

MODEL TG704A

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- Elgar is promptly notified of defects by the Buyer and that notification occurs within the warranty period;
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- the Buyer returns the defective product in the original, or equivalent, shipping container;
- if, upon examination of such product by Elgar it is disclosed that, in fact, a defect in materials and/or workmanship does exist, that the defect in the product was not caused by improper conditions, misuse, or negligence; and,
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CONDITIONS OF WARRANTY

- To return a defective product, contact an Elgar representative or the Elgar factory for an RMA number. Unauthorized returns will not be accepted and will be returned at the shipper's expense.
- For Elgar products found to be defective within thirty days of receipt by the original purchaser, Elgar will absorb all ground freight charges for the repair. Products found defective within the warranty period, but beyond the initial thirty-day period, should be returned prepaid to Elgar for repair.
- Normal warranty service is performed by Elgar during the weekday hours of 7:30 am to 4:30 pm Pacific time. Warranty repair work requested to be accomplished outside of normal working hours will be subject to Elgar non-warranty service rates.
- Warranty field service is available on an emergency basis. Travel expenses (travel time, per diem expense, and related air fare) are the responsibility of the Buyer. A Buyer purchase order is required by Elgar prior to scheduling.
- A product found, upon inspection by Elgar, to be in specification is subject to an inspection fee and applicable freight charges.
- Equipment purchased in the United States carries only a United States warranty for which repair must be accomplished at the Elgar factory.

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SECTION I INTRODUCTION AND GENERAL DESCRIPTION

SCOPE OF MANUAL

This manual describes the Model TG704A transient generator manufactured by the Elgar Corporation for use with the Elgar AC Power Sources. The manual contains installation, operation and maintenance instruction, circuit description, circuit diagrams and parts lists.

INTRODUCTION

The Elgar Model TG704A transient generator provides low-level single or three-phase signals in 300-500 and 45-70Hz frequency ranges to drive the Elgar AC Power Sources for generation of single or three-phase power. The low-level signals may be modified by internally generated frequency and amplitude transients to facilitate transient-susceptibility testing of equipment powered by the associated AC Power Sources.

The frequency and amplitude transients are generated internally and analog DC voltages are available at test points proportional to instantaneous amplitude and frequency.

The output signals may be frequency or amplitude modulated by external signal sources.

As an optional feature, harmonic distortion may be introduced into the output signals, phased in such a manner as to either peak or

flatten the output waveforms. The amount of harmonic distortion is normally 8%, but it is internally adjustable 0-10%.

MODEL IDENTIFICATION

The various options are identified by dash numbers as follows:

Model TG704A-1	Single-phase
Model TG704A-3	Three-phase
Model TG704A-1D	Single-phase, Distortion option
Model TG704A-3D	Three-phase, Distortion option

GENERAL DESCRIPTION

The Model TG704A is housed in a 3½ inch high rack-mount enclosure. It is powered from 115V, 60Hz or 230V, 50-60Hz and may be switched on and off independently of the associated power source.

Front panel controls permit selection of frequency range, initial frequency, initial amplitude, and the magnitude and duration of frequency and amplitude transients. Frequency and amplitude transients are initiated independently by momentary push-buttons on the front panel. Additional momentary "CAL" push-buttons are provided which force the steady-state output equal to the selected transient condition.

A "drop-out" push-button causes the signal outputs to go to zero for the duration of the selected amplitude transient.

Waveform selector push-buttons select sine, flattened or peaked output waveforms in those units which have the distortion option installed.

Output signals to the associated power sources are wired to a MS3102A-20-27S connector (J1) on the rear panel. A cable, furnished with the transient generator, carries these signals to the power sources. An additional rear panel connector, J2, provides for remote access to the transient initiate, analog frequency, and analog amplitude connections.

SECTION II SPECIFICATIONS

OUTPUTS

Frequency Range	300 - 500 Hz or 45 - 70 Hz														
Distortion, Sine Mode with Distortion Option	Less than 1% Peak mode or Flat mode 8% total														
Approximate Harmonic Spectrum:	<table> <tr> <td>2nd</td> <td>4.5%</td> </tr> <tr> <td>3rd</td> <td>4.5%</td> </tr> <tr> <td>4th</td> <td>3%</td> </tr> <tr> <td>5th</td> <td>1.5%</td> </tr> <tr> <td>6th</td> <td>1.5%</td> </tr> <tr> <td>7th</td> <td>3%</td> </tr> <tr> <td colspan="2">All others less than 1/2%</td> </tr> </table>	2nd	4.5%	3rd	4.5%	4th	3%	5th	1.5%	6th	1.5%	7th	3%	All others less than 1/2%	
2nd	4.5%														
3rd	4.5%														
4th	3%														
5th	1.5%														
6th	1.5%														
7th	3%														
All others less than 1/2%															
Amplitude Range	58-190V RMS (at output of associated power sources)														
Frequency Transient Magnitude	400Hz range — ± 100 Hz 60Hz range — ± 10 Hz														
Frequency Transient Duration	15 Millisec to 15 Sec														
Frequency Transient Response	Double exponential filtered, 33 millisec time constant														
Amplitude Transient Magnitude	± 80 V RMS														
Amplitude Transient Duration	15 Millisec to 15 Sec														
Amplitude Transient Response	Instantaneous, rise time less than 100 microsec														
Analog Frequency Output	1 volt DC per 100Hz (300-500 range) 1 volt DC per 15Hz (45-70Hz range)														

Analog Amplitude Output	1 volt DC per 40V RMS
Analog Output Accuracy	±1%
Size	3½" x 16½" x 15" (panel 3½" x 19")
Weight	20 lbs.

INPUT

Power	115V or 230V RMS, 50-60Hz, less than 100VA
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SECTION III

PRELIMINARY INSPECTION AND OPERATION

INSPECTION UPON RECEIPT

The Elgar transient generator is aligned, calibrated, and tested prior to shipment. The instrument is therefore ready for immediate use upon receipt. The following checks should be made, however, to assure that the instrument has suffered no damage during shipment.

1. Make a visual inspection of the shipping container prior to accepting the package from the carrier. If extensive damage to the shipping container is evident, a description of damage should be noted on the carrier's receipt, and signed by the driver of carrier agent. If damage is not apparent until the instrument is unpacked, a claim for concealed damage should be placed with the carrier and all shipping containers and filler material saved for inspection. Forward a report of damage to the Elgar Service Department, which will provide instructions for repair or replacement of the instrument.
2. Make a visual inspection of the instrument when it is removed from the shipping container.

INSTALLATION

The transient generator is normally installed in a relay rack with an associated Elgar single or

three-phase AC power source system. The transient generator line cord must be connected to a source of 115V 60Hz power. The signal output connector must be connected to a cable (furnished with the transient generator) connecting the signals to the Jones S312AB receptacles on the rear panels of the power sources. Signal interconnections within the power sources are completed by installing dummy plug-in modules, Model 400A-114 in the A-phase source, Model 400B in the B-phase source and Model 400C in the C-phase source. For three-phase power sources, such as Models 153A, 503 or 1503, a single Model 400A-113 dummy plug-in is required.

If remote operation is desired, the transient initiate connections are available at J2 on the rear panel.

The maximum transient voltage available from the system is limited by the output voltage capability of the AC power sources. The three-phase sources, which are normally limited to 130V RMS maximum output, must be ordered with special output transformers if 0-190 volt capability is desired. Because of the higher step-up ratio of the transformer, the output current capability is correspondingly reduced. Single phase sources may be connected for 0-260 volt operation. For maximum current capability at 190V RMS, those single-phase sources which have 28V tapped secondary windings can be connected for 0-200V RMS by using only the parts of the secondary windings above the taps, as shown in Fig. 3-1.

SECTION III

When using this connection, either the front panel voltmeter should be re-wired to indicate the actual voltage at the output terminal, or an external voltmeter should be used.

OPERATION

To prevent over-voltage at the load, it is advisable to calibrate the AMPLITUDE control settings on the power source front panels before connecting the load. Turn on the transient generator and power sources. Select the desired frequency range on the transient generator and set the AMPLITUDE control on the transient generator to 115V. Now adjust the front panel AMPLITUDE controls on the sources until the source outputs are 115V. This standardizes the power source gains for the signal levels from the transient generator, and the power source AMPLITUDE controls should not be readjusted unless the frequency range is changed, in which case minor adjustments may be required.

After the power source AMPLITUDE controls have been set, the steady state frequency and amplitude of the system are controlled by the FREQUENCY and AMPLITUDE controls of the transient generator.

To generate frequency transients, set the FREQUENCY TRANSIENT DURATION dial and TRANSIENT DURATION MULT. push buttons for the desired duration of the transient. Set the FREQUENCY TRANSIENT MAGNITUDE dial for the desired frequency excursion. The transient may now be generated by pressing the FREQUENCY TRANSIENT INITIATE button. If it is

desired to verify the transient excursion with an external frequency counter, holding down the CAL button will force the steady state frequency to assume the transient value for as long as the button is held.

The frequency transient is not instantaneous, but has its rise and fall times filtered by a 30 millisecond double-exponential filter. Thus, for frequency transients shorter than 100 milliseconds, the frequency excursion will not reach the full programmed value.

An analog voltage proportional to instantaneous frequency is available at the ANALOG FREQUENCY test point on the front panel of the transient generator. On the 300-500Hz range, this voltage is 1 volt DC per 100Hz frequency. On the 45-70Hz range, the voltage is 1 volt DC per 15Hz frequency.

To generate amplitude transients, set the AMPLITUDE TRANSIENT DURATION dial and TRANSIENT DURATION MULT. push buttons for the desired duration of the transient. The voltage excursion of the transient is set on the AMPLITUDE TRANSIENT MAGNITUDE dial, and the transient is generated by the transient INITIATE button. Pressing the DROPOUT button causes the system outputs to go to zero for the programmed duration of the transient.

The scale factor of analog voltage at the ANALOG AMPLITUDE test point is 40 volts RMS per volt DC. This scale factor, and the calibration of the AMPLITUDE AND AMPLITUDE TRANSIENT MAGNITUDE dials hold for both 45-70 and 300-500Hz frequency ranges.

HARMONIC DISTORTION

In transient generators with the harmonic distortion option, harmonic distortion may be added to the output signals by pressing either the PEAK or FLAT button. The phase angle of the added harmonics is selected to either peak or flatten the output waveform. In the SINE position, no distortion is added.

FREQUENCY MODULATION

The output signals of the transient generator may be frequency modulated by an external signal connected to J4. On the 400Hz range,

the output frequency excursion is 10Hz/volt. On the 60Hz range, it is 1Hz/volt.

AMPLITUDE MODULATION

The output signals of the transient generator may be amplitude modulated by an external signal connected to J3. The power source outputs will vary 4V RMS per volt at J3. The percentage modulation may be computed by:

$$\% \text{ Mod} = E_i (\text{pk}) \frac{4}{E_o} \times 100$$

where $E_i (\text{pk})$ is the peak value of the input signal at J3 and E_o is the RMS output voltage setting.

1. Remove jumper straps from rear panel terminal strip.
2. Add wire jumper and connect load as shown.
3. Changing internal connections to front panel binding posts and meter as shown in dotted lines will connect binding posts and meter correctly to 0-200V output terminals.

