Film-Tech

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PANASTEREO

CX230EX

CINEMA BOOTH MONIT0R

OWNER'S MANUAL

PANASTEREO CX230EX CINEMA BOOTH MONITOR

OVERVIEW

The CX230EX Monitor is the world's first computer controlled booth monitor. It is simple to use, provides advanced features not previously found in booth monitor equipment and has been designed for easy interface to computer automation systems via a standard RS232 interface connector.

SYSTEM FEATURES

- Single-chip microprocessor control system with power supervision and watchdog circuits provides high immunity to interference for reliable latch-up-free operation.

- Monitoring of both sound processor outputs and amplifier outputs.

- Full monitoring of biamp systems.

- Built-in analogue to digital converter with digital bargraph meter for auditorium volume indication.

- Fast Mute function.

- Two-digit LED digital volume indicator.

- Built-in compressor for easier monitoring of highly dynamic (SR or digital) soundtracks.

- Built-in stereo 25watt monitor amplifier.

- All inputs are balanced and isolated for low noise, high quality monitoring and zero interaction with the cinema sound system.

- All functions (including volume control) accessible via RS232 serial interface.

- Digitised auditorium sound level available via RS232 serial interface for remote indication of volume level with computer automation systems.

- All monitor connections via removable mini-Phoenix connectors so the monitor chassis can be easily removed for service.

SYSTEM SPECIFICATIONS

Sound processor Inputs: Nominal 300mV input sensitivity, 10k ohm balanced

Amplifier Inputs: Nominal 3V input sensitivity, 100k ohm balanced

Amplifier Output Power: 2 x 25W RMS into 8 ohms.

CX230EX OPERATION

MONITORING AN INDIVIDUAL CHANNEL

Select a channel to be monitored by pressing the pushbutton for the appropriate channel once.

An LED indicator will illuminate above the selected input button. Adjust the volume control for a comfortable listening level. The volume is indicated by the 2-digit display to the left of the control.

Biamp installations only:

It is possible to monitor each of the front channel high and low frequency outputs separately.

Press the left, centre or right pushbutton once to monitor a mix of the high and low frequency outputs for each channel.

Press the same button a second time to monitor the high frequency output only. Press the same button a third time to monitor just the low frequency output.

Repeatedly pressing the same button will cycle through the above three options.

MONITORING A MIX

When the MIX button is pressed, the monitor output will be a blend of the front three channels (left, centre and right).   In MIX mode a compressor is automatically inserted to reduce the difference in volume between very loud and very soft signals. This makes it easier to monitor digital and SR soundtracks. The compressor can be disabled by setting the options. (See Installation section).

The surround channel is not included in the mix because the delay which is normally introduced in the cinema processor for the surround channel may cause confusing echo effects. The surround and sub bass channels must be monitored individually.

MONITORING THE PROCESSOR OUTPUTS OR THE AMPLIFIER OUTPUTS

Press the SOURCE pushbutton to select either the outputs from the sound processor or the outputs from the amplifiers.

Repeatedly pressing the SOURCE button will toggle back and forth between the processor and the amplifier outputs.

MUTING THE MONITOR OUTPUTS

Press the MUTE button to silence the monitor without changing the volume setting. Press the MUTE button a second time to restore the monitor output to normal.

(The monitor can also be muted by turning the volume down to zero, but in this case the volume must be turned up again to restore the previous listening level).

CX230EX INSTALLATION

CONNECTING THE SOUND PROCESSOR OUTPUTS.

NOTE: For non-biamped installations, the left channel should be connected to the LL input , the centre channel to the CL input and right channel to the RL input.

1. SOUND PROCESSOR WITH UNBALANCED OUTPUTS (DOLBY, SMART, ULTRA STEREO)

Use two-core shielded audio cable to connect the outputs from the sound processor to the monitor "from processor" inputs.

Connect the "+" terminal from each sound processor output to the "+" terminal of each corresponding monitor "From Processor" input.

Connect the ground terminal of each processor output to the "-" terminal of each corresponding monitor "From Processor" input.

Connect the cable shield to the "E" terminal of each monitor "from processor" input only. Do not connect the shields at the sound processor.

