TECHNICAL MANUAL

INTEGRATED CIRCUIT TURNTABLE PREAMPLIFIER

994 6690 003

Technical Manual # 888 1712 001

Printed: March 1977

LIST OF EFFECTIVE PAGES

TOTAL NUMBER OF PAGES IS AS FOLLOWS: 15

PAGE NO.	ISSUE	PAGE NO.	ISSUE
Title Page	Original		
List of Effective Pages	Original		
iii	Original		
1-0 through 1-2	Original		
2-1 through 2-2	Original		
3-1	Original		
3-2	Blank		
4-1 through 4-3	Original		
4-4	Blank		
5-1	Original		
5-2	Blank		
5-3 through 5-4	Original		

* THE ASTERISK INDICATES PAGES REVISED, ADDED OR DELETED BY THE CURRENT CHANGE.

1712

TABLE OF CONTENTS

LIST OF TABLES

LIST OF ILLUSTRATIONS

1712

WARNING: Disconnect primary power prior to servicing.

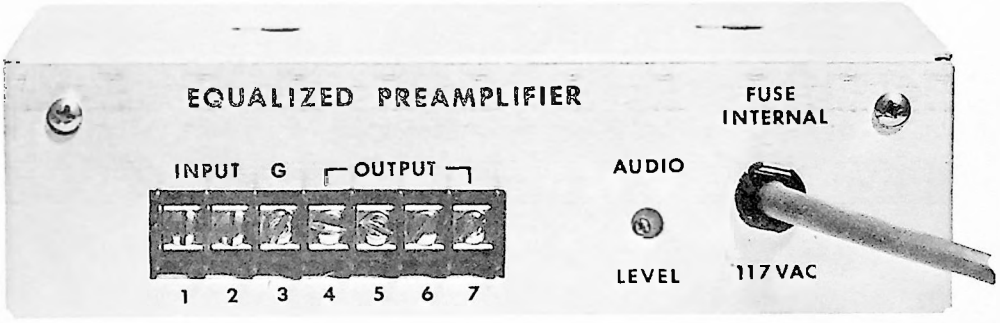


Figure 1-1. Integrated Circuit Turntable Preamplifier

1712

WARNING: Disconnect primary power prior to servicing.

SECTION I

GENERAL DESCRIPTION

1-1. INTRODUCTION.

1-2. This manual contains all information necessary to install, operate, and maintain the Integrated Circuit Turntable Preamplifier, part number 994 6690 003. Figure 1-1 shows the front view of the equipment supplied.

1-3. ELECTRICAL AND MECHANICAL CHARACTERISTICS.

1-4. Table 1-1 lists the electrical and mechanical characteristics of the Integrated Circuit Turntable Preamplifier.

1712

WARNING: Disconnect primary power prior to servicing.

Table 1-1. Electrical and MECHANICAL Characteristics

FUNCTION	CHARACTERISTIC
Input Impedance	47,000 ohms
Maximum Input	150 mV at 1 kHz (clip point), 60 mV at 1 kHz (+15 dBm output)
Output	-2 dBm with 9 mV input at 1 kHz (typically cartridge level)
Response	Within ±1 dB of RIAA/NAB standard curve
Distortion	Less than 0.5% at +15 dBm output, 50-15,000 Hz
Noise	At least 85 dB below +15 dBm output, 20 Hz to 20 kHz.
Load Impedance	600 ohms or 150 ohms, flating for grounded or ungrounded loads.
Operating Ambient Temperature Range	0^{o} to $+60^{o}$ C
Power	117/234 volts, 50/60 Hz, 1 watt
Mounting	Two holes for mounting to Harris turntable or inside of any cabinet. May be mounted in any position.
Size	7-7/16 inches long, 3-1/8 inchs wide, 2-1/16 inches high
Weight and Cubage	Net weight, 1 lb. Packed weight, 8 lbs. Cubage: 1 cubic foot.

1712

WARNING: Disconnect primary power prior to servicing.

