

Instruction Manual

MANLM101070C

REV. D0202

LM-101 LIGHT MONITOR



eddyco.com

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TABLE OF CONTENTS

GENERAL INFORMATION:

Basic Description	1
Limited Warranty	2
Unpacking/User Responsibility	3
Operator Safety	4

DESCRIPTION AND SPECIFICATIONS:

Front Panel Description	5
Rear Panel Description	6
LM-101 Specifications	7

INSTALLATION:

Initial Startup	8
Initial Operation Checkout	8

CALIBRATION PARAMETERS:

Recorder Output	9
Acc. Output Calibration	9
Output Offset Calibration	9
Electronic Zero	9
Meter Calibration	9
Source Light Voltage Adjustment	10
Filter Phase Adjustment	10
Filter Tuning Procedure	10
IR Power Supply	10
IR Detector Adjustment	10

ENGINEERING DRAWINGS:

Complete Schematic SChLM1010001	A
Main Board Layout LM101ASY060B	B
IR Power Supply SCHLM1010004	C
IR Power Supply Layout LM101ASY0004	D
Monochromator SCHLM101MR05	E
IR Detector Amp SCHLM101CRO	F
SI Detector SCHLMC10072B	G
PMT 101-102	H

BASIC DESCRIPTION

The LM-101 Optical Monitor provides the optimum in economical deposition control using optical parameters. Automatic phase locking and zeroing simplify operation. Digital offset and 10 to 1 scale expansion provide unparalleled resolution. Visible and IR range are available. Available options include monochromators and PMT detectors from 180 nm to 850 nm with internal stable power sources and preamplifiers.

LIMITED WARRANTY

This LM-101 Light Monitor is warranted against defects in materials and workmanship for a period of one year from the date of shipment to the original purchaser. This warranty will be void if the instrument is not properly operated under conditions of normal use and if normal and accepted maintenance protocols are not performed.

Defects resulting from, or repairs necessitated by, improper installation, misuse, negligence, accident or corrosion of the equipment or any cause other than defective materials or workmanship are not covered by this warranty. No other warranties are expressed or implied, including but not limited to the implied warranties of merchantability and fitness for a particular purpose. EDDY Company is not liable for consequential damages resulting from the use of its equipment.

Purchaser's sole and exclusive remedy under the above warranty is limited to EDDY Company, at its option, repairing or replacing any item which proves to be defective during the warranty period provided the item is returned to EDDY Company together with a written statement of the problem encountered. Any such obligation on the seller's part is subject to the following requirements: 1) defect must be promptly reported to the seller, 2) if so advised by the seller, component must be returned to the seller, no later than seven (7) days after the end of the warranty period, and 3) on examination by the seller the part or component must be found to comply with the above warranty. Any item claimed to be defective during the warranty period must be returned to the builder with the transportation charges prepaid. Return trip transportation charges will be paid by the purchaser. In the event that the seller elects to refund the purchase price, the instrument shall be the property of the seller and shall be promptly shipped back to the seller at the seller's expense. EDDY Company reserves the sole right to determine whether service is covered by the warranty.

If there are any questions about any of the equipment, parts or service call EDDY Company. For all repairs, whether or not they are covered by the warranty, first call EDDY Company service line or our Internet address.

Phone number: 760-961-8457

Internet:

www.eddyco.com

If the equipment needs to be returned for any reason you will be given a Return Material Authorization (RMA) number.

UNPACKING

1. Completely unpack the instrument. Your LM-101 was released to the carrier in good condition and properly packed. It is essential to examine the contents of the shipment to ensure that no damage occurred during transit.
2. Compare the shipped materials to the packing list. Items included with your LM-101 are:
 - a. LM-101 Light Monitor
 - b. Operation and service manual
 - c. Power cord
 - d. Installation kit: Strip chart recorder cable; 1 – 2 amp SB fuse; 1 – 6 amp SB fuse.
3. Call EDDY Company first if there are any problems.

Phone: 760-961-8457

FAX: 760-961-8458

USER RESPONSIBILITY

This equipment will perform in accordance with the instructions and information contained in the user's manual when the equipment is installed, operated, and maintained in compliance with the instructions. Equipment should be checked periodically, routine maintenance performed, and broken or non-working parts replaced immediately.

The user/purchaser shall have sole responsibility for any malfunctions resulting from their improper use or lack of maintenance of the equipment.

