DMA8Plus Digital Media Adapter Installation and User's Manual

Issue 2 Part Number 91805

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Regulatory Notices

FCC

NOTE: 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 this instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Canada

This Class A digital apparatus complies with Canadian ICES-003.

EU/EMC

This unit complies with the EMC requirement of EN55103-1 and EN55103-2 when operated in an E2 environment in accordance with this manual.

Important Safety Instructions

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. WARNING: To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture.
7. Clean only with dry cloth.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. No naked flame sources, such as lighted candles, should be placed on the apparatus
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.
11. Only use attachments/accessories specified by the manufacturer.
12. Unplug this apparatus during lightning storms or when unused for long periods of time.
13. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
14. Do not expose the apparatus to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

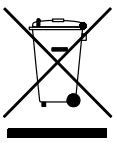
15. CAUTION: Troubleshooting must be performed by a trained technician. To reduce the risk of electric shock, do not attempt to service this equipment unless you are qualified to do so.
16. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
17. This apparatus must be earthed (grounded) by connecting to a correctly wired and earthed power outlet.
18. Ensure that your mains supply is in the correct range for the input power requirement of the unit.
19. In order to reduce the risk of electrical shock, the power cord must be disconnected when the power supply assembly is removed.
20. This equipment is designed to mount in a suitably ventilated 19" rack; ensure that any ventilation slots in the unit are not blocked or covered.
21. The mains power disconnect device for this unit is the plug-in mains cord rather than a power switch. The mains cord must remain readily accessible for disconnecting mains power.
22. To avoid exposure to dangerous voltages and to avoid damage to the unit, do not connect the rear-panel Ethernet port to telephone circuits.
23. As the colours of the cores in the mains lead may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows:
    - The green and yellow core must be connected to the terminal in the plug identified by the letter E, or by the earth symbol ⏚, or coloured green, or green and yellow.
    - The blue core must be connected to the terminal marked with the letter N or coloured black.
    - The brown core must be connected to the terminal marked with the letter L or coloured red.
24. This apparatus must be earthed.

Fuses

WARNING: Check that the correct fuses have been installed. For continued protection against risk of fire, replace only with fuses of the same type and rating. For details on fuse ratings and instructions on fuse replacement, see Checking the Two User-Serviceable Fuses on page 10.

WEEE

PRODUCT END-OF-LIFE INFORMATION



This product was designed and built by Dolby Laboratories to provide many years of service, and is backed by our commitment to provide high-quality support. When it eventually reaches the end of its serviceable life, it should be disposed of in accordance with local or national legislation.

For current information please visit our website at: http://www.dolby.com/environment.

IMPORTANT SAFETY NOTICE

This unit complies with safety standard EN60065 as appropriate. The unit shall not be exposed to dripping or splashing and no objects filled with liquids, such as coffee cups, shall be placed on the equipment. To ensure safe operation and to guard against potential shock hazard or risk of fire, the following must be observed:

GB

- Ensure that your mains supply is in the correct range for the input power requirement of the unit.
- Ensure fuses fitted are the correct rating and type as marked on the unit.
- The unit must be earthed by connecting to a correctly wired and earthed power outlet.
- The power cord supplied with this unit must be wired as follows:

Live—Brown Neutral—Blue Earth—Green/Yellow

IMPORTANT – NOTE DE SECURITE

Ce materiel est conforme à la norme EN60065. Ne pas exposer cet appareil aux éclaboussures ou aux gouttes de liquide. Ne pas poser d'objets remplis de liquide, tels que des tasses de café, sur l'appareil. Pour vous assurer d'un fonctionnement sans danger et de prévenir tout choc électrique ou tout risque d'incendie, veillez à observer les recommandations suivantes.

F

- Le selecteur de tension doit être placé sur la valeur correspondante à votre alimentation réseau.
- Les fusibles doivent correspondre à la valeur indiquée sur le materiel.
- Le materiel doit être correctement relié à la terre.
- Le cordon secteur livré avec le materiel doit être cablé de la manière suivante:

Phase—Brun Neutre—Bleu Terre—Vert/Jaune

WICHTIGER SICHERHEITSHINWEIS

Dieses Gerät entspricht der Sicherheitsnorm EN60065. Das Gerät darf nicht mit Flüssigkeiten (Spritzwasser usw.) in Berührung kommen; stellen Sie keine Gefäße, z.B. Kaffeetassen, auf das Gerät. Für das sichere Funktionieren des Gerätes und zur Unfallverhütung (elektrischer Schlag, Feuer) sind die folgenden Regeln unbedingt einzuhalten:

D

- Der Spannungswähler muß auf Ihre Netzspannung eingestellt sein.
- Die Sicherungen müssen in Typ und Stromwert mit den Angaben auf dem Gerät übereinstimmen.
- Die Erdung des Gerätes muß über eine geerdete Steckdose gewährleistet sein.
- Das mitgelieferte Netzkabel muß wie folgt verdrahtet werden:

Phase—braun Nulleiter—blau Erde—grün/gelb

NORME DI SICUREZZA – IMPORTANTE

Questa apparecchiatura è stata costruita in accordo alle norme di sicurezza EN60065. Il prodotto non deve essere sottoposto a schizzi, spruzzi e gocciolamenti, e nessun tipo di oggetto riempito con liquidi, come ad esempio tazze di caffè, deve essere appoggiato sul dispositivo. Per una perfetta sicurezza ed al fine di evitare eventuali rischi di scossa êlettrica o d'incendio vanno osservate le seguenti misure di sicurezza:

I

- Assicurarsi che il selettore di cambio tensione sia posizionato sul valore corretto.
- Assicurarsi che la portata ed il tipo di fusibili siano quelli prescritti dalla casa costruttrice.
- L'apparecchiatura deve avere un collegamento di messa a terra ben eseguito; anche la connessione rete deve avere un collegamento a terra.
- Il cavo di alimentazione a corredo dell'apparecchiatura deve essere collegato come segue:

Filo tensione—Marrone Neutro—Blu Massa—Verde/Giallo

AVISO IMPORTANTE DE SEGURIDAD

Esta unidad cumple con la norma de seguridad EN60065. La unidad no debe ser expuesta a goteos o salpicaduras y no deben colocarse sobre el equipo recipientes con liquidos, como tazas de cafe. Para asegurarse un funcionamiento seguro y prevenir cualquier posible peligro de descarga o riesgo de incendio, se han de observar las siguientes precauciones:

E

- Asegúrese que el selector de tensión esté ajustado a la tensión correcta para su alimentación.
- Asegúrese que los fusibles colocados son del tipo y valor correctos, tal como se marca en la unidad.
- La unidad debe ser puesta a tierra, conectándola a un conector de red correctamente cableado y puesto a tierra.
- El cable de red suministrado con esta unidad, debe ser cableado como sigue:

Vivo—Marrón Neutro—Azul Tierra—Verde/Amarillo

VIKTIGA SÄKERHETSÅTGÄRDER!

Denna enhet uppfyller säkerhetsstandard EN60065. Enheten får ej utsättas för yttre åverkan samt föremål innehållande vätska, såsom kaffemuggar, får ej placeras på utrustningen. För att garantera säkerheten och gardera mot eventuell elchock eller brandrisk, måste följande observeras:

S

- Kontrollera att spänningsväljaren är inställd på korrekt nätspänning.
- Konrollera att säkringarna är av rätt typ och för rätt strömstyrka så som anvisningarna på enheten föreskriver.
- Enheten måste vara jordad genom anslutning till ett korrekt kopplat och jordat el-uttag.
- El-sladden som medföljer denna enhet måste kopplas enligt foljande:

Fas—Brun Neutral—Blå Jord—Grön/Gul

BELANGRIJK VEILIGHEIDS-VOORSCHRIFT:

Deze unit voldoet aan de EN60065 veiligheids-standaards. Dit apparaat mag niet worden blootgesteld aan vocht. Vanwege het risico dat er druppels in het apparaat vallen, dient u er geen vloeistoffen in bekers op te plaatsen. Voor een veilig gebruik en om het gevaar van electrische schokken en het risico van brand te vermijden, dienen de volgende regels in acht te worden genomen:

NL

- Controleer of de spanningscaroussel op het juiste Voltage staat.
- Gebruik alleen zekeringen van de aangegeven typen en waarden.
- Aansluiting van de unit alleen aan een geaarde wandcontactdoos.
- De netkabel die met de unit wordt geleverd, moet als volgt worden aangesloten:

Fase—Bruin Nul—Blauw Aarde—Groen/Geel

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Introduction

The Dolby® DMA8Plus Digital Media Adapter is a direct result of Dolby Laboratories' continued leadership in the development of innovative cinema technologies. The DMA8Plus provides all the interface capabilities and digital inputs you're likely to need. With the DMA8Plus, you can adapt your existing sound system for digital cinema and other digital audio sources. The unit provides a straightforward interface to existing Dolby cinema equipment, such as the CP650, CP500, CP65, CP55, CP45, CP200, and DA20. In addition, the DMA8Plus provides theatres with audio solutions to today's alternative programming challenges, such as pay-per-view events and digital broadcasting.

The DMA8Plus has four separate digital inputs and accepts up to eight channels of PCM digital audio as well as Dolby Digital and Dolby E bitstreams. Two-channel audio sources can be decoded as discrete, Dolby Pro Logic®, or Dolby Pro Logic II signals. Analog audio outputs are calibrated to cinema processor reference levels to ensure a straightforward interface with your cinema's existing sound processor.

With the DMA8Plus, you can present high-quality audio from the following audio sources and formats:

- Dolby Digital Cinema
- Onscreen advertising servers
- Digital VTRs
- Digital satellite or cable TV receivers
- DVDs
- PCM
- Dolby Digital consumer bitstreams
- Dolby E

A separate adjustable global audio delay is assigned to each digital input to ensure that sound and picture are perfectly synchronized during digital cinema presentations. Different delays can be assigned to different inputs, providing flexibility for alternative content sources, which often require different delays.

The DMA8Plus is also compatible with existing theatre automation systems and ASCII command strings. Its ability to handle multiple formats and future upgrades make it an essential tool for an evolving digital cinema market.

The DMA8Plus is designed to fit between an existing DA20 (Dolby Digital film decoder) and a cinema processor. This allows both the DA20 and DMA8Plus to share the six-channel input of the cinema processor. When the DMA8Plus is in Film mode, standard six-channel analog signals from any source, such as a Dolby DA20, are routed through the DMA8Plus to the six-channel input of a cinema sound processor (pass-through). In one of the four digital modes, the DMA8Plus decodes and routes signals from a variety of nonfilm sources to the existing cinema sound processor.

1.1 DMA8Plus Front Panel

The DMA8Plus front panel includes the following components:

- Five push buttons to select the input source (**digital 1**, **digital 2**, **digital 3**, **digital 4**, or **film**)
- Four LEDs that indicate a **valid** clock presence for each digital input
- Four LEDs that indicate the current **format** (**PCM**, **Dolby Digital**, **Dolby E**, or **Aux** [auxiliary])
- Three LEDs that indicate the **decode mode** (**Pro Logic II**, **Pro Logic**, or **Discrete)**
- Eight LEDs that monitor the eight-channel analog audio **output activity** (**L**, **C**, **R**, **Sw**, **Ls**, **Rs**, **7** and **8**)
- One USB port for firmware upgrades and setup software

Figure 1-1 DMA8Plus Front Panel

1.1.1 Digital Input Push Buttons

When you press any of the **digital 1**, **digital 2**, **digital 3**, or **digital 4** push buttons, that button illuminates, indicating that the selected input is active until you press one of the other push buttons. Pressing a push button selects a specific digital input source, as shown in Table 1-1. The DMA8Plus sends a format pulse to the cinema processor to switch the processor into the appropriate six-channel input format (see Table 4-7).

Note: Be sure to use a control cable to connect the cinema processor to the DMA8Plus **TO CP CONTROL** connector.

When in a digital mode, the DMA8Plus can switch between PCM, Dolby Digital, or Dolby E encoded bitstreams.

Table 1-1 Digital Push Button Functionality

Digital Push Button	Input Source Selected
digital 1	Selects the digital input source from the 4xAES digital input 1 (four-channel pairs, 25-pin D-connector)
digital 2	Selects the digital input source from the 1xAES digital input 2 (BNC)
digital 3	Selects the digital input source from the 1xAES digital input 3 (BNC)
digital 4	Selects the digital input source from the 1xAES digital input 4 (S/PDIF optical)

1.1.2 Film Push Button

When you press this button it illuminates, indicating that **film** mode is active. When the DMA8Plus is in Film mode, audio is received from the analog audio input, which then passes through to the analog audio output (while the unit is in Film mode or when powered off). The DMA8Plus sends a format pulse to the cinema processor to enable an appropriate format **(**see Table 4-8**).** When you press any cinema processor **format** button, the DMA8Plus switches to Film mode without sending its Film mode pulse assertion.

Note: Be sure to use a control cable to connect the cinema processor to the DMA8Plu**s TO CP CONTROL** connector.

1.1.3 Valid Input Clock

Each of the four digital input push buttons has a green **valid** LED located beneath it. These LEDs illuminate when a valid input clock signal is detected on the respective input (regardless of whether the corresponding button is selected).

1.1.4 Output Activity LEDs

There are eight signal-level LEDs, one for each channel. The signals are monitored after the D/A converter output, and before the output relays. The LEDs vary in intensity and are brightest at +20 dBr (r = 300 mV), while turning off at approximately –26 dBr.

