

SERVICE WARNING

Only qualified service technicians who are familiar with safety checks and guidelines should perform service work. Before replacing parts, disconnect power source to protect electrostatically sensitive parts. Do not attempt to modify any circuit unless so recommended by the manufacturer. When servicing the receiver, use an isolation transformer between the line cord and power receptacle.

SERVICING THE HIGH VOLTAGE AND CRT

Use EXTREME CAUTION when servicing the high voltage circuits. To discharge static high voltage, connect a 10K ohms resistor in series with a test lead between the receiver and CRT anode lead. DO NOT lift the CRT by the neck. Always wear shatterproof goggles when handling the CRT to protect eyes in case of implosion.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Be aware of the instructions and procedures covering X-ray radiation. In solid-state receivers and monitors, the CRT is the only potential source of X-rays. Keep an accurate high voltage meter available at all times. Check meter calibration periodically. Whenever servicing a receiver, check the high voltage at various brightness levels to be sure it is regulating properly. Keep high voltage at rated value, NO HIGHER.

Excessive high voltage may cause X-ray radiation or failure of associated components. DO NOT depend on protection circuits to keep voltage at rated value. When troubleshooting a receiver with excessive high voltage, avoid close contact with the CRT. DO NOT operate the receiver longer than necessary. To locate the cause of excessive high voltage, use a variable AC transformer to regulate voltage. In present receivers, many electrical and mechanical components have safety related characteristics which are not detectable by visual inspection. Such components are identified by a # on both the schematic and the parts list. For SAFETY, use only equivalent replacement parts when replacing these components.

The listing of any available replacement part herein in no case constitutes a recommendation, warranty, or guarantee by Howard W. Sams & Company as to the quality and suitability of such replacement part. The numbers of the listed parts have been compiled from information furnished to Howard W. Sams & Company by the manufacturers of the specific type of replacement part listed.

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SAFETY CHECKS – FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

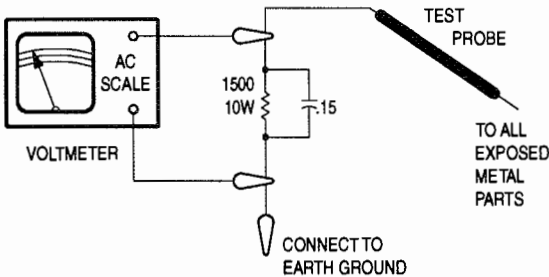
Unplug the AC cord, connect a jumper across the plug prongs, and turn the power switch on (if applicable). Use an ohmmeter to measure the resistance between the jumped AC plug and any exposed metal cabinet parts such as antenna screw heads, control shafts, or handle brackets. Exposed metal parts with a return path should measure between 1M ohms and 5.2M ohms. Parts without a return path must measure infinity.

Hot Leakage Current Check

Plug the AC cord directly into an AC outlet. DO NOT use an isolation transformer. Use a 1500 ohms, 10W resistor in parallel with a .15µF capacitor to connect between any exposed metal parts on the receiver and a good earth ground. (See figure below.) Use an AC voltmeter with at least 5000 ohms per volt sensitivity to measure the voltage across the resistor. Check all exposed metal parts and measure voltage at each point. Voltage measurements should not exceed .75VAC, 500µA. Any value exceeding this limit constitutes a potential shock hazard and must be corrected. If the AC plug is not polarized, reverse the AC plug and repeat exposed metal part voltage measurement at each point.

GENERAL GUIDELINES

Perform a final SAFETY CHECK before returning receiver to customer. Check repaired area for poorly soldered connections, and check entire circuit board for solder splashes. Check inner board wiring for pinched wires or wires contacting any high wattage resistors. Check that all control knobs, shields, covers, grounds, and mounting hardware have been replaced. Be sure to replace all insulators and restore proper lead dress.



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SET 3387

MODEL 25GT500FE1 (CHASSIS CTC177AA)

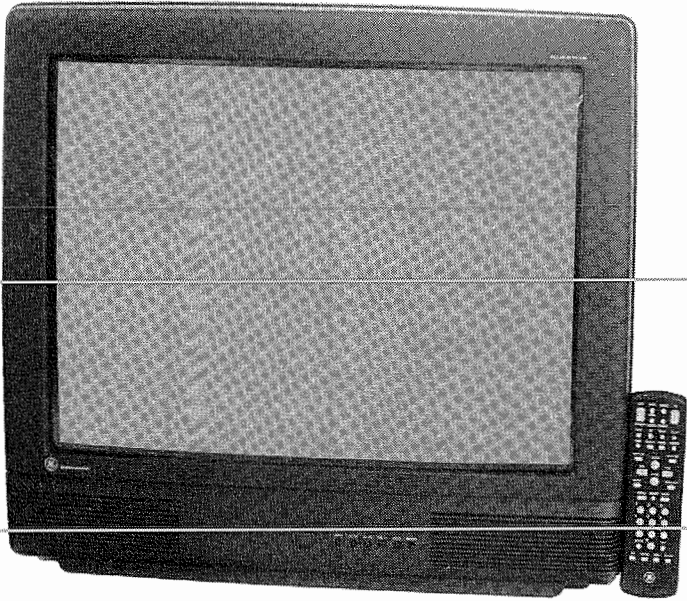
GE

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GE

Model 25GT500FE1 (Chassis CTC177AA)



Representative Model

Complete coverage
for servicing a television receiver...

- Schematics
- Parts list
- Component locations
- Troubleshooting guide

Coverage includes these additional models and chassis:

MODEL	CHASSIS
25GT506FE1	CTC177AA
25GT506JX1	CTC177AA
25GC710KF1	CTC177AK

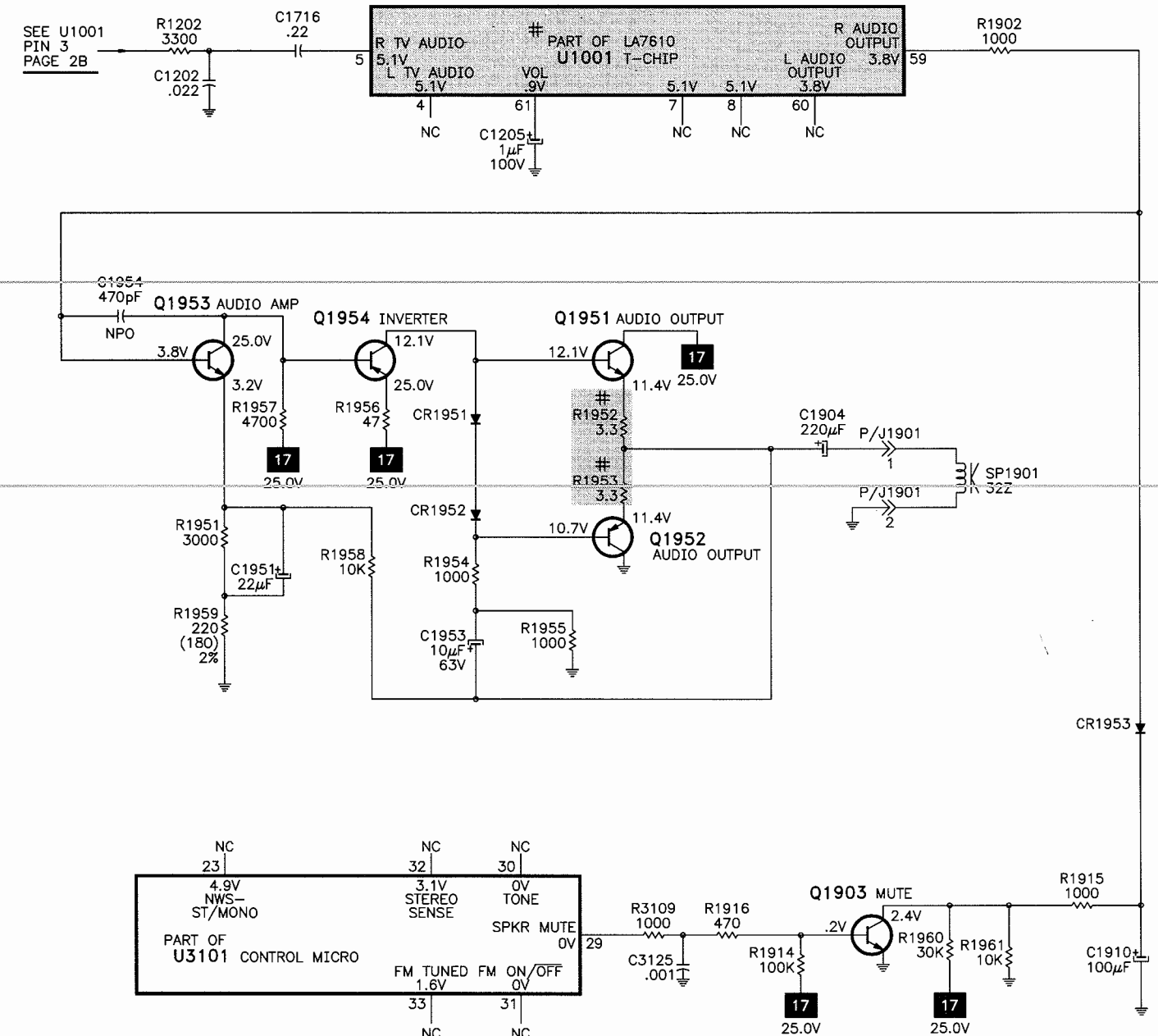


HOWARD W. SAMS & COMPANY

OCTOBER 1994 SET 3387

For Supplier Address,
See PHOTOFACT Annual Index

AUDIO SCHEMATIC



MODEL 25GT50MEE1 (CHASSIS CTC177AA)

TROUBLESHOOTING

POWER SUPPLY

Check AC fuse F4001. If fuse is open, check CR4001 thru CR4004, C4003, C4004, C4006 thru C4010, Q4401, and U4101. Apply 120VAC and check for 140V at the cathode of CR4106. If voltage is missing, check U4101 and T4101. Confirm operation of U4101 by checking for -40.5V \pm .5V at pin 1 of U4101. If the voltage is incorrect, U4101 may be defective or there may be an abnormal load. If source 1 measures approximately 30.0V, check for a short at pin 1 of U4101. If source 1 measures approximately 200V, check for an open at pin 1 of U4101. If the outputs are shorted, the power supply will shut down until short is removed. Check voltages associated with Q4103 and Q4105. If voltages are incorrect, check Q3101, Q3102, Q4103, Q4105, U4102, and pin 1 of U3101. If voltages are correct, refer to the "Horizontal" section of this Troubleshooting guide.

HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC. Momentary short pin XRP1 to XRP2. The receiver should lose raster and sound. If the receiver does not shutdown, the shutdown circuit should be repaired. To resume normal operation, remove AC power and wait 30 seconds, then turn the receiver on.

HIGH VOLTAGE SHUTDOWN

CAUTION: When defeating the high voltage shutdown circuit, do not exceed the maximum high voltage specified on the schematic as this may cause excessive X-radiation and damage to the CRT and associated components. Monitor high voltage while troubleshooting. The high voltage is monitored by CR4901 rectifying pulses from T4401. Should the high voltage increase, the rectified voltage at the cathode of CR4901 will also increase and trigger CR4902. Q4901 will turn on and the receiver will shutdown. To troubleshoot, disconnect one end of CR4902 and check Q4901, CR4901, CR4902, and associated components.

Voltages Taken At Q4901 With TV In Shutdown

Emitter	0V
Base	0V
Collector	.1V

HORIZONTAL

To determine if the receiver is in shutdown, refer to the "High Voltage Shutdown" section of this Troubleshooting guide. Check for 7.0V at pin 22 of U1001. This voltage is used by the horizontal drive circuit for start up and the receiver will not operate if this voltage is missing. If the 7.0V is missing, check pin 22 of U1001 for an internal short to

ground and check CR4115. Inject a horizontal signal at the base of Q4401. If horizontal deflection is now present, check Q4301, Q4302, and pins 24 thru 27 of U1001. If horizontal sweep is missing, check Q4401 and T4401. The high voltage rectifier is part of T4401, if defective it will affect the performance of the horizontal circuits. Width or foldover problems may be caused by C4402 thru C4406.

CHROMA / VIDEO

Inject a video signal at pin 51 of U1001, and check for video on the CRT. If video is now present, refer to the "IF AGC" section of this Troubleshooting guide. Check for a video waveform at pin 48 of U1001. If waveform is missing, check Q2704 and pin 51 of U1001. If the waveform is present, check pins 1, 31, 34, 35, 39, 43, 44, 45, 48, and 63 of U1001. Check for chroma waveforms at pins 36, 37, and 38 of U1001. If the waveforms are missing, check pins 15, 40, 41, 42, 46, 47, 49, and 50 of U1001. If the proper waveforms are present, refer to the "Raster" section of this Troubleshooting guide.

VERTICAL

Check pin 17 of U1001 for proper a waveform. If the waveform is present, check U4501. If the waveform missing, check pins 17, 18, and 32 of U1001.

RASTER

Check the CRT and CRT voltages. If red is missing, check pin 36 of U1001 and Q5001. If green is missing, check pin 37 of U1001 and Q5002. If blue is missing, check pin 38 of U1001 and Q5003.

AUDIO

Select an active TV channel and check for a audio waveform at pin 59 of U1001. If the waveform is missing, check pins 3, 4, 5, 7, 8, 59, 60, and 61 of U1001. If the waveform is present, check Q1951 thru Q1954 and pin 29 of U3101.

IF AGC

Inject an IF signal at pin 11 of U1001 and check for video on the CRT. If video is present on the CRT, check the tuner circuit. Check for a video waveform at pin 51 of U1001, if present, refer to the "Chroma / Video" section of this Troubleshooting guide. If the waveform is missing, check pins 6, 10, 11, 12, 14, 55, 62, and 64 of U1001.

SYSTEM CONTROL MICROPROCESSOR CIRCUIT

- Check for proper power supply sources.
- Press power button and check for horizontal drive pulses at pin 24 of U1001. If drive pulses are present, even if just momentarily, then the system control microprocessor circuit is operating properly and the problem is in the horizontal circuit. If pulses are not present at pin 24 of U1001, check for 7.0V at pin 22 of U1001. If 7.0V is missing, unsolder pin 22 of U1001, and check for 7.0V at the foil pad. If 7.0V is present, U1001 is defective. If 7.0V is missing, check components associated with pin 22 of U1001.
- Check for 5.0V \pm .4V at pins 1 and 20 of U3101. If the voltage is missing at pin 1, check the reset circuit. If the voltage is missing at pin 20, check the power supply.
- Check for a 5.0V p-p oscillator waveform at pin 41 and 42 of U3101. If waveform voltage is incorrect, check Y3101. If waveform is missing, check Y3101 and U3101.
- Ensure that no data pulses are on pins 14, 15, and 16 of U3101 while receiver is in standby mode. Press power button and check for pulses on pins 14, 15, and pin 16 of U3101.
- If pulses are missing, unsolder pins 4 and 5 of U7401 and check for pulses on pins 14, 15, and pin 16 of U3101 while

depressing the power button. If pulses are now present, check U7401 and associated components,

- If pulses are still missing, unsolder pins 14, 15, and 16 of U3101 and check for 5.0V p-p data pulses while receiver is in standby mode. If pulses are missing, check U3101.
- If 5.0V p-p data pulses are present, resolder pins 14, 15, and 16 of U3101 and unsolder pins 5 and 6 of U3201. Check for data pulses at the foil pads of pins 5 and 6 of U3201, while the receiver is in the standby mode. If data pulses are present, then U3201 is probably defective.
NOTE: Do not throw away the old U3201 until it is proven that a new U3201 will repair the problem. If the new U3201 does not repair the problem, reinstall the old U3201 so that a complete chassis alignment will not be required.
- If data pulses are not present with pins 5 and 6 of U3201 unsoldered, resolder pins 5 and 6 of U3201. Unsolder pins 52, 53, and 54 of U1001, and check for data pulses at the foil pads of these pins. If data pulses are present, then U1001 is probably defective. If data pulses are missing, check components associated with pins 52, 53, and 54 of U1001.
- When problem has been isolated and repaired, ensure that all components that were unsoldered during troubleshooting are properly resoldered.

TEST EQUIPMENT

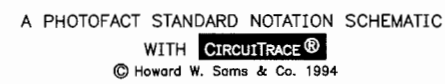
Test equipment listed by participating manufacturer illustrates typical or equivalent equipment used by Sams engineers to obtain measurements. This equipment is compatible with most types used by field service technicians.

Equipment	Sencore No.
Oscilloscope	SC3100
Generators	
RGB	CM2000
Multiburst Signal	VG91
Color Bar	VG91
TV Stereo	VG91
Digital VOM	SC3100
Frequency Meter	SC3100
Hi-Voltage Probe	HP200
Accessory Probes	TP212

Equipment	Sencore No.
Isolation Transformer	PR57
Capacitance Analyzer	LC101, LC102
CRT Analyzer	CR70
AC Leakage Tester	PR57
Inductance Analyzer	LC101, LC102
Flyback Yoke Tester	TVA92
TV Stereo Power Monitor	SR68, PA81
Field Strength Meter	SL750
Transistor Tester	TF46
Video Analyzer	VG91, TVA92

POWER SUPPLY

Δ TAKEN FROM COMMON TIE POINT \downarrow



MISCELLANEOUS ADJUSTMENTS

PRETUNING

NOTE: All procedures require an antenna connected and power applied to the receiver.

Auto Program

1. Press the menu button to select setup menu and highlight autoprogram.
2. Press the + button. All available channels are scanned and stored in memory.
3. Press display to clear menu.

Channel Memory

1. Press the menu button to select the setup menu.
2. Press channel down button to highlight channel memory.
3. Select channel to add or erase with number buttons.
4. Press + to add a channel or - to erase a channel.
5. Repeat steps 3 and 4 to add or erase other channels.
6. When finished, press done to save selections.

SERVICE MENU

The following adjustment and alignment procedures are accessed thru a service menu. To access the service menu, turn the receiver on. Press the menu button and hold it down while pressing the power button. While holding down the menu button, release the power button and press the volume + button. The screen will display a one line menu, on the left the parameter P 00, and on the right the value of that parameter V 00. Release buttons. Adjustments are made by selecting the proper parameter and changing the value of that parameter. To change the parameter number use channel up and down buttons. To adjust the current value of that parameter use volume + and - buttons. The three main groups of parameters are, the service adjustment parameters, the chassis alignment parameters, and the tuner alignment parameters. To access and change any of the parameters, the proper parameter pass number and value must be entered. This information is listed at the beginning of each alignment. When these parameters are modified, the T-Chip and the corresponding EEPROM are updated. Adjustments and alignments are bus controlled, except focus and screen. Turn the receiver off to exit the service menu

WARNING: When adjusting the horizontal frequency be careful not to exceed the value range, or the receiver will go into shutdown, and replacement of U3101 may be required. In case the receiver goes into shutdown loop, connect a capacitor across C4402 with the same value. Redo horizontal frequency adjustment, then remove the capacitor. It may be necessary to readjust the horizontal frequency.

MECHANICAL TUNER COIL ALIGNMENT PARAMETERS

The tuner coil alignment is preset at the time of manufacture and should require no further adjustment. The following recommended procedure should be performed only in event a complete tuner alignment is necessary, which is unlikely. Use plastic or wooden tool to knife coils. This procedure is performed with top tuner cover removed and bottom tuner cover in place and soldered. Tuner Service Modulator RCA stock No. 215568 is used in this procedure.

