Gateway Configuration Editor Guide

ISSUE 1.3

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1. INTRODUCTION TO GATEWAY, THE SYSTEM CONFIGURATION EDITOR

1.1 OVERVIEW

Gateway is the software application used to configure the Trilogy IP based intercom products. These include Gemini, Messenger and Mercury.

A "configuration" is all of the information needed for the matrix system to operate as required: IP addresses so they can communicate; declarations of the panels and other audio devices that are connected; what the panel keys should do; groups and conference functionality; and so on.

The configuration is stored in a set of database tables on a PC acting as a server. This database server may be the same one as that on which the Gateway editor is run, but it need not be.

The database is of a client/server design and is managed by a Windows service named "Trilogy Database Supervisor". This service is loaded automatically every time the PC starts up, and it then runs in the background.

The client/server design means that multiple "clients" can connect simultaneously while the supervisor manages the reading and submission of data to and from the database, and provides file "locking" to prevent two clients attempting to change data at the same time. In the overall context, "clients" include the Gateway configuration editor itself as well as the matrices and any soft panels in use.

The Gateway Editor and Database Supervisor should already have been installed on a PC or laptop that is connected to the same network as the intercom matrix. This is covered in the Gemini Implementation Guide which is provided on the CD which accompanies your system, or may be downloaded from the Trilogy website at www.trilogycomms.com.

A small graphical application 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 will launch automatically at start up. When it is run, a small additional icon will be displayed in the Windows system tray adjacent to the clock. On double clicking the icon, the database supervisor will be displayed

Start Gateway on the PC: the default credentials are Admin | trilogy.

If all is well, the Database Supervisor will show that both the Gateway Editor and any matrix hosts are connected and operational. A similar form is available by selecting "Active Clients" from the Gateway editor "View" menu – this is described in Tutorial 1, as part of uploading and restarting the system to run a new configuration.

1.2 RELATED DOCUMENTS

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

1.3 GATEWAY OPERATIONAL METHODOLOGY

Gateway has a number of principle areas within the main application window.

The tree view list in the left hand pane is the main navigation tool within Gateway.
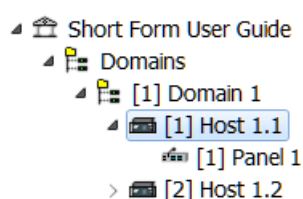
Where an entry has an arrow to the left of it, the tree may be expanded to show "children" of the parent.

To access a **basic** editor, **single** click on the required item. For example, to edit "Host 1.1" simply click once on the "Host 1.1" symbol in the tree view.

To access an **advanced** editor, **double** click on the symbol as appropriate.

The selected editor will then appear in the Main Window to the right of the screen.

Once an editor is selected, a variety of editing methods are supported, depending on the activity being undertaken such as: drop-down selection boxes; "either/or" selection (or "radio" buttons); text entry; or drag-and-drop. You can also right-click within many forms to call up a selection list. These will be explained as necessary in the later section describing the configuration of a simple Gemini system. The principles and techniques described are applicable to all hardware platforms within the Trilogy product range – key differences will be discussed as they arise.

Many editors have navigation buttons allowing quick access to the next "record" (for example, the next panel connected to the host matrix). This tool bar also has "accept" and "reject" change buttons – note that any changes made are *automatically* accepted when you move on to edit something else, so if you want to reject a change made, you must click on the reject cross. A "refresh data" button at the end reloads the information stored in the database for that editor page should there be any doubt as to whether the page is current or not.

It is also useful to know that every menu item or button has a "tool tip": if the mouse cursor is allowed to hover over a button, a brief explanation will appear.
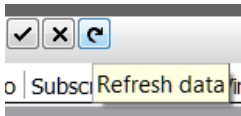
A "tool tip" showing that the circular arrow means "Refresh Data"

Many editors also have "add" and "delete" buttons allowing, for example, an entire matrix to be added or deleted from the configuration. This tool bar also has a "grid options" button that allows displayed data to be exported (for documentation purposes, for example).

2. TUTORIAL 1: CONFIGURING A SIMPLE SYSTEM

This tutorial will walk through the initial configuration of a simple Gemini system.
It is recommended that you read all the preceding chapters first, to ensure you are familiar with the basic operational philosophy of the Gateway configuration editor, as well as making sure your Gemini matrix is operational, and that both are succesfully connected to the database supervisor.
A "Simple" system, or *enterprise*, for the purposes of this guide, means:

- A single Gemini matrix, or *host* in a single *domain*
- No HSL audio connections
- No use of IP audio

The tutorial will walk through the creation of a completely new configuration from scratch, including the addition and configuration of control panels and 4-wire ports – subscribers - and then we will upload the configuration to the matrix, restart the configuration on the system, and check that everything is working correctly.

Further sections in this guide explain control panels themselves covering:

- Key Operation
- Tallies
- "cut" switch functionality
- The rotary encoder control, or "REN"

There are also more advanced tutorials explaining:

- Fixed Crosspoints
- Groups
- Conferences and Production Talkback
- IFBs
- Dimming

2.1 ENTERPRISE, DOMAIN, HOST, SUBSCRIBER – AN OVERVIEW

Since a complete system can comprise many elements – individual matrices, perhaps installed over several sites, with a large number of control panels and other audio devices – with the added complexity of an IP network, as well as the Gemini High Speed Link, it is necessary to have a numbering system that uniquely identifies all these elements.
The system employed is termed the "EDHS" system:

E=enterprise and is used to represent the complete system. At present "e" is always 0, but the adoption of "e" allows for future expansion to assist interoperability between completely different organisations.
D=domain. A domain is a convenient collection of devices, usually in the same physical location, such as "studio 1". They can be used to logically separate devices for convenience, but are also essential when it comes to IP networks: this will be explained later.
H=host where a host is an individual matrix
S=subscriber which, like a telephone subscriber, is at the end of the line – the actual device used by the operator, such as a control panel, or a 4-wire audio port.

2.2 CONFIGURATION – FIRST STEPS

Start the Gateway configuration editor.
To ensure that we are working with a new, blank configuration, click the **menu** button (the gear icon) and select the **File** menu and the choose **New** (refer to section 1.3 entitled "Gateway Operational Methodology" if you're not sure where the menu button is).
Click **Yes** when asked if you're sure you want to create a new configuration – although if another administrator has been working on a configuration it might be worth saving their work first – this can be done from the same **File** menu by choosing **Save**.

2.3 IP ADDRESS PLAN

An important step at this early stage is to select suitable IP addresses for all your Gemini (and related) equipment. A full explanation of this, with a suggested approach, is given in the Gemini and Messenger Implementation Guides which are provided on the accompanying CD, or available to download from the Trilogy website, www.trilogycomms.com. An example table is shown below.

	IP	DSP 1 DSP 2	subnet mask	gateway address
Gemini	192.168.200.200	192.168.200.210 192.168.200.211	255.255.255.0	not set
Laptop / PC	192.168.200.100	n/a	255.255.255.0	not set

2.4 NETWORKED DSP

Networked DSP is a commonly fitted option and requires 2 additional IP Addresses per Gemini. These are shown in the sample IP Address Plan (above) and assigned in the Host Editor (Advanced). See section 2.7 for information.

2.5 ENTERPRISE EDITOR

Now single click the very top entry in the tree view (in the left hand pane of the editor) – it will be labelled **Config<date>** where **<date>** is today's date. This opens the Enterprise Editor, and we can give our new configuration a name – for example "Tutorial 1" and perhaps the description could be "Simple Gemini system configuration ".
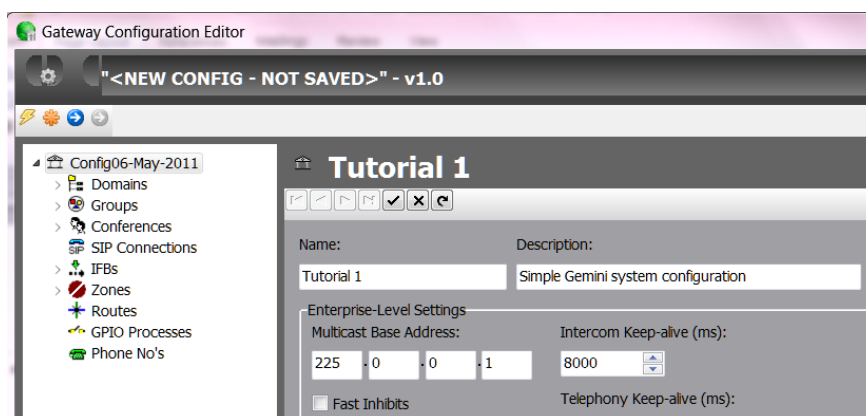
No other changes are needed at the **Enterprise** level.

2.6 DOMAIN EDITOR

Next, expand the tree view relating to **Domains** by clicking the arrow to the left, to reveal that the configuration has, by default, created a single domain called "**Domain1**. There is no small arrow adjacent to Domain1, which indicates that currently, there are no hosts within that domain. Single click on the **Domain 1** element of the tree view to open the basic **Domain** editor.

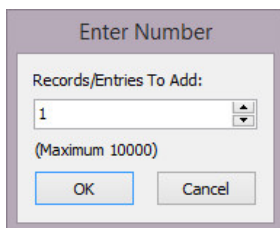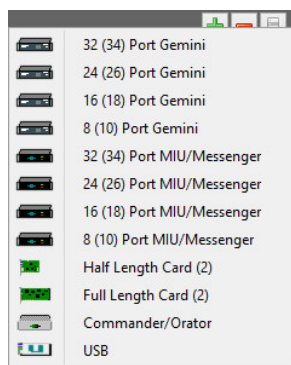Since this configuration only requires a single mattrix, click on the green "+" button and select one of the host types shown in the list. For this example, we are using a single 32 Port Gemini. If you wish to run this configuration on the hardware you have purchased, then choose the host type accordingly.

After selecting the appropriate host type, a further small pop-up dialogue will appear. Enter the number of hosts of this type which you wish to add to the configuration. For this example, enter 1, and click OK.

Host 1.1 (the 1.1 means domain 1, host 1, as determined by the **e.d.h.s** numbering scheme), can be renamed if wished by clicking the **name** field associated with this host and entering your own name – perhaps "Gemini Matrix1" – along with a comment if so required.

The most important field to configure is the IP address. Without this being entered, the database supervisor will not be able to locate the correct Gemini matrix on the IP network.

The IP address must match the IP address given to the Gemini we are configuring – this is from the IP Address Plan discussed earlier.

TIP
When you have entered the first "octet" (192 in this example) you can move to the next field (where we'll enter 168 in this example) by:

- Either pressing the tab key on the keyboard
- or, since this is an IP address that is separated by a dot (or "full stop", or a "period"), you can press the "dot" key on the keyboard

Once the IP address is entered, it is good practice to click the tick in the navigation tool bar – although changes will be saved automatically if you navigate away from this editor. Once confirmed, the IP address entered will also appear next to the host in the grid view.

Your view of the domain editor should now be similar to that shown below.

The actual port types for the matrix will almost certainly be correct, the default being "**AEB**", or "Audio Expansion Board", which support analogue control panels and 4-wire audio. In the event your matrix has other modules fitted, please refer to a later chapter.

2.7 HOST EDITOR (ADVANCED) | AUDIO

To configure Networked DSP option boards, open the Advanced Host Editor by double-clicking the corresponding icon in the "tree". Alternatively, right-click the tree icon and select "Show Advanced Editor".
Click on the "Audio" tab.
As shown below, turn on the checkbox for Networked DSPs and by reference to the initial plan, enter the IP Addresses.

We now need to configure the **subscribers** to be the correct type.

