QDC Engine
Quick Reference Guide
Software Version 16.2 and above
Part Number: XXXXX
Document Number: 1.0

IMPORTANT NOTICE

CONTENTS

CERTIFICATES & COMPLIANCES

CC EMISSION CONTROL

This equipment 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.

The QDC Engine conform to the EMC directives :-

EN 55022:1998 Class A - Emissions

EN 55024:1998 Class 3 - Susceptibility

The QDC Engine also conform to the Safety directives :-

UL 1419 - Professional Video & Audio Equipment

IEC 60950 - Information Technology Equipment

For further information on EMC procedures please refer to the following titles:-

Noise Reduction Techniques In Electronic Systems by Henry W Ott

EMC by Tim Williams

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. Changes or modifications not expressly approved by Fairlight ESP can affect emission compliance and could void the user's authority to operate this equipment.

CHARACTERISTICS	DESCRIPTION
Equipment Type	Supplemented Data: Information Technology
Equipment Class	Supplmental Data: Class 1 - Grounded equipment
Installation Catergory	Requirment Category 2 - Local level appliances, portable equipment etc.
Pollution Degree	Requirment: Level 2 operating enviorment - Normally only non-conductive pollution occurs. Occasionally there may be a temporary conductivity caused by condensation.

SAFETY SYMBOLS

The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product's enclosure; that may be of sufficient magnitude to constitute a risk of electric shock to persons.

L'eclair, dans une triangle, est destiné à alerter l'utilisateur de la présence de haute tension dangereuse non isolée dans l'enclosure du produit, qui peut être d'un voltage suffisant pour constituer un risque d'électrocution.

Das dreieckige Schild mit Blitzsymbol soll den Benutzer vor unisolierten Hochspannungen innerhalb des Gerätes warnen. Es besteht Lebensgefahr durch elektrischen Schlag!

El simbolo del rayo dentro de un triángulo equilátero, es usado para indicar la presencia de un voltage peligroso en el interior del aparato, de suficiente intensidad, como para constituir riesgo de electrocución a las personas.

"三角形内加上闪电似的箭号"表示机件／机器内部有"暴露的高电压"，可能造成触电的危险。

The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the appliance.

Le point d'exclamation dans une triangle est destiné à alerter l'utilisateur de la présence d'instructions importantes de fonctionnement et d'entretien dans la littérature accompagnant l'appareil.

Das dreieckige Schild mit Ausrufungszeichen soll den Benutzer auf wichtige Bedienungs- und Wartungshinweise in der Bedienungsanleitung hinweisen.

El simbolo de exclamación dentro de un triángulo equilátero avisa al usuario de la presencia de instrucciones importantes acerca del funcionamiento y mantención del aparato en los documentos que se

"三角形内加上感叹号"表示提醒使用者查阅附上的"重要操作和维修指南"。

MAINS PLUGS & MAINS POWER CORDS

The following lists the recommended Mains Plugs and Leads for use in various countries throughout the world.

Mains Attachment Plugs		
Standards applicable for Mains Plugs	**Rating**	**Country**
ASTA BS1363 1984	10A @ 250VAC	UK
BS546, 1950	10A @ 250VAC	India, Kenya, Nigeria, Kuwait, Parts of Asia and the Far East
IEC695-2-1 & NF-USE	10A @ 250VAC	France & Belgium
DIN49441 & CEE 7 Sheet VII	10A @ 250VAC	Europe
SEV	10A @ 250VAC	Switzerland
CEI23-16	10A @ 250VAC	Italy
NEMA5-15P & NEMA6-15P	10A @ 250VAC	USA
Mains Power Leads		
Standards applicable for Mains Leads	**Rating**	**Country**
CSA22.2 No.42 & UL498	10A @ 250VAC	Canada & Japan
ASE 1011 (1959)	10A @ 250VAC	Switzerland
CEI 2316	10A @ 250VAC	Italy
SRAF 1962	10A @ 250VAC	Denmark
AS3112-1990, NZSS198-1967	10A @ 250VAC	Australia, New Zealand, Fiji, Papua New Guinea, Republic of China
UL498 & SJT 10A minimum rating with IEC60320-1 coupler	10A @ 250VAC	USA

OBTAINING TECHNICAL SUPPORT

Users requiring technical support should contact their local Fairlight office or distributor.

Information can also be found on the world wide web at :-

http://www.fairlightesp.com

United Kingdom	USA – West Coast
Fairlight ESP Limited Unit 12, Spectrum House 32-34 Gordon House Road London NW5 1LP England Tel: +44 171 267 3323 Fax: +44 171 267 0919	Fairlight USA 844 North Seward Street, Hollywood, CA90038 USA Tel: +1 323 465 0070 Fax: +1 323 465 0080
France	**USA – East Coast**
Fairlight France 41-43 Rue des Peupliers 92100 Boulogne-Billancourt Paris France Tel: +33 1 4610 9292 Fax: +33 1 4610 9295	Fairlight USA 2 West 45th Street, Suite 605 New York, NY 10036 USA Tel: +1 212 819 1289 Fax: +1 212 819 0376
Germany	**Japan**
Fairlight Deutschland Gmbh August-Bebel-Strasse 26-53 14482 Potsdam-Babelsberg Berlin Germany Tel: +49 331 721 2930 Fax: +49 331 721 2933	Fairlight Japan Inc. Seijyo 4-2-23, Setagaya-Ku, Tokoyo 157-0066 Japan Tel: +81 3 5940 1515 Fax: +81 3 5940 1516

Asia - Pacific
Fairlight ESP Pty.limited Unit 2, 1 Skyline Place, Frenchs Forest NSW 2086 Australia Tel: +61 2 8977 9999 Fax: +61 2 8977 9900

SECTION 1 - INTRODUCTION

The aim of this manual is to provide configuration and service information to assist technical personnel when providing support for Fairlight QDC Engine products.

The manual is intended to be regularly updated with information, as the QDC Engine begins to be installed across a wide range of audio facilities.

QDC Engine

The QDC Engine currently ships with the following products :-

- Merlin

- FAME 2

- Prodigy 2

- MFX3.48

1.1 STATIC PRECAUTIONS

Please take note that all Fairlight manufactured electronic modules are static sensitive and should be handled under anti static conditions. When working on a system always ensure that you have an anti static lead connected and that the system is connected to ground through an earth lead.

Never work on the system while powered up unless you are authorized by Fairlight to do so. As a matter of practice always touch the external chassis of the system before opening the front panel. If cards are not handled under anti static procedures your machine may sustain damage which could either cause a complete failure or may cause intermittent crashes and subsequential system failure.

When handling cards please ensure that they are placed in anti static bags when not in the system. For shipment purposes electronic modules should be placed in an anti static bag and then suitably surrounded with loose packaging materials in a solid card board box. Cards shipped to Fairlight without the correct anti static packaging will have their warranty voided. If you have any enquiries on this matter please feel free to contact your local Fairlight office or distributor.

1.2 ENVIRONMENT

The system is designed to be operated in a clean air-conditioned environment. Generally, an area comfortable for people (20°C - 21°C) should be suitable. The rack mounted units and disk drives, use fans for ventilation. Users may find it desirable to install these units away from the operator/console location.

Make sure that the rack units can access cool air through the opening on the front of the Engine and expel warm air from the back. As with all computer systems, the Fairlight will operate more reliably if static generating floor coverings are avoided.

Do not fit the Engine into a closed environment except where ducted cool air is forced through the Rack. Do not run the Engine whilst it is on the ground as it will accumulate dust, which may eventually cause a failure.

The Engine unit is normally installed in a suitable 19" rack which is at least 600 mm deep, or has an open back section. It is recommended that external hard drives be mounted on a rack tray, above or below the Engine, using the shortest possible cables to prevent SCSI bus corruption.

Please Avoid:

- Fitting the Engine where air circulation will be restricted.

- Installing Engine close to heat sources.

- Installing in dusty or damp area.

- Installing in area subject to vibration.

- Installing in area with strong magnetic or electric fields

Section 2 - Drive Installations

2.1 Introduction

The following section deals with installing internal and external SCSI based media devices and configuring them for use with the QDC Engine. For information regarding approved SCSI drives please refer to a local Fairlight ESP office or distributor.

2.2 Installing Internal Hard Disk Drives

The QDC Engine has been designed to accept two fixed 3.5" disk drives and 2 removable 5.25" drive enclosures fitted on to an internal drive bracket. The system comes configured with one system disk which contains the O/S9 Operating System and application software. This allows for 3 media drives to be fitted internally. The two removable drive carriers have been designed to provide durable and reliable mounting for 3.5" SCSI drives within 5.25" half height peripheral slots.

The Internal SCSI buss is connected via a SCSI loom directly to the motherboard. The SCSI buss is based on the Ultra Wide, 68 Pin configuration

  1 To install a hard drive within the Engine, first remove the dress panel.
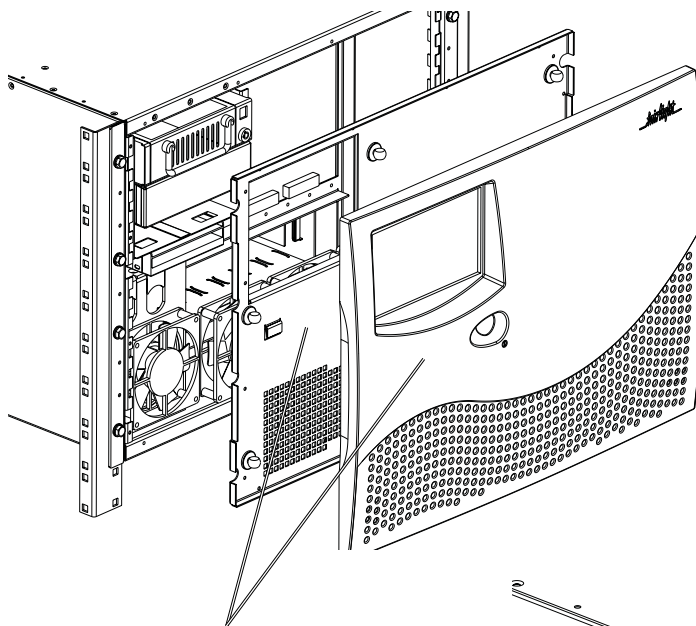
Engine Front Panels
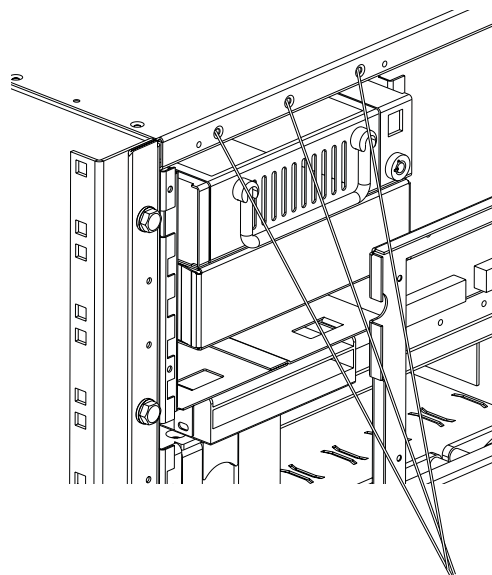
Retaining Bolts

2. Next, unscrew the eight screws holding the front panel in place, gently pull the front panel away from the Engine, being careful to note the three cables connected to the back of the panel from the power supply and the back plane within the Engine.

3. Disconnect the fan power loom from the connector labeled F1 on the back plane.

4. Using a small flat headed screwdriver, turn the red screw (anti-clockwise) on the power switch connector on the rear of the front panel.

5. Disconnect the power connector, leading from the Power On switch to the F2 connector on the back plane (and leading to the Power Supply).

6. Disconnect the SCSI extender cable from the internal SCSI cable, mounted on the right side of the power supply.

7. The front panel can now be removed fully from the front of the Engine and placed on a suitable surface until reinstallation.