2. SOUND PROCESSOR WITH BALANCED OUTPUTS (PANASTEREO)

Use two-core shielded audio cable to connect the outputs from the sound processor to the monitor "From Processor" inputs.

Connect the "+" terminal from each sound processor output to the "+" terminal of each corresponding monitor "From Processor" input.

Connect the "-" terminal of each processor output to the "-" terminal of each corresponding monitor "from processor" input.

Connect the cable shield to the "E" terminal of each monitor "from processor" input only. Do not connect the shields at the sound processor.

CONNECTING THE AMPLIFIER OUTPUTS.

NOTE: For non-biamped installations, the left channel should be connected to the LL input , the centre channel to the CL input and right channel to the RL input.

Use light gauge unshielded cable for this purpose.

Connect the "+" (Red) terminal of each amplifier output to the "+" terminal of each corresponding monitor "From Amplifier" input.

Connect the "-" (Black) terminal of each amplifier to the "-" terminal of each corresponding monitor "From Amplifier" input.

NOTE: DO NOT USE A SINGLE GROUND CONNECTION BETWEEN THE AMPLIFIERS AND THE MONITOR OR CONNECT THE "-" (BLACK) TERMINALS OF THE AMPLIFIERS TOGETHER. SUCH CONNECTIONS MAY CAUSE CROSSTALK, UNPREDICTABLE AMPLIFIER BEHAVIOUR OR DAMAGE TO WIRING.

CX230EX INSTALLATION con't

CONNECTING THE MONITOR SPEAKER OUTPUTS

Use medium gauge (minimum 0.75mm2) twin polarised wire (figure 8) between each of the monitor speaker outputs and the monitor speakers. The monitor speakers can be 8 or 4 ohms.

If you are using only one speaker, connect it to the left channel output and set the "MONO/STEREO" switch at the back of the monitor unit to the "MONO" position. Otherwise ensure that the "MONO/STEREO" switch is in the "STEREO" position.

CONNECTING THE SERIAL INTERFACE TO A COMPUTER AUTOMATION SYSTEM.

Use 4-core shielded computer or audio cable. The CX230EX is configured as a DCE device (Data Circuit Terminating Equipment), i.e. pin 2 = transmit data out and pin 3 = receive data in. Connect one conductor to pin 2 , one to pin 3 and one conductor to pin 5 (ground). The fourth conductor can be left unused or also connected to pin 5 (ground). Solder the cable shield to the body of the D-connector plug.

If the connection is to a DTE device (Data Terminal Equipment) such as a PC or the Panalogic RC140 automation unit, the cable should be wired pin-for-pin (i.e. pin 2 to pin 2, pin 3 to pin 3, and pin 5 to pin 5). If the connection is to another DCE device, pins 2 and 3 must be crossed over (reversed) at one end.

SETTING THE OPTIONS WITH THE VIRTUAL DIP SWITCHES

The CX230EX has a number of options which may be accessed using the following method:

Press and hold the "MIX" button for at least 2 seconds. The bargraph display will change to show a red bar at the extreme right. At the extreme left of the bargraph display the first 4 green LEDs indicate which options are set. To change an option, press the corresponding button to toggle the LED on or off. For example the far left button "LEFT" will toggle the first green LED (option 1). The next button "CENTRE" will toggle the second green LED (option 2) etc.

The available options are as follows:

Option 1 (LED 1) – Select 1.5 dB per division resolution for the bargraph meter. (Normal resolution is 3dB per division).

Option 2 (LED 2) – Defeat compressor. The MIX compressor is bypassed at all times.

Option 3 (LED 3) – Defeat biamp mode. Pressing the LEFT, CENTRE or RIGHT buttons always selects only the LF input.

Option 4 (LED 4) – Disable selection of processor inputs. The "SOURCE" button is locked in "AMPS" mode. "PROC" cannot be selected.

To exit the DIP switch mode press and hold the "MIX" button for at least 2 seconds. The red bar at the right of the bar graph will disappear to indicate normal meter mode.

SYSTEM ALIGNMENT

After installation it is necessary to adjust each of the input levels of the monitor to ensure correct balance between each input and to calibrate the auditorium sound level meter.   Alignment is best performed at the same time as the sound processor B-Chain alignment to avoid duplication.

