Euphonix is AVID™

FC726

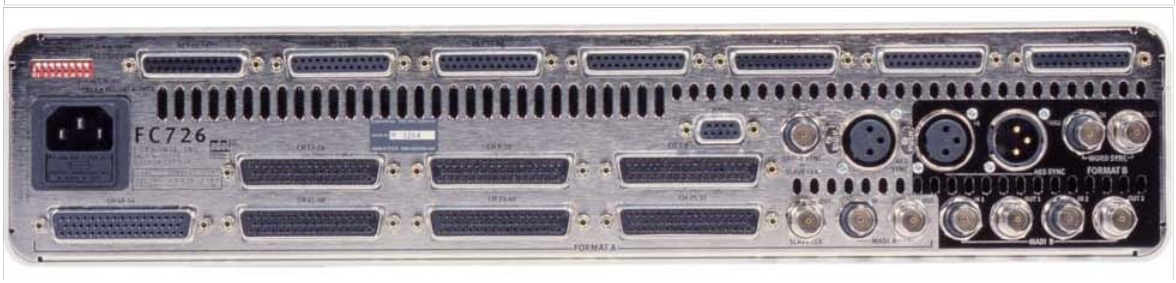
Digital Audio Format Converter

Installation Manual

Document Revision: A

Part Number: 840-11321-01

Release Date: August 2010



Euphonix is Avid. Learn more at www.avid.com

Regulatory and Safety Notices

Warnings and Cautions

Never install equipment if it appears damaged.

Disconnect the power cord before servicing unit.

Only perform the services explicitly described in this document. For services or procedures not outlined in this document, speak with authorized Avid service personnel.

Follow all warnings and cautions in the procedures.

Operate the device within its marked electrical ratings and product usage instructions.

If you need to replace a battery in an Avid hardware unit, be sure to use the correct battery type. There might be a risk of explosion if a battery is replaced by an incorrect type. Dispose of used batteries according to the manufacturer's instructions.

FCC Notice

Part 15 of the Federal Communication Commission Rules and Regulations has established Radio Frequency (RF) emission limits to provide an interference free radio frequency spectrum. Many electronic devices produce RF energy incidental to their intended purpose.

These rules place electronic equipment into two classes, A and B, depending on the intended use.

Class A devices are those that may be expected to be installed in a business or commercial environment. Class B devices are those that may be expected to be installed in a home or residential environment. The FCC requires devices in both classes to be labeled with the interference likelihood and additional operating instructions. The rating label on the equipment will show which class the product is (A or B). Class A product will not have an FCC logo. Class B equipment will have an FCC logo. The information statements differ on the two classes.

Class A Equipment

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 instructions, 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 personal expense.

Modifications

The FCC requires the user to be notified that any changes or modifications made to Avid hardware that are not expressly approved by Avid Technology may void the user's authority to operate the equipment.

Cables

Connections to Avid hardware must be made with shielded cables with metallic RFI/EMI connector hoods in order to maintain compliance with FCC Rules and Regulations.

PRODUCTS WITH MULTIPLE POWER INPUTS:

WARNING: Each power input is intended to be connected to a separate branch circuit. Risk of high leakage exists if multiple inputs are connected to a single source and protective earth is not present. A QUALIFIED SERVICE PERSON shall verify that each socket-outlet from which the equipment is to be powered provides a connection to the building protective earth. If any do not provide this connection, the QUALIFIED SERVICE PERSON shall arrange for the installation of a PROTECTIVE EARTHING CONDUCTOR from the separate protective earthing terminal to the protective earth wire in the building.

Canadian ICES-003

Class A Equipment

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecté toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Declaration of Conformity

CE

Declaration of conformity

Konformitätserklärung

Déclaration de conformité

Declaración de Confomidad

Verklaring de overeenstemming

Dichiarazione di conformità

We/Wir/ Nous/WIJ/Noi:

Avid Technology

1925 Andover Street

Tewksbury, MA, 01876 USA

European Contact: Nearest Avid Sales and Service Office or

Avid Technology International B.V.

Sandyford Industrial Estate

Unit 38, Carmanhall Road

Dublin 18, Ireland

declare under our sole responsibility that the product,

erklären, in alleiniger Verantwortung,daß dieses Produkt,

déclarons sous notre seule responsabilité que le produit,

declaramos, bajo nuestra sola responsabilidad, que el producto,

verklaren onder onze verantwoordelijkheid, dat het product,

dichiariamo sotto nostra unica responsabilità, che il prodotto,

Product Name(s) : Digital Audio Format Converter

Model Number(s): FC726

Product Options: This declaration covers all options for the above product(s).

to which this declaration relates is in conformity with the following standard(s) or other normative documents.

auf das sich diese Erklärung bezieht, mit der/den folgenden Norm(en) oder Richtlinie(n) übereinstimmt.

auquel se réfère cette déclaration est conforme à la (aux) norme(s) ou au(x) document(s) normatif(s).

al que se refiere esta declaración es conforme a la(s) norma(s) u otro(s) documento(s) normativo(s).

waarnaar deze verklaring verwijst, aan de volende norm(en) of richtlijn(en) beantwoordt.

a cui si riferisce questa dichiarazione è conforme alla/e seguente/i norma/o documento/i normativo/i.

The requirements of the European Council:

Safety: Directive 2006/95/EC

EN 60065:2002 /A1:2006

EMC: Directive 2004/108/EC

EN 55103-1:1996

EN 55103-2:1996

LED Safety Notices

Avid hardware might contain LED or Laser devices for communication use. These devices are compliant with the requirements for Class 1 LED and Laser Products and are safe in the intended use. In normal operation the output of these laser devices does not exceed the exposure limit of the eye and cannot cause harm.

Standard to which conformity is declared: (IEC 60825-1)

Optical connections are located on the rear panel and are typically labeled “Optical” or “SPDIF/ADAT.” The exact location of optical connections is identified more clearly elsewhere in the documentation for the Avid hardware device.

Use of controls and/or adjustments or the performance of procedures other than those specified herein and elsewhere in documentation for the Avid hardware might result in hazardous radiation exposure.

Disposal of Waste Equipment by Users in the European Union

This symbol on the product or its packaging indicates that this product must not be disposed of with other waste. Instead, it is your responsibility to dispose of your waste equipment by handing it over to a designated collection point for the recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help 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 recycling office or the dealer from whom you purchased the product.

Rack-mount Requirements

The following rack-mount requirements are listed below:

• Elevated Operating Ambient — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment might be greater than room ambient. Therefore, consider installing the equipment in an environment compatible with the maximum ambient temperature (Tma) specified by the manufacturer.

• Reduced Air Flow — Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised. Do not block vents.

• Mechanical Loading — Mounting of the equipment in the rack should be such that a hazardous condition is not achieved due to uneven mechanical loading.

• Circuit Overloading — Consideration should be given to the connection of the equipment to the supply circuit and the effect that overloading of the circuits might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.

• Reliable earthing — Reliable earthing of rack-mounted equipment should be maintained. Particular attention should be given to supply connections other than direct connections to the branch circuit (for example, use of power strips).

Lithium Battery Replacement

If a battery is supplied in this Avid product it *must* only be replaced by qualified personnel. Contact Avid Customer Support for assistance.

WARNING

Danger of explosion if battery is incorrectly replaced. Replace with only the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

ADVARSEL!

Lithiumbatteri - Eksplosionsfare ved fejlagtig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Levér det brugte batteri tilbage til leverandøren.

ADVARSEL!

Lithiumbatteri - Eksplosjonsfare. Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparatleverandøren.

VARNING

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

VAROITUS

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Table of Contents

List of Figures

List of Tables

Chapter 1: Introduction and Interface

The Euphonix FC726 is a compact, 2U, digital-audio format converter that translates back and forth between MADI (**M**ultichannel **A**udio **D**igital **I**nterface) and the digital audio formats listed in Table 1-1. AES/EBU outputs are always available, regardless of the formats being translated. The FC726 performs the highest quality sample-rate conversion (SRC) on all channels that require it.

The FC726 sets a new standard for format conversion devices with the following features:

- Can apply different format conversion and/or SRC to each bank of eight channels.
- Automatically applies SRC when necessary but can be manually disabled.
- Performs format conversion and SRC on more channels (56) than other devices.
- Each of the 56 channels is bidirectional.
- Supports 24-bit audio at a 96 kHz sample rate.
- Maintains compatibility with older devices by offering 16- or 20-bit dithering and supporting 96 kHz legacy standards.

