

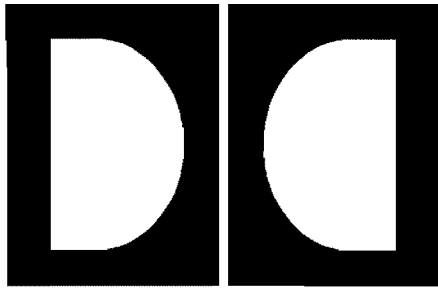
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Dolby
Cat. No. 814A
Digital Surround EX™
Auto-Switching Card
Installation Guide

Draft 2

Part Number 91xxx

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S02/XXXXXX

Draft 2 Part Number 91xxx

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1 Introduction

The digital data stream from current films produced with the Dolby Digital Surround EX™ process contains auto-switching bits in the digital data blocks. The Cat. No. 814A auto-switching card detects these bits and switches the SA10 into Surround EX mode. If the auto-switching bits are not present in the data blocks, or if the film is a non-Dolby Digital print, Surround EX mode is switched off. Current SA10s are shipped with this card. A Cat. No. 814A upgrade kit is available for installation in earlier SA10s.

Use this manual along with the SA10 Installation Manual (Dolby part number 91574 Issue 5 or later) for proper installation and alignment of your. If you received Model SA10 with the Cat. No. 814A card already installed, skip to Section 4.

2 The Cat. No. 814A Upgrade Kit

The following items are included in the Cat. No. 814A Upgrade Kit. If you received an SA10 with the Cat. No. 814A already installed, these items were shipped with your SA10:

- Cat. No. 814A card
- Part No. 83416 Surround EX auto-switching cable assembly
- Film Trailer with Surround EX auto-switching bits in the sound data blocks

3 Board Installation

The steps in this upgrade involve handling printed circuit boards. Many components on PC boards are very sensitive to static electricity. These components can be destroyed if static charge on your body discharges through the component. You do not even have to touch the component to damage it. Before touching the printed circuit board, ground yourself by rubbing the frame of the unit with each hand or by wearing an earthing strap.

1. Remove mains power from the SA10 by unplugging the rear panel power cable.
2. Carefully remove the Cat. No. 511 and Cat. No. 510 boards and place them on a flat, level, non-conductive surface.
3. Remove 4 screws from the back of the SA10. These screws are very long, and don't necessarily have to be completely removed from the SA10.
4. Remove the screw from the top-center of the Cat. No. 814.
5. Remove the ribbon cables from J2 and J3.
6. Remove the Cat. No. 814 board.

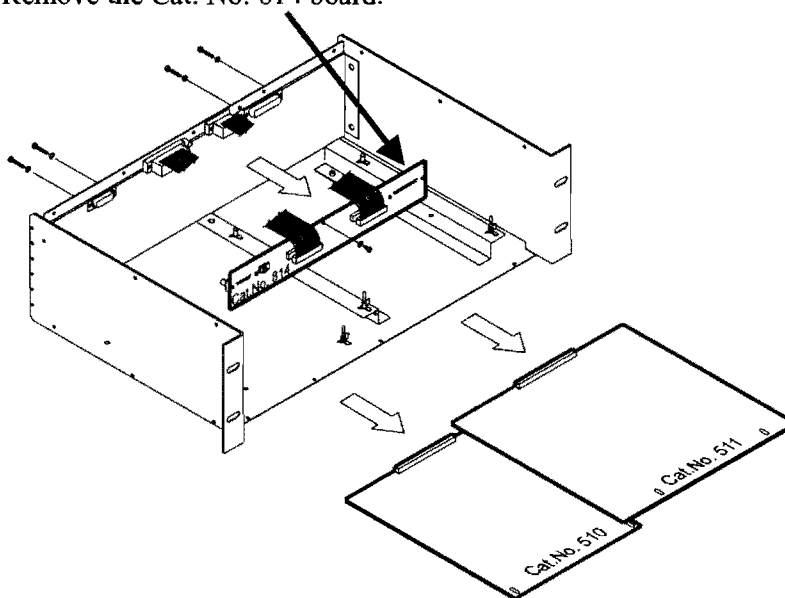


Figure 1 Remove the existing Cat. No. 814 card

7. Make sure that the Cat. 814A has standoffs mounted on the rear of J4 (Female 15-pin D connector) and J1 (Female 25-pin D connector). There should be a total of 4 standoffs. If these are missing, use the standoffs from the original Cat. No. 814 board.
8. Seat the Cat. No. 814A onto the SA10 backplane and reinstall all cables and screws.

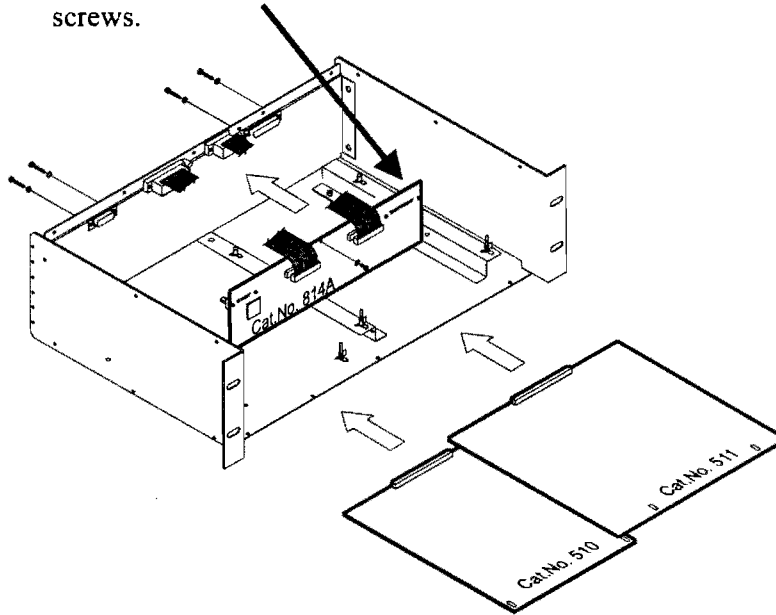


Figure 2 Install the new Cat. No. 814A

4 Cinema Processor Type Switch

A rotary switch, located on the Cat. No. 814A board, is accessible by opening the front panel. The switch is visible by looking through to the back of the unit. The switch is shipped from the factory set to position 0.