OPERATOR SAFETY

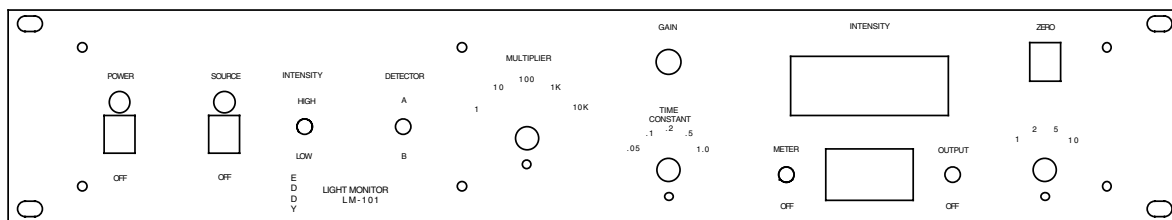
DANGER:

Potentially lethal voltages may exist within this unit, even with the power shut off. Only qualified personnel should attempt service. Failure to observe all safety precautions may result in personal injury.

Observe the following precautions when servicing this instrument because of the potential high voltage.

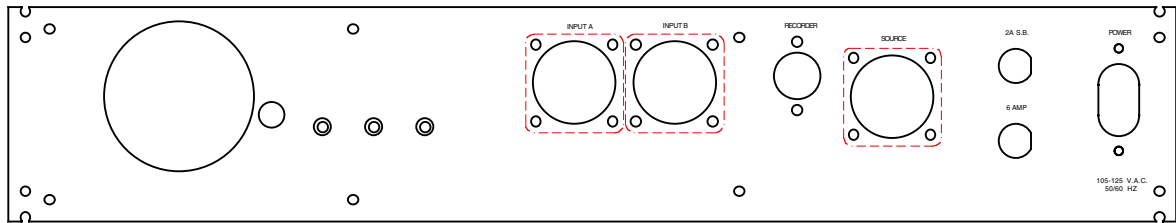
1. Make sure HIGH VOLTAGE WARNING signs are posted in the service area.
2. Remove rings, watches, bracelets, and any other metal jewelry before working around high voltage.
3. DO NOT WORK ALONE.
4. Be sure all equipment is connected to a power source that has the correct polarity and grounding, as prescribed by the local electrical codes.
5. Before servicing equipment be sure it is switched off at the main power switch. This switch should have a lock out feature.
6. Use a grounding hook to discharge any electrical parts that hold a lethal voltage after shutoff. Be sure these parts are discharged before attempting any repairs.
7. Do not touch any high voltage leads unless the power is off and a grounding hook is connected to the parts being serviced.
8. This instruments high-voltage components are equipped with electrical interlocks to protect personnel from injury. DO NOT ATTEMPT TO DEFEAT, OVERRIDE, OR BYPASS THESE PROTECTIVE DEVICES.
9. Never leave loose ends on high voltage devices.

FRONT PANEL



- POWER ON:** Turns on power to unit.
Red LED indicates power supplies are functional.
- SOURCE:** Turns on lamp power supply and IR Detector power supply.
Green LED indicates source lamp and power supply are working.
- INTENSITY:** Selects one of two pre-set power settings for the lamp.
Low 10.5 volts - 2000 hours life
High 11.5 volts - 100 hours life
- DETECTOR:** In the up position this connects input A to monitor; down connects input B to the monitor.
- MULTIPLIER:** Decade gain switch for establishing optimal range.
- GAIN:** Fine gain adjustment. The gain has a ten turn potentiometer with gain from 10% to 100%.
- TIME CONSTANT:** Adjusts the dynamic response of the units in seconds.
- INTENSITY:** 3 1/2 digit linear display of light intensity.
- OFFSET:** Shifts zero reference of light reading signal.
- METER SWITCH:** In the up position it connects offset signal to digital display, reducing the reading by the amount of the offset.
- OUTPUT SWITCH:** In the up position subtracts offset switch to recorder output.
- ZERO:** Press to block light path and electronically zero unit.
- RECORDER EXPANDER:** Multiplies intensity signal by the factor selected (scale expansion).

REAR PANEL



INPUT A: Connects detector to monitor and provides preamp and gain changing power.

INPUT B: Connects detector to monitor and provides preamp and gain changing power.

RECORDER: Provides 0 – 100 mv DC output signal proportional to display reading. It may be changed to give 0-10 mv, 0-1 to 0-10V by changing 1 internal resistor.

SOURCE: Provides lamp, chopper, beam flag, and sync power.

FUSE 1: Primary fuse power.

FUSE 2: Lamp power fuse.

POWER: 3 prong 105-125 VAC 50/60 HZ power input.

LM-101 LIGHT MONITOR SPECIFICATIONS

CABINET:	3 1/2" X 19" X 9" deep
WEIGHT:	18 lbs.
SHIPPING WEIGHT:	22 lbs.
AC INPUT VOLTAGE RANGE:	105 – 125 VAC 50/60 Hz, 2 amps.
LINEARITY:	Better than .05%
LAMP STABILITY:	Voltage 0.1 % if input power is 105 – 125 VAC Voltage 0.05%/C degrees of environmental temperature.
COMPENSATION RANGE (gain):	5 times + ten-turn vernier potentiometer.
RECORDER OUTPUT:	100 mv with expansion of 1x, 2x, 5x, and 10x.