2.8 HOST EDITOR | SUBSCRIBERS

Single click the host (**Gemini1** in this example) in the tree view to launch the standard subscriber editor.
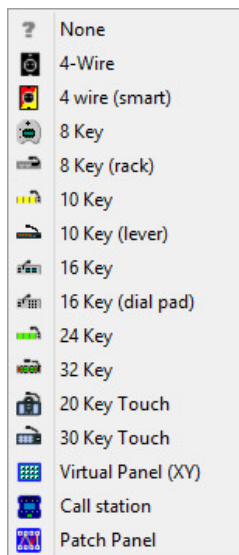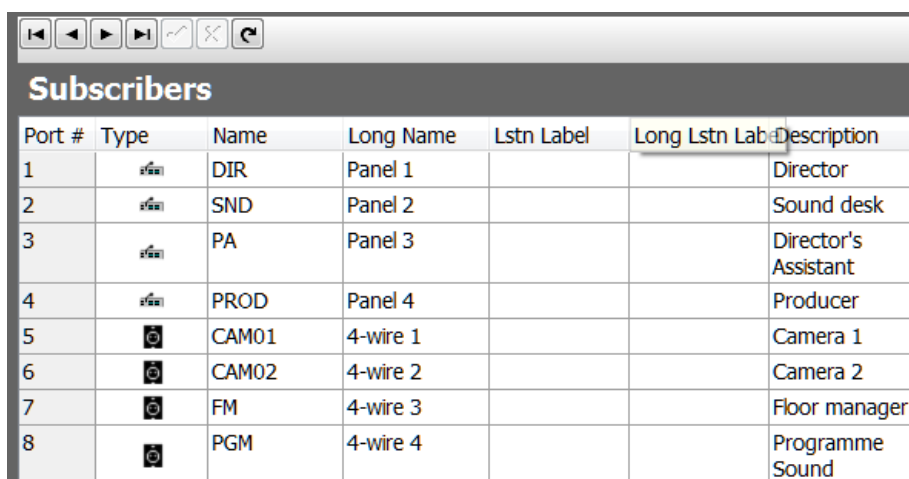
Click within the **Type** field for every port of your matrix and select the correct type from the drop down menu, according to your installation. The two most commonly used port types are **Panel** and **4-wire**. The different types of panels available, and their main differences are explained later. For each subscriber, a name should be entered. This name will be used on control panel displays when keys are assigned to speak or listen to the subscriber - it is worth bearing in mind that the majority of Trilogy panels support 5 character labels, so choose appropriate abbrevations. The Trilogy touch panels support 8 character labels: if these are deployed anywhere on your system, you can define additional "long" names.

It is good practice, although not essential, to enter a **Description** for each subscriber – this would typically be a full explanation of the subscriber including, perhaps, its location in the studio.

It is not necessary to enter text in the **Lstn Label** (the "Listen" label) field.

For this tutorial, assign the first 4 ports as panels, and the second as 4-wires, labelling them like this:

Port #	Type	Name	Long Name	Lstn Label	Long Lstn Label	Description
1		DIR	Panel 1			Director
2		SND	Panel 2			Sound desk
3		PA	Panel 3			Director's Assistant
4		PROD	Panel 4			Producer
5		CAM01	4-wire 1			Camera 1
6		CAM02	4-wire 2			Camera 2
7		FM	4-wire 3			Floor manager
8		PGM	4-wire 4			Programme Sound

The final task, before we have a basic, but functional, configuration is to add keys to panels.

2.9 PANEL EDITOR

Ensure the tree view on the left is fully expanded to show the configured subscribers. Single click on the first of your panels to launch the panel editor.
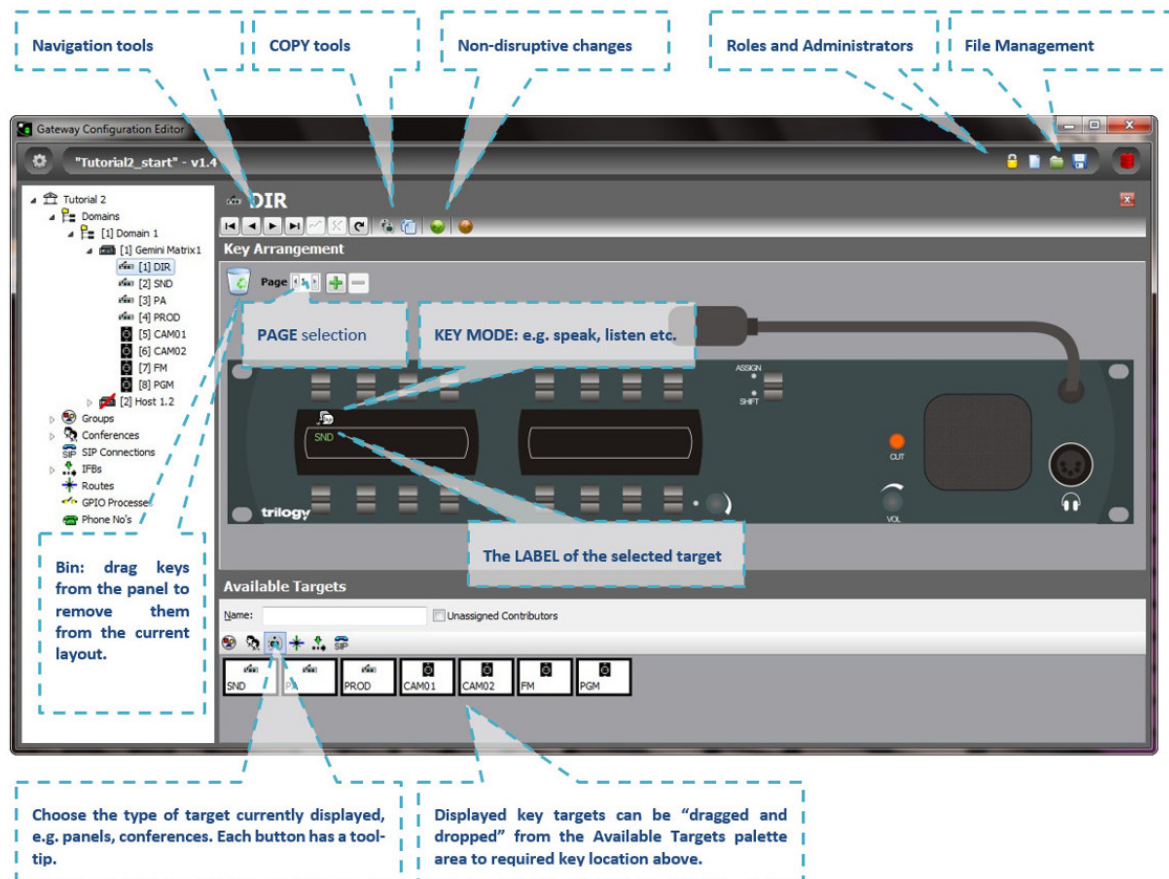
To add keys to a control panel, simply click on one of the available targets from the palette area in the lower part of the screen. Now drag and drop this target on to the required key location area of the panel. As you reach the correct "drop" point, a small rectangle will be highlighted.

- You can also rearrange the layout of keys on the panel using the same drag and drop mechanism.
- To speed up the process, you can select multiple targets from the palette using the normal Windows control and shift key functions. As you drop these multiple targets onto the panel, any existing assignments will be overwritten.
- Many of the Trilogy control panels use lever keys which have both an up and a down action. This allows much greater flexibility since every key can be programmed with a number of *modes*. For example:
  - Press upwards to open a latched speaking route (i.e. hands free). Press downwards for a momentary route (i.e press-to-talk).
  - Press upwards to listen to a 4-wire circuit (e.g. a camera). Press downwards to speak to that 4-wire.
- The key mode is preset and will be intelligently set according to the type of target you have selected. To edit the preset mode, click on the settings icon near the top right corner of the panel pane.

- To edit the mode of a key once it has been assigned, left click on the key icon. A pop-up selection will appear. The most widely used modes are described.
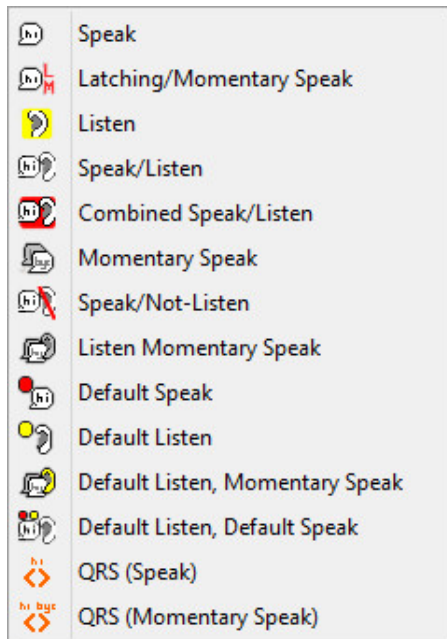
Speak. This key operates as a latching speak key if you briefly press the key, otherwise it is a momentary speak, making a speak route only for the duration of the keypress.

Latching /Momentary Speak. This key will always be a momentary speak if the key is pressed downwards, and is always latching in the upwards direction.To turn off the latched speak, press up for a second time.

Speak/listen. Has the latching/momentary characteristics of the **speak** key, but the downwards motion is for speaking and the upwards motion for listening.

- QRS. The QRS is a smart "quick response" key that allows a reply to the most recent incoming call to be made without first having to locate the specifically configured key for that caller on the panel. The label of a QRS key will change from < > to show the identity of the caller.

Gateway offers an array of key types, all of which may be selected from the dialogue that pops up. An explanation of all the available key types is given in Appendix 2 – Key Types.

Now configure keys as required for the panels in your system. It is useful to note:

- For this tutorial, at the very least assign speak keys on the Director panel to speak to Sound, and vice versa.

- Panel-to-panel intercom almost always uses **speak** keys, with **no need** for corresponding listen keys at panels. Communications with 4-wires almost always need a listen keys, but may need a speak/listen key.

Note that a second or "shift" page is also available, doubling the number of key targets that a given panel may have – the two pages available can be easily selected within Gateway and by the panel operator. Additional shift pages may be added using the Advanced Editor but try to avoid adding too many or operators may become confused.

At this point, the Configuration, although basic, is functional and will work. Before learning about more advanced functionality we will upload the configuration to the matrix and run it, to make sure it works as we expect.

2.10 UPLOAD AND RESTART THE CONFIGURATION

There are a number of different ways to transfer the configuration data to your matrix.
The most informative, and the best one to use at this stage is the Active Clients window. From the
menu button, choose View, then Active Clients. A new pop-up dialogue will be displayed. As well as
showing any client that is connected to the database supervisor, there are two actions available
from the tools on the left of the dialogue:
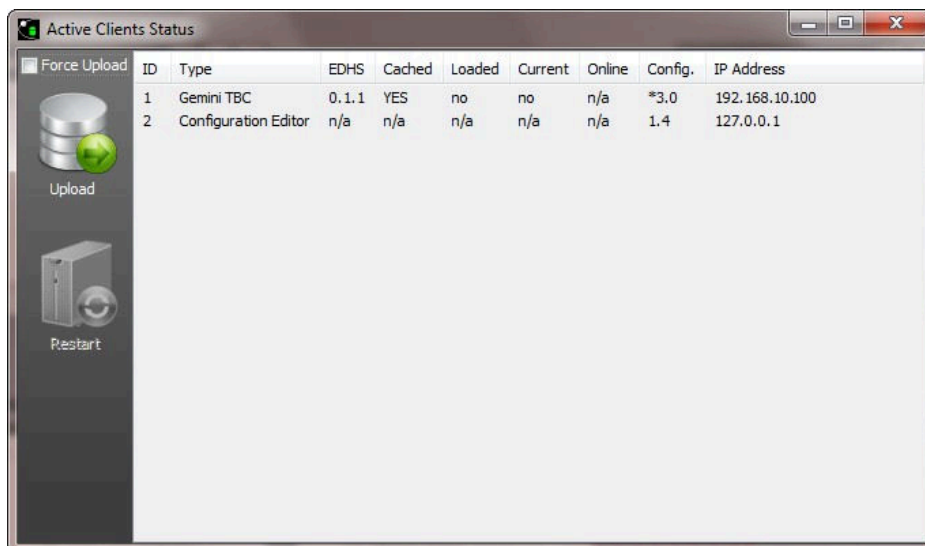
- **Upload** – this sends the new configuration to the host(s), but does not restart the system.
  The system continues to run its current configuration.
- **Restart** – the uploaded configuration is activated. A short period of system disruption will
  occur before the new configuration runs.

Select **Upload.** Once this process has completed, a dialogue will ask you to confirm that you wish to
"go live" with the configuration – click on **Yes**. The system will then restart and the new
configuration will be running.

There is a preferences menu accessible from the setup menu (use the menu button). From there you
can set an option to cause an uploaded configuration to always be immediately run once the upload
is completed, rather than having to confirm it each time.

Check the keys on your panel(s) to confirm that they are, indeed, as configured: assuming so, you
have successfully completed tutorial one, and are now able to configure a simple Gemini system.
The configuration created during the tutorial is available on the product CD, and is named
"Tutorial1_finished.trilogy"

The next tutorial will cover the use of Groups and Conferences, Production Talkback, IFBs and
dimming, but we will now take a quick look at control panels to understand how they operate.

3. CONTROL PANELS

Trilogy supplies a range of control panels, with different numbers of keys and in differing form factors. Full details are provided in the separate control panel guide, 700-90-628. This section explains the functionality available on Trilogy panels. The following topics are covered:
- Keys and Tallies
- Panel Display
- Working in the 'Shift' Mode
- Loudspeaker Volume
- Panel Encoders
- Assignable Features
- Cut Switch Features
- Extra Panel Features

3.1 KEYS AND TALLIES

All keys on panels connected to the intercom system are configured on a key-by-key basis, using Gateway. The function of a panel key can be either: Listen; Speak; Listen and Speak or a Phone key type. Each panel key can also be programmed to either be:

- *latching* (the function remains active when the key is briefly pressed) or -
- *momentary* (the function is only active whilst the key is pressed and held).