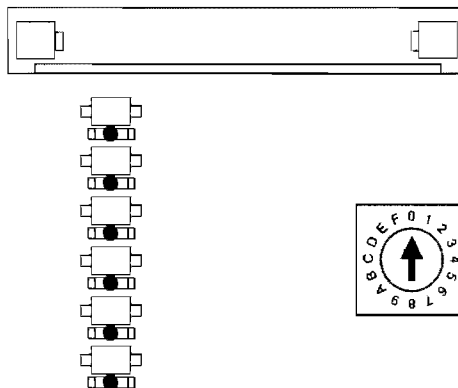









Figure 3 Cinema Processor Type Switch on Cat. No. 814A Board

Use the information in the table below to set the switch. For the CP500, see Section 6 for assigning format 10 to the softkeys.

Table 1 Cat. No. 814A Cinema Processor Type Switch Positions

Switch Position	Function
1	CP500 with Auto Surround EX on softkey 1 (SK1), Manual Surround EX on SK5
2	CP500 with Auto Surround EX on softkey 2 (SK2), Manual Surround EX on SK6
3	CP500 with Auto Surround EX on softkey 3 (SK3), Manual Surround EX on SK7
4	CP500 with Auto Surround EX on softkey 4 (SK4), Manual Surround EX on SK8
5	CP500 with Auto Surround EX on softkey 5 (SK5) CP45 Auto Surround EX CP65 Auto Surround EX
6	CP500 with Auto Surround EX on softkey 6 (SK6)
7	CP500 with Auto Surround EX on softkey 7 (SK7)
 8	CP500 with Auto Surround EX on softkey 8 (SK8) - Recommended CP55 Auto Surround EX
 9	CP200 Auto Surround EX
A	not used
B	not used
 C	Automation signal test. See note 2 and Section 8 Troubleshooting
 D	Surround EX forced on
 E	CP200 Manual Surround EX
 F	CP65 Manual Surround EX CP45 Manual Surround EX
 0	CP500 Manual Surround EX on SK8 CP55 CP65 Manual Surround EX

Notes:

1. "Manual Surround EX " switch positions E, F, or 0, set the Cat. No. 814A to operate the same as a Cat. No. 814 (non-A), i.e. the SA10 switches into Surround EX mode when a format 10 automation pulse has been received, regardless of the presence of Surround EX flags in the bitstream. Auto Surround EX requires surround EX flags as well as a format 10 pulse on the proper automation line, as set by the cinema processor type switch.
2. With the switch in position C, the control input connector pin number where an automation pulse is received is briefly displayed in BCD on the status LEDs (least significant bit on top)

5 Connections

The following pages show the hookup wiring to the various Dolby cinema processors, using the Surround EX auto-switching cable assembly (Dolby part number 83416) shipped with the product.

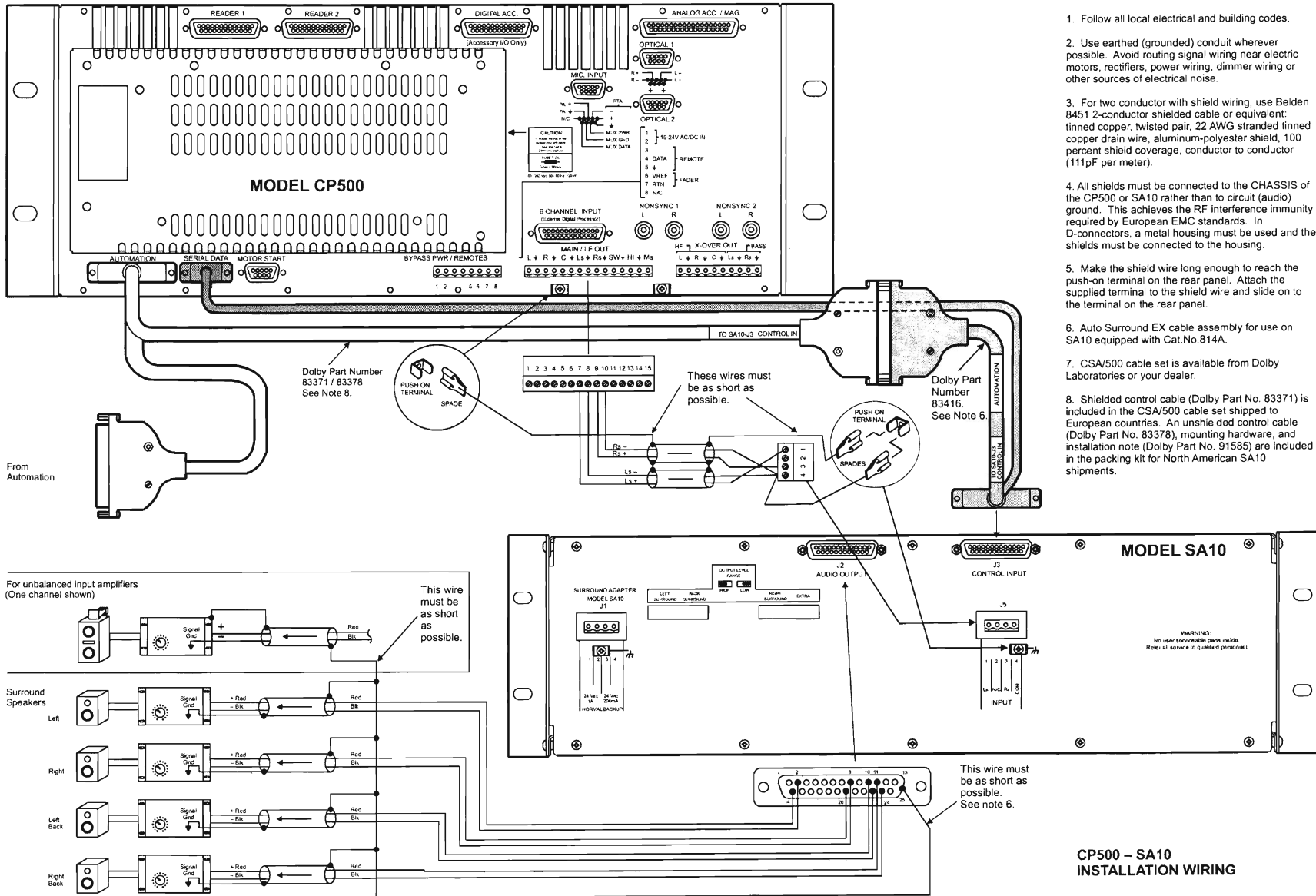
Note:

Installation with the CP45 requires the use of an Automation Interface Adapter board, Cat. No. 545, available from Dolby Laboratories or your dealer.

