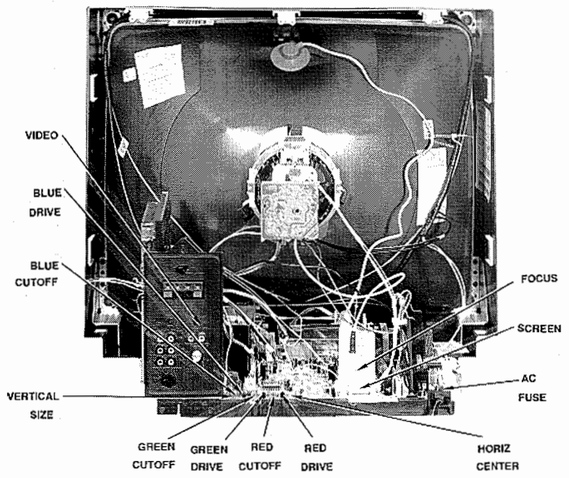


CABINET-REAR VIEW

DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

Remove six screws holding cabinet back and remove back. Disconnect HV anode, CRT socket, deflection yoke connectors, degaussing coil connector, speaker connector, and all required cabling. Remove three screws holding main board assembly to cabinet bottom. Slide assembly out of cabinet. Remove two screws holding switch panel to cabinet front and remove from cabinet.

CRT REMOVAL

Follow "Chassis Removal" procedure and lay set facedown on a soft protective surface. Loosen and remove CRT neck assemblies. Remove four screws holding CRT to cabinet front and lift CRT out of cabinet. Do not lift CRT by the neck.

SERVICING IN THE FIELD

CRT IMPLOSION PROTECTION AND CLEANING

Implosion protection is an integral part of the picture tube, cleaning accomplished without CRT removal.

FUSE DEVICES

A 4-amp fuse is used for AC line protection. (See photo, Cabinet - Rear View.)

LED ACCESSIBILITY

LEDS are accessible after removing the switch panel. See Disassembly Instructions.

CHANNEL TUNING

Channel Up and Down buttons are provided for channel scanning with ten numbered buttons (on Remote Transmitter) provided for one or two-digit entry direct access channel selection. Fine tuning is automatic.

HIGH VOLTAGE

For High Voltage procedure, refer to Miscellaneous Adjustments.

FOCUS

The focus may be varied by a Focus control. (See photo, Cabinet - Rear View.)

AGC

The RF AGC may be varied by an RF AGC Control (See photo, Main Board Top View.)

CENTERING

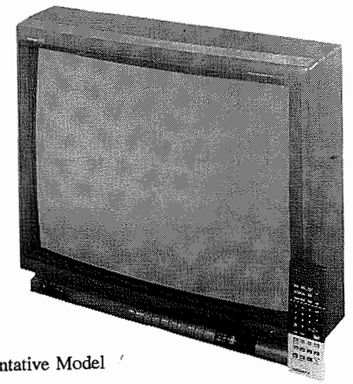
Horizontal centering is accomplished by proper adjustment of the horizontal centering control. (See photo, Cabinet - Rear View.)

Vertical centering is accomplished by proper adjustment of the vertical centering switch. (See photo, Main Board Top View.)

SAMS PHOTOFACT®
For Supplier Address See PHOTOFACT Index

PHILIPS CHASSIS 20R101,27R101/4/6,31R102/3

MODEL	CHASSIS	MODEL	CHASSIS
27K251	27R106	P0K271	27R104
27K261	27R106	P0K371	31R102
27K271	27R104	T0K261	27R106
27K471	27R106	T0K271	27R104
27K472	27R106	T0K471	27R106
31K371	31R102	20K161	20R101
31K571	31R103	20K171	20R101
PK7605	27R101	P0K171	20R101
P0K261	27R106		



Representative Model

SAFETY PRECAUTIONS

See Page 7.

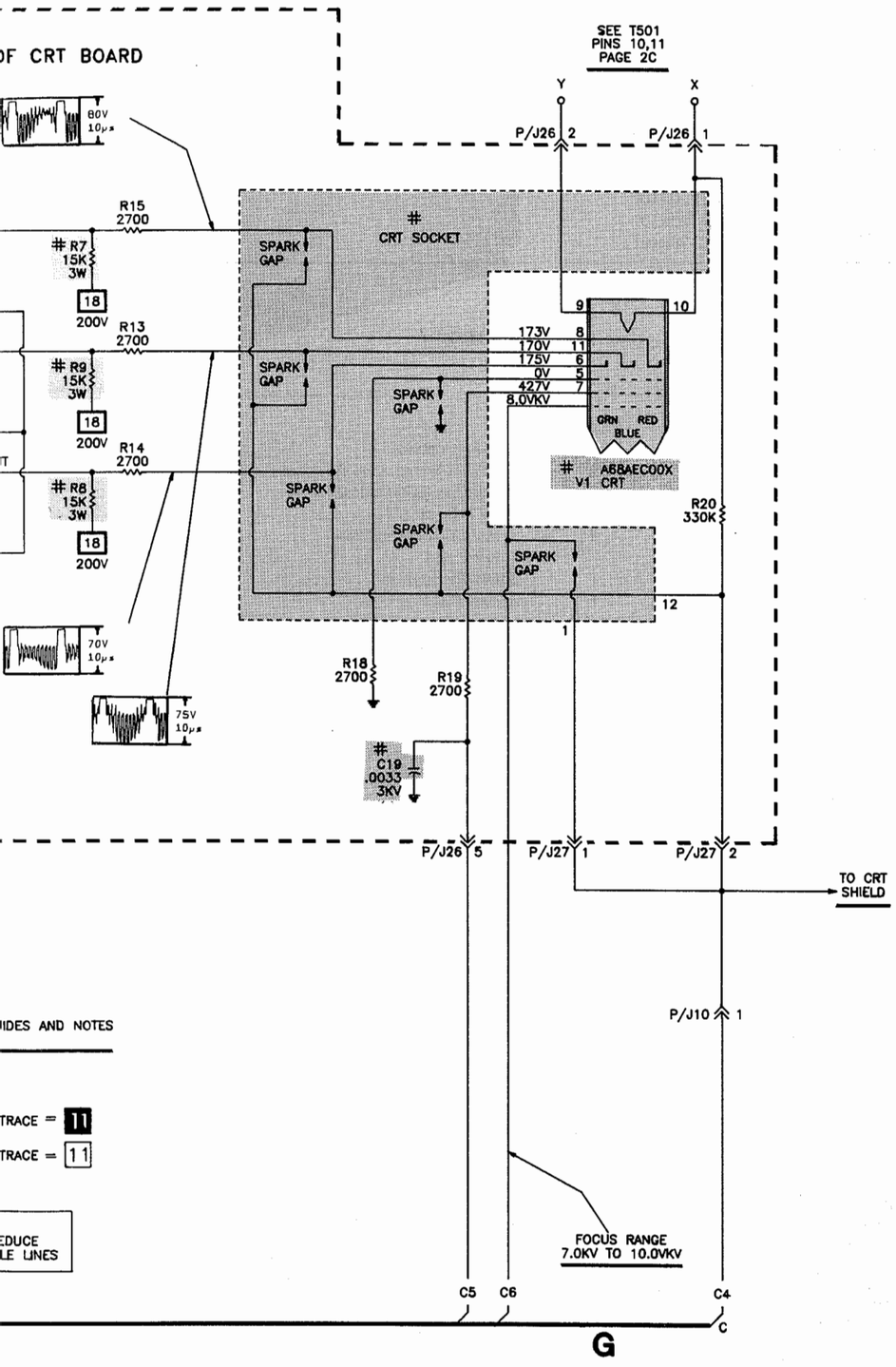
INDEX

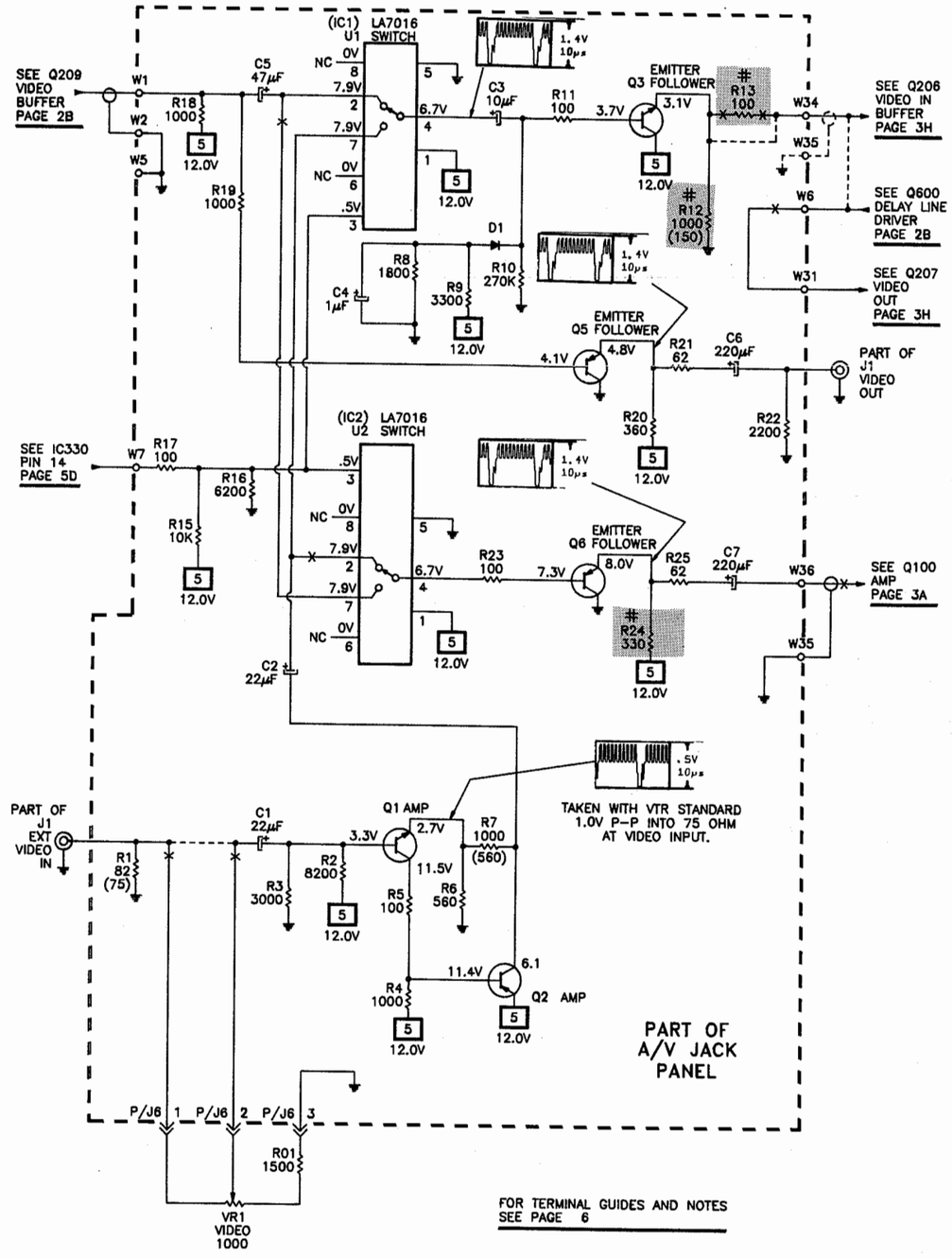
SAMS™ Howard W. Sams & Company
2647 Waterfront Parkway, East Drive, Suite 300, Indianapolis, Indiana 46214 U.S.A.

10 9 8 7 6 5 4 3 2 1 0

DATE 4-91 SET 2823 FOLDER 1

PHILIPS CHASSIS 20R101,27R101/4/6,31R102/3
SET 2823 FOLDER 1





PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3

A/V JACK
H

TEST EQUIPMENT

Test equipment listed by manufacturer illustrates typical or equivalent equipment used by SAMS' engineers to obtain measurements and is compatible with most types used by field service technicians.

Equipment	B&K Precision No.	SENCORE No.
Oscilloscope	1541A, 2120, 2125, 2160, 2190, 2522	SC61
Generators		
RGB	1249A, 1260	RG67
Multiburst Signal	1251, 1260	VA62A
Color Bar	1211A, 1249A, 1251, 1260	VA62A, CG25, NT64
TV Stereo	2009	ST65, ST66
Analog VOM	114, 117, 177, 214	
Digital VOM	377, 388HD, 2700 Series, 2831A 2860, 2900 Series	DVM37, DVM56A, SC61
Frequency Meter	1803A, 1804A, 1805, 1822, 1851, 1855	FC71, SC61
Hi-Voltage Probe VOM/DMM Accessory probes	HV-44 PR-28(HV)	HP200 TP212
Isolation Transformer	TR110, 1604,1653,1655	PR57
Capacitance Analyzer	810A, 815, 820, 830	LC76, LC101, LC102
CRT Analyzer	480, 490	CR70
Temperature Probe	TP-28, TP-30	
AC Leakage Tester	1655	PR57
Logic Probe	DP21, DP51	
Logic Pulser	DP31, DP101	
Inductance Analyzer	875A	LC76, LC101, LC102
Flyback Yoke Tester	875A	VA62A, LC76, LC101, LC102
TV Stereo Power Monitor		SR68
Field Strength Meter		FS73, FS74
Transistor Tester	510, 520B, 530	TF46
Video Analyzer		VA62A
Modulator/Converter	1201	

TV ALIGNMENT INSTRUCTIONS

Use an isolation transformer,or observe polarity, and maintain line voltage at 120VAC.
Allow a 20 minute warm-up period for reciever and test equipment.
Suggested Alignment tools: **GC-THORSEN**

ALIGNMENT COILS:	RECOMMENDED TOOLS:
L205, L230, L222	9440

PRELIMINARY INSTRUCTIONS

Select highest unused channel. Set scope sweep to external or vector mode. Connect scope vertical input to scope vertical input on sweep/marker generator. Connect scope external horizontal input to scope horizontal input on sweep/marker generator. Ground test equipment to TV chassis unless specified otherwise. Use only enough generator output to provide a useable indication. Sweep Generator frequency is 44MHz with 10MHz Sweep.
NOTE: Response may vary from that shown.
Apply 6.6V to TP210.

VIDEO IF ALIGNMENT (SWEEP MARKER GENERATOR)

DIRECT PROBE FROM SWEEP GENERATOR	SWEEP GENERATOR OUTPUT	MARKER GENERATOR FREQUENCY	REMARKS
TP1	TP207	45.75MHz	Adjust L230 for Maximum 45.75MHz. See Figure 1

TV ALIGNMENT INSTRUCTIONS (CONTINUED)

VIDEO IF ALIGNMENT (BAR SWEEP GENERATOR)

BAR SWEEP GENERATOR	SCOPE INPUT	REMARKS
To Antenna	TP1	Perform Video IF Adjustments per SWEEP/MARKER GENERATOR Instructions. See Figure 3

SOUND IF ALIGNMENT

Tune in a station and adjust L205 for Maximum sound. Reduce signal strength at the antenna terminals until distortion appears. Continue to reduce the signal while aligning for undistorted output by adjusting L205.

AUTOMATIC FINE TUNING ALIGNMENT

Connect as explained in preliminary instructions unless specified otherwise.

DIRECT PROBE FROM SWEEP GENERATOR	SWEEP GENERATOR OUTPUT	MARKER GENERATOR FREQUENCY	REMARKS
TP2	TP207	45.75MHz	Adjust L233 to place 45.75MHz marker as shown. See Figure 2

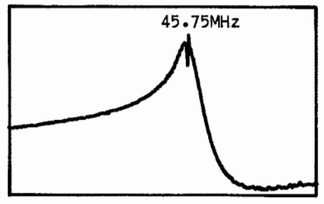


Figure 1

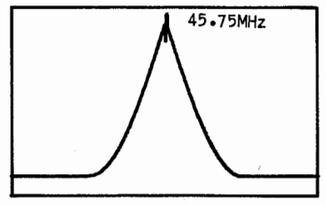
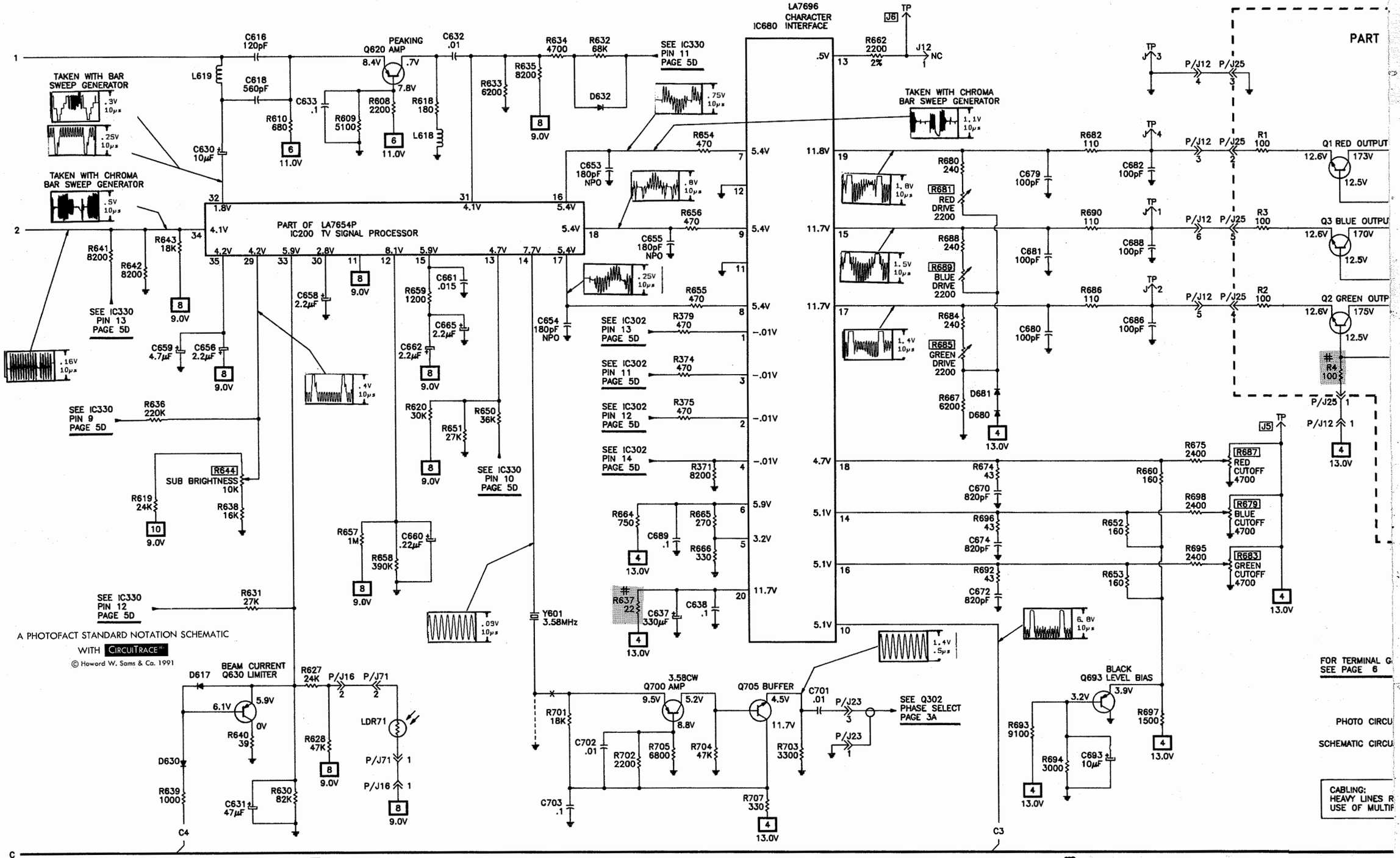


Figure 2


Figure 3


LA7696
CHARACTER
IC680 INTERFACE
PART OF LA7654P
IC200 TV SIGNAL PROCESSOR
TAKEN WITH BAR
SWEEP GENERATOR
TAKEN WITH CHROMA
BAR SWEEP GENERATOR
PEAKING
Q620 AMP
SEE IC330
PIN 11
PAGE 5D
SEE IC330
PIN 13
PAGE 5D
SEE IC330
PIN 9
PAGE 5D
SEE IC330
PIN 12
PAGE 5D
SEE IC330
PIN 10
PAGE 5D
SEE IC302
PIN 13
PAGE 5D
SEE IC302
PIN 11
PAGE 5D
SEE IC302
PIN 12
PAGE 5D
SEE IC302
PIN 14
PAGE 5D
SUB BRIGHTNESS
10K
BEAM CURRENT
Q630 LIMITER
3.58CW
Q700 AMP
Q705 BUFFER
SEE Q302
PHASE SELECT
PAGE 3A
BLACK
Q693 LEVEL BIAS
RED
DRIVE
2200
BLUE
DRIVE
2200
GREEN
DRIVE
2200
RED
CUTOFF
4700
BLUE
CUTOFF
4700
GREEN
CUTOFF
4700
Q1 RED OUTPUT
Q3 BLUE OUTPU
Q2 GREEN OUTP
Y601
3.58MHz
LDR71
PART
FOR TERMINAL G
SEE PAGE 6
PHOTO CIRCU
SCHEMATIC CIRCU
CABLING:
HEAVY LINES R
USE OF MULTIF
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™
© Howard W. Sams & Co. 1991

TROUBLESHOOTING AID

Note: Waveforms taken with triggered scope, Keyed-Rainbow generator. Schematic voltages measured with digital meter, no signal. Controls adjusted for normal operation.

