

**emutel™|Virtuoso**

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V5 Local Exchange Simulator

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## INTRODUCTION

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- emutel™|Virtuoso** The emutel™|Virtuoso simulates a Central Office switch. Depending on which cards are inserted the switch can emulate V5.1, V5.2, basic rate ISDN, primary rate ISDN, or analogue telephone networks.
- A call on any bearer channel on any interface can be connected to any other bearer channel on any other interface.
- The setup and configuration of emutel™|Virtuoso is achieved via a Windows application program. A protocol analyser is available as a software option.
- The manual** This manual outlines how the emutel™|Virtuoso should be set up and how the network and terminal equipment are connected.

## PRODUCT SPECIFICATION

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<b>ISDN Connections</b>	emutel™  <b>Virtuoso</b> can simulate, basic rate ISDN on either an S <sub>0</sub> or U interface, analogue, primary rate ISDN on either E1 (S <sub>2m</sub> ) or T1, V5.1 and V5.2 on up to 8 E1 (S <sub>2m</sub> ) links.
<b>Terminal Port</b>	A V.24 port is provided allowing the connection of a PC for configuration and analysis of the unit.
<b>Ethernet Port</b>	An IEEE 802.3 Ethernet port is provided for connection to a local area network.  LEDs indicate (1) network present, (2) network activity.
<b>Power</b>	emutel™  <b>Virtuoso</b> is available in mains powered and dc powered versions. The mains version accepts a voltage of 110-240V AC (50-60Hz). The dc version accepts a voltage of -36V to -72V DC
<b>V5 Connections</b>	emutel™  <b>Virtuoso</b> can support up to 8 V5 interfaces running a combination of V5.1 and V5.2.  The number and type of V5 interfaces available to the user will be determined at time of purchase.
<b>Unpack emutel™ Virtuoso</b>	First unpack emutel™  <b>Virtuoso</b> and check for signs of damage in transit. If the unit or packaging is damaged this should be reported immediately to <b>arca technologies</b> .
<b>Take an Inventory</b>	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. <ul style="list-style-type: none"><li>◆ emutel™ <b>Virtuoso</b> V5 Local Exchange Simulator</li><li>◆ Cables for ISDN - RJ45-RJ45</li><li>◆ Mains Cable</li><li>◆ Terminal Cable DB9-DB9 (1 of)</li><li>◆ This Manual</li></ul>

## **PRODUCT SPECIFICATION**

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- Connect to a PC or terminal** Plug the terminal cable into the terminal connector on the controller card at the front of the unit and connect to a PC.
- (emutel<sup>TM</sup>**Virtuoso** default terminal settings are ANSI terminal compatible, 19200-baud, 8 data bits, no parity, 2 stop bits).
- Connect power** Plug the power cable into the rear of the unit and switch on. (emutel<sup>TM</sup>**Virtuoso** will work on 110V or 240V mains supply without adjustment).
- Connect terminal equipment** E1 links can be connected to the emutel<sup>TM</sup>**Virtuoso** using the RJ-45 cables provided. For V5.2, the Primary and Secondary links port are defined in the configuration file.

## QUICK REFERENCE GUIDE

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**Introduction** emutel™|Virtuoso consists of a chassis, mains or dc power supply, controller card and up to 2 line cards.

The controller card must be fitted in the first slot.

There are no user serviceable parts inside emutel™|Virtuoso. Removal of the case by unauthorised staff will result in a void of warranty.

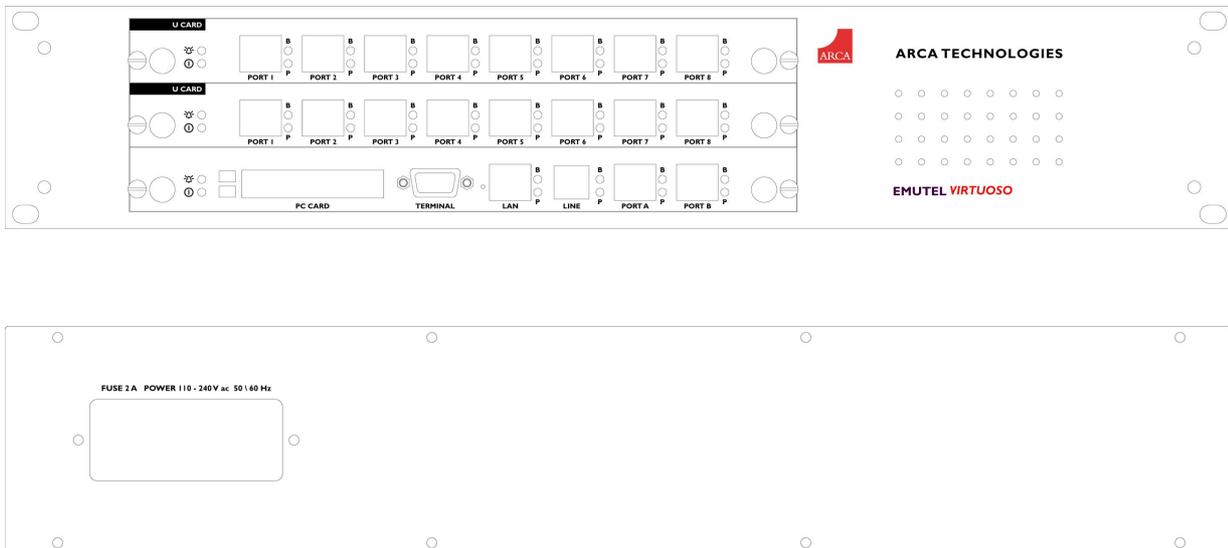


Figure 1 emutel™|Virtuoso front and rear panels

**Chassis** The chassis consists of a metal case and a back plane to accept the controller card, line cards and power supply.

## QUICK REFERENCE GUIDE

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### Mains Power supply

The mains power supply has a universal input suitable for 110V-240Vac/50-60Hz. Connection to any other source may result in the unit failing to comply with safety requirements.

Power should be supplied via an IEC mains lead (supplied).

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

### DC power supply

The dc power supply has 2 input connectors. Both accept a voltage of  $-36V$  to  $-72V$ . Power can be connected to either or both input connectors.

**NB the 0V connections on both connectors are common and are connected to the case. The 0V connection should be connected to earth.**



Figure 2 emutel™**Virtuoso** controller card

### Controller card

The controller card can feature 2 primary rate ports, 2 PC Card slots, modem, LAN port, terminal port and LEDs.

The terminal port is a V.24 compatible control port to which a PC running the application provided could be connected.

The LAN port is an IEEE 802.3 compatible Ethernet port. It allows emutel™**Virtuoso** to be controlled remotely via Telnet.

The Line port, which allows modem access, permits connection to a real line. This feature will be implemented at a later date.

## QUICK REFERENCE GUIDE

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Port 1 and port 2 are the pin-outs of the terminal. Ethernet, modem and PRI ports are given in an Appendix 2.

LEDs indicate power and alarm.

