WAVETEK

INSTRUCTION MANUAL

# Model 145

145-S-620, 145-S-872 & 145-S-1021

## 20 MHz Pulse/Function Generator

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## 20 MHz Pulse/Function Generator



**Model 145-S-620** is a standard Wavetek Model 145 modified to provide a SYMMETRY control on the rear panel. This control allows the waveform time symmetry to be continuously adjusted over a 19:1 to 1:19 range. When this control is switched on, the generator operates at approximately 1/10 of the selected frequency. All procedures and descriptions in this manual assume that the SYMMETRY control is in the OFF position.

**Model 145-S-872** is identical to the standard Model 145 except for the addition of an elapsed time meter installed on the rear panel.

**Model 145-S-1021** is identical to the standard Model 145 except for the addition of both the SYMMETRY control and an elapsed time meter installed on the rear panel.

Option parts lists, assembly drawings and schematics as well as those for the Standard Model 145 are contained in Section 7 of this manual.

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Manual Part Number 1300-00-0101

# WARRANTY

Wavetek warrants that all products manufactured by Wavetek conform to published Wavetek specifications and are free from defects in materials and workmanship for a period of one (1) year from the date of delivery when used under normal conditions and within the service conditions for which they were furnished.

The obligation of Wavetek arising from a Warranty claim shall be limited to repairing, or at its option, replacing without charge, any product which in Wavetek's sole opinion proves to be defective within the scope of the Warranty. In the event Wavetek is not able to modify, repair or replace non-conforming defective parts or components to a condition as warrantied within a reasonable time after receipt thereof, Buyers shall be credited for their value at the original purchase price.

Wavetek must be notified in writing of the defect or nonconformity within the Warranty period and the affected product returned to Wavetek's factory or to an authorized service center within (30) days after discovery of such defect or nonconformity.

For product warranties requiring return to Wavetek, products must be returned to a service facility designated by Wavetek. Buyer shall prepay shipping charges, taxes, duties and insurance for products returned to Wavetek for warranty service. Except for products returned to Buyer from another country, Wavetek shall pay for return of products to Buyer.

Wavetek shall have no responsibility hereunder for any defect or damage caused by improper storage, improper installation, unauthorized modification, misuse, neglect, inadequate maintenance, accident or for any product which has been repaired or altered by anyone other than Wavetek or its authorized representative and not in accordance with instructions furnished by Wavetek.

### Exclusion of Other Warranties

**The Warranty described above is Buyer's sole and exclusive remedy and no other warranty, whether written or oral, is expressed or implied. Wavetek specifically disclaims the implied warranties of merchantability and fitness for a particular purpose.** No statement, representation, agreement, or understanding, oral or written, made by an agent, distributor, representative, or employee of Wavetek, which is not contained in the foregoing Warranty will be binding upon Wavetek, unless made in writing and executed by an authorized Wavetek employee. **Under no circumstances shall Wavetek be liable for any direct, indirect, special, incidental, or consequential damages, expenses, losses or delays (including loss of profits) based on contract, tort, or any other legal theory.**

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# CONTENTS (Continued)

**SECTION 7 PARTS LIST AND SCHEMATICS**



# ILLUSTRATIONS



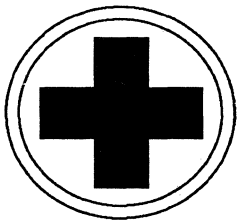
*NOTE*

*The following illustrations appear at the rear of this manual in the order shown.*

| Drawing Number | Title |
|---|---|
| 0102-00-0101 | Instrument Assembly and Parts List |
| 0004-00-0101 | Instrument Schematic |
| 0102-00-0575 | Chassis Assembly |
| 1101-00-0575 | Chassis Assembly Parts List |

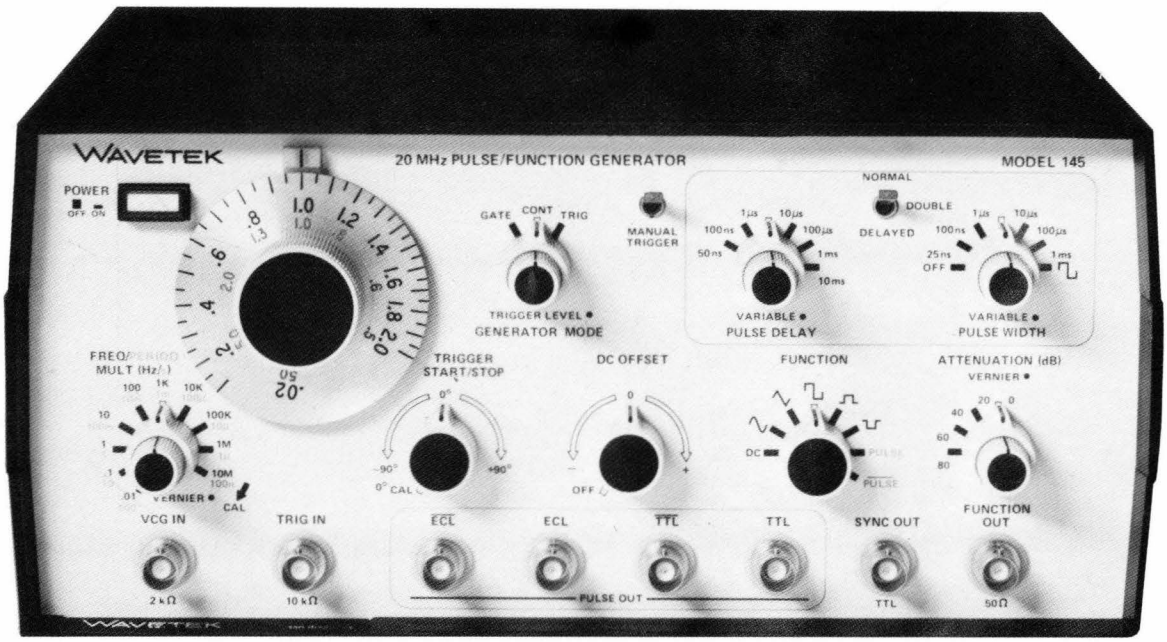
# ILLUSTRATIONS (Continued)

## SAFETY FIRST



**PROTECT YOURSELF.** Follow these precautions:

- Don't touch the outputs of the instrument or any exposed test wiring carrying the output signals. This instrument can generate hazardous voltages and currents.
- Don't bypass the power cord's ground lead with two-wire extension cords or plug adaptors.
- Don't disconnect the green and yellow safety-earth-ground wire that connects the ground lug of the power receptacle to the chassis ground terminal (marked with ⏚ or ⚠ ).
- Don't hold you eyes extremely close to an rf output for a long time. The normally nonhazardous low-power rf energy generated by the instrument could possible cause eye injury.
- Don't plug in the power cord until directed to by the installation instructions.
- Don't repair the instrument unless you are a qualified electronics technician and know how to work with hazardous voltages.
- Pay attention to the **WARNING** statements. They point out situations that can cause injury or death.
- Pay attention to the CAUTION statements. They point out situations that can cause equipment damage.




**Model 145, 20 MHz Function/Pulse Generator**

# SECTION 1
# GENERAL DESCRIPTION

## 1.1 THE MODEL 145

The Model 145 20 MHz Pulse/Function Generator has the versatility of output found in a function generator, plus the pulse characteristics of a pulse generator. It is a precision source of sine, triangle, balanced square, positive square and negative square waveforms, a source of dc levels and a source of normal and inverted pulses. All are front panel and remote control variable from 0.0001 Hz to 20 MHz (periods from 50 ns to 10,000s). Pulse widths are variable from 25 ns to 1 ms and pulse delays variable from 50 ns to 10 ms. Double pulses (two pulses per period) are also available with variable time between pulses. The logical complement of the pulse is selectable and either pulse or complement are output simultaneously as ECL, $\overline{\text{ECL}}$, TTL, $\overline{\text{TTL}}$ and variable amplitude and offset pulses.

The amplitude controllable output of either waveform or pulse can be varied to 30 volts peak-to-peak (open circuit) and attenuated up to 80 dB. DC voltage or dc offset of signal is variable by front panel control and by external control between ±15 volts (open circuit). The outputs are also triggerable for one or multiple cycles by front panel switch or remote signal. A voltage representing generator frequency and a TTL level sync pulse at the frequency of the generator are auxiliary outputs.

## 1.2 SPECIFICATIONS

### 1.2.1 Versatility

Instrument operates as either a function generator or pulse generator.

### 1.2.2 Function Generator

**Waveforms**
Selectable sine∿, square ⊓, triangle △, positive square ⎍, negative square ⎎ and dc. TTL sync pulse and fixed amplitude pulses of TTL, $\overline{\text{TTL}}$, ECL and $\overline{\text{ECL}}$, all simulaneously available with function output.

**Operational Modes**
Continuous: Generator oscillates continuously at selected frequency.

Triggered: Generator is quiescent until triggered by an external signal or manual triger, then generates one cycle at selected frequency.

Gated: As triggered mode, except generator oscillates for the duration of the gate signal.

**Frequency Range**
0.0001 Hz to 20 MHz in 10 overlapping ranges with approximately 1% vernier control.

**Function Output**
∿, ⊓, △ selectable and variable to 30 Vp-p (15 Vp-p into 50Ω). ⎍, ⎎, to 15 Vp (7.5 Vp into 50Ω). All waveforms and dc can supply 150 mA peak current and may be attenuated to 60 dB in 20 dB steps with an additional 20 dB vernier.

**DC Output and DC Offset**
Selectable thru FUNCTION OUT output. Controlled by front panel control or by applying an external voltage. Adjustable between a minumum of ±14.4 Vdc (±7.2 Vdc into 50Ω) with signal peak plus offset limited to ±14.4 Vdc (±7.2 Vdc into 50Ω). External offset sensitivity approximately −1 V/V with output into open circuit. DC offset and output waveform attenuated proportionately the 60 dB output attenuator.

**Sync Output**
A TTL level pulse. Will drive 50Ω termination.

**GCV—Generator Controlled Voltage**
At GCV OUT connector, a 0 to +2V signal proportional to generator frequency. 600Ω source impedance.

**VCG—Voltage Controlled Generator**
Up to 1000:1 frequency change with external 0 to 2 volt signal to VCG IN connector. Upper and lower frequencies limited to maximum and minimum of selected range.

Slew Rate: 2% of range per μs.

Linearity:
±0.2% for 10 Hz to 200 kHz.
±0.75% for 0.001 Hz to 2 MHz.

Impedance: 2 kΩ.

**Trigger and Gate**
Input Range: 1 Vp-p to ±10V.

Impedance: 10 kΩ, 33 pF.
Pulse Width: 25 ns minimum.
Repetition Rate: 10 MHz maximum.
Adjustable Triggered Signal Start/Stop Point (sine and triangle only): Approximately –90° to +90° to 2 MHz.

### 1.2.3 Frequency Precision

**Dial Accuracy**
±3% of full range from X .01 Hz to X 1 MHz.
±5% of full range on X 10 MHz.

**Time Symmetry**
Square wave variation less than:
±1% from 0.001 Hz to 200 kHz
±0.5% from 20 Hz to 20 kHz

### 1.2.4 Amplitude Precision

**Amplitude Change With Frequency**
Sine variation less than:
± 0.1 dB for 0.001 Hz to 200 kHz
± 0.5 dB for 200 kHz to 2 MHz
± 3.0 dB for 2 to 20 MHz

**Step Attenuator Accuracy**
0.3 dB per 20 dB step at 2 kHz.

### 1.2.5 Waveform Characteristics

**Sine Distortion**
<0.5% on X 100 Hz to X 10 kHz.
<1.0% on X .01 to X 10 Hz and X 100 kHz.
All harmonics 34 dB below fundamental on X 1 MHz.
All harmonics 26 dB below fundamental on X 10 MHz.

**Square Wave Rise/Fall Times**
At FUNCTION OUT <20 ns for 15V p-p output into 50Ω load.

### 1.2.6 Pulse Generator

**Pulse Outputs**
Variable amplitude pulse, and simultaneous fixed ECL, $\overline{\text{ECL}}$, TTL and $\overline{\text{TTL}}$ pulses and TTL sync pulse. All outputs can drive 50Ω terminations.

**Operational Modes**
Continuous, triggered and gated plus the following.
Normal Pulse: Adjustable width pulse in phase with sync signal.
Delayed Pulse: Pulse delayed with respect to normal pulse. Pulse delay and pulse width adjustable.
Double Pulse: Two pulses for every period. Time between pulses and pulse width adjustable. Minimum period 100 ns.

**Pulse Period Range**
50 ns to 10,000s in 10 overlapping ranges with approximately 1% vernier control.

**Pulse Width**
25 ns to 1 ms in 5 overlapping ranges with vernier control. Includes OFF and square wave.

**Pulse Delay**
50 ns to 10 ms in 6 overlapping ranges with vernier control.

**Duty Cycle**
Duty cycles to 70% for periods > 100 ns (< 10 MHz); for periods < 100 ns (> 10 MHz) duty cycles are approximately 50%.

**Function Output**
Variable to 30V p-p (15V p-p into 50Ω). DC offset and attenuation are same as for function generator.

**Pulse Rise/Fall Times**
At FUNCTION OUT, < 20 ns for 15V p-p output into 50Ω load.

### 1.2.7 General

**Stability**
Short Term: ±0.05% for 10 minutes.
Long Term: ±0.25% for 24 hours.
Percentages apply to amplitude, frequency and dc offset.

**Environmental**
Specifications apply at 23°C ± 5°C. Instrument will operate from 0°C to 50°C ambient temperatures.

## Dimensions
28.6 cm (11 ¼ in.) wide; 13.3 cm (5 ¼ in.) high; 27.3 cm (10 ¾ in.) deep.

**Weight**
5 kg (11 lb) net; 6.6 kg (14½ lb) shipping.

**Power**
90 to 105V, 108 to 126V, 198 to 231V and 216 to 252V selectable; 48 to 400 Hz; less than 30 watts.

*NOTE*

*All specifications apply from 0.1 to 2.0 on frequency dial when FUNCTION OUT output is at maximum and 50Ω terminated. Function generator specifications apply when PULSE WIDTH control is OFF.*

## 1.3 EQUIPMENT REQUIRED

Equipment required is given in table 1-1.

**Table 1-1. Equipment Required But Not Supplied**

| Equipment | Manufacturer's Part Number | Alternate Part Number | Application Accept-ance | Application Calibra-tion |
|---|---|---|---|---|
| Oscilloscope | TEK 465 | TEK 475 | X | X |
| Voltmeter | Fluke 8000A | Fluke 8010A | | X |
| Distortion Analyzer | HP334A | | | X |
| Counter | HP5300B | HP5345A | | X |
| Function Generator | Wavetek 180 | Wavetek 148 | X | X |
| DC Voltage Source | JF 332 | | X | X |
| 50Ω Termination | TEK 011-0099-00 | Fluke Y9103 | | X |
| 3 Foot Coax Cables | TEK 012-0057-01 | Pomona 4964-SS-36 | X | X |
| Coax Tee Connector | TEK 103-0030-00 | Pomona 3285 | X | |

# SECTION 2
# INSTALLATION

## 2.1 MECHANICAL INSTALLATION

After unpacking the instrument, visually inspect all external parts for possible damage to connectors, surface areas, etc. If damage is discovered, file a claim with the carrier who transported the unit. The shipping container and packing material should be saved in case reshipment is required.

## 2.2 ELECTRICAL INSTALLATION

### 2.2.1 Power Connection

**WARNING**

To preclude injury or death due to shock, the third wire earth ground must be continuous to the facility power outlet. Before connecting to the facility power outlet, examine extension cords, autotransformers, etc., between the instrument and the facility power outlet for a continuous earth ground path. The earth ground path can be identified at the plug on the instrument power cord; of the three terminals, the earth ground terminal is the nonmatching shape, usually cylindrical.

**CAUTION**

To prevent damage to the instrument, check for proper match of line and instrument voltage and proper fuse type and rating.

*NOTE*

*Unless otherwise specified at the time of purchase, this instrument was shipped from the factory with the power transformer connected for operation on a 108 to 132 Vac line supply and with a 0.5 amp slow blow fuse.*

Conversion to other input voltages requires a change in rear panel fuse-holder voltage card position and slow blow fuse according to the following table and procedure.

| Card Position | Input Vac | Fuse |
|---|---|---|
| 100 | 90 to 105 | 0.5 amp |
| 120 | 108 to 126 | 0.5 amp |
| 220 | 198 to 231 | 0.25 amp |
| 240 | 216 to 252 | 0.25 amp |

1. Open fuse holder cover door and rotate fuse pull to left to remove the fuse.
2. Select operating voltage by orienting the printed circuit board to position the desired voltage on the top left side. Push the board firmly into its module slot.
3. Rotate the fuse-pull back into the normal position and insert the correct fuse into the fuse holder. Close the cover door.
4. Connect the ac line cord to the mating connector at the rear of the unit and the power source.

### 2.2.2 Signal Connections

Use 3 foot RG58U 50Ω shielded cables equipped with female BNC connectors to distribute all input and output signals.

## 2.3 ELECTRICAL ACCEPTANCE CHECK

This checkout procedure is a general verification of generator operation: Should a malfunction be found, refer to the warranty in the front of this manual.

Refer to table 1-1 for equipment required for this procedure.

Preset the generator front panel controls as follows:

Set up the oscilloscope, Model 145 and external generator as shown in figure 2-1.

| Control | Position |
|---|---|
| Dial | 1.0 |
| GENERATOR MODE | CONT |
| TRIGGER LEVEL | 9 o'clock |
| PULSE DELAY | 1 μs ▮ 10 μs |
| PULSE DELAY VARIABLE | 12 o'clock |
| NORMAL/DOUBLE/DELAYED | NORMAL |
| PULSE WIDTH | OFF |
| PULSE WIDTH VARIABLE | 12 o'clock |
| ATTENUATION | 0 |
| ATTENUATION VERNIER | Full cw |
| FUNCTION | ⊓ |
| DC OFFSET | OFF |
| TRIGGER START/STOP | 0° CAL |
| FREQ/PERIOD MULT | 1K |
| VERNIER | Full cw |

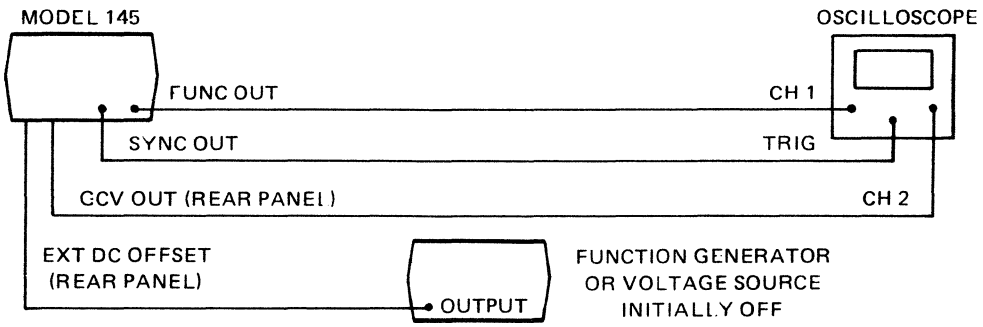



**Figure 2-1. Initial Setup**

**Table 2-1. Acceptance Procedure**

| Step | Control | Position/Operation | Observe |
|---|---|---|---|
| 1 | POWER | ON | 1 kHz square wave. |
| 2 | Dial | Rotate dial. Return to 1.0. | Rotation ccw increases frequency of square on one channel and dc level on other channel; cw decreases frequency and dc level. |
| 3 | FREQ/PERIOD MULT | Rotate switch. Return to 1K. | Rotation cw increases frequency; ccw decreases frequency (dc level not affected). |
| 4 | VERNIER | Rotate ccw. Return to CAL. | Rotation ccw gives a small decrease in frequency. |
| 5 | ATTENUATION | Rotate ccw. Return to 0. | Rotation ccw reduces square wave amplitude. |
| 6 | ATTENUATION VERNIER | Rotate ccw. | Square wave amplitude decreases. |
| 7 | DC OFFSET | Rotate cw. Return to OFF. | Square wave is immediately offset below previous level; then waveform moves up to a positive level. OFF returns waveform to original position. (Clipping occurs at ±15V.) |
| 8 | Function Generator or Voltage Source | Vary input voltage. | Waveform dc level varies. |
| | Remove EXT DC OFFSET IN cable and connect to VCG IN connector. Remove GCV OUT cable. | | |
| 9 | Function Generator or Voltage Source | Vary input voltage; then disconnect input. | Frequency increases with increased voltage, decreases with decreased voltage. |
| 10 | ATTENUATION VERNIER | Rotate cw. | Square wave amplitude increases. |
| 11 | FUNCTION | Rotate to DC, ∿ , ∿ , ⊓ , ⊓ , ⊔ , then ∿ . | Note dc level on scope. ∿ , ∿ and ⊓ should be centered on dc level. ⊓ should rest on dc level, ⊔ should rise to dc level. |
| 12 | GENERATOR MODE | GATE | A dc level. |
| 13 | MANUAL TRIG | Press down. | A series of sine waves. |

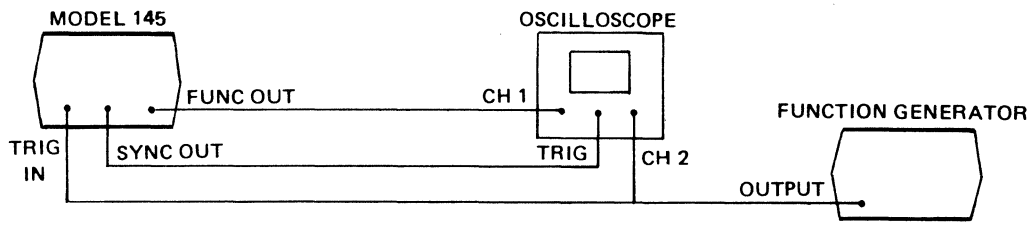



**Figure 2-2. Second Setup**

**Table 2-1. Acceptance Procedure (Continued)**

| Step | Control | Position/Operation | Observe |
|---|---|---|---|
| | Set up a trigger source as shown in figure 2-2. Trigger on triangle waveform. Set trigger source at 100 Hz ∿ . | | |
| 14 | TRIGGER LEVEL | Rotate knob. Set for several cycles. | Knob varies number of cycles gated. |
| 15 | GENERATOR MODE | TRIG | One cycle per trigger cycle. |
| 16 | TRIGGER START/STOP | Rotate knob, then to 0° CAL. | CW starts sine wave at +90°; ccw starts sine wave at −90°. Fully cw gives continuous sine waves. |
| | *NOTE: Select square wave on trigger source.* | | |
| 17 | FUNCTION | PULSE | DC level (minus). |
| 18 | PULSE WIDTH | Turn cw to 100 μs ▮ 1 ms. | Pulse appears. |
| 19 | PULSE WIDTH VARIABLE | Rotate, then to 12 o'clock | CW increases pulse width; ccw decreases pulse width. |
| 20 | FUNCTION | PULSE, then $\overline{\text{PULSE}}$. | Pulse direction reverses; dc levels remain the same values. |
| 21 | NORMAL/DOUBLE/ DELAYED Switch | DELAYED | No change. |
| 22 | PULSE DELAYED | 100 μs ▮ 1 ms | Small horizontal shift. |
| 23 | PULSE DELAYED VARIABLE | Turn knob. | Pulse moves horizontally. |
| 24 | NORMAL/DOUBLE/ DELAYED Switch | DOUBLE | No change. |
| 25 | PULSE DELAYED VARIABLE | Turn knob to resolve two pulses. | Double pulse appears. |

## 2.4 PREPARATION FOR SHIPMENT

If original packing material was saved, pack instrument in same manner as received. When using packing materials other than original, use the following guidelines:

1. Wrap instrument in plastic packing material.
2. Use double-wall cardboard shipping container.
3. Protect all sides with shock-absorbing material such as styrofoam dunnage to prevent instrument movement within the container.
4. Seal shipping container with approved sealing tape.
5. Mark FRAGILE on all sides, top and bottom of shipping container.

## 2.5 PREPARATION FOR STORAGE

This instrument should be stored in a clean, dry environment. The following limitations apply to both storage and reshipment.

1. Temperature within −55°C to +75°C range.
2. Relativity humidity not to exceed 95% at +25°C and sea level (non-condensing).
3. Altitude from sea level to 40,000 feet.

## 2.6 PREPARATION FOR EXTENDED STORAGE

For extended storage greater than 6 months, pack instrument as indicated for shipment.

# SECTION 3
# OPERATION

## 3.1 CONTROLS AND CONNECTIONS

The generator front panel controls and connectors are shown in figure 3-1 and keyed to the following descriptions.

**(1) POWER Switch**

Turns generator on and off.

**(2) Frequency Dial**

Settings under the dial index mark multiplied by (17) determine the output signal frequency. The dial calibration marks correspond to the frequency (black) numbers only. The period (grey) numbers are approximations only. Refer to table 3-1 for quick period/frequency conversion. The frequency can be varied by the vernier (17) and the VCG signal (16)

**(3) GENERATOR MODE Switch**

Selects one of the following three modes.

CONT – Continuous output at FUNCTION OUT, SYNC OUT and, if PULSE WIDTH is on, PULSE OUT connectors.

TRIG – DC level output at all six output connectors until the generator is triggered by MANUAL TRIGGER switch or with a signal at the TRIG IN connector. When triggered, the generator output is one cycle of waveform or one pulse period followed by a dc level.

GATE – As for TRIG except the output is continuous for the duration of the trigger signal at TRIG IN. The last cycle or period started is completed.

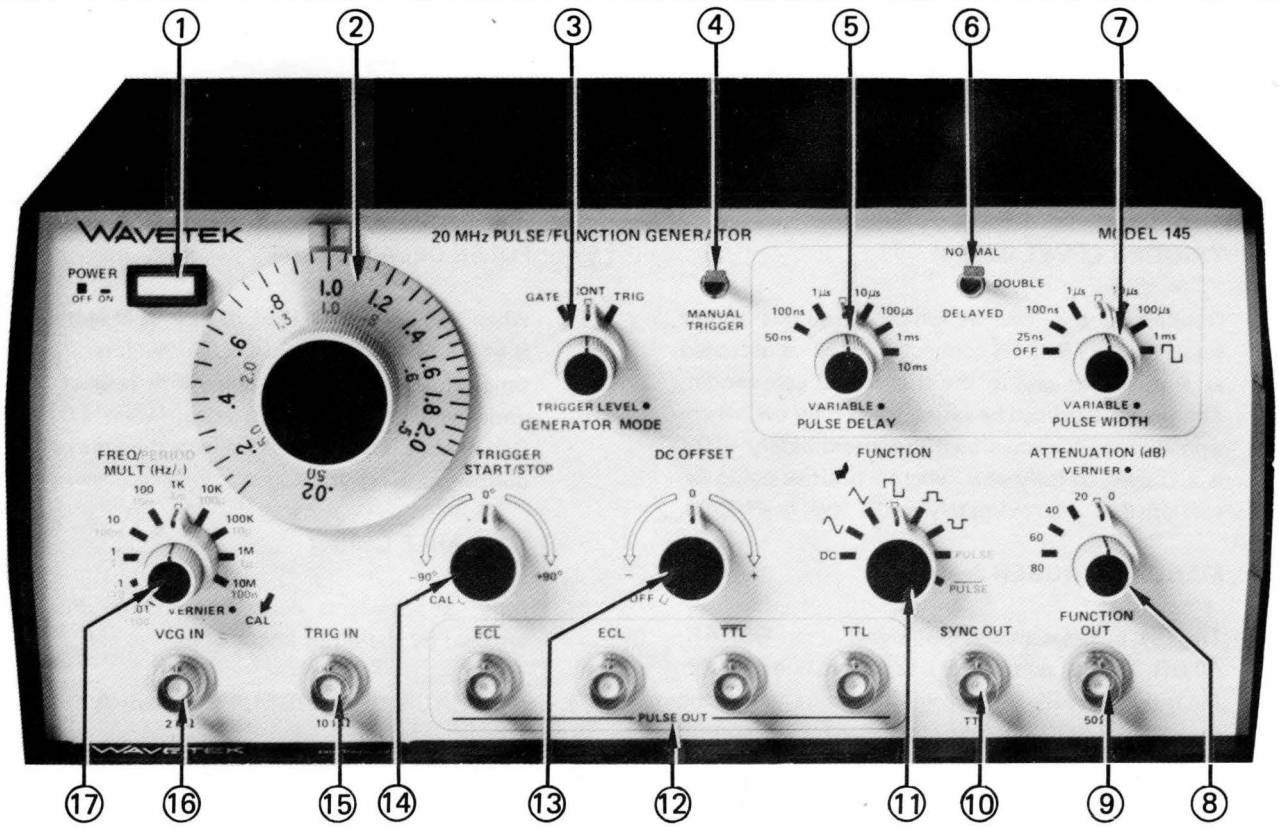



**Figure 3-1. Controls and Connectors**

**Table 3-1. Period to Frequency Conversion**

**Converted Frequency Dial Values**
**(Based on f = 1/T where ⊓⊔)**
**⊢T⊣**

| Time | Freq | Time | Freq | Time | Freq |
|---|---|---|---|---|---|
| .5 | 2 | 2.3 | .44 | 4.1 | .24 |
| .6 | 1.67 | 2.4 | .42 | 4.2 | .24 |
| .7 | 1.43 | 2.5 | .4 | 4.3 | .23 |
| .8 | 1.25 | 2.6 | .39 | 4.4 | .23 |
| .9 | 1.11 | 2.7 | .37 | 4.5 | .22 |
| 1 | 1 | 2.8 | .36 | 4.6 | .22 |
| 1.1 | .91 | 2.9 | .35 | 4.7 | .21 |
| 1.2 | .83 | 3 | .33 | 4.8 | .21 |
| 1.3 | .77 | 3.1 | .32 | 4.9 | .2 |
| 1.4 | .71 | 3.2 | .31 | 5 | .2 |
| 1.5 | .67 | 3.3 | .3 | | |
| 1.6 | .63 | 3.4 | .29 | | |
| 1.7 | .59 | 3.5 | .29 | | |
| 1.8 | .56 | 3.6 | .28 | | |
| 1.9 | .53 | 3.7 | .27 | | |
| 2 | .5 | 3.8 | .26 | | |
| 2.1 | .48 | 3.9 | .26 | | |
| 2.2 | .46 | 4 | .25 | | |

**Symbols**
M = $10^6$
k = $10^3$
m = $10^{-3}$
$\mu$ = $10^{-6}$
n = $10^{-9}$

To use the dial calibration marks when setting period time, the period must be converted to frequency.

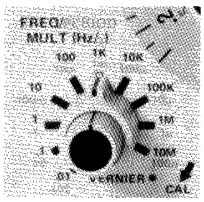
*Example:* Set generator for a 23 $\mu$s pulse period.

1. Find the number 23 (or .23, 2.3, etc.) in the Time column. Note its form and Freq equivalent.

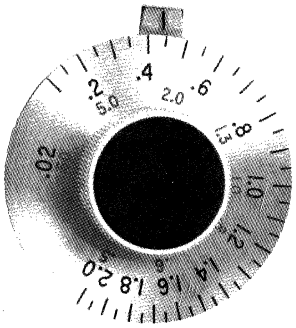
| Time | Freq |
|---|---|
| 2.3 | .44 |

2. Express 23 $\mu$s using the 2.3 form: 2.3 X $10^{-5}$.

3. Set FREQ/PERIOD MULT switch to the equivalent of $10^{-5}$: 10$\mu$.




4. Set the dial to the frequency equivalent of 2.3: .44.




*NOTE: Refer to paragraph 1.2 for dial accuracy.*

**TRIGGER LEVEL Control**

Determines the level at which the input trigger signal at the TRIG IN connector (15) is accepted as a trigger or gate in the trigger and gate modes. The trigger level can be varied from fully cw, where a positive-going excursion thru approximately −10V is a trigger, to fully ccw, where a positive-going excursion thru approximately +10V level is a trigger.

**(4) MANUAL TRIGGER Switch**

Triggers or gates the output signal when GENERATOR MODE switch (3) is at TRIG or GATE. In trigger mode, one cycle is output when the switch is pressed. In gate mode, cycles are continuously output as long as the switch is held down.

*NOTE*
*Set TRIGGER LEVEL (3) fully ccw.*

**(5) PULSE DELAY Control**

When NORMAL/DOUBLE/DELAYED switch (6) is at DELAYED, PULSE DELAY selects one of six time ranges for delay of pulse with respect to the undelayed signal leading edge. When (6) is at DOUBLE, PULSE DELAY selects the time between double pulse leading edges.

**VARIABLE Control**

Inner knob selects delay time within the range selected by the outer knob.

**(6) NORMAL/DOUBLE/DELAYED Switch**

Selects the pulse parameters as follows:

NORMAL – Pulse of width and frequency set by front panel switches appears at TTL, $\overline{\text{TTL}}$, ECL,

$\overline{\text{ECL}}$ and FUNCTION OUT connectors with synchronous leading edges to the sync pulse ⑩ trailing edge.

DOUBLE—As NORMAL plus an additional pulse in each pulse period delayed from the first pulse leading edge by time ⑤

DELAYED—As NORMAL, except the pulse leading edge is delayed from the normal pulse leading edge by time ⑤

### ⑦ PULSE WIDTH Control

Outer knob selects the range for the width of all pulses except sync. Has OFF and square wave detents. When in OFF position, the 145 has no PULSE OUT outputs. The square wave ( ⊓ ) detent is normally used to check the 50% period point; PULSE DELAY ⑤ has no effect. For the best square wave output, set FUNCTION ⑪ to ⊓

### VARIABLE Control

Inner knob selects pulse width within the range selected by the outer knob.

### ⑧ ATTENUATION Control

Outer knob reduces output voltage level of all outputs at FUNCTION OUT with increasing steps of attenuation.

### VERNIER Control

Inner knob is a 20 dB vernier which controls the output within the steps of the outer knob. DC and offset voltages are not affected by this control.

### ⑨ FUNCTION OUT Connector

The only output for the functions other than fixed amplitude pulse. At this output the functions and pulses are controllable in amplitude and dc offset; the other outputs furnish fixed amplitude pulses only.

### ⑩ SYNC OUT Connector

Furnishes a TTL pulse for each cycle or period of the generator. To be used for scope or similar synchronization. Refer to paragraph 3.2.1.4 for conversion to an ECL sync pulse.

### ⑪ FUNCTION Switch

Selects one of eight output signals; dc, waveforms or pulses.

### ⑫ PULSE OUT

Four standard pulses for logic circuits as follows (PULSE WIDTH ⑦ must be other than OFF):

TTL Connector—Furnishes a transistor-transistor-logic level pulse whose occurence and duration are controllable. Levels are typically $<0.5$V quiescent, $>$ 2.0V active into a 50Ω termination.

$\overline{\text{TTL}}$ Connector—Same as TTL connector except active and quiescent levels are reversed.

ECL Connector—Furnishes an emitter-coupled logic level pusle with controllable occurence and duration. Levels are typically $-1.8$V quiescent, $-0.9$V active into a 50Ω termination connector to $-2$ volts. Refer to paragraph 3.2.1.3 for ECL loading instructions.

$\overline{\text{ECL}}$ Connector—Furnishes an output like the ECL output, except active and quiescent levels are reversed.

### ⑬ DC OFFSET Control

Offsets the waveform or dc level at ⑨ from approximately $-15$V to $+15$V (open circuit; approximately $\pm 7.5$V into 50Ω). An OFF position ensures no offset.

### ⑭ TRIGGER START/STOP Control

Sets the start and stop point of the selected waveform (sine or triangle only) appearing at ⑨ Usually used in the trigger mode and in combination with ⑬ to create desired waveforms. 0° CAL position ensures conventional waveforms symmetrical about 0 Vdc.

### ⑮ TRIG IN Connector

Accepts a 1 Vp-p to 10V external signal to trigger the generator. (Up to $\pm 50$V will not damage circuitry.) Triggers on rising edge of input which crosses TRIGGER LEVEL ③ setting from negative to positive.

### ⑯ VCG IN Connector

Accepts 0 to $+2$V ac or dc voltages to vary up to 1000:1 the frequency and period of the outputs.

The upper and lower limits are defined by the maximum and minimum dial (2) settings multiplied by (17) . VCG input will not drive the generator beyond the normal dial limits of a range.

(17) **FREQ/PERIOD MULT Switch**

The outer knob selects one of ten frequency/period multipliers for the dial (2) setting. Frequency, then period, are noted at each setting.

**VERNIER Control**

A fine adjustment of the frequency dial (2) setting.

**Not Shown** **EXT DC OFFSET IN Connector (Rear Panel)**

Applied voltage offsets the selected waveform linearly. Offset is 1V for each −1V applied with output connected into an open circuit. Maximum input is ±7.5V. Offset is affected by the attenuator (8) .

**Not Shown** **GCV OUT Connector (Rear Panel)**

This connector gives a 0 to +2V signal proportional to the frequency of the generator within any given range. The signal can be used as the X drive for X-Y recorders.

## 3.2 OPERATION

Perform the initial checkout in Section 2 for the feel of the instrument. Any questions concerning individual controls and connectors may be answered in paragraph 3.1.

### 3.2.1 Signal Termination

#### 3.2.1.1 FUNCTION OUT Signal

Proper signal termination, or loading, of the generator connectors is necessary for its specified operation. For example, the proper termination of the main output is shown in figure 3-2. Placing the 50Ω terminator, or 50Ω resistance, in parallel with a higher impedance matches the receiving instrument input impedance to the generator output impedance, thereby minimizing signal reflection or power loss on the line due to phase angle mismatch.

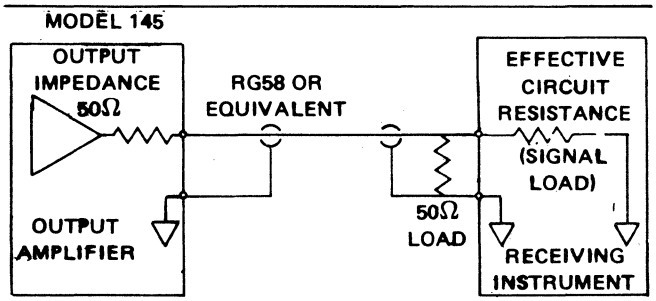



**Figure 3-2. Signal Termination**

#### 3.2.1.2 TTL PULSE OUT Signals

The TTL and $\overline{\text{TTL}}$ PULSE OUT outputs can drive 50Ω and higher impedance terminations.

#### 3.2.1.3 ECL PULSE OUT Signals

The ECL and $\overline{\text{ECL}}$ PULSE OUT outputs are driven by MC10124's. The signals must be properly terminated at the point that they enter an external ECL circuit. Several connection possibilities are shown in figure 3-3.

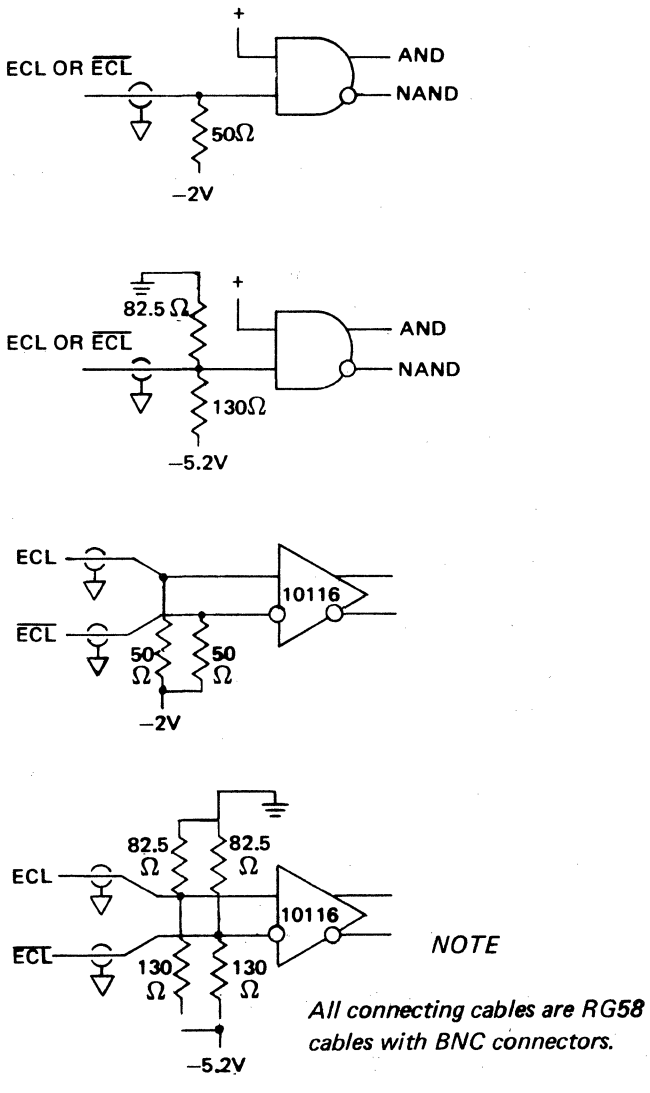



**Figure 3-3. ECL Terminations**

### 3.2.1.4 Conversion of SYNC OUT TTL to ECL

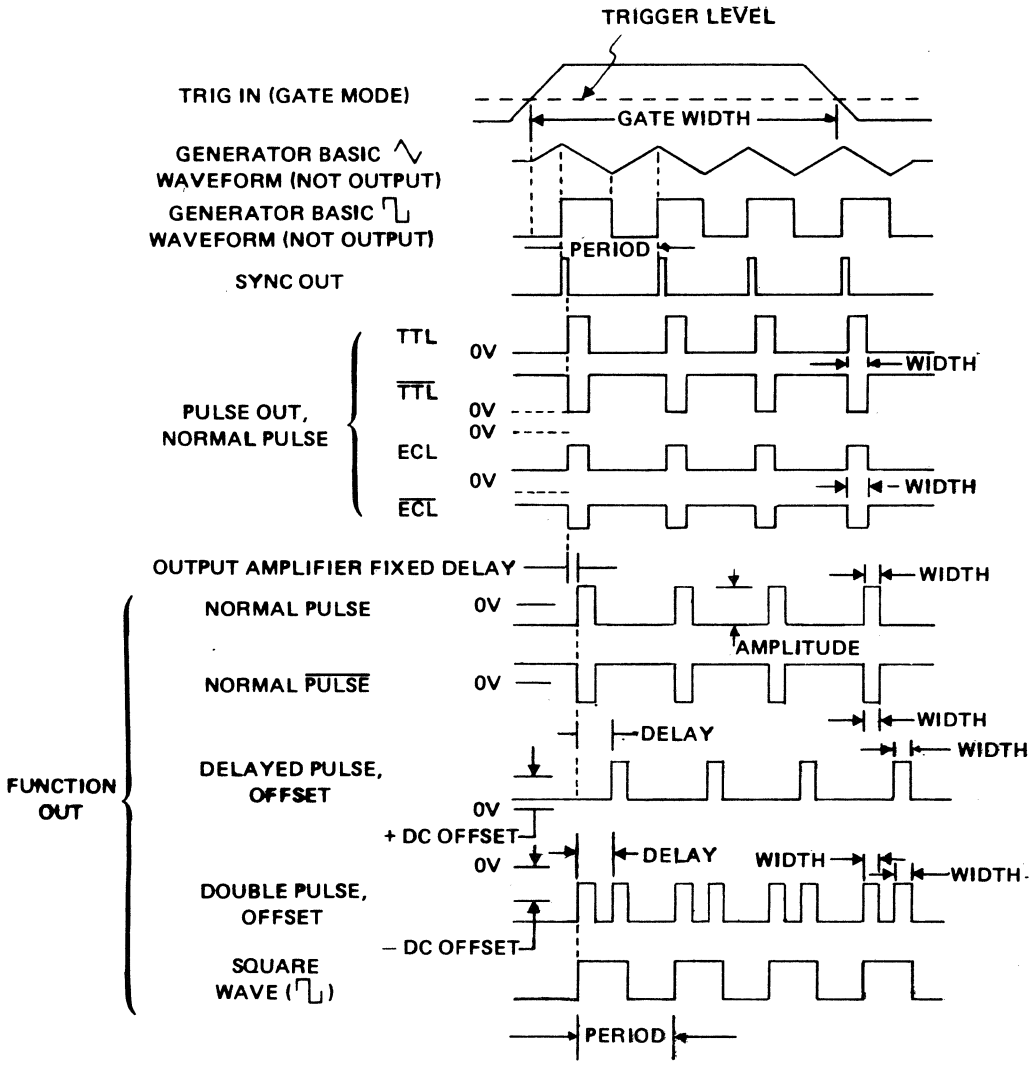
The SYNC OUT TTL pulse can be converted to an ECL pulse by rerouting two jumpers on the trigger/pulse printed circuit board. Disconnect jumper at E24 and connect to E25. Disconnect jumper at E27 and connect to E28. The two jumpers are correctly routed from E25 to E26 and from E28 to E29 for ECL operation. Instrument disassembly is covered in paragraph 5.3.

### 3.2.2 Pulses

See figure 3-4 for definition of controllable pulse characteristics.

### 3.2.3 Waveforms

See figure 3-5 for definition of controllable waveform characteristics.




*NOTES*

1. *Not Shown: TTL, $\overline{TTL}$, ECL, $\overline{ECL}$ double pulse, delayed pulse and $\overline{pulse}$.*

2. *Pulse period is determined by the generator frequency setting unless in trigger mode, in which case it is determined by trigger frequency.*

3. *In trigger mode, just one period is generated for each trigger pulse.*

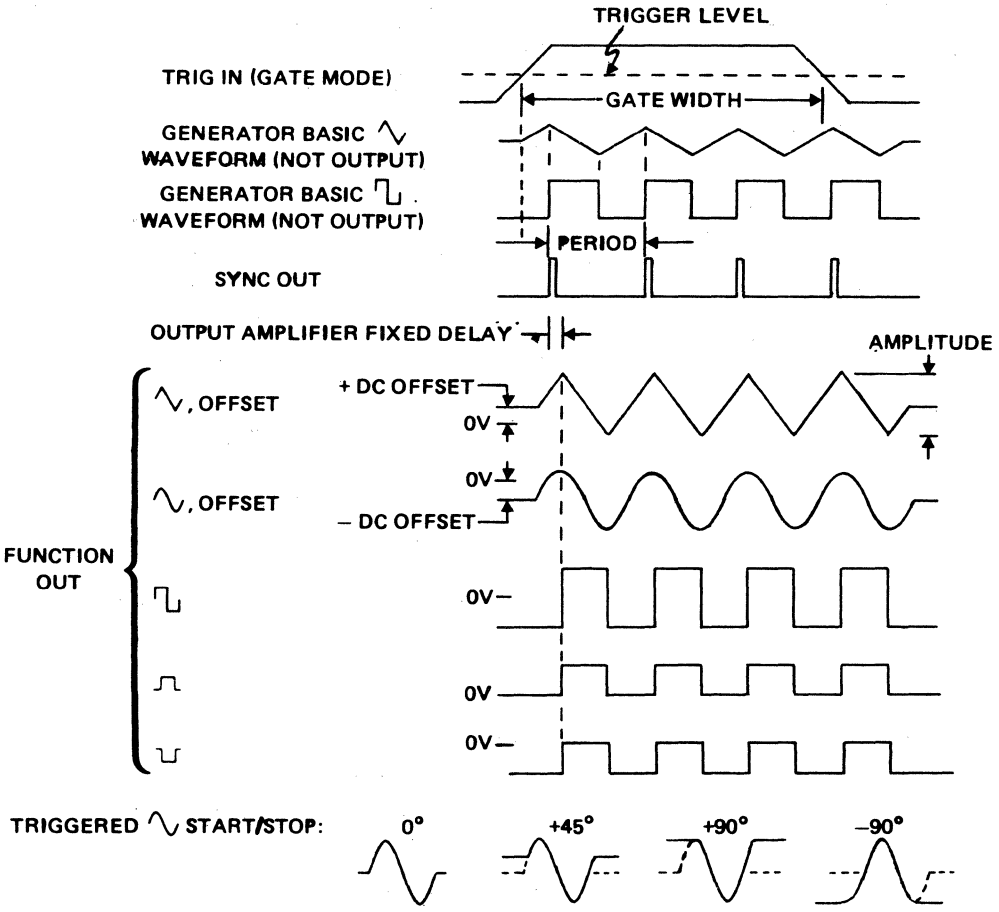
   *DC offset plus pulse peak voltage > | 7.5V | causes pulse clipping.*

**Figure 3-4. Pulse Characteristics**

### 3.2.4 Voltage Controlled Function Generator Operation

Operation as a voltage controlled function generator (VCG) is as for a manually controlled function generator, only the frequency within particular ranges is additionally controlled with dc levels (±2V excursions) injected at the VCG IN connector. Set the frequency dial to a reference from which the frequency is to be voltage controlled.

1. For frequency control with positive dc inputs at VCG IN, set the dial for a lower frequency limit.
2. For frequency control with negative dc inputs at VCG IN, set the dial for an upper frequency limit.
3. For modulation with an ac input at VCG IN, set dial at desired center frequency. Do not exceed the maximum dial range of the selected frequency range.




*NOTES*

1. *Period is controlled by the generator frequency setting.*
2. *In trigger mode, just one period is generated for each trigger pulse.*
3. *DC offset plus peak waveform voltage > | 7.5V | causes waveform clipping.*

**Figure 3-5. Waveform Characteristics**

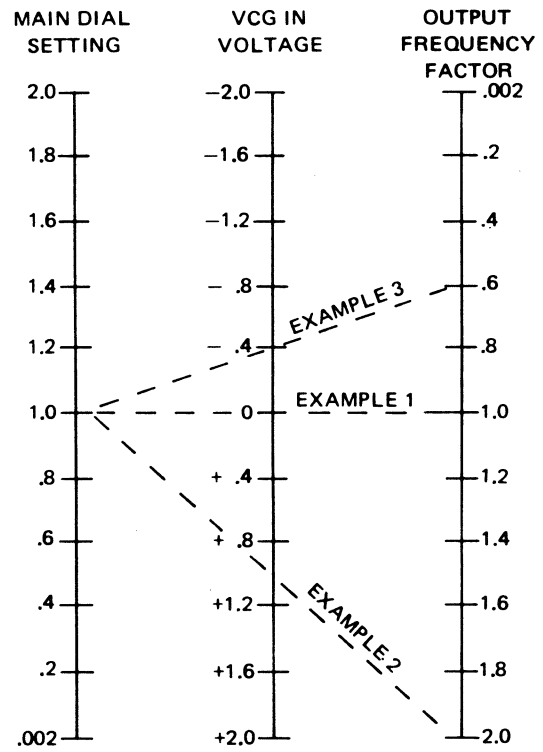



**Figure 3-6. VCG Voltage-to-Frequency Nomograph**

Figure 3-6 is a nomograph with examples of dial and voltage effects. Example 1 shows that with 0V VCG input, frequency is as determined by the main dial setting, 1.0 in this example. Example 2 shows that with a positive VCG input, output frequency is increased. Example 3 shows that with a negative VCG input, output frequency is decreased. (Note that the Output Frequency Factor column value must be multiplied by a frequency range multiplier to give the actual output frequency.)

