

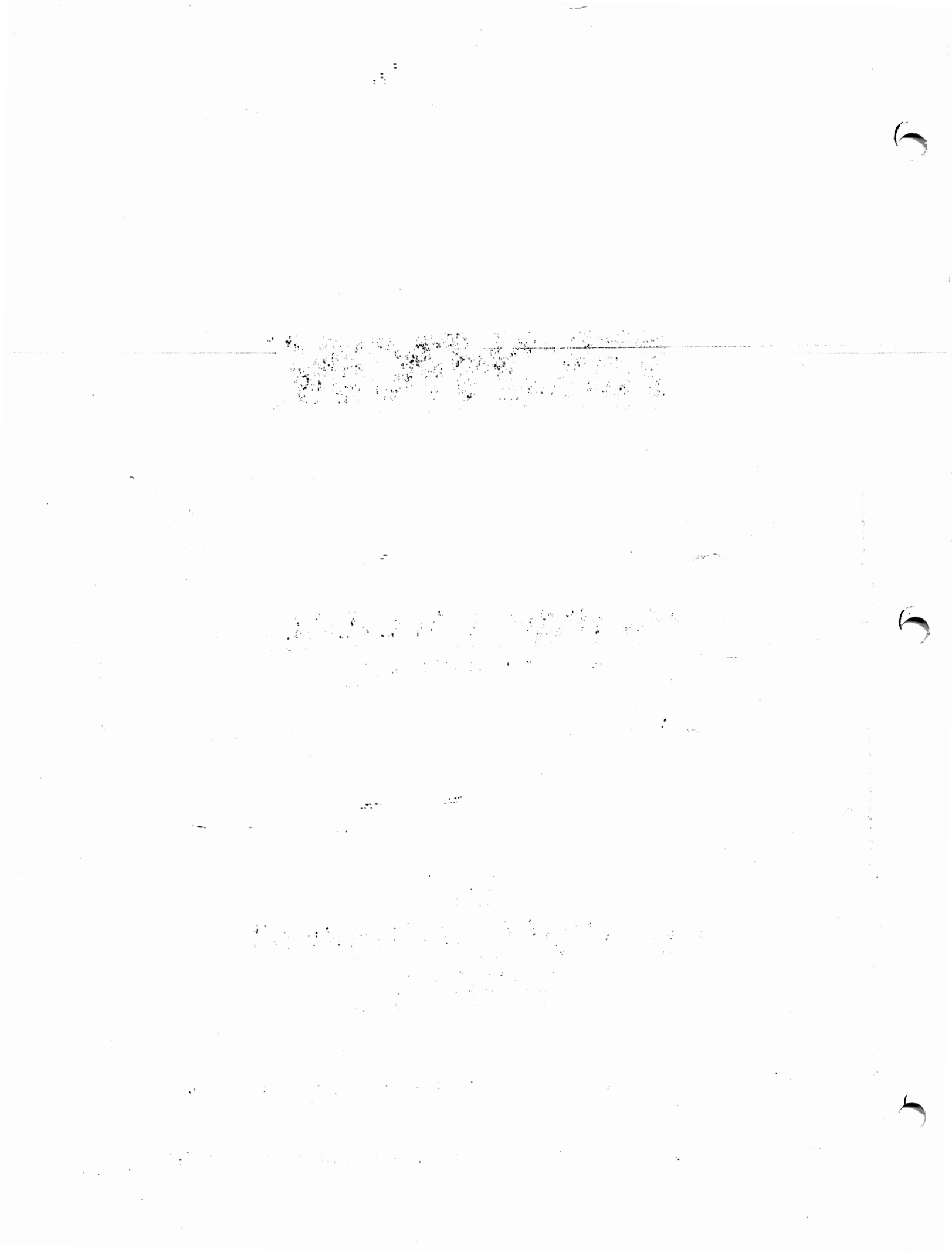
TECHRON.

TECHNICAL MANUAL

Includes Service Information

75A08 CONTROLLED CURRENT MODULE

Techron Division of Crown International, Inc., 1718 W. Mishawaka Road, Elkhart, IN 46517-4095



TECHRON
LIMITED ONE-YEAR WARRANTY

SUMMARY OF WARRANTY

CROWN INTERNATIONAL, INC., 1718 W. Mishawaka Road, Elkhart, Indiana 46517 (Warrantor) warrants to the ORIGINAL COMMERCIAL PURCHASER ONLY of each NEW TECHRON product, for a period of one (1) year from the date of purchase by the original purchaser (warranty period) that the product is free of defects in materials or workmanship and will meet or exceed all advertised specifications for such a product. This warranty does not extend to any subsequent purchaser or user, and automatically terminates upon your sale or other disposition of our product.

ITEMS EXCLUDED FROM WARRANTY

We are not responsible for product failure caused by misuse, accident or neglect. This warranty does not extend to any product on which the serial number has been defaced, altered or removed. It does not cover damage to loads or any other products or accessories resulting from Techron product failure. It does not cover defects or damage caused by your use of unauthorized modifications, accessories, parts, or service.

WHAT WE WILL DO

We will remedy any defect in materials or workmanship by repair, replacement, or refunds. If a refund is elected, then you must make the defective or malfunctioning component available to us free and clear of all liens or other encumbrances. The refund will be equal to the actual purchase price, not including interest, insurance, closing costs, and other finance charges less a reasonable depreciation on the product from the date of original purchase. Warranty work can only be performed at our authorized service centers or at our factory. Expenses in remedying the defect will be borne by Crown, including one way surface freight shipping costs within the United States. (Purchaser must bear the expense of shipping the product between any foreign country and the port of entry in the United States and all taxes, duties, and other custom's fee for such foreign shipments.)

HOW TO OBTAIN WARRANTY SERVICE

You must notify us of your need for warranty service not later than ninety (90) days after expiration of the warranty period. We will give you an authorization to return it to us for service. All components must be shipped in a factory pack or equivalent which, if needed, may be obtained from us for a nominal charge. Corrective actions will be taken within a reasonable time of the date of receipt of the defective product by us. If the repairs made by us are not satisfactory, notify us immediately.

DISCLAIMER OF CONSEQUENTIAL AND INCIDENTAL DAMAGES

YOU ARE NOT ENTITLED TO RECOVER FROM US ANY CONSEQUENTIAL OR INCIDENTAL DAMAGES RESULTING FROM ANY DEFECT IN OUR PRODUCT. THIS INCLUDES ANY DAMAGE TO ANOTHER PRODUCT OR PRODUCTS RESULTING FROM SUCH A DEFECT.

