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GUITAR ORGAN

V251

SERVICE INFORMATION

Thomas Organ Company • National Service Department • Sepulveda, California

CIRCUIT DESCRIPTION

MASTERBOARD

The Masterboard is the main electronic assembly of the Guitar Organ. It consists of the following:

A. Voltage Regulator (Stabilizer)

This unit is located on the Masterboard adjacent to the voicing filters. Its schematic is shown on drawing No. OS/091. The stabilizer is set to deliver a constant 8.4 volts D.C. to the Percussion Circuit by adjusting VR3 (250 Ohm Potentiometer).

B. Tone Generator & Divider Boards

There are 6 Tone Generators, one to match each of the guitar strings. The master oscillator is an emitter coupled multivibrator consisting of transistors TR1 and TR2 plus their associated resistors and capacitors. (See Drg. No. OS/068).

The frequency of oscillation is determined by the tuning capacitor C1 and the total neck resistance between pin 8 of the Tone Generator Board and ground. When the open button for any of the string tones is depressed, all of the series neck resistors are in the circuit. This produces the lowest frequency. The tuning control VR1 (for the associated Tone Generator) on the Masterboard is used for fine tuning. When the 12th fret is played the octave tuning control VR2 (for the associated Tone Generator) on the Masterboard is used to tune the octave. When VR2 is adjusted, it may be necessary to retune VR1.

Transistors TR3 and TR4 plus their associated components form a bi-stable Eccles-Jordan frequency divider. There are two divider outputs taken from the collector of TR1:

(1) A signal is fed from the collector of TR4 through resistor R16 and capacitor C9 to pin 3 of the T.G. Board. From pin 3, this signal is fed to the octave switch, and then to the effects switch.

(2) Another signal is taken from the collector of TR1 and fed through the flute filter comprised of resistors R17, R18, R19 and capacitors C7, C8 and C10.

The output of the flute filter is connected to pin 2 of the T.G. Board. This signal from pin 2 is fed to the flute switch, and then to the output of the effects switch. The combination of tones either go through or bypass the percussion unit depending upon whether "percussion" is switched on or off.

C. Percussion Unit (See Drawing OS/063)

This unit is located on the Masterboard adjacent to the voltage stabilizer. The percussion unit consists of the following four sections:

(1) Emitter Follower - TR3

This circuit performs the function of impedance matching between the percussion input and T-1 of the balanced modulator.

(2) Balanced Modulator TR4 & TR5

This is a transformer coupled push pull audio amplifier, the gain of which is controlled by an external "triggering" (bias) circuit. This is the only section of the percussion circuit through which the plerctum signals pass. The modulator is normally biased at cutoff, so that the keyboard signals are passed only when a triggering pulse is applied to the base of transistors TR4 and TR5.

(3) Multivibrator

The multivibrator consists of transistors TR1 and TR2 and their associated components. In sustain mode, TR1 is normally "on" and TR2 is "off", and the circuit acts as a one-shot multivibrator.

No pulses are fed to the modulator until TR1 receives a pulse from the Electronic Plerctum which shorts its base to ground. The duration of the pulse is determined by the value of the sustain capacitors C6 and C4 or C3. The repeat percussion effect is created in this section by connecting pin 8 to pin 6 of the Modulator Board via the percussion switch. TR1 and TR2 then function as an astable multivibrator. Repeat rate is controlled by VR3 on the escutcheon. VR1 is a preset control and is located on the Masterboard. This control sets the minimum repeat rate of one beat per second at the first position on VR3.

(4) Pre-Amplifier

The pulsed tones from the modulator are fed through the preamp, where the signal is amplified and fed to the second half of the percussion switch SW11B. From there it goes through the Organ Volume Control to the amplifier.

D. Voicing Units

There are four voicing boards mounted vertically on the Masterboard. Each one is a frequency selective band-pass network and supplies different tonal effects to the amplifier. These voices are selected by the Effects Switch.

FRONT ESCUTCHEON

All of the musician's Guitar and Organ controls, switches, pickups, tremolo unit, etc. are mounted on the front escutcheon. The wiring diagram for these electrical components is shown in Dwg. No. OS/097.

POWER SUPPLY

This unit uses a bridge rectifier circuit to convert either 110V or 220V AC to 12V DC. The Amplifier to Guitar cable feeds the DC voltage to the Guitar through pins 2 and 3 of the connectors. Pin 1 returns the output from the Guitar to the Guitar Output Jack in the Power Supply. Pin 4 returns the output from the Organ circuit to the Organ Output Jack on the Power Supply. The center pin grounds the common circuits on the Guitar Organ to Power Supply ground. The Guitar may be played acoustically without the Power Supply On/Off switch in the "on" position.

Two phone jack and cable assemblies are supplied with the Guitar Organ and both may be plugged into amplifiers when it is desired to rapidly switch from Organ to Guitar.

NOTE: If only one amplifier having a single input is available it will be necessary to use a "Y" adaptor for rapid switching.

DISASSEMBLY INSTRUCTIONS

A. FRETBOARD

1. Remove Guitar Strings.
2. Remove bridge nut.
3. Lift out the position dots using a small screwdriver or pen knife.
4. Remove the 15 screws which were exposed by the removal of the position dots and bridge nut.
5. Lift the fretboard away from the neck, taking care not to break the wires connected to the body.
6. The fretboard is reassembled in the reverse order.
 - (a) Carefully align the fret board with the neck and check for fit before tightening down the screws.
 - (b) Replace the position dots using a small dab of Mastic compound

B. MASTERBOARD

1. Remove the back plate escutcheon from the body, which is secured by ten Phillips Head wood screws.
2. Remove 29 snap-on cable connectors by gripping with the fingers and pulling upward. Refer to Drg. No. OS/097 for wire color code.
3. Remove the four wood screws from the corners of the Masterboard. Do not lose the spacers between the Masterboard and the body.
4. Lift the Masterboard from the body.
5. The Masterboard is reassembled in the reverse order.
 - (a) Do not forget to replace the spacers under the corners of the board.
 - (b) Do not over-tighten the board mounting screws.

C. FRONT ESCUTCHEON

1. Remove the Guitar Strings.
2. Remove four screws which secure the Tremolo Tailpiece Assembly.
3. Remove 11 screws around the edge of the escutcheon and eight screws which secure the pickup Mounting Plate. These are #3 x 1/2" Phillips head screws.
4. Lift away the escutcheon from the body. Be careful not to break the wiring passing through the body to the Masterboard.
5. To remove completely from the guitar, disconnect the snap-on connectors from the Masterboard.
6. Reassemble in reverse order.
 - (a) Make sure that the wires are not pinched before tightening the screws.
 - (b) When replacing the Tremolo Unit make sure that the ground wire makes contact.

D. POWER SUPPLY

1. Remove the four screws which secure the front panel to the case.
 2. Remove the two small screws located on the bottom of the case.
 3. Withdraw the front panel.
- NOTE: The chassis is connected to this panel.
4. Reassemble in reverse order.

CHECKOUT PROCEDURE

The Guitar Organ can be completely tested by checking out all of the front panel controls.

Hook up the guitar as follows:

1. Connect the power unit to the Guitar with the cable supplied.
2. Connect the two outputs from the jacks on the Power Unit to two separate amplifier inputs using the two Phone Plug and Cable Assemblies supplied.
3. Check to see that the fuse plug is inserted in the correct voltage position, i.e. 220V or 110V. The plug is accessible by removing the rear panel from the Power Unit.
4. Connect the Power Unit to the A.C. outlet using the cable supplied.
CAUTION: Be sure that the ground lead is attached when using the AC plug adapter.
5. Turn the power unit on. The red pilot light should glow.

CHECK OUT

A. GUITAR SECTION

Strum on all six strings without touching frets for the following tests.

