

***GSI LUMONICS***

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# Operating Manual

## Driver Amplifiers A-102 and AX-200

# OPERATING MANUAL

## ***DRIVER AMPLIFIERS A-102 AND AX-200***

### DESCRIPTION:

The A-102 and AX-200 Driver Amplifiers are solid-state variable output impedance amplifiers especially designed to drive all General Scanning's galvanometers.

The variable output impedance capability permits adjusting the response to step changes in the input, and it is useful in minimizing transient distortion. Zero-offset and Gain controls are provided at the front panel of the AX-200.

### SPECIFICATIONS:

Input Range:	$\pm 1$ Vdc
Input Impedance:	50 k (at maximum Gain setting)
Load Impedance:	5-10 ohms
Output Current:	$\pm 1.0$ A
Gain (maximum):	1 A/volt
Frequency Response:	dc to 20 kHz (resistive load)
Step Response:	0.1 A/s (resistive load)
Offset Current Range:	$\pm 1.0$ A
Offset Drift:	0.02% per degree C
Gain Stability:	0.02% per degree C

### OTHER DATA:

	<b><i>A-102</i></b>	<b><i>AX-200</i></b>
Power:	$\pm 15$ Vdc or 18 Vdc	117 Vac 50-60 Hz
	1.2 A	30 Watts
Fuses:	1 A (two)	1 A (three)
Dimensions:	2.5" x 5" approximately	4" H x 9" W x 8" D
Weight:	2.5 oz.	6 lbs.

## OPERATING PROCEDURE:

### ***A-102 DRIVER AMPLIFIER:***

1. Attach the aluminum metal bracket to a suitable heat sink, such as an aluminum sheet 1/16" thick and 6" x 6".
2. Connect a ZERO OFFSET potentiometer, 50 k, across terminal C, D, and J.
3. Connect the scanner across terminals H and K. If the scanner rotation is found opposite from that desired, the polarity of this connection should be reversed.
4. Apply dc power, positive to terminal A, negative to L, with GND to E.
5. Apply input at b, with GND at F.
6. The drive current to the scanner can be monitored from the potential from K to GND. The drive voltage is approximately that from H to GND.

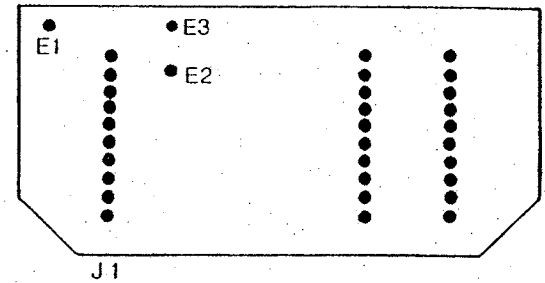
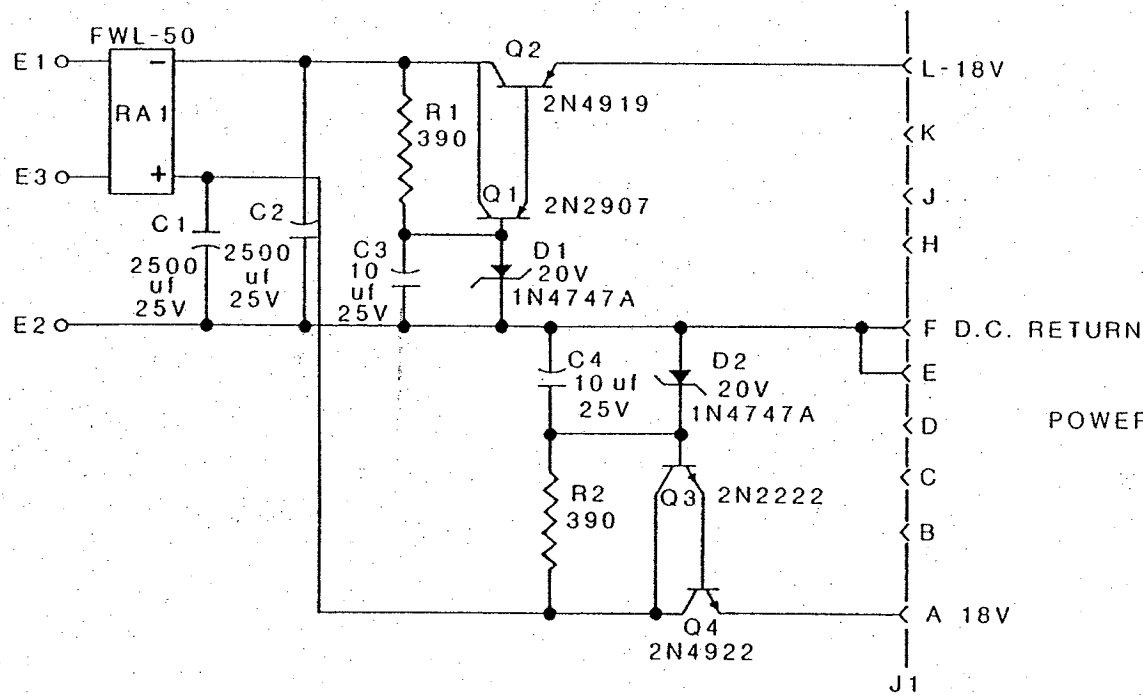
**CAUTION: Do not short either H or K to GND.**