*NOTE*

*The frequency vernier must be rotated fully ccw for 1000:1 range.*

*Nonlinear operation results when the VCG input voltage is excessive; that is, when the attempted generator frequency exceeds the range setting (2 times the multiplier setting) or in the other direction, 1/1000th of the range setting.*

The up to 1000:1 VCG sweep of the generator frequencies available in each range results from a 2V excursion at the VCG IN connector. With the frequency dial set to 2.0, excursions between −2V and 0V at VCG IN provide the up to 1000:1 frequency sweep. With the dial set to .002, excursions between 0V and +2V at VCG IN provide the up to 1000:1 sweep within the set frequency range.

### 3.2.5 Delay of Triggered Pulse

Additional pulse delay is available in triggered mode. Not only is the PULSE DELAY usable, but the ¼ cycle delay between trigger acceptance and sync pulse shown in figure 3-7 can also be variable delay.

Merely determine the delay desired and apply this formula for the frequency setting:

$$\text{Frequency in Hz} = \frac{1}{(4 \cdot \text{delay in seconds})}$$

Then, adjust the pulse width for your desired pulse. Practical range with the frequency dial and multiplier is 1 ms to 42 minutes. Delay control range is 50 ns to 10 ms.

Frequency vernier and start/stop control also affect the delay. So, for accurate frequency dial control of delay, set these at their cal positions.

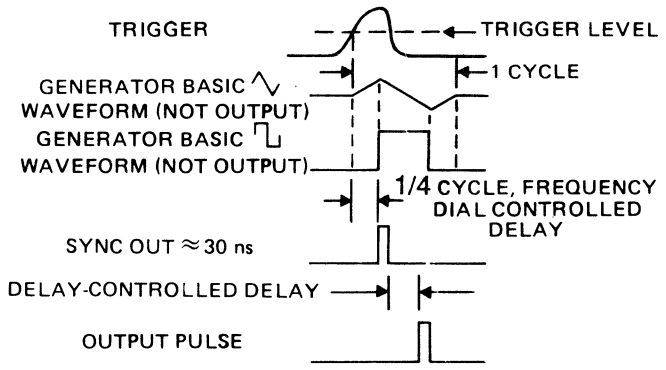



**Figure 3-7. Pulse Delay From Trigger**

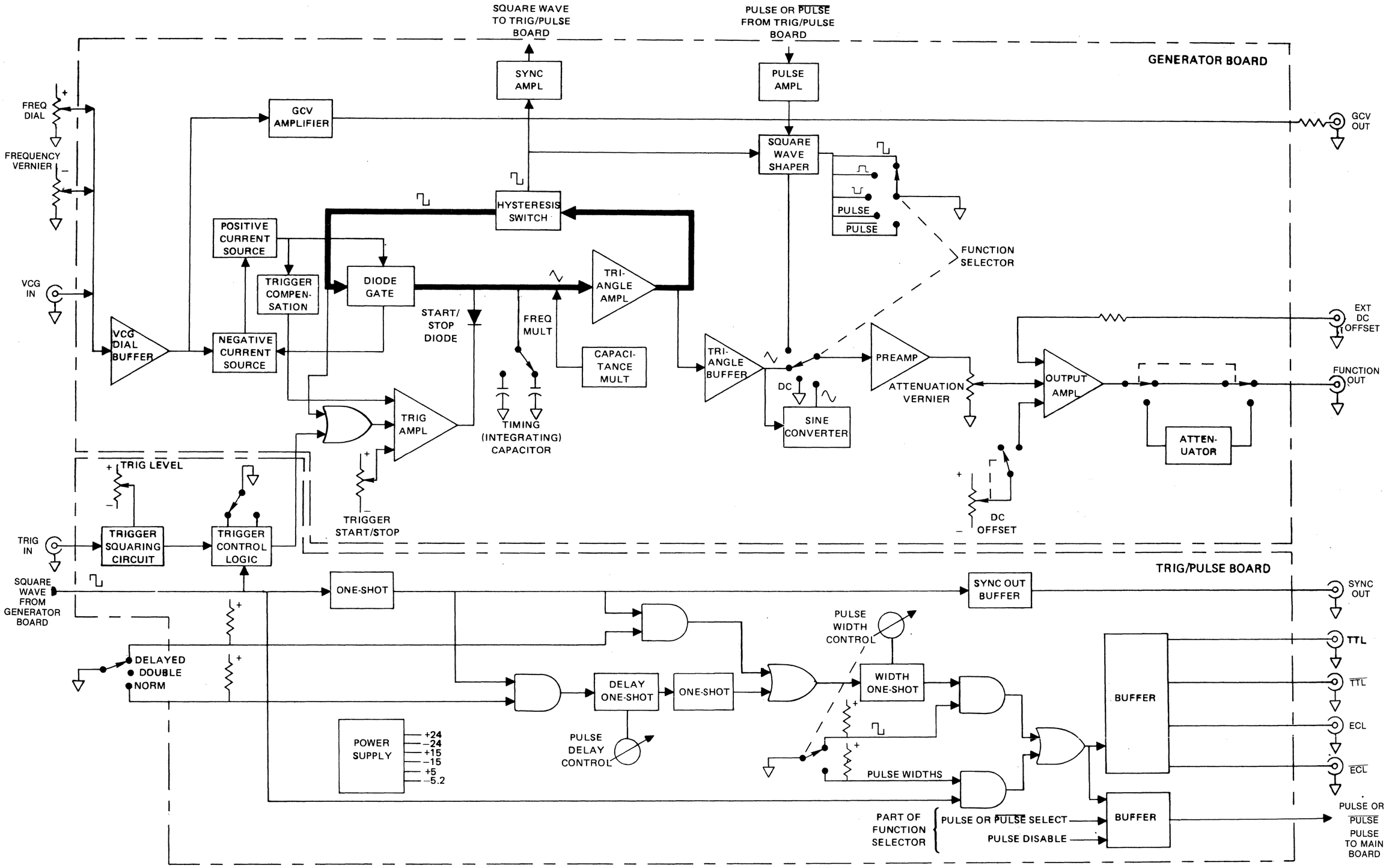



**Figure 4-1. Overall Block Diagram**

# SECTION 4
# CIRCUIT DESCRIPTION

## 4.1 BASIC WAVEFORM DEVELOPMENT

The heart of the generator (the bold path in figure 4-1) is a triangle and square wave generator. The triangle waves are developed by capacitor charging ramps that are alternately reversed in polarity. The polarity reversal is caused by a flip-flop circuit, or hysteresis switch, that in turn produces the square waves. The flip-flop changes states upon detecting amplitude limits of the charging ramps through the triangle amplifier.

As shown in figure 4-1, the VCG dial buffer sums the currents from the frequency dial, frequency vernier and VCG in connector. The VCG dial buffer is an inverting amplifier whose output voltage is used to control a positive current source and a negative current source. For symmetrical output waveforms, the currents from the two current sources are equal and directly proportional to the voltage of the VCG dial buffer output. The diode gate, which is controlled by the hysteresis switch, is used to switch the positive or the negative current to the integrating capacitor selected by the frequency multiplier. If the positive current is switched into the integrating capacitor, the voltage across the capacitor will rise linearly to generate the triangle rise transition. If the current is negative, the voltage across the integrating capacitor will fall linearly to produce the fall transition.

The triangle amplifier is a unity gain amplifier whose output is fed to the hysteresis switch. The hysteresis switch has two voltage limit points (+1.25 and −1.25V) at its input.

During the time the output voltage of the triangle amplifier is rising, the output voltage of the hysteresis switch is positive, but when the output voltage of the triangle reaches +1.25V, it triggers the hysteresis switch causing the output to switch negative. Once the control voltage into the diode gate becomes negative, it will switch the positive current out and switch the negative current in to the integrating capacitor, so that the voltage across the capacitor will reverse, starting a linear decrease of the waveform. When the decreasing voltage reaches −1.25V, the output of the hysteresis switch will switch back to positive, reversing the process. This action generates the triangle waveform as shown in figure 4-2. Since the output of the hysteresis switch is a square wave, the result is simultaneous generation of a square wave and a triangle wave at the same frequency.

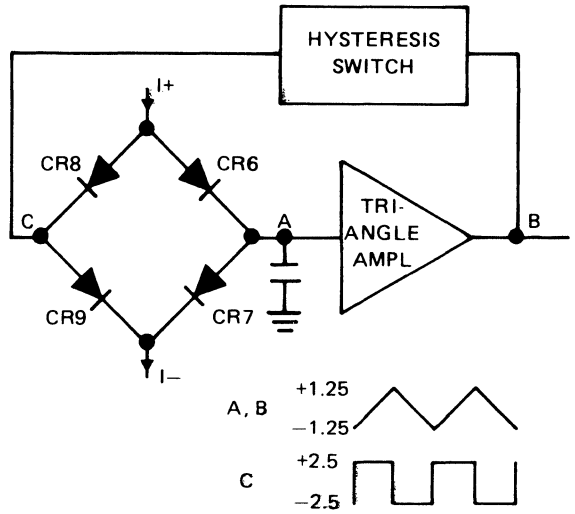



**Figure 4-2. Basic Generator and Timing Diagram**

The output frequency is determined by the magnitude of the capacitor selected by the frequency multiplier and the magnitude of the positive and negative current sources. Since the current sources are linearily proportional to the control voltage of the VCG circuit, the output frequency will also be linearily proportional to the control voltage.

The output of the hysteresis switch is fed to the sync amplifier and also the the square wave shaper. The square wave shaper consists of a shaping circuit which limits the square wave output swing to ±1.25V. For positive pulse outputs, it limits the output voltage swing from -1.25 to 0V; and for negative pulse outputs, it limits the output voltage swing from 0 to +1.25V. The PULSE or $\overline{\text{PULSE}}$ from the auxiliary board are bipolar and processed as the square wave.

The triangle wave from the triangle amplifier is coupled through a buffer amplifier and made available to the function selector switch. The buffer amplifier provides a low impedance to drive the sine converter circuit. The sine converter, using the nonlinear characteristics of its diodes, converts the triangle wave into a sine wave.

The square wave from the sync amplifier, processed through a one-shot and the sync out buffer, is externally available at the sync out connector. The sync pulse, then, is a TTL level pulse output of the generator frequency.

## 4.2 AMPLITUDE OFFSET AND ATTENUATION

The selected waveform is inverted and amplified in the preamplifier. The preamplified waveform is sent to the output amplifier.

The output amplifier is an inverting amplifier with a current limiting output stage for short circuit protection. The dc offset control provides the offset to the selected waveforms center reference. The dc offset can be set by voltage at the external dc offset connector. The output amplifier establishes the generator 0 dB attenuation reference. An output attenuator decreases this reference amplitude in operator selected 20 dB steps. The attenuator consists of three voltage dividers. Attenuation between the steps is provided by the attenuation vernier.

## 4.3 TRIGGER AND GATE CONTROL

Generator operation is controlled by allowing or preventing the timing capacitor to charge. Figure 4-3 shows in detail this portion of the circuit. For continuous operation, the trigger amplifier maintains a positive level above the positive peak developed by the charging capacitors. This reverse biases (turns off) the start/stop diode, and the trigger amplifier does not interfere with continuous operation.

When the trigger amplifier outputs some level below the positive peak charging level, the diode is forward biased (turned on) to sink the integrating current from the current source, preventing the capacitors from charging to the positive peak. This stops waveform generation and holds the triangle output at some dc level called the trigger baseline. The trigger baseline is the level where a triangle waveform cycle starts and where it stops. This baseline is directly applicable to the triangle waveform and thus affects the sine wave. The square wave levels, output via the hysteresis switch, are not affected by the triangle baseline levels.

The normal trigger baseline is zero volts, analogous to 0° phase of a sine or triangle waveform. The trigger start/stop control offsets the trigger amplifier output and can change the baseline for starting and stopping a sine or triangle waveform from its negative peak (−90°) to its positive peak (+90°) range. At the extreme positive peak level setting though, the diode is again reverse biased and generator operation goes continuous.

When charging level is being held, the positive current generator still varies its output with corresponding frequency control inputs. These varying currents must be sunk through the diode to keep the timing capacitors from varying their charge, and thus varying the trigger baseline. The baseline compensation circuit monitors the output from the positive current generator to control the trigger amplifier and thus control the necessary compensating current through the diode.

The trigger control logic determines that after a waveform starts, it always stops at a complete cycle and at the same phase at which it started. The trigger control logic latches the trigger amplifier for an enabling output from the time the cycle starts to when the negative peak of the last cycle is reached (just one cycle in the trigger mode). Upon reaching the negative peak, the timing capacitor continues charging positive again, but stops upon reaching the trigger baseline. A square wave from the hysteresis switch synchronizes the last negative peak time for unlatching the trigger amplifier for its trigger baseline output.

The generator mode control circuitry (not shown) determines whether the trigger control logic is to be fired for just one cycle, or is to be held on for the duration of the trigger input. When in gate mode, the trigger is directly coupled for controlling the trigger control logic. In the trigger mode, the squaring circuit output is converted by a one-shot to a narrow pulse which fires the trigger control logic.

The squaring circuit is a level detector that generates a square pulse for the duration of a trigger signal above the set trigger level. The pulse is also generated for the duration the manual trigger switch is held down in gate mode, and fires one cycle in triggered mode.

## 4.4 PULSE OUTPUTS

The pulse outputs are based on the square wave from the basic generator circuit (see figure 4-1); the pulse frequency is controlled by the frequency dial, frequency vernier and VCG voltage in the same manner as the waveforms. The square wave is first modified to the sync pulse by a one-shot circuit; then the normal/double/delayed pulse selector switch sets or inhibits AND gates to distribute the sync pulse to the delay one-shot and the width one-shot circuits. When the switch is in normal position, the sync pulse is gated to the width one-shot; the delay one-shot is bypassed. When the switch is in delayed position, the sync pulse is gated to the delay one-shot only. With the switch in the double position, the sync pulse is gated to both the delay and width one-shots.

Pulse width of the width and delay one-shot pulses can be varied by the front panel width and delay controls, respectively. The resulting pulse is gated by the selection of a pulse width value rather than the square wave ( ⊓⊔ ) detent on the pulse width switch. The pulse or the basic generator square wave, as selected by the pulse width control, is sent to a buffer circuit and output as TTL, $\overline{\text{TTL}}$, ECL and $\overline{\text{ECL}}$ pulses. The pulse or square wave is also routed to another buffer which is set by the selection of PULSE, $\overline{\text{PULSE}}$ or a

waveform with the front panel function switch. This output, a normal pulse or a complemented pulse, is routed to the square wave shaper and output, if selected, through the output amplifier as a variable amplitude pulse. The pulse modes of normal, delayed and double are shown as timing diagrams in figures 4-4, 4-5 and 4-6.

## 4.5 WIDTH AND DELAY ONE-SHOTS

The pulse width and delay one-shots feature front panel adjustable current sources to regulate the capacitor charge time and as a result, the one-shot pulse width. The steady state condition of the one-shot circuit is as shown in figure 4-7: Upon triggering, $\overline{Q}$ goes low, the switch transistor switches off and the capacitor begins to charge. When the voltage across the capacitor is sufficient, the level detector senses the set level, the flip-flop is cleared and the circuit reverts to its steady state condition. The duty cycle of the one-shots is limited by the capacitor discharge time when returning to steady state conditions.

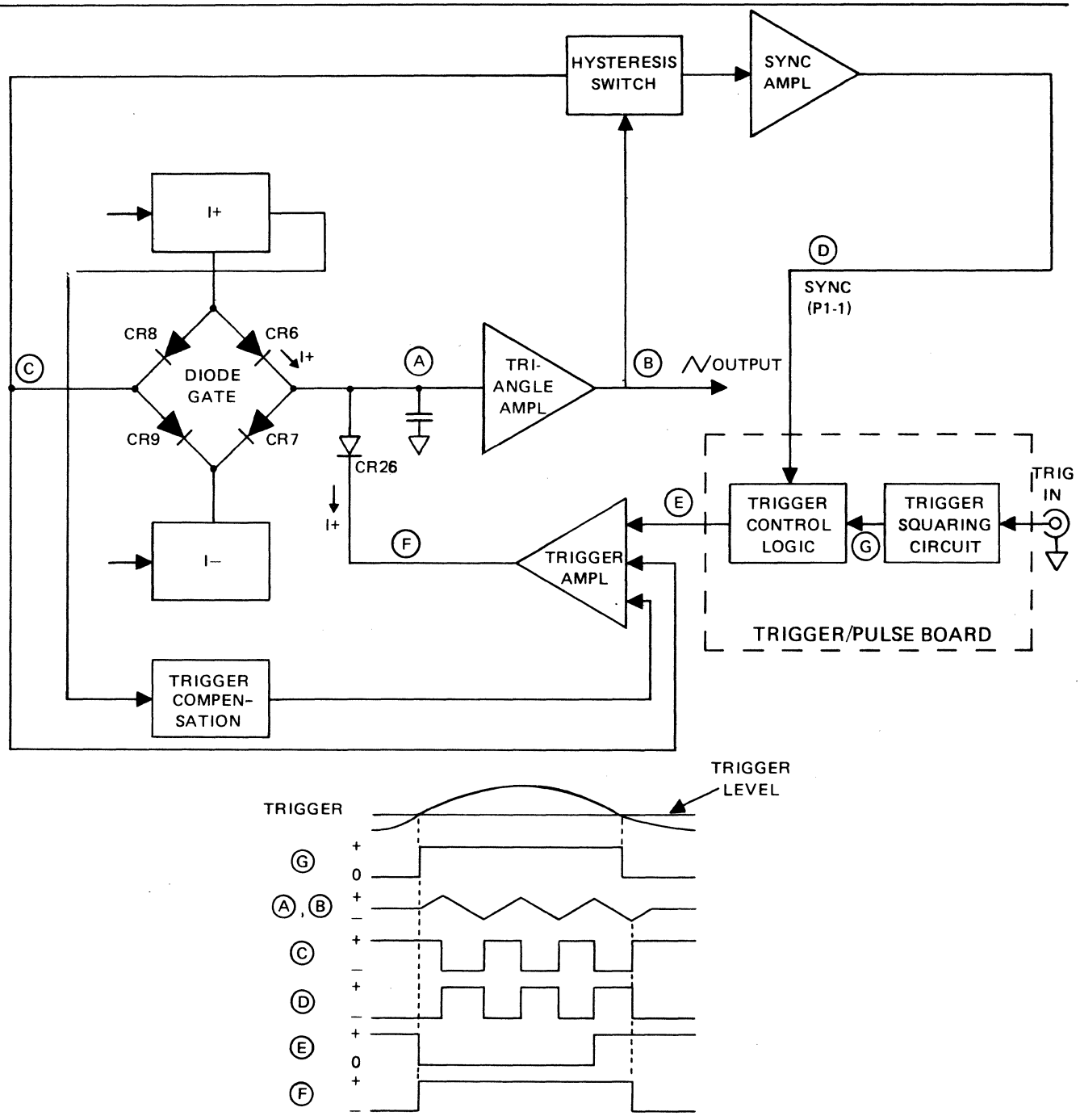



**Figure 4-3. Trigger Circuit and Timing**

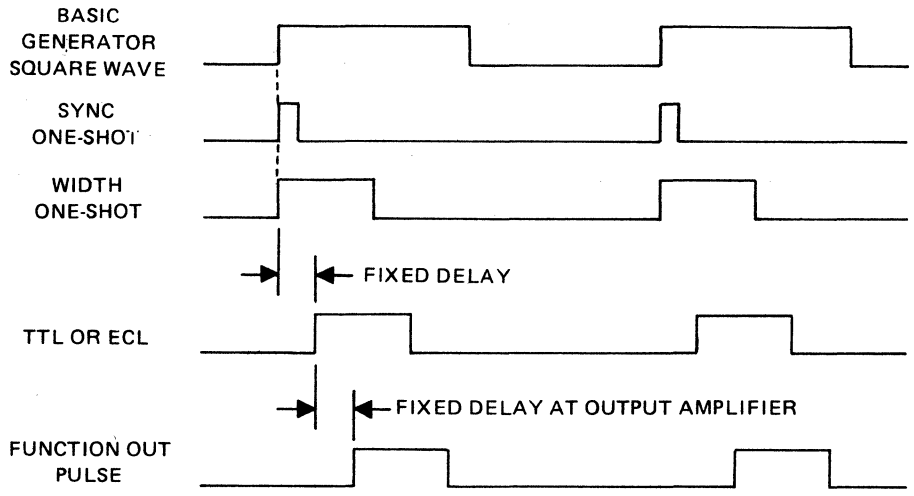



**Figure 4-4. Normal Mode Timing**

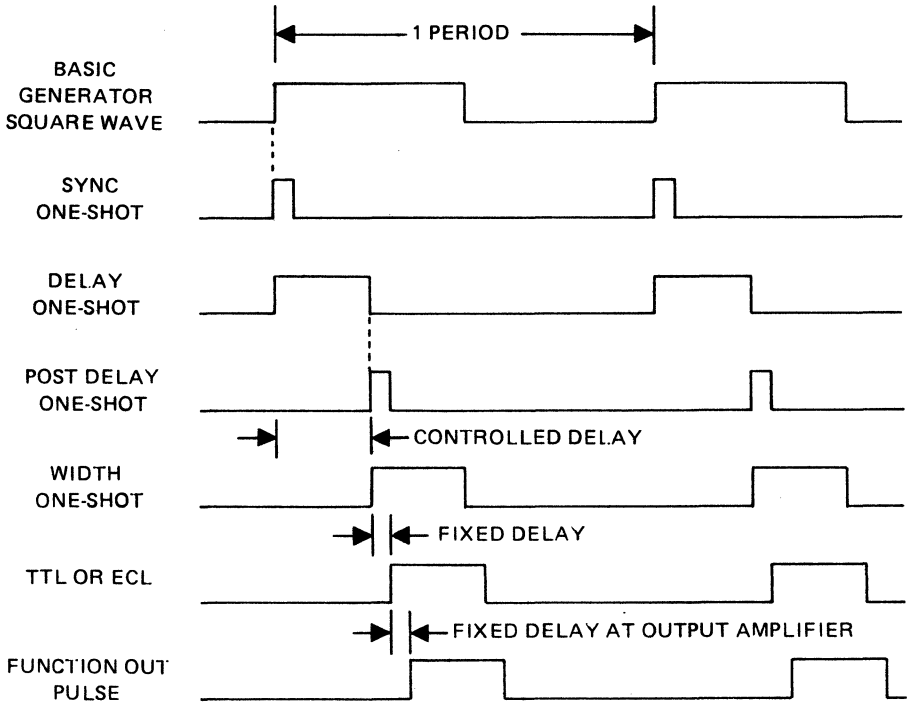



**Figure 4-5. Delayed Mode Timing**

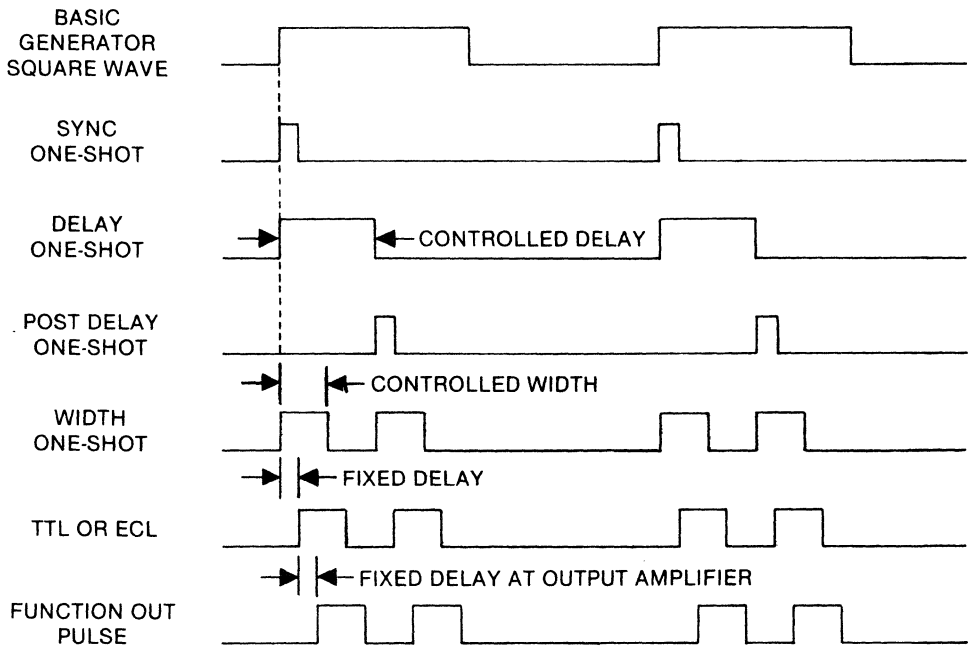



**Figure 4-6. Double Mode Timing**

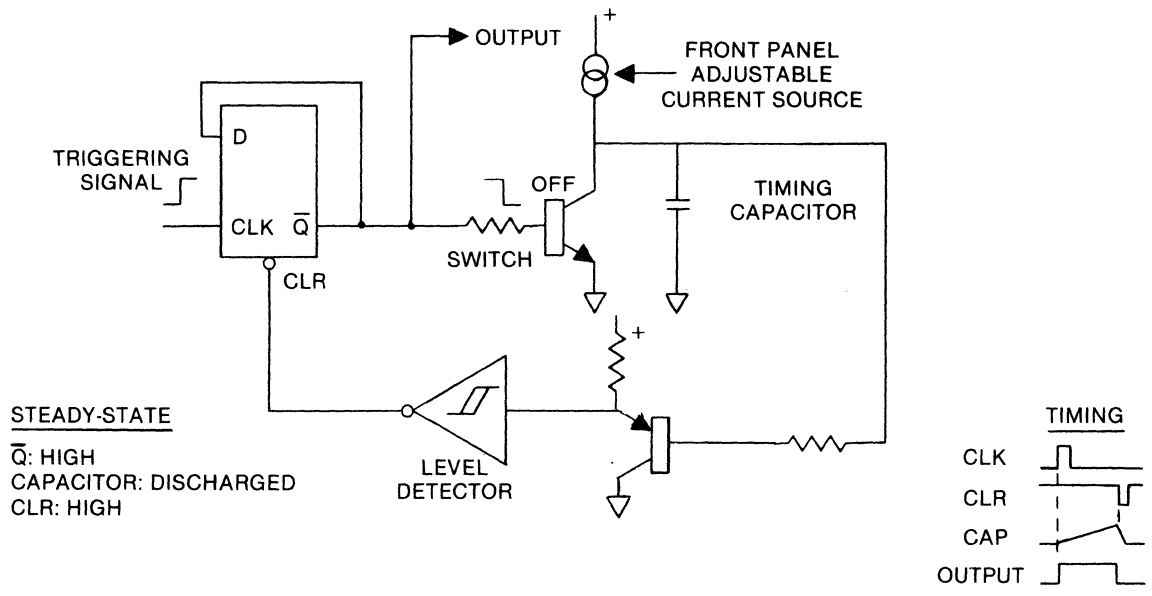



**Figure 4-7. Width and Delay One-Shots**

NOTE

The completion of the calibration procedure returns the instrument to correct alignment.

**CALIBRATION LIMITS AND TOLERANCES ARE NOT INSTRUMENT SPECIFICATIONS**

Instrument specifications are given in Section 1 of this manual.

# SECTION 5
# MAINTENANCE

## 5.1 FACTORY REPAIR

Wavetek maintains a factory repair department for those customers not possessing the necessary personnel or test equipment to maintain the instrument. If an instrument is returned to the factory for calibration or repair, a detailed description of the specific problem should be attached to minimize turnaround time.

## 5.2 INSPECTION AND PERFORMANCE VERIFICATION

Inspect and verify instrument performance every six months or at a frequency determined from actual instrument usage. Inspect the exterior for damage, cleanness and loose knobs. Use a soft cloth dampened with commercial window cleaner to clean the exterior. When calibrating or repairing the instrument, inspect the instrument interior for heat damage and loose wires. This instrument requires no lubrication. Verify performance by performing the calibration procedures.

## 5.3 REQUIRED TEST EQUIPMENT

Refer to table 1-1 for equipment required to perform the calibration procedures.

## 5.4 REMOVING GENERATOR COVERS

WARNING

**With covers removed, several dangerous voltage points may be exposed. Contact with these points could cause serious injury or death.**

1. Invert the instrument; remove the four screws in the cover.
2. Turn the instrument upright; remove the top cover; and remove the four screws securing the bottom cover.
3. Replace the top cover.

*NOTE*

*Remove the covers only when it is necessary to make adjustments or measurements.*

## 5.5 CALIBRATION

After referring to the following preliminary data, perform calibration, as necessary, per table 5-1. If performing partial calibration, check previous settings and adjustments for applicability. See figures 5-1 and 5-2 for calibration point location.

1. Unless otherwise noted, all measurements made at the 50Ω OUT connector should be terminated into a 50Ω (±0.1%) load.

2. Allow the unit to warm up at least 30 minutes for final calibration. Keep the instrument covers on to maintain heat. Remove covers only to make adjustments or measurements.

3. Verify operation in TRIG and GATE modes by connecting an external generator to the TRIG IN BNC and observing proper operation of TRIGGER LEVEL and TRIGGER START/STOP controls (paragraph 3.1).

4. Verify SYNC OUT is an approximate 30 ns positive pulse into 50Ω and that GCV OUT is a voltage proportional to dial position with a 2V max (open circuit).

5. Properly terminate the TTL, $\overline{\text{TTL}}$, ECL and $\overline{\text{ECL}}$ outputs (paragraph 3.2.1) and verify proper operation (paragraph 3.1)

6. After starting the calibration by connecting the unit to an ac source and setting the front panel switches as follows; invert the instrument.

| | |
|---|---|
| Dial | .02 |
| FREQ MULT | 100K |
| FREQ VERNIER | Full cw |
| GENERATOR MODE | CONT |
| TRIGGER LEVEL | Full ccw |
| TRIGGER START/STOP | 0° CAL |
| PULSE DELAY | 50 ns ▮ 100 ns |
| PULSE DELAY VARIABLE | cw |
| Pulse Mode | DOUBLE |
| PULSE WIDTH | OFF |
| PULSE WIDTH VARIABLE | 12 o'clock |
| DC OFFSET | OFF |
| FUNCTION | DC |
| ATTENUATION | 20 ▮ 0 |
| ATTENUATION VERNIER | Full ccw |
| POWER | ON |

**Table 5-1. Calibration Chart**

| Step | Check | Tester | Cal Points | Control Settings | Adjust | Desired Results | Remarks |
|---|---|---|---|---|---|---|---|
| 1 | Power Supply | DVM | C112 | | | +15 ±0.05 Vdc | If voltage is incorrect, proceed to step 3. |
| 2 | | | C111 | | | −15 ±0.05 Vdc | If voltage is correct, proceed to step 9. |

Steps 3 - 8 are on the trig/pulse board. Place the cover on the generator and turn it upright. Remove the top cover for access to the trig/pulse board.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 3 | Power Supply | DVM | TP1 (COM)<br>TP2<br>(+15 Vdc) | | R27 | +15 ±0.02 Vdc | |
| 4 | | | TP3 | | | −15 ±0.05 Vdc | |
| 5 | | | TP4 | | | +24 ±1 Vdc | |
| 6 | | | TP5 | | | −24 ±1 Vdc | |
| 7 | | | TP6 | | | +5 ±0.2 Vdc | |
| 8 | | | TP7 | | R18 | −5.2 ±0.01 Vdc | |

If steps 3 - 8 were performed, place the cover on, invert the generator and warm up the generator for ½ hour. Remove the uppermost cover for generator board access when necessary.

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 9 | Cap Mult Balance | DVM (DCV) | TP5 (COM)<br>TP1 | | R55 | < 5 mV | |
| 10 | Power Ampl Balance | | FUNC-TION OUT | | R181 | 0 ±0.01 Vdc | Terminate with 50Ω load. |
| 11 | Preamp Balance | | | ATTENUATION VERNIER: full cw | R252 | 0 ±0.01 Vdc | |
| 12 | VCG Null | Scope | | FUNCTION: ⌜⌞ | R12 | Minimum frequency shift | Observe one cycle at 50μs/div. Alternately short and open VCG IN BNC while adjusting R12. |
| 13 | 1000:1 Freq | | | FREQ VERNIER: full ccw | R13 BOD Freq Adj | < 1 cycle (< 200 Hz) | Scope on .5 ms/div. |

Table 5-1. Calibration Chart (Continued)

| Step | Check | Tester | Cal Points | Control Settings | Adjust | Desired Results | Remarks |
|---|---|---|---|---|---|---|---|
| 14 | 1000:1 Sym-metry | Scope | FUNC-TION OUT | | R16 BOD Sym | Symmetrical wave-form | *NOTE: Steps 13 and 14 are interactive.* |
| 15 | Main Sym-metry | | | FREQ VERNIER: full cw<br>Dial: 2.0<br>FREQ MULT: 1K | R35 TOD Sym | Symmetrical wave-form | |
| 16 | Sine Distor-tion | Distortion Analyzer, Scope | | FUNCTION: ∿ | R120 Triangle Balance | Symmetrical residue | Connect FUNCTION OUT to distortion analyzer and distor-tion analyzer output to scope. Set scope to .1V/div. Sync scope to SYNC OUT BNC loaded into 50Ω. |
| 17 | | | | | R93, R107 Triangle Peaks | Minimum sine distortion | If either adjustment is going near a stop, re-center both pots and return to step 15. |
| 18 | Main Freq | Frequency Counter/ Timer | | FUNCTION: ⊓ | R4 TOD Freq Adj | 2000 ±10 Hz | Remove SYNC OUT cable. |
| 19 | Cap Mult Freq | | | FREQ MULT: 10 | R48 | 20 ±0.1 Hz | |
| 20 | X 10M Freq | | | FREQ MULT: 10M<br>Dial: Vary | C40 | Best frequency tracking over X 10M range | |
| 21 | X 1M Freq | | | FREQ MULT: 1M<br>Dial: Vary | C34 | Best frequency tracking over X 1M range | This adjustment must be made each time step 20 is done. |
| 22 | Trigger Baseline | Scope | | FUNCTION: ∿<br>GENERATOR MODE: TRIG<br>Dial: Vary | R162 | Minimum shift of baseline around 0 Vdc | |

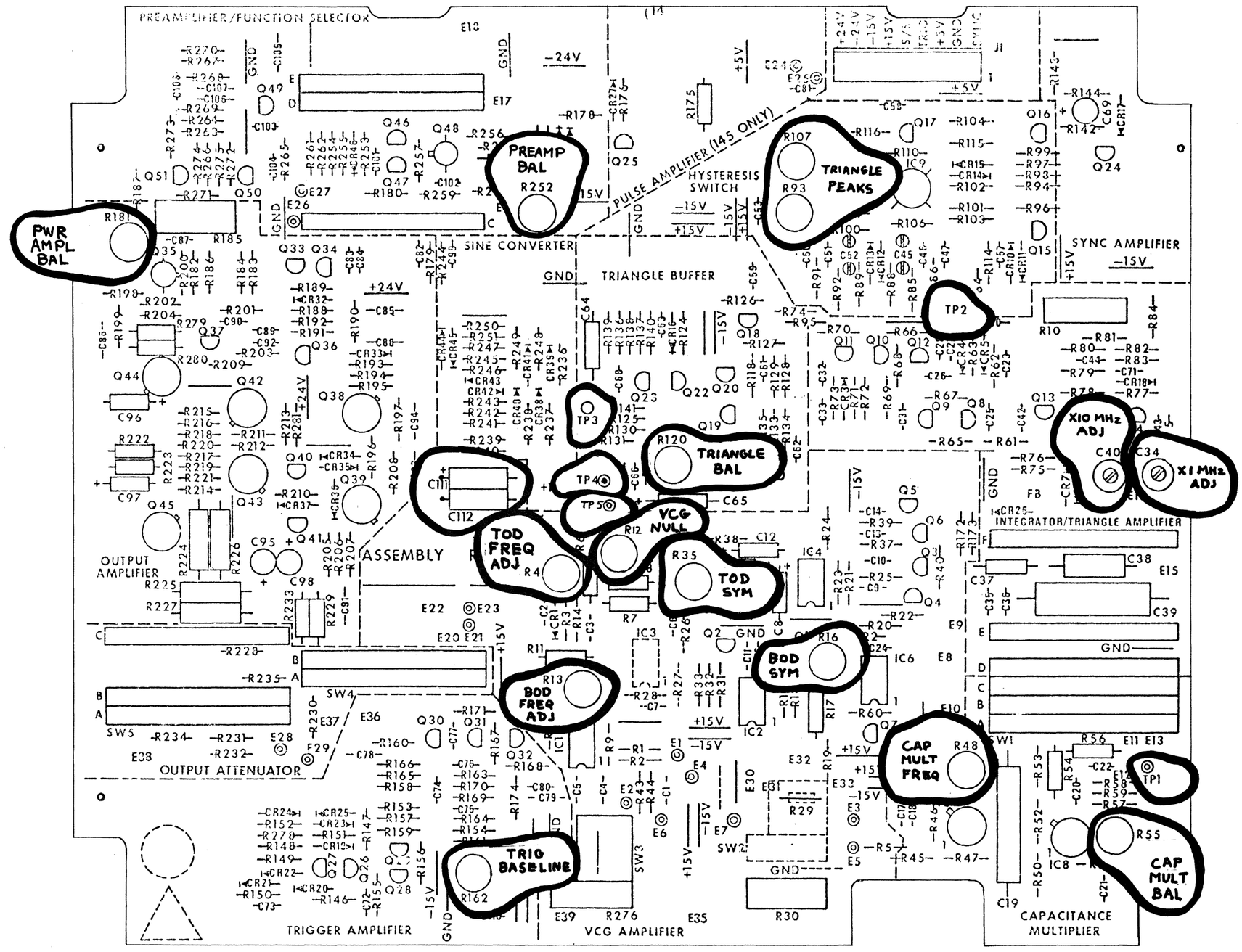



**Figure 5-1. Generator Board**

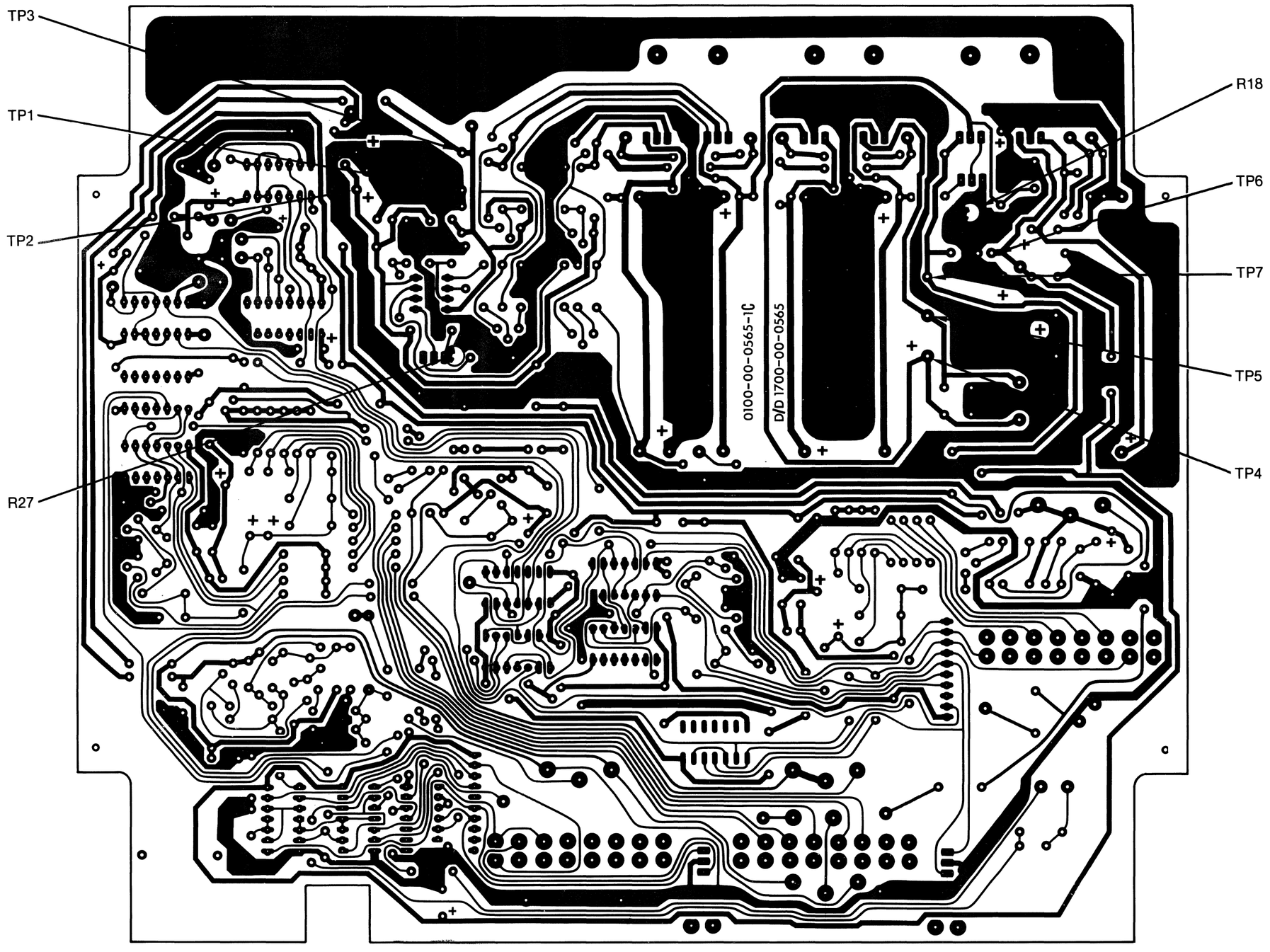



**Figure 5-2. Trig/Pulse Board**

# SECTION 6
# TROUBLESHOOTING

## 6.1 FACTORY REPAIR

Wavetek maintains a factory repair department for those customers not possessing the necessary personnel or test equipment to maintain the instrument. If an instrument is returned to the factory for calibration or repair, a detailed description of the specific problem should be attached to minimize turnaround time.

## 6.2 TROUBLESHOOTING CHARTS

Troubleshooting charts are given in figures 6-1 thru 6-9. The charts do not cover every possible trouble, but will be an aid in systematically isolating faulty components.

Figure 6-1. Initial Checks, Generator Board
Figure 6-2. Generator Loop Checks, Generator Board
Figure 6-3. VCG Checks, Generator Board
Figure 6-4. Generator Output Checks
Figure 6-5. Trigger and Gate Mode Checks, Trig/Pulse Board
Figure 6-6. Power Supply Checks, Trig/Pulse Board
Figure 6-7. Generator Input and Output Checks
Figure 6-8. Pulse Mode Checks, Trig/Pulse Board
Figure 6-9. Pulse Generator Checks, Trig/Pulse Board

## 6.3 TROUBLESHOOTING INDIVIDUAL COMPONENTS

### 6.3.1 Transistor

1. A transistor is defective if more than one volt is measured across its base emitter junction in the forward direction.

2. A transistor when used as a switch may have a few volts reverse bias voltage across base-emitter junction.

3. If the collector and emitter voltages are the same, but the base emitter voltage is less than 500 mV forward voltage (or reversed bias), the transistor is defective.

4. A transistor is defective if its base current is larger than 10% of its emitter current (calculate currents from voltage across the base and emitter series resistors).

5. In a transistor differential pair (common emitter stages), either their base voltages are the same in normal operating condition, or the one with less forward voltage across its base emitter junction should be off (no collector current); otherwise, one of the transistors is defective.

### 6.3.2 Diode

1. A diode is defective if there is greater than one volt (typically 0.7 volt) forward voltage across it.

### 6.3.3 Operational Amplifier (e.g., 741, 1458)

1. The "+" and "–" inputs of an operational amplifier will have less than 15 mV voltage difference when operating under normal conditions.

2. When the output of the amplifier is connected to the "–" input (voltage follower connection), the output should be the same voltage as the "+" input voltage; otherwise, the operational amplifier is defective.

### 6.3.4 Capacitor

1. Shorted capacitors have zero volts across their terminals.

2. Opened capacitor can be located (but not always) by using a good capacitor connected in parallel with the capacitor under test and observing the resulting effect.

### 6.3.5 Digital TTL IC's (e.g. 7400 Series)

1. The device is operating correctly if the output high state is $> +2.4V$ and low state is $< +0.5V$.

2. The input must show the same two levels as in step 1. If the levels are between +0.8V and +2.0V, the connection to the driving circuit output is open.

## 6.4 DISASSEMBLY/REASSEMBLY INSTRUCTIONS (For the Bench Instrument)

### 6.4.1 Disassembly

WARNING

**With covers removed, several dangerous voltage points may be exposed. Contact with these points could cause serious injury or death.**

Review the following procedure and identify components using chassis assembly drawing 0102-00-0575 (refer to Section 7).

1. Disconnect the power plug from the line receptacle.

2. Invert the instrument and remove four screws fastening the bottom cover to the top cover.

3. Turn the instrument upright and remove the top cover.

4. Remove the four screws fastening the lower board to the bottom cover standoffs.

5. Remove the instrument from the bottom cover and invert the instrument.

6. Unsolder the No. 18 black wire at the solder lug of FUNCTION OUT BNC.

7. Disconnect the following wires from the generator board locations:

   E28 (coax) and E29 (shield) function output;
   E26 (yellow) and E27 (white-black) Ext DC;
   E6 (green) and E7 (white-black), GCV;
   E1 (brown) and E2 (white-black), VCG;
   E4 (red), E5 (brown) and E3 (orange) dial pot.

8. Remove all knobs except the dial knob.

9. Remove four screws fastening the generator board (upper board in this inverted position) to standoffs between the boards.

10. Tilt the front panel forward and slide it forward enough to clear the detents of the generator board and lift the generator board free. Slide the front panel back over the detents of the remaining board.

11. For troubleshooting, set the generator board component side up on the working surface alongside the rest of the instrument. Ensure that the generator board is lying on a nonconductive surface and it is not making physical contact with the rest of the instrument. A jumper wire may be attached between E3 and E4 of the generator board to simulate a top-of-dial frequency voltage. It may be necessary to replace some of the knobs to set up various test conditions.

    At this point, the entire instrument is accessible for troubleshooting. To reassemble, perform steps 6 through 16, paragraph 6.4.2.

12. To completely remove the generator board, disconnect the following wires from the generator board:

    E21 pulse disable;
    E23 pulse select;
    E24 pulse coax;
    E25 pulse coax shield.

    Disconnect the Molex connector. To reassemble, perform steps 1 through 16, paragraph 6.4.2.

13. To remove the trigger/pulse board, remove the two screws connecting the power switch to the trigger/pulse board.

14. Unsolder the following wires from the trigger/pulse board:

    E1 (blue);
    E2 (white-blue);
    E3 (blue);
    E4 (red);
    E5 (white-red);
    E6 (red);
    E7 (green);
    E8 (green);
    E9 (blue);
    E10 (red);
    E11 (violet);
    E12 (white);
    E13 (white);
    E14 (white);
    E15 (gray);
    E16 (orange);
    E17 (red);
    E18 (white-black);
    E19 (yellow);
    E22 (brown);
    E48 (green);
    E30 (coax, center conductor);
    E31 (coax, shield);
    J6 ($\overline{\text{TTL}}$ BNC), E40 and E41;
    J5 ($\overline{\text{TTL}}$ BNC), E42 and E43;
    J4 ($\overline{\text{ECL}}$ BNC), E44 and E47;
    J3 ($\overline{\text{ECL}}$ BNC), E45 and E46.

15. Unsolder the green-yellow wire connecting the front and rear panels.

16. Slide out the trigger/pulse board.

### 6.4.2 Reassembly

Refer to the chassis assembly drawing 0102-00-0575 (refer to Section 7) for correct positioning of the reassembled components.

1. Turn the unit upside down (bottom of unit up).

2. Insert the trigger/pulse board (component side up).

3. Solder the following wires to the board:

   E1 (blue);
   E2 (white-blue);
   E3 (blue);
   E4 (red);
   E5 (white-red);
   E6 (red);
   E7 (green);
   E8 (green);
   E30 (coax-center conductor);
   E31 (coax-shield);
   J6 (TTL BNC), E40 and E41;
   J5 ($\overline{\text{TTL}}$ BNC), E42 and E43;
   J4 (ECL BNC), E44 and E47;
   J3 ($\overline{\text{ECL}}$ BNC), E45 and E46;
   E9 (blue);
   E10 (red);
   E11 (violet);
   E12 (white);
   E13 (white);
   E14 (white);
   E15 (gray);
   E16 (orange);
   E17 (red);
   E18 (white-black);
   E19 (yellow);
   E22 (brown);
   E48 (green).

4. Secure the power switch to the trigger/pulse board.

5. Solder the green-yellow wire connecting the front and rear panels.

6. Slide in the generator board (component side up).

7. Secure the four screws attaching the generator and trigger/pulse boards together.

8. Install the two screws securing the generator to the left side panel mounting brackets.

9. Push the front panel back over the board detents.

10. Connect the following wires to the generator board:

    E4 (red), E5 (brown) and E3 (orange) dial pot;
    E1 (brown) and E2 (white-black) VCG;
    E6 (green) and E7 (white-black) GCV;
    E28 (coax, center conductor) and E29 (coax shield);
    E26 (yellow) and E27 (white-black) Ext DC;
    E23 from E34 of trigger/pulse board;
    E21 from E39 of trigger/pulse board;
    E24 from E37 of trigger/pulse board;
    E25 from E38 of trigger/pulse board.

    Connect the Molex connector.

11. Solder the large No. 18 ground wire to the output BNC.

12. Turn the instrument upright and slide front and rear panels into the bottom cover. This spaces them correctly for proper knob alignment.