8. Next remove the three bolts holding the drive mount bracket in place.

Bracket Fan

Drive Bracket

Retaining Bolts

Kingston Drive Unit
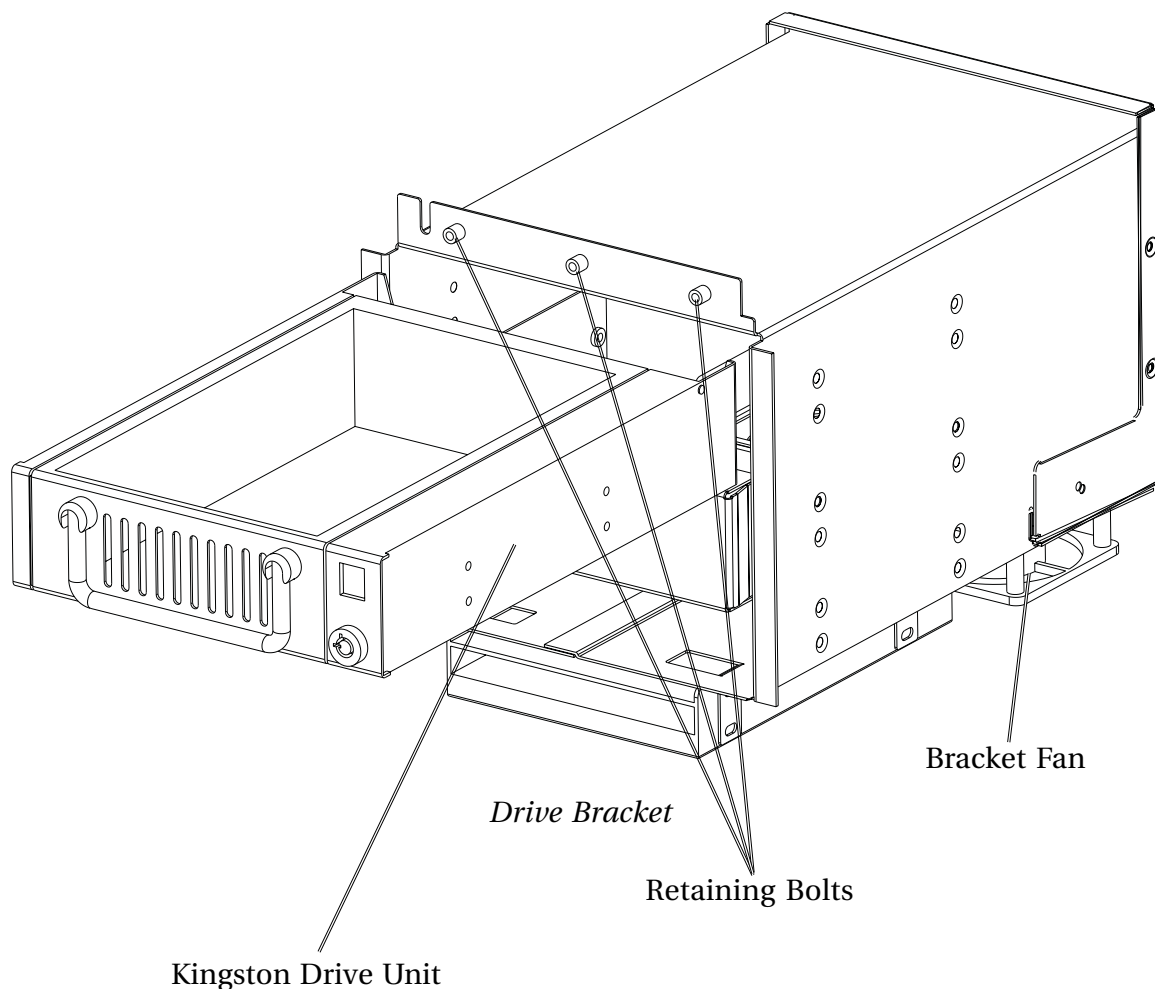
9. Pull out the bracket from the Engine being careful to disconnect the power cable for the fan attached.

10. Remove termination blocks and set a unique SCSI ID on the drive. Refer to the SCSI drives manufacturers User Manual for details.

11. Insert the drive or cradle, into one of the appropriate sections of the enclosure.

12. Mount four screws to the two sides of the drive bracket to allow the device to remain securely fastened. Note - These screws should be supplied with the drive.

13. Connect the Drive Bracket SCSI extender cable to the internal SCSI cable connector.

14. Connect the power loom on to the back of the cradle or disk drive.

15. Insert the drive bracket back into the Engine and attach the three bolts and fan power cable again.

16. Reattach the front panel, remembering to attach the fan power loom to the F1 connector on the backplane and connect the two power connectors onto the back of the Power On switch.

2.3 INSTALLING EXTERNAL HARD DISK DRIVES

An additional SCSI controller can be added to the system and fitted in one of three PCI slots on the PXY Main Processor Board. With the controller physically installed an additional 4 SCSI devices can be connected to the system bringing the available devices allowed to 7.

All cabling to SCSI devices must be kept as short as possible and the Buss must be terminated using an active SCSI terminator plugged into the last drive in the chain. SCSI I.D.'s can be 0 through to 6. SCSI I.D. 7 is reserved for the internal SCSI controller.

Some disks have SCSI terminating resistors in place and this should be checked and resistors removed when extra disks are being added to the system. Lower transfer rates and SCSI errors will result if the buss is not correctly terminated.

2.3.1 ADDING AN ADDITIONAL SCSI CARD

1.   Remove the pozi-drive screws using a pozi 1 drive screwdriver.

2.   The System I/O Panel must be removed from the Engine. Pull outwards the two compact PCI receptacle holders and slowly pull the panel out from the back of the Engine.

3.   Next remove the SCSI loom from the PXY Main Processor Board and fully remove the System I/O Panel from the Engine and lay it horizontally on a anti static surface.

WARNING - MAKE SURE ANTI-STATIC PRECAUTIONS HAVE BEEN TAKEN BEFORE COMMENCING WORK ON THE ENGINE AND PXY MAIN PROCESSOR CARD.

System I/O Panel

Pozi-drive Screws

PCI Compact Receptacles
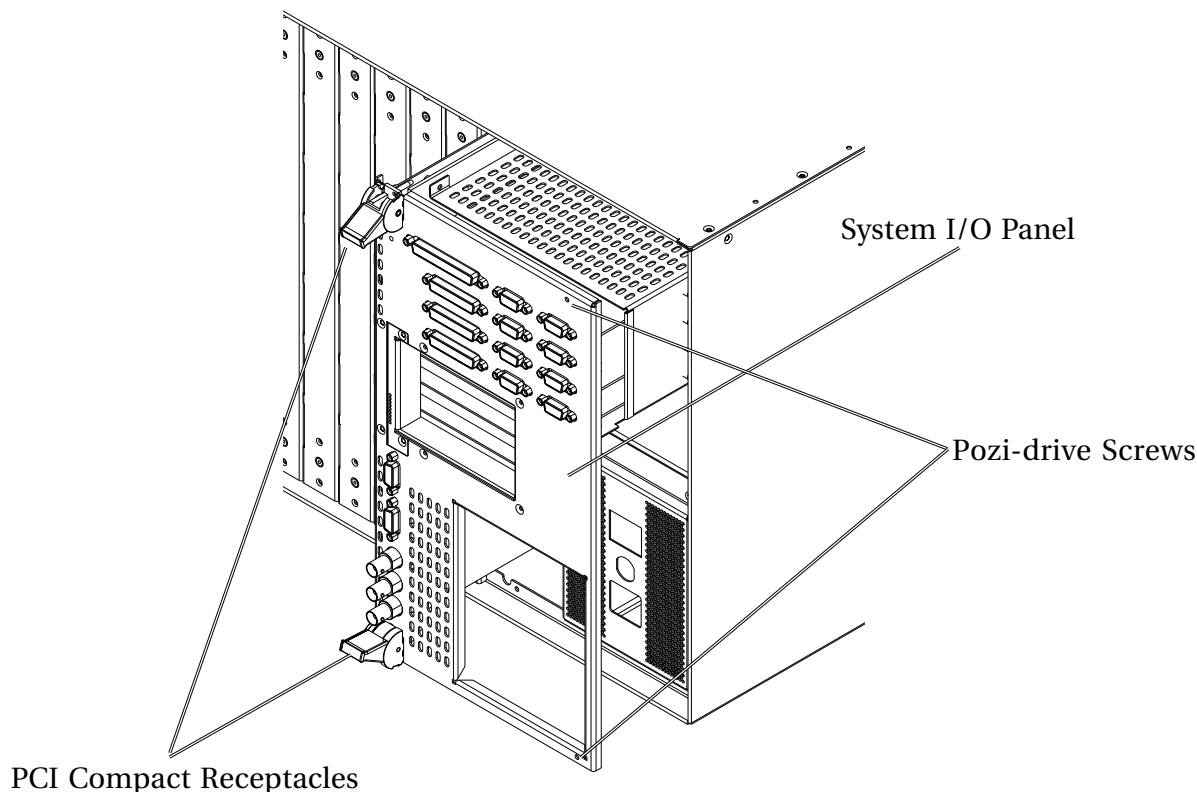
4.   Lay the System I/O Panel on its side so that the PXY Main Processor Board is horizontal.

5.   Choose one of the available PCI slots on the PXY Main Processor Board and remove the blanking plate. Remember to remove the screw holding the plate in place !
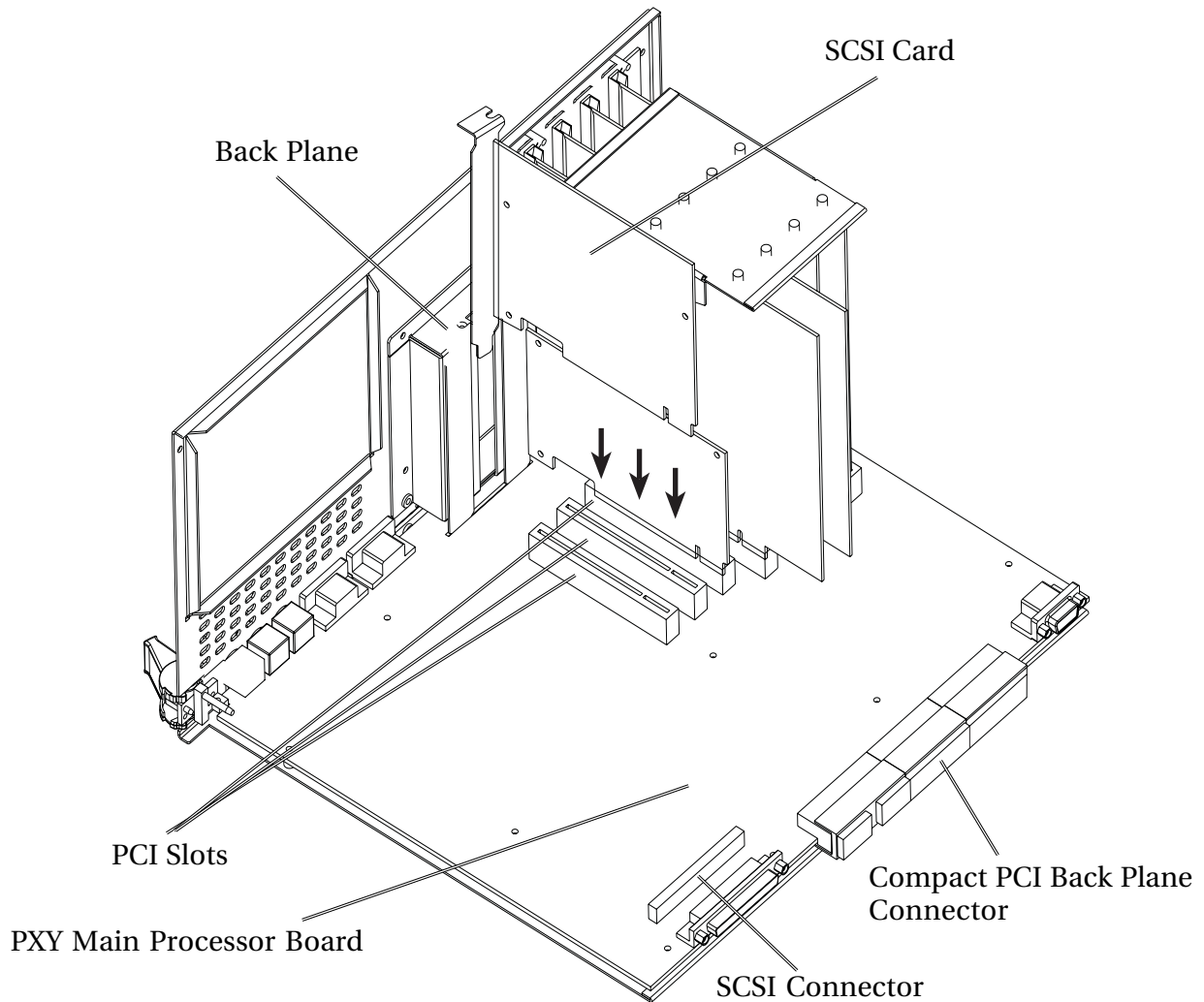
Horizontal PXY Main Processor Board / System I/O Panel

6.   Insert the SCSI Card into the PCI slot, making sure the connectors are fully inserted

7.   Screw the Card onto the back plane.

8.   Insert the System I/O Panel back into the Engine, being careful to reconnect to the compact PCI back plane.

9.   Before fully inserting the System I/O Panel, reattach the SCSI loom to the SCSI connector on the PXY Main Processor Board.

10. Pull the PCi Compact Receptacles holders inwards to lock the board in place.

11. Replace the pozi-drive screws into the PXY Main Processor Board.

12. The physical installation is now complete.

SECTION 5 - CONFIGURING DISK DRIVES

5.1 EXTERNAL HARD DISK DRIVES

An additional SCSI controller can be added to the system and fitted in one of three PCI slots on the PXY Main Processor Board. With the controller physically installed an additional 7 SCSI devices can be connected to the system.

