



**Chassis (8- Slot)**

MXU9940

**Composite Cards**

MXU9941C-G703

MXU9941C-X21/V.35

**Channel Cards (Max.7)**

**Data:**

MXU9942C-X21/V.35

**Voice:**

MXU9943C-FXS

MXU9943C-FXO

MXU9943C-E&M

**SNMP Management Option**

MXU9944-SNMP

**Rev 2.0**

**ENVOY**  
**Voice and Data Multiplexor**



**TECHNICAL: (0118) 965 6000**

**SALES: (0118) 965 5100**

**FAX: (0118) 965 5001**

**ADDRESS: 464 Basingstoke Road, Reading, Berkshire RG2 0QN**

**WEB: [www.blackbox.co.uk](http://www.blackbox.co.uk)**

**How To Contact your Local Black Box**

**Italy:**

**Black Box Italia S.P.A**

**Tel: 0227400280**

**Fax: 0227400219**

**Web Site: [www.blackbox.it](http://www.blackbox.it)**

**Australia:**

**Black Box Catalog Australia PTY LTD**

**Tel: 0398797100**

**Fax: 0398702955**

**Deutschland:**

**Black Box Deutschland**

**Tel: 0811/5541-0**

**Fax: 0811/5541-499**

**Web Site: [www.blackbox-deutschland.com](http://www.blackbox-deutschland.com)**

**Brazil:**

**Black Box Do Brasil.**

**Tel: (011) 5515-4000**

**Fax: (011) 5515-4002**

**Web Site: [www.blackbox.com.br](http://www.blackbox.com.br)**

**Switzerland:**

**Datacom Black Box Services AG**

**Tel: 0554517070**

**Fax: 0554517075**

**Web Site: [www.black-box.ch](http://www.black-box.ch)**

**Canada:**

**Black Box Canada Corp.**

**Tel: 0416-736-8000**

**Fax: 0416-736-7348**

**Web Site: [www.blackbox.com](http://www.blackbox.com)**

**Netherlands:**

**Black Box Datacom BV**

**Tel: 03032417799**

**Fax: 0302414746**

**Web Site: [www.blackbox.nl/](http://www.blackbox.nl/)**

**Mexico:**

**Black Box De Mexico S.A. de C.V**

**Tel: 05-420-0100**

**Fax: 05-420-0123**

**Web Site: [www.blackbox.com.mx](http://www.blackbox.com.mx)**

**Belgium:**

**Black Box**

**Tel: 027258550**

**Fax: 027259212**

**Web Site: [www.blackbox.be](http://www.blackbox.be)**

**Japan:**

**Black Box Catalog**

**Tel: 03-3820-5011**

**Fax: 03-3820-5010**

**Web Site: [www.blackbox.co.jp/](http://www.blackbox.co.jp/)**



**France:**

**Black Box Catalogue**

**Tel: 0145606700**

**Fax: 0145606747**

**Web Site: [www.blackbox.fr](http://www.blackbox.fr)**

**U.S.A**

**Black Box Corporation**

**Tel: 724-746-5500**

**Fax: 724-746-0746**

**Web Site: [www.blackbox.com](http://www.blackbox.com)**

**Spain:**

**Black Box Comunicaciones S.A.**

**Tel: 91 663 0200**

**Fax: 91 661 84 35**

**Web Site: [www.blackbox.es](http://www.blackbox.es)**

**Chile**

**Black Box Chile**

**Tel: 6680141**

**Fax: 6680140**

**Web Site: [www.Blackbox.cl](http://www.Blackbox.cl)**



# **Envoy**

## **Voice and Data Multiplexer**

### **User Manual**



**WARNING - BEFORE INSTALLATION, PLEASE REFER TO SAFETY INSTRUCTIONS IN APPENDIX A, AND EMC INSTRUCTIONS IN APPENDIX C**

Certified Compliant in the EC, when fitted in accordance with the installation instructions, against the following directives/standards:

**Low Voltage Directive** (73/23/EEC and amendment 93/68/EEC)

EN60950 : 1992 (Safety)

**Electromagnetic Compatibility** directive (89/336/EEC and subsequent amendments to date):

EN55022 : 1994 (Emissions)

EN50082-1 : 1992 (Immunity)

**Telecommunications Terminal Equipment** directive (91/263/EEC and amendment 93/68/EEC) where indicated in approvals requirements section.



*Contents*

Glossary.....8

Introduction.....9

    Functional Overview .....10

    Typical Applications .....10

Use and Configuration .....12

    Mechanical Construction.....12

    Supply Voltage and Connection.....13

    Environmental Considerations .....13

    Fitting Option Cards.....14

    Removing Option Cards.....15

    Powering up the Unit.....16

    Supervisor Terminal Requirements.....16

    Supervisor Terminal Emulation .....16

    General Set-Up Display Layout.....17

    General Keyboard Conventions.....17

    Cursor Movement .....18

    Parameter Changing.....18

    Accepting all changes and Updating the Configuration.....18

    Abandoning Changes .....18

    Local or Remote Configuration .....18

    Changing the Configuration Page.....18

    Clearing the Configuration back to Factory Default.....18

    Front Panel LEDs.....19

E1 Composite Card.....20

    Installation.....20

    Composite Network Connection.....21

    E1 Clocking.....22

        Network Clocking.....22

        Back to Back Clocking .....22

        External Clock reference.....22

    Main Set-up Display Screen.....23

    Composite Link Parameters.....24

    Option Card Configuration .....25

    Composite Set-Up Display Screen.....25

    Idle Bandwidth Display Screen .....25

    Alarms Display Screen.....27

    Setting the Alarm Conditions.....27

    Link Carrier Loss.....28

    Card Mismatch / Channel Mismatch .....28

    Remote Alarm.....28

    Link BER High.....28

    Statistics Display Screen .....28



## ENVOY Voice and Data Multiplexor

Event Log Display Screen.....	30
Setting the System's Real-Time Clock.....	30
Clearing the Event Log .....	30
<b>Nx8k Composite Card.....</b>	<b>31</b>
Installation.....	31
Telnet Login .....	31
Composite Network Connection.....	31
Clocking .....	32
Jumper settings.....	34
Main Set-up Display Screen.....	35
Composite Link Parameters.....	36
Menu Page Selections .....	37
Option Card Menus.....	37
Option Cards.....	37
Composite.....	38
Bandwidth Menus .....	40
Set BW.....	40
Allocated BW .....	41
Alarms Menu.....	42
Logs Menus .....	43
Events... ..	43
Statistics .....	44
Ethernet .....	44
IP.....	45
System Menus .....	45
Identity.....	45
Telnet... ..	46
Sys Config .....	47
<b>DATA Card.....</b>	<b>48</b>
Installation.....	48
Jumper Settings.....	48
DTE Rear Card Option.....	49
DCE Rear Card Option .....	49
Data Card Configuration Screen .....	49
<b>Voice Cards .....</b>	<b>52</b>
Installation.....	52
Voice Card Options.....	52
Voice Tie Line .....	53
Telephone Extensions .....	53
Voice Piggy Back.....	54
E&M Voice Card Option.....	55
FXS Voice Card Option.....	55
FXO Voice Card Option .....	55
Voice Card Configuration Screen.....	55



Appendix A - Warnings .....	58
Appendix B - Approval Requirements .....	61
Appendix C – EMC Requirements .....	62
Limitation of Emissions: .....	62
'D-Type' Connections.....	62
Mains Connection .....	62
To Ensure that adequate immunity is achieved: .....	63
Appendix D - Supervisor Port Pinout.....	64
Appendix E - E1 Composite Interface Pinouts .....	65
Appendix F - Nx8k Composite Interface Pinouts.....	66
Appendix G - X.21/V.11 DCE Data Channel Pinout.....	67
Appendix H - X.21/V.11 DTE Data Channel Pinout.....	68
Appendix I - Voice Port Pinout .....	69
Appendix J - RJ45 E1 Crossover Cable.....	70
Appendix K - Nx8k Composite Cables. ....	71
Appendix L - Telephone Adaptor Lead.....	77



## *Glossary*

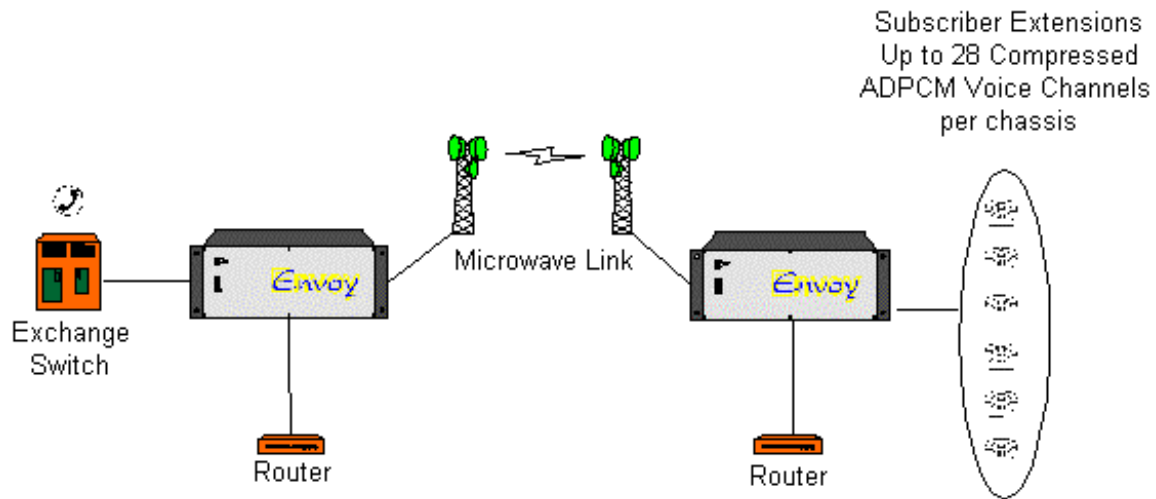
ADPCM	Adaptive Differential Pulse-Code Modulation
ASCII	American Standard Code for Information Interchange
bps	bits per second
BER	Bit Error Rate
BT	British Telecommunications
BVC	Bipolar Violation Count
CRC	Cyclic Redundancy Check
D&I	Drop and Insert
DCE	Data Communications Equipment
DTE	Data Terminal Equipment
DTMF	Dual Tone Multiple Frequency
EEPROM	Electrically Erasable Programmable Read-Only Memory
EUR	European
FAS	Frame Alignment Synchronisation
FEBE	Far End Block Errors
GND	Ground
IDC	Insulation Displacement Connector
LAN	Local Area Network
LED	Light Emitting Diode
PABX	Private Automatic Branch Exchange
PC	Personal Computer
PCM	Pulse Code Modulation
PSTN	Public Switched Telephone Network
SELV	Safety Extra Low Voltage
SKT	Socket
SNMP	Simple Network Management Protocol
SYNC	Synchronisation
TDM	Time Division Multiplexer
TNV	Telecom Network Voltage
WAN	Wide Area Network





*Introduction*

The Envoy is a modular Time Division Multiplexer (TDM) which is easily configured for use in a variety of voice and data applications. It is ideal for remote voice channel distribution using microwave radio connectivity (see Figure 1). It can operate on communication links at rates up to 2Mbps (E1 G.704 links for example).



**Figure 1**      **Typical Microwave Link Application**

The Envoy chassis houses up to eight individual cards (1 composite card and up to 7 voice/data cards). It can provide up to 28 voice channels with the option of fitting a data card to use any spare bandwidth (for LAN bridges/routers).

The unit is easily configured from either end of the link, using a terminal or a PC running a terminal emulation package.

This user manual covers installation and set-up of user options for the multiplexer. A full set of cable diagrams is available in the appendices.



## Functional Overview

The Envoy multiplexer is a TDM operating on links up to 2Mbps. It consists of a rack mounted chassis frame with 8 card slots and integral power supply and cooling. One of the card slots must be fitted with the 'composite' or management card. The remaining 7 slots can be fitted with any combination of voice and data cards.

The type of composite card fitted determines the type of service you may connect the Envoy to. For example, to connect to a 2Mbps G.704 E1 service, the E1 composite card must be fitted.

All voice option cards have four voice channels on each card. Three different options allow the Envoy to be connected directly to telephones (FXS option), to an exchange (FXO option), or to use 4-wire E&M signalling (E&M option). Any combination of voice options may be fitted into an Envoy. All voice cards are capable of both PCM encoding and ADPCM compression - using compression allows more efficient use of bandwidth available on the communication link.

The two-channel data card option can be used to transport synchronous data to 'soak' up any remaining bandwidth. Any number of data cards may be fitted depending on how many data channels are required.

## Typical Applications

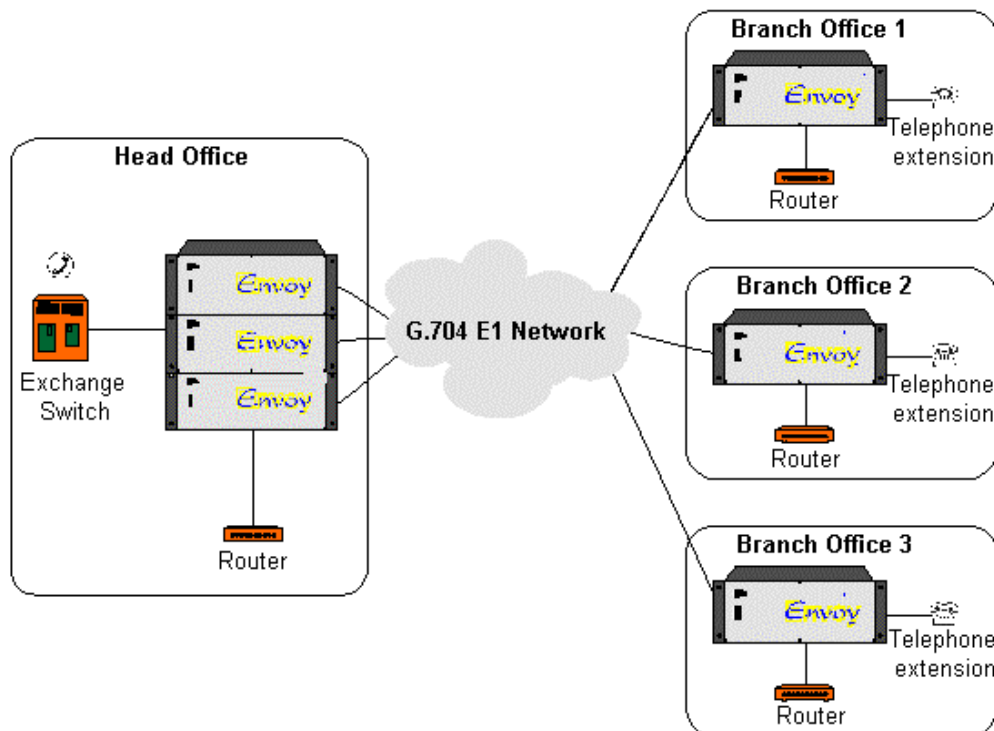
The Envoy must be used in *point-to-point* applications; this means there must always be an Envoy at each end of a communication link (normally called '**local**' and '**remote**' units). The local Envoy does not necessarily have to be fitted with the same complement of option cards as its remote unit, though a voice card option must have a corresponding voice card option, and a data card must have a corresponding data card.

With a total of 7 slots available for option cards, the Envoy may be used to provide up to 28 voice channel connections between two sites. If less voice channels are required, data cards may be fitted to spare slots in the Envoy chassis.

A typical application could be to connect two sites using microwave radio connectivity (see Figure 1). Some bandwidth can be used to carry voice or fax traffic, with some bandwidth used by Ethernet routers to carry LAN traffic from one site to the other. This type of application is ideal for short distances, or where land lines may not be available (remote areas for example).



Another application could be to link the Head Office of a company with its Branch Offices (see Figure 2). In this case, extensions from the telephone exchange of the Head Office are connected into each of the three Envoys. These Envoys are connected (via G.704 E1 leased lines) to corresponding units at the Branch Offices. Picking up a phone line at one of the Branch Offices will automatically be routed to the Head Office exchange, and vice-versa ('long-line' extensions). Additionally, spare bandwidth is used to carry LAN traffic around the whole organisation using Ethernet routers. Users at the Branch office will be able to access the LAN (and hence the servers) as if they were on the same network.



**Figure 2** **Typical Branch Office Application**

Further savings can be made by compressing the voice data, allowing more voice channels or data to be transported in the same bandwidth. 32Kbps ADPCM allows 50% compression with *no discernible loss in quality* of voice communication.

## Use and Configuration

This section covers installation and set-up of the Envoy. Each option card is detailed in a later section. Please refer to Appendix A for Installation Warnings. **Installation should only be carried out by suitably trained service personnel.**

### Mechanical Construction

The Envoy is housed in a 4U tall 19" enclosure – see Figure 3. If rack brackets are fitted the Envoy may be rack mounted in a 19" wide cabinet.

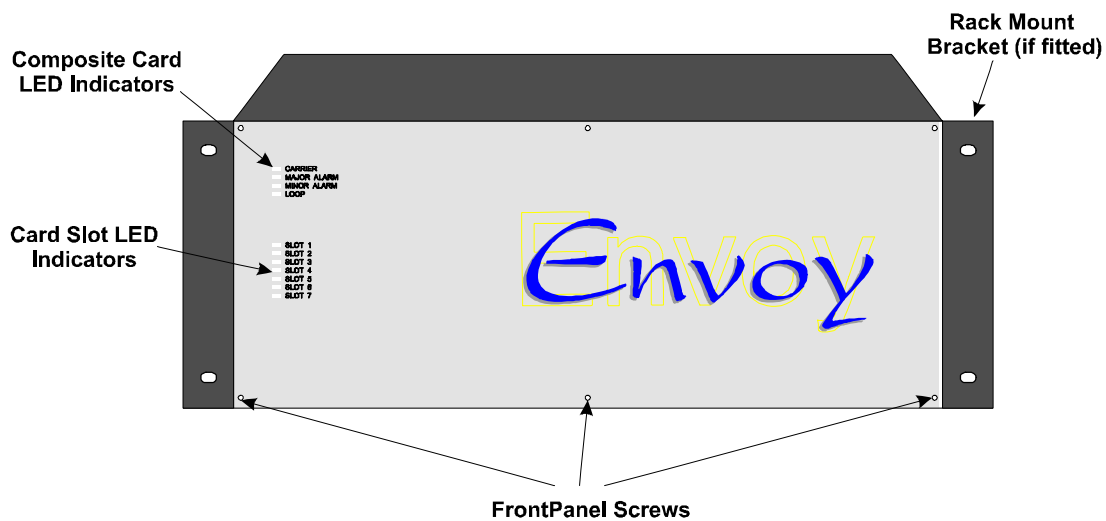
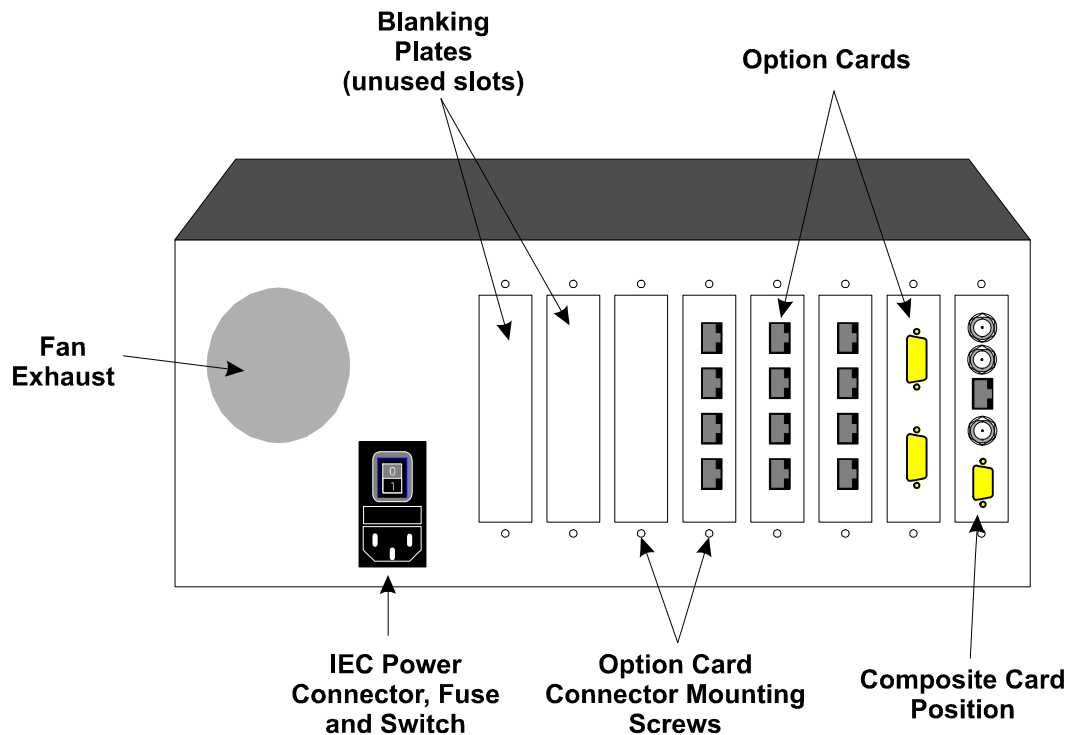


Figure 3 Envoy Front Panel

The front panel has indicator LEDs showing the status of the unit and its various card slots.

