Duality Fuse

Installation and Setup Guide

Solid State Logic
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Duality Fuse

Installation and Setup Guide

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Solid State Logic

OXFORD • ENGLAND

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PLEASE READ ALL INSTRUCTIONS, PAY SPECIAL HEED TO SAFETY WARNINGS.

E&OE

December 2022

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Section 1 – Introduction

About This Manual

The object of this manual is to provide owners and installers of the Solid State Logic (SSL) Duality Fuse console with information in the following areas:

Section 2 Safety Information – Please read this section as it includes important information relating to the electrical supply requirements and to physical safety.

Section 3 Preparation – Provides detail about the console and its optional components and also what preparation is necessary relating to the proposed location and any peripheral equipment that may be required. Some items and services will need to be supplied by the facility.

Section 4 Installation – Provides instructions relating to cabling and connection for the console and its optional items.

Section 5 Connecting Your DAW – Provides step-by-step instructions on how to physically connect your DAW plus the console and workstation configuration settings.

Appendices Specifications, connector pinouts, configuration details and useful guidelines.

The information provided by this manual is relevant to all frame sizes of the Duality console.

Symbols Used

Electrical safety hazard.

General safety warning.

Indicates that it is the responsibility of the facility to provide this item or service.

Important, useful or otherwise noteworthy information will be indicated inside a border

Indicates that additional information may be located on another page or in an Appendix.

Contacting SSL

Information relating to support for the Duality console is available on the internet:

www.solidstatelogic.com/products/duality

The latest version of this manual can be downloaded from:

https://www.solidstatelogic.com/products/duality?tab=documents

Section 2 – Safety Information

This section contains definitions and warnings, and practical information to ensure a safe working environment. Please take time to read this section before undertaking any installation work.

Definitions

'Maintenance'

All maintenance must be carried out by fully trained personnel. Note: It is advisable to observe suitable ESD precautions when maintenance to any part is undertaken.

'Non-User Adjustments'

Adjustments or alterations to the equipment may affect the performance such that safety and/or international compliance standards may no longer be met. Any such adjustments must therefore only be carried out by fully trained personnel.

'Users'

This equipment is designed for use solely by engineers and competent operators skilled in the use of professional audio equipment.

'Environment'

This product is a class A product intended to form an integrated component part of a professional audio recording, mixing, TV, radio broadcast or similar studio wherein it will perform to specification providing that it is installed according to professional practice.

Electrical Safety Warning

When installing or servicing any item of SSL equipment with power applied, when cover panels are removed, HAZARDOUS CONDITIONS CAN EXIST.

These hazards include:

- High voltages
- High energy stored in capacitors
- High currents available from DC power busses
- Hot component surfaces

Any metal jewellery (watches, bracelets, neck-chains and rings) that could inadvertently come into contact with uninsulated parts should always be removed before reaching inside powered equipment.

Installation Instructions

Voltage Selection and Fusing

The Duality Fuse console uses auto-ranging power supplies so voltage range selection is not necessary. Some 3rd party sub-systems however may have user-selectable voltage inlets. Always confirm that the input mains voltage range is set correctly before applying power. Always isolate the mains supply before changing the input range setting.

If it is ever necessary to replace a blown mains fuse, then always use the correct rating and type of replacement. If a correctly rated fuse continues to blow, then a fault exists and the cause should be investigated or the unit returned to SSL for repair/replacement as appropriate.

Technical specifications can be found in Appendix A on page 50 of this manual.

Safety Earth Connection

Any mains powered item of SSL equipment that is supplied with a 3-core mains lead (whether connectorised or not) should always have the earth wire connected to the mains supply ground. This is the safety earth and grounds the exposed metal parts of the racks and cases and should not be removed for any reason.

Mains Supply and Phases

SSL equipment is designed for connection to single-phase supplies with the Neutral conductor at earth potential – category TN – and is fitted with a protective fuse in the Live conductor only. It is not designed for use with Phase (Live) and Neutral connections reversed or where the Neutral conductor is not at earth potential (TT or IT supplies).

All mains powered assemblies must be connected to the same mains phase.

Mains cables will be coded with either of the following colour schemes:

	1	or	**2**
LIVE:	Brown		Black
NEUTRAL:	Blue		White
EARTH:	Yellow/Green		Green

Mains Isolation and Over-Current Protection

An external disconnect device is required for this equipment; a detachable power cord – as fitted to this equipment – is a suitable disconnect device.

Where a mains plug or appliance coupler is used as the disconnect device, it must remain readily operable.

The power leads must be kept in good condition. If a power cable shows any sign of damage, or if either connector becomes loose, feels warm or appears discoloured then the power lead assembly should be replaced.

An external over-current protection device is required to protect the wiring to this equipment which must be installed according to the current wiring regulations; in certain countries this function is supplied by use of a fused plug.

Physical Safety

⚠ Console sections are too heavy for one person to lift.

If any console trim is removed then there may be sharp edges on the exposed frame metalwork.

Standards Conformance

CE

This apparatus fully conforms with the current protection requirements of the European Community Council directives on EMC and LVD.

Cables supplied with SSL equipment may be fitted with ferrite rings at either end. These are necessary to comply with European CE regulations and should not be removed. If any console metalwork is modified in any way – such as the addition of holes for custom switches etc. – then the CE certification status of the product may be adversely affected.

FCC Certification

The equipment which forms a Duality system has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Instructions for Disposal of WEEE by Users in the EU

The symbol shown here, which is on the product or on its packaging, indicates that this product must not be disposed of with other waste. Instead, it is the user's responsibility to dispose of their waste equipment by handing it over to a designated collection point for recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can drop off your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

Section 3 – Preparation

Services Available From SSL

Shipment

All consoles are available ex-works and can be collected from SSL's headquarters in Begbroke, Oxfordshire, UK.

Packing, crating for airfreight and shipment by specialist carrier can all be arranged at additional cost.

Where delivery is by road and within the EU consoles are normally shipped complete and with legs removed. For all other shipments consoles will be split into 24-channel sections with legs removed; each section will be crated separately. Note that trim parts are not normally removed for shipment so care must be taken to protect the trim during reassembly.

Commissioning

Duality Fuse consoles do not include on-site commissioning by an SSL engineer as standard. Commissioning can be requested at the time of purchase, at additional cost, and is usually expected to take from 2 to 3 days. Consoles above 48 channels and those split for shipment or with corner sections may require an additional 1 day of commissioning time.

Before the console is installed all control room building work must be completed and the environment MUST be clean and free from dust otherwise the warranty will be rendered invalid. Ancillary equipment, such as power distribution and monitoring loudspeakers, should be installed and working prior to the commissioning date.

We would recommend that commissioning is specified for consoles that are split for shipment. Unless commissioning has been included it will be the responsibility of the facility to reconnect the console sections and to re-attach the legs.

You should contact your local SSL office or agent at least four weeks prior to delivery to allocate a commissioning date.

Training

The commissioning time can be extended to allow for up to two days of standard operator training. This is provided at additional cost and is subject to engineer availability.

Maintenance training may also be arranged, at additional cost.

Training should be requested at time of order. For all training we recommend that no more than five persons attend each session. If the use of an interpreter is necessary the training period may need to be extended (at additional cost). Note that travel and subsistence expenses are not normally included. Please contact SSL's Training Department at: *support@solid-state-logic.com*.

Factory Warranty

All new systems include a 13 month warranty which commences on the date of shipment. This warranty includes:

- Technical – phone, fax and e-mail – support via your local distributor or office during normal business hours
- Supply of exchange parts*
- Service engineer visits (note that travel and subsistence costs are not covered by the warranty)
- Maintenance software upgrades

** It is not expected that a visit from an SSL engineer will be necessary in the majority of cases where a replacement part is required. Console sub-assemblies are designed to be easily removable to simplify replacement. There are a useful selection of maintenance videos viewable on the SSL website (https://www.solidstatelogic.com/) in the Support Help Centre.*

Extended Warranty

The warranty period may optionally be extended. The extended cover available can be specified as 'Parts and Labour' or 'Parts Only'. In either case the travel and subsistence costs are not included.

Physical Requirements

Console Control Surface Layout

- Consoles are available fitted with 24, 48, 72 or 96 input channels. Other channel quantities are not available.
- The centre section can be located to the right of any 24 channel section (ie. not at the left-hand end of the console).
- A 19" section fitted with 12U of racking is available. These sections can be used for rack mounted outboard equipment and are also used if the console is fitted with an internal patchbay – see 'Patchbay Options' below.
- A Producer's Table section is also available. This assembly is 603mm wide and is fitted with a flat, full-depth table. Cable access covers are located at the rear corners of the table.
- Angled corners (12°) can be fitted where the centre section or any 24-channel/rack/table section is joined.

Patch sections cannot be placed directly to the left of the centre section.

The console is a self-contained system; there are no remote power supplies or I/O racks. The frame is not fitted with cooling fans.

Power, audio and control connections are all made to the rear of the console. A cable tray is fitted along the rear lower edge of the frame to support connecting cables. Console legs are hollow and fitted with a removable rear panel so that installation cables can be concealed inside. Corresponding floor ducting will be necessary to take full advantage of this feature. (The 48-channel console is also fitted with a centre leg. This leg is of reduced depth which is insufficient to accommodate the number of cables from a 24-channel bay).

See Appendix E, page 62, for console footprint drawings.

Patchbay Options

The console may optionally be supplied with a bantam patchbay. Patchbays can be fitted internally to the console or may be remotely mounted into furniture or racks supplied by the facility.

The number of patchrow sections supplied is dependant upon console size; 24 or 48-channel console will require a single 19" section whereas the patch for 72 and 96 channel frames will require 2 off 19" sections.

See Appendix D, page 57, for patchbay layouts.

Patchbays are assembled using individual 1U Bantam patch modules. For internal patchbays these modules will be wired down to a connector panel mounted at the rear of the patch section legs.

Patchbay Connectors – D25 or DL96

The standard patch internal patch connector panel is fitted with 25-way D-type connectors.

To simplify the integration into a facility with existing cabling, patchbays may optionally be wired out to female DL96 connectors mounted at the rear of the patch section.

Each 1U patchrow is a self-contained connectorised unit. The normalling between each pair of upper and lower jacks is set using normalling links or by internal switches. The normalling on user-option patchrows can therefore be configured as required. Information showing how to set the normalling links is printed on the cover of each patchrow unit and in Appendix D on page 57.

See page 22 for additional information relating to patchbays.

Cable Access and Ducting

Cable ducting will almost certainly be required between the console and any outboard equipment/patch racks and the recording areas. If a full remote patchbay is being provided then the ducting between the console and the patch racks will need to be of sufficient size to accommodate the following numbers of cables:

24 channel remote patch will require 38 off 11mm diameter cables
48 channel remote patch will require 56 off 11mm diameter cables
72 channel remote patch will require 74 off 11mm diameter cables
96 channel remote patch will require 92 off 11mm diameter cables

A cable tray is fitted to the rear of the console to support the cable looms is located directly below the connectors. The tray is provided with holes that coincide with the console leg positions. The console legs are hollow with holes through each foot so that any leads can be concealed within the console legs. It is recommended that the cables are dropped using the nearest leg. Where floor ducting is not available, the lower section of each leg's rear cover is removable to allow cables to exit to the rear.

Thermal Considerations

The console is cooled by convection from the front inlet (in the knee panels) to the exit at the top of the rear panels. It is essential that these ventilation grills are not obstructed in any way.

Particular care must be taken when considering the installation of studio furniture – such as shelving – across the rear of the console. Sufficient space must be left for the free flow of air from the rear grills, and also above the heatsink fins. Clearance behind the console must not be less than 50mm and clearance above the console not less than 200mm.

The heatsink fins on the console rear panels can reach temperatures of approximately 30 degrees Celsius above ambient room temperature.

Service Access

Although access to all electronic assemblies within the frame is from the front of the console, note that each of the console's channel modules is secured by a screw through its rear panel. It is still necessary therefore, to have access to the rear of the console.

System Options

Speaker shelves	A flat shelf that fits over the top trim of the console. Can be retrofitted to existing consoles without modification.
Additional patchrows	1U connectorised 2 x 48-jack patchrows. Can be specified independently from patchbays. Mating D25–D25 cables are not supplied. DL socket to 3-off 25-way D-type-male adaptor leads are available at extra cost.
DL Connector Panel	The internal patchbay option is wired out as standard to a panel fitted with D25 female connectors. This panel can be replaced with one fitted with DL96 female connectors to simplify the interface to an installation where DL connectors are already in use.
TFT Monitor arm	A vertical adjustable arm fitted to the rear of the console to which one or two LCD monitors may be mounted. Suitable for monitors equipped with the VESA MIS-D 100 mounting. *Page 31*.
PSU redundancy	For critical operations, such as live recording or on-air production a dual power supply system can be specified. This option features two independent PSUs per console section, each having an independent mains supply input connector.
Script Tray	A 315mm wide Perspex panel which fits over the channel area leaving the faders free. The tray is fitted with rollers allowing it to be moved sideways across the console.

Technical Requirements

Sync Source

The Duality Fuse console does not require a synchronisation signal.

Power Connections

The console is fitted with auto-sensing power supplies which will function at any voltage from 100 to 240 volts ±10%.

Each console is supplied with one IEC mains power lead for every 24 channel bay (the centre section is powered by the bay to its left). A 48ch console is therefore supplied with two power leads (a 72ch console has three and 96ch with four). The leads provided are 2m in length and wires are colour-coded according to the EC standard.

- A separate power outlet for each 24ch section should be provided beneath the console. Power leads included are unterminated at the supply end to facilitate each user's preferred connection method.
- An additional power outlet will be needed to power the Fusion section.
- Each power outlet provided should be able to be switched and must be protected by a fuse.
- It is recommended that there be provision for all supply outlets to be switched concurrently so that the console can be switched on or off by a single action.

To reduce the risk of electric shock, plug each power supply cord into separate branch circuits employing separate service grounds.

Refer to Appendix A, page 50, for console power ratings.

UPS Provision

Where either the primary or backup supply of mains power is provided from an uninterruptable source (UPS) the output waveform of the UPS equipment must be of the sinusoidal variety. Switched or stepped output waveforms may cause damage to the console power supplies so must not be used.

Air Conditioning

The power dissipated by a 48 channel Duality Fuse console is approximately 1,540W (2,200W for 72ch and 2,860 for 96ch). When all the studio equipment is taken into consideration, particularly if additional lighting is being installed, the combined heat output could be sufficient to cause the temperature to rise to uncomfortable levels. It is therefore likely that air conditioning will be required.

> *Please refer to the SSL environmental specifications and the additional note relating to humidity levels when planning an air conditioning system Appendix F, page 67.*

Grounding

A standard system should not require any additional grounding over and above that supplied by a correctly installed mains supply. All console metalwork is permanently bonded to mains earth. A permanent earth connection via the mains inlet must be provided.

A console chassis connection is provided adjacent to the XLR input for channel one at the rear of the console.

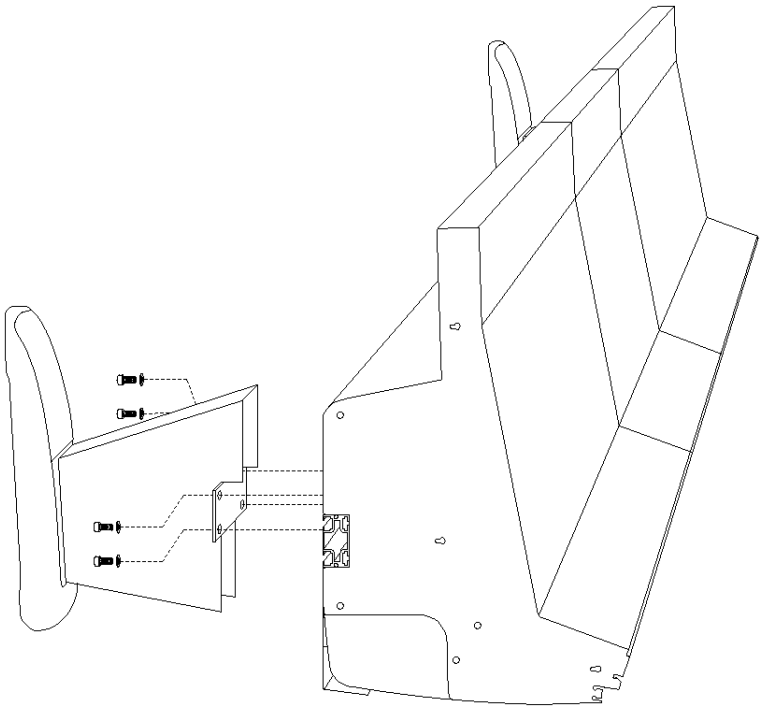
All audio connectors have their screen pins connected directly to the chassis at the point of entry to comply with AES/EBU grounding and EMC standards.

Workstation interface

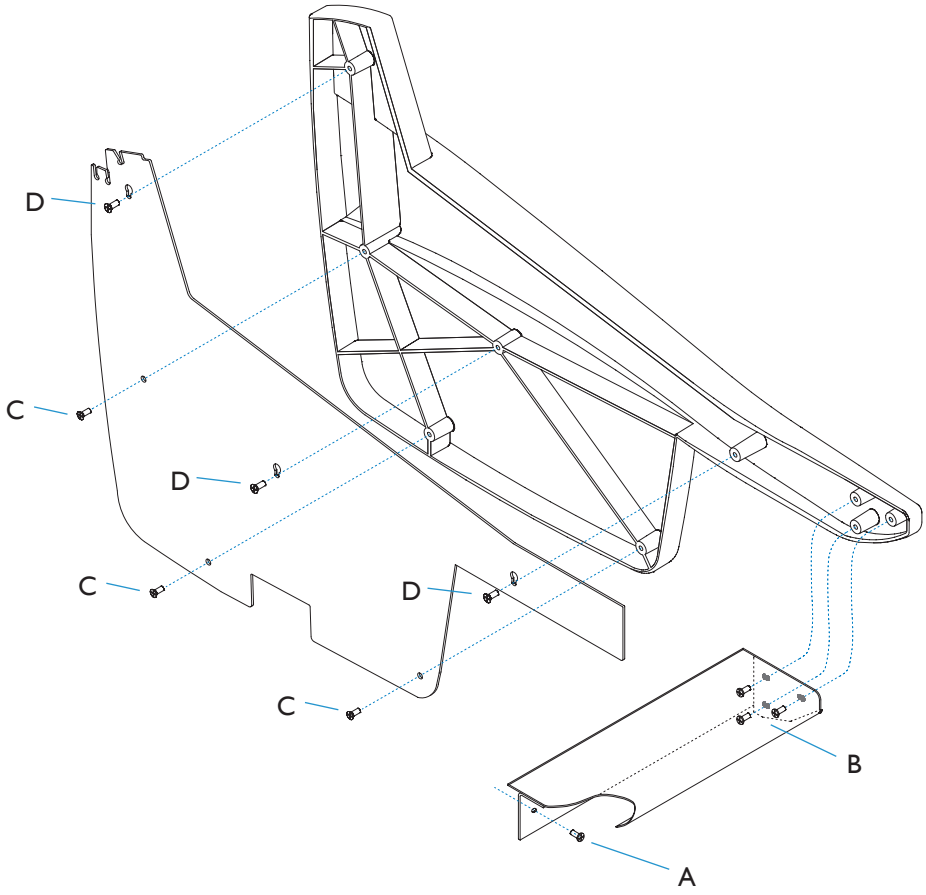
DAW interfacing is available via standard MIDI 5-pin DIN connectors or over ipMIDI.

Space for a pointing device such as a trackpad, trackball or mouse is provided underneath the Fusion section, adjacent to the Group faders.

Leg Attachment



End Trim and Buffer Attachment



Section 4 – Installation

Unpacking The Console

For deliveries by road transport within the EU it is usual that the console will not be split for shipment and the legs will still be attached. For other destinations worldwide the console will be split and the legs will be removed – each section being supplied in a separate wooden crate.

Using a large screwdriver or pry-bar carefully open the crate containing each console section. The crates are not designed to be reusable. With all the crate sides removed there will be sufficient space for a minimum of six people to lift the console sections clear of the crate base.

The console is normally shipped with its trim fitted. Do NOT using any trim part as a lifting point. Particularly, do NOT lift the front of the console using the buffer alone.

Attaching the legs

It is recommended that at least four people are available to perform this operation.

The bolts required to attach the legs are shipped in a separate trim kit box. A 6mm hex-key will be needed to tighten the leg bolts. The bolts screw into a threaded insert inside the main supporting beam. There are four bolts per leg.

Unless trollies or stands are available the safest way to attach the legs is for the console to be rolled onto its back. Ensure that ample padding is provided – such as blankets or bubble-wrap – to protect the rear panels (the PSU heatsink fins protrude from the rear of the console and care must be taken not to damage them).

The legs should be positioned so they align with holes in the cable tray – legs are hollow so that cables can be routed inside. Refer to Appendix E for the correct positioning of each console leg.

Removing/fitting the trim

If it is necessary to remove the trim sections – to manoeuvre the console or to adjoin existing furniture – then please refer to the following information and the illustration shown on the facing page. Note that it will be necessary to remove audio channel modules to gain access to some trim fixing screws.

Front Buffer

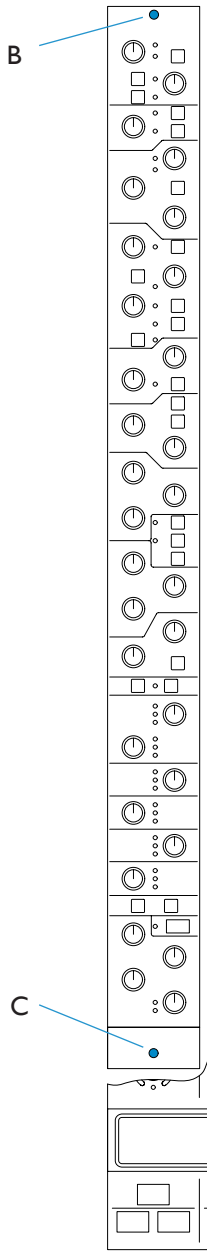
The front buffer sections are secured by pan-head screws [A] which locate through the buffer into the front beam of the console – four screws are used for each 24 channel bay and two screws for the centre section. Where a buffer meets an end trim there are an additional three screws [B] fixed into the trim. Adjacent buffer sections are joined using three screws and M6 nuts. All the fixings are accessed from beneath the buffer.

