

Version 4 - Multiple Consoles

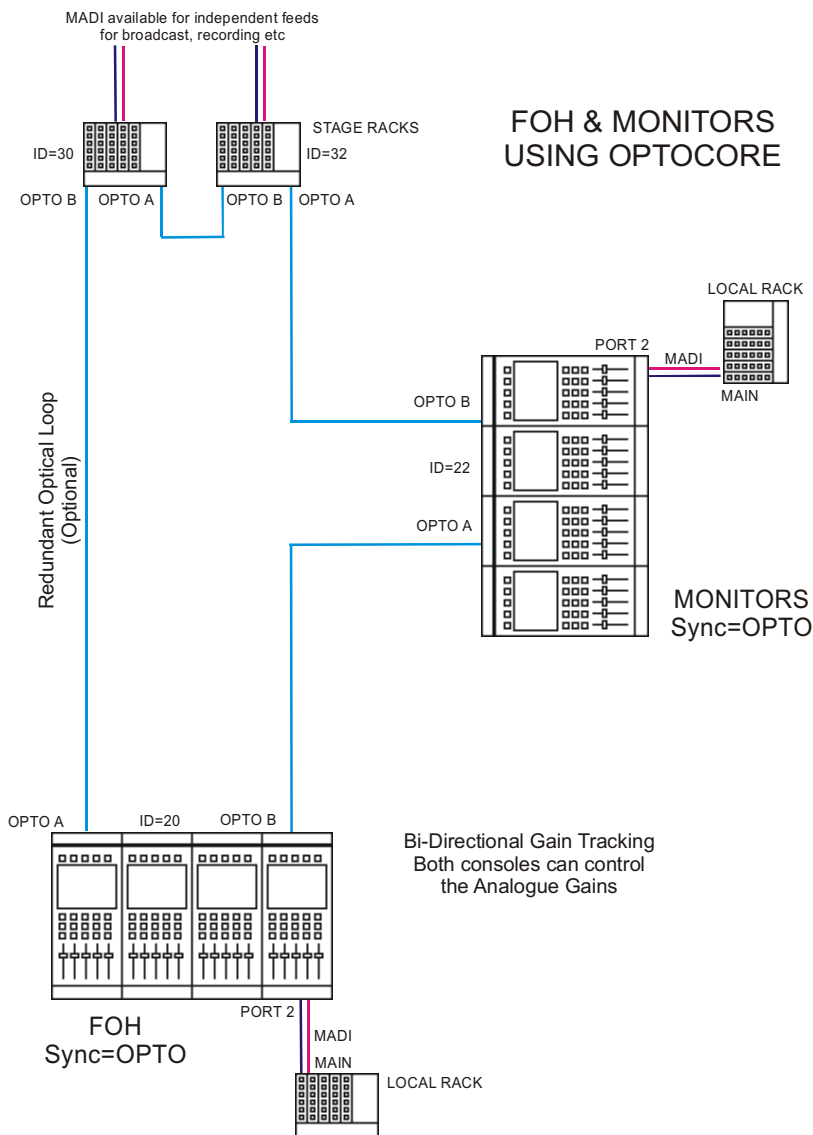
Issue A, July 2007 for Version 4.0+ Software

6.1 FOH and Monitors Setup

Front of House and Monitor consoles (with 1 local rack each) may independently share input signals from up to 3 stage racks and have individual control of input gains with the use of Gain Tracking.

The local racks may be completely different but the sockets file on each console must contain identical entries for the shared racks.

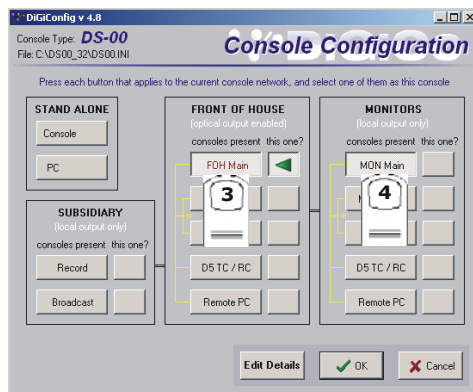
The rest of the configuration must match the hardware of the actual console but the two consoles do not need to be identical.



To set up the hardware configuration open the **DiGiConfig** program in the **System / Service / Configure Hardware** menu. Console software will automatically close to enable configuration changes.

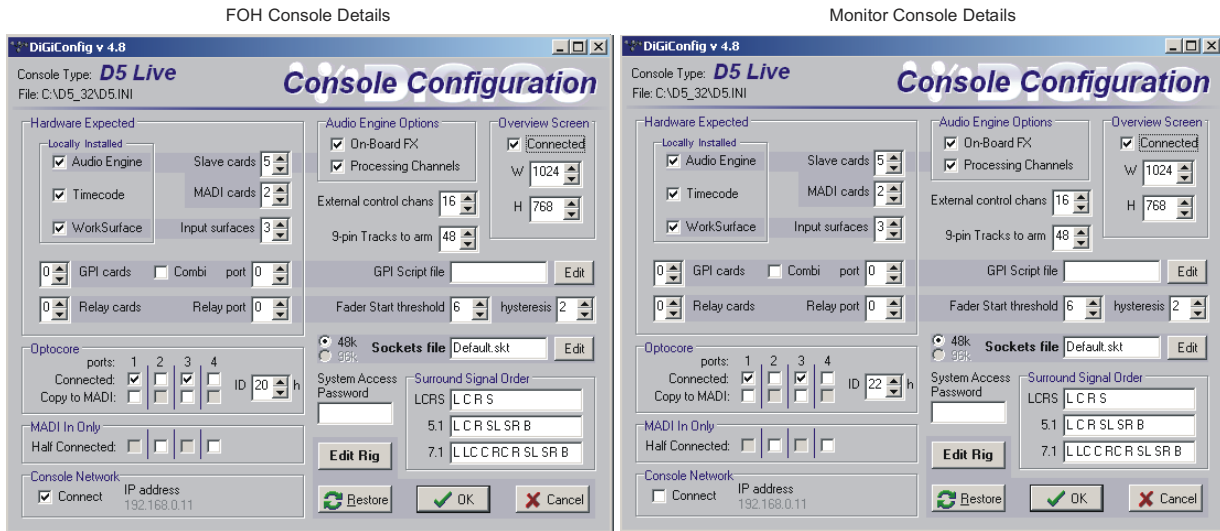
Select all the consoles in the rig (**FOH Main** and **MON Main**) and then select the console that you are configuring by pressing the **THIS ONE?** button. You can check the configuration by pressing the **EDIT Details** Button but clicking **OK** will confirm the setup and return to console software. Repeat this process for the other console.

Note: Both consoles should have Optocore selected in their Setup / Audio Sync panels.



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The following configuration details will have been created:



Note that the Optocore IDs are 20 (FOH) and 22 (MON). In this example, other details are the same but this is not necessarily always the case.

In the following two examples the consoles are connected with:

a) MADI only.