DETECTORS

VISIBLE: detector	UV enhanced, selected low noise silicon and preamp. Range is 350 –1100 nm.
INFRARED	PBS detector with a range of 1000 to 3000 nm. Includes a low noise power supply retrofitted in the Light Monitor. + 47.5 VDC - 47.5 VDC
SOURCE POWER:	10.5/11.5 VDC regulated to + - .01%

INITIAL STARTUP

1. Read the manual.
2. Connect all shipped parts.
3. After reading the manual, establish that all the connected instruments are working properly.

INITIAL OPERATION CHECKOUT

1. Mount the Source and the Detector on a vibration free support.
2. Connect the Source to the Monitor and the Detector to INPUT A.
3. Position all toggles switches down, all selector switches CCW and set OFFSET to zero.
4. Turn on the power.
5. Red LED will light up and indicate power is on.
6. Turn on the SOURCE (up).
7. Green LED will light indicating the lamp and power supply are operating.
8. Place Detector switch in the A position.
9. Press ZERO and hold down. The light path will be blocked and the INTENSITY reading will electronically zero.
10. Increase the MULTIPLIER (coarse adjustment) and the GAIN (fine adjustment) to get the desired reading.
11. Block the beam and note the rate of INTENSITY reading change.
12. Set the maximum time constant (1).
13. Block the beam and note a slower response.
14. Set OFFSET to the same value as the INTENSITY reading.
15. With METER switch up the INTENSITY signal should be near zero.

RECORDER OUTPUT

1. Connect the recorder to RECORDER jack on the LM-101.
2. Set recorder for 100 mv full scale.
3. Turn on LM-101 and set GAIN to give a 1000 reading.
4. Adjust the recorder to read full scale.
5. Reduce the GAIN to give a reading of 50 on the display.
6. Change RECORDER EXPANDER setting and note the reading is multiplied by the setting selected..
7. Return RECORDER EXPANDER to "1" and change the GAIN to give approximately a 550 reading.
8. Set OFFSET to 500 and turn on the OUTPUT (switch up), note the RECORDER reading will be decreased by the value selected in the offset pot.

ACC. OUTPUT CALIBRATION

1. Connect DVM to ACC. pin 2.
2. With the METER offset on, the RECORDER EXPANDER at 2, and the OFFSET at 000, adjust R67 to give zero output.

OUTPUT OFFSET CALIBRATION

1. Connect the DVM to IC-7 pin 6.
2. Set the OFFSET to 000 and the METER offset on.
3. Adjust R51 to give zero reading.
4. Set the OFFSET to 1000 and adjust R49 to give 10.00v reading.

ELECTRONIC ZERO

1. METER offset on.
2. Connect DVM to IC-8 pin 6
3. Press ZERO and adjust R31 to give zero output.
4. While holding ZERO in, adjust the PANEL meter pot, (right side behind front bezel), to give 000 reading.

METER CALIBRATION

1. With no signal, check the INTENSITY meter for 000 reading.
2. Dial 1000 in the OFFSET pot and turn on METER offset.
3. Adjust R53 to give 1000 reading.
4. Turn off the OFFSET switch and check for zero reading.

SOURCE LIGHT VOLTAGE ADJUSTMENT

1. Connect DVM from the common of R57 and R58 to the common of R16 and R62. This will give the source light's voltage.
2. Connect the source to the monitor, set the INTENSITY to High and adjust R59 for the desired voltage (factory value 11.5V). Change the INTENSITY to Low and adjust R60 for the desired voltage (factory value 10.5V).

FILTER PHASE ADJUSTMENT

1. Connect the scope to the center terminal of T5.
2. Adjust the source and detector to give about 1000 signal on the INTENSITY meter.
3. Vary the settings of R28 and R29 to give the highest signal.
4. Remove the case on the source and bend the bracket to give the best-rectified sine wave.
5. Readjust R28 and R29 for maximum signal.