SECTION II

INSTALLATION AND OPERATION

2-1. INTRODUCTION.

2-2. This section contains information for installing and operating the Integrated Circuit Turntable Preamplifier. Refer to Section V for the schematic diagram that supports the following discussion.

2-3. MOUNTING.

2-4. The Preamplifier is mounted with two No. 10 self-tapping screws, located on 3-3/4 inch mounting centers. The unit is intended for vertical mounting, with the line cord down (other mounting positions may be used). Add-on units for stereo are mounted by placing the second unit's cover over the special top-hat rivets on the bottom side of the first unit, and sliding to engage the rivets in the holes.

2-5. INPUT CONNECTIONS.

2-6. This Preamplifier is designed to work with any of the popular moving-magnet cartridges. It is recommended that the high side of the cartridge be connected to terminal No. 2, the low side to terminal No. 1, and the cable shield to terminal No. 3 of TB1. The impedance (47k ohms) may be modified by changing the value of R7 on the PC board. This should be done only in special cases, to suit non-standard cartridges. A high frequency scratch filter may be added by placing a 5000-20,000 ohm resistor across the input terminals, 1 and 2.

2-7. OUTPUT CONNECTIONS.

2-8. Output connections are provided for both 600 ohm and 150 ohm lines. For 600 ohm operation, connect the output line to TB1-4 and TB1-7, (the red wire to 4 and the black wire to 7). Place a jumper between TB1-5 and TB1-6. For 150 ohm operation, connect the output line to TB1-4 and TB1-5, (the red wire to 4 and the black wire to 5). Place jumpers between TB1-4 and TB1-6, and between TB1-5 and TB1-7. The Output Level Control provides a means of adjusting the level of the preamplifier to match the requirement of the following equipment.

2-9. POWER CONNECTIONS.

2-10. Plug the line cord into any standard outlet providing 117 Vac +10% 50/60 Hz. No switch is provided since the power consumption is 1 Watt. Dress the power cord away from the audio lines for minimum hum. For 234 Vac operation, remove jumpers J1 and J3 on the PC board and add new jumper J2 to the PC board.

1712

WARNING: Disconnect primary power prior to servicing.

2-11. CIRCUIT DESCRIPTION.

2-12. The internal power transformer, T1, provides voltage for a full wave bridge, which produces an unregulated positive and negative 24 Vdc. These voltages are series regulated by U2 and U3 to provide a regulated ±15 Vdc. The input signal from the cartridge is voltage-amplified by the IC (U1), amplified by the current-boosters (Q1 and Q2), which then drive the output transformer (T2) through control R18. The R1AA Curve is produced by means of negative feedback output of Q1 and Q2 to the other input of U1.

NOTE

In strong RF fields it my be necessary to modify the grounding. Install a solder lug under the screw above and to the left of terminal No. 1. Terminate the input and output cable shields at this point keeping the shield connections as short as possible.

1712

WARNING: Disconnect primary power prior to servicing.

SECTION III

MAINTENANCE

3-1. INTRODUCTION.

3-2. This section provides information for servicing the Integrated Circuit Turntable Preamplifier.

3-3. TROUBLESHOOTING.

3-4. The Preamplifier has received a thorough factory check. Should trouble be encountered, check the following:

a. OUTPUT CONNECTIONS - Could be loose or shorted. Normal output may be heard with phones with proper operation.

b. INPUT CONNECTIONS - One side is grounded, be sure cartridge ground connects to amplifier ground. Feed input from oscillator at -40 dBm a 12 mV for normal output, at 1 kHz.

c. CARTRIDGE - Replace if output obtained with oscillator but not with the original cartridge.

d. POWER SYSTEM - AC supply dead, blown fuse, or objective line cord. Check output of T1, DC across C18 and C19 and Pin 2 of U2 to ground and Pin 2 of U3 to ground as shown in figure 5-1.

e. TRANSISTOR AND IC - Substitute new ones if no tester is available or the original transistors show defective on test.

f. CIRCUIT VOLTAGES - With normal operation the voltages on the schematic will be obtained, ±20% with an accurate meter. Record the voltages on the Unit for future use.

g. SIGNAL VOLTAGES - A sensitive AC VTVM is required, also record these readings for future troubleshooting.

