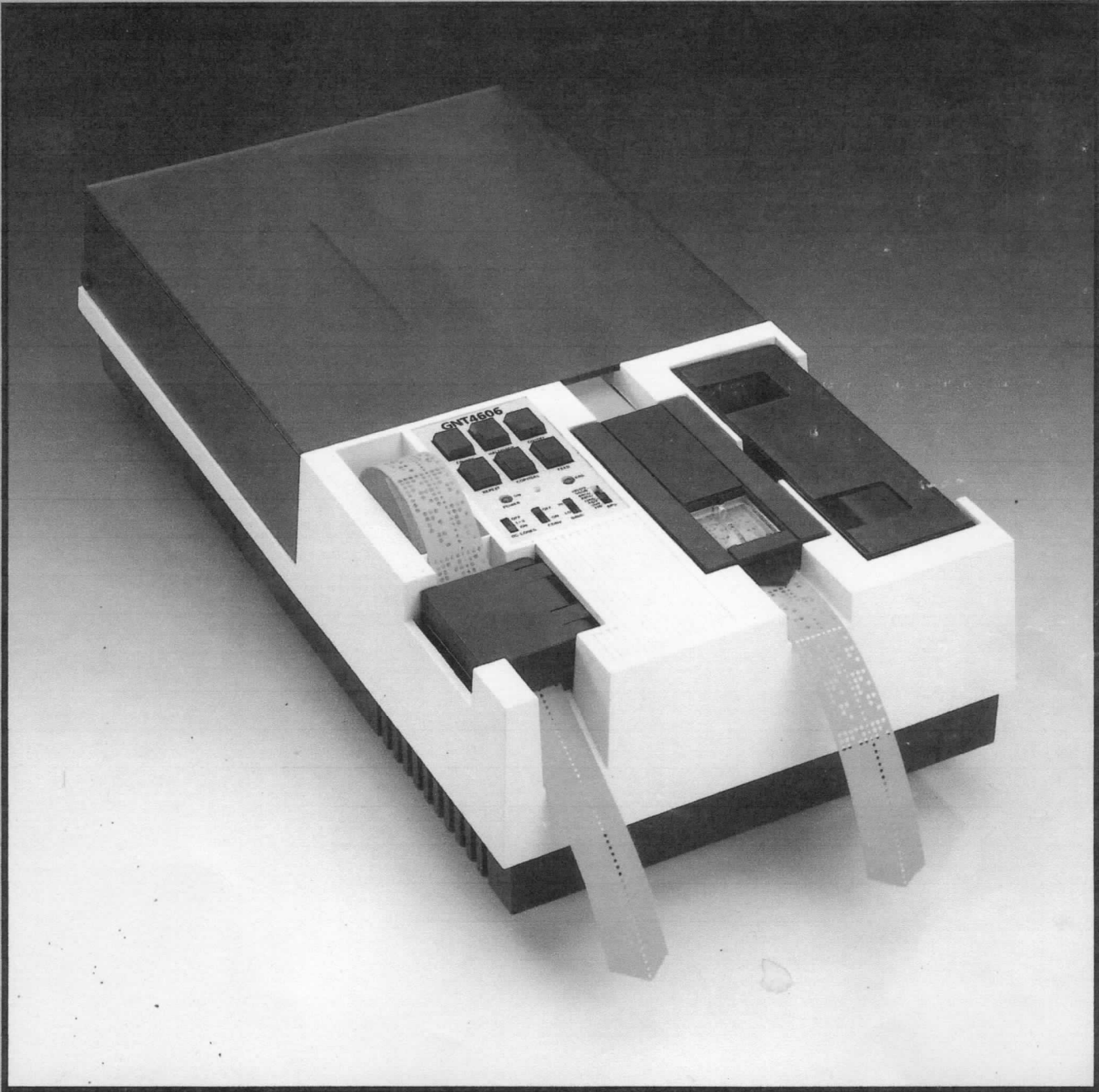


GNT 4606



Reader/ Punch Station
Instruction Manuel

GN Telematic
a GN DataCom company

TABLE OF CONTENTS

Section	Title	Page
1.	GENERAL	1-1
1.1	Scope	1-1
1.2	Description	1-1
2.	TECHNICAL DATA	2-1
2.1	Dimensions and Weight	2-1
2.2	Environment	2-1
2.3	A.C. Supply	2-1
2.4	Tape	2-1
2.5	Buffer	2-1
2.6	Speed	2-1
2.7	Baud rate etc.	2-1
3.	SETTING UP	3-1
3.1	Unpacking and Inspection	3-1
3.2	Model Identification	3-1
3.3	Installation	3-1
3.4	A.C. Supply	3-1
3.5	Static Electricity	3-1
3.6	Top Panel Slide Switches	3-2
3.7	DIP Programming Switch	3-3
3.8	Input/Output Signals	3-5
3.9	DC Code Control on RD Input	3-8
4.	OPERATING	4-1
4.1	Tape Loading	4-1
4.2	Manual Controls	4-1
4.3	Indicators	4-3
5.	OPTIONS	5-1
6.	CONVERSION CODES	6-1
6.1	Conversion Codes, ASCII to EIA-244-B	6-1
6.2	Conversion Codes, EIA-244-B to ASCII	6-3

1. GENERAL

1.1 Scope

This manual is a guide to operating the GNT 4606 Reader/Punch unit with data buffer.

1.2 Description

The GNT 4606 is the ideal paper tape reader/punch combination. It handles serial data at speeds up to 19200 Baud, and all data and control signals conform to RS232.

Optionally there is a current loop facility.

The GNT 4606 has a built-in RAM buffer for up to 131,000 characters depending of type.

The GNT 4606 is intended for NC applications and incorporates facilities for code conversion between ASCII and ISO or EIA codes.

The unit is equipped with a GNT 36 high performance 75 char/s punch mechanism and a GNT 29 high speed tape reader (up to 1000 char/s).

The GNT 4606 has a 25 pole female connector (DB-25S).

Data transmission in half or full duplex and in step by step mode.

Tapes can be duplicated.

It is possible to transmit data from the buffer in reverse direction first when the program tape is wound with the program start inside at the core.