All connections to the Envoy are made at the rear of the unit – see Figure 4. The composite card **MUST** be fitted into Slot 0. This is to ensure that the LEDs line up with the front panel metalwork. Option cards may be fitted into any of the other slots as required. The order or position of the option cards does not matter, although slots should be filled starting from slot 1 up to slot 8. Any unused slots may be covered by blanking plates on the rear panel.



**Figure 4 Envoy Rear Panel**

## Supply Voltage and Connection

The Envoy may be optionally DC or AC powered. Both allow considerable input voltage variation.

AC powered option: 100 - 240V AC without adjustment.

DC powered option: 48V DC without adjustment.

## Environmental Considerations

The Envoy Multiplexer must be operated under the following atmospheric conditions:

Temperature: 0 to 40 °C

Humidity: 0% to 90% non-condensing

Air Pressure: 86 to 106 kPa

## Fitting Option Cards



**NOTE: Refer to Appendix A for Safety Warnings**



**NOTE: The Envoy MUST be disconnected from the power supply before opening the unit or fitting any option cards.**



**NOTE: The Envoy contains electrostatic sensitive devices, take anti-static precautions when working on the unit.**

With the power **DISCONNECTED**, six screws on the front panel of the enclosure (refer to Figure 3) are removed to gain access to the interior. This allows installation or removal of option cards. Be careful not to damage the front panel label when removing the front panel.

Each option card is constructed as a front and rear card pair (see Figure 5); the rear assembly just contains the physical connectors and normally remains fixed in position (two screws attach it to the rear panel of the unit). This allows the main assembly to be removed from the chassis without disconnecting all the cables at the rear of the unit.

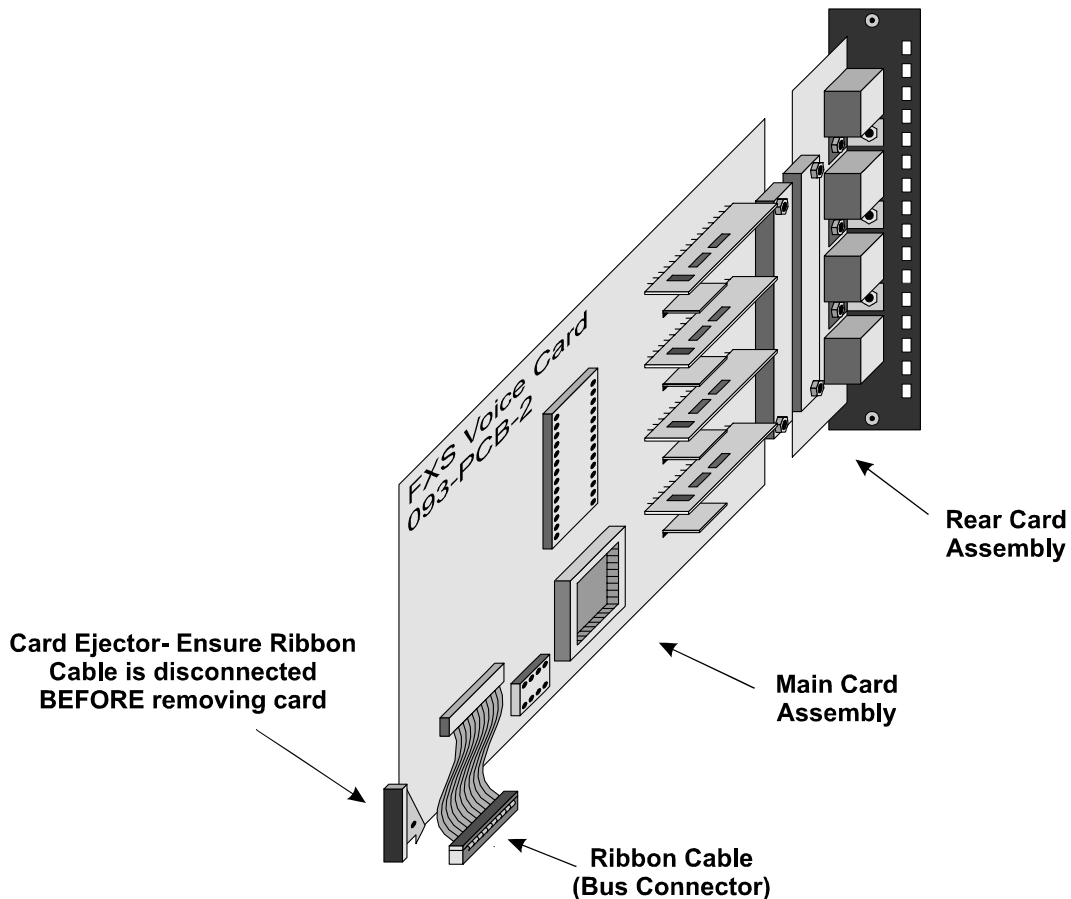


Figure 5

Rear and Main Assembly of Option Card



Each option card is supplied with its own rear panel. Mating of incorrect main card assemblies and rear card assemblies is not possible since the connector position is different for each pair type. Voice cards share the same rear card assembly type

To fit an option card, first ensure it is correctly attached to its rear card assembly (only minimal pressure is required). Pick which slot in the unit the option card is to be fitted – if the option card is the composite or management card, it must be fitted in Slot 0, otherwise, option cards should be fitted starting from Slot 1 upwards. If a blanking plate has been fitted to the rear of the slot, it must be removed by removing the two screws, top and bottom, first. Retain the screws for attachment of the rear card assembly into the unit. The blanking plate should be retained in case it is required to be re-fitted at a later date.

Once the blanking plate has been removed, carefully slide in the option card (from the front of the unit), using the card guides top and bottom. Just before the card is fully inside the unit, the card ejector should be opened and then clicked into the upright position (closed) as the card is pushed fully home. The 'hook' of the card ejector should engage into a slot at the front of the lower card guide.

Using the two screws from the blanking plate, the rear card assembly may be screwed into the rear of the unit to fix it into position.

Each option card has a ribbon cable assembly that connects to the row of connectors on the internal PCB or 'bus' board. Carefully attach the ribbon cable to the nearest socket (only minimal pressure is required).

Replace the front panel of the unit using the six screws. Be careful not to damage the front panel label when fitting the front panel. *Overtightening of the front panel screws may damage the label.*

### Removing Option Cards

With the power **DISCONNECTED**, open the front panel of the unit as defined on page 14.

*The ribbon cable **MUST** be removed before the option card is removed from the unit, otherwise damage may occur to the option card or the unit.*

Remove the ribbon cable by gently pulling the ribbon cable upwards (only minimal effort is required). If access is restricted, flat nose pliers may be used to lift the ribbon cable upwards. **Be very careful not to damage the ribbon or other internal components of the unit when using pliers.**

If the rear card assembly is to be removed with the main card, the two screws that fix the rear card should be removed first. Retain these screws for fixing of the blanking or replacement card.

Use the card ejector to start the removal of the card from the front of the unit. Slide the card out and place immediately into an anti-static bag.

If a new card is to be fitted into the slot, refer to page 14; otherwise fit a blanking plate to the rear of the unit to cover the hole.

Replace the front panel of the unit using the six screws. Be careful not to damage the front panel label when fitting the front panel. *Overtightening of the front panel screws may damage the label.*

### Powering up the Unit

Power up the unit using the switch at the rear of the unit (refer to Figure 4). All LEDs on the front panel should turn on briefly before they assume their normal function. The fan inside the unit should start up to provide cooling for the power supply.

The unit may be configured using an asynchronous terminal. A laptop PC running an asynchronous terminal emulation program such as PCAnywhere™, CrossTalk™ or Windows Terminal™ is ideal for the field engineer. The terminal should be connected via its serial port to the SUPERVISOR port on the rear of the composite card.

### Supervisor Terminal Requirements

The terminal should be configured as follows:

8 bit character, no parity, one stop bit, speed 9.6Kbps.

A 'modem' or 'straight' serial cable is suitable for connection of the Supervisor port (the Supervisor port pinout is described in 0).

### Supervisor Terminal Emulation

The Envoy supports several terminal emulations. When connection is made between the terminal and the Supervisor port, the following screen will appear:

```
Please select terminal type from the following:

1 = VT52
2 = VT100
3 = ADDSVP
4 = ADM3A
5 = H1500
6 = N8009
7 = TVI920
```

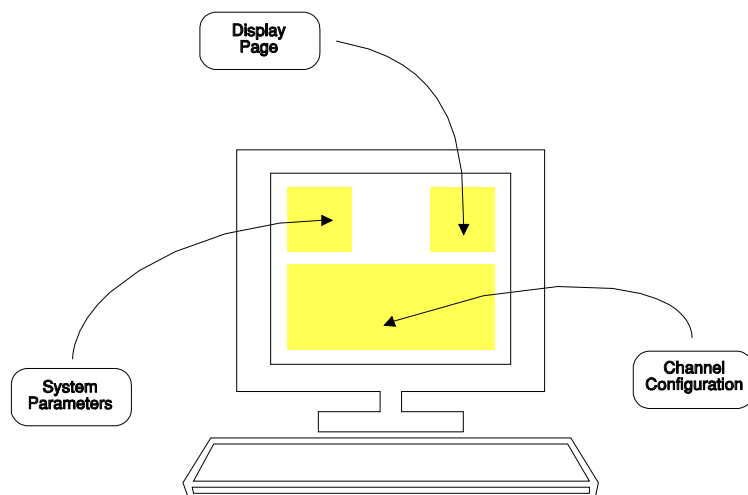
The terminal type or emulation in use should be selected by pressing the relevant number key on the PC or terminal. The terminal will then show the basic configuration screen for the multiplexer set-up.

You may return to this screen at any time by pressing 'CTRL' and 'E' at the same time.



## General Set-Up Display Layout

There are three main areas on the supervisor set-up screen used to change parameters for the Envoy:



Upper left -  
**System parameters** (Mode, Clock Ref, Carrier, Available Bandwidth, and Configure etc.).

Upper right -  
 Other **display pages** which may be selected, (Statistics etc.).

Bottom -**Configuration.**

## General Keyboard Conventions

Only a few keys are required to configure the Envoy multiplexer and are summarised as follows:

- (Right arrow)                      Moves the cursor to the next field to the right.
- ← (Left arrow)                        Moves the cursor to the next field to the left.
- ↑ (Up arrow)                           Moves the cursor to the next field upwards.
- ↓ (Down arrow)                        Moves the cursor to the next field downwards.
- + (Plus) or <SPACEBAR>            Toggles the parameter value up to the next available setting.
- (Minus)                                Toggles the parameter value down to the next available setting.
- <ENTER> or <RETURN>                Accepts the current display page (otherwise the same as ↓).
- <CTRL> and U                            Updates all changes.
- <ESC> or <CTRL> and A                Abandons all changes since the last <CTRL> U.
- <CTRL> and P                            Refresh screen.
- <CTRL> and E                            Exit to terminal selection screen

## Cursor Movement

The cursor symbol “>” is moved around the screen to the required field using the **arrow keys**.

## Parameter Changing

If it is possible to modify the field over which the cursor is placed, an appropriate message is shown at the bottom of the screen. No message will appear if the field is non-configurable.

Pressing the **Space** bar, the “+” key or the “-“ key will cycle through the choices available for a parameter.

## Accepting all changes and Updating the Configuration

If “**Control**” and “**U**” are pressed at the same time after the configuration has been suitably adjusted, the configuration is updated at the local and remote end as necessary and held in non-volatile Memory. It may take a short while to complete the update while it transfers the information to the remote end.

## Abandoning Changes

Pressing **ESC** or <**CTRL**>**A** at any point before a configuration is updated will cause the message “**Abandon Changes? (y/n)**” to appear at the bottom of the screen . If “**n**” is selected the message will disappear and editing may continue. If “**y**” is pressed, all modifications will be abandoned and the last updated configuration will be re-painted on the screen.

## Local or Remote Configuration

Most settings are independent at each end of the multiplexer link e.g. **Clock Reference**.

The “**Configure**” parameter in the upper left of the selected screen shows whether the **LOCAL** or **REMOTE** multiplexer is being configured.

## Changing the Configuration Page

The configuration page required, e.g. “**Alarms**”, or “**Composite**” etc., is selected by moving the cursor to the **upper right area** and pressing Enter when alongside the required page.

## Clearing the Configuration back to Factory Default

The multiplexer may be reset back to the factory default configuration by pressing **CTRL-R** four times when the cursor is on the Terminal emulation page (see page16). A confirm message will be displayed before the configuration is reset. The previous configuration will be lost.

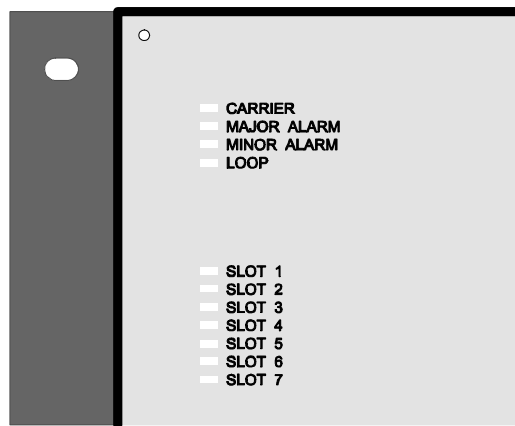


Figure 6 Front Panel LEDs

**Front Panel LEDs**

Refer to the table below for the meaning of the front panel LEDs shown in Figure 6.

LED LABEL	CONDITION	NOTES
CARRIER	Slow Flash	No RX Carrier established
	Fast Flash	Clock detected, searching for Synchronisation.
	Steady Green	CARRIER Synchronised
MAJOR ALARM	Red	Red if a MAJOR Alarm condition has occurred.
	Not illuminated	No MAJOR alarm condition.
MINOR ALARM	Red	Red if a Minor Alarm condition has occurred.
	Not illuminated	No Minor alarm condition.
LOOP	Not illuminated	<b>Normal run mode</b>
	Green	If any Composite or data channel looped or in a test mode.
SLOT 1 to SLOT 7	Not illuminated	No option card detected in slot
	Green	<b>Normal run mode</b> Option card detected and valid for both local and remote units
	Amber	If card detected in slot of only one unit – card will be disabled.
	Red	Option card incompatible with corresponding option card in remote unit, or card has been changed or removed since last update – card will be disabled.

## E1 Composite Card

### Installation



**NOTE: Refer to Appendix A for Safety Warnings**



**NOTE: The Envoy MUST be disconnected from the power supply before opening the unit or fitting any option cards.**



**NOTE: The Envoy contains electrostatic sensitive devices, take anti-static precautions when working on the unit.**

Refer to pages 14 and 15 for installation and removal of option cards.

The E1 Composite Card **MUST** only be fitted into **Slot 0** of the Envoy chassis.

The required interface (European 120 Ohms RJ45 or UK 75 Ohms 2 x BNC), **must be selected using the rear card assembly internal jumper links** as described below, before connecting to the network. The current interface type is reported on the main set-up screen as either **EUR** or **UK** as appropriate.

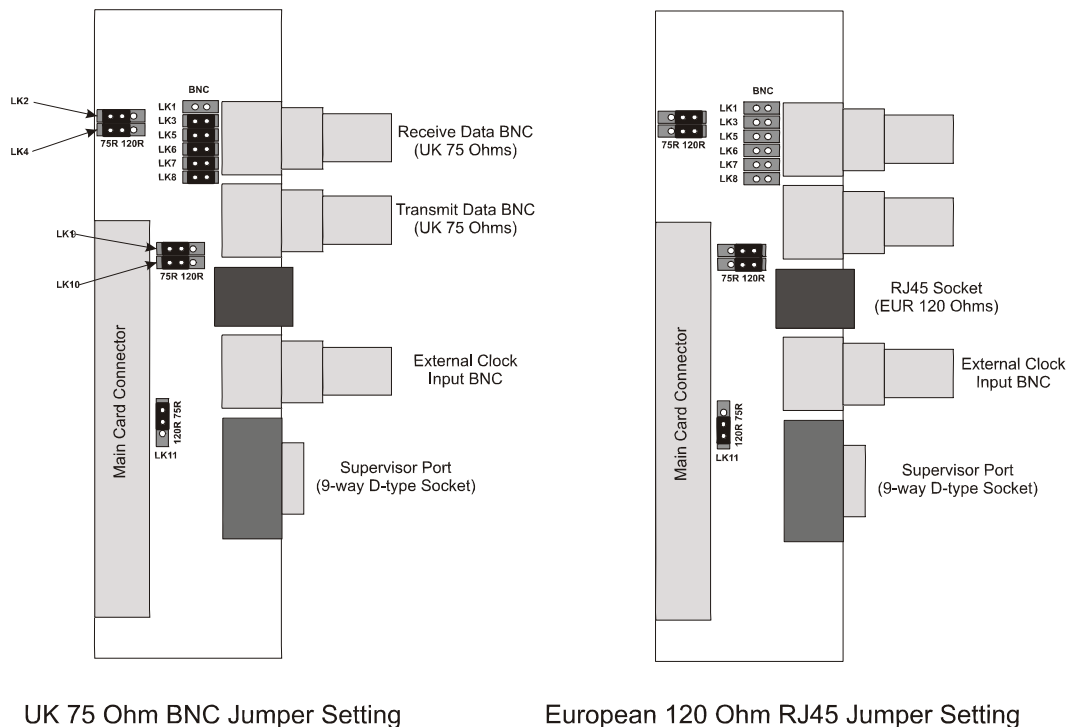


Figure 7

E1 Composite Rear Card Jumper Settings



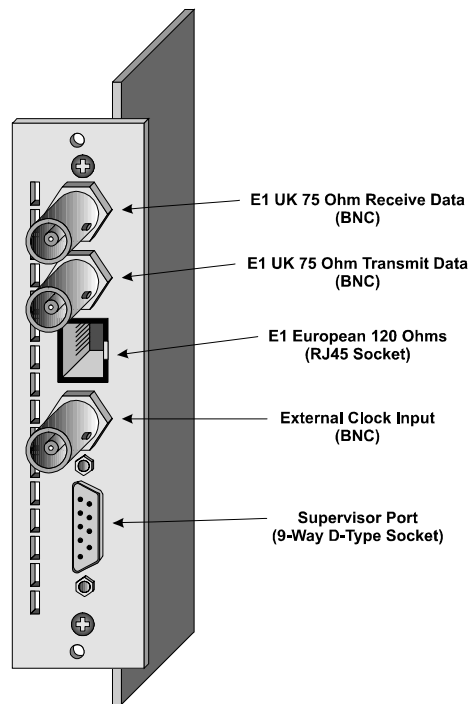
## Composite Network Connection

The E1 Composite Card supports both UK (75 Ohm) and European Network Interfaces (120 Ohm) – refer to Figure 8.

