tiSP

8/16 Channel
Statistical Multiplexer

ESPRIT

8/16 Channel Statistical Multiplexer User Manual

CE

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.

Part Number: **EA 08600B**

CONTENTS

APPENDICES

Esprit 8/16 Channel Statistical Multiplexer

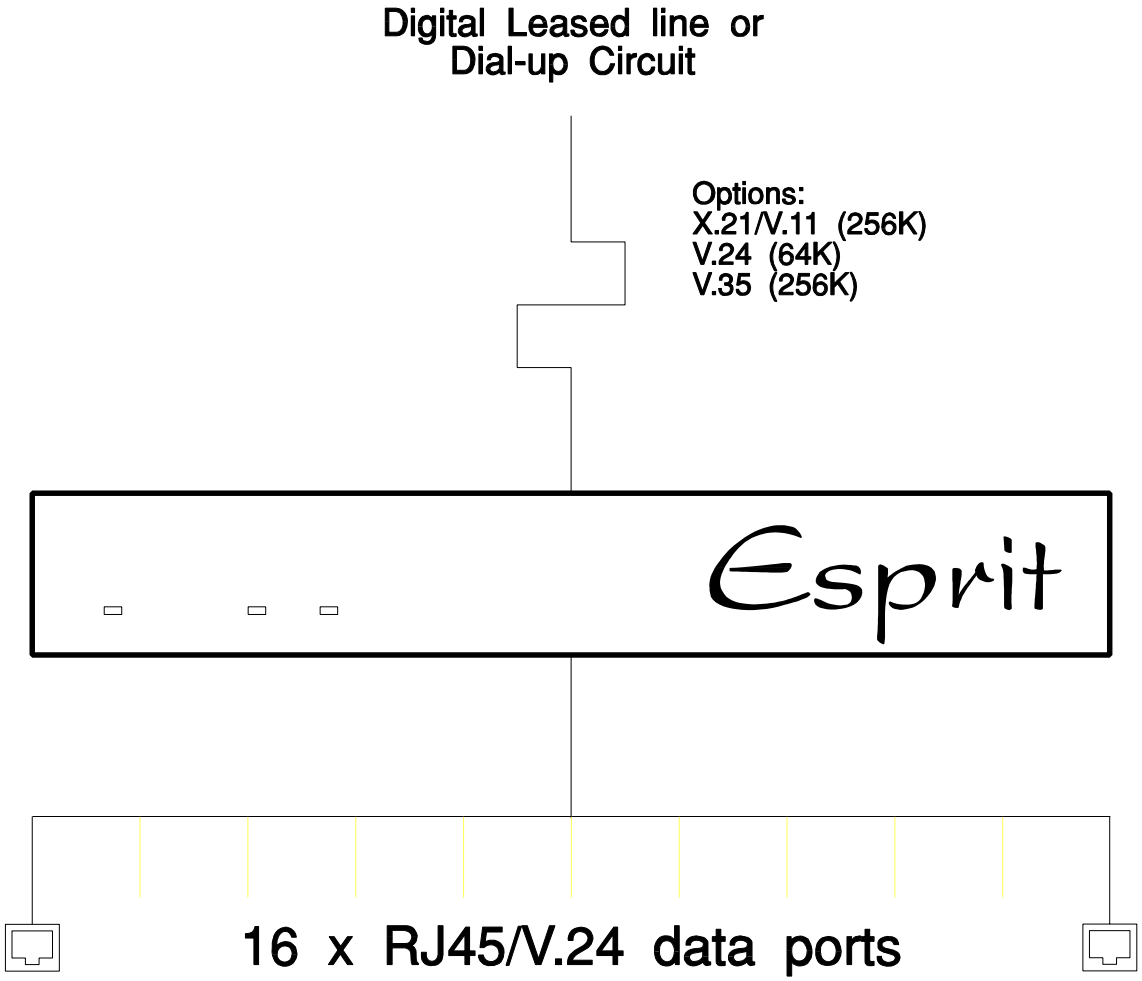
User Manual

1 INTRODUCTION

The Esprit is an 8 or 16 channel asynchronous statistical multiplexer, which may be used with Dial up Modems and Leased lines (such as KiloStream™) up to 256 Kbps in the case of the 16 channel unit or 64Kbps for the 8 channel.

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 setup of user options for the multiplexer.
A full set of cable specifications are available in the appendices.



Note: Max rate for 8 channel unit is 64K

1.1 Functional overview

The Esprit has 8 or 16 asynchronous ports, and a single composite link which has a selectable interface type (X.21, V.24 or V.35) .
The composite interface supports synchronous link rates of up to 256Kbps (64Kbps for the 8 channel unit), either dial up or leased line, for connection to Modems or digital services such as BT KiloStream™.

The sixteen channel unit will support data rates of up to 115.2Kbps, with a maximum aggregate of 1843.2Kbps.
The eight channel unit supports rates up to 38.4Kbps with a maximum aggregate of 307.2Kbps.

Unrestricted speed conversions are also possible by setting different data rates at the local and remote sites.

2 USE AND CONFIGURATION

This section covers connection and set-up of the channel data ports. The composite port is covered in Section 3, the **installation** section of this manual.

