A CLEAR-COM COMPANY

Gemini

Digital Intercom

Implementation Guide

ISSUE 3.4

TRILOGY COMMUNICATIONS LIMITED
26 Focus Way
Andover
Hampshire
SP10 5NY
United Kingdom
Telephone. +44 (0) 1264 384000
Fax. +44 (0) 1264 334806
www.trilogycomms.com

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3.0	14 May 2014	Additional option boards	
3.1	18 August 2015	Reformat	
3.2	28 February 2016	New logo, beltpack revision	
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3.4	26 January 2018	Updated for software v5.2.0.3	

CONTENTS

1. INTRODUCTION

Trilogy's pioneering Gemini 'Distributed Matrix' Intercom addresses the demanding needs of today's broadcast and professional media industries namely; expandable structure to cope as requirements change, choice of operator panels to suit both application and user, simple installation over short and long distances and absolute reliability, to deliver a unique intercom solution that combines full programme quality audio with integrated IP capability.

Gemini's architecture is built on the concept of a de-centralised, scalable platform of 32 port matrices each with IP connectivity. The 20 kHz audio performance is preserved both internally and over a Gemini network of up to 256 ports using the proprietary High Speed Link (HSL) over standard Cat 6 or fibre connections. This approach eliminates the single point of failure, and combined with both the use of a dual redundant ring of audio and IP failsafe routing ensures that Gemini delivers ultra-resilient performance.

Gemini's flexible design is suited to every application ranging from small single studios to the largest multi-studio complex and then using Gemini's seamless IP interfacing a network can be expanded almost limitlessly both in terms of system size and geographic location via LAN, WAN or Satellite. Intuitive system operation allied to connectivity for both traditional and IP enabled intercom panels together with support for telephony and intelligent interfacing to analogue and SIP enabled phone systems and portable devices makes Gemini undoubtedly the most flexible system available today.

1.1 RELATED DOCUMENTS

Document	*Description*	*Document*	*Description*
70090622	Gateway Configuration Guide	70090628	Control Panel Installation Guide
70090620	Gemini Implementation Guide - *This Document*	70090626	Messenger Implementation Guide
70090630	Gemini Quick Start Guide	70090627	Messenger Quick Start Guide

1.2 SYSTEM IMPLEMENTATION

This manual provides installation information for the Gemini Intercom system. Cabling and pin-out information is included for all of the Trilogy manufactured items plus some commonly used third party equipment. Other information relating to the hardware configuration will be useful if the system is upgraded or expanded in the future.

- **Section 2** covers the matrix assembly and installation, to the point where the matrix may be powered.
- **Section 3** explains the use of the Gemini front touch screen.
- **Section 4** covers the browser based management interface.
- **Section 5** covers all of the cabling necessary to complete the installation and gives details of the range of option boards.
- **Section 6** provides information on connecting multiple matrices to form a network.
- **Section 7** provides information on installing other equipment (e.g. telephones, radio talkback).
- **Section 8** explains the firmware upgrade feature provided by the Gateway editor.
- **Section 9** gives the system specification for matrix hardware, control panels and the configuration computer.

For further assistance please contact Trilogy Communications Technical Support Department at the address given at the front of this document. You may also contact us via the website at -- www.trilogycomms.com or directly by e-mail at support@trilogycomms.com.

1.3 Options Available and Module Type Numbers

Please contact our Sales Department for a complete listing of the current module types.
Each Gemini matrix unit is available with 1, 2, 3 or 4 option boards, providing a mix of panel, audio and telephony facilities. Extra option boards may be easily fitted at any time. The second (redundant spare) power supply and the DSP board (which enables networking over IP) are also available as options, either with the initial purchase or later.

Part Number	*Description*
700-26-15	Gemini Redundant Power Supply
700-26-18	HSL Fibre Interface Adaptor
700-26-20	8 port Audio Expansion Board (AEB)
700-26-21	AES / MADI Interface Board
700-26-23	4 line Telephony Board (FXO)
700-26-25	IP Panel Interface (IPPI)
700-26-34	*8 channel DSP Module (IP Networking) – no longer available*
700-26-31	*32 channel DSP Module (IP Networking) – replaced by 700-26-35*
700-26-35	32/64 channel Networked DSP Module (IP Networking)

Due to the nature of talkback systems, any given installation may have some custom items. Trilogy Communications prides itself on its ability to tailor standard components to meet specific requirements and is willing to discuss any other customisation as required.

2. INSTALLATION

2.1 INTRODUCTION

Follow the sequence below, step by step, to install the Gemini matrix.

- Unpack the matrix.
- Fit the matrix frame into the equipment bay.
- Apply power to the system and check basic operation.
- Connect control panels and check operation with the supplied configuration.
- Set up the configuration PC by installing the Gateway Configuration software.

2.2 UNPACKING

Carefully unpack the equipment from its transit material and check each item for signs of damage.
Check the contents of the boxes against our despatch note and your original order to ensure that you have received the correct parts.
In the event that the unit has been damaged or does not match your order, immediately contact Trilogy Communications at the address given at the front of this guide.

2.3 RACK MOUNTING

General - The matrix is built in multiples of 2U. The depth of each chassis (excluding mating connectors) is 375 mm. Appropriate care should be taken with cooling and ventilation within the equipment bay. The air inlet is on the right side of the chassis, towards the rear, as viewed from behind while the exhaust is on the left side. Take care not to obscure these vents.
Elevated Operating Ambient - If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient. Therefore, consideration should be given to installing the equipment in an environment compatible with the maximum ambient temperature specified by the manufacturer.
Reduced Air Flow - Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.
Mechanical Loading - Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.
Circuit Overloading - Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
Reliable Earthing - Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (e.g. use of power strips).

2.4 EARTHING REQUIREMENTS

This equipment is categorised Class 1 under the IEEE Code of Practice and must be connected to an earthed supply.
Each Gemini chassis is provided with a single 4mm-earthing stud on the rear panel. Incoming mains earth from the IEC connector is internally bonded to both the chassis and technical 0V to meet safety requirements and performance specifications. The stud allows the addition of an earth strap in rack installations.

2.5 Mains Connection and Safety

Important
Power Supply Cord Used as Disconnect Means

CAUTION: THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE SOCKET-OUTLET IS LOCATED / INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.

ATTENTION: LE CORDON D'ALIMENTATION EST UTILISÉ COMME INTERRUPTEUR GÉNÉRAL. LA PRISE DE COURANT DOIT ÊTRE SITUÉE OU INSTALLÉE À PROXIMITÉ DE L'ÉQUIPMENT ET ÊTRE FACILE D'ACCÉS.

The power supplies within the unit are a switched mode design and will cope automatically with a wide input voltage range (see specification, section 0). There are no user accessible fuses inside the power supply. The power supplies are crowbar protected against short circuits of the matrix electronics. Each power supply module must be retained using the screws provided.

The standard Gemini is fitted with a single mains power supply unit (PSU), with an option to fit a second PSU. Each power supply has its own, dedicated, IEC mains plug on the rear of the Gemini. These should be wired according to the instructions provided with a mating mains socket using suitable cable. See above for earthing requirements.

Mains cable conductors are to be three-core (two-wire with ground), wire gauge 18 AWG (cross sectional area 0.75mm^2) Jacket to be type SJT.

Covers are only to be removed by trained personnel. Shock hazard exists with covers removed; therefore disconnect mains supply before removal. Interconnection between circuit boards and panels are all safety extra low voltage (SELV) as defined by IEC/EN/CSA/UL 60950-1-200X. The equipment signal connections must only be connected to SELV circuits to prevent hazards from improper connection.

There are no user replaceable fuses inside the Option (port) Modules.

CAUTION: RISK OF EXPLOSION IF BATTERY IS REPLACED BY AN INCORRECT TYPE.

ATTENTION: RISQUE D'EXPLOSION EN CAS DE REMPLACEMENT PAR UNE PILE DE TYPE INCORRECT.

2.6 STARTING THE SYSTEM

2.6.1 IP Address Plan

Each Gemini matrix chassis requires a single, static IP Address. In addition, the 700-26-35 Networked DSP Module requires two further static addresses. To create a Gemini network, these IP addresses will normally be part of the same subnet, or different subnets linked by routers.

- If Gemini is connected to a completely private network, you can choose the addresses yourself.
- If Gemini is joining a corporate LAN, you may need to discuss and agree the addresses with your IT Department.

Create a network plan before powering up the system. A sample plan is shown below.

	EDHS	IP	DSP IP 1 DSP IP 2	IPPI	LAN subnet mask	LAN gateway address
Gemini 1	0.1.1	192.168.200.200	192.168.200.211 192.168.200.212	192.168.200.220	255.255.255.0	192.168.200.1
IP Panel 1	0.1.1.25	192.168.200.221			255.255.255.0	192.168.200.1
Gemini 2	0.1.2	192.168.200.201	192.168.200.213 192.168.200.214		255.255.255.0	192.168.200.1
Gemini 3	0.2.1	192.168.6.10	192.168.6.11 192.168.6.12		255.255.255.0	192.168.6.1
Database	n/a	192.168.200.50			255.255.255.0	192.168.200.1

Notes

1. Gemini 3 is shown in a different domain, as seen by the “D” value of 2 within the EDHS address. For a detailed explanation, please refer to the Gateway Configuration Guide.
2. It is important to be consistent when entering values. For example, if a LAN gateway address is defined, it must then be entered across all hardware and software screens.
3. Gemini 1 is fitted with a single, optional IP Panel Interface (IPPI). Each IPPI requires a single IP address for itself and supports up to 8 IP connected panels. The first such panel is shown in the plan with address 192.168.200.221.

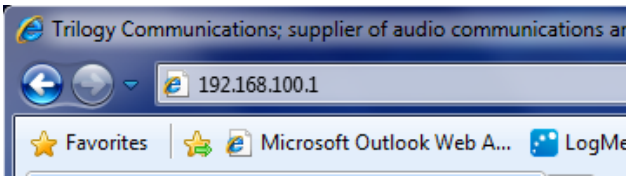
It is important to keep this address plan close at hand when writing your Gateway Configuration.

On delivery, unless previously arranged, all matrices will carry the same address, so it is important to power each matrix in turn **before** connecting to the network, and set the assigned address using the front panel screen. Networked DSP and IPPI addresses are only defined within the database and will be set to 0.0.0.0 or undefined until a suitable configuration has loaded and initialised.

The configuration PC running the Gateway configuration software and associated database must also be connected to the same network. Best practice dictates that the database is running at all times although the Gateway editor may be shut down after use. It is possible to install the database and Gateway on separate PCs although in the first instance we recommend that they are installed on one computer to simplify setup. See section 2.7.1 for more information on installing the software.

2.6.2 Gemini Browser

Once the IP address has been set for each Gemini matrix, a browser facility is provided to allow further configuration during the setup phase. This is an engineering tool and it is not a replacement or alternative to the Gateway configuration editor. To browse into each Gemini matrix, simply enter its IP address into the address line of your web browser. For example, if you set the IP address of your Gemini matrix to be 192.168.100.1, just type this address into your browser as shown below and press <return>.



The default password for admin level access is ***trilogy***.

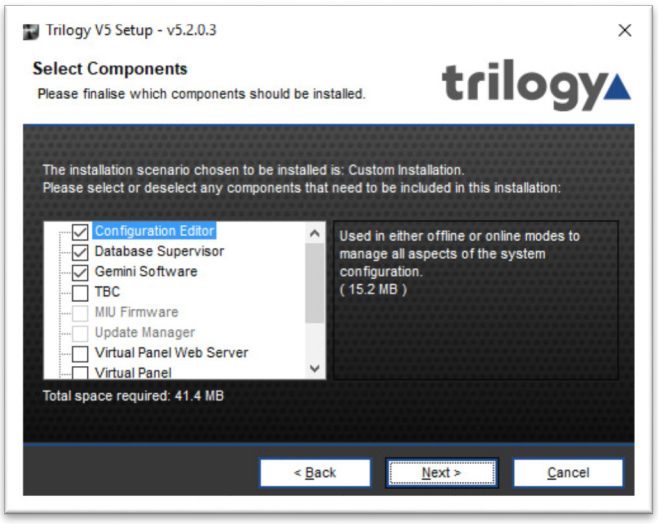
For more information on this feature, see section 4 - Gemini Web Browser.

2.7 GATEWAY CONFIGURATION SOFTWARE

Since the standard Gateway installation includes a database, the software should ideally be installed on a PC which ideally is permanently accessible by the Gemini matrix. If the PC is subsequently switched off or removed, the matrix will continue to operate but a slight loss of functionality will occur. The minimum PC requirement is given in section 9.8.

2.7.1 Installing the software

The software is normally provided on a CD which will auto-run when loaded into the optical drive on your PC. For security reasons, your PC may not allow discs to auto-run; in this case, use Windows Explorer to browse to the “Software” folder of the CD and double click the file “TrilogyV5Setup.exe”.
When the installation application appears, we suggest that you accept the default options on most of the screens. The Gateway Configuration Editor requires a database, so the most common installation scenario is that shown below. If you wish, Gateway and the database may be installed on different PCs but we suggest that in the first instance you install both applications side-by-side, and separate them once the system is working correctly.

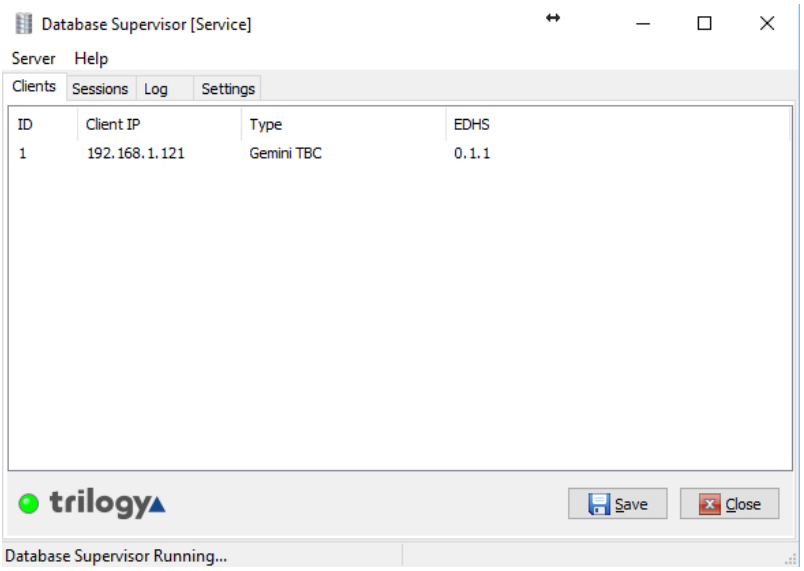


For the vast majority of Gemini system installations, the three components selected are the only ones required. If additional components are selected, they will consume additional resource and may impair system performance.

On all other screens, we suggest that you accept the default values offered. There is no need to restart your PC once the installation is complete.

2.7.2 Database

The database is managed by a Windows service named “Trilogy Database Supervisor”. This service is loaded automatically every time the PC boots up, and it then runs in the background. A small graphical interface (GUI) is also provided as part of the installation. This allows you to monitor the current status of the database and to perform routine maintenance and troubleshooting. It is optional and you may choose only to run it when required. By default, the installation will add a shortcut to the Windows start-up folder and a small additional icon will be displayed in the Windows system tray adjacent to the clock (see icon on left). On double clicking the icon, the database supervisor is displayed (below).

