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TECHNICAL MANUAL GNT 4604/4605

Reader/Punch Station

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CONTENTS OF SECTION 1

1.1. GENERAL

1.1.1 Scope

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

GNT 4604, serial version (KDVK-121xx)

GNT 4604, serial/parallel version (KDVK-141xx)

GNT 4605, parallel version (IEEE 488-1978)

1.1.2 Description of GNT 4604

The GNT 4604 is the ideal paper tape reader/punch combination. It handles serial data at speeds up to 9600 Baud, and all data and control signals conform to RS232C/V24. There is also a current loop facility and a parallel input for the punch.

The GNT 4604 is intended for NC applications and incorporates facilities for conversion between ASCII and ISO or EIA code.

The GNT 4604 has two signal connectors and can be inserted between a computer and a terminal. The Data Circuit-Terminating Equipment (DCE) connector (TO DCE) goes to the computer, and the Data Terminal Equipment (DTE) connector (TO DTE) to the terminal.

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

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

Tapes can be duplicated.

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

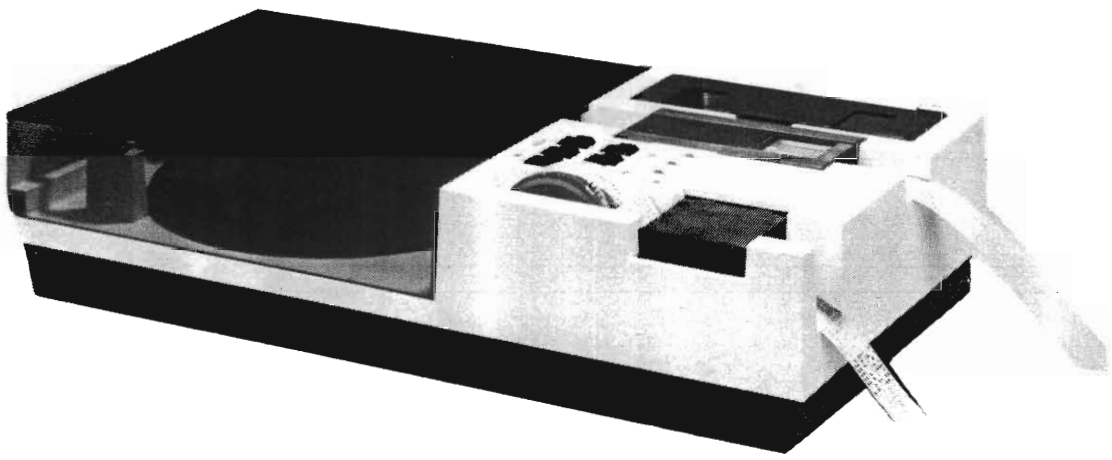


Fig. 1.1 GNT 4604/4605 Reader/Punch Combo

1.1.3 Description of GNT 4605

The GNT 4605 is a paper tape reader/punch which implements the IEEE 488-1978 standard.

The GNT 4605 is equipped with a buffer of 8 kbytes for both the reader and the punch. This buffer makes it possible to read data into the punch to make it possible to work with the controller (computer) while the GNT 4605 punches.

Tapes can be copied off-line by pressing one key on the keyboard.

With the GNT 4605 it is possible to choose between 3 read-modes. The normal would be to read one data string at the time separated by CRLF. This is default mode. It is also possible to decide how many characters you want to read by the set-up mode.

1.2 TECHNICAL DATA

1.2.1 Environment

Temperature:

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

Humidity: 15-95% RH, non-condensing

1.2.2 A.C. Supply (Selectable)

Switch:	Nom. supply	Min.-Max.
220 V	220/240 V	187-254 V
220 V	200 V [1]	170-230 V
115 V	110/115 V	94-127 V
115 V	100 V [1]	85-115 V

Frequency: 48-63 Hz
Power (KDVK 121xx): 95 W
Power (KDVK 141xx): 60 W

[1] Selectable by inside strapping in some types only

[1]----------> Common output
Standard setting --> Output at 100 or 200 V ac
at 115 or 220/240 V ac

Label inside GNT 4604

1.2.3 Tape

1.2.3.1 For Punch (GNT 36)

Material: According to ISO 1729
Form: Rolls, max. diameter 8", standard 2" core
Width: 1" (25.4 mm), 8-unit
Thickness: 0.05 - 0.12 mm

1.2.3.2 For Reader (GNT 29)

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

CONTENTS OF SECTION 2

2.1 SETTING UP

2.1.1 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.

2.1.2 Model Identification

The model is identified by the ID label which is visible when the chad box is removed. See Fig. 2.6

Type No.	Version	Power cable	Interface
KDVK-12101	GNT 4604	US (Americ.)	Serial
KDVK-12121	GNT 4604	E (European)	Serial
KDVK-12532	GNT 4605	US + E	Parallel
KDVK-14101	GNT 4604	US (Americ.)	Serial
KDVK-14121	GNT 4604	E (European)	Serial

The types KDVK-12xxx are not produced any longer. In this manual the software develloped for KDVK-12xxx is described as older type even it sometimes is used in the newer KDVK-14xxx.

For the type KDVK-14xxx 2 different software versions exist (Software I and software II). The differences between the 2 versions are in the control signals (shown in section 2.6) and software II has some more functions f. inst. 9600 Baud and the possibility to punch FAPT programs.

2.1.3 Installation

The GNT 4604 is a free-standing, table-top unit.

2.1.4 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 4604. See Fig. 2.5 and section 5 (Drawing 46/10801 or 46/15350)

To change to another A.C. voltage, slide the switch and/or move the wire to the opposite position.

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

2.1.5 Top Panel Slide Switches for GNT 4604

(See Fig.2.2 and 2.3, Control Panel)

The functions of CTS, RTS, DC-codes etc. depends of the combination between the switches and the software and may differ from the text below. See the charts in section 2.6 for the function of the different softwares.

2.1.5.1 Mode

(See the Data Flow Diagram, Fig. 2.1)

a) LOC (Local mode)

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. Examples of local operation are tape generation. See Typical Applications, Section 2.4.

Reader ON:

Data transmitted from Reader/Punch Combo to DTE.

Reader controlled by DC1/DC3 or DTR or RTS or the START/HALT pushbutton (STEP button in older types).

Reader OFF:

Data transmitted from DTE to Reader/Punch Combo.

Data echoed (if SW-1 = ON).

Tape punched if PUNCH is ON.

Punch controlled by DC2/DC4 (if DC CODES = ON) or the PUNCH button.

Punch goes OFF on overrun error.

Punch goes OFF on framing error.

Handshaking operation possible and necessary at Baud rates of 1200 Baud or more. CTS ON = PUNCH READY.

b) LINE

The line mode is used for on-line operation where the Reader/Punch Combo is used to generate hardcopy of data passed from the Data Circuit-Terminating Equipment (DCE) to the Data Terminal Equipment (DTE) or in cases where the GNT 4604 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 (DCE only) or the START/HALT pushbutton.

DSR must be ON (or floating).

If PUNCH is ON, data from DCE is punched.

Punch controlled by DC2/DC4 (if DC CODES = ON, DC2-DC4 are not punched), from DCE only.

Handshaking operation possible. RTS ON = PUNCH READY.

Reader OFF:

If PUNCH is ON, data from DCE is punched.

Punch controlled by DC2/DC4 (if DC CODES = ON, DC2/DC4 are not punched), from DCE only.

Handshaking operation possible and necessary at Baud rates of 1200 Baud or more. RTS ON = PUNCH READY.

c) CPU

This mode is used when the Reader/Punch Combo acts as a terminal to a computer. NC programs may be dumped to or read from the Reader/Punch. Data flow is only through the connector to DCE.

Reader ON:

Reader output transmitted to DCE.

Reader controlled by CTS or DC1/DC3 (from DCE only) or the START/HALT push button.

DSR must be ON (or floating).

Punch controlled by DC2/DC4 (if DC CODES = ON, DC1-DC4 are not punched).

If PUNCH is ON, received data is punched.

When PUNCH goes ON, RTS goes ON.

When PUNCH goes OFF, RTS goes OFF.

Handshaking operation possible using RTS. (If DC CODES = ON, DC1 = PUNCH READY, DC3 = PUNCH NOT READY).

Reader OFF:

If PUNCH is ON, data is punched. When PUNCH goes ON, RTS goes ON and a DC1 character is transmitted to the DCE. When PUNCH goes OFF, RTS goes OFF and a DC3 character is transmitted.

Punch can be controlled by DC2/DC4 from DCE only. (If DC CODES = ON, DC2/DC4 are not punched).

Handshaking operation possible and necessary at Baud rates of 1200 Baud and more. RTS ON = PUNCH READY. Conc. DC CODES see section 2.6

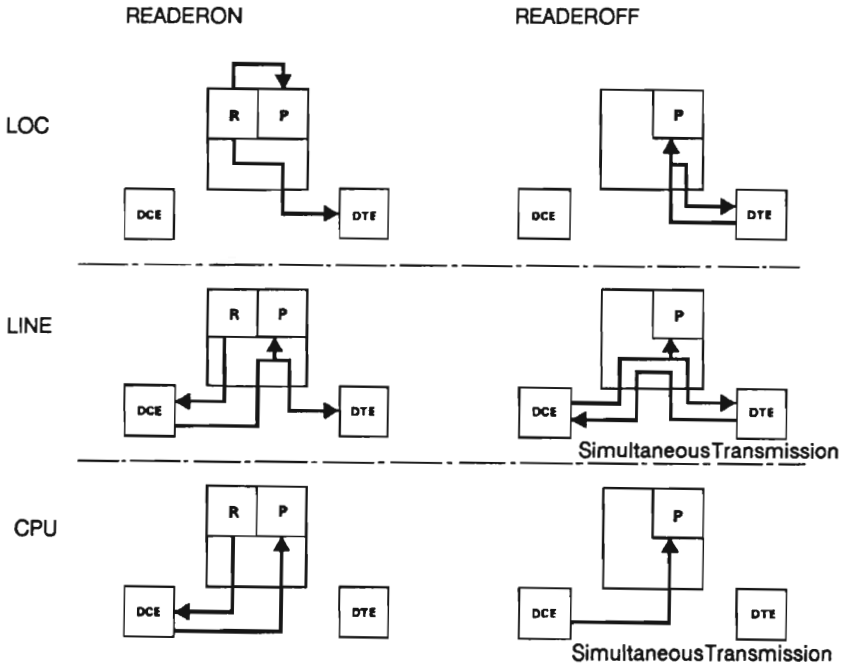


Fig. 2.1 Data Flow Diagram

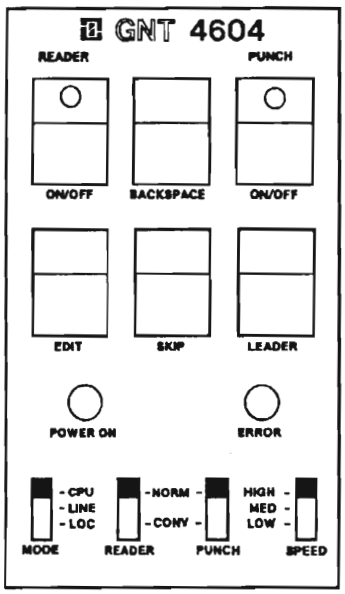


Fig. 2.2 Control Panel (KDVK-12xxx)

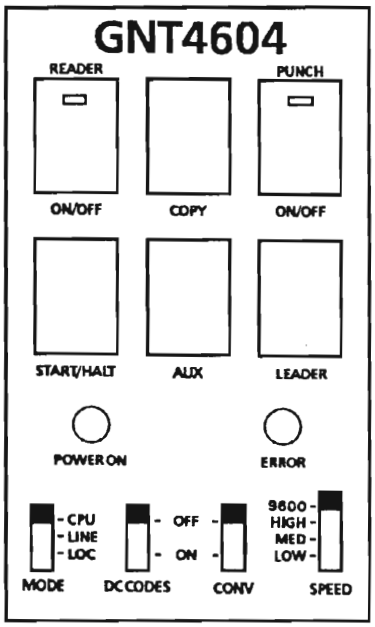


Fig. 2.3 Control Panel (KDVK-14xxx)

DC3 is transmitted 64 characters before the punch buffer is full and RTS goes OFF 4 characters before the buffer is full. RTS goes ON and DC1 is transmitted when the buffer is nearly empty again i.e. 8 characters left in the buffer.

2.1.5.2 Conv

In KDVK-12xxx the reader and punch had each a switch, but in KDVK-14xxx the switch is commen for both reader and punch.

READER:

The switch has 2 positions, OFF and ON. In position OFF, the characters read are transmitted to the DCE/DTE without conversion. The word length is defined by DIP programming switches WORD LENGTH, 4 and 5.

When the switch is ON, the characters read will be recognized as ISO or EIA characters, according to DIP switch 8 (see section 2.1.6), and converted to ASCII characters, the word length again defined by WORD LENGTH DIP switches.

PUNCH:

In position OFF, the characters from the DCE/DTE are punched without conversion. In position ON the characters are converted from ASCII to EIA or ISO, depending on the setting of DIP switch 8 (see section 2.1.6).

Note on the character codes:

The ASCII code is a 7-bit code set for information processing interchange and is known as CCITT Alphabet No. 5. For numerical control of machines, a 7-bit code set is defined by ISO 840; it is a part of the ASCII code set. The representation on tape, including an even parity bit, is defined by ISO 1113 (known as ISO-code). Another code set for numerical control is defined by EIA RS-244-A; it is a 8-bit code (known as EIA code). It has always odd parity.

Conversion from and to EIA and ISO codes is easily performed by setting the CONV switch accordingly.

See also under typical applications (section 2.4 and the conversion table section 2.5).

2.1.5.3 DC Codes

In KDVK-12xxx the switch is SW-3 in the DIP Programming Switch.

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

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

DC CODES ON: DC2 + DC4 Control on.
DC CODES OFF: DC2 + DC4 Control off.

The DC1 and DC3 codes are normaly active.

When the READER is ON and the PUNCH is OFF, the reader is activated by sending a DC1 character to the Reader/Punch Combo. The reader is deactivated by a DC3 character.

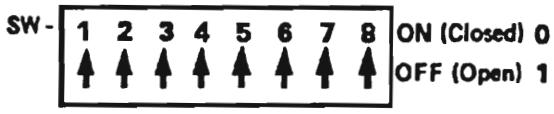
When DC CODES is ON, a DC2 character transmitted to the Reader/Punch Combo will set the punch on and cause all following characters to be punched. The punch is stopped by a DC4 character or by pushing the PUNCH button.

The PUNCH can control a remote transmitter by sending DC3 and DC1 characters. DC3 will stop the transmission and DC1 will start the transmission again. These functions are only possible when the READER is OFF or in STAND BY mode.

2.1.5.4 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 2.1.6.

In the type KDVK-14xxx with software version II, the switch has an extra possition for 9600 Baud. This speed 9600 Baud is indepent of the setting of SW-6 and SW-7 in the DIP Programming Switch.



2.1.6 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.

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.

DC-CODES

SW-3 Not in use in newer types. The function is moved to a toppanel switch

In older types:

ON: Control on.

OFF: Control off.

WORD LENGTH (DCE/DTE)

SW-4	SW-5	
ON	ON	7 data bits (bit 8 must be the stop bit, fig. 2.4).
OFF	ON	8 data bits (bit 9 must be the stop bit, fig. 2.4).
ON	OFF	8-bits including the parity bit. Received data will be detected for the right parity. The reader can transmit random data i.e. the codes in the tape will be transmitted as they are with both even and odd parity.
OFF	OFF	8-bits including the parity bit. Received data will be detected for the right parity. The reader will detect the read characters and stop in case of wrong parity.

The microprocessor will automatically detect even or odd parity in the first incoming data and in the first read data after the power is switched ON, and it will remember the parity until the power is switched OFF.

The two parity checks (for the receive line and for the reader) are independent of each other.

When the Reader/Punch Combo is in CPU or Local mode and a parity error is detected (when programmed), the TD output on the connector to DCE or RD output on the connector to DTE goes to logical 0 for 500 ms. If READER is ON, it goes OFF.

The punch will stop in case of parity faults. In older types the punch will continue punching.

2 stop bits are generated on transmission. For incoming data, only 1 stop bit is required.

In all three modes, when a framing error or a punch overrun is detected, the punch will go OFF and the error LED will flash for approximately 5 s.

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

A punch overrun occur when the buffer is over filled i.e. the handshake signal is not respected.

BAUD RATE

		SPEED		
SW-6	SW-7	LOW	MED	HIGH
ON	ON	110 BAUD	300 BAUD	600 BAUD
OFF	ON	150 BAUD	300 BAUD	1200 BAUD
ON	OFF	150 BAUD	300 BAUD	2400 BAUD
OFF	OFF	200 BAUD	300 BAUD	4800 BAUD

CONVERSION

SW-8 ON: If the CONV switch on the top panel is in position ON, the characters on the tape will be recognized as ISO characters. The characters to and from the DCE/DTE are 7-bit ASCII or 8-bit ISO, depending on the word length setting.

OFF: If the CONV switch on the top panel is in position ON, the characters on the tape will be recognized as EIA characters. The characters to and from the DCE/DTE are 7-bit ASCII or 8-bit ISO, depending on the word length setting.

When the CONV switch is in OFF, the setting of this switch is immaterial.

2.1.7 Input/Output Signals

The signals are in accordance with EIA standard RS232C and CCITT V24 and V28. The current loop is 20 mA, passive. The types KDVK 14xxx have additional RS-423 in the "TO DCE" connector and in the "TO DTE" connector parallel TTL input to the punch.

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

The connector "TO DCE" (Data Circuit-Terminating Equipment) is a Cannon DB-25P (male).

Note that the configurations of the 2 signal connectors are identical concerning the RS-232, but signal directions are reversed.

2.1.8 Serial data format

Two different data formats are recognized by the Reader/Punch Combo: 7-bit or 8-bit. An 8-bit word can be checked for parity error when this is programmed by the DIP switch (see section 2.1.6).

Only 1 stop bit is checked on incomming data, while outgoing data always have 2 stop bits.

a) 7- bit

b) 8- bit

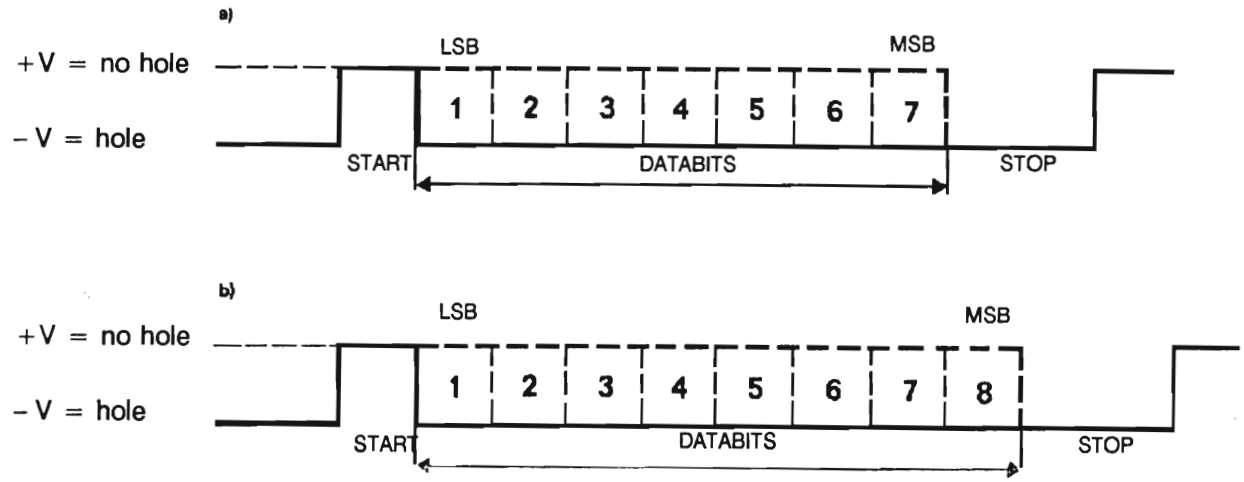
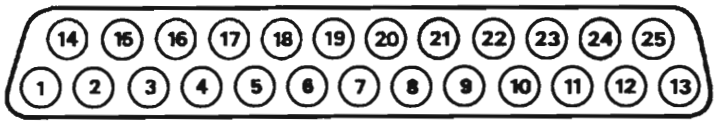


Fig. 2.4 Serial Data

2.1.9 Connector TO DTE (Data Terminal Equipment)



DB-25-S

Pin No.	Name	Description	Remark
1	PG	Protective Ground	
2	TD	Transmitted Data	input
3	RD	Received Data	output
4	RTS	Request To Send	input
5	CTS	Clear To Send	output
6	DSR	Data Set Ready	output
7	SG	Signal Ground	common return
20	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
25	+12V	+12V limited by 560 ohm	output
12,10,14,15,16, 17,19 and 21	CHI-8	Parallel Data	input (not in older types)
22	S/P-	Serial Parallel	input (not in older types)
23	PI	Punch Instruction	input (not in older types)
24	PR	Punch Ready	output (not in older types)
11	PE	Punch Error	output (not in older types)
8	NC	Not connected	

Notes:

RTS input: Fed through to connector to DCE.

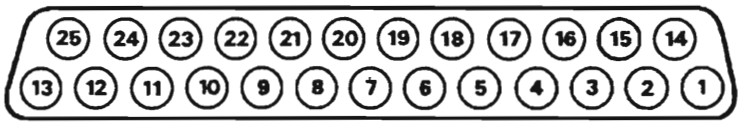
CTS output: PUNCH handshaking signal

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 connector to DCE and works only in CPU and LINE mode.

2.1.10 Connector TO DCE (Data Circuit-Terminating Equipment)



DB-25-P

Pin No.	Name	Description	Remark
1	PG	Protective Ground	
2	TD	Transmitted Data	output
14	TD'	SG	output (not in older types)
3	RD	Received Data	input
15	RD'	Received Data RS423	input (not in older types)
4	RTS	Request To Send	output
16	RTS'	SG	output (not in older types)
5	CTS	Clear To Send	input
17	CTS'	Clear To Send RS423	input (not in older types)
6	DSR	Data Set Ready	input
7	SG	Signal Ground	common return
20	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
24	-12 V	-12 V limited by 560 ohm	output
25	+12 V	+12 V limited by 560 ohm	output
8,10,11,12,19, 21,22 and 23	NC	Not connected	

Notes:

CTS input:Reader control signal in CPU and LINE modes (the transition from - to + and from + to - is used as ON and OFF)

DSR input:Must be ON in CPU and LINE modes to activate reader

RTS output:PUNCH handshaking signal. OFF = not ready (When DC- code switch is ON RTS is always high)

DTR output:Goes ON to indicate CPU or Line mode

2.1.11 Signal levels for GNT 4604

Data signals	"1"	"0"
Paper Tape	hole	no hole
TD input (to DTE) and		
RD input (to DCE)	-3 to -30 V	+3 to +30 V
TD/RD output	typ. -10 V	typ. +10 V
Current loop input	+12 to +30 mA	+3 to -30 mA (no current)
Current loop output	open collector output, max. 100 mA/60 V	

Control signals	ON	OFF
RTS input (to 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

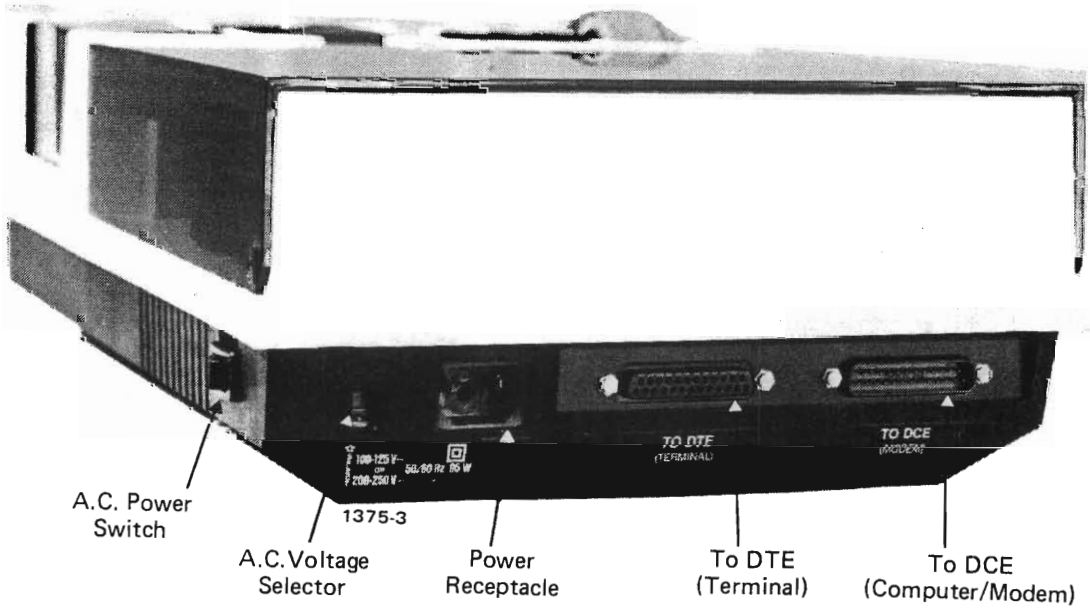


Fig.2.5 Back View of GNT 4604

2.1.12 DIP Programming Switch for GNT 4605

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. 2.5.

DEVICE ADDRESS

SW-1 – SW-5 Binary setting of address 0-31
SW-1 = LSB SW-5 = MSB.

DIRECTION MODE

SW-6 + SW-7

	SW-6	SW-7
Normal:	OFF	OFF
Talk:	X	ON
Listen:	ON	OFF

(X = do'nt care)

DUAL PRIMARY ADDRESS

SW-8

OFF Primary address.
All 32 addresses can be used as device address.
The reader string terminator is CRLF.

ON Dual primary address.
Only all even addresses can be used as device address. The odd address one higher than the selected even address is used to select the wanted reader mode. When the reader mode is selected, the punch must be OFF.

Ad. SW-8 ON:

Reader modes:

Nnnn: N characters is read 000< = nnn < = 255.

ALL: The reader does not stop until the tape is out.

CRLF: The reader continue until CRLF (default mode).

Ex. (with a HP9825):

```
clr 709          puts the reader in Nn-mode
wrt709, "N057".  and makes it read 57 charact-
read 708, A$     ers with the last character send
```

From factory the switch is preset to 08 decimal (switch 4: ON, the rest: OFF):

Address: 8

Listen only: OFF

Talk only: OFF

Dual address: OFF

2.1.13 Leader Select for GNT 4605

Inside the GNT 4605 a switch is placed on the interface board for leader select.

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.

2.1.14 Input/Output Signals for GNT 4605

All input/output signals and the pin connecting are in accordance with IEEE 488-1978 standard.

2.2 OPERATING

2.2.1 Tape Loading

2.2.1.1 Punch

1. Turn the power switch and see that the "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. 2.6.
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.

2.2.1.2 Reader

Place the tape to be read in the container as shown in Fig. 2.6. Open the reader lid, place the tape underneath the "nose" and 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. 3.1.

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

2.2.1.3 Chad

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

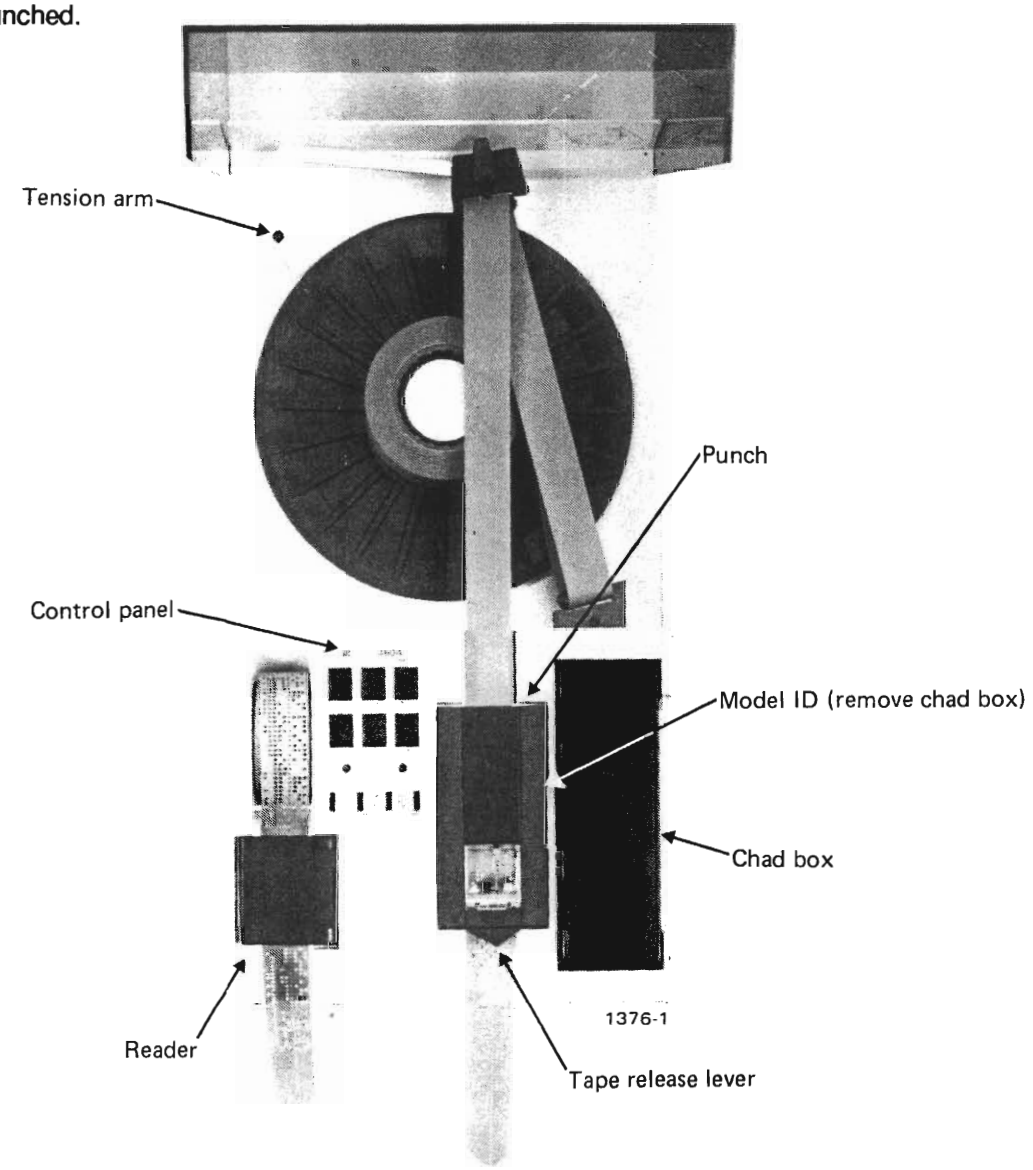


Fig. 2.6 Top View

2.2.2 Manual Controls for GNT 4604

2.2.2.1 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. 2.5 (rear view).

2.2.2.2 PUSH BUTTONS (See Fig. 2.2 and 2.3)

a) READER

When READER is pushed, the reader changes state from ON to OFF or vice versa. When the reader is off the reader memory is cleared. If the control signals are on, the READER will read continuously.

b) PUNCH

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

c) START/HALT (only on types KDVK-14xxx)

If the reader is enabled by the READER pushbutton, the transmission can be stopped and started by the START/HALT pushbutton without clearing the reader memory. The START/HALT correspond to a received DC–1 and DC–3-code.

d) AUX (only on types KDVK-14xxx)

The AUX can be used for different purposes.In the standard version it will operate as LEADER, but with all holes (DEL–CODE) punched in the tape. This function can be deleted by removing a resistor on the interface p.c.b. (R100, 1 Kohm)

In type KDVK-14xxx with software version II has another function too. If the AUX is depressed while the PUNCH is switched ON, the Punch goes into "FAPT" mode, and when characters are received to the punch the software will check if it is a FAPT program and punch the characters according to this mode e.i. delete some characters.

The punch should be switched OFF after having received a FAPT program to enable receiving of other programs and also to be able to look for another FAPT program.

e) COPY (only on types KDVK-14xxx)

The COPY pushbutton starts both the reader and the punch and makes a copy of the tape placed in the reader. The read data is not transmitted to the connectors "to DCE" or "to DTE". The copy function can be stopped by pressing either COPY, PUNCH or READER or if TAPE OUT occurs.

f) LEADER

When LEADER is pushed, a leader is produced having holes punched either 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 2.1.6

g) EDIT (only on older types)

When EDIT is activated momentarily (less than 1 sec.), the reader will read and transmit one character. When EDIT is held down (more than 1 sec.), readin continues until the button is released, or until the tape runs out.

h) SKIP (only on older types)

SKIP funcions only in conjunction with EDIT: When EDIT and SKIP are both depressed, the characters read are neither transmitted nor punched.

i) BACKSPACE (only on older types)

When BACKSPACE is pressed, the tape in the reader moves backwards. If some characters are stored in the buffer, the BACKSPACE will take place inside the buffer. The character BS (08 Hex) is transmitted to the DTE.

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

If BACKSPACE is held down while A.C.Power is switched on, this key will be ignored, and backspacing the punch can be done by transmitting the ASCII code BS (08 Hex) to the Reader/Punch Combo.

2.2.2.3 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. In older units it also flashes when EDIT or Backspace is used to indicate edit-mode. To exit from edit-mode, push READER twice.

c) PUNCH

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

d) ERROR

This LED flashes for 5 s after the detection of a framing error.

It lights in the following error situations (applies to punch):

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 (RTS 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.

2.2.3 Manual Controls for GNT 4605

2.2.3.1 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. 2.8 (back view).

2.2.3.2 PUSHBUTTONS (See Fig. 2.7)

a) READER

When READER is pushed, the reader changes state from ON to OFF or vice versa.

b) PUNCH

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

Note: In normal mode (DIP switches 6 and 7 OFF) the reader and punch can only be started from remote.

c) 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 switch on the interface board determines the type of leader. See Section 2.1.13.

d) COPY

When COPY is pushed, the tape placed in the reader is copied on the punch. Copying is indicated with the reader and punch LED ON. To go into copy mode the device must not be in talker or listener mode, the reader and punch LED must be OFF.

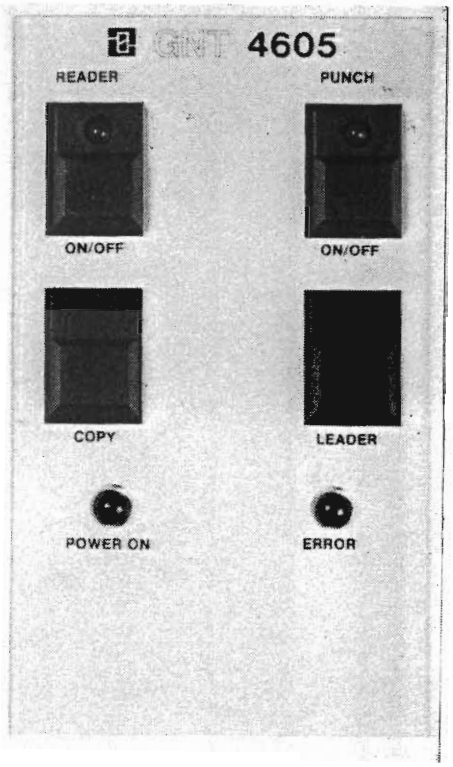


Fig. 2.7 Control panel

Fig. 2.8 Back view of GNT 4605

2.2.4 Modes for GNT 4605

2.2.4.1 TALKER

The reader stops when it reaches the "last character" and EOI is sent together with the "last character".

