# AHB/AOCR

# ELECTRONIC INDICATION UNIT

# AND

# TRANSMISSION SYSTEM

January 1989

## Electronic Indication Unit

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## Introduction

The purpose of the AHB/AOCR Electronic Indication Unit is to provide the signalman with an indication of the condition of an automatic crossing in his section.

These indications are given by LED's mounted on the faceplate of the unit and are as follows:-

**Crossing in order, power off** (red) - LED 1

**Crossing in order, power on** (yellow) - LED 2

**Failed/local control** (red) - LED 3

The faceplate also contains two switches.

Switch 1 Positioned between LED 1 and LED2 and engraved with a line which should be aligned with the valid indication.

Switch 2 Positioned between LED 2 and LED 3. Again the knob has been engraved with a line which should be aligned with the valid indication.

Operation

Normally only one LED will be lit and no action will be required by the signalman. Since the normal condition of the crossing is "Crossing in order, power on" this will be LED 2.

**Should there be a loss of power at the crossing** LED 2 will go out and LED 1 will flash. A buzzer will sound, to draw the signalman's attention to the change of state, and he will be required to acknowledge this by changing the position of switch 1 (aligning the knob with the valid indication).

When the switch is correctly positioned LED 1 will be constantly lit and the buzzer will be silenced.

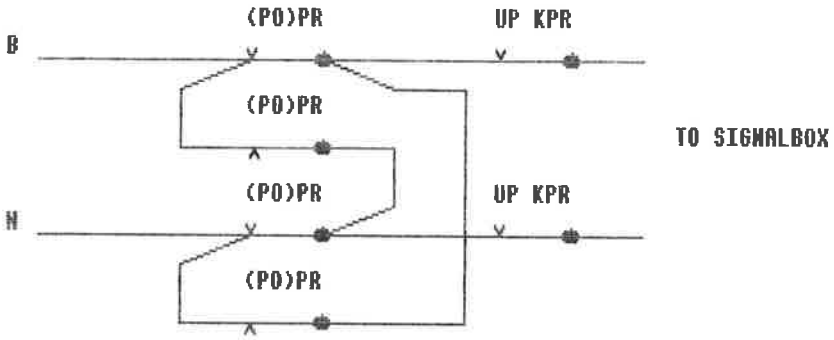
When the power is restored, LED 1 will go out, LED 2 flash, and the buzzer sound (until the switch is aligned with LED 2, acknowledging restoration and steadying LED 2).

**Should the crossing fail or local control be taken** (e.g. for maintenance purposes), LED 1 and LED 2 will go out, LED 3 will flash and the buzzer will sound (to draw the signalman's attention to the change of state). He will then be required to acknowledge this by changing the position of switch 2 (aligning the knob with the valid indication). LED 3 will then steady.

When the fault is rectified, or control is returned to the signalman, LED 2 will flash and the buzzer sound. The signalman should acknowledge this by realigning switch 2 with LED2 (power on). LED 2 will then steady.

Implementation

The circuit shown is required at the crossing.




**When the barriers are raised** the UP KPR (barriers up indication repeat relay) is **energised.**

This sends a voltage from the crossing, (via a pole route, cables or a mixture of both), to the signalbox. The presence of this voltage on the line is detected by the Electronic Indication Unit which gives a **crossing in order** indication.

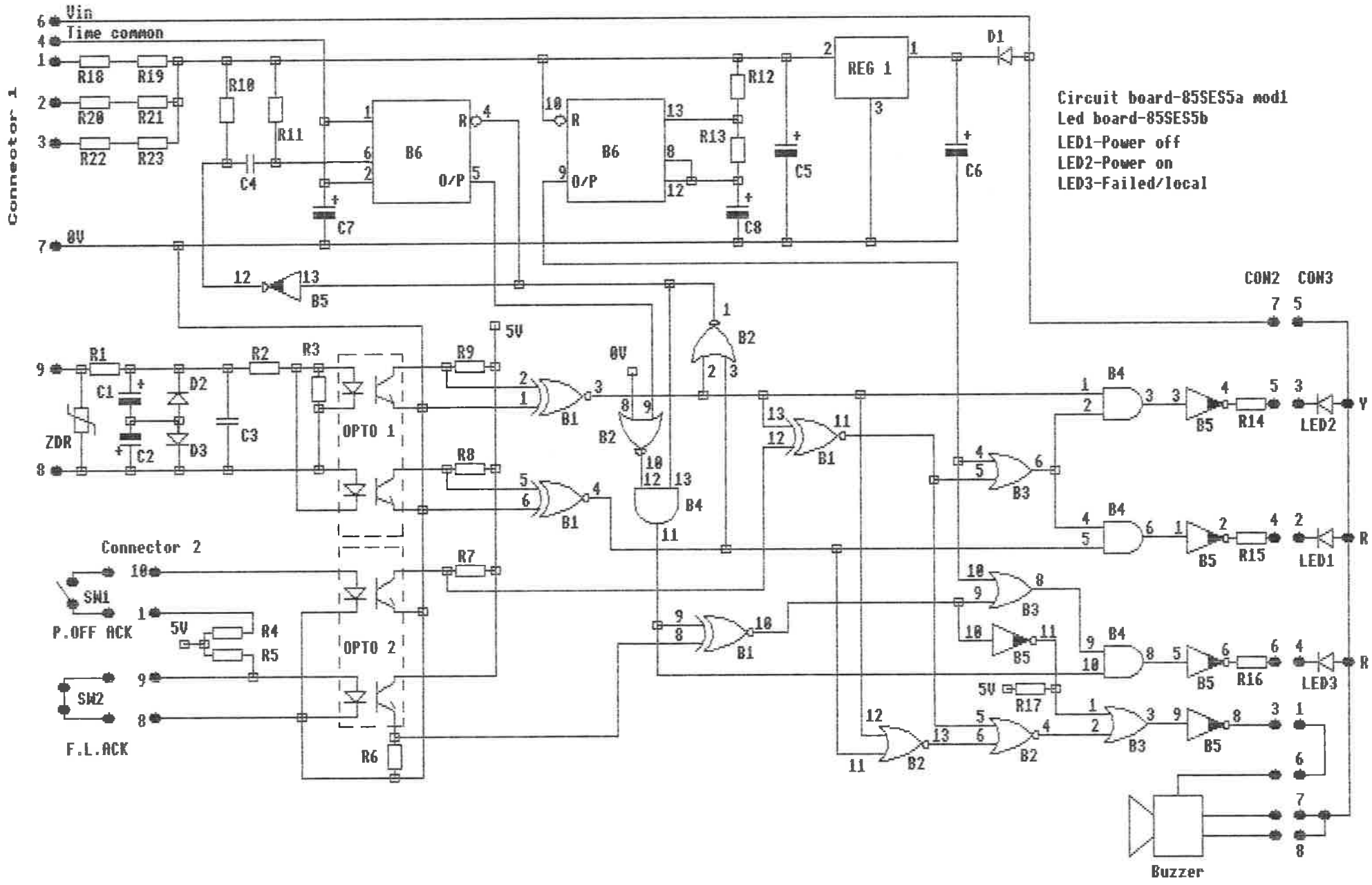
The contacts of the (PO)PR power on repeat relay form a pole change circuit. Thus, with the barriers up, the polarity of the line voltage present at the Electronic Indication Unit can be used to determine whether power is present at the crossing.

