# TECHNICAL SERVICE MANUAL for





2500 Walden Ave. Buffalo, N.Y. 14225



#### INTRODUCTION

This manual provides servicing and parts information for Maestro Model MP-1 Phaser, manufactured by Norlin Music, Inc., 2500 Walden Avenue, Buffalo, New York 14225. The Maestro Phaser generates standard phasing effects for guitar, bass and other electroacoustical music signals. Specifications for the Maestro Phaser include:

Input Imped	ance 1 megohm
Maximum R	ecommended
Input Lev	el10dBm
Output Imp	edance 5K ohms
Insertion Lo	ss 0dB
Output Nois	e82dBm
Phasing Stag	es 6
Range of SP	EED Control 0.10 Hz to 6.5 Hz
Power Requ	irements 9.0 VDC at 3.0 mil-
	liamperes nominal
Recommend	ed Battery Type NEDA 1604

Estimated Battery Life . . . . . 100 hrs.

#### CIRCUIT DESCRIPTION

The Maestro Phaser produces phasing effects by movement of an active filter and consists of: (1) an input buffer and summing amplifier section which conditions the input signal from the signal source; (2) a six stage current controlled phase shifting chain which generates the phasing effect; (3) a low frequency triangle oscillator and exponential current source which drives the phase shift chain; and (4) a power supply section which powers the unit. Operating controls consist of a SPEED control which adjusts the phasing rate, a BALLS control which adjusts the phasing effect and an internal foot switch which selects either the output of the phase shift chain or the unaltered signal. Refer to Figure 4 for the schematic diagram.

Input Buffer and Summing Amplifier

In the phasing mode, the input signal from AXE jack J1 is coupled to input buffer IC1A converting the source's high input impedance to a low output impedance for driving summing amplifier IC1B. IC1B inverts the signal, adds a gain of 1.4 and sums the output signal from BALLS control R35 with the input signal. The output of summing amplifier IC1B drives the phase shift chain.

#### Six Stage Phase Shift Chain

The phase shift chain starts with IC2, an operational transconductance amplifier (OTA) with a Darlington output stage. The OTA has a current output with very high output impedance while the Darlington stage isolates the output of the OTA from the load. IC2 is used as a current controlled phase shift element and, with surrounding circuitry, can be substituted by the simple equivalent circuit illustrated in Figure 1.

The signal from IC1B is coupled through C5 and  $R_{\rm C}$  in series with an inverter resulting in a network with a gain of one and a frequency dependent phase shift. With a dc input, C5 has no effect on phase resulting in a phase shift of 180 degrees. As the frequency increases, C5 comes into effect and the phase shift heads toward 360 degrees. At a frequency equal to  $2\,\pi\,R_{\rm C}$ C, the phase shift is 270 degrees. The value of  $R_{\rm C}$  is controlled by  $I_{\rm C}$  into pin 5. As  $I_{\rm C}$  increases, the effective value of  $R_{\rm C}$  as well as the phase decreases but gain remains the same. Therefore, the phase shift is current controlled.

IC3 through IC6 operate in a manner identical to IC2. The phase shift of each stage adds to all previous stages and since they are driven by the same current from Q1B, they move together. The five moveable stages are followed by a stationary stage, IC7B. This phase shift stage is fixed and operates the same as the equivalent circuit with  $R_{\rm C}$  replaced by

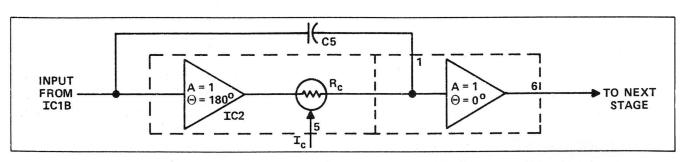


FIGURE 1 SIMPLE EQUIVALENT CIRCUIT

R33 adding a fixed phase shift to the chain. The output of IC7B drives BALLS control R35 and R36. R36 and R37 sum the outputs of IC7B and the original signal resulting in cancellation of the signal at frequencies where there are 180 degree phase shifts. With 100 microamperes of current through Q1B, these frequencies are 500 Hz, 2.25 KHz and 8 KHz. These notch frequencies move with the control current resulting in the phasing effect. BALLS control R35 applies positive feedback around the phase shift chain resulting in resonant peaking between notches. At our example current, these frequencies are 35 Hz, 1.2 KHz and 4.1 KHz.

Low Frequency Oscillator and Exponential Current Source

IC8A and IC8B form a dual slope integrating triangle oscillator of standard design and will not be discussed here. The triangle waveform from IC8A is applied to a lowpass shelf filter composed of R46, C17, R47 and R48. This filter reduces the amplitude of the triangle wave at higher frequencies to maintain smooth phasing. The filter output is applied to the input attenuator for exponential current source Q1 which reduces the signal level at the base of Q1B to a maximum of 120 mv. Exponential current source Q1 comprises a matched pair of NPN and PNP transistors and a constant current sink, Q3. When the voltage at the base of Q1A equals the 4.5 volt supply, collector current from Q1B equals the current through Q3 which is adjusted by center trimpot R50. This adjustment affects the center point of the phase shift chain. When the base of Q1B rises 18 mv above the 4.5 volt supply, current from Q1B doubles from its previous value. Another 18 my rise results in another doubling and vice versa. This circuit changes the linearly varying triangle to an exponential varying current. The 120 mv drive from the filter to Q1B results in six octaves of current.

## Power Supply

The main power supply for the Maestro Phaser is a 9 volt battery which is connected to the circuit when a standard phone plug is inserted in AXE jack J1. R39, R40 and IC7A provide a low impedance supply voltage at half the main supply voltage.

#### DISASSEMBLY

a) Pull out plungers on battery holder assembly
 (1, Figure 2) and remove battery holder assembly.

Disconnect battery (2) if present and remove.

- b) Loosen setscrews (3) securing dial assemblies (4 and 5) by inserting a 1/16 inch Allen wrench through holes in dial assemblies and remove dial assemblies.
- c) Remove nut (6) using a half inch nut driver, lock washer (7), three screws (8) and screw (9) from each end cap (10) and remove both end caps.

#### CAUTION

Do not set Maestro Phaser on its side when removing second end cap as damage to rotary pot shaft may result.

- d) Position Maestro Phaser face down and carefully slide hinge assembly (11) out of housing assembly (24) making certain spring (12) around push switch assembly (15) does not fly off and remove spring.
- e) Disconnect three pin connector on printed circuit board assembly (23) noting black wire on left side of connector.
- f) Remove nuts (13) using a half inch nut driver and flat washers (14) from AXE and AMP jacks.
- g) Remove hex nut (16), lock washer (17) and flat washer (18) and slide out push switch (20), lock washer and hex ring. Carefully remove printed circuit board assembly (23).
- h) Slide foot pads out of their channels if replacement is required.