13. Install all knobs. Align them so that they match the front panel graphics and are spaced approximately 1/16th of an inch away from the surface the front panel.

14. Install four screws to secure the lower board to the bottom cover standoffs

15. Replace the top cover and invert the instrument.

16. Secure the top cover with four screws into bottom cover.

## 6.5 DISASSEMBLY/REASSEMBLY INSTRUCTIONS (For the Rack Mounted Instrument)

### 6.5.1 Disassembly

Review the following procedure and identify components using drawings 0102-00-0621 and 0102-00-0575 (refer to Section 7).

1. Disconnect the power plug from the line receptacle.

2. Turn the unit top side up.

3. Remove the four top cover screws and cover.

4. Invert the unit (bottom side up).

5. Remove the four bottom cover screws and cover.

6. Remove all front panel knobs except the frequency dial knob.

7. Position the unit upside down (bottom of unit) with the front panel away from you.

8. Remove the three screws holding the heat sinks of the trigger/pulse board to the rear panel.

9. Remove the two screws attaching the front panel to the right side panel (labeled "R.H." in drawing 0102-00-0621).

10. Remove the two screws securing the rear panel to the left side panel.

11. Remove the two screws securing the generator board to the left side panel mounting brackets.

12. Unsolder the large No. 18 (black) ground on the function output BNC.

13. To remove the generator board, disconnect the following wires from the generator board locations:

    E28 (coax) and E29 (shield), function output;
    E26 (yellow) and E27 (white-black), Ext DC;
    E6 (green) and E7 (white-black), GCV;
    E1 (brown) and E2 (white-black), VCG;
    E4 (red), E5 (brown) and E3 (orange), dial pot;
    E23 (pulse select);
    E21 (pulse disable);
    E24 (pulse coax);
    E25 (pulse coax shield).

    Disconnect the Molex connector.

14. Slide the rear panel to the right and backwards. Notice that the wires for the power supply are connected to the rear panel.

15. Remove the two screws attaching the generator board to the mounting brackets on the right side panel.

16. Remove the four screws securing the generator and trigger/pulse boards together.

17. Remove the main board back and upwards.

18. For troubleshooting the generator and trigger/pulse boards, turn the instrument around with the front panel facing you (keep the unit inverted). Place the generator board (component side up) on a working surface with the board on the right side of the unit. Ensure the generator board is lying on a nonconductive surface and not making physical contact with the rest of the unit. Jumper E3 and E4 simulate the top of dial frequency voltage. Pull J1 (Molex connector) from the instrument and plug into position on the generator board. Add the following jumpers between the generator and trigger/pulse board:

| **Trigger/Pulse** | **Generator** |
|---|---|
| E34 (pulse select) | E23 |
| E39 (pulse disable) | E21 |
| E37 (pulse coax, center) | E24 |
| E38 (pulse coax, shield) | E25 |

    It may be necessary to replace some of the knobs to set up various test conditions.

    At this point, the entire instrument is accessible for troubleshooting. To reassemble, perform steps 6 through 19, paragraph 6.5.2.

19. To remove the trigger/pulse board, remove the two screws connecting the power switch to the trigger/pulse board.

20. Unsolder the following wires from the trigger/pulse board:

    E1 (blue);
    E2 (white-blue);
    E3 (blue);
    E4 (red);
    E5 (white-red);
    E6 (red);
    E7 (green);
    E8 (green);
    E9 (blue);
    E10 (red);
    E11 (violet);
    E12 (white);
    E13 (white);
    E14 (white);
    E15 (gray);
    E16 (orange);
    E17 (red);
    E18 (white-black);
    E19 (yellow);

E22 (brown);
E48 (green);
E30 (coax, center conductor);
E31 (coax, shield);
J6 (TTL BNC), E40 and E41;
J5 ($\overline{\text{TTL}}$ BNC), E42 and E43;
J4 (ECL BNC), E44 and E47;
J3 ($\overline{\text{ECL}}$ BNC), E45 and E46.

21. Unsolder the green-yellow wire connecting the front and rear panels.

22. Slide out the trigger/pulse board.

### 6.5.2 Reassembly

Review the following procedure and identify components using drawings 0102-00-0621 and 0102-00-0575 (refer to Section 7).

1. Turn the unit upside down (bottom of unit up).

2. Insert the trigger/pulse board (component side up).

3. Solder the following wires to the board:

4. Secure the power switch to the trigger/pulse board.

E1 (blue);
E2 (white-blue);
E3 (blue);
E4 (red);
E5 (white-red);
E6 (red);
E7 (green);
E8 (green);
E30 (coax-center conductor);
E31 (coax-shield);
J6 (TTL BNC), E40 and E41;
J5 ($\overline{\text{TTL}}$ BNC), E42 and E43;
J4 (ECL BNC), E44 and E47;
J3 ($\overline{\text{ECL}}$ BNC), E45 and E46;
E9 (blue);
E10 (red);
E11 (violet);
E12 (white);
E13 (white);
E14 (white);
E15 (gray);
E16 (orange);
E17 (red);
E18 (white-black);
E19 (yellow);
E22 (brown);
E48 (green).

5. Solder the green-yellow wire connecting the front and rear panels.

6. Slide in the generator board (component side up).

7. Secure the four screws attaching the generator and trigger/pulse boards together.

8. Install the two screws securing the generator to the left side panel mounting brackets.

9. Attach all knobs to the front panel.

10. Slide the rear panel and right side panel into position. Align the wires with notched locations on the generator board.

11. Install the two screws securing the rear and left side panel.

12. Secure the front and right side panels with two screws.

13. Install the two screws securing the generator to the right side panel mounting brackets.

14. Secure the heat sink to the rear panel using three screws.

15. Connect the following wires to the generator board:

E4 (red), E5 (brown) and E3 (orange) dial pot;
E1 (brown) and E2 (white-black) VCG;
E6 (green) and E7 (white-black) GCV;
E28 (coax, center conductor) and E29 (coax shield);
E26 (yellow) and E27 (white-black) Ext DC;
E23 from E34 of trigger/pulse board;
E21 from E39 of trigger/pulse board;
E24 from E37 of trigger/pulse board;
E25 from E38 of trigger/pulse board;

Connect the Molex connector.

16. Solder the large No. 18 ground wire to the output BNC.

17. Visually inspect the instrument for missing hardware and disconnected wires.

18. Attach top and bottom covers with four screws for each cover.

19. Check the unit for proper operation.

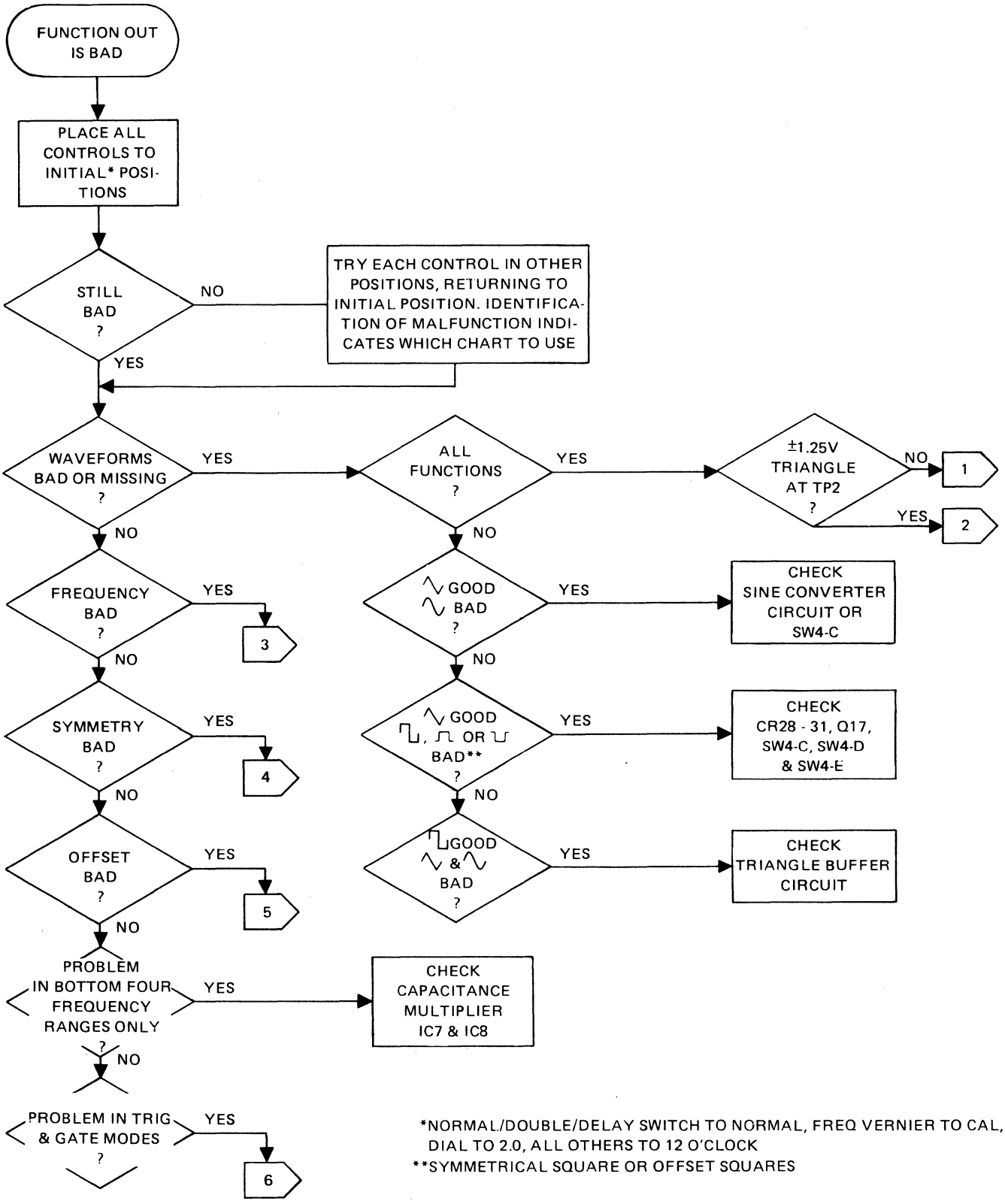
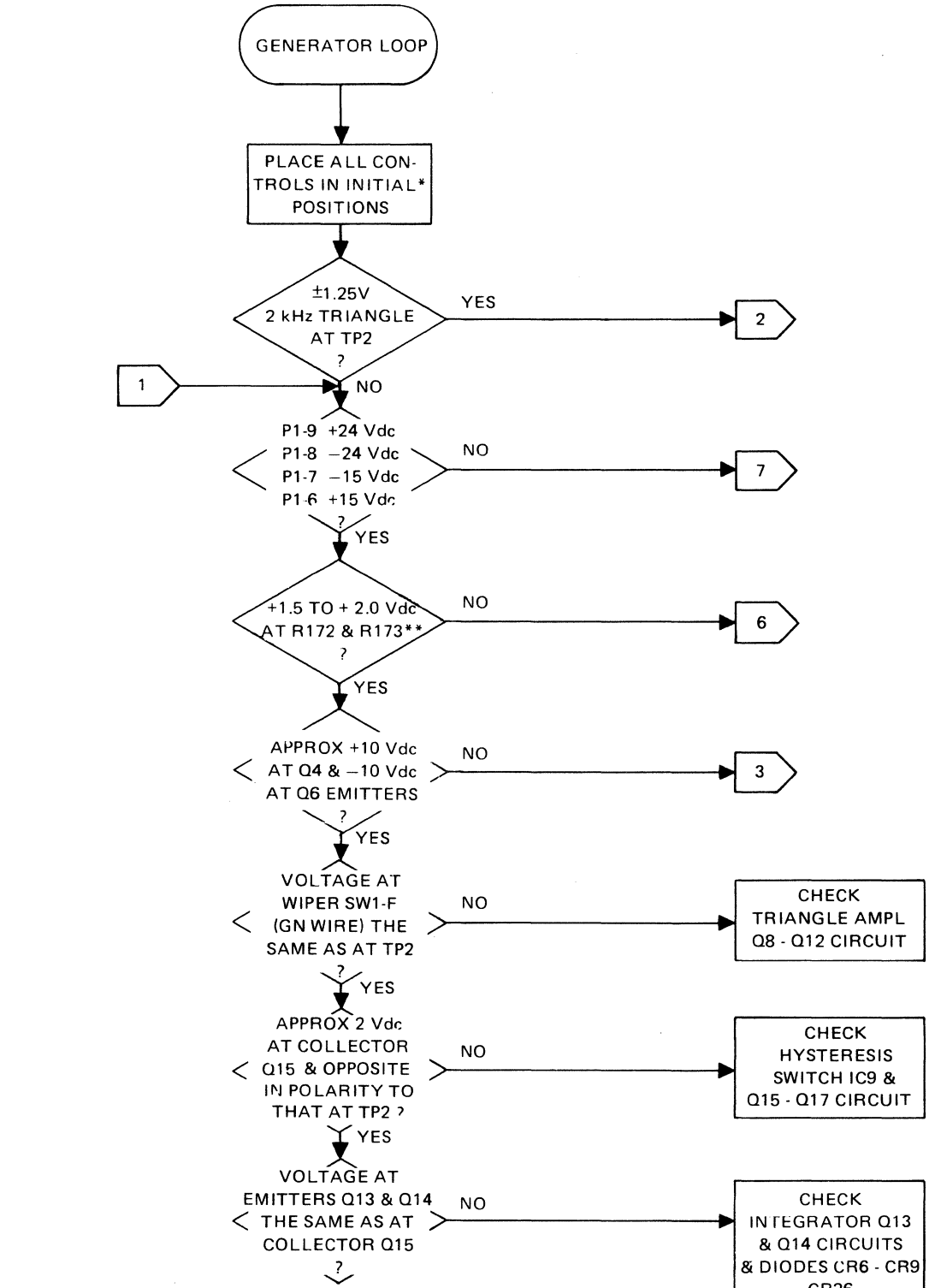



**Figure 6-1. Initial Checks, Generator Board**

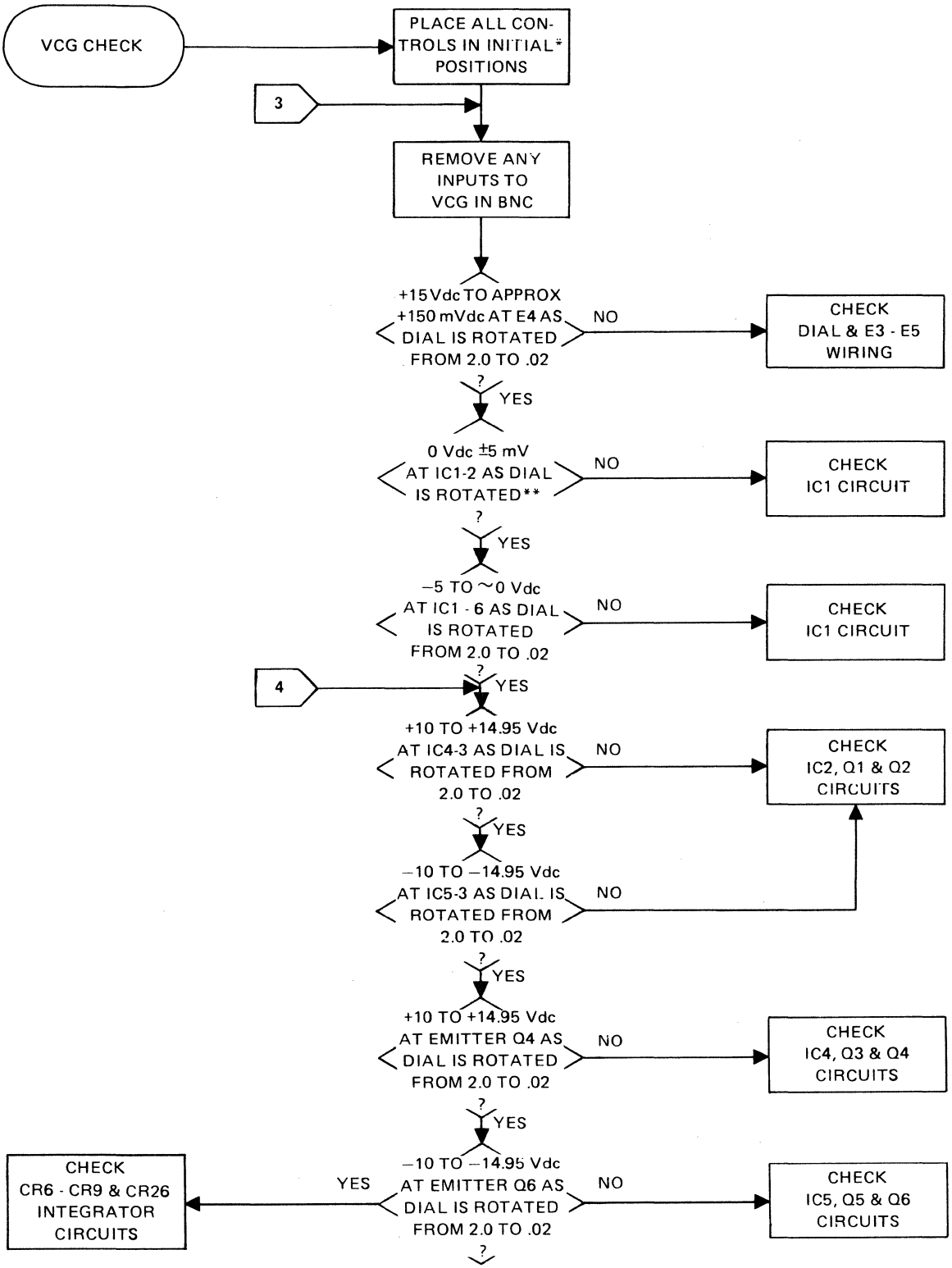



*NORMAL/DOUBLE/DELAY SWITCH TO NORMAL, FREQ VERNIER TO CAL, DIAL TO 2.0, ALL OTHERS TO 12 O'CLOCK

**A NEGATIVE VOLTAGE HERE STOPS GENERATOR FOR TRIGGERED OPERATION

***USE SCOPE AND HIGH IMPEDANCE PROBE

**Figure 6-2. Generator Loop Checks, Generator Board**




*NORMAL/DOUBLE/DELAY SWITCH TO NORMAL, FREQ VERNIER TO CAL, DIAL TO 2.0, ALL OTHERS TO 12 O'CLOCK

**USE SCOPE AND HIGH IMPEDANCE PROBE FOR THIS AND SUBSEQUENT VCG MEASUREMENTS

**Figure 6-3. VCG Checks, Generator Board**

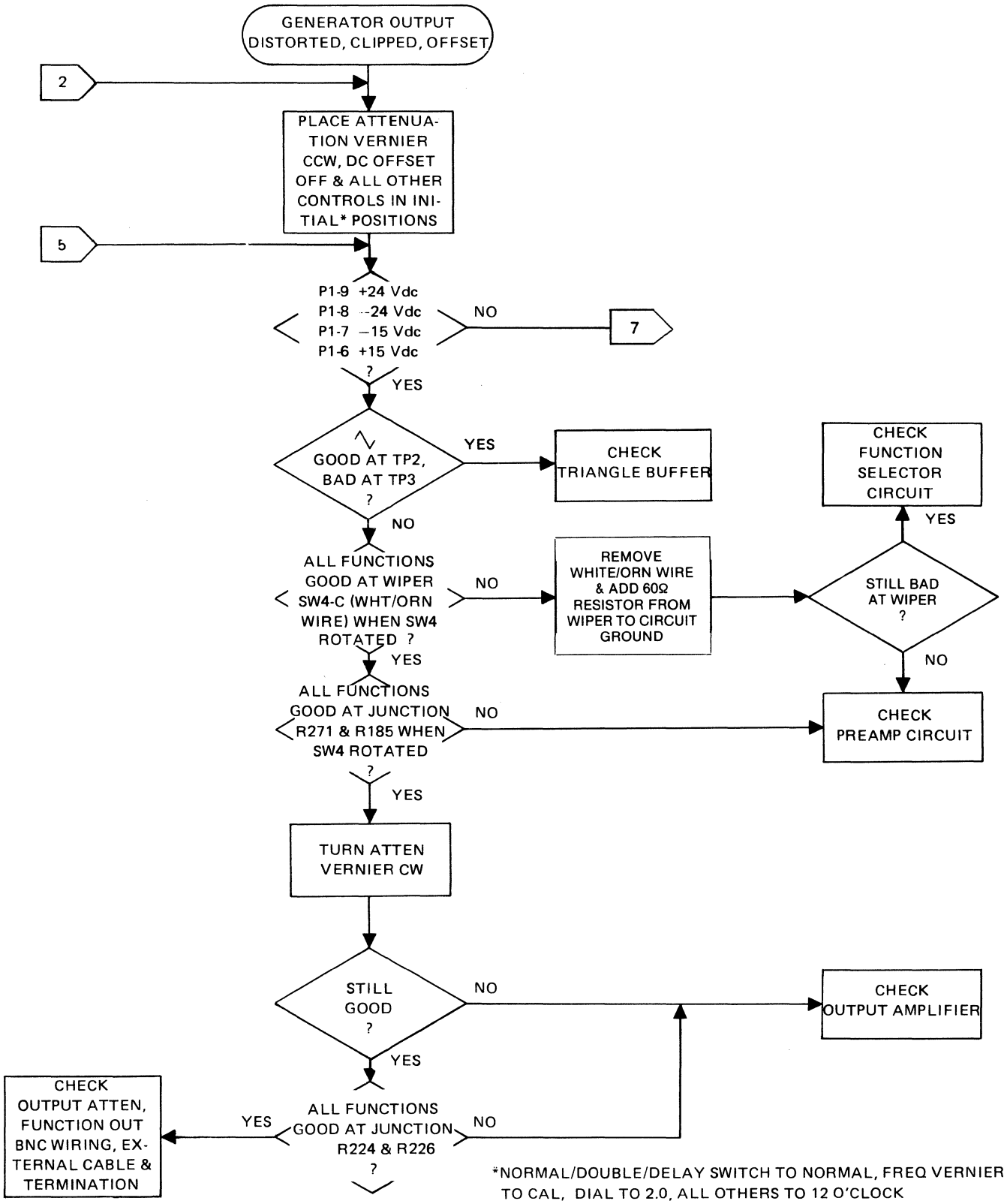
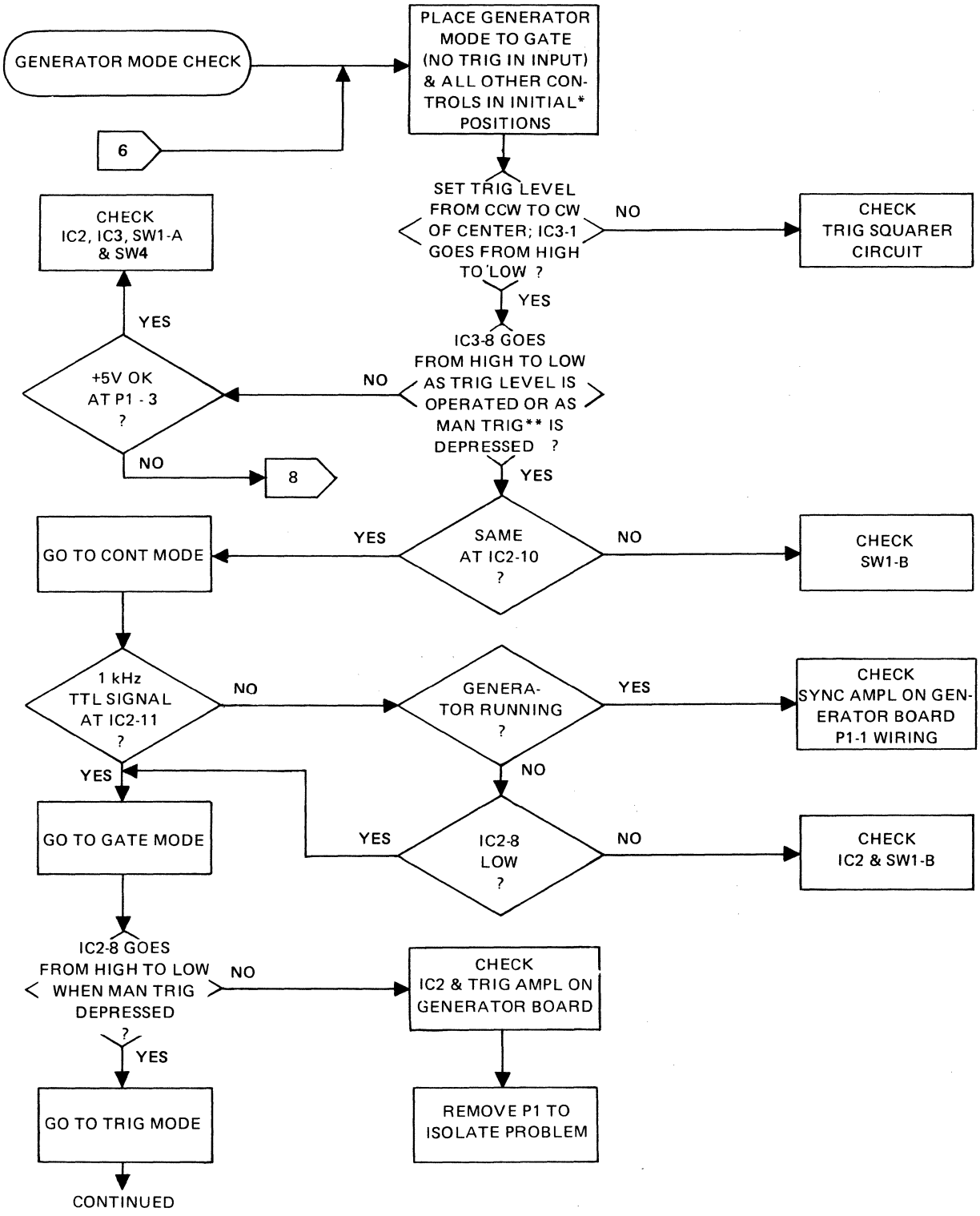



**Figure 6-4. Generator Output Checks, Generator Board**




*NORMAL/DOUBLE/DELAY SWITCH TO NORMAL, FREQ VERNIER TO CAL, DIAL TO 2.0, ALL OTHERS TO 12 O'CLOCK

**RETURN TRIG LEVEL CCW TO OPERATE MANUAL TRIGGER

**Figure 6-5. Trigger and Gate Mode Checks, Trig/Pulse Board (Page 1 of 2)**

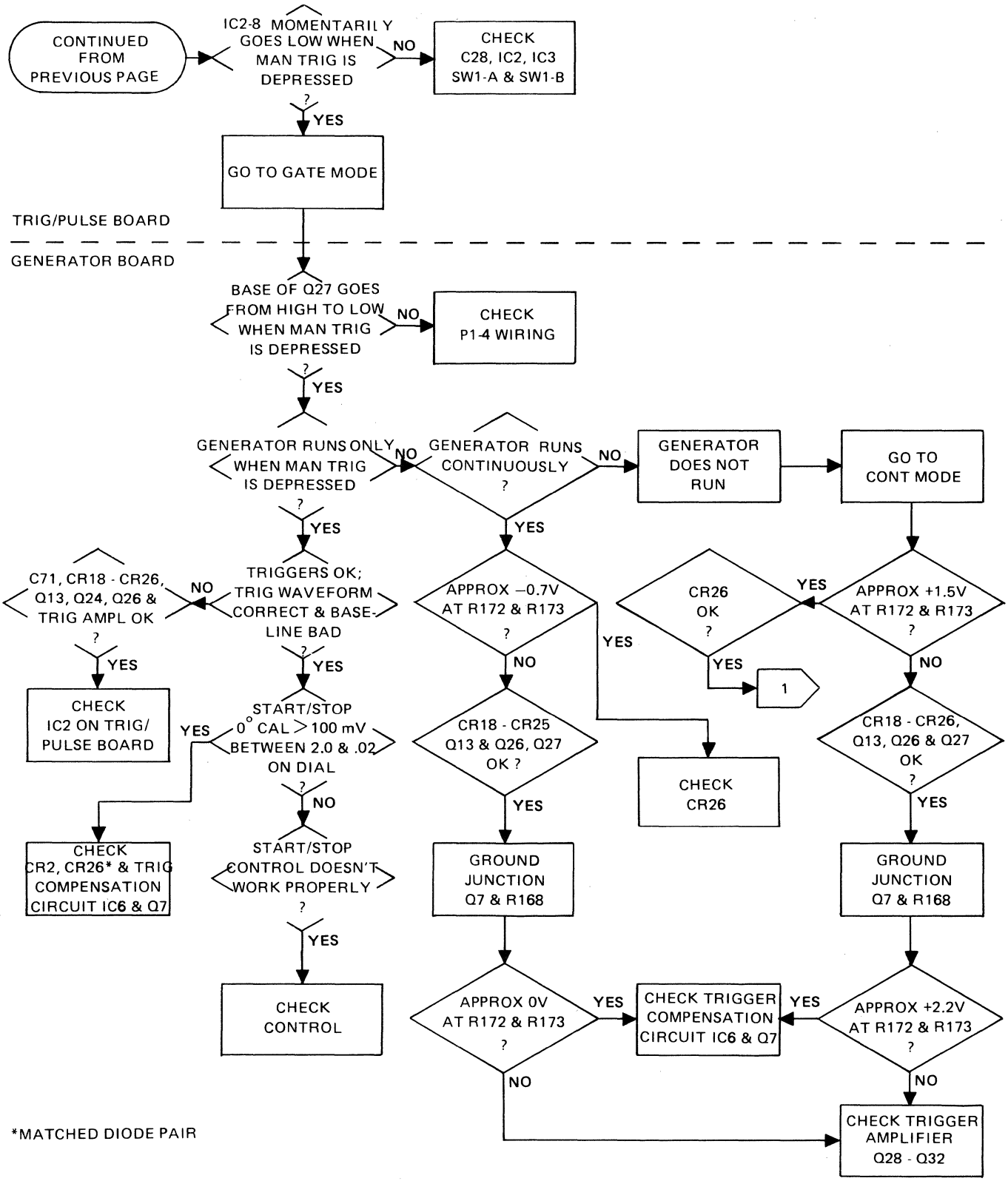



**Figure 6-5. Trigger and Gate Mode Checks, Trig/Pulse Board (Page 2 of 2)**

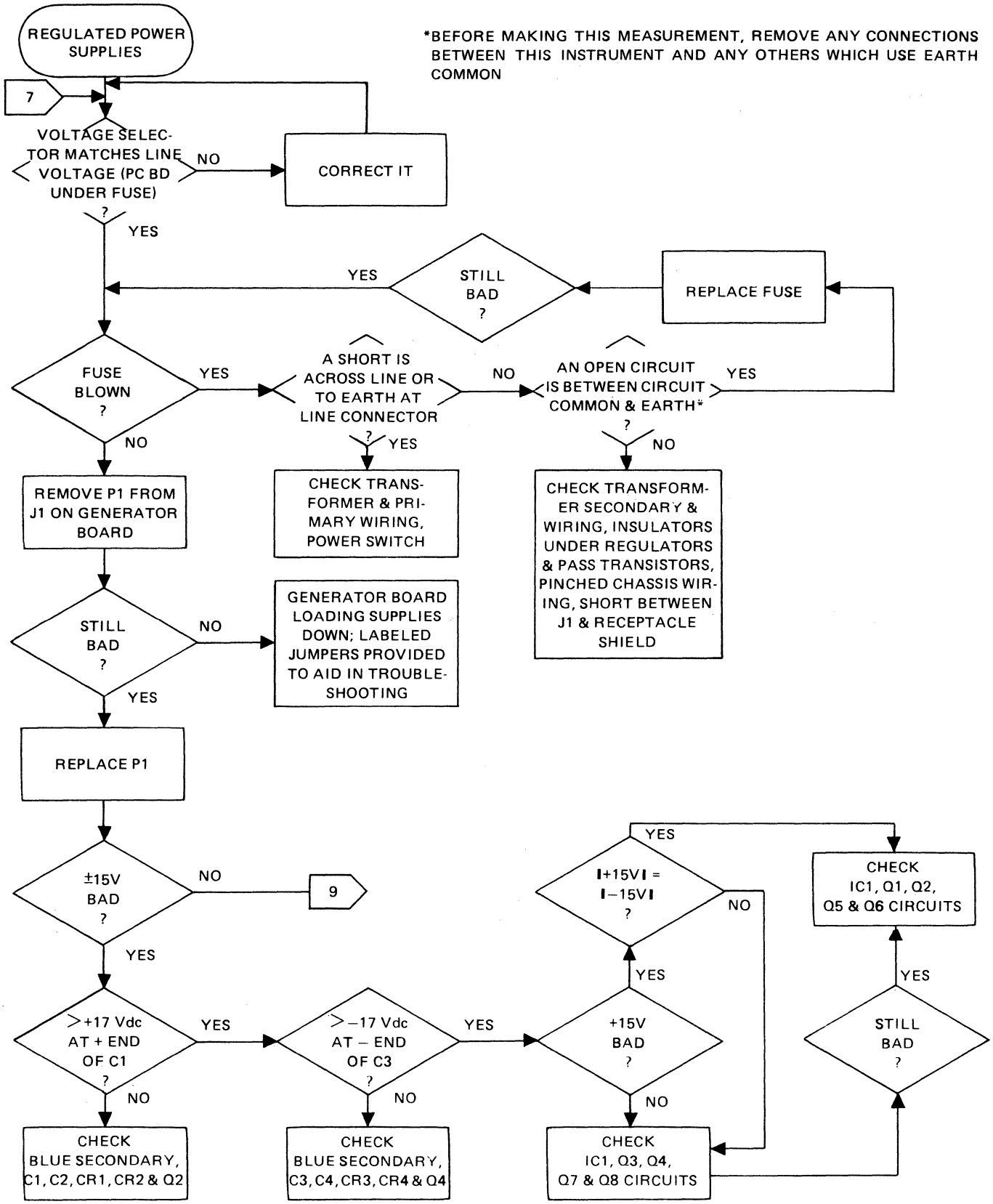



**Figure 6-6. Power supply checks, Trig/Pulse Board (Page 1 of 2)**

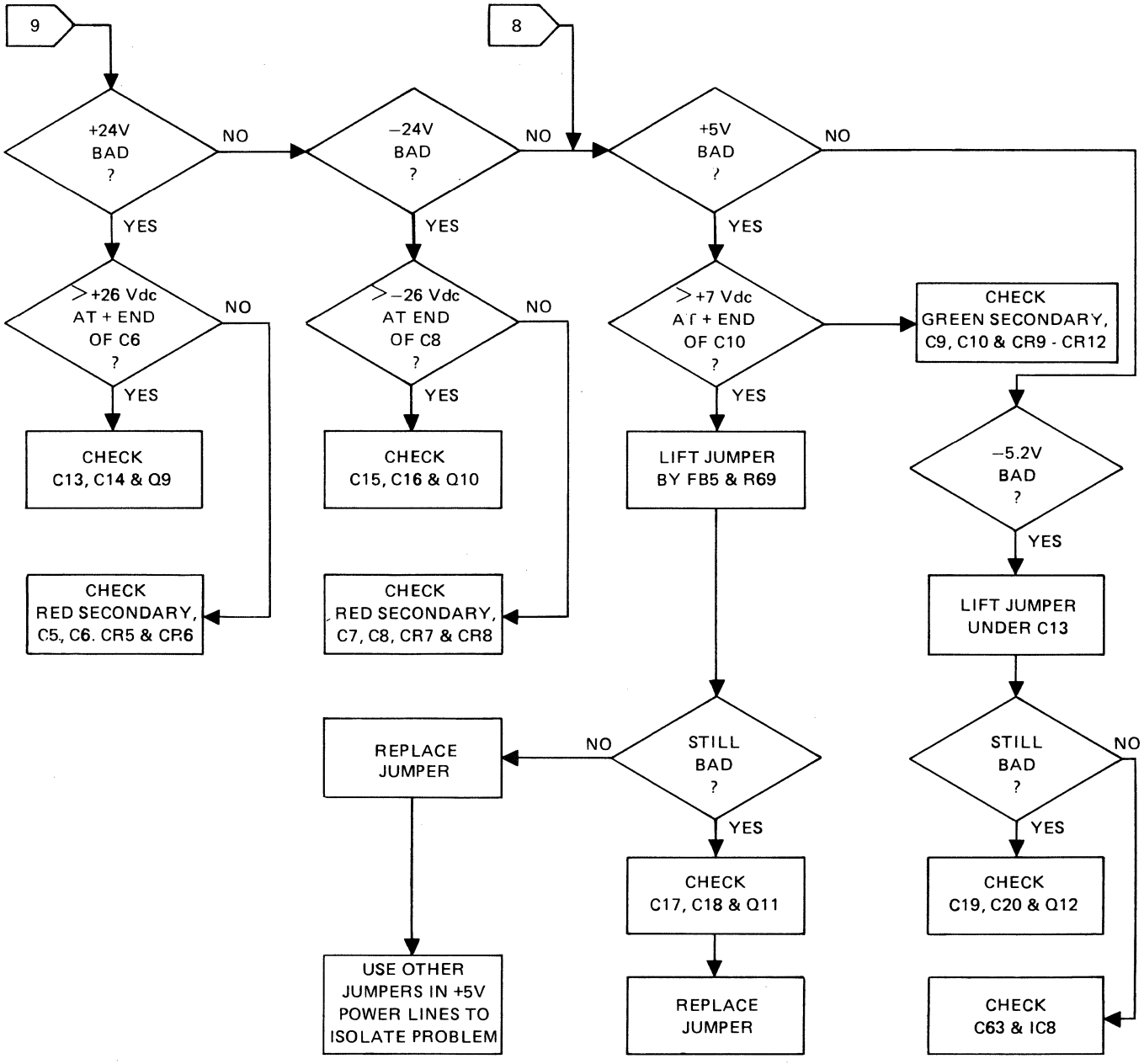



**Figure 6-6. Power Supply Checks, Trig/Pulse Board (Page 2 of 2)**

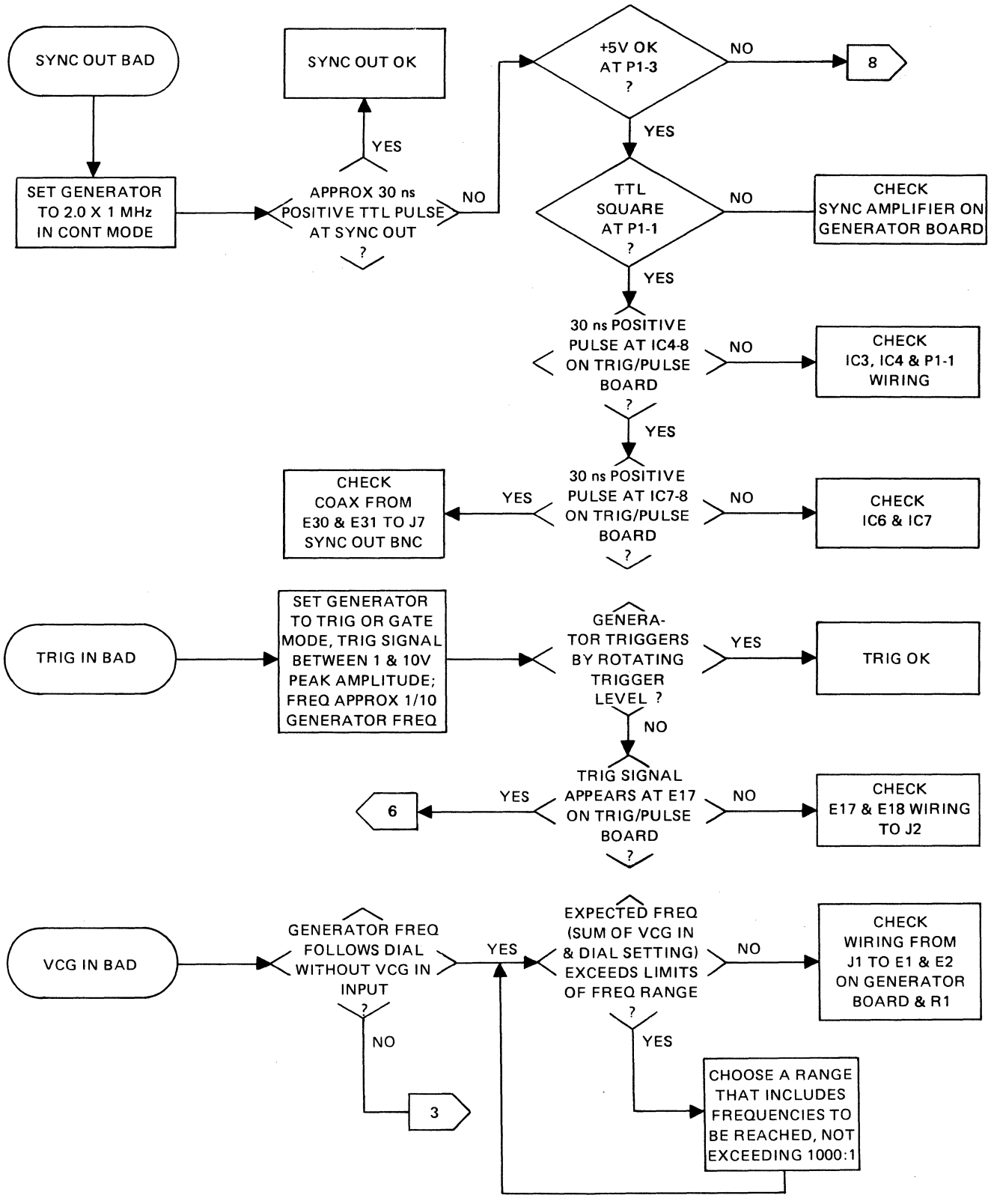



**Figure 6-7. Generator Input and Output Checks (Page 1 of 2)**

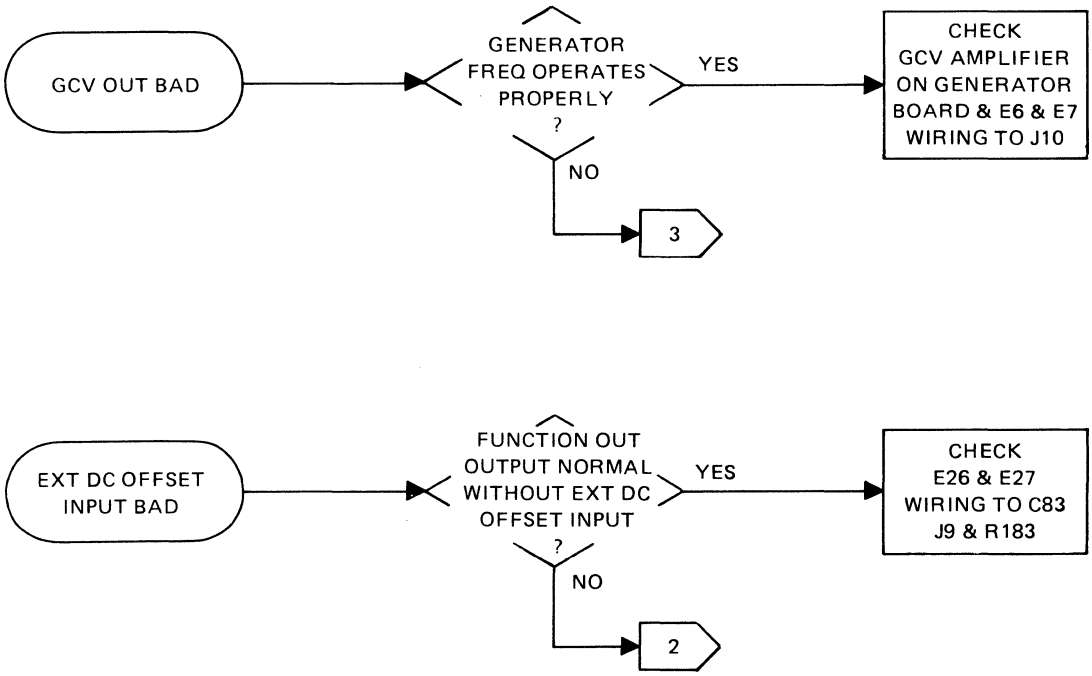



**Figure 6-7. Generator Input and Output Checks (Page 2 of 2)**

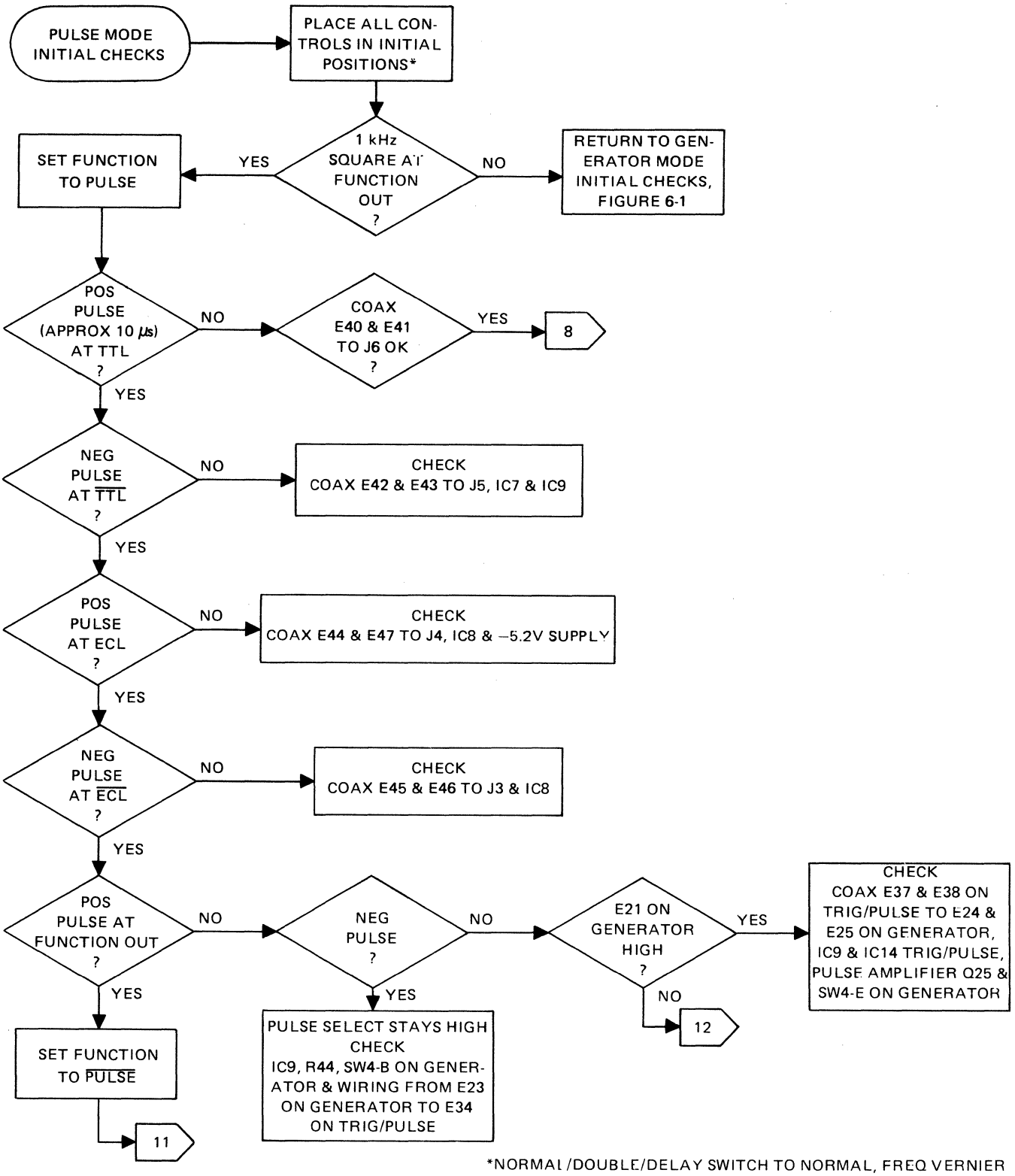



**Figure 6-8. Pulse Mode Checks, Trig/Pulse board (Page 1 of 2)**

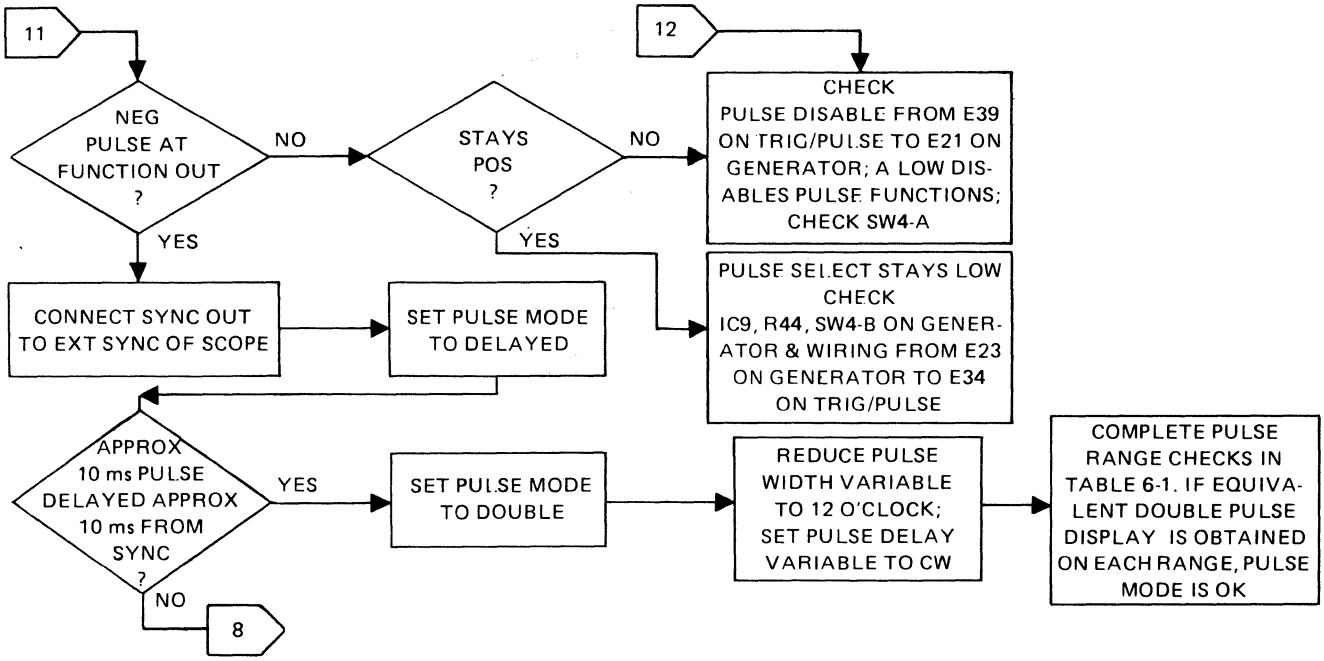



**Figure 6-8. Pulse Mode Checks, Trig/Pulse Board (Page 2 of 2)**

**Table 6-1. Pulse Ranges**

| Pulse Width | Ranging Components | Pulse Delay | Ranging Components | Pulse Period | Scope Horizontal |
|---|---|---|---|---|---|
| OFF | IC5, SW3-A | NA | NA | NA | NA |
| 25 ns ▮ 100 ns | C55, Q19, Q20, SW3-B | 50 ns ▮ 100 ns | C40, Q16, Q17, SW2-B | > 0.5 μs | 0.05 μs/div |
| 100 ns ▮ 1 μs | C56, CR29, CR30 | 100 ns ▮ 1 μs | C41, CR19, CR20 | > 5 μs | 0.5 μs/div |
| 1 μs ▮ 10 μs | C57, CR31, CR32 | 1 μs ▮ 10 μs | C42, CR21, CR22 | > 50 μs | 5 μs/div |
| 10 μs ▮ 100 μs | C58, CR33, CR34 | 10 μs ▮ 100 μs | C43, CR23, CR24 | > 0.5 ms | 50 μs/div |
| 100 μs ▮ 1 ms | C59, CR35, CR36 | 100 μs ▮ 1 ms | C44, CR25, CR26 | > 5 ms | 0.5 ms/div |
| 100 μs ▮ 1 ms | C59, CR35, CR36 | 1 ms ▮ 10 mst | C45, CR27, CR28 | > 5 ms | 0.5 ms/div |
| ⎍ | IC4 - IC6, SW3-A | NA | NA | 0.5 ms | 0.5 ms/div |