**When the barriers are down** the UP KPR is **de-energised** and the feed from the crossing to the signal box is cut. The Electronic Indication Unit detects that no voltage is present on the line.

During the crossings normal operation the barriers will be lowered. To prevent this giving a false failure indication, a time delay is built into the Electronic Indication Unit as follows:-

| | | |
|---|---|---|
| AHB | Single line working | 3 mins. |
| | Double line working | 4 mins |
| AOCR | No delay | |

If the voltage is still not present on the line after this delay a **failed/local** indication will be given.


Connector 1
Vin
Time common
0V
R18
R19
R20
R21
R22
R23
R10
R11
C4
C7
B6
O/P
R12
R13
C5
C8
REG 1
D1
C6
Circuit board-85SES5a mod1
Led board-85SES5b
LED1-Power off
LED2-Power on
LED3-Failed/local
CON2
CON3
B5
B2
5V
R1
R2
R3
R9
R8
R7
C1
C2
C3
D2
D3
ZDR
OPTO 1
OPTO 2
B1
B4
B3
R14
R15
R16
R17
LED2
LED1
LED3
Y
R
Connector 2
SW1
P.OFF ACK
SW2
F.L.ACK
R4
R5
R6
Buzzer

The circuit can be considered as consisting of the following section:-

**SUPPLY REGULATION:-** The logic circuit requires a smooth, constant 5VDC supply to operate correctly. The circuit is based on National Semiconductor's LM340 series fixed rail voltage regulator and requires a minimum input voltage of 7VDC. A series diode (D2) is provided for reverse voltage protection.

**INPUT:-** The circuit will operate over a voltage range of 24 to 50 volts. This part of the circuit is completely isolated from the rest of the card by the use of the opto-isolator OPTO 1 (ILCT6) and forms a buffer between the lines and the logic circuit.

**THE 556 TIMER:-** The 556 timer is split into two sections:-

1. Monostable - used for timing.

2. Oscillator - provides flashing LED supply.

The monostable provides the desired delay in response to the changes at the crossing.

The oscillator is used to produce a flashing supply and its timing components are selected to give an output of 1Hz.

**LOGIC:-** This decodes the line voltage to give the required indications.

**OUTPUT:-** The drive circuit for the LED's and buzzer is an open collector, inverting buffer (MM7406). This enables the indications to be driven from the unregulated supply thus isolating them from the logic.

Diagrams included: Circuit Diagram.
Front & Back panel drilling details.
Front panel labeling.

Description Mod1

The unit is built in a Bicc Vero "Apollo" case (seafoam & chocolate brown - SES standard colours).

The back panel is brushed aluminium and is machined to allow the fitting of the barrier and marker strip (Drawing No.4).

The front panel is chocolate brown plastic and is machined to accommodate the buzzer, two switches and three Led's (Drawing No.4).

Earlier versions had painted aluminium front and back panels (Drawing No.3).

The circuit board (85SES5A Mod1) is populated using the circuit diagram, material list and silk screen legend on the printed circuit board bearing in mind that Connector 1 is mounted on the underside of the PCB. The PCB is located in the position nearest the rear panel with the components facing the front panel. This aids the removal of the lid.

The circuit board (85SES5B) is populated using the circuit diagram, material list and silk screen legend on the printed circuit board bearing in mind that Led's 1,2 and 3 are mounted on the underside of the PCB. This board is mounted on the front panel by the Led lenses.

Ribbon cables connect the barrier strip to connector 1 and connector 2 to connector 3. The buzzer is also terminated on connector 3.

Connector allocation:-

| Connector 1 | Core colour | Barrier strip |
|---|---|---|
| 1 | Black | 1 |
| 2 | Brown | 2 |
| 3 | Red | 3 |
| 4 | Orange | 4 |
| 5 | Yellow | -- |
| 6 | Green | 7 |
| 7 | Blue | 8 |
| 8 | Violet | 11 |
| 9 | Grey | 12 |
| 10 | ---- | -- |

Connector allocation cont.

| Connector 2 | Core colour | Allocation | Connector 3 |
|---|---|---|---|
| 1 | Grey | SW 1 pull up | |
| 2 | ---- | | |
| 3 | Black | Buzzer o/p | 1 |
| 4 | Brown | Power off | 2 |
| 5 | Red | Power on | 3 |
| 6 | Orange | Failed/Local | 4 |
| 7 | Yellow | unregulated Supply | 5 |
| 8 | Green | SW 2 | |
| 9 | Blue | SW 2 pull up | |
| 10 | Violet | SW 1 | |
| | Black | Buzzer i/p | 6 |
| | Red | Buzzer unreg. sup. | 7 |
| | White | Buzzer unreg. sup. | 8 |

See **NOTES** for further details.

The connections to the terminal barrier strip mounted on the back panel of the unit are as follows:-

Terminal 1: 1 second. (Immediately)
Terminal 2: 3 minutes.
Terminal 3: 4 minutes.
Terminal 4: Time common.
Terminal 5: No connection.
Terminal 6: No connection.
Terminal 7: B12. Recommended supply voltage
Terminal 8: N12.
Terminal 9: No connection.
Terminal 10: No connection.
Terminal 11: -ve Line normal.
Terminal 12: +ve Line normal.

