

VISIONNETWORK

ES3610/11 VN-GLIMPSE RGB ADAPTER



USER GUIDE

ELECTROSONIC

VN-GLIMPSE RGB ADAPTER USER GUIDE
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Issued by:

Product Support Team,
Electrosonic Ltd.,
Hawley Mill,
Hawley Road,
Dartford,
Kent,
DA2 7SY,
United Kingdom.

Documentation written and designed by Andrew M. Bailey.

Printed in the United Kingdom.

IMPORTANT SAFETY MARKINGS

The following symbols are used throughout this User Guide to advise you of important instructions:



This symbol warns the presence of a voltage of sufficient magnitude to cause a severe or fatal electric shock. Follow the appropriate instructions carefully to avoid the risk of injury.



This symbol indicates an important instruction for the correct and safe installation, operation or maintenance of your RGB ADAPTER system. Failure to comply with such instructions may result in injury to personnel or damage to the RGB ADAPTER hardware.



The **ES3610** product conforms with the protection requirements of the EC Directive 89/336/EEC (relating to Electromagnetic Compatibility) and EC Directive 73/23/EEC (relating to Low Voltage) by application of the following standards:

EN 55022:1994 Class A; EN 55024:1994 Class A; EN60950:2000

The **ES3611** product conforms with the protection requirements of the EC Directive 89/336/EEC (relating to Electromagnetic Compatibility) and EC Directive 73/23/EEC (relating to Low Voltage) by application of the following standards:

EN 55022:1994 Class B; EN 55024:1994 Class B; EN60950:2000

Provided that:

- The product is used in accordance with the manufacturer's instructions.
- The product is not connected to any peripheral equipment that is not CE marked.

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SECTION 1:

Introduction

What is the VN-GLIMPSE RGB ADAPTER?

The VN-GLIMPSE RGB ADAPTER is used to distribute an RGB monitor signal from a source computer (or similar graphical device) across an IP network to a viewing station.

At its simplest the viewing station can be another computer, running the VN-GLIMPSE VIEWER software application. For more advanced applications one of the VISIONNETWORK (VN) range of image processors can be used, allowing more than one VN-GLIMPSE source to be viewed simultaneously (along with other source types) on a target display.

The VN-GLIMPSE RGB ADAPTER uses a fast Digital Signal Processor to provide near real-time loss-less compression performance and is ideally suited to source images with low to moderate motion.

It also allows keyboard and mouse controls at the viewing station to be used to remotely control software applications on the source computer.

The VN-GLIMPSE RGB ADAPTER simply connects between the source computer and its monitor, keyboard and mouse. It is fully independent of the source computer operating system or hardware manufacturer and does not impair the performance of the source computer in any way.

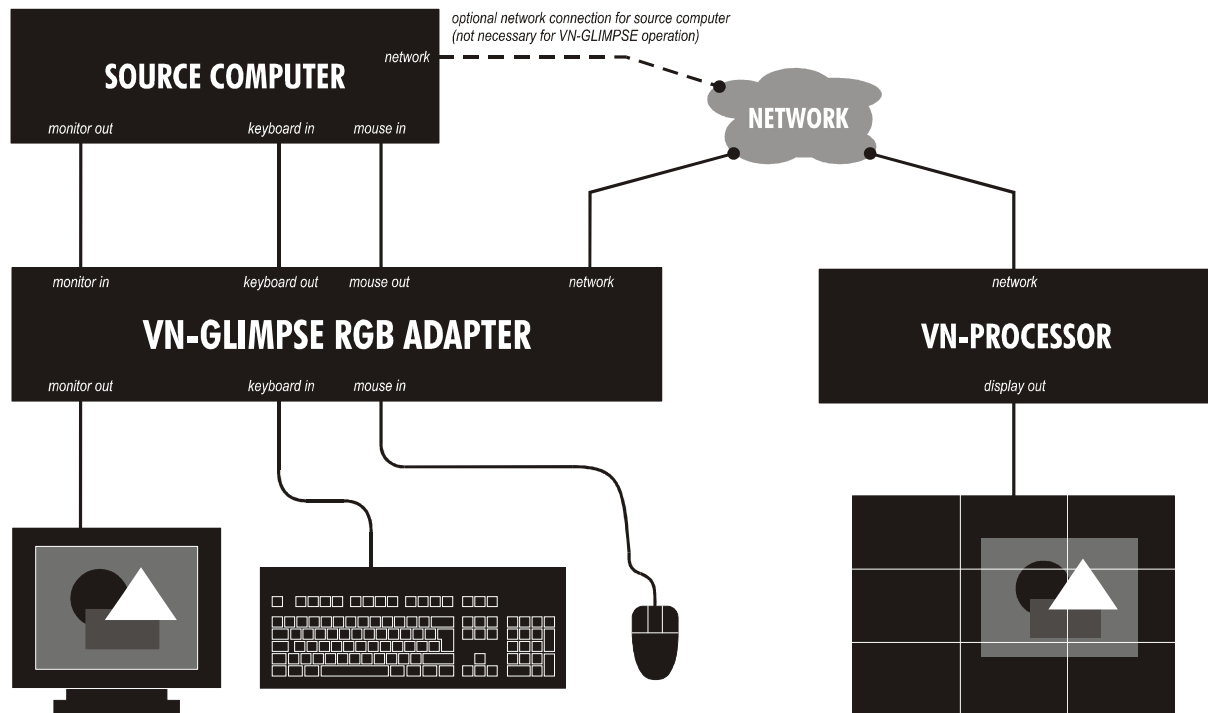
Single or Multiple Users

By default the VN-GLIMPSE RGB ADAPTER operates in 'unicast mode' allowing one user (viewing station) to be connected at one time.

Where more than one user (viewing station) is required, the unit can also operate in 'multicast mode'. However, please note that an additional license is required for this mode of operation.

Typical System Application

The diagram below shows a typical system application utilizing the VN-GLIMPSE RGB ADAPTER allowing a computer source to be viewed on a VISIONNETWORK (VN) Processor:



The RGB ADAPTER is connected between the source computer and its monitor, keyboard and mouse. From these connections the RGB ADAPTER collects data about changes in the display content along with keyboard and mouse actions. This data is then made available to a VN-Processor which displays a facsimile of the source on the target display.

In addition, if the VN-Processor is equipped with its own keyboard and mouse, then these can be used to 'take control' of any applications running on the source computer.

The operation of the RGB ADAPTER is completely transparent to the user of the source computer; performance of the computer is not affected in any way.

Front Panel Features



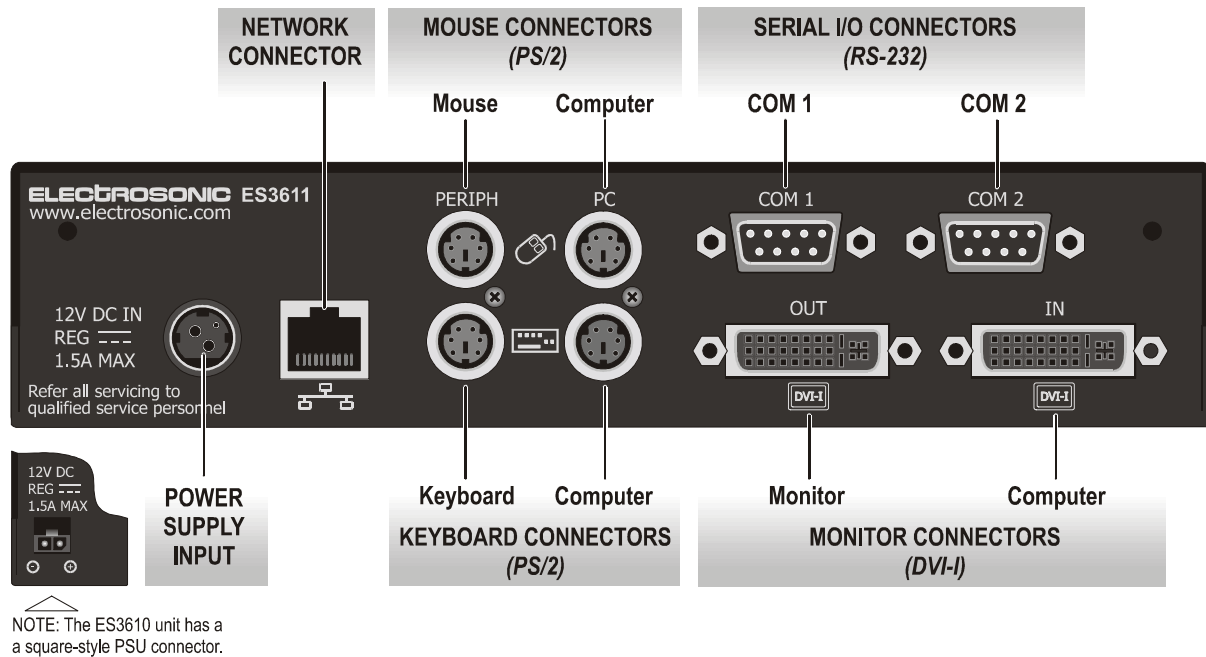
Indicators

The following indicators are visible on the front of the RGB ADAPTER:

Name	Color	Function
POWER	Green	Lit when the unit is receiving power from the 12V supply input.
NETWORK	Orange	Indicates the status of the Ethernet connection: <i>Flashing Intermittently</i> – data is being transmitted across the network. <i>Unlit</i> – no network connection detected.
STATUS	Orange	Indicates the internal status of the RGB ADAPTER: <i>Lit</i> – the unit is working normally and is connected to a valid source. <i>Flashing Regularly</i> – the unit is working normally but has no source. <i>Unlit</i> – the unit is not functioning correctly.

NOTE: When the RGB ADAPTER is powered-up the NETWORK and STATUS indicators will light up or flash intermittently for around 15 seconds while the unit initializes.

Rear Panel Features



Full details of connector types, pin-outs and specifications can be found in Section 5: Technical Data. Briefly, these are as follows:

Power Supply Input

The RGB ADAPTER requires a 12V power supply via this connector. A suitable mains operated power supply unit (PSU) is provided.