WARRANTY ALTERATIONS

NO PERSON HAS THE AUTHORITY TO ENLARGE, AMEND, OR MODIFY THIS WARRANTY. THE WARRANTY IS NOT EXTENDED BY THE LENGTH OF TIME WHICH YOU ARE DEPRIVED OF THE USE OF THE PRODUCT. REPAIRS AND REPLACEMENT PARTS PROVIDED UNDER THE TERMS OF THIS WARRANTY SHALL CARRY ONLY THE UNEXPIRED PORTION OF THIS WARRANTY.

DESIGN CHANGES

We reserve the right to change the design of any product from time to time without notice and with no obligation to make corresponding changes in products previously manufactured.

LEGAL REMEDIES OF PURCHASER

There is no warranty which extends beyond the terms hereof. This written warranty is given in lieu of any oral or implied warranties not contained herein. WE DISCLAIM ALL IMPLIED WARRANTIES, INCLUDING WITHOUT LIMITATION ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. No action to enforce this Warranty shall be commenced later than ninety (90) days after expiration of the warranty period.

TECHRON division of Crown International, Inc.
1718 W. Mishawaka Road, Elkhart, IN 46517-4095

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1. GENERAL INFORMATION

1.1. Introduction

The 75A08 module adds controlled current capability to TECHRON®* 7520, 7540, or 7550 amplifiers. By adding current control capability, the load current of the amplifier is the programmed output variable instead of the output voltage. This controlled current mode is useful in applications where the magnetic field produced by a coil needs to be proportional to coil current and not voltage.

The 75A08 features an active differential input circuit to avoid ground loops and improve noise immunity. The differential current monitor aides in grounding monitoring equipment.

Precise input level adjustments are made with 25 turn pots. A switch to change operation from controlled current to constant voltage is provided on the back panel to add flexibility to the 75A08. All controls and adjustments are clearly marked for easy identification.

1.2. Specifications

INPUT: Differential input, 20K ohm impedance.

CURRENT MONITOR: 600 ohm balanced. Calibration 1.0 volts per amp differential, 0.5 volts per ampere unbalanced.

NOISE: Absolute noise was measured at 80 uVRMS at the MONITOR output. Referenced to 1V/A RMS, this is well below 1 part in 12,000.

1.3. Service Policies

Due to the sophisticated circuitry of Model 75A08, have only qualified and fully trained technicians perform service work, or return to the factory in original packing for service. Replacement packing is obtainable from TECHRON.

When returning Model 75A08, enclose a brief letter explaining as completely as possible the problem or problems. For any service performed outside the TECHRON factory, read, understand and follow instructions in this manual.

Return authorization is not required before sending a 75A08 to the factory for service.

* TECHRON is a division of CROWN INTERNATIONAL, INC.

REPORT OF THE BOARD OF DIRECTORS

The Board of Directors has the honor to acknowledge the cooperation and assistance of the various departments of the company in the preparation of this report.

The financial statements of the company for the year ended December 31, 1954, have been audited by the independent accountants, Messrs. [Name], who have expressed their opinion thereon in their report.

The Board of Directors has reviewed the financial statements and the report of the independent accountants and has approved them for inclusion in this report.

The Board of Directors has also reviewed the operations of the company for the year and has approved the report of the management thereon.

The Board of Directors has no further information to report.

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REPORT OF THE BOARD OF DIRECTORS

2. INSTALLATION AND OPERATION

The design of the 75A08 permits rapid field installation on a TECHRON 7520, 7540, or 7550 power supply amplifier. The following steps and illustrations will aid in installing the 75A08.

2.1. Installation

1. Turn off the power of the host amplifier.
2. Mount the 75A08 by plugging it into the host amplifier's 11 pin "octal" style socket located on the back of the amplifier.
3. Connect the four wires in the gray cable to the output terminals of the host amplifier. 7550 installation is different than installation on 7520 or 7540. Illustrations 2-1 and 2-2 shows installation on either type of amplifier.
4. Adjust both input controls on the front panel of the host amplifier to the maximum clockwise position.
5. Set the STEREO/MONO switch to the STEREO position.

The 75A08 barrier block has now become the controlled current systems input and output connecting points. Make all connections to the system at the 75A08.