1. Manually tune the receiver and the tuner service modulator to channel 125 (band 3) and enter parameter 154.
2. Connect DVM to tuner side of R7525.
3. Check for voltage reading between 4.5V and 4.7V, if not, expand or compress L7303 to set voltage within these limits.
4. Manually tune the receiver and the tuner service modulator to channel 50 (band 2) and enter parameter 127.
5. While DVM is still connected to R7525, check for voltage reading between 4.8V and 5.0V, if not, expand or compress L7304 to set voltage within these limits.
6. Manually tune the receiver and the tuner service modulator to channel 17 (band 1) and enter parameter 109.
7. While DVM is still connected to R7525, check for voltage reading between 4.4V and 4.6V, if not, expand or compress L7305 to set voltage within these limits.

HIGH VOLTAGE CHECK

Tune in a picture. Set brightness, contrast, and color to minimum. Connect a high voltage probe to the CRT anode. High voltage should measure 25.5kV to 27.5kV.

COLOR TEMPERATURE

NOTE: See Service Adjustment Parameters to change drive and bias values.

Press menu button on the receiver for collapsed raster setup line. Preset the red, green, and blue drive values to 32. Preset the red, green, and blue bias values to provide 170V at the collector of the respective output transistors. Adjust screen control for a service line that is just visible. Adjust red, green, and blue drives to obtain a white raster. Check the low light to high light gray scale tracking. Repeat the procedure, if necessary, to obtain the best performance.

8. Manually tune the receiver and the tuner service modulator to channel 125 (band 3) and enter parameter 154.
9. Connect DVM to positive side of C7503.
10. Set parameter value range to 31.
11. Expand or compress L7105 for minimum RF AGC voltage.
12. Enter parameter 155 and set parameter value range to 31.
13. Expand or compress L7104 for minimum RF AGC voltage.
14. Enter parameter 156 and set parameter value range to 31.
15. Expand or compress L7102 for minimum RF AGC voltage.
16. Manually tune the receiver and the tuner service modulator to channel 50 (band 2) and enter parameter 127.
17. Set parameter value range to 31.
18. Expand or compress L7113 for minimum RF AGC voltage.
19. Enter parameter 128 and set parameter value range to 31.
20. Expand or compress L7111 for minimum RF AGC voltage.
21. Enter parameter 129 and set parameter value range to 31.
22. Expand or compress L7107 for minimum RF AGC voltage.
23. Manually tune the receiver and the tuner service modulator to channel 17 (band 1) and enter parameter 109.
24. Set parameter value range to 31.
25. Expand or compress L7114 for minimum RF AGC voltage.
26. Enter parameter 110 and set parameter value range to 31.
27. Expand or compress L7112 for minimum RF AGC voltage.
28. Enter parameter 111 and set parameter value range to 31.
29. Expand or compress L7106 for minimum RF AGC voltage.
30. Perform the entire Electronic Tuner Alignment.

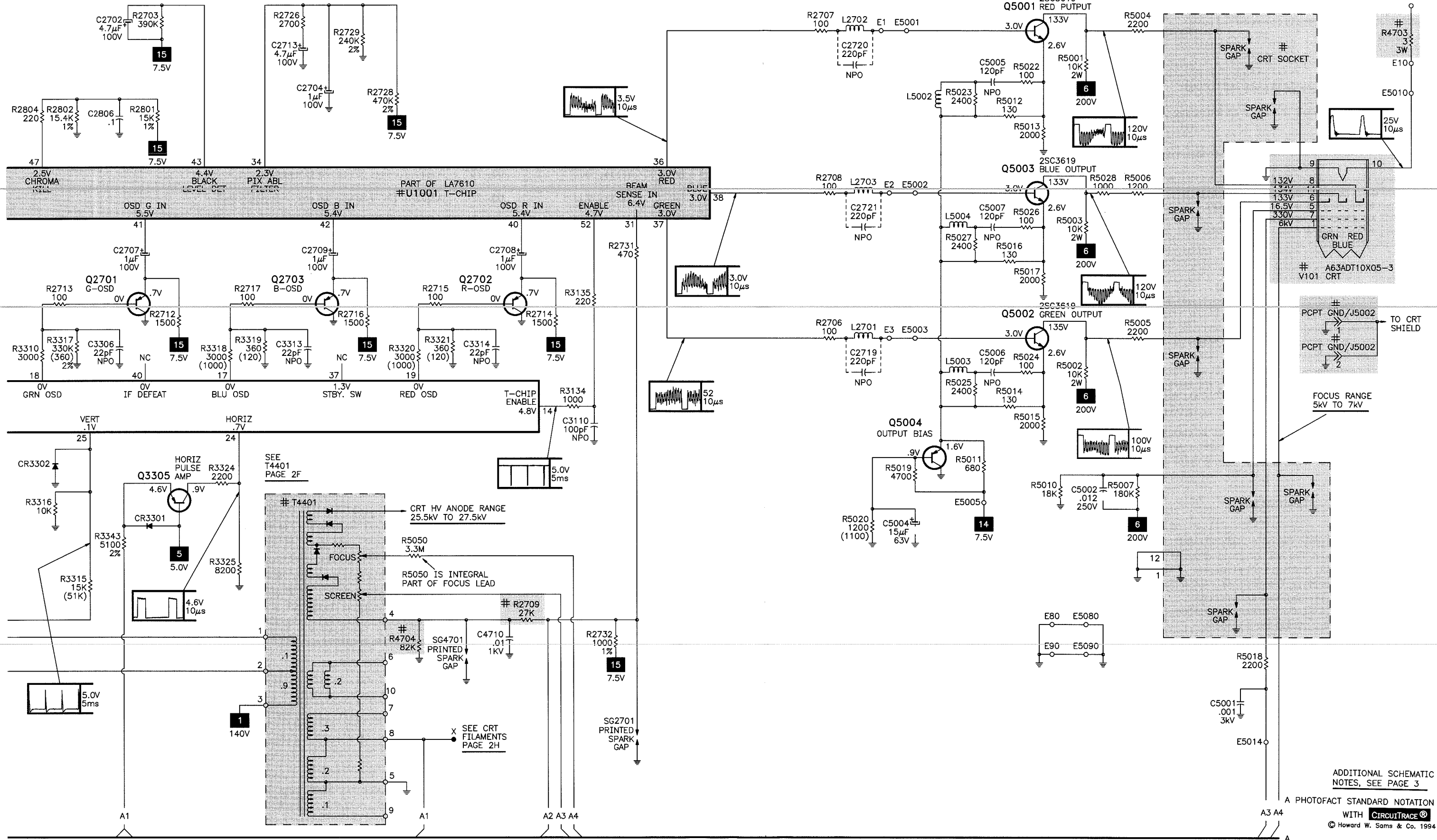
SERVICE ADJUSTMENT PARAMETERS

Parameter No.	Parameter Name	Value Range	Comment
00	Pass number	Must set to 76	May not advance until value set.
01	Horizontal Frequency	00 - 31	Adjust for stable or slowly moving horizontal lines.
02	Horizontal Phase	00 - 15	Adjust to center picture left to right.
03	EW DC	00 - 15	Not used this model.
04	EW Amplitude	00 - 07	Not used this model.
05	Vertical DC	00 - 15	Adjust to center picture top to bottom.
06	Vertical Size	00 - 31	Adjust to 1/4" overscan top and bottom of screen.
07	Red Bias	00 - 127	Press menu button on the receiver for setup line.
08	Green Bias	00 - 127	Press menu button on the receiver for setup line.
09	Blue Bias	00 - 127	Press menu button on the receiver for setup line.
10	Red Drive	00 - 63	Press menu button on the receiver for setup line.
11	Green Drive	00 - 63	Press menu button on the receiver for setup line.
12	Blue Drive	00 - 63	Press menu button on the receiver for setup line.

CHASSIS ALIGNMENT PARAMETERS

Parameter No.	Parameter Name	Value Range	Comment
13	Pass number	Must set to 77	May not advance to higher parameter until value is set.
14	PLL Tuning	00 - 63	Apply 4.0V to pin 14 of U1001. Short TP7102 (junction of R7130 and R2313) to ground. Connect 41.25MHz marker to pin 1 of SF2301. Connect an oscilloscope to pin 55 of U1001. Adjust value for 2.2μs sinewave.
15	4.5MHz Trap	00 - 07	Short TP7102 (junction of R7130 and R2313) to ground. Apply 45.75MHz (300mV) and 41.25MHz (100mV) to pin 1 of SF2301. Connect an oscilloscope to pin 63 of U1001, and adjust value for minimum 4.5MHz sinewave.
16	Video Level	00 - 07	Tune in a color bar pattern, 100% modulation, super pulse display. Connect an oscilloscope to pin 63 of U1001. Adjust value range to produce 2V p-p response.
17	FM Level	00 - 15	Connect signal generator to pin 55 of U1001, inject 4.5MHz carrier, 1kHz modulation, with 25kHz deviation. Apply 4.0V to pin 14 of U1001. Connect an oscilloscope to pin 3 of U1001, and adjust value range for 1.2V p-p of 1kHz component.
18	B+ Trim	00 - 15	Not used on this chassis.
19	RF AGC (1)	00 - 31	Manual tune channel 6.
20	D-PIP Chroma	-	Adjust value levels to match big picture levels.
21	D-PIP Tint	-	Adjust value levels to match big picture levels.
22	D-PIP Brightness	-	Adjust value levels to match big picture levels.
23	D-PIP Contrast	-	Adjust value levels to match big picture levels.
24	Factory Tint	00 - 63	-

(1) RF AGC has been preset at time of manufacture for optimum operation over a wide range of RF signal input conditions. Readjustment should not be required unless the tuner has been repaired, U1001, U3101, or U3201 has been replaced, or unusual signal conditions exist. Use weakest local signal to adjust RF AGC parameter setting.