5.1.1 WIDE BASED DISK DRIVES

The Ultra Wide single ended SCSI specification is used within the internal and external SCSI busses. This allows for ultra fast transfers speeds from a disk drive up to 40 megabytes a second.

The SCSI controller comes configured with a single ended 68 Pin configuration connector.

Only a Fairlight supplied SCSI Controller can be installed and configured with the Engine.
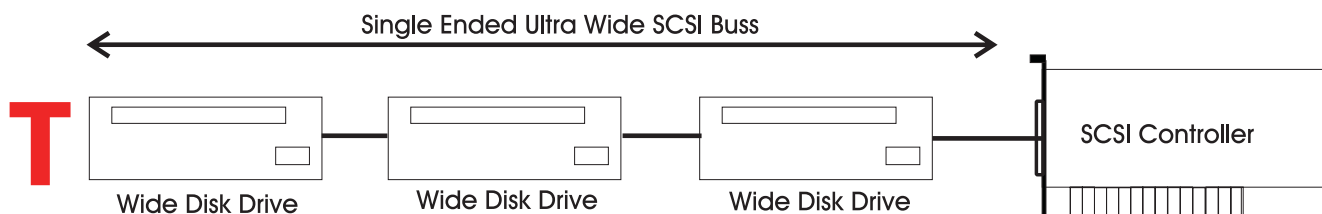
All cabling to SCSI devices must be kept as short as possible. The maximum length for the entire buss must not exceed more than 1.5 meters. It is highly recommended that drive enclosures with an active backplane be used to reduce cable lengths.

Some disks have SCSI terminating resistors in place and these should be checked and resistors removed when extra disks are being added to the system.

The last disk drive at the end of the chain must be terminated using an active terminator.Lower transfer rates and SCSI errors will result if the buss is not correctly terminated.

SCSI I.D.'s can be 0 through to 6. SCSI I.D. 7 is reserved for the SCSI controller.

5.1.2 NARROW BASED DISK DRIVES

Narrow Based SCSI Disk Drives may be attached to the buss but must always be the last in the chain after any Wide disks are connected.

A quality 68 pin to 50 pin Adaptor must be used when connecting from the SCSI buss to a narrow disk drive.

The end of the Buss must be terminated using an active SCSI terminator plugged into the last drive in the chain.

When using narrow based disk drives along the SCSI buss the Engine must be configured for Narrow use only.

5.1.2 CONFIGURING THE ENGINE FOR NARROW USE

Connect disk drives to external SCSI buss port.

Power on the disk drives and Engine

When the BIOS screen appears PRESS THE SPACE BAR, before the -

"Press Key To Display Boot Menu" Countdown ends.

Under Booting Procedure press RC and press Enter .

A message should appear next on screen asking

"Do you want to use the recommendedNVRAM Configuration" PRESS N

Press C then Enter - to "Reconfigure The System Setup"

Press Return untill the cursor has moved down to the 11 th line -

Slot 1 SCSI Wide........

At this point you will need to know which PCI slot the SCSI Controller Card has been fitted in. Looking at the Merlin Engine from the rear will show which slot the card is in -

•   Slot 1 is the top most slot

•   Slot 2 is the middle slot

•   Slot 3 is the Bottom slot

Use the Enter key on the Console Keyboard to move down the list to the correct slot.

Next press 0 on the Console Keyboard to change from Wide to Narrow use.

Then Press Enter untill the following message appears on screen

"Enter the NVRAM Section you wish to Update"

Select Q and then press Enter.

A message will appear -

"NVRAM Configuration is complete ....System will now restart"

Press Return on the Console Keyboard.

The configuration is now complete.

5.1.3 MIXING WIDE AND NARROW DISK DRIVES

Wide and Narrow based disk drives can be mixed on the same SCSI buss at the same time -

Narrow Based SCSI Disk Drives must always be the last in the chain after any Wide disks are connected.

If the Engine is configured to run in Wide Mode, a quality 68 pin to 50 pin Adaptor must be used when connecting from the SCSI buss to a narrow disk drive.

Please note the High Data Byte must be terminated when using an Adaptor, to allow for correct termination wide converting to a Narrow disk drive.

Remember to always terminate the last drive in the chain.

Single Ended Wide based SCSI Buss — Narrow Disk Drive — Wide to Narrow Adaptor — Wide Disk Drive — SCSI Controller
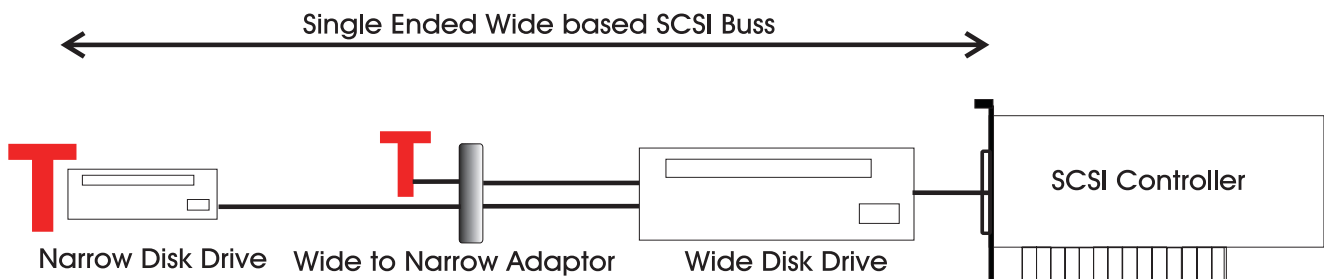
If the Engine is configured to run in Narrow mode, an Adaptor without High Byte termination may be used.

Remember to always terminate the last drive in the chain.

Single Ended Narrow based SCSI Buss — Narrow Disk Drive — Wide Disk Drive — SCSI Controller
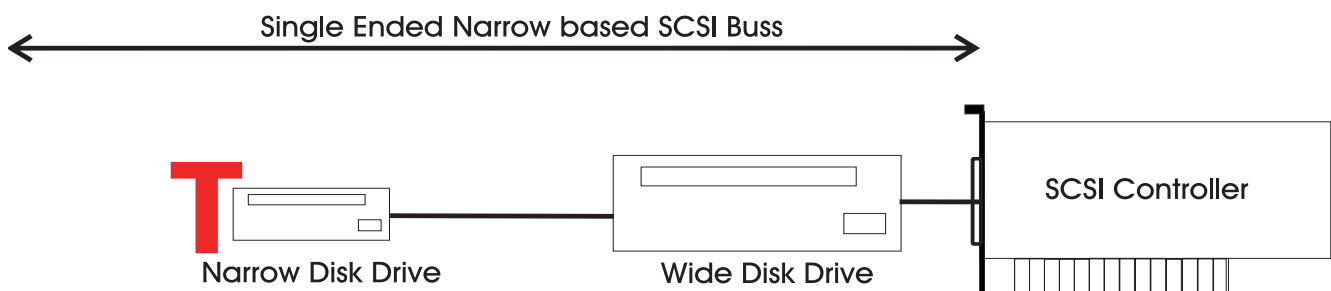
3.2 CHECKING FOR NEWLY INSTALLED SCSI DEVICES

Once you have mounted all external and internal SCSI devices, the following will aid you in determining if they are all detected.

1. Ensure that the Engine is completely reassembled and that there are no loose cables.

2. Power up the Engine and Console.

3. Press the SPACE BAR once a gray display is seen. If you miss the time window in which the Space bar must be pressed, simply reboot and try again.

4. The displayed prompt is " Select a boot method from the above menu: ".

5. From the prompt type " SCAN " < RETURN >.

6. Observe that all SCSI devices are detected.

7. You may need to run this command a couple of times as some drives are much slower to boot than the Engine.

8. If a SCSI device is not seen, power down the system and check all SCSI ID's and that the SCSI and power cables are connected.

3.3 BOOT DISK FAILURE

If a Boot Disk becomes corrupted, or simply fails, the following procedure should be used.

The procedure assumes that the Engine is connected via Ethernet to a PC which has the latest upgrade / .GZ file.

1. Obtain a disk drive and plan to use it as the new Boot Disk.

2. Power down the QDC Engine and follow Section 2.2 Installing Internal Hard Disk Drives.

3. Once the disk is installed, reconnect cabling and power up the Engine.

4. When the BIOS screen appears PRESS THE SPACE BAR, before the -

    "Press Key To Display Boot Menu" Countdown ends.

5. Type ROM and press enter. Then wait for the RAM Disk to load.

6. Type FTP and copy an upgrade .GZ file to the RAM disk.

7. Once this file has been transferred

    type - upgrade

    The system will ask which disk you want to upgrade onto, select the new disk. The system will then load the OS/9 operating system and the main software application.

8. During the upgrade, if the disk has not been formatted the system will format the disk.

SECTION 4 - CONNECTING TO A LOCAL AREA NETWORK

The QDC Engine can be connected to a Local Area Network and run as part of a Fairlight MediaLink network, providing connectivity to other MFX systems, disk drives and Fairlight products.

For more details regarding connecting to a network please contact a local Fairlight office or distributor or read the MediaLink Installation and User Manuals.

4.0.1 ADDING A NETWORK CARD

1   First, the System I/O Panel must be removed from the Engine. Pull inwards the two compact PCI receptacle holders and slowly pull the panel out from the back of the Engine.

2   Next remove the SCSI loom from the PXY Main Processor Board and fully remove the System I/O Panel from the Engine and lay it horizontally on an anti static surface.

WARNING - MAKE SURE ANTI-STATIC PRECAUTIONS HAVE BEEN TAKEN BEFORE COMMENCING WORK ON THE ENGINE AND PXY MAIN PROCESSOR BOARD.

System I/O Panel

PCI Compact Receptacles
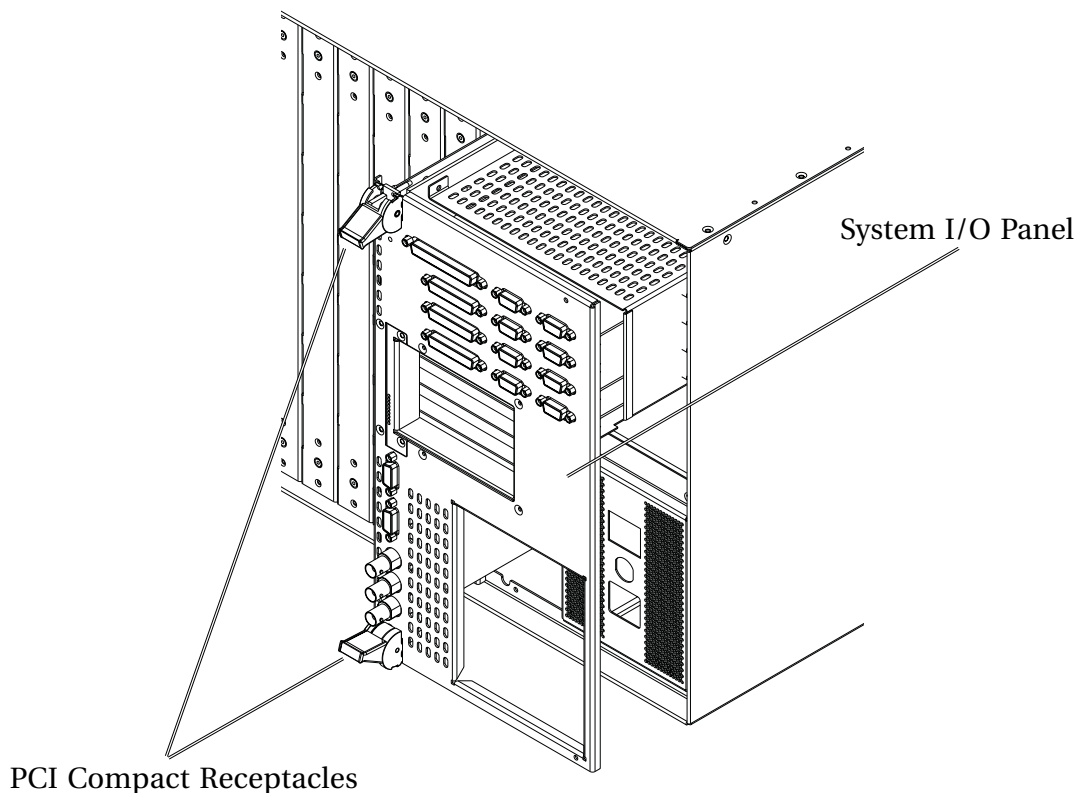
3   Lay the System I/O Panel on its side so that the PXY Main Processor Board is horizontal.

4   Choose one of the available PCI slots on the PXY Main Processor Board and remove the blanking plate. Remember to remove the screw holding the plate in place !

