FACIT DATA PRODUCTS

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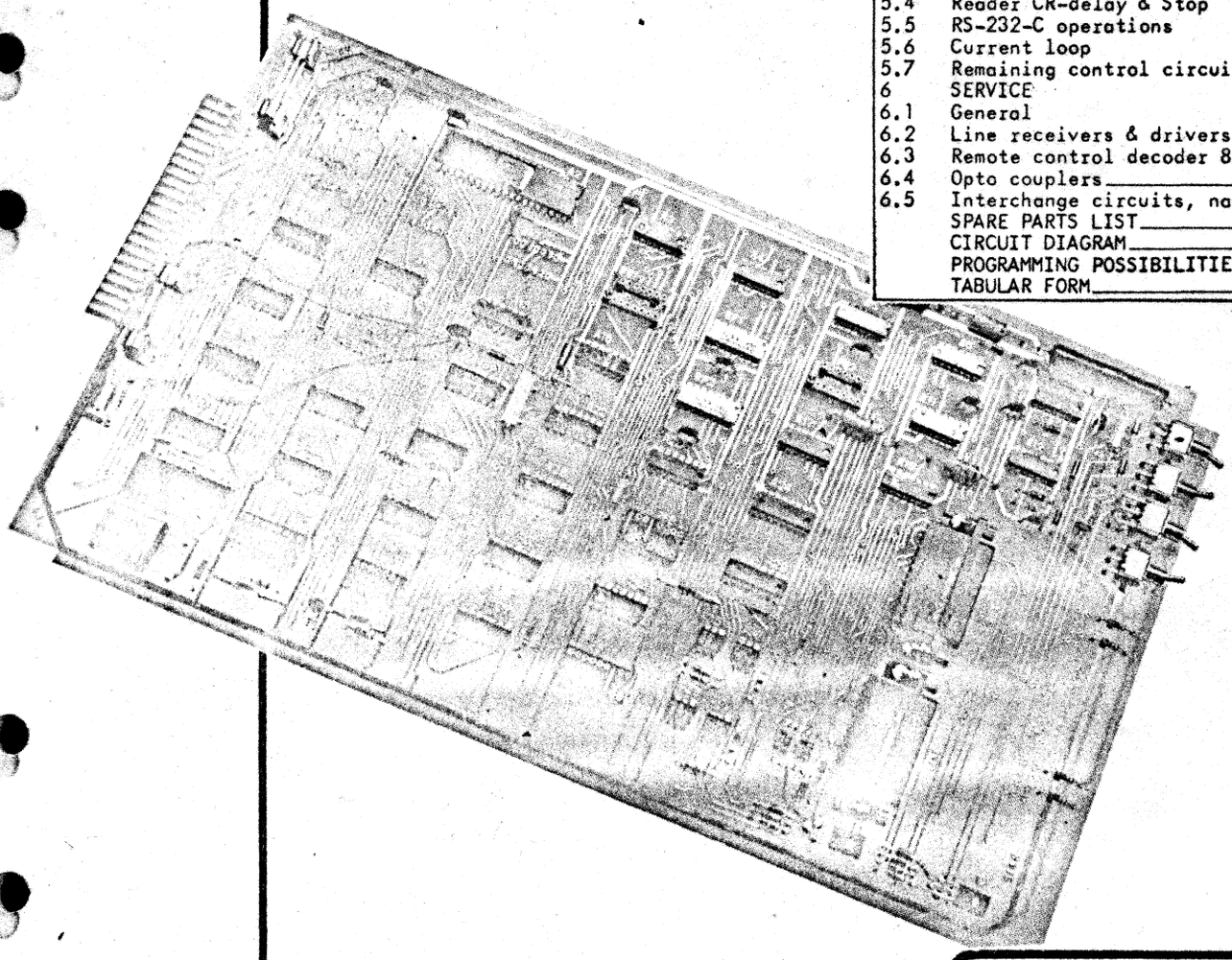

# SERVICE INSTRUCTION
# SPARE PARTS LIST

## 5148
## serial interface for 4040 TAPE PUNCH/READER

Group FD


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## LIST OF ABBREVIATIONS

| | |
|---|---|
| Ⓐ | pulses for man. feed |
| AUX. | auxiliary (-device) |
| Ⓑ | CTS-condition for READER |
| bps | bits per second |
| Ⓒ | freq. to voltage converter |
| C.C.I.T.T. | Comité Consultatif International Télégraphique et Téléphonique |
| CE(L) $\overline{CE}$ | chip enable (low) logical "0" |
| CL | current loop |
| CR | carriage return |
| CTS | clear to send |
| Ⓓ | ERROR from PUNCH or READER |
| DC1-4 | device control 1-4 |
| DR | data available (UART) |
| DRR | data available reset (UART) |
| DTR | data terminal ready |
| EIA | Electronic Industries Association |
| EOT | end of tape |
| FF | flip flop |
| H | high signal, logical "1" |
| PI | punch instruction |
| POR | power on reset |
| PROM | programmable read only memory |
| PSP | punch stop |
| PSS | punch start stop |
| PST | punch start |
| PWB | printed wire board |
| RD | received data |
| "RD" | internal signal name for RD |
| RDS | reader data strobe |
| RID | reader interrupt delay |
| RS | reader step |
| RSS | reader start stop |
| RTS | request to send |
| START(L) | start from 4040 panel |
| STOP(EXT)(L) | stop from 4040 panel |
| TBRL | data strobe for parallel input (UART) |
| TD | transmitted data |
| "TD" | internal signal name for TD |
| TRE | transmitted end of character |
| UART | universal asynchronous receiver/transmitter |

# 1 GENERAL

FACIT 5148 interface is designed for interfacing FACIT 4040 TAPE PUNCH/READER to different communication circuits as shown in Fig. 1. (For abbreviations see page 2)

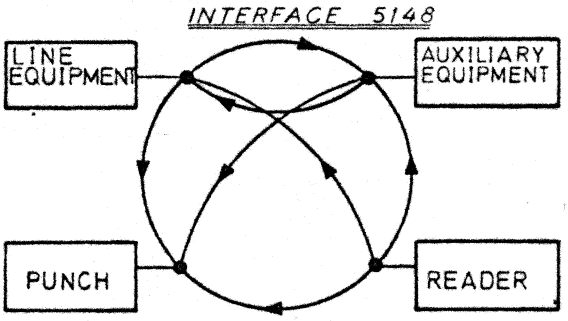



FIG 1 Different data paths possible by jumper set ups

The interface follows the recommendations set up in EIA RS 232-C and C.C.I.T.T. V-24. CURRENT LOOP transmission, 20mA or 60mA, is also incorporated. The interface permits serial data to be received and transmitted to an auxiliary device or to the punch. The interface also permits parallel data to be received from the reader and transmitted to a line device or to the punch or to an auxiliary device. The desired system is intended to be set up at the time of installation but may easily be changed simply by using jumpers and changing the set-up of operational mode switches.

# 2 SPECIFICATIONS

## 2.1 SIGNALS LINE/AUXILIARY

Interchange points between interface and LINE (modem) and interface and AUXILIARY in accordance to C.C.I.T.T.

Received data: data from LINE and AUXILIARY to interface 5148. See Fig. 2.

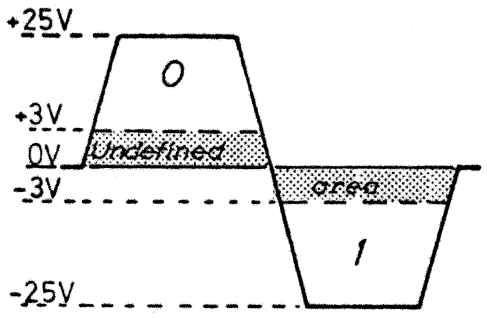



FIG 2

Transmitted data: data from interface 5148 to LINE and AUXILIARY. See Fig. 3.

