SAFETY PRECAUTIONS

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.

SAFETY CHECKS – FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

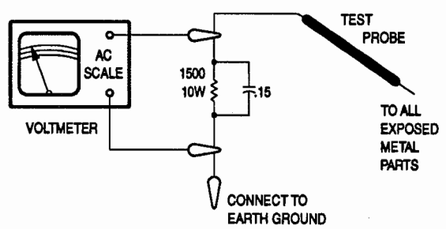
Unplug the AC cord, connect a jumper across the plug prongs, and turn the power switch on (if applicable). Use an ohmmeter to measure the resistance between the jumped AC plug and any exposed metal cabinet parts such as antenna screw heads, control shafts, or handle brackets. Exposed metal parts with 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.



TEST JIG HOOKUP

Function	Chek-A-Color Adapter No.	PC Board Plug No.	Pin	Color
CRT	B239	J500	1, 2	Red
Yoke	D4137	J500	3, 4	Blue
Yoke Setting	YP1A	J550	1	Green
Comments	Focus Tap	J550	2	Yellow

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MODEL CC2546P102 (CHASSIS 25E510-00AA)

CROSLEY

PHOTOFACT® Technical Service Data

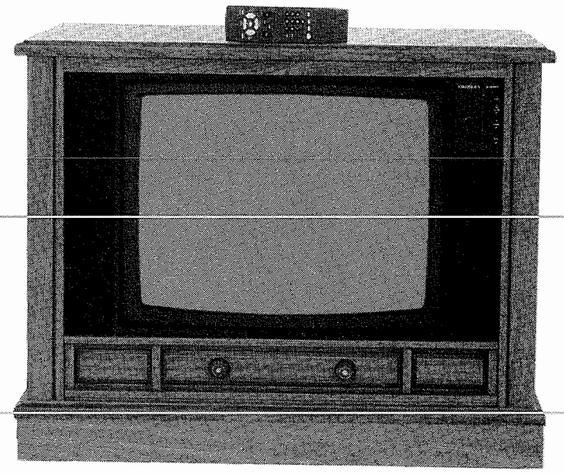
SET 3527

INDEX

For Supplier Address,
See PHOTOFACT Annual Index

CROSLEY

Model CC2546P102 (Chassis 25E510-00AA)



Complete coverage for servicing a television receiver...

- Schematics
- Parts list
- Component locations
- Troubleshooting guide

Coverage includes these additional models and chassis:

MODEL	CHASSIS
CC2546P101	25E510-00AA
CC2547A101	25E510-00AA

HOWARD W. SAMS & COMPANY

AUGUST 1995 SET 3527

3527

POWER SUPPLY SCHEMATIC

P1 120VAC 335mA POLARIZED
F400 4A
ACH
ACN
L400
C400 .22 250VAC
PRINTED SPARK GAP
PRINTED SPARK GAP
R401 4.7M
P/J401 2
L499 DEGAUSSING
P/J401 1
R400 10.1 COLD PTC
R403 1.5 10W
C401 .001 500V
C403 .001 500V
D431
D432
D433
D434
C402 .001 500V
C404 .001 500V
149V
C405 680µF 200V
F401 2.5A
P/J410 1
P/J410 2
R448 47 10W
IC410 STR30130 130V REGULATOR
3 149V
0V 5
NC
1
132V 2
130V 4
R466 47
870
K400 DEGAUSSING
17 26.3V
5.4V 5ms
R405 220K
R438 680K
R423 4700
R422 4700
R424 220K
R431 47
C431 3.3µF 200V
Q420 START UP SWITCH
136V
135V
135V
D421
R432 1000
R436 470K
Z405 16.0V
Q402 SWITCH
.3V
120V
SEE IC345 PIN 46 PAGE 2F
R412 100K
R406 47K
R402 27K
Z402 33V
SEE IC345 PIN 16 PAGE 2E
Q403 STANDBY SWITCH
R408 100
7.6V
130V
8.5V
BC548C STANDBY SWITCH
Q404 PROTECTOR
7.8V
8.3V
D415
D416
TIP47
Q400 REGULATOR
138V
131V
D413
R437 4.7
D410 1N5062
D411 1N5062
R411 100
R409 120K
R404 1000
C406 100µF
C432 100µF 200V
1 130V SOURCE
C470 47µF
2 9.0V SOURCE
STANDBY
Q410 REGULATOR
5.4V
6.0V
R416 100
R417 6.8
3 5.0V SOURCE
L417
4 5.0V SOURCE
R305 22 (10)
L418
5 5.0V SOURCE
L315
6 5.0V SOURCE
Z406 6.2V
C415 100µF
C316 .022
C315 .022
7 14.0V SOURCE
C419 2200µF
C459 .01
R488 6.2
R468 1
P/J650 5
P/J51 1
R28 100
8 14.0V SOURCE
C24 100pF 500V
C28 1000µF
D405
D630
9 13.5V SOURCE
D629
10 13.0V SOURCE
R645 1M
R419 1
R459 100 2W
P/J40 1
11 13.5V SOURCE
C42 1000µF
Q462 9V REGULATOR
14.0V
10.1V
12 9.5V SOURCE
R462 330 (470)
Z462 10.0V
R470 4.3
13 9.2V SOURCE
C204 100µF
C462 330µF
C463 .01
C205 .022
C611 .01
Q463 5V REGULATOR
14.0V
5.8V
14 5.6V SOURCE
R463 1500
C465 .001
Z463 6.2V
R464 68 1W
Q461 5V REGULATOR
12.1V
5.7V
15 5.0V SOURCE
C365 100µF
R461 1000
Z461 5.6V

C417 .001
500V
D409
R420 .51
SEE T501 PAGE 2C
255V 10µs
140V 10µs
230V 10µs
130V 10µs
PART OF T501
7
3
4
11
2
6
.5
.3
.5
.8
.4
C31 .0022
500V
D30
R30 51
R421 1
P/J4 1
P/J9 2
P/J4 2
P/J9 1
L30
29
30
C32 220µF
Z30 12.0V
C30 220µF
16 12.0V△ SOURCE
C445 .001
500V
D445
R445 1
17 26.3V SOURCE
C447 1000µF
C460 .001
500V
D460
R460 2.2
C461 22µF 250V
R480 330K
P/J603 1
P/J52 4
R22 100
C23 .022 400V
L21
19 200V SOURCE
C475 .001
500V
D475
R475 .51
R231 2.2 3W
C235 .1 100V
R229 300K
C231 2200µF
P/J250 4
P/J210 1
20 13.0V(A) SOURCE
C760 220µF
20 13.0V(B) SOURCE
R704 75
Z700 9.1V
C717 .1
C703 100µF
21 9.2V SOURCE

△ TAKEN FROM COMMON TIE POINT

VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

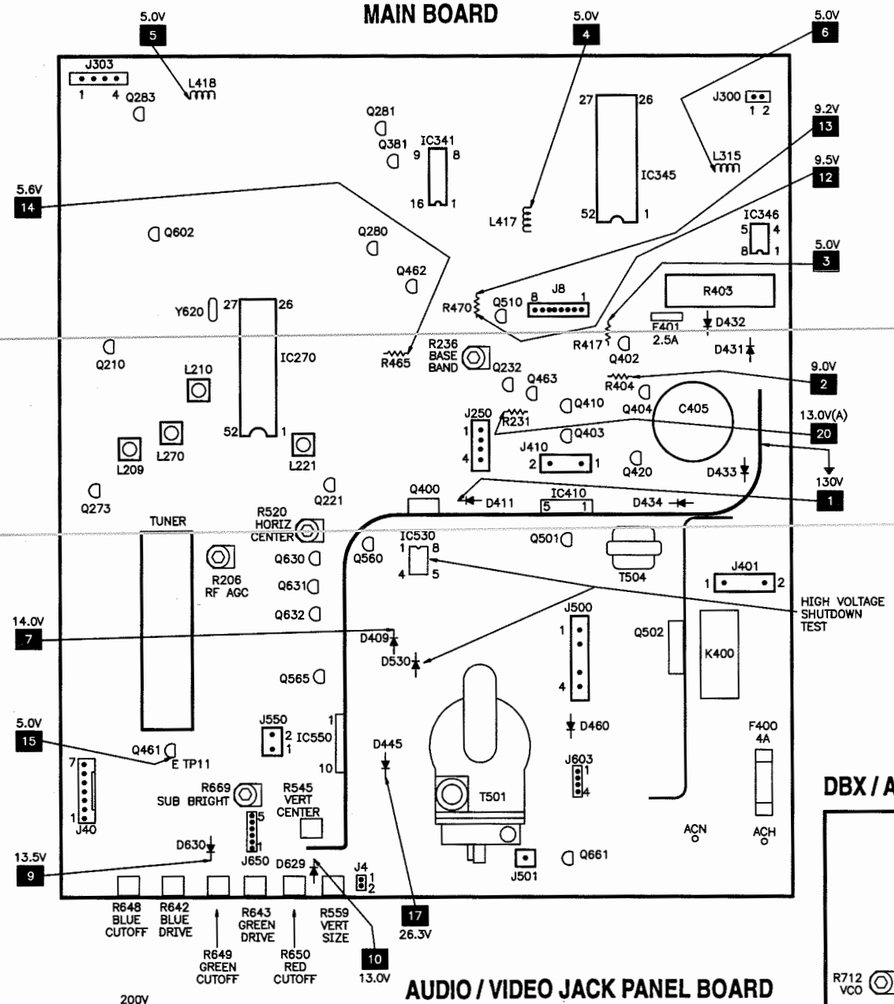
A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

CROSLEY MODEL CC2546P102 (CHASSIS 25E510-00AA)