Equipment required: Pink Noise Card, Real Time Analyser (RTA)

ALIGNMENT OF NON-BIAMPED SYSTEMS

1. Insert a pink noise card into the appropriate slot in the sound processor.

2. Set the sound processor to Optical Stereo and set the volume to level "7" for a pink noise level of 85db in the auditorium.

3. Select the pink noise generator to **CENTRE**.

4. Turn off the Sub Bass amplifier.

5. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

6. Select the "SOURCE" switch to "AMPS", and select "CENTRE".

7. Adjust the "AMPLIFIERS - CL" trimpot so that the CX230EX sound level meter reads 85db.

8. Select the "SOURCE" switch to "PROC".

9. Adjust the "Processor - CL" trimpot so that the CX230EX sound level meter reads 85db.

10. Turn off the Centre channel amplifier and turn on the Sub Bass amplifier.

11. Note the SPL reading on the RTA.

12. Select the "SOURCE" switch to "AMPS", and select "SUB BASS".

13. Adjust the "AMPLIFIERS - SW" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

14. Select the "SOURCE" switch to "PROC".

15. Adjust the "Processor - SW" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

16. Turn on the Centre Channel amplifier.

17. Select the pink noise generator to **LEFT**.

18. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

19. Select the "SOURCE" switch to "AMPS", and select "LEFT".

20. Adjust the "AMPLIFIERS - LL" trimpot so that the CX230EX sound level meter reads 85db.

21. Select the "SOURCE" switch to "PROC".

22. Adjust the "Processor - LL" trimpot on the monitor so that the CX230EX sound level meter reads 85db.

23. Select the pink noise generator to **RIGHT**.

24. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

25. Select the "SOURCE" switch to "AMPS", and select "RIGHT".

26. Adjust the "AMPLIFIERS - RL" trimpot so that the CX230EX sound level meter reads 85db.

27. Select the "SOURCE" switch to "PROC".

28. Adjust the "Processor - RL" trimpot so that the CX230EX sound level meter reads 85db.

29. Select the pink noise generator to **LEFT SURROUND**.

30. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

31. Select the "SOURCE" switch to "AMPS", and select "LEFT SURROUND".

32. Adjust the "AMPLIFIERS - LS" trimpot so that the CX230EX sound level meter reads 85db.

33. Select the "SOURCE" switch to "PROC".

34. Adjust the "Processor - LS" trimpot so that the CX230EX sound level meter reads 85db.

35. Select the pink noise generator to **RIGHT SURROUND**.

36. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

37. Select the "SOURCE" switch to "AMPS", and select "RIGHT SURROUND".

38. Adjust the "AMPLIFIERS - RS" trimpot so that the CX230EX sound level meter reads 85db.

39. Select the "SOURCE" switch to "PROC".

40. Adjust the "Processor - RS" trimpot so that the CX230EX sound level meter reads 85db.

The CX230EX alignment is now complete.

ALIGNMENT OF BIAMPED SYSTEMS

1. Insert a pink noise card into the appropriate slot in the sound processor.

2. Set the sound processor volume to level "7" for a pink noise level of 85db in the auditorium.

3. Select the pink noise generator to **CENTRE**.

4. Turn off the Sub Bass amplifier.

5. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

6. Turn off the Centre channel low frequency amplifier and note the SPL reading on the RTA.

7. Select the "SOURCE" switch to "AMPS", and select "CENTRE HF" by pressing the "CENTRE" pushbutton twice. Only the "HF" LED above the CENTRE pushbutton should be illuminated.

8. Adjust the "AMPLIFIERS - CH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

9. Select the "SOURCE" switch to "PROC".

10. Adjust the "PROCESSOR - CH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

11. Turn off the Centre channel high frequency amplifier and turn on the Centre channel low frequency amplifier. Note the SPL reading on the RTA.

12. Select the "SOURCE" switch to "AMPS", and select "CENTRE LF" by pressing the "CENTRE" pushbutton once. Only the "LF" LED above the CENTRE pushbutton should be illuminated.