## TEST, ADJUSTMENT AND TROUBLESHOOTING

The Maestro Phaser requires one adjustment to set the phase shift chain to the correct reference frequency assuring the unit will sweep over the correct frequency range. When troubleshooting, refer to the circuit description, schematic diagram and replacement part lists. Observe dc voltage levels and ac signal levels as shown on the schematic diagram using an oscilloscope. A high impedance voltmeter (1 megohm per volt or higher) may be used to measure dc voltage levels. Note that voltage levels and

waveforms displayed on the schematic diagram are not absolute values as readings may vary between units. Once the problem is localized, check the suspected part by direct substitution if possible. Otherwise use a voltmeter or oscilloscope to determine the malfunctioning part.

#### NOTE

All replacement parts may be obtained from Norlin Music, Inc. However, many standard electronic parts may be obtained locally in less time than is required to receive them from Norlin. When purchasing replacement parts locally, check the parts list for proper value, tolerance and rating.

- a) Visually inspect unit for broken wires, damaged components, loose connections and other obvious defects.
- b) Make certain unit is connected and operated according to Owners Manual or instruction label located on bottom of unit. If possible, check associated equipment such as cables, battery or amplifier used with the unit.
- c) Turn BALLS and SPEED controls to "0" and variable resistor R50 full counterclockwise.
- d) Connect a 9 volt power supply with a 0 to 10 ma meter connected in series to the battery clip and apply a 2.25 KHz, 100 mv peak-to-peak sine wave to AXE jack J1.
- e) Connect an oscilloscope to output AMP jack J2 and a short clip lead across R49 (located near printed circuit board center, Figure 3).
- f) Adjust R50 for an indication of 1.8 ma on the milliampere meter and adjust R50 back and forth for a null indication on oscilloscope. Milliampere meter should indicate 2 ±0.25 ma.
- g) Check for null indications at  $550 \pm 100$  Hz and  $8 \pm 1$  KHz. Adjust BALLS control to "9" and observe oscilloscope for a peak indication at  $1.2 \pm 0.1$  KHz with a voltage level of  $700 \pm 50$  mv peak to peak. Disconnect clip lead across R49 and 9 volt power supply from unit.

#### REASSEMBLY

- a) Reassemble Maestro Phaser in reverse order of disassembly referring to the exploded view (Figure 2) and noting the following additions.
- b) Finger tighten nuts (13) securing printed circuit board assembly (23) to housing assembly (24) to allow printed circuit board assembly to fit into slots of end caps (10). After both end caps are installed, tighten nuts (13).
- c) Connect three pin connector (21) to printed circuit board assembly (23) making certain black wire (pin 1) is on left side of connector at bottom of printed circuit board.
- d) Slip dial assemblies (4 and 5) on rotary pot shafts (left dial assembly (4) marked "L" between "9" and "0" and right dial assembly (5) marked "R" between "9" and "0") and turn each dial assembly full counterclockwise and then clockwise.
- e) Turn right dial assembly full counterclockwise. Holding dial assembly steady at "0," insert small screwdriver in hole at center of dial assembly and turn pot shaft full counterclockwise, then approximately five degrees clockwise to relieve strain on pot shaft. Tighten setscrew (3).
- f) Turn left dial assembly full clockwise. Holding dial assembly steady at "0," insert small screwdriver in hole at center of dial assembly and turn pot shaft full clockwise, then five degrees counterclockwise to relieve strain on pot shaft. Tighten setscrew (3).
- g) Rotate both dial assemblies making certain their range is from "0" to "9."

#### REPLACEMENT PART LISTS

#### **ORDERING**

The following lists specify parts available from Norlin Music, Inc., Customer Service Department, 2500 Walden Avenue, Buffalo, New York 14225, (716) 681-7242. Please specify the unit name, model, serial number, part description, electrical reference designator if applicable and part number when ordering.

## MAESTRO PHASER REPLACEMENT PARTS LIST

NDEX NO.	PART NUMBER	DESCRIPTION	QTY
Figure 2	997-040094-001	Maestro Phaser	_
1	997-040040-001	Battery Holder Assembly, consisting of:	1
	964-040004-001	Battery Holder	1
	930-040044-001	Plunger	2
	930-040043-001	Grommet	2
2		Battery, 9 Volt, NEDA 1604	Ref
3	903-040486-061	Setscrew, No. 6-32 x 5/16 lg, Cup Point (Clad Plate)	2
4	997-040041-001	Dial Assembly, Left Side, consisting of:	1
	964-040020-001	Dial	1
	913-040022-001	Decal, Dial, Left Side	1
	913-040046-001	Decal, Disc	1
5	997-040041-003	Dial Assembly, Right Side, consisting of:	1
	964-040020-001	Dial	1
	913-040022-003	Decal, Dial, Right Side	1
	913-040046-001	Decal, Disc	1
6	902-040504-007	Nut, 3/8-32	2
7	904-040495-014	Lock Washer, 3/8 Int	2
8	811-040039-010	Screw, Self Tapping, No. 6A x 5/8 lg	6
9	811-040032-016	Screw, Self Tapping, No. 6A x 1 lg	2
10	968-040009-001	End Cap, Die Cast	2
11	997-040039-001	Hinge Assembly, consisting of:	1
	968-040014-001	Hinge Extrusion	1
	916-040021-001	Foot Pad	2
	905-040045-004	Rivet, Nylon	2
12	975-040128-001	Spring, Compression	1
13	902-040504-007	Nut, 3/8-32	2
14	904-042026-001	Flat Washer, 3/8	2
15	997-040124-001	Push Switch Assembly, consisting of:	1
16	902-040504-006	Hex Nut (15/32 Bushing)	1 Re
17	904-040065-015	Lock Washer (15/32 Bushing) Int. Tooth	2
18	904-041495-006	Flat Washer (15/32 Bushing)	1
19		Hex Ring (15/32 Bushing)	1 Re
20	902-041442-007	Push Switch, SPDT	1
20	960-040127-001	Housing, Terminal, 3 Position	1
	910-041714-003		
22 23	910-041720-001	Pin	3
	996-040063-001	Housing Assembly, consisting of:	1
24	997-040126-001	Housing Assembly, consisting or:	1
	968-040013-001	Foot Pad	2
	916-040021-001	Push Switch Assembly (See 15, Figure 2)	
	997-040124-001		Ref
	997-040039-001	Hinge Assembly (See 11, Figure 2)	Ref
25	975-040128-001	Spring, Compression (See 12, Figure 2)	Ref
25	913-040089-001	Decal, BALLS-SPEED	1
26	913-040086-001	Decal, MAESTRO PHASER	1
27	913-040050-001	Decal, AXE-AMP	1
28	913-040081-001	Instruction Label	1
	993-040396-001	Owners Manual	1