End Trim

Each of the end trims is secured in three stages Firstly, three Posi-head screws [C] through the profile (these screws are directly accessible). Secondly, three pan-head screws [B] through the front buffer (visible from beneath the buffer). Thirdly, the side trim will now be secured by three more screws [D]. These screws need to be loosened but may not need to be removed completely as the corresponding holes are widened at the top. Lifting the trim by approximately 20mm should allow it to pull free although it may be easier to remove these screws completely.

Top Trim

The top trim for each bay is constructed in two parts: a rear support and a front hinged section. Under most circumstances access for servicing can be gained by simply hinging up the front section. This is a push fit over the meter panels and can be opened by gently pulling upwards along its front edge. The rear fixed section of the trim is also a push fit over the profiles but is also screwed to the console rear panels. This section can be removed by undoing the screws and then by pulling upwards – note, this is normally a much firmer fit.

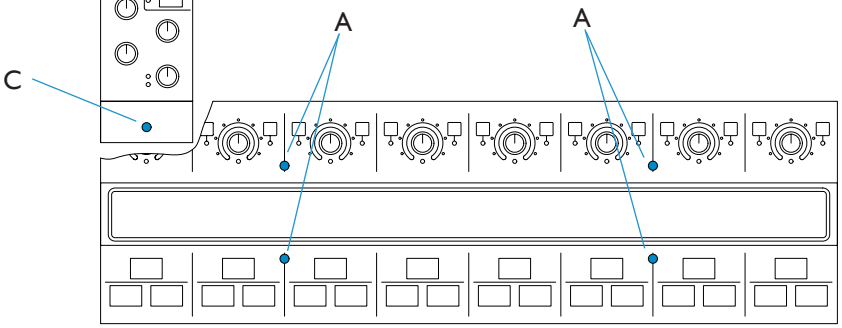


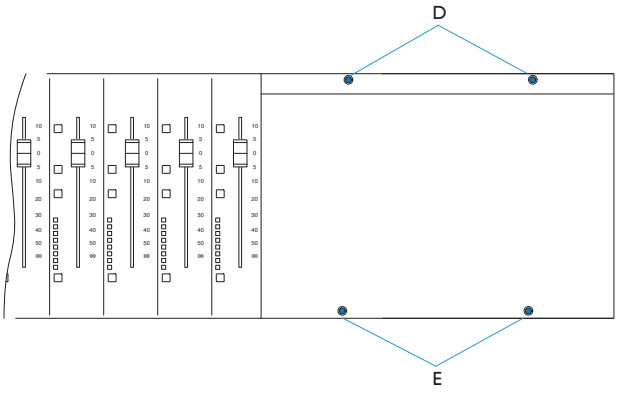
Channel Strip Removal

1. *Remove Solo & Cut panel (see below).*
2. *Remove 1 x M3 hex-head front panel screw [**B**] from top of module. Screw module puller tool into threaded hole.*
3. *Remove 1 x M3 cross-head screw [**C**] from bottom of module (beneath Solo Tile).*
4. *Remove 1 x M3 cross head screw from rear panel (above XLR input socket).*
5. *Pull module upwards from bottom edge using hole in lower edge and guide with puller at top.*

Solo and Cut Panel Removal

1. *Remove 4 x M3 hex-head screws [**A**]*
2. *Lift panel up from ends*





Mouse/Trackpad Panel Removal

1. *lift the centre section magnetic scribble strip to reveal the screws [**D**].*
2. *Remove the centre section front buffer (p.13) to reveal the screws [**E**].*
3. *Lift panel assembly up and to the left.*

Console reassembly

In certain cases – except for smaller frames and some deliveries by road within the EU – consoles will be split for shipment. Splits will be at each 24-channel bay section – note that the centre section must remain connected to the 24-channel bay to its left. Corner sections are always removed before shipment. Unless commissioning by SSL has been arranged the client will need to reassemble the console on site.

A split point features two 3mm profiles held together by 9 off M3.5 screws (called 'stitching' screws). The console beam is also split and is joined and strengthened by using two insert bars and a support plate held in place by eight M10 bolts – *See the diagram on page 18 for the mechanical assembly detail.*

In addition to the mechanical split, three audio and one data cable will need to be re-connected.

To gain access to the stitching screws and the data connectors it will be necessary to raise the top trim and remove 2 or 3 channel strips from either side of the split. If the split is to the right of the centre section then the track-ball panel will need to be removed. The channel meter panel will also need to be tilted forward in order to reconnect its data lead.

Removing Channel Strips and Panels

The console MUST be switched off and every mains input leads disconnected before any covers or panels are removed.

Tools required to remove channel and centre section panels are as follows:

- 2.5mm hex driver — *For visible front panel screws*
- 1pt cross-head driver — *For rear panel screws and hidden screws*
- Module puller tool — *For lifting the top edge of channel strips and cassettes*

Where two adjacent channel bays are being joined it is recommended that three modules are removed from either side of the split. This should be sufficient to gain access to the stitching screws and the bus ribbon connectors.

It should not be necessary to remove centre section panels as the stitching screws should have been inserted from the right-hand (ie. module) side of the split. The track-ball will need to be removed to gain access to the screws in the fader area.

Refer to the diagrams opposite for panel removal instructions and to page 18 for locations of the stitching screws.

Cable Connections

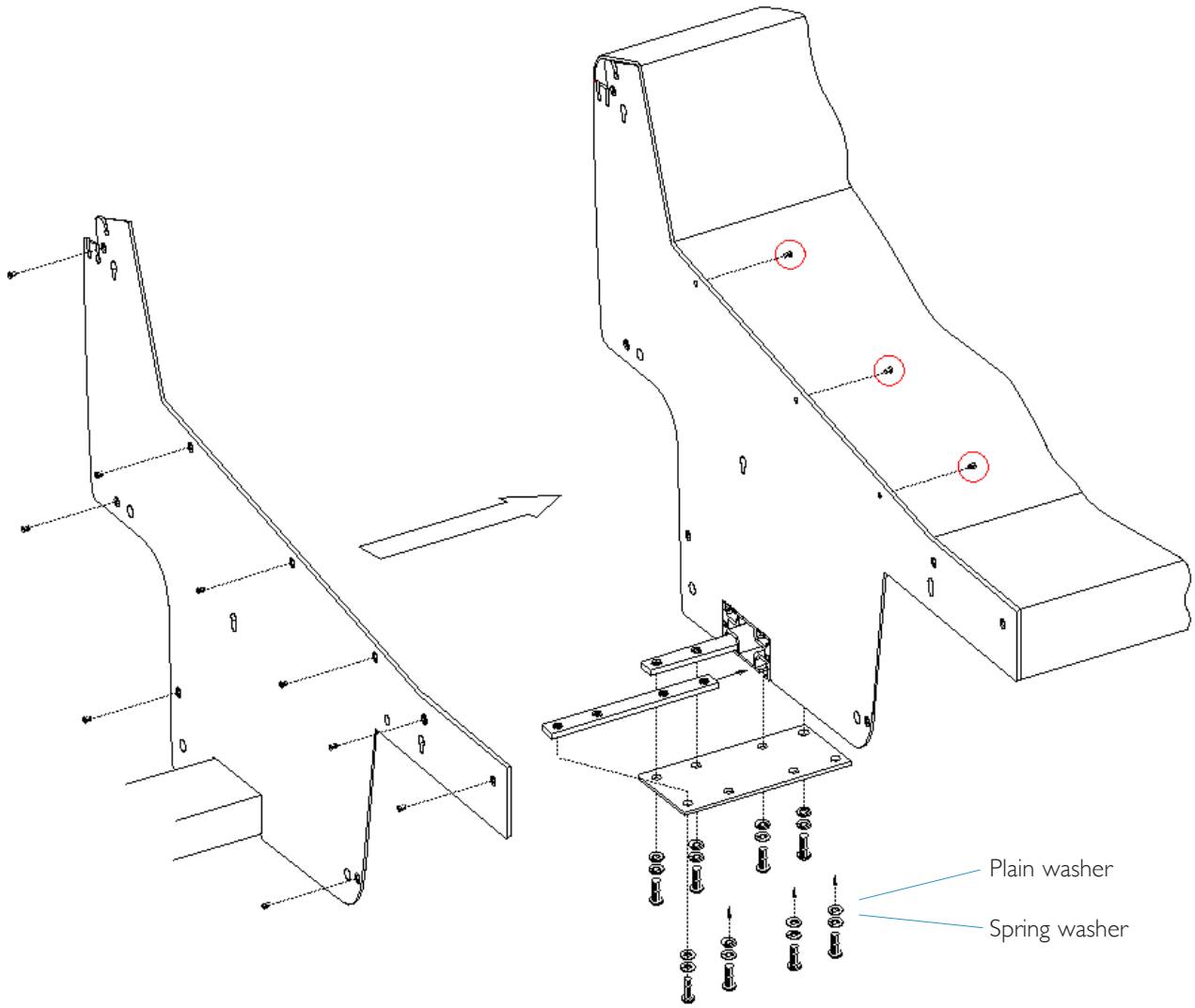
Once the frame has been mechanically joined (see following page) there are four cables that need to be re-connected.

- Three ribbon connectors are used to link the channel strip buscards between 24ch bays. These are located at the left-hand edge of each channel bay. Once the bays are joined, the two 50-way and one 40-way connectors should be in the correct location and will simply require pressing into their corresponding sockets (PL1A, PL2A and PL3A).

- One meter lead will also need to be re-connected behind the 24ch wide meter panel. Instructions are as follows:

    1. *Hinge up the front section of the channel bay top trim.*
    2. *Remove six off M3 x 8mm cross head screws from the top of the meter panel.*
    3. *Gently pull upwards on the meter panel at each edge until its lower edge is free – the panel does not need to be removed completely and can just be tilted forward to gain access to the connector.*
    4 *Locate the meter lead and its corresponding socket. This will be found on the meter drive card assembly in the middle of the meter panel, the socket is at the bottom edge near the centre of the drive card, and is labelled PL3.*
    5. *Route the cable through the penthouse section of the frame and connect to socket PL3 on the drive card.*

Assembly of Adjacent Console Bays



◯ Three screws fitted from the right-hand side if the split is to the right of the centre section.

Section Assembly

Before commencing mechanical assembly all necessary modules or panels should be removed. The top trim sections should also be hinged open.

Make sure that at least six people are available before attempting to move console sections. Ensure all parts are supported adequately – a strong stand (such as a stool or trolley) of approximately 420mm high will be extremely useful to support the un-supported end of the console whilst the sections are aligned.

Before the sections can be joined, they must be horizontal and at the same height.

Locate the insert parts needed for reassembly of the beam. (These parts will usually be assembled and slid into one of the beam sections – loosening all eight of the M10 bolts will allow the plate and inserts to slide along to the beam joint).

Position the plate and inserts at the joint so that approximately half of the insert is visible. Hand tighten the bolts.

Align the two console sections so that the beam inserts are in the correct position on the opposing beam. It may be necessary to remove four of the bolts. If particularly awkward then remove all eight bolts and the securing plate.

Carefully push the two console sections together. If the sections are aligned correctly, the inserts should slide into place with minimal force – they are not a tight fit.

> *Take particular care that the buscard linking ribbons and the meter cable are not snagged or crushed when positioning the frame sections.*

Fit any remaining M10 bolts and hand-tighten checking that the inserts are still positioned with half in each section. Tighten sufficiently so that the joint is secure and the sections will not slide apart. Some adjustment may still be necessary until all screws are in place.

Although stitching screws can be fitted from either side of the profile they are usually inserted through the left profile to screw into the right-hand side. The exception will be at the centre-section split where three of the screws are be inserted from, the right – thus eliminating the need to remove master section panels.

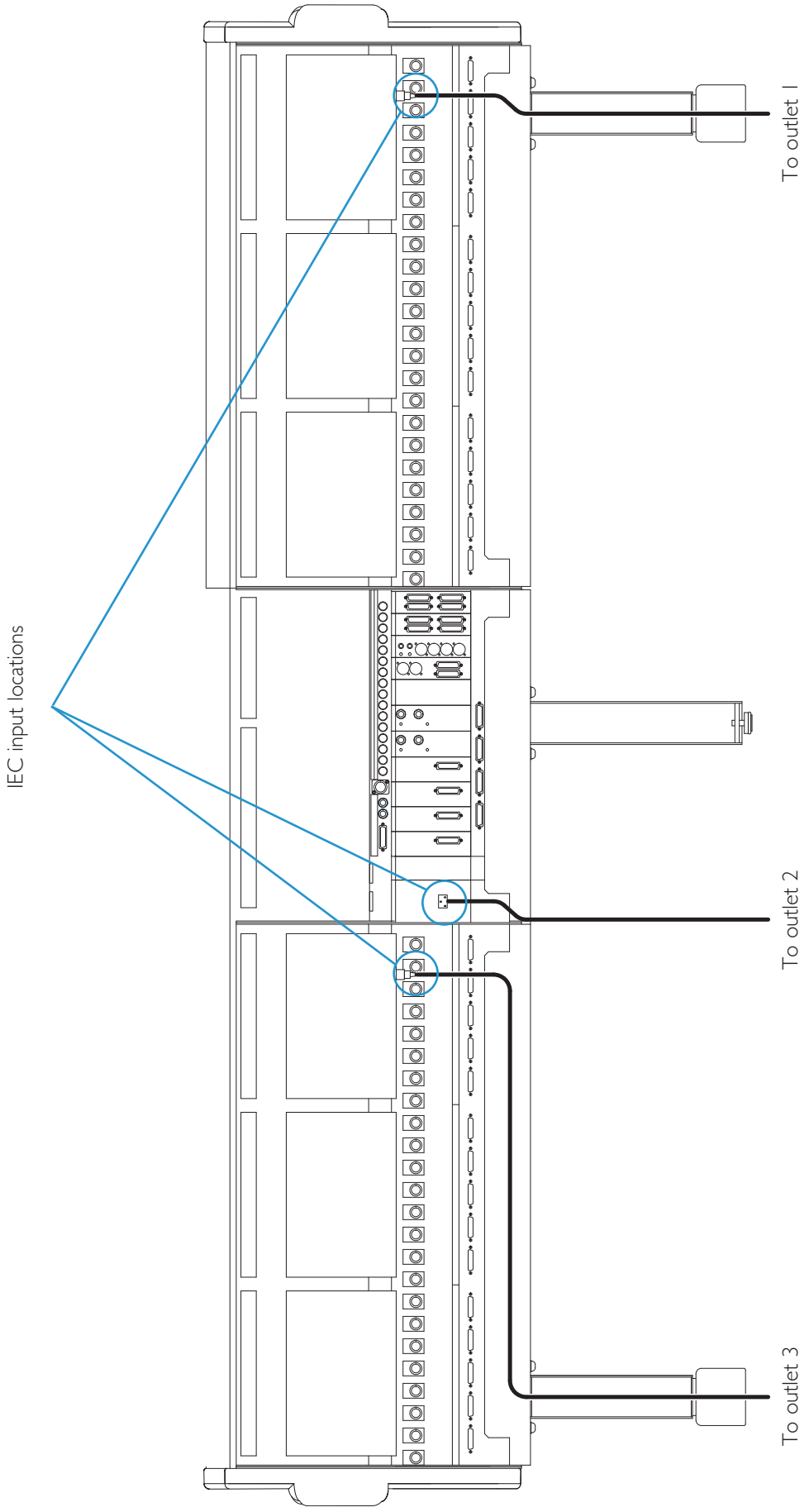
> *Before inserting the nine off 'stitching' screws check that the profiles are touching all round with no gaps; do not use the M3.5 screws to pull the two sections together*

Insert the nine off M3.5 'stitching' screws through the LH profile and loosely fix into the corresponding holes in the RH profile. Secure each screw by a few turns only until all nine are located.

Gradually tighten the screws a few turns at a time checking that the profile edges are correctly aligned. Only tighten the screws completely once alignment is correct.

Now fully tighten each of the M10 bolts in the beam plate.

Power connections – 48 channel Console



Power Connection

Power supplies for the console are fitted to every bay of 24 channels. Aside from the Fusion processing, the centre section does not have its own supply as it receives its power from the bay to its left. The Fusion section has its own mains inlet IEC in the centre of the console.

A 24 channel console has a two power inputs, a 48 channel console will have three input leads, a 72 channel console will have four and a 96 channels console has five. The leads supplied are 2m.

It is important that all of the mains leads are connected to the same supply source so that they are all switched concurrently. Power input to each section is via IEC plug. Refer to the power provision notes on page 13.

1. Locate the two (three, four or five) 2m IEC input leads and attach to the console in the locations indicated opposite.
2. Run each mains lead along the underside of the cable trays and secure with cable ties (holes are provided) – this will keep the power cables separated from the audio cables.
3. Route the lead for each section down the middle of the nearest console leg.
4. Terminate each lead at a suitable outlet located near or beneath the console legs.

The mains safety earth must be connected at each power outlet.

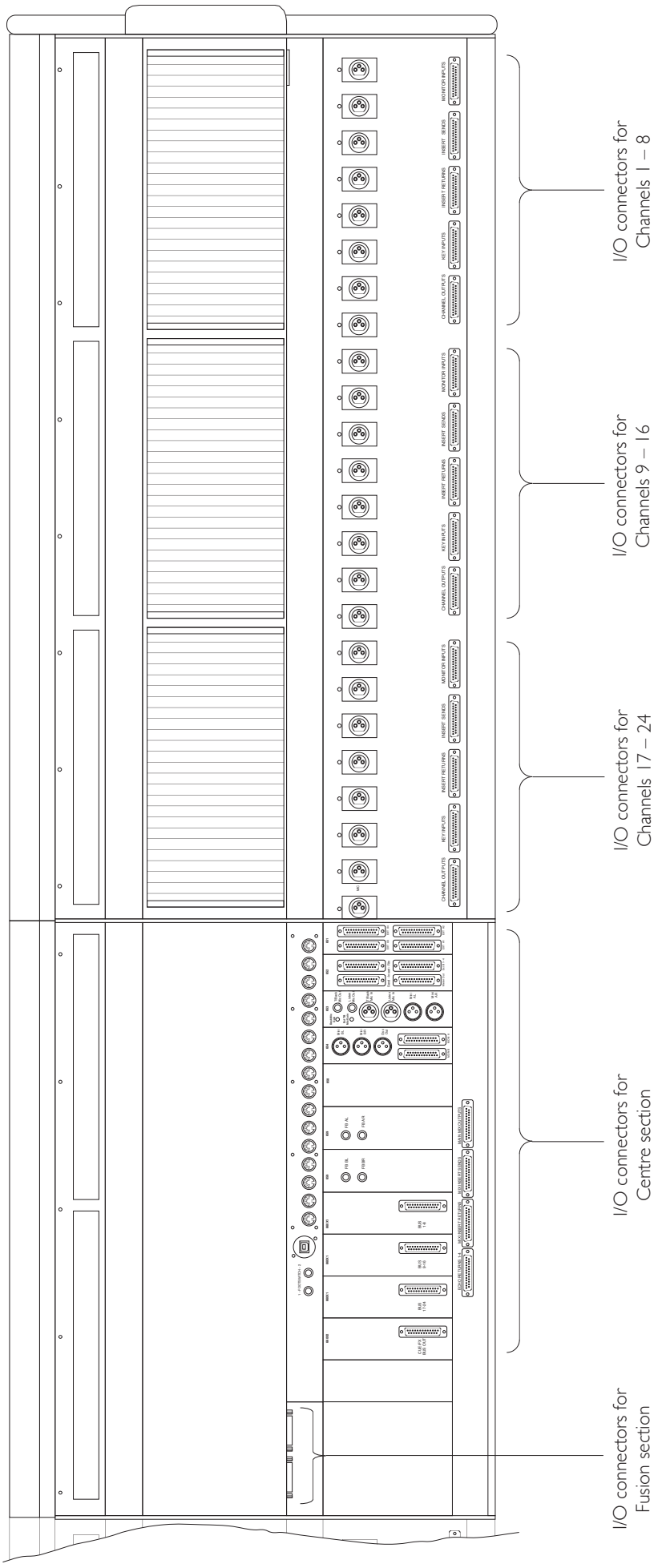
The power sources must not be from different phases of a 3-phase supply.

UPS Provision

Where either the primary or backup supply of mains power is provided from an uninterruptable source (UPS) the output waveform of the UPS equipment must be of the sinusoidal variety. Switched or stepped output waveforms may cause damage to the console power supplies so must not be used.

Console rear view – Audio Connections

24-channel Bay and Centre Section



Audio Connections – No Patchbay

All audio connections are made at the rear of the console. The majority of line level input and output connections are made using high quality 25-pin D-type female connectors – some ancillary circuits are accessed using 1/4" jack and XLRs. All Microphone inputs are via 3-pin XLR female connectors.

- All audio circuits are balanced.
- All cable screen pins are connected to the console chassis.
- All XLRs are wired using pin 2 as the non-inverting leg ('2-hot').
- The binding posts for the 25-way D-type connectors use the UNC 4-40 thread.

The audio cabling for the channel bays can be routed down the back of the nearest leg; it is possible, with care, to locate all cabling for a 48-channel console within one leg. The centre section cabling can be routed down its own leg or split between the nearest channel bays.

Refer to Appendix C, page 52, for connector pinouts.

Channel Connections

The I/O connectors for each 24-channel bay are arranged into three repeating 8-channel groups. Each group consists of five D25 and 8 XLR female connectors.

