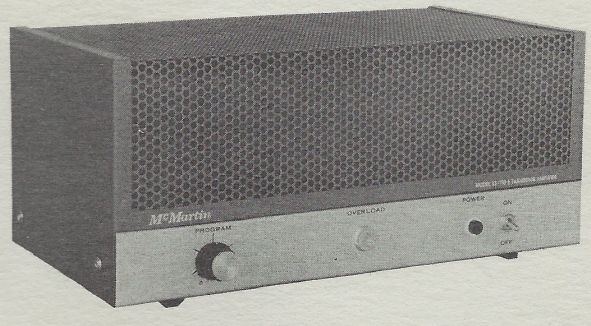
McMARTIN INDUSTRIES, INC.
3104 Farnam Street
Omaha, Nebraska 68131

McMartin®

MEMBER EIA

NAB

LT500A / LT750A / LT1000



TRANSISTOR AMPLIFIER

50 / 75 / 100 WATTS

INSTRUCTION MANUAL

TABLE OF CONTENTS

SPECIFICATIONS

POWER OUTPUT	LT-500A -- 50W RMS, 75W MUSIC, 100W PEAK LT-750A -- 75W RMS, 112W MUSIC, 150W PEAK LT-1000 -- 100W RMS, 150W MUSIC, 200W PEAK
FREQUENCY RESPONSE	20-20,000 HZ + 0, - 1.5DB
HUM AND NOISE	BETTER THAN 80DB BELOW RATED POWER OUTPUT
INPUT SENSITIVITY	LESS THAN 300 MV
DISTORTION	LESS THAN 1.0 PERCENT 20-20,000HZ AT 3DB BELOW RPO LESS THAN 2.0 PERCENT 50-10,000 HZ AT RPO

NOTE - ALL TESTS CONDUCTED IN ACCORDANCE WITH E.I.A. STANDARDS SE-101-A WHERE APPLICABLE.

INPUTS (1)

PROGRAM	UNBALANCED 50,000 OHMS
LINE (W/MT-4	BALANCED 10,000 OHMS BRIDGING BALANCED 600 OHMS MATCHING
PHONO (W/CP-90)	MAGNETIC CARTRIDGE ONLY
(W/CP-90C)	CERAMIC OR CRYSTAL CARTRIDGE
TAPEHEAD (W/TP-10)	EQUALIZED FOR 1-7/8 I.P.S.
(W/TP-30)	EQUALIZED FOR 3-3/4 I.P.S.
(W/TP-70)	EQUALIZED FOR 7-1/2 I.P.S.
OUTPUTS	BALANCED 70.7 AND 25 VOLT LINE AND UNBALANCED 8 OHMS
CONTROLS	PROGRAM GAIN ON-OFF SWITCH
REAR CHASSIS	AC CONVENIENCE OUTLET (UNSWITCHED)
POWER SUPPLY	120 VOLTS AC 50/60 HZ, FUSED 200W MAX.
AMBIENT TEMPERATURE	FULL PERFORMANCE TO 150^0 F (65^0 C)

NOTE - ALL REFERENCES TO POWER OUTPUT OR RATED POWER OUTPUT REFER TO RMS POWER OUTPUT WHICH IS THE STANDARD OF THE COMMERCIAL/INDUSTRIAL ELECTRONICS INDUSTRY. APPLICATION OF THE FORMULAS IN THIS MANUAL TO HIGH FIDELITY OR INEXPENSIVE GENERAL PURPOSE AMPLIFIERS THAT RATE BY MUSIC OR PEAK POWER WILL REQUIRE ADJUSTMENTS BACK TO RMS RATINGS. RMS POWER IS APPROXIMATELY 50%, OF PEAK POWER AND $65^0/0$ OF MUSIC POWER.

SPECIFICATIONS – (CONT'D)

DIMENSIONS AND FINISH	16" W X 7" H X 8-3/4" D MCMARTIN BLUE AND SILVER
SHIPPING WEIGHT	26 LBS.
	UL AND CSA LISTED

OPTIONAL AND ACCESSORY EQUIPMENT

CP-90	PHONO PREAMPLIFIER (MAGNETIC CARTRIDGE ONLY)
CP-90C	PHONO PREAMPLIFIER (CERAMIC OR CRYSTAL CARTRIDGE)
TP-10	TAPE HEAD PREAMPLIFIER FOR 1-7/8 I.P.S.
TP-30	TAPE HEAD PREAMPLIFIER FOR 3-3/4 I.P.S.
TP-70	TAPE HEAD PREAMPLIFIER FOR 7-1/2 I.P.S.
MT-4	UNIVERSAL MICROPHONE/LINE TRANSFORMER
RP-500A	19 INCH RACK PANEL ASSEMBLY (8-3/4" H) LT-500A
RP-750A	19 INCH RACK PANEL ASSEMBLY (8-3/4" H) LT-750A
RP-1000	19 INCH RACK PANEL ASSEMBLY (8-3/4" H) LT-1000