2.1 Data Channel Connection

Peripherals are connected to the V.24/V.28 8-way 'RJ45' type connectors configured DCE and numbered 1 to 16 (1 to 8) at the rear of the multiplexer. The pin connections for these data channels are defined in Appendix G.

2.2 Default Channel Setup

When delivered, the Esprit Statistical Multiplexer is set to operate with all channels set as follows:

Rate	:	9600 bps
Bits/Char	:	8
Stop Bits	:	1
Parity	:	NONE
Flow Control	:	XOFF
RTS	:	ON
Mode	:	NORMAL

2.3 Changing the Configuration

The Esprit may be configured using an asynchronous terminal. A laptop PC running an asynchronous terminal emulation program such as PCAnywhere™, CrossTalk™ or Blast™ is ideal for the field engineer.
Windows™ Terminal may also be used to configure an Esprit but please note that under **Settings** - **Terminal Preferences**, the box for 'Use function, arrow and ctrl keys for Windows' must **NOT** be set. If it is, then you will not be able to move the cursor around on the screen.
The terminal should be connected via its serial port to the SUPERVISOR port on the rear of the multiplexer.

2.4 Supervisor Terminal requirements

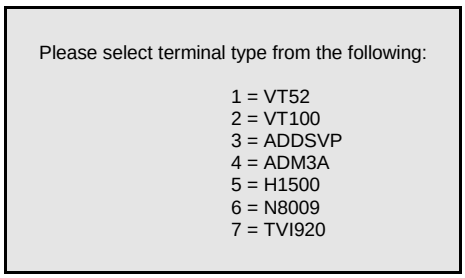
The terminal must be configured to:

8 bit character, no parity, one stop bit, speed 9.6Kbps, Xon/Xoff

A suitable cable for connection of the Supervisor port is defined in Appendix E.

2.5 Supervisor Terminal Emulations

Several terminal emulations are supported by the Esprit. When connection is made between the terminal or PC and the rear panel port labelled **SUPERVISOR**, the following screen will appear:

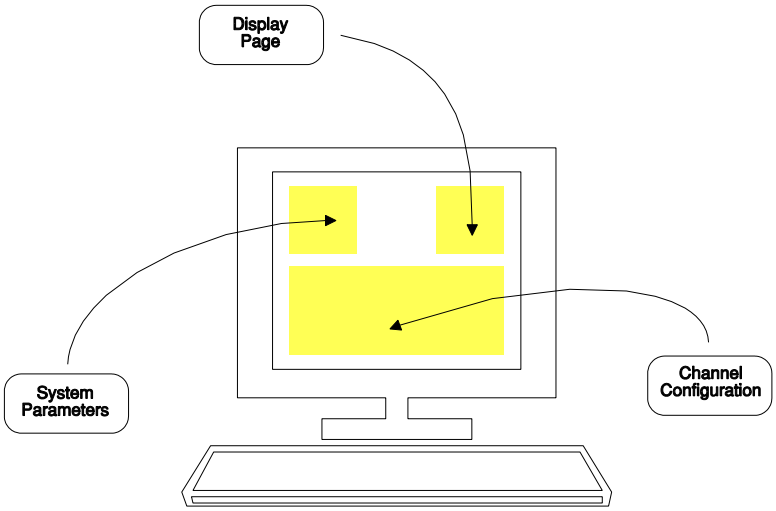


The terminal type or emulation in use should be selected by pressing the relevant number key on the PC or terminal. The monitor will now show the basic configuration screen for the multiplexer setup. This is formatted as below (16 channel unit shown):

```
                    ESPRIT 16 CHANNEL STATISTICAL MULTIPLEXER                Vx.xx
================================================================================

Carrier       :      V.11 PRESENT 64K            Channels 1 - 16       :
Link Clock    :      EXTERNAL                    Modem Setup           :
Mode          :      NORMAL                      Statistics            :
Configuration :      >LOCAL


Channel       :      1      2      3      4      5      6      7      8
Rate          :      9600   9600   9600   9600   9600   9600   9600   9600
Bits/Char     :      8      8      8      8      8      8      8      8
Stop Bits     :      1      1      1      1      1      1      1      1
Parity        :      NONE   NONE   NONE   NONE   NONE   NONE   NONE   NONE
Flow Control  :      XOFF   XOFF   XOFF   XOFF   XOFF   XOFF   XOFF   XOFF
RTS           :      ON     ON     ON     ON     ON     ON     ON     ON
Mode          :      NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL NORMAL

                     <= More                                          More =>


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

2.6 General Set-Up Display Layout

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



Upper left -
System parameters (Mode, Link Clock, Carrier, Residual, and Configure).

Upper right -
Other **display pages** which may be selected (Channels 1 to 16, Modem Setup.

Bottom -
Channel configuration.

The initial display is that for the ASYNC channels.

2.7 General Keyboard Conventions

Only a few keys are required to configure the Esprit 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 (else same as ↓).
<CTRL> and U	Accepts all changes and causes multiplexer re-configuration.
<ESC>	Abandons all changes since last <CTRL> and U.

2.7.1 Cursor Movement

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

2.7.2 Parameter changing

If it is possible to modify the field over which the cursor is placed, the message "Use <SPACEBAR>, <+>, <->" is shown at the bottom of the screen. No message will appear if the field is calculated, un-modifiable or hardware set.

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

2.7.3 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 (NVRAM.)

2.7.4 Abandoning Changes

Pressing **ESC** 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 last updated configuration will be re-painted to the screen.

2.7.5 Local or Remote Configuration.

Most settings are independent at each end of the multiplexer link e.g. **Flow Control, and Rate**.

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

2.7.6 Changing the configuration page

The **Configuration Page** required, e.g. Channels 1-16, or Modem Setup etc., is selected by moving the cursor to the **upper right area** and pressing Enter when alongside the required page.

2.8 Composite Configuration

PARAMETER	CHOICES	NOTES
Carrier	V.24, V.11 Toggle through software Internal link fitted to J5	If the screen shows either V.24 or V.11 then you may toggle between the two using the space bar. To select V.35 , the link fitted to J5 must be moved to J6
	V.35 Internal link fitted to J6	
Link Clock	Ext	Normal setting.
	INT [Rate]	Internal clock rates of up to 256K may be set for test purposes.(64K for 8 channel unit)

2.9 STATMUX channel Configuration

To change the Statmux channel configuration, select the configuration screen (shown on page 7) by moving the cursor to the top line on the right hand area of the screen, next to '**Channels 1-16:**' **(Channels 1-8)** and pressing **ENTER** or **RETURN**.

The display shows parameters for eight data channels CH1 to CH8, or CH9 to CH16. The alternative 8 channels are selected by moving the cursor further to the left or right as necessary.

Each data channel has parameters selectable as detailed on the following page.

2.10 Copying another channel's set-up

Channel data may be copied from another similar STATMUX channel, by placing the cursor over the **channel number** field (of the channel to be changed).

The message '**Enter number or use <+>/<-> to copy channel**' appears.

Simply entering the **number** (if channel is less than 10) of the channel to be copied transfers all of that channels parameters to the current channel. If the channel number is greater than 10, the spacebar may be used to increment it through each channel number.

Esprit Channel Set-up Options		
PARAMETER	CHOICES	NOTES
Channel	1 to 16 (8)	Use spacebar or '-' key to select another channel to copy.
Rate	0 to 115200 bps. (38400bps for 8 channel)	Data channel bit rate. Independently settable at each end of link.
Bits/Char	5, 6, 7 or 8 bits.	Number of bits per asynchronous character.
Stop Bits	1, 1.5 or 2	Number of stop bits per asynchronous character.
Parity	EVEN, ODD or NONE	Asynchronous data parity.
Flow Control	XOFF CTS NONE	XOFF - use XON/XOFF soft flow control CTS - Uses DTR (input) to control data flow out from MUX, CTS (output) to control data flow from equipment to MUX. No Flow control used
RTS	ON OFF (DSR)	Always on Always off Transparent to DSR
Mode	NORMAL	Normal RUN mode.
	ECHO	Data echoed locally **and** sent to remote (Half duplex mode).
	LLOOP	Data locally looped back to this site. Not sent via link.
	QBF1	Send Quick Brown Fox message directly to local port.

	QBF2	Send Quick Brown Fox message via link to remote port.
	LOOP-R	Set this at **remote** site to loop back data to local via link.

2.11 Modem Configuration Options

The screen below shows the Modem Configuration options. A modem call is made when characters are detected in any channel buffer. The call will be dropped automatically after the period shown as 'Link fallback' after all data has been sent successfully.

```
                    ESPRIT 16 CHANNEL STATISTICAL MULTIPLEXER              Vx.xx
================================================================================

Carrier       :      V.24 LOST                  Channels 1 - 16      :
Link Clock    :      EXTERNAL                   Modem Setup          :
Mode          :      NORMAL                     Statistics           :
Configuration :      >LOCAL


Link Fallback :      30 Seconds



Status        :      Idle



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

Esprit Modem/External TA Configuration options		
PARAMETER	CHOICES	NOTES
Link Fallback	PERM	LINK permanently established. Use for leased line operation.

	30 Seconds, 1 Minute 2 Minutes, 5 Minutes 15 Minutes, 30 Minutes 60 Minutes.	Time before call is automatically dropped, if no further data flow detected.
Status	No Options	Gives the current diagnostic status of the Modem call progress

3 Esprit Multiplexer Installation

BEFORE INSTALLATION, PLEASE REFER TO THE SAFETY WARNINGS IN APPENDIX A, APPROVALS REQUIREMENTS IN APPENDIX B, and EMC REQUIREMENTS IN APPENDIX C

3.1 Supply Voltage & Connection

A.C. 100 - 240V a.c. without adjustment.
D.C. 48V d.c. without adjustment. **(OPTIONAL TBA)**

The Esprit may be optionally DC or AC powered. The AC power supply is a switched mode unit, the optional DC power supply unit being a DC to DC convertor. Both allow considerable input voltage variation.

3.2 Environmental Considerations

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

Temperature:	0 to 40 degrees centigrade.
Humidity:	0% to 90% non-condensing.
Air Pressure:	86 to 106 kPa.