For each primary rate port the P LED is on when both physical link layer and data link layer are active. It flashes when only the physical link is active. The B LED is on when any B channel is in use.

For the Ethernet port the P LED indicates network present and the B LED indicates network activity.

For the modem port the P LED is on for off-hook and flashing for ringing. The B LED indicates data transfer.

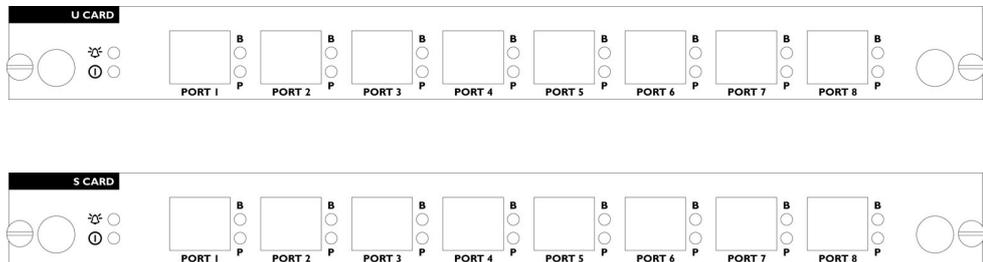


Figure 3 emuTel™ Virtuosio U card and S card

## QUICK REFERENCE GUIDE

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### U and S cards

The U and S cards feature 8 Basic Rate Ports and LEDs.

Ports 1-8 are BRI 1-8 if fitted in the first line card slot or BRI 9-16 if fitted in the second line card slot.

Pin-outs of the BRI interfaces are given in appendix 2.

LEDs indicate power and alarm.

For each port the P LED is on when both physical link layer and data link layer are active. It flashes when only the physical link is active. The B LED is on when any B channel is in use.

### Restoring default settings

When the unit is first switched on 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 emutel™|Virtuoso. If this occurs emutel™|Virtuoso will restore the factory defaults otherwise it will use the stored settings.

If a setting has been changed and emutel™|Virtuoso ceases to operate, powering up emutel™|Virtuoso, while holding down <ctrl-c> for the first 20 seconds, will restore a working configuration to emutel™|Virtuoso.

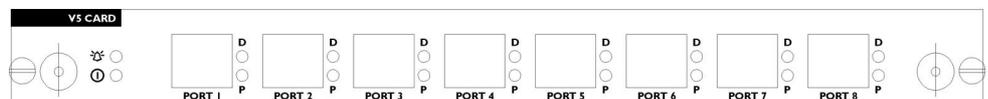


Figure 4 emutel™|Virtuoso V5 card

## **QUICK REFERENCE GUIDE**

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**V5CARD** The V5card features 8 E1 Ports and LEDs.

Pin-outs of the PRI interfaces are given in Appendix 2.

LEDs indicate power and alarm. The alarm LED will be on if there is an error with the V5 card.

For each port the P LED is on when the physical link layer is active. The D LED is on when any of the data link layers are active.

## SOFTWARE INSTALLATION

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**Software installation** The emutel™**Virtuoso** is controlled using the emutel™**Virtuoso** Windows application. This application is capable of running on a PC with windows 95/98/2000 and NT operating systems.

**Installation of software** The emutel™**Virtuoso** Windows application and V5Analyser can be installed using the CD provided. If auto-run is not enabled on the CD, browse to the V5Rack\_V1.21.exe in the Install\_V1.21 folder. Double-click on the file to start the installation and follow the on screen instructions. Once completed the software will be installed on the local drive **c:\program files\arca technologies\emutel Virtuoso**.

### emutel™**Virtuoso** folder contents

This folder contains.

**- emutel™**Virtuoso** Windows Application (V5Rack)**

This program is used to control the configuration and display the current state of each port of the emutel™**Virtuoso**.

**- V5Analyser**

The V5Analyser displays full decoding of the V5 protocol and ISDN protocol as well as providing statistical analysis.

**- V5Rack.HLP**

The Help file for the V5Rack program.

**- V5Rack.cnt**

The contents section of the Help file for the V5Rack program.

**CFG Folder**

This folder contains two text file templates for configuration purposes.

**- V51config.V5**

The V51CONFIG file is a template for the text file used to configure the emutel™**Virtuoso** to the users V5.1 interface requirements.

**- V52config.V5**

The V52CONFIG file is a template for the text file used to configure the emutel™**Virtuoso** to the users V5.2 interface requirements.

## QUICK START GUIDE

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### Introduction to the windows application

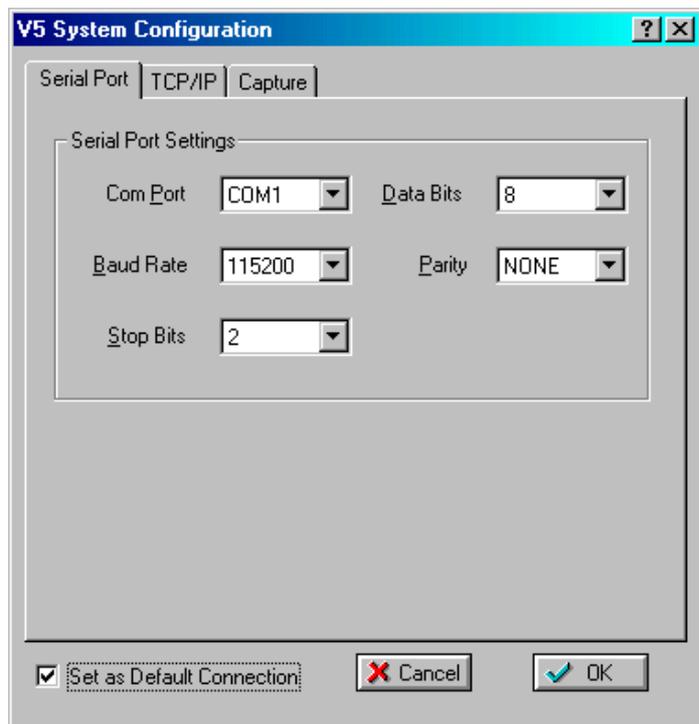
Before using the emutel™**Virtuoso**, the unit must be correctly connected and the configuration must match that of the corresponding Access Network. This is achieved using the **emutel** Windows application V5Rack, supplied with the unit. The unit connection will be considered first.

The emutel™**Virtuoso** can be connected in two ways, using the RS-232 port or a LAN connection. Both are described below.

#### 1. RS-232 connection

To connect the V5Rack to the emutel™**Virtuoso** use the RS-232 cable provided. Connect the RS-232 cable to the nine-way D-type connector situated at the front of the Controller card.

From the V5Rack menu select Connection -> Configuration. After a short time lag, the V5Rack application will display the current configuration of the emutel™**Virtuoso**. Set the RS-232 port settings as shown below.