The connectors for each group are allocated as follows:

Channel Outputs	*D25 female*	*Channels direct outputs*
Key Input	*D25 female*	*External access to the channel dynamics sidechain*
Insert Send	*D25 female*	
Insert Return	*D25 female*	
Monitor Input	*D25 female*	*Line level input to channel/monitor path*
Channel Input	*XLR 3-pin Female (x8)*	*Microphone or 2nd Line level input*

Centre Section Connectors

The connectors are allocated as follows:

Ext A 1 [2,3,4]	*D25 female (x4)*	*Four independent 5.1 inputs*
Ext B	*D25 female*	*Four independent stereo inputs*
Insert Send/Return	*D25 female (x2)*	*5.1 + Lt/Rt Monitor insert point*
Meter Out	*D25 female*	*Main 5.1 + Solo meter feeds*
Mon A	*D25 female*	*Main 5.1 + Mini-A loudspeaker feeds**
Mon B	*D25 female*	*Alt 5.1 + Mini-B loudspeaker feeds**
Bus 1–8 [9/16, 17/24]	*D25 female (x3)*	*24 track outputs*
Cue/FX Bus Out	*D25 female*	*2 stereo and 4 mono feeds*
Echo Returns 1–4	*D25 female*	*2 stereo inputs*
Mix Insert send/return	*D25 female (x2)*	*5.1 + stereo mix insert point*
Main Mix Outputs	*D25 female*	*5.1 + stereo mix out*
F/B A and B LR	*1/4" balanced jack (x4)*	*Foldback A and B sends*
Mini A and Mini B	*XLR 3-pin male (x4)*	*Mini LS A & B sends**
Osc out	*XLR 3-pin male (x4)*	*Oscillator feed*
Listen/TB Mic in	*XLR 3-pin Female (x2)*	*Listen and Talkback Microphone inputs*
Listen/TB Mic out	*1/4" balanced jack (x2)*	*Listen and Talkback Microphone feeds*

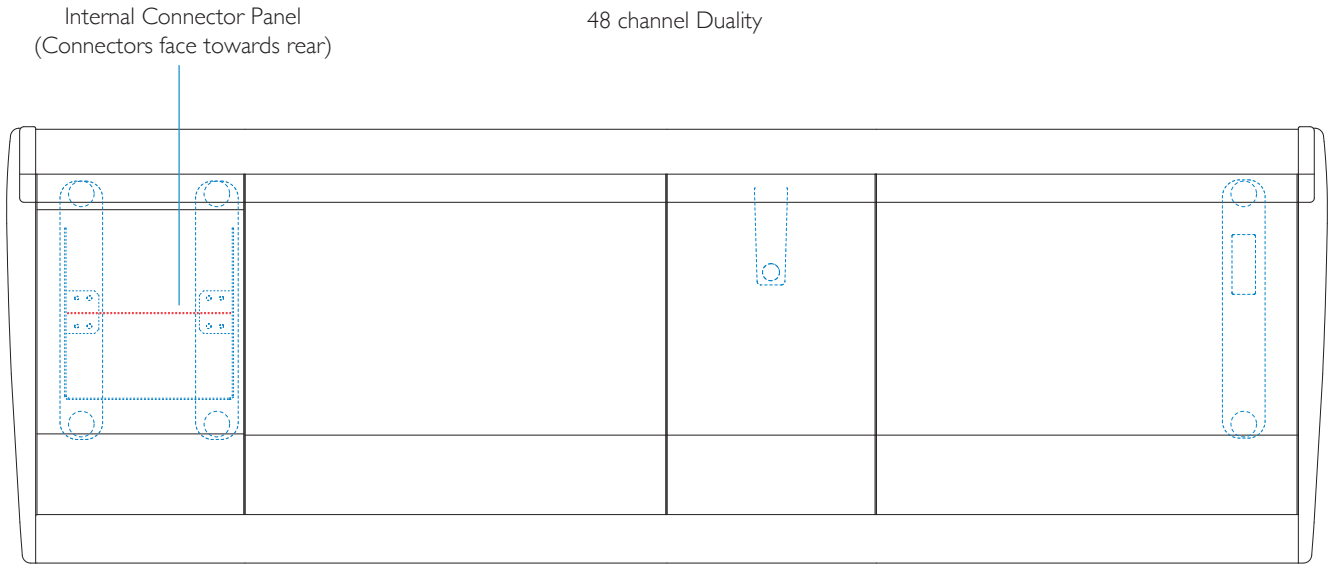
**Mini A and B feeds are duplicated on D25 and XLR connectors.*

Fusion Section Connectors

The connectors are allocated as follows:

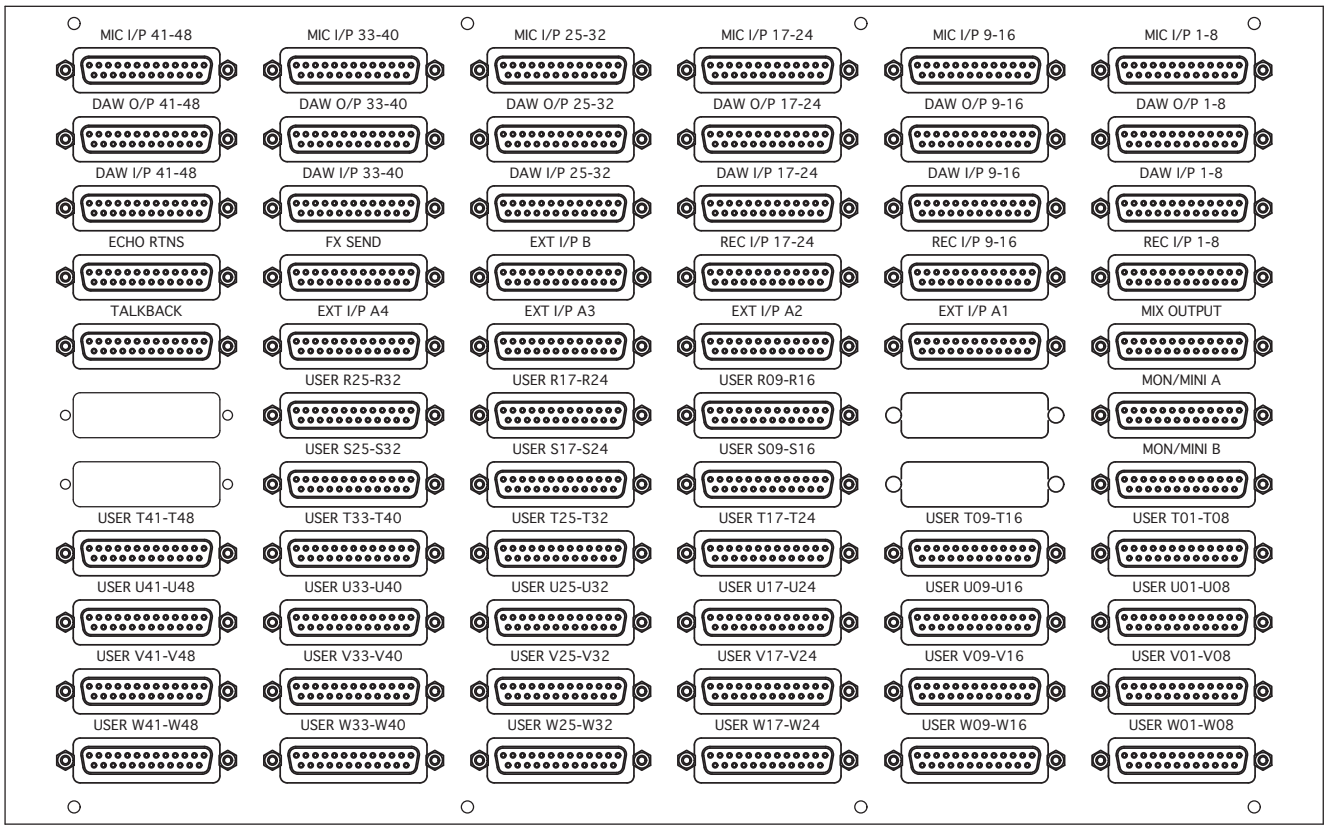
Mix Insert Rtn from patch	*D25 female*	*Feed into the Fusion processor switching section*
Fusion IP & Rtns	*D25 female*	*Stereo Input into Fusion and into Fusion Internal Insert Return*
Fusion OP & Sends	*D25 female*	*Stereo Output from Fusion and from Fusion Internal Insert Sends*
To Console Mix Ins Rtns	*D25 female*	*Feed to console Mix Ins Returns from the Fusion processor switching*

Location of Internal Patch Connector Panel



Patchbay section may be located at either end of the console

D25 Connector Panel



Audio Connections – With Patchbay

Consoles may be specified to include either an internal or an external bantam jack patchbay.

Patchrows supplied are 1U enclosed units fitted with 12 off 25-way D-type female connectors.

Internal Patchbay

Internal patchbays are installed into one or two 12U 19" rack sections.

24 and 48 channel consoles use a single 19" section; 72 and 96 channel consoles will require 2 x 19" sections.

The internal patch section of the frame features a wider double leg and includes a shielded cover for cable protection. A connector panel is fitted at the rear of the double leg to provide access to all user inputs and outputs. Internal cabling between the console, patchrows and the connector panel is provided.

The connectors on the panel are 25-way D-type Female and binding posts use the UNC 4-40 thread.

A trim panel is supplied for the rear of the patch leg to conceal the connector panel and the installation cables.

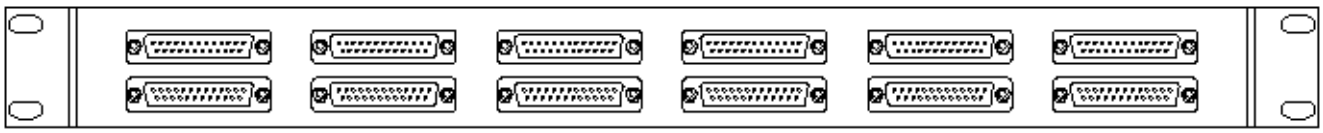
Remote Patchbay

The audio cabling for the channel bays can be routed down the back of the nearest leg; it is possible, with care, to locate all cabling for a 48-channel console within one leg. The centre section cabling can be routed down its own leg or split between the nearest channel bays.

Refer to Appendix C, page 52, for the connector pinouts.

Refer to Appendix D, page 57, for the patchbay layouts.

Patchrow Rear Panel

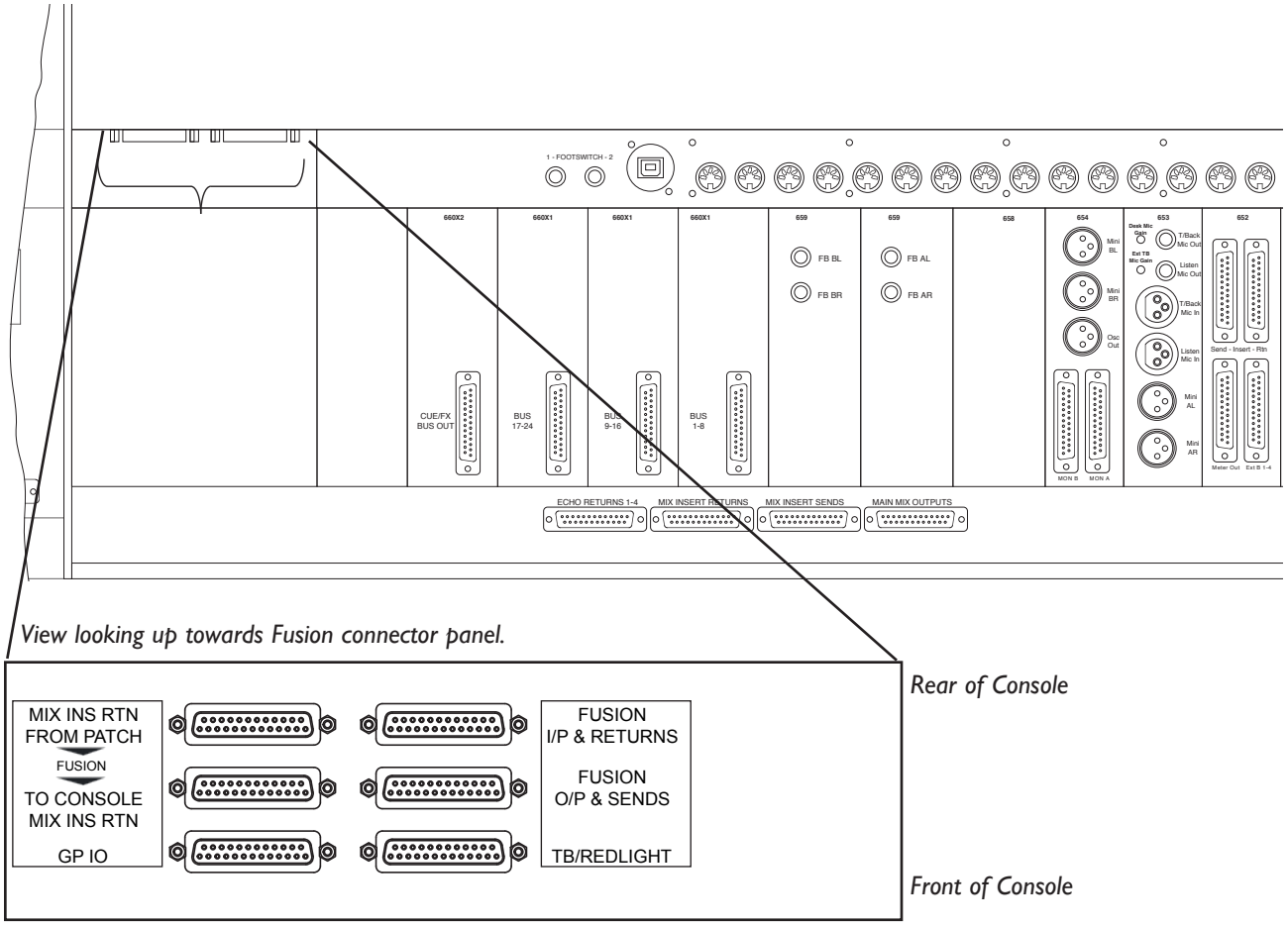


Audio Connections – Fusion Processing

The 25-Way D-Type connectors for the Fusion processing section are located on the rear of the console, behind the Fusion processing section and under a horizontal ledge above Fusion IEC power connector.

There are four D-Type connectors for audio and one for the four User GPIO keys at the bottom of the Fusion processing section on the console surface and another for the Red Light &Talkback connections.

Rear view of console centre section



View looking up towards Fusion connector panel.

Rear of Console

Front of Console

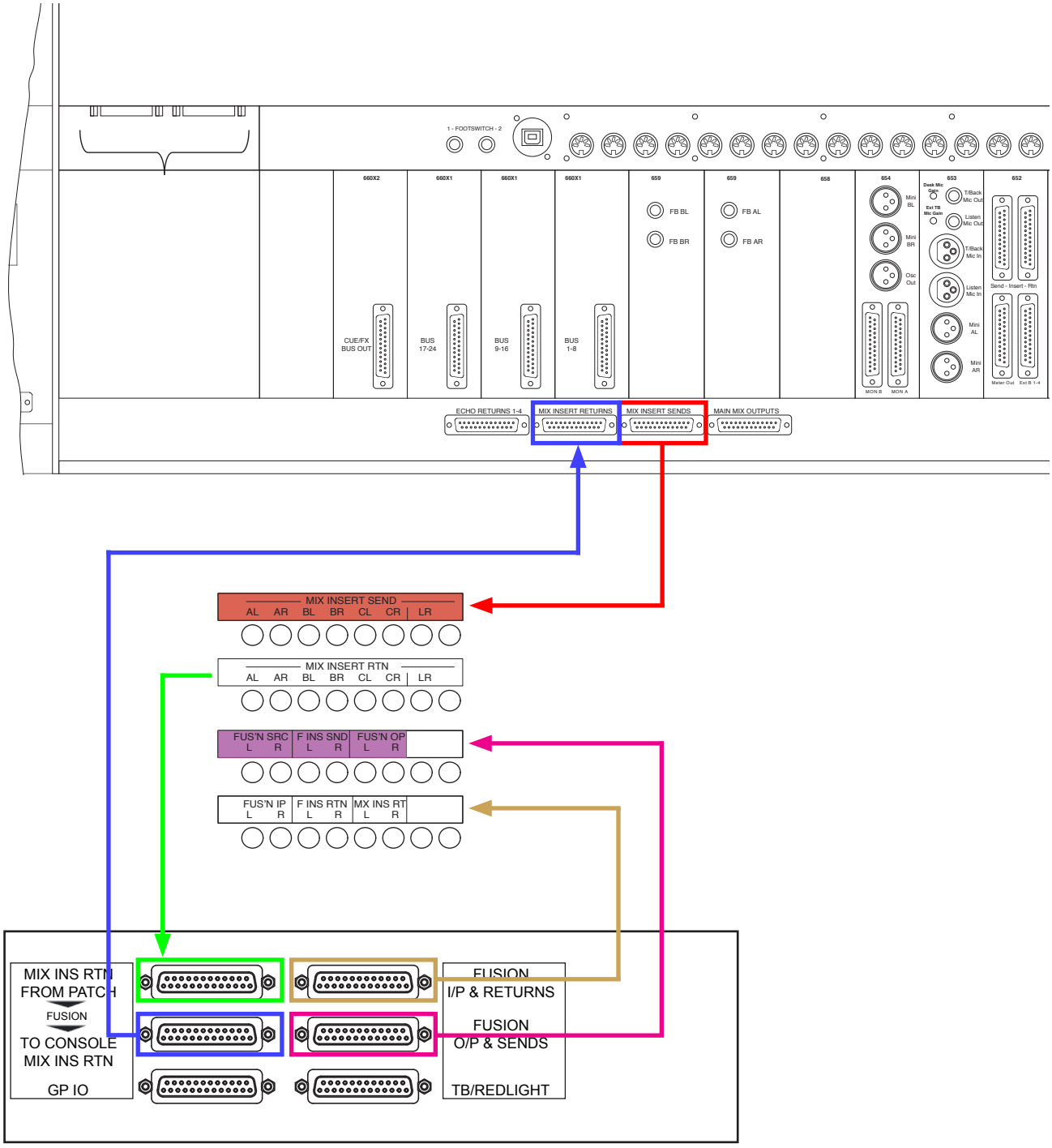
Refer to Appendix C, page 52, for the connector pinouts.

Refer to Appendix D, page 57, for patchbay layouts.

The Fusion processing is ideally connected using a patchbay to give the greatest flexibility, however, it is possible to connect the Fusion directly to the connections on Duality. The images on the following pages show these two methods of connection.

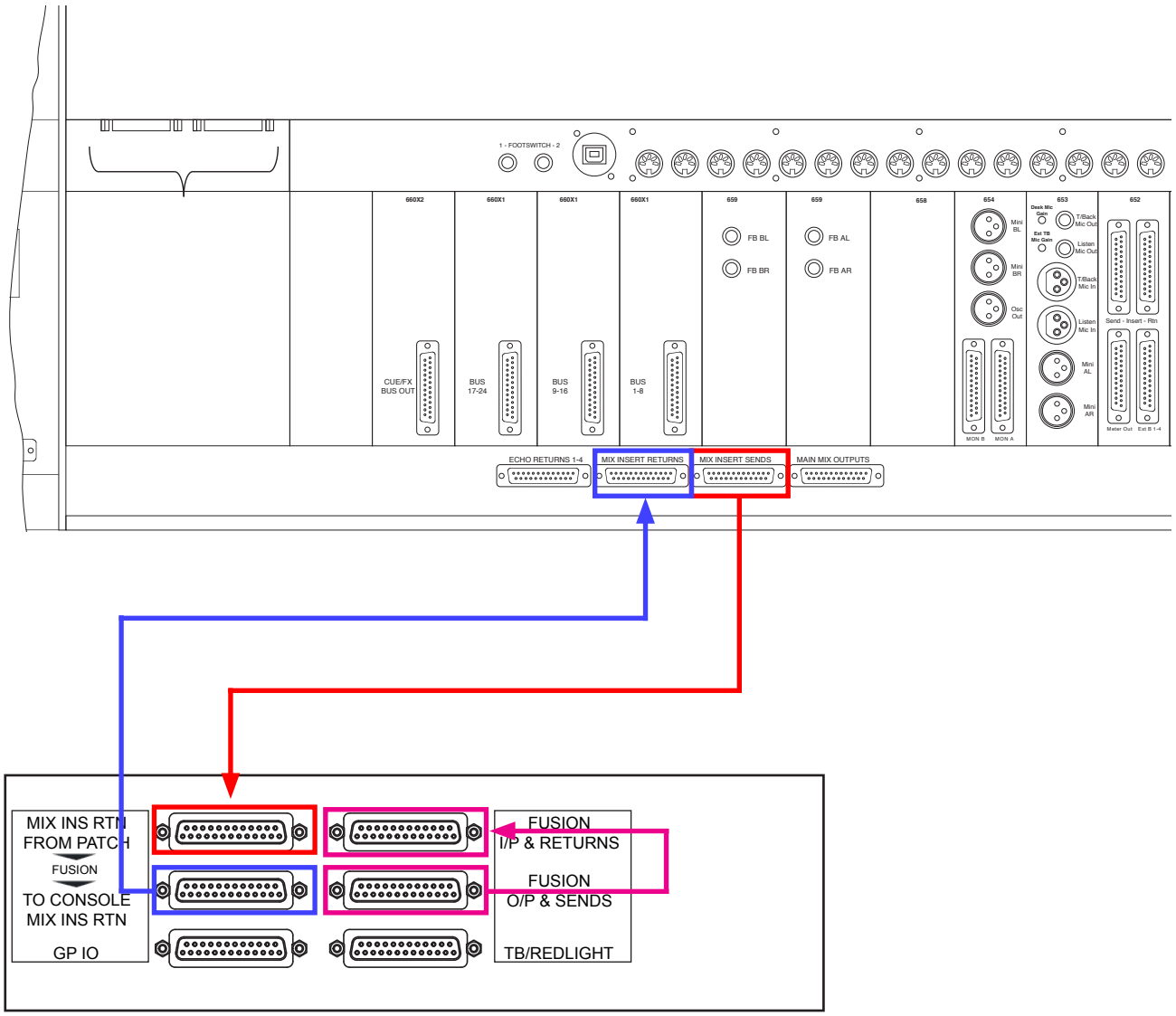
Fusion Connection Using Patchbay

To connect the Fusion processing using a Patchbay, the cable routing is as shown below.



Fusion Connection Without Patchbay

To connect the Fusion processing without a Patchbay, the cable routing is as shown below.