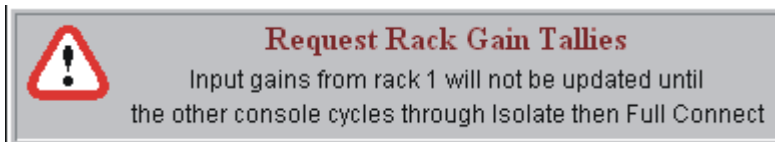
b) Mixed Optocore and MADI.

In both situations, Gain Tracking can only be unidirectional with one console acting as Master and the other console tracking the gain changes. In the examples, it is assumed that the FOH console will act as Master for gain control but a setup with the Monitor console as Master and the FOH tracking the changes is also possible.

The console that is acting as the "Slave" is connected to each stage rack by a single MADI cable from the stage rack's MADI out to the console's MADI IN on the relevant port.

IMPORTANT NOTE: It is very important to ensure that the Hardware Configuration is correct in these situations - see the next two pages. When the "Slave" is defined as **Half Connected** by **MADI IN Only** then the analogue gain pots on that console will have no control over the stage racks.

When you press the MADI racks **Full Connect** button in the **System/Audio Network** panel, you will be prompted to **Request Rack Gain Tallies**. The other console should be cycled through Isolate and then Full Connect again to update the "Slave's" gain controls.



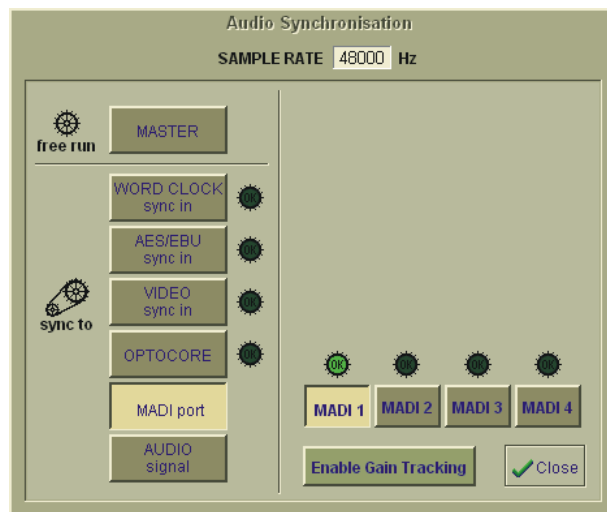
MADI Connections Only

The recommended connection between the Monitor console and Stage Racks is a single MADI OUT from each Stage Rack's AUX MADI connected to the console's MADI 1 IN for Stage Rack 1 and MADI 3 IN for Stage Rack 2.

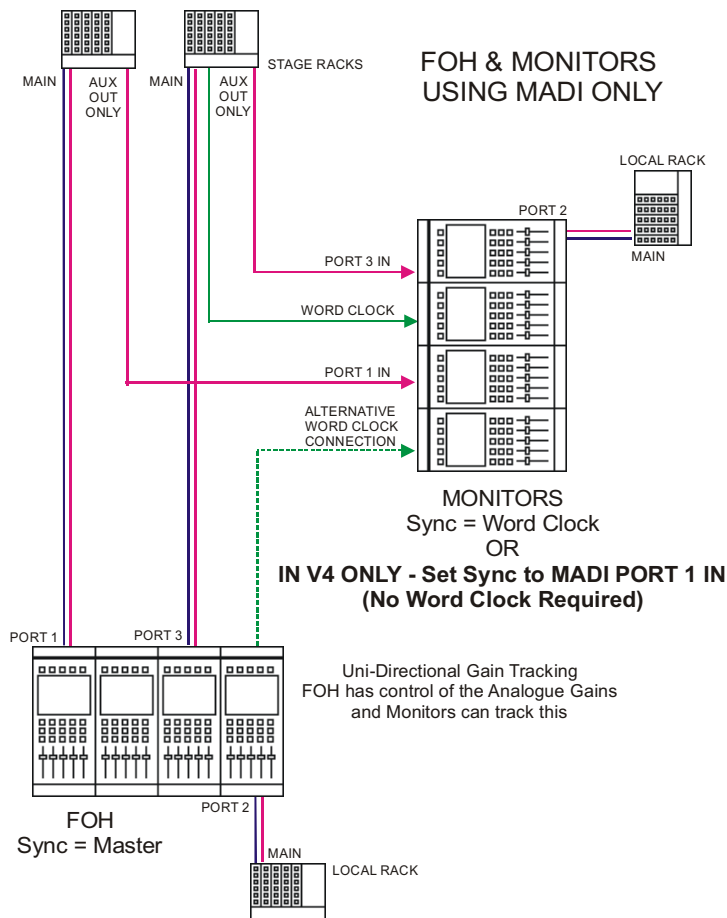
The FOH (Master console) is connected via MADI In and Out to both stage racks.

Note: With Version 3, this configuration used to require a **Word Clock** connection to the Monitor console from either the FOH console or one of the shared racks. This setup can still be used and in this case the FOH console should be set to **Setup / Audio Sync = Master** and the Monitor console to **Setup / Audio Sync = Word Clock**.

With Version 4, the Monitor console can be set to **Setup / Audio Sync = MADI Port 1** (provided that there is a shared rack on that port) and there will then be no requirement for the additional **Word Clock** connection.



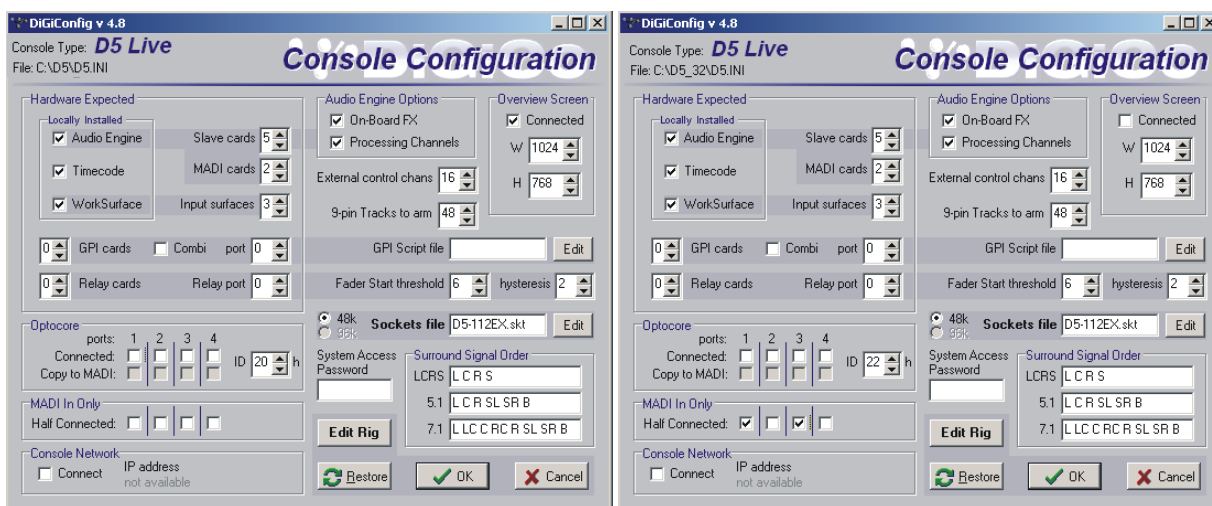
MADI Connections Only



For this setup the **Hardware Configuration** must be manually edited by pressing **Edit Details**. The FOH (Master) console should have **no Optocore Connected** boxes ticked and the Monitor console should be configured as being **MADI In Only** for the relevant racks (in this case racks 1 and 3) by ticking the **Half Connected** boxes as below.