FILTER TUNING PROCEDURE

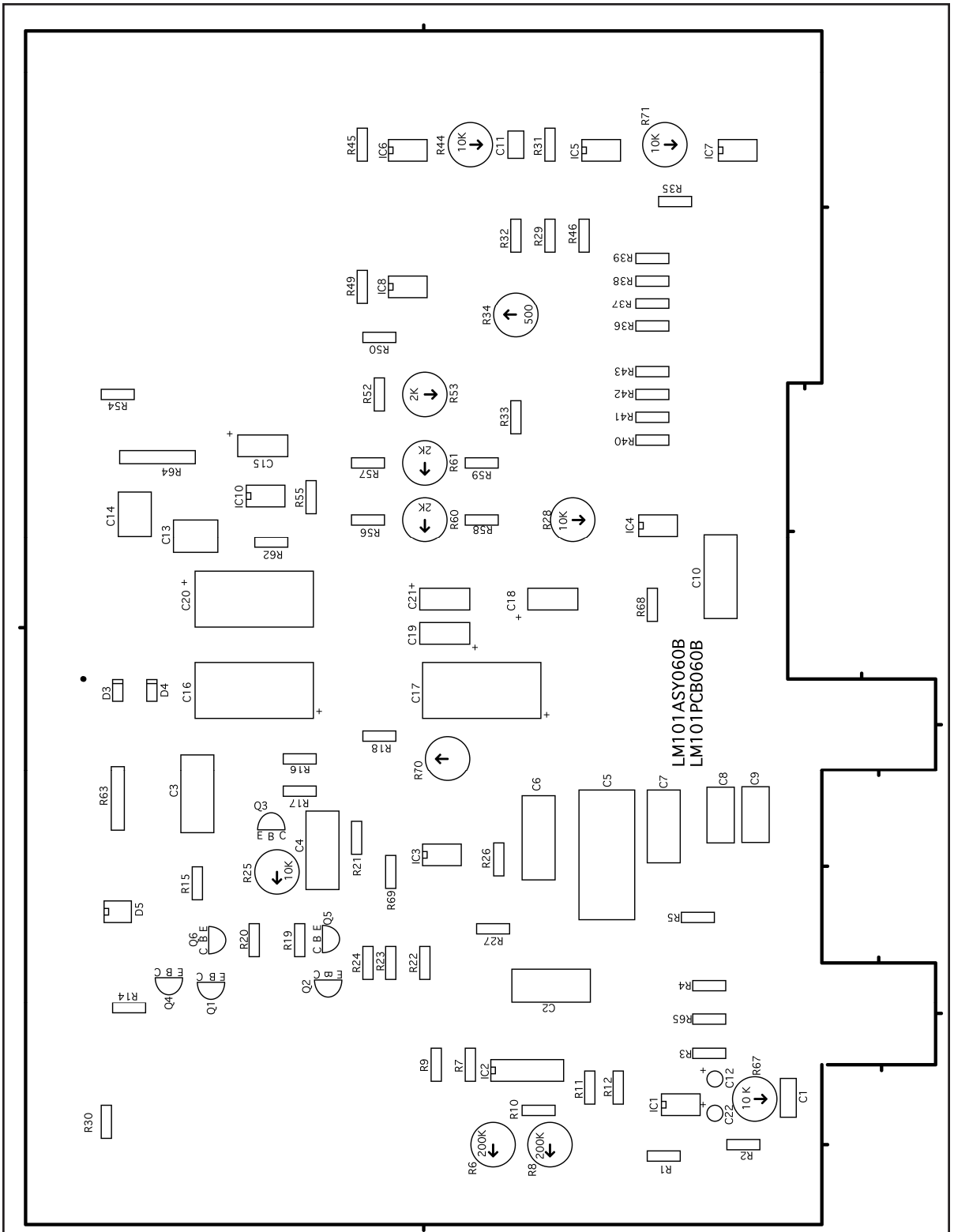
1. Connect the scope to IC2 output.
2. Adjust R29 and R10 to give the maximum signal (200 Hz sine wave).
3. Connect the scope to the center tap of T1 and "bend" the sync board on the source to give the "best" rectified sine wave.
4. Fine-tune this sine wave with R9 and R10.