TELEVISION SCHEMATIC continued

ADDITIONAL SCHEMATIC
NOTES, SEE PAGE 3

A PHOTOFACT STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE®**
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MISCELLANEOUS ADJUSTMENTS continued

TUNER CIRCUIT VOLTAGE CHART

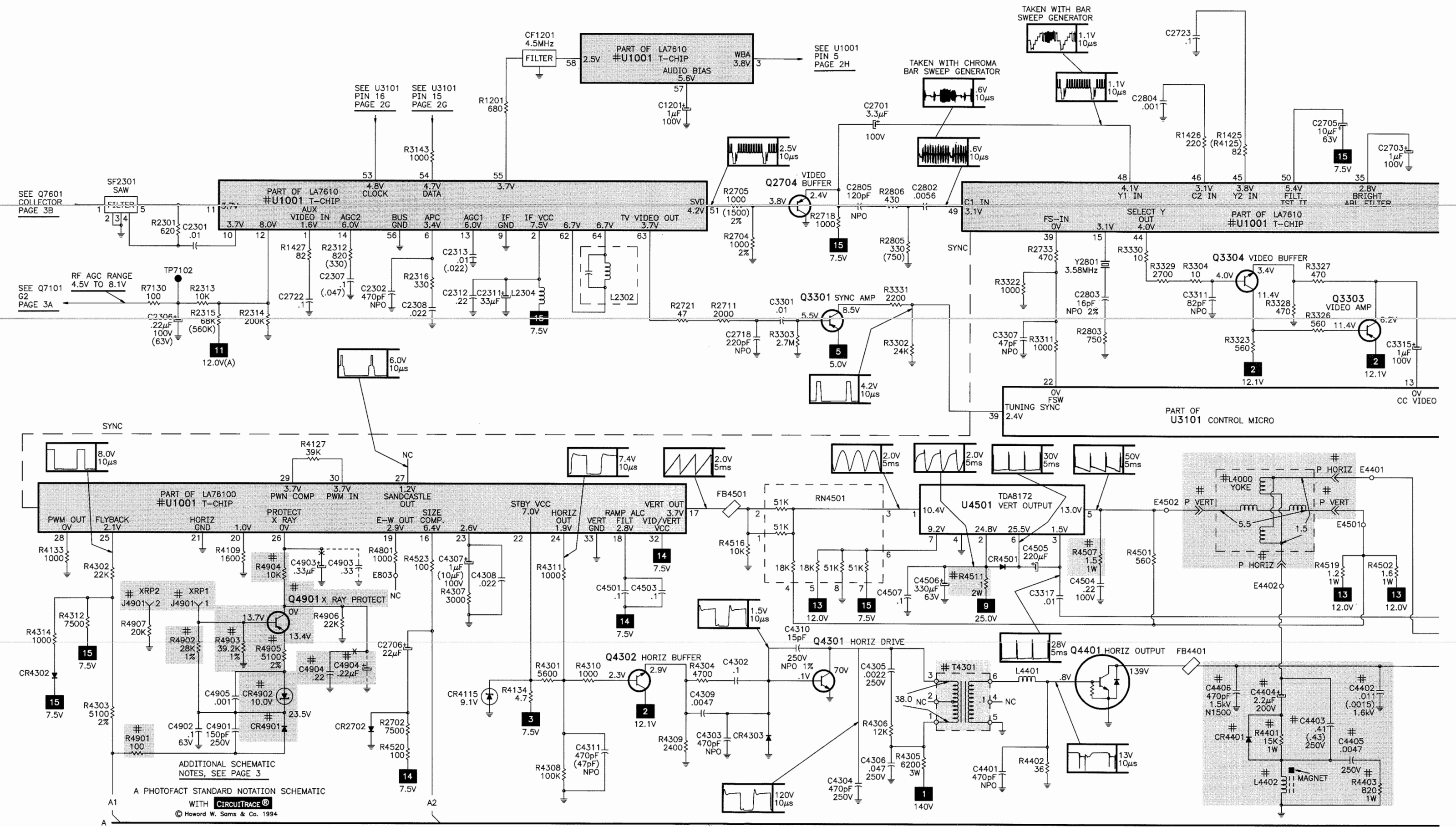
ELECTRONIC TUNER ALIGNMENT PARAMETERS

Use Tuner Service Modulator, RCA stock no. 215568, and a VCR for signal source. Monitor RF AGC at the positive end of C2306 (TP7102), or at pin 12 of U1001, and adjust for minimum voltage at each parameter. The entire Electronic Tuner Alignment procedure, once started, must be completed in its entirety. Electronic Tuner Alignment is performed with top and bottom covers in place with bottom cover soldered.

Parameter No.	Parameter Name	Value Range	Parameter No.	Parameter Name	Value Range
25	Pass number	Must set to 78	128	Ch. 50 primary	00-63
100	Ch. 2 secondary	00-63	129	Ch. 50 single	00-63
101	Ch. 2 primary	00-63	130	Ch. 51 secondary	00-63
102	Ch. 2 single	00-63	131	Ch. 51 primary	00-63
103	Ch. 6 secondary	00-63	132	Ch. 51 single	00-63
104	Ch. 6 primary	00-63	133	Ch. 57 secondary	00-63
105	Ch. 6 single	00-63	134	Ch. 57 primary	00-63
106	Ch. 14 secondary	00-63	135	Ch. 57 single	00-63
107	Ch. 14 primary	00-63	136	Ch. 63 secondary	00-63
108	Ch. 14 single	00-63	137	Ch. 63 primary	00-63
109	Ch. 17 secondary	00-63	138	Ch. 63 single	00-63
110	Ch. 17 primary	00-63	139	Ch. 76 secondary	00-63
111	Ch. 17 single	00-63	140	Ch. 76 primary	00-63
112	Ch. 18 secondary	00-63	141	Ch. 76 single	00-63
113	Ch. 18 primary	00-63	142	Ch. 83 secondary	00-63
114	Ch. 18 single	00-63	143	Ch. 83 primary	00-63
115	Ch. 13 secondary	00-63	144	Ch. 83 single	00-63
116	Ch. 13 primary	00-63	145	Ch. 93 secondary	00-63
117	Ch. 13 single	00-63	146	Ch. 93 primary	00-63
118	Ch. 34 secondary	00-63	147	Ch. 93 single	00-63
119	Ch. 34 primary	00-63	148	Ch. 110 secondary	00-63
120	Ch. 34 single	00-63	149	Ch. 110 primary	00-63
121	Ch. 37 secondary	00-63	150	Ch. 110 single	00-63
122	Ch. 37 primary	00-63	151	Ch. 117 secondary	00-63
123	Ch. 37 single	00-63	152	Ch. 117 primary	00-63
124	Ch. 48 secondary	00-63	153	Ch. 117 single	00-63
125	Ch. 48 primary	00-63	154	Ch. 125 secondary	00-63
126	Ch. 48 single	00-63	155	Ch. 125 primary	00-63
127	Ch. 50 secondary	00-63	156	Ch. 125 single	00-63

