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PENNYWISE
PERIPHERALS

DF1
Pennywise™ Digital Fader
For Use With
CA21 Cinema Automation

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1 Introduction

The Pennywise DF1 Digital Fader enables serial control of sound processors which do not have their own serial interfaces.

The DF1 has been designed especially for use with the new CAPIO version of the Pennywise CA21 Cinema Automation unit. The CAPIO version does not have a digital fader.

The features of the DF1 are

(1) an RS-232 serial interface for connecting to the CA21,

(2) relays for controlling the sound processor (selecting sound formats, mute, remote fader),

(3) optically isolated inputs for receiving status information from the sound processor (sensing the sound format status leds, mute led, fader remote led),

(4) an optically isolated DtoA convertor for simulating a remote potentiometer and adjusting the volume of the sound processor via the processor's remote fader feature,

(5) two optically isolated inputs to allow remote control of the volume.

(6) The DF1 requires 12V DC which is available at the CA21 sound processor serial port connector.

2 Connecting up a DF1

2.1 Connection Scheme

Detailed connection diagrams for different sound processors are given later, but the basic connection scheme is as follows.

(1) The serial port on the DF1 is connected to the sound processor serial port on the CA21. +12VDC for the DF1 is also supplied from the CA21 serial port connector.

(2) The relays on the DF1 are connected to the sound format, mute and fader remote select inputs on the sound processor.

(3) If the sound processor provides suitable sound format status outputs (often for driving leds), these are connected to the optically isolated inputs on the DF1.

(4) The digital fader output on the DF1 is connected to the remote fader potentiometer inputs on the sound processor.

(5) The remote volume inputs on the DF1 can be connected to push buttons in the auditorium, for example.

2.1 Settings

The following settings (setup options on the CA21, links on the DF1) must be made.

(1) The “SP” (sound processor type) setup option on the CA21 must be set to a value of 5.

(2) The sound processor links on the DF1 must be set for the particular sound processor the DF1 is driving. Links 3, 4 and 5 on the DF1 circuit board are used. Links 1 and 2 must be left out for normal operation. (See the Table below.)

(3) The gain of the digital fader can be adjusted using the blue potentiometer on the DF1 circuit board. The gain is adjusted so that the sound level using the sound processor’s local fader and the DF1's (remote) fader match.

Selecting the Sound Processor on the DF1

Sound Processor	Link 3	Link 4	Link 5
	Out	Out	Out
Dolby CP45	Out	Out	In
Dolby CP65	Out	In	Out
	Out	In	In
Dolby CP650	In	Out	Out
	In	Out	In
	In	In	Out
	In	In	In

3 Controlling Different Sound Processors

The first version of the DF1 does not support all sound processor. Further processors will be added in the next revision of the DF1 firmware.

3.1 Dolby CP45

The CP45 is fairly well suited to control by the DF1.

The CP45 has a strange remote fader profile so that if the remote fader is removed the CP45 can select maximum volume. The CP45 apparently has an inbuilt protection circuit to guard against this situation but to be safe the DF1 has an additional safe guard built in.

The fader local/remote relay in the DF1 must be connected to the CP45. When this relay is closed the remote fader in the DF1 will be selected. The DF1 does not close this relay until a set volume command has been received from the CA21. That way the remote fader is not selected until the DF1 volume is defined.

The CP45 provides outputs for driving sound format status leds. These outputs actually share the same lines as the inputs for selecting sound formats. The status outputs/format select inputs are connected to the relays and the optically isolated inputs on the DF1. The current format selected on the CP45 is then displayed by the sound format leds on the CA21 front panel.

The CP45 has a mute control which toggles mute. Changing the sound format unmutes the sound. Some CA21 configurations mute the sound whilst the projector turret is rotating. To avoid confusion if the sound format is changed at the same time, the DF1 mutes the sound by cutting the volume to zero rather than by operating mute on the CP45.

When driving a CP45 the DF1 must be set as follows.