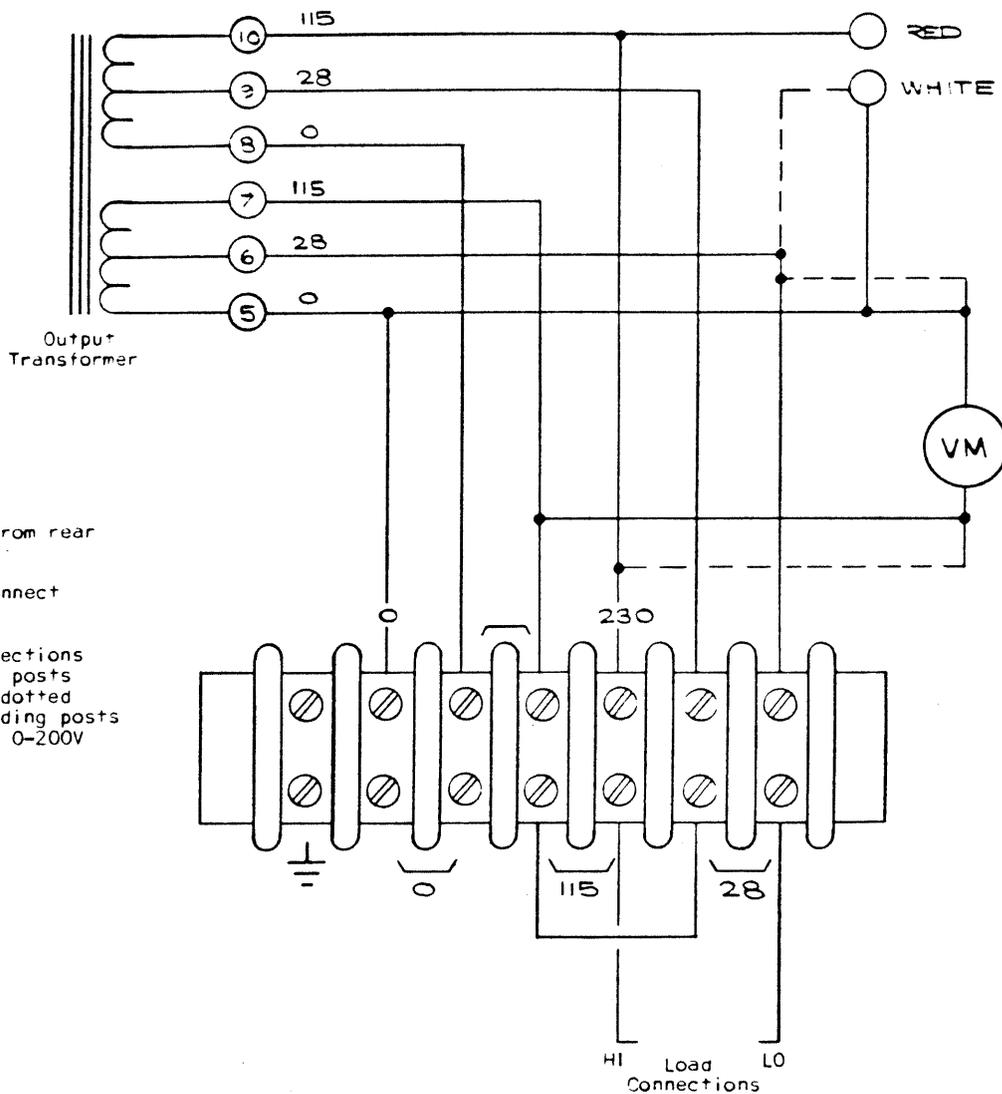


Figure 3-1. 200V. Output Connectors

SECTION IV THEORY OF OPERATION

GENERAL

The Model TG704A transient generator consists of a voltage-controlled sine wave oscillator, an analog multiplier to give voltage-controlled output amplitude, two transient generators to generate analog transient voltages, and, in three-phase units, a broadband single-phase to three-phase converter to produce three-phase output signals. With the harmonic distortion option, distortion generators are installed in each phase. Table 4-1 lists the assemblies installed in each version of the transient generator.

VOLTAGE-CONTROLLED OSCILLATOR 09-146-40

The voltage controlled oscillator consists of a Wavetek 120-021 generator module and a Wavetek 120-022 sine converter module. The frequency of the generator is proportional to the DC voltage applied to the VCG terminal and inversely proportional to the capacitance connected to the C terminal. C103 and C104 are selected to give an output frequency of 400Hz when the VCG voltage from Z201 is 4V DC. C101 and C102 are added by frequency range button S1 to lower the frequency range to 45-70Hz. The VCG voltage from Z201 consists of the sum of the steady-state frequency voltage from FREQUENCY control R14 and the frequency transient voltage from Z202.

The sine converter module modifies the triangle-wave signal from the voltage-controlled module to a sine wave. Adjustment potentiometers R102, R105 and R108 set the operating conditions of the sine converter for minimum distortion.

ANALOG MULTIPLIER

The sine-wave signal from the sine converter module is applied to pin 9 of analog multiplier Z103. Operational amplifier Z104 combines and level-shifts the outputs of Z103. The output of Z104 is a sine wave signal the amplitude of which is proportional to the analog amplitude voltage from Z301, applied to pin 4 of multiplier Z4. Adjustment potentiometers R115, R116, and R127 correct the input and output offsets of Z103.

VOLTAGE CONTROLLED OSCILLATOR 09-153-40

This oscillator, used with the distortion option, is similar to 09-146-40 except that the analog multiplier, Z103 is omitted, together with its associated components, and operational amplifier Z104 is connected as a unity-gain buffer for the oscillator signal from Z102.

Table 4-1

<u>MODEL NO.</u>	<u>ASSEMBLIES INSTALLED</u>	
TG704A-1	Oscillator	09-146-40
	Frequency Transient	09-147-40
	Amplitude Transient	09-148-40
TG704A-1D	Oscillator	09-153-40
	Frequency Transient	09-147-40
	Amplitude Transient	09-148-40
	Distortion Generator	09-150-40
TG704A-3	Oscillator	09-146-40
	Frequency Transient	09-147-40
	Amplitude Transient	09-148-40
	Phase Shifter	09-149-40
TG704-3D	Oscillator	09-153-40
	Frequency Transient	09-147-40
	Amplitude Transient	09-148-40
	Phase Shifter	09-149-40
	Distortion Generator (3)	09-150-40

BROADBAND PHASE SHIFTER 09-149-40

The broadband phase shifter converts the single phase signal from Z104 to three signals with 120° phase relationship to drive the three power sources. The A-phase signal passes through operational-amplifier all-pass phase shift network Z403 and Z404. The phase shift of this path varies from 0° to 360° as frequency is increased. The B-phase signal passes through operational amplifier all-pass phase shift networks Z401 and Z402 which have similar phase-shift characteristics. The R-C time constants in the phase shift networks are selected so that the difference in phase shift between the A-phase and B-phase signals is constant at 120° over the frequency range of 300-500 Hz. The C-phase signal is produced by operational amplifier Z405, which delivers the inverted sum of the A-phase and B-phase signals.

On the 45-70Hz frequency range, switch S1 switches in additional components to control the phase shift at the lower frequencies.

FREQUENCY TRANSIENT GENERATOR 09-147-40

The steady-state frequency is determined by the voltage from the arm of FREQUENCY control R14. During a frequency transient, relay K201 is closed, adding to this voltage the voltage from the arm of FREQUENCY TRANSIENT potentiometer R16. The voltage from R16 is filtered in operational-amplifier active filter Z202 to slow its rise and fall times.

The transient is started by TRANSIENT INITIATE push-button S8, which sets flip-flop Q202 and Q203. Q203 energizes relay K201 and turns off clamp transistor Q202 which allows the selected timing capacitor to charge. When the voltage on the timing capacitor equals the voltage from the arm of transient duration potentiometer R18, comparator Z203 conducts and resets the flip-flop, terminating the transient.

AMPLITUDE TRANSIENT GENERATOR 09-148-40

The steady-state amplitude is determined by the voltage from the arm of AMPLITUDE

control R21, applied through operational amplifier Z301 to pin 4 of analog multiplier Z103. During an amplitude transient, relay K301 is closed, adding to this voltage the voltage from the arm of AMPLITUDE TRANSIENT control R23. The timing of the amplitude transient is determined by flip-flop Q302 and Q303 and timer circuit Q301 and Z303, which operate the same as the frequency transient timer.

To facilitate measuring the transient excursion with external instruments, CAL push-button S9 energizes relay K301, causing the transient state to be maintained for as long as the button is held.

When the drop-out button is pressed, flip-flop Q304 and Q305 is set, closing relay K302 which shorts the output Z301 and programs the output signals to zero. Q305 also turns off Q301, starting the timer. At the end of the programmed time, Z303 resets the flip-flop, terminating the drop-out.

DISTORTION GENERATOR 09-150-40

When the distortion generator option is installed a different oscillator assembly, 09-153-40, is used. This oscillator does not have an analog multiplier and the multiplication is accomplished in the distortion generator assemblies.

The input signal from the phase shifter is applied to Z501 which partially clips the signal

to introduce harmonic distortion. The clipped signal is applied to summing amplifier Z502, where its fundamental frequency component is balanced out by a portion of the input signal from R501. The output of Z502 contains only harmonics of the input frequency. This harmonic signal is either added or subtracted from the input signal in differential summing amplifier Z503 to produce either a peaked or flattened output waveform. The percentage of harmonic distortion is determined by the setting of R539. The output of Z503 is applied to multiplier Z504 and Z505. The operation of the multiplier is covered in the discussion of the oscillator assembly, P. 4-1.

POWER SUPPLIES

Transformer T1 in conjunction with rectifiers CR1 through CR4 provides rectified plus and minus 20V DC to the plus and minus 15V regulators. In the -15V regulator, operational amplifier Z2 compares the regulated output to the zener voltage of CR6, producing an error signal which controls the conduction of pass transistor Q2. R2, R3 and CR5 assure that the regulator starts when power is applied. Adjustment potentiometer R11 permits setting the regulated output precisely to -15V.

In the +15V regulator, operational amplifier Z1 compares the +15V output to the regulated -15V, producing an error signal which controls the conduction of pass transistor Q1.

SECTION V MAINTENANCE

SERVICE INFORMATION

Questions concerned with the operation, repair, or servicing of this instrument should be directed to the nearest Elgar representative or to the Service Department, Elgar Corporation, 9250 Brown Deer Road, San Diego, Ca. 92121. **INCLUDE THE MODEL NUMBER AND SERIAL NUMBER** in any correspondence concerning the instrument.

FACTORY REPAIR

Should it be necessary to return an instrument to the factory for repair, please contact the Elgar Corporation Service Department for authorization to make shipment.

DO NOT RETURN THE UNIT FOR REPAIR WITHOUT AUTHORIZATION.

SHIPPING DAMAGE

It is possible for equipment to be damaged in shipment. Therefore, it is imperative that the instrument be tested and inspected as soon as it is received. If the instrument shows signs of damage, notify the carrier immediately. The carrier's agent will prepare a report of damage to be forwarded to the Elgar Corporation Service Department. You will be advised as to the action necessary to have the instrument repaired or replaced.

ADJUSTMENT PROCEDURE

FRONT PANEL CONTROLS

The calibration of the front panel dials is determined by the position of the indicator knobs on their control shafts. These positions are set at the factory and are unlikely to require readjustment in the field. The following procedure will verify the positions of the knobs and indicate what readjustments are required.

STEADY STATE FREQUENCY

First verify that the $-15V$ power supply is set to $-15V \pm 0.1\%$. If necessary, readjust R11. Set the FREQUENCY dial to 400Hz. The voltage at the ANALOG FREQUENCY test point on the rear panel should be $+4V$ DC $\pm 0.25\%$. If readjustment is required, loosen the set screws in the vernier drive unit behind the front panel and re-position the potentiometer shaft.

STEADY STATE AMPLITUDE

Set the AMPLITUDE dial to 120V. The voltage at the ANALOG AMPLITUDE test point should be $3V$ DC $\pm 0.25\%$. If readjustment is required, change the position of the potentiometer shaft in the vernier drive unit behind the front panel.

FREQUENCY TRANSIENT MAGNITUDE

Set the FREQUENCY TRANSIENT dial to zero. The voltage at the arm of the potentiometer (R16) should be zero volts. Re-adjust as necessary.

AMPLITUDE TRANSIENT MAGNITUDE

Set the AMPLITUDE TRANSIENT dial to zero. The voltage at the arm of the potentiometer (R23) should be zero. Re-adjust as necessary.

TRANSIENT DURATION DIALS

Turn the transient duration knob fully CCW. Dial should read .15.

OSCILLATOR ASSEMBLY

The oscillator output can be observed on test point 403. The oscillator frequency is calibrated at 400Hz by selecting the value of trim capacitor C104. 60Hz calibration is accomplished by selecting the value of trim capacitor C102.

Adjustment potentiometers R102, R105 and R108 are used to minimize the output distortion of the sine converter. Observe the signal at test point 403 with a distortion analyzer and adjust R102, R103 and R108 for minimum distortion. These adjustments interact somewhat, so the adjustment sequence should be repeated until no further improvement is obtained. The distortion at test point 403 should be less than 0.5%.

To adjust the multiplier offsets, observe the signal at test point 403 with a DC coupled oscilloscope. Short circuit the ANALOG AMPLITUDE test point on the rear panel to the COMMON test point. Adjust R116 for zero AC signal. Adjust R127 for zero DC component. Remove the short circuit from the ANALOG AMPLITUDE test point and adjust R115 for zero DC component in the AC signal.

NOTE: With the distortion option, oscillator assembly 09-153-40 is installed. This assembly does not have multiplier adjustments R115, R116, and R127. With the distortion option, multiplier adjustments are made on the distortion generator boards.

PHASE SHIFTER ASSEMBLY 09-149-40

The phase angle adjustment should be made with a precision phase angle meter. Alternatively, a differential AC voltmeter can be used to measure line-to-line voltages. Phase angle measurements are best made at the output of the associated AC power sources, thereby any differential phase-shifts in the power sources are calibrated out. When using the differential voltmeter, set all three line-to-neutral voltages to 120V. When the phase angles are correct, the line-to-line voltages will all be equal. Set the frequency to 300Hz and adjust R416 for 120° phase relationship. Then set frequency to 500Hz and adjust R406 for 120° phase relationship. These adjustments interact, so they should be repeated several times. Now set frequency range 45-70Hz and frequency to 45Hz. Adjust R418 for 120° phase relationship. Set frequency to 70Hz and adjust R408 for 120° phase relationship. Repeat these adjustments several times.

