



McMartin

MX-5

MIXER/PREAMPLIFIER

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McMartin®

MX-5

MIXER/PREAMPLIFIER

INSTRUCTION MANUAL

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I. TECHNICAL SPECIFICATIONS

INPUTS

Microphone..... Four (4) Total: Channel #1 switchable to operate as 1 kHz tone generator. Channels #3 and #4 convertible to RIAA equalized magnetic phono service, by internal plug reversal

Program..... One

INPUT IMPEDANCES

Mic Channels.... ..50-150 ohms balanced; may be modified to 25K-ohms unbalanced by internal strapping. Channels #3 and #4 switchable to 47K-ohms for magnetic phono service by internal plug reversal

Program Channel.. ..600 ohms, balanced (matching); 10K-ohms, balanced (bridging); or 25K-ohms, unbalanced, (bridging)

INPUT LEVELS

Mic Channels.... ..-60 dBV balanced; -28 dBV overload point; -55 dBV, unbalanced. Channels 3 & 4 in magnetic phono mode: 2 millivolts @ 1 kHz

Program Channel.. ..600 ohms matching or 100 millivolts, 25K-ohms, unbalanced

FREQUENCY RESPONSE

Mic Channels.... .. ± 1.0 dB, 50-20,000 Hz, ± 2.0 dB, 20-20,000 Hz; or -10 dB roll-off @50 Hz by internal plug reversal. Channels #3 & #4 in magnetic phono mode: within 2.0 dB of RIAA curve

Program Channel.. .. ± 0.5 dB, 50-20,000 Hz; ± 1.0 dB, 20-20,000 Hz

NOISE

Mic Channels.... ..65 dB (wide band) and 72 dB (with 15 kHz low pass filter) below +8 dBm output, with 3.0 mV input signal. Equivalent Input Noise: -122 dBm. Channels #3 & #4 in magnetic phono mode: -55 dB

Program Channel.. ..80 dB (wide band) and 85 dB (w/15 kHz LP filter) below +18 dBm output

OUTPUT IMPEDANCES & LEVELS.....

A) 600 ohms balanced: +4 or +8 dBm, nominal; +18 dBm maximum into 600-ohm load

B) 5K-ohms, unbalanced @3.0 volts, rms

C) 50/150 balanced: -45 dBm

D) Headphone jack: 600 ohms, unbalanced (isolated) @ +12 dBm

TOTAL HARMONIC & INTERMODULATION DISTORTION.....

..... 0.5% or less, 20-20,000 Hz @ +8 dBm output level; 1.0% or less, 20-20,000 Hz @ +18dBm output level

FRONT PANEL CONTROLS.....

.... Mic #1/tone generator level, Mic #2 level, Mic #3 & #4/equalized phono levels, Program level, and Master gain

FRONT PANEL SWITCHES.....

.... + 4 or +8 dBm metering and power on/off

REAR PANEL SWITCHES.....

..... Mic #1/Tone Generator

REAR PANEL TERMINATIONS.....

... Channel #1 to #4 inputs, C1F connectors; Mic Level Output, C1M connector; Balanced program input and balanced 600-ohm output, screw terminals; unbalanced program input and 5K-ohm unbalanced output, RCA phono jack; 36-volt dc external power, two-pin Cinch Jones socket

POWER REQUIREMENTS.....

..105-125 Vac, 50/60 Hz, 3 watts. (Fuse: 1/8 ampere, slow-blow); or 36 Vdc, 70 mA

DIMENSIONS.....

.....12-3/4" (32.4 cm) wide
2-3/4" (7.0 cm) height
7-3/4" (19.7 cm) deep

SHIPPING WEIGHT.....

.....6 pounds

FINISH.....

... McMartin blue and silver gray

II. GENERAL DESCRIPTION

The McMartin MX-5 mixer/preamplifier is an extremely versatile unit designed for individual level control and signal processing of five separate input sources, with amplification of these premixed sources to line level output.

The five input sources are mixed by front panel controls; four at microphone signal level, either with 50-150 ohm balanced characteristics, or by internal plug reversal, with 25K-ohm unbalanced configuration; and the fifth at program level.

Two of the microphone-level channels are convertible to RIAA-equalized magnetic phono service, by reversal

of internal plugs. The first microphone channel may be converted, by a rear panel slide switch, to operate as a 1-kHz sine-wave tone generator for system test level pre-adjustment purposes.

