

ISDN *Miniant*

(2 PRI- and 8 or 15 BRI- or 8 BRI- or 15 BRI- Interfaces)

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INTRODUCTION

The MINIAMT is an invaluable tool that is useful when multiple basic rate ISDN and primary rate ISDN terminals must be tested or demonstrated.

The **MINIAMT** provides eight basic rate interfaces (BRI) and optionally two primary rate interfaces (PRI) into which ISDN terminal equipment (e.g. terminal adapters, ISDN telephones, PABXs, video conferencing systems) can be plugged. The BRIs may be either all S₀ interfaces (i.e. I.430 compatible) or all U interfaces (i.e. ANSI T1.601 compatible). The PRIs may be either S_{2m} (i.e. E1 G.703 compatible) or T1 interfaces and the interfaces need not be the same type. Additionally an optional plug in card may be added. Basic rate plug in cards are available with 7 S₀ interfaces or 7 U interfaces. An analogue plug in card is available with 14 analogue ports.

The **MINIAMT** is available in desktop and 19" rack cases. This manual shows the desktop version.

A call on any bearer channel on any interface can be connected to any other bearer channel on any other interface. Virtually any type of call can be connected as the **MINIAMT** supports unrestricted digital, voice, 3.1kHz audio, V.110 and V.120 bearer capabilities. The **MINIAMT** can also provide a 40V, 1W power supply on each of the BRIs operating in both normal and restricted modes if they are S₀ interfaces and 88V 1.5W normal and sealing (i.e. 20mA current limit) on U interface. Internal tones (A law and law) are provided for voice/3.1 kHz terminals.

The unit also supports X.25 packet calls on the D channel of BRI1 and BRI2.

Also available as a software option is a protocol analyser. When activated it will report what is happening at each of the BRI and PRI interface ports. Decoding can be enabled or disabled at:-

- Layer 1 (physical layer).
- Layer 2 (data link layer).
- Layer 3 (call control layer).

If layer 1 decoding is enabled the analyser will report the state of the physical connection.

At layers 2 and 3 you can select one of four possible modes of operation:-

- No reporting.
- Display message contents as hex bytes.
- Display message contents in brief text messages.

OR

- Display message contents in detail, decoding all the information elements at layer 3. The originator, the interface number and the time are clearly identified in each message.

Finally the **MINIAMT** ISDN signalling can be disabled and permanent B channel connections established between each interface.

This manual outlines how the **MINIAMT** should be set up and how the terminal equipment is connected.

QUICK REFERENCE GUIDE

Introduction	<p>This section allows you to set up and use your MINIAMT with minimum effort. If you follow this guide and the terminal equipment still does not function then please read the complete manual.</p> <p>The steps are as follows:-</p>
Unpack the MINIAMT	<p>Unpack the MINIAMT. There should be a Terminal Cable (DB9-DB25), two ISDN Cables (RJ45-RJ45) and a Mains Power Cable.</p> <p>If you have ordered any Network Personality Modules they should also be included. Note that the Protocol Analyser is not contained on a separate module.</p> <p>If you have ordered the analogue option there should be seven adapters: either RJ45 to two RJ11 or RJ45 to two BT connectors.</p>
Plug in the power cable	<p>Plug the power cable into the rear of the unit and switch on (MINIAMT will work on 110V or 240V mains supply without adjustment).</p>
Plug terminals into correct interface	<p>Plug terminals into correct BRI or PRI interface (power up screen will tell you what interfaces are installed on the MINIAMT).</p>
Make a call	<p>Make a call from one terminal to the other. (The default telephone numbers and other parameters are shown in Table 1.)</p>
If the call did not work	<p>For BRI calls where no LEDs became lit on the front panel then the terminals probably require power feeding. If not already switched on turn it on by following the instructions in Chapter 2 Software Setup/Hardware Setup Screen.</p> <p>For PRI calls where no LEDs became lit on the front panel then the framing format probably requires changing. Follow the instructions in Chapter 2 Software Setup/Hardware Setup Screen.</p> <p>Also check that the interface being used is the correct type for the terminal (i.e. U interface terminals will not work on an S interface and T1 terminals will not work on an E1 interface).</p> <p>If the P LED comes on but no D LED then there is a problem with Layer 2. Try making the call again - this may fix the problem.</p>

QUICK REFERENCE GUIDE

Parameter	Default Setting
Baud Rate	19,200
Parity	None
Stop Bits	2
Data Bits	8
BRI S/U Power Feeding	ON
100 Terminators	100 BRI/120 PRI
B channels/PRI	30
Use SPIDS	Optional
Numbering Option	Multiple Subscriber Numbering
CLIP	ON
BRI 1	384700/10
BRI 2	384720/30
BRI 3	384740/50
BRI 4	384760/70
BRI 5	384780/90
BRI 6	384800/10
BRI 7	384820/30
BRI 8	384840/50
BRI 9	384860/70
BRI 10	384880/90
BRI 11	384900/10
BRI 12	384920/30
BRI 13	384940/50
BRI 14	384960/70
BRI 15	384980/90
PRI 1	384100-384129
PRI 2	384200-384229

Table 1 **MINIAMT** Default Settings

PRODUCT SPECIFICATION

ISDN / Analogue Connections ISDN Simulation Mode

The **MINIAMT** provides a combination of ISDN S₀ or U BRI ports, ISDN S_{2m} or T1 PRI ports, and analogue ports, all operating as the network side of the connection. The available combinations are described in the introduction.

The BRI interfaces can optionally provide a supply to power terminal equipment. This is 40V,1W for S₀ and 88V,1.5W for U.

The analogue interfaces provide -48V power feeding to power telephones.

Permanent B Channel Connections

Normal ISDN Signalling is suspended and permanent connections made between the PRI and BRI interfaces.

LED Indicators

In operation, LEDs indicate the operating level of each port. The LEDs operate as follows:-

- Physical layer activated on the BRI interfaces.
- Data link layer activated on the BRI interfaces.
- B1/B2 channel connected on the BRI interfaces.
- B channel(s) connected on the PRI interfaces.
- Off hook on the analogue interfaces.
- Ringing on the analogue interfaces.
- Power is on.

Terminal Port

A V.24 port is provided at the rear of the unit allowing the connection of an ANSI (or Wyse 50) compatible terminal or PC for setting up the unit.

Network Personality Module

The **MINIAMT** can be made to simulate country specific networks (e.g. 1TR6, BT, Euro ISDN etc.) by plugging a pre-programmed Network Personality Module into the slot on the front of the unit.

HARDWARE SETUP

Unpack the **MINIAMT**

First unpack the **MINIAMT** and check for signs of damage in transit. If the unit or packaging is damaged this should be reported immediately to your supplier.

Take an Inventory

Assuming there is no damage, take an inventory of the parts supplied. Check that the items ordered were actually received. The list below should be of help in identifying each part.

Check Options Supplied

To check which options have been installed inside the main unit check the option label on the back of the unit or the power up screen on the **TERMINAL**:-

- **MINIAMT** Network Simulator.
- Cables for ISDN - RJ45-RJ45 (2 off).
- Mains Cable.
- Terminal Cable DB9-DB25 (1 off).
- **MINIAMT** Protocol Analyser (Option).
- **MINIAMT** Network Personality Modules (Options).
- This Manual.

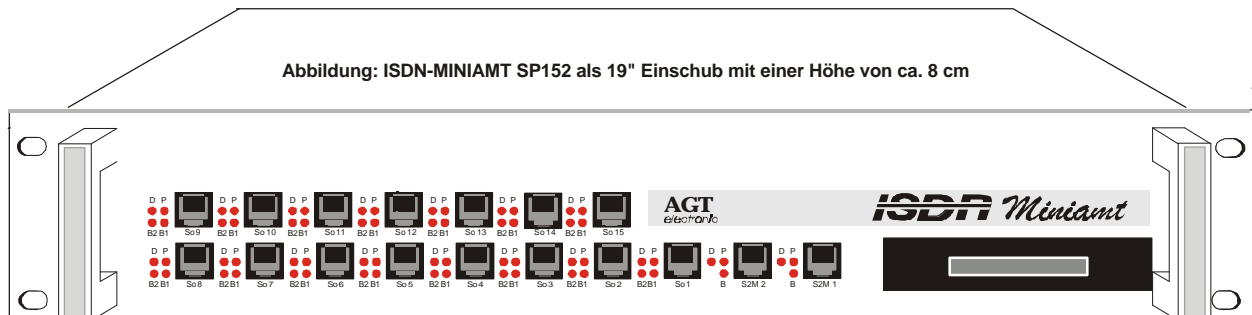


Figure 1 The **MINIAMT** Front Panel

The BRI1-BRI8 RJ45 connectors provide the BRI interfaces into the unit and the PRI1-PRI2 connectors provide the PRI connections into the unit. The BRI9-15 connectors may provide BRI or analogue interfaces depending on the options fitted.

Start Up Sequence

When the unit is first switched on all the LEDs will illuminate. During this period the terminal port will default to 19200 baud, no parity, 8 data bits and 2 stop bits and will search for a <ctrl-c> being transmitted to the **MINIAMT**. If this occurs the **MINIAMT** will restore the factory defaults. This is useful if a setting has been changed and the **MINIAMT** ceases to operate as a result. Powering up the **MINIAMT** and immediately typing <ctrl-c> will restore a working configuration to the **MINIAMT**.

ISDN and Analogue interface Pinouts

The following table shows the pinouts of the RJ45 connectors for the ISDN and analogue interfaces. The analogue interface has 2 interfaces on each connector.

HARDWARE SETUP

Figure 2a shows an RJ45 plug.

	PRI	BRI		Dual analogue
	E1 or T1	S	U	
1	T-	NC	NC	TIP / A
2	T+	NC	NC	SHUNT
3	NC	R-	NC	RING / B
4	R-	T-	RING	NC
5	R+	T+	TIP	NC
6	NC	R+	NC	TIP / A
7	NC	NC	NC	SHUNT
8	NC	NC	NC	RING / B

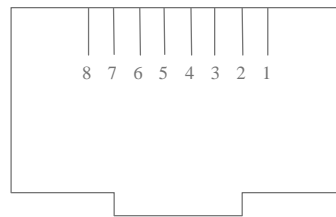


Figure 2a RJ45 plug (front view)

The following table shows the pinouts of the RJ11 and BT connectors for the analogue interface. An adaptor is provided to split the RJ45 connection to either 2 RJ11 connectors or 2 BT connectors.

	RJ11 connector
1	NC
2	NC
3	TIP
4	RING
5	NC
6	NC

	BT connector
1	NC
2	A
3	NC
4	SHUNT
5	B
6	NC

RJ11 and BT plugs are shown in figure 2b and figure 2c.