The "last character" is specified in the set-up procedure, default mode is CRLF-mode.

The reader can be stopped and restarted from the keyboard.

In case of error (no tape or no feedhole) a service-request is performed. After an error a device-clear should be executed.

2.2.4.2 LISTENER

All received characters are punched (except those in set-up mode).

If the buffer gets full, it restarts receiving characters when the buffer is empty. One service-request is performed when the buffer gets full and one more when the buffer gets empty, so it is possible to do other jobs when the punch is active. When the buffer gets full, the transmission should be stopped within 256 characters to avoid overload.

The punch can be stopped and restarted from the keyboard, but not the transmission. This means that the memory can be loaded when the punch is stopped.

In case of taut tape a service-request is performed. If it is not tape-out and the tension arm is moved back to its normal position, the punching is resumed.

2.2.4.3 SERIAL POLL

After a service-request it is possible to get status of the device by a serial poll (see Fig. 2.9).

2.2.4.4 PARALLEL POLL

With this it is possible to get one bit status from the device.

2.2.4.5 DEVICE CLEAR

Initialize the device to power-on state.

	I (rsv)	buffer full	buffer over-load	buffer empty	no tape	no feedhole	error punch

2.2.5 Operationally Considerations for GNT 4605

2.2.5.1 READER

Using the reader you first of all got to decide which way you want to use it.

Do you want to change between the 3 modes Nnnn, ALL or CRLF dual-addressing switch must be ON. The device is now in the dual-address mode and can only read and punch on even addresses.

If you only want to separate the blocks of data with CRLF, the dual-addressing switch must be OFF and you can use the device on all addresses.

You can now put the tape in the reader and start it from the controller.

Ex. (with a HP9825) this instruction will read
read 708,A$ one string of data from the GNT 4605 with the address 8.

2.2.5.2 PUNCH

Punching less than 8000 characters is very simple, you just have to transmit the wanted characters to the device.

If there is more than 8000 characters ,you can do 2 things.

You can do the same as before, but then the controller will be hung up on the bus and you can do nothing else but punch.

Instead you can separate the transmission in blocks by means of service-request. When the buffer get full, the device sends a service-request and the transmission should be stopped within 256 characters to avoid overload. When the buffer gets empty, a new service-request is sent and the transmission can be resumed.

2.3 TYPICAL APPLICATIONS FOR GNT 4604

2.3.1 Loading a NC Program from Tape

Connector: To DCE

Control signals: DSR, CTS ON or floating

MODE: LINE

READER SWITCH: NORM

PUNCH SWITCH: NORM

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. The reader can also be controlled by DC1/DC3 in which case DIP switch 3 should be ON.

2.3.2 Preparing a Tape from a Terminal

Connector: To DTE

Control signals: none

Programming switch: ECHO ON

MODE: LOC

READER SWITCH: NORM

PUNCH SWITCH: NORM

SPEED: to match terminal

READER: OFF

PUNCH: ON

BACKSPACE held down when A.C.Power is applied. Type the characters to be punched. If an incorrect character is typed, type BACKSPACE. Then type delete, followed by the correct character.

2.3.3 Punching Tape at High Speed

Connector: To DCE

Control signals: RTS

MODE: CPU

PUNCH SWITCH: NORM

SPEED: to match computer

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 RTS handshaking signal, or alternatively X-ON/X-OFF (DC1/DC3).

2.3.4 Editing a Tape

Connector: To DTE

Control signals: none

MODE: LOC

READER SWITCH: NORM

PUNCH SWITCH: NORM

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 LF 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.

The Reader/Punch Combo will remember the position of the next character to be transmitted as long as it stays in READ mode.

2.3.5 Converting an EIA Tape to an ISO Tape – Generating ISO Tape

Connector: To DTE

Control signals: none

READER SWITCH: CONV

PUNCH SWITCH: NORM

READER: ON

PUNCH: ON

DIP switch 8: OFF

Place the tape in the reader and start it. The Reader/Punch Combo will generate a corresponding ISO tape according to the conversion table in Section 2.5.

As the ISO code is identical to the ASCII code save for the even parity in bit 8, an ISO tape can be generated from an ASCII terminal by placing the PUNCH SWITCH in position CONVERSION and set DIP switch 8 ON.

2.3.6 Two-Way Data Transmission via Modem, Incoming Data Punched

Connector: modem to "to DCE"
terminal to "to DTE"

Control signals: CTS ON = READ
DSR ON or floating

MODE: LINE

READER SWITCH: NORM

PUNCH SWITCH: NORM

SPEED: to match modem

READER: ON

PUNCH: ON

The reader will read data to the modem when CTS is ON. If the reader is OFF, data can be send from the terminal to the modem.

Incoming data from the modem will be punched out.

2.3.7 Dumping a NC Program to the Reader/Punch Combo and a Printer

Connector: computer to "to DCE"
printer to "to DTE"

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

MODE: LINE

READER SWITCH: NORM

PUNCH SWITCH: NORM

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, RTS. Otherwise this is not necessary, and the computer and printer will operate in the normal way.

For software developed for KDVK-141xx.

CONV.	Function			DIP switch
	I/O	READ	PUNCH	SW-8
ON	ASCII/ISO		EIA	OFF
ON	ASCII/ISO	EIA		OFF
ON	ASCII		ISO	ON
ON	ASCII	ISO		ON
OFF	7/8 bit	7/8 bit	7/8 bit	
	-------- (any code) --------			

ASCII/ISO depends on word length setting

For software developed for KDVK-121xx.

	Function			Switch Settings		
	I/O	READ	PUNCH	SW-8	READER	PUNCH
CONVERSION	ASCII		EIA	OFF		CONV
	ASCII	EIA		OFF	CONV	
		ASCII	EIA	OFF	NORM	CONV
		EIA	ASCII	OFF	CONV	NORM
	ISO		EIA	OFF		CONV
	ISO	EIA		OFF	CONV	
		ISO	EIA	OFF	NORM	CONV
		EIA	ISO	OFF	CONV	NORM
	ASCII		ISO	ON		CONV
	ASCII	ISO		ON	CONV	
		ASCII	ISO	ON	NORM	CONV
EDITING (Local mode only)	ASCII	ASCII	ASCII	ON	NORM	NORM
	ISO	ISO	ISO	ON	NORM	NORM
	ISO	EIA	EIA	OFF	CONV	CONV
	ISO	EIA	ISO	OFF	CONV	NORM
NO CONVERSION	7/8 bit	7/8 bit	7/8 bit		NORM	NORM
	-------- (any code) --------					

Definitions:

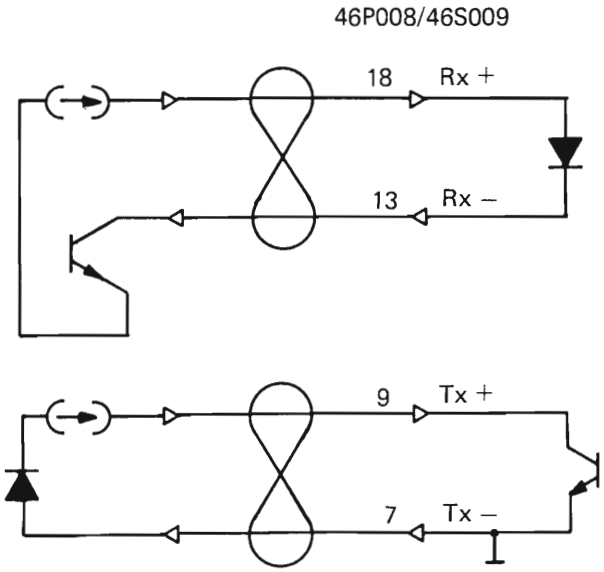
ASCII	7-bit code	(bit 8 not defined)
ISO	8-bit code	(ASCII + even parity)
EIA	8-bit code	(EIA: RS 244)

WORD LENGTH and PARITY CHECK

(see also section 2.1.6)

	SW-4	SW-5
7-bit no parity check	ON	ON
8-bit no parity check	OFF	ON
8-bit + parity check (received data)	ON	OFF
8-bit + parity check (received		

2.3.8 Applications for Current loop for GNT 4604



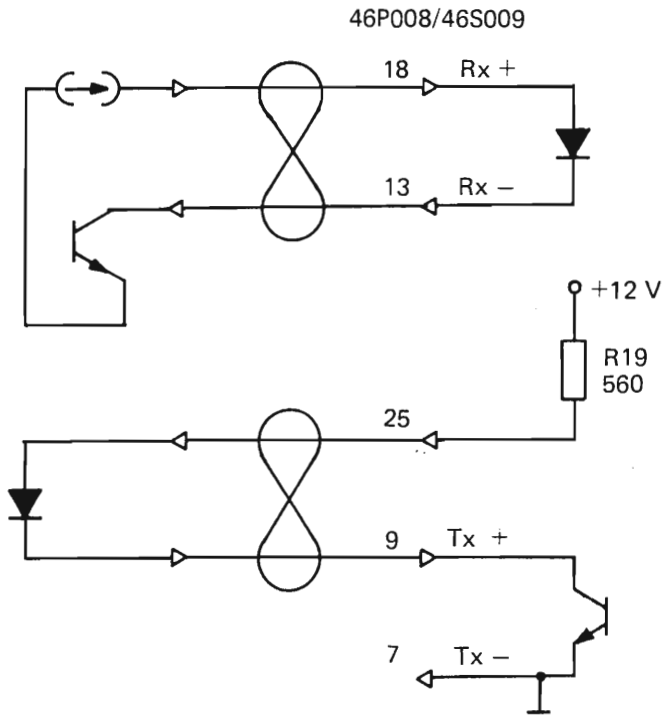
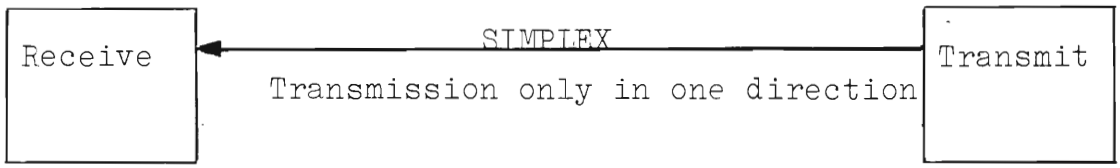
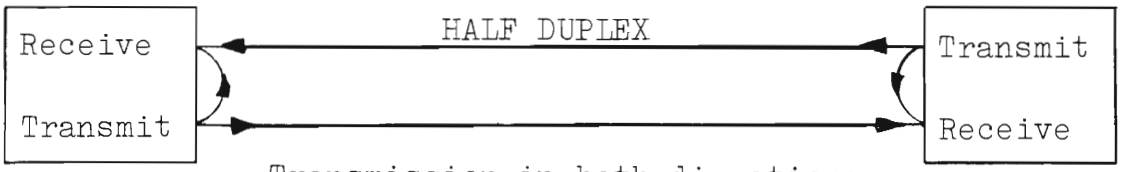
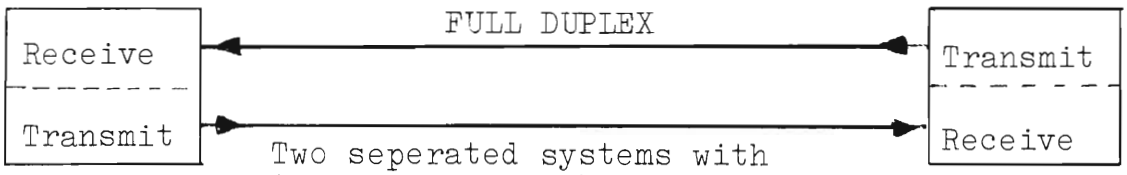
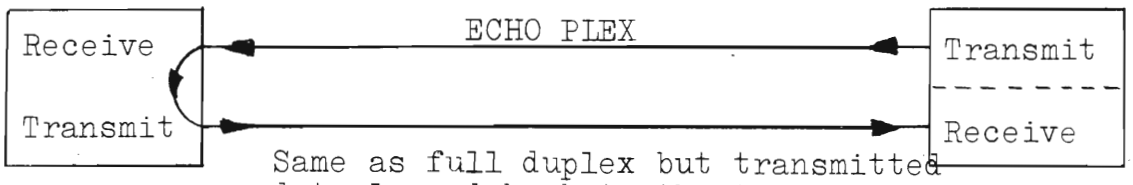


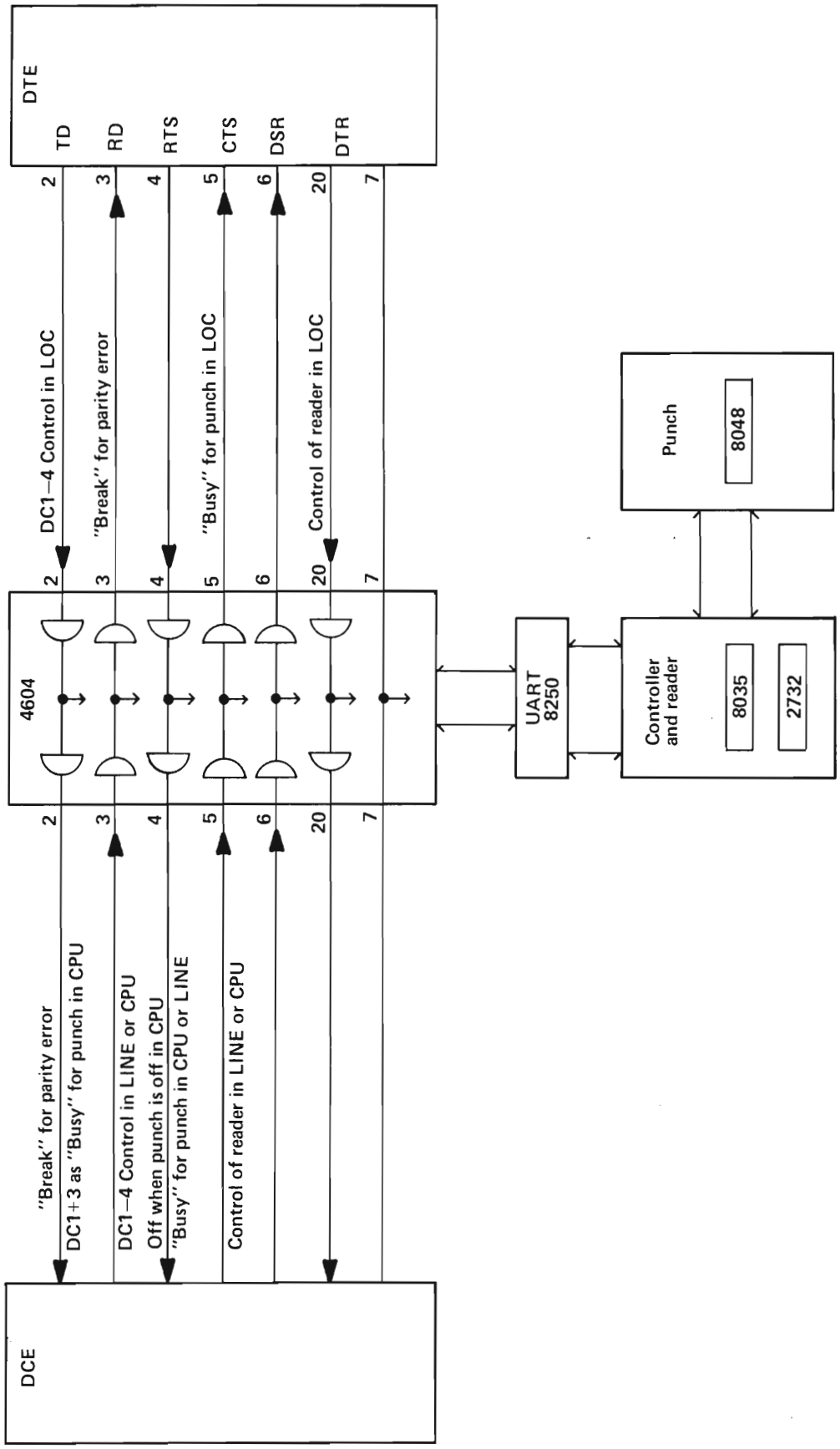
Fig. 2.12 Receiver passive 10 - 100 mA, transmitter active 20 mA

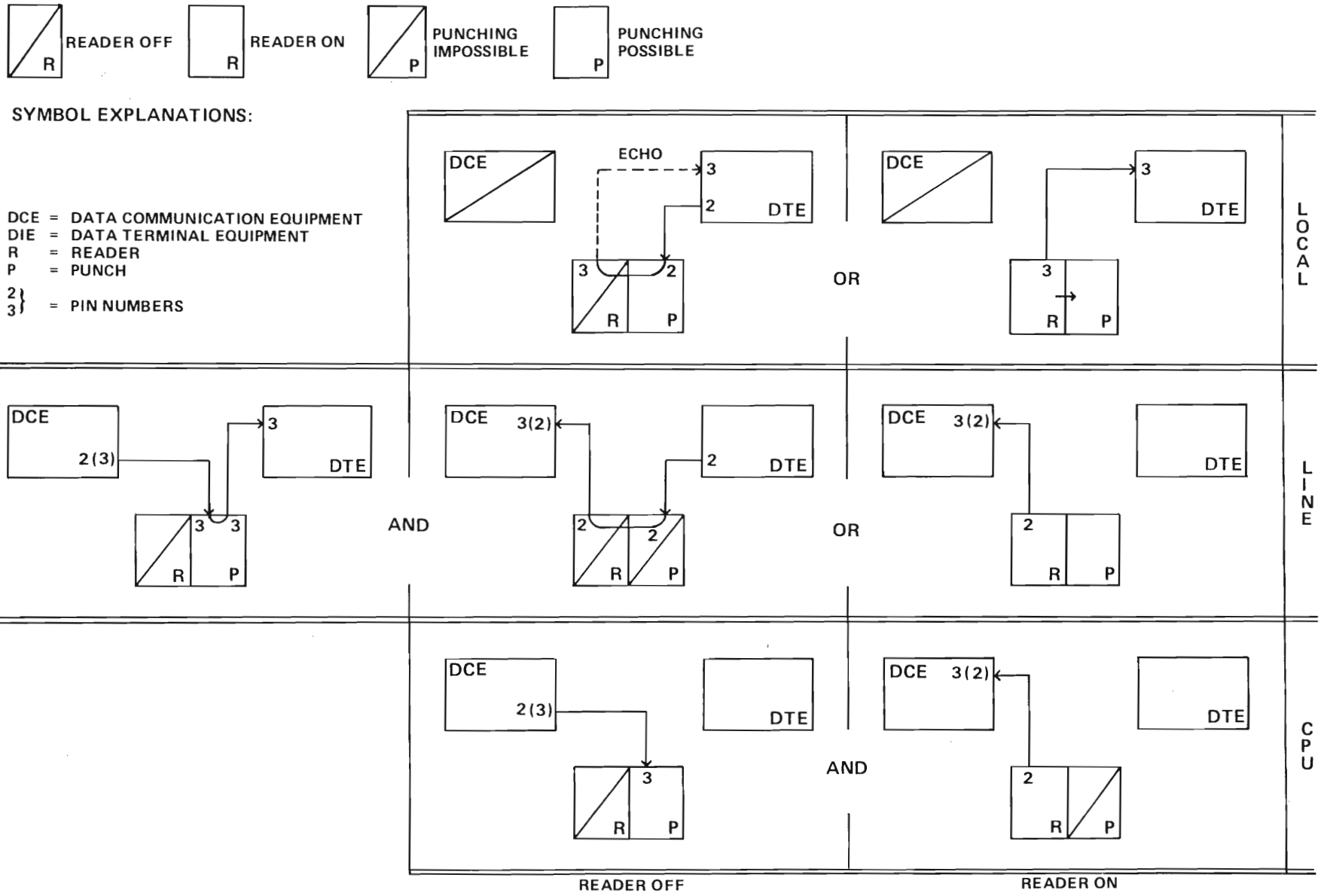

Receive
SIMPLEX
Transmission only in one direction
Transmit


Receive
Transmit
HALF DUPLEX
Transmit
Receive
Transmission in both directions
but only in one at a time.


Receive
Transmit
FULL DUPLEX
Transmit
Receive
Two seperated systems with
transmission in both directions
at a time.


Receive
Transmit
ECHO PLEX
Transmit
Receive
Same as full duplex but transmitted
data looped back to the terminal


DTE
TD
RD
RTS
CTS
DSR
DTR
2
3
4
5
6
20
7
DC1–4 Control in LOC
"Break" for parity error
"Busy" for punch in LOC
Control of reader in LOC
4604
UART 8250
Controller and reader
8035
2732
Punch
8048
DCE
"Break" for parity error
DC1+3 as "Busy" for punch in CPU
DC1–4 Control in LINE or CPU
Off when punch is off in CPU
"Busy" for punch in CPU or LINE
Control of reader in LINE or CPU



GN Telematic

2.4 TYPICAL APPLICATIONS FOR GNT 4605

The interface in GNT 4605 can only be used in connection with an IEEE bus-system.

The GNT 4605 contains the following features:

Interface function capability codes	Interface functions description
SH1	Complete source handshake capability.
AH1	Complete acceptor handshake capability.
T5	Talker: Basic talker, serial poll, talk only mode, and unaddressed with MLA.
L3	Listener: Basic listener, listen only mode and unaddressed with MTA.
SR1	Service request capability.
RL0	No remote/local capability.
PP1	Parallel poll capability.
DC1	Full device clear capability.
DT0	No device trigger capability.
C0	No controller capability.
B1	Open collector drivers.

2.5 CONVERSION CODES FOR GNT 4604

2.5.1 Conversion Codes, ASCII/EIA

2.5.1.1 ASCII TO EIA RS-244-A CONVERSION

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

2.5.1.2 EIA RS-244-A TO ASCII CONVERSION

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				

2.5.1.3 ASCII to EIA RS-244-B CONVERSION

(In programs developed for KDVK-141xx)

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	

2.5.1.3 ASCII to EIA RS-244-B CONVERSION (continued)

(In programs developed for KDVK-141xx)

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

2.5.1.4 EIA RS-244-B TO ASCII CONVERSION

(In programs developed for KDVK-141xx)

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 Output	
79	i	49	I	7A	LC	No Output	
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				

* A or a etc. dependent on precedence code

2.6 CONTROL SIGNALS

2.6.1 Functions of Control Codes and Signals for GNT 4604 (KDVK-12xxx)

EPROM 0157

Input from Top Panel			Input from DCE CPU and LINE mode			Output to DCE CPU mode		Output to DCE LINE mode	
PUNCH LED	READER LED	DC-CODES	CTS[1]	DC1-3	DC2-4	RTS	DC1-3	RTS	DC1-3
ON	ON	ON	CONTR	CONT[2)6)]	CONTR	CONTR	–[4]	CONTR	–[3]
ON	ON	OFF	CONTR	DATA	DATA	CONTR	–[4]	CONTR	–[3]
ON	OFF	ON	–	DATA	CONTR	CONTR	CONTR	CONTR	–[3]
ON	OFF	OFF	–	DATA	DATA	CONTR	CONTR	CONTR	–[3]
OFF	ON	ON	CONTR	CONTR[6]	–	OFF	–[4]	DTE[5]	
OFF	ON	OFF	CONTR	–	–	OFF	–[4]	DTE[5]	
OFF	OFF	ON	–	CONTR[7]	–	OFF	–	DTE[5]	
OFF	OFF	OFF	–	–	–	OFF	–	DTE[5]	

[1] CTS uses "high" and "low" level to start and stop the reader.

[2] DC1-3 also punched.

[3] DC1-3 cannot be used. DC-codes cannot be mixed from different sources.

[4] DC1-3 can be part of DATA from tape.

[5] RTS depends of input from DTE.

[6] DC1-3 works only when CTS is "high" or open.

[7] DC1-3 are stored in memory until READER goes ON.

2.6.2 Functions of Control Codes and Signals for GNT 4604 (KDVK-14xxx)

EPROM 0198 (software I)

Input from Top Panel			Input from DCE CPU and LINE mode			Output to DCE CPU mode		Output to DCE LINE mode	
PUNCH LED	READER LED	DC-CODES	CTS[1]	DC1-3	DC2-4	RTS	DC1-3	RTS	DC1-3
ON	ON	ON	–	CONTR[2]	CONTR	CONTR	CONTR	CONTR	–[3]
ON	ON	OFF	CONTR	CONTR[2]	DATA	CONTR	CONTR[4]	CONTR	–[3]
ON	OFF	ON	–	DATA	CONTR	CONTR	CONTR	CONTR	–[3]
ON	OFF	OFF	–	DATA	DATA	CONTR	CONTR	CONTR	–[3]
OFF	ON	ON	–	CONTR	CONTR	OFF	–[4]	DTE[5]	
OFF	ON	OFF	CONTR	CONTR	–	OFF	–[4]	DTE[5]	
OFF	OFF	ON	–	CONTR[6]	CONTR	OFF	–	DTE[5]	
OFF	OFF	OFF	–	CONTR[7]	–	OFF	–	DTE[5]	

[1] CTS uses the transition from - to + and from + to - to start and stop the reader.

[2] DC1-3 also punched.

[3] DC1-3 cannot be used. DC-codes cannot be mixed from different sources.

[4] DC1-3 can be part of DATA from tape.

[5] RTS depends of input from DTE.

[6] DC1-3 are stored in memory until READER goes ON.

[7] DC1-3 are stored in memory until READER goes ON, but CTS must be OFF or open.

2.6.3 Functions of Control Codes and Signals for GNT 4604 (KDVK-14xxx)

EPROM 019B (software II)

Input from Top Panel			Input from DCE CPU and LINE mode			Output to DCE CPU mode		Output to DCE LINE mode	
PUNCH LED	READER LED	DC-CODES	CTS[1]	DC1-3	DC2-4	RTS	DC1-3	RTS	DC1-3
ON	ON	ON	–	CONTR	CONTR	CONTR	CONTR	CONTR	–[3]
ON	ON	OFF	CONTR	DATA[2]	DATA	CONTR	–[4]	CONTR	–[3]
ON	OFF	ON	–	DATA	CONTR	CONTR	CONTR	CONTR	–[3]
ON	OFF	OFF	–	DATA	DATA	CONTR	CONTR	CONTR	–[3]
OFF	ON	ON	–	CONTR	CONTR	OFF	–[4]	DTE[5]	
OFF	ON	OFF	CONTR	CONTR	–	OFF	–[4]	DTE[5]	
OFF	OFF	ON	–	CONTR[6]	CONTR	OFF	–	DTE[5]	
OFF	OFF	OFF	–	CONTR[7]	–	OFF	–	DTE[5]	

[1] CTS uses the transition from - to + and from + to - to start and stop the reader.

[2] The first DC3 received will stop the reader. The next will be punched.

[3] DC1-3 cannot be used. DC-codes cannot be mixed from different sources.

[4] DC1-3 can be part of DATA from tape.

[5] RTS depends of input from DTE.

[6] DC1-3 are stored in memory until READER goes ON.

[7] DC1-3 are stored in memory until READER goes ON, but CTS must be OFF or open.

CONTENTS OF SECTION 3

3.1 OPTIONS

Reader unwinder for 8'' rolls.

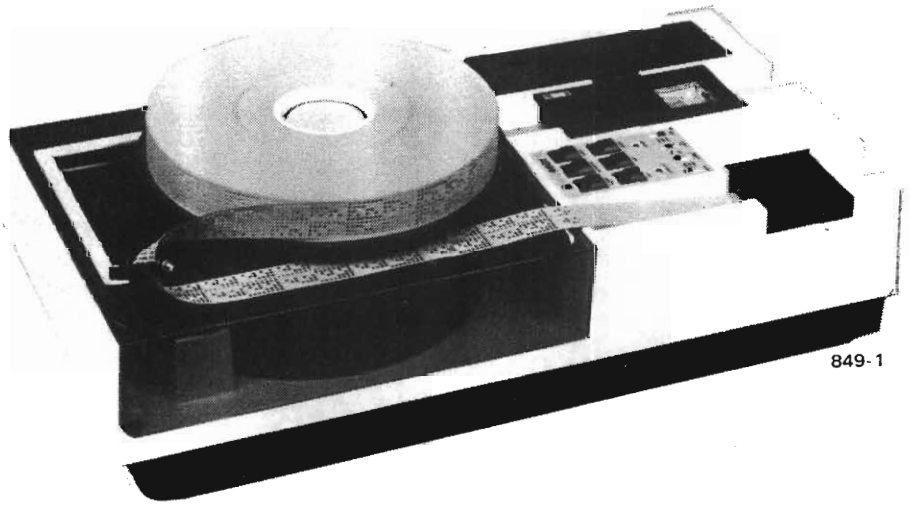


Fig. 3.1 GNT 4604 Reader/Punch Combo, showing optional unwinder

CONTENTS OF SECTION 4

Technical Service Bulletin

GN Telematic

Concerning: GNT 4605

Date: May 1987

Reader faults.

The GNT 29 reader motor is normally "grounded" through one of the wires in the motor cable connector.

The "grounding" wire can cause some reader troubles in the GNT 4605, because it is connected directly to the signal ground (0V) on the interface p.c.b.

Therefore the grounding wire should be disconnected from the plug and connected to the punch mechanism directly.

Also the taut tape lever should be connected to the punch mechanism.

With these 2 internal wires static voltages between the metalparts are equalized and the reader is not so sensitive as when the "grounding" is done via 0V.

DNCT/BS-alc
File D167alc16

Technical Service Bulletin

GN Telematic

Concerning: GNT 4601 - 4604 - 5601
Reader z46/29000

Date: Jan 1985

Window for the Photo Transistors

The window covering the photo transistors is pressed into the housing and the surface of the window should be placed lower than the surface of the housing.

In few cases we have seen windows placed with the surface higher than the housing. That will not disturb the reading at the moment, but perhaps after a period when the tape has worn the window and made it non-transparent.

We will therefore ask you to check the readers before delivering them to customers, to prevent against future faults. If the window is placed wrongly, please press it down to right position with a finger.

Technical Service Bulletin

GN Telematic

Concerning: GNT 4601 and GNT 4604

Date: April, 1984

Reader Stops

Now and then there have been some difficulties with the reader. The reader would stop for no apparent reason.

This Technical Service Bulletin is a supplement to the two bulletins we sent out in January and February this year.

1. When reading long tapes it happens that the whole reader punch unit charges up a high static voltage. The voltage depends on the type of tape, f.inst. the red tape supplied with the unit has undergone antistatic treatment and will normally not cause any problems. The high voltage can cause the reader to stop.

   The solution is to "ground" the reader, the punch mechanism and the tension arm via the interface board. The "grounding" could f.inst. be an earth connection through the shield around the data cable via pin 1 in one of the cannon connectors or from the earth in a CPU via 0V to pin 7 in one of the connectors. Inside the unit it is then necessary to connect the "grounding" wire going from pin 1 to the spade connector between the two flatcable connectors for the punch and the switch pannel to the punch mechanism. From the spade plug an extra cable must be connected to the internal connections as described in the service bulletin dated February, 1984.

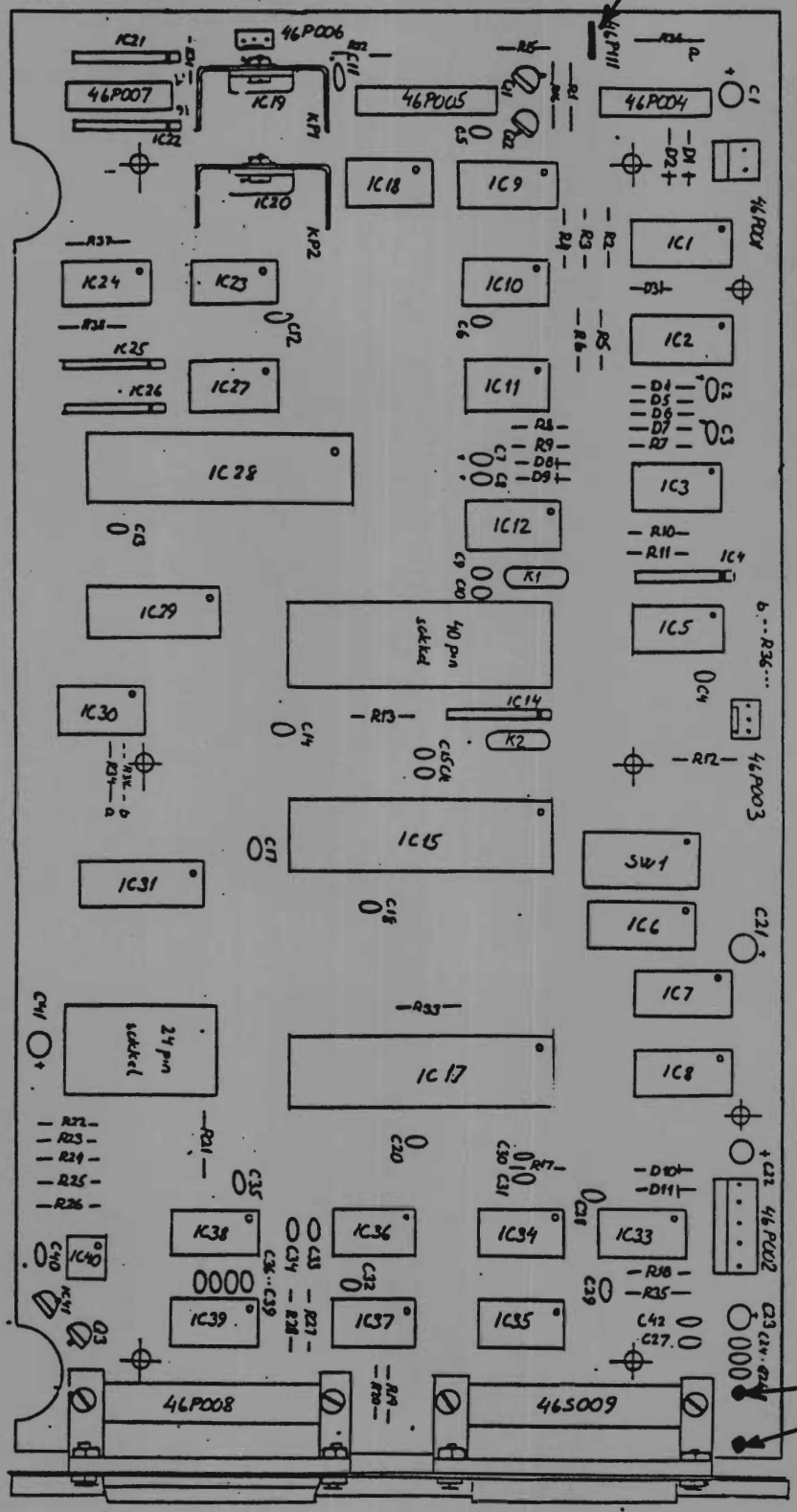
   If pin 7 is used for "grounding" a resistor of 100Ω must be added between the wires for pin 1 and pin 7. Two solder points are already placed on the board for this resistor. See the drawing.

