

GNT 
AUTOMATIC A/S

GNT 4601 READER/PUNCH COMBO

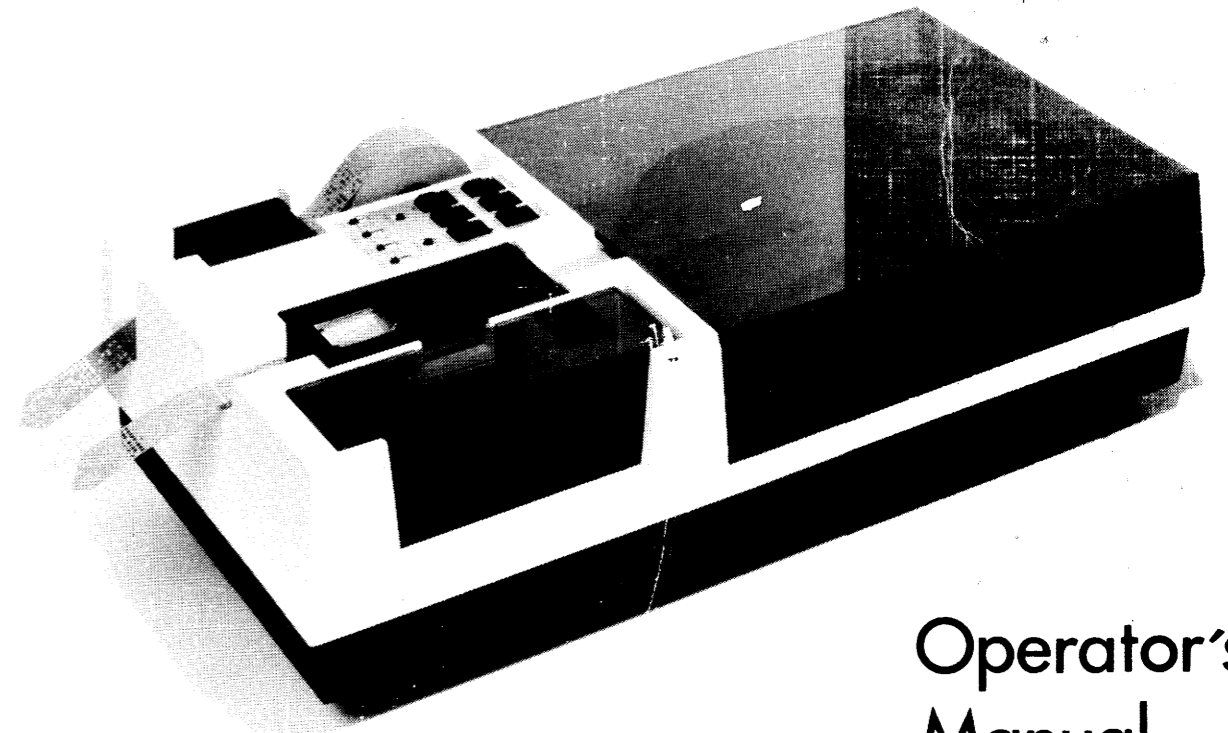
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Operator's
Manual

GNT 
AUTOMATIC A/S

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1. GENERAL

1.1 Scope

This manual is a guide to operating the GNT 4601 Reader/Punch Combo and applies to the following:

- GNT 4601, standard version (8-channel)
- GNT 4601, converter version (Option A)
- GNT 4601, 5-channel version (Option B).

1.2 Description

The GNT 4601 is the ideal paper tape reader/punch combination. It handles serial data at speeds up to 1200 Baud, and all data and control signals conform to RS232C/V24. There is also a current loop facility.

The GNT 4601 is extremely flexible and has a wide range of applications:

- Word processing systems
- In-line operation between computer and terminal
- Numeric control systems
- General data storage and program loading
- Tape duplication and editing.

The GNT 4601 has two signal connectors and can be inserted between a modem or computer and a terminal. The Data Communication Equipment (DCE) connector goes to the computer/modem, and the Data Terminal Equipment (DTE) connector to the terminal.

The Reader/Punch Combo can also be used as a terminal itself. In this case, only the DCE connector is used.

If the Reader/Punch Combo is to be used together with another terminal, only the DTE connector is used.

Warning — This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

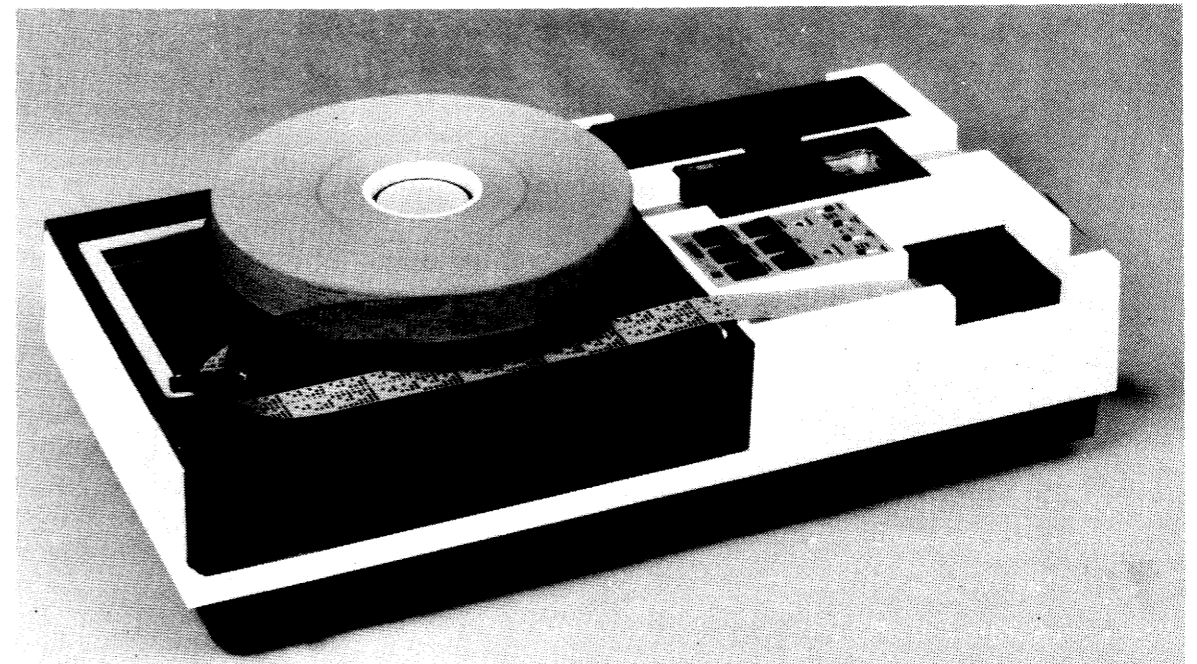


Fig. 1.1 GNT 4601 Reader/Punch Combo, showing optional unwinder

2. TECHNICAL DATA

2.1 Environment

Temperature:
 Ambient operating +5° C to +40° C
 Ambient storage -40° C to +70° C