Table 1-1 Digital audio formats supported by the FC726

Company/ Organization	Format Name	Equipment Using Format	Transmission Medium
Audio Engineers Society	MADI	Euphonix R-1, S-5, Sony 3348, many large format digital consoles	BNC cable
	AES/EBU (AES-3)	Sony PCM-800, most DAT machines and stereo D/A devices, sound cards, effects processors	Two balanced XLR cables
Tascam	TDIF-1 (**T**eac **D**igital **I**nterface **F**ormat)	Tascam DA-88, DA-98, small format digital consoles and workstations	25-pin cable
Mitsubishi	ProDigi	Otari and Mitsubishi digital multitracks	Two 50-pin cables
Sony	SDIF-2	Sony 3324 and 3348	Two 50-pin cables
Alesis	ADAT Optical	Alesis ADAT (type I and II), many small format digital consoles and workstations	Two fiber optic cables

The utility and power of the FC726 is exhibited by transferring digital audio between incompatible devices:

- Mixdown on a Euphonix System 5 digital console at 24-bit 96 kHz with source material from a ProDigi or Sony tape machine at 48 kHz (automatic SRC).
- Mixdown on a Euphonix System 5 digital console from a audio workstation.
- Transfer tracks from a Tascam DA-88, Sony 3348, or Alesis ADAT to a Euphonix R-1.

The audio remains entirely in the digital domain so it suffers no degradation due to D/A and A/D conversion.

1.1 Basic Concepts

1.1.1 Channels and Banks

The FC726 can convert 56 digital audio channels in two directions simultaneously (*simultaneous bidirectional conversion*) with any of the supported devices. The 56 channels are divided into seven banks, each with eight channels. Each bank may be connected to a different third-party device running at a different sample rate (i.e., Tascam DA-88 on channels 1–8, ADAT on 9–16, and AES/EBU on 40–48).

1.1.2 Signal Flow

Since 56 channels can be converted bidirectionally, signal routing can become confusing. These simple rules should help clarify the signal flow:

- Audio arriving at the **MADI B Input** is sent out the **Format A Output**.
- Audio arriving at the **Format A** connectors is sent out the **MADI B Output**.
- The AES outputs always mirror the **Format A Output**.

1.1.3 Format A Inputs

Three connectors can be used by third-party inputs: the common **DB-50** connectors, the **MADI A Inputs**, and the **DB-25 AES** connectors. The appropriate signal is chosen according to the following rules:

- If the MADI switch is *ON*, the MADI input is used for all 56 channels.
- If the MADI switch is *OFF*, either the common DB-50 or AES signals are used in eight-channel banks.

  If only one connector is in use, that format is selected.

  If both are connected, the common DB-50 signal takes precedence.

Format A Adapters

To create a compact 2U device with maximum flexibility, the FC726 uses a common DB-50 connector for all third-party formats. An adapter is required to convert from the DB-50 connector to the company's own connector. The adapter is not intended to be the connecting cable; it simply adapts the common DB-50 connector so it behaves like the rear panel of the third-party device. These adapters are available separately from Euphonix. In most cases, another cable is required to connect the adapter to the third-party device. See Appendix A: *Pinout and Cable Specifications* for detailed information.

1.1.4 Sample Rate Conversion

Digital audio devices have previously been required to use the same sample rate to operate correctly together. The FC726 removes this limitation by allowing many sample rates simultaneously. For example, by using the common DB-50 connectors, each eight-channel bank can operate at its own sample rate. Furthermore, the FC726 detects different sample rates and automatically activates SRC.

Although the FC726's SRC is the highest quality available, some users may still require an unaltered, bit-for-bit copy of the data. In this case, connected devices can be slaved to the same sample clock, which disables SRC automatically (you can also disable SRC manually).

1.2 Front Panel

The FC726's front panel is shown in Figure 1-1. Enlarged sections of the front panel are shown in Figure 1-2 and Figure 1-3; the numbers in the figures correspond to the numbered items below describing that feature.

Figure 1-1 FC726 front panel

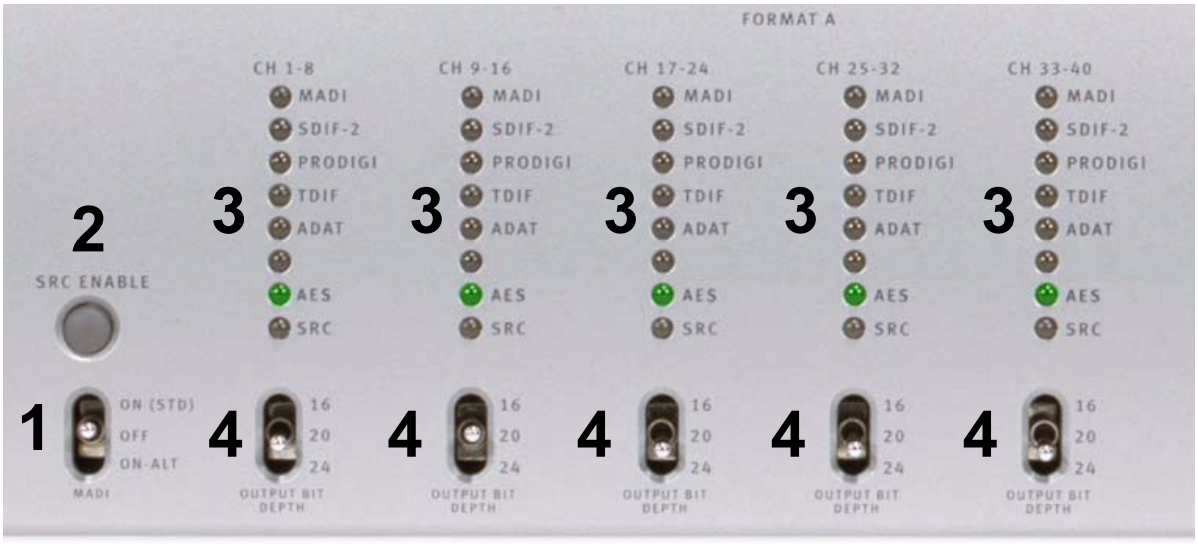


Figure 1-2 FC726 front panel (left)

1. MADI Switch

This three-position switch selects whether MADI is used for the **Format A Input** and the characteristics of the MADI signal.

ON-STD: Selects the standard MADI settings used by Euphonix (sample rate = frame rate).

OFF: Selects the common DB-50 connectors and ignores the **Format A MADI** inputs. Use this setting with SDIF, TDIF, ProDigi, ADAT, or AES devices.

ON-ALT: Selects MADI running at sample rate = 96 kHz, frame rate = 48 kHz.

2. SRC ENABLE Button

This button lights when the FC726 detects different sample rates on the A and B formats and SRC is being used. Press the button when lit to turn off SRC. The button flashes if SRC is needed but has been disabled by the user. Press the button again to reset the FC726's automatic SRC detection circuitry.

When a device first locks to the FC726, the button may occasionally light to indicate SRC is necessary when it is not. Press the button twice to reset the FC726's automatic SRC detection circuitry. SRC is not needed if the button does not light.

3. FORMAT A Input Indicator LEDs

Each eight-channel bank has seven LEDs to indicate the format attached to the **Format A Input**; only one of these LEDs can be lit at a time. The LED lights dimly yellow if an adapter is attached but the FC726 has not locked; the LED lights bright yellow when the FC726 locks to the device.

The bottom **SRC** LED functions independently of the first seven. It lights red if the FC726 has detected that SRC is required on that bank; it flashes red if SRC is required but has been disabled by the user.

4. OUTPUT BIT DEPTH Select Switch

For each eight-channel bank, this switch sets the bit depth for the signal output to the Format A device. When set to 24, all 24 bits are transferred from the MADI input to the Format A output device without dithering. When set to 20 or 16, the signal is dithered to the selected number of bits before being output to the Format A device.

NOTE: *This switch affects the **Format A** output only; it has no effect on the **Format B MADI** audio output.*

Figure 1-3 FC726 front panel (right)

5. FORMAT B Sample Rate LEDs

These LEDs indicate the Format B sample rate. If the rate is not 44.1, 48, or 96 kHz (±3%), the **CUSTOM** LED lights. Since the FC726 supports SRC, Format A may operate at several sample rates that are not indicated by individual LEDs.