1. **Guitar Volume Control**
Rotate the control in both directions. The c. c. w. position should have the lowest level with increasing loudness when rotating in the c. w. direction.
2. **Guitar Tone Control**
Rotate the Guitar Tone Control in both directions. In the counter clockwise (c. c. w.) position the bass tones should be louder in the clockwise (c. w.) position the treble tones should be louder.
3. **Guitar Low-High Control**
In the first position only PU1, the lower pickup, is connected. In the second position both pickups are connected. In the third position only PU2, the upper pickup, is connected. A difference of tonal quality can be detected for each position.
4. **Guitar Output**
 - (a) Set the Guitar Volume Control at its approximate mid-position.
 - (b) Turn up the loudness control on the guitar amplifier for the organ input channel and disconnect the guitar output plug from the amplifier.
 - (c) Strum on the guitar strings. No sound should be heard from the amplifier.

B. ORGAN SECTION

1. On/Off slide switch - Turns the organ section "on" or "off". This can be checked as follows:
 - (a) Turn Organ Volume Control to its approximate mid-position.
 - (b) Depress several of the open String buttons.
 - (c) Slide the switch to its on position. Sound should be heard. When the switch is slid to the off position the sound should cut out.

2. Organ Volume Control

With several of the open string buttons depressed, rotate the control in both directions. The loudness level should increase as it is being rotated in the c.w. direction.

3. Octave Control Switch

With several of the open string buttons depressed:

- (a) In the first position a unison tone is heard from the speaker.
- (b) In the second position, a tone one octave lower is heard from the speaker.
- (c) In the third position, a combination of the unison and sub-octave tones are heard from the speaker.
- (d) In the fourth position both unison and octave divider outputs from the tone generators are grounded out. However, a flute tone can be heard with the flute switch in the "on" position.

4. Flute Switch

This switch cuts the flute tone in or out. Step 3 (d) checked this switch.

5. Organ Tone Switch

Check for different voices when switching. Positions one through four, switch in the four voicing filters. Position five switches in the attenuator and position six grounds out the output from the octave switch. Chart No. 1 gives some combinations of various control settings to obtain different voices.

CHART NO. 1 GUITAR ORGAN EFFECTS & SETTINGS
(Control Position Reading Clockwise)

CONTROLS	OCTAVE	ORGAN TONE	FLUTE	PERCUSSION	SUSTAIN	REMARKS
CHURCH ORGAN	1 or 2	4	ON	OFF		Hold Chord and Swell up on Vol. Con.
HARMONIUM	3	4	ON	OFF		
HARPSICHORD	1	3	OFF	ON	SHORT	Use Electronic Plectrum
CHIMES	1	3	OFF	ON	LONG	Use Electronic Plectrum
BANJO	3	2	OFF	ON		Set Repeat Rate as Required
HAWAIIAN	3	2	OFF	ON	LONG	Use Tremolo & Electronic Plectrum as required
ZITHER	2	5	OFF	ON	LONG	Use Electronic Plectrum
FLUTE	4	4	ON	OFF		
CLARINET (High)	2	3	OFF	OFF		
BAG PIPES	1	1	OFF	OFF		Hold "A" Button Down for Drone
CLARINET (Low)	2	1	OFF	OFF		
CYMBALS	1	.5	OFF	ON	LONG	Use Electronic Plectrum
BEAT PERCUSSIVE	1	5	ON	ON	LONG	Use Electronic Plectrum

6. **Sustain and Percussion On/Off Switches**
 These two switches work in conjunction with each other. The Percussion switch must be on before the Sustain circuit can take effect.
 Check this circuit as follows:
 - (a) Turn the Percussion Switch "on".
 - (b) Set the Sustain Switch to position one.
 - (c) Connect the Electronic Plectrum.
 - (d) Hold down one of the frets and pluck the string sharply with the Plectrum. The tone should come on and then rapidly decay.
 - (e) Set the Sustain Switch to position two and repeat step d. The decay time should be a little longer.
 - (f) Set the Sustain Switch to position three and repeat step d. The tone decay time should be longer than for position two.
 - (g) Set the Sustain Switch to position four and hold down one of the frets. A repeating percussive tone should be heard. The rate of repetition is adjusted by rotating the Repeat Rate Control. In the c. c. w. position the rate is slow. Rotating the control c. w. should increase the rate.
7. **Repeat Rate Control**
 See Part 6 (g) above.
8. **Open String Buttons**
 Depress each of the six buttons one at a time. The proper tone for the button designations should be heard for each one.
9. **String Cut-Out Control**
 This slide switch, located below the E and A Open String Buttons, electrically disconnects the fret resistors from their tone generators. With the switch in the "off" position no tones should be heard when the E and A Open String Buttons are depressed.

TROUBLESHOOTING GUIDE

A. GENERAL

Check for the following before starting to service the unit:

1. The lead from the Power Supply to the AC outlet is properly connected.
2. The Power Supply is switched on and the red light is glowing.
3. The lead from the Power Supply to the Guitar is properly connected.
4. The organ On/Off switch is in the "on" position and the Organ Volume Control is turned up.
5. The output leads from the Power Supply to the amplifier are properly connected.
6. There is (-12V) D.C. at the Guitar (check at pin 10 on the Masterboard).

B. NO OUTPUT FROM POWER SUPPLY

1. Check the 1/2 Amp fuse which is accessible by removal of the rear panel.
2. If fuse is O.K. make a visible check for broken connections.
3. Check the AC voltage across the secondary of the power transformer.
 This should be 12V with a Current Drain of 100 mA.

C. NO ORGAN TONES BUT 12V DC IS AVAILABLE AT GUITAR

1. Check the following Switch settings:
 - (a) Organ On/Off is "on".
 - (b) Octave Switch is in one of 1st three positions.
 - (c) Effects switch is in one of first five positions.
 - (d) Flute Switch is "on".
 - (e) Percussion Switch is "off".
 - (f) Organ Volume Control is advanced.

2. If still no organ tones, check as follows:

- (a) Stabilizer output for - 8.4V between emitter and ground.
- (b) Check Masterboard for broken foil and poor solder joints.

D. If organ note plays continuously when instrument is turned on, check for the following:

1. That strings are not touching fret contacts.
2. All open note buttons are in "up" position.
3. If 1. and 2. are O.K. depress the open note buttons one at a time to determine which string is affected.
4. After locating the string, test each fret position in turn to find the exact note.
5. Remove the fretboard as described in the disassembly instructions, and check for contacts shorting to the neck at the position determined in step 4. Make sure that the lead has not been cut through where it passes the contact lug.
6. In the case of the highest note sounding continuously, also check the return leads at the points of leaving the neck and entering the body.

REPLACEMENT PARTS LIST

TONE GENERATORS

ALL TONE GENERATORS CAPACITORS

Location	Part No.	Description
C2	09-3488-0	220 pF 63V 10%
C3-C6	09-3513-0	2200 pF 63V 10%
C4-C5	09-3489-0	500 pF 63V 10%
C9	09-3487-0	330 pF 63V 10%
C10	09-3515-0	2700 pF 63V 10%

RESISTORS

R1-R3-R9-R10-R12-R13- R14-R17-R18-R19-R20	60-10305	10 k Ohm 1/2W 5%
R2	60-47305	47 k Ohm 1/2W 5%
R4	60-33205	3.3 k Ohm 1/2W 5%
R5	60-47105	470 Ohm 1/2W 5%
R6		Factory Selected
Series with R6	60-52205	5.2 k Ohm 1/2W 5%
R7	60-22405	220 k Ohm 1/2W 5%
R8-R11-R15	60-22205	2.2 k Ohm 1/2 5%
R16	60-10405	100 k Ohm 1/2W 5%

MISCELLANEOUS

TH1	09-3550-0	Thermistor
TR1	09-3557-0	Transistor (BCZ11)
TR2	09-3471-0	Transistor (UI5703)
TR3-TR4	09-347-0 09-3457-0	Transistor (AC113) PC Board Only (JMI -51)

"E" - 6 T.G. Assy. (Blue Dot)

C1	09-352-0	.15 uF 160V 20%
C1 (ext.)-C7	09-353-0	.047 uF 160V 10%
C8	09-353-0	.022 uF 160V 10%