ARCHITECTS AND ENGINEERS SPECIFICATIONS

THE AMPLIFIER SHALL BE A MCMARTIN LT-500A, LT-750A, OR LT-1000. THE LT-500A SHALL BE ALL TRANSISTORIZED AND CAPABLE OF 50 WATTS RMS, 75 WATTS MUSIC AND 100 WATTS PEAK. THE LT-750A SHALL BE ALL TRANSISTORIZED AND CAPABLE OF 75 WATTS RMS, 112 WATTS MUSIC AND 150 WATTS PEAK. THE LT-1000 SHALL BE ALL TRANSISTORIZED AND CAPABLE OF 100 WATTS RMS, 150 WATTS MUSIC AND 200 WATTS PEAK. ONLY AMPLIFIERS MEETING ALL 3 WATTAGE RATINGS WILL BE ACCEPTED. THE FREQUENCY RESPONSE SHALL BE 20-20,000HZ + 0,-1.5DB AND HUM AND NOISE SHALL BE BETTER THAN 80B BELOW RATED POWER OUTPUT. THE AMPLIFIER SHALL HAVE DISTORTION LESS THAN 1.0 PERCENT FROM 20-20,000HZ AT 3DB BELOW RPO AND LESS THAN 2.0 PERCENT FROM 50-10,000HZ AT RPO. IT SHALL BE DESIGNED TO OPERATE CONTINUOUSLY ON LINE VOLTAGES OF 100-125 V., 50/60 HZ OVER A TEMPERATURE RANGE OF 0^0 FAHRENHEIT TO 150^0 FAHRENHEIT.

ARCHITECTS AND ENGINEERS SPECIFICATIONS (CONT'D)

THE PROTECTIVE CIRCUIT SHALL BE TRANSISTORIZED TO ENABLE THE AMPLIFIER TO RESTORE TO FULL OPERATION WITHIN ONE (1) MILLISECOND AFTER A SHORT OR OVERLOAD CONDITION IS REMOVED. ONLY AMPLIFIERS USING TRANSISTOR PROTECTIVE CIRCUITS FOR PROTECTION AGAINST OVERLOAD OR SHORTED CIRCUITS, WITH RECOVERY TIME WITHIN ONE (1) MILLISECOND SHALL BE ACCEPTED. THE AMPLIFIER SHALL HAVE A PROGRAM INPUT WITH A SOCKET TO ACCOMMODATE PLUG-IN ACCESSORIES TO PERMIT THE USE OF BALANCED LINE WITH ISOLATION. BOTH MATCHING AND BRIDGING SHALL BE AVAILABLE. OPTIONAL PREAMPLIFIERS FOR MAGNETIC CARTRIDGES OR EQUALIZED TAPE SHALL BE AVAILABLE. THE AMPLIFIER SHALL HAVE UNBALANCED 8 OHMS AND BALANCED 25 V. AND 70.7 V. OUTPUTS.

THE AMPLIFIER SHALL BE LISTED WITH UL AND CSA.

GENERAL DESCRIPTION

THIS FAMILY OF POWER AMPLIFIERS SETS NEW STANDARDS IN HIGH POWER TRANSISTOR AUDIO AMPLIFIER DESIGN. THESE UNITS FEATURING ADVANCED SOLID STATE CIRCUITRY, ARE CONSERVATIVELY RATED TO DELIVER FULL CONTINUOUS SINE WAVE POWER AT RATED POWER OUTPUT. WIDE FREQUENCY RESPONSE ASSURES EXCELLENT REPRODUCTION OF SPEECH AND MUSIC.

PROTECTION FROM OVERLOAD CONDITIONS IS PROVIDED BY AN EXCLUSIVE CIRCUIT WHICH SENSES TROUBLE AND THROUGH INTERREACTION WITH THE OUTPUT TRANSISTORS, PREVENTS THEIR DESTRUCTION. THE AMPLIFIERS WILL AUTOMATICALLY RECYCLE TO A NORMAL OPERATIONAL MODE WITHIN ONE MILLISECOND AFTER THE CAUSE OF THE OVERLOAD OR SHORTED CONDITION IS REMOVED.

THESE AMPLIFIERS ARE IDEAL FOR STADIUMS, FACTORIES, LARGE OFFICE BUILDINGS, AND WHEREVER HIGH POWER IS DESIRED. AN OPTIONAL 19" RACK PANEL ASSEMBLY IS AVAILABLE FOR SYSTEM OR CONSOLE MOUNTING.

THE PROGRAM INPUT IS STANDARD 50,000 OHMS UNBALANCED. THE PROGRAM INPUT CAN BE CONVERTED TO 10,000 OR 600 OHMS BALANCED BY USE OF THE MT-4 UNIVERSAL PLUG-IN TRANSFORMER (OPTIONAL).

FOR INSTALLATIONS REQUIRING THE PROGRAM TO OPERATE FROM A MAGNETIC PHONO CARTRIDGE, THE OPTIONAL PLUG-IN PREAMPLIFIER CP-90 IS USED. THE CP-90C MAY BE USED WITH A CERAMIC OR CRYSTAL CARTRIDGE. FOR INSTALLATIONS REQUIRING THE INPUT TO OPERATE FROM A TAPE RECORDER, THE TP SERIES PLUG-IN UNITS ARE USED. THE TP-10 IS USED FOR 1-7/8 I.P.S., TP-30 FOR 3-3/4 I.P.S., AND TP-70 FOR 7-1/2 I.P.S.

THE SPEAKER OUTPUTS ARE COMPLETE WITH BALANCED 70.7 VOLT AND 25 VOLT CONNECTIONS AND AN 8 OHM UNBALANCED OUTPUT.

REMEMBER, THE NAME McMARTIN, PIONEER IN TRANSISTOR DESIGN, ASSURES OUTSTANDING PERFORMANCE, QUALITY, AND RELIABILITY.

CONNECTIONS

ALTHOUGH THESE AMPLIFIERS ARE OF RUGGED DESIGN AND WILL WITHSTAND UNUSUALLY SEVERE OPERATING CONDITIONS, SOME CARE SHOULD BE EXERCISED DURING INSTALLATION AND OPERATION.

CARE SHOULD BE TAKEN TO SEE THAT INPUT CONNECTIONS ARE MADE PROPERLY AND SECURELY. PREFERABLY, USE SPADE LUGS FOR CONNECTION TO ALL SCREW TERMINALS.