2. In readers produced before November, 1983, it may be necessary to add a capacitor between the reference voltage and 0V as described in the Service Bulletin of January, 1984.

3. A wrong placement of the sprocket wheel on the motor shaft can cause the reader to stop. Check with a correctly punched tape that the wheel is placed correctly. With the feed holes in the tape placed exactly over the pins on the sprocket wheel there should be a small play between the edge of the tape and the side of the cover in both sides of the tape.

... 2

Spade plug
to be connected to
the punch mechanism



Resistor
100Ω

6, Telefonvej DK-2860 Soeborg
Copenhagen Denmark

4. The sinsitivity of the three phototransistors detecting the feed holes can be adjusted on potentiometers placed on the phototransistor board underneath the reader.

   The three phototransistors are named FHA, FHB, and FHC. The potentiometers for FHB and FHC should be adjusted so that the on/off ratios from the transistors are 1:1, f.inst. shown on an oscilloscope. The potentiometer for FHA should be adjusted until a distance between the "backside" of the FHC pulse and the backside" of the FHA pulse of 25% of the time of a whole character is obtained. See the drawing.

   The on-level of FHA is typically 55% of a whole character but might go up to 80%.

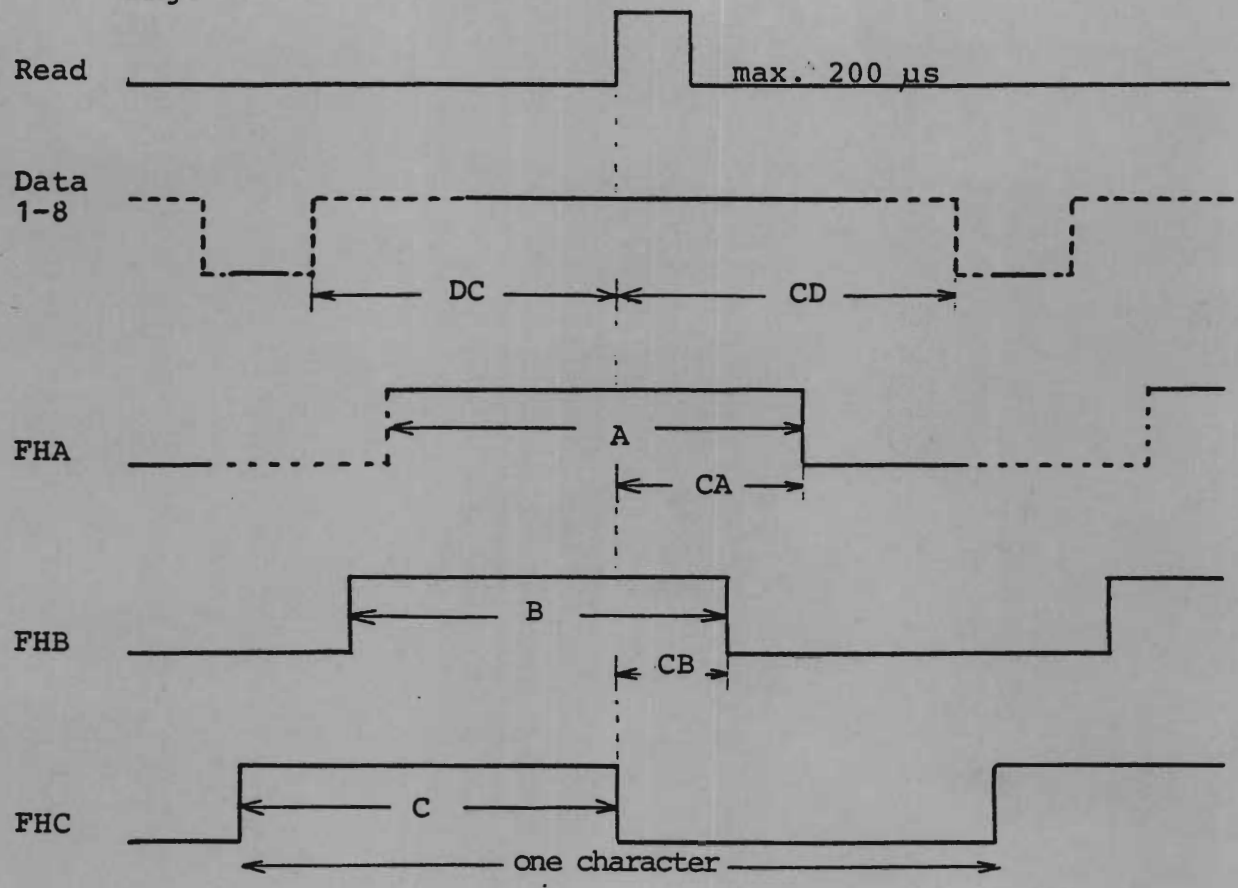
   Also the "backside" of the FHB pulse should come later than the "backside" of the FHC pulse.

   In some elder readers it could be difficult to reach CA = 25% within the 80% limitation of A. Therefore, we have changed the lid for the reader.

   The whole LED board is raised 0.5 mm in proportion to the old lid. The "thickness" of the new lid should be 5.5 mm. See the drawing.

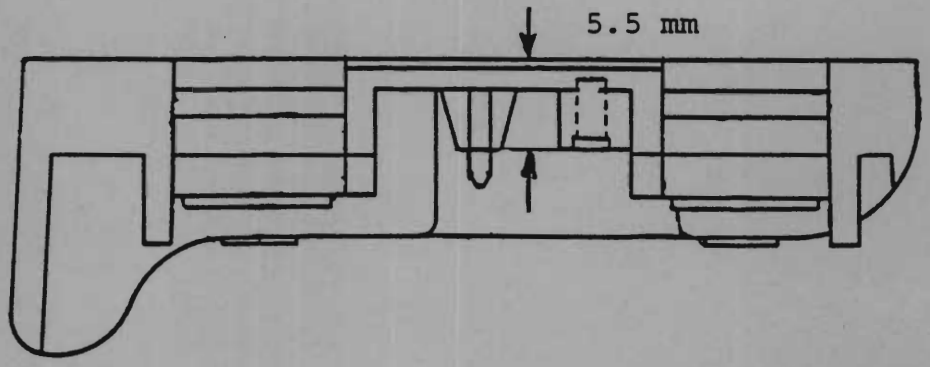
NB! When adjusting the potentiometers take care that the phototransistor board is kept in darkness, because the light might influence the measurements.

... 4



Typical length measured in % of one character:

A : 55% (up to 80%)
B : 50% Adj. on potm. B
C : 50% Adj. on potm. C
CA: 25% Adj. on potm. A
CB: 5-25%
CD: 35-65%
DC: 20-60%



1984.05.04

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Copenhagen Denmark

Technical Service Bulletin

GN Telematic

Concerning: GNT 3601, GNT 3602B, GNT 4601 and GNT 4604

Date: February, 1984

Equalizing Of Internal Static Voltage In Abovementioned Units

To equalize the internal static voltage that may arise f.inst. when the punch station draws the tape from the unwinder, an electric connection has been introduced from the tension arm for the unwinder to the punch mechanism. In units with tape readers the reader motors have also been connected to the punch mechanism.

Without these internal connections the discharge of static voltage could cause disturbances in the electronics, especially at low air humidity.

The parts numbers of the two cables are:

z46/24010 (for tension arm) and
z46/24020 (for reader motor)

One end of cable z46/24010 is mounted under a screw head (on GNT 3601 and GNT 3602B) or under a nut (on GNT 4601 and GNT 4604) which is connected electrically to the tension arm. The other end with the clamp is placed on the edge of the punch chassis.

The cable for reader motor z46/24020 is soldered to the soldering lug of the motor housing (only on the new motors) and is connected to the edge of the punch chassis.

Technical Service Bulletin

GN Telematic

Concerning: GNT 4601 and GNT 4604 **Date:** January 1984

Reader stops for no apparent reason

In some reader/punch units the reader has stopped in the middle of reading a tape and LED has switched off for no apparent reason. The reader could then be re-started immediately after on the push-button.

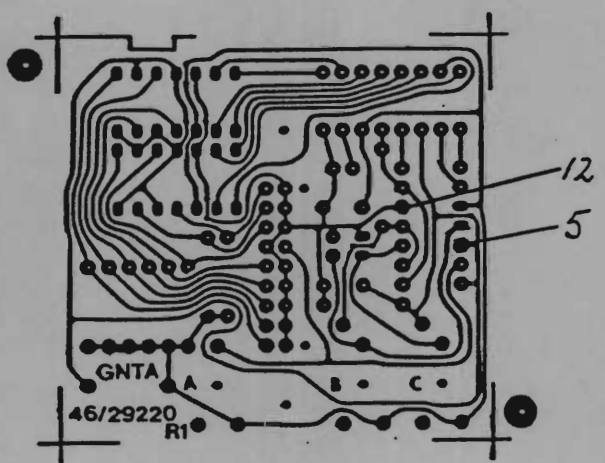
It has not been possible to point our a real fault f.inst. a missing feedhole in the tape or a defective component.

The problem will probably be solved by inserting a capacitor on the back of the GNT 29 printboard.

The problem in question might occur on the 4601'a and 4604's with a program number higher than 0146

A capacitor of 5-22 nF should be fitted between the reference voltage and the ground

All readers produced since Nov. 83 have the capacitor mounted on the solderside of the photosensorboard between pin 5 and pin 12 of IC3. Later, when the new lay-out of the photosensorboard is delivered the capacitor is placed on the componentside of the board. The new board can be recognized on the mark R1 (revision 1) beside the part-number 46/29220.



Technical Service Bulletin

GN Telematic

Concerning: GNT 4604

Date: December 1983

Program Change

We have improved the existing program so that it is possible to copy in local mode even though the DC switch is ON.

This is done as follows:

- When the power switch on the 4604 is switched ON, the punch is automatically ready for punching and does not need a DC code.

- When pushing the reader ON button and keeping it down for a long period of time (1 second), a DC1 code will automatically be generated for start of reader.

In this way, this improvement will not affect the other ways the 4604 are used.

The eprom containing this modification has partnumber Z46/21961 (unchanged) but modificationnumber 0157 or higher.

CONTENTS OF SECTION 5

5.1 TECHNICAL DESCRIPTIONS

5.1.1 Technical Description of Reader/Punch Combo

5.1.1.1 MECHANICAL DESIGN

The case is divided into two sections: top cover and base. The tape dispenser, reader, punch mechanism, and electronics are mounted on the top cover. The base holds the transformer and A.C. power inlet. The chad box snaps into place in an opening in the top cover.

The reader is sprocket-driven, has its own built-in motor and utilizes opto-electronics.

The GNT 36 Tape Punch is fastened to the top cover by a single clamp and is therefore easy to remove for servicing. Torque is provided by a D.C. motor and drive belt.

The tape dispenser comprises turntable, tension control mechanism and tape error sensors.

5.1.2 Technical Description of GNT 36 Tape Punch

5.1.2.1 MECHANICAL DESIGN

General

The GNT 36 Tape Punch is fastened by a single clamp and is therefore easy to remove for servicing.

Motor torque is transmitted to the punch mechanism by an O-ring drive belt. No clutch is used.

The punching needles are controlled by a selector box containing 9 electro-magnets.

Functional Description

The GNT 36 is a synchronous punch, which means that its main shaft is in constant rotation and that data and feed pulses must be applied at times governed by the angular position of the main shaft. Pulse synchronization is ensured by a photo-electric timing generator.

Perforation of code and feed holes is accomplished by punching needles which are driven through and withdrawn from the tape by an eccentric on the main shaft. The selection of each needle is controlled by an electro-magnet.

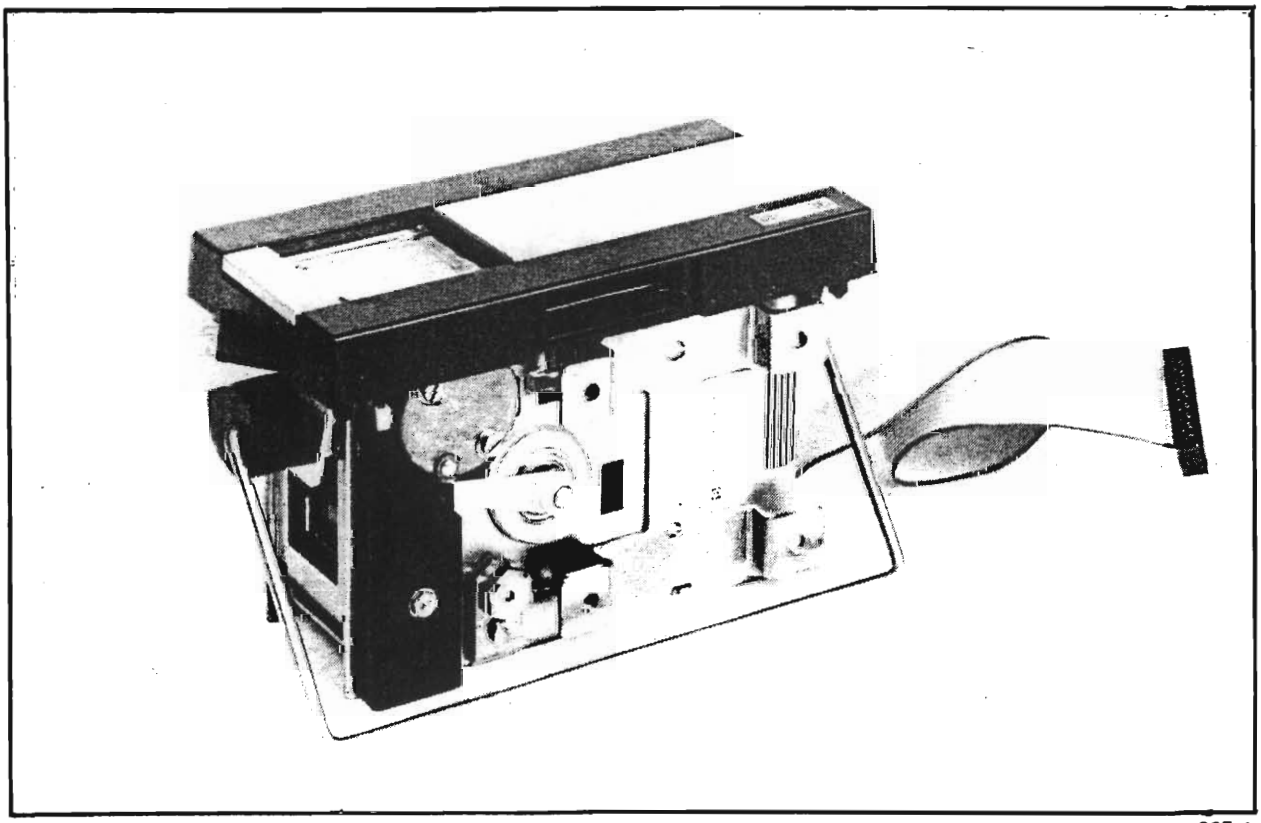
The tape is moved forwards or backwards by a sprocket wheel which is driven via an electro-magnetically activated dog clutch.

Punching (Fig. 5.2 and 5.3)

The motor drives the flywheel via a round-sectioned drive belt. The flywheel is connected to the eccentric main shaft which rides on ball bearings at both ends.

The main shaft punch eccentric is in constant engagement with the punching bridge which holds the interposers. If a punching needle is to be selected, its corresponding interposer moves forward (solenoid activated) while the punch eccentric is moving through BDC.

The interposer tip slides under the needle so that the needle follows the movement of the punching bridge, and is positively driven through the tape. The solenoid is then deenergized, and the interposer withdrawn by a spring as soon as it is free. The needle is positively pulled down by the extractor (see also Section *Selector Box*, page 5-7).



367-1

Fig. 5.1 GNT 36 Tape Punch

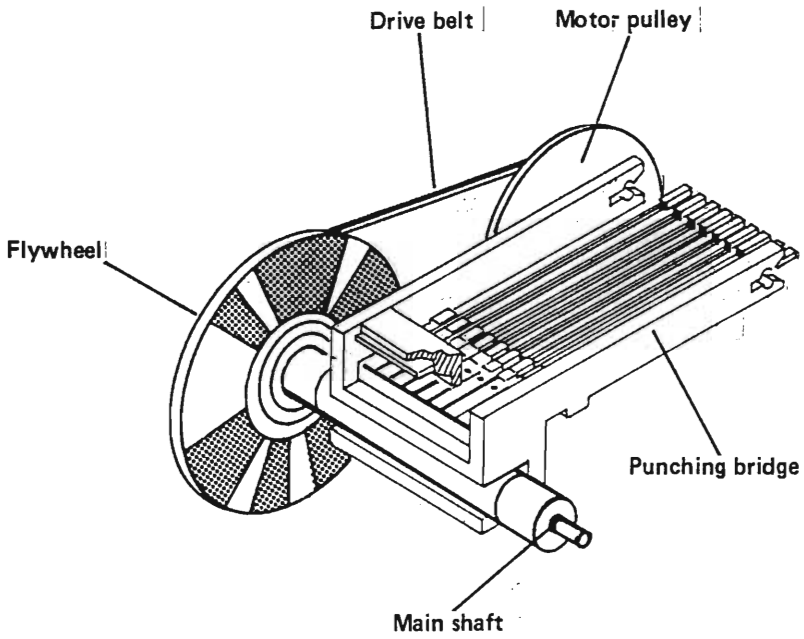


Fig. 5.2 Punching mechanism

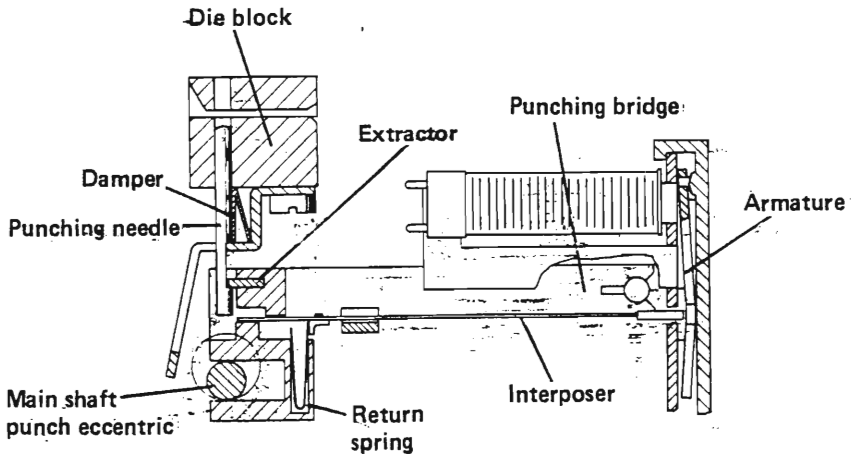


Fig. 5.3 Punching mechanism

Tape Feed (Fig. 5.4, 5.5 and 5.6)

Tape feed (forward or back) is accomplished by a sprocket wheel which engages with the tape feed holes. The sprocket wheel is fastened concentrically to a jockey wheel which ordinarily is held in position by a sprung roller arm. On the side of the jockey wheel are radial slots which form the driven part of the dog clutch.

At the end of the main shaft opposite the flywheel is a small feed eccentric. This eccentric is connected by a rod to the feed clutch housing which therefore rocks as the main shaft rotates.

Fastened inside the clutch housing is a pawl which moves back and forth across the surface of the jockey wheel, but is held out of engagement by a spring. When the tape feed solenoid is energized, the pawl engages with one of the radial slots on the jockey wheel, and the wheel rotates either forwards or backwards depending on the time moment of activation. Since the jockey wheel is a unit with the feed sprocket, the tape is moved correspondingly.

If the pawl is held engaged between 70^0 and 250^0, the tape will be advanced one pitch (see Fig. 5.6), and if it is held engaged between 250^0 and 70^0, the tape will move back (see also Fig. 5.9 and 5.10).

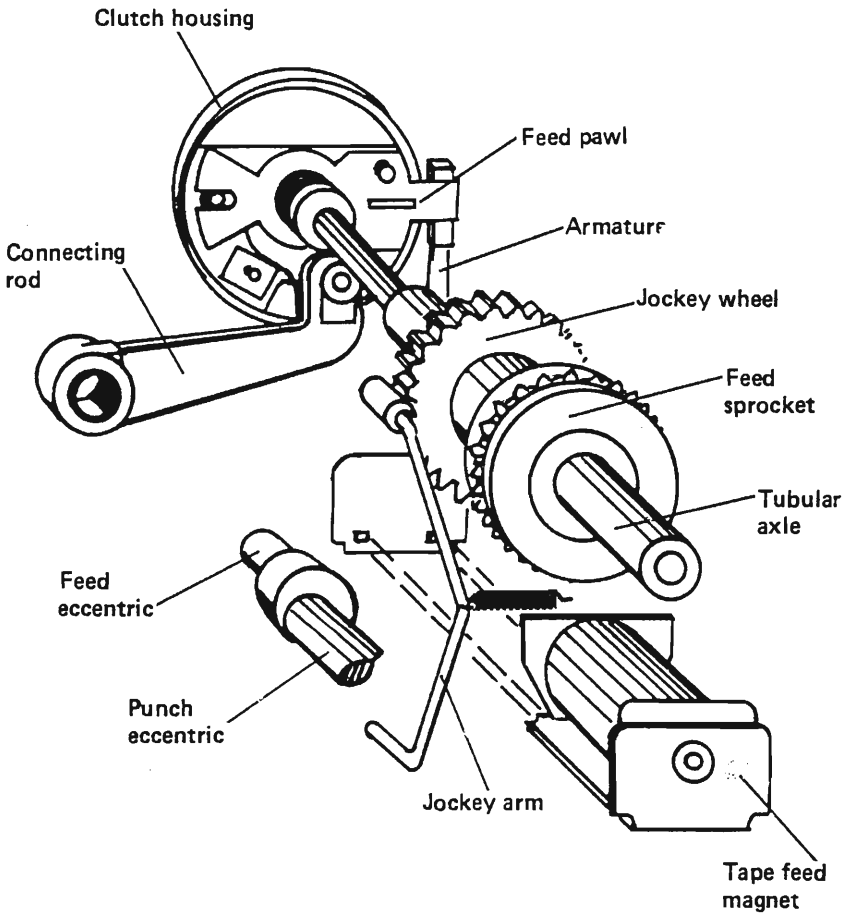


Fig. 5.4 Tape feed mechanism

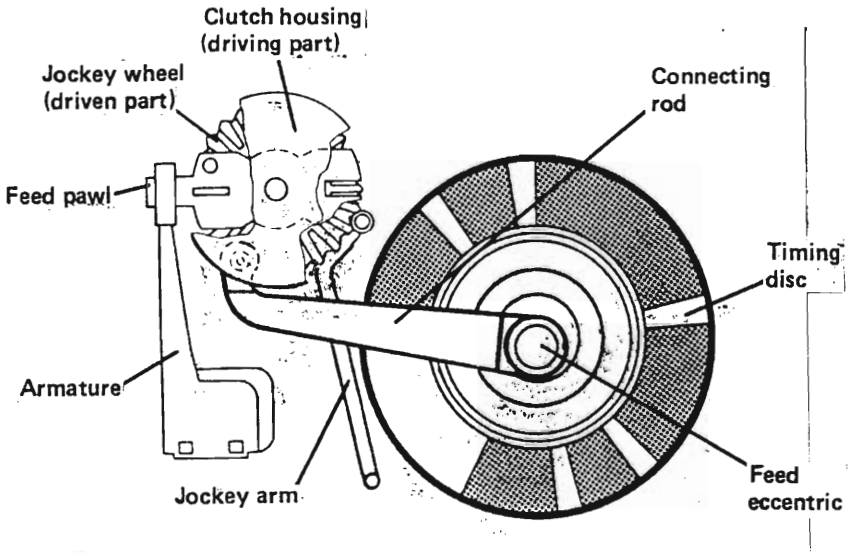
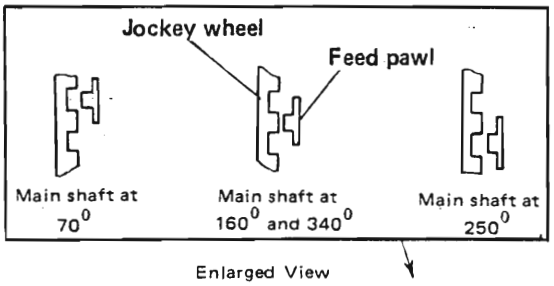
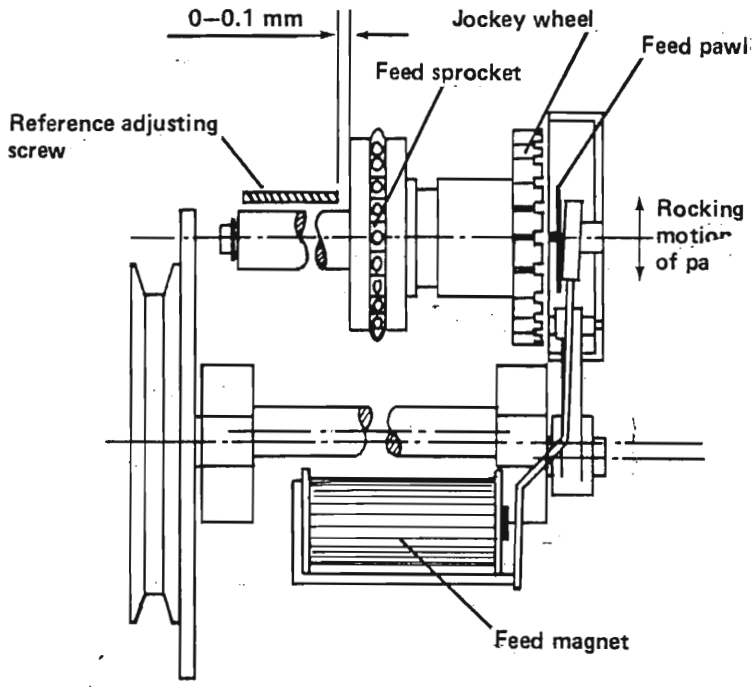


Fig. 5.6 Tape feed mechanism





Selector Box (Fig. 5.7)

The selector box houses 9 electro-magnets. When the appropriate electro-magnet is energized, the corresponding armature and interposer move forward approx. 0.9 mm. The interposer tip slides under the lower end of the punching needle so that when the punching bridge moves upward, driven by the main shaft, the needle follows the motion and pierces the tape. Those needles which have not been selected remain down.

When the downward motion of the punching bridge begins, the selector magnets have been de-energized, and the interposers are retracted by their springs. The extractor engages with the cut-outs in the needles which had been selected and withdraws the needles.

Besides the selector magnets, the selector box also contains the reflective object sensor.

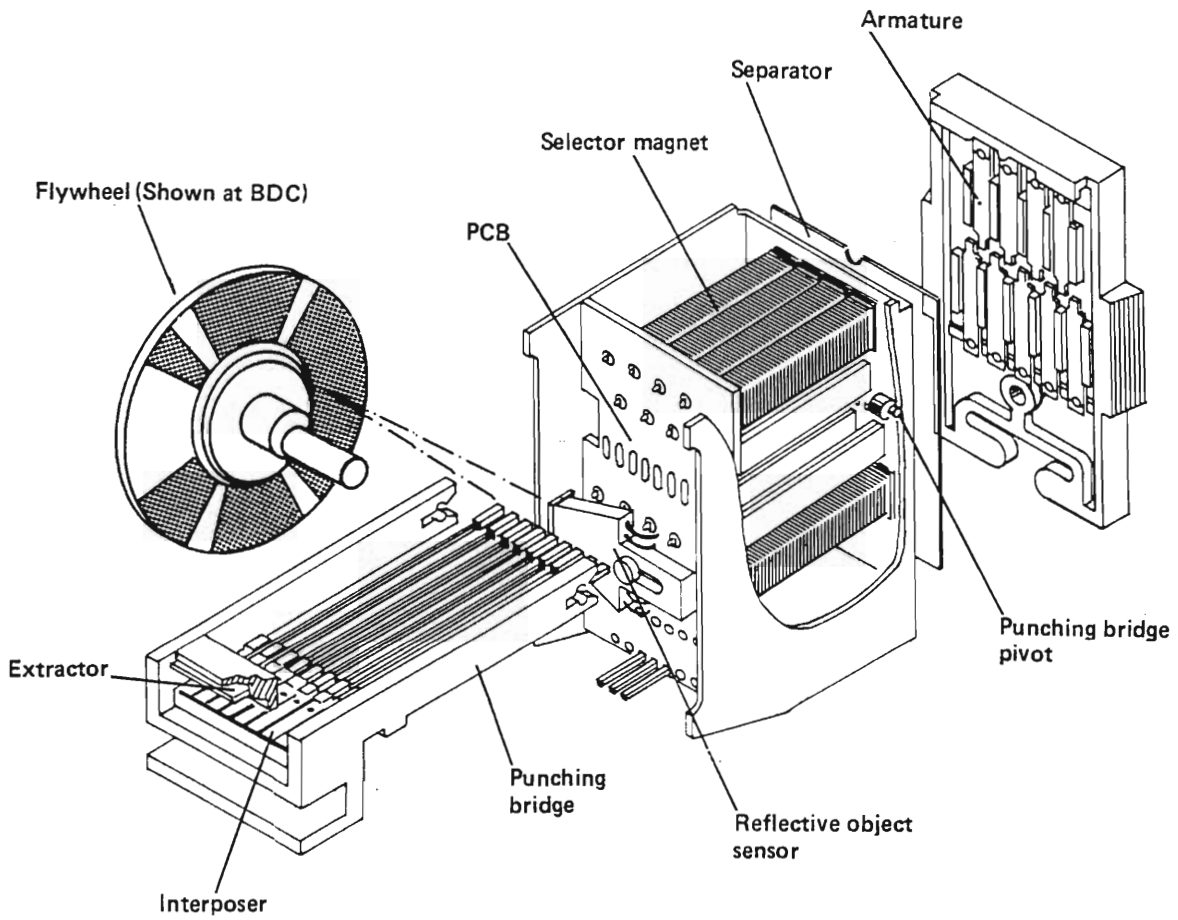


Fig. 5.7 Selector box

Punch Mechanism Timing

The mechanism is equipped with a photo-electric timing generator, the output of which is used to synchronize the data and tape feed pulses with the angular position of the shaft. The timing generator consists of a timing disc and reflective object sensor.

Fig. 5.8 shows the timing disc, which is on the back of the main shaft flywheel. Data signals to the selector box are applied throughout zones 5, 0 and 1.

Feed forward occurs after data selection in zones 3, 4, 5 and 0. Back-space is 180^0 out of phase with feed forward and therefore occurs in zones 0, 1, 2 and 3.

The waveforms for the photo sensor output and magnet pulses are shown in Fig. 5.9. Note that 0^0 in the mechanical cycle is defined when the main shaft's punch eccentric is at TDC (top dead center).

If all mechanical movements were instantaneous upon initiation of a control signal, the correct time for energizing the selector magnets would be at 180^0, and the correct time for de-energizing them would be at 0^0.

However, since the selector magnets have an activation time of approx. 3.7 ms, the selector pulse is applied at 80^0. The interposers will thus have moved forward by the time the main shaft has reached 180^0 (at a shaft speed of 4500 rmp, corresponding to 75 char./s).

The selector pulse is removed at 260^0, but since the release time is approx. 2 ms, the interposers remain activated until the needles have pierced the tape.

The tape feed magnet has an actuation time of approx. 4 ms. The feed magnet is energized at 285^0, the pawl is therefore engaged at the correct point, and the forward motion begins.

The forward step is not complete until 250^0, but the pulse is removed at 195^0, thereby allowing for the release time and ensuring that tape movement and punching do not occur simultaneously.

A similar discussion applies to the back-space pulse, except that this is energized at 105^0 and removed at 15^0.