The four microphone channel response characteristics, by internal plug reversal, may be either 'flat' or attenuated 10 dB at 50 Hertz.

Rear chassis XL-type female connectors serve as the input termination for each of the four microphone-level channels.

The program input channel will accept either a 25K-ohm unbalanced source through a rear-panel RCA phono jack, or alternatively through rear-chassis screw terminals, a 600-ohm matching input.

A front panel master gain control permits overall level adjustment of the premixed input signals.

Balanced, 600-ohm output, with +18 dBm level capability, appears on rear panel screw terminals. Alternatively, a separate 5K-ohm unbalanced output at 3.0 volts rms level, is brought out to a rear panel RCA phono jack.

Output level is visually monitored by an illuminated VU meter, calibrated to display 'zero VU' when either a +8 dBm or +4 dBm level, by front panel switch selection, appears at the balanced output terminals.

In addition, a microphone level output is terminated in an XL-type male connector.

Isolated headphone output, at +18 dBm level, appears on a standard 1/4" rear panel phone jack.

AC power is controlled by a front-panel slide switch. The MX-5 may be powered from an external 36-volt dc source through a rear-panel dc power jack.

Finished in McMartin blue and silver gray, the MX-5 is designed for desk-top or shelf-mount operation.

III. INSTALLATION

After unpacking the unit, inspect thoroughly for either external or internal damage. If any is detected, immediately notify the shipping carrier and advise McMartin of said action.

During the above internal inspection where the top cover has been removed, changes in channel impedances or function (as channel #3 or #4 magnetic phono service) should be made by proper jumper plug orientation (See Dwg. #000519).

Inputs to the four microphone/microphone-phono channels are terminated in 3-pin, XL-type female connectors. A balanced-line 600-ohm program input may be attached to a screw-type rear-chassis terminal strip, using shielded two-conductor cable, with the shield attached to the 'ground' terminal. Alternatively if an unbalanced, high-impedance program source is used, this connection is made through an RCA phono jack located on the rear panel, with the associated jumper in the UNBAL position.

Balanced, 600-ohm output appears on rear-panel screw terminals. Interconnection to external equipment should be made with shielded two-conductor cable with the shield attached to the GND terminal of the output screw terminals.

MX-5 output, at a nominal -40 dBm level, appears on a rear-chassis 3-pin male, XL type connector. Unbalanced high-impedance output is terminated on a rear-chassis, RCA phono jack.

The output may be monitored through a rear-panel headphone jack. This provides a +18 dBm level at 600 ohms. Although headphones of 600-ohm or higher impedance are recommended, usable level is available for headphones of lower impedance.

The four low-level microphone input channels will accept balanced, 150-ohm microphones, or alternatively, by jumper-plug reversal (See Dwg. #000519) unbalanced high-impedance microphones. Channel 3 and 4 will also accept magnetic phono inputs. For this operation, the appropriate MIC/PHONO and LO/HI jumper plugs should be reversed.

High-impedance or magnetic phono input connections are made to pins #1 and #3 (#1 is ground) of the input XL-connectors.

An internal TONE GENERATOR, associated with the MIC #1 input is energized by operation of the rear panel TONE/MIC switch. The level of the tone is adjusted by the MIC #1 mixer control for setting system levels.

IV. CIRCUIT DESCRIPTION

Microphone input signals are amplified to mixing bus level by use of dual amplifiers located in IC-1 and IC-2. One half of each IC is used per input channel, and since the operation for each of the microphone inputs is essentially identical, except for input/output pin designations for the IC's, the operation of MIC 2 input only will be described.

The balanced input signal is fed to pins 2 and 3 of the XL input connector, through T-2 to the input terminal, pin 8 of IC-1B. (C-7 provides RF filtering). Note that for high impedance microphone inputs (pins 1 & 3 of input connector), T-2 is bypassed by reversing the HI/LO jumper plug. The input signal path is then directly to pin 8 of IC-1B. The frequency response of IC-1B may be changed from FLAT to a -10 dB roll-off curve by placing the FLAT/BASS CUT jumper plug in the position which selects the C-11, rather than the C-10, capacitor. These capacitors, in conjunction with R-8, R-9 and R-10, comprise the proper feedback network for establishing the frequency response of IC-1B. The output of IC-1B, pin 5, is fed to MIC 2 mixer control R-12, the rotor of which through mixing bus load resistor R-13 feeds the bus input to the balance of the circuitry.