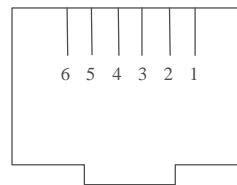


Figure 2b RJ11 plug (front view)

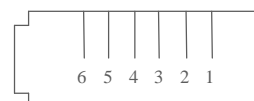


Figure 2c BT plug (front view)

Figure 4a shows a schematic of how the power is generated at the ISDN S₀ interface port while figure 4b shows a schematic of U interface power feeding. (See Software Setup/Hardware Setup Screen for an explanation of how the power feeding for the BRI operates.)

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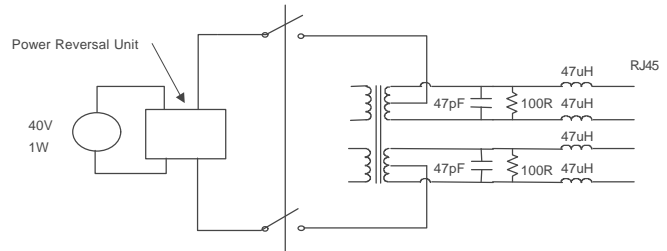


Figure 4a Schematic of 40 V Power Supply (S I / F)

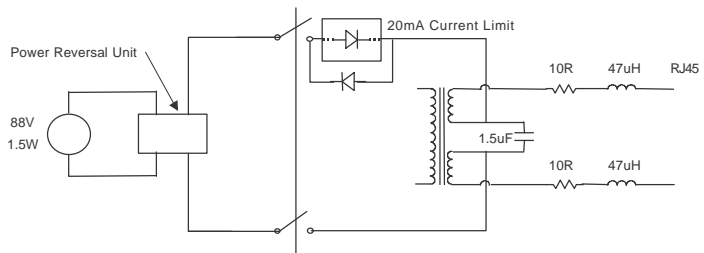


Figure 4b Schematic of 88V Power Supply (U I / F)

LED Indicators

Beside each ISDN interface port is a group of LEDs. These LEDs indicate the state of the ISDN interface beside them. The P LED lights whenever the ISDN line has activated. The D LED lights whenever the Data Link layer for that port is active (i.e. Multi-Frame Established). The corresponding B channel LED on the BRI interfaces (B1/B2) lights whenever that bearer channel is connected. On the PRI interface one B LED is provided which lights whenever there is an active B channel.

Beside each analogue port LEDs indicate off hook and ringing.

In addition the Power LED lights whenever 5 V power is present in the unit.

Network Personality Module

Beside the two PRI interfaces is the slot for the Network Personality Module. The **MINIAMT** can be made to simulate specific networks (e.g. 1TR6) by plugging the relevant Network Personality Module into this slot.



Figure 5 **MINIAMT** Back Panel

HARDWARE SETUP

Terminal Port

The **MINIAMT** has one V.24 compatible control port to which a PC or VT100 compatible terminal or a PC emulating an ANSI terminal (e.g. running Procomm, Windows, Terminal, Hyper Terminal etc.) can be connected. The pinout of the port is shown in figure 5b. Table 3 overleaf lists the operation of each pin.

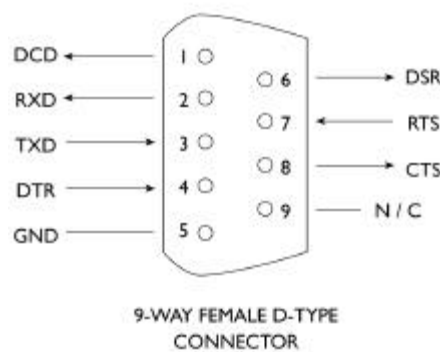


Figure 5b V.24 Terminal Port

Pin	Function	Description
1	DCD	Data Carrier Detect (always active)
2	RXD	Received Data (output)
3	TXD	Transmitted Data (input)
4	DTR	Data Terminal Ready (input- ignored)
5	GND	Ground
6	DSR	Data Set Ready (always active)
7	RTS	Request to Send (input- ignored)
8	CTS	Clear to Send (output- active when MINIAMT can receive Data)

Table 3 Terminal Port Pin Description

Start-up Sequence

When the **MINIAMT** is powered up it transmits an opening message, referred to later in the "Copyright Screen" (see Chapter 2). Once the **MINIAMT** has been set up properly then it is not necessary to connect a terminal. To set up the **MINIAMT** press any key on the terminal or PC keyboard and the setup screen, figure 7, is presented. Chapter 2 covers setting up the **MINIAMT**.

The factory default settings for the **MINIAMT** are 19200 baud, 8 data bits, 2 stop bits, no parity, although you can change these settings. If the **MINIAMT**'s settings in memory become corrupt it may not be possible to operate the terminal as the baud rate may be wrong. The **MINIAMT** will always power up with the terminal port operating at 19200 baud, 8 data bits, 2 stop bit, no parity and will maintain this setting during the time when the power up LEDs are on. Typing <ctrl-c> during this time will reload the factory defaults and the terminal should start to function normally again.

Power

The **MINIAMT** power connector will accept an IEC mains lead (supplied). The **MINIAMT** has a universal input suitable for 90-250 V ac 50-60 Hz. Connection to any other source may result in the unit failing to comply with safety requirements.

Warning - Earth the MINIAMT

The power supply must have a protective ground (Earth) connection. If not the mains filter will force the metal case to a voltage equal to half the mains supply voltage.

There are no user serviceable parts inside the **MINIAMT**. It should

HARDWARE SETUP

only be opened by approved maintenance staff, otherwise the warranty will be invalidated.

Once the terminal has been connected to the control port, power can be applied. All the LEDs will light and then extinguish once the power on self-test is completed. (The Power LED will stay on.) The terminal should now display the opening copyright message and can be set up as described in the next chapter.

Introduction

This chapter outlines the user interface of the **MINIAMT** and how the various functions of the **MINIAMT** are set up and used.

Assuming that the hardware has been set up as described in Chapter 1, when power is applied the following message should be displayed on your terminal or PC.

Copyright Screen

```
NT Simulator (XXX) Vx.xx dd mmm yyyy S/N xxxxxxxxx  
  
B9 B10 B11 B12 B13 B14 B15  
XX XX XX XX XX XX XX  
  
XX XX XX XX XX XX XX XX XX XX  
B8 B7 B6 B5 B4 B3 B2 B1 P2 P1  
  
X.25 version Vx.xx  
Analog version Vx.xx (ONLY IF Analog Module is fitted)
```

Figure 6 Copyright Screen

The default data format is 19200 baud, 8 data bits, 2 stop bits, no parity. If no message appears then there is probably something wrong with the control cable. If some characters are displayed but the format is strange then the terminal parameters are probably incorrect. Try adjusting the terminal parameters so that they match the **MINIAMT**.

Nothing further will happen until you press a key. Note that once the unit has been set up it is not necessary to set it up each time it is powered on, and consequently the terminal need not be connected thereafter.

The **MINIAMT** now displays the main set up screen, shown in figure 7.

```
Hardware Setup  
Software Setup  
Terminal Setup  
Telephone Number Setup  
Analyser Setup
```

Figure 7 Main System Menu

Changing Parameters

The set up of the **MINIAMT** is structured rather like a tree with the menu of figure 7 at the top. You move to a more detailed lower function by using the <up-arrow> and <down-arrow> keys to select the desired function and presses <enter> on the keyboard. To move to the next higher function press the <esc> key on the keyboard. Note that <u> and <d> perform the same function as <up-arrow> and <down-arrow>.

Once you have located the item you wish to change use <space> to cycle through the various options permitted.

Some information must be entered by typing it in rather than using <space> (e.g. telephone numbers). Move to the item to be changed and press <enter>. A prompt will appear at the bottom of the screen requesting the information.

The options listed in figure 7 are as follows:-

Hardware Setup

This function allows you to set up the communications ports, and various other hardware functions of the **MINIAMT**.

Software Setup

This function allows you to change the operation of the **MINIAMT** by

SOFTWARE SETUP

switching on and off information elements in the call control messages or by changing the way in which the layer 2 and layer 3 software operates. This function can be used to enable facilities such as Multiple Subscriber Numbering and Subaddressing.

Terminal Setup	This function allows you to change the terminal type.
Telephone Number Setup	This function allows you to change the default telephone numbers for each B channel and the special purpose telephone numbers.
Analyser Setup	This function allows you to change the analyser options.
Hardware Setup Screen	On selecting this option you are presented with the screen of figure 8.

```
Hardware Setup

Coms Port Baud Rate          xxxx
Coms Port Parity            xxxx
Coms Port Stop Bits         xxxx
Coms Port Data Bits         xxxx
NT(LT)/TE/Tran Mode         xxxx
100 ohm Terminators       xxxx
BRI S/U Power Feed         xxxx
BRI S Power Mode           xxxx
BRI U Power Mode           xxxx
BRI S Bus Timing           xxxx
Selected Tone               xxxx
PRI E.1 I/F Config         xxxx
PRI T.1 I/F Config         xxxx
Analogue Ring Mode         xxxx
Analogue Caller ID Mode    xxxx
Analogue Disconnect Mode   xxxx
U-Interface M4 Bit         xxxx
```

Figure 8 Hardware Setup Menu

All of the fields in figure 8 are changed by highlighting the required field and cycling through the options using the <space>. The fields are listed below:-

Coms Port Parameters These are the parameters for the control terminal i.e. baud rate, parity, stop bits and data bits. Note that changing these parameters will mean that you will have to change the terminal setup also.

NT(LT) / Tran Mode This field selects between Network Terminator Mode (NT) and Permanent B Channel Connections.

In NT mode the **MINIAMT** will simulate an ISDN network, allowing PRI and BRI terminals to be plugged in and to call each other.