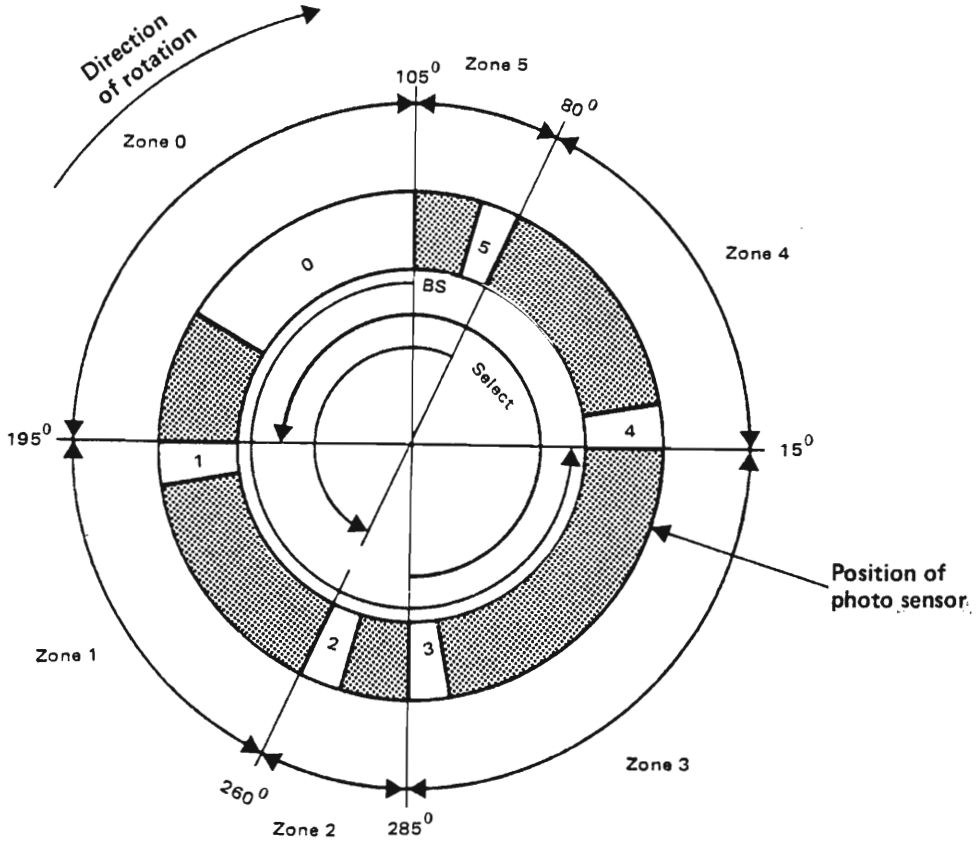


Fig. 5.8 Timing disc, 75 char./s

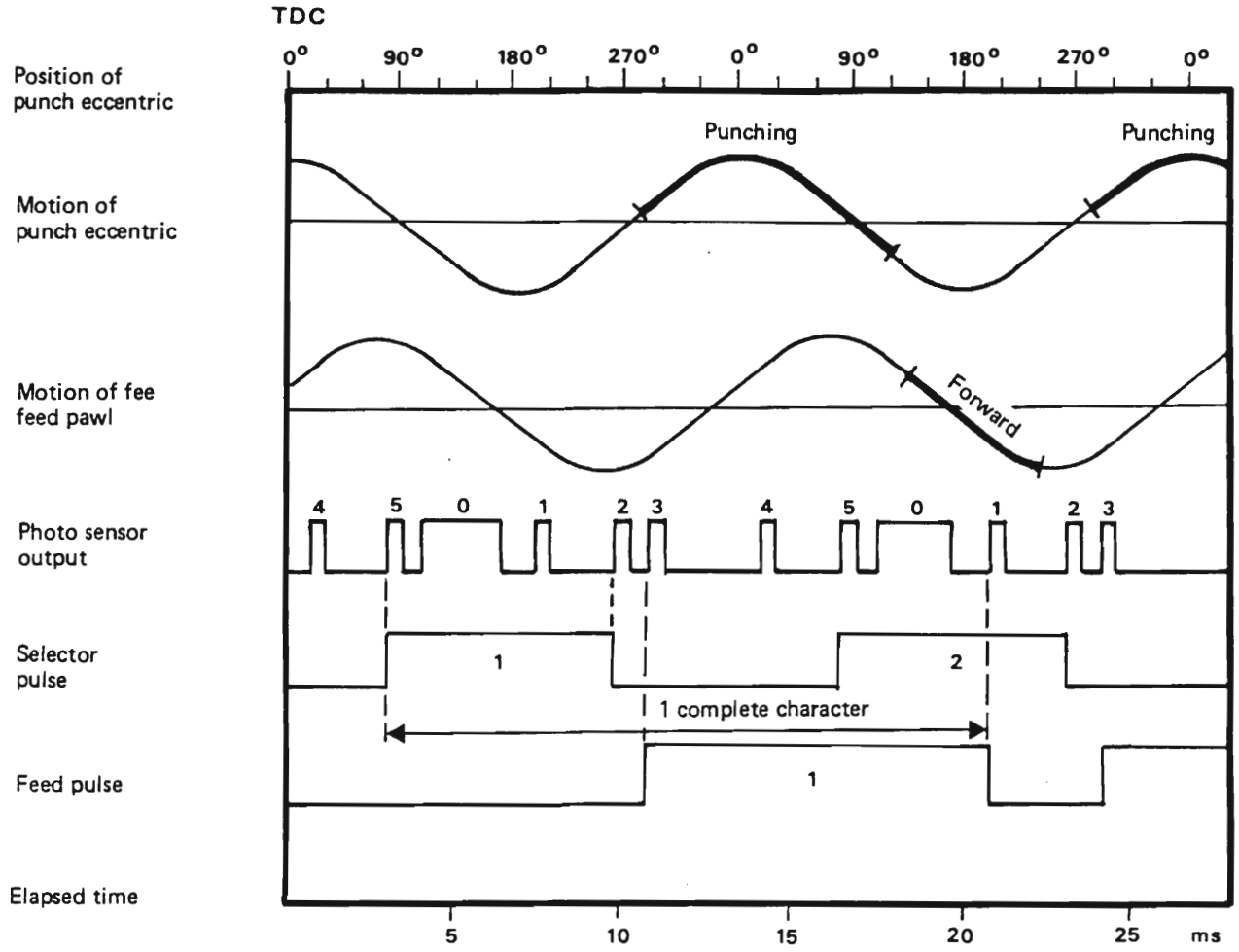
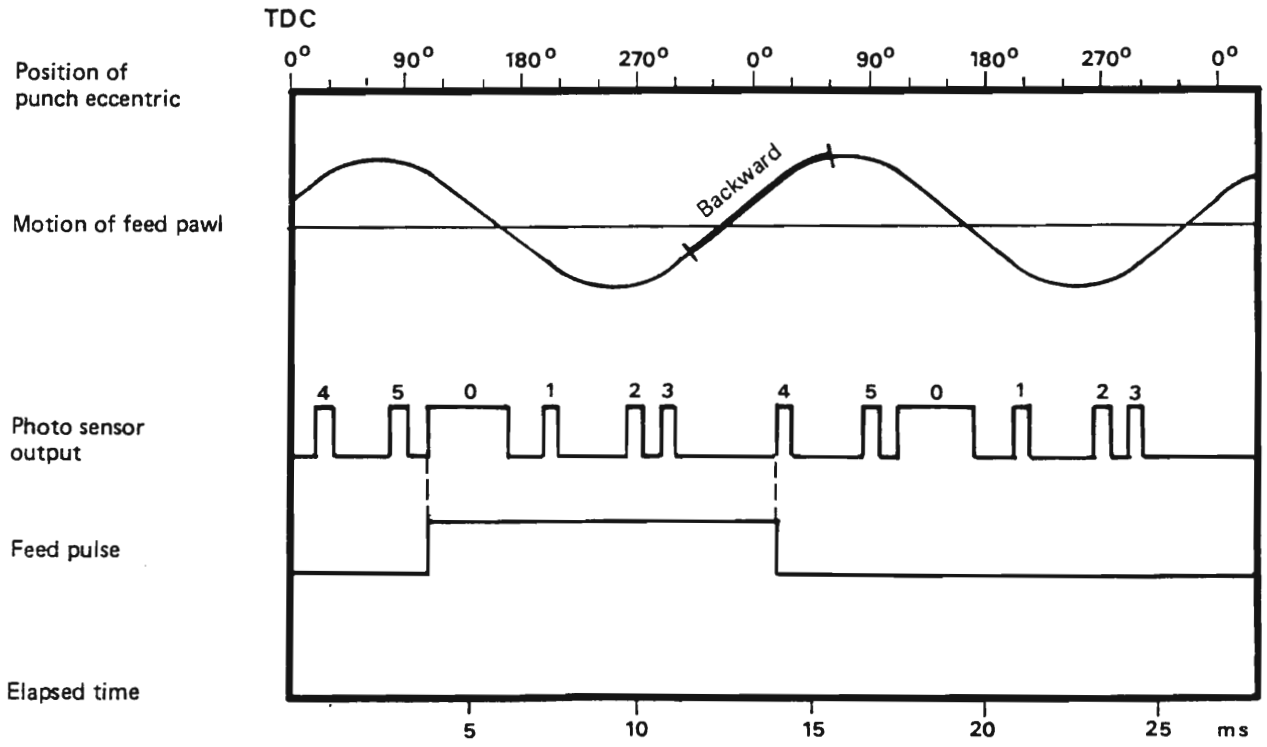


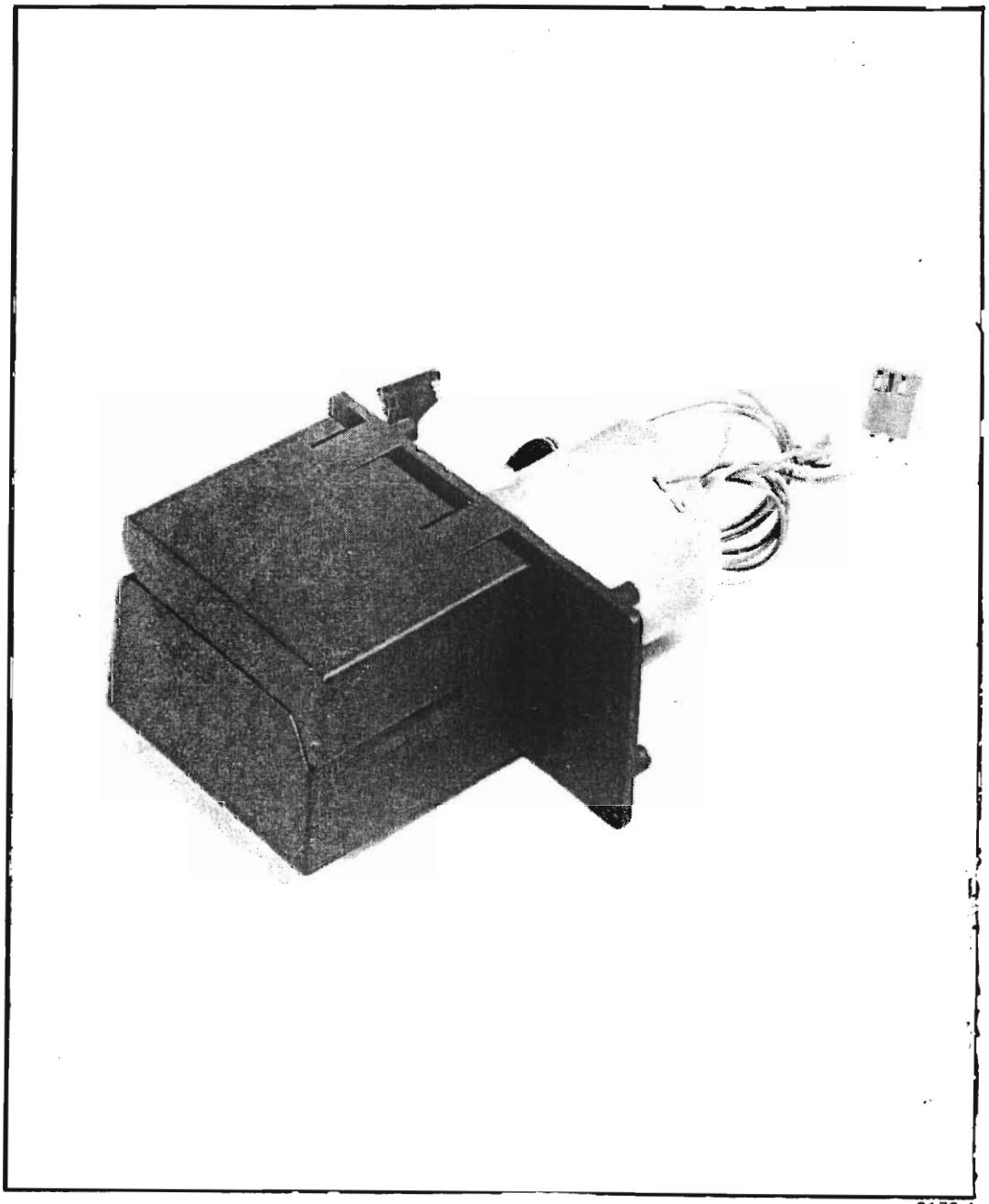
Fig. 5.9 Timing diagram, forward step



5.1.3 Technical Description of GNT 29 Tape Reader

5.1.3.1 GENERAL

The GNT 29 is an optical paper tape reader. Tape is drawn through the reader by a sprocket wheel driven by a D.C. motor. Light is supplied by 10 infrared LED's mounted in the reader's lid. The transmitted light is converted to TTL-compatible signals by 11 photo-transistors and associated comparators.



2172-4

Fig. 5.11 GNT 29 Tape Reader

5.2 Diagrams

D4-KDVK-12000	Wiring diagram GNT 4604/01 with GNT 29 Tape Reader (Type KDVK-12xxx)
D4-KDVK-14000	Wiring diagram GNT 4604 (Type KDVK-14xxx)
D4-Z46/10801	Transformer (Type KDVK-14xxx)
D4-Z46/15350	Transformer (Type KDVK-12xxx)
D4-Z46-22000	Power Supply p.c.b. (Type KDVK-12xxx)
D4-Z46/23000	Keyboard (Type KDVK-12xxx)
D4-Z46-23001	Keyboard (Type KDVK-14xxx)
D2-Z46/21020 a.o. (sheet 1)	Interface GNT 4604 with GNT 29 tape Reader (Type KDVK-12xxx)
D2-Z46/21020 a.o. (sheet 2)	Interface GNT 4604 with GNT 29 Tape Reader (Type KDVK-12xxx)
D4-Z46/21050 a.o. (sheet 1)	Interface GNT 4604 (Type KDVK-14xxx)
D3-Z46/21050 a.o. (sheet 2)	Interface GNT 4604 (Type KDVK-14xxx)
D3-Z46/21050 a.o. (sheet 3)	Interface GNT 4604 (Type KDVK-14xxx)
D3-Z46/21050 a.o. (sheet 4)	Interface GNT 4604 (Type KDVK-14xxx)
D3-Z46/21050 a.o. (sheet 5)	Interface GNT 4604 (Type KDVK-14xxx)
D4-Z46/21050 a.o. (sheet 6)	Interface GNT 4604 (Type KDVK-14xxx)
Z46/24100	Adaptercable
D4-KDSK-161	GNT 36 Tape Punch
D4-Z46/29000	Wiring Diagram GNT 29 Tape Reader
D4-Z46/29200	Photo sensor p.c.b. GNT 29 Tape Reader
D4-Z46/29250	LED Diagram GNT 29 Tape Reader
D2-Z46/25100 (sheet 1/2)	Interface GNT 4605
D2-Z46/25100	Interface

Projection	Prl. appr.	GNT AUTOMATIC A/S	No. D4-KDVK-12000	Sheet 1
Design M	Drawn AH	Final appr. 10.2.84 MJ	Scale —	Title WIRING DIAGRAM GNT 4601-4604
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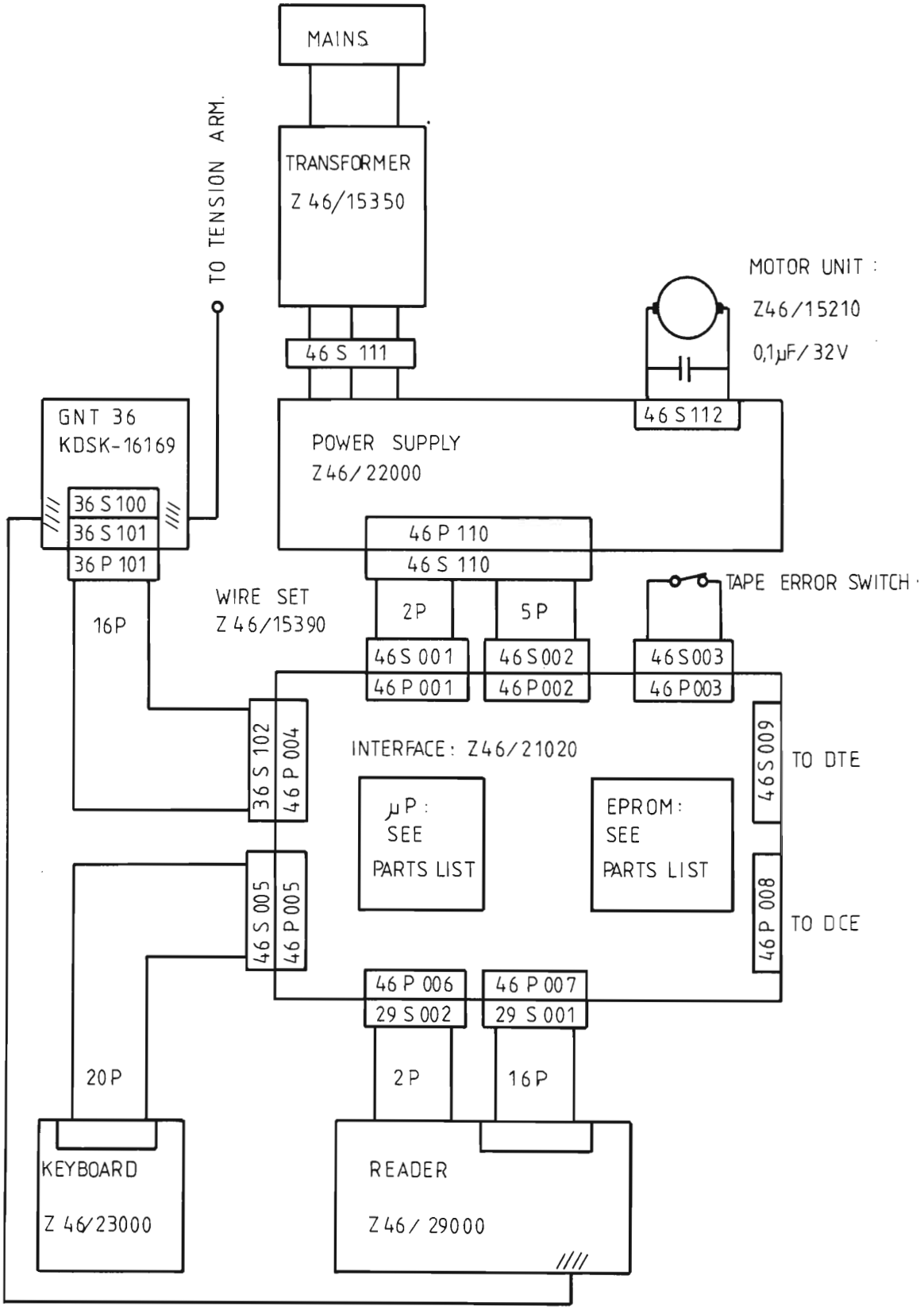
		Matr. —	Specf. —	
		Dim. —	Treatment —	
Part of:		Matr. no. —	Surface —	



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Design / Drawn RLS	Tol.			
Checked / Matr. check	Matr.	Specf.		
	Dim.	Treatment		
Part of:	Matr. no.	Surface		

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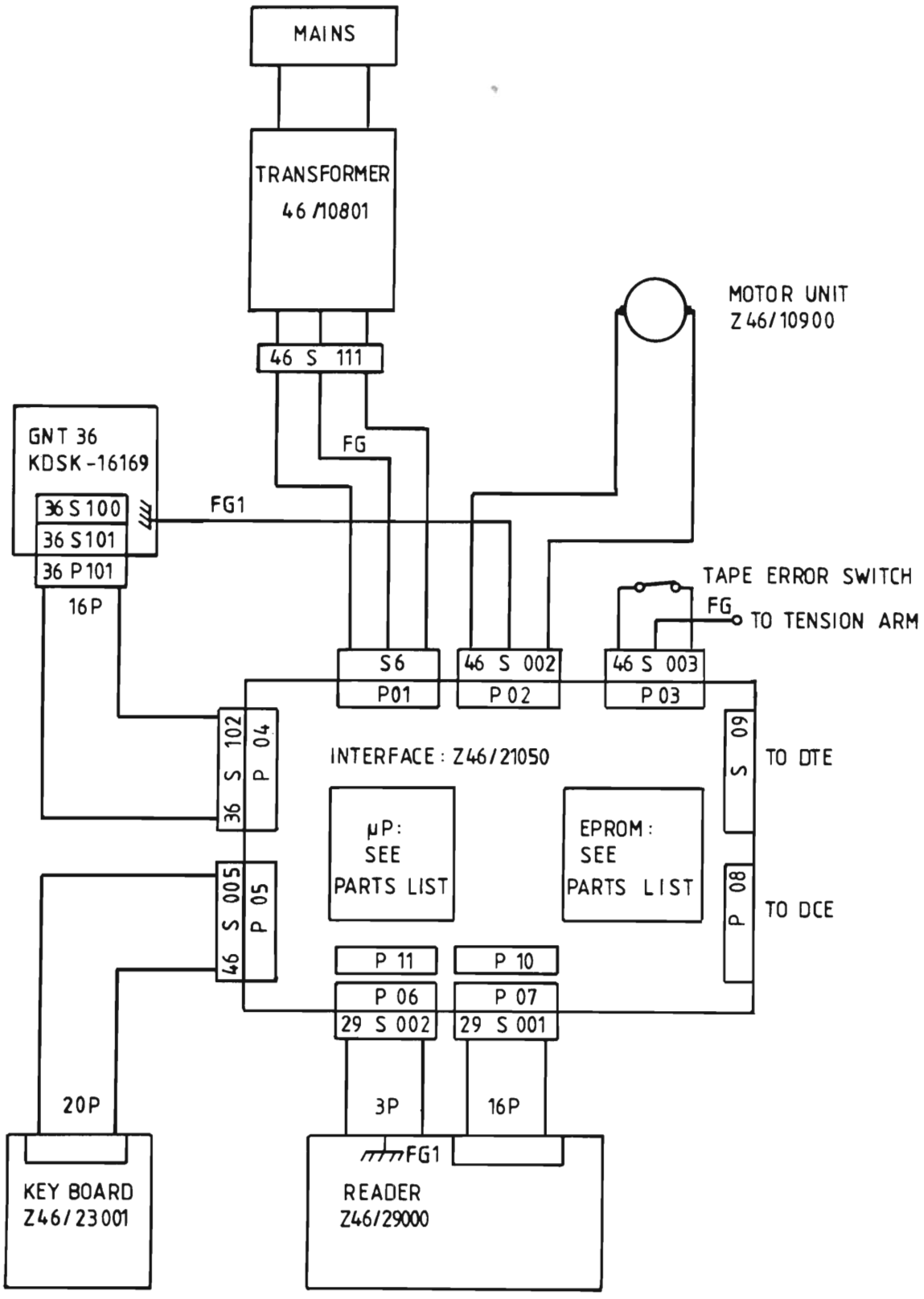

Afbildning-Projection

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Benævnelse	Transformer, diagram		Title	
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Dim —	Matr. nr —	Overfl.-Surface —		
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Tol —				

Kon: SK Tegn.: RLS 26-4-87 SK

Tegn. kontr Matr kontr.

Indgår i - Part of

KDVK-14101+
KV15-51
KV46-64

D

4550 4290 3167

Revisions

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B 90	SK 0927
C 91	0816

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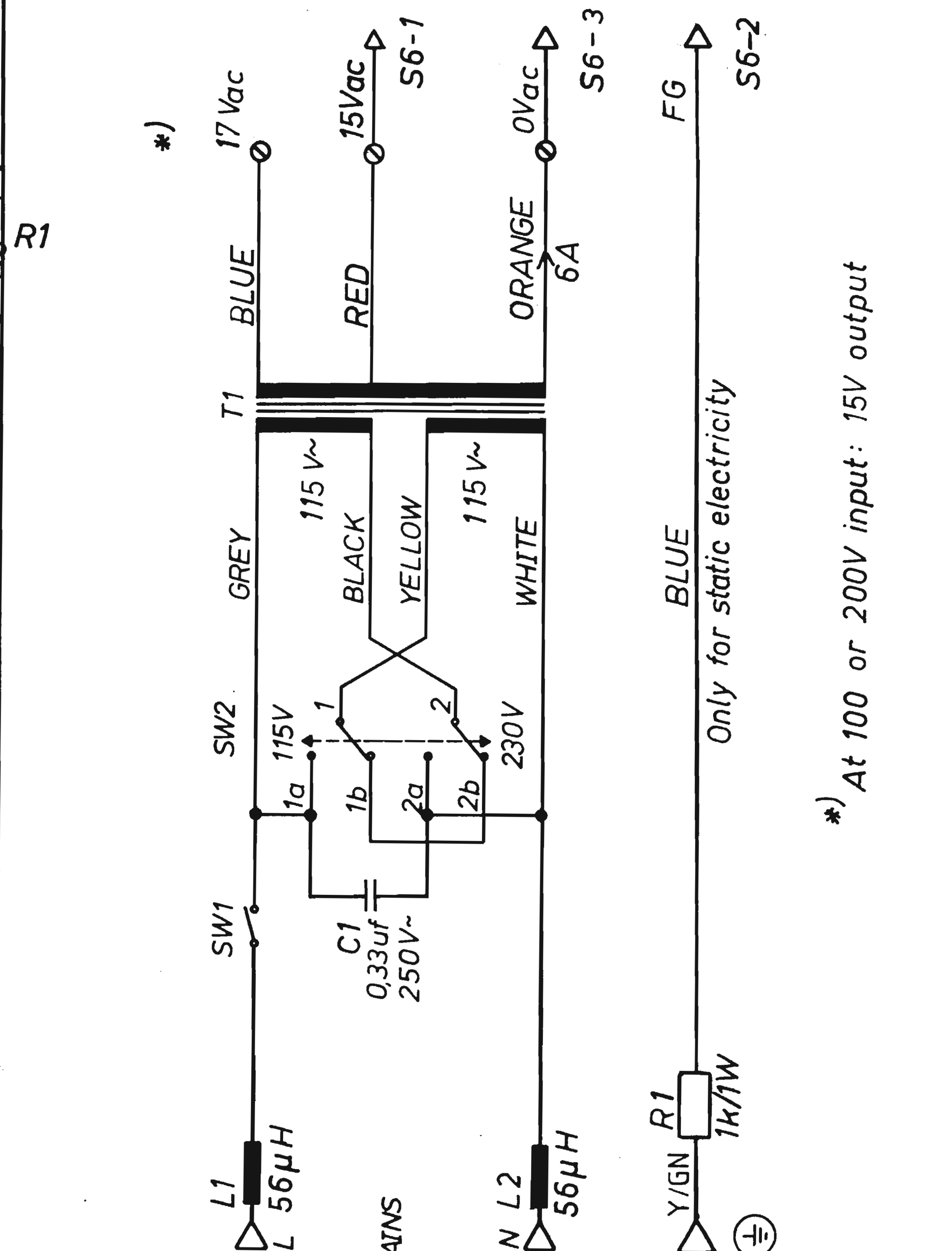

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GNT AUTOMATIC A/S
DENMARK

Nr. D4-Z46/ 15350

Sheet

12/6-84 SK

Benævnelse

Transformer unit

Title

Tegn. godk. 18/11-86 SK

Konstr. | Tegn. GHJ

Tegn. kontr. | Matr. kontr.

Matr. —	Kval. —	Beh.-Treatment —
Dim. —	Matr. nr. —	Overfl.-Surface —
Tegn. regler Drg. rules	Scale —	
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Revisions

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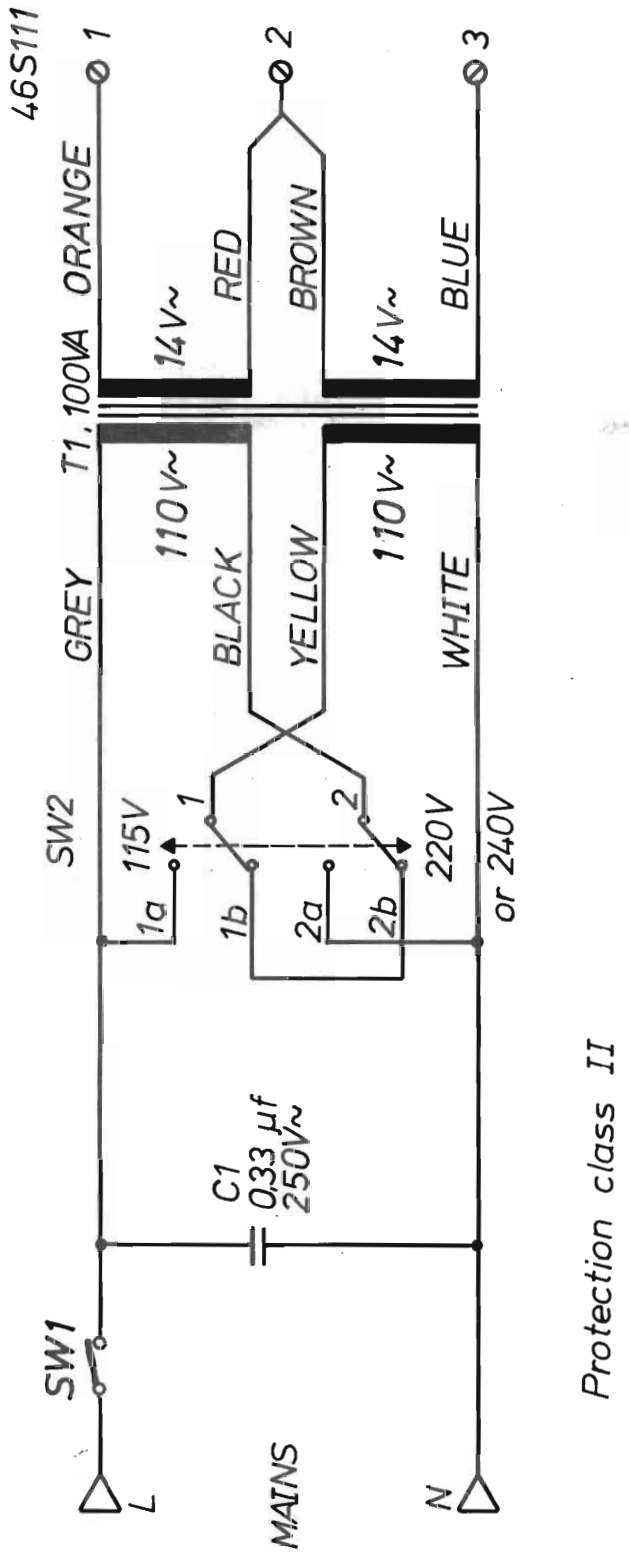

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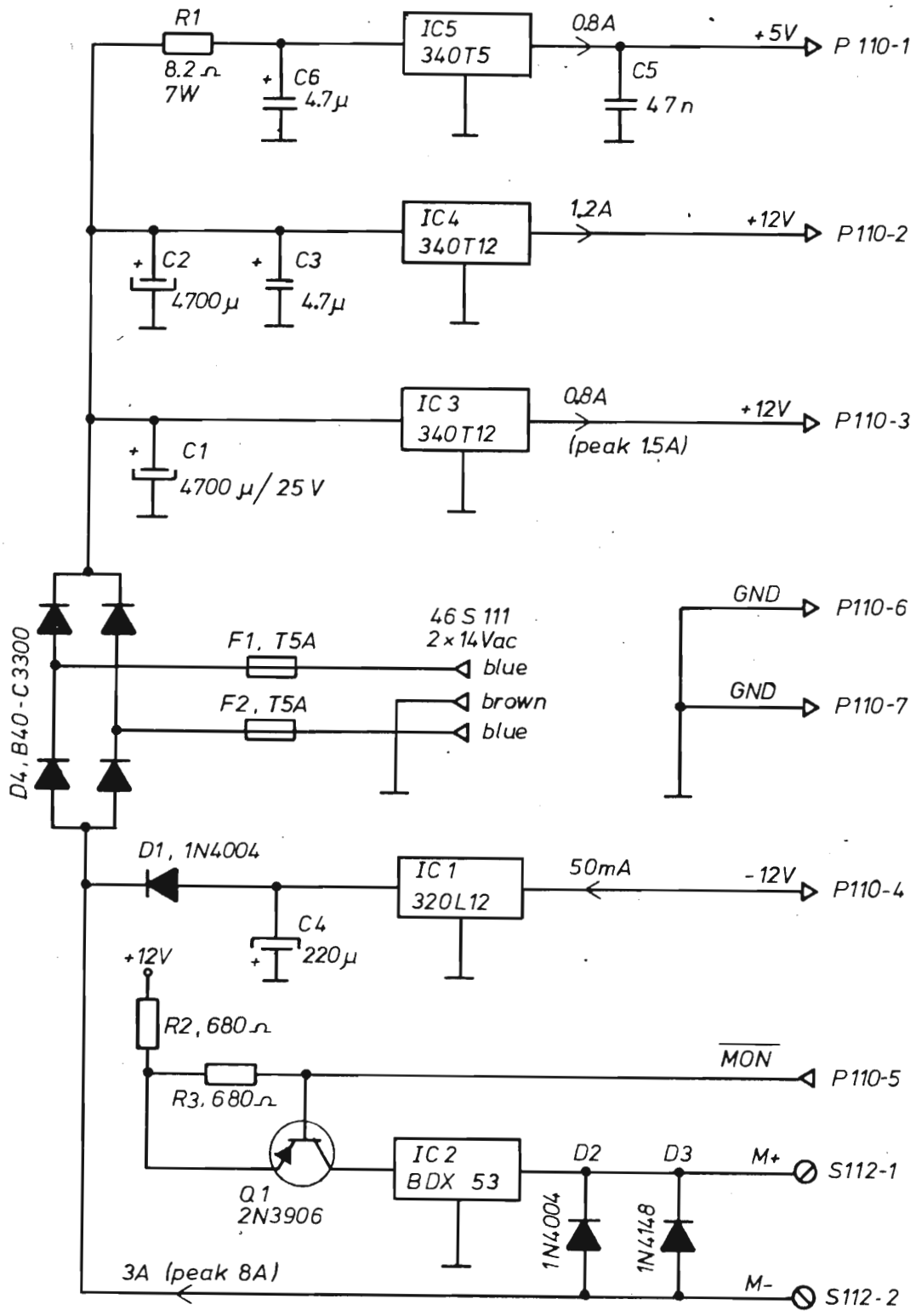

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GNT AUTOMATIC A/S

Scale —

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Sheet

Title Tastatur. Keyboard

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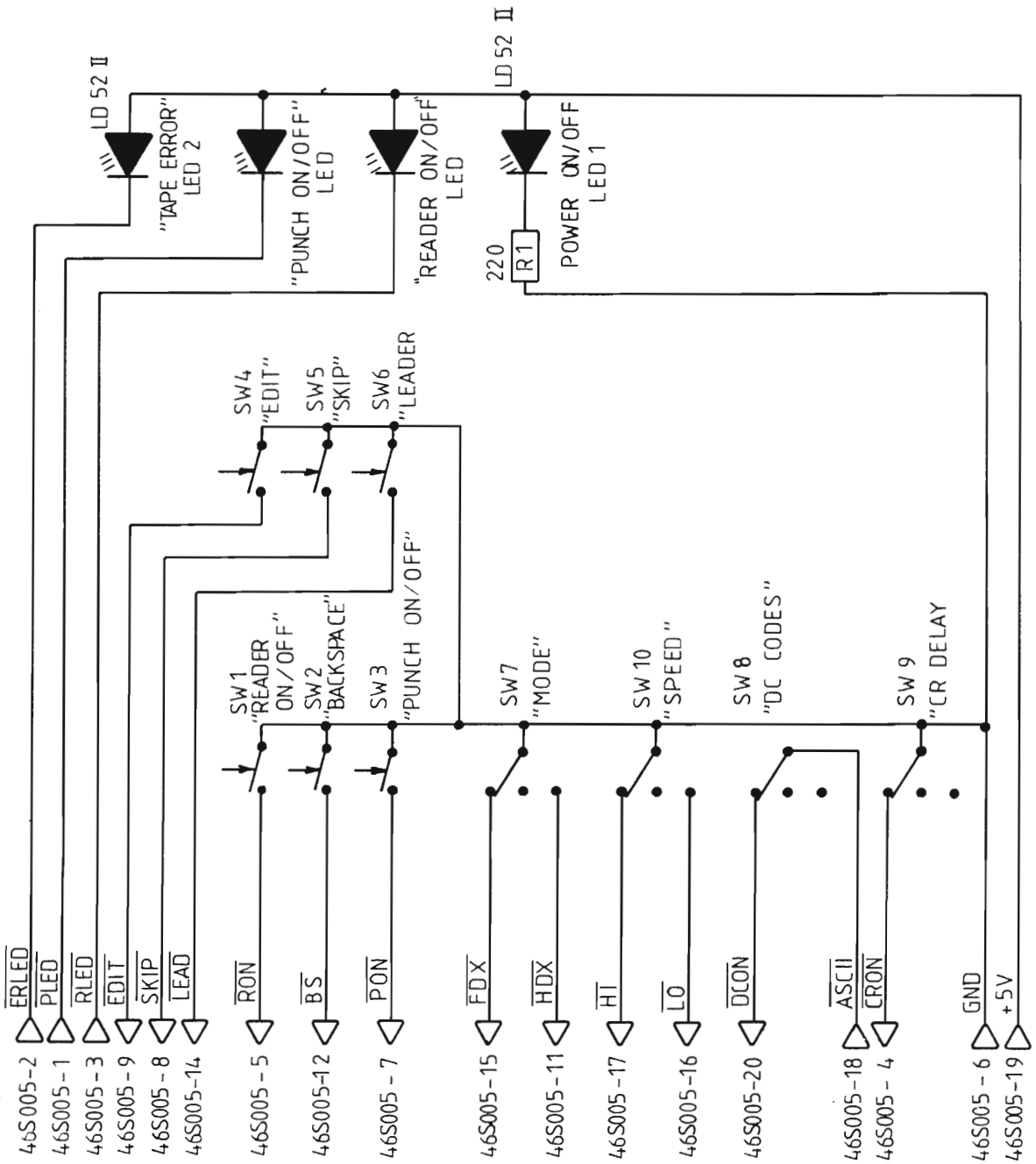