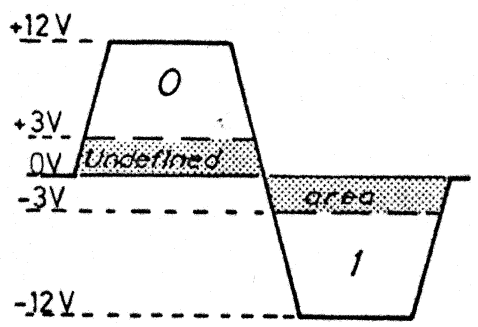



FIG 3

## 2.2 SIGNALS, INTERFACE INTERNAL

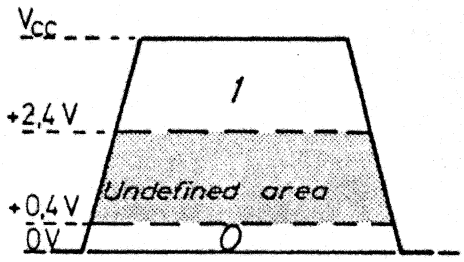



FIG 4

## 2.3 CONNECTORS

Two receptacles, LINE (X3) and AUX (X2) are used. Mating connector shells should only be of type AMP 206478-3 in order to avoid short circuit to the interface. See Fig. 5.

Pin figuration:

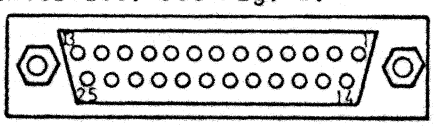



FIG 5

X2 and X3 have the same pin designation. Where the signal straight through is the same point the pin number is encircled.

| Pin | Designation |
|---|---|
| ① | Frame ground/protective ground (101) |
| 2 | Transmitted data (103) |
| 3 | Received data (104) |
| 4 | Request to send (105) |
| 5 | Clear to send (106) |
| ⑥ | Data set ready (107) |
| ⑦ | Signal ground (102) |
| ⑧ | Received line signal detector (109) |
| 9 | Not used |
| 10 | +CL receive/receive CL+ |
| 11 | -CL receive/receive CL- |
| 12 | +CL transmit/transmit CL+ |
| 13 | -CL transmit/transmit CL- |
| 14 | Not used |
| 15 | Not used |
| 16 | Not used |
| 17 | Not used |
| 18 | Not used |
| 19 | Not used |
| 20 | Data terminal ready (108/2) |
| 21 | Signal quality detector (110) |
| 22 | Ring indicator (125) |
| ㉓ | Not used |
| 24 | Not used |
| 25 | Connected but not used |

## 2.4 BAUD RATES

The system uses a frequency 16 times the baud rate. There are two separate selectors for the BAUD RATE operated by jumpers. One for the READER, PS3 and one for the PUNCH, PS 4. In "ON LINE" mode they work independently. In "OFF LINE" mode the BAUD RATE is controlled by the PUNCH selector, PS 4. The following BAUD RATES are available:

READER: 4800-2400-1200-600-300-150-110--75-50 bps.

PUNCH: 600-300-150-110-75-50 bps.

## 2.5 POWER

+24V & +5V are supplied by 4040. Both lines have 1 A fuses. +12V is derived from +24V

line over a Zener-diode. -12V is produced by a half-wave rectification of a frequency, deriving from the BAUD rate generator, that charges a capacitor. A Zener-diode determines the value.

## 2.6 CURRENT LOOP

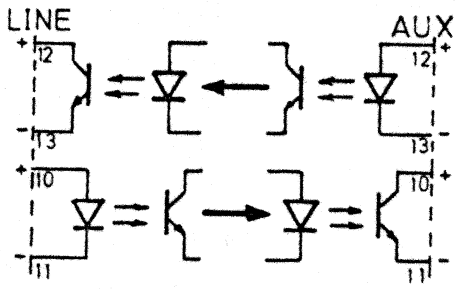



FIG 6 CURRENT LOOP/schematic

Isolated current loop with input resistance:
Rin < 100ohm at 20mA
Rin < 50ohm at 60mA
Voltage drop over output switch: typ. 1V
Protected against inproper connections and reverse transients.

## 2.7 INTERCHANGE CONVENTIONS

| LOGICAL INDICATION | |
|---|---|
| 0 | 1 |
| SPACE | MARK |
| pos.volt(+) | neg.volt(-) |
| ON-state | OFF-state |
| START-bit | STOP-bit |
| no current | current |
| | open circuit |

# 3 CONSTRUCTION & DESIGN

The interface is built up on a PWB. The PWB is inserted into board edge connector K2 of F 4070. On PWB are two receptacles, type DB 25 S, marked AUX(X2) and LINE(X3). On PWB are also four switches, S1 - S4 for operation modes and six jumper plug sockets, PS 1 - 6 which are used for different purposes like BAUD RATE, control conditions etc. There are also possibilities to connect certain signals to ON(+12V) or OFF(-12V) via solder jumpers A & B. See Fig. 13.

# 4 FUNCTION

## 4.1 GENERAL See Fig. 7 & 8.

One main part for PUNCH/READER work is the UART. The other main parts are; BAUD RATE generator and selectors, CHARACTER FORMAT circuits, CR & Stop- decoder for the READER, control circuits for PUNCH/READER, remote control circuits, LINE receivers and drivers, OPTO-couplers, circuits for control signals, MODE control switches and different jumpers for special purposes.

Operations mainly involving the PUNCH and READER will here be explained.

## 4.2 PUNCH See Fig. 8 & 9.

The PUNCH can be operated from all three sources, the READER, LINE or AUXILIARY. In all cases remote control must be used in order to activate punch start and stop. When PI is H a punch cycle may start. The only kinds of information between the interface and the punch are; data channels 1-9, PI and