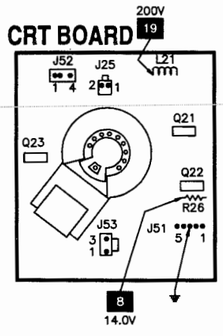
G H

PLACEMENT CHART

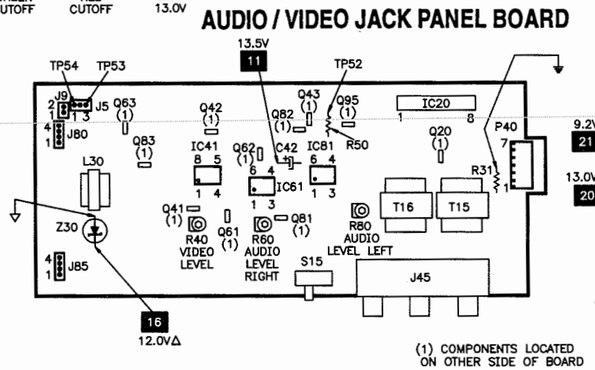
MAIN BOARD



CRT BOARD



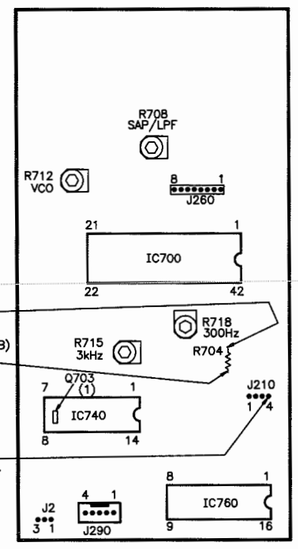
AUDIO / VIDEO JACK PANEL BOARD



(1) COMPONENTS LOCATED ON OTHER SIDE OF BOARD

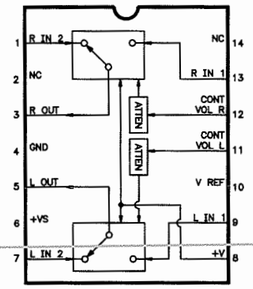
Δ TAKEN FROM COMMON TIE POINT

DBX / AVL STEREO BOARD

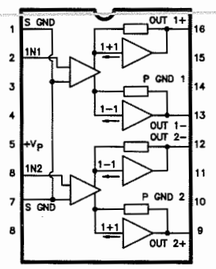


IC FUNCTIONS

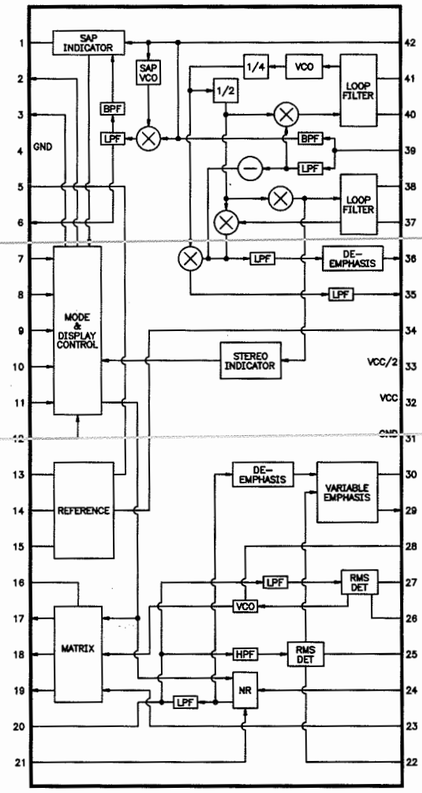
IC740
TDA8198



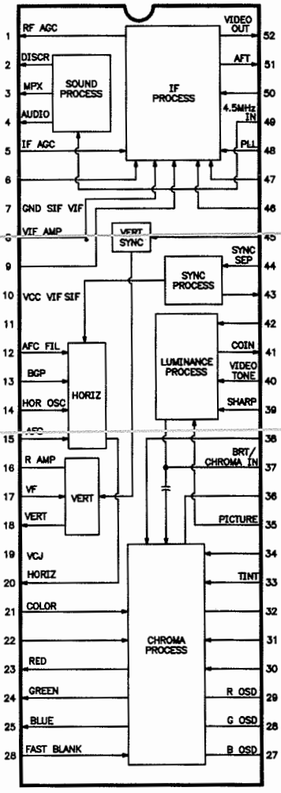
IC760
TDA7053



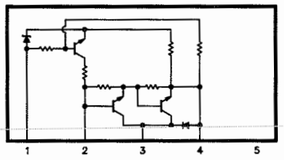
IC700
CXA1124BS



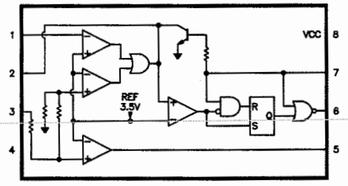
IC270
M52030ASP



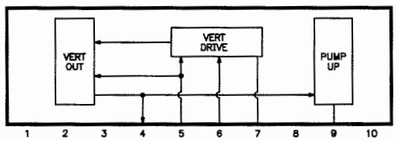
IC410
STR30130



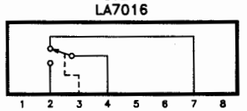
IC530
SC78130U



IC550
LA7831



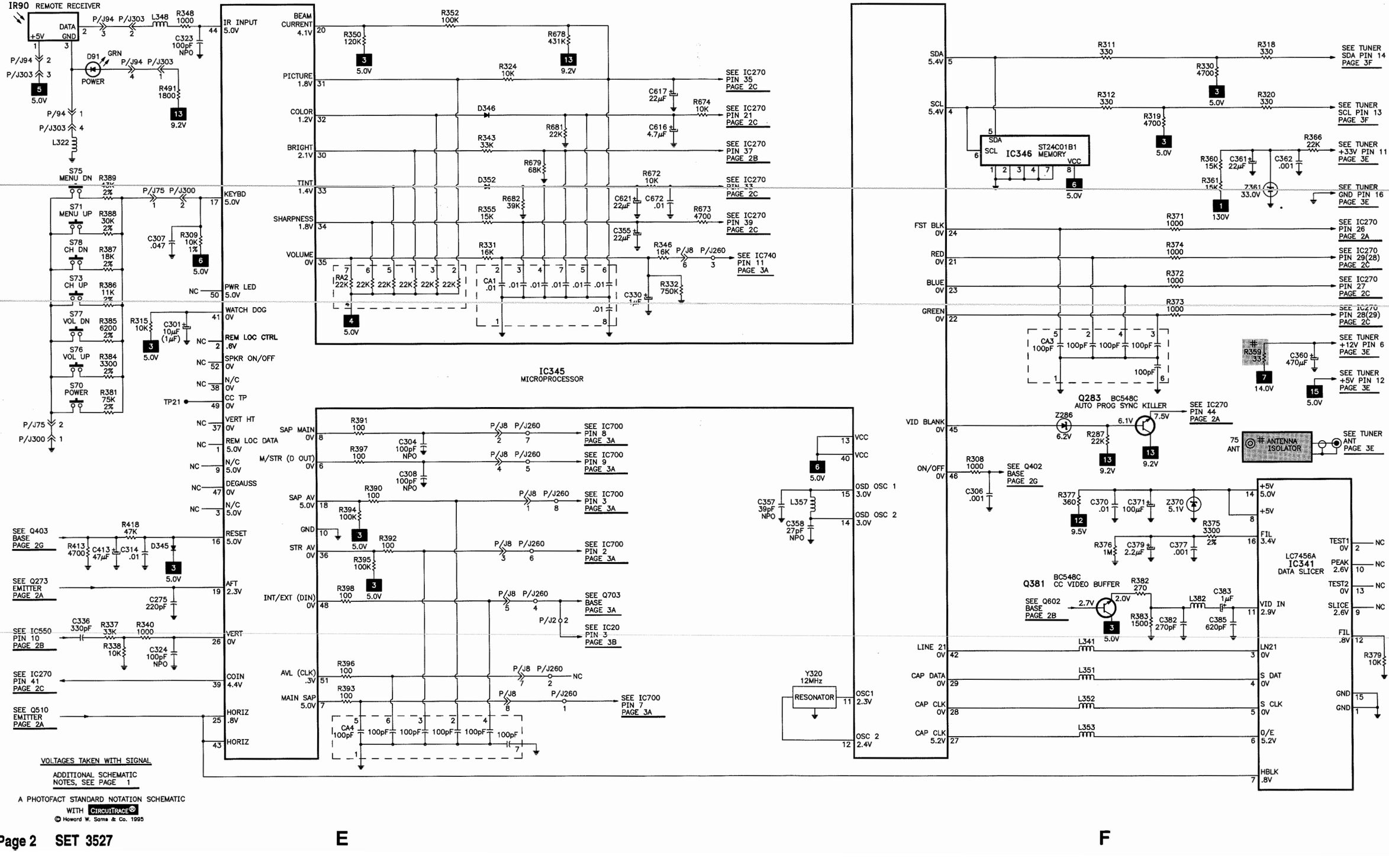
IC20
LA7016



CROSLEY

MODEL CC2546P102 (CHASSIS 25E510-00AA)

SYSTEM CONTROL SCHEMATIC



E

F

MISCELLANEOUS ADJUSTMENTS

RF AGC

Tune in a medium strength station. Rotate R206 clockwise until snow appears, then back to a point where snow just disappears.

HORIZONTAL CENTERING

Tune in a picture. Adjust R520 for best horizontal centering.

SUB BRIGHTNESS

Tune in an active station. Set color and picture settings to minimum. Set brightness to midrange. Adjust R669 for just visible highlights.

VIDEO INPUT

Inject a 1.0V p-p video signal into the video input jack. Connect an oscilloscope to TP52. Adjust R40 for 2.0V p-p.

RIGHT AUDIO INPUT

Inject a 1.0V p-p 1kHz audio signal into the right audio jack. Connect an oscilloscope to TP53. Adjust R60 for 1.5V p-p.

LEFT AUDIO INPUT

Inject a 1.0V p-p 1kHz audio signal into the left audio jack. Connect oscilloscope to TP54. Adjust R80 for 1.5V p-p.

COLOR PURITY

Operate the receiver for 15 minutes. Use a degaussing coil to demagnetize the CRT and mounting hardware. Position the convergence/purity assembly with the 2Y pole rings over the gun element gap nearest the CRT bell gap (between G2 and G3). Turn R649 fully clockwise and R643 fully counterclockwise. Loosen the yoke and remove the yoke wedges. Slide the yoke against the bell of the CRT and tighten the clamp enough to hold the yoke in position. Tune in a single-cross pattern and adjust the 2Y pole rings for parallel red and blue lines, as centered and overlapped as possible. Tune in a white screen. Turn R650, R648, and R643 controls fully clockwise, and R649 and R642 controls fully counterclockwise. Spread the 2X pole rings for a centered green area. Move the yoke back for best green purity and tighten the yoke clamp just enough to hold the yoke in position. Perform convergence adjustment.

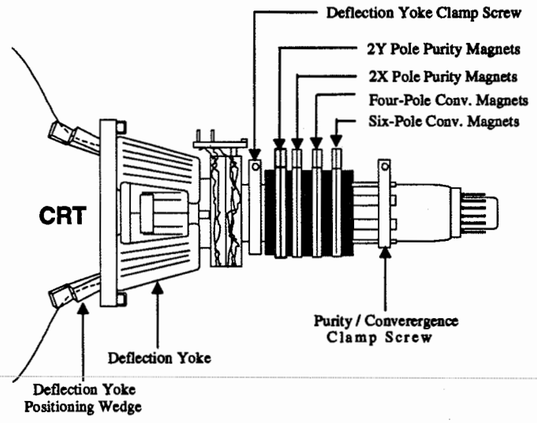
COLOR TEMPERATURE

Disconnect the antenna. Set the brightness, sharpness, tint, and picture to midrange. Set R642 and R643 to midrange. Set R648, R649, and R650 to minimum. Disconnect the vertical yoke connector. Adjust the screen control for a dim line of one dominant color. Adjust the two remaining cutoff controls for a white line. Reconnect the vertical yoke connector. Tune in a black and white signal. Adjust drives for best black and white at high and low brightness.

CONVERGENCE

Operate the receiver for fifteen minutes. Set R642, R643, R648, R649, and R650 to midrange. Tune in a dot pattern. Adjust the 4 pole magnet tabs to converge the red and blue dots at the center of the screen. Adjust the 6 pole magnet tabs to converge the red/blue dots with the green dots at the center of the screen. Spread the two tabs of each set of magnets equally and opposite to converge vertically, and rotate both tabs in the same direction to converge horizontally. The 4 and 6 pole magnets interact, repeat adjustment until center convergence is correct. Tune in a crosshatch pattern. Remove the rubber wedges between the deflection yoke and the CRT. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen, and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke right or left to converge the horizontal lines at the top and bottom of the screen, and vertical lines at the right and left sides of the screen. Repeat convergence procedure as necessary to obtain best overall convergence.