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Part of:		Tol	

No. D 4 - Z46/23001 — Sheet

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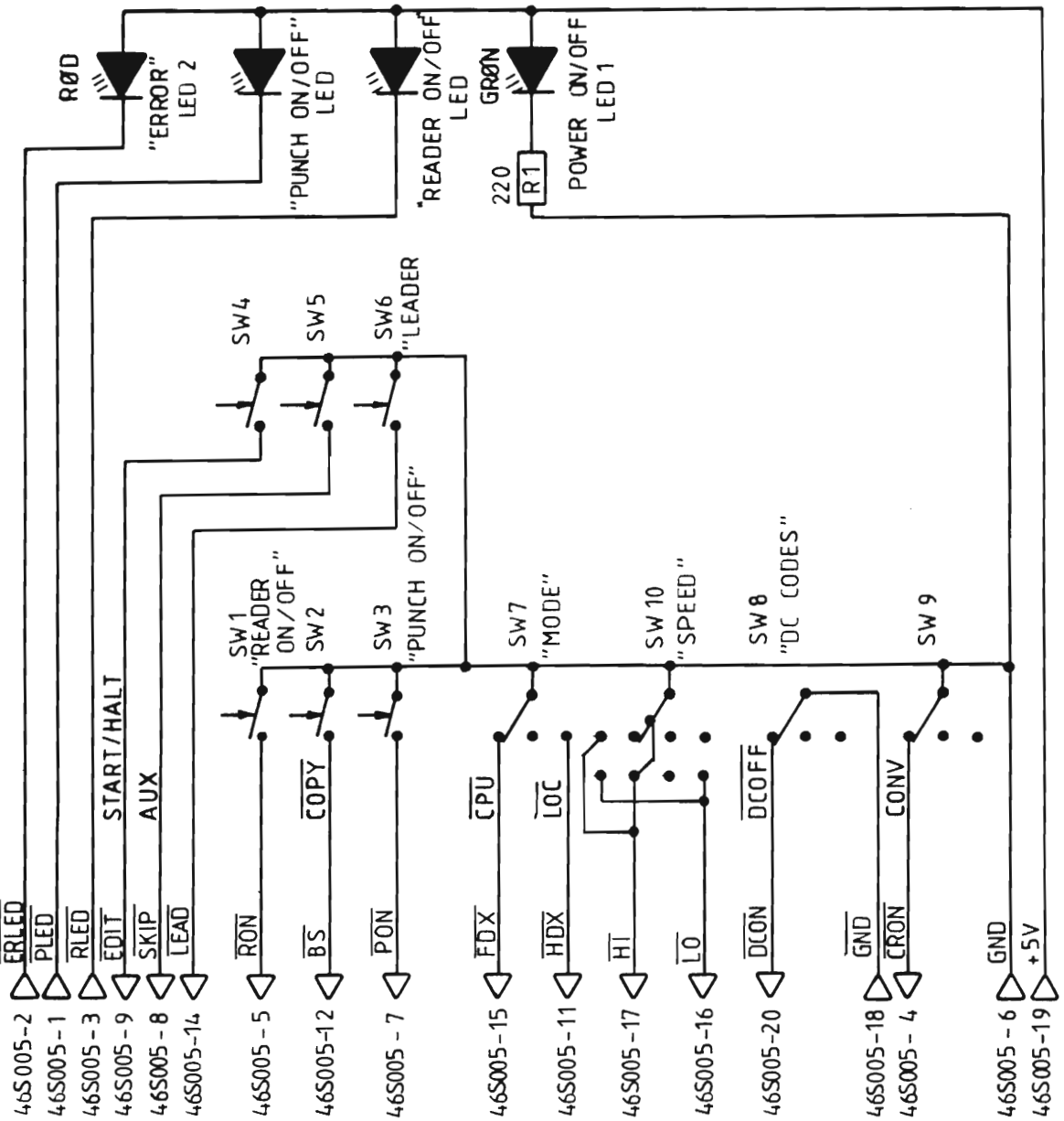

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870923	

46S009-2 TD
-3 RD
-4 RTS
-5 CTS
-6 DSR
-20 DTR
CPU
+5V
V+
V-
IC 17
IC 8
IC 7
IC 27
IC 15
IC 2
IC 3.1
IC 3.2
IC 3.3
IC 3.4
IC 5.1
IC 5.2
IC 5.3
IC 5.5
IC 5.6
IC 33.1
IC 33.2
IC 33.3
IC 33.4
IC 33.5
IC 34.1
IC 34.2
IC 34.3
IC 35.1
IC 35.2
IC 35.3
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IC 36.2
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IC 37.2
IC 37.3
IC 37.4
IC 38.1
IC 38.2
IC 38.3
IC 39.1
IC 39.2
IC 39.3
IC 40
IC 41
Q3
D10
D11
D4
D5
D6
D7
SW1
K2
46P008-20 DTR
-6 DSR
-5 CTS
-4 RTS
-3 RD
-2 TD
46P008-18 Rx+
46S009-18
46P008-13 Rx-
46S009-13
46P008-9 Tx+
46S009-9
46P008-7 Tx-
46S009-7
46P008-7, 46S009-7 SG
46P008-25, 46S009-25 V+
46P008-1, 46S009-1 PG
46P003-1
46P006-2
46P111-1
46P005-18
GND
+5V (+5V)
VB
V+ (+12V)
V- (-12V)
VM (+12V)
46P032-4
46P001-1
SPROCKET
WR
RD
ERROR
READY
PUNCH
BS
LEDON
MR
A0
A1
A6
A7
DB0
BUS
DB7
RESET
SLRES
RLED
PLED
ERLED
MR

GNT	Nr.	R34	R36
4604	Z46/21020	Pos.a	Pos.a
4601	Z46/21030	Pos.b	Pos.b
4601A	Z46 21040	Pos.b	Pos.b

GNT AUTOMATIC A/S
DENMARK

Interface

D2-Z46/21020+

Sheet 1

1 2 3 4 5 6 7 8

Projection

Tegn. GHJ

Matr kontr.

1 of

2101 m.fl.

Revisions		
A	MIJ	
84	08 13	

Other editions

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Replaces

LED 46P007 - 10

Q1 Q2 R15 330 R16 1k R1 4k7

+5V LOC CPU LO HT RNORM BS EDIT SKIP PON RON PNORM

46P005 -11 -15 -16 -17 -20 -12 -9 -8 -7 -5 -4

46P007 -8 -7 -6 -5 -4 -3 -2 -1

IC 28 PB7 PB6 PB5 PB4 PB3 PB2 PB1 PB0 PC2 PC1 PC0 PA7 PA0 PC5 PC4 PC7 PC6

IC24.2 470 R37 820 R31 IC 19 820 R32 IC 20 470 R38 IC24.5

MO1 46P006 - 1

MO2 46P006 - 3 FH 46P007 - 16 46P007 - 15 46P007 - 12 SPROCKET 46P007 - 13

FHB FHC IC23.1 IC23.2 +5V

CH8 46P004 - 9 CH7 -8 CH6 -10 CH5 -7 CH4 -12 CH3 -16 CH2 -1 VM -5-6-11

IC 9 GND

IC 18.1 IC 18.2 IC 11.2 IC 11.1 IC 18.3 IC 18.4 IC 11.3

CH1 46P004 -2 FH -3 FMAG -4 MON 46P002 -2 RLED 46P005 -3 PLED -1 ERLED -2

D1 D2 D3

IC 1 GND +5V

IC 10.2 IC 10.3 IC 11.4 IC 10.1 IC5.2

C7 D8 D9

CPU WR RD ERROR READY PUNCH BS LEDON MR A0 A1 A6 A7

IC 30,1 1,4,10,13 IC, 4C IC 27 3Y 4Y 1Y 3A 4A 1A

IC5.1

DB0 BUS DB7

RESET SLRES

IC 30.2

IC 29 D1 D2 D3 D4 D5 D6 D7 D8 Q8 Q7 Q6 Q5 Q4 Q3 Q2 Q1 CLOCK OC GND Vcc

K1 C10 C9

8048/8749 XTAL2 XTAL1 RD RESET INT P12 P23 P25 P10 P17 DB7 DB0 P16 P15 P13 T0 T1 EA Vss Vdd Vcc P20 P22 P21 P27 P26

IC14 IC12 IC14 IC14 IC6 SW1 1k R13 1k R12

TP TE FAD 46P0

RLED PLED ERLED MR

GNT AUTOMATIC A S DENMARK

84061414 Benævnelse: Interface

Title

Tegn. godt

Matr — Kval — Beh. Treatment —

Dim — Mat. gr. — Overfl. Surface —

Tegn. regler Drg. rules — Scale — Term. gr. — Nr. D2-Z46/21020

Tol. —

1 2 3 4 5 6 7 8

Sh 2

Sh 5

Sh 6

Master CPU U15-16-31

UART U17

Logic U5-7-8-30-35-36-37

Driver/Receiver U34-35-38-39-40

P08 Seriel I/O

Logic/Driver U1-2

P05 LED

Driver/Receiver U34-35-40

S09 Seriel I/O

Sh 3

Sh 4

Slave CPU U13

Latch U29

I/O U28

P05 Key Board

P07 Reader Character

Latch U42

S09 Parallel Punch Input

Driver U19

P06 Reader Motor

Driver U1-9

P04 Punch Character

Logic U23-27

P07 Reader Feed Holes

Power Supply U43-45-46-47

+12V

+ 8V

+ 5V

-12V

P01

AC from Transformer

Driver U44

P02 Punch Motor

Sheet	1	2	3	4	5	6
Rev.	B	B	B	A	B	B

GN Telematic

Title: Interface for GNT 4601/04 Overview

Prm. appr.

Final appr. 890216 JJa

Matr.

Specf.

Dim.

Treatment

Matr. no.

Surface

Scale

Tol.

No. D3-Z46-21050+

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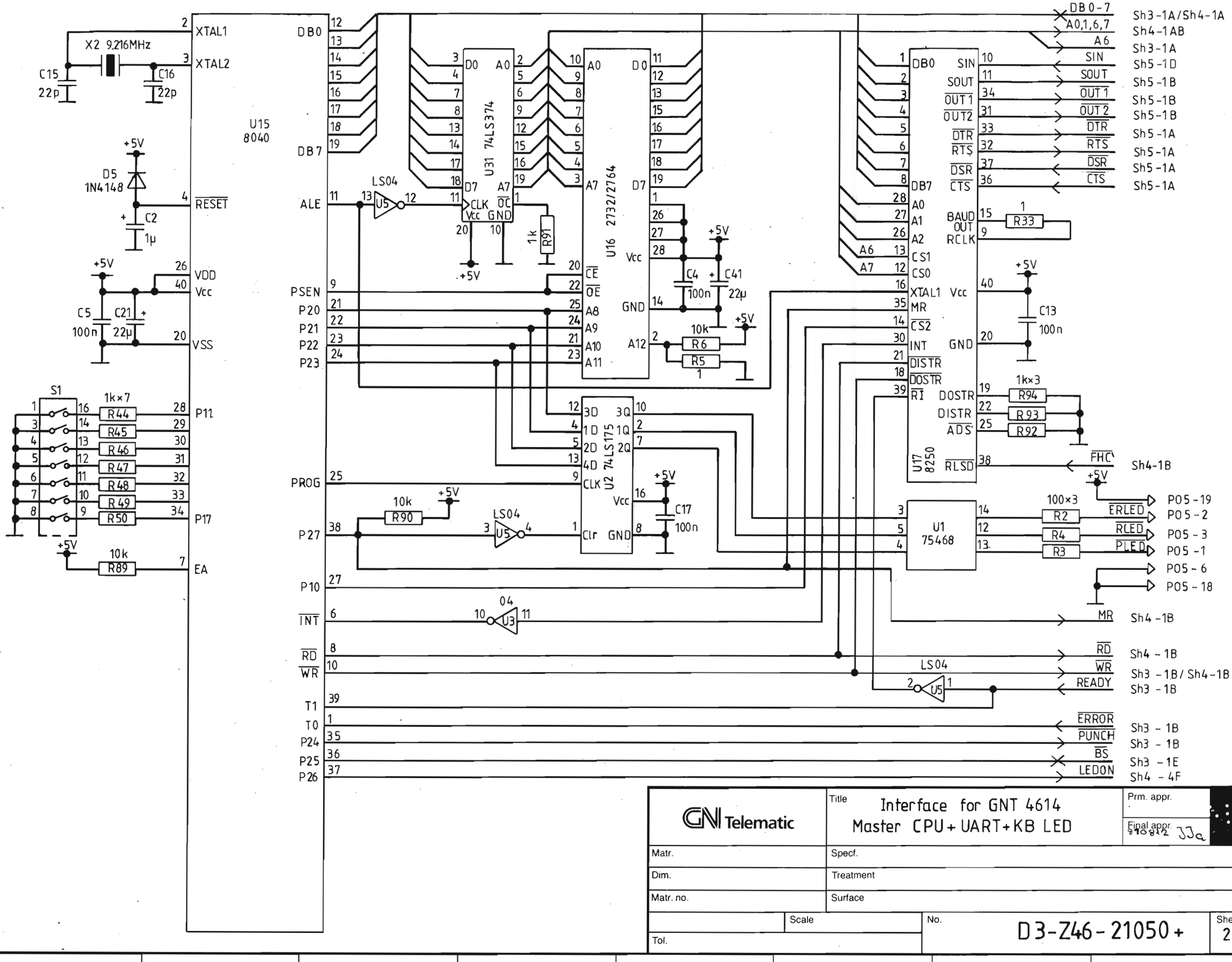
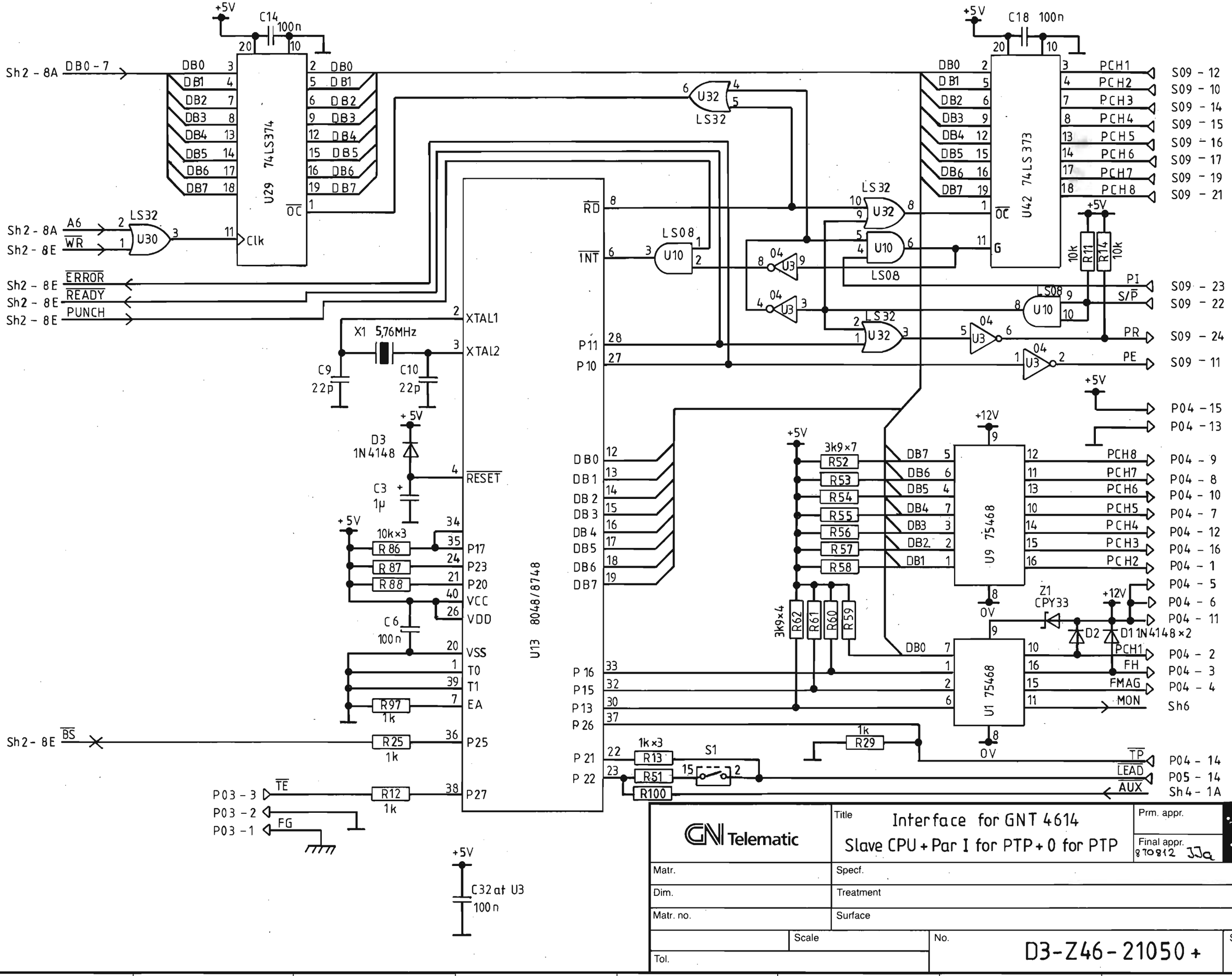


GN Telematic	Title: Interface for GNT 4614 Master CPU+UART+KB LED	Prm. appr. Final appr. 8/08/12 JJa
Matr.	Specf.	
Dim.	Treatment	
Matr. no.	Surface	
Scale	No. D3-Z46-21050+	Sheet 2
Tol.		



GN Telematic	Title: Interface for GNT 4614 Slave CPU + Par I for PTP + 0 for PTP	Prm. appr.	
		Final appr. 870812 JJa	
Matr.	Specf.		
Dim.	Treatment		
Matr. no.	Surface		
	Scale	No. D3-Z46-21050 +	Sheet 3
Tol.			

Sh5-1E $\overline{CPU}$
Sh3-8E $\overline{AUX}$
Sh2-8A DB0-7
Sh2-8A A0
Sh2-8A A1
Sh2-8A A7
Sh2-8D $\overline{MR}$
Sh2-8E $\overline{WR}$
Sh2-8E $\overline{RD}$
Sh2-8C $\overline{FHC}$

U28 8255A

34	D0	PB7 25	$\overline{LOC}$ P05-11
33	D1	PB6 24	$\overline{CPU}$ P05-15
32	D2	PB5 23	$\overline{LO}$ P05-16
31	D3	PB4 22	$\overline{HI}$ P05-17
30	D4	PB3 21	$\overline{DC\ OFF}$ P05-20
29	D5	PB2 20	$\overline{COPY}$ P05-12
28	D6	PB1 19	S/H P05-9
27	D7	PB0 18	$\overline{AUX}$ P05-8
9	A0	PC2 16	$\overline{PON}$ P05-7
8	A1	PC1 15	$\overline{RON}$ P05-5
6	$\overline{CS}$	PC0 14	$\overline{CON\ OFF}$ P05-4
35	RES	PA7 37	RCH8 P07-8
36	$\overline{WR}$	PA6 38	RCH7 P07-7
5	$\overline{RD}$	PA5 39	RCH6 P07-6
10	PC7	PA4 40	RCH5 P07-5
11	PC6	PA3 1	RCH4 P07-4
12	PC5	PA2 2	RCH3 P07-3
13	PC4	PA1 3	RCH2 P07-2
26	Vcc	PA0 4	RCH1 P07-1
7	GND		

+5V, 10k×19
R63 R64 R65 R66 R67 R68 R69 R70 R71 R72 R73 R74 R75 R76 R77 R78 R79 R80 R81

C12 100n

C20 at U23 100n

U27 LS 125A: Vcc 14, GND 7
DB0 3, DB1 11, DB3 8
1Y 4Y 3Y 1C 2C 3C 4C
1A 4A 3A
2 12 9 1 4 10 13

LS32 U30: A6 Sh2-8A, 4 5 6

U23 LS74 (clk, clr, Pr, D, Q): 12 11 10 9 13
U23 LS74 (clk, clr, Pr, D, Q): 2 3 4 5 1
LS14 U33: 13 12, 11 10

P07-11 REF
P10-4 REF
P07-14 FHA
P10-1 FHA
P07-16 FHA
P10-2 FHB
P07-15 FHB
P10-3 FHC
P07-12 FHC
P07-13 $\overline{FHC}$
P10-6
P07-9

10k R82, 100 R43, 1n C48
10k R83, 100 R40, 1n C49
10k R85, 100 R41, 1n C51

P06-3 M02
P06-1 M01
P06-2 FG1
Sh6 FG1
P11-3
P11-2 FG1
P11-1

U19 L272: 2 1 7 8, 3 6 5 4,9-16
+8V, +5V, 0V
10k R30, 1k R31, 3k9 R32
1k R39, 10k R37, 3k9 R38
C46 1µ, C47 1µ
100 R99

Q1 BC327: +12V, 1k R16, 560 R15
Q2 BC547A: 4k7 R1, LS04 U5 8 9
$\overline{LEDON}$ Sh2-8E

P07-10 LED
P10-5 LED

GN Telematic	Title	Interface for GNT 4614 PTR Input + KB Input	Prm. appr.
			Final appr. 870812 JJa
Matr.	Specf.		
Dim.	Treatment		
Matr. no.	Surface		
	Scale	No. D3-Z46-21050+	Sheet 4
Tol.			

A B C D E F

1 2 3 4 5 6 7 8

Sh2-8B CTS
Sh2-8A DTR
Sh2-8B DSR
Sh2-8A RTS

Sh2-8A OUT1
Sh2-8A OUT2
Sh2-8A SOUT

Sh2-8A SIN

Sh4-1A CPU

U8 LS153: ASEL, BSEL, 2C0, 2C2, 1C0, 1C2, 1C3, 1G, 2G, Vcc, GND, 1C1, 2C1, 1Y, 2Y, 2C3
U7 LS153: ASEL, BSEL, 2C0, 2C1, 1C1, 2Y, 1C0, 1C2, 1C3, 2C2, 2C3, 1Y, 1G, 2G, Vcc, GND

LS14 U33 · 560 R35 · C42 10n · LS14 U33
LS04 U5
LS14 U33 · 560 R18 · C27 10n · LS14 U33

LS32 U30 · LS08 U36 · 1488 U34 · CTS · C25 220p · +5V · 10k R27
LS08 U36 · 9637 U39 · CTS · CTS' · 10k R7
LS32 U37 · LS32 U37 · 1488 U34 · DTR · C35 220p · DTR' · DTR
LS32 U37 · 1* R103 · 4k7 R17 · +5V · 1489 U35 · C30 220p
LS08 U36 · 1488 U34 · DSR · C26 220p
LS04 U5 · 1* R34 · 1* R36 · LS32 U30 · LS08 U36 · R101 1* · 1489 U35 · DSR · C36 220p · +5V · 4k7 R28
LS32 U32 · R102 1* · LS32 U37 · 9636 U38 · RTS · RTS' · R104 1* · 1489 U35 · RTS · C24 220p
1489 U35 · TD · C29 220p
1488 U34 · RD · C31 220p
+5V · 10k R22 · 9637 U39 · RD · RD' · 10k R8
U40 SFH600-1 · R23 100k · D4 1N4148
RX+ · RX+
RX- · RX-
100k R9 · +12V · 9636 U38 · TD · TD'
4k7 R26 · -12V · Q4 BC547A · TX+ · TX+ · TX- · TX- · SG

+5V · C28 at U36/U37 · 100n
+12V · C33 at U34 · 100n · C34 at U38 · 100n · -12V

+12V · 560 R19 · P08-25 · S09-25
560 R10 · P08-24 · -12V
10k R96 · FG · 100 R98 · Shield · P08-1 · S09-1

S09-5
P08-5 · P08-17
P08-20 · P08-19 · S09-20
S09-6
P08-6 · P08-8
P08-4 · P08-16
S09-4
S09-2
S09-3
P08-3 · P08-15
P08-18 · S09-18
P08-13 · S09-13
P08-2 · P08-14
P08-9 · P09-9 · P08-7 · P09-7

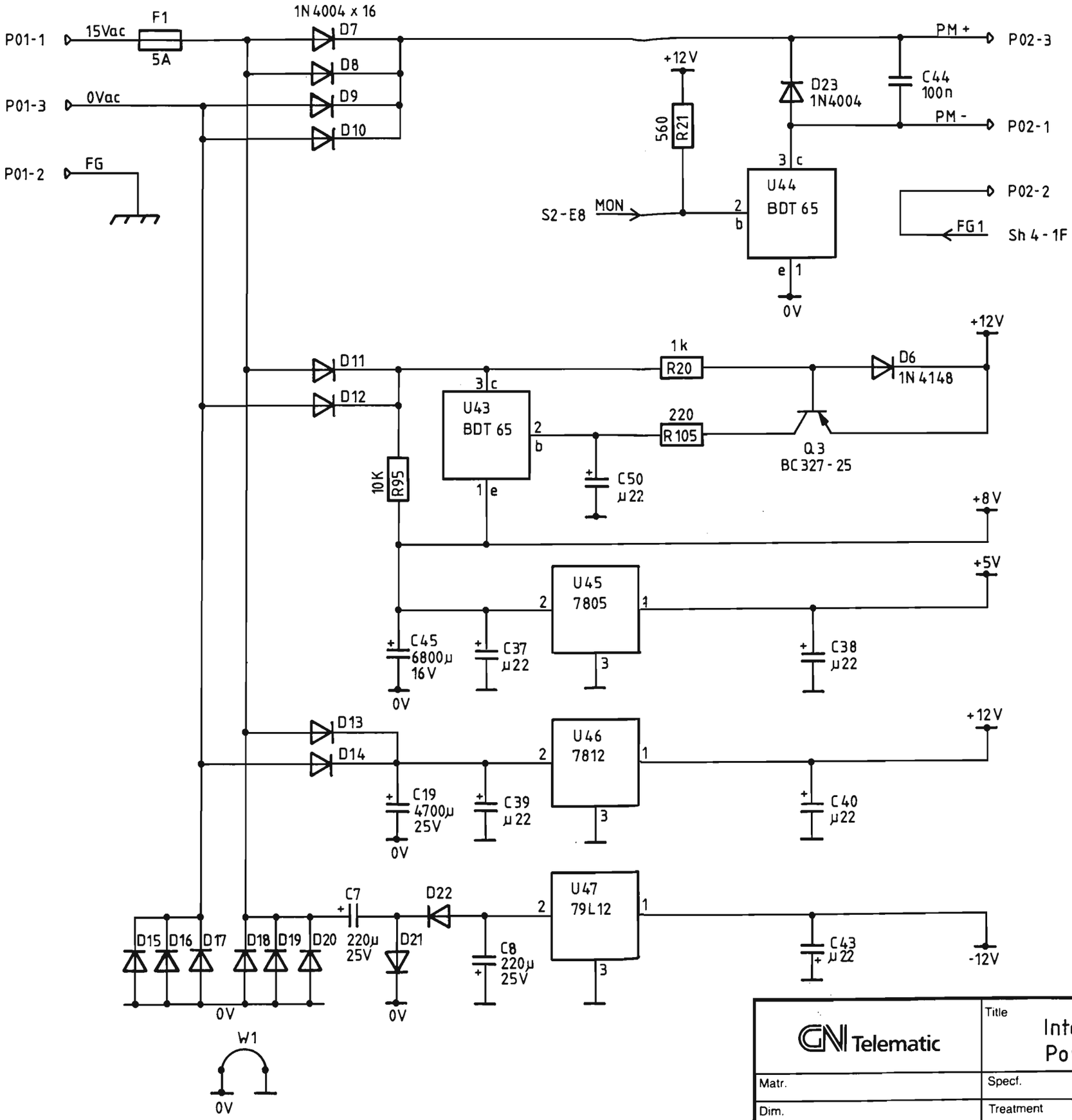
	R34	R36	R101	R102	R103	R104
Z46-21060	-	+	+	-	+	-
Z46-21050	+	-	+	-	+	-

GN Telematic

Title	Interface for GNT 4601/04 Communication I/O	Prm. appr.	
		Final appr. 870812 JJa	
Matr.	Specf.		
Dim.	Treatment		
Matr. no.	Surface		
	Scale	No. D3-Z46-21050 +	Sheet 5
Tol.			

A B C D E F

1 2 3 4 5 6 7 8



GN Telematic	Title: Interface for GNT 4601/04 Power Supply	Prm. appr.	
		Final appr. 890216 JJa	
Matr.	Specf.		
Dim.	Treatment		
Matr. no.	Surface		
	Scale	No. D3-Z46-21050 +	Sheet 6
Tol.			

Projection	Prl. appr.	GNT AUTOMATIC A/S	No. Z46-24100	Sheet
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		Dim.	Treatment	
		Matr. no.	Surface	

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	B 88	0328

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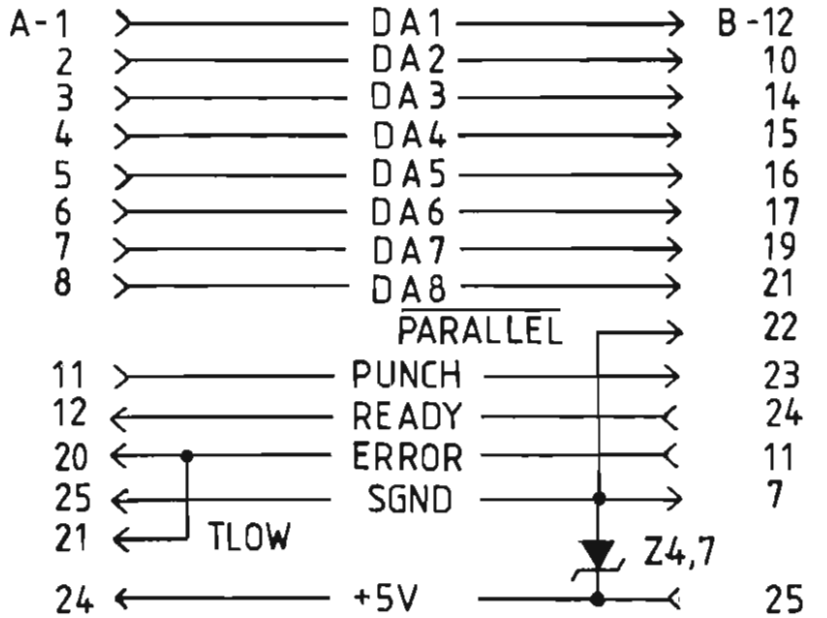
GNT 4614 (TO DTE)
Parallel. punch inp.