1712

WARNING: Disconnect primary power prior to servicing.

SECTION IV

PARTS LIST

4-1. INTRODUCTION.

4-2. This section provides description, reference designator and order number for selectable replaceable parts for proper maintenance of the Integrated Circuit Turntable Preamplifier. Refer to table 4-1.

NOTE

Actual component values may vary slightly from component values listed on schematics and parts lists. Due to industry-wide shortages, it is sometimes necessary to use parts other than those specified. In every case, however, a substitute part is selected for conformance to overall design specifications so that equipment performance is not affected.

4-3. REPLACEABLE PARTS SERVICE.

4-4. Replacement parts are available 24 hours a day, seven days a week from the Harris Service Parts Department. Telephone 217-222-8200 to contact the Service Parts Department or address correspondence to Service Parts Department, Harris Broadcast Products Division, Harris Corporation, 123 Hampshire Street, Quincy, Illinois 62301 USA.

1712

WARNING: Disconnect primary power prior to servicing.

Table 4-1. Integrated Circuit Turntable Preamplifier - 992 4820 001

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
C1	500 0911 000	Capacitor, 750 pF, 500V, 5%	1
C2	500 0902 000	Capacitor, 3300 pF, 500V, 5%	1
C3,C4,C5	526 0048 000	Capacitor, 10 uF, 20V, 20%	3
C6	500 0759 000	Capacitor, 100 pF, Mica	1
C7,C8,C9	516 0375 000	Capacitor, .01 uF, 50V	3
C10	526 0048 000	Capacitor, 10 uF, 20V, 20%	1
C11	516 0375 000	Capacitor, .01 uF, 50V	1
C12 thru C15	516 0067 000	Capacitor, .003 uF, 1 kV, Disc	4
C16,C17	516 0393 000	Capacitor, .025 uF, 500V, Disc	2
C18,C19	522 0394 000	Capacitor, 100 uF, 50V	2
CR1,CR2	384 0255 000	Diode, MZ2360	2
CR3	384 0618 000	Rectifier, Bridge	1
F1	398 0337 000	Fuse, 1/10 Ampere	1
L1	915 1181 001	Inductor Assembly	1
Q1	380 0320 000	Transistor, TIP-29	1
Q2	380 0188 000	Transistor, TIP-30	1
R1	540 1195 000	Resistor, 16k ohm, 1/2W, 5%	1
R2	540 1152 000	Resistor, 75k ohm, 1/2W, 5%	1
R3	540 1221 000	Resistor, 910k ohm, 1/2W, 5%	1
R4	540 1182 000	Resistor, 2200 ohm, 1/2W, 5%	1
R5	540 1202 000	Resistor, 51k ohm, 1/2W, 5%	1
R6	540 1221 000	Resistor, 910k ohm, 1/2W, 5%	1
R7	540 1102 000	Resistor, 100 ohm, 1/2W, 5%	1

WARNING: Disconnect primary power prior to servicing.

Table 4-1. Integrated Circuit Turntable Preamplifier - 992 4820 001 (Continued)