Permanent B Channel Connection disables normal ISDN signalling and allows for the creation of permanent connections between B channels. Any B channel on any interface can be connected to any other B channel. The BRI D channels are not connected. If the Permanent B Channel Connection is selected you can configure the B Channels by typing <enter>. The screen if fig 9 is displayed.

```
Permanent B Channel Connection Setup - Main Board

BRI1 B Channel 1 -> xRIx Channel x
BRI1 B Channel 2 -> xRIx Channel x
BRI2 B Channel 1 -> xRIx Channel x
BRI2 B Channel 2 -> xRIx Channel x
BRI3 B Channel 1 -> xRIx Channel x
BRI3 B Channel 2 -> xRIx Channel x
BRI4 B Channel 1 -> xRIx Channel x
```

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```
BRI4 B Channel 2 -> xRIx Channel x
BRI5 B Channel 1 -> xRIx Channel x
BRI5 B Channel 2 -> xRIx Channel x
BRI6 B Channel 1 -> xRIx Channel x
BRI6 B Channel 2 -> xRIx Channel x
BRI7 B Channel 1 -> xRIx Channel x
BRI7 B Channel 2 -> xRIx Channel x
BRI8 B Channel 1 -> xRIx Channel x
BRI8 B Channel 2 -> xRIx Channel x
```

```
Plug In Module Connections
PRI1 Connections
PRI2 Connections
```

Figure 9 BRI1-BRI8 Connection Setup Menu

To change the BRI B channel connections move to the relevant field and press <space> until the desired B channel is selected. To change the BRI B channel connections on the BRI plug in card move to the relevant field and type <enter>. The screen of fig 10 is displayed.

Permanent B Channel Connection Setup - Plug In Module

```
BRI9 B Channel 1 -> xRIx Channel x
BRI9 B Channel 2 -> xRIx Channel x
BRI10 B Channel 1 -> xRIx Channel x
BRI10 B Channel 2 -> xRIx Channel x
BRI11 B Channel 1 -> xRIx Channel x
BRI11 B Channel 2 -> xRIx Channel x
BRI12 B Channel 1 -> xRIx Channel x
BRI12 B Channel 2 -> xRIx Channel x
BRI13 B Channel 1 -> xRIx Channel x
BRI13 B Channel 2 -> xRIx Channel x
BRI14 B Channel 1 -> xRIx Channel x
BRI14 B Channel 2 -> xRIx Channel x
BRI15 B Channel 1 -> xRIx Channel x
BRI15 B Channel 2 -> xRIx Channel x
```

Figure 10 BRI9-BRI15 Connection Setup Menu

Connections are changed in the same way.

Permanent B Channel Connection Setup - Main Board

```
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
PRI1 B Channel 1-> xRIx Ch x PRI1 B Channel 2 -> xRIx Ch x
```

Figure 11 PRIn Connection Setup Menu

To change the PRI connections move to the relevant PRI prompt and press <enter>. The screen of figure 11 is displayed. The connections are changed in the same way as for the BRI connections.

100 ohm Terminators

The 100 ohm terminators for the BRI interfaces are always present. The 120 ohm terminators for the PRI interfaces are always installed so it is not possible to change this field. This field is displayed to provide compatibility with other Simulator family members.

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BRI S/U Power Feed	Setting this to ON forces the MINIAMT to provide a nominal 40 V 1 W dc supply to the ISDN S ₀ interface and a nominal 88V 1.5 W dc supply to the ISDN U interface if any terminal adapters or ISDN telephones require it.
BRI S Power Mode	This field allows you to switch the power from normal mode to restricted mode i.e. the power provided at the ISDN BRI S ₀ interface will switch polarity. This field should be set to normal operation unless you wish to test the terminal adapter operation in restricted power mode.
BRI U Power Mode	The U interface module is fitted with a current limiter circuit which restricts the total current to 20 mA in sealing mode. Switching to normal mode power will disable the current limiter and the U interface will be supplied with the full 88 V 1.5 W power available. This will be necessary for testing NT1s and other line powered devices.
S Bus Timing	In NT mode using an S interface this field will switch between adaptive timing or fixed timing on the S ₀ interface. Use adaptive timing if the S ₀ interfaces have long cables attached.
Selected Tone	The MINIAMT can generate a tone on a B channel whenever a terminal dials a particular telephone number (see Chapter 2 Software Setup/Telephone Number Setup Screen). This field is used to select the tone frequency and power level. It is also possible to select dialtone, ring tone, error tone (reorder tone) and busy tone using this field. Note that the '+' and '-' keys can be used to skip frequencies while <space> will skip to the next supported power level.
PRI E1 I/F config.	This field switches between AMI and HDB3 encoding on the E1 interface and sets the S bit to 1 or to reflect the status of the FEBE bit in the S2m interface, and to switch CRC4 multi-framing on or off.
PRI T1 I/F config.	This field switches between AMI and B8ZS encoding on the T1 interface and sets the framing to SLC96, SF, T1DM or ESF.
Analogue Ring Mode	This field allows you to set the shape of the ringing voltage on analogue interfaces. It is normally set to sinusoidal but can be changed to trapezoidal.
Analogue Caller ID Mode	This field allows you to set the format of the caller ID signal on analogue interfaces. FSK (ETSI) is for European telephones and FSK (Bellcore) is for American telephones.
Analogue Disconnect Mode	This field allows you to set the change in the line state that occurs for 0.5 seconds when the network is disconnecting the call. It is normally set to line break but can be changed to line reversal or line unchanged.
U-Interface M4 Bit	None Automatic None, U interface activation/deactivation does not use the M-4 bits Automatic, U interface activation/deactivation will use the M-4 bits

SOFTWARE SETUP

Software Setup Screen On selecting this option the screen of figure 12 is displayed.

```
Software Setup

Network Type                               nnnn
Drop Layer 2 if No Call Active             xxxx
Drop Layer 1 if Layer 2 Inactive          xxxx
Drop TEI if Layer 1 Inactive              xxxx
Number of B Channels per PRI               n
Use Service Profile Ids (SPIDs)           xxxx
Allow Overlap Sending/Receiving           xxxx
Numbering System Option                   xxxx
Called Party Number                       xxxx
Calling Party Number                      xxxx
Called Party Sub-addressing               xxxx
Calling Party Sub-addressing              xxxx
Higher Level Compatibility                 xxxx
Lower Level Compatibility                  xxxx
D-Channel X.25 Setup                      xxxx
```

Figure 12 NT Mode Software Setup Menu

These features are enabled or disabled by selecting the relevant field and pressing <space>:-

Network Type	Can be changed on NAT/AT&T/DMS and BT Network Personality Modules only.
Drop Layer 2 if No Call Active	If activated the MINIAMT will disconnect layer 2 after a predetermined time if there are no active calls. This time can be set up by pressing <enter> on this field if it is activated. The screen of figure 13 is presented.
	<pre>L2 Drop Timeout Setup Timeout until L2 Dropped (secs) nn</pre>
	Figure 13 Drop Timeout Menu
	Pressing <esc> will leave the value unchanged and <enter> will allow you to change the default value.
Drop Layer 1 if Layer 2 Inactive	If enabled the MINIAMT will deactivate layer 1 immediately layer 2 becomes inactive.
Drop TEI if Layer 1 Inactive	If activated the MINIAMT will remove its TEI value(s) once the layer 1 is deactivated. The terminals will then have to send an ID Request once they become active again.
Number of B channels per PRI	You can select between 6 and 30 (23 if using NAT/AT&T/DMS or NTT Network Personality Module). To set each PRI or BRI interface as being point-point or point-multipoint operation press <enter> and the screen of figure 14 will be displayed.

SOFTWARE SETUP

Point to Point/Multipoint Setup

```
PRI # 0          xxxxx
PRI # 1          xxxxx

BRI # 0          xxxxx
BRI # 1          xxxxx
BRI # 2          xxxxx
BRI # 3          xxxxx
BRI # 4          xxxxx
BRI # 5          xxxxx
BRI # 6          xxxxx
BRI # 7          xxxxx
BRI # 8          xxxxx
BRI # 9          xxxxx
BRI # 10         xxxxx
BRI # 11         xxxxx
BRI # 12         xxxxx
BRI # 13         xxxxx
BRI # 14         xxxxx
```

Figure 14 Point-Point/Point-Multipoint Setup

Each interface can be set to point-point mode (i.e. no broadcast TEI in use for SETUP messages) or in point-multipoint mode (i.e. broadcast TEI 127 used).

Use Service Profile IDs (SPIDs)

This field allows the **MINIAMT** to accept a Service Profile Identifier from the terminal and assign a Terminal Endpoint to it. While using the NAT/AT&T/DMS network personality card this field can be set to (a) Optional - SPIDs may be used but if they are not calls can still be made (b) Mandatory - SPID initialisation must be completed successfully before calls can be made (c) AutoSPID - same as (b) but the AutoSPID feature of National ISDN 1997 i.e. enabled. If using any other network support card (or none) this field is fixed at Optional. If this field is activated you can press <enter> to set up the SPIDs and the screen of figure 15 is presented.

Service Profile Identifier Setup - Main Board

```
Channel #1 Tel No tttttt      ssssssssss
Channel #1 Tel No tttttt      ssssssssss
Channel #2 Tel No tttttt      ssssssssss
Channel #2 Tel No tttttt      ssssssssss
Channel #3 Tel No tttttt      ssssssssss
Channel #3 Tel No tttttt      ssssssssss
Channel #4 Tel No tttttt      ssssssssss
Channel #4 Tel No tttttt      ssssssssss
Channel #5 Tel No tttttt      ssssssssss
Channel #5 Tel No tttttt      ssssssssss
Channel #6 Tel No tttttt      ssssssssss
Channel #6 Tel No tttttt      ssssssssss
Channel #7 Tel No tttttt      ssssssssss
Channel #7 Tel No tttttt      ssssssssss
Channel #8 Tel No tttttt      ssssssssss
Channel #8 Tel No tttttt      ssssssssss
```

Plug In Module Service Profile Setup

Figure 15 Service Profile ID Setup Menu (main board)

You can change any of the SPIDs by moving to the relevant SPID and pressing <enter>. A prompt appears requesting the new SPID value.

Select Plug In Module Service Profile Setup to access SPIDs for BRI9 - BRI15.

SOFTWARE SETUP

Figure 16 shows the display.

```
Service Profile Identifier Setup - Plug in Module

Channel #9 Tel No tttttt          ssssssssss
Channel #9 Tel No tttttt          ssssssssss
Channel #10 Tel No tttttt         ssssssssss
Channel #10 Tel No tttttt         ssssssssss
Channel #11 Tel No tttttt         ssssssssss
Channel #11 Tel No tttttt         ssssssssss
Channel #12 Tel No tttttt         ssssssssss
Channel #12 Tel No tttttt         ssssssssss
Channel #13 Tel No tttttt         ssssssssss
Channel #13 Tel No tttttt         ssssssssss
Channel #14 Tel No tttttt         ssssssssss
Channel #14 Tel No tttttt         ssssssssss
Channel #15 Tel No tttttt         ssssssssss
Channel #15 Tel No tttttt         ssssssssss
```

Figure 16 Service Profile ID Setup Menu (expansion board)

Allow Overlap Sending/Receiving

If activated the **MINIAMT** will allow Overlap Receiving on certain enbloc dialled calls. If deactivated Overlap Receiving is not allowed. For a further explanation of how Overlap Receiving works read the information in Chapter 4 on fault finding section entitled Overlap Receiving Will Not Work.

The remaining options affect the contents of the SETUP message sent from the **MINIAMT** to the called terminal as follows:-

Numbering System Option

The **Normal** numbering system uses the numbers assigned to each B channel in the Telephone Number Setup Menu. **Multiple Subscriber Numbering** (MSN) is also available. If this feature is enabled and a number is called the last digit (last two digits on a PRI) is treated as a wildcard i.e. dialling 384701 will connect to the channel whose number is set up as 384700. In addition to this the dialled number is provided to the destination terminal in the Called Party Number information element, assuming that the Called Party Number information element is enabled. (Note that in BT and 1TR6 Network Personality Modules only the last digit dialled is provided regardless of whether the Called Party Number information element is enabled or not.)

The third option is **Auxiliary Working**. Enabling this feature sets all B channels on an interface to the same telephone number. Lastly **Direct Dialling In** (DDI) is provided. This works in basically the same way as MSN. Overlap receiving works independently of the numbering option.

N.American software only 2 DN/2 SPID (Fixed B)

The numbering option in the Software setup has been re-worded. Each BRI port has 1 Directory Numbers (DN) and 1 SPID numbers for each B channel.

2 DN/2 SPID/MSN

Each BRI port has 2 Directory Numbers (DN) and 2 SPID numbers. MSN also operates in this mode.

1 DN/1 SPID (x2)

Each BRI port has 1 Directory Numbers (DN) and 1 SPID numbers only.

T here is no Direct Dial In option in N.American software.

Called Party Number

If activated a Called Party Number information element is included in the SETUP message sent to the destination terminal. This is the

network generated directory number if the calling terminal did not send a Called Party Number information element to the **MINIAMT** in its transmitted SETUP message or simply a copy of the terminal supplied number if it did include a Called Party Number information element in its transmitted SETUP message to the **MINIAMT**.

Note that a Called Party Number is sometimes included in the SETUP message from the MINIAMT to the called terminal even if this field is set to No.

If switched to Yes pressing <enter> when on this field displays the screen of figure 17.

Called Party Number Setup

