying case)

Length: 493 mm (19")
Width: 450 mm (18")
Height: 132 mm (5")

Weight: 12 kg. (26 lb)

Environment

Ambient Operating Temperature:

+5 deg. C to +40 deg. C
15-85% RH, non-condensing

Ambient Storage Temperature

-20 deg. C to +70 deg. C
15-95% RH, non-condensing

A.C. Supply (Selectable; for switch location, see Fig. 1.4.)

Switch Setting	115 V	220V
Voltage	110-125V	200-240V
Frequency	47-63 Hz	47-63 Hz
Power	100W	100W

Punch (GNT 36)

Speed:	0-75 char/s, +5%, -10%
Type of Punching:	8-unit (ISO 1154)

Tape:

material:	according to ISO 1729
width:	1" (8-unit ISO)
thickness:	0.05 - 0.12 mm

Reader (GNT 29)

Speed:	0-400 char/s

Tape:

material:	any with transparency to 50%
width:	1" (8-unit ISO)

Printer

Type:	impact dot matrix with ribbon cassette
Line length:	24 chars.
Speed:	42 lines/min.
Life:	5×10^5 char.

Paper:

width:	58 mm (2 1/4 in.)
rolls:	70 mm diameter (2 3/4 in.)

Communication Ports (COMM1,COMM2)

Baud rates:	110, 150, 200, 300, 600, 1200 2400, 4800, 9600
Codes:	ASCII, EIA
Serial data format:	Odd, even, or no parity. 7 or 8 bits/character
Parallel data:	TTL compatible

Tape Dispenser (See also Fig. 2.1)

Tape is fed from a turntable, around a fixed roller and a movable roller on an arm which maintains correct tape tension and also senses for tape out or taut tape.

Tape form: rolls; 8" diameter, standard 2" core

Reader Tape Container

Holds tapes up to about 75 mm (3") in diameter. For larger rolls, an optional unwinder is available. The unwinder cannot be transported in the carrying case.

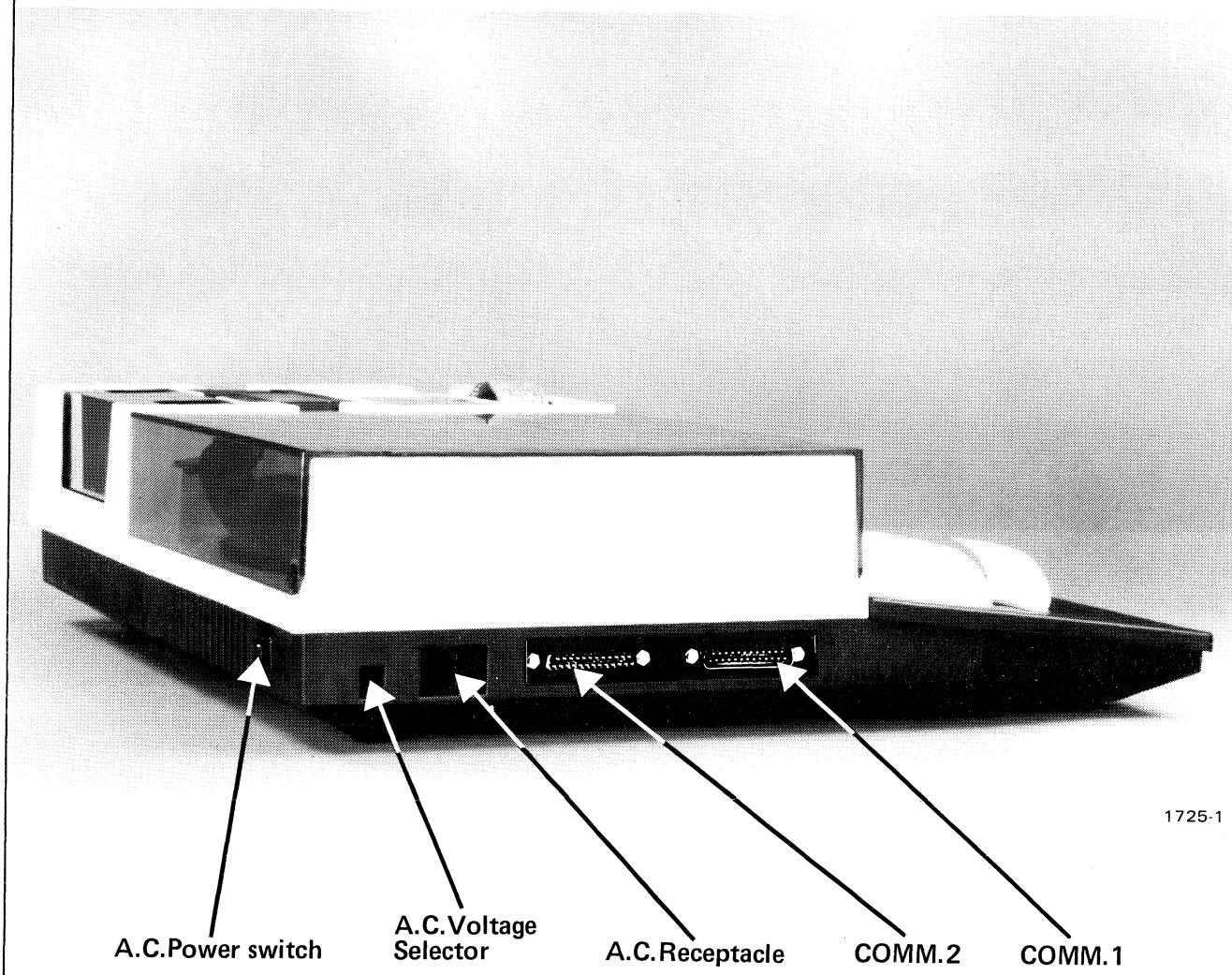


Fig. 1.4 Signal connectors and A.C. power

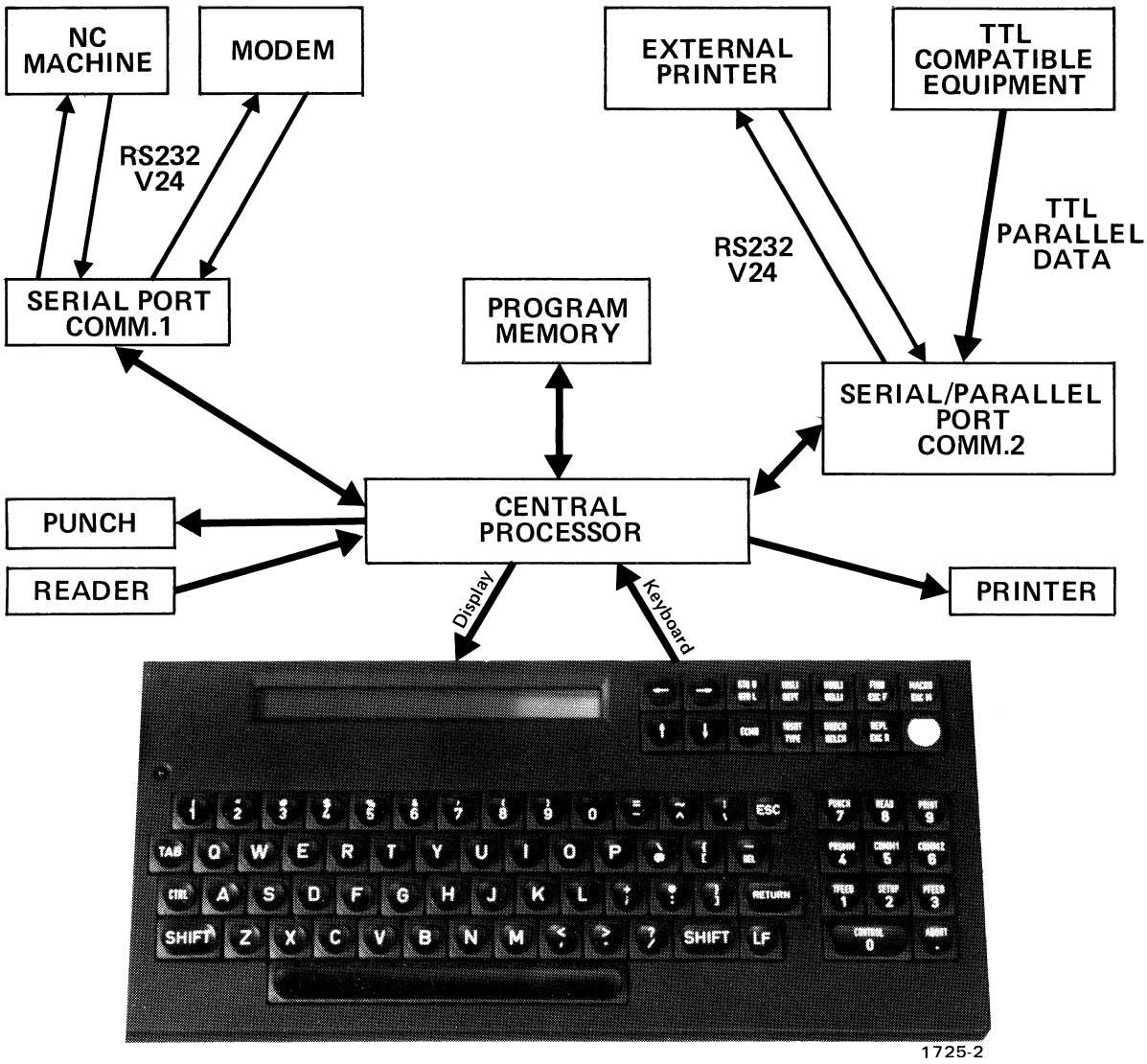


Fig. 1.5 GNT 5601, data transfer (CONTROL MODE)