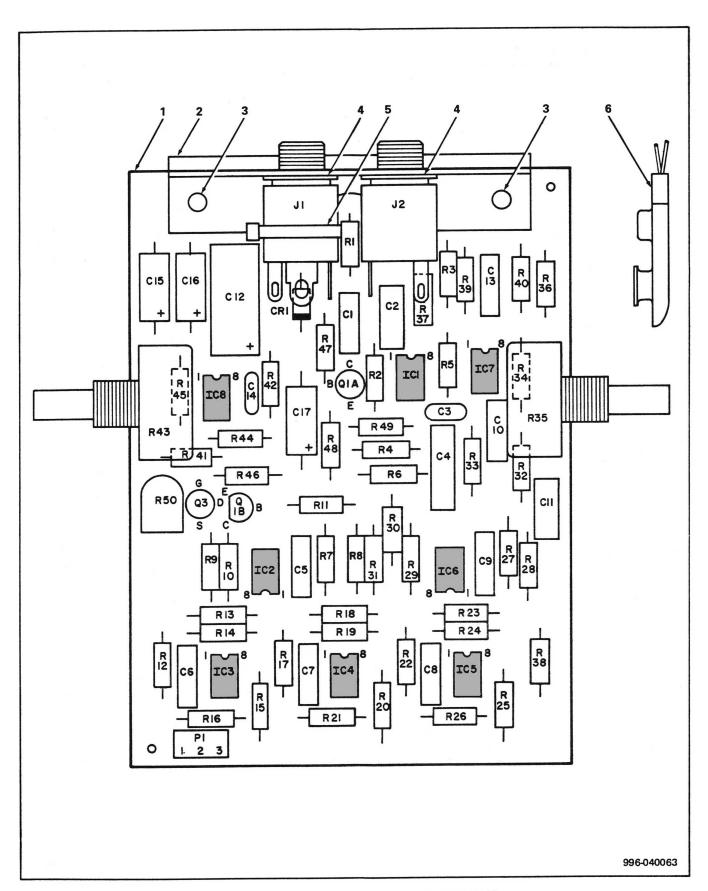


FIGURE 3 PRINTED CIRCUIT BOARD ASSEMBLY

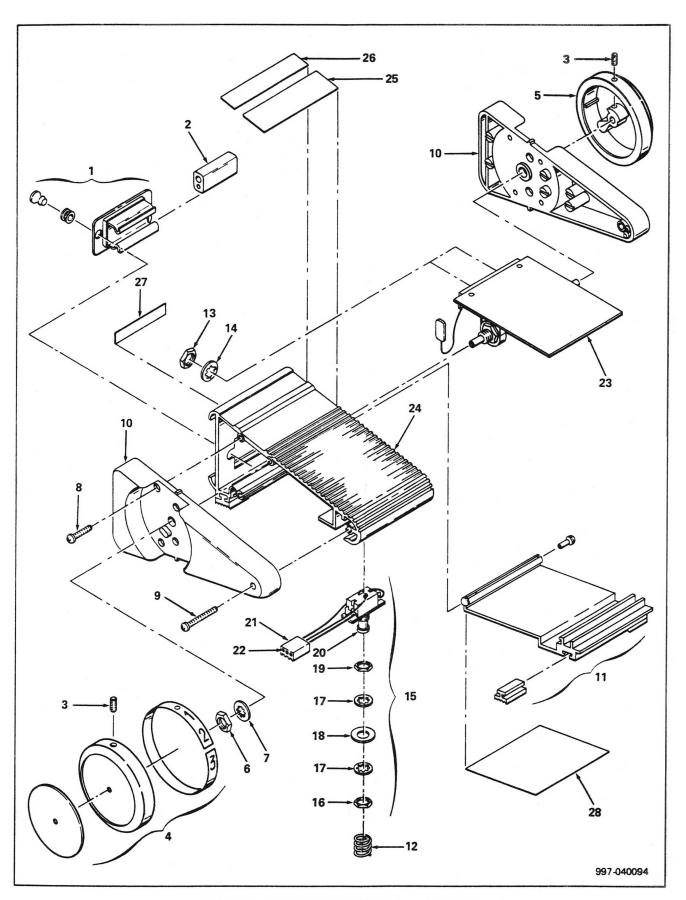


FIGURE 2 MAESTRO PHASER EXPLODED VIEW

## PRINTED CIRCUIT BOARD ASSEMBLY REPLACEMENT PARTS LIST

Figure 3 1 986-040063-001 2 967-040019-001 3 960-040065-014 4 904-040065-014 5 976-040791-002 6 935-041801-001 C1 946-041978-103 C2, C11 946-041978-103 C12 945-040209-009 C12 945-040209-009 C13 946-041978-104 C14 947-040200-103 C14 947-040200-103 C15 thru C17 CR1 945-040209-001 C15 thru C17 CR1 991-041209-001 C1 1, C7, IC8 991-041209-001 IC1, IC7, IC8 991-041209-001 IC2 thru IC6 J1 910-041306-001 J1 910-041306-001 J1 910-041306-001 Q1A 991-041275-001 Q1A 991-041275-001 R1,R36,R37,R45 R2, R38 R3 852-312103-001 R6 882-312203-001 R6 R6 R7,R9,R12,R14,R17,R19,R22,R24,R27,R29 R10,R14,R144 R33 R32,R24 R33 R32,R24 R33 R32,R24 R33 R32,R24 R33 R32,R24 R33 R32,R24 R33 R32,R34 R44 882-312203-001 R49 R49 R85-312203-001 R49 R49 R85-312203-001 R49 R49 R85-312203-001 R6 R6R4 R89 R85-312203-001 R6 R6R6 R6 R3-312200-001 R6 R6 R6 R6R4 R89 R85-312203-001 R6 R6R6 R7,R9,R12,R14,R44 R89 R85-312203-001 R6 R6R6 R7,R9,R12,R14,R14 R89 R85-312203-001 R6 R6R6 R7,R9,R12,R14,R44 R89 R85-312203-001 R6 R6R7,R9,R12,R14,R44 R89 R85-312203-001 R6 R6R7,R9,R12,R14,R14 R89 R85-312203-001 R6 R6R7,R9,R12,R14,R14 R89 R85-312203-001 R6 R6R7,R9,R12,R14,R9,R9,R9,R9,R9,R9,R9,R9,R9,R9,R9,R9,R9,	INDEX NO. OR REF DESIG	PART NUMBER	DESCRIPTION	QTY
2 967-040019-001 3 905-040498-001 4 904-040065-014 5 976-040791-002 6 935-041601-001 C1 946-041978-103 C2, C11 946-041978-224 C3 947-042020-221 C4 946-040123-224 C5 thru C10 C12 946-041978-102 C13 946-041978-102 C14 946-041978-102 C15 946-041978-102 C16 946-041978-102 C17 946-041978-102 C18 945-040209-009 C18 945-040209-009 C19 945-040209-009 C10 946-041978-104 C14 947-040200-103 C15 thru C17 C18 945-040209-001 C19 945-040209-001 C19 945-040209-001 C19 945-040209-001 C19 945-040209-001 C19 945-040209-001 C19 191-041306-004 C10 191-041306-004 C11 191-041306-004 C12 191-041306-004 C13 946-041978-104 C14 991-041306-004 C15 191-041306-004 C16 191-041306-004 C17 191-041306-004 C18 991-041275-001 C19 041803-003 C10 991-041275-001 C11 S2-31233-001 C11 S2-31233-001 C11 S2-31233-001 C12 C12 C12 C12 C12 C12 C2	Figure 3	996-040063-001	Printed Circuit Board Assembly, consisting of:	_
3 905-040498-001 4 904-040065-014 5 976-040791-002 6 935-041601-001 C1 946-041978-103 C2, C11 946-041978-103 C3 947-042020-221 C4 946-040123-224 C5 thru C10 C12 945-040209-009 C13 946-041978-102 C14 947-040200-103 C15 thru C17 C14 947-040200-103 C15 thru C17 C15 1919-042019-004 C16 1919-04209-001 C17 C18 1919-04209-001 C19 1910-041306-001 C19 1910-041306-001 C10 1910-041306-001 C10 1910-041306-001 C11 01 01 01 01 01 01 01 01 01 01 01 01 0	1	980-040062-001	Printed Circuit Board	1
4 994-040065-014 5 976-040791-002 6 935-041091-001 C1 946-041978-103 C2, C11 946-041978-103 C2, C11 946-041978-224 C3 947-042020-221 C4 946-041923-224 C5 thru C10 946-041978-102 C12 946-040123-224 C5 thru C10 946-041978-104 C14 947-040200-099 C13 946-041978-104 C14 947-040200-103 C15 thru C17 946-04099-001 C16 919-042019-004 C17 C18 919-042019-004 C19 102 thru C6 91-04120-001 C19 102 thru C6 91-04120-001 C19 102 thru C6 91-04120-001 C102 thru C6 91-04120-001 C103 91-041205-001 C104 991-041506-004 C105 C105 September 20	2	967-040019-001	Angle Bracket	1
5         976-040791-002         Cable Tie, Small           6         935-041601-001         Battery Clip, 9 Volt.           C1         946-041978-103         Capacitor, Polyester, 0.21 uf           C2, C11         946-041978-224         Capacitor, Polyester, 0.22 uf           C3         947-040200-221         Capacitor, Polyester, 0.22 uf           C4         946-040123-224         Capacitor, Polyester, 0.22 uf           C5 thru C10         946-041978-102         Capacitor, Polyester, 0.001 uf           C12         946-041978-104         Capacitor, Polyester, 0.01 uf           C14         947-040200-103         Capacitor, Polyester, 0.1 uf           C14         947-040200-103         Capacitor, Polyester, 0.1 uf           C14         947-040200-103         Capacitor, Polyester, 0.1 uf           C15 thru C17         946-041978-104         Capacitor, Disc, 0.01 uf           C18         91-04210-004         Diode, Rectifier, 1N4004           IC1, IC7, IC8         991-04120-001         Integrated Circuit, SN72L022P           I1         910-041306-004         Jack, Phone, 2 Circuit, Switchcraft 112B           J2         910-041306-001         Jack, Phone, 2 Circuit, Switchcraft 112B           Q3         991-041275-001         Transistor, PNP, 2N39904, part of matched set <td>. 3</td> <td>905-040498-001</td> <td>Pop Rivet, 1/8 Dia</td> <td>2</td>	. 3	905-040498-001	Pop Rivet, 1/8 Dia	2
6 935-041601-001 C1 946-041978-103 Capacitor, Polyester, 0.01 uf C2, C11 946-041978-224 Capacitor, Polyester, 0.01 uf Capacitor, Polyester, 0.22 uf C3 947-042020-221 Capacitor, Polyester, 0.22 uf C4 946-041978-102 Capacitor, Polyester, 0.22 uf C5 thru C10 946-041978-104 Capacitor, Polyester, 0.22 uf C4 946-0401978-104 Capacitor, Polyester, 0.20 uf C12 946-040209-009 Capacitor, Aluminum, Electrolytic, 100 uf, 25 V. C13 946-040209-009 Capacitor, Aluminum, Electrolytic, 100 uf, 25 V. C13 946-040209-001 Capacitor, Polyester, 0.1 uf C14 947-040200-103 Capacitor, Polyester, 0.1 uf C15 thru C17 991-042019-004 Capacitor, Disc, 201 uf Capacitor, Polyester, 0.1 uf C16 Unit C6 991-041209-001 Capacitor, Polyester, 0.1 uf C2 thru C6 991-041209-001 Integrated Circuit, SN72L022P Integrated Circuit, SN72L022P Integrated Circuit, C3094E Jack, Phone, 2 Circuit, Switchcraft 112B Jack, Phone, 2 Circuit, Switchcraft 112B Jack, Phone, 1 Circuit, Switchcraft 111 Canector, Straight, 3 Position C1A 991-041275-001 Transistor, PNP, 2N3904, part of matched set. Transistor, PNP, 2N3904, part of matched set. Transistor, PNP, 2N3906, part of matched set. Transistor, E101 Resistor, 10K Ohms, ±5%, 1/4 W Resistor, 10K Ohms, ±5%, 1/4 W Resistor, 33K Ohms, ±5%, 1/4 W Resistor, 33K Ohms, ±5%, 1/4 W Resistor, 39K Ohms, ±5%, 1/4 W Resistor, 39K Ohms, ±5%, 1/4 W Resistor, 10K Ohms, ±5%, 1/4 W Resistor, 20K Ohms, ±5%, 1/4 W Resistor, 30K Ohms,	4	904-040065-014	Lock Washer, 3/8 Int	2