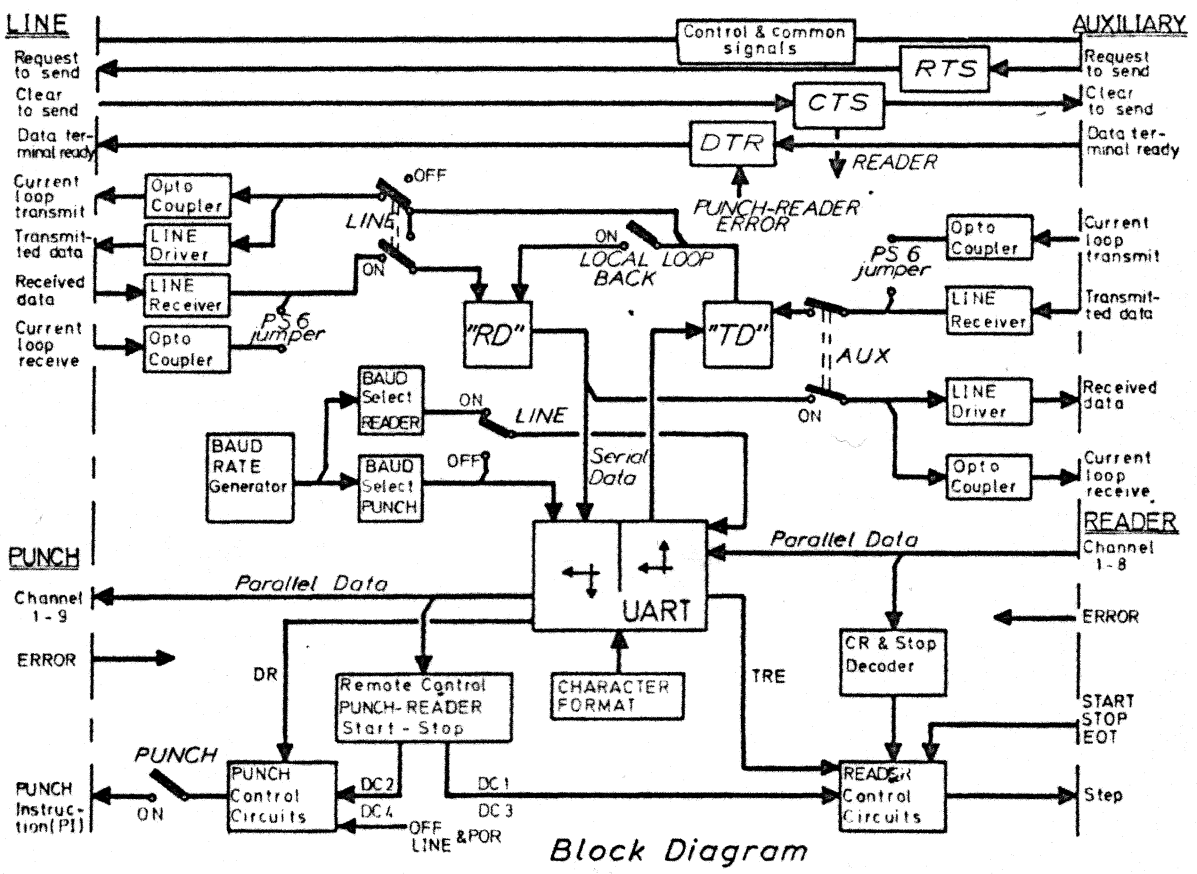



FIG 7 Block Diagram

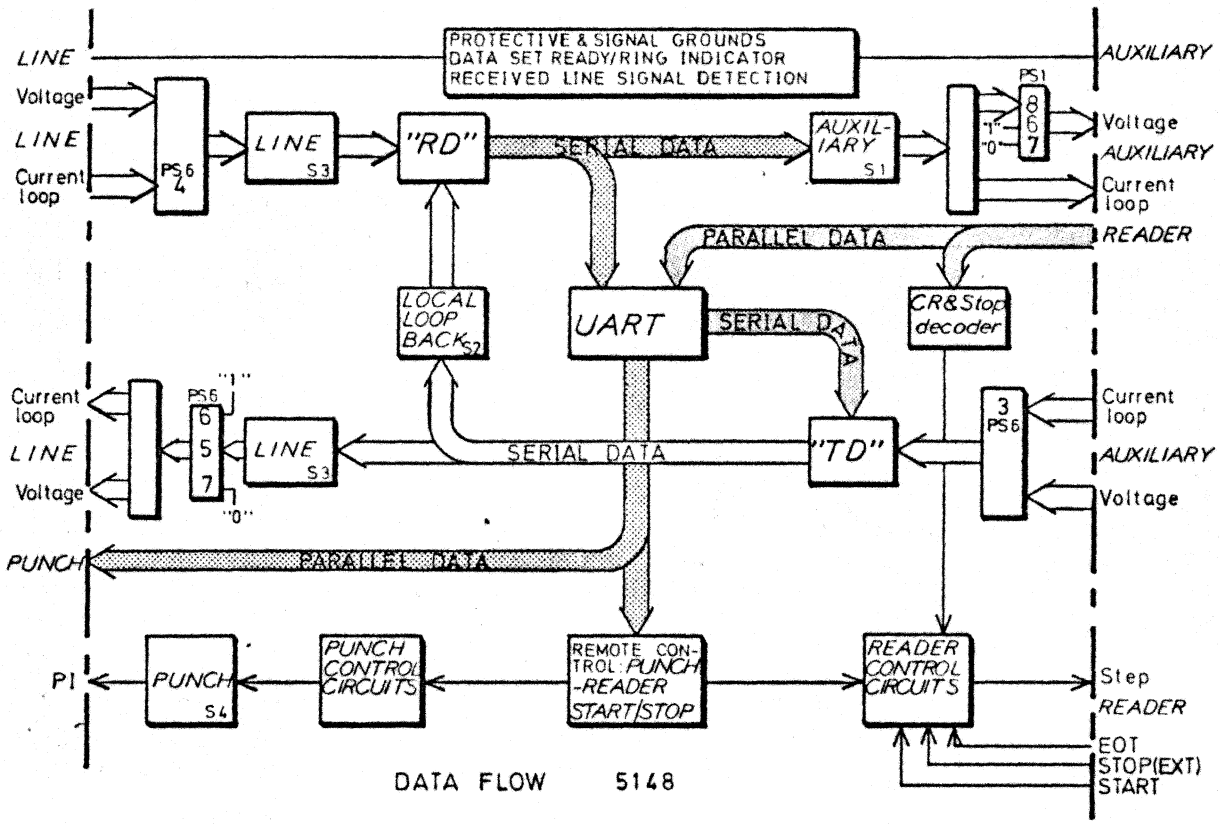



FIG 8 DATA FLOW 5148

ERROR. Data must come from UART together with signal DR. DR is fed back to UART as signal DRR which resets DR. UART accepts data as long as DR=0. A delay between DR and DRR is arranged in circuit: A17:4-C1-A17:5. This is a simulated "data receive" signal. Start condition and DR activate PI. As long as start is active, every DR gives a PI and this continues until start is taken away.

Three FF's are used for the start condition; PST, PSP and PSS. DC2 triggers PST which presets PSS. DC4 triggers PSP which clears PSS. To get DC2 and DC4, jumpers PS2:2 and 4 are used. Switch PUNCH(S4) must be ON when using the PUNCH. Start condition is always on hand when interface is OFF LINE or during POR.

## 4.3 READER See Fig. 8 & 10.

The READER is controlled by RS via RSS and RDS. A negative pulse from RDS initiates RS and Step is sent to the READER which moves the tape to the next word. During RDS, CR & Stop decoder is opened and data are checked for DC3 and CR. This information can be used to stop the READER by using jumper PS2:5 & 6. If so the operation of the READER is stopped and must be started with START. Delay which is controlled by jumper PS2: 7 or 8 affects RDS and thus also RS.

Feed hole on Ch9 together with RSS give TBRL to UART. This is a strobe pulse that transfers the parallel data on Ch1-8 to UART. When UART has transmitted the serial data it also gives a signal, TRE, which is used to trigger RDS (if no Delay or Stop) in order to repeat the operation. Condition CTS from LINE (Ⓑ) has only influence at the first start. If LINE wants to stop the reading, this can only be done by signal DC3 via received data line to RD and UART. Jumper PS2:3 is used. Other means of stopping the READER can be by reading code DC3 on the tape. Otherwise EOT or Stop(L) stop the READER. If Right/Left Feed are depressed on the PUNCH/READER