FOH Console fully connected with MADI (has gain control)

Monitor Console with MADI IN only (can only track gain changes)



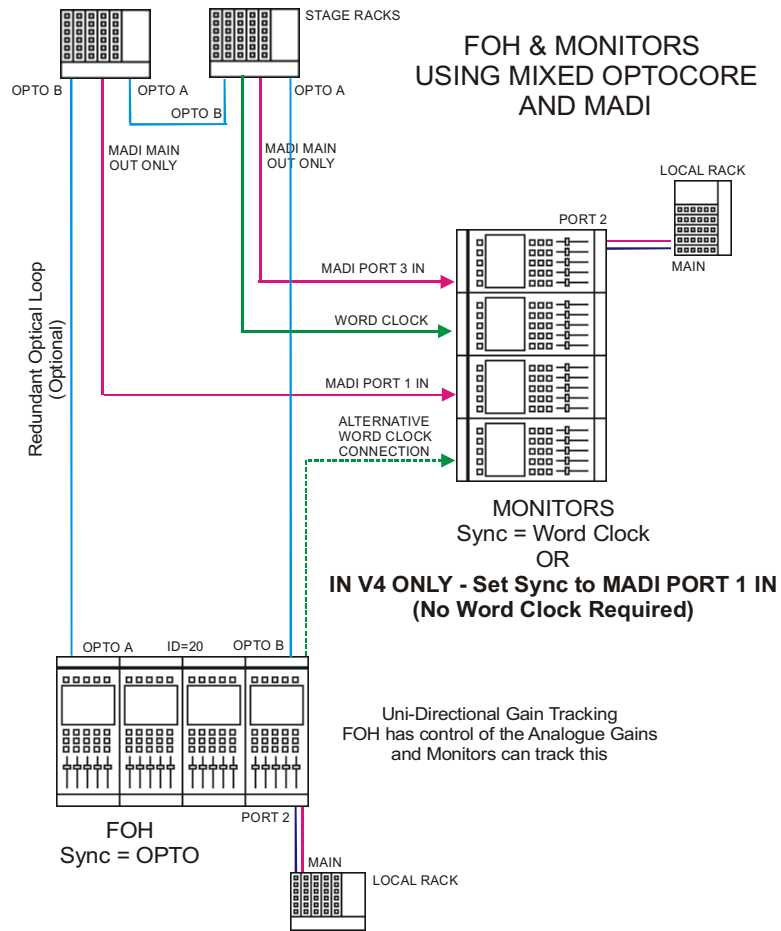
Mixed Optocore and MADI Connections

When connecting the FOH (Master) console with Optocore and the Monitor (Slave) console with MADI, the recommended connection between the Monitor console and Stage Racks is a single MADI OUT from each Stage Rack's MAIN MADI connected to the console's MADI 1 IN for Stage Rack 1 and MADI 3 IN for Stage Rack 2.

The FOH is connected with the standard Optocore loop.

Note: With Version 3, this configuration used to require a Word Clock connection to the Monitor console from either the FOH console or one of the shared racks. This setup can still be used and in this case the FOH console should be set to Setup / Audio Sync = Master and the Monitor console to Setup / Audio Sync = Word Clock.

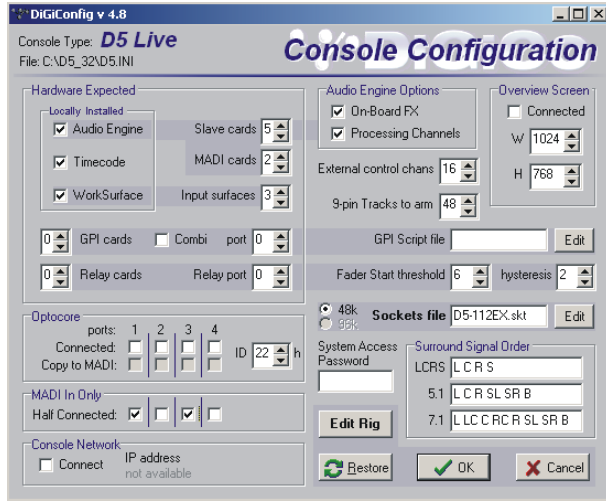
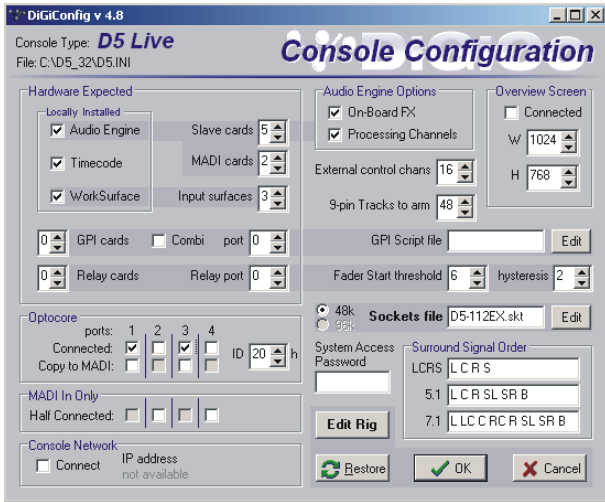
With Version 4, the Monitor console can be set to Setup / Audio Sync = MADI Port 1 (provided that there is a shared rack on that port) and there will then be no requirement for the additional Word Clock connection.



For this setup the **Hardware Configuration** must be manually edited by pressing **Edit Details**. The FOH (Master) console should have **Optocore Connected** boxes ticked and the Monitor console should be configured as being **MADI In Only** for the relevant racks (in this case racks 1 and 3) by ticking the **Half Connected** boxes as below.