 Associated with each key are two tally lamps; one red and one yellow:

- The *red* lamp indicates when you are speaking
- The *yellow* lamp indicates when you are listening.

The yellow lamp has a further function to indicate when there is an audio 4 wire source present at the panel. If the *signal presence* option is enabled in the Gateway advanced panel editor, the yellow lamp will flash at a medium rate if the audio is present *and* the key is *not* selected to listen to the source.

To listen to the source, a key type with a listen function should be assigned in Gateway. The key is pressed up to listen, and the yellow tally will go solid yellow to indicate you have selected the audio source.

3.2 PANEL DISPLAY

The five-character label shown on the display next to each key shows the key's assigned **target** – either the destination that will be spoken to, for a speak key, or the source that will be listened to, for a listen key.
Gateway has a **User Label** function available in the **Advanced Panel Editor**. This allows the label on a key of a specific panel to be different to the default name entered in the **basic** editor.

3.3 SHIFT MODE

If you press the panel **ASSIGN/SHIFT** key downwards, a yellow LED next to the key indicates that you are in shifted page mode and a second page of keys becomes available. To return to the main page, simply press the **ASSIGN/SHIFT** key DOWN again. The shifted keys can have a totally different set of functions to the main page, for example; Key 1 on the main page could be a speak key to the Director whereas Key 1 on the shifted page could be a listen and speak key to Camera 1.

Normal practice is to present the operator with just two pages (main and shift) but the software allows the creation of multiple shift pages via the advanced panel editor. The panel shift key then operates in a circular fashion, e.g.

MAIN >> SHIFT 1 >> SHIFT 2 >> SHIFT 3 >> MAIN

To avoid confusing the operator, use caution when deciding to add extra pages.

3.4 LOUDSPEAKER VOLUME

The knob on the panel with the **VOL** legend controls the loudspeaker or headset volume. The **Advanced Panel Editor** can be used to set a "minimum" level or "hold off" to prevent the volume being inadvertently reduced to zero.

3.5 ROTARY ENCODERS (RENs)

The Rotary Encoders or RENs are the additional knobs that are provided with a single adjacent red LED. Each Trilogy panel has one or more RENs.

By default, when you select a listen key to a 4 wire on the panel, or receive an incoming call, the LED next to the REN will light for ten seconds. This allows the user to adjust the listening level of the source audio to a preferred level. This level adjustment is only for the panel where it is made – it does not affect anyone else. Level changes are temporary and will be reset when the matrix is restarted.

Other level control actions such as "Master Input Gain" may be programmed from Gateway for each REN on each panel: these will override the default described above.

The REN is also used during locally assignable functions.

3.6 ASSIGNABLE FEATURES

A useful feature of the Trilogy panel is the ability to locally reassign keys on the panel. This feature can be barred on a key by key basis from the Gateway software if required.
NOTE:
- It is possible to reassign more than one key on a panel.
- Locally assigned keys are not stored on the system, so if the system is restarted, all local assignments are cleared.
- The yellow tally on the **ASSIGN** key will remain ON to indicate that a key or keys have been re-assigned on the panel.

To reassign a key: -
- Press the Assign/Shift key **UPWARDS**. The Assign lamp will now flash.
- Choose the key you wish to reassign by pressing **DOWN** on that key. The red and yellow tally lamps will flash simultaneously.
- Use the REN to choose the reassign option, the choices are as follows:
  - **TYPE>** Allows the user to change the key mode for the key selected.
  - **SUBS>** Allows the operator to assign the key to another subscriber or port on the system.
  - When selected, the display shows the first available port. Scroll through the port list using any REN. Continue through the list until the target appears, e.g. **DIR** for Director.
  - Press the key DOWN to select this target as the new key assignment.
  - **GRP>** Allows the operator to assign the key to another Group defined in the Gateway editor.
  - **CONF>** Allows the operator to assign the key to another Conference defined in the Gateway editor.
  - **IFB>** Allows the operator assign the key to another IFB defined in the Gateway editor.
  - **PHN>** Allows the operator to assign the key to another Phone Group defined in the Gateway editor.
  - **RTE>** Allows the operator to assign the key to another Route defined in the Gateway editor.
  - **CLR>** Allows the operator to clear the key target.
  - **RLD>** Reload the panel key assignments from the database, as previously configured with the Gateway editor.
  - **ME?>** Displays the panel name as defined in the Gateway editor. This is useful during installation.
  - **EXIT>** Exit the key assignment menu.

3.7 'CUT' SWITCH FEATURES

Depending on the panel type, the red **CUT** switch on the front panel is either configured from the Gateway **Panel Advanced Editor** or via DIP switches accessed via the top cover of the panel. Initially, the Cut switch is set to cut the panel microphone when the switch is depressed (the cut switch will illuminate red when engaged). Where configuration via Gateway is possible, you can set the cut switch, instead, to:

- No panel microphone cut, or
- Headset changeover. In this mode, pressing the cut switch will mute the panel loudspeaker and switch between the panel and headset microphone. Note that the headset earpieces will be active at all times.

If the panel has the DIP switches on the top edge of the panel the following modes can be set: -

		DIP 1	DIP 2	DIP 3
No Action		OFF	X	X
CUT activated		ON	OFF	OFF
LS cut only		ON	ON	OFF
Mic cut only		ON	OFF	ON
LS and Mic Cut		ON	ON	ON

X="don't care"; the position of the switch is not important.

3.8 EXTRA PANEL FEATURES

On the rear of the standard Trilogy panel range are connectors to allow access to extra features within the panel. These include local logic inputs and outputs, footswitch connection and audio inputs and outputs. Please refer to the Trilogy Control Panel Guide for further details.

4. TUTORIAL 2 – UNDERSTANDING MORE COMPLEX FUNCTIONS

4.1 BEFORE YOU START

This tutorial presumes the existence of a basic configuration with panels and 4-wires declared. It was created during Tutorial 1 and is available on the product CD as "Tutorial2_start.trilogy", or you may create it following the list below.

- A single Enterprise (called **Tutorial 2)**
- A single domain (called **Domain 1**)
- Single Gemini or Messenger matrix (called **Matrix 1**) with IP address that matches the matrix of your system
- Ports 1-4 as panels, labelled:
  - DIR
  - SND
  - PA
  - PROD
- Ports 5-8 as 4-wires labelled:
  - CAM01
  - CAM02
  - FM
  - PGM

4.2 PERMANENT CROSSPOINTS OR "FIXED ROUTES"

The Routes Editor allows for complex conditional control of audio routes, often using GPI inputs and outputs. This functionality is briefly covered in section 14 "Appendix 4 – A Basic Introduction to GPI", but a common requirement is a simple permanent crosspoint: a route that exists at all times. This is accomplished in Gateway using a "fixed route".

To add a fixed route, invoke the **Basic Routes Editor** by single clicking **Routes** in the tree view. Then:
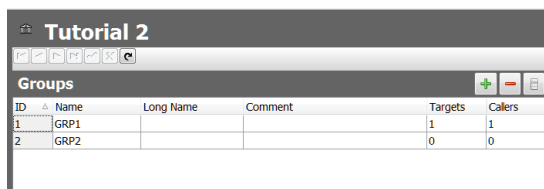
- Add a route entry using the green + button
- select the required source in the **Source** column
- select the required destination in the **Destination** column
- Ensure the checkbox in the column headed **Fixed** is checked. If not checked, the Route declaration is still valid but requires some other controlling action to turn it on or off.
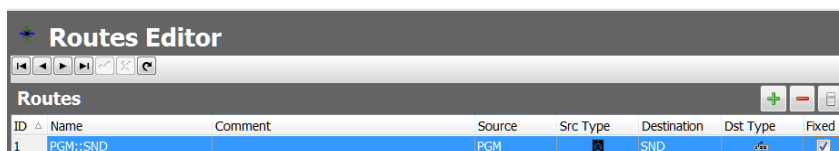
The default label given to the route created is the source label followed by the destination label, separated by a double colon. This can be edited if required, but route labels rarely appear on panels.

Adding a fixed route in this way is often a quick way to solve a specific requirement but remember that once the check-box is ticked, no other controlling influence can break the route. You may for example consider programming a key on an appropriate panel, to turn the route on or off.

4.3 GROUPS

A Gateway **Group** is a convenient method of providing "one-to-many" communication: the ability to speak to multiple destinations simultaneously from a single panel key.

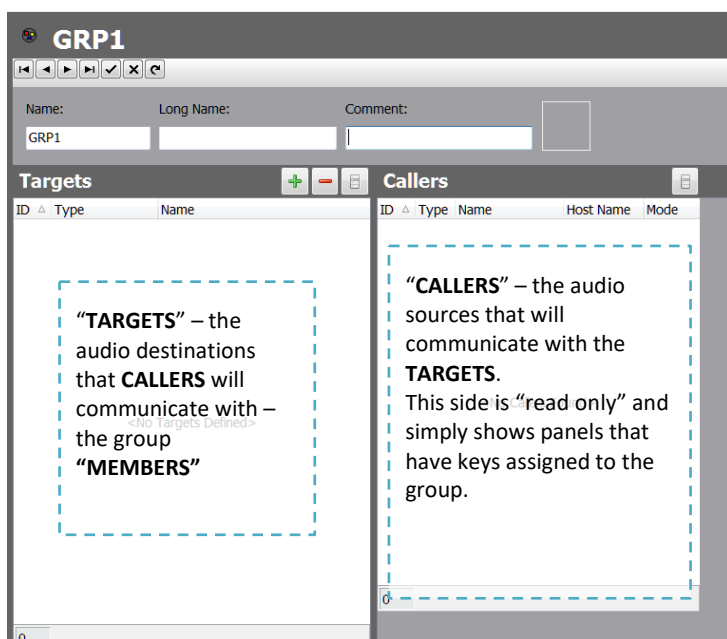Groups can also be used to listen to multiple sources ("many-to-one") and, if wished, "many-to-many" communication. By default, two **Groups** are added to a new configuration. To add more **Groups**, invoke the **Basic Group Editor** by a single click on the top entry of the Group list in the tree view (labelled **Groups**). Use the green + button to create more **Groups** as required.

Starting with the "**Tutorial2_start.trilogy**" configuration, we will now explore **Group** configuration by invoking the **Basic Group Editor**. Expand the **Groups** tree view on the left so that the default **Group** is shown and single click the first group, named by default **GRP1** to access the **Group** Editor. **Groups** comprise two lists: **Targets**; and **Callers**.

Targets are added to the Group using the **Basic Group Editor**, whereas **Callers** are inferred and automatically displayed within the editor when panel keys are assigned to the group.

Edit the group as follows:
- **Name** "ALL"
- **Long Name** "Call All"
- **Comment** "Director's Call All"
- Add ports 2 through 8 as **targets**.

TIP: If you want to select 2 or more items from a selection dialogue, you can use the standard Windows multi-select method by using the shift or control keys.

Now edit panel 1 (DIR) by single clicking on the tree view entry for that panel. Add a key on the panel targeting this group by selecting the Group symbol from the small piano-key toolbar just above the **available targets** palette. The tutorial assumes this is on key 5, but the actual key is not important.

Return to the **Basic Group Editor** by single clicking on the **ALL** group in the tree view, and you will observe that the Director's panel is now listed in the **Callers** window.

When the Director presses the speak key that targets the **ALL** group, audio routes will be established from the Director's panel to all 7 other subscribers added as targets.

If a listen key were assigned instead, the Director would be able to listen to multiple sources – this is normally only used to listen to 4-wires rather than panels. If wished, you can upload this configuration and restart the Matrix to see the Group in operation. Later tutorials cover systems comprising more than one matrix and the use of IP audio between sites. Note that a group call uses one IP channel for every target in the list that is on a different host to the calling panel.

4.4 CONFERENCES AND PRODUCTION TALKBACK

A Gateway **Conference** is a convenient method of providing "many-to-many" communication: the ability for multiple panel operators to speak and/or listen to many 4-wires and for panel operators to communicate with each other simultaneously, using a single key per panel. Compared to Groups, there is greater flexibility in the way conference participants interact making them especially useful for **Production Talkback**.

Production Talkback (PTB) is the name often given to the communications function commonly used during programme making, allowing the Director to speak directly to the cameras, sound desk, etc., without having to press a key to speak – he has an "open microphone". Operators who listen to the Director via Production Talkback may be provided with the ability to speak back to the production talkback if required, but this privilege need not be granted.