Fig. 1.6 Numeric keypad

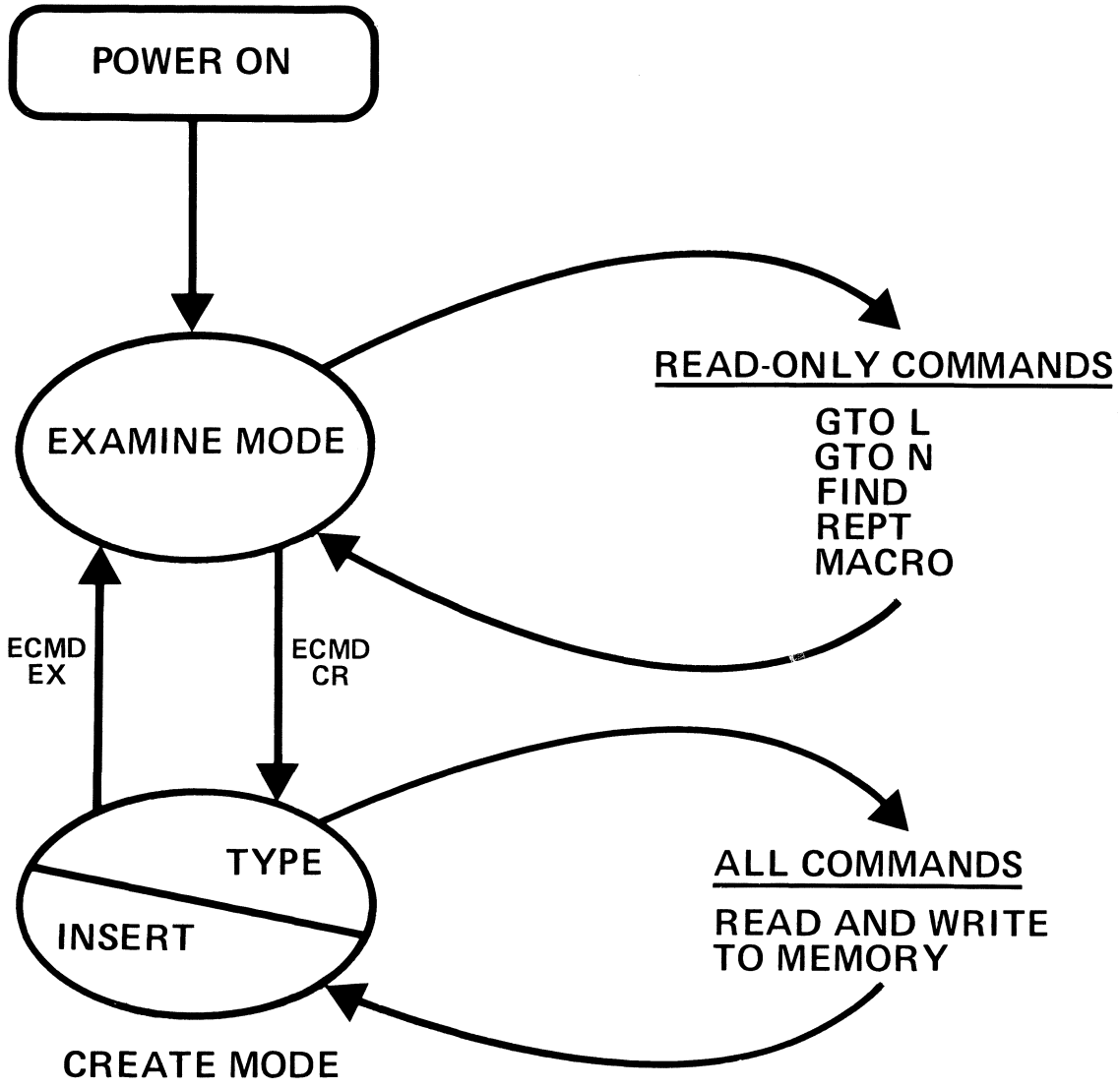


Fig. 1.7 Editor flow chart

Fig. 1.8 Editor dedicated keys

Chad Box

Clear plastic. Easily removed for emptying by pressing down and lifting. Remount by snapping into place.

Keyboard

Type: Full alpha-numeric with second function and dedicated keys.

The keyboard is divided into 3 sections which are described briefly below. See also Section 2.7.

1. The alpha-numeric section is a standard data keyboard with both letters, numbers and computer-specific keys.

2. The numeric keypad can be used to enter numerical values (0-9) or to activate the different control functions, for example tape feed. The control functions are described in Sections 1.4 and 3.

3. The editor pad comprises cursor control (the 4 arrows) and the various dedicated-keys which are described in Sections 1.6 and 4. The orange Second Function Key (Fig. 1.8) is common to the editor pad and the numeric keypad.

Display

Type:	LCD (liquid crystal)
Lines:	2
Chars./line:	40
Cursor:	blinking

Power Switch (Fig. 1.4)

Turns the A.C. power to the electronics on and off. Power-on is indicated by a green light-emitting diode.

Carrying Case

See Fig. 1.2

Power Cords

Two Cords supplied: European (220V) and US (115V)

Adaptor Cable

Adapts Connector COMM2 to Facit TTL signals

1.4 Functional Overview (CONTROL MODE)

The GNT 5601 has extensive facilites for moving and converting data (See Fig.1.5). As shown in the figure, all data flow to and from the different devices (READER, PUNCH, MEMORY, etc.) is directed by using the Numeric Keypad in conjunction with the display. This mode of operation is called the CONTROL MODE as opposed to the EDITOR MODE which is introduced in Section 1.5.

On the Numeric Keypad, above each number, is the 2nd function associated with that key (See Fig. 1.6). The 2nd function is invoked by pressing the orange 2nd Function Key (See Fig. 1.8) and thereafter pressing the desired key. The 2nd functions are briefly summarized below. See Section 3 for a complete discussion.

PUNCH	Selects the punch as data destination
READ	Selects the reader as data source
PRINT	Selects the printer as data destination
PRGMM	Selects the program memory as either source or destination
COMM1	Selects the serial communications port as either source or destination
COMM2	Selects the serial/parallel port as either source or destination
TFEED	Advances tape through the punch and punches a leader
SETUP	Displays the set-up parameters and allows them to be changed
PFEED	Advances the printer paper
CONTROL	Used to enter or return to CONTROL MODE
ABORT	Ends any of the control functions

To initiate a data transfer from the reader, for example, press [2nd] [READ], and the display will show:

```
**********************************************
* FROM: READER       TO:                     *
*                                            *
**********************************************
```

automatically filling in READER after the word "FROM" indicating that the reader can only be a data source. You must now select a data destination.

If you had, instead, starting by pressing [2nd] [PUNCH], the display would have shown:

```
**********************************************
* FROM:              TO: PUNCH               *
*                                            *
**********************************************
```

since the punch can only be a data destination. You now fill in the data source.

In the case of a device which can be either source or destination, for example, COMM1, the editor will prompt for additional information. See Section 3 for details.

When the required information is filled in, hit [RETURN] and the transfer will begin.

1.5 Editor Overview (EXAMINE/CREATE)

When power is turned on, the editor starts up in EXAMINE mode (Fig. 1.7), which means that only commands which do not change the memory can be executed. That is, the memory contents can be examined only. Any attempt to write to the memory will result in an acoustic error signal, and the display will show the message: NOT IN CREATE. In order to write to the memory, the editor must be in CREATE mode. This mode is initiated by pressing [ECMD]. The display will prompt:

```
**************************************************
*                                                *
* COMMAND:                                       *
**************************************************
```

and you must key in [C][R][RETURN]. The editor is now in CREATE mode.

CREATE mode has two sub-modes, TYPE and INSERT. Initially, the editor is in CREATE/TYPE mode. TYPE is the normal mode used when writing an NC program from scratch. Characters are entered from the keyboard and when RETURN is pressed, the line is entered in the memory. A new line is automatically numbered (increments of 100), and the editor is ready to accept a new line. Errors can be corrected by hitting [DEL] to remove the last character typed (just to the left of the cursor) or by using DELCH which removes the character at the cursor postion and moves all characters to the right one position to the left.

CREATE/INSERT mode is usually used when re-editing a program. In this mode, characters are inserted between already existing characters. The character typed on the keyboard appears on the screen and the character at the cursor and all those to the right are shifted one position to the right. TYPE, of course, can also be used during re-editing if you wish to write over existing characters.

All Keyboard commands can be executed from either TYPE or INSERT.

The editor keys are shown in Fig 1.8. The 4 keys to the left are cursor controls and move the cursor in the direction indicated. (See Section 2.7 for a discussion of cursor movement and general use of the keyboard.) The other keys execute various editor functions as summarized below. Some keys have both a primary and secondary function. The primary function is the lower one, printed in white letters, while the 2nd function is printed in orange to match the orange 2nd Function Key (Fig. 1.8). To use the 2nd function, the orange button must be

pressed followed by the desired key. For a complete discussion, see Section 4.

GTO N/GTO L

Used to move the cursor either to a desired line number or a desired sequence number.

ECMD

Used to initiate various software commands (See Section 5), among these CR which puts the editor into the CREATE mode and EX which returns to the EXAMINE mode.

INSLI/REPT

The primary function, REPEAT, is used when a keystroke is to be repeated a specified number of times.
The second function, INSERT LINE, is used to insert a program line between two already existing lines.

INSRT/TYPE

Two sub-modes of CREATE; one inserts characters between other characters and the other types directly over characters that are already on the display.

UNDLI/DELLI

The primary function, DELETE LINE is used to erase a line from the program memory.
The second function UNDELETE LINE replaces the erased line.

UNDCH/DELCH

The primary function, DELETE CHARACTER, is used to erase a single character from the program memory. This is similar to the DEL function on the main keyboard. See Sections 2.7 and 4.7 for a complete discussion.
The second function, UNDELETE CHARACTER, replaces the erased character.

FIND/EXC F

These two functions are used to find a sequence of characters in the program memory. This sequence or "string" is defined by the programmer.

REPL/EXC R

These two functions are used to find a sequence of characters in the program memory and then replace it with another sequence.

MACRO/EXC M

These commands are used to build and execute a series of keystrokes which are to be regarded as a single command. This is used when one discovers, in the course of editing a program, that a certain series of keystrokes is used again and again. This much-used command series can then be made into a MACRO and executed by a single keystroke whenever needed.

2. GETTING STARTED

2.1 Unpacking and Inspection

Inspect the shipping carton for visible signs of damage incurred during transit. Unpack the carton, and check the contents against the shipping documents. Any damage or omissions should be reported immediately.

The model is identified by the ID label which is visible when the chad box is removed. See Fig. 2.1 and Section 2.8.

2.2 A.C. Power

From the factory, all machines are set to 220V. Power cords for 115V operation and 220V operation are included.

The required A.C. supply voltage is shown on the selector switch on the back of the instrument. See Fig. 1.4.

To change to another A.C. voltage, slide the switch to the opposite position. Use the correct power cord.

The power receptacle accepts a standard business machine plug which is mounted on both power cords.

Throw the power switch, and see that the green "power-on" indicator lights up. See Figs. 1.3 and 1.4.

2.3 Tape Loading (Punch)

1. Open the lid, and place a roll of tape on the turn-table.

2. Thread the tape around the two rollers as shown in Fig. 2.1.

3. Depress the tape release lever so that the transparent window pops up.

4. Slide the tape into the punch mechanism so that the sprocket wheel is covered. Snap the window closed.

5. Press the orange Second Function button. See Fig. 1.8. Then press TFEED and hold it until a sufficient leader has been punched. To change the type of leader, see Section 3.8.

2.4 Tape Loading (Reader)

Place the tape to be read in the container as shown in Fig. 2.1. Open the reader lid, slide the tape under the tab, and engage the tape with the sprocket. Then close the lid. Do not open the lid while the reader is running.