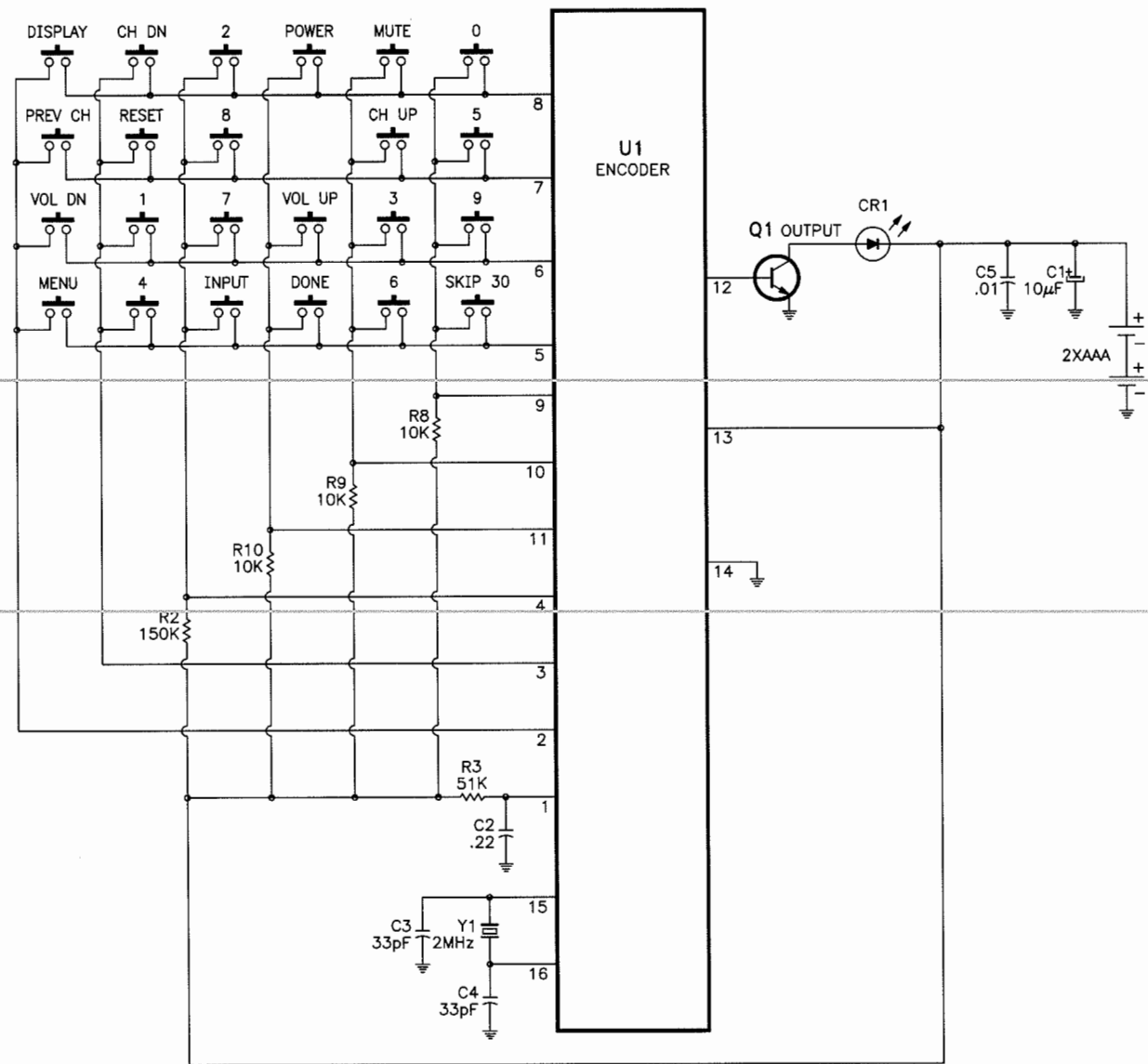
Pin	VHF Low Band	VHF High Band	UHF Band
U7301			
1	5.4V	5.4V	5.3V
2	2.9V	3.0V	3.2V
3	7.8V	7.7V	7.6V
4	3.0V	3.0V	3.2V
5	7.8V	7.7V	7.6V
6	0V	0V	0V
7	3.0V	3.0V	0V
8	9.0V	9.0V	8.8V
9	3.0V	3.0V	3.3V
10	3.3V	3.2V	2.9V
11	4.9V	5.1V	9.7V
12	3.3V	3.2V	2.9V
13	0V	0V	0V
14	9.1V	9.0V	5.4V
15	3.4V	3.4V	2.9V
16	3.4V	3.4V	2.9V
U7401			
1	1.7V	2.1V	1.7V
2	2.1V	2.1V	2.1V
3	2.1V	2.1V	2.1V
4	4.8V	4.8V	4.8V
5	4.7V	4.7V	4.7V
6	0V	0V	0V
7	1.3V	1.3V	1.3V
8	11.5V	0V	0V
9	7.4V	7.4V	0V
10	4.8V	4.8V	4.8V
11	2.3V	2.3V	2.3V
12	2.3V	2.3V	2.3V
13	0V	0V	0V
14	.6V	.6V	.6V
U7501			
1	1.3V	1.7V	1.8V
2	1.3V	1.7V	1.8V
3	1.3V	1.6V	1.8V
4	33.0V	33.0V	33.0V
5	1.1V	1.5V	1.6V
6	1.1V	1.5V	1.6V
7	1.4V	4.0V	4.8V
8	.7V	3.5V	4.6V
9	1.0V	1.4V	1.5V
10	1.0V	1.4V	1.5V
11	0V	0V	0V
12	1.1V	1.4V	1.5V
13	1.1V	1.4V	1.5V
14	1.2V	3.4V	4.4V
NOTE: VHF Low Band voltages taken on channel 2. VHF High Band voltages taken on channel 7. UHF Band voltages taken on channel 14. Voltages taken with signal.			

TELEVISION SCHEMATIC



REMOTE TRANSMITTER SCHEMATIC

SCHEMATIC NOTES



For SAFETY use only equivalent replacement part, see parts list.

* Circuitry not used in some versions.

--- Circuitry used in some versions.

⏏ Ground

⏏ Chassis ground

▽ Common tie point

△ Taken from common tie point

3 Schematic CIRCUITRACE®: Voltage source tie point.

A Cabling: Heavy lines reduce use of multiple lines.

Waveforms and voltages are taken from ground, unless noted otherwise.
Waveforms taken with triggered scope and keyed rainbow generator. Waveform voltage is peak to peak. Timebase is per division. Waveforms shown at 10 divisions.
Supply voltages maintained as seen at input.
Voltages measured with digital meter and no signal.
Controls adjusted for normal operation.
Capacitors are 50 volts or less, 5% or greater unless noted.
Electrolytic capacitors are 50 volts or less, 20% or greater unless noted.
Resistors are 1/2W or less, 5% or greater unless noted.
Value in () used in some versions.
Measurements with switching as shown, unless noted.
Rated voltage shown on zener diodes.

Important Parts Information

- The parts listed here are those not usually available from a well-stocked supply cabinet or bin.
- Where items may be replaced with equivalent parts, several alternates are shown from participating vendors.
- On the parts lists, safety items are marked with a # to remind you that only exact replacements are recommended for these items.
- When ordering parts, state the model number, part number, and description.

Obtaining Parts

Many of these parts are available from your local Sams authorized distributor or the manufacturer of the equipment. Call Sams for the name of your nearest distributor:

800-428-7267

Or consult the Sams *Annual Index* for the address of the original equipment manufacturer.

Participating Vendors

Information on test equipment and replacement parts is listed in these pages for the following participating vendors. Consult the Sams *Annual Index* for their current address.

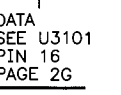
- | | |
|--|--|
| ▪ Custom Components Corporation (Chek-A-Color) | ▪ PTS Electronics Corporation (PTS) |
| ▪ NTE Electronics, Inc. (NTE) | ▪ Sencore, Inc. |
| ▪ Philips ECG Company (ECG) | ▪ Thomson Consumer Electronics, Inc. (SK, TCE) |

PARTS LIST

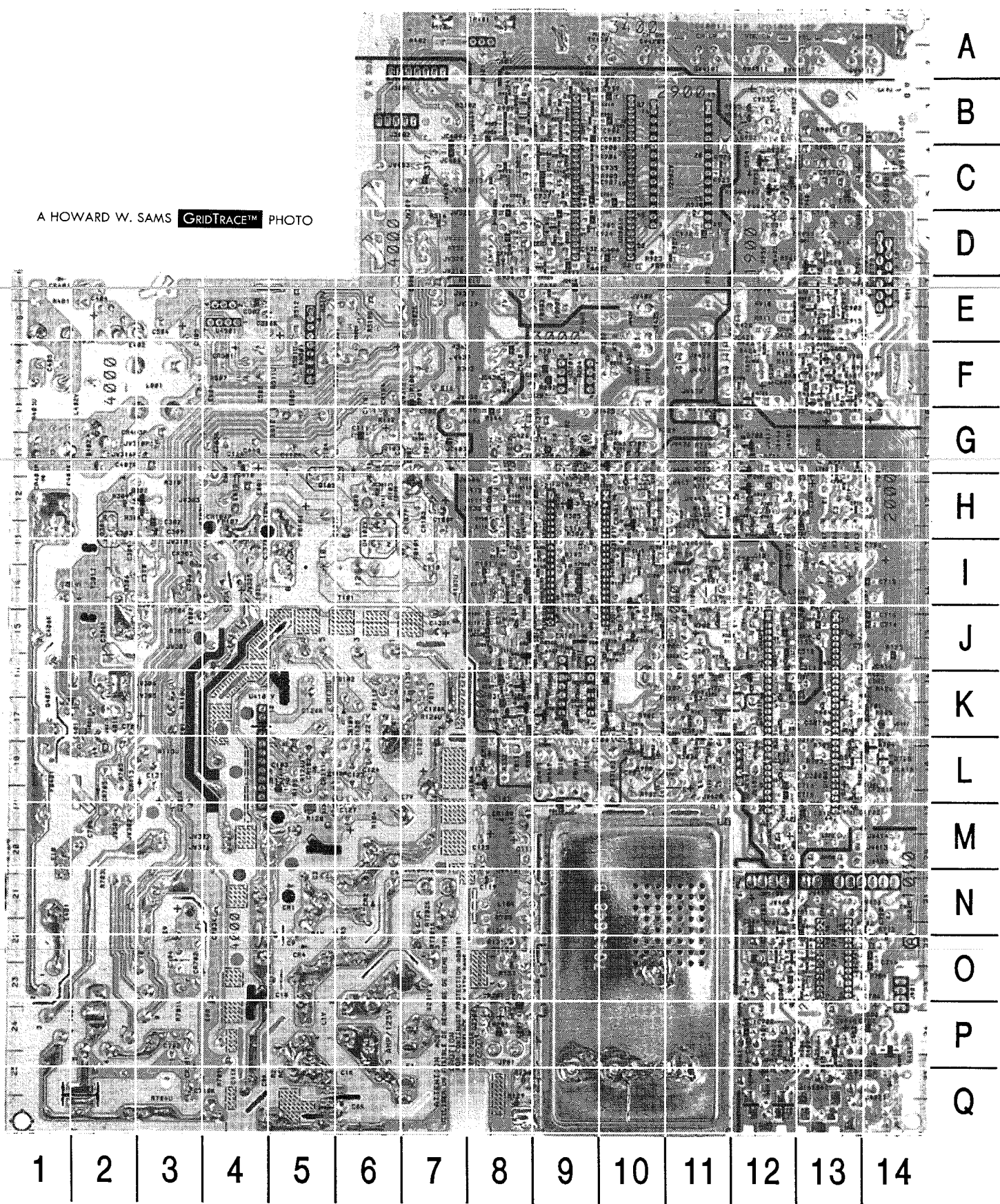
SEMICONDUCTORS					
(Select replacement for best results.)					
Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
CR1951, 52, 53	-	164717	NTE519	ECG519	SK3100
CR2702	-	164717	NTE519	ECG519	SK3100
CR3101	-	164874	NTE177	ECG177	SK9091
CR3102	-	201133	-	-	-
CR3301	-	164717	NTE519	ECG519	SK3100
CR3302	-	201133	-	-	-
CR4001 Thru					
CR4004	-	147015	NTE125	ECG125	SK5010A
CR4101	-	164874	NTE177	ECG177	SK9091
CR4102	-	176296	NTE125	ECG125	SK5010A
CR4103	-	164717	NTE519	ECG519	SK3100
CR4104	-	215488	-	-	-
CR4106	-	164589	NTE558	ECG558	SK3998
CR4107	-	164590	NTE580	ECG580	SK5036
CR4108	-	217306	-	-	-
CR4109	-	215490	-	-	-
CR4111	-	176296	NTE125	ECG125	SK5010A
CR4112	-	140971	NTE552	ECG552	SK9000
CR4113	-	176296	NTE125	ECG125	SK5010A
CR4114	-	164874	NTE177	ECG177	SK9091
CR4115	-	215491	-	-	-
CR4201	-	164717	NTE519	ECG519	SK3100
CR4302	-	164717	NTE519	ECG519	SK3100
CR4303	-	176296	NTE125	ECG125	SK5010A
# CR4401	-	140971	NTE552	ECG552	SK9000
CR4501	-	147015	NTE125	ECG125	SK5010A
CR4701	-	207878	NTE4043B	ECG4043B	SK4043B
CR4702	-	176296	NTE125	ECG125	SK5010A
CR4703	-	164717	NTE519	ECG519	SK3100
CR4704	-	164588	NTE519	ECG519	SK3100
CR4705	-	176296	NTE125	ECG125	SK5010A
# CR4901	-	157301	NTE177	ECG177	SK9091
# CR4902	-	159429	NTE5019T1	ECG5019T1	SK9970
CR7101, 02, 03 (1)	-	215492	-	-	-
CR7105	-	215493	-	-	-
CR7106, 07, 08 (2)	-	215494	-	-	-
CR7109, 10	-	215493	-	-	-
CR7111 (2)	-	215494	-	-	-
CR7112	-	215493	-	-	-
CR7113 (2)	-	215494	-	-	-
CR7114 (1)	-	215492	-	-	-
CR7301 (1)	-	215492	-	-	-
CR7302 (2)	-	215494	-	-	-
CR7303	-	215493	-	-	-
CR7304 (1)	-	215492	-	-	-
CR7305 (2)	-	215494	-	-	-
Q1903	-	215495	-	-	-
# For SAFETY use only equivalent replacement part.					
(1) Part of CR7101					
(2) Part of CR7106					