"A" - 5 T.G. Assy. (Red Dot)

C1	09-3525-0	.1 uF 160V 10%
C1 (ext.)	09-3538-0	.047 uF 160V 10%
C7	09-3537-0	.033 uF 160V 10%
C8	09-3535-0	.015 uF 160V 10%

"D" - 4 T.G. Assy. (Black Dot)

C1	09-3525-0	.1 uF 160V 10%
C1 (ext.)		not used
C7	09-3536-0	.022 uF 160V 10%
C8	09-3528-0	.01 uF 160V 10%

"G" - 3 T.G. Assy. (Orange Dot)

C1	09-3524-0	.068 uF 400V 20%
C1 (ext.)	09-3535-0	.015 uF 160V 10%
C7	09-3536-0	.022 uF 160V 10%
C8	09-3528-0	.01 uF 160V 10%

"B" - 2 T.G. Assy. (Yellow Dot)

C1	09-3524-0	.068 uF 400V 20%
C1 (ext.)		not used
C7	09-3535-0	.015 uF 160V 10%
C8	09-3527-0	6800 pF 160V 10%

"E" - 1 T.G. Assy. (Green Dot)

C1	09-3538-0	.047 uF 160V 10%
C1 (ext.)		not used
C7	09-3535-0	.015 uF 160V 10%
C8	09-3527-0	6800 pF 160V 10%

**VOICING BOARDS & STABILIZER UNIT
(REFER TO DRG. NO. OS/091)**

J. M. I. 52A (Complete Assy.) 09-3458-0

C1	09-3513-0	.2200 pF 63V 10% Capacitor
C2	09-3549-0	.033 uF 160V 10% Capacitor
C3	09-3514-0	.0033 uF 63V 10% Capacitor
R1	60-10402	100 k Ohm 1/2W 20% Resistor
R2-R3	60-27302	27 k Ohm 1/2W 20% Resistor
	09-3546-0	PC Board Only (JMI - 52A)

J. M. I. 52B/1 (Complete Assy.) 09-3459-0

C4	09-3525-0	.1 uF 160V 10% Capacitor
CH1	09-3479-0	1 H. Choke
	09-3464-0	PC Board Only (JMI 52B/1)

J. M. I. 52B/2 (Complete Assy.) 09-3460-0

C5	09-3526-0	.15 uF 160V 10% Capacitor
CH2	09-3478-0	.25 H Choke
	09-3547-0	PC Board Only (JMI 52B/2)

J. M. I. 52C (Complete Assy.) 09-3461-0

C6	09-3516-0	6800 pF 125V 20% Capacitor
C7-C8	09-3519-0	.01 uF 20% Capacitor
CH3	09-3479-0	1 H.Choke
R4	60-10402	100 k Ohm 1/2W 20% Resistor
	09-3548-0	P.C. Board Only (JMI - 52C)

Stabilizer Unit

C50	09-3485-0	125 uF 16V (Electro.)
R50	60-15105	150 Ohm 1/2W 5% Resistor
R51	Use 60-82105	820 Ohm 1/2W 5% Resistor
VR3	09-3558-0	250 Ohm Pot.
TR50	09-3470-0	Transistor AC 113
ZD50	09-3473-0	Zener Diode (1S 2091 A)

PERCUSSION CIRCUIT
(Part of Master Board)

CAPACITORS

Location	Part No.	Description
C1	09-3486-0	400 uF 15V (Electro.)
C2-C6	09-3538-0	.047 uF 160V 10%
C3	09-3525-0	.1 uF 160V 10%
C4	09-3559-0	.22 uF 250V 20%
C5	09-3536-0	.022 uF 160V 10%
C7	09-3560-0	1 uF 60V (Electro.)
C8	09-3483-0	50 uF 25V (Electro.)
C9-C14-C15	09-3482-0	10 uF 16V (Electro.)
C11-C12-C17	09-3484-0	100 uF 16V (Electro.)
C13-C15	09-3485-0	125 uF 16V (Electro.)
C16	09-3561-0	.0047 uF 400V 10%
C19	09-3562-0	.47 uF 100V 10%

RESISTORS: All 1/2W 10% Unless Otherwise Indicated

R1	60-47101	470 Ohm
R2-R5-R16	60-22201	2.2 k Ohm
R3-R6-R11	60-22301	22 k Ohm
R4	60-22401	220 k Ohm
R7-R8	60-47401	470 k Ohm
R9-R15-R17-R22	60-10201	1 k Ohm
R10	60-15201	1.5 k Ohm
R12-R23	60-47301	47 k Ohm
R13-R21	60-10301	10 k Ohm
R14-R19	60-10401	100 k Ohm
R18	60-47201	4.7 k Ohm
R20	60-69301	68 k Ohm
VR1	09-3432-0	220 k Ohm Pot.
VR2	09-3531-0	3.3 k Ohm Pot.
VR3	09-3530-0	2 k Ohm Pot. (Repeat Rate)

NOTE: VR3 is not on the Master Board

MISCELLANEOUS

T1	09-3468-0	Modulator Input Transformer
T2	09-3469-0	Modulator Output Transformer
TR1-TR2	09-3471-0	Transistor (Type U15703)
TR3-TR6	09-3470-0	Transistor (Type AC113)
TR4-TR5	09-3472-0	Transistors (Matched Pair)
D1	Use 86-5029-3	Silicon Diode

GUITAR NECK ASSY. (09-3481-0)

RESISTORS: All 1% 1/4W

09-3490-0	533 Ohms
09-3491-0	608 Ohms
09-3492-0	667 Ohms
09-3493-0	751 Ohms
09-3494-0	809 Ohms
09-3496-0	850 Ohms
09-3497-0	907 Ohms
09-3498-0	929 Ohms
09-3499-0	1000 Ohms
09-3500-0	1060 Ohms
09-3501-0	1091 Ohms
09-3502-0	1142 Ohms
09-3503-0	1240 Ohms
09-3504-0	1350 Ohms
09-3505-0	1460 Ohms
09-3507-0	1570 Ohms
09-3508-0	1680 Ohms
09-3509-0	1790 Ohms
09-3510-0	1900 Ohms
09-3511-C	2000 Ohms
09-3512-0	2110 Ohms

MISCELLANEOUS

09-3402-0	Bridge Nut - 3/16 x 3/8 x 1-5/8
09-3506-0	Fret Board Assy. W/Frets & Resistors
09-3414-0	Fret Board Mtg. Screw #3 x 3/8
09-3495-0	Guitar Neck Frame (Aluminum)
09-3415-0	Position Dots - (White)
09-1105-0	Machine Head Assy. - 6 String (Chrome Knob)
09-1106-0	Machine Head Cover - Single
09-1108-0	Machine Head Eyelet - Hex
09-115-0	Machine Head Mtg. Screw #3 x 3/8 Rd

GUITAR BODY ASSEMBLY

Location	Part No.	Description
C1	09-3523-0	.047 uF 400V 20% Capacitor
PU1-PU2	09-1026-0	Pickup W/Cover (White) N w Spaced-6 String
	09-3427-0	Pickup W/Cover (Black) N ow Spaced-6 String
R21	09-3542-0	150 k Ohm 1/4W 20%
R22	09-3543-0	47 k Ohm 1/4W 20%
RV1	09-3534-0	250 k Ohm Log. Pot. (Guitar Volume)
RV2	09-3533-0	250 k Ohm Lin. Pot. (Guitar Tone)
RV3	09-3530-0	2 k Ohm Lin. Pot. (Repeat Rate)
RV4	09-3532-0	100 k Ohm Lin. Pot. (Orga Volume)

SW1 thru SW6
SW7-SW13
SW8
SW9
SW10
SW11
SW12
SW14

09-3413-0
09-3411-0
09-3475-0
09-3476-0
09-3477-0
09-3474-0
09-3439-0
09-3540-0

Open String Button (Momentary)
On/Off Slide Switch
Octave Switch (Rotary)
Effects Switch (Rotary)
Flute On/Off SW (Rotary)
Percussion On/Off (Rotary)
Short/Med./Long/Repeat - SW (Rotary)
Guitar - High - Low Switch (Rotary)