Network Connector

This connects the RGB ADAPTER to the viewing station, usually via an Ethernet network. Captured image data is output from here. Configuration (if needed) of the RGB ADAPTER is also achieved via this connection. See page 27 for further details

Keyboard Connectors

Standard PS/2 connectors, used to connect the RGB ADAPTER between the source computer and its keyboard.

Mouse Connectors

Standard PS/2 connectors, used to connect the RGB ADAPTER between the source computer and its mouse.

Monitor Connectors

Standard DVD-I connectors, used to connect the RGB ADAPTER between the source computer and its monitor. Compatible with both digital and analog sources – see Source Compatibility (page 12).

Serial I/O Connectors

Standard 9-pin connectors used to establish a serial data link between the RGB ADAPTER and an external computer. These are not used during normal operation.

Source Compatibility

The RGB ADAPTER is compatible with both digital (DVI) and analog graphics sources up to UXGA resolution (1600 x 1200 @ 60Hz, 24-bit color). See page 48 for a list of standard supported sources.

The RGB ADAPTER incorporates advanced image acquisition circuitry which can auto-detect a wide range of source types without the need for any additional setup.

For specialist or non-standard source formats, user customizable source modes can be created and downloaded to the RGB ADAPTER. Please consult Electrosonic Product Support for further help and advice on using customizable source modes.

IMPORTANT NOTE

The VN-GLIMPSE RGB ADAPTER does not provide Analog-to-Digital or Digital-to-Analog conversion via its monitor connections. A digital source must use a digital monitor and an analog source must use an analog monitor.

Control Capability

Local keyboard and mouse control of the source computer is fully maintained while connected to the RGB ADAPTER. In addition, keyboard and mouse functions can be remotely controlled from the viewing station.

Little or no internal configuration is required in order to use the RGB ADAPTER. Where access to the internal configuration is required this can be achieved using an external computer connected to the RGB ADAPTER – either via the Network connector or the COM1 Serial Port.

A configuration software tool is provided. For further details on using this tool, refer to page 30.

Accessories

Supplied Accessories

In addition to this User Guide, the RGB ADAPTER is supplied with the following accessories. If any of these items is missing or damaged, please contact your Electrosonic dealer immediately:

Item	Qty	Re-order Code
12V Power Supply Unit (PSU) <i>Note: ES3610-P has a square-style connector; ES3611-P has a round-style connector.</i>	1	ES3610-P ES3611-P
Mains Cord for PSU (with 3-pin 'Edison' plug) <i>For use in the USA.</i>	1	CA4291
Mains Cord for PSU (bare-ended) <i>For use in Europe and all other countries.</i>	1	CA429
Mouse/Keyboard Cable (2 metre PS/2 to PS/2)	2	Digital Cable Kit: ES3611-CD
Digital Monitor Cable (2 metre DVI-D to DVI-D)	1	
Analog Monitor Cable (2 metre 15-pin HD-type to DVI-A)	1	
DVI-A to 15-pin HD Adapter	1	Analog Cable Kit: ES3611-CA
Clip-on Ferrite* <i>For supplied Monitor Cable – see Important Note below.</i>	1	
Software Disc <i>Containing VN-GLIMPSE Setup Utility, VN-GLIMPSE VIEWER and ADMINISTRATOR, plus full documentation.</i>	1	M20046

* **IMPORTANT NOTE:** Whether you are using the Digital or Analog Monitor Cable, it must be fitted with the Clip-on Ferrite. Position the ferrite nearest to the end of the cable that connects to the DVI-I IN connector on the VN-GLIMPSE RGB ADAPTER. Refer to the connection diagrams on pages 24 & 25.

Optional Accessories

The following optional accessories are also available for use with the RGB ADAPTER – these must be ordered separately from your Electrosonic dealer:

Item	Order Code
Rack Mounting Kit <i>A kit that allows one or two ES3610/11 units to be installed in a 19inch equipment rack. Full instructions are included with the kit.</i>	ES3611-RM

SECTION 2:

Installation

Choosing a Suitable Location

The VN-GLIMPSE RGB ADAPTER is designed to be used either as a free-standing unit or (by using the optional kit available) to be mounted in a 19 inch equipment rack.



CAUTION

Whichever installation method you choose there are certain environmental requirements, detailed on page 17, which must be observed in order to ensure safe and reliable operation.

For rack-mounted applications the criteria detailed on page 18, must also be observed.

Environmental Requirements



CAUTION

The criteria on this page must be observed for all installations of the RGB ADAPTER, whether free-standing or rack-mounted.

Orientation

The RGB ADAPTER must be operated in the horizontal position only. When used free-standing it must be placed on a stable, flat and level surface. Ensure that the surface finish will not be affected by the heat produced by the RGB ADAPTER when in use.

Temperature

DO NOT install or operate the RGB ADAPTER in an area where the ambient temperature exceeds 35°C (95°F) or falls below 5°C (35°F).

Remember that, as with all electronic equipment, the RGB ADAPTER and its associated PSU also produces heat which may affect the ambient temperature.

After the RGB ADAPTER has been in use for a period of time the external casing will be very warm to the touch. While the temperature is well within safe limits please be aware that it may be hotter than you are expecting. Ensure that any adjacent surfaces will not be affected by the heat.

Ventilation

No special ventilation is required. However, it is recommended that free air circulation is permitted around the unit.

Humidity & Water

DO NOT install or operate the RGB ADAPTER in an area in which the ambient relative humidity exceeds 85% or in an area that is prone to condensation.

DO NOT install or operate the RGB ADAPTER near water or in a location which may be prone to water seepage — the RGB ADAPTER is not waterproof.

Rack-mount Requirements



CAUTION

For rack-mounted installations, the following criteria must be observed (in addition to the Environmental Requirements listed on page 17)

Mounting & Support

ALWAYS use the special rack-mount kit (available separately) to secure the RGB ADAPTER. Full details on using the kit are included with the kit.

DO NOT stand other units directly on top of the RGB ADAPTER when it is rack-mounted as this will place excessive strain on the mounting brackets.

Ventilation

ALWAYS ensure that the rack enclosure is adequately ventilated. Sufficient airflow must be achieved (by convection or forced-air cooling) to satisfy the ventilation requirements of **all** items of equipment installed within the rack.

A ventilation gap of at least 44mm (1U) is recommended above and below the RGB ADAPTER and adjacent surfaces or equipment.

Mains Supply

ALWAYS ensure that the mains power supply is of the correct voltage and frequency for **all** equipment within the rack, and that it has a good ground/earth connection.

Where a power strip (mains distribution batten) is used (of either a hard-wired or plug and socket type), always ensure that the current rating of both the power strip and the supply is sufficient for all equipment within the rack.

Mains Power Connection (via PSU)

The RGB ADAPTER must be powered from a 12 Volt DC regulated supply. A suitable mains-operated power supply unit (PSU) is provided. The mains connection details that follow relate to the PSU.



NEVER CONNECT THE RGB ADAPTER DIRECTLY TO THE MAINS.

ALWAYS use the PSU provided. If a backup/replacement PSU is required, always use an Electrosonic approved PSU.

Supply Requirements (for PSU)



ALWAYS observe the following instructions to ensure safe and reliable operation of the PSU.

ALWAYS ensure that the mains supply voltage is single phase only and is within the permitted range:

- 100 – 240V AC (0.45A Max.) 50 – 60Hz.

NEVER connect the PSU to a DC supply.

DO NOT allow the mains power point to be overloaded. This is particularly important to check when powering several items of equipment from a single power point (e.g. within rack-mounted installations).

WARNING: To avoid the possible risk of electric shock or product damage due to condensation, ALWAYS allow the PSU to become acclimatized to ambient temperature and humidity for at least thirty minutes BEFORE switching on. This is particularly important when moving the unit from a cold to a warm location.

NOTE: *The PSU is double-insulated and does not require an earth/ground connection.*

Mains Power Cord (for PSU)

The mains PSU is equipped with a 3-pin (male) type mains connector which requires a power cord fitted with a corresponding 3-pin IEC320 (female) connector.

Two power cords are supplied with the PSU, each having a different termination; you must use the lead appropriate for your country:

In...	Use the...	Re-order Code
USA and Canada	cord fitted with the 3-pin American-style 'Edison' plug.	CA4291
UK, Europe and all other countries	unterminated cord and fit a suitable plug as described on page 21.	CA429

WARNING: Do not allow anything to rest on the mains power cord.

Power-up Procedure

You must always ensure that the RGB ADAPTER is powered-up at the same time as the source computer or slightly before.

Powering the RGB ADAPTER *after* the source computer may result in the source computer not correctly detecting the mouse, keyboard and/or monitor.

Fitting a Mains Plug


If you are fitting a plug to the unterminated power cord (or replacing an existing plug), you must fit a plug that:

- is rated for use with mains voltage
- is equipped with a grounding pin/connection
- complies with any applicable National or Local electrical regulations.
- is fitted with a correctly rated fuse (applicable to UK-style plugs only – see page 22.)

WARNING: Never attempt to fit or use a plug without a ground or earth pin/connection.

Wiring Details

The wires of both mains power cords (supplied with each RGB ADAPTER) are color-coded as shown in the table below; be sure to connect your plug in accordance with the following guidelines:

Connect the wire colored...	to the plug terminal identified with...
Brown	'L' or 'Live' or 'Line' (or colored red or brown)
Blue	'N' or 'Neutral' (or colored blue or black)
Green & Yellow	'E' or 'Earth' or 'Ground' (or colored green or green & yellow)
	WARNING — If you are unsure of the connections, or if the markings in your plug do not match those given above, CONSULT A QUALIFIED ELECTRICIAN.

NOTE: The PSU is double-insulated and does not require an earth/ground connection. However, the earth cable of the mains lead must be connected in the plug.

External Supply Protection



The mains power cord supplied with this product is rated at 10A maximum and must be protected from overload by an external fuse or circuit breaker.

