KENWOOD

20MHz OSCILLOSCOPE

# CS-3035

## OPTION

DC POWER SUPPLY

# BP-70

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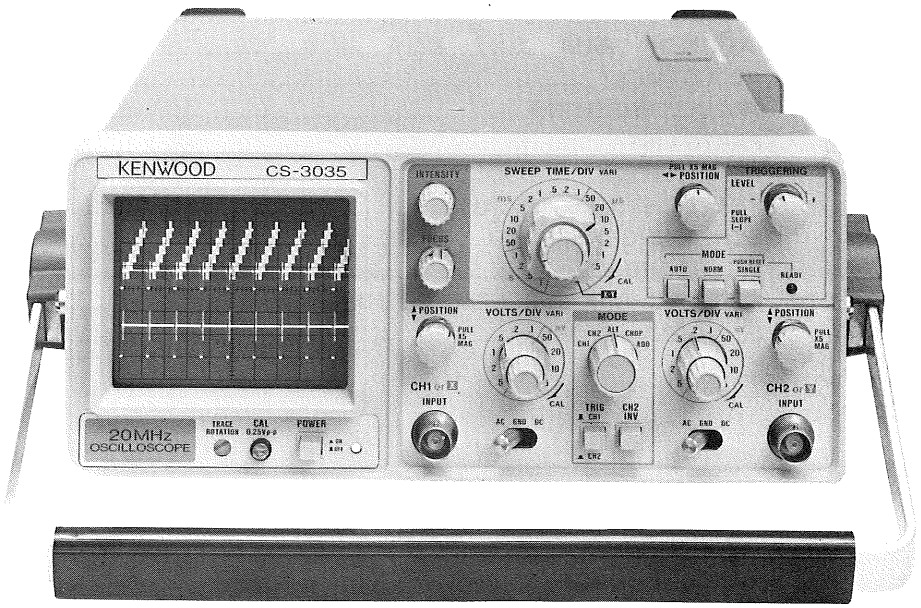
# SERVICE MANUAL

KENWOOD CORPORATION



## WARNING

**The following instructions are for use by qualified personnel only. To avoid electric shock, do not perform any servicing other than contained in the operating instructions unless you are qualified to do so.**

# CONTENTS

# CS-3035 SPECIFICATIONS

**CRT**

Type.....Rectangular high luminance CRT (with internal graticule)
Acceleration Voltage .....Approx. 1.8 kV
Display Area.....8×10 div flat-face (1 div=6.35 mm)

**VERTICAL AXIS**

Operating Modes.....CH1, CH2, ALT, CHOP, ADD
Sensitivity .....5 mV/div to 5 V/div, +/−3%
Sensitivity Magnification ...5 times +/−5% (×5 MAG used)
Attenuator.....1-2-5 step sequence, 10 ranges, adjustable between ranges
Frequency Response
5 mV/div to 5 V/div.....DC: DC to 20 MHz, −3 dB
AC: 5 Hz to 20 MHz, −3 dB
×5 MAG used.....DC: DC to 4 MHz, −3 dB
AC: 5 Hz to 4 MHz, −3 dB
Input Impedance .....1 Mohm, approx. 40 pF
Rise Time.....17.5 ns or less (20 MHz)
Crosstalk.....−40 dB minimum
Polarity Inversion .....CH2 only
Chop Frequency.....Approx. 50 kHz
⚠ Maximum Input Voltage.....800 Vp-p or 400 V (DC+AC peak)

**HORIZONTAL AXIS**

Operating Modes.....X-Y operation selectable with sweep knob
CH1: X axis CH2: Y axis
Sensitivity .....Same as vertical axis (CH1)
Input Impedance .....Same as vertical axis (CH1)
Frequency Response.....DC: DC to 200 kHz, −3 dB
AC: 5 Hz to 200 kHz, −3 dB
X-Y Phase Difference.....3° or less at 10 kHz
⚠ Maximum Input Voltage.....Same as vertical axis (CH1)

**SWEEP**

Sweep Type .....NORM: Triggering sweep
AUTO: Sweep free runs in absence of trigger
SINGLE: Single sweep
Sweep Time .....0.2 μs/div to 1 s/div +/− 3% in 21 ranges, 1-2-5 sequence, adjustable between ranges
Sweep Magnification .....5 times +/−5% (×5 MAG used)

**TRIGGERING**

Internal Sync .....INT, LINE
External Sync .....EXT
External Sync Input
Impedance .....1 Mohm, 40 pF or less
⚠ Maximum External Trigger
Input Voltage.....50 V (DC+$AC_{peak}$)
Sync Coupling .....AC, $HF_{REJ}$, DC
Polarity .....+/−
Trigger Sensitivity .....

| Coupling | Frequency | Amplitude (Voltage) | |
|---|---|---|---|
| | | INT | EXT |
| DC | DC~2 MHz | 0.5 div | 0.1 Vp-p |
| | ~20 MHz | 1 div | 0.2 Vp-p |
| $HF_{REJ}$ | Attenuation at more than 1.5 kHz | | |
| AC | 10 Hz~2 MHz | 0.5 div | 0.1 Vp-p |
| | ~20 MHz | 1 div | 0.2 Vp-p |

AUTO: Same as above specification for above 50 Hz.

# CS-3035 SPECIFICATIONS

**CALIBRATION VOLTAGE** .....Square wave (positive polarity)
0.25 Vp-p ±2%, 1 kHz ±2%

**POWER REQUIREMENTS**

Power Supply Voltage .....AC100/120/220/240 V ±10% 216 V~250 V 50/60 Hz

Power Consumption .....Approx. 22 W (at 100 V AC)

**DIMENSIONS AND WEIGHT**

Dimensions.....216 (width) × 89 (height) × 298 (depth) mm

Weight.....Approx. 4 kg

**OPERATING TEMPERATURE AND HUMIDITY FOR GUARANTEED SPECIFICATIONS**
5 to 35°C, 85% maximum RH

**ACCESSORIES**.....

| | |
|---|---|
| Probe (PC-30) | 2 pcs. |
| Panel Cover | 1 pc. |
| Instruction Manual | 1 pc. |
| Power Cord | 1 pc. |
| Fuse (0.5 A) | 2 pcs. |
| (0.3 A) | 2 pcs. |

# BP-70 SPECIFICATIONS

**Batteries** ..... NiCad Batteries: 4000mAH × 10 (internal)
Other external battery: (+11.5 V to +13.5 V)

**Input current** .....2A (Approx. 2 hrs. use)

**Output**..... +18 V, −18 V, +110 V, +150 V
(each output voltage is unregulated)

**Charging current** ..... 300 mA (16 hrs/charge)

**Charging frequency** ..... 17 kHz

**Switch**..... CHG-OPE (front)
Internal and external (rear)

**Dimensions**..... 180 (W) × 41 (H) × 220 (D) mm

**Weight**..... 2.5 Kg

**Ambient temperature and humidity**..... 5°C to 35°C, 85% RH

**Leak current** ..... (Input current when the power is off) 200 μA max.

**Other**.....
- The input and output have a common ground.
- The negative side of the input can be connected to the unit ground.
- The oscilloscope cannot be used when the batteries are charging.

## SAFETY

Before connecting the instrument to a power source, carefully read the following information, then verify that the proper power cord is used and the proper line fuse is installed for power source. If the power cord is not applied for specified voltage, there is always a certain amount of danger from electric shock.

### Line voltage

This instrument operates using ac-power input voltages that 100/120/220/240 V at frequencies from 50 Hz to 60 Hz.

### Power cord

The ground wire of the 3-wire ac power plug places the chassis and housing of the oscilloscope at earth ground. Do not attempt to defeat the ground wire connection or float the oscilloscope; to do so may pose a great safety hazard. The appropriate power cord is supplied that is specified when the instrument is ordered.

The power cords are shown as follows in Fig. 1.

### Line fuse

The fuse holder is located on the rear panel and contains the line fuse. Verify that the proper fuse is installed by replacing the line fuse.

### Voltage conversion

This oscilloscope may be operated from either a 100 V to 240 V, 50/60 Hz power source. Use the following procedure to change from 100 to 240 volt operation or vice versa.

1. Remove the fuse holder.
2. Replace fuse F 1 with a fuse of appropriate value, 0.5 amp for 100 VAC to 120 VAC operation, 0.3 amp for 220 VAC to 240 VAC operation.
3. When performing the reinsertion of fuse holder for the voltage conversion, the appropriate power cord should be used. (See Fig. 1.)
4. For the method of wiring selection in the primary side of the power transformer, refer to page 6.

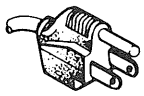
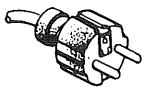
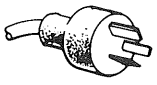
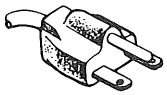
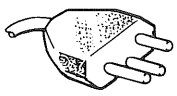
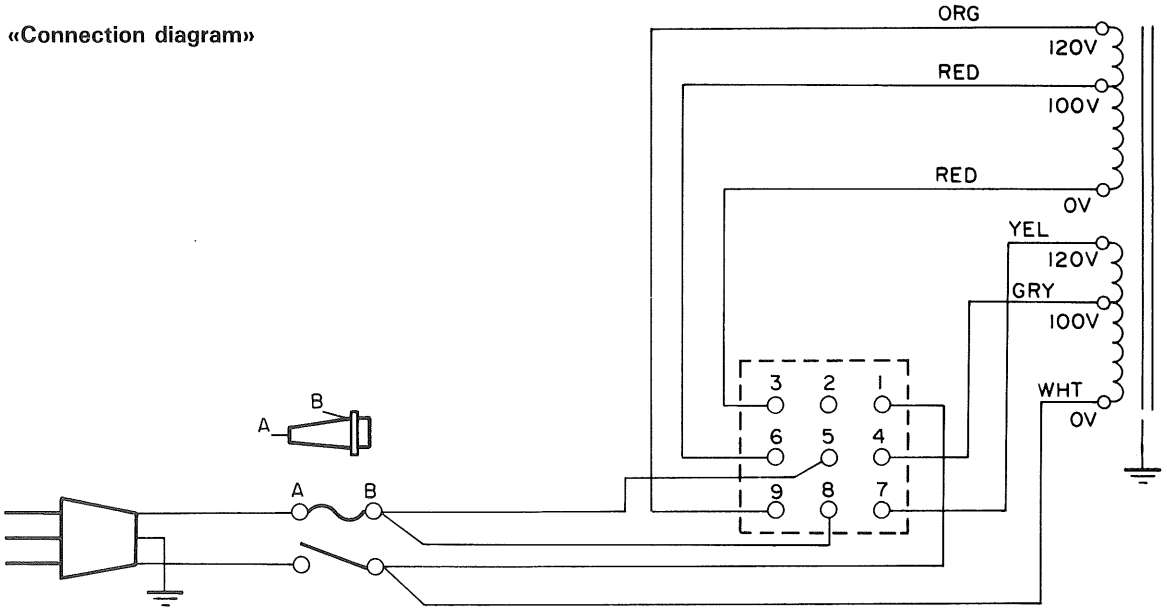
| Plug configuration | Power cord and plug type | Factory installed instrument fuse | Line cord plug fuse | Parts No. for power cord and plate |
|---|---|---|---|---|
|  | North American<br>120 volt/60 Hz<br>Rated 15 amp<br>(12 amp max; NEC) | 0.5 A, 250 V<br>Fast blow<br>6×30 mm | None | Cord:<br>E30-1820-05 |
|  | Universal Europe<br>220 volt/50 Hz<br>Rated 16 amp | North Europe<br>0.3 A, 250 V<br>Fast blow 5×20 mm<br>Other Europe<br>0.3 A, 250 V<br>Fast blow 6×30 mm | None | Cord:<br>E30-1819-05 |
|  | U.K.<br>240 volt/50 Hz<br>Rated 13 amp | 0.3 A, 250 V<br>Fast blow<br>6×30 mm | 0.8 A<br>Type C | — |
|  | Australian<br>240 volt/50 Hz<br>Rated 10 amp | 0.3 A, 250 V<br>Fast blow<br>6×30 mm | None | Cord:<br>E30-1821-05 |
|  | North American<br>240 volt/60 Hz<br>Rated 15 amp<br>(12 amp max; NEC) | 0.3 A, 250 V<br>Fast blow<br>6×30 mm | None | — |
|  | Switzerland<br>240 volt/50 Hz<br>Rated 10 amp | 0.3 A, 250 V<br>Fast blow<br>6×30 mm | None | — |

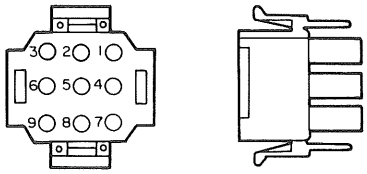
**Fig. 1 Power Input Voltage Configuration**

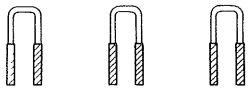
# SUPPLY VOLTAGE SELECTION METHOD

**«Connection diagram»**




**«Selection method»**




Selection between input voltages is made by changing the connection pin.

| | (a) | (b) | (c) |
|---|---|---|---|
| AC 100 V~ | ① — ③ | ④ — ⑧ | ⑥ — ⑤ |
| AC 120 V~ | ① — ③ | ⑦ — ⑧ | ⑨ — ⑤ |
| AC 220 V~ | ④ — ③ | ⑨ — ⑧ | ② — ⑤ NC |
| AC 240 V~ | ⑦ — ③ | ⑨ — ⑧ | ② — ⑤ NC |

# CS-3035 CIRCUIT DESCRIPTION

## 1. VERTICAL SECTION

The vertical section has two input channels and consists of an amp system for attenuation and amplification of the signals input to it, trig amp for feeding the signal to the horizontal section for use as the trig signal, and circuit for controlling these.

### Attenuator Circuit

The signal applied to the input terminal is applied to the attenuator after passing through the input selection switch. The attenuator consists of 1/10 and 1/100 attenuators and a rotary switch for changing the amp gain in 1-2-5 steps. These 1/10 and 1/100 attenuators are adjusted to the required performance by a trimmer capacitor for square wave adjustment and a trimmer capacitor for input capacitance adjustment. The signal is not attenuated when VOLTS/DIV is set to the ranges from 5 mV to 50 mV. It is attenuated to 1/10 in the ranges from 0.1 V to 0.5 V, and attenuated to 1/100 in the ranges from 1 V to 5 V range.

### Vertical Amplifier

The vertical amplifier amplifies the signal output from the attenuator, applies the required control, and applies the signal to the CRT deflecting plate.

The attenuator output is input to the preamp, and amp gain, variable, mag, pos, etc., control are performed there. The input buffer for the preamp is Q102, and forms an initial stage feedback amp by combining with Q101 and Q104. The emitters of Q101 and Q104 are connected, and thus, the operation of the feedback amp prevents any change in the base potential of Q101 and Q104. The gain corresponding to the 1-2-5 steps is adjusted by switching the resistor at the source of Q102. This output is fed to the base of Q105 and Q106. R119 located between the emitters of Q105 and Q106 adjusts the sensitivity of the amplifier. The signal output from these transistors is then split to R124 (VARIABLE) and to R125 and R128, and fed to the emitters of Q107 and Q108.

The circuits allows the collector resistance of Q107 and Q108 to be selected, and MAG operation is enabled by switching S103.

The signal to the trigger amp is supplied from the emitters of Q109 and Q110 in the next stage. The POSITION signal is added by this collector, and the channel is selected by the switching circuit formed from D104 and D106. Both D103 and D104 are double diodes with a common anode, and the cathode of one of the diodes is connected to the cathode of the other diode. The signal of the channel with the higher potential is fed to the output amp. Both channels are output in the ADD mode.

The output amp amplifies the signal from the preamp, and applies it to the deflecting plate of the CRT. The level of this signal is approximately 10 V/div. at the deflecting plate. To obtain this signal level, a feedback amp with high throughput using a floating emitter follower is used in the final stage.

### Trigger Amplifier

As described above, the trigger amp amplifies the signal fed from the emitters of Q109 and Q110, passes it through the same diode switch used for V MODE switching, and feeds the trigger signal to the horizontal section. R149 adjusts the DC level of this signal. In the X-Y mode, this diode switch is set to the CH1 side, and the CH1 trigger signal becomes the X signal.

## 2. HORIZONTAL SECTION

The horizontal section consists of a trigger circuit section for generating the trigger pulse from the trigger signal, a sweep generator for generating the sweep signal and unblanking signal from this pulse, and a horizontal output amp for feeding the horizontal signal to the CRT.

### Trigger Circuit

After the internal trigger signal fed from the V amp is input to the trigger amp, it is output as the trigger signal and X signal. These two signals have the opposite phase. The signals passes through a switch circuit for source, coupling, and slope switching, etc., and is input to the trigger Schmitt comparator. It is compared with the output of the TRIG LEVEL knob, and a trigger pulse is generated. The hysteresis of this circuit is generated by resistor R336 inserted between the collector of Q312 and base of Q311 and resistor R339 inserted between collector of Q311 and base of Q312.

The collector of Q312 is used as a trigger pulse, and sweep starts from the rising edge of this pulse.

### Sweep Generator

The sweep generator creates the sweep signal from the trigger pulse described above, and also generates a GATE signal synchronized to this sweep signal. The trigger pulse is input to IC301 and IC302. IC302 is a retriggerable one-shot multivibrator, and determines the presence of a trigger pulse within a set period for auto sweep in the AUTO mode. IC301 is a D-type flip-flop and the output changes at the rising edge of the pulse input to the clock input. This Q output is connected to the gate of a Miller circuit for sweep signal generation. This Miller circuit consisting of Q305, 325, and a time switch section, etc., cuts off D310 when the input goes to H. The output of the Miller circuit goes to the collector of Q325. The slope of the Miller circuit rising edge is determined by capacitors C310 to C312 and R348 to R355 selected by switch S304. In addition, VARIABLE changes the voltage applied to the above resistors to change the sweep speed.

The comparator circuit formed by Q306 and Q307 determines the sweep starting point. The circuit formed by Q303 and Q304 is for hold off. Q of IC301 is used as the gate signal for unblanking.

### Output Amplifier

The X signal or sweep signal is selected and input to the horizontal output amp. The amp amplifies this signal to form the differential signal applied to the horizontal deflecting plate of the CRT. The sweep signal and X signal are input to Pins 1 and 8 of IC303, selected by the analog switch, and input to the base of Q313. The signal is then combined with the position signal and converted to the differential signal. The signal is then amplified by transistors Q315 and Q316 in the NORM mode, and by transistors Q317 and Q318 in the MAG mode. The final stage is a feedback amp using a push-pull amplifier for high frequencies.

## 3. POWER & AXIS AMPLIFIER SECTION

The power-Z section includes a power supply section for generating the DC voltage needed for the circuits, high voltage section for generating the high voltage needed for the CRT, and a Z amp for creating the unblanking signal.

### Power Supply

The power supply section creates the DC voltage needed for the circuit from the secondary output of the power transformer, and also performs power exchange with the optionally attached BP-70 DC Power Supply. All of the regulators are series regulators, and power of +240 V, +100 V, +12 V, −12 V, and +5 V are produced. +240 V power is used mainly for the horizontal output amp. +100 V is used mainly as the power supply for the vertical output amp. The unregulated +22 V voltage is used for high voltage. Although the CS-3035 has no AC power supply and can operate when combined with the BP-70, the same +22 V power used for high voltage is used for charging the internal batteries of the BP-70, and high voltage oscillation is stopped during charging to prevent excessive load.

### High Voltage

The high voltage section produces the −1800 V high voltage applied to the CRT from the +22 V unregulated power supplied from the power supply section. The main section is the DC-DC convertor formed around T701, and the high voltage rectification section uses a P-P rectification circuit to reduce the load on the transformer. The high voltage level is stabilized by detecting the cathode of the CRT and controlling the DC drive voltage for converter oscillation. In addition, as described above, the base of Q707 is set to 0 during BP-70 recharging to stop oscillation.

### Z Axis Amplifier & Unblanking

The Z-amp amplifies the gate signal created by the sweep generator and the chop blk signal generated by the vertical switching signal generator. The above signals and INTEN level are input to the emitter of Q704. The signal is applied to the high voltage circuit after amplification by the push-pull amp similar to that in the final stage of the horizontal stage. At this time, the signal passes through C716 after the AC component has been chopped by C703 and the DC component by Q714, and is then rectified by D711 and D712.

Trace Rotation

Trace rotation is an emitter matching driver for driving L701.

### Calibrator

The CAL of CS-3035 uses NE555 for oscillation.

# BP-70 CIRCUIT DESCRIPTION

## Converter

The converter includes a DC-DC converter using power FETs, a switch signal generator for switching the converter, and a charge circuit for charging the battery.

## DC-DC Converter

The DC-DC converter section creates the DC voltage needed for the oscilloscope circuits from the 12 V DC battery power. The primary stage is the oscillation output of the switch signal generator, and the Q1 and Q2 power FETs are switched ON alternately. Capacitors and resistors are connected in series between the drain of Q1 and gate of Q2 and the drain of Q2 and the gate of Q1. This creates a positive feedback loop with the transistors and improves switching efficiency.

Switch Generator

This section generates the oscillation waveforms for switching the power FETs in the DC-DC converter described above.

When this unit is operating from 100 VAC, Pins 1 and 2 of IC2 are at the high level, and oscillation is stopped.