6. FORMAT B Sync Source LEDs

These LEDs shows Format B's sync source. The blue button below the **AUTO** LED manually toggles the sync source sequentially from **AUTO** to **AES**, **WORD**, **MADI**, and **FORMAT A**. When set to **AUTO**, the FC726 accepts the first sync signal detected with the following priority: **AES**, **WORD**, **MADI**, and **FORMAT A**. For example, if MADI and Format A sync are both present, the selected source will be MADI because it is higher in the priority list.

7. Power Switch

This switch turns power to the FC726 on or off.

1.3 Rear Panel

The FC726's rear panel is shown in Figure 1-4. Enlarged sections of the rear panel are shown in Figure 1-5 and Figure 1-6; the numbers in the figures correspond to the numbered items below describing that feature.

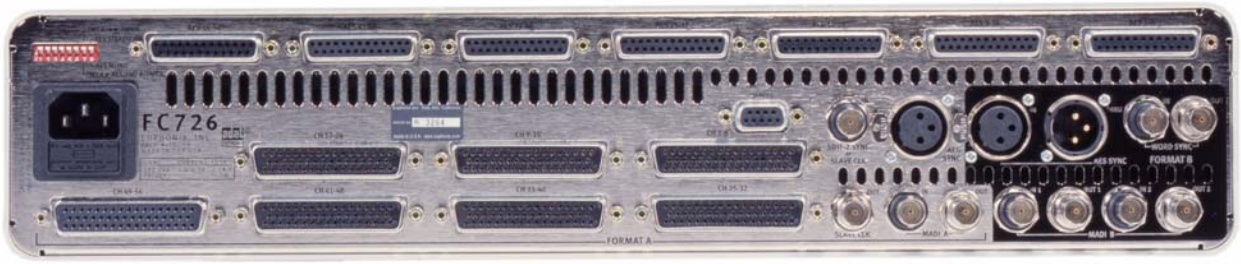


Figure 1-4 FC726 rear panel

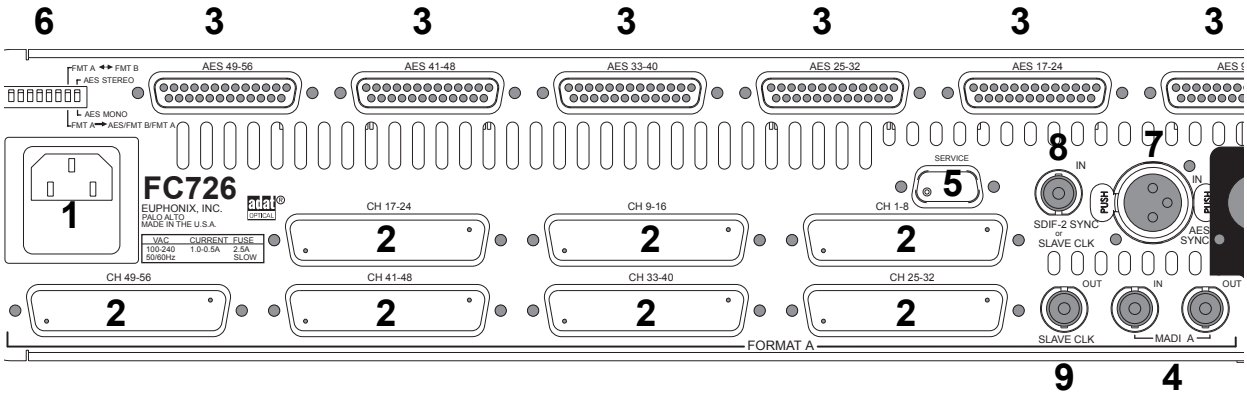


Figure 1-5 FC726 rear panel (left)

1. AC Power Input

Connect the power cable shipped with the FC726 to its AC input and an AC mains power source.

2. Format A Common DB-50 Connectors

Seven common DB-50 connectors connect third-party devices to the FC726. Each connector provides eight bidirectional audio channels. You must use the appropriate adapters for each format to connect the third-party devices. See *Format A Adapters* on page 11.

3. Format A AES Connectors

Seven DB-25 connectors connect AES devices to the FC726. Each connector provides eight bidirectional channels (four AES pairs). To connect to the third-party devices, use the DB-25-to-XLR breakout cable available from Euphonix.

NOTE: *Do not use DB-25-to-XLR breakout cables made by other companies because the pin numbering may be incompatible! See* ***Appendix A: Pinout and Cable Specifications*** *for specific cable information.*

---

4. Format A MADI IN and MADI OUT

The **Format A MADI In** and **MADI Out** BNC connectors interface with non-Euphonix MADI devices. At 48 kHz, MADI A provides 24-bit audio on 56 channels. At 96 kHz, only 28 24-bit audio channels (1–28) are available.

NOTE: *Unlike MADI B, which has a second set of I/O connectors, MADI A provides only 28 channels at 96 kHz.*

---

5. Service DB-9 Jack

This jack connects to a PC's serial port to upgrade the FC726 firmware.

CAUTION: *Do not connect anything to the* ***Service DB-9*** *jack unless instructed to do so by Euphonix technical support.*

---

6. DIP Switches

These eight DIP switches (numbered 1–8 from left to right) set various modes on the FC726. Switches 3–5 and 7 are not currently implemented.

Switch #1 Bidirectional mode

Flip this switch when converting between third-party formats using one FC726 (see page 24).

Switch #2 MADI MERGE

When set to MADI MERGE (down), Format B MADI Input 1 channels 1–24 are merged with Format B MADI Input 2 channels 1–28 and Format B MADI Input 1 channels 25–28 to form a single 56-channel input stream. Format B MADI Output 1 sends channels 1–56 and Format B MADI Output 2 sends channels 25–56 followed by 1–24 from the third-party inputs.

Switch #6 AES MASTER/SLAVE

When set to SLAVE (up), the Format A AES outputs lock to their corresponding AES inputs. Within each bank, all AES outputs operate at the sample rate of the lowest-numbered, locked AES input. For example, if the first bank (channels 1–8) has a 44.1 kHz AES signal connected to inputs 1/2 and a 48 kHz input connected to inputs 5/6, then AES output channels 1–8 will all run at 44.1 kHz. If AES inputs are not present on a bank, Format A will get sample clock from the Format B Sync input. If sync is not present, Format A will then lock to the Format B Sync Input.

When set to MASTER (down), Format A's AES outputs get sample clock from the Format A Sync input. If Format A sync is not present, Format A's AES outputs will then lock to the Format B Sync Input.

Switch #8 AES STEREO/AES MONO

Set this switch to AES Stereo (up) for the normal configuration where each AES signal contains two discreet channels. If the sample rate is above 52 kHz (i.e., 96 or 88.2 kHz), and the AES signal connected to the FC726 implements two-wire AES (also referred to as mono mode AES), set the switch to AES Mono (down). This setting treats each AES signal as a single channel with a frame rate running at half its sample rate. For example, a 96 kHz two-wire AES signal runs at 48 kHz by using the left channel for the even samples and the right channel for the odd samples. This switch affects both the AES inputs and outputs.

7. Format A AES Sync In

Connect an AES sync signal to this XLR connector to synchronize the **Format A MADI** signal. According to the AES specification, the AES sync signal must use the same sample rate as the incoming MADI signal to operate correctly.

NOTE: *It is possible, but not recommended, to connect a MADI signal without using a corresponding sync signal. Providing an AES or Word sync results in lower jitter and should be used whenever possible.*

---

8. SDIF-2 or SLAVE CLK IN

This connector can receive either an SDIF or slave clock sync signal. The FC726 automatically detects which signal type has been connected.

An SDIF device must send a word sync signal to this connector to properly connect to the FC726.

9. SLAVE CLK OUT

If **Slave Clk In** has a valid sync signal, it is passed through to **Slave Clk Out**. If **Slave Clk In** does not have a valid sync signal, the lowest numbered bank that is locked and in use is selected as the clock source.