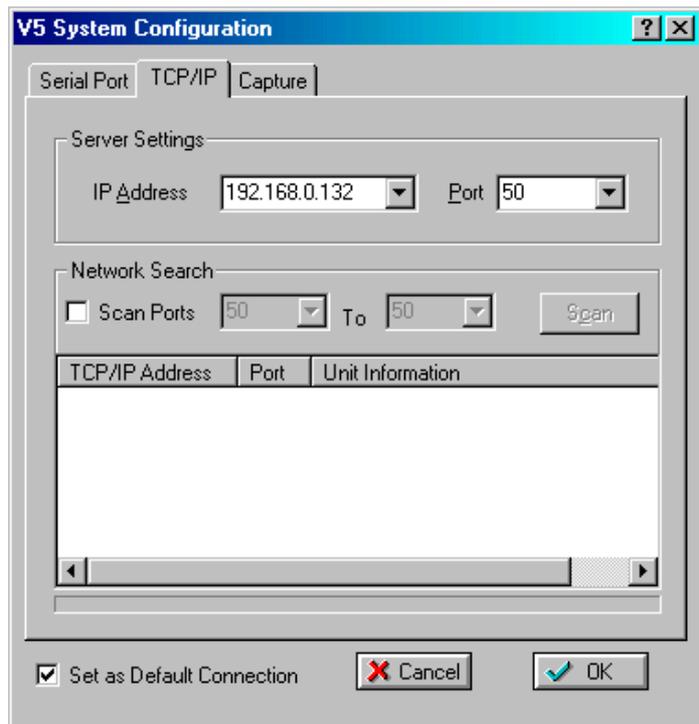
## QUICK START GUIDE

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To use the RS-232 as the default connection, tick the “Set as Default Connection” checkbox.

### **2. Ethernet connection**

To connect the V5Rack to the emutel™|Virtuoso use a RJ-45 cable. Connect the cable to the LAN connector situated at the front of the Controller card. From the V5Rack menu select Connection -> Configuration and select the TCP/IP tab.



The Ethernet default settings are shown in the configuration window above. Before selecting OK, tick the “Set as Default Connection”.

## QUICK START GUIDE

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### Viewing V5 systems

Once the connection to the unit has been established using the Windows application, the available V5 systems are displayed as small icons. Clicking on a specific system icon displays a detailed visual representation of that system. For more detailed information refer to Chapter 7 and the online Help file in V5Rack.

### Changing the configuration

A new text file needs to be generated that matches any new configuration requirements. Once the text file has been generated, this file can be uploaded to the unit. Select **File -> Upload V5Config**. Choose the required file to be uploaded to the emutel™|Virtuoso. The windows software will ask the unit to reset the system so that the changes can take place. If the file has been uploaded correctly the new systems and ports displayed on the screen will match those in the text file.

A more detailed description of the V5Rack functions is given in **Chapter 7**.

### Connecting the V5Analyser

Using the V5Rack menu select **Analyser -> analyser on**. This will enable the emutel™|Virtuoso to transmit analyser messages.

From the **arca technologies** directory, launch the V5Analyser. When the main window is displayed, connect the V5Analyser by clicking on the icon shown below.



A successful connection will display the following window.



## QUICK START GUIDE

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Analyser messages will now be displayed. Further information on the analyser menus can be found using the online help in V5Analyser.

**Summary** The instructions given so far, will ensure that the emutel™|**Virtuoso** Local Exchange Simulator is set up correctly. A more detailed explanation of the operation of the V5Rack and V5Analyser are detailed in Chapters 7 and Chapter 9. Further information is also available in the online help in these programs.

Finally, the telephone numbers for the emutel™|**Virtuoso** are detailed in Appendix 1.

## FAULT FINDING

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### Introduction to fault finding

Due to the nature of the V5 protocol care must be taken when changing the configuration of the unit. Here are some examples of operator error that may help eliminate initial problems.

### Unable to connect to the emutel™|Virtuoso using the V5Rack

You should first ensure that the port settings are correct. If the problem persists further then:

- ◆ Using a Dumb terminal, such as HyperTerminal set the Baud rate to 19200.
- ◆ Power cycle the unit
- ◆ On power up press CTRL + C
- ◆ Reset should continuously be displayed on the screen
- ◆ Release the Keys until the **arca technologies** copyright screen appears
- ◆ Press Enter and then Enter into the Hardware set-up menu
- ◆ Using the Space bar change the Baud Rate of the unit to 115200 and press ESC
- ◆ Closed down the Dumb terminal and try to connect to the unit again

### Configuration errors

If the expected change in configuration has not occurred after uploading a new configuration file to the emutel™|Virtuoso, power cycle the unit and reconnect to the emutel™|Virtuoso using the V5Rack application. If the configuration changes have not taken place then the problem may be due to:

**Incorrect configuration for version.** The user may be trying to upload a configuration that does not match the allowed configuration of the unit. Check with your supplier or **arca technologies** to detail the configuration limitations set at time of purchase.

**Incorrect configuration.** There may be errors in the text file used to generate the configuration file. This could be due to missing, incorrect or invalid configuration text. Check the text file for mistakes such as duplicated layer3 addresses on the same system.

## V5RACK APPLICATION MENU

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<b>V5Rack application introduction</b>	The following information provides a brief overview of the V5Rack application menu options. For more comprehensive information, please refer to the online Help. This is accessible under the Help->Help Topics menu.
<b>File -&gt; SaveV5 Config</b>	This enables the user to save the units current configuration to file.
<b>File -&gt; Upload V5Config</b>	Opens a configuration file and uploads it to the emutel™ Virtuoso. Configuration files are of type *.V5
<b>Connection -&gt; Configuration</b>	Enables the user to select and configure the connection type ( RS-232 or Ethernet ). The user can also set properties of the capture file for the <b>emutel Rack System Messages</b>
<b>Connection -&gt; Connect</b>	This function enables the user to connect the <b>emutel</b> V5Rack software to the emutel™ Virtuoso using the default connection path.
<b>Connection -&gt; Disconnect</b>	This function enables the user to disconnect the <b>emutel</b> V5Rack software from the emutel™ Virtuoso.
<b>System -&gt; Reset System</b>	Enables the user to force the system to reset. This has the same function as power cycling the unit.
<b>System-&gt; Request Configuration</b>	This function enables the user to request the current configuration of the unit from the emutel™ Virtuoso.
<b>System -&gt; Magic Number</b>	Enables a qualified technician to send a new magic number to the unit providing enhanced functionality.
<b>Analyser -&gt; Analyser On/Off</b>	Enables the emutel™ Virtuoso to send analyser messages to the V5 protocol analyser.
<b>View -&gt; System Messages</b>	Enables the user to view all the messages and decoding that are being passed to and from the <b>emutel</b> Windows application to emutel™ Virtuoso.
<b>View -&gt; V5 Unit Bar</b>	The <b>V5 Unit Bar</b> enables the user to see the current V5 settings that are enabled on the unit such as number of links and type of interface.

## **V5RACK APPLICATION MENU**

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The Connection Bar displays the connection status of the unit and remote analyser.