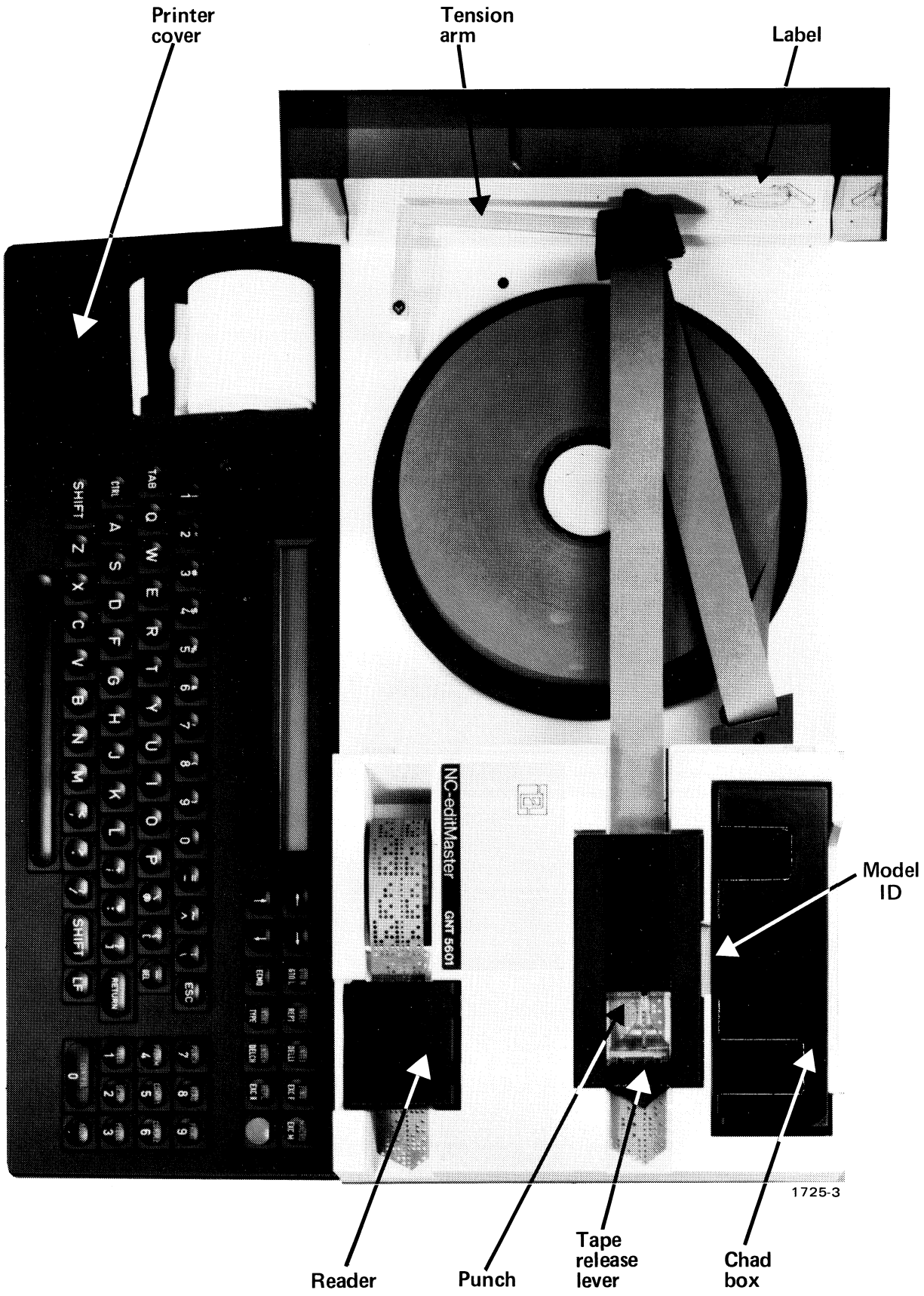


Fig. 2.1 Tape/reader loading

2.5 Paper Loading and Ribbon Replacement (Printer)

2.5.1 Paper Loading

Snap off the printer cover plate (Fig. 2.1). Insert the paper end into the channel being careful not to slide it under the channel by mistake. Press the orange [2nd] button, and release it. Then hold down [PFEED]. The printer will slowly draw the paper through the mechanism. Continue PFEED until 2 or 3 cm of paper projects. Snap the cover on again, sliding the paper end through the slot as you do so. Lastly, place the paper roll in the container.

2.5.2 Replacing the Ribbon Cassette (Fig. 2.2)

First remove the paper roll and cover plate. Push down on the end of the cassette where "PUSH" is embossed. The other end of the cassette will swing up, and the cassette can be removed and disposed of.
Before inserting the new cassette, turn the button in the direction indicated by the arrow to tighten the ribbon. Click the cassette into place. Tighten the ribbon once more. Replace the paper roll and cover plate.

2.6 Signal Connections

The two signal connectors are located on the side of the NC editMaster as shown in Fig. 1.4. They can run XON/XOFF protocol, use hardware handshaking RTS/CTS, or at low data rates run without handshaking. The type of handshaking used is one of the SET-UP parameters.

COMM1 is a two-way serial channel with RS232C/V24 compatible signals. It is designed for data transfer to and from NC machines, modems and other peripherals.

COMM2 is a combined serial/parallel channel. The serial data signals are in accordance with RS232C/V24 standards.
The parallel data signals are FACIT TTL compatible when the adaptor cable is used.
The port can be configured in two ways: serial-out/serial-in or serial-out/parallel-in. The desired configuration is selected by the SET-UP function. See Section 3.8

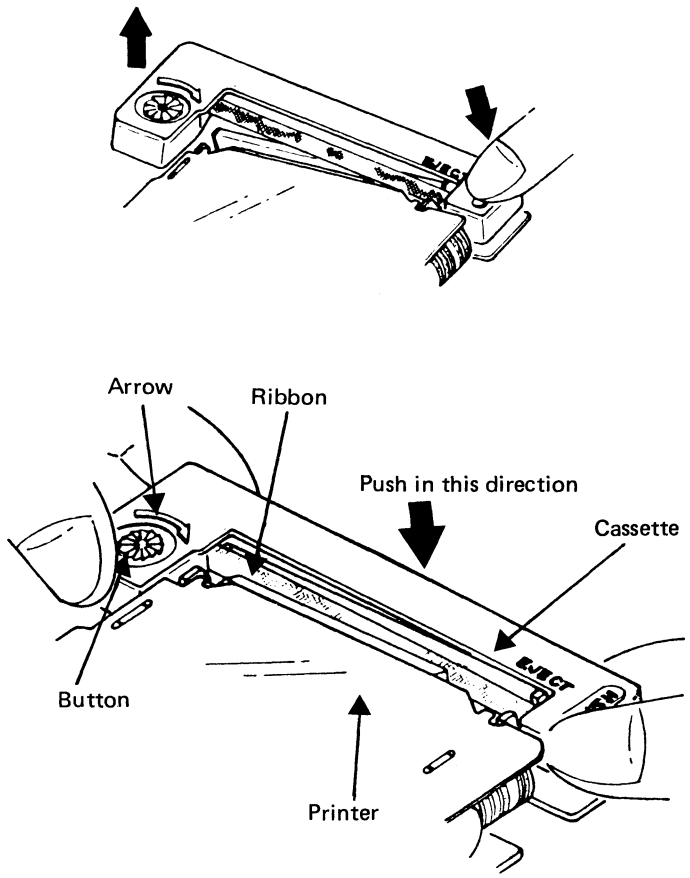


Fig. 2.2 Cassette removal and replacement

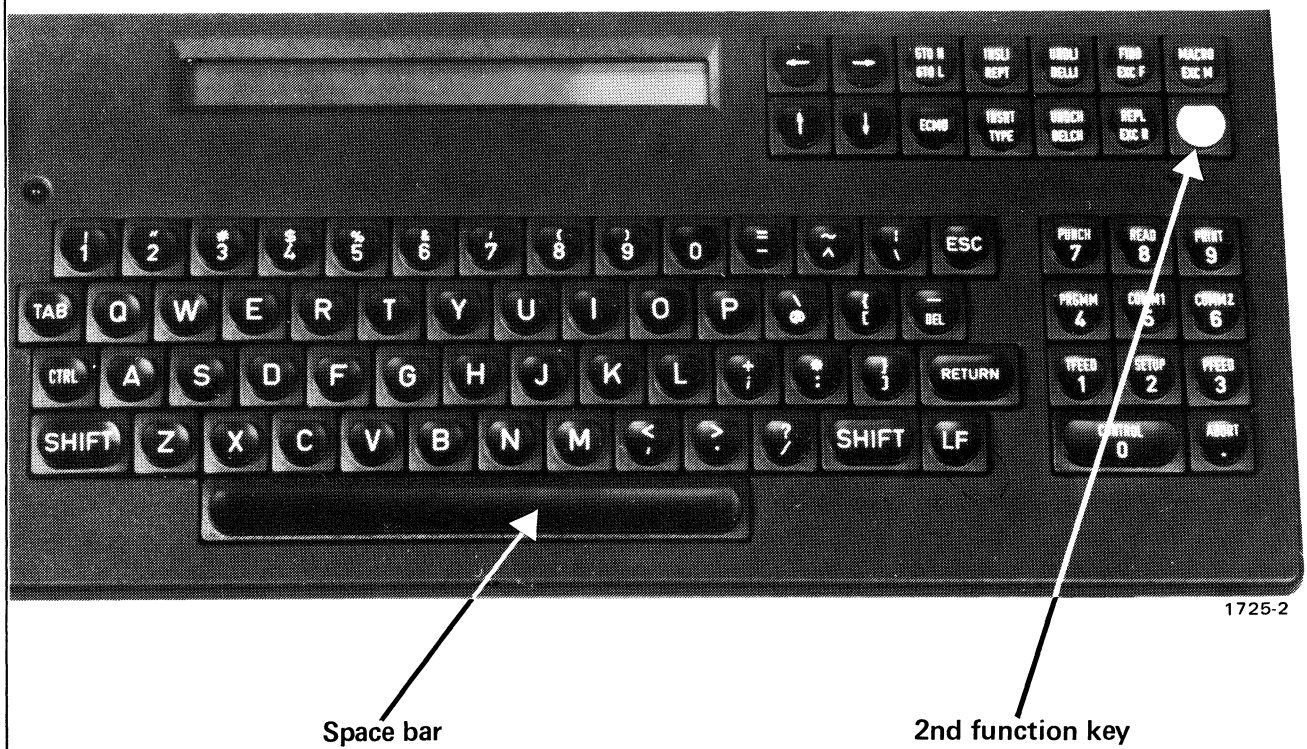
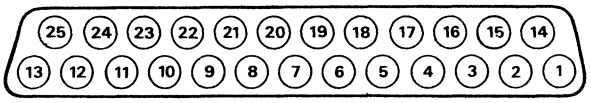


Fig. 2.3 Keyboard

2.6.1 COMM1 revised Sept. 83



DB-25P

Pin No.	RS232C	V24	Name	Description	Remark
1	AA	101	PG	Protective Ground	
2	BA	103	TD	Transmitted Data	output
3	BB	104	RD	Received Data	input
4	CA	105	RTS	Request To Send	output
5	CB	106	CTS	Clear To Send	input
6	CC	107	DSR	Data Set Ready	input
7	AB	102	SG	Signal Ground	common return
8		109	RLSD	Received Line Signal Detect	input
20	CD	108.2	DTR	Data Terminal Ready	output
22				Must not be used	

NOTES:

Pin 4, RTS: Handshaking signal to peripheral indicating that COMM1 is ready to receive data.