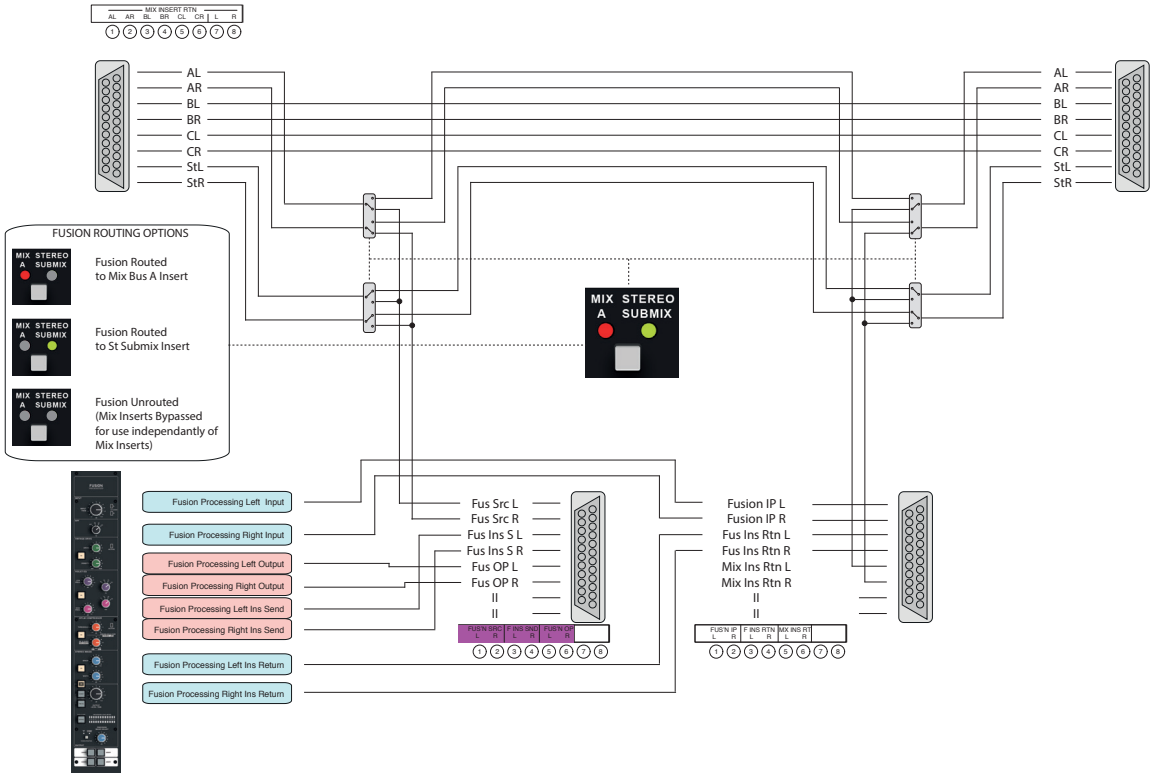


In this arrangement, the Fusion Outputs and Insert Sends are directly bridged to the Inputs and Insert Returns respectively. This removes the ability to independantly access the Fusion connections, so there are three options. Fusion in Mix Bus A Insert, Fusion in the Stereo Submix Insert, or Fusion out of circuit.

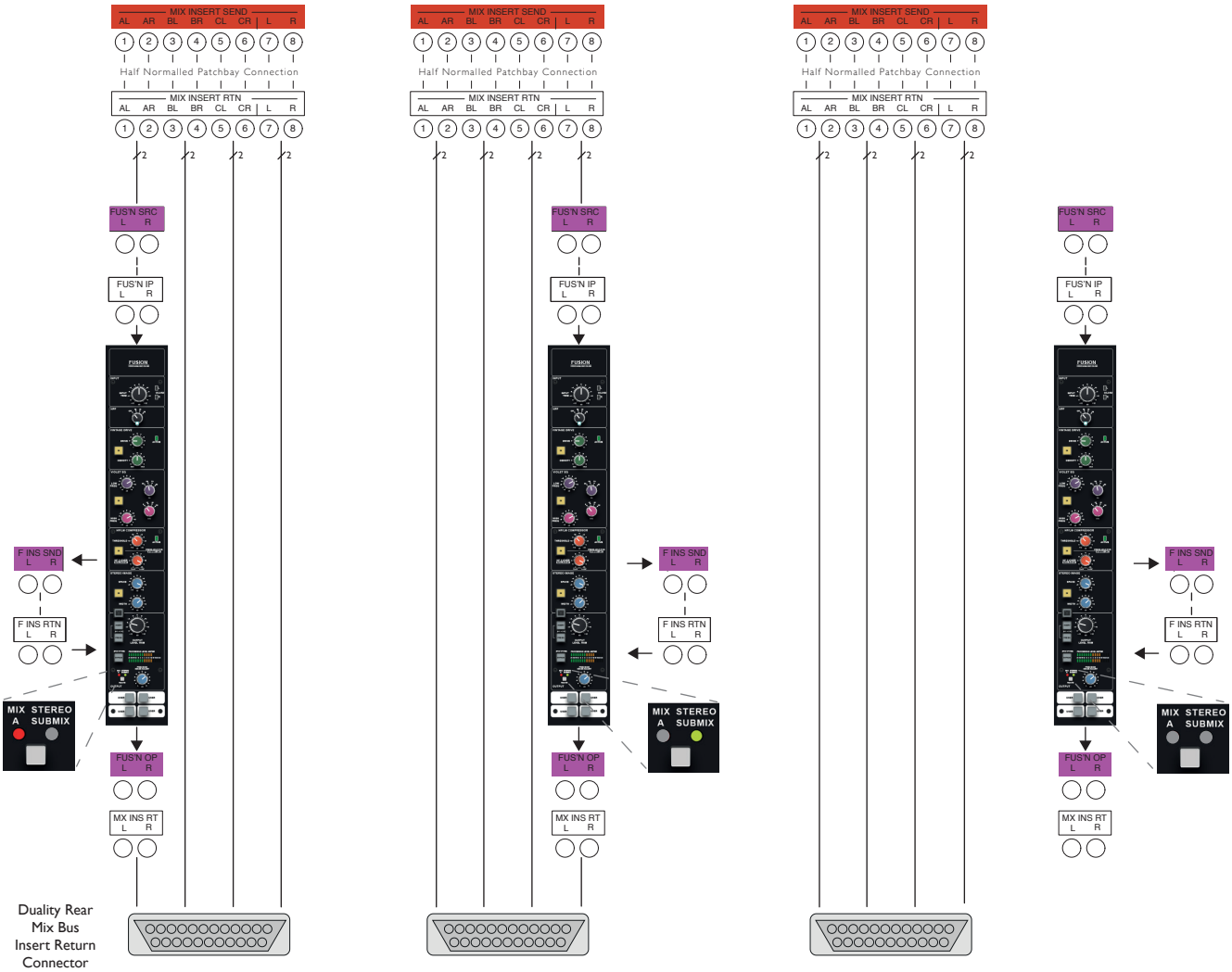
Another possibility is to use connectorised cables for the bridged connection, thus allowing the Fusion Ins, Outs and Inserts to be separately connected. Although this is a possible connection method, it is significantly more clear and flexible to use a patchbay, as with many other of Duality's connections.

Fusion Switch PCB/Interconnection Diagram

The diagram below shows the structure of the Fusion Switch Interface PCB



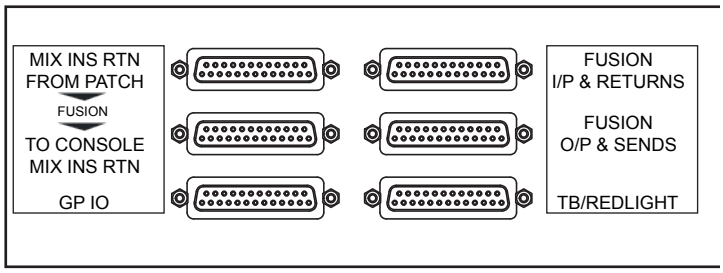
The diagram below shows the effects on the signal routing of the different switch options.



Flash Card

An SD flash card is fitted vertically at the rear of the console adjacent to the two serial data connectors. This is used for storing project information and should not be removed during normal operation.

Red Light/Talkback and User Switch GPIO Connector

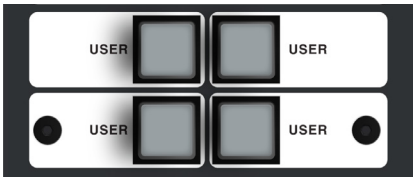


The D25 fitted to the rear panel provides the connection for the red light switch contacts. It also provides input and output signals for monitoring, talkback and signalling functions. Switch functions are activated by connecting their inputs down to 0V.

NOTE. The contacts for the Red Light output are via a DIL relay and are rated as follows: 30Vdc, 25Vac, 100mA max. Do not use the Red Light contacts to directly switch capacitive or reactive loads; always use an external relay with a suitable contact rating.

The four front panel "User" switches (shown right) activate relay closures and have lights fed from separate 'talley' inputs. They are connected to the lower left 25 Way D-Type GPIO connector on the Fusion connection panel.

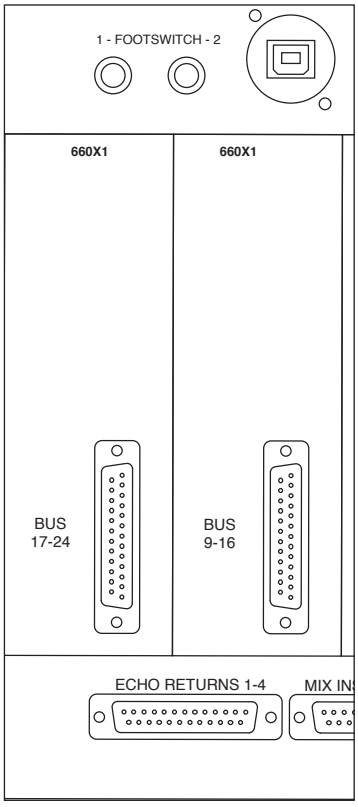
Refer to Appendix C, page 52, for the connector pinouts.



Footswitch Connection

In addition to the logic functions provided in the above red light/talkback connector, two additional assignable inputs are available on footswitch 1/4" jacks.

Mono 1/4" TS jacks are used – signals are activated by connecting the two Tip/Sleeve jack contacts together.



TFT Monitor Arm Attachment (option)

A single or double TFT monitor mounting arm is available as an option. The arm is compatible with all VESA compliant flat screen monitors.

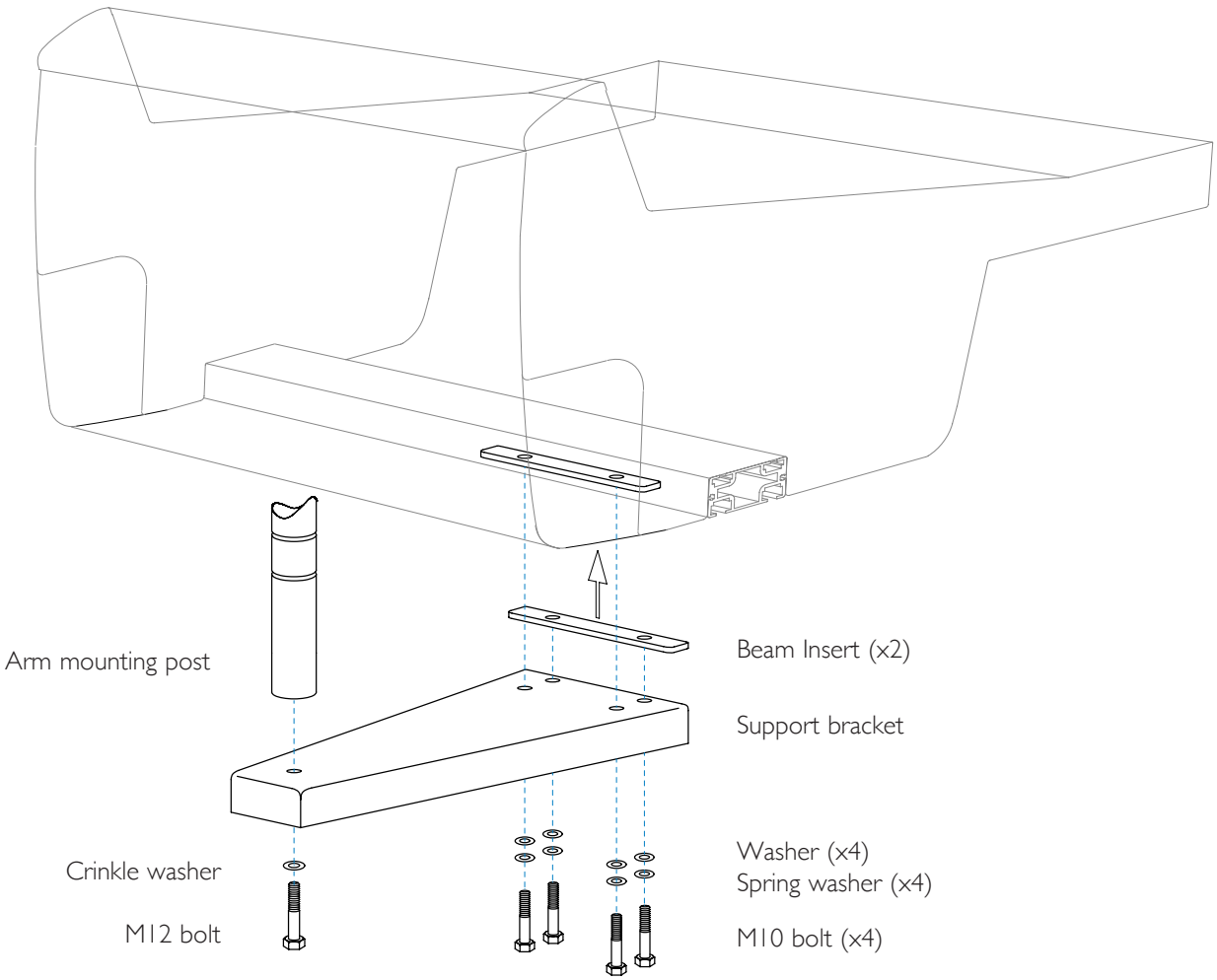
The arm is attached to the console using a support plate which is bolted to two inserts in the main console beam. The diagram below details how the arm is attached to the console beam.

Arm Specifications

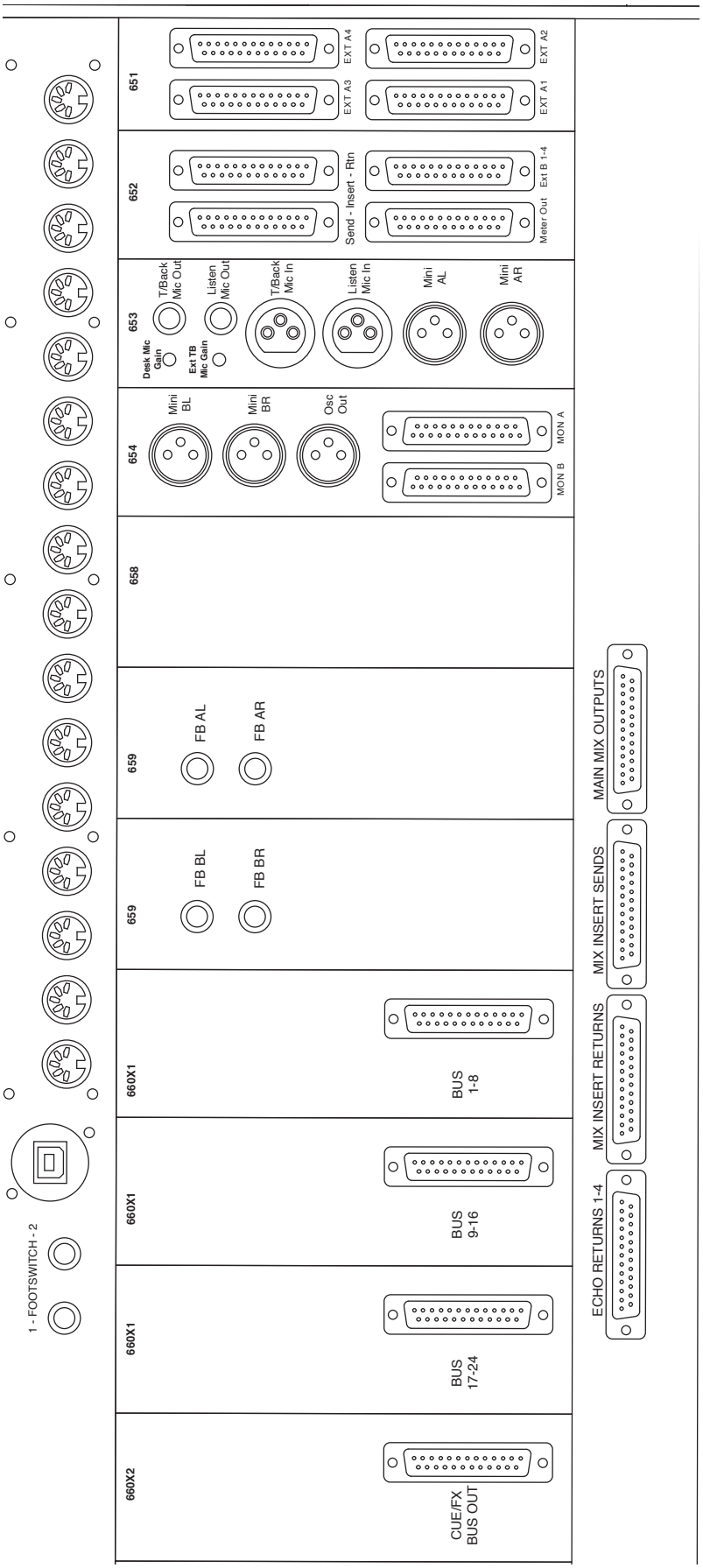
The standard articulated arm has a maximum weight capacity of 8.5Kg (18.7lb), with a maximum extension (centre of mounting pole to rear of screen) of 460mm.

Articulated arms with increased load capacities of 12Kg (maximum extension of 425mm) or 24Kg (maximum extension of 437mm) are available at additional cost. Contact SSL's Project Engineering department for further details.

Monitor arms are supported on a 700mm pole which will have a small degree of flex when supporting a large load. It is recommended that when using the heavy duty monitor arms, only a single arm is used per mounting post



Centre Section DAW and Network Connections



Section 5 – Connecting Your DAW

Overview

Duality Fuse communicates with a DAW using a MIDI interface. The MIDI interface allows Duality Fuse to be used with a wide variety of DAW applications on a number of different platforms.

The MIDI connection can be made either by connecting physical cables to a multiport MIDI interface, or via an Ethernet connection after installing an ipMIDI driver onto the workstation computer. *The ipMIDI driver enables your workstation to send and receive MIDI control data via a network. Using Ethernet ensures the fastest possible communication between your workstation computer and Duality.*

Duality DAW control uses either the Mackie Control Universal (MCU) or the 'HUI' compatible protocols so any DAW program that can be configured to use multiple HUI or MCU devices is able to access the full power of the Duality Fuse. Please refer to your DAW manual for details on how to configure the DAW application for Duality Fuse under Mackie or HUI control.

This section deals with the Ethernet connection method – which allows two DAW control layers to be configured. If the physical MIDI cable connection method is being used (using a multi-port MIDI interface), then only one DAW Control layer can be configured. The physical MIDI ports are located on the rear of the console; this connection method is described on page 41.

Before the console can successfully communicate with the DAW over Ethernet the following steps must all be completed:

1. **The Ethernet connection must work and be defined correctly:**
   - Install the ipMIDI driver
   - Create the Ethernet network – either directly or via a LAN (switch or managed hub)
2. **The Duality console 'Setup' preferences must be defined correctly:**
   - Enable ipMIDI on the Duality console
   - Select the DAW layer
3. **The Pro Tools settings must be defined correctly:**
   - Set up the MIDI controller configuration
   - Set up MTC and MMC
   - Logic Pro settings
   - Find the console using the Duality Remote application

To help troubleshoot any problems, some notes are provided on page 40.

Installing the ipMIDI Driver and Logictivity Browser

Before you can use an Ethernet connection (either directly or via a network) a third party ipMIDI software driver must be installed onto the DAW computer.

Download on to your workstation computer either the *DualityDelta_Mac_Support.dmg* disk image (Macintosh) or the *DualityDelta_Win_Support.zip* file (Windows). These contain the Duality Remote and ipMIDI applications and the latest version of the installation instructions:

System requirements for your workstation computer:

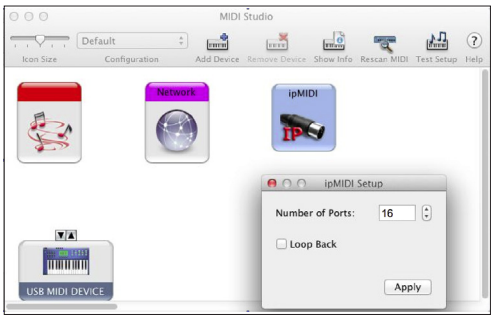
- Duality Remote is a Java application. It will run under Java Version 5 or higher.
- ipMIDI is compatible with Windows 2000 (max 9 MIDI ports), XP, Vista , 7 and Macintosh OSX 10.4 and above.

ipMIDI Software Installation (For Macintosh)

Mount the DualityDelta_Mac_Support.dmg disk image and open it.

Duality Remote — Drag the enclosed Duality Remote application to the Applications folder, then to the Dock or any other convenient location.

ipMIDI — Double click on the ipMIDI.pkg file to run the installation program. Note that you will be asked to log out and in again once you have completed the installation. Once you have logged back in open Audio MIDI Setup and double click on the ipMIDI icon. Set the number of MIDI ports to 16 in the resulting pop-up.



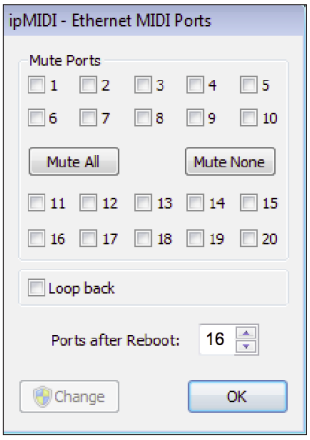
If you are upgrading an older copy of ipMIDI you must uninstall it before running the installer. To uninstall ipMIDI simply delete: </Library/Audio/MIDI Drivers/ipMIDIDriver.bundle>. You should empty the Trash after deleting the bundle file before running the installer.

ipMIDI Software Installation (For PC)

Open the DualityDelta_Win_Support.zip archive.