The operation of MIC-1 for TONE GENERATOR operation and MIC-3 and MIC-4 for magnetic phono operation are slightly different than the MIC-2 operation just described.

When tone generation is desired, SW-3 is placed in the TONE position. This applies operating voltage to the tone generator circuitry associated with Q-1 and Q-2, producing a sine wave output signal of nominally 1000 Hertz. Operation of SW-3 in the TONE position also switches the input to MIC-1 mixer control, R-6, from the output of IC-1A to the output of the tone generator.

The magnetic phono equalization (within 2 dB of the RIAA curve) for PHONO operation of mixers #3 and #4 is performed by placing the MIC/PHONO jumper plug in

the PHONO position. For channel #3 (channel #4 is identical), when the jumper plug is in the PHONO position a feedback network consisting of R-16, R-17, R-18 and R-19 and C-14, C-15, C-16 and C-18 is inserted between the IC-2A input and output producing the desired RIAA response curve. Note: when channels #3 and/or #4 are operated in PHONO mode, the associated FLAT/BASS CUT jumper plugs should always be in FLAT position.

Balanced 600-ohm program input sources at a nominal -10 dBm level may be fed to channel #5, through connection to TB-1A. This input is transformer-isolated by T-5 with the jumper plug in the BAL position. Bridging balanced inputs may be used by removing R-26 and R-38. Unbalanced inputs are fed into a rear-panel RCA phono jack. T-5 is bypassed for such inputs by positioning the jumper plug in the UNBAL position.

Balanced, or unbalanced program inputs, feeds the PGM mixer control, R-39.

The mixer bus (combination of mixer channel #1 through #5 outputs) is fed to the R-50 MASTER gain control. The rotor of R-50 feeds the inputs of IC-3. One section, IC-3A, of this dual audio integrated circuit drives the headphone output jack. The remaining half, IC-3B, in conjunction with Q-3, provides a high-level unbalanced low-impedance output signal which is transformed to a balanced, 600-ohm output by T-2. A separate unbalanced 5000 ohm output is terminated on a rear-chassis RCA phono jack. The balanced output is visually monitored by the front panel VU meter, M-1, and is terminated at TB-1B. Line levels of either +4 or +8 dBm may be monitored by proper switch position of SW-2. In addition, this output is attenuated by the network of R-4, 5 and 6 to provide a nominal -40 dBm microphone level output at a rear-panel 3-pin male XL-type connector.

The MX-5 contains a dc power supply, with on/off ac power controlled by POWER switch SW-1. LM-1 provides neon-lamp VU meter illumination. D-2 and D-3 provide full wave center tap rectification of T-1 secondary ac voltage. C-43 is the filter capacitor. This dc voltage is regulated by pass transistor Q-4, referenced to a

36-volt Zener diode, Z-1, and the capacitance multiplier effect of C-42. The MX-5 may also be operated from an external 36 volt dc source, capable of delivering a constant load of 70 milliamperes. 1N4004 diodes series-connected in the internal and external dc power supply feeds isolate the two power sources and prevent damage from connection of an external dc supply of reverse polarity.

V. MAINTENANCE

Maintenance and repair of the MX-5 should be performed only by qualified service personnel experienced in transistor/integrated circuit technology. McMartin Industries maintains a full-time staff qualified to perform this type of service. Factory repair insures that original equipment parts will be used rather than similar-type replacement components.

Before attempting repair, the following preliminary checks should be made:

1. Ascertain that power is actually being applied to the equipment. Check power source, line cord and plug, fuse and front panel ac switch.
2. Disconnect external lines from TB-1B and substitute a 600-ohm resistor. If the MX-5 is now operational, the trouble exists in the interconnecting line or in equipment external to the MX-5.
3. Check input sources, microphone cables and connectors. Interchange microphones between mixing channels. If one microphone is 'dead', logical substitutions will help in isolating a defective unit.
4. Check input switches for proper positioning.

In the event the above conditions are satisfied, it may be assumed that the MX-5 is at fault. The following fault location tabulation will be helpful in isolating the problem and remedying same.