It is also possible to repeat the transmission of data from the buffer to the receiver or the punch.

Warning - This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions manual, it 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.

2. TECHNICAL DATA

2.1 Dimensions and Weight

Dimensions: 477*246*122 mm
 Weight: 5.3 kg (11.7 lbs)

2.2 Environment

Temperature:

Ambient operating	+5°C to +40°C
without glaciation	min. 0°C
at 50% duty cycle	max 55°C
Ambient storage	-40°C to +70°C

Humidity: 15-95% RH, non-condensing

2.3 A.C. Supply (Selectable)

Voltage-Switch:	Nom. supply	Min.-Max.
115 V	100 V	85-110 V
230 V	200 V	170-220 V
115 V	110 / 115 V *)	98-127 V
230 V	220 / 240 V *	195-253 V
Frequency:	50 or 60 Hz	48-63 Hz
Power:		10-60 W

*) Selectable by inside strapping (See Fig. 3.2)

2.4 Tape

2.4.1 For Punch (GNT 36)

Material: According to ISO 1729
 Form: Rolls, max. diameter 8" (205mm)
 with 2" core (120.000 char.)
 or 60mm core (108.000 char.)
 Width: 1" (25.4 mm), 8-unit
 Thickness: 0.05 - 0.12 mm

2.4.2 For Reader (GNT 29)

Material: Any with transparency up to 50%
 Form: Rolls up to 75 mm (30.000 characters)
 or with unwinder option, 8" (205mm)
 rolls and core 2" or 60mm
 (approx.120.000 characters)
 Width: 1" (25.4 mm), 8-unit ISO

2.5 Buffer

Ram: 131.000 characters
 optional 458.000 characters.

2.6 Speed

Punch: 75 characters/s
 Reader: 450 char./s without using the buffer
 450 char./s without using an unwinder
 1000 char./s when using buffer and
 unwinder

2.7 Baud rate etc.

Baud rate:	RS-232:	110 - 19200
	CL (20mA):	110 - 4800
Word format:	start bit:	1
	data bits:	7, 8 or 9
	parity bit:	none or even
	stop bits:	1 or 2
		min. 10 bits, max. 11 bits/word.

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.

Number	Version	Power cable
KV46-64126	Japan	US (American)

3.3 Installation

The GNT 4606 is a free-standing, table-top unit.