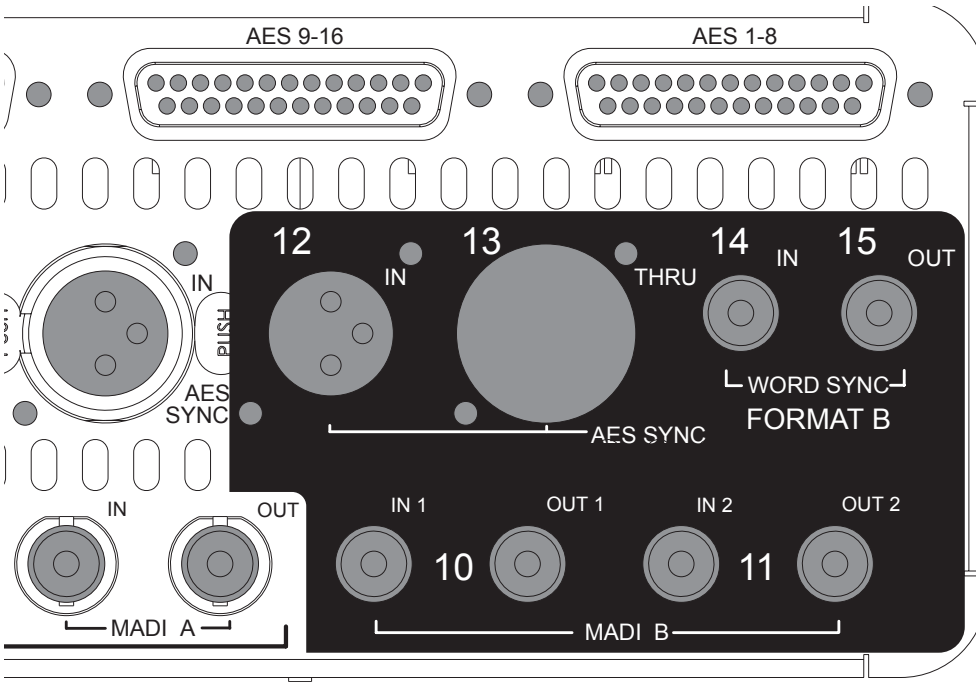


Figure 1-6 FC726 rear panel (right)

10. Format B MADI IN 1 and MADI OUT 1

These BNC connectors are used to interface with a MADI device. (Euphonix users can connect these to a Studio Hub, MA703, or AM713) At 48 kHz, the **Format B MADI In 1 and MADI Out1** connectors provide 56 24-bit audio channels. At 96 kHz, they provide 28 24-bit audio channels (channels 1–28).

11. Format B MADI IN 2 and MADI OUT 2

At 96 kHz, the **Format B MADI In 2and Out 2** connectors provide 28 additional 24-bit audio channels (29–56).

At 48 kHz, **Format B MADI In 2** is ignored and **Format B MADI Out 2** carries the same audio as **Format B MADI Out 1** but with the channel numbering reversed: **Format A** channels 29–56 are output on **Format B MADI Out 2** channels 1–28; **Format A** channels 1–28 are output on **Format B MADI Out 2** channels 29–56.

12. Format B AES SYNC IN

Connect an AES sync signal to this XLR connector to synchronize the **Format B MADI** signal. According to the AES specification, the AES sync signal must use the same sample rate as the incoming MADI signal to operate correctly.

NOTE: *It is possible, but not recommended, to connect a MADI signal without using a corresponding sync signal. Providing an AES or Word sync results in lower jitter and should be used whenever possible.*

13. Format B AES SYNC THRU

This connector outputs a copy of the **Format B AES Sync In** signal.

14. Format B WORD SYNC IN

Connect a word sync signal to this BNC connector to synchronize the **Format B MADI** signal. According to the AES specification, the word sync signal must use the same sample rate as the incoming MADI signal to operate correctly.

NOTE: *It is possible, but not recommended, to connect a MADI signal without using a corresponding sync signal. Providing an AES or Word sync results in lower jitter and should be used whenever possible.*

15. Format B WORD SYNC OUT

This connector outputs a copy of the **Format B Word Sync In** signal. However, this output generates a word sync signal at the **Format B** sample rate *even if nothing is connected* to **Format B Word Sync In**. Note this important difference in behavior from **Format B AES Sync Thru**.

Chapter 2: Operating Instructions

This chapter provides operating instructions to connect third-party devices supported by the FC726.

2.1 SDIF-2

SDIF-2 is a 24-channel format with inputs and outputs on separate DB-50 connectors. The FC726 SDIF-2 adapter has three DB-50 connectors, one for each eight-channel bank (labeled 1–8, 9–16, 17–24) but they may be connected to any FC726 bank. This allows routing the channels in eight-channel groups.

The SDIF-2 format requires connecting an external word clock on a BNC cable from the SDIF device to the FC726's **SDIF-2 Sync** input or the FC726 will not lock. Turn the MADI switch on the FC726 front panel to *OFF* (center position).

2.2 TDIF

1. Connect the TDIF adapter to the DB-50 connector(s) on the FC726's rear panel.
2. Turn the MADI switch on the FC726 front panel to *OFF* (center position).
3. To avoid SRC, either lock the TDIF device to the MADI B device, or lock the MADI B device to the TDIF device.

   To lock the TDIF device to the MADI B device (i.e, Euphonix System 5 or R-1), connect a word clock from the MADI device to the TDIF device's **Word Sync In**. The **Format B Word Sync Out** on the FC726 may be used if no other word clock output is available. Set the TDIF device to slave to its word clock input.

   To lock the MADI B device to the TDIF device, connect the TDIF device's **Word Sync Out** to the MADI B device's word clock input (i.e, on the Euphonix Studio Hub). Set the MADI B device to slave to its word clock input.
4. SRC is required if the MADI B device runs at 96 kHz and the TDIF device at 48 kHz. The TDIF and MADI B devices can each run on their own internal sample clocks without additional sync signals.

2.3 ADAT

1. Connect the ADAT adapter to the DB-50 ports on the FC726 rear panel.
2. Connect the ADAT optical cables to the ADAT rear panel and to the adapter's optical input and output.
3. Turn the MADI switch on the FC726 front panel to *OFF* (center position).
4. Set the ADAT adapter switch to the same setting used on the ADAT front panel.

   If multiple slaved ADATs are connected, this switch should match the setting of the first (master) ADAT. Always use the ADAT INT setting to perform SRC.

The switch on the ADAT adapter has two settings to tell the FC726 how to synchronize to the ADAT optical device(s). Its setting depends on whether the connected ADAT optical device slaves to the FC726 or runs on its own internal clock:

ADAT INT: The ADAT runs on its own internal clock (INT refers to *internal*).

ADAT DIG: The ADAT slaves to its optical (digital) inputs (DIG refers to *digital*). Since the optical input comes from the FC726, this setting slaves the ADAT to the FC726.

2.4 ProDigi

ProDigi (PD) is a 16-channel format with inputs and outputs on separate DB-50 connectors. The FC726 PD adapter has two DB-50 connectors, one for each eight-channel bank (labeled 1–8 and 9–16). They may be connected to any bank on the FC726 with one restriction: the connector labeled 1–8 must be connected to a lower-numbered bank than the 9–16 connector. This allows the channels to be routed in eight-channel groups. Turn the MADI switch on the FC726 front panel to *OFF* (center position).

2.5 AES

Each of the 28 AES inputs can run at a different sample rate. The following rules clarify how the sample rate of the AES output signal is derived:

- Within each bank, all AES outputs operate at the sample rate of the lowest-numbered AES input that is locked. For example, if the first bank (channels 1–8) has a 44.1 kHz AES signal connected to inputs 1/2 and a 48 kHz input connected to inputs 5/6, then AES output channels 1–8 all run at 44.1 kHz.
- If AES inputs are not present on a bank, but another Format A device (i.e., TDIF) is connected and locked, the AES outputs run at the Format A sample rate for that bank.
- If a bank has neither AES inputs nor a third-party device, the AES outputs run at the Format B sample rate.
- If the MADI switch is *On*, the AES outputs run at the Format A MADI sample rate.

Furthermore, these rules can be modified by DIP switch #6: **AES Master/Slave** (see *DIP Switches* on page 16).

- If the switch is set to **Master** (up; the default position), the rules stated above apply.
- If the switch is set to **Slave (**down), the AES outputs never run at the AES input sample rate. Instead, they follow the rules above assuming an AES input is *not* present. This mode should be used to lock the connected AES device to the AES output of the FC726.

2.6 Converting Between Third-Party Formats

2.6.1 Using Two Units (56 Bidirectional Channels)

1. Connect Format B MADI Input of the first FC726 to the Format B MADI Output of the second FC726.
2. Connect Format B MADI Input of the second FC726 to the Format B MADI Output of the first FC726.
3. At 48 kHz, use the In1 and Out1 connectors; at 96 kHz, use In1 and Out1 and In2 and Out2 connectors.
4. Connect the third-party devices as described in their sections of this chapter.
5. Connect a common sync source to both FC726s and all attached third-party devices.