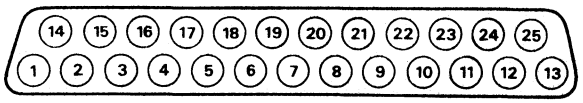
Pin 5, CTS: Handshaking signal from the peripheral which indicates that it is ready to receive data from COMM1.

Pin 6, DSR: Must be high or floating to enable transmission from COMM1.

Pin 8, RLSD: Must be high or floating to enable transmission from COMM1.

Pin 20, DTR: Always high when COMM1 is in use.

2.6.2 COMM2 revised Sept. 83



DB-25S

Pin No.	RS232C	V24	Name	Description	Remark
1	AA	101	PG	Protective Ground	
2	BA	103	TD	Transmitted Data	input
3	BB	104	RD	Received Data	output
4	CA	105	RTS	Request To Send	input
5	CB	106	CTS	Clear To Send	output
6	CC	107	DSR	Data Set Ready	output
7	AB	102	SG	Signal Ground	common return
9,11			ERR1	Error Signal	output
12			CH1	Data Channel 1	input
13			CH2	Data Channel 2	input
14			CH3	Data Channel 3	input
15			CH4	Data Channel 4	input
16			CH5	Data Channel 5	input
17			CH6	Data Channel 6	input
18			TO	Tape Out Signal	output
19			CH7	Data Channel 7	input
20	CD	108.2	DTR	Data Terminal Ready	input
21			CH8	Data Channel 8	input
22				Must not be used	
23			PI	Punch Instruction	input
24			PR	Punch Ready	output
25			+5V	DC voltage	output

NOTES:

RS232C/V24 Signals

Pin 4, RTS: Data request from peripheral.

Pin 5, CTS: Data request from COMM2.

Pin 6, DSR: Always high when port is in use.

Pin 20, DTR: Must be high or floating to enable operation.

TTL Parallel Signals (FACIT compatible when adaptor cable is used)

Pins 9,11, ERR1: Error signal to parallel data source indicating that the NC editMaster can no longer accept data

Pins 12-17,19, DATA: TTL Data lines from parallel source

Pin 23, PI: The parallel channel reads data in when this signal goes high.

Pin 24, PR: This line is high when COMM2 is ready to receive data and goes low when it is busy.

2.7 Using the Keyboard, Display and Cursor

In order to get acquainted with the keyboard, you must first put the NC-editMaster in the CREATE mode. (See also Sections 1.5 and 5.1). If you press a key before entering CREATE, a "beep" is heard and the display looks like this:

```
**************************************************
* 000100                                         *
*                                 NOT IN CREATE  *
**************************************************
```

Enter the CREATE mode by hitting [ECMD], and when the display prompts:

```
**************************************************
* 000100                                         *
* COMMAND:                                       *
**************************************************
```

answer [C][R][RETURN]

The digits 000100 on the display indicate that you are looking at line number 100 in the memory. The editor automatically numbers each line using increments of 100, so this is the top line.

Notice the black rectangle blinking on and off. This is called the cursor. When the cursor blinks off, an underline is left to show the cursor postion. The cursor indicates where the next character will appear on the display or which character will be erased.

Type your name, and notice how the cursor moves to the right each time. Now hit [RETURN] and notice that your name disappears and a new line number, 200,appears. Your name is still there (in the memory), but it has been "scrolled" up.

Now type the street you live on and [RETURN]. Again, note the scrolling. Type your city. Try hitting the [DEL] button, and see what happens. Re-type the deleted letters, and hit [RETURN]. Type your country [RETURN] and telephone number [RETURN]. At this point the display should look like this:

```
**************************************************
* 000600                                         *
*                                                *
**************************************************
```

Find the group of 4 keys with arrows on them (Figs. 1.8 and 2.3). Press the [↑]. The display looks like this:

```
**************************************************
* 000500 Telephone 01-393980                     *
* 000600                                         *
**************************************************
```

The cursor has moved up to the previous line, and the line has been scrolled down so it enters our field of vision. Press [↑] a few times and the information you filled in will come into view one line at a time. Try [↓] too. The cursor can also be moved left and right within any one line by using [→] and [←]. You cannot, however, move the cursor into the line number. Note that a repeated cursor movement occurs if an arrow is held down. All of the keys on the main keyboard have this repeat function. Try the following:

Press and hold [↓] to move to the bottom line. Hold down the "A" key, and watch the display. A long string of a's will appear. At the end of the line, the cursor will hop to the next line and the a's will continue until a warning beep is heard, and the following message is displayed.

```
**************************************************
* aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa *
* aaaaaaaaaaaaaaaaaaaaaaa LINE TOO LONG          *
**************************************************
```

You can now erase the entire line by holding down [DEL].

With the simple techniques used in this section, NC programs can be written and modified. Of course, more sophisticated commands are available, and with practice the programmer will use them more and more. See, for example, the sample editing session, Section 6.1.

2.8 Chad Box

The clear plastic chad box is removed for emptying by pressing it downwards and then lifting it up and out. To remount, simply press it into place.

2.9 Getting Out of Trouble

If something unforeseen happens, and the editMaster does not respond to the keyboard, try typing [CTRL-C], that is, hold [CTRL] down while typing [C]. The program should then restart without erasing the memory. If this fails, turn off the AC power, wait a few seconds, and turn it on again.

3. CONTROL FUNCTIONS (The Numeric Keypad)

The CONTROL mode is used for data transfer. All control functions are accessed from the numeric keypad by pressing the orange [2nd] button, releasing it and then pressing the desired control key. A function can be stopped at any time by hitting [2nd][ABORT]. See Section 3.11.

The various functions are described below:

3.1 PUNCH

When [2nd][PUNCH] is hit, the display will prompt as follows:

```
**********************************************
* FROM:              TO: PUNCH               *
*                                            *
**********************************************
```

automatically filling in the destination and asking for the source, which can be READ, COMM1, COMM2 or PRGMM. Note that if COMM2 is specified, the input can be parallel or serial data depending on the SET-UP definition. See Section 3.8.

If the data source is not ready, the punch will not start, and an error message will be displayed. An error message will also be displayed in case of tape out.

3.2 READ

When [2nd][READ] is hit, the display will prompt:

```
**********************************************
* FROM: READER       TO:                     *
*                                            *
**********************************************
```

filling in the source and asking for the destination which can be PRINT, PUNCH, COMM1, COMM2 or PRGMM. If COMM1 or COMM2 is specified, the output can be serial data only.

If there is no tape in the reader, the following message will be displayed:

```
**********************************************
* FROM: READER       TO: MEMORY              *
* *HALTED*  INSERT TAPE, TYPE (SPACE)        *
**********************************************
```

If the destination is not ready to accept data, an error message will be displayed. This can occur if there is a tape out condition or if the program memory is full or if one of the communication channels is not ready.

If PUNCH has been selected as the destination, tape code conversion between ASCII and EIA will take place if this has been programmed at SET-UP.

3.3 PRINT

The PRINT command prompts for data source in the same way as PUNCH. If the program memory has been selected as source, a second prompt will ask for the starting and ending line numbers. The editor's internal line numbers can be printed out or not according to the SET-UP.

3.4 PRGMM (PROGRAM PRGMMRY)

Entering [2n][PRGMM] results in the prompt:

```
**************************************************
* FROM:                TO:                       *
* DEFINE IN (I) or OUT (O)                       *
**************************************************
```

asking whether the memory is be an input (destination) or output (source). If you specify [O], the display will ask you to fill in the first line to be sent from memory and the last. If you want to send the entire memory, type [RETURN] each time.

```
**************************************************
* FROM: MEMORY      TO:                          *
* 1. LINE:          2. LINE:                     *
**************************************************
```

After the second [RETURN], the display will show:

```
**************************************************
* FROM: MEMORY       TO:                         *
* MEMORY OUTPUT FIELD DEFINED                    *
**************************************************
```

and you fill in the data destination.

If you had answered [I] to the first question, the display would have prompted:

```
**************************************************
* FROM:              TO: MEMORY                  *
*                                                *
**************************************************
```

and you fill in the data source. Data will be written after the last line in the memory. Note that you cannot use the memory as a data destination unless the editor is in the CREATE mode.

3.5 COMM1

Entering [2nd][COMM1] causes the prompt:

```
**************************************************
* FROM: COMM1**     TO: COMM1**                  *
*                                                *
**************************************************
```

which indicates that COMM1 has started up in ON-LINE mode which can be used for manual communication between the GNT 5601 and an external device, for example when accessing a data base via modem. Typically the remote computer sends a sign-on and then expects a logon command before data can be exchanged.

In the ON-LINE mode all entries from the keybaord are transmitted to COMM1 and are not displayed. All characters received from COMM1 are displayed except those designated as control characters (00H-19H). Control characters are shown as "CT", except for 09 which is shown as "HT" (horizontal tab). Pressing [CTRL][E] will send a 350 ms break.

At any time during ON-LINE operation, a data source or destination can be specified by pressing [2nd] and then the desired key. After this, pressing [RETURN] will initiate the new communication.

The usual error messages for tape out and not ready apply.

3.6 COMM2

Entering [2nd][COMM2] first causes a prompt for I (Input) or O (Output) and then a prompt for source or destination. Like COMM1, COMM2 is a bi-directional port, but there are certain restrictions on it: Depending on the way it has been configured at SET-UP, input is either serial or parallel.

The parallel input is designed to be FACIT TTL compatible when used with the interconnecting cable (supplied as standard equipment).

COMM2's configuration is indicated on the display as either COMM2/P or COMM2/S when the port has been specified as input.

When specified as output, the display will always write COMM2/S.

3.7 TFEED

When [2nd][TFEED] is pressed, the tape will be advanced and punched with feed holes only or with feed holes plus delete (all channels) or with a SPACE character according to the type of leader selected at SETUP. See Section 3.8. Tape feed continues as long as the button is held down.

3.8 SETUP

The SETUP mode is used to display and specify all of the parameters used by the NC-editMaster. These parameters are assigned default values from the factory as follows:

READER

No file mark check	:	Reader starts on first character.
Parity check	:	Even

PUNCH

Leader, Trailer and Tape Feed	:	Feed holes only
Length of Leader and Trailer	:	9 inches
Comments	:	will be punched
Comment delimiters	:	( )
Manreadables	:	enabled
Parity punched	:	Even

COMM1

Hardware handshaking disabled : XON/XOFF always enabled
1200 Baud, Even parity, 2 stop bits, 8 bits/char.

COMM2

Parallel input enabled
Hardware handshaking disabled : XON/XOFF always enabled
1200 Baud, Even parity,
2 stop bits, 8 bits/char

CODES

Inputs	:	ASCII
Outputs	:	ASCII
Output line terminator	:	CR LF

EDITOR

Automatic sequencing enabled	:	First sequence N100
	:	Increment 1

MISC.

Line numbers	:	Sent to printer
Internal printer	:	Enabled
Capslock	:	ON

The SETUP mode is initiated by first pressing [2nd] and then [SETUP]. The parameters are displayed on 8 lines. Using the cursor in the usual way, you can move up and down, thereby displaying 2 of the 8 lines at a time. You also use the cursor controls to move back and forth within a particular line when you want to change a parameter.