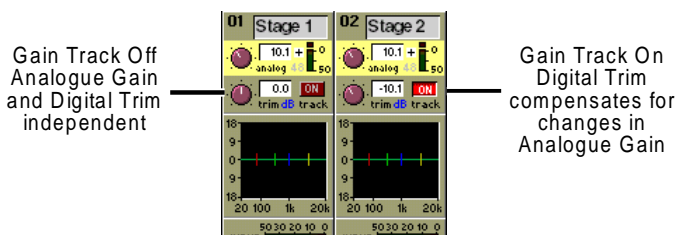
FOH Console fully connected with OPTOCORE (has gain control)

Monitor Console with MADI IN only (can only track gain changes)



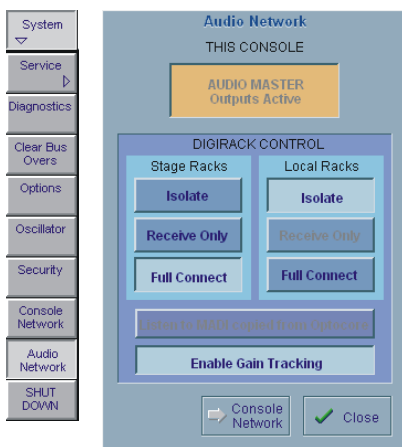
6.1.1 Gain Tracking Settings

With the Optocore connection, Gain Tracking can be bidirectional. If either console adjusts the analogue gain, the other console can compensate for that change by applying an opposite digital trim. Each Input Channel has a **Track On/Off** switch next to the **Digital Trim** control. This is controlled by touching the screen in the area of the switch and using the worksurface phase button beneath the gain control. If it is switched off, the Analogue Gain and Digital Trim are completely independent but if it is switched on for both consoles, any change in the Analogue Gain by either user is compensated by an opposite Digital Trim. This means that the overall level remains the same on both consoles when the Analogue Gain is adjusted.



If the system has been defined as consisting of more than one console, the **Audio Network** panel will automatically open on boot up or load session. The panel can also be opened from the **System** menu.

Gain Tracking must be activated by pressing the **Enable Gain Tracking** button at the bottom of the **Consoles and Racks** panel.



The initial state will have no connection between the devices and the racks (**Isolated**) and the panel appears in order to prompt the operator to make the necessary connections.

In this state, any gain adjustments made on the console will have no effect as the racks will not be receiving any data.

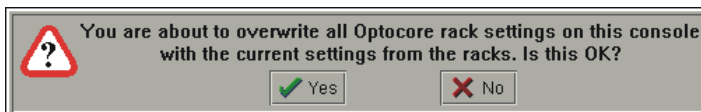
If you go to **Receive Only** then **Full Connect** you can join the rack sharing without making any gain changes. If you are responsible for the analogue gains, it is likely that you will want to go straight to **Full Connect** after load session or boot up.

Options are:

Isolate where the console will not communicate with the racks and therefore any adjustment of input gain or +48V switch will have no effect on the rack settings.

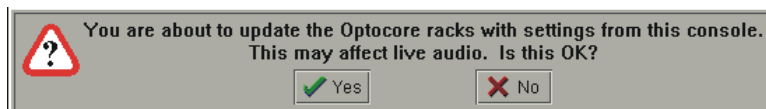
Receive Only where the console will receive the rack's existing settings but will not be able to control the gain etc on the racks.

Receive Only



Full Connect where the console will send its settings to the racks and change them accordingly.

Full Connect



6.1.2 Gain Tracking Procedures

The suggested setup for two consoles which are sharing the same racks is as follows:

a) One operator will be responsible for adjusting the analogue gains on the racks (Recommended):

- 1) One console should fully connect to the racks using the **System / Audio Network** panel's **Full Connect** button for the Optocore racks.
- 2) The operators should agree on and set a level of analogue gain that provides enough headroom for the required application.
- 3) The second console should connect to the racks in **Receive Only** mode to ensure that it doesn't send its own current gain levels to the racks.
- 4) Gain Tracking should be switched on for the console that is in **Receive Only** mode consoles for all the channels that are being shared.
- 5) Both operators should use their own console's digital trims to adjust their overall operating level from this point onwards.

If the analogue gains need to be changed, only the console that is in Full Connect will be able to do this but the second console will be not be affected by these changes as it has its Gain Tracking switched on.

b) Both operators want to be able to control the analogue gain on the racks:

- 1) One console should fully connect to the racks using the **System / Audio Network's** panel's **Full Connect** button for the Optocore racks.
- 2) The operators should agree on and set a level of analogue gain that provides enough headroom for the required application.
- 3) The second console should connect to the racks in **Receive Only** mode to ensure that it doesn't send its own current gain levels to the racks. This console may then do a **Full Connect** to the racks.
- 4) With both consoles in **Full Connect**, Gain Tracking should be switched on for both consoles for all the channels that are being shared.
- 5) If either operator changes the analogue gain there will be no overall level change on either console as the digital trims will always compensate for the change in analogue gain.

Note: If either operator wishes to change the analogue gain and not have their own console's digital trim compensating, they should temporarily switch off Gain Tracking on the required channel, make the gain change and then switch gain tracking back on again.

6.1.3 Gain Tracking and Snapshots

In a FOH and Monitors system, a great deal of care must be taken if analogue gains are to be changed with snapshots. There are a number of methods of doing this but as the following points illustrate, there are several things to consider.

Note: Analogue gain now have their own Scope button and digital trims are included in the Trims/DelaysScope.

It is intended that one console will not have analogue gains in any of its snapshots' scopes. This prevents it from sending any rack commands at all and therefore it cannot change analogue gains with snapshots.

A similar situation could be created by making the console **Receive Only** for rack control but this will also prevent manual analogue gain changes.

In either case, the other console is then in complete control of snapshot gain changes.

When a session is loaded it starts in **Isolate**, so if you go to **Receive Only** then **Full Connect** you can join the rack sharing without making any gain changes. If you are responsible for the analogue gains, it is likely that you will want to go straight to **Full Connect** after load session.

Subsequently, both consoles can be in **Full Connect** at all times; this way if either operator spots an over (or under) they can manually adjust the analogue gain on either console and if **Gain Tracking** is on for both consoles the balance will not be disturbed.

Note: Problems may occur if both consoles are using snapshots and they have digital trim changes in their snapshots.

In this situation, snapshots must be stored at the same time on both consoles so that the analogue gain changes on the controlling console will be reflected in a stored digital trim level on the other console which is recalled with the firing of the snapshot.

The console that is not controlling analogue gains should normally have Gain Tracking switched on to enable its digital trims to compensate for the other console's analogue gain changes. This system will work correctly but if the digital trims are subsequently changed with an in dependent snapshot then the automatic adjustment may be overridden and unanticipated overall levels may result.

Suggested methods:

1) Do not change analogue gains with snapshots from either console.

This is the simplest method and involves removing **Analogue Gain Scope** from all console snapshots.

Both consoles can be in **Full Connect** so that either operator can adjust analogue gains manually.

Gain Tracking can be switched on for both consoles to ensure that neither is affected by manual gain changes that are made by the other.

Digital trim changes can be made manually or in snapshots on both consoles as these changes are completely independent of the other console and cannot affect it in any way.

2) Only change analogue gains with snapshots from one console.

If there is a requirement to change input socket routing and/or analogue gains with snapshots then only one console should control the gains.

The second console should have either:

a) **Analogue Gain Scope** removed from all of its snapshots.