SEMICONDUCTORS continued					
(Select replacement for best results.)					
Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
Q1951	-	177788	NTE31*	ECG31*	SK3866A*
Q1952	-	177789	NTE32*	ECG32*	SK3867A*
Q1953	-	215495	-	-	-
Q1954	-	215496	-	-	-
Q2701 Thru					
Q2704	-	215496	-	-	-
Q3101	-	215495	-	-	-
Q3102	-	215496	-	-	-
Q3301	-	215496	-	-	-
Q3302	-	160696	NTE123AP	ECG123AP	SK3854
Q3303	-	215496	-	-	-
Q3304	-	215495	-	-	-
Q3305	-	215496	-	-	-
Q4101	-	157627	NTE54	ECG54	SK9366
Q4103, 05	-	160696	NTE123AP	ECG123AP	SK3854
Q4106	-	215495	-	-	-
Q4301	-	146851	NTE287	ECG287	SK3433
Q4302	-	215495	-	-	-
Q4401	-	191142	NTE2331	ECG2331	SK10088
# Q4901	-	147665	NTE159	ECG159	SK3466
Q5001, 02, 03	2SC3619	215497	NTE157	ECG157	SK3747
Q5004	-	143806	NTE159	ECG159	SK3466
Q7101, 02	-	200566	-	-	-
Q7401	-	215495	-	-	-
Q7402	-	215496	-	-	-
Q7403	-	215495	-	-	-
Q7404	-	215496	-	-	-
Q7501, 02	-	215495	-	-	-
Q7601	-	146848	NTE229*	ECG229*	SK3246A*
# U1001	LA7610	215524	-	-	-
U3101	-	217320	-	-	-
U3201	-	218400	-	-	-
U4101	STK730-010	215530	-	-	-
U4102	L7812CV	162394	NTE966	ECG966	SK3592
U4501	TDA8172	215531	NTE1788	ECG1788	SK9875
U7301	CXA1594L	215532	-	-	-
U7401	-	215533	-	-	-
U7501	-	215534	-	-	-
# For SAFETY use only equivalent replacement part.					
* Lead configuration may vary from original.					

CONTROLS & RESISTORS			
Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
R1711	3300 2% 1/10W SMT	195938	-
# R1908	18 5% 3W	181234	3W018
# R1952, 53	3.3 5% 1/4W	829A33	QW3D3
R2704	1000 2% 1/10W SMT	197638	-
R2705	1000 2% 1/10W SMT	197638	-
	1500 2% 1/10W SMT	197628	-
# R2709	27K 5% 1/2W	206037	HW327
R2728	470K 2% 1/10W SMT	205381	-
R2729	240K 2% 1/8W SMT	215687	-
R2732	1000 1% 1/4W	179753	-
R2801	15K 1% 1/10W SMT	215498	-
R2802	15.4K 1% 1/10W SMT	217310	-
R3317	330K 2% 1/10W SMT	-	-
	360 5% 1/10W SMT	205337	-
R3343	5100 2% 1/4W	175417	QW251
# R4001	2.7 10% 15W Wirewound	190487	-
# R4002	2.7M 10% 1/2W	217662	HW527
# R4135	27 2% 1/2W	830027	HW027
R4303	5100 2% 1/4W	175417	HW251
R4305	6200 5% 3W	179252	3W262
# R4401	15K 5% 1W	190557	1W315
# R4403	820 5% 1W	175349	1W182
# R4507	1.5 5% 1W	178619	1W1D5
# R4511	1 10% 2W Wirewound	215577	-
# R4701	10 10% 1/2W	830010	HW010
	10 2% 1/2W Nonflammable	-	HW010
# R4702	3.9 5% 2W Wirewound	218370	-
# R4703	3 5% 3W Wirewound	215212	-
# R4704	82K 5% 1/2W	830382	HW382
# R4901	100 5% 1/4W	829110	QW110
# R4902	28K 1% 1/4W	195731	-
# R4903	39.2K 1% 1/4W	190469	-
# R4904	10K 5% 1/4W	175317	QW310
# R4905	5100 2% 1/4W	175417	QW251
R7401	191K 1% 1/10W SMT	215214	-
R7408	37.4K 1% 1/10W SMT	215215	-
R7411	1M 1% 1/10W SMT	215216	-
R7501, 02, 03	10K 1% 1/10W SMT	215217	-
R7504, 05, 06	26.1K 1% 1/8W SMT	215218	-
R7507	14.3K 1% 1/10W SMT	215219	-
R7508	453 1% 1/8W SMT	217317	-
R7509	15.8K 1% 1/10W SMT	215199	-
R7510	100K 1% 1/10W SMT	215221	-
R7512	15.8K 1% 1/4W	181121	-
R7513	100K 1% 1/10W SMT	215221	-
R7515	15.8K 1% 1/4W	181121	-
R7516	100K 1% 1/10W SMT	215221	-
RN4501	Resistor Network	215499	-
# RT4201	5.2 PTC Cold	207768	-
# For SAFETY use only equivalent replacement part.			