The SETUP parameters can be changed in two different ways. When the cursor is correctly positioned you either:

1) Press the space bar to roll the display through the various values, or

2) Enter the desired value directly using the keyboard. Illegal values will be ignored.

In the figures below, those parameters which must be typed in directly are marked "T".

The parameters themselves are of two types:

1) Those which are saved in the EEPROM and need not be re-entered each time the machine is turned on, and

2) Those which must be entered each time. Note however, that default values are assigned to these by the editMaster at power-on.

In the figures below, parameters which are NOT saved are marked "N". The values shown are the default values which are installed at the factory.

When you have selected the values you want, exit SET-UP by pressing [2nd] and then [ABORT].

If you do not STORE the parameters, they will be valid as long as the machine is in use, but when it is turned off and on again, the previous set of parameters will be restored.

To save the new values you have chosen, type [ECMD], and when the display prompts for a command, answer as shown below:

```
**********************************************
*                                            *
* COMMAND: STORE                             *
**********************************************
```

When [RETURN] is hit, the display will ask you to *WAIT* a moment, and the new values will be stored.

You can, at any time, return to the factory settings by typing [ECMD] and answering DEF (default) to the prompt. When you type [RETURN], the display will again show *WAIT*, and after a moment the default values will be restored.

3.8.1 Line 1: READER

```
                    1  2   3   4  5   6
*************************************************
*SET-UP. READER .NO  %. NO.  \\.  E   *
*                                               *
*************************************************
                         T       T  T
```

1) Should the reader start reading on a special FILE MARK character?
Use the space bar to roll YES/NO.

2) If so, what is the character?
Type in the character.
The file mark character itself will also be read.

3) Should any characters be ignored (max. 2 chars.)?
Roll between YES/NO.

4,5) If so, type in the characters. If you only want 1 character type it in twice.

6) What PARITY should the reader check for?
Roll through E/O/N (Even/Odd/None).
In this case, parity means the 8th data bit as punched on the tape.
Note that the parity selected applies only when using ASCII. EIA parity is always odd.
If an incorrect parity bit is read, the display will show:

```
*************************************************
* FROM: READER        TO: PUNCH          *
* *HALTED*  READER PARITY ERROR          *
*************************************************
```

and the reader will stop. It can be started again by pressing the SPACE bar. The incorrect character will be transmitted as " " (5C Hex). Note that 00 is not read.

3.8.2 Line 2: PUNCH

```
                    1 2 3 4 5  6  7  8  9  10
*****************************************************
*SET-UP. PUNCH .0 0 0.9 9.YES (  ).YES. E*
*                                                   *
*****************************************************
                                      T  T
```

1) What LEADER character should be punched before each job?
Use the space bar to roll through 0/D/S.

   0 = Feed holes only
   D = Delete characters (all channels punched)
   S = "Space" character (20 Hex ASCII or 10 Hex EIA)

2) What TRAILER character should be punched after each job?
Again, use the space bar to roll through 0/D/S.

3) What character should be punched when TAPE FEED is activated?
Roll through 0/D/S.

4) How many inches long should the leader be?
Use the Space Bar to roll through 0 - 9.
Note that 1 inch = 10 characters.

5) How many inches long should the trailer be?
Roll through 0 - 9.

6) Should COMMENTS be punched on the tape?
Roll YES/NO

7) What character is to be used as START DELIMITER for a comment?
Type in the desired character.

8) What character is to used as END DELIMITER for a comment?
Type in the desired character. (Must be different from the START DELIMITER). You may use [RETURN].

9) Do you want to include MANREADABLES?
Roll through YES/NO.
If you answer YES, then use the cursor to move to line 8, and type in the desired message. Now, each time a job is punched, the tape will look like this:

   MANREADABLES-LEADER-JOB-TRAILER.

10) What PARITY should be punched on the tape?
Applies to ASCII only. EIA parity is always odd.
Roll through E/O/N (Even/Odd/None)
The parity bit is the 8th bit on the tape. If No Parity is selected, the 8th channel will be blank.

3.8.3 Line 3: COMM1 (Signal Connections, See Section 2.6.1)

```
                  1   2   3  4  5
**************************************************
*SET-UP. COMM1 .0. 1200. E. 2. 8          *
*                                         *
**************************************************
```

1) How should the port be configured?
   Roll through 0/1/2/3.
   See the table and figure below. Note that DC codes (XON/XOFF) are always enabled.

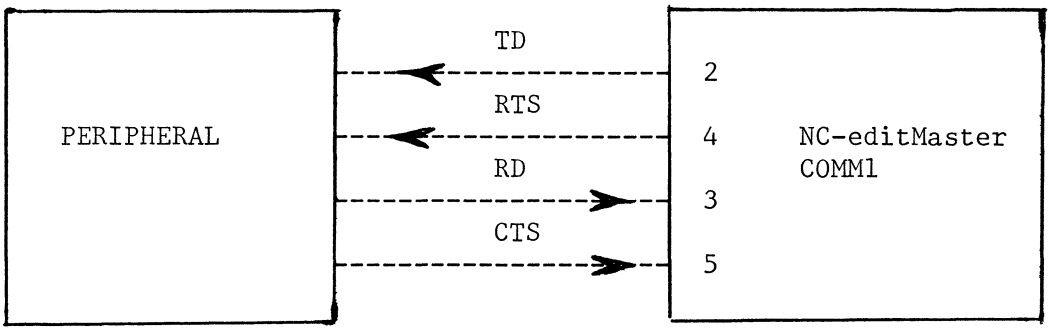
   0 = Hardware handshaking disabled. In this mode, the NC-editMaster sends XON before each transmission. When transmission ends, XOFF is sent.

   1 = RS491 Handshaking. At the start of transmission RTS=1. When transmission ends, RTS=0.

   2 = Full Duplex. At the start of transmission, RTS=1. When transmission ends, RTS=0.

   3 = Half Duplex. At the start of transmissin, RTS=1 if COMM1 is defined as output or if COMM1 is in ON-LINE mode. If COMM1 is defined as input, RTS=0. When transmission ends, RTS=0.

	TD active	TD halted	RD active	RD halted
0)	until XOFF received	XOFF received waits for XON	until buffer full then sends XOFF	sends XON when ready
1)	CTS=1	CTS=0	RTS=1	RTS=0
2)	RTS=1 CTS=1	CTS=0 RTS=0 and waits for CTS=1	RTS=1	RTS=0 CTS must = 0 before RTS=1
3)	RTS=1 CTS=1	CTS=0 RTS=0 and waits for CTS=1	RTS=0 CTS=0 CTS must=0 before RTS=1	



2) What BAUD RATE is to be used?
Roll the display through the following values:
110/150/200/300/600/1200/2400/4800/9600

3) Which type of PARITY is to be used?
Applies only when using ASCII. EIA parity is always odd.
Roll the display through E/O/N (Even/Odd/None).
Note that this is transmission parity. It is not the 8th data bit and will not, for example, be punched on the tape.

4) How many STOP BITS should be used?
Rolls through 1/2.
Note that this refers to transmitted stop bits only. The NC-editMaster requires only 1 stop bit on received data.

5) When using ASCII code, how many BITS/WORD do you require?
Roll through 7/8.

Note that when selecting COMM1, the editMaster will first enter the ON-LINE mode in which all communication is in ASCII, with a configuration corresponding to questions 1,2,3,4 and 5. There is no line terminator, as such. If you press RETURN, a carriage return is sent. If you press LINE FEED, a line feed character is sent.
When the actual data transmission is initiated, COMM1 will then respect the protocol chosen in answer to questions 1-5, Section 3.8.5.

3.8.4 Line 4: COMM2 (Signal connections, See Section 2.6.2)

```
                  1 2  3   4 5 6  7  8   9
*************************************************
*SET-UP. COMM2.P.0.1200.E.2.8. NO.55.080.*
*                                               *
*************************************************
                                       T   T
                                       N   N
```

1) When using COMM2 as input, what type of data is to used?
Roll through S/P (Serial/Parallel)
Use the adaptor cable if you specify P, and the parallel input is Facit TTL compatible.

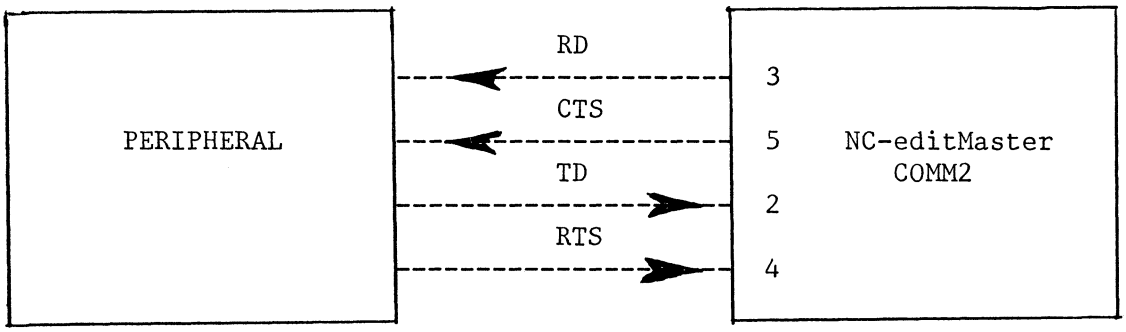
2) How should the port be configured for serial data?
Roll through 0/1/2.
See the table and figure below. Note that DC codes (XON/XOFF) are always enabled.

0 = Hardware handshaking disabled.
In this mode, the NC-editMaster sends XON before each transmission. When transmission ends, XOFF is sent.

1 = RS491 Handshaking. At the start of transmission CTS=1. When transmission ends, CTS=0.

2 = Full Duplex. At the start of transmission, CTS=1. When transmission ends, CTS=0.

	RD active	RD halted	TD active	TD halted
0)	until XOFF received	XOFF received waits for XON	until buffer full then sends XOFF	sends XON when ready
1)	RTS=1	RTS=0	CTS=1	CTS=0
2)	CTS=1 RTS=1	RTS=0 CTS=0 and waits for RTS=1	CTS=1	CTS=0



3,4,5,6) Choice of BAUD RATE, PARITY, number of STOP BITS transmitted and 7 or 8 bit ASCII code.
See the previous section.

7) Do you want to format the output?
Rolls through YES/NO.
If you answer YES, the next two questions should be answered.

8) What is the PAGE LENGTH of your printer?
Type in the number of lines you want printed out for each page. A form feed will be inserted after this number of lines.

9) What is the PRINTER LINE LENGTH?
Type in the number of characters per line (including spaces). The editMaster will send the pre-selected line terminator (See Section 3.8.5) to the printer after this number of characters.

3.8.5 Line 5: CODES

```
                    1  2    3     4     5
**************************************************
*SET-UP. CODES .A. A. CR LF.00 00.7F 7F. *
*                                                *
**************************************************
                                    T     T
                                    N     N
```

1) Do you want all INPUTS to be ASCII or EIA code?
Roll through A/E.
If, for example, you choose E, all inputs will be treated as EIA code. This includes input from the reader.