ALL UNBALANCED INPUT CONNECTIONS SHOULD BE PROPERLY SHIELDED. INPUT AND OUTPUT CONNECTIONS SHOULD NOT BE RUN FOR LONG DISTANCES IN CLOSE PROXIMITY TO ONE ANOTHER, SUCH AS THROUGH A COMMON CONDUIT.

ALL OF THESE POWER AMPLIFIERS MEET UL AND CSA CLASS II REQUIREMENTS ON ALL OUTPUTS. SO, CONDUIT WIRING FOR SPEAKER CONNECTIONS IS NOT NECESSARY EXCEPT WHERE LOCAL CODE REQUIRES THIS ON LOW VOLTAGE WIRING.

OPERATION UNDER UNLOADED CONDITIONS OR SWITCHING THE OUTPUT CIRCUITS WITHOUT A MINIMUM FIXED LOAD SHOULD BE AVOIDED UNLESS "MAKE-BEFORE-BREAK" TYPE SWITCHING IS EMPLOYED. OPERATION UNDER THESE CONDITIONS ENHANCES THE DANGER OF OUTPUT AND DRIVER TRANSISTOR FAILURE (DUE TO TRANSIENTS) ESPECIALLY UNDER HIGH LINE VOLTAGE CONDITIONS.

PROGRAM INPUT

UNBALANCED 50 K OHM INPUT

THE UNBALANCED BRIDGING INPUT PERFORMS WELL ACROSS ANY HIGH OR MEDIUM-IMPEDANCE SOURCE WITH MINIMUM OF 0.3 VOLTS. CONNECT TO LABELED SCREW HEADS.

LINE BRIDGING

THE OPTIONAL PLUT-IN MT-4 TRANSFORMER MUST BE USED. THE "LINE TRANS" SOCKET IS FACTORY WIRED FOR 10 K BALANCED. THIS BALANCED 10,000 OHM IMPEDANCE ENABLES MANY AMPLIFIERS TO BE CONNECTED TO A SINGLE 600 OHM LINE WITHOUT LOADING. THE REAR CHASSIS TERMINALS ARE MARKED "LINE IN". FOR BEST FREQUENCY RESPONSE THE LINE SHOULD BE TERMINATED WITH A SINGLE 600 OHM RESISTOR.

LINE MATCHING

THE OPTIONAL PLUG-IN MT-4 TRANSFORMER MUST BE USED AND "PROGRAM TRANS" SOCKET WIRING MODIFIED FOR BALANCED 600 OHM IMPEDANCE. MOVE THE MT-4 SOCKET WIRES CONNECTED TO PINS 5 AND 6 TO PINS 1 AND 4. CONNECT THE INPUT TO REAR CHASSIS TERMINALS MARKED "LINE IN".

PROGRAM INPUT

THE PROGRAM JACK IS MOUNTED ON THE REAR OF THE CHASSIS AND IS CONNECTED DIRECTLY TO THE TRANSFORMER SOCKET. THE PROGRAM JACK IS USED FOR CONNECTION OF A HIGH-IMPEDANCE SOURCE, SUCH AS A TUNER. WHEN A PHONO CARTRIDGE IS USED, THE CP-90 OR CP-90C MUST BE INSERTED INTO THE TRANSFORMER SOCKET MARKET "PROGRAM TRANS".

PROGRAM INPUT (CONT'D)

TAPE HEAD

FOR CONNECTION TO A TAPE PLAYBACK HEAD, INSERT THE TP-10, TP-30, OR TP-70 INTO THE "PROGRAM TRANS" SOCKET AND CONNECT THE TAPE HEAD TO THE PROGRAM JACK. THE TP-10 IS EQUALIZED FOR 1-7/8 I.P.S., THE TP-30 IS EQUALIZED FOR 3-3/4 I.P.S., AND THE TP-70 IS EQUALIZED FOR 7-1/2 I.P.S.

OUTPUTS

SUSTAINED OUTPUT OVERLOADS AND SHORT CIRCUITS AT HIGH OPERATING LEVELS SHOULD BE AVOIDED. ALTHOUGH THESE AMPLIFIERS ARE PROTECTED AGAINST SUCH OPERATING CONDITIONS, EXCESSIVE LOADING WILL CAUSE INCREASED DISTORTION AND DEGRADE PERFORMANCE. FOR OPTIMUM EFFICIENCY, THE OUTPUT CIRCUITS SHOULD BE TERMINATED WITH THE PROPER LOAD IMPEDANCE. THESE ARE INDICATED IN THE CHART FOR THE VARIOUS WATTAGE AMPLIFIERS AND CONSTANT VOLTAGE LINES. IMPROPER LOADING WILL ALSO CAUSE THE OVERLOAD LIGHT TO GIVE A FAULTY INDICATION OF POWER OUTPUT.

THE 8 OHM OUTPUT IS RECOMMENDED ONLY WHEN A SINGLE SPEAKER IS EMPLOYED IN THE SYSTEM. RUNS SHOULD BE KEPT SHORT AND WIRE OF SUFFICIENT SIZE TO HANDLE THE MAXIMUM LOAD CURRENT MUST BE USED. IF MORE THAN ONE SPEAKER IS CONNECTED TO THE 8 OHM OUTPUT, THEY SHOULD BE CONNECTED SO THAT THE TOTAL LOAD SEEN BY THE AMPLIFIER IS STILL 8 OHMS. THIS WILL REQUIRE SERIES OR PARALLEL, OR COMBINATION OF SERIES AND PARALLEL CONNECTIONS. THIS SHOULD BE DONE ONLY WITH SPEAKERS HAVING SIMILAR CHARACTERISTICS AND POWER RATINGS.