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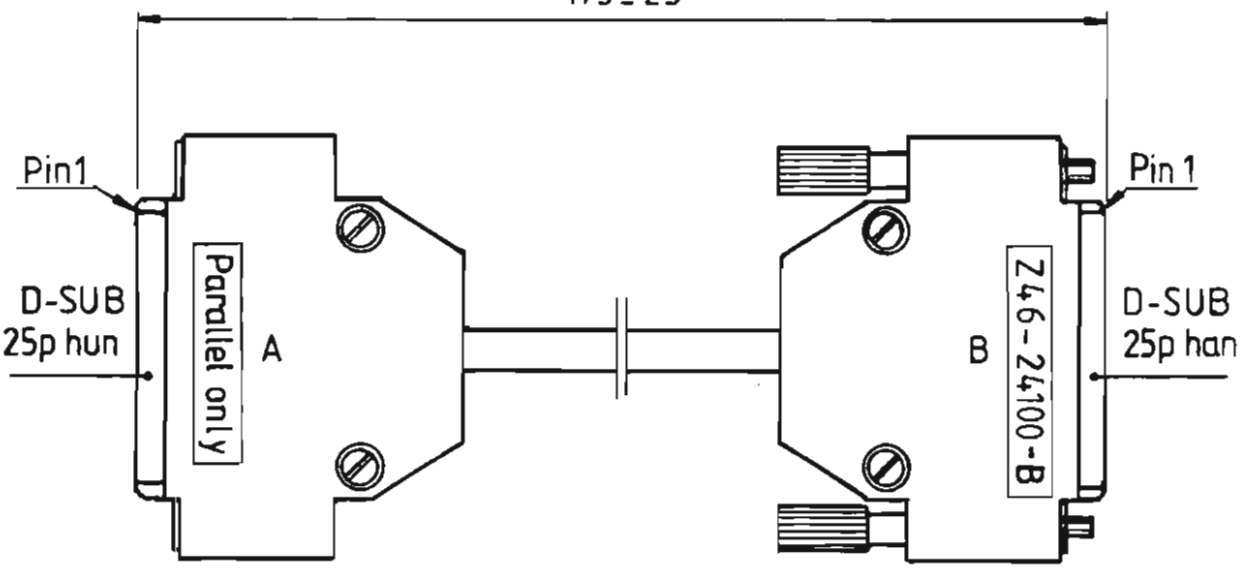

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4-40 UNC Fingerskrue

Kontakt spec.	Se AS-HX22-23000
Stik kappe	Se AS-HX22-29000
Ledning	min. AWG 26, UL style 1007 eller 2560
Ledningskappe	Kunststof UL

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Tegn. kontr. / Mætr. kontr.	Dim. —	Mætr. nr. —	Overfl.-Surface —	
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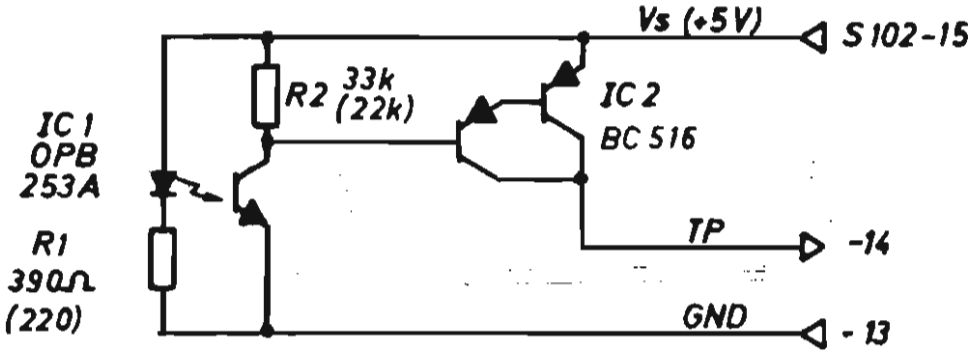

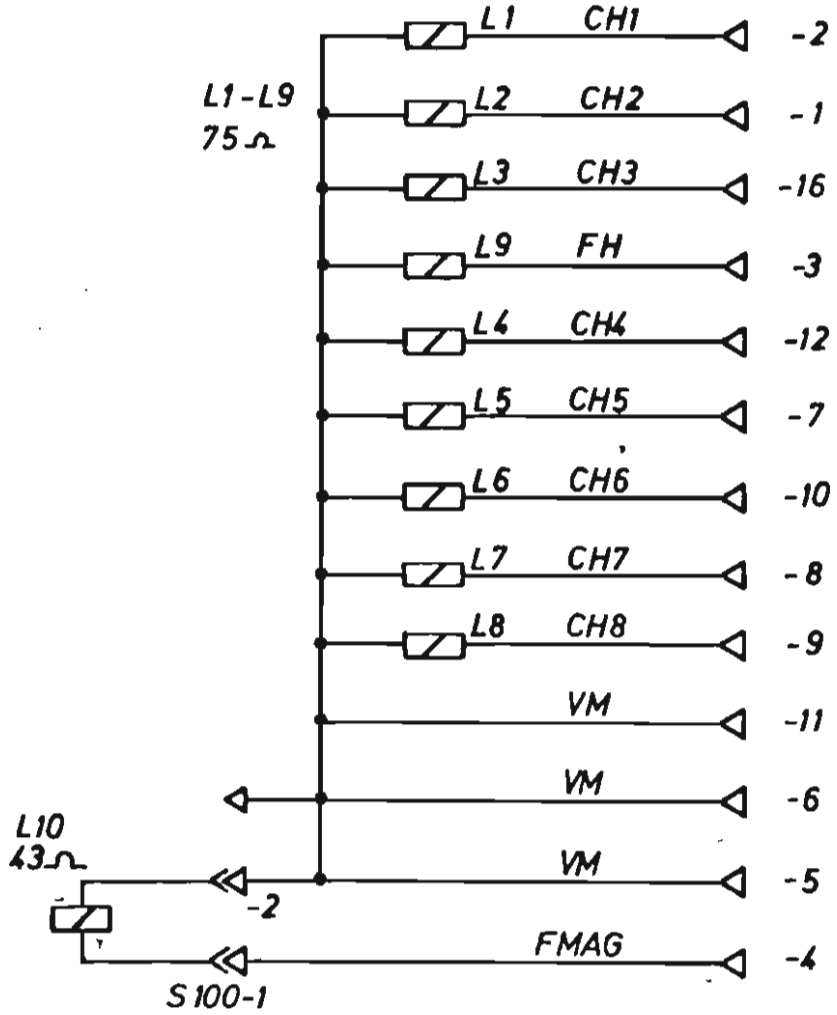

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Konstr. SK	Benævnelse: Læser, diagram		Title: GNT 29 Reader diagram	
Tegn. KHH	Tegn. godk. 25-85 SK			
Tegn. kontr. OTP	Mætr. —	Kval. —	Beh. - Treatment —	
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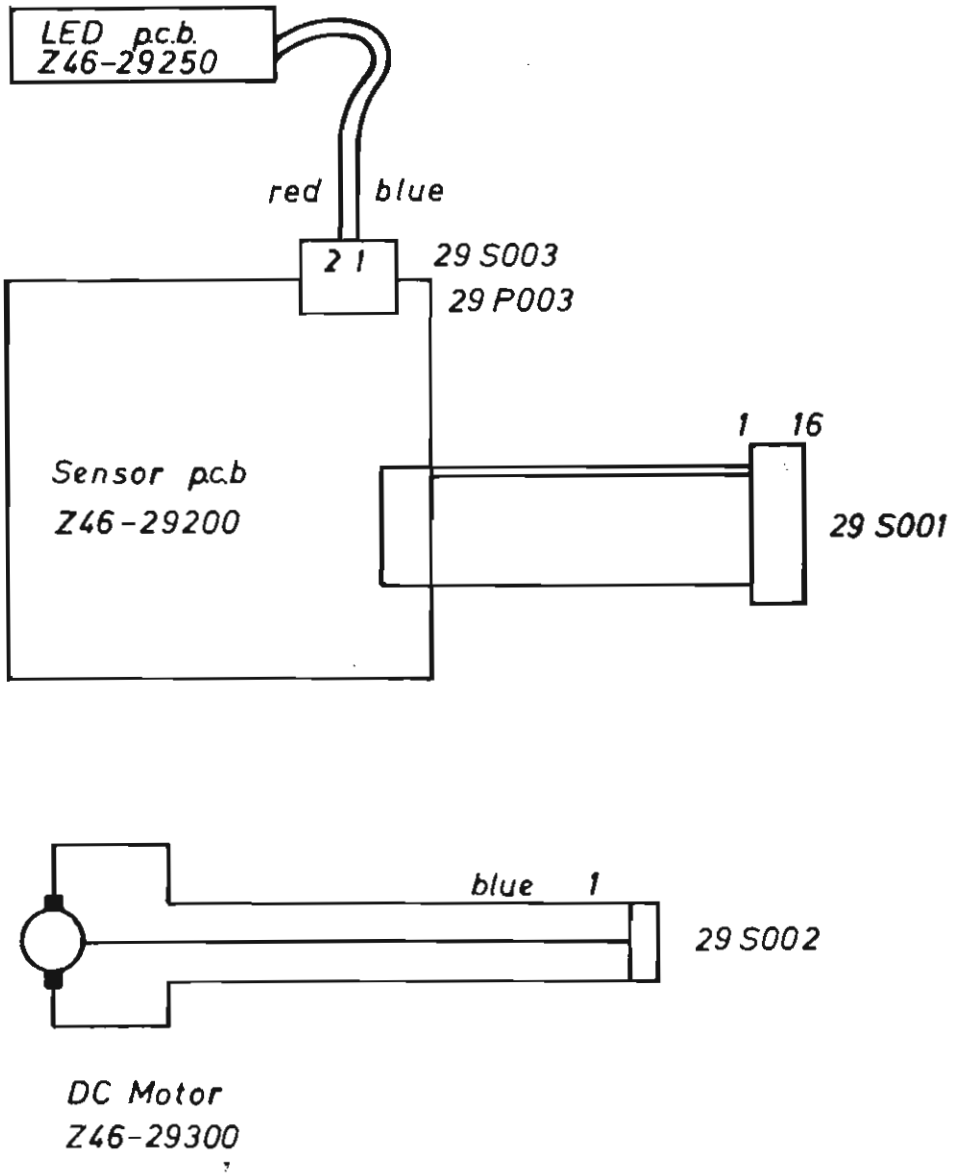
B 85	SK 05-21



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Benævnelse: Fotosensor, diagram

Title: Photosensor, diagram

Tegn. godk. 19-92 SK

Konstr. SI

Tegn. AnP

Tegn. kontr.

Matr. kontr.

Matr. —

Kval —

Beh.-Treatment —

Dim. —

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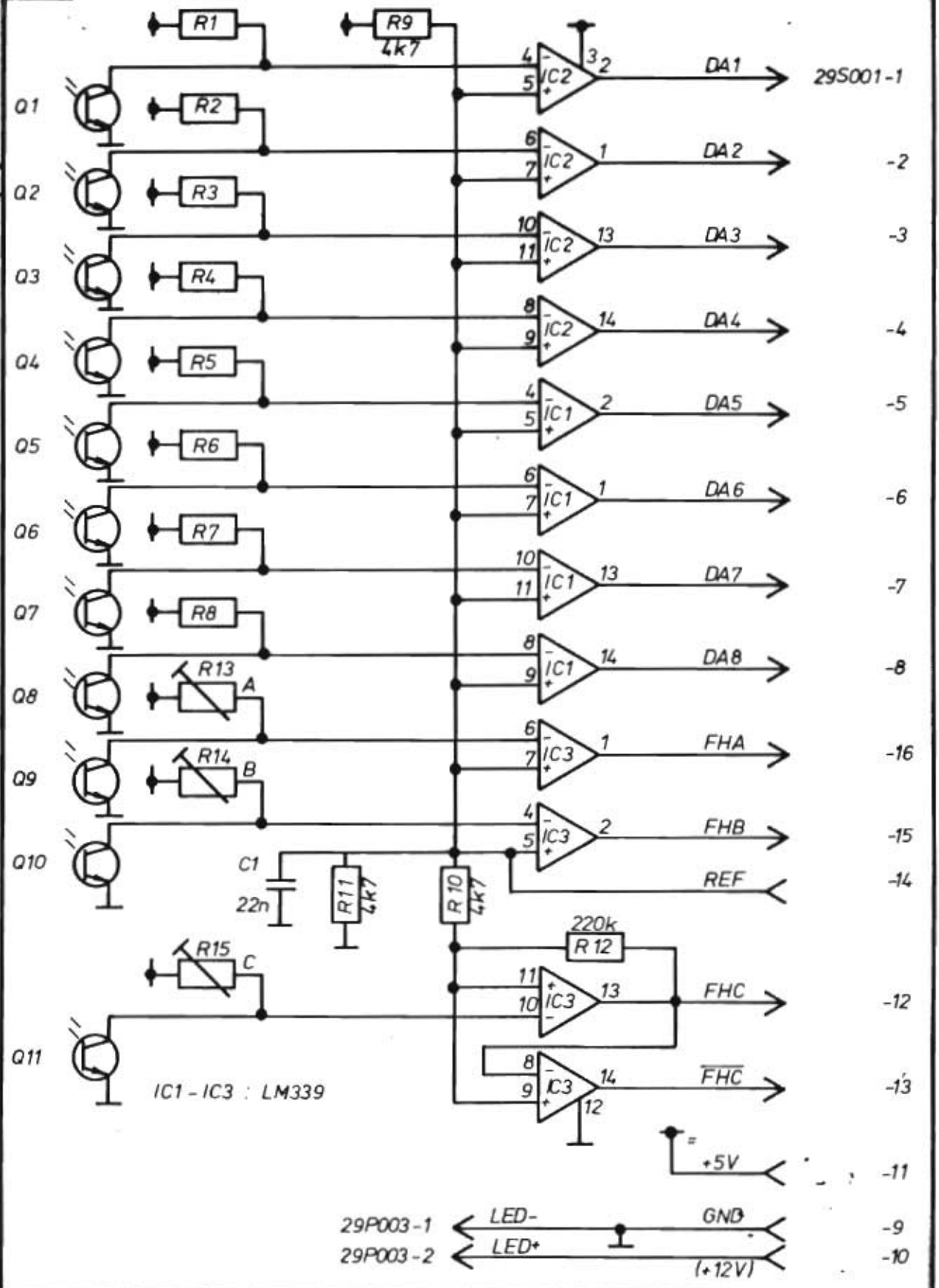

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Nr. D4-Z46/29250

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8404029K

Benævnelse

LED, diagram

Title

Tegn. godk. 6/11-84 SK

Kontr.

Tegn. ÅnP

Tegn. kontr.

Matr. kontr.

Matr.

Kval

Beh.-Treatment

Dim.

Matr. gr.

Overfl.-Surface

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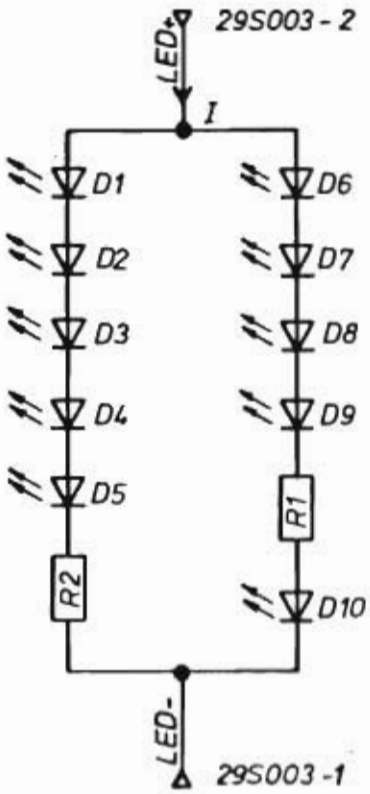

Input : 12Vdc ±5%
Output: ca 1mW/diode, infrarød stråling (950nm)

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R1 - R2	560	390
I (mA)	20-25	28-36
max T_A (°C)	65	60

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Nr D4-Z46/29250

Sheet

5.3 Component Layouts

Z46/22000	Power supply p.c.b.
Z46/21020	Interface p.c.b. GNT 4604 with GNT 29 Tape Reader (Type KDVK-12xxx)
Z46/21050	Interface p.c.b. GNT 4604 (Type KDVK-14xxx)
Z46/23000	Keyboard (Type KDVK-12xxx)
Z46/23001	Keyboard (Type KDVK-14xxx)
Z46/25100	Interface GNT 4605

Afbildning - Projection

GNT AUTOMATIC A/S DENMARK

Term. gr.

Nr. Z46/22000

Sheet 1

Benævnelse: Strømforsyning

Title: Power supply

Konstr.

Tegn. AnP

Tegn. kontr.

Matr. kontr.

Tegn. godk. ISA-82 SK

Matr. —

Kval. —

Beh. - Treatment —

Dim. —

Matr. nr. —

Overfl. - Surface —

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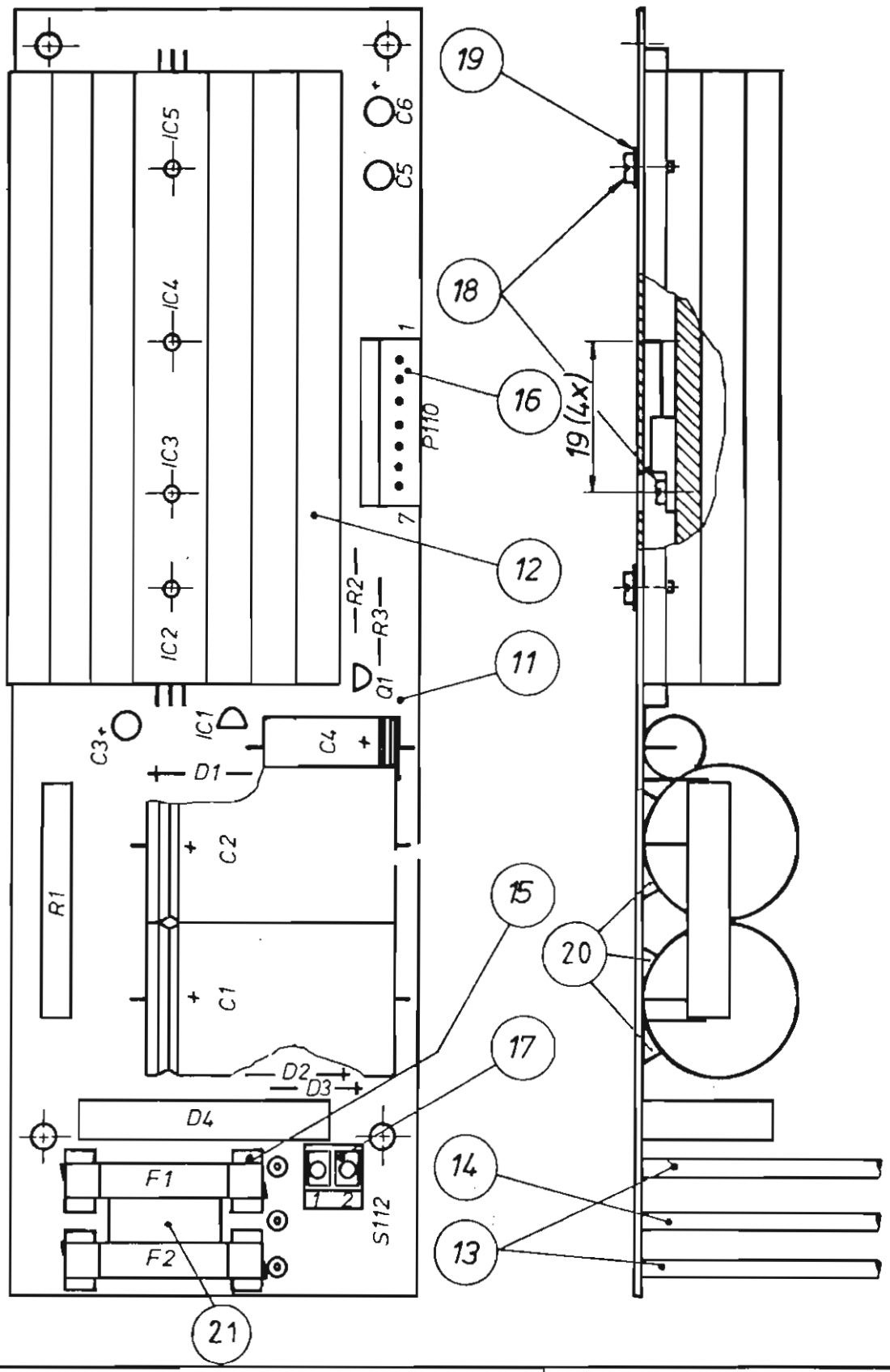

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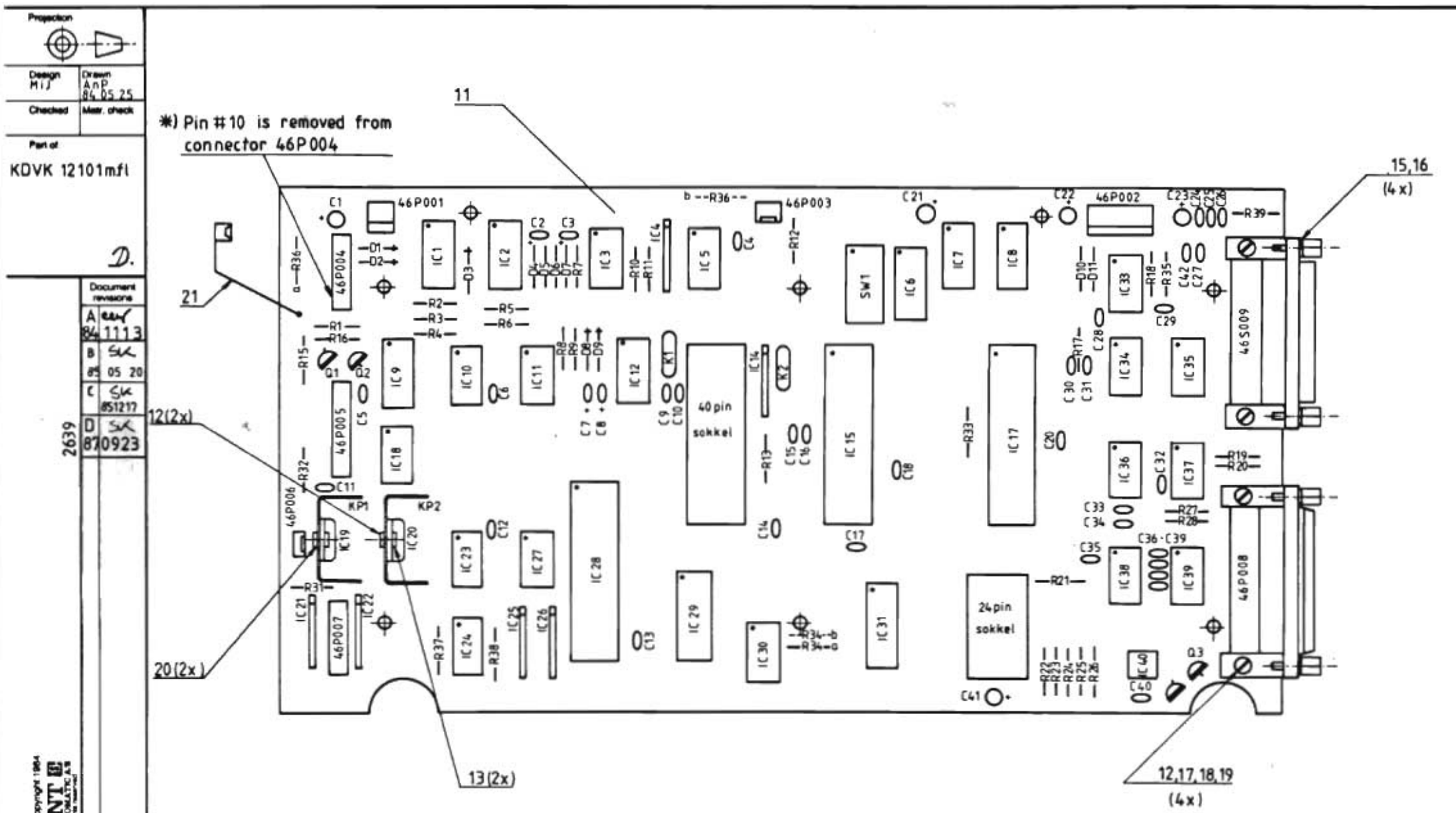

*) På 46P004 fjernes ben 10.

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8039	GNT 4601	Z46/ 21030	Pos. b	Pos. b	
IC 15	Titel	Nr.	R34	R36	

GNT AUTOMATIC A/S

Title: Interface

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Z46/21020+

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D	SK	870923

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Term. gr.

Nr. Z46/23000

Sheet 1

Benævnelse: Tastatur

Title: Keyboard

Konstr.	Tegn.
M	AnP

Tegn. godk. 8.9.82 MD

Tegn. kontr.	Matr. kontr.

Matr.	Kval.	Beh.-Treatment
—	—	—

Dim.	Matr. nr.	Overfl.-Surface
—	—	—

Tegn. regler Drg. rules

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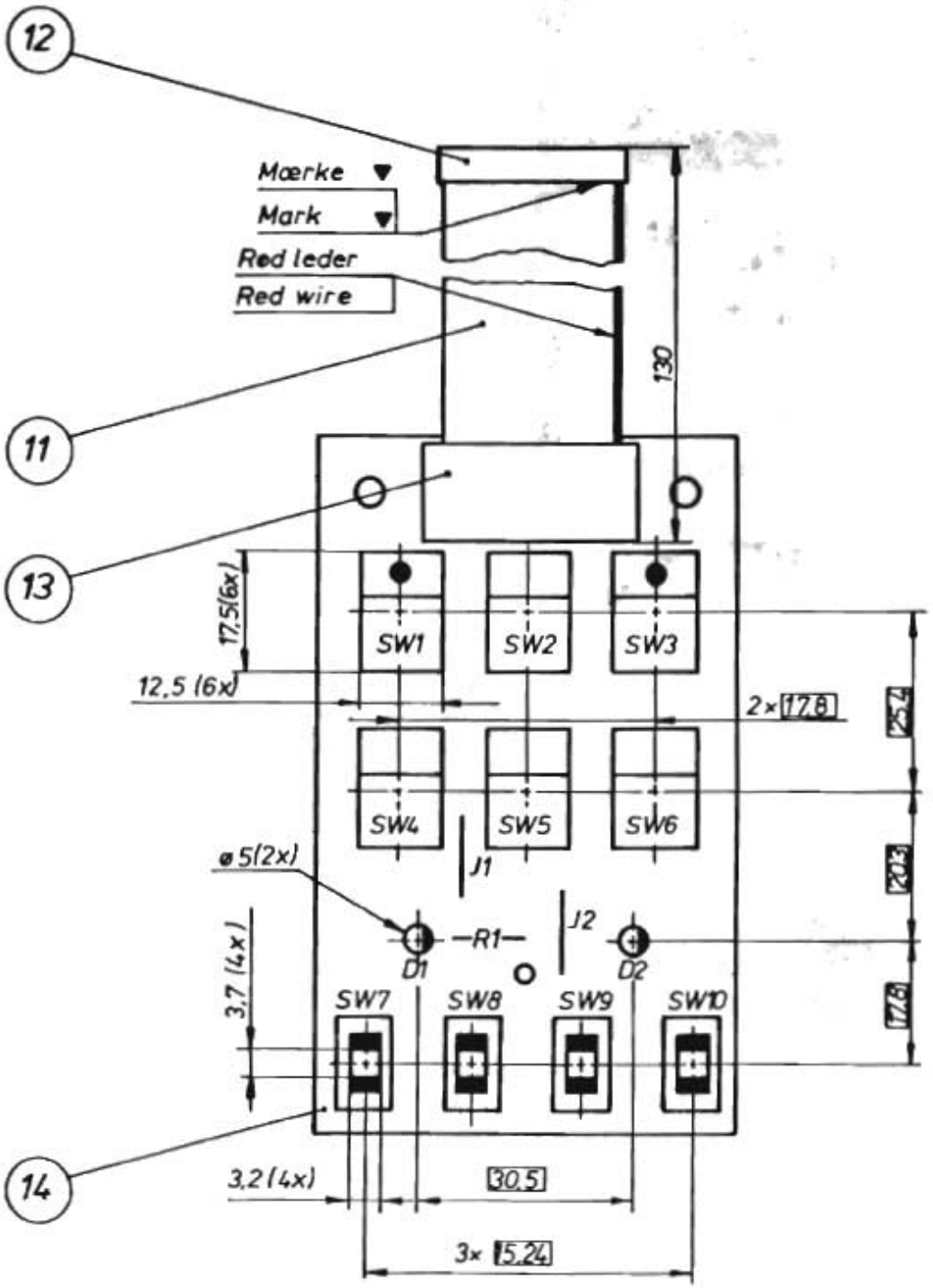

⊕ □0,6 Ⓜ indbyrdes (12x)

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GNT AUTOMATIC A/S
DENMARK

Term gr.

Nr. Z46/23001

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Benævnelse: Tastatur

Title: Keyboard

Tegn godk. 8/1.12.09 SK

Kontr. —

Tegn. RLS

Tegn. kontr

Matr. kontr.

Matr. —

Kval —

Beh · Treatment —

Dim. —

Matr. nr —

Overfl. · Surface —

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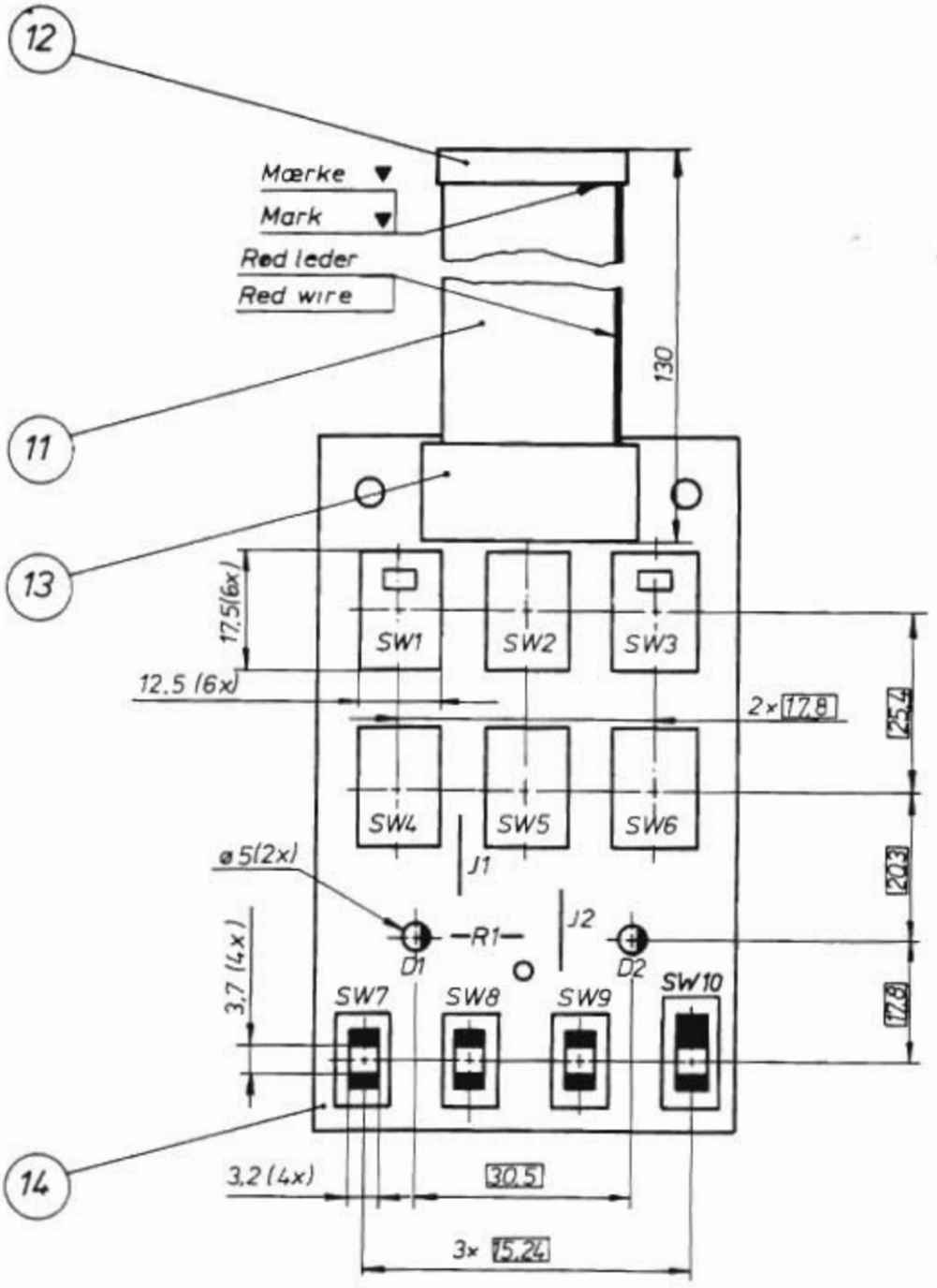

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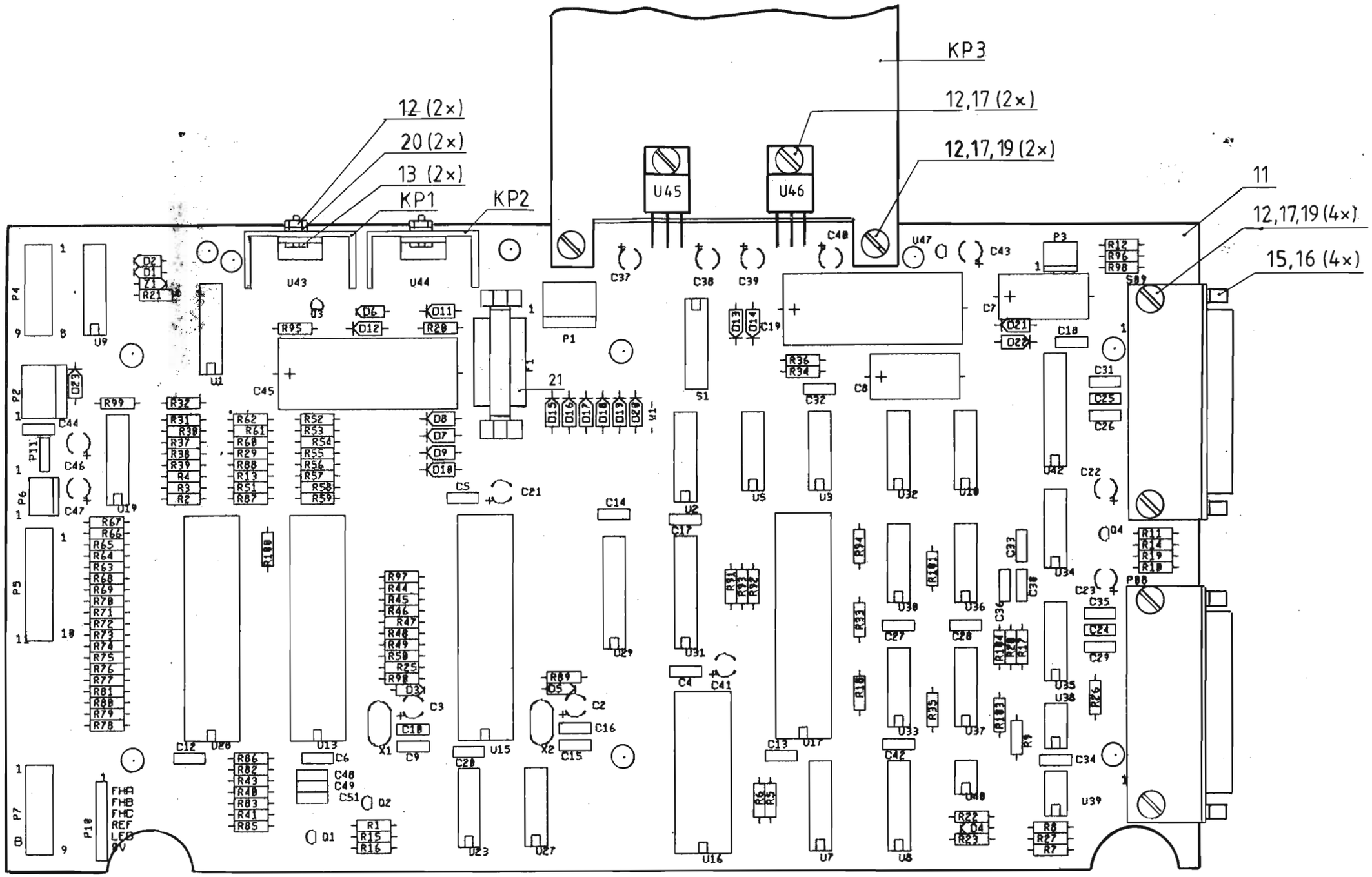

B-8113--46-21150 COMPONENT NOTATION

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		Final appr. 870812 Wa
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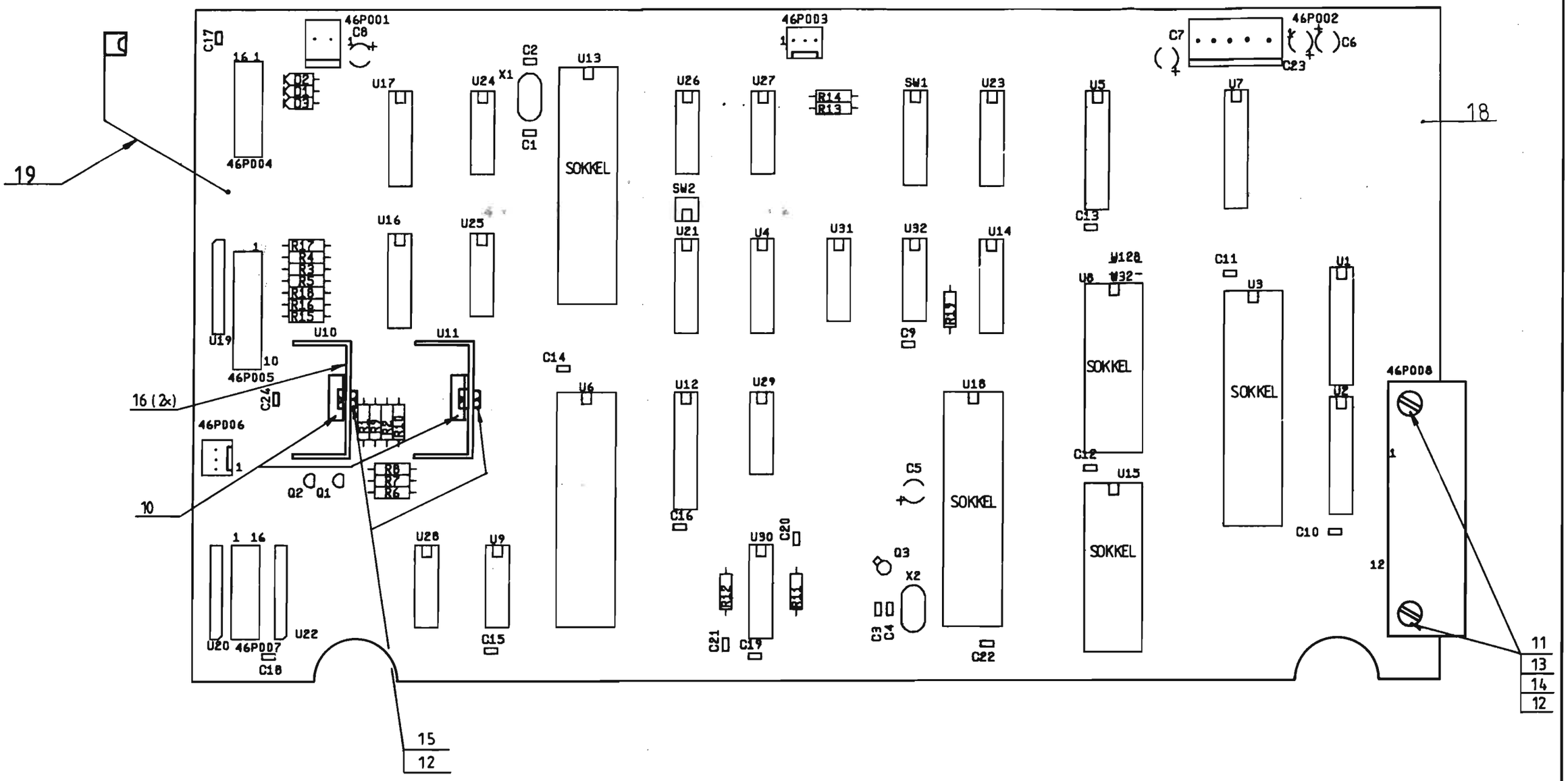


GNT AUTOMATIC A/S	TITLE: LOGIKPRINT. GNT 4605	PRM.APPR.	
		FIN.APPR. 3/5 Esp	
MATR.	SPECIF.		
DIM.	TREATMENT		
MATR.NO.	SURFACE		
	SCALE 1:1	NO. Z46/25100	SHEET
TOL.			