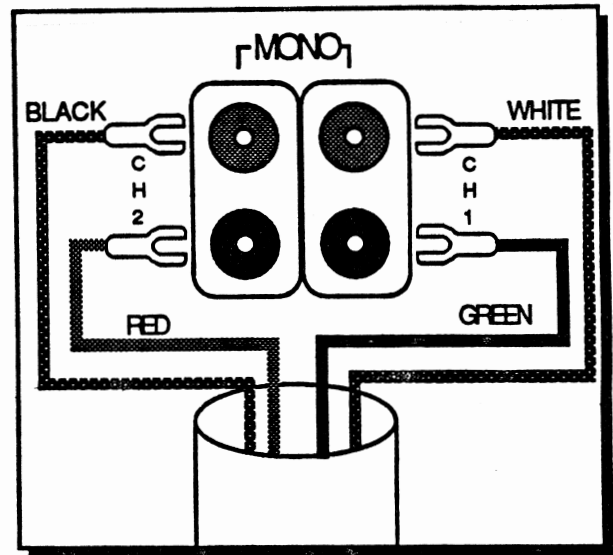


Illustration 2-1 7550 Installation

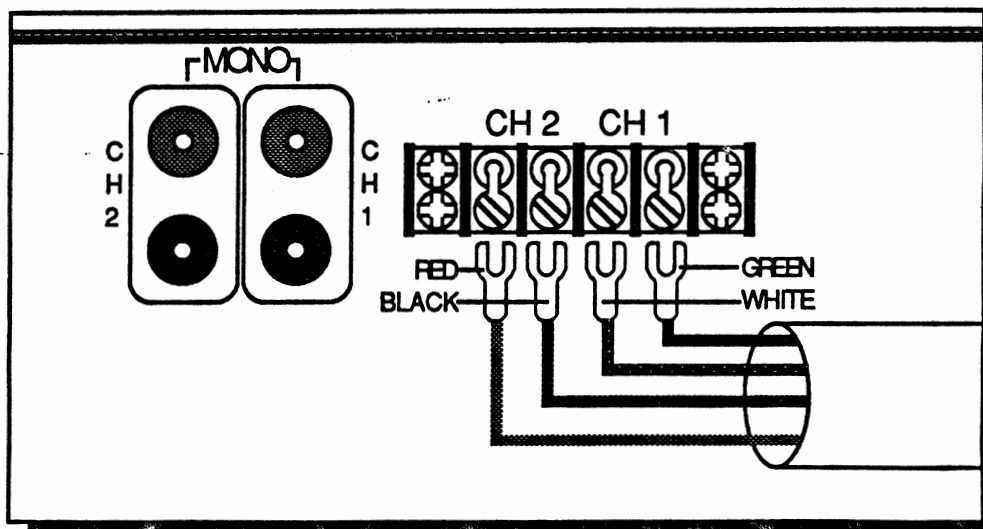


Illustration 2-2 7520 or 7540 Installation

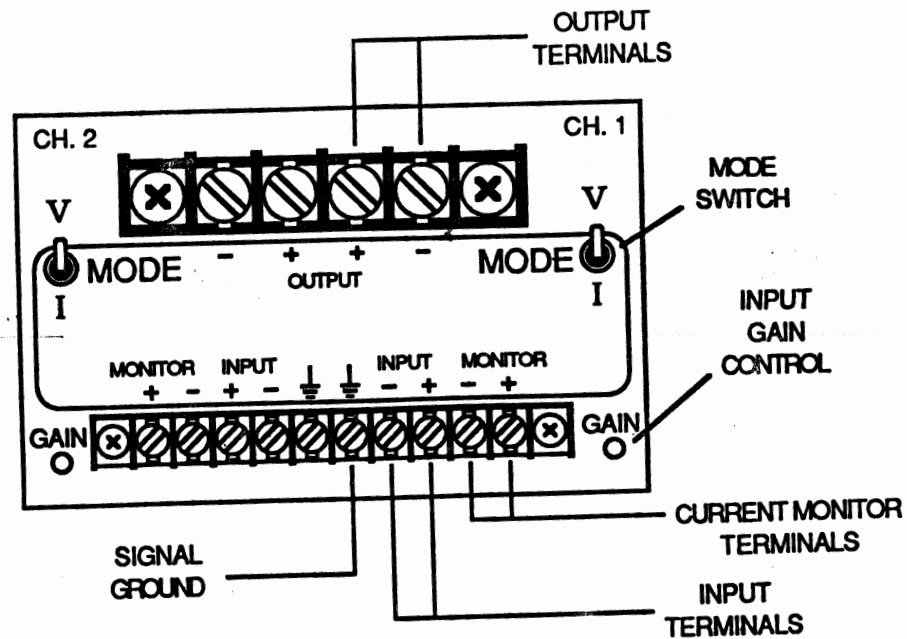


Illustration 2-3 75A08 Controls

2.2. 75A08 Controls and Terminals

Input Gain Control: Screwdriver adjustable, 25 turn control. Clockwise rotation to increase sensitivity.

Mode Switch: Two position mode switch to select constant voltage (V) or controlled current (I) mode of operation

Current Monitor Terminals: Used to monitor the amplifiers output current. Single ended scale factor is 0.5 volt/ampere, 1.0volts/ampere differential.

Output Terminals: System connections to the load.

Input Terminals: High impedance, differential signal input.

Signal Ground: Use to ground the shield from signal sources or monitoring equipment.

2.4. Input Connections

The 75A08 has an active differential input stage. Make input connections through the barrier block on the lower part of the 75A08.

Use a differential signal source for best noise immunity and ground loop prevention.

To use the 75A08 with a single ended source, connect as shown in Illustration 2-4 or 2-5. The resistor value in Illustration 2-5 equals the output impedance of the signal source.