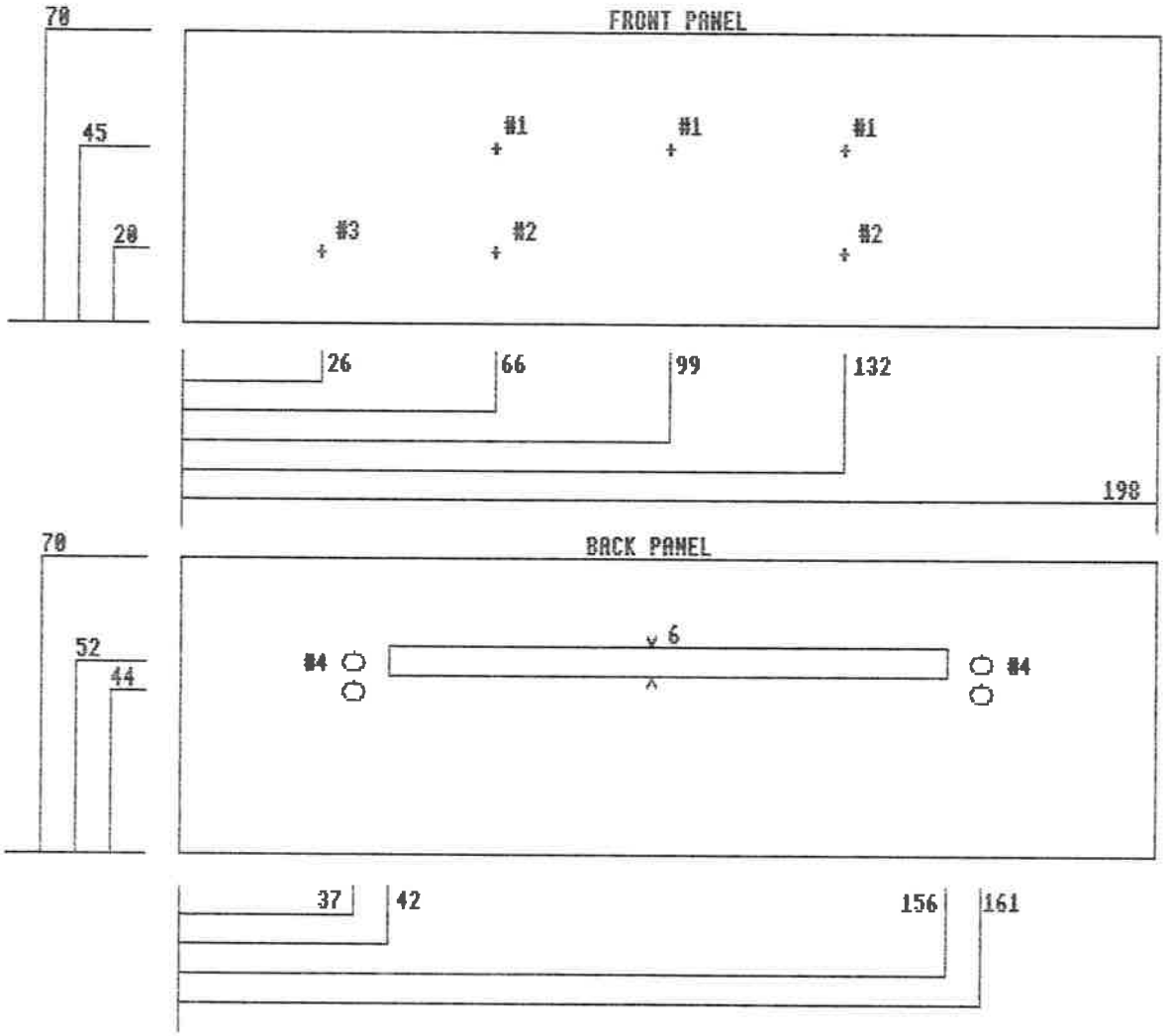
NOTE:

Time delays **MUST** be set by linking terminals 1, 2 or 3 to terminal 4 as required.

To prevent the unit from timing out link terminal 4 to terminal 8.