1.1.5 Format LEDs

There are four bitstream **format** LEDs (**PCM**, **Dolby Digital**, **Dolby E, and Aux**). The Aux format is currently reserved for future use. These LEDs illuminate when the DMA8Plus is actually receiving the respective data format.

1.1.6 Decode Mode LEDs

There are three bitstream processing LEDs, indicating the **decode mode** (**Pro Logic II**, **Pro Logic**, and **Discrete**).

1.1.7 USB Port

The USB port is provided for connecting to a PC. You can use it to set up or update the DMA8Plus firmware.

1.2 DMA8Plus Rear Panel

The DMA8Plus rear panel includes the following components:

- AC input
- **TO CP CONTROL** (25-pin male D-connector for cinema processor format interface)
- **TO DA CONTROL** (25-pin female D-connector for DA20 processor interface)
- One **4xAES** (AES/EBU) digital input (25-pin female D-connector)
- Two **1xAES** (AES3) digital inputs (BNC)
- One **OPTICAL** (S/PDIF) digital input (Toslink™ connector)
- **DIGITAL MEDIA AUTOMATION** (9-pin female D-connector from cinema automation control)
- **RS-232 port** (9-pin female D-connector for control via ASCII command strings)
- **10BASE-T** (RJ45 Ethernet port for control through ASCII command strings, Dolby Digital cinema systems, and setup/updates)
- **AUDIO OUT TO CP** (25-pin male D-connector balanced audio to cinema processor)
- **ANALOG AUDIO IN** (25-pin female D-connector audio from DA20)

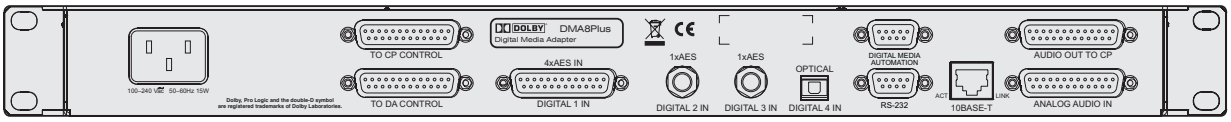


Figure 1-2 DMA8Plus Rear Panel

1.2.1 To CP Control Connector

This connector is a 25-pin male D-connector for connecting to a Dolby cinema processor's automation input. It has a floating ground. This output performs the following functions:

- Prevents a DA20 from reverting the cinema processor to a Dolby SR format while the DMA8Plus is in a digital mode utilizing the cinema processor in Format 10
- Enables the DMA8Plus to send a film or digital format command to the cinema processor to switch the processor to an associated format
- Enables the DMA8Plus to receive and activate a film command from a cinema processor when the processor's **format** button is activated

Note: A cable kit is available (US customers only) for connecting the DMA8Plus to a CP650 or CP500 along with your existing automation connection. If you require this kit, order CDMA/D.

1.2.2 To DA Control Connector

This is a 25-pin female D-connector for interfacing to a Dolby DA20 **CP Sense Control** port. It has a floating ground. This interface prevents or blocks a Dolby SR format reversion from a DA20 while the DMA8Plus is in a digital mode, utilizing a Dolby cinema processor in Format 10.

1.2.3 4xAES Input (AES/EBU)

This 25-pin female D-connector receives four AES3 streams, which are linked to the **digital 1** button. Typically, this input connects to a Dolby Digital cinema server. It accommodates PCM audio at 96, 48, and 44.1 kHz (16, 20, and 24 bit), Dolby Digital at all data rates and sample rates, and Dolby E at frame rates of 23.98 (24 pulldown), 24, 25, 29.97, and 30 fps. The decoding of coded audio is restricted to the first AES3 channel pair. The clocks for all four pairs are derived from pair 1. This connector has a floating ground.

1.2.4 1xAES Inputs (AES3)

These BNC connectors are linked to the **digital 2** and **digital 3** buttons respectively. They accommodate PCM audio at 96, 48, and 44.1 kHz (16-, 20-, and 24-bit), Dolby Digital at all data rates and sample rates, and Dolby E at frame rates of 23.98 (24 pulldown), 24, 25, 29.97, and 30 fps. A BNC male to RCA female adapter can interface with most consumer gear. These connectors have floating grounds.

1.2.5 S/PDIF Optical Input

This Toslink optical connector is linked to the **digital 4** button. It accommodates PCM audio at 96, 48, and 44.1 kHz (16-, 20-, and 24-bit), Dolby Digital at all data rates and sample rates, and Dolby E at frame rates of 23.98 (24 pulldown), 24, 25, 29.97, and 30 fps.

1.2.6 Digital Media Automation Connector

This interface connects to a theatre automation system. It is a 9-pin female D-connector providing ground-switching control of the front-panel input selection buttons. It has a floating ground. The automation system can switch between film sound (pass-through) and any of the four digital media sources. This function duplicates the front-panel digital input buttons and the **film** button. Two pins (6, 7) provide relay dry contact closure whenever you select either **digital 1**, **digital 2**, **digital 3**, or **digital 4** (the relay contacts open when Film mode is selected) for CP200 digital subwoofer logic control.

1.2.7 RS-232 Serial Port

You can use this port for serial control using ASCII string commands. Set this port to `9600` and `8 1` and use a pin-to-pin serial cable. You can also perform the same function using the Ethernet port, as described in Section 1.2.8.

1.2.8 Ethernet Port

This is an illuminated RJ45 10BASE-T Ethernet port with activity LEDs, which provides an interface to a Dolby Digital Cinema network and also serial control through telnet protocol to port 61412. You can also use this port for setup software and firmware upgrades.

1.2.9 Audio Out to CP Connector

This connector is an eight-channel analog output (L, C, R, Ls, Rs, SW, and unassigned channels 7 and 8), which is present on a male 25 pin D-connector (300 mV reference level). This is either the audio received from the **ANALOG AUDIO IN** port (Film mode) or the audio converted from one of the digital input sources. This connector has a floating ground.

Caution: When connecting the DMA8Plus to a CP45, CP55, CP65, or CP200, be sure to ground the negative side of all audio channels. Failure to do so will result in a reduced audio output level (approximately –6 dB) for that channel. The original audio cables for these processors (DA20 to CP audio cables) were designed for unbalanced audio. As a result, not all grounds are connected to the negative side of the associated channel. You can insert the Cat. No. 757 audio cable adapter dongle with the existing audio output cable to ensure proper grounding of all CP45, CP55, CP65, or CP200 channels. For more information, see DMA8Plus Audio Out to CP Pinouts on page 44.

1.2.10 Analog Audio In Connector

This is an eight-channel analog input (L, C, R, Ls, Rs, SW, and unassigned channels 7 and 8) designed to receive 300 mV(ref) inputs from a DA20 or other external sources and inputs on a female 25-pin D-connector. This analog input signal passes through the DMA8Plus (when in **film** mode) via relay contacts. These relay contacts are normal to "pass-through" when the DMA8Plus is not powered on. This connector's ground passes through the **AUDIO OUT TO CP** connector in **film** mode, and is otherwise floating.

Installation and Maintenance

2.1 DMA8Plus Floating Signal Grounds

The DMA8Plus is designed to eliminate ground loops, which can occur when the unit is connected to multiple external equipment grounds. For this reason, the following DMA8Plus connectors have isolated grounds:

- Analog audio inputs and outputs: When in Pass-Through (**film**) mode, the low side of each signal is switched along with the hot side. Note that the positive side of the signal is capacitively coupled. If the external signal passing through is balanced, the output is also balanced. When in internal (digital) modes, the output is floating and balanced. Any common mode signal between the DMA8Plus audio outputs and its chassis ground must not exceed ± 6V peak.
- **DIGITAL MEDIA AUTOMATION** connector: the common is floating and can be ± 10V peak from the chassis ground.
- **TO CP CONTROL** and **TO DA CONTROL** connectors: The common is floating and can be ± 10V peak from the chassis ground. Note that the CP/DA common is separate from the **DIGITAL MEDIA AUTOMATION** common.
- **1xAES** BNC digital inputs: These are transformer isolated and their grounds can be ±10V peak from the chassis ground.
- **4xAES** D-connector digital inputs: These are transformer isolated and their grounds can be ± 10V peak from the chassis ground.

Note: The RS-232 input ground is connected to the DMA8Plus chassis ground and is **not** floating.

2.2 Digital Audio Inputs

There are two professional interface methods used for digital audio: AES/EBU (also known as AES3) and AES-3id. These methods stream the same digital data and professional audio header information over copper conductor links, but use different types of conductors and connectors.

AES/EBU uses a balanced connection (two conductors plus shield) with a characteristic input impedance of 110Ω, nominal peak-to-peak signal level of 5 V, and, most commonly, XLR connectors. The typical maximum transmission distance is 100 meters (328 feet). AES-3id uses an unbalanced connection (one signal conductor plus shield) with a characteristic input impedance of 75Ω, peak-to-peak signal level of 1 V, and BNC ("push and twist") connectors. The typical maximum transmission distance is 1,000 meters (3,280 feet).

Professional digital audio equipment typically uses the AES/EBU method because balanced operation yields superior noise immunity, as it does with analog audio signals, and because XLR connectors are the standard on analog professional audio equipment.

Professional video equipment typically uses the AES-3id variation of this interface, with BNC connectors. As with XLR connectors on professional audio equipment, the adoption of BNC connectors for the audio on professional video equipment stems from the existing use for the video signal. Also, the unbalanced AES-3id signal can connect to more than one piece of equipment by using the loop-through connectors available on some devices. The signal is robust for long cable runs.

2.2.1 Consumer Interface Standards for Digital Audio

The consumer interface standard for digital audio is S/PDIF (IEC 61937). S/PDIF uses coaxial unbalanced connections (one signal conductor plus shield) with a characteristic input impedance of 75Ω with RCA (phono) connectors, or a fiber-optic cable with Toslink™ connectors. The unbalanced coaxial connection has a peak-to-peak signal level of 0.5 V. The typical maximum transmission distance is 10 meters (33 feet). Although S/PDIF-specific cables with suitable connectors can be purchased, you can also obtain good results using high-quality 75Ω video cable with the appropriate connectors and/or adapters.

2.2.2 Cable Issues

Even in digital audio, noise-free signals are very important. The cable used for digital signals is specifically designed for such use, although it looks the same as the cable used for analog audio or video signals. Any professional audio equipment or broadcast supply company can provide 110Ω cable with connectors (or without, if you'd like to terminate them yourself) for AES/EBU connections, and high-quality 75Ω video cables with BNC connectors for AES-3id connections. Use of cables or connectors not designed for digital transmission or with incorrect impedance compromises the integrity of the bitstream. This can result in unreliable hardware interconnections, especially with long cable runs.

2.2.3 Multiple Sources: Conversion Between Interface Standards

Although some details of the bitstreams used in the AES and S/PDIF standards are different, the audio information is exactly the same. As a result, most audio equipment accepts either standard with no need to convert the bitstream itself; this is the case with the DMA8Plus. However, if you intend to connect sources across different types of digital audio inputs, do not attempt to convert a digital interface type by directly wiring an XLR connector to a BNC or RCA plug. This causes an impedance mismatch and signal reflections, resulting in digital waveform degradation. This may appear to work, but the results are unreliable and dropouts occur.

For conversion between the AES-3id and S/PDIF formats, you can use high-quality RCA-to-BNC adapters because the cable and impedance are both the same (75Ω).

For conversion between the AES/EBU and AES-3id or AES/EBU and S/PDIF formats, a simple and economical method uses inline transformers. These devices perform the necessary impedance and balanced/unbalanced conversion. Table 2-1 shows some examples of suitable adapters. The unbalanced connector in these examples is BNC.

You can add BNC-to-RCA adapters for connecting to consumer S/PDIF connections. The following units use passive circuitry.

Table 2-1 Examples of Available Balanced/Unbalanced Adapters

Adapter Type	Neutrik®	Canare®
XLR female 110Ω in to BNC female 75Ω out	NA-BF	BCJ-XJ-TRA
BNC female 75Ω in to male XLR 110Ω out	NA-BM	BCJ-XP-TRA

Higher-priced units incorporating active circuitry are also available. These offer additional features like multiple inputs, inputs for Toslink digital connections, and multiple outputs.

2.3 Connections

For connecting the DMA8Plus to your cinema processor, refer to Wiring Diagrams on page 11. Use the appropriate diagram for your cinema processor model.

For proper operation in locations where there is considerable RF or other interference field, strictly adhere to the cable types, lengths, and pin assignments. Shields must connect only to the chassis and should not be paralleled with the negative side of inputs or outputs.

Pinout information for each connector is listed in Rear-Panel Connector Descriptions and Types on page 36.

2.4 Fuse Information

Warning: To reduce the risk of fire, replace fuses only with the same type and rating.

The DMA8Plus uses a universal-switching power supply that handles the full range of nominal mains voltages between 100 and 240 VAC, and any frequency between 50 and 60 Hz. If a power supply fuse blows, do not attempt to replace it. In such a case, please contact Dolby Laboratories for a replacement power supply.

There are two fuses on the Cat. No. 758 board, which are user serviceable, as described in Checking the Two User-Serviceable Fuses on page 10.

2.4.1 Checking the Two User-Serviceable Fuses

The fuse rating for the user-serviceable fuses is:

T 1A L (time-lag, 3.15 amp, 250 V, 20 mm, slow blowing) for all operating voltages.

Warning: Before performing the following steps, be sure to disconnect the DMA8Plus power cable from the power source.

1. Open the DMA8Plus lid.
2. Remove the fuse cover, which covers the fuses.
3. Remove the two fuses from their slots, check each of them, and replace, if required.
4. Replace the fuse cover.