†Rotate PULSE DELAY VERNIER ccw for proper display

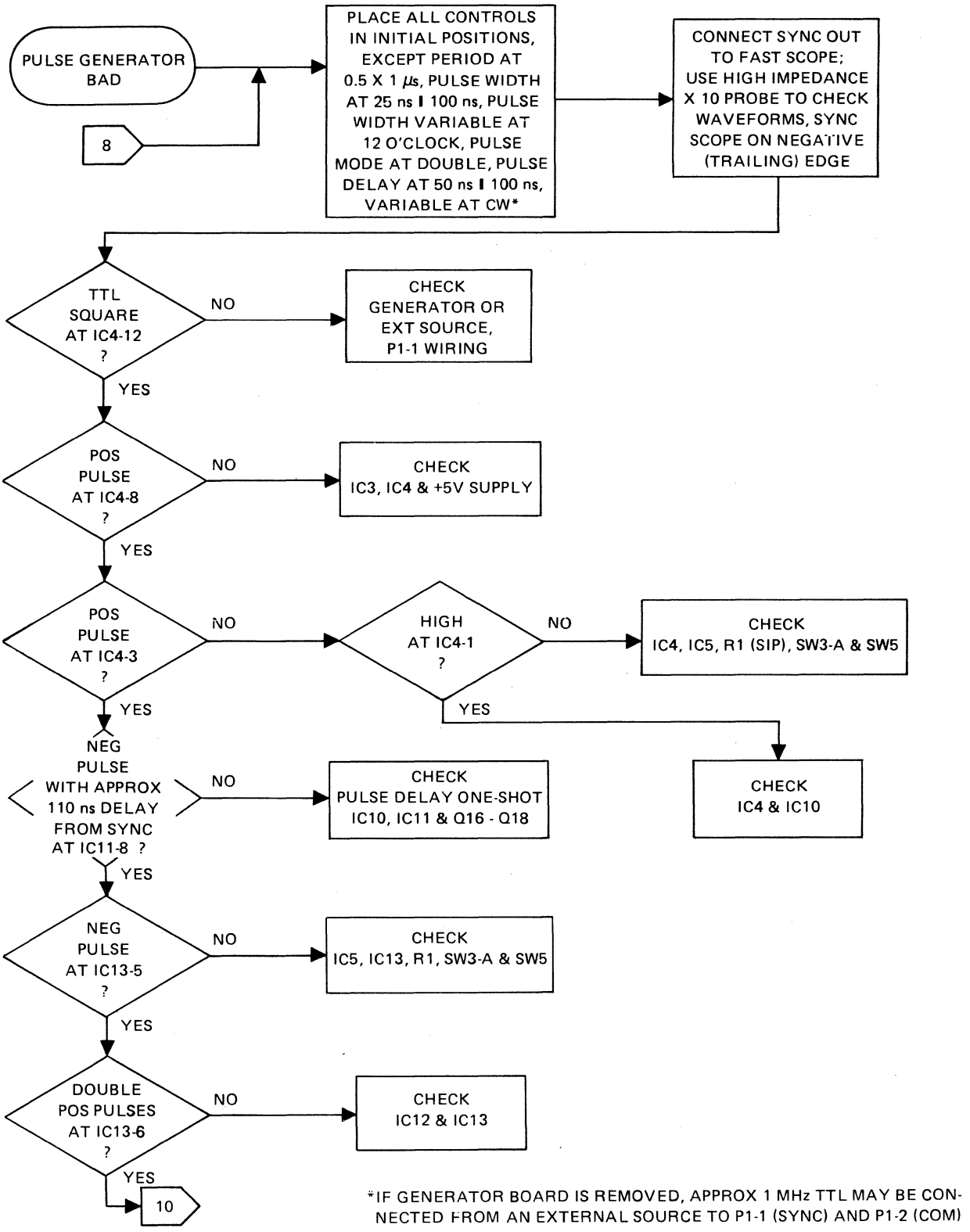



**Figure 6-9. Pulse Generator Checks, Trig/Pulse Board (Page 1 of 2)**

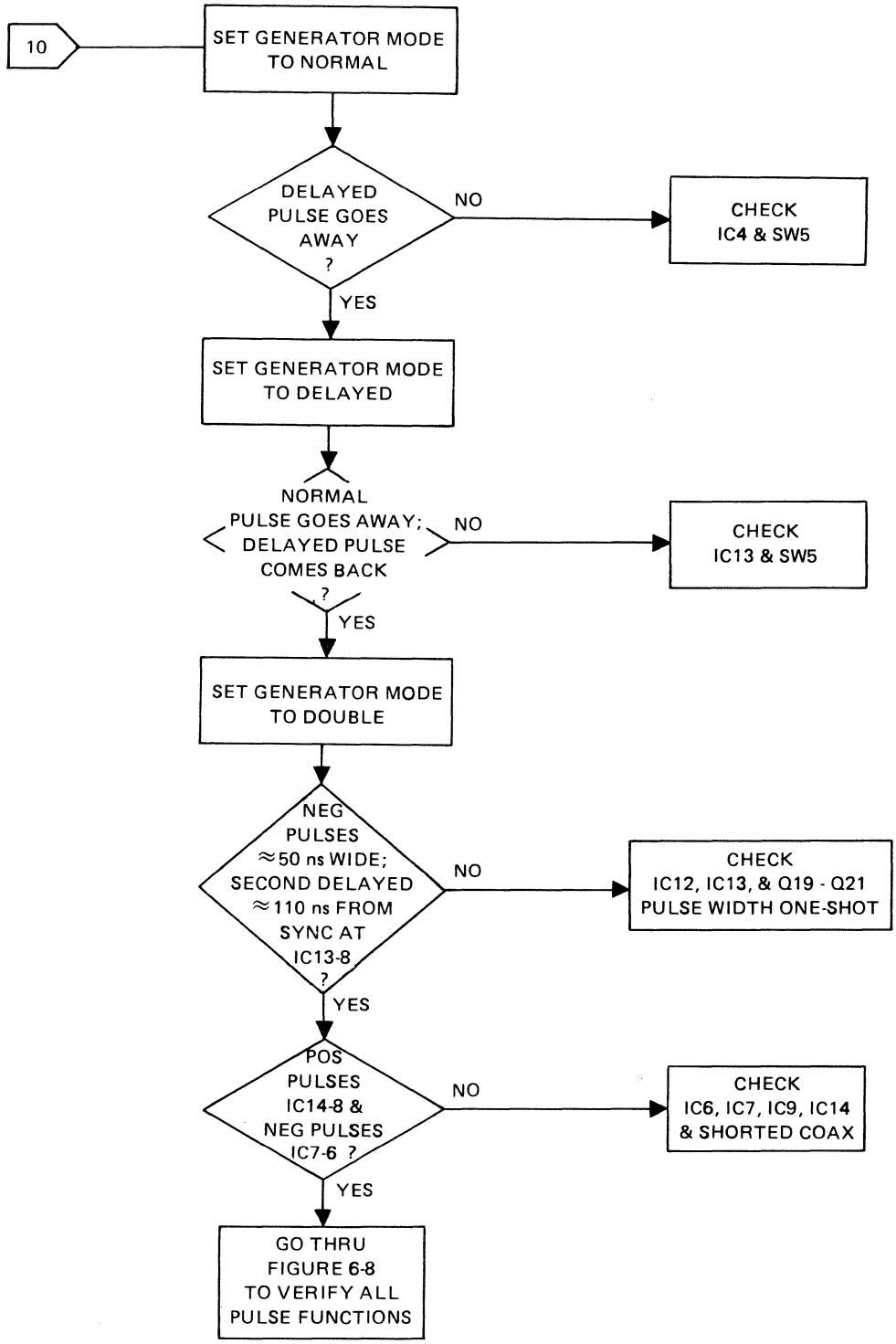



**Figure 6-9. Pulse Generator Checks, Trig/Pulse Board (Page 2 of 2)**

# SECTION 7
# PARTS AND SCHEMATICS

## 7.1 DRAWINGS

The following assembly drawings, schematics and parts lists are in the arrangement shown below.

| Drawings | Drawing No. |
|---|---|
| Instrument Assy & Parts List | 0102-00-0101 |
| Instrument Schematic | 0004-00-0101 |
| Chassis Assy | 0102-00-0575 |
| Chassis Assy Parts List | 1101-00-0575 |
| Generator Board Schematic | 0103-00-0556 |
| Generator Board Parts Locator | 1100-00-0556 |
| Generator Board Assy (sheets 2 & 3) | 0101-00-0556 |
| Generator Board Parts List | 1100-00-0556 |
| Current Limiter Assy & Parts List | 0101-00-1008 |
| Trigger/Pulse Board Schematic | 0103-00-0565 |
| Trigger/Pulse Board Parts Locator | 1100-00-0565 |
| Trigger/Pulse Board Assy (sheet 2) | 0101-00-0565 |
| Trigger/Pulse Board Parts List | 1100-00-0565 |
| Rack Mount Assy & Parts List | 0102-00-0621 |
| Chassis Assembly | 1101-00-3243 |
| Chassis Parts List | 1100-00-3243 |
| Generator Board Schematic | 1104-00-3245 |
| Generator Board Assembly | 1101-00-3245 |
| Generator Board Parts List | 1100-00-3245 |
| Option 001 Timer Assy & Parts List | 0102-00-0221 |
| Option 003 Timer Assy | 0102-00-0442 |
| Option 003 Timer Parts List | 1000-00-0442 |

## 7.2 ORDERING PARTS

When ordering spare parts, please specify part number, circuit reference, next higher assembly and serial number of the unit.

## 7.3 ERRATA

Under Wavetek's product improvement program, the latest electronic designs and circuits are incorporated into each Wavetek instrument as quickly as development and testing permit. Because of the time needed to compose and print instruction manuals, it is not always possible to include the most recent changes in the initial printing. Whenever this occurs, errata pages are prepared to summarize the changes made and are inserted inside the shipping carton with the instrument. If no such pages exist, the manual is correct as printed.

## 7.4 INDEX OF FEDERAL SUPPLY CODES

The following table gives the Federal Supply Code for Manufacturers (FSCM) for manufacturers cited in the parts lists.

| MFGR Code | Manufacturer | FSCM |
|---|---|---|
| AMP | AMP Inc.<br>P.O. Box 3608<br>Harrisburg, PA 17105 | 00779 |
| ANDEV | Analog Devices Inc.<br>221 Fifth Street<br>Cambridge, MA 02142 | 24355 |
| ARCO | Arco Electronics Inc.<br>Community Drive<br>Great Neck, NY 11022 | 84171 |
| BECK | Beckman Instrument Inc.<br>2500 Harbor Blvd.<br>Fullerton, CA 92634 | 71738 |
| BOURN | Bourns Inc.<br>1200 Columbia Ave.<br>Riverside, CA 92507 | 32997 |
| C&K | C&K Components Inc.<br>103 Morse Street<br>Newton, MA 02158 | 09353 |
| CRL | Centralab-Division<br>of Globe Union<br>Milwaukee, WI 53201 | 71590 |
| CHIM | Chicago Miniature Lamp<br>Works<br>4433 Ravenwoods Ave.<br>Chicago, IL 60640 | 71744 |
| CINCH | Cinch Manufacturing Co.<br>1026 S. Homan Street<br>Chicago, IL 60624 | 71785 |
| CRL | Centralab-Division<br>of Globe Union<br>P.O. Box 591<br>Milwaukee, WI 53201 | 71590 |

| MFGR Code | Manufacturer | FSCM |
|---|---|---|
| CORCM | Corman Inc.<br>2635 N. Kildars Ave.<br>Chicago, IL 60639 | 05245 |
| CTS | CTS Corporation<br>Elkhart, IN 46514 | 71450 |
| FAIR | Fairchild Semiconductor Division<br>313 Frontage Road<br>Mountain View, CA 94043 | 07263 |
| FERRX | Ferroxcube Corporation of America<br>Mount Marion Road<br>Saugerties, NY 12477 | 02114 |
| GAVTT | Gavitt Wire & Cable<br>455 N. Quince Street<br>Escondido, CA 92025 | 23499 |
| IMB | IMB<br>15401 S. Carments Rd.<br>Santa Fe Springs, CA 90670 | 27556 |
| KING | Kings Electronics Co. Inc.<br>40 Marbledale Road<br>Tuckahoe, NY 11223 | 91836 |
| LITFU | Littelfuse Inc.<br>800 E. Northwest Highway<br>Des Plaines, IL 60016 | 79515 |
| MAL | Mallory Capacitor Co.<br>3029 E. Washington St.<br>P.O. Box 372<br>Indianapolis, IN 46206 | 90201 |
| METRS | Milton Ross Company<br>511 Second St. Pike<br>Southhampton, PA 18966 | 07047 |
| MICRO | Micro Semiconductor Corporation<br>11250 Playa Court<br>Culver City, CA 90230 | 14552 |
| MOLEX | Molex Products Co.<br>5224 Katrine Avenue<br>Docuners Grove, IL 60515 | 27264 |
| MOT | Motorola Inc.<br>Semiconductor Production Div<br>5005 East McDowell Rd.<br>Phoenix, AZ 85008 | 04713 |
| PACRD | Packard Electric Division<br>408 Dana Street N.E.<br>Warren, OH 44481 | 77060 |
| RCA | RCA<br>Harrison, NJ 07029 | 86684 |
| ROGAN | Rogan Bros., Inc.<br>8031 N. Monticello St.<br>Skokie, IL 60076 | 86797 |
| SEMTEC | Semitech Corporation<br>652 Mitchell Road<br>Newbury Park, CA 91320 | 14099 |
| SMITH | Herman H. Smith<br>812 Snediker Avenue<br>Brooklyn, NY 11207 | 83330 |
| SPRAG | Sprage Electric Co.<br>North Adams, MA 01247 | 56289 |
| STKPL | Stackpole Components<br>P.O. Box 14466<br>Raleigh, NC 27610 | 29604 |
| THOMN | Thompson Industries Inc.<br>1029 Plandome Road<br>Manhasset, NY 11030 | 96881 |
| TI | Texas Instruments<br>North Central Exprwy<br>Dallas, TX 75231 | 01295 |
| TRIKO | Trico Products Corp.<br>817 Washington Street<br>Buffalo, NY 14203 | 75915 |
| TRW | TRW Electronic Components Division<br>666 Garland Place<br>Des Plaines, IL 60016 | 18486 |
| UNICP | Unicorp | 44729 |
| USECO | USECO Inc.<br>Mt. Vernon, NY | 15849 |
| WVTK | Wavetek<br>9045 Balboa Avenue<br>San Diego, CA 92123 | 23338 |

## 7.5 CAPACITOR VARIANCE

Because of changes in part suppliers, certain capacitor values in your instrument may differ from those called out in the schematics and parts lists. These value variations are well within tolerable limits for correct circuit performance.

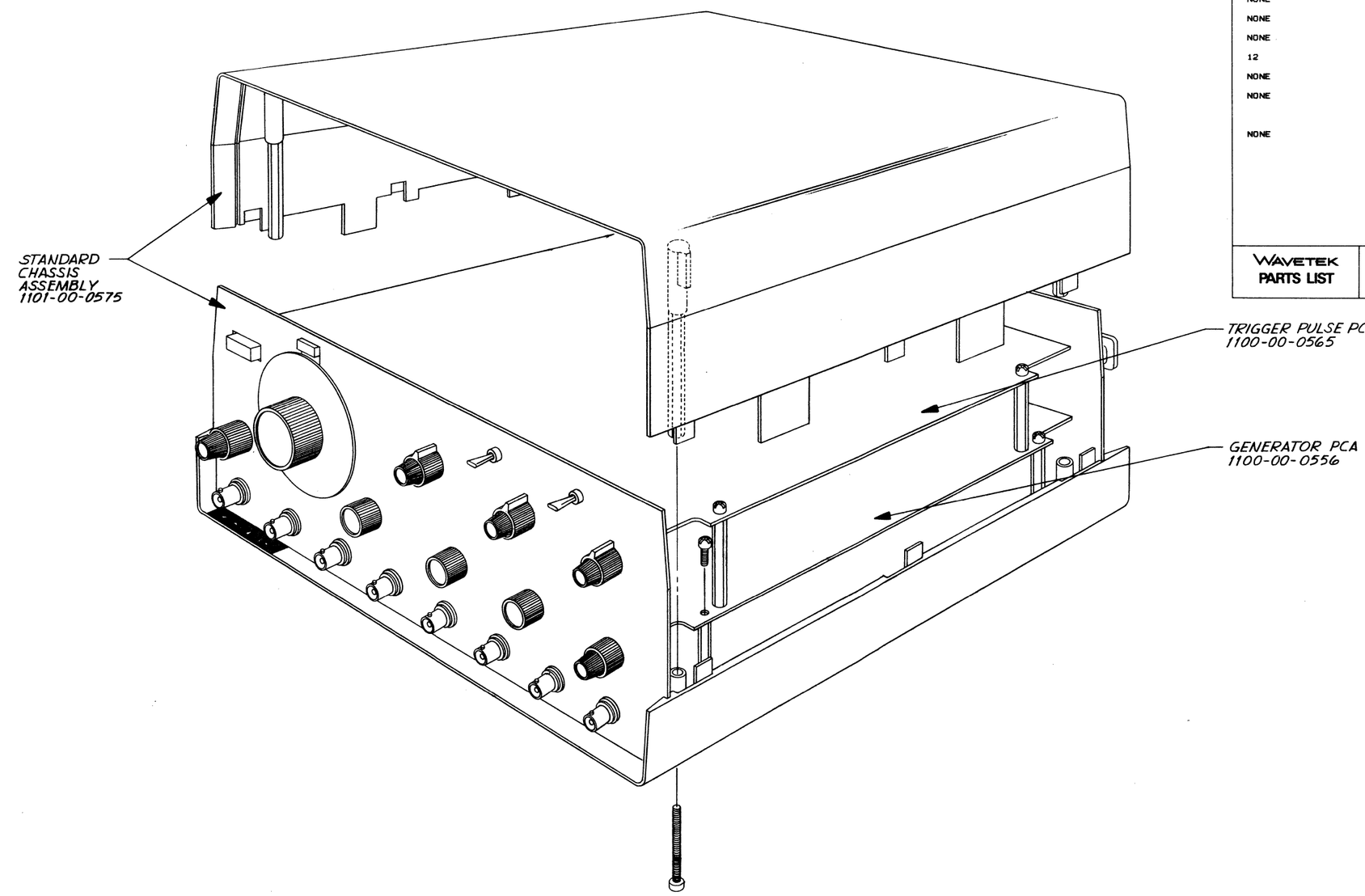
The following capacitor variations may occur in your instruments:

| Assembly | Part | Ref Designation | Values |
|---|---|---|---|
| 1100-00-0565 | 1500-35-0003 | C-14, C-16 | 50 μF, 50V or 47 μF, 50V |
| 1100-00-0565 | 1500-35-0103 | C-6, C-8 | 500 μF, 50V or 470 μF, 50V |
| 1100-00-0556 | 1500-72-7602 | C-95, C-98 | 27 μF, 35V or 33 μF, 35V |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| — | 4053, 4058 (CL III) | A.C.T. | 11-21-83 | |
| A | 6146 | A.T. | 2/24/84 | G.A.R.T. |

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | SCHEMATIC, INSTRUMENT | 0004-00-0101 | WVTK | 0004-00-0101 | 1 |
| NONE | FINAL CAL PROCEEDURE | 0006-00-0101 | WVTK | 0006-00-0101 | 1 |
| NONE | ASSY DRWG, MODEL 145 | 0102-00-0101 | WVTK | 0102-00-0101 | 1 |
| NONE | ATP FOR MODEL 145 AND OPTIONS | 1002-00-0101 | WVTK | 1002-00-0101 | 1 |
| NONE | PCA, GENERATOR | 145-556 | WVTK | 1100-00-0556 | 1 |
| NONE | STD CHASSIS | 145-575 | WVTK | 1101-00-0575 | 1 |
| NONE | KIT, FINAL ASSY -145 | 145-1554 | WVTK | 1206-00-1554 | 1 |
| 12 | I.D. LABEL | 801-9090 | WVTK | 1400-00-9090 | 1 |
| NONE | 101-7(F) INSERT | 101-7 | WVTK | 3300-00-0003 | 1 |
| NONE | CARTON 15 1/4X15 1/4X9 3/4, 200#, SINGLE, RSC | 101-7A | WVTK | 3300-01-0003 | 1 |
| NONE | MODEL 145 INSTRUCTION MANUAL 145-STD, 145-S-620, 145-S-872, 145-S-1021 | MANUAL-145 | WVTK | 1300-00-0101 | 1 |

| WAVETEK PARTS LIST | TITLE: MODEL 145 20MHZ PULSE FUNCTIONGENERATOR | ASSEMBLY NO. 1000-00-0101 PAGE 1 | REV AA |
|---|---|---|---|



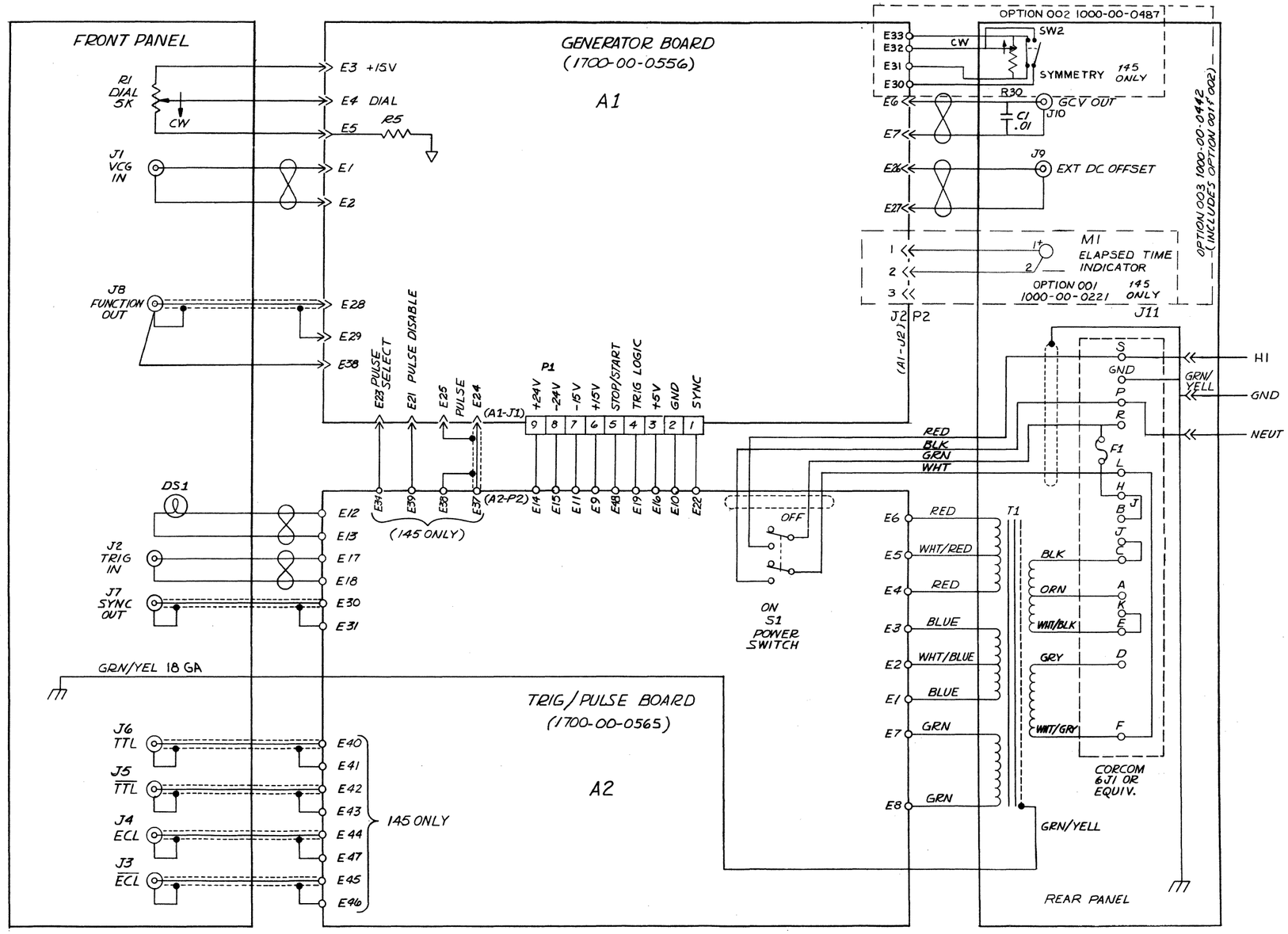

1. FOR PARTS LIST SEE 1000-00-0101

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER 11-8-83 | WAVETEK SAN DIEGO, CALIFORNIA | |
| MATERIAL — | PROJ ENGR 11/21/83 | TITLE: ASSEMBLY MODEL 145 | |
| FINISH WAVETEK PROCESS — | RELEASE APPROV 11/21/83 | | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO. 145 | DWG NO. 0102-00-0101 REV A |
| | SCALE — | CODE IDENT 23338 | SHEET 1 OF 1 |

0102-00-0101 A

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| B | ECN 1800 | JRM | 9-5-8 | |
| C | ECN 1801 | JRM | 9-6-8 | |
| D | ECN 2723 AUDIT | LOU | 5-1981 | |
| E | ECN 3881 | FN | 8/1/86 | |
| F | ECN6153 | DAM | 3-8-88 | |
| G | 9447 | | 7/5/91 | |



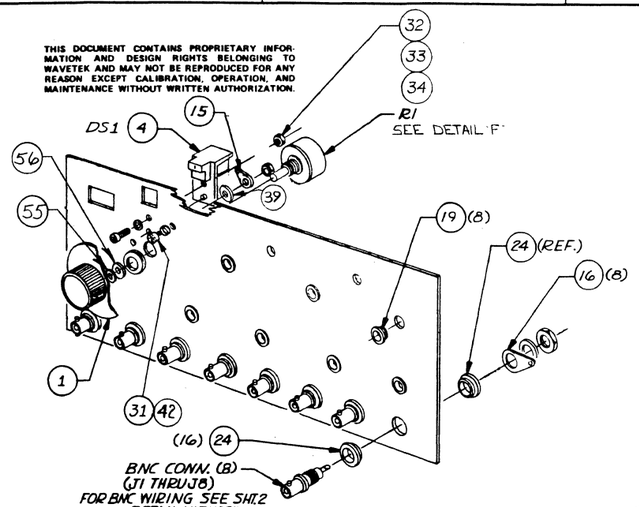

3/16A 220-240VAC
1. F1 - 3/8A 100-120 VAC

NOTE UNLESS OTHERWISE SPECIFIED

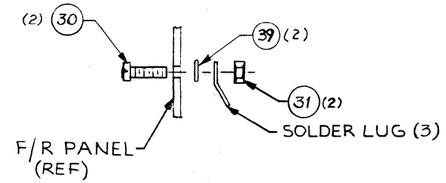
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 11-976 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE INSTRUMENT SCHEMATIC |
| | RELEASE APPROV | 2-27-91 | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1 .XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 143/145 |
| | SCALE | | DWG NO. 0004-00-0101 REV G |
| | CODE IDENT 23338 | | SHEET 1 OF 1 |

NOTES:
ALL CONNECTIONS TO BE MECHANICALLY SECURE PRIOR TO SOLDERING GROUND WIRES.

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| B | ECN 1806 | JRM | 9-1-78 | |
| C | " 1837 | LDH | 1-16-79 | |
| D | ECN 2091, 2124 | DC | 12-3-80 | |
| E | " 2179 | LOU | 1-23-81 | |
| F | 2559 | LOU | 2-12-81 | |
| G | 2724 | LOU | 5-19-81 | |
| H | 2986 | DC | 12-6-82 | |
| — | 3360 (II) | JM | 9/29/83 | |
| — | 3435 (III) | JM | 3-22-84 | |
| J | ECN 3881 | JP | 9-4-85 | |
| — | 4085, 4105 (CL III) | JT | 1-21-86 | |
| K | ECN 4938, 6146 | JT | 2-19-86 | A.R.T. |
| L | 7322 | JT | 5-2-86 | A.R.T. |
| M | 8087 | M.C. 3-17-87 | 3-24-87 | H.N. |
| N | 9228 | M.C. 10-19-87 | 11-4-87 | A.R.T. |
| P | ECO # 90-337 | MS | 5-23-90 | YM |

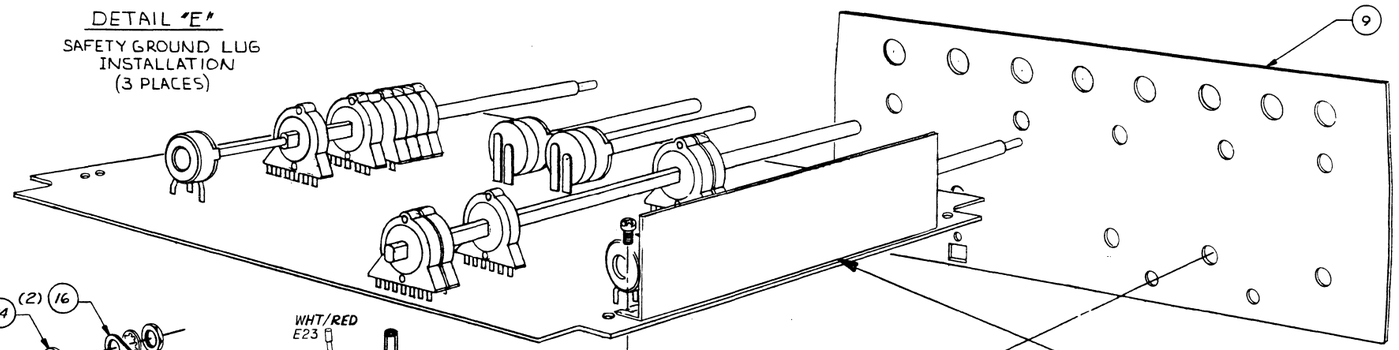


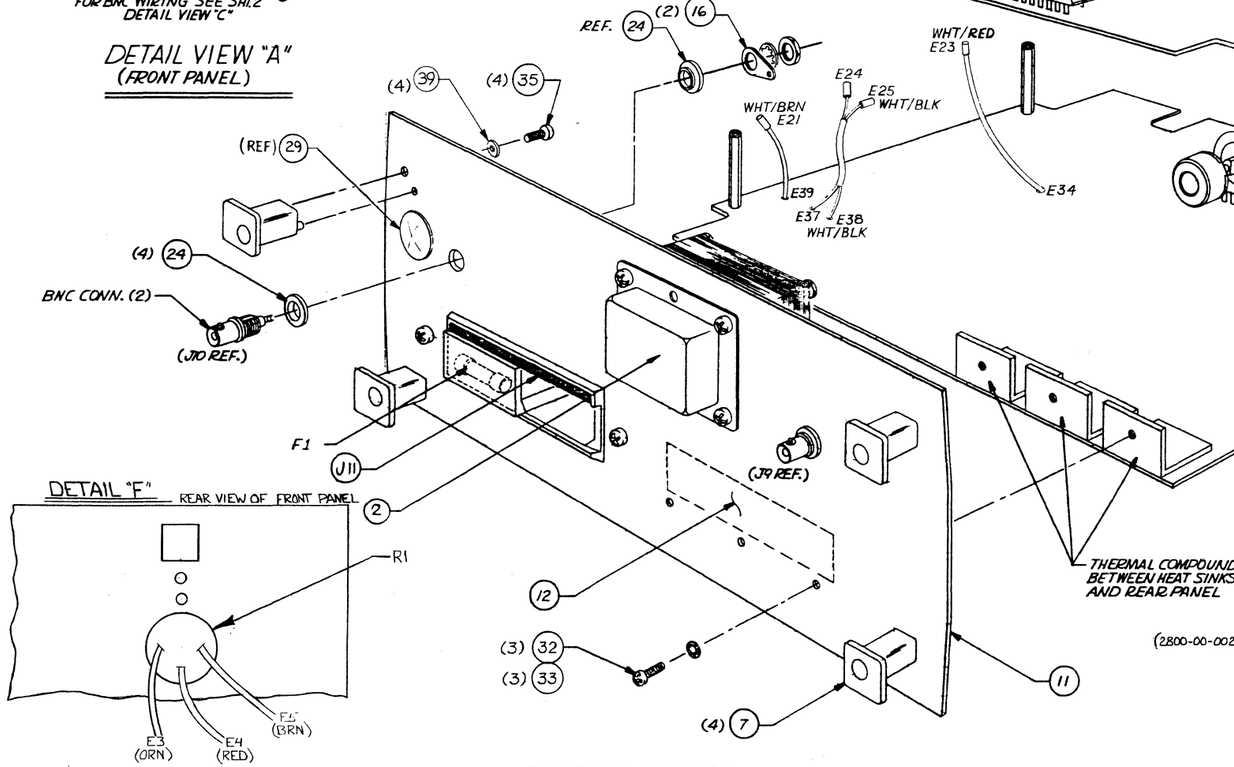

DETAIL VIEW "A"
(FRONT PANEL)




DETAIL "E"
SAFETY GROUND LUG INSTALLATION (3 PLACES)

SEE DETAIL VIEW "A" (FOR FRONT PANEL)

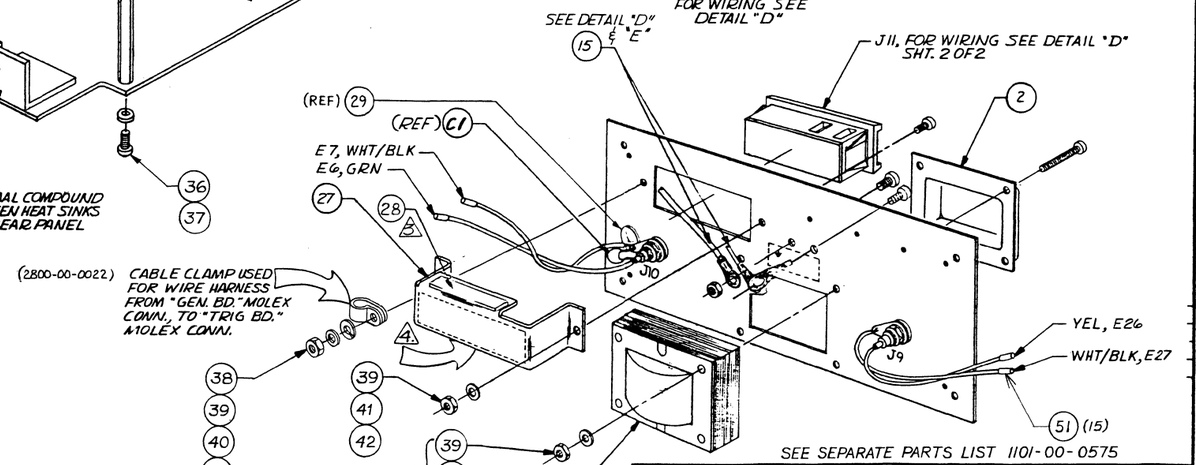



DETAIL "F" REAR VIEW OF FRONT PANEL




DETAIL VIEW "B"
REAR PANEL
FOR WIRING SEE DETAIL "D"




SEE DETAIL VIEW "B" (FOR REAR PANEL)

SEE SEPARATE PARTS LIST 1101-00-0575

5. AFTER INSTALLATION OF FRONT AND REAR FEET, APPLY (1) DROP OF LOCTITE 414 (OR EQUIV.) TO SCREW THREADS (6). ALLOW 1 HR. MIN. TO DRY WITH FEET UP.

4 APPLY INSULATOR TO BOTTOM SIDE AS ARROW INDICATES

3 INSTALL ITEM 28 USING DOW CORNING RTV 3140 TO COVER. THEN APPLY INSULATOR. SEE 4

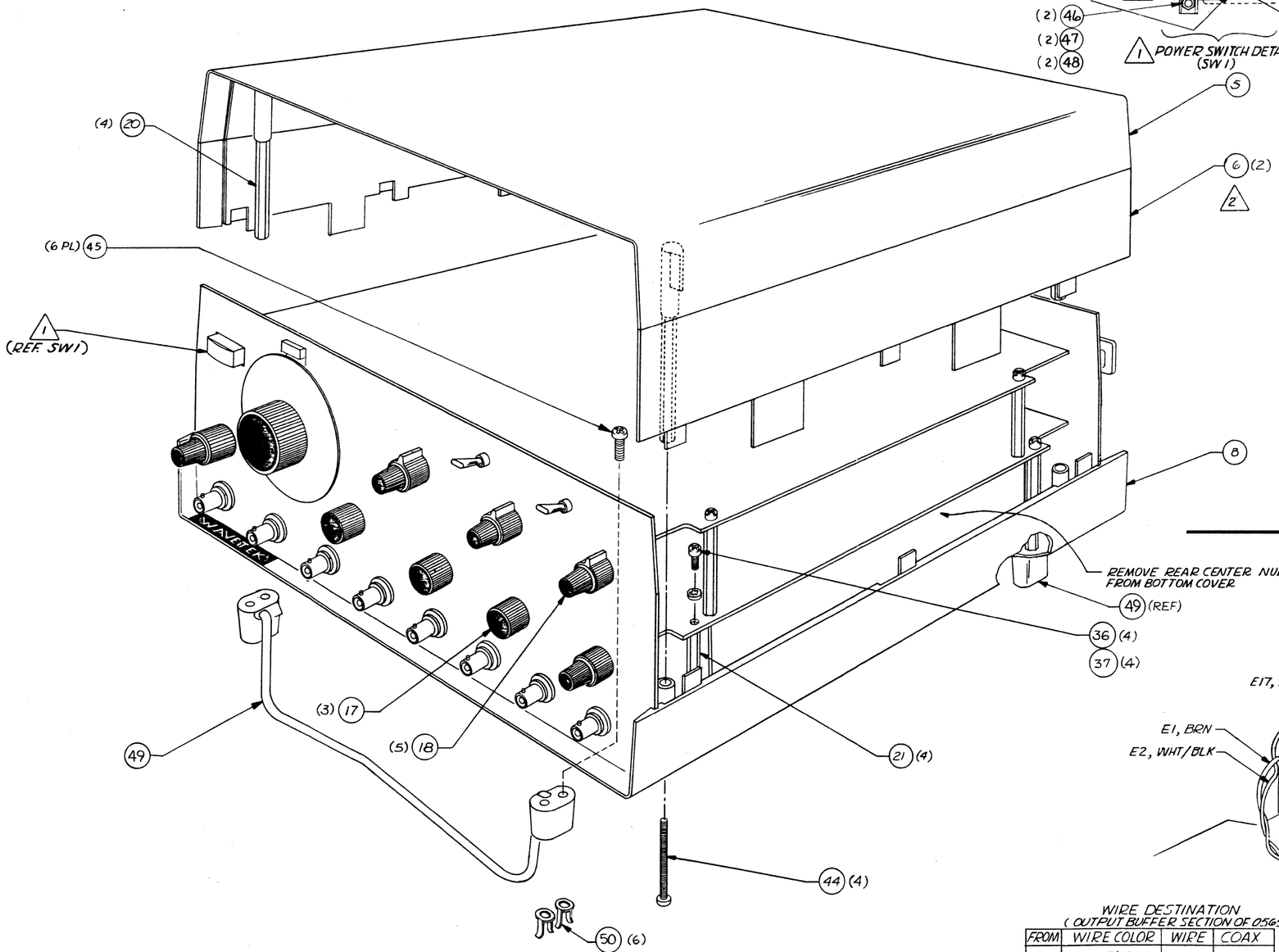
2 CEMENT ITEM 6 (2) TO ITEM 5 (TYP. BOTH SIDES)

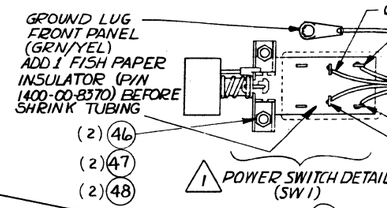
1 MOUNT SWITCH TO P.C. BOARD PRIOR TO INSTALLING FRONT PANEL USE NO. 2-56 x 1/4 PAN HEAD SCREW WITH NUT (2)

NOTE: UNLESS OTHERWISE SPECIFIED

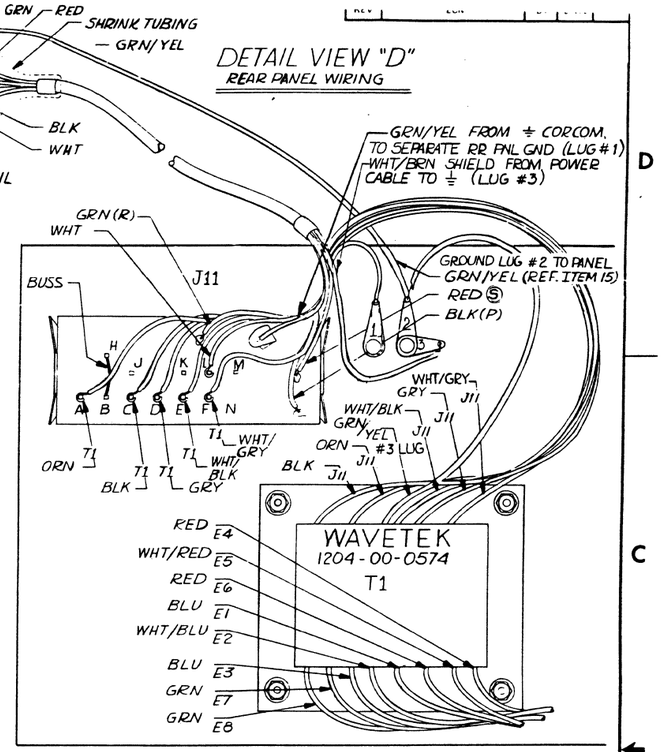
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 1-7-77 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: ASSEMBLY STANDARD CHASSIS |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1° XX ± .030 | | |
| | DO NOT SCALE DWG | MODEL NO. 145 | DWG NO. 0102-00-0575 REV P |
| | SCALE | CODE IDENT 23338 | SHEET 1 OF 2 |

0102-00-0575 P

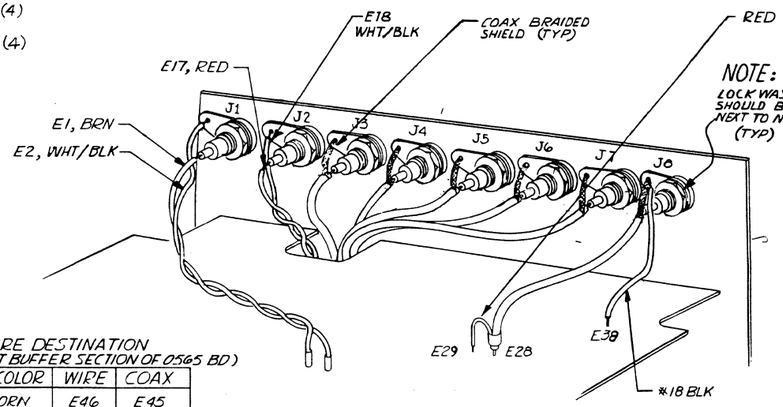



## DETAIL VIEW "D"
REAR PANEL WIRING




## DETAIL VIEW "C"
BNC CONN. WIRING, FRONT PANEL




WIRE DESTINATION
( OUTPUT BUFFER SECTION OF 0565 BD )

| FROM | WIRE COLOR | WIRE | COAX |
|---|---|---|---|
| J3 | WHT/ORN | E46 | E45 |
| J4 | WHT/YEL | E47 | E44 |
| J5 | WHT/GRN | E43 | E42 |
| J6 | WHT/BLU | E41 | E40 |
| J7 | WHT/VIO | E31 | E30 |

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 11-8-77 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | 3/20/95 | TITLE ASSEMBLY STANDARD CHASSIS |
| | RELEASE APPROV | 3-23-77 | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | | |
| | SCALE | MODEL NO 145 | DWG NO 0102-00-0575 REV P |
| | | CODE IDENT 23338 | SHEET 2 OF 2 |

0102-00-0575 P

115665



| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CHASSIS | 0102-00-0575 | WVTK | 0102-00-0575 | 1 |
| NONE | PCA, TRIGGER/PULSE | 145-565 | WVTK | 1100-00-0565 | 1 |
| NONE | ASSY, FRONT PANEL -145 | 145-1555 | WVTK | 1206-00-1555 | 1 |
| NONE | ASSY, REAR PANEL -145 | 145-1556 | WVTK | 1206-00-1556 | 1 |
| 27 | SHIELD, PWR | 801-6210 | WVTK | 1400-00-6210 | 1 |
| NONE | INSULATOR PLATE REF: 3200-03-0004 | 145-3931 | WVTK | 1400-01-3931 | 1 |
| 18 | COAX KNOB SET | RB-67-1-SB+O-M-9 | RDGAN | 2400-01-0009 | 3 |
| NONE | CLAMP, CABLE | E-4 | RICH | 2800-00-0022 | 1 |
| 48 | WASHER, LOCK, SPLIT S/S #2 | MS35338-134 | MS | 2800-45-2000 | 2 |
| 33 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 3 |
| 39 | WASHER, LOCK, REG S/S #6 | MS 35338-136 | CMRCL | 2800-45-6000 | 9 |
| 40 | WASHER, FLAT, SS, #6 LARGE OUTLINE | AN 960C6 | CMRCL | 2800-46-6001 | 1 |
| 46 | SCREW PLPS PAN M/S 18-8 S/S 2-56X1/4 | SCREW PH 2-56X1/4S/S | CMRCL | 2800-48-2104 | 2 |

WAVETEK PARTS LIST | TITLE STD CHASSIS | ASSEMBLY NO. 1101-00-0575 | REV P



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CHASSIS | 0102-00-0575 | WVTK | 0102-00-0575 | 1 |
| NONE | DIAL ASSY-145 | 1201-00-1885 | WVTK | 1201-00-1885 | 1 |
| 4 | INDICATOR, DIAL | 180-303 | WVTK | 1400-00-4970 | 1 |
| 9 | PANEL, FRONT | 145-6770 | WVTK | 1400-00-6770 | 1 |
| J1 J2 J3 J4 J5 J6 J7 J8 | CONN BNC | KC-7946 | KING | 2100-01-0002 | 8 |
| 16 | SOLDER LUG | 1497 | SMITH | 2100-04-0012 | 8 |
| 15 | SOLDER LUG | 11A144 | ZIER | 2100-04-0025 | 1 |
| 19 | BUSHING NYLINER | 4L2FF | THOMN | 2800-01-0002 | 8 |
| 24 | WASHER, SHOULDER, WHITE | 2668 | SMITH | 2800-27-0004 | 16 |
| 55 | WASHER, WAVE SPRING | 5804-133-1 | SEA | 2800-28-0021 | 1 |
| 56 | WASHER, FLAT, BRASS, .025 ID, .400 OD | 5714-62-32 | SESTM | 2800-28-0022 | 1 |
| 33 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 1 |
| 32 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 1 |
| 42 | SCREW PLPS PAN M/S 18-8 S/S 6-32X3/8 | MS 51957-28 | CMRCL | 2800-48-6106 | 1 |
| 34 | NUT, MACHINE SCREW, | NAS 671C4 | CMRCL | 2800-50-4100 | 1 |

WAVETEK PARTS LIST | TITLE ASSY, FRONT PANEL -145 | ASSEMBLY NO. 1206-00-1555 | REV B



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CHASSIS | 0102-00-0575 | WVTK | 0102-00-0575 | 1 |
| T1 | TRANSFORMER | 143-574 | WVTK | 1204-00-0574 | 1 |
| NONE | ASSY, CONDUCTOR CABLE 143-145 | 143-145-1959 | WVTK | 1207-00-1959 | 1 |
| 2 | END BELL | 1400-00-0174 | WVTK | 1400-00-0174 | 1 |
| 7 | POST | 180-302 | WVTK | 1400-00-5020 | 4 |
| 11 | PANEL, REAR | 145-6760 | WVTK | 1400-00-6760 | 1 |
| NONE | INSULATOR, PWR SWITCH REF: 1600-99-0001 | 801-8370 | WVTK | 1400-00-8370 | 1 |
| C1 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNG | 1500-01-0310 | 1 |
| J10 J9 | CONN BNC | KC-7946 | KING | 2100-01-0002 | 2 |
| J11 | CONN, RECEPTACLE | 6VJ1 | CORCM | 2100-03-0026 | 1 |
| 16A | SOLDER LUG | 1497 | SMITH | 2100-04-0012 | 2 |
| 15A | SOLDER LUG | 11A144 | ZIER | 2100-04-0025 | 3 |
| F1 | FUSE, 1/2A, 250V | 313.500 | LITFU | 2400-05-0010 | 1 |
| 24 | WASHER, SHOULDER, WHITE | 2668 | SMITH | 2800-27-0004 | 4 |
| 29 | PLUG BUTTON | 2663(BLACK) | HEYCO | 2800-35-0004 | 1 |

WAVETEK PARTS LIST | TITLE ASSY, REAR PANEL -145 | ASSEMBLY NO. 1206-00-1556 | REV C



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| 32 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 3 |
| 42 | SCREW PLPS PAN M/S 18-8 S/S 6-32X3/8 | MS 51957-28 | CMRCL | 2800-48-6106 | 1 |
| 38 | SCREW, MACH, PH, PHLPS, 6-32 X 1/2, SS 18-8 SS, #6-32X1/2 | MS 51957-30 | CMRCL | 2800-48-6108 | 1 |
| 47 | NUT, MACHINE SCREW, 18-8 SS, #2-56 | 2-56 M/S NUT 18-8 S/S | CMRCL | 2800-50-2100 | 2 |
| 41 | NUT, MACHINE SCREW, 18-8 SS, #6-32 | MS 35649-64 | CMRCL | 2800-50-6101 | 2 |

WAVETEK PARTS LIST | TITLE STD CHASSIS | ASSEMBLY NO. 1101-00-0575 | REV P



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | 18-8 SS, #4-40 | | | | |
| 31 | NUT, LOCKING, MS, 6-32, SS 18-8 SS, #6-32 | MS 20364-632 | CMRCL | 2800-50-6102 | 1 |
| R1 | POT, DIAL, 5K+/-5%, PRECISION, LINEAR | ECONOPOT MKIII 78PF-14 | NEI | 4600-05-0212 | 1 |

WAVETEK PARTS LIST | TITLE ASSY, FRONT PANEL -145 | ASSEMBLY NO. 1206-00-1555 | REV B



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| 39 | WASHER, LOCK, REG S/S #6 | MS 35338-136 | CMRCL | 2800-45-6000 | 4 |
| NONE | WASHER, FLAT, SS, #6 LARGE OUTLINE | AN 960C6 | CMRCL | 2800-46-6001 | 4 |
| 43 | MS, PH, PHLPS, 6-32 X 1 1/2, SS 18-8 SS, #6-32X1.5 | MS 51957-36 | CMRCL | 2800-48-6124 | 4 |
| 30 | SCREW, CAP, SOCKET HD, 6-32X3/8 | MS 16995-17 | CMRCL | 2800-49-6106 | 2 |
| 41 | NUT, MACHINE SCREW, 18-8 SS, #6-32 | MS 35649-64 | CMRCL | 2800-50-6101 | 4 |
| 31 | NUT, LOCKING, MS, 6-32, SS 18-8 SS, #6-32 | MS 20364-632 | CMRCL | 2800-50-6102 | 2 |
| 35 | SCREW, SELF-TAP, PH, PHL PS, #6 X 3/8, SS TYPE BF, #6X3/8 | MS24626-19 | CMRCL | 2800-59-6006 | 4 |
| SW1 | SWITCH ASSY PB | 1XTA0003TA100B-W/NE152 | ECG | 5102-00-0008 | 1 |
| NONE | PWR CORD | 17251 | BELDN | 6001-80-0005 | 1 |

WAVETEK PARTS LIST | TITLE ASSY, REAR PANEL -145 | ASSEMBLY NO. 1206-00-1556 | REV C



NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST STD CHASSIS |
| | PROJ. ENGR. | | |
| FINISH WAVETEK PROCESS | RELEASE APPROV. | | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ± | | SIZE D · FSCM NO. 23338 · DWG. NO. 1101-00-0575 · REV P · SCALE · MODEL 145 · SHEET 1 OF 1 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| B | ECN 1545 | RO | 6-6-7 | |
| C | ECN 1625 | RO | 11-3-7 | |
| D | ECN 1800 | JRM | 9-5-8 | |
| E | ECN 2089 | DC | 1-23-80 | |
| F | ECN 2123 | LJTE | 4-17-80 | |

VCG AMP

SYMMETRY CONTROL MODEL 143 ONLY

VCG DIAL BUFFER

POSITIVE CURRENT SOURCE

NEGATIVE CURRENT SOURCE

TRIGGER COMPENSATION

GCV AMPLIFIER

CAPACITANCE MULTIPLIER

J1 VCG IN

DIAL 5K CW

R1 2K

R2 15K

R3 4.99K

C1 .01

C2 150PF

R4 1K

R5 4a.4

R6 68K, 1/4W NOM

R7 1M, 1/4 W

R8 5.1M 1/2W, 10%

R9 1.5K

R10 10K VERNIER

R11 5.1M 1/2 W 10%

R12 10K

R13 100K

R14 4.99K

C3 .01

C4 .01

C5 .01

CR1

R15 2K

R16 100K

R17 6.8M 1/2W 10%

IC2 1/2 MC1458

R18 1.5K

Q1 2N5486

R19 2.49K

R20 4.99K

CR2 FD777

R21 604

R285 TRIM

R22 4.99K

X10M

SW1-D

X.01

R23 1.5K

R24 10

C8 1μF

C9 .001

C10 330PF

R282 TBD

Q4 2N3905

IC4 LF411

R25 249

Q3 2N5460

I+ (2B8)

R28 2K

C7 .01

R26 4.99K

R27 4.99K

C6 .01

IC3 LM741

SW2

J MODEL 145 ONLY

R29 TRIM

R30 50K SYM

C11 .01

R33 2.49K

R231 2K

R32 1.5K

Q2 2N5460

R34 4.75K

R35 500

R41 10K

R42 4.02K

IC1 1/2 MC1458

C16 .01

R43 3.01K

R44 604

R39 249

C13 .001

Q5 2N5485

Q6 2N3905

R40 604 X10M

R283, 24.9K

C12 1μF

R36 1.5K

R38 10

-24V

R37 4.99K

C14 330PF

SW1-C

I- (2A8)

+24

C24 .01

IC6 1/2 MC1458

R60 750

2N5462 Q7

COMP. OUT (3C1)

J1

SYNC → P1-1

GND → P1-2

+5V → P1-3

TRIG LOGIC → P1-4

STOP/START → P1-5

+15V → P1-6

-15V → P1-7

-24V → P1-8

+24V → P1-9

J10 GCV OUT

E6 E7

R46 6.98K

R48 1K

IC7 CA3140

R49 100

C19 1,1% POLYC.