CRT NECK ASSEMBLY



TEST MODE SERVICE INFORMATION

NOTE: To perform all test mode functions, a prior year 23 or 25 push-button "stick" transmitter, UR14, T251, or a NAP universal remote transmitter may be used.

To enter test mode, turn the receiver on, then enter 0, 6, 2, 5, 9, 6, and press menu button on the receiver, without allowing time out between key entries. The two line screen display indicates circuit and register information as follows.

Top left; 2988-3 indicates the software version of the microprocessor in use.

Top right; E indicates the failure of a functional part of the system. Error codes will be displayed only if the function is not operating properly or the receiver does not include a particular feature. A = tuner, B = memory, C = remote locator, D = automatic volume level, and E = color PIP.

Bottom left; channel number.

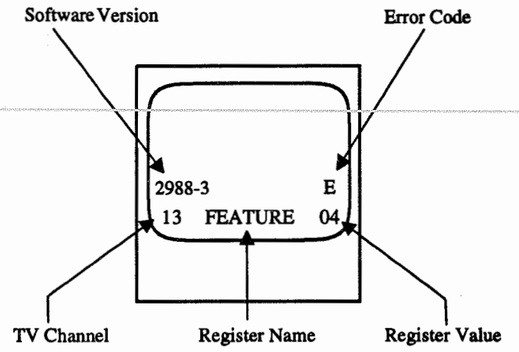
Bottom middle; name of current register.

Bottom right; register value in hexadecimal.

To access a register press menu button on remote transmitter until the desired register appears on screen. Change the value of a selected register by pressing the + or - keys. Depressing the "Status/Exit" key on the remote transmitter the runtimer will be displayed in hexadecimal format in the upper left hand corner of the screen. Depressing the "Personal Preference" key on the transmitter will reset all register values to the factory position (if used). Store the register value by turning the receiver off with the power switch on the cabinet, not on the remote transmitter. To exit the service test mode press the power button on the receiver.

See table below for register information.

Register	Factory Value
FEATURE	04
BRIGHT	1F
PICTURE	1F
COLOR	1F
TINT	1F
SHARP	1F
OSD	15
PIP COLOR	1F
PIP TINT	1F
VOL INC	08



STEREO ADJUSTMENTS

NOTE: Adjustments made using a MTS TV / stereo generator connected to antenna terminals.

BASEBAND LEVEL

Select pilot, 1kHz audio frequency, and L+R modulating signal. Connect one channel of a dual trace oscilloscope to pin 17 of IC700 and the other channel to pin 18 of IC700. Connect both probe grounds to pin 31 of IC700. Set oscilloscope time div. to 1ms, volts to .2V, and select the add A+B function. Adjust R236 for .7V p-p.

STEREO VCO

Select stereo mode on receiver. Select pilot, 1kHz audio frequency, and L+R modulating signal. Connect oscilloscope to pin 2 of IC700. Adjust R712 fully counterclockwise and turn slowly clockwise until voltage level goes low. Mark the control at this position. Adjust R712 fully clockwise and turn slowly counterclockwise until voltage level goes low. Mark the control at this position. Set R712 to the center of the marks.

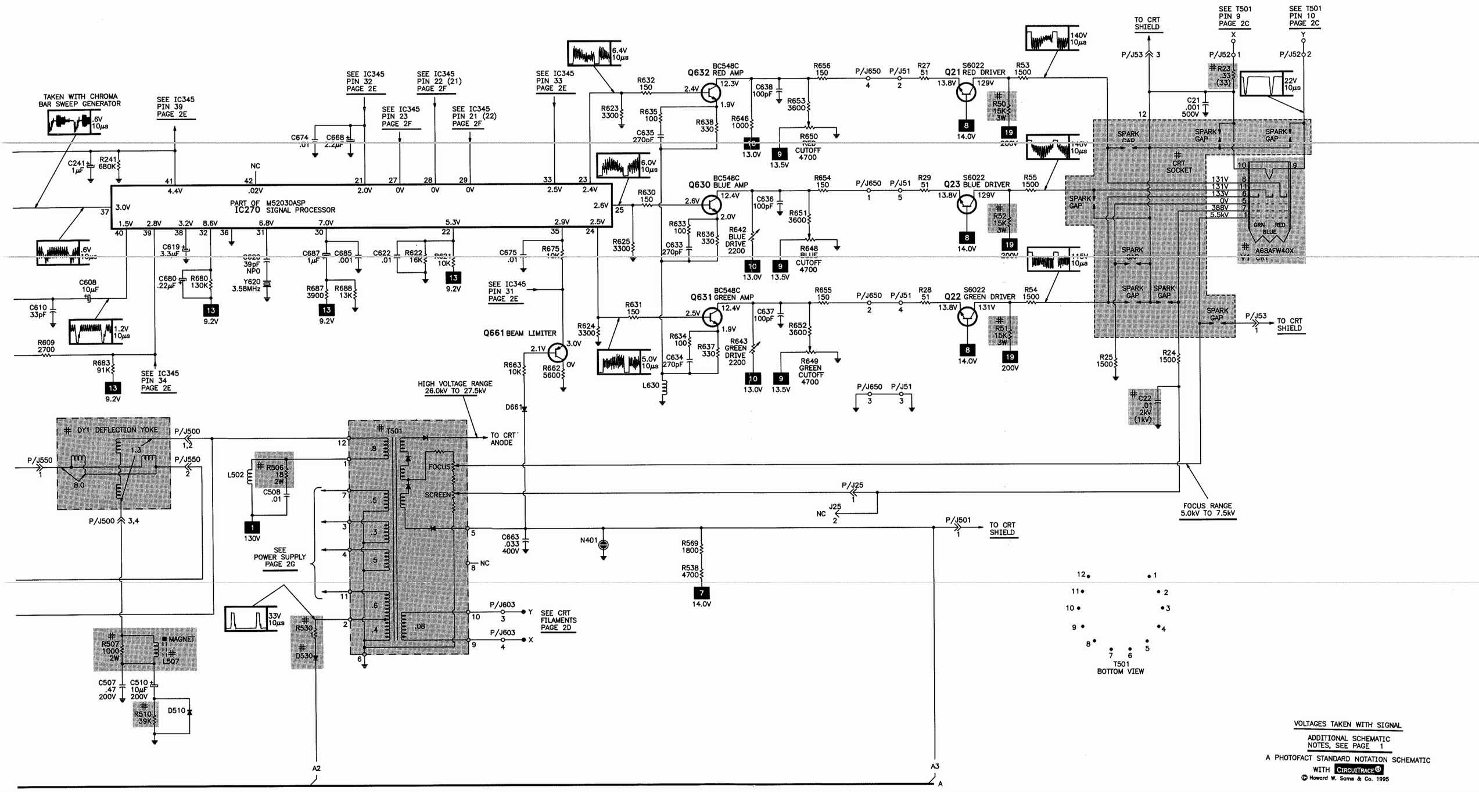
SAP FILTER

Select SAP mode on the receiver. Select SAP, 1kHz audio frequency, and L-R modulating signal. Connect an oscilloscope to pin 21 of IC700. Adjust R708 for maximum amplitude of the waveform.

SEPARATION

Select stereo mode on receiver. Select pilot, 300Hz audio frequency, and left modulating signal. Connect an oscilloscope to pin 17 of IC700 and adjust R718 for minimum amplitude of waveform. Set audio frequency to 8kHz and adjust R715 for minimum amplitude of waveform. Repeat until no further decrease in amplitude can be obtained.

TELEVISION SCHEMATIC continued



VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

TROUBLESHOOTING

POWER SUPPLY

Check F400. If fuse is open, check D431 thru D434, R401, R403, and C400 thru C405. Check F401. If fuse is open, check IC410, Q400, and Q502. Apply 120VAC, with receiver off, check for 8.5V at emitter of Q403. If the voltage is missing, check Q403, Q404, R411, R408, and Z402. Check for 16.0V at pin 4 of IC410, turn the receiver on and check for 130V at the same pin. If voltage is missing, check Q402, Q420, and Z405. Check for 5.4V at the emitter of Q410. If voltage is missing, check Q410 and Z406. Check for 130V at the emitter of Q400. If voltage is missing, check for 132V at pin 2 of IC410 and check Q400 and IC410. Check for 8.5V at the collector of Q410. If voltage is missing, check Q462 and Z462, and refer to the "Horizontal" section of this Troubleshooting guide.

HIGH VOLTAGE SHUTDOWN TEST

Connect a jumper between the cathode of D530, and pin 3 of IC530. The receiver should lose horizontal sync. If receiver fails to lose horizontal sync, the high voltage shutdown circuit needs repaired.

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 the high voltage while troubleshooting.

The high voltage from T501 is monitored and rectified by D530. Should the high voltage increase, the output to IC530 will increase and supply a voltage that is above 6.0V to pin 12 of IC270. The horizontal oscillator will change frequency and decrease the high voltage. To troubleshoot, remove R530 from the circuit and use a variable transformer for AC power. Start at 90.0VAC and increase as necessary to locate and repair the defect. Return R530 to the circuit.

HORIZONTAL

Determine if the receiver is in shutdown by referring to the "High Voltage Shutdown" section of this Troubleshooting guide. If the receiver is not in shutdown, inject a horizontal signal at the base of Q502. If horizontal deflection is now present, check Q501, T504, and pins 13, 19, and 20 of IC270. If horizontal deflection is not present, check Q502, T501, and the components associated with D409, D445, D475, and D460 for defects. The high voltage rectifier is part of T501 and if defective will affect the operation of the horizontal circuits. Horizontal linearity or foldover may be caused by C505, C506, C507, C510, or C511 being defective.

VERTICAL

Check for a proper waveform at pin 18 of IC270. If the waveform is missing, check pins 16, 17, and 18 of IC270. If the waveform is present, check Q560, Q565, and IC550. Vertical linearity or height problems may be caused by vertical feedback and bias circuits, check C551, C553, and C554.

IF AGC

Inject a video IF signal at pin 8 of IC270 and check for video on the CRT. If video is present, check the tuner, tuner control, and tuner AFC circuits. Check for a video waveform at pin 52 of IC270, if video waveform is present, refer to the "Video" section of this Troubleshooting guide. If video waveform is missing, apply AGC bias at pin 5 of IC270 and check for a video waveform at pin 52 of IC270. If the waveform is present, check pins 1, 5, and 6 of IC270. If waveform is missing, check pins 8, 9, 47, 48, 50, 51, 52 of IC270 and check AFC circuit.

VIDEO

Check for a video waveform at pin 52 of IC270. If the waveform is missing, Refer to the "IF AGC" section of this Troubleshooting guide. If the waveform is present, check for a video waveforms at pin 40 of IC270. If the waveform is missing, check Q210, IC20, Q20, and Q602. If the waveform is present, Check for the proper waveforms at pins 23, 24, and25 of IC270. IF the waveforms are missing, check IC270. If the waveforms are present, refer to the "Raster" section of this Troubleshooting guide. If brightness is inadequate or cannot be controlled, check the voltages and components associated with pin 37 of IC270.