| COMPONENT | DESCRIPTION | MAIN SUPPLIER | STOCK NO. | QTY. |
|---|---|---|---|---|
| OPT 1,2 | ILCT 6 | STC | 34629H | 2 |
| REG 1 | LM340T5 | STC | 33147H | 1 |
| B1 | 74HC266 | STC | 50503C | 1 |
| B2 | 74HC02 | STC | 58149X | 1 |
| B4 | 74HC08 | STC | 58151A | 1 |
| B3 | 74HC32 | STC | 09008E | 1 |
| B5 | 7406 | STC | 30999R | 1 |
| B6 | 556 TIMER | STC | 99484B | 1 |
| R14,15,16 | 560R 0.6W | FARNELL | MRS25 560R | 3 |
| R1 | 4K7 0.4W | FARNELL | SFR25 4K7 | 1 |
| R3 | 820R 0.4W | FARNELL | SFR25 820R | 1 |
| R2,4,5 | 2K7 0.4W | FARNELL | SFR25 2K7 | 3 |
| R6,7,8,9,10,11,17 | 10K .4W | FARNELL | SFR25 10K | 7 |
| R12 | 47k 0.4W | FARNELL | SFR25 47K | 1 |
| R18 SOT | 100K 0.4W | FARNELL | SFR25 100K | 1 |
| R13 | 470K 0.4W | FARNELL | SFR25 470K | 1 |
| R20 SOT | 15M 0.25W | STC | 54147B | 1 |
| R22 SOT | 22M 0.25W | STC | 54151X | 1 |
| CD9,10,11,12,13,14 | 10nF 5mm | FARNELL | 143-674 | 6 |
| C4 | 10nF 5mm | FARNELL | 143-691 | 1 |
| C3 | 220nF 5mm | FARNELL | 143-682 | 1 |
| C8 | 1uF 35V TANT | STC | 91907F | 1 |
| C7 | 10uF 16V TANT | STC | 91889X | 1 |
| C5 | 47uF 16V TANT | STC | 91893H | 1 |
| C6 | 47uF 40V ELEC | STC | 74690B | 1 |
| C1,2 | 100uF 40V ELEC | STC | 74691X | 2 |
| D1,2,3 | IN4004 | STC | 13217G | 3 |
| CONNECTOR | WAFER 10 WAY | STC | 00423R | 3 |
| CONNECTOR | HOUSING 10 WAY | STC | 00412D | 3 |
| CONNECTOR | CRIMP TERMINAL | STC | 00591X | 30 |
| LED1,3 | RED | FARNELL | HLMP3301 | 2 |
| LED2 | YELLOW | FARNELL | HLMP3401 | 1 |
| LENS | RED | FARNELL | 170-808 | 2 |
| LENS | YELLOW | FARNELL | 170-811 | 1 |
| CABLE | RIBBON | STC | 71264R | 0.6M |
| BOLT | M4 x 12MM | FARNELL | 149-518 * | 4 |
| NUT | M4 | FARNELL | 149-682 * | 4 |
| LOCK WASHER | M4 | FARNELL | 149-696 * | 4 |
| TURRET TAGS | SMALL | RS | 433-573 * | 12 |
| ZENAMIC | 90VAC 0.6W | FARNELL | Z15L151 | 1 |
| SWITCH | ROTARY MAINS | RS | 316-800 | 2 |
| KNOB | COLLET KNOB | RS | 498-750 * | 2 |
| BARRIER STRIP | 15A STANDARD | RS | 423-374 | 1 |
| BARRIER STRIP | MARKER STRIP | RS | 423-346 * | 1 |
| BUZZER | TWO TONE | RS | 249-429 | 1 |
| LED PCB | 85SES5B | SES | 85SES5B | 1 |
| PCB | 85SES5A MOD1 | ACD. | 85SES5A MOD1 | 1 |
| BOX | APOLLO | VEROSPEED | 75-39244D | 1 |
| TRANSFERS | 2.5mm WHITE | RS | 508-368 * | 1 |
| LACQUER | CLEAR | RS | 556-222 * | 1 |

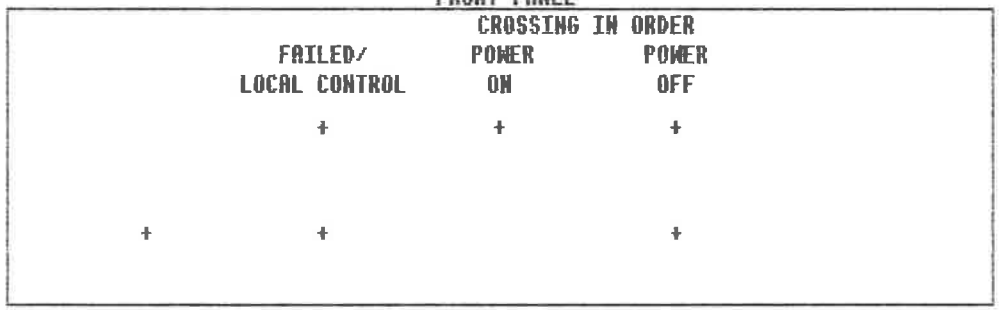
* Multi item packs. See **NOTES** for additional components.



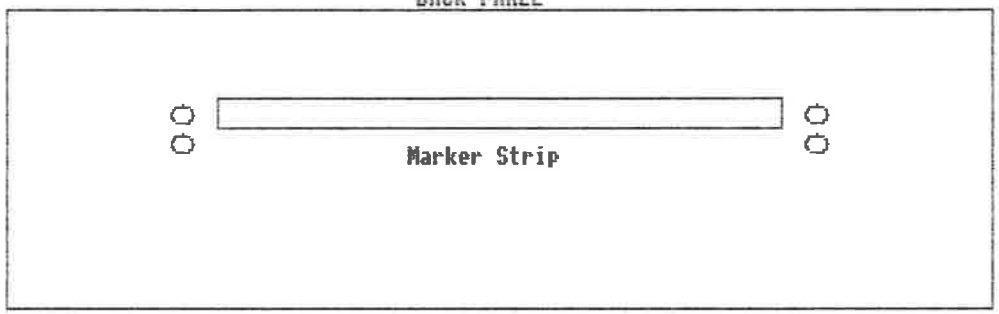

#1 - 6.5mm Dia.
#2 - 9mm Dia.
#3 - 12mm Dia.
#4 - 4mm Dia.

All dimensions in mm

FRONT PANEL



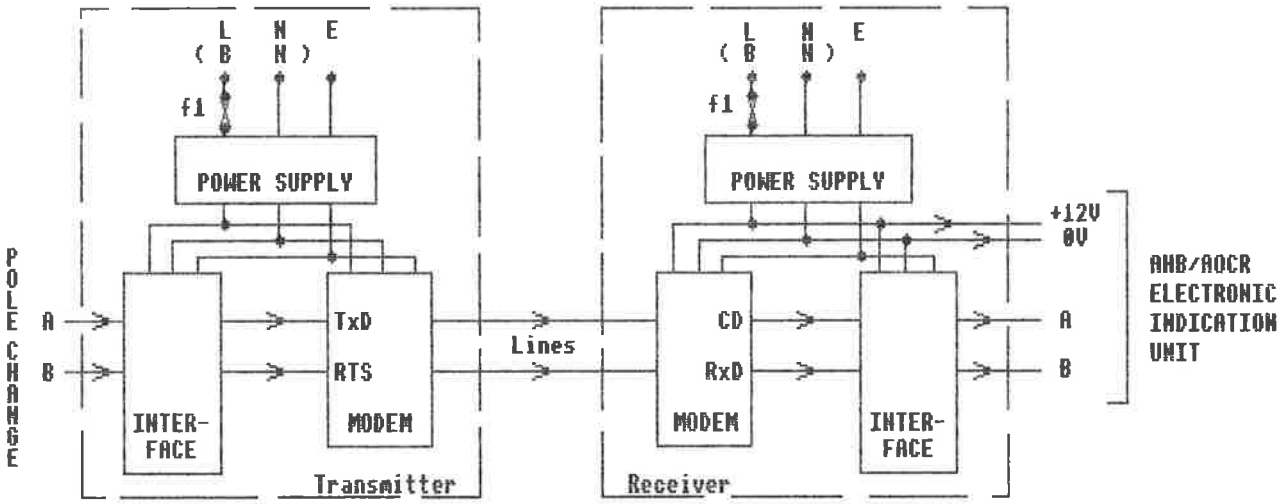

BACK PANEL



## Introduction

The concept of the AHB/AOCR Transmission System is to simulate the output of the pole change circuit at the Signal box.