By default, two **Conferences** are included with a new configuration.
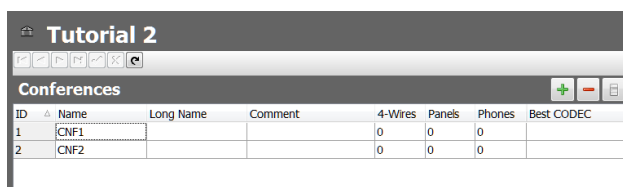
To add more **Conferences**, invoke the **Basic Conference Editor** by a single click on the top entry of the Conference list in the tree view (labelled **Conferences**). Use the green + button to create more **Conferences** as required.

Starting with the "**Tutorial2_start.trilogy**" configuration, we will now explore **Conference** configuration by invoking the **Basic Conference Editor**. Expand the **Conferences** tree view on the left and single click the first conference, named by default **CNF1** to access the basic **Conference** Editor.
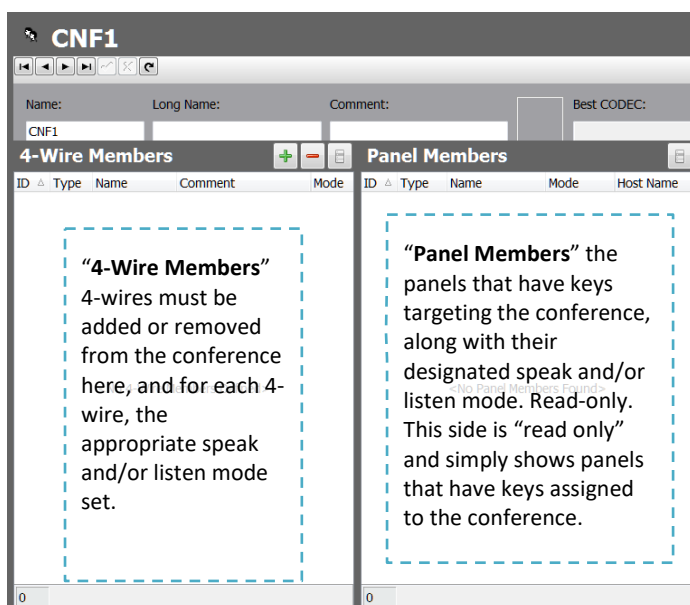
Conferences comprise two lists:
- 4-Wire Members
- Panel Members

4-wires must be added to the Conference using the **Basic Conference Editor**, whereas **Panels** are displayed for convenience within the editor when panel keys are assigned to the conference.
Edit the conference as follows:
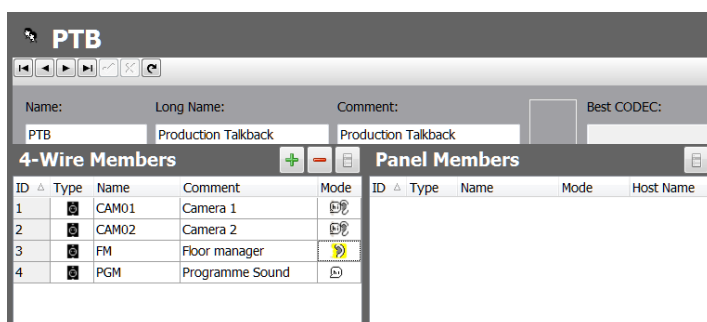
- **Name** - "PTB"
- **Long Name** - "Production Talkback"
- **Comment** - "Production Talkback"
- Add 4-wire ports 5 through 8
- Edit the "Mode" for the Floor Manager to be "Listen"
- Edit the "Mode" for Programme Sound to be "Speak"
- "Mode" for cameras remains as Speak/Listen.

Next, we need to add keys to the panels who will participate in the PTB conference. In this example there are four panel participants and they are given different panel key types, in line with their workflow within the programme production.

In each case, keys are added using the same technique as the previous section (Groups) but we select the Conferences button on the piano-key selector just above the palette area.

Complete the panels one-by-one, changing the key type as shown in the table below.

Director	default speak, default listen	
Sound	default listen, momentary speak	
Production	default listen, momentary speak	
PA	default listen	

Finally, return to the basic Conference editor for PTB and view all of the Conference Members:

When the configuration is uploaded and started, **Cameras** and **Programme Sound**, being 4-wires, will immediately be contributing to the PTB conference. Usually the camera operators will have a push-to-talk button so their audio will not actually appear in the conference at this time, but the audio route (or "crosspoint") will be made in the matrix.

- The **Director**'s panel has a key that defaults to speaking and listening – the director will have an open microphone and will be able to speak to all listening members without having to push the key and, likewise, will be listening to anyone who speaks back to PTB.
- **Sound, PA** and the **Producer** panels all have default listen keys and will be being able to hear PTB without having to select a key.
- **Sound** and the **Producer** panels have the ability to speak back to PTB with a momentary key.
- **Floor Manager** (4-wire) can only listen to PTB, whereas **Programme Sound** is simply a permanent contributor or input to PTB

4.4.1   Additional notes on Conferences

Conferences may be used within a large scale system, spanning many hosts across multiple domains. To make the best use of available IP bandwidth, they are designed to use IP multicast techniques. This does require specific network hardware and specialised setup, which may not always be appropriate in every environment. For each conference, the advanced editor has two additional checkboxes. The first is only applicable to Gemini and will cause routes within the conference to be made over HSL, rather than over IP. For a pure Gemini environment this is preferred. The second checkbox turns off multicast, so that any remaining routes are point-to-point unicast.
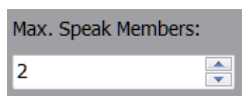
Gemini Conferences, by default, limit the number of members that may simultaneously speak to two. This can be changed by invoking the **Advanced Conference Editor.**

4.5   IFBs

4.5.1   What Is An IFB?

An IFB – or Interrupted Feedback (sometimes known as Interrupted Foldback) - is an intercom circuit that consists of a 4-wire feed sent to a destination which can then be interrupted and replaced by a different audio feed.

Typical usage might be that the destination port is an earpiece worn by a presenter, with programme sound normally being fed to it, which may then be interrupted when the director or producer wishes to speak to the presenter. The audio feed can either be interrupted completely or simply attenuated – dimmed – to a lower level. There are many other uses and IFBs should be regarded as a key part of the programming toolkit.

By default, a single IFB is included with a new configuration. To add more IFBs, invoke the **Basic IFBs Editor by a** single click on the top entry of the IFB list of the tree view (labelled IFBs). Use the green + button to create more IFBs as required.

Starting with the "**Tutorial2_start.trilogy**" configuration, we will now explore IFB configuration by invoking the **Basic IFB Editor**. Expand the IFB tree view on the left so that the default **IFB1** is shown and single click it to access the basic IFB Editor.

IFB Editor.

The diagram is annotated with the following labels:

Diagrammatic representation of an IFB

"SOURCES" – the audio feeds (inputs) that are usually routed to the **DESTINATIONS**, and that will be **interrupted**.

A list of sources that will **interrupt** audio routed from the **sources** to the **destinations**.

When sources are added here, they will cause an interrupt whenever, and however, a route is made from the interrupt source to the **destinations**.

The IFB **level** is an advanced function that provides a priority system. When an **interrupt** trigger occurs, not only is the **source** port interrupted, but also any **interrupt** sources of lower priority than the interrupting source will be cut or dimmed too.

"DESTINATIONS" – the audio outputs the **SOURCES** are usually routed to until **interrupted**.

Determines whether **sources**, when **interrupted** are cut or dimmed and, if dimmed, by how many decibels.

This is a list of panels that have keys assigned to target the IFB directly, rather than indirectly through having been added to the **interrupts** list.

4.5.2 Building a simple IFB

IFBs are often daunting at first, so we will configure this IFB and then explain how it will operate in practice.


First, we will add a key on the **Producer** panel (port 4 of the tutorial configuration) targeting IFB1. Do this via the basic panel editor, selecting the IFB symbol from the available targets list. The tutorial assumes this is on key 5, but the actual key is not important.

Similarly, add a speak/listen key on the Sound (SND) panel to speak to the Floor Manager (FM) Select the **IFB Basic Editor** again. You will see that the **IFB Key Interrupts** window now lists the **Producer** panel.

It is good practice to give the IFB a **long name** – such as, for this example, **Floor Manager IFB**. Configure the following:

- **IFB Source** as Port 8 (Programme sound, or PGM)
- **IFB Destination** as Port 7 (Floor Manager, or FM)
- **Interrupts** as Director (DIR) and Sound (SND) – you will need to choose the **Add Interrupt** option when adding them, rather than **GPI** or **GPO**
- Change the **level** of the Director's interrupt to **Level 2**

Now return to the basic IFB Editor and review the results.
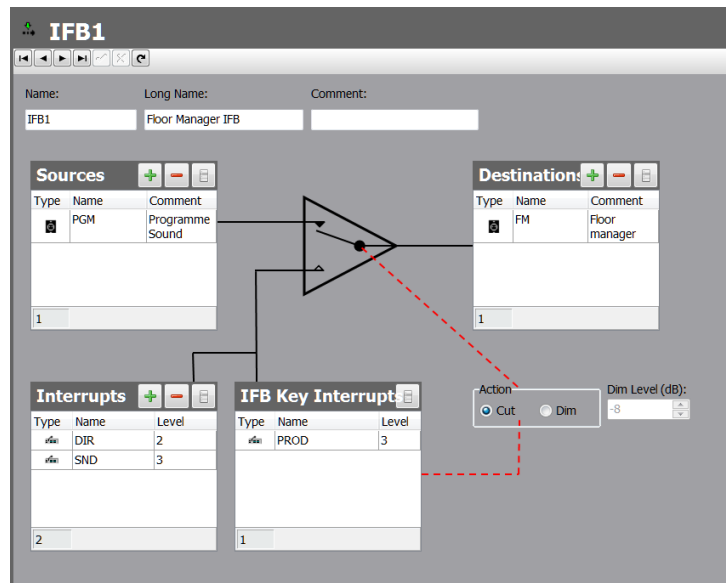
- Normally, programme sound (**the IFB Source**) is being fed to the floor manager audio output (**the IFB Destination**). It is not necessary to make this route in any other way – declaring the IFB source and destination in the editor causes the route to be made when the configuration is run.
- The Producer panel has a key targeted at IFB1. If this key is pressed to speak to **IFB1**, the Producer panel audio will replace the programme sound audio the floor manager was hearing.
- The Sound panel has a key targeted directly at the floor manager. If this key is pressed, to speak to the **FM**, the Sound panel's audio will replace the programme sound audio the floor manager is hearing.
- The Director does **not** currently have a key targeting either **IFB1,** or the **FM** directly. However, by including this panel as an **IFB Interrupt**, we can ensure that if a key were to be assigned to the IFB or FM - perhaps by locally re-assign at the panel itself -then it would be an IFB interrupt trigger.

What is the difference between "Interrupts" and "IFB Key Interrupts"?

- Sources added as "**interrupts"** relate to routes made directly to the associated IFB **destination** (FM in this example). If the IFB destination is changed there will either be no IFB action, or keys will need to be reconfigured as well.
- Keys targeted at the IFB itself will act as triggers regardless of what actual ports are configured in the IFB as **destinations**. The destinations can be changed without having to reconfigure IFB-related keys on panels).

Best practice is to target keys directly at the IFB.

- If the Director speaks to the Floor Manager, because it is declared as a Level 2 trigger, not only would the source (programme sound) be cut, the lower priority Sound panel would also be cut, and could not speak to the FM while the Director was speaking.

Now upload this configuration and restart the matrix to see the IFB in operation.

4.6 DIMMING

Gemini provides two main dimming techniques to control howlround:

1. Mirror dimming
2. Dimming Locations

What causes howlround?
Howlround is the unwanted howling noise that can occur when a microphone picks up sound from the speaker that the microphone is feeding. On stage this is because the microphone is too close to the loudspeaker.

In a talkback system, howlround occurs when the audio from the microphone on one panel is received at another panel and then picked up by that panel's microphone and fed back to the original panel. An infinite feedback loop is created, and howlround is the result.

Talkback systems are particularly prone to howlround since there are often occasions when "full duplex" communications occurs. This can be when two panels both have latched-on speak keys to each other, or it can be just for a brief moment when one the speak key on one panel has not quite been released before the other person replies.

There is a third, more complex situation, where howlround can occur. This is when there are two panels in close physical proximity, and audio from one of those panels' speakers is picked up by the other, close, panel. If that audio is then conveyed to a remote panel and picked up by its microphone, and sent back to the first panel, a feedback loop involving all three panels can occur.