FOR MULTIPLE SPEAKER SYSTEMS THE 25 OR 70.7 VOLT LINES SHOULD BE USED. MATCHING TRANSFORMERS AT THE SPEAKER LOCATIONS SHOULD THEN BE INSTALLED AND TAPPED FOR THE DESIRED LISTENING LEVELS. THE 70.7 VOLT LINES SHOULD BE USED FOR LARGER SYSTEMS AND LONG RUNS TO MINIMIZE COST OF SYSTEM WIRING. THE MAXIMUM SYSTEM LOAD CURRENT SHOULD ALWAYS BE CALCULATED FOR THE OUTPUT CONNECTIONS USED, TO DETERMINE THE WIRE SIZE REQUIRED. THIS CAN BE DONE BY FORMULA $I = \frac{P}{V}$.

EXAMPLE, SUPPOSE WE HAVE A SYSTEM EMPLOYING AN LT-1000. A LARGE NUMBER OF SPEAKERS WILL BE REQUIRED AND RUNS MAY BE SEVERAL HUNDRED FEET FROM THE AMPLIFIER LOCATION. THE 70.7 VOLT OUTPUT SHOULD BE SELECTED AND MAXIMUM LOAD CURRENT CALCULATED AS FOLLOWS.

$$I \text{ (MAXIMUM LOAD CURRENT)} = \frac{\text{P-WATTS (AMPLIFIER RATING)}}{\text{V-VOLTS (RATED POWER OUTPUT VOLTAGE)}} = \frac{100W}{70.7V} = 1.4 \text{ AMPS}$$

A CHART SHOWING THE MAXIMUM LOAD CURRENTS FOR EACH OUTPUT OF THE LT-500A, LT-750A, AND LT-1000 IS INCLUDED. A SUITABLE WIRE SIZE SHOULD THEN BE SELECTED TO HANDLE THIS CURRENT. IF RUNS ARE LONG, IT WILL NEVER HURT TO SELECT A SIZE OR TWO LARGER

OUTPUTS (CONT'D)

TO MINIMIZE LOSSES, FOR FURTHER INFORMATION, PLEASE REFER TO A REPRINT OF "CONSTANT VOLTAGE AUDIO LINES" WRITTEN BY C.W. KING OF MCMARTIN INDUSTRIE INC., AND PUBLISHED IN THE JANUARY, 1966 ISSUE OF "SOUND MERCHANDISING."

AMPLIFIER	POWER RATING	OUTPUT		MAXIMUM LOAD CURRENT		
		25 VOLTS	70.7 VOLTS	8 OHMS	25 VOLTS	70.7 VOLTS
LT-500A	50 WATTS	12.5 OHM	100 OHMS	2.5 AMPS	2 AMPS	0.7 AMPS
LT-750A	75 WATTS	8.3 OHM	66.6 OHMS	3.1 AMPS	3 AMPS	1.1 AMPS
LT-1000	100 WATTS	6.25 OHM	50 OHMS	3.6 AMPS	4 AMPS	1.4 AMPS

INSTALLATION AND OPERATION

ONCE THE AMPLIFIER INPUT AND OUTPUT CONNECTIONS HAVE BEEN WIRED, THE AMPLIFIER IS READY TO BE PLACED IN SERVICE. BEFORE CONNECTING TO A POWER SOURCE, IT IS ADVISABLE TO CHECK LINE VOLTAGE. THESE AMPLIFIERS ARE EQUIPPED WITH POWER TRANSFORMER PRIMARY TAPS FOR 105 TO 115 VOLTS AND 115 TO 125 VOLTS. THEY ARE NORMALLY SHIPPED FROM THE FACTORY WIRED FOR 115 TO 125 VOLTS. THIS TAP SHOULD BE CHANGED TO 105/115V ONLY WHEN THE AMPLIFIER IS GOING TO BE INSTALLED IN LOCATIONS HAVING SUSTAINED LOW LINE VOLTAGE. IN MANY INDUSTRIAL LOCATIONS THE SUPPLY VOLTAGE MAY VARY CONSIDERABLY DURING DIFFERENT TIMES OF THE DAY. IF IN DOUBT, IT IS BETTER TO LEAVE THE AMPLIFIER TAPPED 115/125V. IF LINE VOLTAGE IS LOW, THE ONLY LOSS IN PERFORMANCE WILL BE A SLIGHT REDUCTION IN POWER OUTPUT.

TO CHANGE PRIMARY TAPS FROM 115/125 TO 105/115 IT IS NECESSARY TO REMOVE THE BOTTOM COVER AND UNSOLDER THE WHITE WIRE CONNECTED TO THE BLACK-RED WIRE (ON THE TERMINAL STRIP UNDER THE POWER TRANSFORMER) AND CONNECT IT TO THE BLACK-WHITE WIRE. UNDER NO CONDITIONS SHOULD THESE AMPLIFIERS BE CONNECTED TO A POWER SOURCE HAVING A SUSTAINED VOLTAGE ABOVE 125V AC.

AFTER THE AMPLIFIER HAS BEEN CONNECTED AND POWER APPLIED, THE GAIN CONTROL SHOULD BE OPENED JUST FAR ENOUGH TO REACH THE DESIRED OUTPUT LEVEL. MAXIMUM OUTPUT WILL BE INDICATED BY THE OVERLOAD LIGHT PROVIDED THE AMPLIFIER IS CORRECTLY LOADED. THE GAIN SHOULD NOT BE ADVANCED BEYOND THE POINT WHERE THIS LIGHT FLASHES OCCASIONALLY ON PROGRAM PEAKS. IF THE OVERLOAD LIGHT FLASHES CONTINUOUSLY, THIS INDICATES

THE AMPLIFIER IS BEING OVERDRIVEN, AND THE OUTPUT WILL BE GREATLY DISTORTED.