NOTE: *Do not allow both FC726s to attempt to lock to each other's MADI input.*

2.6.2 Using One Unit (24 Bidirectional Channels)

1. Move dip switch #1 to the down position.
2. Loop Format B MADI Out 2 to Format B MADI In 1.
3. If there is no sync on Format B, select Format A as the sync source from the front panel.
4. Connect the third-party I/O devices.

The conversion is from third-party I/O channels 1–24 to channels 25–48. As always, all third-party inputs are still converted to Format B MADI Out 1.

For example, to convert 24 channels of ADAT to 24 channels TDIF (DA88), connect ADAT to third-party channels 1–24, connect the three DA88s to channels 25–48 and follow the steps above.

2.7 Specifications

FC726 Performance Specifications	
Sync Sources	AES, word clock, MADI, Format A
Sync Outputs	AES thru and word clock out
Sync Detection	Auto or switched
Format A Audio Inputs	56 digital AES (DB25), transformer isolated, 110 Ω Third-Party I/O (DB50) MADI (BNC), 75 Ω
Format A Audio Outputs	56 digital AES (DB25), transformer isolated, 110 Ω Third-Party I/O (DB50) MADI (BNC), 75 Ω
Signal-to-Noise Ratio	144 dB (unweighted) 120 dB (unweighted) with SRC engaged
Group Delay	SRC Off - 4 F_s SRC On - 4 F_s + ms delay ($43/F_{s\ input}$ + $45/F_{s\ output}$)
Format B MADI Inputs	BNC 75 Ω 56 channels at 44.1/48 kHz 28 channels at 88.2/96 kHz
Format B MADI Output	BNC 75 Ω 56 channels at 44.1/48 kHz 28 channels at 88.2/96 kHz

FC726 Technical Specifications	
Power Requirements	110–240 VAC; 50 or 60 Hz (Auto-ranging)
Power Consumption	1 A
Temperature of Operation	5–35°C
Dimensions	Height: 3.5 in (89 mm); Width: 19 in (483 mm); Depth: 18.25 in (470 mm) Weight: 13.5 lb (6 kg)

Appendix A: Pinout and Cable Specifications

This appendix provides detailed information about the FC726's connectors for those who wish to create or repair their own cables. Contact Euphonix for a list of the adapters and cables available for third-party devices.

NOTE: *The ADAT requires an adapter that contains active electronics with a DB-50 connector on one end and an ADAT optical connector on the other. This adapter cannot be constructed using the information presented in this appendix; contact Euphonix for this adapter.*

A.1 AES/EBU DB-25

Figure A-1 shows the cable diagram. Table A-1 shows the pinout for the FC726's AES/EBU DB-25 connector.

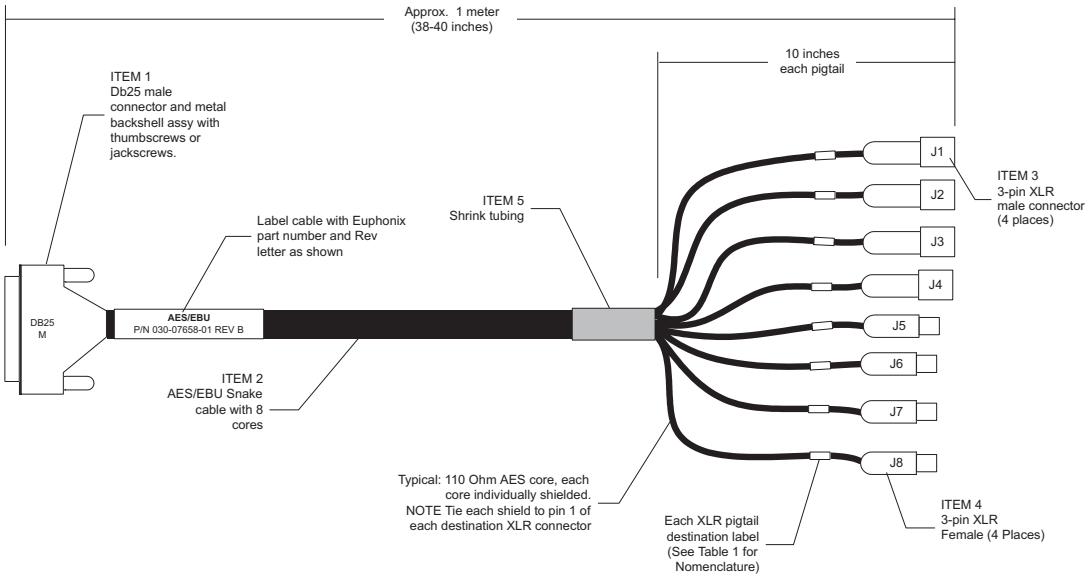


TABLE 1 Cable Label Details

Conn.		Label
DB25-M	AES/EBU	030-07658-01 Rev
XLR-J1		1 & 2 OUT
XLR-J2		3 & 4 OUT
XLR-J3		5 & 6 OUT
XLR-J4		7 & 8 OUT
XLR-J5		1 & 2 IN
XLR-J6		3 & 4 IN
XLR-J7		5 & 6 IN
XLR-J8		7 & 8 IN

PARTS LIST

Item	Qty	Euph P/N	Mfr	Mfr P/N	Description
1	1		AMP	HD-20 series	DB25-M D-sub & shell
2	1 meter		Mogami	3162	AES/EBU snake cable
			Alternate: Belden	1805A	AES/EBU snake cable
3	4		Neutrik	NC3MX	3 p XLR M
4	4		Neutrik	NC3FX	3 p XLR F
5	2 inch				.75 OD shrink tubing

Figure A-1 AES DB-25 breakout cable assembly diagram

Table A-1 AES/EBU DB-25 connector pinout

Pin	Description
Pin 1	N/C
Pin 2	Channel 1 / 2 In (COLD)
Pin 3	Channel 3 / 4 In (GND)
Pin 4	Channel 3 / 4 In (HOT)
Pin 5	Channel 5 / 6 In (COLD)
Pin 6	Channel 7 / 8 In (GND)
Pin 7	Channel 7 / 8 In (HOT)
Pin 8	Channel 1 / 2 Out (COLD)
Pin 9	Channel 3 / 4 Out (GND)
Pin 10	Channel 3 / 4 Out (HOT)
Pin 11	Channel 5 / 6 Out (COLD)
Pin 12	Channel 7 / 8 Out (GND)
Pin 13	Channel 7 / 8 Out (HOT)
Pin 14	Channel 1 / 2 In (GND)
Pin 15	Channel 1 / 2 In (HOT)
Pin 16	Channel 3/ 4 In (COLD)
Pin 17	Channel 5 / 6 In (GND)
Pin 18	Channel 5 / 6 In (HOT)
Pin 19	Channel 7 / 8 In (COLD)
Pin 20	Channel 1 / 2 Out (GND)
Pin 21	Channel 1 / 2 Out (HOT)
Pin 22	Channel 3 / 4 Out (COLD)
Pin 23	Channel 5 / 6 Out (GND)
Pin 24	Channel 5 / 6 Out (HOT)
Pin 25	Channel 7 / 8 Out (COLD)