MISCELLANEOUS

09-3406-0 Adjustable Bridge Assy.
09-3541-0 Body & Pickup Cover Mtg. Screw #3 x 1/2 Ov.
09-3446-0 Body & Pickup Cover (Plastic)
09-3407-0 Bridge Assy. Base
09-3409-0 Bridge Adjusting Nut (Chrome)
09-3408-0 Bridge Assy. Top Bar
09-3405-0 Control Knob - Chrome W/Black Insert
09-3404-0 Control Knob - Chrome W/Black Insert & Bat Handle
09-3410-0 Guitar Neck Rear Cover Plate
09-1038-0 Guitar Neck Rear Cover Plate Screw #10 x 1-7/8 Ov.
09-3403-0 Guitar Neck Strap
09-3455-0 Master P. C. Board Assy. (Complete)
09-3465-0 Master P. C. Board (Only)
09-2109-0 Pickup Mtg. Bracket (Chrome)
09-1036-0 Pickup Adjusting Spring & Screw Assy.
09-131-0 Pickup Mtg. Bracket Mtg. Screw #4 x 3/8 Ov.
09-3451-0 Plectrum Input Socket (1 Pin Connector)
09-3445-0 Rear Body Cover (Plastic)
09-3412-0 Slide Switch Mtg. Screw, Nut & Washer Assy.
09-1622-0 Strap Button & Screw Assy.
09-2104-0 Tremolo & Tailpiece Assy.
09-136-0 Tremolo & Tailpiece Mtg. Screw #6 x 1/2" Ov.
09-3480-0 Wood Guitar Body (Specify Color)

TREMOLO TAILPIECE ASSEMBLY (09-2104-0)

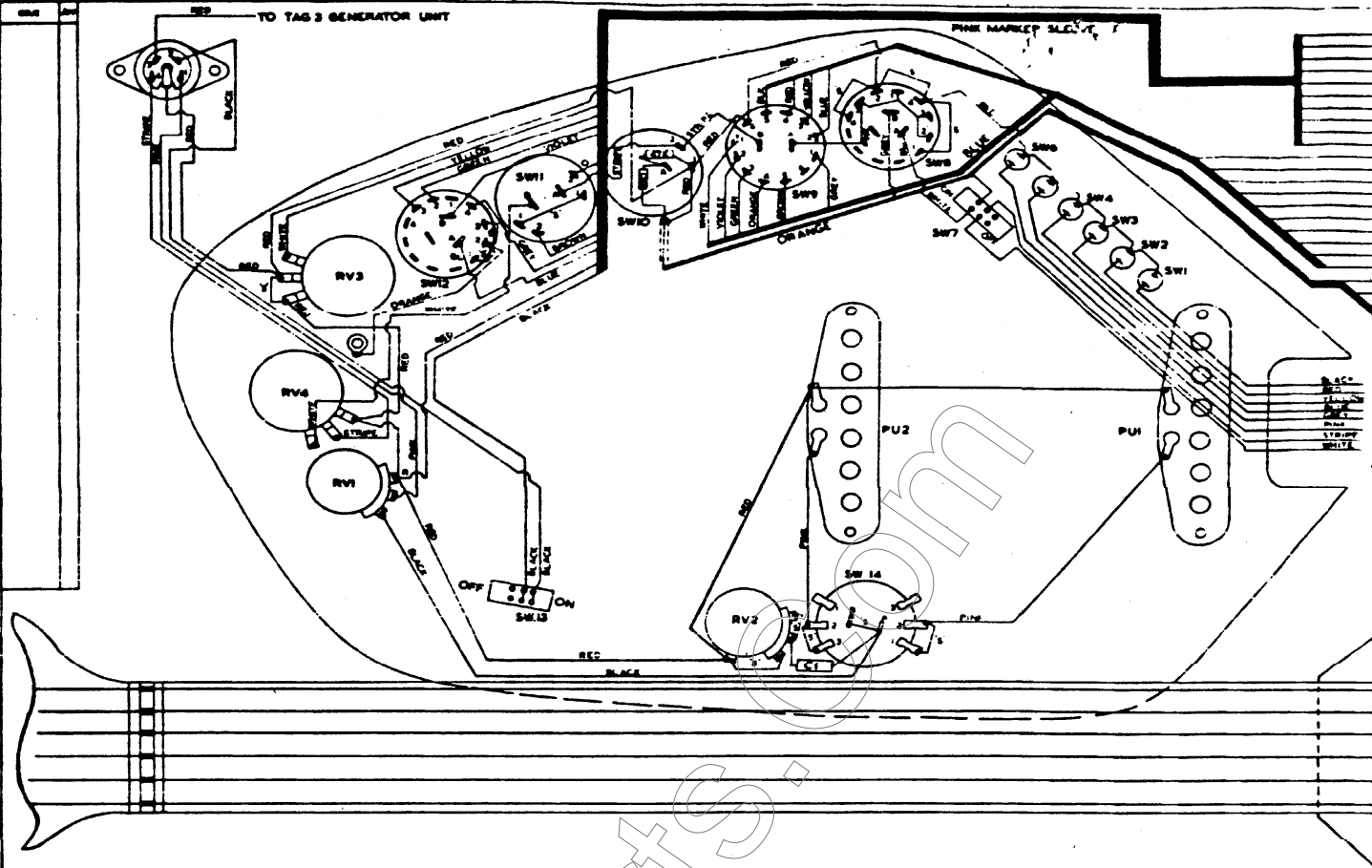
09-3321-0 Aluminum Roller - Single Notch (String "A" -5)
09-3324-0 Aluminum Roller - Single Notch (String "B" -2)
09-3322-0 Aluminum Roller - Single Notch (String "D" -4)
09-3325-0 Aluminum Roller - Single Notch (String "E" -1)
09-3320-0 Aluminum Roller - Single Notch (String "D" -6)
09-3323-0 Aluminum Roller - Single Notch (String "G" -3)
09-3330-0 Knob (Black - For Tremolo Arm)
09-3326-0 Outside Retainer Ring - 3/16 I. D.
09-3317-0 Outside Retainer Ring - 5/16 I. D.
09-3319-0 Roller Bar
09-3316-0 String Mtg. Pin
09-3315-0 String Tension Bar
09-3318-0 String Tension Bar Retainer
09-3276-0 Tailpiece Frame
09-3313-0 Tremolo Action Arm
09-3314-0 Tremolo Action Arm Mtg. Screw #10-32 x 11.
09-3312-0 Tremolo Arm Mtg. Nut #10-32 x 5/16 Hex.
09-3311-0 Tremolo Arm Mtg. Screw #10-32 x 11/16 Rd.
09-3328-0 Tremolo Arm Mtg. Washer (Leather)
09-3327-0 Tremolo Arm Mtg. Washer (Metal)
09-1308-0 Tremolo Arm W/Knob
09-1009-0 Tremolo Spring

POWER SUPPLY

Location	Part No.	Description
C1	09-3441-0	5000 uF 15V (Electro.)
C2	09-3440-0	.05 uF 400V AC/1000V DC
F1	09-3437-0	.5A Fuse & Holder Assy.
	09-3545-0	.5A Fuse (Only)
JK1-JK2	09-3426-0	Phone Jack (Only)
MR1	09-3416-0	Rectifier Stack (SEI-M160)
NE1	09-3424-0	Indicator Lamp W/Jewel
SK1	09-3428-0	Power Input Socket (Male)
SK2	09-7253-0	Fuse Socket - Chassis Mtd.
SK3	09-3453-0	Instrument Input Socket (Female)
SW1	09-3425-0	On/Off Switch - Toggle (DPST)
T1	09-3438-0	Power Transformer
	09-3430-0	Back Panel - Louvered
	09-3420-0	Back Panel Mtg. Screw #6-32 x 1/2 - Slotted
	09-3434-0	Cabinet Handle Assy.
	09-3442-0	Electrolytic Capacitor Mtg. Clip
	09-3431-0	Front Panel Mtg. Screw #8-32 x 3/8 F.H.
	09-3429-0	Front Panel - Punched & Printed
	09-7251-0	Fuseholder
	09-7258-0	Fuseholder Cover
	09-3419-0	Phone Jack Mtg. Nut
	09-3418-0	Phone Jack Mtg. Trim (Red)
	09-3417-0	Phone Jack Mtg. Trim (White)
	09-3436-0	Plastic Foot & Screw Assy.
	09-3422-0	Plug & Connector Mtg. Screw & Nut Assy.
	09-3433-0	Power Supply Case
	09-3423-0	Power Supply & Case Assy. - Complete
	09-3421-0	Toggle Switch Mtg. Nut