C1 946-041978-103 Capacitor, Polyester, 0.01 uf C2, C11 946-041978-224 Capacitor, Polyester, 0.22 uf C4 946-041978-102 Capacitor, Polyester, 0.22 uf C5 thru C10 945-040209-009 Capacitor, Polyester, 0.22 uf C5 thru C10 945-040209-009 Capacitor, Polyester, 0.001 uf C12 945-040209-009 Capacitor, Polyester, 0.001 uf C13 946-041978-104 Capacitor, Polyester, 0.001 uf C14 947-040200-103 Capacitor, Polyester, 0.1 uf C2 Capacitor, Polyester, 0.1 uf C3 Capacitor, Polyester, 0.1 uf C4 947-040200-103 Capacitor, Polyester, 0.1 uf C4 947-040200-103 Capacitor, Polyester, 0.1 uf C4 Capacitor, Polyester, 0.1 uf C5 Capacitor, Polyester, 0.1 uf C5 Capacitor, Polyester, 0.1 uf C5 Capacitor, Polyester, 0.1 uf C6 Capacitor, Polyester, 0.22 uf C6 Capacitor, Polyester, 0.20 uf C6	5	976-040791-002	Cable Tie, Small	1
C2, C11 C3 947-042020-221 C4 946-041978-224 C5 thru C10 946-041978-102 C12 945-040209-009 C13 946-041978-104 C14 947-040200-103 C15 thru C17 C17 C18 910-041209-001 C19 910-041306-001 C10 101, IC7, IC8 911-041209-001 C19 101, IC7, IC8 910-041209-001 C19 102 103 946-041978-104 C10 101, IC7, IC8 910-041209-001 C19 102 Integrated Circuit, CA3094E C19 102 Integrated Circuit, CA3094E C19 102 Integrated Circuit, Switcheraft 112B C19 110 110 110 110 110 110 110 110 110 1	6	935-041601-001	Battery Clip, 9 Volt	1
C3 947-04202-021 Capacitor, Disc, 220 pf. C4 946-040123-224 Capacitor, Polyester, 0.22 uf. C5 thru C10 946-041978-102 Capacitor, Polyester, 0.001 uf. C12 945-040209-009 Capacitor, Polyester, 0.001 uf. C13 946-041978-104 Capacitor, Polyester, 0.1 uf. C14 947-040200-103 Capacitor, Polyester, 0.1 uf. C15 thru C17 945-040209-001 Capacitor, Aluminum, Electrolytic, 10 uf, 25 V. CR1 919-04209-004 Diode, Rectifier, 1N4004. IC1, IC7, IC8 991-041209-001 Integrated Circuit, SN72L022P. IC2 thru IC6 991-041209-001 Integrated Circuit, SN72L022P. J1 910-041306-004 Jack, Phone, 2 Circuit, Switchcraft 112B. J2 910-041306-001 Jack, Phone, 2 Circuit, Switchcraft 112B. J3 910-041803-003 Connector, Straight, 3 Position C1B U3 991-041275-001 Transistor, PNP, 2N3906, part of matched set. Transistor, SNSC, IV4 W. R83 852-312333-001 Resistor, 10K Ohms, ±5%, 1/4 W. R84 852-31263-001 Resistor, 33K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 47K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 78K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 78K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312390-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312390-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS R35 R35-925-040078-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R43 R46, R48 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R842 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R852-312300-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R648 R647 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R65100 R648 R647 R647 R647 R647 R647 R647 R647 R647	C1	946-041978-103	Capacitor, Polyester, 0.01 uf	1
C3 947-04202-021 Capacitor, Disc, 220 pf. C4 946-040123-224 Capacitor, Polyester, 0.22 uf. C5 thru C10 946-041978-102 Capacitor, Polyester, 0.001 uf. C12 945-040209-009 Capacitor, Polyester, 0.001 uf. C13 946-041978-104 Capacitor, Polyester, 0.1 uf. C14 947-040200-103 Capacitor, Polyester, 0.1 uf. C15 thru C17 945-040209-001 Capacitor, Aluminum, Electrolytic, 10 uf, 25 V. CR1 919-04209-004 Diode, Rectifier, 1N4004. IC1, IC7, IC8 991-041209-001 Integrated Circuit, SN72L022P. IC2 thru IC6 991-041209-001 Integrated Circuit, SN72L022P. J1 910-041306-004 Jack, Phone, 2 Circuit, Switchcraft 112B. J2 910-041306-001 Jack, Phone, 2 Circuit, Switchcraft 112B. J3 910-041803-003 Connector, Straight, 3 Position C1B U3 991-041275-001 Transistor, PNP, 2N3906, part of matched set. Transistor, SNSC, IV4 W. R83 852-312333-001 Resistor, 10K Ohms, ±5%, 1/4 W. R84 852-31263-001 Resistor, 33K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 47K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 78K Ohms, ±5%, 1/4 W. R852-312473-001 Resistor, 78K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312100-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312390-001 Resistor, 39K Ohms, ±5%, 1/4 W. R852-312390-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS R35 R35-925-040078-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R43 R46, R48 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R842 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R852-312300-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R648 R647 852-312300-001 Resistor, 30K Ohms, ±5%, 1/4 W. R65100 R648 R647 R647 R647 R647 R647 R647 R647 R647	C2, C11	946-041978-224	Capacitor, Polyester, 0.22 uf	2
C4 946-040123-224 Capacitor, Polyester, 0.22 uf. C5 thru C10 946-041978-102 Capacitor, Polyester, 0.001 uf. C12 945-040209-009 Capacitor, Polyester, 0.001 uf. C13 946-041978-104 Capacitor, Polyester, 0.1 uf. C14 947-040200-103 Capacitor, Polyester, 0.1 uf. C14 947-040200-103 Capacitor, Disc, 0.01 uf. C14 947-040200-101 Capacitor, Polyester, 0.1 uf. C2 Capacitor, Disc, 0.01 uf. C14 947-040200-101 Capacitor, Aluminum, Electrolytic, 10 uf, 25 V. C14 Diode, Restifier, 114004 Diode, Restifier, 11		947-042020-221		1