Installation with the CP55 requires the use of an Automation Interface Adapter board, Cat. No. 321, and cable assembly part number 83133, available from Dolby Laboratories or your dealer.

Installation with the CP200 requires the use of Interface Cable Cat. No. 845, available from Dolby Laboratories or your dealer.

1. Locate the Surround EX auto-switching cable assembly shipped with the product.
2. Plug the end marked "TO SA10-J3 CONTROL IN" into J3 on the SA10.
3. Connect the automation control cable (unique to each type of cinema processor) into the opposite end of this cable.
4. Plug the end marked "SERIAL DATA" into the serial data connector on the CP500 or DA20.
5. Reapply power to the SA10.

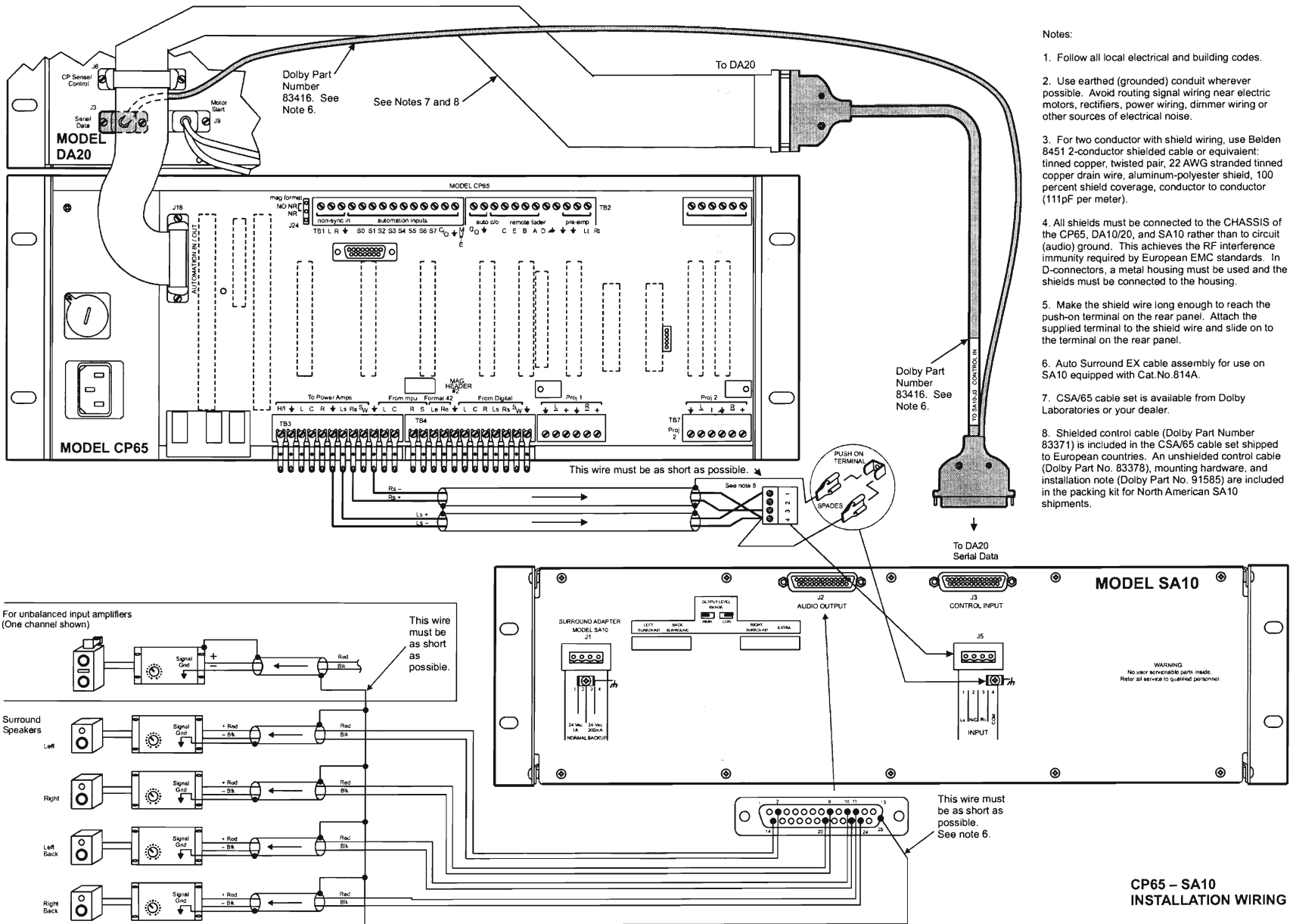


Notes:

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 2-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 (111pF per meter).
4. All shields must be connected to the CHASSIS of the CP500 or SA10 rather than to circuit (audio) ground. This achieves the RF interference immunity required by European EMC standards. In D-connectors, a metal housing must be used and the shields must be connected to the housing.
5. Make the shield wire long enough to reach the push-on terminal on the rear panel. Attach the supplied terminal to the shield wire and slide on to the terminal on the rear panel.
6. Auto Surround EX cable assembly for use on SA10 equipped with Cat.No.814A.
7. CSA/500 cable set is available from Dolby Laboratories or your dealer.
8. Shielded control cable (Dolby Part No. 83371) is included in the CSA/500 cable set shipped to European countries. An unshielded control cable (Dolby Part No. 83378), mounting hardware, and installation note (Dolby Part No. 91585) are included in the packing kit for North American SA10 shipments.