The composite port appears on the rear panel as an RJ45 socket (European 120 Ohms) and 2 x BNC connector (UK 75 Ohms), the pin-out for each interface standard being shown in 0.

For UK connection, screened BNC cables should be used, with the screen connected to chassis at the TX connector only (fit LK6). The RX screen to chassis link (LK1) should be left unconnected. Fit links to LK3, LK5, LK7, LK8 to enable the BNC ports.

For EUROPEAN connection, un-screened RJ45 cables are suitable. The screen to chassis links must be *isolated* – ensure links LK6 and LK1 are **removed**. Links LK3, LK5, LK7, LK8 should be removed to isolate the BNC connectors.



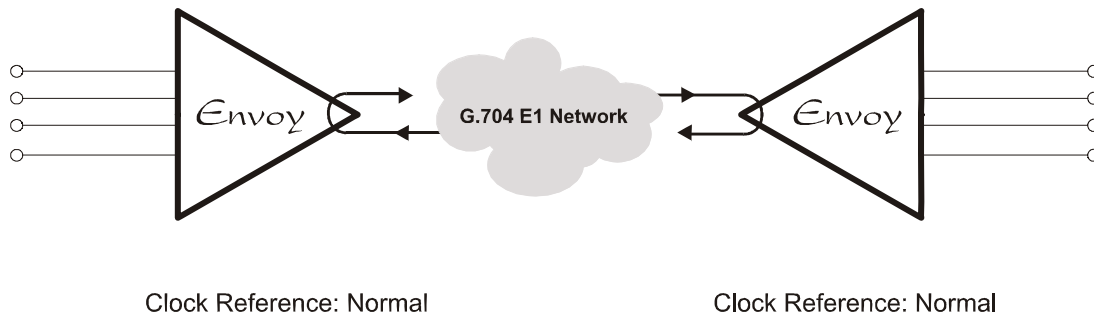
**Figure 8** **E1 Composite Rear Card Connectors**

To ensure the correct termination resistance is applied, the two position links LK2, LK4, LK9, LK10, LK11 should be fitted to **75R** (UK) or **120R** (European) positions as appropriate – refer to Figure 7.

## E1 Clocking

### Network Clocking

The Envoy would normally be connected to a communications network and would derive its master clock from the Network's received data. To operate in this mode, both local and remote units should be set to 'Normal' clock.



**Figure 9** **Network Clock Operation**

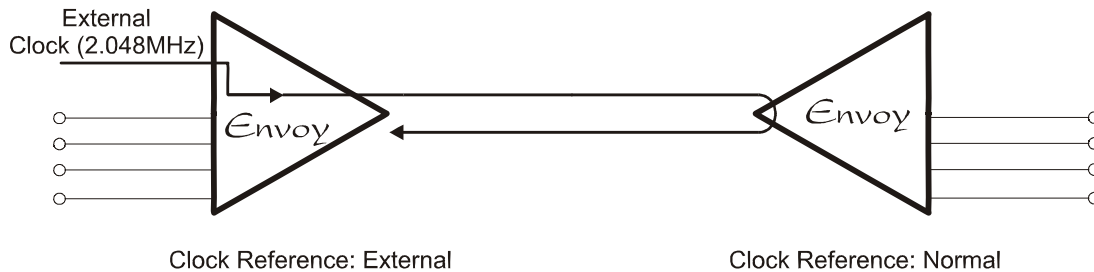
### Back to Back Clocking

For a simple demonstration, or local network use, two Envoy multiplexors may be connected 'back to back', using a cross over cable. To operate in this mode, both local and remote units should be set to 'Normal' clock.

For **UK interfaces**, a pair of 75 Ohm BNC cables should be used, connecting TX on one unit to RX on the other and visa versa. For **European interfaces** an RJ45 crossover cable should be used, as described in 0.

### External Clock reference

An external clock BNC connector is available for connection of a 2.048MHz TTL square wave with a stability of 50ppm or better.



**Figure 10** **External Clock Reference**

### Main Set-up Display Screen

Once the terminal type has been selected (refer to page 16 ) the screen shown in Figure 11 will be displayed. The composite link parameters are displayed in the System (upper left) area of the screen. Menu page selections are displayed in the upper right part of the screen – the asterisk '\*' indicates which page is currently being displayed. Initially, the **Option Cards** menu page is selected. The 'Slot 1' to 'Slot 7' legends detail the card types fitted.

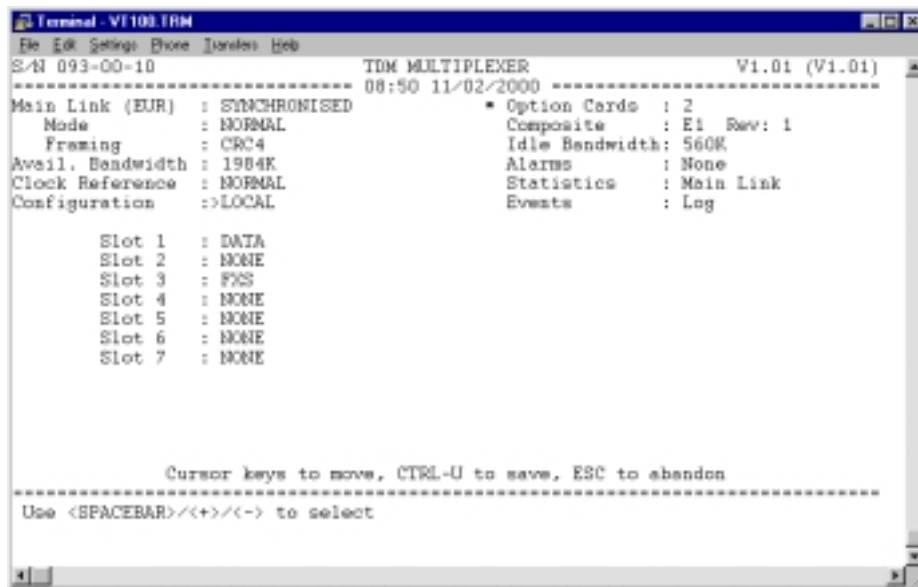


Figure 11 Main Set-Up Screen (Option Cards)

## Composite Link Parameters

The parameters in the System area (upper left) and the choices available by pressing the **Space Bar** or + and – keys are detailed in the table below.

Composite Link Set-up Options		
PARAMETER	CHOICES	NOTES
<b>Main Link</b>	SYNCHRONISED CRC4 Hunt NO CARRIER	Shows whether the link is successfully connected. No options selectable.
<b>Mode</b>	NORMAL	Normal run mode.
	LOCAL LOOP	Composite loopback, causes MUX to get carrier even when not connected to link.
	REMOTE LOOP	Payload loopback, causes data at E1 port to be echoed to the network.
<b>Framing</b>	CRC4	16-Frame synchronisation, using CRC4 pattern. Allows better link diagnostics.
	NON-CRC4	2 Frame Synchronisation only. Only use this if the link does not support CRC4 mode. The Envoy will 'rob' 8Kbps of bandwidth to maintain a 16 frame synchronisation with the remote unit.
<b>Avail. Bandwidth</b>		Displays bandwidth available for use from the composite link. No options selectable
<b>Clock Reference</b>	NORMAL	Clock sourced from E1 receive data if available, otherwise from internal reference.
	EXTERNAL	Clock sourced from external clock connector. Must be 2.048Mbps accurate to 50ppm or better.
<b>Configuration</b>	LOCAL REMOTE	"Modified" appears if change has been made.



### Option Card Configuration

Option card types are displayed in the lower half of the display. Use the cursor keys to position the arrow '>' on one of the slots and press <Return> to access the option card configuration screen (refer to appropriate section). Empty slots will be displayed with the legend 'None'.

### Composite Set-Up Display Screen

The **Composite** set-up screen allows configuration of the E1 timeslots that may be used by the Envoy (see Figure 12). Timeslot 0 is always used for synchronising and is shown as 'S' (this may not be changed). The other timeslots 1 to 31 may be set to 'E' for enable, or '-' for disable. Enabling a timeslot will add 64Kbps to the **Avail. Bandwidth** display legend – each timeslot gives 64Kbps of bandwidth to the Envoy.

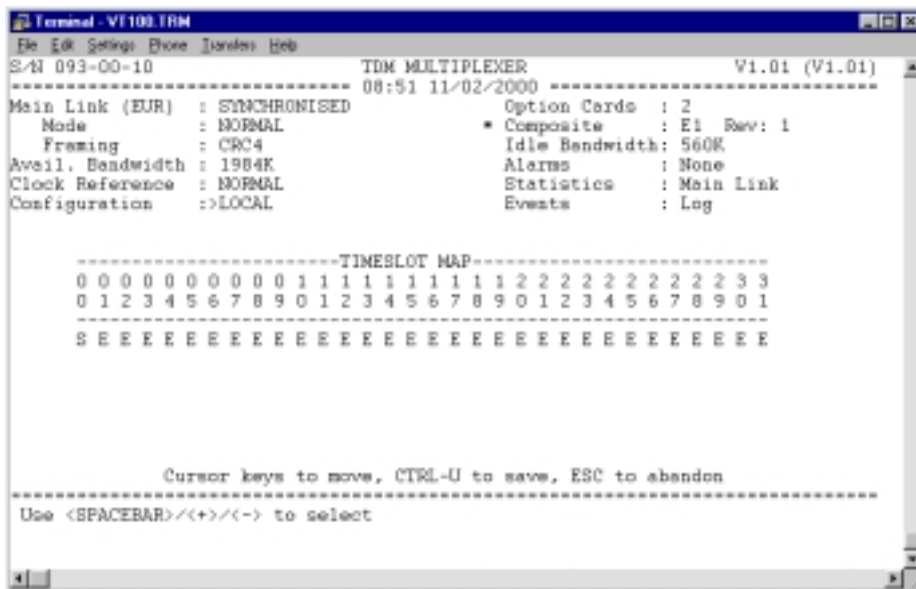


Figure 12 Composite Set-Up Display Screen

For E1 links, all timeslots 1 to 31 should be set to enable to give the full 1984Kbps of bandwidth to the Envoy. For fractional E1 links, only those timeslots that are available should be set to enable, otherwise data may be transmitted in invalid timeslots.

### Idle Bandwidth Display Screen

The **Idle Bandwidth** legend shows the current available idle (free) bandwidth available for use by the Envoy. If this menu item is selected, a diagnostic screen showing the current bandwidth mapping is displayed (see Figure 13). No user configurable items are on this page, the mapping of the bandwidth is computed entirely by software.

## ENVOY Voice and Data Multiplexor

The bandwidth allocation is displayed as 256 bits (4 lines of 64 bits) with the following legends:

#	Bit position unavailable for use
-	Bit position free
S	Envoy signalling bit
Upper number	Slot number
Lower number	Channel number

```
Terminal - VI100.TRM
File Edit Settings Phone Database Help
S-N 093-00-10 TDM MULTIPLEXER V1.01 (V1.01)
----- 08:51 11/02/2000 -----
Main Link (EUR) : SYNCHRONISED Option Cards : 2
Mode : NORMAL Composite : E1 Rev: 1
Framing : CRC4 * Idle Bandwidth: 560K
Avail. Bandwidth : 1984K Alarms : None
Clock Reference : NORMAL Statistics : Main Link
Configuration :>LOCAL Events : Log

Slot: ##### 11111111 11111111 11111111 11111111 11111111 11111111 11111111
Chan: ##### 22222222 22222222 22222222 22222222 22222222 22222222 22222222

Slot: 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111
Chan: 22222222 22222222 22222222 22222222 22222222 22222222 22222222 22222222

Slot: 11111111 11111111 11111111 11111111 11111111 33333333 33333333 35-----
Chan: 22222222 11111111 11111111 11111111 11111111 44444444 33332221 18-----

Slot: -----
Chan: -----

Cursor keys to move, CTRL-U to save, ESC to abandon
-----
Use <SPACEBAR>/<+>/<-> to select
```

Figure 13 Idle Bandwidth Display Screen

## Alarms Display Screen

The **Alarms** page (see Figure 14) allows setting of the conditions that cause the front panel alarm LEDs to come on (to visually warn an operator of a problem).

```

Terminal: V1100.TRM
File Edit Settings Phone Database Help
-----
S/N 093-00-10          TDM MULTIPLEXER          V1.01 (V1.01)
08:52 11/02/2000
-----
Main Link (EUR) : SYNCHRONISED      Option Cards : 2
Mode           : NORMAL             Composite    : E1 Rev: 1
Framing        : CRC4               Idle Bandwidth: 560K
Avail. Bandwidth : 1984K           * Alarms    : None
Clock Reference : NORMAL            Statistics   : Main Link
Configuration  :>LOCAL              Events      : Log

Event          Action          Status
Link Carrier Loss: MAJOR        OK
Timeslot Mismatch: MAJOR        OK
Sig. bit Mismatch: MAJOR        OK
Card Mismatch  : MAJOR          OK
Channel Mismatch : MAJOR        OK
Remote Alarm   : NO ACTION      OK
Link BER High  : NO ACTION      OK          BER Threshold : 1E-8

-----
Cursor keys to move, CTRL-U to save, ESC to abandon
Use <SPACEBAR>/<+>/<-> to select
    
```

Figure 14 Alarms Display Screen

## Setting the Alarm Conditions

Each of the possible Alarm conditions may be set to any of the following actions:

- a) NO ACTION The events will not cause the LEDs to come on, or the event to be logged.
- b) LOG ONLY The events will not cause the LEDs to come on, but the event **will be logged**.
- c) MINOR The event will be logged, and will cause the MINOR alarm LED to illuminate.
- d) MAJOR The event will be logged, and will cause the MAJOR alarm LED to illuminate.

Note that the screen display also indicates the highest active alarm status (None, Minor or MAJOR), to the right of the 'Alarm' page prompt on the top right of the screen.

The reasons for which an alarm may be reported as 'FAULT' are identified below:

## Link Carrier Loss

The local Multiplexor cannot identify a valid synchronisation sequence (FAS, CRC4 etc) from the remote multiplexor.

## Card Mismatch / Channel Mismatch

The configuration in the local unit **does not match** that in the remote unit. This would almost certainly lead to data errors on some channels so option cards will be disabled.

## Remote Alarm

Shows FAULT if a remote Alarm is being received from the remote multiplexor.

Remote alarms are generated by any condition set at the remote site to give a MAJOR alarm. If you want a particular alarm to be reported through the remote alarm bit, you must set its **Action** field to either MAJOR or MINOR. Any alarm which is set to MAJOR or MINOR will cause a remote alarm to be sent through the link.

## Link BER High

Shows FAULT if the Bit Error Rate exceeds the threshold set. With an error free link, this fault will eventually clear when the BER becomes less than the threshold set.

## Statistics Display Screen

The Statistics pages give regularly updated information as to the performance of the E1 data link(s).

It is important to note that there are in fact **two** statistics pages available for viewing:

- a) Local Main Link
- b) Remote Main Link

The local and remote pages are accessed in the normal manner (using the spacebar on the 'Configuration' field).

Each entry on a page represents a summary of link performance over 15 minutes of operation. The **Current** entry, is updated every 10 seconds with any errors identified in the preceding 10 seconds.

To view additional entries not shown (if any) on the current screen page, move the cursor to the '**Period end**' field, and use the **Left and Right arrow keys**. This will scroll the statistics information up or down by one page respectively.

For diagnostics purposes it is possible to **Clear** the **Current** line (i.e. start a fresh line), by moving the cursor to the '**Period end**' field, then typing <CTRL> and R. This is useful if the

operator wishes to check that a condition which may have been causing errors has been removed.

```

Terminal - VI100.TRM
-----
S/N 093-00-10          TDM MULTIPLXER          V1.01 (V1.01)
-----
Main Link (EUR) : SYNCHRONISED          Option Cards : 2
Mode           : NORMAL                  Composite   : E1 Rev: 1
Framing        : CRC4                    Idle Bandwidth: 560K
Aveil. Bandwidth : 1984K                 Alarms     : None
Clock Reference : NORMAL                  * Statistics : Main Link
Configuration  : LOCAL                    Events     : Log

Error Counts: >Period End---BVC---BER---CRC---FEBE---FAS---SYNC
08:50:00      0 <1E-09          0      0      0      0
08:53:34     4931 2.7E-05        3     9218  9     10
08:54:32      0 <1E-09          0      0      0      0
Current:     08:54:40      0 <1E-09          0      0      0      0

-----
Cursor keys to move, CTRL-U to save, ESC to abandon
-----
(S)tart, (E)nd, (^R)eset current, <+>/<-> = scroll
  
```

**Figure 15      Statistics Display Screen**

On the screen display, the following abbreviations are used:

- BVC            =      Bipolar Violation Count errors
- BER           =      Approximate Bit Error Rate (based on BVC), which may be used to trigger an alarm. Note that BER is only calculated when the unit is in SYNC with the remote unit.
- CRC           =      Cyclic Redundancy Check errors (in CRC4 mode only, otherwise shown as '----')
- FEBE          =      Far End Block Errors (in CRC4 mode only otherwise shown as '-- --')
- FAS           =      Frame Alignment Signal losses
- SYNC          =      Synchronisation losses (reported each time sync goes from 'present' to 'lost')

These statistics provide a very useful summary of link performance over the last 24 Hour period.

Note that, unlike the event log, the statistics are **not** retained in the event of a power failure.

## Event Log Display Screen

An event log is maintained which stores (in non-volatile memory) crucial events, such as power up, alarms, and configuration change, and carrier loss times.

The kind of information which is included in the event log may be chosen by the user, by selecting the alarm conditions on the **Alarm page**, see pages 27 and 28.

## Setting the System's Real-Time Clock

To change the system clock time, position the > cursor at the "Set Clock" field. The message 'Enter time and date (hh-mm-ss dd/mm/yy)' will appear at the bottom of the screen. The time should be entered following the format shown. Time updates may be entered without a date, but to change the date, both must be entered.

The clock is non-volatile so will continue to run when the unit is powered off.

## Clearing the Event Log

The event log can be cleared by moving the cursor to the first event (after 'Events:') and pressing <CTRL> and 'R' together. This will **delete all events** from the list, and leave the message 'Event Log Cleared' as the only event. It may be useful to clear the **remote** event log at the same time, by accessing the REMOTE page, and repeating this process.

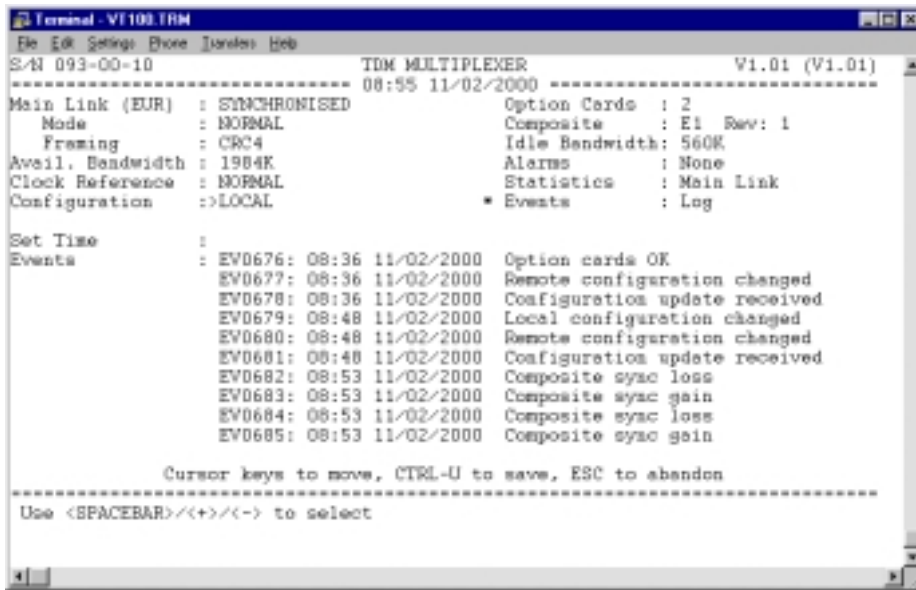


Figure 16 Events Display Screen

## *Nx8k Composite Card*

### Installation



**NOTE: Refer to Appendix A for Safety Warnings**



**NOTE: The Envoy MUST be disconnected from the power supply before opening the unit or fitting any option cards.**



**NOTE: The Envoy contains electrostatic sensitive devices, take anti-static precautions when working on the unit.**

*Refer to Pages 14 and 15 for installation and removal of option cards.*

The Nx8k Composite Card **MUST** only be fitted into **Slot 0** of the Envoy chassis.