Humidity:
 15 - 95% RH, non-condensing

2.2 A.C. Supply (Selectable)

Switch setting:	115 V	230 V
Voltage:	100 - 125 V	200 - 250 V
Frequency:	47 - 63 Hz	47 - 63 Hz
Power:	95 W	95 W

2.3 Tape

2.3.1 FOR PUNCH

Material:
 Paper, according to ISO 1729
 Mylar/foil/mylar
 Metalized mylar
 Polyester

Form:
 Rolls, max. diameter 8", standard 2" core

★ Width:
 1" (25.4 mm), 8-unit ISO

Thickness:
 0.05 - 0.12 mm

2.3.2 FOR READER

Material:
 Any with transparency up to 50%

Form:
 Rolls up to 75 mm, with unwinder option, 8" rolls

★ Width:
 1" (25.4 mm), 8-unit ISO

★ Options A, B: 11/16" (17.5 mm), 5-unit ISO.

3. SETTING UP

3.1 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.

3.2 Model Identification

The model is identified by the ID label which is visible when the chad box is removed. See Fig. 4.1.

Number	Version	Remark	*Power cable	Note
KDVK-12301	Standard		US	
KDVK-12321	Standard		E	
KDVK-12311	NC	ASCII-ASCII	US	Option C
KDVK-12331	NC	ASCII-ASCII	E	Option C
KDVK-12411	Converter	ASCII-Telex	E	Option A
KDVK-12413	Converter	ASCII-Telex	US	Option A
KDVK-12415	Converter	Scandinavia	E	Option A
KDVK-12421	Converter	United States	US	Option A
KDVK-12432	Converter	France	E	Option A
KDVK-12434	Converter	United Kingdom	E	Option A
KDVK-12436	Converter	Germany	E	Option A
KDVK-12442	Converter	Switzerland	E	Option A
KDVK-12444	Converter	Italy	E	Option A
KDVK-12446	Converter	Australia	E	Option A
KDVK-12501	5-channel		US	Option B
KDVK-12521	5-channel		E	Option B

*E = European, US = American

3.3 Installation

The GNT 4601 is a free-standing, table-top unit.

3.4 A.C. Supply

The required A.C. supply voltage is shown on the selector switch at the rear of the instrument. See Fig. 3.3.

To change to another A.C. voltage, slide the switch to the opposite position.

The power receptacle accepts a standard business machine plug which is supplied.

3.5 Top Panel Slide Switches
(See Fig. 3.2, Control Panel)

3.5.1 MODE (See the Data Flow Diagram, Fig. 3.1)

a) LOC

This mode is used for off-line operation, that is, when connection is desired to the Data Terminal Equipment (DTE) only and not to the computer or modem. Examples of local operation are tape editing and generation. See Typical Applications, Section 4.3.

Reader ON:

Data transmitted from Reader/Punch Combo to DTE.

Tape copied if PUNCH is ON.

Punch controlled by DC2/DC4 (if selected).

Reader controlled by DC1/DC3 (if selected) or DTR.

CTS and DSR both high to indicate LOCAL MODE.

Reader OFF:

Data transmitted from DTE to Reader/Punch Combo.

Data echoed (if programmed).

Tape punched if PUNCH is ON.

Punch controlled by DC2/DC4 (if selected).

Max. Baud rate 600, no handshaking.

Punch goes OFF on overrun error.

b) FDX

The full duplex mode is used for on-line operation where the Reader/Punch Combo is used to generate hard-copy of data passed from the Data Communication Equipment (DCE) to the Data Terminal Equipment (DTE) or in cases where the GNT 4601 acts as the terminal, either alone or in conjunction with a printer. In this mode, simultaneous transmission can take place.

Reader ON:

Reader output transmitted to DCE.

Reader controlled by CTS or DC1/DC3 (from DCE only).

DSR must be ON (or floating).

READER ON can be obtained whether CTS is ON or OFF.

If PUNCH is ON, data from DCE is punched.

Punch controlled by DC2/DC4 (if selected), from DCE only.

Handshaking operation possible. DTR ON = PUNCH READY.

Reader OFF:

If PUNCH is ON, data from DCE is punched.

Punch controlled by DC2/DC4 (if selected), from DCE only.

Handshaking operation possible and necessary if Baud rate is 1200 Baud. DTR ON = PUNCH READY.

c) HDX

This mode, in general, is used only with a modem which operates in half-duplex mode, that is, when simultaneous transmission cannot take place.

Reader ON:

Reader output transmitted to DCE and DTE.

Reader controlled by CTS or DC1/DC3 (from DCE only).

DSR must be ON (or floating).

To get READER ON, CTS must first be OFF.

Punching cannot take place.

Reader OFF:

Data can flow both ways, though not at the same time.

Only data from DCE can be punched.

Punch can be controlled by DC2/DC4 from DCE only.

Handshaking operation possible and necessary if Baud rate is 1200 Baud. DTR ON = PUNCH READY.

When the DC CODES switch and the READER are ON, the reader is activated by sending a DC1 character to the Reader/Punch Combo. The reader is deactivated either by a DC3 character, by pushing the READER button, by a control signal going OFF or when the tape runs out.

When DC CODES and PUNCH are ON, a DC2 character transmitted to the Reader/Punch Combo will cause all following characters to be punched. The punch is deactivated either by a DC4 character or by pushing the PUNCH button.

Note:

DC CODES are functional only when SW-3 on the DIP programming switch is ON (see Section 3.6). DC2 and DC4 are not punched.