Symptom	Cause
No VU meter illumination	Check power switch SW-1 and fuse, F-1. Shorted primary winding (T-1) Shorted rectifiers (D-2, D-3) Shorted filter capacitor (C-43)
Fuse fails when power applied	
No +36 Vdc at power supply output (cathode of D-1)	Ground short on positive supply on main PCB. Open regulator transistor, Q-4 Defective isolating diode, D-1, Shorted Zener diode, Z-1 Shorted filter capacitor, C-43 Open rectifier, D-2 or D-3 Open power transformer, T-1 Defective switch, SW-1 Open fuse, F-1
No output or distorted output at TB-1B, but headphone output okay	Output line shorted. Defective transistor, Q-3 Defective line transformer, T-2 Defective output coupling capacitor, C-37. 'B' section of IC-3 defective

Symptom	Cause
Output level okay, but no headphone output or distorted headphone signal	"A" section of IC-3 defective. Capacitor C-40 defective.
One microphone channel 'dead' or distorted	Check HI/LO jumper plug for proper position Microphone may be defective Transfer input mic plug to another channel If that channel okay, microphone defective. If not, check input transformer, IC; input and output coupling capacitors.
Channels 1 & 2 both okay, but Channels 3 & 4 both 'dead' or vice versa	Defective IC, or decoupling RC network (C-8, R-11 or C-26, R-32) from dc supply Check pin #6 on IC's.
No signal through balanced program input	Check position of BAL/UNBAL jumper plug. MUST be in BAL position.

VI. PARTS LIST

The majority of components used in the MX-5 are of standard values and tolerances and are generally available from local electronics parts wholesalers. Those of unusual value, tolerances or mechanical configuration or of McMartin manufacture are listed below. In ordering replacement parts, please specify model, serial number, McMartin part number and description.

CHASSIS PARTS

Symbol	Part Number	Description
D-1	210008	Diode, type 1N4004
F-1	280016	Fuse, .125 amp, slo-blo
LM-1	290013	Lamp, neon, A9A, 110 V
M-1	700063	Meter, VU
R-5, R-12, R-22, R-33, R-39, R-50	401019	Control, mixer or master; 50K-ohm C-1 taper
T-1	900076	Transformer, power
T-2	910046	Transformer, line output

MAIN PCB PARTS

C-1, C-6, C-12, C-21, C-34, C-39	600052	Capacitor, electrolytic, 0.5 mfd/63 V
C-8, C-26, C-37	600011	Capacitor, electrolytic, 47 mfd/25 V
C-35	600034	Capacitor, electrolytic, 47 mfd/63 V
C-42, C-43	600013	Capacitor, electrolytic, 100 mfd/63 V
D-1, D-2, D-3	210008	Diode, type 1N4004
IC-1, IC-2, IC-3	230062	Integrated Circuit, dual; type LM387N
Q-3	201071	Transistor, type MPS-U05
Q-4	201024	Transistor, type 2N3053
R-45	410053	Trimmer, resistor; 2.5K-ohm
T-1 through 4	910060	Transformer, microphone input
T-5	910052	Transformer, program input
Z-1	220008	Diode, Zener; 36 volt