**View -> Status Bar** This toolbar displays help descriptions of menu items.

**Help->Help Topics** Comprehensive online Help guide.

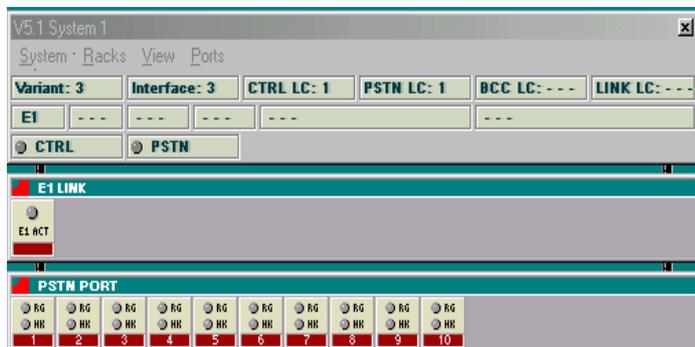
**Help->About V5** Copyright information.

## V5RACK SYSTEM MENU

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### Using the V5Rack graphical user interface

Once the V5Rack application is connected to the emutel™|Virtuoso, the V5 Systems window will display an icon for each of the systems that are currently configured on the unit. Double clicking on each of the icons will display a graphical representation of the selected system as shown in the example below.



### V5Rack System Menu

#### System -> Restart system

This function enables the user to send a restart request to the Access Network from emutel™|Virtuoso.

#### Racks -> E1 link

The E1 rack will display the links that are currently configured at the Local Exchange. From this rack the user can gain more information about the E1 Link status.



A right-click on an E1 link icon displays further menu options that will now be described in more detail.

## V5RACK SYSTEM MENU

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### E1 link icon right-click menu options

#### Blocking -> Immediate

The Local Exchange will immediately block the link.

#### Blocking -> Unblock

The emutel™|Virtuoso Local Exchange simulator will send an Unblock Request to the V5 Access Network for the required E1 link.

#### ID Request

This message will invoke the emutel™|Virtuoso to send an ID request out on that particular Link.

#### Info Request

The info request message will ask emutel™|Virtuoso to return all the relevant port information. This information will be displayed in the systems messages window after API\_LINK\_INFO\_CO.

### E1 link icon pop-up information

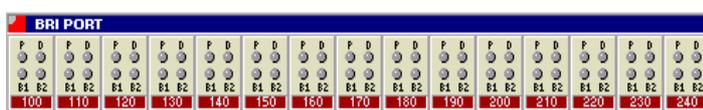
Hovering over an E1 link icon with the mouse pointer displays the relevant information for that link such as L3 address and timeslot information.

### E1 link icon LEDs and blocking information

The activity and state of the E1 link is presented visually to the user. The LED at the centre of the icon will turn Red when the link is active. When the Link is blocked the coloured bar at the bottom of the link is Red. When the Link is unblocked this will change colour to Green. The number that is displayed in this bar represents the Layer3 address of the Link.

### Rack -> ISDN Rack BRI

From this rack the user can gain more information about the Basic Rate Interface (BRI) ports. Each ISDN rack can display 15 BRI ports.



## V5RACK SYSTEM MENU

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A right-click on a BRI port icon displays further menu options that will now be described in more detail.

### **BRI port right-click menu options**

#### **Block Port**

This command initiates the emutel™**Virtuoso** to send a port block request to the Access Network to block that particular port. The port will then enter the OUT OF SERVICE state.

#### **Unblock Port**

The Unblock Port command enables emutel™**Virtuoso** to request that a particular port be unblocked to the Access Network. If this is successful the port will enter the AN1 NULL state.

#### **Get Port Info**

The Get port Info command enables the user to gather all the information about that port that is currently available such as L3 address and port state.

#### **Port Status -> Activate Access**

Sends an ISDN port status FSM request to activate port access.

#### **Port Status -> De-activate Access**

Sends an ISDN port status FSM request to deactivate port access.

### **BRI port icon pop-up information**

Hovering over a BRI port icon with the mouse pointer displays the relevant information for that port such as L3 address and telephone numbers.

### **BRI port icon LEDs and blocking information**

The activity and state of the BRI port is presented visually to the user. The icon has four LEDs:

**P LED** - When the P LED is red this means that the Physical layer is active for this particular BRI.

**D LED** - When the D LED is red this means that the D-channel for this particular BRI is active.

## V5RACK SYSTEM MENU

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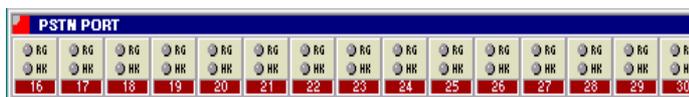
**B1 LED** - When the B1 LED is red this means that the B1-channel for this particular BRI is currently in use.

**B2 LED** - When the B2 LED is red this means that the B2-channel for this particular BRI is currently in use.

When the BRI is blocked the coloured bar at the bottom of the link is Red. When the BRI is unblocked this will change colour to Green. The number that is displayed in this bar represents the Layer3 address of the port.

### Racks -> PSTN RACK

Each PSTN rack can display 30 PSTN ports. From this rack the user can gain more information about the PSTN ports. A right-click on a PSTN port icon displays further menu options that will now be described in more detail.



### PSTN port right-click menu options

#### Block Port

This command initiates the emutel™ **Virtuoso** to send a port block request to the Access Network to block that particular port. The port will then enter the OUT OF SERVICE state.

#### Unblock Port

The Unblock Port command enables emutel™ **Virtuoso** to request that a particular port be unblocked to the Access Network. If this is successful the port will enter the AN1 NULL state.

#### Get Port Info

The Get port Info command enables the user to gather all the information about that port that is currently available such as L3 address and port state.

Hovering over the Port icon with the mouse pointer displays the relevant information for that PSTN port such as L3 address and telephone number.

## V5RACK SYSTEM MENU

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### **PSTN port icon LEDs and blocking information**

The activity and state of the PSTN port is presented visually to the user. The icon has four LEDs:

**RG LED** - The Ring LED will flash red when the PSTN port at the Access Network is ringing.

**HK LED** - The Hook LED will illuminate red when the PSTN port at the Access Network is off hook.

When the PSTN port is blocked the coloured bar at the bottom of the link is Red when the PSTN port is unblocked this will change colour to Green. The number that is displayed in this bar represents the Layer3 address of the port.

### **Further information on V5Rack**

**Please refer to the online Help file in the V5Rack program.**

## V5 CONFIGURATION FILE

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**The emutel configuration file** The **emutel** Windows application software is supplied with two files in the directory called v51config.v5 and v52config.v2.

Changing the text files allows the configuration of the unit to be matched to the Access Network. An explanation of the text file sections is given below.

**[SYSTEMS]** Indicates to the emutel™**Virtuoso** that the following data contains all of the information for each V5 system.