Fused Plugs (UK-style)

If the power cord is fitted with a UK-style BS1363 3-pin plug (*i.e.* with provision for an internal fuse), then it must be fitted with a BS1362 ASTA approved 1 inch cartridge fuse.

This fuse must be rated at a **maximum of 10A/250V**. Since the current draw of the PSU is less than 1A, a fuse of a lower rating **not less than 3A/250V** may be used.

WARNING: Never attempt to fit a fuse or circuit breaker of a higher maximum rating than shown above.

Unfused Plugs or Hard-wired

If the power cord is fitted with an unfused plug, or is hard-wired into a power strip (mains distribution batten), then the power cord must be protected by an external fuse or circuit breaker of a rating shown in the table below:

Supply Voltage	110V nominal	230V nominal
Maximum Fuse Rating	10A	10A
Minimum Fuse Rating	3A	3A
WARNING: Never attempt to fit a fuse or circuit breaker of a higher maximum rating than shown above.		

Connecting to a Computer

The RGB ADAPTER is compatible with both digital (DVI) and analog graphics signals. The unit is provided with the necessary additional cables that you will require.

For a Digital Source...

☞ Use the following cables (replacement kit no. ES3610-CD) and refer to the connection diagram on page 24.

- Mouse/Keyboard Cable (PS/2 to PS/2) (2 off),
- Digital Monitor Cable (DVI-D to DVI-D).

For an Analog Source...

☞ Use the following cables (replacement kit no. ES3610-CA) and refer to the connection diagram on page 25.

- Mouse/Keyboard Cable (PS/2 to PS/2) (2 off),
- Analog Monitor Cable (15-pin Hi-Density D-type to DVI-A), plus
- DVI-A to 15-pin Hi-Density D-type Adapter

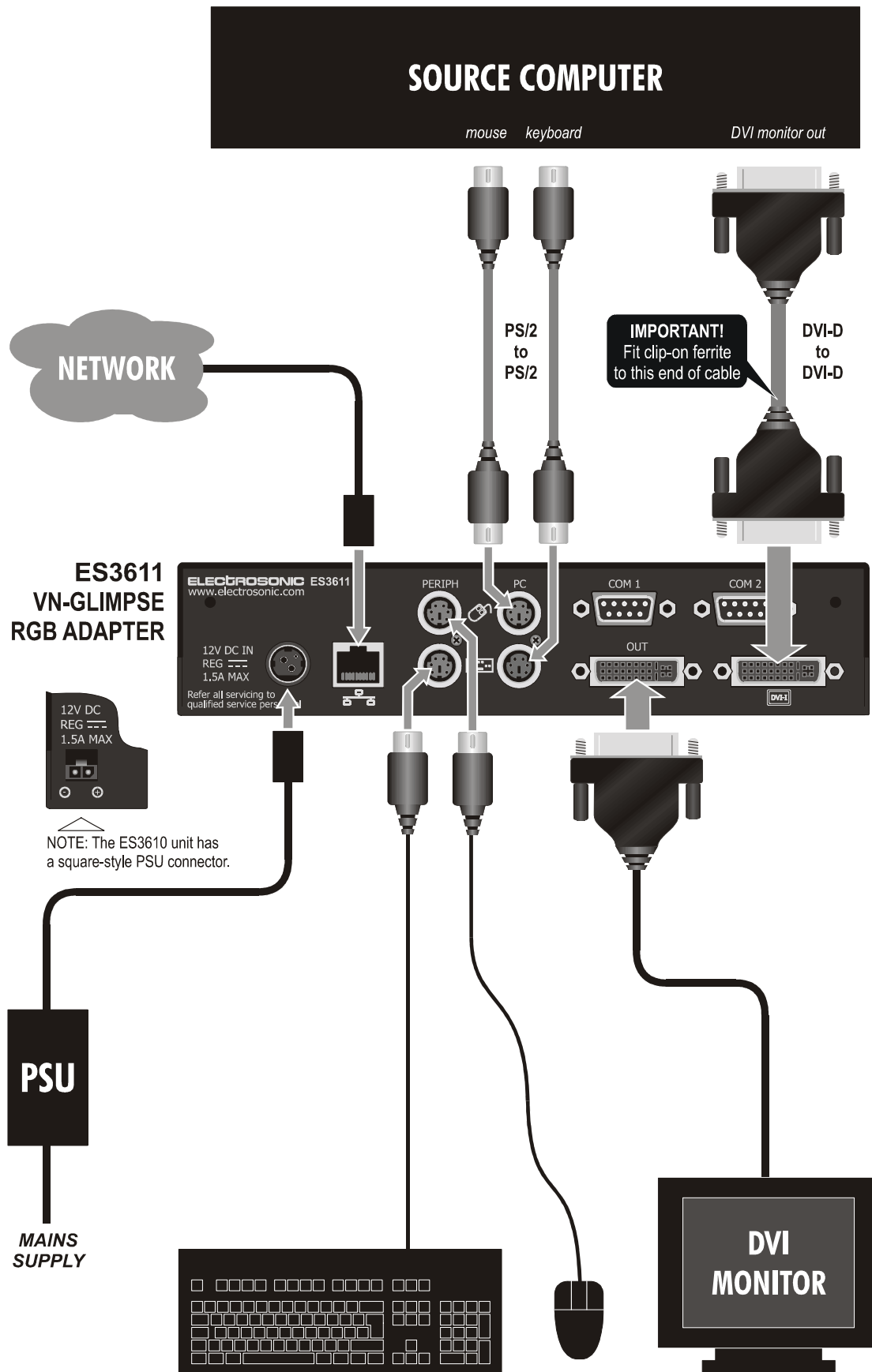
IMPORTANT NOTES

The VN-GLIMPSE RGB ADAPTER does not provide Analog-to-Digital or Digital-to-Analog conversion via its monitor connections. A digital source must use a digital monitor and an analog source must use an analog monitor.

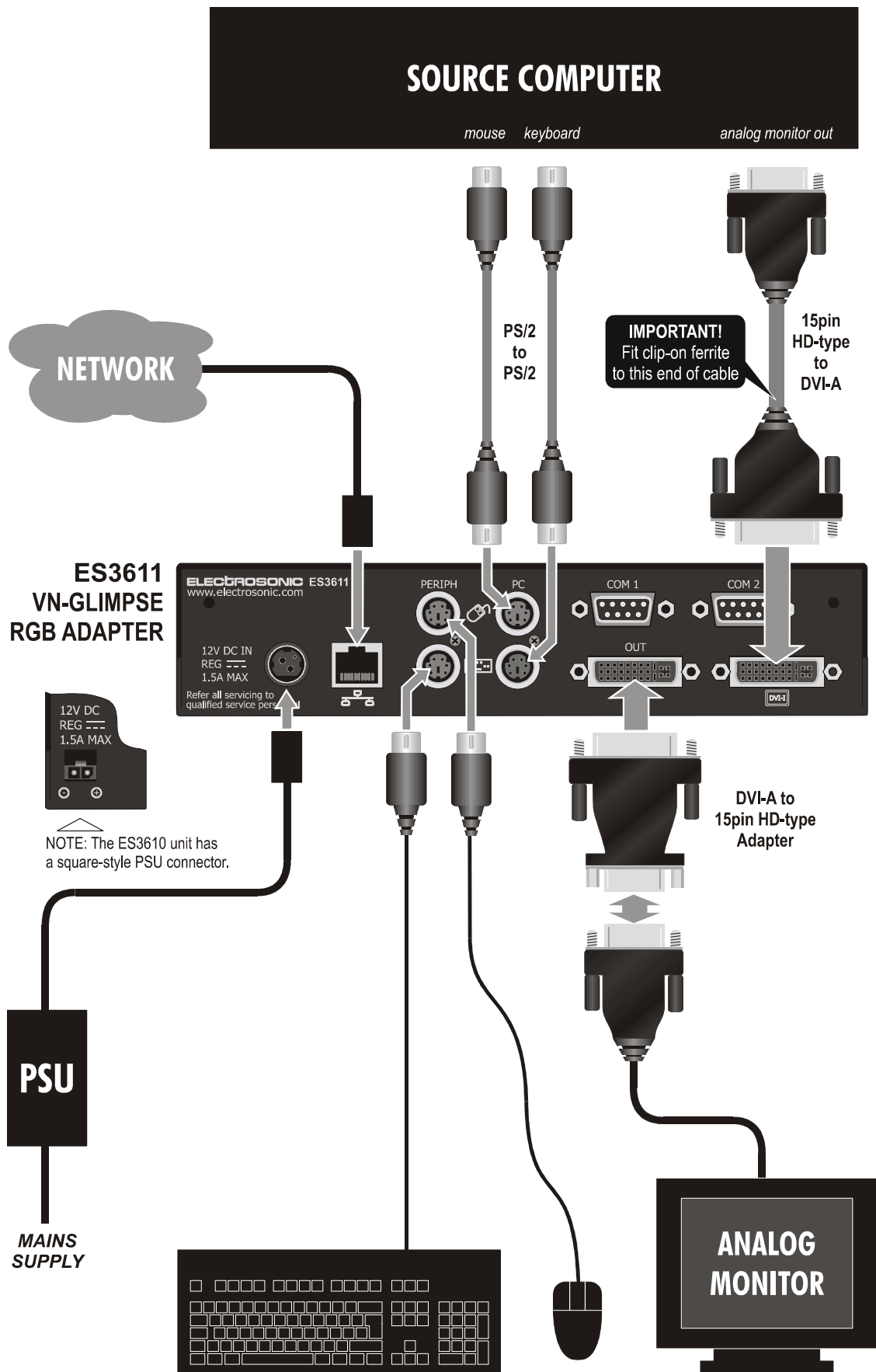
Disconnecting and reconnecting PS/2 cables to a computer that is already switched on may cause loss of mouse/keyboard control or cause the computer to 'freeze'. It is recommended, therefore, that the connections are made while the computer is powered-down. See also 'Power-up Procedure' on page 20.

