Film-Tech

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6.0 KT-41 Solar Cell Preamplifier

6.1 Introduction

The KT-41 Solar Cell Preamplifier provides necessary signal gain for film sound tracks to permit processing by the Kintek system, which does not require a split solar cell. One KT-41 is necessary for each solar cell. A split solar cell is used to decode SVA (Dolby) Prints with an SVA processor.

6.2 Front and Rear Panels

Refer to Figure 6.1. Front Panel of the KT-41.

1. Cell Current Control. This trimmer adjusts the current for the solar cell and provides for simple level matching between projectors.

2. CW, OK, and CCW LEDs. These indicators show whether the cell current control is at the proper level or needs to be moved clockwise or counterclockwise.

3. TPI. This test point is used for measuring the output level.

4. Slit Loss Correction. Use this control for high-frequency compensation.

Refer to Figure 6.2. Rear Panel of the KT-41.

1. 3-Pin Connector. When purchased with the KT-30S, the KT-41 comes with 30 feet of cable to run between the projector and this connector.

2. 5-Pin Connector. When purchased with the KT-30S, the KT-41 comes with a cable already wired to the other components. Follow the procedures in Section 6.0 for other installations.

6.3 Specifications

Cell Current	1 microamperes to 300 microamperes. 10 microamperes to 100 microamperes, typical.
Slit Loss Correction	0 dB to +10 dB. Normally set at 0 dB.
Output Impedance	1000 ohms, resistive.
Output Level	Approximately 1 dBm (869 mV RMS) from an 80% modulated 1-kHz test loop for cell bias currents of 5 microamperes to 300 microamperes.
Power Requirements	± 12 VDC to ± 15 VDC, dual regulated, 1% ripple at 20 mA.
Dimensions	1" H X 4 1/2" W X 4" D. (25.4 mm H X 114.3 mm W X 101.6 mm D.)
Weight	5 ounces. (141.8 grams.)

Kintek products are manufactured under one or more of the following U.S. patents: 3,681,618; 3,714,462; 3,789,143; 4,101,849; 4,097,767.

Other patents pending.

6.4 Installation

6.4.1 Unpacking and Mounting

Remove the unit carefully from its shipping carton. The KT-41 was carefully inspected and tested at the factory. Contact your dealer in the event of any problems. We suggest saving the shipping carton and packing materials for safely transporting the unit in the future. The KT-41 can be easily mounted on an equipment rack.

6.4.2 Precautions

When locating any electronic equipment near heat sources, provide adequate clearance for ventilation. Excessive heat shortens the life of any electronic component. Avoid high humidity and water.

Mounting electronic equipment and connecting cables as far as possible from motors and large power transformers lessens the possibility of 60-Hz hum being heard in the system.

6.4.3 Connections

When the KT-41 is ordered with the KT-30S system, the 5-pin connector is already wired to the other components. The 3-pin connector plugs into the solar cell. No electronic components, like capacitors and resistors, should be used between the solar cell and the preamplifier.

Use the wiring code below for other installations or to add a KT-41 to an existing KT-30S system. On the rear panel of the KT-41, the following connections are made:

3-pin connector

	Wire (Belden 8451 or similar)
Pin 1 and 3 are ground	black/dark green
Pin 2 is the input high side from the solar cell	red (+)

5-pin connector

	Wire (Belden 8723 or similar)	KT-30S Rack
Pin 1 is output low	black (-)	TB2 pin 1
Pin 2 is output high	red (+)	TB2 pin 2
Pin 3 is ground	grey	TB1 pin 2
Pin 4 is -12 VDC to -15 VDC	white	TB1 pin 3
Pin 5 is +12 VDC to +15 VDC	bright green	TB1 pin 1

TB1 = Small Terminal Block

TB2 = Large Terminal Block

6.5 Operation

Refer to Section 1.5.1 for the full alignment procedure.

6.5.1 System Alignment

For the full alignment procedure the following equipment is required:

Spectrum Analyzer (a 1/3-octave analyzer is preferable).

SPL Meter (may be part of the analyzer, but a hand-held unit permits easy checking of sound levels at various locations in the auditorium).

Multimeter.

Pink-Noise Film (such as Dolby Cat. 69).

SMPTE Buzz Track.

Academy Print (other than trailers).

Kintek A Chain

1. Before installing the Kintek system, check the existing system. Using a loop of SMPTE buzz track, adjust the lateral guide roller for minimum high and low frequency tones. Perform this step on all projectors. Shut power amplifiers and system off.