3.5.3 CR DELAY

When the CR DELAY switch is ON, certain ASCII or EIA characters read by the reader will be followed by a delay before the next character is sent. The delay characters are selected by SW-3 on the DIP programming switch (see Section 3.6). The delays are given below:

ASCII Code	
carriage return (CR)	300 ms
line feed (LF)	200 ms

EIA 244-A Code	
End-Of-Block (EOB)	300 ms

These delays are used when operating with a printer.

3.5.2 DC CODES

Special ASCII characters can be used to start or stop the reader or punch by remote control. These characters are known by various names:

Names	Function
DC1 X-ON Ctl-Q	Reader ON
DC2 TAPE Ctl-R	Punch ON
DC3 X-OFF Ctl-S	Reader OFF
DC4 NO TAPE Ctl-T	Punch OFF

3.5.4 SPEED

The SPEED switch selects one of 3 transmission rates, LOW, MED or HIGH. These 3 transmission rates are in turn defined by the DIP programming switch. See Section 3.6.

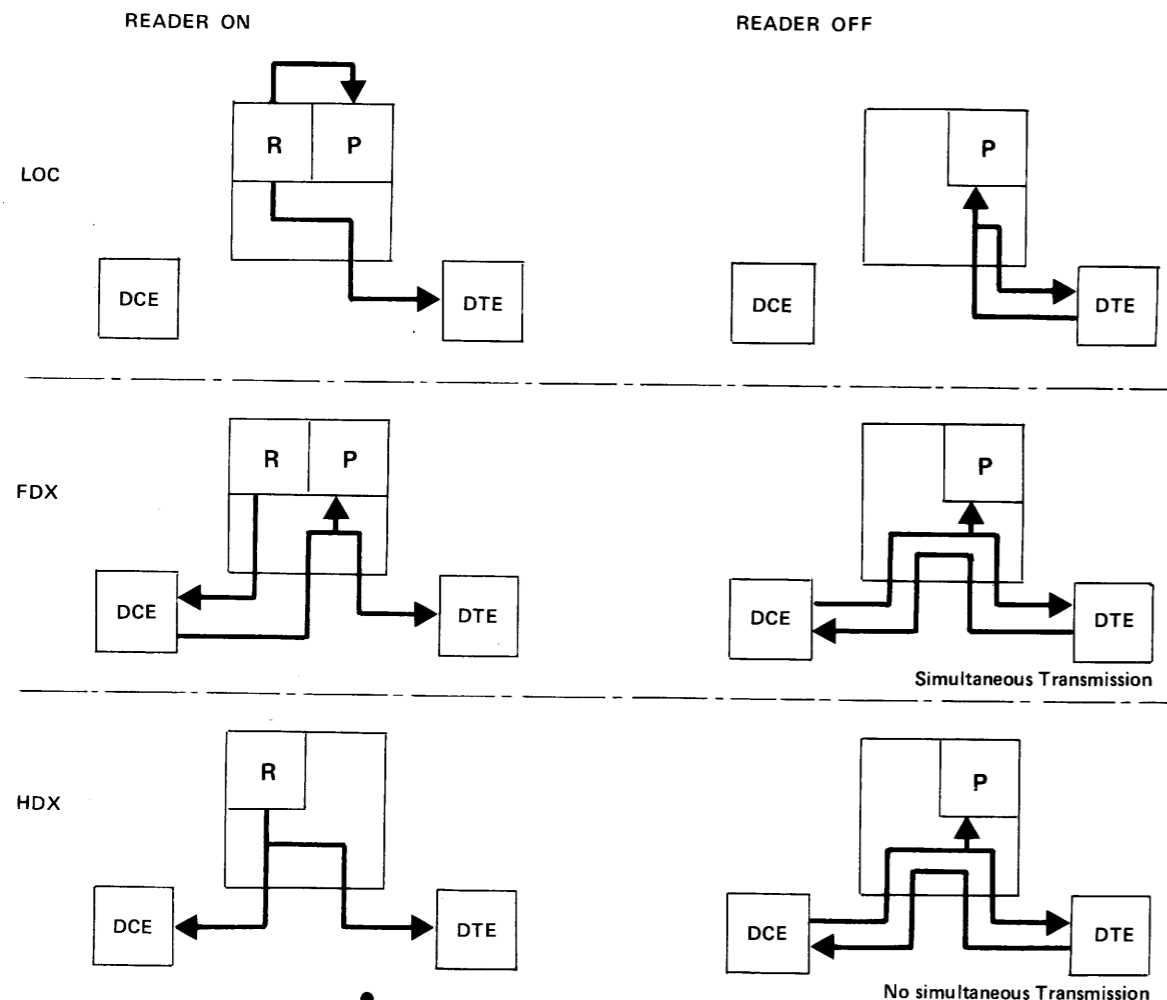


Fig. 3.1 Data flow diagram

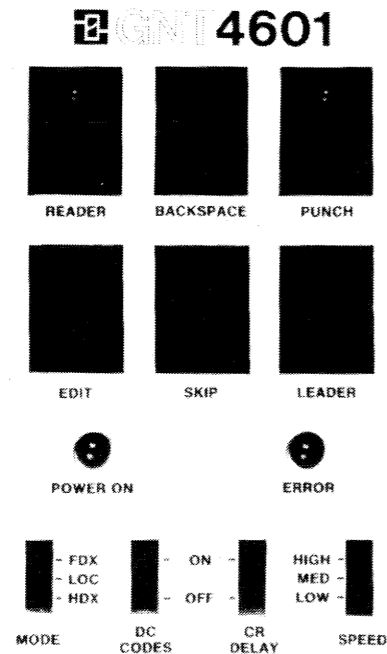


Fig. 3.2 Control panel

3.6 DIP Programming Switch

Before attempting to program the 8-pole DIP switch, be sure the A.C. power is disconnected. The DIP switch is accessible through an aperture in the base of the Reader/Punch Combo. See Fig. 3.5.

ECHO
SW-1 ON: Data from the DTE to the Reader/Punch Combo is sent back to the DTE (LOC MODE only).
OFF: No function.

LEADER SELECT
SW-2 ON: Tape delete. All channels and feed hole punched when LEADER button is pushed.
OFF: Tape feed. Feed hole only punched when LEADER is pushed.