R50 10

R45 1K

R47 1K

C18 .01

C17 .01

IC8 CA3140

R51 1K

C20 .01

C21 .01

R55 10K

R52, 10K

R53, 100K

R54, 1M, 1/4W

R56, 10M 0.6W, 1%

R57 100

C22 .001

R58 8.25K

R59 82.5

TP1

SWI-A

SWI-B

CAP. MULTIPLIER OUT (2A8)

* * = NOMINAL VALUE CALLED OUT ON P/L.
1 = MATCHED SET OF 3 RESISTORS
2 = MATCHED PAIR OF FD777 DIODES (OTHER ON SHT. 3 OF 4)
4 = SELECTED COMPONENT
5 = MATCHED SET OF (2) 2N5485
7 = MATCHED SET OF (2) 2N3563
6 = MATCHED SET OF (3) CAPACITORS
5 = MATCHED SET OF (8) FD777 DIODES
4. DIODES ARE FD6666
3. RESISTORS ARE 1/8W, 1% MF
2. CAPACITANCE IN MICROFARADS
1. RESISTANCE IN OHMS

NOTE: UNLESS OTHERWISE SPECIFIED

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| U | 89-364 | BG | 8,89 | KA |
| T | 7786 | JT | 12/12/86 | A.R.T. |
| S | 4938,6153 | ACT | 1/28/86 | A.R.T. |
| R | 4664,4864 | DAH | 7/22/85 | A.R.T. |
| Q | 4132,4133,4082 | DC | 1/23/84 | DT |
| — | #4074 (CL III) | DC | 1/19/84 | DT |
| P | 3881 | FN | 8/12/83 | |
| — | 3617 (CL II) | fna | 3/22/83 | |
| N | 3516, 3517 | fna | 11/9/82 | |
| M | 2988,2985,2987,2984 | DC | 8-26-82 | |
| L | 2950, 2951 | fna | 12/4/81 | |
| K | 2877, 2878 | fna | 10/30/81 | |
| J | ECN# 2817, 2819 | DC | 8-5-81 | |
| H | 2736 | LOU | 6-5-81 | |
| G | ECN 2353, 2354 | LOU | 11-7-80 | |

SEE SEPERATE PART LIST 1100-00-0556

REMOVE ALL BURRS AND BREAK SHARP EDGES
MATERIAL
FINISH WAVETEK PROCESS
DRAWN D. Cosell DATE 12-27-76
PROJENGR
RELEASE APPROV
TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030
DO NOT SCALE DWG
SCALE

WAVETEK SAN DIEGO • CALIFORNIA

TITLE
SCHEMATIC GENERATOR BOARD

MODEL NO. 143/145
DWG NO. 0103-00-0556
REV U
CODE IDENT 23338
SHEET 1 OF 4

0103-00-0556 U

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## INTEGRATOR/ TRIANGLE AMPLIFIER

TP2
R64 10Ω
+15V
R62 1.5K
R63 1.5K
C29 .01
CR4 IN823A
C27 .01
CR5 IN823A
C30 .01
Q8 2N5485
R65 33.2
C28 220PF S.M.
R66 150
Q12 2N3563
C26 100PF S.M.
C25 15PF S.M.
R67 316
R68 33.2
Q10 2N3905
C31 220PF S.M.
R61 10
R69 33.2
R70 750
Q9 2N5485
R71 316
R72 33.2
Q11 2N3905
C32 .01
R73 100
CR3 IN823A
-15V
R74 10
C33 .01
GND

## HYSTERESIS SWITCH

R95 33.2
+15V
R93 500
R94 1K
R96 1.21K
R97 1.21K
R98 1K
R99 1K
C45 TRIM
R85 54.9 NOM.
C46 47PF S.M.
R86 604
C47 68PF S.M.
C53 .01
R100 **
Q15 2N3640
R102 249
CR14
CR15
Q16 2N3640
R101 33.2
R103 33.2
C48 TRIM
R104 1K
Q17 2N3905
R88 316
R89 316
CR12 HP2811
CR13 HP2811
IC9 CA3049
R114 150
R115 392
C57 .01
R91 604
C50 68PF S.M.
R92 54.9 NOM.
C51 47PF S.M.
C52 TRIM
C55 **
R106 464
R105 **
R108 1K
R109 33.2
R110 33.2
R111 1K
C49 **
R113 1.5K
R107 500
C54 .01
C56 .01
R112 10K
C58 .01
R116 10
-15V
GND

## TRIANGLE BUFFER

+15V
C65 5.6 35V
R117 4.99K
R118 100
C60 .01
R120 200
R123 10
R119 332
R122 909
C66 .01
Q19 2N3905
R125 825
R124 100
Q22 2N3905
TP3
C63 .01
TRI-FUNCTION (4B8, 3B1)
R126 33.2
Q18 2N3563
Q20 2N3563
R130 33.2
TP4
R131 301K
C67 .1
R127 100
C61 5PF
R128 100
R129 100
R140 33.2
CR16 IN4581
R137 249
R141 10
Q23 2N3905
C59 10PF
R136 7.5K
R132 15K
R134 316
R138 7.5K
Q21 2N3903
R133 7.5K
C62 .01
R135 750
R139 10
C64 5.6 35V
C68 .01
-15V
GND
TP5

+15V
R284 2.15m
J2
1
-15V → 2
N/C → 3
1000-00-0221
OPTION 001
(5000 HOUR TIMER)

R81 10 +15V
R78 7.5K
R80 3.65K
R79 33.2
CR10
C44 .01
CR11
R82 33.2
Q14 2N3905
R83 3.65K
R84 10 -15V
R75 33.2
Q13 2N3903
CR8 FD777
CR6 FD777
CR7 FD777
CR9 FD777
R76 33.2
R77 7.5K
C43 .01
C40 3.5 13PF
C41 **
C42 .01
FB
GND

I+ (IC2)
TRIG OUT (3D1)
SW1-F
X10M
X1M
X100K
X10K
X1K
X100
X10
X1
X.1
X.01
CW
E14
E16
C34 3.5/13PF
C35 **
C36 820PF S.M.
C37 .01
C38 .1
C39 1
CAP. MULTIPLIER OUT (1A3)
I⁻ (IC2)
TRIG. SYNC (3C7)

+5V
C69 22/25V
R144 249
CR17
R142 100
Q24 2N3905
-15V
PI-1 SYNC
SYNC AMPLIFIER
R143 215
SQUARE FUNCTION (3B5)

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 11-21-76 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJENGR | 3/29/78 | TITLE: SCHEMATIC GENERATOR BOARD |
| | RELEASE, APPROV | 3-28-77 | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1 XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 143/145 · DWG NO. 0103-00-0556 · REV U |
| | SCALE | | CODE IDENT 23338 · SHEET 2 OF 4 |

0103-00-0556 T

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## TRIGGER AMPLIFIER

P1-5

START/STOP
-15V
R30 10K
CW
SW-2
+15V
START/STOP
145 ONLY

+15V
R148 576 NOM.
R151 2.49K
R147 2.49K
R278 2.49K
C72 .01
SW1-E X10M
E9
CW
X.01
E15
R154 76.8K
R153 100
CR19 FD777
CR23
CR25
P1-4 TRIG LOGIC
C71, .01
CR18
TRI ; SYNC (2A8)
R145 100
R149 100
Q27 2N3903
CR20
CR21
CR22
CR24
Q26 2N3905
R146 10K
C73 .01
R150 3.01K
R152 4.99K
-15V
GND
Q28 2N3903
Q29 2N3903
R155 1K
R156 2.49K
R157 49.9K
R158 100
R159 249
R161 24.9K
R162 10K
R160 7.5K
R165 1K
R171 2.49K
R166 21.5
R172 10
CR26 FD777
TRIGGER OUT (2B8)
R173 10
Q30 2N3905
C74 .01
R163 15K
C78 .1
R167 750
R168 1K
C76 5Pf
C77 5Pf
TRIGGER COMP (1C1)
Q32 2N3905
C75 .01
Q31 2N3903
R164 7.5K
R169 1.78K
R170 21.5
R174 100
C80 .01
C79 .1
COM

## PULSE AMPLIFIER (145 ONLY)

+15V
C81 .01
PULSE
E24
GND
E25
R175 49.9 1/4 W
Q25 2N3903
CR27
R176 1.5K
-15V
GND
FUNCTION SQUARE (2A2)

## FUNCTION SELECTOR

+15V
R177 3.01K
CR28
CR29
CR30
CR31
FD777 (4)
R178 3.01K
-15V
SW4-E
E17
CW
SW4-D
E18
CW
R179 200
C82 10PF
SW4-C
DC
E19
CW
2180
100
SW4-A
E20
CW
SW4-B
E22
CW
E23
E21
TRIANGLE (2D1)
SINE (4B6)
PREAMP IN (4A4)
PULSE DISABLE
PULSE SELECT
145 ONLY
PULSE
PULSE

0103-00-0556

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D COOPER | DATE 11-8-76 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJENGR | | TITLE SCHEMATIC GENERATOR BOARD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ·010 ANGLES ·1 .XX ·030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 143/145 |
| | SCALE | | DWG NO. 0103-00-0556 REV U |
| | | | CODE IDENT 23338 SHEET 3 OF 4 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## OUTPUT AMPLIFIER

+24V
C85 .1
+15V
R181 100K
R182 150K
-15V
R183 2K
R184 1.96K
C83 .01
C84 .01
OFST
J9 EXT DC OFFSET
E26
E27
GND
R188 2.49K
R189 2.49K
CR32
Q33 2N3905
Q34 2N3905
C88 .1
R191 3.65K
R192 33.2
CR33 IN823A
R193 392
R194 392
R195 392
Q36 2N3563
Q38 2N5160 (HEAT SINK)
R190 750
C89 .01
R196 10
R197 100 NOM.
C94 .1
+24V
R281 24.9K
U13 LM317T
E43
R284 100
R285 4.7
CUR. LMTR. P.C.
CR47 IN758A
CR48 IN758A
E44
OUTPUT ATTENUATOR
Q42 2N2219A
Q44 (HEAT SINK) 2N3866
C95 27pF 35V
C96 1µF
R224 49.9 1/2W
R225 49.9 1/2W
R226 49.9 1/2W
R227 49.9 1/2W
R215 61.9
R218 15
R216 100
R220 15
Q40 2N3903
R211 1.1K
CR34
CR35
R209 2K
FUNCTION OUT
E28
SW5-C
SW5-A
SW5-B
O
CW
-20
-40
-60
E29
E38
R230 249
R235 56.2
R231 499
R228 909
R232 4.99K
R229 124 1/4W
R233 121 1/4W
R234 61.9
E34
E35
E36
E37
E39
DETENT GNDS.
R185 500 VARIABLE
CW R186 249
R187 T 27.4
C87 100 PF
R200 1K
C90 .01
R201 46.4K
R203 10K
C82 .01
R204 33.2
R202 3.65K
R205 464
R206 464
R207 464
R208 100 NOM
Q35 AD812
R198 1.5K
R199 4.02K
Q37 2N3640
Q39 2N3866 (HEAT SINK)
R210 10
R213 24.9K
Q41 2N3905
R212 1.1K
R214 100
R219 15
R221 15
Q45 2N5160 (HEAT SINK)
R217 61.9
Q43 2N2905A
C97, 1µF
E42
C98 27µF/35V
R287 4.7
R286 100
CR49 IN758A
CR50 IN758A
E41
E40
U12 LM337T
CUR. LMTR. P.C.
-24V
C86 .1
C91 .1
C93 .1
-24V
GND
GND
GND

## SINE CONVERTER

C111 5.6
R237 23.7K
R238 8.25K
R239 11K
R240 11K
R241 150
R242 249
R243 576
C99 220 PF S.M. NOM.
SINE FUNCTION (3B1)
R244 61.9
CR38
CR40
CR42
CR44
CR39
CR41
CR43
CR45
FD777 SET OF 8
R236 10 NOM
TRIANGLE FUNCTION (2D1)
R245 249
R246 576
R247 150
R248 23.7K
R249 8.25K
R250 11K
R251 11K
C112 5.6
-15V

## PRE-AMPLIFIER

+15V
R253 33.2
R254 2.49K
R255 2.49K
C101 .01
CR46
Q46 2N3905
R261 7.5K
R262 249
Q49 2N3640
R267 1.5K
R268 61.9
C107
C109 .1
C103 .01
R269 33.2
C108 3PF(NOM.)
R270 681
R271 90.9
Q47 2N3905
R263 13K NOM.
R264 681
R252 100 K
R256 301K
C102 100PF
Q48 AD812
R259 499
C104 .01
R265 10K
R272 33.2
Q50 2N3563
R273 10
Q51 2N3905
R257 1K
R258 3.65K
R260 61.9
R266 7.5K
R274 2.49K
R275 61.9
C106 .1
C105 .1
-15V
GND
GND
PREAMP IN (3B1)

## DC OFFSET

-15V
CW
OFF
R276 10K
SW3
OFST
+15V
C110 .01

## LAST REF. DES. USED

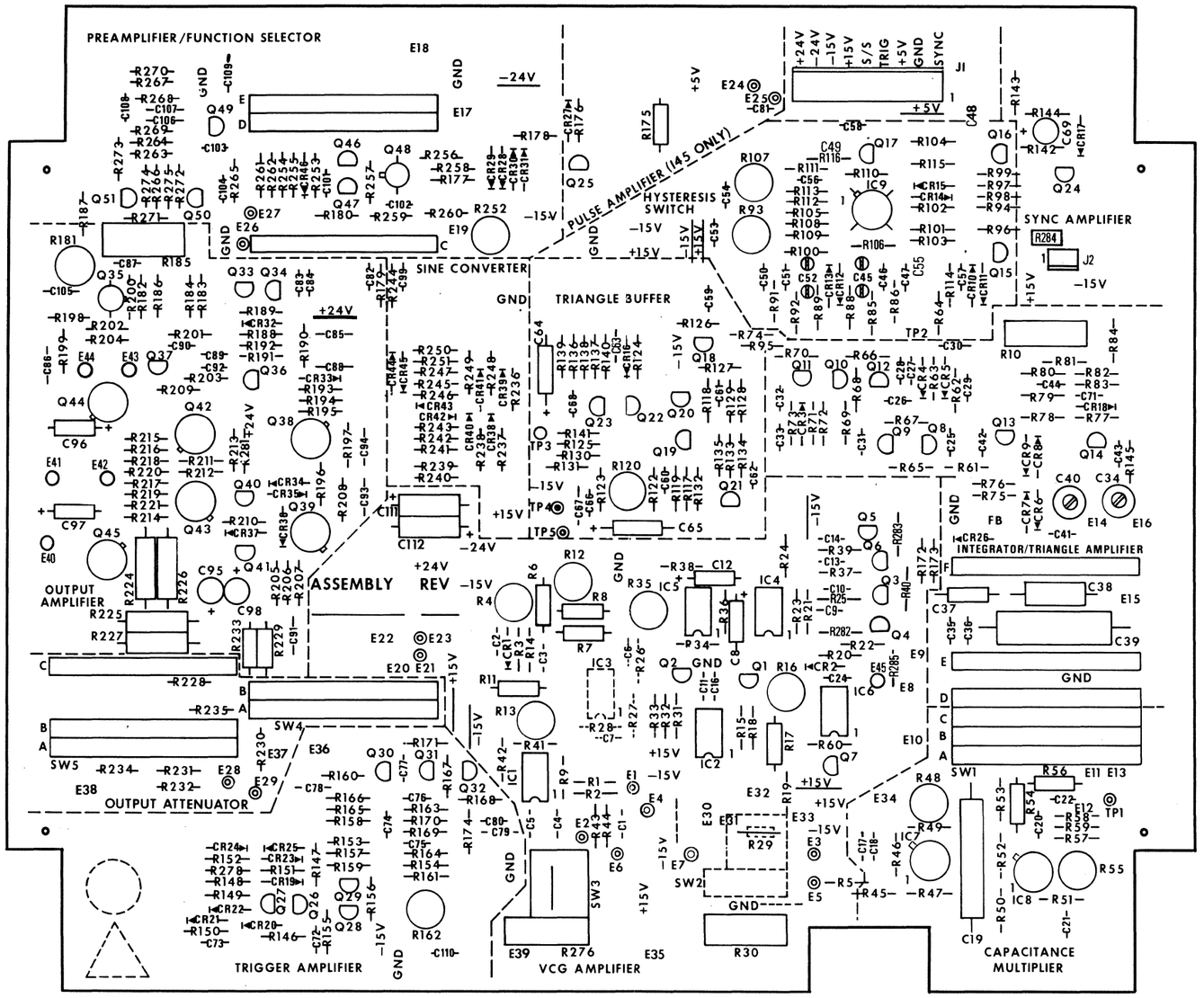
Q51
R283
C112
CR46
E34
TP5
SW-5

NOT USED:
C100
C15, C23, R87, R90, R280, R223

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 11-1-76 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | 3-28-83 | TITLE: SCHEMATIC GENERATOR BOARD |
| FINISH WAVETEK PROCESS | RELEASE APPROV | 3-23-77 | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1 .XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO. 143/145 | DWG NO. 0103-00-0556 REV U |
| | SCALE | CODE IDENT 23338 | SHEET 4 OF 4 |

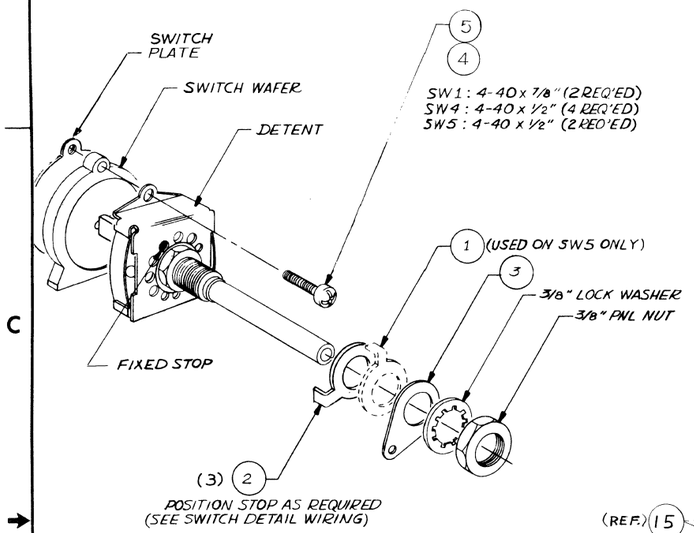
0103-00-0556 T



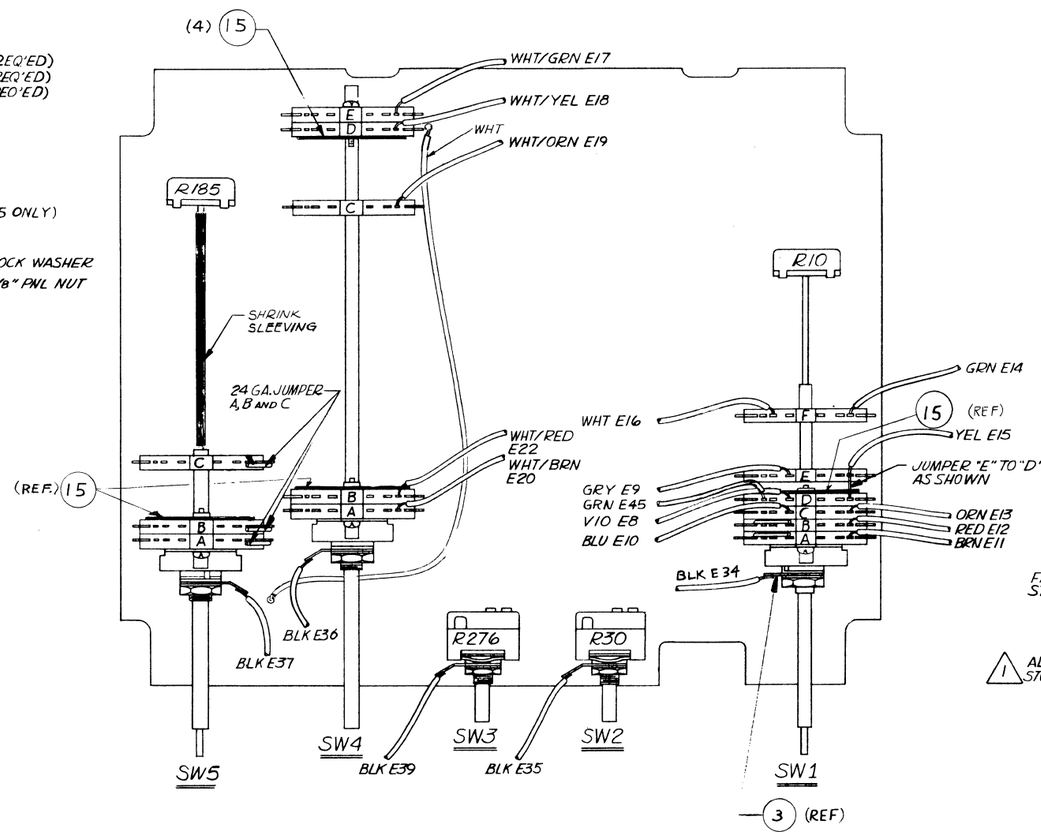

MADE FROM 0100-00-0556-3F

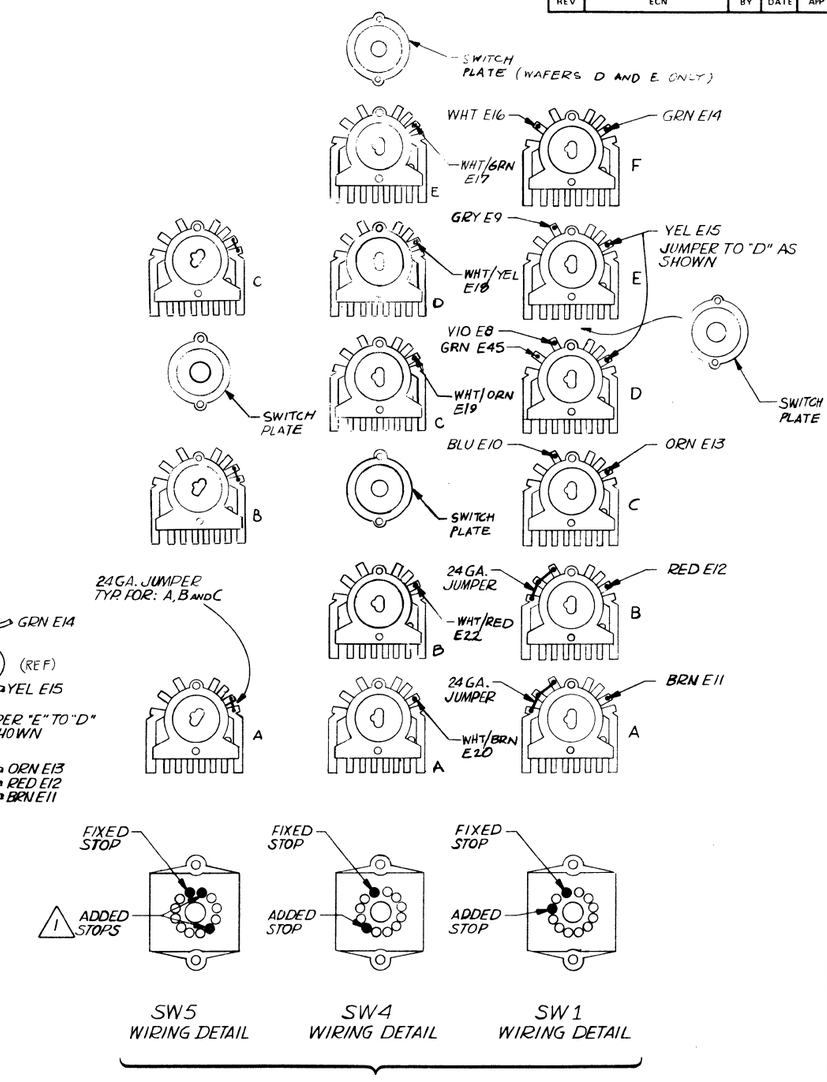
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: PCA, GENERATOR BD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1 XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145 |
| | SCALE | | DWG NO 1100-00-0556 REV |
| | | | CODE IDENT 23338 SHEET OF |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




TYPICAL HARDWARE STACK-UP



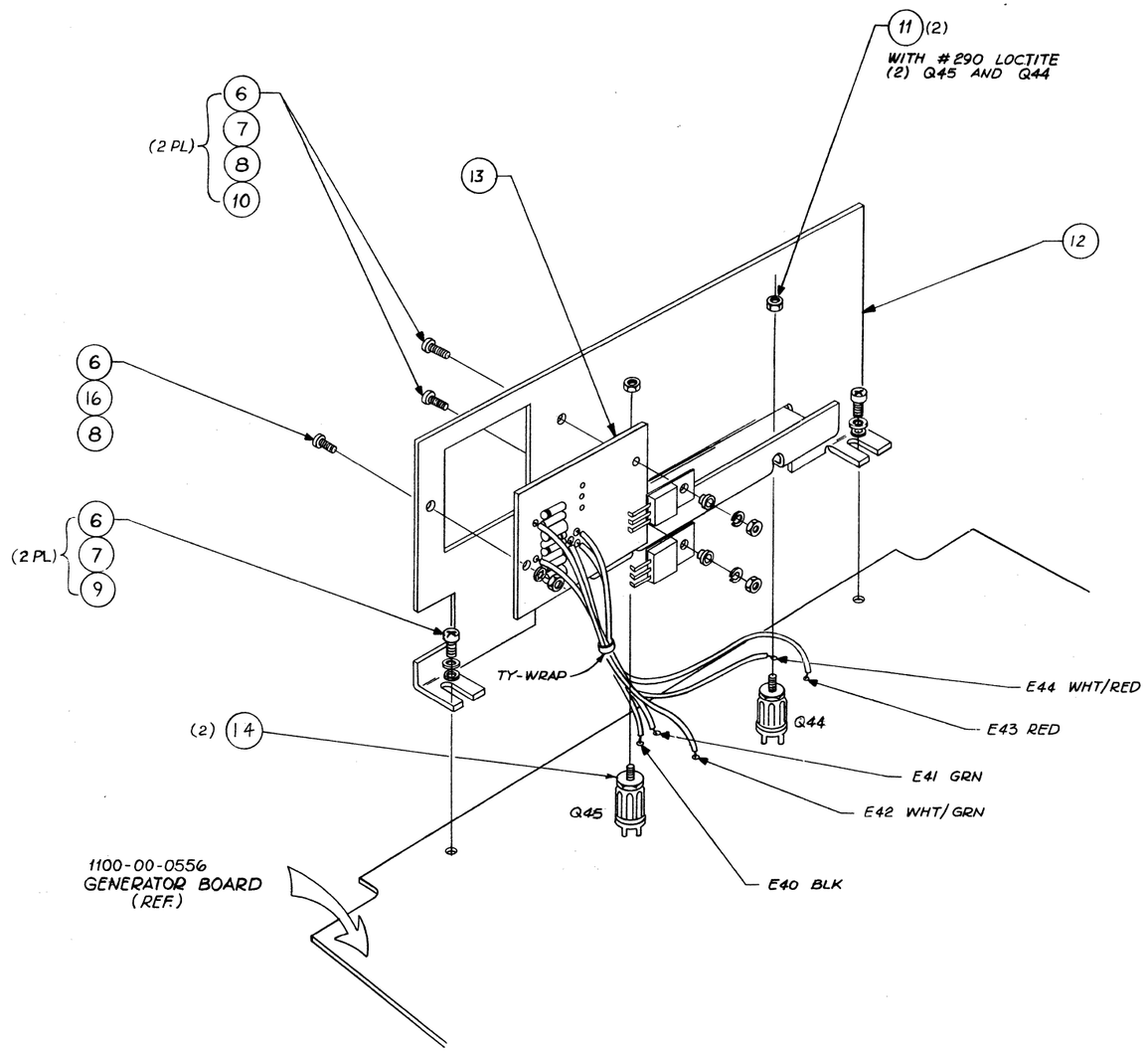




NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN J.D. COOPER | DATE 12-6-77 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL — | PROJ ENGR | | TITLE: ASSEMBLY GENERATOR BOARD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS — | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | MODEL NO 145 | DWG NO 0101-00-0556 REV V |
| | SCALE | CODE IDENT 23338 | SHEET 2 OF 3 |

0101-00-0556 V

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN F.N. AQUINO | DATE 6/10/82 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJENGR | | TITLE: ASSEMBLY GENERATOR BOARD |
| FINISH WAVETEK PROCESS | RELEASE APPROV 5/24/83 | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1 .XX ±.030 | |
| | DO NOT SCALE DWG | SCALE | MODEL NO. 145 / DWG NO. 0101-00-0556 / REV. V |
| | | | CODE IDENT 23338 / SHEET 3 OF 3 |

0101-00-0556 V

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG GENERATOR | 0101-00-0556 | WVTK | 0101-00-0556 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| 13 | PCA, CURRENT LIMITER | 143-1008 | WVTK | 1208-00-1008 | 1 |
| NONE | KIT, PRE WAVE LOAD 145-0556 | 145-1563 | WVTK | 1208-00-1563 | 1 |
| C49 | CAP, CER, 56PF, 1KV | DD-560 | CRL | 1500-05-6001 | 1 |
| C37 38 39 | CAP SET, POLYC MIXED MATCHED SET | 1509-80-0008 | BISHO | 1509-80-0008 | 1 |
| J1 | CONN, 9PIN | 09-60-1091 | MOLEX | 2100-02-0052 | 1 |
| NONE | SOCKET, MINISERT | 75060-012 | BERG | 2100-03-0076 | 4 |
| NONE | KNOB STD | RB-67-1-SB-M | ROGAN | 2400-01-0008 | 3 |
| NONE | COAX KNOB SET | RB-67-1-SB+O-M-9 | ROGAN | 2400-01-0009 | 2 |
| NONE | SUPER KIT | 2500-0145-01 | WVTK | 2500-0145-01 | 1 |
| NONE | HEAT SINK | 207 | WAKE | 2800-11-0001 | 2 |
| NONE | TRANSIPAD | 531-218 | BIVAR | 2800-11-0004 | 2 |
| 14 | HEATSINK | 2606SH5E | WAKE | 2800-11-0012 | 2 |
| 11 | NUT, MACHINE SCREW, 18-8 SS, #6-32 SMALL PATTERN | NAS 671C6 | CMRCL | 2800-50-6100 | 2 |

WAVETEK PARTS LIST | TITLE PCA, GENERATOR | ASSEMBLY NO. 1100-00-0556 | PAGE 1 | REV AC

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CURRENT LIMITER BOARD | 0101-00-1008 | WVTK | 0101-00-1008 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| 12 | HEATSINK BRACKET | 143-5083 | WVTK | 1400-01-5083 | 1 |
| NONE | CURRENT LIMITER BD REF: SPEC 0008-00-0455 REV C | 143-1008 | WVTK | 1700-00-1008 | 1 |
| 10 | WASHER | 5607-150 | SESTM | 2800-11-0015 | 2 |
| 7 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 2 |
| 16 | LOCK WASHER, INTERNAL TOOTH, SS #4 | MS 35333-70 | CMRCL | 2800-45-4001 | 1 |
| 6 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 3 |
| 8 | NUT, MACHINE SCREW, 18-8 SS, #4-40 | NAS 671C4 | CMRCL | 2800-50-4100 | 3 |
| R285 R287 | RES, C, 1/2W, 5%, 4.7 | RC-1/2-4R7J | STKPL | 4700-25-0479 | 2 |
| R284 R286 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 2 |
| CR47 CR48 CR49 CR50 | DIODE, ZENER, 10V | 1N758A | FAIR | 4801-01-0758 | 4 |
| U13 | VOLT REGULATOR, 3 TERMINAL ADJUSTABLE | LM317T | NSC | 7000-03-1700 | 1 |

WAVETEK PARTS LIST | TITLE PCA, CURRENT LIMITER | ASSEMBLY NO. 1208-00-1008 | PAGE 1 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG GENERATOR | 0101-00-0556 | WVTK | 0101-00-0556 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| NONE | PC BD PREPPED 145-0556 | 145-1564 | WVTK | 1208-00-1564 | 1 |
| C55 | CAP, CER, 5PF, 1KV | DD-050 LONG LEAD | CRL | 1500-00-5001 | 1 |
| C108T C61 C76 C77 | CAP, CER DISK, 5PF, 1KV, 10% | 0311-00018 | WVTK | 1500-00-5011 | 4 |
| C59 C82 | CAP, CER, 10PF, 1KV | DD-100 | CRL | 1500-01-0011 | 2 |
| C102 C87 | CAP, CER, 100PF, 1KV | DD-101 | CRL | 1500-01-0111 | 2 |
| C13 C22 C9 | CAP, CER, .001UF, 1KV | DD-102 | CRL | 1500-01-0211 | 3 |
| C1 C101 C103 C104 C11 C110 C16 C17 C18 C20 C21 C24 C27 C29 C3 C30 C32 C33 C4 C42 C43 C44 C5 C53 C54 C56 C57 C58 C60 C62 C63 C66 C68 C71 C72 C73 C74 C75 C80 C81 C83 C84 C89 C90 C92 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNG | 1500-01-0310 | 45 |
| C105 C106 C107 C109 C67 C78 C79 C85 C86 C88 C91 C93 C94 | CAP, CER, MON, .1MF, 50V, AXIAL | CAC03Z5U104Z050A | CORNG | 1500-01-0405 | 13 |
| C2 | CAP, CER, 150PF, 1KV | DD-151 | CRL | 1500-01-5111 | 1 |
| C10 C14 | CAP, CER, 330PF, 1KV | DD-331 | CRL | 1500-03-3111 | 2 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 1 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| Q44 | TRANS | 2N3866 | MOT | 4901-03-8660 | 1 |
| Q45 | TRANS | 2N5160-18 | MOT | 4901-05-1600 | 1 |

WAVETEK PARTS LIST | TITLE PCA, GENERATOR | ASSEMBLY NO. 1100-00-0556 | PAGE 2 | REV AC

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | POS | | | | |
| U12 | VOLT REGULATOR | LM337T | NSC | 7000-03-3700 | 1 |

WAVETEK PARTS LIST | TITLE PCA, CURRENT LIMITER | ASSEMBLY NO. 1208-00-1008 | PAGE 2 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| C26 | CAP, MICA, 100PF, 500V | DM15-101J | ARCO | 1500-11-0100 | 1 |
| C25 | CAP, MICA, 15PF, 500V | DM15-150J | ARCO | 1500-11-5000 | 1 |
| C28 C31 C99T | CAP, MICA, 220PF, 500V, RADIAL | DM15-221J | ARCO | 1500-12-2100 | 3 |
| NONE | CAP, MICA, 30PF, 500V, RADIAL | DM15-300J | ARCO | 1500-13-0000 | 1 |
| C46 C51 | CAP, MICA, 47PF, 500V | DM15-470J | ARCO | 1500-14-7000 | 2 |
| C47 C50 NONE | CAP, MICA, 68PF, 500V | DM15-680J | ARCO | 1500-16-8000 | 3 |
| C36 | CAP, MICA, 820PF, 300V | DM15-821F | ARCO | 1500-18-2101 | 1 |
| C69 | CAP, ELECT, 22MF, 25V, RADIAL | SRA25V822RM6X7LL | UNCON | 1500-32-2002 | 1 |
| C19 | CAP, POLYC, 1MF, 100V, AXIAL | B1A105F | ELPAC | 1500-41-0504 | 1 |
| C34 C40 | CAP, VAR, 3.5-13PF, 250V | 7S-TRIKO-02 3.5/13PF | TRIKO | 1500-51-3000 | 2 |
| C12 C8 C96 C97 | CAP, TANT, 1MF, 35V | 150D105X9035A2 | SPRAG | 1500-71-0502 | 4 |
| C95 C98 | CAP, TANT 27UF, 35V+/-10%, 0.25LS | 199D276X9035FE4 | SPRAG | 1500-72-7602 | 2 |
| C111 C112 C64 C65 | CAP, TANT, 5.6MF, 35V | 150D565X9035B2 | SPRAG | 1500-75-6502 | 4 |
| NONE | TRANSIPAD | 10123N | METRS | 2800-11-0003 | 2 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 2 | REV AB

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| FINISH: WAVETEK PROCESS | RELEASE APPROV. | | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ± | | SIZE D \| FSCM NO. 23338 \| DWG. NO. 1100-00-0556 \| REV AC; SCALE \| MODEL 145 \| SHEET 1 OF 3 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | TRANSIPAD | 531-218 | BIVAR | 2800-11-0004 | 2 |
| FB1 | FERRITE BEAD | 56-590-65/3B | FERRX | 3100-00-0001 | 1 |
| R4 R48 | POT, TRIM, 1K | 91AR1K | BECK | 4600-01-0209 | 2 |
| R12 R162 R55 | POT, TRIM, 10K | 91AR10K | BECK | 4600-01-0315 | 3 |
| R13 R16 R181 R252 | POT, TRIM, 100K | 91AR100K | BECK | 4600-01-0402 | 4 |
| R120 | POT, TRIM, 200 | 91AR200 | BECK | 4600-02-0101 | 1 |
| R107 R35 R93 | POT, TRIM, 500 | 91AR500 | BECK | 4600-05-0104 | 3 |
| R11 R8 | RES, C, 1/2W, 10%, 5.1M | RC-1/2-515J | STKPL | 4700-25-5104 | 2 |
| R17 | RES, C, 1/2W, 10%, 6.8M | | | 4700-25-6804 | 1 |
| R118 R124 R127 R128 R129 R142 R145 R149 R153 R158 R174 R180 R214 R216 R49 R57 R73 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 17 |
| R104 R108 R111 R155 R165 R168 R200 R257 R45 R47 R51 R94 R98 R99 | RES, MF, 1/8W, 1%, 1K | RN55D-1001F | TRW | 4701-03-1001 | 14 |
| R112 R146 R203 R265 R41 | RES, MF, 1/8W, 1%, 10K | RN55D-1002F | TRW | 4701-03-1002 | 5 |
| R116 R123 R139 R141 R172 R173 R196 R210 R236T R24 R273 R38 R50 R61 R64 R74 | RES, MF, 1/8W, 1%, 10 | 5043ED10R100F | MEPCO | 4701-03-1009 | 18 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 3 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R81 R84 | | | | | |
| R211 R212 | RES, MF, 1/8W, 1%, 1.1K | RN55D-1101F | TRW | 4701-03-1101 | 2 |
| R239 R240 R250 R251 | RES, MF, 1/8W, 1%, 11K | RN55D-1102F | TRW | 4701-03-1102 | 4 |
| R96 R97 | RES, MF, 1/8W, 1%, 1.21K | RN55D-1211F | TRW | 4701-03-1211 | 2 |
| R114 R241 R247 R66 | RES, MF, 1/8W, 1%, 150 | RN55D-1500F | TRW | 4701-03-1500 | 4 |
| R113 R176 R18 R198 R23 R267 R32 R36 R62 R63 R9 | RES, MF, 1/8W, 1%, 1.5K | RN55D-1501F | TRW | 4701-03-1501 | 11 |
| R132 R163 R2 | RES, MF, 1/8W, 1%, 15K | RN55D-1502F | TRW | 4701-03-1502 | 3 |
| R182 | RES, MF, 1/8W, 1%, 150K | RN55D-1503F | TRW | 4701-03-1503 | 1 |
| R218 R219 R220 R221 | RES, MF, 1/8W, 1%, 15 | RN55D-15R0F | TRW | 4701-03-1509 | 4 |
| R263T | RES, MF, 1/8W, 1%, 17.4K | RN55D-1742F | TRW | 4701-03-1742 | 1 |
| R169 | RES, MF, 1/8W, 1%, 1.78K | RN55D-1781F | TRW | 4701-03-1781 | 1 |
| R184 | RES, MF, 1/8W, 1%, 1.96K | RN55D-1961F | TRW | 4701-03-1961 | 1 |
| R179 | RES, MF, 1/8W, 1%, 200 | RN55D-2000F | TRW | 4701-03-2000 | 1 |
| R1 R15 R183 R209 R31 | RES, MF, 1/8W, 1%, 2K | RN55D-2001F | TRW | 4701-03-2001 | 5 |
| R143 | RES, MF, 1/8W, 1%, 215 | RN55D-2150F | TRW | 4701-03-2150 | 1 |
| R166 R170 | RES, MF, 1/8W, 1%, 21.5 | RN55D-21R5F | TRW | 4701-03-2159 | 2 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 4 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R237 R248 | RES, MF, 1/8W, 1%, 23.7K | RN55D-2372F | TRW | 4701-03-2372 | 2 |
| R102 R137 R144 R159 R186 R230 R242 R245 R25 R262 R39 | RES, MF, 1/8W, 1%, 249 | RN55D-2490F | TRW | 4701-03-2490 | 11 |
| R147 R151 R156 R171 R188 R189 R19 R254 R255 R274 R278 R33 | RES, MF, 1/8W, 1%, 2.49K | RN55D-2491F | TRW | 4701-03-2491 | 12 |
| R161 R213 R281 R283 | RES, MF, 1/8W, 1%, 24.9K | RN55D-2492F | TRW | 4701-03-2492 | 4 |
| R187T | RES, MF, 1/8W, 1%, 27.4 | RN55D-27R4F | TRW | 4701-03-2749 | 1 |
| R150 R177 R178 R43 | RES, MF, 1/8W, 1%, 3.01K | RN55D-3011F | TRW | 4701-03-3011 | 4 |
| R131 R256 | RES, MF, 1/8W, 1%, 301K | RN55D-3013F | TRW | 4701-03-3013 | 2 |
| R134 R67 R71 R88 R89 | RES, MF, 1/8W, 1%, 316 | RN55D-3160F | TRW | 4701-03-3160 | 5 |
| R101 R103 R109 R110 R119 R126 R130 R140 R192 R204 R253 R269 R272 R65 R68 R69 R72 R75 R76 R79 R82 R95 | RES, MF, 1/8W, 1%, 33.2 | RN55D-33R2F | TRW | 4701-03-3329 | 22 |
| R100T R105T | RES, MF, 1/8W, 1%, 3.57K | RN55D-3571F | TRW | 4701-03-3571 | 2 |
| R191 R202 R258 R80 R83 | RES, MF, 1/8W, 1%, 3.65K | RN55D-3651F | TRW | 4701-03-3651 | 5 |
| R115 R193 R194 R195 | RES, MF, 1/8W, 1%, 392 | RN55D-3920F | TRW | 4701-03-3920 | 4 |
| R199 R42 | RES, MF, 1/8W, 1%, 4.02K | RN55D-4021F | TRW | 4701-03-4021 | 2 |
| R106 R205 R206 R207 | RES, MF, 1/8W, 1%, 464 | RN55D-4640F | TRW | 4701-03-4640 | 4 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 5 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R201 | RES, MF, 1/8W, 1%, 46.4K | RN55D-4642F | TRW | 4701-03-4642 | 1 |
| R5 | RES, MF, 1.8W, 1%, 46.4 | RN55D-46R4F | TRW | 4701-03-4649 | 1 |
| R34 | RES, MF, 1/8W, 1%, 4.75K | RN55D-4751F | TRW | 4701-03-4751 | 1 |
| R231 R259 | RES, MF, 1/8, 1%, 499 | RN55D-4990F | TRW | 4701-03-4990 | 2 |
| R117 R14 R152 R20 R22 R232 R3 R37 | RES, MF, 1/8W, 1%, 4.99K | RN55D-4991F | TRW | 4701-03-4991 | 8 |
| R157 | RES, MF, 1/8W, 1%, 49.9K | RN55D-4992F | TRW | 4701-03-4992 | 1 |
| R85T R92T | RES, MF, 1/8W, 1%, 54.9 | RN55D-54R9F | TRW | 4701-03-5499 | 2 |
| R235 | RES, MF, 1/8W, 1%, 56.2 | RN55D-56R2F | TRW | 4701-03-5629 | 1 |
| R148T R243 R246 | RES, MF, 1/8W, 1%, 576 | RN55D-5760F | TRW | 4701-03-5760 | 3 |
| R21 R40 R44 R86 R91 | RES, MF, 1/8W, 1%, 604 | RN55D-6040F | TRW | 4701-03-6040 | 5 |
| R215 R217 R234 R244 R260 R268 R275 | RES, MF, 1/8W, 1%, 61.9 | RN55D-61R9F | TRW | 4701-03-6199 | 7 |
| R264 R270 | RES, MF, 1/8W, 1%, 681 | RN55D-6810F | TRW | 4701-03-6810 | 2 |
| R46 | RES, MF, 1/8W, 1%, 6.98K | RN55D-6981F | TRW | 4701-03-6981 | 1 |
| R135 R167 R190 R60 R70 | RES, MF, 1/8W, 1%, 750 | RN55D-7500F | TRW | 4701-03-7500 | 5 |
| R133 R136 R138 R160 R164 R261 R266 R77 R78 | RES, MF, 1/8W, 1%, 7.5K | RN55D-7501F | TRW | 4701-03-7501 | 9 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 6 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R154 | RES, MF, 1/8W, 1%, 76.8K | RN55D-7682F | TRW | 4701-03-7682 | 1 |
| R125 | RES, MF, 1/8W, 1%, 825 | RN55D-8250F | TRW | 4701-03-8250 | 1 |
| R238 R249 R58 | RES, MF, 1/8W, 1%, 8.25K | RN55D-8251F | TRW | 4701-03-8251 | 3 |
| R197T R208T R59 | RES, MF, 1/8W, 1%, 82.5 | RN55D-82R5F | TRW | 4701-03-8259 | 3 |
| R122 R228 | RES, MF, 1/8W, 1%, 909 | RN55D-9090F | TRW | 4701-03-9090 | 2 |
| R271 | RES, MF, 1/8W, 1%, 90.9 | RN55D-90R9F | TRW | 4701-03-9099 | 1 |
| R7 | RES, MF, 1/4W, 1%, 1M | RN60D-1004F | TRW | 4701-13-1004 | 1 |
| R233 | RES, MF, 1/4W, 1%, 121 | RN60D-1210F | TRW | 4701-13-1210 | 1 |
| R229 | RES, MF, 1/4W, 1%, 124 | RN60D-1240F | TRW | 4701-13-1240 | 1 |
| R175 | RES, MF, 1/4W, 1%, 49.9 | RN60D-49R9F | TRW | 4701-13-4999 | 1 |
| R6T | RES, MF, 1/4W, 1%, 698K | RN60D-6983F | TRW | 4701-13-6983 | 1 |
| R224 R225 R226 R227 | RES, MF, 1/2W, 1%, 49.9 | RN65D-49R9F | TRW | 4701-23-4999 | 4 |
| R52 R53 R54 | RES, MF, MIXED SET | 4789-00-0043 | IRC | 4789-00-0043 | 1 |
| R56 | RES, MF, .6W, 1%, 10M | ML-181 | CADDO | 4799-00-0003 | 1 |
| 17 | RES, 0 OHM JUMPER | JP02T68Q | ROHM | 4799-00-0087 | 9 |
| CR3 CR33 CR4 CR5 | DIODE, ZENER, 6.2V, IN823 | 1N823A | MOT | 4801-01-0823 | 4 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 7 | REV AB