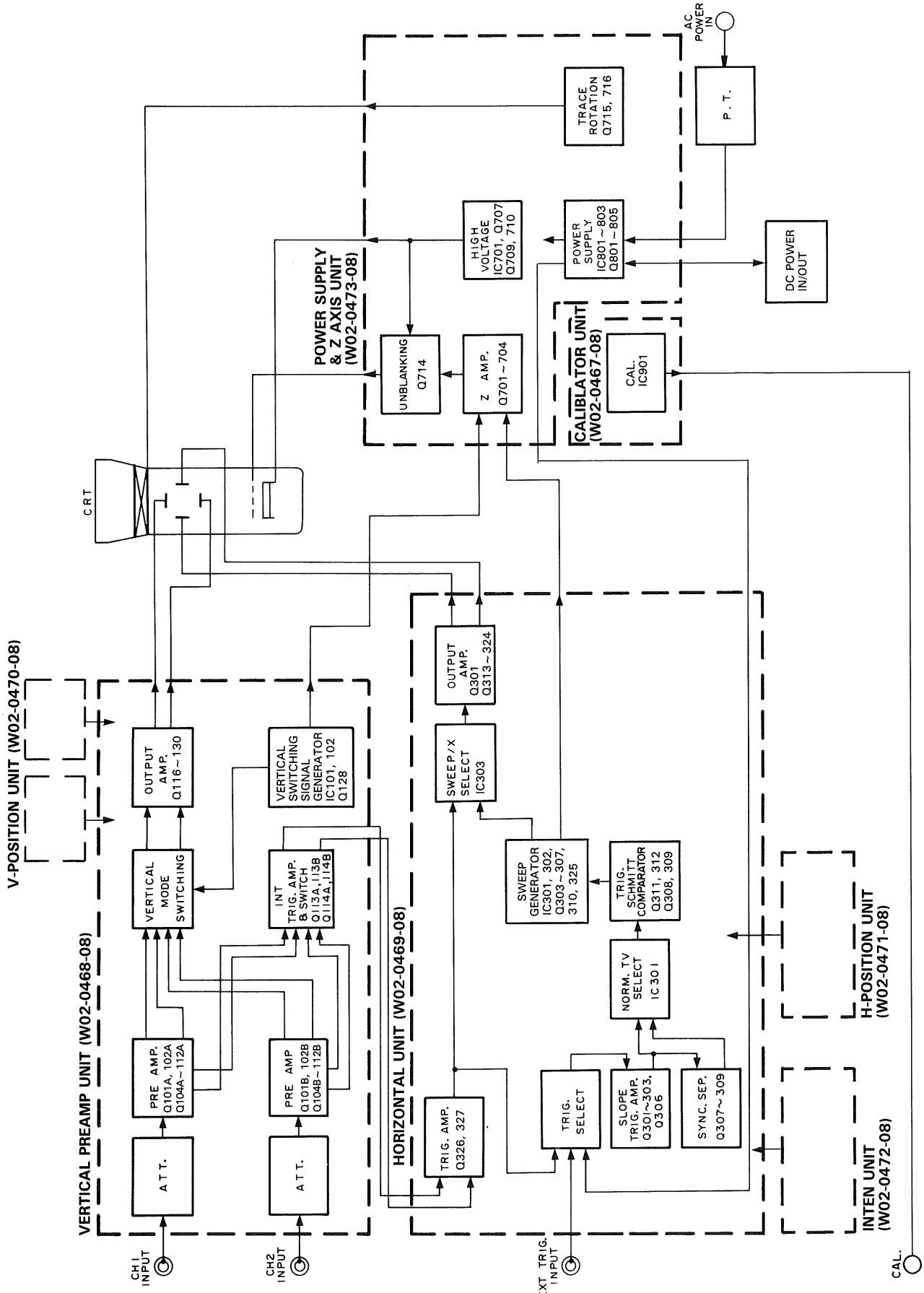
Charge Circuit

This is a circuit for charging the internal battery. It is a constant current using the forward drop voltage of the D3 LED.

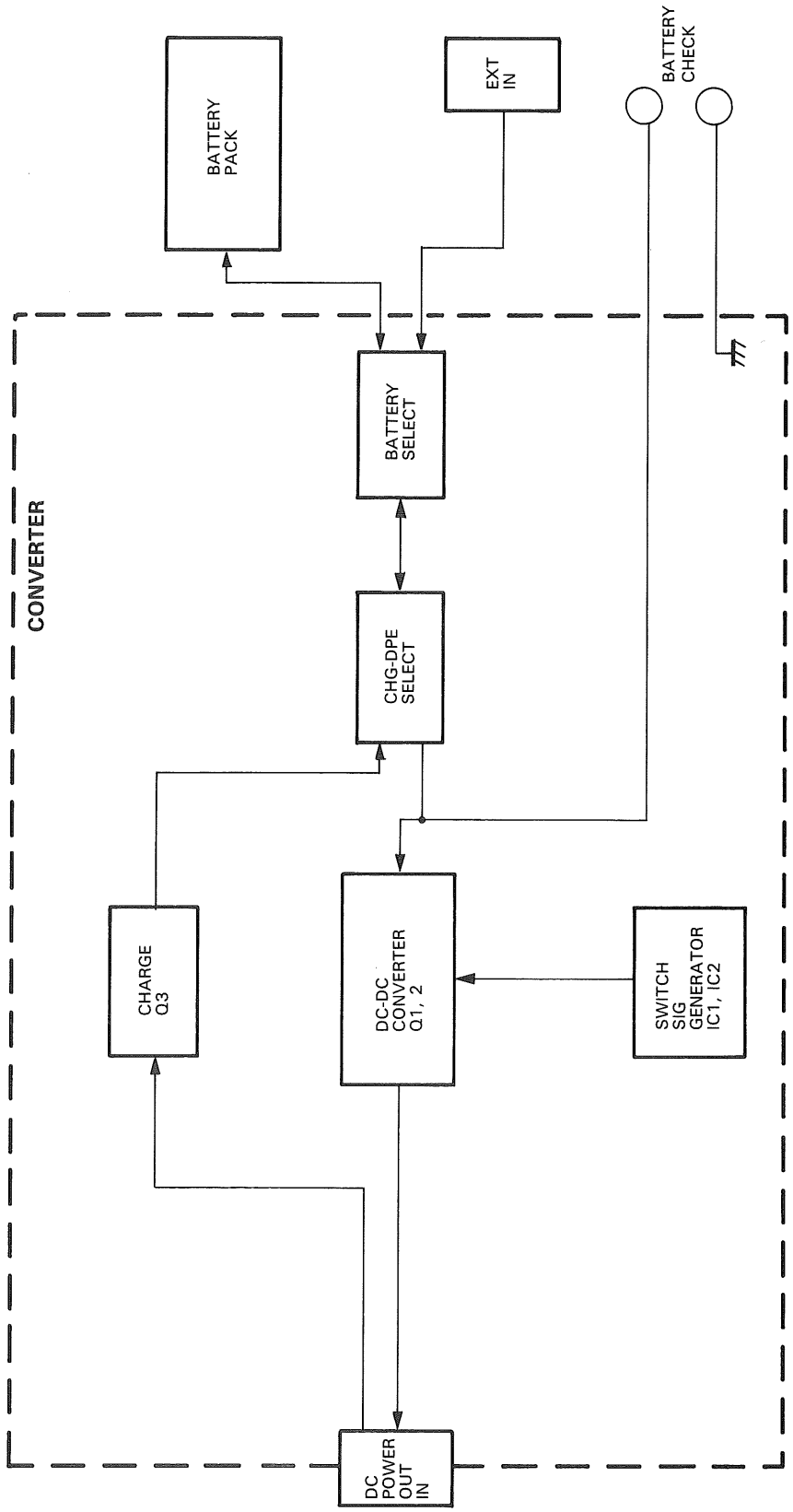
## Battery

The BP-70 is capable of operation from external batteries and also has a built-in 12 V × 4000 mAH battery. Operation for two hours is possible when this battery is fully charged. The battery consists of 10 ni-cad cells connected in series.

# CS-3035 BLOCK DAIGRAM



# BP-70 BLOCK DIAGRAM



# ADJUSTMENT

To obtain the best performance, periodically calibrate the unit. Sometimes, only one mode need be calibrated, while at other times, all modes should be calibrated. When one mode is calibrated, it must be noted that the other modes may be affected. When calibrating all modes, perform the calibration in the specified sequence.
The following calibration required an accurate measuring instrument and an insulated adjusting flat blade screwdriver. If they are not available, contact your dealer. For optimum adjustment, turn the power on and warm up the scope sufficiently (more than 30 minutes) before starting.
Before calibrating the scope, check the power supply voltage.

## TEST EQUIPMENT REQUIRED

The following instrument or their equivalent should be used for making adjustment.

| Test Equipment | Model | Minimum Specification |
|---|---|---|
| Digital Multi-Meter | DL-706 (KENWOOD) | Impedance: More than 10 MΩ, Measuring range: 0.01 V to 199 V |
| Sine-Wave Generator | 651 B (YHP) | Frequency: 10 Hz to 10 MHz, constant voltage over tuning range |
| Sine-Wave Generator | SG-503 (Tektronix) | Frequency: 50 kHz to 100 MHz, Output impedance: 50 Ω, constant voltage over tuning range. |
| Square-Wave Generator | PG-506 (Tektronix) | Output signal: 1 kHz, Amplitude: 10 mVp-p to 10 Vp-p, Accuracy: within ±1%, Rise time: 35 ns or less<br>100 kHz, Rise time: 1 ns or less |
| Q Meter | 4343B (YHP) | — |
| Color Pattern Generator | CG-911A (KENWOOD) | — |
| Oscilloscope | CS-6010 (KENWOOD) | Sensitivity: more than 5 mV<br>Frequency response: More than 100 MHz |
| Time-Marker Generator | TG-501 (Tektronix) | Time mark: 0.5 s to 0.1μs repetive waveform |
| High-Voltage Probe | — | Input Impedance: 1000 MΩ |
| Termination | — | Impedance: 50 Ω<br>Accuracy: within 3% |
| Termination | — | 3 watts type impedance: 50 Ω |
| Attenuator | — | −20 dB attenuation (50 Ω) |

**Table 1**

## PREPARATION FOR ADJUSTMENT

### Control Settings

The control settings listed below must be used for each adjustment procedure.
Exceptions to these settings will be noted as they occur. After completing a adjustment, return the controls to the following settings.

| NAME OF KNOBS | POSITION |
|---|---|
| INTENSITY | 12 o'clock |
| FOCUS | Mechanical Center |
| CH1, CH2, ▲▼ POSITION, PULL×5 MAG | Mechanical center, push |
| CH1, CH2, VOLTS/DIV | 10 mV/DIV |
| CH1, CH2, VARIABLE | CAL |
| CH1, CH2, AC-GND-DC | GND |
| MODE | CH1 |
| TRIG | CH1 |
| CH2 INV | NORM |
| ◄► POSITION, PULL×5 MAG | Mechanical center, push |
| SWEEP TIME/DIV | 1ms |
| SWEEP VARIABLE | CAL |
| TRIG. LEVEL | Mechanical Center, Push |
| MODE | AUTO |
| COUPLING | AC |
| SOURCE | INT |

**Table 2**

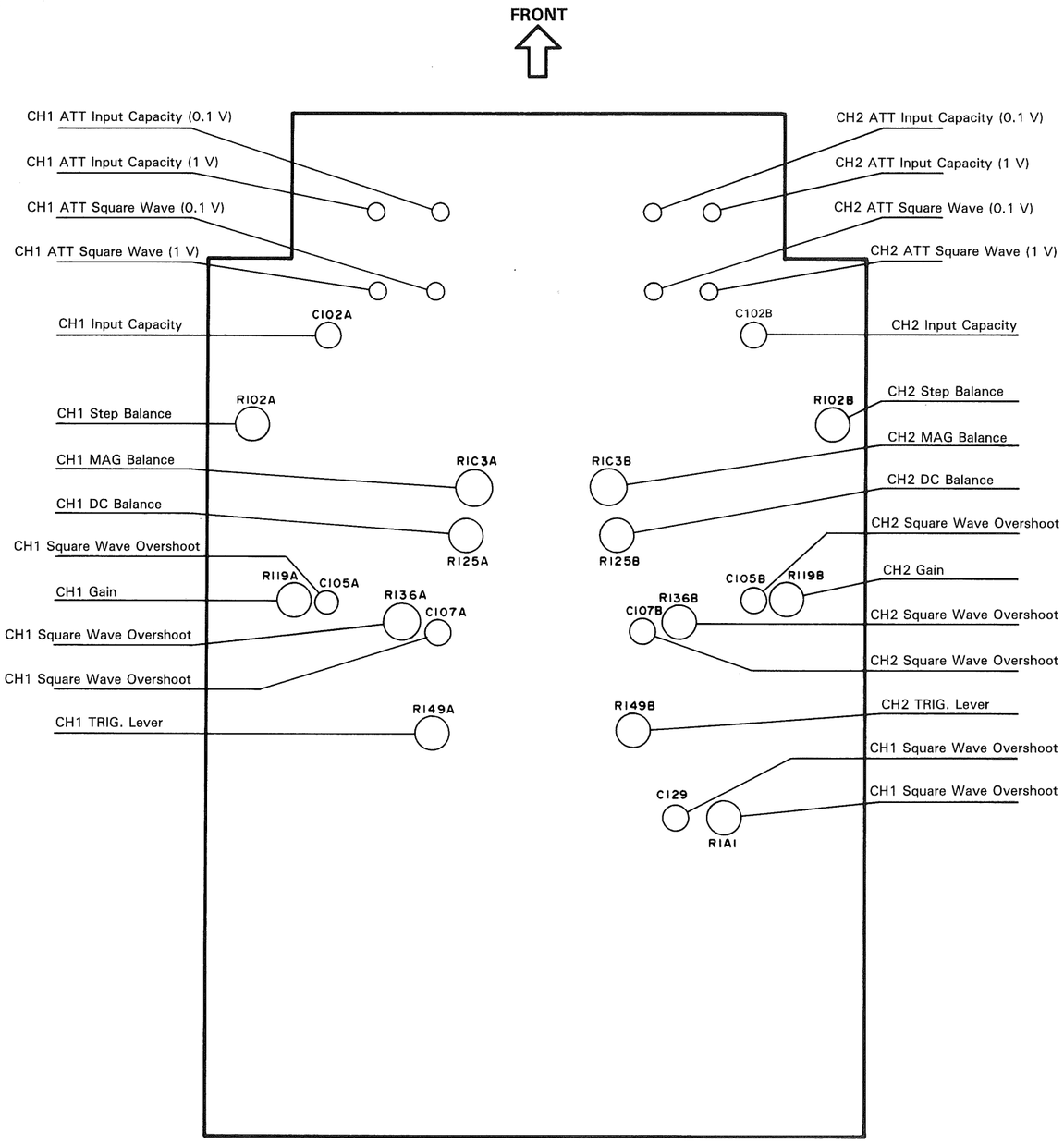
# ADJUSTMENT

| Item | Adjustment R (C) | P.C.B. | Setting | Procedure |
|---|---|---|---|---|
| **1. POWER SUPPLY & CRT SECTION ADJUSTMENT** | | | | |
| INTENSITY | R743 | W02-0473-08 | SWEEP TIME/DIV; X-Y<br>AC-GND-DC; GND | Adjust the luminescent spot erase control between 11-o'clock position and 13-o'clock position. |
| FOCUS | R738 | W02-0473-08 | SWEEP TIME/DIV; X-Y<br>AC-GND-DC; GND | Adjust the FOCUS control between 9-o'clock position and 15-o'clock position so that the spot is rounded with the luminescent spot just focused. |
| ASTIG | R715 | W02-0473-08 | SWEEP TIME/DIV; X-Y<br>AC-GND-DC; GND | |
| TRACE ROTATION | | W02-0467-08 | AC-GND-DC; GND | Adjust so that the luminescent line goes parallel with the horizontal line of the scale. |
| **2. VERTICAL SECTION ADJUSTMENTS** | | | | |
| CH1 STEP BAL | R102A | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent line does not change even when the VOLTS/DIV control is rotated. |
| CH1 DC BAL | R125A | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent line does not change even when the VARIABLE control is rotated. |
| CH1 MAG BAL | R103A | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent lines does not change even with the ×5 MAG knob is set to "PULL". |
| CH1 GAIN | R119A | W02-0468-08 | VOLTS/DIV; 5 mV | Input a square wave of 1 kHz, 20 mVp-p and adjust so that its amplitude is of 4 divisions. |
| CH2 STEP BAL | R102B | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent line does not change even when the VOLTS/DIV control is rotated. |
| CH2 DC BAL | R125B | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent line does not change even when the VARIABLE control is rotated. |
| CH2 MAG BAL | R1C3B | W02-0468-08 | AC-GND-DC; GND<br>VOLTS/DIV; 5 mV | Adjust so that the position of the luminescent line does not change even when the ×5 MAG knob is set to "PULL". |
| CH2 GAIN | R119B | W02-0468-08 | VOLTS/DIV; 5 mV | Input a square wave of 1 kHz, 20 mVp-p and adjust so that its amplitude is of 4 divisions. |
| CH1 Input Capacity | C102A | W02-0468-08 | VOLTS/DIV; 10 mV | Adjust the input capacity to 39 pF ±1 pF. |
| CH1 Square Wave Overshoot | C105A<br>C107A<br>R136A<br>C129<br>R1A1 | W02-0468-08 | VOLTS/DIV; 10 mV | |
| CH1 ATT Input Capacity | | W02-0468-08 | VOLTS/DIV; 0.1 V<br>; 1 V | Adjust the input capacity to 39 pF ±1 pF. |
| CH1 ATT Square Wave | | W02-0468-08 | VOLTS/DIV; 0.1 V<br>; 1 V | Input a square wave of 1 kHz, 5 divisions and adjust so that its waveform is flat. |
| CH2 Input Capacity | C102B | W02-0468-08 | VOLTS/DIV; 10 mV | Adjust the input capacity to 39 pF ±1 pF. |