WHEN THE AMPLIFIER IS CONNECTED TO A PREAMP SUCH AS THE LX-50A, LX-40A, OR LX-600, IT IS MOST DESIRABLE TO OBTAIN AS MUCH SIGNAL AS POSSIBLE FROM THE SOURCE RATHER THAN OPERATE THE BASIC AMP AT FULL GAIN. RUNNING THE BASIC AMP AT MAXIMUM GAIN INCREASES THE HUM AND NOISE PICKUP FROM THE PREAMP OUTPUT STAGES AND THE INTERCONNECTING WIRING.

IN INSTALLATIONS WHERE THE SIGNAL LEVEL FROM THE SOURCE VARIES GREATLY, IT MAY BE DESIRABLE TO INSTALL A COMPRESSOR/LIMITER, SUCH AS THE MCMARTIN LR-1004 BETWEEN THE SOURCE AND THE BASIC AMPLIFIER. THIS LIMITER WILL THEN MAINTAIN A NEAR CONSTANT INPUT LEVEL TO THE BASIC AMPLIFIER.

ADEQUATE VENTILATION SHOULD BE PROVIDED SO THAT AN UNOBSTRUCTED AIR FLOW MAY PASS THROUGH THE BOTTOM OF THE CHASSIS, OVER THE HEAT SINKS, (LOCATED AT EACH END) AND OUT THROUGH THE TOP COVER. IF THESE AMPLIFIERS ARE OPERATED AT HIGH AMBIENT TEMPERATURES (SUCH AS IN RACK MOUNTED INSTALLATIONS WITH OTHER EQUIPMENT) IT IS DESIRABLE TO PROVIDE SOME MEANS OF FORCED AIR VENTILATION. IN INSTALLATIONS WHERE TUBE EQUIPMENT MUST BE RACK MOUNTED WITH THESE AMPLIFIERS, ALWAYS PLACE THE TRANSISTOR UNITS AT THE BOTTOM OF THE RACK.

FIELD SERVICING

ONCE THESE AMPLIFIERS HAVE BEEN PLACED INTO PROPER OPERATION, THEY SHOULD REQUIRE LITTLE OR NO SERVICING. THERE ARE NO TUBES TO BURN OUT, OR MECHANICAL PARTS TO WEAR OUT, EXCEPT THE POWER SWITCH. THE NEON PILOT LAMPS MAY REQUIRE REPLACEMENT AFTER SEVERAL YEARS OF CONTINUOUS OPERATION.

IN THE EVENT AN AMPLIFIER FAILS IN SERVICE, THE FOLLOWING INSTALLATION CHECKS SHOULD BE MADE BEFORE THE UNIT IS REPLACED OR REPAIRED AND REINSTALLED.

1. CHECK AC LINE VOLTAGE.
2. CHECK OUTPUT CONNECTIONS FOR OPENS AND SHORTS.
3. CHECK INPUT CONNECTIONS FOR PROPER TERMINATION AND SIGNAL SOURCE. IT IS DESIRABLE TO CHECK THE SIGNAL SOURCE AT THE AMPLIFIER INPUT FOR HIGH-FREQUENCY OSCILLATIONS, TRANSIENTS, AND EXCESSIVE NOISE. THIS MAY BE DONE WITH A GOOD QUALITY OSCILLOSCOPE. FM TUNERS OPERATING IN THE SYSTEM SHOULD BE SQUELCHED UNDER NO-SIGNAL CONDITIONS. HIGH FREQUENCY COMPONENTS FROM AN UNSQUELCHED TUNER CAN CAUSE EXCESSIVE HEATING.
4. CHECK INSTALLATION FOR CORRECT MOUNTING AND VENTILATION. THESE AMPLIFIERS SHOULD NEVER BE MOUNTED ON THEIR SIDE. FOR PROPER CIRCULATION OF AIR OVER THE HEAT SINKS, ALWAYS MOUNT THE UNIT UPRIGHT, OR AS NEAR SO AS POSSIBLE.

ONCE THESE CHECKS HAVE BEEN MADE, AND THE SYSTEM IS STILL NOT OPERATING, CHECK THE AMPLIFIER'S FUSING. IF THE DC FUSE IS OPEN, REPLACE IT WITH

A SLO-BLO FUSE OF THE SAME RATING AND REAPPLY POWER. IF THE FUSE FAILS AGAIN AS SOON AS POWER IS APPLIED, THE UNIT MUST BE REMOVED FOR SERVICING.

CAUTION - TO PREVENT ELECTRICAL SHOCK, DO NOT REMOVE COVERS. THERE ARE NO USER-SERVICEABLE COMPONENTS. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

REPAIR AND SHOP SERVICING

SHOP SERVICING OF TRANSISTOR EQUIPMENT SHOULD BE DONE BY QUALIFIED PERSONNEL ONLY. WITHOUT A KNOWLEDGE OF THE CIRCUITRY IN THESE UNITS, ATTEMPTS TO REPAIR THEM CAN CAUSE SERIOUS DAMAGE. THE FOLLOWING EQUIPMENT IS ESSENTIAL BEFORE ANY WORK IS STARTED.

1. VOM WITH DC CURRENT RANGES.
2. VARIABLE VOLTAGE AC SOURCE FROM 0 TO 125 VAC.
3. OSCILLOSCOPE.
4. AUDIO OSCILLATOR.
5. 8 OHM LOAD (NON INDUCTIVE).