It does this by the use of **interface** cards and **modems** (one at each end of the transmission link). The Block diagram below illustrates the principles employed.




The transmission system is designed to work in conjunction with the A.O.C.R. Electronic indication unit and allows operation over British Telecoms lines.

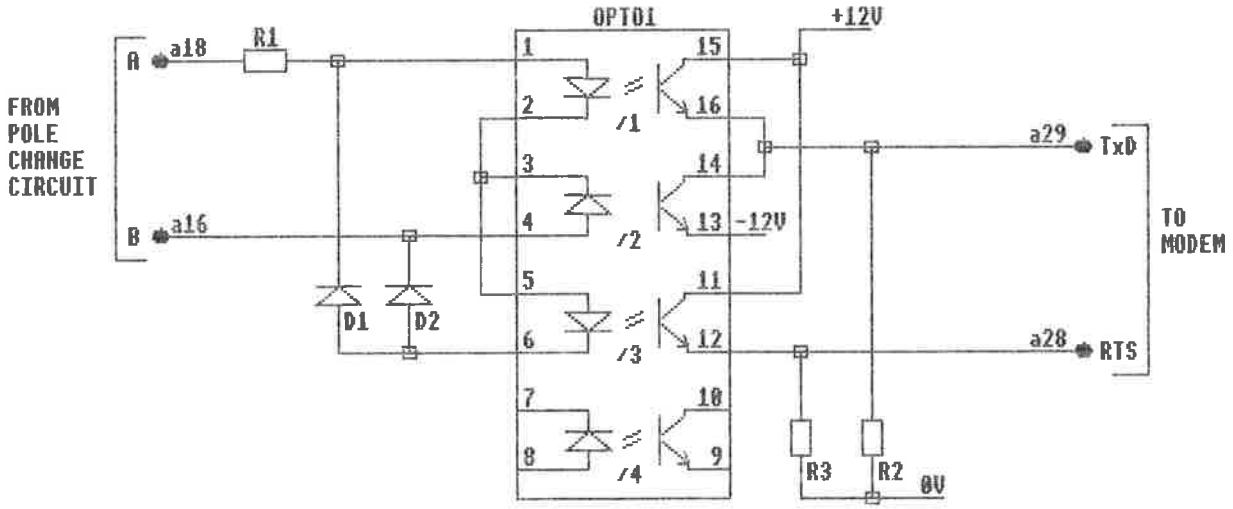
The system consists of:

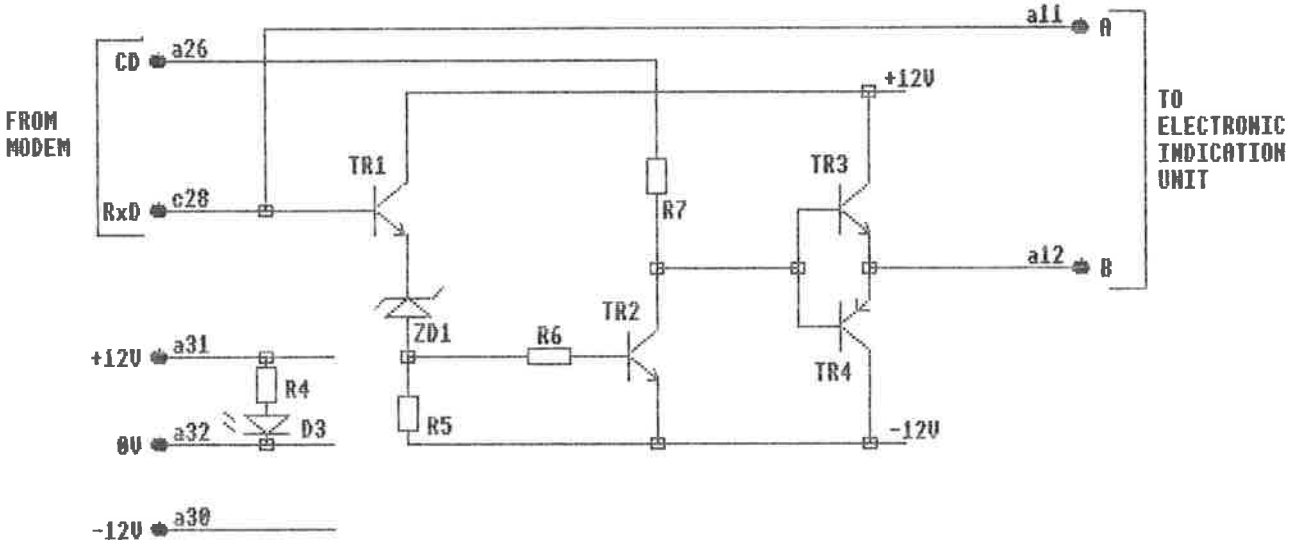
1) Power supply - 110VAC or 24-28VDC input. Both are Bicc Vero types and have +/-12VDC outputs.

2) Modem (modulator/demodulator) - A British Telecom approved four wire full duplex modem is used to provide the transmission medium. The three states of the modem are utilised (Mark, Space and Carrier detect).

3) Interface card - This card has two functions, it converts the three states of a pole change circuit into suitable input signals for the modem in the transmitter and, in the receiver converts the received signals back into a pole change circuit for the indication unit.

The modules are housed in Bicc Vero KM7 cases and have brackets for mounting on a frame.