C5 thru C10 C12 946-041978-102 C13 946-041978-104 C14 947-040209-009 C3pacitor, Polyester, 0.001 uf C14 947-040209-0103 C15 thru C17 CR1 919-042019-004 Integrated Circuit, Switchcraft 112B J2 910-041306-001 J1 910-041803-003 C15 R12, R38 R35-312103-001 R8, R13, R18, R23, R28 R8, R3, R18, R23, R28 R35-312103-001 R8, R36 R37, R34 R35 R35, R35 R34 R35, R34 R35 R35, R35 R34 R35, R35 R35 R35 R35, R36 R36 R37, R37 R37 R37 R37 R37 R38 R38-312103-001 R9, R2, R38 R39, R12, R14, R17, R16, R21, R24, R27, R29 R11, R16, R21, R26, R31 R37 R38 R37 R39, R40, R41, R44 R42 R42 R42 R42 R43 R46, R48 R47 R47 R55-312303-001 Resistor, R04 Chms, ±5%, 1/4 W Resistor, R	C4	946-040123-224		1
C12	C5 thru C10	946-041978-102		6
C13 C14 C14 Q47-040200-103 C3pacitor, Disc, 0.01 uf C3pacitor, Disc, 0.02 uf Capacitor, Disc, 0.02 uf Capacitor, Disc, 0.02 uf Capacitor, Disc, 0.02 uf Capacitor, Disc, 0.02 uf Circuit, CA3094E  Lace, 10pacitor, Disc, 0.02 uf Circuit, CA3094E  Lace, 10pacitor, Disc, 0.02 uf Circuit, CA3094E  Lac	C12			1
C14 947-040200-103 Capacitor, Disc, 0.01 uf C15 thru C17 945-040209-001 Capacitor, Aluminum, Electrolytic, 10 uf, 25 V. CR1 919-042019-004 Diode, Rectifier, 1N4004  IC1, IC7, IC8 991-041209-001 Integrated Circuit, CA3094E.  J1 910-041306-004 Jack, Phone, 2 Circuit, Switchcraft 112B. J2 910-041306-001 Jack, Phone, 1 Circuit, Switchcraft 111  P1 910-041803-003 Connector, Straight, 3 Position.  Q1A 991-040672-001 Transistor, NPN, 2N3904, part of matched set. Transistor, PNP, 2N3906, part of matched set. Transistor, PNP, 2N3906, part of matched set. Transistor, 10K Ohms, ± 5%, 1/4 W. R2, R38 852-312103-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R52-312623-001 Resistor, 33K Ohms, ± 5%, 1/4 W. R6 852-312124-001 Resistor, 47K Ohms, ± 5%, 1/4 W. R7,R9,R12,R14,R17, R19,R22,R24,R27,R29  R8,R13,R18,R23,R28 R52-312102-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R19,R22,R24,R27,R29  R8,R13,R18,R23,R28 R52-312102-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R852-31203-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R852-31203-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R852-312104-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R852-312104-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R852-312104-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R832,R34 852-312102-001 Resistor, 20K Ohms, ± 5%, 1/4 W. R833 852-312304-001 Resistor, 20K Ohms, ± 5%, 1/4 W. R834 925-040078-001 Resistor, 10K Ohms, ± 5%, 1/4 W. R845 852-312304-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS R46,R48 852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R847 852-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R847 R847 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R848 R852-312303-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R8616,R48 852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R8616,R48 R847 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R847 R847 R847 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R848 R847 R848 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R849 R849 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W. R840 R841 R842 R852-312303-001 R846,R48 R852-312303-001 R846,R48 R852-312303-001 R846	C13			1
C15 thru C17 CR1 919-042019-004 IC1, IC7, IC8 991-041209-001 IC2 thru IC6 991-041206-001 J1 910-041306-004 J2 910-041306-004 J3 991-041306-001 P1 910-041803-003 C1A 991-040672-001 R1,R36,R37,R45 R2, R38 852-312103-001 R3 R4,R4 852-312623-001 R6 R7,R9,R12,R14,R17,R19,R22,R24,R27,R29 R8,R13,R18,R23,R28 R10,R15,R20,R25,R30 R11,R16,R21,R26,R31 R33 R32-312204-001 R34 R34 R35 R44 R35 R35-312204-001 R34 R34 R35 R35-312204-001 R46,R48 R43 R44 R42 R43 R44 R42 R52-312204-001 R46,R48 R44 R52-312204-001 R46,R48 R43 R46,R48 R47 R52-312303-001 R6istor, Roker Resistor, Roker Resistor, Bok Ohms, ±5%, 1/4 W Resistor, 39K Ohms, ±5%, 1/4 W Resistor, 39K Ohms, ±5%, 1/4 W Resistor, 39K Ohms, ±5%, 1/4 W Resistor, Roker Resistor, Noker Resistor, Roker Resistor, Noker Resistor, Roker Resistor, Roker Resistor, Roker Resistor, Noker Resistor, Roker Resistor, Roker Resistor, Noker Resistor, Roker Resistor, Noker Resistor, Roker Resistor, Roker Resistor, Noker Resistor, Roker Resistor, R	C14			1
CR1	1			3
IC1, IC7, IC8	and the same of th			1
Integrated Circuit, CA3094E.   Jack, Phone, 2 Circuit, Switchcraft 112B.   Jack, Phone, 1 Circuit, Switchcraft 111B.   Jack, Phone, 1 Circuit, Switchcraft 111		AND DOOR OF BUILDING COME NAME OF		3
J1 910-041306-004 J2 910-041306-001 P1 910-041803-003 O1A 991-040672-001 R1,R36,R37,R45 R2,R38 R52-312105-001 R5-312124-001 R7-R9,R12,R14,R17,R19,R22,R24,R27,R29 R8,R13,R18,R23,R28 R10,R15,R20,R25,R30 R11,R16,R21,R26,R31 R35 R35-312204-001 R35-R40,R41,R44 R42 R352-312204-001 R44 R42 R43 R44 R45 R45 R47 R45 R45 R47 R45 R47 R46 R47 R46 R47	1			5
J2         910-041306-001         Jack, Phone, 1 Circuit, Switchcraft 111           P1         910-041803-003         Connector, Straight, 3 Position           Q1A         991-040672-001         Transistor, NPN, 2N3904, part of matched set           Q1B         Transistor, PNP, 2N3906, part of matched set           Q3         991-041275-001         Resistor, 10K Ohms, ± 5%, 1/4 W           R1,R36,R37,R45         852-312103-001         Resistor, 10K Ohms, ± 5%, 1/4 W           R2, R38         852-312333-001         Resistor, 1 Megohm, ± 5%, 1/4 W           R3         852-312623-001         Resistor, 33K Ohms, ± 5%, 1/4 W           R4         852-312473-001         Resistor, 47K Ohms, ± 5%, 1/4 W           R6         852-312124-001         Resistor, 120K Ohms, ± 5%, 1/4 W           R7,R9,R12,R14,R17,         Resistor, 39K Ohms, ± 5%, 1/4 W           R19,R22,R24,R27,R29         R8,R13,R18,R23,R28         852-312102-001         Resistor, 1.5K Ohms, ± 5%, 1/4 W           R10,R15,R20,R25,R30         852-31203-001         Resistor, 20K Ohms, ± 5%, 1/4 W           R33         852-312204-001         Resistor, 390K Ohms, ± 5%, 1/4 W           R33         852-312304-001         Resistor, 200K Ohms, ± 5%, 1/4 W           R35         925-040078-001         Resistor, 80tary, Reverse, Audio, 1 Megohm, BALLS           R39,				1