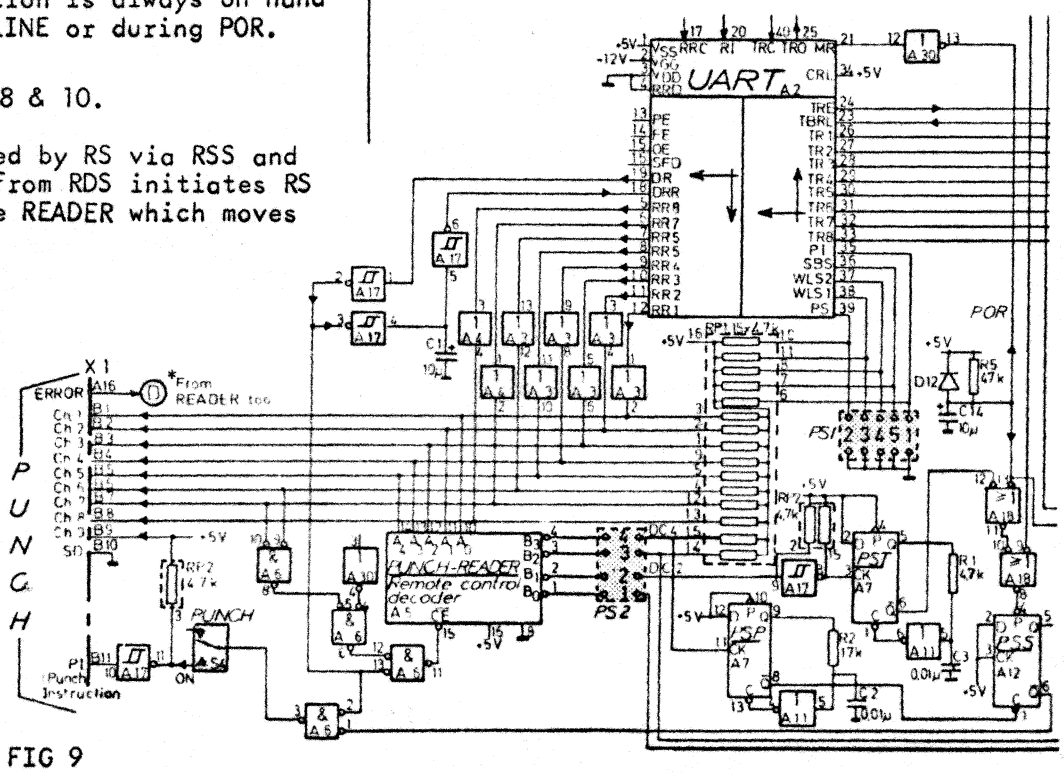



FIG 9

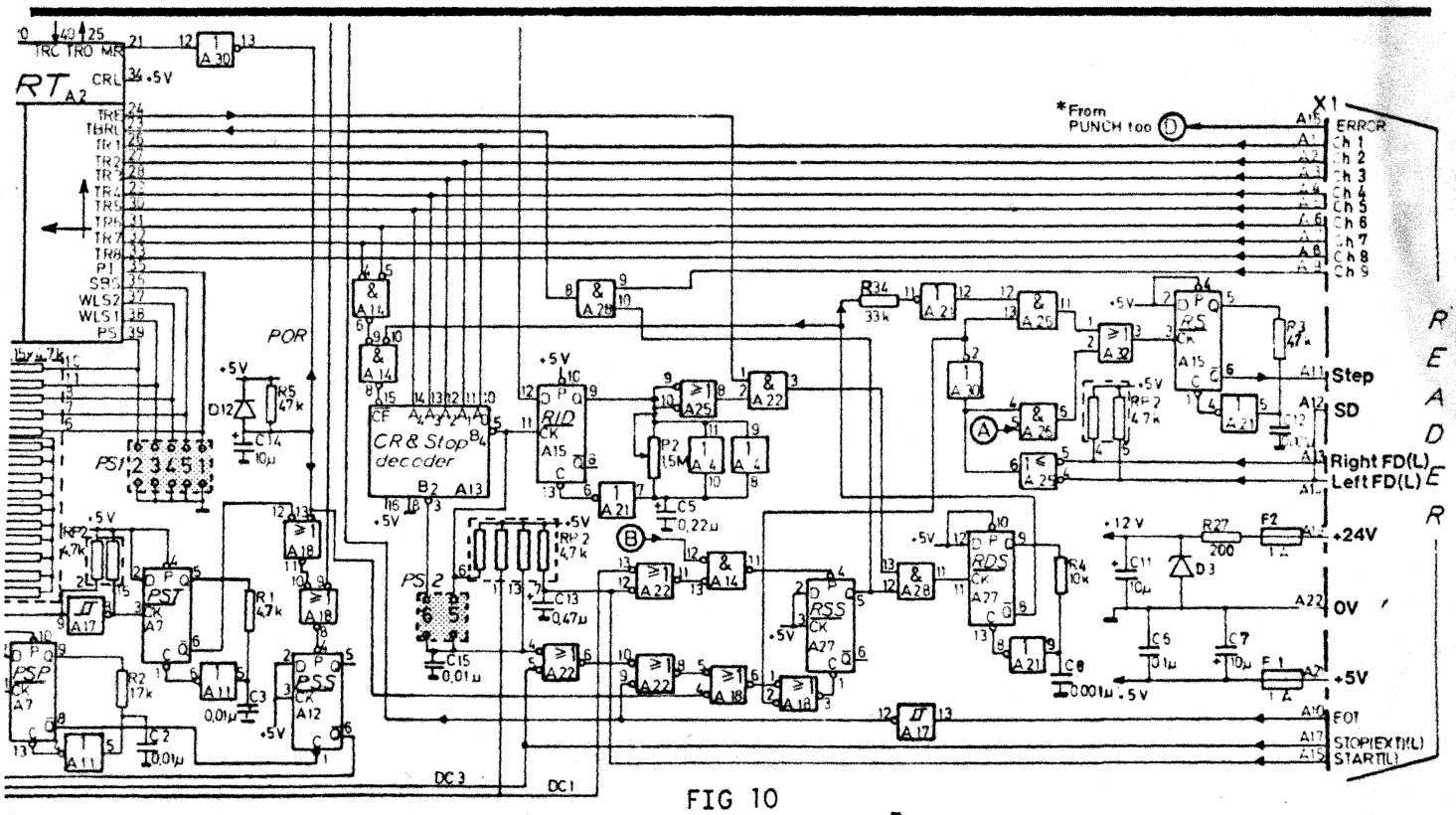



FIG 10

this 0-sets RSS and thus blocks the reading of data to UART. This is a kind of error and the operation read must be started by using START switch on PUNCH/READER. Sometimes the receiving device needs extra time to handle the information. A printer getting CR must have the next word from the READER delayed in order to avoid possible data loss. This can be done by using jumper PS2:5 and RID. TRE from UART is blocked as long as RID is 1-set. The time depends on setting of P2 which can delay from 10ms to 1s. For DC 1-4 see section 5.3.

## 4.4 CLOCK PULSE See Fig. 11.

Clock pulse generation is build up around the BAUD RATE generator A37.

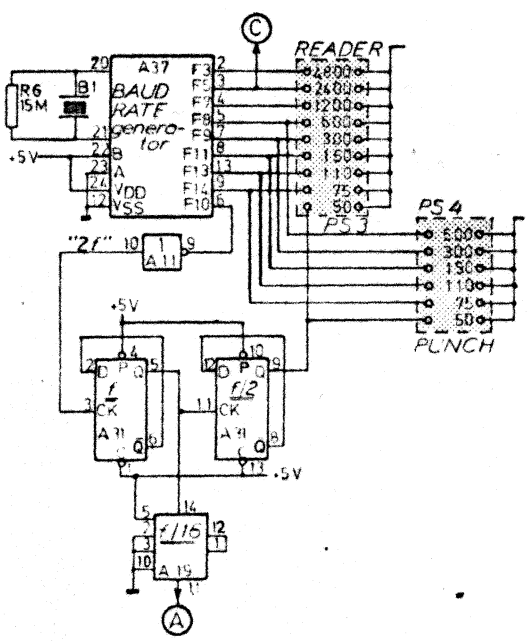



FIG 11

This generator is crystal controlled by B1. The generator makes it possible to get all baud rates except 50 bps directly. See table Fig. 12.

For this purpose F10 (=3200Hz:16=200 bps) is used and the frequency is divided by four.

| Output number | Output rates (Hz) x64 | x16 | x8 | x1 | rate sel. B | A | rate |
|---|---|---|---|---|---|---|---|
| F 1 | 614.4k | 153.6k | 76.8k | 9600 | B | A | |
| F 2 | 460.8k | 115.2k | 57.6k | 7200 | 0 | 0 | x1 |
| F 3 | 307.2k | 76.8k | 38.4k | 4800 | 0 | 1 | x8 |
| F 4 | 230.4k | 67.6k | 28.8k | 3600 | 1 | 0 | x16 |
| F 5 | 153.6k | 38.4k | 19.2k | 2400 | 1 | 1 | x64 |
| F 6 | 115.2k | 28.8k | 14.4k | 1800 | | | |
| F 7 | 76.8k | 19.2k | 9600 | 1200 | | | |
| F 8 | 38.4k | 9600 | 4800 | 600 | | | |
| F 9 | 19.2k | 4800 | 2400 | 300 | | | |
| F10 | 12.8k | 3200 | 1600 | 200 | | | |
| F11 | 9600 | 2400 | 1200 | 150 | | | |
| F12 | 8613.2 | 2153.3 | 1076.6 | 134.5 | | | |
| F13 | 7035.5 | 1758.8 | 879.4 | 109.9 | | | |
| F14 | 4800 | 1200 | 600 | 75 | | | |
| F15 | 921.6k | 921.6k | 921.6k | 921.6k | | | |
| F16 | 1.843M | 1.843M | 1.843M | 1.843M | | | |

FIG 12

* F16 is the buffered oscillator output

F10 is also used in a manual operation with the rocker switch on the control panel of FACIT 4040, Right/Left Feed. First it is divided by two, then by 16 giving signal A (f=100Hz).

## 4.5 OPERATION MODES See Fig. 13..

The interface operation modes are controlled by four switches: S1-4. These are located on the edge of the board.