```
Type          tttttttt
Plan          pppppppppp
```

Figure 17 Called Party Number IE Setup

This screen allows you to reconfigure the Called Party Number information element before it is sent to the called party. If Type or Plan are set to automatic then the Called Party Number will be passed through the **MINIAMT** unaltered. The Type field can be forced to a different setting by pressing <space> while on the Type field.

Available settings are:-

- Unknown
- International
- National
- Network
- Subscriber
- Abbreviated

Similarly the Plan field can be forced to a fixed value.

Available plans are:-

- Unknown
- ISDN / Telephony
- Data
- Telex
- National
- Private

Calling Party Number

If this feature is activated a Calling Party Number information element is included in the SETUP message sent from the **MINIAMT** to the destination terminal. This is the network generated directory number if the calling terminal did not send a Calling Party Number information element in its transmitted SETUP message to the **MINIAMT** or simply a copy of the terminal supplied number if it did include a Calling Party Number information element in its transmitted SETUP message to the **MINIAMT**.

If switched to Yes pressing <enter> when on this field displays the screen of figure 18.

Calling Party Number Setup

```
Type          tttttttt
Plan          pppppppppp
Screening     ssssssssss
Presentation  pppppppppp
```

Figure 18 Calling Party Number IE Setup

This screen allows you to reconfigure the Calling Party Number information element before it is sent to the called party. If Type, Plan, Screening or Presentation are set to automatic then the Called Party Number will be passed through the **MINIAMT** unaltered.

The Type field can be forced to a different setting by pressing <space> while on the Type field.

Available settings are:-

- Unknown
- International
- National
- Network
- Subscriber
- Abbreviated

Similarly the Plan field can be forced to a fixed value.

Available plans are:-

- Unknown
- ISDN / Telephony
- Data
- Telex
- National
- Private

The Screening field can be forced to a fixed value.

Available screening indicators are:-

- User Provided Not Screened
- User Provided Verified and Passed
- User Provided Verified and Failed
- Network Provided

The Presentation field can be forced to a fixed value.

Available presentation indicators are:-

- Presentation Allowed
- Presentation Restricted
- Number Not Available

Note that if Presentation Restricted is chosen no number digits will be included in the Calling Party Number information element.

Called Party Subaddress

If this feature is enabled a Called Party Subaddress information element is included in the SETUP message sent to the destination terminal, but only if the calling terminal sent a Called Party Subaddress information element in its transmitted SETUP message to the **MINIAMT**. The CCITT and ETSI Network Personality Modules allow the generation of a Called Party Subaddress by dialling an enbloc number and the Called Party Subaddress separated by a # (e.g. dial 384000#123 to generate a subaddress of 123).

Calling Party Subaddress

If this feature is enabled a Calling Party Subaddress information element is included in the SETUP message sent to the destination terminal, but only if the calling terminal sent a Calling Party Subaddress information element in its transmitted SETUP message.

Higher Level Compatibility

If this feature is activated a Higher Level Compatibility information element is included in the SETUP message sent to the destination terminal. If this information element is supplied by the calling terminal then a copy is simply passed to the destination terminal, otherwise the **MINIAMT** generates this information element based on the contents of the Bearer Capability.

If activated pressing <enter> when on this field allows you to map the "information transfer capability" field of the Bearer Capability information element to the "high layer characteristics identification" of the High Layer Compatibility information element (see Q.931). To allow you to set up this mapping the screen of figure 19 is displayed.

The table is edited in the normal fashion - move to the element to be changed and use <space> to cycle through the available options until the desired option is selected.

The available options are:-

- Telephone
- Fax Group 2 / 3
- Slow Scan Video
- Fax Group 4
- Teletex - basic mixed and fax
- Teletex - basic and processible
- International Videotex
- Telex
- Message Handling
- OSI Application
- Maintenance
- Management

One of these options is then chosen for each of the displayed fields to define the mapping required. For example, 'Speech' in the Bearer Compatibility information element might be mapped to 'Telephony' in the High Layer compatibility information element.

Higher Layer Compatibility Setup

```
Speech translates as           xxxxxxxxxxxx
Unrestricted Digital translates as xxxxxxxxxxxx
Restricted Digital translates as xxxxxxxxxxxx
3.1 kHz Audio translates as   xxxxxxxxxxxx
7 kHz Audio translates as     xxxxxxxxxxxx
Video translates as           xxxxxxxxxxxx
```

Figure 19 Translation from Bearer Capabilities to HLC

Lower Level Compatibility

If this feature is activated a Lower Level Compatibility information element is included in the SETUP message sent to the destination terminal. If this information element is supplied by the calling terminal then a copy is simply passed to the destination terminal, otherwise the **MINIAMT** generates this information element from the Bearer Capability information element.

D-Channel X25 Setup

If this feature is activated then it is possible to send D channel packet data between BRI1 and BRI2.

When activated typing <enter> when on this field allows you to configure the parameters of each interface. The screen of figure 20 is displayed.

```
X25 Setup

BRI1 PVC                xxxxxxxxxxxx
BRI1 Outgoing Only     xxxxxxxxxxxx
BRI1 Bothway           xxxxxxxxxxxx
BRI1 Incoming Only     xxxxxxxxxxxx
BRI2 PVC                xxxxxxxxxxxx
BRI2 Outgoing Only     xxxxxxxxxxxx
BRI2 Bothway           xxxxxxxxxxxx
BRI2 Incoming Only     xxxxxxxxxxxx
```

Figure 20 X25 Setup Screen

You can enter a logical channel number for PVC connections, Incoming Calls, Bothway Calls, Outgoing Calls and a TEI value to be used on the particular channel.

X.25 restart

```
RESTART on L2 establish    xx
```

Force simulator to issue a RESTART message when L2 establishes. For more information on X.25, see Appendix.

Terminal Setup Screen

On selecting this option you are presented with the screen of figure 21.

```
Terminal Setup

Terminal Type              ttttt
```

Figure 21 Terminal Type Setup Menu

You can select a terminal type by typing <space>. Supported terminals are ANSI, ANSI-Colour and Wyse 50.

Telephone Number Setup Screen

On selecting this option the screen of figure 22 is displayed.

```
Telephone Number Setup

Configure BRI numbers     xxxx
Configure P1 numbers     xxxx
Configure P2 numbers     xxxx

Busy Number              xxxx
Unallocated Number       xxxx
No User Responded Number xxxx
Call Rejected Number     xxxx
Out of Order Number      xxxx
Temporary Failure Number xxxx
No Answer Number         xxxx
Test Tone Number         xxxx
Loopback Number          xxxx
```

Figure 22 Telephone Number Setup Menu

The fields of figure 22 are modified by selecting the relevant telephone number using the <up-arrow> and <down-arrow> keys and pressing <enter>. A prompt to enter a new telephone number appears at the bottom of the screen. If the Numbering System Option is set to Normal, pressing <enter> on either of the PRI numbers will display a further screen as shown in figure 23 overleaf. This is used to set up a telephone number for each B channel on the PRI interface.

Primary Rate Interface Telephone Number Setup

B1 Number	xxxx	B16 Number	xxxx
B2 Number	xxxx	B17 Number	xxxx
B3 Number	xxxx	B18 Number	xxxx
B4 Number	xxxx	B19 Number	xxxx
B5 Number	xxxx	B20 Number	xxxx
B6 Number	xxxx	B21 Number	xxxx
B7 Number	xxxx	B22 Number	xxxx
B8 Number	xxxx	B23 Number	xxxx
B9 Number	xxxx	B24 Number	xxxx
B10 Number	xxxx	B25 Number	xxxx
B11 Number	xxxx	B26 Number	xxxx
B12 Number	xxxx	B27 Number	xxxx
B13 Number	xxxx	B28 Number	xxxx
B14 Number	xxxx	B29 Number	xxxx
B15 Number	xxxx	B30 Number	xxxx

Figure 23 PRI Telephone Number Setup Menu

Selecting Configure BRI numbers allows numbers for each BRI to be set. The display is shown in figure 24. If the analogue module is fitted the numbers for BRI 9 b1 to BRI 15 b2 are used for A1 to A14.

Basic Rate Interface Telephone Number Setup

BRI1 B1 Number	: xxxx	BRI8 B2 Number	: xxxx
BRI1 B2 Number	: xxxx	BRI9 B1 Number	: xxxx
BRI2 B1 Number	: xxxx	BRI9 B2 Number	: xxxx
BRI2 B2 Number	: xxxx	BRI10 B1 Number	: xxxx
BRI3 B1 Number	: xxxx	BRI10 B2 Number	: xxxx
BRI3 B2 Number	: xxxx	BRI11 B1 Number	: xxxx
BRI4 B1 Number	: xxxx	BRI11 B2 Number	: xxxx
BRI4 B2 Number	: xxxx	BRI12 B1 Number	: xxxx
BRI5 B1 Number	: xxxx	BRI12 B2 Number	: xxxx
BRI5 B2 Number	: xxxx	BRI13 B1 Number	: xxxx
BRI6 B1 Number	: xxxx	BRI13 B2 Number	: xxxx
BRI6 B2 Number	: xxxx	BRI14 B1 Number	: xxxx
BRI7 B1 Number	: xxxx	BRI14 B2 Number	: xxxx
BRI7 B2 Number	: xxxx	BRI15 B1 Number	: xxxx
BRI8 B1 Number	: xxxx	BRI15 B2 Number	: xxxx

Figure 24 BRI Telephone Number Setup Menu

To make a call simply dial the telephone number of the relevant port and B channel. Whenever Multiple Subscriber Numbering (MSN) is enabled (see Software Setup Menu/Numbering System Option) the last digit (last two digits for a PRI) in the telephone number is (are) treated as a wildcard, i.e. if Port 1 B1 Number is set to 384710 and you dial 384716 a connection will be made to BRI1 B1. If Auxiliary Working is enabled all B channels on an interface use the same telephone number but only one number is allowed. Direct Dialling In (DDI) works in exactly the same way as MSN.

A series of failure numbers are also defined. If you dial any of these numbers the call is rejected with a cause value defined by the failure mode, i.e. calling the User Busy number will cause the call to be rejected with cause value 17.

A number is defined for test tones. Dialling this number will force the **MINIAMT** to send a PCM tone (A law or law) on the B channel. The tone frequency and power level are adjusted in the Hardware Setup Menu. Note that silence, dial tone, busy tone, and error tone can also be sent.

Introduction

Before the analyser can be used it must be configured as explained in Chapter 2. The information is repeated here for convenience.

On selecting the analyser setup option from the main menu the screen of figure 25 is displayed.