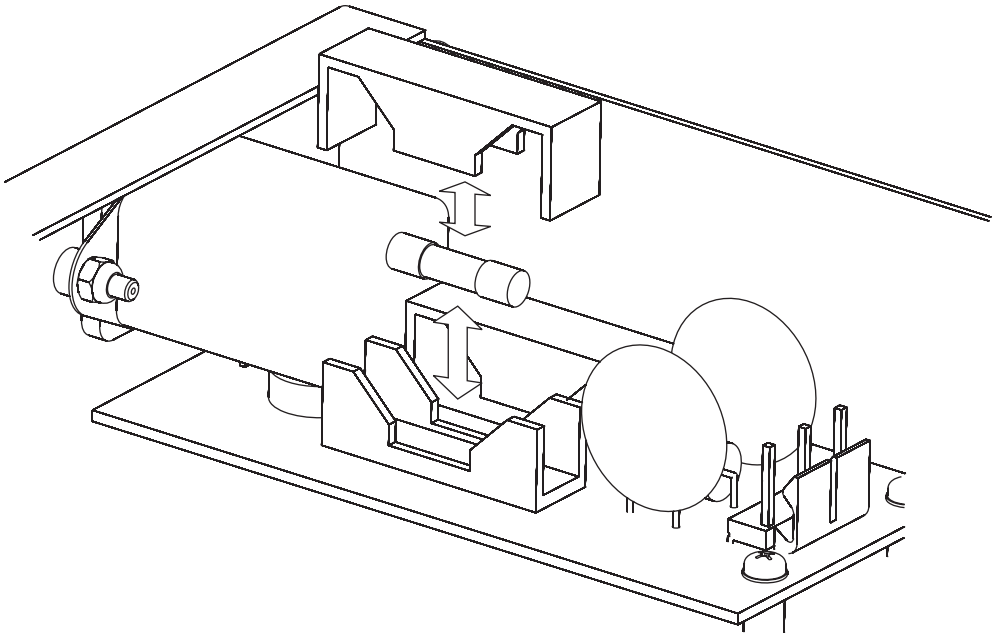


Figure 2-1 Checking the User-Serviceable Fuses

2.5 Mains Power Wiring

In some countries the primary mains cable may not have a connector fitted. These nonterminated leads must be properly wired to an approved mains connector in accordance with the following international code:

- Brown wire: Live or hot
- Blue wire: Neutral
- Green wire: Mains ground

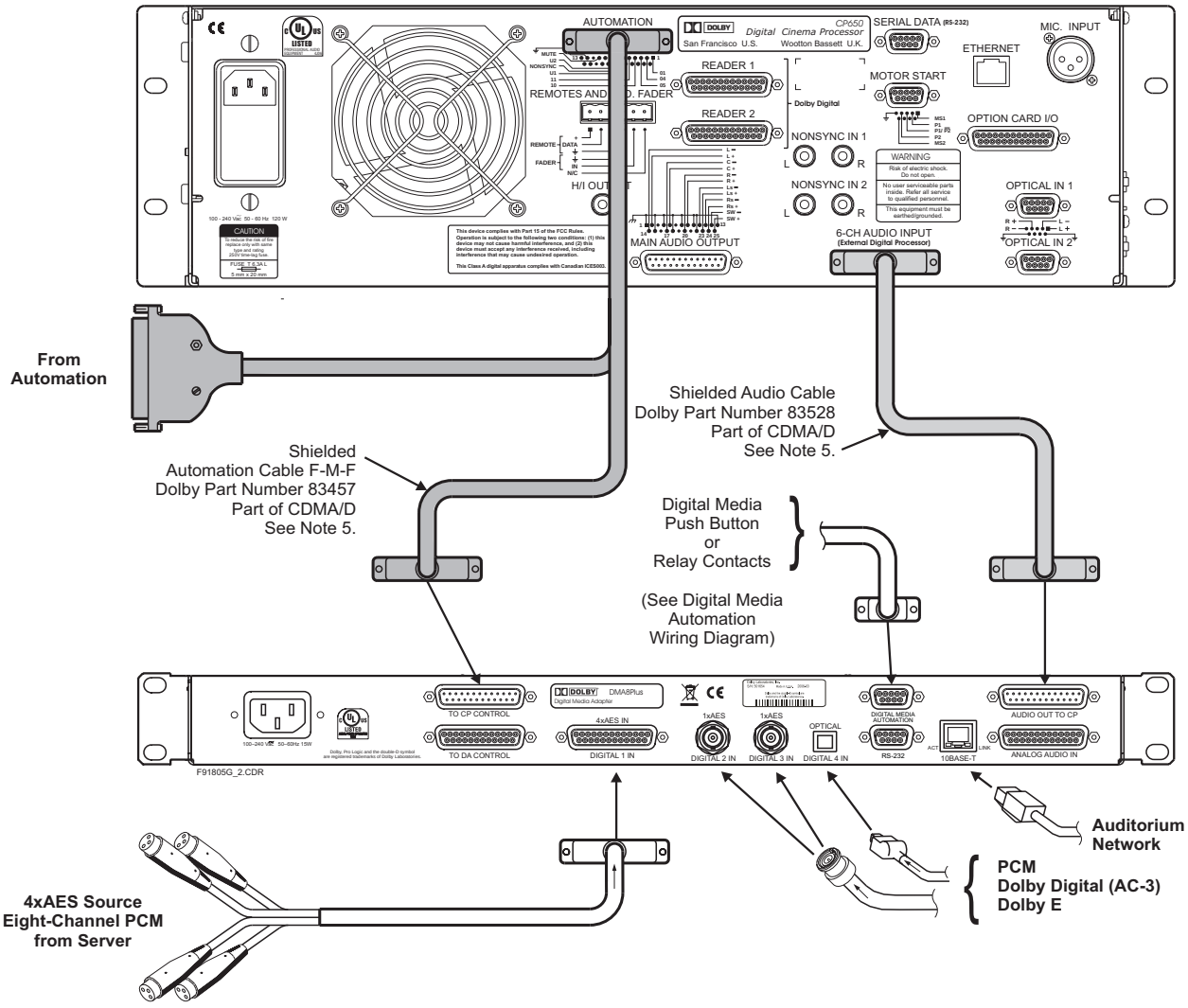
Warning: If you are uncertain about the wiring of your AC mains outlet then do not use it. Consult a qualified electrician.

2.6 Wiring Diagrams

This section contains connection diagrams for these cinema processors.

- CP650
- CP500
- CP65/DA20
- CP55/DA20
- CP45/DA20
- CP200/DA20

Choose the appropriate diagram based on your installed equipment.



Notes:

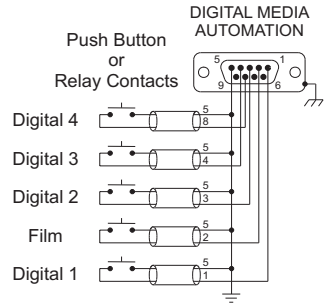
1. Follow all local electrical and building codes.

2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

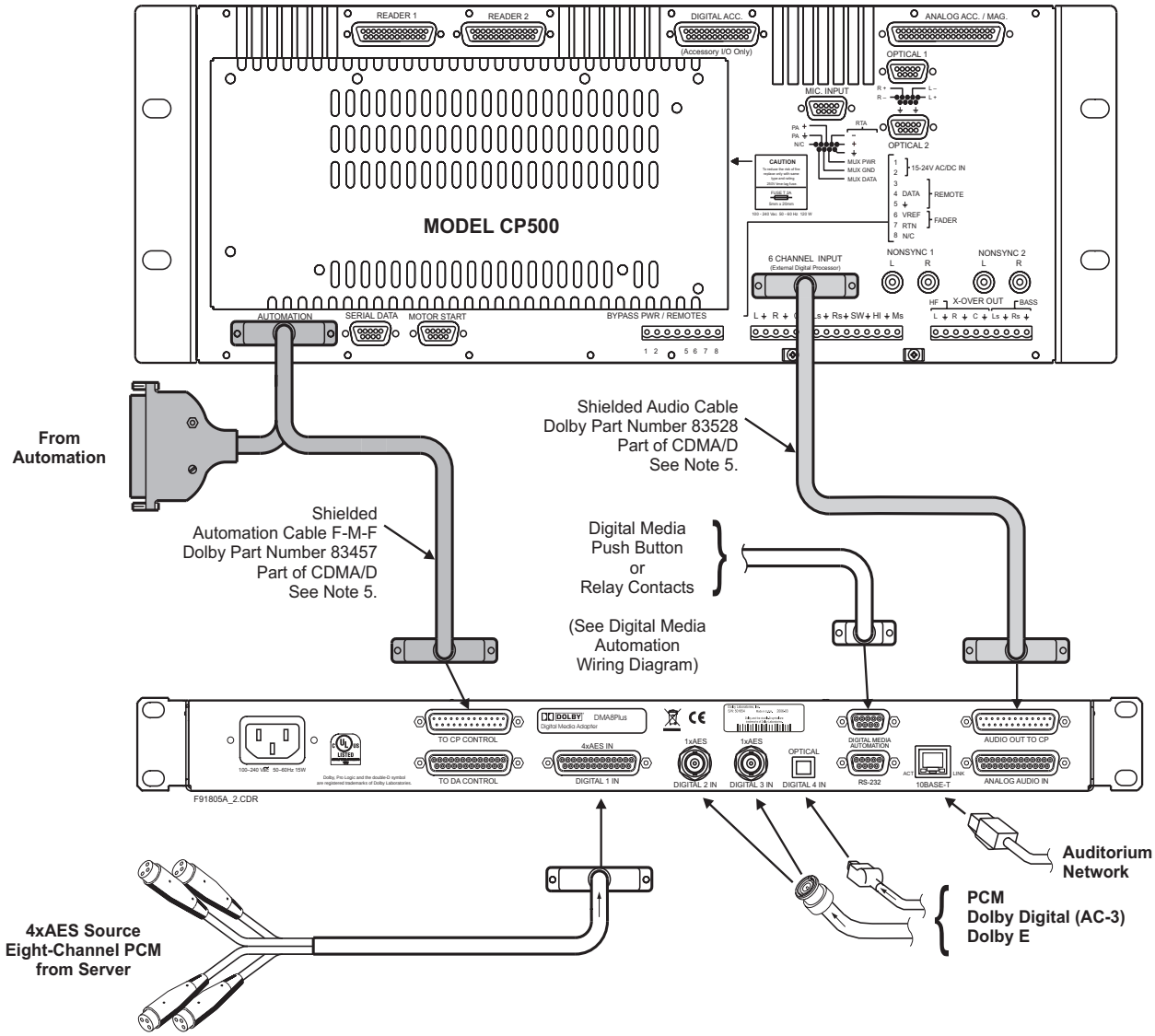
4. All shields must be connected to the chassis of the CP650 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

5. The Shielded Audio and Automation Cables are included in the CDMA/D cable set.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM

DMA8PLUS TO CP650 INSTALLATION WIRING



Notes:

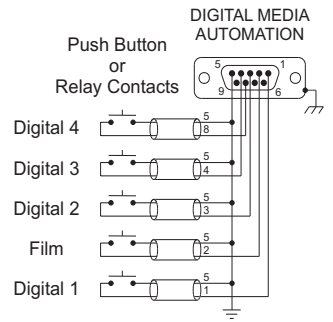
1. Follow all local electrical and building codes.

2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

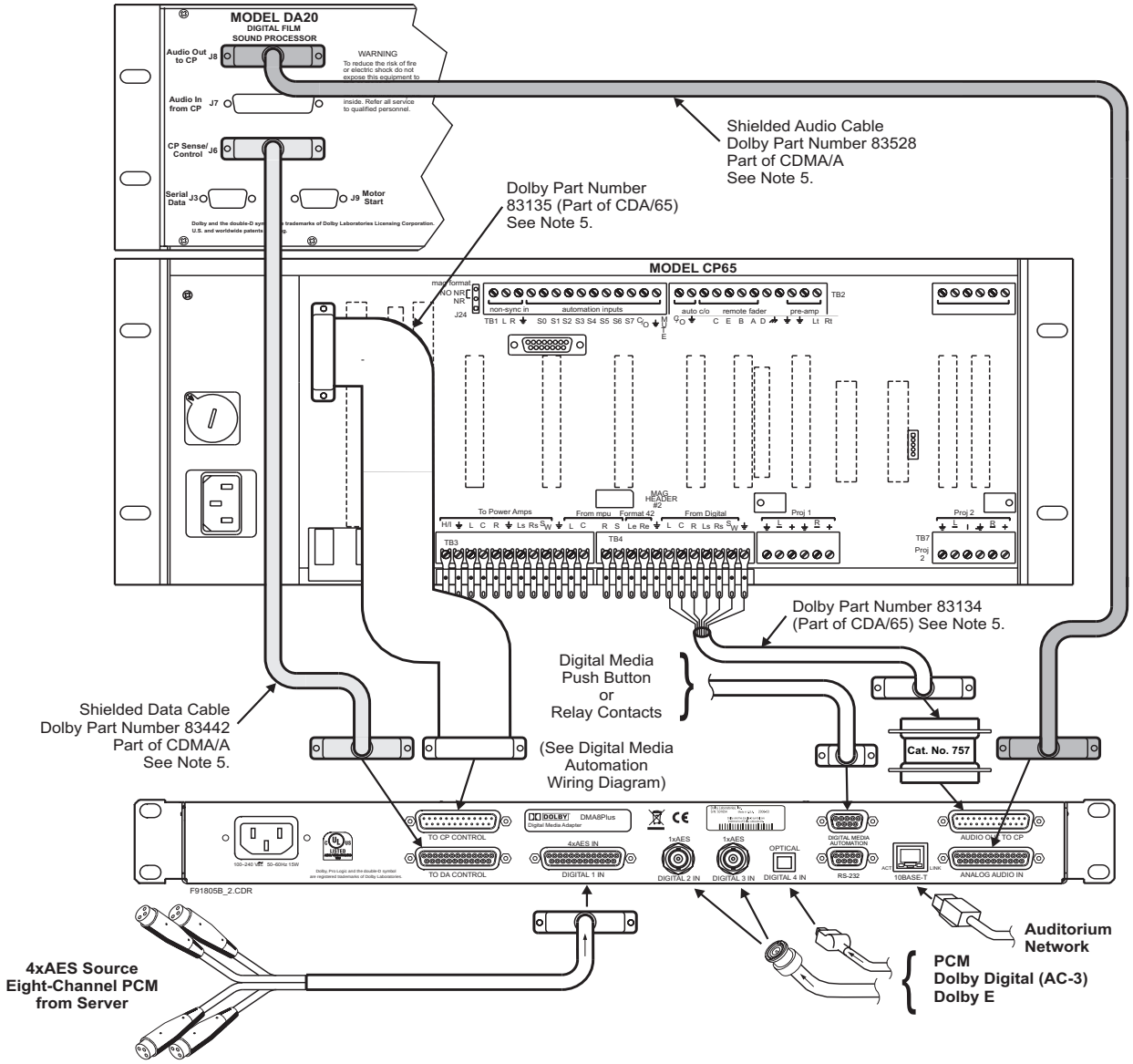
4. All shields must be connected to the chassis of the CP500 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