Network Card

Back Plane

PCI Slots

PXY Main Processor Board

Compact PCI Back Plane Connector
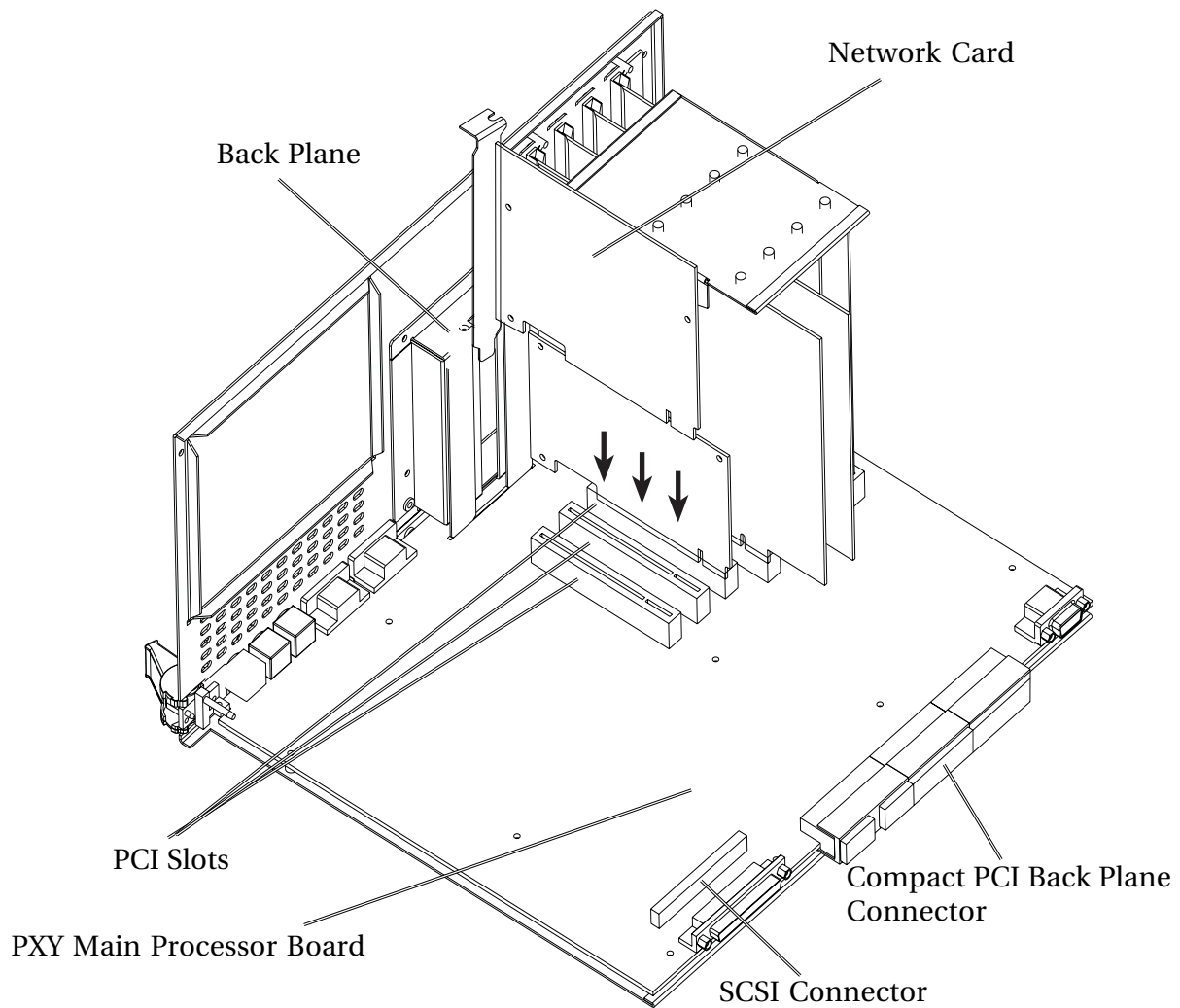
SCSI Connector

Horizontal PXY Main Processor / System I/O Panel

5   Insert the Network Card into the PCI slot, making sure the connectors are fully inserted.

6   Screw the Card onto the back plane.

7   Insert the System I/O Panel back into the Engine, being careful to reconnect to the compact PCI back plane.

8   Before fully inserting the System I/O Panel, reattach the SCSI loom to the SCSI connector on the PXY Main Processor Board.

9   The physical installation is now complete.

Section 5 - Configuring Audio I/O

5.1 General Description

The PCB assembly QDC is the DSP engine of the QDC Technology architecture. As such it is the successor to ESP-DCC and performs a similar function in the Merlin,MFX3.48, Prodigy 2 and Fame 2 systems. It is designed to be largely compatible to ESP-DCC from a functional and software point of view, at the same time providing significantly increased capabilities for future expansion. The name QDC "Quad Digital Channel" refers to the fact that the QDC card consists of four identical sections, each of which corresponds more or less to a single ESP-DCC. The name could also be interpreted as "Quad DSP Card", but this is not strictly correct since there may be up to 8 DSPs per card.

5.2 I/O Capabilities

The QDC card has connectors for six I/O mezzanine cards, which plug onto and lay parallel to the main QDC PCB. These cards provide analog and digital I/O -

´ AI-1, provides 8 analog inputs

´ AO-1, provides 8 analog outputs

´ AES-1, provides 4 stereo digital (AES) inputs and 4 stereo digital (AES) outputs.

Each QDC card is capable of allowing a maximum of :-

2   AI-1 cards - 16 analog inputs

4   AO-1 cards - 32 analog outputs

Or

2   AI-1 cards - 16 analog inputs

4   AES-1 cards - 32 digital inputs and 32 digital outputs

The I/O connectors for the AES-1 and AO-1 cards are identical, which allows these cards to be interchanged as required. However use of a mezzanine card in the position normally reserved for the other will require special external I/O cabling to deal with the resulting changed pinout on the 50pin sub-D connectors.

Typically, one or both of the analog output cards (AO-1) will be replaced by digital I/O cards (AES-1), increasing the digital I/O capability up to 16 stereo in + 16 stereo out.

The maximum possible I/O capability is achieved with four AES-1 cards

If the analog input card (AI-1) is also fitted in this configuration then there are total of 48 (mono) input channels, of which any 32 (with certain restrictions) can be used simultaneously.

5.3 ADDING I/O

Depending on the configuration of the QDC Engine, the following describes how to add and configure I/O modules to a QDC.

QDC Card   Receptacles   *QDC Enigne*
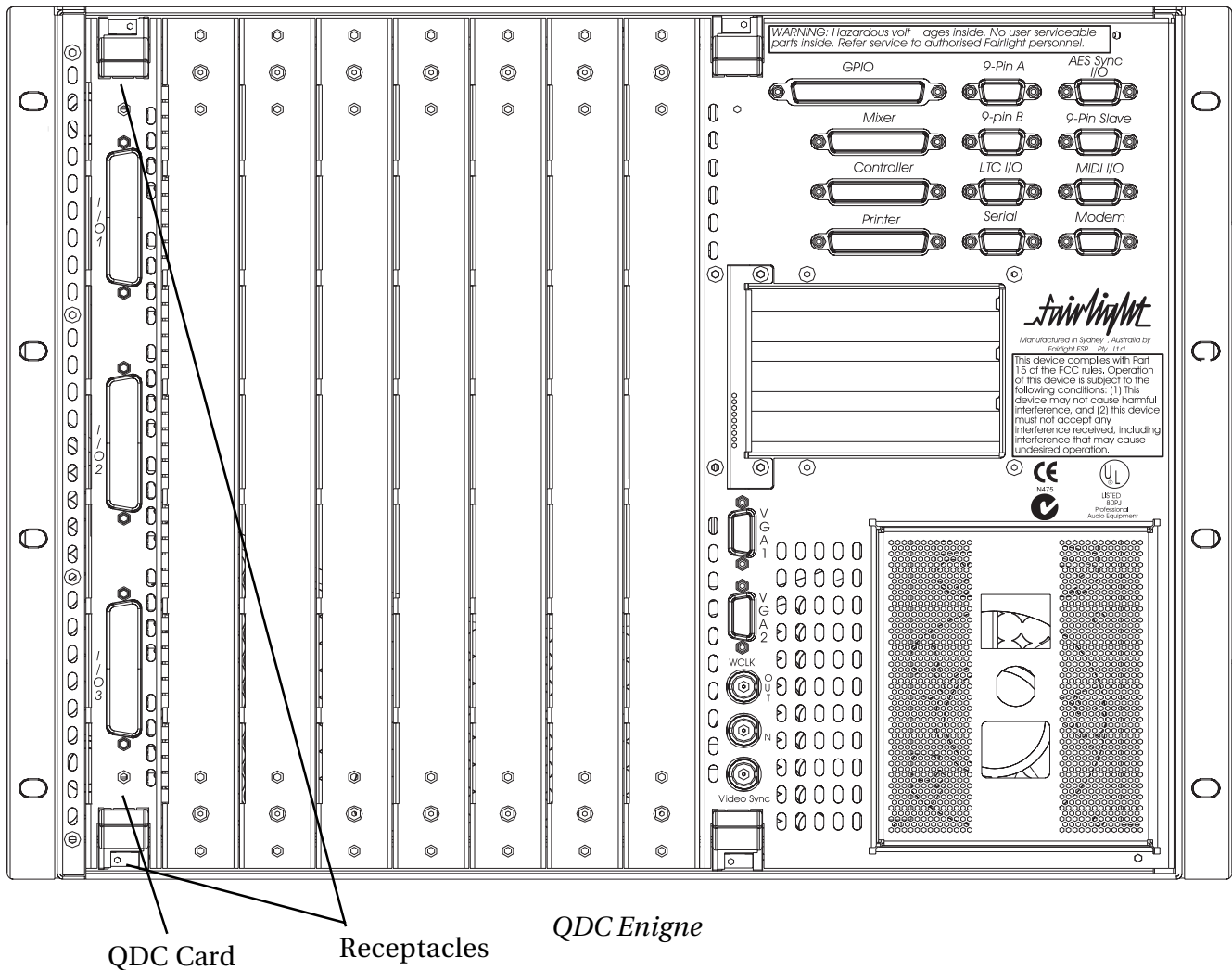
1. Prepare an anti-static envoriemnt before commencing work on the Engine

2. First remove the QDC from the rear of the Engine by unscrewing the 2 screws using a philips screwdrive. Then push inwards, the top and bottom receptacles and gently pull the Card out.

3. Lay the Card on a stable, even surface, with the mezzaine boards facing upwards. Or if it is an unpopulated QDC, with the 4 memory chips facing up.

4. Depending on the configuration, the mezzanine Cards need to be configured in paricular slots. Please view the table and diagram on the following page for futher details.

AI

AO or AES

AO or AES

AO or AES

AO or AES

AI

QDC Card with 6 Mezzanine Cards Connected

The above diagram illustrates a QDC with all 6 I/O slots being populated. The table below describes where the different I/O Mezzanine Cards can be inserted on to the QDC Card.

I/O Card Type	QDC Slots
AI	Can only be inserted in Slots 1 and 6
AO	Can be inserted in Slots 2,3,4 and 5
AES	Can be inserted in Slots 2,3,4 and 5

• AI cards must only be inserted into Slots 1 and 6. Neither AO or AES cards can be inserted in to these slots.

• AO and AES Cards may be inserted into slots 2,3,4, and 5.

- AO Cards should always be inserted into the highest slots first and then AES Cards inserted into the remaining available slots moving vertically down the QDC.
- Always insert the I/O Cards with the name of the board facing upwards and pressing over the hole at each end of the board horizontally.
- Always remove I/O cards by gently pulling up or down verticaly. This decreases the connec tors from being damaged.

5.   Remove the I/O Card from its packaging and anti-static bag and insert it onto the highest available slot on the QDC.

6.   After checking that the card is firmly seated. Insert the QDC back in the Engine. Pay carfeful attention to the 3 sets of guide rails on the top and bottom of the Engine when guiding the QDC inside.

7.   Before pulling the recepacles outwards to lock the QDC in place, make sure tha the card is fully inserted in the Engine.

8.   Connect cabling back to the Engine and power up the console and Engine.

9.   As the system boots up, check that the new I/O card is seen. If the card is not seen it may need to be reseated.

10.   Once the cards are seen, the system is ready for use. Read the Appendix at the back of this Manual for pin out details for the 3 50 way D type Connectors.

Section 6 - Diagnostic Commands

Support and Service personnel should find the following commands useful when diagnosing hardware problems with a QDC Engine.

All the commands below assume the user has quit the main software application and is at the command prompt.

7.1 JTAG

Simply type - jtag

At the command prompt and a list of the QDC Engines backplanes PCB number and revision will appear. This may be useful when diagnosing if a system has the most up to date hardware revisions.