PICTURE OR SOUND

NO PIC, NO SOUND, NO RASTER: Check AC power supply and sources generated from Horizontal Output Transformer (T501). Refer to "Troubleshooting" Power Supply and Horizontal circuits.
NO PIC, NO SOUND, HAS RASTER: Check IF-AGC and source voltages from Horizontal Output Transformer (T501). Refer to "Troubleshooting" IF-AGC and Horizontal circuits.
NO PIC, HAS SOUND, NO RASTER: Check Horizontal Output Transformer (T501) sources and Video circuit. Refer to "Troubleshooting" Horizontal and Video circuits.
NO PIC, HAS SOUND, HAS RASTER: Refer to "Troubleshooting" Video circuit.
HAS PIC, NO SOUND: Refer to "Troubleshooting" Audio circuit.
OVERLOADED PICTURE: Refer to "Troubleshooting" IF-AGC circuit.
LOW OR EXCESSIVE BRIGHTNESS: Check Video and Luminance circuits. Refer to "Troubleshooting" Video circuit.

SWEEP

NO RASTER, HAS SOUND: Check HV rectifier, Part of Horizontal Output Transformer (T501). Refer to "Troubleshooting" Horizontal circuit.
NO RASTER, NO SOUND: Refer to "Troubleshooting" Horizontal circuit.
NO VERT DEFLECTION: Refer to "Troubleshooting" Vertical circuit.
POOR VERT LIN OR FOLDOVER: Refer to "Troubleshooting" Vertical circuit.
POOR HORIZ LIN OR FOLDOVER: Refer to "Troubleshooting" Horizontal circuit.
NARROW PICTURE: Refer to "Troubleshooting" Horizontal circuit.
VERT OFF FREQUENCY: Refer to "Troubleshooting" Vertical circuit.
HORIZ OFF FREQUENCY: Refer to "Troubleshooting" Horizontal circuit.

SYNC

NO VERT/HORIZ SYNC: Refer to "Troubleshooting" Sync circuit.

RASTER

YELLOW (NO BLUE): Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.
CYAN (NO RED): Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.
MAGENTA (NO GREEN): Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.

COLOR (B/W operating normally)

NO COLOR: Refer to "Troubleshooting" Chroma circuit.
WEAK COLOR: Refer to "Troubleshooting" Chroma circuit.
NO COLOR SYNC: Refer to "Troubleshooting" Chroma circuit.
NO GREEN: Check Chroma and Green Output circuits. Refer to "Troubleshooting" Raster circuit.
NO BLUE: Check Chroma and Blue Output circuits. Refer to "Troubleshooting" Raster circuit.
NO RED: Check Chroma and Red Output circuits. Refer to "Troubleshooting" Raster circuit.
INCORRECT HUE (TINT): Refer to "Troubleshooting" Chroma circuit.

TEST JIG HOOKUP

FUNCTION	Chek-A-Color ADAPTER NO.	PC BOARD PLUG NO. J11	PIN 1	BLACK
			PIN 2	YELLOW
CRT	B239			
YOKE	D482			
YOKE SETTING	YP1	PC BOARD PLUG NO. J8	PINS 1,2	RED
COMMENTS	FOCUS TAP		PINS 4,5	BLUE

TROUBLESHOOTING

POWER SUPPLY

Check the AC Fuse (F400). If Fuse F400 is open, check Bridge Rectifier Diodes (D402 thru D405), Capacitors C400, C403 and C417 and Electrolytic C411. Apply 120VAC and check for 158V* at the cathode of Diode D403. If this voltage is missing, check Line Filter (L400), Degauss Relay (K400). If 158V* is present, check for 130V at the cathode of D414. If this voltage is missing, check the voltages and components associated with the Voltage Control Amp Transistor (Q461), Output Voltage Reg IC (IC400), Controller IC (IC401) and Power Reg (Q410). If the voltage at D414 is 178V, the set may be in shutdown, refer to the "Horizontal" and the "High Voltage Shutdown" sections of this Troubleshooting guide. If the proper voltage is present at D414, refer to the "Horizontal" section of this Troubleshooting guide.

*Taken from Common Tie Point.

HORIZONTAL

Determine if the TV is in shutdown, refer to the "High Voltage Shutdown" section of this Troubleshooting guide. If the TV is not in shutdown, inject a horizontal signal at the base of the Horizontal Output Transistor (Q501). If horizontal deflection is now present, check the voltages, waveforms and components associated with Pins 20, 22 thru 25 of the Signal Processor IC (IC200) and the Horizontal Driver Transistor (Q500). If there is still no horizontal sweep, check the voltages, waveforms and components associated with Horizontal Driver Transformer (T500), Q501 and the Horizontal Output Transformer (T501). The high voltage rectifier is part of (T501) and if defective will affect the performance of the horizontal circuits. If the Horizontal Oscillator is off frequency, check the voltages, waveforms and components associated with Pin 24 of IC200. Horizontal linearity or foldover problems may be caused by Capacitors C505, C521, C522, C524, and Linearity Coil (L509) being defective.

Voltage Taken with TV in Shutdown
Cathode D414 178V

HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC, turn set On, set all customer controls for normal operation. Connect a 7.3V Bias thru an isolation diode to the cathode of D520. Set should lose Raster and Sound. If set does not lose raster and sound the shutdown circuit should be repaired. To resume normal operation, remove AC Power and wait 30 seconds then turn set On.

IF-AGC

Inject a video IF signal at the IF input and check for video on the CRT. If video is present, check the tuner, tuner control and tuner AFC circuits. If there is no video on the CRT, check for a video waveform at TP1. If video is present at TP1, refer to the "Video" section of this Troubleshooting guide. If there is no video at TP1, apply AGC bias to Pin 10 of the Signal Processor IC (IC200). If video is now present at TP1, check the voltages, waveforms and components associated with Pins 8, 10 and 40 of IC200. If there is still no video at TP1, check the voltages, waveforms and components associated with Pins 5 thru 8, 10, 36, 37, 38, 40, 41, 42 of IC200 and the Video buffer Transistor (Q209). A defective AGC circuit can cause an overloaded picture, excessive snow or loss of audio and video. See the AGC Voltage Chart for AGC voltages with signal.

AGC VOLTAGE CHART
IC200

Pin 8	5.3V
Pin 10	6.7V
Pin 40	3.6V

AUDIO

Select an active TV channel and check for an audio waveform at Pin 1 of the Stereo/SAP Decoder IDBX IC (IC120). If there is no audio, check the voltages, waveforms and components associated with the Sound Detector IC (IC260), Pins 1, 2, 9 and 39 of the Signal Processor IC (IC200) and the Base Band Buffer Transistor (Q200). If audio is present at Pin 1 of IC120, select a station that is transmitting a Stereo signal and check for audio at Pins 26 and 37 of IC120. If audio is missing, check voltages, waveforms and components associated with Pins 15 thru 27, 29, 36 thru 45 of IC120. Select a station transmitting a SAP signal. Select the SAP mode and check

C

D

C1870CA-002
IC120 STEREO/SAP DECODER/DBX

5.7V 1.2V 1.3V 4.3V 4.3V 4.4V 4.4V 1.3V 1.1V 5.0V 1.3V 5.7V .5V 5.7V .5V 5.8V 5.0V

R108 30K
R105 82K
R102 FREE RUN FREQ 47K
R104 1000
C108 3.3µF
C107 4.7µF
R107 110K
C110 2.2µF
R128 549K 1%
R122 10K
R123 SAP/ST 10K
C132 3.3µF 1%
R125 75K
TP126
R126 SAP/ST DBX 47K
C131 .47µF
R132 3kHz SEP 220K
C129 .47µF
R130 91K
R131 300Hz SEP 100K
R129 33K
C128 .47µF
C135 .1 10% 100V
C134 1µF

SEE IC330 PIN 16 PAGE 5D
R115 1500
STEREO IC121 COMPARATOR
R111 6800
R112 2700
R113 3300
R114 3300
R116 3300
4.5V 4.5V
SEE IC330 PIN 15 PAGE 5D

C118 1µF
C121 1µF
5.5V 5.5V
SEE IC160 PIN 1 PAGE 6E
SEE IC160 PIN 3 PAGE 6E
TP134

IC670 LA7222 SWITCH
LUMINANCE Q670 BUFFER
R669 100
R673 560
R670 120
C642 .1
7.1V 6.6V 5.9V 7.1V

LUMINANCE Q615 EQUALIZER
C612 70pF
L611 1.0
C613 150pF
R624 680
R621 100
R623 1500
R625 470
R626 560
C677 22µF
3.4V 6.5V 2.8V

LUMINANCE Q635 AMP
C676 100µF
C644 120pF
L635 1.0
C635 39pF
R647 100
R646 2200
R661 620
R678 470
R663 470
R617 1100
R648 91
2.7V 7.4V 2.0V

R671 1000
R676 1000
SEE IC301 PIN 14 PAGE 5C
4.6V 4.6V

R649 1000
C648 .047
R668 75
C671 .047
R622 75K
12.0V

C678 .33µF
R677 82
13.0V

PART OF A/V JACK PANEL
J2 S-VHS
W41 W42 W43 W44
P/J21

1.4V 10µs
.18V 10µs

P/J8
SEE W6 PINCUSHION BOARD PAGE 5H

T501
HV RANGE 27.5KV TO 39.0KV
R500A FOCUS
R500B SCREEN
P/J9
C511 .22 100V
SEE POWER SUPPLY PAGE 3F
82V 5µs

L504
R506 15 2W
C506 .01 100V
130V
32V 5µs

D518 Q518 COMPARATOR
R522 3650 1%
D513
R518 11K
R519 1000
R523 20K
R517 2670 1%
R516 100
C516 .1
Z512
R520 5620 1%
D520
C523 22µF
Z516
SEE Q462 SHUTDOWN LATCH PAGE 3E
25.2V 25.7V 0V 27.1V 29.8V
28.0V

R513 2 (1.1) (1W)
C510 .047
SEE CRT FILAMENT PAGE 2G

P/J19
SEE W3 PINCUSHION BOARD PAGE 5H
SEE W4 PINCUSHION BOARD PAGE 5H
240V 10µs

C508 .001 500V
D502
C509 22µF 250V
22V 5µs
P/J9 P/J26
R16 100
L16 4.7
C16 .022 500V
18 200V SOURCE
PART OF CRT BOARD

PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11

FOR TERMINAL GUIDES AND NOTES SEE PAGE 6

CABLING:
HEAVY LINES REDUCE USE OF MULTIPLE LINES

C4 C5 C6 C2

TROUBLESHOOTING (CONTINUED)

for an audio waveform at Pin 12 of IC120. If waveform is missing, check the voltages, waveforms and components associated with Pins 2 thru 14, 28, 47 and 48 of IC120. Check for audio waveforms at Pins 1 and 3 of the Stereo/Audio Control IC (IC160). If waveforms are missing, check voltages, waveforms and components associated with Pins 29 thru 35 of IC120. If waveforms are present at Pins 1 and 3 of IC160, check for waveforms at Pins 7 and 10 of the Stereo Amp IC (IC180). If waveforms are missing, check voltages, waveforms and components associated with IC160 and IC180.

HIGH VOLTAGE SHUTDOWN

The high voltage is monitored by Diode D513, rectifying pulses from the Horizontal Output Transformer (T501). Should the high voltage increase, the rectified voltage at the cathode of Diode D513 will also increase and trigger Zener Diode Z512. This causes Shutdown Latch (Q462) and On/Off Shutdown IC (IC402) to turn on and shutdown Controller IC (IC401). To troubleshoot, remove D520 from the circuit and use a variac for AC power. Start at 90VAC and increase as necessary to locate and repair defect. Return D520 to the circuit.

NOTE: Care shold be taken in defeating the high voltage shutdown circuit, as this may cause excessive X-radiation and damage to the CRT, Transformer T501 and associated components. Monitor the high voltage and troubleshoot.

VOLTAGES TAKEN WITH TV IN SHUTDOWN
IC401
Pin 5 .21V*
D403
CATHODE 169V*

*Taken from common tie point.

VIDEO

Inject a video signal at TP1 and check for video on the CRT. If video is present, refer to the "IF-AGC" section of this Troubleshooting guide. If there is no video on the CRT, check for a video waveform at Pin 32 of Signal processor IC (IC200). If video is missing at Pin 32 of IC200, check the voltages, waveforms and components associated with Switch IC (IC1), Emitter Follower Transistor (Q3), Video In Buffer (Q206), Multiplexor IC (IC230), Video Out Transistor (Q207), Delay Line Driver Transistor (Q600), Luminance Buffer Transistor (Q610), Luminance Equalizer Transistor (Q615), Switch IC (IC670) and Luminance Buffer Transistor (Q670). If video is present at Pin 32 of IC200, check for a video waveform at Pin 10 of Character Interface IC (IC680). If the waveform is missing, check the voltages, waveforms and components associated with Pins 19, 29 thru 33 of IC200. If the waveform is present at Pin 10 of IC680, check the voltages, waveforms and components associated with IC680, Output Transistors (Q1, Q2, Q3) and CRT. If the brightness is inadequate or cannot be controlled, check the voltages, waveforms and components associated with Pin 29 of IC200.

VERTICAL

Inject a vertical drive signal at Pin 3 of the Vertical output IC (IC550). If vertical deflection is now present, check voltages, waveforms and components associated with Pin 27 of the Signal Processor IC (IC200) and the Vertical Amp Transistor (Q304). If there is still no vertical deflection, check the voltages, waveforms and components associated with IC550. Vertical linearity or foldover problems may be caused by vertical feedback and bias circuits, check Electrolytics C553, C565 and C567 for defects.

SYNC

If there is no vertical or horizontal sync, check the voltages, waveforms and components associated with Pin 26 of the Signal Processor IC (IC200). If there is no vertical sync, check the voltages, waveforms and components associated with Pins 26 and 27 of IC200. If there is no horizontal sync, check the voltages and components associated with Pins 22 thru 26 of IC200.

RASTER

Check the CRT and CRT voltages. If there is no Red, check the voltages and components associated with Pin 16 of the Signal Processor IC (IC200), Pins 1, 7 and 19 of the Character Interface IC (IC680) and Red Output Transistor (Q1). If there is no Blue, check the voltages and components associated with Pin 18 of IC200, Pins 3, 9 and 15 of IC680 and Blue Output Transistor (Q3). If there is no Green, check the voltages and components associated with Pin 17 of IC200, Pins 2, 8 and 17 of IC680 and Green Output Transistor (Q2). If the raster has a keystone shape, check the Deflection Yoke (DY1). If the raster has height or width problems, refer to the "Vertical", "Horizontal" and "Power Supply" sections of this Troubleshooting guide.

CHROMA

Check for a chroma waveform at Pin 34 of the Signal processor IC (IC200). If the waveform is missing, check the components associated with Pin 34. Check the voltages, waveforms and components associated with Pins 11 and 12 of the switch IC (IC670). If a chroma waveform is present at Pin 34 of IC200, check for the proper waveforms at Pins 16, 17 and 18 of IC200. If these waveforms are missing, check the voltages, waveforms and components associated with Pins 11 thru 18, 34 and 35 of IC200. Check the 3.58MHz oscillator at Pin 14 of IC200. If there is inadequate tint range, check the voltages and components associated with Pin 13 of IC200. If the proper waveforms are present at Pins 16, 17 and 18 of IC200, refer to the "Raster" section of this Troubleshooting guide.

PIP TROUBLESHOOTING

PIP VIDEO

Check the waveform at Pin 8 of Multiplexer/Analog to Digital Converter (IC150). If the waveform is missing check waveforms, voltages, and components associated with Amp Transistor (Q100), Low Pass Filter Transistor (Q101), and Buffer Transistor (Q102). If the waveform is present at Pin 8 of IC150, check the waveform at Pin 1 of Multiplexer IC (IC230). If the waveform is missing, check voltages, waveforms, logic and components associated with PIP Video Buffer Transistor (Q203), PIP Video Amps (Q200, Q202), D/A IC (IC200), Logic Unit IC (IC400), IC150 and SRAM IC (IC410). If the waveform is present at Pin 1 of IC230, check voltages and components associated with IC230.

PIP OSCILLATOR

Check the waveform at Pin 2 of Phase Detect IC (IC300). If the waveform is missing at Pin 2 of IC300, check voltages, waveforms and components associated with Phase Select Transistor (Q302), Phase Buffer Transistor (Q303), and Phase Amp Transistor (Q304). If the waveform is present at Pin 2 of IC300, check for 14.318MHz at Pin 34 of Logic Unit IC (IC400). If the frequency is incorrect check voltages, waveforms, logic and components associated with Osc Buffers (Q300, Q301) and Phase Detect IC (IC300).

PIP SYNC

Check the waveform at Pin 27 of Decoder IC (IC100). If the waveform is missing check voltages and components associated with Pin 27 of IC100. If the waveform is present at Pin 27 of IC100 check voltages and components associated with IC100.

PIP CHROMA

Check the waveform at Pin 30 of Decoder IC (IC100). If the waveform is missing, check the voltages and components associated with Pin 30 of IC100. If the waveform is present at Pin 30 of IC100, check the waveforms at pins 6 and 7 of Multiplexer/Analog to Digital Converter IC (IC150). If the waveforms at Pins 6 and 7 of IC150 are missing, check voltages and components associated with R-Y Transistor (Q108), B-Y Transistor (Q109), B-Y Clamp Transistor (Q106), R-Y Clamp Transistor (Q107), Level Converter IC (IC180) and IC100. If waveforms are present at Pins 6 and 7 of IC150, check voltages, logic and components associated with IC150, Logic Unit IC (IC400) and SRAM IC (IC415).

PIP VERTICAL

Check the waveform at Pin 24 of Decoder IC (IC100). If the waveform is missing, check voltages and components associated with IC100. If the waveform at Pin 24 of IC100 is present, check the waveform at Pin 30 of Logic Unit IC (IC400). If the waveform at Pin 30 of IC400 is missing, check voltages and components associated with Vert Transistor (Q209). If the waveform at Pin 30 of IC400 is present, check the logic and components associated with IC400.

PIP HORIZONTAL

Check the waveform at the Emitter of PIP Horiz Transistor (Q103). If the waveform at the Emitter of Q103 is missing, check voltages, waveforms and components associated with PIP Horiz Transistors (Q103, Q104) and Decoder IC (IC100). If the waveform is present at the Emitter of Q103, check the waveform at Pin 31 of Logic Unit IC (IC400). If the waveform at Pin 31 of IC400 is missing, check voltages and components associated with Horiz Transistor (Q208). If the waveform is present at Pin 31 of IC400, check the logic and components associated with IC400.