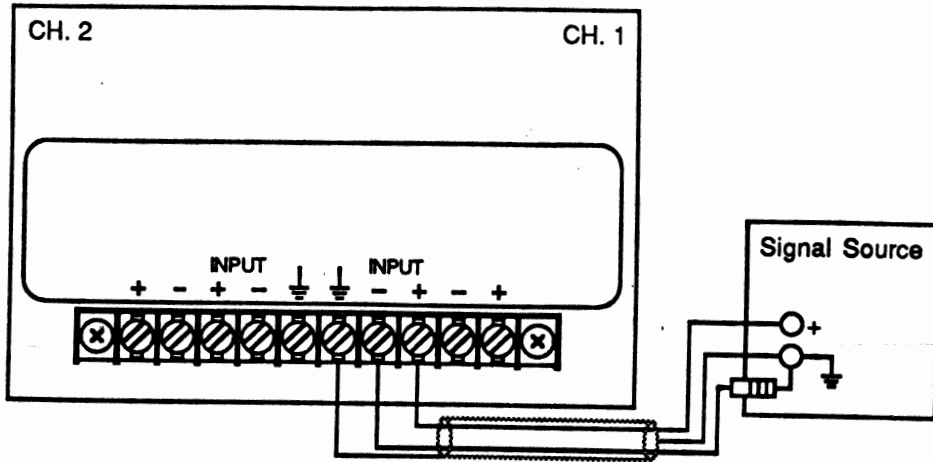


Illustration 2-4 Preferred Single Ended Input

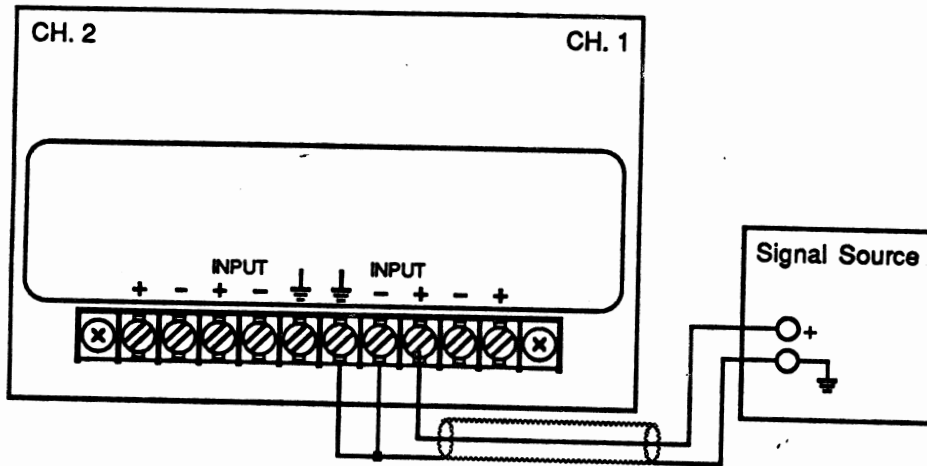


Illustration 2-5 Alternative Single Ended Input

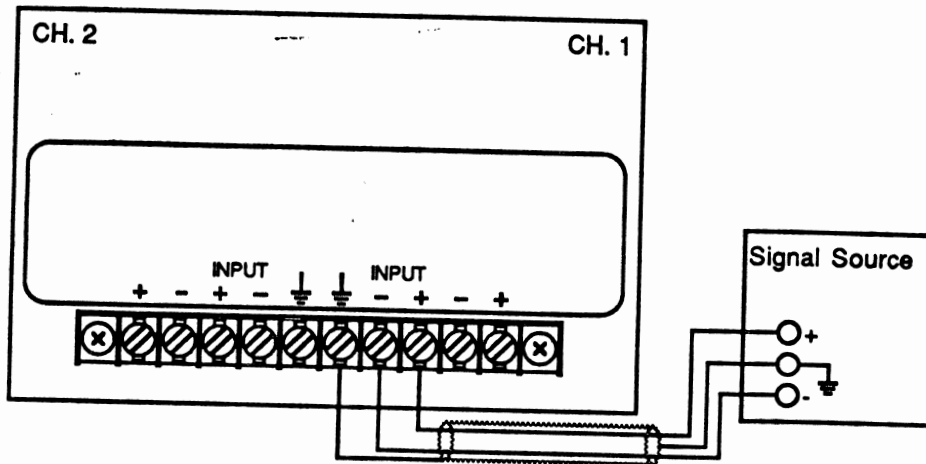


Illustration 2-6 Differential Input

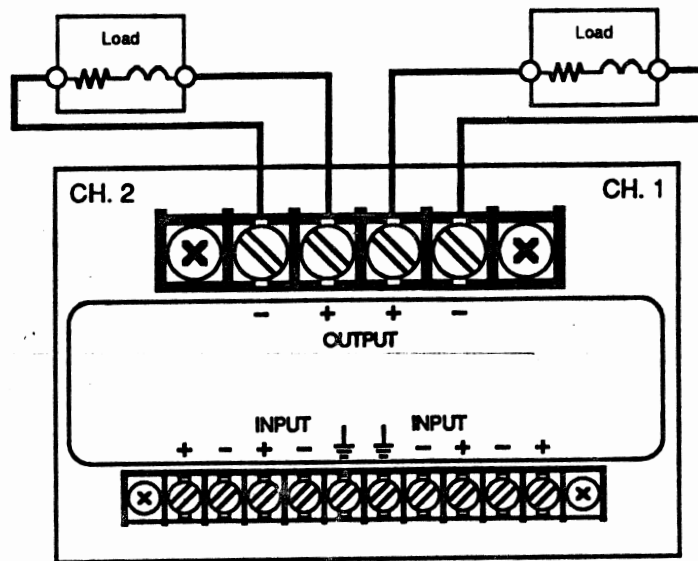


Illustration 2-7 Load Connections

2.3. Load Connection

Connect the load to the terminals marked OUTPUT on the upper face of the 75A08 module.

CAUTION

The - (common) terminals are not grounded to the chassis. These terminals are two separate points. Connecting them will result in improper system operation.

2.5. Current Monitor Connections

Observe the output current by placing an unbalanced input instrument between the MONITOR + terminal and signal ground. Connect an instrument with a differential input to the MONITOR + and - terminals.

Connect the shield to the signal ground terminal.

2.6. Setting the Gain

The gain or sensitivity of the 75A08 is adjustable using the 25 turn pot labeled GAIN.

CAUTION

The 75A08 will cause a transient current when switched from the current to voltage mode. This transient can cause damage to equipment. Turn the amplifier front panel controls full CCW before changing modes to avoid this problem. Return the controls to the full CW position after switching.

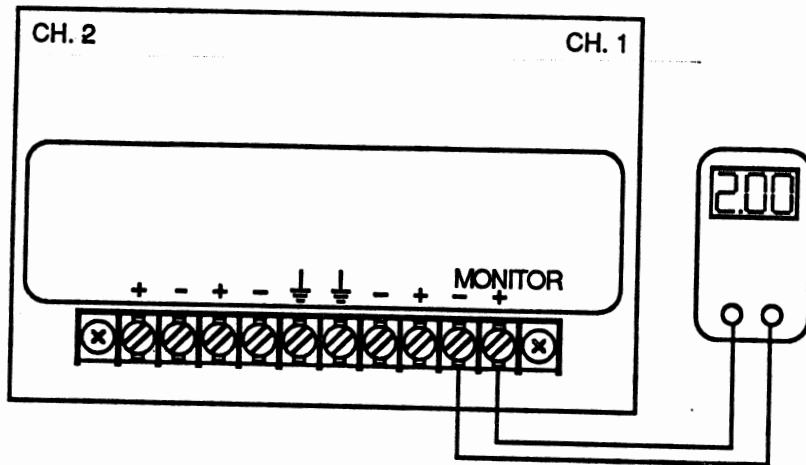


Illustration 2-8 Differential Current Monitor

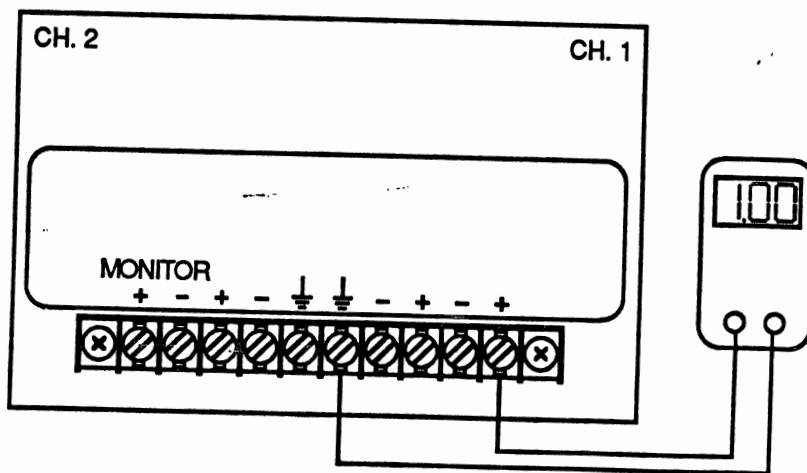


Illustration 2-9 Singled Current Current Monitor

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4. TESTING AND ADJUSTMENT

4.1. Introduction

The procedures outlined in this section must be performed following service to the 75A08 controlled current Module.

4.1.1. Required Test Equipment

These procedures require a signal generator, a dual trace oscilloscope, and a 3 1/2 digit voltmeter. These items are described in Table 4-1.