CP500 - SA10
INSTALLATION WIRING

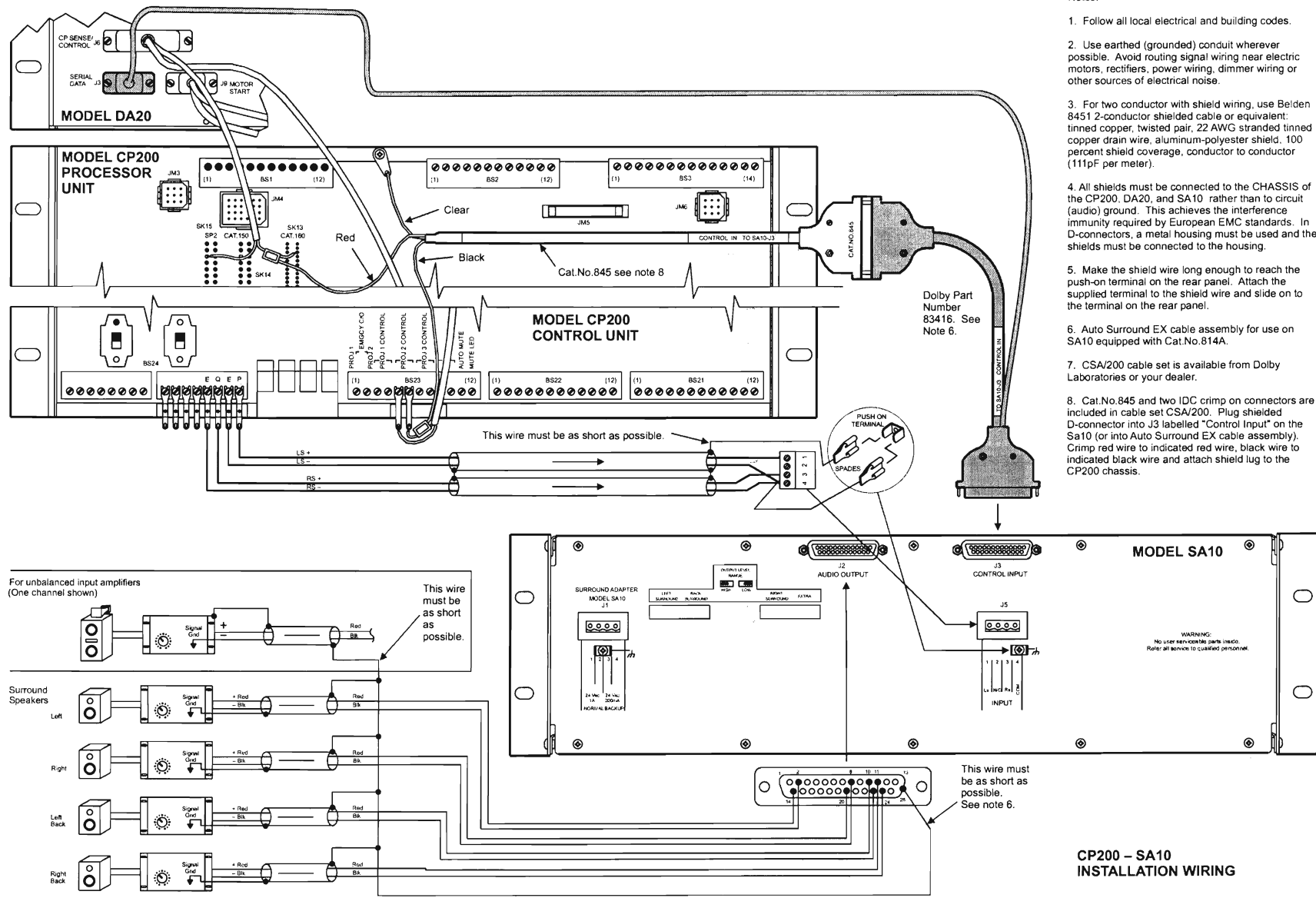
Cat. No. 814A Installation



Notes:

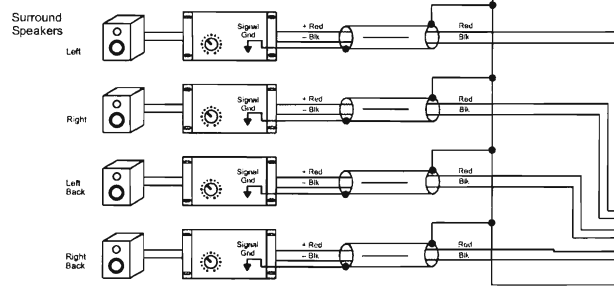
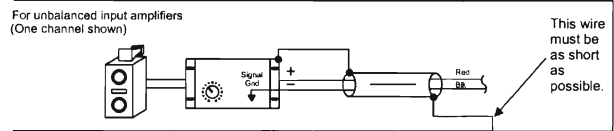
1. Follow all local electrical and building codes.
2. Use earthed (grounded) conduit wherever possible. Avoid routing signal wiring near electric motors, rectifiers, power wiring, dimmer wiring or other sources of electrical noise.
3. For two conductor with shield wiring, use Belden 8451 2-conductor 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 (111pF per meter).
4. All shields must be connected to the CHASSIS of the CP65, DA10/20, and SA10 rather than to circuit (audio) ground. This achieves the RF interference immunity required by European EMC standards. In D-connectors, a metal housing must be used and the shields must be connected to the housing.
5. Make the shield wire long enough to reach the push-on terminal on the rear panel. Attach the supplied terminal to the shield wire and slide on to the terminal on the rear panel.
6. Auto Surround EX cable assembly for use on SA10 equipped with Cat.No.814A.
7. CSA/65 cable set is available from Dolby Laboratories or your dealer.
8. Shielded control cable (Dolby Part Number 83371) is included in the CSA/65 cable set shipped to European countries. An unshielded control cable (Dolby Part No. 83378), mounting hardware, and installation note (Dolby Part No. 91585) are included in the packing kit for North American SA10 shipments.