3.4 A.C. Supply

The available A.C. supply voltage is set on the selector switch at the rear of the instrument and by the placement of a wire in the terminal strip inside the GNT 4606.

To change to another A.C. voltage, slide the switch and/or move the wire to the opposite position. (See Sec. 2.2 and Fig. 3.2).

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

The text on the selector switch shows if is set to either 115V or 230V and the unit is marked with a label warning you if the wire inside is set to 100V or 200V.

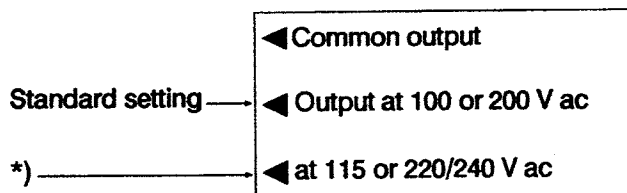


Fig. 3.2 Voltage Selection

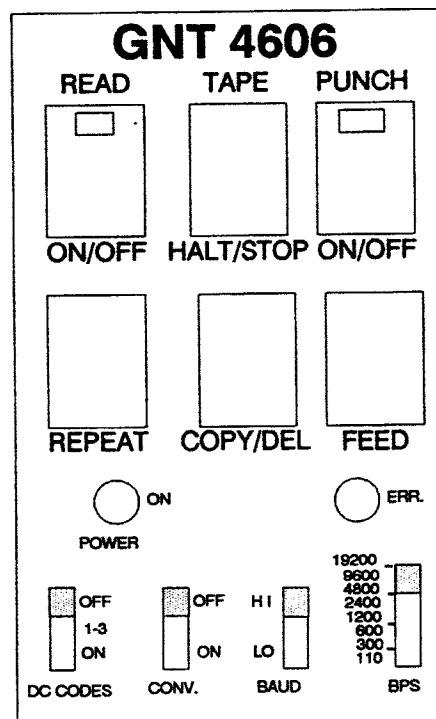


Fig. 3.1 Control Panel

3.5 Static Electricity

When the tape moves through the reader or punch and passes the plastic parts, a static voltage will be generated. The voltage may be very high, especially when the reader reads fast, the air humidity is very low and if the tape is not antistatic treated.

The voltage is not dangerous, but it may, if the electrical charge (i.e. the voltage and the capacity) is high enough, produce errors when the voltage is discharged.

To avoid the above errors all metal parts coming into contact with the tape are connected to signal ground and protective ground in the RS-232 and the power receptacle and one of these 3 lines must be connected to earth at the installation.

3.6 Top Panel Slide Switches

(See Fig. 3.1, Control Panel)

3.6.1 DC-CODES

DC CODES (Remote control levels)

The DC CODES switch selects 1 of 3 control levels:

- ON:** DC1/DC3 and DC2/DC4 control ON.
- 1-3:** Only DC1/DC3 control is active
- OFF:** Only DC1/DC3 control when PUNCH is OFF and READ ON

DC CODES ON:

A DC2 character send to the GNT 4606 will set PUNCH ON and all the following characters will be punched, a DC4 character will set PUNCH OFF.

A DC1 character send to the GNT 4606 when PUNCH is OFF will set READ ON and start the data transmission if/when CTS is ON. A DC3 character will set READ OFF if/when CTS is OFF.

DC1/DC3 but not DC2/DC4 will be punched when PUNCH is ON

DC CODES 1-3:

(DC1/DC3 codes ON, DC2/DC4 codes OFF)

READ switches ON when a DC1 character is send to the GNT4606 and a tape is placed in the reader. The transmission starts, when CTS is ON.

READ switches OFF when a DC3 character and CTS OFF is received.

All characters will be punched, but not DC1/DC3 when READ is ON or is switching ON or OFF.

DC CODES OFF:

(CTS remote control ON)

READ goes ON and the transmission starts, if CTS goes ON and a tape is loaded in the reader. READ switches OFF when the tape is read and transmitted.

PUNCH goes temporarily OFF when DSR is OFF.

All characters will be punched incl. DC codes when PUNCH is ON.

Handshake:

The handshake signals for the reader data (DC3/DC1 or CTS OFF/ON) are always active (for stop/resume of the data transmission) in all 3 levels of control.