# ADJUSTMENT

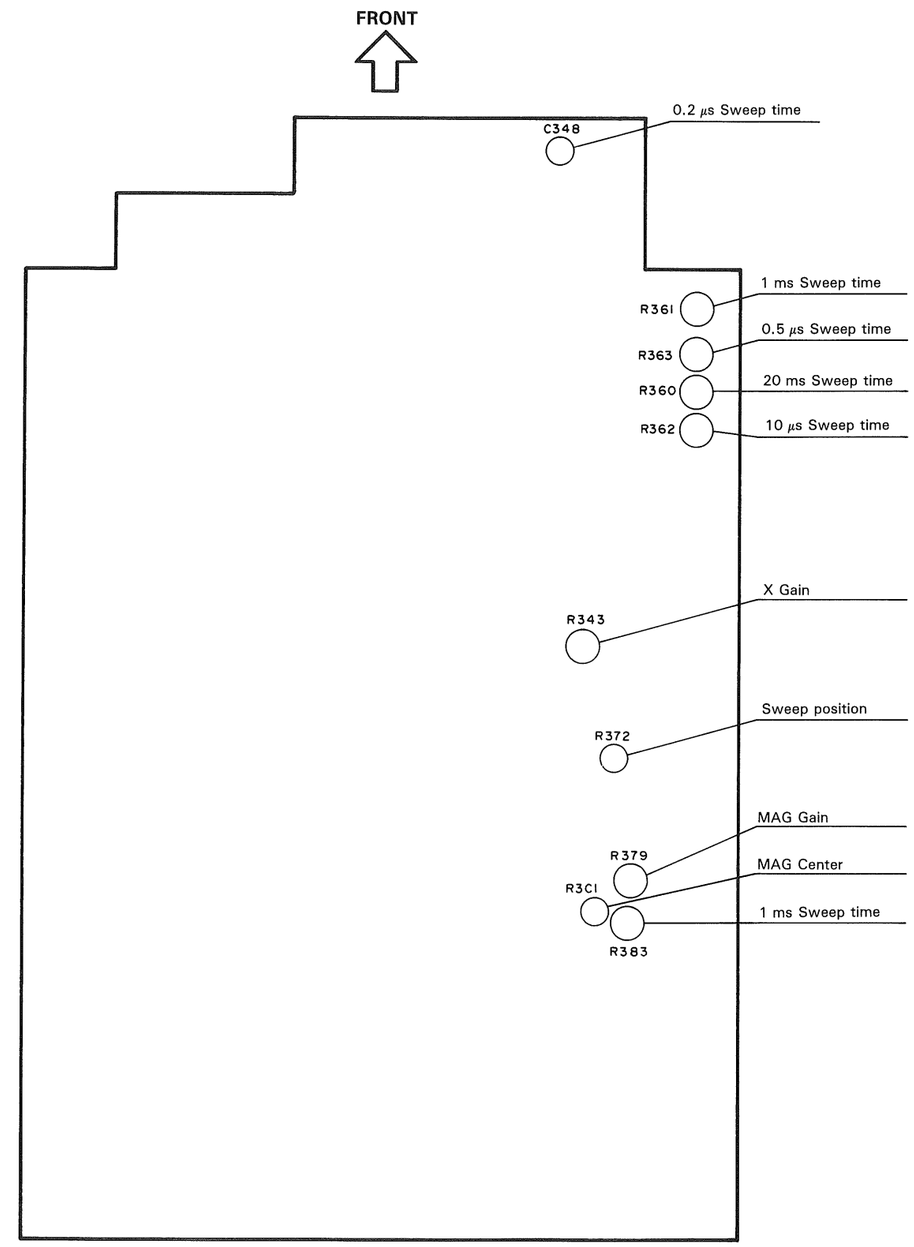
| Item | Adjustment R (C) | P.C.B. | Setting | Procedure |
|---|---|---|---|---|
| CH2 Square Wave Overshoot | C105B<br>C107B<br>R136B | W02-0468-08 | VOLTS/DIV; 10 mV | |
| CH2 ATT Input Capacity | | W02-0468-08 | VOLTS/DIV; 0.1 V<br>; 1 V | Adjust the input capacity to 39 pF ±1 pF. |
| CH2 ATT Square Wave | | W02-0468-08 | VOLTS/DIV; 0.1 V<br>; 1 V | Input a square wave of 1 kHz, 5 divisions and adjust so that its waveform is flat. |
| **3. HORIZONTAL SECTION ADJUSTMENTS** | | | | |
| 1 ms SWEEP TIME | R361<br>R383 | W02-0469-08 | SWEEP TIME/DIV; 1 ms | Adjust R361 so that the sweep length is of 11 waves for 1 ms marker. After that, adjust R383 so that the top of each wave is put on a graduation of the scale. |
| SWEEP Start point | R372 | W02-0469-08 | SWEEP TIME/DIV; 1 ms | Adjust so that with R372 set to the mechanical center position the start of the sweep is put on the left end of the scale. |
| MAG GAIN | R379 | W02-0469-08 | SWEEP TIME/DIV; 1 ms<br>×5 MAG; PULL | Adjust so that with an input of 1 ms marker signal its amplitude is of 5 divisions. |
| MAG Center | R3C1 | W02-0469-08 | SWEEP TIME/DIV; 1 ms<br>×5 MAG; PULL | Set the left end of the 1 ms marker signal to the center of the scale, then adjust so that with the setting of "×5 MAG" the left end comes to the center of the scale. |
| 20 ms SWEEP TIME | R360 | W02-0469-08 | SWEEP TIME/DIV; 20 ms | Adjust so that 20 ms marker signal is put on each graduation of the scale. |
| 10 μs SWEEP TIME | R362 | W02-0469-08 | SWEEP TIME/DIV; 10 μs | Adjust so that 10 μs maker signal is put on each graduation of the scale. |
| 0.5 μs SWEEP TIME | R363 | W02-0469-08 | SWEEP TIME/DIV; 0.5 μs | Adjust so that 0.5 μs marker signal is put on each graduation of the scale. |
| 0.2 μs SWEEP TIME | C348 | W02-0469-08 | SWEEP TIME/DIV; 0.2 μs | Adjust so that 0.2 μs maker signal is put on each graduation of the scale. |
| CH1 TRIG LEVEL | R149A | W02-0468-08 | | Adjust so that with a 1 1 kHz sinewave input of 4 divisions the trigger point does not change even when selection is made between trigger coupling AC and DC. |
| CH2 TRIG LEVEL | R149B | W02-0468-08 | | Adjust so that with a 1 kHz sinewave input of 4 divisions the trigger point does not change even when selection is made between trigger coupling AC and DC. |
| X-GAIN | R343 | W02-0468-08 | SWEEP TIME/DIV; X-Y<br>CH1 VOLTS/DIV; 10 mV | Adjust so that with a 1 kHz square wave input of 50 mV its amplitude is of 5 divisions. |
| **4. CAL ADJUSTMENT** | | | | |
| CAL Voltage<br>Frequency | R906<br>R909 | W02-0467-08 | | Adjust R906 so that the voltage at the CAL pin is 0.25 V ±2%.<br>Adjust R909 so that its frequency is 1 kHz ±2%. |

## VERTICAL PREAMP UNIT (W02-0468-08)

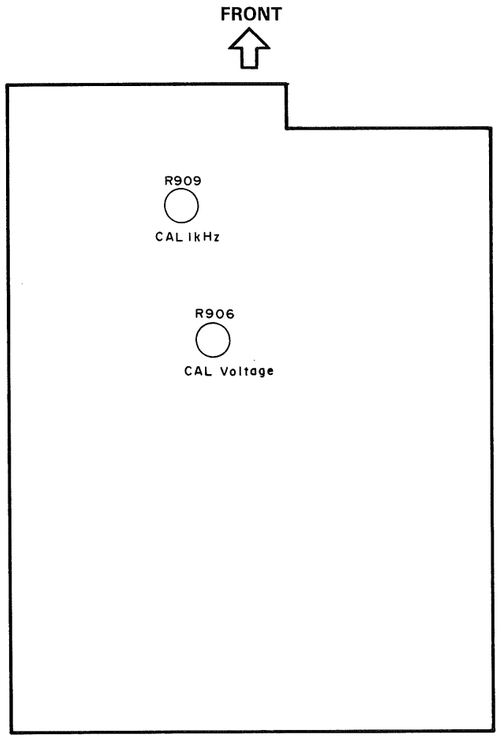



ADJUSTMENT

## HORIZONTAL UNIT (W02-0469-08)

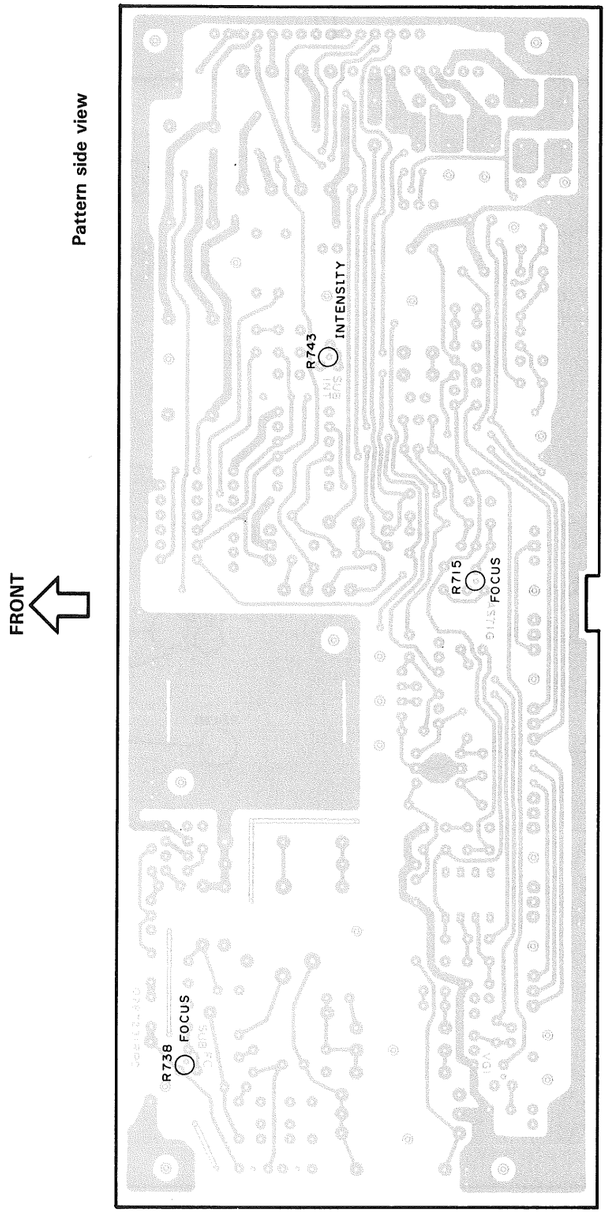


## CALIBRATOR UNIT (W02-0467-08)

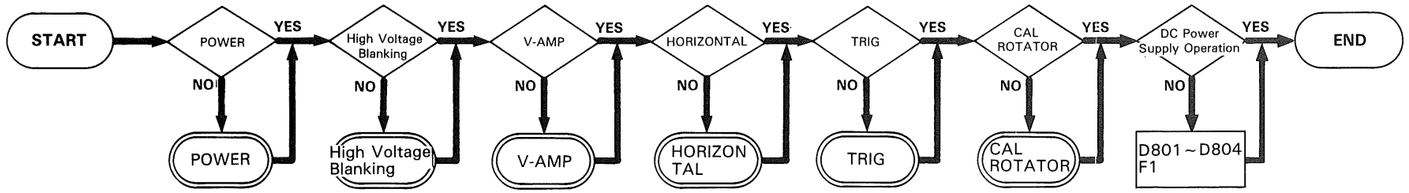


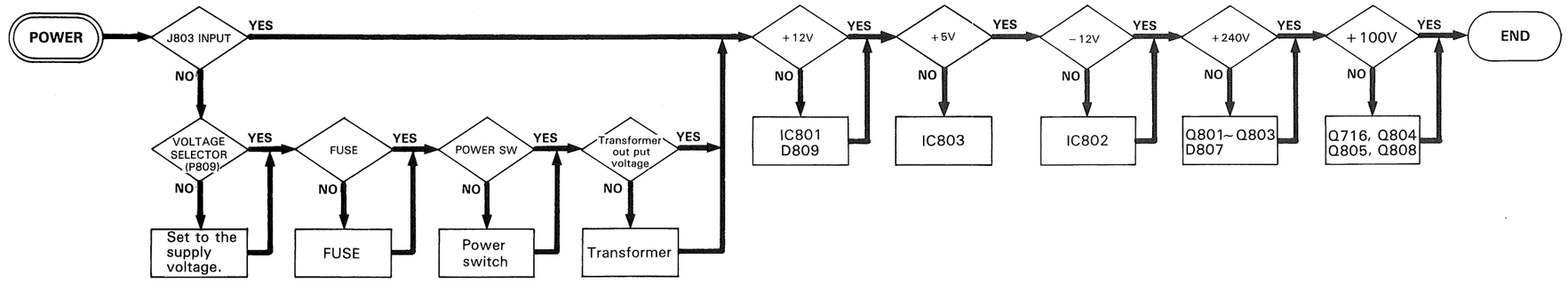

ADJUSTMENT

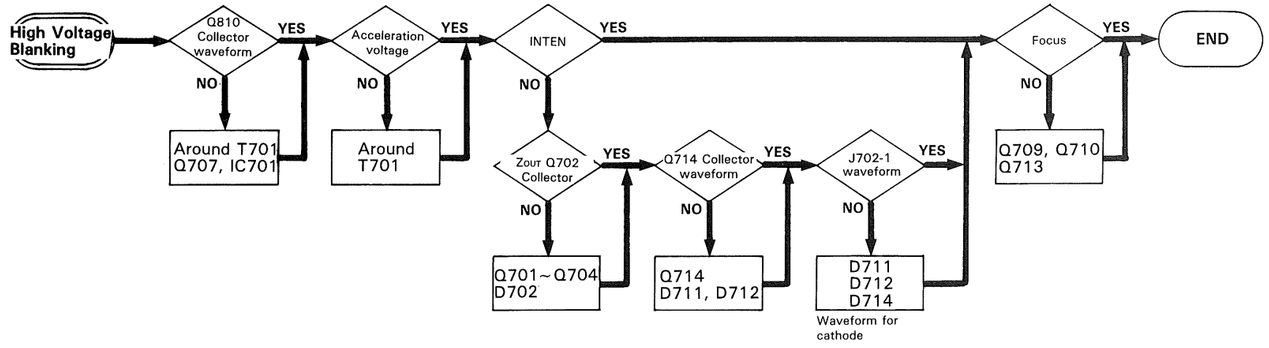
## POWER SUPPLY & Z AXIS UNIT (W02-0473-08)