1. Oscilloscope Dual Channel Vert. Sensitivity - 2mV/div Vert. Frequency DC-15 MHz	Tektronix 2215A Hewlett-Packard Phillips PM3207
2. Audio Signal Generator Sine/Square Output-3 Volts RMS into 3. ohm load, 1%THD	Wavetek 193 Khrohn-Hite 1000,1200
4. Digital Voltmeter AC/DC Volts-1mV-100v AC/DC Amps-10mAmps-10 Amps Ohms-.1 ohm-10Mohms	Fluke 8060 series
5. Non metallic screwdriver to make adjustments	GC 8276 or 8277
6. Precision Current Shunt	1% resistor

Table 4-1 Required Test Equipment

4.1.2. Test Equipment Grounding

Avoid ground loops in test equipment caused by connecting input ground to output ground.

4.1.3. Trim Pot Locations

The adjustment pots are on two different boards of the 75A08. The next three illustrations show the access holes and locations of the pots with the cover on and on both of the PC boards.

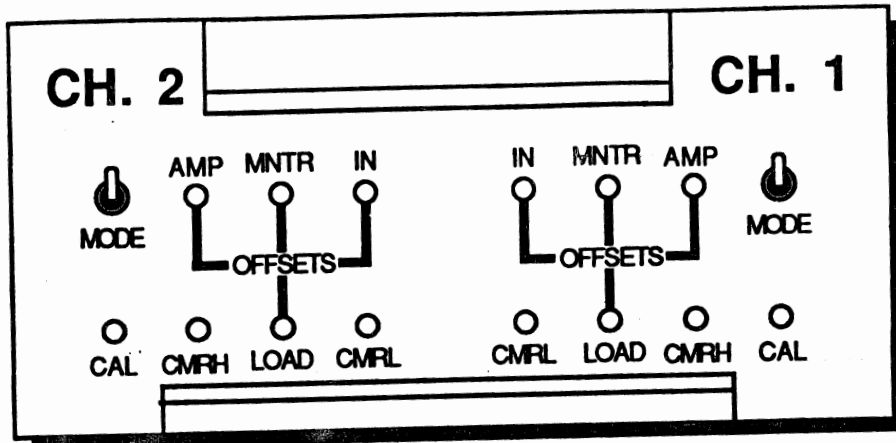


Illustration 4-1 Trim Pots, External Location

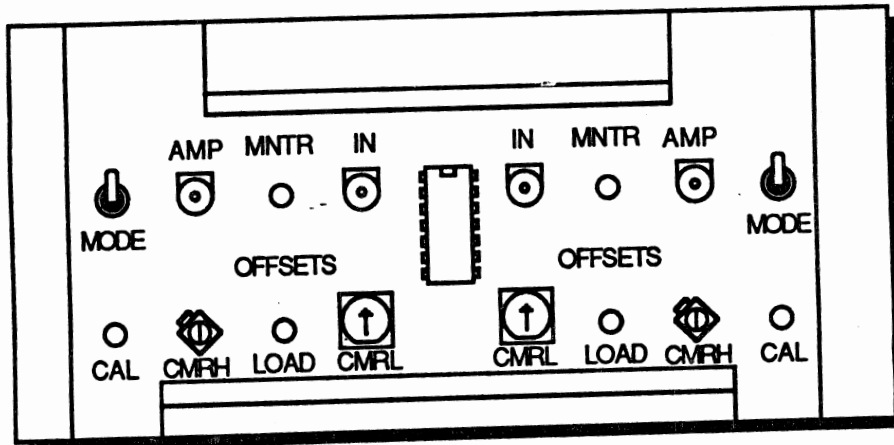


Illustration 4-2 Trim Pots, Input Board

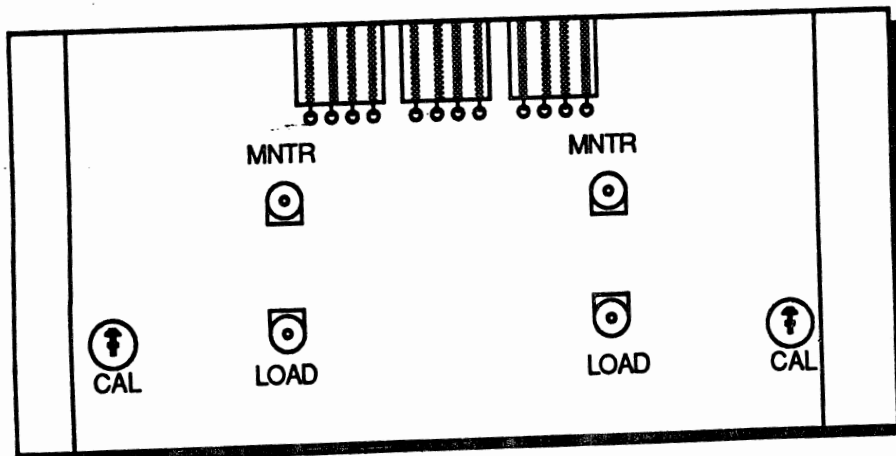


Illustration 4-3 Trim Pots, Monitor Board

4.2. Pre Test

1. Remove the 75A08 from the host amplifier.
2. Turn the host amplifier front panel level control fully clockwise.
3. Turn on the amplifier.
4. Connect a DVM across the red and black binding posts of the amplifier. If there is more than ± 0.01 volts DC at the binding posts, perform service on the host amplifier before proceeding.

Note: Typically, one channel will have +5 millivolts present and the other channel will have - 5 millivolts present.

5. Turn the amplifier off.
6. Install the 75A08 on the amplifier.
7. Set the 75A08 mode switch of both channels to the "V" position.
8. Turn the GAIN controls fully counter clockwise.
9. Remove the 75A08 adjustment hole cover plate by removing the nuts from the mode switches.

4.3. Amplifier Offset

1. Short the INPUT + and - terminals to input ground.
2. Connect a DVM from OUTPUT + TO OUTPUT - of the 75A08.
3. Turn the amplifier on.
4. Adjust AMP for 0.00 VDC.

4.4. Input Offset

1. Connect a DVM across the red and black binding posts of the amplifier.
2. Short the INPUT + and - terminals.
3. Adjust the 75A08 GAIN control fully clockwise
4. Adjust IN (input offset) for 0.00Vdc at the amplifier load terminals.