OR

b) It should be in **Receive Only** for rack commands so that it cannot send its own analogue gain changes.

Gain tracking should be switched on for the second console so that unforeseen gain changes on the first will not affect its overall balance.

Gain tracking may also be switched on for the first console but this is not really necessary as the second console will not be controlling the analogue gains at all.

When the first console stores a snapshot that will change analogue gains, the second console should then store its own snapshot that reflects the required digital trim settings to compensate for that change. These snapshots should then be fired at the same time (approximately) during the show.

Note: The most important aspect of this procedure is the coordination of snapshots between the two consoles. It is not advisable for the two operators to store snapshots independently of each other - they must both store snapshots at the same time.

6.2 Redundancy and Mirroring

6.2.1 Redundant Optical Loop

If an additional Optocore cable is connected to complete the loop between all connected devices, the redundant cable will ensure that a single break in the Optocore connection will not result in a loss of function.

This applies in single or multiple console operation.

6.2.2 Redundant Mirror Console or Engine

The following information refers to a Redundant Mirror Console but the setup for a Redundant Engine is identical.

The significant difference between the two situations is that a Redundant Engine only provides console control using a conventional computer monitor and a keyboard with trackball. With a Redundant Console, full worksurface control is possible.

The Mirror console is normally connected to the console and stage racks with optical fibre cables and two 5 metre BNC MADI cables are connected to the auxiliary MADI port on the local Rack.

An Ethernet Crossover cable (**not a standard CAT5 cable**) is also connected between the Main console and Mirror consoles or both devices are connected to an Ethernet switch if some form of Remote control is also used with the system eg. a Remote PC running the console software.

In the unlikely event that the Main console's audio engine fails, audio is automatically switched to the Mirror console without any interruption in the program material.

The Mirror console can be set to mirror the Main console's settings and therefore, in the case of loss of worksurface control on the Main console, the Mirror console's worksurface can be used to perform any function.

If the console's audio engine function is recovered then the operator can transfer audio processing back to the main console at any time with the press of a single screen button.

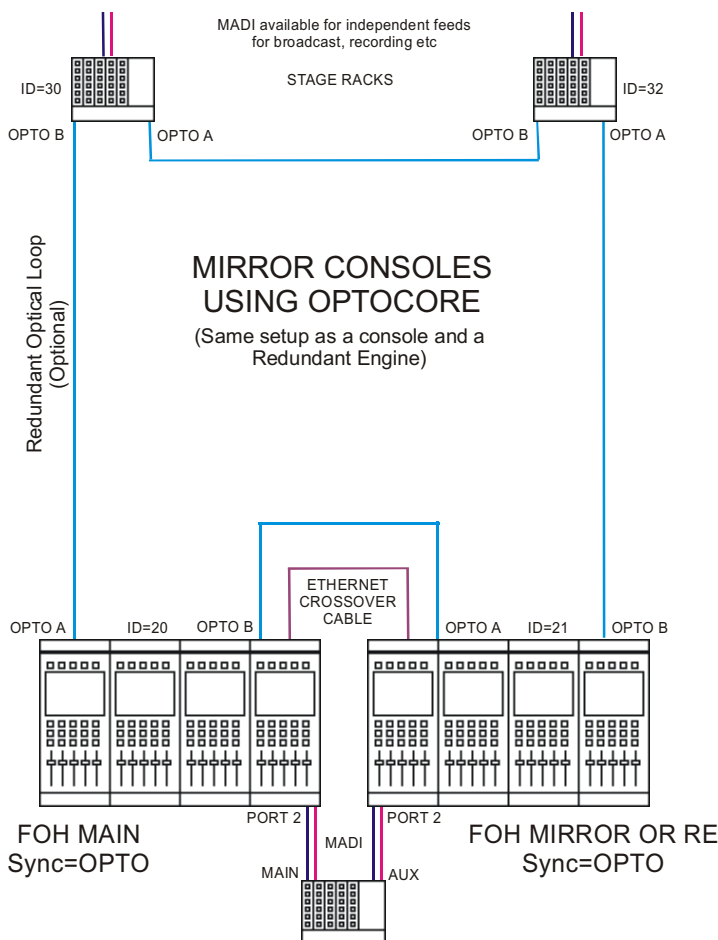
NOTE: The most important aspect of the connection system is that the optical fibre cables are always in a strict Port A to Port B configuration. Connecting any device's A port to another device's A port may result in a malfunction of the system. The same applies to B to B connections. If your system has more devices simply continue with the A to B rule.

When using optical connections, the Main and Mirror consoles should both be set to OPTOCORE sync in the Setup/Audio Sync panel on the Master Screen.

Stage Racks should always be next to each other in the chain so if you were connecting a third rack into the system below, it should be positioned between Stage Rack 2 and the Mirror console.

In this example there are 2 consoles with 1 local rack sharing signals from 2 stage racks:

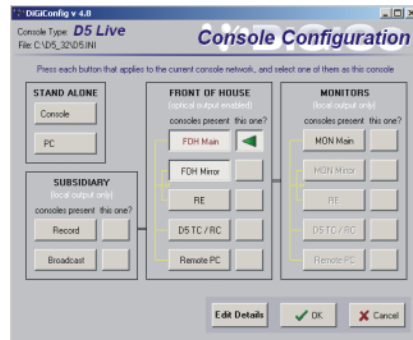
When the consoles have been connected and started their **Sessions** must be **Synced** using the **Send/Receive Session** functions on the **System/Console Network** panel. The Sockets files on the two mirrored should also be identical.



Having ensured that the consoles are identical in both hardware and software, run the **DiGiConfig** program in the **System / Service / Configure Hardware** menu. Console software will automatically close to enable configuration changes.

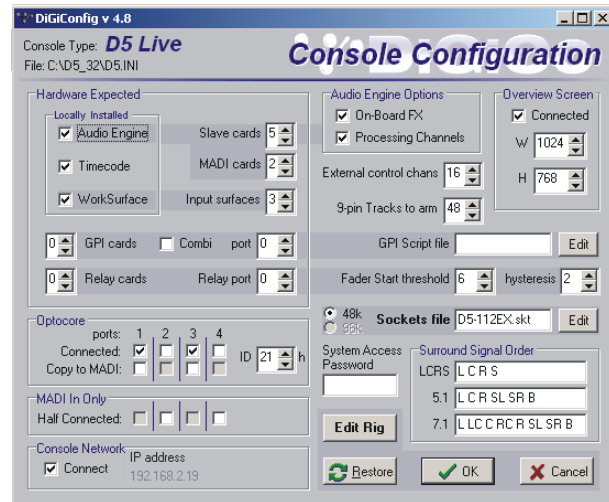
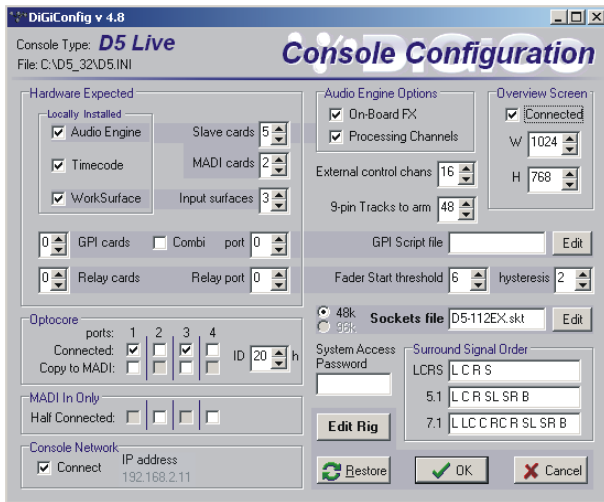
Select all the consoles in the rig (eg. **FOH Main** and **FOH Mirror**) and then select the console that you are configuring by pressing the **THIS ONE** button. You can check the configuration by pressing the **EDIT Details** Button but clicking **OK** will confirm the setup and return to console software. Repeat this process for the other console.