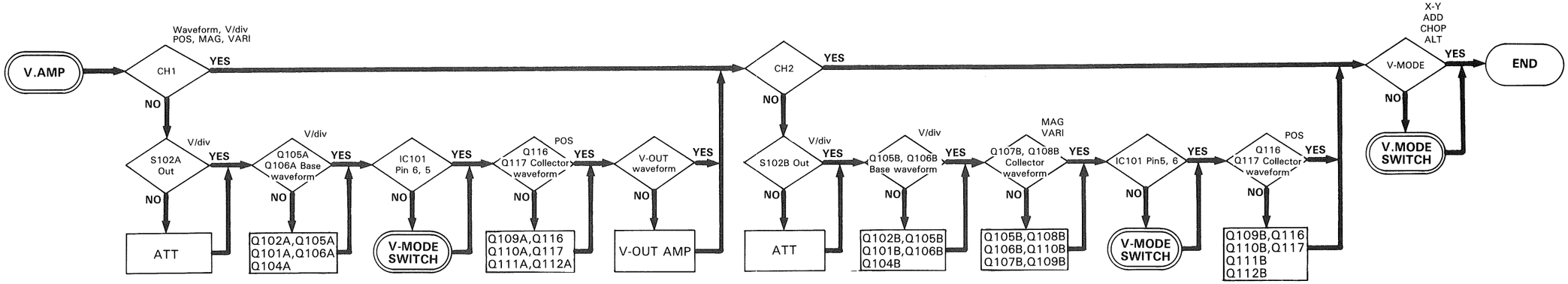
# TROUBLESHOOTING

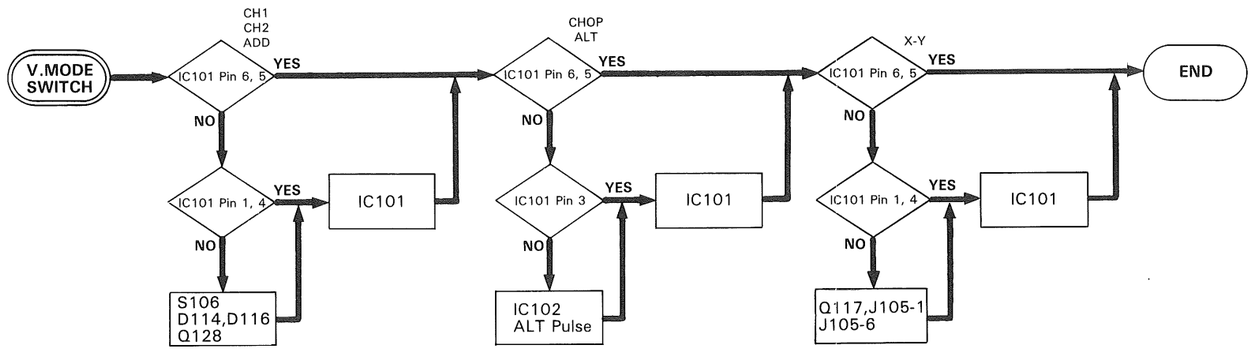


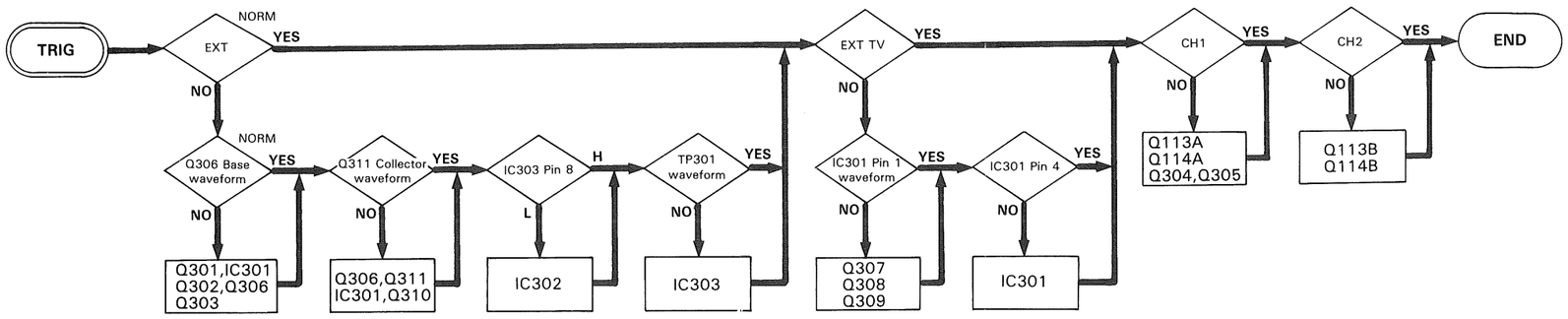



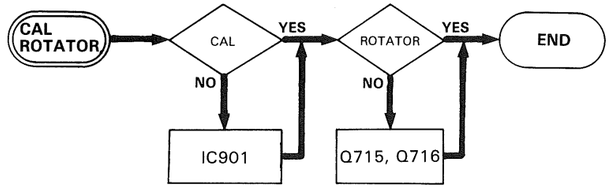
# TROUBLESHOOTING

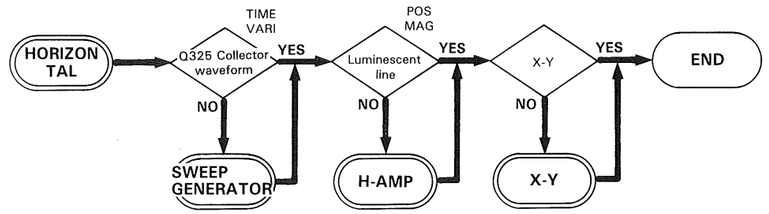


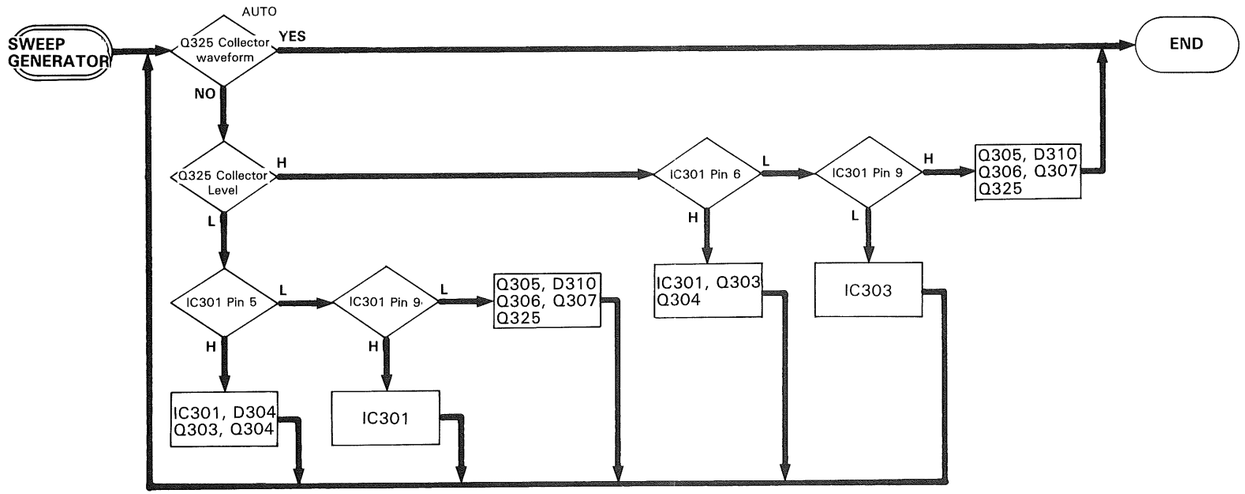



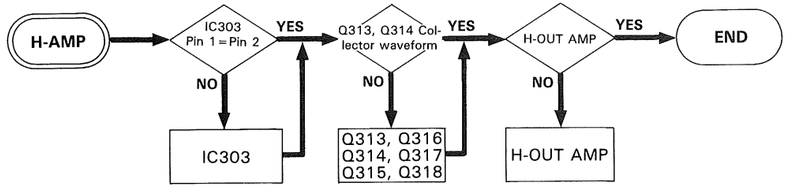



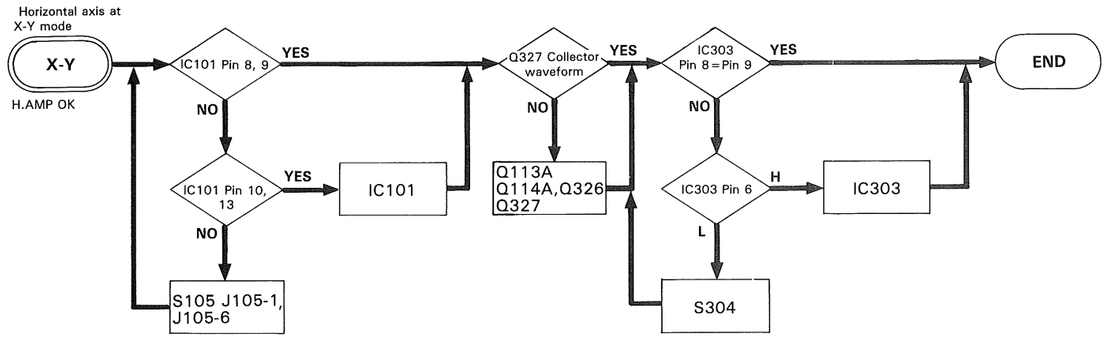
# TROUBLESHOOTING



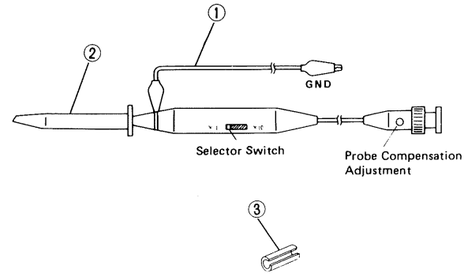
# PARTS LIST

## CS-3035 UNIT

### Y70-1650-00

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | B50-7680-00 | INSTRUCTION MANUAL,JAPANESE |
| | B50-7681-00 | INSTRUCTION MANUAL,ENGLISH |
| | E01-0108-08 | CRT SOCKET |
| | E30-1644-15 | BS POWER CORD |
| | E30-1818-05 | JIS POWER CORD |
| | E30-1819-05 | CEE POWER CORD |
| | E30-1820-05 | UL/CSA POWER CORD |
| | E30-1821-05 | SAA POWER CORD |
| | E31-5605-08 | WIRE ASS'Y(J305-306,J304-307) |
| | E31-5606-08 | WIRE ASS'Y(J805-J906) |
| | E31-5607-08 | WIRE ASS'Y(J105-J303) |
| | E31-5608-08 | WIRE ASS'Y(J108-J107) |
| | E31-5609-08 | WIRE ASS'Y(J109-314,J807-309) |
| | E31-5610-08 | WIRE ASS'Y(J808-J910) |
| | E31-5611-08 | WIRE ASS'Y(J903-POWER LED) |
| | E31-5612-08 | WIRE ASS'Y(J315-READY LED) |
| | E31-5613-08 | WIRE ASS'Y(J106-J806) |
| | E31-5614-08 | WIRE ASS'Y(J308-J804) |
| | E31-5615-08 | WIRE ASS'Y(J801-J802) |
| | F05-3011-05 | FUSE(6X30MM) 0.3A |
| | F05-3019-08 | FUSE(5X20MM) 0.3A |
| | F05-5013-05 | FUSE(6X30MM) 0.5A |
| | H01-5898-08 | CARTON BOX |
| | H12-0577-08 | PAD,TOP |
| | H12-0578-08 | PAD,BOTTOM |
| | H12-0579-08 | PAD,PLATE |
| | H20-1730-08 | VINYL COVER |
| | W03-2308-05 | PROBE (PC-30) |
| P809 | F09-0518-08 | CAP |
| P809A | E23-0569-08 | CONNECTOR PIN WITH WIRE |
| 1 | A01-1206-08 | CASE,TOP |
| 2 | A01-1207-08 | CASE,BOTTOM |
| 3 | A20-2835-08 | MOLDED PANEL |
| 4 | A21-1144-08 | DECORATIVE PANEL |
| 5 | A21-1145-08 | DECORATIVE PANEL |
| 6 | A22-0875-08 | SUB PANEL |
| 7 | A23-1691-08 | REAR PANEL |
| 8 | A23-1694-08 | REAR PANEL |
| 9 | A50-0512-08 | FRAME,RIGHT |
| 10 | A50-0513-08 | FRAME,LEFT |
| 11 | B07-0719-08 | ESCUTCHEON |
| 12 | B11-0508-08 | FILTER |
| 13 | B30-0967-08 | LED |
| 14 | B40-2920-08 | PANEL |
| 15 | B40-2922-08 | NAME PLATE,MODEL NO. |
| 16 | D21-0921-08 | EXTENTION SHAFT |
| 17 | D21-0922-08 | EXTENTION SHAFT |
| 18 | D22-0505-08 | COUPLING |
| 19 | D22-0506-08 | COUPLING |
| 20 | E01-0107-08 | CRT SOCKET |
| 21 | E04-0259-05 | BNC RECEPTACLE |
| 22 | E18-0351-05 | AC INLET 3 P |
| 23 | E21-0668-08 | CAL TERMINAL |
| 24 | F07-0953-08 | COVER |
| 25 | F10-1609-08 | FRAME,CENTER |
| 26 | F11-1219-08 | SHIELD CASE |
| 27 | F11-1220-08 | SHIELD CASE |
| 28 | F19-0716-08 | SHIELD PLATE |
| 29 | F19-0717-08 | BLIND PLATE |
| 30 | F20-0678-08 | ADHESIVE TAPE |
| 31 | F20-0680-08 | INSULATED SHEET |
| 32 | G13-0726-08 | CUSHION |
| 33 | G13-0727-08 | CUSHION |
| 34 | J02-0522-08 | RUBBER FOOT |
| 35A | J13-0508-08 | FUSE HOLDER,FOR 6X30MM FUSE |
| 35B | J13-0509-08 | FUSE HOLDER,ROR 5X20MM FUSE |
| 36 | J21-4641-08 | BRACKET |
| 37 | J21-4643-08 | BRACKET;CRT |
| 38 | J21-4644-08 | BRACKET;CRT |
| 39 | J21-4645-08 | HANDLE STEPPER |
| 40 | J21-4647-08 | BRACKET |
| 41 | J21-4648-08 | BRACKET |
| 43 | K01-0530-08 | HANDLE |
| 44 | K21-0900-08 | KNOB;SWEEP VARI |
| 45 | K21-0901-08 | KNOB;SWEEP TIME/DIV |
| 46 | K21-0902-08 | KNOB;POSITION,TRIG.LEVEL |
| 47 | K21-0903-08 | KNOB;INTEN,VOLTS VARI |
| 48 | K21-0904-08 | KNOB;VOLTS/DIV |
| 49 | K21-0905-08 | KNOB;V OR Y MODE |
| 50 | K27-0544-08 | KNOB;POWER |
| 51 | K27-0545-08 | PUSH BUTTON |
| 52 | L01-9836-08 | POWER TRANSFORMER |
| 53 | L39-0529-08 | ROTATOR COIL(REF NO.L801) |
| 54 | N09-0763-08 | SCREW |
| 55 | W01-0503-04 | REAR RUBBER FOOT/CORD WRAP |
| 56 | W02-0467-08 | CALIBRATOR UNIT |
| 57 | W02-0468-08 | VERTICAL UNIT |
| 58 | W02-0469-08 | HORIZONTAL UNIT |
| 59 | W02-0470-08 | V-POSITION UNIT |
| 60 | W02-0471-08 | H-POSITION UNIT |
| 61 | W02-0472-08 | INTEN UNIT |
| 62 | W02-0473-08 | POWER SUPPLY & Z AXIS UNIT |
| 63 | 952TM31 | CRT |

## MODEL PC-30 (LOW CAPACITY PROBE)

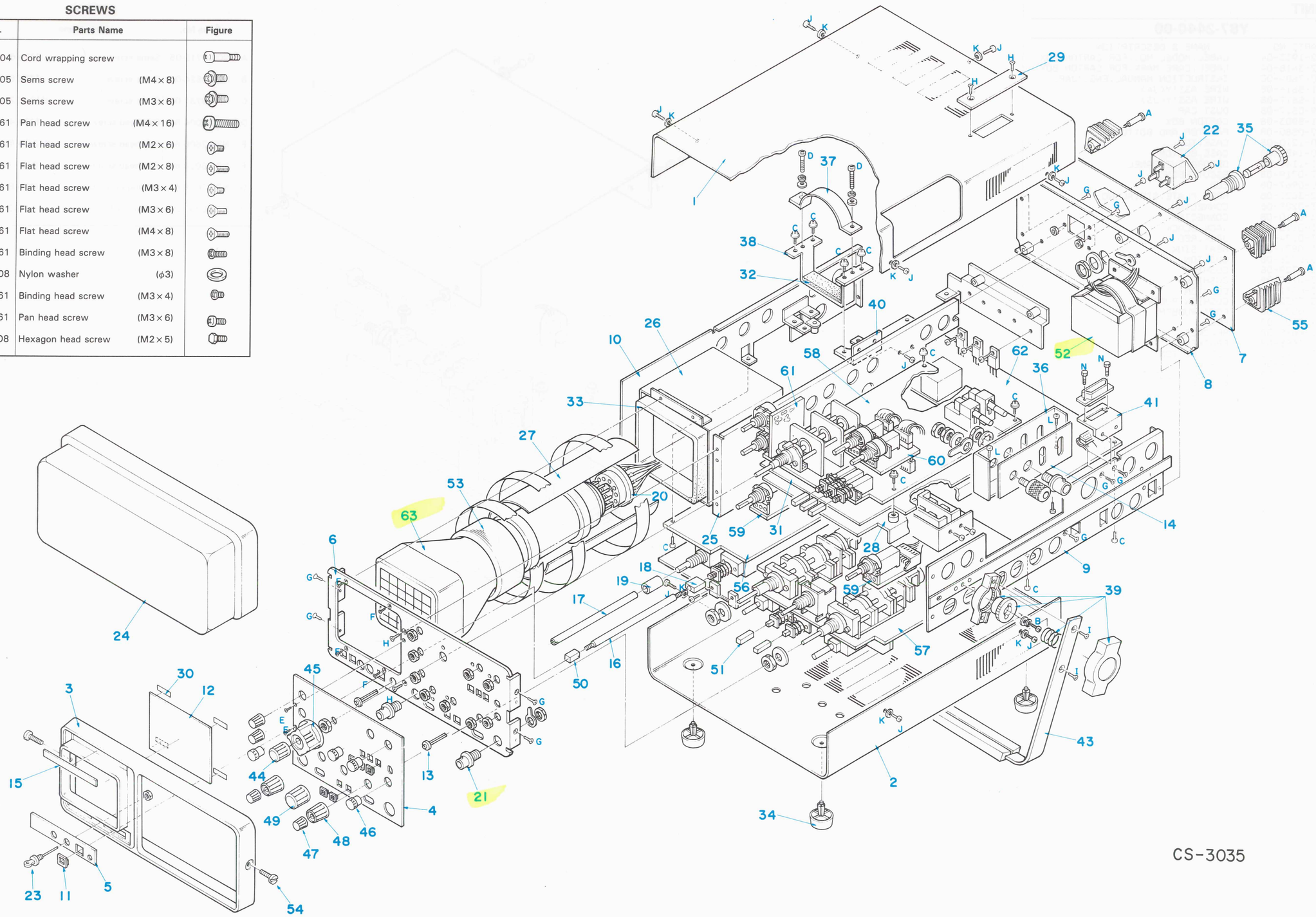



| ITEM | DESCRIPTION | PARTS NO. |
|---|---|---|
| ① | Ground Wire Assembly | E30-1883-08 |
| ② | Retractable Hook Tip | E29-0540-08 |
| ③ | Marker (Orange) | B42-1950-08 |

# CS-3035 DISASSEMBLY

## SCREWS

| | Parts No. | Parts Name | | Figure |
|---|---|---|---|---|
| A | N08-0611-04 | Cord wrapping screw | | |
| B | N09-0654-05 | Sems screw | (M4×8) | |
| C | N09-0718-05 | Sems screw | (M3×6) | |
| D | N30-4016-61 | Pan head screw | (M4×16) | |
| E | N32-2006-61 | Flat head screw | (M2×6) | |
| F | N32-2008-61 | Flat head screw | (M2×8) | |
| G | N32-3004-61 | Flat head screw | (M3×4) | |
| H | N32-3006-61 | Flat head screw | (M3×6) | |
| I | N32-4008-61 | Flat head screw | (M4×8) | |
| J | N35-3008-61 | Binding head screw | (M3×8) | |
| K | N19-0733-08 | Nylon washer | (ϕ3) | |
| L | N35-3004-61 | Binding head screw | (M3×4) | |
| M | N30-3006-61 | Pan head screw | (M3×6) | |
| N | N09-0775-08 | Hexagon head screw | (M2×5) | |




CS-3035

# PARTS LIST

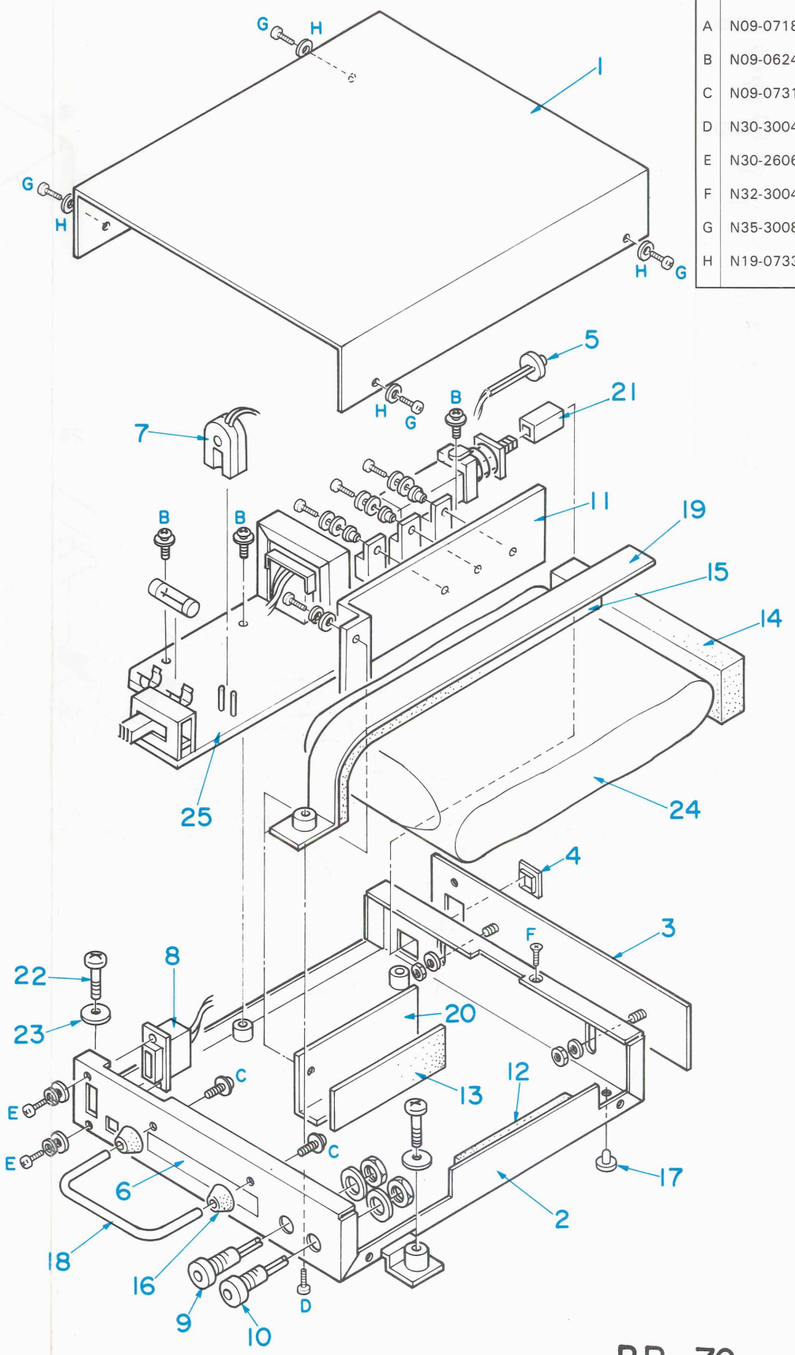
## BP-70 UNIT

### Y87-2440-00

| REF.NO | PARTS NO | NAME & DESCRIPTION |
|---|---|---|
| | B42-1933-04 | LABEL,MODEL NO.,FOR CARTON BOX |
| | B42-3618-04 | LABEL,CARE MARK,FOR CARTON BOX |
| | B50-7684-00 | INSTRUCTION MANUAL,ENG./JAP. |
| | E31-5616-08 | WIRE ASS'Y(J4) |
| | E31-5617-08 | WIRE ASS'Y(J3) |
| | F09-0517-08 | DUST CAP |
| | H01-5903-08 | CARTON BOX |
| | H12-0580-08 | PAD,TOP AND BOTTOM |
| 1 | A10-1210-08 | CASE,TOP |
| 2 | A10-1453-08 | CASE,BOTTOM |
| 3 | A21-1149-08 | DECORATIVE PANEL |
| 4 | B07-0719-08 | ESCUTCHEON |
| 5 | B30-0967-08 | LED |
| 6 | B42-3621-08 | NAME PLATE,SIRIAL NO. |
| 7 | E03-0209-08 | CONNECTOR |
| 8 | E03-0210-08 | CONNECTOR |
| 9 | E13-0173-08 | JACK,BLACK |
| 10 | E13-0174-08 | JACK,RED |
| 11 | F01-0871-08 | HEAT SINK |
| 12 | G13-0728-08 | CUSHION |
| 13 | G13-0729-08 | CUSHION |
| 14 | G13-0730-08 | CUSHION |
| 15 | G13-0731-08 | CUSHION |
| 16 | G13-0732-08 | CUSHION,RUBBER |
| 17 | J02-0523-08 | FOOT,RUBBER |
| 18 | J09-0507-08 | FOOT |
| 19 | J21-4649-08 | BRACKET |
| 20 | J21-4658-08 | BRACKET |
| 21 | K27-0545-08 | PUSH BUTTON |
| 22 | N09-0769-08 | SCREW |
| 23 | N19-0734-08 | WASHER,NYLON |
| 24 | W02-0461-08 | BATTERY PACK |
| 25 | W02-0462-08 | CONVERTER UNIT |



# BP-70 DISASSEMBLY




**SCREWS**

| | Parts No. | Parts Name | Figure |
|---|---|---|---|
| A | N09-0718-05 | Sems screw (M3×6) | |
| B | N09-0624-04 | Sems screw (M3×8) | |
| C | N09-0731-05 | Sems screw (M3×12) | |
| D | N30-3004-61 | Pan head screw (M3×4) | |
| E | N30-2606-61 | Pan head screw (M2.6×6) | |
| F | N32-3004-61 | Flat head screw (M3×4) | |
| G | N35-3008-61 | Binding head screw (M3×8) | |
| H | N19-0733-08 | Nylon washer (φ3) | |

BP-70

# PARTS LIST

## CS-3035 CALIBRATION UNIT

### W02-0467-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | J25-3522-08 | PCB (UNMOUNTED) | | | |
| C901 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C902 | CF92V1H102K | CAP. POLYESTER | 1000P | 10% | 50% |
| C903 | CF92V1H103K | CAP. POLYESTER | 0.01 | 10% | 50V |
| C904 | CF92V1H103K | CAP. POLYESTER | 0.01 | 10% | 50V |
| C914 | C90-0991-08 | CAP. ELECTRO | 33 | 20% | 16V |
| C915 | C90-0991-08 | CAP. ELECTRO | 33 | 20% | 16V |
| D902 | 1S1587 | DIODE | | | |
| IC901 | NE555P | IC, TIMMER | | | |
| J902 | E23-0571-08 | PIN TERMINAL | | | |
| J903 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J906 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J910 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| R901 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R902 | RD14BB2E332J | RES. CARBON | 3.3K | 5% | 1/4W |
| R903 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R904 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R905 | RD14BB2E242J | RES. CARBON | 2.4K | 5% | 1/4W |
| R906 | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R907 | RD14BB2E202J | RES. CARBON | 2K | 5% | 1/4W |
| R908 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R909 | R12-5405-05 | RES. SEMI FIXED | 100K | | |
| R930 | R05-3519-08 | V.R. | | | |
| R936 | RD14BB2E272J | RES. CARBON | 2.7K | 5% | 1/4W |
| R946 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R947 | RD14BB2E272J | RES. CARBON | 2.7K | 5% | 1/4W |
| S801 | S40-1517-08 | SWITCH | | | |