CODE SELECTION
SW-3 ON: ASCII characters CR and LF will be followed by a delay when read by reader if CR DELAY is ON (see Section 3.5.3). DC CODES will be recognized if DC CODES is ON (see Section 3.5.2).
OFF: EIA character EOB will be followed by a delay when read by reader if CR DELAY is ON (see Section 3.5.3). DC CODES will not be recognized regardless of the position of the DC CODES switch.

PARITY CHECK/GENERATION, FRAMING AND OVERRUN ERROR

SW-4	SW-5	Parity	Framing	Overrun error
ON	ON	NO	NO	YES
ON	OFF	NO	YES	YES
OFF	ON	ODD	YES	YES
OFF	OFF	EVEN	YES	YES

Parity and Framing Error (when programmed)

LOC: RD output on DTE goes to logical 0 for 500 ms: If READER is ON, it goes OFF. The character is punched.
HDX: No indication.
FDX: TD output on DCE goes to logical 0 for 500 ms: If READER is ON, it goes OFF. The character is punched.

Note: A framing error is a synchronization error which can be the result of an incorrect Baud rate, format or word length.

Parity (9th bit) is checked on incoming data to the punch.

Parity (9th bit) is generated on outgoing data from the reader.

Overrun Error (always active)

LOC: PUNCH goes OFF.
HDX, FDX: The DTR output on the DCE connector will go OFF for 500 ms. PUNCH goes OFF.

Note: An overrun error may result when the punch's handshaking signals are not respected.

BAUD RATE

SW-6	SW-7	LOW	SPEED MED	HIGH
ON	ON	110 Baud	300 Baud	600 Baud
OFF	ON	110 Baud	300 Baud	1200 Baud
ON	OFF	110 Baud	600 Baud	1200 Baud
OFF	OFF	300 Baud	600 Baud	1200 Baud

If 110 Baud has been chosen, 2 stop bits will be generated. In all other cases, 1 stop bit will be generated. For incoming data, only 1 stop bit is required.

SKIP DELETE (Reader Only)

SW-8 ON: Deleted characters (all 8 channels punched) will be ignored by the reader.
OFF: No function. Delete will be treated as a normal character.

3.7 Input/Output Signals

All signals are in accordance with EIA standard RS232C and CCITT V24 and V28. The current loop is 20/60 mA, passive.

The DTE (Data Terminal Equipment) signal connector is a Cannon DB-25S (female) mounted at the rear of the instrument.

The DCE (Data Communication Equipment) connector is a Cannon DB-25P (male).

Note that the configurations of the 2 signal connectors are identical, but signal directions are reversed (except for current loop). Undesignated pins of the same number are connected together to give a direct throughput.

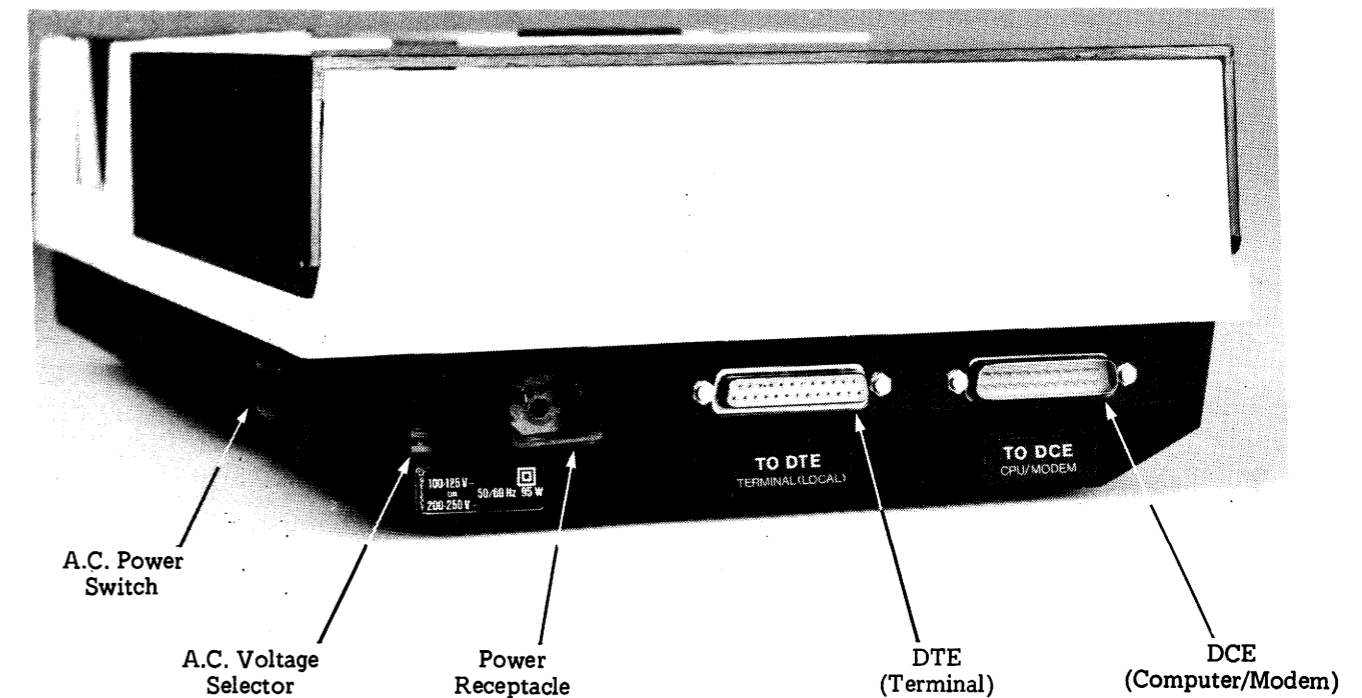
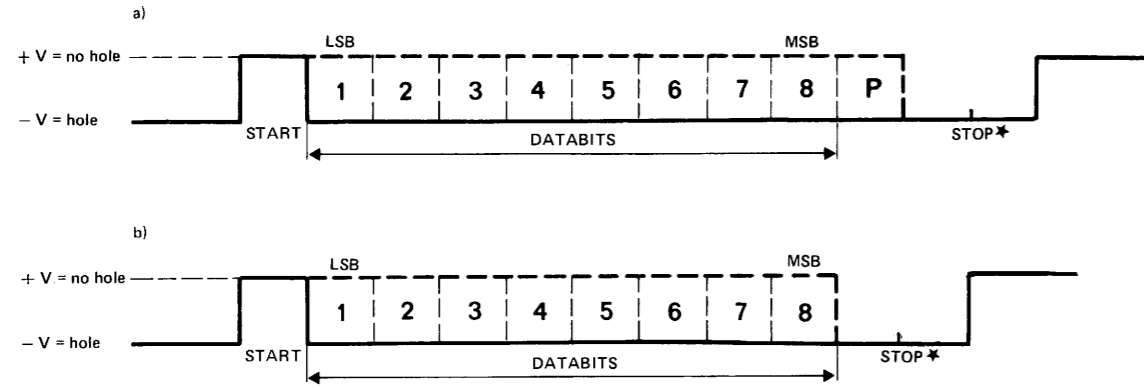