3.3 Mechanical Construction

The Esprit is housed in a 1.5U tall 19" enclosure. An optional rack mount kit is available on request. Three LEDs on the front panel indicate the current status of the multiplexer.

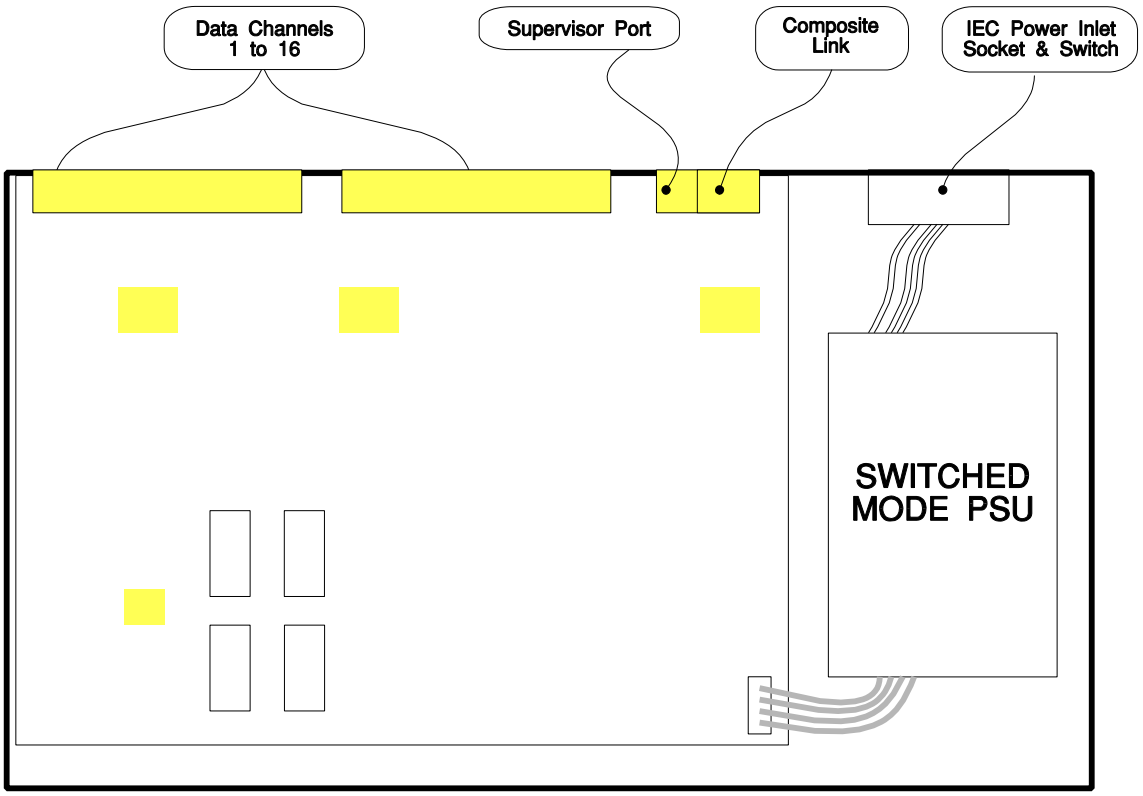
The multiplexer MUST be disconnected from the power supply before opening the unit or changing any network connections.

Screws on the left, right and top of the enclosure are removed using a Pozidrive screwdriver to access the interior.

The rear panel (illustrated on page 26) accommodates the link interface connectors and supervisor port.

3.4 Composite Interface Selection

The composite interface type is selected through the menu page. (X21/V11, V24, V35). It is necessary to use the corresponding external **cable** to make connection once the interface card has been fitted.



3.5 Composite Network Connection

The Esprit Statistical Multiplexer supports Network Interfaces of X21/V11, V35 and V24.

The composite port appears on the back panel as a 15 way D-type connector, the pin-out for each interface standard being shown in Appendix F. Correct cables for Network connection are shown in Appendix H.

3.6 Composite Link Parameters

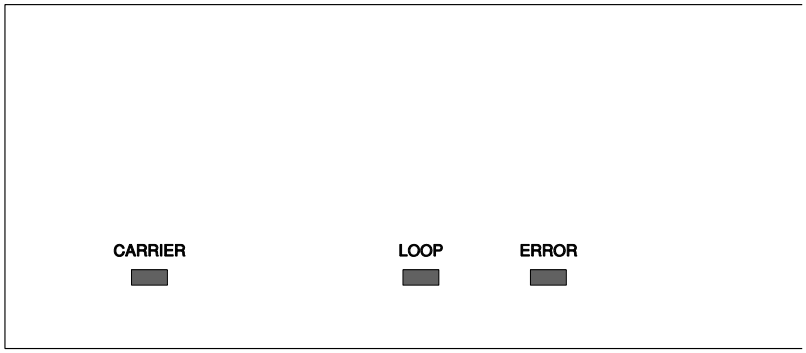
Parameters in the **System** area (upper left) and the choices available by pressing the **Space Bar** or **+** and **-** keys are:

PARAMETER	CHOICES	NOTES
Link Clock	EXTERNAL INTERNAL 64K	Rate up to 256K can be set on INTERNAL
V.11/V.24/ V.35	Present Lost	Shows whether the link is successfully connected.
Mode	NORMAL LLOOP	Normal RUN Mode Loops all transmitted data to the receiver.
Configuration	LOCAL REMOTE	"Modified" appears if change has been made. In dial up mode, a call will automatically be made when the remote page is accessed.