7.2 JTAG +CONFIG

Simply type jtag +config (make sure there is a space between jtag and +)

At the command prompt for a list of

- QDC
- AI
- AO
- AI
- AES
- PXY
- SI01

Board version numbers and revisions.

7.3   QDCINIT

Type QDCINTI at the command prompt to reinitialise the QDC Cards. The system will then list the QDC configuration including .

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Section 7 - Routine Maintenance

7.1 Cleaning The Exterior Of The Units

You should clean the system units often enough to prevent dust or dirt from accumulating. Dirt acts as a thermal insulating blanket that prevents effective heat dissipation and may provide high-resistance electrical leakage paths between conductors or components in a humid environment.

Clean the dust from the outside by wiping with a soft cloth or small brush. A brush is especially useful for removing dust from around connectors and cooling grilles. Use a cloth dampened in water that contains 50% Isopropyl alcohol to remove hardened dirt. You should not use abrasive cleaners.

7.2 Cleaning The Monitor Screens

The Graphics Monitor has a special coating on the screen which prevents glare. A cleaning cloth should be supplied with the Graphics Monitor and the instructions given in the monitor manual should be followed.

7.3 Cleaning The Engine Air Filter

To ensure good airflow through the Engine, the air filter in the front panel must be periodically cleaned. It is usually sufficient to simply remove accumulated dust using a vacuum cleaner to suck it out of the front panel grille. From time to time, however, the front panel will have to be removed to give the filter a thorough clean or even replace it altogether. The front dress panel should removed to allow access to the Air Filter.

1. Gently lift the dress panel away from the Engine.

2. Unclip the Air Filter and remove it from the front facia of the 2nd panel.

3. Once the air filter has been removed, clean it thoroughly by washing it in warm water with mild detergent. Make sure it is completely dry before reinstalling it.

CAUTION: DO NOT ALLOW WATER TO GET INSIDE ANY ENCLOSED ASSEMBLY OR COMPONENT. DO NOT CLEAN ANY PLASTIC MATERIALS WITH ORGANIC CLEANING SOLVENTS, SUCH AS BENZENE, TOLUENE, XYLENE, ACETONE, OR SIMILAR COMPOUNDS, BECAUSE THEY MAY DAMAGE THE PLASTIC. CAUTION: DO NOT USE CLEANING FLUIDS, OTHER THAN THOSE MENTIONED IN THE GRAPHICS MONITOR MANUAL, TO CLEAN THE SCREEN - THE SPECIAL COATING COULD BE DAMAGED.

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4. Reverse the above steps to attach the front dress panel back into place.

Engine Front Panel
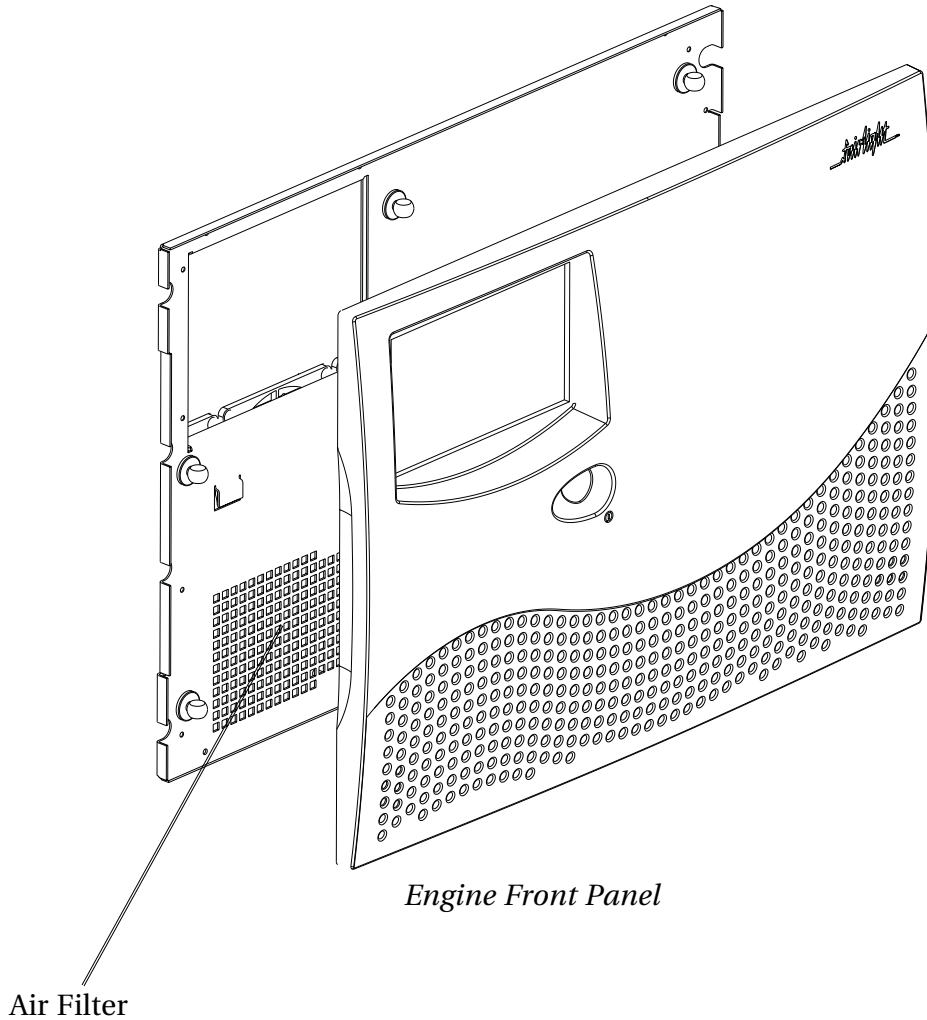
Air Filter

NEW AIR FILTERS

If the filter cannot be cleaned properly or is worn out, a new one should be ordered. Please contact your local Fairlight office or Distributor.

SECTION 8 - QDC DIAGNOSIS

The following section is intended to highlight recent reports from the field on service issues relating to the QDC Engine and to give instructions for resolving them.

TDI STUCK HIGH/LOW DURING STARTUP

If while the QDC Engine is booting, you get an error, TDI STUCK HIGH/LOW, type the folowing in the shell -

jtag -nvv (i.e. -n v v, but with no spaces)

This will go through the entire JTAG download chain and give a verbose output of the presence of every JTAG device.

By carefully looking at the info, the screen output will indicate whch device has the TDI STUCK HIGH/LOW.

The PXY, QDC, AES card or an Analog card may be at fault. The TDI signal goes throughout the entire machine.
The TDI signal is the JTAG chain clock. If this doesn't get through to any detected JTAG devices, you get this error.

The most common problems are -

Dry intermittent joints on a mezzanine card. This can happen if the nylon bolts that hold the cards to the QDC are tightened up too much. If the nylon bolts are tightened up too much, the cards will flex considerably, causing the SMDs solder joints to break.

Try shuffling the order of the QDC's.

If running a Merlin-48/MFX3.48 with a large amount of IO, try changing the PSU. Early PSU's don't have enough grunt, especially on the +12v rail. For example, a QDC was made in production, in which it was thought that 'all' the cards where faulty. Changed the PSU, and the QDC worked perfectly.

QDC XILINX DONE ERRORS

This error can happen from time to time.
If it does, first turn off the machine at the BACK.
Leave it for 1 minute, turn it back on at the back, and then power up at the front.
If the error happens again, turn the machine off at the back, remove the offending QDC, and remove the middle two AES cards (if applicable).
Reseat the 4 x 32Mb EDO SIMMS. Rebuild the QDC, put it back in the engine.
If the error happens again, the QDC is no good.
If it works, still keep an eye on it. If the problem returns again relatively quickly, replace it.

BLOWALL DOES NOT WORK

Occasionally blowall -ckq will not work (frozen) after an upgrade.
To get around this, reboot the QDC engine.
While it is booting, stop it at the point where the network config happens.
While in the setup file, do a BLUE 'K'. This 'KILLS' the editor ,and dumps you to the shell.
You will be presented with a $ prompt.
Type login, and login as usual.
Then do the blowall. It should work properly.

COMMAND INFO

1)   The RENAME command does not function in QDC based systems.

        Use ESPRENAME. Use a -? option to find out how to use it.
        (basically the same as rename, but all pathnames must be absolute)

2)   FIND is now gone. Use ESPFIND. -?

LONG SVGA RUNS

40-50 metre run of SVGA CABLE causes problems with Horizontal Sync.
The symptom is horizontal tearing over the timecode display on the screen.
This was rectified by making an adapter at the QDC Enigne end that increased the
SVGA source impedance on H by 56R.
(i.e. a 56R resistor in series on the H at the QDC Engine end).

TO TURN OFF DITHER...

This is useful for digital CRC testing using Audio Precision Test Equipment
In AMAN_CFG, enter in the following line AFTER the revision history...(software version 16.4.01b
and onwards)
setenv DISABLE_DITHER 1

TO MONITOR SYSTEM INTERUPTS...

In the shell, do the following,

p2init vecccount

vectors >>>/tvt &

Now run the application. Open a project, jump to the shell using $, and type...
tvtline vectors

This will show you what all of the interupts are doing. Use CTRL E to get out of it.

TO RE-INITALISE A QDC THAT CAN'T BE ACCESSED (HARDWARE REVISION 0)...

QDCs in this state cannot be programmed by normal methods (e.g. jtag -cq).
In the shell, type...
jtag -v bareprog
qdcinit

APPENDIX - CONNECTION SPECIFICATIONS

INTRODUCTION

The following information contains all the wiring details to allow users to connect peripheral devices to the back panel of the Engine.

A1 - AUDIO I/O CONFIGURATION

The Engine uses a Fairlight ESP designed proprietary card called the QDC for all its audio I/O and processing.

Up to 3 QDC cards can be configured within an Engine.

On each QDC , a maximum of 6 I/O module boards, can be configured, to allow 8 I/O channels per module.

This allows for a maximum of

- 16 analog inputs

- 32 analog outputs

or

- 32 digital inputs

- 32 digital outputs

- 16 analog inputs per QDC to be available.

The following pages describe the wiring pin outs for each QDC, to enable installation personnel to configure and wire the system.
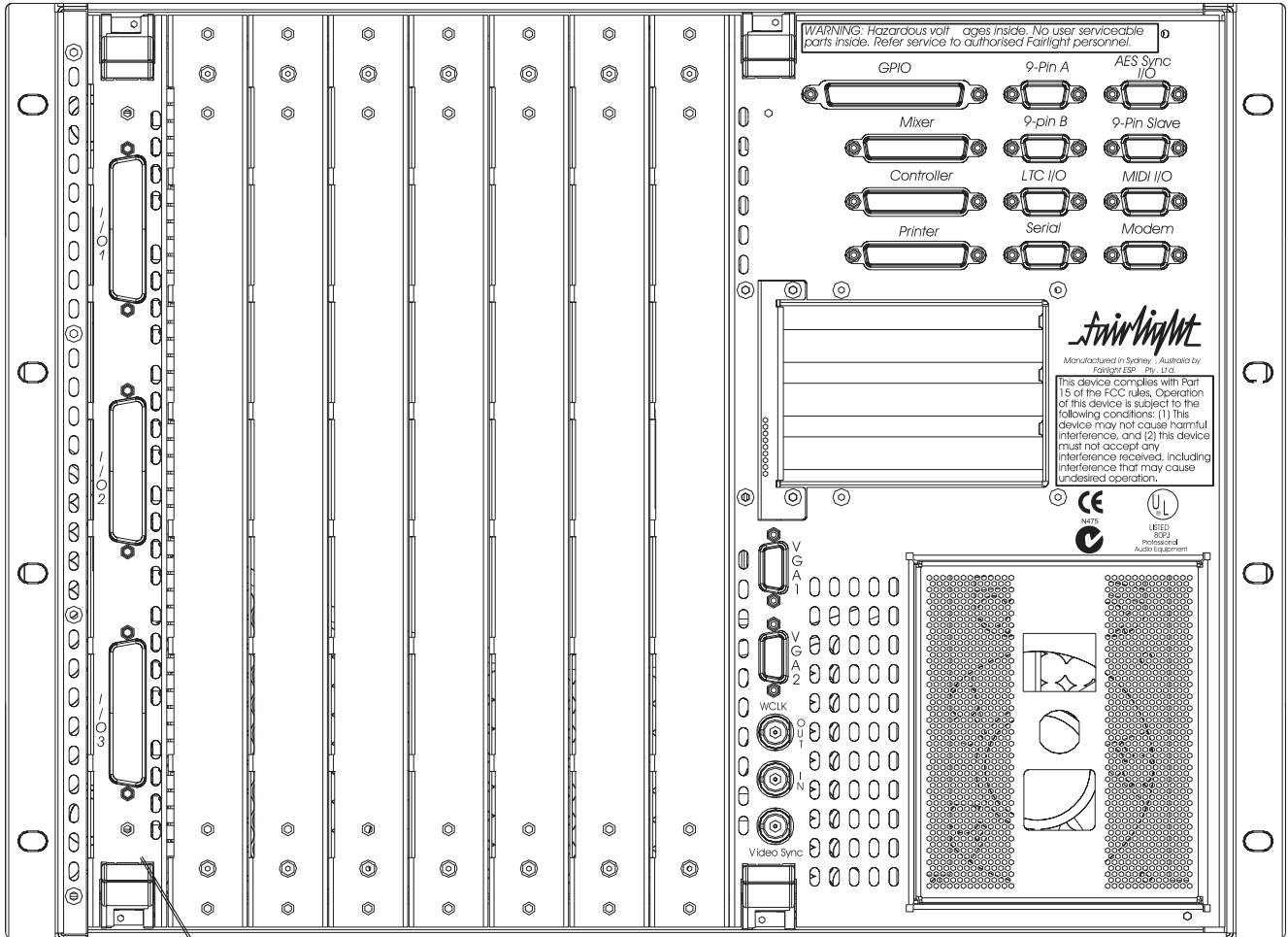
Engine Rear Panel

QDC card

QDC Configuration

Each QDC card comes with three connectors, each housing 50 pins. The following tables show the Audio I/O Configurations - the connectors and Pinouts for Merlin. In some configurations more than one QDC card is required to enable all analog and digital I/O.