A

B

C

SEE TUNER PIN (8) +V PAGE 5E

SEE IC390 PIN 6 PAGE 5C

SEE TUNER PIN (9) IF PAGE 5E

SEE TUNER PIN (11) IF PAGE 5E

SEE TUNER PIN (5) AGC PAGE 5E

SEE TUNER PIN (7) +30V PAGE 5E

SEE TUNER PIN (6) +12V PAGE 5E

SEE TUNER PIN (10) GND PAGE 5E

SEE IC1 PIN 2 PAGE 2H

SEE W6 A/V JACK PANEL PAGE 2H

SEE W34 A/V JACK PANEL PAGE 2H

SEE IC301 PIN 17 PAGE 5C

SEE IC301 PIN 34 PAGE 5C

SEE IC301 PIN 33 PAGE 5C

SEE IC30 PIN 13 PAGE 5C

SEE Q304 VERT AMP PAGE 5C

SEE Q304 VERT AMP PAGE 5D

SEE Q209 VERT PAGE 3C

SEE PINCUSHION MODULE PAGE 5H

SEE W1 PINCUSHION BOARD PAGE 5H

SEE W5 PINCUSHION BOARD PAGE 5H

SEE Q306 HORIZ REF PAGE 5C

SEE Q208 HORIZ PAGE 3C

SEE PINCUS BOA PAGE

TAKEN WITH BAR SWEEP GENERATOR

IF AGC RANGE 6.5V TO 9.0V

RF AGC RANGE 3.6V TO 8.2V

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE™

A

B

COLOR

TINT

VIDEO BURST

IC180 LEVEL CONVERTER LM358N

IC100 DECODER LA7620

NOTE: WAVEFORMS AND VOLTAGES TAKEN WITH PIP ON AND VTR STANDARD 1.0V p-p INTO 75 OHMS AT VIDEO INPUT.

IC150 MULTIPLEXER/ ANALOG TO DIGITAL CONVERTER M52686P

IC300 PHASE DETECT SN74HC86N

Q104 PIP HORIZ

Q103 PIP HORIZ

Q110 BUFFER

Q108 R-Y

Q109 B-Y

Q107 R-Y CLAMP

Q106 B-Y CLAMP

Q100 AMP

Q101 LOW PASS FILTER

Q102 BUFFER

Q302 PHASE SELECT

Q303 PHASE BUFFER

Q304 PHASE AMP

SEE IC301 PIN 39 PAGE 5D

SEE IC550 P PIN 3 PAGE 2A

SEE Q510 FLYBACK PULSE BUFFER PAGE 2B

SEE IC301 P PIN 38 PAGE 5D

SEE Q6 EMITTER FOLLOWER PAGE 2H

SEE Q705 BUFFER PAGE 2E

C

D

IC107
RAM

IC108
ROM

IC110
LATCH

R50 33K
R51 33K
R52 33K
R53 33K
R54 33K
R55 33K
R56 33K
R57 33K

R47 33K

R45 5600
R41 5600
R43 5600
R42 5600
R44 5600

TP1
C11 .01 10%
D6
D5
D9
D10
3V
6.0V

PART OF IC105
PART OF IC102

B17 B19 B14 B18 B23 B20 B16 B21 B22 B20 B15 B18 B19 B21 B22 B20 B

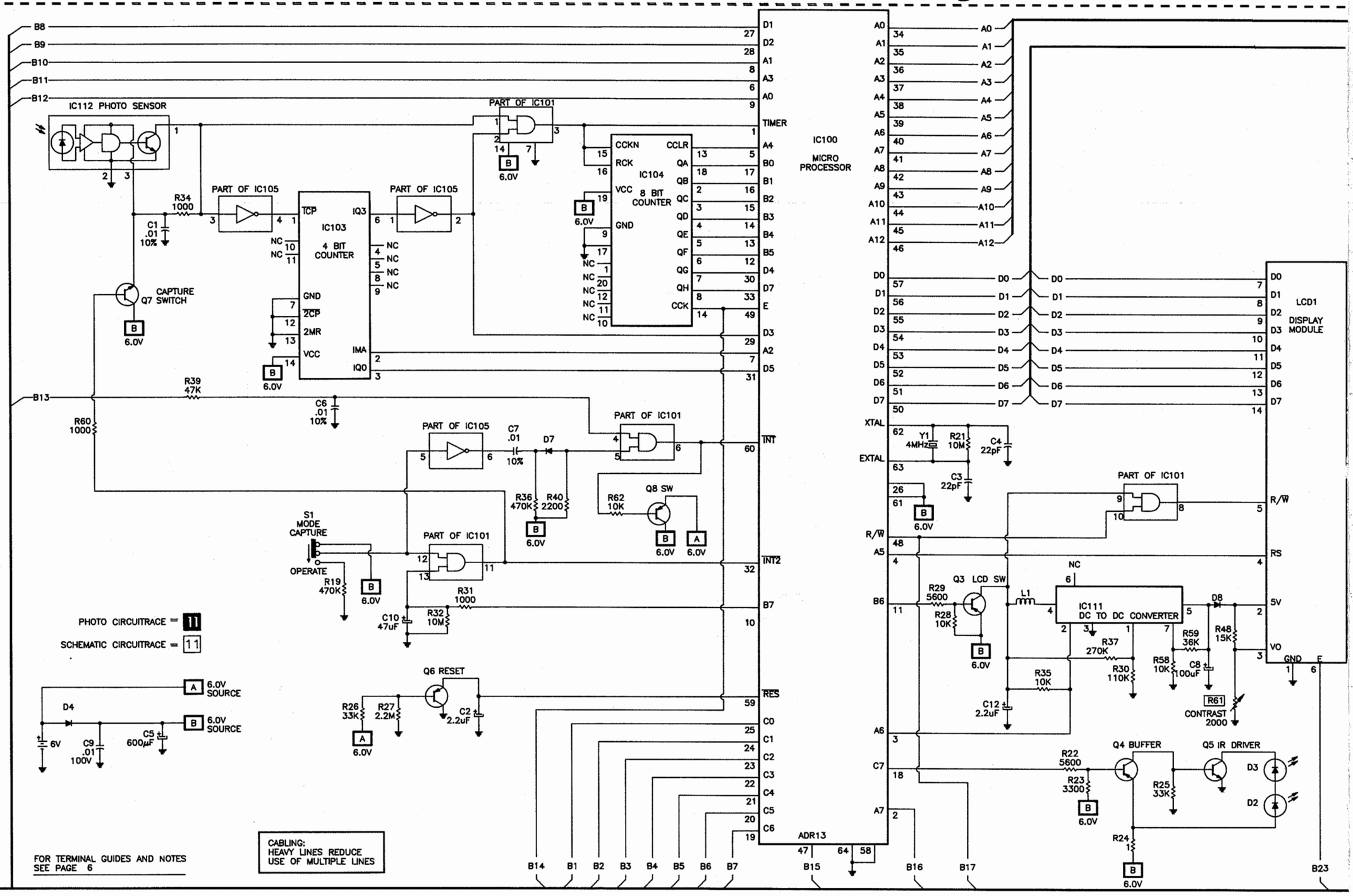
C

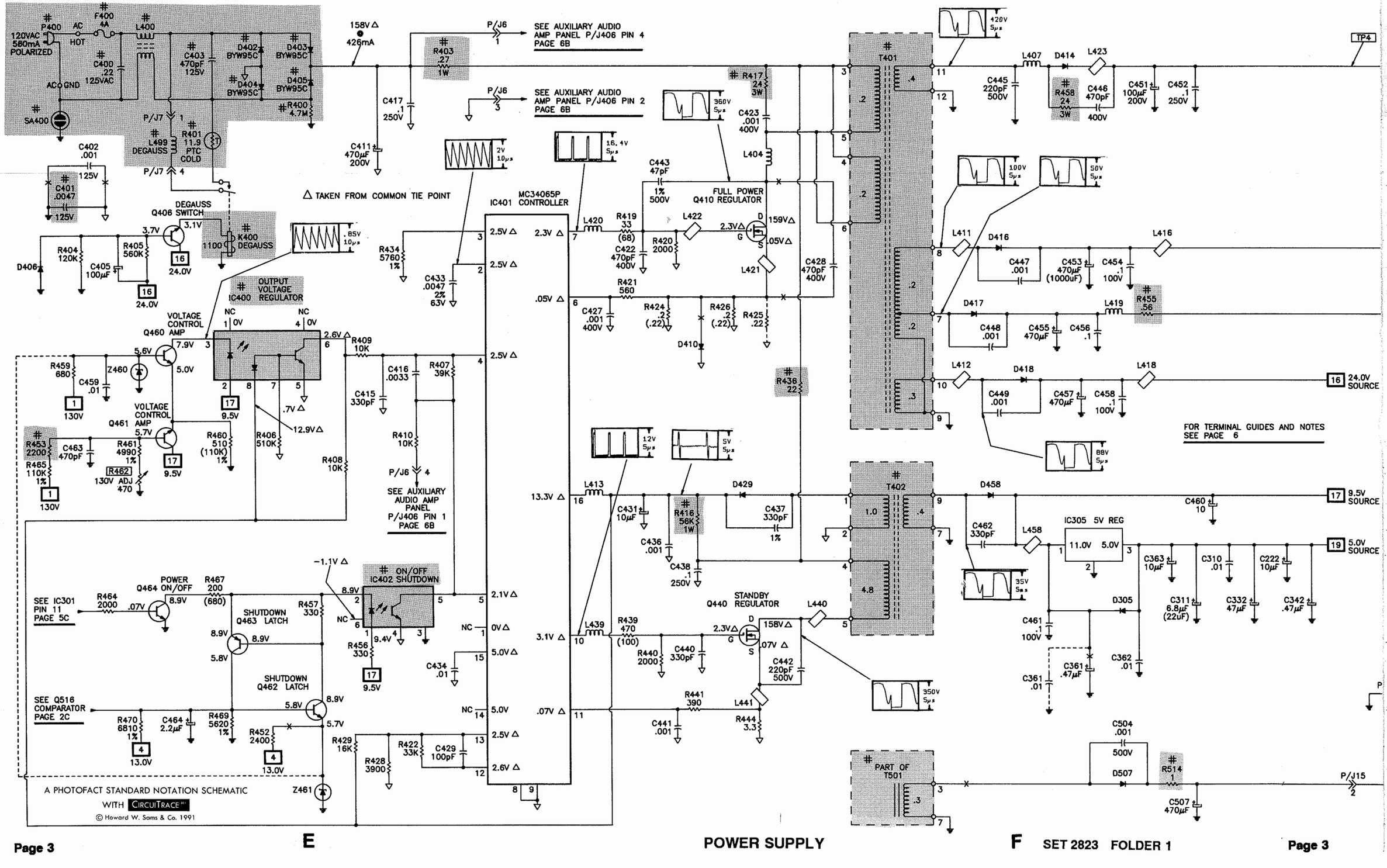
D

R122 10K
R121 10K
D103
13 9.0V
14 5.0V
P 17 PVR
P 18 PHR
P 2 SDA
P 3 SDAA
P 30 MVR
P 31 MHR
P 1 SCL
H 14 RST
32
42
P 19 YUV0
P 20 YUV1
P 21 YUV2
P 22 YUV3
P 23 YUV4
P 24 YUV5
P 28 SY
P 29 SRY
P 27 SBY
P 25 ADC
P 26 PCP
P 64 VCC
H 35 TEST
P 34 FS4
P 33 FSC
IC400 LOGIC UNIT
3.6V
CM0 39 P C0
CM1 40 P C1
CM2 41 P C2
CM3 38 P C3
CM4 37 P C4
CM5 36 P C5
YM0 48 P Y0
YM1 46 P Y1
YM2 44 P Y2
YM3 43 P Y3
YM4 45 P Y4
YM5 47 P Y5
MA0 49 P A0
MA1 50 P A1
MA2 51 P A2
MA3 53 P A3
MA4 55 P A4
MA5 57 P A5
MA6 59 P A6
MA7 61 P A7
MA8 60 P A8
MA9 58 P A9
MA10 52 P A10
MA11 56 P A11
MA12 62 P A12
MWEN 63
MOEN 54
PCV0 8 P
PCV1 13 P
PCV2 12 P
PCV3 7 P
PCV4 6 P
PCV5 9 P
PCV6 10 P
PCV7 11 L
PSW 5 P
MCP 4 P
DA1 15 *
DA2 16 *
IC415 SRAM MB8464A -80L-SK
A0 P 10 A0
A1 P 9 A1
A2 P 8 A2
A3 P 7 A3
A4 P 6 A4
A5 P 5 A5
A6 P 4 A6
A7 P 3 A7
A8 P 25 A8
A9 P 24 A9
A10 P 21 A10
A11 P 23 A11
A12 P 2 A12
DQ0 11 P C0
DQ1 12 P C1
DQ2 13 P C2
DQ3 15 P C3
DQ4 16 P C4
DQ5 17 P C5
DQ6 18 P NC
DQ7 19 P NC
0V 1 NC
CS2 26
VCC 28
P 27 WE
P 22 OE
CST 20
14
R265 H 100
14 5.0V
IC410 SRAM MB8464A -80L-SK
DQ0 11 P Y0
DQ1 12 P Y1
DQ2 13 P Y2
DQ3 15 P Y3
DQ4 16 P Y4
DQ5 17 P Y5
R264 H 100
CABLING:
HEAVY LINES REDUCE USE OF MULTIPLE LINES
.14V 10µs
IC200 D/A TDA8702
B0 P 12
B1 P 11
B2 P 3
B3 P 4
B4 P 10
B5 P 9
B6 P 8
B7 P 7
2.4V CLK P 5
3.7V VOUTN 15
4.6V VOUT 14 NC
4.8V VCCA 16
VCCD 13
1.2V REF 1
AGND 2
DGND 6
R212 430
L201 1.2
C210 4.7µF
C208 39pF
C209 120pF
R214 22K
R213 22K
13 9.0V
C203 47µF
C206 .1
L200 2.4
14 5.0V
C204 .1
Q200 PIP VIDEO AMP
4.6V 4.0V
R216 4.0V 1200
R219 100
13 9.0V
Q202 PIP VIDEO AMP
8.3V 4.6V
R220 75
8.9V
13 9.0V
R224 22
C214 1µF
R223 750
1
Q201 CLAMP
4.6V 4.0V
8.9V
R217 220
R215 2200
13 9.0V
R221 WHITE LEVEL 4700
R222 100
C212 7pF
R218 2200
C211 47µF
PHOTO CIRCUITRACE = 11
SCHEMATIC CIRCUITRACE = 11
FOR TERMINAL GUIDES AND NOTES SEE PAGE 6
2
3
P
L902 R902 22 R206 6800
Q209 VERT .6V .2V
R209 1000
R208 10K
14 5.0V
C902 100pF
C224 100pF
R207 3300
L912
5V 5µs
/J1002 2
L901 R901 22 R203 22K
Q208 HORIZ .1V 4.1V
R205 10K
14 5.0V
C901 100pF
C223 100pF
R204 1500
L911
5V 10µs
/J1002 1
L905 R905 22 R202 22K
/J1002 5
C905 100pF
L915
R200 10K
C200 .1
14 5.0V
14 5.0V
NC
C326 33pF
Q300 OSC BUFFER 2.8V 2.1V 4.4V
R324 100
R328 47K
R354 68K
R346 22
C328 47pF
15 4.5V
15 4.5V
Q301 OSC BUFFER
R352 220 1.8V
2.0V
C342 .001
R342 1000
R340 470K
15 4.5V
R350 1000
C330 100pF
R334 3000
R336 SYMMETRY 2200
R338 3900
14 5.0V
TINT
COLOR