4.6.1 Mirror Dimming

Howlround only occurs when a full duplex communication path exists between two panels, and the software automatically detects this scenario. If detected, attenuation is automatically applied to both audio routes. The attenuation is very effective at eliminating the feedback and therefore prevents howlround. This type of dimming is also called "mirror dimming".
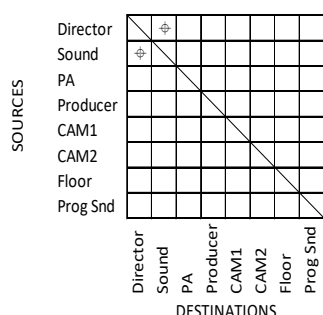
Mirror dimming. This term is derived from the traditional crosspoint diagrams that were used to depict talkback systems. Sources and destinations provide the axes of an X-Y grid, and symbols are used to depict crosspoint at the intersection of a source and destination.

The two crosspoints that represent the Director connected to Sound and vice versa, are the mirror of each other about a diagonal line. "Mirror Dimming" is the automatic application of attenuation when those "mirror crosspoints" are detected.

By default, 12dB of attenuation is applied to the audio route, but this can be adjusted if required using the **Advanced Panel Editor**. The **Basic Host Editor** can also be used to alter dimming values on a per-subscriber basis.
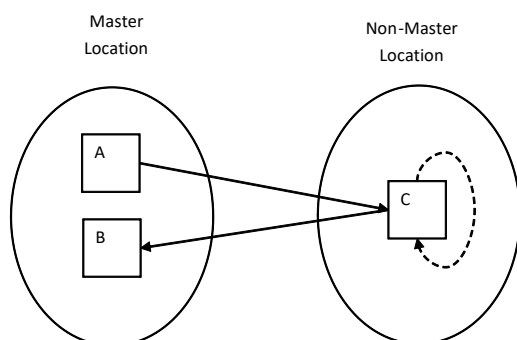
4.6.2 Dimming Locations

Gemini uses **Dimming Locations** to deal with the complex scenario where three or more panels are causing the howlround condition. Dimming locations are only available with Gemini matrix hardware.

A **Dimming Location** is an area, or a room, within the installation where two or more panels are in close proximity and might be the cause of the complex howlround situation described above.
The following rules apply to Dimming Locations:

- Panels within a Dimming Location must all belong to the same Gemini matrix (host)
- A panel may only belong to 1 Dimming Location
- A Dimming Location can be configured as a 'Master Location'. Panels within a master location are those which will **not** have routes dimmed when the complex howlround scenario occurs (i.e. it is panels in non-master locations that will have their audio dimmed)
- When any panel in a non-master Dimming Location speaks to any panel in the "master" Dimming Location, and any panel in the master Dimming Location is already speaking to any panel in the non-master Dimming Location B, then all audio routes *from* panels in the master location *to* those in the non-master location will be dimmed.

In the scenario depicted here, if Panel A is speaking to Panel C, then when Panel C speaks to Panel B, it is the route from Panel A to Panel C that is dimmed.

To use the feature, add Dimming Locations using the **Advanced Enterprise Editor.**
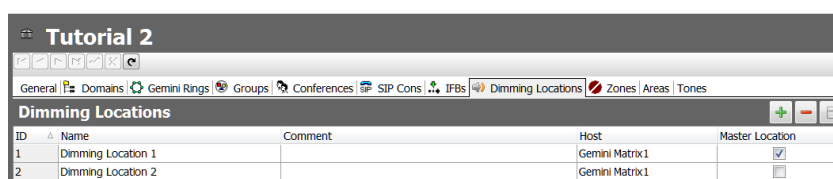
- Choose the host that the dimming locations will belong to
- Ensure that check box is selected for **Master** locations – those locations where routes to panels are not to be dimmed.

Now use the **Basic Host Editor** to assign panels to the dimming locations.

In the example here, the Director and PA are in a Master Location, and the Sound panel in a different location. If the Director is speaking to Sound, and Sound speaks to the PA, the route from the Director to Sound will be dimmed.

5. CONFIGURING A SYSTEM WITH MORE THAN ONE MATRIX

5.1 BEFORE YOU START

This section assumes that the intercom system, including any control panels, has been installed correctly, and that the Gateway configuration and database software is installed. The PC or laptop that has the Gateway software, and the matrices, should be connected to an IP Network.
It is **highly recommended** that you complete Tutorial 1, to gain a thorough understanding of the configuration of a simple single-matrix system as well as the Gateway editor itself.

5.2 INTRODUCTION TO SYSTEMS WITH MORE THAN ONE MATRIX

5.2.1 High Speed Link (HSL) – Gemini only
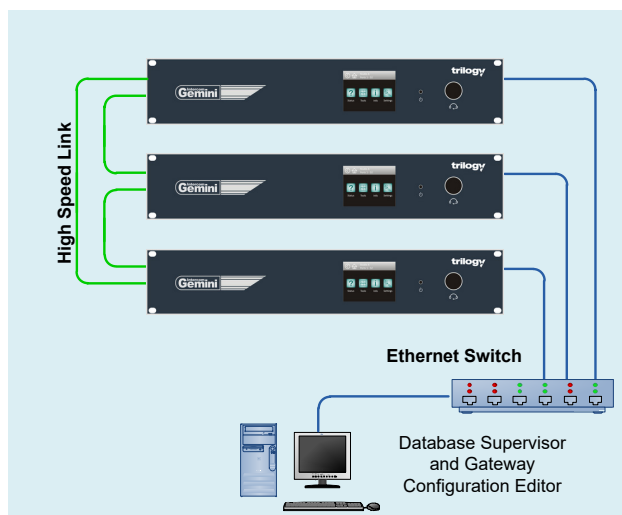
The key to systems using more than one Gemini matrix is the High Speed Link, or "HSL". Messenger and Mercury matrices do not have the HSL connectivity. HSL provides the bidirectional, low latency mechanism for transporting audio channels between Gemini matrices. For enhanced resilience, the HSL may be connected as a redundant ring, either using conventional CAT6 cable for up to 90 metres or over unrestricted distances 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.
Further resilience may be provided by use of IP audio, but this is covered in a later section.
Nevertheless, an IP network between all matrices is a necessity, since it is used for all real-time data communications between the matrices.

5.2.2 Network

All Trilogy IP based intercom systems are designed to connect to any 10/100base-TX Ethernet network with provision to support both static & DHCP IP addresses. Matrices can be connected over LAN, WAN, Internet & satellite on standards based IP architecture. Typically, the system operates on networks and WAN segments that include other video, data & voice traffic. It uses 'heartbeats' to ensure network robustness and supports IEEE 802.1p prioritised packet switching, IEEE 802.1q VLAN 12 bit identifiers and RFC2474 Differentiated Services to allow precise network control of traffic. When considering network requirements for operation over IP, be aware that you will need to open ports UDP 2076 & UDP 2077 if the network has firewall protection between the matrix hosts.

5.3 TUTORIAL 3 – CREATING AN HSL RING (GEMINI ONLY)
5.3.1 First steps

This tutorial will use as its starting point the configuration that has been created during tutorials 1 and 2. It is available on the product CD as *Tutorial3_start.trilogy*. We will assume that the system comprises 2 matrices. Both matrices should have had their IP address configured as described in Tutorial 1, and it is recommended that you use a Web Browser to confirm that both matrices are operational and the network is connected correctly. It is also imperative that both matrices have correct E.D.H. addresses: the first should be 0.1.1 and the second 0.1.2.
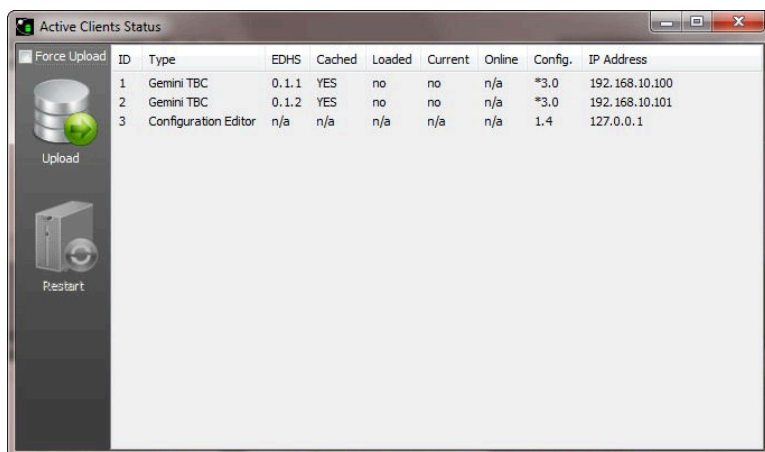

Launch the Gateway Configuration Editor and check the "Active Clients" status to confirm that both matrices are listed.

Add the HSL cables to the rear of both Gemini. These are "straight" cables (i.e. not cross-over) but HSL+ on Gemini 1 should connect to HSL- on Gemini 2 (and vice-versa).

5.3.2 Configuration Changes

Launch the Advanced Enterprise Editor by double clicking the name of this Enterprise at the top of the tree view on the left ("Tutorial 3" if you're using the configuration from the product CD) and select the tab labelled Gemini Rings.
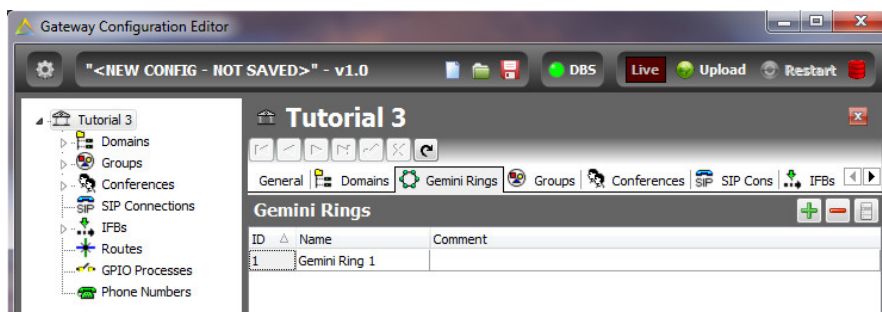
Add a single Gemini Ring by clicking the "add" button, calling it, for example, "Gemini Ring 1".

Launch the **Basic Domain Editor** by expanding the tree view and single clicking on Domain 1.
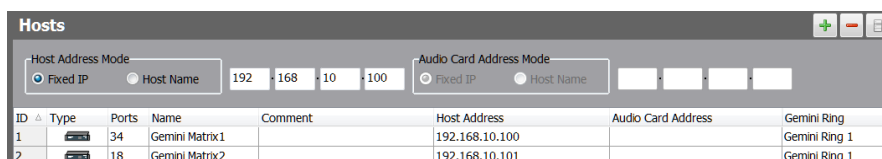
- Name the second Gemini Host "Gemini Matrix2".

- Edit the IP address of the second Gemini Host to match that assigned to the matrix via its front panel.

Note: you may need to change the host "type" to match the Gemini matrix actually installed.

- Using the column at the far right of the grid, select "Gemini Ring 1" for both hosts.
- Launch the **Basic Host Editor** for Gemini Matrix2, by single clicking its entry in the tree view. Add subscribers as required: for the purposes of this tutorial we will simply add a single panel on port 1, leaving the default label "H2S1" (Host 2, panel 1) to prove that the HSL is working.
- Launch the **Basic Panel Editor** and add a key on the **Director** panel on the first Gemini matrix in the ring, targeting our new panel **H2S1** and, likewise, a key on panel **H2S1** targeting the **Director** panel.
- Upload and restart the configuration and check that the Director panel can speak to H2S1 and vice versa.

Within the scope of a basic tutorial it is not easy to prove that HSL is working correctly. However, while speaking, you can try to remove one of the HSL cables and the conversation should continue uninterrupted. By listening carefully, you may hear a momentary break when the second cable is removed and the system reverts to IP audio. This confirms the resilience of the dual redundancy. The two-matrix Gemini System is now operational. The configuration created in this tutorial is available on the product CD as ***Tutorial3_finished.trilogy.***

6. CONFIGURING A MULTI-SITE SYSTEM

6.1 BEFORE YOU START

This section assumes that the system, including any control panels, has been installed correctly, and that the Gateway configuration and database software is installed. The PC or laptop that has the Gateway software, and the matrices, should be connected to an IP Network.