4 TROUBLESHOOTING

4.1 Front Panel LEDs

On the front panel only the **CARRIER** light should be illuminated during normal use.



When the multiplexer is IDLE the CARRIER LED will flash slowly. A faster flash shows that a call attempt is being made on a dial up modem.

LED LABEL	CONDITION	NOTES
CARRIER	Slow Flash	IDLE
	Fast Flash	Call established, searching for synchronisation.
	Steady Green	Call in progress - passing data OK
LOOP	Not illuminated	Normal un-looped mode
	Green	Some Channels looped or in QBF test modes.
ERROR	Red	Red if an ERROR has occurred on the composite link.
	Not illuminated	Unlit if link passing data correctly.

4.2 Diagnostics & Loopbacks

A number of debug options are available. They are described in the table in section 2.10, on page 11. It is possible loop back any channel, as well as sending continuous Quick Brown Fox messages either locally and remotely, to allow data and flow control

to be tested for proper operation.

If flow control is properly set, the messages should be received without loss when attached to a data tester, terminal or printer. In the case of printers, it is essential to test flow control also under **off-line** conditions, as many have very large buffers which can give a misleading indication that flow control is working when it is in fact not ever requested by the printer.

4.3 Back-to-Back Testing

It is possible to test a pair of Esprits in a back-to-back mode using a cable as described in Appendix I

First ensure that both multiplxers are set to the same type of composite interface, then connect the two composite ports using the appropriate cable.
Set one mux to Internal Clock and also select an valid rate for it to run at. Set the other mux to External clock.
The multiplexers should establish carrier and perform exactly as if connected via a digital service.

When you have finished any back-to-back testing, always set the clock back to External as conflict will occur if it is connected to a digital data service.