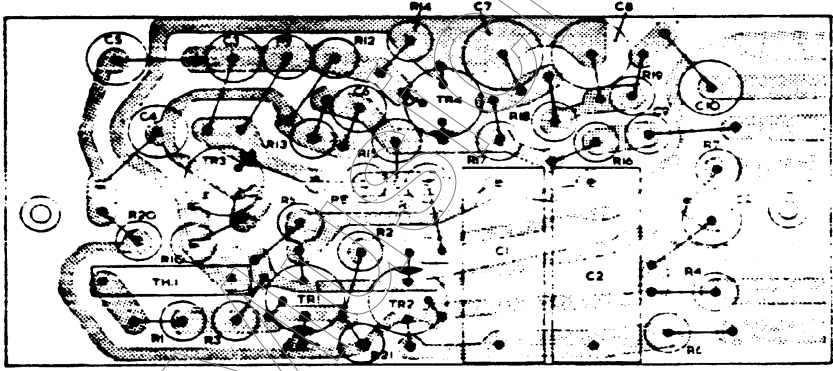
MISCELLANEOUS ACCESSORIES

09-3449-0	Electronic Plectrum & Cable Assy.
09-3435-0	Instrument Input Plug (Male - Part of 09-3452-0)
09-3450-0	One Pin Connector Plug (Part of Plectrum)
09-3544-0	Phone Jack & Cable Assy. - 4'
09-3448-0	Power Cable Plug (Female)
09-3447-0	Power Input Cable & Plug Assy. - 9'
09-3452-0	Power Unit to Guitar Cable & Plug Assy. - 9'
09-333-0	Guitar Case



02340 023000 021900 021790 021480 021170 021160 021140 021142 02109 021060 021000 021007 02080 02078 02050

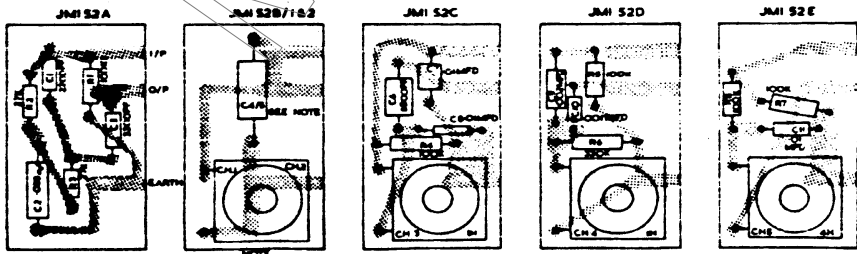
ALL RESISTORS IN OHMS



- V (1)
- DIV FLU O/P (2)
- DIV O/P (3)
- OSC C/P (4)
- EARTH (5)
- VR1 (7)
- VR2 (8)

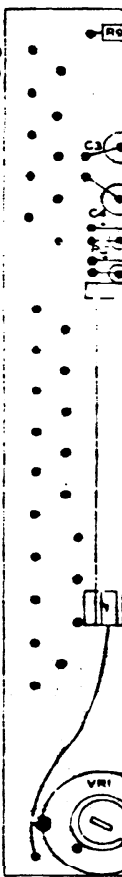
- VE SUPPLY (1)
- REPEAT RATE (2)
- REPEAT TRIGGER (3)
- SUSTAIN SWITCH (4)
- TRIGGER I/R (5)
- MEDIUM SUSTAIN (6)
- LONG SUSTAIN (7)
- EARTH (8)
- PERCUSSION I/P (9)
- PERCUSSION O/P (10)

- ATTENUATOR (30)
- JMI 52B FILTER (2) (4A)
- JMI 52B FILTER (1) (3A)
- JMI 52C FILTER (2A)
- JMI 52A FILTER (1A)
- OSC O/P (J)
- DIV O/P (H)
- DIV. FLUTE O/P (G)
- F (E)
- D (D)
- C (C)
- B (B)
- A (A)