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FOH Console Details

Mirror FOH Console Details



Note that the Optocore IDs are 20 (FOH) and 21 (MIRROR). In this example the network details show that the FOH Main console has an IP address of 192.168.2.11 and the FOH Mirror console has an IP address of 192.168.2.19. All other aspects of the two consoles are identical.

The console IP Address which should be unique to each device but only differ in the last of the four numbers (The number after the last dot):

These IP Addresses are assigned to the consoles and engines at the factory and should not be changed unless two devices in the same system have the same address.

The console Optocore ID which should be unique to each device in the system that is connected to the optical loop (Settings on Remote Control devices such as a remote PC or RC are not significant).

Console Optocore ID's should be as follows:

FOH Main Console = 20

FOH Main Console's Mirror = 21

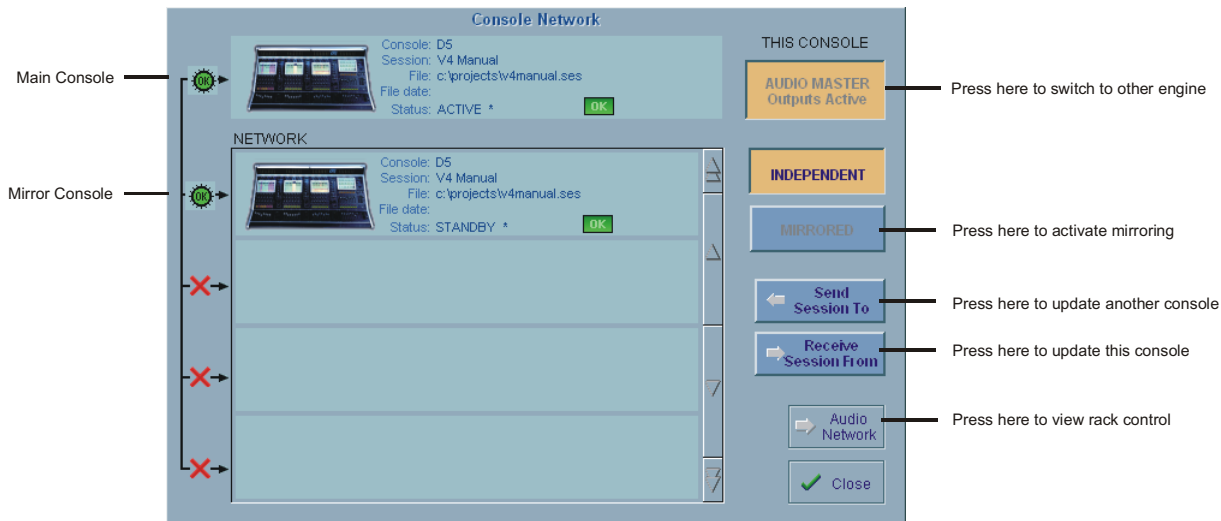
Monitor Console = 22

Monitor Console's Mirror = 23

6.2.3 Sync Session & Mirroring

The Main console and Mirror must have the same Sockets File and Session File and this can be achieved by using the Send/Receive Session Functions. Assuming that a session has already been created on the Main console and its Sockets file is as required then proceed as follows:

Working on the Mirror Console (used to mirror the Main console), press the **System/Console Network** button and this panel will open:

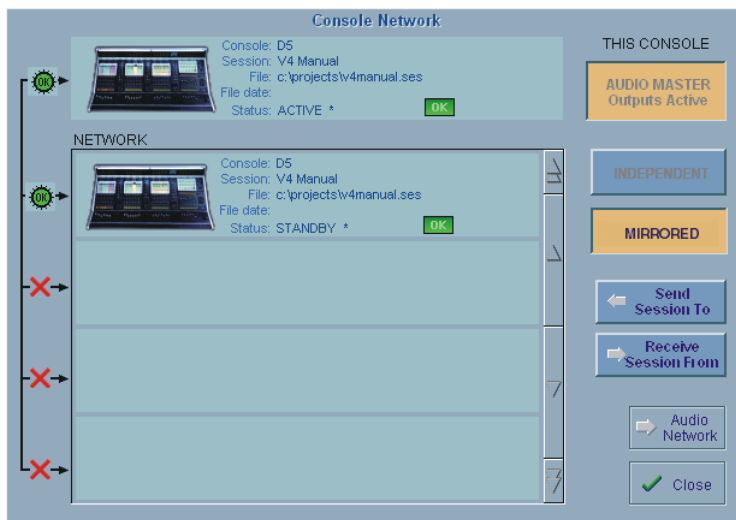


This shows a list of the devices that are connected on the network and in this example there are 2 D5's.

- 1) Select the device from the list that you wish to transfer from.
- 2) Press the **Receive Session From** button - This will transfer the Session File to the Mirror console. A session can be synced in either direction; the default setting is from the current audio master.

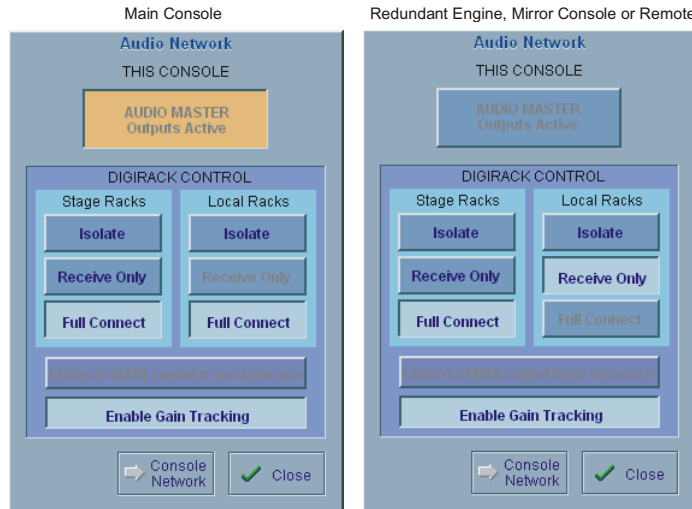
NOTE: It is important to ensure that the 2 consoles' SOCKETS FILES are identical before attempting to mirror them.