A

B




P400 AC HOT 120VAC 560mA POLARIZED
F400 4A
L400
C400 .22 125VAC
C403 470pF 125V
D402 BYW95C
D403 BYW95C
D404 BYW95C
D405 BYW95C
R400 4.7M
AC GND
SA400
P/J7
L499 DEGAUSS
R401 11.9 PTC COLD
158V△
426mA
R403 27 1W
P/J6 1
SEE AUXILIARY AUDIO AMP PANEL P/J406 PIN 4 PAGE 6B
P/J6 3
SEE AUXILIARY AUDIO AMP PANEL P/J406 PIN 2 PAGE 6B
C417 .1 250V
C411 470μF 200V
C402 .001 125V
C401 .0047 125V
DEGAUSS Q406 SWITCH
K400 DEGAUSS
△ TAKEN FROM COMMON TIE POINT
MC34065P IC401 CONTROLLER
R404 120K
R405 560K
C405 100μF
D406
24.0V
OUTPUT VOLTAGE REGULATOR IC400
VOLTAGE CONTROL Q460 AMP
VOLTAGE CONTROL Q461 AMP
R459 680
C459 .01
Z460
R453 2200
C463 470pF
R465 110K 1%
R461 4990 1%
R462 130V ADJ 470
R460 510 (110K) 1%
R406 510K
R409 10K
C416 .0033
C415 330pF
R407 39K
R410 10K
R408 10K
P/J6 4
SEE AUXILIARY AUDIO AMP PANEL P/J406 PIN 1 PAGE 6B
130V
9.5V
12.9V△
.7V△
5.6V
7.9V
5.0V
5.7V
ON/OFF IC402 SHUTDOWN
POWER ON/OFF Q464
R467 200 (680)
R464 2000 .07V
R457 330
R456 330
SHUTDOWN Q463 LATCH
SHUTDOWN Q462 LATCH
SEE IC301 PIN 11 PAGE 5C
SEE Q516 COMPARATOR PAGE 2C
R470 6810 1%
C464 2.2μF
R469 5620 1%
R452 2400
13.0V
−1.1V△
8.9V
9.4V
5.8V
Z461
R434 5760 1%
C433 .0047 2% 63V
2.5V△
2.3V△
.05V△
2.1V△
0V△
5.0V△
2.6V△
C434 .01
C429 100pF
R428 3900
R429 16K
R422 33K
L420
R419 33 (68)
C422 470pF 400V
R420 2000
L422
L421
C443 47pF 1% 500V
FULL POWER Q410 REGULATOR
R417 24 3W
C423 .001 400V
L404
159V△
.05V△
C428 470pF 400V
C427 .001 400V
R424 .2 (.22)
R426 .2 (.22)
R425 .22
D410
R438 22
R421 560
L413
C431 10μF
C436 .001
R416 56K 1W
C438 .1 250V
D429
C437 330pF 1%
13.3V△
3.1V△
.07V△
L439
R439 470 (100)
C440 330pF
R440 2000
STANDBY Q440 REGULATOR
L440
158V△
.07V△
C442 220pF 500V
L441
R441 390
C441 .001
R444 3.3
C504 .001 500V
D507
R514
C507 470μF
PART OF T501
P/J15 2
T401
T402
L407
D414
L423
C445 220pF 500V
R458 24 3W
C446 470pF 400V
C451 100μF 200V
C452 .1 250V
TP4
L411
D416
L416
C447 .001
C453 470μF (1000uF)
C454 .1 100V
R455 56
D417
L419
C448 .001
C455 470μF
C456 .1
L412
D418
L418
C449 .001
C457 470μF
C458 .1 100V
16 24.0V SOURCE
FOR TERMINAL GUIDES AND NOTES SEE PAGE 6
D458
C460 10
17 9.5V SOURCE
C462 330pF
L458
IC305 5V REG
11.0V 5.0V
19 5.0V SOURCE
C363 10μF
C310 .01
C222 10μF
C311 6.8μF (22uF)
C332 47μF
C342 .47μF
D305
C461 .1 100V
C361 .47μF
C361 .01
C362 .01
P
420V 5μs
100V 5μs
50V 5μs
360V 5μs
16.4V 5μs
2V 10μs
.85V 10μs
12V 5μs
5V 5μs
88V 5μs
35V 5μs
350V 5μs
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™
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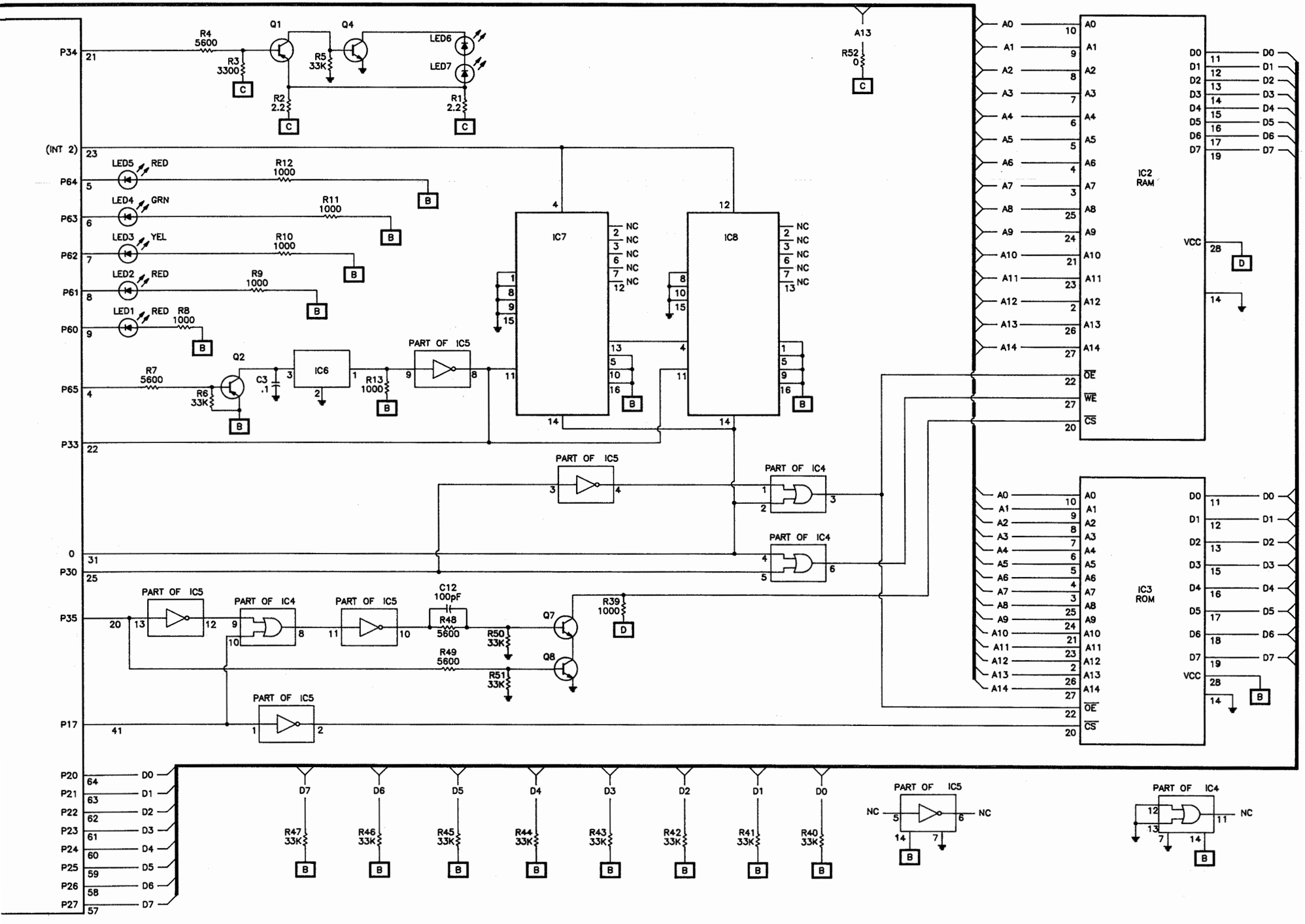
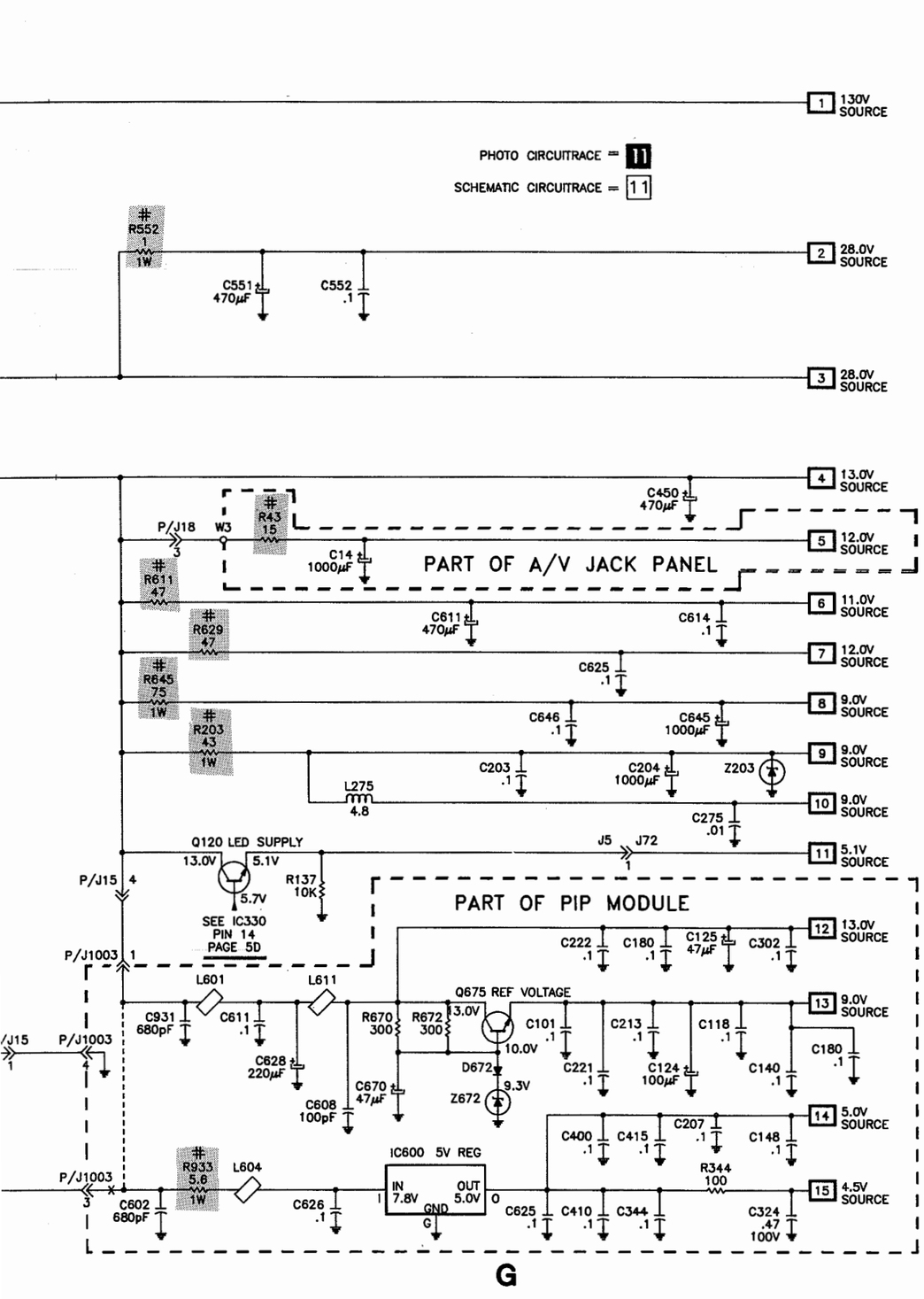
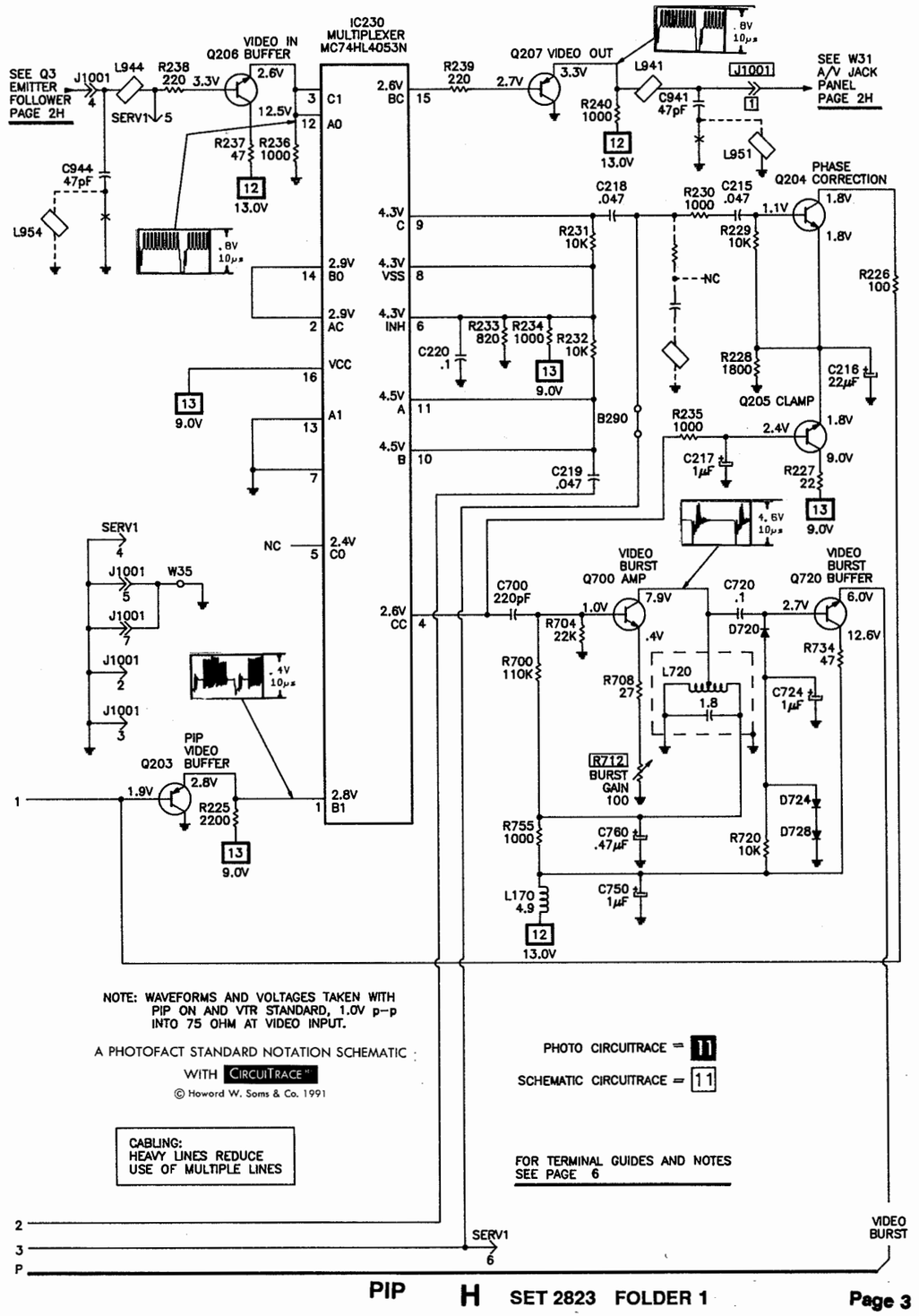
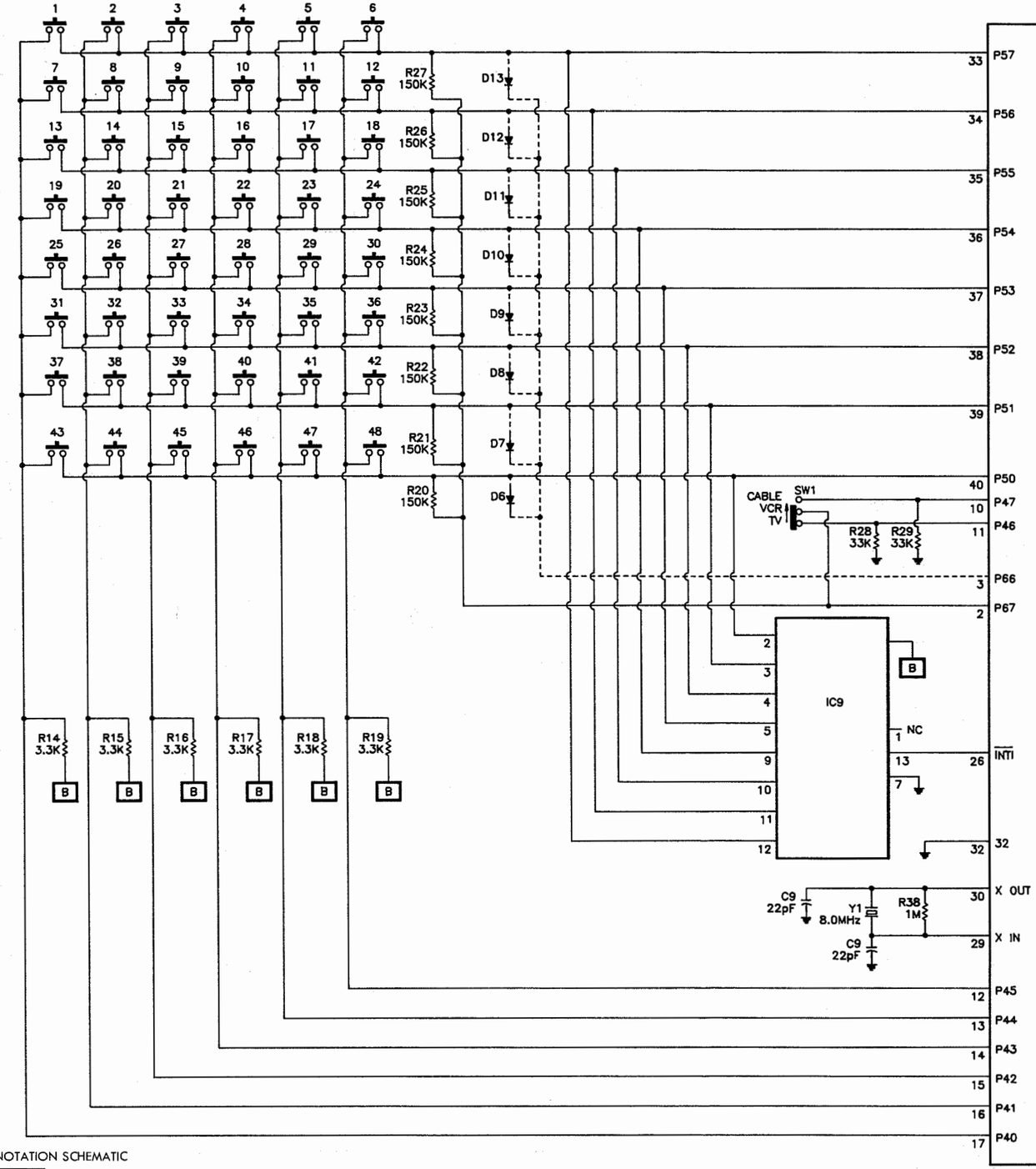


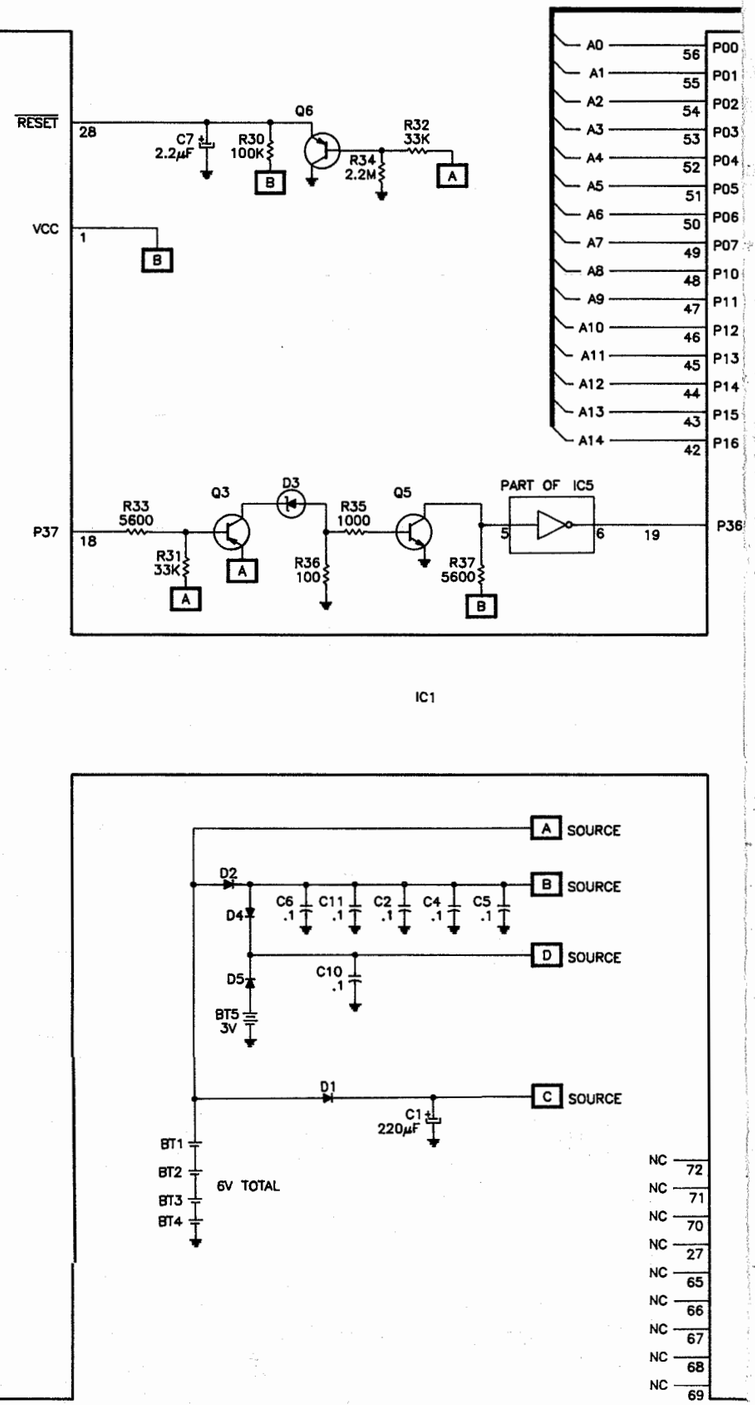
PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3



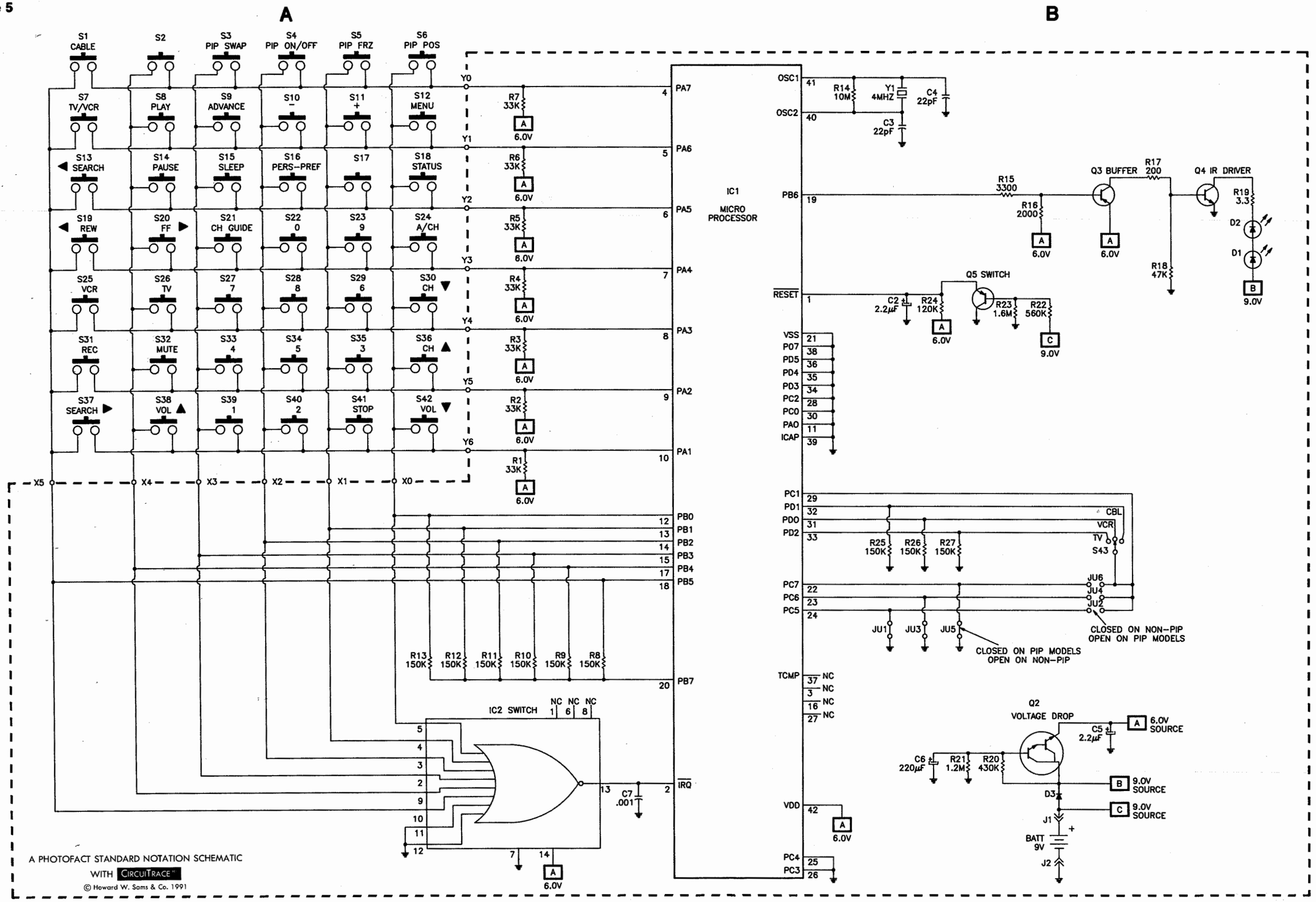


PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3


R27 150K
R26 150K
R25 150K
R24 150K
R23 150K
R22 150K
R21 150K
R20 150K
D13
D12
D11
D10
D9
D8
D7
D6
CABLE
VCR
TV
SW1
R28 33K
R29 33K
R14 3.3K
R15 3.3K
R16 3.3K
R17 3.3K
R18 3.3K
R19 3.3K
IC9
NC
INTI
C9 22pF
Y1 8.0MHz
R38 1M
C9 22pF
X OUT
X IN
P57
P56
P55
P54
P53
P52
P51
P50
P47
P46
P66
P67
P45
P44
P43
P42
P41
P40