If you use a monitor cable or adapter other than that provided with the RGB ADAPTER you must ensure that all pins are properly interconnected, otherwise the computer graphics card or monitor may not operate correctly.

Connection Diagram (Digital Source)



Connection Diagram (Analog Source)



Connecting the RGB ADAPTER to a Network

Source content captured by the RGB ADAPTER is transmitted to the viewing device using TCP/IP. The unit therefore requires a connection to an Ethernet network.

CAUTION: Do not proceed with connecting or configuring the RGB ADAPTER for an existing network until you are certain you know what you are doing – incorrect connection or configuration may cause disruption to other network users.

Network Requirements

Typically, the RGB ADAPTER will connect to convenient network point on an existing in-house network. Use a standard patch cable for this purpose. This is not supplied with the RGB ADAPTER but is readily available in a variety of lengths from all good computer suppliers. Do not use the crossover patch cable supplied: this will not work.

If a convenient network point is not available it will be necessary to have one installed – please consult the IT/Network Administrator or Building Facilities Manager for advice. Alternatively, the RGB ADAPTER and source computer can 'share' a connection by using a hub or switcher.

In all cases you will need to obtain details about the following network settings to be used by the RGB ADAPTER:

IP Address		Factory default = 172.28.231.98
SubnetMask		Factory default = 255.255.0.0
Device Name*		
DNS Server Address*		
WINS Server Address*		
Default Gateway*		

* Optional settings – not required for correct operation.

The Network Administrator should be able to provide this information.

Setting the Correct IP Address

It is important that the IP Address of the RGB ADAPTER is set correctly. This must be within the range of addresses specified for the network and must not be in use by another network device. The Subnet Mask must also be set to the correct value. A brief guide to IP Addressing is provided in Appendix A.

The IP Address of the RGB ADAPTER can only be changed using the setup utility provided on the Software Disc. See page 30 for further details on using this utility.

SECTION 3:

VN-GLIMPSE Setup Utility

Introduction

In many applications no special setup or configuration of the RGB ADAPTER will be required other than to set its IP Address and Subnet Mask.

Any RGB ADAPTER configuration that *is* required is achieved by means of the VN-GLIMPSE Setup Utility provided on the Software Disc. The Setup Utility must be installed and run on a suitable PC or laptop computer (the 'configuration computer').

HINT: *You can install the Setup Utility on the source computer and use this machine to configure the RGB ADAPTER.*

The configuration computer must then be connected to the RGB ADAPTER via its Network port. There are two ways of achieving this:

- **Method 1** – Direct connection between the computer and the RGB ADAPTER (using a crossover patch cable – not supplied), or
- **Method 2** – Indirect connection between the computer and the RGB ADAPTER via an existing local area network (LAN).

Method 1 is recommended as it allows the RGB ADAPTER to be configured without the risk of its default settings conflicting with other devices. Once the unit is configured it can be safely connected to the network.

Method 2 can only be used if you are certain that the default settings will not cause a conflict with other network devices. This includes other RGB ADAPTERs. If you intend connecting and setting-up a number of RGB ADAPTERs on the same network, always power-up and configure each unit, one at a time. If all units are powered-up at the same time with the same default settings, configuration will be impossible.

NOTE: *The Setup Utility uses network broadcast messages to detect and communicate with the RGB ADAPTER. Therefore, the configuration computer and RGB ADAPTER(s) need not be on the same subnet (i.e. they can have different Subnet Masks).*

Installing the Setup Utility

Minimum Computer Specification

The VN-GLIMPSE Setup Utility must be installed on a computer that meets or exceeds the following minimum specification:

	Minimum	Recommended
Operating System	Windows NT4 (SP6)	Windows 2000, XP
Processor	Any processor with MMX instruction set	Pentium 3 or higher
Memory (RAM)	64MB	128MB
Hard Disk Free Space	1MB	>1MB
Graphics	1024x768, 65K colors (16-bit)	1024x768, 16.7M colors (32-bit)
Network Card	Ethernet 10BASE-T	Ethernet 100BASE-T

Installation Procedure

- Insert the Software Disc into a CD-ROM drive on the computer. After a few seconds the disc browser should start automatically.

HINT: *If the disc browser does not start for any reason, start it manually by running the setup.exe file located on the root of the disc.*

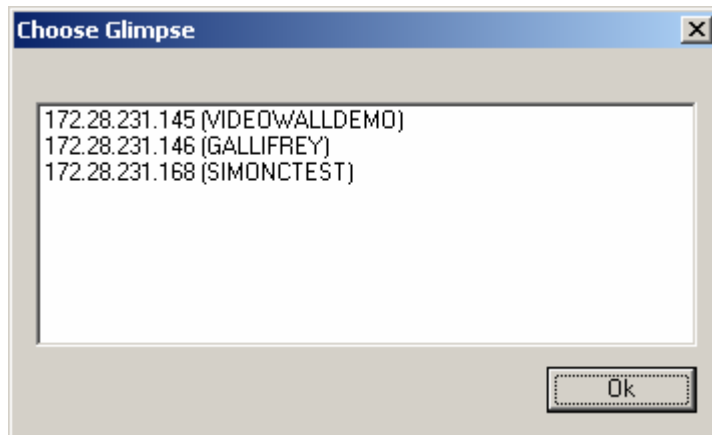
- Click on the Install VN-GLIMPSE Setup Utility option then follow the on-screen instructions.

Using the VN-GLIMPSE Setup Utility

To start the Setup Utility...

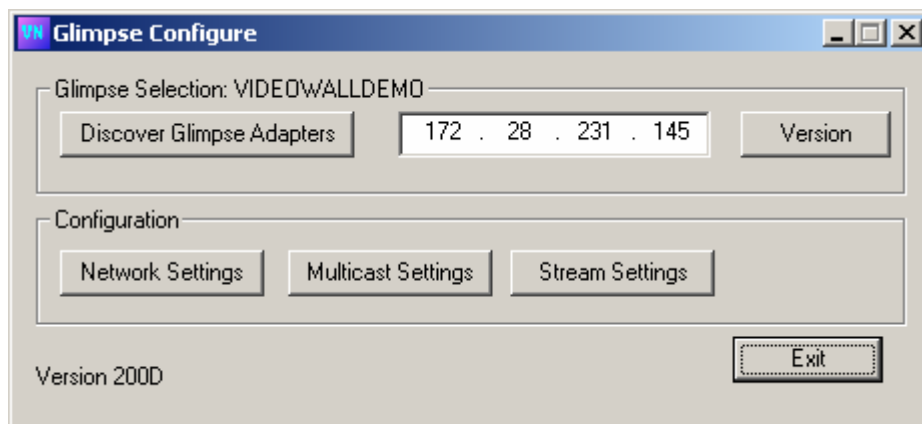
- ☞ From the **Start** menu, choose **Programs** | **Electrosonic** | **GlimpseConfigure**.

The Choose Glimpse dialog will appear, listing all VN-GLIMPSE RGB ADAPTERS found on the network:



- ☞ Click on the address of the unit you want to connect to, and then click the **OK** button.

The main dialog of the Setup Utility will then appear:

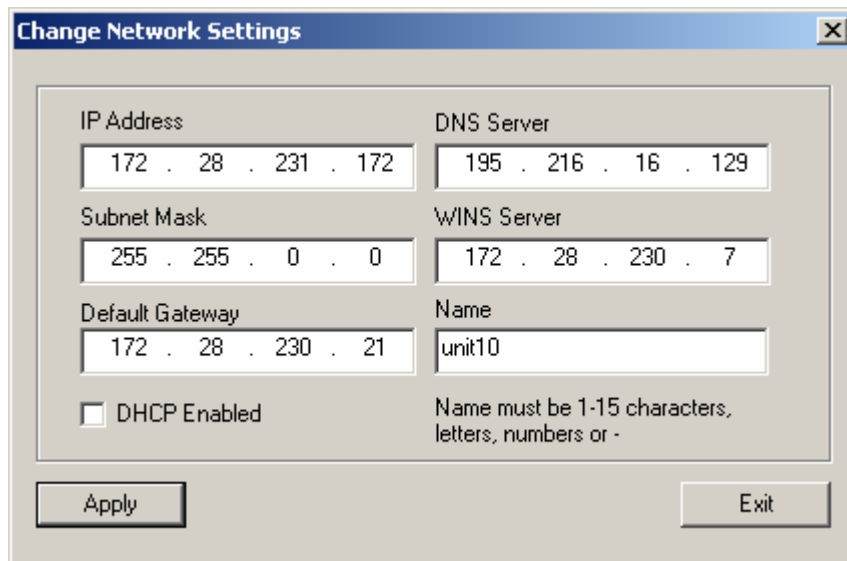


HINT: If you want to select a different RGB ADAPTER, or check for a previously 'missing' unit, click the **Discover Glimpse Agents** button. The Choose Glimpse dialog will then reappear.

To change Network Settings (including IP Address)...

- Click the **Network Settings** button.

The Change Network Settings dialog will appear:



The 'Change Network Settings' dialog box contains the following fields and controls:

Field	Value
IP Address	172 . 28 . 231 . 172
Subnet Mask	255 . 255 . 0 . 0
Default Gateway	172 . 28 . 230 . 21
DNS Server	195 . 216 . 16 . 129
WINS Server	172 . 28 . 230 . 7
Name	unit10

☐ DHCP Enabled

Name must be 1-15 characters, letters, numbers or -

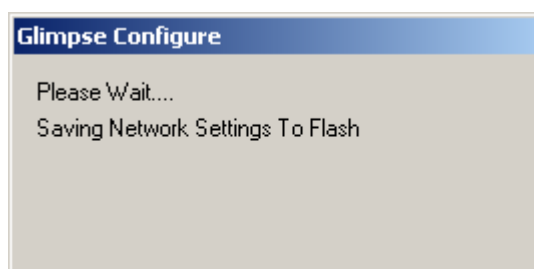
Buttons: Apply, Exit

- Change the settings as required.