4.4 Statistics

Below is an example of the Statistics page.

```
                    ESPRIT 16 CHANNEL STATISTICAL MULTIPLEXER              Vx.xx
================================================================================

Carrier       :      V.11 PRESENT 64K            Channels 1 - 16      :
Link Clock    :      EXTERNAL                    Modem Setup          :
Mode          :      NORMAL                      Statistics           :
Configuration :      >LOCAL



Frames Sent    : 9415              Frames Received      : 11607
Frame Errors   : 0                 Frame Errors         : 0
Retransmit     : 0                 Retransmit           : 0
Throughput     : 3584              Throughput           : 3584
                                   Unnumbered           : 512
Carrier Loss   : 0



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

Frames sent - Number of frames that have been transmitted across the composite link.

Frames Errors - Number of frames that have errored whilst being transmitted.

Retransmit - Number of retransmit requests received.

Throughput - Data throughput in bytes/second.

Frames Received- Number of frames that have been received across the composite link.

Frames Errors - Number of frames that have errored whilst being received.

Retransmit - Number of retransmit requests received.

Throughput - Data throughput in bytes/second.

Unnumbered - Number of idle frames received.

Carrier Loss - Number of times that carrier has been lost.

To reset the statistics page type <CTRL> - R

APPENDIX A - SAFETY REQUIREMENTS

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** port
ii) **Composite** port
iii) **1** to **16** (Channel ports)

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.

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 Port
ii) Composite port
iii) 1 to 16 (Channel Ports)

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.

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'équipment

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

Ports SELV.

1) port **Supervisor**
2) port **Composite**
3) ports pour les canaux **1 à 16**

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.

APPENDIX B - APPROVAL REQUIREMENTS

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

X.21/V.11

Throughout Europe (Pan European) to I-CTR2 at data rates up to and including 256Kbps when the composite interface is configured to X.21/V.11 .
Connection must be made using a suitable non-integral interface specific cable, details of which are provided in Appendix H, page 30. This cable is available from your dealer using the specified part number.

V.35

Throughout Europe (Pan European) to I-CTR2 at data rates up to and including 256Kbps when the composite interface is configured to V.35 .
Connection must be made using a suitable non-integral interface specific cable, details of which are provided in Appendix H, page 31. This cable is available from your dealer using the specified part number.

V.24

Throughout Europe (Pan European) to I-CTR2 at data rates up to and including 19.2Kbps when the composite interface is configured to V.24 .
Connection must be made using a suitable non-integral interface specific cable, details of which are provided in Appendix H, page 32. This cable is available from your dealer using the specified part number.

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:

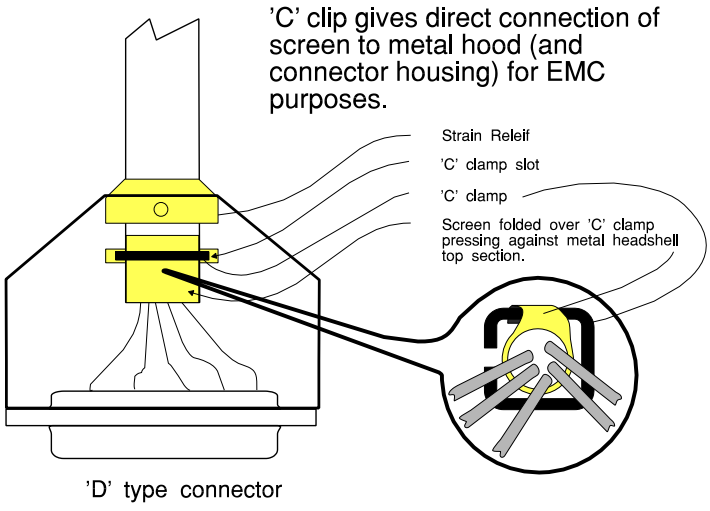
C.1 Limitation of Emissions:

C.1.1 'D-Type' Connections