1. REMOVE THE AMPLIFIER'S TOP AND BOTTOM COVERS AND CHECK THE AC FUSE. CONNECT A 0-500 MA DC METER ACROSS THE DC FUSE TERMINALS AND REMOVE THE DC FUSE (+ TERMINAL TO GROUND, - TERMINAL TO POWER TRANSFORMER CENTER TAP). CONNECT THE AMPLIFIER TO THE VARIABLE AC SOURCE SET TO 0 VOLTS AND TURN ON THE POWER SWITCH. RAISE SUPPLY VOLTAGE SLOWLY AND WATCH DC CURRENT. IF IT RISES SUDDENLY TO OVER 300 MA, REMOVE POWER.

2. REMOVE THE OUTPUT AND DRIVER TRANSISTORS AND CHECK FOR COLLECTOR TO EMITTER SHORTS. THIS CAN BE DONE WITH A SIMPLE OHMETER CHECK OR WITH A SUITABLE TRANSISTOR RESTER, IF AVAILABLE. REPLACE ANY SHORTED DEVICES AND REPEAT THE ABOVE PROCEDURE. ONCE THE SUPPLY VOLTAGE IS BROUGHT UP TO 120V AC, THE IDLING CURRENT (NO SIGNAL) SHOULD BE ABOUT 150 TO 200 MA. THIS MAY BE ADJUSTED BY THE BIAS CONTROL R-11.

3. REPLACE THE DC FUSE AND CHECK THE FULL SUPPLY VOLTAGE AT POINT A. ALSO CHECK THE CENTER POINT VOLTAGE AT POINT B WHICH SHOULD BE 1/2 OF THE VOLTAGE AT POINT A.

4. WHEN THE SUPPLY VOLTAGES AND IDLING CURRENT ARE NORMAL, AN 8 OHM LOAD MAY BE CONNECTED TO THE 8 OHM OUTPUT AND SIGNAL APPLIED TO THE INPUT. FEED IN 1 KHZ SINE WAVE AND OBSERVE THE OUTPUT ON A SCOPE. IF NO SIGNAL APPEARS AT THE OUTPUT, CHECK THE PROTECTIVE TRANSISTOR Q-8 AND THE PREAMP STAGES Q-1 AND Q-2. ALSO CHECK THE PREAMP SUPPLY VOLTAGE AT POINT C. (THIS SHOULD BE BETWEEN 45 AND 55 VOLTS DC)

4. ONCE THE ABOVE CHECKS AND REPAIRS ARE MADE, THE AMPLIFIER, IN MOST CASES WILL BE BACK IN OPERATION. OTHER SECTIONS SUCH AS THE POWER SUPPLY ARE VERY CONVENTIONAL, AND SHOULD PRESENT NO SERVICE PROBLEM TO A QUALIFIED TECHNICIAN.

AS A FINAL CHECK, BRING THE AMPLIFIER UP TO RATED POWER AT 1 KHZ AND CHECK FOR SYMMETRICAL CLIPPING, PROPER-OPERATION OF THE OVERLOAD LIGHT, CORRECT OUTPUT VOLTAGE ACROSS THE 70.7 AND 25 VOLT LINES, ETC. IF DISTORTION MEASURING EQUIPMENT IS AVAILABLE, IT MAY ALSO BE DESIRABLE TO CHECK IM (AT LOW LEVEL), HARMONIC DISTORTION, AND FREQUENCY RESPONSE. DO NOT LEAVE A SINE WAVE APPLIED TO THE AMPLIFIER AT FULL POWER ABOVE 10 KHZ FOR MORE THAN A FEW MINUTES.

AFTER THE AMPLIFIER HAS WARMED UP, CHECK IDLING CURRENT ONCE MORE AND RESET FROM 200 – 250 MA MAXIMUM.

WARNING – WHEN CHECKING IDLING CURRENT WITHOUT RAISING SUPPLY VOLTAGE SLOWLY, CONNECT THE METER, APPLY POWER, AND THEN REMOVE THE DC FUSE WITH NO INPUT SIGNAL. CHARGING CURRENT FROM THE POWER SUPPLY FILTERS WILL DAMAGE THE METER IF THE FUSE IS REMOVED BEFORE POWER IS APPLIED.