The handshake signals from the punch buffer (DC3 and/or RTS OFF) are send about 2000 characters before the buffer is full.

DC1 and/or RTS ON are send when the buffer has space for 4000 characters.

The RTS handshake is not active in level DC CODES ON.

The DC characters are not send in level DC CODES OFF, when CTS is OFF or when READ is transmitting.

DC codes used:

DC1	Reader Start / Buffer ready	Hex 11
DC2	Punch ON	Hex 12
DC3	Reader Stop	Hex 13 or 93
DC3	Buffer full (OFF)	Hex 13 or 93 (See section 3.7 S2)
DC4	Punch OFF	Hex 14

3.6.2 CONV.

When the switch is ON received characters are converted from ASCII (ISO) to EIA or ISO tapes and tapes read are tested, converted and transmitted as ASCII (ISO) codes. The codes are defined by the setting of switches S1, S2 and S3 in the DIP switch block. The conversion between ASCII and EIA is defined in the tables in section 6.

When the CONV switch is OFF the characters are punched/transmitted without conversion and parity check.

3.6.3 BAUD

The Baud rate is selected by means of two switches BAUD and BPS.

The positions HI (High) or LO (Low) selects which of the two Baud rates indicated by the setting of the BPS switch to be used.

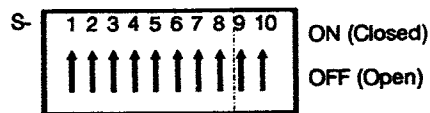
3.6.4 BPS

The BPS (Bit per second) switch may be set to one of 4 positions. Each position shows 2 Baud rates and the position of the BAUD switch indicate the active rate.

BAUD/BPS	1	2	3	4
HI	300	1200	4800	19200
LO	110	600	2400	9600

3.7 DIP Programming Switch

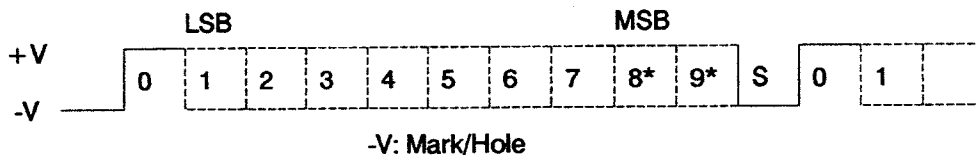
The DIP programming switch block (switches S1 – S9) is accessible through the aperture in the base while S10 is only accessible when the GNT 4606 is taken apart.



Note: The DIP switches are only read when the power goes on.

Serial Data Format

3 different data formats are transmitted from the PTP/R unit: 7, 8 or 9 according to the switch setting of the DIP programming switch.



- Bit 0: Start bit.
- Bit 1 – 7: Data bits, track 1 to 7 on tape.
- Bit 8*: Data bit or even parity bit at S2 ON (ISO). "Null" bit or Stop bit at S2 OFF (ASCII).
- Bit 9*: Omitted at S3 ON. At S3 OFF: Stop bit or even parity bit (9 bit) at CONV ON.
- Bit S: Stop bit or stop element lasts to next start bit.

S1, S2 and S3 Word format / codes.

S1	S2	S3	Data Code	Stop Code	DC3 Code	RD input (Conv ON (see sec.3.5))	Tape ¹⁾	TD output
OFF	OFF	OFF	8 bit	2 bit	H13	ASCII	EIA	ASCII
OFF	OFF	ON	8 bit	1 bit	H13	ASCII	EIA	ASCII
OFF	ON	OFF	8 bit	2 bit	H93	ISO	EIA	ISO
OFF	ON	ON	8 bit	1 bit	H93	ISO	EIA	ISO
ON	OFF	OFF	8 bit	2 bit	H13	ASCII	ISO	ASCII
ON	OFF	ON	7 bit	2 bit	H13	ASCII	ISO	ASCII
ON	ON	OFF	8 bit	2 bit	H93	9 bit ²⁾	8 bit	9 bit ³⁾
ON	ON	ON	8 bit	1 bit	H93	ISO ⁴⁾	ISO	ISO