2) Do you want all OUTPUTS to be ASCII or EIA?
Roll through A/E.
Note: To convert from one code to another, you can, for example, set input to A and output to E. When an ASCII tape is read in and sent to the punch, the resulting tape will be in EIA code.

3) Which character or character sequence shall be transmitted as LINE TERMINATOR. Applies to ASCII only. The EIA line terminator is always EOB.
Roll through CR/LF/CR LF/LF CR.
The line terminator selected here will be sent to COMM1, COMM2 and also to the punch or external printer.

4,5) Are there any characters which you want converted to non-standard values when making an ASCII/EIA or EIA/ASCII conversion?
First enter the hex value of an ASCII character and then the hex value of the desired EIA conversion. See the conversion tables, Section 8. Then enter the 2nd ASCII hex value and the desired EIA conversion.
If standard conversion is desired, leave the values as they are.

3.8.6 Line 6: EDITOR

```
                    1     2    3
**************************************************
*SET-UP. EDITOR .YES. 00N100. 01.                *
*                                                *
**************************************************
                          T    T
```

1) Do you want to enable AUTOMATIC SEQUENCING? (automatic block numbering).
Roll through YES/NO.
If you answer yes to this, the editor will automatically supply sequence (block) numbers. You start a line by typing the first letter of the sequence (N, for example). The editor fills in the number. Each time this is done, the sequence number is incremented. Note that the editor does not distinguish between upper and lower case regarding the first letter of the sequence.

2) Type in the FIRST SEQUENCE NUMBER (block number).

3) What sequence number (block number) INCREMENT is desired? Type in an increment from 1 to 99.

3.8.7 Line 7: MISC

```
                    1   2   3   4   5
**************************************************
*SET-UP. MISC. . NO.YES. NO.YES. NO.      *
*                                         *
**************************************************
```

1) Do you want LINE NUMBERS sent from the MEMORY.
Roll through YES/NO. If you answer YES to this question, line numbers will be sent to ALL output devices.
If you answer NO, you can still choose to send line numbers to the list device by answering YES to the next question.

2) Do you want to send LINE NUMBERS to the PRINTER?
Roll through YES/NO.

3) Do you want to use the EXTERNAL PRINTER as the primary list device.?
Roll through YES/NO.
If you answer YES, the external printer will be selected instead of the built-in printer when you fill in PRINT as destination.
It is recommended that an external printer be used where possible. This will give a longer line length, higher speed, and increase the life of the built-in printer.

4) Do you want upper-case letters only?
Roll YES/NO.
If you answer YES, the CAPSLOCK function is enabled.

5) Do you want to make an exact DUPLICATE TAPE when reading from the reader and punching on the punch?
Roll YES/NO.
If you answer YES to this, you will get a exact copy of the tape in the reader, including manreadables, leader, trailer and tape feed.

3.8.8 Line 8: Manreadables

```
**************************************************
*                                                *
*MANREADABLES.                                   *
**************************************************
```

If you have answered YES to the manreadables enable, Section 3.8.2, you can now type in the desired text. This will be punched out on the tape immediately preceding the leader and can consist of both upper and lower-case letters which are punched as a 5 x 7 matrix vertically along the tape.

The desired text must start immediately after the dot.
Typing [RETURN] defines the end of the manreadables regardless of what letters remain on the line. Manreadables are not STORED, and must be re-entered for each session.

3.9 PFEED

When [2nd][PFEED] is pressed, the printer paper will be advanced one line. Paper feed continues if the button is held down.

3.10 CONTROL KEY

This key can be used to enter the CONTROL mode in the same way as the other control keys, the only difference being that neither source nor destination will be defined.
Its main function, however, is to return to the CONTROL mode when you have exited to the editor and then want to come back to the same CONTROL configuration you had before.

3.11 ABORT

A CONTROL command can be stopped at any time by hitting [2nd][ABORT].

After abort, the editMaster remains in CONTROL mode, and the user may redefine the command; for example, which line numbers are to be read from memory. If ABORT is pressed a second time, the station returns to EDITOR MODE.

ABORT is also used to exit the SET-UP mode. This does not invalidate any changes you have made to the set-up parameters.

4. EDITOR DEDICATED KEYS "Hard Commands"

The editor can be used in two ways:

1] Editor Commands
2] Dedicated Keys

The Editor Commands or soft commands are initiated by hitting the [ECMD] key. The display then prompts:

```
**************************************************
*                                                *
* COMMAND:                                       *
**************************************************
```

and one of the commands listed in Section 5 can be typed in from the main keyboard.

The dedicated-key commands are initiated by hitting a key on the editor pad (Fig. 1.8) and then filling in the information asked for by the display (if any).

4.1 CURSOR CONTROL (arrow up, down, left, right):

These 4 keys move the cursor in the indicated direction.The up and down arrows make the cursor hop from line to line (scrolling takes place), while the left and right arrows cause cursor movement on the line only. The movement is repeated if the key is held down.

4.2 GO TO SEQUENCE NUMBER/GO TO LINE (GTO N/GTO L)

These commands are similar in function. The 2nd function moves the cursor to an NC sequence number (e.g. N23), while the primary function moves the cursor to an editor line number. The editor automatically numbers each line in the memory, though the line number is not part of the NC program. This number can, however, optionally be printed or punched when the program is transferred from memory. This option is selected by SETUP. See Section 3.8.

Note that the editor can GOTO a line number which is anywhere in the memory, while it can only GOTO a sequence number which is below.

In either case, the display prompts for the desired line by asking either

```
**************************************************
*                                                *
* GOTO LINE:                                     *
**************************************************
```

or

```
**************************************************
*                                                *
* GOTO SEQ:                                      *
**************************************************
```

You fill in the desired line, and when you press [RETURN], the cursor will move to that line.

If the line does not exist, the display will announce:

```
**************************************************
*                                                *
*                                  NOT FOUND     *
**************************************************
```

and the cursor will remain at the starting postion.

4.3 EDITOR COMMAND (ECMD):

The edit command key is used to select various editor commands which do not appear on the keypad. See Section 5 for a complete discussion of these software commands.

4.4 INSERT LINE/REPEAT (INSLI/REPT)

The primary function is used when a command is to be carried out several times, one after the other. When [REPT] is hit, the display prompts:

```
**************************************************
*                                                *
* REPEAT:                                        *
**************************************************
```

and you answer by typing in a number,"n", and then one of the editor keys. The command will be executed "n" times (max. 255).

For example, to write the numeral 6, 20 times, you enter:
[REPT][2][0][6].

Note that the [2] and the [0] are entered from the alphanumeric keypad, while [6] must be entered from the numeric keypad.

The 2nd function is used to insert a line between 2 already existing lines. Type [2nd][INSLI]. If the cursor is positioned, for example, on line 200, and the next line is number 300, a new line, numbered 210, will be established. The display is then ready to accept the new line which the user enters using the alpha-numeric keyboard (and the numeric keypad, if desired). If you again activate [2nd][INSLI], the new line number will be 220. If you wish to insert a line between 210 and 220, move the cursor up to line 210 and press [2nd][INSLI]. A new line numbered 211 will be established. If there is no space between lines, a warning beep will sound, and the program must be renumbered. See Section 5.5.

4.5 INSERT/TYPE (INSRT/TYPE)

CREATE mode has two sub-modes, TYPE and INSERT. TYPE is the normal mode used when writing an NC program from scratch. Characters are entered from the keyboard and when [RETURN] is pressed, the line is written to the memory. A new line is automatically numbered (increments of 100), and the editor is ready to the line. Errors can be corrected by hitting [DEL] to remove the last character typed (just to the left of the cursor) or by using DELCH which removes the character at the cursor postion and moves all characters to the right one position to the left. In TYPE mode, you can write on top of characters which are already on the display without bothering to erase them.

If the memory is full, an error message is flashed on the display.

CREATE/INSERT mode is usually used when re-editing a program. In this mode, characters are inserted between already existing characters. The character typed on the keyboard appears on the screen and the character at the cursor and all those to the right are shifted one position to the right.

For example: If you have the line:

000600 N10X349

on the display, and you wish to insert a space between N10 and X349, proceed as follows:

Press [2nd][INSRT] to enter INSERT mode. Using the arrows, move the cursor to the X. Now type [SPACE] and a space will be inserted between the X and the preceding 0. The X and all characters to the right of the cursor will be shifted right.

The line will now be as follows:

000600 N10 X349.

4.6 UNDELETE LINE/DELETE LINE (UNDLI/DELLI)

To erase an entire line, position the cursor anywhere on the line and enter [DELLI]. The line disappears from the display, and is erased from the memory. If however, you have made a mistake and would like to restore the line, enter [2nd][UNDLI], and the line will reappear on the display and be restored to the memory.

4.7 UNDELETE CHARACTER/DELETE CHARACTER (UNDCH/DELCH)

To erase a character, position the cursor on the character in question and enter [DELCH]. The character will disappear from the display and be erased from the memory. All characters to the right are shifted left. Note the difference between DELCH and the DEL key which is located on the alpha-numeric keyboard. DEL deletes the character just to the left of the cursor.

If you wish to restore the deleted character, enter [2nd][UNDCH], and the character will reappear. Regardless of whether you are in TYPE or INSERT mode, the character at the cursor and all those to the right will be shifted right.

4.8 FIND/EXECUTE FIND (FIND/EXC F)

When [2nd][FIND] is entered, the display will prompt for a string of characters to be searched for in the memory:

```
**************************************************
*                                                *
* FIND STRING:                            --) *
**************************************************
```

You can now enter a string of up to 25 characters in length. Hit [RETURN], and the string will be stored in the find buffer.

You can now use the FIND buffer by pressing [EXC F]. The cursor will move in the last used direction. This means that each time the left or right arrow is used, the editor remembers the direction and uses this as the default search direction. (This direction is indicated by a small arrow on the display). When the string in the FIND buffer is matched, the cursor stops on the first character of the string. To find the next occurence of the string hit [EXC F] again. To change the search direction, press either the left or right arrow.

If the string cannot be found, a message will appear:

```
**************************************************
*                                                *
*                                  NOT FOUND   *
**************************************************
```

and the cursor will be restored to its position before the command was executed.

4.9 REPLACE/EXECUTE REPLACE (REPL/EXC R)

You can simultaneously FIND a string and REPLACE it by another. Enter [2nd][REPL], and the display prompts:

```
**************************************************
*                                                *
* REPL.  STRING:                          --) *
**************************************************
```

Enter the string which is to replace the FOUND string (up to 25 characters), and then press [RETURN]. Both the FIND and REPLACE buffers are now full. You can, for example, find the string without replacing it by using [EXC F], or you can find it and replace it by using [EXC R].

You can find and replace all the strings in the program by first moving the cursor to the top program line. This can be done, for example, by pressing [up arrow] and holding it. (All keys repeat except for function keys.) Hit [right arrow] to ensure that the search direction is forward. Then press [REPT]. The display will prompt for a number:

```
**************************************************
*                                                *
* REPEAT:                                        *
**************************************************
```

To be sure that you find and replace all of the strings in question, fill in a large number, for example 255 (which happens to be the maximum number allowed). Then hit [EXC R], and all the strings matching those in the FIND buffer will be found and replaced by the string in the REPLACE buffer.