### Telnet Login

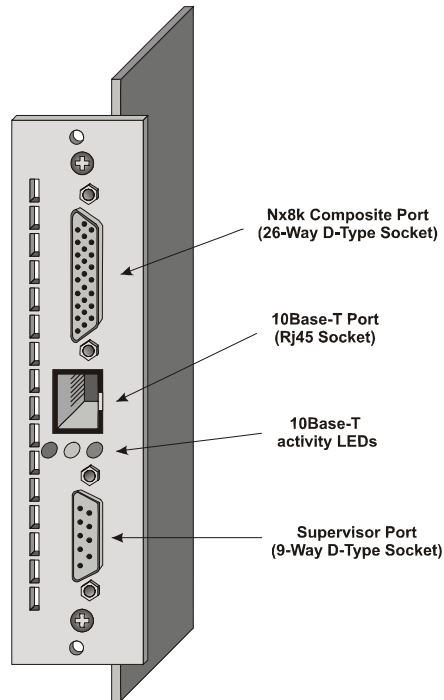
When connecting to the Envoy using telnet, the login account is 'mgr'. If a password has been set, a password prompt will also be presented to the user.

### Composite Network Connection

The Nx8k Composite Card supports V11/X21, V35, EIA530, EIA530A, V36/RS449 and V28/RS232, DTE and DCE Interfaces – refer to Figure 17.

The composite port appears on the rear panel as a 26 way female high density D connector, the pin-out of which is shown in Appendix F. Conversion to the required interface is made using the correct cable as specified in Appendix K.



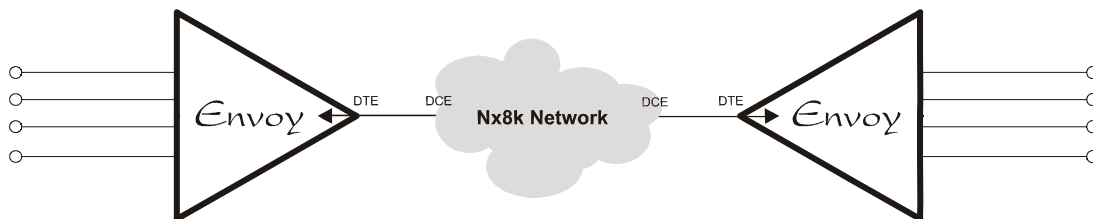


**Figure 17** **Nx8k Composite Rear Card Connectors**

**Clocking**

There are two types of interface port available for the Nx8k Composite, DTE and DCE. A DCE port sources a clock and a DTE port uses the clock supplied to it. In any system there should only be one clock source, whether it is the network or one of the Envoys in a back to back implementation. If there is more than one clock source in a system then occasional, momentary losses of synchronisation, and therefore errors, may occur.

The Envoy would normally derive its master clock from the Nx8k Network. To operate in this mode, both local and remote units should be connected to the network with a DTE cable, see Figure 18.



**Figure 18** **Network Clocking Operation**

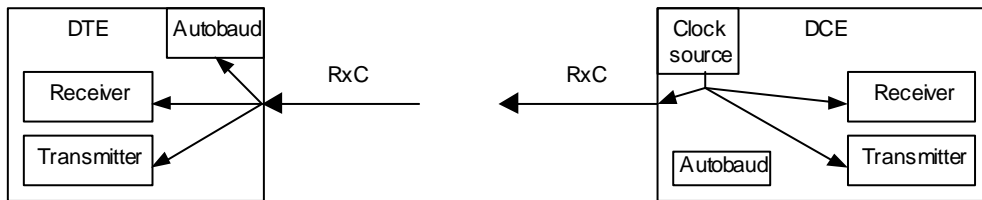
It is possible to connect two Envoys back to back by using a DCE cable on one Envoy and a DTE cable on the other. This way the Envoy with the DCE cable becomes the clock source, see Figure 19.



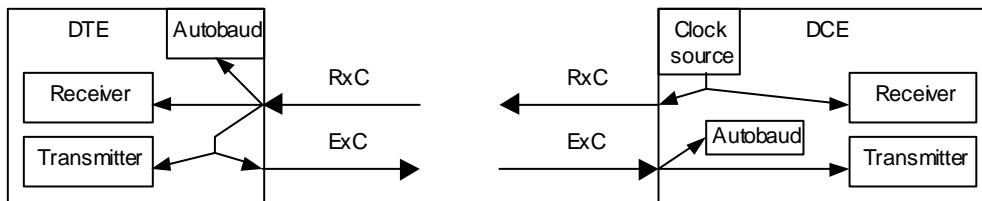


**Figure 19** **Back to Back Clcking Operation**

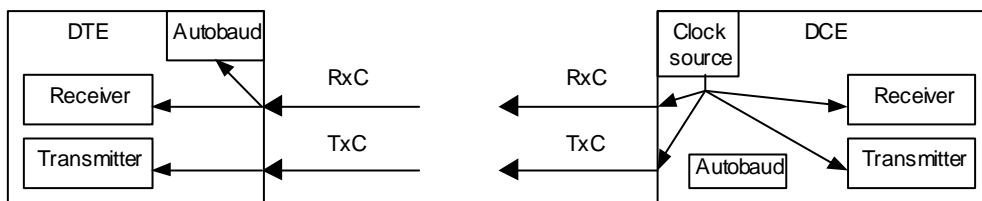
In addition to the transmit and receive clocks there is also an external transmit clock which is sourced by the DTE, this provides additional flexibility when interfacing different types of equipment. The external clock, if enabled, is used as the timing source for the transmit data and the transmit clock is ignored. The different clocking possibilities for both DTE's and DCE's are shown in Figure 20, Figure 21, Figure 22 and Figure 23.



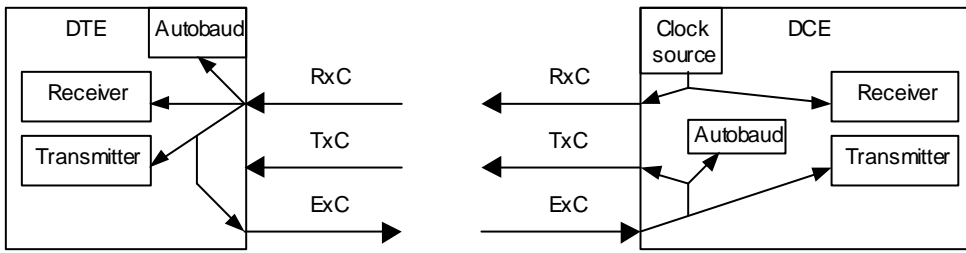
**Figure 20** **Tx clock disabled, Ext clock disabled**



**Figure 21** **Tx clock disabled, Ext clock enabled**



**Figure 22** **Tx clock enabled, Ext clock disabled**



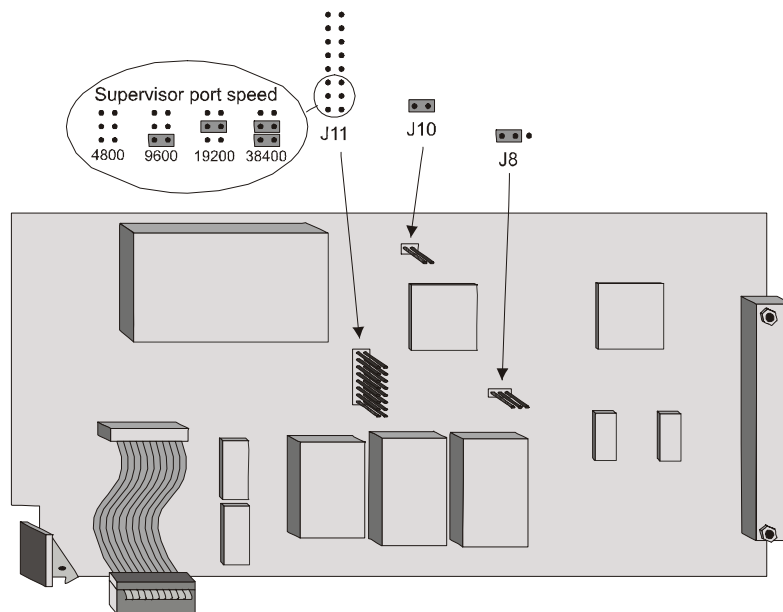
**Figure 23 Tx clock enabled, Ext clock enabled**

In summary if an Envoy is required to provide both transmit and receive clocks a DCE interface should be used. If it is just required to provide a transmit clock then a DTE interface set for external clock would be best. However, in most situations using a DTE interface as in Figure 22 would be adequate.

**Jumper settings**

Normally the factory default setting for the jumpers will be adequate. However, the function of the Supervisor port can be altered to suit individual requirements by changing some of the jumper settings.

Jumper J10 must always be in and J8 must always be in position 1-2 for the unit to operate. These jumper positions can be seen in Figure 24. J11 is a set of eight jumpers that change the speed of the supervisor port and whether it is used for management or as an extra data channel. See Figure 24.



**Figure 24 Jumper Settings**

### Main Set-up Display Screen

Once the terminal type has been selected (refer to page 16) the screen shown in Figure 25 will be displayed. The composite link parameters are displayed in the System (upper left) area of the screen. Menu page selections are displayed in the upper right part of the screen – the asterisk ‘\*’ indicates which page is currently being displayed. Initially, the **Option Cards** menu page is selected. The ‘Slot 1’ to ‘Slot 7’ legends detail the actual card types fitted.

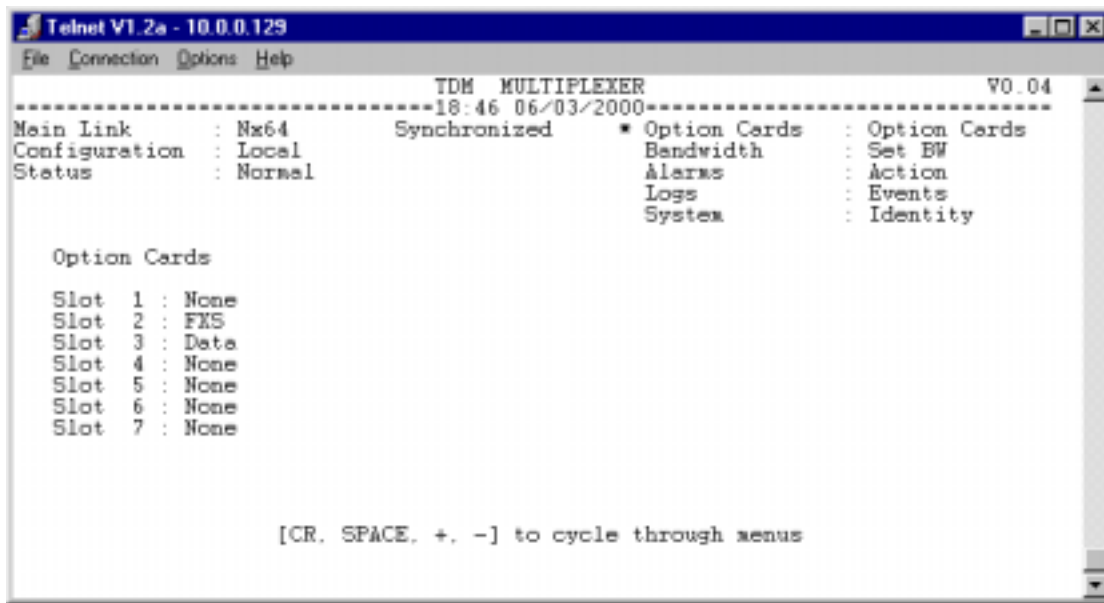


Figure 25 Main Set-Up Screen (Option Cards)

## Composite Link Parameters

The parameters in the System area (upper left) give brief details of the state of the composite link. The choices available can be changed by pressing <Space Bar> are detailed in the Composite Link Set-Up Options table.

Composite Link Set-up Options		
PARAMETER	CHOICES	NOTES
<b>Main Link</b>	Nx64	If the unit loses synchronisation then "No Carrier" is displayed, otherwise "Synchronised" will be shown. Information only. Can not be edited.
<b>Configuration</b>	Local Remote	Allows viewing and editing of either unit's configuration. "Cfg Changed" appears if change has been made.
<b>Status</b>	No Remote	Communications with the remote unit can not be established. Information only. Can not be edited.
	Loading	Currently establishing communications with the remote unit. Information only. Can not be edited.
	Normal	Remote communications functioning correctly. Information only. Cannot be edited.

### Menu Page Selections

In the upper right section of the screen are the menu page selections. Different menu pages can be displayed by moving the cursor to the appropriate item and pressing either <Space Bar>, <Return>, <+> or <->. Some items have more than one menu page associated with it, the following table shows the menu pages that are available and under which item.

Menu Page Selections		
ITEM	MENU PAGE	NOTES
Option Cards	Option Cards	Option card status and configuration
	Composite	Composite status and configuration
Bandwidth	Set BW	Composite main link speed configuration
	Allocated BW	Indicates how the bandwidth is allocated to option cards
Alarms	Action	Alarm status and configuration
Logs	Events	Log of system events
	Statistics	Composite link synchronisation statistics log
	Ethernet	Ethernet statistics log
	IP	IP statistics log
System	Identity	Contains basic system information such as version numbers, IP address, etc.
	Telnet	Telnet configuration
	Sys Config	System real time clock configuration

### Option Card Menus

#### Option Cards

Option card types are displayed in the lower half of the display. Use the cursor keys to position the cursor on one of the slots and press <Space Bar> or <Return> to access the option card configuration screen (refer to appropriate section). Empty slots will be displayed with the legend 'None'.

## Composite

This menu is used to configure the characteristics of the composite link and to view the type and status of the interface used. Those items on the left of the screen can be changed, the right hand side of the screen is status information only.

The following table identifies each of the menu items, some of which may not be displayed if they are not relevant to the interface type being used. Each possible value is described for each menu item.

Composite Menu Item Selections		
Revision	e.g. 1	Indicates the version number of the hardware
Mode	NORMAL	Normal operating mode
	LLOOP	Local loop: Data is looped back before reaching the composite cable
	RLOOP	Remote loop: Data from the remote unit is looped back to the remote unit
	LRLOOP	Local and Remote loop: Both units data is looped back to itself on this composite card
Tx. Clock	Enabled	A DCE will enable the transmit clock in the composite cable.  A DTE will use the transmit clock as the timing source for transmit data. As long as Ext. clock is disabled.
	Disabled	Transmit clock will not be used. A DTE will use the receive clock as its timing source for transmit data unless Ext. clock is enabled.
Ext. Clock	Enabled	A DCE will use the external transmit clock from the composite as its timing source for transmit data. A DTE will enable the external transmit clock in the composite cable.
	Disabled	External transmit clock will not be used.
Autobaud	Enabled	Allows the unit to automatically detect the clock speed from the composite. A DTE will measure the receive clock and a DCE will measure the external clock.
	Disabled	The user must manually configure the composite link speed in the Bandwidth



		menu screen.
C (X21/V11 DTE)	ON	Control signal ON
I (X21/V11 DCE)	OFF	Control signal OFF
RTS (other DTE's)	LOOP	Signal looped with its paired signal, i.e. C with I, RTS with CTS and DTR with DSR.
CTS (other DCE's)		
DTR (other DTE's)		
DSR (other DCE's)	CARRIER	Signal asserted ON if the main link is synchronised, so carrier is available.
DCD (other DCE's)		
Protocol	e.g. X21	Displays the interface protocol type.
Interface	e.g. DTE	Displays the interface endpoint type.
C (X21/V11 DCE)	ON	Control signal ON
I (X21/V11 DTE)		
RTS (other DCE's)	OFF	Control signal OFF
CTS (other DTE's)		
DTR (other DCE's)		
DSR (other DTE's)		
DCD (other DTE's)		
Sync.	Resetting	Resetting the synchroniser
	Clearing remote	
	Searching for sync.	Searching for and aligning to the synchronisation pattern
	Validating sync.	
	Aligning FIFO	
	Searching for ready sig.	Synchronised, checking to see if the remote has synchronised
	Confirming sync.	
	Synchronised	



## ENVOY Voice and Data Multiplexor

```
Telnet V1.2a - 10.0.0.135
File Connection Options Help
-----TDM MULTIPLEXER----- V0.08
-----14:14 02/02/2000-----
Main Link      : Nx64          No Carrier      * Option Cards : Composite
Configuration  : Local                               Bandwidth    : Set BW
Status        : No Remote                               Alarms      : Action
                                                    Logs        : Ethernet
                                                    System     : Identity

Nx64 composite interface          Revision : 1
Mode      : NORMAL                Protocol : EIA 530A
Tx. Clock : Enabled               Interface: DTE
Ext. Clock: Disabled              CTS     : OFF
Autobaud  : Disabled              DSR     : OFF
RTS       : ON                    DCD     : OFF
DTR       : ON                    Sync.   : Clearing remote
```

### Bandwidth Menus

#### Set BW

If the Envoy is configured for Manual Baud on the composite menu screen then the Available Bandwidth menu item may be changed to set up the speed of the composite link. This is done by pressing <RETURN>, <SPACE BAR>, <+> or <->. If configured for AutoBaud then this menu item cannot be changed, it indicates the speed of the composite link which has been automatically measured and configured.

The Composite Comms BW item can be changed to alter the amount of the composite link used for communications between the two Envoy units, local and remote. The default is 1.5k, which is a dedicated channel for the composite cards embedded within the standard signalling bits. Setting this item to a higher speed will use some of the bandwidth of the composite link, which cannot then be used for option cards. The speed is changed by pressing <RETURN>, <SPACE BAR>, <+> or <->.



The Idle Bandwidth item is for indication only. It shows the amount of bandwidth on the composite link that has not yet been configured for use and is spare.

```

Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER----- V0.04
-----18:55 10/03/2000-----
Main Link      : Nx64      Synchronized  Option Cards  : Composite
Configuration : Local          * Bandwidth    : Set BW
Status        : Normal                               Alarms       : Action
                                                    Logs         : Ethernet
                                                    System       : Identity

Composite Bandwidth Configuration
Available Bandwidth : 1256K
Composite Comms BW  : 48K
Idle Bandwidth      : 0K

[CR, SPACE, +, -] to cycle through menus
    
```

## Allocated BW

This screen shows how the composite links bandwidth has been allocated by the Envoy in each frame (one frame last 125us). The information is displayed as a table of bits, up to 256 bits per frame, which equates to 2048kbits/s. Each set of 8 bits is shown as a block (64kbits/s) to make reading the display easier.