(1) To select CP45 operation insert a jumper at position 5 on the DF1 circuit board. All other links must be left open.

(2) Adjust the gain of the DF1 using POT1 near the remote fader connector. Set a volume of 6.0 on the CA21 and on the CP45 fader knob. Do an “A/B” test by switching between the local and remote faders. Adjust POT1 on the DF1 until the sound levels with both faders agree.

3.2 Dolby CP65

The CP65 is well suited to control by the DF1.

The CP65 provides outputs for driving sound format status leds. These outputs are connected to the optically isolated inputs on the DF1. The current format selected on the CP65 is then displayed by the sound format leds on the front of the CA21.

The CP65 has a mute control which toggles mute. Changing the sound format unmutes the sound. Some CA21 configurations mute the sound whilst the projector turret is rotating. To avoid confusion if the sound format is changed at the same time, the DF1 mutes the sound by cutting the volume to zero rather than by operating mute on the CP65.

The CA21 can control the local/remote function on the CP65. The DF1 is the remote fader. Pushing the FADER REMOTE button to the left of the CA21 volume display toggles between the local fader in the CP65 and the remote fader in the DF1. The led beside the button on the CA21 is on when the remote fader (DF1) is selected.

When driving a CP65 the DF1 must be set as follows.

(1) To select CP65 operation insert a jumper at position 4 on the DF1 circuit board. All other links must be left open.

(2) Adjust the gain of the DF1 using POT1 near the remote fader connector. Set a volume of say 6.0 on the CA21 and on the CP65 fader knob. Then do an “A/B” test by switching between the local and remote faders. Adjust POT1 on the DF1 until the sound levels with both faders agree.

3.2 Dolby CP650

The CP650 will eventually have a serial interface suitable for control by an automation unit. However first versions of the CP650 are not able to be controlled in this way.

In the meantime, the CP650 can be controlled by a DF1 using the CP650's parallel interface which is rather like that for a CP65.