NOTE: *In and Out are from the FC726's perspective.*

A.2 Third-Party Devices

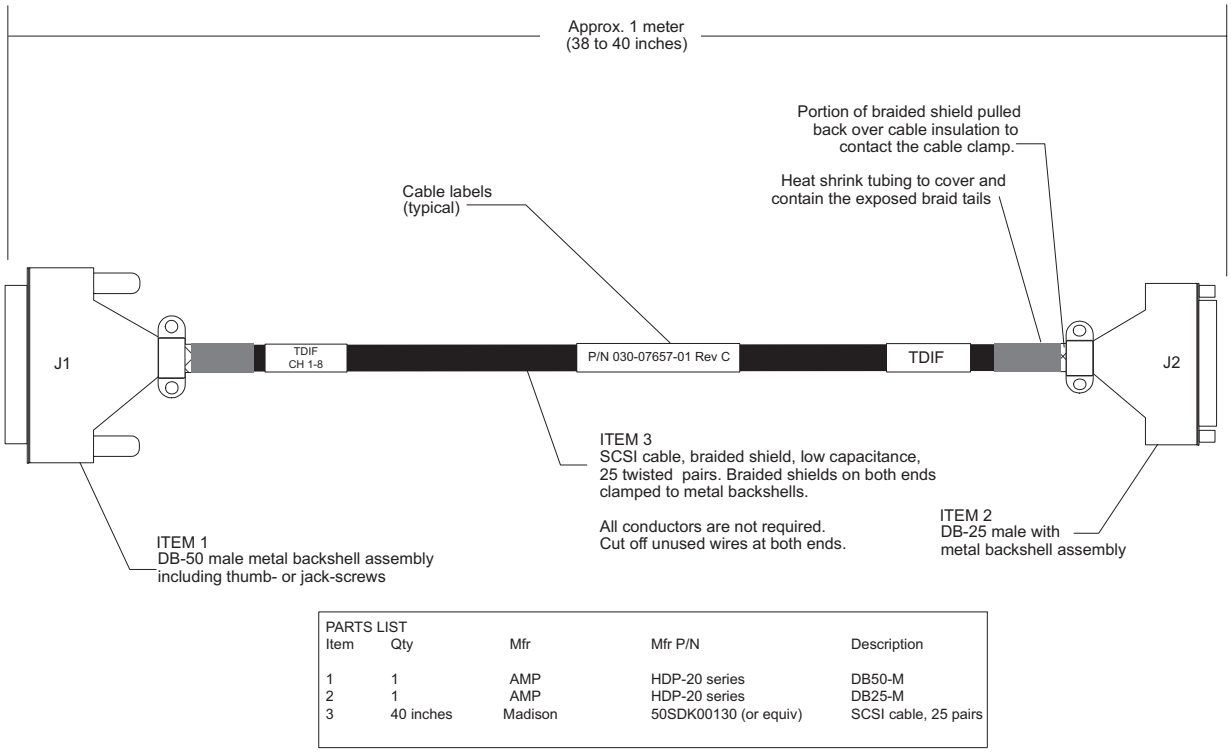
Table A-2 Common DB-50 connector pinout and usage with third party devices

Pin #	Common Connector (DB50 Female)	SDIF usage	TDIF usage	ProDigi usage	ADAT usage
1	In 1+	In 1+	NC	In 1+	In 1/2
2	In 1-	In 1-	In 1/2	In 1-	NC
3	In 2+	In 3+	NC	In 3+	In 3/4
4	In 2-	In 3-	In 3/4	In 3-	NC
5	In 3+	In 5+	NC	In 5+	In 5/6
6	In 3-	In 5-	In 5/6	In 5-	NC
7	In 4+	In 7+	NC	In 7+	In 7/8
8	In 4-	In 7-	In 7/8	In 7-	NC
9	GND	GND	GND	GND	GND
10	In 5+/GP In A	In 2+	NC	In 2+	Error In
11	In 5-	In 2-	NC	In 2-	NC
12	In 6+/GP In B	In 4+	NC	In 4+	User0 In
13	In 6-	In 4-	NC	In 4-	NC
14	In 7+/GP In C	In 6+	NC	In 6+	User1 In
15	In 7-	In 6-	NC	In 6-	NC
16	In 8+/GP In D	In 8+	NC	In 8+	Mstr/Slv IN
17	In 8-	In 8-	NC	In 8-	NC
18	Cable ID2	0 (tie to pin 23)	0 (tie to pin 23)	0 (tie to pin 23)	1 (NC)
19	Cable ID1	0 (tie to pin 23)	1 (NC)	1 (NC)	0 (tie to pin 23)
20	Cable ID0	1 (NC)	0 (tie to pin 23)	1 (NC)	0 (tie to pin 23)
21	Bit Clk In+	NC	NC	Bit Clk In+	Bit Clk In
22	Bit Clk In-	NC	NC	Bit Clk In-	NC
23	GND	GND	GND	GND	GND
24	Word Clk In+	NC	In LR Clk	Word Clk In+	Word Clk In
25	Word Clk In-	NC	NC	Word Clk In-	GND
26	Out 1+	Out 1+	NC	Out 1+	Out 1/2
27	Out 1-	Out 1-	Out 1/2	Out 1-	NC
28	Out 2+	Out 3+	NC	Out 3+	Out 3/4
29	Out 2-	Out 3-	Out 3/4	Out 3-	NC
30	Out 3+	Out 5+	NC	Out 5+	Out 5/6
31	Out 3-	Out 5-	Out 5/6	Out 5-	NC
32	Out 4+	Out 7+	NC	Out 7+	Out 7/8
33	Out 4-	Out 7-	Out 7/8	Out 7-	NC
34	Out 5+/GP Out A	Out 2+	FS0 out	Out 2+	Mute Out
35	Out 5-	Out 2-	NC	Out 2-	NC
36	Out 6+/GP Out B	Out 4+	FS1 out	Out 4+	NC
37	Out 6-	Out 4-	NC	Out 4-	NC
38	Out 7+/GP Out C	Out 6+	Emph Out	Out 6+	NC
39	Out 7-	Out 6-	NC	Out 6-	NC
40	Out 8+/GP Out D	Out 8+	NC	Out 8+	NC
41	Out 8-	Out 8-	NC	Out 8-	NC
42	Bit Clk Out+	NC	NC	Bit Clk Out+	Bit Clk Out
43	Bit Clk Out-	NC	NC	Bit Clk Out-	GND
44	GND	GND	GND	GND	GND
45	Word Clk Out+	NC	Out LR Clk	Word Clk Out+	Word Clk Out
46	Word Clk Out-	NC	NC	Word Clk Out-	GND
47	Extra In/GP In E+	NC	NC	NC	DVCO In
48	Extra In/GP In E-	NC	NC	NC	NC
49	NC	NC	NC	NC	Vcc
50	GND	GND	GND	GND	GND

NOTE: *In and Out are from the FC726's perspective.*

A.2.1 TDIF

Figure A-2 shows the cable diagram. Table A-3 shows the pinout for the FC726's TDIF connector.



PARTS LIST

Item	Qty	Mfr	Mfr P/N	Description
1	1	AMP	HDP-20 series	DB50-M
2	1	AMP	HDP-20 series	DB25-M
3	40 inches	Madison	50SDK00130 (or equiv)	SCSI cable, 25 pairs

Figure A-2 DB-50-to-DB-25 TDIF cable assembly diagram

Table A-3 FC726 TDIF cable wiring specification

Connector	Pin	Connection	Description
J1	1	NC	
J1	2	J2-1	In 1/2
J1	3	NC	
J1	4	J2-2	In 3/4
J1	5	NC	
J1	6	J2-3	In 5/6
J1	7	NC	
J1	8	J2-4	In 7/8
J1	9	J2-7,24,25	GND
J1	10	NC	
J1	11	NC	
J1	12	NC	
J1	13	NC	
J1	14	NC	
J1	15	NC	
J1	16	NC	
J1	17	NC	
J1	18	J1-23	Cable ID
J1	19	NC	Cable ID
J1	20	J1-23	Cable ID
J1	21	NC	
J1	22	NC	
J1	23	J2-17,J1-18,J1-20	GND
J1	24	J2-5	Word Clock In
J1	25	NC	
J1	26	NC	
J1	27	J2-13	Out 1/2
J1	28	NC	
J1	29	J2-12	Out 3/4
J1	30	NC	
J1	31	J2-11	Out 5/6
J1	32	NC	
J1	33	J2-10	Out 7/8
J1	34	J2-8	FS0 Out
J1	35	NC	
J1	36	J2-20	FS1 Out
J1	37	NC	
J1	38	J2-21	Emph Out
J1	39	NC	
J1	40	NC	
J1	41	NC	
J1	42	NC	
J1	43	NC	
J1	44	J2-22,23	GND
J1	45	J2-9	Word Clock Out
J1	46	NC	
J1	47	NC	
J1	48	NC	
J1	49	NC	
J1	50	J2-14,15,16	GND

Notes:
J1 = DB-50 male
J2 = DB-25 male

Twisted pairs:
J2-1/14
J2-2/15
J2-3/16
J2-4/17
J2-5/7
J2-9/22
J2-11/23
J2-12/24
J2-13/25
The rest don't matter

In and Out are from the FC727's perspective.

A.2.2 SDIF

Figure A-3 shows the cable diagram. Table A-4 shows the pinout for the FC726's SDIF connector.