FROM
POLE
CHANGE
CIRCUIT
A
B
a18
a16
R1
D1
D2
OPTO1
1
2
3
4
5
6
7
8
15
16
14
13
11
12
10
9
/1
/2
/3
/4
+12V
-12V
0V
R3
R2
a29
TxD
a28
RTS
TO
MODEM


FROM
MODEM
CD
a26
RxD
c28
+12V
a31
R4
0V
a32
D3
-12V
a30
TR1
ZD1
R6
R5
TR2
R7
TR3
TR4
+12V
-12V
a11
A
a12
B
TO
ELECTRONIC
INDICATION
UNIT

Interface Card - circuit description.

The interface card has two distinct functions

**1) Transmitter**

Lines Normal (B on terminal A and N on terminal B).

Opto 1/1 and 1/3 will be on.

Opto 1/3 enables the modem carrier (RTS) and opto 1/1 puts +12V on the TxD input thus sending a **"SPACE"** to the receiver.

Lines Reversed.

Opto 1/2 and 1/3 will be on.

As before 1/3 enables the modem carrier (RTS). Opto 1/2 puts -12V on the TxD input thus sending a **"MARK"** to the receiver.

Lines Broken.

No opto's on.

Modem input RTS is pulled to 0V thus disabling the carrier.

**2) Receiver**

The receiver consists of a simple four transistor circuit and utilises two output signals available from the modem (CD and RxD).

On receiving a **"SPACE"**

Both the receiver's carrier detect (CD) and received data (RxD) goes to +12V.

Terminal A follows RxD.

Terminal B is derived from CD and RxD. With RxD at +12V, TR1 is turned on thus pulling the base of TR2 high enough to turn it on. The collector of TR2 is pulled to -12V switching on TR4 and turning TR3 off putting terminal B to -12V.

This presents **line normal** to the indication unit.

Interface Card cont.

On receiving a "**MARK**"

CD is at +12V, RxD is now -12V.

As before terminal A follows RxD.

Terminal B is derived as follows - with RxD at -12V TR1 is turned off keeping TR2 off. TR2 collector resistor R7 pulls the bases of TR3 and TR4 to +12V switching on TR3 and switching of TR4 putting terminal B to +12V.

This presents **lines reversed** to the indication unit.

Lines **Broken.**

CD and RxD is at -12V.

Terminal A follows RxD.

With CD at -12V it pulls down the collector of TR2 thus switching off TR3 and switching on TR4. This puts terminal B at -12V. With no potential difference between the terminals the indication unit perceives a **line broken.**

There is also a power on led - D3 and R4.

## Installation Terminations

The unit has three connectors on the rear panel, an I.E.C. connector and two 'D' type connectors.

| | Transmitter | Receiver |
|---|---|---|
| I.E.C. | 24-28V DC | 110V AC |
| | L - B24-28 | L - BX110 |
| | N - N24-28 | N - NX110 |
| | E - Earth | E - Earth |

15 way 'D' type (LOCAL)-

| | | |
|---|---|---|
| Pin No.9 | +ve Line Normal | |
| Pin No.1 | -ve Line Normal | |
| Pin No.15 | | +ve Line Normal |
| Pin No.8 | | -ve Line Normal |
| Pin No.12 | | +12V DC |
| Pin No.4 | | 0V DC |

9 way 'D' type (REMOTE)-

| | | |
|---|---|---|
| Pin No.9 | Tx A | |
| Pin No.5 | Tx B | |
| Pin No.6 | | Rx A |
| Pin No.1 | | Rx B |

**Modem switch positions**

SW1 1
SW2 0
SW3 1
SW4 1
SW5 0
SW6 Dont care

0 implies a switch in the ON position.

Both the modem and the interface card are capable of working as a transmitter or as a receiver. It is therefore possible to operate the transmitter or receiver "back to back".

Testing the transmitter back to back.

First connect the transmit and receive lines of the REMOTE socket (details listed below), then plug in the electronic indication unit into the LOCAL socket. Testing of the barriers and indications can then be carried out in the normal way.

Testing the receiver back to back.

Although a test, similar to the above, can be carried out a pole change circuit will be required. If this is available the following test can be carred out.

First connect the transmit and receive lines of the REMOTE socket (details listed below), then plug in the electronic indication unit into the LOCAL socket. The wires for the pole change circuit are taken from the LOCAL socket. Testing of the indications can then be carried out in the normal way.

Full list of terminations.

15 way 'D' type (LOCAL)-

| | Transmitter | Receiver |
|---|---|---|
| Pin No.9 | +ve Line normal out | +ve line normal out |
| Pin No.1 | -ve Line normal out | -ve line normal out |
| Pin No.15 | +ve line normal in | +ve Line Normal in |
| Pin No.8 | -ve line normal in | -ve Line Normal in |
| Pin No.12 | | +12V DC |
| Pin No.4 | | 0V DC |

9 way 'D' type (REMOTE)-

| | Transmitter | Receiver |
|---|---|---|
| Pin No.9 | Tx A | Tx A |
| Pin No.5 | Tx B | Tx B |
| Pin No.6 | Rx A | Rx A |
| Pin No.1 | Rx B | Rx B |

There are a number of indications on both the transmitter and receiver to aid faulting.

Power supplies -

110V

Green neon - if not illuminated check 110V source.

Red led's - if illuminated check fuse on power supply card.

24-28V DC

Green led - if not illuminated check 24-28V source

Interface card

Red led - if not illuminated check supply fuse.

Modem

There are six led's on this card, they illuminate according to the input conditions.

| | | LEDs ILLUMINATED | |
|---|---|---|---|
| | | Tx | Rx |
| PO/ON | Lines normal | DTR<br>TxD<br>RTS | DTR<br>RxD<br>CD |
| PO/OFF | Lines reversed | DTR<br>RTS | DTR<br>CD |
| FAILED/LOCAL | Lines broken | DTR | DTR |

Modem transmission lines broken - Tx indications follow inputs from crossing and Rx indicates DTR.

The transmitter/receiver circuit is built on a double sided micro board and is plugged into a Bicc Vero KM7, 24HP, 3U, single eurocard rack together with the power supply and modem.

All edge connectors are DIN 41612 except the D.C. power supply which uses type H15.

The following pages contain - edge connector pinouts, drilling details, labelling details and material list .