5. The Shielded Audio and Automation Cables are included in the CDMA/D cable set.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM

DMA8PLUS TO CP500 INSTALLATION WIRING



Notes:

1. Follow all local electrical and building codes.

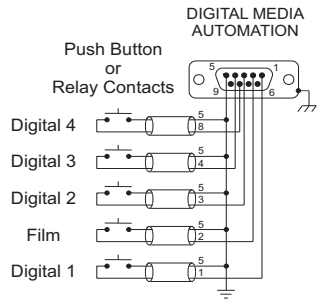
2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

4. All shields must be connected to the chassis of the DA20 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

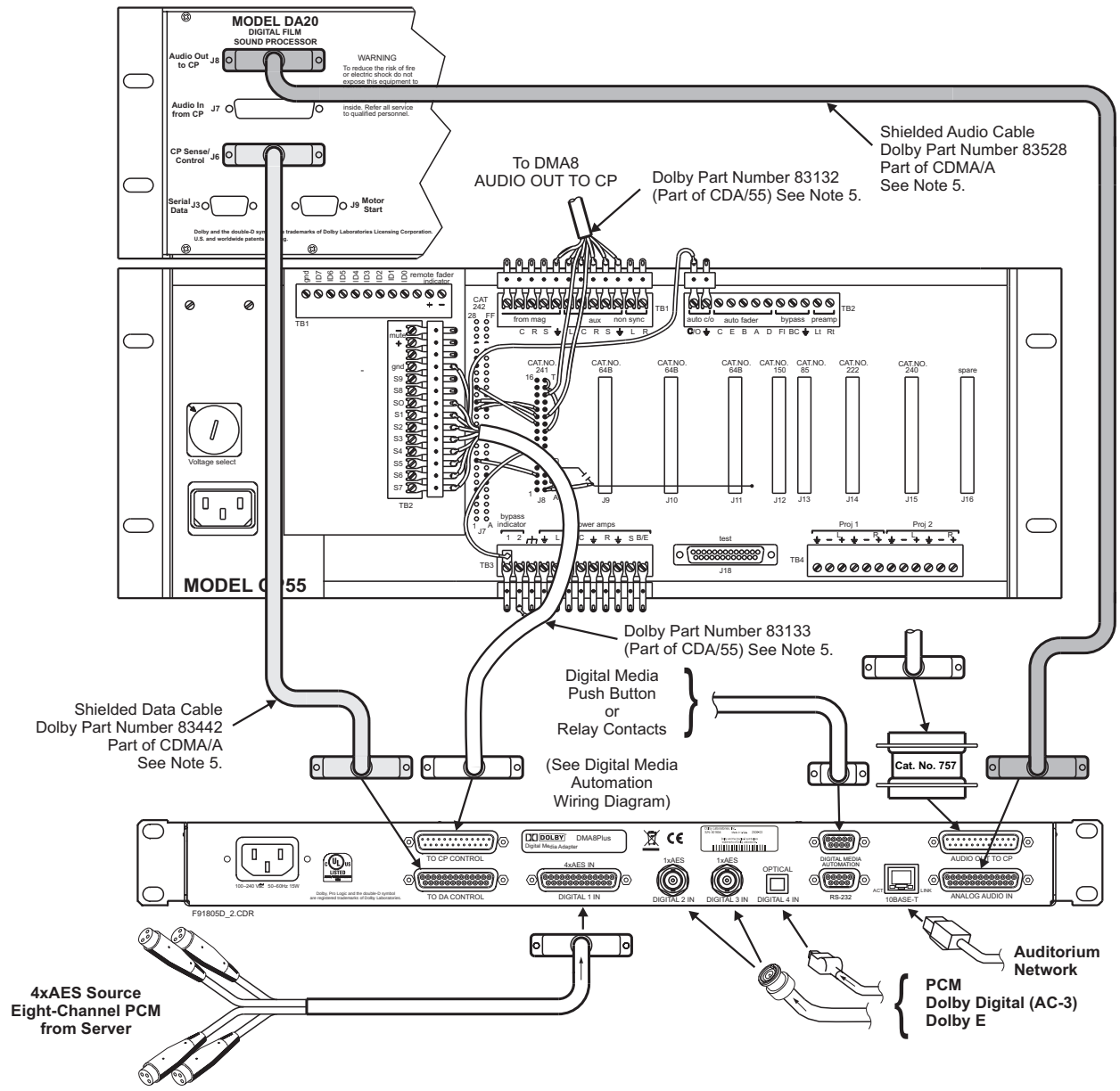
5. Re-attach existing cables (Dolby Part Numbers 83134 and 83135) to the DMA8Plus as shown (cables are included in CDA/65 cable set). The Shielded Audio and Data Cables are included in CDMA/A cable set (Dolby Part Numbers 83442 and 83528).

6. Caution: Be sure to ground the negative side of all audio channels. The original CP audio cables were designed for unbalanced audio. Not all grounds are connected to the negative side of the associated DMA8Plus channel. Insert the Cat. No. 757 audio adapter as shown on the diagram.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM

DMA8PLUS TO CP65/DA20 INSTALLATION WIRING



Notes:

1. Follow all local electrical and building codes.

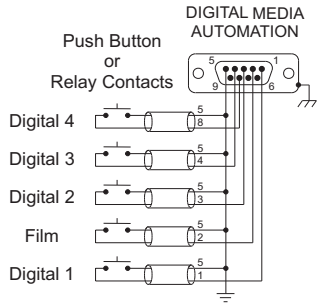
2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

4. All shields must be connected to the chassis of the DA20 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

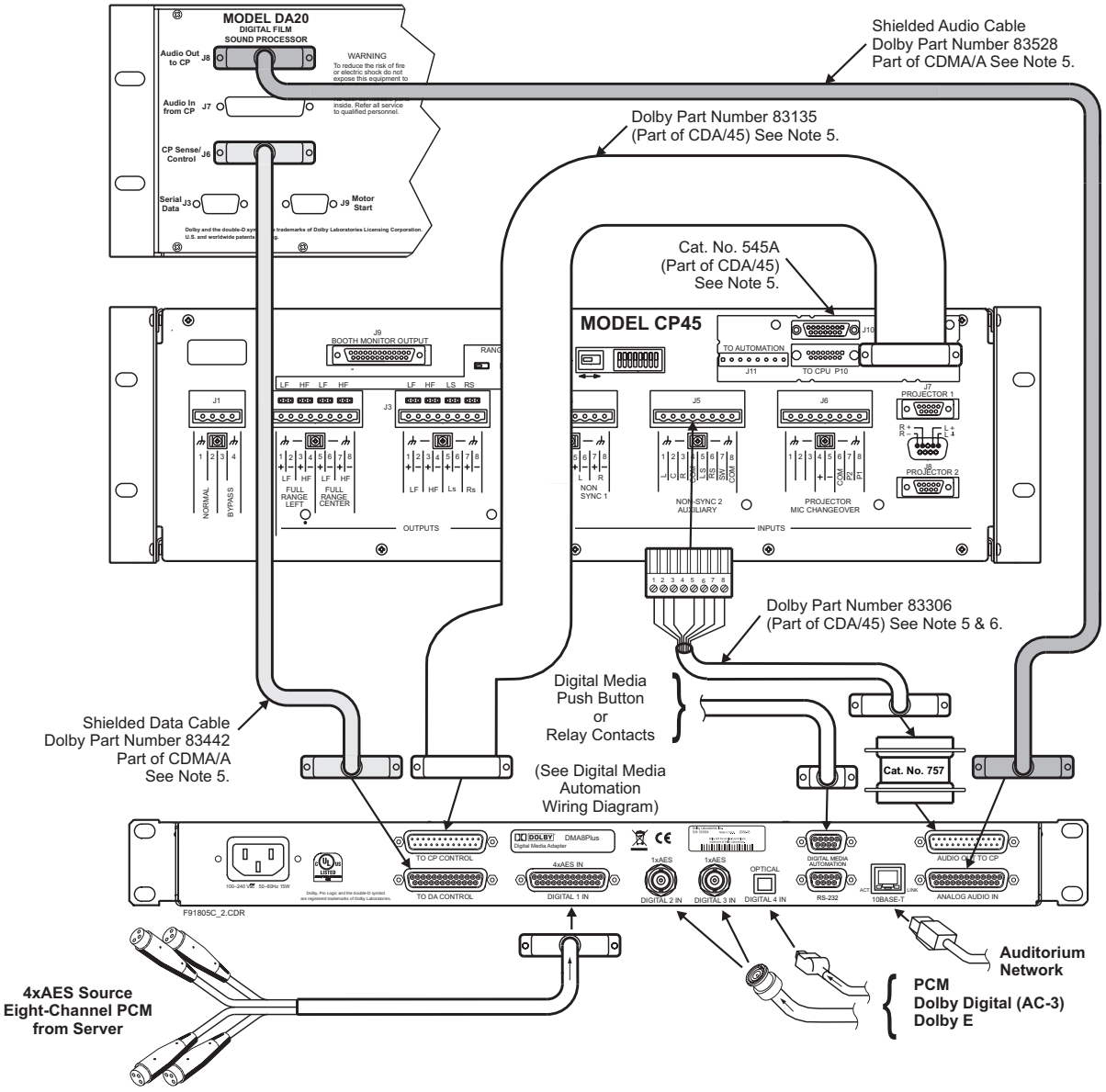
5. Re-attach existing cables (Dolby Part Numbers 83132 and 83133) to the DMA8Plus as shown. (Cables are included in CDA/55 cable set.) The Shielded Audio and Data Cables are included in CDMA/A cable set (Dolby Part Numbers 83442 and 83528).

6. Caution: Be sure to ground the negative side of all audio channels. The original CP audio cables were designed for unbalanced audio. Not all grounds are connected to the negative side of the associated DMA8Plus channel. Insert the Cat. No. 757 audio adapter as shown on the diagram.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM

DMA8PLUS TO CP55/DA20 INSTALLATION WIRING



Notes:

1. Follow all local electrical and building codes.

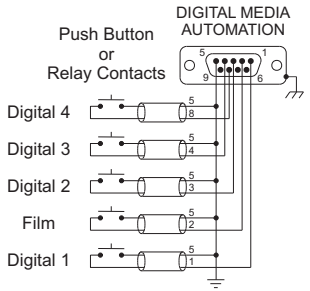
2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