CHROMA

Check for a chroma waveform at pin 37 of IC270. If waveform is missing, refer to the "Video" section of this Troubleshooting guide. Check for the proper waveforms at pins 23, 24, and 25 of IC270. If these waveforms are missing, check pins 21 thru 25, 27 thru 33, 36, and 38 of IC270. If the waveforms are present at pins 23, 24, and 25 of IC270, refer to the "raster" section of this Troubleshooting guide. Check the 3.58MHz oscillator at pins 30 of IC270. If tint range is inadequate, check pin 33 of IC270.

RASTER

Check the CRT and CRT voltages. If red is missing, check pin 23 of IC270, Q632, and Q21. If green is missing, check pin 24 of IC270, Q631, and Q22. If blue is missing, check pin 25 of IC270, Q630, and Q23. If the raster has a keystone shape, check the deflection yoke. If the raster has height or width problems, refer to the "Vertical," "Horizontal," or "Power Supply" sections of this Troubleshooting guide.

AUDIO

Select an active channel and check for an audio waveform at pin 3 of IC270. If audio is missing, check pins 2, 3, and 49 of IC270. Select a station that is transmitting a stereo signal and check for an audio waveform at pin 39 of IC700. If waveform is missing, check Q232. Check for audio waveforms at pins 17 and 18 of IC700. If the waveforms are missing, check IC700. Check for audio waveform at pins 3 and 5 of IC740. If the waveforms are missing, check IC740. Check for audio at pins 9, 12, 13, and 16 of IC760. If audio is missing, check IC760. Check the voltage at pin 11 of IC740, it should measure .7V at mute and 4.3V at maximum volume.

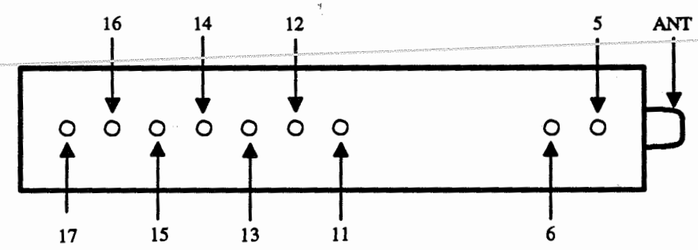
TUNER INFORMATION

TUNER VOLTAGE CHART

Pin No.	VHF Low Band	VHF High Band	UHF Band	Pin No.	VHF Low Band	VHF High Band	UHF Band
5	5.1V	5.2V	5.2V	15	2.7V	2.7V	2.7V
6	12.0V	12.0V	12.0V	16	0V	0V	0V
11	1.4V	1.4V	1.6V	17	0V	0V	0V
12	5.0V	5.0V	5.0V				
13	5.4V	5.4V	5.4V				
14	5.4V	5.4V	5.4V				

NOTE: VHF Low Band voltages taken on channel 2.
VHF High Band voltages taken on channel 7.
UHF Band voltages taken on channel 14.

TUNER TERMINAL GUIDE



SCHEMATIC NOTES

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

-x- 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.

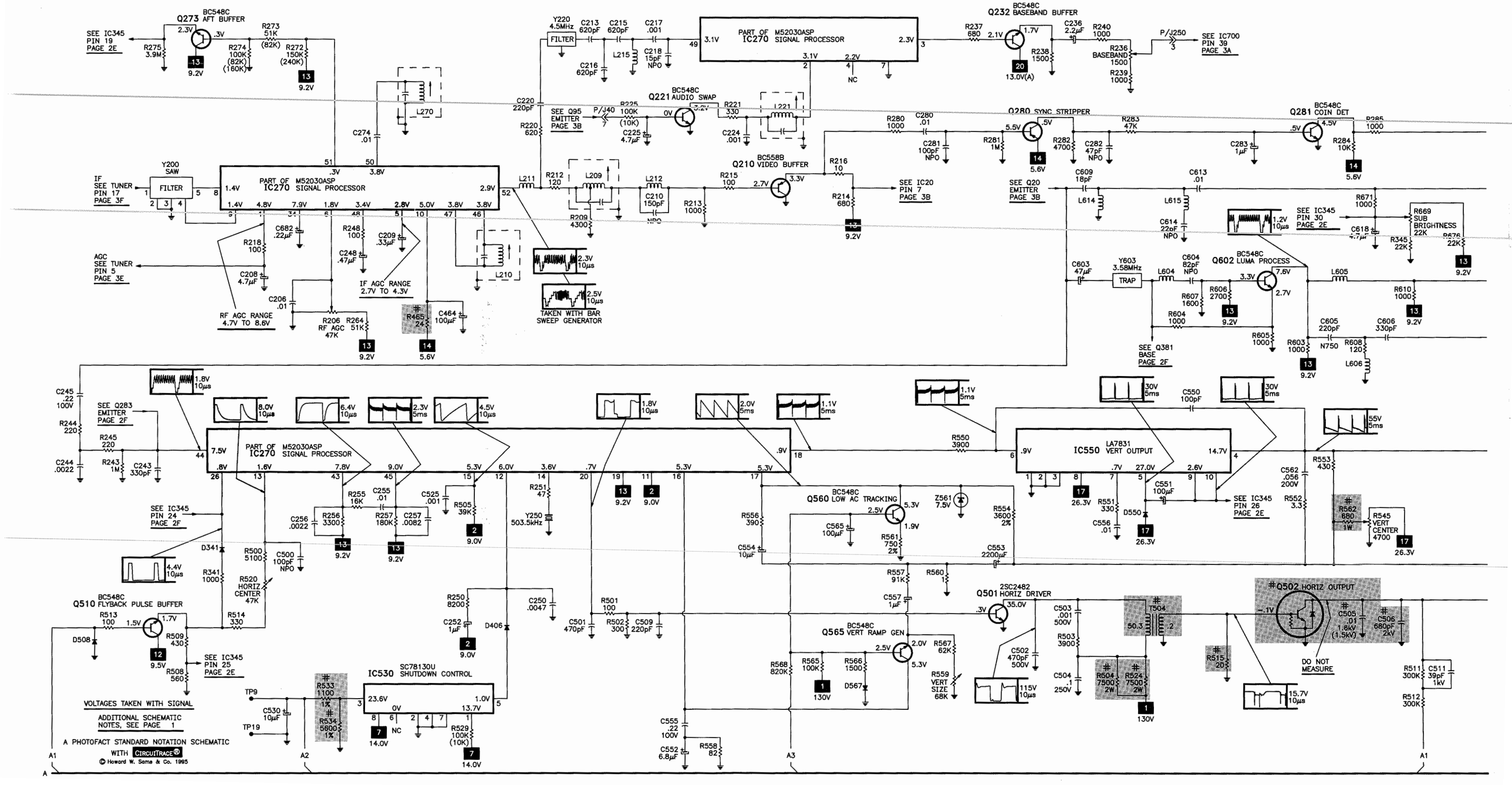
A Cabling: Heavy lines reduce use of multiple lines.

Waveforms and voltages are taken from ground, unless noted otherwise.
Waveforms taken with triggered scope and colorbar signal. 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 a 1000µV RF signal, with colorbar pattern, applied to antenna terminal.
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.

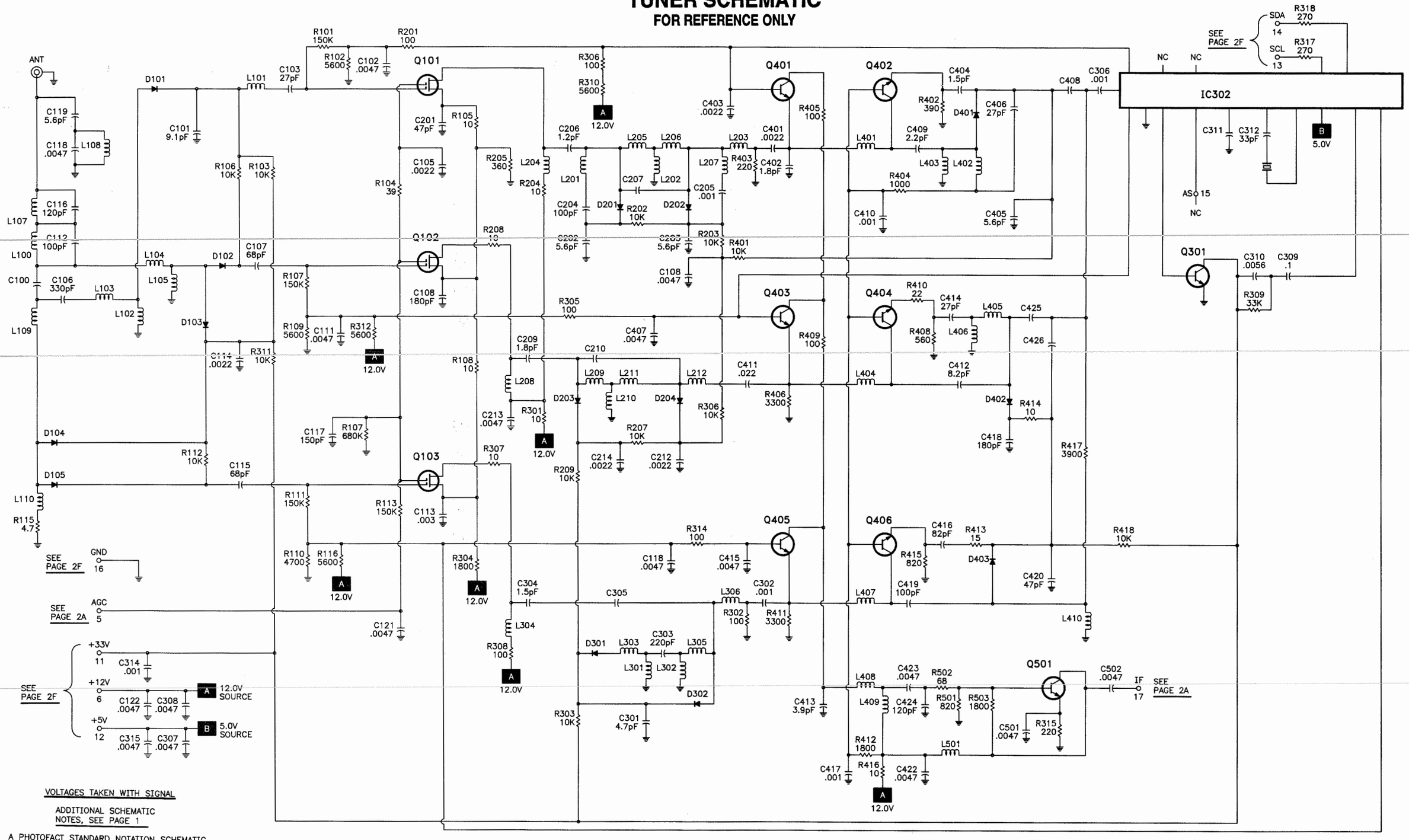
A

B

TELEVISION SCHEMATIC



TUNER SCHEMATIC
FOR REFERENCE ONLY



VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

PARTS LIST continued

CAPACITORS & ELECTROLYTICS

	Item No.	Rating	Mfr. Part No.
#	**C22**	.01 20% 2kV	-
		.01 20% 1kV	4835 122 57002
#	**C33**	.0047 20% 250VAC	4835 122 97023
	C210	150pF 5% 50V NPO	4835 122 47042
	C218	15pF 5% 50V NPO	4835 122 47085
	C281	100pF 5% 50V NPO	4835 122 47014
	C282	47pF 5% 50V NPO	4835 122 47051
	C304, 08	100pF 5% 50V NPO	4835 122 47014
	C323, 24	100pF 5% 50V NPO	4835 122 47014
	C357	39pF 5% 50V NPO	4835 122 47021
	C358	27pF 5% 50V NPO	4835 122 47018
#	**C400**	.22 250VAC	4835 122 97047
	C500	100pF 5% 50V NPO	4835 122 47014
#	**C505**	.01 1.6kV	-
		.01 1.5kV	4835 121 47438
#	**C506**	680pF 10% 2kV	4835 122 47037
	C511	39pF 5% 1kV	4835 122 47224
	C604	82pF 5% 50V NPO	4835 122 47024
	C605	220pF 5% 50V N750	4835 122 47025
	C614	22pF 5% 50V NPO	4835 122 47017
	C620	39pF 5% 50V NPO	4835 122 47021
	CA1	.01 X 7 Network	4835 122 97049
	CA3	100pF X 5 Network	4835 122 97077
	CA4	100pF X 6 Network	4835 122 97042