RESET
VCC
C7 2.2µF
R30 100K
Q6
R32 33K
R34 2.2M
R33 5600
Q3
D3
R35 1000
Q5
PART OF IC5
R31 33K
R36 100
R37 5600
P37
P36
A0
A1
A2
A3
A4
A5
A6
A7
A8
A9
A10
A11
A12
A13
A14
P00
P01
P02
P03
P04
P05
P06
P07
P10
P11
P12
P13
P14
P15
P16
IC1

A SOURCE
B SOURCE
D SOURCE
C SOURCE
D2
D4
D5
C6 .1
C11 .1
C2 .1
C4 .1
C5 .1
C10 .1
BT5 3V
D1
C1 220µF
BT1
BT2
BT3
BT4
6V TOTAL
NC 72
NC 71
NC 70
NC 27
NC 65
NC 66
NC 67
NC 68
NC 69

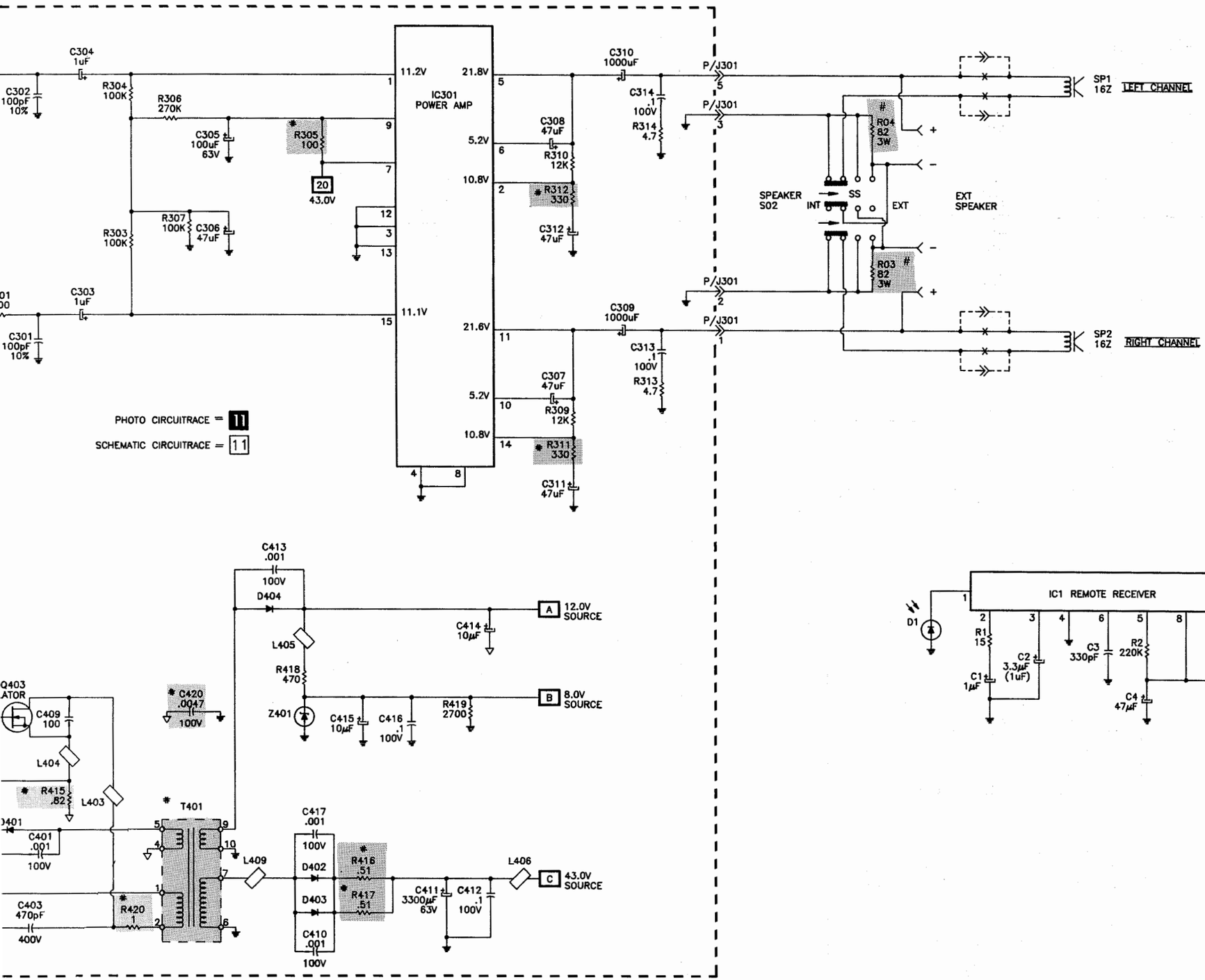


A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE™

REMOTE CONTROL UR8

C

D



JDIO AMP 31" MODELS

REMOTE CONTROL RECEIVER

C

D

IC301 MICRO-COMPUTER

SEE REMOTE RECEIVER PAGE 6D

SW79 CONTROL +
SW74 CH-UP
SW72 VOL-UP
SW80 CONTROL -
SW75 CH-DN
SW73 VOL-DN
SW77 MENU
SW76 RECALL
SW78 ADVANCE
SW71 POWER

IC390 AFT COMPARATOR LM393N

POWER ON Q301 RESET

SEE Q256 INVERTER PAGE 2B

SEE IC120 PIN 28 PAGE 2B

SEE IC120 PIN 29 PAGE 2B

SEE IC200 PIN 38 PAGE 2A

SEE IC670 PINS 2,4 PAGE 2D

SEE IC120 PIN 32 PAGE 2C

BUFFER Q303 AMP

SEE Q464 POWER ON/OFF PAGE 3E

FOR TERMINAL GUIDES AND NOTES SEE PAGE 6

D6145C CHARACTER GEN IC302

SCREEN Q313 BLANKER

GRAPHICS Q380 WIPE

Q304 VERT AMP

Q306 HORIZ REF

SEE IC550 PIN 3 PAGE 2B

SEE Q510 FLYBACK PULSE BUFFER PAGE 2B

ERASABLE IC304 PROM

PCF8583P CLOCK /RAM IC303

TDA8444 DAC IC330

SEE IC120 PIN 31 PAGE 2D

SEE TUNER PIN (14) SCL PAGE 5E

SEE TUNER PIN (13) SDA PAGE 5E

SEE IC400 PIN 1 PAGE 3C

SEE IC400 PIN 2 PAGE 3B

SEE IC160 PIN 12 PAGE 6E

SEE IC160 PIN 11 PAGE 6E

SEE IC200 PIN 29 PAGE 2E

SEE IC200 PIN 13 PAGE 2E

SEE IC200 PIN 31 PAGE 2F

SEE IC200 PIN 33 PAGE 2E

SEE IC200 PIN 34 PAGE 2E

SEE Q120 LED SUPPLY PAGE 3G

SEE IC1,1C2 PIN 3 PAGE 2H

SEE IC121 PINS 2,5 PAGE 2D

SEE IC680 PIN 1 PAGE 2F

SEE IC680 PIN 3 PAGE 2F

SEE IC680 PIN 2 PAGE 2F

SEE TUNER PIN (3) RF SW2 PAGE 5E

SEE TUNER PIN (4) RF SW1 PAGE 5E

SEE TUNER PIN (2) RF SW3 PAGE 5E

PART OF A/V JACK PANEL

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

TUNER CONTROL

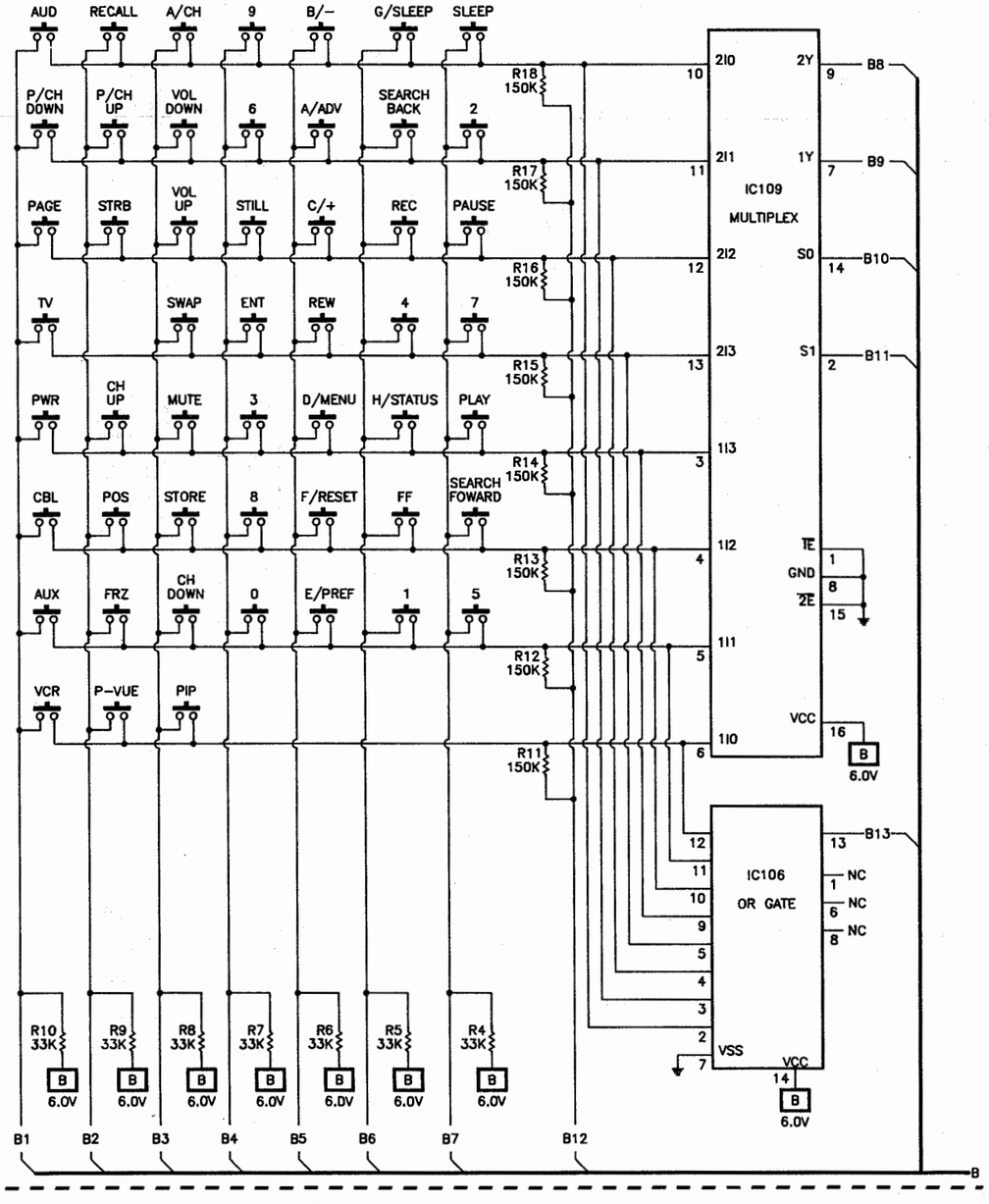
A

FOR TERMINAL GUIDES AND NOTES
SEE PAGE 6

PHOTO CIRCUITRACE = 11

SCHEMATIC CIRCUITRACE = 11

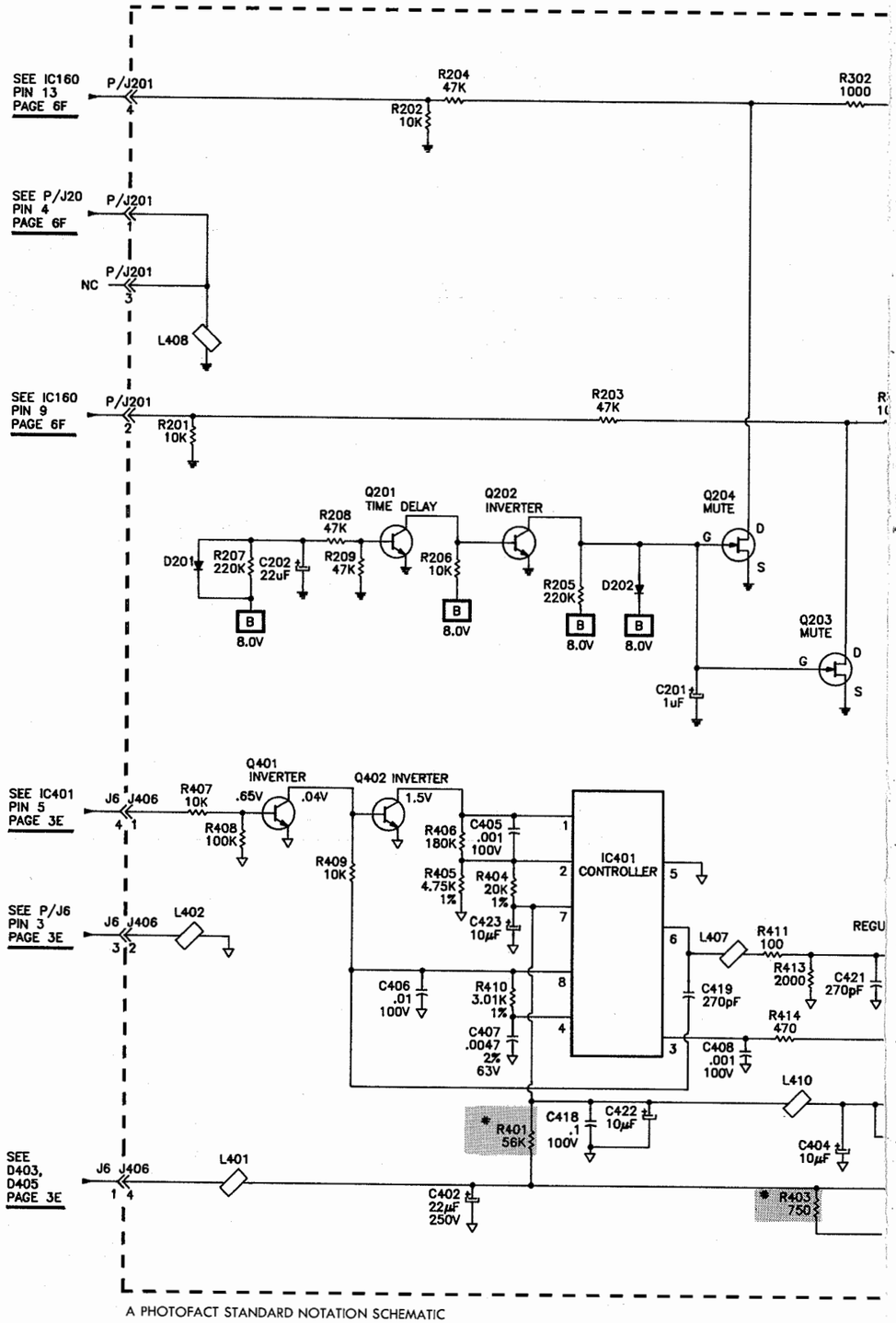
CABLING:
HEAVY LINES REDUCE
USE OF MULTIPLE LINES



A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®

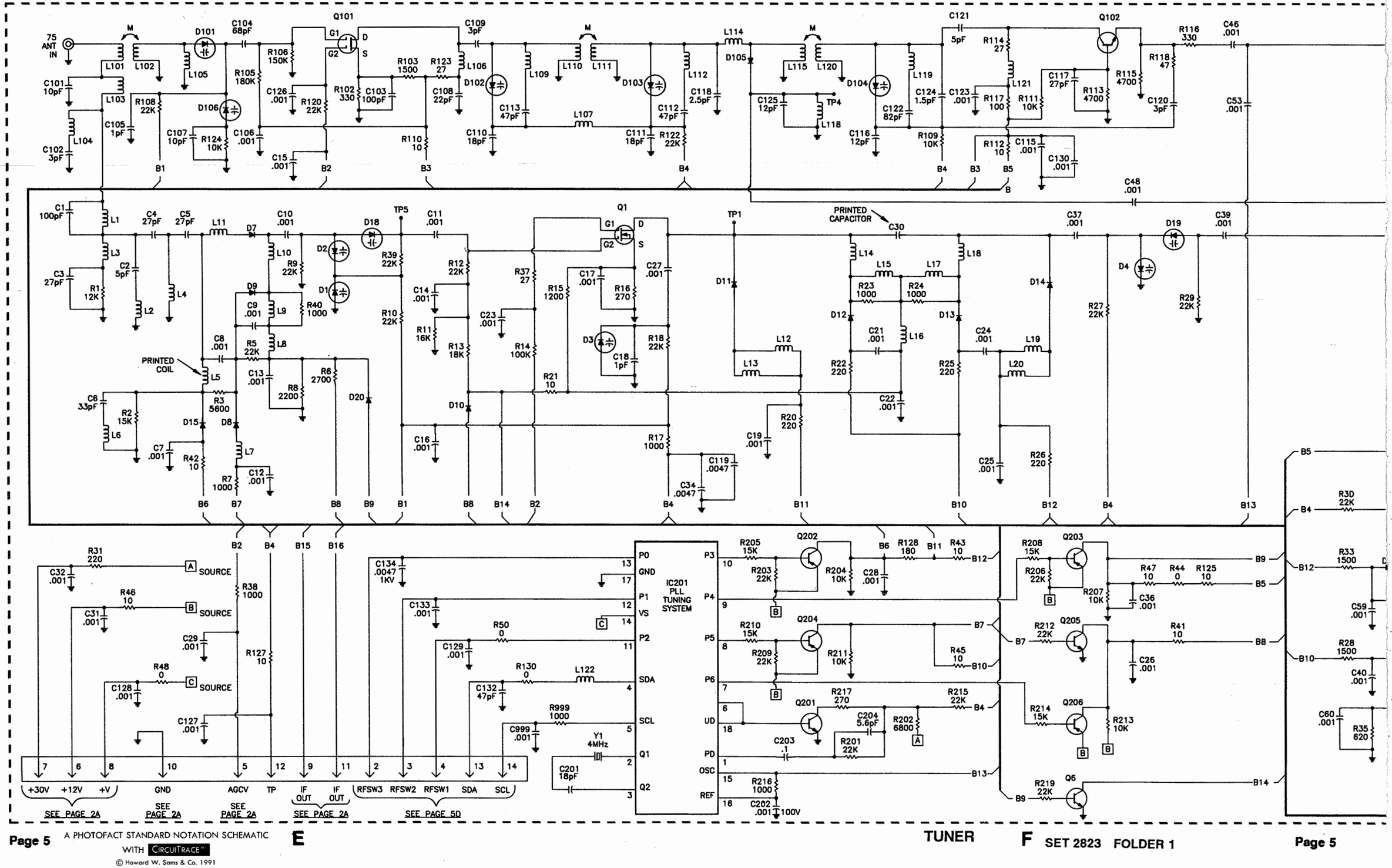
REMOTE CONTROL UR4

B



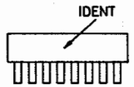
A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH CIRCUITRACE®