4. All shields must be connected to the chassis of the DA20 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

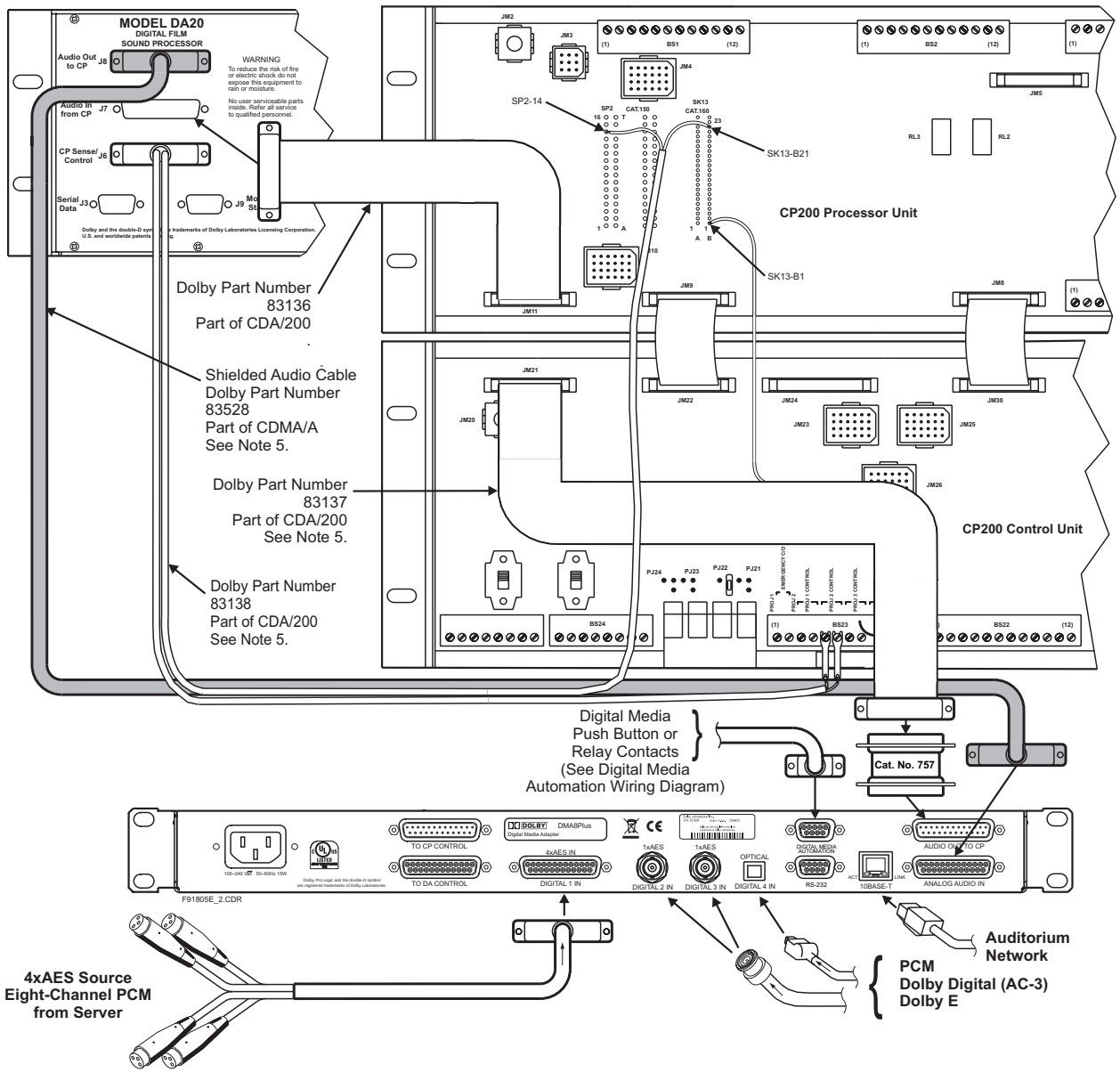
5. Re-attach existing cables (Dolby Part Numbers 83306 and 83135) to the DMA8Plus as shown. (Cables and Cat. No. 545A are included in CDA/45 upgrade kit. All existing Cat. No. 545 assemblies must be upgraded to Cat. No. 545A. The Shielded Audio and Data Cables are included in CDMA/A cable set (Dolby Part Numbers 83442 and 83528).

6. Caution: Be sure to ground the negative side of all audio channels. The original CP audio cables were designed for unbalanced audio. Not all grounds are connected to the negative side of the associated DMA8Plus channel. Insert the Cat. No. 757 audio adapter as shown on the diagram.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM

DMA8PLUS TO CP45/DA20 INSTALLATION WIRING



Notes:

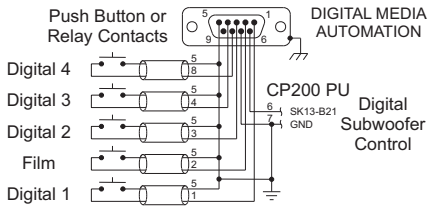
1. Follow all local electrical and building codes.

2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring, or other sources of electrical noise.

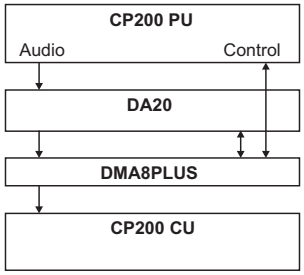
3. For two-conductor with shield wiring, use Belden 8451 two-conductor shielded cable or equivalent: tinned copper, twisted pair, 22 AWG stranded tinned copper drain wire, aluminum-polyester shield, 100 percent shield coverage, conductor to conductor (111 pF per meter).

4. All shields must be connected to the chassis of the DA20 or DMA8Plus rather than to circuit (audio) ground. This achieves the RF interference immunity required by the FCC and European EMC standards. For D-connectors, a metal housing must be used and the shields must be connected to the housing.

5. Re-attach existing cables (Dolby Part No's 83137 and 83138) to the DMA8Plus as shown. (Cables included in CDA/200 cable set.) The Shielded Audio Cable is included in the CDMA/A cable set.



DIGITAL MEDIA AUTOMATION WIRING DIAGRAM



SIGNAL FLOW DIAGRAM

DMA8PLUS TO CP200/DA20 INSTALLATION WIRING

Setting up the DMA8Plus

3.1 DMA8Plus Setup Software

The setup software is required to complete the DMA8Plus installation and perform other functions. You begin by installing the setup software on a PC running Microsoft® Windows® XP Service Pack 2 or later. When the installation is completed, you launch the setup software, and then connect your PC to the DMA8Plus using a USB cable (as described in Installing and Running the Setup Software on page 20) to perform the following functions:

- Select the model number of the cinema processor connected to the DMA8Plus for DA/CP control
- Enter the network settings
- Select the PCM input-channel routing
- Set the **Global delay** for each digital input
- Set the **2Ch Decode Mode** (**Auto**, **Pro Logic®**, **Pro Logic II**, or **Discrete L/R**) for PCM, Dolby® Digital, and Dolby E
- Enable or disable **Silent Switch** mode
- Enable or disable **Dialog Normalization** for Dolby Digital bitstreams
- Set the **Surround Delay**
- Select the Pro Logic subwoofer filter
- Select the **Power-on Mode**
- Select the **'To CP Control' Pin Assignments**

In addition, the setup software displays the following information:

- **Sample Rate** and **Data Rate** (when available)
- **Dialnorm** and **Channel Mode** metadata information (when available)
- Signal-level monitoring level meters
- Current input selection
- Audio format (**PCM**, **Dolby Digital**, **Dolby E**, or **Aux**)
- Decode mode (**Pro Logic**, **Pro Logic II**, or **Discrete**)
- Version numbers for the DMA8Plus firmware and setup software

3.2 Installing and Running the Setup Software

1. Run the DMA8Plus installation program to install the setup software on your PC. The welcome screen appears, as shown in Figure 3-1.

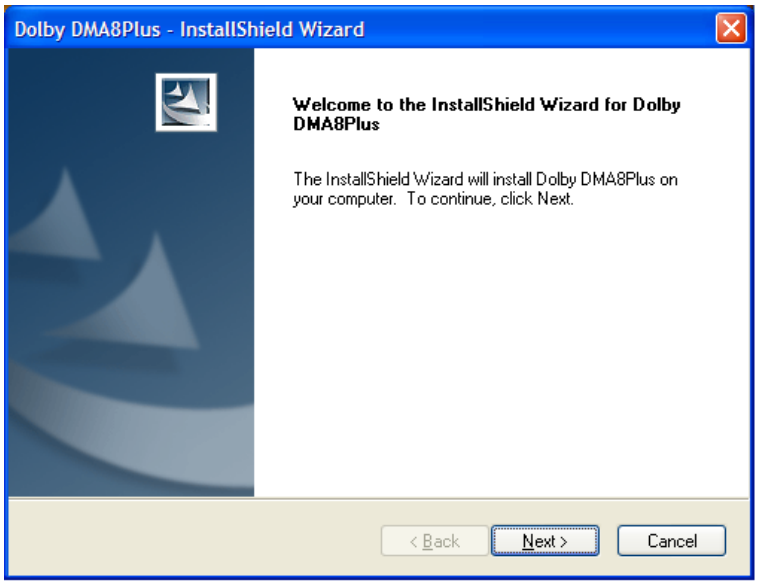


Figure 3-1 Installation Welcome Screen

2. Click **Next**, then follow the onscreen instructions to install the software.
3. Launch the setup software by selecting **Start**>**Programs**>**Dolby**>**DMA8Plus Setup**, then connect your PC to the DMA8Plus front-panel USB port to establish a connection. The DMA8Plus **Profile** settings window appears, as shown in Figure 3-2.

3.3 Profile

When you launch and connect the DMA8Plus setup software, the **Profile** settings window appears, as shown in Figure 3-2. The virtual status monitor appears in the lower section of the window.

Near the top of the window, there are also tabs for **Network**, **Digital Input 1**, **Digital Input 2**, **Digital Input 3, Digital Input 4**, and **Global Settings**. When you click any of these tabs, the corresponding parameter window appears where you can enter and/or modify the respective settings, as described in the sections that follow. The virtual status monitor also appears at the bottom of each of these tab settings windows. Following is a description of the **Profile** settings and the virtual status monitor.

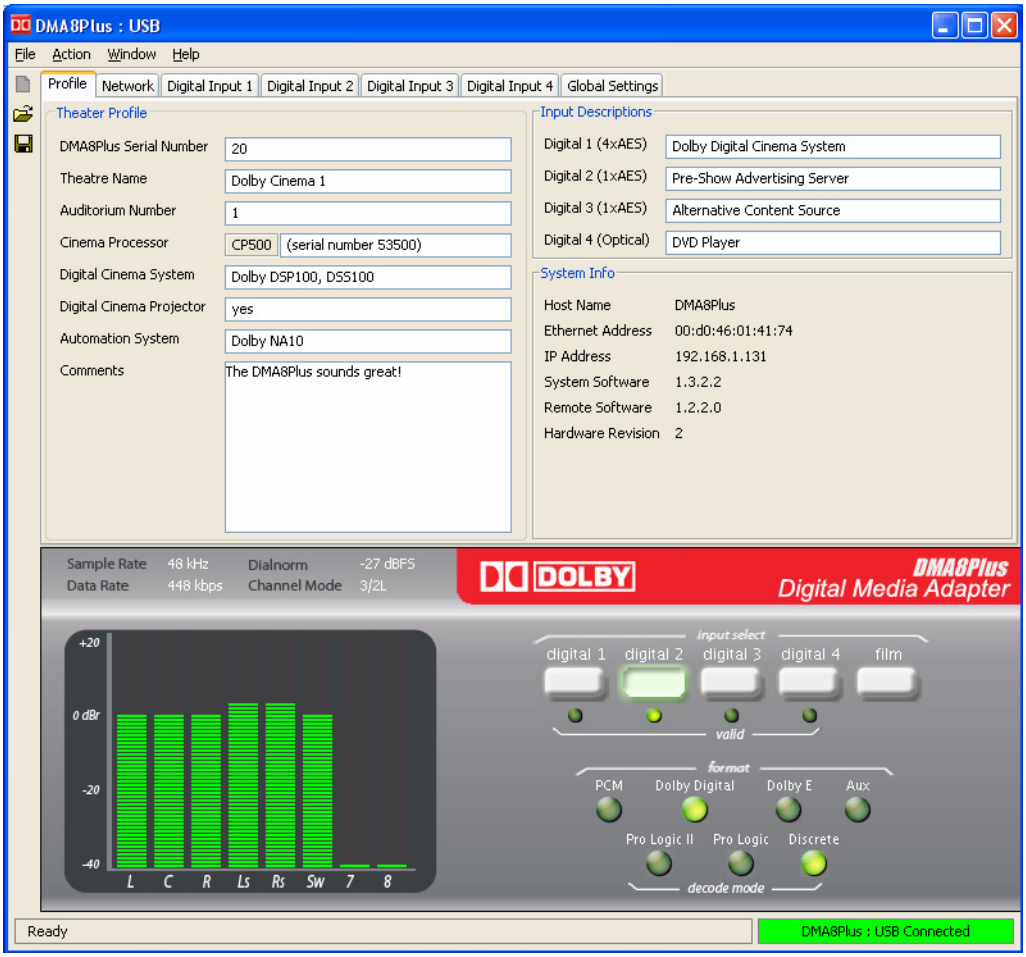


Figure 3-2 Profile Settings Window

3.3.1 Profile Settings

Selecting this tab displays the **Profile** settings window. In this window, you can enter the corresponding information for your system. This information defines the **Theatre Profile** for the local auditorium. In addition, **Input Descriptions** appears for each digital input. You can edit each description and enter the desired information.

3.3.2 Virtual Status Monitor

The virtual status monitor provides a user-friendly interface that is similar to the DMA8Plus front panel. Its eight-channel signal-presence meter monitors the DMA8Plus analog output (before the bypass relays). Five virtual buttons represent the **digital 1**, **digital 2**, **digital 3**, **digital 4**, and **film** input selections. When you click any of these buttons, the associated input is activated. Each of the digital input buttons has an associated virtual LED, representing a **valid** clock presence. In addition, four virtual LEDs represent format decoding, one each for **PCM**, **Dolby Digital**, **Dolby E, and Aux (for future use)**. Three more virtual LEDs represent the **decode mode**, one each for **Pro Logic II**, **Pro Logic**, and **Discrete**. Parameter indicators display the **Sample Rate**, **Data Rate**, **Dialnorm**, and **Channel Mode** (when available).