4.10 MACRO/EXECUTE MACRO (MACRO/EXC M)

A MACRO is a single command which represents several keystrokes. A MACRO is usually used when the programmer discovers that he is using a particular series of keystrokes again and again.
In order to simplify the programming, this series of commands can be defined as a MACRO and from then on be invoked by a single keystroke [EXC M].

After [2nd][MACRO] is entered, a series of keystrokes can then be typed will be stored in the MACRO buffer. The series is terminated by again typing [2nd][MACRO] or by typing [EXC M] which terminates the macro and executes it. This command line is recalled from the buffer and batch processed as a single command whenever [EXC M] is hit.

Example: [2nd] [MACRO] [REPT] [5] [DELCH] [2nd] [MACRO].

Now, when [EXC M] is hit, 5 characters will be deleted.

Up to 255 keystrokes can be chained to form a single macro.

5. EDITOR COMMANDS (ECMD) "Soft Commands"

In contrast to the dedicated-key commands, these are software commands which must be written to the LCD display. All soft commands are initiated by pressing [ECMD]. The display prompts

```
**************************************************
*                                                *
* COMMAND:                                       *
**************************************************
```

and one of the following can be typed in - either the full name or the abbreviation. Activate the command by typing [RETURN].

5.1 CREATE (CR)

When the A.C. power is turned on, the NC editMaster is in the EXAMINE mode which means that the memory can be read but not written. In order to write anything into the memory, the CREATE mode must first be entered. See Fig. 1.7. Type [ECMD], and enter [C][R] as shown below:

```
**************************************************
*                                                *
* COMMAND: CR                                    *
**************************************************
```

Complete the command by hitting [RETURN].

5.2 EXAMINE (EX)

If, after writing and editing a program, you wish to return to the EXAMINE mode in order to write-protect the memory contents, press [ECMD] and type in [E][X], followed by [RETURN]. Now, any attempt to alter the memory will trigger an acoustic warning (beep) and an error message.

5.3 COPY LINE (CO)

After pressing [ECMD] and typing [C][O] the display will prompt:

```
**************************************************
*                                                *
* COPY LINE:                                     *
**************************************************
```

You enter the first line number of a block of lines which is to be copied somewhere else in the program memory.
The display will now look like this:

```
**************************************************
*                                                *
* COPY LINE: 210   TO                            *
**************************************************
```

You enter the line number of the last line in the block.
A third prompt will now appear.

```
**************************************************
*                                                *
* FROM: 210     TO: 450    ==)                   *
**************************************************
```

You enter the line number of the line after which the block is to be inserted. The original block is not altered in any way.

5.4 MOVE LINE (MO)

This command resembles COPY LINE except that the original block of lines is removed from the memory and moved to the new location. The line numbers are changed to fit this new location.

5.5 RENUMBER (RENUM)

This command causes all lines to be renumbered starting with line 000100 and incrementing by 100 for each successive line. Note that the editor must be in CREATE mode before this command can be used.

5.6 RESEQUENCE (RESEQ)

This command is similar to RENUM except that the sequence numbers are renumbered. The increment is one of the SET-UP parameters. See Section 3.8.

5.7 TOP (T)

This command moves the cursor to the top line of the program.

5.8 BOTTOM (B)

This command moves the cursor to the bottom line of the program.

5.9 DELETE LINE (DEL)

The display prompts for the first line to be deleted and when that has been filled in prompts for the last line.

```
**************************************************
*                                                *
* DEL. LINE: 210   TO  420                       *
**************************************************
```

The lines named and all those in between will be deleted.

5.10 CLEAR (CLEAR)

This command clears the memory.

5.11 STORE (STORE)

When you have found the proper SET-UP parameters, you can use this command to STORE them in non-volatile memory. See Section 3.8.

5.12 UP (UP)

Use this command if you want to insert a line above the first line in the memory. If the first line is, for example, 100, then execution of this command will give the following result:

```
**************************************************
* 000090                                         *
* 000100 N100 G14                                *
**************************************************
```

You can now enter the desired program line and if necessary can continue to enter lines above this one. If you run out of space, RENUMBER and start again.

5.13 DEFAULT (DEF)

You can, at any time, return to the factory installed SET-UP parameters by using this command. See also Section 3.8.

6. APPLICATIONS AND EXAMPLES

6.1 Creating a Program (Sample Session)

Turn the power off, wait a few seconds, and turn the power on again. After the power-on, the display should look like this:

```
**************************************************
*        NC-editMaster GNT 5601                  *
*      GNT Automatic A/S, Denmark                *
**************************************************
```

Try to press one of the letter keys on the main keyboard, for example [B]. You will hear a beep, and the keyboard will look like this:

```
**************************************************
*        NC-editMaster GNT 5601                  *
*                                NOT IN CREATE *
**************************************************
```

The editor does not allow you to write anything in the memory before CREATE mode has been entered. Hit [ECMD], and the display will look like this:

```
**************************************************
*        NC-editMaster GNT 5601                  *
* COMMAND:                                       *
**************************************************
```

Now type [C][R][RETURN], and the editor is ready to accept input.

Assume that the following program is to be entered:

```
000100     %
000200     N101 G14
000300     N102 G00 G96 X6400Z32650 F30 S100 T0202 M44M03M08
000400     N103 G85
000500     N104 G00 X6100Z32650 D1000U50 W10
000600     N105 G00 X1220 Z32650
000700     N106 G01 X1720 Z32400
000800     N107 Z30250
000900     N108 X1650
001000     N109 X5481
001100     N110 Z29800
```

Enter [%][RETURN] and [N][space][G][1][4][RETURN], and the display will look like:

```
**************************************************
* 000200 N101 G14                                *
* 000300                                         *
**************************************************
```

Note that the first line, line 100, has now scrolled up past the top of the display. Start to type in the next line, but when you get to X64002Z, type an X instead of a Z. Then type [DEL] and notice that the X disappears and the cursor moves back one position. You can now type the correct letter and continue with the program line. However, let's assume that you type E30 instead of F30 but don't notice it until the line is finished. Take note of the fact that since this line is more than 40 characters in length, it automatically continues on the next line. The display is now as follows:

```
**************************************************
* 000300 N102 G00 G96 X640023Z32650 E30  *
* S100 T0202 M44M03M08                           *
**************************************************
```

But now you notice the mistake. Using the cursor arrows, move the cursor so that it is positioned over the incorrect E. Now type in the correct F.

Continue typing in the lines, but make the following mistake. Type sequence N104 twice. When you are finished with the program you can return to the beginning and check your work. On a small program, this is done by simply holding [↑] down. This initiates a character-repeat function, and the cursor moves quickly to the top of the program. On a longer program, this is more easily done by using [ECMD] and entering [T] (for Top) when the display prompts for a COMMAND.

Step through the program using [↓] or the [RETURN] key. At line 000600, you notice that this line is duplicated and repair the fault as follows. Check to see if you are in TYPE mode. Look for the little "T" at the beginning of the line. If you see an "I", hit [TYPE], and change from INSERT to TYPE mode. Then type over the incorrect characters.

Finish the editing session by entering [ECMD] and answering [E][X] to the prompt. This command puts the editor back into the EXAMINE mode so that you cannot accidently erase or change the program before it is safely saved on tape.

6.2 Punching a Program from the Memory onto Tape

After writing a program as described in Section 6.1, you will probably want to punch it on tape. Load the tape dispenser and punch as described in Section 2.4. A leader will be automatically punched before the job itself. Note that the type of leader is one of the SETUP parameters. Check also that you will be punching the tape in the desired code, ASCII or EIA (another SETUP parameter). Hit [2nd] [PUNCH], and the display prompts:

```
**************************************************
* FROM:                TO: PUNCH                 *
*                                                *
**************************************************
```

The program to be punched is in the memory, so hit [2nd][PRGMM] to fill in the source. The display prompts:

```
**************************************************
* FROM: MEMORY         TO: PUNCH                 *
* 1. LINE:             2. LINE:                  *
**************************************************
```

and you hit [RETURN] twice to define the memory field as being the entire memroy. When [RETURN] is pressed again, the program will be punched out. A trailer is punched automatically after the program. The trailer length is also a SET-UP parameter.

6.3 Loading a Program from Tape into the NC Machine

To load the program you've just written into the NC machine, a connection must be made between one of the communication channels (for this example, COMM1) and the machine. The transfer can take place in various ways:

1) At low speed with no handshaking

2) At high speed with software handshaking (XON/XOFF)

3) At high speed with hardware handshaking (RTS/CTS)

For case 1, only 2 wires are necessary: pin 2 (Transmitted Data) and pin 7 (Signal Ground). See also Section 2.6.1.

For case 2, a return signal must be provided, so pin 3 (Received Data) must also be connected.

For case 3, pin 5 (Clear To Send) must be used.

The type of handshaking is specified at SETUP. See Section 3.8.

Now load the tape into the reader as described in Section 2.5. Press [2nd][READ], and the display prompts:

```
**************************************************
* FROM: READER        TO:                        *
*                                                *
**************************************************
```

and you hit [2nd][COMM1] to define COMM1 as the data destination. Now hit [RETURN]. The reader will start, and the program will be loaded into the NC machine. If there are any problems with the transfer, check that the Baud rate and format being used match the settings on the NC machine.

6.4 Editing a Tape

If the display does not show a blank line like this:

```
**************************************************
* 000100                                         *
*                                                *
**************************************************
```

there is already a program in the memory. Note that in some cases, it is possible to have a program in the memory even though the display shows a blank line. Check this by moving the cursor up and down. You have the choice of saving the memory contents or erasing it before loading the new program. For this example, assume that the memory is to be erased. This can be done by entering [ECMD], and when the display prompts for a command, enter CLEAR as shown:

```
**************************************************
* 002100 G00 X6100Z32650                         *
* COMMAND: CLEAR                                 *
**************************************************
```

Type [RETURN], and the memory will be emptied.

Load the reader with a punched tape as described in Section 2.6. Enter [2nd][READ], and the display will prompt:

```
**************************************************
* FROM: READER        TO:                        *
*                                                *
**************************************************
```

asking for a data destination. In this case, enter [2nd][PRGMM] and then [RETURN]. The tape will now run through the reader. When the tape has run out, press any key to exit to the editor. The contents of the tape should now be in the memory. Step through the memory line by line by hitting [down arrow], and check that the program looks reasonable. If it does not, check the SETUP parameters to be sure that the code selected matches the tape. If, for example, the code is set to EIA, change to ASCII and read the tape again. See Section 3.8

6.5 Copying a Tape (with or without ASCII/EIA Code Conversion)

Load the tape to be copied into the reader as described in Section 2.5. Load the punch with tape as described in Section 2.4, and generate a leader by pressing [2nd][TFEED]. If code conversion from ASCII to EIA or vice versa is desired, check the SETUP parameters (Section 3.8).