NOTE: 400Hz phase adjustments must be made first before 60Hz adjustments are attempted.

DISTORTION GENERATOR ASSEMBLY 09-150-40

One distortion generator board is installed in single phase units and three identical boards are installed in three-phase units. In three-phase units, the adjustment procedure must be followed for all three boards.

Observe the output at test point 508 with a DC coupled oscilloscope. On the rear panel of the transient generator, short the ANALOG AMPLITUDE test point to the COMMON test point. Adjust R525 for zero AC signal on the oscilloscope, then adjust R536 for zero DC on the oscilloscope. Remove the short circuit from the ANALOG

AMPLITUDE test point and adjust R524 for zero DC component in the oscilloscope signal.

Set frequency to 400Hz. Observe the signal at test point 507 with a wave analyzer tuned to 400Hz. Adjust R501 for zero 400Hz signal. Alternatively, the signal at test point 507 may be observed with a TRUE RMS voltmeter and R501 adjusted for minimum indication. Now observe the signal at test point 508 with a distortion analyzer. Depress the PEAK waveform button on the front panel and adjust

R539 for 8% distortion. Depress the FLAT waveform button and verify that distortion is still 8%.

TROUBLESHOOTING

In the case of malfunction, the best troubleshooting method is signal tracing. As an aid to signal tracing, the following voltage measurements are given for a properly functioning unit set to 400Hz, 120V. (Voltage measurements are made with respect to circuit common, test point 0, (black):

CHASSIS ASSEMBLY:

Test point 5 (Green)	-15V DC $\pm 1/4\%$
Test point 2 (Red)	+15V DC $\pm 1\%$
Analog Frequency (rear panel)	+4V DC $\pm 1\%$
Analog Amplitude (rear panel)	+3V DC $\pm 1\%$

OSCILLATOR ASSEMBLY 09-146-40

Generator Output	Bottom of R104 - 3.5V peak to peak 400Hz triangle wave
Sine Converter output	Top of R109 - 8.5V peak to peak 400Hz sine wave
Z104 Output	Top of R109 - 8.5V peak to peak sine wave

OSCILLATOR ASSEMBLY 09-153-40 (distortion option)

Generator output	Top of R104 - 3.5V peak to peak 400Hz triangle wave
Sine Converter output	Top of R109 - 8.5V peak to peak 400Hz sine wave
Z104 Output (Z104 pin 6)	8.5V peak to peak sine wave

PHASE SHIFTER ASSEMBLY 09-149-40

Phase A output - Test point 404 (Yellow)	- 8.5V peak to peak sine wave
Phase B output - Test point 405 (Green)	- 8.5V peak to peak sine wave, -120° from Phase A
Phase C output - Test point 406 (Blue)	- 8.5V peak to peak sine wave, $+120^\circ$ from Phase A

FREQUENCY TRANSIENT 09-147-40

Analog Frequency - Test point 201 (Brown)	- +4V DC for 400Hz, increases to +5V DC when +100Hz frequency transient is programmed
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AMPLITUDE TRANSIENT 09-148-40

Analog Amplitude – Test point 302 (Red) – +3V DC for 120V setting, increases to +4V DC
+40V transient is programmed.

DISTORTION GENERATOR 09-150-40

Z501 output – pin 6 – clipped sine wave +4.5V to –1V.

Z502 output – Test point 507 (Violet) distorted waveform -2.5V peak to peak, no fundamental
frequency component

Z503 output – pin 6:
Sine mode – 8V peak to peak sine wave
Flat mode – 7.5V peak to peak flattened waveform
Peak mode – 8.5V peak to peak peaked waveform

Output Signal – Test point 508 (Gray):
Sine mode – 7V peak to peak sine wave
Flat mode – 6.5V peak to peak flattened waveform
Peak mode – 7.5V peak to peak peaked waveform