It is **highly recommended** that you complete both Tutorial 1 and Tutorial 3, to gain a thorough understanding of the configuration of a simple single-matrix system as well as the Gateway editor. Only Gemini hardware has the HSL interface, so any instructions regarding HSL are not applicable to Messenger. However, network considerations are common to both platforms.
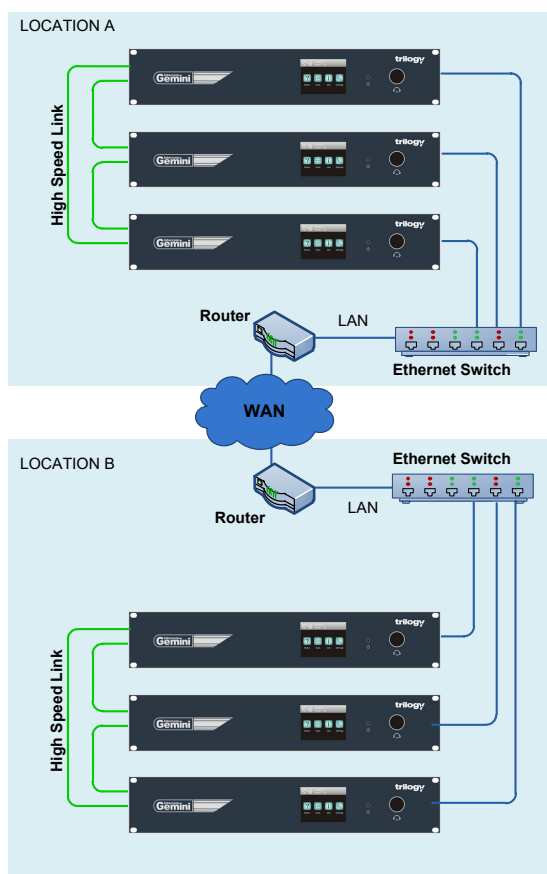
6.2 INTRODUCTION TO SYSTEMS OPERATING OVER MULTIPLE SITES

6.2.1 High Speed Link (HSL)

Within a given site, audio is most effectively transported between Gemini matrices using the High Speed Link, or "HSL". HSL is only available with the Gemini hardware platform.

HSL provides the bidirectional, low latency mechanism for transporting audio channels between the required Gemini units. For enhanced resilience, the HSL may be connected as a redundant ring, either using conventional CAT6 cable for up to 90 metres or over unrestricted distances via an optical fibre link. This ensures that the system is tolerant of a break in any segment of the link, with no loss of audio traffic between the matrices.

When an installation spans multiple sites, it can prove impractical to run a fibre or copper cable between sites.

Both Gemini and Messenger are equipped with an Ethernet interface as standard – IP is used for all real-time data communications between the matrices – and by the addition of an appropriate DSP hardware module, audio, too, can be sent over the network. Since Messenger does not have the HSL circuitry, some DSP is always provided for VoIP processing. For Gemini, it is an option, normally factory fitted at time of purchase.

6.2.2 Network

Matrices can be connected over LAN, WAN, Internet & satellite on standards based IP architecture. Typically, the system operates on networks and WAN segments that include other video, data & voice traffic. It uses 'heartbeats' to ensure network robustness and supports IEEE 802.1p prioritised packet switching, IEEE 802.1q VLAN 12 bit identifiers and RFC2474 Differentiated Services to allow precise network control of traffic.

When considering network requirements for intercom operation over IP, be aware that you will need to open ports UDP 2076 & UDP 2077 if the network has firewall protection between the matrix hosts.

Compared to the earlier tutorials, the two new network considerations are **Network Audio** and **Gateways and Routers**.

6.2.3 Network Audio

Bandwidth profiles allow selection of a variety of audio compression codecs along with control of the way the audio is carried in an IP packet. Gateway provides 20 preset "coding profiles" that combine these parameters to provide a specific IP payload, ranging from 10kbps to 100kbps, allowing audio quality, network bandwidth and latency to be optimised for any given network.

Simplistically
- On a Local Area Network, especially if it is dedicated to Gemini, G.722 using 10ms of audio per IP packet gives the highest quality, lowest latency audio.
- On a Wide Area Network, especially if the network is shared with other traffic, G.729 is a great compromise.
- Where bandwidth is severely compromised – perhaps over a satellite link – G.723 is the only viable option.

Audio CODECs

G.711 is a Pulse code modulation (PCM) of voice frequencies on a 64kbit/s channel. G.711 uses a sampling rate of 8kbit/s. Non-uniform quantization with 8 bits is used to represent each sample, resulting in a 64kbit/s bit rate.
Pros: Designed to deliver precise transmission of speech, very low processing overheads.
Cons: Poor network efficiency.

G.722 is a wideband speech codec operating at 64kbit/s. Technology of the codec is based on split band ADPCM.
Pros: useful in fixed network voice over IP applications, where the required bandwidth is typically not prohibitive. A significant improvement in speech quality over G.711, with a small encoding delay of <3ms.
Cons: not ideal over WAN.

G.723.1 is a speech codec that compresses voice audio in 30ms frames. An algorithmic look-ahead of 7.5ms duration means that total algorithmic delay is 37.5ms.
Pros: very high compression whilst maintaining high quality audio.
Cons: computationally intensive; 37.5ms encoding delay. Not well-suited to music.

G.726 is an ADPCM speech codec for the transmission of voice at rates of (usually) 32kbit/s.
Pros: Uses 32kbits which is half the rate of G.711 codec and hence increasing the usable network capacity by 100%. Used on international trunks in the phone network.
Cons: Not well-suited to music.

Packet Size
Gateway allows either 10ms, 20ms or 30ms of audio to be sent in each IP packet. Very simply, the more audio that is sent, the fewer the packets that need to be sent, so network efficiency is increased, but latency also increases as more audio must be accumulated before it is sent.
The combination of CODEC – and the implicit algorithmic delay for each type - and Packet Size, is the predominant factor determining latency.

6.2.4 Gateways and Routers

Matrices in earlier tutorials were on the same IP subnet – the IP addresses were in the same "range". This means in practice that the network devices readily "see" each other. A network message may be sent out directly to the destination IP address, and the network switching topology allows it to reach its intended destination with ease.

Once network devices are connected by a wide area network, it is highly likely that each site has its own IP address range: it's own subnet. If an IP message is sent from a device on one subnet to a device on a different subnet, the basic network switching devices do not know where to route the packets.

The IP networking device used to discover how to route packets in this scenario is a "router". Router functionality is outside the scope of this tutorial, but suffice it to say that as long as the IP address of the router itself is known, packets will be able to traverse between subnets.

The router is often known as a "gateway", as it provides a gateway to other subnets. In essence, the network device makes a decision as to whether the IP packet is to be sent to a device on it's own subnet. If not, the packet is sent to the router – to the gateway IP address – instead.
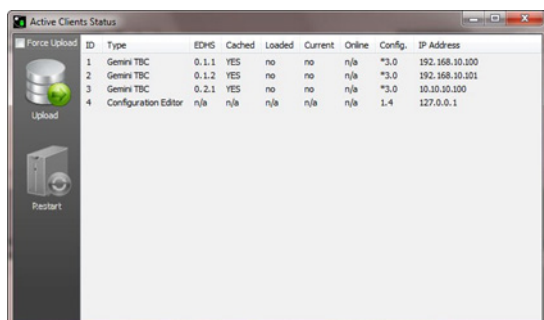
When configuring a multi-site system of this type, it is important to be totally consistent when entering IP addresses. If "gateway" addresses are defined in the configuration, they must also be set correctly on the matrix hardware. For Gemini this can be carried out via the web interface: for Messenger and Mercury, either by temporarily connecting a local monitor to the VGA connector, or by using Windows Remote Desktop.

7. TUTORIAL 4 –INTERCOM SYSTEMS ON TWO DOMAINS

This tutorial will use as its starting point the configuration that has been created during tutorial 3. It is available on the product CD as *Tutorial4_start.trilogy*. This tutorial assumes that site one has 2 matrices and the system at the second site has just one.

7.1 INTRODUCTION

All matrices should have had their IP address configured as described in Tutorial 1, and it is recommended that you use a Web Browser to confirm that all matrices are operational and the network is connected correctly. As advised above, take care to enter gateway addresses correctly and restart the hardware when prompted. Unless the network and the routers are configured correctly, it is extremely unlikely that this tutorial will prove successful.
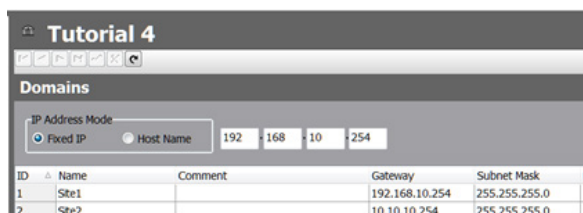

It is also imperative that the matrices have correct E.D.H. addresses:

- Site One: the first matrix should be 0.1.1 and the second 0.1.2.
- Site Two: the matrix should be 0.2.1.

Launch Gateway and click the "Active Clients" button to confirm that all matrices are present. If not, then carefully check the IP address, gateway and EDHS settings.

7.2 CONFIGURATION CHANGES

Launch the **Basic Domains Editor** by single clicking on the tree view entry labelled "**Domains**". Add a new domain by clicking the "add" button.

- It is a good idea to give the domains a meaningful name that relates to the sites themselves: we'll use Site1 and Site2.
- Enter the gateway IP addresses – the IP addresses of the routers – for each domain, along with the correct subnet mask for each.

Launch the Basic Domain Editor for Site2 by single clicking the Site2 entry in the tree view.

- Add hosts as appropriate for Site 2. For the purposes of this tutorial we will add a single 8 port Gemini host and leave it with its default name "Host 2.1".
- Give the new host the correct IP address.

Launch the Basic Host Editor for Host 2.1. Add subscribers as required: for the purposes of this tutorial we will simply add a single panel as port 1.
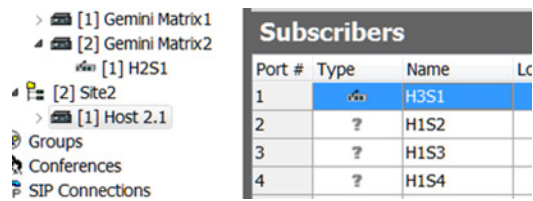
Edit the default panel name from "H1S1" (Host 1, Subscriber 1) to be "H3S1".

NOTE: The default name for this subscriber is H1S1 because this matrix is the first host of the second domain.

Launch the Basic Panel Editor and add a key on the Director panel on the first Gemini matrix in the ring, targeting our new panel H3S1 and, likewise, a key on new panel H3S1 targeting the Director panel.

Upload and restart the configuration and check that the Director panel can speak to H3S1 and vice versa.

The two-site system is now operational. The configuration created in this tutorial is available on the product CD as **Tutorial4_finished.trilogy.**

8. CONFIGURING A SYSTEM FOR MULTIPLE ADMINISTRATORS

8.1 INTRODUCTION

The default set-up for a system using Gateway is for a single system administrator to have overall control of the configuration management, whether this consists of a single matrix frame, or multiple frames arranged in a complex network. Although this may be suitable for smaller installations, it is unlikely to be appropriate for a large, multi-studio arrangement. In such instances, the Gateway "Roles and Administrators" feature can be used to create multiple administrators and grant them control over segments of the intercom network. In this section we will examine this feature and demonstrate a typical example.

8.2 LAUNCHING THE ROLES AND ADMINISTRATORS EDITOR

The Roles and Administrators Editor is only available to the top level system administrator. When the top level administrator has logged in, an additional "lock" icon is displayed on the toolbar at the top right corner of the screen. As explained in earlier sections, the credentials for the top level administrator are *Admin | trilogy.*

When Gateway is first installed, only the top level system administrator is provided: no roles or additional administrators are present. Our first task is to create a number of roles based on a system encompassing two studios. The example below shows a new configuration with two Gemini hosts named Studio A and Studio B.


8.3 CREATING ROLES

Firstly we will create three new roles:
- Senior Administrator
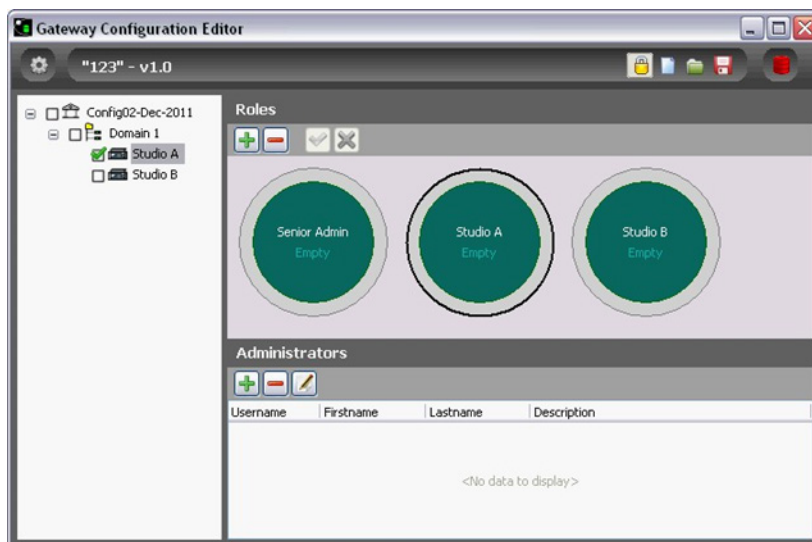- Studio A administrator
- Studio B administrator

After logging in as the top level administrator, switch to the Roles and Administrators editor by pressing the lock icon on the toolbar. Click the green "+" icon to create a new role. Highlight this new role by clicking on the name in the centre of the circle, and then edit the name of the role within the text box by double-clicking in the top row.