## CS-3035 VERTICAL PREAMP UNIT

### W02-0468-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F01-0872-08 | HEAT SINK | | | |
| | F10-1612-08 | SHIELD PLATE | | | |
| | F10-1613-08 | SHIELD PLATE | | | |
| | F20-0682-08 | SPACER(Q1,Q2) | | | |
| | J25-5323-08 | PCB (UNMOUNTED) | | | |
| C101A | C91-1289-08 | CAP. POLYESTER | 0.047 | 10% | 400V |
| C101B | C91-1289-08 | CAP. POLYESTER | 0.047 | 10% | 400V |
| C102A | C05-0031-15 | CAP. TRIMMER | 10P | | |
| C102B | C05-0031-15 | CAP. TRIMMER | 10P | | |
| C105A | C05-0030-15 | CAP. TRIMMER | 20P | | |
| C105B | C05-0030-15 | CAP. TRIMMER | 20P | | |
| C107A | C05-0309-05 | CAP. TRIMMER | 40P | | |
| C107B | C05-0309-05 | CAP. TRIMMER | 40P | | |
| C113 | C91-1297-08 | CAP. MICA | 150P | 10% | |
| C114 | C91-1297-08 | CAP. MICA | 150P | 10% | |
| C116 | CF92V1H472K | CAP. POLYESTER | 4700P | 10% | 50V |
| C117 | CF92V1H472K | CAP. POLYESTER | 4700P | 10% | 50V |
| C119 | CF92V1H102K | CAP. POLYESTER | 1000P | 10% | 50% |
| C120 | CE04W2C2R2M | CAP. ELECTRO | 2.2 | 20% | 160V |
| C121 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C122 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C123 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C124A | C91-1289-08 | CAP. POLYESTER | 0.047 | 10% | 400V |
| C124B | C91-1289-08 | CAP. POLYESTER | 0.047 | 10% | 400V |
| C125A | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C125B | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C126 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C127A | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C127B | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C129 | C05-0030-15 | CAP. TRIMMER | 20P | | |
| C131 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C132 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C133 | C91-1295-08 | CAP. CERAMIC | 0.068 | 20% | 25V |
| C134 | C91-1295-08 | CAP. CERAMIC | 0.068 | 20% | 25V |
| C135 | CF92V1H102K | CAP. POLYESTER | 1000P | 10% | 50% |
| C136A | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C136B | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C136C | R92-1061-05 | JUMPING RES. | ZERO OHM (5MM) | | |
| C137A | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C137B | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C137C | R92-1061-05 | JUMPING RES. | ZERO OHM (5MM) | | |
| C138 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C139 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C141A | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C141B | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C142A | CM93BD2A560J | CAP. MICA | 56P | 5% | 100V |
| C142B | CM93BD2A560J | CAP. MICA | 56P | 5% | 100V |
| C143A | CM93BD2A070D | CAP. MICA | 7P | 0.5P | 100V |
| C143B | CM93BD2A070D | CAP. MICA | 7P | 0.5P | 100V |
| C144 | CM93BD2A101J | CAP. MICA | 100P | 5% | 100V |
| C146 | CM93BD2A030D | CAP. MICA | 3P | 0.5P | 100V |
| C147A | C91-1295-08 | CAP. CERAMIC | 0.068 | 20% | 25V |
| C147B | C91-1295-08 | CAP. CERAMIC | 0.068 | 20% | 25V |
| C148A | CM93BD2A560J | CAP. MICA | 56P | 5% | 100V |
| C148B | CM93BD2A560J | CAP. MICA | 56P | 5% | 100V |
| C149A | CM93BD2A270J | CAP. MICA | 27P | 5% | 100V |
| C149B | CM93BD2A200J | CAP. MICA | 20P | 5% | 100V |
| C150A | CM93BD2A080D | CAP. MICA | 8P | 0.5P | 100V |
| C150B | CM93BD2A080D | CAP. MICA | 8P | 0.5P | 100V |
| C151A | CM93BD2A030D | CAP. MICA | 3P | 0.5P | 100V |
| C151B | CM93BD2A030D | CAP. MICA | 3P | 0.5P | 100V |
| C152A | CM93BD2A070D | CAP. MICA | 7P | 0.5P | 100V |
| C152B | CM93BD2A070D | CAP. MICA | 7P | 0.5P | 100V |
| C153 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C154 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C155 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C156 | C91-1296-08 | CAP. CERAMIC | 0.1 | 10% | 100V |
| C157A | CM93BD2A200J | CAP. MICA | 20P | 5% | 100V |
| C157B | CM93BD2A200J | CAP. MICA | 20P | 5% | 100V |
| D101A | 1S1587 | DIODE | | | |
| D101B | 1S1587 | DIODE | | | |
| D104A | 1SS200 | DIODE | | | |
| D104B | 1SS200 | DIODE | | | |
| D106A | 1SS200 | DIODE | | | |
| D106B | 1SS200 | DIODE | | | |
| D108A | 1SS200 | DIODE | | | |
| D108B | 1SS200 | DIODE | | | |
| D110A | 1SS200 | DIODE | | | |
| D110B | 1SS200 | DIODE | | | |
| D112 | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D113 | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D114 | 1SS16 | DIODE | | | |
| D116 | 1SS16 | DIODE | | | |
| D117 | 1N60 | DIODE | | | |
| D118A | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D118B | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D120 | 1N60 | DIODE | | | |
| D121 | 1N60 | DIODE | | | |
| D122 | 1N60 | DIODE | | | |
| D123A | 1S1587 | DIODE | | | |
| D123B | 1S1587 | DIODE | | | |
| D124A | 1S1587 | DIODE | | | |
| D124B | 1S1587 | DIODE | | | |
| D125A | 1S1587 | DIODE | | | |
| D125B | 1S1587 | DIODE | | | |
| IC101 | SN74LS74AN | IC, D-FLIP FLOP | | | |
| IC102 | SN74LS02N | IC, QUAD 2-INPUT NOR GATE | | | |
| J102A | E23-0571-08 | PIN TERMINAL | | | |
| J102B | E23-0571-08 | PIN TERMINAL | | | |
| J103A | E23-0571-08 | PIN TERMINAL | | | |
| J103B | E23-0571-08 | PIN TERMINAL | | | |
| J105 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J106 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J107A | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J107B | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J109 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| L103 | L37-0048-08 | COIL | 2.7UH | 20% | |
| L104 | L37-0048-08 | COIL | 2.7UH | 20% | |
| Q101A | 2SA1005(L) | TR. SI, PNP | | | |
| Q101B | 2SA1005(L) | TR. SI, PNP | | | |
| Q102A | 2SK240(BL) | FET, N-CHANNEL | | | |
| Q102B | 2SK240(BL) | FET, N-CHANNEL | | | |
| Q104A | 2SA1005(L) | TR. SI, PNP | | | |
| Q104B | 2SA1005(L) | TR. SI, PNP | | | |
| Q105A | 2SC1923(D) | TR. SI, NPN | | | |
| Q105B | 2SC1923(D) | TR. SI, NPN | | | |
| Q106A | 2SC1923(D) | TR. SI, NPN | | | |
| Q106B | 2SC1923(D) | TR. SI, NPN | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| Q107A | 2SC1923(O) | TR. SI, NPN | | | |
| Q107B | 2SC1923(O) | TR. SI, NPN | | | |
| Q108A | 2SC1923(O) | TR. SI, NPN | | | |
| Q108B | 2SC1923(O) | TR. SI, NPN | | | |
| Q109A | 2SA1005(K) | TR. SI, PNP | | | |
| Q109B | 2SA1005(K) | TR. SI, PNP | | | |
| Q110A | 2SA1005(K) | TR. SI, PNP | | | |
| Q110B | 2SA1005(K) | TR. SI, PNP | | | |
| Q111A | 2SA1005(L) | TR. SI, PNP | | | |
| Q111B | 2SA1005(L) | TR. SI, PNP | | | |
| Q112A | 2SA1005(L) | TR. SI, PNP | | | |
| Q112B | 2SA1005(L) | TR. SI, PNP | | | |
| Q113A | 2SA1015(Y) | TR. SI, PNP | | | |
| Q113B | 2SA1015(Y) | TR. SI, PNP | | | |
| Q114A | 2SA1015(Y) | TR. SI, PNP | | | |
| Q114B | 2SA1015(Y) | TR. SI, PNP | | | |
| Q116 | 2SA1005(L) | TR. SI, PNP | | | |
| Q117 | 2SA1005(L) | TR. SI, PNP | | | |
| Q118 | 2SC1923(O) | TR. SI, NPN | | | |
| Q119 | 2SC1923(O) | TR. SI, NPN | | | |
| Q120 | 2SC1730(Y) | TR. SI, NPN | | | |
| Q121 | 2SC1730(Y) | TR. SI, NPN | | | |
| Q122 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q123 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q124 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q125 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q127A | 2SK117(BL) | FET, N-CHANNEL | | | |
| Q127B | 2SK117(BL) | FET, N-CHANNEL | | | |
| Q128 | 2SC1815(GR) | TR. SI, NPN | | | |
| R1A0 | RD14BB2E301J | RES, CARBON | 300 | 5% | 1/4W |
| R1A1 | R12-1554-08 | RES. SEMI FIXED | 1KB | | |
| R1A2 | RD14BB2E301J | RES, CARBON | 300 | 5% | 1/4W |
| R1A3 | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R1A4 | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R1A5 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R1A6 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R1A7 | RD14BB2E180J | RES. CARBON | 18 | 5% | 1/4W |
| R1A8 | RD14BB2E180J | RES. CARBON | 18 | 5% | 1/4W |
| R1A9 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R1B0 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R1B1 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R1B2 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R1B4 | RD14BB2E2R2J | RES. CARBON | 2.2 | 5% | 1/4W |
| R1B5 | RD14BB2E2R2J | RES. CARBON | 2.2 | 5% | 1/4W |
| R1B6A | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R1B6B | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R1B7A | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R1B7B | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R1B8A | RN14BK2E1981F | RES. METAL FILM | 1.98K | 1% | 1/4W |
| R1B8B | RN14BK2E1981F | RES. METAL FILM | 1.98K | 1% | 1/4W |
| R1B9A | RN14BK2E1981F | RES. METAL FILM | 1.98K | 1% | 1/4W |
| R1B9B | RN14BK2E1981F | RES. METAL FILM | 1.98K | 1% | 1/4W |
| R1C0A | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C0B | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C1A | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R1C1B | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R1C2A | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R1C2B | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R1C3A | R12-0587-08 | RES. SEMI FIXED | 330 B | | |
| R1C3B | R12-0587-08 | RES. SEMI FIXED | 330 B | | |
| R1C4 | RD14BB2E680J | RES. CARBON | 68 | 5% | 1/4W |
| R1C5 | RD14BB2E680J | RES. CARBON | 68 | 5% | 1/4W |
| R1C6A | RD14BB2E100J | RES. CARBON | 10 | 5% | 1/4W |
| R1C6B | RD14BB2E100J | RES. CARBON | 10 | 5% | 1/4W |
| R1C7A | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C7B | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C8A | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C8B | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R1C9A | RD14BB2E561J | RES. CARBON | 560 | 5% | 1/4W |
| R1C9B | RD14BB2E561J | RES. CARBON | 560 | 5% | 1/4W |
| R1D1 | RD14BB2E220J | RES. CARBON | 22 | 5% | 1/4W |
| R101A | RD14BB2E334J | RES. CARBON | 330K | 5% | 1/4W |
| R101B | RD14BB2E334J | RES. CARBON | 330K | 5% | 1/4W |
| R102A | R12-3442-05 | RES. SEMI FIXED | 47KB | | |
| R102B | R12-3442-05 | RES. SEMI FIXED | 47KB | | |
| R103A | RD14BB2E243J | RES. CARBON | 24K | 5% | 1/4W |
| R103B | RD14BB2E243J | RES. CARBON | 24K | 5% | 1/4W |
| R104A | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R104B | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R105A | RN14BK2E1501F | RES. METAL FILM | 1.5K | 1% | 1/4W |
| R105B | RN14BK2E1501F | RES. METAL FILM | 1.5K | 1% | 1/4W |
| R106A | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R106B | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R107A | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R107B | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R108A | RN14BK2E1501F | RES. METAL FILM | 1.5K | 1% | 1/4W |
| R108B | RN14BK2E1501F | RES. METAL FILM | 1.5K | 1% | 1/4W |
| R110A | RN14BK2E1001F | RES. METAL FILM | 1K | 1% | 1/4W |
| R110B | RN14BK2E1001F | RES. METAL FILM | 1K | 1% | 1/4W |
| R111A | RN14BK2E1580F | RES. METAL FILM | 158 | 1% | 1/4W |
| R111B | RN14BK2E1580F | RES. METAL FILM | 158 | 1% | 1/4W |
| R112A | RN14BK2E3650F | RES. METAL FILM | 365 | 1% | 1/4W |
| R112B | RN14BK2E3650F | RES. METAL FILM | 365 | 1% | 1/4W |
| R113A | RN14BK2E9760F | RES. METAL FILM | 976 | 1% | 1/4W |
| R113B | RN14BK2E9760F | RES. METAL FILM | 976 | 1% | 1/4W |
| R114A | RN14BK2E1001F | RES. METAL FILM | 1K | 1% | 1/4W |
| R114B | RN14BK2E1001F | RES. METAL FILM | 1K | 1% | 1/4W |
| R115A | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R115B | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R116A | RD14BB2E271J | RES. CARBON | 270 | 5% | 1/4W |
| R116B | RD14BB2E271J | RES. CARBON | 270 | 5% | 1/4W |
| R117A | R12-0588-08 | RES. SEMI FIXED | 220 B | | |
| R117B | R12-0588-08 | RES. SEMI FIXED | 220 B | | |
| R118A | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R118B | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R119A | R12-0585-08 | RES. SEMI FIXED | 470 B | | |
| R119B | R12-0585-08 | RES. SEMI FIXED | 470 B | | |
| R120A | R12-1553-08 | RES. SEMI FIXED | 2.2KB | | |
| R120B | R12-1553-08 | RES. SEMI FIXED | 2.2KB | | |
| R121A | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R121B | RN14BK2E3001F | RES. METAL FILM | 3K | 1% | 1/4W |
| R122A | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R122B | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R123A | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R123B | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R125A | R12-0588-08 | RES. SEMI FIXED | 220 B | | |
| R125B | R12-0588-08 | RES. SEMI FIXED | 220 B | | |
| R126A | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R126B | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R127A | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R127B | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R128A | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R128B | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R129A | RD14BB2E122J | RES. CARBON | 1.2K | 5% | 1/4W |
| R129B | RD14BB2E122J | RES. CARBON | 1.2K | 5% | 1/4W |
| R130A | RN14BK2E4700F | RES. METAL FILM | 470 | 1% | 1/4W |
| R130B | RN14BK2E4700F | RES. METAL FILM | 470 | 1% | 1/4W |
| R132A | RD14BB2E681J | RES. CARBON | 680 | 5% | 1/4W |
| R132B | RD14BB2E681J | RES. CARBON | 680 | 5% | 1/4W |
| R133A | RN14BK2E4700F | RES. METAL FILM | 470 | 1% | 1/4W |
| R133B | RN14BK2E4700F | RES. METAL FILM | 470 | 1% | 1/4W |
| R135A | RN14BK2E1201F | RES. METAL FILM | 1.2K | 1% | 1/4W |
| R135B | RN14BK2E1201F | RES. METAL FILM | 1.2K | 1% | 1/4W |
| R136A | R12-1553-08 | RES. SEMI FIXED | 2.2KB | | |
| R136B | R12-1553-08 | RES. SEMI FIXED | 2.2KB | | |
| R137A | RN14BK2E1201F | RES. METAL FILM | 1.2K | 1% | 1/4W |
| R137B | RN14BK2E1201F | RES. METAL FILM | 1.2K | 1% | 1/4W |
| R138B | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R139B | R92-1061-05 | JUMPING RES. | ZERO | OHM | (5MM) |
| R140A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R140B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R142A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R142B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R143A | RD14BB2E912J | RES. CARBON | 9.1K | 5% | 1/4W |
| R143B | RD14BB2E912J | RES. CARBON | 9.1K | 5% | 1/4W |
| R144A | RD14BB2E332J | RES. CARBON | 3.3K | 5% | 1/4W |
| R144B | RD14BB2E332J | RES. CARBON | 3.3K | 5% | 1/4W |
| R145A | RD14BB2E122J | RES. CARBON | 1.2K | 5% | 1/4W |
| R145B | RD14BB2E122J | RES. CARBON | 1.2K | 5% | 1/4W |
| R146A | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R146B | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R147A | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R147B | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R148A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R148B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R149A | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R149B | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R150A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R150B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R156 | RD14BB2E301J | RES, CARBON | 300 | 5% | 1/4W |
| R157 | RD14BB2E751J | RES. CARBON | 750 | 5% | 1/4W |
| R158 | RD14BB2E391J | RES. CARBON | 390 | 5% | 1/4W |
| R159 | RD14BB2E391J | RES. CARBON | 390 | 5% | 1/4W |
| R160 | RD14BB2E301J | RES, CARBON | 300 | 5% | 1/4W |
| R161 | RD14BB2E431J | RES. CARBON | 430 | 5% | 1/4W |
| R163 | RN14BK2E2700F | RES. METAL FILM | 270 | 1% | 1/4W |
| R164 | RN14BK2E1600F | RES. METAL FILM | 160 | 1% | 1/4W |
| R166 | RN14BK2E2700F | RES. METAL FILM | 270 | 1% | 1/4W |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R167 | RN14BK2E1600F | RES. METAL FILM | 160 | 1% | 1/4W |
| R169 | RD14BB2E273J | RES. CARBON | 27K | 5% | 1/4W |
| R170 | RD14BB2E273J | RES. CARBON | 27K | 5% | 1/4W |
| R174 | R92-1061-05 | JUMPING RES. | ZERO OHM | | (5MM) |
| R175 | R92-1061-05 | JUMPING RES. | ZERO OHM | | (5MM) |
| R176 | RN14BK2E2702F | RES. METAL FILM | 27K | 1% | 1/4W |
| R177 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R178 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R179 | RN14BK2E2702F | RES. METAL FILM | 27K | 1% | 1/4W |
| R180 | RD14BB2E361J | RES. CARBON | 360 | 5% | 1/4W |
| R181 | RD14BB2E361J | RES. CARBON | 360 | 5% | 1/4W |
| R182 | RD14BB2E471J | RES. CARBON | 470 | 5% | 1/4W |
| R183 | RD14BB2E363J | RES. CARBON | 36K | 5% | 1/4W |
| R184 | RD14BB2E363J | RES. CARBON | 36K | 5% | 1/4W |
| R185 | RD14BB2E471J | RES. CARBON | 470 | 5% | 1/4W |
| R186 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R187 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R189 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R190 | RD14BB2E222J | RES. CARBON | 2.2K | 5% | 1/4W |
| R191 | RD14BB2E222J | RES. CARBON | 2.2K | 5% | 1/4W |
| R192 | RD14BB2E751J | RES. CARBON | 750 | 5% | 1/4W |
| R193A | RN14BK2E1004F | RES. METAL FILM | 1M | 1% | 1/4W |
| R193B | RN14BK2E1004F | RES. METAL FILM | 1M | 1% | 1/4W |
| R194A | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R194B | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R195A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R195B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R196A | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R196B | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R197A | RD14BB2E301J | RES. CARBON | 300 | 5% | 1/4W |
| R197B | RD14BB2E301J | RES. CARBON | 300 | 5% | 1/4W |
| S101A | S33-2507-08 * | LEVER SWITCH | | | |
| S101B | S33-2507-08 * | LEVER SWITCH | | | |
| S102A | S02-3503-08 * | ATTENUATOR | | | |
| S102B | S02-3503-08 * | ATTENUATOR | | | |
| S104 | S42-2517-08 | SWITCH | | | |
| S106 | S03-4503-08 * | ROTARY SWITCH | | | |

## CS-3035 HORIZONTAL UNIT

### W02-0469-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F19-0720-08 | PLATE | | | |
| | J25-5321-08 | PCB (UNMOUNTED) | | | |
| C301 | CF92V1H103J | CAP. POLYESTER | 0.01 | 5% | 50V |
| C302 | CF93AN2D222K | CAP. POLYESTER | 2200P | 10% | 200V |
| C303 | CF93AN2D473K | CAP. POLYESTER | 0.047 | 10% | 200V |
| C304 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C305 | CM93BF2A101J | CAP. MICA | 100P | 5% | 100V |
| C306 | CM93BF2A471J | CAP. MICA | 470P | 5% | 100V |
| C307 | C90-0995-08 | CAP. ELECTRO | 10 | 20% | 50V |
| C308 | CM93BF2A121J | CAP. MICA | 120P | 5% | 100V |
| C309 | CM93BD2A100D | CAP. MICA | 10P | 0.5P | 100V |
| C310 | C91-1294-08 | CAP. FILM | 2.2 | 2% | 50V |
| C311 | C91-1293-08 | CAP. FILM | 0.022 | 1% | 50V |
| C312 | C91-1302-08 | CAP. MICA | 220P | 5% | 50V |
| C313 | C90-0995-08 | CAP. ELECTRO | 10 | 20% | 50V |
| C314 | C90-0995-08 | CAP. ELECTRO | 10 | 20% | 50V |
| C315 | CF92V1H473J | CAP. POLYESTER | 0.047 | 5% | 50V |
| C316 | CF92V1H222J | CAP. POLYESTER | 2200P | 5% | 50V |
| C317 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C318 | CK45E2H103P | CAP. CERAMIC | 0.01 | | 500V |
| C319 | CK45E2H103P | CAP. CERAMIC | 0.01 | | 500V |
| C320 | C91-1286-08 | CAP. POLYESTER | 0.047 | 10% | 2KV |
| C321 | CK45E2H103P | CAP. CERAMIC | 0.01 | | 500V |
| C322 | C90-0993-08 | CAP. ELECTRO | 2.2 | 20% | 350V |
| C323 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C324 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C325 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C326 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C327 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C328 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C329 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C330 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C331 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C332 | CF92V1H102J | CAP. POLYESTER | 1000P | 5% | 50V |
| C333 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C334 | CM93BF2A121J | CAP. MICA | 120P | 5% | 100V |
| C335 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C336 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C337 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C338 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| C339 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C340 | CM93BF2A270J | CAP. MICA | 27P | 5% | 100V |
| C341 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C342 | CM93BF2A151J | CAP. MICA | 150P | 5% | 100V |
| C343 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C345A | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C345B | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C346A | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C346B | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C347 | C05-0030-15 | CAP. TRIMMER | 20P | | |
| C348 | C05-0309-05 | CAP. TRIMMER | 40P | | |
| C349 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C350 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C351 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C352 | CM93BF2A121J | CAP. MICA | 120P | 5% | 100V |
| C353 | CM93BF2A221J | CAP. MICA | 220P | 5% | 100V |
| C354 | CM93BF2A221J | CAP. MICA | 220P | 5% | 100V |
| C355 | CM93BD2A050D | CAP. MICA | 5P | 0.5P | 100V |
| C356 | CM93BD2A200J | CAP. MICA | 20P | 5% | 100V |
| C357 | CM93BF2A560J | CAP. MICA | 56P | 5% | 100V |
| C358 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C359 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| C360A | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C360B | CM93BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| D302 | 1S1587 | DIODE | | | |
| D303 | 1S1587 | DIODE | | | |
| D304 | 02BZ2.2 | DIODE, ZENER | 2.2V | | |
| D305 | 1S1587 | DIODE | | | |
| D306 | 1S1587 | DIODE | | | |
| D307 | NO USE | | | | |
| D308 | 1S1587 | DIODE | | | |
| D309 | 1S1587 | DIODE | | | |
| D310 | 1S1587 | DIODE | | | |
| D311 | 1S1587 | DIODE | | | |
| D312 | 1S1587 | DIODE | | | |
| D313 | 1S1587 | DIODE | | | |
| D314 | 1S1587 | DIODE | | | |
| D315 | 1S1587 | DIODE | | | |
| D316 | 1S1587 | DIODE | | | |
| D317 | 1S1587 | DIODE | | | |
| D318 | 1S1587 | DIODE | | | |
| D319 | 1N60 | DIODE | | | |
| D320 | 1SS16 | DIODE | | | |
| D321 | 05Z9.1Y | DIODE, ZENER | 9.1V | | |
| D322 | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D323 | NO USE | | | | |
| D324 | 1N60 | DIODE | | | |
| IC301 | SN74LS74AN | IC, D-FLIP FLOP | | | |
| IC302 | SN74LS122N | IC, RETRIGG. MONO. MULTIVIB. | | | |
| IC303 | MC14066BCP | IC, QUAD. ANALOG SW/QUAD. MPX | | | |
| IC304 | MC14066BCP | IC, QUAD. ANALOG SW/QUAD. MPX | | | |
| J302 | E23-0571-08 | PIN TERMINAL | | | |
| J303 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J304 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J305 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J308 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J309 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J310 | NO USE | | | | |
| J311 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J314 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J315 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| Q301 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q302 | 2SK240(BL) | FET, N-CHANNEL | | | |
| Q303 | 2SC1923(D) | TR. SI, NPN | | | |
| Q304 | 2SC1923(D) | TR. SI, NPN | | | |
| Q305 | 2SK117(BL) | FET, N-CHANNEL | | | |
| Q306 | 2SA1005(L) | TR. SI, PNP | | | |
| Q307 | 2SA1005(L) | TR. SI, PNP | | | |
| Q308 | 2SC1923(D) | TR. SI, NPN | | | |
| Q309 | 2SC1923(D) | TR. SI, NPN | | | |
| Q310 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q311 | 2SA1005(L) | TR. SI, PNP | | | |
| Q312 | 2SA1005(L) | TR. SI, PNP | | | |
| Q313 | 2SC1923(D) | TR. SI, NPN | | | |
| Q314 | 2SC1923(D) | TR. SI, NPN | | | |
| Q315 | 2SA1005(L) | TR. SI, PNP | | | |
| Q316 | 2SA1005(L) | TR. SI, PNP | | | |
| Q317 | 2SA1005(L) | TR. SI, PNP | | | |