This product relies on the use of screened cables for connection to the 15 way and 25 way 'D-Type' ports. The cables must have the foil or braid screen connected effectively to the metal headshell to ensure continued compliance. The following **headshells** are among those which have been found to provide suitable screen connection:

		25 Way	15 Way
a)	CINCH	SCH25-K	SCH15-K
b)	RS	460-979	454-930
c)	TOBY	MHDTZK-25-K	MHDTZK-15-K

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.

C.1.2 RJ45 Data Channel Connections

The RJ45 Channel Data connections do **not** normally require any shielding or ferrite to meet emissions requirements, unless they are to be connected to other equipment that **does** require a shielded cable, in which case suitable precautions should be taken.

C.1.3 Mains Connection

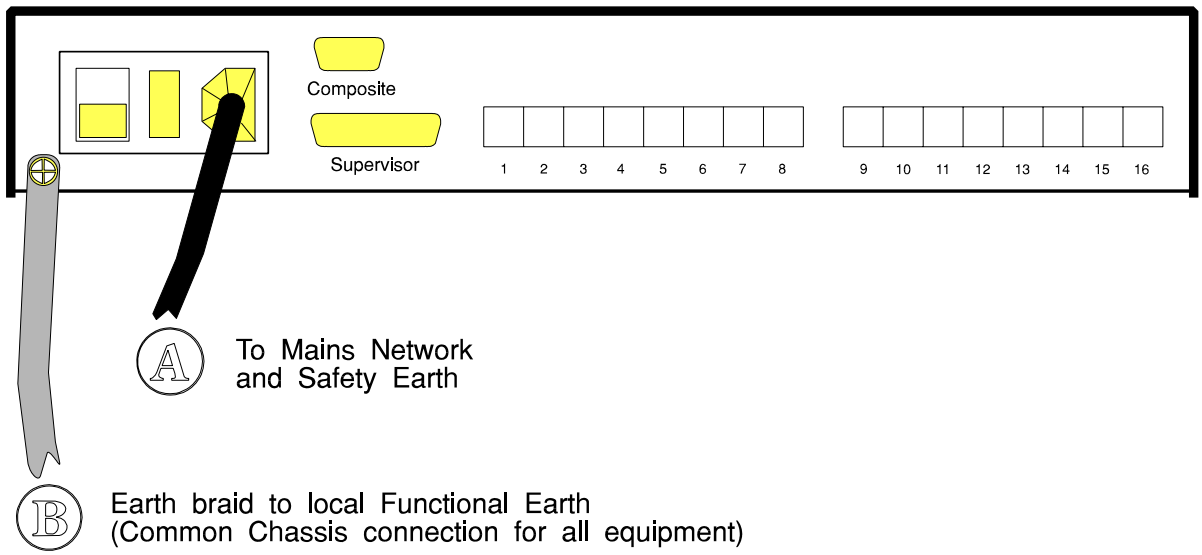
The mains connection is internally filtered and requires no special consideration.

C.2 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 below:

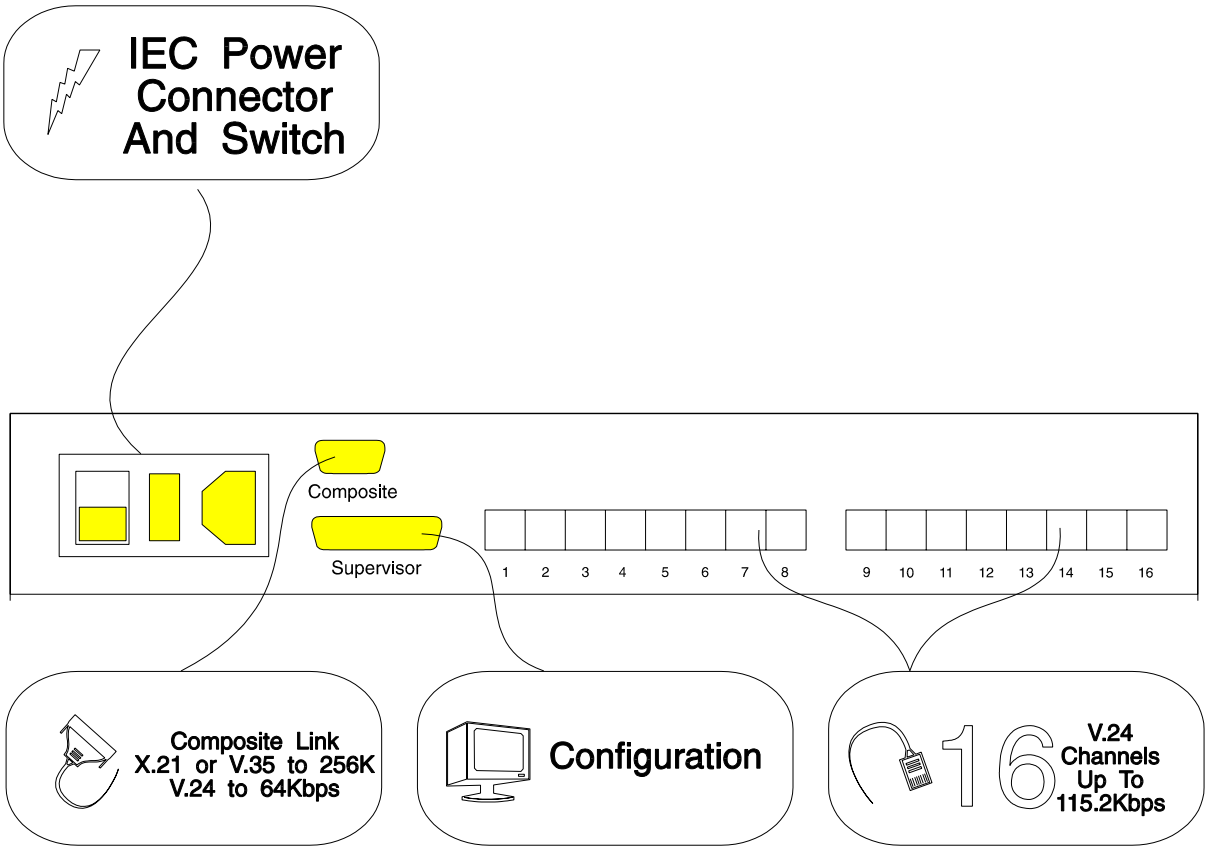
Separate Chassis Earth Connection for Optimum Immunity



APPENDIX D

Rear Panel Layout

The layout of all ports on the rear panel of a 16 channel Esprit multiplexer is shown in the diagram below, the 8 channel version doesn't have ports 9-16:



Note: Max channel rate of 38.4K for 8 channel Esprit

APPENDIX E - Supervisor port pinout

V.24 Supervisor Port Pinout (25 Way D Type Configured DCE)

1	Ground
2	TxD
3	RxD
4	RTS
5	CTS
6	DSR
7	Common
8	DCD
20	DTR

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.

Cable for connection to PC serial port

Signal	Mux 25 way Male	PC Serial Port 25 way Female	PC Serial Port 9 way Female
Ground	1	1	-
TxD	2	2	3
RxD	3	3	2
RTS	4	4	7
CTS	5	5	8
DSR	6	6	6
Common	7	7	5
DCD	8	8	1
DTR	20	20	4

APPENDIX F - LINK A 15 way pinout

15 D-Type Composite Interface Pin Connections (DTE)				
15 Way Mux Connector	**X.21/V11**	**V.35**	**V.24**	**Type at Connector** (Normal Use)
1	PROTECTIVE GROUND			-
8	G	COMMON	COMMON	Common Return
2	T(A)	TXDa	TXD	Generator
9	T(B)	TXDb	-	Generator
3	C(A)	DTR	DTR	Generator
10	C(B)	-	-	Generator
4	R(A)	RXDa	RXD	Load
11	R(B)	RXDb	-	Load
5	I(A)	DCD	DCD	Load
12	I(B)	-	-	Load
6	S(A)	RXCa	RXC	Load
13	S(B)	RXCb	-	Load
7	X/B(A)	TXCa	TXC	Load
14	X/B(B)	TXCa	-	Load
15	RTS	RTS	-	Generator

Notes: 1 15 way D-type connector shell and termination as specified in EMC section Appendix C, on page 24 of this manual.

APPENDIX G - V.24 Data Channel Pinout

V.24 Data Channels connectors 1 - 16 (8 Way RJ45 Type Configured DCE)

DATA CHANNEL CONNECTIONS:		
Description	**DCE - RJ45**	**Type**
Protective Ground	-	-
TxD	6	Load
RxD	5	Generator
RTS	8	Load
CTS	7	Generator
DSR	1	Generator
Common	4	-
DCD	2	Generator
DTR	3	Load

APPENDIX H - NETWORK COMPOSITE CABLES

X.21/V.11 STRAIGHT 15 Way Multiplexer Composite DTE to Network DCE Cable (P/N BB15019C)			
MUX 15 Way Male Connector UNC 4/40 Screws	**V.11 15 Way Male Connector M3 Screws[2]**		**Type at Connector** (Normal Use)
1	1	SHIELD	-
8	8	G	Common Return
2	2	T(A)	Generator
9	9	T(B)	Generator
3	3	C(A)	Generator
10	10	C(B)	Generator
4	4	R(A)	Load
11	11	R(B)	Load
5	5	I(A)	Load
12	12	I(B)	Load
6	6	S(A)	Load
13	13	S(B)	Load

Notes:

1 Pin 14 on Mux not Connected

2 V11 Male for connection to NTU must have M3 Screws. Mux end has 4/40 screws unless National Regulations permit the use of UNC 4/40. Each cable end must be clearly identifiable.

3 Dashed lines show wires to be twisted pairs.

4 Cable type: Belden 9506, 6 wire twisted pair overall screen (or equivalent). Maximum length 100 Metres.

5 Connector shell and termination as specified in EMC section Appendix C, on page 24 of this manual.