Fig. 3.3 Back view

3.7.1 SERIAL DATA FORMAT

Two different data formats are recognized by the Reader/Punch Combo: 8-bit with parity or 8-bit without parity (according to the setting of the DIP programming switch. See Section 3.6).

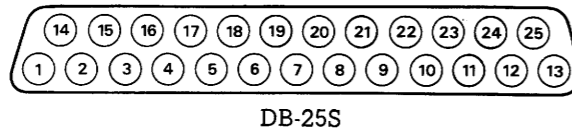


* 2 stop bits only at transmission at 110 Baud, else 1 stop bit

- a) with parity bit
- b) without parity bit

Fig. 3.4 Serial data

3.7.2 DTE CONNECTOR (Data Terminal Equipment)



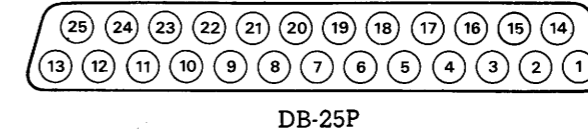
Pin No.	RS232C	V24	Name	Description	Remark
1	AA	101	PG	Protective Ground	
2	BA	103	TD	Transmitted Data	input
3	BB	104	RD	Received Data	output
4	CA	105	RTS	Request To Send	input
5	CB	106	CTS	Clear To Send	output
6	CC	107	DSR	Data Set Ready	output
7	AB	102	SG	Signal Ground	common return
20	CD	108.2	DTR	Data Terminal Ready	input
7			Tx-	Current Loop Transmit	minus
9			Tx+	Current Loop Transmit	plus
13			Rx-	Current Loop Receive	minus
18			Rx+	Current Loop Receive	plus

Notes:

- RTS input: Fed through to DCE connector
- CTS output: Goes ON to indicate LOCAL MODE
- DSR output: Goes ON to indicate LOCAL MODE
- DTR input: Reader control signal in LOCAL MODE

The 4 pins for current loop are connected in parallel to the 4 pins for current loop in the DCE connector and works only in HDX and FDX.

3.7.3 DCE CONNECTOR (Data Communication Equipment)



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
20	CD	108.2	DTR	Data Terminal Ready	output
7			Tx-	Current Loop Transmit	minus
9			Tx+	Current Loop Transmit	plus
13			Rx-	Current Loop Receive	minus
18			Rx+	Current Loop Receive	plus

Notes:

- RTS output: Goes ON when READER is ON
- CTS input: Reader control signal in HDX and FDX modes
- DSR input: Must be ON in HDX and FDX modes to activate reader
- DTR output: PUNCH handshaking signal. OFF = not ready

3.7.4 SIGNAL LEVELS

Data signals	"1"	"0"
Paper tape	hole	no hole
TD input (DTE) and RD input (DCE)	-3 to -30 V	+3 to +30 V
TD/RD output	typ. -10 V	typ. +10 V
Current loop input	+12 to +100 mA	+3 to -100 mA (no current)
Current loop output	open collector output, max. 100 mA/60 V	
Control signals	ON	OFF
RTS input (DTE) ¹	+3 to +30 V	0 to -30 V
DTR, CTS, DSR inputs ²	0 to +30 V	-3 to -30 V
All outputs	typ. +10 V	typ. -10 V