- 1) PUNCH- or READ-HALT at input parity error at CONV ON
- 2) PUNCH-HALT at RD parity error on bit 9
- 3) Bit 9 is an even parity bit
- 4) ISO: 8 bit code with even parity

S4 RTS control

S4	RTS control levels
OFF	Ready for communication, data and DC codes
ON	Ready to accept punch data and DC codes

S5 and S6 Reading mode

S5	Reading mode
OFF	Without use of buffer (max. 450 char./s)
ON	from reader to buffer and from buffer to host

S6	Reader ON/OFF control speed
OFF	Remote ON/OFF active max.450 char./s
ON	Only manual start max.1000 char./s

S7, S8, S9 and S10 For future use

OFF	Standard setting for all
-----	--------------------------

3.8 Input/Output Signals

The I/O signals are in accordance with RS-491 standard for serial interface, having RS-232 electrical characteristics and DTE connections.

A version with additional 20mA current loop is available.

The signal connector is a female D-sub connector DB-25S placed at the rear of the GNT 4606.

3.8.1 Connector

Pin No.	Name	Description	Remark
1	PG	Protective Ground	for EMC use
2	TD	Transmitted Data	output
3	RD	Received Data	input
4	RTS	Request To Send	output
5	CTS	Clear To Send	input
6	DSR	Data Set Ready	input
7	SG	Signal Ground	common return
8	RR	Receiver Ready	connected to pin 6
20	DTR	Data Terminal Ready	output
14	TD'	TD reference (SG - RS-423)	
15	RD'	RD reference (SG - RS-423)	
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	ERR	Punch error, tape out	output
25	+V	+ 12V limited by 470 ohm	output

Signal Definitions:

Pin 1, PG (Protective Ground or Shield)

connected to connector frame and to Signal Ground (0V) through resistor R1 (100kohm).

Pin 2, TD (Transmitted Data or Send Data) output

Data send from reader and reader buffer or handshake characters from the punch buffer .
CTS and DSR must be ON when data transmission is in progress.

Punch buffer handshake:

DC CODES	ON / 1-3	OFF	x	x
READ	OFF	x	ON	x
CTS	ON	x	x	OFF
Buffer full	DC3	—	—	—
Buffer empty	DC1	—	—	—
PUNCH ON/OFF	—*)	—*)	—	—

*) DC1 – DC3 at S7, S8, S9 and S10: OFF, ON, OFF, OFF

Pin 3, RD (Received Data) input

Data to punch buffer and DC control characters for punch and reader. DSR must be ON when data is transmitted.

When the buffer is full, the transmission must stop within 2000 characters.

When PUNCH is OFF the punch buffer is closed.

PUNCH is OFF:

1. from a DC4-code to a DC2-code (when DC CODE switch is ON)
2. from manual PUNCH OFF to ON
3. when the DSR signal is OFF
4. when a transmission error occurs.
5. when the reader uses the buffer

DC-Code control see section 3.9

Pin 4, RTS (Request To Send) output

The RTS signal is ON:

1. when the punch buffer is ready to receive data. (PUNCH ON and buffer not full).
2. when the GNT 4606 is ready to receive DC codes. (at DC CODES ON).
3. when the reader is ready to send data. (tape ready and S4 OFF, see section 3.7 S4)

The RTS signal:

DC CODES	ON	x	OFF	OFF
DIP Switch S4	x	OFF	x	ON
Reader ready	x	Yes	No	x
Punch ready	ON	ON	ON	ON
Buffer full	ON	ON	OFF	OFF
PUNCH OFF	ON	ON	OFF	OFF

The RTS signal is OFF when COPY or REPEAT PUNCH is ON

Pin 5, CTS (Clear To Send) input

The CTS signal must always be ON when the GNT 4606 shall send data or DC codes on pin 2 (TD). When CTS goes OFF, the character in progress will be completed but the next one will not be transmitted before the signal goes ON again.

CTS control of TD:

DC CODES	x	x	OFF
READ	ON	ON	OFF
DC3 STOP	No	Yes	x
S6 DIP Sw.	x	OFF	OFF
CTS OFF	STOP	END	—
CTS ↑	START	—	START

Pin 6, DSR (Data Set Ready) input

The DSR signal must always be ON when the GNT 4606 transmits or receives data or DC codes. When DSR goes ON, PUNCH switches ON ready to receive data. If DSR goes OFF, READ and PUNCH switches OFF and the data lines will be closed.