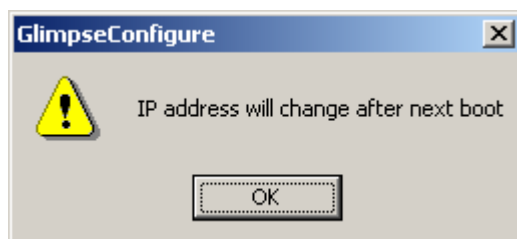
HINT: Here you can set a new IP address, subnet mask or select DHCP (automatic assignment of an address by the host network). In addition, you can assign a name to the RGB ADAPTER; this will require you to specify the address of a DNS and WINS server as well as the name. The name must be 1 to 15 characters long and comprise letters and numbers. It can also include the dash character '-' but must not contain any spaces. The first character must be a letter.

- Click the **Apply** button to save the new settings or **Exit** to retain the existing settings.

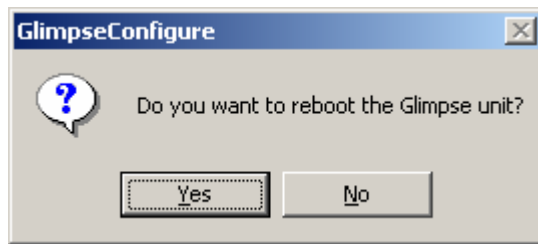
If you clicked Apply, the following message will display for a few seconds, while the new settings are stored:



Once the settings have been saved, the following message will appear:



- Click **OK** to continue. The following dialog will now appear:

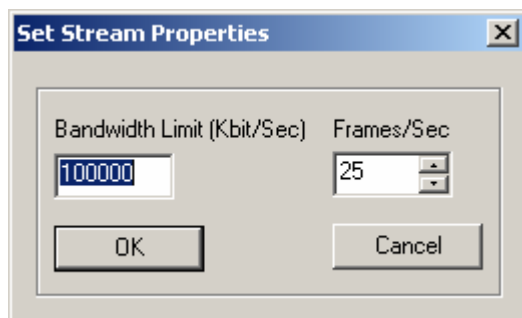


- To reboot the RGB ADAPTER and implement the new settings now, click **Yes**. Otherwise, click **No** — the settings will be implemented the *next* time that the RGB ADAPTER is rebooted.

To change Encoder Parameters (Stream Settings)...

- Click the **Stream Settings** button.

The Set Stream Settings dialog will appear:



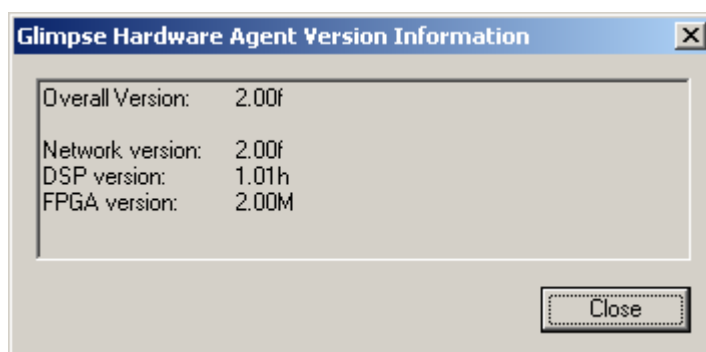
- To change the maximum refresh rate, adjust the **Frames/Sec** value.
- To change the maximum bandwidth available to the RGB ADAPTER, set the **Bandwidth Limit** value as required.

HINT: For advice about using these parameters, see 'Understanding VN-GLIMPSE Performance' (pages 56-58).

To check the current Firmware Version...

- Click the **Version** button.

The Version Information dialog will appear:



SECTION 4:

VN-GLIMPSE VIEWER

Introduction

The VN-GLIMPSE VIEWER is a small software application that is used to display VN-GLIMPSE sources on a conventional computer or laptop.

VN-GLIMPSE sources are captured using either:

- VN-GLIMPSE SERVER (software-based capture), or
- VN-GLIMPSE RGB ADAPTER (hardware-based capture)

Any number of VN-GLIMPSE sources can exist on a given network. VN-GLIMPSE VIEWER can connect to only one source at a time.


Installing the Glimpse Viewer

Minimum Computer Requirements

The VN-GLIMPSE VIEWER must be installed on a computer that meets or exceeds the following minimum specification:

	Minimum	Recommended
Operating System	Windows NT4 (SP6)	Windows 2000, XP
Processor	Any processor with MMX instruction set	Pentium 3 or higher
Memory (RAM)	64MB	128MB
Hard Disk Free Space	1MB	>1MB
Graphics	1024x768, 65K colors (16-bit)	1024x768, 16.7M colors (32-bit)
Network Card	Ethernet 10BASE-T	Ethernet 100BASE-T

Installation Procedure

-  Insert the Software Disc into a CD-ROM drive on the computer. After a few seconds the disc browser should start automatically.

HINT: *If the disc browser does not start for any reason, start it manually by running the setup.exe file located on the root of the disc.*

-  Click on the Install VN-GLIMPSE VIEWER option then follow the on-screen instructions.

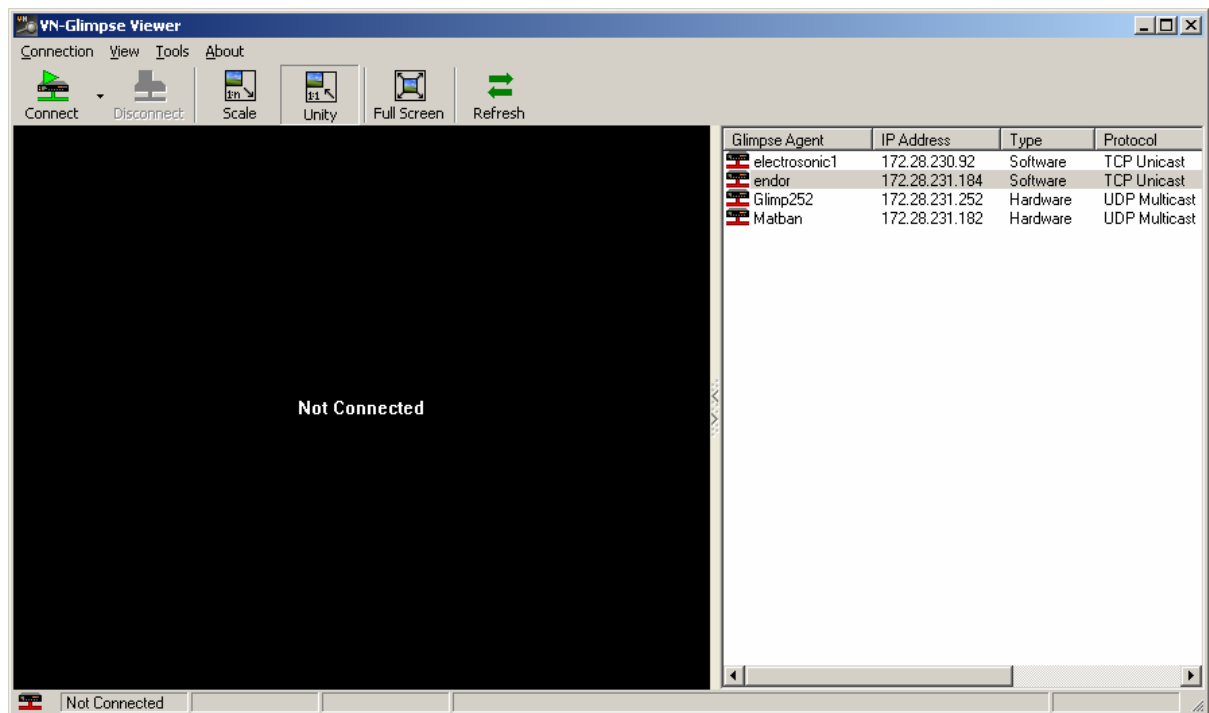
Using the VN-GLIMPSE VIEWER

To start the VN-GLIMPSE VIEWER...

From the **Start** menu, choose **Programs | Electrosonic | VN-GlimpseViewer**.

VN-GLIMPSE VIEWER will now begin detecting VN-GLIMPSE sources available on the network. This process may take several seconds to complete, especially if there are a large number of sources.

The VIEWER interface will then appear:



On the left-hand side is the Source Window which displays the currently 'connected' source. When no source is connected, it appears black, with the message 'Not Connected'.

On the right-hand side is the Channel List which shows all the currently available VN-GLIMPSE sources. The following details are displayed for each source:




- **Glimpse Agent** – network name of a hardware agent or the name of the host computer for a software agent;
- **IP Address** – of the hardware agent or host computer for a software agent;
- **Type** – whether it is a Hardware or Software agent;
- **Protocol** – the method used to carry source data across the network, either TCP Unicast (allowing one client connection) or UDP Multicast (allowing multiple clients).
- **Multicast Group*** – the address of a Multicast source.
- **Port*** – the port number being used by the Multicast source. VIEWER receives data on port 5000 only.

NOTE: Parameters marked * are not applicable to software agents (e.g. VN-GLIMPSE SERVER)

To refresh the Source List...

The Channel List is not automatically updated to show the current status of all sources. For example, if a new source is added once VN-GLIMPSE VIEWER has been started, it will not automatically appear in the source list.

To ensure that the list of VN-GLIMPSE sources is up-to-date you can manually refresh it (*i.e.* redetect all sources) by doing any one of the following:

-  Click the **Refresh** button on the **Task** area, or
-  Select **Refresh Channel List** from the **View** menu, or
-  Press **F5** on the keyboard.

IMPORTANT NOTE *Sources that are located on a different subnet to VN-GLIMPSE VIEWER will not automatically appear in the Channel List. Use the Connect dialog box to connect to and view these sources (see page 38).*

Source Connection and Disconnection

To connect to a Source using the Channel List...