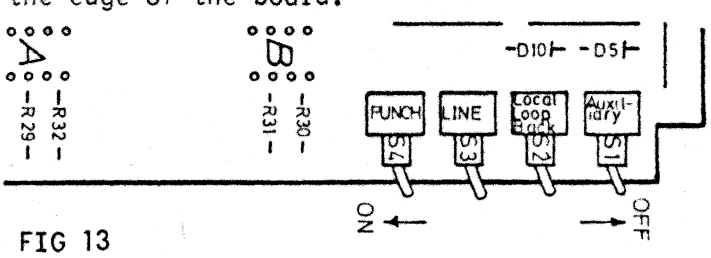



FIG 13

AUXILIARY (S1)
Enables or disables the auxiliary device.

LOCAL LOOP BACK (S2)
With S3 = OFF; S2 state has no meaning, because "TD" becomes "RD" independently of S2.

With S3 = ON; S2 = ON enables transmitted data from either the auxiliary device, (if S1 = ON) or the READER to be presented to the PUNCH, if S4 = ON and other punch start conditions are at hand.

LINE (S3)
When ON, received data from LINE are presented to the interface and the auxiliary device, transmitted data from the interface or the auxiliary device are presented to LINE (full duplex).

Baud rates for PUNCH respectively READER are individually selected.

When OFF, received data from LINE are disabled as well as transmitted data to LINE. Baud rate for the PUNCH and READER is determined by the punch selector. It is possible to have ERROR from PUNCH/READER transmitted as "not CTS" ($\overline{CTS}$) to the auxiliary device if S1 = ON.

S3 = OFF also sets PSS in start condition. It means that any serial data presented to UART, if S4 = ON, will be punched (no need of DC2).

PUNCH (S4)
Enables or disables the punch.

## 4.6 CONTROL SIGNALS See Fig. 14

The control signals concern the information transfer between LINE and AUXILIARY. They are associated with the recommendations set up by RS-232-C and C.C.I.T.T.

Three signals will be discussed:
Data terminal ready (108/2) DTR
Clear to send (106) CTS and
Request to send (105) RTS.

DTR to LINE is a kind of busy signal telling LINE that either the PUNCH or the auxiliary device is ready to accept data from LINE. Note that the OR-function works in such a way that when both are connected, DTR exists as long as any of the two signals are present. By using jumper PS5:1 a constant DTR is set up. This DTR, either from PS5:1 or AUX is transferred only if S1=ON.

CTS to AUX is a signal telling AUX that transmission of data for either the READER(S3=OFF) or LINE is permitted. There are two possibilities to 1-set this signal by jumper PS6:8 or PS5:3. The difference is that PS6:8 affects only AUX while PS5:3 also enables or disables the reader start (RSS) when S3 = ON.

RTS to LINE is a signal that tells LINE that either AUX(RTS if S1=ON) or the READER($\overline{EOT}$) wants to send data if S3=ON. RTS from AUX may be substituted by jumper PS5:2. If S3=OFF, RTS is set with jumper PS5:4.

# 5 PROGRAMMING

## 5.1 CHARACTER FORMAT

Independent of signal standards, RS-232-C or CURRENT LOOP, the following set-ups are necessary: see Fig. 15.

| Jumper socket | pos | designation |
|---|---|---|
| PS 1 | 1 | parity ON |
| | 2 | EVEN parity |
| | 3 | word length |
| | 4 | word length |
| | 5 | 1 stop-bit |

WORD LENGTH

| word bits | pos |
|---|---|
| 5 | 3 & 4 |
| 6 | 4 |
| 7 | 3 |
| 8 | - |

FIG 15

Pos = place where jumpers must be inserted. In other cases - no jumpers.

## 5.2 BAUD RATE, PUNCH/READER See Fig. 16

Set-ups needed for PUNCH/READER operations.

READER BAUD RATE

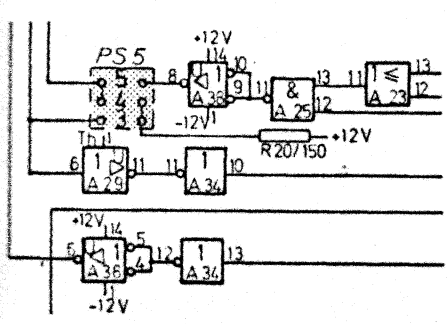
| Jumper socket | pos | designation |
|---|---|---|
| PS 3 | 1 | 4800bps |
| | 2 | 2400" |
| | 3 | 1200" |
| | 4 | 600" |
| | 5 | 300" |
| | 6 | 150" |
| | 7 | 110" |
| | 8 | 75" |
| | 9 | 50" |

PUNCH BAUD RATE

| Jumper socket | pos | designation |
|---|---|---|
| PS 4 | 1 | 600bps |
| | 2 | 300" |
| | 3 | 150" |
| | 4 | 110" |
| | 5 | 75" |
| | 6 | 50" |
| | 7 | not used |

FIG 16

NOTE only one jumper in each socket.
In OFF LINE the READER always has the same baud rate as the PUNCH.



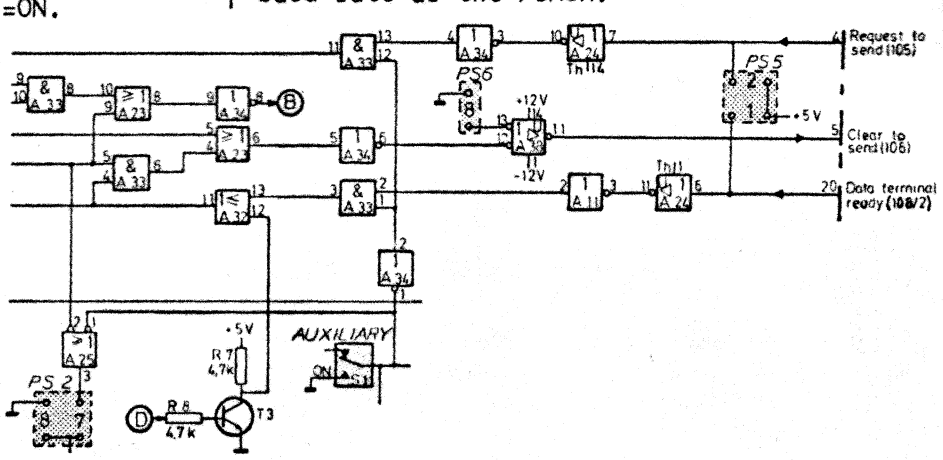




FIG 14

## 5.3 REMOTE CONTROL, PUNCH/READER See Fig. 17

In order to operate the PUNCH/READER the control codes DC1 - DC4 are needed.

| Jumper socket | pos | designation | data bit No. 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|
| PS 2 | 1 | DC1: READER START | | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | 2 | DC2: PUNCH " | | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| | 3 | DC3: READER STOP | | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| | 4 | DC4: PUNCH " | | 0 | 0 | 1 | 0 | 1 | 0 | 0 |

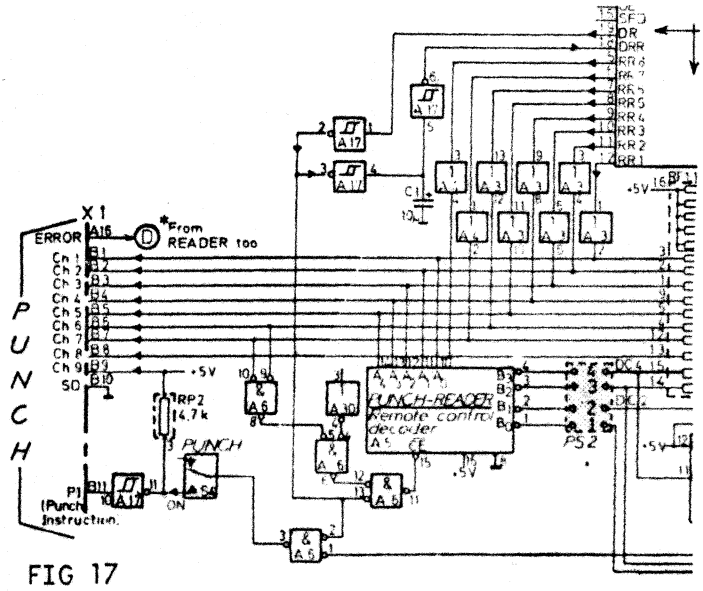



FIG 17

Normally DC1 - DC4 come from LINE or AUXILIARY but when the READER uses the PUNCH, DC1 and DC4 come from the tape.