- 3) When the Sessions have been synced, Mirroring can be activated by pressing the **Mirrored** button on the Mirror console - the button will go orange when Mirroring is active.



If you have other devices in your system such as a Remote Controller then this process should be repeated on each device, always syncing sessions and mirroring **From** the Main console.

6.2.4 DiGiRack Control



If the system has been defined as consisting of more than one device, the **Audio Network** panel will automatically open on boot up or load session.

This panel can also be opened from the **System** menu.

The initial state will have no connection between the console and the racks (**Isolated**) and the panel appears in order to prompt the operator to make the necessary connections.

In this state, any gain adjustments made on the console will have no effect as the racks will not be receiving any data.

The Main console's **MASTER Audio Outputs Active** button will normally be highlighted in orange to show that it is the master responsible for audio processing at this time.

The same button on the Mirror should not be highlighted at all.

The MADi Rack's connect states **Receive Only** and **Full Connect** are enabled/disabled and set according to the Audio Master active state – an inactive engine cannot output to a MADi rack.

When the Main console and the Redundant Engine have been mirrored, the communication with the DiGiRacks should be activated.

In a system where there is only a single console and a mirror, on the Main console, press the **Full Connect** buttons for the Optocore and MADi racks. You will then be required to confirm the action, the session settings will be sent to the racks and the console will have full control over them.

If you have a system where more than one console is sharing the racks you may wish to use the **Receive Only** mode where the console will receive the rack's existing settings but will not be able to control the gain on the racks.

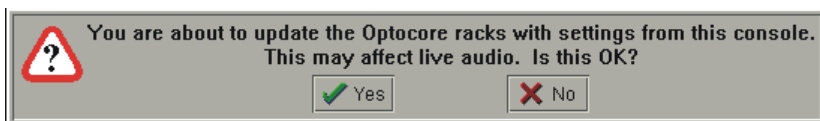
Options are:

Isolate where the console will not communicate with the racks and therefore any adjustment of input gain or +48V switch will have no effect on the rack settings.

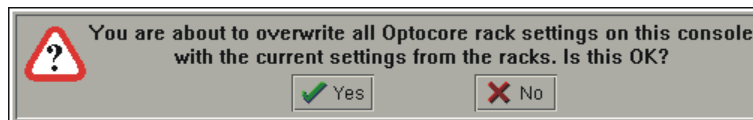
Receive Only where the console will receive the rack's existing settings but will not be able to control the gain etc on the racks.

Full Connect where the console will send its settings to the racks and change them accordingly.