Duality Remote — Copy the DualityRemote.exe file to the Program Files folder (or any other convenient location) then create a shortcut to it on your desktop and/or task bar. Double clicking on this will launch the Duality Remote program.

ipMIDI — Run the setupipmidi_1.6.exe application (note that the last part of the name may change depending on the version you are installing) by double clicking on it. Note that you will have to restart the computer at the end of the setup process. Once the computer has restarted right click on the ipMIDI icon in the task bar and set the number of MIDI ports to 16 in the resulting pop-up.



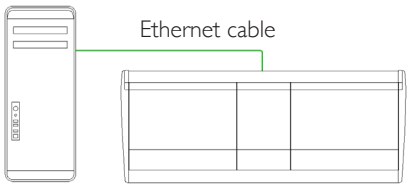
If you are upgrading an older copy of ipMIDI you must uninstall it (using Add/Remove programs) before running the installer.

Ethernet Network Setup

Several methods are available for the network connection:

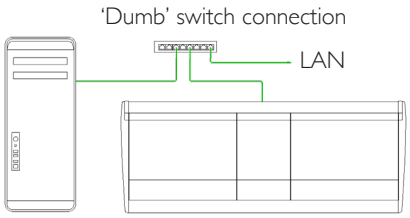
Direct Cable Connection

+ Simplest installation
+ Fixed IP address
+ Will not interfere with other network devices
- Computer cannot access Internet at same time as console
- Needs separate OSX "Network Location" plus Pro Tools re-launch for functionality



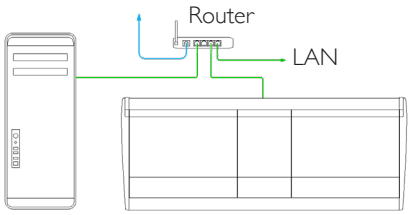
Direct via 'Dumb' Hub

+ Fixed IP address
+ Console can be managed from any network computer
- ipMIDI data will be received by all network devices
- Will cause interference with any other SSL ipMIDI equipment
- May reduce network bandwidth and interference with any other network devices



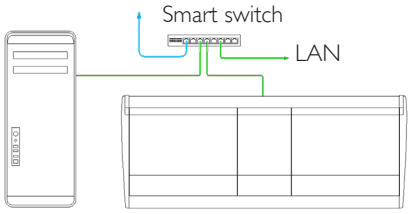
DHCP Router/Switch

+ ipMIDI data will not be broadcast to other LAN devices
+ Allows separate "Network Location" access to the Internet
- Cannot connect to other computers on the network
- DAW computer only sees the router



Smart VLAN Switch

+ Allows access to console and Internet simultaneously
+ ipMIDI data will not be broadcast to other LAN devices
+ Computer receives IP data from the LAN
+ Computer is visible to other computers on the network
- Requires some IT knowledge for configuration



On larger networks or multi-console installations the ipMIDI data might cause networks to run slowly. In these instances it would be advantageous to install the smart switch to isolate the console network from the company's TCP/IP network. Refer to page 39 for additional information.

Duality's IP Address

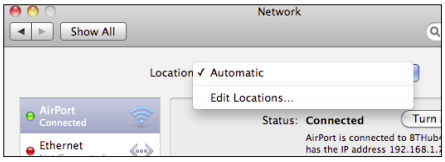
By default, Duality uses a fixed IP address of 192.168.1.2.

If for any reason you wish to set a different static IP address, this can be achieved using a terminal and a serial connection to Serial Port 1. See page 40 for details.

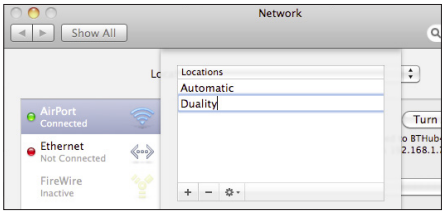
Alternatively, if your installation precludes a simple direct connection, Duality can be set to use a dynamically assigned (DHCP) address. Switching between the two options is achieved in the ***SSL*** > ***Misc*** > ***Net*** menu *(requires console restart)*.

Direct Network Connection (Macintosh)

To create a new network location for the Duality console:



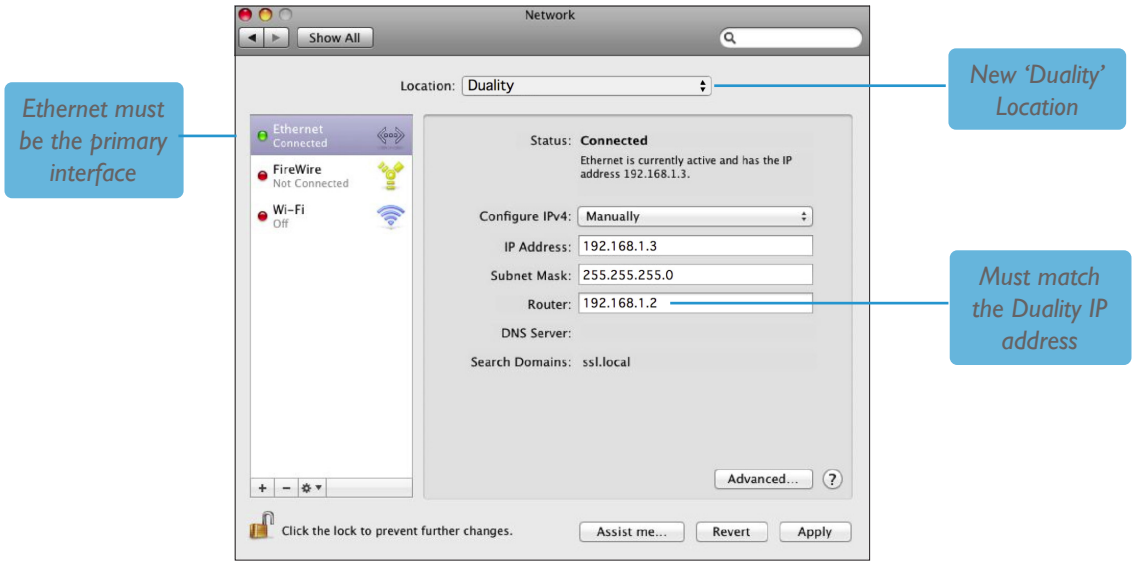
- On your computer go to *System Preferences* and click on the *Network* icon.
- On the *Location* dropdown, select *Edit Locations...*
- Click on the '+' symbol and add a new location name, probably 'Duality', and then click *Done*.



To simplify the process of switching between networks, it is recommended that you create an additional network Location ('Internet' for example) to enable separate connection to the internet. This would use the network settings provided by your Internet Service Provider or network administrator. You can easily switch between network Locations by going to the Network Menu and scrolling down.

Next, apply the Network IP settings:

- Set ***Configure IPv4*** to ***Manually*** then fill in the IP Address and Subnet mask boxes with the numbers shown below. The IP address should be in the 192.168.1.nnn range with a Subnet Mask of 255.255.255.0.



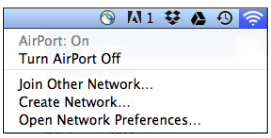
Now physically connect the console:

- Using an RJ45 cable, make a direct network connection between the ***Network*** port on your Duality to a network port on your workstation computer.

Note that many computer adaptor cards will autosense a direct connection negating the need for a crossover cable. If you are unsure whether your workstation computer's network adapter has this functionality, please use a crossover rather than a pin-to-pin cable.

Please note that currently OS X does not allow two ports to be used for IP traffic. As such, the connection to your main network will not be available while the Duality is connected.

Note also that if your workstation computer is a Mac, you should ensure that your Mac Airport is switched off. We strongly recommend this as Airport is known to cause conflicts with ipMIDI data. If you wish to use the internet, we suggest you configure Duality with a Router/Switch (see Connection Using DHCP).

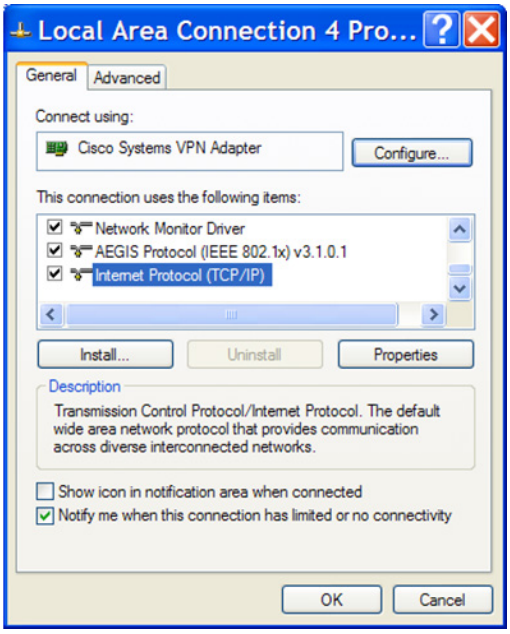


- check that the IP address is set to FIXED in the console's ***SSL*** > ***MISC*** > ***NET*** menu.

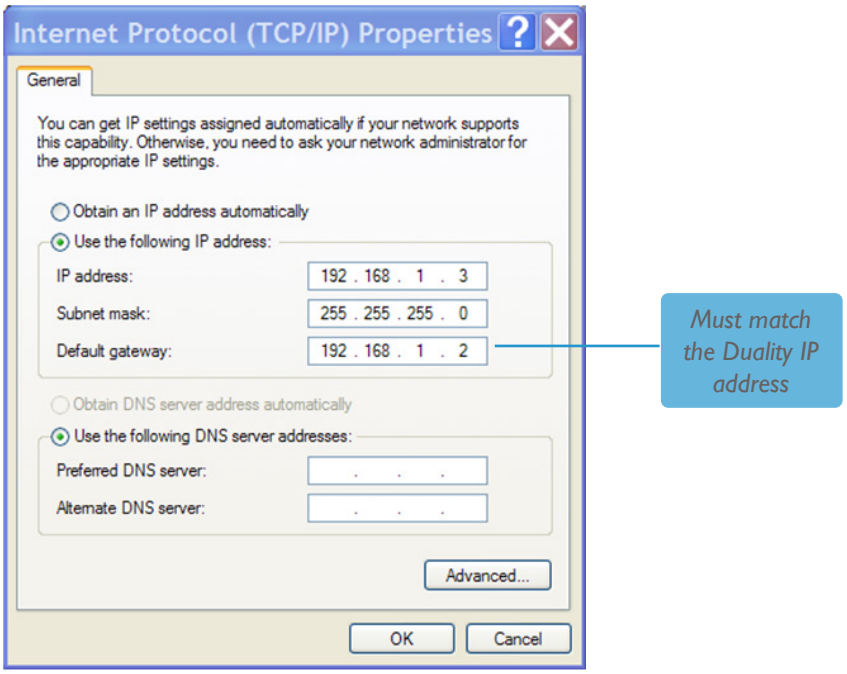
To confirm that the physical connection is established, it can be checked from a terminal command, using the 'Ping' command. See page 40.

Direct Network connection (PC)

- Double click on Network Connections in Start/Control Panel. Right click on the network adapter connected to your Duality (likely to be called "Local Area Connection"). Select Properties.



- Select Internet Protocol (TCP/IP) and Properties.
- Next, configure the adapter as shown below:

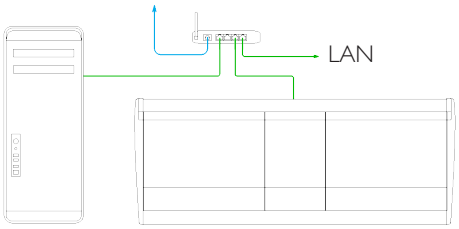


Click on OK on both windows to save. Back in your network connection list, right click on your adaptor and ensure that it is enabled. If it is disabled, the enable option will appear in the list. Click on enable.

Now physically connect the console as described opposite.

Network Connection Using DHCP

If the Duality is being connected to the DAW workstation via a Local Area Network (LAN), a DHCP enabled router with at least 3 Ethernet ports will be required. The principle behind this method is that your Internet router acts as a DHCP server, dynamically assigning IP addresses to all the devices on your network. The simplest configuration would be as shown.



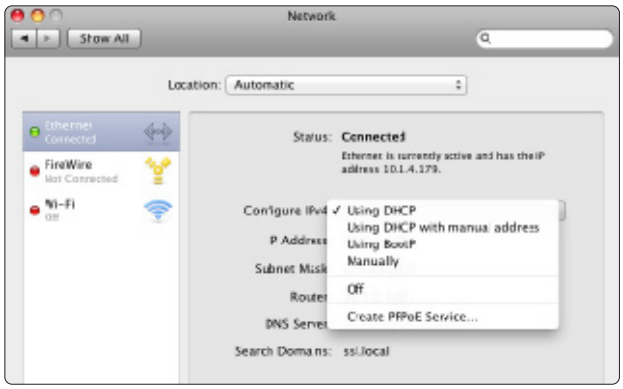
Duality can be set to use a dynamically assigned (DHCP) address in the ***SSL*** > ***Misc*** > ***Net*** menu.

! If you change the IP address mode, you will need to restart your Duality under the same SSL > Misc > Net menu.

Create a new network location for the Duality console as described on page 35.

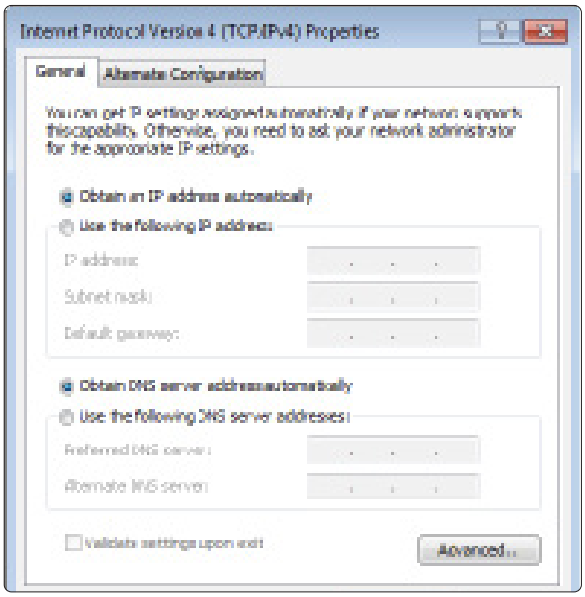
DHCP Settings (Macintosh)

- Under *System Preferences*, click on the *Network* icon.
- Set ***Configure IPv4*** to ***Using DHCP***.



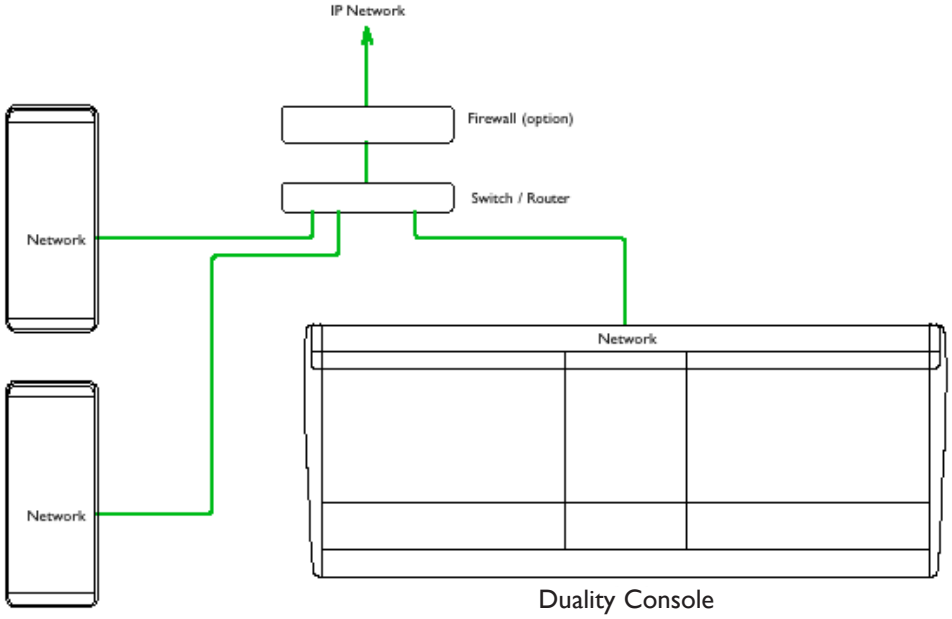
DHCP Settings (Windows)

- Go to Network / Local Area Connection Properties.
- Open up the option Internet Protocol version 4 (TCP/IPv4).
- Choose the option ***Obtain an IP address automatically***.



Larger Networks and ipMIDI

To ensure minimum latency, the ipMIDI driver uses multicast UDP rather than TCP/IP. This means that the network



Duality Console

connection should be as short as possible and should only use routers that can support high data transfer rates. Problems have been experienced with some domestic routers, particularly when used with Pro Tools.

Because ipMIDI uses multicast UDP packets, messages between one computer and the Duality console will be received by all other computers and printers on the network, potentially causing problems in installations with more than one Duality. The UDP packets can be blocked by using a firewall router and connecting the main network to the WAN connector. The firewall can then be configured to allow all traffic apart from UDP ports 21928 through 21947 (which are used by ipMIDI) and, optionally, port 50081 (which is used by the Duality Remote application).

It may be necessary to use a separate Ethernet switch in place of the integrated firewall router switch as some of these devices can not support the high data transfer rate required. The NetGear FS108 (an eight port switch) has been used successfully. Most systems can be easily configured with a direct connection between Duality and the controlling computer.

SSL can supply a preconfigured 8-port managed switch which will isolate the console ipMIDI data from the facility's IP network. Please contact SSL Support for more details and an example diagram.

Assigning Duality's Fixed IP Address

An alternative fixed IP address can be set using the console's diagnostic port. You will need a PC or Mac running terminal emulator software. Connect your computer's serial port to Serial Port 2 on the rear of the console using a 9 way 'D' type extension cable. *The pin-out for Serial Port 2 is shown on page 56.*

Set the terminal configuration as follows:

Baud rate 19200, 8 data bits, No parity, No start bit, 1 stop bit, Flow control Xon/Xoff

Press the '*Return*' key (<CR>) and the terminal window should echo a '>' if communication is established.

To fix the IP address type the following:

ip <CR>	
setip nnn nnn nnn nnn <CR>	*Where 'nnn...' is the IP address, 192.168.1.2*
setmask nnn nnn nnn nnn <CR>	*Where 'nnn...' is the subnet mask 192.168.1.1. Note that this should match other devices local to the console.*
setgate nnn nnn nnn nnn <CR>	*Where 'nnn...' is the gateway address e.g. '10 1 1 1'*

Network trouble shooting

Most Ethernet adaptor cards have two leds associated with each port. The first indicates that the link is connected and the second indicates network traffic. Please note that some Macintosh computers do not have external leds to indicate status. Instead the link status is shown in the System Preferences/Network menu.

On your host workstation computer, confirm that the link led is permanently illuminated. If it is not permanently illuminated, it suggests you have a cabling error. In this instance please check the following:

- The RJ45 network connector on the console and on your workstation are fully inserted.
- If you are using a pin-pin cable to make a direct connection between your console and workstation, try replacing it with a crossover cable
- Try replacing the network cable
- If you are not using a direct connection between your console and workstation using the default fixed IP address on the console, please try this simple configuration to rule out issues with external routers and network switches. If the link led is illuminated, the next step is to confirm that the activity led is illuminating periodically to show network traffic. If it does not illuminate periodically check the following:
- If your workstation is not connected directly to your console using a crossover RJ45 cable and fixed IP addressing, follow the installation instructions to configure this simple network configuration to rule out issues with any external routers or network switches.
- Using the fixed default IP address on the console, check that the workstation has basic communications using 'ping'.

Under Windows – Select: '*Run*' under the '*Start*' menu. In the resulting window enter '*cmd*' to launch the command prompt. In the command prompt window enter '*ping 192.168.1.2*'

On OSX: Open a Finder window, select *Applications*, then *Utilities*, and double-click on *Terminal*. In the terminal window enter *'ping –c4 192.168.1.2'*

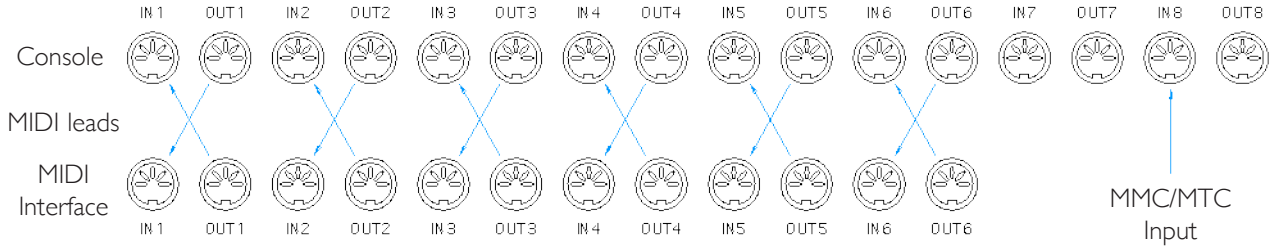
In both cases your host computer will try to establish communications with your console. In the resultant terminal text, check that the console responded to every message sent by your workstation.

Using Physical MIDI Ports to Connect your DAW

As an alternative to ipMIDI, standard multi-port MIDI connections can be used between the Duality console and the DAW. In this mode only one DAW layer can be configured.

To select this mode, go to: ***SSL*** > ***Misc*** > ***Setup*** and set ***MIDI communicates via: MIDI Ports***.

The console communicates with the DAW via the MIDI ports located on the rear of the console:



MIDI ports should be connected to your DAW MIDI interface unit – three available ports are required (one port includes an IN and OUT socket). To connect a port, the output of the MIDI interface unit port 1 should connect to the MIDI 1 input port on the console and the MIDI output of the console port 1 should connect to the input of your MIDI interface unit port 1. Repeat for the other ports using the diagram above as a guide.

Follow the instructions on configuring your workstation but use the physical MIDI ports rather than the virtual MIDI ports when selecting MIDI ports.

The recommended maximum length of MIDI cables is 15 meters.