For each entry in the table there is an identifier for the Envoy card slot number and the channel number of that card. The meaning of each is shown in the following table:

Symbol	Description
S	Reserved for voice and data signalling bits
C	Reserved for extra composite communications
n	1 to 7. Number representing the card slot of the Envoy
-	Bit unused. Indicates spare bandwidth
#	Bit not available. Shown if link speed is slower than 2048kbits/s
X	Collision. There has been an allocation mismatch

```

Telnet V1.2a - 10.0.0.129
File Connection Options Help
-----TDM MULTIPLEXER-----
-----18:53 06/03/2000-----
Main Link      : Nx64      Synchronized      Option Cards   : Option Cards
Configuration  : Local          * Bandwidth     : Allocated BW
Status        : Normal          Alarms         : Action
                                           Logs          : Events
                                           System       : Identity

Slot: 90000002 22222222 22222222 22222222 22222223 33333333 33333333 33333333
Chan: 90000001 11111112 22222223 33333334 44444441 11111111 11111111 11111111

Slot: 33333333 33333333 33333333 33333333 33333333 33333333 33333333 33333333
Chan: 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

Slot: 33333333 33333333 33333333 33333333 33333333 33333333 33333333 33333333
Chan: 11111111 11111111 11111111 11111111 11111111 11111111 11111111 11111111

Slot: #####  #####  #####  #####  #####  #####  #####  #####
Chan: #####  #####  #####  #####  #####  #####  #####  #####

[CR, SPACE, +, -] to cycle through menus
    
```

## Alarms Menu

The Alarms menu configures the alarm generated by pressing <RETURN>, <SPACE BAR>, <+> or <-> and displays the current status of that alarm.

Link Carrier Loss indicates the local Multiplexer cannot identify a valid synchronisation sequence from the remote multiplexer.

Option Card Mismatch or Channel Mismatch indicates the configuration in the local unit does not match that in the remote unit. This would almost certainly lead to data errors on some channels so option cards will be disabled.

Remote Alarm shows FAULT if a remote Alarm is being received from the remote multiplexer. These are generated by any condition set at the remote site to give a MAJOR alarm. If you want a particular alarm to be reported through the remote alarm bit, you must set its Action field to either MAJOR or MINOR. Any alarm that is set to MAJOR or MINOR will cause a remote alarm to be sent through the link.

Alarm Level	Description
NO ACTION	Fault condition is not reported
LOG ONLY	Fault condition is only recorded in the event log.
MINOR	Fault recorded in the event log and minor alarm will be illuminated on the front panel. An SNMP trap will also be sent if configured to do so.
MAJOR	Fault recorded in the event log and major alarm will be illuminated on the front panel. An SNMP trap will also be sent if configured to do so.

```

Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----
-----19:39 10/03/2000-----
Main Link      : Nx64      Synchronized  Option Cards   : Composite
Configuration  : Local    Cfg Changed   Bandwidth     : Set BW
Status         : Normal                    * Alarms       : Action
                                           Logs          : Ethernet
                                           System        : Identity

Event          Action      Status
Link Carrier Loss : MAJOR    OK
Option Card Mismatch : MAJOR    OK
Channel Mismatch : MAJOR    OK
Remote Alarm    : NO ACTION OK

[CR, SPACE, +, -] to cycle through menus
    
```

## Logs Menus

### Events

The events page shows events stored in the event log. The event log can store 650 events, if this number is exceeded the oldest events are overwritten. If there are more events stored than can be displayed you may scroll through the events by pressing <LEFT> to view the previous page or <RIGHT> to view the next page. To jump to the start of the log to see the first event press <S> and to jump to the end press <E>. The log can be reset by pressing <CTRL> and <R> together.

The information given is the event number, time and date the event occurred and a text string detailing the nature of the event

```

Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----
-----20:00 10/03/2000-----
Main Link      : Nx64      Synchronized  Option Cards   : Composite
Configuration  : Local    Cfg Changed   Bandwidth     : Set BW
Status         : Normal                    * Alarms       : Action
                                           * Logs         : Events
                                           System        : Identity

Event Log

EV00031:23:48 21/01/2000 System Reset
EV00032:23:48 21/01/2000 Composite sync loss
EV00033:23:48 21/01/2000 Composite sync gain
EV00034:23:52 21/01/2000 Local configuration changed
EV00035:23:52 21/01/2000 Remote configuration changed
EV00036:23:52 21/01/2000 Composite sync loss
EV00037:23:52 21/01/2000 Composite sync gain
EV00038:23:54 21/01/2000 System Reset
EV00039:23:54 21/01/2000 Composite sync gain
EV00040:23:54 21/01/2000 System Reset

[^R, S, E, LEFT, RIGHT] Clear log. Start. End. Page down. Page up
    
```

# ENVOY Voice and Data Multiplexor

## Statistics

This page shows statistics on the composite link in one minute blocks. The number of synchronisation losses, transmit buffer overflows, receive buffer overflows, transmit buffer underflows and receive buffer underflows are counted and displayed every ten seconds. Each minute the counter is reset and a new line is started.

```
Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----VO.04
-----20:38 10/03/2000-----
Main Link      : Nx64      Synchronized
Configuration  : Local
Status         : Normal
Option Cards   : Composite
Bandwidth      : Set BW
Alarms         : Action
* Logs         : Statistics
System         : Identity

Link Statistics
PeriodEnd----SyncLoss---TxOver---RxOver---TxUnder---RxUnder
20:30:58      0          0          0          0          0
20:31:58      0          0          0          0          0
20:32:58      0          0          0          0          0
20:33:58      0          0          0          0          0
20:34:58      0          0          0          0          0
20:35:58      0          0          0          0          0
20:36:58      0          0          0          0          0
20:37:58      0          0          0          0          0
20:38:00      0          0          0          0          0

[CR, SPACE, +, -] to cycle through menus
```

## Ethernet

The Ethernet page displays statistics for the Ethernet link that have been recorded since power on. The transmit statistics are shown on the left and receive statistics on the right.

```
Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----VO.04
-----20:43 10/03/2000-----
Main Link      : Nx64      Synchronized
Configuration  : Local
Status         : Normal
Option Cards   : Composite
Bandwidth      : Set BW
Alarms         : Action
* Logs         : Ethernet
System         : Identity

Ethernet Statistics
Frames Sent      : 449      Frames Recieved   : 578
Bad Frames       : 0        Bad Frames        : 0
Deferred Frames  : 0        Miss              : 0
Heartbeat Errors : 0        Length Violations : 0
Late Collisions  : 0        Alignment Violations : 0
Retry Limit Reached : 0    CRC Errors        : 0
Fifo Underrun    : 0        Fifo Underrun     : 0
Carrier Sense Lost : 0    Fifo Overrun      : 0

[CR, SPACE, +, -] to cycle through menus
```

## IP

The IP page shows the IP statistics for the unit that have been recorded since power on. The transmit statistics are shown on the left and receive statistics on the right.

```

Telnet V1.2a - 10.0.0.130
-----
TDM MULTIPLEXER V0.04
-----
18:57 24/03/2000
-----
Main Link      : Nx64      Option Cards   : Composite
Configuration  : Local    Bandwidth     : Set BW
Status         : Normal    Alarms        : Action
                                   * Logs        : IP
                                   System         : Identity

IP Statistics

IP Packets Sent      : 28      IP Packets Recieved : 153
Forwards             : 0      Header Errors       : 0
Discards             : 0      Address Errors      : 0
No Routes            : 0      Unknown Protocols  : 0
Fragments OK         : 0      Discards            : 0
Fragments Failed     : 0      Reassembly Requireds : 0
Fragments Created    : 0      Reassembly OKs     : 0
                                   Reassembly Fails   : 0

[CR, SPACE, +, -] to cycle through menus

```

## System Menus

### Identity

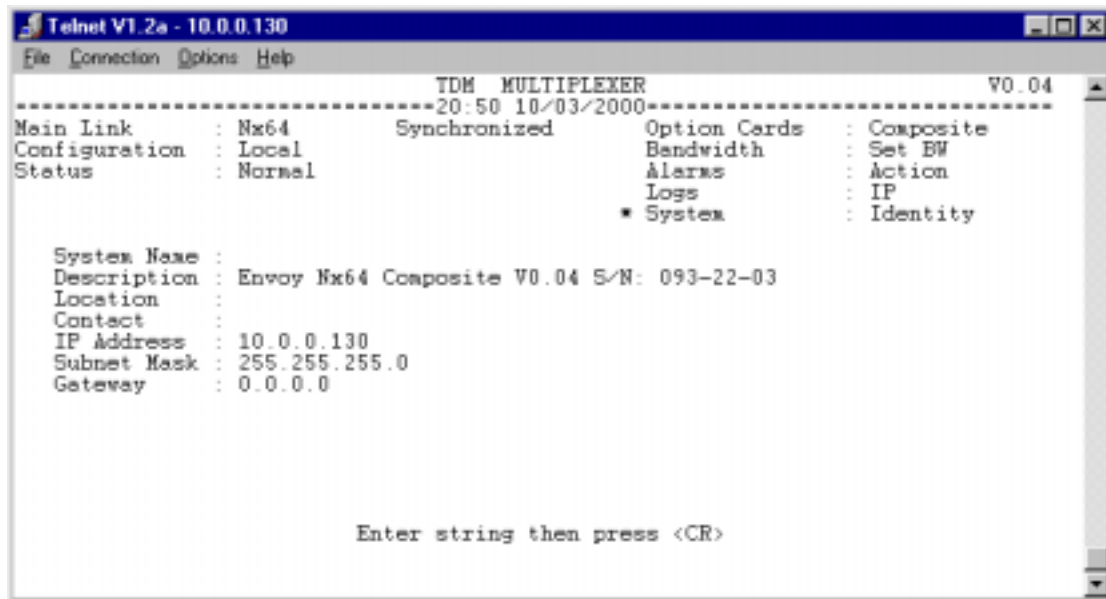
This screen shows basic identity information about the unit. User defined text strings can be entered in the 'System Name', 'Location' and 'Contact' sections so the unit can easily be identified when being configured remotely. None of the items on this menu page will be updated until the unit has been powered off and on again.

The 'Description' section cannot be modified, it shows the unit type, serial number and software version number.



## ENVOY Voice and Data Multiplexor

The IP address, subnet mask and gateway addresses for the unit are entered on this page.



```
Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----YDM MULTIPLEXER-----V0.04
-----20:50 10/03/2000-----
Main Link      : Nx64      Synchronized      Option Cards   : Composite
Configuration  : Local      Bandwidth        : Set BW
Status         : Normal      Alarms           : Action
                                      Logs              : IP
                                      * System         : Identity

System Name   :
Description   : Envoy Nx64 Composite V0.04 S/N: 093-22-03
Location      :
Contact       :
IP Address    : 10.0.0.130
Subnet Mask   : 255.255.255.0
Gateway       : 0.0.0.0

Enter string then press <CR>
```

### Telnet

This page controls the security of telnet accesses to the unit. If a password is entered then the user will be asked for it at log in.

The 'IP Address' and 'IP Mask' fields control which terminals are allowed access to the Envoy for both Telnet and SNMP. The 'IP Mask' is a set of four fields, each of which defines an eight bit binary number, represented as a decimal number in the range 0 to 255. It controls which binary digits of the IP address of the terminal accessing the Envoy are compared with that in the IP address field. If no match is found then that terminal is not allowed access to the Envoy.

For example, if the mask is set to 0.0.0.0 then none of the address bits are compared so any terminal may have access, if set to 255.255.255.255 then all bits will be compared so only the address which matches that entered in the IP address field may have access. To only allow access to a range of addresses the mask could be set to 255.255.255.0 so comparing the first three fields of the IP address. If the IP address field were set to 10.0.0.0 then any terminal which has an IP address in the range 10.0.0.0 to 10.0.0.255 will have access granted.

```

Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----V0.04
-----20:53 10/03/2000-----
Main Link      : Nx64      Synchronized  Option Cards  : Composite
Configuration  : Local    Bandwidth     : Set BW
Status         : Normal    Alarms       : Action
                                   Logs          : IP
                                   * System       : Telnet

Telnet configuration
Password       :
IP Address     : 0.0.0.0
IP Mask        : 0.0.0.0
    
```

## Sys Config

This page is where the Envoy's clock and calendar is configured. The clock is non-volatile and will continue to run even when the unit is powered off.

```

Telnet V1.2a - 10.0.0.130
File Connection Options Help
-----TDM MULTIPLEXER-----V0.04
-----20:53 10/03/2000-----
Main Link      : Nx64      Synchronized  Option Cards  : Composite
Configuration  : Local    Bandwidth     : Set BW
Status         : Normal    Alarms       : Action
                                   Logs          : IP
                                   * System       : Sys Config

Set Clock      :

Enter time and date (hh-mm-ss dd/mm/yy)
    
```



## DATA Card

### Installation



**NOTE:** Refer to Appendix A for Safety Warnings



**NOTE:** The Envoy **MUST** be disconnected from the power supply before opening the unit or fitting any option cards.

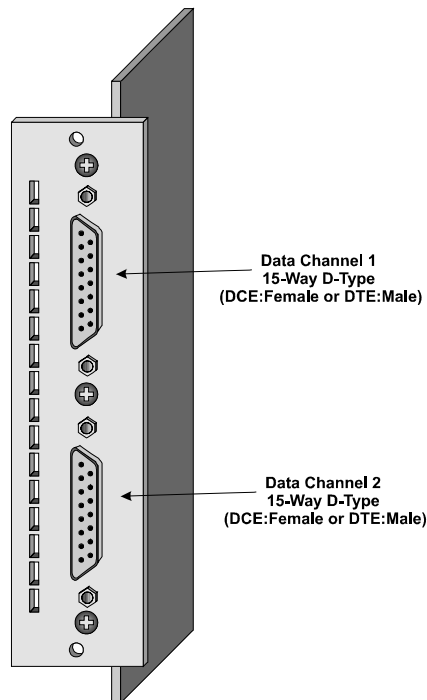


**NOTE:** The Envoy contains electrostatic sensitive devices, take anti-static precautions when working on the unit.

Refer to pages 14 and 15 for installation and removal of option cards.

Data cards may be fitted to any slot (apart from slot 0) in the Envoy chassis. *There **must** be a corresponding data card in the same slot inside the remote unit.*

Data cards will be supplied with a DTE or DCE interface rear card assembly as required (see Figure 26). The current rear card type will be indicated on the configuration screen.



**Figure 26** **Data Card Rear Connectors**

### Jumper Settings

Normally the factory default jumper settings will be adequate. However, some networks may require that signals on the interface are terminated and if any errors are experienced then the data card should be configured to include termination. This can be done by placing jumpers



on the headers labelled J2, J3, J4, J7, J8 and J9 near the rear of the board. J7, 8 and 9 are terminators for port 1 and J2, 3 and 4 are for port 2.

## DTE Rear Card Option

The Data card with DTE rear card option provides a DTE interface for connected equipment (see 0 for pinout information). This option clocks data in and out using the supplied clock from the connected equipment. The user should ensure that this clock is **locked** to the main Envoy clock source (composite clock source) for error-free operation.

When using a clock that the not locked to the main Envoy clock source, occasional errors may occur (some buffering is performed in the Envoy, but eventually the buffers will overrun/underrun). An error checking/correcting protocol should be used over the data channel to account for this condition.

## DCE Rear Card Option

The Data card with DCE rear card option provides a DCE interface for connected equipment (see 0 for pinout information). This option provides the clock to the connected equipment. This clock will be slaved to the Envoy master clock so no data errors will occur.

## Data Card Configuration Screen

An example of the data card configuration screen is shown in Figure 27. Configurable items are detailed in the Data Channel Set-Up Options.

```

Terminal: VT100.TRM
-----
                          TDM MULTIPLEXER                          VO.06 (VO.06)
                          14:16 18/02/1999
-----
Main Link (EUR) : SYNCHRONISED * Option Cards : 2
  Mode          : NORMAL         Composite   : E1 Rev: 1
  Framing       : CRC4           Idle Bandwidth: 552K
Avail. Bandwidth : 1984K        Alarms      : None
Clock Reference  : INTERNAL     Statistics  : Main Link
Configuration    :>LOCAL       Events       : Log

  Slot          : 1             DATA X21 DCE Rev: 1
  Channel       : 1             2
  Data Rate    : 256K          1024K
  Data Mode    : NORMAL        NORMAL
  Indicate     : TRANS         TRANS
  Control      : OFF           OFF

-----
Cursor keys to move, CTRL-U to save, ESC to abandon
-----
Use <SPACEBAR>/<+>/<-> to select
  
```

**Figure 27**      **Data Card Configuration Screen**

<b>Data Channel Set-up Options</b>		
<b>PARAMETER</b>	<b>CHOICES</b>	<b>NOTES</b>
<b>Data Rate</b>	Off, 8K ... 2048K in 8K steps.	<p>This sets the data rate (in Kbps) of the port. The maximum data rate is limited to the current available bandwidth.</p> <p>In addition to the normal keys, the following are available:</p> <p>'0' sets the rate to zero</p> <p>'M' set the rate to maximum</p> <p>'6' advances the rate in 64K steps</p>
<b>Data Mode</b>	NORMAL	Normal run mode.
	LLOOP	Enables local loopback – data into the port is echoed back out. Useful for testing the port drivers and receivers.
	RLOOP	Enables payload loopback – data to the port (from remote) is echoed back to the remote. Useful for remote testing of a data card
	LRLOOP	Enables 'bi-lateral' loopback - both loopbacks applied at the same time.
<b>Indicate (DCE) Control (DTE)</b>	ON	Output permanently asserted
	OFF	Output permanently not asserted



	LOOP	Output follows Input – <i>Output looped to Input</i>
	CARR	Output asserted whenever carrier is present
	TRANS	Transparent mode. Output asserted when <b>remote</b> input pin is asserted (sampling rate approximately 2ms)
<b>Control (DCE) Indicate (DTE)</b>	ON or OFF	Indication only. Displays current state of pin input. This is not a real-time display and is only updated approximately every 5 seconds.



## Voice Cards

### Installation



**NOTE: Refer to Appendix A for Safety Warnings**



**NOTE: The Envoy MUST be disconnected from the power supply before opening the unit or fitting any option cards.**

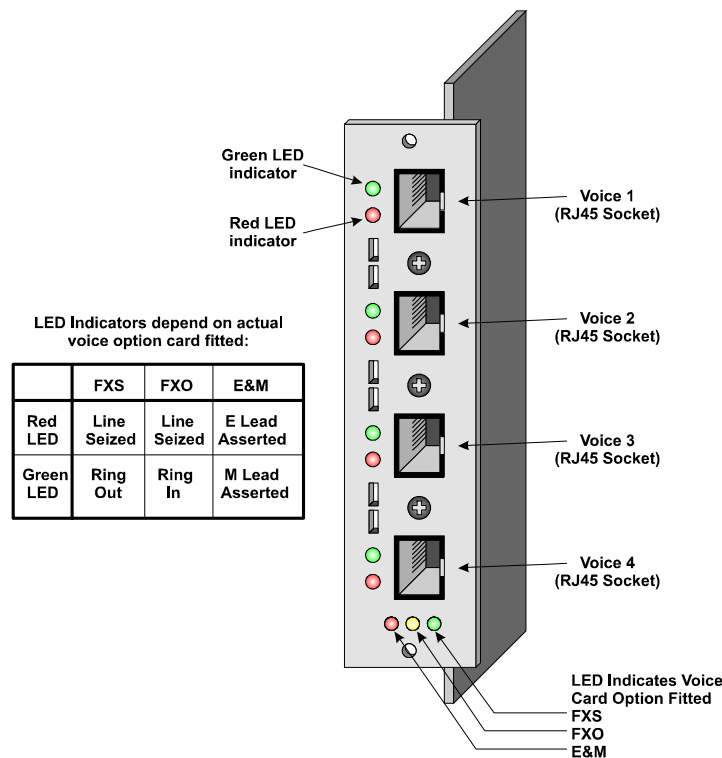


**NOTE: The Envoy contains electrostatic sensitive devices, take anti-static precautions when working on the unit.**

Refer to Sections 14 and 15 for installation and removal of option cards.