**SYSTEM** The number that follows this determines which system the following information belongs too.

**V5type** The V5type determines whether a system is V5.1 or V5.2 using the numbers 1 (V5.1) and 2 (V5.2).

**Variant Id** The user can change the Variant Id to match the Access Network. If the Variant Id does not match the AN equipment's Variant Id the interfaces will fail to start up together.

**Interface Id** The user can change the Interface Id to match the Access Network. If the Variant Id does not match the AN equipment's Interface Id the interfaces will fail to start up together.

**Ctrl\_lcc\_id** This number represents the Logical C-channel Id. This number is defined at  
**pstn\_lcc\_id** the Link configuration and will determine the timeslot on which the Ctrl  
**bcc\_lcc\_id** protocol is implemented. Due to the restriction of V5.1 these values should  
**link\_lcc\_id** be set to 1.

**[BRI PORTS]** Informs the emutel™**Virtuoso** that the following information represents the systems Basic Rate Interfaces.

**BRI** This text followed by a number represents the Basic Rate port number.

**l3\_address** Enables the user to set the Layer 3 address of the desired port.

## V5 CONFIGURATION FILE

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<b>System</b>	This enables emutel <sup>TM</sup> <b>Virtuoso</b> to determine which system the ISDN port belongs to.
<b>ds_lcc_id</b> (V5.2 only)	This function enables the user to set the Logical C-channel that ISDN D-type ( SAPI 0 calls).
<b>p_lcc_id</b> (V5.2 only)	This function enables the user to set the Logical C-channel that ISDN P-type ( SAPI 16 calls).
<b>f_lcc_id</b> (V5.2 only)	This function enables the user to set the Logical C-channel that ISDN F-type ( SAPI 32 - 62 calls).
<b>Time_slot_B1</b> (V5.1 only)	This function enables the user to allocate the timeslot value for the B1 channel.
<b>Time_slot_B2</b> (V5.1 only)	This function enables the user to allocate the timeslot value for the B2 channel.
<b>[PSTN PORTS]</b>	Informs emutel <sup>TM</sup> <b>Virtuoso</b> that the following information represents the systems PSTN ports.
<b>PSTN</b>	This text followed by a number represents the PSTN port number.
<b>l3_address</b>	Enables the user to set the Layer 3 address of the desired port.
<b>System</b>	This enables emutel <sup>TM</sup> <b>Virtuoso</b> to determine which system the PSTN port belongs to.
<b>Time_slot</b> (V5.1 only)	This function enables the user to allocate the timeslot value for the pstn port.
<b>[E1 LINKS]</b>	Informs emutel <sup>TM</sup> <b>Virtuoso</b> that the following information represents the systems E1 links.
<b>LINK</b>	This text followed by a number represents the Link number.

## V5 CONFIGURATION FILE

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**System** This enables emutel™**Virtuoso** to determine which system the E1 Link belongs to.

This function enables the user to set the Link to three types:

- ◆ PRIMARY\_LINK
- ◆ SECONDARY\_LINK
- ◆ NORMAL\_LINK
- ◆ UNUSED\_LINK

### **PRIMARY\_LINK**

Primary Link identifier to the V5 system. Each V5.2 system must have a Primary link defined.

### **SECONDARY\_LINK**

Secondary Link identifier to the V5 system. Each V5.2 system must have a Secondary Link defined.

### **NORMAL\_LINK**

The normal link defines any active link that is not Primary or Secondary.

### **UNUSED LINK**

An unused link defines a link that is not to be used in the new configuration.

**l3\_address** Each link must have a Layer 3 address.

**ts\_16\_type** The timeslot (ts) type for each communication channel has three options:  
**ts\_15\_type** **LOGICAL\_TIMESLOT** – This value sets the particular timeslot on that link  
**ts\_31\_type** to be a logical C-channel.

**STANDBY\_TIMESLOT** - This value sets the particular timeslot on that link to be a standby timeslot. Standby timeslots should only be configured on the secondary link.

**NORMAL\_TIMESLOT** - This value sets the particular timeslot on that link to be a normal Bearer Channel.

## **V5 CONFIGURATION FILE**

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**[BCC\_ALLOC]** Informs the emutel<sup>TM</sup>|Virtuoso that the following information represents the V5.2 BCC allocation method for timeslots.

**Bcc\_alloc\_method** The allocation method is used to determine the method by which each timeslot is allocated for a V5.2 call

### **NORMAL\_ALLOCATION**

All the Timeslots are allocated on the Primary Link first before moving to the secondary link and then to any other link connected.

### **CYCLIC\_LINK**

Each allocation will be done on the following link to the previous allocation.

If Call 1 is allocated TS 1 Link 1

Call 2 will be allocated TS 1 Link 2

This will continue until all the Timeslots have been allocated on all of the Links

### **CYCLIC\_TIMESLOT**

The BCC protocol will allocate the next timeslot even if the previous allocation has been de-allocated.

### **EVEN\_ALLOCATION**

The BCC protocol will allocate the next Link even if the previous allocation has been de-allocated. Thereby spreading the traffic across all the available links.

**Note** Each line must end in a semi colon else upload to the emutel<sup>TM</sup>|Virtuoso will be unsuccessful.

## V5 ANALYSER MENU

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- V5 Analyser menus introduction** A brief introduction to the menus of V5 Analyser follows. Comprehensive help on the V5 Analyser program is available in the online Help.
- FILE -> OPEN CAPTURE** Opens a previously saved binary capture. Previous traces saved as a binary file will be of type \*.CAP. The Open Capture command will default to the Windows Desktop directory. **Shortcut key (Ctrl + O)**
- FILE -> SAVE AS (ASCII)** The current trace will be saved as a text file (\*.txt) and can be retrieved using a simple text editor. **Shortcut key (Ctrl + S)**
- FILE -> SAVE AS (Binary)** The current trace will be saved as a binary file (\*.CAP). This file can only be retrieved using the V5Analyser software.
- FILE -> Load Configuration** Loads in a saved configuration file, which can be applied to a current trace.
- FILE -> Save configuration** Writes the current configuration of the V5Analyser to file for future use.
- FILE -> Load Filter** Retrieves a previously stored filter for use on a saved file, display file or the current history buffer.
- FILE -> Save filter** Writes the current filter settings to file for retrieval at a later date.
- FILE -> Exit** Exits the V5Analyser application. **Shortcut key (Ctrl + X)**
- Monitor -> Connection** Enables the V5Analyser to receive analyser messages from the **emutel** Graphical User interface. Ensure that analyser is enabled in the **emutel** application. **Shortcut key (Ctrl + C)**
- Monitor -> Disconnection** Stops the V5Analyser buffers receiving messages in the history buffer. **Shortcut key (Ctrl + D)**
- Monitor -> Start Recording** Begins writing incoming analyser messages file. This function can be used for long periods of testing where the history buffer may not be big enough to hold all the required messages.