REF. SYMBOL	HARRIS PART NO.	DESCRIPTION	QTY.
R8	540 1179 000	Resistor, 3600 ohm, 1/2W, 5%	1
R9	550 0626 000	Potentiometer, 10k ohm, 1/2W, 10%	1
R10	540 1102 000	Resistor, 1/2W, 100 ohm, 5%	1
R11	540 1179 000	Resistor, 3600 ohm, 1/2W, 5%	1
R12,R13,R14	540 1102 000	Resistor, 100 ohm, 1/2W, 5%	3
R15,R16	540 1151 000	Resistor, 10 ohm, 1/2W, 5%	2
R17	540 1102 000	Resistor, 100 ohm, 1/2W, 5%	1
R18	550 0387 000	Potentiometer, 1k ohm, 1/4W, 10%	1
T1	472 0713 000	Transformer, Power	1
T2	478 0398 000	Transformer, Output	1
TB1	614 0542 000	Terminal Board, 7 Terminals	1
U1	382 0459 000	Integrated Circuit, LF356N	1
U2	382 0359 000	Integrated Circuit, MC7815CP	1
U3	382 0360 000	Integrated Circuit, MC7915CP	1
XF1,XF1A	402 0129 000	Clip, Fuse 102068	2
XU1	404 0304 000	Socket, Integrated Circuit, 8 Pin	1
	939 2346 001	Printed Board Assembly	1

1712

WARNING: Disconnect primary power prior to servicing.