CONTENTS OF SECTION 6

6.1 MAINTENANCE THE READER/PUNCH COMBO

6.1.1 Dismantling
(See the Exploded Views, Fig. 7.1 and 7.2)

6.1.1.1 OPENING THE READER/PUNCH COMBO (Fig. 6.1)

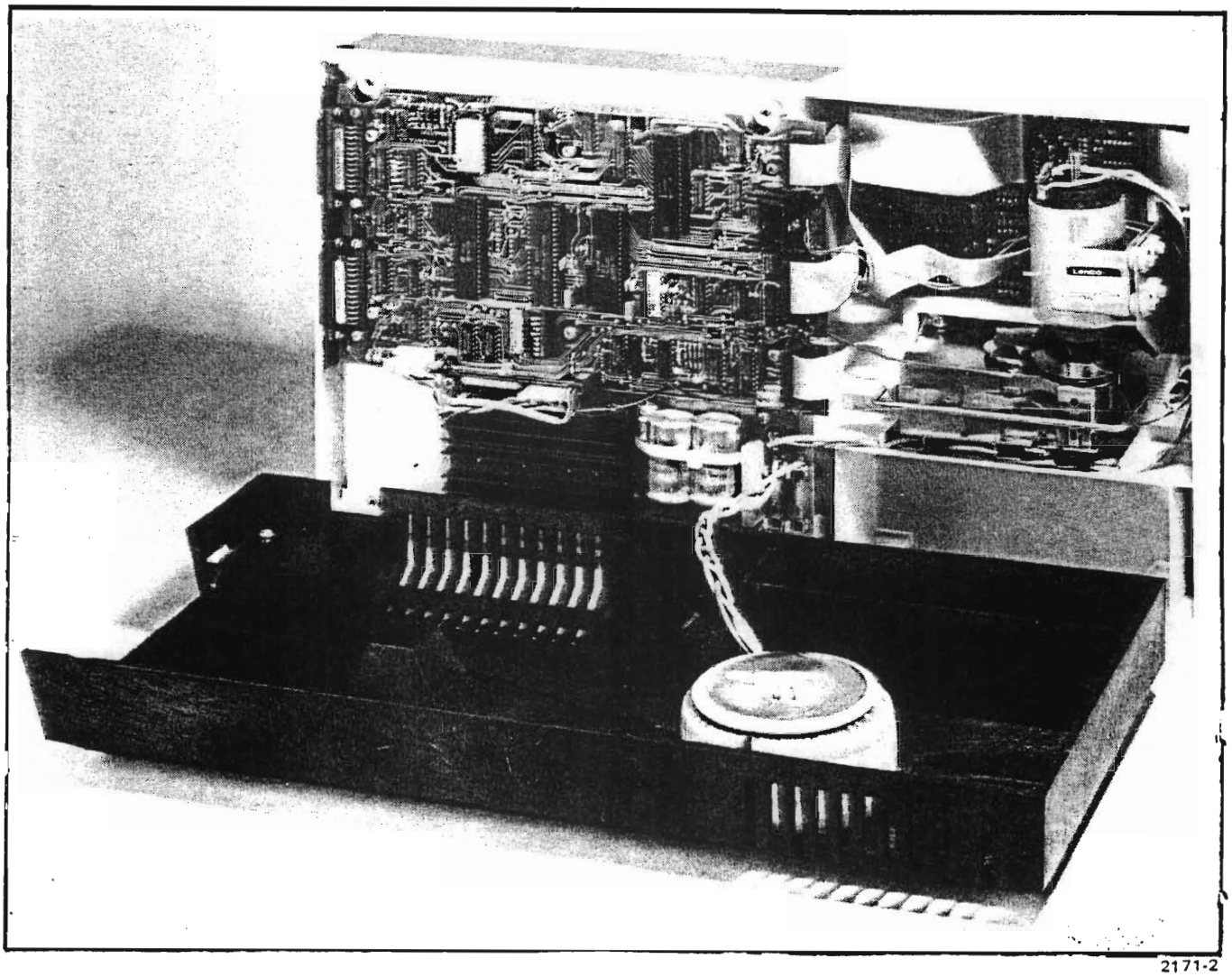
a) Unplug the A.C. power cord.

b) Shake any chad out of the chad chute into the chad box, and remove the chad box.

c) Turn the Reader/Punch Combo over, and loosen the 5 screws which hold the top and base together.

d) Separate the top and base (see Fig. 6.1), and place the top on the right side (do not place the top upside down for not to scratch the lid).

e) To remove the base completely, unscrew the 3 trafo wires from the terminal block in the base.



2171-2

Fig. 6.1 Opening the Reader/Punch Combo

6.1.1.2 REMOVING THE PUNCH MECHANISM (Fig. 6.2)

a) Open the Reader/Punch Combo (see Section 6.1.1.1).

b) Unplug the punch mechanism's ribbon cable from the logic p.c.b.

c) Unsnap the clamp, and remove the drive belt and punch mechanism (see Fig. 6.2).

d) To replace, clip the mounting clamp into the 2 holes in the mechanism's top cover brackets. Be sure the flats on the rubber pads are turned towards the mounting surface. Twist the 2 pads so that the mechanism is held fast.

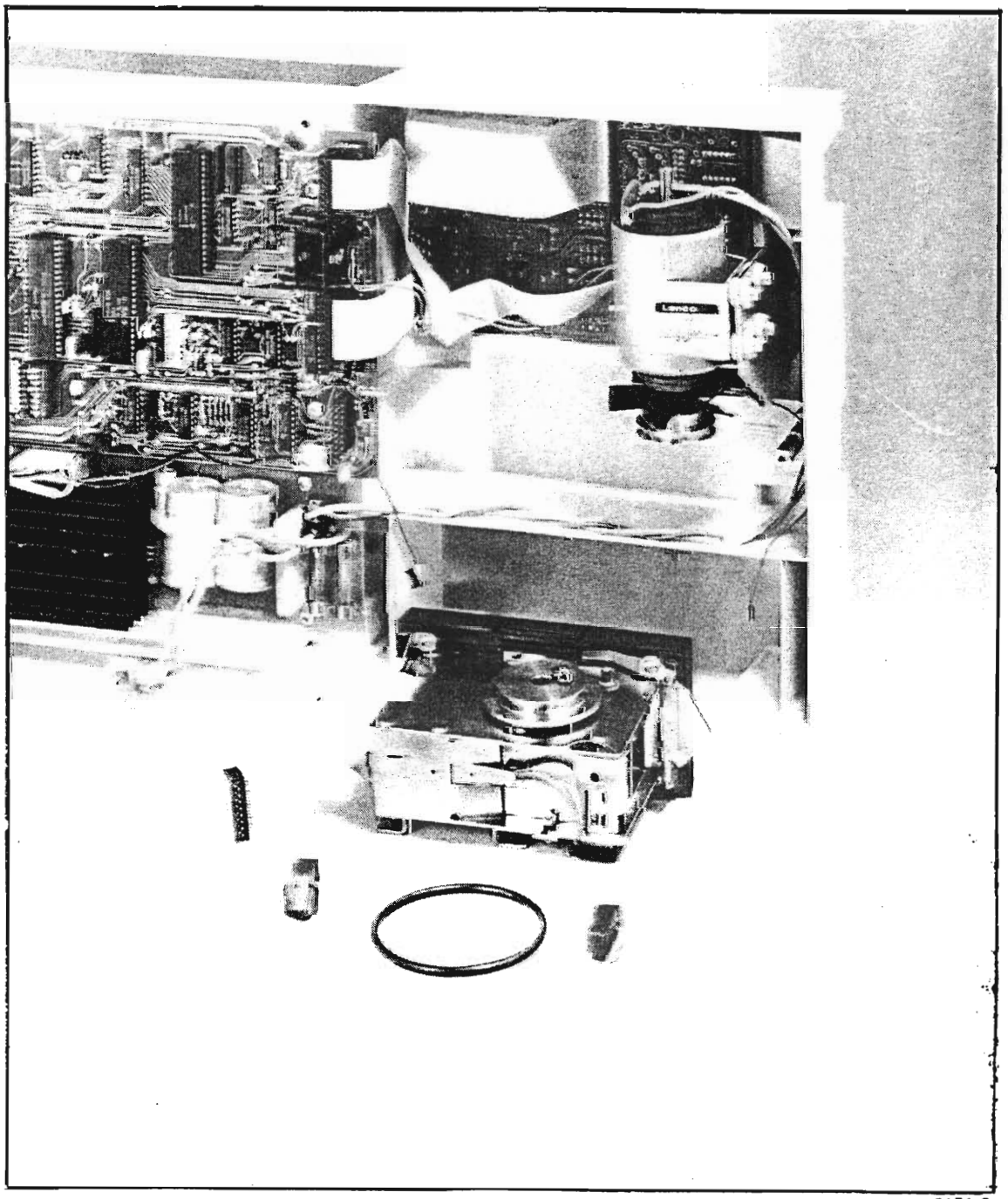


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Fig. 6.2 Removing the punch mechanism

6.1.1.3 REMOVING THE MOTOR (Fig. 6.3)

a) Open the Reader/Punch Combo (see Section 6.1.1.1).

b) Unscrew the motor leads from the terminal block on the power supply p.c.b. Note their orientation.

c) Remove the drive belt.

d) Remove the 2 screws which hold the motor unit and lift it out.

6.1.1.4 REMOVING THE READER (Fig. 6.3)

a) Remove the motor unit as above.

b) Unplug the plugs from the logic p.c.b.

c) Lift the reader lid.

d) Slide out the reader.

6.1.1.5 REMOVING THE CONTROL PANEL (Fig. 6.3)

a) Unplug the plug from the logic p.c.b.

b) Unscrew the 2 screws which hold the panel and slide it out.

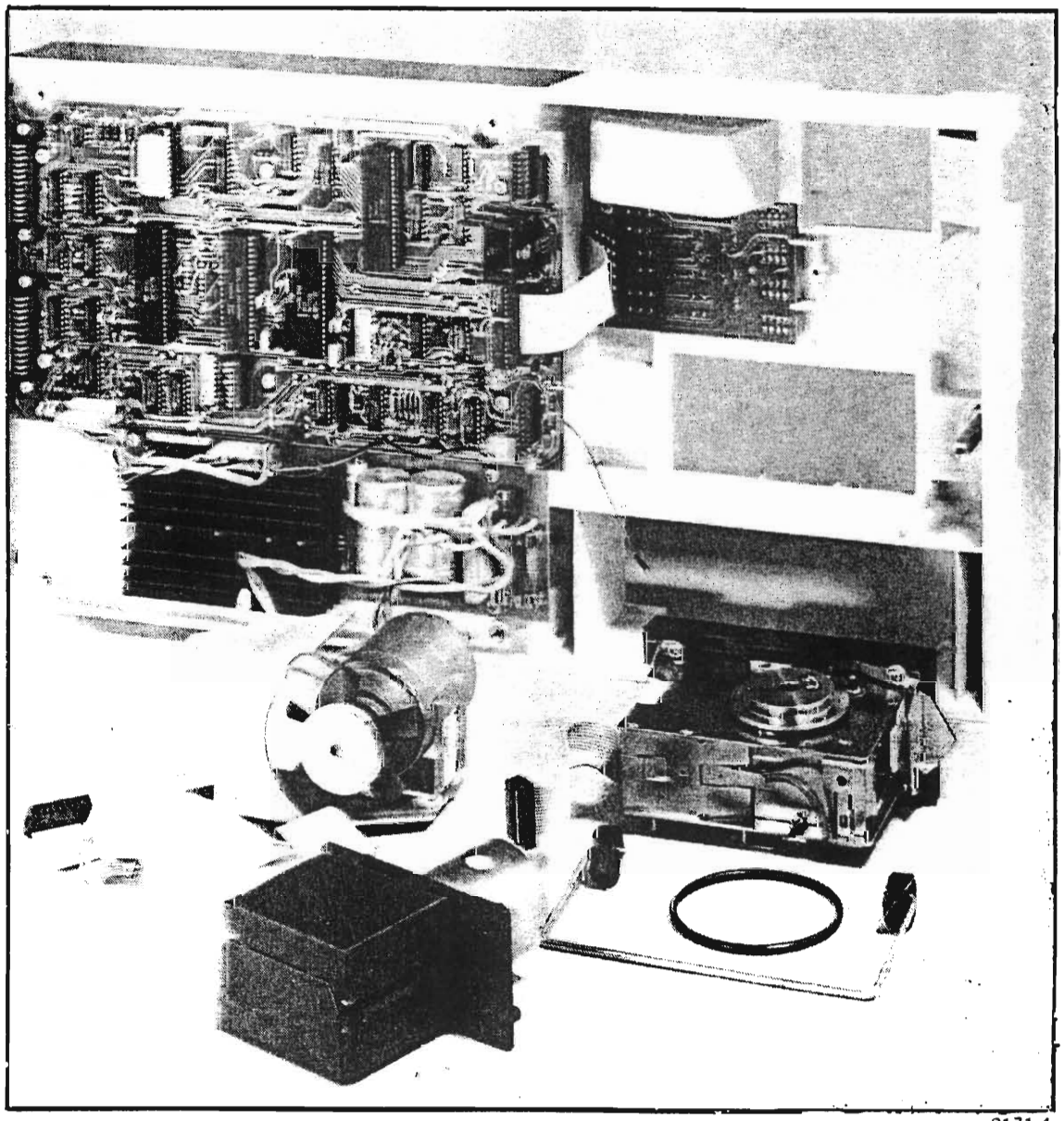

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Fig. 6.3 Removing the motor, reader and control panel

6.1.2 Adjustments the Tape Handler (Fig. 6.4)

6.1.2.1 GENERAL

The tape handler is factory adjusted. If, however, a part has been replaced or some malfunction develops, adjustment may be necessary.

Open the Reader/Punch Combo as described in Section 6.1.1.1 and proceed as follows:

6.1.2.2 TENSION ARM (Tape Out, Taut Tape)

Both tape out and taut tape are indicated by one double-actuated microswitch. Tape out is activated when there is no tape passing through the tension arm roller unit.

To check this function, hold the roller unit parallel to the cabinet, and allow it to move towards the cabinet. At a distance of 3-5 mm, the click of the microswitch should be heard. If not, loosen the screw and move the adjusting piece A to achieve the correct actuation point. Fasten the screw again.

Taut tape is activated when the roller unit is 76-80 mm from the cabinet. This adjustment is made by the adjusting piece B.

6.1.2.3 TURNTABLE BRAKE

Check the brake by holding the tension arm away from the cabinet and giving the turntable a spin. Slowly let the arm move back, and note the point at which braking occurs. The distance to the edge of the cabinet should be 12.5-16.5 mm. If not, adjust on adjusting piece C.

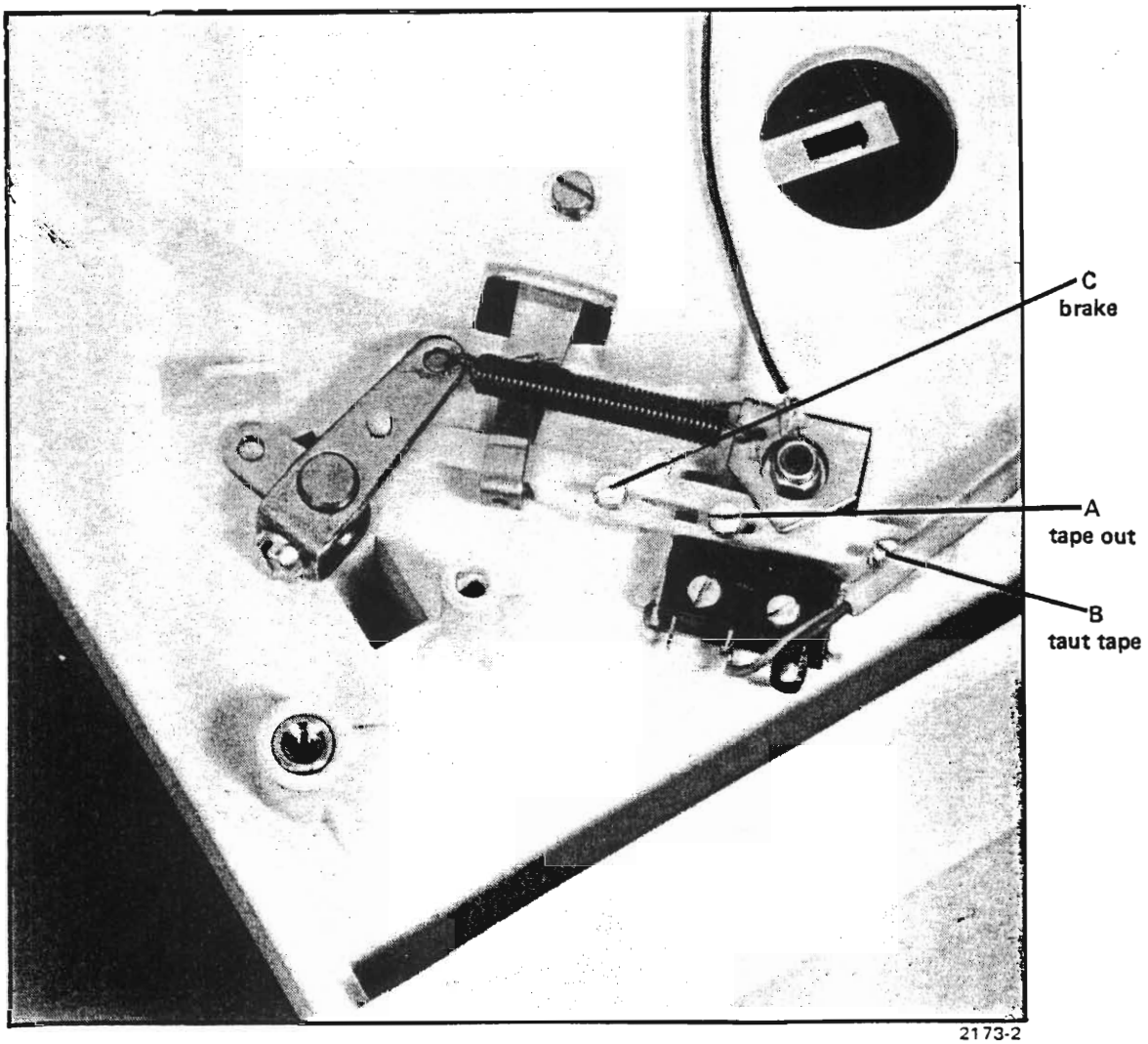

Fig. 6.4 Tape handler adjustments

6.1.3 Maintenance the GNT 36 Tape Punch

6.1.3.1 DISMANTLING

Removing the Top Cover (Fig. 6.5)

a) Remove the punch mechanism (see Section 6.1.1.2).

b) Pull outwards on the tab at the rear of the mechanism.

c) Lift out the cover.

d) When fitting a new thrust pad, see Section *Removing the Thrust Pad* (d), page 6-8

Removing the Selector Box (Fig. 6.5)

a) Remove the top cover.

b) Grasp the selector box by its two serrated tabs (Fig. 6.5), and slide it out while depressing the locking clip.

Removing the Punch Set (Fig. 6.5)

a) Remove the selector box.

b) Unscrew the two screws which hold the die block.

c) Lift out the punch set.

NB: When reassembling, press the punch set toward the black tape guide cover during fastening the screws.

Removing the Tape Feed Magnet (Fig. 6.6)

a) Remove the punch mechanism (see Section 6.1.1.2).

b) Lift the locking clip on the bottom of the mechanism, and unplug the connector.

c) Press the locking tab on the magnet bracket so that the magnet unit is freed.

d) Slide the unit out of the chassis.

Reassembly

e) To replace, merely snap the unit into place.

f) Be sure to insert the plug with the rectangular opening towards the locking clip.

Removing the Main Shaft (Fig. 6.5)

a) Remove the punch set.

b) Press the shaft out.

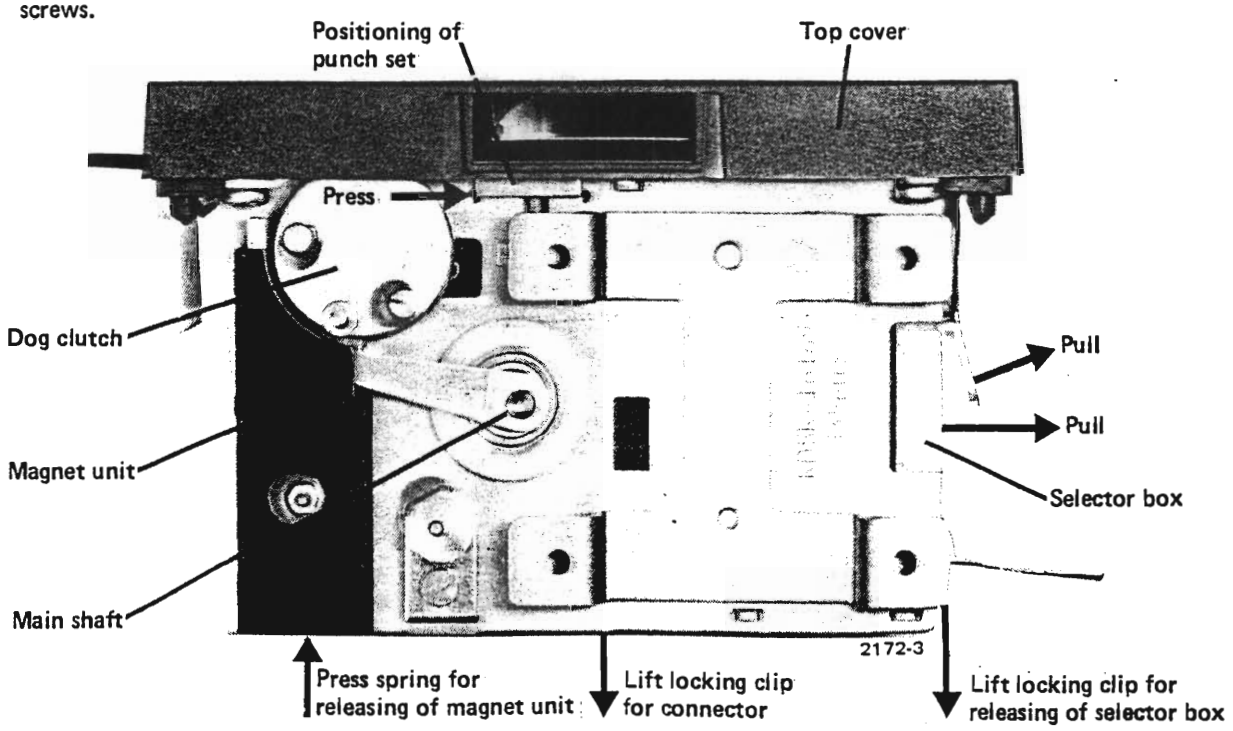

Fig. 6.5 Removing the punch mechanim's top cover

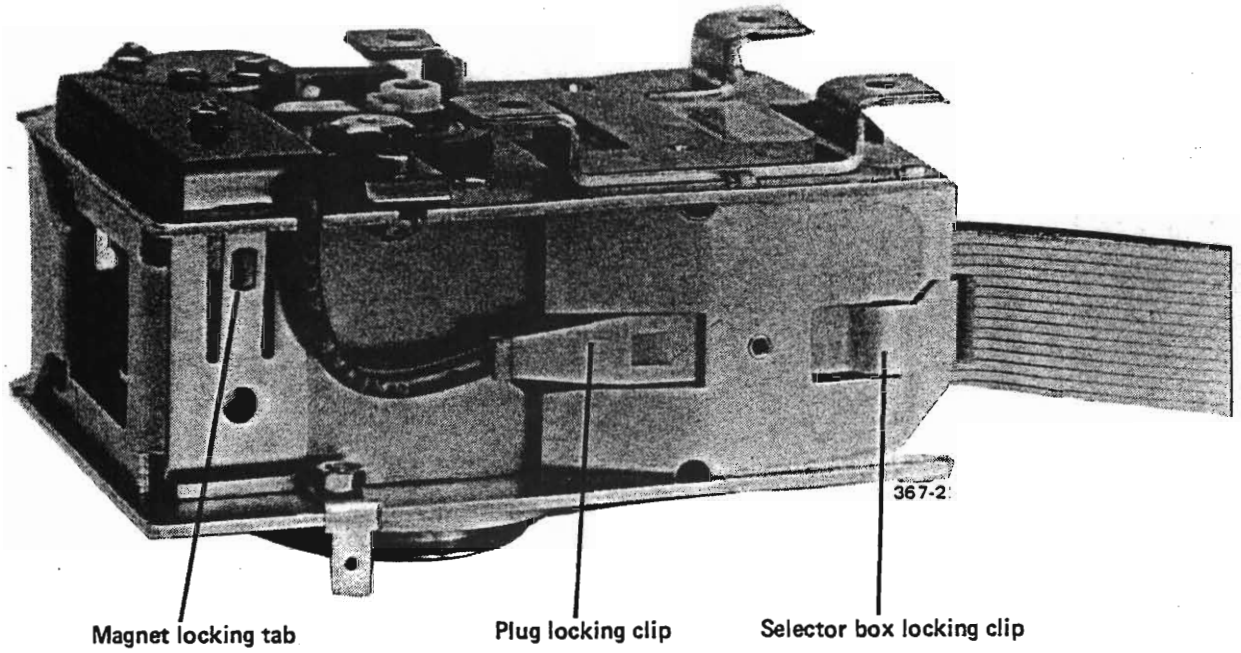

Fig. 6.6 Dismantling the GNT 36 Tape punch

Removing the Dog Clutch (Fig. 6.5)✶

a) Remove the top cover.

b) Remove the tape feed magnet.

c) Loosen the reference locking screw (Fig. 6.9).

d) Slide out the clutch unit.

Removing the Tape Feed Wheel (Fig. 7.3)✶

a) Remove the dog clutch.

b) Unsnap the tape guide plate, and rotate it upwards.

c) Hold the jockey arm out of the way, and withdraw the feed wheel.

Removing the Jockey Arm Spring (Fig. 7.3)

a) Remove the tape feed wheel.

b) Unhook the spring from its mooring on the chassis, and slide the spring off the arm.

✶When reassembling, ensure that there is 0.1 mm between the feed wheel and the reference adjusting screw (see Section 6.1.3.2 *Reference Adjustment* (c), page 6-10.

Removing the Jockey Arm (Fig. 7.3)

a) Remove the jockey arm spring.

b) Loosen the pitch locking screw (Fig. 6.8).

c) Turn the eccentric hex nut so that the arm is free.

d) Slide the arm out.

NB: After reassembly, the pitch adjustment procedure must be carried out (see Section 6.1.3.2 *Pitch*).

Removing the Punching Bridge (Fig. 7.3)

a) Remove the selector box .

b) Grasp the punching bridge with thumb and forefinger, and pull it out.

Reassembly

c) To replace, carefully insert the interposers into the slots in the p.c.b., and snap the bridge into place.

Replacing the Signal Cable

a) Remove the selector box.

b) Remove the cable clamping yoke.

c) Pinch the cable and free it from the slot.

d) Unplug the connector.

Reassembly

e) When replacing the cable, be sure that pin No. 1 is located adjacent to the milled edge on the selector box receptacle.

Removing the Tape Guide Cover (Fig. 7.3)

a) Remove the punch set.

b) Slide the cover into the opening left by the die block.

c) Lift out the cover.

Note that the tape guide springs fall out when the cover is removed. Be sure to replace them correctly as shown in Fig. 6.10.

Removing the Tape Guide Plate (Fig. 7.3)

a) Remove the punch set.

b) Unsnap the forward end of the guide plate.

c) Lift out the guide plate.

Removing the Thrust Pad (Fig. 7.3)

a) Remove the top cover.

b) Depress the latch so that the window pops up.

c) Unclip the thrust pad.

d) When fitting a new thrust pad, check the clearance between the thust pad and the sprocket wheel hub (Fig. 6.7) as follows:

1. Open the pop-up window.
2. Insert a strip of paper tape, 5 x 70 mm, into the slot beneath the tear-off tip so that it rests on the sprocket wheel hub with its edge against the sprockets.
3. Close the window, and check that the paper can move freely.
4. Repeat steps 1-3 with the paper on the other side of the sprockets.
5. Repeat the test (steps 1-4) with 3 layers of paper, and check that in this case the strips are clamped tightly between the thrust pad and the hub.
6. If the above conditions are not met, remove the thrust pad, and bend it.

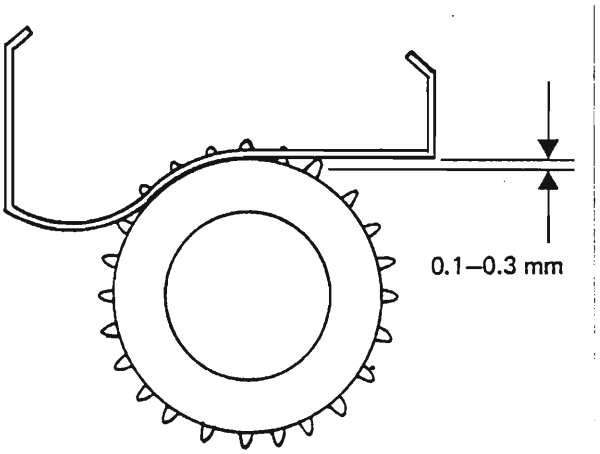

Fig. 6.7 Thrust pad clearance

Removing the Pop-Up Window

a) Remove the top cover.

b) Unscrew the 2 screws which hold the forward bracket.

c) Remove the pop-up window and thrust pad.

d) Unclip the thust pad.

6.1.3.2 ADJUSTMENTS

General

Normally, no adjustments are necessary. However, if a part has been replaced, the adjustments should be checked. The punching mechanism must be removed before the adjustments can be made (see Section 6.1.1.2). The adjustments should be carried out in the order given.

Pitch (Jockey Arm)

a) Clean the die block, so that no chad are in holes 1 and 8.

b) Insert a piece of correctly punched tape into the mechanism so that holes 1 and 8 are visible in the die block.

c) Maintaining a light backwards tension on the tape, turn the pitch eccentric on the side of the punch until the holes are aligned (see Fig. 6.8). NB: for ISO punch sets, the eccentric should be at approx. 9 o'clock, for TTS, 11 o'clock.

d) Carry out the pawl adjustment (see next Section *Pawl Adjustment*).

e) After the pawl adjustment has been carried out, the final pitch adjustment is made by punching a piece of tape and checking it against a pitch gauge. Alternatively, measure the distance, center-to-center across 51 feed holes (50 pitches). The distance should be 127.0 mm ± 0.6 mm. If the tape has been punched with no tape drag, the distance should be near the maximum.

f) Finally, recheck the pawl adjustment.

Pawl Adjustment

a) Loosen the locking screw (see Fig. 6.8).

b) If necessary, a rough adjustment can be made by holding the pawl in engagement and rotating the flywheel. Set the adjusting screw so that the jockey roller moves symmetrically to and fro across one tooth of the jockey gear (i.e. from one "valey" to another((see Fig. 5.6).

c) The final adjustment is made by holding the pawl in and rotating the flywheel. At both ends of the pawl travel, there should be a "dead" angle of at least 50^0 (measured on the flywheel) where the feed sprocket does not move.

d) Tighten the locking screw.

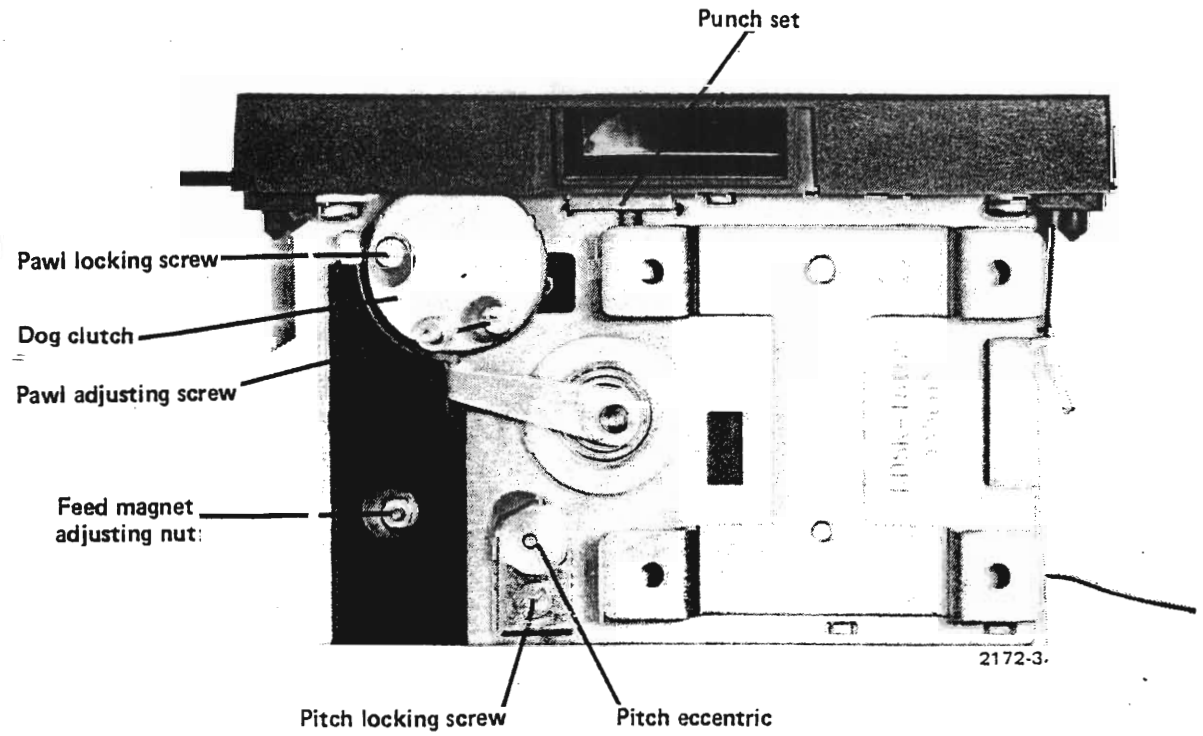

Fig. 6.8 Adjustments

Feed Magnet Adjustment

a) Apply 12 V D.C. between pin 4 and pin 6 (plug 36 P 110). Be sure that the feed pawl engages one of the radial slots on the side of the jockey wheel.

b) Adjust the nut (Fig. 6.8), so that the feed pawl is touching the face of the jockey wheel. Then turn the adjusting nut another 1/4 turn clockwise.