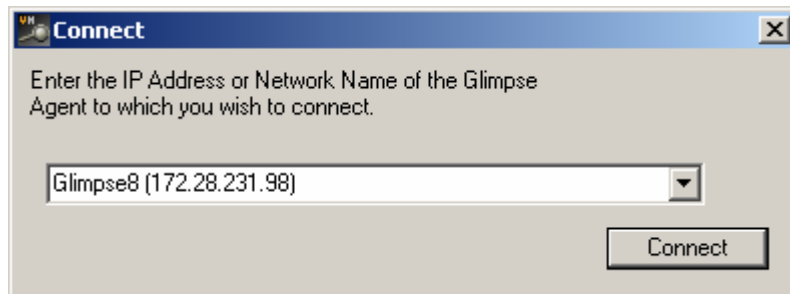
- ☞ Double-click the required source name or IP Address in the Channel List.

Alternatively, highlight the required source (single-click) then click the Connect button on the toolbar.

HINT: *If the required source is not displayed, try refreshing the list by clicking the Refresh button on the toolbar, or choosing Refresh Channel List from the View menu, or pressing F5 on the keyboard.*

To connect to a Source using the Connect dialog box...

- ☞ From the **File** menu choose **Connect To**. The following dialog will appear:



- ☞ Enter either the IP Address or Name of the source that you want to connect to.

HINT: *The drop-down list shows the most recently entered or selected sources. If required, you can select one of these.*

- ☞ Click the **Connect** button.

To disconnect from a source...

- ☞ Click the **Disconnect** button on the toolbar.

Alternatively, choose Disconnect from the File menu.

Viewing Options

The VN-GLIMPSE VIEWER provides a number of options for setting the viewing environment. You can choose to:

- View the source at its original resolution (unity) or scaled to fit the available window size.
- View the source full screen (*i.e.* without the menu bar, toolbar, channel list, *etc.*)
- Hide/show the VIEWER toolbar, channel list and/or status bar.
- Hide/show the current source refresh rate and data bandwidth on the status bar.

To view the source full screen...

☞ Click the **Full Screen** button on the toolbar.

Alternatively, choose Full Screen from the View menu, or press Alt+Enter on the keyboard.

☞ To return to normal view press **Esc** or **Alt+Enter** on the keyboard.

To select unity or scale mode...

☞ Click the **Unity** or **Scale** button on the toolbar.

Alternatively, choose Unity or Scale from the View menu.

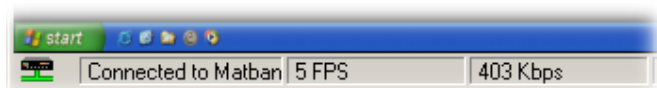
NOTE: If the source is larger than the available window space, selecting the unity option will crop the visible image. Scroll bars will appear allowing you to select which part of the source frame you want to view.

To hide/show the toolbar, channel list or status bar...

☞ From the **View** menu choose either **Toolbar**, **Status Bar** or **Channel List** to toggle the item visibility.

The corresponding item is visible when a checkmark is displayed next to it in the menu.

To hide/show the source refresh rate on the status bar...



☞ From the **View** menu choose **Frame Rate Display** to toggle the item visibility.

NOTE: The maximum capture rate is defined by the VN-GLIMPSE SERVER or VN-GLIMPSE RGB ADAPTER that is streaming the source. It cannot be changed using the VN-GLIMPSE VIEWER.

HINT: To set the maximum capture rate of a VN-GLIMPSE RGB ADAPTER, use either the Setup Utility (see page 32) or the VN-GLIMPSE ADMINISTRATOR application (supplied on the Software Disc). To set the refresh rate of a VN-GLIMPSE SERVER, choose Set Capture Rate from the Capture Rate menu, and then enter the new maximum rate (captures/sec).

Remote Mouse and Keyboard Control

This feature allows the mouse and keyboard (of the computer running VN-GLIMPSE VIEWER) to emulate mouse and keyboard operation on the source computer.

Remote mouse and keyboard control can be used with software agents and also with hardware agents that are operating in TCP unicast mode. Hardware agents operating in UDP multicast mode cannot be remotely controlled since they can have more than one viewing client connected.

A remote control 'session' is initiated by the viewing client. A session can be terminated automatically after a preset period of mouse/keyboard inactivity ('timeout'), or manually by pressing a predefined 'hot key' on the keyboard.

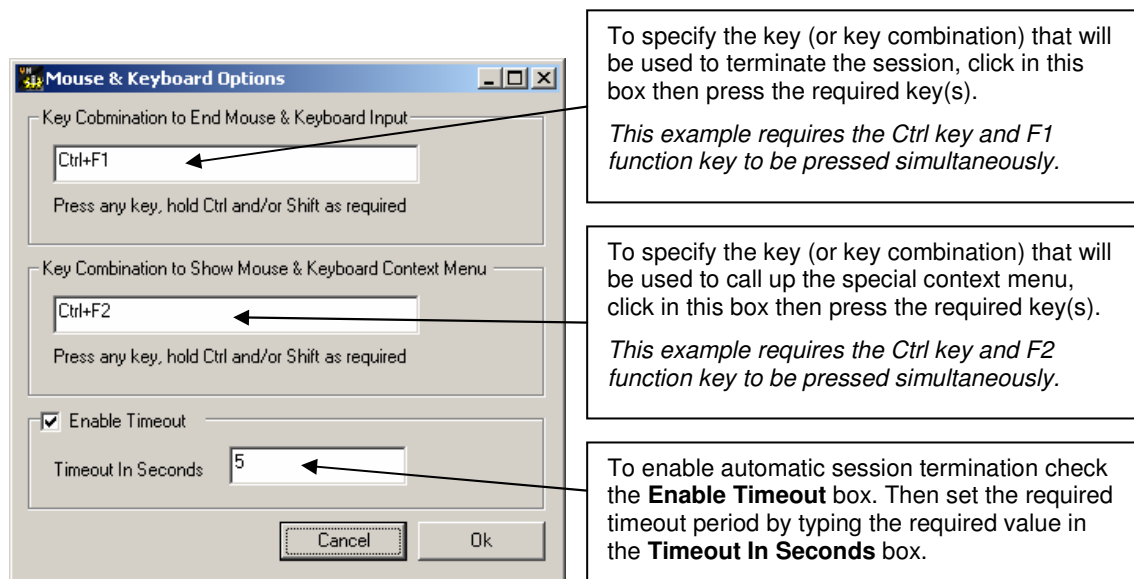
To enable/disable remote mouse and keyboard control...

☞ From the **Tools** menu choose **Mouse & Keyboard**.

*When this option is checked, remote control is enabled.
When this option is unchecked, remote control is disabled.*

To set up mouse and keyboard control options...

☞ From the **Tools** menu choose **Mouse & Keyboard Options** to show the following dialog:



☞ Change the settings as required, and then click **OK** to save the settings.

Using Mouse and Keyboard Control

To use remote mouse and keyboard control you first need to 'connect' to the source and open a viewer window (as described on page 38).

To start a mouse and keyboard control session...

- ☞ Click anywhere in the source area of the viewer window.

A red border will appear around the source area, showing that a control session is now active.

- ☞ You can now use the mouse and keyboard to control the source computer.

Remember, if automatic session termination is enabled (see page 40) the session will terminate after a predefined period of mouse and keyboard inactivity.

To manually stop a mouse and keyboard control session...

- ☞ Press the predefined key (or key combination) on the keyboard. By default this is set to **Ctrl+F1** (i.e. pressing the Ctrl and F1 function keys simultaneously).

To access the special context menu during a control session...

- ☞ Press the predefined key (or key combination) on the keyboard. By default this is set to **Ctrl+F2** (i.e. pressing the Ctrl and F2 function keys simultaneously).

The context menu allows access to send the following 'special' keys and key combinations to the remote computer:

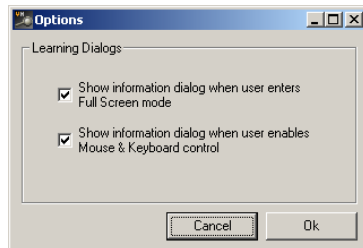
Ctrl + Alt + Delete	to call up the Windows Security (Task Manager) dialog
Windows key	to display the Windows Start menu
Windows + Tab	to switch between applications
End Keyboard And Mouse	(to end the control session)

- ☞ Click the required option to continue, or the **Esc** key to clear the menu.

Learning Dialogs

When performing certain operations, VN-GLIMPSE VIEWER displays a 'learning dialog' giving helpful tips and information. As you get more familiar with using VIEWER you may prefer to turn off these dialogs.

☞ From the **Tools** menu, choose **Options** to open the following dialog:



☞ Uncheck the appropriate boxes to disable the learning dialogs, then click **OK**.


Command line switch options

The VN-GLIMPSE VIEWER may be launched with a number of command line switches that affect its startup behavior.

Command line switch	Function
-c [server IP address]	Connect to server
-r	Connect to last server
-f, -s, -u	Display mode -f = Full screen -s = Scaled screen -u = Unity mode
-n	Do not show splash screen on start up
-t	Hide tool bar
-a	Hide status bar
-l	Hide channel list
-m	Hide main menu
-d	No discovery on launch

The command line switches may be used separately or together


Command line switch examples:

 To connect to a server on launch

"C:\Program Files\Electrosonic\VN-Glimpse Viewer 5\VN-Glimpse Viewer.exe" -c 172.28.228.105

Note:


*There are quotation marks around the path and application part of the command line;
There are spaces before and after the -c.*

 To connect to a server on launch and hide the splash screen

"C:\Program Files\Electrosonic\VN-Glimpse Viewer 5\VN-Glimpse Viewer.exe" -c 172.28.228.105 -n

Note:

The space before the -n.

 To connect to a server on launch, hide the splash screen and display in unity mode

"C:\Program Files\Electrosonic\VN-Glimpse Viewer 5\VN-Glimpse Viewer.exe" -c 172.28.228.105 -n -u

Note:

The space before the -u.