DSR control of GNT 4606:

	PUNCH	READ	COPY	HALT
DSR OFF	OFF	OFF	—	—
DSR ↑	ON	—	—	—

Pin 20, DTR (Data Terminal Ready) output

The DTR signal is always ON when the power is ON and the GNT 4606 is ready to transmit and receive data or DC codes.

DTR goes OFF for 5 sec. when the Baud rate or the word format is wrong and OFF at buffer overrun.

Pin 14 and 15, REF (Reference Signal, Ground)

Can be used as reference signals for TD and RD when RS-423 (RS491) interface is chosen.

Pin 24, ERR (Punch Error) output

The ERR signal goes ON at tape out and other punch failures.

3.9 DC-Code Control on RD Input

(See section 3.6.1 DC codes switch)

DC CODE SWITCH: ON

PUNCH	ON	OFF	OFF	OFF
READ	x	ON	ON	OFF
CTS	x	ON	OFF	x
DC1: READ ON	Punch	Start	—	RON ²⁾
DC2: PUNCH ON	—	PON ^{*)}	PON ^{*)}	PON
DC3: READ OFF	Punch	Stop	ROFF ²⁾	—
DC4: PUNCH OFF	POFF	—	—	—

DC CODE SWITCH: 1-3

PUNCH	ON	ON	ON	OFF	OFF	OFF
READ	ON	ON	OFF	ON	ON	OFF
CTS	ON	OFF	x	ON	OFF	x
DC1: READ ON	Start	—	RON ^{*)}	Start	—	RON ²⁾
DC2: PUNCH ON	Punch	Punch	Punch	—	—	—
DC3: READ OFF	Stop	ROFF ²⁾	Punch	Stop	ROFF ²⁾	—
DC4: PUNCH OFF	Punch	Punch	Punch	—	—	—

DC CODE SWITCH: OFF

PUNCH	ON	OFF	OFF	OFF
READ	x	ON	ON	OFF
CTS	x	ON	OFF	
DC1: READ ON	Punch	Start	—	—
DC2: PUNCH ON	Punch	—	—	—
DC3: READ OFF	Punch	Stop	—	—
DC4: PUNCH OFF	Punch	—	—	—

Punch: Code will be punched.

Start/Stop: DC1/DC3 handshake.

PON^{*)}: Reader OFF if buffer is used.

RON^{*)}: Reader ON if tape is loaded and S6 is OFF, punch data at no tape or if S6 is ON.

x: Irrelevant, any input

—: No function

2): only if S6 is OFF (Remote ON/OFF control active).

4. OPERATING

4.1 Tape Loading

4.1.1 Punch

1. Open the tape container lid and place a roll of tape on the turntable.
2. Thread the tape around the two rollers (see Fig 4.1).
3. Depress the tape release lever so that the transparent window pops up.
4. Slide the tape into the punch mechanism until the sprocket wheel is covered.
5. Snap the window closed, turn the power switch ON and depress the FEED button until a sufficient leader has been punched.
6. The transparent plastic box is removed for emptying by pressing it slightly downward and then lifting it up and out. To remount, merely press it into place.

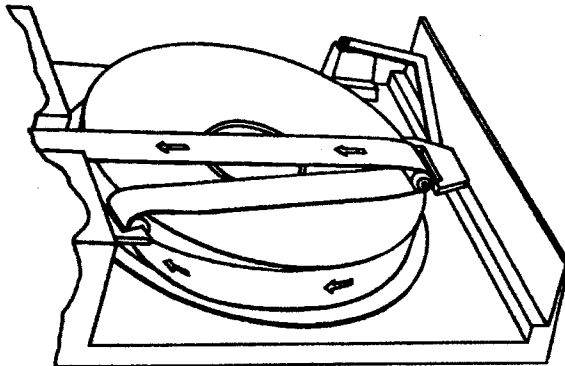


Fig. 4.1 Tape Loading

4.1.2 Reader

Place the tape to be read in the container. Open the reader lid, place the tape underneath the "nose" and engage the tape with the sprocket wheel, and close the lid.

An optional unwinder has to be used for reels larger than 75 mm (see section 5).