 # For SAFETY use only equivalent replacement part.

CABINET PARTS

Item	Mfr. Part No.
Cup, Rear Cabinet	4835 437 67002
Keypad, 7 Pushbutton	4835 410 37205
Lens, IR	4835 381 17006
Mask	4835 432 77076
Overlay, Jack Panel	4835 459 17443

COILS & TRANSFORMERS

	Item No.	Function/Rating	Mfr. Part No.	On-Unit No.
#	**DY1**	Yoke 100° Horiz 1.34mH Vert 15.3mH	4835 150 17108	368007001
	L21	100µH	4835 157 57141	-
#	**L30**	-	4835 148 27042	300803-0003
	L209	4.5MHz	4835 157 57113	-
	L210	45.75MHz	4835 157 57485	-
	L211	2.2µH	4835 157 67005	-
	L212	4.7µH	4835 157 57059	-
	L215	3.9µH	4835 157 67007	-
	L221	4.5MHz	4835 157 57113	-
	L270	45.8MHz	4835 157 57608	-
	L315, 22	2.7µH	4835 157 67006	-
	L341	1.8µH	4835 157 67033	-
	L348	2.7µH	4835 157 67006	-
	L351 Thru L357	8.2µH	4835 150 57068	-
	L353	1.8µH	4835 157 67033	-
	L382	47µH	4835 157 67013	-
	L400	Line Filter	4835 157 57077	-
	L417, 18	2.7µH	4835 157 67006	-
	L499	Degaussing	4835 157 97064	-
	L502	Suppression	4835 152 27047	-
#	**L507**	Linearity	4835 150 57034	-
	L604	27µH	4835 157 67019	-
	L605	22µH	4835 157 67018	-
	L606	33µH	4835 157 67025	-
	L614	15µH	4835 157 57057	-
	L615	47µH	4835 150 57045	-
	L630	.47µH	4835 157 57947	-
#	**T15, 16**	Audio Output	4835 148 87282	320417-1
#	**T501** (1)	Horizontal Output	4835 140 67113	3640B5-0002
#	**T504**	Horizontal Drive	4835 142 47021	913-1001

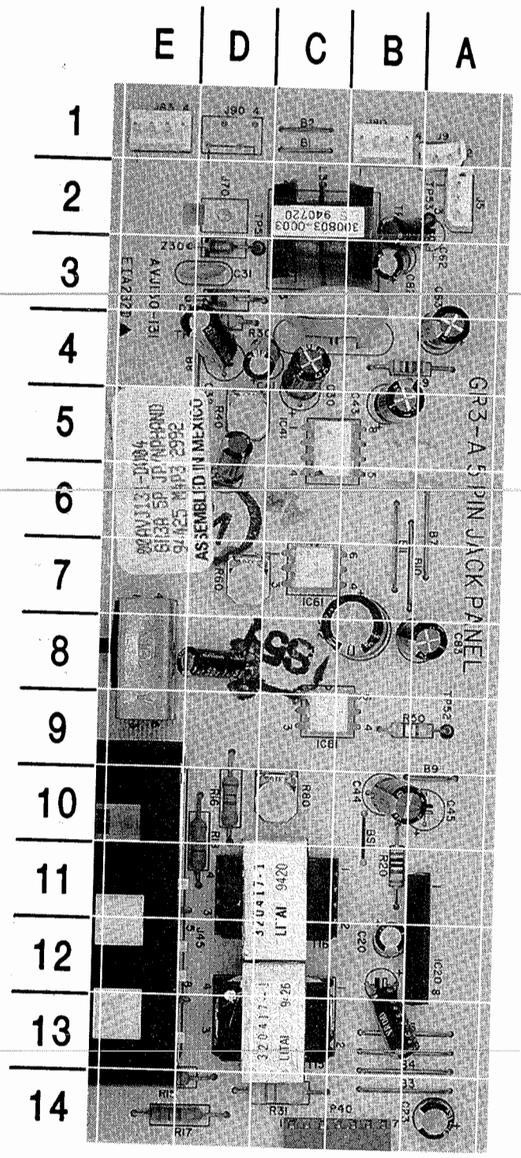
 # For SAFETY use only equivalent replacement part.
(1) Focus and screen controls are part of T501.

MISCELLANEOUS

	Item No.	Description	Mfr. Part No.	Notes
#	**F400**	Fuse	4835 253 97095	4Amp, 125VAC, Slow Blow
#	**F401**	Fuse	4835 253 97031	2.5Amp
	IR90	Receiver	4835 219 47271	Remote
	J45	Jack	0018 225 80001	Assembly
	K400	Relay	4835 277 27016	Degauss
	N401	Neon Bulb	4835 134 27001	-
#	**P1**	Line Cord	4835 321 17006	AC, Polarized
#	**S15**	Switch	4835 276 17248	Speaker
	S70	Switch	4835 276 57003	Power
	S71	Switch	4835 276 57003	Menu Up
	S73	Switch	4835 276 57003	Channel Up
	S75	Switch	4835 276 57003	Menu Down
	S76	Switch	4835 276 57003	Volume Up
	S77	Switch	4835 276 57003	Volume Down
	S78	Switch	4835 276 57003	Channel Down
	SP1, 2	Speaker	4835 240 37005	3" X 5", 16 Ohms
#	**V1**	CRT	4835 131 27082	A68AFW40X
	Y200	Filter	4835 153 97022	SAW
	Y220	Filter	4835 153 57004	4.5MHz
	Y250	Crystal	4835 157 57145	503.5kHz
	Y320	Resonator	4835 157 57938	12MHz
	Y603	Trap	4835 154 97025	3.58MHz
	Y620	Crystal	4835 242 77022	3.58MHz
		Adapter		Antenna 75 To 300 Ohms
#		Antenna Isolator	4835 219 47242	-
		Magnet	4835 150 27004	Purity/Convergence
		PC Board (1)	4835 219 57484	Audio/Video Jack Panel, 00AVJ131B002
		PC Board (1)	-	CRT, 00APT132
		PC Board (1)	4835 219 57497	DBX/AVL Stereo, 00ASD031
		PC Board (1)	-	Keyboard, 00ASW112
		PC Board (1)	-	Main, 00EME575
		PC Board (1)	-	Remote Receiver, 00ALR012
#		Socket	4835 265 97332	CRT
		Transmitter	4835 219 17554	Remote, G144AABA03
		Tuner (1)	4835 210 47055	UHF/VHF, UV936
		Wedge	4835 535 27001	Yoke Positioning
		Wedge	4835 535 27002	Yoke Positioning

 # For SAFETY use only equivalent replacement part.
(1) Contact PTS Electronics Corporation for replacement; order by manufacturer's part number.

AUDIO / VIDEO JACK PANEL BOARD - TOP VIEW

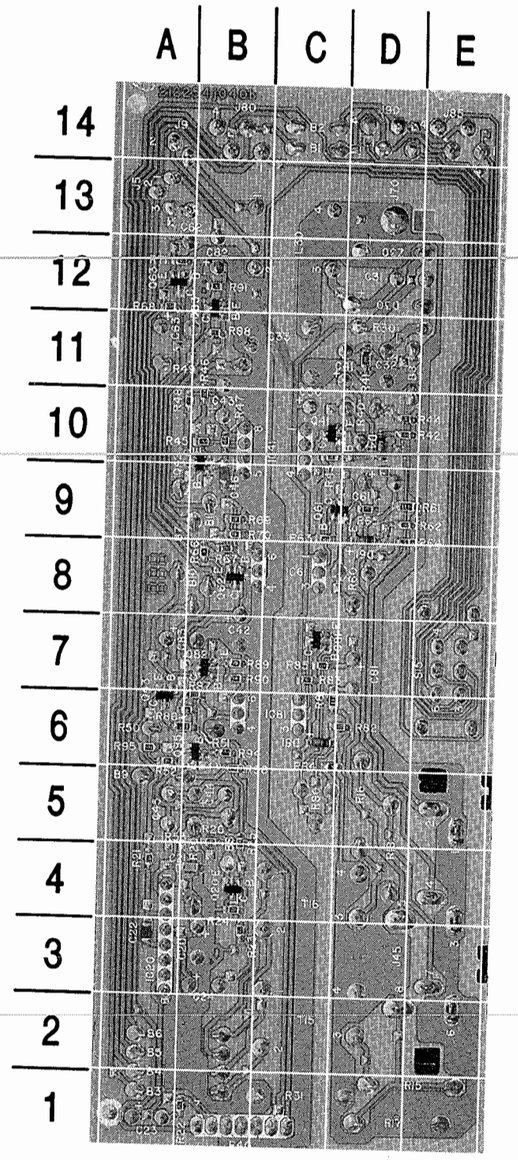


AUDIO / VIDEO JACK PANEL BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE

C20	B-12	J45	E-12
C30	C-4	J80	B-1
C31	D-3	J85	E-1
C32	D-4	L30	C-2
C33	C-4	P40	C-14
C41	D-4	R15	E-14
C42	B-8	R16	D-10
C43	B-5	R17	E-14
C44	B-10	R18	D-11
C61	D-5	R20	B-11
C62	B-2	R30	D-4
C63	A-4	R31	C-14
C81	D-8	R40	D-5
C82	B-3	R49	B-4
C83	A-8	R60	D-7
C23A	A-14	R80	C-10
C24A	B-13	R50A	A-9
D30	D-3	S15	E-8
IC20	A-11	T15	C-13
IC41	C-5	T16	C-11
IC61	C-7	TP52	A-9
IC81	C-9	TP53	A-2
J5	A-2	TP54	B-2
J9	A-1	Z30	D-3