IR POWER SUPPLY

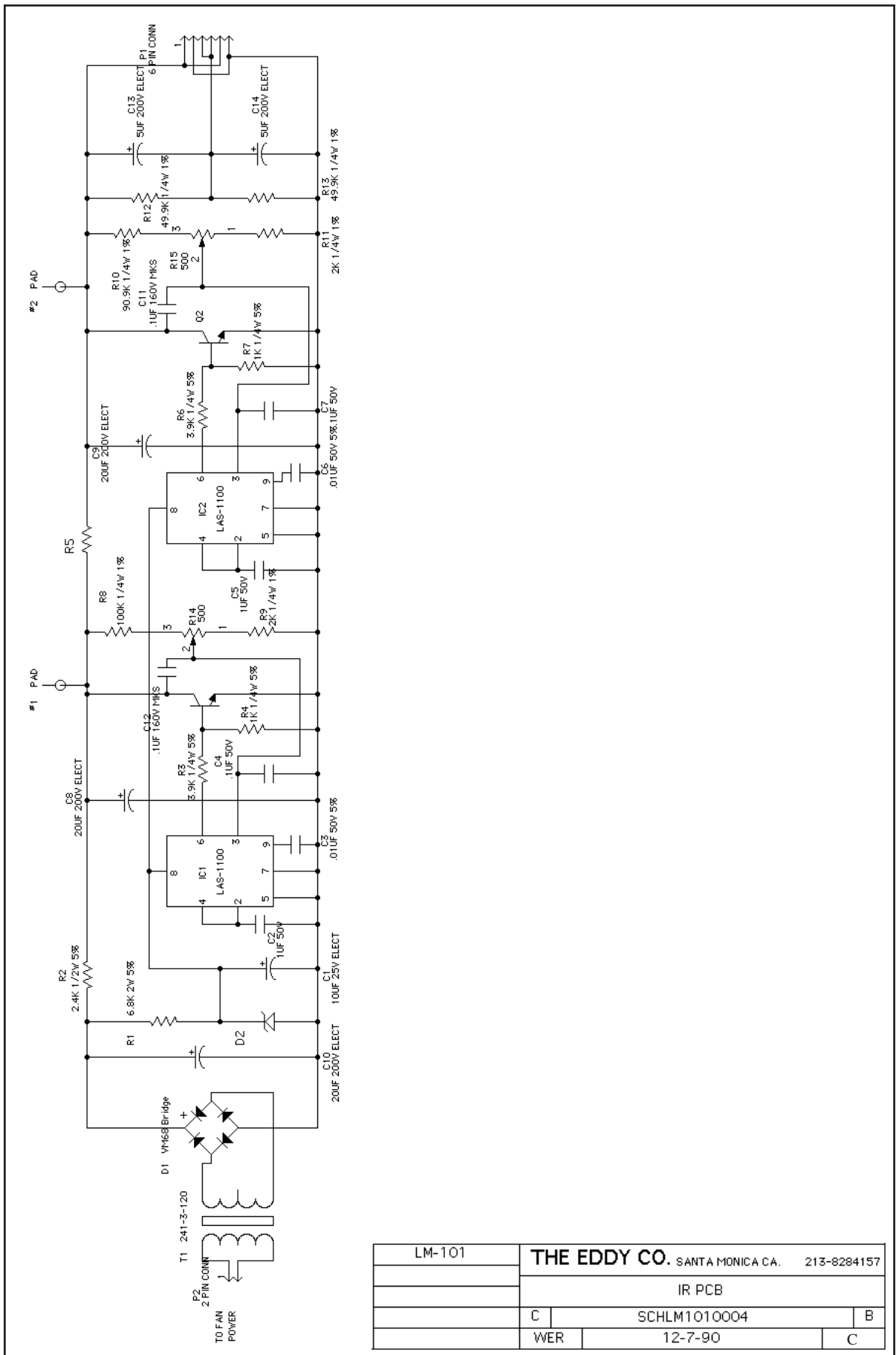
1. Turn on the POWER and then the SOURCE switch of the LM-101.
2. Set R5 on the IR board to give maximum voltage across C10.
3. Set R12 to give 95.0 volts across C10.
4. Set R5 to give 108.0 volts across C10.
5. Set R15 to make + an - voltage out equal (about 47.5 volts).