## 5.4 CR & STOP DECODER See Fig. 18

| Jumper socket | pos | designation | data bit No. 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|---|---|---|
| PS 2 | 5 | "READER" CR | | 0 | 0 | 0 | 1 | 1 | 0 | 1 |
| | 6 | DC3: READER STOP | | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| | 7 | ON {LINE or AUX}: READER INTERRUPT DELAY | | | | | | | | |
| | 8 | No INTERRUPT DELAY | | | | | | | | |

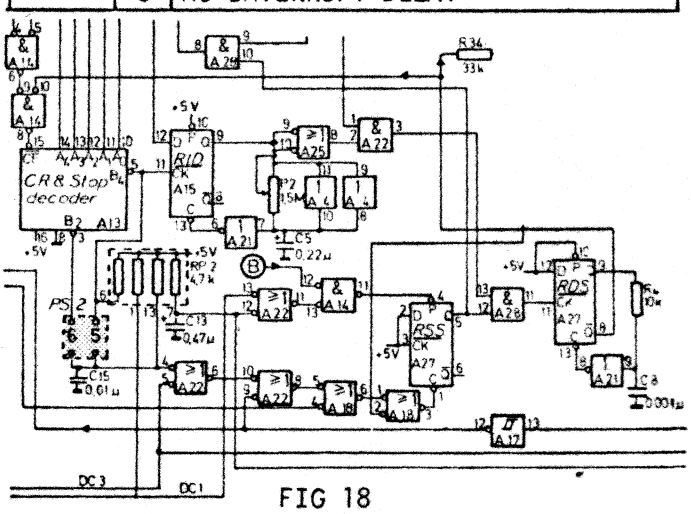



FIG 18

A device performing CR normally needs extra time for the operation. If the control circuits for the READER do not delay the reading a new word would be read and probably lost. The reason is the fact there is no "handshake" between the READER and the other equipment. The normal operation is to read a new word as soon as UART has transmitted the last received word (TRE).

CR signals Clear to RSS via jumper PS2:5 (stop reading). This is a kind of error which must be reset by using START.

RID is controlled by jumper PS2:7 or 8. With no jumper, D-input of RID acts as if the line is H and the delay is independently. PS2:8 means; no delay and PS2:7 means; RID is controlled by either AUXILIARY=ON or LINE=ON.

When using Remote control for Stop (DC3) of the READER it results in reading of extra words from the tape because as soon as the parallel data from the READER exist in serial form, TRE starts the call for the next word. UART must transfer the serial data into parallel data again before the Remote control has the information. To avoid this jumper PS2:6 is used instead of jumper PS2:3.

## 5.5 RS-232-C OPERATION

For operations according to RS-232-C, three jumpers are needed.

| Jumper socket | pos | designation |
|---|---|---|
| PS 1 | 8 | RD to AUX |
| PS 5 | 5 | RTS to LINE |
| PS 6 | 5 | TD to LINE |

This set-up also handles the full duplex operation.

## 5.6 CURRENT LOOP

In CURRENT LOOP operation it is necessary to determine between half duplex or full duplex mode and the current rate at which the transmission shall work.

## 5.7 REMAINING CONTROL SIGNALS

The rest of the jumpers allow certain signals to be forced to fixed conditions. They can be used for testing purposes or specific applications:

| Jumper socket | pos | designation |
|---|---|---|
| PS 1 | 6 | RD(AUX) = 0 |
| | 7 | RD(AUX) = 1 |
| PS 5 | 1 | DTR(AUX) = 1 |
| | 2 | RTS(AUX) = 1 |
| | 3 | CTS(LINE) = 1 |
| | 4 | RTS(LINE) = 1 |
| PS 6 | 6 | TD(LINE) = 0 |
| | 7 | TD(LINE) = 1 |
| | 8 | CTS(AUX) = 1 |

Finally four lines may be set ON or OFF by connecting them to either +12V or -12V with solder jumpers (A & B). See Fig. 19.

| Receptacle X2 & X3 pin No. | designation |
|---|---|
| 8 | Received Line Signal Detector |
| 21 | Signal Quality Detector |
| 22 | Ring Indicator |
| 25 | Not used |

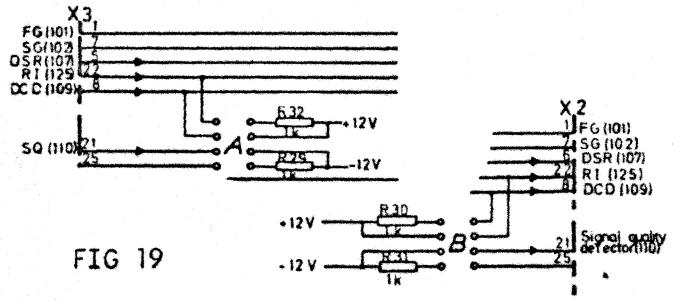



FIG 19

# 6 SERVICE

## 6.1 GENERAL

A test of just the functions of the PWB is easily carried out. By simply applying +5V & +24V, most functions may be tested by means of jumpers, switches and connecting inputs to ON or OFF-state.

Field service have tests as follows: with jumpers as "standard setting" (see Fig. 26), set switches; S3=OFF, S4=ON, S2=ON. Place tape in READER and press "START" (tape should duplicate).

In order to make the understanding of 5148 better some of the none standard circuits are explained.

## 6.2 LINE RECEIVERS & DRIVERS See Fig. 20.

### 6.2.1 Quad line receiver SN 75154

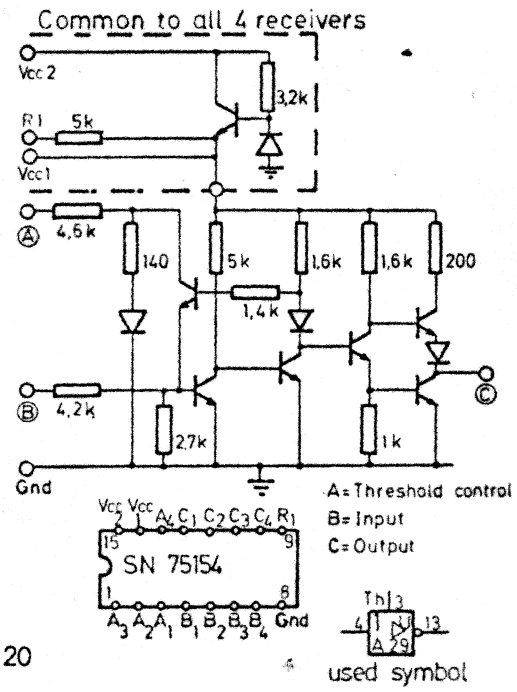



FIG 20

The threshold control has no logical function. It is used here for fail-safe operation by leaving the terminal open. Thus the output will go H if the input goes to 0 or open-circuit condition.

### 6.2.2 Quad line driver MC 1488 L

See Fig. 21.

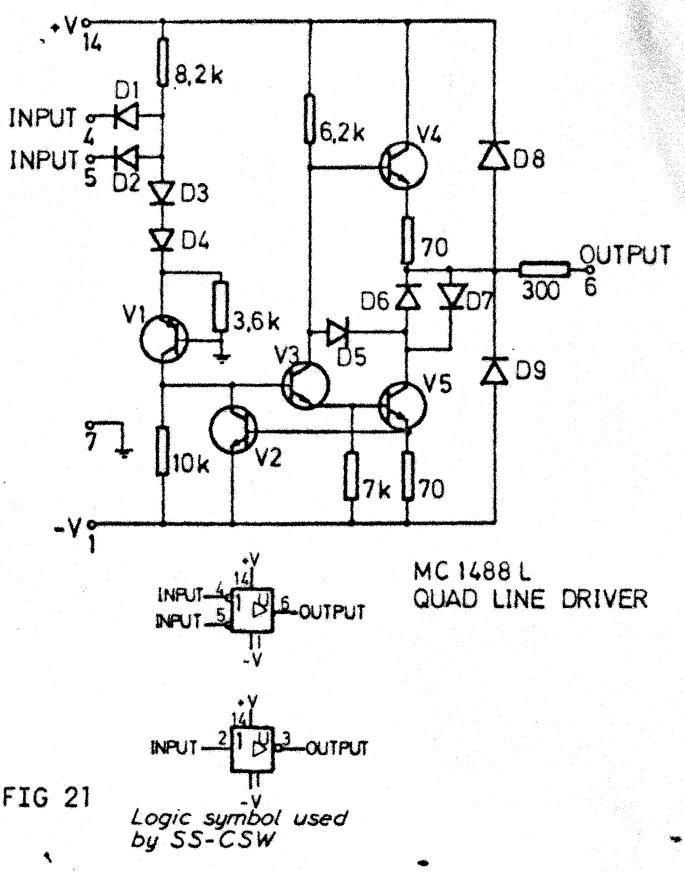



FIG 21

### 6.3 REMOTE CONTROL DECODER: 82 S 23

See Fig. 22.