- 1) Floating input = OFF
- 2) Floating input = ON

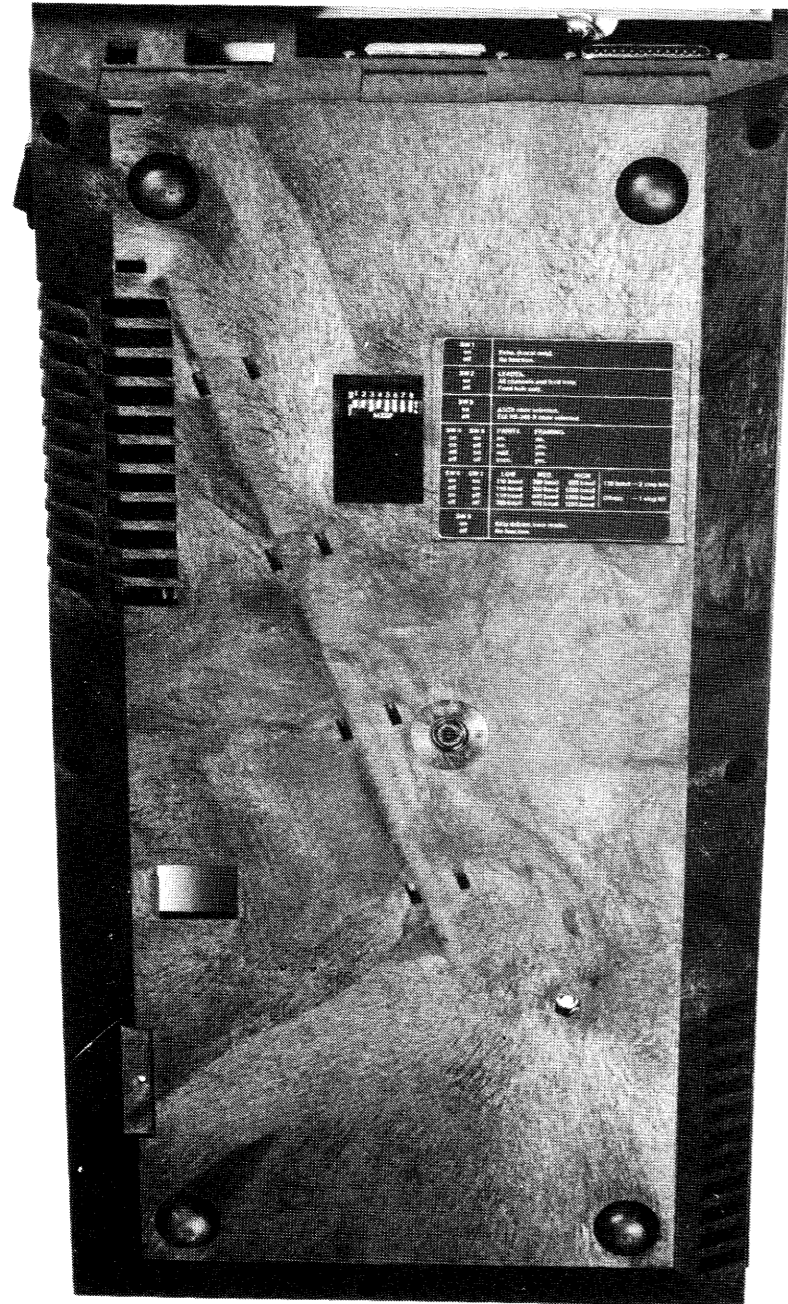


Fig. 3.5 Bottom view

4. OPERATING

4.1 Tape Loading

4.1.1 PUNCH

1. Throw the power switch and see that the red "power on" indicator lights up.
2. Open the lid and place a roll of tape on the turntable.
3. Thread the tape around the two rollers as shown in Fig. 4.1.
4. Depress the tape release lever so that the transparent window pops up.
5. Slide the tape into the punch mechanism until the sprocket wheel is covered.
6. Snap the window closed, and depress the leader button until a sufficient leader has been punched.

4.1.2 READER

Place the tape to be read in the container as shown in Fig. 4.1. Open the reader lid, engage the tape with the sprocket, and close the lid. If the optional unwinder is to be used (reels larger than 75 mm) thread the tape as shown in Fig. 1.1.

4.1.3 CHAD

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

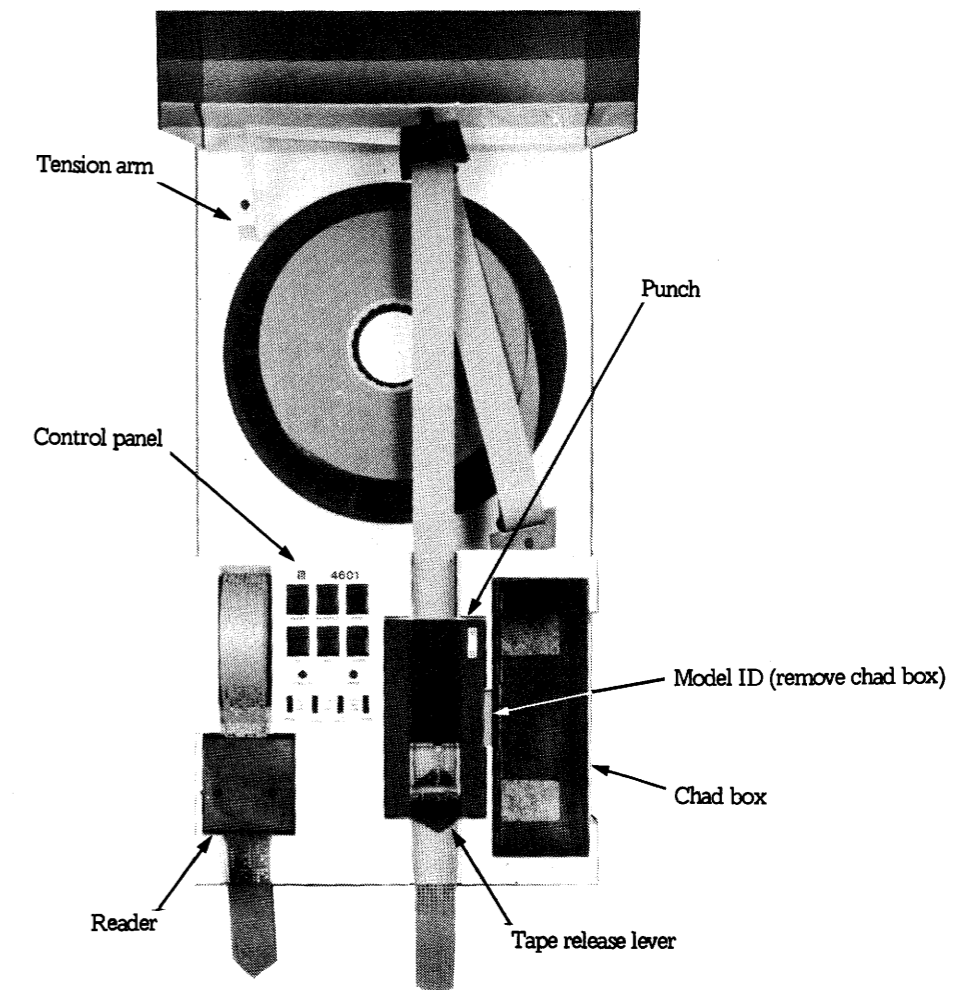


Fig. 4.1 Top view

4.2 Manual Controls

4.2.1 A.C. POWER SWITCH

The A.C. Power Switch is located on the side of the Reader/Punch Unit, near the power receptacle. See Fig. 3.3 (back view).

4.2.2 PUSH BUTTONS (See Fig. 3.2)

Note that EDIT, SKIP, and BACKSPACE function only with the READER OFF and the Reader/Punch Combo in LOC MODE.

a) READER

When READER is pushed, the reader changes state from ON to OFF or vice versa. In HDX mode, CTS must be OFF.

b) PUNCH

When PUNCH is pushed, the punch changes state from ON to OFF or vice versa.

c) EDIT

When EDIT is activated momentarily (less than 1 second), the reader will read one character. When EDIT is held down (more than 1 second), reading continues until a CR or EOB is read (depending on the setting of the DIP programming switch, see Section 3.6), or until the button is released, or until the tape runs out.

d) SKIP

SKIP functions only in conjunction with EDIT: When EDIT and SKIP are both depressed, the characters read are not punched. They are, however sent to the DTE.

e) BACKSPACE

When BACKSPACE is pressed, the tape in the reader moves back one character.