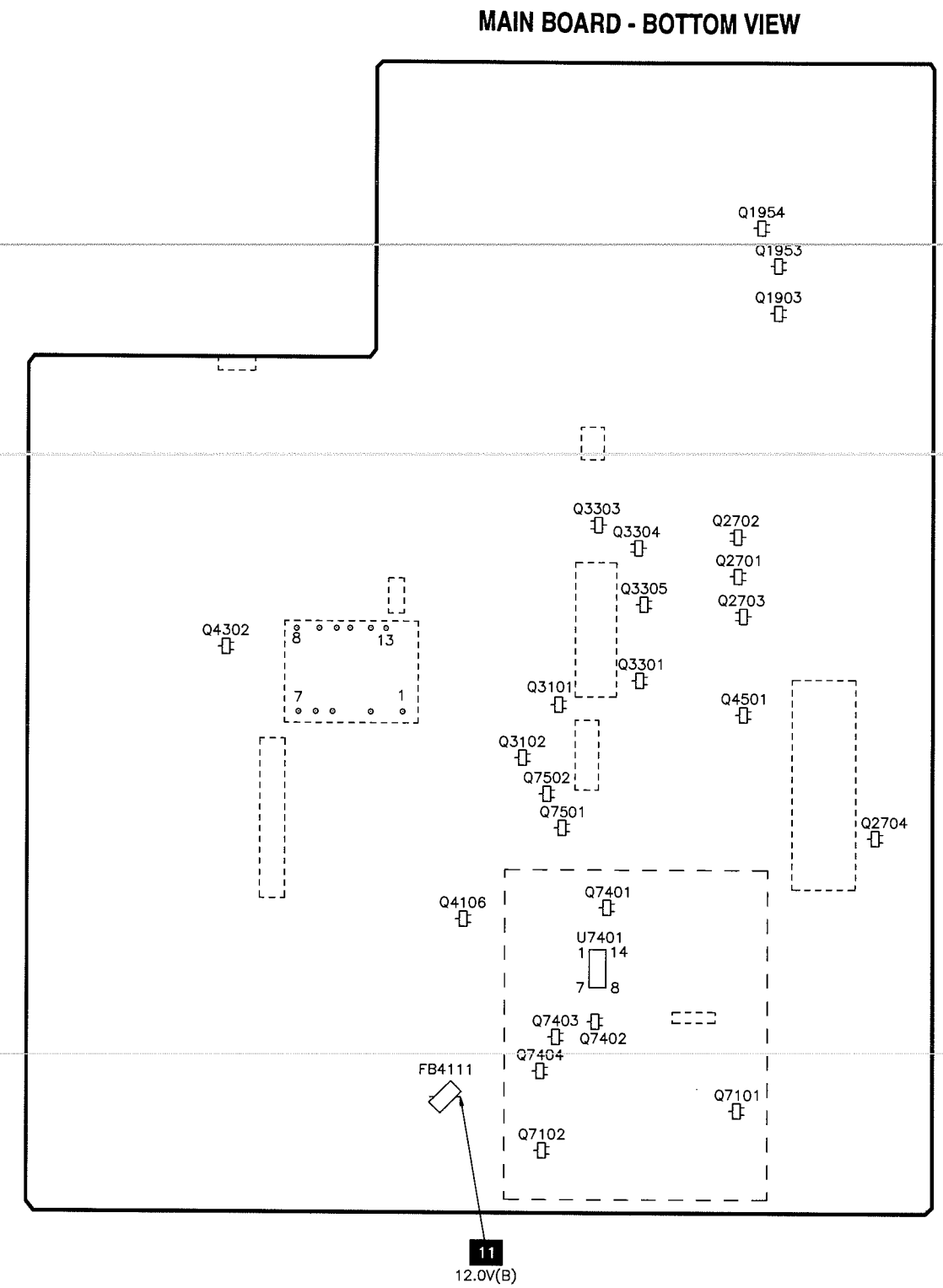
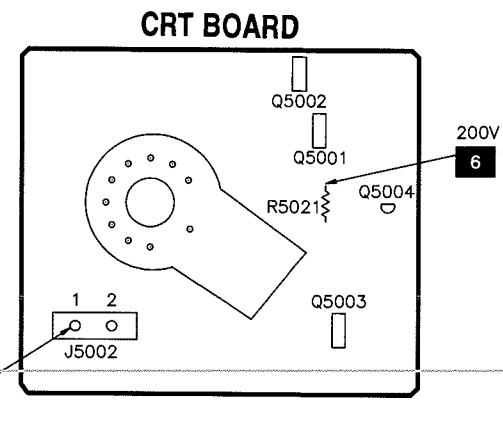
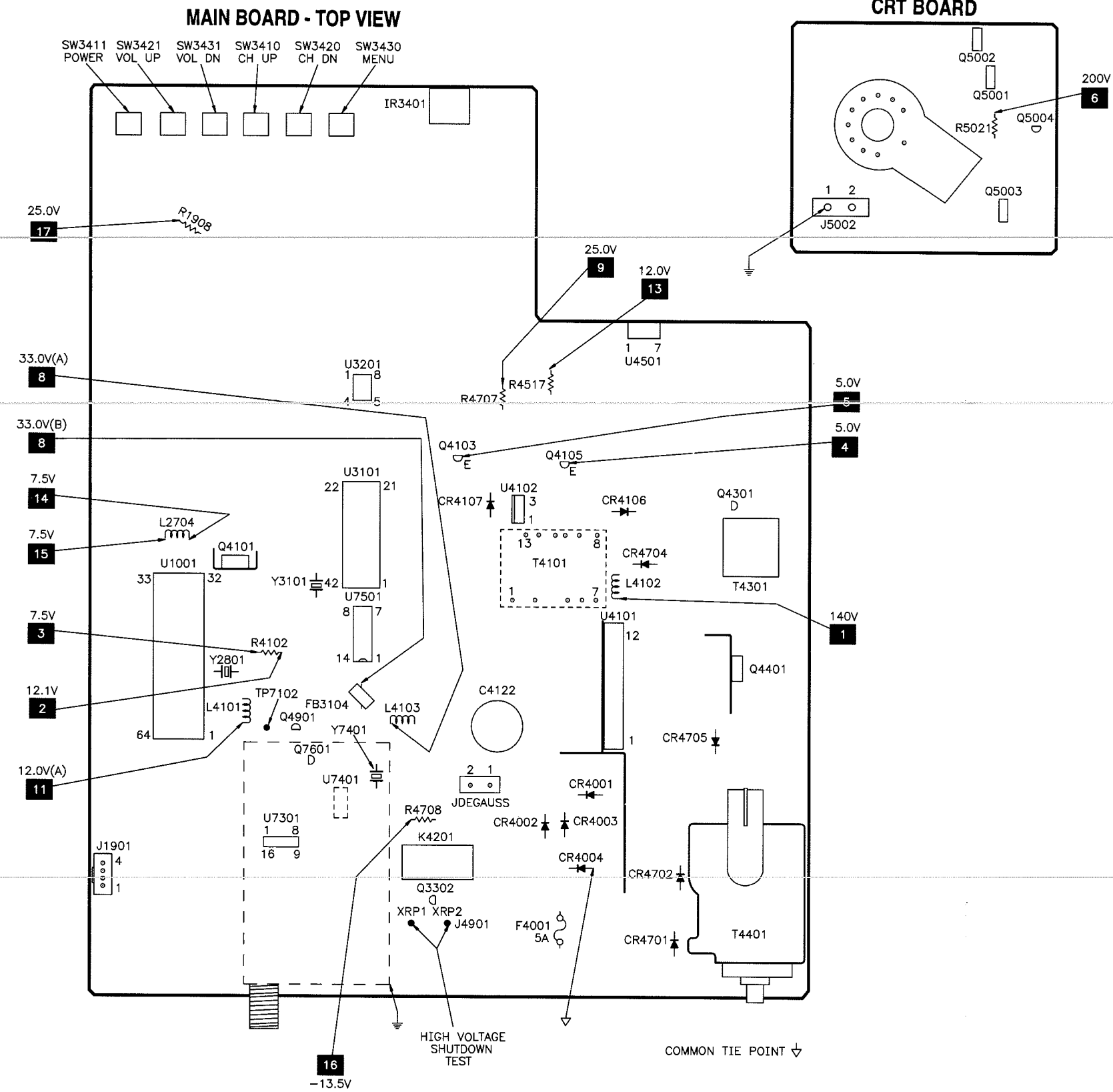
MAIN BOARD - BOTTOM VIEW