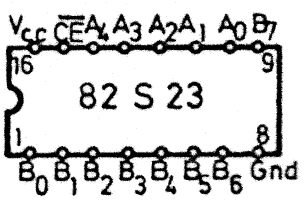



FIG 22

This is a 32 x 8 PROM with open collector output. It contains 32 words, each with 8 bits. The PROM is addressed on A 0-4 and selected with CE(L). The word output is B 0-7. In 5148 a total of 5 words are used. Each word has a single "1" on the B-outputs. The output "1" is represented by a LOW signal.

### 6.4 OPTO-COUPLERS

#### 6.4.1 RECEIVED DATA (A35 & A39)

See Fig. 23

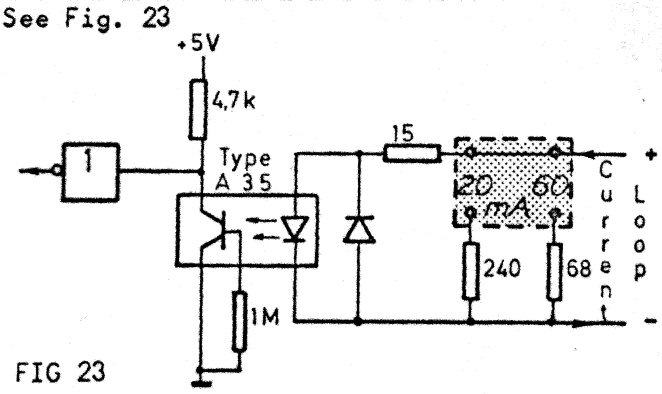



FIG 23

This can be set-up for different currents, 20mA or 60mA, by jumpers PS5:6,7,8,9. With no jumper it is the transmitting device that determines the current value.

### 6.4.2 Transmitted data (A36 & A40)

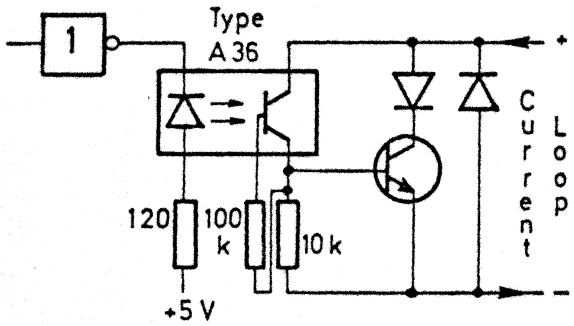



FIG 24

This circuit has no current limiting jumpers. The transistor acts simply as a switch controlled by the opto coupler where the receiving device has to determine the current itself.

### 6.5 INTERCHANGE CIRCUITS, NAME & NUMBERS

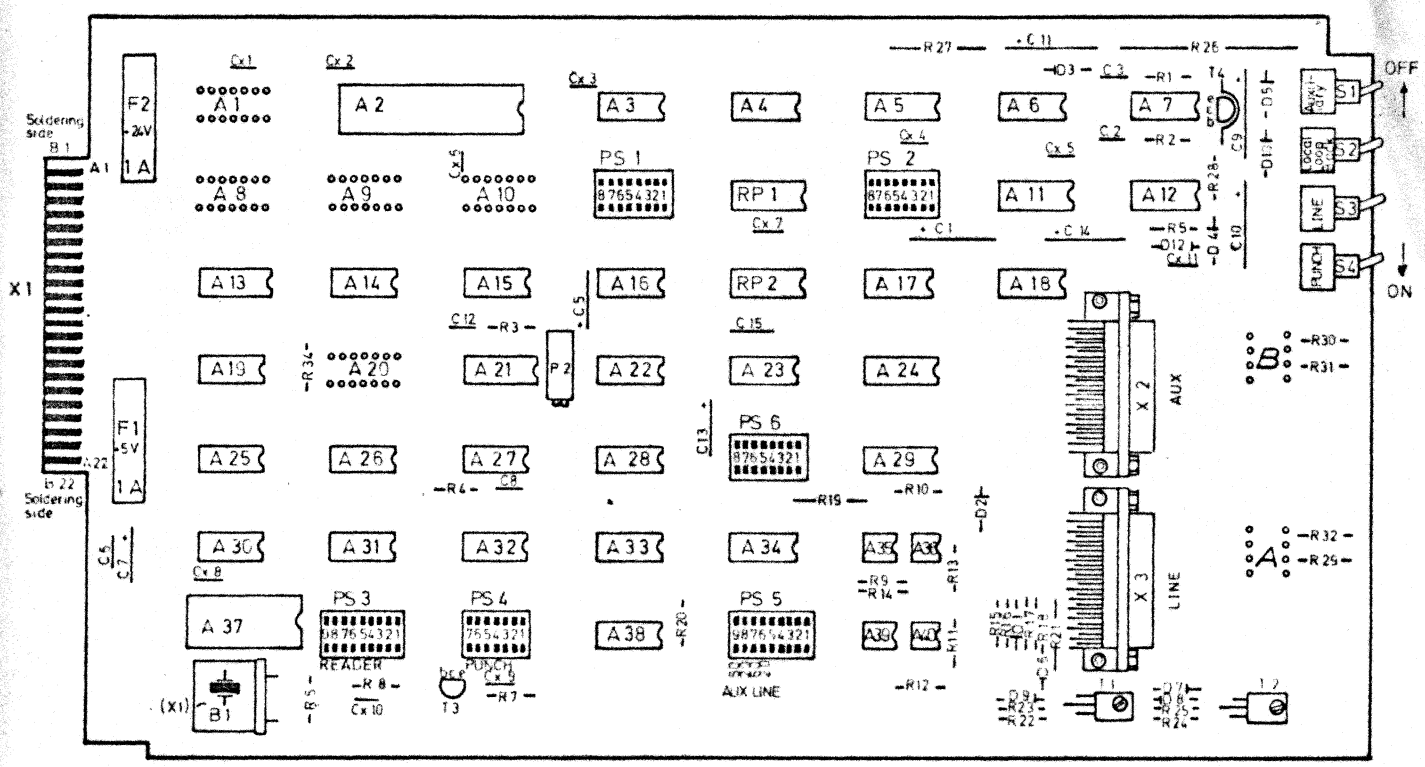
Connectors X2 & X3 with their utilized pins, names and numbers according to C.C.I.T.T. and EIA RS-232-C.