4.5. Monitor Offset

1. Connect a DVM from MONITOR + to signal ground.
2. Adjust LOAD for 0.00Vdc.
3. Connect a DVM from MONITOR - to signal ground.
4. Adjust MNTR (monitor offset) for 0.00Vdc.

4.6. Common Mode Rejection

1. Connect the INPUT terminals to a signal source as shown in Illustration 4-4.
2. Set the input signal for 1kHz output.
3. Connect an oscilloscope set for maximum sensitivity from ~~signal~~ *OUTPUT* ground to *LOAD OUTPUT*
4. Adjust CMRL (Low Frequency Common Mode) for minimum signal on the scope.
5. Change the input signal to 20 kHz.
6. Adjust CMRH (High Frequency Common Mode) for minimum signal on the scope.
7. Repeat 2,3,4,5 and 6 for minimum interaction.

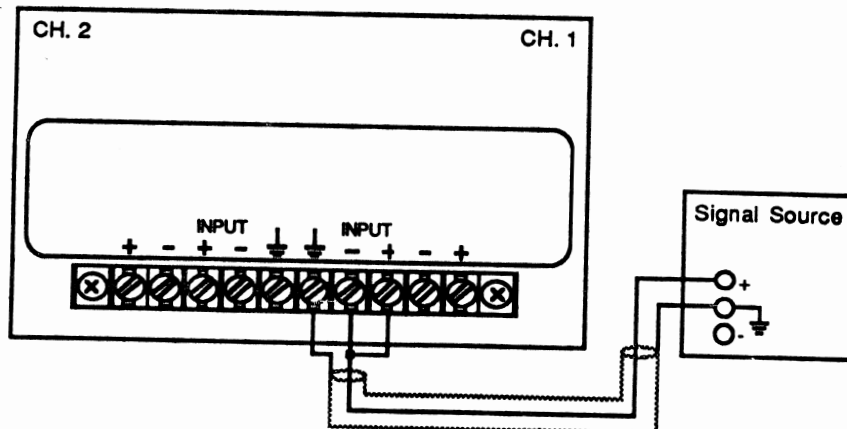


Illustration 4-4 Common Mode Rejection Input

5.6. Exploded View Parts

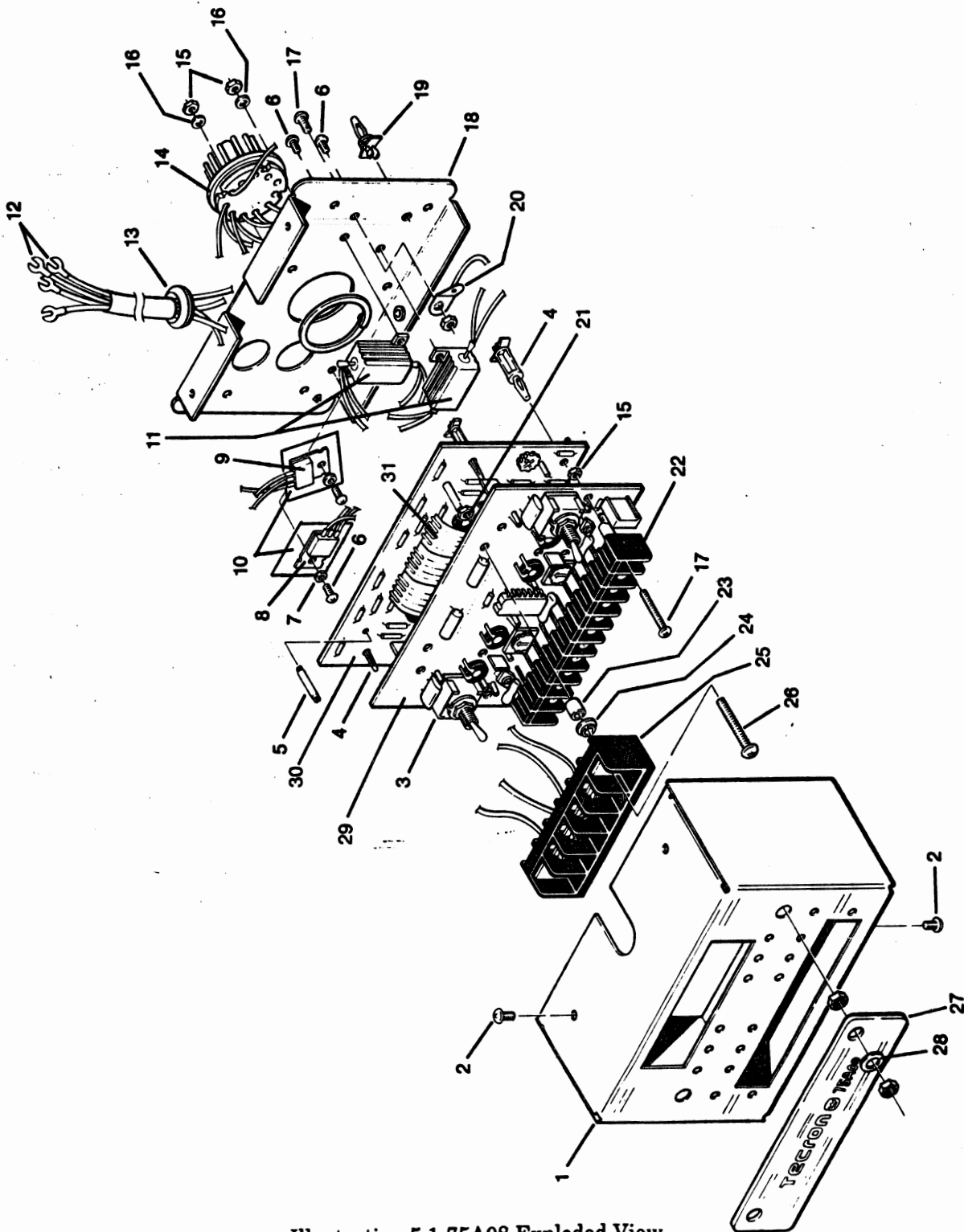


Illustration 5-1 75A08 Exploded View

4.7. Current Monitor Calibration

1. Set the mode switch to I.
2. Connect a current meter capable of handling currents greater than 16 amps in series with the load.
3. Measure from MONITOR + to MONITOR - with an AC voltmeter.
4. Adjust GAIN for 1.00 VAC.
5. Adjust CAL for 1.00 ampere through the load.