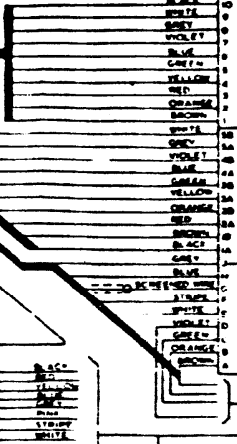
GUITAR ORGAN
V251

MOTHER BOARD AND PERCUSSION UNIT
FOR CIRCUIT DIAGRAMS SEE 05/093
05/091
05/088
05/097

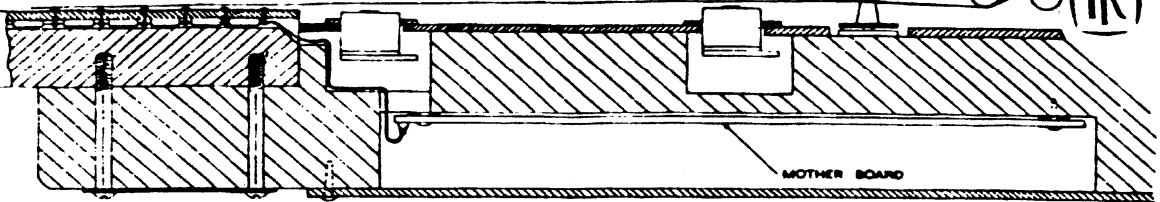


IF IN DOUBT ASK

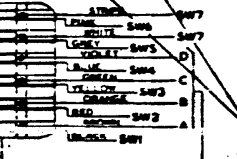
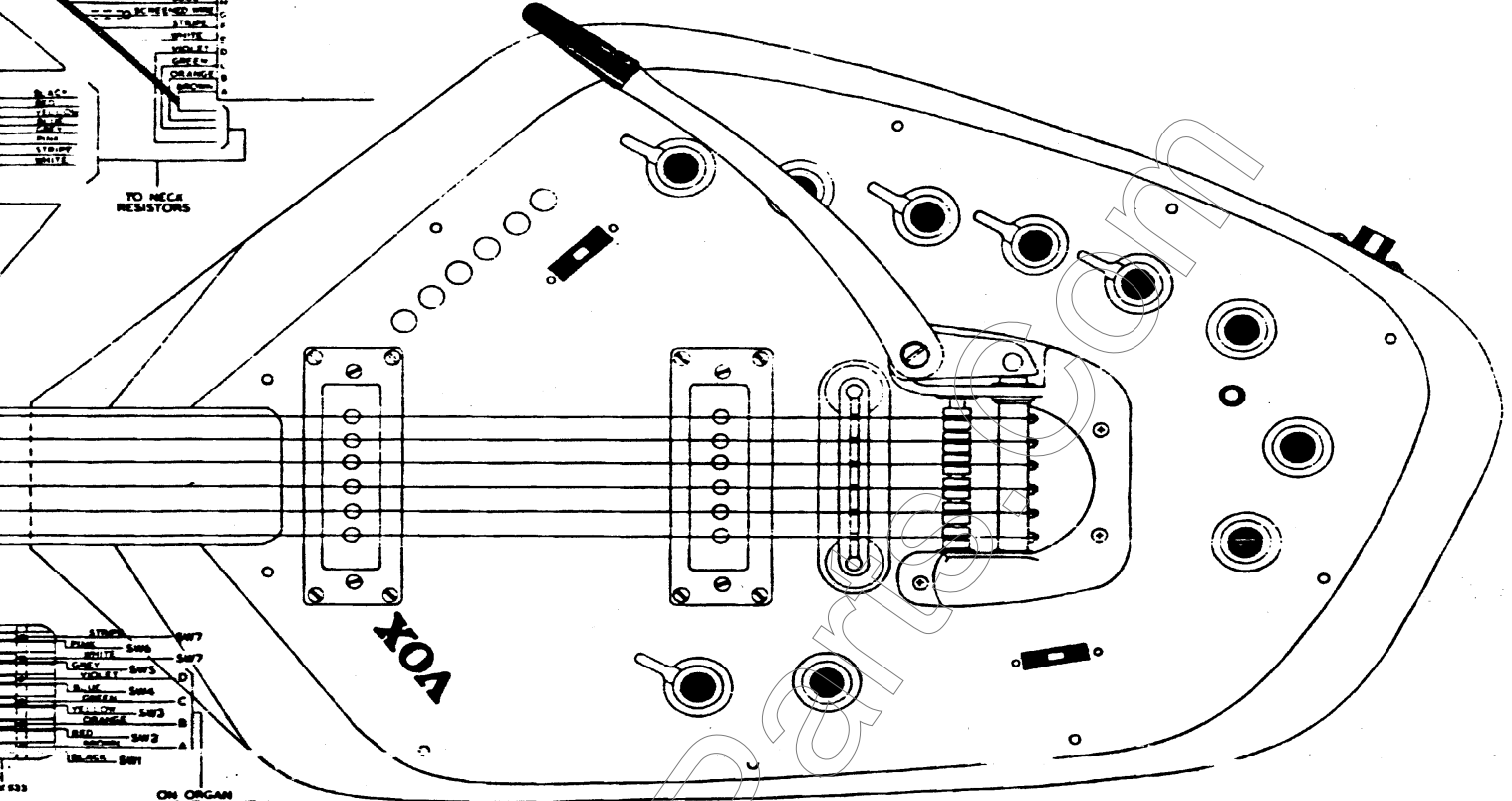
THIRD ANGLE PROJECTION