13. Adjust the "AMPLIFIERS - CL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

14. Select the "SOURCE" switch to "PROC".

15. Adjust the "PROCESSOR - CL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

16. Switch on the Centre channel high frequency amplifier and check the reading on the CX230EX sound level meter. It should be 85dB.

17. Turn off both the Centre HF and LF amplifiers and turn on the Sub Bass amplifier.

18. Note the SPL reading on the RTA.

19. Select the "SOURCE" switch to "AMPS", and select "SUB BASS".

20. Adjust the "AMPLIFIERS - SW" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

21. Select the "SOURCE" switch to "PROC".

22. Adjust the "Processor - SW" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

23. Turn on the Centre HF and LF amplifiers.

24. Select the pink noise card to **LEFT**.

25. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

26. Turn off the Left channel low frequency amplifier and note the SPL reading on the RTA.

27. Select the "SOURCE" switch to "AMPS", and select "LEFT HF" by pressing the "LEFT" pushbutton twice. Only the "HF" LED above the LEFT pushbutton should be illuminated.

28. Adjust the "AMPLIFIERS - LH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

29. Select the "SOURCE" switch to "PROC".

30. Adjust the "PROCESSOR - LH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

31. Turn off the Left channel high frequency amplifier and turn on the Left channel low frequency amplifier. Note the SPL reading on the RTA.

32. Select the "SOURCE" switch to "AMPS", and select "LEFT LF" by pressing the "LEFT" pushbutton once. Only the "LF" LED above the LEFT pushbutton should be illuminated.

33. Adjust the "AMPLIFIERS - LL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

34. Select the "SOURCE" switch to "PROC".

35. Adjust the "PROCESSOR - LL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

36. Switch on the Left channel high frequency amplifier and check the reading on the CX230EX sound level meter. It should be 85dB.

37. Select the pink noise card to **RIGHT**.

38. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

39. Turn off the Right channel low frequency amplifier and note the SPL reading on the RTA.

40. Select the "SOURCE" switch to "AMPS", and select "RIGHT HF" by pressing the "RIGHT" pushbutton twice. Only the "HF" LED above the RIGHT pushbutton should be illuminated.

41. Adjust the "AMPLIFIERS - RH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

42. Select the "SOURCE" switch to "PROC".

43. Adjust the "PROCESSOR - RH" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

44. Turn off the Right channel high frequency amplifier and turn on the Right channel low frequency amplifier. Note the SPL reading on the RTA.

45. Select the "SOURCE" switch to "AMPS", and select "RIGHT LF" by pressing the "RIGHT" pushbutton once. Only the "LF" LED above the RIGHT pushbutton should be illuminated.

46. Adjust the "AMPLIFIERS - RL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

47. Select the "SOURCE" switch to "PROC".

48. Adjust the "PROCESSOR - RL" trimpot so that the CX230EX sound level meter reads the same as the SPL reading on the RTA.

49. Switch on the Right channel high frequency amplifier and check the reading on the CX230EX sound level meter. It should be 85dB.

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41. Select the pink noise generator to **LEFT SURROUND**.

42. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

43. Select the "SOURCE" switch to "AMPS", and select "LEFT SURROUND".

44. Adjust the "AMPLIFIERS - LS" trimpot so that the CX230EX sound level meter reads 85db.

45. Select the "SOURCE" switch to "PROC".

46. Adjust the "Processor - LS" trimpot so that the CX230EX sound level meter reads 85db.

47. Select the pink noise generator to **RIGHT SURROUND**.

48. Check the SPL reading on the RTA. It should be 85dB. If not, check the B-Chain alignment of the sound processor.

49. Select the "SOURCE" switch to "AMPS", and select "RIGHT SURROUND".

50. Adjust the "AMPLIFIERS - RS" trimpot so that the CX230EX sound level meter reads 85db.

51. Select the "SOURCE" switch to "PROC".

52. Adjust the "Processor - RS" trimpot so that the CX230EX sound level meter reads 85db.

The CX230EX alignment is now complete.

REFERENCE DATA

Serial Interface Protocol Description

The CX230EX is equipped with a standard RS232 serial communications port using a 9 pin D-sub connector. The data format is fixed and is in the following format:
One start bit, eight data bits, one stop bit, no parity, 9600 baud.