**SECTION VI
PARTS LISTS AND DIAGRAMS**

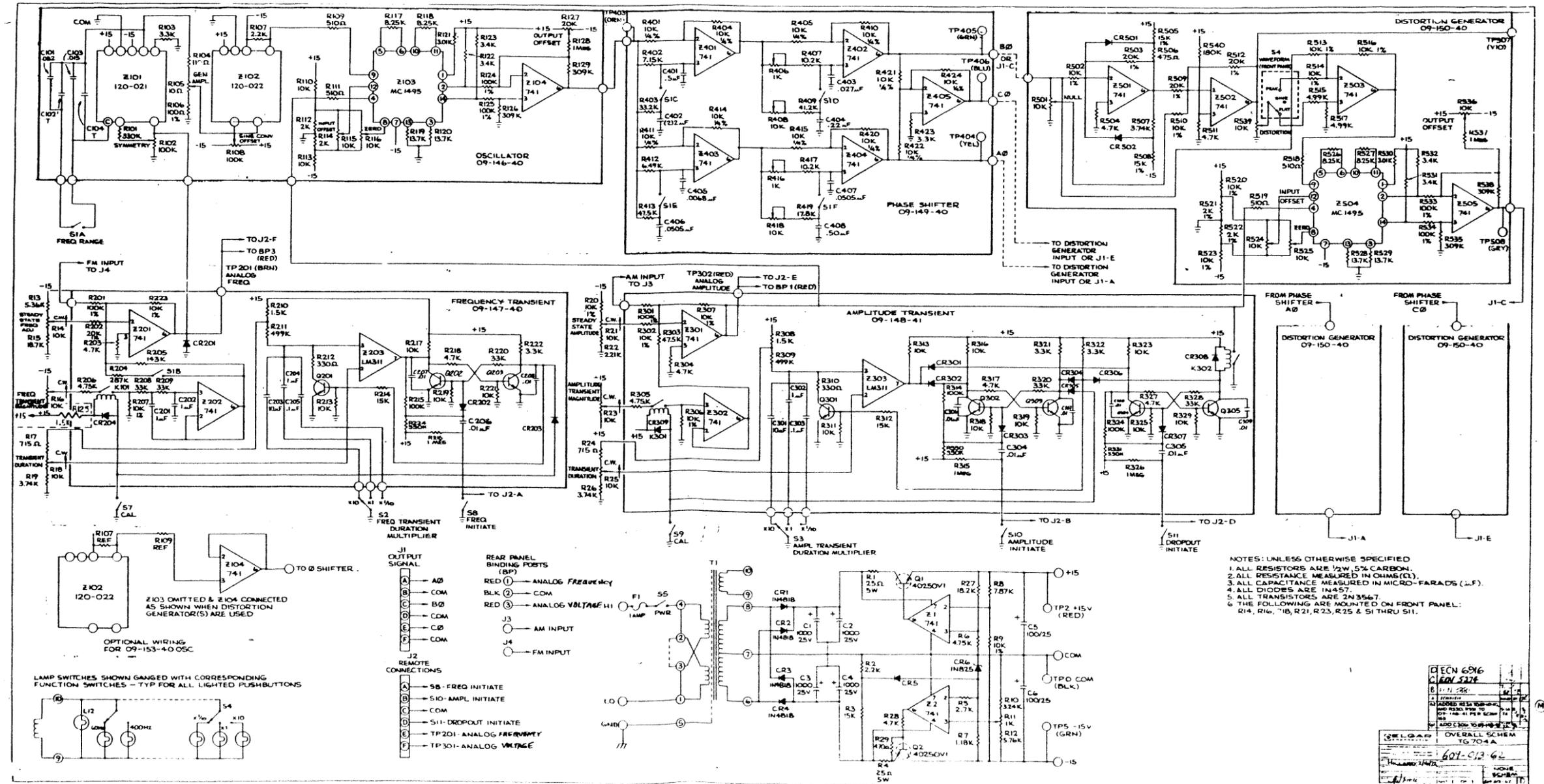


Figure 6-1. Schematic Diagram

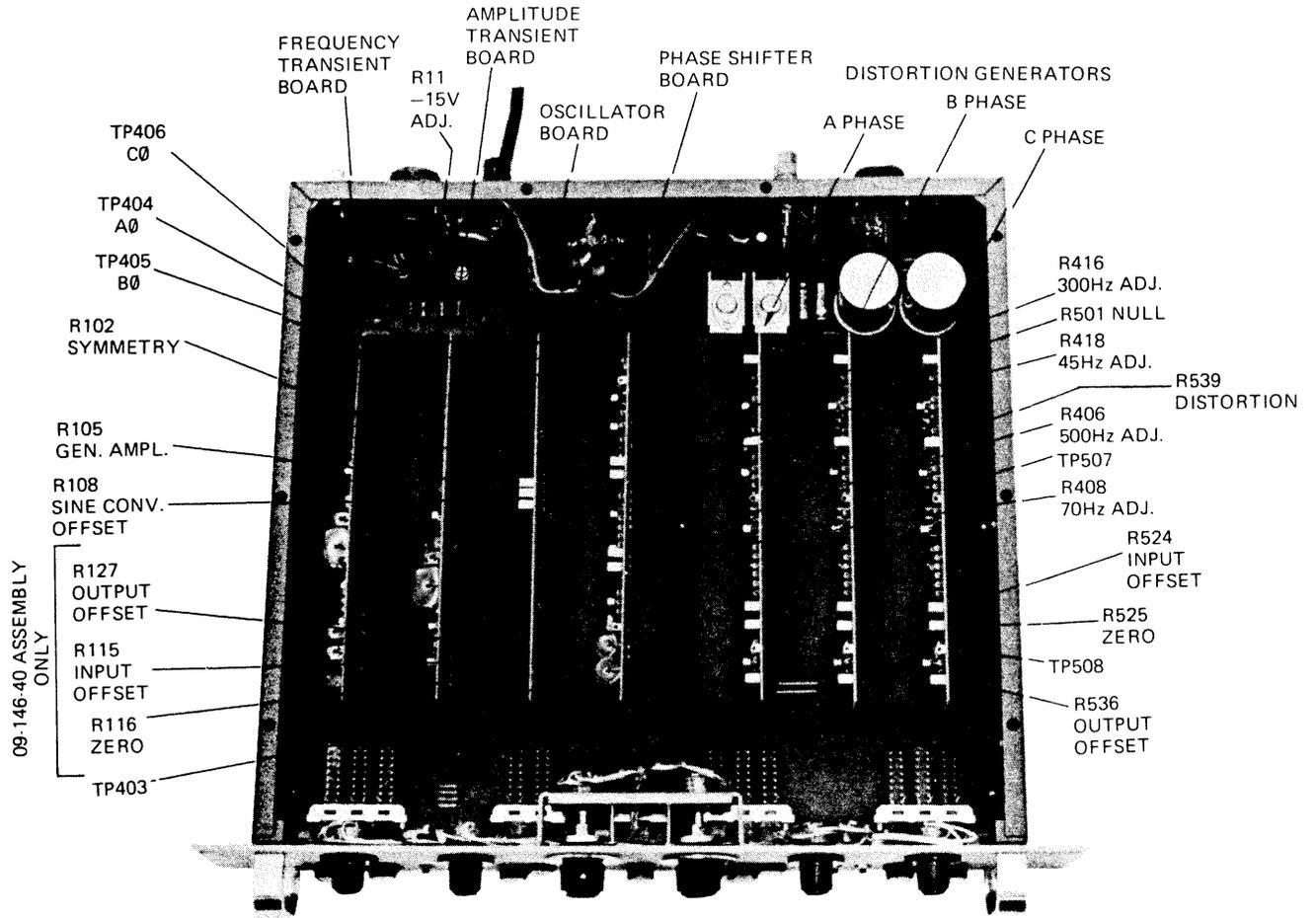


Figure 6-2. Circuit Board Locations

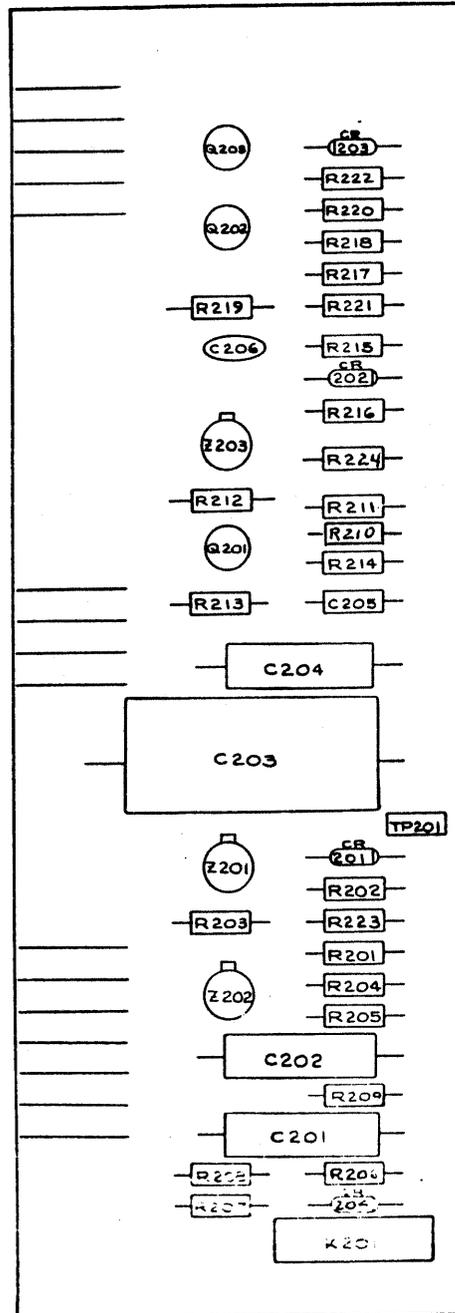


Figure 6-3. Component Layout - Frequency Transient Board 09-147-41

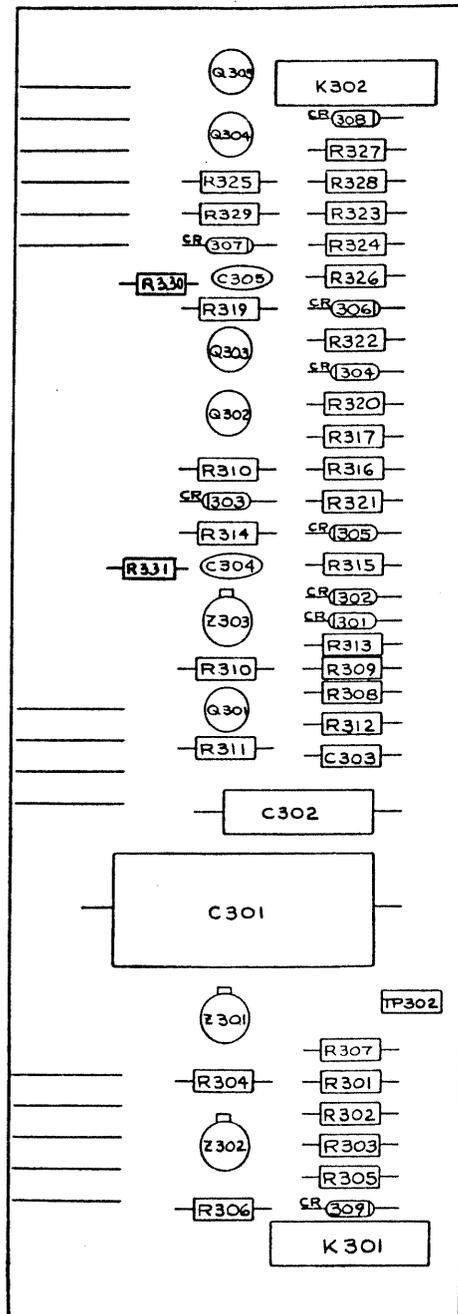


Figure 6-4. Component Layout - Amplitude Transient Board 09-148-41

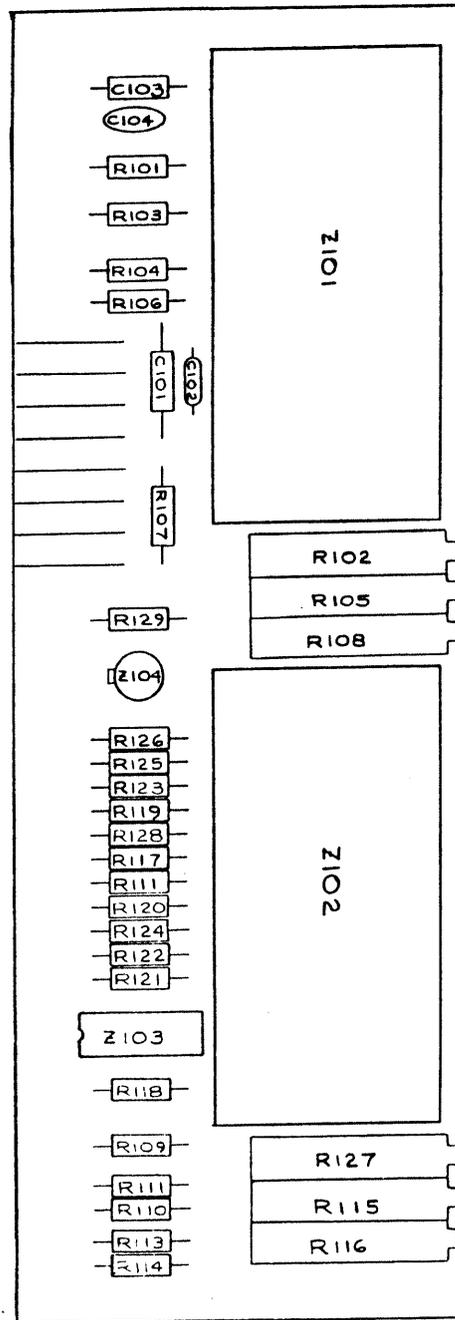


Figure 6-5. Component Layout - Oscillator Board 09-146-41

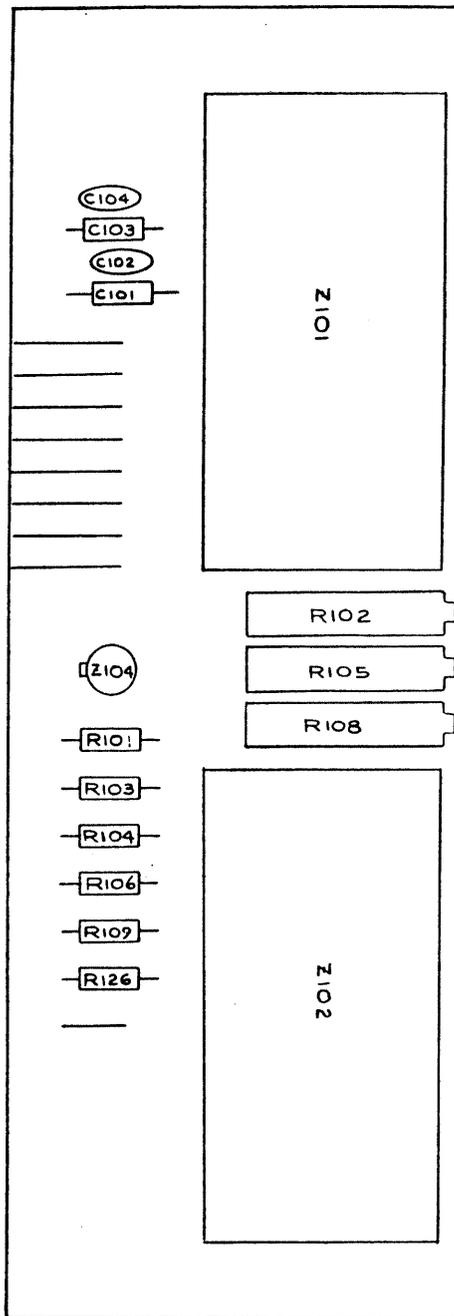


Figure 6-6. Component Layout - Oscillator Board
(Distortion Option) 09-153-40

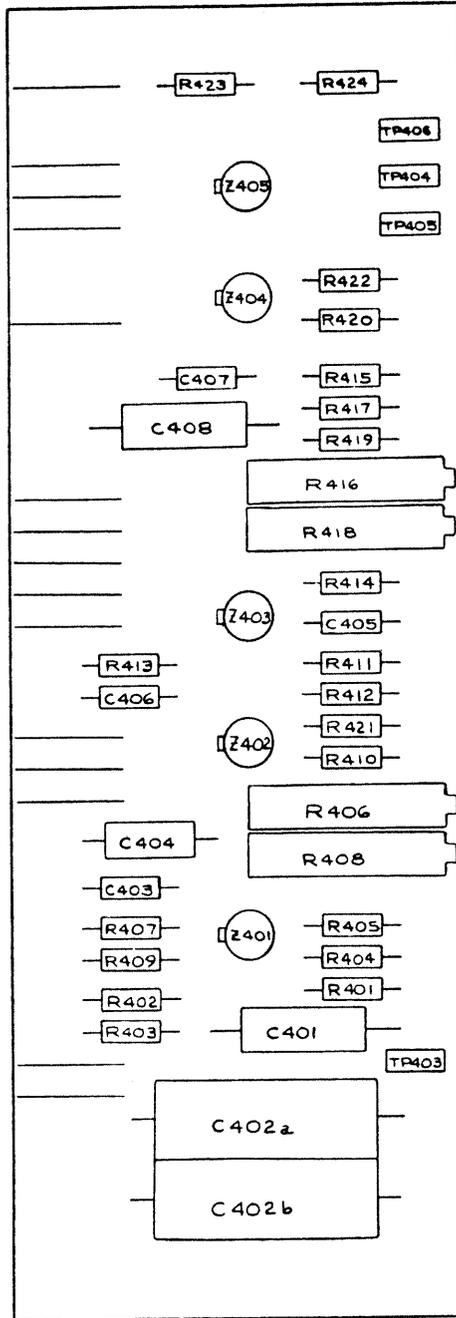


Figure 6-7. Component Layout - Phase Shifter Board 09-149-41

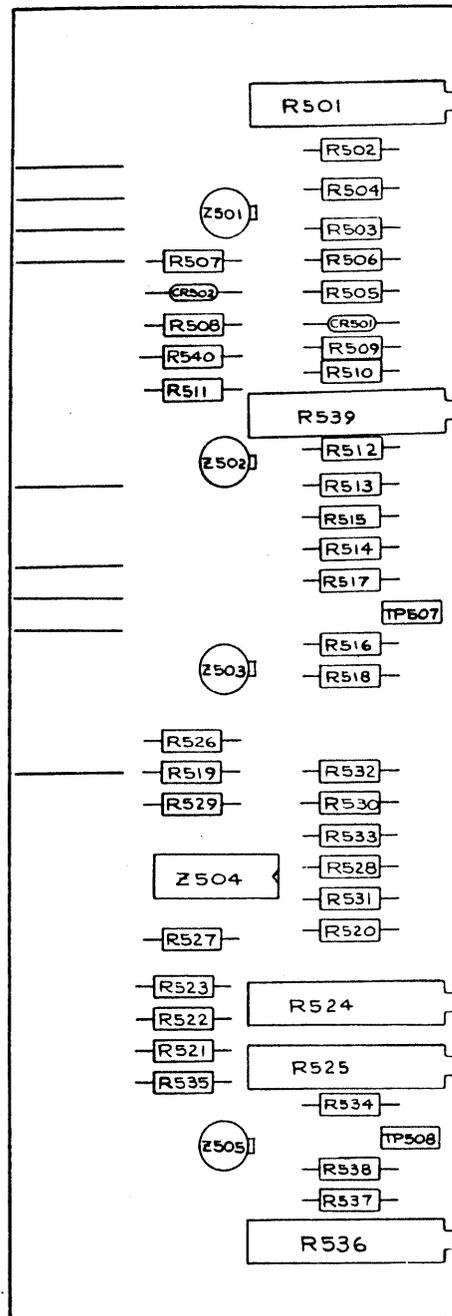


Figure 6-8. Component Layout - Distortion Generator Board 09-150-41

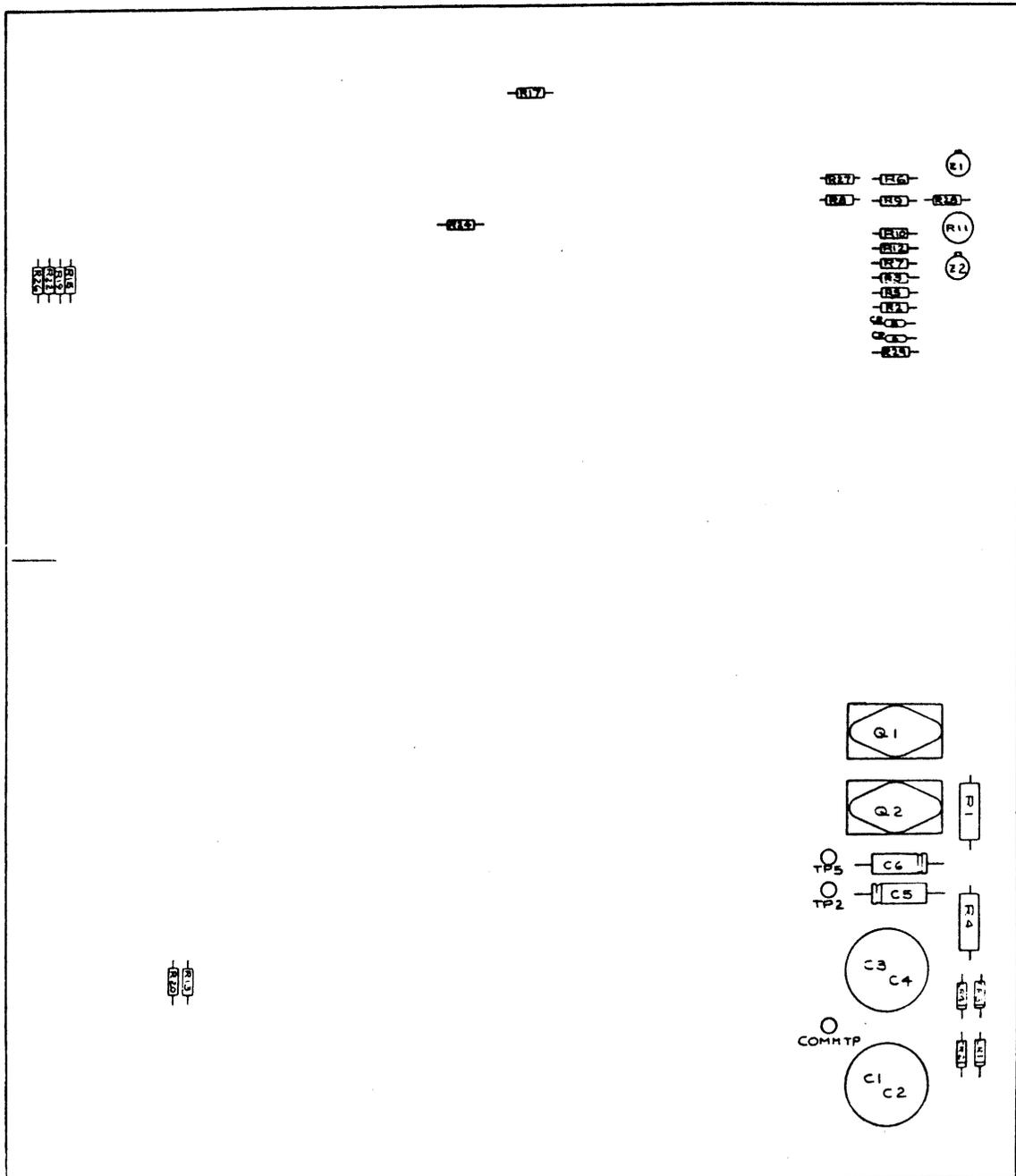


Figure 6-9. Component Layout - Mother Board 09-151-41

FRONT PANEL

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
R14,R16,R18,R21 R23,R25	10K	Potentiometer		Spectrol	152-9507-10K	819-103-SP
S1		Push button		Centralab		860-RAN-TG
S2,S3		Push button		Centralab		860-MUL-TG
S4		Push button		Centralab		860-WFM-TG
S5		Push button		Centralab		860-PWR-TG
S7,S8,S9,S10,S11		Push button		ALCO	MSP103C	860-103-CX

CHASSIS

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
F1		Fuse	1A	Littlefuse	3AG 1A	858-3AG-1X
J1		Connector		Bendix	MS3102A20-27S	855-111-41
J2		Connector		Bendix	MS3102A20-7P	855-130-82
J3, J4		BNC Connector		Amphenol	UG1094	856-u10-94
BP1, BP3		Binding Post		Superior	DF30RC	891-030-02
BP2		Binding Post		Superior	DF30BC	891-030-00
T1		Transformer		Aztec	11039	990-091-90

FREQUENCY TRANSIENT BOARD 09-147-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C201,C202,C204	1.0 μ f	Mylar	200V	IMB	ZA2C105J	822-105-53
C203	10.0 μ f	Mylar	100V	IMB	SA9B106J	822-106-X0
C205	.10 μ f	Mylar	200V	IMB	ZA2C104J	822-104-53
C206	.01 μ f	Cer. Disc	100V	Centralab	DDM103	821-103-00
RESISTORS						
R201	100K	Metal Film	1/8W 1%	Dale	RN60C1003F	813-100-3F
R202	20K	Metal Film	1/8W 1%	Dale	RN60C2002F	813-200-2F
R203,R218	4.7K	Carb. Comp	1/2W 5%	Speer	RC20GF472J	802-472-05
R204	287K	Metal Film	1/8W 1%	Dale	RN60C2873F	813-287-3F
R205	143K	Metal Film	1/8W 1%	Dale	RN60C1433F	813-143-3F
R206	4.75K	Metal Film	1/8W 1%	Dale	RN60C4751F	813-475-1F
R207,R223	10K	Metal Film	1/8W 1%	Dale	RN60C1002F	813-100-2F
R208,R209,R220	33K	Carb. Comp	1/2W 5%	Speer	RC20GF333J	802-333-05
R210	1.5K	Carb. Comp	1/2W 5%	Speer	RC20GF152J	802-152-05
R211	499K	Metal Film	1/8W 1%	Dale	RN60C4993F	813-499-3F
R212	330 Ω	Carb. Comp	1/2W 5%	Speer	RC20GF331J	802-331-05
R213,R217,R219 R221	10K	Carb. Comp	1/2W 5%	Speer	RC20GF103J	802-103-05
R214	15K	Carb. Comp	1/2W 5%	Speer	RC20GF153J	802-153-05
R215	100K	Carb. Comp	1/2W 5%	Speer	RC20GF104J	802-104-05
R216	1M	Carb. Comp	1/2W 5%	Speer	RC20GF105J	802-105-05
R222	3.3K	Carb. Comp	1/2W 5%	Speer	RC20GF332J	802-332-05
R224	330K	Resistor	1/2W, 5%	Speer	RC20GF334J	802-334-05
CR201 thru CR204		Diode	50 MA	Fairchild	1N914	844-914-XX
TRANSISTORS						
Q201,Q202,Q203		Transistor		Fairchild	2N3567	835-356-7X
INTEGRATED CIRCUITS						
Z201,Z202		OP AMP		Motorola	1741CG	849-174-1X
Z203		Comparator		National	LM311	849-LM3-11
MISC.						
K201		Relay	12V	Aztec	E1A12	861-E1A-12

AMPLITUDE TRANSIENT BOARD 09-148-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C301	10.0 μ f	Mylar	100V	IMB	SA9B106J	822-106-X0
C302	1.0 μ f	Mylar	200V	IMB	ZA2C105J	822-105-53
C303	.10 μ f	Mylar	200V	IMB	ZA2C104J	822-104-53
C304,C305	.01 μ f	Cer. Disc	100V	Centralab	DDM103	821-103-00