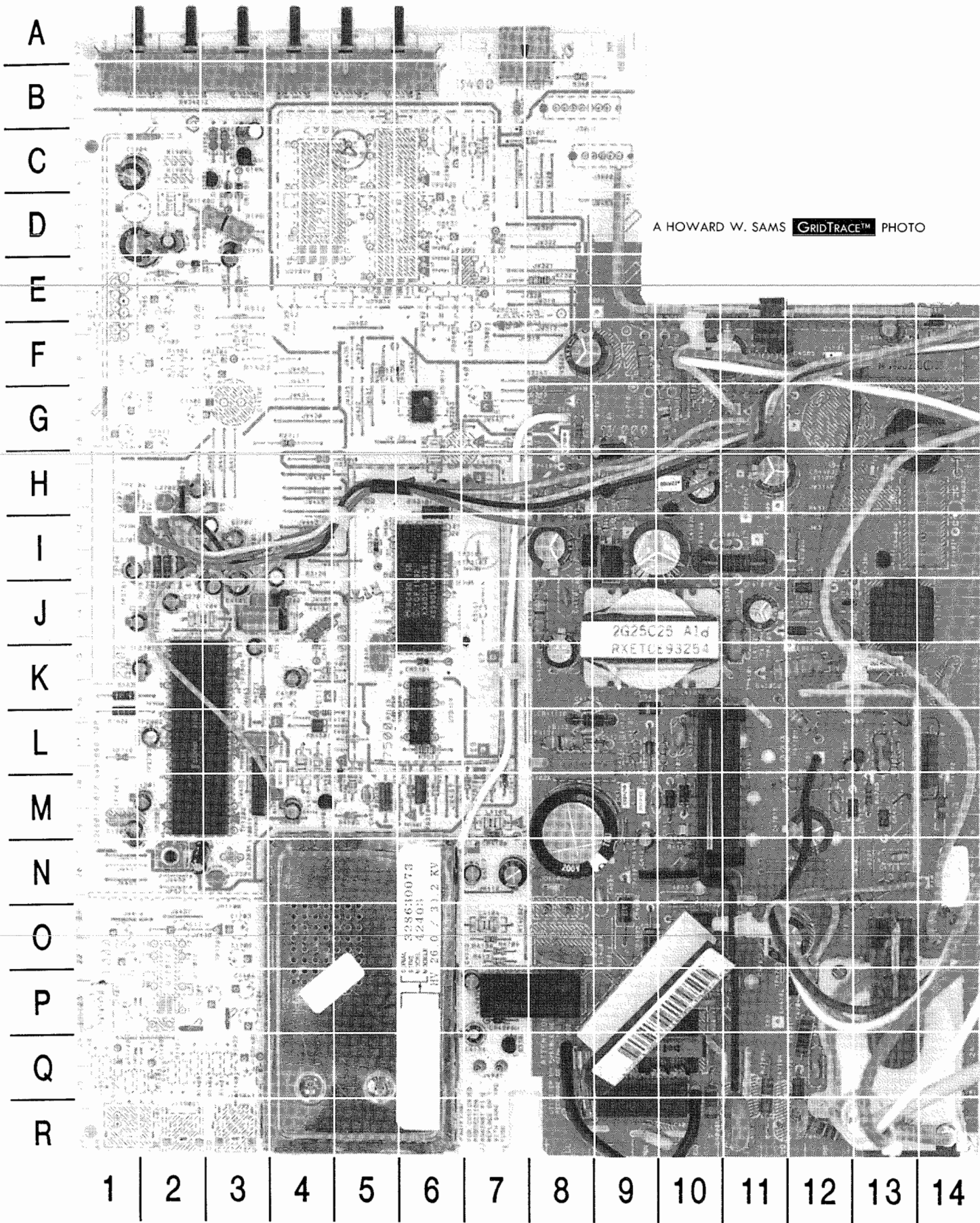
MAIN BOARD - BOTTOM VIEW, GRIDTRACE LOCATION GUIDE

C1202	M-13	C4501	I-12	R2804	K-13	R4136	M-5
C1203	O-12	C4503	I-12	R2805	K-14	R4201	P-8
C1204	N-12	C4507	E-4	R2806	K-13	R4301	K-12
C1716	L-12	C4903	K-12	R3101	I-8	R4302	K-11
C1908	C-13	C4904	L-11	R3103	I-8	R4304	H-3
C1952	C-12	C7122	K-8	R3104	I-8	R4307	K-11
C1954	C-12	C7124	J-8	R3105	I-9	R4308	J-12
C2301	L-12	C7501	J-9	R3106	J-8	R4309	H-2
C2302	L-12	C7505	L-10	R3109	H-10	R4310	I-12
C2307	K-13	C7506	K-10	R3111	H-8	R4311	J-12
C2308	L-13	C7507	K-8	R3112	H-8	R4314	F-10
C2309	M-12	CR3102	J-8	R3114	H-9	R4516	D-7
C2312	M-13	CR3302	H-9	R3115	H-9	R4520	J-11
C2313	L-13	CR7101	J-9	R3118	J-8	R4801	K-12
C2718	J-10	Q1903	D-13	R3119	J-8	R7129	K-8
C2722	P-12	Q1953	C-12	R3120	J-9	R7132	K-8
C2723	P-14	Q1954	C-12	R3124	J-8	R7314	K-8
C2802	K-13	Q2701	G-12	R3125	I-8	R7501	K-9
C2803	K-12	Q2702	G-12	R3129	K-9	R7502	J-9
C2804	P-14	Q2703	H-12	R3130	J-9	R7503	K-9
C2805	H-12	Q2704	L-14	R3131	J-9	R7513	K-10
C2806	H-12	Q3101	J-8	R3132	K-8	R7514	K-10
C3101	H-8	Q3102	K-8	R3133	K-8	R7516	J-10
C3102	H-8	Q3301	I-10	R3134	H-9	R7517	K-10
C3103	I-8	Q3303	G-9	R3135	H-8	R7523	K-10
C3104	I-8	Q3304	G-10	R3137	J-10	R7524	J-10
C3106	I-8	Q3305	H-10	R3139	J-8		
C3107	J-8	Q4106	L-8	R3140	H-8		
C3109	I-8	Q4302	H-3	R3145	K-9		
C3110	H-8	Q7501	K-9	R3201	F-9		
C3112	H-9	Q7502	K-8	R3202	F-9		
C3113	J-8	R1201	L-14	R3204	F-9		
C3114	J-9	R1202	M-12	R3301	J-9		
C3115	J-9	R1419	F-12	R3302	I-9		
C3122	K-8	R1427	M-12	R3303	J-10		
C3123	H-10	R1902	F-13	R3304	G-10		
C3125	H-9	R1951	D-12	R3305	H-9		
C3126	K-8	R1954	B-12	R3306	H-9		
C3201	F-9	R1955	B-12	R3310	H-8		
C3301	L-12	R1956	C-12	R3311	H-10		
C3303	K-8	R1957	C-12	R3314	F-10		
C3306	G-8	R1961	D-12	R3316	H-9		
C3307	G-10	R2301	L-11	R3317	G-11		
C3310	I-9	R2312	K-12	R3318	H-8		
C3311	G-9	R2313	L-11	R3319	G-11		
C3312	I-8	R2314	L-12	R3320	G-9		
C3313	G-8	R2315	L-11	R3321	G-11		
C3314	G-9	R2316	L-12	R3322	G-10		
C3316	H-9	R2702	J-11	R3323	G-10		
C3317	C-7	R2703	H-12	R3324	H-10		
C3401	A-8	R2704	L-13	R3325	H-9		
C4103	L-5	R2705	L-13	R3326	G-9		
C4111	G-6	R2712	H-12	R3327	H-9		
C4114	G-4	R2713	G-11	R3328	H-10		
C4119	N-8	R2714	G-12	R3330	J-13		
C4120	J-12	R2715	G-12	R3331	J-10		
C4121	J-12	R2716	H-12	R4101	I-11		
C4133	K-11	R2717	H-11	R4108	F-7		
C4134	I-13	R2721	M-13	R4109	K-12		
C4201	P-8	R2726	I-13	R4112	G-6		
C4302	H-3	R2728	H-13	R4119	I-11		
C4303	H-2	R2729	H-13	R4127	J-12		
C4308	J-12	R2731	J-12	R4129	L-5		
C4309	H-3	R2801	H-12	R4132	L-8		
C4311	J-13	R2802	H-12	R4133	J-12		
C4401	K-2	R2803	K-11	R4134	K-11		

PLACEMENT CHART



MAIN BOARD - TOP VIEW



MAIN BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE							
C1201	M-2	C4506	F-11	L2703	H-1	R4306	J-13
C1205	M-1	C4701	M-12	L2704	J-2	R4312	F-5
C1909	D-2	C4702	Q-12	L3101	H-7	R4401	F-14
C1910	D-2	C4703	O-11	L3102	H-6	R4402	L-13
C1951	D-3	C4704	P-12	L4001	Q-10	R4403	G-14
C1953	C-3	C4705	H-11	L4101	L-4	R4501	F-10
C2306	M-4	C4706	J-12	L4102	J-11	R4502	F-9
C2311	N-2	C4708	N-13	L4103	M-7	R4507	G-11
C2701	L-2	C4709	L-13	L4401	L-13	R4511	G-10
C2702	I-3	C4710	R-12	L4402	G-14	R4517	G-10
C2703	J-2	C4901	H-8	P101	R-7	R4519	F-10
C2704	I-3	C4902	G-8	Q1951	C-3	R4523	K-3
C2705	I-3	C4905	M-5	Q1952	C-3	R4701	Q-12
C2706	K-3	CF1201	M-1	Q3302	Q-7	R4702	I-12
C2707	J-2	CR1951	C-3	Q4101	J-3	R4703	N-13
C2708	I-1	CR1952	C-3	Q4103	H-9	R4704	R-12
C2709	K-2	CR1953	E-2	Q4105	H-10	R4705	M-13
C2713	J-3	CR2702	J-4	Q4301	I-13	R4708	O-7
C2724	H-2	CR3101	K-6	Q4401	L-14	R4901	G-8
C3315	H-6	CR3301	I-5	Q4901	M-4	R4902	M-5
C4001	Q-9	CR4001	O-10	R1425	K-1	R4903	L-4
C4003	N-10	CR4002	O-9	R1426	L-1	R4904	K-4
C4004	N-9	CR4003	O-9	R1914	E-2	R4905	M-5
C4006	R-9	CR4004	P-10	R1915	E-2	R4906	L-5
C4007	M-8	CR4101	K-4	R1916	E-3	R4907	L-4
C4008	R-11	CR4102	M-10	R1952	C-3	R7512	L-6
C4009	O-10	CR4103	H-8	R1953	C-3	R7515	L-5
C4010	P-10	CR4104	G-9	R1958	D-3	R7518	M-6
C4101	J-3	CR4106	I-11	R1959	E-3	R7519	M-6
C4104	H-10	CR4107	I-8	R1960	D-2	R7520	M-7
C4105	J-11	CR4108	M-7	R2706	I-2	R7525	M-6
C4107	I-10	CR4109	L-9	R2707	I-2	RN4501	F-10
C4108	I-8	CR4111	M-10	R2708	I-2	RT4201	O-8
C4109	I-11	CR4112	L-9	R2709	Q-11	SF2301	M-3
C4110	H-9	CR4113	M-13	R2711	G-4	SW3410	A-4
C4112	H-10	CR4201	P-7	R2718	L-1	SW3411	A-2
C4116	M-4	CR4302	F-6	R2732	E-8	SW3420	A-5
C4117	N-7	CR4303	J-12	R2733	I-2	SW3421	A-2
C4118	H-9	CR4401	E-14	R3102	C-8	SW3430	A-6
C4122	L-8	CR4501	G-11	R3143	I-4	SW3431	A-3
C4123	N-9	CR4701	Q-12	R3203	G-6	T4301	J-13
C4124	M-9	CR4702	P-12	R3315	G-8	T4401	P-13
C4125	N-7	CR4704	J-12	R3329	H-4	TP7102	M-4
C4126	L-10	CR4705	M-13	R3332	M-7	U1001	L-2
C4127	M-9	CR4901	H-8	R3343	G-8	U3101	J-6
C4128	L-8	CR4902	M-5	R3401	B-7	U3201	G-6
C4129	I-4	F4001	Q-8	R3402	B-8	U4101	M-11
C4130	K-8	FB3101	H-6	R4001	P-9	U4102	I-9
C4131	M-12	FB3103	M-5	R4002	R-10	U4501	F-11
C4135	K-8	FB3104	M-6	R4102	L-4	U7501	K-6
C4136	M-9	FB4102	K-9	R4103	I-8	XRP1	Q-7
C4137	J-11	FB4106	I-10	R4104	N-9	XRP2	Q-7
C4138	Q-7	FB4107	I-11	R4105	M-10	Y3101	K-5
C4304	I-13	FB4108	I-8	R4106	J-4		
C4305	J-12	FB4109	I-8	R4107	J-8		
C4306	K-13	FB4401	M-14	R4110	L-12		
C4307	K-4	FB4501	L-4	R4111	I-9		
C4310	J-12	IR3401	A-7	R4113	M-12		
C4402	H-14	J-DEGAUS	O-8	R4122	L-9		
C4403	F-13	J1901	P-1	R4124	M-10		
C4404	F-13	J4901	Q-7	R4125	L-9		
C4405	G-14	K4201	P-7	R4126	L-8		
C4406	K-14	L2302	N-2	R4128	N-10		
C4502	F-8	L2304	N-3	R4135	L-10		
C4504	F-12	L2701	I-2	R4303	G-8		
C4505	F-12	L2702	H-2	R4305	K-12		