Voice Cards may be fitted to any slot (apart from slot 0) in the Envoy chassis. *There **must** be a corresponding voice card in the same slot inside the remote unit, although it may be a different voice card type.*

Voice cards will be supplied with a four port rear card assembly with RJ45 sockets. The rear card assembly is common to all voice option cards (see Figure 28).



**Figure 28**

**Voice Card Rear Connectors**

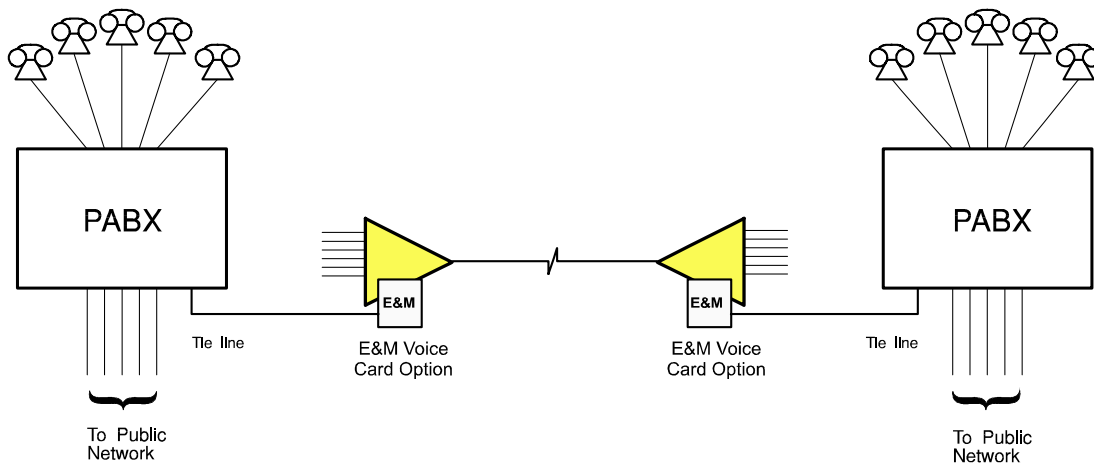
### Voice Card Options

Several different voice card options are available, depending on the application required. Some common applications are detailed below to show which voice options are suitable.



### Voice Tie Line

Figure 29 illustrates a voice ‘Tie Line’ connection. Extension telephones may direct dial extensions at the remote location, or call out or receive calls from the PSTN (Public Switched Telephone Network) connected to the remote location.

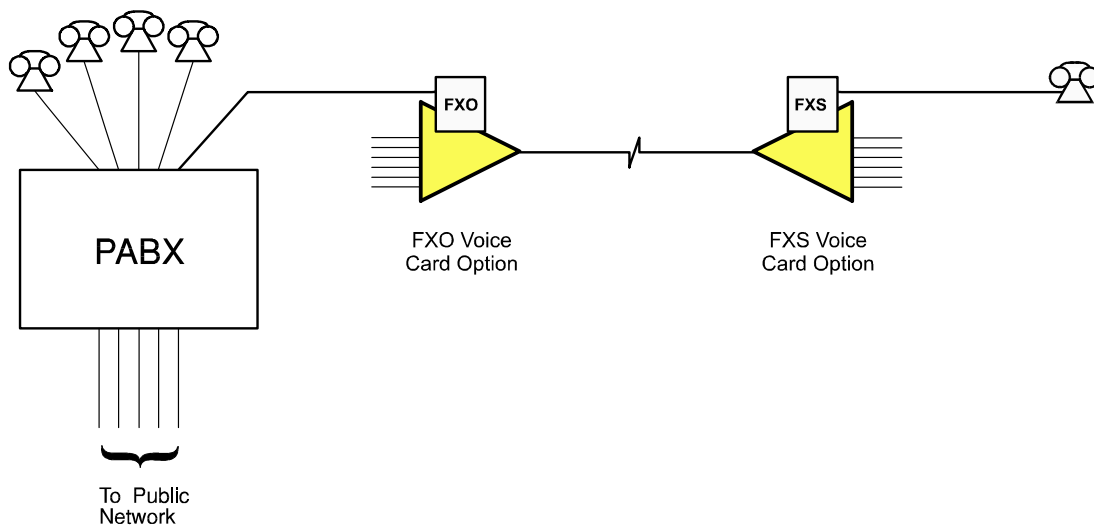


**Figure 29** **Voice Tie Line**

This is the most common, and most flexible method for connection. It requires Tie-Line cards (AC15 or E&M) to be fitted to each PABX. These will interface to **E&M** voice option cards fitted inside each Envoy.

### Telephone Extensions

FXS and FXO voice options may be used to extend an extension line to a remote site as shown in Figure 30. This allows the remote telephone to behave as if it is directly connected to the PABX. Note that this may not be suitable for extending Key-System extensions, as there is no standard for Key-System extension interfaces.



**Figure 30** **PABX Extension**

This 'long-line' extension requires a FXO card to interface with the PABX and a FXS card to ring the phone.

## Voice Piggy Back

A piggy back arrangement extends the last example using telephone extension ports and trunk lines as shown in Figure 31. This allows less flexibility than the Tie-Line approach, as direct extension dialling is not possible in the extension-to-trunk direction. It is, however usually possible (by PABX programming) to arrange that when a call arrives on the trunk line on the PABX, that a single extension or group of extensions will ring.

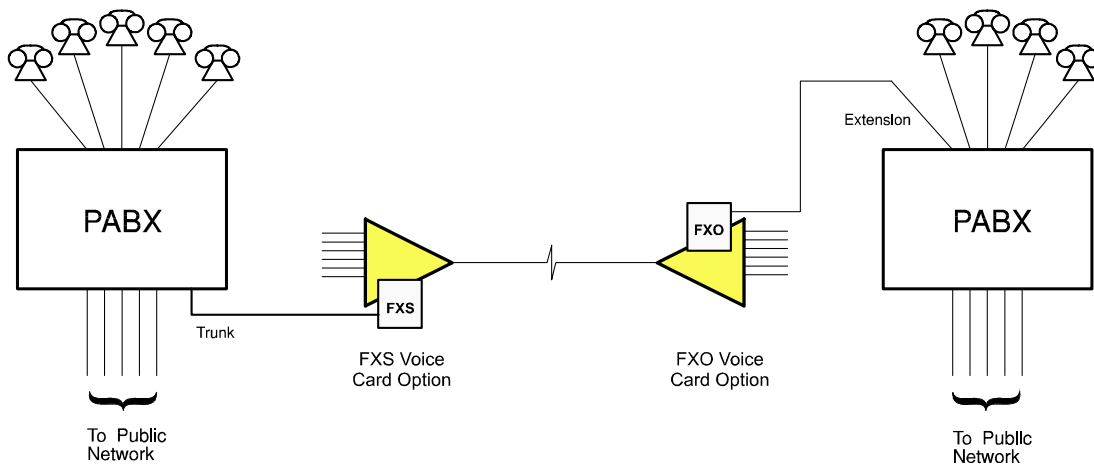


Figure 31 Voice Piggy Back

There is, however, no way to connect two PABX extensions together, PABX's are not designed to do this, and **it will not work** (see Figure 32).

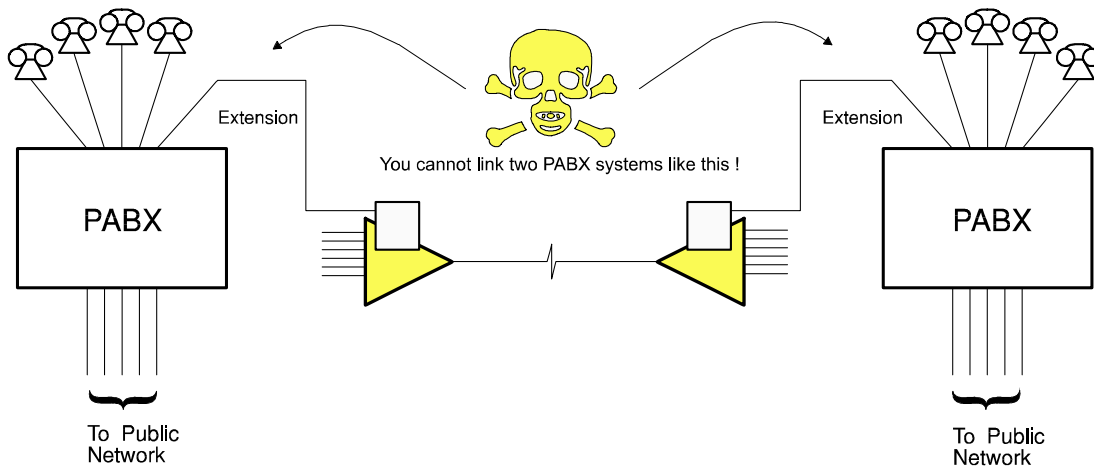


Figure 32 !! Voice Disaster !!

**E&M Voice Card Option**

The E&M voice option provides simple Tie-Line interface with E (Ear) and M (Mouth) signalling (also called DC5) to 4-wire audio voice equipment. Depending on the algorithm and data rates used, the E&M card will also carry Dual Tone Multiple Frequency (DTMF) and basic AC15 signalling.

**FXS Voice Card Option**

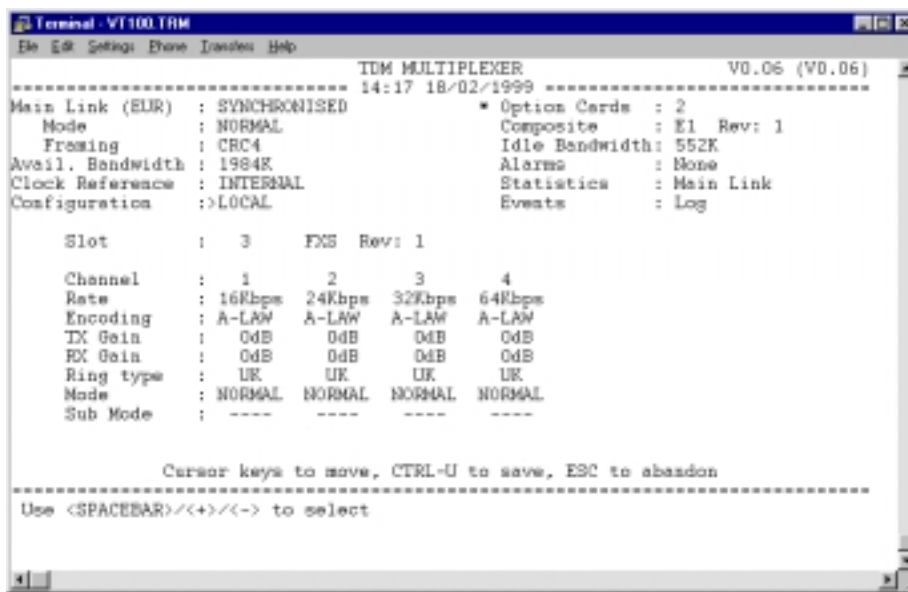
The FXS voice option provides a simple interface to 2 wire (A wire and B wire) voice equipment. It provides both line wetting voltage and ringing signals to the equipment, which may be a PABX Trunk connection or a simple telephone.

**FXO Voice Card Option**

The FXO voice option provides an interface for connection to a PABX Extension port which normally supplies a ring voltage – it ‘looks like’ a simple telephone.

**Voice Card Configuration Screen**

An example of the voice card configuration screen is shown in Figure 33. Configurable items are detailed in the Voice Channel Set-Up Options table.



**Figure 33**      **Voice Card Configuration Screen**

<b>Voice Channel Set-up Options</b>		
<b>PARAMETER</b>	<b>CHOICES</b>	<b>NOTES</b>
<b>Rate</b>	Off 16Kbps (2-bit ADPCM) 24Kbps (3-bit ADPCM) 32Kbps (4-bit ADPCM) 64Kbps (8-bit PCM)	This sets the voice digitising rate for the port.
<b>Encoding</b>	A-LAW	Enables A-Law voice encoding.
	Mu-LAW	Enables Mu-Law voice encoding.
<b>TX Gain</b>	0 to +7 dB	Transmit gain setting – adjust as required
<b>RX Gain</b>	0 to -7 dB	Receive gain setting – adjust as required
<b>Ring Type (FXS Only)</b>	UK	UK ring style: Two 25Hz bursts 400ms long with 200ms gap. 3 second period.
	EUROPE	European ring style: One 50Hz burst 1.8 seconds long. 5 second period.
<b>Mode (Used in conjunction with Sub-Mode)</b>	NORMAL	Normal run mode
	TONE	Enables tone generator. Use <b>Sub-Mode</b> to select frequency. Useful for testing voice port





DTMF	Enables DTMF tone generator. Use <b>Sub-Mode</b> to select DTMF code. Useful for testing voice port
LOOP	Loops channel 1 to channel 2 and channel 3 to channel 4. <b>Sub-Mode</b> must be set to <b>X-OVER</b> and main composite data must be looped back to the unit for this mode to work. Useful for testing single voice card.



*Appendix A - Warnings*

**WARNING:      THIS EQUIPMENT MUST BE EARTHED/  
GROUNDED**

This equipment relies on the EARTH / GROUND connection to ensure safe operation such that the user and TELECOM Network are adequately protected. It must not under any circumstances be operated without an earth connection, which could nullify its approval for connection to a network.

**WARNING:      INSTALLATION OF EQUIPMENT**

Installation of this equipment must only be performed by suitably trained service personnel.

**WARNING:      CONNECTION OF OTHER EQUIPMENT**

This equipment allows connection only of suitably approved equipment to its ports, the safety status of which are defined below.

**SELV Ports:**

- i)      **Supervisor**
- ii)     **EXT CLK**
- iii)    **CH1 – CH2**

The above named ports are classified as SELV (Safety Extra Low Voltage) in accordance with in Clause 2.3 of EN60950 (BS7002, IEC950 as applicable), and **must only** be connected to equipment which similarly complies with the SELV safety classification.

**TNV Ports:**

- i)      **Composite**
- ii)     **Voice 1 – Voice 4**

The above named ports are classified as TNV (Telecom Network Voltage) in accordance with Clause 6 of EN60950 (BS7002, IEC950 as applicable), and **must only** be connected to equipment which similarly complies with the TNV safety classification.

**Warnung:      Dieses Gerät Muß an einem Anschluß mit Schutzleiter betrieben werden.**

Zum sicheren Betrieb ist der Anschluß des Gerätes an Spannungsversorgungen mit Schutzleiter notwendig. Nur so kann ein optimaler Schutz für Bedienpersonal und Übertragungseinrichtungen gewährleistet werden. Unter keinen Umständen darf dieses Gerät ohne Schutzleiter betrieben werden, da ansonsten die Zulassung für den Anschluß an Netzen erlischt.

**Warnung:      Installation des Gerätes**

Die Installation des Gerätes darf nur von entsprechend ausgebildetem und autorisiertem Personal durchgeführt werden.

**Warnung:      Anschluß von anderen Geräten**

Angeschlossen werden dürfen nur Systeme mit entsprechenden zugelassenen und geeigneten Schnittstellen, siehe auch nachfolgende Tabelle:

**SELV Ports**

- i)      **Supervisor**
- ii)     **EXT CLK**
- iii)    **CH1 – CH2**

Die oben aufgeführten Ports sind klassifiziert als SELV (Safety Extra Low Voltage) in Übereinstimmung mit Absatz 2.3 der Verordnung EN60950 (BS7002, IEC950 soweit anwendbar), und dürfen nur zusammen mit Geräten verwendet werden, die dieser Bestimmung entsprechen.

**TNV Ports**

- i)      **Composite**
- ii)     **Voice 1 – Voice 4**

Die oben aufgeführten Ports sind klassifiziert als TNV (Telecom Network Voltage) in Übereinstimmung mit Absatz 6 der Verordnung EN60950 (BS7002, IEC950 soweit anwendbar), und dürfen nur zusammen mit Geräten verwendet werden, die dieser Bestimmung entsprechen.

**Mise en garde: Cet équipement doit être relié a la terre**

Cet équipement doit posséder une prise de terre de manière à ce que le réseau télécom et ses utilisateurs soient équitablement protégés. Tout manquement à cette obligation entraînerait l'annulation de l'autorisation de connexion a un réseau.

**Mise en garde: Installation de l'équipement**

L'installation doit être assurée uniquement par des personnels convenablement formés à ce type de matériel.

**Mise en garde: Connexion d'autres équipements**

Des équipement complémentaires pouvant être connectés aux ports de cet équipement à la seule condition que ceux-ci soient agréés. Les conditions optimales de sécurité pour toute connexion sont définies ci-dessous:

**Ports SELV:**

- i) **Supervisor**
- ii) **EXT CLK**
- iii) **CH1 – CH2**

Les ports cités ci-dessous sont classés dans la catégorie SELV (Safety Extra Low Voltage) conformément à la classe 2.3 de EN60950 (BS7002, IEC950 applicable) et doivent être connectés à des équipements répondant à la norme de sécurité SELV.

**Ports TNV:**

- i) **Composite**
- ii) **Voice 1 – Voice 4**

Les ports cités ci-dessous sont classés dans la catégorie TNV (Telecom Network Voltage) conformément à la classe 6 de EN60950 (BS7002, IEC950 applicable) et doivent être connectés à des équipements répondant à la norme de sécurité TNV.



## *Appendix B - Approval Requirements*

The Envoy MULTIPLEXER carrying the BABT / CE168 assessment symbols and approval number, is approved for connection to the networks identified in this Appendix as follows:

---

### E1 Composite - G.703/G.704

In the UK, to PD7024 (75 Ohm Un-balanced) via 2 x BNC connectors. The internal jumper links must be set to the **75R** position, as detailed in the installation instructions.

Throughout Europe (Pan European) to CTR12 and CTR13 via RJ45 Connector (120 Ohms Balanced). The internal jumper links must be set to the **120R** position, as detailed in the installation instructions.

---

## Appendix C – EMC Requirements

To ensure compliance with the EMC directive, some care must be taken to ensure that the units are installed properly, using suitable cables and connections. The following must be observed:

### Limitation of Emissions:

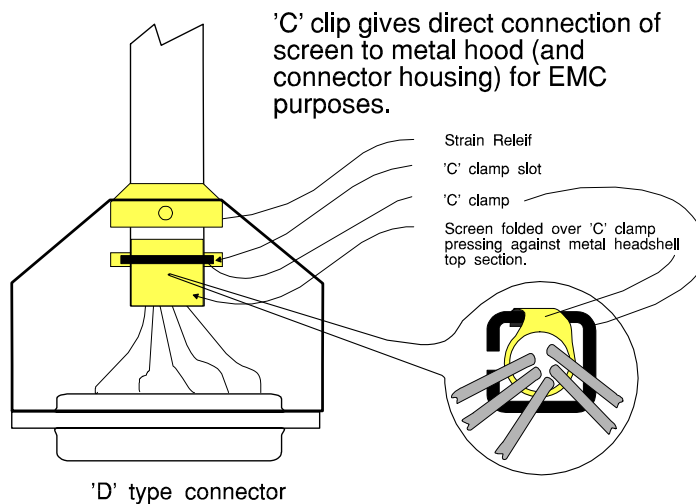
#### 'D-Type' Connections

This product relies on the use of screened cables for connection to the 15 way 'D-Type' ports. The cables must have the foil or braid screen connected effectively to the metal headshell to ensure continued compliance. These headshells are available from Black Box under the following part numbers:

**DB15 - FA033**

**DB25 - FA031**

The diagram below illustrates an example of a suitable screen connection. Note how the foil or braid screen is bent back over the 'C' clip to achieve a pressure contact of the screen against the shell:



It is important to keep the screen to shell connection as short as possible.

#### Mains Connection

The mains connection is internally filtered and requires no special consideration.