2. Install the Kintek system. Refer to the procedure in Section 1.4.3.

3. Check the polarity of the solar cell wiring.

KT-41:

Pins 1 and 3 : ground

Pin 2 : +

For split cells, refer to the stereo variable area (SVA) processor manual for wiring information.

4. Install new exciter lamps. Break the old ones. Run new lamps at about 80% of rated voltage to prolong their usefulness and reduce filament sag.

5. Turn on the Kintek system and exciter lamps. Leave the KT-100 Power Amplifiers and KT-90 Subwoofer off.

6. While the system is warming up, place the controls in the following positions:

KT-24: Low-frequency control, full counter-clockwise (ccw).
Surround-level control, to "5."
Surround output limit (rear), full ccw.

KT-21: Expansion control, far left (minimum).
Enhance button, pushed in.
High-frequency control (rear), 12 o'clock position (on units without an "A" after the serial number, leave the control at the full ccw position).

KT-22: Operate button, pushed in.

KT-41: Both preamplifier slit-loss controls, full ccw.

7. MAKE CERTAIN THERE IS NO FILM IN THE LIGHT PATH AND THE EXCITER LAMP VOLTAGE IS SET AT 80% OF RATED LAMP VOLTAGE BEFORE PROCEEDING.

8. With the exciter lamp on, adjust the cell current control on the KT-41 so the "OK" LED illuminates.

9. Once the "OK" LED is on, a voltage of 3.42 VDC $\pm$ 10% should be measured between the test point (TPI) and ground. With a pink-noise loop running, a voltage of 0.35 V RMS should be measured. Please note: when film is in the light path, the solar cell is not correctly connected, or the solar cell is inoperable, the "CCW" LED lights. (In older units, the "CW" LED lights.)

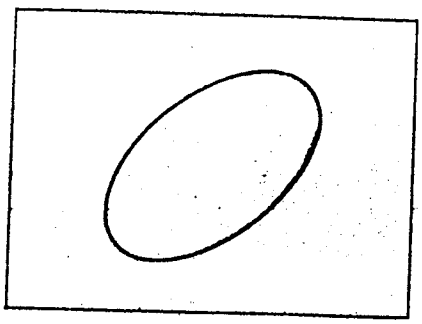
10. Connect the spectrum analyzer to TPI of one of the preamplifiers and place a loop of pink-noise film in the appropriate projector. Important: the emulsion should be facing away from the screen as it runs through the projector.

11. Examine the slit lens. Replace it with a new one if it is larger than 1 mil. Loosen the clamp so the slit lens moves freely. Run the pink-noise loop. While observing the display on the analyzer, focus the slit lens by moving it in and out to obtain the maximum level of high frequencies. Adjust the lens azimuth with slight back-and-forth turns to gain the best high-frequency response.

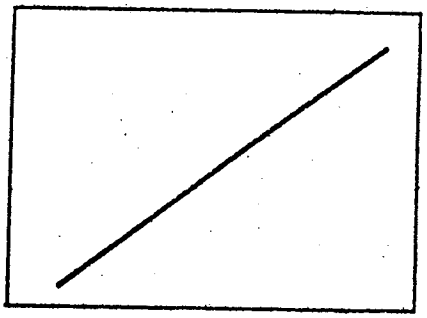
12. Tighten the clamp only enough to hold the slit lens in place. Over tightening distorts lens elements.

Follow Steps a to f if a split cell is used.

a. If the projector uses a split solar cell required for stereo processors, connect a dual trace oscilloscope, set in the XY mode, to the left and right preamplifier test points in the processor. Adjust the slit lens focus as described in Step 11 while observing the oscillscope trace for the azimuth adjustment. Adjust for the straightest 45° line possible. Tighten the lens clamp.



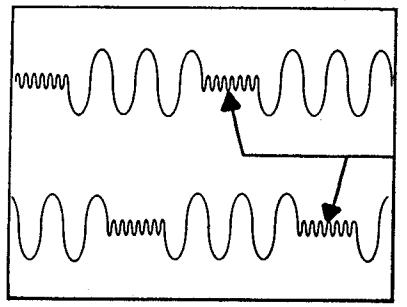
Wrong



Correct

b. Remove the pink-noise loop and replace it with a left-right cell adjustment film loop such as Dolby Cat. 97.

c. Place the scope in the dual-trace mode and run the film. Loosen the cell and adjust the lateral position of the cell for a minimum of cross talk.