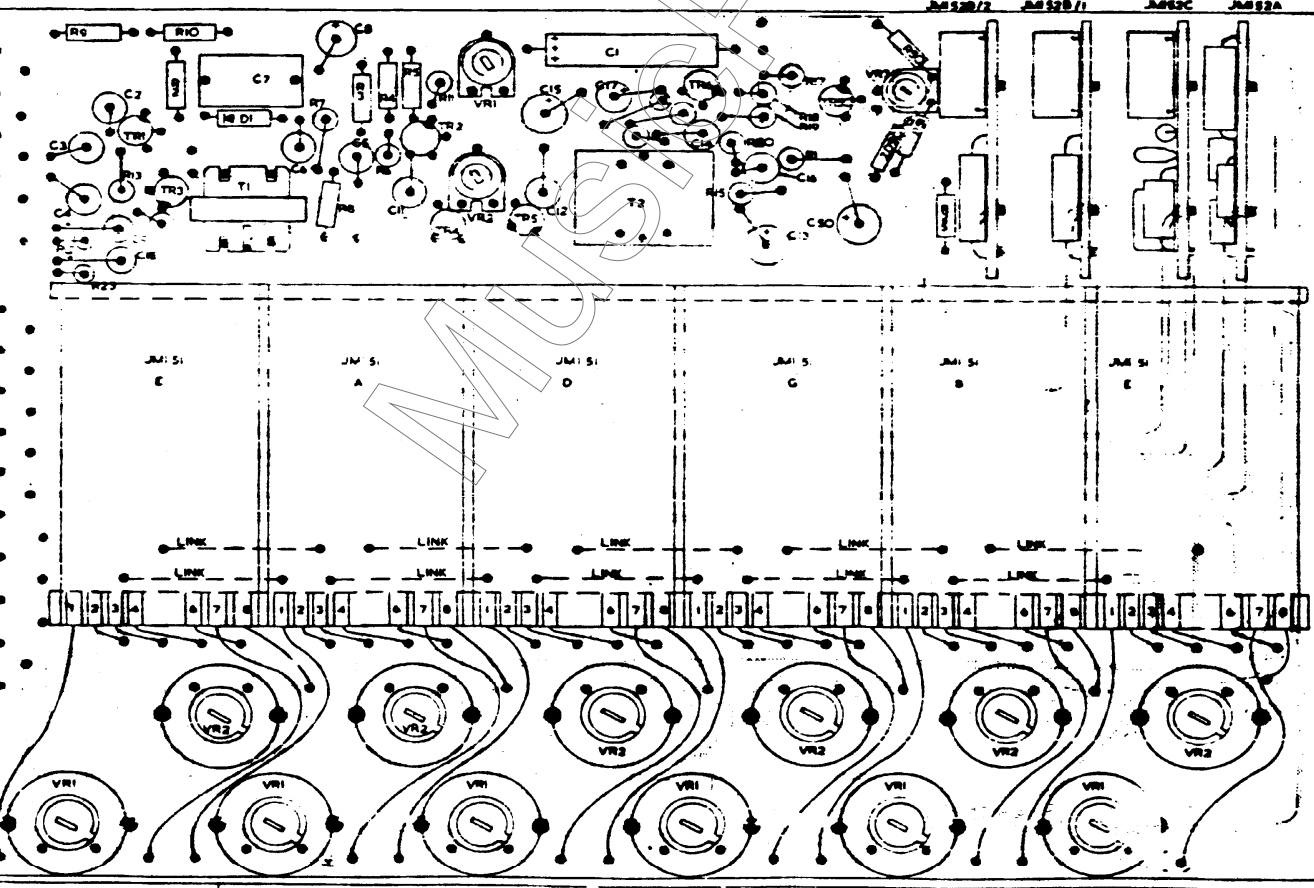
ORGAN GENERATOR UNIT



CUT-AWAY VIEW SHOWING WIRING FROM PLETBOARD TO MOTHER BOARD

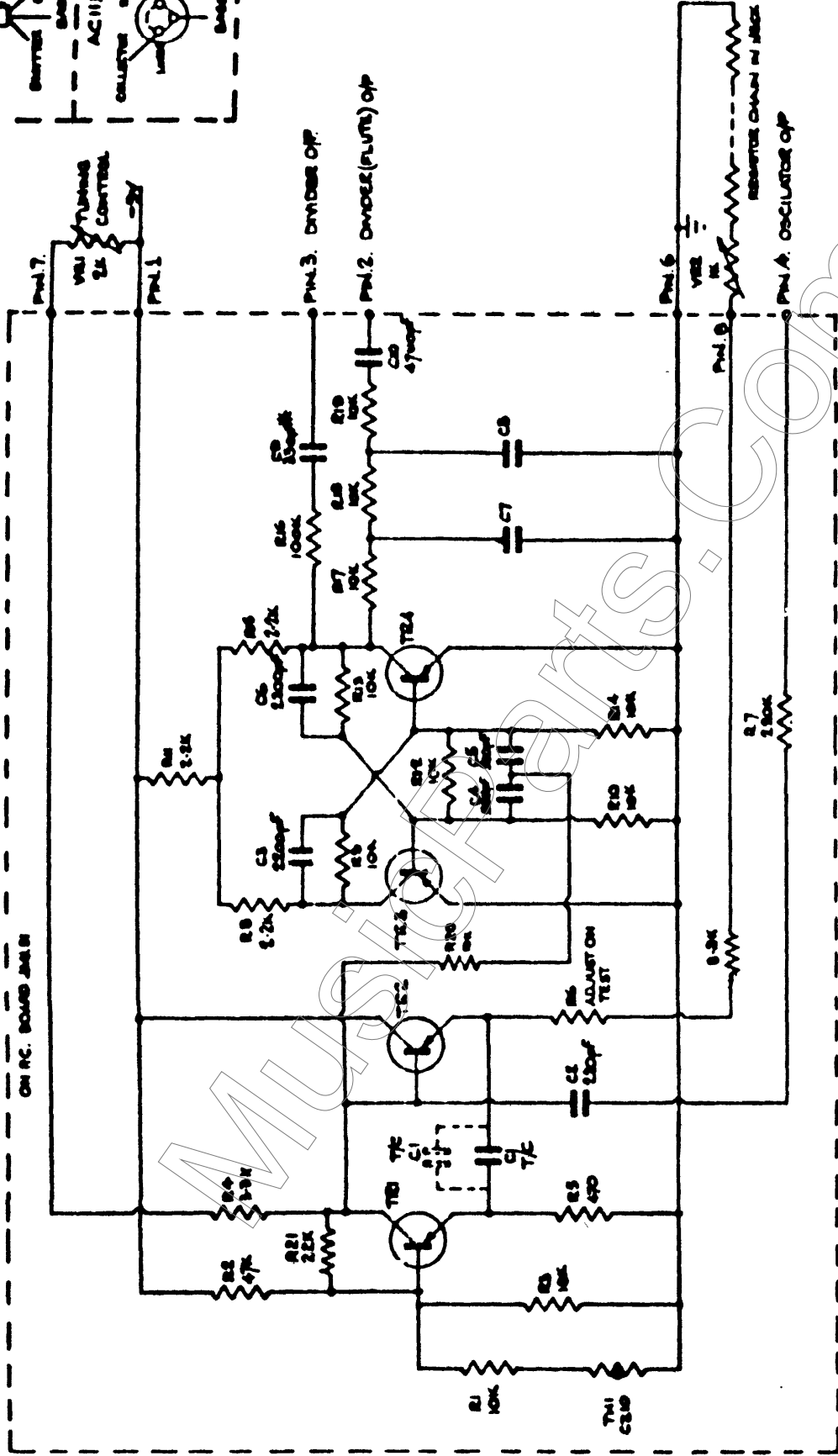


ON ORGAN GENERATOR UNIT



DES NO
05/068

ON RC BOARD 2A1 B

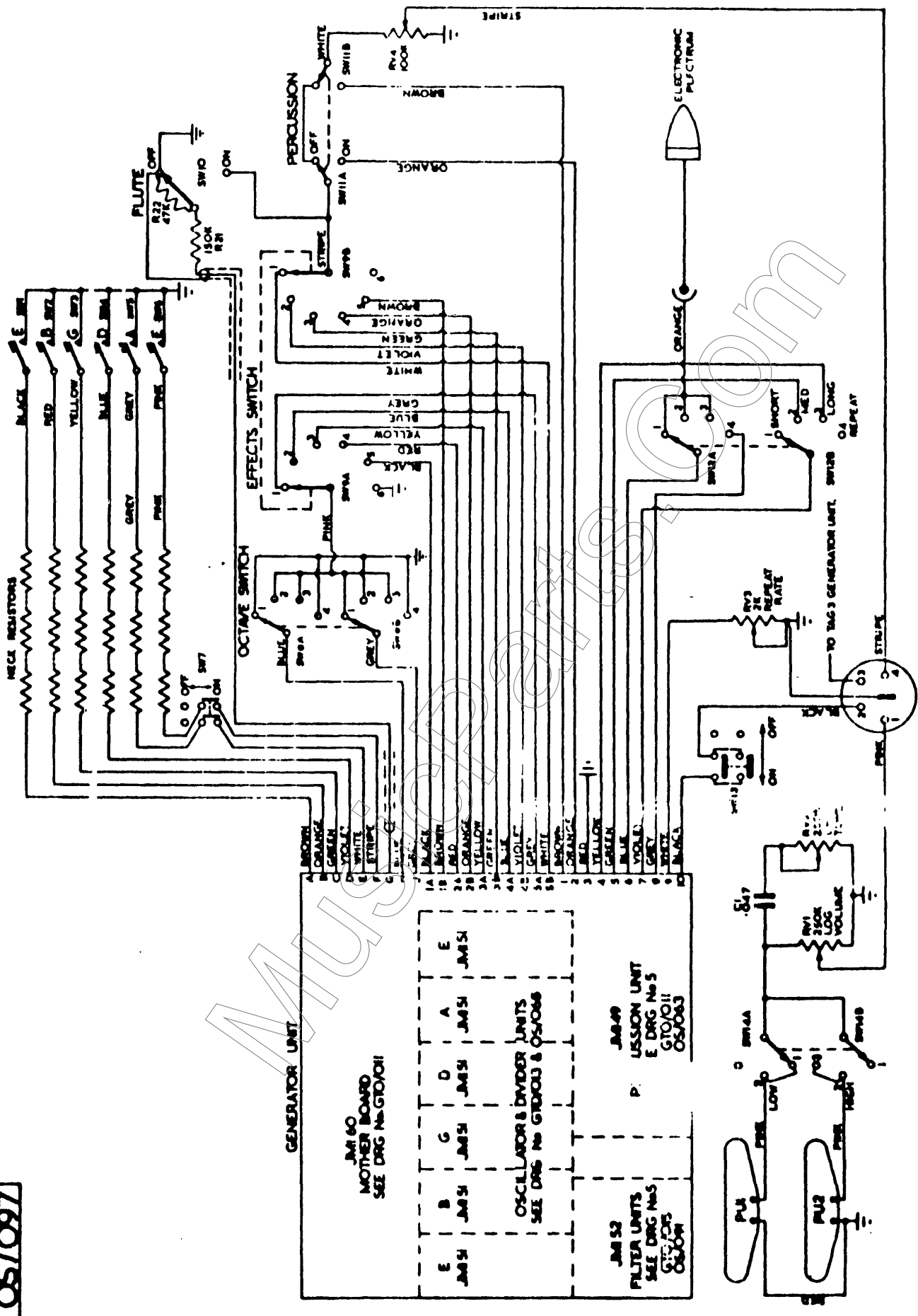


FOR OSCILLATOR & DIVIDER COMP. LAYOUT JAL 54 USE DES. G.D.013

IF C5 ON BASS GUITAR ORGAN IS REPLACED WITH 0-01
ALL RESISTORS IN OHMS UNLESS OTHERWISE STATED.
ALL CAPACITORS IN M.F.D. UNLESS OTHERWISE STATED.

GUITAR ORGAN		GUITAR ORGAN BASS		TRANSISTORS	
TR	FILTER	TR	FILTER	TR	TRANSISTORS
TR1	C7	TR1	C7	TR1	BC107
TR2	47k	TR2	47k	TR2	BC108
TR3	33k	TR3	33k	TR3	BC107
TR4	22k	TR4	22k	TR4	BC107
TR5	15k	TR5	15k	TR5	BC107
TR6	10k	TR6	10k	TR6	BC107
TR7	8.2k	TR7	8.2k	TR7	BC107
TR8	6.8k	TR8	6.8k	TR8	BC107
TR9	5.6k	TR9	5.6k	TR9	BC107
TR10	4.7k	TR10	4.7k	TR10	BC107

TITLE:-		DESIGN	
GUITAR ORGAN		DESIGNER	J.S. King
OSCILLATOR & DIVIDER UNIT		CHECKED	DT.H.
JENNINGS MEDICAL INDUSTRIES LTD		APP	
DARTFORD KENT.		DATE	05/068