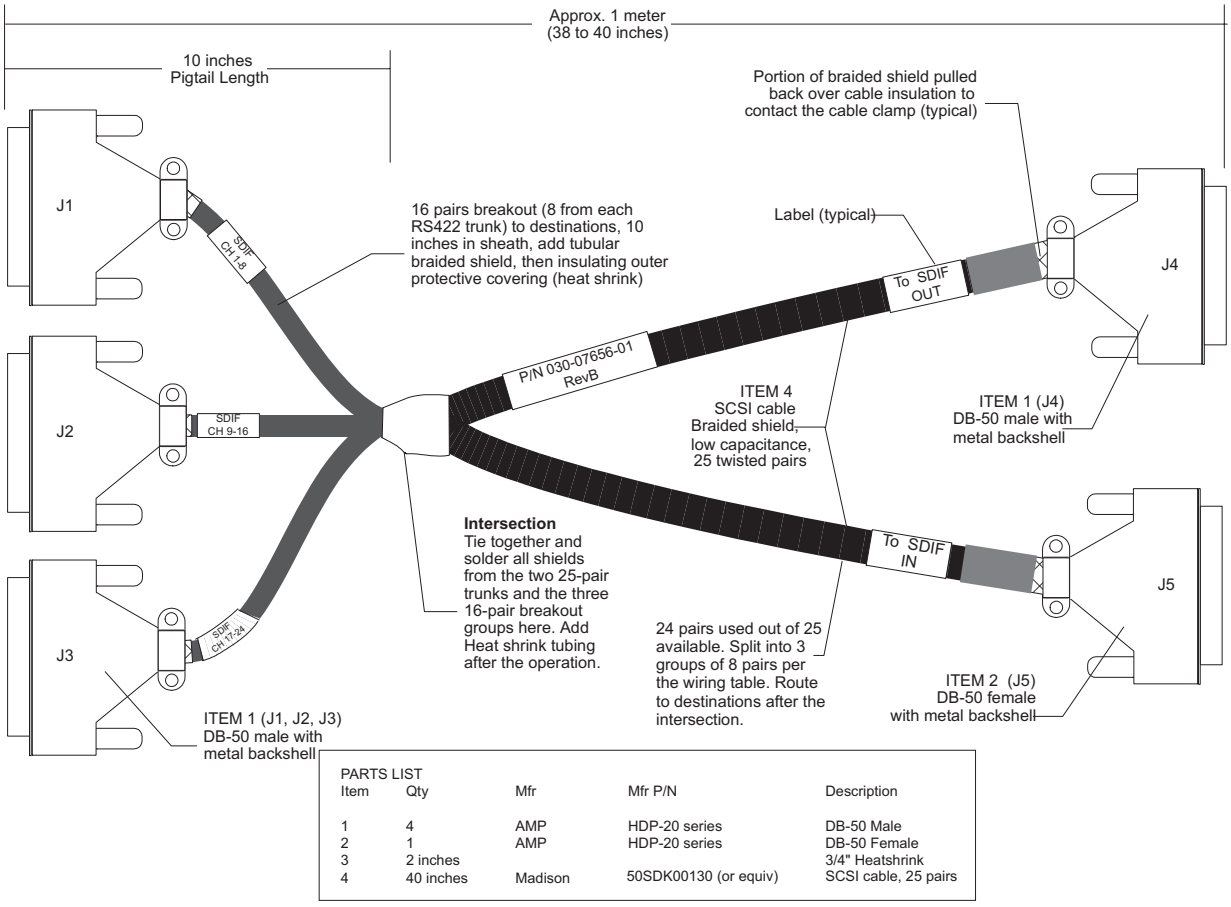


Figure A-3 DB-50 MX3-to-DB-50 Male/Female SDIF cable assembly diagram

Table A-4 FC726 SDIF cable wiring specification

Connector	Pin	Connection	Description
J1	1	J4-2	In 1+
J1	2	J4-1	In 1-
J1	3	J4-6	In 3+
J1	4	J4-5	In 3-
J1	5	J4-10	In 5+
J1	6	J4-9	In 5-
J1	7	J4-14	In 7+
J1	8	J4-13	In 7-
J1	9	NC (GND)	
J1	10	J4-4	In 2+
J1	11	J4-3	In 2-
J1	12	J4-8	In 4+
J1	13	J4-7	In 4-
J1	14	J4-12	In 6+
J1	15	J4-11	In 6-
J1	16	J4-16	In 8+
J1	17	J4-15	In 8-
J1	18	J1-23	Cable ID
J1	19	J1-23	Cable ID
J1	20	NC	Cable ID
J1	21	NC	
J1	22	NC	
J1	23	J1-18,19	GND
J1	24	NC	
J1	25	NC	
J1	26	J5-2	Out 1+
J1	27	J5-1	Out 1-
J1	28	J5-6	Out 3+
J1	29	J5-5	Out 3-
J1	30	J5-10	Out 5+
J1	31	J5-9	Out 5-
J1	32	J5-14	Out 7+
J1	33	J5-13	Out 7-
J1	34	J5-4	Out 2+
J1	35	J5-3	Out 2-
J1	36	J5-8	Out 4+
J1	37	J5-7	Out 4-
J1	38	J5-12	Out 6+
J1	39	J5-11	Out 6-
J1	40	J5-16	Out 8+
J1	41	J5-15	Out 8-
J1	42	NC	
J1	43	NC	
J1	44	NC	
J1	45	NC	
J1	46	NC	
J1	47	NC	
J1	48	NC	
J1	49	NC	
J1	50	NC	

Notes:

J1,J2,J3 = DB-50 male

J4 = DB-50 male

J5 = DB-50 female

Jx-x
Jx-x *denotes twisted pair*

In and Out are from the FC727's perspective.

Table A-4 FC726 SDIF cable wiring specification continued

Connector	Pin	Connection	Description
J2	1	J4-18	In 9+
J2	2	J4-17	In 9-
J2	3	J4-22	In 11+
J2	4	J4-21	In 11-
J2	5	J4-26	In 13+
J2	6	J4-25	In 13-
J2	7	J4-30	In 15+
J2	8	J4-29	In 15-
J2	9	NC	
J2	10	J4-20	In 10+
J2	11	J4-19	In 10-
J2	12	J4-24	In 12+
J2	13	J4-23	In 12-
J2	14	J4-28	In 14+
J2	15	J4-27	In 14-
J2	16	J4-32	In 16+
J2	17	J4-31	In 16-
J2	18	J2-23	Cable ID
J2	19	J2-23	Cable ID
J2	20	NC	Cable ID
J2	21	NC	
J2	22	NC	
J2	23	J2-18,19	GND
J2	24	NC	
J2	25	NC	
J2	26	J5-18	Out 9+
J2	27	J5-17	Out 9-
J2	28	J5-22	Out 11+
J2	29	J5-21	Out 11-
J2	30	J5-26	Out 13+
J2	31	J5-25	Out 13-
J2	32	J5-30	Out 15+
J2	33	J5-29	Out 15-
J2	34	J5-20	Out 10+
J2	35	J5-19	Out 10-
J2	36	J5-24	Out 12+
J2	37	J5-23	Out 12-
J2	38	J5-28	Out 14+
J2	39	J5-27	Out 14-
J2	40	J5-32	Out 16+
J2	41	J5-31	Out 16-
J2	42	NC	
J2	43	NC	
J2	44	NC	
J2	45	NC	
J2	46	NC	
J2	47	NC	
J2	48	NC	
J2	49	NC	
J2	50	NC	

Table A-4 FC726 SDIF cable wiring specification continued

Connector	Pin	Connection	Description
J3	1	J4-34	In 17+
J3	2	J4-33	In 17-
J3	3	J4-38	In 19+
J3	4	J4-37	In 19-
J3	5	J4-42	In 21+
J3	6	J4-41	In 21-
J3	7	J4-46	In 23+
J3	8	J4-45	In 23-
J3	9	NC	
J3	10	J4-36	In 18+
J3	11	J4-35	In 18-
J3	12	J4-40	In 20+
J3	13	J4-39	In 20-
J3	14	J4-44	In 22+
J3	15	J4-43	In 22-
J3	16	J4-48	In 24+
J3	17	J4-47	In 24-
J3	18	J3-23	Cable ID
J3	19	J3-23	Cable ID
J3	20	NC	Cable ID
J3	21	NC	
J3	22	NC	
J3	23	J3-18,19	GND
J3	24	NC	
J3	25	NC	
J3	26	J5-34	Out 17+
J3	27	J5-33	Out 17-
J3	28	J5-38	Out 19+
J3	29	J5-37	Out 19-
J3	30	J5-42	Out 21+
J3	31	J5-41	Out 21-
J3	32	J5-46	Out 23+
J3	33	J5-45	Out 23-
J3	34	J5-36	Out 18+
J3	35	J5-35	Out 18-
J3	36	J5-40	Out 20+
J3	37	J5-39	Out 20-
J3	38	J5-44	Out 22+
J3	39	J5-43	Out 22-
J3	40	J5-48	Out 24+
J3	41	J5-47	Out 24-
J3	42	NC	
J3	43	NC	
J3	44	NC	
J3	45	NC	
J3	46	NC	
J3	47	NC	
J3	48	NC	
J3	49	NC	
J3	50	NC	

A.2.3 ProDigi

Figure A-4 shows the cable diagram. Table A-5 shows the pinout for the FC726's ProDigi connector.