WARRANTY

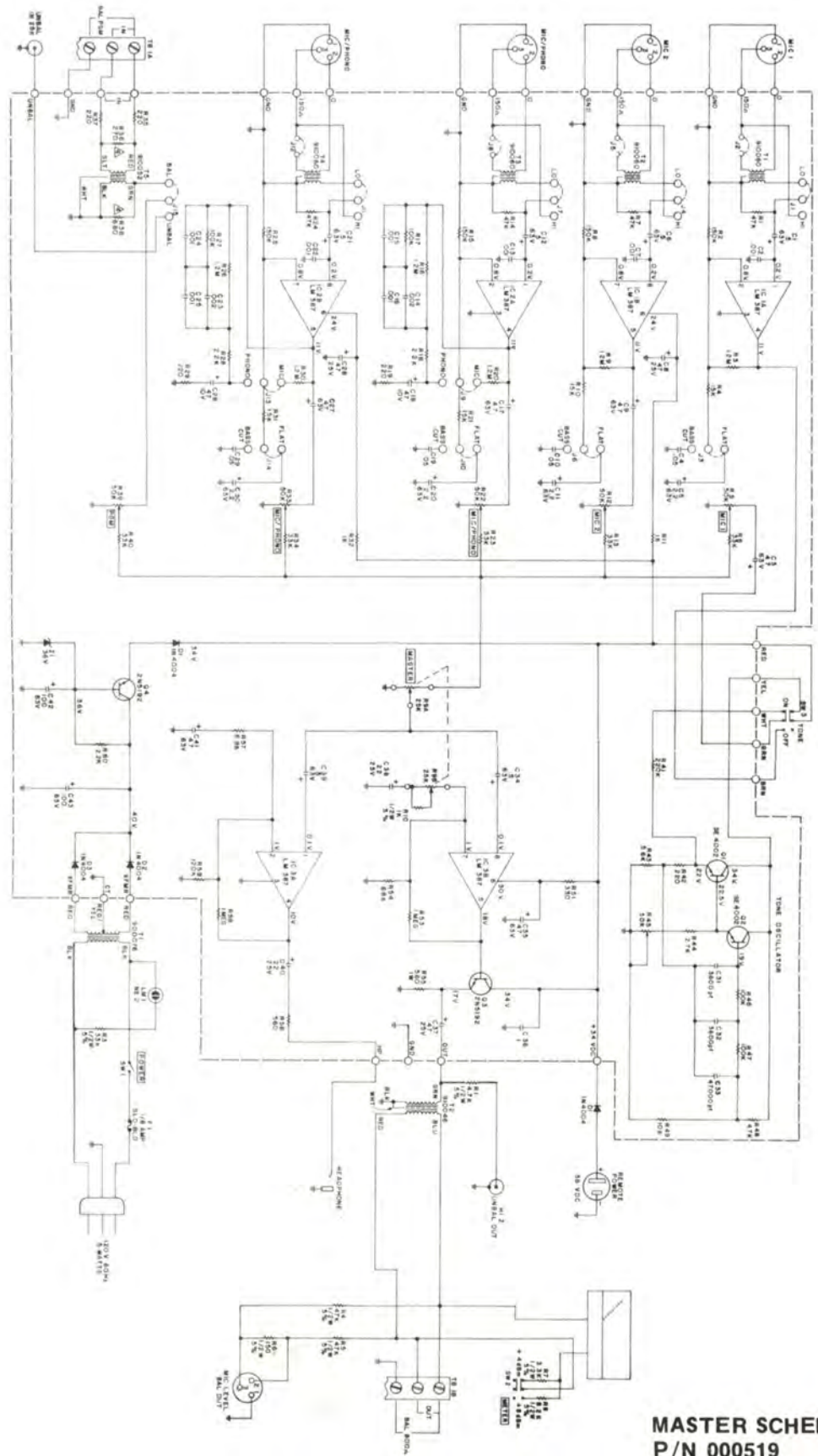
McMartin products are warranted to be free from defects in materials and workmanship for a period of one year after shipping date, when subjected to normal usage and service. All warranties are void if (a) equipment has been altered or repaired by others without McMartin's specific prior authorization; or (b) equipment is operated under environmental conditions or circumstances other than those specifically described in McMartin literature or instruction manuals.

Upon notification within the applicable warranty period, McMartin agrees without charge, to repair, replace, or supply replacement parts for any properly maintained equipment or parts that are defective as to design, materials or workmanship and that are returned in accordance with McMartin's instructions to the Buyer. At McMartin's sole discretion, the Buyer may be requested to return the defective part or equipment to McMartin, FOB Omaha, Nebraska. Parts or equipment may be returned only with McMartin's prior authorization and must be identified by a return authorization number previously issued by McMartin's Customer Service Department. All merchandise so returned must be sent transportation prepaid, at Buyer's risk. Full details of the failure or malfunction should be included so as to expedite repair or replacement. Repair parts or repaired or replaced equipment will be returned to the Buyer, FOB factory.

The above warranty does not extend to other equipment, such as tubes, transistors, I.C.'s lamps or fuses manufactured by others, which are subject to only such adjustment as McMartin may obtain from the suppliers thereof. McMartin shall not be liable for consequential damages resulting from the use of, or the inability to use, the equipment; nor for any loss, damage or expense incurred thereby; nor from any other cause.

Except as set forth herein, and except as to title, there are no warranties, or any affirmations of fact or promises by McMartin, with reference to the equipment, or to merchantability, fitness, for particular application, signal coverage, infringement, or otherwise, which extend beyond the description of the equipment on the face hereof.

- 5. 750 Ω BALANCED 500 Ω IN OUT
- 6. REMOVE 500 Ω RES FOR MONITOR BAL IN/OUT
- 7. 100 Ω POTENTIOMETER FROM PANEL FUNCTION
- 8. 500 Ω RESISTOR FROM PANEL FUNCTION
- 9. 100 Ω RESISTOR FROM PANEL FUNCTION
- 10. 100 Ω RESISTOR FROM PANEL FUNCTION



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