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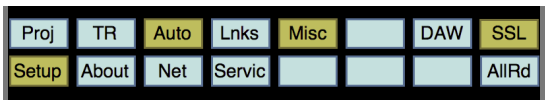
Enabling ipMIDI on your Duality Fuse

In the ***SSL*** > ***Misc*** > ***Setup*** menu check that the following settings are selected:



- Set ***MIDI connects via:*** to ***Network***. Your console will now communicate with your workstation via Ethernet.

  With 'MIDI connects via:' set to 'MIDI ports', Duality will communicate with your workstation via the physical MIDI connectors on the rear of your console.

- ***DAW1:*** and ***DAW2:*** must be set to match your workstation(s). If you are not using DAW2, then its setting MUST be set to ***NONE***.

- ***Channel Count DAW1:*** – Select the total number of channels dedicated to DAW control (8 – 48 in steps of 8). When DAW 2 is assigned, there will be a ***Channel Count DAW 2:*** menu entry.

  NB. Set to 32 or fewer for Pro Tools HUI – number must match the number of HUI peripherals in Pro Tools.

! IMPORTANT – The console will need to be rebooted after changing any of these settings.

The δ-Ctrl Plug-In

Before mixing with Duality δ-Control, the δ-Ctrl plug-in will need to be installed onto the workstation computer. The plug-in can be downloaded from SSL's website.

See the Duality Operator's Manual for additional information.

Setting workstation(s) to communicate via ipMIDI

The Duality Fuse uses 16 virtual MIDI ports which are pre-assigned as follows:

Port	DAW	Assignment	Port	DAW	Assignment
1	1	Faders 1 – 8	9	2	Faders 17 – 24
2	1	Faders 9 – 16	10	2	Faders 25 – 32
3	1	Faders 17 – 24	11	2	Faders 33 – 40
4	1	Faders 25 – 32	12	2	Faders 41 – 48
5	1	Faders 33 – 40	13		Not used
6	1	Faders 41 – 48	14		MTC Input *
7	2	Faders 1 – 8	15		Duality MIDI port 1
8	2	Faders 9 – 16	16		Duality MIDI port 2

** ipMiDI port 14, or hardware MIDI port 8, can be used as the MTC input, allowing MTC to be connected from systems (such as RADAR) that do not support the ipMIDI driver. MTC should only be routed to one port at a time.*

Note that there are now two switchable workstation layers allowing to independent workstations to be interfaced. Once configured, you can switch between the two layers using the console's **SSL** > **DAW** menu.

MIDI Port 14 – If your console is equipped with automation, this port is used to feed automation with MTC.

MIDI Ports 15 & 16 – Mapped to the conventional MIDI connectors on the rear of the console allowing connection of a keyboard or other MIDI device to your DAW via ipMIDI.

The MCU protocol supports automatic detection of connected control surfaces. To enable this select Logic Handshake.

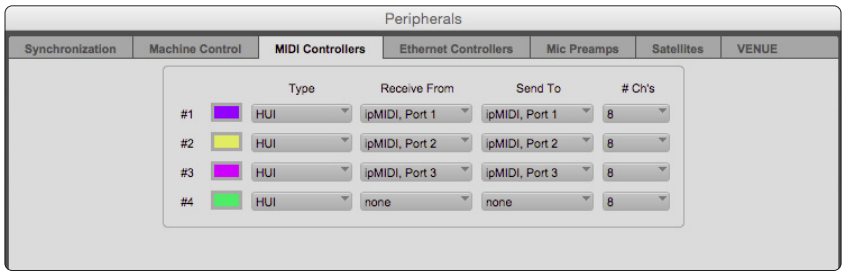
Logic will then automatically detect the Duality. If you select Logic Handshake on both layers then Logic will detect 6 control surfaces, which may not be what you want! The other protocols do not transmit handshaking messages.

To enable control of your workstation via HUI or MCU your workstation(s) must be configured to match the appropriate layer in the list above. This is done using the MIDI Controller configuration page of your workstation.

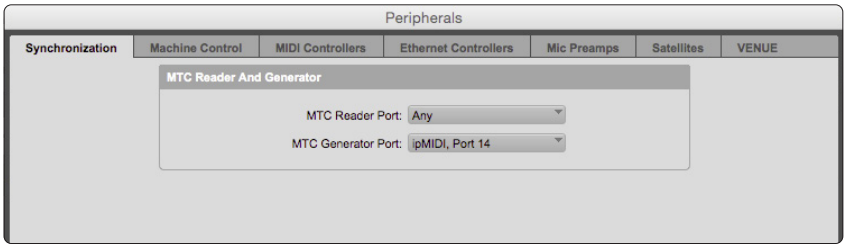
The following pages show examples using Pro Tools 11 and Logic Pro X.

Workstation Setup – Pro Tools

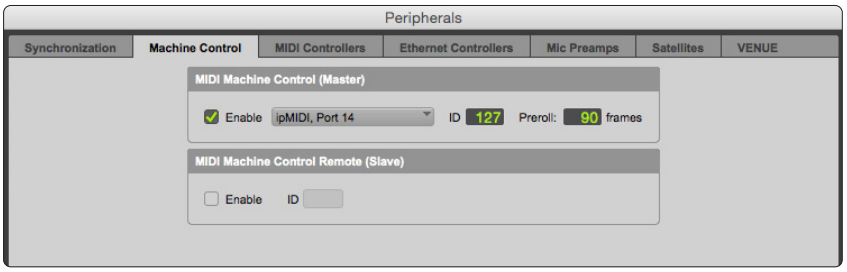
Go to ***Setup*** / ***Peripherals*** / ***MIDI Controllers***. Add up to four HUI peripherals (depending on how many DAW channels you want to control). See the previous table for ipMIDI assignments:



If you have automation, set the ***MTC Generator Port*** in the ***Synchronization*** tab to ***ipMIDI port 14*** (or physical MIDI port 8 if you are using the console MIDI ports):



Also, set the MMC midi port in the ***Machine Control*** tab to ***ipMIDI port 14*** (or physical MIDI port 8 if you are using the console MIDI ports):



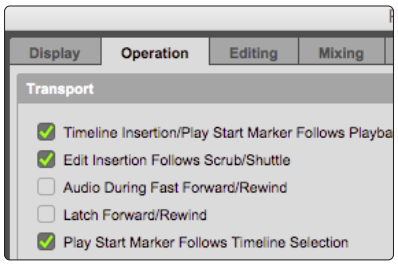
Before mixing, the following options should be enabled in the Pro Tools ***Setup*** / ***Preferences*** / ***Mixing*** menu :

1. Plug-in Controls Default to ***Auto-Enabled***
2. Latching Behaviour for Switch Controls in "***Touch***"
3. Set the SSL δ-Control Plug-in as a '***Favourite***' by Command-click (Mac) or Control-click (PC) the ***Insert Selector*** and then selecting the SSL plug-in from the ***Other*** category. It will then appear at the top of the Insert Selector pop-up menu for fast access.

For the MMC Locate message to update the desk timecode readout the following options should be enabled in the Pro Tools ***Setup*** / ***Preferences*** / ***Synchronization*** menu:

1. Machine Chases Memory Location.

To make Pro Tools behave like a tape machine for SSL Legacy Automation enable the following in the Pro Tools ***Setup*** / ***Preferences*** / ***Operation*** menu :



1. Timeline Insertion/Play Start Marker Follows Playback
2. Edit Insertion Follows Scrub/Shuttle

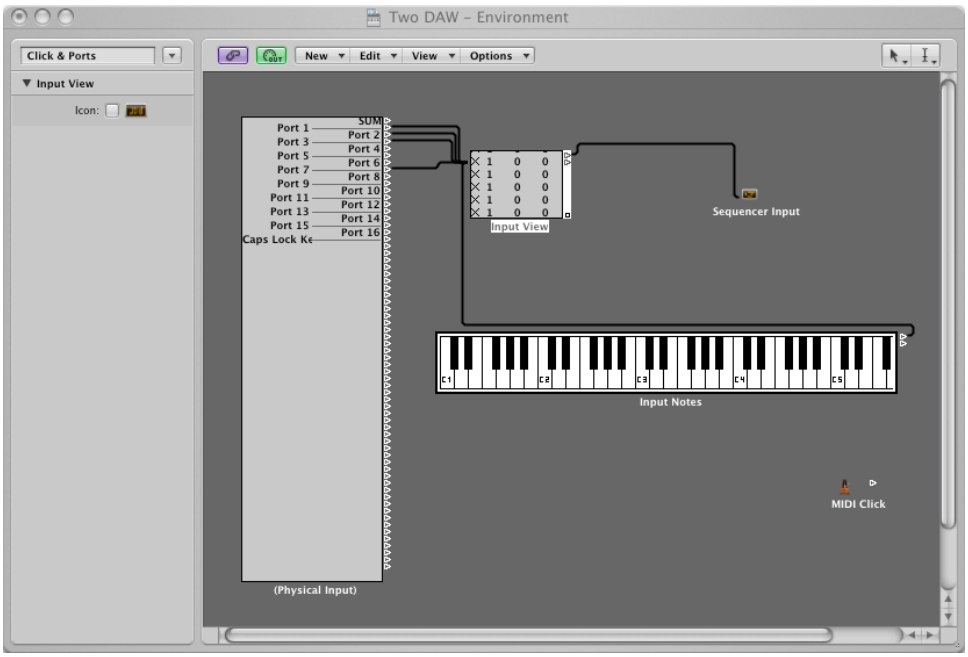
Workstation Setup – Logic Pro X

When Logic is assigned to one of the two Duality workstation layers a Mackie Control together with a Mackie Control Extender must be added to the Logic Pro Preferences/Control Surfaces Setup menu as shown below:

Duality Faders 1-8 are mapped to the Mackie Control ports along with the Master Fader and workstation Control function switches. Duality Faders 9 -16 and 17-24 are mapped to the Mackie Control Extender ports. The actual ipMIDI ports used will depend on which layer (or layers) Logic is assigned to. See the list of Duality MIDI port assignments for details – it is essential that the layout shown is followed. If the physical arrangement is reversed, then the Duality faders will not map correctly to the on-screen faders in Logic.

If the protocol is set to ***Logic Handshake***, Logic should automatically detect six virtual controllers which will be shown in the Logic Setup menu (as shown above), with the appropriate Duality ipMIDI ports assigned. If Logic fails to detect the control surfaces, then the controllers can be added manually via the New/Install menu and the appropriate MIDI Out port and Input assigned. As described above, normally only one layer should be set to ***Logic Handshake***, otherwise Logic will detect and connect to all 12 MIDI ports!

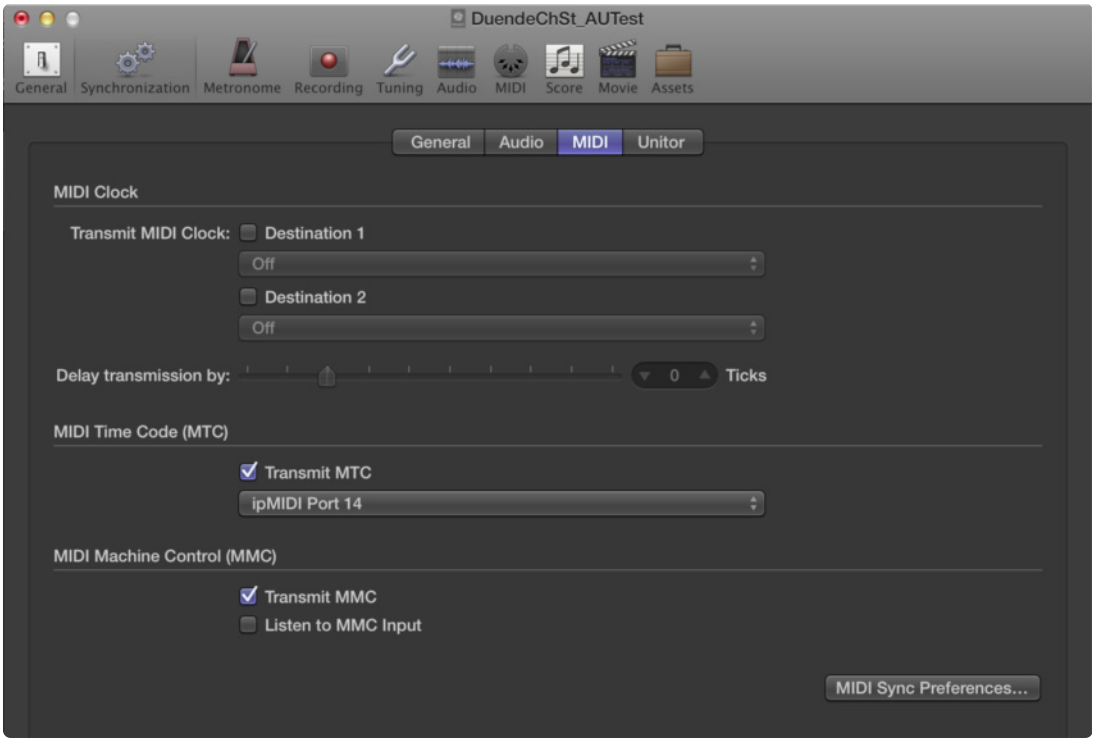
Logic's Click and ports environment layer selects the SUM of all of the ipMIDI input ports as its default MCU control data source. This may lead to difficulties when using multiple DAW layers. To avoid Logic responding to MIDI messages intended for the other DAW layer, the Click and Port MIDI port mapping should be changed from SUM to individual direct MIDI port assignment. The example below shows Logic on DAW layer 1:



Preferences/Control Surfaces Setup menu:

If you have automation, set the MMC midi port in ***File*** / ***Project Settings*** / ***Synchronisation*** / ***MIDI*** to ***ipMIDI port 14*** (or physical MIDI port 7 if you are using the console MIDI ports).

For other DAWs, please refer to the program's manual for details about configuring MIDI controllers.



Finding a console on the Duality Remote application

Launch Duality Remote on your workstation. Normally Duality Remote will automatically locate the console and the message 'Duality Connected' will be shown in green text in the bottom left hand corner of the browser:

If the list is empty, click on '*Find Duality*', select the console you wish to connect to and click the check box. The first time you connect (or if you wish to connect to a different console) kick on the '*Find*' icon. .

If your console does not appear in the list, it suggests you have a network related issue. Please follow the steps in the network trouble shooting section at the end of this document to resolve the issue.

Enabling the Logictivity features on your console

The following information only applies to Duality consoles that do not currently have the Duality δ-Ctrl software installed.

1. Find the console's serial number. The serial number label is located on the rear of the console adjacent to the mains inlet connector. The serial number starts with the letters Duality followed by a numerical number. Make a note of the numerical number for the registration process (e.g. if the serial number is DO80, note 80).

2. If you have not registered your console on-line (or you have forgotten your username), complete the on-line registration:

   https://www.solidstatelogic.com/product-registration

3. Navigate to the on-line registration page and enter your activation code and the numerical element of your console's serial number previously noted. The activation code can only be used once. Please ensure that you enter the correct serial number on the activation page.

4. After a successful activation, you will be invited to download and install the latest version of software. Follow the link to the download page.

Appendices

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Appendix C – Connector Pinouts 52
Appendix D – Patchbay Layouts 57
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Appendix A – Specifications

Duality Fuse Console

Parameter	*Condition*	*Value*	*Unit*	*Notes*
Height	To top of meter trim	982	mm	
Height adjustment		-0 +10	mm	
Width:	24 channel console	1,710	mm	*No patchbay*
(1)	48 channel console	2,700	mm	*No patchbay*
	48 channel console plus patch	3,190	mm	*Internal patchbay*
	72 channel console	3,690	mm	*No patchbay*
	96 channel console	4,680	mm	*No patchbay*
	19" racking section	488	mm	
	Producer's table section	603	mm	
Depth		1,024	mm	
Weight:	24ch	190	Kg	
	48ch	310	Kg	
	72ch	430	Kg	
	96ch	550	Kg	
	19" racking section	15	Kg	*Empty*
	1U patchrow	3.2	Kg	*Each*
	Producer's section	18	Kg	
Heat dissipation:	24ch	1,005	W	
	48ch	1,565	W	
	72ch	2,225	W	
	96ch	2,885	W	
Voltage	Input range	100 – 240	V	*±10%*
Current:	Over voltage range: for 1st 24ch	9.1 – 3.9	A	*24 channels inc centre section*
	For additional 24 channel bays	6.9 – 2.9	A	*1 for 48ch, 2 for 72ch, 3 for 96ch*
Power factor		0.95		
Fusing	None			
Noise	Fanless			
Connectors:	Mains input	IEC male		
	MIDI	5-pin DIN 180° female		
	Network	RJ45 100BaseT		
	Line level audio	25-way D-type female		
	Microphone input	XLR 3-pin female		
	Mini LS output	XLR 3-pin male		
	TB / Listen Mic / FB sends	1/4" TRS jack female		
	USB	4-pin type A		
	Serial	9-way D-type female		

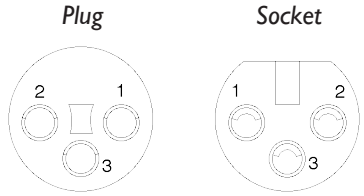
1. Dimensions apply to straight consoles only. For dimensions of ProStation consoles and custom consoles which include corner sections please contact to SSL's Project Engineering Department. projeng@solidstatelogic.com

Appendix B – Connector Details

XLR 3-Pin

Pinout for Balanced Audio

Pin	*Signal*	*Notes*
1	Ground	
2	Hot	*+ve*
3	Cold	*-ve*

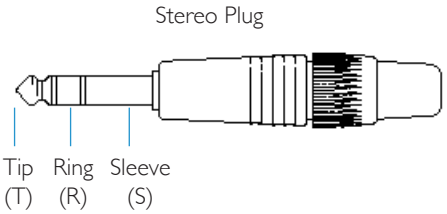


Connectors Viewed From Wiring Side

1/4" TRS Jack

Pinout for Balanced Audio

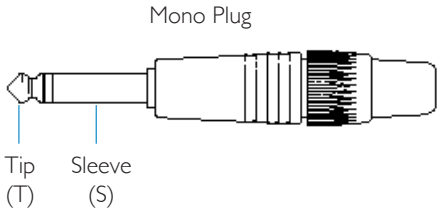
Pin	*Signal*	*Notes*
Sleeve	Ground	
Tip	Hot	*+ve*
Ring	Cold	*-ve*



Pinout for Instrument / Footswitch*

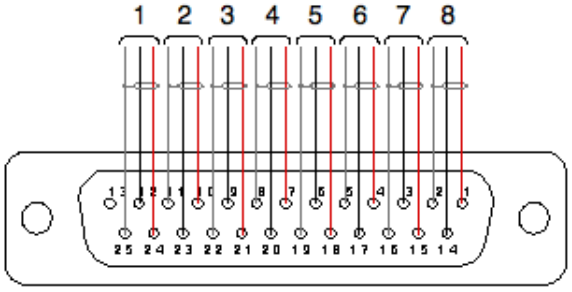
Pin	*Signal*	*Notes*
Sleeve	Screen / 0V	
Tip	Input / Switch	*-ve*

**Connect Tip to Sleeve to trigger input*

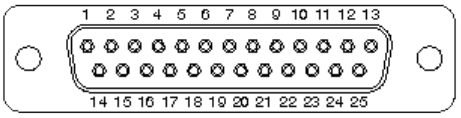


D-Type Multipin

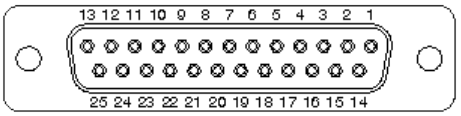
Circuit arrangement for all audio connectors:



Connectors Viewed From Wiring Side



Socket

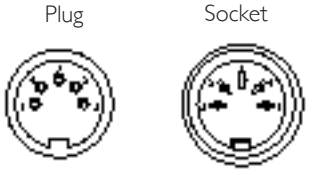


Plug

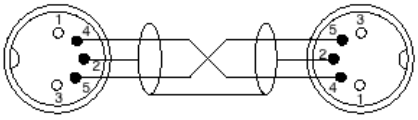
DIN 5-Pin 180°

Pinout for MIDI data

Pin	*Signal*	*Notes*
1	n/c	
2	Screen	
3	n/c	
4	Midi +	
5	Midi -	



Connectors Viewed From Wiring Side



Plug–Plug MIDI Lead

Appendix C – Connector Pinouts

Channel Connectors

Channel Input				
Location:	24 Channel Bay Rear Panel			
Connector Type:	XLR 3-pin female			
Pin	*Description*		*Notes:*	
1	Ground			
2	Hot (+ve)			
3	Cold (-ve)			

Channel Outputs / Key / Insert Send & Return / Monitor Input				
Location:	24 Channel Bay Rear Panel			
Connector Type:	25-way D-type female			
Pin		*Description*		*Notes*
1		cct 8	+	
14		cct 8	–	
2		cct 8	Screen	
15		cct 7	+	
3		cct 7	–	
16		cct 7	Screen	
4		cct 6	+	
17		cct 6	–	
5		cct 6	Screen	
18		cct 5	+	
6		cct 5	–	
19		cct 5	Screen	
7		cct 4	+	
20		cct 4	–	
8		cct 4	Screen	
21		cct 3	+	
9		cct 3	–	
22		cct 3	Screen	
10		cct 2	+	
23		cct 2	–	
11		cct 2	Screen	
24		cct 1	+	
12		cct 1	–	
25		cct 1	Screen	
13				n/c

Centre Section Connectors

Ext A 1–4 / Ext B / Meter Out / Monitor Insert

Location: Centre Section rear panel

Connector Type: 25-way D-type female

Cct	Hot	Cold	Screen	Ext A In 1–4	Ext B input	Meter Output	Mon Ins Send	Mon Ins Ret
1	24	12	25	Left	1-Left	Left	Left	Left
2	10	23	11	Right	1-Right	Right	Right	Right
3	21	9	22	Centre	2-Left	Centre	Centre	Centre
4	7	20	8	LFE	2-Right	LFE	LFE	LFE
5	18	6	19	Surr' Left	3-Left	Surr' Left	Surr' Left	Surr' Left
6	4	17	5	Surr' Right	3-Right	Surr' Right	Surr' Right	Surr' Right
7	15	3	16	–	4-Left	Solo Left	Lt to Decoder	Lt from Enc
8	1	14	2	–	4-Right	Solo Right	Rt to Decoder	Rt from Enc