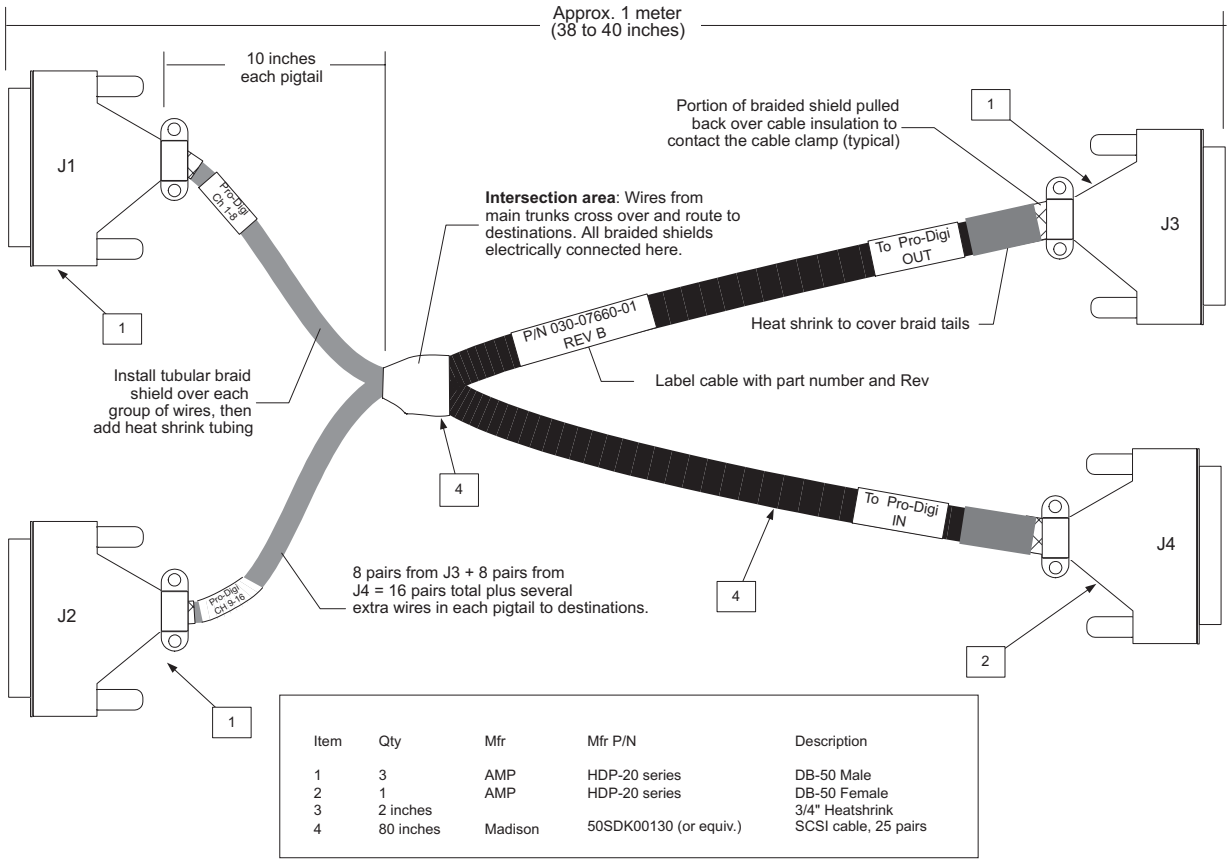


Figure A-4 DB-50 Male/Male-to-DB-50 Male/Female ProDigi cable assembly diagram

Table A-5 FC726 ProDigi cable wiring specification

Connector	Pin	Connection	Description
J1	1	J3-1	In 1+
J1	2	J3-18	In 1-
J1	3	J3-3	In 3+
J1	4	J3-20	In 3-
J1	5	J3-5	In 5+
J1	6	J3-22	In 5-
J1	7	J3-7	In 7+
J1	8	J3-24	In 7-
J1	9	J3-17	GND
J1	10	J3-2	In 2+
J1	11	J3-19	In 2-
J1	12	J3-4	In 4+
J1	13	J3-21	In 4-
J1	14	J3-6	In 6+
J1	15	J3-23	In 6-
J1	16	J3-8	In 8+
J1	17	J3-25	In 8-
J1	18	J1-23	Cable ID
J1	19	NC	Cable ID
J1	20	NC	Cable ID
J1	21	J3-34	Bit Clk In+
J1	22	J3-35	Bit Clk In-
J1	23	J1-18	GND
J1	24	J3-36	Word Clk In+
J1	25	J3-37	Word Clk In-
J1	26	J4-1	Out 1+
J1	27	J4-18	Out 1-
J1	28	J4-3	Out 3+
J1	29	J4-20	Out 3-
J1	30	J4-5	Out 5+
J1	31	J4-22	Out 5-
J1	32	J4-7	Out 7+
J1	33	J4-24	Out 7-
J1	34	J4-2	Out 2+
J1	35	J4-19	Out 2-
J1	36	J4-4	Out 4+
J1	37	J4-21	Out 4-
J1	38	J4-6	Out 6+
J1	39	J4-23	Out 6-
J1	40	J4-8	Out 8+
J1	41	J4-25	Out 8-
J1	42	J4-34	Bit Clk Out+
J1	43	J4-35	Bit Clk Out-
J1	44	NC	
J1	45	J4-36	Word Clk Out+
J1	46	J4-37	Word Clk Out-
J1	47	NC	
J1	48	NC	
J1	49	NC	
J1	50	J3-50	GND

Notes:
J1,J2,J3 = DB-50 male
J4 = DB-50 female

Jx-x
Jx-x *denotes* twisted pair

In and Out are from the FC727's perspective.

Table A-5 FC726 ProDigi cable wiring specification continued

Connector	Pin	Connection	Description
J2	1	J3-9	In 9+
J2	2	J3-26	In 9-
J2	3	J3-11	In 11+
J2	4	J3-28	In 11-
J2	5	J3-13	In 13+
J2	6	J3-30	In 13-
J2	7	J3-15	In 15+
J2	8	J3-32	In 15-
J2	9	J4-17	GND
J2	10	J3-10	In 10+
J2	11	J3-27	In 10-
J2	12	J3-12	In 12+
J2	13	J3-29	In 12-
J2	14	J3-14	In 14+
J2	15	J3-31	In 14-
J2	16	J3-16	In 16+
J2	17	J3-33	In 16-
J2	18	J2-23	Cable ID
J2	19	NC	Cable ID
J2	20	NC	Cable ID
J2	21	NC	
J2	22	NC	
J2	23	J2-18	GND
J2	24	NC	
J2	25	NC	
J2	26	J4-9	Out 9+
J2	27	J4-26	Out 9-
J2	28	J4-11	Out 11+
J2	29	J4-28	Out 11-
J2	30	J4-13	Out 13+
J2	31	J4-30	Out 13-
J2	32	J4-15	Out 15+
J2	33	J4-32	Out 15-
J2	34	J4-10	Out 10+
J2	35	J4-27	Out 10-
J2	36	J4-12	Out 12+
J2	37	J4-29	Out 12-
J2	38	J4-14	Out 14+
J2	39	J4-31	Out 14-
J2	40	J4-16	Out 16+
J2	41	J4-33	Out 16-
J2	42	NC	
J2	43	NC	
J2	44	NC	
J2	45	NC	
J2	46	NC	
J2	47	NC	
J2	48	NC	
J2	49	NC	
J2	50	J4-50	