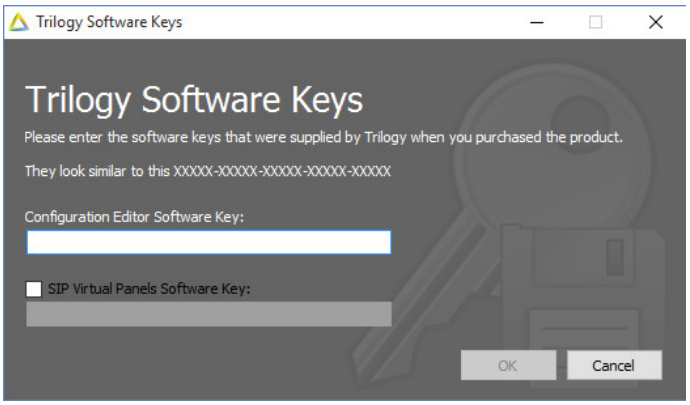


Any clients currently connected to the database will be listed here. This includes Gemini and Mercury matrices as well as any running instances of the Gateway editor. The “Server” menu includes options to Stop / Start the database service – the current state is shown by the green or red indicator and text at the lower left corner. The “close” button (lower right corner) minimises the GUI to the system tray – it does not affect the running state of the database service.
As mentioned above, the database and Gateway may be installed on separate PCs if so required. For example, the database may be installed on to a server, while Gateway is installed on a laptop, which may then be shut down and removed. Gateway can also be installed on multiple PCs or laptops, although simultaneous access is not permitted. See Gateway Configuration Guide 70090622 for more information on configuring multiple user accounts.

Remember –

- The database is the **heart** of the system: system wide, there is only one database.
- Both Gemini and Gateway editor connect to the database as clients. Both have settings to connect to the database IP address.
- Each Gemini keeps a local, cached copy of the database information relevant to itself. This means the database can be switched off or disconnected, but ideally, it should be present at all times.

2.7.3 Software Features



Versions 4.1.0.x and later will prompt you for a feature unlock code when first run. The code is supplied with your original purchase CD and you should keep this safe for any future re-installation. Additional paid for features may be unlocked by entering a new code.

2.7.4 Firewall

The software installer will automatically create additional Windows firewall rules to allow all clients to connect to the database server.

The most common scenario is to use the Windows firewall but if you have opted for a third-party firewall application, the following rules must be added for **inbound** ports.

- TCP 12005 (database data)
- TCP 12006 (database admin)
- TCP 13001 (supervisor)
- TCP 80 (web browser)

Please contact your IT Administrator or Trilogy Technical Support for further assistance.

2.7.5 Using Gateway Configuration Editor

The default log-in credentials are: ***Admin | trilogy***

For further information please refer to the Gateway Configuration Guide, 70090622, supplied on CD.

3. GEMINI FRONT PANEL SCREEN

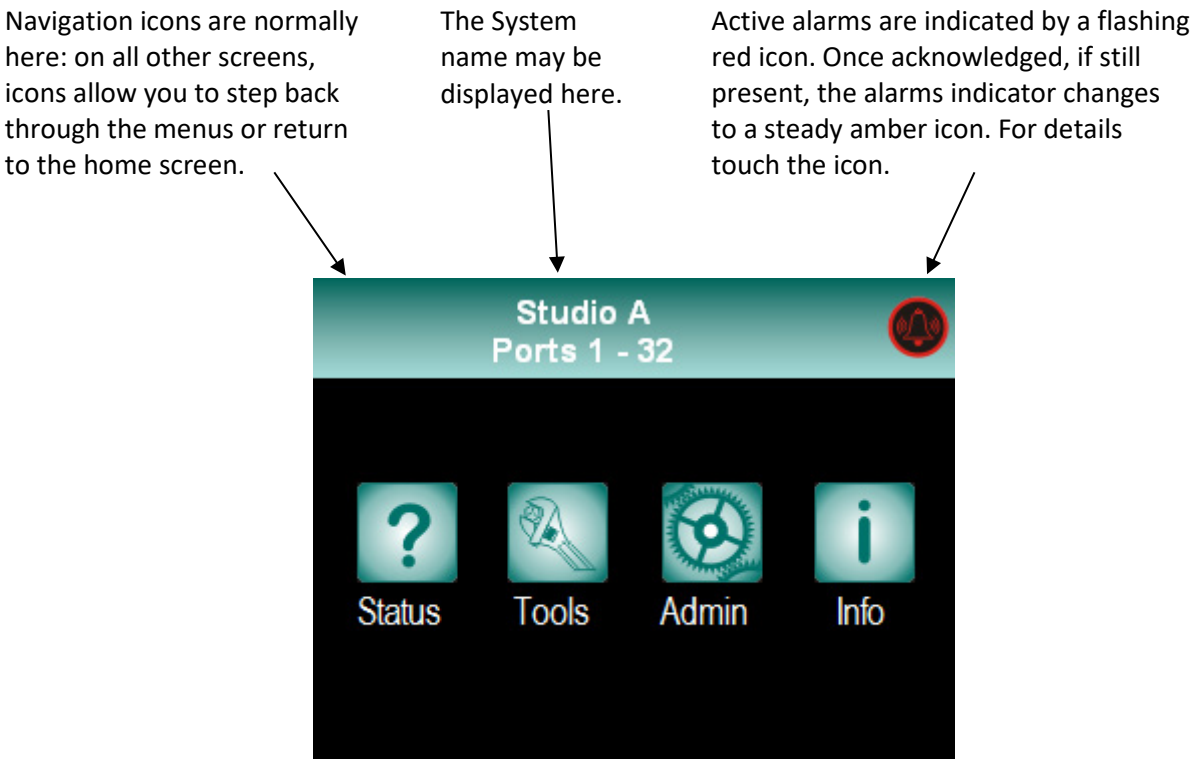
Each Gemini matrix is equipped with a QVGA LED touch screen. This provides the following functionality:

- initial setup including network IP parameters
- System information including current configuration, software version etc.
- diagnostics including fan and power supply status
- audio monitoring
- visibility of GPI input and output states
- wiring information

The information is provided through a series of touch operated menus. All changes to settings which could potentially disrupt the system are password protected. The default password is ***trilogy***.

3.1 HOME SCREEN

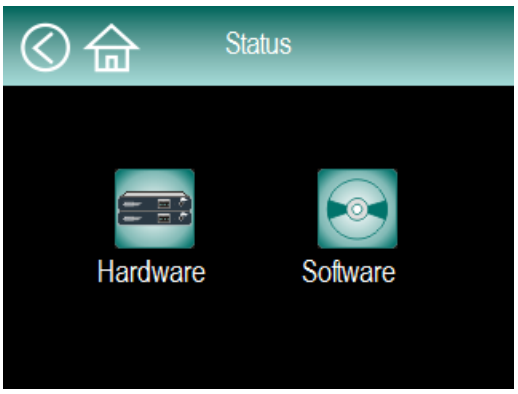
When the system has powered up and initialised, the home screen will appear. The key areas of this screen are explained below.



The upper 20% of the screen is used consistently as an information bar. The alarms indicator and navigation icons appear on most screens.
The lower 80% of the screen provides either further menu choices or is used as the principal display area.

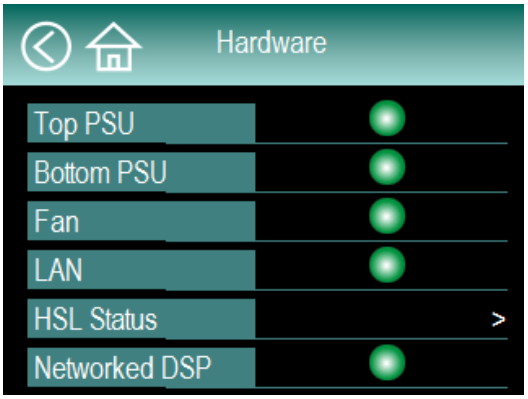
Status	Read only menus provide status information on the current status of both hardware and software. See section 3.2 for more information.
Tools	A selection of maintenance and diagnostic tools is provided. A soft reset the facility is also available. See section 3.3 for more information.
Admin	The IP settings may be viewed as read only, or following entry of the Administrator password, the settings may be changed. See section 3.4 for more information.
Info	Read only menus provide wiring information for all of the rear panel connectors. See section 3.5 for more information.

3.2 STATUS MENU



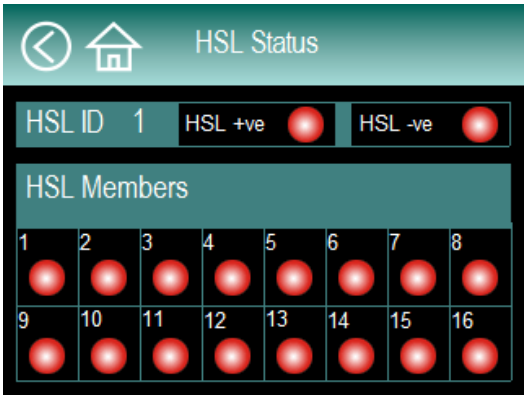
Navigation icons are now displayed at the top left of the screen within the information bar.

3.2.1 Status – Hardware



A green indicator shows that the item is operating correctly. An item which has failed, or is not operating correctly will show a red indicator.

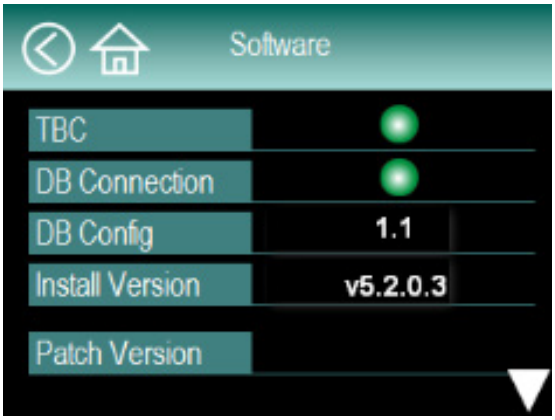
Click on the > arrow to see detailed HSL status.

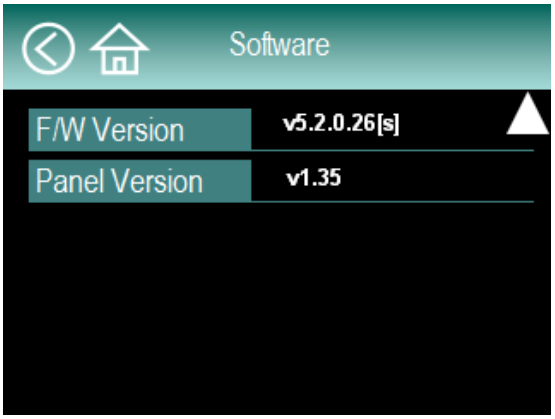


This screen shows the current state of the HSL ring. An unbroken ring will indicate green for both HSL+ and HSL-. Presence of other members of the ring, as configured, is shown below. Since the ring is resilient, it is possible for all members to be visible, even if one connection is missing.

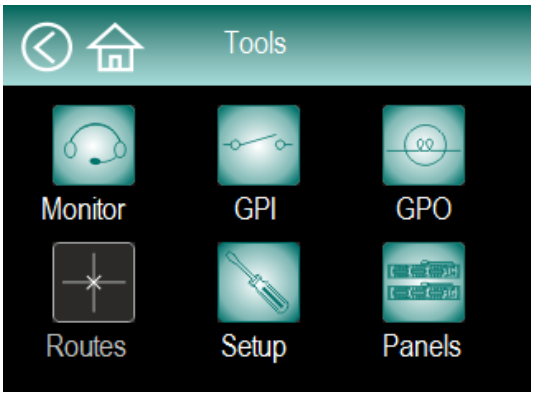
3.2.2 Status – Software

This screen displays the software versions currently installed on the Gemini and shows if the Gemini is currently connected to the database by a green or red indicator. A second page (not shown here) shows the firmware version currently running on the Gemini and the firmware version of the front touch screen. View the second page by pressing the “down arrow”, lower right.





3.3 TOOLS MENU



3.3.1 Tools – Monitor

Monitor each matrix input signal using the front panel headset.

3.3.2 Tools – GPI

View the status of GPI input signals presented to Gemini.

3.3.3 Tools – GPO

View the status of GPI output signals generated by Gemini.

3.3.4 Tools – Routes

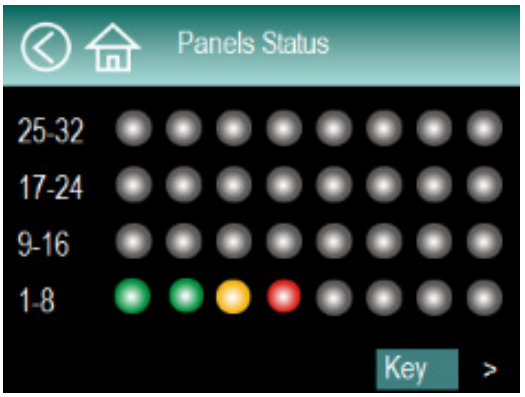
Not currently available.

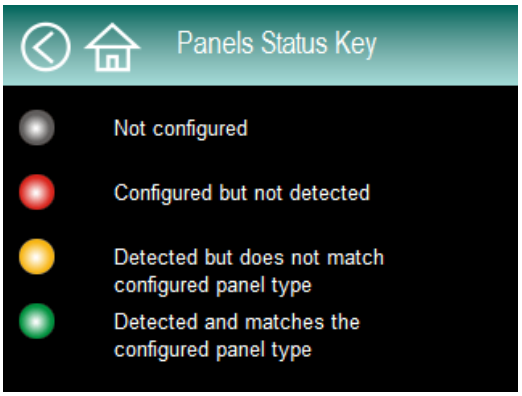
3.3.5 Tools – Setup

Just one setting is provided: the touchscreen key click may be turned on / off.

3.3.6 Tools – Panels

This useful diagnostic menu allows you to view the current panel connectivity on a per-port basis. Four different states are indicated and a description of the states is also shown on screen by pressing the “Key” button. Only the data lines are verified: this diagnostic does not check audio to and from the panel.





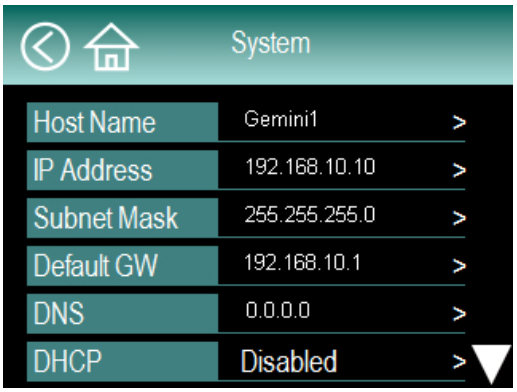
3.4 Admin Menu

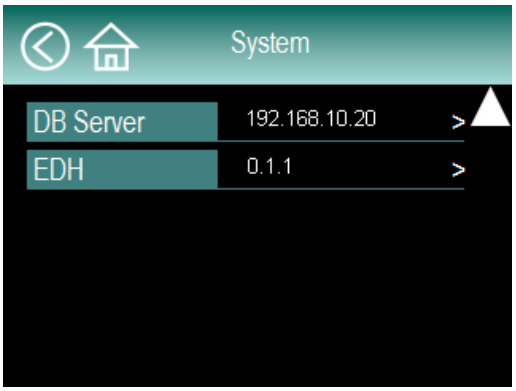
On first accessing the Admin menu, only “System” and “Log In” are available, the remaining options are greyed out until logged in as Administrator. Prior to logging in, “System” is shown as read-only.

3.4.1 Admin – Reset

This option is only available after successfully logging in as Administrator. On confirmation, **Reset** initiates a “soft” restart of Gemini. Following a shutdown and reboot, all firmware and software is re-loaded, followed by the system configuration. Time taken varies according to system complexity but is typically around 40 seconds.

3.4.2 Admin – System (2 pages)





Gemini network parameters and system identity (EDH address) may be viewed on this menu. To edit the settings, first log-in using the option below, then click the right arrow > to enter the edit menu. A system reset is required after changing any of these settings.

3.4.3 Admin – Reload Configuration

This option is only available after successfully logging in as Administrator. On confirmation, **Configuration** Reload requests the most up to date configuration from the database and restarts Gemini using that configuration. The same action may also be carried out from the Gemini web management pages and from the Gateway editor.