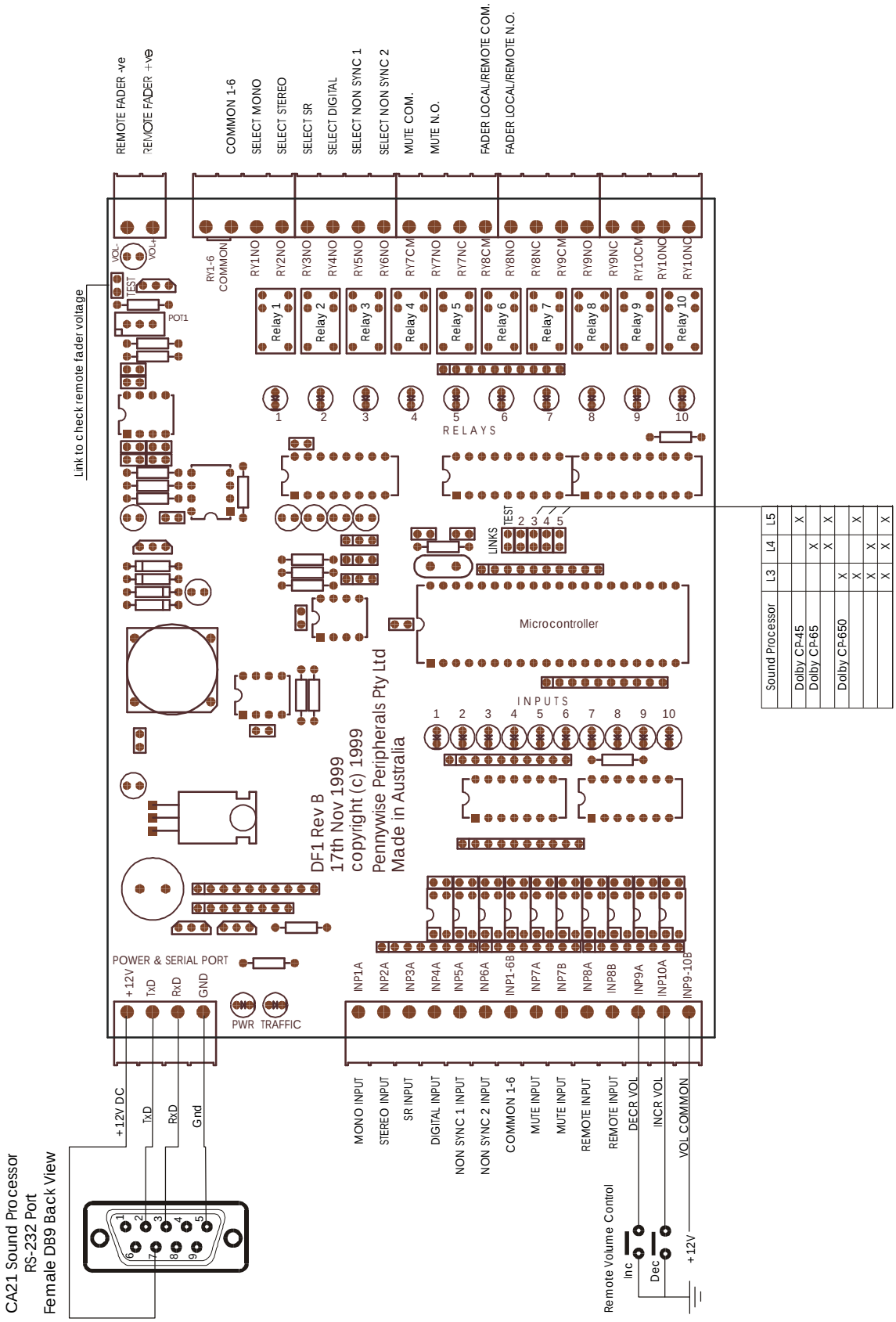
When driven by a remote fader (potentiometer) the CP650 uses an AtoD convertor to indicate the fader level on it's own display. Because of the limited accuracy of this AtoD convertor the display on the CP650 may not show exactly the same level as the volume display on the CA21.