+	GND	-
17	33	50
16	32	49
15	31	48
14	30	47
13	29	46
12	28	45
11	27	44
10	26	43
9	25	42
8	24	41
7	23	40
6	22	39
5	21	38
4	20	37
3	19	36
2	18	35

QDC Connector Pin Outs
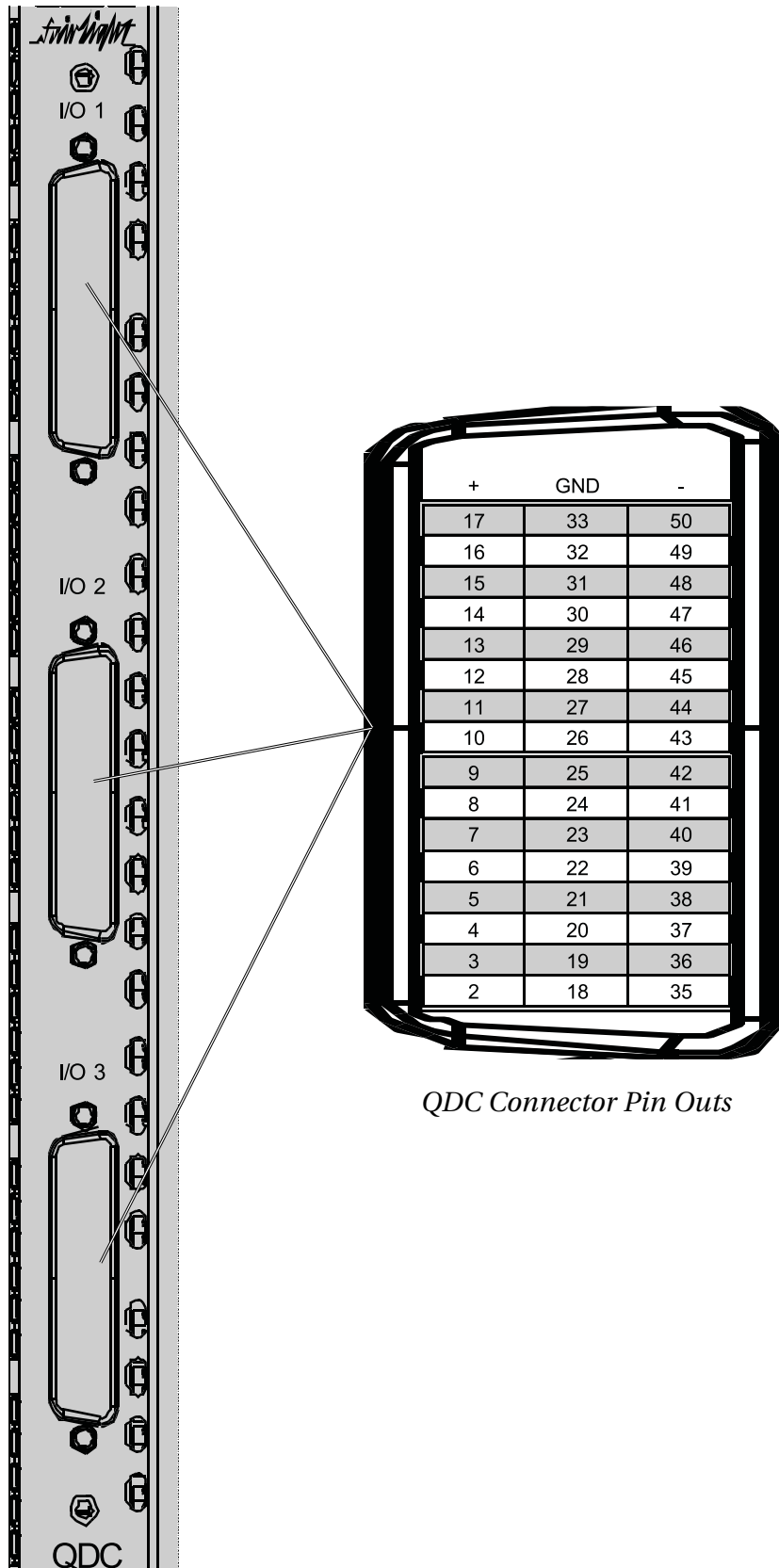
A1.1 ANALOG AUDIO I/O SPECIFICATIONS

Connector	50 way 3 Row D Female
Input	Balanced
Input Level	+24dbu max
Input Sensitivity	+4dbu nominal (adjustable)
Input Impedence	> 10k Ohms
Output	Electronic balanced differential
Output Level	+24dbu max at 0dBFS, nominal +4dbu
Output Impedence	< 55 Ohms
Output Load	>600 Ohms

A1.2 DIGITAL AUDIO I/O SPECIFICATIONS

Connector	50 way 3 row D Female
Channels	16 stereo pairs per I/O Module
Sample Rates	32KHz, 44.1 KHz, 48Khz, 88.2KHz, 96 KHz, 0.1% run up and run down
Input Type	> 200mV differential
Output level	>4.3V TTL

1.1.1 24 Track Digital   24 Digital I/Os   1 QDC Card

Analog Inputs

Port	QDC	Con	+	GND	-

Analog Outputs

Port	QDC	Con	+	GND	-

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	1	1	9	25	42
D In 19 - 20			8	24	41
D In 21 - 22			7	23	40
D In 23 - 24			6	22	39

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	1	1	5	21	38
D Out 19 - 20			4	20	37
D Out 21 - 22			3	19	36
D Out 23 - 24			2	18	35

1.1.2 24 Track Mixed I/O   24 Digital I/Os   8 Analog Inputs   1 QDC Card

Analog Inputs

Port	QDC	Con	Pins +	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43

Analog Outputs

Port	QDC	Con	Pins +	GND	-

Digital Inputs

Port	QDC	Con	Pins +	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	1	1	9	25	42
D In 19 - 20			8	24	41
D In 21 - 22			7	23	40
D In 23 - 24			6	22	39

Digital Outputs

Port	QDC	Con	Pins +	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	1	1	5	21	38
D Out 19 - 20			4	20	37
D Out 21 - 22			3	19	36
D Out 23 - 24			2	18	35

1.1.3 24 Track Analog

24 Analog Inputs

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43

24 Analog Outputs

Analog Outputs

Port	QDC	Con	+	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	9	25	42
A Out 10			8	24	41
A Out 11			7	23	40
A Out 12			6	22	39
A Out 13			5	21	38
A Out 14			4	20	37
A Out 15			3	19	36
A Out 16			2	18	35
A Out 17	1	2	17	33	50
A Out 18			16	32	49
A Out 19			15	31	48
A Out 20			14	30	47
A Out 21			13	29	46
A Out 22			12	28	45
A Out 23			11	27	44
A Out 24			10	26	43

Digital Inputs

Port	QDC	Con	+	GND	-

2 QDC Cards

Digital Outputs

Port	QDC	Con	+	GND	-

1.1.4 24 Track Analog plus Digital · 24 Digital I/Os – 24 Analog Inputs – 24 Analog Outputs · 2 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43

Analog Outputs

Port	QDC	Con	+	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	17	33	50
A Out 10			16	32	49
A Out 11			15	31	48
A Out 12			14	30	47
A Out 13			13	29	46
A Out 14			12	28	45
A Out 15			11	27	44
A Out 16			10	26	43
A Out 17	2	1	9	25	42
A Out 18			8	24	41
A Out 19			7	23	40
A Out 20			6	22	39
A Out 21			5	21	38
A Out 22			4	20	37
A Out 23			3	19	36
A Out 24			2	18	35

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	2	2	17	33	50
D In 19 - 20			16	32	49
D In 21 - 22			15	31	48
D In 23 - 24			14	30	47

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	2	2	13	29	46
D Out 19 - 20			12	28	45
D Out 21 - 22			11	27	44
D Out 23 - 24			10	26	43

2.1.1 32 Track Digital   32 Digital I/Os   2 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-

Analog Outputs

Port	QDC	Con	+	GND	-

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	1	1	9	25	42
D In 19 - 20			8	24	41
D In 21 - 22			7	23	40
D In 23 - 24			6	22	39
D In 25 - 26	2	2	17	33	50
D In 27 - 28			16	32	49
D In 29 - 30			15	31	48
D In 31 - 32			14	30	47

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	1	1	5	21	38
D Out 19 - 20			4	20	37
D Out 21 - 22			3	19	36
D Out 23 - 24			2	18	35
D Out 25 - 26	2	2	13	29	46
D Out 27 - 28			12	28	45
D Out 29 - 30			11	27	44
D Out 31 - 32			10	26	43

2.1.2   32 Track Mixed   I/O32 Digital   I/O – 16 Analog Inputs   1 QDC Card

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43

Analog Outputs

Port	QDC	Con	+	GND	-

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	2	2	17	33	50
D In 19 - 20			16	32	49
D In 21 - 22			15	31	48
D In 23 - 24			14	30	47
D In 25 - 26	2	2	9	25	42
D In 27 - 28			8	24	41
D In 29 - 30			7	23	40
D In 31 - 32			6	22	39

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	2	2	13	29	46
D Out 19 - 20			12	28	45
D Out 21 - 22			11	27	44
D Out 23 - 24			10	26	43
D Out 25 - 26	2	2	5	21	38
D Out 27 - 28			4	20	37
D Out 29 - 30			3	19	36
D Out 31 - 32			2	18	35

2.1.3 32 Track Analog   32 Analog Inputs   32 Analog Outputs   2 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43
A In 25	2	3	17	33	50
A In 26			16	32	49
A In 27			15	31	48
A In 28			14	30	47
A In 29			13	29	46
A In 30			12	28	45
A In 31			11	27	44
A In 32			10	26	43

Analog Outputs

Port	QDC	Con	+	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	9	25	42
A Out 10			8	24	41
A Out 11			7	23	40
A Out 12			6	22	39
A Out 13			5	21	38
A Out 14			4	20	37
A Out 15			3	19	36
A Out 16			2	18	35
A Out 17	1	2	17	33	50
A Out 18			16	32	49
A Out 19			15	31	48
A Out 20			14	30	47
A Out 21			13	29	46
A Out 22			12	28	45
A Out 23			11	27	44
A Out 24			10	26	43
A Out 25	1	2	9	25	42
A Out 26			8	24	41
A Out 27			7	23	40
A Out 28			6	22	39
A Out 29			5	21	38
A Out 30			4	20	37
A Out 31			3	19	36
A Out 32			2	18	35

Digital Inputs

Port	QDC	Con	+	GND	-

Digital Outputs

Port	QDC	Con	+	GND	-

2.1.4 32 Track Analog plus Digital 32 Digital I/Os – 32 Analog Inputs – 32 Analog Outputs 2 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43
A In 25	2	3	17	33	50
A In 26			16	32	49
A In 27			15	31	48
A In 28			14	30	47
A In 29			13	29	46
A In 30			12	28	45
A In 31			11	27	44
A In 32			10	26	43

Analog Outputs

Port	QDC	Con	+	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	9	25	42
A Out 10			8	24	41
A Out 11			7	23	40
A Out 12			6	22	39
A Out 13			5	21	38
A Out 14			4	20	37
A Out 15			3	19	36
A Out 16			2	18	35
A Out 17	2	1	9	25	42
A Out 18			8	24	41
A Out 19			7	23	40
A Out 20			6	22	39
A Out 21			5	21	38
A Out 22			4	20	37
A Out 23			3	19	36
A Out 24			2	18	35
A Out 25	2	3	9	25	42
A Out 26			8	24	41
A Out 27			7	23	40
A Out 28			6	22	39
A Out 29			5	21	38
A Out 30			4	20	37
A Out 31			3	19	36
A Out 32			2	18	35