**CP65 - SA10
INSTALLATION WIRING**

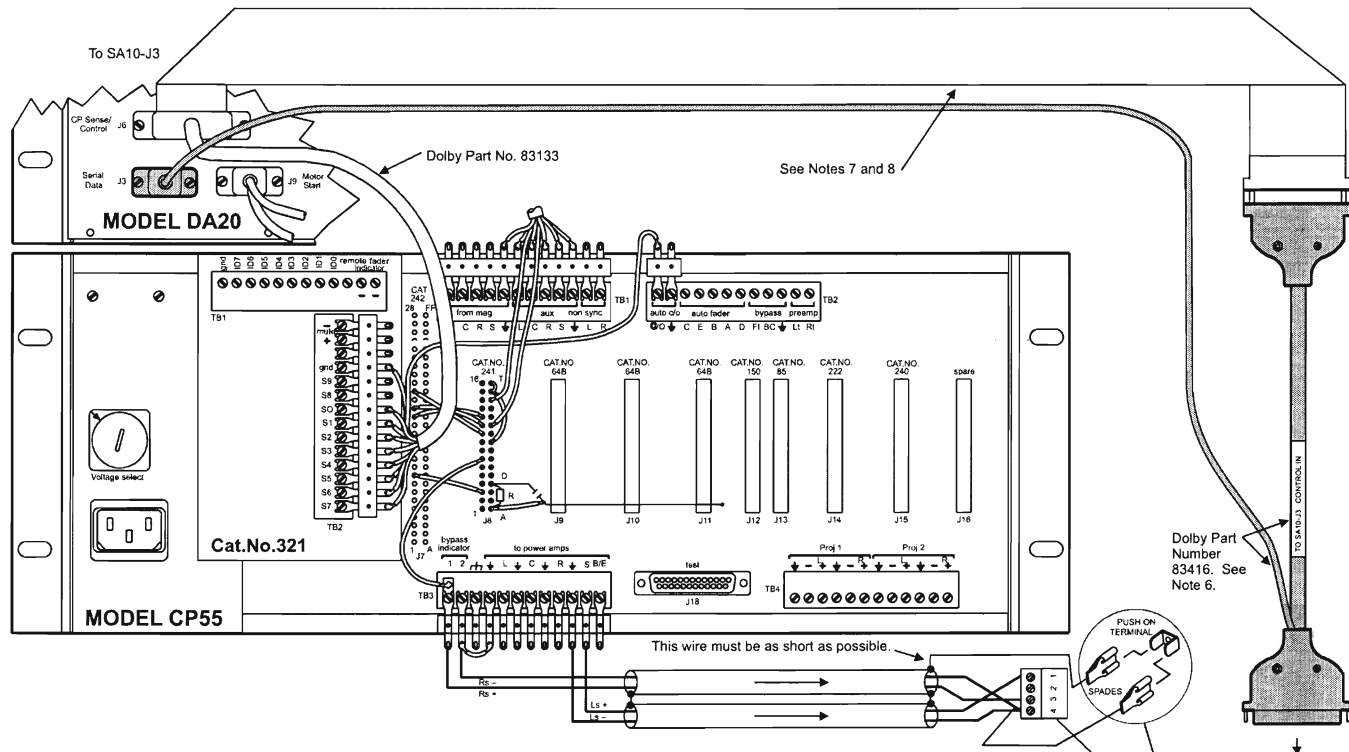


Notes:

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 2-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 (111pF per meter).
4. All shields must be connected to the CHASSIS of the CP200, DA20, and SA10 rather than to circuit (audio) ground. This achieves the interference immunity required by European EMC standards. In D-connectors, a metal housing must be used and the shields must be connected to the housing.
5. Make the shield wire long enough to reach the push-on terminal on the rear panel. Attach the supplied terminal to the shield wire and slide on to the terminal on the rear panel.
6. Auto Surround EX cable assembly for use on SA10 equipped with Cat.No.814A.
7. CSA/200 cable set is available from Dolby Laboratories or your dealer.
8. Cat.No.845 and two IDC crimp on connectors are included in cable set CSA/200. Plug shielded D-connector into J3 labelled "Control Input" on the SA10 (or into Auto Surround EX cable assembly). Crimp red wire to indicated red wire, black wire to indicated black wire and attach shield lug to the CP200 chassis.



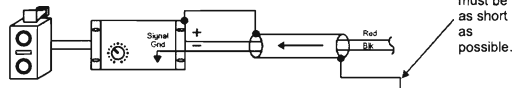
CP200 - SA10
INSTALLATION WIRING



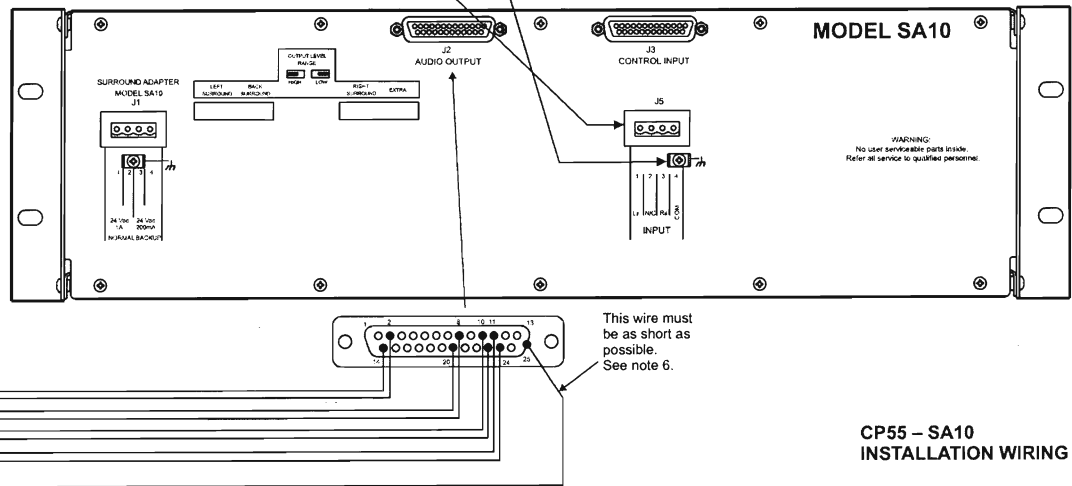
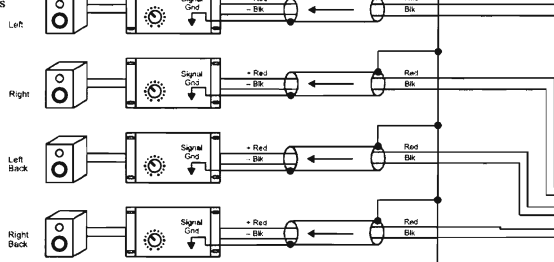
Notes:

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 2-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 (11pF per meter).
4. All shields must be connected to the CHASSIS of the CP55, DA20, and SA10 rather than to circuit (audio) ground. This achieves the RF interference immunity required by European EMC standards. In D-connectors, a metal housing must be used and the shields must be connected to the housing.
5. Make the shield wire long enough to reach the push-on terminal on the rear panel. Attach the supplied terminal to the shield wire and slide on to the terminal on the rear panel.
6. Auto Surround EX cable assembly for use on SA10 equipped with Cat.No.814A.
7. CSA/55 cable set is available from Dolby Laboratories or your dealer.
8. Shielded control cable (Dolby Part No. 83371) is included in the CSA/55 cable set shipped to European countries. An unshielded control cable (Dolby Part No. 83378), mounting hardware, and installation note (Dolby Part No. 91585) are included in the packing kit for North American SA10 shipments.

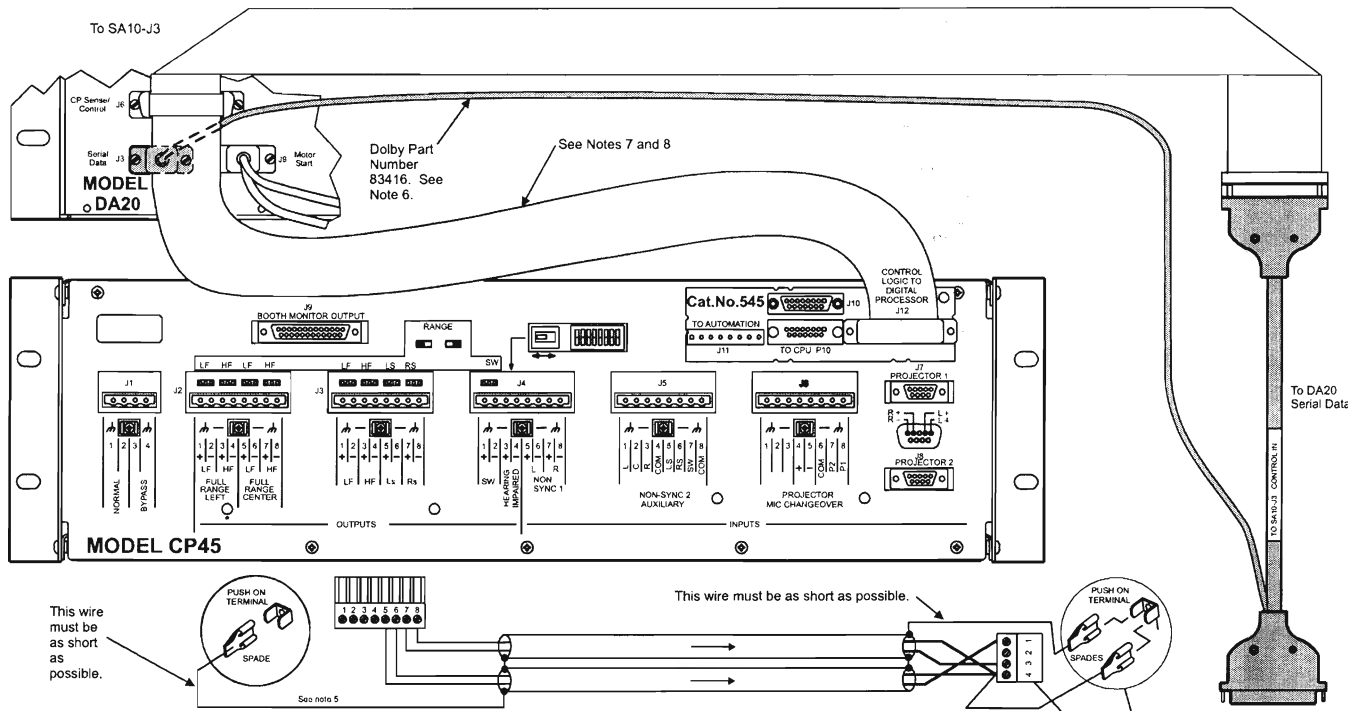
For unbalanced input amplifiers (One channel shown)