Their normal abbreviations and their signaling directions are included. See Fig. 25.

| X2 X3 pin No. | Interchange circuit, No & name | | DCE → ← DTE |
|---|---|---|---|
| | according to C.C.I.T.T. | according to EIA RS-232-C (name) | |
| 1 | 101/protective ground (earth) | AA/protective ground, frame ground (FG) | |
| 2 | 103/transmitted data | BA/transmitted data (TD) | ← |
| 3 | 104/received data | BB/received data (RD) | → |
| 4 | 105/request to send | CA/request to send (RTS) | ← |
| 5 | 106/ready to sending | CB/clear to send (CTS) | → |
| 6 | 107/data set ready | CC/data set ready (DSR) | → |
| 7 | 102/signal ground | AB/signal ground (SG) | |
| 8 | 109/data channel received signal detector | CF/received line signal detector (DCD) | → |
| 10 | | | |
| 11 | | | |
| 12 | | | |
| 13 | | | |
| 20 | 108/2/data terminal ready | CD/data terminal ready (DTR) | ← |
| 21 | 110/signal quality detector | CG/signal quality detector (SQ) | → |
| 22 | 125/calling indicator | CE/ring indicator (RI) | → |
| 25 | | | |

▒ not used in accordance to standards

FIG 25




| Component designation | | Part No. | Description |
|---|---|---|---|
| A2 | | 1063 60 82-50/4 | UART TMS 6011NC/TR1602B |
| A5,13 | * | 1155 30 00-00/8 | Prom signetics 82S23 |
| A11,21 | * | 1155 30 10-00/7 | IC CD4049 |
| A24,29 | * | 1155 30 20-00/6 | IC SN75154 |
| A35,39 | * | 1155 30 30-00/5 | Opto coupler MCT-2 |
| A36,40 | * | 1155 30 40-00/4 | Opto coupler H11D2 |
| A37 | * | 1155 30 50-00/3 | IC MC14411 |
| T1,2 | * | 1155 30 60-00/2 | Trans MJE340 |
| T3,4 | * | 1155 30 70-00/1 | Trans 2N3417 |
| D1,2,12 | | 1159 19 20-00/2 | Diode 1N914, 1N4148 |
| C1,9-11,14 | | 1062 31 23-50/1 | Cap 10µF 35V |
| C2-4, Cx1-11 | | 1062 10 01-30/3 | Cap 10nF 25V |
| C5 | | 1159 11 59-00/6 | Cap 220nF 35V 10% |
| C6 | | 1595 93 10-10/1 | Cap 0.1µF 25V |
| C7 | | 1159 30 60-30/1 | Cap 10µF 20V 10% |
| C8,12 | | 1062 10 11-30/2 | Cap 1nF 25V |
| C13 | | 1159 30 50-50/0 | Cap 470nF 35V 10% |
| RP1,2 | * | 1155 30 80-00/0 | Res 15x4.7k |

| Component designation | | Part No. | Description |
|---|---|---|---|
| R6 | * | 1155 30 90-00/9 | Res 15M 1/4W 5% |
| R15,17 | * | 1155 31 00-00/6 | Res 240 1/4W 5% |
| R26 | | 1159 23 10-20/2 | Res 150 10W |
| R27 | * | 1155 31 10-00/5 | Res 200 2W 5% |
| R28 | * | 1155 31 20-00/4 | Res 300 1/4W 5% |
| P2 | * | 1155 31 30-00/3 | Res VARIABEL 2M |
| PS1,2,6 | * | 1155 31 40-00/2 | Jumper socket 16-pin |
| PS3,5 | * | 1155 31 50-00/1 | Jumper socket 18-pin |
| PS4 | * | 1155 31 60-00/0 | Jumper socket 14-pin |
| | * | 1155 31 70-00/9 | Jumper for socket: Augat 8136-475G1 |
| S1,2,4 | * | 1155 31 80-00/8 | Switch 1-pole |
| S3 | * | 1155 31 90-00/7 | Switch 2-pole |
| F1,2 | * | 1155 32 00-00/4 | Fuse 1A |
| B1 | * | 1155 32 10-00/3 | X-tal 1.8432MHz SOKOL SC18432 |
| | * | 1155 32 20-00/2 | Heat-sink 292AB for T4 |
| X2,3 | * | 1155 32 30-00/1 | Receptacle 25-pole, AMP 206584-2 |
| | * | 1155 32 40-00/0 | Plug, mating X2,3 AMP 206478-3 |

* Normally not available as spare part

# INTERFACE 5148 CIRCUIT DIAGRAM

LINE

Protective ground
Signal ground
Data Set Ready
Ring Indicator
Received line signal detector

X3
FG (101) 1
SG (102) 7
DSR (107) 6
RI (125) 22
DCD (109) 8
SQ (110) 21 25
RTS (105) 4
CTS (106) 5
DTR (108/2) 20
Transmit CL- 13
Transmit CL- 12
Receive CL- 11
Receive CL- 10
RD (104) 3
TD (103) 2

SURPLUS CIRCUITS

READER

PUNCH

AUXILIARY

X2
FG (101) 1
SG (102) 7
DSR (107) 6
RI (125) 22
DCD (109) 8
Signal quality detector (110) 21 25
Request to send (105) 4
Clear to send (106) 5
Data terminal ready (108/2) 20
Received data (104) 3
-CL Receive 10
-CL Receive 9
-CL Transmit 12
-CL Transmit 13
Transmitted data (103) 2

X1
ERROR A16
Ch 1 B1
Ch 2 B2
Ch 3 B3
Ch 4 B4
Ch 5 B5
Ch 6 B6
Ch 7 B7
Ch 8 B8
Ch 9 B9
SD B10
P1 (Punch Instruction) B11
*From READER too

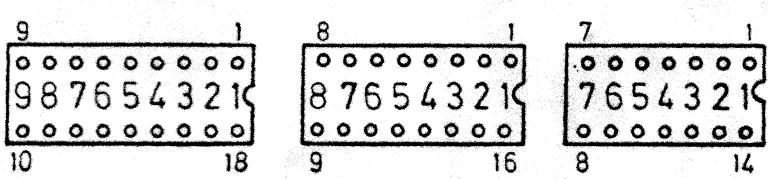
X1
ERROR A16
Ch 1 A1
Ch 2 A2
Ch 3 A3
Ch 4 A4
Ch 5 A5
Ch 6 A6
Ch 7 A7
Ch 8 A8
Ch 9 A9
EOT A10
STOP(EXT)(L) A17
START(L) A15
Step A11
SD A12
Right FD(L) A13
Left FD(L) A14
+24 V A19
0 V A22
+5V A21
*From PUNCH too

78.03.20/ajs:SS - CSW/II - 78.04.04 / III-78.05.09/IV

PROGRAMMING POSSIBILITIES IN TABULAR FORM

| Function | Jumper | Jumper position | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| RS-232-C | 1 | | | | | | | | | (1) |
| | 5 | | | | | (1) | | | | |
| | 6 | | | | | (1) | | | | |
| Current loop | 6 | | | 1A | 1L | 1L | 0L | 0L | | |
| Line receiver 20mA | 5 | | | | | | 1 | | | |
| Line receiver 60mA | 5 | | | | | | | 1 | | |
| Auxiliary receiver 20mA | 5 | | | | | | | | 1 | |
| Auxiliary receiver 60mA | 5 | | | | | | | | | 1 |
| Half duplex (current loop only) | 6 | 1L | 1A | | | | | | | |
| Full duplex current loop and RS-232-C | 6 | 0 | 0 | | | | | | | |
| Baud rate reader (bps) | 3 | 4800 | 2400 | (1200) | 600 | 300 | 150 | 110 | 75 | 50 |
| Baud rate punch (bps) | 4 | (600) | 300 | 150 | 110 | 75 | 50 | | | |
| Parity ON | 1 | (1) | | | | | | | | |
| Parity OFF | 1 | 0 | | | | | | | | |
| Parity ODD | 1 | | (1) | | | | | | | |
| Parity EVEN | 1 | | 0 | | | | | | | |
| Word length 5 bits | 1 | | | 1 | 1 | | | | | |
| Word length 6 bits | 1 | | | | 1 | | | | | |
| Word length 7 bits | 1 | | | (1) | | | | | | |
| Word length 8 bits | 1 | | | 0 | 0 | | | | | |
| One stop bit | 1 | | | | | (1) | | | | |
| Two stop bits | 1 | | | | | 0 | | | | |
| Remote control:DC1 reader start | 2 | (1) | | | | | | | | |
| Remote control:DC2 punch start | 2 | | (1) | | | | | | | |
| Remote control:DC3 reader stop | 2 | | | (1) | | | | | | |
| Remote control:DC4 punch stop | 2 | | | | (1) | | | | | |
| Reader stop: CR (tape) | 2 | | | | | (1) | | | | |
| Reader stop: DC3 (tape) | 2 | | | | | | (1) | | | |
| Carriage return delay: YES | 2 | | | | | | | (1) | | |
| Carriage return delay: NO | 2 | | | | | | | | 1 | |

1 : jumper required
0 : no jumper
() : standard factory program
L : LINE
A : AUXILIARY




PS3, PS5 PS1, PS2, PS6 PS4

FIG 26