IR DETECTOR ADJUST

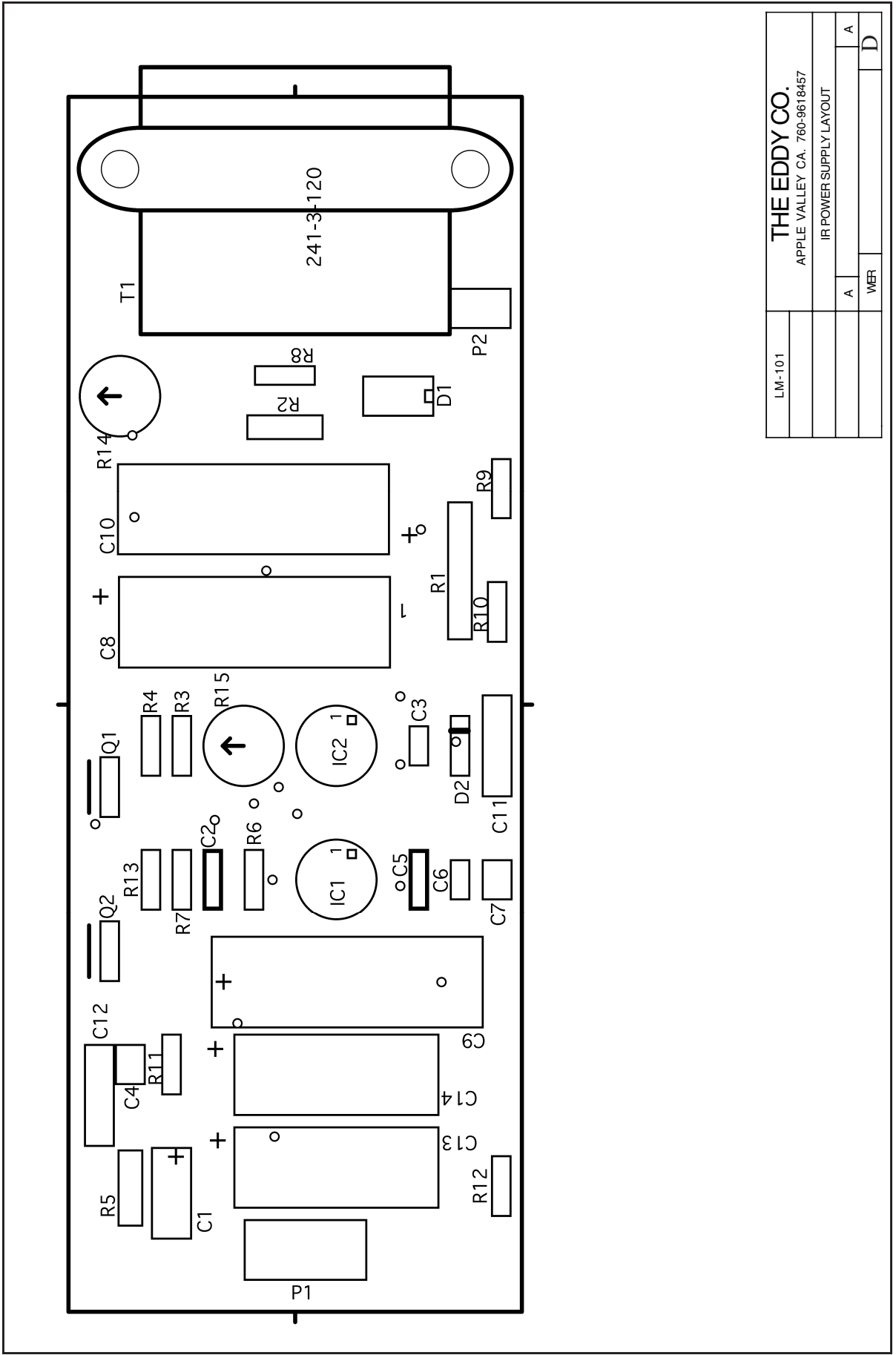
1. Turn power on.
2. Block all light from the detector.
3. Set LM-101 GAIN to 1000.
4. Adjust R41 to give zero voltage out.
5. With normal signal into the detector, adjust R5 to give zero voltage at junction of C3, R5, and the detector.



LM-101		THE EDDY CO.	
		APPLE VALLEY CA. 760-9618457	
MAIN BOARD			
A	LM101ASY060B		A
WER			B



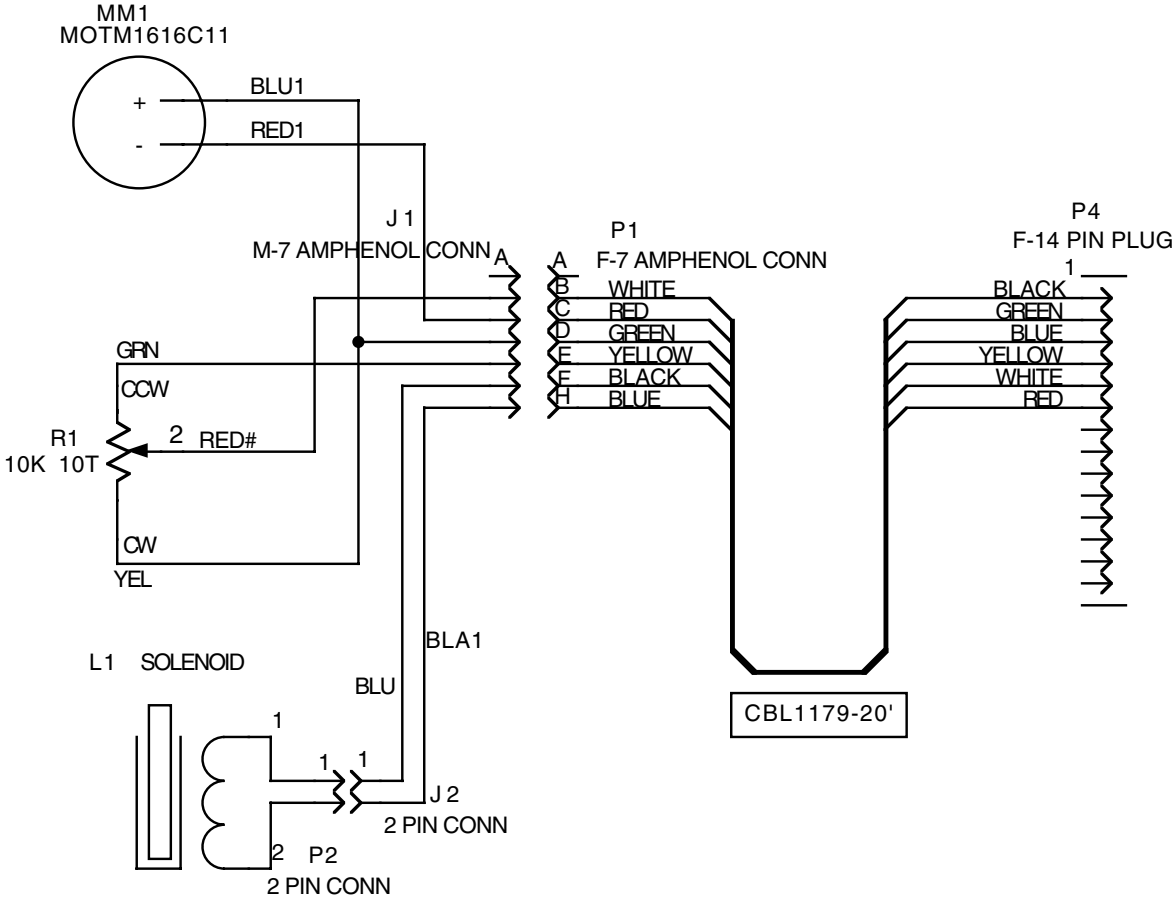
LM-101	THE EDDY CO. SANTA MONICA CA. 213-8284157		
	IR PCB		
C	SCHLM1010004		B
WER	12-7-90		C