3.4.4 Admin – Presets

This option is only available after successfully logging in as Administrator.
There are a number of key settings which ensure the correct operation of a Gemini intercom network. Some are system wide, such as the database server address, others such as EDHS address are unique for each Gemini. If there is a need to replace an individual Gemini then all these settings must be correct. A “system presets” file holds the data for all Gemini and may be saved locally to each one, including any spares. A group of settings from within the file may be recalled from the front panel, allowing a replacement to be more easily deployed. These are the settings saved, per Gemini, in the file:

- Gemini EDHS
- Gemini IP Address
- Subnet Mask
- Network gateway address
- Gemini Hostname
- Domain Name Server address (DNS)
- Gemini description
- Database server address

The file should be created in a text editor (e.g. Notepad) using the template supplied in section 9.10. The edited presets file is then uploaded using the browser: see section 0. The presets are accessible from the Gemini front panel as shown below, where an individual preset may be chosen from the list. Pressing the green “tick” will cause the replacement Gemini to restart with a new identity. To avoid IP conflicts, the new unit should only be connected once the old one has been removed.

For further assistance with this feature, please contact Trilogy Technical Support.

3.4.5 Admin – Log In

Enter the Administrator password using the telephone style keypad.

The default password is ***trilogy***, so press the corresponding keys **8745649** as shown. The screen will display *******.

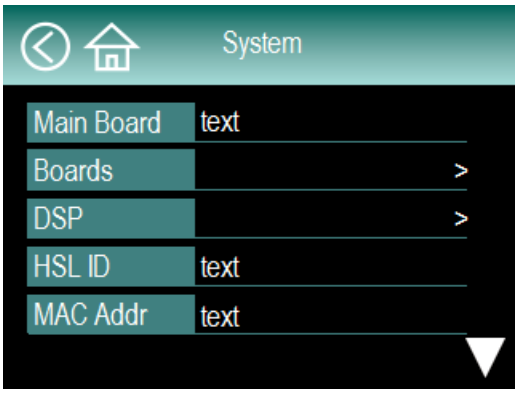
For security, the system will auto log-out after 5 minutes inactivity, or if the Gemini is reset to implement changes. It may be appropriate to manually log-out if leaving the Gemini unattended.

The default password may be changed using the web browser: we would recommend keeping a record of the password with multiple, trusted personnel. See section 4.7.4.

3.5 INFO MENU

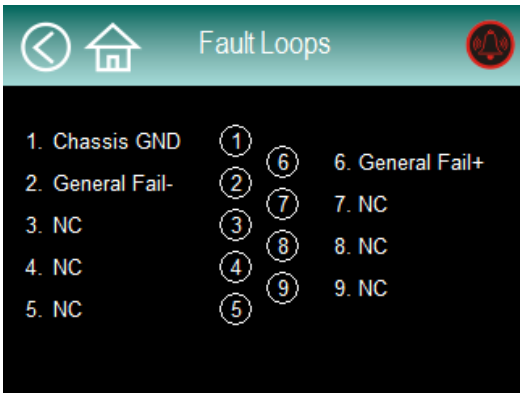
All entries on this menu are read-only and require no additional log-in.

3.5.1 Info – System



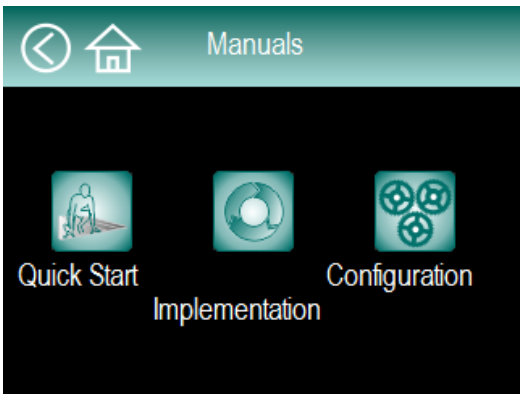
This screen provides hardware information including type and revision numbers for the system mainboard, option boards and DSP.

3.5.2 Info – Wiring



This screen provides wiring information for all external connectors – a sample is shown. The same information is provided in Section 5.1 of this manual.

3.5.3 Info – Manuals

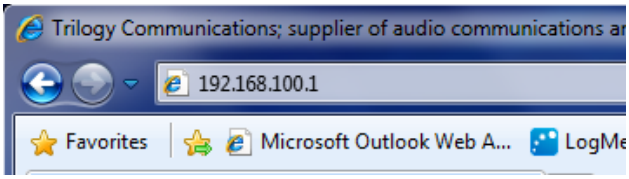


Each icon provides a QR code which can be used with a smartphone to download the latest version of each manual from the Trilogy website, www.trilogycomms.com.

4. GEMINI WEB BROWSER

4.1 INTRODUCTION

Once the IP address has been set for each Gemini matrix, a browser facility is provided to allow further configuration during the setup phase. This is an engineering tool and it is not a replacement or alternative to the Gateway configuration editor. To browse into each Gemini matrix, simply enter its IP address into the address line of your web browser. For example, if you set the IP address of your Gemini matrix to be 192.168.100.1, just type this address into your browser as shown below and press <return>.

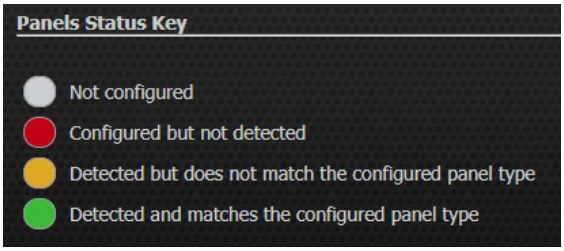


The default password for admin level access is ***trilogy***.

The home page (Status > Main) provides a concise summary of the current status, as shown below.

Note the following:

- The first level menu runs left to right at the top of the page. All pages with the exception of Admin are accessible and carry read-only information. The Admin section is password protected.
- The second level menu runs top to bottom down the left side of the page.
- Status Indicator Key – see example below for panels.



In general, the status indicators use the colour key shown. On some pages, the colours have a more precise meaning and this is explained on the page. For example, relating to control panels, an amber indication means a panel is connected but does not match the type configured.

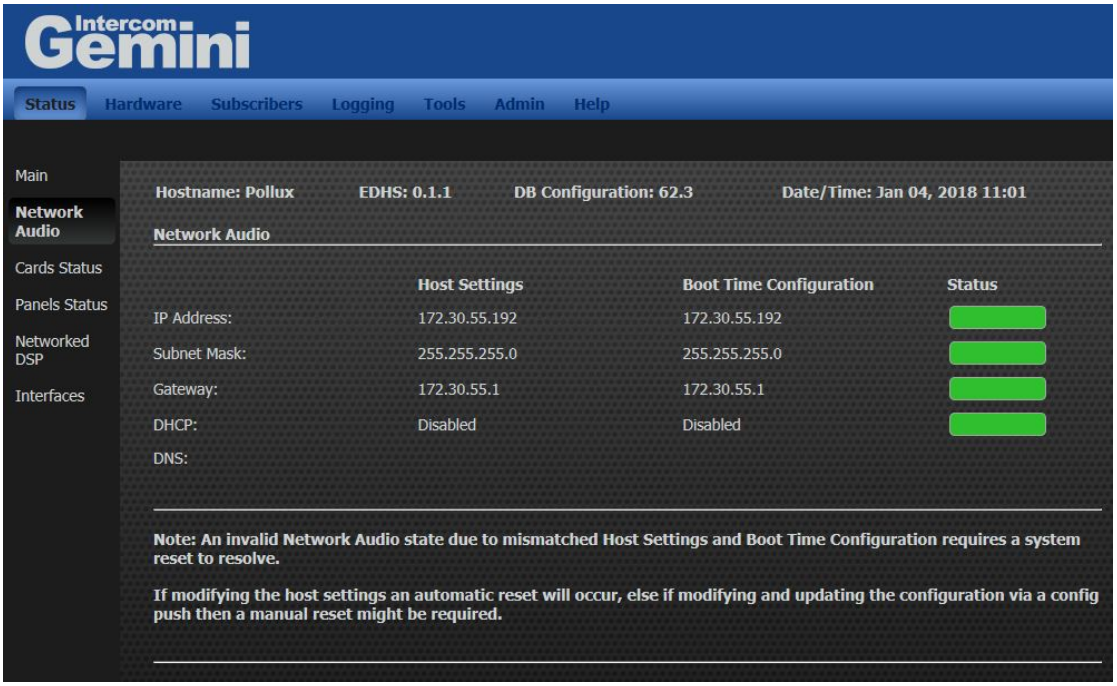
4.2 STATUS

Complete status information is arranged across six web pages, described below.

4.2.1 Status > Main

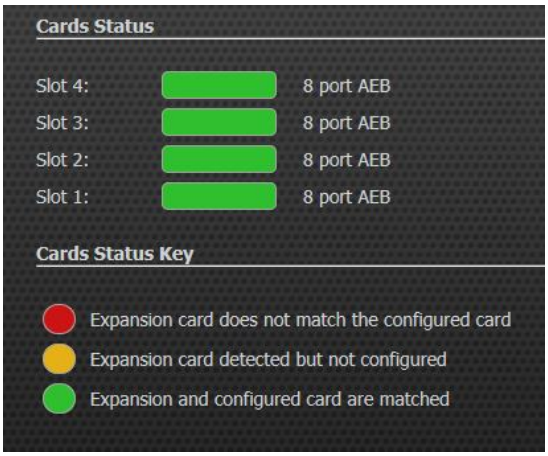
The Status > Main page provides a concise summary of the current Gemini status: linked pages provide more detail -- see image above. The CPU meter display may be turned on / off on the Admin > Preferences web page. Drill down for more information from the side menu or by following on page links.

4.2.2 Status > Network Audio

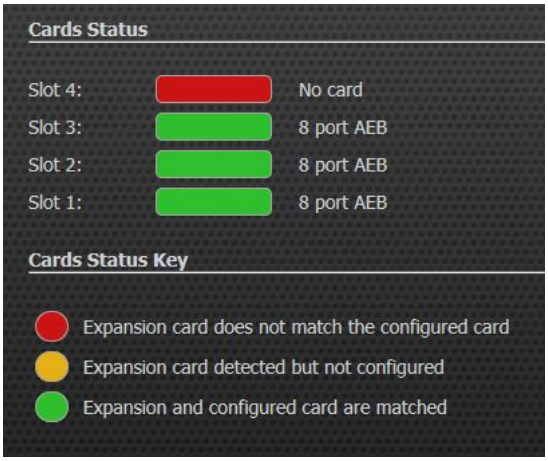


Any mismatch between the Boot Time settings and those contained in the Gateway Editor configuration will cause an invalid Network Audio state, shown by a red indication on the main status page. This error means the system will not operate correctly and the problem must be resolved before continuing. The page allows you to trace the source of the error and correct accordingly. Note the on-screen warning regarding system reset.

4.2.3 Status > Cards

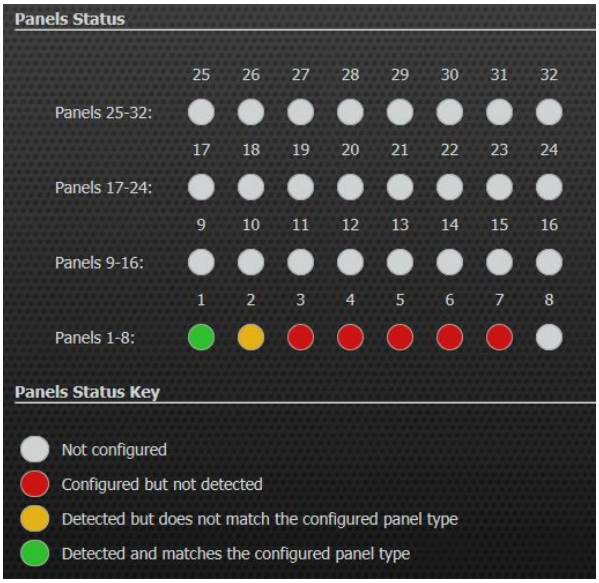


This page summarises the cards fitted in the Gemini matrix and compares it to the cards requested in the Gateway configuration. Any mismatch will cause an amber or red indication as explained in the key. Ideally, the overall cards status should be green but errors will not necessarily cause the system to malfunction.



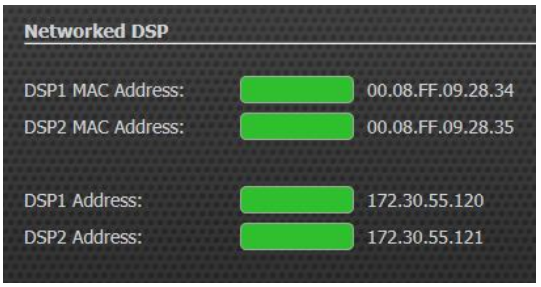
For example, a matrix set as “32 port” in Gateway, but currently only using 24 ports and with no card fitted in slot 4 will show an error but will operate correctly.

4.2.4 Status > Panels



This page provides a summary of the panels connected to the matrix, versus those defined in the Gateway configuration file. Any errors will not normally cause the system to malfunction. For example, extra panels may have been defined in advance of future expansion or alternative panel types may be fitted during planned maintenance.

4.2.5 Status > Networked DSP



Optional Networked DSP (part no. 700-26-35) requires 2 additional IP addresses to be set within the Gateway editor configuration. Earlier versions of DSP are not IP connected and do not require IP addresses. In these cases the values are marked as not applicable (N/A).

4.2.6 Status > Interfaces

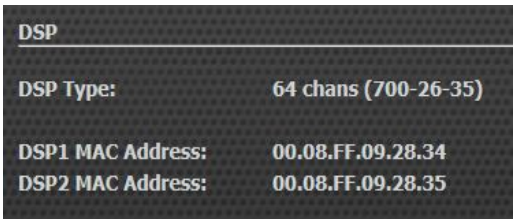
The principal interface is the Gemini connection to the LAN and any mismatch between the boot setting and that defined in the Gateway editor must be corrected.

Gemini can also connect to a Trilogy Commander or Orator matrix via a suitable IP to serial converter – please contact Trilogy Technical Support for more information.

Gemini supports the Ember+ API and the interface is enabled on the Admin > Preferences web page, see section 4.7.8. Use of the API is a chargeable option which requires a key code to be purchased and entered in the Gateway editor. API actions supported are listed in section 9.11.

4.3 HARDWARE

There are three pages, shown below. They show read-only information for the fitted cards, the Gemini main board and optional DSP.



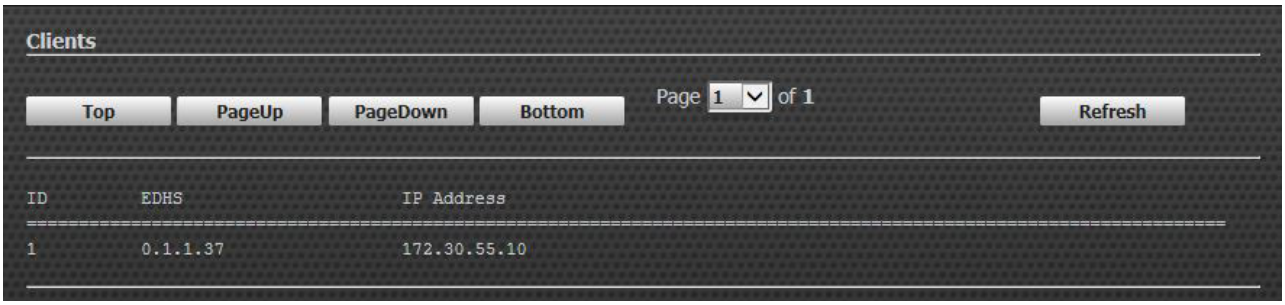
Note:

- The “Cards” screen reports the firmware version running on option boards. This information may be requested by Trilogy Technical Support.
- Both the “Main Board” and “DSP” screens report the MAC Address which can be required when diagnosing any network connectivity issues during installation.

4.4 SUBSCRIBERS

There are two pages, shown below.

Shows hardware panels currently recognised and connected to the local host, information includes: Which port the panel is connected to, the panel type and the version of firmware running on the panel. The report is dynamic and is refreshed, by default, every 15 seconds.



Shows virtual panels currently recognised and connected to the local host, information includes: Which port the panel is connected to, the IP address of the machine hosting the virtual panel. The report is dynamic and is refreshed, by default, every 15 seconds.