3.4 Network

Selecting this tab displays the DMA8Plus **Ethernet Settings** window, as shown in Figure 3-3. In this window, you can configure the DMA8Plus network settings. If you change the network settings, two buttons are highlighted below your settings: **Discard Changes** and **Apply Changes**. Clicking one of these buttons performs the respective action. The default entries are set for a Dolby Digital Cinema system. Following is list of these default entries:

- **Host Name**: DMA8Plus
- **DHCP**: **Disable**
- **IP Address**: 192.168.*x*.131 (*x* = auditorium number)
- **Subnet Mask**: 255.255.255.128
- **Default Gateway**: 192.168.*x*.129 (*x* = auditorium number)

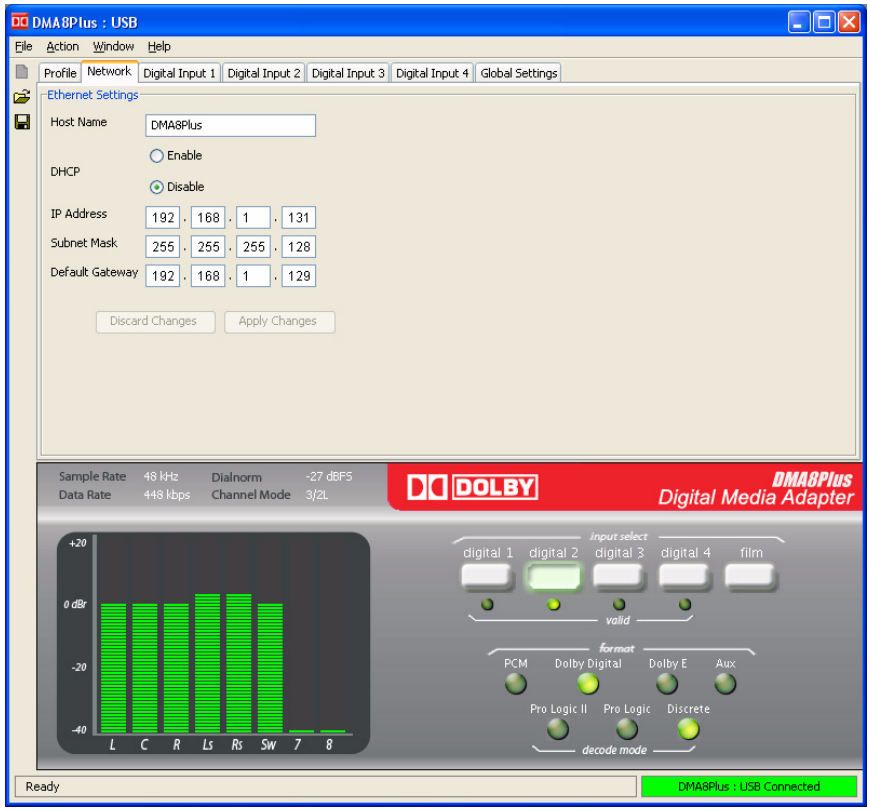


Figure 3-3 Ethernet Settings Window

3.5 Digital Inputs 1, 2, 3, and 4

Selecting any of these tabs displays the corresponding digital input window. The examples in Figure 3-4 and Figure 3-5 show the **Digital Input 1** and **Digital Input 2** windows. The same setting options are provided in each digital input window, except for the **PCM Channel Assignment**, which appears only in the **Digital Input 1** window. Following is a description of each of these settings.

Figure 3-4 Digital Input 1 Window

Figure 3-5 Digital Input 2 Window

3.5.1 Global Delay

Specifies an audio delay (in addition to the DMA8Plus decoding delay of approximately 7 ms for 4xAES PCM). This function synchronizes the audio with the video that is required for digital cinema projectors, which add a video processing delay. Use the up and down arrows to set the **Global delay** between 0 and 250 ms. You can specify a different **Global delay** for **digital 1**, **digital 2**, **digital 3**, and **digital 4**.

Systems that use an external video scaler may add another decoding delay.

3.5.2 PCM Settings

Following is a description of the PCM settings.

PCM Channel Assignment (Digital Input 1 Only)

The analog audio output channels (L, R, C, LFE, Ls, Rs) are always fixed and hardwired to a cinema processor. However, when a PCM bitstream input-channel mapping is not a default SMPTE configuration (L/R, C/LFE, Ls/Rs), you must reassign the input channels to match the hard wired audio outputs. For channel reassignment, the surround delay and the LFE filter are always tied at the output.

To reassign the input channels, use the drop-down menu for each of the AES channel inputs or click one of the three preset buttons (**L/R C/Sw/ Ls/Rs**, **L/C R/Ls**, **Rs/Sw**, or **L/Ls C/Rs R/Sw)**. To activate your changes, click the **Apply changes** button. To cancel your changes, click the **Discard changes** button.

2Ch Decode Mode

These options apply only to a two-channel input stream. There are three options: **Pro Logic**, **Pro Logic II**, and **Discrete L/R**.

Note: For Dolby Digital Cinema multichannel PCM, you must use the **Discrete L/R** option.

Processing Mode

Minimum Latency

When selected, this default mode provides the quickest audio processing (approximately 7 ms) for PCM audio.

Silent Switch

When selected, this mode constantly checks for transitions between PCM and coded audio, and switches between the two silently. This mode adds a 40 ms latency to the audio processing (for a total latency of approximately 47 ms).

Mute

When selected, this mode mutes the audio when PCM is detected.

3.5.3 Dolby Digital Settings

Following is a description of the Dolby Digital settings,

2Ch Decode Mode

For two-channel configurations, there are four options: **Auto**, **Pro Logic**, **Pro Logic II**, and **Discrete L/R**. The audio decode mode follows the surrounds metadata parameter that is embedded within the bitstream. Alternatively, you can enable Pro Logic or Pro Logic II decoding, which overrides the presence or absence of the surrounds metadata in two-channel bitstreams. The **Discrete L/R** mode sends the audio only to the Left and Right channels.

Dialog Normalization

When enabled (**Enable)**, this option sets the decoder level shift according to the encoded metadata embedded in a Dolby Digital (AC-3) bitstream. Metadata is available on most DVDs, terrestrial and satellite broadcast signals, and other Dolby Digital sources. The default is **Disable.**

3.5.4 Dolby E Settings

Following is a description of the Dolby E settings.

2Ch Decode Mode

Same functionality as for Dolby Digital, as described previously.

Dialog Normalization

Same functionality as for Dolby Digital, as described previously.

Program Select

You can select one of four possible programs to receive a Dolby E bitstream: **P1, P2, P3,** or **P4.** The default is **P1**.

3.6 Global Settings

Selecting this tab displays the **Global Settings** window, as shown in Figure 3-6. Following is a description of each of these settings.

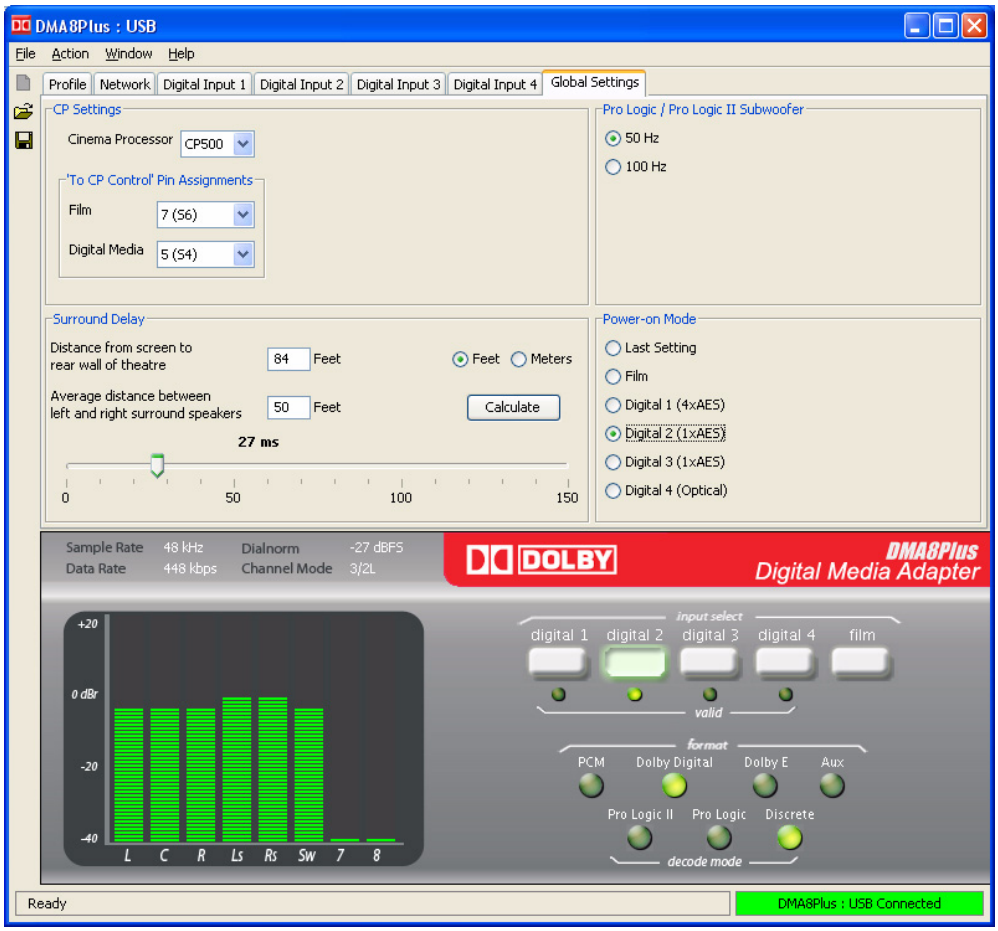


Figure 3-6 Global Settings Window

3.6.1 CP Settings

Following is a description of the cinema processor (CP) settings.

Cinema Processor

Selects the cinema processor connected to the DMA8Plus. This parameter affects the **'To CP Control' Pin Assignments**. If you are not using a Dolby processor, select **Custom** and set the appropriate **'To CP Control' Pin Assignments** for your setup.

'To CP Control' Pin Assignments

The pin assignments for **Film** and **Digital Media** correspond to the cinema processor's nonsync format and six-channel input format. For default CP formats on control lines 0–7 (pins 1–8) see Table 4-7. The various DMA8Plus cinema processor **Film** defaults correspond to each cinema processor's default nonsync format. Likewise, the **Digital Media** defaults correspond to each cinema processor's default six-channel input format. You can change any of these pins manually to accommodate your setup.

3.6.2 Surround Delay

When the unit receives audio from a digital media source, you need to apply a delay to the Surround channels, so the Center and Surrounds audio reach the listener at the same time. Set the **Surround Delay** by entering the dimensions of the auditorium and clicking the **Calculate** button, or use the slider if you know the required delay setting.

Note: If the DMA8Plus is connected to a CP650, the CP650 applies the appropriate digital media surround delay based on its settings (format 11). If the CP650 has been selected as the cinema processor type, the **Surround Delay** setting in this window is disabled. Use this function to set the digital media surround delay only when connected to other cinema processors.

3.6.3 Pro Logic/Pro Logic II Subwoofer

Selects a subwoofer filter of 50 Hz (default) or 100 Hz for Pro Logic and Pro Logic II decoding. This subwoofer signal is derived from the matrix decoded sum of Left, Center, and Right, which passes through this filter. The main audio outputs bandwidth (L, C, R) is not affected because this subwoofer signal is a reinforcement rather than a bass redirection.

3.6.4 Power-on Mode

Selects the desired DMA8Plus startup mode when the unit is powered on. You can select **Last Setting**, **Film**, or any of the digital inputs: **digital 1 (4xAES), digital 2 (1xAES), digital 3 (1xAES),** or **digital 4 (Optical)**.

3.7 File Menu

You can use the setup software **File** menu to load and save settings. Following is a description of each of these functions.

3.7.1 Loading Settings

You can load a previously saved .dlb parameter file as follows:

Select **Open** in the **File** menu, browse to the desired .dlb file on your PC, and open that file.

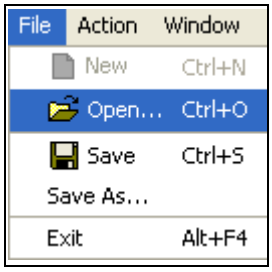


Figure 3-7 Selecting Open in the File Menu

3.7.2 Saving Settings

You can save your current settings to a .dlb parameter file as follows:

Select **Save** in the **File** menu, browse to the location on your PC where you want to save the file, enter a file name, and click **Save**. To modify an existing .dlb file and save it under a different name, open the file, then select **Save As** in the **File** menu.

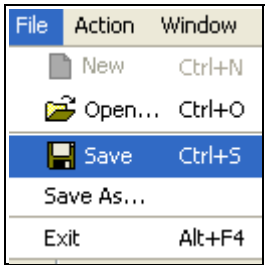


Figure 3-8 Selecting Save in the File Menu

3.8 Action Menu

You can use the setup software **Action** menu to connect to a local or remote device and update the DMA8Plus firmware, as described in the sections that follow. The **Extract Logs** and **View Log** options currently do not function. To extract an event log, see ASCII String Commands on page 42.

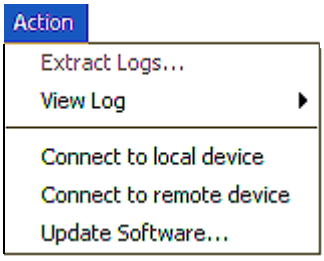


Figure 3-9 Action Menu

3.8.1 Connecting to a Local or Remote Device

These options allow you to connect to a DMA8Plus that is connected to your PC (local device) or a DMA8Plus that is connected to an Ethernet network (remote device). If you select **Connect to remote device**, a prompt for an IP address appears, as shown in Figure 3-10. Enter the IP address of the remote DMA8Plus and click **OK.**

Note: If you are connecting directly to a DMA8Plus, use a crossover cable. If you are connecting to a switch, use a standard Ethernet cable.