P1 910-041803-003 Connector, Straight, 3 Position  Q1A 991-040672-001 Transistor, NPN, 2N3904, part of matched set.  Q3 991-041275-001 Transistor, PNP, 2N3906, part of matched set.  R1,R36,R37,R45 852-312103-001 Resistor, 10K Ohms, ± 5%, 1/4 W.  R3 852-312333-001 Resistor, 10K Ohms, ± 5%, 1/4 W.  R4 852-312623-001 Resistor, 33K Ohms, ± 5%, 1/4 W.  R5 852-312473-001 Resistor, 47K Ohms, ± 5%, 1/4 W.  R6 852-31244-001 Resistor, 47K Ohms, ± 5%, 1/4 W.  R7,R9,R12,R14,R17, R19,R22,R24,R27,R29  R8,R13,R18,R23,R28 852-312152-001 Resistor, 39K Ohms, ± 5%, 1/4 W.  R10,R15,R20,R25,R30 852-312102-001 Resistor, 1.5K Ohms, ± 5%, 1/4 W.  R33 852-312204-001 Resistor, 20K Ohms, ± 5%, 1/4 W.  R33 852-312204-001 Resistor, 20K Ohms, ± 5%, 1/4 W.  R33 852-312204-001 Resistor, 20K Ohms, ± 5%, 1/4 W.  R34 852-312304-001 Resistor, 20K Ohms, ± 5%, 1/4 W.  R39,R40,R41,R44 852-312104-001 Resistor, 10K Ohms, ± 5%, 1/4 W.  R42 852-312304-001 Resistor, 20K Ohms, ± 5%, 1/4 W.  R43 925-040079-001 Resistor, 30K Ohms, ± 5%, 1/4 W.  R44 852-312304-001 Resistor, 10K Ohms, ± 5%, 1/4 W.  R45 852-312304-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R46,R48 852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W.  R44 R45 852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W.  R45 R46,R48 852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W.  R47 852-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W.				1
Q1A Q1B Q3 991-040672-001 Transistor, NPN, 2N3904 , part of matched set Transistor, PNP, 2N3906 , part of matched set Transistor, PNP, 2N3906 , part of matched set Transistor, PNP, 2N3906 , part of matched set Q3 991-041275-001 Transistor, E101 Resistor, 10K Ohms, ± 5%, 1/4 W R2, R38 852-312103-001 Resistor, 1 Megohm, ± 5%, 1/4 W R3 852-312333-001 Resistor, 33K Ohms, ± 5%, 1/4 W R4 852-312473-001 Resistor, 62K Ohms, ± 5%, 1/4 W R5 852-312124-001 Resistor, 47K Ohms, ± 5%, 1/4 W R6 852-312124-001 Resistor, 120K Ohms, ± 5%, 1/4 W Resistor, 39K Ohms, ± 5%, 1/4 W Resistor, 39K Ohms, ± 5%, 1/4 W R19,R22,R24,R27,R29 R8,R13,R18,R23,R28 R10,R15,R20,R25,R30 R52-312102-001 Resistor, 15K Ohms, ± 5%, 1/4 W R31,R16,R21,R26,R31 R32,R34 R52-312304-001 Resistor, 20K Ohms, ± 5%, 1/4 W R83 R52-312304-001 Resistor, 390K Ohms, ± 5%, 1/4 W R83 R33 R52-312204-001 Resistor, 390K Ohms, ± 5%, 1/4 W R839,R40,R41,R44 R52-312104-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS R42 R52-312304-001 Resistor, 300K Ohms, ± 5%, 1/4 W R843 R42 R52-312304-001 Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R846,R48 R47 R52-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED R846,R48 R47 R52-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, 30K Ohms				1
Q1B         Q3         991-041275-001         Transistor, PNP, 2N3906 , part of matched set	i i			1
Q3       991-041275-001       Transistor, E101         R1,R36,R37,R45       852-312103-001       Resistor, 10K Ohms, ± 5%, 1/4 W         R2, R38       852-312333-001       Resistor, 33K Ohms, ± 5%, 1/4 W         R4       852-312623-001       Resistor, 62K Ohms, ± 5%, 1/4 W         R5       852-312473-001       Resistor, 47K Ohms, ± 5%, 1/4 W         R6       852-312124-001       Resistor, 120K Ohms, ± 5%, 1/4 W         R7,R9,R12,R14,R17,       852-312393-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R19,R22,R24,R27,R29       R8,R13,R18,R23,R28       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312202-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R32,R34       852-312394-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R33       852-312204-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R39,R40,R41,R44       852-312304-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R46,R48       852-312303-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W		331-0400/2-001		1
R1,R36,R37,R45       852-312103-001       Resistor, 10K Ohms, ± 5%, 1/4 W         R2, R38       852-312105-001       Resistor, 1 Megohm, ± 5%, 1/4 W         R3       852-312333-001       Resistor, 33K Ohms, ± 5%, 1/4 W         R4       852-312473-001       Resistor, 62K Ohms, ± 5%, 1/4 W         R5       852-312124-001       Resistor, 120K Ohms, ± 5%, 1/4 W         R7,R9,R12,R14,R17,       852-312393-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R19,R22,R24,R27,R29       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R10,R15,R20,R25,R30       852-312102-001       Resistor, 1K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312304-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R33       852-312394-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 30K Ohms, ± 5%, 1/4 W		001 0/1275 001		1
R2, R38       852-312105-001       Resistor, 1 Megohm, ± 5%, 1/4 W         R3       852-312333-001       Resistor, 33K Ohms, ± 5%, 1/4 W         R4       852-312623-001       Resistor, 62K Ohms, ± 5%, 1/4 W         R5       852-3121473-001       Resistor, 47K Ohms, ± 5%, 1/4 W         R6       852-312124-001       Resistor, 120K Ohms, ± 5%, 1/4 W         R7,R9,R12,R14,R17,       852-312393-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R19,R22,R24,R27,R29       R8,R13,R18,R23,R28       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R10,R15,R20,R25,R30       852-312102-001       Resistor, 1 K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312203-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R33       852-312204-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R39,R40,R41,R44       852-312104-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R42       852-312304-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 30K Ohms, ± 5%, 1/4 W	1	SUPERIORS IN LOOSE OF SECURITIES COME. AMERICAN SEC.		4
R3		SHEEDER POOR CONTRACTOR OF STREET SHEET		2