AUXILIARY A



AUDIO/VIDEO JACK PANEL

Q1,Q2,Q3,
Q5,Q6,Q7,Q8
BOTTOM VIEW

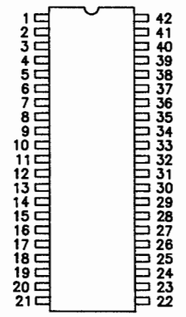


U1,U2
FRONT VIEW

CRT BOARD

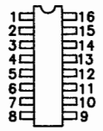
Q1,Q2.Q3
BOTTOM VIEW

MAIN BOARD

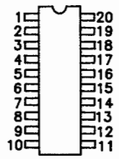


IC200
TOP VIEW

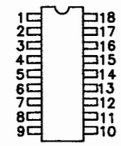
IC402
TOP VIEW



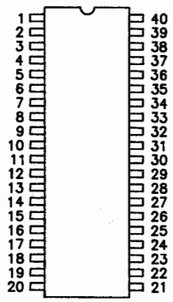
IC330,IC401
TOP VIEW



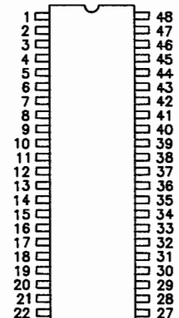
IC160,IC680
TOP VIEW



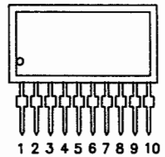
IC302
TOP VIEW



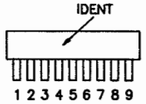
IC301
TOP VIEW



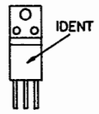
IC120
TOP VIEW



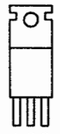
IC180
FRONT VIEW



IC260
FRONT VIEW

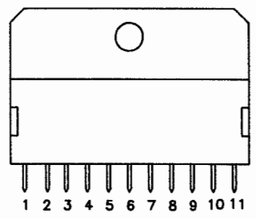


Q501
FRONT VIEW

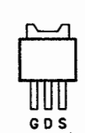


IC305
FRONT VIEW

Q120,Q270,Q518,
Q600,Q670,Q693
BOTTOM VIEW

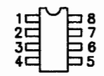


IC550
FRONT VIEW

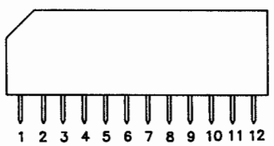


Q440
FRONT VIEW

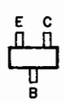
Q410
FRONT VIEW



IC121,IC303,IC304,
IC390,IC400
TOP VIEW

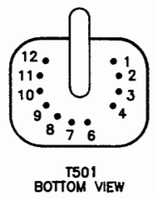


IC670
FRONT VIEW



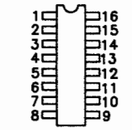
Q200,Q209,Q251,
Q253,Q256,Q301,
Q303,Q304,Q306,
Q313,Q380,Q406,
Q460 THRU Q464,
Q510,Q605,Q610,
Q615,Q620,Q630,
Q635,Q700,Q705
TOP VIEW

Q500,Q518,Q693
BOTTOM VIEW



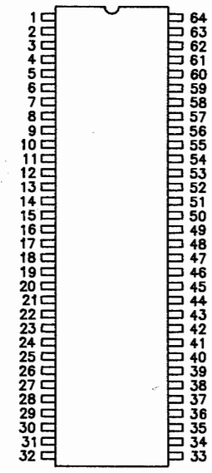
T501
BOTTOM VIEW

PIP MODULE

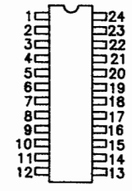


IC200,IC230
TOP VIEW

IC300
TOP VIEW



IC400
TOP VIEW

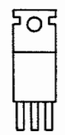


IC150
TOP VIEW

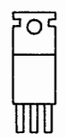
IC180
TOP VIEW

Q100 THRU Q104,
Q106 THRU Q110,
Q200 THRU Q209,
Q300 THRU Q204,
Q700,Q720
TOP VIEW

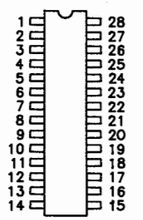
IC100
TOP VIEW



IC600
FRONT VIEW



Q675
FRONT VIEW



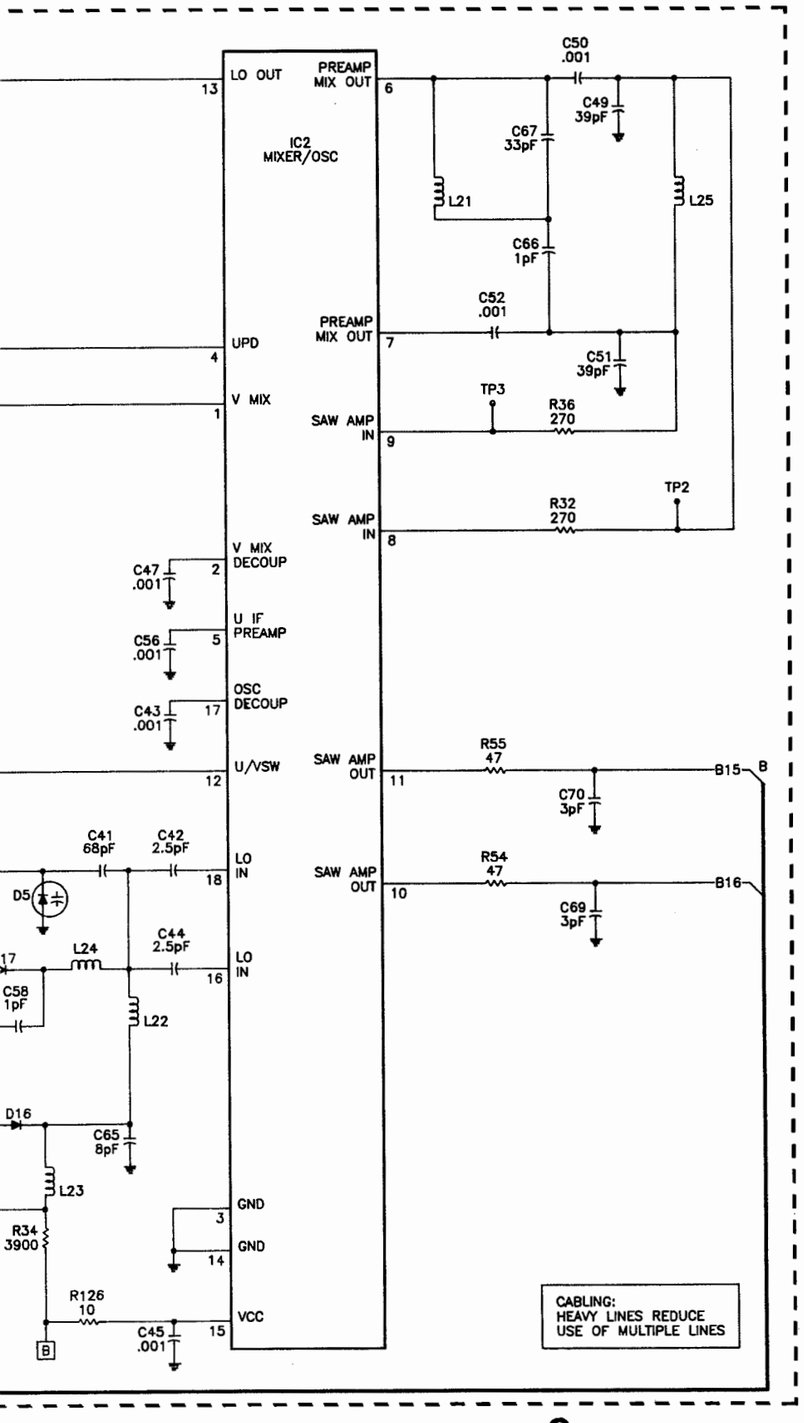
IC410,IC415
TOP VIEW

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

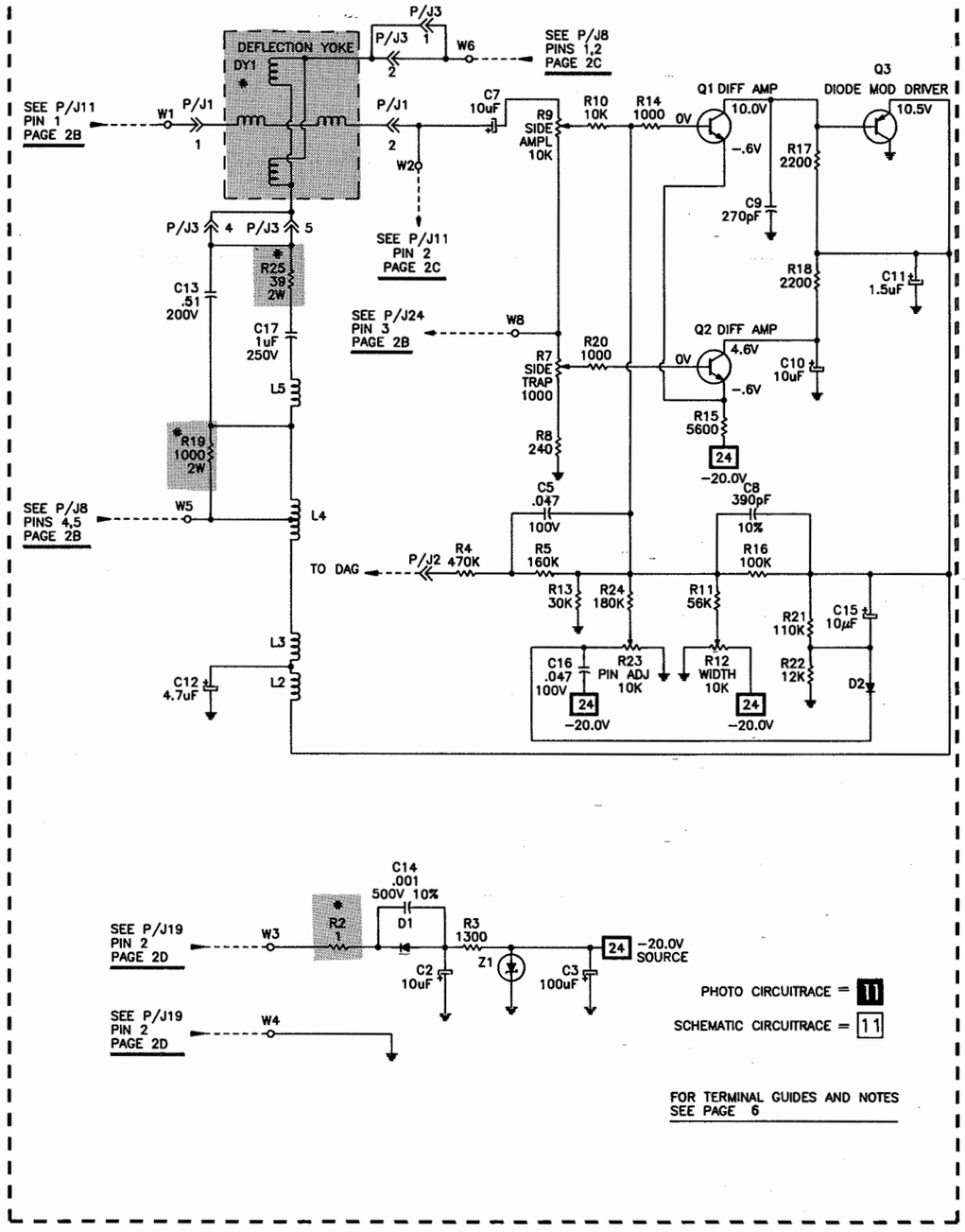
- Circuitry not used in some versions
- Circuitry used in some versions
- Nominal value
- Ground
- Chassis
- Common tie point

Waveforms and voltages are taken from ground, unless otherwise noted.
Waveforms: triggered scope, keyed rainbow generator.
Item numbers in rectangles appear in alignment and adjustment instructions.
Supply voltage maintained as shown at input.
Voltages measured with digital meter, no signal.
Controls adjusted for normal operation.
Terminal identification may not be found on unit.
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.