# PARTS LIST

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| Q318 | 2SA1005(L) | TR. SI, PNP | | | |
| Q319 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q320 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q321 | 2SA1381 | TR. SI, PNP | | | |
| Q322 | 2SC3503 | TR. SI, NPN | | | |
| Q323 | 2SC3503 | TR. SI, NPN | | | |
| Q324 | 2SA1381 | TR. SI, PNP | | | |
| Q325 | 2SC1815(GR) | TR. SI, NPN | | | |
| Q326 | 2SA1005(L) | TR. SI, PNP | | | |
| Q327 | 2SA1005(L) | TR. SI, PNP | | | |
| R3A2 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R3A3 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R3A4 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R3A5 | RD14BB2E335J | RES. CARBON | 3.3M | 5% | 1/4W |
| R3A6 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R3A7 | RD14BB2E202J | RES. CARBON | 2K | 5% | 1/4W |
| R3A8 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R3A9 | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R3B0 | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R3B1 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R3B2 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R3B3 | RD14BB2E322J | RES. CARBON | 3.2K | 5% | 1/4W |
| R3B4 | RD14BB2E331J | RES. CARBON | 330 | 5% | 1/4W |
| R3B5 | RD14BB2E183J | RES. CARBON | 18K | 5% | 1/4W |
| R3B6 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R3B7 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R3B8 | RD14BB2E153J | RES. CARBON | 15K | 5% | 1/4W |
| R3B9 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R3C0 | RD14BB2E105J | RES. CARBON | 1M | 5% | 1/4W |
| R3C1 | R12-1554-08 | RES. SEMI FIXED | 1KB | | |
| R3C2 | RD14BB2E122J | RES. CARBON | 1.2K | 5% | 1/4W |
| R3C5 | RD14BB2E183J | RES. CARBON | 18K | 5% | 1/4W |
| R3C6 | RD14BB2E622J | RES. CARBON | 6.2K | 5% | 1/4W |
| R3C7 | RD14BB2E622J | RES. CARBON | 6.2K | 5% | 1/4W |
| R3C8 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R3C9 | RD14BB2E222J | RES. CARBON | 2.2K | 5% | 1/4W |
| R3D0 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R3D1 | RD14BB2E151J | RES. CARBON | 150 | 5% | 1/4W |
| R3D2 | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R3D3 | RD14BB2E223J | RES. CARBON | 22K | 5% | 1/4W |
| R3D4 | RD14BB2E331J | RES. CARBON | 330 | 5% | 1/4W |
| R3D5 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R3D6 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R3D7 | RD14BB2E111J | RES. CARBON | 110 | 5% | 1/4W |
| R303 | RN14BK2E6801F | RES. METAL FILM | 6.8K | 1% | 1/4W |
| R304 | RN14BK2E1602F | RES. METAL FILM | 16K | 1% | 1/4W |
| R305 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R306 | RD14BB2E304J | RES. CARBON | 300K | 5% | 1/4W |
| R307 | NO USE | | | | |
| R308 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R309 | RD14BB2E684J | RES. CARBON | 680K | 5% | 1/4W |
| R310 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R311 | RD14BB2E434J | RES. CARBON | 430K | 5% | 1/4W |
| R312 | RD14BB2E513J | RES. CARBON | 51K | 5% | 1/4W |
| R313 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R314 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R315 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R316 | RD14BB2E123J | RES. CARBON | 12K | 5% | 1/4W |
| R317 | RD14BB2E392J | RES. CARBON | 3.9K | 5% | 1/4W |
| R318 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R319 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R320 | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R321 | RD14BB2E133J | RES. CARBON | 13K | 5% | 1/4W |
| R322 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R323 | R92-1061-05 | JUMPING RES. | ZERO OHM | | (5MM) |
| R324 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R325 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R326 | NO USE | | | | |
| R327 | RD14BB2E123J | RES. CARBON | 12K | 5% | 1/4W |
| R328 | RD14BB2E243J | RES. CARBON | 24K | 5% | 1/4W |
| R329 | RD14BB2E432J | RES. CARBON | 4.3K | 5% | 1/4W |
| R330 | RD14BB2E472J | RES. CARBON | 4.7K | 5% | 1/4W |
| R331 | RD14BB2E223J | RES. CARBON | 22K | 5% | 1/4W |
| R332 | RD14BB2E510J | RES. CARBON | 51 | 5% | 1/4W |
| R333 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R334 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R335 | NO USE | | | | |
| R336 | RD14BB2E622J | RES. CARBON | 6.2K | 5% | 1/4W |
| R337 | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R338 | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R339 | RD14BB2E622J | RES. CARBON | 6.2K | 5% | 1/4W |
| R340 | RD14BB2E202J | RES. CARBON | 2K | 5% | 1/4W |
| R341 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R342 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R343 | R12-1408-05 | RES. SEMI FIXED | 4.7KB | | |
| R344 | RD14BB2E511J | RES. CARBON | 510 | 5% | 1/4W |
| R345 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R346 | NO USE | | | | |
| R347 | RD14BB2E682J | RES. CARBON | 6.8K | 5% | 1/4W |
| R348A | RN14BK2E2004F | RES. METAL FILM | 2M | 1% | 1/4W |
| R348B | RN14BK2E3004F | RES. METAL FILM | 3M | 1% | 1/4W |
| R349A | RN14BK2E2004F | RES. METAL FILM | 2M | 1% | 1/4W |
| R349B | RN14BK2E3004F | RES. METAL FILM | 3M | 1% | 1/4W |
| R350 | RN14BK2E2004F | RES. METAL FILM | 2M | 1% | 1/4W |
| R351 | RN14BK2E1004F | RES. METAL FILM | 1M | 1% | 1/4W |
| R352 | RN14BK2E5003F | RES. METAL FILM | 500K | 1% | 1/4W |
| R353 | RN14BK2E2003F | RES. METAL FILM | 200K | 1% | 1/4W |
| R354 | RN14BK2E1001F | RES. METAL FILM | 1K | 1% | 1/4W |
| R355 | RN14BK2E1003F | RES. METAL FILM | 100K | 1% | 1/4W |
| R356 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R357 | R92-1061-05 | JUMPING RES. | ZERO OHM | | (5MM) |
| R358 | R05-3516-08 | V.R. | 500 B | | |
| R359 | RD14BB2E332J | RES. CARBON | 3.3K | 5% | 1/4W |
| R360 | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R361 | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R362 | R12-1408-05 | RES. SEMI FIXED | 4.7KB | | |
| R363 | R12-1408-05 | RES. SEMI FIXED | 4.7KB | | |
| R364 | RD14BB2E222J | RES. CARBON | 2.2K | 5% | 1/4W |
| R365 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R366 | RD14BB2E363J | RES. CARBON | 36K | 5% | 1/4W |
| R367 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R368 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R369 | RD14BB2E153J | RES. CARBON | 15K | 5% | 1/4W |
| R370 | RD14BB2E513J | RES. CARBON | 51K | 5% | 1/4W |
| R371 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R372 | R12-3557-08 | RES. SEMI FIXED | 10KB | | |
| R373 | RD14BB2E301J | RES. CARBON | 300 | 5% | 1/4W |
| R374 | RD14BB2E562J | RES. CARBON | 5.6K | 5% | 1/4W |
| R375 | RD14BB2E322J | RES. CARBON | 3.2K | 5% | 1/4W |
| R376 | RD14BB2E322J | RES. CARBON | 3.2K | 5% | 1/4W |
| R377 | RD14BB2E242J | RES. CARBON | 2.4K | 5% | 1/4W |
| R378 | RD14BB2E161J | RES. CARBON | 160 | 5% | 1/4W |
| R379 | R12-0588-08 | RES. SEMI FIXED | 220 B | | |
| R380 | RD14BB2E242J | RES. CARBON | 2.4K | 5% | 1/4W |
| R381 | RD14BB2E242J | RES. CARBON | 2.4K | 5% | 1/4W |
| R382 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R383 | R12-1408-05 | RES. SEMI FIXED | 4.7KB | | |
| R384 | RD14BB2E242J | RES. CARBON | 2.4K | 5% | 1/4W |
| R385 | NO USE | | | | |
| R386 | RD14BB2E914J | RES. CARBON | 910K | 5% | 1/4W |
| R387 | RN14BK2E1003F | RES. METAL FILM | 100K | 1% | 1/4W |
| R388 | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R389 | RN14BK2E5601F | RES. METAL FILM | 5.6K | 1% | 1/4W |
| R390 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R393 | RN14BK2E1003F | RES. METAL FILM | 100K | 1% | 1/4W |
| R394 | RD14BB2E103J | RES. CARBON | 10K | 5% | 1/4W |
| R395 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R396 | RD14BB2E204J | RES. CARBON | 200K | 5% | 1/4W |
| R397 | RD14BB2E204J | RES. CARBON | 200K | 5% | 1/4W |
| R398 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| S301 | S33-2508-08 | LEVER SWITCH | | | |
| S302 | S33-2508-08 | LEVER SWITCH | | | |
| S303 | S42-3514-08 | SWITCH | | | |
| S304 | S29-3504-08 | ROTARY SWITCH | | | |
| TP003 | E23-0575-08 | TERMINAL | | | |
| TP004 | E23-0575-08 | TERMINAL | | | |

## CS-3035 V-POSITION UNIT

### W02-0470-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | |
|---|---|---|---|
| | J25-5319-08 | PCB (UNMOUNTED) | |
| J108 | E40-7055-08 | PIN CONNECTOR | 6 P |
| R141 | R05-3518-08 | V.R. | 2X10KB |

# PARTS LIST

## CS-3035 H-POSITION UNIT

### W02-0471-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | J25-5320-08 | PCB (UNMOUNTED) | | | |
| | R92-1061-05 | JUMPING RES. | ZERO OHM (5MM) | | |
| J306 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J307 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| R301 | R05-3518-08 | V.R. | 2X10KB | | |
| R302 | R05-3518-08 | V.R. | 2X10KB | | |
| R303 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R304 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |

## CS-3035 INTEN UNIT

### W02-0472-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | |
|---|---|---|---|
| | J25-5325-08 | PCB (UNMOUNTED) | |
| J313 | E40-7054-08 | PIN CONNECTOR | 6 P |
| R3A0 | R05-3520-08 | V.R. | 10K |
| R399 | R05-3520-08 | V.R. | 10K |

## CS-3035 POWER SUPPLY & Z AXIS UNIT

### W02-0473-08

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F01-0873-08 | HEAT SINK | | | |
| | F11-1223-08 | SHIELD CASE | | | |
| | F20-0682-08 | SPACER(Q1,Q2) | | | |
| | J25-5324-08 | PCB (UNMOUNTED) | | | |
| C701 | C91-1299-08 | CAP. POLYESTER | 0.1 | | 400V |
| C702 | C91-1299-08 | CAP. POLYESTER | 0.1 | | 400V |
| C703 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C704 | CF92AN2D103K | CAP. POLYESTER | 0.01 | 10% | 200V |
| C705 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C706 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C707 | C90-0997-08 | CAP. ELECTRO | 47 | 20% | 63V |
| C708 | CF92V1H104K | CAP. POLYESTER | 0.1 | 10% | 50V |
| C709 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C711 | C91-1284-08 | CAP. CERAMIC | 470 | | 2KV |
| C712 | CF92V1H224K | CAP. POLYESTER | 0.22 | 10% | 50V |
| C713 | C91-1300-08 | CAP. CERAMIC | 4700P | | 2KV |
| C714A | CM73BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C714B | CM73BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C714C | CM73BD2A010D | CAP. MICA | 1P | 0.5P | 100V |
| C715 | C90-0991-08 | CAP. ELECTRO | 33 | 20% | 16V |
| C716 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C717 | C91-1298-08 | CAP. CERAMIC | 0.01 | | 50V |
| C718 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C719 | NO USE | | | | |
| C720 | CF92AN2A223K | CAP. POLYESTER | 0.022 | 10% | 100V |
| C721 | C91-1285-08 | CAP. CERAMIC | 6800 | | 2KV |
| C722 | CM93BF2A121K | CAP. MICA | 120P | 10% | 100V |
| C802 | C90-0998-08 | CAP. ELECTRO | 47 | 20% | 250V |
| C803 | C90-0993-08 | CAP. ELECTRO | 2.2 | 20% | 350V |
| C804 | C90-0998-08 | CAP. ELECTRO | 47 | 20% | 250V |
| C805 | C90-3001-08 | CAP. ELECTRO | 2.2 | 20% | 160V |
| C806 | C90-0996-08 | CAP. ELECTRO | 1000 | 20% | 50V |
| C807 | NO USE | | | | |
| C808 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C811 | C90-0996-08 | CAP. ELECTRO | 1000 | 20% | 50V |
| C812 | NO USE | | | | |
| C813 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C814 | C91-1299-08 | CAP. POLYESTER | 0.1 | | 400V |
| C815 | CF92AN2D103K | CAP. POLYESTER | 0.01 | 10% | 200V |
| C816 | C90-0994-08 | CAP. ELECTRO | 47 | 20% | 35V |
| D701 | 1S1587 | DIODE | | | |
| D702 | 05Z5.6Y | DIODE, ZENER | 5.6V | | |
| D706 | 1S1834 | DIODE | | | |
| D707 | ESJA52-12 | DIODE, HIGH VOLTAGE | | | |
| D708 | 1S1587 | DIODE | | | |
| D709 | 1S1587 | DIODE | | | |
| D710 | 1S2091 | DIODE | | | |
| D711 | 05Z82 | DIODE, ZENER | 82V | | |
| D712 | 05Z82 | DIODE, ZENER | 82V | | |
| D713 | ESJA52-12 | DIODE, HIGH VOLTAGE | | | |
| D714 | 05Z82 | DIODE, ZENER | 82V | | |
| D715 | NO USE | | | | |
| D716 | 05Z100 | DIODE, ZENER | 100V | | |
| D717 | 1S1587 | DIODE | | | |
| D801 | 1GZ61 | DIODE | | | |
| D802 | 1GZ61 | DIODE | | | |
| D803 | NO USE | | | | |
| D804 | 1GZ61 | DIODE | | | |
| D807 | 1G4B1 | DIODE,STACK | | | |
| D808 | 1G4B1 | DIODE,STACK | | | |
| D809 | 1G4B1 | DIODE,STACK | | | |
| IC701 | TL082CP | IC, OP AMP | | | |
| IC801 | UA78M12UC | IC, POSITIVE VOLTAGE REGULATOR | | | |
| IC802 | UA79M12AUC | IC, NEGATIVE VOLTAGE REGULATOR | | | |
| IC803 | UA78M05UC | IC, POSITVE VOLTAGE REGULATOR | | | |
| J701 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J702 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J703 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J802 | E40-7052-08 | PIN CONNECTOR | 15P | | |
| J803 | E40-7053-08 | PIN CONNECTOR | 8 P | | |
| J804 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J805 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J806 | E40-7047-08 | PIN CONNECTOR | 6 P | | |
| J807 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J808 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| Q701 | 2SA1360(Y) | TR. SI, PNP | | | |
| Q702 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q703 | 2SA781 | TR. SI, PNP | | | |
| Q704 | 2SC1923(D) | TR. SI, NPN | | | |
| Q705 | NO USE | | | | |
| Q706 | 2SC3503 | TR. SI, NPN | | | |
| Q707 | 2SD880(GR) | TR. SI, NPN | | | |
| Q708 | NO USE | | | | |
| Q709 | 2SA1091(O) | TR. SI, PNP | | | |
| Q710 | 2SA1091(O) | TR. SI, PNP | | | |
| Q711 | 2SC1815(GR) | TR. SI, NPN | | | |
| Q712 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q713 | 2SA1091(O) | TR. SI, PNP | | | |
| Q714 | 2SC3423(Y) | TR. SI, NPN | | | |
| Q715 | 2SC1815(Y) | TR. SI, NPN | | | |
| Q716 | 2SA1015(Y) | TR. SI, PNP | | | |
| Q801 | 2SD1410 | TR, SI, NPN | | | |
| Q802 | 2SC2240 | TR, SI, NPN | | | |
| Q803 | 2SD1410 | TR, SI, NPN | | | |
| Q804 | 2SC2240 | TR, SI, NPN | | | |
| Q805 | 2SD1410 | TR, SI, NPN | | | |
| R701 | RD14BB2E105J | RES. CARBON | 1M | 5% | 1/4W |
| R702 | RD14BB2E683J | RES. CARBON | 68K | 5% | 1/4W |
| R703 | RD14BB2E272J | RES. CARBON | 2.7K | 5% | 1/4W |
| R704 | RD14BB2E623J | RES. CARBON | 62K | 5% | 1/4W |
| R705 | RD14BB2E302J | RES. CARBON | 3K | 5% | 1/4W |
| R706 | RD14BB2E752J | RES. CARBON | 7.5K | 5% | 1/4W |
| R707 | RD14BB2E510J | RES. CARBON | 51 | 5% | 1/4W |
| R708 | RD14BB2E154J | RES. CARBON | 150K | 5% | 1/4W |
| R715 | R12-8517-08 | RES. SEMI FIXED | 1.0MB | | |
| R716 | RD14BB2E514J | RES. CARBON | 510K | 5% | 1/4W |
| R717 | R92-1438-08 | RES. FUSE | 5.1 | 5% | 1/2W |
| R718 | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R719 | RD14BB2E332J | RES. CARBON | 3.3K | 5% | 1/4W |
| R720 | RN14BK2E3203F | RES. METAL FILM | 320K | 1% | 1/4W |
| R721 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R722 | NO USE | | | | |
| R723 | R92-1437-08 | RES. CARBON | 47M | 2% | |
| R724 | NO USE | | | | |
| R725 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R728 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R729A | RD14BB2E305J | RES. CARBON | 3M | 5% | 1/4W |
| R729B | RD14BB2E305J | RES. CARBON | 3M | 5% | 1/4W |
| R729C | RD14BB2E305J | RES. CARBON | 3M | 5% | 1/4W |
| R729D | RD14BB2E305J | RES. CARBON | 3M | 5% | 1/4W |
| R730 | RD14BB2E623J | RES. CARBON | 62K | 5% | 1/4W |