4.5 LOGGING

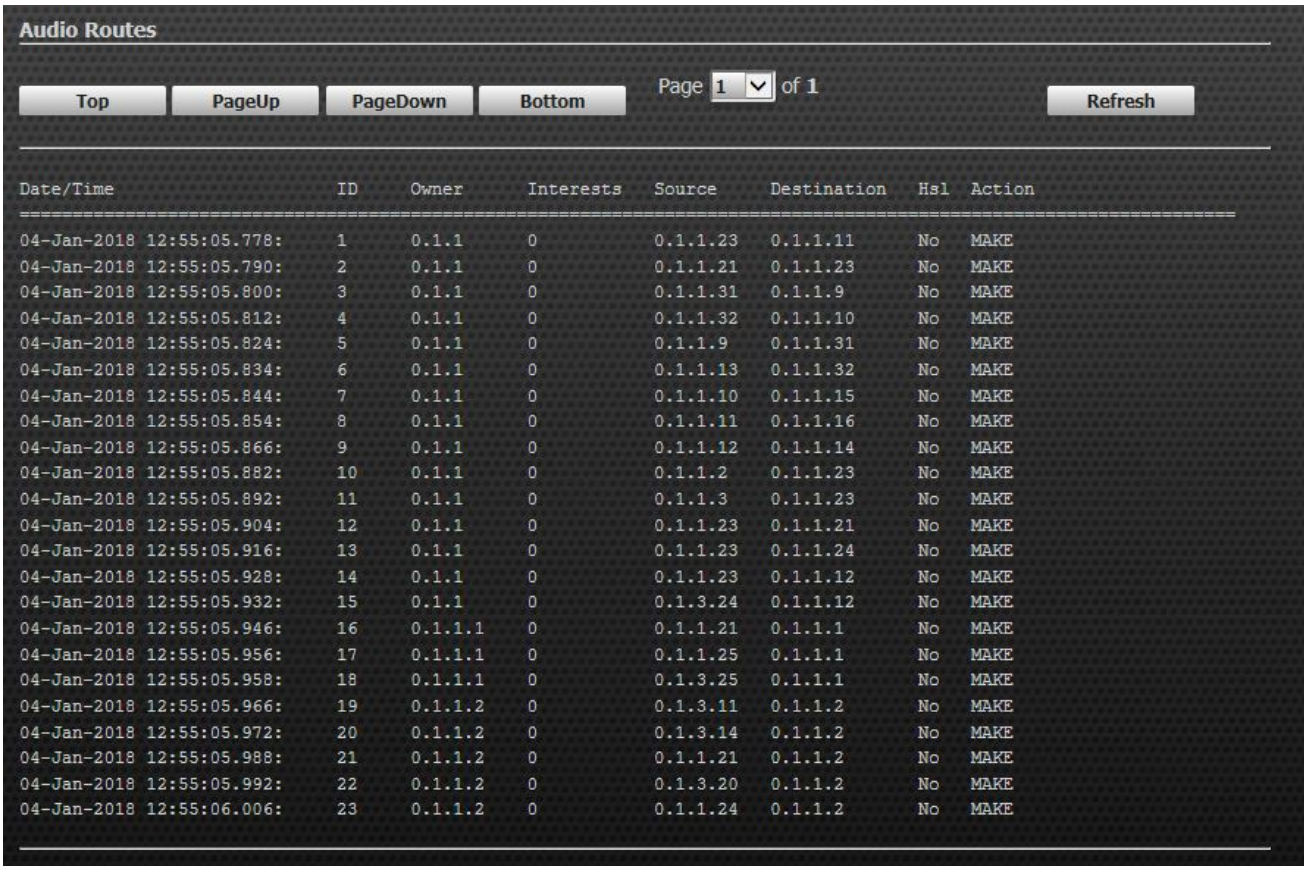
Gemini has comprehensive built in logging but by default this is disabled. Logging on a complex real time operating system will consume system resource and in the limit, impair operation. Therefore it should be enabled selectively, under guidance from Trilogy Technical Support. Logging is enabled within the Admin > Settings > Preferences section of Gemini web management – see section 4.7.8. Results are displayed across four pages.

4.5.1 Logging > Connections

Data connections indicate a remote host TBC communicating with the local host. The EDH number identifies the remote host.
Remote host audio connection identify a route made from the remote host to the local host. The EDHS or Multicast number identifies the source of the audio route to the local host.
The **ID** unique and is incremented each time a connection is made.

The report is dynamic and is refreshed, by default, every 15 seconds.

4.5.2 Logging > Audio Routes



Audio Routes

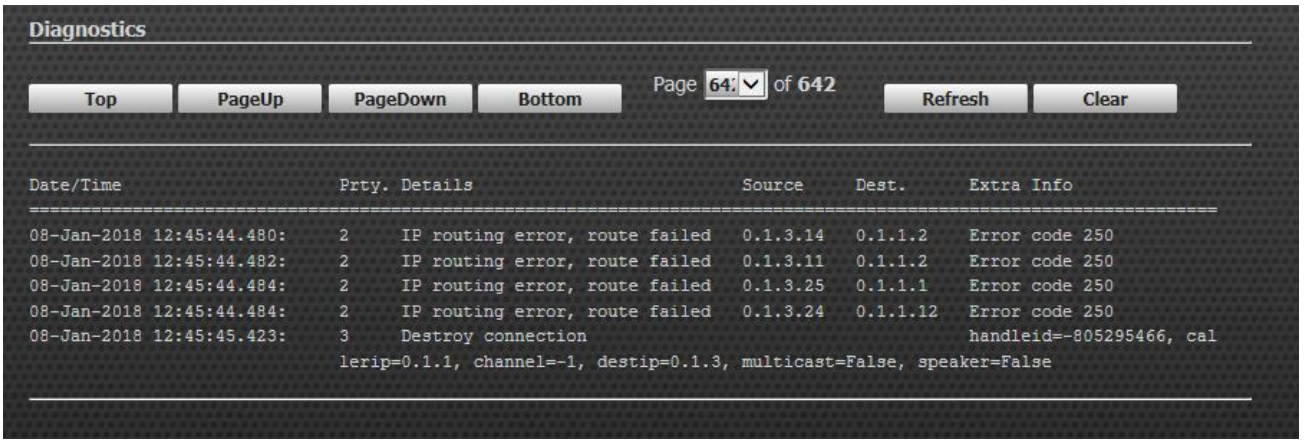
Top | PageUp | PageDown | Bottom | Page 1 of 1 | Refresh

Date/Time	ID	Owner	Interests	Source	Destination	Hsl	Action
04-Jan-2018 12:55:05.778:	1	0.1.1	0	0.1.1.23	0.1.1.11	No	MAKE
04-Jan-2018 12:55:05.790:	2	0.1.1	0	0.1.1.21	0.1.1.23	No	MAKE
04-Jan-2018 12:55:05.800:	3	0.1.1	0	0.1.1.31	0.1.1.9	No	MAKE
04-Jan-2018 12:55:05.812:	4	0.1.1	0	0.1.1.32	0.1.1.10	No	MAKE
04-Jan-2018 12:55:05.824:	5	0.1.1	0	0.1.1.9	0.1.1.31	No	MAKE
04-Jan-2018 12:55:05.834:	6	0.1.1	0	0.1.1.13	0.1.1.32	No	MAKE
04-Jan-2018 12:55:05.844:	7	0.1.1	0	0.1.1.10	0.1.1.15	No	MAKE
04-Jan-2018 12:55:05.854:	8	0.1.1	0	0.1.1.11	0.1.1.16	No	MAKE
04-Jan-2018 12:55:05.866:	9	0.1.1	0	0.1.1.12	0.1.1.14	No	MAKE
04-Jan-2018 12:55:05.882:	10	0.1.1	0	0.1.1.2	0.1.1.23	No	MAKE
04-Jan-2018 12:55:05.892:	11	0.1.1	0	0.1.1.3	0.1.1.23	No	MAKE
04-Jan-2018 12:55:05.904:	12	0.1.1	0	0.1.1.23	0.1.1.21	No	MAKE
04-Jan-2018 12:55:05.916:	13	0.1.1	0	0.1.1.23	0.1.1.24	No	MAKE
04-Jan-2018 12:55:05.928:	14	0.1.1	0	0.1.1.23	0.1.1.12	No	MAKE
04-Jan-2018 12:55:05.932:	15	0.1.1	0	0.1.3.24	0.1.1.12	No	MAKE
04-Jan-2018 12:55:05.946:	16	0.1.1.1	0	0.1.1.21	0.1.1.1	No	MAKE
04-Jan-2018 12:55:05.956:	17	0.1.1.1	0	0.1.1.25	0.1.1.1	No	MAKE
04-Jan-2018 12:55:05.958:	18	0.1.1.1	0	0.1.3.25	0.1.1.1	No	MAKE
04-Jan-2018 12:55:05.966:	19	0.1.1.2	0	0.1.3.11	0.1.1.2	No	MAKE
04-Jan-2018 12:55:05.972:	20	0.1.1.2	0	0.1.3.14	0.1.1.2	No	MAKE
04-Jan-2018 12:55:05.988:	21	0.1.1.2	0	0.1.1.21	0.1.1.2	No	MAKE
04-Jan-2018 12:55:05.992:	22	0.1.1.2	0	0.1.3.20	0.1.1.2	No	MAKE
04-Jan-2018 12:55:06.006:	23	0.1.1.2	0	0.1.1.24	0.1.1.2	No	MAKE

This screen shows a snapshot of the state of all audio routes to the local host. Information includes -

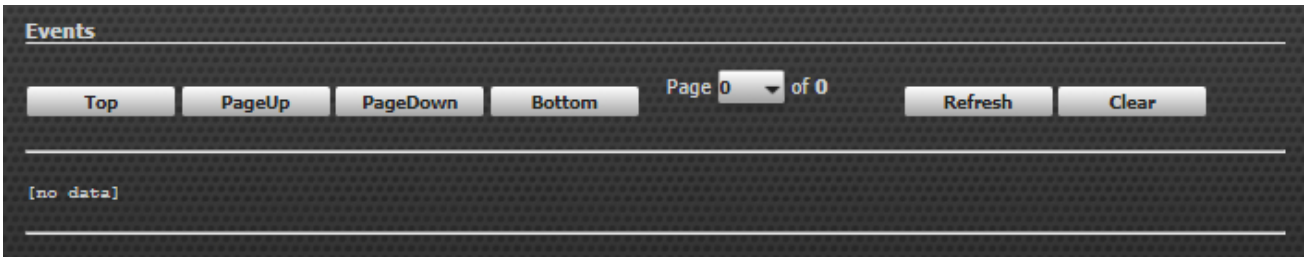
- Date/Time: - The time and date when the route was established
- ID: - Unique and incremented each time a route is established
- Owner: - Which panel or host has ownership of the route.
- Interests: - Number of other subscribers potentially interested in the route status.
- Source: - The EDHS address of the audio route source.
- Destination: - The EDHS address of the audio route destination.
- HSL: - Is the route being made over the HSL (High Speed Link) Yes/No
- Action: - Audio route type, can be either MAKE, BREAK, INHIBIT or MUTE

4.5.3 Logging > Diagnostics



The Diagnostic debug logger generates a timestamped debug log of the TBC runtime messages. Enabling this option will add additional load to the Gemini CPU and should only be enabled if instructed by Trilogy Technical Support. During normal operation of the system this option should be disabled.

4.5.4 Logging > Events



This logging screen is disabled by default, enabled by the Events check box in the Admin > Settings > Preferences Gemini web page. Enabling this option will add additional load to the Gemini CPU and should only be enabled if instructed by Trilogy Technical Support. During normal operation of the system this option should be disabled.

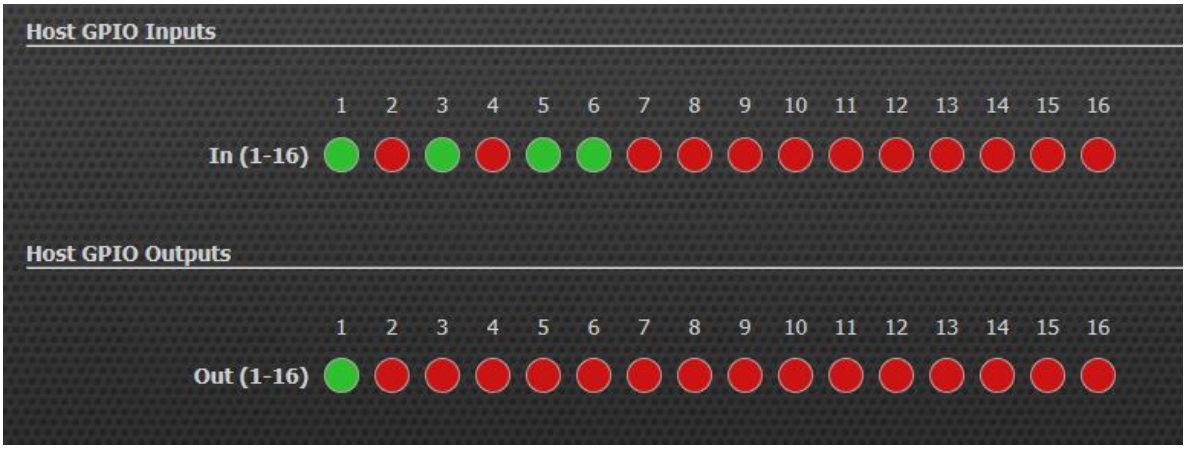
The Events debug logger generates a timestamped debug log of system level messages, for example system boot messages, hardware status etc.

4.6 TOOLS

There are three pages providing real time information about the state of all General Purpose Interface (GPI) inputs and outputs. The first page covers the Gemini matrix itself – the second and third pages display the state of panel GPIs.

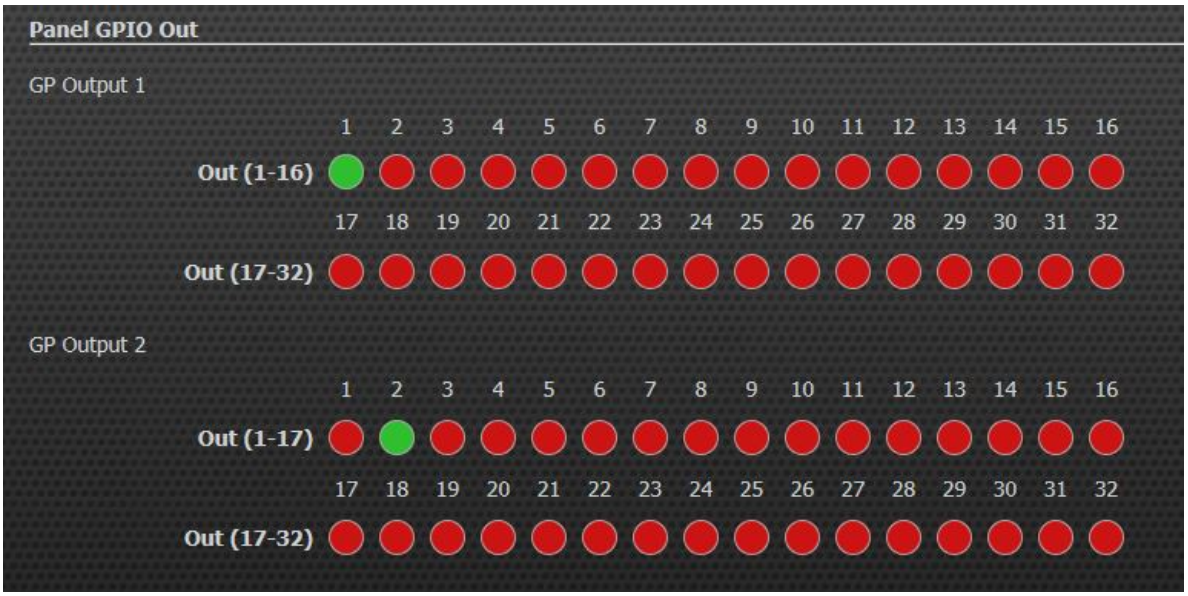
- A red indicator shows a GPI input or output which is currently not active.
- A green indicator shows a GPI input or output which is active or asserted.
- These definitions are the “raw” logical states. The Gateway editor has a number of options to invert the logic when building a rule or process and this should be taken into account when tracing a process.
- The pages are useful when examining a GPI change of state -- auto-refresh interval is 10 seconds so wait for this to occur or press the browser refresh button.