```
Analyser Setup

Analyser Time          nn:nn:nn dd/mm/yy
Layer 1 Hardware      xxxx
Layer 2 Data Link     xxxx
Layer 3 Call Control  xxxx
X.25 D Channel        xxxx
Channel Filter        xxxx
Call Reference Filter  xxxx
Analyser Specification xxxx
Activate Analyser     xxxx
```

Figure 25 Analyser Setup Menu

This screen defines how the protocol analyser option operates.

The time stamp on the analyser display can be changed to the current time rather than elapsed time since power up.

The analyser will report activity at layers 1, 2 and 3. Select the reporting level required at each layer by moving to the particular option and pressing <space>. The reporting levels available are:-

- Inactive - no reporting of any activity.
- Hex Display - Messages are displayed as hex digits.
- ASCII Short Display – messages are displayed in a shortened text form.
- ASCII Long Display – messages are displayed in text form and all the information elements are decoded and displayed.

You can also select channel filtering. If selected, reporting will only take place on the channels selected using this option.

A call reference filter can also be set up. To use this facility move to the Call Reference field and press <enter>. You are now prompted to enter a call reference value. Once entered only calls having this call reference will be reported at layer 3, layers 1 and 2 being unaffected.

You may also select the decoding of messages which are defined for a particular ISDN network. The networks currently supported are CCITT (general purpose), BTNR191/BT ETSI (UK), AT&T 5ESS (USA), NT DMS100 (USA), National ISDN 1 (USA), 1TR6 (Germany) and VN2/3 (France), ETSI (Europe), NTT (Japan).

Enter analyser mode by setting Activate Analyser to Yes and pressing <enter>. To exit analyser mode press <esc>.

Information Provided at Layer 1

A typical display of a layer 1 message is shown below.

```
23: Ch 1 L1 STATE = Activated
    00:01:75:30.271
```

The information presented is outlined below.

Sequence Number

Each message has a unique sequence number so that old messages can be easily located.

Channel Number

The channel number (e.g. BRI1, BRI2, PRI1, PRI2 etc.) on which the event occurred.

Layer Number

The layer on which the event is being reported.

ANALYSER OPERATION

State	The new state of the physical layer e.g. Activated.
Timestamp	The time that the message was recorded. The timestamp has the form dd:hh:mm:ss.nnn where dd represents days, hh hours, mm minutes, ss seconds and nnn milliseconds. Note that layer 1 messages are generated only if a change occurs in the state of the physical link.
Information Provided at Layer 2	A typical display of a short ASCII layer 2 message is shown below. <pre>23: TE Ch 2 L2 00:01:75:30.271 SAPI= 0, TEI= 40, C/R= 0, P/F=1, TYPE= SABME</pre> The information presented is outlined below.
Sequence Number	Each message has a unique number so that old messages can be easily located.
Originator	This field reports which side generated the message, TE for terminal generated messages and NT for network generated messages.
Channel Number	The channel number (e.g. BR11, BR12, PR11, PR12 etc.) on which the event occurred.
Layer Number	The layer on which the event is being reported.
Timestamp	The time that the message was generated (NT message) or received (TE message). The timestamp has the form dd:hh:mm:ss.nnn where dd represents days, hh hours, mm minutes, ss seconds and nnn milliseconds.
Service Access Point Identifier*	
Terminal Endpoint Identifier*	
Command / Response Bit*	
Poll / Final Bit*	
Type*	The message type, being one of I, RR, RNR, REJ, SABME, DM, UI, DISC, UA, FRMR, XID. A typical display of a long ASCII layer 2 message is shown below. <pre>23: TE Ch 2 L2 00:01:75:30.271 SAPI= 0, TEI= 40, C/R= 0, P/F=1, TYPE= INFO N(R)= 1, N(s)= 1</pre> The following information has been added:-
Send Sequence Number N(s)*	
Receive Sequence Number N(r)*	Layer 2 management transactions may also be decoded in long form messages. A typical decode follows. <pre>23: TE Ch 2 L2 00:01:75:30.271 SAPI= 0, TEI= 40, C/R= 0, P/F=1, TYPE= UI MEI= 15, Ri= 7FCD, MSG TYPE= ID Request, Ai= 0</pre> The following information has been added:-
Management Entity Identifier*	
Reference Number (Ri)*	
Management Message Type*	One of ID Request, ID Assigned, ID Denied, ID Check Request, ID Check Response, ID Remove, ID Verify.

Action Indicator* Only Information and certain Unnumbered Information messages at layer 2 include layer 3 messages.

A typical display of a hex layer 2 message is shown below.

```
23: TE Ch 2 L2          00:01:75:30.271
02 81 00 02 41 01 81 0D 18 01 89
```

The information contained in the message is not decoded but simply displayed as hex octets.

Fields marked with * are explained further in CCITT Q.921 Digital Subscriber Signalling System No 1, Data Link Layer.

Information Provided at Layer 3

A typical display of a short ASCII layer 3 message is shown below.

```
23: TE Ch 1 L3          00:01:75:30.271
PD= 65, LEN= 1, FLAG= Orig, CALL REF= 3, TYPE= SETUP
```

The information presented is outlined below:-

Sequence Number Each message has a unique sequence number so that old messages can be easily located.

Originator This field reports which side generated the message, TE for terminal generated and NT for network generated.

Channel Number The channel number (e.g. 1, 2 for B1 and B2 and 16, 17 for P1 and P2) on which the event occurred.

Layer Number The layer on which the event is being reported.

Timestamp The time that the message was generated (NT message) or received (TE message). The timestamp has the form dd:hh:mm:ss.nnn where dd represents days, hh hours, mm minutes, ss seconds and nnn milliseconds.

Protocol Discriminator*

Call Reference* The call reference consists of three parts, the Length of the call reference, the Value of the call reference and the Originator of the call reference.

Message Type* One of the Q.931 supported messages, or network specific message.

A typical display of a long ASCII layer 3 message is shown below.

```
23: TE Ch 1 L3          00:01:75:30.271
PD = 65, LEN = 1, FLAG = Orig, CALL REF = 3, TYPE = SETUP
CALLING PARTY NUMBER:0 LENGTH = 7
TYPE = Unknown PLAN = ISDN / Telephony NUMBER = `234231`
CALLED PARTY NUMBER:0 LENGTH = 7
TYPE = Unknown PLAN = ISDN / Telephony NUMBER = `384020`
```

In the long ASCII message, decode all the information elements contained in the message are decoded. Information elements are separated by a blank line, the information element name together with relevant codeset and length appears as a heading above each information element decode and the decoded information is indented by 1 space.

ANALYSER OPERATION

A typical display of a hex layer 3 message is shown below.