Repeat this operation until three roles have been created as shown below.
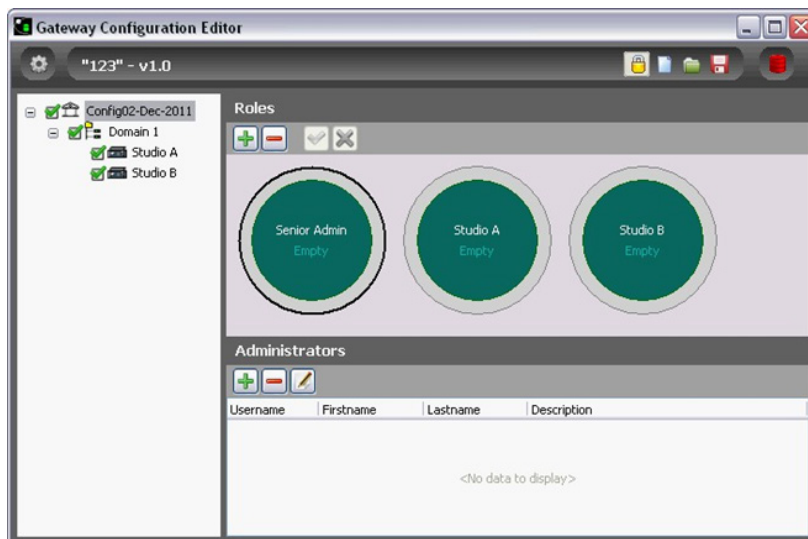
Highlight the Senior Administrator role by clicking on the name in the centre of that circle: the circumference of the circle changes to black to indicate that the role is currently selected.

The permissions allocated to this new role are indicated in the tree view on the left side of the screen: where permission has been granted, a green tick is shown adjacent to a Host. The permissions currently granted to the Senior Administrator are appropriate (see image above).

Repeat this process for the Studio A and Studio B administrators and un-check the permission boxes for each one as appropriate. These are shown after adjustment for Studio A (see image on left).

8.4 CREATING ADMINISTRATORS

The next stage is to create a number of administrators and then to assign them to specific roles. Each administrator is simply a set of login credentials plus a description but they have no authority or permissions until assigned to a role. To create a new administrator, click on the green "+" icon in the lower pane of the Editor. Enter the details of each new administrator in the edit box and press the tick when complete. To edit the details of an administrator, highlight the list entry and click the edit button on the Administrators toolbar.
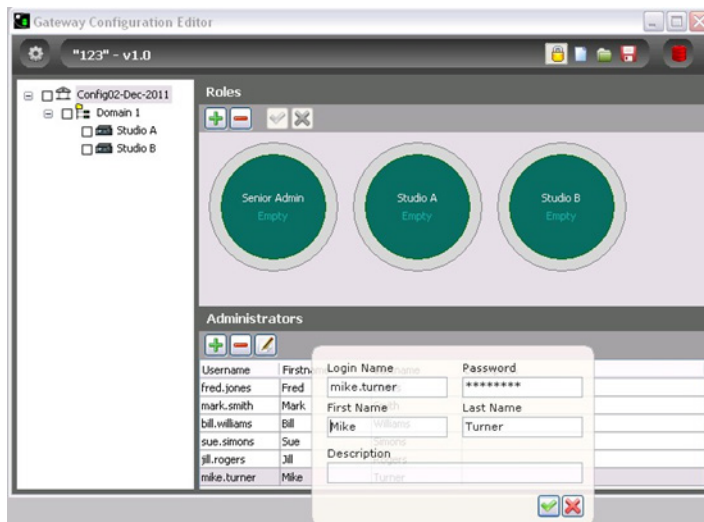
This image shows six new administrators -- they are not currently assigned to any roles.

8.5 ASSOCIATING ROLES AND ADMINISTRATORS

The final step is to assign the operators to specific roles. To do this, simply highlight an administrator from the list and drag the cursor into the appropriate role "circle".
The following rules and conditions apply:

- each role may have one or more administrators
- each administrator may be assigned to one or more roles
- a role without any administrators serves no purpose
- an administrator who is not assigned to any roles also serves no purpose

The screen below shows the six administrators who have now been assigned to specific roles in the configuration of the Gemini network. The number in the centre of each roll circle indicates the number of administrators currently assigned to that role. Position the mouse cursor over the centre of the circle to see a list of the names of current administrators in that role.
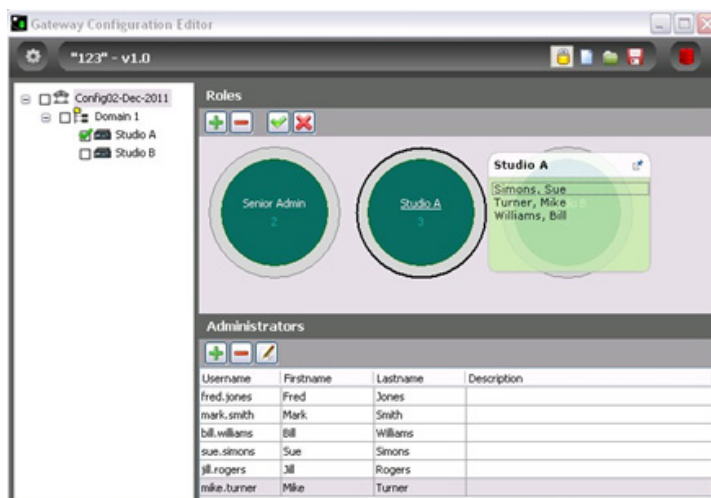
NOTE: if additional hosts are added later, they are automatically added to every current role with the permissions set to on. Although these settings may be appropriate for the overall system administrator, minor roles such as Studio A and Studio B (above) must be edited to remove these new hosts as appropriate.

8.6 USING ROLES AND ADMINISTRATORS

It is important to realise that although multiple administrators may be created for a system, they cannot log-in simultaneously. To avoid data conflicts, only one administrator may log-in at a specific point in time. If a second administrator attempts to log-in, the following will result:

- The person already logged in will see a pop-up message to advise that someone else is attempting to connect. He can choose to block the second person, or allow him to connect. If he chooses to allow the other person, he must then exit Gateway. If he ignores this message, he will be forcibly disconnected after 30 seconds. This allows for the situation where a PC has been left un-attended.

- The second person, attempting to connect will see a pop-up message to advise that another operator is already logged in. He can then choose to abandon his attempt to log-in, or wait for the other person to respond. If there is no response from the other party, then the second person will be allowed to connect around 30 seconds later.

9. NON-DISRUPTIVE (LIVE) CHANGES

9.1 INTRODUCTION

In previous sections we have discussed the mechanism for making changes and updates to the configuration. To re-cap, changes are made using the Gateway configuration editor and then uploaded to any connected Gemini and Messenger hosts. The upload process is non-disruptive: that is, there is no effect whatsoever on the operation of the system, control panels or currently active conversations. Following the upload, the system must be restarted for the changes to take effect. The restart process is disruptive: all control panels are reset in order to load the new key layout and all conversations are halted.

The time taken to carry out each process depends on both the size and complexity of the system plus the power of the PC which is running the Database Supervisor application. As a guideline, allow 20 seconds for the upload plus a further 10 seconds to restart.

A second mechanism is provided within Gateway which allows minor changes to be made with minimal disturbance to the production or broadcast. Typically changes take less than five seconds to take effect and only the keys which have been edited on an individual panel will change.

9.2 MAKING CHANGES

The graphical panel editor form is used to make non-disruptive changes to control panels. To view this form, single click on a control panel from the tree menu on the left side of the screen. A typical form is shown below.
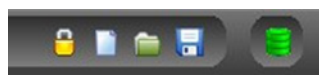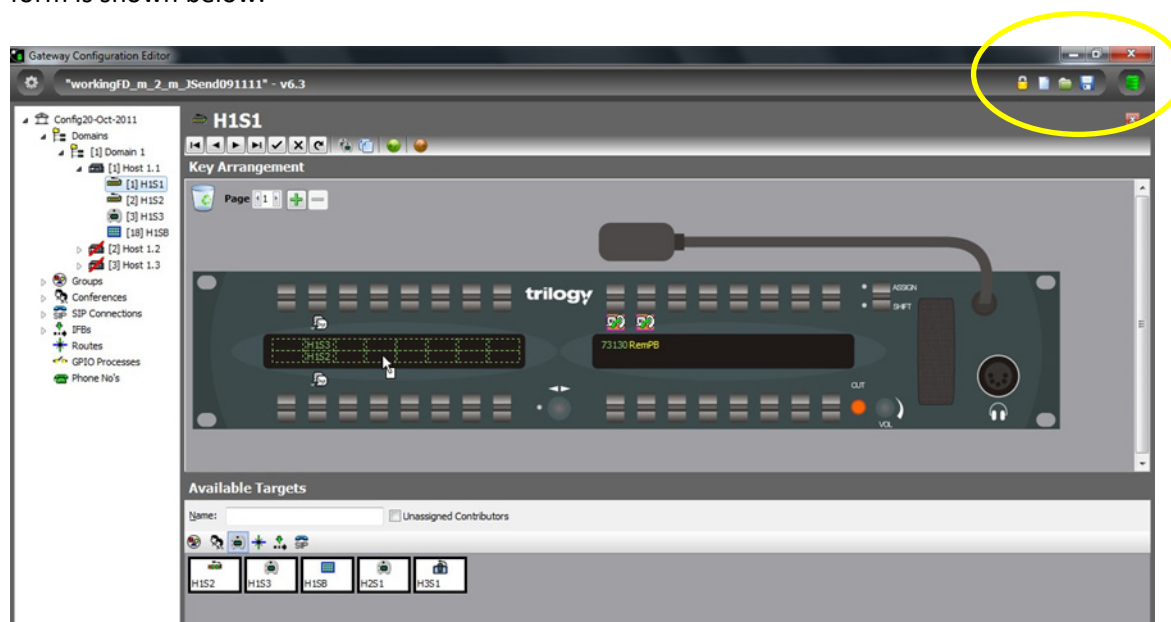

Note the status of the system as indicated by the toolbar and icons at the top right-hand corner of the screen.

- The "floppy disc" is blue, indicating that the configuration seen in Gateway has been archived to disc.

- The barrel is green, indicating that the configuration seen in Gateway is "in sync" with that running on the intercom system.

Best practice is to ensure that both these conditions are met prior to making any non-disruptive changes. If the barrel is anything other than green you will not be able to engage the live mode.

Now edit the panel layout by either dragging and dropping existing keys or adding new keys from the palette. When you have completed the edits, press the tick button on the toolbar within the editor. Your edits are now committed to the database and the supervisor application will immediately process these changes and compile new data for this control panel. To send the revised key layout to the control panel, press the green "ball" indicator on the panel editor form.
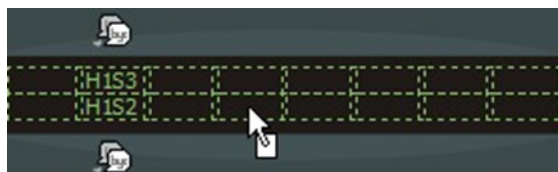
Re-arrange existing keys or add additional keys from the palette.

Press the tick to commit the changes to the database.
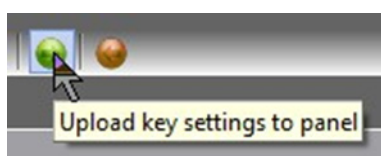
Press the green "ball" to send the revised key layout to the panel.

Only the key positions which are affected by any changes in Gateway will be updated. All other key locations on the panel and any current calls or routes associated with those keys will not be affected.

Changes made in Gateway take precedence over changes made locally by a panel operator (where allowed). If a panel operator has made a local change and the system administrator makes a subsequent change via Gateway, the original change will be discarded.

Only the panel which is currently visible will be updated. If you make changes to a panel, commit those changes to the database and then move to a different screen of Gateway, your changes will not be actioned but will be stored until either:

• You return to the same panel and complete the process by pressing the green "ball", OR you carry out a full upload and re-start procedure.