A HOWARD W. SAMS GRIDTRACE™ PHOTO

AUDIO / VIDEO JACK PANEL BOARD - BOTTOM VIEW



AUDIO / VIDEO JACK PANEL BOARD - BOTTOM VIEW, GRIDTRACE LOCATION GUIDE

C46	B-9	R64	D-9
C21A	B-4	R65	D-9
C22A	A-3	R66	B-8
D41	D-10	R67	B-8
D61	D-9	R68	A-12
D81	C-6	R69	B-9
Q20	B-4	R70	B-9
Q41	C-10	R71	A-12
Q42	B-10	R81	C-6
Q43	A-6	R82	D-6
Q61	C-9	R83	C-7
Q62	B-8	R84	C-6
Q63	A-12	R85	C-7
Q81	C-7	R86	B-6
Q82	B-7	R87	B-6
Q83	B-12	R88	B-11
Q95	B-6	R89	B-7
R21	A-4	R90	B-7
R41	D-11	R91	B-12
R42	D-10	R94	B-6
R43	C-10	R95	A-6
R44	D-10	R96	B-5
R45	B-10	R22A	B-1
R46	B-10	R23A	B-4
R47	B-10	R24A	B-4
R48	A-10	R25A	B-5
R61	D-9	R26A	B-5
R62	D-9	R51A	B-6
R63	C-9	R52A	A-6

A HOWARD W. SAMS GRIDTRACE™ PHOTO

PARTS LIST continued

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
Q400	TIP47	4835 130 47072	NTE198	ECG198	SK3220
Q402	-	4835 130 47059	NTE399	ECG399	SK9352
Q403	-	4835 130 47892	-	-	-
Q404	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q410	-	4835 130 47051	NTE123AP	ECG123AP	SK3854
Q420	-	4835 130 47059	NTE399	ECG399	SK9352
Q461	-	4835 130 47051	NTE123AP	ECG123AP	SK3854
Q462	-	4835 130 47059	NTE399	ECG399	SK9352
Q463	-	4835 130 47051	NTE123AP	ECG123AP	SK3854
Q501	2SC2482	4835 130 47073	NTE399	ECG399	SK9352
# **Q502**	-	4835 130 47897	NTE2353	ECG2353*	-
Q510, 60, 65	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q602	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q630, 31, 32	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q661	-	4835 130 47126	NTE159*	ECG159*	SK3466*
Q703	-	4835 130 47086	NTE2406	ECG2406	SK10097
Z24	-	4835 130 37737	-	-	-
Z30	-	4835 130 37423	NTE142A	ECG142A	-
Z286	-	4835 130 37121	NTE5013T1	ECG5013T1	SK9969
Z361	-	4835 130 37502	NTE147A	ECG147A	-
Z370	-	4835 130 37119	-	-	-
Z402	-	4835 130 37003	-	-	-
Z405	-	4835 130 37501	NTE5075A	ECG5075A	-
Z406	-	4835 130 37121	NTE5013T1	ECG5013T1	SK9969
Z461	-	4835 130 37068	NTE5011T1	ECG5011T1	SK9968
Z462	-	4835 130 37203	NTE5019T1	ECG5019T1	-
Z463	-	4835 130 37121	NTE5013T1	ECG5013T1	SK9969
Z561	-	4835 130 37777	-	-	-
Z700	-	4835 130 37778	-	-	-

 # 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.
# **R20**	10 5% 1/3W	4822 111 30508	-
# **R22**	100 5% 1/2W	4835 116 67089	HW110
# **R23**	.33 5% 1/2W	-	HWD33
	33 5% 1/2W	4835 116 57114	HW033
# **R26**	100 5% 1/3W	4835 116 87002	-
# **R30**	51 5% 1/2W	4835 116 67086	HW051
# **R31**	4.7M 5% 1/2W	4835 116 57009	HW547
R40	1000 Video Level	4835 100 97031	-
# **R49**	82 5% 1/3W	4822 111 30533	HW082
# **R50, 51, 52**	15K 5% 3W	4835 116 67018	3W315
R60	470 Audio Level Right	4835 100 97038	-
# **R66**	100 5% 1/10W	4835 111 37001	-
R80	470 Audio Level Left	4835 100 97038	-
# **R86**	100 5% 1/10W	4835 111 37001	-
R206	47K RF AGC	4835 100 17042	-
# **R231**	2.2 5% 3W	4835 116 67069	3W2D2
R236	1500 Baseband	4835 100 17053	-
# **R305**	22 5% 1/4W	-	QW022
	10 5% 1/4W	4835 116 57362	QW010
R309	10K 1% 1/8W	4835 116 57481	-
# **R359**	33 5% 1/3W	4835 116 57159	-
R375	3300 2% 1/4W	-	QW233
	3300 5% 1/4W	4835 116 57422	QW233
R381	75K 2% 1/8W	4835 110 67226	EW375
R384	3300 2% 1/8W	4835 110 67223	EW233
R385	6200 2% 1/8W	4835 110 67093	EW262
R386	11K 2% 1/8W	4835 110 67217	EW311
R387	18K 2% 1/8W	4835 110 67221	EW318
R388	30K 2% 1/8W	4835 110 67117	EW330
R389	43K 2% 1/8W	4835 110 67224	EW343
R400	10.1 Cold PTC	4835 116 47001	-
# **R401**	4.7M 5% 1/2W	4835 116 57009	HW547
# **R403**	1.5 10% 10W Wirewound	4835 112 37024	10W1D5
# **R411**	100 5% 1/3W	4835 116 87002	-
# **R417**	6.8 5% 1/4W	4835 116 57559	QW6D8
# **R419**	1 5% 1/3W	4822 111 30483	-
# **R420**	.51 5% 1/2W	4835 116 67001	HWD51
# **R421, 45**	1 5% 1/3W	4822 111 30483	-
# **R448**	47 5% 30W Wirewound	4835 112 37021	-
# **R459**	100 5% 2W	4835 116 57132	2W110
# **R460**	2.2 5% 1/3W	4822 111 30492	-
# **R464**	68 5% 1W	4835 116 57279	1W068
# **R465**	24 5% 1/4W	4835 116 57493	QW024
# **R466**	47 5% 1/3W	4835 116 57069	-
# **R468**	1 5% 1/3W	4822 111 30483	-
# **R469**	8.2 5% 1/3W	4822 111 30506	-
# **R470**	4.3 5% 1/8W	4835 116 57497	EW4D3
# **R475**	.51 5% 1/2W	4835 116 67001	HWD51
# **R504**	7500 5% 2W	4835 116 57286	2W275
# **R506**	18 5% 2W	4835 116 67017	2W018
# **R507**	1000 5% 2W	4835 116 57057	2W210
# **R510**	39K 5% 1/4W	4835 116 57475	QW339
# **R515**	20 5% 1/3W	4835 116 57065	-

 # For SAFETY use only equivalent replacement part.

CONTROLS & RESISTORS continued

Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
R520	47K Horizontal Centering	4835 100 17042	-
# **R524**	7500 5% 2W	4835 116 57286	2W275
# **R530**	1 5% 1/3W	4822 111 30483	-
# **R533**	1100 1% 1/4W	4835 116 57482	-
# **R534**	5600 1% 1/4W	4835 116 57485	-
R545	4700 Vertical Centering	4835 100 17054	-
R554	3600 2% 1/8W	4835 110 67208	EW236
R559	68K Vertical Size	4835 100 17052	-
R561	750 2% 1/8W	4835 110 67231	EW175
# **R562**	680 5% 1W	4835 116 67144	-
R642	2200 Blue Drive	4835 100 17021	-
R643	2200 Green Drive	4835 100 17021	-
R648	4700 Blue Cutoff	4835 100 17022	-
R649	4700 Green Cutoff	4835 100 17022	-
R650	4700 Red Cutoff	4835 100 17022	-
R669	22K Sub Brightness	4835 100 17038	-
# **R704**	75 5% 1/2W	4835 116 57371	HW075
R708	10K SAP/LPF	4835 100 97032	-
R709	750K 1% 1/8W	4835 111 37362	-
R710, 11	47.5K 1% 1/8W	4835 111 37359	-
R712	22K VCO	4835 100 97041	-
R715	2200 3kHz	4835 101 37005	-
R717	43K 2% 1/10W	4835 111 37344	-
R718	4700 300Hz	4835 100 97039	-
# **R740**	12 5% 1/3W	-	-
	10 5% 1/3W	4822 111 30508	-
# **R760**	6.8 5% 3W	4835 116 67088	3W6D8
RA2	22K 5% 1/4W Network	4835 111 97038	-

 # For SAFETY use only equivalent replacement part.

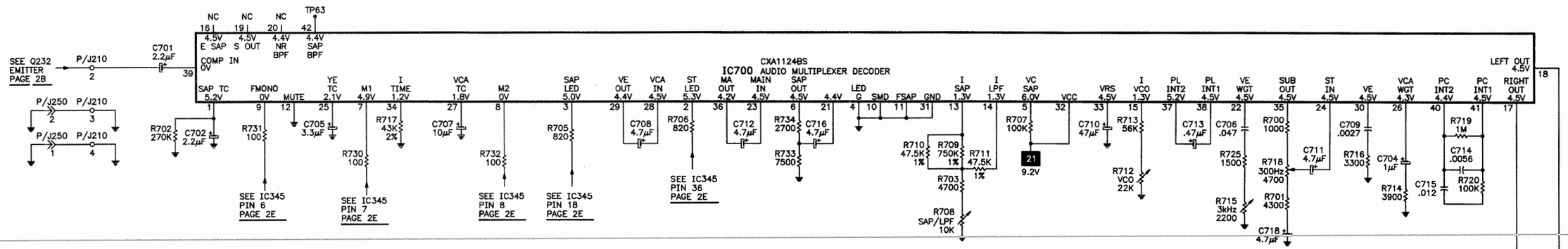
Created with pride by the employees of Howard W. Sams & Company.