```
23: TE Ch 2 L2          00:01:75:30.271
41 01 81 0D 18 01 89
```

The information contained in the message is not decoded but simply displayed as hex octets.

X.25 D Channel None
Hex
ASCII Short Display
ASCII Long Display

For more information on * marked fields, messages and information elements refer to CCITT Q.931 Digital Subscriber Signaling System No 1, Network Layer.

Analyser Commands

As soon as you enter analyser mode, stored messages (if there are any) are displayed in accordance with the analyser options selected. You may enter <esc> to exit analyser mode, change the decode options and enter analyser mode again without losing any messages. The options available are:-

- <m> - Manual Mode** The analyser enters manual mode. Automatic display of incoming messages is stopped and you can review the messages in the message buffer. Pressing M again will leave manual mode.
- <home> or - Go to First Message** Will display messages starting at the oldest message in the buffer. This command works in manual and automatic modes.
- <end> or <e> - Go to Last Message** Will go to the last message in the buffer and display any new messages which arrive. This command works in manual and automatic modes.
- <up> or <u> - Review Previous Message** Will display the message which arrived just before the last message displayed. This command works only in manual mode.
- <down> or <d> - Go to Next Message** Will display the message which arrived just after the last message displayed. This command works only in manual mode.
- <c> - Clear Buffer** Will remove all messages from the buffer. This command works in manual and automatic modes.
- <h> - Pause Display** Will pause a scrolling display. Pressing <h> will start the display scrolling again.

Note that whenever an attempt is made to move to a message beyond the start or end of the message buffer a beep will be sent to the terminal.

Introduction	This section seeks to provide some guidance on solving common problems encountered in using the MINIAMT .
Changing a parameter on the MINIAMT forced it to stop operating	<p>Changing parameters on the MINIAMT may cause the unit to change operating modes and appear to stop functioning.</p> <p>To recover from this condition reload the factory defaults. When the MINIAMT powers up the configuration LED's will light for about 1 second. During this period if the MINIAMT receives a <ctrl-c> character it will reload the defaults. The MINIAMT defaults to 19200 baud, 2 stop bits, 8 data bits and no parity during this period.</p>
Terminal will not activate at layer 1 (i.e. P LED does not illuminate)	<p>If the P LED does not illuminate then the physical connection between the terminal and the MINIAMT is not functioning. Check first that the terminal is connected to the correct interface type. The "Copyright Screen" displays the type of interfacing installed. Or check the settings in the Hardware Setup Menu. Switch on the BRI power feeding. If this does not help switch power operation between normal and restricted if the terminal is connected to an S₀ BRI.</p> <p>For US originating products with U interfaces then the U interface power should be set to Sealing. To power NT-1s the U interface power should be set to Normal. Be careful when switching the U interface to Non-Sealing power as products intended to be connected to a current limited U interface may be damaged by the non current limited power in Non-Sealing mode (e.g. Motorola Bitsurfer).</p>
Terminal will not answer a call	<p>Firstly check that the call is actually being routed to the called terminal as expected. To do this dial the number of the called terminal and check that one of the B channel LEDs illuminate. If the terminal responds by activating the ISDN line (P LED illuminates) and by starting up layer 2 (D LED illuminates) then the terminal has received the call and is not answering for a specific reason (e.g. incompatible Bearer Capability, wrong Calling Party Number, wrong Called Party Number etc).</p> <p>If neither P nor D LED illuminate then the terminal may be faulty or else refer to the guidance notes for section entitled "Terminal will not activate at layer 1".</p> <p>If the protocol analyser option is available set it to display the layer 3 messages. The called terminal may send DISCONNECT, RELEASE or RELEASE COMPLETE with a cause value indicating the problem.</p> <p>A potential problem may be that called terminal and calling terminal do not support the same bearer capability in which case the called terminal will send RELEASE COMPLETE with a cause "Incompatible Destination". Another possibility is that the called terminal is expecting a Called Party Number or Calling Party Number information element in the SETUP message. Turn on these options in the Software Setup Menu and ensure that the called terminal is programmed accordingly. Conversely the terminal may be refusing the call because a called party number has been supplied but it is programmed for a different number.</p> <p>It is also necessary that both terminals are running the same protocols. Most protocols (not 1TR6) will work with the basic CCITT network supplied on the MINIAMT but may have reduced functionality.</p>

Another possibility is that the terminal requires a Subaddress. Switch on Called Party Subaddress and Calling Party Subaddress in the Software Setup Menu.

For terminals based on NAT/AT&T/DMS protocols the correct endpoint ID at layer 3 must be used. If this is the source of the problem it may be necessary to restart both **MINIAMT** and terminal to ensure SPID initialisation is successfully completed.

Another problem may be the number of digits used in the Called Party Number information element. Terminals from North America usually have a 7 digit called party number and the terminals may not accept a 6 digit number which is the default on the **MINIAMT**. To get around this problem change the numbering scheme of the **MINIAMT**.

Other NAT/AT&T/DMS voice band terminals may require a Call Appearance information element to be sent in the Setup message to the terminal. Set this up as defined in section NAT/AT&T/DMS network personality module.

Terminal can dial only one number to set up two calls

If the calling terminal can be programmed with one telephone number to dial two calls then the **MINIAMT** Numbering System option must be switched from Normal to Auxiliary Working, MSN or DDI. In Normal operation each B channel has a separate telephone number. To call B1 on interface 2 dial 384720 and to dial B2 on interface 2 dial 384730 (if using the default numbering system).

The other possibilities are:-

Auxiliary Working

One number is assigned per interface. Dialling this number can route a call to B1 on the called interface. Dialling this number again will route a call to B2 on the called interface, and so on. No other numbers will be accepted.

Multiple Subscriber Numbering (MSN)

A base number is assigned to an interface. An interface can be called by dialling any of ten numbers referenced to the base by changing the last digit (two digits for PRI interface). For example using MSN and the default numbering system interface B1 will respond to all numbers in the range 384700-384709. The Called Party Number information element is always included in the SETUP message sent to the terminal.

Direct Dialling In (DDI)

This works in exactly the same way as MSN except that the called party number is sent to the called terminal if the Called Party Number option is enabled in the Software Setup Menu.

Windows Terminal Emulation will not move up and down menus

If using the Windows terminal emulation program in its default configuration the <up> and <down> arrow keys will not function with the menus. This is because Windows uses these keys and does not pass any characters to the **MINIAMT**. In most cases <up> can be replaced with the 'u' or 'U' key and <down> by the 'd' or 'D' key.

Alternatively change the operation of Windows by clicking on the Settings and Terminal Preferences options and then disable the "Use

Function, Arrow and Ctrl Keys for Windows” option.

No communication with terminal port

Communication failure can occur for several reasons. Firstly check that the **MINIAMT** is powering up properly. The power LED should illuminate and the correct power up sequence should be observed (see Chapter 1). In particular the internal relays should switch on power up and this should be audible.

Next check the cable. The **MINIAMT** provides a DCE connection so a cable with a 9 way D male to 9 way D female connected pin for pin will connect the **MINIAMT** to a PC.

If the cable is correct then check the communication parameters. The default is 19200 baud, no parity, 2 stop bits and 8 data bits. If the parameters have changed then during the power up sequence type <ctrl-c> at the keyboard of the terminal (terminal set for default communications parameters) and all the factory defaults should be restored (see Chapter 1). Another possibility is that the **MINIAMT** is not powering up properly because the network personality module installed in the **MINIAMT** will not start up and the LEDs on the front panel may flash. In this case see section entitled “Network Personality Module will not work”.

Parameters are lost when Network Personality Module is changed

If more than one type of software is being used, e.g. CCITT ROM, ETSI Network Personality Module, USA Network Personality Module, the parameter table may be of a different length. Hence when a different type is used the settings may be considered invalid and reset to that software’s default.

The solution is to upgrade all the software types to the same version number.

Overlap receiving will not work

Overlap Sending/Receiving is available on the **MINIAMT** and operates as follows.

(a) Overlap Sending used to dial the call

Here the calling terminal sends a SETUP message to the **MINIAMT** without any Called Party Number information. The **MINIAMT** will respond with SETUP ACK and the calling terminal can now dial the call by sending the Called Party Number as digits in INFO messages. Once the **MINIAMT** has received enough digits to route the call the **MINIAMT** will send SETUP to the called terminal but will not include the Sending Complete information element. If the called terminal responds with CALL PROCEEDING, ALERTING or CONNECT then the **MINIAMT** will send CALL PROCEEDING to the calling terminal followed by ALERTING or CONNECT as appropriate. The called terminal does not support overlap receiving in this case. However if the called terminal sends SETUP ACK then the **MINIAMT** will continue to accept digits in INFO messages from the calling terminal and will pass these to the called terminal. Once the called terminal has received enough digits to route the call internally it will send CALL PROCEEDING, ALERTING or CONNECT to the **MINIAMT** and the **MINIAMT** will send CALL PROCEEDING to the calling terminal followed by ALERTING or CONNECT as appropriate.

(b) Enbloc dialling used to dial the call

Here the calling terminal sends a SETUP containing the Called Party Number information required to route the call. If the Called

Party Number option is enabled in the Software Setup Menu then all of the enbloc digits are forwarded to the called terminal. Otherwise only the overlap extension digits (i.e. the full dialled number less the digits used to route the call e.g. 384700 for BRI 1) are sent in the Called Party Number information element.

(c) Enbloc Dialling used to dial the call with an incomplete number

This is a combination of (a) and (b). The SETUP message contains some of the Called Party Number information to the **MINIAMT**. If the Called Party Number option is enabled in the Software Setup Menu then all of the enbloc digits are forwarded. If not only the overlap extension digits are forwarded. The terminal responds with SETUP ACK. The calling terminal supplies the remaining digits in INFO messages until enough digits are sent to start routing. Operation at the called terminal is the same as before.

However dialling a Called Party Number (i.e. base number plus overlap extension digits) ending in '0' will disable overlap receiving at the called terminal and the SETUP message sent by the **MINIAMT** to the called terminal will include a Sending Complete information element. The called terminal must respond with CALL PROCEEDING, ALERTING or CONNECT without waiting for more digits from the **MINIAMT**.

If overlap receiving does not work check the called party number does not end in '0'. To change this reprogram the base number using the Telephone Number Setup Menu or enable DDI / MSN which will provide a range of 10 numbers with the last digit being 'don't care'.

It is also possible to completely disable Overlap Receiving for all numbers by setting the Enable Overlap Sending / Receiving option in the Software Setup Menu to No. All SETUP messages sent to the called terminal will now have the Sending Complete information element included.

It is worth checking if the terminal (say PABX) requires point-point operation at the **MINIAMT** to function in overlap receiving. If so the interface into which the terminal has been plugged requires setting to point-point mode (see Software Setup/Software Setup Screen).

Changing parameters had no effect on operation of MINIAMT

Some parameters once changed will not effect the operation of the unit immediately. If the **MINIAMT** does not seem to be operating properly use the <esc> key to go back to the main power up Copyright Screen. If this does not work then switch the **MINIAMT** off and on again. Please inform Digital Engineering.

Protocol Analyser will not run

Firstly check that you have purchased this option. If not you will still be able to enter the protocol analyser but no messages will be decoded.

To enter the protocol analyser move to the Activate Analyser field and switch it to Yes. Then press <enter> to start the analyser.

If this does not work then check the analyser option i.e. at least one level of decode must be enabled and the interface to which the terminal is connected must be enabled. If you are not sure set decode for layers 1, 2 and 3 on all interface ports.

FAULT FINDING

If there is still no output check that the correct protocol analyser specification (i.e. network type) is being used for the terminal.

Network Personality Module will not work

The most likely cause of the Network Personality Module not functioning is that the serial number programmed into the module does not match the **MINIAMT** serial number on which it is running.

Note that the network support Network Personality Modules will run only on the MINIAMT for which they were purchased.

If the Network Personality Module has just been reprogrammed then it is possible that it was not reprogrammed correctly. Try programming the Network Personality Module again.

Garbage appears on screen everytime I power on

The most likely reason for this is – the simulator and software communications package eg. Hyperterminal are at different baud rates. To rectify this you can either go through the various baud rates on the comms package until the correct one is found, or do a Factory Reset, ensuring you use a baud rate of 19200 on the Comms package when typing Control-C.

Introduction

This section outlines the differences in operation of the **MINIAMT** between the CCITT emulation provided on the standard **MINIAMT** and the ETSI Network Personality Module.

Figure 26 shows the Software Setup Menu when simulating an ETSI network.

```
Software Setup

Network Type                               ETSI
Drop Layer 2 if No Call Active             xxxx
Drop Layer 1 if Layer 2 Inactive           xxxx
Drop TEI if Layer 1 Inactive               xxxx
Number of B Channels per PRI               n
Use Service Profile IDs (SPIDs)           xxxx
Allow Overlap Sending/Receiving            xxxx
Numbering System Option                    xxxx
Called Party Number (DDI/MSN)              xxxx
Calling Party Number (CLIP)                xxxx
Called Party Subaddressing (SUB)           xxxx
Calling Party Subaddressing (SUB)          xxxx
Higher Level Compatibility                  xxxx
Lower Level Compatibility                   xxxx
Supplementary Services                      xxxx
```

Figure 26 ETSI Software Setup Menu

Supplementary Services have been added to the menu. To access the supplementary services menu move to the Supplementary Services field and type <enter>.

Figure 27 overleaf shows the ETSI Supplementary Services Setup Menu.

```
ETSI Supplementary Services Setup

Connected Party Number (COLP)              xxxx
Advice of Charge (AOC)                     xxxx
Call Waiting (CW)                           xxxx
Call Hold (HOLD)                             xxxx
Explicit Call Transfer (ECT)                 xxxx
Call Diversion (CFU/CFB/CFNR/CD)           xxxx
Malicious Call Identification                xxxx
Three-Party Calling (3PTY)                  xxxx
Supplementary Services Setup
```

Figure 27 ETSI Supplementary Service Setup Menu

The services offered are as follows:-

Connected Party Number

The Connected Party Number information element is sent to the calling terminal as part of the CONNECT message. If the called terminal supplies a Connected Party Number this is sent to the calling party otherwise the **MINIAMT** will generate one.

If switched to Yes pressing <enter> when on this field displays the screen of figure 28.