TERMINAL GUIDES AND NOTES



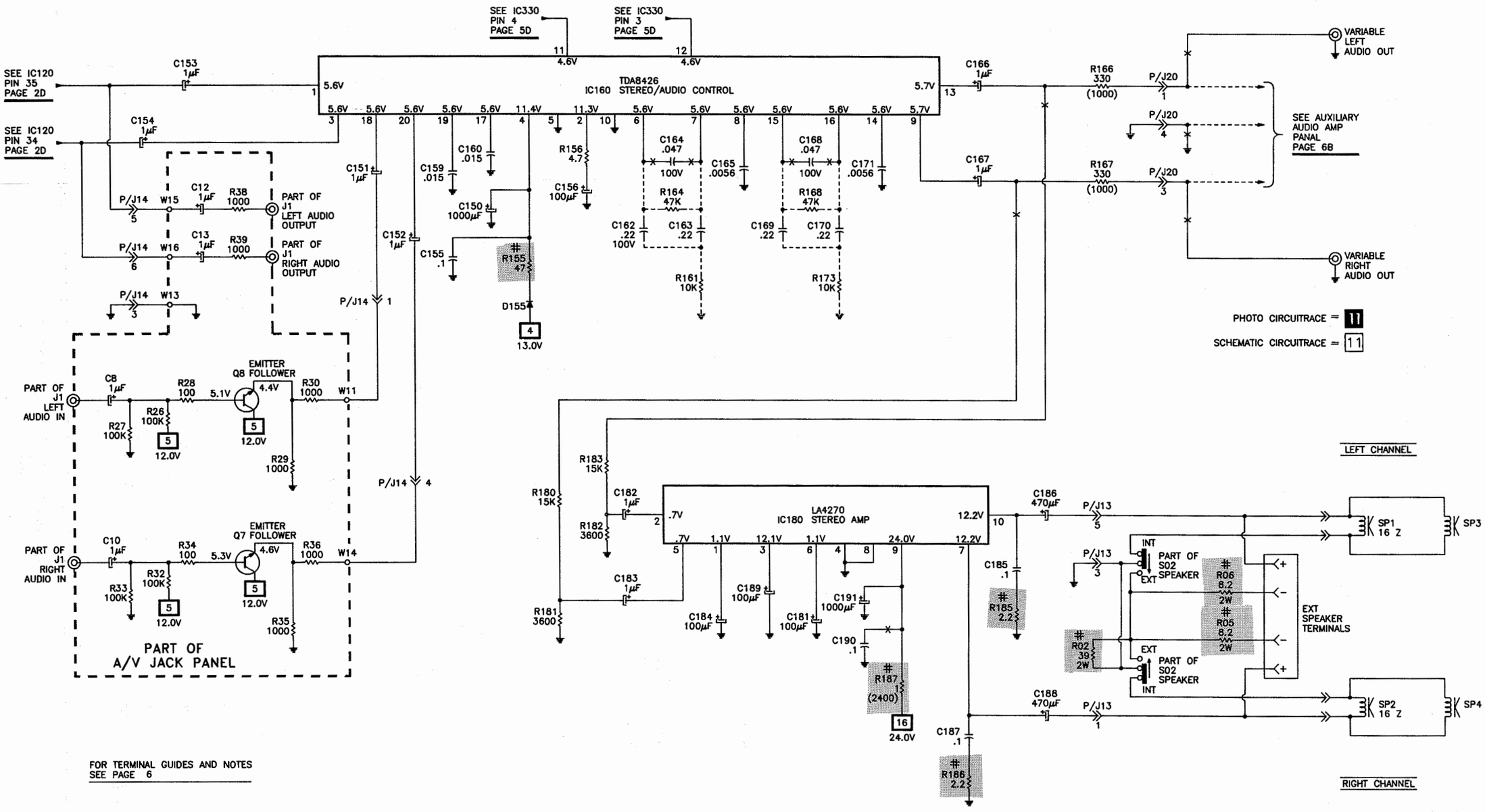
G



PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3

PINCUSHION

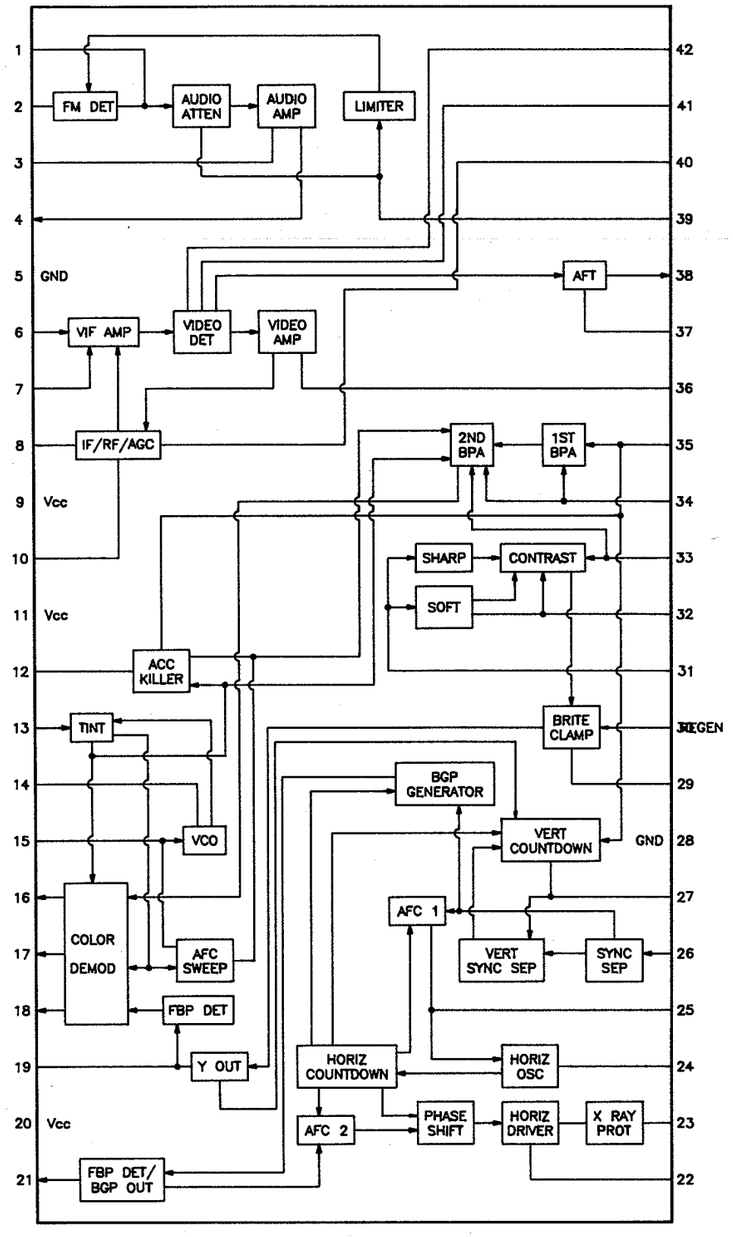
H



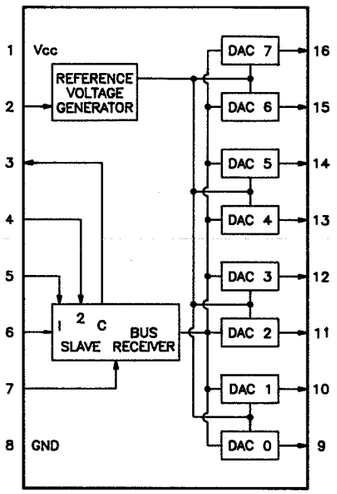
FOR TERMINAL GUIDES AND NOTES SEE PAGE 6

STEREO/AUDIO CONTROL

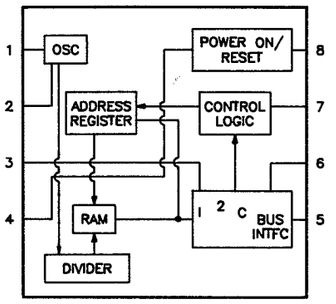
IC200 SIGNAL PROCESSOR



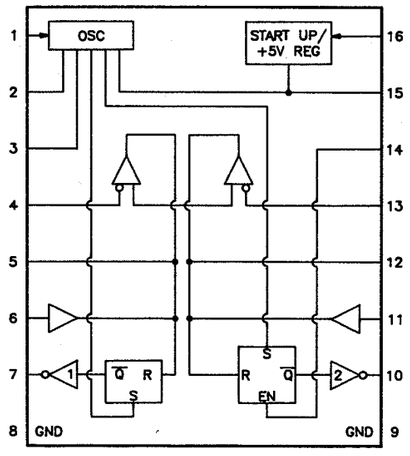
IC330 DAC



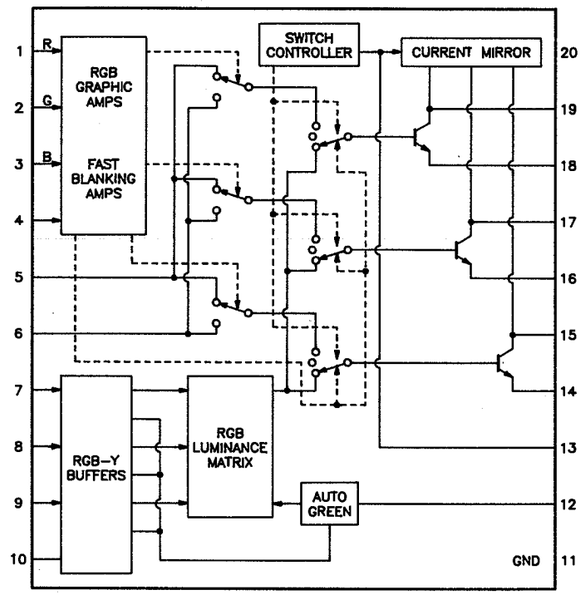
IC303 CLOCK/RAM



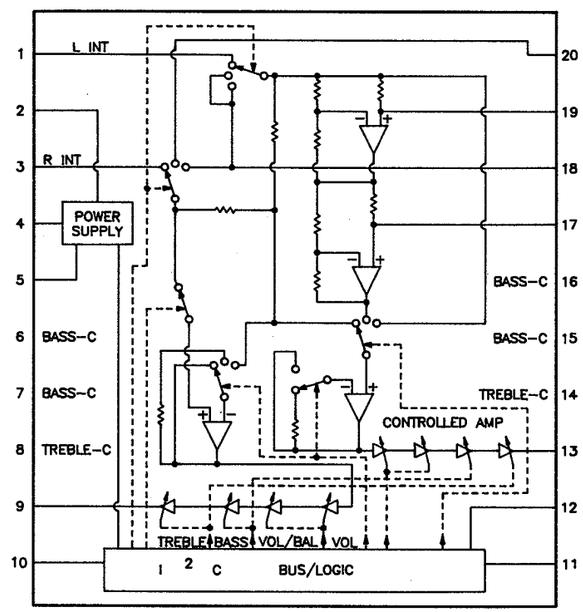
IC401 CONTROLLER



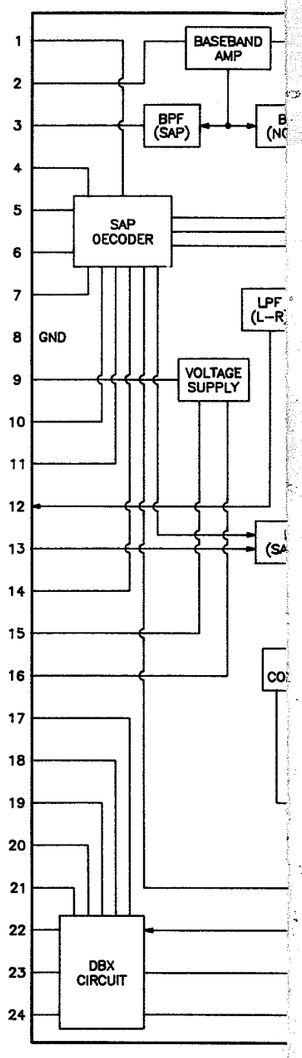
IC680 CHARACTER INTERFACE



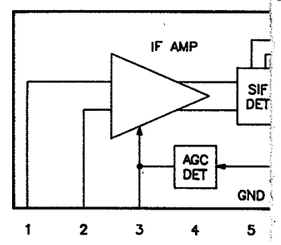
IC160 STEREO/AUDIO CONTROL



1C120 STEREO



IC260 SOUN



IC FU

IENT

enna terminals. Select PILOT, and Left Modulating Signal. to TP134, low side to ground. Control (R131) for MINIMUM, 8kHz. Adjust 3kHz Separation MUM. Repeat until no further

ITS

with color bar pattern applied to

ient

1005. Attach a jumper from pin Connect a frequency counter to .318MHz Frequency Coil (L334) jumper from pin 2 of IC300 and

ENT

.005. Attach a jumper from pin onnect an Oscilloscope to pin 34 und. Adjust Symmetry Control cle. Remove jumper from pin 2 J1005.

oin 8 of IC150. Adjust Y Gain -p.

JSTMENT

o pin 7 of IC150. Adjust Clamp to center chroma signal on signal

STMENT

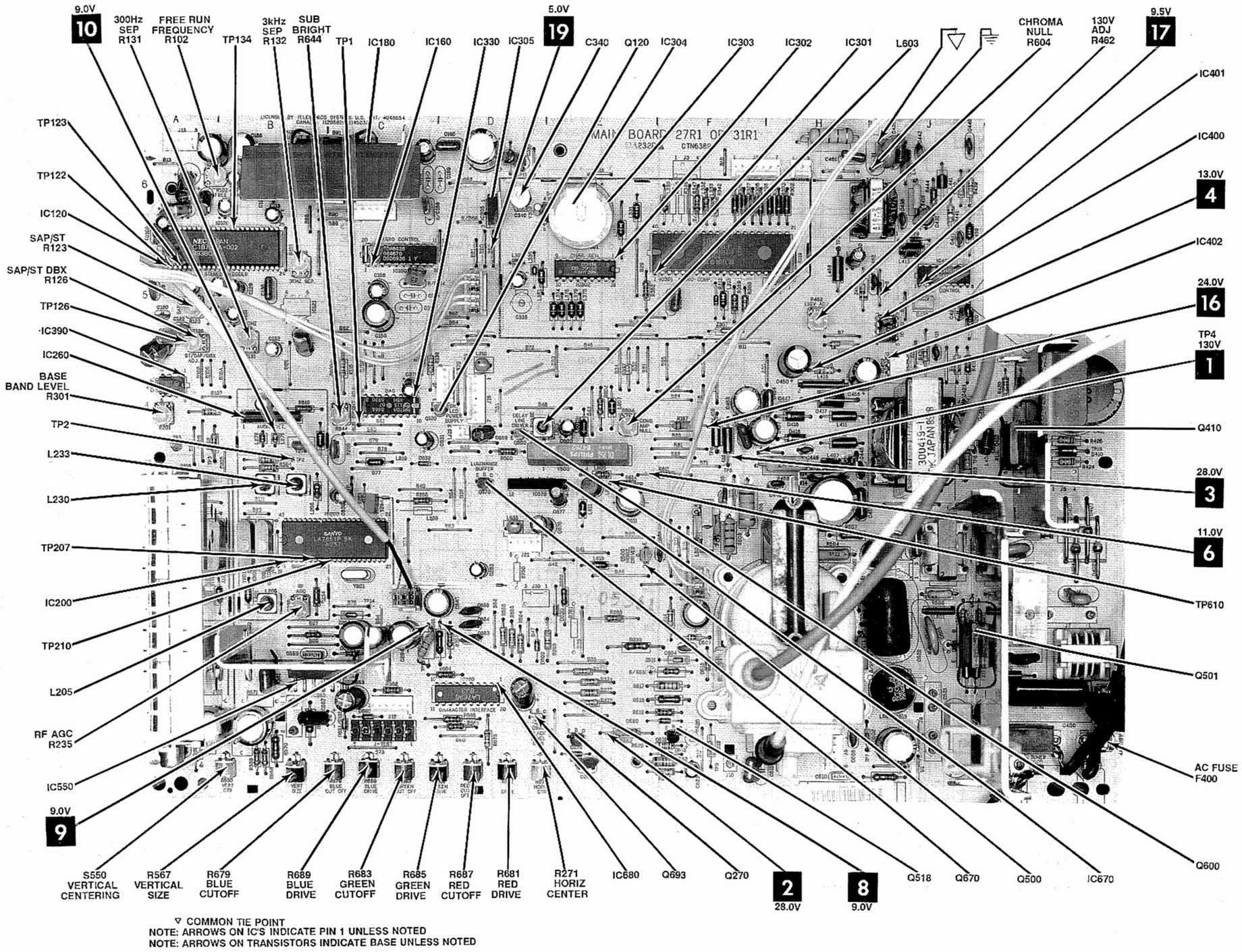
to pin 1 of Connector P/J1001. ntrol (R221) to balance PIP White vel.

MENT

rol (R318) for correct tint in PIP

MENT

eter to Emitter of Q720. Adjust 2) for 6.0V.

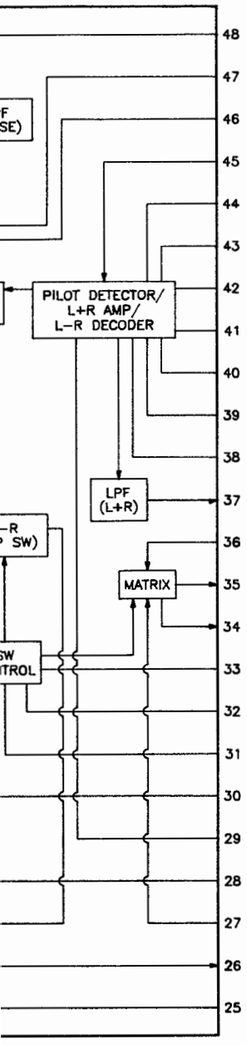


▽ COMMON TIE POINT
NOTE: ARROWS ON IC'S INDICATE PIN 1 UNLESS NOTED
NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED

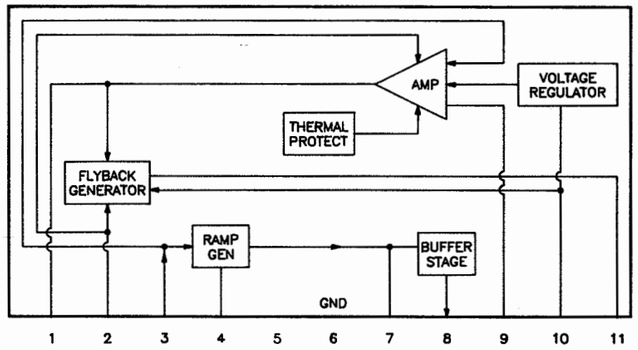
A HOWARD W. SAMS CIRCUITRACE® PHOTO

MAIN BOARD-TOP VIEW

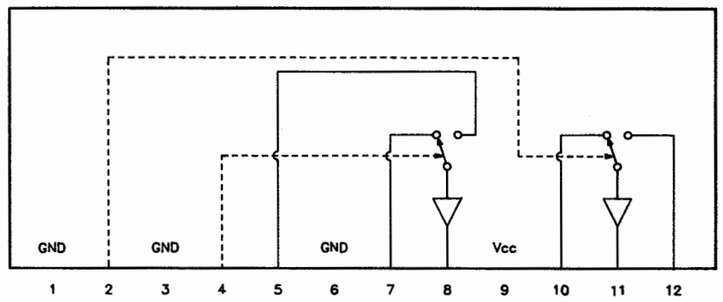
SAP DECODER/DBX



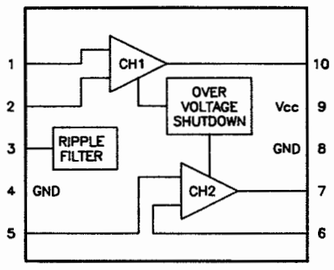
IC550 VERT OUTPUT



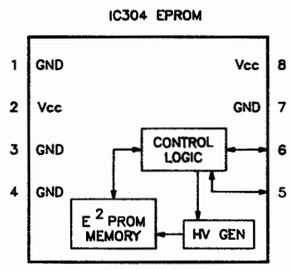
IC670 SWITCH



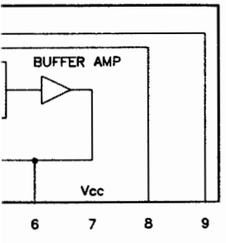
IC180 STEREO AMP



IC304 EPROM

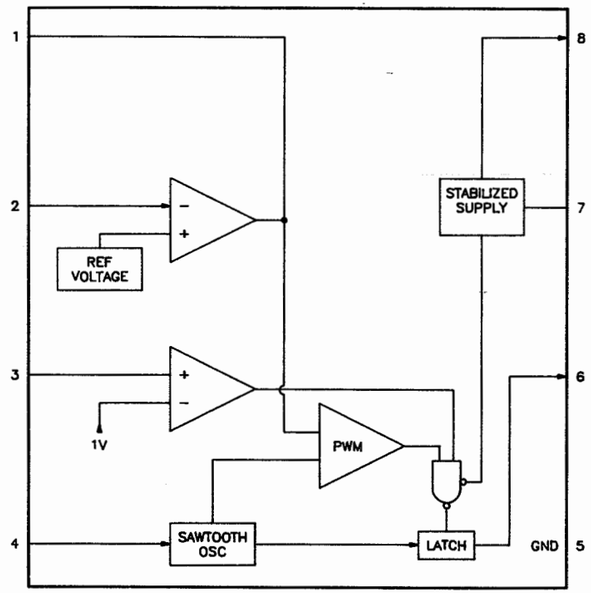


D DET

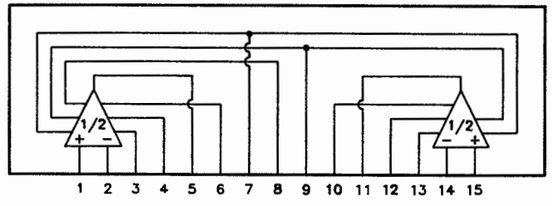


MAIN BOARD

IC401 CONTROLLER



IC301 POWER AMP



AUXILIARY AUDIO AMPLIFIER PANEL

NCTIONS

MISCELLANEOUS ADJUSTMENTS

PRETUNING

Note: Remote Transmitter is used to perform Pretuning operations.

Timer
1. Press TV button.
2. Press Menu button, Four (4) button, One (1) button.
3. Press ADV button to select hours or minutes.
4. Press Minus (-) or Plus (+) button to set proper hours and minutes.
5. Press Status Exit button to clear screen.

Sleep Timer
1. Press TV button, SLEEP button.
2. Use Sleep button to select sleep timer interval.
3. Press Status Exit to clear screen.

NOTE: To select channel higher than 69 press Menu button, Three (3) button. Use Plus (+) or Minus (-) to select "Cable".

Program Channels
1. Connect antenna or CATV
2. Press TV button.
3. Press Menu button, Three (3) button, Two (2) button.
4. Use Adv button to select "Select Channels".
5. Use Channel Up (▲), Channel Down (▼) or Number buttons to select channel.
6. Press Plus (+) or Minus (-) button to add selected channel to memory.
7. Repeat steps 5 and 6 to select additional channels.
8. Press Status Exit to clear screen.

Auto Program Channels
1. Perform steps (1-3) of Program Channels procedure.
2. Use ADV button to select "Auto-Program Channels".
3. Press Plus (+) button to program active channels.
4. When "Finish" appears on the screen, press Status Exit button to clear screen.

Parental Control Code
1. Press Menu button, Four (4) button, Four (4) button.
2. Press Plus (+) button.
3. Press Zero (0) button, Seven (7) button, One (1) button, One (1) button.
4. Repeat step 3 and then use number buttons to enter new four digit code.
5. Press Status Exit to clear screen.

Parental Control
1. Press Menu button, Four (4) button, Four (4) button, Two (2) button.
2. Use number buttons to enter correct Parental Control Code.
3. Use Channel Up (▲), Channel (▼), or number buttons to select channel.
4. Press Minus (-) or Plus (+) button to enter selected channel.
5. Repeat steps 3 and 4 to select additional channels.
6. Press Status Exit button to clear screen.

NOTE: This chassis employs digital customer controls. Unless otherwise indicated all controls were set for normal operation with PIP off. Some functions are accessible through the Remote Transmitter only.

B+ ADJUSTMENT

Tune in a picture. Adjust Brightness to MINIMUM. Connect a digital DC Voltmeter to TP4, low side to ground. With AC line voltage set to 120VAC, adjust 130V Control (R462) for 130VDC.

HIGH VOLTAGE CHECK

Tune in a picture. Set Brightness, Color, and Picture to MINIMUM. Connect a High Voltage probe to CRT Anode. High Voltage should read 27.5KV to 29.0KV.

RF AGC ADJUSTMENT

Tune in a picture. Adjust RF AGC Control (R235) Counterclockwise until snow appears in picture, then Clockwise until snow disappears.

COMB FILTER ADJUSTMENT

Tune in a color bar pattern. Connect an Oscilloscope to TP610, low side to ground. Adjust Chroma Null (R604) and Comb Phase Coil (L603) for MINIMUM chroma component in waveform.

VERTICAL CENTER HEIGHT ADJUSTMENT

Tune in a picture. Adjust Vertical Size Control (R567) to reduce size of raster until top and bottom edge are visible. Adjust Vertical Centering Switch (S550) to provide best vertical centering. Readjust R567 to provide slight overscan without stretching picture.

HORIZONTAL CENTERING ADJUSTMENT

Tune in a crosshatch pattern. Adjust Horizontal Centering Control (R271) for best horizontal centering of picture.

CLOCK OSCILLATOR ADJUSTMENT

NOTE: Adjustment is not recommended. If adjustment is necessary proceed as follows: Connect a 3VDC Bias to a 10K ohm resistor. Connect resistor to SRAM IC303 Pin 7. Connect a Frequency Counter through a low capacitance probe to IC303 Pin 7. Adjust Clock Oscillator Trimmer (C340) for 1 second +/- 4 microseconds.

MISCELLANEOUS ADJUSTMENTS (CONTINUED)

COLOR PURITY ADJUSTMENT

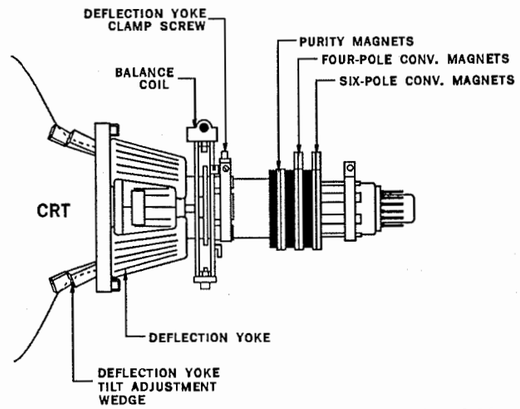
Operate the set for 15 minutes. Use a degaussing coil to demagnetize the CRT and Mounting brackets. Select AUX IN on receiver. Set Picture to MINIMUM, Brightness for viewable raster. Set Blue (R679) and Green (R683) Cutoff Controls fully Clockwise. Set Green (R685) and Blue (R689) Drive Controls fully Counterclockwise. Set Red Cutoff Control (R687) fully Counterclockwise. Advance Red Drive Control (R681) Clockwise to produce a Red raster. Loosen the Deflection Yoke clamp screw and slide the Deflection Yoke backward. Rotate and spread the purity magnet tabs until the red band is centered on the screen. Move the Deflection Yoke forward until a uniform red screen is obtained.

GRAY SCALE ADJUSTMENT

Tune in a picture. Using the Remote Transmitter select Per/Pref 0. Select AUX IN on receiver. Set Color to MINIMUM. Set Sub Brightness Control (R644) to MINIMUM. Set Screen Control (R500B) to MINIMUM. Set Red (R687), Green (R683) and Blue (R679) Cutoff Controls and Green (R685), Blue (R689) and Red (R681) Drive Controls to fully Clockwise positions. Remove power from set, remove Plug P11. Connect a Jumper between J-TEST Pins 5 and 6. Restore power to set. Adjust Screen Control until a faint line of one color just appears. Remove the J-TEST Pin Jumper. Adjust the Sub Brightness Control until a faint line of one color just appears. Adjust the Cut-off Controls of the remaining two colors to obtain a dim white line. Remove power from set, replace Plug P11. Restore power to set. Select Antenna Input. Tune in a picture. Adjust 2 Drive Controls for best white in highlight areas. Check tracking at low and high brightness. If necessary, retouch Bias Controls at high brightness.