J. Barker, N. Beck, B. Bryant, B. Buchanan, T. Clensy, D. Cobb, G. Farrell, B. Fink, M. Herkless, J. Kocha, F. Malek, B. Medaris, R. Raus, B. Skinner, J. Young

A

B

AUDIO SCHEMATIC



PARTS LIST

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)
- NTE Electronics, Inc. (NTE)
- Philips ECG Company (ECG)
- PTS Electronics Corporation (PTS)
- Sencore, Inc.
- Thomson Consumer Electronics, Inc. (SK, TCE)

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.	Equipment	Sencore No.
Oscilloscope	SC3100	Isolation Transformer	PR57
Generators		Capacitance Analyzer	LC101, LC102
RGB	CM2000	CRT Analyzer	CR70
Multiburst Signal	VG91	AC Leakage Tester	PR57
Color Bar	VG91	Inductance Analyzer	LC101, LC102
TV Stereo	VG91	Flyback Yoke Tester	TVA92
Digital VOM	SC3100	TV Stereo Power Monitor	SR68, PA81
Frequency Meter	SC3100	Field Strength Meter	SL750
Hi-Voltage Probe	HP200	Transistor Tester	TF46
Accessory Probes	TP212	Video Analyzer	VG91, TVA92

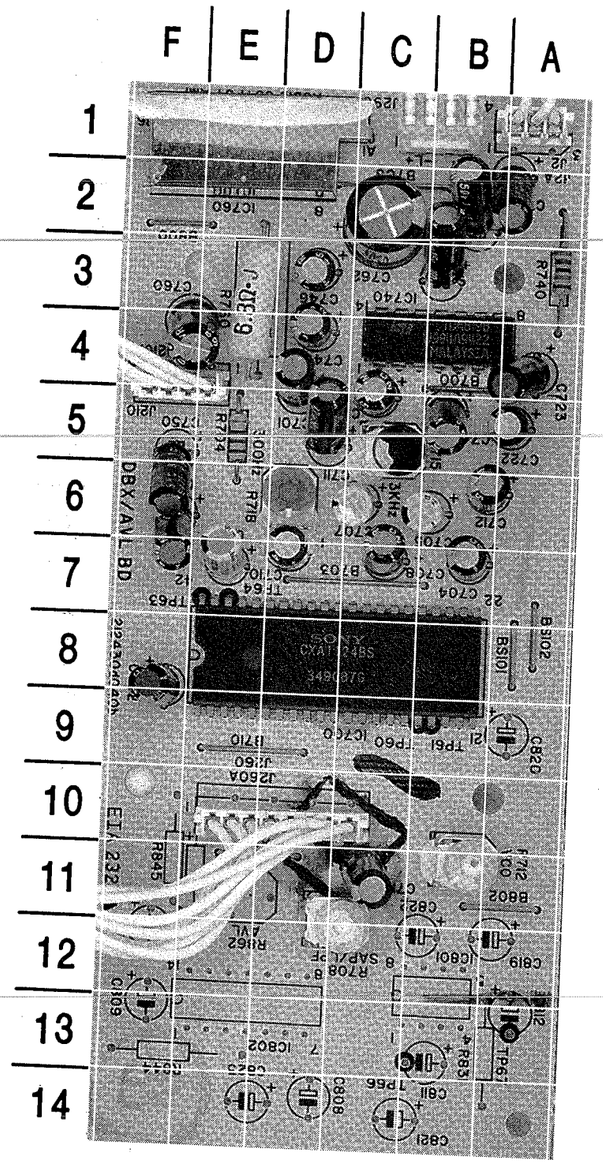
SEMICONDUCTORS

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D20	-	4835 130 37066	-	-	-
D30	-	4835 130 37052	NTE580	ECG580	SK5036
D41, 61, 81	-	4835 130 37066	-	-	-
D91	-	4835 130 37516	-	-	-
D341, 45	-	4835 130 37048	NTE519	ECG519	SK3100
D346, 52	-	4835 130 37048	NTE519	ECG519	SK3100
D405	-	4835 130 37094	NTE580	ECG580	SK5036
D406	-	4835 130 37048	NTE519	ECG519	SK3100
D409	-	4835 130 37094	NTE580	ECG580	SK5036
D410, 11	1N5062	4822 130 41275	NTE125	ECG125	SK3081
D413, 15	-	4835 130 37048	NTE519	ECG519	SK3100
D416, 21	-	4835 130 37048	NTE519	ECG519	SK3100
D431 Thru					
D434	-	4835 130 37059	NTE580	ECG580	SK5036
D445	-	4835 130 37052	NTE580	ECG580	SK5036
D460	-	4835 130 37094	NTE580	ECG580	SK5036
D475	-	4835 130 37052	NTE580	ECG580	SK5036
D508	-	4835 130 37048	NTE519	ECG519	SK3100
D510	-	4835 130 37052	NTE580	ECG580	SK5036
# **D530**	-	4835 130 37048	NTE519	ECG519	SK3100
D550	-	4835 130 37094	NTE580	ECG580	SK5036
D567	-	4835 130 37048	NTE519	ECG519	SK3100
D629	-	4835 130 37048	NTE519	ECG519	SK3100
D630	-	4835 130 37058	NTE587	ECG587	SK9937
D661	-	4835 130 37053	NTE552	ECG552	SK9000
IC20	LA7016	4835 209 87074	NTE1781	ECG1781	SK9746
# **IC41**	TLP651	4835 130 97058	-	-	-
# **IC61, 81**	TLP631	4835 130 47903	NTE3041	ECG3041	SK2041
IC270	M52030ASP	4835 209 88106	-	-	-
IC341	LC7456A	4835 209 88189	-	-	-
IC345	-	4835 209 88187	-	-	-
IC346	ST24C01B1	4835 209 88108	-	-	-
IC410	STR30130	4835 209 47056	NTE1777	ECG1777	SK9870
IC530	SC78130U	4835 209 87838	-	-	-
IC550	LA7831	4835 209 87073	NTE1797	ECG1797	SK9753
IC700	CXA1124BS	4835 209 88002	-	-	-
IC740	TDA8198	4835 209 87982	-	-	-
IC760	TDA7053	4835 209 87808	-	-	-
Q20	-	4835 130 47094	-	-	-
Q21, 22, 23	S6022	4835 130 47796	-	-	-
Q41, 42	-	4835 130 47094	-	-	-
Q43	-	4835 130 47751	NTE2406	ECG2406	-
Q61, 62, 63	-	4835 130 47094	-	-	-
Q81, 82, 83	-	4835 130 47094	-	-	-
Q95	-	4835 130 47094	-	-	-
Q210	BC558B	4835 130 47126	NTE159*	ECG159*	SK3466*
Q221, 32, 73	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q280	-	4835 130 47126	NTE159*	ECG159*	SK3466*
Q281, 83	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*
Q381	BC548C	4835 130 47064	NTE123AP*	ECG123AP*	SK3854*

 # For SAFETY use only equivalent replacement part.
* Lead configuration may vary from original.

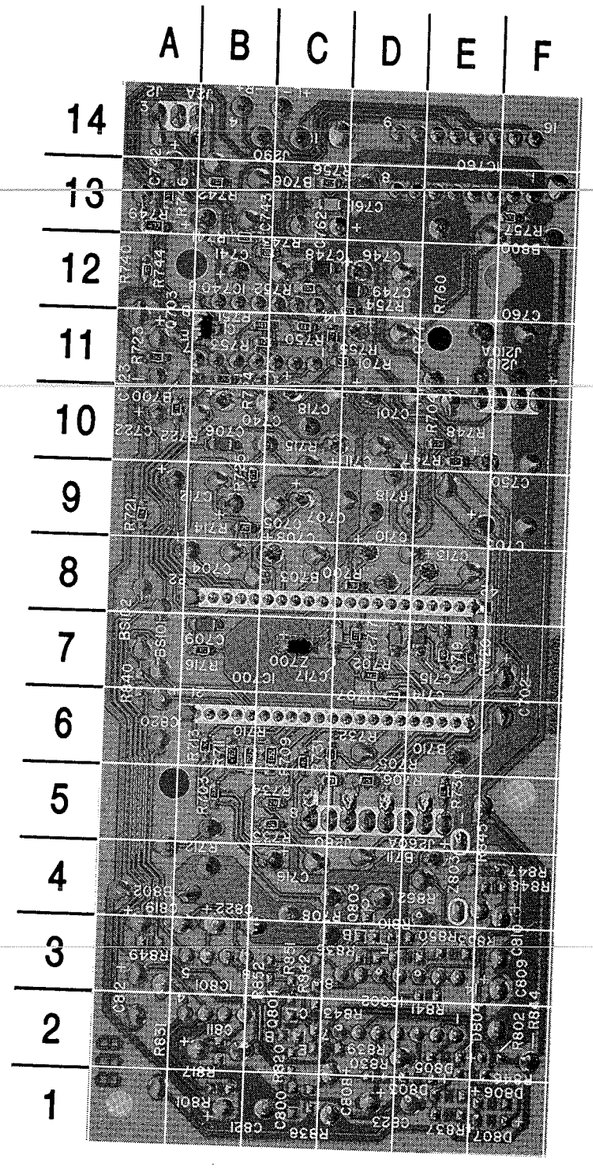
DBX / AVL STEREO BOARD - TOP VIEW



DBX / AVL STEREO BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE

C701	D-4	C746	D-3
C702	F-8	C747	D-4
C703	F-7	C750	E-6
C704	B-7	C760	F-4
C705	B-6	C762	C-2
C707	C-6	IC700	E-9
C708	C-7	IC740	C-4
C710	D-7	IC760	F-2
C711	D-5	J2	A-1
C712	B-6	J210	E-4
C713	E-7	J260	E-10
C716	C-11	J290	C-1
C718	C-4	R704	E-5
C722	A-5	R708	C-12
C723	A-4	R712	B-11
C740	B-5	R715	C-5
C741	B-3	R718	D-6
C742	A-2	R740	A-3
C743	B-2	R760	E-3