## V5 ANALYSER MENU

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<b>Monitor -&gt; Stop Recording</b>	Prevents further incoming messages from being written to file.
<b>Monitor -&gt; Pause</b>	Stops the current display from scrolling and continues writing analyser messages to the history buffer or file.
<b>Monitor -&gt; Stop (Play &amp; Record)</b>	Stops recording to the file and prevents further analyser messages being displayed.
<b>Monitor -&gt; Clear History Buffer</b>	When beginning a new trace it is important to ensure that the history buffer is cleared. This avoids confusion during analysis.
<b>Monitor -&gt; Display Led Panel</b>	Displays the Link configuration using a graphical display panel located in a small window above the analyser message. These LEDs graphically display the links that are to be monitored and the direction which the messages are being monitored.
<b>Monitor -&gt; Display Status Bar <u>2</u></b>	Enables the bar beneath the analyser window. This enables you to view the Path and Name of the current Record file and the current configuration file.
<b>Analyzer</b>	Displays the path of the capture file for the current Analyser trace.
<b>Search -&gt; Find</b>	Enables the user to search the current trace for a particular string of text. The search window gives an option to search file in required direction (up or down). The search criteria can be set to be case sensitive. <b>Shortcut Key (Ctrl + F)</b>
<b>Search -&gt; Next</b>	The next command enables the user to search for the required string of text again in the same direction as defined in the original search. This operation can be used repeatedly to search the whole file. <b>Shortcut Key (F3)</b>
<b>Search -&gt; Previous</b>	The previous command enables the user to search for the required string of text as defined in the original search in the opposite direction to the original search criteria. This operation can be used repeatedly to search the whole file in this direction. <b>Shortcut Key (F2)</b>

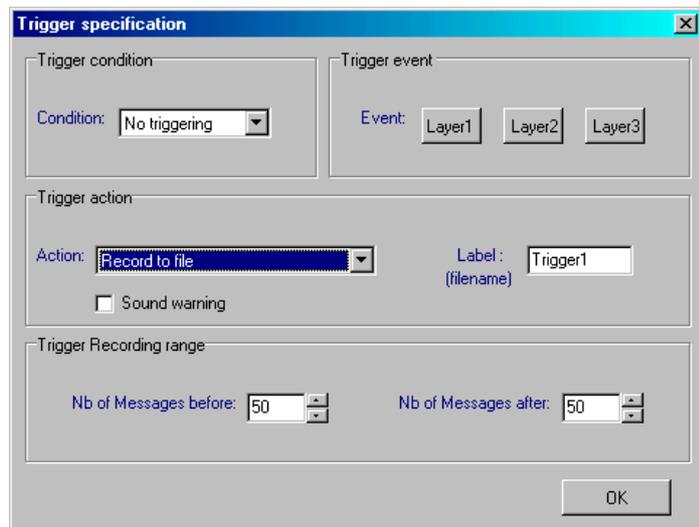
## V5 ANALYSER MENU

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- Markers -> Go to marker 1** Moves the cursor line to a predefined first marker point. Used in large traces to jump to the start of a significant event. **Shortcut Key (F5)**
- Markers -> Go to marker 2** Moves the cursor line to a predefined second marker point. Used in large traces to jump to the end of a significant event. **Shortcut Key (F6)**
- Markers -> Set marker 1** This function allows the user to mark the starting point of a trace that may be a significant point of interest in a large file. The user can find this part of text quickly using the shortcut key F5. **Shortcut Key (Ctrl + F5)**
- Markers -> Set Marker** This function allows the user to mark the end point of a trace ending the user interest in the trace. The user can find this part of text quickly using the shortcut key F6. **Shortcut Key (Ctrl + F6)**
- Tools -> triggers -> trigger action** The trigger function can be used to begin a recording action to a file. The triggering function allows the user to trigger on a particular event in Layer 1, Layer 2 and Layer 3. The triggering action allows this function to be set up. Within this function the user can enable or disable triggering, define the action to be taken i.e. record to file.
- This function also enables the user to define the size of the triggering file by selecting the number of messages to be stored before the selected event has occurred and the number of messages after the selected event has occurred. This controls the size of a trace and enables the user to look for a certain event, which may occur in a bulk call test over a period of time.

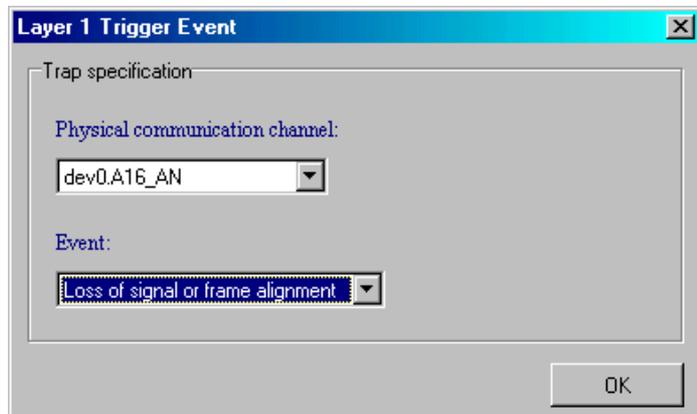
## V5 ANALYSER MENU

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**Tools -> triggers -> Layer 1 triggering event**

Enables to user to define the criteria for triggering a record to file due to a particular Layer 1 event occurring such as loss of power or CRC error.

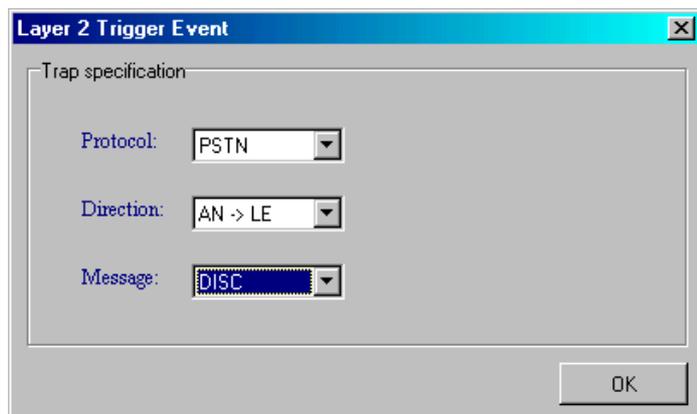


## V5 ANALYSER MENU

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### Tools -> triggers -> Layer 2 triggering event

Enables to user to define the criteria for triggering a record to file due to a particular Layer 2 event occurring. This includes the direction of the message, the protocol (BCC, PSTN, ISDN etc) and the message.