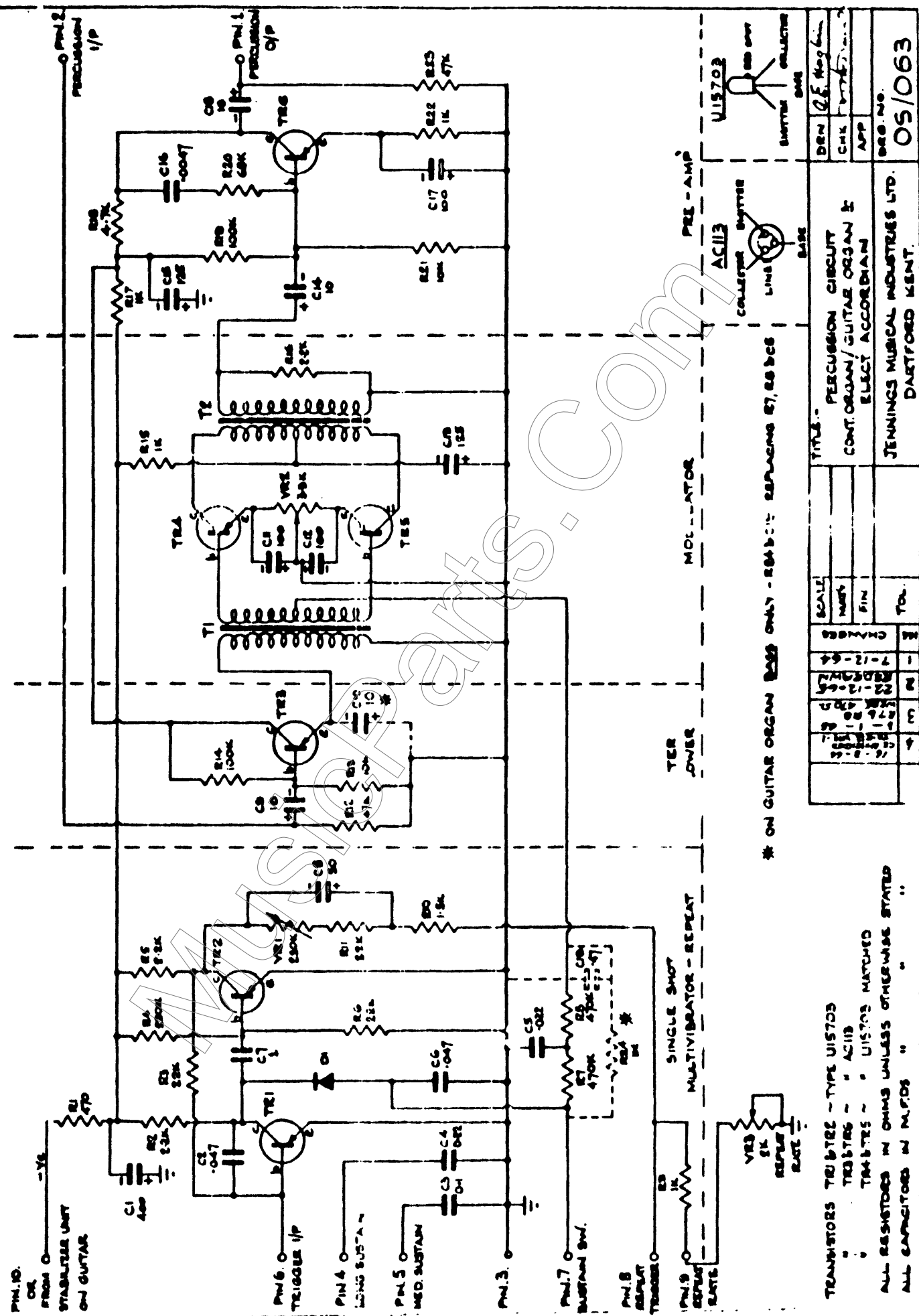


SCALE	INCHES	1/8	1/4	3/8	1/2	3/4	1
MILLIMETERS		2	5	10	15	20	25
NO.							
DATE							
BY							
CHECKED							
APPROVED							
DRN	DRN	CHK	CHK	APP	APP	APP	APP
TITLE: GUITAR ORGAN BLOCK WIRING DIAGRAM							OS/097
JENNINGS MUSICAL INDUSTRIES LTD. DARTFORD, KENT							

NOTE: ON BASE UNIT, NECK RESISTORS FOR ELECTRONIC PERCUSSION UNIT TAKE 1 AND 7 TO FITTED BASE UNIT. SEE DIAGRAM FOR ELECTRONIC PERCUSSION UNIT. BASE NO. GTO/011

DES. NO.
05/063

PC BOARD J.M.I. 49



* ON GUITAR ORGAN BAYS ONLY - REPLACE RESISTORS R7, R8, R9

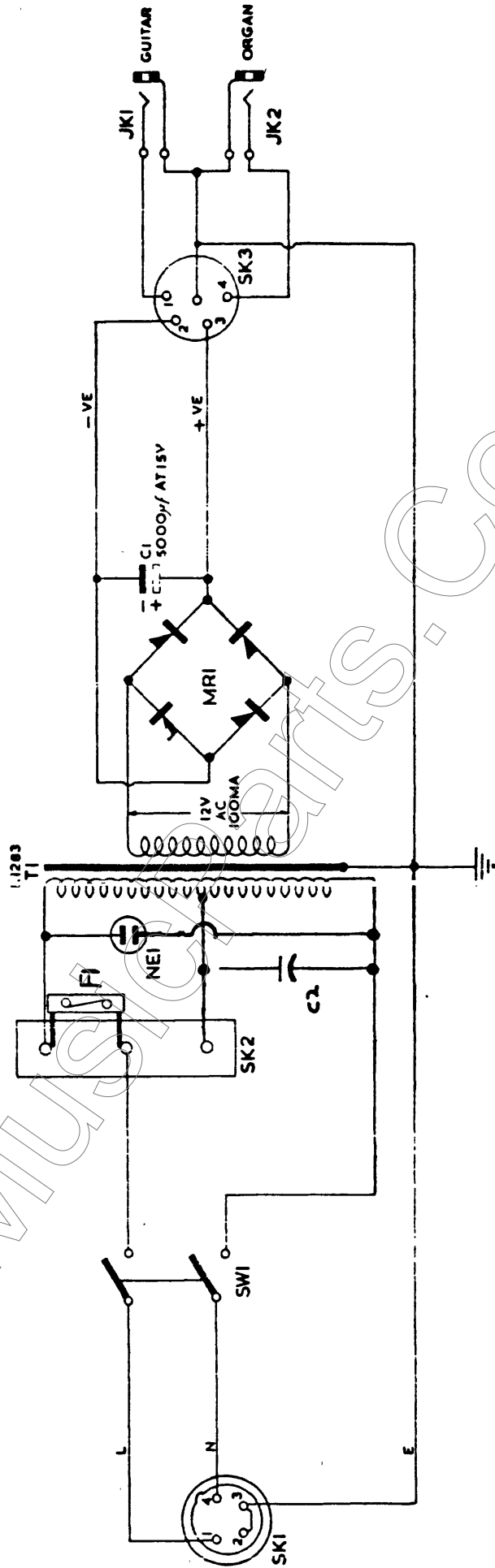
TRANSISTORS TR1-TR6 - TYPE U15703
 TR1-TR3 - " AC113
 TR4-TR6 - " U15703 MATCHED
 ALL RESISTORS IN OHMS UNLESS OTHERWISE STATED
 ALL CAPACITORS IN MICROFARADS "

SCALE	NO.	REV.	TOT.
1	1	1	1
2	2	1	2
3	3	1	3
4	4	1	4
5	5	1	5
6	6	1	6
7	7	1	7
8	8	1	8
9	9	1	9
10	10	1	10

TITLE - PERCUSSION CIRCUIT
 CONT. ORGAN / GUITAR ORGAN &
 ELECT ACCORDIAN
 JENNINGS MUSICAL INDUSTRIES LTD.
 DARTFORD KENT.

DES.	CHK.	APP.	DRG. NO.
Q.E. King			05/063

DRG. NO.
OS/101



SCALE		TITLE:		DRN.	R. S. G.
MAT.		GUITAR ORGAN		CHK.	D. H. G.
FIN.		POWER SUPPLY CIRCUIT		APP.	
TOL		JENNINGS MUSICAL INDUSTRIES LTD		DRG. NO.	OS/101
ISS		DARTFORD, KENT.			
CHANGES					
1					
2					
RE-ROUTED					
EARTH					