```
Connected Party Number Setup

Connected Party Number (COLP/COLR)         xxxx
Type                                         xxxx
Plan                                         xxxx
Screening                                    xxxx
Presentation                                 xxxx
```

Figure 28 Connected Party Number Setup Menu

Connected Party Number field manipulation is accomplished in the same way as for Calling Party Number and you should refer to Chapter 2 Software Setup/Calling Party Number for further information.

Advice of Charge

The **MINIAMT** sends Advice of Charge information to the calling terminal. Various options are available:-

- CEPT Total - each AOC message shows total charge.
- CEPT Incremental – each AOC message adds a number of units to the total bill (above options can be chosen using codeset 5 or codeset 6).
- ETSI AOC-D - AOC messages show cost of call during the call using AOC-D messages.
- ETSI AOC-E - AOC messages show cost of call at the end of the call using AOC-E messages
- Currency or Units - AOC information can be sent as currency or units
- Currency Identifier – Three letters which will be sent with the AOC message when using currency.

If you press <enter>. When on this field the menu of figure 29 is displayed.

Billing Parameters Setup

Time between billing messages (secs)	5
Amount to be added each time	1
CEPT Total (Codeset 5)	No
CEPT Incremental (Codeset 5)	No
CEPT Total (Codeset 6)	No
CEPT Incremental (Codeset 6)	No
CEPT AOC Style	Italtel (Italy)
ETSI AOC-D ASN1	No
ETSI AOC-E ASN1	No
Currency or Units	Units
Currency Identifier	EUR

Figure 29 Advice of Charge Setup Menu

The amount to be added each time is the number of units or currency amount to be added when each AOC message is sent. The time between messages defines the number of seconds between each AOC message. The AOC style refers to CEPT messages only and selects the format used by various telephone companies.

Call Waiting

Call is offered to the BRI interface even if both B channels are busy. If disabled calling user is returned busy immediately.

Call Hold

Call can be put on hold in the **MINIAMT** using ETSI call hold (HOLD) protocol.

Explicit Call Transfer

Calling terminal sets up a call and puts it on hold. Calling terminal sets up a second call. On activating Explicit Call Transfer the calling terminal is disconnected from both calls and these calls are connected together.

Call Hold

Call can be put on hold in the **MINIAMT** using ETSI call hold (HOLD) protocol.

Explicit Call Transfer

Calling terminal sets up a call and puts it on hold. Calling terminal sets up a second call. On activating Explicit Call Transfer the calling terminal is disconnected from both calls and these calls are connected together.

Call Diversion

Terminal sets may send messages to the **MINIAMT** to cause it to forward an incoming call to another number under certain conditions. Supported facilities include CFU (call forward unconditional), CFB (call forward busy), CFNR (call forward no response) and CD (call deflection).

If you press <enter> when on this field the menu of figure 30 is displayed.

ETSI Call Forwarding Setup

```
Served User Notified of Diversion          xx
Calling User Notified of Diversion          xx
Served User Notified if Active              xx
Diverting No. Released to Diverted-to-User xx

Call Forwarding Unconditional              (CFU)  xx
Call Forwarding User Busy                  (CFB)  xx
Call Forwarding User Busy                  (CFNR) xx
Call Diversion                             (CD)   xx
```

Figure 30 ETSI Call Forwarding Setup Menu

This allows you to set up the call diversion parameters according to the information provided in ETS 300 207-1 Page 12.

Main Differences Between CCITT and ETSI

The main differences between CCITT and ETSI are:-

- The CONNECT message includes the CEPT Advice of Charge information element (if enabled) and the Date/Time information element.
- Advice of Charge (ETSI or CEPT option) is supplied in INFO or FACILITY messages during the call.
- Date/Time information element does not include seconds.

A subset of the CCITT Bearer Capability information element is allowed in the SETUP message sent to the network. The most notable restrictions are :-

- law encoding is not a valid layer 1 protocol in the Bearer Capability information element.
- V.120 rate adaptation is not a valid layer 1 protocol in the Bearer Capability information element.
- Keypad information element is not supported for sending the Called Party Number.
- Supplementary services available only for ETSI network.

Introduction

This section outlines the differences in operation of the **MINIAMT** between the CCITT emulation provided on the standard **MINIAMT** and the BT Network Personality Module.

Figure 31 shows the Software Setup Menu when simulating a BT network.

```
Software Setup

Network Type                BTNR191
Drop Layer 2 if No Call Active      xxxx
Drop Layer 1 if Layer 2 Inactive    xxxx
Drop TEI if Layer 1 Inactive        xxxx
Number of B Channels per PRI        n
Use Service Profile IDs (SPIDs)     xxxx
Allow Overlap Sending/Receiving     xxxx
Numbering System Option             xxxx
Called Party Number                 xxxx
Calling Party Number                 xxxx
Called Party Subaddressing          xxxx
Voice is End-to-End ISDN            xxxx
```

Figure 31 BT Software Setup Menu

The network type can be changed from BTNR191 (original BT ISDN Network) and BTETSI (new ISDN Network).

The BTNR191 network support defines a new parameter in the menu. Switching "Voice is End-to-End ISDN" to "On" changes some of the display messages used by the MINIAMT.

Main Differences Between CCITT and BT

The main differences between CCITT and BT are:-

- In the RELEASE COMPLETE message a cause value of 21 has priority over other cause values whereas in CCITT a cause of 18 has priority.

There are many display messages on the BT network not found in the CCITT specification. The most commonly encountered messages are:-

- *03*1#
*86*number string#
*AA*NUMBER UNOBTAINABLE# or *EC*00#
*AA*CLEARED# or *EC*30#
*AA*NETWORK BUSY# or *EC*07#
*AA*NUMBER BUSY# or *EC*08#
*AA*INCOMPATIBLE TERMINAL# or *EC*13#
*AA*ERROR# or *EC*15#
*AA*NO REPLY# or *EC*1f#
*AA*NOT SUITABLE FOR DATA#
- A CALL PROCEEDING message in response to an outgoing SETUP message causes ALERTING to be sent to the calling party.
- SETUP ACKNOWLEDGE is sent by the network in response to a SETUP message even if the SETUP message contained the complete called party number.
- A subset of the CCITT Bearer Capability information element is allowed (see ETSI support card for more details).
- The Calling Party Number information element has a maximum length of 15 digits.

- Progress Indicator information element location field is always “network beyond interworking type”.
- Calling Party Number and Called Party Number information element type and plan field are always “unknown”.
- In MSN operation only the last digit of the Called Party Number is sent to the called terminal in the SETUP message.
- Generation of a Subaddress by concatenating the Called Party Number digits is supported in BT (e.g. dial enbloc 384000#123 generates a Called Party Subaddress of ‘123’).

Introduction

This section outlines the differences in operation of the **MINIAMT** between the CCITT emulation provided on the standard **MINIAMT** and the VN2/3 Networking Personality Module.

Main Differences Between CCITT and VN2/3

The main differences are:-

- VN2/3 adds a new information element to the SETUP message "Mode de fonctionnement d'usager" in codeset 6. This is mandatory in the SETUP message in both user→network and network→user directions.
- In the user→network SETUP message the Higher Layer Compatibility information element is mandatory.
- The Sending Complete information element is not supported in VN3.

A subset of the CCITT Bearer Capability information element is allowed in the SETUP message sent to the network. The most notable restrictions are:-

- Coding Standard is fixed at CCITT.
- Information Transfer Capability is Speech, 3.1 kHz Audio or Unrestricted Digital.
- Information Transfer Rate is 64k only.
- Layer 1 protocol is G.711 A law or H.221/H.242 (G.722/G.725).
- A new optional information element "Facility d'usager a usager" in codeset 6 is defined. The **MINIAMT** analyser decodes this although the **MINIAMT** does not generate it.
- Octet 3a (Recommendation) is not supported in the Cause information element.
- Keypad information element is not supported.

Introduction

This section outlines the differences in operation of the **MINIAMT** between the CCITT emulation provided on the standard **MINIAMT** and the 1TR6 Network Personality Module.

Figure 32 shows the Software Setup Menu when simulating a 1TR6 network.

```
Software Setup

Drop Layer 2 if No Call Active      xxxx
Drop Layer 1 if Layer 2 Inactive    xxxx
Drop TEI if Layer 1 Inactive        xxxx
Number of B Channels per PRI        n
Use Service Profile IDs (SPIDs)     xxxx
Allow Overlap Sending/Receiving     xxxx
Numbering System Option              xxxx
Call Waiting                         xxxx
Billing                              xxxx
Additional Transmission Attributes   xxxx
Called User Status                   xxxx
Date/Time                            xxxx
```

Figure 32 1TR6 Software Setup Menu

Main Differences Between CCITT and 1TR6

The German 1TR6 network is very different to Q.931 based networks such as ETSI. To understand all of the differences refer to the 1TR6 specification. The **MINIAMT** does not support all of the differences provided by 1TR6 but the following notes outline the main differences between the standard network and 1TR6. 1TR6 does not use the normal Q.931 protocol discriminator (i.e. = 8) but defines two new ones N0 (=1) and N1 (=65). Some messages are valid only with N0 and some only with N1.

The following Q.931 messages are not supported:-

- PROGRESS
- RESTART
- RESTART ACKNOWLEDGE

The following N0 messages are additional to Q.931:-

- REGISTER INDICATION
- CANCEL INDICATION
- FACILITY STATUS
- STATUS ACKNOWLEDGE
- STATUS REJECT
- FACILITY INFORMATION
- INFORMATION ACKNOWLEDGE
- INFORMATION REJECT
- CLOSE
- CLOSE ACKNOWLEDGE

None of these messages are supported by the **MINIAMT**.

The following N1 messages are additional to Q.931:-

- DETACH
- CANCEL ACKNOWLEDGE
- CANCEL REJECT
- FACILITY ACKNOWLEDGE
- FACILITY CANCEL
- FACILITY REGISTER
- FACILITY REJECT
- REGISTER ACKNOWLEDGE
- REGISTER REJECT

None of these messages are supported by the **MINIAMT**.

The following messages (supported by the **MINIAMT**) are common to 1TR6 and Q.931 but their numeric value is different.

- INFORMATION (1TR6 = 0 x 6d)
- STATUS (1TR6 = 0 x 63)

1TR6 also defines additional information elements not found in Q.931. These are mostly found in codeset 6:-

- Service Indicator
- Charging Information
- Date
- Facility Select
- Status of Facilities
- Status of Called User
- Additional Transmission Attributes

The only non-Q.931 message in codeset 0 is Connected Address.

The following Q.931 information elements are not supported in 1TR6:-

- Segmented Message
- Bearer Capability
- Call State
- Facility
- Progress Indicator
- Notification Indicator
- Date / Time
- Signal
- Switchhook
- Feature Activation
- Feature Indication
- Calling Party Sub-address
- Called Party Sub-address
- Transit Network Selection
- Restart Indicator
- Low Layer Compatibility
- High Layer Compatibility

Where information elements are supported by both Q.931 and 1TR6 they may have a different structure, e.g. the Cause information element supports different cause values in 1TR6 and Q.931.

Because the Bearer Capability information element is not supported 1TR6 uses the Service Indicator information element in its place. The 1TR6 Date information element is mandatory in the CONNECT, CONNECT ACKNOWLEDGE, DISCONNECT, and RELEASE messages from the **MINIAMT**.

The 1TR6 Called User Status information element is mandatory in the ALERT message from the **MINIAMT**.

The following information elements are used by the **MINIAMT** and can be enabled in the Software Setup menu as shown in figure 33:-