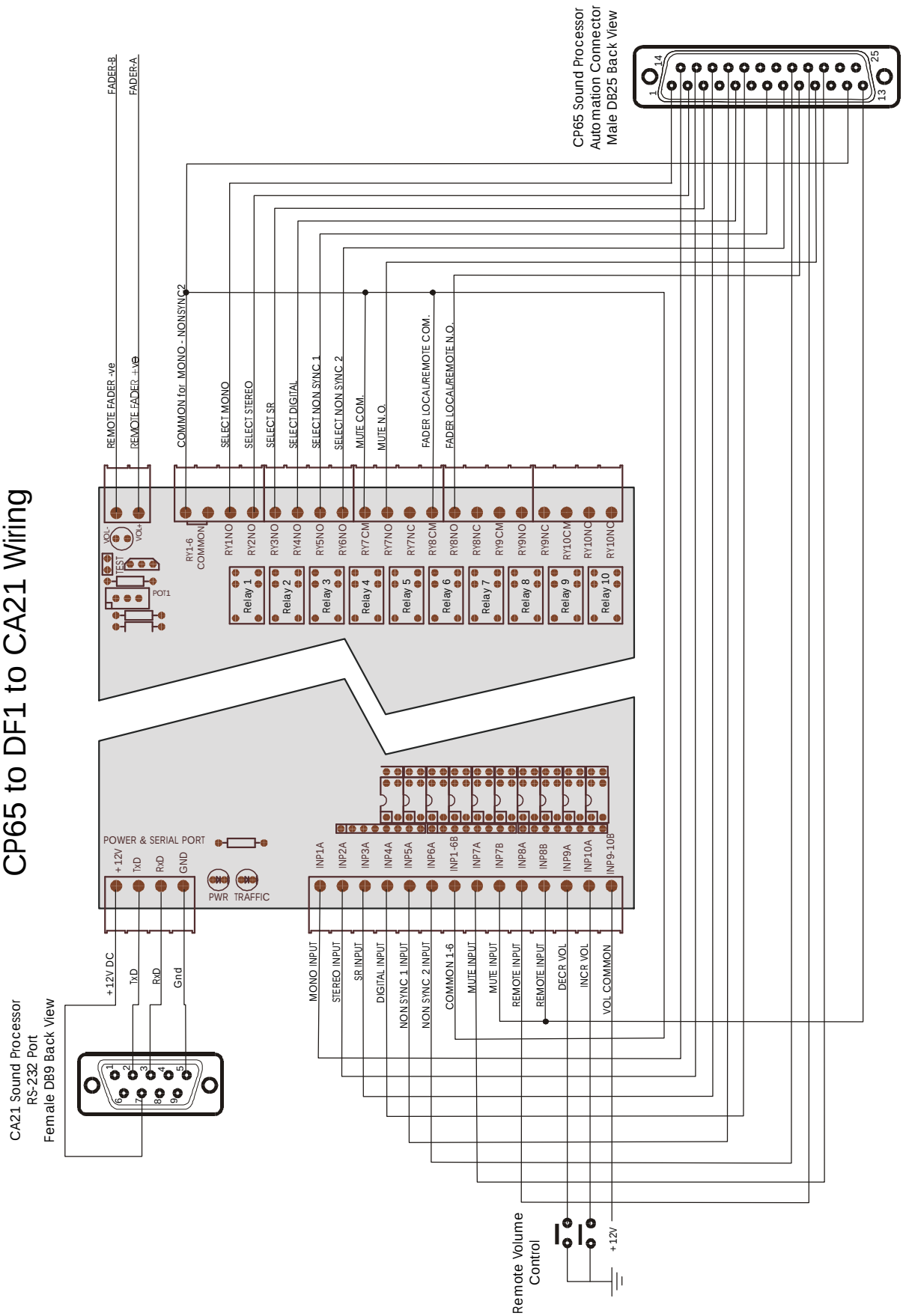
When driving a CP650 the DF1 must be set as follows.

(1) To select CP650 operation insert a jumper at position 3 on the DF1 circuit board. All other links must be left open.

(2) Adjust the gain of the DF1 using POT1 near the remote fader connector so the volume display on the CA21 matches the display on the CP650. Set a volume of say 6.0 on the CA21 then adjust POT1 on the DF1 until the sound level displays on the CA21 and CP650 match. Then fine tune POT1 for agreement over the range of fader settings in normal use. As mentioned above, the two displays may not agree precisely over the full range of levels, particularly at each end (around 0.0 and 9.9).

DFI Circuit Board and CA21 Interface




CP65 to DF1 to CA21 Wiring
CP65 Sound Processor
Automation Connector
Male DB25 Back View
CA21 Sound Processor
RS-232 Port
Female DB9 Back View
Remote Volume
Control
REMOTE FADER -ve
REMOTE FADER +ve
FADER-B
FADER-A
COMMON for MONO - NONSYNC2
SELECT MONO
SELECT STEREO
SELECT SR
SELECT DIGITAL
SELECT NON SYNC 1
SELECT NON SYNC 2
MUTE COM.
MUTE N.O.
FADER LOCAL/REMOTE COM.
FADER LOCAL/REMOTE N.O.
POWER & SERIAL PORT
+12V
TxD
RxD
GND
PWR
TRAFFIC
+12V DC
Gnd
MONO INPUT
STEREO INPUT
SR INPUT
DIGITAL INPUT
NON SYNC 1 INPUT
NON SYNC 2 INPUT
COMMON 1-6
MUTE INPUT
REMOTE INPUT
DECR VOL
INCR VOL
VOL COMMON
Relay 1
Relay 2
Relay 3
Relay 4
Relay 5
Relay 6
Relay 7
Relay 8
Relay 9
Relay 10