4.8. Final Procedure

1. Repeat Sections 4.3 to 4.7 for the second channel.
2. Replace the adjustment cover plate.

4.9. Load Compensation

To compensate the 75A08 for loads other than load specified at time of ordering the 75A08, two parts in each channel must be replaced. Remove the top cover and replace R108, R208, C103, and C203 according to the following formulas:

1. Calculate the value for R108 or R208 using the following formula:

$$R103 = (15,708 (L) (BW)$$

2. Calculate the value for C103 or C203 using the following formula:

$$C103 = \frac{1}{(R + 0.05) (15,707) (BW)}$$

L inductance of load in henries
R resistance of the load in ohms
B W bandwidth in hertz

These calculations will give you an approximation of the compensation values to use. To find the optimum values of R108 and C103, follow the next procedure. This procedure discusses the components in channel 1 but is the same for channel 2.

1. Replace the compensation components on the printed circuit board (R108 and C103) with an RC decade box. Use short, twisted wire to connect the decade box to the circuit board.
2. Set the calculated values for C103 and R208 on the decade box.
3. Connect the load to 75A08's output terminals.
4. Connect a signal generator to the 75A08 input. Set its output for a square wave at the highest frequency used in your application. Adjust the amplitude of the generator for minimum amplitude.
5. Connect an oscilloscope to the current monitor output.
6. Turn the amplifier on.
7. Observe the oscilloscope. If the system is stable (no oscillations), continue to increase the amplitude to the desired level. If the system oscillates, turn the amplifier off and try different compensation values until stability is achieved. If the square wave is distorted as shown in Illustration 4-5, take the recommended corrective action.

After the appropriate values have been found, remove the RC decade box and replace with the components shown on the decade box. Because of differences between the components in the decade box and the fixed components, the R108 and C103 may have to be adjusted slightly.



Optimum compensation: Decrease R108.



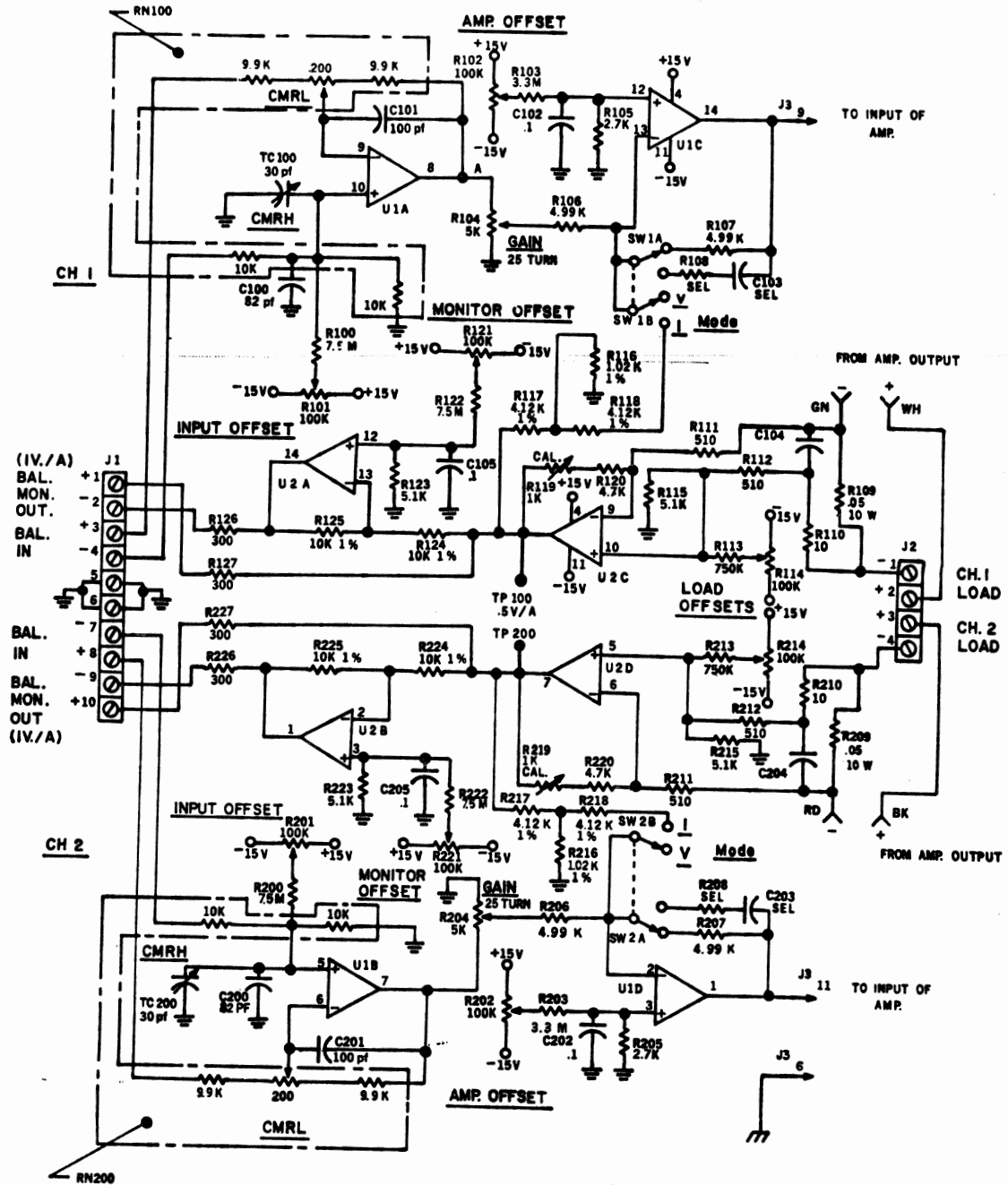
Increase R108.