4.6.1 Tools > Host GPI



4.6.2 Tools > Panel GPI Input

4.6.3 Tools > Panel GPI Out

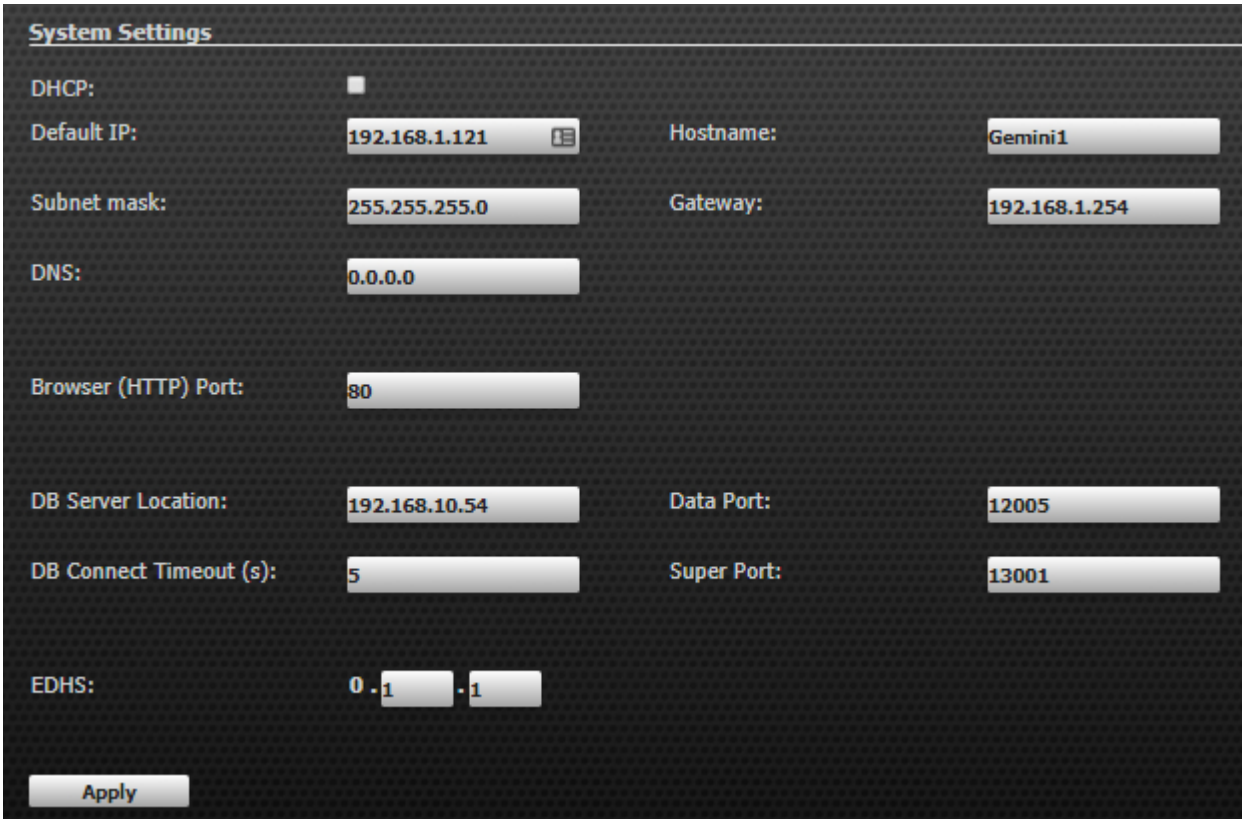


4.7 ADMIN

4.7.1 Introduction

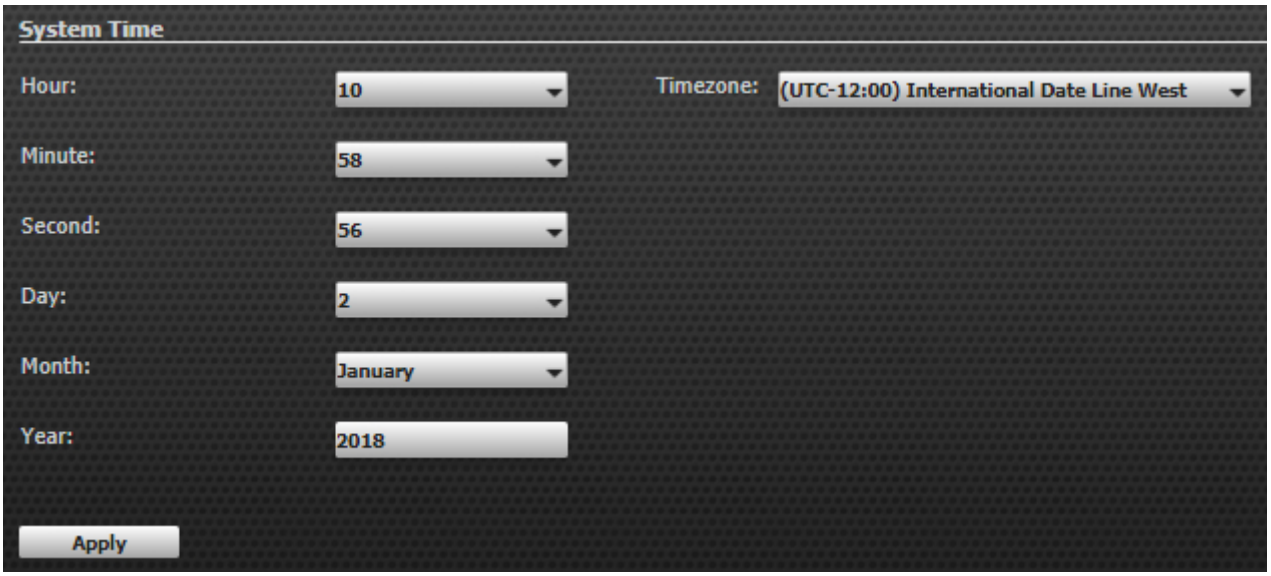
This area branches into two groups of web pages, Settings and Debug. They have separate passwords although initially both are set to ***trilogy***. The Settings pages are outlined below: they also include pages to set system preferences and to perform software updates. Debug should only be used at the request of Trilogy Technical Support.

4.7.2 Admin > Settings > System Settings



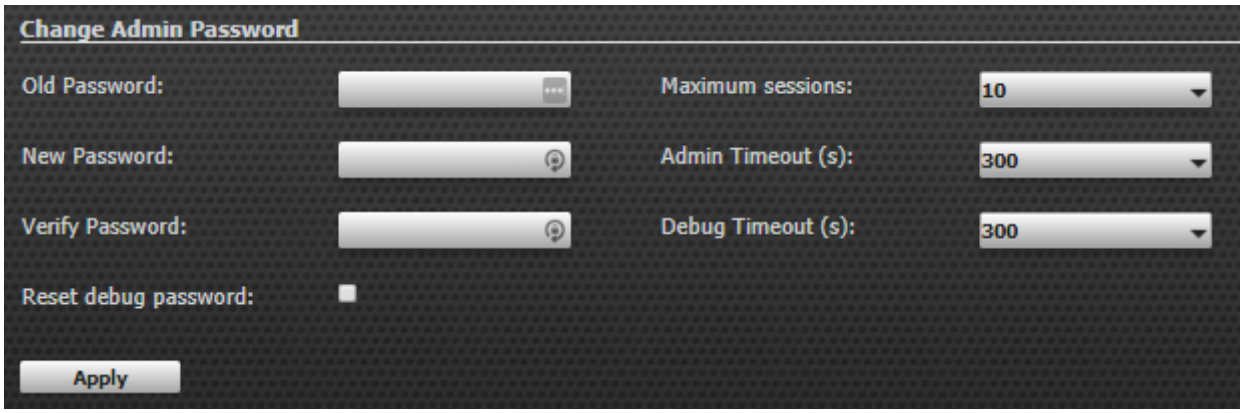
These are the key settings which identify the Gemini matrix and allow it to connect to the database server. Most of these are also presented on the Gemini front touch screen and would normally be set prior to connecting Gemini to the network. Dynamic IP address allocation (DHCP) is supported but not recommended. Inconsistency in the entry of these parameters may result in unexpected system behaviour. Any changes to values on this page will normally require a system reset.

4.7.3 Admin > Settings > System Time



System time is only used for logging and is not key to operation.

4.7.4 Admin > Settings > Password



The Admin password is also used to access protected areas of the front touch screen menus where it is entered in numerical form (see section 3.4.5). The password cannot be changed from the touch screen. If the Reset debug password box is checked, then the debug password will also be reset to the value entered above.

4.7.5 Admin > Settings > Miscellaneous Actions

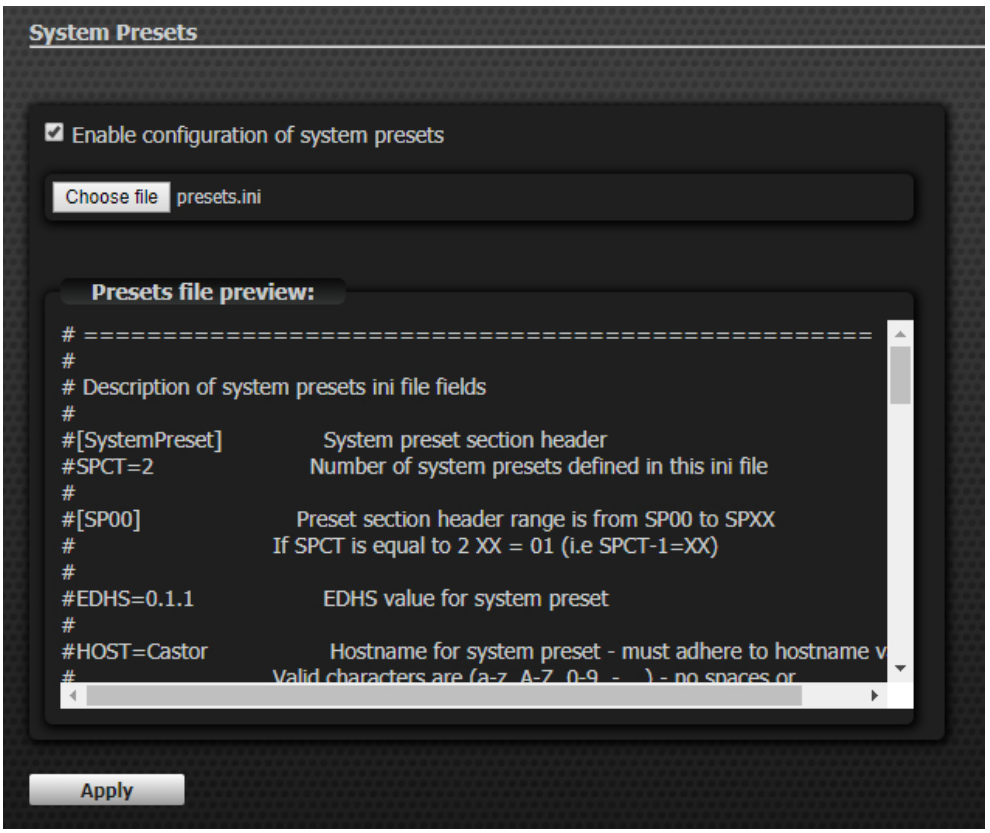
- **Reset** carries out a “soft” restart of Gemini. Following a shutdown and reboot, all firmware and software is re-loaded, followed by the system configuration. Time taken varies according to system complexity but is typically around 40 seconds.
- **Factory Reset** wipes all current firmware, software and data, placing Gemini into a “recovery” state. This should only be carried out under instruction from Trilogy Technical Support.
- **Configuration Reload** requests the most up to date configuration from the database and restarts Gemini using that configuration. The same action may also be carried out from the Gemini front panel and from the Gateway editor.
- **Configuration Reset** will restart Gemini with no configuration applied.

4.7.6 Admin > Settings > System Presets

There are a number of key settings which ensure the correct operation of a Gemini intercom network. Some are system wide, such as the database server address, others such as EDHS address are unique for each Gemini. If there is a need to replace an individual Gemini then all these settings must be correct. A “system presets” file holds the data for all Gemini and may be saved locally to each one, including any spares. A group of settings from within the file may be recalled from the front panel, allowing a replacement to be more easily deployed. These are the settings saved, per Gemini, in the file:

- Gemini EDHS
- Gemini IP Address
- Subnet Mask
- Network gateway address
- Gemini Hostname
- Domain Name Server address (DNS)
- Gemini description
- Database server address

The file should be created in a text editor (e.g. Notepad) using the file in section 9.10 as a template. Once uploaded through the browser, the presets are accessible from the Gemini front panel where an individual preset may be chosen. This will cause the replacement Gemini to restart with a new identity. To avoid IP conflicts, the new unit should only be connected to the network once the old one has been removed.

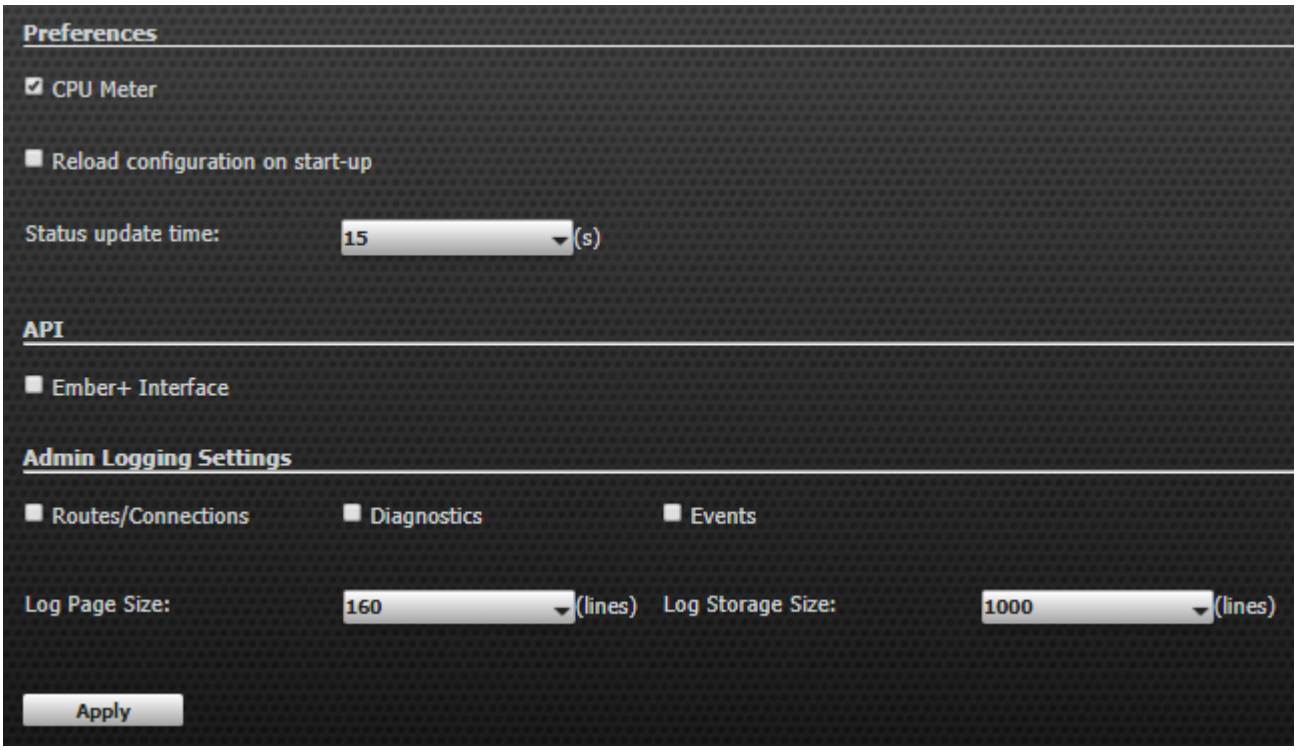


4.7.7 Admin > Settings > SNMP Settings

Simple Network Management Protocol (SNMP) is an Internet Standard protocol for collecting and organizing information about managed devices on IP networks. Gemini can connect as client to a maximum of three third-party SNMP Managers. Routine status information is available when the interface is enabled by the first checkbox. In addition, SNMP traps or “alert messages” are sent to the manager if the second checkbox is on.