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| CR16 | DIODE, REFERENCE, LOW LEVEL, TEMP COMP | 1N4581 | MICRO | 4801-01-4581 | 1 |
| CR19 CR28 CR29 CR30 CR31 CR6 CR7 CR8 CR9 | DIODE, ULTRA FAST | 1N4244 | T/CSF | 4807-02-0777 | 9 |
| CR1 CR10 CR11 CR14 CR15 CR17 CR18 CR20 CR21 CR22 CR23 CR24 CR25 CR27 CR32 CR34 CR35 CR36 CR37 CR46 | DIODE 1N4148 COMPUTER, G/P, 75V, 200MA, SWITCHING | 1N4148 | FAIR | 4807-02-6666 | 20 |
| CR12 CR13 | DIODE 5082-2811 SCHOTTKY, 15V, 20MA | 5082-2811 | HP | 4809-02-2811 | 2 |
| CR2 26 | DIODE, M/PR, FD-777 QTY: 2: 4807-02-0777 | 4898-00-0004 | KLG | 4898-00-0004 | 1 |
| CR38 39 40 41 42 43 44 45 | DIODE, SET, 8-FD-777 QTY: 8: 4807-02-0777 | 4898-00-0010 | KLG | 4898-00-0010 | 1 |
| Q42 | TRANS 2N2219A NPN GENERAL PURPOSE TO-5 | 2N2219A | NSC | 4901-02-2191 | 1 |
| Q43 | TRANS 2N2905A PNP GENERAL PURPOSE TO-5 | 2N2905A | NSC | 4901-02-9051 | 1 |
| Q12 Q36 Q50 | TRANS, NPN, TO-92 | 2N3563 | FAIR | 4901-03-5630 | 3 |
| Q15 Q16 Q37 Q49 | TRANS, PNP, TO-92 | MPS3640 | MOT | 4901-03-6400 | 4 |
| Q39 | TRANS | 2N3866 | MOT | 4901-03-8660 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | PAGE 8 | REV AB

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| | RELEASE APPROV. | | |
| FINISH WAVETEK PROCESS | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX ± .XXX ± | | SIZE D · FSCM NO. 23338 · DWG. NO. 1100-00-0556 · REV AC |
| DO NOT SCALE DRAWING | | | SCALE · MODEL 145 · SHEET 2 OF 3 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| Q13 Q21 Q22 Q25 Q27 Q28 Q29 Q31 Q40 Q6 | TRANS, GENERAL PURPOSE, NPN, TO-92 | 2N3903 | NSC | 4901-03-9030 | 10 |
| Q10 Q11 Q14 Q17 Q19 Q23 Q24 Q26 Q30 Q32 Q33 Q34 Q4 Q41 Q46 Q47 Q51 | TRANS, GENERAL PURPOSE, PNP, TO-92 | 2N3905 | ITT | 4901-03-9050 | 17 |
| Q38 | TRANS | 2N5160-18 | MOT | 4901-05-1600 | 1 |
| Q3 | TRANS, P-CHANNEL JFETS | 2N5460 | MOT | 4901-05-4600 | 1 |
| Q5 | TRANS, N-CHANNEL JFETS | 2N5485 | MOT | 4901-05-4850 | 1 |
| Q1 | TRANS N-CHANNEL JFETS | 2N5486 | MOT | 4901-05-4860 | 1 |
| Q18 20 | TRANS, M/PR, 2N3563 QTY: 2: 4901-03-5630 | 4998-00-0004 | KLQ | 4998-00-0004 | 1 |
| Q2 Q7 | TRANS, SEL, 2N5462 QTY: 1: 4901-05-4620 | 4998-00-0008 | KLQ | 4998-00-0008 | 2 |
| Q8 9 | TRANS, M/PR, 2N5485 QTY: 2: 4901-05-4850 | 4998-00-0009 | KLQ | 4998-00-0009 | 1 |
| IC4 IC5 | OP AMP, LOWOFFSET/DRIFT JFET INPUT TIONAL AMPLI | LF411CN | NSC | 7000-04-1100 | 2 |
| Q35 Q48 | TRANS, MONO, DUAL, NPN | LS312-52 | LINSY | 7000-08-1200 | 2 |
| IC1 IC2 IC6 | OP AMP, DUAL, HIGH GAIN, INTERNALLY COMP | MC1458P1 | MOT | 7000-14-5800 | 3 |

| WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | REV AB |
|---|---|---|---|
| | | PAGE 9 | |

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY, SWITCH SW-1 145-0556 | 145-1565 | WVTK | 1202-00-1565 | 1 |
| NONE | ASSY, SWITCH SW-2 145-0556 | 145-1566 | WVTK | 1202-00-1566 | 1 |
| NONE | ASSY, SWITCH SW-3 145-0556 | 145-1567 | WVTK | 1202-00-1567 | 1 |
| NONE | ASSY, SWITCH SW-4 145-0556 | 145-1568 | WVTK | 1202-00-1568 | 1 |
| NONE | ASSY, SWITCH SW-5 145-0556 | 145-1569 | WVTK | 1202-00-1569 | 1 |

| WAVETEK PARTS LIST | TITLE SUPER KIT | ASSEMBLY NO. 2500-0145-01 | REV |
|---|---|---|---|
| | | PAGE 1 | |

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| IC9 | DIFFERENTIAL AMP, DUAL HIGH FREQ | CA3049T | RCA | 7000-30-4900 | 1 |
| IC7 IC8 | OP AMP, BIMOS MOSFET INPUT/BIPOLAR OUTPUT | CA3140S | RCA | 7000-31-4001 | 2 |

| WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0556 | ASSEMBLY NO. 1208-00-1563 | REV AB |
|---|---|---|---|
| | | PAGE 10 | |

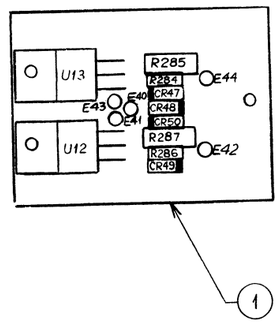
NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| FINISH WAVETEK PROCESS | RELEASE APPROV. | | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX ± .XXX ± ± | | SIZE D; FSCM NO. 23338; DWG. NO. 1100-00-0556; REV AC; SCALE; MODEL 145; SHEET 3 OF 3 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| A | 4938 | A.T. | 2/24/86 | |

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CURRENT LIMITER BOARD | 0101-00-1008 | WVTK | 0101-00-1008 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| 12 | HEATSINK BRACKET | 143-5083 | WVTK | 1400-01-5083 | 1 |
| NONE | CURRENT LIMITER BD REF: SPEC 0008-00-0455 REV C | 143-1008 | WVTK | 1700-00-1008 | 1 |
| 10 | WASHER | 5607-150 | SESTM | 2800-11-0015 | 2 |
| 7 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 2 |
| 16 | LOCK WASHER, INTERNAL TOOTH, SS #4 | MS 35333-70 | CMRCL | 2800-45-4001 | 1 |
| 6 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 3 |
| 8 | NUT, MACHINE SCREW, 18-8 SS, #4-40 | NAS 671C4 | CMRCL | 2800-50-4100 | 3 |
| R285 R287 | RES, C, 1/2W, 5%, 4.7 | RC-1/2-4R7J | STKPL | 4700-25-0479 | 2 |
| R284 R286 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 2 |
| CR47 CR48 CR49 CR50 | DIODE, ZENER, 10V | 1N758A | FAIR | 4801-01-0758 | 4 |
| U13 | VOLT REGULATOR, 3 TERMINAL ADJUSTABLE | LM317T | NSC | 7000-03-1700 | 1 |

| WAVETEK PARTS LIST | TITLE PCA, CURRENT LIMITER | ASSEMBLY NO. 1208-00-1008 | REV B |
|---|---|---|---|
| | | PAGE 1 | |




| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | POS | | | | |
| U12 | VOLT REGULATOR | LM337T | NSC | 7000-03-3700 | 1 |

| WAVETEK PARTS LIST | TITLE PCA, CURRENT LIMITER | ASSEMBLY NO. 1208-00-1008 | REV B |
|---|---|---|---|
| | | PAGE 2 | |

1. SEE 0103-00-0556 FOR SCHEMATIC.

NOTE. UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN RO FITE | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE ASSEMBLY, CURRENT LIMITER BD. |
| FINISH WAVETEK PROCESS | RELEASE APPROV | 3/93 | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1 XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145 / DWG NO 0101-00-1008 / REV A |
| | SCALE 2/1 | | CODE IDENT 23338 / SHEET 1 OF 1 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| B | ECN 1674 | RO | 6/5/78 | |
| C | ECN 1800 | JRM | 9-5-80 | |
| D | ECN 2090 | DC | 12-3-80 | |
| E | ECN #[illegible] | [illegible] | [illegible] | |
| F | ECN 2481 | LOU | 11-7-84 | |
| G | ECN #2801 | DC | 8-3-88 | |
| H | 3195, 3196 | JM | 5/24/89 | |
| / | 3018 (CL II) | JM | 3/22/89 | |
| J | ECN 4417 | KA | 9/16/89 | |
| K | ECN 4674 | KA | 7/31/95 | |
| L | 4664 | DAM | 7/22/95 | |
| M | 7554 | PT | 7/7/96 | |
| N | 89-410 | BG | 10/24/89 | KA |

+15V E9 → P1-6

GND E10 → P1-2

-15V E11 → P1-7

E12 LAMP F/P

E13 LAMP F/P

± 15V REGULATOR

+24V E14 → P1-9

-24V E15 → P1-8

± 24V REGULATOR

+5V E16 → P1-3

+5,-5.2V REGULATOR

145 ONLY

LAST REF DES USED
C67
CR36
FB9
IC14
RT2
SW4
Q21
F2

1. RESISTORS ARE 1/8W, 1% MF
2. RESISTANCE IN OHMS
3. CAPACITANCE IN MICROFARADS
4. * = M.P. 10K RESISTORS

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES
MATERIAL
FINISH WAVETEK PROCESS
DRAWN D. COOPER 1/10/76
PROJENGR 3/20/92
RELEASE APPROV 3-23-77
TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1 XX ±.030
DO NOT SCALE DWG
SCALE

WAVETEK SAN DIEGO • CALIFORNIA

TITLE
SCHEMATIC
TRIG/PULSE BOARD

MODEL NO. 143/145
DWG NO. 0103-00-0565
REV N
CODE IDENT 23338
SHEET 1 OF 2

0103-00-0565 N

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## TRIGGER SQUARING CIRCUIT

## TRIGGER/PULSE LOGIC

## PULSE DELAY ONE-SHOT (MODEL 145 ONLY)

## PULSE WIDTH ONE-SHOT (MODEL 145 ONLY)

## PULSE OUTPUT BUFFERS (MODEL 145 ONLY)

## SYNC OUT BUFFER

## STOP/START (MODEL 143 ONLY)

6. **SELECTED COMPONENT
5. * NOMINAL VALUE CALLED OUT ON P/L.
4. ALL DIODES ARE FD6666
3. ALL RESISTORS ARE 1/8 W, 1%, MF
2. CAPACITANCE IN MICROFARADS
1. RESISTANCE IN OHMS

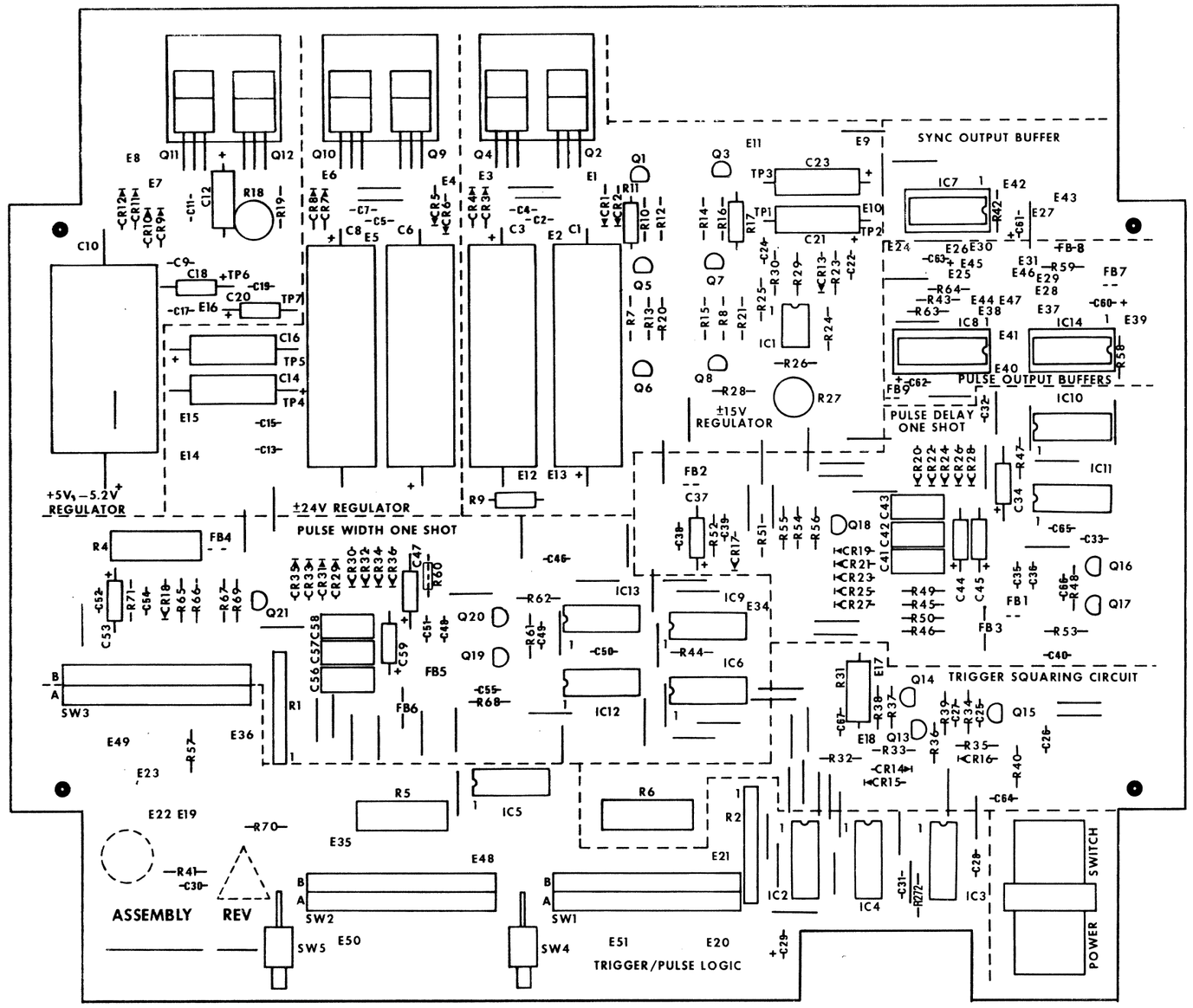
NOTE: UNLESS OTHERWISE SPECIFIED

E49 DETENT SW3
E50 DETENT SW2
E51 DETENT SW1

NOT USED
E32
E33

| | | | | |
|---|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 1/12/76 | WAVETEK SAN DIEGO • CALIFORNIA | |
| MATERIAL | PROJ MGR | | TITLE: SCHEMATIC TRIG/PULSE BOARD | |
| FINISH WAVETEK PROCESS | RELEASE APPROV | | | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | | |
| | DO NOT SCALE DWG | | MODEL NO. 143/145 | DWG NO. 0103-00-0565 REV N |
| | SCALE | | CODE IDENT 23338 | SHEET 2 OF 2 |

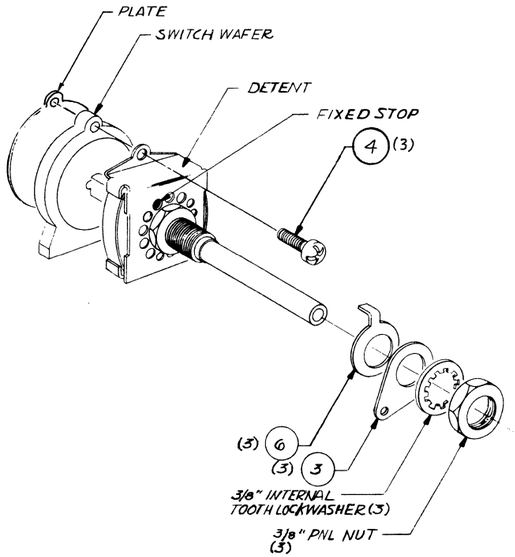
0103-00-0565 N



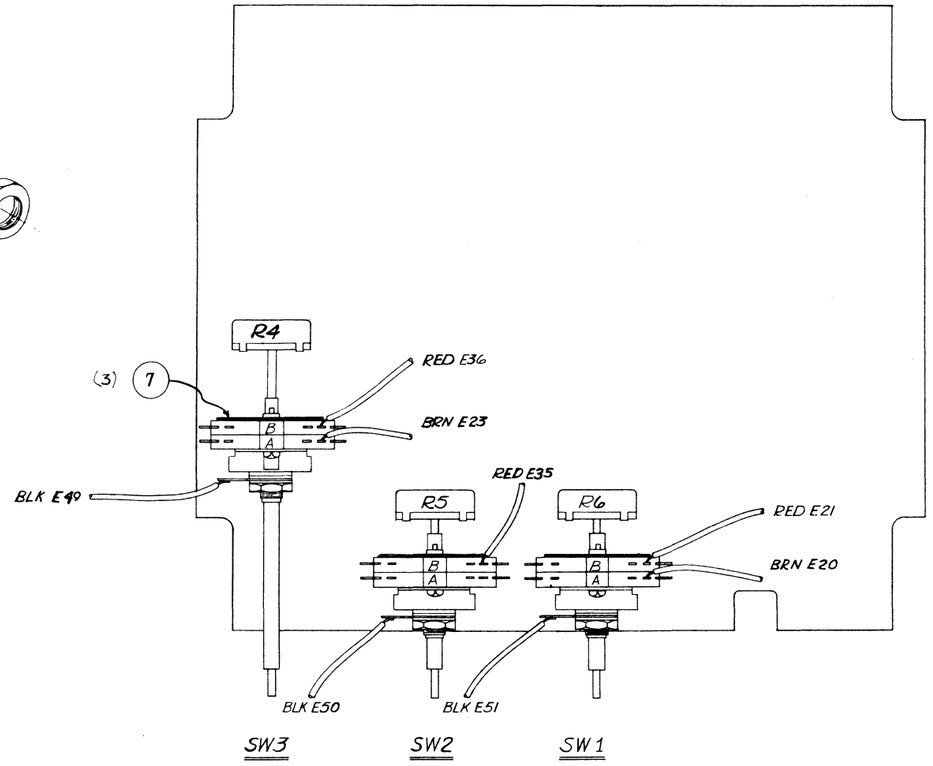

MADE FROM 0100-00-0565-3G

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: PCA, TRIG/PULSE BD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145 / DWG NO 1100-00-0565 / REV |
| | SCALE | | CODE IDENT 23338 / SHEET OF |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

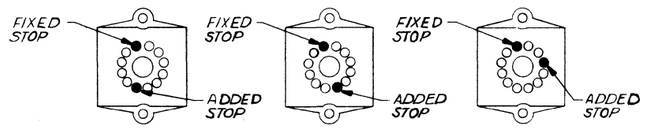



TYPICAL HARDWARE STACK-UP










DETENT SHOWN FROM FRONT VIEW IN FULL COUNTER CLOCKWISE POSITION

NOTE UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D. COOPER | DATE 12/77 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: ASSEMBLY TRIG/PULSE BD. |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | MODEL NO 145 | DWG NO 0101-00-0565 REV N |
| | SCALE | CODE IDENT 23338 | SHEET 2 OF 2 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG TRIG/PULSE | 0101-00-0565 | WVTK | 0101-00-0565 | 1 |
| NONE | SCHEMATIC TRIG/PULSE | 0103-00-0565 | WVTK | 0103-00-0565 | 1 |
| NONE | KIT, PRE WAVE LOAD 145-0565 | 145-1557 | WVTK | 1208-00-1557 | 1 |
| NONE | BRKT, HEAT SINK | 182-308 | WVTK | 1400-00-5143 | 3 |
| NONE | SUPER KIT | 2500-0145-02 | WVTK | 2500-0145-02 | 1 |
| NONE | SUPER KIT | 2500-0145-03 | WVTK | 2500-0145-03 | 1 |
| NONE | STANDOFF 1.750 H, .250 HEX4-40 | P-609-M03-F05-440 | UNICP | 2800-02-0016 | 4 |
| 1 | WASHER | 5607-150 | SESTM | 2800-11-0015 | 6 |
| 5 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 6 |
| 37 | LOCK WASHER, INTERNAL TOOTH, SS #4 | MS 35333-70 | CMRCL | 2800-45-4001 | 4 |
| 36 | SCREW PLPS PAN M/S 18-8 S/S 4-40X1/4 | MS 51957-13 | CMRCL | 2800-48-4104 | 4 |
| 4 | MS, PH, PHLPS, 4-40 X 1/2, SS 18-8 SS, #4-40X1/2 | MS 51957-17 | CMRCL | 2800-48-4108 | 6 |
| 7 | NUT, MACHINE SCREW, 18-8 SS, #4-40 | NAS 671C4 | CMRCL | 2800-50-4100 | 6 |
| 2 | INSULATOR(TO-220) | 60-11-8302-1674 | CHOMR | 3100-00-0010 | 6 |
| R26 | RES, MF, 1/8W, 1%, 8.06K | RN55D-8061F | TRW | 4701-03-8061 | 1 |
| Q4 | TRANS, NPN, TO-220 | TIP-29 | MOT | 4902-00-0290 | 1 |
| Q2 | TRANS, PNP, TO-220 | TIP30 | TI | 4902-00-0300 | 1 |
| SW5 | SWITCH, TDPDLE | 7103 P3Y9AV2Q | C&K | 5106-00-0019 | 1 |
| SW4 | SWITCH, TDPDLE | 7108 P3Y9AV2Q | C&K | 5106-00-0020 | 1 |
| Q9 | VOLT REGULATOR, POSITIVE | 7824 | FAIR | 7000-78-2400 | 1 |
| Q12 | VOLT REGULATOR, NEGATIVE | MC7905CP | MOT | 7000-79-0500 | 1 |
| Q10 | VOLT REGULATOR, NEGATIVE | 7924 | FAIR | 7000-79-2400 | 1 |
| Q11 | VOLT REGULATOR | MA7805UC | FAIR | 8000-78-0500 | 1 |
| IC8 | XLATR, 4 TTL-ECL, ECL | MC10124P | MOT | 8001-01-2400 | 1 |
| IC14 IC7 | LINE DRIVERS, DUAL 4 INPUT POSITIVE-NAND 50 OHM | 74S140 | TI | 8007-41-4001 | 2 |

WAVETEK PARTS LIST | TITLE PCA, TRIGGER/PULSE | ASSEMBLY NO. 1100-00-0565 | REV U



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG TRIG/PULSE | 0101-00-0565 | WVTK | 0101-00-0565 | 1 |
| NONE | SCHEMATIC TRIG/PULSE | 0103-00-0565 | WVTK | 0103-00-0565 | 1 |
| C50 C65 | CAP, CER DISK, 5PF, 1KV, 10% | 0311-00018 | WVTK | 1500-00-5011 | 2 |
| C27 | CAP, CER, 10PF, 1KV | DD-100 | CRL | 1500-01-0011 | 1 |
| C11 C17 C19 C2 C22 C24 C25 C26 C32 C35 C36 C38 C39 C4 C46 C4B C5 C51 C52 C54 C64 C7 C9 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNG | 1500-01-0310 | 23 |
| C13 C15 | CAP, CER, MON, .1MF, 50V, AXIAL | CAC03Z5U104Z050A | CORNG | 1500-01-0405 | 2 |
| C30 C49 C66 | CAP, CER, 22PF, 1KV | DD-220 | CRL | 1500-02-2011 | 3 |
| C67 | CAP, CER, 33PF, 1KV | DD-330 | CRL | 1500-03-3011 | 1 |
| C31T C33 | CAP, MICA, 220PF, 500V, RADIAL | DM15-221J | ARCO | 1500-12-2100 | 2 |
| C40T C55T | CAP, MICA, 50PF, 500V | DM15-500J | ARCO | 1500-15-0000 | 2 |
| C28T | CAP, MICA, 560PF, 300V | DM15-561J | ARCO | 1500-15-6100 | 1 |
| C21 C23 | CAP, ELECT, 100MF, 16V | ECEB1CU101 | PANAS | 1500-31-0101 | 2 |
| C1 C3 | CAP, ELECT, 1000MF, 35V | 39D108G035BL6 | SPRAG | 1500-31-0212 | 2 |
| C29 C60 C61 C62 C63 | CAP, ELECT, 22MF, 25V, RA | SRA25VB22RM6X7LL | UNCON | 1500-32-2002 | 5 |
| | DIAL | | | | |
| C10 | CAP, ELECT, 4000MF, 15V | TC0402U015N1L | MAL | 1500-34-0211 | 1 |
| C14 C16 | CAP, ELECT, 50MF, 50V | 50DD5060050DD7 | SPRAG | 1500-35-0003 | 2 |
| C6 C8 | CAP, ELECT, 500MF, 50V | 39D507G050BL4 | SPRAG | 1500-35-0103 | 2 |
| C41 C56 | CAP, MYLAR, .001MF100V | 225P10291WD3 | SPRAG | 1500-41-0204 | 2 |
| C42 C57 | CAP, MYLAR, .01MF, 100V | 225P10391WD3 | SPRAG | 1500-41-0314 | 2 |
| C43 C58 | CAP, MYLAR, .1MF, 100V | 225P10491WD3 | SPRAG | 1500-41-0444 | 2 |
| C44 C59 | CAP, TANT, 1MF, 35V | 150D105X9035A2 | SPRAG | 1500-71-0502 | 2 |
| C45 | CAP, TANT, 10MF, 20V | 150D106X9020B2 | SPRAG | 1500-71-0601 | 1 |
| C18 C20 C34 C47 | CAP, TANT, 33MF, 10V | 150D336X9010B2 | SPRAG | 1500-73-3601 | 4 |
| C12 C37 C53 | CAP, TANT, 5.6MF, 35V | 150D565X9035B2 | SPRAG | 1500-75-6502 | 3 |
| NONE | TRIGGER/PULSE REF: SPEC 0008-00-0455 REV C | 145-0565 | WVTK | 1700-00-0565 | 1 |
| NONE | SKT, IC, 16PIN | DILB16P-108T | BURND | 2100-03-0028 | 1 |
| NONE | SKT, IC, 14 PIN | DILB14P-108T | BURND | 2100-03-0066 | 2 |
| FB1 FB2 FB3 FB4 FB5 FB6 FB7 FB8 FB9 | FERRITE BEAD | 56-590-65/3B | FERRX | 3100-00-0001 | 9 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0565 | ASSEMBLY NO. 1208-00-1557 | REV U



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R27 | POT, TRIM, 1K | 91AR1K | BECK | 4600-01-0209 | 1 |
| R18 | POT, TRIM, 20 | 91AR20 | BECK | 4600-02-0000 | 1 |
| R11 R17 | RES, C, 1/2W, 5%, 4.7 | RC-1/2-4R7J | STKPL | 4700-25-0479 | 2 |
| R9 | RES, C, 1/2W, 5%, 220 | RC-1/2-221J | STKPL | 4700-25-2200 | 1 |
| R31 | RES, C, 1W, 10%, 10K | RC32GF103J | AB | 4700-35-1002 | 1 |
| R33 R41 R54 R67 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 4 |
| R13 R15 R20 R21 R48 R61 | RES, MF, 1/8W, 1%, 1K | RN55D-1001F | TRW | 4701-03-1001 | 6 |
| R45 R46 R49 | RES, MF, 1/8W, 1%, 10K | RN55D-1002F | TRW | 4701-03-1002 | 3 |
| R47 R53 R60 R68 | RES, MF, 1/8W, 1%, 10 | 5043ED10R100F | MEPCO | 4701-03-1009 | 4 |
| R39 | RES, MF, 1/8W, 1%, 1.5K | RN55D-1501F | TRW | 4701-03-1501 | 1 |
| R32 | RES, MF, 1/8W, 1%, 15K | RN55D-1502F | TRW | 4701-03-1502 | 1 |
| R35 | RES, MF, 1/8W, 1%, 1.78K | RN55D-17B1F | TRW | 4701-03-17B1 | 1 |
| R272 | RES, MF, 1/8W, 1%, 200 | RN55D-2000F | TRW | 4701-03-2000 | 1 |
| R42 R44 R58 R59 | RES, MF, 1/8W, 1%, 2.21K | RN55D-2211F | TRW | 4701-03-2211 | 4 |
| R23 | RES, MF, 1/8W, 1%, 2.37K | RN55D-2371F | TRW | 4701-03-2371 | 1 |
| R51 R65 | RES, MF, 1/8W, 1%, 2.49K | RN55D-2491F | TRW | 4701-03-2491 | 2 |
| R37 | RES, MF, 1/8W, 1%, 24.9K | RN55D-2492F | TRW | 4701-03-2492 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0565 | ASSEMBLY NO. 1208-00-1557 | REV U



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R19 | RES, MF, 1/8W, 1%, 301 | RN55D-3010F | TRW | 4701-03-3010 | 1 |
| R57 R70 | RES, MF, 1/8W, 1%, 392 | RN55D-3920F | TRW | 4701-03-3920 | 2 |
| R24 | RES, MF, 1/8W, 1%, 3.92K | RN55D-3921F | TRW | 4701-03-3921 | 1 |
| R38T | RES, MF, 1/8W, 1%, 432 | RN55D-4320F | TRW | 4701-03-4320 | 1 |
| R7 R8 | RES, MF, 1/8W, 1%, 4.75K | RN55D-4751F | TRW | 4701-03-4751 | 2 |
| R10 R16 R43 R50 R62 R63 R64 | RES, MF, 1/8, 1%, 499 | RN55D-4990F | TRW | 4701-03-4990 | 7 |
| R12 R14 R25 R34 R40 R52 R71 | RES, MF, 1/8W, 1%, 4.99K | RN55D-4991F | TRW | 4701-03-4991 | 7 |
| R56 R69 | RES, MF, 1/8W, 1%, 511 | RN55D-5110F | TRW | 4701-03-5110 | 2 |
| R28 | RES, MF, 1/8W, 1%, 5.76K | RN55D-5761F | TRW | 4701-03-5761 | 1 |
| R36 | RES, MF, 1/8W, 1%, 6.98K | RN55D-69B1F | TRW | 4701-03-6981 | 1 |
| R55 R66 | RES, MF, 1/8W, 1%, 78.7K | RN55D-7872F | TRW | 4701-03-7872 | 2 |
| R1 R2 | RES NETWORK 10K 2% 10PIN SIP BUSS | 4310R-101-103 | BOURN | 4770-00-0008 | 2 |
| R29 30 | RES, SET, 2-10K, 1/8W QTY: 2: 4701-03-1002 | 4789-00-0019 | IRC | 4789-00-0019 | 1 |
| B | RES, 0 OHM JUMPER | JP02T6B0 | ROHM | 4799-00-0087 | 9 |
| CR13 | DIODE, REFERENCE, LOW LEVEL, TEMP COMP | 1N4581 | MICRO | 4801-01-4581 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0565 | ASSEMBLY NO. 1208-00-1557 | REV U



NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, TRIGGER/PULSE |
| | PROJ. ENGR. | | |
| FINISH: WAVETEK PROCESS | RELEASE APPROV. | | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ± | | SIZE D \| FSCM NO. 23338 \| DWG. NO. 1100-00-0565 \| REV U; SCALE \| MODEL 145 \| SHEET 1 OF 2 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| CR1 CR10 CR11 CR12 CR2 CR3 CR4 CR5 CR6 CR7 CR8 CR9 | DIODE, 1N4002 GEN PURPOSE RECT. 100V, 1A | 1N4002 | FAIR | 4801-02-0001 | 12 |
| CR14 CR15 CR16 CR17 CR18 CR19 CR20 CR21 CR22 CR23 CR24 CR25 CR26 CR27 CR28 CR29 CR30 CR31 CR32 CR33 CR34 CR35 CR36 | DIODE 1N4148 COMPUTER, G/P, 75V, 200M A, SWITCHING | 1N4148 | FAIR | 4807-02-6666 | 23 |
| Q1 Q13 Q14 Q15 Q5 Q6 | TRANS, GENERAL PURPOSE, NPN, TO-92 | 2N3903 | NSC | 4901-03-9030 | 6 |
| Q17 Q18 Q20 Q21 Q3 Q7 Q8 | TRANS, GENERAL PURPOSE, PNP, TO-92 | 2N3905 | ITT | 4901-03-9050 | 7 |
| Q16 Q19 | TRANS, NPN, TO-92 | MPS2369 | MOT | 4902-02-3690 | 2 |
| IC1 | OP AMP, DUAL, HIGH GAIN, INTERNALLY COMP | MC1458P1 | MOT | 7000-14-5800 | 1 |
| IC3 | GATE, NAND, QUAD 2-INPUT | 7400 | TI | 8000-74-0000 | 1 |
| IC6 | GATE, NAND, QUAD 2-INP, TTL | SN74LS00N | TI | 8000-74-0010 | 1 |
| IC5 | BUF/DRIVERS, HEX, W/OC HIGH VOLTAGE OUTPUTS | 7407 | TI | 8000-74-0700 | 1 |
| IC4 | GATE AND, QUAD 2-INP, TTL | 74LS08 | TI | 8000-74-0810 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0565 | ASSEMBLY NO. 1208-00-1557 | REV U



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | KIT, HARNESS & WIRE -145 | 145-1562 | WVTK | 1207-00-1562 | 1 |
| NONE | ASSY, LAMP 143-145 | 143-145-1960 | WVTK | 1207-00-1960 | 1 |
| NONE | ASSY, COAX 143-145-0585 | 143-145-1962 | WVTK | 1207-00-1962 | 1 |
| NONE | ASSY, COAX 143-145-0585 | 143-145-1963 | WVTK | 1207-00-1963 | 1 |
| NONE | ASSY, COAX 145-0565 | 145-1978 | WVTK | 1207-00-1978 | 1 |
| NONE | ASSY, COAX 145-0565 | 145-1979 | WVTK | 1207-00-1979 | 1 |
| NONE | ASSY, COAX 145-0565 | 145-1980 | WVTK | 1207-00-1980 | 1 |
| NONE | ASSY, COAX 145-0565 | 145-1981 | WVTK | 1207-00-1981 | 1 |
| NONE | ASSY, COAX 145-0565 | 145-1982 | WVTK | 1207-00-1982 | 1 |
| NONE | ASSY, MOLEX CONNECTOR HARNESS 145-0565 | 145-1983 | WVTK | 1207-00-1983 | 1 |

WAVETEK PARTS LIST | TITLE SUPER KIT | ASSEMBLY NO. 2500-0145-02 | REV



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| IC10 IC12 | FLIP-FLOP DUAL D- POS EDGE TRIG | 74S74 | TI | 8000-74-7401 | 2 |
| IC2 | FLIP-FLOP DUAL, D-POS EDGE TRIG, TTL | 74LS74 | TI | 8000-74-7410 | 1 |
| IC9 | GATE, XOR QUAD 2INP TIONLY | SN74LS86N | TI | 8000-74-8611 | 1 |
| IC11 IC13 | GATE, NAND, S/TRIG, QUAD 2-INP POS | 74S132 | TI | 8007-41-3201 | 2 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-0565 | ASSEMBLY NO. 1208-00-1557 | REV U



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY, SWITCH SW-1 145-0565 | 145-1559 | WVTK | 1202-00-1559 | 1 |
| NONE | ASSY, SWITCH SW-2 145-0565 | 145-1560 | WVTK | 1202-00-1560 | 1 |
| NONE | ASSY, SWITCH SW-3 145-0565 | 145-1561 | WVTK | 1202-00-1561 | 1 |

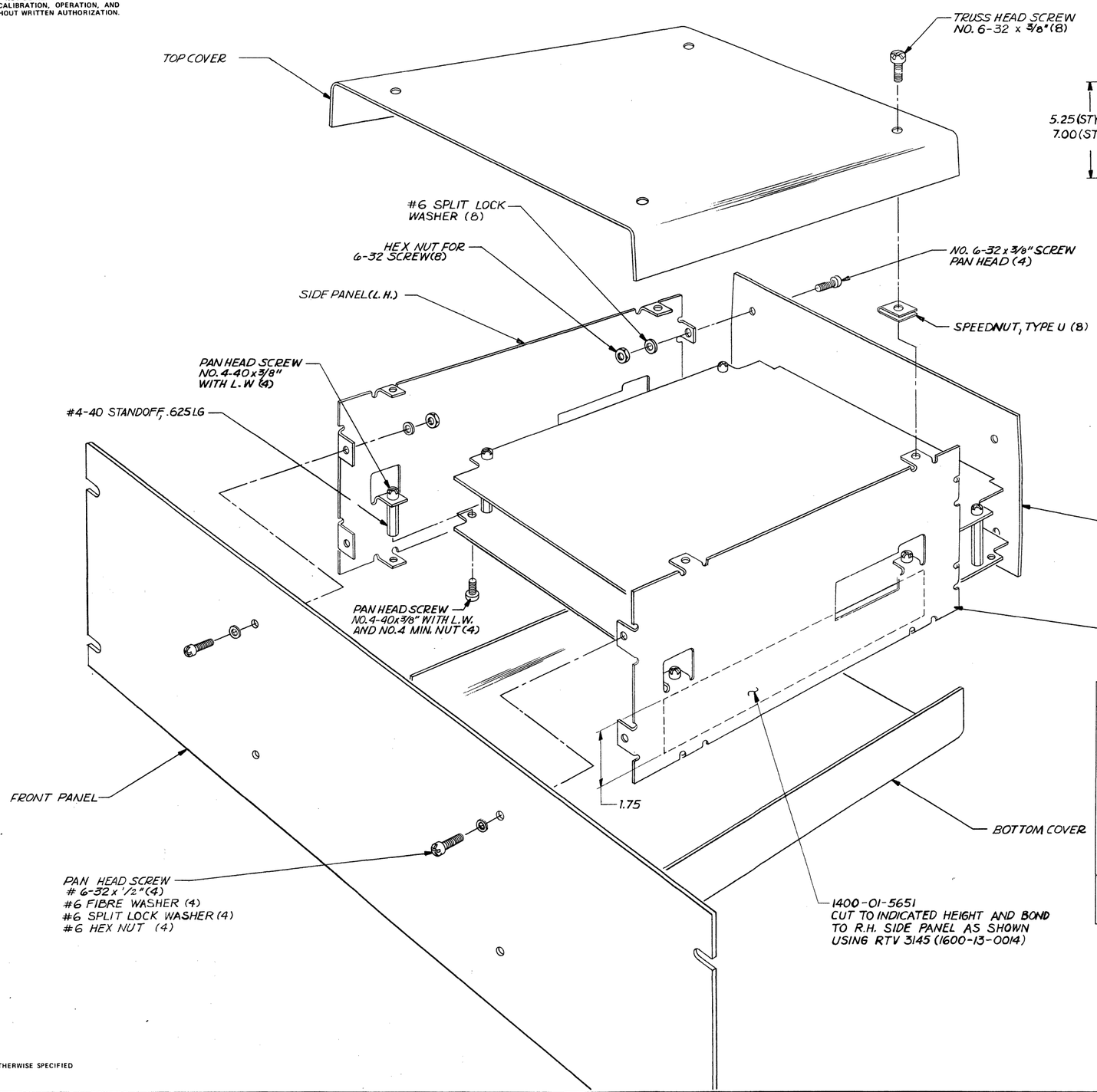
WAVETEK PARTS LIST | TITLE SUPER KIT | ASSEMBLY NO. 2500-0145-03 | REV

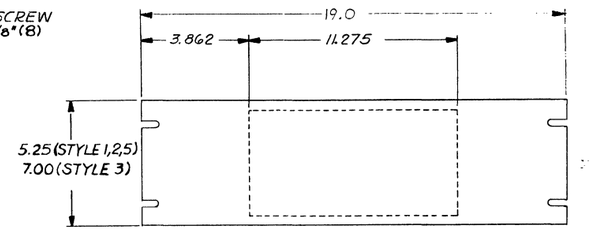


NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, TRIGGER/PULSE |
| | PROJ. ENGR. | | |
| | RELEASE APPROV. | | |
| FINISH WAVETEK PROCESS | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ± | | SIZE D \| FSCM NO. 23338 \| DWG. NO. 1100-00-0565 \| REV U |
| DO NOT SCALE DRAWING | | | SCALE \| MODEL 145 \| SHEET 2 OF 2 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| A | 4073 | J.C. | 12/6/82 | D.C. |
| B | 4610 | J.H.M. | 10-8-84 | A.L.T. |




| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | COVER, HALF, R/M | 183-5412 | WVTK | 1400-00-5412 | 2 |
| NONE | PL, SIDE, R/M, RH | 183-5443 | WVTK | 1400-00-5443 | 1 |
| NONE | PL, SIDE, R/M, LH | 183-5633 | WVTK | 1400-00-5633 | 1 |
| NONE | FRONT PANEL R/M | 145-7600 | WVTK | 1400-00-7600 | 1 |
| NONE | INSULATOR, R/M SIDE PANEL | 1400-01-5651 | WVTK | 1400-01-5651 | 1 |
| NONE | STANDOFF | 013-003-9 | WVTK | 1420-00-0093 | 4 |
| NONE | SPEEDNUT, TYPE/U | C8091-632-4 | TINN | 2800-09-0004 | 8 |
| NONE | WASHER, SHOULDER | 2661 | SMITH | 2800-27-0002 | 4 |

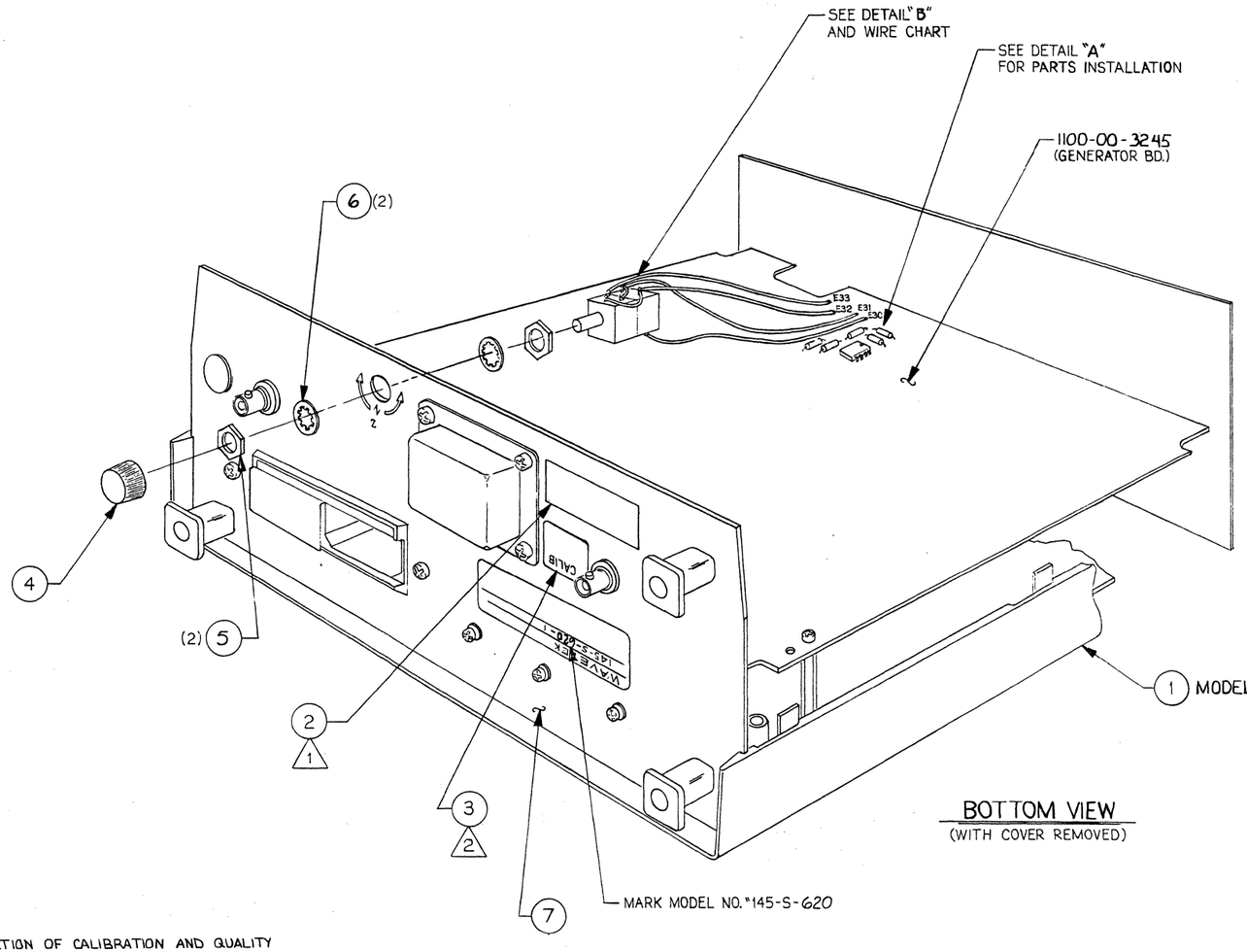
WAVETEK PARTS LIST | TITLE: R/M ASSY-MODEL 145 STYLE 1 | ASSEMBLY NO. 1101-00-2894 | REV | PAGE 1

NOTE: UNLESS OTHERWISE SPECIFIED

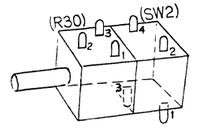
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN D.COOPER | DATE 4-29-7 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL // | PROJ ENGR | | TITLE: ASSEMBLY RACK MOUNT |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS // | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO. 143/145 | DWG NO. 0102-00-0621 REV B |
| | SCALE NONE | CODE IDENT 23338 | SHEET 1 OF 1 |

0102-00-0621 B

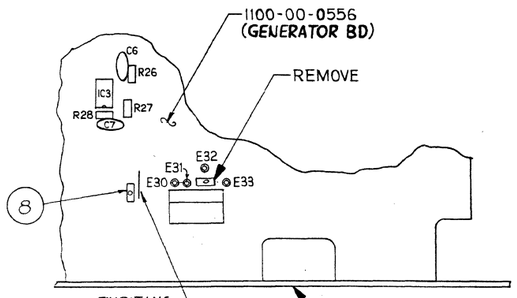
| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| A | ECO # 89-262 | MS | 4/21/89 | cmb |




BOTTOM VIEW
(WITH COVER REMOVED)




DETAIL "B"




DETAIL "A"
(SCALE: FULL)

| WIRE CHART | | | |
|---|---|---|---|
| FROM | TO | WIRE COLOR 22 GA | LENGTH |
| R30-1 | SW2-4 | BARE | 0.5 |
| SW2-4 | E31 | RED | 9.0 |
| R30-2 | SW2-2 | ORN | 1.0 |
| SW2-2 | E32 | ORN | 9.0 |
| R30-3 | SW2-3 | YEL | 1.5 |
| SW2-3 | E33 | YEL | 9.0 |
| SW2-1 | E30 | BRN | 9.0 |

2 UPON COMPLETION OF CALIBRATION AND QUALITY CONTROL ACCEPTANCE APPLY SIGNED CALIBRATION LABEL IN AREA INDICATED.

1 MARK LABEL FOR OPTION 002.

NOTE: UNLESS OTHERWISE SPECIFIED

REMOVE ALL BURRS AND BREAK SHARP EDGES
MATERIAL —
FINISH WAVETEK PROCESS —
DRAWN MELISSA SMITH DATE 4/21/89
PROJ ENGR.
RELEASE APPROV.
TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° .XX ±.030
DO NOT SCALE DWG
SCALE NONE

WAVETEK SAN DIEGO • CALIFORNIA

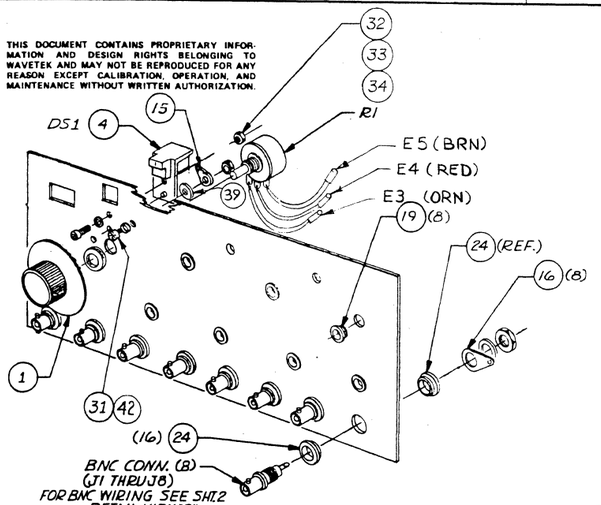
TITLE
MODEL 145-002 OPTION
SYMMETRY CONTROL

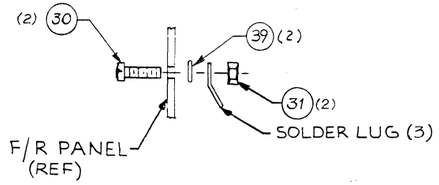
| MODEL NO. | DWG NO. | REV |
|---|---|---|
| 145-S-620 | 1101-00-3243 | A |

CODE IDENT 23338 SHEET 1 OF 3

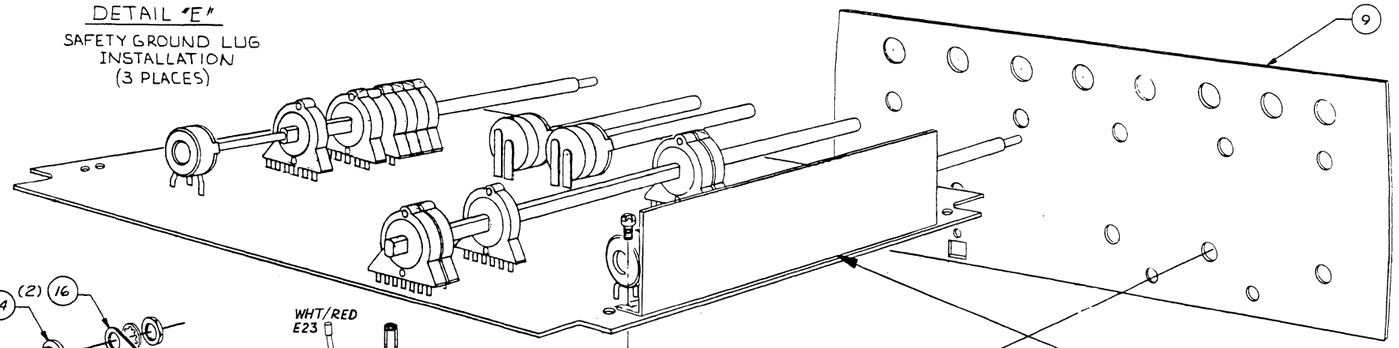
| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

NOTES:
ALL CONNECTIONS TO BE MECHANICALLY SECURE PRIOR TO SOLDERING GROUND WIRES.