Monitor Outputs / Track Sends / Cue FX

Location: Centre Section rear panel

Connector Type: 25-way D-type female

Cct	Hot	Cold	Screen	Mon A	Mon B	Track Sends	CUE/FX Out
1	24	12	25	Main Left	Alt Left	Bus 1 [9,17]	St Cue AL
2	10	23	11	Main Right	Alt Right	Bus 2 [10,18]	St Cue AR
3	21	9	22	Main Centre	Alt Centre	Bus 3 [11,19]	St Cue BL
4	7	20	8	Main LFE	Alt LFE	Bus 4 [12,20]	St Cue BR
5	18	6	19	Main LS	Alt LS	Bus 5 [13,21]	FX 1
6	4	17	5	Main RS	Alt RS	Bus 6 [14,22]	FX 2
7	15	3	16	Mini A Left	Mini B Left	Bus 7 [15,23]	FX 3
8	1	14	2	Mini A Left	Mini B Left	Bus 8 [16,24]	FX 4

Echo returns 1–4 / Mix Insert / Main Mix Outputs

Location: Centre Section rear panel

Connector Type: 25-way D-type female

Cct	Hot	Cold	Screen	Echo Returns	Mix Insert Send	Mix Insert Rtn**	Main Mix Out
1	24	12	25	1 Left	Left [AL]	Left [AL]	Left [AL]
2	10	23	11	1 Right	Right [AR]	Right [AR]	Right [AR]
3	21	9	22	2 Left	Centre [BL]	Centre [BL]	Centre [BL]
4	7	20	8	2 Right	LFE [BR]	LFE [BR]	LFE [BR]
5	18	6	19	3 Left	Surr' Left [CL]	Surr' Left [CL]	Surr' Left [CL]
6	4	17	5	3 Right	Surr' Right [CR]	Surr' Right [CR]	Surr' Right [CR]
7	15	3	16	4 Left	Stereo Left	Stereo Left	Stereo Left
8	1	14	2	4 Right	Stereo Left	Stereo Left	Stereo Left

** See Fusion Connections on following pages

Echo returns 1–4 / Mix Insert / Main Mix Outputs							
Location:		Centre Section Fusion panel					
Connector Type:		25-way D-type female					
Cct	Hot	Cold	Screen	**Mix Insert Return From Patch**	**To Console Mix Insert Return**	**Fusion Inputs & Returns**	**Fusion Outputs & Sends**
1	24	12	25	Mix AL [5.1 Left]	Mix AL via Fusion**	Fusion Input Left	from Mix Bus Ins Snd L
2	10	23	11	Mix AR [5.1 Right]	Mix AR via Fusion**	Fusion Input Right	from Mix Bus Ins Snd R
3	21	9	22	Mix BL [5.1 Centre]	Mix BL	Fusion Insert Send L	Fusion Insert Rtn L
4	7	20	8	Mix BR [5.1 LFE]	Mix BR	Fusion Insert Send R	Fusion Insert Rtn R
5	18	6	19	Mix CL [5.1 Ls]	Mix CL	to Mix Bus Ins Rtn L	Fusion Output Left
6	4	17	5	Mix CR [5.1 Rs]	Mix CR	to Mix Bus Ins Rtn R	Fusion Output Right
7	15	3	16	Stereo Submix Left	Stereo Submix Left via Fusion**		
8	1	14	2	Stereo Submix Right	Stereo Submix Right via Fusion**		

GPIO/ User Key Connections

The four 'User' keys at the bottom of the Fusion section are a set of switched relay closures with independant 'talley' inputs. These are for use as general purpose switches and/or indicators. The switches are numbers as shown in the image on the right, and their electrical characteristics are shown below.

Switch Outputs

All output switch closures are via DIL relay.

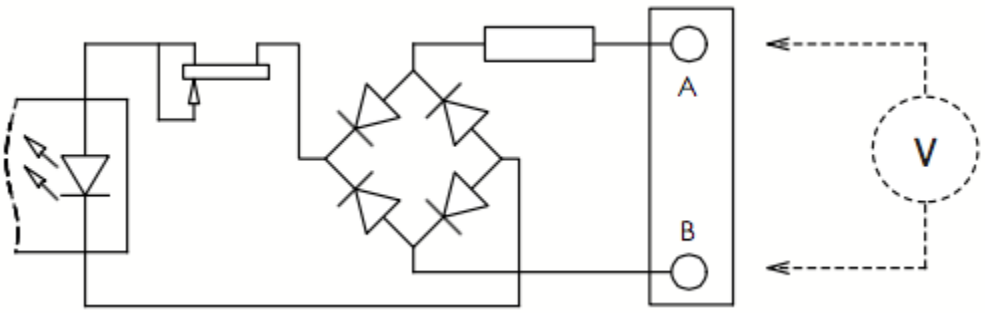
DO NOT use these outputs to directly switch capacitive or reactive loads; always use a separate external relay with suitable contact rating.

DIL Relay Ratings:

- 100V DC, 125V AC
- 100mA max.

Switch 'Remote Talley' Inputs

Switches are either locally illuminated i.e. no talley, or remotely illuminated by applying an AC or DC voltage of between 4V and 24V. The current drawn is approximately 10mA. Minimum input pulse duration 50mS. The selection of remote or local illumination is by means of four DIP switches (one for each user switch) located on the D-Sub connector PCB. Details of the switch options are on the following page.



Fusion User GPIO Switches		
Location:	Centre Section Fusion Connector Panel	
Connector Type:	25-way D-type female	

Pin		*Description*	*Notes*
1		Input 1A	See Input requirements
	14	Input 1B	
2		Input 2A	
	15	Input 2B	
3		Input 3A	
	16	Input 3B	
4		Input 4A	
	17	Input 4B	
5			
	18		
6			
	19		
7		+12V Output	0.5A Max (both pins), Linked to pin 13
	20	Chassis	Reference for +12V Output on pins 7 & 13
8		Output 1A	See contact ratings
	21	Output 1B	
9		Output 2A	
	22	Output 2B	
10		Output 3A	
	23	Output 3B	
11		Output 4A	
	24	Output 4B	
12			
	25		
13		+12V Output	As pin 7

GPI DIP Switch Settings

For each of the GPIO Switches there is an option to have the LED locally or remotely illuminated. This selection is set using four DIP switch settings on the Switch Interface card (SSL Part # 629785X1). This card carries the D-Type connectors for the Fuse interface at the rear of the Duality Centre Section so needs to be accessed inside the frame.

The Switches are numbered 1-4 and act as follows

User Switch Talley Options					
Switch	*Description*	*State*	*Function*	*State*	*Function*
1	Talley Option 1	Off	Sw 1 LED Local Illumination	On	Sw 1 LED Remote Illumination
2	Talley Option 2	Off	Sw 2 LED Local Illumination	On	Sw 2 LED Remote Illumination
3	Talley Option 3	Off	Sw 3 LED Local Illumination	On	Sw 3 LED Remote Illumination
4	Talley Option 4	Off	Sw 4 LED Local Illumination	On	Sw 4 LED Remote Illumination

Talkback, Red Light and Monitor Status Connections

Talkback/Red Light/Monitor Status Connector

Location: Centre Section Lower Rear Panel

Connector Type: 25-way D-type female

Pin	Description	Notes:
1	Red Light Relay contact 'A'	*Normally open – follows Red Light switch. See Note below.*
14	Red Light Relay contact 'B'	" " " "
2	0V	
15	GP Input 1	*Not used*
3	GP Input 2	*Not used*
16	Monitor Cut	
4	Monitor Dim	
17	Slate Switch	
5	Listen Switch	
18	Red Light Switch	
6	TB All Switch	
19	FB A Switch	
7	FB B Switch	
20	Ext TB Switch	
8	+4V	*Max 200mA*
21	Slate Tally	
9	Listen Tally	
22	Red Light Tally	
10	TB All Tally	
23	FB A Tally	
11	FB B Tally	
24	Ext TB Tally	
12	-	
25	-	
13	-	

Notes:
1. Inputs are active low (connect to 0V to activate).
   Inputs are pulled high to +4V via an internal 3k9Ω resistor and are diode clamped high and low.
2. Tally outputs are open-collector pull down with series 47Ω resistor.

Serial 1&2 (Serial 2 – Terminal, Serial 1 – unused)

Location: Centre section Rear Panel – Lower

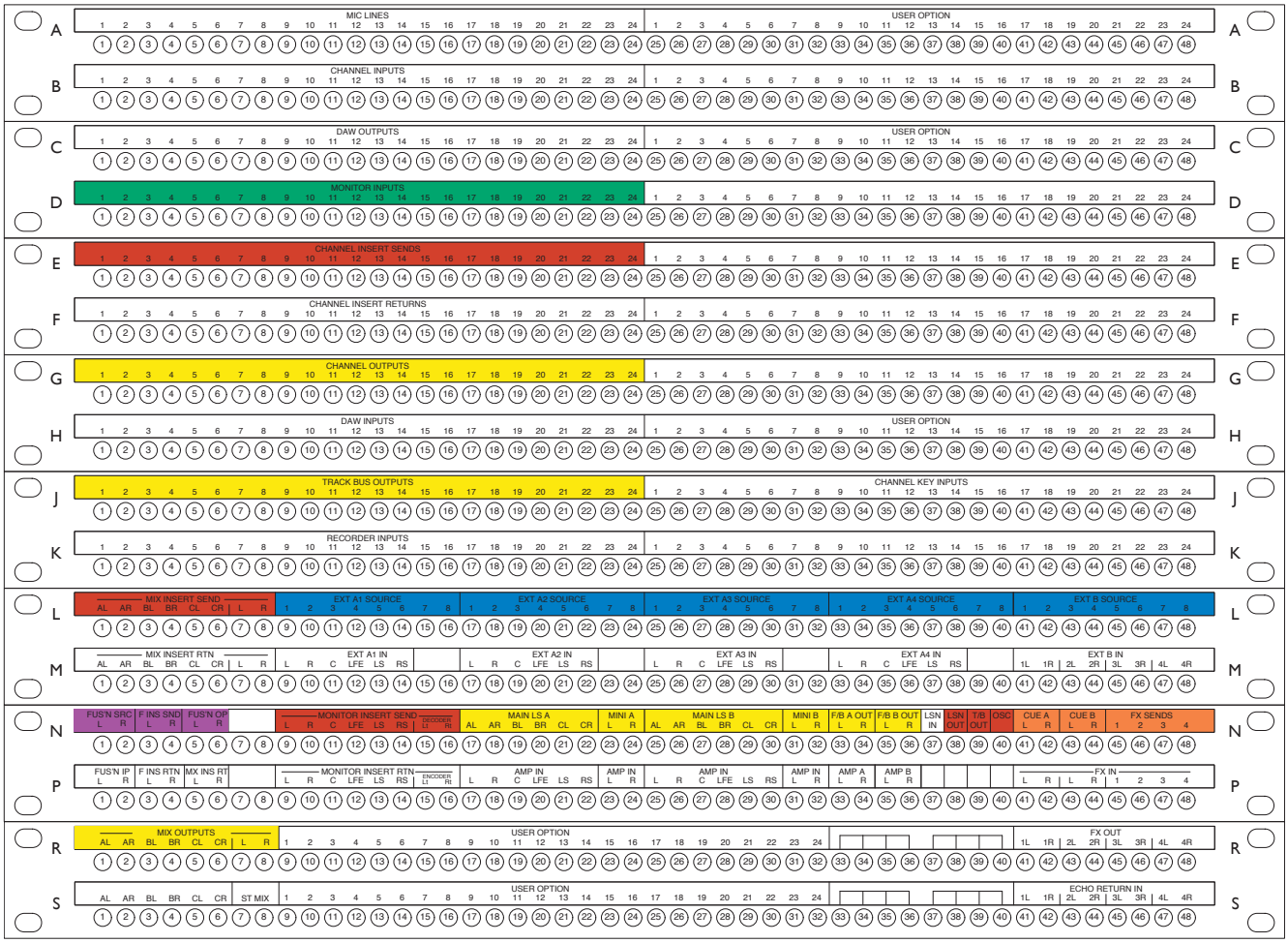
Connector Type: 9-way D-type Male

Pin	Description	Notes
1	0V	*Connector case connected to chassis*
6	0V	
2	Tx Data	
7	0V	
3	Rx Data	
8	n/c	
4	n/c	
9	n/c	
5	0V	