SECTION 5:

Technical Data

Mechanical Data

Overall Dimensions: *Width:* 200mm (7.9 inches)
Depth: 155mm (6.125 inches) *[including rear sockets]*
Height: 44mm (1.75 inches) *[excluding rubber feet]*
47mm (1.85 inches) *[including rubber feet]*

Average Weight: 0.67 kg (1.5 lbs)

Operating Conditions

Ambient Temperature: 5°C to 35°C (41°F to 95°F).
Ambient Humidity: 85% maximum (non-condensing).
Location: Free-standing or 19" Rack-mounting (using approved kit).

Power Supply

RGB ADAPTER

Supply Voltage: 12V DC Regulated.
Supply Current: 1.5A max.

PSU

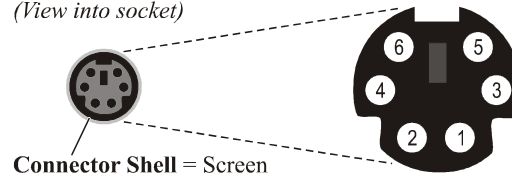
Supply Voltage: 100 – 240V AC nominal.
Supply Frequency: 50 – 60 Hz nominal.
Supply Current: 0.45A maximum.
Supply Connector: IEC320 'Europlug'.

Control Inputs/Outputs

Keyboard/Mouse Connectors

Function: Keyboard and mouse pass-through connections for source computer.
Connector Type: 6-pin mini-DIN (female)
Pin-out Details:

(View into socket)



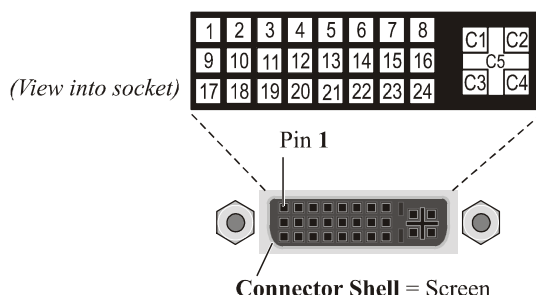
Pin	Function
1	Data
2	No connection
3	Ground
4	+5V supply*
5	Clock
6	No connection

** 5V on pin 4 limited to 200mA by thermal fuse.*

Mating Connector: 6-pin mini-DIN (male).
Recommended Cable: Supplied PS/2 cable.
Max. Cable Length: 2.95 metres (9.5 feet).

Monitor Connectors

Function: Monitor pass-through connections for source computer.
 Connector Type: DVI-I (female).
 Pin-out Details:



Digital Connections

Pin	Function	Pin	Function	Pin	Function
1	TMDS 2-	9	TMDS 1-	17	TMDS 0-
2	TMDS 2+	10	TMDS 1+	18	TMDS 0+
3	Ground (2/4)	11	Ground (1/3)	19	Ground (0/5)
4	TMDS 4-	12	TMDS 3-	20	TMDS 5-
5	TMDS 4+	13	TMDS 3+	21	TMDS 5+
6	DDC Clock	14	+5V supply*	22	Ground (Clk)
7	DDC Data	15	Ground (for 5v)	23	TMDS Clock+
8	Analog V-Sync	16	Hot Plug Detect	24	TMDS Clock-

* Loop-thru connection only — 5V supply is provided by source.

Analog Connections

Pin	Function
C1	Red Signal
C2	Green Signal
C3	Blue Signal
C4	Horizontal Sync
C5	Ground

NOTE:
Analog Vertical Sync
is on pin 8.

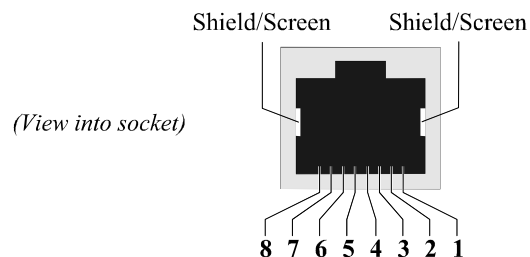
Mating Connector: DVI-D or DVI-I (male).
 Recommended Cable: Supplied DVI cables.
 Maximum Cable Length: 2.95 metres (9.5 feet).
 Signal Type: DVI (PanelLink® TMDS).
 Pixel Clock: 25MHz – 165MHz.
 Supported Sources: See table on page 48.
 Color Depth: 24-bit maximum.
 Scan Mode: Progressive.
 DVI Standard: DVI 1.0
 Display Data Channel
 Standard: DDC2B.
 DDC Levels: $V_{IH} = 2.4V$
 $V_{OH} = 0.9V$
 $I_{LOADMAX} = 2mA$

Supported Source Formats

Source Resolution	Digital	Analog		
		<i>H & V Sync</i>	<i>Composite Sync</i>	<i>Sync on Green</i>
640x480@60Hz	✓	✓	✓	✓
640x480@72Hz	✓	✓	✓	✓
640x480@75Hz	✓	✓	✓	✓
640x480@85Hz	✓	✓	✓	✓
600x800@56Hz		✓	✓	✓
600x800@60Hz	✓	✓	✓	✓
600x800@72Hz	✓	✓	✓	✓
600x800@75Hz	✓	✓	✓	✓
600x800@85Hz	✓	✓	✓	✓
1024x768@60Hz	✓	✓	✓	✓
1024x768@70Hz	✓	✓	✓	✓
1024x768@72Hz	✓			
1024x768@75Hz	✓	✓	✓	✓
1024x768@85Hz	✓	✓	✓	✓
1152x864@75Hz	✓	✓	✓	✓
1280x1024@60Hz	✓	✓	✓	✓
1280x1024@75Hz		✓	✓	✓
1280x1024@85Hz		✓	✓	✓
1600x1200@60Hz (162MHz)		✓	✓	✓
1600x1200@60Hz (135MHz)				

Network Connector

Function: Connection to a local area network and/or control PC.
 Connector Type: Shielded RJ-45 Socket.
 Pin-out Details:



Pin	Function	Pin	Function
1	TD+ (+ data transmit)	5	NC
2	TD- (- data transmit)	6	RD- (- data receive)
3	RD+ (+ data receive)	7	NC
4	NC	8	NC

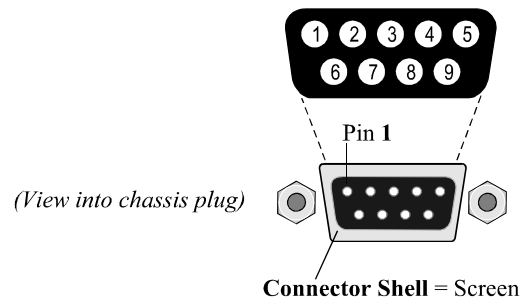
Mating Connector: Shielded RJ-45 Plug.
 Recommended Cable: Shielded twisted pair (STP).
 Max. Cable Length: 100 metres (330 feet).
 Comms Standard: 10Base-T, 100Base-T.
 Ethernet (MAC) Address: 00:E0:AA:03:xx:xx
 where xx:xx is a unique hex address for each unit.
 IP Address: Factory-set default is 172.28.231.98.
 User-definable via setup utility & VN-GLIMPSE ADMINISTRATOR.

Serial (RS-232) Connectors

Function: COM1 – used for low level setup or system recovery.
COM2 – reserved for future expansion.

Connector Type: 9-pin D-type (male)

Pin-out Details:



Pin	Function	Pin	Function
1	DCD	6	DSR
2	RX (data in)	7	RTS
3	TX (data out)	8	CTS
4	DTR	9	RING
5	Ground		

Mating Connector: 9-pin D-type (female) with metal cover

Recommended Cable: 6-core plus overall screen (low capacitance),
0.22mm² min. per core.

Max. Cable Length: 2.95 metres (9.5 feet).

Comms Standard: RS-232.

COM1 Default Setting: *Baud:* 115200
Bits: 8
Parity: None
Stop Bits: 1
Flow Control: None

APPENDIX A:

Guide to IP Addressing

What is an IP Address?

A full explanation of IP addressing is beyond the scope of this user guide. However the following details will provide you with enough information to get started.

An IP Address is a 32-bit binary number that is used to identify each device on an Ethernet network. This number is usually represented by four decimal numbers (each in the range 0 to 255) separated by dots, *e.g.* 198.123.34.240. This is called 'dotted decimal notation'.

An IP Address is divided into two parts:

- the 'network identifier', and
- the 'host identifier'.

On a given network each address must have the same network identifier value but have a unique host identifier. There are, therefore, different 'classes' of address which define:

- the range of valid addresses, and
- which parts of the address are used for the network and host identifiers.

The most common IP Address classes are:

Class Name	Valid Address Range	Identifier Arrangement*
Class A	0.0.0.1 to 127.255.255.254	NNN.HHH.HHH.HHH
Class B	128.0.0.1 to 191.255.255.254	NNN.NNN.HHH.HHH
Class C	192.0.0.1 to 223.255.255.254	NNN.NNN.NNN.HHH

*Where: NNN = Network identifier
HHH = Host identifier

Private & Public Address Ranges

Within each of the above classes are a range of addresses designated as 'private' addresses. These are addresses which should only ever be used on private local networks and intranets and cannot be accessed directly from the internet.

10.0.0.0 – 10.255.255.255
172.16.0.0 – 172.31.255.255
169.254.0.0 – 169.254.255.255
192.168.0.0 – 192.168.255.255

All other addresses outside these ranges are considered 'public' addresses.

Multicast Address Range

A further range of addresses are available for multicast usage:

224.0.0.0 – 239.255.255.255

These addresses (also known as Class D addresses) are used to allow several devices to be part of the same multicast group. Each device in the group has the same multicast address and can effectively send data to all other devices in the same group simultaneously.

Choosing IP Addresses

If your RGB ADAPTER(s) and control PC are directly connected, or connected via their own independent network, then follow the guidelines below for choosing your IP Address(es).

However, if you intend connecting your RGB ADAPTER (s) and control PC to an existing network, you will need to advise the network administrator and ask them to allocate suitable addresses to you.