# PARTS LIST

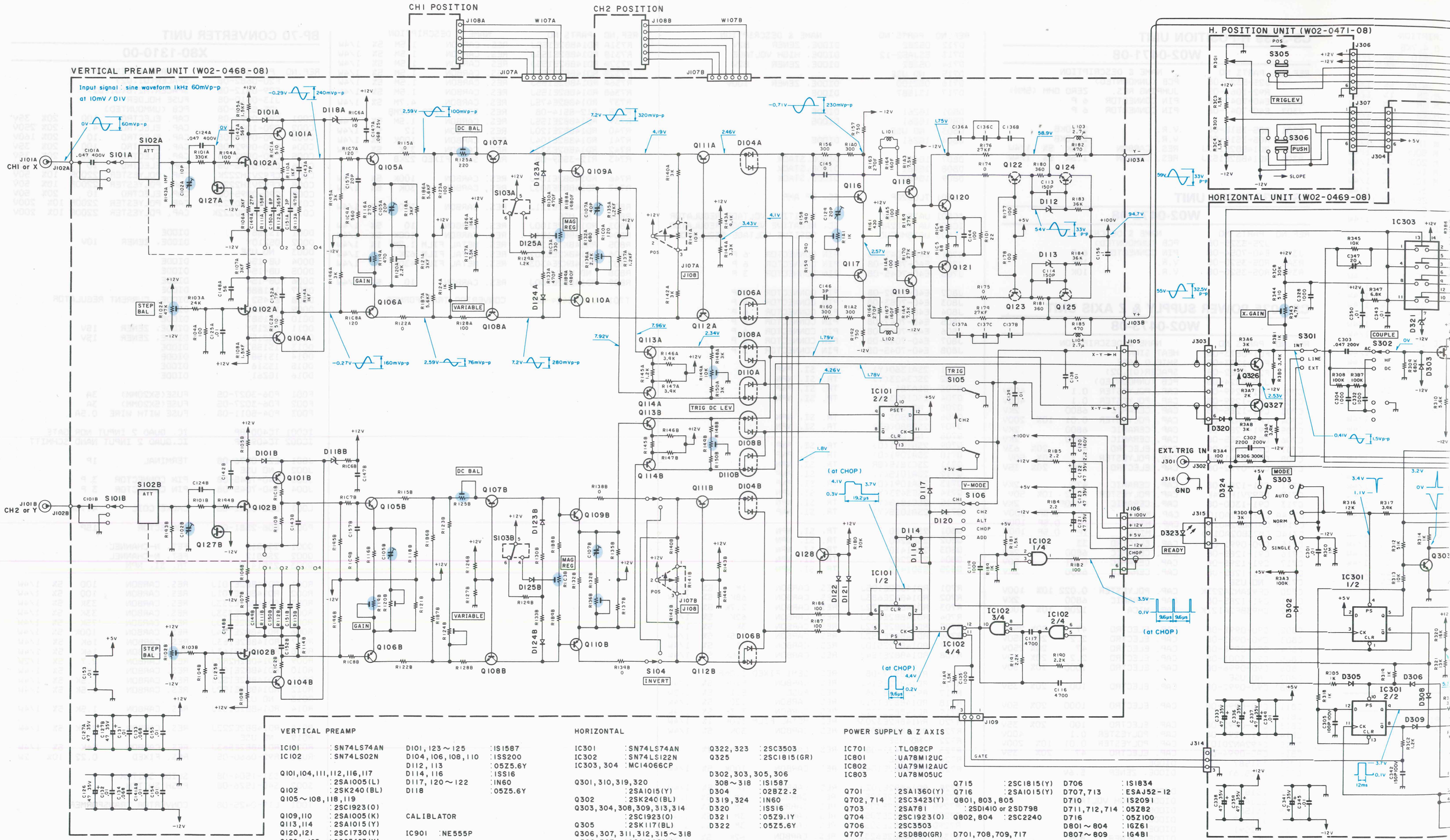
| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| R731A | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R731B | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R732A | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R732B | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R736A | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R736B | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R737 | RD14BB2E475J | RES. CARBON | 4.7M | 5% | 1/4W |
| R738 | R12-8514-08 | RES. SEMI FIXED | 2.2MB | | |
| R739 | RD14BB2E155J | RES. CARBON | 1.5M | 5% | 1/4W |
| R740 | RD14BB2E120J | RES. CARBON | 12 | 5% | 1/4W |
| R741 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R742 | RD14BB2E333J | RES. CARBON | 33K | 5% | 1/4W |
| R743 | R12-3559-08 | RES. SEMI FIXED | 22KB | | |
| R746 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R747 | RD14BB2E303J | RES. CARBON | 30K | 5% | 1/4W |
| R801 | RD14BB2E121J | RES. CARBON | 120 | 5% | 1/4W |
| R802 | NO USE | | | | |
| R803 | RD14BB2E100J | RES. CARBON | 10 | 5% | 1/4W |
| R804 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R805 | RN14BK2E1204F | RES. METAL FILM | 1.2M | 1% | 1/4W |
| R806 | RN14BK2E6202F | RES. METAL FILM | 62K | 1% | 1/4W |
| R807 | RN14BK2E4303F | RES. METAL FILM | 430K | 1% | 1/4W |
| R808 | NO USE | | | | |
| R809 | RD14BB2E100J | RES. CARBON | 10 | 5% | 1/4W |
| T701 | L19-0424-08 | CONVERTOR TRANSFORMER | | | |

## BP-70 CONVERTER UNIT

### X80-1310-00

| REF.NO | PARTS NO | NAME & DESCRIPTION | | | |
|---|---|---|---|---|---|
| | F20-0682-08 | SPACER(Q1,Q2) | | | |
| | F29-0512-08 | SPACER,M2.6(Q1,Q2) | | | |
| | J13-0510-08 | FUSE HOLDER | | | |
| | J25-5326-08 | PCB (UNMOUNTED) | | | |
| C001 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C002 | C90-1000-08 | CAP. ELECTRO | 4.7 | 20% | 250V |
| C003 | C90-0999-08 | CAP. ELECTRO | 10 | 20% | 160V |
| C004 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C005 | C90-0992-08 | CAP. ELECTRO | 100 | 20% | 35V |
| C006 | C90-0995-08 | CAP. ELECTRO | 10 | 20% | 50V |
| C007 | CF92V1H222K | CAP. POLYESTER | 2200P | 10% | 50V |
| C008 | CF92V1H222K | CAP. POLYESTER | 2200P | 10% | 50V |
| C009 | C90-0995-08 | CAP. ELECTRO | 10 | 20% | 50V |
| C010 | CF92AN2D222K | CAP. POLYESTER | 2200P | 10% | 200V |
| C011 | CF92AN2D222K | CAP. POLYESTER | 2200P | 10% | 200V |
| D001 | 1S1587 | DIODE | | | |
| D002 | 05Z10Y | DIODE, ZENER | 10V | | |
| D003 | NO USE | | | | |
| D004 | UB-154 | DIODE | | | |
| D005 | UB-154 | DIODE | | | |
| D006 | UB-154 | DIODE | | | |
| D007 | 1S1888 | DIODE | | | |
| D008 | E-452 | DIODE, CURRENT REGULATOR | | | |
| D009 | 1S1587 | DIODE | | | |
| D010 | 1S1587 | DIODE | | | |
| D011 | 05Z15Y | DIODE, ZENER | 15V | | |
| D012 | 05Z15Y | DIODE, ZENER | 15V | | |
| D013 | 1S1587 | DIODE | | | |
| D014 | 1S1587 | DIODE | | | |
| D015 | 1SS16 | DIODE | | | |
| D016 | 1GZ61 | DIODE | | | |
| F001 | F06-3027-05 | FUSE(5X20MM) | 3A | | |
| F002 | F06-3027-05 | FUSE(5X20MM) | 3A | | |
| F003 | F04-5011-08 | FUSE WITH WIRE | 0.5A | | |
| IC001 | TC4001BP | IC, QUAD 2 INPUT NOR GATE | | | |
| IC002 | TC4093BP | IC,QUAD 2 INPUT NAND SCHMITT | | | |
| J001 | E23-0576-08 | TERMINAL | 1P | | |
| J002 | NO USE | | | | |
| J003 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| J004 | E40-7045-08 | PIN CONNECTOR | 3 P | | |
| L001 | L33-0812-08 | CHOKE COIL | 4.7UH | | |
| P002 | E08-2581-08 | CONNECTOR | 15P | | |
| Q001 | 2SK812 | FET, N-CHANNEL | | | |
| Q002 | 2SK812 | FET, N-CHANNEL | | | |
| Q003 | 2SD1410 | TR, SI, NPN | | | |
| R001 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R002 | RD14BB2E101J | RES. CARBON | 100 | 5% | 1/4W |
| R003 | RD14BB2E333J | RES. CARBON | 33K | 5% | 1/4W |
| R004 | RD14BB2E333J | RES. CARBON | 33K | 5% | 1/4W |
| R005 | RD14BB2E753J | RES. CARBON | 75K | 5% | 1/4W |
| R006 | RD14BB2E104J | RES. CARBON | 100K | 5% | 1/4W |
| R007 | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R008 | RD14BB2E163J | RES. CARBON | 16K | 5% | 1/4W |
| R009 | RD14DB2H2R7J | RES. CARBON | 2.7 | 5% | 1/2W |
| R010 | RD14BB2E102J | RES. CARBON | 1K | 5% | 1/4W |
| R011 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R012 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R013 | NO USE | | | | |
| R014 | RD14BB2E152J | RES. CARBON | 1.5K | 5% | 1/4W |
| R018 | RD14BB2E222J | RES. CARBON | 2.2K | 5% | 1/4W |
| R019 | NO USE | | | | |
| R020 | RD14BB2E563J | RES. CARBON | 56K | 5% | 1/4W |
| R021 | R92-0660-05 | RES. FIXED | 0.22 | 10% | 2W |
| S001 | S31-1504-08 | SLIDE SWITCH | | | |
| S002 | S40-1526-08 | PUSH SWITCH | | | |
| T001 | L19-0425-08 | CONVERTOR TRANSFORMER | | | |

# SCHEMATIC DIAGRAM




## VERTICAL PREAMP

| | |
|---|---|
| IC101 | SN74LS74AN |
| IC102 | SN74LS02N |
| Q101,104,111,112,116,117 | 2SA1005(L) |
| Q102 | 2SK240(BL) |
| Q105～108,118,119 | 2SC1923(O) |
| Q109,110 | 2SA1005(K) |
| Q113,114 | 2SA1015(Y) |
| Q120,121 | 2SC1730(Y) |
| Q122～125 | 2SC3423(Y) |
| Q127 | 2SK117(BL) |
| Q128 | 2SC1815(GR) |
| D101,123～125 | IS1587 |
| D104,106,108,110 | ISS200 |
| D112,113 | 05Z5.6Y |
| D114,116 | ISS16 |
| D117,120～122 | IN60 |
| D118 | 05Z5.6Y |

## CALIBLATOR

| | |
|---|---|
| IC901 | NE555P |
| D902 | IS1587 |

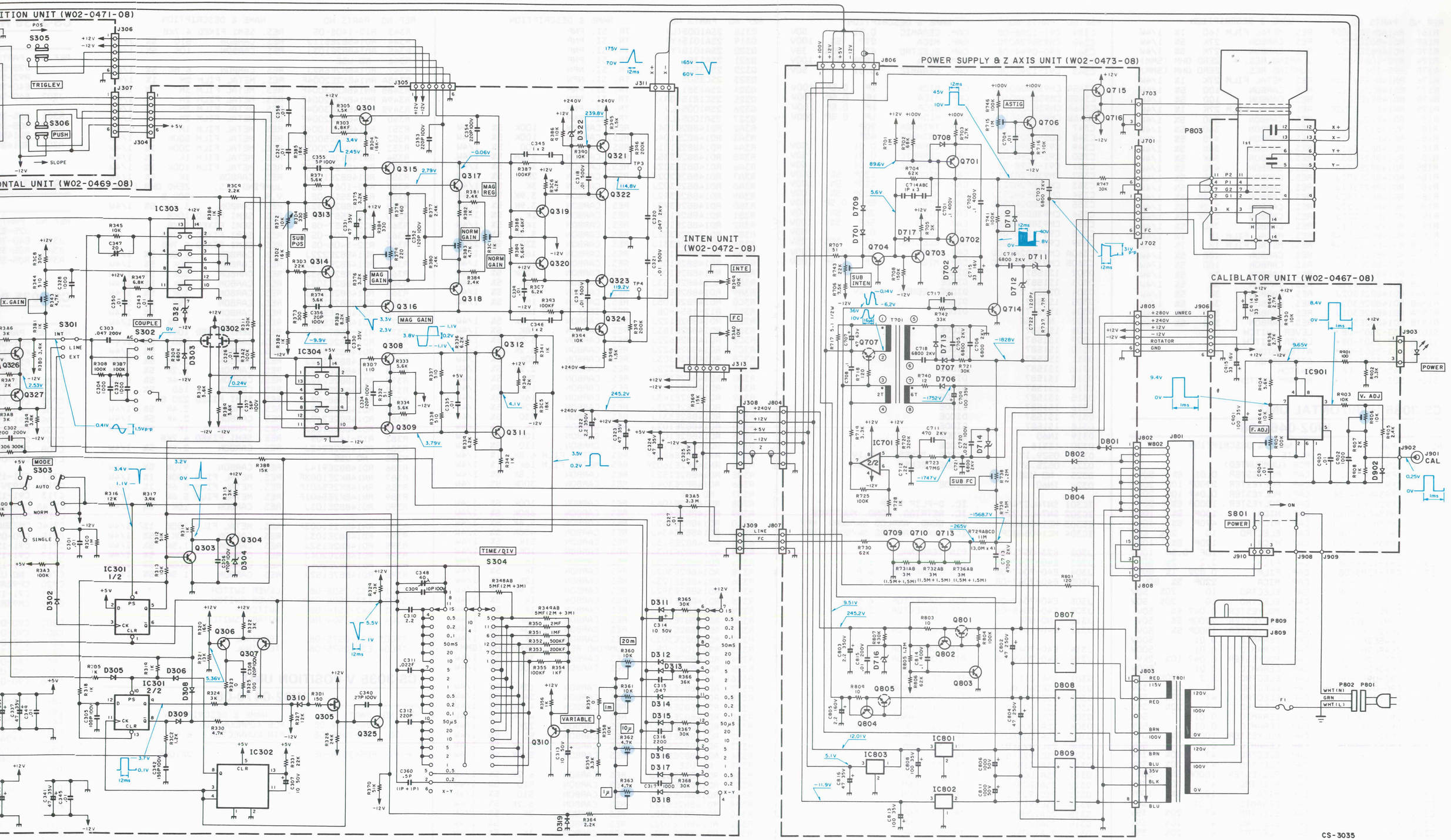
## HORIZONTAL

| | |
|---|---|
| IC301 | SN74LS74AN |
| IC302 | SN74LS122N |
| IC303,304 | MC14066CP |
| Q301,310,319,320 | 2SA1015(Y) |
| Q302 | 2SK240(BL) |
| Q303,304,308,309,313,314 | 2SC1923(O) |
| Q305 | 2SK117(BL) |
| Q306,307,311,312,315～318,326,327 | 2SA1005(L) |
| Q321,324 | 2SA1381 |
| Q322,323 | 2SC3503 |
| Q325 | 2SC1815(GR) |
| D302,303,305,306,308～318 | IS1587 |
| D304 | 02BZ2.2 |
| D319,324 | IN60 |
| D320 | ISS16 |
| D321 | 05Z9.1Y |
| D322 | 05Z5.6Y |

## POWER SUPPLY & Z AXIS

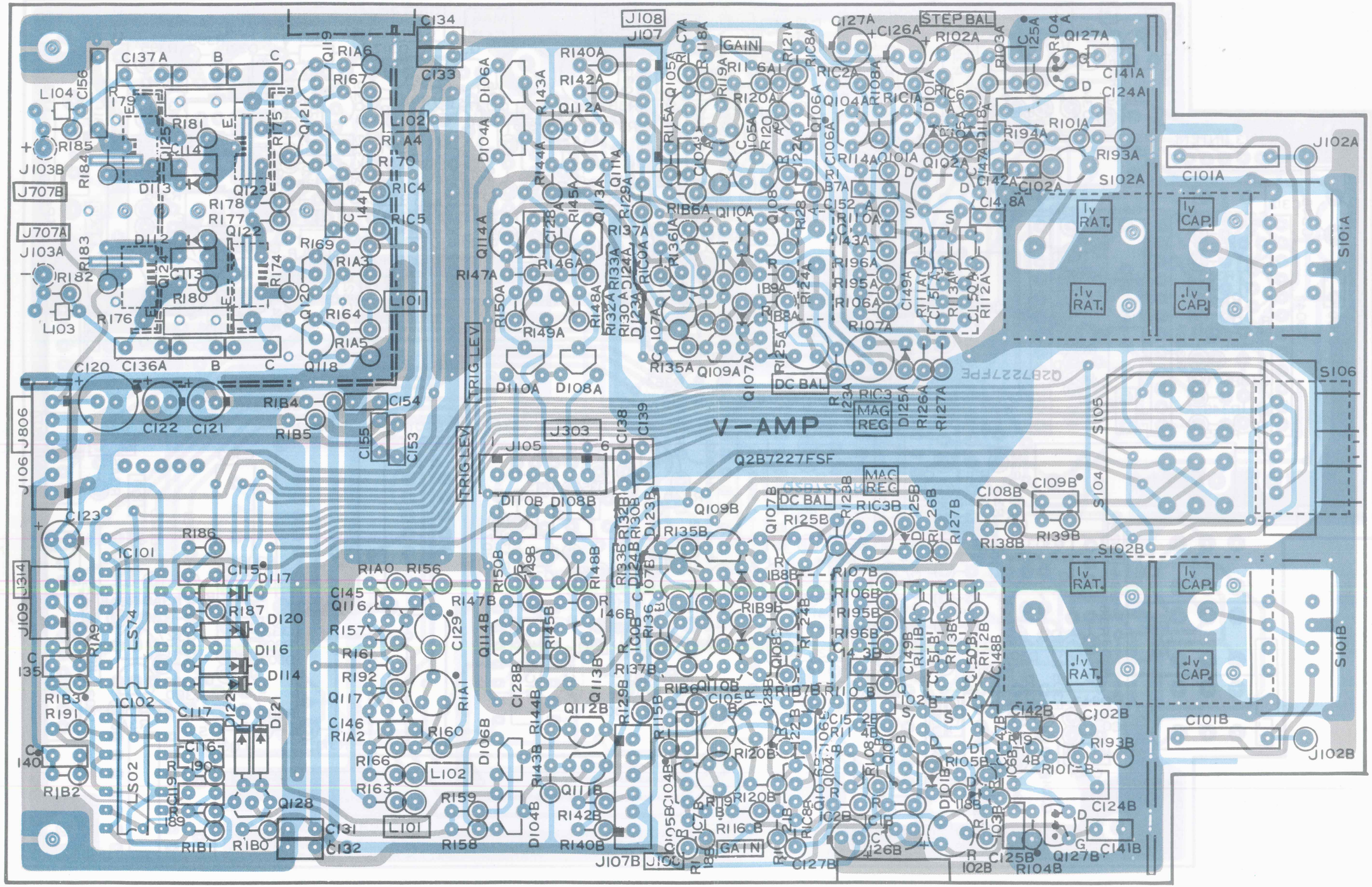
| | |
|---|---|
| IC701 | TL082CP |
| IC801 | UA78M12UC |
| IC802 | UA79M12AUC |
| IC803 | UA78M05UC |
| Q701 | 2SA1360(Y) |
| Q702,714 | 2SC3423(Y) |
| Q703 | 2SA781 |
| Q704 | 2SC1923(O) |
| Q706 | 2SC3503 |
| Q707 | 2SD880(GR) |
| Q709,710,713 | 2SA1091(O) |
| Q715 | 2SC1815(Y) |
| Q716 | 2SA1015(Y) |
| Q801,803,805 | 2SD1410 or 2SD798 |
| Q802,804 | 2SC2240 |
| D701,708,709,717 | IS1587 |
| D702 | 05Z5.6Y |
| D706 | IS1834 |
| D707,713 | ESAJ52-12 |
| D710 | IS2091 |
| D711,712,714 | 05Z82 |
| D716 | 05Z100 |
| D801～804 | 1GZ61 |
| D807～809 | 1G4B1 |