Appendix D – Patchbay Layouts

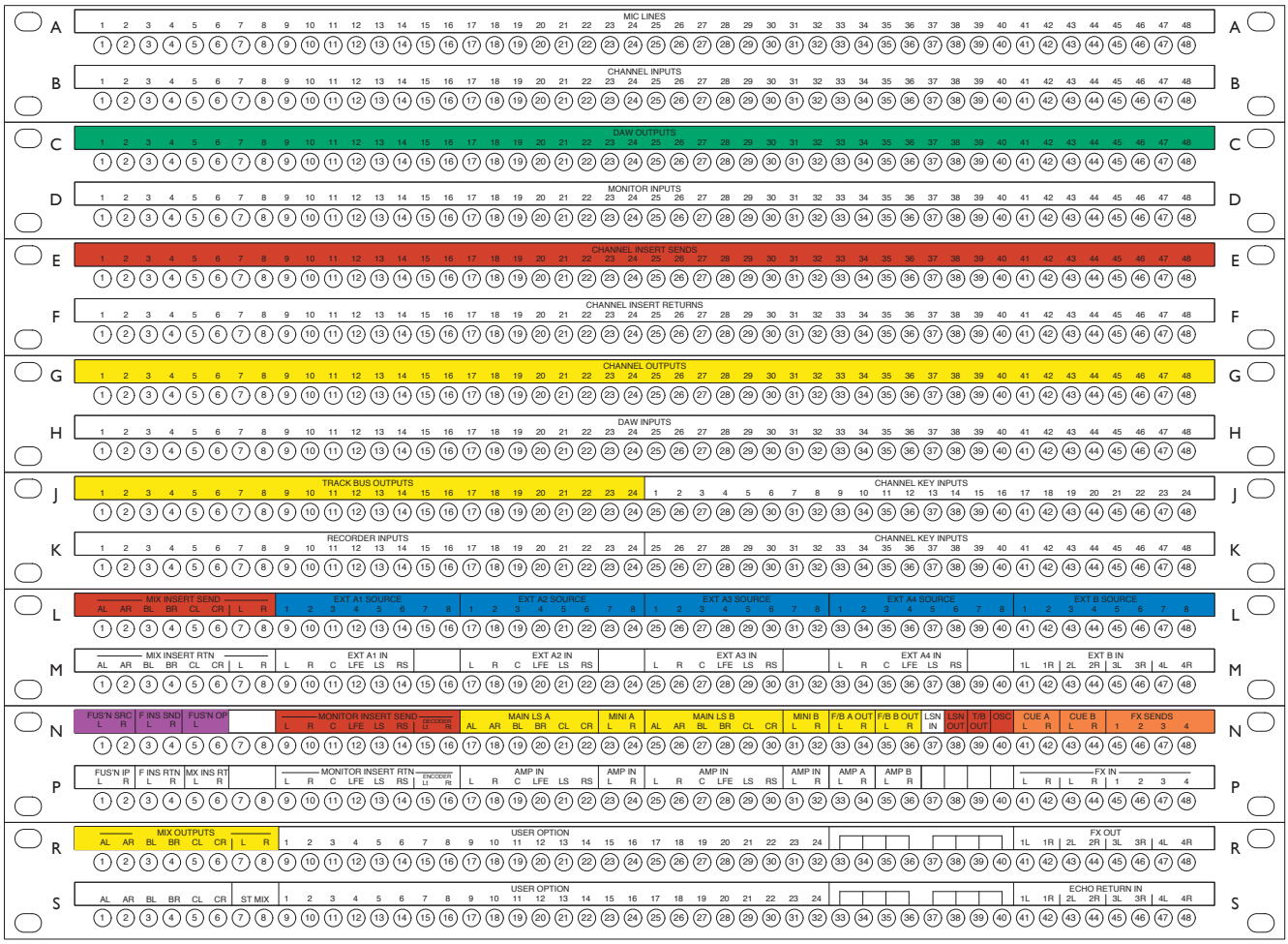
24 Channel Patchbay

1 X 19" section.



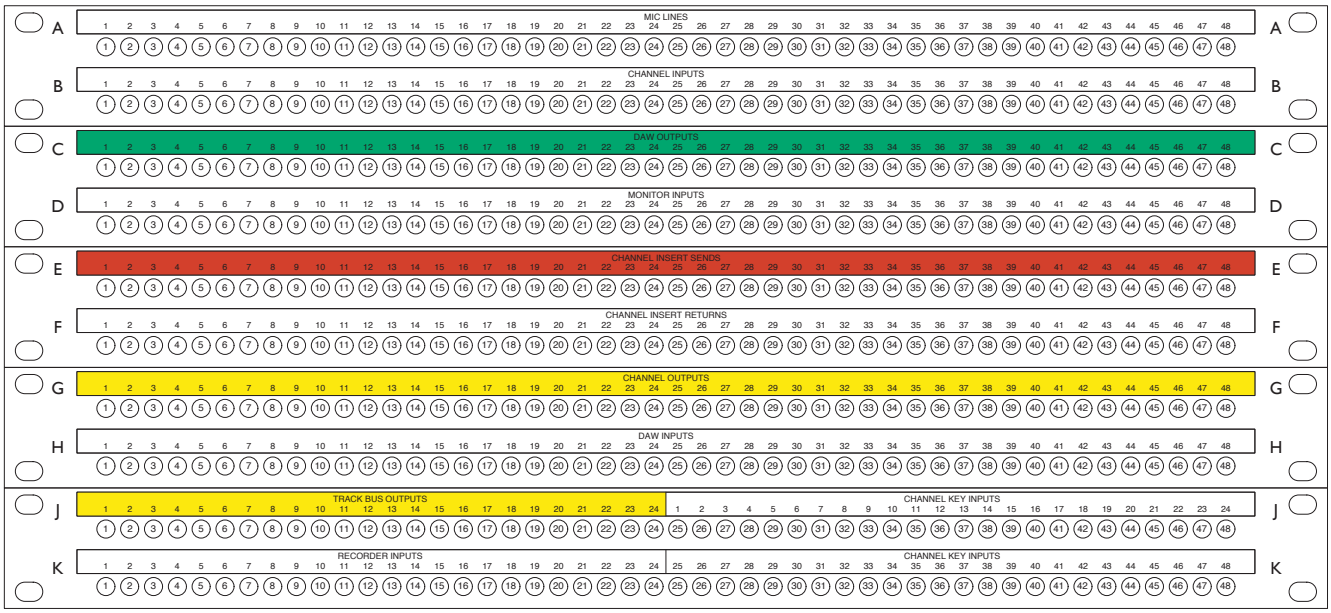
48 Channel Patchbay

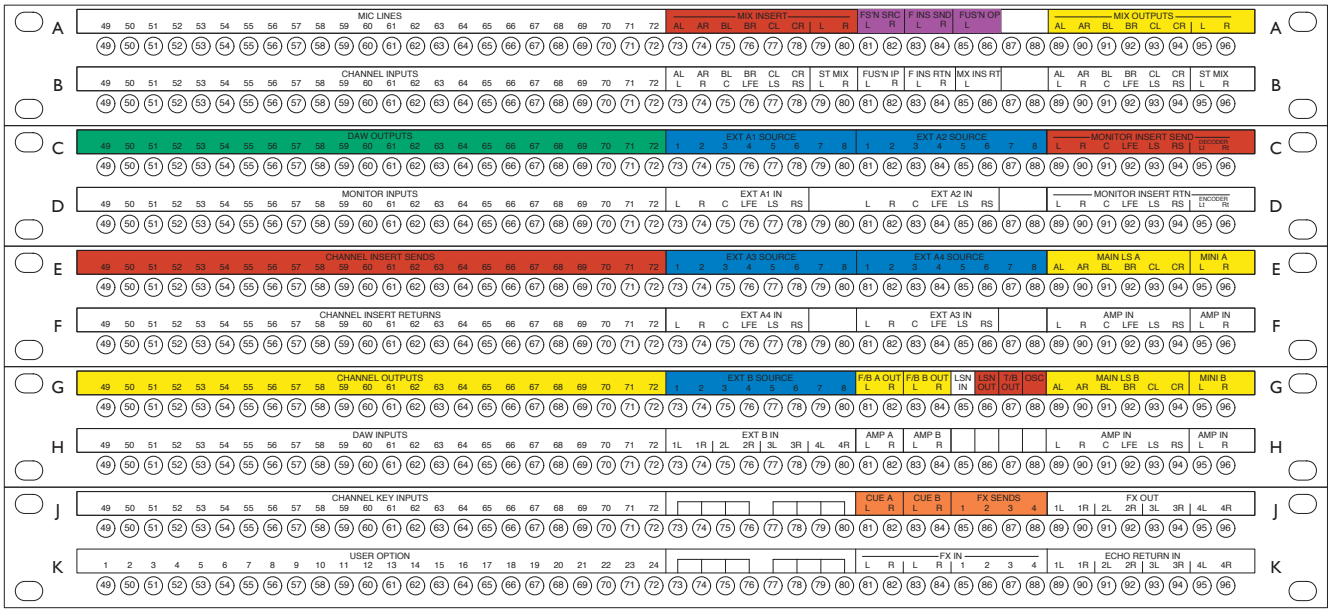
1 x 19" section



72 Channel Patchbay

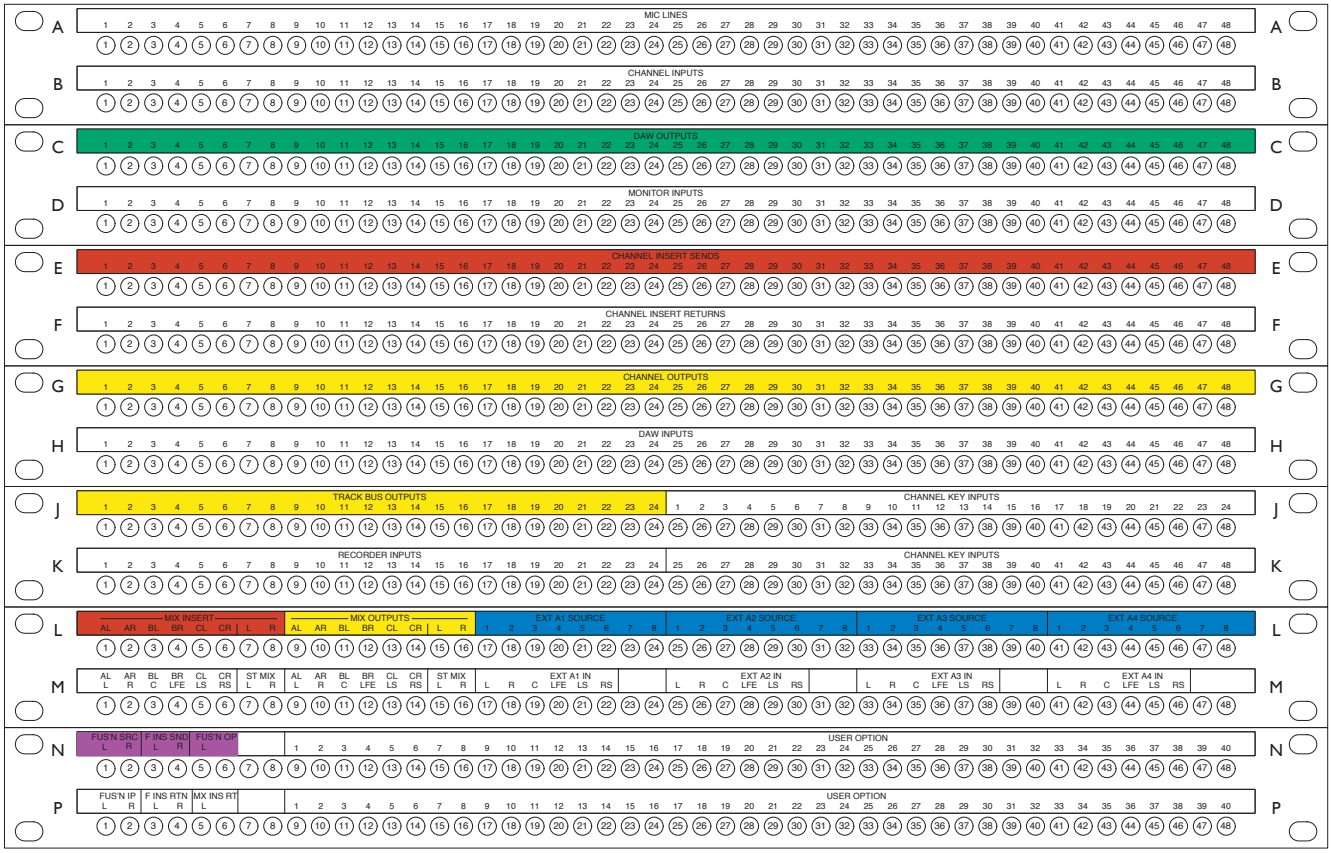
2 x 19" sections

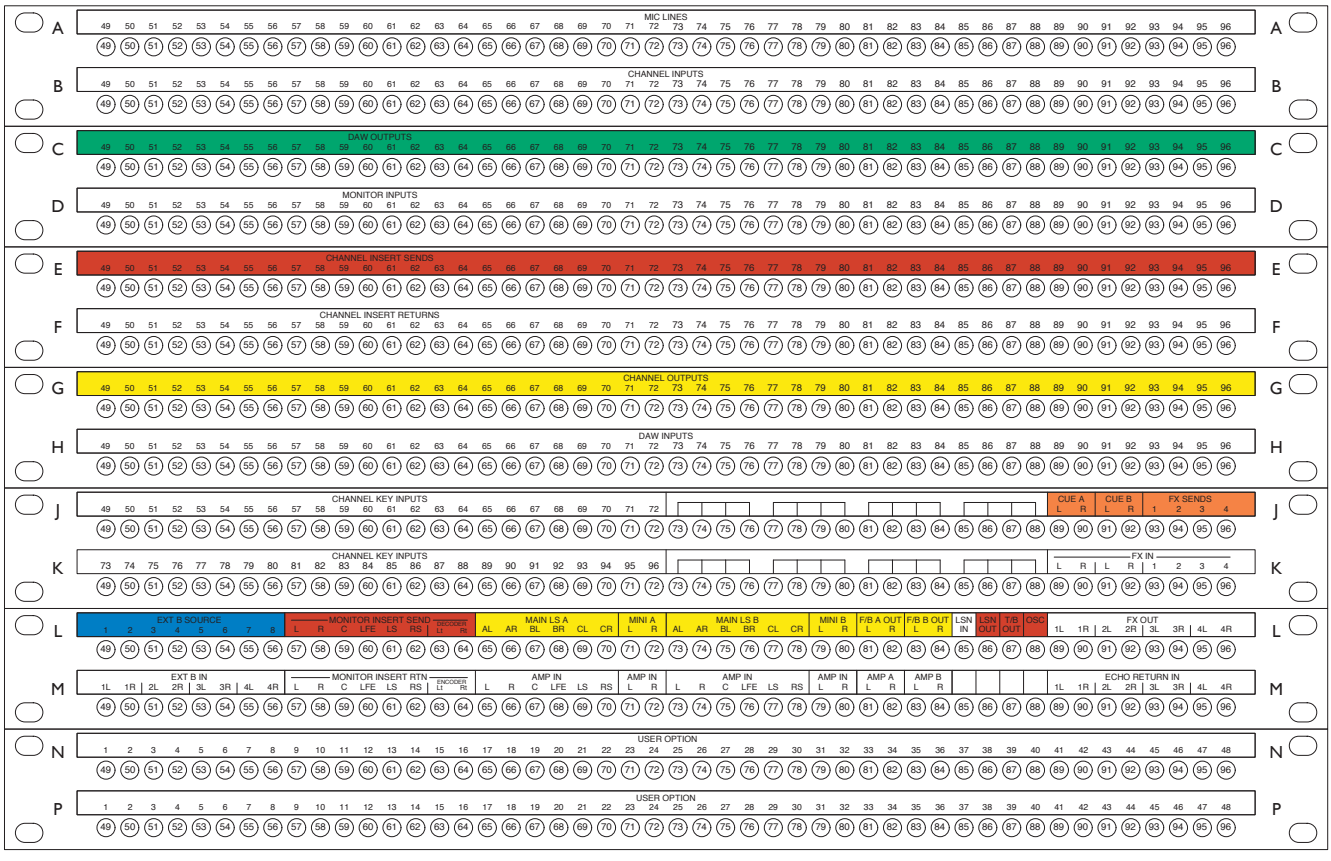




96 Channel Patchbay

2 x 19" sections

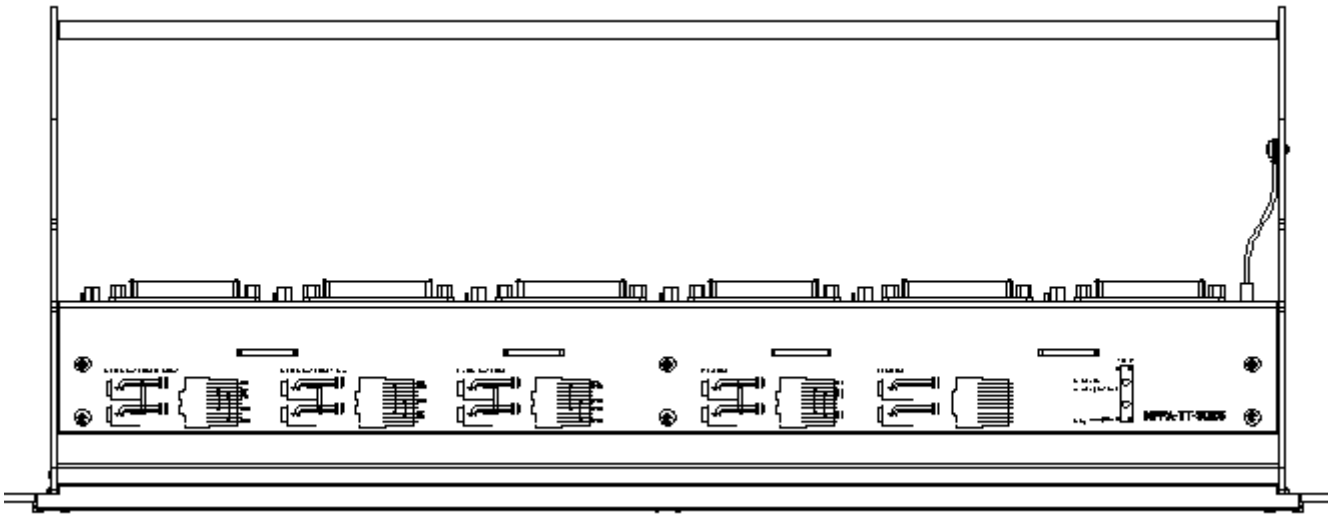




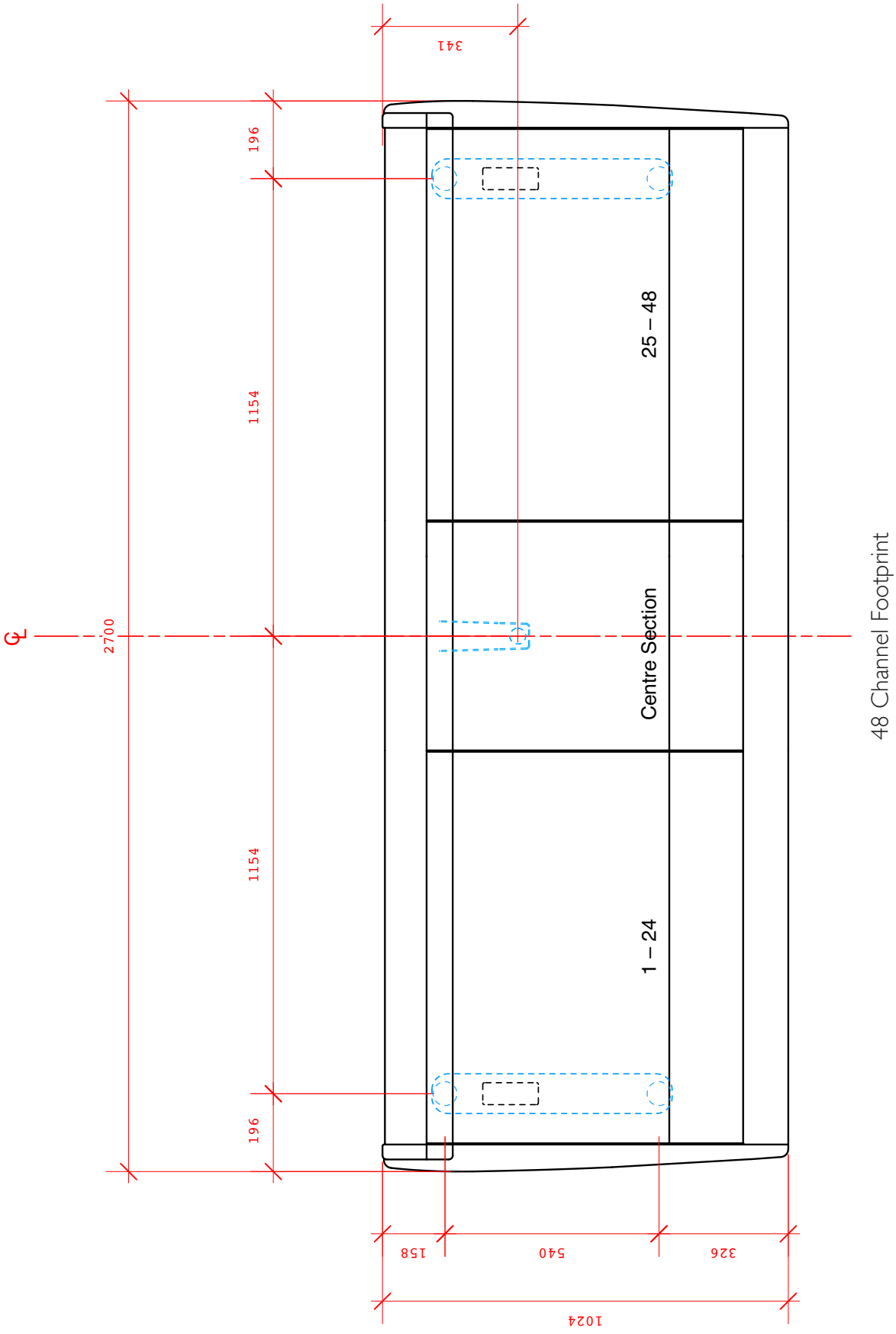
Patchrow Normalling Link Setings

Neutrik Patchrows

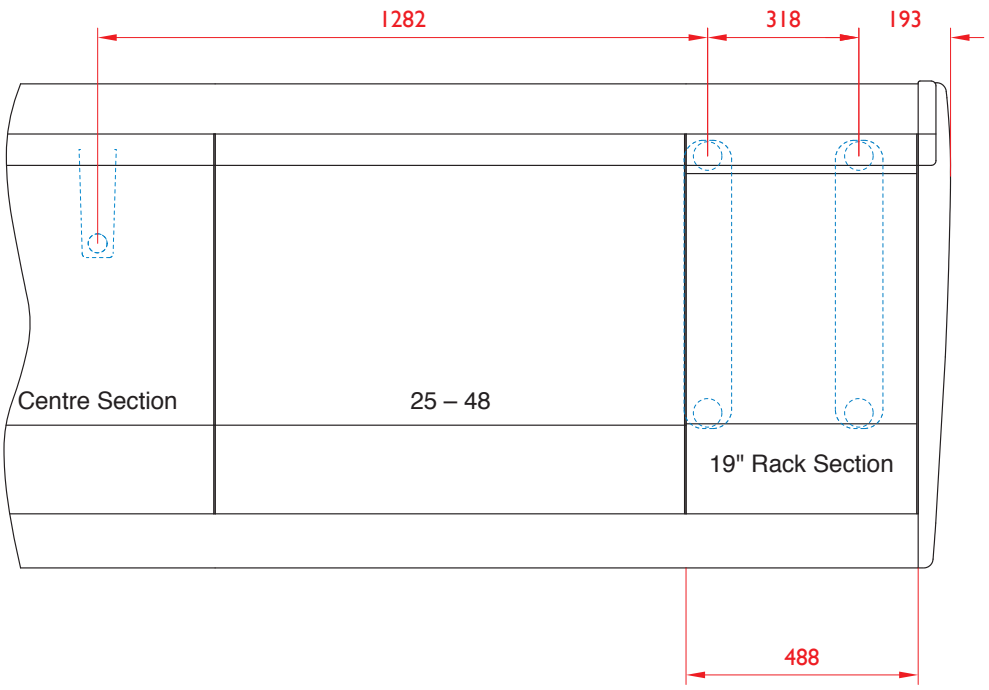
Normalling of Neutrik patchrows is achieved by installing connecting links into the side of each pair of jacks. Detailed instructions on where to fit these links is provided in the manual included with the console's trim kit; these instructions are also printed on the top of each patchrow cover panel.



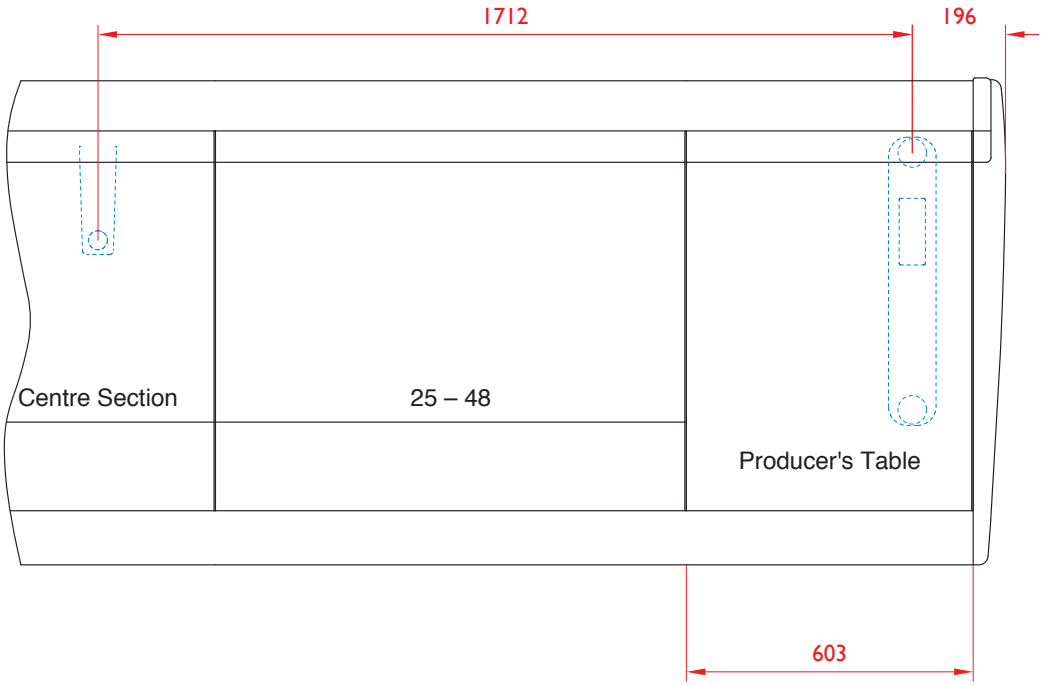
Appendix E – Console Footprint



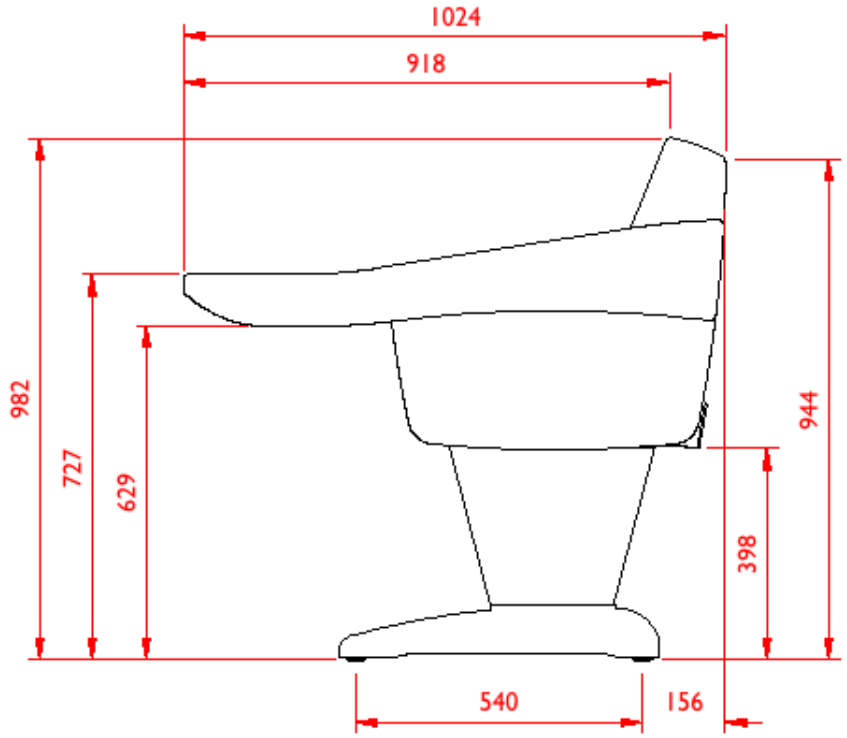
Internal 19" Patchbay Section



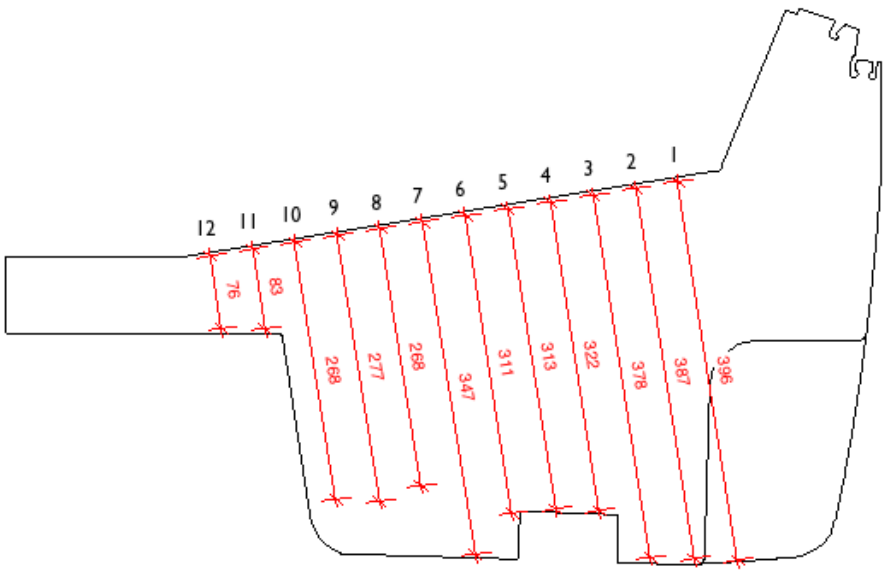
Internal Producer's Table



Duality Profile



19" Section Racking Depths



Appendix F – Environmental Specification

Temperature	Operating: Non-operating: Max. Gradient:	5 to 30 Deg. C -20 to 50 Deg. C 15 Deg. C/Hour
Relative Humidity	Operating: Non-operating: Max. Wet bulb:	30 to 80 % 5 to 90 % 29 Deg. C (non-condensing)
Vibration	Operating: Non-operating, power off:	< 0.2 G (3 - 100Hz.) < 0.4 G (3 - 100Hz.)
Shock	Operating: Non-operating:	< 2 G (10mSec. Max.) < 10 G (10mSec. Max.)
Altitude (Above sea level)	Operating: Non-operating:	0 to 3,000 m 0 to 12,000 m

Notes Relating to Static and Air Conditioning

- Any item of electronic equipment can be affected by electrostatic discharge. It is considered good practice to avoid using fully insulating floor coverings in technical areas.
- Air conditioning will usually be required. Note however, that a cool and dry atmosphere can significantly increase the likelihood of a build-up of static charge. It is recommended that air conditioning systems are designed such that the relative humidity does not fall below 30% during periods of operation.