Edge connector pinouts

| Modem | | | | Interface card | | | |
|---|---|---|---|---|---|---|---|
| c | | | a | c | | | a |
| PO GND | : 1: | PO GND | | | : 1: | | |
| | : 2: | | | | : 2: | | |
| LINE B | : 3: | LINE A | | | : 3: | | |
| | : 4: | | | | : 4: | | |
| PO GND | : 5: | PO GND | | | : 5: | | |
| | : 6: | | | | : 6: | | |
| 600R | : 7: | Rx IN | | | : 7: | | |
| | : 8: | | | | : 8: | | |
| | : 9: | | | | : 9: | | |
| | :10: | | | | :10: | | |
| 10V out | :11: | 5V out | | | :11: | OUT | RxD |
| MS 1 | :12: | MS 0 | | | :12: | OUT | RxD |
| MS 3 | :13: | MS 2 | | | :13: | | |
| | :14: | MS 4 | | | :14: | | |
| | :15: | | | | :15: | | |
| | :16: | | | | :16: | 50V | Bin |
| | :17: | | | | :17: | | |
| | :18: | | | | :18: | 50V | Ain |
| | :19: | | | | :19: | | |
| | :20: | DTR | | | :20: | | |
| | :21: | | | | :21: | | |
| | :22: | | | | :22: | | |
| | :23: | | | | :23: | | |
| | :24: | | | | :24: | | |
| | :25: | | | | :25: | | |
| 0V | :26: | CD | | | :26: | CD | |
| | :27: | | | | :27: | | |
| V24 RxD | :28: | RTS | | V24 RxD | :28: | RTS | |
| 0V | :29: | V24 TxD | | | :29: | V24 | TxD |
| | :30: | -12V | | | :30: | -12V | |
| | :31: | +12V | | | :31: | +12V | |
| 0V | :32: | 0V | | 0V | :32: | 0V | |

600R Resistor on modem linked between a7 and c26

Card positions: Modem - 20
Interface - 16

Edge connector pinouts cont.

**A.C. Power Supply**

| c | | a |
|---|---|---|
| OUTPUT1 | 1 | 12VDC |
| | 2 | |
| OUTPUT2 | 3 | 12VDC |
| | 4 | |
| LED2 A | 5 | LED2 A |
| | 6 | |
| | 7 | |
| | 8 | |
| | 9 | |
| AC IN | 10 | AC IN |
| AC IN | 11 | AC IN |
| | 12 | |
| | 13 | |
| | 14 | |
| | 15 | |
| | 16 | |
| | 17 | |
| | 18 | |
| AC IN | 19 | AC IN |
| AC IN | 20 | AC IN |
| | 21 | |
| | 22 | |
| AC IN | 23 | AC IN |
| | 24 | |
| | 25 | |
| | 26 | |
| | 27 | |
| OUTPUT2 | 28 | 0V |
| | 29 | |
| LED1 A | 30 | LED1 A |
| | 31 | |
| OUTPUT1 | 32 | 0V |

**D.C. Power Supply**

| | | |
|---|---|---|
| | | |
| | | |
| | | |
| | 4 | +12V |
| +12V | 6 | |
| | | |
| | 8 | 0V |
| | | |
| 0V | 10 | |
| | | |
| | 12 | NC |
| | | |
| NC | 14 | |
| | | |
| | 16 | 0V |
| | | |
| 0V | 18 | |
| | | |
| | 20 | -12V |
| | | |
| -12V | 22 | |
| | | |
| | 24 | 0Vin |
| | | |
| 0Vin | 26 | |
| | | |
| | 28 | +Vin |
| | | |
| +Vin | 30 | |
| | | |
| | 32 | GND |