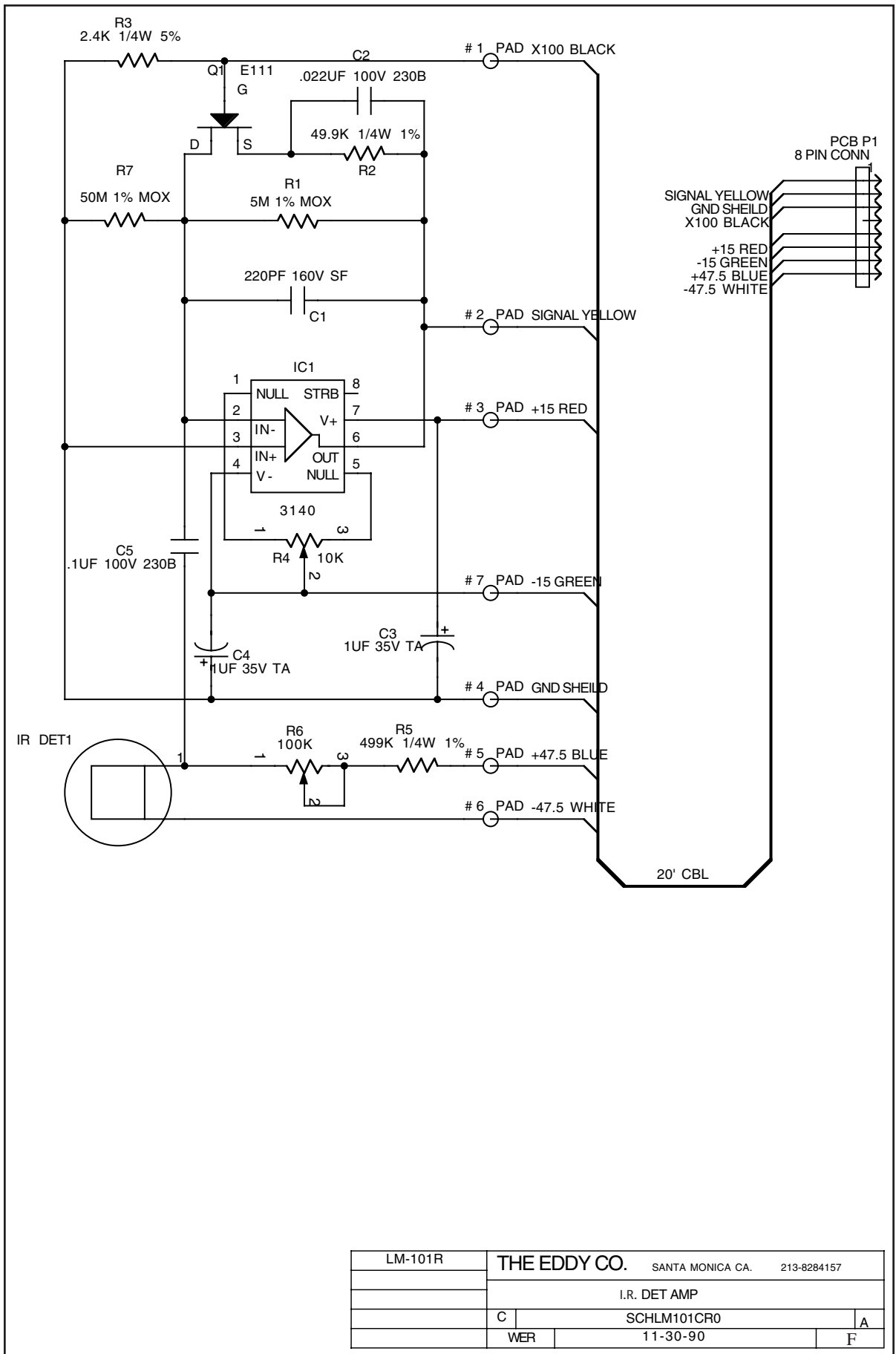
LM-101	THE EDDY CO.		
	APPLE VALLEY CA. 760-9618457		
	IR POWER SUPPLY LAYOUT		
	A		A
	VER		D