RESISTORS						
R301	100K	Metal Film	1/8W 1%	Dale	RN60C1003F	813-100-3F
R302,R307	10K	Metal Film	1/8W 1%	Dale	RN60C1002F	813-100-2F
R303	47.5K	Metal Film	1/8W 1%	Dale	RN60C4752F	813-475-2F
R304,R317,R327	4.7K	Carb. Comp	1/2W 5%	Speer	RC20GF472J	802-472-05
R305	4.75K	Metal Film	1/8W 1%	Dale	RN60C4751F	813-475-1F
R306,R311,R313, R316,R318,R319, R323,R325,R329	10K	Carb. Comp	1/2W 5%	Speer	RC20GF103J	802-103-05
R308	1.5K	Carb. Comp	1/2W 5%	Speer	RC20GF152J	802-152-05
R309	499K	Metal Film	1/8W 1%	Dale	RN60C4993F	813-499-3F
R310	330 Ω	Carb. Comp	1/2W 5%	Speer	RC20GF331J	802-331-05
R312	15K	Carb. Comp	1/2W 5%	Speer	RC20GF153J	802-153-05
R314,R324	100K	Carb. Comp	1/2W 5%	Speer	RC20GF104J	802-104-05
R315,R326	1M	Carb. Comp	1/2W 5%	Speer	RC20GF105J	802-105-05
R320,R328	33K	Carb. Comp	1/2W 5%	Speer	RC20GF333J	802-333-05
R321,R322	3.3K	Carb. Comp	1/2W 5%	Speer	RC20GF332J	802-332-05
R330,331	330K	Resistor	1/2W, 5%	Speer	RC20GF334J	802-334-05
CR301 thru CR309		Diode	50MA	Fairchild	1N914	844-914-XX
TRANSISTORS						
Q301 thru Q305		Transistor		Fairchild	2N3567	835-356-7X
INTEGRATED CIRCUITS						
Z301,Z302		OP AMP		Motorola	1741CG	849-174-1X
Z303		Comparator		National	LM311	849-LM3-11
MISC.						
K301,K302		Relay	12V	Aztec	E1A12	861-E1A-12

OSCILLATOR BOARD 09-146-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C101	.082 μ f	Polycarb	100V	IMB	BA1B823F	822-823-11
C102,C104	FSV					
C103	.015 μ f	Polycarb	100V	IMB	BA1B153F	822-152-11
RESISTORS						
R101	330K	Carb. Comp	1/2W 5%	Speer	RC20GF334J	802-334-05
R102,R108	100K	Potentiometer		Helipot	78PR100K	819-104-78
R103	3.3K	Carb. Comp	1/2W 5%	Speer	RC20GF332J	802-332-05
R104	121 Ω	Metal Film	1/8W 1%	Dale	RN60C1210F	813-121-0F
R105	10 Ω	Potentiometer		Helipot	78PR10	819-100-78
R106	100 Ω	Metal Film	1/8W 1%	Dale	RN60C1000F	813-100-0F
R107	2.2K	Carb. Comp	1/2W 5%	Speer	RC20GF222J	802-222-05
R109,R111	510 Ω	Carb. Comp	1/2W 5%	Speer	RC20GF511J	802-511-05
R110,R113	10K	Metal Film	1/8W 1%	Dale	RN60C1002F	813-100-2F
R112,R114	2K	Metal Film	1/8W 1%	Dale	RN60C2001F	813-200-1F
R115,R116	10K	Potentiometer		Helipot	78PR10K	819-103-78
R117,R118	8.25K	Metal Film	1/8W 1%	Dale	RN60C8251F	813-825-1F
R119,R120	13.7K	Metal Film	1/8W, 1%	Dale	RN60C1372F	813-137-2F
R121	3.01K	Metal Film	1/8W 1%	Dale	RN60C3011F	813-301-1F
R122,R123	3.4K	Metal Film	1/8W 1%	Dale	RN60C3401F	813-340-1F
R124,R125	100K	Metal Film	1/8W 1%	Dale	RN60C1003F	813-100-3F
R126,R129	309K	Metal Film	1/8W 1%	Dale	RN60C3093F	813-309-3F
R127	20K	Potentiometer		Helipot	78PR20K	819-203-78
R128	1M	Carb. Comp	1/2W 5%	Speer	RC20GF105J	802-105-05
INTEGRATED CIRCUITS						
Z101		Generator		Wavetek	120-021	867-120-21
Z102		Sine Module		Wavetek	120-022	867-120-22
Z103		Multiplier		Motorola	MC1495L	849-149-5L
Z104		OP AMP		Motorola	1741CG	849-174-1X

OPTIONAL OSCILLATOR BOARD 09-153-40

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C101	.082 μ f	Polycarb	100V	IMB	BA1B823F	822-823-11
C102,C104	FSV					
C103	.015 μ f	Polycarb	100V	IMB	BA1B153F	822-152-11
RESISTORS						
R101	330K	Carb. Comp	1/2W 5%	Speer	RC20GF334J	802-334-05
R102,R108	100K	Potentiometer		Helipot	78PR100K	819-104-78
R103	3.3K	Carb. Comp	1/2W 5%	Speer	RC20GF332J	802-332-05
R104	121 Ω	Metal Film	1/8W 1%	Dale	RN60C1210F	813-121-0F
R105	10 Ω	Potentiometer		Helipot	78PR10	819-100-78
R106	100 Ω	Metal Film	1/8W 1%	Dale	RN60C1000F	813-100-0F
R109	510 Ω	Carb. Comp	1/2W 5%	Speer	RC20GF511J	802-511-05
R126	309K	Metal Film	1/8W 1%	Dale	RN60C3093F	813-309-3F
INTEGRATED CIRCUITS						
Z101		Generator		Wavetek	120-021	867-120-21
Z102		Sine Module		Wavetek	120-022	867-120-22