### ***AX-200 DRIVER AMPLIFIER:***

1. Connect scanner to rear microphone connector.
2. Plug power cord into ac line and turn unit ON.
3. Turn the Zero-offset control and verify that the rest position of the scanner can be varied over the full scan range.
4. Apply input drive signal. The required input is determined by the scanner's sensitivity (mA/degree) and the fact that the amplifier produces 1 mA per MV of input. If the scanner rotation is opposite from that desired with respect to the polarity of the input signal, the connections to the scanner should be reversed.
5. See *A-102 Driver Amplifier* Operating Procedure and **CAUTION** for monitoring drive current and voltage at scanner.

## ADJUSTMENTS:

1. **FEEDBACK:** As the schematic of the A-102 shows, voltage sensing is accomplished through an ac coupling capacitor C9. The nominal value of this capacitor is 0.047 MFD. For very fast scanners, the resulting time constant may be too slow to give step response settling to zero error in optimum time. For very slow scanners, the time constant may be too short for the feedback signal to be effective in damping oscillatory transients. In these instances, the value of the capacitor should be reduced or increased accordingly.
2. **SIGNAL CONDITIONING:** When avoiding square wave overshoot is particularly desired, the input signal may be suitably slowed down by connecting a capacitor across pins 2 and 6 (the inverting input and the output) of the operational amplifier. A typical value is 500 pf.