Press [2nd][READ]. The display should show:

```
**************************************************
* FROM: READER        TO:                        *
*                                                *
**************************************************
```

Press [2nd][PUNCH], thereby defining the punch as data destination. Hit [RETURN], and the tape will be copied.

6.6 Dumping a Program from the NC Machine to the Printer

In Section 6.3, a program was sent to the NC machine. Here we reverse the data direction. Again, the transfer can take place without handshaking, with software handshaking or with hardware handshaking. If hardware handshaking is to be used, pin 4 (Request To Send) must be connected. See Section 2.6.1.

If desired, press [2nd][PFEED] to give a little blank paper before the print-out. Now hit [2nd][PRINT], and the display shows:

```
**************************************************
* FROM:                TO: PRINTER               *
*                                                *
**************************************************
```

Hit [2nd][COMM1] to define the source and [RETURN] to run.

In example 6.3, we could have used either COMM2 or COMM1, but since COMM2 is often configured as serial-out/parallel-in, it is simplest to regard COMM1 as the general two-way serial port. COMM2 can then be used to drive an external serial printer and for parallel input.

If the print-out is a lot of nonsense, check the code conversion selected at SETUP. If no printing occurs, check the handshaking lines. Be sure, too, that the correct type of handshaking has been set up. If the printer seems to lose characters, the transmission rate is probably too fast. Switch to a lower Baud rate or implement handshaking.

6.7 Punching a Tape from a Parallel Data Source

Connect the parallel signal to COMM2. If the data source you are using is FACIT TTL compatible, plug in the adaptor cable. Otherwise, check the signal connections for COMM2. See Section 2.6.2.

Enter [2nd PUNCH], and the display prompts:

```
**************************************************
* FROM:                TO: PUNCH                 *
*                                                *
**************************************************
```

Enter [2nd][COMM2], followed by [RETURN], and the punch procedure will start.

7. TROUBLE SHOOTING

In almost all cases, the source of the trouble will be pin-pointed by an error message on the display. For a complete list and explanation of these messages, see below. In the remaining cases, where the error message does not reveal the source of the trouble, the problem is almost certainly a parameter mismatch, for example, Baud rate, framing or code.
If the problem is lost characters, you should choose a lower Baud rate or implement handshaking, either software (XON/XOFF) or hardware (RTS/CTS).

7.1 READER Error Messages

INSERT TAPE, TYPE [SPACE]

This message appears if you have forgotten to load the reader. Load tape according to Section 2.4, and then press the SPACE bar to start the reader

READER PARITY ERROR

The tape in the reader has the wrong parity. Change reader parity as described in SETUP, Section 3.8.

7.2 PUNCH Error Messages

TAPE OUT, INSERT TAPE

If the tape runs out while the PUNCH is running, this message will appear. ABORT the command, load a new roll of tape (See Section 2.5), and re-run the command.

7.3 COMM1 Error Messages

COMM1 PARITY ERROR

Parity mismatch on the incoming signal. Redefine parity according to Section 3.8.

COMM1 FRAMING ERROR

The incoming signal is not framed correctly. This is most probably caused by a Baud rate or word-length mismatch.

COMM1 BREAK INTERRUPT

The external data source has sent a "break". This is considered an ABORT by the editMaster.

COMM1 OVERRUN

Data is coming in too fast. Use software or hardware handshaking See Section 3.8.

DC-CODES NOT ALLOWED WITH EIA

Software handshaking cannot be used with EIA codes. Use hardware handshaking, or if this is impossible, go to a lower Baud rate and run without handshaking.

ERROR: DSR LOW
ERROR: RLSD LOW

These two signals must be high or floating to enable communication. See Section 2.6.1.

7.4 COMM2 Error Messages

COMM2 PARITY ERROR
COMM2 FRAMING ERROR
COMM2 BREAK INTERRUPT
COMM2 OVERRUN
DC-CODES NOT ALLOWED WITH EIA

See the corresponding explanations above, Section 7.3.

ERROR: DTR LOW

DTR must be high or floating to enable communication. See Section 2.6.2.

PARALLEL OVERRUN

Parallel data is coming in too fast. The handshaking protocol is not being observed. Check the signal connections in Section 2.6.2. Remember to use the adaptor cable for FACIT TTL compatability.

7.5 EDITOR/MEMORY Error Messages

MEMORY FULL

The user memory has a capacity of 24 kilobytes (about 60 meters of tape), more than enough for most NC applications.
However, if the memory capacity is exceeded, this message will appear.

NOT IN CREATE

This message appears when the editor is in EXAMINE mode (after power-on for example) and you press a key which tries to write in the memory (e.g. INSLI). To write in the memory, you must first enter CREATE mode. This is done by hitting [ECMD] and then filling in [C][R] when the display prompts:

```
**************************************************
*                                                *
* COMMAND: CR                                    *
**************************************************
```

ILLEGAL KEY

This message appears when an incorrect response is given to a prompt. For example, when using REPT, the display looks as follows:

```
**************************************************
*                                                *
* REPEAT:                                        *
**************************************************
```

If you press a key which is not a number (maybe you have entered the letter "O" instead of zero), the editor considers this an illegal key.

ILLEGAL COM.

This means that you have filled in a command that is unknown to the editor after [ECMD]. See Section 5.

NOT FOUND

If you have entered a string in the FIND buffer that the editor cannot find (when EXC F is invoked), this message will appear on the display. Check that the search has taken place in the right direction (forwards or backwards in the program). You can specify the search direction by pressing either [right arrow] or [left arrow]. This error can occur when using either FIND or REPL. See Sections 4.8 and 4.9. It can also occur when using GOTO N or GOTO L if a non-existent line number is specified.

LINE TOO LONG

The editor cannot accept lines longer than 255 characters.

TOO MANY!

The FIND buffer and the REPLACE buffer each have room for 25 characters.

MAX 255!

The MACRO command can consist of a string of up to 255 commands, but no more. REPEAT also has a maximum of 255.

8. CONVERSION TABLES

ASCII Input		EIA Output		ASCII Input		EIA Output	
HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR
00	NUL	00	BLANK	20	SP	10	SP
01	SOH	NO OUTPUT		21	!	NO OUTPUT	
02	STX	NO OUTPUT		22	"	NO OUTPUT	
03	ETX	NO OUTPUT		23	#	NO OUTPUT	
04	EOT	NO OUTPUT		24	$	5B	%
05	ENQ	NO OUTPUT		25	%	0B	EOR
06	ACK	NO OUTPUT		26	&	0E	&
07	BEL	NO OUTPUT		27	'	NO OUTPUT	
08	BS	2A	BS	28	(	4C	Punch ON
09	HT	3E	TAB	29	)	2F	Punch OFF
0A	LF	80	EOB	2A	*	NO OUTPUT	
0B	VT	NO OUTPUT		2B	+	70	+
0C	FF	NO OUTPUT		2C	,	3B	,
0D	CR	NO OUTPUT		2D	–	40	–
0E	SO	NO OUTPUT		2E	.	6B	.
0F	SI	NO OUTPUT		2F	/	31	/
10	DLE	NO OUTPUT		30	0	20	0
11	DC1	NO OUTPUT		31	1	01	1
12	DC2	NO OUTPUT		32	2	02	2
13	DC3	NO OUTPUT		33	3	13	3
14	DC4	NO OUTPUT		34	4	04	4
15	NAK	NO OUTPUT		35	5	15	5
16	SYN	NO OUTPUT		36	6	16	6
17	ETB	NO OUTPUT		37	7	07	7
18	CAN	NO OUTPUT		38	8	08	8
19	EM	NO OUTPUT		39	9	19	9
1A	SUB	NO OUTPUT		3A	:	46	O
1B	ESC	NO OUTPUT		3B	;	0E	&
1C	FS	NO OUTPUT		3C	<	NO OUTPUT	
1D	GS	NO OUTPUT		3D	=	6D	=
1E	RS	NO OUTPUT		3E	>	NO OUTPUT	
1F	US	NO OUTPUT		3F	?	NO OUTPUT	

ASCII Input		EIA Output		ASCII Input		EIA Output	
HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR
40	@	NO OUTPUT		60	`	NO OUTPUT	
41	A	61	A	61	a	61	a
42	B	62	B	62	b	62	b
43	C	73	C	63	c	73	c
44	D	64	D	64	d	64	d
45	E	75	E	65	e	75	e
46	F	76	F	66	f	76	f
47	G	67	G	67	g	67	g
48	H	68	H	68	h	68	h
49	I	79	I	69	i	79	i
4A	J	51	J	6A	j	51	j
4B	K	52	K	6B	k	52	k
4C	L	43	L	6C	l	43	l
4D	M	54	M	6D	m	54	m
4E	N	45	N	6E	n	45	n
4F	O	46	O	6F	o	46	o
50	P	57	P	70	p	57	p
51	Q	58	Q	71	q	58	q
52	R	49	R	72	r	49	r
53	S	32	S	73	s	32	s
54	T	23	T	74	t	23	t
55	U	34	U	75	u	34	u
56	V	25	V	76	v	25	v
57	W	26	W	77	w	26	w
58	X	37	X	78	x	37	x
59	Y	38	Y	79	y	38	y
5A	Z	29	Z	7A	z	29	z
5B	[	NO OUTPUT		7B	{	NO OUTPUT	
5C	\	NO OUTPUT		7C	|	NO OUTPUT	
5D	]	NO OUTPUT		7D	}	NO OUTPUT	
5E	^	NO OUTPUT		7E	~	NO OUTPUT	
5F	_	NO OUTPUT		7F	DEL	7F	DEL

EIA Input		ASCII Output		EIA Input		ASCII Output	
HEX	CHAR	HEX	CHAR	HEX	CHAR	HEX	CHAR
01	1	31	1	26	w	57	W
02	2	32	2	37	x	58	X
13	3	33	3	38	y	59	Y
04	4	34	4	29	z	5A	Z
15	5	35	5	6B	.	2E	.
16	6	36	6	3B	,	2C	,
07	7	37	7	31	/	2F	/
08	8	38	8	70	+	2B	+
19	9	39	9	40	–	2D	–
20	0	30	0	0E	&	3B	;
61	a	41	A ✱	5B	%	24	$
62	b	42	B	3E	TAB	09	HT
73	c	43	C	80	EOB	0D+0A	CR+LF
64	d	44	D	7F	DEL	7F	DEL
75	e	45	E	0B	EOR	25	%
76	f	46	F	10	SP	20	SP
67	g	47	G	2A	BS	08	BS
68	h	48	H	7C	UC	NO OUTPUT	
79	i	49	I	7A	LC	NO OUTPUT	
51	j	4A	J	00	BLANK	00	NUL
52	k	4B	K				
43	l	4C	L				
54	m	4D	M	4C	Punch ON	28	(
45	n	4E	N	2F	Punch OFF	29	)
46	o	4F	O	6D	=	3D	=
57	p	50	P				
58	q	51	Q				
49	r	52	R				
32	s	53	S				
23	t	54	T				
34	u	55	U				
25	v	56	V				

✱ A or a etc. dependent on precedence code