If PUNCH is ON, the tape in the punch will also move back one character.

f) LEADER

When LEADER is pushed, a leader is produced having either holes punched in all channels (Delete) or in no channels (Feed holes only). The position of SW-2 on the DIP switch determines the type of leader. See Section 3.6.

4.2.3 INDICATORS

a) POWER ON

This LED lights when the A.C. power switch is turned on.

b) READER

This LED, located in the READER button, lights when the READER is ON.

c) PUNCH

This LED, located in the PUNCH button, lights when the PUNCH is ON.

d) ERROR (applies to punch only)

This LED lights in the following error situations:

- tape out
- taut tape
- incorrect motor speed
- lack of synchronization between punch and electronics.

When ERROR lights, the PUNCH goes OFF. The punch buffer continues to accept characters, and these will not be lost if transmission is stopped when the buffer is full (DTR goes OFF).

When the fault is corrected (e.g. when a new roll is loaded after "tape out"), press LEADER, and the stored characters will be punched out.

4.3 Typical Applications

4.3.1 READING TAPE TO A CRT TERMINAL

Connector: DTE
 Control signals: DTR = ON or floating
 MODE: LOC
 DC CODES: ON
 CR DELAY: OFF
 SPEED: to match terminal
 READER: ON
 PUNCH: OFF

Activate the reader by sending DC1 (Ctl-Q) from the keyboard. Data from the tape will be read to the CRT. To stop the tape, send DC3 (Ctl-S), or let the tape run out, automatically stopping the reader.

4.3.2 LOADING A COMPUTER PROGRAM FROM TAPE

Connector: DCE
 Control signals: DSR, CTS ON or floating
 MODE: FDX
 DC CODES: OFF
 CR DELAY: OFF or ON
 SPEED: to match computer's serial port
 READER: ON
 PUNCH: OFF

Start the computer load program. Then press READER ON. As a rule, the computer will be fast enough to accept the characters without handshaking. If necessary, however, CTS can be used to start and stop the reader, or if you wish to avoid the use of control signals, set CR DELAY ON, and the additional delay provided by CR/LF will often be sufficient.

4.3.3 PREPARING A TAPE FROM A TERMINAL

Connector: DTE
 Control signals: none
 Programming switch: ECHO ON
 MODE: LOC
 DC CODES: OFF
 CR DELAY: don't care
 SPEED: to match terminal
 READER: OFF
 PUNCH: ON

Type the characters to be punched. If an incorrect character is typed, push BACKSPACE (on the Reader/Punch Combo control panel). Then type delete, followed by the correct character.

4.3.4 PUNCHING TAPE AT HIGH SPEED

Connector: DCE
 Control signals: DTR
 MODE: HDX or FDX
 DC CODES: OFF or ON
 CR DELAY: don't care
 SPEED: HIGH (1200 Baud)
 READER: OFF
 PUNCH: ON

This mode of operation utilizes the full speed of the punch when dumping from a computer or when using a terminal with SEND PAGE capability. The data source must be able to recognize the DTR handshaking signal. Data blocks can be omitted using DC2/DC4.

4.3.5 EDITING A TAPE

Connector: DTE
 Control signals: none
 MODE: LOC
 DC CODES: OFF
 CR DELAY: OFF
 SPEED: to match terminal
 READER: OFF
 PUNCH: ON

Assume that you have a tape which is to be edited. This is, some parts are to be duplicated, some parts left out, characters are to be added or deleted.

To duplicate a piece of tape, hold EDIT down. Tape will be duplicated until EDIT is released or a CR is read. To read one character at a time, depress EDIT momentarily.

If a character is to be deleted, read up to the character. Then hold SKIP down while touching EDIT.

A character can be added by typing it in from the terminal.

To delete a large portion of tape, turn the PUNCH OFF, and run the reader past the unwanted portion by turning the READER ON. If you go too far, you can back up by using BACKSPACE.

4.3.6 TWO-WAY DATA TRANSMISSION VIA MODEM, INCOMING DATA PUNCHED

Connector: modem to DCE
 terminal to DTE
 Control signals: CTS ON = READ
 DSR ON or floating
 MODE: FDX
 DC CODES: ON
 CR DELAY: ON
 SPEED: to match modem
 READER: ON
 PUNCH: ON

The reader will read data to the modem when CTS is ON and when a DC1 character is received. If the reader is OFF, data can be sent from the terminal to the modem.

Incoming data from the modem will be punched out (controlled by DC2/DC4).

4.3.7 DUMPING AN NC PROGRAM TO THE READER/PUNCH COMBO AND A PRINTER

Connector: computer to DCE
 printer to DTE

Control signals: DTR ON = PUNCH READY
 any signals from printer fed through to computer

MODE: FDX

DC CODES: ON or OFF

CR DELAY: don't care

SPEED: to match computer's serial port

READER: OFF

PUNCH: ON

In this configuration, the Reader Punch Combo is inserted in-line between the computer and the printer and records the same data. If the printer is faster than the punch (i.e. over 75 char./s) then the computer must respect the punch handshaking signal, DTR. Otherwise this is not necessary, and the computer and printer will operate in the normal way.

4.4 Trouble Shooting

4.4.1 READER

Symptom	Possible cause
READER ON LED does not light when READER button is depressed.	In HDX mode CTS must be OFF before READER ON can be obtained. Strap CTS to RTS on DCE connector.
READER ON lights, but reader does not read.	In FDX and HDX, CTS and DSR must be ON before reader starts. In LOC, DTR must be ON. If DC CODES are ON, the reader waits for DC1 before starting, even if the control signal is ON.
Reader reads, but no characters are received.	Receiver connected to the wrong connector, or MODE switch in wrong position.
Reader reads, but gives incorrect characters or error indication on data receiver.	Baud rate or parity generation not matched to receiver. See Section 3.6.
No CR or LF delay.	DIP programming switch set incorrectly. See Section 3.6.