Adjust for an equal minimum.

d. If the split cell is used with a stereo system designed to decode Dolby encoded optical sound tracks, lace up and run the Dolby-tone side of the Cat. 69 film loop.

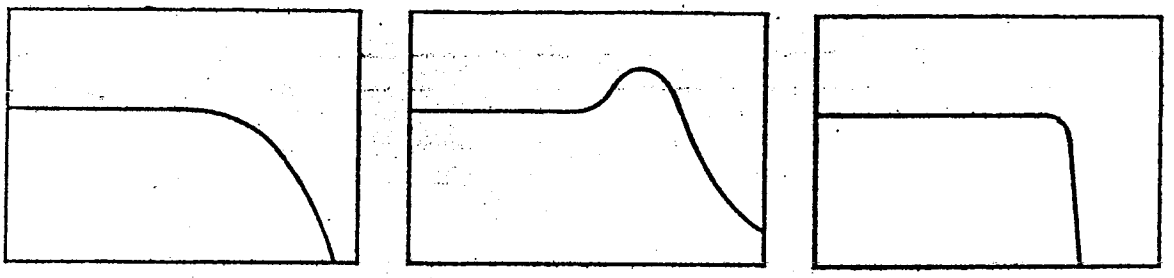
e. Adjust the left and right Dolby level calibration controls within the stereo processor so that the needles on Dolby meters are at the center of the dot. Other manufacturers use different means of accomplishing this Dolby level calibration. Consult their manuals.

f. Check to see if the left and right cells are properly connected to their left and right preamplifiers by inserting a business card in front of the slit lens. Observe the two meters. The right channel should drop first. Correct and recalibrate Dolby levels if necessary.

13. Apply a dot of red nail polish to the top outer edge of the lateral-guide-roller adjustment knob to indicate the correct position.

14. Lace up and roll the pink-noise loop.

15. With the analyzer connected to one of the test points on the preamplifiers, adjust the slit loss correction on the KT-41 to extend the high-frequency response as far as possible out to 10 kHz. No portion of the curve should be above the flat (0 dB) line.



Start Wrong Correct

Follow Step a if a split cell is used.

a. If a stereo processor with its stereo preamplifiers are also being used, connect the analyzer to the left and right test points and adjust the left and right slit loss correction controls as required for the similar result as shown in the drawings, but extending the high-frequency response to 12 kHz.

16. Repeat the previous steps and set up the remaining projectors. If the KT-26 SVA interface unit is used, the bypass levels on the Dolby

preamplifier must be balanced. Refer to section 11.5.1 at this point.

END OF KINTEK A CHAIN ADJUSTMENT.

6.6 Theory of Operation

6.6.1 Flow Chart

6.6.2 Schematic and Board Layouts

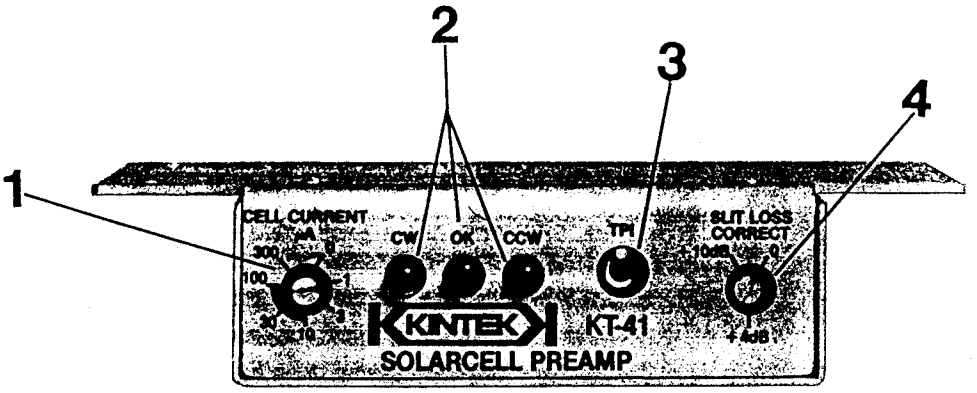


Figure 6.1. Front Panel of the KT-41.