PHASE SHIFTER 09-149-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C401,C408	.50 μ f	Polycarb	100V	IMB	BA1B504F	822-504-11
C402a,C402b	2.0 μ f	Polycarb	100V	IMB	BA1B205F	822-205-11
C403	.027 μ f	Polycarb	100V	IMB	BA1B273F	822-273-11
C404	.22 μ f	Polycarb	100V	IMB	BA1B224F	822-224-11
C405	.0068 μ f	Polycarb	100V	IMB	BA1B682F	822-682-11
C406,C407	.0505 μ f	Polycarb	100V	IMB	BA1B5052F	829-505-2F
RESISTORS						
R401,R404,R405, R410,R411,R414, R415,R420,R421, R422,R424	10K	Metal Film	1/8W 1/4%	DALE	RN60C1002C	814-100-2C
R402	7.15K	Metal Film	1/8W 1%	Dale	RN60C7151F	813-715-1F
R403	33.2K	Metal Film	1/8W 1%	Dale	RN60C3322F	813-332-2F
R406,R416	1K	Potentiometer		Helipot	78PR1K	819-102-78
R407,R417	10.2K	Metal Film	1/8W 1%	Dale	RN60C1022F	813-102-2F
R408,R418	10K	Potentiometer		Helipot	78PR10K	819-103-78
R409	41.2K	Metal Film	1/8W 1%	Dale	RN60C4122F	813-412-2F
R412	6.49K	Metal Film	1/8W 1%	Dale	RN60C6491F	813-649-1F
R413	47.5K	Metal Film	1/8W 1%	Dale	RN60C4752F	813-475-2F
R419	17.8K	Metal Film	1/8W 1%	Dale	RN60C1782F	813-178-2F
R423	3.3K	Carb. Comp	1/2W 5%	Speer	RC20GF332J	802-332-05
INTEGRATED CIRCUITS						
Z401 thru Z405		OP AMP		Motorola	1741CG	849-174-1X

DISTORTION GENERATOR 09-150-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
RESISTORS						
R501, R524, R525, R536, R539	10K	Potentiometer		Helipot	78PR10K	819-102-78
R502, R510, R513, R514, R516, R520, R523	10K	Metal Film	1/8W 1%	Dale	RN60C1002F	813-100-2F
R503, R509, R512	20K	Metal Film	1/8W 1%	Dale	RN60C2002F	813-200-2F
R504, R511	4.7K	Carb. Comp	1/2W 5%	Speer	RC20GF472J	802-472-05
R505, R508	15K	Metal Film	1/8W 1%	Dale	RN60C1502F	813-150-2F
R506	47.5Ω	Metal Film	1/8W 1%	Dale	RN60C4750F	813-475-0F
R507	3.74K	Metal Film	1/8W 1%	Dale	RN60C3741F	813-374-1F
R515, R517	4.99K	Metal Film	1/8W 1%	Dale	RN60C4991F	813-499-1F
R518, R519	510Ω	Carb. Comp	1/2W 5%	Speer	RC20GF511J	802-511-05
R521, R522	2K	Metal Film	1/8W 1%	Dale	RN60C2001F	813-200-1F
R526, R527	8.25K	Metal Film	1/8W 1%	Dale	RN60C8251F	813-825-1F
R528, R529	13.7K	Metal Film	1/8W 1%	Dale	RN60C1372F	813-137-2F
R530	3.01K	Metal Film	1/8W 1%	Dale	RN60C3011F	813-301-1F
R531, R532	3.4K	Metal Film	1/8W 1%	Dale	RN60C3401F	813-340-1F
R533, R534	100K	Metal Film	1/8W 1%	Dale	RN60C1003F	813-100-3F
R535, R538	309K	Metal Film	1/8W 1%	Dale	RN60C3933F	813-393-3F
R537	1M	Carb. Comp	1/2W 5%	Speer	RC20GF105J	802-105-05
R540	180K	Carb. Comp	1/2W 5%	Speer	RC20GF184J	802-184-05
SEMICONDUCTORS						
CR501, CR502		Diode	50MA	Fairchild	1N914	844-914-XX
INTEGRATED CIRCUITS						
Z501, Z502, Z503, Z505		OP AMP		Motorola	1741CG	849-174-1X
Z504		Multiplier		Motorola	MC1495L	849-149-5L

MOTHER BOARD 09-151-41

SCHEMATIC DESIGNATION	VALUE	DESCRIPTION OR TYPE	RATING	MANUFACTURER		ELGAR PART NUMBER
				NAME	PART NUMBER	
CAPACITORS						
C1,C2,C3,C4 C5,C6	1000 μ f 100 μ f	Electrolytic Electrolytic	25V 25V	Sprague Sprague	PWP201.15A 500D107G025DD7	824-108-53 824-107-51
RESISTORS						
R1,R4	25 Ω	WW	5W 5%	Dale	CW5 25 Ω	807-250-05
R2	2.2K	Carb. Comp.	1/2W 5%	Speer	RC20GF222J	802-222-05
R3	15K	Carb. Comp.	1/2W 5%	Speer	RC20GF153J	802-153-05
R5	2.7K	Carb. Comp.	1/2W 5%	Speer	RC20GF272J	802-272-05
R6	4.75K	Metal Film	1/8W 1%	Dale	RN60C4751F	813-475-1F
R7	1.18K	Metal Film	1/8W 1%	Dale	RN60C1181F	813-118-1F
R8	7.87K	Metal Film	1/8W 1%	Dale	RN60C7871F	813-787-1F
R9,R20	10K	Metal Film	1/8W 1%	Dale	RN60C1002F	813-100-2F
R10	3.24K	Metal Film	1/8W 1%	Dale	RN60C3241F	813-324-1F
R11	1K	Potentiometer		Spectrol	84-3-8-102	819-102-84
R12	5.76K	Metal Film	1/8W 1%	Dale	RN60C5761F	813-576-1F
R13	5.36K	Metal Film	1/8W 1%	Dale	RN60C5361F	813-536-1F
R15	18.7K	Metal Film	1/8W 1%	Dale	RN60C1872F	813-187-2F
R17,R24	715 Ω	Metal Film	1/8W 1%	Dale	RN607150F	813-715-0F
R19,R26	3.74K	Metal Film	1/8W 1%	Dale	RN60C3741F	813-374-1F
R22	2.21K	Metal Film	1/8W 1%	Dale	RN60C2211F	813-221-1F
R27	18.2K	Metal Film	1/8W 1%	Dale	RN60C1822F	813-182-2F
SEMICONDUCTORS						
CR1,CR2,CR3,CR4 CR5 CR6		Rectifier Diode Zener	200V 1A 50MA 6.2V	Westinghouse Fairchild IRC	1N4818 1N914 1N825	845-481-8X 844-914-XX 843-825-XX
TRANSISTORS						
Q1,Q2		Transistor		RCA	40250V1	839-402-5V
INTEGRATED CIRCUITS						
Z1,Z2		OP AMP		Motorola	1741CG	849-174-1X

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI
 TG 704A-3D

OP: ORDER POLICY CODE

509-292-44 OPCODE: 0 REV: TG 704A-3D
 MODEL:
 ECO NO:
 DATE OF LAST ECO: 00/00/00

PART NUMBER	DESCRIPTION	O P RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM	SC	DAYS OFF SET	REFERENCE DESIGNATOR	EFFECTIV DATE	OBSOLETE DATE
101-TRI-06	121-DP-TG 275#DW CARTON A	3	0	1.000	1.000	EA	F	0		00/00/00	99/99/99
609-013-62	TG704A SCHEMATIC A	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
609-034-91	MANUAL TG704A	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
609-013-62	TG704A SCHEMATIC A	3	1	1.000	1.000	EA	B	0	6-1	00/00/00	99/99/99
802-103-05	FREQ TRANS ASSY TG704 A	3	0	1.000	1.000	EA	M	0		00/00/00	99/99/99
802-104-05	RES, 10K, 1/2W, 2%, MF	3	0	4.000	1.000	EA	B	0		00/00/00	99/99/99
802-105-05	RES, 100K, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-152-05	RES, 1.0M, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-153-05	RES, 1.5K, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-331-05	RES, 15K, 1/2W, 2%, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-332-05	RES, 330, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-333-05	RES, 3.3K, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-334-05	RES, 33K, 1/2W, 2%, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-472-05	RES, 4.7K, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-100-2F	RES, 10.0K, 1/4W, 1%, 70C, RN60, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-100-3F	RES, 100K, 1/4W, 1%, 70C, RN60, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-143-3F	RES, 143K, 1/4W, 1%, 70C, RN60, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-200-2F	RES, 20.0K, 1/4W, 1%, 70C, RN60, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-287-3F	RES, 287K, 1/4W, 1%, 70C, RN60, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-475-1F	RES, 4.75K, 1/4W, 1%, 70C, RN60, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-499-3F	RES, 499K, 1/4W, 1%, 70C, RN60, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
821-103-00	CAP, .01UF, Z5U, 20%, 100-150V, RAD	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
822-104-53	CAP, .10UF, 200V, 5%, FILM	3	0	3.000	1.000	EA	B	0		00/00/00	99/99/99
822-105-53	CAP, 1UF, 200V, 5%, FILM	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
822-106-X0	CAP, 10UF, 100V, 5%, FILM	3	0	3.000	1.000	EA	B	0		00/00/00	99/99/99
835-356-7P	XSTR, 40V, HF/A, M, T0-92	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
844-914-XX	DIODE, 100V, SIGNAL SWITCH, AXL	3	0	3.000	1.000	EA	B	0		00/00/00	99/99/99
849-174-1X	IC, LIN, OP-AMP, 8PIN CAN	3	0	4.000	1.000	EA	F	0		00/00/00	99/99/99
849-LM3-11	IC, LIN, LM311H, DUAL, COMP	3	0	2.000	1.000	EA	F	0		00/00/00	99/99/99
861-E1A-12	RELAY, 12VDC, E1A12/R1164-1	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
892-105-01	TP, 105-0858-001, BRN	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
892-430-01	TP, 430-108, BRN	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
899-014-52	PIN, ELCO, STD, 90 DEG	3	0	16.000	1.000	EA	B	0		00/00/00	99/99/99
909-147-22	PCB FREQ TRANSIENT A	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
609-148-42	AMP TRANS TG704A-3 A	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-103-05	RES, 10K, 1/2W, 2%, MF	3	0	7.000	1.000	EA	M	0		00/00/00	99/99/99
802-104-05	RES, 100K, 1/2W, 2%, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-105-05	RES, 1.0M, 1/2W, 2%, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-152-05	RES, 1.5K, 1/2W, 2%, MF	3	0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-153-05	RES, 15K, 1/2W, 2%, MF	3	0	1.000	1.000	EA	B	0		00/00/00	99/99/99

INDENTED BILL OF MATERIAL
 =====
 AS OF ALL DATE

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI

OP: ORDER POLICY CODE

509-292-44 OPCODE: 0 REV: TG 704A-3D

MODEL:
 DATE OF LAST ECO: 00/00/00

PART NUMBER	DESCRIPTION	O	P	RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM	SC	DAYS OFF SET	REFERENCE DESIGNATOR	EFFECTIVE DATE	OBSOLETE DATE
* 802-331-05	RES, 330, 1/2W, 2%, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-332-05	RES, 3.3K, 1/2W, 2%, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-333-05	RES, 33K, 1/2W, 2%, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-334-05	RES, 330K, 1/2W, 2%, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-472-05	RES, 4.7K, 1/2W, 2%, MF	3	0		0	4.000	1.000	EA	B	0		00/00/00	99/99/99
813-100-2F	RES, 10.0K, 1/4W, 1%, 70C, RN60, MF	3	0		0	3.000	1.000	EA	B	0		00/00/00	99/99/99
* 813-100-3F	RES, 100K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-475-1F	RES, 4.75K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-475-2F	RES, 47.5K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-499-3F	RES, 499K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
821-103-00	CAP, 0.1UF, 250V, 20%, 100-150V, RAD	3	F		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
821-104-53	CAP, 1500PF, 500V, 10%, CER, DISC	3	C		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
822-105-53	CAP, 10UF, 200V, 5%, FILM	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
822-106-X0	CAP, 10UF, 100V, 5%, FILM	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
835-356-7P	XSTR, 40V, HF/A, M, T0-92	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
844-914-XX	DIODE, 100V, SIGNAL SWITCH, AXL	3	F		0	5.000	1.000	EA	B	0		00/00/00	99/99/99
849-174-1X	IC, LIN, OP-AMP, 8PIN CAN	3	F		0	9.000	1.000	EA	F	0		00/00/00	99/99/99
849-LM3-11	IC, LIN, LM311H, DUAL, COMP	3	F		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
861-E1A-12	RELAY, 12VDC, E1A12/R1164-1	3	B		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
892-105-02	TP, 105-0852-001, RED	3	B		0	15.000	1.000	EA	B	0		00/00/00	99/99/99
899-014-52	PIN, ELCO, STD, 90 DEG	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
909-148-23	BD AMP TRANS TG	3	C		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
609-149-42	PHASE SHIFTER TG704A A	3	C		0	1.000	1.000	EA	M	0		00/00/00	99/99/99
802-332-05	RES, 3.3K, 1/2W, 2%, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
802-332-05	RES, 3.3K, 1/2W, 2%, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-102-2F	RES, 10.2K, 1/4W, 1%, 70C, RN60, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
813-102-2F	RES, 17.8K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-178-2F	RES, 17.8K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-178-2F	RES, 33.2K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-332-2F	RES, 33.2K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-412-2F	RES, 41.2K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-412-2F	RES, 47.5K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-475-2F	RES, 47.5K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-475-2F	RES, 6.49K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-649-1F	RES, 6.49K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-715-1F	RES, 7.15K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
813-715-1F	RES, 7.15K, 1/4W, 1%, 70C, RN60, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
814-100-2C	RES, 10K, 1/8W, .25%, RN60, MF	3	0		0	11.000	1.000	EA	B	0		00/00/00	03/23/01