For an overview of the Gemini status information provided, please see section 9.9.

4.7.8 Admin > Preferences



Preferences

- The **CPU Meter** displayed on the main status page may be turned on / off here.
- **Reload configuration on start-up**:
  - If the box is **not** checked Gemini will load the configuration data held in memory from before the reboot.
  - If the box is checked, Gemini will load the current configuration held in the database.

  By default, the box is **not** checked.

API

- The Ember+ interface is enabled here. There are additional settings in Gateway – please see the Gateway Configuration Guide 70090622 for details.

Admin Logging

- By default all admin logging is disabled. Since logging consumes system resources it can impair performance, so should be turned off when not required. Additional settings control the log size.

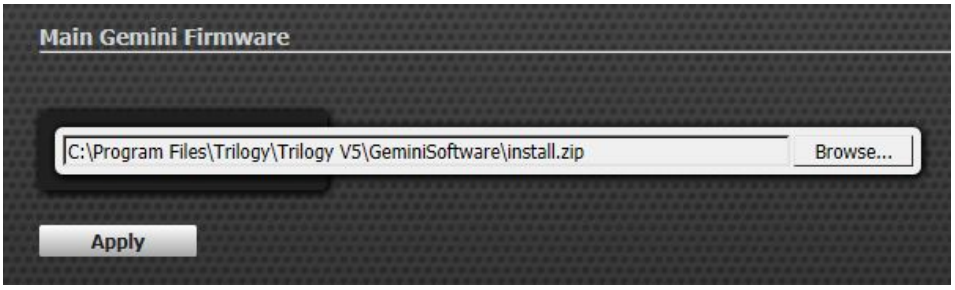
Status Update Time

- Sets the auto-refresh frequency of web pages – default 15 seconds.

4.7.9 Admin > Updates

There are three web pages for Gemini updates, described below. Most update actions are disruptive and should form part of a planned maintenance schedule.

Admin > Updates > Gemini Main



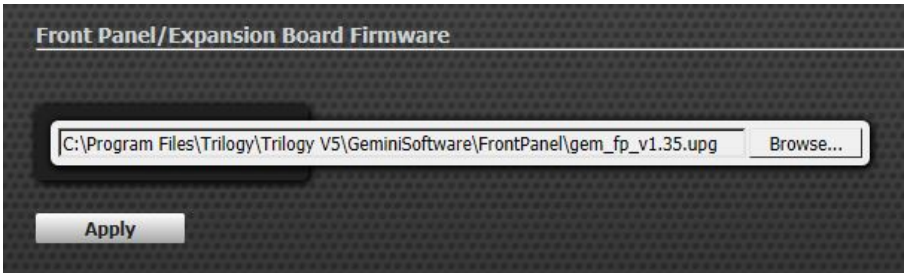
Gemini will be offline and out of service for the duration of the upgrade. Choose a suitable time and ensure that the system is not in use. The update file will normally be supplied by Trilogy Technical Support or be included as part of a complete update package. If selected during the Gateway installation, a copy of the file can be found here:

C:\Program Files (x86)\Trilogy\Trilogy V5\GeminiSoftware\install.zip – [for Windows 64 bit]
C:\Program Files\Trilogy\Trilogy V5\GeminiSoftware\install.zip – [for Windows 32 bit]

Take care to select the correct file. The update takes around 90 seconds: no data is lost but the browser connection may fail towards the end of the process, in which case simply enter the Gemini IP address again.

An alternative update method for multiple Gemini is available from within the Gateway editor – see section 8.

Admin > Updates > Front Panel / Expansion Board



For the front panel, the process is similar to the main board described above. It should be carried out after the mainboard and takes around 5 minutes to complete. The front panel will be out of action during the upgrade but the matrix remains in service. Expansion board firmware does not normally require updating but will be supplied by Trilogy Technical Support if needed.

For multiple Gemini, an alternative method is available from the Gateway editor – see section 8.

Admin > Updates > Command Line

This page should only be used under instruction from Trilogy Technical Support.

4.8 HELP

The Help web page area includes links to wiring information, user manual downloads and contact information.

5. CONNECTING TO THE MATRIX

This section provides information for the connection of a single Gemini matrix. Networked Gemini matrix systems are built using multiple frames, linked using a combination of IP networking and the proprietary high speed link (HSL) as appropriate.

- Information about different option boards is provided in Section 5.2.
- Information on building a Gemini network is given in Section 6.

5.1 CONNECTING TO GEMINI

For a single Gemini matrix, just the following connections are required for initial operation:

- IP Network link to a suitable PC, running the Gateway editor and database applications.
- Mains (one or two connectors).
- Matrix ports. See Section 5.2.

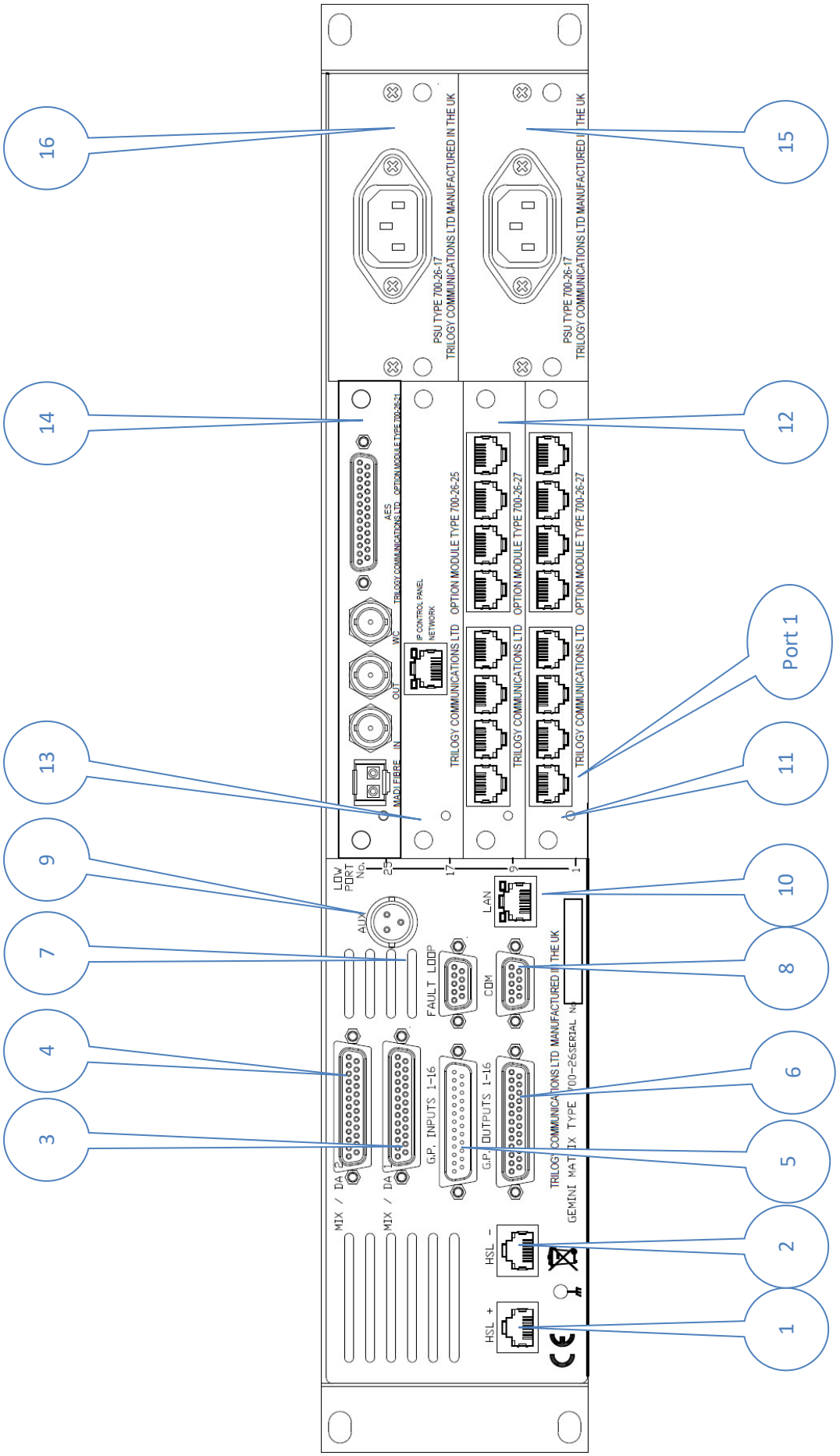
Trilogy provides a range of option boards which may be fitted in the Gemini chassis. At the time of writing (January 2018) these are as follows:

Part #	***Description***
700-26-20	Audio Expansion Board (AEB) - 8 Channel
700-26-21	MADI /AES Interface Board
700-26-23	Telephone Interface Board – FXO – 4 Channel
700-26-25	IP Panel Interface (IPPI) - 8 Channel

Within some simple rules, the boards may be freely mixed within each chassis. Please see Section 5.2 for detailed information.

The following drawing shows the rear view of a fully loaded single 2U Gemini matrix, fitted with a selection of option boards. Due to the modular nature of the design, module types are not identified externally. In a typical arrangement with 4 x 700-26-20 AEB, viewed from the rear, port 1 is at bottom left of the port connection area and port 32 is at top right.

Item	***Description***	***Connector on chassis***
1	HSL (High Speed Link) +	RJ45
2	HSL (High Speed Link) -	RJ45
3	Camera Mix / DA 1	D25 socket
4	Camera Mix / DA 2	D25 socket
5	GPI Output 1 - 16	D25 socket
6	GPI Input 1 - 16	D25 plug
7	Fault Loop	D9 socket
8	COM Port	D9 socket
9	Aux Power	Hirose 3 pin socket
10	LAN	RJ45
11	Option Board 1 (AEB) (lower slot)	8 x RJ45 – see section 5.2.1
12	Option Board 2 (AEB)	8 x RJ45 – see section 5.2.1
13	Option Board 3 (IPPI)	1 x RJ45 – see section 5.2.4
14	Option Board 4 (MADI) (upper slot)	Various - see section 5.2.2
15	Power Supply 1	IEC
16	Power Supply 2	IEC


16
15
14
12
13
11
Port 1
9
10
7
8
4
6
3
5
2
1
PSU TYPE 700-26-17
TRILOGY COMMUNICATIONS LTD MANUFACTURED IN THE UK
OPTION MODULE TYPE 700-26-25
OPTION MODULE TYPE 700-26-27
TRILOGY COMMUNICATIONS LTD
IP CONTROL PANEL NETWORK
AES
WC
OUT
IN
MADI FIBRE
LOW PORT No.
AUX
LAN
FAULT LOOP
COM
G.P. INPUTS 1-16
G.P. OUTPUTS 1-16
MIX / DA
HSL -
HSL +
GEMINI MATRIX TYPE 700-26
SERIAL No.

5.1.1 Option Boards 1 – 4 (ports 1 – 32)

Please see section 5.2 for detailed information.

5.1.2 Camera Mix / DA Connectors 1 & 2

Each connector provides a mixing pad for up to 6 inputs from cameras, plus a 6 output audio distribution amplifier to supply talkback to a group of cameras. Once configured in the Gateway editor, the cameras may then be treated as a single source and destination. Camera Mix 1 uses port 33 – Camera Mix 2 uses port 34 if enabled in Gateway editor on the advanced audio tab.

Connector type: Chassis mounted D25 socket.

Pin	*Function*	*Pin*	*Function*
1	Screen/Chassis		
2	From Cam 1+	14	From Cam 1-
3	From Cam 2+	15	From Cam 2-
4	From Cam 3+	16	From Cam 3-
5	From Cam 4+	17	From Cam 4-
6	From Cam 5+	18	From Cam 5-
7	From Cam 6+	19	From Cam 6-
8	To Cam 1+	20	To Cam 1-
9	To Cam 2+	21	To Cam 2-
10	To Cam 3+	22	To Cam 3-
11	To Cam 4+	23	To Cam 4-
12	To Cam 5+	24	To Cam 5-
13	To Cam 6+	25	To Cam 6-

5.1.3 Fault Loop

A single general purpose fault loop indicates a fault condition when open. The fault condition occurs on loss of any main power supply rail, loss of any standby power supply rail (if the redundant spare PSU is fitted) or failure of the internal fan.

Connector type: Chassis mounted D9 socket.

Pin	*Function*
1	Chassis Ground
2	General fail -
6	General fail +
3,4,5,7,8,9	No connection

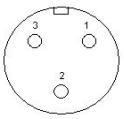
The general purpose output circuit is opto-isolated open collector, maximum current 160mA, absolute maximum voltage +60V.

5.1.4 Auxiliary Power

Auxiliary power, suitable for Trilogy wired beltpacks, is provided on the rear of each Gemini. Internal fuses are self-resetting.

Connector type: Chassis mounted 3 pin Hirose socket.

Pin	*Function*
1	+12 VDC, ±0.5 V, fuse protected at 450 mA.
2	Ground
3	-12 VDC, ±0.5 V, fuse protected at 200 mA.



5.1.5 General Purpose Interface (GPI) Inputs and Outputs

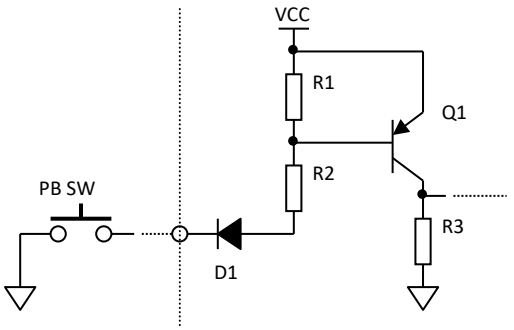
Each Gemini matrix frame provides 16 GPI inputs, plus 16 GPI outputs.

GPI Input Connections

Connector type: Chassis mounted D25 plug.

Pin	*Function*
1	Input 1
2	Input 3
3	Input 5
4	Input 7
5	Ground
6	Input 9
7	Input 11
8	Input 13
9	Input 15
10	Ground
11	Ground
12	No connection
13	No connection
14	Input 2
15	Input 4
16	Input 6
17	Input 8
18	No connection
19	Input 10
20	Input 12
21	Input 14
22	Input 16
23	No connection
24	Ground
25	Ground

GPI Input Wiring



Inputs are activated by a closure to ground shown as a push button (PB).

Input Specification:

Input Activation	<1.0V with respect to unit 0V.
Absolute Maximum Voltage	+60V.

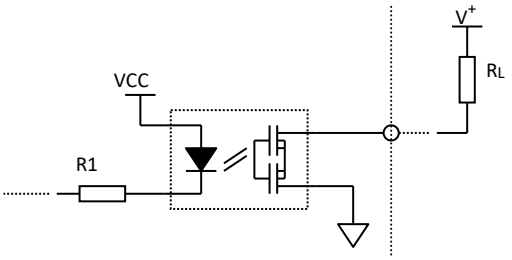
GPI Output Connections

GPI Outputs are divided into two types. Outputs 1-8 share a common ground: outputs 9-16 are fully floating.

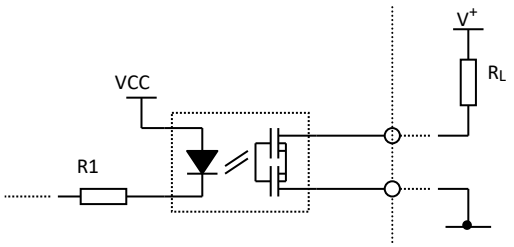
Connector type: Chassis mounted D25 socket.