10. APPENDIX 1 – BASIC TROUBLESHOOTING

- This appendix provides a few basic tips should initial attempts to prove a Gemini system operational not be successful.
- Check that the matrix unit is powered up, and has an Ethernet cable plugged in. Obvious, but worth checking.
- Check IP addresses.
    - Check the IP address assigned to the Gemini Matrix by looking at its front panel. For Messenger, the simplest way is probably to temporarily connect a monitor and check the TBC and (if appropriate) local database settings. Further details are given in the Implementation Guide for each hardware platform.
    - Check the IP address of the PC running Gateway.
    - Are they both in the same subnet? Simplistically, for most installations, this means that the IP addresses look pretty much the same, except for the last part: for example 192.168.10.100 and 192.168.10.200 are in the same subnet: 192.168.20.100 and 192.168.10.200 are NOT in the same subnet.
    - Check, double check and ask a friend to look for typos. 192.186.10.100 is easy to miss.
    - Be totally consistent when declaring gateway IP addresses. If set on the hardware, they must also be declared in the Gateway software. Any mis-match will probably show as network audio errors.
- Make sure the subnet masks are correct. Again, typical systems (but not all) will have a subnet mask 255.255.255.0 – but, generally, if both the PC and the matrix have the same subnet mask, it's probably correct.
- Use Gateway's View Active Clients dialogue to confirm what is connected to the database supervisor. Or double-click the small Database Supervisor icon in the system tray for a similar view.
- Use "PING" from the Gateway PC to make sure the network is connected. "PING" is available from the command prompt of Windows PCs. In Windows 7, you can simply type "cmd" in the "search programs and files" dialogue from the start button, and click it when presented. Then type "ping 192.168.10.100" (or whatever the IP address of the matrix is) and make sure there's a response. But remember – PING is a blunt tool: just because it works, does not mean everything is OK.
- If not, there's a cabling, network, firewall, or IP address issue and the best option is to discuss with the system installer.
- From the web browser connection to a Gemini Matrix, look at the status page and log messages for clues.
- For Mercury and Messenger, examine the TBC status and log.

11. APPENDIX 2 – KEY TYPES

Key Icon	Key Name	Description
	Speak	Operates as a latching speak key if you briefly press the key, otherwise it is a momentary speak, making a speak route only for the duration of the key press. The upwards and downwards action of a lever-action key is identical.
	Latching/Momentary Speak	A momentary speak if the key is pressed downwards, and is always latching in the upwards direction.
	Listen	A latching/momentary operation, the same as the **speak** key, but listening rather than speaking. Generally **not** used for communications with panels, but useful for 4-wires.
	Speak/Listen	Has the latching/momentary characteristics of the speak key, but the downwards motion is for speaking and the upwards motion for listening.
	Combined Speak/Listen	Operates as a latching key making both speak *and* listen routes if you briefly press the key, otherwise it is a momentary action, making the routes only for the duration of the key press. The upwards and downwards action of a lever-action key is identical.
	Momentary Speak	A speak key that only ever has a momentary action, making a speak route only for the duration of the key press. The upwards and downwards action of a lever-action key is identical.
	Speak/Not Listen	Operates like the Speak/Listen key, with the downward motion speaking, upwards listen, and a choice of momentary or latching depending on the duration of the key press. However, when the speak route is made, the listen route is temporarily suspended for the duration of the speak route.
	Listen/Momentary Speak	As per Speak/Listen, with the downwards motion for speaking and the upwards motion for listening, but only the listen action will latch if pressed briefly.
	Default Speak	As the standard Speak key, but the key defaults to being on – i.e. the speak route made – when the system starts.
	Default Listen	As the standard Listen key, but the key defaults to being on – i.e. the listen route made – when the system starts.
	Default Listen, Momentary Speak	As per Listen/momentary speak, except the listen route defaults to on when the system starts.
	QRS (Speak)	A "quick response" key that allows a reply to the most recent incoming call to be made without first having to locate the specifically configured key for that caller on the panel. The reply may be latched or momentary depending on the length of the key press.
	QRS (Momentary Speak)	As per QRS (Speak) except the speak route can only ever be momentary.
	Fast Speak	The speak and/or listen and momentary/latching characteristics of "fast" keys are identical to their "non-fast" versions, but differ in the way the route is established; they are really only relevant on long latency networks, such as IP-over-Satellite.

Fast keys are not required within a broadcast environment.

See extra information below regarding Fast Keys. |
	Fast Listen	
	Fast Speak /Listen	
	Fast Momentary	

11.1 FAST KEYS

When a key is pressed, there are a few message exchanges between Hosts to negotiate the route and make sure each matrix has sufficient routing resources to make the route. On most IP networks the delay resulting from any network latency is negligible (just a few milliseconds) and can be ignored. On a network with high latency, the delay can be appreciable – over satellite a message will take at least 550ms to arrive. If a response is required, the delay from pressing a key to the route being made will be well over 1 second.

Fast keys work around this by pre-negotiating the matrix resources required and reserving audio channels – the audio route is essentially pre-made, although no audio is flowing. When a key Is pressed, all that is needed is to make a local audio route to allow the audio to flow from end to end. A single message is then sent to confirm the audio is being sent: by the time the audio arrives, so does the message, so the remote tally indicator showing the audio route generally lights at the same time as audio is heard.

## 12. APPENDIX 3 - INTERFACING TO MERCURY

All of the Trilogy IP based intercom products share a significant commonality in the underlying software, especially in relation to IP encapsulation of audio and the inter-host message structure. Although Gateway was originally developed to meet the needs of a broadcast market, more recent versions of Gateway also support Mercury in a non-broadcast specific role.

Simplistically therefore, a Mercury or Messenger host can communicate with a Gemini Host seamlessly, with audio being carried between them using IP.

Note that the fundamental audio bandwidth of the Mercury and Messenger platform is at best 7 kHz (when 16 kHz sampling is used), compared to Gemini which uses 48 kHz sampling to provide full broadcast quality.

12.1 INTERFACING TO MERCURY HOSTS

Using the **Basic Domain Editor**, Mercury or Messenger hosts can be added in exactly the same way as Gemini. It will also be necessary to invoke the **Advanced Host Editor** (by doubling clicking the relevant host in the tree view) to configure the option modules that have been fitted.
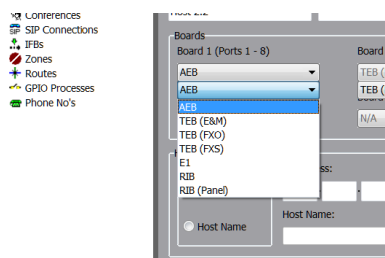
Declare the type of each expansion module fitted: they will default to the AEB (Audio Expansion Board). Remember that the lowest number ports (1 to 8) are located at the bottom of the chassis – 25 to 32 at the top.

Once the Host is declared, the remaining configuration is conducted in the same manner as a Gemini Matrix.

**13. APPENDIX 4 – A BASIC INTRODUCTION TO GPI**

The Gemini Matrix is fitted with a GPI (General Purpose Interface) module, equipped with:
- 16 General Purpose **Inputs** (GPIs) – a contact closure to ground "asserts" the GPI
- 16 General Purpose **Outputs** (GPOs) – opto-isolated using low resistance bi-directional mosfet outputs

Refer to the Implementation Guide for electrical and installation information, etc.

For Mercury and Messenger platforms, GPI is a hardware option which would normally be factory fitted.

To make use of GPIO, they must first be added to the configuration ("declared") using the **Advanced Host Editor** - **GPIO** tab, and adding (up to) 16 "Standard GPI" and (up to) 16 "Standard GPO". They are neither automatically detected nor automatically declared on any platform.
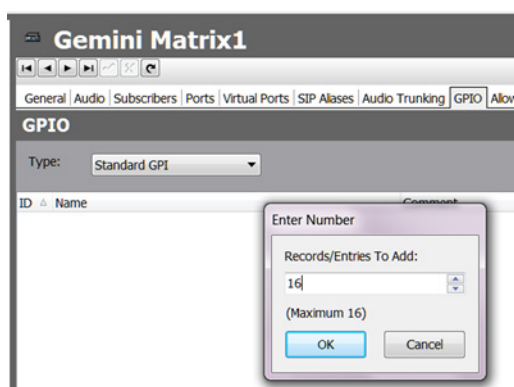
Declare inputs and / or outputs using the "Type" selection, then the green "+" button.

Many Trilogy control panels also provide local GPI inputs and outputs. These can be useful where for example, a control is required in a studio gallery. Using the panel GPIO will reduce the cable run length which would otherwise be back to the matrix in an apparatus room. These should also be declared on a panel by panel basis, and once this is done, they are globally available.

There is a second class of GPIO known as **Audio (VOX) Inputs** and **Audio (VOX) Outputs**. These provide GPI event triggers if the audio at a matrix input or output exceeds a software adjustable level. They are useful for 4-wire ports to show that the source is speaking, otherwise there would be no "listen" tally displayed at panels.

GPIOs are also closely integrated with routes – please review section 4.2 on page 20. In the example below, 3 routes have been declared and should be self-explanatory. The default label for a route is of the form **source::destination** and is rarely displayed on panel displays so they are usually left with the default text. The "**Fixed**" attribute is used to permanently make the route (a "fixed crosspoint") and when planning to use routes as part of a GPI related process, the fixed box should not be checked.

ID	Name	Comment	Source	Src Type	Destination	Dst Type	Fixed
1	DIR::FM	Director to Floor Manager	DIR		FM		☐
2	CAM01::PTB	Camera 1 to PTB Conference	CAM01		PTB		☐
3	PGM::FM	Programme Sound to Floor Manager	PGM		FM		☐

Once both GPIO and routes have been declared, the **GPIO Processes** editor is used to configure GPIO functions. Another way to view this editor is a process of building logical rules.
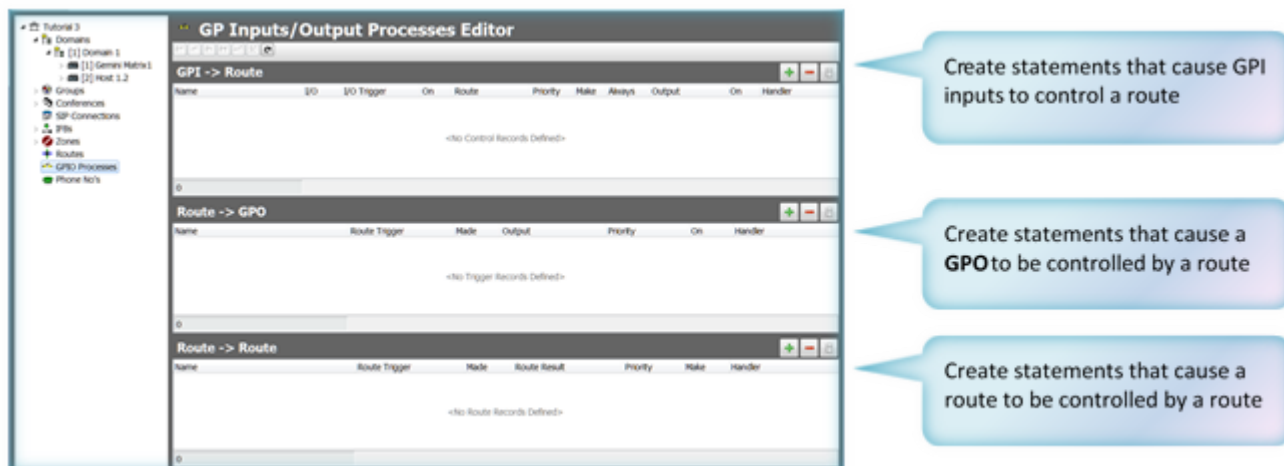
The following 3 examples are available in a configuration called "**GPIO Functionality.trilogy**" provided on the product CD.

The three sections of the editor are totally independent and each statement is described below. You may find it helps to clarify a relatively complex form by reading each entry as a logical statement.

13.1   GPI -> ROUTE

If GPI **GII-0.1.1:1** is **ON** (i.e. asserted) the route **CAMO1 to PTB** is to be **MADE** and GPO **GIO-0.1.1:1** is to be **MADE** (i.e. asserted). The responsibility for this action rests with **Gemini Matrix1**.
This type of function might be used if CAM01 has a push-to-talk switch which, when pressed, is required to make an audio route from the camera to the production talkback conference. A GPO is also triggered which might be used to illuminate a warning tally in the studio.

13.2 ROUTE->GPO

If the route **DIR to FM** is **MADE** then GPO **GIO-0.1.1:2** is to be **MADE** (i.e. asserted). The responsibility for this action rests with Gemini Matrix1.
This type of function might be used if the Floor Manager's beltpack has a tally light that can be illuminated by a GPIO signal.

13.3 ROUTE->ROUTE

If the route **DIR to FM** is **MADE** then the route from **PGM to FM** is **NOT** to be **MADE** (i.e.it is *inhibited*). The responsibility for this action rests with **Gemini Matrix1**.
This type of function might be used if the Floor Manager's programme sound fed is to be interrupted when the Director speaks (although this is more effectively done using an **IFB**).