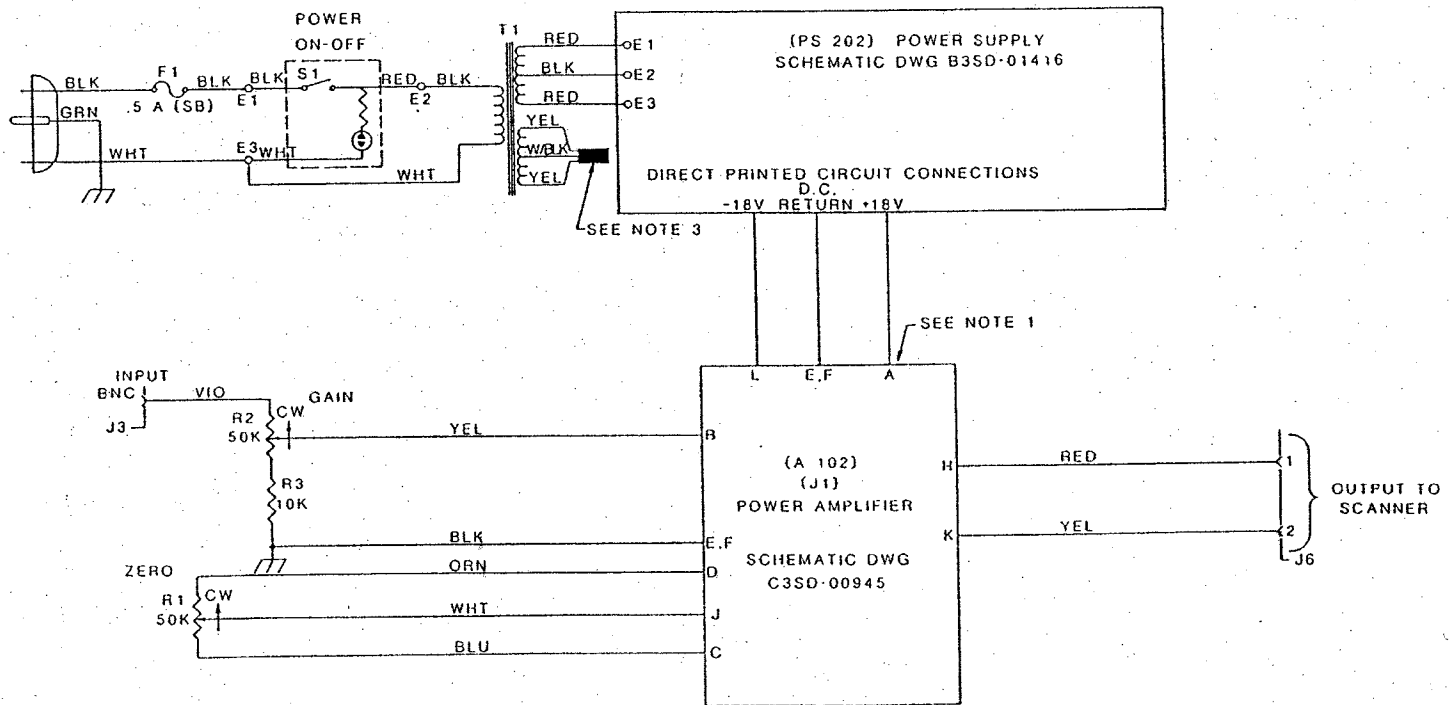


POWER SUPPLY & INTERCONNECT P.C. BOARD  
(VIEWED FROM CIRCUIT SIDE)

NOTE:

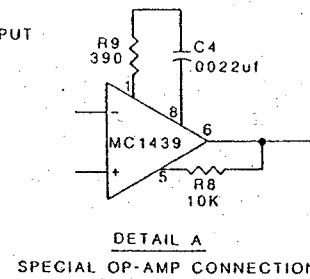
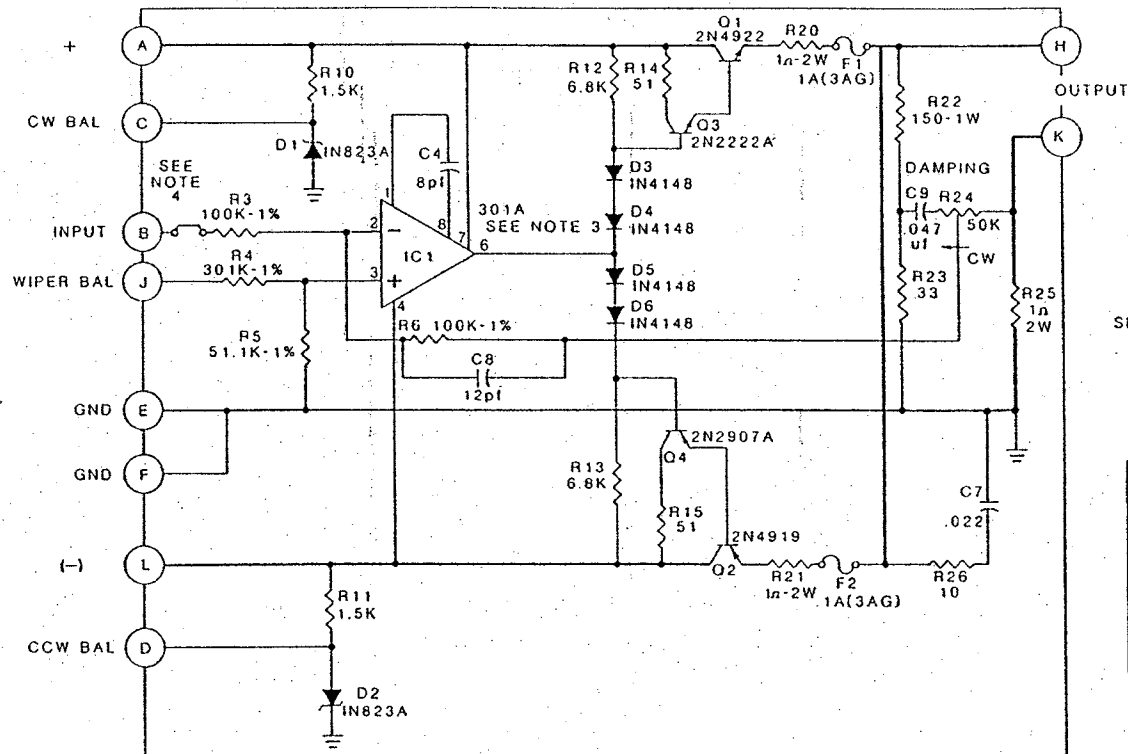
1. REF PC ASSY C311-01415

**Schematic PS202**

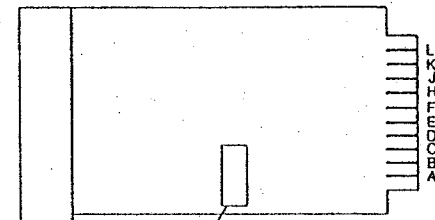


**NOTES:**

1. LETTERS SIGNIFY PIN LETTERS OF J1 WHICH IS PART OF PS 20.
2. UNITS PRIOR TO S/N 2908 WERE WIRED WITH A FUSE (1A) BETWEEN PIN H OF J1 AND PIN 1 OF J2.
3. CUT YEL WIRES & W/BLK WIRE THEN HEAT SHRINK TOGETHER MAKING SURE ALL WIRES ARE ELECTRICALLY ISOLATED FROM EACH OTHER.



DETAIL A  
SPECIAL OP-AMP CONNECTION



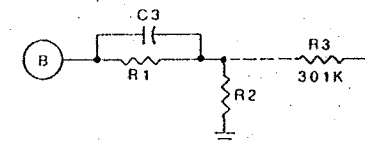
DETAIL B  
A100 CONNECTOR ORIENTATION

**NOTES:**

1. ALL RESISTORS .25 W 5% COMPOSITION UNLESS OTHERWISE SPECIFIED.
2. (A) INDICATES PC EDGE CONTACT SEE DETAIL B.
3. OP-AMP IC1 IS A 301A EXCEPT ON SPECIAL UNITS WHICH REQUIRE AN MC1439. C4 & R8 ONLY USED WITH MC1439. SEE DETAIL A.
4. PC BOARD HAS PROVISION FOR SCANNER FREQUENCY COMPENSATION. SEE DETAIL C.
5. REF PC ASSY C317-00953

**SPECIFICATIONS:**

GAIN: 1 VOLT/AMP  
 OUTPUT:  $\pm 1.0$  AMP MAX  
 SUPPLY:  $\pm 18$ V-1.2 A (RIPPLE REJECTION 40 db).



DETAIL C  
FREQUENCY COMPENSATION

**Schematic-A102 Amplifier**