```
Charging Information
Additional Transmission Attributes
Called User Status
Date
```

Figure 33 Software Setup Menu

The **MINIAMT** also allows the generation of a call waiting SETUP message.

The NTT Called User Status information element is mandatory in the ALERT message from the **MINIAMT**.

The following information elements which are not supported in Q.931 are available in NTT using codeset 6:-

- Advice of Charge
- Blocking Channel ID

Introduction

This section outlines the differences in operation of the **MINIAMT** between the CCITT emulation provided on the standard **MINIAMT** and the USA Network Personality Module.

The USA Network Personality Module covers three switch variants found in the USA i.e. Bellcore NAT-1, Nortel DMS100 and AT&T 5ESS.

Main Differences Between CCITT and Bellcore National ISDN-1

National ISDN-1 (NAT-1) defines four new ISDN messages not found in Q.931. These are network specific messages (i.e. two octet) and are:-

- KEY HOLD
- KEY RELEASE
- KEY SETUP
- ACKNOWLEDGE

These are not used in the **MINIAMT**.

NAT-1 does not include the following Q.931 messages:-

- USER INFORMATION
- RESTART
- RESTART ACKNOWLEDGE
- SEGMENT
- CONGESTION CONTROL
- FACILITY

NAT-1 defines new information elements in codeset 0. These are:-

- Information Request
- Service Profile Identification
- Endpoint Identifier
- Information Rate
- End to End Transit Delay
- Transit Delay Selection and Identification
- Packet Layer Binary Parameters
- Packet Layer Window Size
- Packet Size
- Closed User Group
- Reverse Charging Information
- Redirection Number

The **MINIAMT** supports Service Profile Identification and Endpoint Identifier information elements.

NAT-1 does not support the following Q.931 information elements:-

- Segmented Message
- Call Identity
- Facility
- Network Specific Facilities
- Display

USA NETWORK PERSONALITY CARD

- Date / Time
- Switchhook
- Restart Indicator
- Sending Complete

NAT-1 offers the following information elements in codeset 6:-

- Redirection Sub-address
 - Redirection Number
- Call Appearance

In NAT-1 the signal information element is mandatory in the following network→user messages:-

- ALERTING
- RELEASE
- CONNECT ACKNOWLEDGE
- RELEASE
- RELEASE COMPLETE
- CALL PROCEEDING
- SETUP ACKNOWLEDGE
- DISCONNECT
- SETUP
- CONNECT

A subset of the CCITT Bearer Capability information element is allowed in the SETUP message sent to the network. The most notable restrictions are:-

- Information transfer capability is speech, unrestricted, 3.1kHz audio only.
- Transfer mode and rate is 64k, Packet mode.
- Layer 1 protocol is rate adapted, law.
- Rate is 56k.
- Layer 2 protocol is LAPD, LAPB.
- Layer 3 protocol is X.25.

Main Differences Between CCITT and Nortel DMS100

DMS-100 defines new ISDN messages not found in Q.931. These are network specific messages (i.e. two octet) and are:-

- KEY HOLD
- KEY RELEASE
- KEY SETUP
- KEY SETUP ACKNOWLEDGE
- RETRIEVE
- RETRIEVE ACKNOWLEDGE
- RETRIEVE REJECT
- HOLD
- HOLD ACKNOWLEDGE
- HOLD REJECT

These are not used in the **MINIAMT**.

DMS100 defines new information elements in codeset 0 which are:-

- Connected Number
- Redirecting Number
- Redirection Number

DMS100 defines new information elements in codeset 6 which are:-

- Protocol Version Control
- Closed User Group

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- Reverse Charging Indication
- Redirecting Subaddress
- Call Appearance

A subset of the CCITT Bearer Capability information element is allowed in the SETUP message sent to the network. The most notable restrictions are:-

- Information transfer capability is speech, unrestricted, 3.1kHz audio only.
- Transfer mode and rate is 64k, Packet mode.
- Layer 1 protocol is rate adapted, law.
- Rate is 56k.
- Layer 2 protocol is LAPD, LAPB.
- Layer 3 protocol is X.25.

The following differences are also noted:-

The Signal information element has additional values not defined in Q.931

User to User signalling is not supported in DMS100.

The Sending Complete information element is not supported in Q.931

Main Differences Between CCITT and AT&T 5ESS

This section to be defined

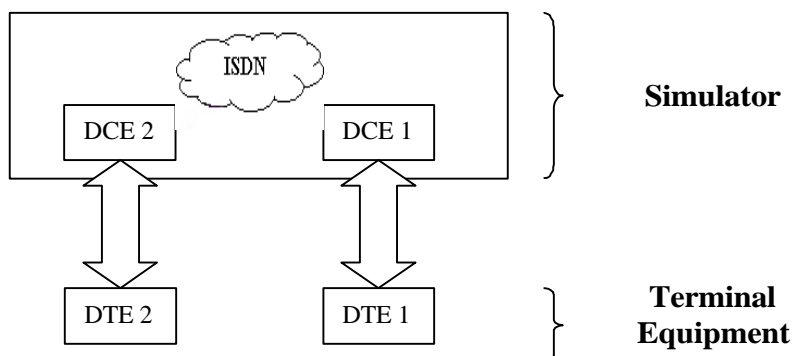
X.25 OPERATION

Purpose The aim of this section is to give users a guide to the setup involved when using the X.25 option on the ISDN-Simulator. The X.25 implementation was developed to aid customers demonstrating user X.25 TE equipment. The X.25 functionality on the MINIAMT is limited and may not be suitable for the development of customer equipment.

Example Setup

For the purpose of this example, An X.25 call will be placed from DTE 1 to DTE 2.

DTE 1 calls DCE 1
 Call is routed through the ISDN cloud
 DCE 2 call DTE 2



X.25 Setup Menu on the MINIAMT

Permanent Virtual Circuits (PVC's) – This is like a leased line connection, where a permanent connection is established between the two DTE's.

Switched Virtual Circuits (SVC's) – In this case the connection between the two DTE's is on a Temporary basis, and is only maintained for the duration of the call.

Parameters

Below is a list of the default values associated with the setup of the simulator (i.e. the DCE).

BRI1 PVC LLC	0 - Lowest Logical Channel (PVC)
BRI1 PVC HLC	0 - Highest Logical Channel (PVC)
BRI1 LOC	1 - Lowest Outgoing Channel (SVC)
BRI1 HOC	2 - Highest Outgoing Channel (SVC)
BRI1 LTC	3 - Lowest Two-way Channel (SVC)
BRI1 HTC	4 - Highest Two-way Channel (SVC)
BRI1 LIC	5 - Lowest Incoming Channel (SVC)
BRI1 HIC	6 - Highest Incoming Channel (SVC)
BRI1 TEI	1 - TEI Value to be used (Default 1)
BRI2 PVC LLC	0 - Lowest Logical Channel (PVC)
BRI2 PVC HLC	0 - Highest Logical Channel (PVC)
BRI2 LOC	1 - Lowest Outgoing Channel (SVC)
BRI2 HOC	2 - Highest Outgoing Channel (SVC)
BRI2 LTC	3 - Lowest Two-way Channel (SVC)
BRI2 HTC	4 - Highest Two-way Channel (SVC)
BRI2 LIC	5 - Lowest Incoming Channel (SVC)
BRI2 HIC	6 - Highest Incoming Channel (SVC)
BRI2 TEI	1 - TEI Value to be used (Default 1)

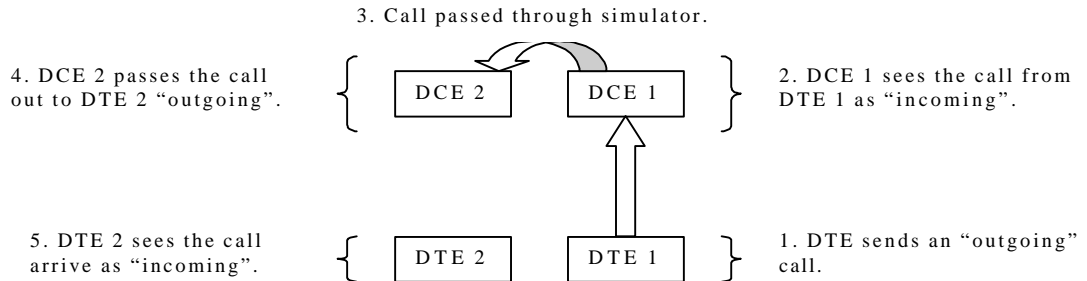
There should be similar options on the DTE, and it is important that the above settings within the simulator (i.e. DCE) match those of the DTE's. It is also worth noting that what is deemed as outgoing at

X.25 OPERATION

one side is deemed as incoming at the other.

To expand on this:

When placing a call from DTE 1 to DTE 2 the following happens.



The process is reversed for a call in the opposite direction (i.e. DTE 2 to DTE 1).

Logical channel Setup

Assuming that the simulator settings are not changed (highlighted in grey below), then the DTE settings will be as follows.

DTE	Channel
<i>Outgoing</i>	5 & 6
<i>Two-way</i>	3 & 4
<i>Incoming</i>	1 & 2

DCE	Channel
<i>Incoming</i>	5 & 6
<i>Two-way</i>	3 & 4
<i>Outgoing</i>	1 & 2

The Two-way channels are used as reserve logical channels, and as they are bi-directional they support both Incoming and Outgoing.

TEI Value

Pressing <Enter> can change the Terminal Endpoint Identifier. As default this value is set to "1".

Called Party Number

When using SVC's it is necessary to send the called party number, as the call is still using the ISDN network. However, depending upon the Terminal Equipment being used, this may be called one of the following.

1. Called Party Number
 2. Telephone number
 3. Address
- Etc.

Restarts

Whenever an X25 call is being set up, a RESTART message must be sent. Normally the DTE will do this, however, due to a generalisation in the specification, some DTE's do not have this capability. For this reason an option has been implemented for the simulator to send a RESTART on Layer 2 establishment.

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