4.4.2 PUNCH

Symptom	Possible cause
PUNCH ON, but no characters are punched.	If DC CODES are selected, DC2 must be sent to activate the punch. Wrong connector or wrong MODE.
Incorrect characters punched.	Baud rate mismatch. GNT 4601 programmed to wrong data code. See Section 3.6. Incorrect word length. Word length must be 8 bits.
Punch stops. LED goes out.	Overflow error. Use DTR as handshaking signal, or use a lower Baud rate.
Punch stops. ERROR lamp lights.	Taut tape or tape out. The punch buffer continues to accept characters, and these will not be lost if transmission is stopped when the buffer is full and DTR goes OFF. When the fault is corrected (e.g. new roll loaded), press LEADER and the stored characters will be punched out.

4.4.3 COMMON

Symptom	Possible cause
Remote control with DC CODES doesn't work.	DIP programming switch set incorrectly. When SW-3 is OFF, DC CODES are not recognized.

5. OPTIONS

Reader unwinder for 8" rolls. See Fig. 1.1.

Option A: Converter Version. Converts ASCII signals to telex code on tape and vice-versa. Telex alphabets for many different nations available. See Section 3.2 and 5.1.

Option B: 5-channel Version. Input/Output signals and punched tape in 5-channel code. See Section 3.2 and 5.2.

Option C: NC Version. Reader may be controlled character by character by using the CTS signal. See Section 3.2 and 5.3.

The differences from the standard version are described below.

5.1 Option A: GNT 4601, Converter Version

The GNT 4601 Converter is designed for use in word processing systems which do not have built-in telex conversion.

The data input from the DTE or DCE is converted from ASCII to Baudot code (CCITT alphabet No. 2) before being punched. A Baudot character read by the reader is converted to ASCII before being output to the DCE/DTE. DCE/DTE signals are thus always in ASCII, while data on tape is always in Baudot.

At the moment, there are 9 different national conversion tables from ASCII to Baudot, while there is only 1 table for converting Baudot to ASCII. To run the built-in test program, hold down the LEADER button while activating the A.C. power switch. When LEADER is released, the ASCII/Baudot conversion table is punched out, i.e. the Baudot character corresponding to ASCII 00H, 01H, 02H etc. Note that a letter shift is always punched when the machine is turned on. Also, when converting from Baudot to ASCII all letters become capitals.

When the DC CODES slide switch is ON, the punch can be remote-controlled by DC2/DC4 and the reader by DC1/DC3.

The editing facilities are not implemented, which means that BACKSPACE, EDIT and SKIP are inoperative.

Handshake operation for the punch is necessary at Baud rates of 600 Baud or more.

5.2 Option B: GNT 4601, 5-channel Version

The GNT 4601 5-channel can be used in conjunction with word processors having built-in ASCII to Baudot code conversion and data bit reversal, e.g. the Philips P5002 with telex software.

Data input/output to the DCE/DTE is 5-bit with 1 1/2 stop bits. Only 5 bits are punched, and the reader accepts only 5-bit tape. No conversion or data bit reversal takes place.

DC CODES are disabled. The DC CODES slide switch should therefore be set to OFF.

The editing facilities are not implemented, which means that BACKSPACE, EDIT and SKIP are inoperative.

Handshake operation for the punch is necessary at Baud rates of 600 Baud or more.

5.3 Option C: GNT 4601, NC Version

The GNT 4601 NC version differs from the standard version only in the control of the reader by the CTS signal.

When CTS goes off and reader is ON, transmission from the reader is stopped immediately (applies to FDX and HDX mode). In this way it is possible to step the reader character by character.

5.4 Conversion Codes, ASCII/Telex

5.4.1 ASCII TO BAUDOT CONVERSION

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

ASCII Input		BAUDOT Output			ASCII Input		BAUDOT Output		
HEX	CHAR	HEX	CHAR	STRING	HEX	CHAR	HEX	CHAR	STRING
40	@			NO OUTPUT	60				NO OUTPUT
41	A	18	A		61	a	18	A	
42	B	13	B		62	b	13	B	
43	C	0E	C		63	c	0E	C	
44	D	12	D		64	d	12	D	
45	E	10	E		65	e	10	E	
46	F	16	F		66	f	16	F	
47	G	0B	G		67	g	0B	G	
48	H	05	H		68	h	05	H	
49	I	0C	I		69	i	0C	I	
4A	J	1A	J		6A	j	1A	J	
4B	K	1E	K		6B	k	1E	K	
4C	L	09	L		6C	l	09	L	
4D	M	07	M		6D	m	07	M	
4E	N	06	N		6E	n	06	N	
4F	O	03	O		6F	o	03	O	
50	P	0D	P		70	p	0D	P	
51	Q	1D	Q		71	q	1D	Q	
52	R	0A	R		72	r	0A	R	
53	S	14	S		73	s	14	S	
54	T	01	T		74	t	01	T	
55	U	1C	U		75	u	1C	U	
56	V	0F	V		76	v	0F	V	
57	W	19	W		77	w	19	W	
58	X	17	X		78	x	17	X	
59	Y	15	Y		79	y	15	Y	
5A	Z	11	Z		7A	z	11	Z	
5B	[	0B	FG-G (National ch)		7B	}			NO OUTPUT
5C	|	05	FG-H (National ch)		7C	|			NO OUTPUT
5D	]	16	FG-F (National ch)		7D	}			NO OUTPUT
5E	~		NO OUTPUT		7E	~			NO OUTPUT
5F	-		NO OUTPUT		7F	DEL			NO OUTPUT

5.4.2 BAUDOT TO ASCII CONVERSION

BAUDOT Input	No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
	Letters	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	<	≡	A...	1...	Space	
	Figures	-	?	:	*	3	À	Æ	Ø	8	Ⓕ	(	)	.	,	9	0	1	4	'	5	7	=	2	/	6	+	<	≡	A...	1...	Space	
	Signal Units	1	●	●	●	●	●				●	●						●	●			●	●	●	●	●			●	●			
	Signal Units	2	●		●				●		●	●	●					●	●				●	●						●	●	●	
Signal Units	3	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
Signal Units	4	●	●	●		●	●			●	●		●	●				●				●	●					●	●				
Signal Units	5	●					●	●			●	●		●	●						●	●	●	●	●			●	●				

ASCII Output	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	CR	LF	no out put	no out put	SP	no out put
	-	?	:	no out put	3]	[8	BEL	()	.	,	9	0	1	4	'	5	7	=	2	/	6	+						