Surround Speakers

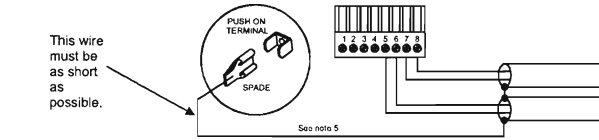


CP55 - SA10 INSTALLATION WIRING

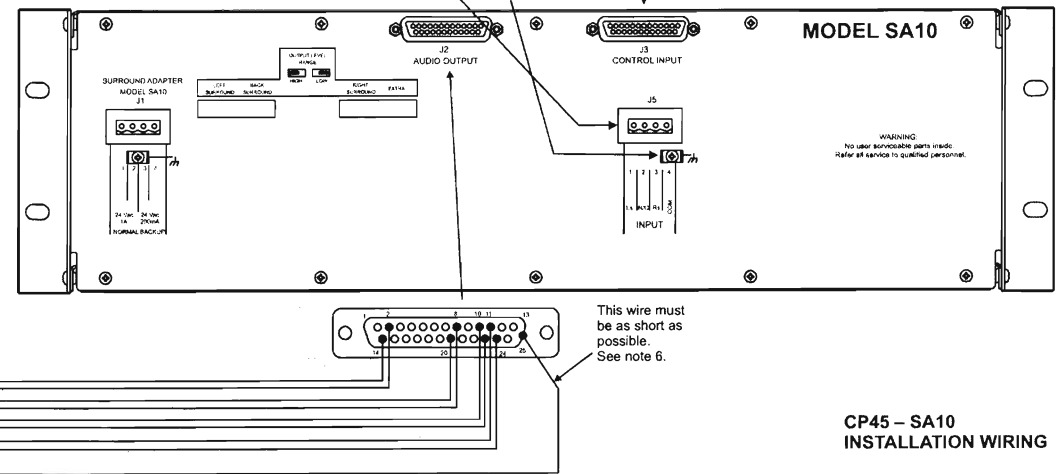
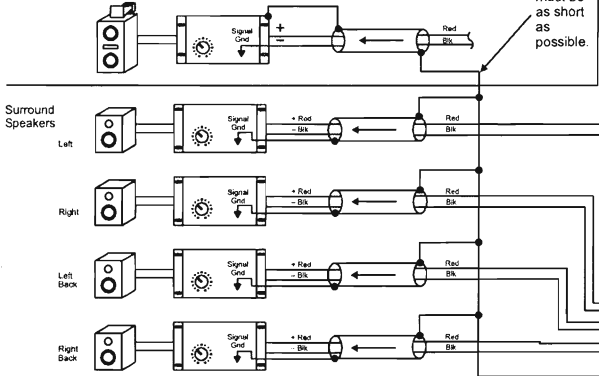


Notes:

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 2-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 (111pF per meter).
4. All shields must be connected to the CHASSIS of the CP45, DA20, and SA10 rather than to circuit (audio) ground. This achieves the RF interference immunity required by European EMC standards. In D-connectors, a metal housing must be used and the shields must be connected to the housing.
5. Make the shield wire long enough to reach the push-on terminal on the rear panel. Attach the supplied terminal to the shield wire and slide on to the terminal on the rear panel.
6. Auto Surround EX cable set is available on SA10 equipped with Cat.No.814A.
7. CSA/45 cable set is available from Dolby Laboratories or your dealer.
8. Shielded control cable (Dolby Part No. 83371) is included in the CSA/45 cable set shipped to European countries. An unshielded control cable (Dolby Part No. 83378), mounting hardware, and installation note (Dolby Part No. 91585) are included in the packing kit for North American SA10 shipments.



For unbalanced input amplifiers (One channel shown)



CP45 - SA10 INSTALLATION WIRING

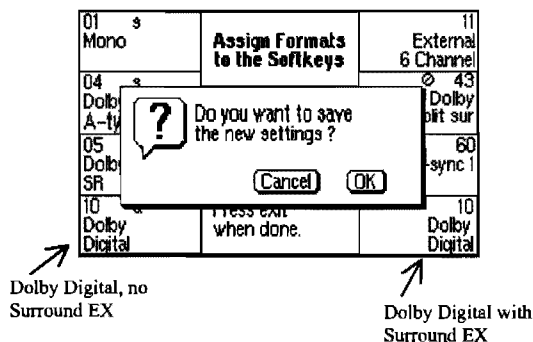
6 Alignment With CP500 (skip this section if you are installing with other cinema processors)

The installed CP500 software must be version 1.61EX, or above. This version disables CP500 surround channel equalization but saves the previous EQ control settings. If system software earlier than V1.61 is re-installed, these settings will become active again.

The Cat. No. 684 card (Horizontal, near the bottom) must be REV 1 or above. Contact your local distributor if the Cat. No. 684 is Rev E or earlier.

6.1 Programming the CP500 Format Screen for Surround EX™ Switching

The cinema processor selector switch on the SA10 Cat. No. 814A board can be set to allow a **Surround EX select** command from the CP500 when any softkey (SK1-SK8) is pressed. This occurs independent of what **format** is programmed to the chosen soft key. We recommend SK8 be used for this purpose. (Note: only SK8 can be used with SA10s equipped with the original Cat. No. 814, non-A, card). Since the factory default standard and default custom format for SK8 is Format 61 (Non-sync 2), it is necessary to program SK8 as Format 10 (Dolby Digital®) on the Custom Format Screen. You must also check to be sure the automation system is set up to allow selection of SK8 for trailers or feature films with Surround EX encoding.



Using this setup, when the feature begins, the automation system will cue SK8. This will select Format 10 on the CP500. When the Surround EX flag contained in the digital sound bitstream is detected by the SA10, it will switch into Dolby Digital Surround EX mode.

7 Cat. No. 814A Troubleshooting

Two inputs are necessary for the Cat. No. 814A to automatically switch the SA10 into and out of Dolby Digital Surround EX mode:

- Surround EX identifying bits in the film data blocks
- format 10 on the automation cable

If your SA10 is not switching automatically:

1. Check all cabling.
2. Make sure the film is running in the correct direction.
3. Check the digital film reader alignment.

Note: The SA10 will not switch into Surround EX while operating in backup power mode.

8 Status LEDs

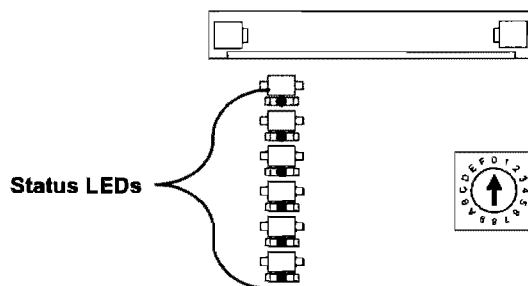


Figure 9 Status LEDs on Cat. No. 814A Board

A row of status LEDs is mounted on the Cat. No. 814A board. The listing below describes each LED, starting at the top.