# IEMATIC DIAGRAM



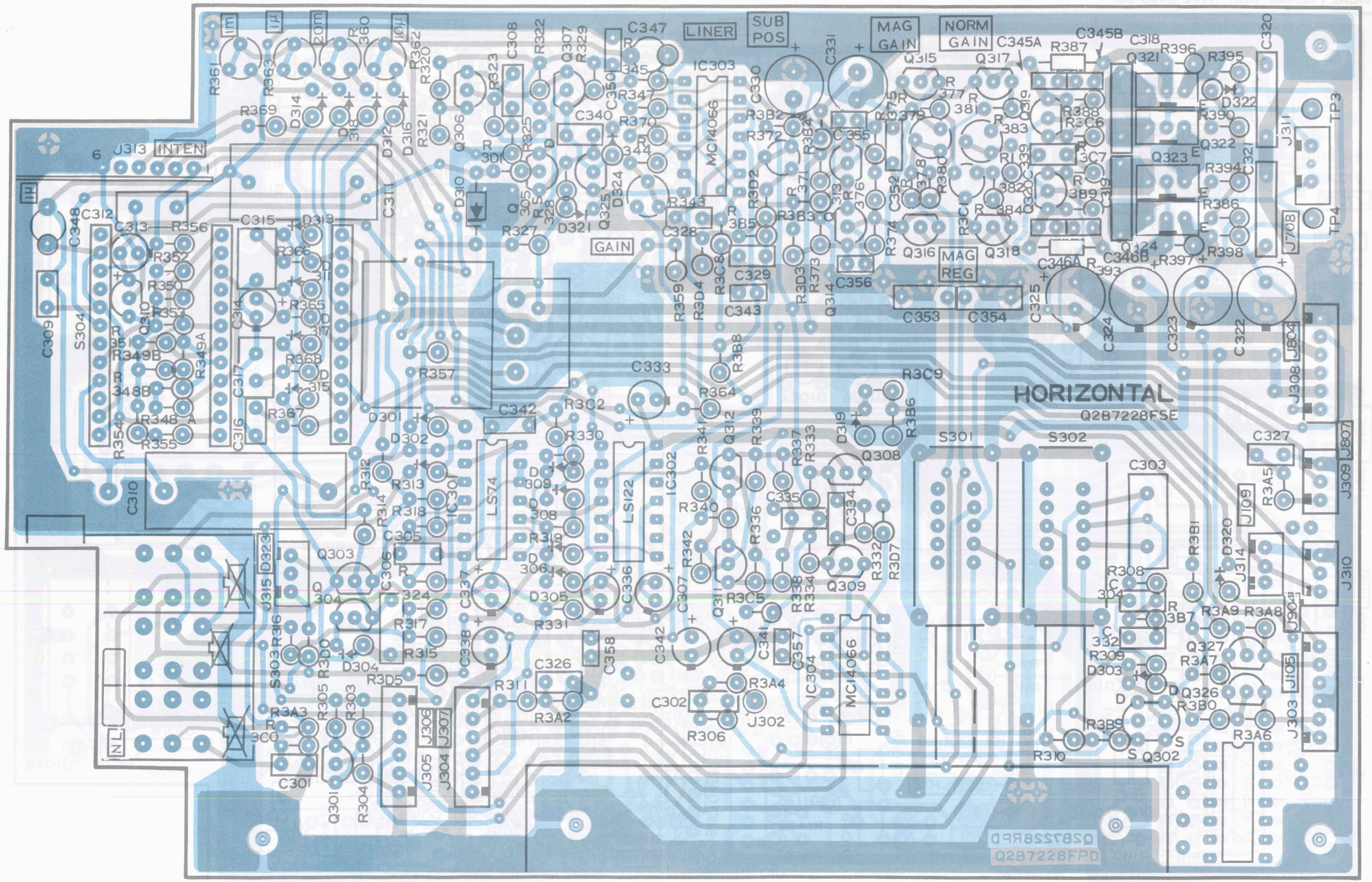
# CS-3035 P.C. BOARD

**VERTICAL PREAMP UNIT (W02-0468-08)**



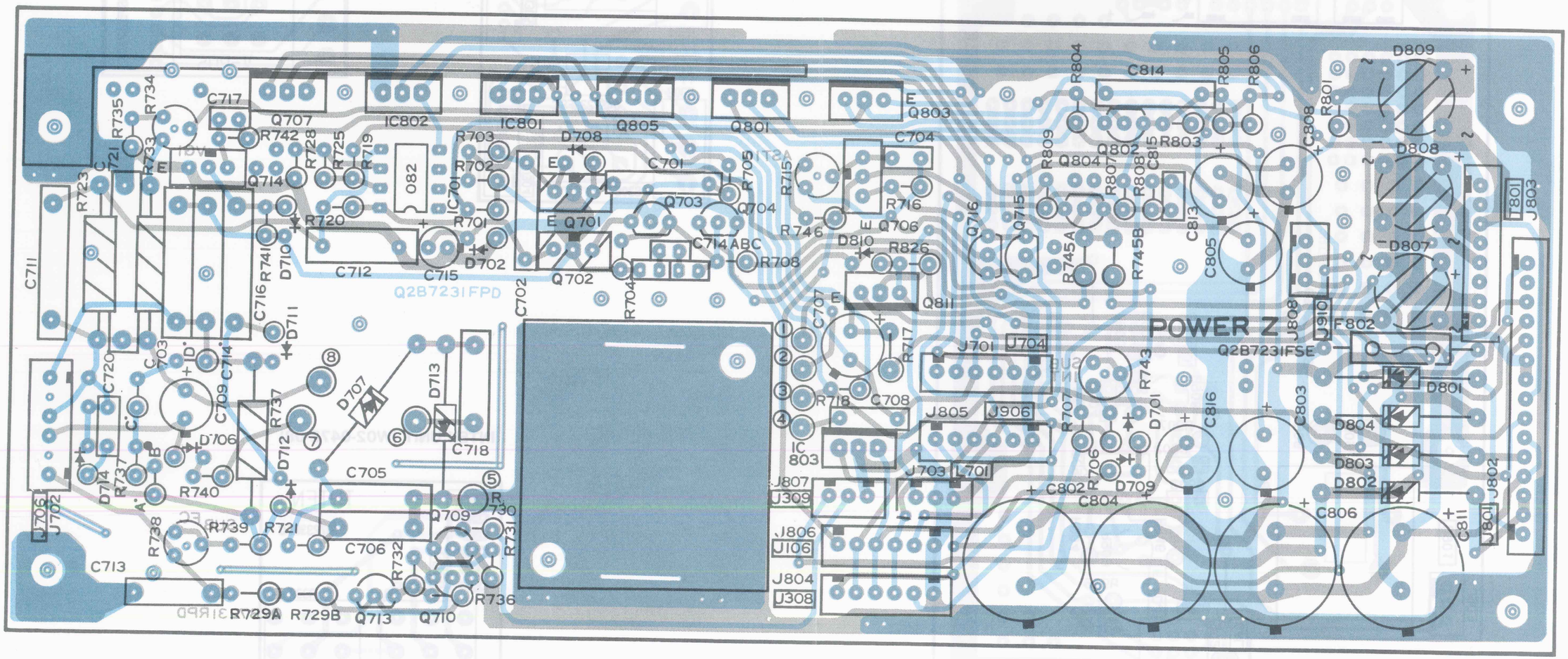
# CS-3035 P.C. BOARD

**HORIZONTAL UNIT (W02-0469-08)**



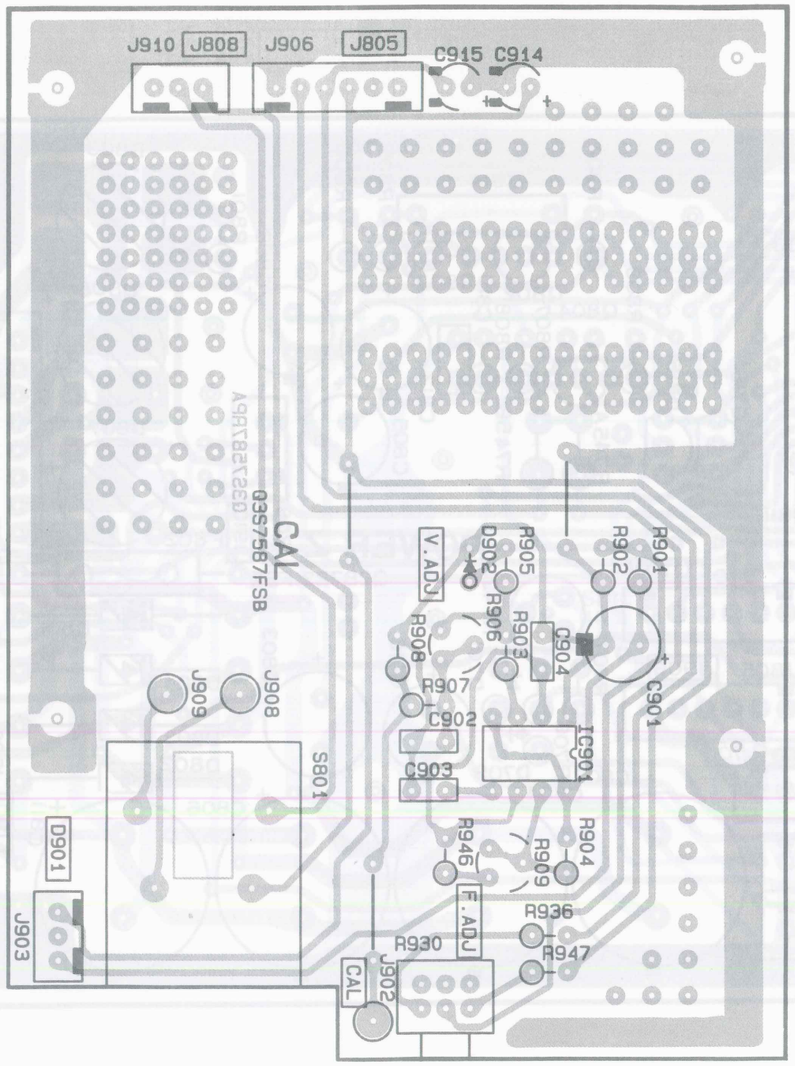
# CS-3035 P.C. BOARD

**POWER SUPPLY & Z AXIS UNIT (W02-0473-08)**

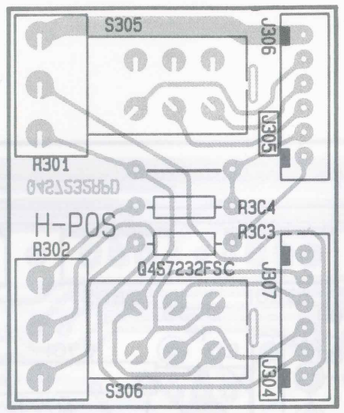


# CS-3035 P.C. BOARD

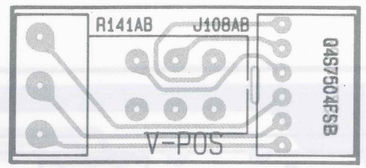
## CALIBRATOR UNIT (W02-0467-08)



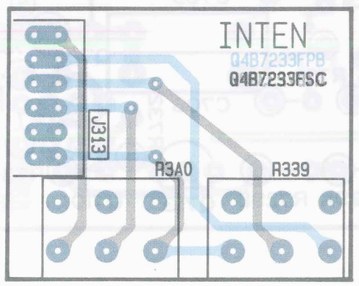

## H-POSITION UNIT (W02-0471-08)




## V-POSITION UNIT (W02-0470-08)

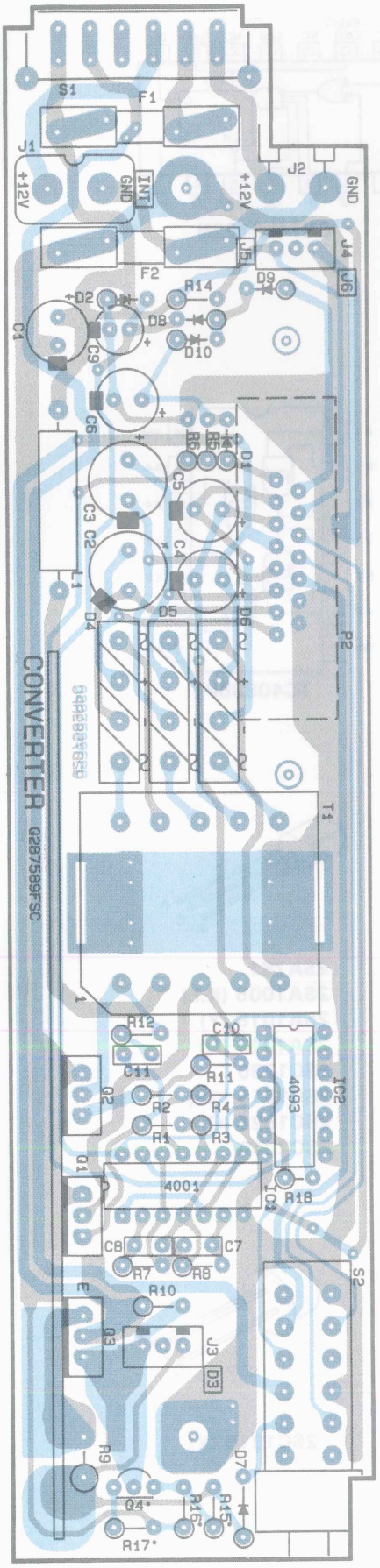


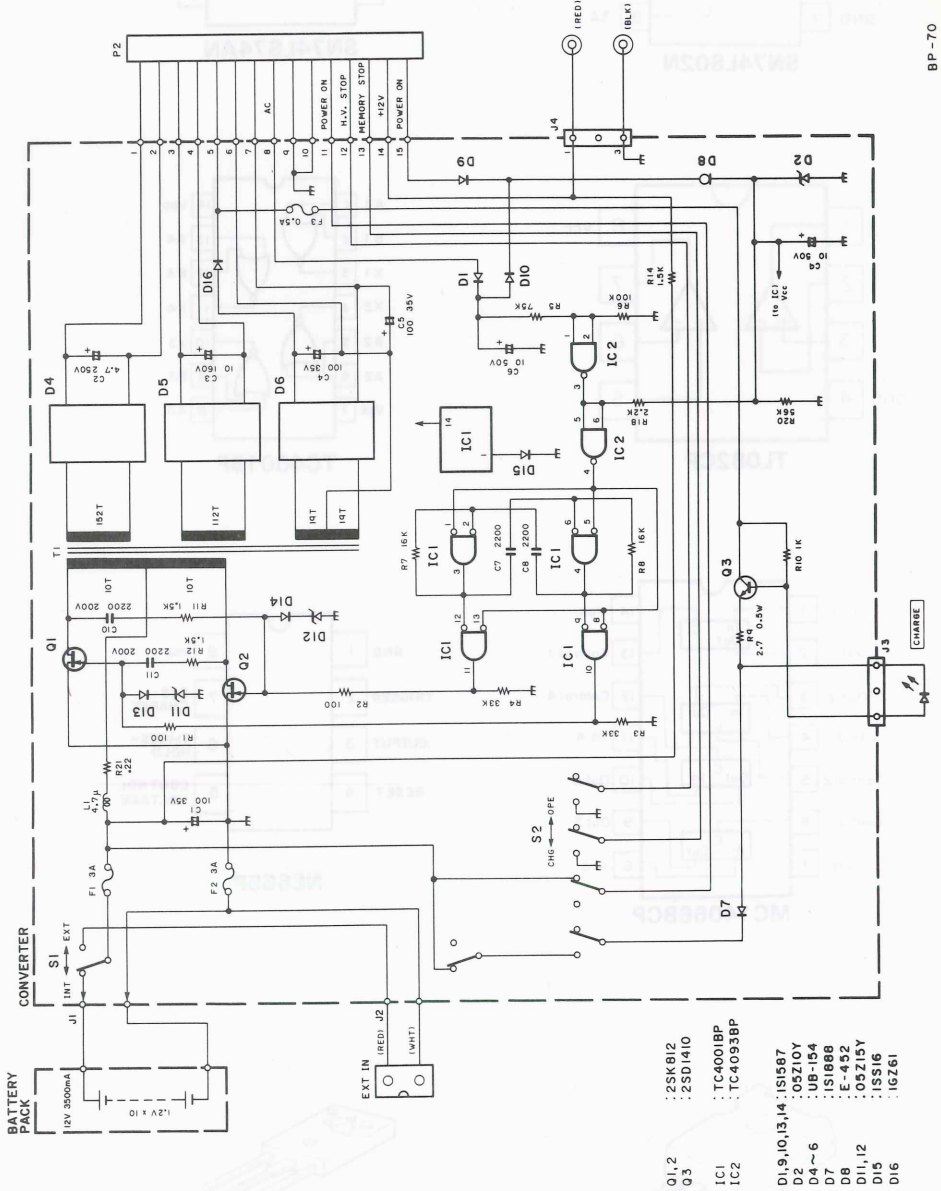

## INTEN UNIT (W02-0472-08)



CONVERTER UNIT
(W02-0462-08)

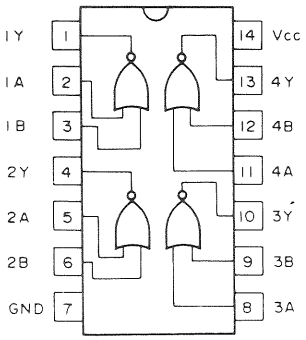
# BP-70 P.C. BOARD/SCHEMATIC DIAGRAM



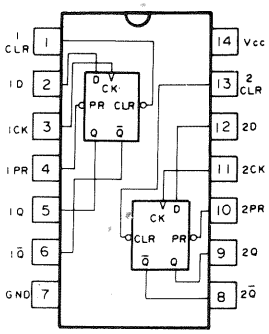




| | | |
|---|---|---|
| Q1,2 | : 2SK812 | |
| Q3 | : 2SD1410 | |
| IC1 | : TC4001BP | |
| IC2 | : TC4093BP | |
| D1,9,10,13,14 | : 1S1587 | |
| D2 | : 05Z10Y | |
| D4~6 | : UB-154 | |
| D7 | : 1S1888 | |
| D8 | : E-452 | |
| D11,12 | : 05Z15Y | |
| D15 | : 1SS16 | |
| D16 | : 1GZ61 | |

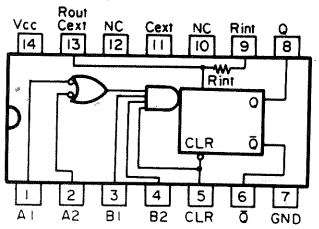
# SEMICONDUCTORS



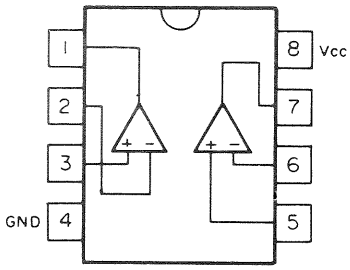

SN74LS02N



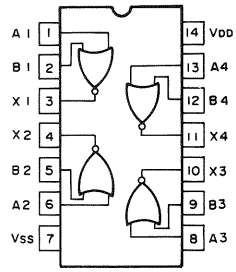

SN74LS74AN



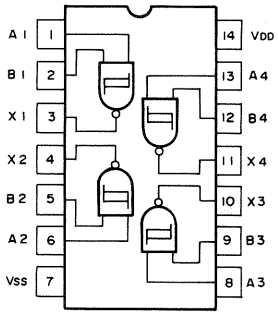

SN74LS122N



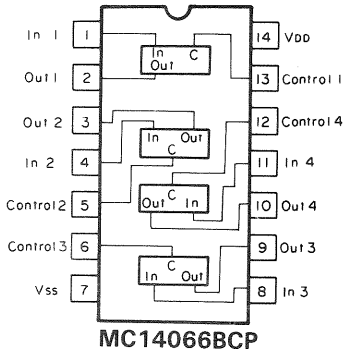

TL082CP



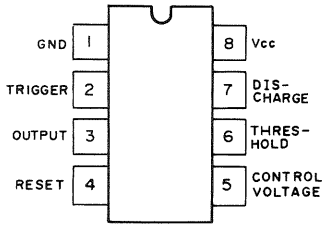

TC4001BP



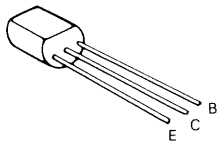

TC4093BP



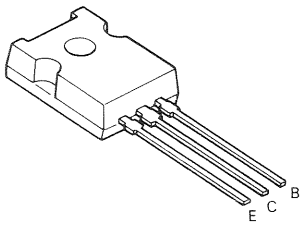

MC14066BCP



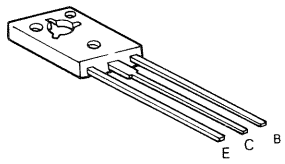

NE555P



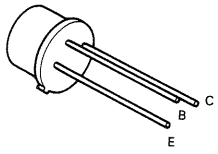

2SA781
2SA1005 (K,L)
2SA1015 (Y)
2SA1019 (O)
2SC1730
2SC1815 (GR)
2SC1923 (O)
2SC2240




2SA1360 (Y)
2SC3423 (Y)

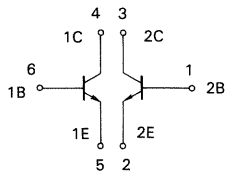


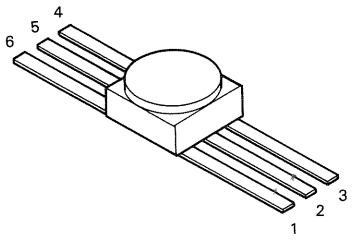

2SA1381
2SC3503



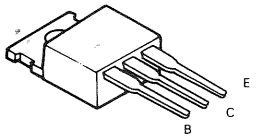

2SC1315 (Y)

# SEMICONDUCTORS

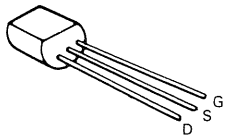


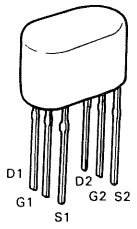

**2SC1925 (O)**



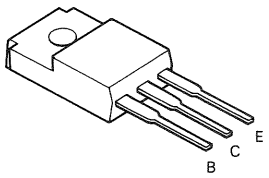

**2SD880 (GR)**



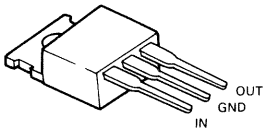

**2SK117 (BL)**



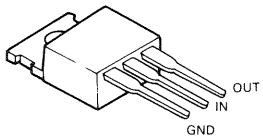

**2SK240 (BL)**



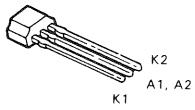

**2SD1410**



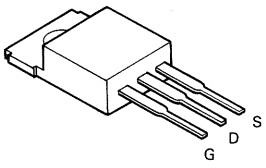

**μA78M05UC**
**μA78M12UC**

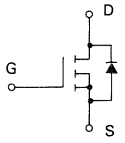



**μA79M12AUC**

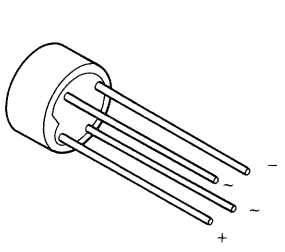


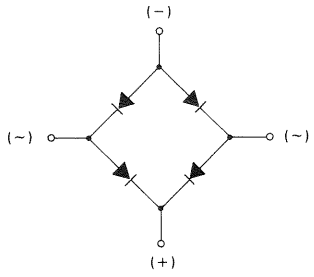

**1SS200**




**2SK812**

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