Command String Format

"Input select" and "volume set" commands are constructed using a seven character ASCII string. Commands start with a **colon** followed by a **four character command** terminated with a **carriage return**, and a **line feed** character which are also valid if they occur in reverse order. (This is to allow compatibility with languages that do not provide easy control of the order of these characters). The "request to send A-D level" command is a single character "ambersand" (&). When a "Request to send A-D level" command is received the CX230EX will respond with a seven byte string as described in "Response String" below.

When the CX230EX detects a command start character (a colon), a timer is started and if the rest of the command including the end characters (CR/LF) is not received within 200mS then the serial port is ignored until another valid start character is seen. If the command is unknown, then it is ignored.

The seven characters in the command string each serve the following functions:
The **first** character is a **colon** and is the start character
The **second to fifth** characters represent the function command which is a mnemonic style command derived from the function to be performed.
The **sixth and seventh** characters are a carriage return and a line feed character.

Input Select Commands:

MLEF	Select Left Channel HF and LF monitor inputs
MLHF	Select Left Channel HF monitor input
MLLF	Select Left Channel LF monitor input
MCEN	Select Centre Channel HF and LF monitor inputs
MCHF	Select Centre Channel HF monitor input
MCLF	Select Centre Channel LF monitor input
MRIG	Select Right Channel HF and LF monitor inputs
MRHF	Select Right Channel HF monitor input
MRLF	Select Right Channel LF monitor input
MLSU	Select Left Surround Channel monitor input
MCSU	Select Centre (EX) Surround Channel monitor input
MRSU	Select Right Surround Channel monitor input
MSUB	Select Sub-Bass Channel monitor input

MMIX	Select Mix
MAMP	Select Amplifier Inputs
MPRO	Select Processor Inputs
MMUT	Select Mute

Set Volume Commands:

MVxx   Set volume to xx, where xx is a number from "00" to "99".

Sample Command Strings:

Select Mix: (ASCII) **:MMIX^M^J** (Hex) **3A 4D 4D 49 58 0D 0A**

Set Volume to "45": (ASCII) **:MV45^M^J** (Hex) **3A 4D 56 34 35 0D 0A**

RESPONSE STRING (From firmware version 2.10)

The seven bytes in the response string each serve the following functions:

BYTE 1 - is an ASCII **Colon** character and is the start character.
BYTE 2 - is the **A to D value** low byte (0-255).
BYTE 3 - is the **A to D value** high byte (0-255).
BYTE 4 - gives the **Monitor Status** according to **Table 1** below.
BYTE 5 - gives the **Monitor Status** according to **Table 2** below.
BYTE 6 - is the current **Monitor Volume** (0-99).
BYTE 7 - is an ASCII **Carriage Return** character.

TABLE 1 – MONITOR STATUS A (Byte 4)

BIT 0 - LEFT INPUT SELECTED (BIT SET)
BIT 1 - CENTRE INPUT SELECTED (BIT SET)
BIT 2 - RIGHT INPUT SELECTED (BIT SET)
BIT 3 - LEFT SURROUND INPUT SELECTED (BIT SET)
BIT 4 - RIGHT SURROUND INPUT SELECTED (BIT SET)
BIT 5 - BACK SURROUND INPUT SELECTED (BIT SET)
BIT 6 - SUB BASS INPUT SELECTED (BIT SET)
BIT 7 - SOURCE (CLEAR = AMPS, SET = PROCESSOR)

TABLE 2 – MONITOR STATUS B (Byte 5)

BIT 0 - LEFT HI INPUT SELECTED (BIT SET)
BIT 1 - LEFT LO INPUT SELECTED (BIT SET)
BIT 2 - CENTRE HI INPUT SELECTED (BIT SET)
BIT 3 - CENTRE LO INPUT SELECTED (BIT SET)
BIT 4 - RIGHT HI INPUT SELECTED (BIT SET)
BIT 5 - RIGHT LO INPUT SELECTED (BIT SET)
BIT 6 - AUX INPUT SELECTED (BIT SET)
BIT 7 - MUTE (CLEAR = OFF, SET = ON)