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	2	2	17	33	50
D In 19 - 20			16	32	49
D In 21 - 22			15	31	48
D In 23 - 24			14	30	47
D In 25 - 26	2	2	9	25	42
D In 27 - 28			8	24	41
D In 29 - 30			7	23	40
D In 31 - 32			6	22	39

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	2	2	13	29	46
D Out 19 - 20			12	28	45
D Out 21 - 22			11	27	44
D Out 23 - 24			10	26	43
D Out 25 - 26	2	2	5	21	38
D Out 27 - 28			4	20	37
D Out 29 - 30			3	19	36
D Out 31 - 32			2	18	35

3.1.1   48 Track Digital   48 Digital I/Os   2 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-

Analog Outputs

Port	QDC	Con	+	GND	-

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	1	1	9	25	42
D In 19 - 20			8	24	41
D In 21 - 22			7	23	40
D In 23 - 24			6	22	39
D In 25 - 26	1	3	17	33	50
D In 27 - 28			16	32	49
D In 29 - 30			15	31	48
D In 31 - 32			14	30	47
D In 33 - 34	2	2	17	33	50
D In 35 - 36			16	32	49
D In 37 - 38			15	31	48
D In 39 - 40			14	30	47
D In 41 - 42	2	2	9	25	42
D In 43 - 44			8	24	41
D In 45 - 46			7	23	40
D In 47 - 48			6	22	39

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	1	1	5	21	38
D Out 19 - 20			4	20	37
D Out 21 - 22			3	19	36
D Out 23 - 24			2	18	35
D Out 25 - 26	1	3	13	29	46
D Out 27 - 28			12	28	45
D Out 29 - 30			11	27	44
D Out 31 - 32			10	26	43
D Out 33 - 34	2	2	13	29	46
D Out 35 - 36			12	28	45
D Out 37 - 38			11	27	44
D Out 39 - 40			10	26	43
D Out 41 - 42	2	2	5	21	38
D Out 43 - 44			4	20	37
D Out 45 - 46			3	19	36
D Out 47 - 48			2	18	35

3.1.2 48 Track Mixed I/O

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43

48 Digital I/Os

Analog Outputs

Port	QDC	Con	+	GND	-

24 Analog Inputs

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	2	2	17	33	50
D In 19 - 20			16	32	49
D In 21 - 22			15	31	48
D In 23 - 24			14	30	47
D In 25 - 26	2	2	9	25	42
D In 27 - 28			8	24	41
D In 29 - 30			7	23	40
D In 31 - 32			6	22	39
D In 33 - 34	2	1	9	25	42
D In 35 - 36			8	24	41
D In 37 - 38			7	23	40
D In 39 - 40			6	22	39
D In 41 - 42	3	2	17	33	50
D In 43 - 44			16	32	49
D In 45 - 46			15	31	48
D In 47 - 48			14	30	47

3 QDC Cards

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	2	2	13	29	46
D Out 19 - 20			12	28	45
D Out 21 - 22			11	27	44
D Out 23 - 24			10	26	43
D Out 25 - 26	2	2	5	21	38
D Out 27 - 28			4	20	37
D Out 29 - 30			3	19	36
D Out 31 - 32			2	18	35
D Out 33 - 34	2	1	5	21	38
D Out 35 - 36			4	20	37
D Out 37 - 38			3	19	36
D Out 39 - 40			2	18	35
D Out 41 - 42	3	2	13	29	46
D Out 43 - 44			12	28	45
D Out 45 - 46			11	27	44
D Out 47 - 48			10	26	43

3.1.3   48 Track Analog   48 Analog Inputs   48 Analog Outputs   2 QDC Cards

Analog Inputs

Port	QDC	Con	Pins +	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43
A In 25	2	3	17	33	50
A In 26			16	32	49
A In 27			15	31	48
A In 28			14	30	47

Analog Outputs

Port	QDC	Con	Pins +	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	9	25	42
A Out 10			8	24	41
A Out 11			7	23	40
A Out 12			6	22	39
A Out 13			5	21	38
A Out 14			4	20	37
A Out 15			3	19	36
A Out 16			2	18	35
A Out 17	1	2	17	33	50
A Out 18			16	32	49
A Out 19			15	31	48
A Out 20			14	30	47
A Out 21			13	29	46
A Out 22			12	28	45
A Out 23			11	27	44
A Out 24			10	26	43
A Out 25	1	2	9	25	42
A Out 26			8	24	41
A Out 27			7	23	40
A Out 28			6	22	39

Digital Inputs

Port	QDC	Con	Pins +	GND	-

Digital Outputs

Port	QDC	Con	Pins +	GND	-

A In					
A In 29			13	29	46
A In 30			12	28	45
A In 31			11	27	44
A In 32			10	26	43
A In 33	3	1	17	33	50
A In 34			16	32	49
A In 35			15	31	48
A In 36			14	30	47
A In 37			13	29	46
A In 38			12	28	45
A In 39			11	27	44
A In 40			10	26	43
A In 41	3	3	17	33	50
A In 42			16	32	49
A In 43			15	31	48
A In 44			14	30	47
A In 45			13	29	46
A In 46			12	28	45
A In 47			11	27	44
A In 48			10	26	43

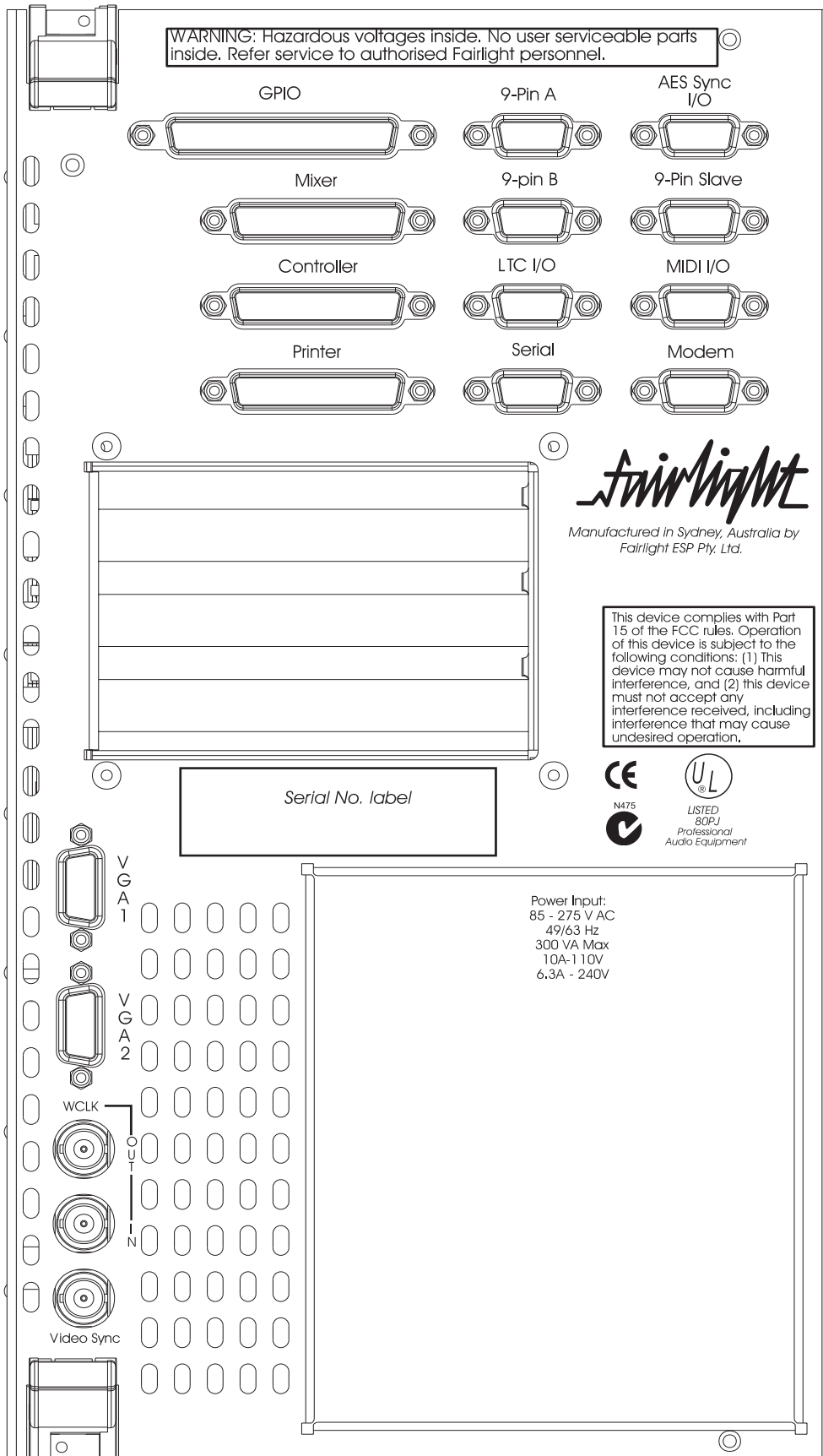| A Out					
A Out 29			5	21	38
A Out 30			4	20	37
A Out 31			3	19	36
A Out 32			2	18	35
A Out 33	2	1	9	25	42
A Out 34			8	24	41
A Out 35			7	23	40
A Out 36			6	22	39
A Out 37			5	21	38
A Out 38			4	20	37
A Out 39			3	19	36
A Out 40			2	18	35
A Out 41	2	3	9	25	42
A Out 42			8	24	41
A Out 43			7	23	40
A Out 44			6	22	39
A Out 45			5	21	38
A Out 46			4	20	37
A Out 47			3	19	36
A Out 48			2	18	35

3.1.4 48 Track Analog plus Digital 48 Digital I/Os 48 Analog Inputs 48 Analog Outputs 3 QDC Cards

Analog Inputs

Port	QDC	Con	+	GND	-
A In 1	1	1	17	33	50
A In 2			16	32	49
A In 3			15	31	48
A In 4			14	30	47
A In 5			13	29	46
A In 6			12	28	45
A In 7			11	27	44
A In 8			10	26	43
A In 9	1	3	17	33	50
A In 10			16	32	49
A In 11			15	31	48
A In 12			14	30	47
A In 13			13	29	46
A In 14			12	28	45
A In 15			11	27	44
A In 16			10	26	43
A In 17	2	1	17	33	50
A In 18			16	32	49
A In 19			15	31	48
A In 20			14	30	47
A In 21			13	29	46
A In 22			12	28	45
A In 23			11	27	44
A In 24			10	26	43
A In 25	2	3	17	33	50
A In 26			16	32	49

Analog Outputs

Port	QDC	Con	+	GND	-
A Out 1	1	1	9	25	42
A Out 2			8	24	41
A Out 3			7	23	40
A Out 4			6	22	39
A Out 5			5	21	38
A Out 6			4	20	37
A Out 7			3	19	36
A Out 8			2	18	35
A Out 9	1	3	9	25	42
A Out 10			8	24	41
A Out 11			7	23	40
A Out 12			6	22	39
A Out 13			5	21	38
A Out 14			4	20	37
A Out 15			3	19	36
A Out 16			2	18	35
A Out 17	2	1	9	25	42
A Out 18			8	24	41
A Out 19			7	23	40
A Out 20			6	22	39
A Out 21			5	21	38
A Out 22			4	20	37
A Out 23			3	19	36
A Out 24			2	18	35
A Out 25	2	3	9	25	42
A Out 26			8	24	41

Digital Inputs

Port	QDC	Con	+	GND	-
D In 1 - 2	1	2	17	33	50
D In 3 - 4			16	32	49
D In 5 - 6			15	31	48
D In 7 - 8			14	30	47
D In 9 - 10	1	2	9	25	42
D In 11 - 12			8	24	41
D In 13 - 14			7	23	40
D In 15 - 16			6	22	39
D In 17 - 18	2	2	17	33	50
D In 19 - 20			16	32	49
D In 21 - 22			15	31	48
D In 23 - 24			14	30	47
D In 25 - 26	2	2	9	25	42
D In 27 - 28			8	24	41
D In 29 - 30			7	23	40
D In 31 - 32			6	22	39
D In 33 - 34	3	2	17	33	50
D In 35 - 36			16	32	49
D In 37 - 38			15	31	48
D In 39 - 40			14	30	47
D In 41 - 42	3	2	9	25	42
D In 43 - 44			8	24	41
D In 45 - 46			7	23	40
D In 47 - 48			6	22	39