SECTION V

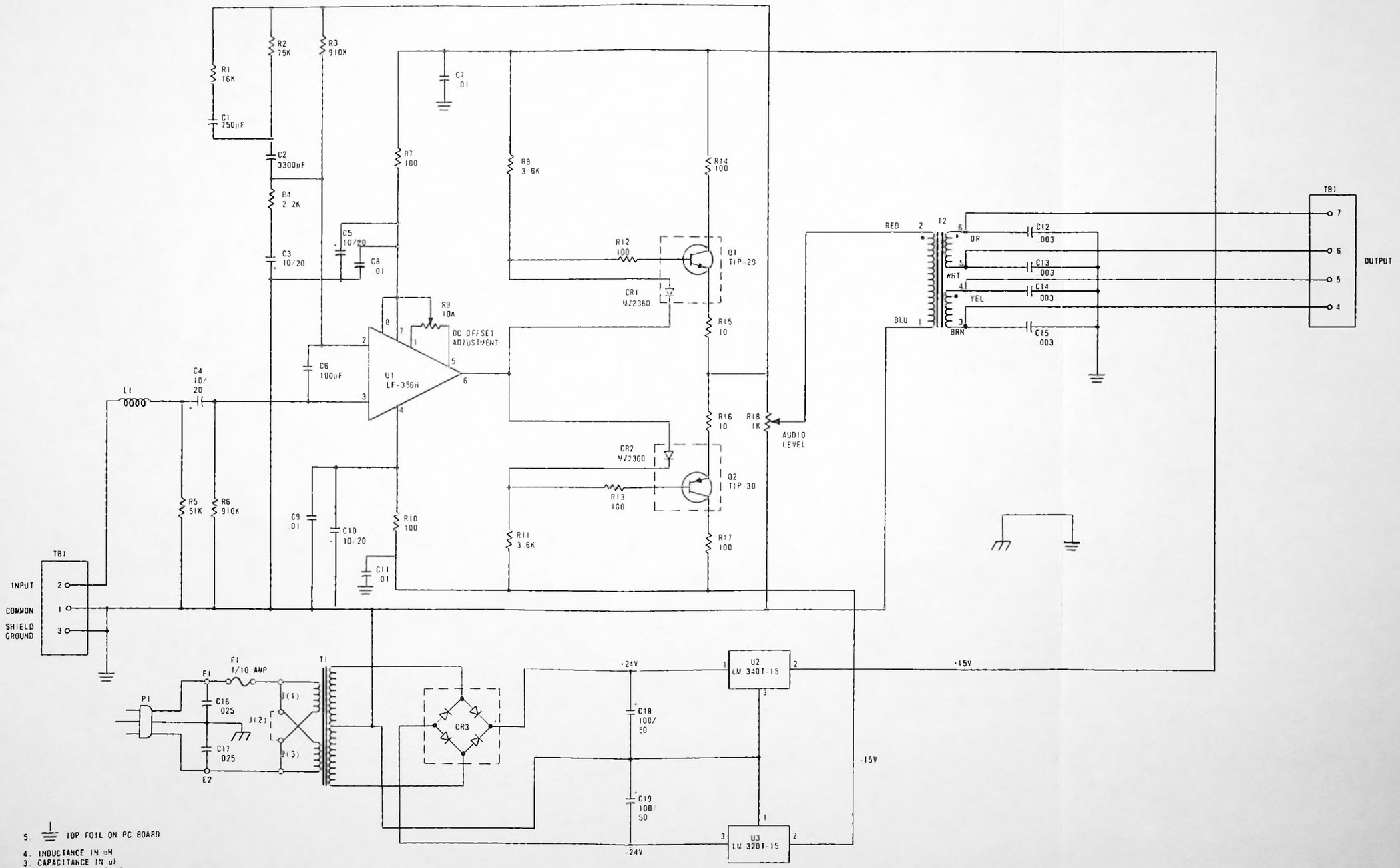
DIAGRAMS

5-1. INTRODUCTION.

5-2. This section contains the schematic diagram for the Integrated Circuit Turntable Preamplifier

1712

WARNING: Disconnect primary power prior to servicing.



5. ⏚ TOP FOIL ON PC BOARD
4. INDUCTANCE IN uH
3. CAPACITANCE IN uF
2. RESISTANCE IN OHMS
1. RESISTORS ARE 1/2 WATT 5%

UNLESS OTHERWISE NOTED.

FIGURE 5-1. INTEGRATED CIRCUIT PHONO PRE-AMP SCHEMATIC 843 1368 001

SAFETY NOTICE

WARNING: THE CURRENTS AND VOLTAGES IN THIS EQUIPMENT ARE DANGEROUS AND UNDER CERTAIN CONDITIONS, COULD BE FATAL.

This manual is intended as general guidance for trained and qualified installation, operating, maintenance and service personnel who are familiar with and aware of the dangers inherent to handling potentially hazardous electrical and/or electronic circuits. It is not intended to contain a complete statement of all safety precautions which should be observed by personnel in using this or other electronic equipment.

THE INSTALLATION, OPERATION, MAINTENANCE AND SERVICING OF THIS EQUIPMENT INVOLVES RISKS TO BOTH PERSONNEL AND EQUIPMENT, AND MUST BE PERFORMED ONLY BY PROPERLY TRAINED AND EXPERIENCED PERSONNEL EXERCISING DUE CARE. PERSONNEL MUST FAMILIARIZE THEMSELVES WITH SAFETY REQUIREMENTS, SAFE HANDLING AND OPERATING PRACTICE, AND RELATED FIRST-AID PROCEDURES (E.G., FOR ELECTRICAL BURNS AND ELECTRICAL SHOCK).

HARRIS CORPORATION Broadcast Equipment Division shall not be responsible for injury or damage resulting from improper installation, operation, maintenance or servicing, or from the use of improperly trained or inexperienced personnel in the performance of such tasks, or from the failure of persons engaged in such tasks to exercise due care.

As with all electronic equipment, care should be taken to avoid electrical shock in all circuits where substantial currents or voltages may be present, either through design or short circuit. Caution should also be observed in lifting and hoisting equipment, especially regarding large structures, during installation.

LIABILITY LIMITATION

The procedures outlined in this Manual are based on the information available at the time of publication and should permit the specified use with minimum risk. However, the manufacturer cannot assume liability with respect to technical application of the contents and shall, under no circumstances, be responsible for damage or injury (whether to person or property) resulting from its use.

The manufacturer is specifically not liable for any damage or injury arising out of failure to follow the instructions in this Manual or failure to exercise due care and caution during installation, operation, maintenance and service of this equipment.

CAUTIONARY NOTICE

Always disconnect power before opening covers, doors, enclosures, gates, panels or shields. Always use grounding sticks and short out high voltage points before servicing. Never make internal adjustments, perform maintenance or service when alone or when tired.

Never remove, short-circuit or tamper with interlock switches on access covers, doors, enclosures, gates, panels or shields. Keep away from live circuits, know your equipment and don't take chances. Proper training of experienced personnel and observing the above guidelines will help assure safe and continued operation of this equipment.