Reference Adjustment

a) The distance from the reference edge of the tape to the center of the feed hole should be 9.96 mm ± 0.1 mm (for TTS, JIS: 11.2 mm ± 0.1 mm). If not, loosen the reference locking screw (Fig. 6.9) and insert a 1.5 mm allen wrench into the adjustment hole.

b) To increase the reference distance, turn the screw clockwise and vice versa.

c) Set the tubular axle so there is 0.1 mm between the feed wheel and the adjusting screw.

d) Tighten the reference locking screw (Fig. 6.9).

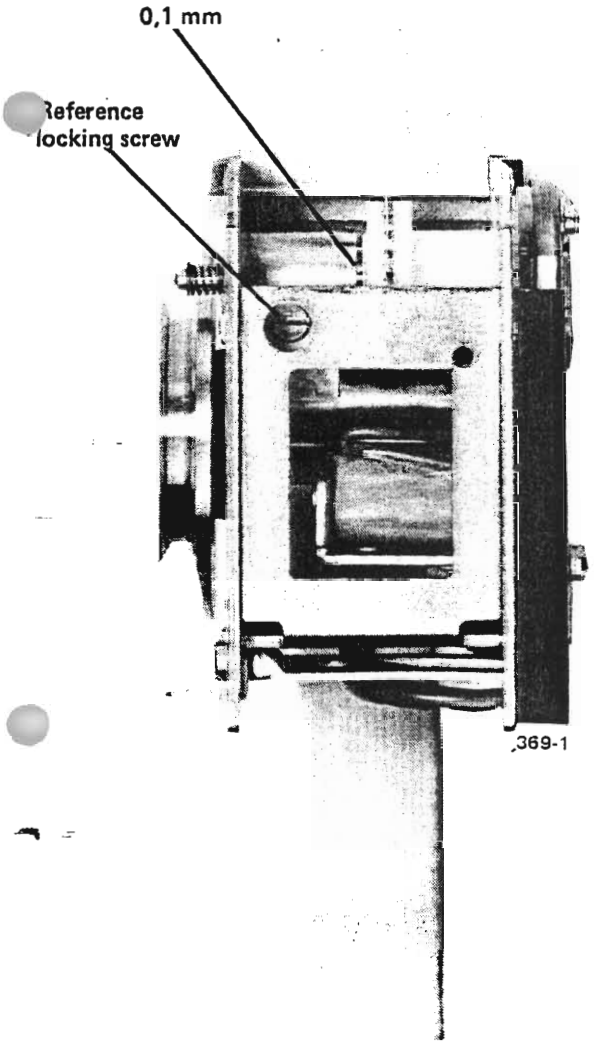

Fig. 6.9 Adjustments

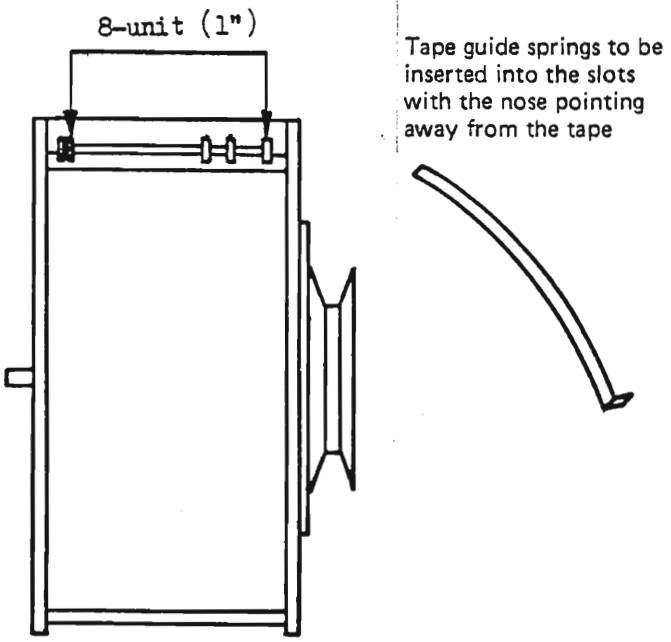

Fig. 6.10 Location of tape guide springs

6.1.4 Maintenance the GNT 29 Tape Reader

6.1.4.1 DISMANTLING

a) Remove the 2 screws holding the photo sensor p.c.b.

b) Lift out the p.c.b., and rotate it up towards the motor. Push in the flat cable to provide slack.

c) Unplug the 2-pole Molex plug.

d) Free the flat cable by sliding it out of the slot, and remove the p.c.b. unit.

e) Remove the 2-pole Molex housing. Make a mark on the housing for the red wire.

f) Loosen the flat spring by pressing on it with a screwdriver.

g) Remove the lid, drawing the red and blue wires out through the hole in the body.

h) Remove the 2 screws holding the motor, and remove the motor.

6.1.4.2 REASSEMBLY

a) Insert the flat spring, but do not snap it into place.

b) Mount the motor using one long and one short screw. Note the orientation of the wires.

c) Put the red and blue wires from the LED board through the hole in the chassis.

d) Mount the lid and close it.

e) Click the spring into place.

f) Push the two wires from the LED board into the Molex housing with the wires as shown in Diagram D4-Z46/29000.

g) Slide the flat cable into the slot, and carefully position photo the sensor p.c.b. while pulling on the flat cable.

h) Replace the 2 screws and fiber washers which hold the photo sensor p.c.b.

6.1.4.3 ADJUSTMENTS

Feed Hole Sensitivity

When the reader is placed in the GNT 4601 or in the GNT 4604, the adjustment of the feed hole sensors can be checked and adjusted in the following way:

Place a tape loop in the reader and start the reader. The reader motor should run continuously.

Then you can check the 3 feed hole photo sensors FHA, FHB, and FHC with an oscilloscope.

When the motor runs continuously, the signals FHB and FHC should shift on-off all the time with a ratio of 1 : 1. If necessary, the ratio can be adjusted on the 2 potentiometers marked B, and C on the photo sensor p.c.b. underneath the reader.

The "backside" of the curve for FHA should come 25% of the length of a whole character later than the "backside" of FHC. Can be adjusted on potentiometer worked A.

The curves for FHA, FHB, and FHC can be measured f.inst. on IC27 pin 9, IC23 pin 2, and IC23 pin 3 on the logic p.c.b.

A way to run the GNT 4601 nearly continuously is to place a tape with delete codes (all 8 signal holes punched) in the reader and set the dip-switch SW-8 on. The reader will then skip all delete characters.

In the GNT 4604 the slide switch for the reader should be set to code conversion and read a tape loop with codes that do not exist in EIA, f.inst. the ASCII-codes for U and * (test code from GNT 3601). The reader will then skip the codes and the motor will run nearly continuously.

Another way is to disconnect the motor cable from the logic p.c.b. and supply the motor with 5 V (red wire +).

Feed Sprocket Adjustment

a) Remove the photo sersor p.c.b.

b) Loosen the Allen screw which fastens the sprocket wheel to the motor axle.

c) Adjust the sprocket position so that the distance from the reference edge to the center-line of the sprocket is 10.06 ± 0.03 mm.

d) Tighten the Allen screw, and recheck the measurement.

e) Replace the photo sensor p.c.b. (see Diagram D4-Z46/29000.

f) When the adjustment is correct, metalized tape should run through the reader without excessive noise.

6.1.4.4 ROUTINE MAINTENANCE

The only maintenance necessary is to keep the tape path and plastic window clean.

6.2 TROUBLE SHOOTING FOR GNT 4604

READER

Symptom	Possible cause
READER ON lights, but reader does not read.	In LINE and CPU, 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 word length not matched to receiver. See Section 2.1.6.
No CR or LF delay.	CR and LF delays are only generated in LOCAL mode and only in the combination 110-300-600 Baud.

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 4604 programmed to wrong data code. See Section 2.1.6. Incorrect word length.
Characters missing.	Handshake problem. Use RTS as handshaking signal, use X-ON/X-OFF in CPU mode 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 RTS goes OFF. When the fault is corrected (e.g. new roll loaded), press LEADER and the stored characters will be punched out. If the punch starts, but stops within a few seconds, check the drive belt to the punch mechanism.
ERROR LAMP flashes.	Framing error. Synchronization error due to Baud rate or word length mismatch. Check for correct DIP-switch setting.

6.3 STATUS AND ERROR MESSAGES FOR GNT 4605

Error (in decimal)	Description
65	Punch error
66	Feed-hole error
68	No tape
72	Buffer empty
73	Buffer empty and punch error
74	Buffer empty and feed-hole error
76	Buffer empty and no tape
80	Buffer overload
81	Buffer overload and punch error
82	Buffer overload and feed-hole error
84	Buffer overload and no tape
96	Buffer full
97	Buffer full and punch error
98	Buffer full and feed-hole error
100	Buffer full and no tape

CONTENTS OF SECTION 7

7.1 PARTS LIST FOR GNT 4601, GNT 4604 AND GNT 4605

(Fig. 7.1 and Fig. 7.2)

Ref. No.	Part No.	Part Name
1	KDSK-16168	GNT 36 Tape Punch, old shaft
1	KDSK-16169	GNT 36 Tape Punch, new shaft
2	Z36/20300	Chad box
3	36/20360	Drive belt Ø=56.7mm
4	Z46/10900	Motor unit (KDVK-14xxx)
		incl.: MY0-52311 Motor
		46/15760 Fan, brown
4	Z46/15210	Motor unit (KDVK-12xxx)
		incl.: MY0-52311 Motor
		46/15760 Fan, brown
5	Z46/29000	GNT 29 Tape Reader
5	46/15660	EMI Tape Reader (only older GNT 4601) replaced by Z46/29000 GNT 29 Tape Reader + Z46/21030 Logic p.c.b.
6	Z46/15010	Top cover
7	36/30260	Felt pad
8	Z36/30210	Tape guide
		excl.: 36/30160 Roller
9	36/30500	Tape width Indicator
10	46/15151	Pushbutton plate (GNT 4601)
10	46/15160	Pushbutton plate (GNT 4604)(KDVK-121xx)
10	46/15161	Pushbutton plate (GNT 4604)(KDVK-141xx)
10	46/15162	Pushbutton plate (GNT 4604)(KDVK-141xx)(9600 Baud)
10	46/25160	Pushbutton plate (GNT 4605)(KDVK-12532)
11	46/15200	Cover for switches
12	46/51170	Lid with spacer (replaces 36/30040)
13	36/30450	Lid bearing
14	34/16180	Nylon washer Ø=6/10*0.5mm
15	MY4-52833	Turntable bearing Ø=6/12mm
16	36/30050	Turntable
17	36/30250	Transparent dish
18	36/30060	Blanking plate
19	Z46/22000	Power supply p.c.b. (KDVK-12xxx)
		incl.: MY2-52550 Fuse T5A
20	Z46/21000	Logic p.c.b. (GNT 4601 with EMI Tape Reader)(KDVK-12xxx)
		excl.: EPROM and microprocessor (pos. 21 and 22)
20	Z46/21020	Logic p.c.b. GNT 4604 (KDVK-121xx)
		excl.: EPROM and microprocessor (pos. 21 and 22)
20	Z46/21030	Logic p.c.b. GNT 4601 with GNT 29 Tape Reader)(KDVK-12xxx)
		excl.: EPROM and microprocessor (pos. 21 and 22)
20	Z46/21050	Logic p.c.b. GNT 4601 and GNT 4604 (KDVK-14xxx)
		excl.: EPROM and microprocessor (pos. 21 and 22)
		46/16020 Protection cover for Logic p.c.b.

Ref. No.	Part No.	Part Name
20	Z46/25100	Logic p.c.b. GNT 4605 (KDVK-12532) excl.: EPROM and microprocessor (pos. 21 and 22)
21	see Section 7.1.1 EPROM	
22	see Section 7.1.2 Microprocessor	
23	MY7-52711	Cord set, US (2 wires)
23	MY7-52240	Cord set, US (3 wires)
23	MY7-52712	Cord set, EU (2 wires)
23	MY7-52816	Cord set, EU (3 wires)
24	46/10852	Transformer (KDVK-14xxx)
24	Z46/15350	Transformer unit (KDVK-12xxx) incl.: MY1-52743 Trafo MY7-52231 Switch MY7-52744 Voltage selector switch
24	Z46/15360	Transformer unit (KDVK-12747) incl.: MY1-56916 Trafo
25	46/15320	A.C. inlet cover
26	Z46/15310	Base incl.: 34/51250 Rubber feet excl.: MY4-52379 Thread bushing
27	MY7-20397	Terminal block
28	36/30330	Leaf spring
29	46/15330	Wire holder strip
30	Z46/15390	Wire set (KDVK-12xxx)
30	Z46/15391	Wire set (KDVK-14xxx)
31	Z46/23000	Keyboard p.c.b. (4601 and 4604)(KDVK-12xxx)
31	Z46/23001	Keyboard p.c.b. (4601 and 4604)(KDVK-14xxx)
31	Z46/23010	Keyboard p.c.b. (4605)(KDVK-12532)
32	Z46/15600	Tension arm unit
33	46/15410	Brake arm
34	46/15420	Rubber brake pad
35	46/15560	Switch plate
36	46/15580	Bushing
37	46/15440	Adjusting piece
38	46/15460	Tension rod
39	MZ7-51380	Microswitch
40	36/30350	Lever arm
41	46/15430	Bearing
42	36/30420	Spring for lever arm
43	46/15400	Spring for brake arm
44	46/15290	Screw
45	36/30490	Label
46	36/30270	Spacer rod
47	36/30360	Shim Ø=7/10*0.5mm

Ref. No.	Part No.	Part Name
not shown:		
	36/30460	Cap
	46/15900	Label for switch setting (GNT 4601)
	46/15911	Label for switch setting (GNT 4604)(KDVK-121xx)
	46/15912	Label for switch setting (GNT 4604)(KDVK-14xxx)
	46/25150	Label for switch setting (GNT 4605)(KDVK-12532)
	Z46/29280	Reversing plug for GNT 29
	Z36/31200	Reversing plug for GNT 36
	HX22-19011	Lock screw (for slide lock)
	HX22-19024	Lock screw (UNC 4*40 thread)
	HX22-19037	Lock screw (2.6 mm thread)

7.1.1 PARTS LIST FOR EPROMS

Ref. No.	Part No.	Part Name
21	Z46/21900	EPROM GNT 4601 with EMI Tape Reader, standard
	Z46/21900	EPROM GNT 4601 with EMI Tape Reader, version A
	Z46/21920	EPROM GNT 4601 with EMI Tape Reader, version B
	Z46/21970	EPROM GNT 4601 with EMI Tape Reader, version C
	Z46/21980	EPROM GNT 4601 with GNT 29 Tape Reader, standard
	Z46/21980	EPROM GNT 4601 with GNT 29 Tape Reader, version A
	Z46/21921	EPROM GNT 4601 with GNT 29 Tape Reader, version B
	Z46/21961	EPROM GNT 4604 (KDVK-12xxx)
	Z46/21962	EPROM GNT 4604 (KDVK-14xxx)
	Z46/25000	EPROM GNT 4605

7.1.2 PARTS LIST FOR MICROPROCESSORS

Ref. No.	Part No.	Part Name
22	Z36/31521	Microprocessor GNT 4601, standard (Tape Punch with old shaft)
	Z36/42511	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, International (Tape Punch with old shaft)
	Z36/42521	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Scandinavia (Tape Punch with old shaft)
	Z36/42531	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Germany (Tape Punch with old shaft)
	Z36/42541	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, US (Tape Punch with old shaft)
	Z36/42551	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, France (Tape Punch with old shaft)
	Z36/42561	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, UK (Tape Punch with old shaft)
	Z36/42571	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Swiss (Tape Punch with old shaft)
	Z36/42581	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Italy (Tape Punch with old shaft)
	Z36/42591	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Australia (Tape Punch with old shaft)
	Z36/42601	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Swiss, IBM (Tape Punch with old shaft)
	Z46/21930	Microprocessor GNT 4601 version B, 5-channel (Tape Punch with old shaft)
	Z36/31522	Microprocessor GNT 4601, standard (Tape Punch with new shaft)
	Z36/42512	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, International (Tape Punch with new shaft)
	Z36/42522	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Scandinavia (Tape Punch with new shaft)
	Z36/42532	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Germany (Tape Punch with new shaft)
	Z36/42542	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, US (Tape Punch with new shaft)
	Z36/42552	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, France (Tape Punch with new shaft)
	Z36/42562	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, UK (Tape Punch with new shaft)
	Z36/42572	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Swiss (Tape Punch with new shaft)
	Z36/42582	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Italy (Tape Punch with new shaft)
	Z36/42592	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Australia (Tape Punch with new shaft)

Ref. No.	Part No.	Part Name
	Z36/42602	Microprocessor GNT 4601 version A, codeconv. ASCII/Telex, Swiss, IBM (Tape Punch with new shaft)
	Z46/21931	Microprocessor GNT 4601 version B, 5-channel (Tape Punch with new shaft)
	Z36/31522	Microprocessor GNT 4604
	Z36/31522	Microprocessor GNT 4605

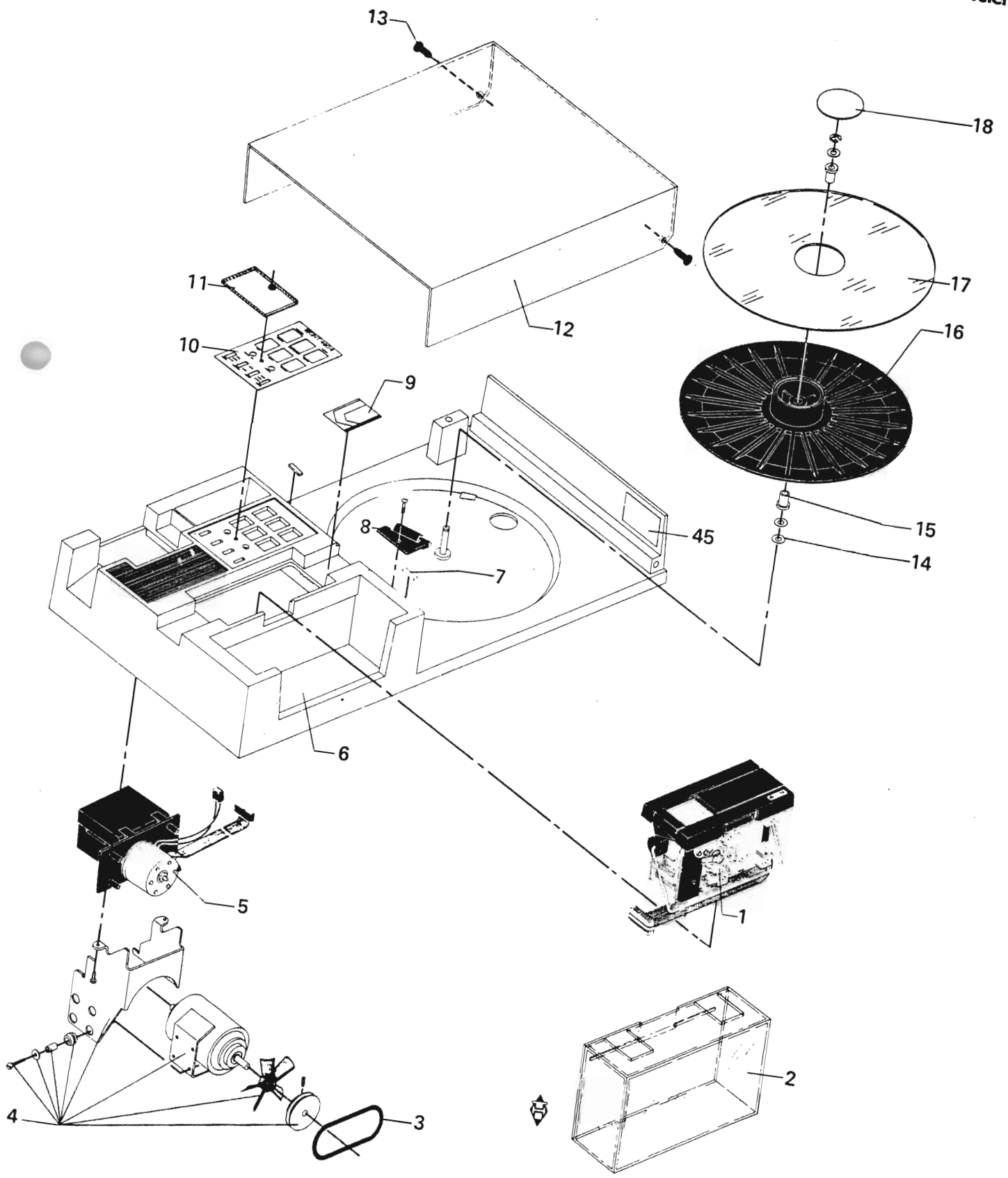

Fig. 7.1

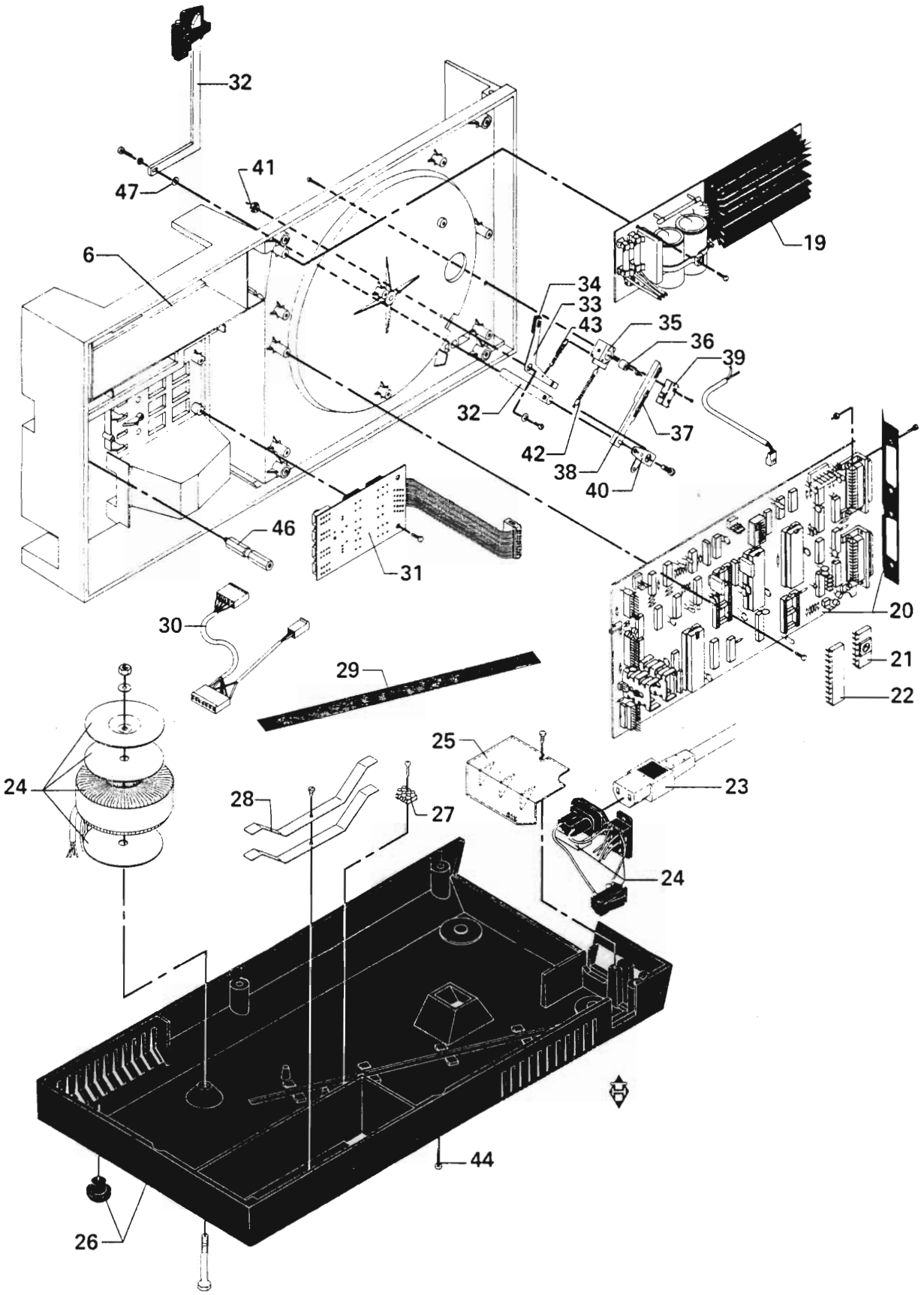
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Fig. 7.2

7.2 PARTS LIST FOR GNT 36 Punch Mechanism

(Fig. 7.3)
(KDSK-16168 and -16169)

Ref. No.	Part No.	Part Name
1	Z36/11730	Top cover unit, black
		incl. 36/10880 Tear off plate
		Z36/10890 Top cover
		36/10930 Chad diverter
		36/10940 Blanking plate
		36/10950 Pop-up window
		36/10960 Thrust pad
		Z36/11750 Chad channel cover plate, black
2	36/10440	Tape guide spring
3	36/10430	Tape guide cover
4	Z36/10370	Punch set, ISO
5	Z36/12060	Selector box unit, 75 char./s (for GNT 4601, 4604 and 5601)
		incl.: Z36/11070 Punching bridge
		36/11430 Cable clamp yoke
		Z36/12510 Signal cable
6	Z36/10490	Tape feed wheel
7	Z36/10590	Clutch mechanism, unit
8	36/10690	Connecting rod
9	36/10170	Jockey eccentric
10	36/10190	Clamp for 36/10170
11	Z36/10700	Tape feed magnet, unit
12	36/11480	Mounting clamp
13	36/11490	Rubber mounting pad
14	Z36/11700	Jockey arm
15	36/10180	Jockey spring
16	36/10460	Clamping ring for feed axle
17	36/10140	Screw, allen
18	Z36/11860	Main shaft 75-6, old type (KDSK-16168)
18	Z36/11870	Main shaft 75-6, new type (KDSK-16169)
19	36/10470	Tape guide plate
20	36/10420	Nut for punch set
21	Z36/10010	Main frame

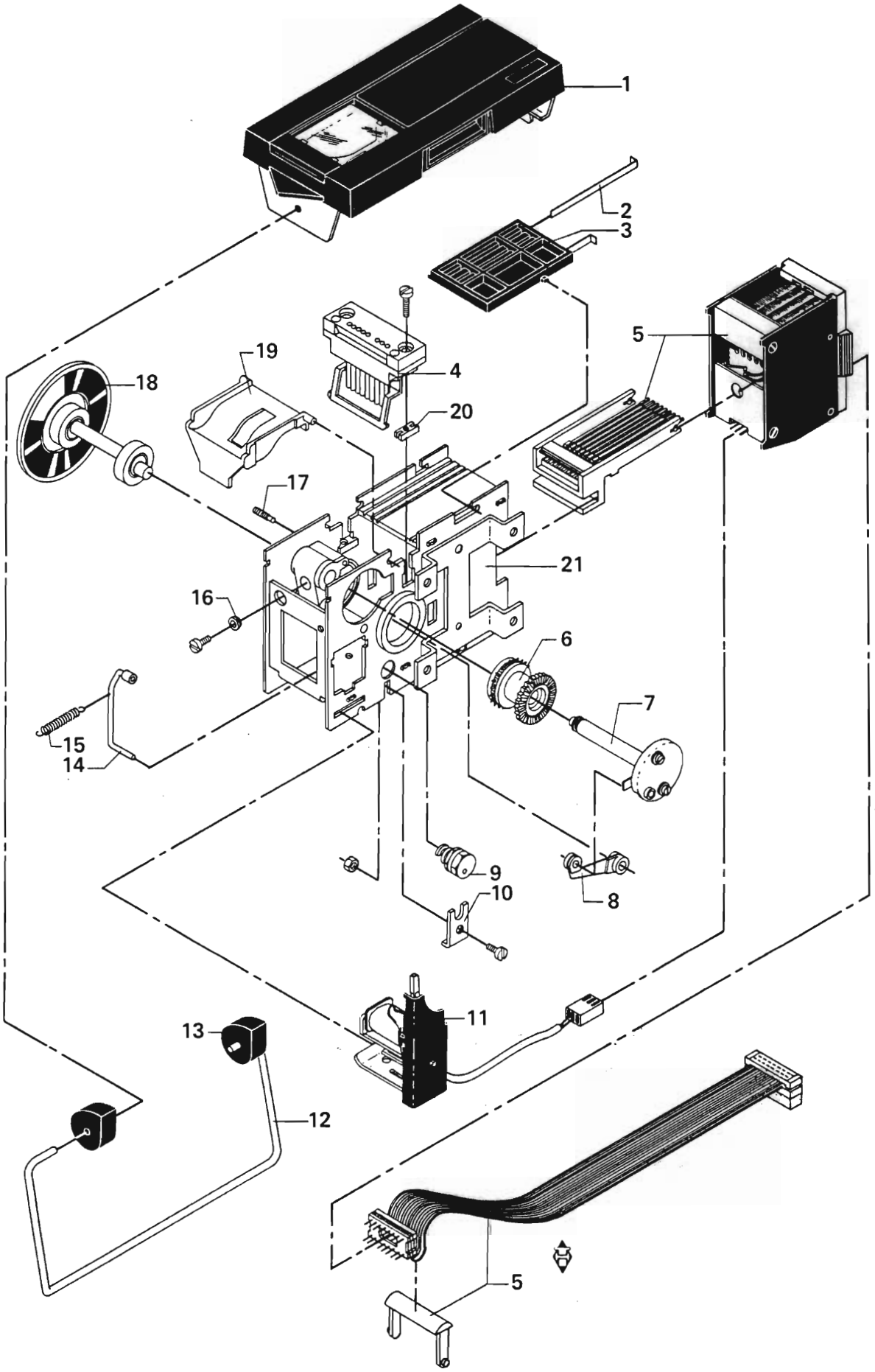

Fig. 7.3

7.3 PARTS LIST FOR GNT 29 TAPE READER

(Fig. 7.4)

Ref. No.	Part No.	Part Name
1	Z46/29200	Photo censor p.c.b.
2	Z46/29250	LED p.c.b.
3	MY7-56231	Molex housing for LED p.c.b. wires
4	Z46/29300	Motor
5	46/29550	Sprocket wheel
6	46/29540	Spring
7	46/29500	Chassis (without Ref. no. 9, 10 and 11)
8	46/29510	Lid
9	46/29490	Pin
10	46/29520	Window
11	46/29530	Knob
not shown:		
	46/29560	Bottom cover

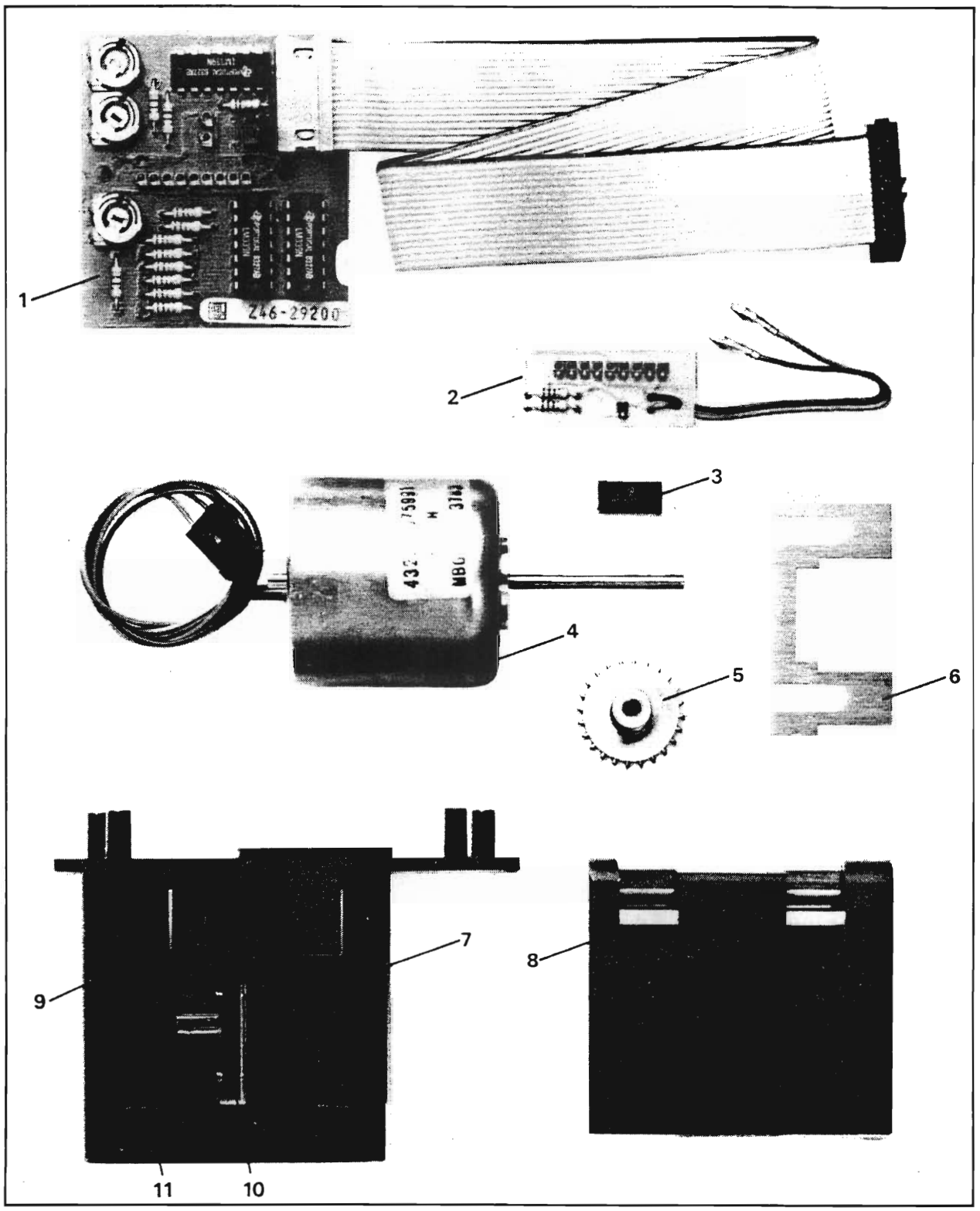

Fig. 7.4