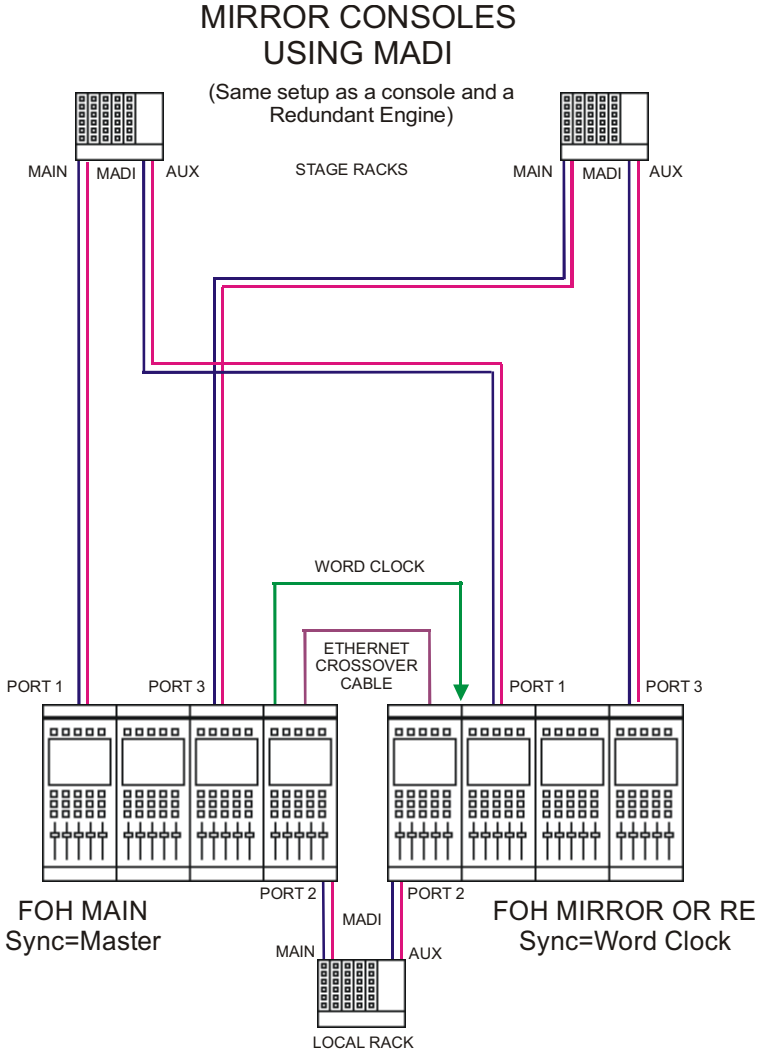
Full Connect



Receive Only

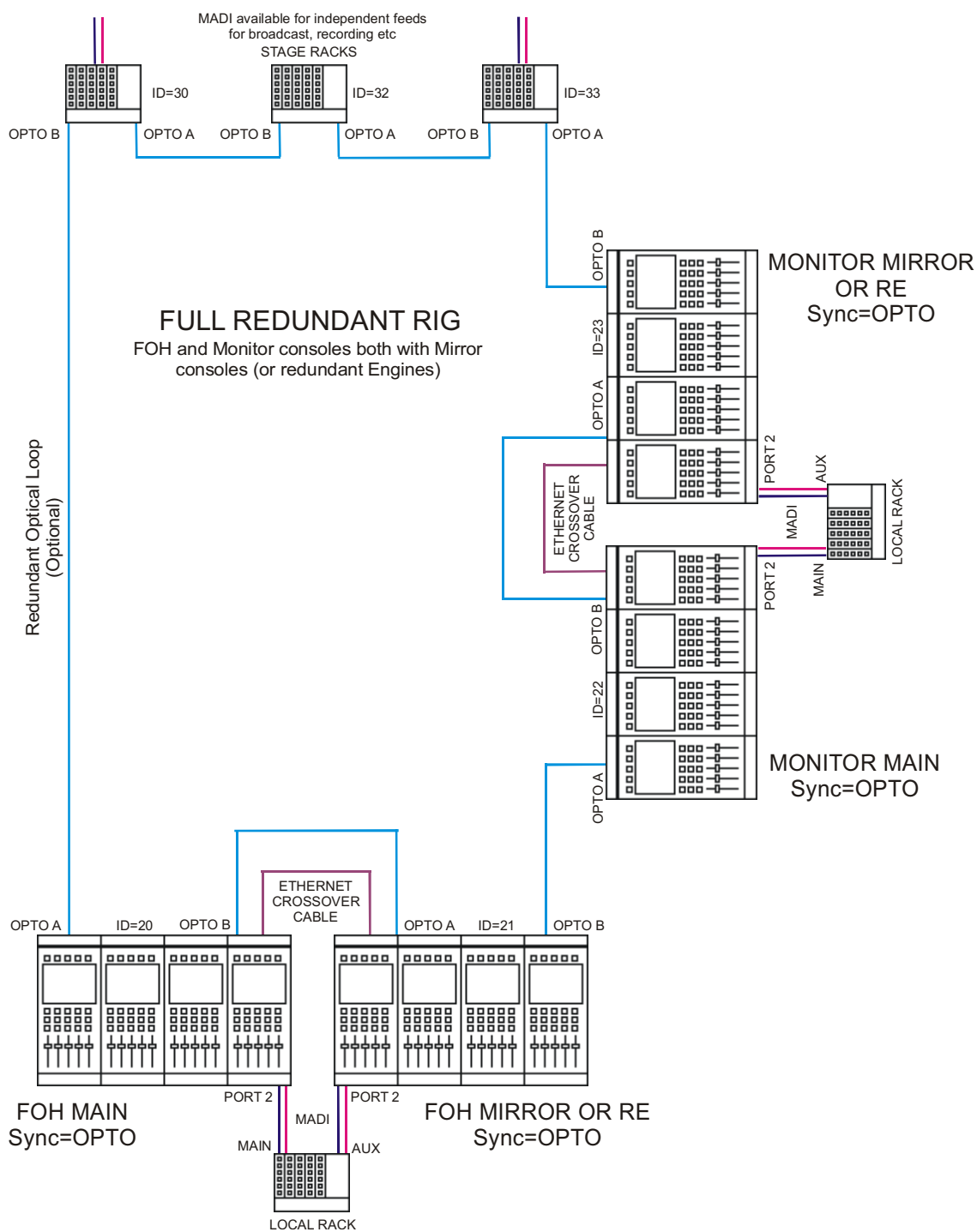


The following diagram shows the connections required to set up a mirror console with MADI connections:



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The following diagram shows the connections required to set up a full rig with redundant mirror Front of House and Monitor consoles, a redundant optical loop and multi-operator Gain Tracking.



6.3 PC Remote Control

If console software is run on a standalone PC or laptop, sessions may be prepared off line or the PC can be used to remote control a console.

Input channel windows are run in separate moveable windows for easier access on smaller screens. The Overview Screen and a Bank Switches window are also displayed. Channel and Master LCD buttons appear at the bottom of each screen.

A PC can also be used as a Remote Control device for the console and this is set up in a similar way to a Mirror console.

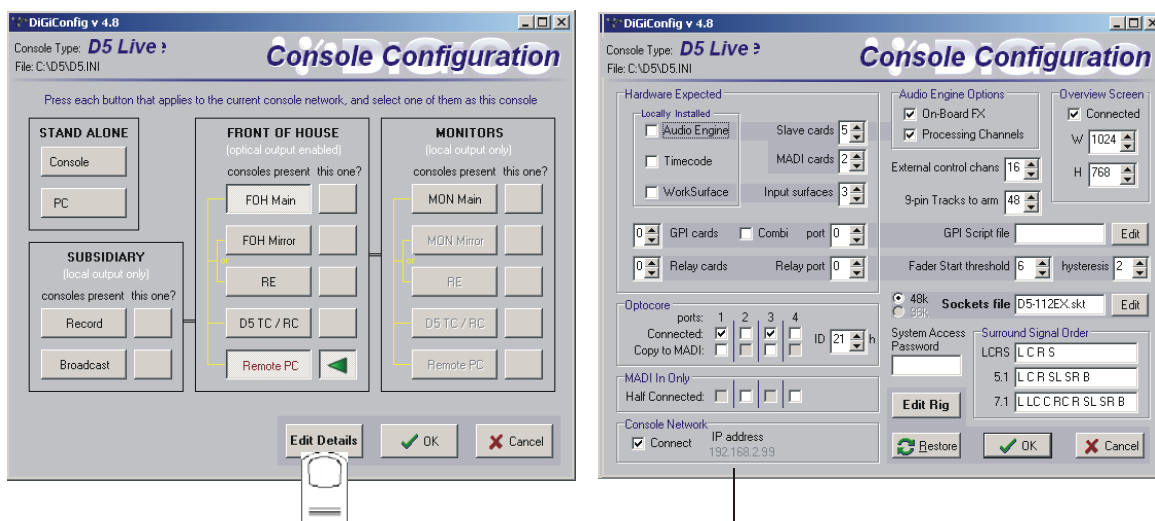
6.3.1 Remote PC Setup

The Remote PC must run under Windows XP or later software and this description assumes that the operator has sufficient knowledge of the operating system to change IP addresses and set up a standard network connection.

Note: With Windows XP the built in Firewall should be disabled as this may cause operational problems.

- 1) An Ethernet Crossover cable (**not a standard CAT5 cable**) should be connected between the Main console and the Remote PC or both devices should be connected to an Ethernet switch if there is a third device in the system eg. a Mirror console or Redundant Engine.
- 2) Set the Remote PC's IP address to 192.168.2.xxx (where xxx is a number between 0 and 255 that is unique within the system).

The IP address can be checked by opening the **System/Service/Configure Hardware** panel, pressing all the buttons for the devices that are present in the system (eg FOH Main and Remote PC) and then selecting the **This One** button for the device that you are working on. Then press **Edit Details** and the IP address can be seen in the bottom left of the panel.



IP Address for "This One"

- 3) Repeat his process for the other device(s) and start the console application on all of them.

As the system has been defined as consisting of more than one device, the **Console Network** panels should open automatically and the **Ethernet Connected** line should show a **green OK light** and not a red cross.

- 4) Proceed with **Syncing the Session files** and then **Mirroring** as described in the previous sections on Mirror consoles (6.2.3).

6.3.2 Remote PC Operation

To use the software with a mouse and keyboard the following functions are necessary:

Left mouse click on a non active window makes it active.

Right mouse click on a window functions as a screen touch.

Double click in the grey area around the LCD buttons to change their function.

Left mouse click on a switch to turn it on or off.

Hold down left mouse button and drag to adjust rotaries and faders.

Ctrl 1 to 6 = bank buttons 1 to 6 on the upper master.

Shift 1 to 6 = bank buttons 1 to 6 on input surface 1.

Up/Down (arrows) = scroll rotary assignment on all input screens.

Page Up/Down acts as the screen scroll button in the Master section.

NOTE: Unlike Version 3, the Control key acts as the All button for all surfaces in Version 4.

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Standalone or Remote PC Screen Appearance