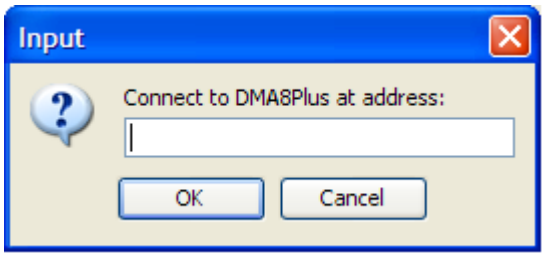


Figure 3-10 Connect to Remote DMA8Plus Prompt

3.8.2 Update Software

With setup software version 1.2.5.0 and later, when you select this option, the setup software closes and Dolby Software Update automatically opens and connects. You can then update the DMA8Plus firmware by following the directions in Updating the DMA8Plus Firmware on page 31. When the update is completed, Dolby Software Update closes and the setup software opens and reconnects.

3.9 Window Menu

You can use the **Window** menu to toggle in and out of **Expert View** mode. In addition, you can turn the **Setup** (tabs view) and/or **Monitor** display(s) on or off.

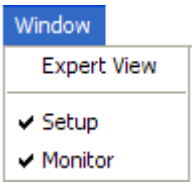


Figure 3-11 Window Menu

Using Expert View

When you select **Expert View**, all the DMA8Plus parameters and command strings appear, including some parameters not displayed in the tabs view. You can modify each of the parameters that are highlighted in green by double clicking on any of these (or selecting one and pressing <Enter>), and then typing the new parameter entry. For more information, see ASCII String Commands on page 42. To return to the tabs display, select **Expert View** again to uncheck it.

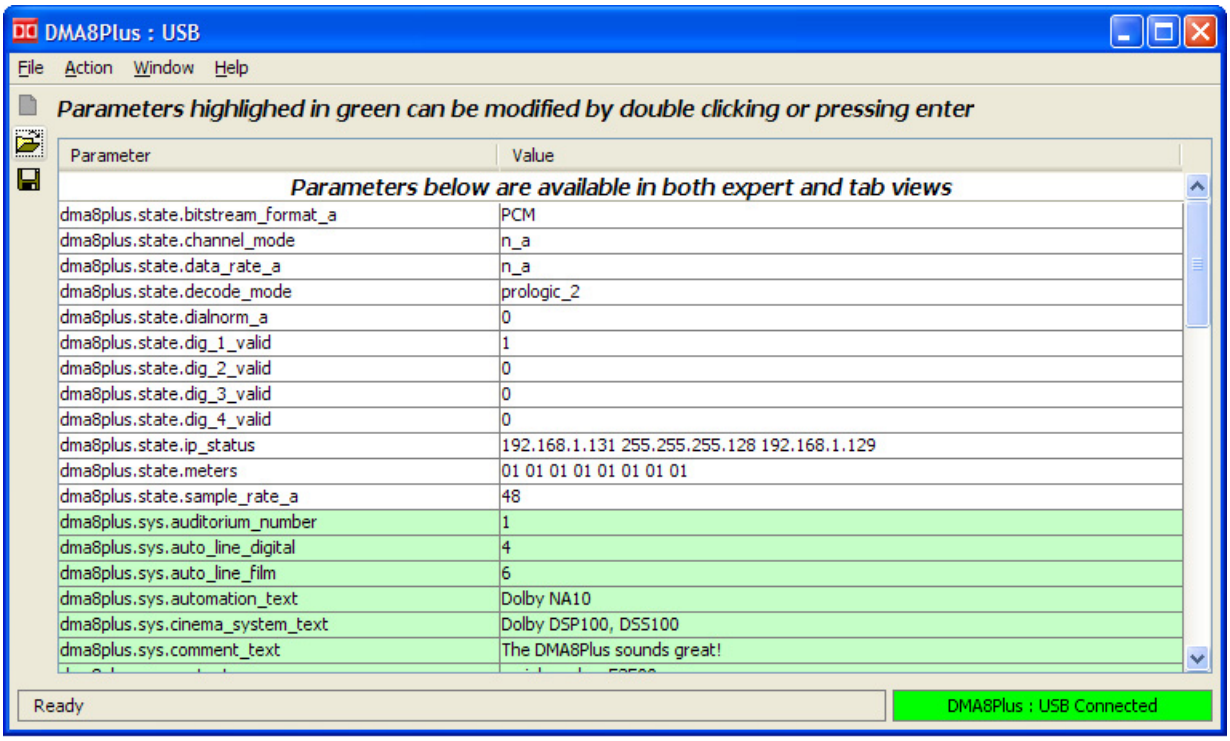


Figure 3-12 Expert View Window

3.10 Updating the DMA8Plus Firmware

To update the DMA8Plus firmware:

1. Obtain the latest version of the Dolby Software Update application from Dolby Laboratories and install it on your PC.
2. Obtain the .dlb update file from Dolby Laboratories and copy it to your PC.
3. Connect your PC to the USB port on the DMA8Plus front panel.
4. Select **Start**>**Programs**>**Dolby**>**Dolby Software Update** to launch the update application.

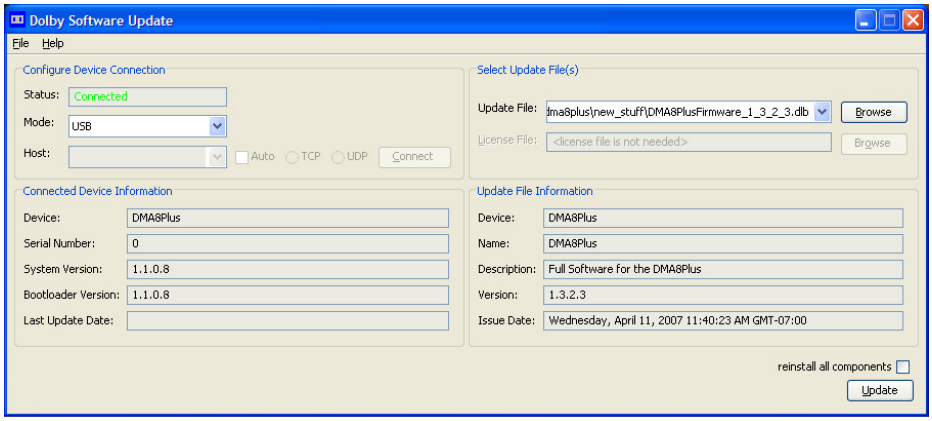


Figure 3-13 Dolby Software Update Screen

5. Click **Browse** to find the .dlb update file on your PC, then click **Open**.
6. Click **Update.**

   After a few seconds, a progress bar displays the status of the update process. When the process is completed, the DMA8Plus automatically reboots with the updated firmware.

Technical Reference

4.1 DMA8Plus Specifications

PC Connection

USB port for setup operations and software upgrades

Input Selector Buttons

Digital 1 through 4 source buttons
Film source button (pass-through)

Indicators

Valid LEDs indicate digital input clock presence for each digital input
Format LEDs indicate PCM, Dolby Digital, Dolby E, or Aux (future) processing
Decode mode LEDs indicate Pro Logic II, Pro Logic, or Discrete modes
Output activity LEDs indicate the presence of signals in each output channel

Construction

1-U rackmount chassis frame

Digital Signal Inputs

All have floating grounds, ±10 V peak difference between the DMA8Plus chassis and signal common permitted

Digital 1 In (4xAES)

25-pin female D-connector provides four AES/EBU inputs of PCM audio (up to eight channels)
Input impedence: 110 Ω

Digital 2 In (1xAES)

Male BNC connector, unbalanced per AES-3ID-1995/SMPTE 276M
Input impedence: 75 Ω

Digital 3 In (1xAES)

Male BNC connector, unbalanced per AES-3ID-1995/SMPTE 276M
Input impedence: 75 Ω

Digital 4 In (Optical)

Optical connector for digital input

Digital Audio Source Formats

PCM: 44.1, 48 and 96 kHz; 16-, 20-, 24-bit
Dolby Digital (AC-3)
Dolby E (23.98, 24, 25, 29.97, 30 fps)
Dolby Pro Logic II
Dolby Surround Pro Logic

Dolby Cinema Processor Compatibility

CP650, CP500, CP200, CP65, CP55, CP45, DA20

Global Delay

Adjustable delay of all channels from 0–250 ms (separate delay for each input)

Surround Channel Delay

Digital media program sources: adjustable from 0–150 ms

Power Requirements

100–240 VAC, 50–60 Hz

Analog Audio Input

25-pin female D-connector for six-channel analog output of a Dolby DA20 or other external processor, which is passed through when Film mode is selected or during power off

Analog Audio Output

25-pin male D-connector, balanced for connecting to a Dolby cinema processor
L, C, R, Ls, Rs, SW (unassigned channels 7 and 8 pass-through for CP200)
300 mV reference level

To CP Control

25-pin male D-connector for format sensing and control providing a customized interface for each Dolby cinema processor. This input has a floating common, < $\pm$10 V peak between the DMA8Plus chassis and common permitted.

To DA Control

25-pin female D-connector for format sensing and control providing a customized interface for each Dolby cinema processor. This input has a floating common, < $\pm$10 V peak between the DMA8Plus chassis and common permitted.

RS-232 Serial Port

9-pin female D-connector for interfacing with software-based automation systems by way of ASCII command strings

10BASE-T Ethernet Port

Ethernet port for interfacing with Dolby Digital Cinema systems and ASCII command strings

Digital Media Automation

9-pin female D-connector, ground-switching relay contact closure for each front-panel button control
Relay contacts provided for CP200 subwoofer control (closure upon any digital format selection). This input has a floating common, < ±10 V peak between the DMA8Plus chassis and common permitted.

Distortion

<0.005 percent, 4×AES input-to-analog output

Dynamic Range

Digital clip to CCIR/ARM weighted noise
Typically greater than 105 dB

Dimensions and Weight

44 × 483 × 342 mm (1.75 × 19 × 13.5 inches)
Net: 4.5 kg (10 lb)

Environmental Conditions

Operating: 0°C to 40°C (32°F to 104°F)
Nonoperating (storage): 0°C to 85°C (32°F to 185°F)
Humidity: 20 to 80 percent relative, noncondensing

Regulatory Notices

North America: This unit complies with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules, and Industry Canada ICES-003 specifications. It is UL Listed for both US and Canada.
Europe: This unit complies with the requirements of Low Voltage Directive 73/23/EEC and EMC Directive 89/336/EEC and carries the CE marking accordingly.

Warranty

One-year limited, parts and labor
Specifications subject to change without notice

4.2 Rear-Panel Connector Descriptions and Types

Table 4-1 Rear-Panel Connector Descriptions and Types

Panel Label	Description	Type
Digital Media Automation	Theatre automation control input (momentary contact), CP200 subwoofer control	DB-9
RS-232 In	ASCII command string automation control	DB-9
10BASE-T	Ethernet connector for ASCII command string control, setup software, Dolby Digital Cinema network	RJ45
To DA Control	DA20 cinema processor sense control	DB-25
To CP Control	Cinema processor automation	DB-25
Analog Audio In	Eight-channel balanced floating analog input for external processor, such as a Dolby DA20	DB-25
Audio Out to CP	Eight-channel balanced floating analog output: L, C, R, Ls, Rs, Sw, 7, 8	DB-25
Optical	S/PDIF optical, Dolby Digital, PCM, Dolby E	Toslink
4xAES In	4 x AES/EBU input (eight-channel PCM audio)	DB-25
1xAES In	Dolby Digital, PCM, Dolby E	2 x BNC
100–240 VAC, 50–60 Hz, 15 W	AC power inlet module with filter	IEC

4.2.1 Digital Media Automation Connector

Table 4-2 Digital Media Connector Pinout

Pin Number	Function	Specification
1	Digital 1 mode	Pulse to pin 5 (push button, relay contacts, etc.) 100 ms min.
2	Film mode	Pulse to pin 5 (push button, relay contacts, etc.)
3	Digital 2 mode	Pulse to pin 5 (push button, relay contacts, etc.) 100 ms minimum
4	Digital 3 mode	Pulse to pin 5 (push button, relay contacts, etc.) 100 ms minimum
5	Digital media automation common	Common for pins 1, 2, 3, 4, 8
6	CP200 digital control	Return for pin 7
7	CP200 digital control	N/O contact closes (latch) to pin 6 in Digital 1–4 modes
8	Digital 4 mode	Pulse to pin 5 (push button, relay contacts, etc.) 100 ms minimum
9	+5 VDC with respect to pin 5 (current limited)	100 mA maximum current, floating rail

4.2.2 Analog Audio In/Out Connectors

Caution: The DMA8Plus has balanced floating analog inputs and outputs. To achieve a full reference level signal, use both positive (Pos) and negative (Neg) pins for each channel.