DETAIL "E"
SAFETY GROUND LUG INSTALLATION (3 PLACES)

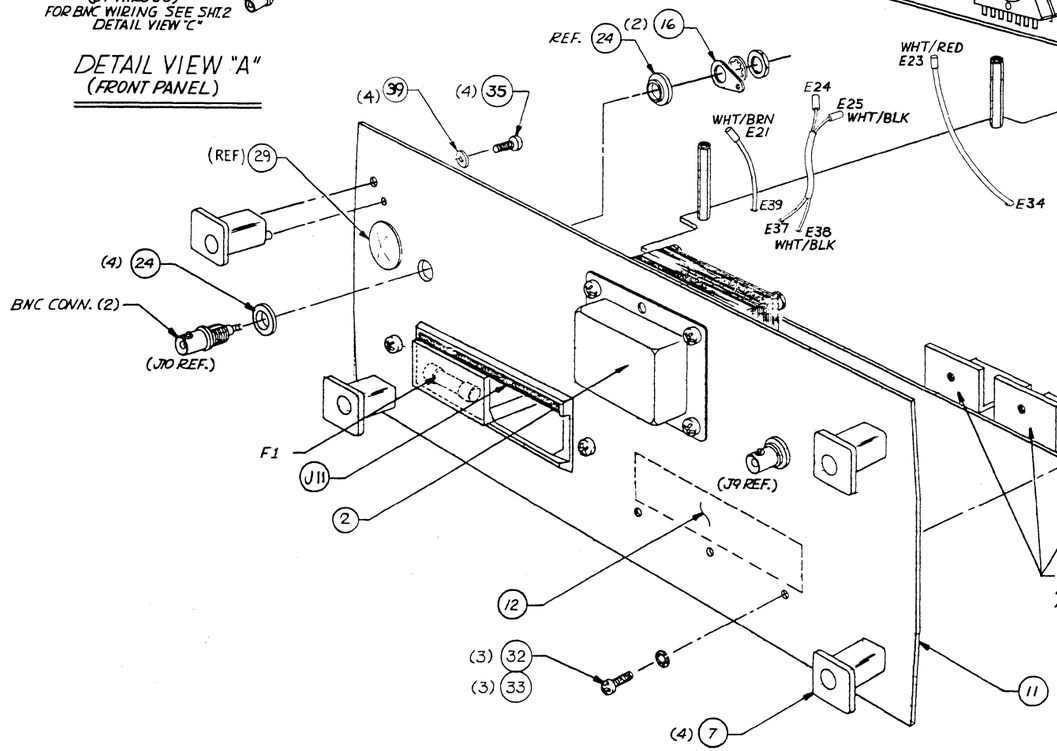


SEE DETAIL VIEW "A" (FOR FRONT PANEL)

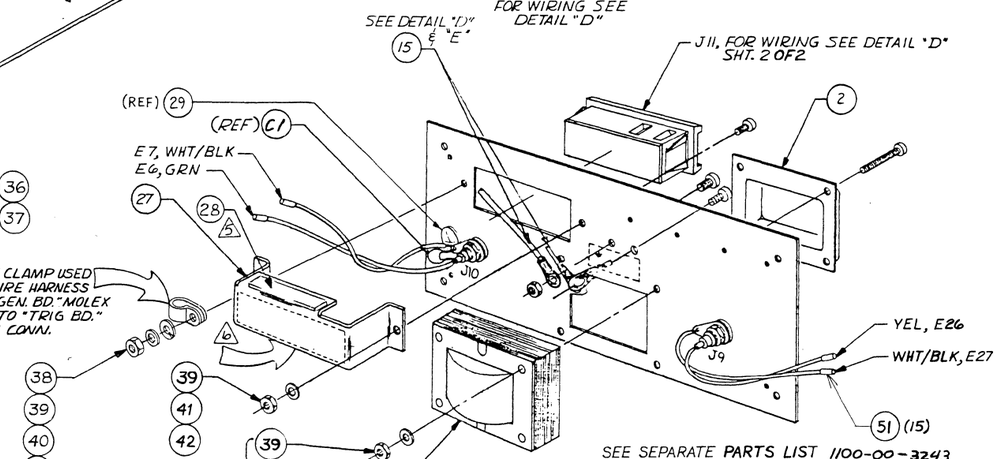
P.C. BD. ASS'Y. (1101-00-3245 REF.)

P.C. BD. ASS'Y. (0102-00-0565 REF.)

DETAIL VIEW "A"
(FRONT PANEL)




DETAIL VIEW "B"
REAR PANEL
FOR WIRING SEE DETAIL "D"




(2800-00-0022) CABLE CLAMP USED FOR WIRE HARNESS FROM "GEN. BD." MOLEX CONN., TO "TRIG BD." MOLEX CONN.




SEE SEPARATE PARTS LIST 1100-00-3243

SEE DETAIL VIEW "B" (FOR REAR PANEL)

7. AFTER INSTALLATION OF FRONT AND REAR FEET, APPLY (1) DROP OF LOCTITE 414 (OR EQUIV.) TO SCREW THREADS (6). ALLOW 1 HR. MIN. TO DRY WITH FEET UP.

△6 APPLY INSULATOR TO BOTTOM SIDE AS ARROW INDICATES

△5 INSTALL ITEM 28 USING DOW CORNING RTV 3140 TO COVER. THEN APPLY INSULATOR. SEE △6

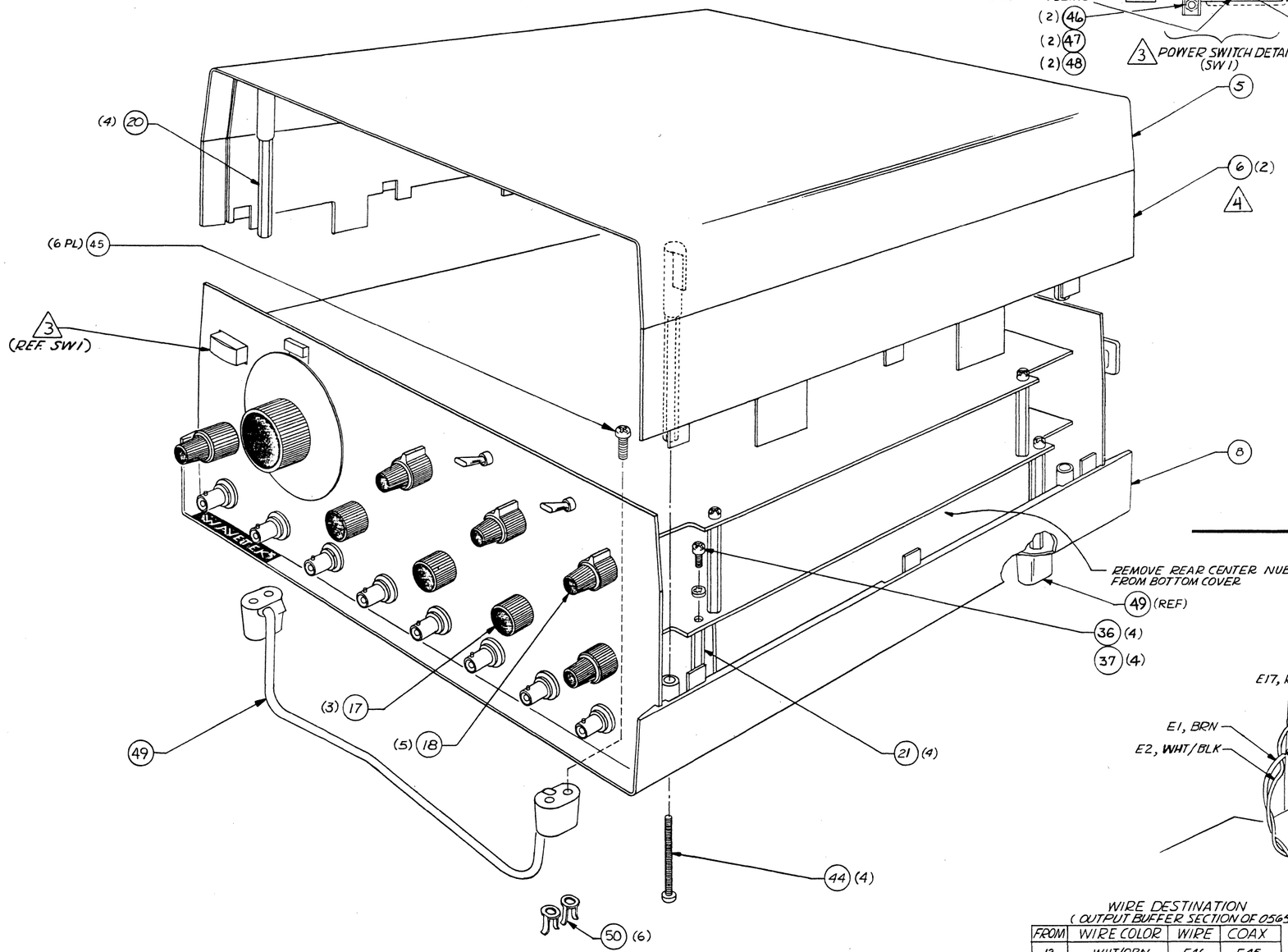
△4 CEMENT ITEM 6 (2) TO ITEM 5 (TYP. BOTH SIDES)

△3 MOUNT SWITCH TO P.C. BOARD PRIOR TO INSTALLING FRONT PANEL USE NO. 2-56 x 1/4 PAN HEAD SCREW WITH NUT (2)

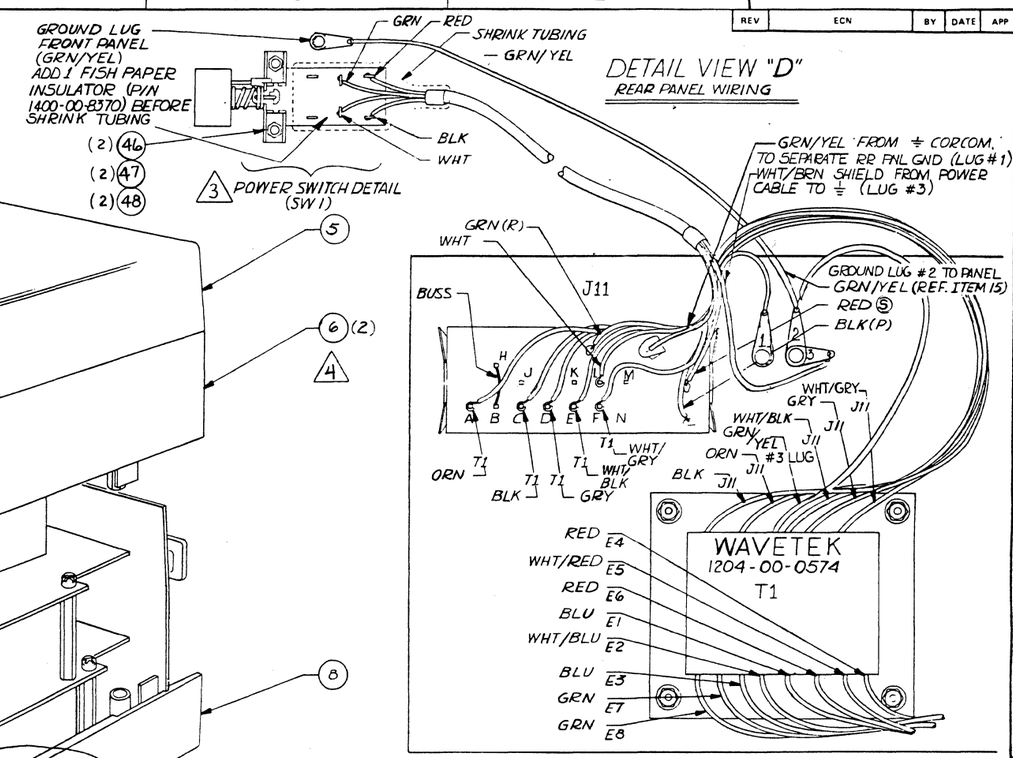
NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/20/89 | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: ASSEMBLY STANDARD CHASSIS |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | MODEL NO. 145-S-620 | DWG NO. 1101-00-3243 REV A |
| | SCALE | CODE IDENT 23338 | SHEET 2 OF 3 |

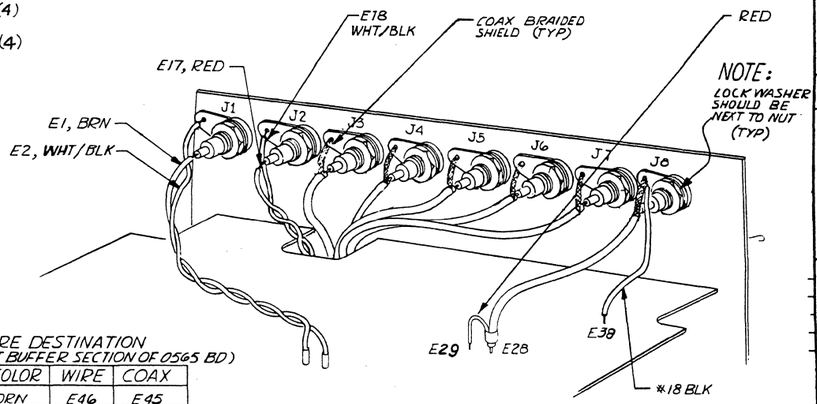
| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




## DETAIL VIEW "D"
REAR PANEL WIRING




## DETAIL VIEW "C"
BNC CONN. WIRING, FRONT PANEL




### WIRE DESTINATION
( OUTPUT BUFFER SECTION OF 0565 BD )

| FROM | WIRE COLOR | WIRE | COAX |
|---|---|---|---|
| J3 | WHT/ORN | E46 | E45 |
| J4 | WHT/YEL | E47 | E44 |
| J5 | WHT/GRN | E43 | E42 |
| J6 | WHT/BLU | E41 | E40 |
| J7 | WHT/VIO | E31 | E30 |

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/20/89 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ MGR | | TITLE: ASSEMBLY STANDARD CHASSIS |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145-S-620 · DWG NO 1101-00-3243 · REV A |
| | SCALE | | CODE IDENT 23338 · SHEET 3 OF 3 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DWG. 145-002 OPTION, SYMMETRY CONTROL | 0102-00-0487 | WVTK | 0102-00-0487 | 1 |
| NONE | PCA, TRIGGER/PULSE | 145-565 | WVTK | 1100-00-0565 | 1 |
| NONE | A/D CHASSIS 145-S-620 | 1101-00-3243 | WVTK | 1101-00-3243 | 1 |
| NONE | REAR PANEL ASSY 145-S-620 | 1200-00-3244 | WVTK | 1200-00-3244 | 1 |
| NONE | ASSY, FRONT PANEL -145 | 145-1555 | WVTK | 1206-00-1555 | 1 |
| 27 | SHIELD, PWR | 801-6210 | WVTK | 1400-00-6210 | 1 |
| NONE | INSULATOR PLATE REF: 3200-03-0004 | 145-3931 | WVTK | 1400-01-3931 | 1 |
| 18 | COAX KNOB SET | RB-67-1-SB+O-M-9 | ROGAN | 2400-01-0009 | 3 |
| NONE | CLAMP, CABLE | E-4 | RICH | 2800-00-0022 | 1 |
| 48 | WASHER, LOCK, SPLIT S/S #2 | MS35338-134 | MS | 2800-45-2000 | 2 |
| 33 | WASHER, LOCK REQ, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 3 |
| 39 | WASHER, LOCK, REQ S/S #6 | MS 35338-136 | CMRCL | 2800-45-6000 | 9 |
| 40 | WASHER, FLAT, SS, #6 | AN 960C6 | CMRCL | 2800-46-6001 | 1 |

WAVETEK PARTS LIST | TITLE: CHASSIS ASSY 145-S-620 | ASSEMBLY NO. 1100-00-3243 | PAGE 1 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CHASSIS | 0102-00-0575 | WVTK | 0102-00-0575 | 1 |
| T1 | TRANSFORMER | 143-574 | WVTK | 1204-00-0574 | 1 |
| NONE | ASSY, CONDUCTOR CABLE 143-145 | 143-145-1959 | WVTK | 1207-00-1959 | 1 |
| 2 | END BELL | 1400-00-0174 | WVTK | 1400-00-0174 | 1 |
| 7 | POST | 180-302 | WVTK | 1400-00-5020 | 4 |
| NONE | INSULATOR, PWR SWITCH REF: 1600-99-0001 | 801-6370 | WVTK | 1400-00-6370 | 1 |
| 2 | LABEL, OPTION, MODEL 23 | 1400-01-9890 | WVTK | 1400-01-9890 | 1 |
| 11 | REAR PANEL | 1400-02-0600 | | 1400-02-0600 | 1 |
| C1 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNG | 1500-01-0310 | 1 |
| J10 J9 | CONN BNC | KC-7946 | KING | 2100-01-0002 | 2 |
| J11 | CONN, RECEPTACLE | 6VJ1 | CORCM | 2100-03-0026 | 1 |
| 16A | SOLDER LUG | 1497 | SMITH | 2100-04-0012 | 2 |
| 15A | SOLDER LUG | 11A144 | ZIER | 2100-04-0025 | 3 |
| 4 | KNOB STD | RB-67-1-SB-M | ROGAN | 2400-01-0008 | 1 |
| F1 | FUSE, 1/2A, 250V | 313.500 | LITFU | 2400-05-0010 | 1 |

WAVETEK PARTS LIST | TITLE: REAR PANEL ASSY 145-S-620 | ASSEMBLY NO. 1200-00-3244 | PAGE 1 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CHASSIS | 0102-00-0575 | WVTK | 0102-00-0575 | 1 |
| NONE | DIAL ASSY-145 | 1201-00-1885 | WVTK | 1201-00-1885 | 1 |
| 4 | INDICATOR, DIAL | 180-303 | WVTK | 1400-00-4970 | 1 |
| 9 | PANEL, FRONT | 145-6770 | WVTK | 1400-00-6770 | 1 |
| J1 J2 J3 J4 J5 J6 J7 J8 | CONN BNC | KC-7946 | KING | 2100-01-0002 | 8 |
| 16 | SOLDER LUG | 1497 | SMITH | 2100-04-0012 | 8 |
| 15 | SOLDER LUG | 11A144 | ZIER | 2100-04-0025 | 1 |
| 19 | BUSHING NYLINER | 4L2FF | THOMN | 2800-01-0002 | 8 |
| 24 | WASHER, SHOULDER, WHITE | 2668 | SMITH | 2800-27-0004 | 16 |
| 55 | WASHER, WAVE SPRING | 5804-133-1 | SEA | 2800-28-0021 | 1 |
| 56 | WASHER, FLAT, BRASS, .025 ID, .400 OD | 5714-62-32 | SESTM | 2800-28-0022 | 1 |
| 33 | WASHER, LOCK REQ, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 1 |
| 32 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 1 |
| 42 | SCREW PLPS PAN M/S 18-8 S/S 6-32X3/8 | MS 51957-28 | CMRCL | 2800-48-6106 | 1 |
| 34 | NUT, MACHINE SCREW, | NAS 671C4 | CMRCL | 2800-50-4100 | 1 |

WAVETEK PARTS LIST | TITLE: ASSY, FRONT PANEL -145 | ASSEMBLY NO. 1206-00-1555 | PAGE 1 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | LARGE OUTLINE | | | | |
| 46 | SCREW PLPS PAN M/S 18-8 S/S 2-56X1/4 | SCREW PH 2-56X1/4S/S | CMRCL | 2800-48-2104 | 2 |
| 32 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 3 |
| 42 | SCREW PLPS PAN M/S 18-8 S/S 6-32X3/8 | MS 51957-28 | CMRCL | 2800-48-6106 | 1 |
| 38 | SCREW, MACH, PH, PHLPS, 6-32 X 1/2, SS 18-8 SS, #6-32X1/2 | MS 51957-30 | CMRCL | 2800-48-6108 | 1 |
| 47 | NUT, MACHINE SCREW, 18-8 SS, #2-56 | 2-56 M/S NUT 18-8 S/S | CMRCL | 2800-50-2100 | 2 |
| 41 | NUT, MACHINE SCREW, 18-8 SS, #6-32 | MS 35649-64 | CMRCL | 2800-50-6101 | 2 |

WAVETEK PARTS LIST | TITLE: CHASSIS ASSY 145-S-620 | ASSEMBLY NO. 1100-00-3243 | PAGE 2 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| 5 | NUT, PANEL, 3/8X1/2X.092, I | 3/8 X 1/2 NUT | CMRCL | 2800-16-0000 | 2 |
| 24 | WASHER, SHOULDER, WHITE | 2668 | SMITH | 2800-27-0004 | 4 |
| 6 | WASHER, INTERNAL TOOTH, 3/8 IN. | 3/8ITLW | CMRCL | 2800-28-0000 | 2 |
| 29 | PLUG BUTTON | 2663(BLACK) | HEYCO | 2800-35-0004 | 1 |
| 39 | WASHER, LOCK, REQ S/S #6 | MS 35338-136 | CMRCL | 2800-45-6000 | 4 |
| NONE | WASHER, FLAT, SS, #6 LARGE OUTLINE | AN 960C6 | CMRCL | 2800-46-6001 | 4 |
| 43 | MS, PH, PHLPS, 6-32 X 1 1/2, SS 18-8 SS, #6-32X1.5 | MS 51957-36 | CMRCL | 2800-48-6124 | 4 |
| 30 | SCREW, CAP, SOCKET HD, 6-32X3/8 | MS 16995-17 | CMRCL | 2800-49-6106 | 2 |
| 41 | NUT, MACHINE SCREW, 18-8 SS, #6-32 | MS 35649-64 | CMRCL | 2800-50-6101 | 4 |
| 31 | NUT, LOCKING, MS, 6-32, SS 18-8 SS, #6-32 | MS 20364-632 | CMRCL | 2800-50-6102 | 2 |
| 35 | SCREW, SELF-TAP, PH, PHLPS, #6 X 3/8, SS TYPE BF, #6X3/8 | MS24626-19 | CMRCL | 2800-59-6006 | 4 |
| R30 | CONTROL SHAFT, SWITCH-POT, CERMET, LINEAR 50K 10%, CCW DETENT | 72LIN04BS503W | AB | 4602-05-0304 | 1 |
| SW1 | SWITCH ASSY PB | 1XTA0003TA100B-W/NE152 | ECG | 5102-00-0008 | 1 |
| NONE | PWR CORD | 17251 | BELDN | 6001-80-0005 | 1 |

WAVETEK PARTS LIST | TITLE: REAR PANEL ASSY 145-S-620 | ASSEMBLY NO. 1200-00-3244 | PAGE 2 | REV B

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | 18-8 SS, #4-40 | | | | |
| 31 | NUT, LOCKING, MS, 6-32, SS 18-8 SS, #6-32 | MS 20364-632 | CMRCL | 2800-50-6102 | 1 |
| R1 | POT, DIAL, 5K+/-5%, PRECISION, LINEAR | ECONOPOT MKIII 78PF-14 | NEI | 4600-05-0212 | 1 |

WAVETEK PARTS LIST | TITLE: ASSY, FRONT PANEL -145 | ASSEMBLY NO. 1206-00-1555 | PAGE 2 | REV B

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST CHASSIS |
| | PROJ. ENGR. | | |
| FINISH: WAVETEK PROCESS | RELEASE APPROV. | | SIZE: D \| FSCM NO.: 23338 \| DWG. NO.: 1100-00-3243 \| REV: B |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS ± DECIMALS .XX ± .XXX ± ANGLES ± | | SCALE: 145-S-620 \| SHEET 1 OF 1 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| A | ECO # 89-262 | MS | 4/21/89 | |

YCG AMP

SYMMETRY CONTROL MODEL 143 ONLY

VCG DIAL BUFFER

GCV AMPLIFIER

POSITIVE CURRENT SOURCE

NEGATIVE CURRENT SOURCE

TRIGGER COMPENSATION

CAPACITANCE MULTIPLIER

J1 VCG IN

DIAL

CW

VERNIER

SW1-D

SW1-C

SW1-A

SW1-B

SW2

J7 MODEL 145 ONLY

J10 GCV OUT

I+ (2B8)

I- (2A8)

COMP. OUT (3C1)

CAP. MULTIPLIER OUT (2A8)

J1

SYNC → P1-1

GND → P1-2

+5V → P1-3

TRIG LOGIC → P1-4

STOP/START → P1-5

+15V → P1-6

-15V → P1-7

-24V → P1-8

+24V → P1-9

* * = NOMINAL VALUE CALLED OUT ON P/L.
1. = MATCHED SET OF 3 RESISTORS
1a = MATCHED PAIR OF FD-777 DIODES (OTHER ON SHT. 3 OF 4)
4. = SELECTED COMPONENT
5. = MATCHED SET OF (2) 2N5485
6. = MATCHED SET OF (2) 2N3563
6a = MATCHED SET OF (3) CAPACITORS
5a = MATCHED SET OF (8) FD777 DIODES
4. DIODES ARE FDG666
3. RESISTORS ARE 1/8W, 1% MF
2. CAPACITANCE IN MICROFARADS
1. RESISTANCE IN OHMS

NOTE: UNLESS OTHERWISE SPECIFIED

SEE SEPERATE PART LIST 1100-00-0556

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/21/89 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ. ENGR. | | TITLE: SCHEMATIC GENERATOR BOARD |
| | RELEASE APPROV. | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX : .010 ANGLES : 1 .XX : .030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 145-S-620 / DWG NO. 1104-00-3245 / REV A |
| | SCALE | | CODE IDENT 23338 / SHEET 1 OF 4 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## INTEGRATOR/ TRIANGLE AMPLIFIER

TP2
R64 10Ω
+15V
R62 1.5K
R63 1.5K
C29 .01
CR4 IN823A
C27 .01
CR5 IN823A
C30 .01
Q8 2N5485
R66 150
R65 33.2
C28 220Pf SM
Q12 2N3563
C26 100Pf SM
R67 316
C25 15Pf S.M.
R68 33.2
Q10 2N3905
C31 220Pf SM
R61 10
R69 33.2
R70 750
Q9 2N5485
R71 316
R72 33.2
Q11 2N3905
CR3 IN823A
C32 .01
R73 100
-15V
R74 10
C33 .01
GND

## HYSTERESIS SWITCH

R95 33.2
+15V
R93 500
R94 1K
R96 1.21K
R97 1.21K
R98 1K
R99 1K
C45 TRIM
R85 54.9 NOM.
C46 47Pf S.M.
R86 604
C47 68Pf S.M.
R88 316
R89 316
R91 604
C50 68Pf S.M.
R92 54.9 NOM.
C51 47Pf S.M.
C52 TRIM
R100 **
C53 .01
Q15 2N3640
R102 249
CR14
CR15
Q16 2N3640
R101 33.2
R103 33.2
C48 TRIM
R104 1K
Q17 2N3905
CR12 HP2811
CR13 HP2811
IC9 CA3049
R114 150
R115 392
C57 .01
C55 **
R106 464
R105 **
R108 1K
R109 33.2
R110 33.2
R111 1K
C49 **
R113 1.5K
R107 500
C54 .01
C56 .01
R112 10K
C58 .01
R116 10
-15V
GND

## TRIANGLE BUFFER

+15V
C65 5.6 35V
R117 4.99K
R118 100
C60 .01
R120 200
R123 10
R119 33.2
R122 909
C66 .01
Q19 2N3905
R125 825
R124 100
Q22 2N3903
TP3
C63 .01
TRI-FUNCTION (4B8,3B1)
R126 33.2
Q18 2N3563
Q20 2N3563
R130 33.2
TP4
R131 301K
C67 .1
R127 100
C61 5Pf
R128 100
R129 100
R140 33.2
CR16 IN4581
R137 249
R141 10
R136 7.5K
Q23 2N3905
C59 10Pf
R132 15K
R134 316
R138 7.5K
Q21 2N3903
R133 7.5K
C62 .01
R135 750
R139 10
C64 5.6 35V
C68 .01
-15V
GND
TP5

+15V
R284 2.15m
J2
-15V
N/C
1000-00-0221 OPTION 001 (5000 HOUR TIMER)

## SYNC AMPLIFIER

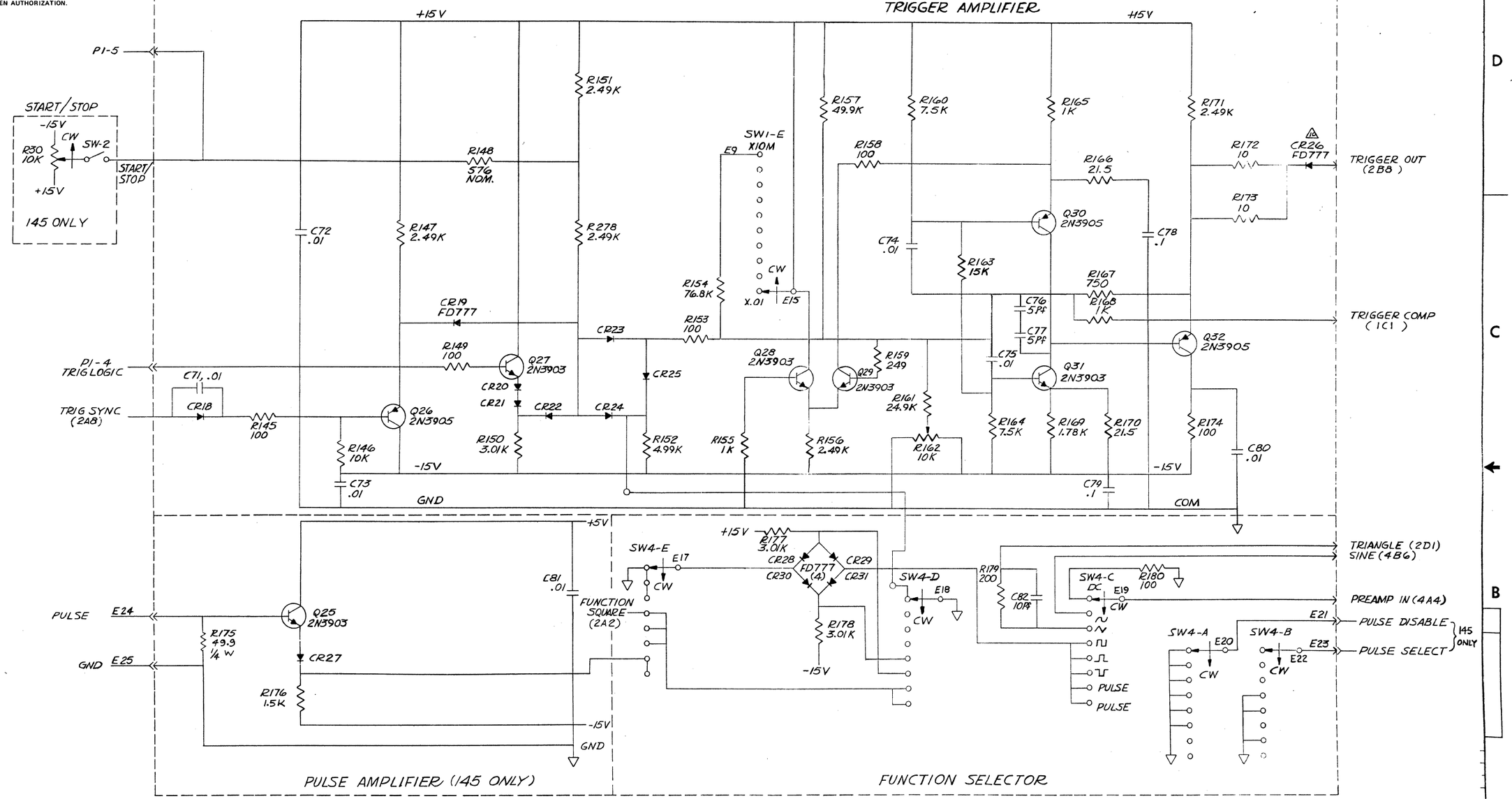
C69 22/25V
+5V
R144 249
R142 100
CR17
Q24 2N3905
P1-1 SYNC
-15V

I+ (IC2)
TRIG OUT (3D1)
SW1-F
X10M
X1M
X100K
X10K
X1K
X100
X10
X1
X.1
X.01
CW
E14
E16
C34 3.5/13 Pf
C35 **
C36 820Pf 1% S.M.
C37 .01
C38 .1
C39 1
FB
R75 33.2
CR8 FD777
CR6 FD777
CR7 FD777
CR9 FD777
R76 33.2
Q13 2N3903
R78 7.5K
R77 7.5K
R81 10
+15V
R80 3.65K
R79 33.2
CR10
CR11
C44 .01
Q14 2N3905
R82 33.2
R83 3.65K
R84 10
-15V
C40 3.5 13 Pf
C41 **
C42 .01
C43 .01
GND
CAP. MULTIPLIER OUT (1A3)
I⁻ (IC2)
TRIG. SYNC (3C7)
R143 215
SQUARE FUNCTION (3B5)

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/21/89 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: SCHEMATIC GENERATOR BOARD |
| | RELEASE, APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1° XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO. 145-S-620 | DWG NO. 1104-00-3245 REV A |
| | SCALE | CODE IDENT 23338 | SHEET 2 OF 4 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: SCHEMATIC GENERATOR BOARD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | MODEL NO: 145-S-620 | DWG NO: 1104-00-3245 REV: A |
| | SCALE | CODE IDENT: 23338 | SHEET 3 OF 4 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

## OUTPUT AMPLIFIER

+24V C85 .1 · C88 .1 · R188 2.49K · R189 2.49K · R191 3.65K · R192 33.2 · R193 392 · R194 392 · R195 392 · +24V · R281 24.9K

+15V · R181 100K · R182 150K · -15V · J9 EXT DC OFFSET · E26 · C83 .01 · R183 2K · R184 1.96K · C84 .01 · OFST · E27 · GND

CR32 · Q33 2N3905 · R190 750 · Q34 2N3905 · CR33 IN823A · Q36 2N3563 · Q38 2N5160 (HEAT SINK) · C89 .01

R196 10 · R197 100 nom. · C94 .1 · Q40 2N3903 · R211 1.1K · Q42 2N2219A · Q44 (HEAT SINK) 2N3866 · R215 61.9 · R218 15 · R216 100 · R220 15 · C95 27µF 35V · C96 1µF · R224 49.9 1/2W · R225 49.9 1/2W · R226 49.9 1/2W · R227 49.9 1/2W

CR34 · CR35 · R209 2K · CR36 · CR37

R185 500 VARIABLE · CW R186 249 · R187 T 27.4 · C87 100 PF · R200 1K · Q35 AD812 · R198 1.5K · R199 4.02K · -24V · C86 .1 · GND

C90 .01 · R201 46.4K · R203 10K · C92 .01 · Q37 2N3640 · R204 33.2 · Q39 2N3866 (HEAT SINK) · R202 3.65K · R205 464 · R206 464 · R207 464 · R208 100 NOM · C91 .1 · C93 .1 · GND

Q41 2N3905 · R212 1.1K · R214 100 · R217 61.9 · Q43 2N2905A · R219 15 · R221 15 · Q45 2N5160 (HEAT SINK) · C97, 1µF · E42 · C98 27µF/35V · R210 10 · R213 24.9K · -24V · GND

R287 4.7 · R286 100 · CR49 IN758A · CR50 IN758A · E41 · E40 · U12 LM337T · CUR. LMTR. P.C.

E43 · U13 LM317T · R284 100 · R285 4.7 · CUR. LMTR. P.C. · CR47 IN758A · CR48 IN758A · E44

## OUTPUT ATTENUATOR

SW5-C · SW5-A · SW5-B · CW · -20 · -40 · -60 · R230 249 · R235 56.2 · R231 499 · R228 909 · R252 4.99K · R229 124 1/4W · R233 121 1/4W · R234 61.9 · GND

FUNCTION OUT · E28 · E29 · E38 · E34 · E35 · E36 · E37 · E39 · DETENT GNDS.

## SINE CONVERTER

C111 5.6 · R237 23.7K · R238 8.25K · R239 11K · R240 11K · R241 150 · R242 249 · R243 576 · C99 220 PF S.M. NOM. · SINE FUNCTION (3B1) · R244 61.9

TRIANGLE FUNCTION (2D1) · R236 10 NOM · CR38 · CR40 · CR42 · CR44 · FD777 SET OF 8 · CR39 · CR41 · CR43 · CR45 · R245 249 · R246 576 · R247 150 · R248 23.7K · R249 8.25K · R250 11K · R251 11K · -15V · C112 5.6

## PRE-AMPLIFIER

+15V · +15V · R253 33.2 · R254 2.49K · R255 2.49K · CR46 · C101 .01 · Q46 2N3905 · R261 7.5K · R262 249 · Q49 2N3640 · R267 1.5K · R268 61.9 · C107 · C109 .1 · C103 .01 · R269 33.2 · C108 5 PF (NOM.) · Q47 2N3905 · R263 13K NOM. · R264 681 · R270 681 · R271 90.9 · R252 100K · R256 301K · C102 100 PF · R265 10K · R273 10 · R272 33.2 · Q51 2N3905 · Q48 AD812 · R259 499 · C104 .01 · Q50 2N3563 · R257 1K · R258 3.65K · R260 61.9 · R266 7.5K · R274 2.49K · R275 61.9 · C106 .1 · -15V · C105 .1 · GND · GND

PREAMP IN (3B1)

DC OFFSET: -15V · CW · OFF · R276 10K · SW3 · OFST · +15V · C110 .01

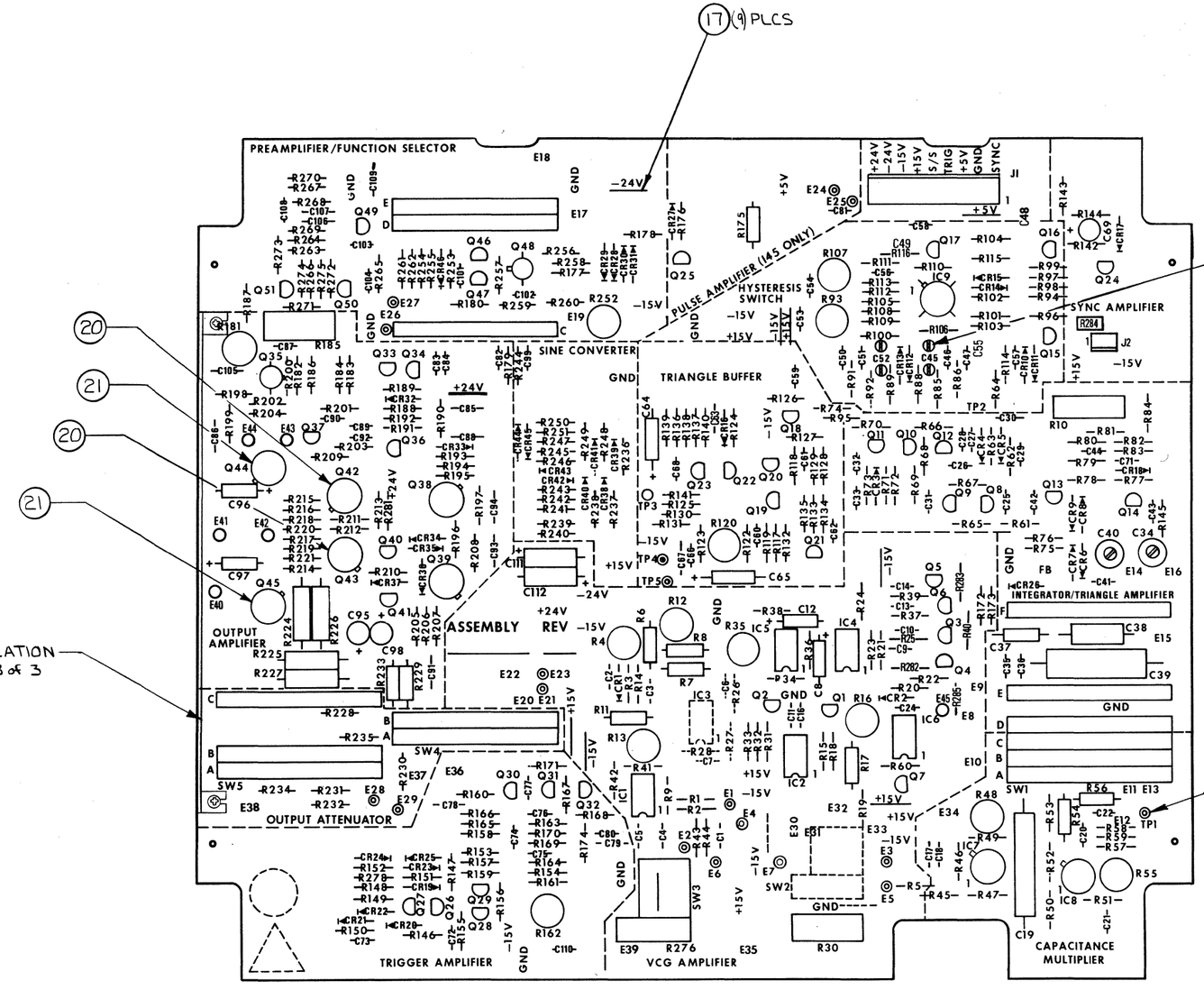
LAST REF. DES. USED
Q51
R283
C112
CR46
E34
TP5
SW-5

NOT USED:
C100
C15, C23,
RB7, R90, R280, R223

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/21/89 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: SCHEMATIC GENERATOR BOARD |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1° XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 145-S-620 · DWG NO. 1104-00-3295 · REV A |
| | SCALE | | CODE IDENT 23338 · SHEET 4 OF 4 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|
| A | ECO # 89-262 | MS | 9/24/89 | DMB |

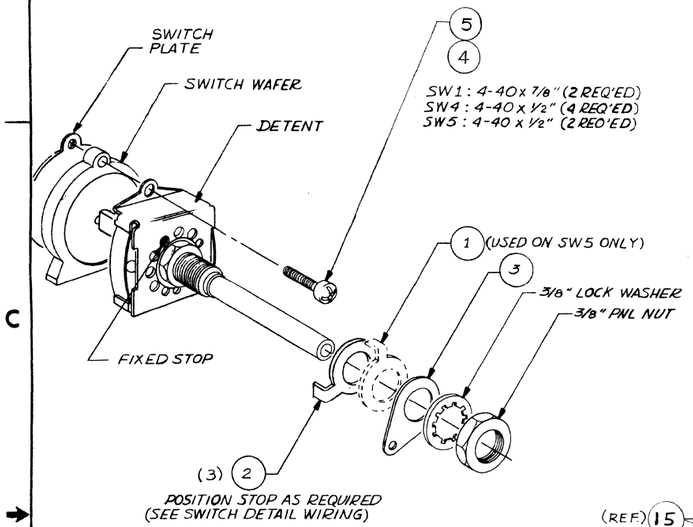



⚠1 TURN TO FULL COUNTER CLOCKWISE POSITION THEN TURN BACK CLOCKWISE ONE POSITION TO INSTALL BOTH STOPS.