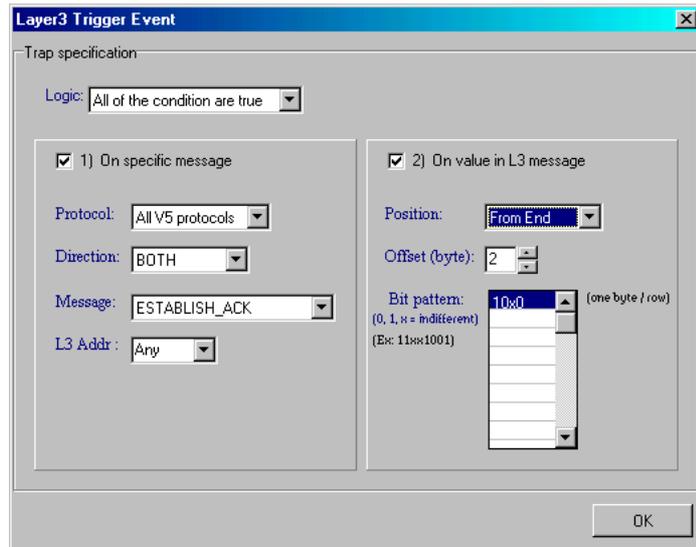
### Tools -> triggers -> Layer 3 triggering event

Enables you to define the criteria for triggering a record to file using three methods:

Checking for a specific message

Checking for a specific pattern in layer 3

Using a combination of options 1 and 2 however you must specify the 'Logic' between the trap (1) and (2): the layer 3 trigger event is verified if trap (1) and trap (2) are verified, or only if one of the traps is verified.



### 1. Checking for a specific message

The data to trap is defined by a specific protocol message (or 'Any'), by a network direction (From -> to; *AN* = Access Network & *LE* = Local exchange), and by an L3 address entered in hexadecimal value (or 'Any').

### 2. Checking for a specific pattern

This is especially useful when you are looking for a sequence in signalling data. The data to trap is defined with a specific pattern to find in layer 3 messages.

A pattern is a sequence of bytes. Enter the pattern as a consecutive sequence of bytes (one byte per line) in the area named "Bit pattern": each byte is represented by its 8 bits value (0 or 1 or "x" meta-character). Meta-character "x" is also allowed: "x" means any byte value in that position is fine.

## V5 ANALYSER MENU

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Also enter Position and Offset value in order to define the position where to find the pattern in the layer 3 protocol message:

- '*Position*': choose either 'From Start' or 'From End'. 'From Start' position is the first byte in the layer 3 protocol message, which is the Protocol discriminator.

- '*Offset*': define the offset in bytes, regarding the '*Position*' chosen.

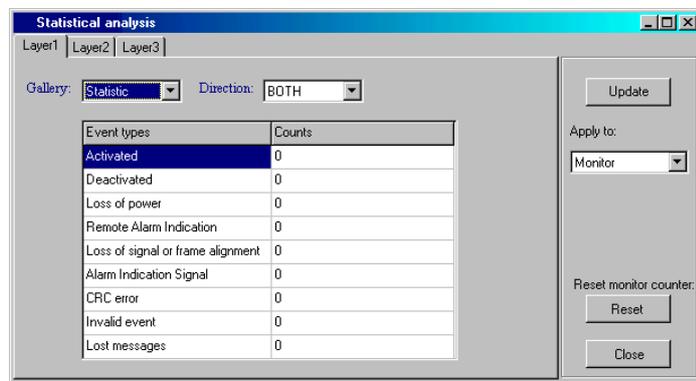
Note: Layer 3 Address (L3Address): It is used to uniquely reference a user port or a common control function. In case of PSTN user port this shall be a 15 bit number. In case of an ISDN user port or a common control function, this shall be a 13 bit number but the *L3Address entered here is always a 16 bit number composed by the 2 bytes which come after the protocol discriminator byte.*

**Note: in the 'Bit pattern' area, do not leave blank lines between two bytes of pattern.**

## V5 ANALYSER MENU

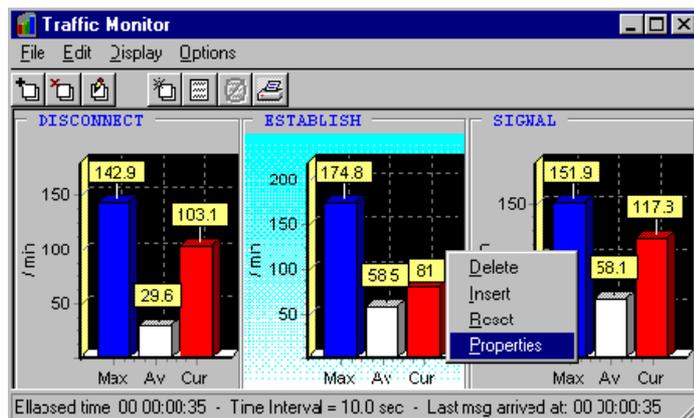
### Tools -> statistics

The statistics function enables the user to view the number of occurrences of any message in Layer1, Layer2 and Layer3 events. Within each window you can apply the statistics count to the monitor, history buffer, or between markers. Analysis can also displayed as a pie chart and applied to any of the protocols such as PSTN, ISDN and BCC protocols running within V5.



### Tools -> Traffic Monitor

The traffic monitor enables the user to view graphically the average, maximum and current rate at which an event is happening.



The traffic monitor has a very intuitive user interface. Some useful tips are:

## V5 ANALYSER MENU

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Add as many charts as you want by choosing "**Add an element**" from the "Edit" menu. For each element, the chart shows the Maximum ("**Max**") throughput, the global Average ("**Av**") throughput since the element has been added, and the current throughput ("**Cur**") which is an average value over a time interval specified by yourself in the element's properties.

To **select** a particular chart, just left-click it. The information displayed in the **status bar** is relative to the selected chart i.e. the "*Elapsed time*" over which the Average value ("**Av**" bar) is computed, the "*Time Interval*" over which the current value ("**Cur**" bar) is computed, and the time when the *last message* in concern *arrived*.

Get the **properties** of a particular chart by double clicking on it. The properties are:

- The chart's **Time Unit**.
- The **Time Interval**. The instant value (the red bar in the screenshot) is calculated over this time interval.

Start the **Journal recording** to save the values as time pass. This will let you create with Microsoft Excel, for instance, a time historical chart.

Choose "File \ **Exit**" to close the Traffic Monitor if you DO NOT want to continue monitoring the traffic (as a background task). Otherwise choose "File \ **Hide**" or click on the upper-right hand icon to close the window.

**Setup -> Protocol selection** Protocol selection should be set to V5.1 & V5.2 protocol

**Setup -> configuration** This function sets the V5Analyser to be configured to a source. It has three functions:

## V5 ANALYSER MENU

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### 1. Server settings

For use with the **emutel** windows application the sever settings should be set to local.

### 2. Capture

This function sets record file and history buffer size. It also enables the user to set the buffer to wrap or stop recording when full.

### 3. Source

Source will automatically display the current C-channels that are available from the emutel™**Virtuoso**.