Table 4-3 Analog Audio In/Out Connector Pinout

Analog Audio In (From DA20) Pin Number	Signal Name	Analog Audio Out (To CP) Pin Number	Signal Name
1	Left Neg input	1	Left Neg output
2	Right Surround Pos input	2	Right Surround Pos output
3	Right Surround Neg input	3	Right Surround Neg output
4	Left Surround Neg input	4	Left Surround Neg output
5	Right Extra Neg input	5	Right Extra Neg output
6	Right Neg input	6	Right Neg output
7	Left Extra Neg input	7	Left Extra Neg output
8	Center Neg input	8	Center Neg output
9	Chassis ground	9	Chassis ground
10	Chassis ground	10	Chassis ground
11	Chassis ground	11	Chassis ground
12	Subwoofer Neg input	12	Subwoofer Neg output
13	Chassis ground	13	Chassis ground
14	Left Pos input	14	Left Pos output
15	Left Surround Pos input	15	Left Surround Pos output
16	Right Extra Pos input	16	Right Extra Pos output
17	Right Pos input	17	Right Pos output
18	Left Extra Pos input	18	Left Extra Pos output
19	Chassis ground	19	Chassis ground
20	Center Pos input	20	Center Pos output
21	Tied to output	21	Tied to input
22	NC	22	NC
23	NC	23	NC
24	Subwoofer Pos input	24	Subwoofer Pos output band-limited to 300 Hz in Digital Media mode
25	Tied to output	25	Tied to input

4.2.3 4xAES In Connector

Table 4-4 4xAES In Connector Pinout

DB-25 Pin Number	Default Signal Name
1	AES Common
2	CH1/2 Neg
3	CH3/4 Pos
4	AES Common
5	CH5/6 Neg
6	CH7/8 Pos
7	AES Common
8	No connection
9	AES Common
10	No connection
11	No connection
12	AES Common
13	No connection
14	CH1/2 Pos
15	AES Common
16	CH3/4 Neg
17	CH5/6 Pos
18	AES Common
19	CH7/8 Neg
20	AES Common
21	No connection
22	No connection
23	AES Common
24	No connection
25	No connection

4.2.4 Remote RS-232 Serial Port

Table 4-5 Serial Port Pinout

Pin Number	Connection
1	No connection
2	Data Out
3	Data In
4	Connected to pin 6
5	Chassis Ground
6	Connected to pin 4
7	Connected to pin 8
8	Connected to pin 7
9	No connection

4.2.5 Automation Connections—CP55 with Cat. No. 321 Interface

Table 4-6 CP55 with Cat. No. 321 Automation Interface Card Installed

CP55 with Cat. No. 222 SR/A Module and Cat. No. 321 (TB2 Fanning Strip)	CP55 with Cat. No. 222 Module and Cat. No. 321 (TB2 Fanning Strip)
CP55 GND	CP55 GND
S9 (mute)	S9 (mute)
S8 (main/remote fader)	S8 (main/remote fader)
S0 (mono)	S0 (mono)
S1 (SR)	S1 (A-type without Surround)
S2 (A-type with Surround)	S2 (A-type with Surround)
S3	S3
S4 (magnetic)	S4 (magnetic)
S5	S5
S6 (nonsync)	S6 (nonsync)
S7 (Dolby Digital)	S7 (aux)

4.2.6 Cinema Processor Automation Pin Assignments

Configuration settings provide default selections for cinema processor automation pin assignments for both **film** mode and the four **digital** modes. For example, when selecting a CP65 cinema processor, the default configuration for **film** mode is **7** and the default configuration for **digital** mode is **5**. This corresponds to **film** mode enabling the CP65 **Nonsync** format and a **digital** mode enabling the CP65 **Format 10**.

Table 4-7 S0–S7 CP Automation Digital Mode Defaults (**digital 1**–**4** defaults shaded)

Pin Number	DMA8Plus To CP/DA Control	CP650 Automation	CP500 Automation	CP65 Automation	CP55 Automation with Cat. No. 222 SR/A Module	CP200	CP45 with Cat. No. 545A Automation Board (J12)
1	**(S0)** Automation select	(01) Mono	(01) Mono	(01) Mono	(01) Mono	SW Control B21 of SK13 (hold Low for Digital SW)	(01) Mono
2	**(S1)** Automation select	(04) Dolby A-type	(04) Dolby A-type	(04) Dolby A-type	(05) Dolby SR	GO	(04) Dolby A-type
3	**(S2)** Automation select	(05) Dolby SR	(05) Dolby SR	(05) Dolby SR	(04) Dolby A-type	A	(05) Dolby SR
4	**(S3)** Automation select	(10) Dolby Digital	(10) Dolby Digital	(60) Nonsync / matrix		B (05) Dolby SR	
5	**(S4)** Automation select	(11) Six-channel input	(11) Six-channel input	(10) Dolby Digital	(22) Magnetic	C (10) Dolby Digital	(10) Dolby Digital
6	**(S5)** Automation select	(U1) User 1		(42) Magnetic		D (60) Nonsync	
7	**(S6)** Automation select	(NS) NS1	(60) NS 1	(60) Nonsync / std	(60) Nonsync	Go Monitor	(60) Nonsync
8	**(S7)** Automation select	(U2) User 2	(61) Nonsync 2	(22) Magnetic	(10) Dolby Digital	Future 11 (A19 of SK27)	
12	GND	GND	GND	GND	GND	GND (BS23 Pin 5)	GND
14						Future 8 (A14 of SK15)	

Note: The CP200 default **Cinema Processor** settings are undefined.

Table 4-8 S0–S7 CP Automation Film Mode Format Defaults (**film** defaults shaded)

Pin Number	DMA8Plus To CP/DA Control	CP650 Automation	CP500 Automation	CP65 Automation	CP55 Automation with Cat. No. 222 SR/A module	CP200	CP45 with Cat. No. 545A Automation Board (J12)
1	**(S0)** Automation select	(01) Mono	(01) Mono	(01) Mono	(01) Mono	SW Control B21 of SK13 (hold Low for Digital SW)	(01) Mono
2	**(S1)** Automation select	(04) Dolby A-type	(04) Dolby A-type	(04) Dolby A-type	(05) Dolby SR	GO	(04) Dolby A-type
3	**(S2)** Automation select	(05) Dolby SR	(05) Dolby SR	(05) Dolby SR	(04) Dolby A-type	A	(05) Dolby SR
4	**(S3)** Automation select	(10) Dolby Digital	(10) Dolby Digital	(60) Nonsync / matrix		B (05) Dolby SR	
5	**(S4)** Automation select	(11) Six-channel input	(11) Six-channel input	(10) Dolby Digital	(22) Magnetic	C (10) Dolby Digital	(10) Dolby Digital
6	**(S5)** Automation select	(U1) User 1		(42) Magnetic		D (60) Nonsync	
7	**(S6)** Automation select	(NS) NS1	(60) NS 1	(60) Nonsync / std	(60) Nonsync	Go Monitor	(60) Nonsync
8	**(S7)** Automation select	(U2) User 2	(61) Nonsync 2	(22) Magnetic	(10) Dolby Digital	Future 11 (A19 of SK27)	
12	GND	GND	GND	GND	GND	GND (BS23 Pin 5)	GND
14						Future 8 (A14 of SK15)	

4.2.7 RS-232 ASCII String Commands

Table 4-9 ASCII String Commands

DMA8Plus ASCII String	Parameter or Action
dma8plus.sys.dig_1_global_delay	0 - 250
dma8plus.sys.dig_2_global_delay	0 - 250
dma8plus.sys.dig_3_global_delay	0 - 250
dma8plus.sys.dig_4_global_delay	0 - 250
dma8plus.sys.dolby_digital_2_channel_decode_mode	auto | lr_discrete | prologic | prologic_2
dma8plus.sys.dolby_digital_dialnorm	off | on
dma8plus.sys.dolby_e_2_channel_decode_mode	auto | lr_discrete | prologic | prologic_2
dma8plus.sys.dolby_e_dialnorm	off | on
dma8plus.sys.dolby_e_program	1 - 4
dma8plus.sys.input_mode	dig_1 | dig_2 | dig_3 | dig_4 | film
dma8plus.sys.ip_setting	[ip.ip.ip.ip nm.nm.nm.nm gw.gw.gw.gw off|on hostname]
dma8plus.sys.ntp_server	[hostname | ip_address]
dma8plus.sys.pcm_2_channel_decode_mode	lr_discrete | prologic | prologic_2
dma8plus.sys.pcm_mute	off | on
dma8plus.sys.pcm_route_1	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_2	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_3	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_4	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_5	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_6	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_7	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.pcm_route_8	C | L | LFE | Le | Ls | R | Re | Rs
dma8plus.sys.power_on_input	dig_1 | dig_2 | dig_3 | dig_4 | film | last
dma8plus.sys.silent_switch	off | on
dma8plus.sys.subwoofer_filter	50 - 100
dma8plus.sys.surround_delay	0 - 150
help	Returns list of commands
status	Returns all parameter status
mfg_print_log	extract event log
Legacy ASCII Strings	**Parameter or Action**
4xaes_input	dig_1 input mode (DMA8 legacy string)
aes_input	dig_2 input mode (DMA8 legacy string)
optical_input	dig_4 input mode (DMA8 legacy string)
film	film input mode (DMA8 legacy string)

4.2.8 To CP Control Pinouts

Table 4-10 To CP Control (25-pin D output)

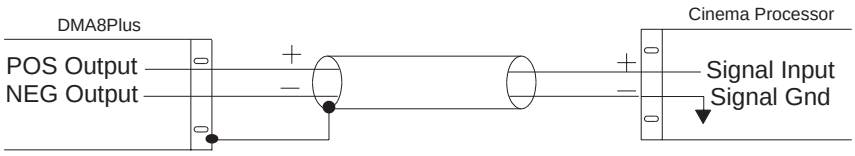
Pin Number	Description
1	**(S0)** Automation Select
2	**(S1)** Automation Select
3	**(S2)** Automation Select
4	**(S3)** Automation Select
5	**(S4)** Automation Select
6	**(S5)** Automation Select
7	**(S6)** Automation Select
8	**(S7)** Automation Select
9	N/C
10	N/C
11	N/C
12	Common
13	N/C
14	N/C
15	N/C
16	N/C
17	N/C
18	N/C
19	N/C
20	N/C
21	N/C
22	N/C
23	N/C
24	N/C
25	N/C

4.2.9 DMA8Plus Audio Out to CP Pinouts

Caution: When connecting the DMA8Plus audio output, be aware that it is balanced. The balanced design offers a high degree of hum rejection, but be careful when terminating to a cinema processor with unbalanced inputs.

Although the CP500 and CP650 cinema processors each use an unbalanced six-channel analog input, this is not a problem, as the unused pins of the associated 25-pin D-connector are all grounded. For best results, use cable Part No. 83528, which is properly shielded and wired with matching twisted channel pairs. We do not recommend using a 25-pin "straight-through" cable.

To properly connect the DMA8Plus balanced audio output to an unbalanced audio input, use shielded twisted pair cable (minimum 22 AWG). Connect the shield at the DMA8Plus end using any of the pins tied to the DMA8Plus chassis (9, 10, 11, 13, or 19). Do not connect the shield at the unbalanced end. Each DMA8Plus audio channel "NEG" output terminates at the unbalanced input device ground pin. Each DMA8Plus audio channel "POS" output terminates at the unbalanced input device positive pin.



When connecting to a CP200, CP45, CP55, or CP65 cinema processor, you must terminate the negative side of each audio channel of the DMA8Plus balanced audio output to the unbalanced cinema processor input ground. Failure to do so results in a reduced audio output level on that channel (typically –6 dB). The original audio cables for these processors (“DA20 to CP” audio cables) are designed for unbalanced audio. As a result, not all grounds are connected to the negative side of the associated channel when the cable is plugged directly into a DMA8Plus (L, Ls, Rs, and SW are likely to be 6 dB low).

You can use a Cat. No. 757 audio cable adapter dongle with the existing audio output cable to ensure proper grounding of all channels. For pin configurations, refer to Table 4-11.

Table 4-11 Audio Out to CP Cables (Cat. No. 757 dongle grounds shaded)

Pin No.	DMA8Plus Audio Out to CP	CP45 Cable 83306.01	CP55 Cable 83132	CP65 Cable 83134	CP200 Cable 83137	CP500, CP650 Cable 83528
1	Left NEG				1 GND	L-
2	Right Surround POS	Rs	Rs	Rs	2 Q	Rs+
3	Right Surround NEG				3	Rs-
4	Left Surround NEG				4	Ls-
5	Right Extra NEG				5	Re-
6	Right NEG	GND	GND	GND	6	R-
7	Left Extra NEG	GND	GND	GND	7	Le-
8	Center NEG	GND	GND	GND	8	C-
9	Ground	GND	GND	GND	9	GND
10	Ground	GND	GND	GND	10	GND
11	Ground	GND	GND	GND		GND
12	Subwoofer NEG					SW-
13	Ground					GND
14	Left POS	L	L	L	11 L	L+
15	Left Surround POS	Ls	Ls	Ls	12 P	Ls+
16	Right Extra POS				13 Re	Re+
17	Right POS	R	R	R	14 R	R+
18	Left Extra POS				15 Le	Le+
19	Ground				16	GND
20	Center POS	C	C	C	17 C	C+
21	Mono Surround (tied directly to audio input)				18S	Mono_S
22	No connection				19	NC
23	No connection				20	NC
24	Subwoofer POS	SW	SW	SW	B1/SK13	SW+
25	Spare (tied directly to audio input)					Spare

4.3 Remote Commands and Control

The DMA8Plus is designed for remote communication using serial or Ethernet connections.

4.3.1 Serial

ASCII character strings sent to the rear-panel serial port can be used to set DMA8Plus parameters and obtain current DMA8Plus status information. The currently available remote commands are listed in Table 4-9.

Serial Communication

Connections can be made from the DMA8Plus rear-panel serial port to a PC serial port or other RS-232 device. The serial port speed on your PC should be set to 9,600 bps, 8 data bits, no parity, 1 stop bit. After the DMA8Plus is powered on, the commands can simply be typed from a program such as HyperTerminal.

4.3.2 Ethernet

ASCII character strings can be sent through telnet to set DMA8Plus parameters and obtain current DMA8Plus status information. The currently available remote commands are listed in Table 4-9.

Ethernet Communication

Default DMA8Plus Ethernet Parameters

IP Address: 192.168.1.131

Command strings must be sent to port 61412

Gateway: 192.168.1.129

Subnet Mask (Netmask): 255.255.255.128