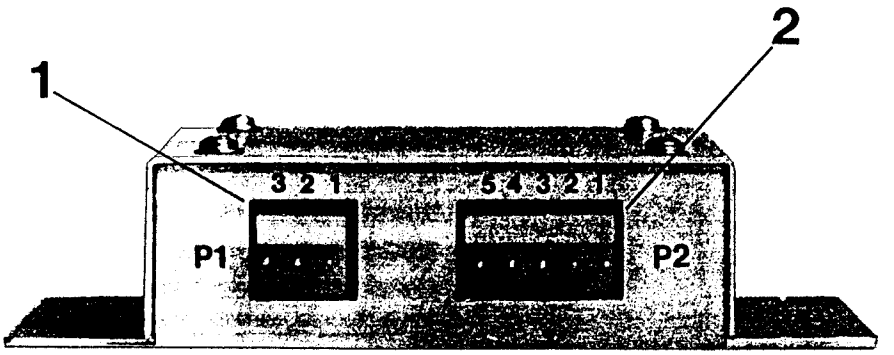


Figure 6.2. Rear Panel of the KT-41.

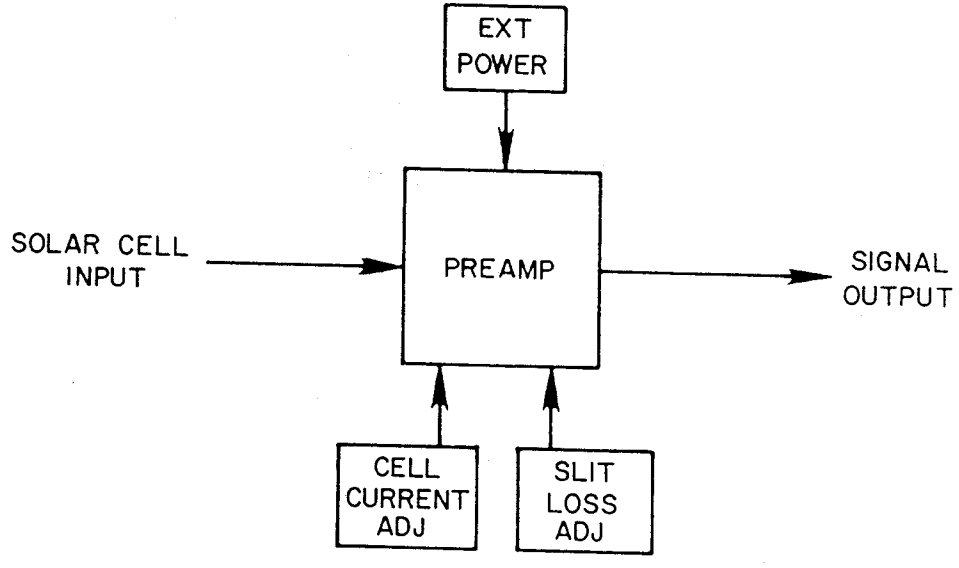
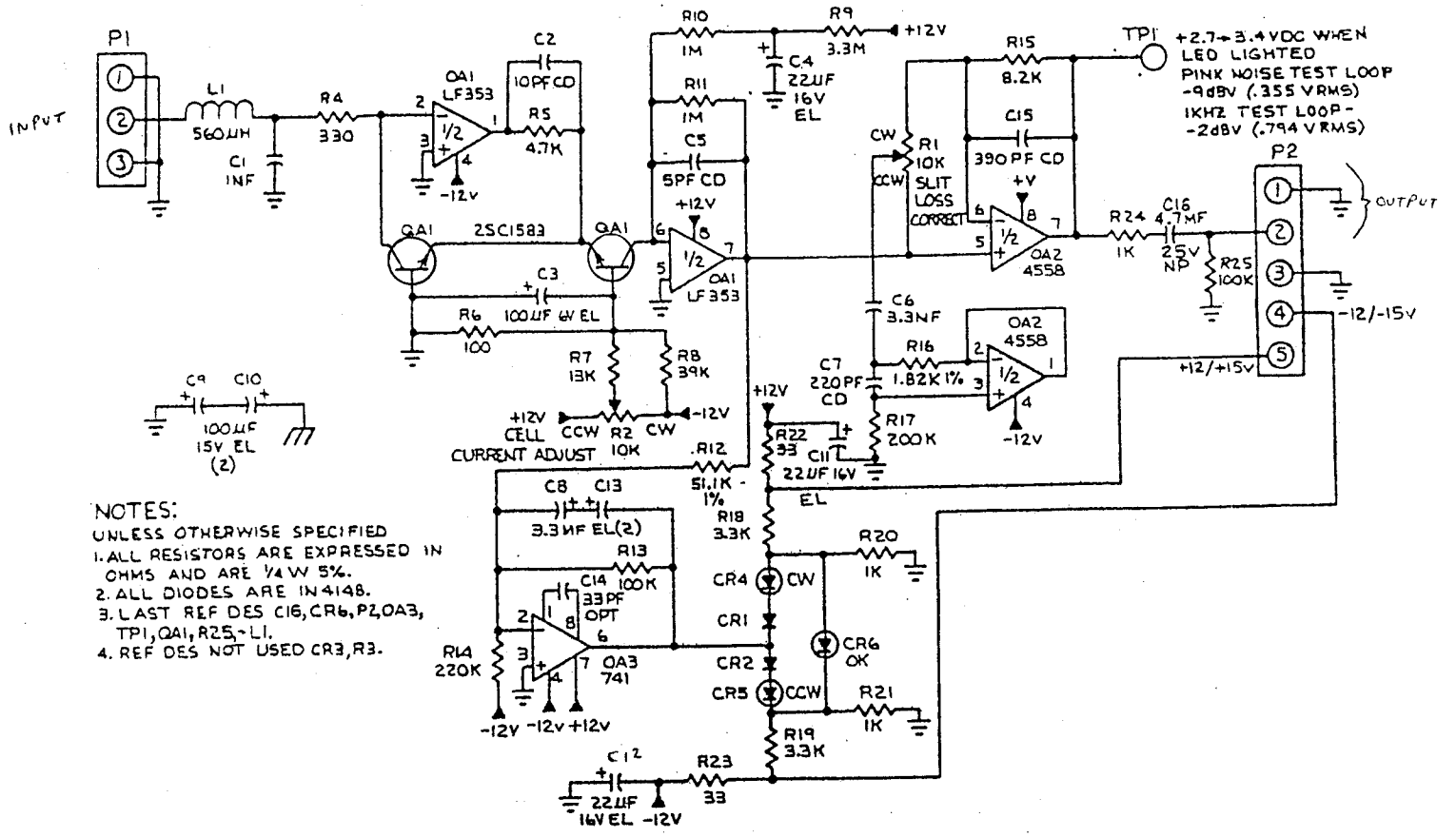