#### **Setup -> filters**

Filters can be applied to reduce the amount of information displayed to the user. This can be achieved by two methods:

1. Suppress/ include selected messages
2. Suppress/include Layer3 address

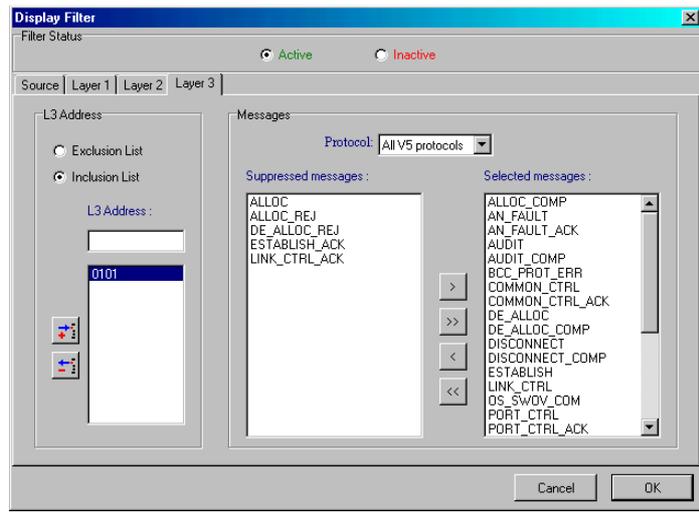
The filters can be applied by selecting the active button on the filter window. The filter can be applied for Layer1, Layer2 and Layer3 messages.

The filters can be applied

- to an existing trace, **Setup ->filters->display**
- to a record file, **Setup ->filters->record**
- to a history buffer, **Setup ->filters->history buffer**

## V5 ANALYSER MENU

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### 1 Message Filter

**Important:** With the V5 protocol using ISDN port, you can have a double layer filter: a filter for V5 protocol messages and L3 address and another for ISDN messages and Call Reference value.

Select the protocol messages to keep or to suppress with the help of the arrow buttons.

#### Arrow buttons

Use the arrow buttons to move one or more message from one list to the other.

- To move the entire message from one list into the other click the double arrow buttons (>> or <<).
- To move only the selected message or messages from one list into the other, click the single arrow buttons (> or <).

## V5 ANALYSER MENU

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### 2. L3Address or Call Reference Filter

#### V5 Protocol: Layer 3 Address (L3Address)

It is used to uniquely reference a user port or a common control function. In case of PSTN user port this shall be a 15 bit number. In case of an ISDN user port or a common control function this shall be a 13 bit number but the L3Address entered here is always a 16 bit number composed by the 2 bytes, which come after the protocol discriminator byte.

Enter the L3Addresses in hexadecimal value and then choose if you want either to exclude or to include only those L3 addresses.

#### ISDN Protocol: Call Reference Value

It is used to identify the call request at the local user-network interface to which the particular message applies. The Call Reference value must be entered in decimal value.

#### Setup -> Display modes

The display modes function allows the user to set the format of the messages that are displayed in the window. This enables the user to set the decoding for each layer:

**Layer 1** – ON\OFF or ALARM ONLY

**Layer 2** – OFF\HEX\SHORT\COMPLETE

**Layer 3** - OFF\HEX\SHORT\Identified\identified + values\COMPLETE

The colours tag enable the user to change the colour combinations of messages. The colours of the messages can be customized to suit the user.

#### Setup -> save setting on exit

This will save any new setting to the setup configuration on exiting the V5Analyser

#### Setup ->save settings now

Saves the setup changes on selection.

## V5 ANALYSER MENU

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- Windows -> New** Enables the user to view a current display in another window. This means you can have a different display method in the second window. Both windows will scroll together. This ensures that both trace decodes are at the same point in the current trace. **Shortcut Key (Ctrl + W)**
- Help->Online help** The online help will enable the user to obtain explanations of the functions shown above. This path may need to be initially set. When selecting the online help function the V5Analyser may display an error message in finding the help files. From this error message select browse to find the required files on your computers hard disk.
- Help ->V5 protocol guide** The V5 protocol guide help gives the user a general description of the V5 messages defined in ETS 300 324 and ETS 300-347

**PORT TELEPHONE NUMBERS**

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<b>PORT</b>	<b>TELEPHONE NUMBER</b>
V5BRI1	320000
V5BRI2	320010
V5BRI3	320020
V5BRI4	320030
V5BRI5	320040
V5BRI6	320050
V5BRI7	320060
V5BRI8	320070
V5BRI9	320080
V5BRI10	320090
V5BRI11	320100
V5BRI12	320110
V5BRI13	320120
V5BRI14	320130
V5BRI15	320140

## **PORT TELEPHONE NUMBERS**

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<b>PORT</b>	<b>TELEPHONE NUMBER</b>
V5PSTN1	310001
V5PSTN2	310002
V5PSTN3	310003
V5PSTN4	310004
V5PSTN5	310005
V5PSTN6	310006
V5PSTN7	310007
V5PSTN8	310008
V5PSTN9	310009
V5PSTN10	310010
V5PSTN11	310011
V5PSTN12	310012
V5PSTN13	310013
V5PSTN14	310014
V5PSTN15	310015
V5PSTN16	310016
V5PSTN17	310017
V5PSTN18	310018
V5PSTN19	310019
V5PSTN20	310020
V5PSTN21	310021
V5PSTN22	310022
V5PSTN23	310023
V5PSTN24	310024
V5PSTN25	310025
V5PSTN26	310026
V5PSTN27	310027
V5PSTN28	310028
V5PSTN29	310029
V5PSTN30	310030
V5PSTN31	310031
V5PSTN32	310032

## **PORT TELEPHONE NUMBERS**

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V5PSTN33	310033
V5PSTN34	310034
V5PSTN35	310035
V5PSTN36	310036
V5PSTN37	310037
V5PSTN38	310038
V5PSTN39	310039
V5PSTN40	310040
V5PSTN41	310041
V5PSTN42	310042
V5PSTN43	310043
V5PSTN44	310044
V5PSTN45	310045
V5PSTN46	310046
V5PSTN47	310047
V5PSTN48	310048
V5PSTN49	310049
V5PSTN50	310050
V5PSTN51	310051
V5PSTN52	310052
V5PSTN53	310053
V5PSTN54	310054
V5PSTN55	310055
V5PSTN56	310056
V5PSTN57	310057
V5PSTN58	310058
V5PSTN59	310059
V5PSTN60	310060

## **PORT TELEPHONE NUMBERS**

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<b>PORT</b>	<b>TELEPHONE NUMBER</b>
V5 EMUTEL BRI1	340010
V5 EMUTEL BRI 2	340020
V5 EMUTEL BRI 3	340030
V5 EMUTEL BRI 4	340040
V5 EMUTEL BRI 5	340050
V5 EMUTEL BRI 6	340060
V5 EMUTEL BRI 7	340070
V5 EMUTEL BRI 8	340080

## ISDN PORT PIN-OUTS

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### ISDN interface Pin-outs

The following table shows the pin-outs of the RJ45 connectors for the ISDN interfaces.

	V5 ports	PRI ports	BRI	
	E1	E1 or T1	S	U
1	T-	T-	NC	NC
2	T+	T+	NC	NC
3	NC	NC	R-	NC
4	R-	R-	T-	RING
5	R+	R+	T+	TIP
6	NC	NC	R+	NC
7	NC	NC	NC	NC
8	NC	NC	NC	NC