## To Ensure that adequate immunity is achieved:

It is in the user's interest to ensure continued product immunity against mains born transients, and static discharge. To achieve this, it is important to ensure that equipment is effectively earthed.

The mains IEC cable provides some protection, but to achieve optimal immunity, the chassis EARTH screw connection should be connected to a local EARTH busbar or cabinet frame wherever possible as shown in Figure 34.

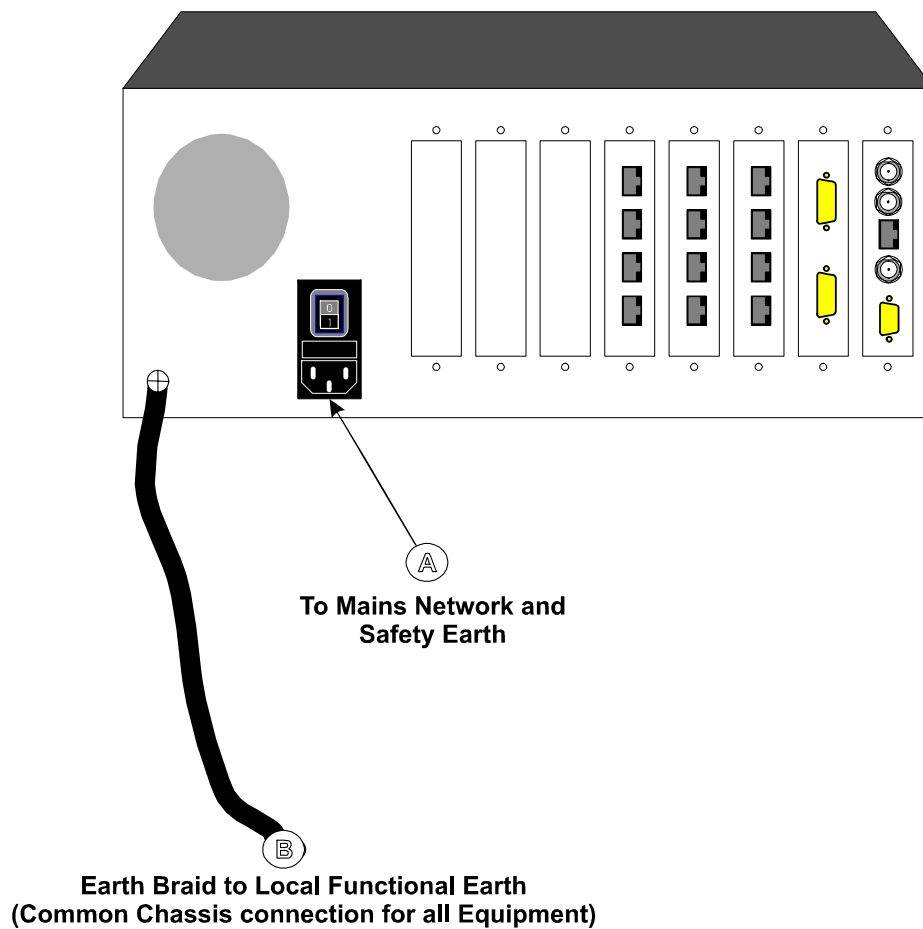


Figure 34 Separate Chassis Earth Connection for Optimum Immunity

*Appendix D - Supervisor Port Pinout*

<b>Terminal Supervisor Port Connections</b>		
<b>Description</b>	<b>Type At Connector</b>	<b>DCE – 9-Way D-Type Socket</b>
DCD	Output	1
RxD	Output	2
TxD	Input	3
DTR	N/C	4
Common	GND	5
DSR	Output	6
RTS	Input	7
CTS	Output	8
RI	N/C	9

**9600bps Operation:** The multiplexer requires connections to TxD, RxD and Common only. The output signals CTS, DSR and DCD are provided for the terminal if required.

Note: Connector shell and termination must be as specified in 0, EMC Requirements

<b>10Base-T Supervisor Port Connections</b>		
<b>Description</b>	<b>Type At Connector</b>	<b>RJ45 Socket</b>
TxP	Output	1
TxN	Output	2
RxP	Input	3
RxN	Input	6





*Appendix E - E1 Composite Interface Pinouts*

Composite Interface Connections (EUROPE) Using 120 Ohm Balanced RJ45			
Name	Description	Type at Connector	DTE - RJ45 Female
RxA	RX Pair	Input	1
RxB		Input	2
TxA	TX Pair	Output	4
TxB		Output	5
S1	Shield Reference	-	3
S2	Shield Reference	-	6

- Notes:
- 1 Fit links LK2, LK4, LK9, LK10, LK11 to **120R** position.
  - 2 LK1 and LK6 **must** both be removed (Isolated).
  - 3 Links LK3, LK5, LK7, LK8 should be removed to isolate the BNC connectors.

Composite Interface Connections (UK) Using 75 Ohm Un-balanced BNC			
Name	Description	Type at Connector	DTE - BNC Female
RxA	RX Pair	Input	Centre RX
RxB		Ground Reference	Outer RX <sup>2</sup>
TxA	TX Pair	Output	Centre TX
TxB		Ground Reference	Outer TX <sup>3</sup>

- Notes:
- 1 Fit links LK2, LK4, LK9, LK10, LK11 to **75R** position.
  - 2 Remove LK1 to isolate RX ground from chassis. Fit LK1 to connect RX ground to chassis.
  - 3 Remove LK6 to isolate TX ground from chassis. Fit LK6 to connect TX ground to chassis.
  - 4 Fit links LK3, LK5, LK7, LK8 to enable BNC connectors.



*Appendix F - Nx8k Composite Interface Pinouts*

Composite Interface Connections		
Name	Type at Connector	26-Way D-Type Socket
DTE TxD/DCE RxD A	Output	9
DTE TxD/DCE RxD B		18
DTE RxD/DCE TxD A	Input	5
DTE RxD/DCE TxD B		14
DTE RTS/DCE CTS A	Output	4
DTE RTS/DCE CTS B		13
DTE CTS/DCE RTS A	Input	11
DTE CTS/DCE RTS B		19
DTE DTR/DCE DSR A	Output	3
DTE DTR/DCE DSR B		12
DTE DSR/DCE DTR A	Input	1
DTE DSR/DCE DTR B		10
DCD A	DTE Input/DCE Output	2
DCD B		20
TxC A	DTE Input/DCE Output	7
TxC B		16
DTE RxC/DCE SCTE A	Input	6
DTE RxC/DCE SCTE B		15
DTE SCTE/DCE RxC A	Output	8
DTE SCTE/DCE RxC B		17
DTE/DCE	Control Input	25
M0	Control Input	22
M1	Control Input	23
M2	Control Input	24



***Appendix G - X.21/V.11 DCE Data Channel Pinout***

**X.21/V.11 Data Channels connectors  
(15 Way D-Type Configured DCE)**

<b>DATA CHANNEL CONNECTIONS:</b>			
<b>Name</b>	<b>Description</b>	<b>Type at Connector</b>	<b>DCE - DB15 Female</b>
Protective Ground		-	1
G	Signal Ground	-	8
T(A)	TxD a	Input	2
T(B)	TxD b	Input	9
R(A)	RxD a	Output	4
R(B)	RxD b	Output	11
S(A)	Clock a	Output	6
S(B)	Clock b	Output	13
I(A)	Indicate a	Output	5
I(B)	Indicate b	Output	12
C(A)	Control a	Input	3
C(B)	Control b	Input	10
X(A)	Ext Clock a	N/C	7
X(B)	Ext Clock b	N/C	14

Note: Connector shell and termination must be as specified in 0, EMC Requirements.

***Appendix H - X.21/V.11 DTE Data Channel Pinout*****X.21/V.11 Data Channels connectors  
(15 Way D-Type Configured DTE)**

<b>DATA CHANNEL CONNECTIONS:</b>			
<b>Name</b>	<b>Description</b>	<b>Type at Connector</b>	<b>DTE - DB15 Male</b>
Protective Ground		-	1
G	Signal Ground	-	8
T(A)	TxD a	Output	2
T(B)	TxD b	Output	9
R(A)	RxD a	Input	4
R(B)	RxD b	Input	11
S(A)	Clock a	Input	6
S(B)	Clock b	Input	13
I(A)	Indicate a	Input	5
I(B)	Indicate b	Input	12
C(A)	Control a	Output	3
C(B)	Control b	Output	10
X(A)	Ext Clock a	N/C	7
X(B)	Ext Clock b	N/C	14

Note: Connector shell and termination must be as specified in 0, EMC Requirements.



***Appendix I - Voice Port Pinout***

All voice card options share the same rear card assembly

<b>E&amp;M VOICE CHANNEL CONNECTIONS:</b>			
<b>Name</b>	<b>Description</b>	<b>Type at Connector</b>	<b>RJ45 Female</b>
M	Mouth	Output	2
A Wire	RXa	4 Wire Input	3
A Wire	TXa	4 Wire Output	4
B Wire	TXb	4 Wire Output	5
B Wire	RXb	4 Wire Input	6
E	Ear	Input	7
EREF	Common	Input	8

<b>FXO VOICE CHANNEL CONNECTIONS:</b>			
<b>Name</b>	<b>Description</b>	<b>Type at Connector</b>	<b>RJ45 Female</b>
A Wire	RXa/TXa	2 Wire I/O	4
B Wire	RXb/TXb	2 Wire I/O	5

<b>FXS VOICE CHANNEL CONNECTIONS:</b>			
<b>Name</b>	<b>Description</b>	<b>Type at Connector</b>	<b>RJ45 Female</b>
Shunt <sup>1</sup>			2
A Wire	RXa/TXa	2 Wire I/O	4
B Wire	RXb/TXb	2 Wire I/O	5

Notes: 1 Additional SHUNT connection (pin 2) is provided for direct connection to UK handsets without the use of a Master Jack, for demonstration purposes.

*Appendix J - RJ45 E1 Crossover Cable.*

RJ45 Crossover Cable (EUROPE) Using 120 Ohm Balanced RJ45			
Name	Description	DTE2 - RJ45 Male	DTE1 - RJ45 Male
TxRxA	TXRX Pair	4	1
TxRxB		5	2
RxTxA	RXTX Pair	1	4
RxTxB		2	5
S1	Shield Reference	6	3
S2	Shield Reference	3	6

- Notes:
- 1 Fit links LK2, LK4, LK9, LK10, LK11 to **120R** position.
  - 2 LK1 and LK6 **must** both be removed (Isolated).
  - 3 Links LK3, LK5, LK7, LK8 should be removed to isolate the BNC connectors.

Appendix K - Nx8k Composite Cables.

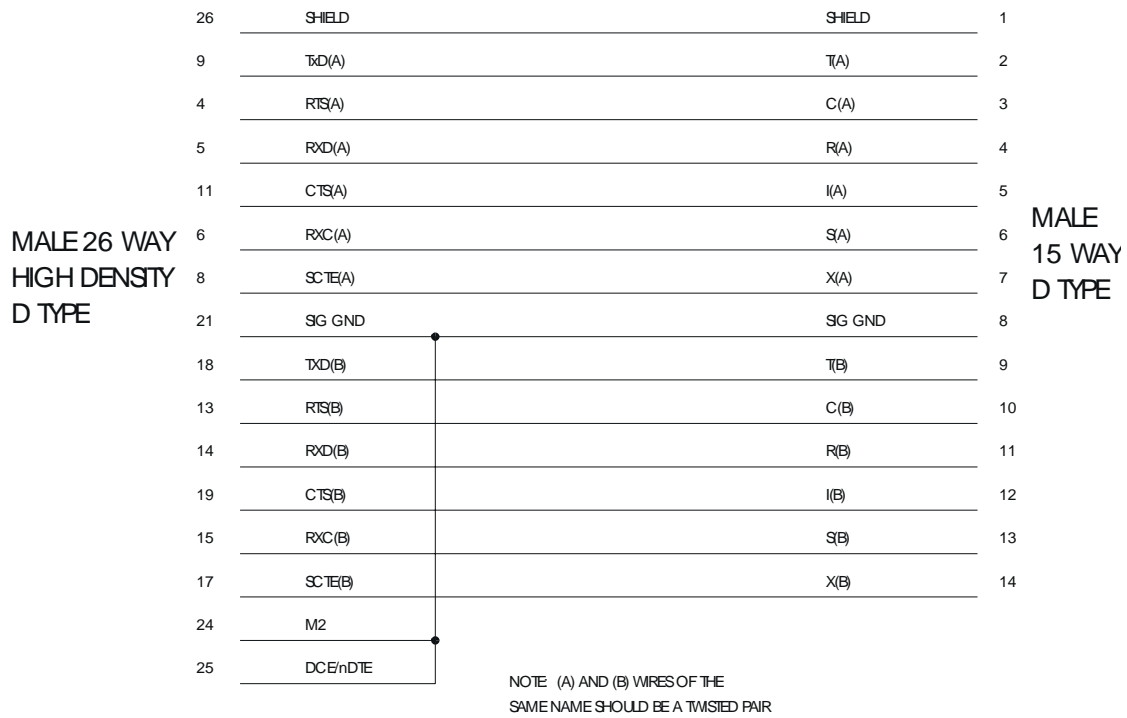


Figure 35 V11 DTE CABLE

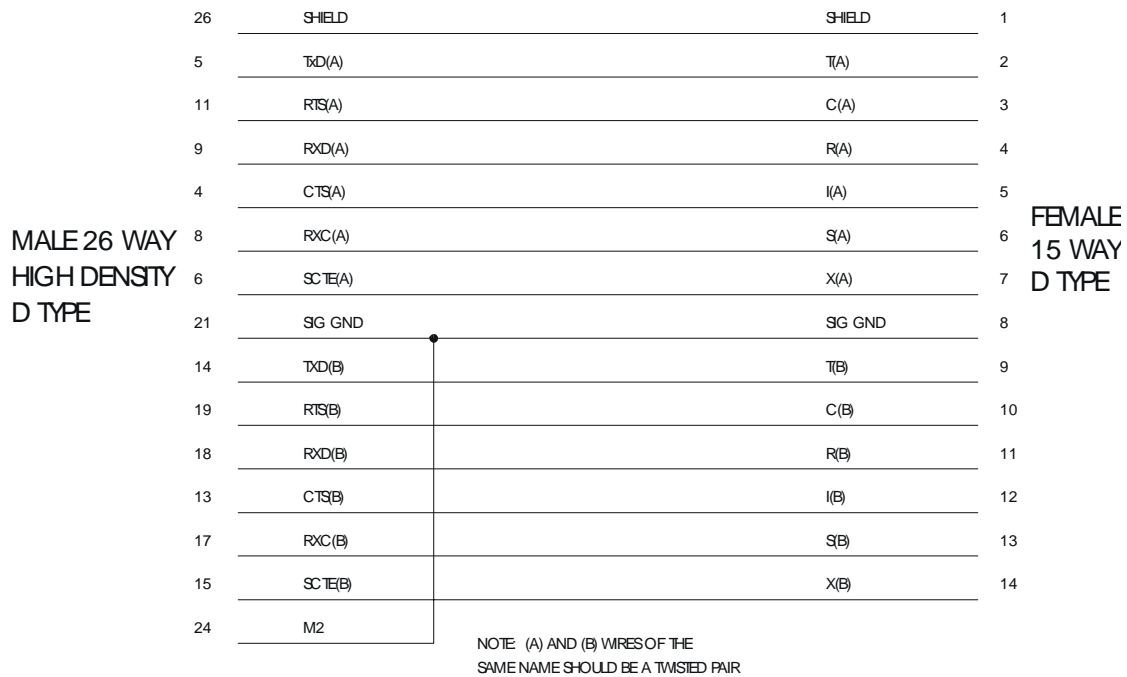
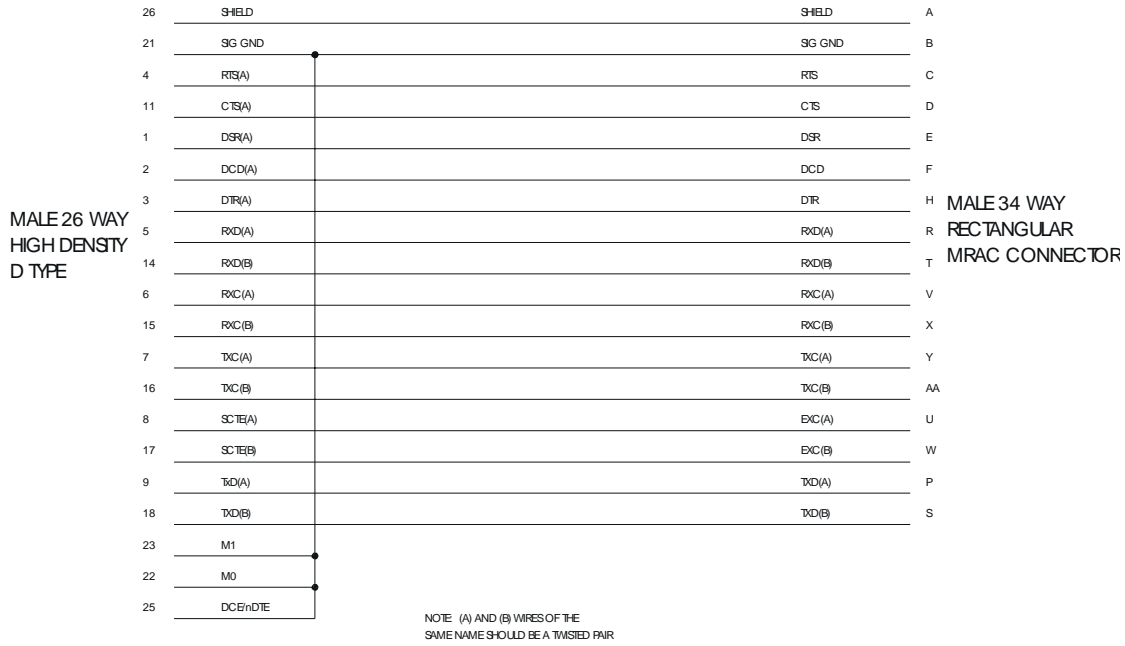
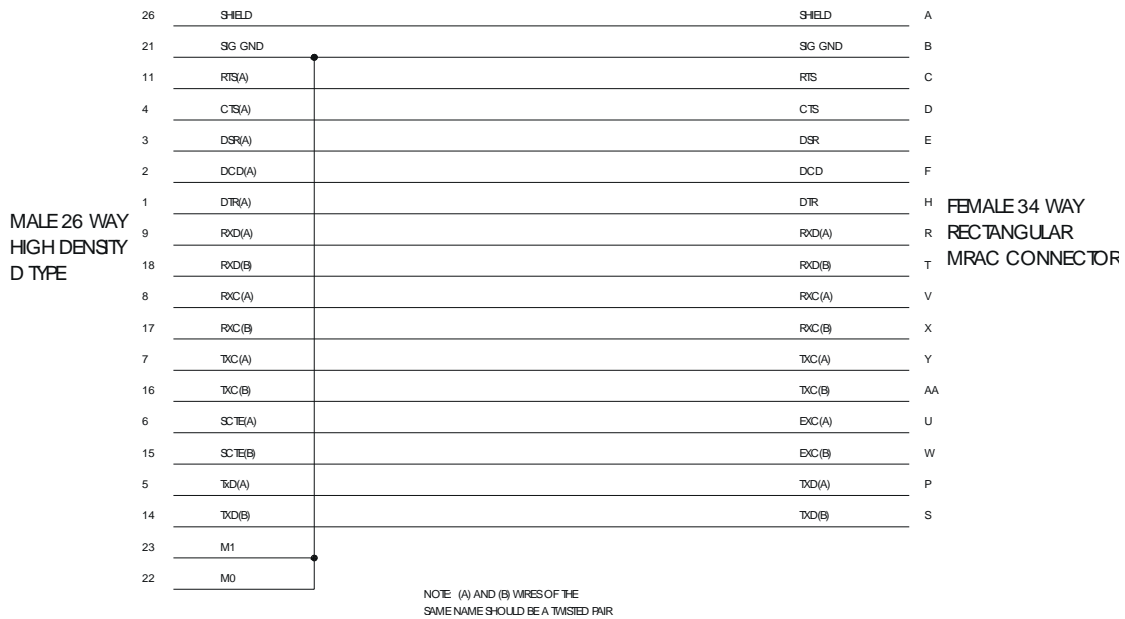