Digital Outputs

Port	QDC	Con	+	GND	-
D Out 1 - 2	1	2	13	29	46
D Out 3 - 4			12	28	45
D Out 5 - 6			11	27	44
D Out 7 - 8			10	26	43
D Out 9 - 10	1	2	5	21	38
D Out 11 - 12			4	20	37
D Out 13 - 14			3	19	36
D Out 15 - 16			2	18	35
D Out 17 - 18	2	2	13	29	46
D Out 19 - 20			12	28	45
D Out 21 - 22			11	27	44
D Out 23 - 24			10	26	43
D Out 25 - 26	2	2	5	21	38
D Out 27 - 28			4	20	37
D Out 29 - 30			3	19	36
D Out 31 - 32			2	18	35
D Out 33 - 34	3	2	13	29	46
D Out 35 - 36			12	28	45
D Out 37 - 38			11	27	44
D Out 39 - 40			10	26	43
D Out 41 - 42	3	2	5	21	38
D Out 43 - 44			4	20	37
D Out 45 - 46			3	19	36
D Out 47 - 48			2	18	35

A In 27			15	31	48		
A In 28			14	30	47		
A In 29			13	29	46		
A In 30			12	28	45		
A In 31			11	27	44		
A In 32			10	26	43		
A In 33	3		17	33	50	1	
A In 34			16	32	49		
A In 35			15	31	48		
A In 36			14	30	47		
A In 37			13	29	46		
A In 38			12	28	45		
A In 39			11	27	44		
A In 40			10	26	43		
A In 41	3		17	33	50	3	
A In 42			16	32	49		
A In 43			15	31	48		
A In 44			14	30	47		
A In 45			13	29	46		
A In 46			12	28	45		
A In 47			11	27	44		
A In 48			10	26	43		

A Out 27			7	23	40		
A Out 28			6	22	39		
A Out 29			5	21	38		
A Out 30			4	20	37		
A Out 31			3	19	36		
A Out 32			2	18	35		
A Out 33	3		9	25	42	1	
A Out 34			8	24	41		
A Out 35			7	23	40		
A Out 36			6	22	39		
A Out 37			5	21	38		
A Out 38			4	20	37		
A Out 39			3	19	36		
A Out 40			2	18	35		
A Out 41	3		9	25	42	3	
A Out 42			8	24	41		
A Out 43			7	23	40		
A Out 44			6	22	39		
A Out 45			5	21	38		
A Out 46			4	20	37		
A Out 47			3	19	36		
A Out 48			2	18	35		

APPENDIX - CONNECTION & SIGNAL SPECIFICATIONS

A2 CONTROL & REFERENCE PINOUTS

WARNING: Hazardous voltages inside. No user serviceable parts inside. Refer service to authorised Fairlight personnel.

GPIO   9-Pin A   AES Sync I/O

Mixer   9-pin B   9-Pin Slave

Controller   LTC I/O   MIDI I/O

Printer   Serial   Modem

Manufactured in Sydney, Australia by Fairlight ESP Pty. Ltd.

This device complies with Part 15 of the FCC rules. Operation of this device is subject to the following conditions: (1) This device may not cause harmful interference, and (2) this device must not accept any interference received, including interference that may cause undesired operation.

Serial No. label

LISTED 80PJ Professional Audio Equipment

VGA 1

VGA 2

WCLK   OUT IN

Video Sync

Power Input:
85 - 275 V AC
49/63 Hz
300 VA Max
10A-110V
6.3A - 240V

Engine System I/O Panel

A3 GENERAL PURPOSE INTERFACE

Connector   37 Pin D Male

Input   TTL (1 LS Load)

Output/Bank   TTL (max 5 TTL loads)
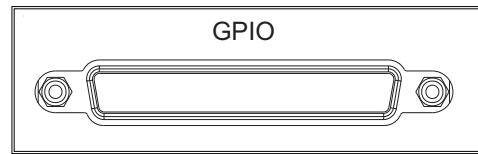
GPIO

1	G N D
2	G PIO 6
3	G PIO 5
4	G N D
5	G PIO B O 2
6	G PIO B O 1
7	G N D
8	G PIO IN 6
9	G PIO IN 5
10	G N D
11	G PIO IN 2
12	G PIO IN 1
13	G N D
14	G PIO O U T6
15	G PIO O U T5
16	G N D
17	G PIO O U T2
18	G PIO O U T1
19	G N D
20	G PI0 B 0 7
21	G N D
22	G PI
23	G PIO B O 3
24	G N D
25	G PIO B O 0
26	G PIO IN 7
27	G N D
28	G PIO IN 4
29	G PIO IN 3
30	G N D
31	G PIO IN O
32	G PIO O U T7
33	G N D
34	G PIO O U T4
35	G PIO O U T3
36	G N D
37	G PIO O U T0

A4 MIXER

Connector   25 pin D Female

Mixer

1	GND
2	RxFFN
3	RxCLKN
4	RxDATN
5	RxWRN
6	NC
7	NC
8	TxFFN
9	TxCLKN
10	TxDATN
11	TxWRPN
12	HSSLDETn
13	SYNCN
14	RxFFP
15	RxCLKP
16	RxDATP
17	RxWRP
18	NC
19	GND
20	TxFFP
21	TXxCLKP
22	TxDATP
23	TxWRP
24	GND
25	SYNCP

A5 CONTROLLER

Connector   25 pin D Female at Engine End

37 pin D Male at Console End

9 pin pigtail D Male at Console End

Controller
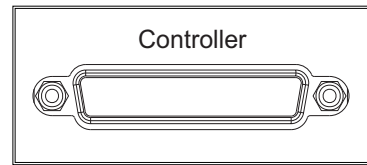
25 Pin D Type Connector Female	Signal Name	Pairing Details	Signal Name	37 Pin D Type Connector Male
1	GND	Pair 1	GND	1
2	CONTx	Pair 1	RSI2	7
3	CONRx	Pair 2	RSO2	24
5	H-TxDATA	Pair 5	RSO1	6
7	GND	Pair 2	GND	10
9	GND	Pair 5	GND	33
10	CONTxPOS	Pair 3	FS+	13
11	CONRxPOS	Pair 4	TS+	12
20	H-RxDATA	Pair 6	RSI1	25
21	GND	Pair 6	*PR	23
23	CONTxNEG	Pair 3	FS-	31
24	CONRxNEG	Pair 4	TS-	30
9 Pin D Type Connector Male	Signal Name	Pairing Details	Signal Name	37 Pin D Type Connector Male
2	MRXD	Any	MRXD	36
3	MTXD	Any	MTXD	37
5	Gnd	any	Gnd	33

A6 PRINTER

Connector   Standard 25 pin D female
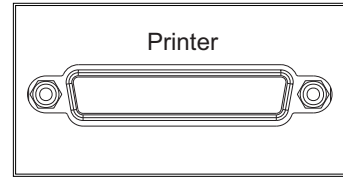
PIN 1	PSTROBEn
PIN 2	PDR0
PIN 3	PDR1
PIN 4	PDR2
PIN 5	PDR3
PIN 6	PDR4
PIN 7	PDR5
PIN 8	PDR6
PIN 9	PDR7
PIN 10	PRACKn
PIN 11	PRBUSYn
PIN 12	PRERROR
PIN 13	PRSELECT
PIN 14	PRAUTOFDn
PIN 15	PRFAULTn
PIN 16	PRINTITn
PIN 17	PRSELINn
PIN 18	GND
PIN 19	GND
PIN 20	GND
PIN 21	GND
PIN 22	GND
PIN 23	GND
PIN 24	GND
PIN 25	GND

A8 9-Pin A

Connector   9 pin D Female

9-Pin A
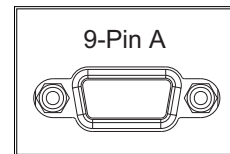
PIN 1	GND
PIN 2	9ARxA
PIN 3	9ATxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9ARxB
PIN 8	9ATxA
PIN 9	NC

A9 9-Pin B

Connector   9 pin D Female

9-pin B
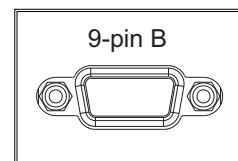
PIN 1	GND
PIN 2	9BRxA
PIN 3	9BTxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9BRxB
PIN 8	9BTxA
PIN 9	NC

A10 9-PIN SLAVE

Connector   9 pin D Female

9-Pin Slave
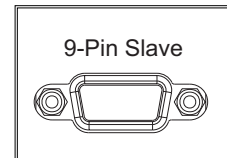
PIN 1	GND
PIN 2	9BTxA
PIN 3	9RRxB
PIN 4	GND
PIN 5	NC
PIN 6	GND
PIN 7	9BTxB
PIN 8	9BRxA
PIN 9	GND

A11 LTC - I/O

LTC I/O

Connector   9 pin D Male

Input Level   -20dbm to +10dbm

Output Level   0dbm
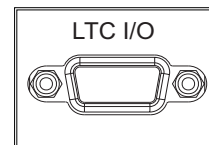
Important note: Unbalanced loads connected to LTC OUT should NOT ground the LTC OUT NEGATIVE signal.

PIN 1	GND
PIN 2	LTC A NEGATIVE
PIN 3	LTC OUT NEGATIVE
PIN 4	GND
PIN 5	LTC B POSITIVE
PIN 6	LTC A POSITIVE
PIN 7	GND
PIN 8	LTC OUT POSITIVE
PIN 9	LTC B NEGATIVE

A12 SERIAL PORT

Connector   Standard 9 pin D male

Serial
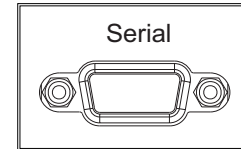
PIN 1	SER_DCD
PIN 2	SER_Rx
PIN 3	SER_Tx
PIN 4	SER_DTR
PIN 5	GND
PIN 6	SER_DSR
PIN 7	SER_RTS
PIN 8	SER_CTS
PIN 9	NC

A13 MIDI I/O

MIDI I/O

Connector   9 pin D female
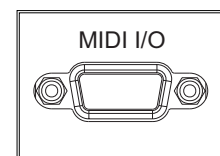
PIN 1	NOT CONNECTED		
PIN 2	MIDI IN NEGATIVE	MIDI IN	DIN PIN 5
PIN 3	MIDI OUT NEGATIVE	MIDI OUT	DIN PIN 5
PIN 4	GND	MIDI THROUGH	DIN PIN 2
PIN 5	MIDI THROUGH POSITIVE	MIDI THROUGH	DIN PIN 4
PIN 6	MIDI POSITIVE	MIDI IN	DIN PIN 4
PIN 7	GND	MIDI OUT	DIN PIN 2
PIN 8	MIDI OUT POSITIVE	MIDI OUT	DIN PIN 4
PIN 9	MIDI THROUGH NEGATIVE	MIDI THROUGH	DIN PIN 5

A14 AES Sync I/O

AES Sync
I/O

Connector   9 pin D Male
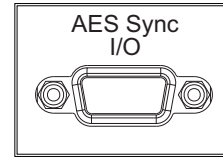
PIN 1	GND
PIN 2	AES IN NEGATIVE
PIN 3	AES OUT POSITIVE
PIN 4	BIPHASE TACH
PIN 5	BIP DIRECTION
PIN 6	AES IN POSITIVE
PIN 7	GND
PIN 8	AES OUT NEGATIVE
PIN 9	NOT CONNECTED

A15 Modem

Modem

Connector   9 pin D Male
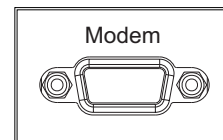
PIN 1	MOD_DCD
PIN 2	MOD_RX
PIN 3	MOD_TX
PIN 4	MOD_DTR
PIN 5	GND
PIN 6	MOD_DSR
PIN 7	MOD_RTS
PIN 8	MOS_CTS
PIN 9	NC

A16 VGA

Connector   15 pin High Density D Female

Resolution   1024(H) x 768(V)

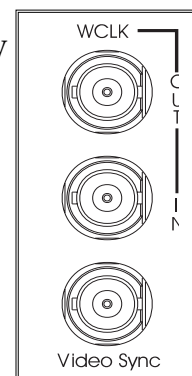Frequency   HSYNC: 60khz   VSYNC: 75hz SVGA STANDARD
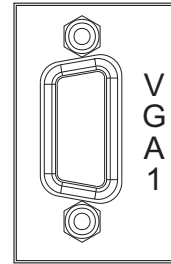
PIN 1	RED
PIN 2	GREEN
PIN 3	BLUE
PIN 4	GND
PIN 5	GND
PIN 6	GND
PIN 7	GND
PIN 8	GND
PIN 10	GND
PIN 11	GND
PIN 12	NC
PIN 13	HSYNC
PIN 14	VSYNC
PIN 15	NC

A17 VIDEO SYNC - IN

Connector   BNC

Input Level   1V p-p 75 Ohms Terminated Internally

A18 WORD CLOCK - IN

Connector   BNC

Input   Optically Isolated

Output Impedence   75 Ohms

A19 WORD CLOCK - OUT

Connector   BNC

Output Level   > 4.3V TTL

Output Impendence   75 Ohms

A20 Dimensions

A20.1 Engine

500mm

360mm

460mm

66