Increase C103

Illustration 4-5 Compensation Waveforms

ITEM#	PART#	QTY.	DESCRIPTION
1	F10411B7	1	75A08 CHASSIS
2	C 4758-6	3	6-32 X.25 SCREW
3	C 4359-3	2	DPDT MIMI TOGGLE SW
4	C 6434-2	4	.5" PC BOARD SUPPORT
5	C 6432-6	4	.5" MINI SUPPORT POST
6	C 5961-5	4	4-40 x .375 Taptite Pan Head Machine Screw
7	C 6446-6	2	.115 Nylon Shoulder Washer
8	C 5453A1	2	2SA1006BR TO-220 PNP
9	C 4647-1	1	TIP-47 TO-220 NPN
10	C 6052-2	2	TO-220 Mica Insulator
11	C 6426-8	2	.05 OHM 10W 1% Wirewound Resistor
12	C 6638-8	4	Crimp On Terminals
13	C 5021-8	1	Rubber Grommet
14	C 3911-2	1	11 PIN PLUG
15	C 1938-7	4	4-40 HEX NUT
16	C 1824-9	8	#4 INT STAR LCKWSHR
17	C 4574-7	2	4-40 X1.25 SCREW
18	M20295J7	1	75A08 BACK COVER
19	C 6032-4	4	.25" BOARD SUPPORT
20	C 3163-0	1	#6 SOLDER LUG
21	C 1889-2	3	6-32 Hex Nut
22	C 6430-0	1	10 Terminal #3 Barrier Block
23	C 6431-8	2	.25 x .14 x .375 Round Spacer
24	C 4037-5	2	.375 x .141 x .093 Nylon Washer
25	C 6429-2	1	4 TERM #6 BARRIOR
26	C 2138-3	2	6-32 X1" SCREW
27	F10410J2	1	75A08 PLATE
28	C 4023-5	2	.440 x .260 x .015 Panel Washer
29	For Ref Only		75A08 Input Board
30	For Ref Only		75A08 Monitor Board
31	C 5970-6	3	4 Conductor, 2.5" Flex Jumper

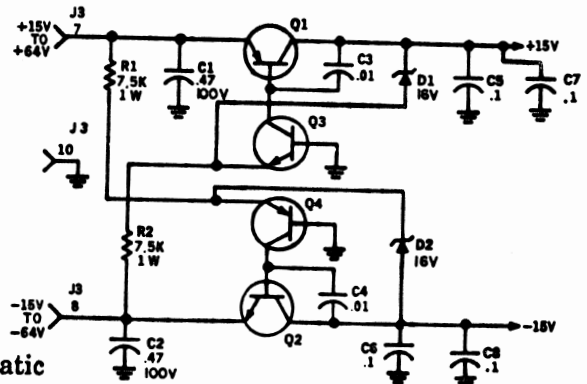
<u>LOCATION #</u>	<u>PART #</u>	<u>DESCRIPTION</u>
R215	C 5163-8	5.1K .25W 5% CF
R216	C 6086-0	1.02K .25W 1% MF
R217	C 5749-2	4.12K .25W 1% MF
R218	C 5749-2	4.12K .25W 1% MF
R219	C 3669-6	1K HELIPOT TRIM
R220	C 3939-3	4.7K .25W 5% CF
R221	C 5062-2	100K LIN TRIM POT
R222	C 4915-2	7.5M .25W 5% COMP
R223	C 5163-8	5.1K .25W 5% CF
R224	C 4859-2	10K .25W 1% MF
R225	C 4859-2	10K .25W 1% MF
R226	C 3801-5	300 OHM .25W 5% CF
R227	C 3801-5	300 OHM .25W 5% CF
RN100	D 4669-4	BAL INPUT RES TRIM
RN200	C 4669-4	BAL INPUT RES TRIM
SW1	C 4359-3	DPDT MINI TOGGLE SW
SW2	C 4359-3	DPDT MINI TOGGLE SW
TC100	C 5058-0	30PF PC MNT TRIM
TC200	C 5058-0	30PF PC MNT TRIM
U1	C 4160-5	HA-4741 QUAD OP AMP
U2	C 4160-5	HA-4741 QUAD OP AMP



75 A08 SCHEMATIC NOTES

- ALL RESISTORS ARE IN OHMS, ALL CAPACITORS IN MICROFARADS UNLESS OTHERWISE DESIGNATED.
- ALL RESISTORS ARE .25 WATT, 5% TOLERANCE UNLESS OTHERWISE DESIGNATED.
- COMPONENTS COMMON TO BOTH CHANNELS ARE NUMBERED FROM 1 TO 99.
- CHANNEL ONE COMPONENTS ARE NUMBERED FROM 100 TO 199.
- CHANNEL TWO COMPONENTS ARE NUMBERED FROM 200 TO 299.
- C104, C 204 = LOAD RELATED PARTS (OPTIONAL).
- J3 = REAR PANEL II PIN "OCTAL" SOCKET.

75A08 Schematic



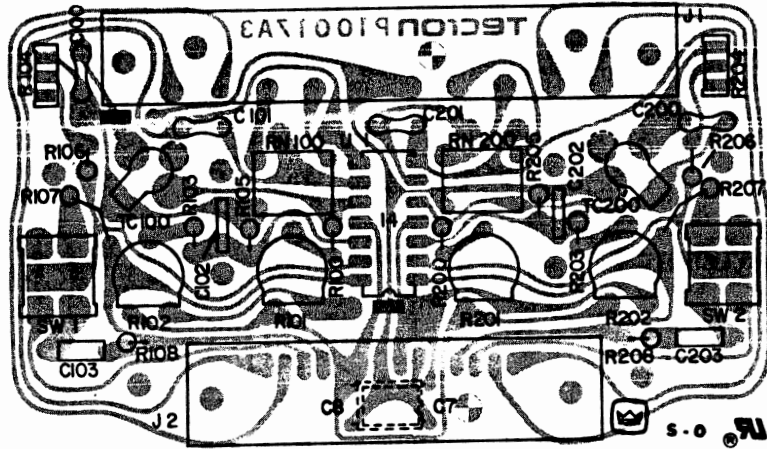


Illustration 5-2 75A08 Input Circuit Board

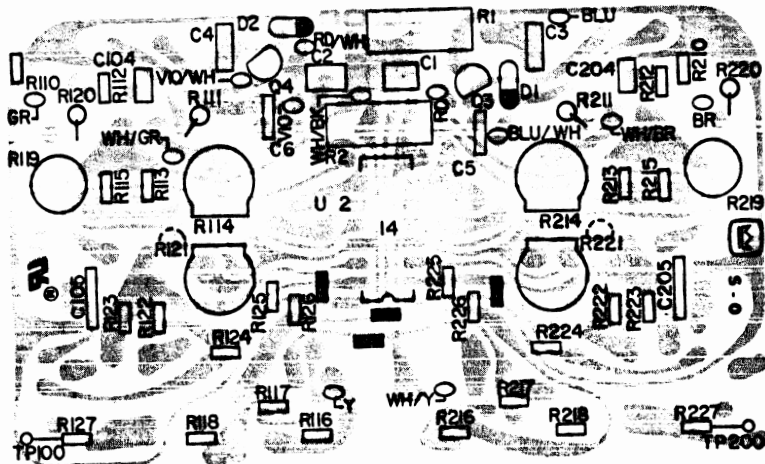


Illustration 5-3 75A08 Monitor Circuit Board