LM101SERVI01

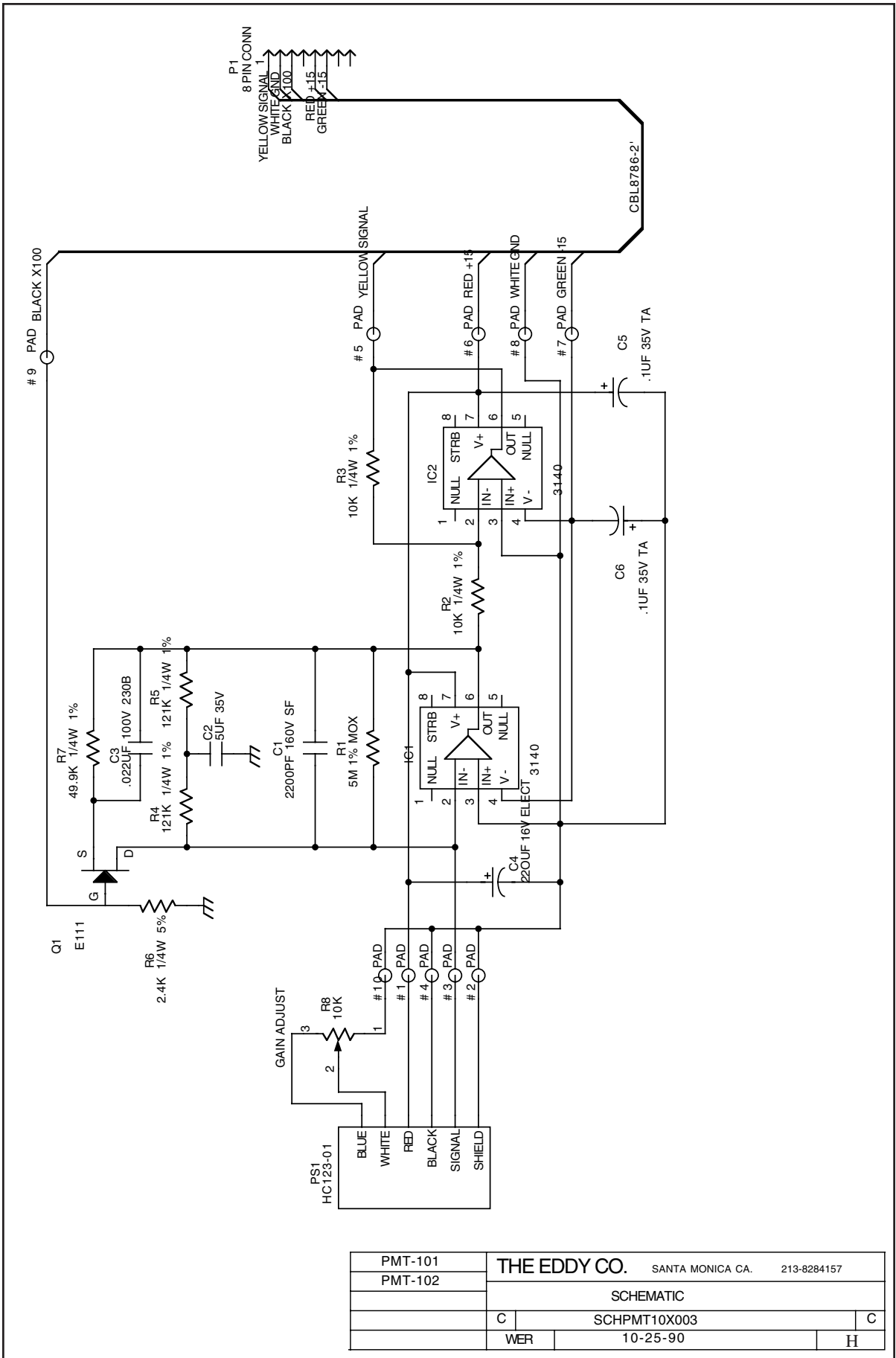
LM101MIQCBL1



ISA MONO	THE EDDY CO.		APPLE VALLEY CA. 92308
	A	SCHLM101MR05	F
		10/6/00	E



LM-101R	THE EDDY CO. SANTA MONICA CA. 213-8284157		
	I.R. DET AMP		
C	SCHLM101CR0		A
WER	11-30-90		F



PMT-101	THE EDDY CO. SANTA MONICA CA. 213-8284157	
PMT-102	SCHEMATIC	
C	SCHPMT10X003	C
WER	10-25-90	H