FIGURE 6.3. FLOW CHART OF THE KT-41.



NOTES:
UNLESS OTHERWISE SPECIFIED
1. ALL RESISTORS ARE EXPRESSED IN OHMS AND ARE ¼W 5%.
2. ALL DIODES ARE IN4148.
3. LAST REF DES C16, CR6, P2, OA3, TP1, QA1, R25, L1.
4. REF DES NOT USED CR3, R3.

FIGURE 6.4
SCHEMATIC OF THE KT-41

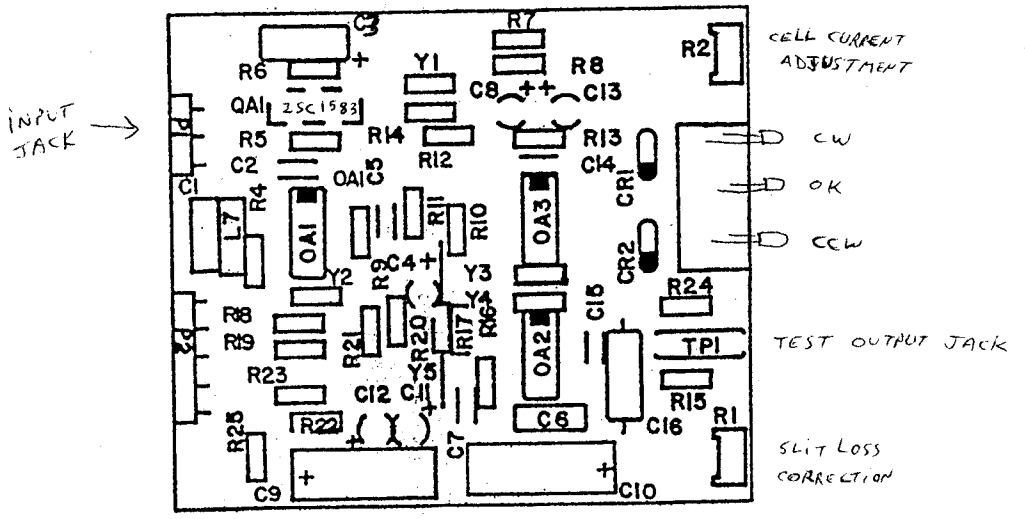


FIGURE 6.5
BOARD LAYOUT OF THE KT-41