Card positions: AC input - 2
DC input - 1

Material list

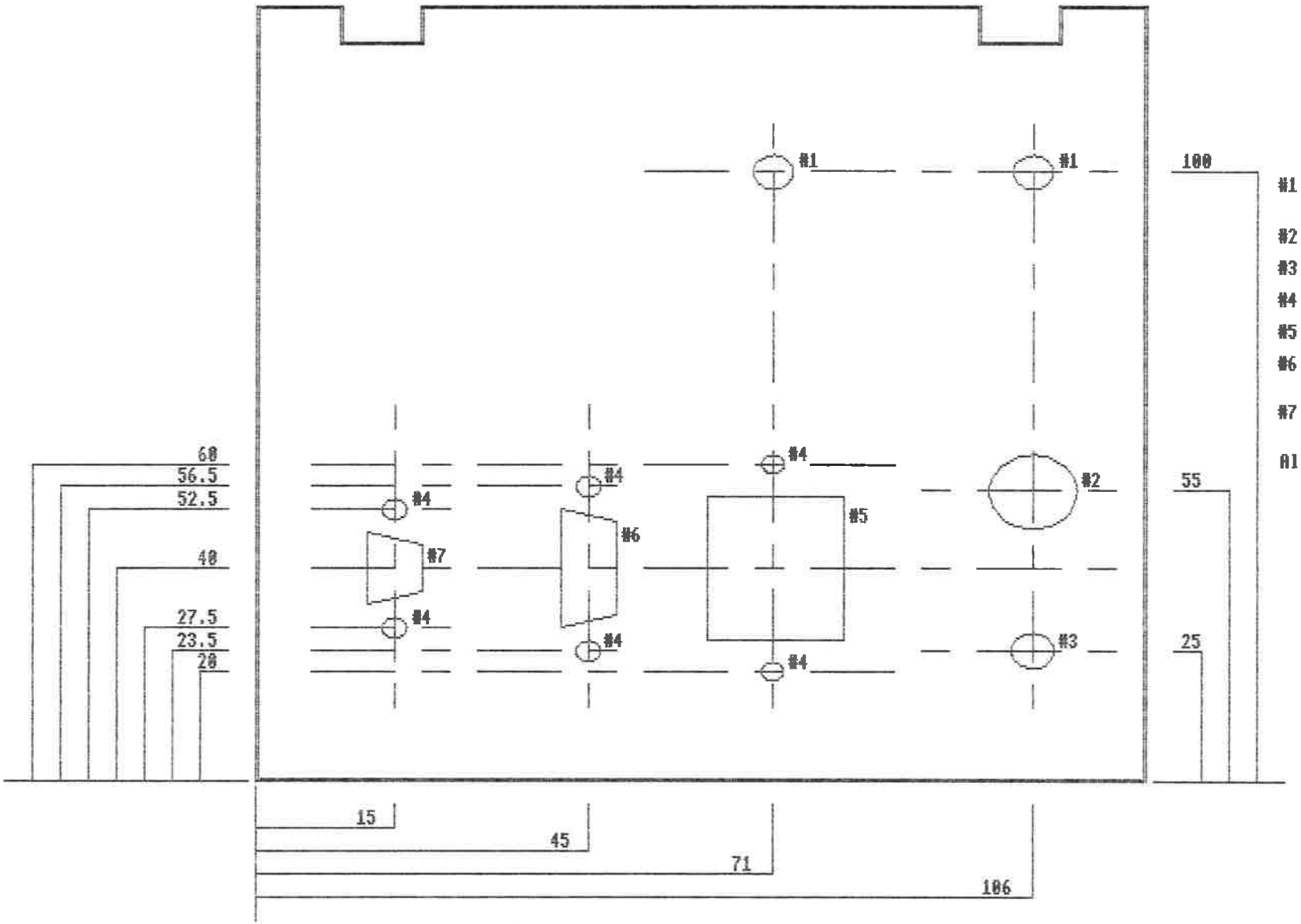
| DESCRIPTION | SUPPLIER | STOCK No. | QTY | |
|---|---|---|---|---|
| Card housing KM7 3U 24HP | Vero Elec. | 124-30421k | 1 | |
| Edge connector mounts | Vero Elec. | 124-34696k | 1 | |
| 3U mounting kit | Vero Elec. | 124-30407L | 1 | |
| 3U 24HP Horiz.hinged panel | Vero Elec. | 174-12976F | 1 | |
| KM7 taped strip | STC | 17880B | 1 | |
| Card guides | STC | 26820X | 6 | |
| Edge connector sockets 41612 | STC | 45532X | 3 | |
| Fuse holder | STC | 44214X | 1 | |
| IEC mains inlet/filter | STC | 58402F | 1 | * |
| IEC mains inlet | STC | 73409H | 1 | $ |
| IEC mains connector right angled | STC | 73413E | 1 | |
| 15 way 'D' type male | STC | 05221D | 1 | |
| 15 way 'D' type female | STC | 05226E | 1 | |
| 15 way 'D' type cover | STC | 59001B | 1 | |
| 9 way 'D' type male | STC | 05220F | 1 | |
| 9 way 'D' type female | STC | 05225G | 1 | |
| 9 way 'D' type cover | STC | 59000D | 1 | |
| Plug contacts | STC | 05230B | 10 | |
| Socket contacts | STC | 05231X | 10 | |
| Fuse 500mA anti-surge | STC | 23701F | 1 | |
| 1/4" spade terminals | STC | 39169G | 1pk | |
| 110V neon Green | Farnell | 147-423 | 1 | |
| Green Led | STC | 27699H | 1 | |
| Red Led | STC | 65097H | 2 | |
| Led clip | STC | 42094H | 3 | |
| 2.5mm screw 6mm | Farnell | 149-461 | 1pk | |
| 2.5mm nut | Farnell | 149-679 | 1pk | |
| 2.5mm lockwasher | Farnell | 149-693 | 1pk | |
| Wire wrap wire | STC | 26207H | 1rl | |
| wire 7/0.2 red | STC | 19832H | 1rl | |
| wire 7/0.2 black | STC | 19825F | 1rl | |
| wire 7/0.2 green/yellow | STC | 72393H | 1rl | |
| Power supply 110V +/-12V 1A | Vero Elec. | 89-2671K | 1 | * |
| Power supply DC-DC +/- 12V 2A | Vero Elec. | 116-44756 | 1 | $ |
| Modem V21/23 single card | ATS Telemetry | 248-020-012 | 1 | |

* These items are used for A.C. input
$ These items are used for D.C. input

Material list cont.- Interface card

| COMPONENT | DESCRIPTION | MAIN SUPPLIER | STOCK NO. | QTY. |
|---|---|---|---|---|
| R4 | 680R 0.33W | FARNELL | SFR25 680R | 1 |
| R1 | 5K6 0.33W | FARNELL | SFR25 5K6 | 1 |
| R2,3,5 | 10K 0.33W | FARNELL | SFR25 10K | 3 |
| R6,7 | 33K 0.33W | FARNELL | SFR25 33K | 1 |
| D1,2 | 1N4004 | STC | 13217G | 2 |
| D3 | RED LED | STC | 09884E | 1 |
| ZD1 | BZY88C3V6 | STC | 69926A | 1 |
| TR1,2,3 | BC107 | STC | 62729B | 3 |
| TR4 | BC177 | STC | 62740A | 1 |
| OPTO 1 | ILQ1 | STC | 21501X | 1 |
| CARD | MICRO BOARD | STC | 07059D | 1 |
| CONNECTOR | 41612 EDGE | STC | 45531B | 1 |
| HANDLE | BLACK | STC | 26907G | 1pk |

The lists are for one end of system, please multiply quantities by two except where the items are supplied on reels or in packets.




#1 6.25mm dia. - AC input only. (internal fuse failure LED's)

#2 12.5mm dia. - Fuse holder.

#3 6.25mm dia. - Neon.

#4 3mm dia.

#5 I.E.C. hole punch.

#6 15 way 'D' hole punch. (Label - LOCAL)

#7 9 way 'D' hole punch. (Label - REMOTE)

All dimensions in mm.

# NOTES

AHB/AOCR Electronic Indication Unit

## Construction

CN1 and CN2 locking bar positioned to the outer edge of card.

CN3 locking bar positioned near LED mounting holes.

Ribbon cable from CN1 to barrier strip - cut 10" length.

Ribbon cable from CN2 to CN3 - cut 7.5" length.

## Test - 18/01/89

Under test some units were failing to time out (i.e. buzzer and LED flashing immediately). The 556 appears to be receiving a reset shortly after being triggered. Temporary solution was to solder on a 1.5nF capacitor (Farnell 143-685) between pin 4 (reset) and 0V on the 556. C4 was also increased by adding a 4.7nF capacitor (Farnell 143-689).

# NOTES