When the READER is ON the lid must not be opened otherwise the synchronism may be lost.

4.2 Manual Controls

4.2.1 A.C. Power switch

The A.C. Power Switch is located on the side of the GNT 4606, near the power receptacle.

4.2.2 Push buttons (See Fig. 3.1)

a) READ

(Manual Reader/Buffer control)

When READ button is pushed, the reader changes state from OFF (or HALT) to ON or from ON to OFF.

If READ goes ON when PUNCH is punching, the reader is controlled directly from and transmits directly to the receiver, but if READ goes ON when the punch buffer is empty, the reader will read the whole tape into the buffer and only the transmission from the buffer is controlled from the receiver by means of the handshake signals.

READ switches OFF when the tape is read and transmitted.

When the READ-ON button is pushed longer than 1 sec. the tape will be read into the buffer (if empty) and transmitted in reverse order to the receiver.

When READ is OFF the reader buffer is disabled, not cleared.

The tape read function can be halted. See section 4.2.2 c) HALT/STOP.

The READ ON/OFF function can be remote controlled. See section 3.5.1 DC CODES and section 3.7 DIP programming switch S6.

b) PUNCH

(Manual Punch Buffer input control)

When PUNCH is pushed, the punch changes state from OFF to ON or from ON to OFF or from HALT back to ON or OFF.

When PUNCH is ON the punch buffer is open and the punch is ON (or HALTED). The punch buffer is closed when PUNCH is OFF, but the punch continuous the punching operation until the buffer is empty.

If PUNCH goes ON when the read buffer is ON, READ will be switched OFF and the buffer cleared.

PUNCH goes temporarily OFF when DSR is OFF and when the reader uses the buffer.

The PUNCH ON/OFF function can be remote controlled. See section 3.5.1 DC CODES.

The tape punching can be halted or stopped. See section 4.2.2 c) HALT/STOP.

c) HALT/STOP

(Manual Tape Supply control)

When the HALT button is pushed shortly the punch and reader tape drives are halted.

The operation can be resumed by using the HALT or the respective PUNCH, READ or COPY button or restarted from the beginning of the memory by using the REPEAT button.

When the HALT/STOP button is pushed longer than 1 second the tape operation is cancelled and the buffer is cleared.

Most of the error situations switch HALT ON. See section 4.2.3 ERROR.

The HALT function cannot be remote controlled.

d) REPEAT

(Manual Repeat Function)

The REPEAT button reloads the buffer, both after a READ function (e.g. after a receive error) and after a PUNCH or COPY function (e.g. after a tape out error or if more copies are wanted).

The function can also be used for test purpose.

When the REPEAT button is pushed longer than for 1 sec. the function will continue.

e) COPY/DEL

(Manual Copy or Tape Delete Feed)

The COPY button starts both the reader and the punch and makes a copy of the reader tape via the buffer.

If more copies are wanted push REPEAT button.

The data is not transmitted.

The COPY function can be halted or canceled by using the HALT button. See section 4.2.2 c) HALT/STOP.

PUNCH goes ON when the copy is done.

When the COPY button is activated without tape in the reader, a tape is punched with holes in all channels (Delete code).

f) FEED

(Manual Tape Leader generating)

When FEED is pushed, a leader is punched immediately with feed holes only, also when PUNCH is ON or in HALT state.

4.3 Indicators

4.3.1 POWER ON

This green LED lights when Power is ON.

4.3.2 READ BUTTON LED

This green LED, located in the READ button, lights when the reader or the reader buffer is sending or is in stand by.

The LED flashes in reader HALT state.

4.3.3 PUNCH BUTTON LED

This green LED, located in the PUNCH button, lights when the PUNCH is ON, that is when the punch buffer is open/receiving.

The LED flashes in punch HALT state.

4.3.4 ERROR LED

The red ERROR LED lights/flashes in the following situations:

ERR. LED	READ LED	PUNCH LED	ERROR SITUATIONS
Flashes	Flashes		Taut tape, tape supply fault.
5s flash	Flashes		Tape data fault at CONV ON
Flashes	5s flash Light out		Missing tape feed hole. Reader tape will oscillate for 5 sec.
Flashes	Flashes	Flashes	Low supply voltage.
Flashes		Flashes	Taut tape, unwinder fault.
Flashes		Flashes	Tape out (see Punch Tape Loading)
5s flash		Flashes	Data fault at CONV ON.
5s flash		Light out	Wrong baud rate or format.
5s flash		Light out	Punch buffer overrun.
Light on		Light out	Punch mechanism fault.
Light on		(Flashes)	Punch motor stop.
Light out		Flashes	Punch halt.