On an independent network you can (in theory) use just about any addresses you wish. However, it is generally recommended that you use the Class C format (*i.e.* from 192.0.0.1 up to 223.255.255.253).

Remember that there are two rules for choosing IP Addresses:

- the network identifier must be the same for each address, and
- the host identifier must be unique for each address.

Applying these rules to Class C addresses, it can be seen that the first three decimal values of your IP Addresses must all be the same, while the last value is used to uniquely identify each device.

The following is an example of a valid Class C addressing scheme:

Device	IP Address
Device 1	208.132.180.41
Device 2	208.132.180.42
Device 3	208.132.180.43

NOTE: *The host identifiers (e.g. 41, 42, and 43 in the above example) need not be sequential or in any particular order. However, it is recommended that you group the numbers for simplicity.*

The following is an example of an **invalid** Class C addressing scheme:

Device	IP Address
Device 1	208.132.180.41
Device 2	192.157.180.42
Device 3	209.100.123.43

NOTE: *These are invalid because the network identifier for each address is not the same, even though each IP Address is unique.*

You can use the Ping command from your computer to check that a device at a particular address is responding correctly (see page 54).

Subnet Mask

The Subnet Mask is another 32-bit binary number that is used to 'mask' certain bits of the IP Address. This provides a method of extending the number of network options for a given IP Address. It works by allowing part of the host identifier to be used as a 'subnet identifier'. Any further explanation of this facility is not relevant here.

However, it is important that you set the correct value for the Subnet Mask. The basic values depend on the class of IP Address being used:

Class Name	Subnet Mask
Class A	255.0.0.0
Class B	255.255.0.0
Class C	255.255.255.0

Using the 'Ping' Utility to Test Communications

You can test for communications between a Windows computer and another device on the same network by using the Windows Ping utility.

- From the Windows Desktop of the computer, click on the **Start** button, and select **Run** from the pop-up menu.

The Run dialog box will appear.

- In the Open box, type in the following command:

```
ping xxx.xxx.xxx.xxx -t
```

where xxx.xxx.xxx.xxx is the IP Address of the device (e.g. an RGB ADAPTER) that you want to test.

- Click on the **OK** button or press the **Enter** key.

A text window will appear showing a series of response messages; these are explained below.

- To stop the ping utility, press **Ctrl + C** on the keyboard.

Response Messages

When you run the Ping utility, it will display a series of response messages, which you can use to determine the state of the communications link. For example, if you have 'pinged' a device with the address 208.132.180.48, you should get a message similar to the following:

```
Reply from 208.132.180.48: bytes=32 time=2ms TTL=32
```

This is the correct response which indicates that the device at the specified address is communicating correctly. Note that the response 'time' value may vary according to network traffic.

If you get the message...

```
Request timed out.
```

...this indicates that there has been no response from the specified address. Either the processor is not receiving data from the computer or not sending data back. Check that the device is powered-up and set to the same address that you 'pinged'. Also, check that you are using the correct type of connecting cables (i.e. 'straight through' or 'crossover') and that they are not damaged or faulty.

If you get the message...

```
Reply from 208.132.180.48: Destination host unreachable.
```

...this indicates that the IP Address of the computer is not in the same 'class' (or subnet) as that of the device being 'pinged'. Check that the SubNet Mask on both the computer and the device are set to the same value (see page 53). Also check that both IP Address are within the correct range for the chosen class and are compatible (see page 53).

APPENDIX B:

Understanding VN-GLIMPSE Performance

Understanding VN-GLIMPSE Performance

In an ideal VN-GLIMPSE system, the source seen at the viewing station should be virtually indistinguishable from the original source. However, in certain circumstances, you may notice some reduction in performance. The following details are intended to explain the problems you may encounter and how to minimize or avoid them.

What are the performance criteria?

Image Refresh Rate – how often the display content is updated. Ideally this should match (or be as close as possible to) the refresh rate of the original source. As the refresh rate decreases a loss of smooth motion will be noticed. For example, a moving mouse cursor will appear to move smoothly at a fast refresh rate but will appear more ‘jerky’ at slower rates.

The RGB ADAPTER features a variable source refresh/update rate. To ensure smooth motion it will use the highest possible refresh rate. However, during periods of intense screen activity, the refresh rate may be temporarily reduced to compensate for the higher volume of data.

Image Latency – how quickly a change in the original source takes to be seen in the viewed source. Ideally this should be instantaneous (*i.e.* in ‘real time’). In practice, there will always be some delay introduced by the electronics and software that processes the data between the original source and the viewing station, but this will usually be small enough to be ignored. As the latency increases a greater ‘time lag’ will become noticeable between events happening in the original source and the same events being seen in the viewed source.

Image Quality – the sharpness and color of the viewed source in comparison to the original. When viewed at the same resolution as the original, there should be no discernable differences. However, if any scaling is applied to the source (*i.e.* displayed smaller or bigger than the original) there will always be some small loss of sharpness. This is an inherent side-effect of image scaling.

What can affect these criteria?

Data Stream ‘Bottlenecks’

The VN-GLIMPSE RGB ADAPTER only streams data relating to ‘changes’ in the source display. Therefore, a source containing a lot of movement (e.g. an MPEG movie) will create more data than a source with little or no movement (e.g. a spreadsheet file). Changes in latency or refresh rate can arise when a ‘bottleneck’ occurs at some point in the data path which restricts the flow of data. The potential bottlenecks are:

Data Encoding – Data from the source capture process is encoded into a VN-GLIMPSE data stream and sent to the network. Under normal circumstances, the RGB ADAPTER is capable of encoding most sources without any difficulty. However, if you are using a high resolution source containing a lot of movement, the encoder may generate more data than can be transmitted between frame captures. In this situation the encoder can temporarily reduce the refresh rate allowing more time for the data to be sent. See ‘Adjusting the Encoder Parameters’ (page 58).

HINT: *Apart from the improved image quality provided by digital sources, they are also more efficient on encoding. This is because analog sources invariably contain a certain amount of noise and this can add to the overall content of the data stream. In addition, analog sources may produce ‘contouring’ effects during motion.*

Network Bandwidth – This is the total volume of data that can be handled by the network at any given time. If you have a high bandwidth network and only one RGB ADAPTER it is unlikely that you will ever experience any problems. However, in extreme circumstances if you have a low bandwidth network, a network with heavy traffic, or you are using several RGB ADAPTERs, you may find that the available bandwidth is insufficient to cope during peak demand. It is important to note that the network will only be as good as its weakest link. For example, if you have a 100BASE-T network with a 10BASE-T router, the effective bandwidth could be much less than expected.

Data Decoding – Whatever viewing platform you are using (i.e. the VN-GLIMPSE VIEWER running on a computer or a VN-2400 Processor) the efficiency with which the data stream is decoded will largely depend on the capacity of CPU (central processing unit). As with the encoding process, the decoder can choose to reduce the refresh rate.

The most likely cause of a bottleneck here is by placing too much demand on the CPU, such that it cannot decode the VN-GLIMPSE data stream quickly enough:

- If you are using the VN-GLIMPSE VIEWER, the CPU of the computer should be as fast as possible. Also, remember that running other applications at the same time as the VIEWER will create extra demand for the CPU.
- If you are using a VN-2400 Processor, remember that the number of sources it is displaying together with the content of those sources will impact on how much work the CPU has to do.
- Sources that are scaled up or down (rather than being viewed at their native resolution) will require more CPU time. See ‘Source Scaling’ below.

Source Scaling

For optimum viewing, it is preferable to display a source at its native resolution (i.e. unity, not scaled). This results in the viewed source being simply a pixel-for-pixel copy of the original. This keeps processing to a minimum and ensures the best possible image quality.

Scaling a source requires each pixel value to be recalculated and, consequently, will place a high demand on the CPU. This can lead to increased latency and reduced refresh rates as described above. In addition, since each pixel is recalculated, the image may not appear as sharp as the original. This will become more noticeable as the image gets smaller, especially if the image contains fine detail.

Adjusting the Encoder Parameters

Using the VN-GLIMPSE Setup Utility (see page 32) you can set the following parameters:

- **Bandwidth Limit** – If you are using a large number of RGB ADPATTERS or you have a slow/busy network, you can reduce this value which sets the *maximum* possible flow of data being streamed onto the network. However, remember that this could cause the refresh rate to be reduced, especially during periods of high source activity.
- **Refresh Rate** (frames/sec) – If you have a source which does not require a particularly high refresh rate, but has a reasonably active content you can set the *maximum* possible refresh using this value. By keeping the Bandwidth Limit high you can keep both latency and the average bandwidth usage to a minimum.

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ELECTROSONIC

UK - London

Hawley Mill, Hawley Road, Dartford, Kent. DA2 7SY
Tel: +44 1322 222 211 Fax: +44 1322 282 282
E-mail: information@electrosonic-uk.com

USA - Minneapolis

10320 Bren Road East, Minnetonka, MN 55343
Tel: +1 952 931 7500 Fax: +1 952 938 9311
E-mail: information@electrosonic.com

USA - Los Angeles

3320 North San Fernando Blvd, Burbank, CA 91504
Tel: +1 818 333 3600 Fax: +1 818 566 4923
E-mail: information@electrosonic.com

USA - New York

11 H Princess Road, Lawrenceville, NJ 08648
Tel: +1 609 219 9494 Fax: +1 609 219 1538
E-mail: information@electrosonic.com

USA - Orlando

4525 Vineland Road, Suite 209, Orlando, FL 32811
Tel: +1 407 839 1154 Fax: +1 407 839 2055
E-mail: information@electrosonic.com

Germany - Düsseldorf

Kronprinzenstrasse 132, D-40217, Düsseldorf
Tel: +49 2832 799708 Fax: +49 2832 799646
E-mail: information@electrosonic-uk.com

Hong Kong

702 Lyndhurst Tower,
1 Lyndhurst Terrace, Central, Hong Kong
Tel: +852 2525 1828 Fax: +852 2877 5811
E-mail: infoasia@electrosonic-uk.com

Web Site: www.electrosonic.com

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