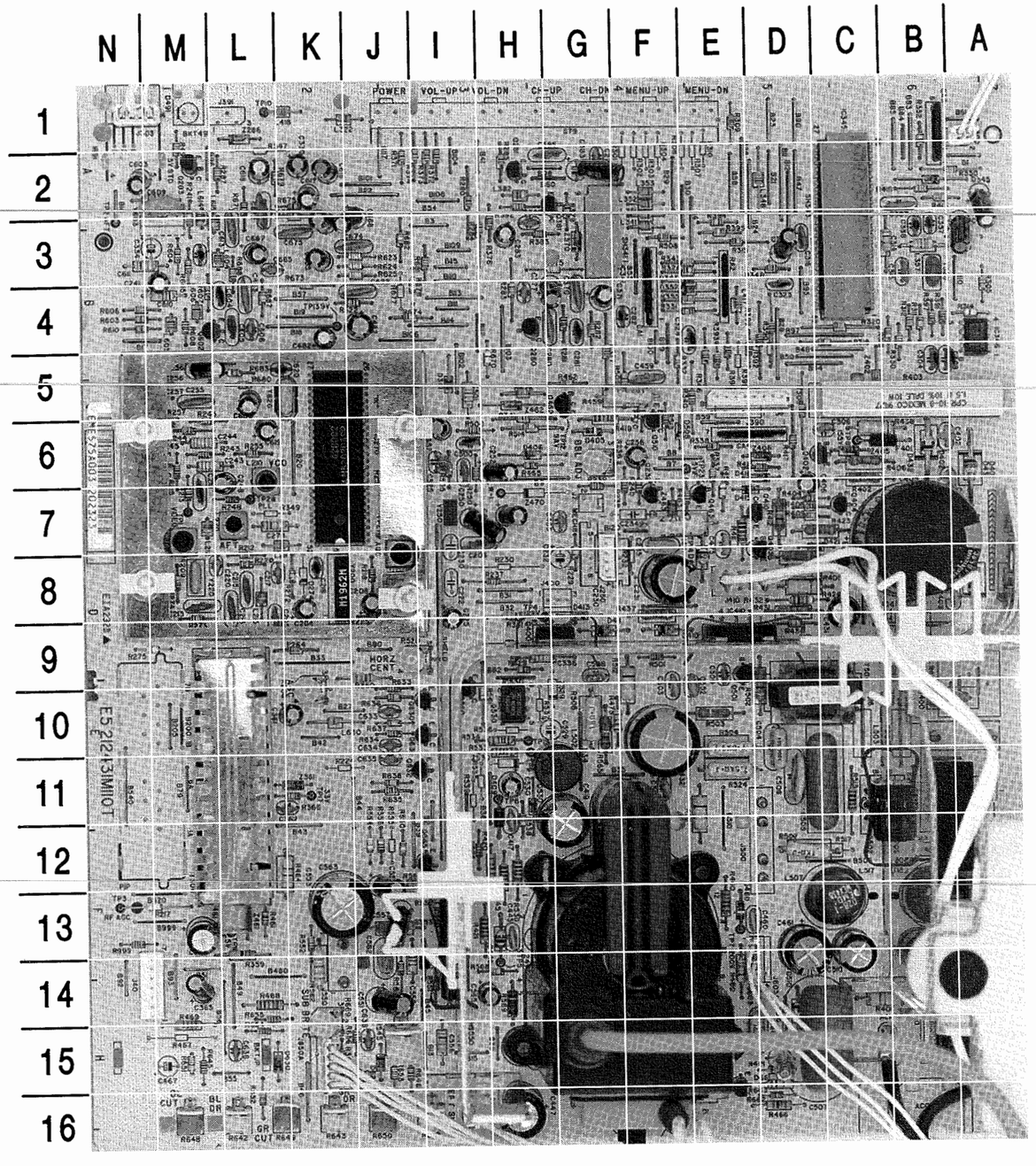
DBX / AVL STEREO BOARD - BOTTOM VIEW



DBX / AVL STEREO BOARD - BOTTOM VIEW, GRIDTRACE LOCATION GUIDE

C706	B-10	R722	A-10
C709	B-7	R723	A-11
C714	D-7	R724	B-11
C715	E-7	R725	B-9
C717	D-7	R730	E-5
C748	C-12	R731	C-6
C749	D-12	R732	D-6
C761	C-13	R733	C-5
Q703	B-11	R734	C-5
R700	D-8	R741	B-13
R701	D-11	R742	B-13
R702	D-7	R743	B-12
R703	B-5	R744	A-12
R705	D-5	R746	B-13
R706	D-5	R747	E-10
R707	D-7	R748	E-10
R709	C-6	R749	A-13
R710	B-6	R750	C-11
R711	B-6	R751	B-11
R713	B-6	R752	C-12
R714	B-9	R753	B-11
R716	B-7	R754	D-12
R717	D-7	R755	C-11
R719	E-7	R756	C-13
R720	E-7	R757	F-13
R721	A-9	Z700	C-7

MAIN BOARD



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MAIN BOARD, GRIDTRACE LOCATION GUIDE

C204	K-8	C403	B-8	C633	J-10	J500	D-11	R209	M-8	R355	E-4	R470	F-5	R634	J-10
C205	L-8	C404	B-8	C634	J-10	J501	E-15	R212	L-8	R359	L-13	R475	G-10	R635	J-11
C206	I-7	C405	B-8	C635	J-11	J550	K-14	R213	M-7	R360	J-9	R480	E-14	R636	J-10
C208	J-8	C406	D-7	C636	L-15	J603	E-13	R214	N-6	R361	H-9	R491	M-1	R637	J-10
C209	J-7	C413	A-3	C637	J-15	J650	K-15	R215	M-6	R366	K-11	R500	I-6	R638	J-11
C210	M-7	C415	A-3	C638	J-15	K400	B-11	R216	N-6	R371	J-2	R501	F-9	R642	L-16
C213	M-8	C417	H-12	C663	E-15	L209	M-7	R218	J-8	R372	I-2	R502	D-10	R643	K-16
C215	L-8	C419	G-12	C668	J-3	L210	L-6	R220	L-8	R373	I-2	R503	E-10	R645	M-15
C216	L-8	C431	C-9	C672	L-2	L211	L-7	R221	I-8	R374	I-2	R504	E-11	R646	J-15
C217	L-8	C432	F-10	C674	J-3	L212	M-7	R225	J-8	R375	G-3	R505	I-6	R648	M-16
C218	K-8	C445	H-13	C675	K-3	L215	L-8	R229	G-8	R376	H-3	R506	G-10	R649	L-16
C220	L-8	C447	H-16	C680	L-5	L221	J-8	R231	F-7	R377	G-5	R507	C-12	R650	J-16
C224	J-8	C459	F-5	C682	K-4	L270	L-7	R236	G-6	R379	G-2	R508	F-3	R651	M-15
C225	I-9	C460	E-13	C685	L-3	L315	A-3	R237	H-8	R382	H-2	R509	F-5	R652	L-16
C231	F-8	C461	D-14	C687	L-3	L322	J-1	R238	F-7	R383	H-3	R510	D-15	R653	J-15
C235	F-7	C462	J-4	CA1	F-4	L341	F-3	R239	G-7	R390	D-4	R511	E-11	R654	L-15
C236	F-6	C463	L-4	CA3	B-2	L348	D-2	R240	F-7	R391	B-4	R512	F-10	R655	L-14
C241	M-3	C464	I-7	CA4	D-6	L351	F-3	R241	M-3	R392	D-5	R513	F-6	R656	K-15
C243	M-6	C465	G-7	D341	I-5	L352	F-2	R243	M-6	R393	E-5	R514	H-6	R662	D-16
C244	M-6	C470	H-7	D345	B-2	L353	F-2	R244	M-6	R394	E-3	R515	C-11	R663	D-15
C245	N-6	C475	E-7	D346	E-4	L357	B-3	R245	M-6	R395	E-3	R520	J-9	R669	K-15
C248	L-6	C500	I-6	D352	E-4	L382	H-2	R248	L-7	R396	E-5	R524	E-11	R671	L-2
C250	I-6	C501	I-5	D405	G-6	L400	A-14	R250	I-6	R397	B-4	R529	H-9	R672	K-2
C252	H-6	C502	E-10	D406	H-6	L417	E-4	R251	J-6	R398	D-4	R530	H-12	R673	K-4
C255	M-5	C503	F-10	D409	H-11	L418	K-1	R255	L-6	R400	A-10	R533	H-10	R674	J-4
C256	M-5	C504	D-11	D410	F-9	L502	G-11	R256	M-5	R401	C-14	R534	H-10	R675	K-2
C257	M-5	C505	C-11	D411	G-9	L507	C-13	R257	M-5	R402	C-7	R538	H-12	R676	H-5
C274	L-7	C506	D-11	D413	G-9	L604	L-3	R264	K-9	R403	B-5	R545	J-15	R678	J-4
C275	G-2	C507	C-15	D415	D-7	L605	M-4	R272	K-8	R404	D-7	R550	J-12	R679	L-2
C280	G-4	C508	G-9	D416	D-6	L606	M-4	R273	M-8	R405	D-8	R551	I-14	R680	L-5
C281	G-4	C509	E-9	D421	D-8	L614	M-3	R274	M-8	R406	C-6	R552	K-13	R681	I-3
C282	F-4	C510	C-14	D431	A-6	L615	L-3	R275	M-9	R408	D-7	R553	J-13	R682	J-3
C283	H-3	C511	F-11	D432	B-6	L630	K-10	R280	I-2	R409	D-7	R554	J-12	R683	L-5
C301	D-3	C525	I-6	D433	A-8	N401	D-15	R281	G-4	R411	E-7	R556	J-12	R687	L-4
C304	B-5	C530	H-11	D434	B-9	Q210	M-6	R282	G-4	R412	D-7	R557	J-13	R688	L-3
C306	C-6	C550	J-14	D445	H-13	Q221	J-8	R283	H-4	R413	B-2	R558	I-6	R999	N-13
C307	B-2	C551	J-14	D460	E-13	Q232	F-7	R284	H-3	R416	D-6	R559	I-16	RA2	E-3
C308	A-5	C552	I-6	D475	E-8	Q273	N-8	R285	H-2	R417	D-6	R560	I-13	T501	F-14
C314	B-3	C553	K-13	D508	F-6	Q280	H-4	R287	L-2	R418	B-2	R561	I-10	T504	C-10
C315	B-3	C554	J-13	D510	D-14	Q281	H-2	R305	A-4	R419	G-6	R562	K-14	Y200	K-8
C316	D-3	C555	J-6	D530	H-11	Q283	M-2	R308	D-5	R420	H-12	R565	G-11	Y220	M-8
C323	D-4	C556	I-15	D550	I-14	Q381	G-2	R309	E-1	R421	I-13	R566	I-12	Y250	I-7
C324	E-4	C557	J-13	D567	I-13	Q400	G-9	R311	B-4	R422	D-8	R567	J-14	Y320	B-3
C330	K-2	C562	J-14	D629	J-15	Q402	C-6	R312	B-4	R423	C-7	R568	H-14	Y603	M-2
C336	H-9	C565	I-14	D630	L-15	Q403	D-8	R315	E-3	R424	D-8	R569	H-14	Y620	K-5
C355	K-3	C603	N-2	D661	D-15	Q404	C-7	R318	C-4	R431	D-8	R603	N-4	Z286	L-1
C357	B-3	C604	L-4	F400	A-15	Q410	D-7	R319	B-4	R432	D-8	R604	M-3	Z361	K-11
C358	B-3	C605	L-4	F401	C-6	Q420	C-8	R320	C-4	R436	D-9	R605	M-3	Z370	G-3
C360	M-13	C606	L-4	IC270	J-7	Q461	L-13	R324	E-3	R437	F-8	R606	N-4	Z402	C-5
C361	K-10	C608	L-5	IC341	F-3	Q462	G-5	R330	B-4	R438	C-6	R607	M-4	Z405	C-6
C362	L-11	C609	M-2	IC345	C-4	Q463	E-7	R331	E-4	R445	H-12	R608	M-4	Z406	D-6
C365	M-14	C610	M-4	IC346	A-5	Q501	E-9	R332	F-5	R448	A-14	R609	L-5	Z461	L-13
C370	G-4	C611	M-3	IC410	D-9	Q502	B-12	R337	E-6	R459	F-5	R610	N-4	Z462	H-5
C371	G-4	C613	L-3	IC530	H-10	Q510	F-6	R338	E-6	R460	E-13	R621	J-5	Z463	F-7
C377	H-4	C614	M-3	IC550	I-13	Q560	I-10	R340	E-5	R461	L-13	R622	J-4	Z561	J-6
C379	G-4	C616	K-2	J8	D-5	Q565	I-12	R341	H-6	R462	G-5	R623	J-3		
C382	H-3	C617	K-2	J40	N-14	Q602	M-4	R343	E-3	R463	E-7	R624	J-3		
C383	G-2	C618	L-2	J250	G-7	Q630	I-10	R345	K-15	R464	L-12	R625	J-3		
C385	G-2	C619	L-6	J300	A-1	Q631	I-10	R346	E-5	R465	H-6	R630	J-5		
C400	A-15	C620	K-5	J303	N-1	Q632	I-11	R348	D-3	R466	D-16	R631	J-5		
C401	A-7	C621	K-3	J401	B-10	Q661	E-16	R350	A-2	R468	L-14	R632	J-5		
C402	B-6	C622	J-4	J410	D-8	R206	K-10	R352	B-1	R469	M-15	R633	J-10		