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI

509-292-44 OPCODE: 0 REV: TG 704A-3D

MODEL:
 ECO NO:

DATE OF LAST ECO: 00/00/00

OP: ORDER POLICY CODE

PART NUMBER	DESCRIPTION	O	P	RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM	SC	DAYS OFF SET	REFERENCE DESIGNATOR	EFFECTIV DATE	OBSOLETE DATE
814-100-2C	RES, 10K, 1/8W, .25%, RN60, MF	3	E		9	11.000	1.000	EA	B	0		03/23/01	99/99/99
819-102-30	POT, 1.0K, 1W, 20T, PC, SIDE ADJ	3	E		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
819-102-30	POT, 1.0K, 1W, 20T, PC, SIDE ADJ	3	E		10	2.000	1.000	EA	B	0		03/23/01	99/99/99
819-103-30	POT, 10K, 1W, 20T, PC, SIDE ADJ	3	D		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
819-103-30	POT, 10K, 1W, 20T, PC, SIDE ADJ	3	D		11	2.000	1.000	EA	B	0		03/23/01	99/99/99
822-205-11	CAP, 2UF, 100V, NO NEW DESIGNS	3	B		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
822-205-77	CAP, 2UF, 100V, 1%, MPE, AXL	0	A		12	2.000	1.000	EA	B	0		03/23/01	99/99/99
822-224-11	CAP, .22UF, 100V, NO NEW DESIGNS	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
822-224-11	CAP, .22UF, 100V, NO NEW DESIGNS	3	B		13	1.000	1.000	EA	B	0		03/23/01	99/99/99
822-273-11	CAP, .027UF, 100V, NO NEW DESIGNS	3	C		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
822-273-11	CAP, .027UF, 100V, NO NEW DESIGNS	3	C		14	1.000	1.000	EA	B	0		03/23/01	99/99/99
822-504-11	CAP, .50UF, 100V, NO NEW DESIGNS	3	B		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
822-504-11	CAP, .50UF, 100V, NO NEW DESIGNS	3	B		15	2.000	1.000	EA	B	0		03/23/01	99/99/99
822-682-11	CAP, .0068UF, 100V, NO NEW DESIGN	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
822-682-11	CAP, .0068UF, 100V, NO NEW DESIGN	3	B		16	1.000	1.000	EA	B	0		03/23/01	99/99/99
829-505-2F	CAP, .0505UF, 100V, NO NEW DESIGN	3	B		0	2.000	1.000	EA	B	0		00/00/00	03/23/01
829-505-2F	CAP, .0505UF, 100V, NO NEW DESIGN	3	B		17	2.000	1.000	EA	B	0		03/23/01	99/99/99
849-174-1X	CAP, .0505UF, 100V, NO NEW DESIGN	3	F		0	5.000	1.000	EA	B	0		00/00/00	03/23/01
849-174-1X	IC, LIN, OP-AMP, 8PIN CAN	3	F		18	5.000	1.000	EA	B	0		03/23/01	99/99/99
849-174-1X	IC, LIN, OP-AMP, 8PIN CAN	3	F		19	1.000	1.000	EA	B	0		00/00/00	03/23/01
849-174-1X	IC, LIN, OP-AMP, 8PIN CAN	3	F		20	1.000	1.000	EA	B	0		03/23/01	99/99/99
892-430-03	TP, 430-106, ORG	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
892-430-03	TP, 430-106, ORG	3	B		19	1.000	1.000	EA	B	0		03/23/01	99/99/99
892-430-04	TP, 430-107, YEL	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
892-430-04	TP, 430-107, YEL	3	B		20	1.000	1.000	EA	B	0		03/23/01	99/99/99
892-430-05	TP, 430-104, GRN	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
892-430-05	TP, 430-104, GRN	3	B		21	1.000	1.000	EA	B	0		03/23/01	99/99/99
892-430-06	TP, 430-105, BLUE	3	B		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
892-430-06	TP, 430-105, BLUE	3	B		22	1.000	1.000	EA	B	0		03/23/01	99/99/99
899-014-52	PIN, ELCO, STD, 90 DEG	3	B		0	15.000	1.000	EA	B	0		00/00/00	03/23/01
899-014-52	PIN, ELCO, STD, 90 DEG	3	B		23	15.000	1.000	EA	B	0		03/23/01	99/99/99
909-149-21	PHASE SHIFT BD TG704 A	3	A		0	1.000	1.000	EA	B	0		00/00/00	03/23/01
909-149-21	PHASE SHIFT BD TG704 A	3	A		24	1.000	1.000	EA	B	0		03/23/01	99/99/99
609-150-42	DIS GEN BD ASSY TG704A	3	A		0	3.000	1.000	EA	M	0		00/00/00	99/99/99
* 802-105-05	RES, 1.0M, 1/2W, 2%, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-184-05	RES, 180K, 1/2W, 2%, MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
802-472-05	RES, 4.7K, 1/2W, 2%, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
802-511-05	RES, 510, 1/2W, 2%, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-100-2F	RES, 10.0K, 1/4W, 1%, 70C, RN60, MF	3	0		0	7.000	1.000	EA	B	0		00/00/00	99/99/99
813-100-3F	RES, 100K, 1/4W, 1%, 70C, RN60, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-137-2F	RES, 13.7K, 1/4W, 1%, 70C, RN60, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-150-2F	RES, 15.0K, 1/4W, 1%, 70C, RN60, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
813-200-1F	RES, 2.00K, 1/4W, 1%, 70C, RN60, MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99

INDENTED BILL OF MATERIAL
 =====
 AS OF ALL DATE

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI
 TG 704A-3D
 509-292-44 OPCODE: 0 REV:
 MODEL:
 ECO NO:
 DATE OF LAST ECO: 00/00/00

OP: ORDER POLICY CODE

PART NUMBER	DESCRIPTION	O	P	RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM	SC	DAYS OFF SET	REFERENCE DESIGNATOR	EFFECTIV		OBSOLETE
												DATE	DATE	
813-200-2F	RES,20.0K,1/4W,1%,70C,RN60,MF	3	0		0	3.000	1.000	EA	B	0		00/00/00	99/99/99	
813-301-1F	RES,3.01K,1/4W,1%,70C,RN60,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-309-3F	RES,309K,1/4W,1%,70C,RN60,MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
813-340-1F	RES,3.40K,1/4W,1%,70C,RN60,MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
813-374-1F	RES,3.74K,1/4W,1%,70C,RN60,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-475-0F	RES,475,1/4W,1%,70C,RN60,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-499-1F	RES,4.99K,1/4W,1%,70C,RN60,MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
813-825-1F	RES,8.25K,1/4W,1%,70C,RN60,MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
819-103-30	POT,10K,1W,20T,PC,SIDE ADJ	3	D		0	5.000	1.000	EA	B	0		00/00/00	99/99/99	
844-914-XX	DIODE,100V,SIGNAL SWITCH,AXL	3	F		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
849-149-5L	IC,MULTI,4QUAD,15V,14P,DIP	3	F		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
849-174-1X	IC,LIN,OP-AMP,8PIN,CAN	3	F		0	4.000	1.000	EA	B	0		00/00/00	99/99/99	
892-430-07	TP,430-112,VIOLET	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
892-430-08	TP,430-113,GREY	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
899-014-52	PIN,ELCO,STD,90 DEG	3	B		0	9.000	1.000	EA	B	0		00/00/00	99/99/99	
909-150-22	PC BRD DIST GEN TG	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
609-153-41	OPTION OSC BRD TG704A A	3	B		0	1.000	1.000	EA	M	0		00/00/00	99/99/99	
802-222-05	RES,2.2K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-332-05	RES,3.3K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-334-05	RES,330K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-511-05	RES,510,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-100-0F	RES,100,1/4W,1%,70C,RN60,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-110-0F	RES,110,1/4W,1%,70C,RN60,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
819-100-30	POT,10,1W,20T,PC,SIDE ADJ	3	C		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
819-104-30	POT,100K,1W,20T,PC,SIDE ADJ	3	C		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	
822-153-11	CAP,.015UF,100V,NO NEW DESIGNS	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
822-823-11	CAP,.082UF,100V,NO NEW DESIGNS	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
849-174-1X	IC,LIN,OP-AMP,8PIN,CAN	3	F		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
867-120-21	GEN,MODULE,120-021	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
867-120-22	PIN,ELCO,STD,90 DEG	3	B		0	8.000	1.000	EA	B	0		00/00/00	99/99/99	
893-014-52	TG OSC OPTION BD 09-153	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
909-153-20	CHASSIS ASSY TG704-3D A	3	C		0	1.000	1.000	EA	X	0		00/00/00	99/99/99	
609-376-44	B ASSY TG704A-3D A	3	M		0	1.000	1.000	EA	M	0		00/00/00	99/99/99	
802-153-05	RES,15K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-222-05	RES,2.2K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-272-05	RES,2.7K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-471-05	RES,470,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
802-472-05	RES,4.7K,1/2W,2%,MF	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
807-250-05	RES,25,5W,5%,WW,AXL	3	0		0	1.000	1.000	EA	B	0		00/00/00	99/99/99	
813-100-2F	RES,10.0K,1/4W,1%,70C,RN60,MF	3	0		0	2.000	1.000	EA	B	0		00/00/00	99/99/99	

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI
 509-292-44 ORPCODE: 0 REV: TG 704A-3D

OP: ORDER POLICY CODE

PART NUMBER	DESCRIPTION	O	P	RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM	SC	DAYS OFF SET	REFERENCE DESIGNATOR	EFFECTIV	OBSOLETE
												DATE	DATE
813-118-1F	RES, 1.18K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-182-2F	RES, 18.2K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-187-2F	RES, 18.7K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-221-1F	RES, 2.21K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-324-1F	RES, 3.24K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-374-1F	RES, 3.74K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-422-1F	RES, 4.22K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-475-1F	RES, 4.75K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-536-1F	RES, 5.36K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-649-1F	RES, 6.49K, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
813-715-0F	RES, 715, 1/4W, 1%, 70C, RN60, MF	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
819-102-84	POT, 1.0K, 1/2W, 1%, 70C, TOP ADJ	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
824-107-51	CAP, 100UF, 25V, 20%, AL, AXL	3	F		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
824-108-53	CAP, 100UF, X2, 25V, NO NEW DSGN	3	B		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
839-402-5V	XSTR,NPN,100V,6A,TIP41C,TO-220	3	E		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
843-825-XX	DIODE,ZENER, 6.2V, .4W, 1N825	3	C		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
844-914-XX	DIODE,100V,SIGNAL SWITCH,AXL	3	F		0	1.000	1.000	EA	F	0		00/00/00	99/99/99
845-400-4X	RECT,PWR,400V,1A,1N4004,DO-41	3	C		0	4.000	1.000	EA	F	0		00/00/00	99/99/99
849-174-1X	IC,LIN,OP-AMP,8PIN CAN	3	F		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
860-MUL-TG	SW,6P,PUSH,MULTIPLR	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
860-PWR-TG	SW,4P,PUSH,POWER,ON	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
860-RAN-TG	SW,6P,PUSH,RANGE	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
860-WFM-TG	SW,6P,PUSH,WAVEFORM	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
892-105-00	TP,105-0853-001,BLK	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
892-105-02	TP,105-0852-001,RED	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
892-105-05	TP,105-0854-001,GRN	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
899-114-32	PIN,ELCO,SGL,ROW 1	3	A		0	81.000	1.000	EA	B	0		00/00/00	99/99/99
909-151-21	MOTHER BD TG 09-151-21	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
609-277-43	PANEL ASSY TG704A-3	3			0	1.000	1.000	EA	B	0		00/00/00	99/99/99
819-103-SP	POT,10K,1/2W,1T,PNL MNT	3	B		0	1.000	1.000	EA	X	0		00/00/00	99/99/99
860-103-CX	SW,3A,125VAC,SPST,PNL MNT	3	A		0	6.000	1.000	EA	B	0		00/00/00	99/99/99
860-451-1D	SW,4511/DAF,BALL,DRIVE,6.3	3	A		0	5.000	1.000	EA	B	0		00/00/00	99/99/99
863-115-01	HANDLE,RECT,LN 2.5IN,ALUM,8-32	3	D		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
897-70S-L2	KNOB,.719DIA,.25 IN,SFT	3	A		0	4.000	1.000	EA	B	0		00/00/00	99/99/99
897-X95-2X	KNOB,BLK,.969D,.25,SFT	3	A		0	2.000	1.000	EA	B	0		00/00/00	99/99/99
909-277-22	FRONT PANEL TG704A SS A	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
909-290-20	DIAL FREQUENCY TG704A A	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
909-291-20	DIAL-AMPLITUDE TG704A A	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
855-111-41	CONN,14P,16AWG,PNL MNT,SKT	3	A		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
855-130-82	CONN,8P,16AWG,PNL MNT,PIN	3	B		0	1.000	1.000	EA	B	0		00/00/00	99/99/99
856-489-01	CONN,BNC,ISOL GRND,FRONT MNT	3	B		0	2.000	1.000	EA	B	0		00/00/00	99/99/99