R4 852-312623-001 Resistor, 62K Ohms, ± 5%, 1/4 W R5 852-312124-001 Resistor, 47K Ohms, ± 5%, 1/4 W R7,R9,R12,R14,R17, R19,R22,R24,R27,R29 R8,R13,R18,R23,R28 R10,R15,R20,R25,R30 R11,R16,R21,R26,R31 R33 R52-312303-001 Resistor, 20K Ohms, ± 5%, 1/4 W R33 R35 925-040078-001 Resistor, 20K Ohms, ± 5%, 1/4 W R39,R40,R41,R44 R42 R42 R43 925-040079-001 R43 R44 R45 R52-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R83 R46,R48 R47 R52-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R83 R52-312303-001 Resistor, 20K Ohms, ± 5%, 1/4 W R845-312303-001 Resistor, 20K Ohms, ± 5%, 1/4 W R846,R48 R52-312303-001 Resistor, 30OK Ohms, ± 5%, 1/4 W R847 R852-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W R847 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R848 R52-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R847 R852-312302-001 Resistor, 30K Ohms, ± 5%, 1/4 W R848 R52-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R849 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R849 R852-312303-001 Resistor, 30K Ohms, ± 5%, 1/4 W R849 R852-312303-001 R852-31				1
R5				1
R6       852-312124-001       Resistor, 120K Ohms, ± 5%, 1/4 W         R7,R9,R12,R14,R17,       852-312393-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R19,R22,R24,R27,R29       R8,R13,R18,R23,R28       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R10,R15,R20,R25,R30       852-312102-001       Resistor, 1K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312203-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R32,R34       852-312394-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R33       852-312204-001       Resistor, 200K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W				1
R7,R9,R12,R14,R17,       852-312393-001       Resistor, 39K Ohms, ± 5%, 1/4 W         R19,R22,R24,R27,R29       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R10,R15,R20,R25,R30       852-312102-001       Resistor, 1K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312203-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R32,R34       852-312394-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, 200K Ohms, ± 5%, 1/4 W         R39,R40,R41,R44       852-312104-001       Resistor, 100K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 30K Ohms, ± 5%, 1/4 W	1			1
R19,R22,R24,R27,R29 R8,R13,R18,R23,R28 R10,R15,R20,R25,R30 R11,R16,R21,R26,R31 R32,R34 R33 R52-312203-001 R35 R39,R40,R41,R44 R42 R42 R43 R43 R46,R48 R47 R47 R52-312302-001 Resistor, 1.5K Ohms, ± 5%, 1/4 W Resistor, 20K Ohms, ± 5%, 1/4 W Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, 30K Ohms, ± 5%, 1/4 W Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED Resistor, 30K Ohms, ± 5%, 1/4 W		ASSESSMENT OF THE PROPERTY OF THE PARTY OF		10
R8,R13,R18,R23,R28       852-312152-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R10,R15,R20,R25,R30       852-312102-001       Resistor, 1.5K Ohms, ± 5%, 1/4 W         R11,R16,R21,R26,R31       852-312203-001       Resistor, 20K Ohms, ± 5%, 1/4 W         R32,R34       852-312394-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R33       852-312204-001       Resistor, 200K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 30K Ohms, ± 5%, 1/4 W		852-312393-001	Resistor, 39K Onms, ± 5%, 1/4 W	10
R10,R15,R20,R25,R30 R11,R16,R21,R26,R31 R32,R34 R33 R34 R35 R35 R39,R40,R41,R44 R42 R42 R43 R43 R44 R43 R44 R47 R47 R47 R55-312302-001 R852-312302-001 Resistor, 1K Ohms, ± 5%, 1/4 W Resistor, 20K Ohms, ± 5%, 1/4 W Resistor, 390K Ohms, ± 5%, 1/4 W Resistor, 20K Ohms, ± 5%, 1/4 W Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS Resistor, 100K Ohms, ± 5%, 1/4 W Resistor, 300K Ohms, ± 5%, 1/4 W Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED Resistor, 30K Ohms, ± 5%, 1/4 W		252 242452 224	D.: 4 51/ Ol 50/ 4/4 W	_ ا
R11,R16,R21,R26,R31 R32,R34 R32,R34 R33 R52-312204-001 R35 R35 R39,R40,R41,R44 R42 R42 R43 R43 R43 R44 R45 R45-312303-001 R46,R48 R47 R47 R35-312302-001 R452-312302-001 R46,R48 R47 R47 R47 R55-312302-001 R452-312302-001 R452-312302-001 R46,R48 R47 R47 R55-312302-001 R46,R48 R47 R55-312302-001 R46,R48 R47 R47 R46,R48 R52-312302-001 R46,R48 R47 R47 R46,R48 R47 R47 R47 R47 R46,R48 R47 R47 R47 R46,R48 R47 R47 R47 R46,R48 R47 R47 R47 R47 R47 R48 R48 R48 R48 R49				5
R32,R34       852-312394-001       Resistor, 390K Ohms, ± 5%, 1/4 W         R33       852-312204-001       Resistor, 200K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312104-001       Resistor, 100K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W	100 00 00			5
R33       852-312204-001       Resistor, 200K Ohms, ± 5%, 1/4 W         R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312104-001       Resistor, 100K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W				5
R35       925-040078-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, BALLS         R39,R40,R41,R44       852-312104-001       Resistor, 100K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W	-	1 100 00 100 100 100 100 100 100 100 10		2
R39,R40,R41,R44       852-312104-001       Resistor, 100K Ohms, ± 5%, 1/4 W         R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W				1
R42       852-312304-001       Resistor, 300K Ohms, ± 5%, 1/4 W         R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W	1			1
R43       925-040079-001       Resistor, Rotary, Reverse, Audio, 1 Megohm, SPEED         R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W         R47       852-312302-001       Resistor, 3K Ohms, ± 5%, 1/4 W		Property and the second second		4
R46,R48       852-312303-001       Resistor, 30K Ohms, ± 5%, 1/4 W				1
R47 852-312302-001 Resistor, 3K Ohms, ± 5%, 1/4 W	1	NOT DESPRESE THE TOTAL PROPERTY OF THE PARTY		1
	The second secon			2
R49   852-312202-001   Resistor, 2K Ohms, +5%, 1/4 W				1
	R49	852-312202-001	Resistor, 2K Ohms, ± 5%, 1/4 W	1
R50 925-040275-004 Resistor, 10K Ohms, Trim, Carbon	R50	925-040275-004	Resistor, 10K Ohms, Trim, Carbon	1