X21bis/V.35 STRAIGHT

15 Way Multiplexer Composite DTE
to Network DCE Cable
(P/N BB08601A)

MUX 15 Way Male Connector UNC 4/40 Screws	**V.35 34 Way MRA Male Connector**		**Type at Connector** (Normal Use)
1	A	SHIELD	-
8	B	COMMON	Common Return
2	P	TXDa	Generator
9	S	TXDb	Generator
15	C	RTS	Generator
3	H	DTR	Generator
4	R	RXDa	Load
11	T	RXDb	Load
5	F	DCD	Load
6	V	RXCa	Load
13	X	RXCb	Load
7	Y	TXCa	Load
14	AA	TXCb	Load

Notes:

1 Dashed lines show wires to be twisted pairs.

2 Cable type: Belden 9507, 7 twisted pair overall screen (or equivalent). Maximum length 100 Metres.

3 Connector shell and termination as specified in EMC section Appendix C, on page 24 of this manual.

X.21bis/V.24 STRAIGHT
15 Way Multiplexer Composite DTE to Network DCE Cable (P/N BB08602A)

MUX 15 Way Male Connector UNC 4/40 Screws	**V.24 25 Way Male Connector UNC 4/40 Screws**		**Type at Connector** (Normal Use)
1	1	SHIELD	-
8	7	COMMON	Common Return
2	2	TXD	Generator
15	4	RTS	Generator
3	20	DTR	Generator
4	3	RXD	Load
5	8	DCD	Load
6	17	RXC	Load
7	15	TXC	Load

Notes:

1. Cable type: Belden 9540, 10 conductors overall screen (or equivalent). Maximum length 10 Metres.

2. Connector shell and termination as specified in EMC section Appendix C, on page 24 of this manual.

APPENDIX I - Back to Back Test Cables

Back to Back cable spec fo X.21/V.11 , V.24 and V.35

Signal Name	15 way D male (Mux A)	15 way D male (Mux B)
Common	8	8
TxDa/RxDa	2	4
TxDb/RxDb	9	11
RxDa/TxDa	4	2
RxDb/TxDb	11	9
Clocka/Xclocka	6 & 7	6 & 7
Clockb/Xclockb	13 & 14	13 & 14

Note : Set Mux A to INTERNAL CLOCK and Mux B to EXTERNAL CLOCK

APPENDIX J - V24 Modem Connections & Setup

Modem setup example

Not all modems behave identically, but the following generic AT commands are a useful starting point. One of the two modems must be set up as the **Originator** and the other is set up as the **Answering** modem.

Set the Originator modem up as follows :-

AT &F0	Set Defaults
AT &M2	Set SYNCHRONOUS DTR dialling
AT &D2	DTR required for modem to go online
AT &S1	DSR Responds to remote modem
AT &Z0= tel No	Set telephone number
AT &W	Save settings

Set the Answering modem up as follows :-

AT &F0	Set Defaults
AT &M1	Set SYNCHRONOUS mode
AT &D0	Ignore DTR
AT &S1	DSR Responds to remote modem
ATS0=1	Set answer to 1 ring
AT &W	Save settings

Connect the composite link of the local multiplexer to the calling modem and the remote to the answering modem using an **X.21bis/V.24 Straight cable**.

APPENDIX K - Esprit TECHNICAL SPECIFICATION

ASYNCHRONOUS DATA CHANNELS

Interface:	V.24/V.28 (DCE)
Capacity:	8 or 16 Channels
Data Rates:	0 to 115200bps (0 to38400bps for 8 channel)
Data Format:	5,6,7,8 bit data
Stop Bits:	1, 1½, or 2 stop bits
Data Parity:	EVEN, ODD or NONE
Data Flow Control:	In Band: XON/XOFF(DC1/DC3). Out Of Band: CTS (Data to Mux), DTR (Data from Mux)
Diagnostics:	Local and Remote Loopbacks. 'Quick Brown Fox' test messages. Echo Mode
Flags:	RTS may be set ON, OFF or to follow DSR from the Remote mux

COMPOSITE LINK

Interface:	V.11 , V.35 , V.24 (all DTE)
Data Rates:	Up to 256Kbps (64K for V.24 or 8 channel version), Clock Source Internal or External
Transmission Modes:	HDLC

SUPERVISOR PORT

Interface:	V.24/V.28 (DCE)
Data Rate:	9600bps asynchronous
Data Format:	8 bits, no parity, 1 stop bit
Supported Terminals:	VT52, VT100, ADDSVP, ADM3A, H1500, N8009, TVI920

GENERAL

Front Panel Indicators:	Carrier, Loop, Error.
Dimensions:	434mm x 274mm x 61mm
Weight:	2.6Kg
Environment:	Operating 0-40°C, 0-90% humidity non-condensing

Power Requirements:	100 - 240V AC , 50 - 60Hz