REPLACEMENT PARTS LIST

LT–500A
LT–750A
LT–1000

SYMBOL NO.	STOCK NO.	DESCRIPTION
C–1	600030	CAPACITOR, 2.5 MFD 64V, TUBULAR
C–2	600035	CAPACITOR, 32 MFD 64V, TUBULAR
C–3	600013	CAPACITOR, 100 MFD 64V, TUBULAR
C–4	600011	CAPACITOR, 50 MFD 25V, TUBULAR
C–5	600002	CAPACITOR, 40 MFD 150V, TUBULAR
C–6	640014	CAPACITOR, 180 PFD ± 10 PERCENT 500V, DISC.
C–7	600022	CAPACITOR, 320 MFD 6.4V, TUBULAR
C–8	601022	CAPACITOR, 500 MFD 150V, T/P MT.
C–9	601020	CAPACITOR, 1000 MFD 100V, T/P MT.
C–10	630026	CAPACITOR, 22 MFD 200VM TUBULAR
C–11	600005	CAPACITOR, 50 MFD 6.4V, TUBULAR
C–12	601022	CAPACITOR, 500 MFD 150V, T/P MT.
C–13	601022	CAPACITOR, 500 MFD 150V, T/P MT.
C–14	640011	CAPACITOR, .02 MFD ± 20 PERCENT, 500V, DISC.
C–15	600013	CAPACITOR, 100 MFD 64V, TUBULAR
C–16	640014	CAPACITOR, 180 PFD ± 10 PERCENT, 500V, DISC.
	RESISTORS ARE ALL CARBON COMPOSITION, ± 5 PERCENT AND RATED AT 1/2 WATT UNLESS OTHERWISE SPECIFIED	
R–1	400035	CONTROL, 50 K OHM ± 20 PERCENT 1/2W
R–2	502164	RESISTOR, 1.5 M OHM
R–3	502136	RESISTOR, 100 K OHM
R–4	502092	RESISTOR, 1.5 K OHM
R–5	502130	RESISTOR, 56 K OHM
R–6	511012	RESISTOR, 3.3 K OHM ± 10 PERCENT 1W
R–7	502104	RESISTOR, 4.7 K OHM (LT–500A)
R–7	502106	RESISTOR, 5.6 K OHM (LT–750A)
R–7	502108	RESISTOR, 5.8 K OHM (LT–1000)
R–8	502100	RESISTOR, 3.3 K OHM
R–9	533033	RESISTOR, 1 K OHM ± 10 PERCENT, 5 W, B/T
R–10	533033	RESISTOR, 1 K OHM ± 10 PERCENT, 5W, B/T
R–11	401005	CONTROL, 25 OHM 5W
R–12	502040	RESISTOR, 10 OHM
R–13	502124	RESISTOR, 33 K OHM
E–14	502102	RESISTOR, 3.9 OHM
R–15	502068	RESISTOR, 150 OHM
R–16	502060	RESISTOR, 68 OHM
R–17	502040	RESISTOR, 10 OHM