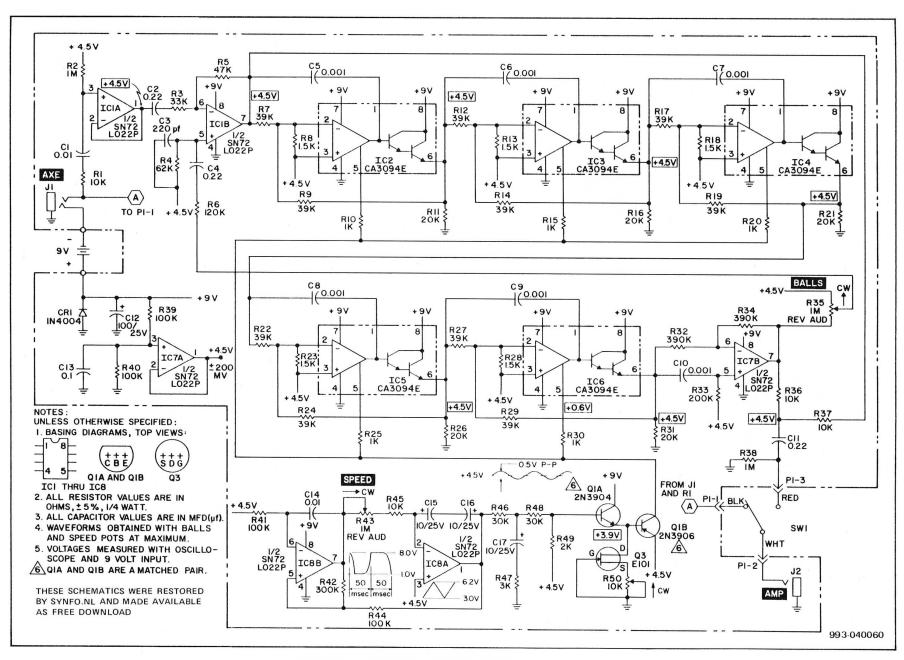
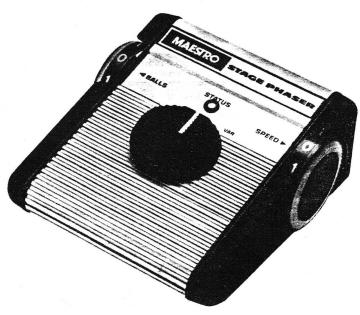


FIGURE 4 MAESTRO PHASER SCHEMATIC DIAGRAM



MAESTRO FUZZ MODEL MFZ-1 MANUAL NO. 993-040657

MAESTRO STAGE PHASER MODEL MSP-1 MANUAL NO. 993-040660





MAESTRO FUZZTAIN MODEL MFZT-1 MANUAL NO. 993-040659

Prepared by TOTAL GRAPHICS CO., INC. 4225 Genesee Street Buffalo, New York 14225