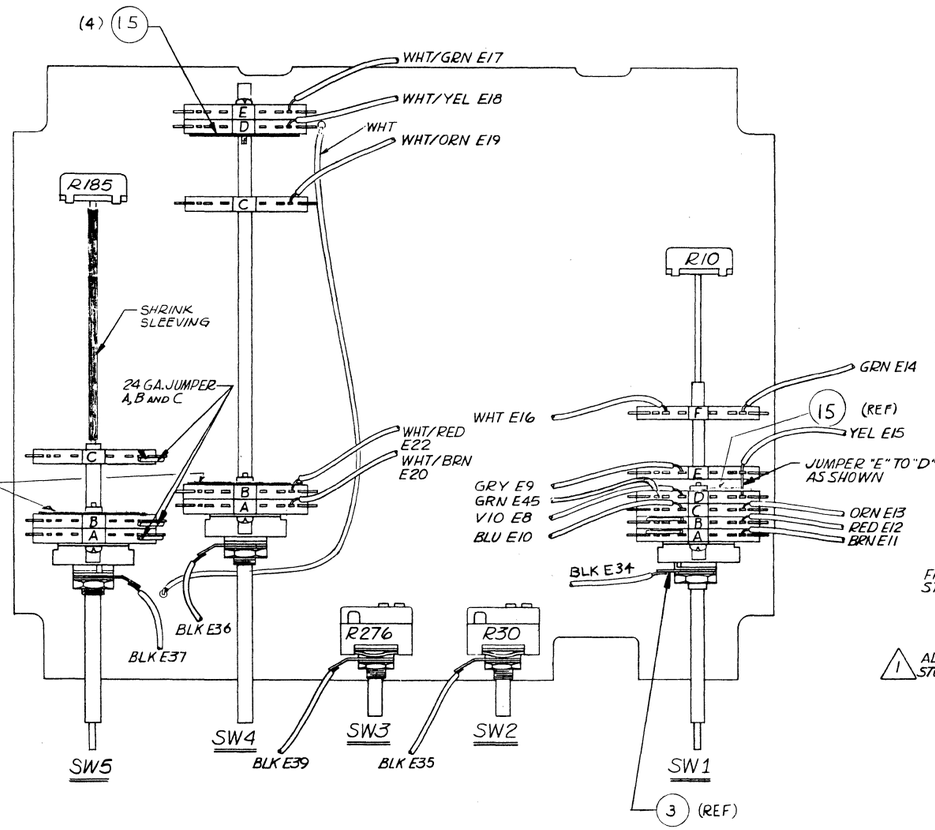
NOTE UNLESS OTHERWISE SPECIFIED

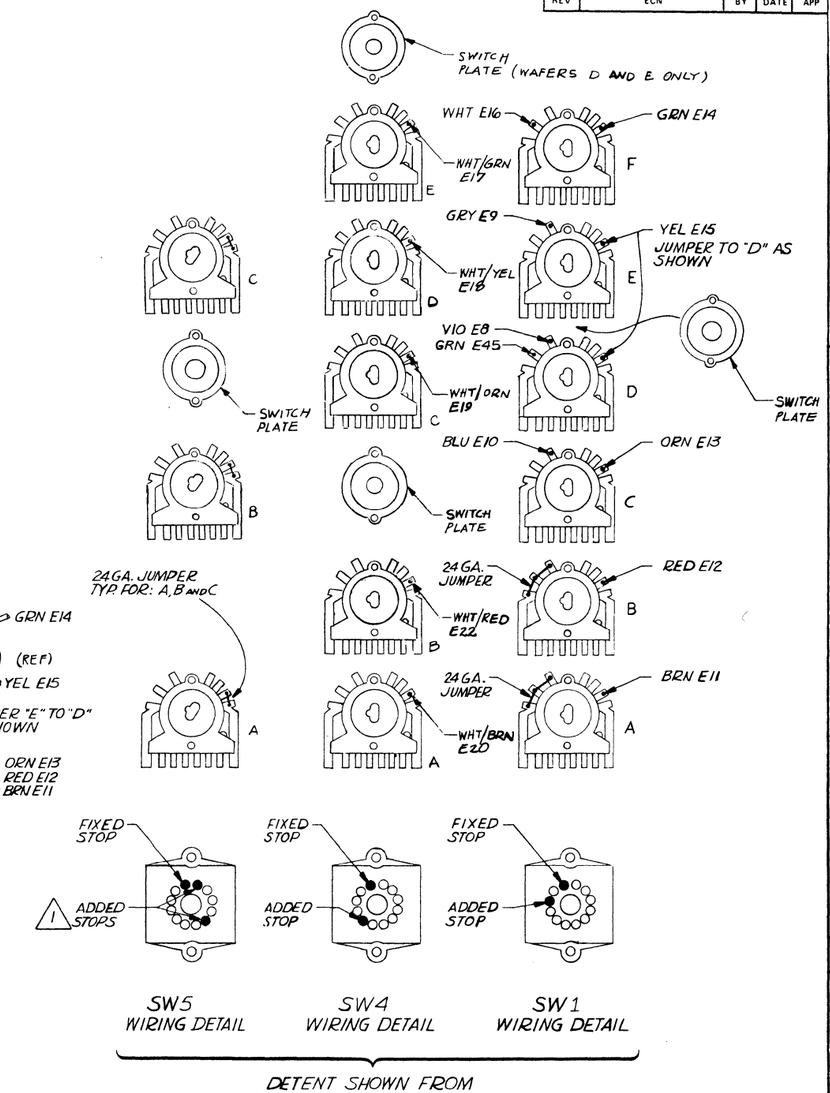
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 11/24/89 | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED D. Buzzell | 12/4/89 | TITLE: ASSEMBLY GENERATOR BOARD |
| | PROJ. ENGR. D. Fish | 6/23/89 | |
| FINISH WAVETEK PROCESS | RELEASE APPROV. D. Fish | 6/23/89 | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES .XX ±.01 .XXX ±.005 | SIZE D | FSCM NO. 23338 |
| | | DWG. NO. 1101-00-3245 | REV A |
| | | SCALE | MODEL 145-5-620 SHEET 1 OF 3 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




TYPICAL HARDWARE STACK-UP

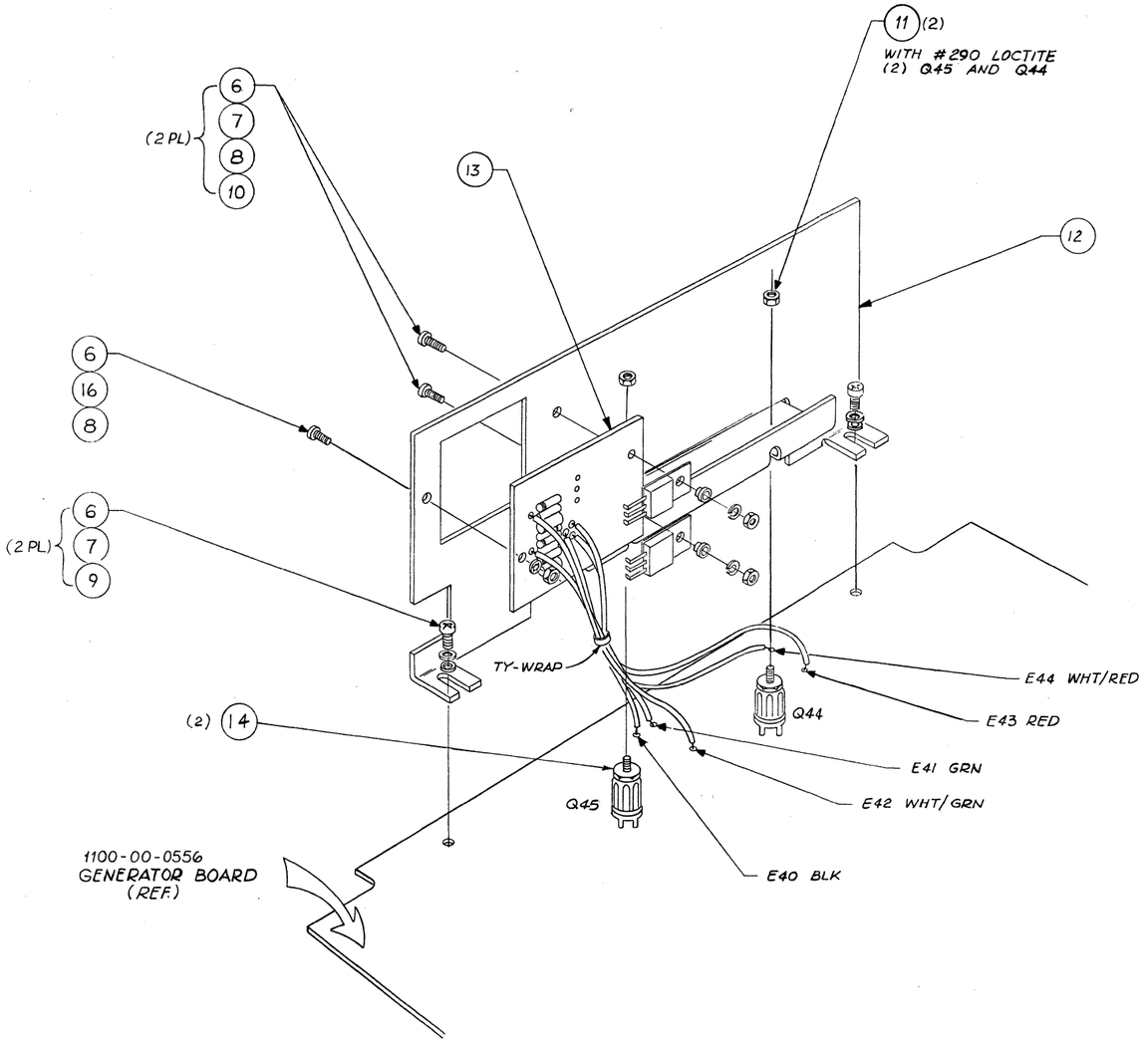



NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 4/2/89 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL — | PROJ ENGR | | TITLE: ASSEMBLY GENERATOR BOARD |
| FINISH WAVETEK PROCESS — | RELEASE APPROV | | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ± .010 ANGLES ± 1 XX ± .030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145-S-620 / DWG NO 1101-00-3245 / REV A |
| | SCALE | | CODE IDENT 23338 / SHEET 2 OF 3 |

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|




NOTE. UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN MELISSA SMITH | DATE 7/4/81 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE ASSEMBLY GENERATOR BOARD |
| | WELFARE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ± .010 ANGLES ±1 .XX ± .030 | | |
| | DO NOT SCALE DWG | | MODEL NO 145-S-620 DWG NO 1101-00-3245 REV A |
| | SCALE | | CODE IDENT 23338 SHEET 3 OF 3 |

BISHOP GRAPHICS/ACCUPRESS REORDER NO. A-3894

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | A/D GENERATOR BD 145-S-620 | 1101-00-3245 | WVTK | 1101-00-3245 | 1 |
| NONE | SCHEMATIC GENERATOR BD 145-S-620 | 1104-00-3245 | WVTK | 1104-00-3245 | 1 |
| 13 | PCA, CURRENT LIMITER | 143-1008 | WVTK | 1208-00-1008 | 1 |
| NONE | KIT, PRE WAVE LOAD 145-3245 | 1208-00-3246 | WVTK | 1208-00-3246 | 1 |
| C49 | CAP, CER, 56PF, 1KV | DD-560 | CRL | 1500-05-6001 | 1 |
| C37 38 39 | CAP SET, POLYC MIXED MATCHED SET | 1509-80-0008 | BISHO | 1509-80-0008 | 1 |
| J1 | CONN, 9PIN | 09-60-1091 | MOLEX | 2100-02-0052 | 1 |
| 18 | SOCKET, MINISERT | 75060-012 | BERG | 2100-03-0076 | 4 |
| NONE | KNOB STD | RB-67-1-SB-M | ROGAN | 2400-01-0008 | 3 |
| NONE | COAX KNOB SET | RB-67-1-SB+O-M-9 | ROGAN | 2400-01-0009 | 2 |
| NONE | SUPER KIT | 2500-0145-01 | WVTK | 2500-0145-01 | 1 |
| NONE | HEAT SINK | 207 | WAKE | 2800-11-0001 | 2 |
| NONE | TRANSIPAD | 531-218 | BIVAR | 2800-11-0004 | 2 |
| 14 | HEATSINK | 2606SH5E | WAKE | 2800-11-0012 | 2 |
| 11 | NUT, MACHINE SCREW, 18-8 SS, #6-32 SMALL PATTERN | NAS 671C6 | CMRCL | 2800-50-6100 | 2 |
| Q44 | TRANS | 2N3866 | MOT | 4901-03-8660 | 1 |
| Q45 | TRANS | 2N5160-18 | MOT | 4901-05-1600 | 1 |

WAVETEK PARTS LIST — TITLE: PCA, GENERATOR BD 145-S-620 — ASSEMBLY NO. 1100-00-3245 — REV B



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG, CURRENT LIMITER BOARD | 0101-00-1008 | WVTK | 0101-00-1008 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| 12 | HEATSINK BRACKET | 143-5083 | WVTK | 1400-01-5083 | 1 |
| NONE | CURRENT LIMITER BD REF: SPEC 0008-00-0455 REV C | 143-1008 | WVTK | 1700-00-1008 | 1 |
| 10 | WASHER | 5607-150 | SESTM | 2800-11-0015 | 2 |
| 7 | WASHER, LOCK REG, S/S #4 | MS 35338-135 | CMRCL | 2800-45-4000 | 2 |
| 16 | LOCK WASHER, INTERNAL TOOTH, SS #4 | MS 35333-70 | CMRCL | 2800-45-4001 | 1 |
| 6 | SCREW PLPS PAN M/S 18-8 S/S 4-40X3/8 | MS 51957-15 | CMRCL | 2800-48-4106 | 3 |
| 8 | NUT, MACHINE SCREW, 18-8 SS, #4-40 | NAS 671C4 | CMRCL | 2800-50-4100 | 3 |
| R285 R287 | RES, C, 1/2W, 5%, 4.7 | RC-1/2-4R7J | STKPL | 4700-25-0479 | 2 |
| R284 R286 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 2 |
| CR47 CR48 CR49 CR50 | DIODE, ZENER, 10V | 1N758A | FAIR | 4801-01-0758 | 4 |
| U13 | VOLT REGULATOR, 3 TERMINAL ADJUSTABLE | LM317T | NSC | 7000-03-1700 | 1 |
| U12 | POS VOLT REGULATOR | LM337T | NSC | 7000-03-3700 | 1 |

WAVETEK PARTS LIST — TITLE: PCA, CURRENT LIMITER — ASSEMBLY NO. 1208-00-1008 — REV B



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY DRWG GENERATOR | 0101-00-0556 | WVTK | 0101-00-0556 | 1 |
| NONE | SCHEMATIC GENERATOR | 0103-00-0556 | WVTK | 0103-00-0556 | 1 |
| C55 | CAP, CER, 5PF, 1KV | DD-050 LONG LEAD | CRL | 1500-00-5001 | 1 |
| C108T C61 C76 C77 | CAP, CER DISK, 5PF, 1KV, 10% | 0311-00018 | WVTK | 1500-00-5011 | 4 |
| C59 C82 | CAP, CER, 10PF, 1KV | DD-100 | CRL | 1500-01-0011 | 2 |
| C102 C87 | CAP, CER, 100PF, 1KV | DD-101 | CRL | 1500-01-0111 | 2 |
| C13 C22 C9 | CAP, CER, .001UF, 1KV | DD-102 | CRL | 1500-01-0211 | 3 |
| C1 C101 C103 C104 C11 C110 C16 C17 C18 C20 C21 C24 C27 C29 C3 C30 C32 C33 C4 C42 C43 C44 C5 C53 C54 C56 C57 C58 C6 C60 C62 C63 C66 C68 C7 C71 C72 C73 C74 C75 C80 C81 C83 C84 C89 C90 C92 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNG | 1500-01-0310 | 47 |
| C105 C106 C107 C109 C67 C78 C79 C85 C86 C88 C91 C93 C94 | CAP, CER, MON, .1MF, 50V, AXIAL | CAC03Z5U104Z050A | CORNG | 1500-01-0405 | 13 |
| C2 | CAP, CER, 150PF, 1KV | DD-151 | CRL | 1500-01-5111 | 1 |
| C10 C14 | CAP, CER, 330PF, 1KV | DD-331 | CRL | 1500-03-3111 | 2 |
| C26 | CAP, MICA, 100PF, 500V | DM15-101J | ARCO | 1500-11-0100 | 1 |
| C25 | CAP, MICA, 15PF, 500V | DM15-150J | ARCO | 1500-11-5000 | 1 |
| C28 C31 C99T | CAP, MICA, 220PF, 500V, RADIAL | DM15-221J | ARCO | 1500-12-2100 | 3 |
| C41T. | CAP, MICA, 30PF, 500V, RADIAL | DM15-300J | ARCO | 1500-13-0000 | 1 |
| C46 C51 | CAP, MICA, 47PF, 500V | DM15-470J | ARCO | 1500-14-7000 | 2 |
| C47 C50 NONE | CAP, MICA, 68PF, 500V | DM15-680J | ARCO | 1500-16-8000 | 3 |
| C36 | CAP, MICA, 820PF, 300V | DM15-821F | ARCO | 1500-18-2101 | 1 |
| C69 | CAP, ELECT, 22MF, 25V, RADIAL | SRA25VB22RM6X7LL | UNCON | 1500-32-2002 | 1 |
| C19 | CAP, POLYC, 1MF, 100V, AXIAL | B1A105F | ELPAC | 1500-41-0504 | 1 |
| C34 C40 | CAP, VAR, 3.5-13PF, 250V | 7S-TRIKO-02 3.5/13PF | TRIKO | 1500-51-3000 | 2 |
| C12 C8 C96 C97 | CAP, TANT, 1MF, 35V | 150D105X9035A2 | SPRAG | 1500-71-0502 | 4 |
| C95 C98 | CAP, TANT 27UF, 35V+/-10%, 0.25LS | 199D276X9035FE4 | SPRAG | 1500-72-7602 | 2 |
| C111 C112 C64 C65 | CAP, TANT, 5.6MF, 35V | 150D565X9035B2 | SPRAG | 1500-75-6502 | 4 |
| NONE | GENERATOR REF: SPEC 0008-00-0455 REV C | 145-0556 | WVTK | 1700-00-0556 | 1 |
| NONE | PIN, MALE | 60809-2 | AMP | 2100-05-0020 | 20 |

WAVETEK PARTS LIST — TITLE: KIT, PRE WAVE LOAD 145-3245 — ASSEMBLY NO. 1208-00-3246 — REV A



NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| FINISH WAVETEK PROCESS | RELEASE APPROV. | | |
| DO NOT SCALE DRAWING | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ° | | SIZE D · FSCM NO. 23338 · DWG. NO. 1100-00-3245 · REV B · SCALE 145-S-620 · SHEET 1 OF 3 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | TRANSIPAD | 10123N | METRS | 2800-11-0003 | 2 |
| NONE | TRANSIPAD | 531-218 | BIVAR | 2800-11-0004 | 2 |
| FB1 | FERRITE BEAD | 56-590-65/3B | FERRX | 3100-00-0001 | 1 |
| R4 R48 | POT, TRIM, 1K | 91AR1K | BECK | 4600-01-0209 | 2 |
| R12 R162 R55 | POT, TRIM, 10K | 91AR10K | BECK | 4600-01-0315 | 3 |
| R13 R16 R181 R252 | POT, TRIM, 100K | 91AR100K | BECK | 4600-01-0402 | 4 |
| R120 | POT, TRIM, 200 | 91AR200 | BECK | 4600-02-0101 | 1 |
| R107 R35 R93 | POT, TRIM, 500 | 91AR500 | BECK | 4600-05-0104 | 3 |
| R11 R8 | RES, C, 1/2W, 10%, 5.1M | RC-1/2-515J | STKPL | 4700-25-5104 | 2 |
| R17 | RES, C, 1/2W, 10%, 6.8M | | | 4700-25-6804 | 1 |
| R118 R124 R127 R128 R129 R142 R145 R149 R153 R158 R174 R180 R214 R216 R49 R57 R73 | RES, MF, 1/8W, 1%, 100 | RN55D-1000F | TRW | 4701-03-1000 | 17 |
| R104 R108 R111 R155 R165 R168 R200 R257 R45 R47 R51 R94 R98 R99 | RES, MF, 1/8W, 1%, 1K | RN55D-1001F | TRW | 4701-03-1001 | 14 |
| R112 R146 R203 R265 R41 | RES, MF, 1/8W, 1%, 10K | RN55D-1002F | TRW | 4701-03-1002 | 5 |
| R116 R123 R139 R141 R172 | RES, MF, 1/8W, 1%, 10 | 5043ED10R100F | MEPCO | 4701-03-1009 | 18 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

PAGE 3

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R166 R170 | RES, MF, 1/8W, 1%, 21.5 | RN55D-21R5F | TRW | 4701-03-2159 | 2 |
| R237 R248 | RES, MF, 1/8W, 1%, 23.7K | RN55D-2372F | TRW | 4701-03-2372 | 2 |
| R102 R137 R144 R159 R186 R230 R242 R245 R25 R262 R39 | RES, MF, 1/8W, 1%, 249 | RN55D-2490F | TRW | 4701-03-2490 | 11 |
| R147 R151 R156 R171 R188 R189 R19 R254 R255 R274 R278 R33 | RES, MF, 1/8W, 1%, 2.49K | RN55D-2491F | TRW | 4701-03-2491 | 12 |
| R161 R213 R281 R283 | RES, MF, 1/8W, 1%, 24.9K | RN55D-2492F | TRW | 4701-03-2492 | 4 |
| R187T | RES, MF, 1/8W, 1%, 27.4 | RN55D-27R4F | TRW | 4701-03-2749 | 1 |
| R150 R177 R178 R43 | RES, MF, 1/8W, 1%, 3.01K | RN55D-3011F | TRW | 4701-03-3011 | 4 |
| R131 R256 | RES, MF, 1/8W, 1%, 301K | RN55D-3013F | TRW | 4701-03-3013 | 2 |
| R134 R67 R71 R88 R89 | RES, MF, 1/8W, 1%, 316 | RN55D-3160F | TRW | 4701-03-3160 | 5 |
| R101 R103 R109 R110 R119 R126 R130 R140 R192 R204 R253 R269 R272 R65 R68 R69 R72 R75 R76 R79 R82 R95 | RES, MF, 1/8W, 1%, 33.2 | RN55D-33R2F | TRW | 4701-03-3329 | 22 |
| R100T R105T | RES, MF, 1/8W, 1%, 3.57K | RN55D-3571F | TRW | 4701-03-3571 | 2 |
| R191 R202 R258 R80 R83 | RES, MF, 1/8W, 1%, 3.65K | RN55D-3651F | TRW | 4701-03-3651 | 5 |
| R115 R193 R194 R195 | RES, MF, 1/8W, 1%, 392 | RN55D-3920F | TRW | 4701-03-3920 | 4 |
| R199 R42 | RES, MF, 1/8W, 1%, 4.02K | RN55D-4021F | TRW | 4701-03-4021 | 2 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

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| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R133 R136 R138 R160 R164 R261 R266 R77 R78 | RES, MF, 1/8W, 1%, 7.5K | RN55D-7501F | TRW | 4701-03-7501 | 9 |
| R154 | RES, MF, 1/8W, 1%, 76.8K | RN55D-7682F | TRW | 4701-03-7682 | 1 |
| R125 | RES, MF, 1/8W, 1%, B25 | RN55D-8250F | TRW | 4701-03-8250 | 1 |
| R238 R249 R58 | RES, MF, 1/8W, 1%, 8.25K | RN55D-8251F | TRW | 4701-03-8251 | 3 |
| R197T R208T R59 | RES, MF, 1/8W, 1%, 82.5 | RN55D-82R5F | TRW | 4701-03-8259 | 3 |
| R122 R228 | RES, MF, 1/8W, 1%, 909 | RN55D-9090F | TRW | 4701-03-9090 | 2 |
| R271 | RES, MF, 1/8W, 1%, 90.9 | RN55D-90R9F | TRW | 4701-03-9099 | 1 |
| R7 | RES, MF, 1/4W, 1%, 1M | RN60D-1004F | TRW | 4701-13-1004 | 1 |
| R233 | RES, MF, 1/4W, 1%, 121 | RN60D-1210F | TRW | 4701-13-1210 | 1 |
| R229 | RES, MF, 1/4W, 1%, 124 | RN60D-1240F | TRW | 4701-13-1240 | 1 |
| R175 | RES, MF, 1/4W, 1%, 49.9 | RN60D-49R9F | TRW | 4701-13-4999 | 1 |
| R6T | RES, MF, 1/4W, 1%, 698K | RN60D-6983F | TRW | 4701-13-6983 | 1 |
| R224 R225 R226 R227 | RES, MF, 1/2W, 1%, 49.9 | RN65D-49R9F | TRW | 4701-23-4999 | 4 |
| R52 R53 R54 | RES, MF, MIXED SET | 4789-00-0043 | IRC | 4789-00-0043 | 1 |
| R56 | RES, MF, .6W, 1%, 10M | ML-1B1 | CADDO | 4799-00-0003 | 1 |
| 17 | RES, 0 OHM JUMPER | JP02T680 | ROHM | 4799-00-0087 | 10 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

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| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R173 R196 R210 R236T R24 R273 R38 R50 R61 R64 R74 R81 R84 | | | | | |
| R211 R212 | RES, MF, 1/8W, 1%, 1.1K | RN55D-1101F | TRW | 4701-03-1101 | 2 |
| R239 R240 R250 R251 | RES, MF, 1/8W, 1%, 11K | RN55D-1102F | TRW | 4701-03-1102 | 4 |
| R96 R97 | RES, MF, 1/8W, 1%, 1.21K | RN55D-1211F | TRW | 4701-03-1211 | 2 |
| R114 R241 R247 R66 | RES, MF, 1/8W, 1%, 150 | RN55D-1500F | TRW | 4701-03-1500 | 4 |
| R113 R176 R18 R198 R23 R267 R32 R36 R62 R63 R9 | RES, MF, 1/8W, 1%, 1.5K | RN55D-1501F | TRW | 4701-03-1501 | 11 |
| R132 R163 R2 | RES, MF, 1/8W, 1%, 15K | RN55D-1502F | TRW | 4701-03-1502 | 3 |
| R182 | RES, MF, 1/8W, 1%, 150K | RN55D-1503F | TRW | 4701-03-1503 | 1 |
| R218 R219 R220 R221 | RES, MF, 1/8W, 1%, 15 | RN55D-15R0F | TRW | 4701-03-1509 | 4 |
| R263T | RES, MF, 1/8W, 1%, 17.4K | RN55D-1742F | TRW | 4701-03-1742 | 1 |
| R169 | RES, MF, 1/8W, 1%, 1.78K | RN55D-1781F | TRW | 4701-03-1781 | 1 |
| R184 | RES, MF, 1/8W, 1%, 1.96K | RN55D-1961F | TRW | 4701-03-1961 | 1 |
| R179 | RES, MF, 1/8W, 1%, 200 | RN55D-2000F | TRW | 4701-03-2000 | 1 |
| R1 R15 R183 R209 R28 R31 | RES, MF, 1/8W, 1%, 2K | RN55D-2001F | TRW | 4701-03-2001 | 6 |
| R143 | RES, MF, 1/8W, 1%, 215 | RN55D-2150F | TRW | 4701-03-2150 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

PAGE 4

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| R106 R205 R206 R207 | RES, MF, 1/8W, 1%, 464 | RN55D-4640F | TRW | 4701-03-4640 | 4 |
| R201 | RES, MF, 1/8W, 1%, 46.4K | RN55D-4642F | TRW | 4701-03-4642 | 1 |
| R5 | RES, MF, 1.8W, 1%, 46.4 | RN55D-46R4F | TRW | 4701-03-4649 | 1 |
| R34 | RES, MF, 1/8W, 1%, 4.75K | RN55D-4751F | TRW | 4701-03-4751 | 1 |
| R231 R259 | RES, MF, 1/8, 1%, 499 | RN55D-4990F | TRW | 4701-03-4990 | 2 |
| R117 R14 R152 R20 R22 R232 R26 R27 R3 R37 | RES, MF, 1/8W, 1%, 4.99K | RN55D-4991F | TRW | 4701-03-4991 | 10 |
| R157 | RES, MF, 1/8W, 1%, 49.9K | RN55D-4992F | TRW | 4701-03-4992 | 1 |
| R85T R92T | RES, MF, 1/8W, 1%, 54.9 | RN55D-54R9F | TRW | 4701-03-5499 | 2 |
| R235 | RES, MF, 1/8W, 1%, 56.2 | RN55D-56R2F | TRW | 4701-03-5629 | 1 |
| R148T R243 R246 | RES, MF, 1/8W, 1%, 576 | RN55D-5760F | TRW | 4701-03-5760 | 3 |
| R21 R40 R44 R86 R91 | RES, MF, 1/8W, 1%, 604 | RN55D-6040F | TRW | 4701-03-6040 | 5 |
| R215 R217 R234 R244 R260 R268 R275 | RES, MF, 1/8W, 1%, 61.9 | RN55D-61R9F | TRW | 4701-03-6199 | 7 |
| R264 R270 | RES, MF, 1/8W, 1%, 681 | RN55D-6810F | TRW | 4701-03-6810 | 2 |
| R46 | RES, MF, 1/8W, 1%, 6.98K | RN55D-6981F | TRW | 4701-03-6981 | 1 |
| R135 R167 R190 R60 R70 | RES, MF, 1/8W, 1%, 750 | RN55D-7500F | TRW | 4701-03-7500 | 5 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

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| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| CR3 CR33 CR4 CR5 | DIODE, ZENER, 6.2V, 1N823 | 1N823A | MOT | 4801-01-0823 | 4 |
| CR16 | DIODE, REFERENCE, LOW LEVEL, TEMP COMP | 1N4581 | MICRO | 4801-01-4581 | 1 |
| CR19 CR28 CR29 CR30 CR31 CR6 CR7 CR8 CR9 | DIODE, ULTRA FAST | 1N4244 | T/CSF | 4807-02-0777 | 9 |
| CR1 CR10 CR11 CR14 CR15 CR17 CR18 CR20 CR21 CR22 CR23 CR24 CR25 CR27 CR32 CR34 CR35 CR36 CR37 CR46 | DIODE 1N4148 COMPUTER, G/P, 75V, 200M A, SWITCHING | 1N4148 | FAIR | 4807-02-6666 | 20 |
| CR12 CR13 | DIODE 5082-2811 SCHOTTKY, 15V, 20MA | 5082-2811 | HP | 4809-02-2811 | 2 |
| CR2 26 | DIODE, M/PR, FD-777 QTY: 2: 4807-02-0777 | 4898-00-0004 | KLG | 4898-00-0004 | 1 |
| CR38 39 40 41 42 43 44 45 | DIODE, SET, 8-FD-777 QTY: 8: 4807-02-0777 | 4898-00-0010 | KLG | 4898-00-0010 | 1 |
| G42 | TRANS 2N2219A NPN GENERAL PURPOSE TO-5 | 2N2219A | NSC | 4901-02-2191 | 1 |
| G43 | TRANS 2N2905A PNP GENERAL PURPOSE TO-5 | 2N2905A | NSC | 4901-02-9051 | 1 |
| G12 G36 G50 | TRANS, NPN, TO-92 | 2N3563 | FAIR | 4901-03-5630 | 3 |
| G15 G16 G37 G49 | TRANS, PNP, TO-92 | MPS3640 | MOT | 4901-03-6400 | 4 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A

PAGE 8

NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| | RELEASE APPROV. | | |
| FINISH WAVETEK PROCESS | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ± | | SIZE D \| FSCM NO. 23338 \| DWG. NO. 1100-00-3245 \| REV B |
| DO NOT SCALE DRAWING | | | SCALE 145-S-620 \| SHEET 2 OF 3 |

| REV | ECO | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| Q39 | TRANS | 2N3866 | MOT | 4901-03-8660 | 1 |
| Q13 Q21 Q22 Q25 Q27 Q28 Q29 Q31 Q40 Q6 | TRANS, GENERAL PURPOSE, NPN, TO-92 | 2N3903 | NSC | 4901-03-9030 | 10 |
| Q10 Q11 Q14 Q17 Q19 Q23 Q24 Q26 Q30 Q32 Q33 Q34 Q4 Q41 Q46 Q47 Q51 | TRANS, GENERAL PURPOSE, PNP, TO-92 | 2N3905 | ITT | 4901-03-9050 | 17 |
| Q38 | TRANS | 2N5160-18 | MOT | 4901-05-1600 | 1 |
| Q3 | TRANS, P-CHANNEL JFETS | 2N5460 | MOT | 4901-05-4600 | 1 |
| Q5 | TRANS, N-CHANNEL JFETS | 2N5485 | MOT | 4901-05-4850 | 1 |
| Q1 | TRANS N-CHANNEL JFETS | 2N5486 | MOT | 4901-05-4860 | 1 |
| Q18 20 | TRANS, M/PR, 2N3563 QTY: 2: 4901-03-5630 | 4998-00-0004 | KLQ | 4998-00-0004 | 1 |
| Q2 Q7 | TRANS, SEL, 2N5462 QTY: 1: 4901-05-4620 | 4998-00-0008 | KLQ | 4998-00-0008 | 2 |
| Q8 9 | TRANS, M/PR, 2N5485 QTY: 2: 4901-05-4850 | 4998-00-0009 | KLQ | 4998-00-0009 | 1 |
| IC4 IC5 | OP AMP, LOWOFFSET/DRIFT JFET INPUT TIONAL AMPLI | LF411CN | NSC | 7000-04-1100 | 2 |
| IC3 | OP AMP, INTERNALLY COMP, HIGH | LM741CN | NSC | 7000-07-4100 | 1 |

WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | ASSY, SWITCH SW-1 145-0556 | 145-1565 | WVTK | 1202-00-1565 | 1 |
| NONE | ASSY, SWITCH SW-2 145-0556 | 145-1566 | WVTK | 1202-00-1566 | 1 |
| NONE | ASSY, SWITCH SW-3 145-0556 | 145-1567 | WVTK | 1202-00-1567 | 1 |
| NONE | ASSY, SWITCH SW-4 145-0556 | 145-1568 | WVTK | 1202-00-1568 | 1 |
| NONE | ASSY, SWITCH SW-5 145-0556 | 145-1569 | WVTK | 1202-00-1569 | 1 |

WAVETEK PARTS LIST | TITLE SUPER KIT | ASSEMBLY NO. 2500-0145-01 | REV



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| | PERFORMANCE | | | | |
| Q35 Q48 | TRANS, MONO, DUAL, NPN | LS312-52 | LINSY | 7000-08-1200 | 2 |
| IC1 IC2 IC6 | OP AMP, DUAL, HIGH GAIN, INTERNALLY COMP | MC1458P1 | MOT | 7000-14-5800 | 3 |
| IC9 | DIFFERENTIAL AMP, DUAL HIGH FREQ | CA3049T | RCA | 7000-30-4900 | 1 |
| IC7 IC8 | OP AMP, BIMOS MOSFET INPUT/BIPOLAR OUTPUT | CA3140S | RCA | 7000-31-4001 | 2 |

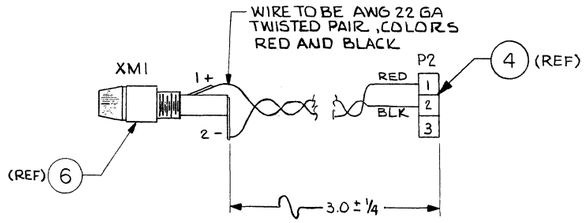
WAVETEK PARTS LIST | TITLE KIT, PRE WAVE LOAD 145-3245 | ASSEMBLY NO. 1208-00-3246 | REV A



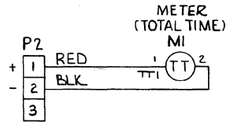
NOTE: UNLESS OTHERWISE SPECIFIED

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL | CHECKED | | TITLE: PARTS LIST PCA, GENERATOR |
| | PROJ. ENGR. | | |
| | RELEASE APPROV. | | |
| FINISH WAVETEK PROCESS | UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ARE: FRACTIONS DECIMALS ANGLES ± .XX ± .XXX ± ± | | SIZE D \| FSCM NO. 23338 \| DWG. NO. 1100-00-3245 \| REV B |
| DO NOT SCALE DRAWING | | | SCALE 145-S-620 \| SHEET 3 OF 3 |

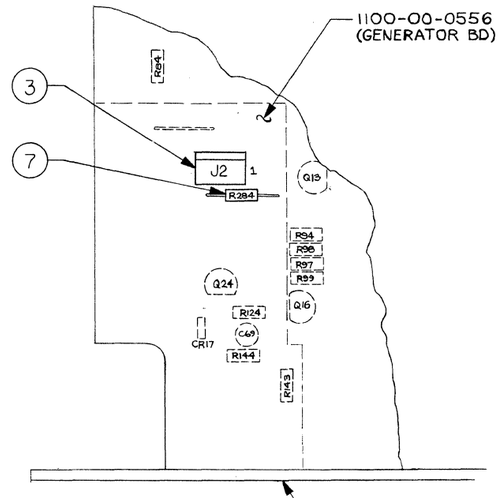
| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|



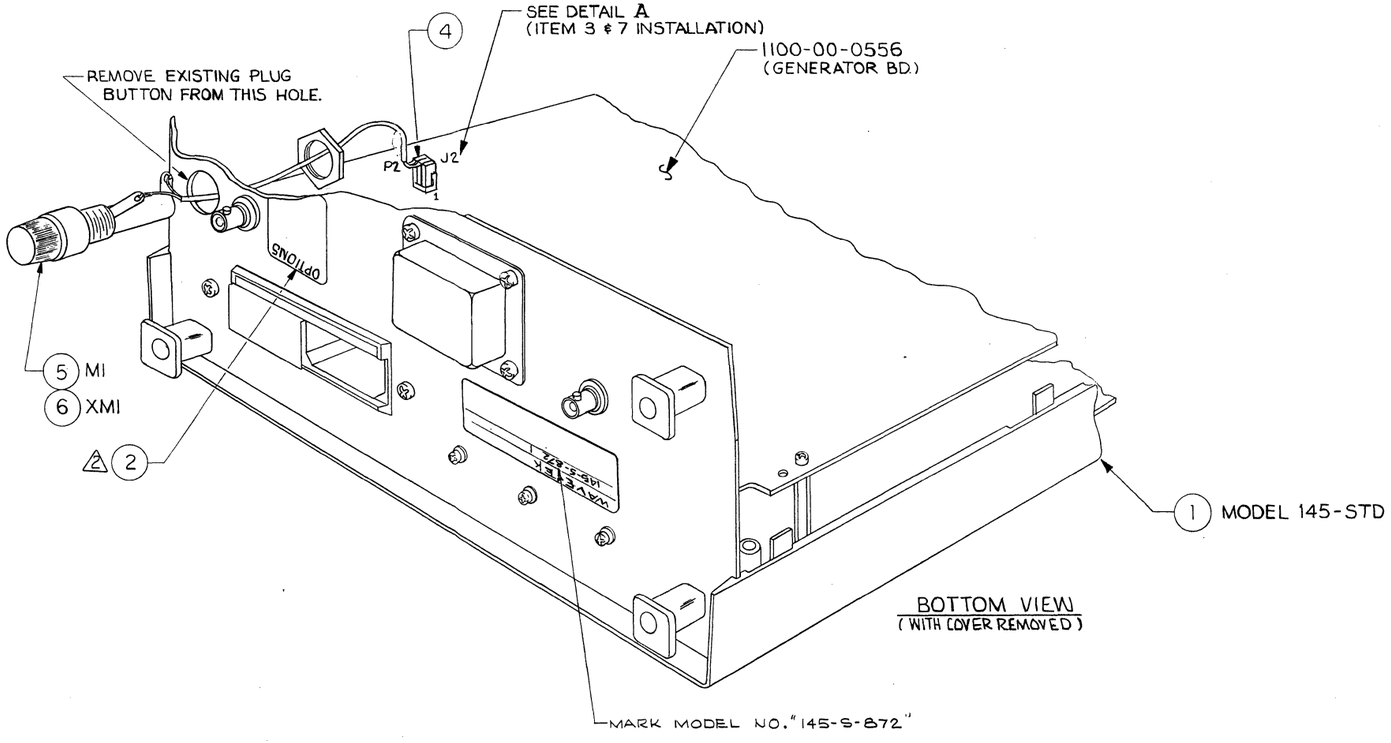

CABLE ASSEMBLY




SCHEMATIC




DETAIL A
SCALE 2:1




BOTTOM VIEW
(WITH COVER REMOVED)

⚠ 2. MARK LABEL FOR OPTION 001.

1. FOR PARTS LIST SEE 1000-00-0221

NOTE: UNLESS OTHERWISE SPECIFIED

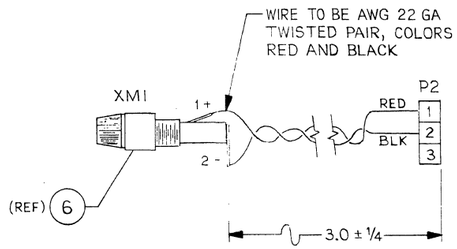
| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | INSTALLATION DWG | 0102-00-0221 | WVTK | 0102-00-0221 | 1 |
| 1 | MODEL 145 20MHZ PULSE FUNCTIONGENERATOR | 145-STD | WVTK | 1000-00-0101 | 1 |
| 2 | LABEL, OPTION | 270-4960 | WVTK | 1400-01-4960 | 1 |
| 3 | CONN HEADER 3 PIN | 640456-3 | AMP | 2100-02-0116 | 1 |
| 4 | HEADER, CONN 3 PIN | 640440-3 | AMP | 2100-02-0117 | 1 |
| 5 | INDICATOR, ELAPSED TIME (5000 HR) | T-000-4 | FRED | 2400-06-0006 | 1 |
| 6 | HOLDER, TIMER | T-102 | FRED | 2400-06-0007 | 1 |
| 7 | RES, MF, 1/8W, 1%, 2.15M | RN55D2154F | TRW | 4701-03-2154 | 1 |

| WAVETEK PARTS LIST | TITLE | ASSEMBLY NO. | REV |
|---|---|---|---|
| | MODEL 145-001 OPTION 5000 HOUR TIMER | 1000-00-0221 | |
| | | PAGE 1 | |

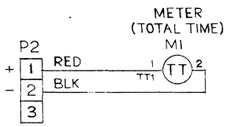
| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN S.MAGALLIA | DATE 7-82 | WAVETEK SAN DIEGO, CALIFORNIA |
| MATERIAL — | PROJ ENGR | | TITLE: MODEL 145-001 OPTION 5000 HOUR TIMER |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS — | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1 XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO 145-001 145-S-872 | DWG NO. 0102-00-0221 REV |
| | SCALE — | CODE IDENT 23338 | SHEET 1 OF 1 |

0102-00-0221

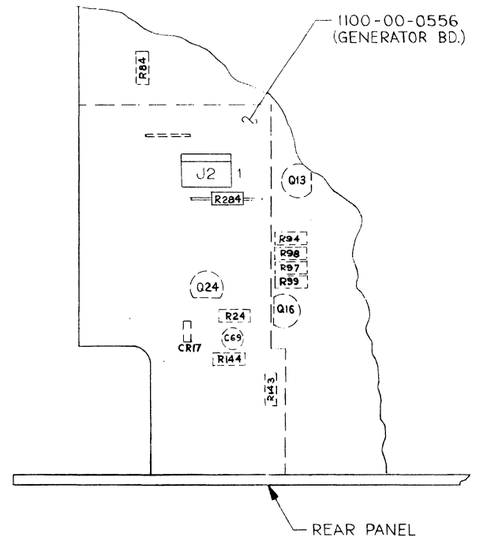
| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|
| A | 6153 | AT | 3/19/86 | A.C.T. |
| B | 7722 | A.T. | 7/1/86 | A.T. |



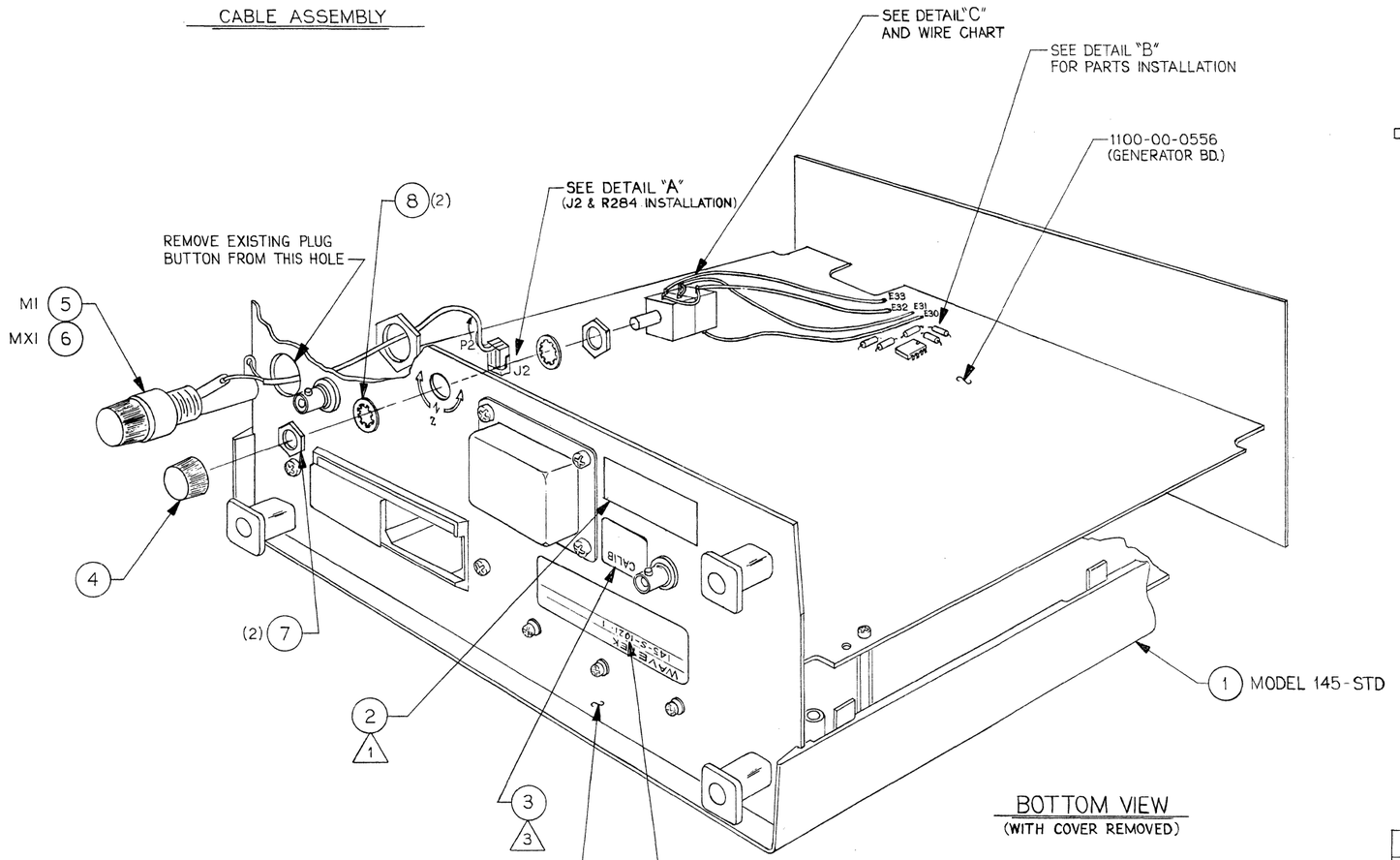

CABLE ASSEMBLY



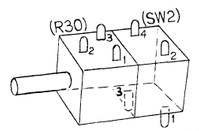

SCHEMATIC



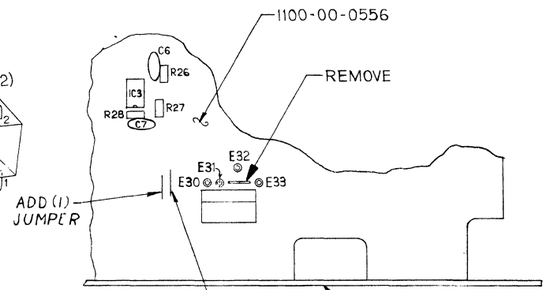

DETAIL "A"
(SCALE 2:1)




BOTTOM VIEW
(WITH COVER REMOVED)




DETAIL "C"




DETAIL "B"
(SCALE: FULL)

| WIRE CHART | | | |
|---|---|---|---|
| FROM | TO | WIRE COLOR 22 GA | LENGTH |
| R30-1 | SW2-4 | BARE | 0.5 |
| SW2-4 | E31 | RED | 9.0 |
| R30-2 | SW2-2 | ORN | 1.0 |
| SW2-2 | E32 | ORN | 9.0 |
| R30-3 | SW2-3 | YEL | 1.5 |
| SW2-3 | E33 | YEL | 9.0 |
| SW2-1 | E30 | BRN | 9.0 |

3. UPON COMPLETION OF CALIBRATION AND QUALITY CONTROL ACCEPTANCE APPLY SIGNED CALIBRATION LABEL IN AREA INDICATED.
2. REMOVE REAR PANEL 1400-00-6760 FROM FUNCTION GENERATOR 1000-00-0101 AND DRILL A .375 HOLE PER 1400-02-0603 AND SILKSCREEN REAR PANEL PER 1400-02-0600. REASSEMBLE REAR PANEL.
1. MARK LABEL FOR OPTION 003.

NOTE: UNLESS OTHERWISE SPECIFIED

SEE SEPARATE PARTS LIST 1000-00-0442

| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN A.TALMADGE | DATE 3/17/86 | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJENGR D.E. FISH | 3/17/86 | TITLE: MODEL 145 - 003 OPTION 5000 HOUR TIMER & SYMMETRY CONTROL |
| FINISH WAVETEK PROCESS | RELEASE APPROV | | |
| | TOLERANCE UNLESS OTHERWISE SPECIFIED XXX ±.010 ANGLES ±1° XX ±.030 | | |
| | DO NOT SCALE DWG | | MODEL NO. 145-003 / 145-S-1021 — DWG NO. 0102-00-0442 — REV B |
| | SCALE NONE | | CODE IDENT 23338 — SHEET 1 OF 1 |

0102-00-0442 B

| REV | ECN | BY | DATE | APP |
|---|---|---|---|---|

| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| NONE | SCHEMATIC, INSTRUMENT | 0004-00-0101 | WVTK | 0004-00-0101 | 1 |
| NONE | ASSY DRWG, MODEL 145 OPTION 5000 HOUR TIMER AND SYMMETRY CONTROL | 0102-00-0442 | WVTK | 0102-00-0442 | 1 |
| 1 | MODEL 145 20MHZ PULSE FUNCTIONGENERATOR | 145 | WVTK | 1000-00-0101 | 1 |
| NONE | ATP FOR MODEL 145 AND OPTIONS | 1002-00-0101 | WVTK | 1002-00-0101 | 1 |
| 2 | LABEL, OPTION, MODEL 23 | 1400-01-9890 | WVTK | 1400-01-9890 | 1 |
| 9 | REAR PANEL | 1400-02-0600 | | 1400-02-0600 | 1 |
| 3 | LABEL, WVTK CALIB | 1400-02-1460 | WVTK | 1400-02-1460 | 1 |
| C6 C7 | CAP CER MON .01MF 50V, AXIAL | CAC02Z5U103Z100A | CORNQ | 1500-01-0310 | 2 |
| J2 | CONN,HEADER, 3 PIN, .100 MTA | 640456-3 | AMP | 2100-02-0116 | 1 |
| P2 | CONN,HEADER, 3 PIN | 640440-3 | AMP | 2100-02-0117 | 1 |
| 4 | KNOB STD | RB-67-1-SB-M | ROGAN | 2400-01-0008 | 1 |
| 5 | INDICATOR,ELAPSED TIME (5000 HR) | T-000-4 | FRED | 2400-06-0006 | 1 |

| WAVETEK PARTS LIST | TITLE: MODEL 145 WITH SPECIAL OPTION S-1021 | ASSEMBLY NO. 1000-00-0442 | REV C |
|---|---|---|---|



| REFERENCE DESIGNATORS | PART DESCRIPTION | ORIG-MFGR-PART-NO | MFGR | WAVETEK NO. | QTY/PT |
|---|---|---|---|---|---|
| 6 | HOLDER,TIMER | T-102 | FRED | 2400-06-0007 | 1 |
| 7 | NUT,PANEL,3/8X1/2X.09 2,Z | 3/8 X 1/2 NUT | CMRCL | 2800-16-0000 | 2 |
| 8 | WASHER, INTERNAL TOOTH, 3/8 IN. | 3/8ITLW | CMRCL | 2800-28-0000 | 2 |
| R30 | CONTROL SHAFT, SWITCH-POT, CERMET, LINEAR 50K 10%, CCW DETENT | 72LIN0488503W | AB | 4602-05-0304 | 1 |
| R28 | RES,MF,1/8W,1%,2K | RN55D-2001F | TRW | 4701-03-2001 | 1 |
| R284 | RES,MF,1/8W,1%,2.15M | RN55D2154F | TRW | 4701-03-2154 | 1 |
| R26 R27 | RES,MF,1/8W,1%,4.99K | RN55D-4991F | TRW | 4701-03-4991 | 2 |
| IC3 | OP AMP, INTERNALLY COMP, HIGH PERFORMANCE | LM741CN | NSC | 7000-07-4100 | 1 |

| WAVETEK PARTS LIST | TITLE: MODEL 145 WITH SPECIAL OPTION S-1021 | ASSEMBLY NO. 1000-00-0442 | REV C |
|---|---|---|---|



| | | | |
|---|---|---|---|
| REMOVE ALL BURRS AND BREAK SHARP EDGES | DRAWN | DATE | WAVETEK SAN DIEGO • CALIFORNIA |
| MATERIAL | PROJ ENGR | | TITLE: PARTS LIST TIMER & SYMMETRY CONTROL |
| | RELEASE APPROV | | |
| FINISH WAVETEK PROCESS | TOLERANCE UNLESS OTHERWISE SPECIFIED .XXX ±.010 ANGLES ±1 XX ±.030 | | |
| | DO NOT SCALE DWG | MODEL NO 145-S-1021 | DWG NO. 1000-00-0442 REV C |
| | SCALE | CODE IDENT 23338 | SHEET 1 OF 1 |

NOTE: UNLESS OTHERWISE SPECIFIED