REPLACEMENT PARTS LIST

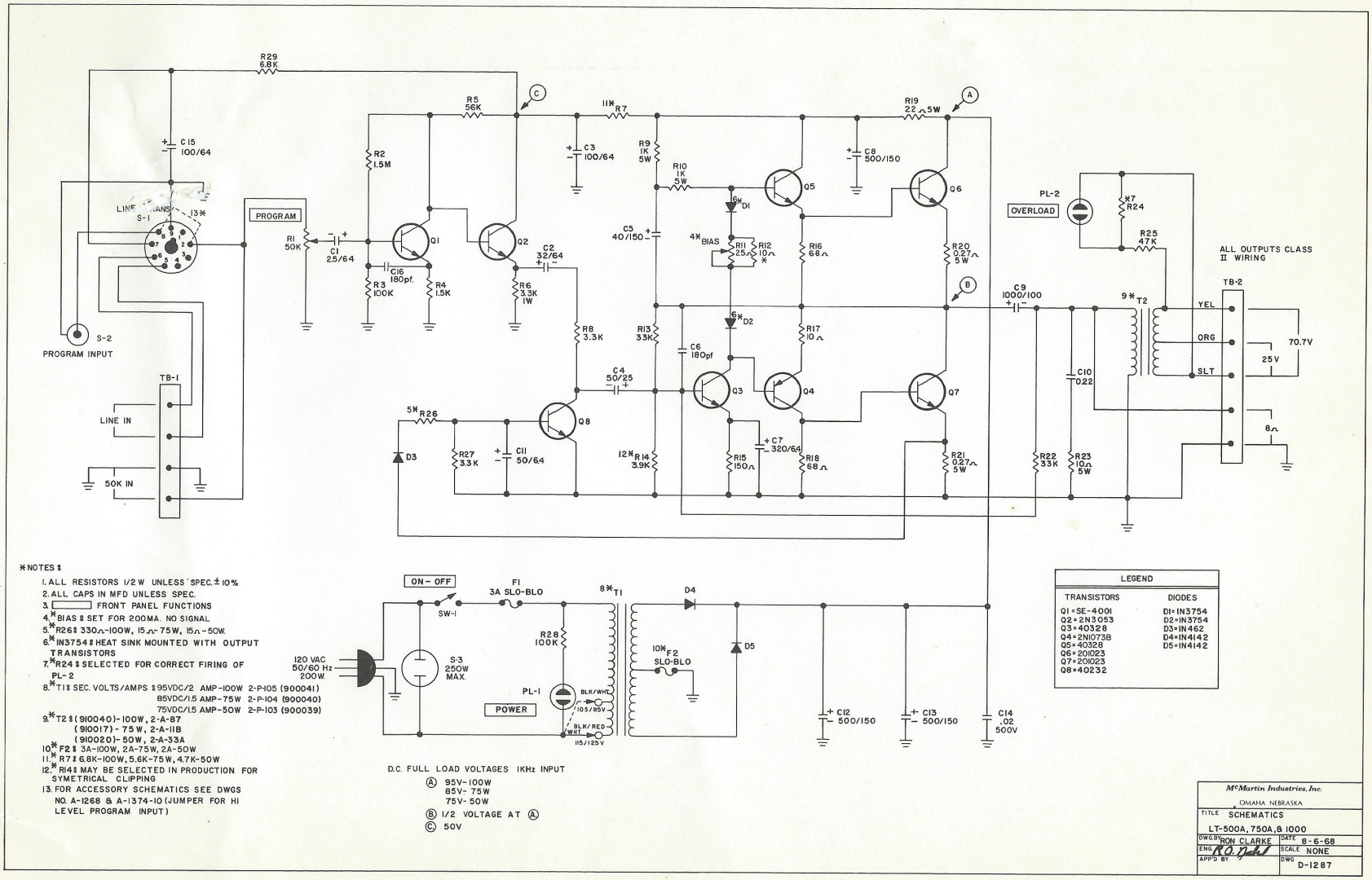
LT–500A
LT–750A
LT–1000

SYMBOL NO.	STOCK NO.	DESCRIPTION
R–18	502060	RESISTOR, 68 OHM
R–19	533009	RESISTOR, 22 OHM ± 10 PERCENT 5 W, B/T
R–20	533024	RESISTOR, .27 OHM ± 10 PERCENT 5W, B/T
R–21	533024	RESISTOR, .27 OHM ± 10 PERCENT 5W, B/T
R–22	502124	RESISTOR, 33 K OHM
R–23	533030	RESISTOR, 10 OHM ± 10 PERCENT, 5W, B/T
R–24	502144	RESISTOR, 220 K OHM
R–25	502128	RESISTOR, 47 K OHM
R–26	502044	RESISTOR, 15 OHM (LT–750A AND LT–500A)
R–26	502076	RESISTOR, 330 OHM (LT–1000)
R–27	502100	RESISTOR, 3.3 K OHM
R–28	502136	RESISTOR, 100 K OHM
R–29	502108	RESISTOR, 6.8 K OHM
D–1	220014	DIODE, IN–3754
D–2	220014	DIODE, IN–3754
D–3	220003	DIODE, IN–462
D–4	210009	DIODE, 3A400 (IN–4142), RECTIFIER
D–5	210009	DIODE, 3A400 (IN–4142), RECTIFIER
Q–1	201022	TRANSISTOR, SE–4001 OR EQUIVALENT
Q–2	201024	TRANSISTOR, 2N–3053 OR EQUIVALENT
Q–3	201034	TRANSISTOR, 40328 OR EQUIVALENT
Q–4	201051	TRANSISTOR, MOTOROLA 2N–1073B
Q–5	201034	TRANSISTOR, 40328 OR EQUIVALENT
Q–6	201023	TRANSISTOR, DELCO DTS–410 OR EQUIVALENT
Q–7	201023	TRANSISTOR, DELCO DTS–410 OR EQUIVALENT
Q–8	201019	TRANSISTOR, 40232 OR EQUIVALENT
T–1	900039	TRANSFORMER, 2P–103, POWER (LT–500A)
T–2	910020	TRANSFORMER, 2A–33A, OUTPUT (LT–500A)
T–1	900040	TRANSFORMER, 2P–104, POWER (LT–750A)
T–2	910017	TRANSFORMER, 2A–11B, OUTPUT (LT–750A)
T–1	900041	TRANSFORMER, 2P–105, POWER (LT–1000)
T–2	910040	TRANSFORMER, 2A–87, OUTPUT (LT–1000)
SW–1	480002	SWITCH, POWER, SPST TOGGLE
F–1	280022	FUSE, 3 AMP 125V, SLO–BLO, P/T
F–2	280018	FUSE, 3 AMP 125V, SLO–BLO (LT–1000)
F–2	280019	FUSE, 2 AMP 125V, SLO–BLO (LT–500A, LT–750A)
PL–1	291002	PILOT LAMP, RED
PL–2	291001	PILOT LAMP, WHITE
TB–1	151017	TERMINAL BOARD, 4 SCREW
TB–2	151018	TERMINAL BOARD, 5 SCREW

REPLACEMENT PARTS LIST

LT–500A
LT–750A
LT–1000

SYMBOL NO.	STOCK NO.	DESCRIPTION
S–1	170010	SOCKET, 9 PIN OCTAL
S–2	172002	PHONO JACK, ROUND
S–3	170031	AC OUTLET



*NOTES:

1. ALL RESISTORS 1/2 W UNLESS SPEC. ± 10%
2. ALL CAPS IN MFD UNLESS SPEC.
3. ☐ FRONT PANEL FUNCTIONS
4. *BIAS IS SET FOR 200MA. NO SIGNAL
5. *R26 IS 330Ω-100W, 15Ω-75W, 15Ω-50W.
6. *IN3754 IS HEAT SINK MOUNTED WITH OUTPUT TRANSISTORS
7. *R24 IS SELECTED FOR CORRECT FIRING OF PL-2
8. *T1 IS SEC. VOLTS/AMPS: 95VDC/2 AMP-100W 2-P-105 (900041)
   85VDC/1.5 AMP-75W 2-P-104 (900040)
   75VDC/1.5 AMP-50W 2-P-103 (900039)
9. *T2 IS (910040)-100W, 2-A-87
   (910017)-75 W, 2-A-11B
   (910020)-50W, 2-A-33A
10. *F2 IS 3A-100W, 2A-75W, 2A-50W
11. *R7 IS 6.8K-100W, 5.6K-75W, 4.7K-50W
12. *R14 IS MAY BE SELECTED IN PRODUCTION FOR SYMETRICAL CLIPPING
13. FOR ACCESSORY SCHEMATICS SEE DWGS NO. A-1268 & A-1374-10 (JUMPER FOR HI LEVEL PROGRAM INPUT)

LEGEND	
TRANSISTORS	DIODES
Q1=SE-4001	D1=IN3754
Q2=2N3053	D2=IN3754
Q3=40328	D3=IN462
Q4=2N1073B	D4=IN4142
Q5=40328	D5=IN4142
Q6=201023	
Q7=201023	
Q8=40232	

D.C. FULL LOAD VOLTAGES 1KHz INPUT

Ⓐ 95V-100W
85V-75W
75V-50W

Ⓑ 1/2 VOLTAGE AT Ⓐ

Ⓒ 50V

McMartin Industries, Inc.
OMAHA NEBRASKA

TITLE	SCHEMATICS LT-500A, 750A, & 1000
DWG BY	RON CLARKE
DATE	8-6-68
ENG	
SCALE	NONE
APP'D BY	
DWG	D-1287