Pin	*Function*
1	Output 1
2	Output 3
3	Output 5
4	Output 7
5	Ground
6	Output 9+
7	Output 10+
8	Output 11+
9	Output 12+
10	Output 13+
11	Output 14+
12	Output 15+
13	Output 16+
14	Output 2
15	Output 4
16	Output 6
17	Output 8
18	Output 9-
19	Output 10-
20	Output 11-
21	Output 12-
22	Output 13-
23	Output 14-
24	Output 15-
25	Output 16-

GPI Output Wiring



Output 1-8 (Common Ground)



Output 9-16 (Floating)

Output Specification:

Absolute Maximum Load Voltage	+60V
Absolute Maximum Load Current	350mA

5.2 Option Boards

Trilogy provides a range of option boards which may be fitted in the Gemini chassis. At the time of writing (January 2018) these are as follows:

Part #	*Description*
700-26-20	Audio Expansion Board (AEB) - 8 Channel
700-26-21	MADI /AES Interface Board
700-26-23	Telephone Interface Board – FXO – 4 Channel
700-26-25	IP Panel Interface (IPPI) - 8 Channel

Within some simple rules, the boards may be freely mixed within each chassis. The numbering of ports is indicated by text silk screened on the rear of the chassis and also on the drawing above. Port 1 is at the bottom left connector, port 8 is at the bottom right; port 25 is the top left and port 32 the top right. It should be noted that some boards do not provide physical port mapping in the traditional sense but still occupy one option slot on the chassis.

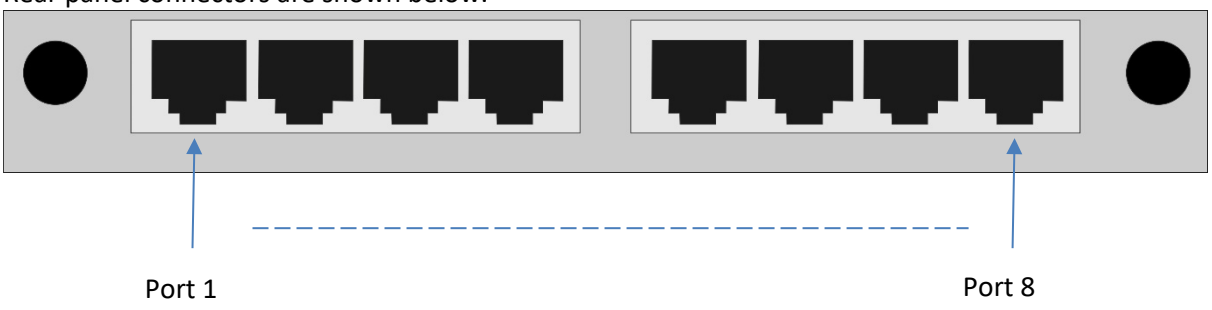
5.2.1 700-26-20 Audio Expansion Board - 8 Channel

The most common option board supports a mix of 8 panels and / or 4-wire audio circuits. The 8 ports may be freely configured one-by-one in software and there are no hardware changes required.

Connector type: Chassis mounted RJ-45.

RJ-45 Pin	*Function*	*Corresponds to…*	*Cable*
1 2	Matrix Data in + Matrix Data in -	Panel Data out	Pair 1
3 6	Matrix Data out + Matrix Data out -	Panel Data in	Pair 2
5 4	Matrix Audio in + Matrix Audio in -	Panel Audio out	Pair 3
7 8	Matrix Audio out + Matrix Audio out -	Panel Audio in	Pair 4
shell	Cable Screen		

Rear panel connectors are shown below.



5.2.2 700-26-21 MADI /AES Interface Board

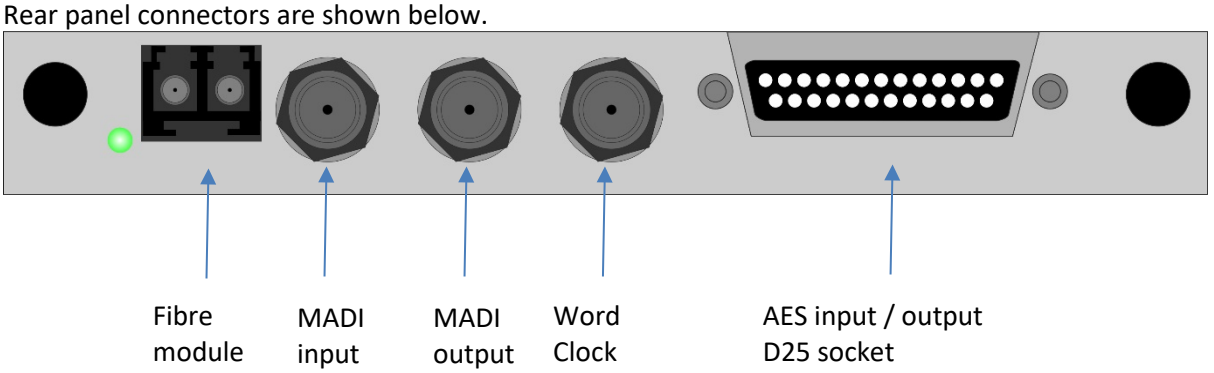
The MADI and AES option board is used within a Gemini system to provide digital audio inputs and outputs. The board has one MADI input, one MADI output plus four AES inputs and outputs (eight audio channels). For MADI, the option board has both BNC connectors and a fibre module. The MADI option board is able to receive/transmit a data stream with 56 or 64 audio channels: the number of channels is automatically detected. The board supports audio with a sampling rate of 48 kHz. The AES interface has four balanced inputs and four balanced outputs. Each input/output consists of two audio channels. The AES channels are capable of transmitting/receiving audio sampled at 48 kHz only.

MADI Fibre: Multimode (MM) fibre with LC connectors.
MADI BNC: 75Ω impedance. Peak to peak output level between 0.3V and 0.6V when correctly terminated.
Word Clock: Minimum level 1.5V when terminated 75Ω. The clock may be looped from board to board should multiple boards be installed. It is not terminated internally although an internal jumper (J22) may be fitted if wished.

AES D25 Fixed socket

Pin	*Function*	*Pin*	*Function*
1	Input 1 / 2 +	14	Input 1 / 2 -
2	Input 3 / 4 +	15	Input 3 / 4 -
3	Input 5 / 6 +	16	Input 5 / 6 -
4	Input 7 / 8 +	17	Input 7 / 8 -
5	Output 1 / 2 +	18	Output 1 / 2 -
6	Output 3 / 4 +	19	Output 3 / 4 -
7	Output 5 / 6 +	20	Output 5 / 6 -
8	Output 7 / 8 +	21	Output 7 / 8 -
9	n/c	22	Ground
10	Ground	23	Ground
11	n/c	24	Ground
12	Ground	25	Ground
13	Ground		

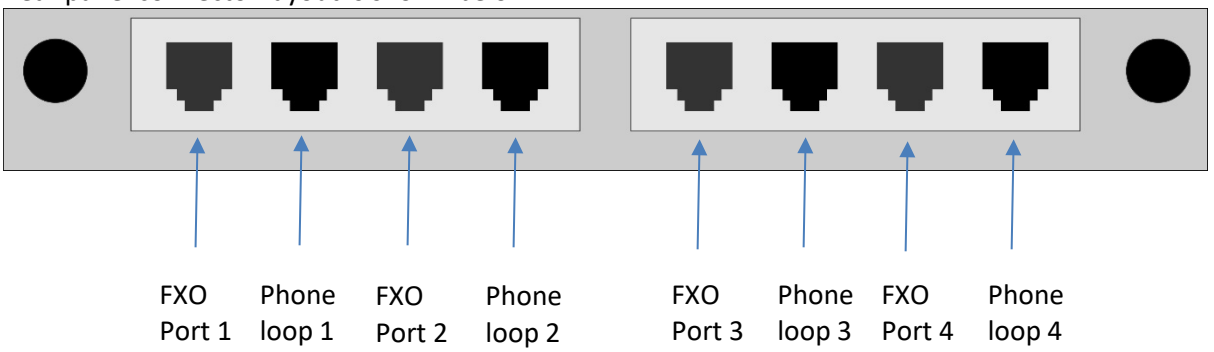
Rear panel connectors are shown below.



5.2.3 700-26-23 Telephone Interface Board – FXO – 4 Channel

The FXO option board provides 4 telephone channels, each with a phone loop through. The telephone ports use RJ 11 connectors.

Rear panel connector layout is shown below.



FXO - RJ11 Pin-out

Pin	*Function*
1	n/c
2	n/c
3	Ring
4	Tip
5	n/c
6	n/c

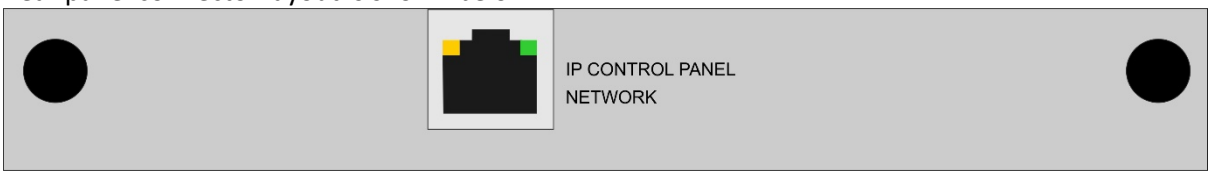
5.2.4 700-26-25 IP Panel Interface - 8 Channel

This option board allows for the connection of up to 8 IP enabled panels from the Trilogy product range. Please contact Trilogy for details of available panel types.

The option board has a single RJ45 connector which should be connected to the same LAN segment as the IP enabled panels. This LAN segment may, or may not be the same as the Gemini network. There is no technical benefit either way and the choice is made purely on convenience.

It is worth noting that the option board carries a simple DHCP server which may be used to simplify panel addressing by avoiding the allocation of static IP addresses. Since only one DHCP server per LAN segment is permitted, this may affect the consideration.

Rear panel connector layout is shown below.

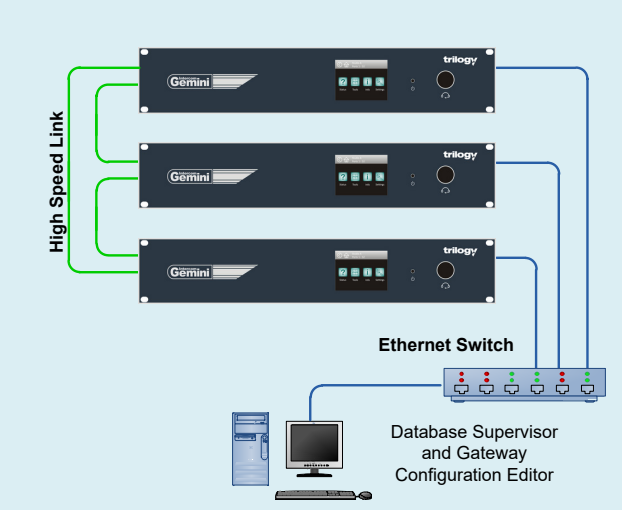


6. NETWORKING

6.1 CONNECTING NETWORKED SYSTEMS

Gemini matrices may be interconnected using either the proprietary high speed link bus (HSL), over a local or wide area network, or any combination of both techniques to fulfil a particular application.
The following diagrams indicate two possible arrangements.

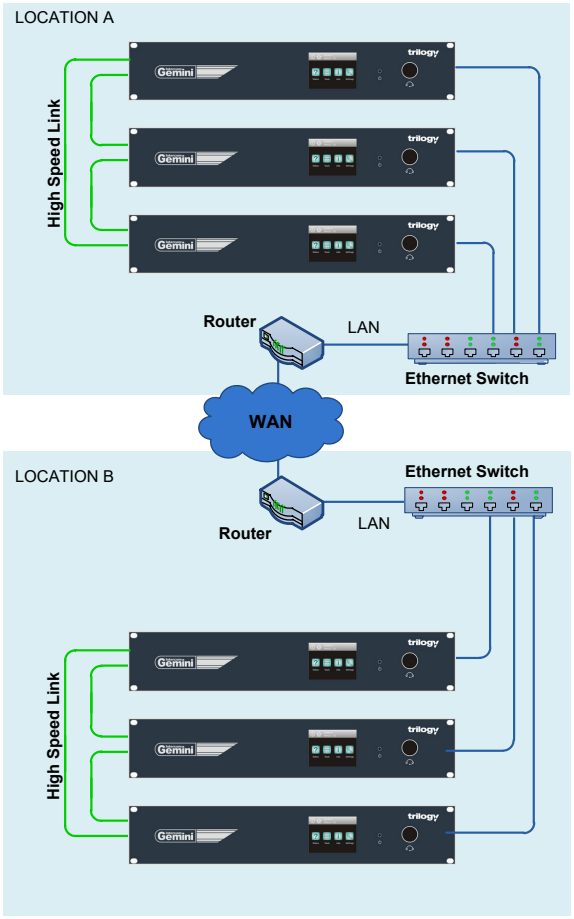
6.2 SINGLE SITE



The key to systems using more than one Gemini matrix is the High Speed Link, or “HSL”. HSL provides the bidirectional, low latency mechanism for transporting audio channels between Gemini matrices. For enhanced resilience, the HSL may be connected as a redundant ring, either using conventional CAT6 cable for up to 90 metres or over distances up to 2 km via an optical fibre link. This ensures that the system is tolerant of a single break in any segment of the link with no loss of audio traffic between the matrices.
If the optional DSP module is fitted, then even if there is a total failure of the HSL link, communication will continue using IP audio.

Nevertheless, an IP network between all matrices is a necessity, since it is used for all real-time data communications between the matrices and for the database connection. This design can be extended up to a maximum of 8 Gemini, providing a matrix of 256 ports.

6.3 TWO SITES



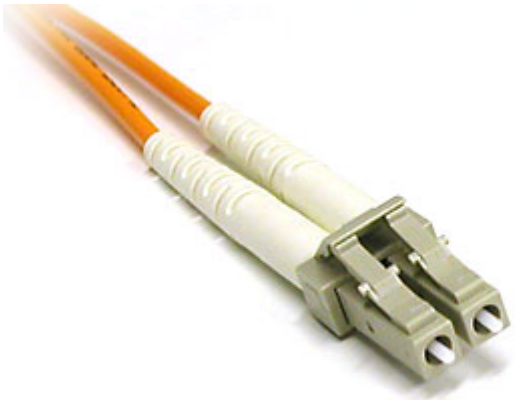
Over longer distances it may be impractical to extend the HSL by either copper or fibre. If sufficient network bandwidth is available and all Gemini are fitted with the optional DSP module, then communication between sites will take place over IP. As explained in the previous example (above), each site may be extended up to a maximum of 8 Gemini. The design can be extended by adding more sites provided WAN bandwidth is available. The entire system is managed and configured by a single database which may be located anywhere on the network.

For more examples of HSL connections, including a mix of copper and fibre, see section 6.4.2.

6.4 700-26-18 HSL Fibre Interface Adaptor

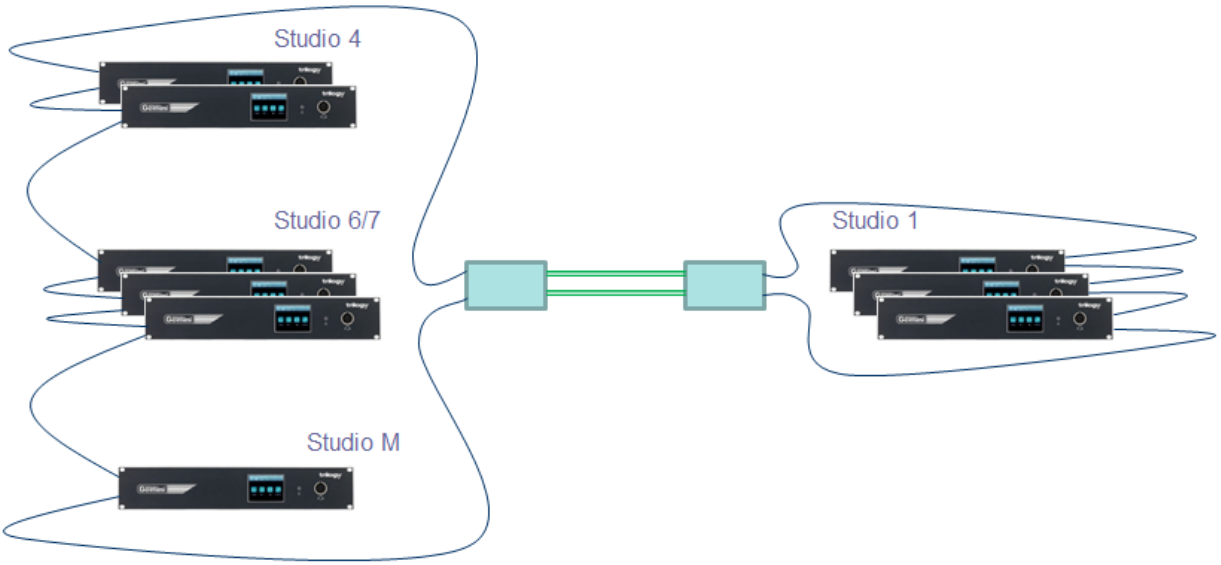
Where Gemini matrices are more than 90 metres apart, the HSL may be extended by use of the 700-26-18 Fibre Interface Box. A single 700-26-18 may be connected to a Gemini matrix ranging in size from 32 to 256 ports, as shown in the diagrams below. The fibre type is single-mode, using LC duplex connectors.
The box connects to both the HSL+ and HSL- ports, as well as to the previous and next points on the overall Gemini ring, thus providing greater resilience. The box is DC powered, using a supplied mains power supply.