Figure 36 V11 DCE CABLE

# ENVOY Voice and Data Multiplexor



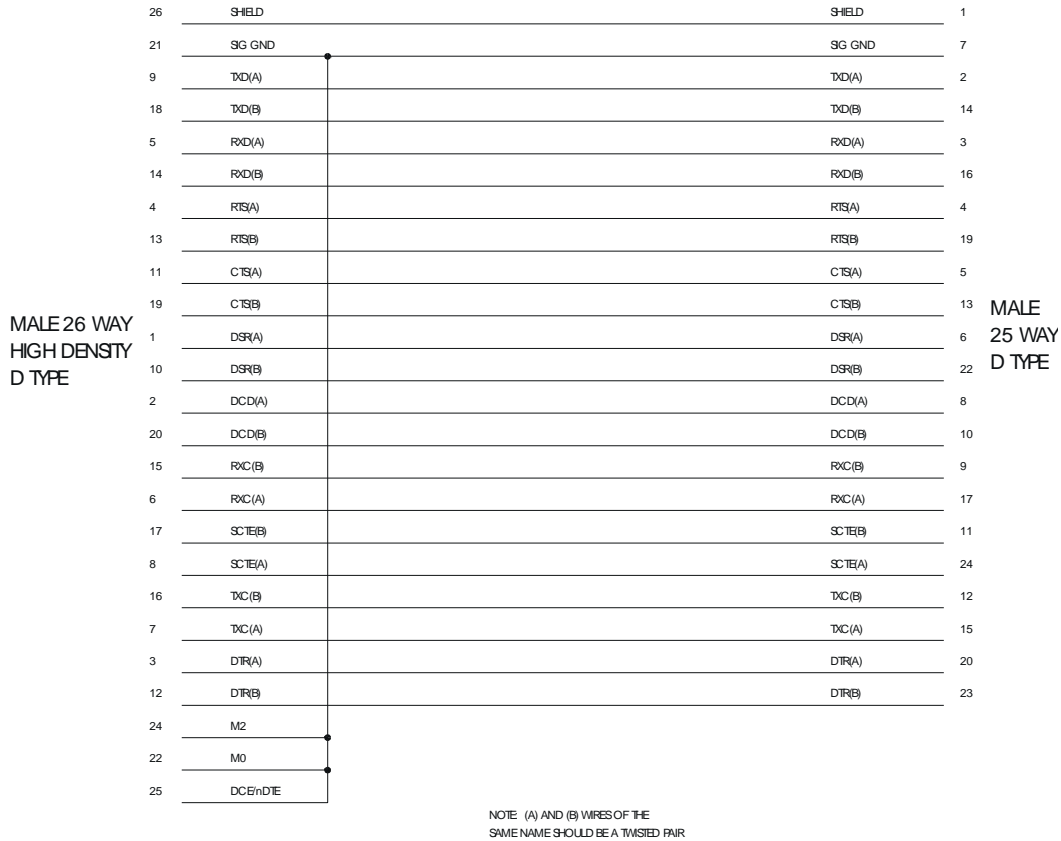
**Figure 37** **V35 DTE CABLE**



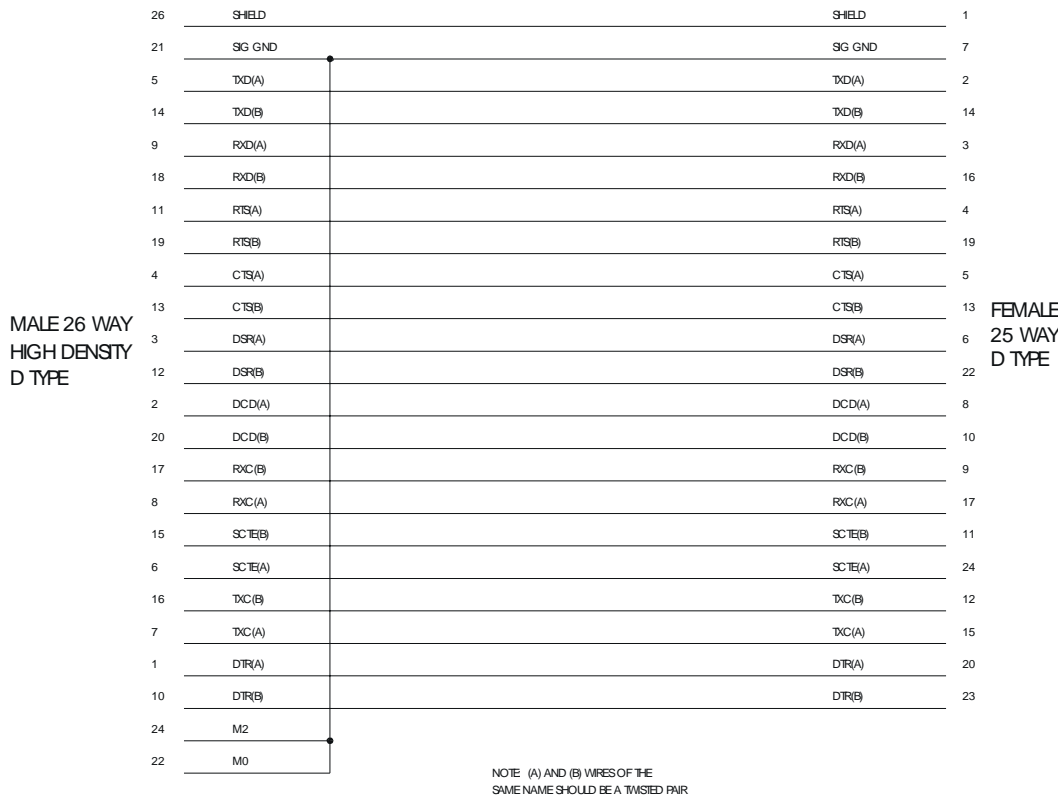
**Figure 38** **V35 DCE CABLE**





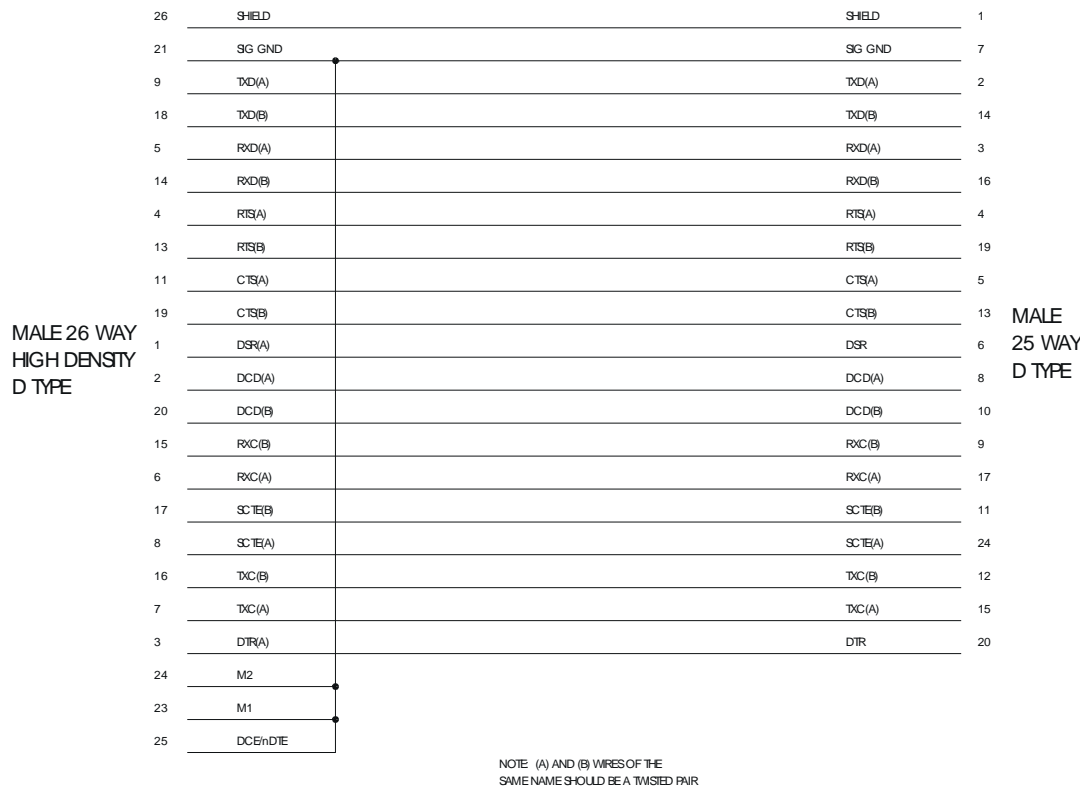


**Figure 39 EIA530 DTE CABLE**

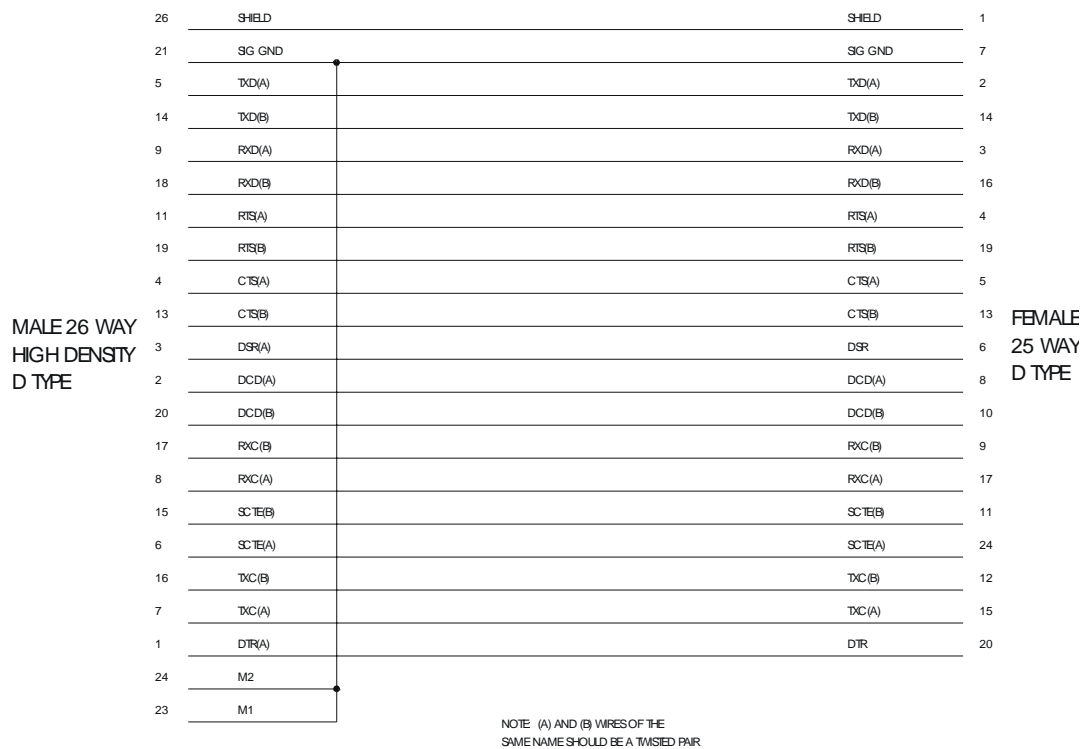


**Figure 40 EIA530 DCE CABLE**

# ENVOY Voice and Data Multiplexor

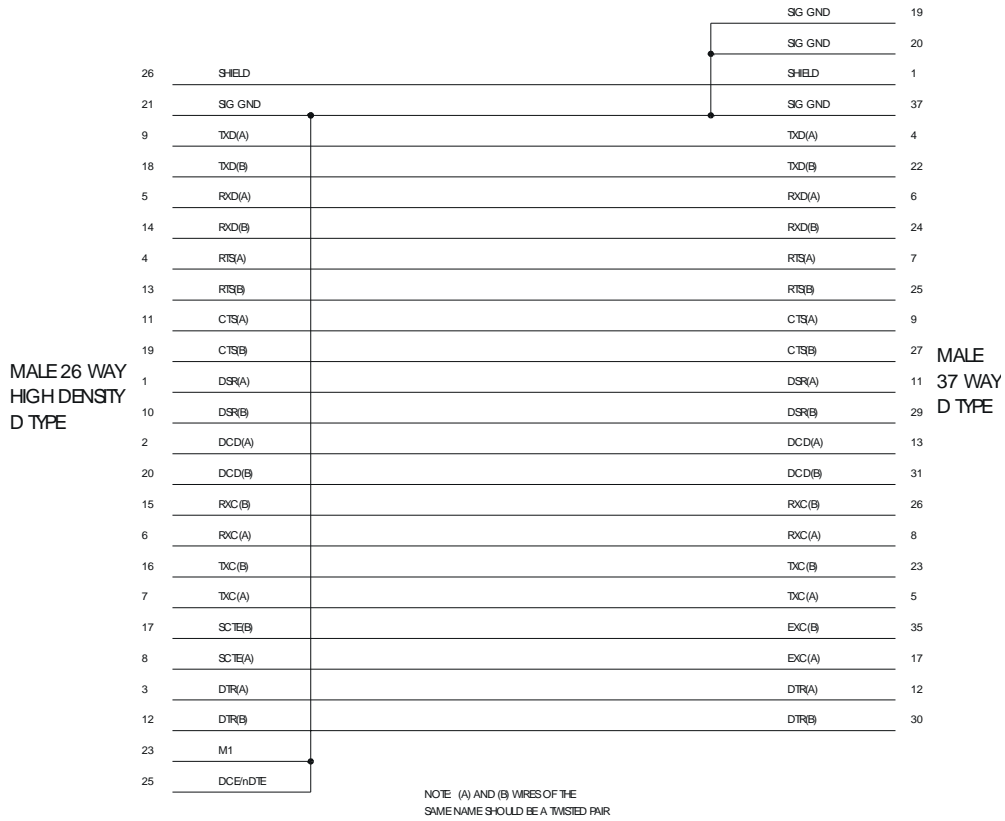


**Figure 41 EIA530A DTE CABLE**

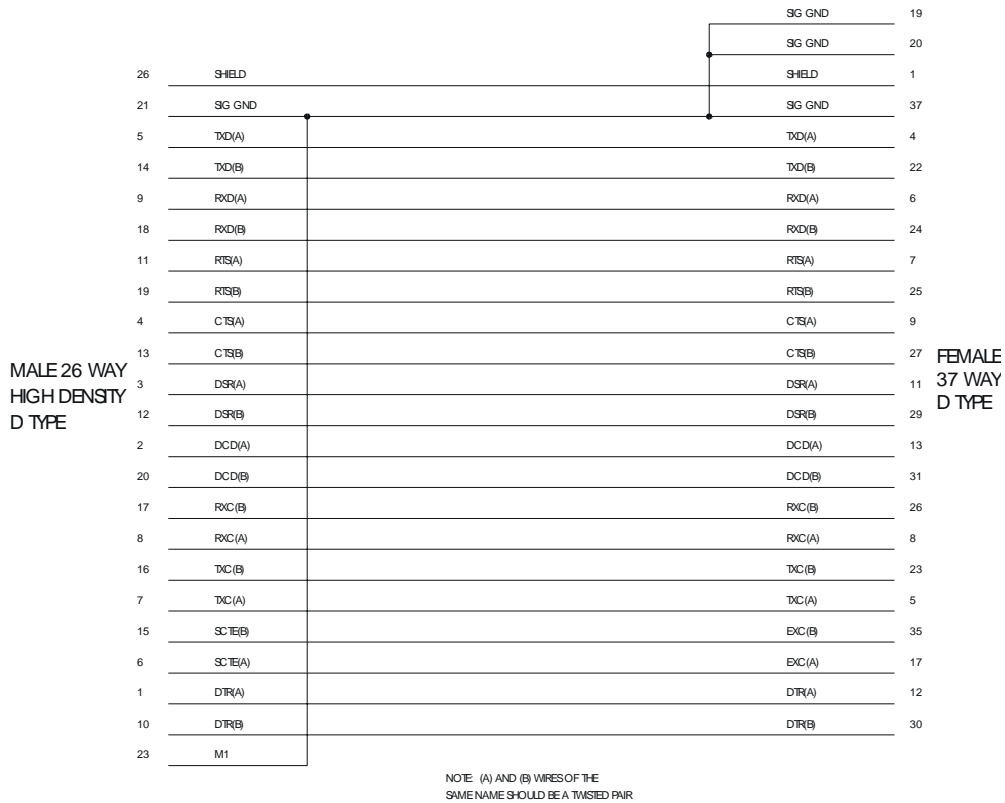


**Figure 42 EIA530A DCE CABLE**

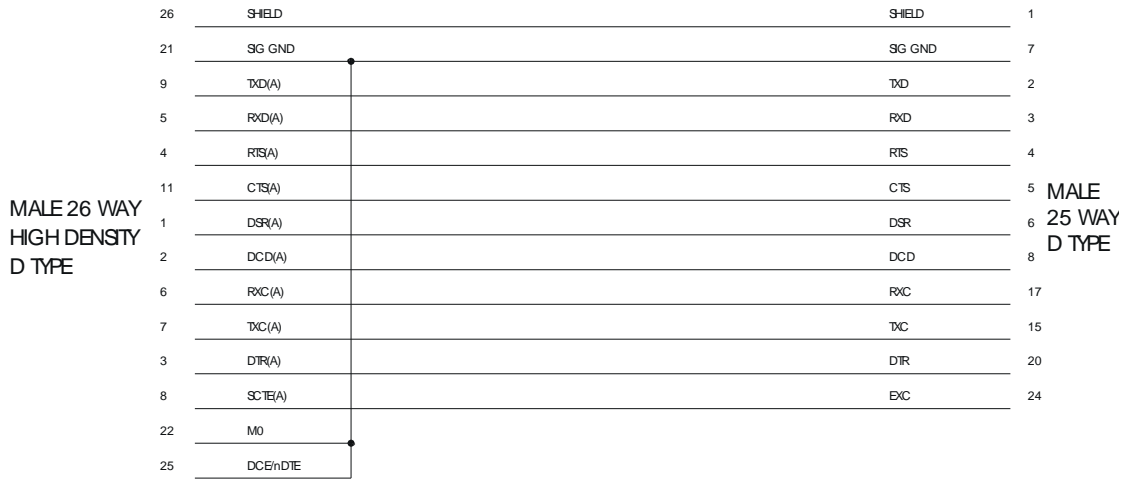




**Figure 43 V36/RS449 DTE CABLE**



**Figure 44 V36/RS449 DCE CABLE**



**Figure 45** **V28/RS232 DTE CABLE**



**Figure 46** **V28/RS232 DCE CABLE**



*Appendix L - Telephone Adaptor Lead*

The following cable specification can be used for connecting UK telephones for test purposes:

<b>Telephone Adaptor Lead</b>			
<b>Name</b>	<b>Colour</b>	<b>RJ45 male</b>	<b>BT Telephone Socket</b>
Shunt <sup>1</sup>	Or/Wh	2	4
A Wire	Bl/Wh	4	2
B Wire	Wh/Bl	5	5

- Notes:
- 1 Additional SHUNT connection (pin 2) is provided for direct connection to UK handsets without the use of a Master Jack, for demonstration purposes.
  - 2 The pin numbering of the BT IDC phone sockets is very confusing. For the purposes of the table above, pin 1 of the phone socket is the pin **furthest** from the mechanical latch locating groove at one end of the socket. This is the opposite