The ERROR LED lights/flashes while the error is on, at data errors for min. 5 sec.

When the fault is corrected the ERROR LED goes off, but the tape is still halted.

If the READ or PUNCH LED flashes, the tape and buffer control is still on and no data are lost. Press HALT key (or READ/PUNCH) to continue or press REPEAT to punch a complete program from buffer.

If the ERROR LED lights constantly, press FEED to restart punch motor.

If the READ or PUNCH LED goes OFF repeat the operation from the beginning.

4.3.5 REMAINING PAPER FOR THE PUNCH

A scale on the turn table indicates how many meters of tape and how many characters are left on the roll with a 60mm core.

5.OPTIONS

Reader unwinder for 8" rolls

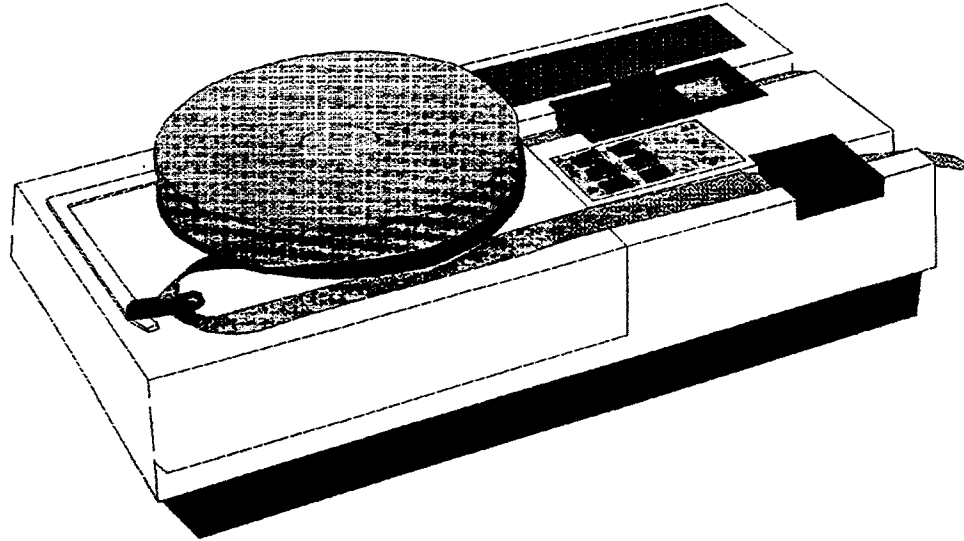


Fig. 5.1 Unwinder KDYK-15317

6. CONVERSION CODES

6.1 Conversion Codes, ASCII to EIA RS-244-B

ASCII Input		EIA Output		ASCII Input		EIA Output	
Hex	Char.	Hex	Char.	Hex	Char.	Hex	Char.
00	NUL	00	NUL	20	Space	10	Space
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	(1A	
09	HT	3E	TAB	29)	4A	
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	Letter O
1B	ESC		No Output	3B	;		No output
1C	FS		No Output	3C	<		No Output
1D	GS		No Output	3D	=		No Output
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	[4C		7B	{		No Output
5C	\		No Output	7C			No Output
5D]	2F		7D	}		No Output
5E	^		No Output	7E	~		No Output
5F	_		No Output	7F	DEL	7F	DEL

6.2 Conversion Codes, EIA RS-244-B to ASCII

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	&	26	&
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 Function
79	i	49	I	7A	LC		No Function
51	j	4A	J	00	NUL	00	NUL
52	k	4B	K				
43	l	4C	L				
54	m	4D	M	4C		5B	[
45	n	4E	N	2F		5D]
46	o	4F	O				
57	p	50	P	1A		28	(
58	q	51	Q	4A		29)
49	r	52	R				
32	s	53	S				
23	t	54	T				
34	u	55	U				
25	v	56	V				