6.4.1 Connectors

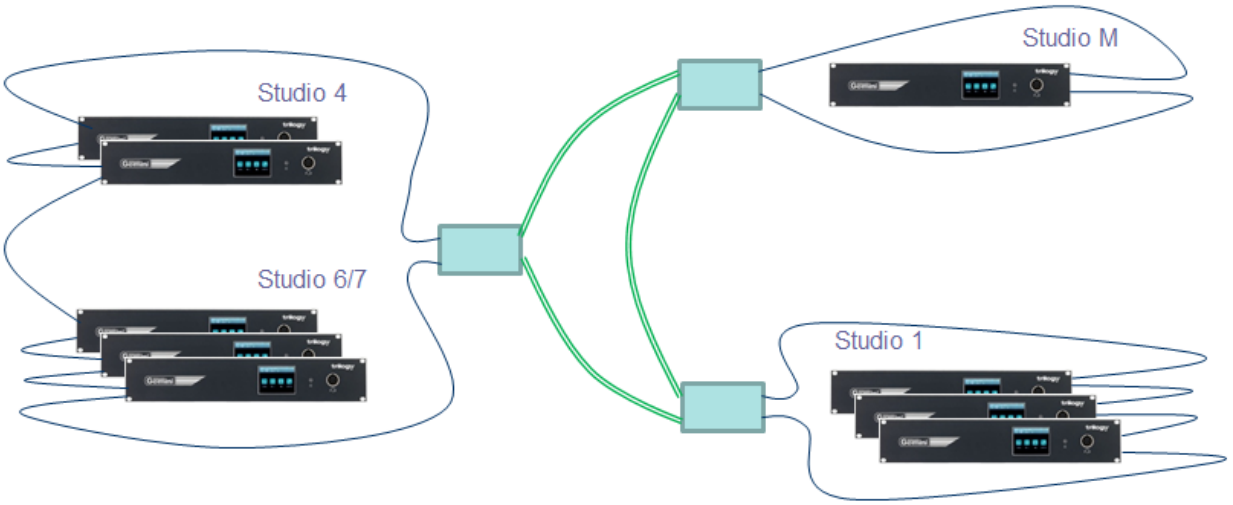


6.4.2 Connection Diagrams

2 locations



3 locations



Copper cable – maximum length of any cable < 100m

Fibre connection

7. OTHER EQUIPMENT

7.1 BELTPACKS

Beltpacks may be connected to the matrix on ports configured as 4-wire. They require an external DC voltage supply, either single or dual rail, depending on the model. A 3 pin Hirose socket is provided on the rear of each matrix with ± 15V protected by an internal self-resetting fuse. See section 5.1.4 for connector details.

The table below show the different belt box types.

Type	*No. of input channels (from matrix)*	*Fixed Connector type (to matrix)*	*Mating Connector type required (to matrix)*	*Supply voltage required (note 3)*	*Headset connector (socket)*
410-50-12	1	XLR6 Male	XLR6 Female	+8.5V to +15V (note 3)	XLR5 Female
410-50-13	2	Hirose 12 Way Plug RM15TRD-12P	Hirose 12 Way Socket RM15TPD-12S	±8.5V to ± 15V (note 3)	XLR5 Female

Notes:

1. All beltpacks have one output channel (i.e. return to the matrix).
2. The beltpack press-to-talk (PTT) switch is normally momentary action. The -12 and -13 types may be ordered with a latching talk switch, using part codes 410-50-12-L & 410-50-13-L.
3. The beltpack will operate reliably on a wide range of supply voltages. Current consumption is approximately 30mA per beltpack. If powered from the matrix, knowledge of the resistivity of installed cable (Ω / 100 m) allows a simple calculation of likely voltage drop.

The following tables give individual connector pin-outs for each model.

410-50-12 Single Channel Beltpack Connection to Matrix	
XLR6 - Pin	***Function***
1,2 (+,-) pair	Audio output from box to matrix
3,4 (+,-) pair	Audio input to box from matrix
5	0V
6	+8.5V to +15V (see note 3 above)

410-50-13 Two Channel Beltpack Connection to Matrix	
Hirose 12 way - Pin	***Function***
1	Chassis
2,3 (+,-) pair	Audio 1 input to box (PTB)
4,5 (+,-) pair	Audio 2 input to box (Prog Snd)
6,7 (+,-) pair	Audio output from box to matrix
8	+8.5V to +15V (see note 3 above)
9	-8.5V to -15V (see note 3 above)
10	0V
11,12	n/c

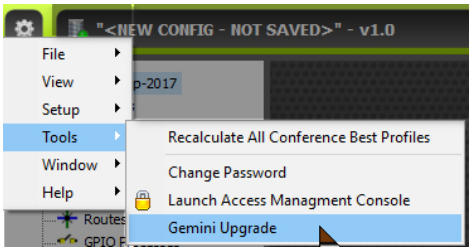
All models Headset Connector (XLR5 Socket)	
Pin	***Function***
1	Mic in (screen)
2	Mic in (signal)
3	Headset Ground
4	Headset Out
5	Headset Out

7.2 RT EQUIPMENT

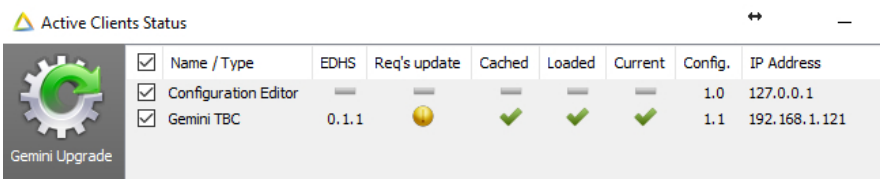
Radio Talkback equipment may be supplied by Trilogy as part of a complete system. It is not manufactured by Trilogy and will be supplied with the original equipment manuals.
The usual configuration consists of one or more base stations and a number of portable transceivers. The base stations are connected to the matrix using normal 4 wire audio ports according to the pin-out information in section 5.1.1.

8. GEMINI UPGRADE

A single Gemini matrix can be upgraded via the web browser, as explained in section 4.7.9. Gemini will be offline and out of service for the duration of the upgrade which takes around 90 seconds. Choose a suitable time and ensure that the system is not in use. This can be time consuming for multiple Gemini so an alternative method is available from the Gateway editor.



After launching the Gateway editor, click on the “gear” icon to open the menus, then select
Tools > Gemini Upgrade.



The upgrade form will launch, listing all currently available Gemini discovered on the network.

Using the checkboxes, select the Gemini you wish to upgrade from the list. Now click the Gemini Upgrade icon and load the upgrade file located on the local PC hard drive. If it was selected during the original Gateway PC installation, a copy of the file can be found here:

C:\Program Files (x86)\Trilogy\Trilogy V5\GeminiSoftware\install.zip – [for Windows 64 bit]
C:\Program Files\Trilogy\Trilogy V5\GeminiSoftware\install.zip – [for Windows 32 bit]

9. SPECIFICATION

9.1 GENERAL

Number of ports	Depends on number and type of option boards fitted. Max 32 per Gemini matrix when 4 x 700-26-20 Audio Expansion Board fitted.
Camera Mix/DA	Qty 2: 6 channel, 4 wire audio
Front panel headset	XLR5 socket. Microphone type: dynamic.
Gemini Network	Up to 8 Gemini matrices per ring, giving a maximum of 256 ports
IP Channels	32/64 channels when DSP option is fitted

9.2 MATRIX AUDIO SPECIFICATION

Port Type	4 wire electronically balanced
Frequency Response	-3 dB @ 20 Hz and 20 kHz
Nominal Level	0 dBu
Input Gain Control	+12 dBu to -12 dBu (1db step resolution) via Gateway
Output Gain Control	+12 dBu to -40dBu (1db step resolution) via Gateway
Maximum Input Level	+20 dBu
Maximum Output Level	+20 dBu
Crosstalk	<–95 dBu @ 1 kHz worst case
Noise	< –62 dBu ITU-R-468 weighted < –69 dBu ITU-R-468 un-weighted
Distortion	<0.025%, 0 dBu at 1 kHz
Input Impedance	24 kΩ
Output Impedance	50 Ω
Sample Rate	48 kHz
Resolution	16 bit

9.3 PANELS

Panel Communication	Balanced RS422 at 230.4 kBaud
Power	See individual sections
Maximum cable run	300 m.
Connection to Matrix	4 twisted pair cable. STP only

9.4 HIGH SPEED LINK (HSL)

HSL Data Rate	270 Mb/s
Audio delay	1.2 ms (typical)
Maximum cable run	100 m between adjacent Gemini matrices when using CAT6 cable
HSL over fibre	Max 2 km using Trilogy supplied fibre converter

9.5 GENERAL PURPOSE INTERFACE (GPI)

Inputs	16: activated by closure to ground Input activation <1.0 V wrt unit 0 V Absolute Maximum input +60 V
Outputs	16 opto-isolated 8 with common ground, 8 floating Absolute Maximum load voltage +60 V Absolute Maximum load current 350 mA

9.6 Mechanical and Environmental

Dimensions	483(w) x 89(h) x 375(d) mm - 19 inch x 2RU rack mounting chassis. Quoted depth excludes mating connectors.
Weight	5 kg net fully equipped (including optional dual PSU)
Operating Temperature	0°C to +50°C
Storage Temperature	-55°C to +70°C
Humidity	90% non-condensing
Approvals	Emissions - EN55022 Immunity - EN55024 Safety - EN60950 CSA UL
Power (single or optional dual)	100/240 V ac, 1.8A, 50/60 Hz
Power consumption	< 65 W fully loaded per matrix
Cooling	Fan assisted Intake : right side rear exhaust : left side rear
Auxiliary power out	+12 VDC ±0.5V, 450 mA -12 VDC ±0.5 V, 200 mA Internally fused, auto resetting.

9.7 Connectors

Power	3 pin IEC chassis plug with retainer (1 per power supply)
Matrix Port	RJ45
Camera Mix/DA	D25 socket
GPI Input	D25 plug
GPI Output	D25 socket
Fault Loop	D9 socket
Serial Com port	D9 plug
HSL +	RJ45
HSL -	RJ45
LAN	RJ45
Aux Power out	Hirose 3 pin socket
Headset (front panel)	XLR5 socket

9.8 PC (Gateway Editor and Database Server)

Operating System	Windows 7/8/10 - 32 or 64 bit (64 bit preferred)
CPU	Intel Core i3 or better
Memory	4 GB minimum, 8 GB preferred with 64 bit OS
Hard Drive	No specific requirement
Optical Drive	Optional for software installation
Antivirus software	Trilogy database directory must be excluded from any scan
Graphics	1024 x 768 minimum resolution

9.9 SNMP

This section outlines the implementation of SNMPv2 for Gemini. The following table lists the parameters and supported states. Please contact Trilogy Technical Support for full details and a copy of the current Management Information Base (MIB).

Parameter	***States***
Gemini Local Audio	OK / Fail
Gemini Network Audio	OK / Fail
Gemini DB Connection	OK / Fail
Gemini TBC	OK / Fail
Gemini Commander Interface	OK / Fail / Not Configured
Gemini PSU	OK / Fail
Gemini fan	OK / Fail
Gemini HSL +ve	OK / Fail / Not Configured
Gemini HSL -ve	OK / Fail / Not Configured
Gemini Networked DSP	OK / Fail / Not Configured
Gemini connected panel status for ports 1 to 32	OK / Fail / Not Configured [for each port]
Gemini Ember+ interface	OK / Fail / Not Configured
Gemini Combined Main state	OK / Fail
Gemini Combined Cards state	OK / Warning / Fail
Gemini Combined Panels state	OK / Warning
Gemini Combined Interfaces state	OK / Warning / Fail

9.10 PRESETS

Copy the text below into a new plain text file created with an editor such as Notepad. Edit the text to match your own installation. See section 4.7.6 for instructions on uploading the file via the web browser and section 3.4.4 on deploying a specific preset from Gemini front touchscreen.

```
# ================================================
#
# Description of system presets ini file fields
#
#[SystemPreset]                System preset section header
#SPCT=2                          Number of system presets defined in this ini file
#
#[SP00]                         Preset section header range is from SP00 to SPXX
#                               If SPCT is equal to 2 XX = 01 (i.e SPCT-1=XX)
#
#EDHS=0.1.1                     EDHS value for system preset
#
#HOST=Castor                    Hostname for system preset - must adhere to hostname validity.
#                               Valid characters are (a-z, A-Z, 0-9, -, _) - no spaces or
#                               other characters allowed
#
#PDSC=WAN Ground Floor          System preset description or tag
#                               Valid characters as for host but spaces and other characters
#                               should be allowed
#
#IPAD=172.30.55.220             IP Address of Gemini host
#
#SBNT=255.255.255.0             Subnet mask
#
#GTWY=172.30.55.1               Default gateway - can be left undefined or 0.0.0.0
#
#SDNS=172.30.55.201             Domain name server - can be left undefined or 0.0.0.0
#
#DBSL=172.30.55.200             Database server IP address
#
# ================================================
#
[SystemPreset]
SPCT=4
#
[SP00]
EDHS=0.1.6
HOST=Studio_1_1
PDSC=Gallery 1 Host 1
IPAD=172.18.65.125
SBNT=255.255.255.0
GTWY=172.18.65.1
SDNS=0.0.0.0
DBSL=172.18.65.201
#
[SP01]
EDHS=0.1.7
HOST=Studio_1_2
PDSC=Gallery 1 Host 2
IPAD=172.18.65.126
SBNT=255.255.255.0
GTWY=172.18.65.1
SDNS=0.0.0.0
DBSL=172.18.65.201
#
[SP02]
EDHS=0.1.8
HOST=Studio_1_3
PDSC=Gallery 1 Host 3
IPAD=172.18.65.127
SBNT=255.255.255.0
GTWY=172.18.65.1
SDNS=0.0.0.0
DBSL=172.18.65.201
#
[SP03]
EDHS=0.1.24
HOST=Studio_2_1
PDSC=Gallery 2 Host 1
IPAD=172.18.65.132
SBNT=255.255.255.0
GTWY=172.18.65.1
SDNS=0.0.0.0
DBSL=172.18.65.201
```

9.11 API

Gemini with Ember+ fully implements the following features:

- Assign key type
- Assign key label
- Assign port label
- Assign 4-wires in a conference
- Assign speak/listen mode of 4wires in a conference
- Assign conference to panel key
- Make/break routes – equivalent to defining fixed routes in the CE
- GPIO inputs and outputs – assign on/off state of defined host and panel GPIOs

The following features are currently partially implemented:

- Assign IFB destination
- Assign IFB sources
- Assign IFB source auto-make state
- Assign IFB cut/dim action
- Assign IFB dim level
- Assign IFB interrupts
- Assign IFB interrupt priority
- Assign IFB GPIO interrupts
- Assign IFB GPIO interrupt priority
- Assign IFB key to a panel

Please contact Trilogy Technical Support for further information.