EX ON (green). Lights whenever the Cat. No. 814A circuitry is in Dolby Digital Surround EX mode. This LED is not on the same logic circuit as the front panel mode indicator.

EX FLAG (green). Whenever Surround EX identifying bits are detected in the film serial data, this LED flashes. If the LED does not light, check the Cat. No. 673A software revision level, the serial data cable connection, and make sure the film being played was encoded with Surround EX identifying flags.

SERIAL DATA (green). This LED flashes whenever the Cat. No. 814A receives a byte on the serial data line. This LED should blink anytime the SA10 is connected to a serial data line, even if film is not playing.

If the serial data LED is off:

4. Check the serial data cable.
5. Make sure the serial data port is on (CP500 only): From the main menu press **menu, SK1, SK1**, then **SK6** to turn the port on and off.
6. Play a film known to contain the Surround EX flags. If the **EX flag (green)** LED glows, indicating Surround EX flags are being received, then the Cat. No. 814A board is defective and must be replaced.
7. Check the revision level of the software on your Cat. No. 673A board by turning its rotary switch to **3**. The seven-segment display should show a **b** or higher. Run a recently released film to upgrade the 673A software.

CURRENT SK UNKNOWN (yellow). Automation pulses are momentary events. If format 10 is already playing when the SA10 is powered on, the Cat. No. 814A missed the automation pulse and therefore will not switch into Surround EX mode. This LED indicates that the Cat. No. 814A has not received an automation pulse. This LED lights anytime the rotary cinema processor select switch is changed. Pressing any format button should cause the LED to go off. If the LED remains on, check the automation cabling and replace if necessary. Also, try disconnecting the external automation equipment.

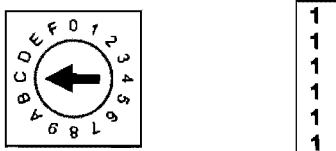
SA10 BUTTON POSITION ERROR (red). The front panel Surround EX mode switch must be in the **OUT** (enable) position, and the inside front panel Test/Normal switch must be in the **IN** (normal) position. The Cat. No. 814A cannot control the SA10 mode if these buttons are set incorrectly. This fault can cause a mechanical clicking noise inside the SA10. The noise indicates an error but will not damage the SA10 or Cat. No. 814A. The Cat. No. 814A waits until this fault is cleared before switching into operational mode.

AUTO EX OFF (red). This LED indicates that the automatic Surround EX function is disabled on the Cat. No. 814A. It operates like a Cat. No. 814 (non-A), i.e., it switches in and out of Surround EX mode when an automation pulse has been received on the correct pin regardless of the presence of any Surround EX flags in the bitstream.

8.1 Checking Automation Signals

If the Cat. No. 814A does not respond to automation pulses, the signals can be checked by interpreting the LEDs with the Cat. No. 814A switched to test mode:

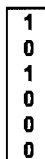
1. Rotate the cinema processor select switch to position C. All LEDs should turn on.



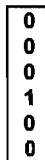
2. Press the format 10 key on the cinema processor.

The automation line, or position, for format 10 should briefly show in the LEDs as a BCD number with the least significant bit (0) on top. (LED on = 1, LED off = 0):

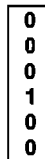
For CP45 or CP65, Format 10 at position 5 should show 101000 = 5, reading from top to bottom.



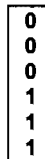
For the CP55, format 10 at position 8 should show 000100 = 8.



For the CP500, softkeys 1–8 correspond to the automation lines. For example, if format 10 is programmed to be on softkey 8 (SK8), **recommended**, then the LEDs should show 000100 = 8.



Or, if format 10 is programmed to be on softkey 7 (SK7), then 000111 = 7 should be indicated on the LEDs when SK7 is pressed.



Note: BCD = Binary Coded Decimal ($1 \cdot n_1 + 2 \cdot n_2 + 4 \cdot n_3 + 8 \cdot n_4$) where $n_1 \dots n_4$ are the zeros and ones in the binary number. The least significant bit is the bit with the lowest value. "n1" in the above example is the least significant bit while "n4" is the most significant bit.

If no LEDs light, check the cabling and power to the SA10.

If the LEDs indicate the correct automation command, but the SA10 does not automatically switch the SA10 to Surround EX mode, make sure the cinema processor select switch is set to the correct position. Also try removing any external automation equipment.

Switch the cinema processor select switch to disable auto Surround EX (position E, F or 0 depending upon which cinema processor is being used). This allows the SA10 to switch into Surround EX whether or not Surround EX flags are present in the bitstream. If this works, then check the serial data integrity.

If none of this works, simply run the film in conventional Dolby Surround mode by pressing the front panel button and contact Dolby Laboratories for technical assistance.

9 Surround EX Auto-switching Cable Pinout (Part No. 83416)

Table 2 Cat. No. 814A Cinema Processor Type Switch Positions

Signal Name	Connector to SA10 Control Input J3 male 25-pin D	Connector Carrying Film Serial Data male 9-pin D	Connector to Cinema Processor Automation female 25-pin D ¹
CNTRL0	Pin 1		Pin 1
CNTRL1	Pin 2		Pin 2
CNTRL2	Pin 3		Pin 3
CNTRL3	Pin 4		Pin 4
CNTRL4	Pin 5		Pin 5 ²
CNTRL5	Pin 6		Pin 6 ³
CNTRL6	Pin 7		Pin 7
CNTRL7	Pin 8		Pin 8 ⁴
Serial Data	Pin 13	Pin 2	
GND	Pin 24		Pin 12
GND	Pin 19	Pin 5	

¹ CP45: Connector J12 on the Cat. No. 545 Automation Adapter board.
 CP55: Automation cable part number 83133 connecting to adapter board Cat. No. 321
 CP200: Adapter cable Cat. No. 845

² CP45: Only pin 5 is monitored by the SA10 for Auto-Surround EX operation
 CP65: Only pin 5 is monitored by the SA10 for Auto-Surround EX operation

³ CP200: Only pin 6 is monitored by the SA10 for Auto-EX operation

⁴ CP55: Only pin 8 is monitored by the SA10 for Auto-EX operation