CLASS CODE GROUP: 1 COMMODITY CLASS
 CLASS CODE: 140 ASSEMBLY, ELGAR - FGI

509-292-44 OPCODE: 0 REV: TG 704A-3D

MODEL:

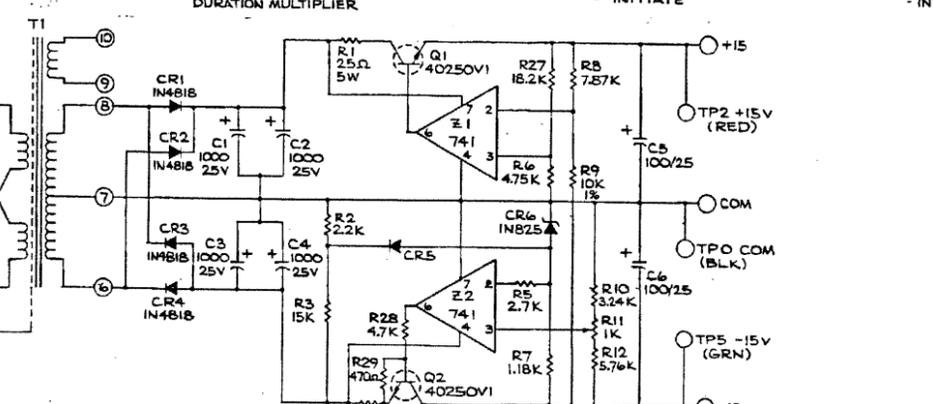
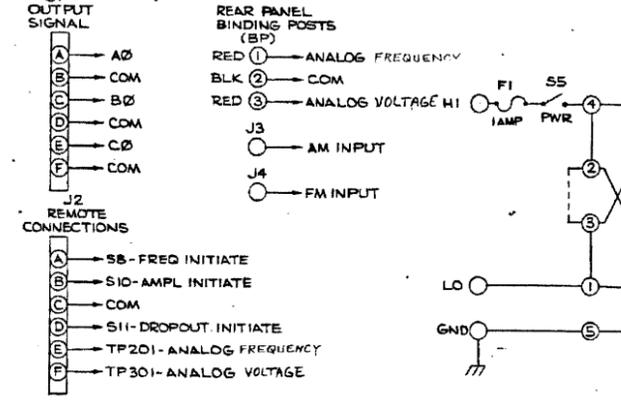
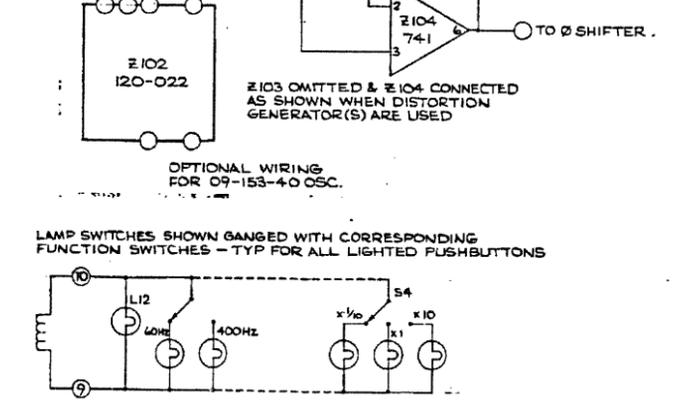
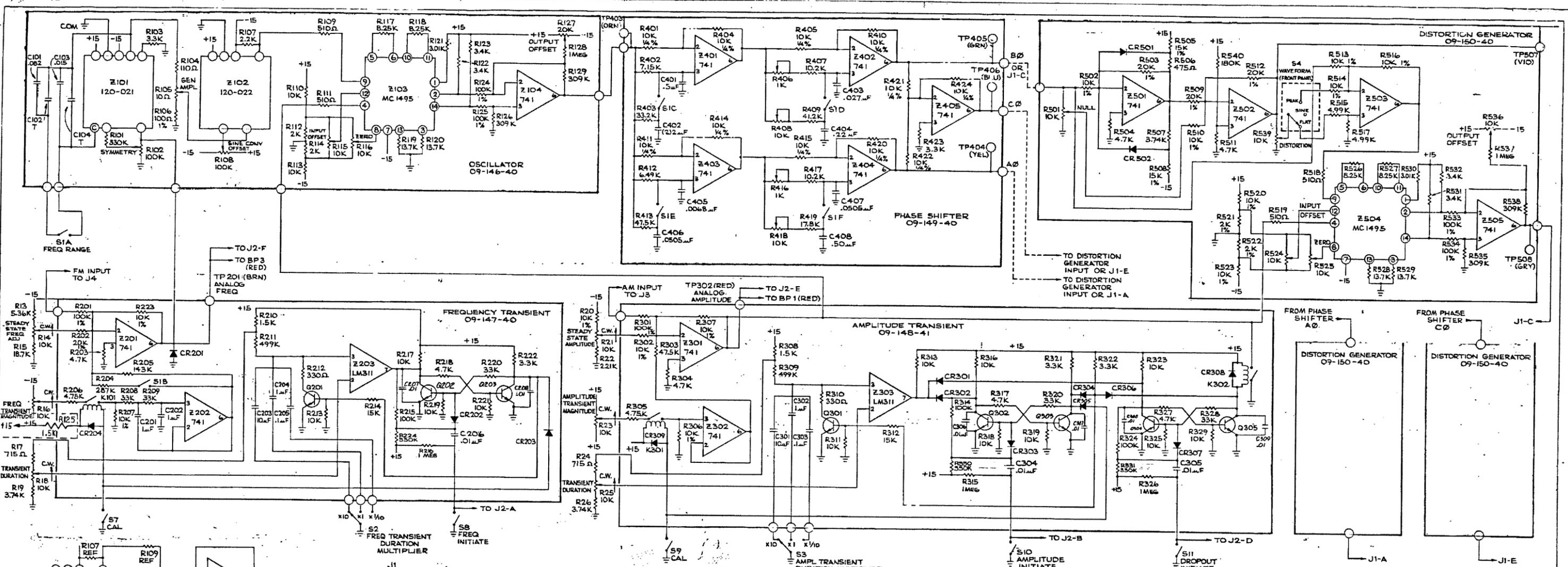
ECO NO:

DATE OF LAST ECO: 00/00/00

OP: ORDER POLICY CODE

PART NUMBER	DESCRIPTION	O P RV	ITEM NO.	QTY PER ASSEMBLY	YIELD FACTR	UM SC	OFF SET	REFERENCE DESIGNATOR	EFFECTIV DATE	OBSOLETE DATE	DAYS
858-342-10	FUSE, HOLDER, 20A, 250V, PNL MNT	3	B	0	1.000	EA B	0		00/00/00	99/99/99	0
858-AGC-1A	FUSE, 1A, 250V	3	B	0	1.000	EA B	0		00/00/00	99/99/99	0
890-174-19	CABLE, 3W, 16AWG, NEMA 5-15P, 3MTR	3	B	0	1.000	EA B	0		00/00/00	99/99/99	0
891-030-00	BINDING POST, 30A, PNL MNT, BLK	3	D	0	1.000	EA B	0		00/00/00	99/99/99	0
891-030-02	BINDING POST, 30A, PNL MNT, RED	3	D	0	2.000	EA B	0		00/00/00	99/99/99	0
893-52A-00	TERM STRIP, 3P, .375IN, LUG TYPE	3	A	0	1.000	EA B	0		00/00/00	99/99/99	0
896-SR6-P4	CLAMP, CABLE, SR6P4	3	E	0	1.000	EA B	0		00/00/00	99/99/99	0
909-276-21	CHASSIS, TG704A SS	3	E	0	1.000	EA B	0		00/00/00	99/99/99	0
909-278-20	TG BD SUPP	3		0	2.000	EA B	0		00/00/00	99/99/99	0
909-279-20	TG CT SUPP	3		0	1.000	EA B	0		00/00/00	99/99/99	0
909-288-21	BD GUIDE	3	A	0	2.000	EA B	0		00/00/00	99/99/99	0
909-289-21	BRD GUIDE	3	B	0	2.000	EA B	0		00/00/00	99/99/99	0
990-091-90	11039 XFMR DP3 90-091 A	3	B	0	1.000	EA M	0		00/00/00	99/99/99	0
110EA04-29	SCREW, 8-32 X 1.187, PPH	3		0	4.000	EA F	0		00/00/00	99/99/99	0
111EF80-01	WASHER, 8, FIBER, SHLDR	3		0	8.000	EA F	0		00/00/00	99/99/99	0
112EB03-01	OBS, NUT, USE 112EB04-01	3		0	4.000	EA F	0		00/00/00	99/99/99	0
112EB04-01	NUT, 8-32, HEX, STD, CS	3		0	4.000	EA F	0		00/00/00	99/99/99	0
1130222-55	WIRE, 22AWG, 300V, GRN, UL, 80C	3		0	2.500	FT F	0		00/00/00	99/99/99	0
1130222-99	WIRE, 22AWG, 300V, WHT, UL1007, 80C	3		0	32.500	FT F	0		00/00/00	99/99/99	0
995-131-25	BRKT, HORIZ L, CRS, 1.12, FLUSH	3	A	0	4.000	EA B	0		00/00/00	99/99/99	0
995-211-39	WIRE, MAG, 22RD, HAPTZ, 200C	3	A	0	.060	LB B	0		00/00/00	99/99/99	0
995-211-41	WIRE, MAG, 24RD, HAPTZ, 200C	3	A	0	.200	LB B	0		00/00/00	99/99/99	0
995-211-43	WIRE, MAG, 26RD, HAPTZ, 200C	3	A	0	.340	LB B	0		00/00/00	99/99/99	0
995-351-13	CORE, LAM, EI-112, 1 PH, M6X29	3	C	0	2.300	LB B	0		00/00/00	99/99/99	0
995-421-25	BOBBIN, EI-112, SQUARE, NYLON	3	A	0	1.000	EA B	0		00/00/00	99/99/99	0
995-441-64	SUPPORT, LEG, .125, EI-112, HST	3	B	0	4.000	EA B	0		00/00/00	99/99/99	0
995-511-23	INSUL, STRAW, #8, .171X.010X24.0"	3	B	0	.500	EA F	0		00/00/00	99/99/99	0
909-206-21	COVER DP D TEX	3	T	0	1.000	EA B	0		00/00/00	99/99/99	0
909-207-21	COVER DP D TEX	3	B	0	1.000	EA B	0		00/00/00	99/99/99	0

* * *



NOTES: UNLESS OTHERWISE SPECIFIED

1. ALL RESISTORS ARE 1/2W, 5% CARBON.
2. ALL RESISTANCE MEASURED IN OHMS (Ø).
3. ALL CAPACITANCE MEASURED IN MICRO-FARADS (µF).
4. ALL DIODES ARE IN457.
5. ALL TRANSISTORS ARE 2N3567.
6. THE FOLLOWING ARE MOUNTED ON FRONT PANEL: R14, R16, R18, R21, R23, R25 & S1 THRU S11.

DCN 6916	REV	DATE
ECN 5274	1	11/04/05
ECN 3881	1	11/04/05
REVISIONS		
1	ADDED R224 TO DRIVE AND R230, R231 TO 09-148-41 PER ECN 74	11/04/05
2	ADD C206 TO 09-146-40	11/04/05
OVERALL SCHEM TG 704 A		
609-013-62		
SCHEM		
1 OF 1		

609-013-62