CONVERGENCE ADJUSTMENT

Operate the set for 15 minutes. Connect a color bar generator to antenna terminals and tune in a dot pattern. Loosen locking ring. Adjust 4 pole magnets to converge the red and blue dots at the center of the screen. Adjust 6 pole magnets to converge the red/blue dots over the green dots at the center of the screen. NOTE: Rotate 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. Four and six pole magnets interact, repeat adjustment until center convergence is correct. Tighten locking ring. Tune in a crosshatch pattern. Remove rubber wedges between the Deflection Yoke and the CRT. Tilt 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 and left to converge the Horizontal lines at the top and bottom of the screen and the Vertical lines at the right and left sides of the screen. Repeat convergence procedure if necessary to obtain the best overall convergence. Replace the rubber wedges. Tighten Deflection Yoke Clampscrew.



CRT NECK ASSEMBLY

STEREO ADJUSTMENTS

NOTE: The following adjustments were made using a B&K Model 2009 MTS TV/STEREO Generator, equivalent generator may be used. Set the receiver to Stereo Mode for all adjustment except where otherwise indicated.

BASE BAND ADJUSTMENT

Connect Generator to antenna terminals. Select PILOT, 1kHz Audio Frequency and L-R Modulating Signal. Connect an Oscilloscope to TP122, low side to ground. Adjust Base Band Volume Level Control (R201) for 700mV p-p.

SAP STEREO ADJUSTMENT

Connect Generator to Antenna terminals. Select SAP, 1kHz Audio Frequency and L-R Modulating Signal. Connect an Oscilloscope to TP123, low side to Ground. Adjust SAP/Stereo Control (R123) for Maximum.

FREE RUN FREQUENCY ADJUSTMENT

Connect Generator to Antenna terminals. Select PILOT, 1kHz Audio Frequency and L-R Modulating Signal. Set Free Run Frequency Control (R102) fully Clockwise. Adjust Free Run Frequency Control Counterclockwise until Stereo indicator lights.

SAP/STEREO/DBX

Connect Generator to Antenna terminals. Select PILOT, 1kHz Audio Frequency and L+R Modulating Signal. Connect a digital DC Voltmeter to TP126, low side to ground. Adjust SAP/Stereo/DBX Control (R126) for 360m VDC.

SEPARATION ADJUSTM

Connect Generator to An
300Hz Audio Frequency
Connect an Oscilloscope
Adjust 300Hz Separation
change Audio Frequency t
Control (R132) for MINI
decrease can be obtained.

PIP ADJUSTMEN

NOTE: Adjustments mad
Main and PIP picture.

14.318MHz OSC Adjustm

Disconnect Connector P/
2 of IC300 to ground.
pin34 of IC400. Adjust 1
for 14.318MHz. Remov
reconnect P/J1005.

SYMMETRY ADJUSTM

Disconnect connector P/J
2 of IC300 to Ground. C
of IC400, low side to gr
(R336) for a 50% duty c
of IC300 and reconnect F

Y GAIN ADJUSTMENT

Connect Oscilloscope to
Control (R104) for .95V

CLAMP OFFSET ADJ

Connect Oscilloscope
Offset Control (R159)
baseline.

WHITE LEVEL ADJU

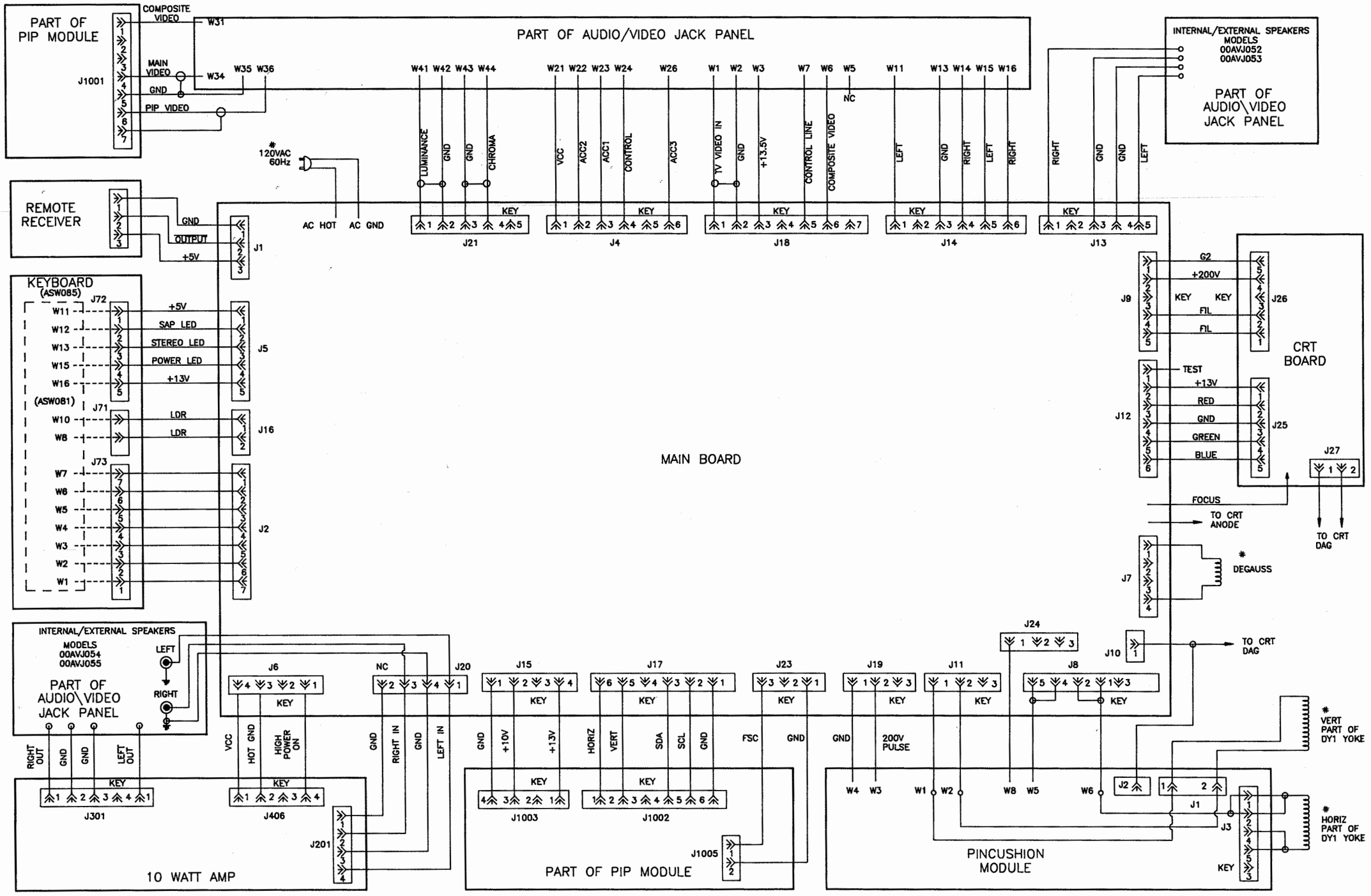
Connect Oscilloscope
Adjust White Level Co
level and Main White l

PHASE FINE ADJUST

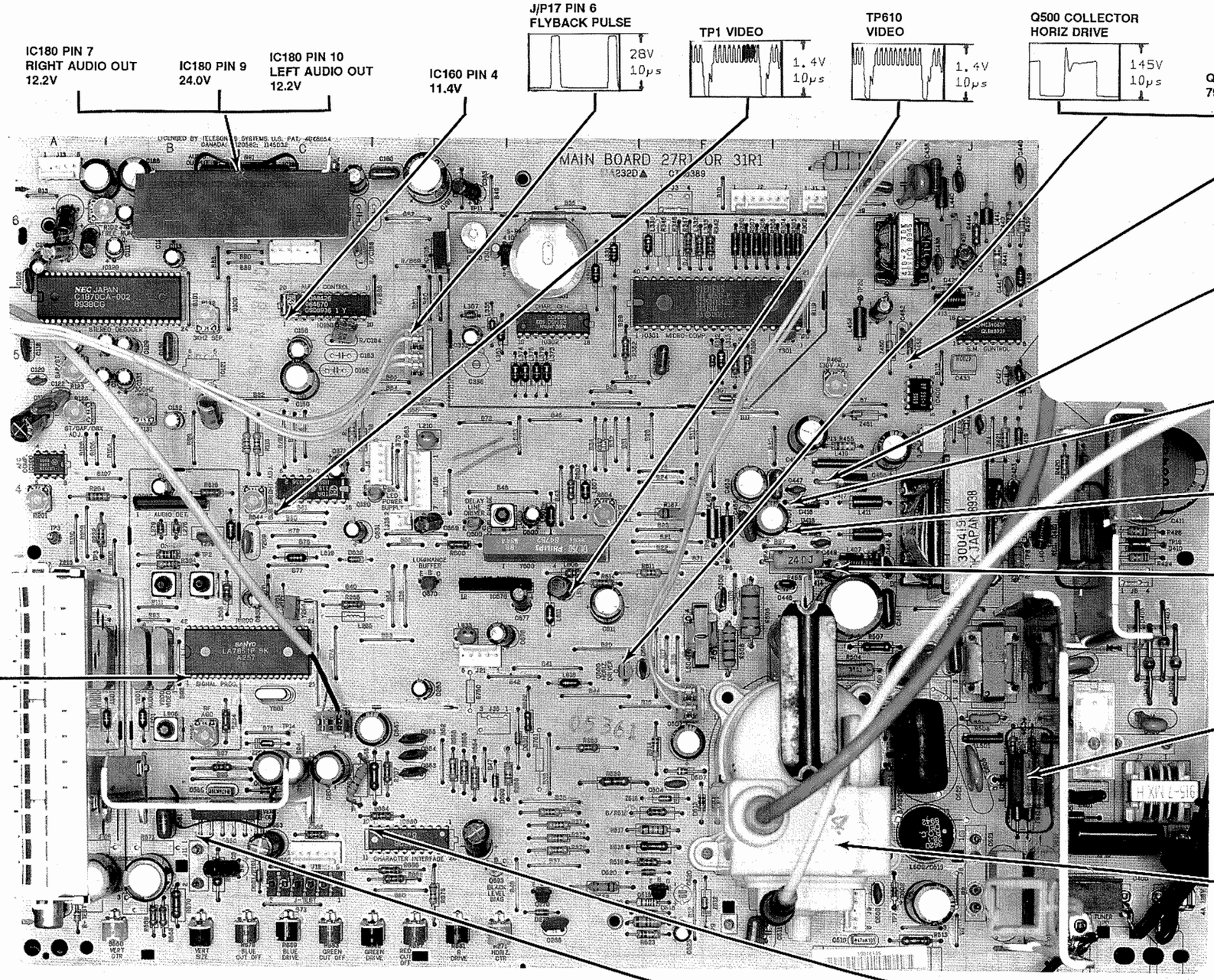
Adjust Phase Fine Con
window.

BURST GAIN ADJUS

Connect a digital voltm
Burst Gain Control (R7



INTERCONNECT WIRING DIAGRAM



A HOWARD W. SAMS QUICK-CHECKS™ PHOTO

MAIN BOARD-TOP VIEW

SAFETY PRECAUTIONS

SERVICE WARNING

Service work should be performed only by qualified service technicians who are familiar with safety checks and guide lines.

1. For continued safety, no modification of any circuit should be attempted unless recommended by manufacturer.
2. Disconnect power source before replacing parts as some parts may be electrostatic sensitive.
3. Use an isolation transformer between the line cord and power receptacle, when servicing chassis.

SERVICING HIGH VOLTAGE AND PICTURE TUBE

When servicing the High Voltage circuits, extreme caution should be used.

1. Discharge static High Voltage by connecting a 10 kohms resistor in series with a test lead between chassis and anode lead of picture tube.
2. Wear shatter-proof eye protection (goggles) when handling the picture tube in case of implosion.
3. DO NOT lift picture tube by the neck.

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Service personnel should be aware of the procedures and instructions covering x-ray radiation. The only potential source of x-ray in present day solid state receivers and monitors is the picture tube.

1. It is only when High Voltage is excessive that x-ray radiation is capable of being emitted from shell of picture tube. Be sure the High Voltage is set at specified level.
2. An accurate High Voltage meter should be available at all times. Meter calibration should be checked periodically.
3. High Voltage should be kept at rated value - NO HIGHER. Higher voltages may cause x-ray radiation or failure of other associated components. DO NOT depend on protection circuit to keep voltages at rated value.
4. Every time a chassis is serviced, High Voltage should be checked at various brightness levels to be sure it is regulating properly.
5. While troubleshooting a set with excessive High Voltage, avoid being close to picture tube. DO NOT operate longer than it is necessary to locate the cause of excessive High Voltage. Use a variable AC transformer to regulate voltage.
6. Many components, electrical and mechanical, in present chassis have safety related characteristics which are not evident with visual inspection. When these components are known, they are identified with a # on the schematic and in the parts list. When replacing these components, for SAFETY, use only an equivalent replacement part.

SAFETY CHECKS-FIRE AND SHOCK HAZARD

Cold Leakage Checks (Sets with isolated ground.)

1. Unplug the AC cord and connect a jumper across the two prongs on the plug.
2. Turn on power switch.
3. Measure the resistance, with an Ohm meter, between the jumpered AC plug and any exposed metal cabinet parts on the set such as: antenna screw heads, control shafts, handle brackets. Exposed metal parts that have a return path should measure between 200 kohms and 5 megohm. Parts without a return path must measure infinity.

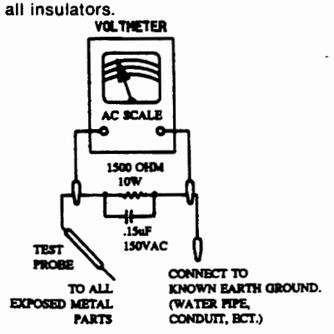
Leakage Current Hot Check

1. Plug the AC cord directly into AC outlet. DO NOT use an isolation transformer.
2. Connect a 1500 Ohm 10 watt resistor, in parallel with a .15μF 150V AC capacitor, between any exposed metal parts on the set and a good earth ground such as a water pipe. (See Figure below.)
3. Using an AC volt meter, with 1000 Ohms per volt or more sensitivity, measure the voltage across the resistor. Check each exposed part and measure voltage at each point.
4. Reverse the AC plug and repeat voltage measurement at each point.
5. The voltage at any point should not exceed .75 volts RMS. This corresponds to .5 milliamps AC. Any value exceeding this limit constitutes a potential shock hazard and must be corrected.

GENERAL GUIDE LINES

A final SAFETY check before returning the set to customer.

1. Check area repaired for poorly soldered or de-soldered connections. Check entire circuit board surface for solder splashes.
2. Check interboard wiring for pinched wires or wires contacting any high-wattage resistors.
3. Check that all control knobs, shields, covers, grounds and mounting hardware have been replaced. Be sure to replace all insulators.

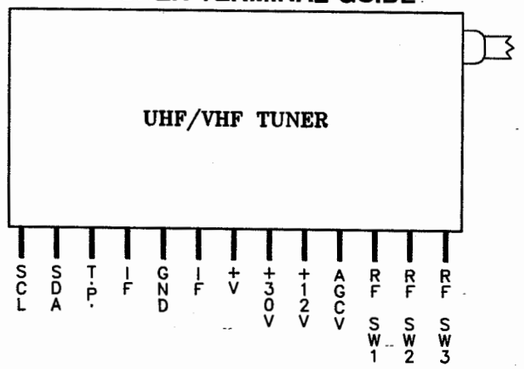


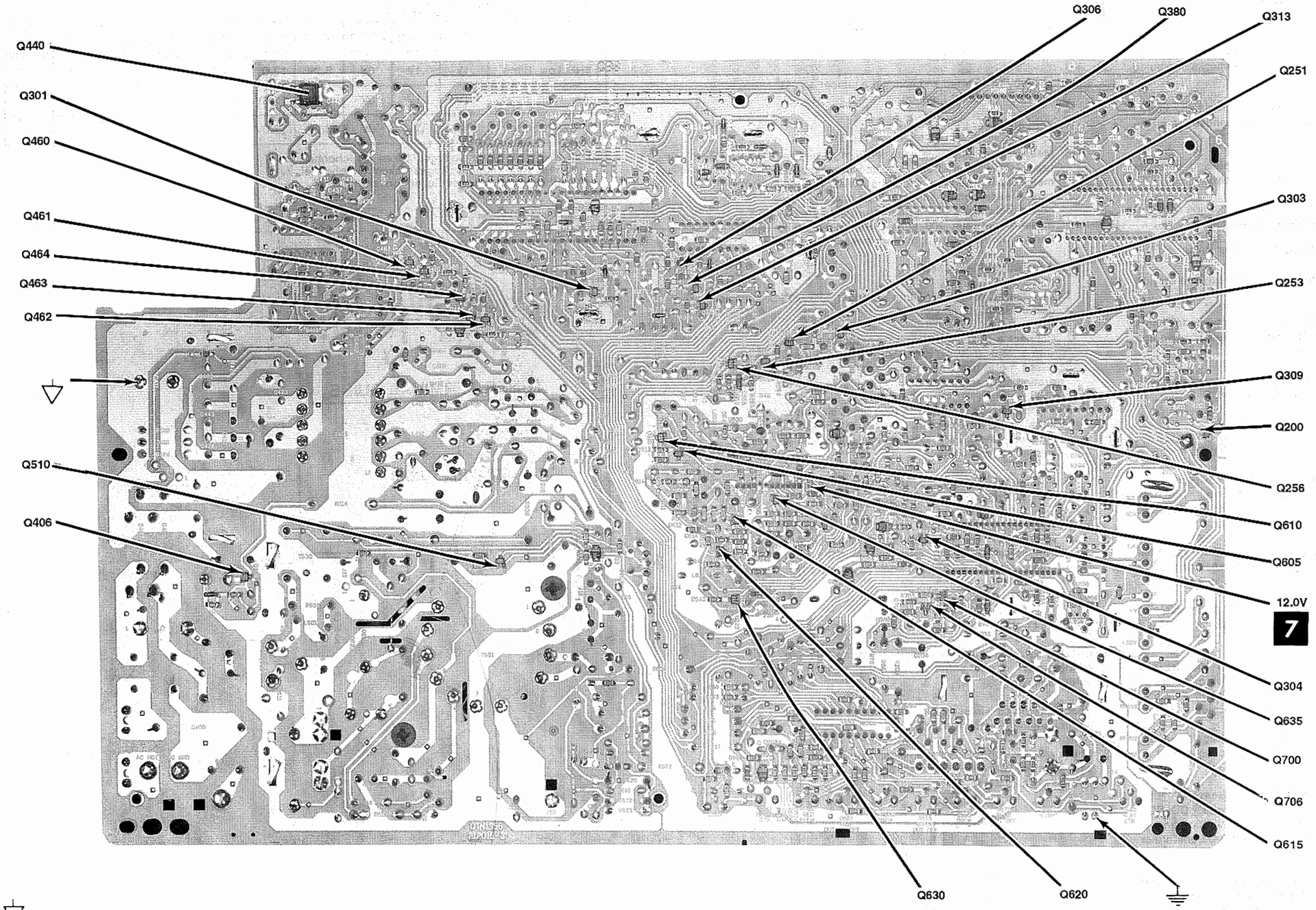
TUNER VOLTAGE CHART

	RFSW3	RFSW2	RFSW1	AGCV	+12V	+30V	+V	T.P.	SDA	SCL
VHF Low Band	.1V	.1V	0V	8.2V	12.0V	30.0V	5.0V	2.4V	4.7V	4.7V
VHF High Band	.1V	.1V	0V	8.2V	12.0V	30.0V	5.0V	10.2V	4.7V	4.7V
UHF Band	.1V	.1V	0V	8.2V	12.0V	30.V	5.0V	5.7V	4.7V	4.7V

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



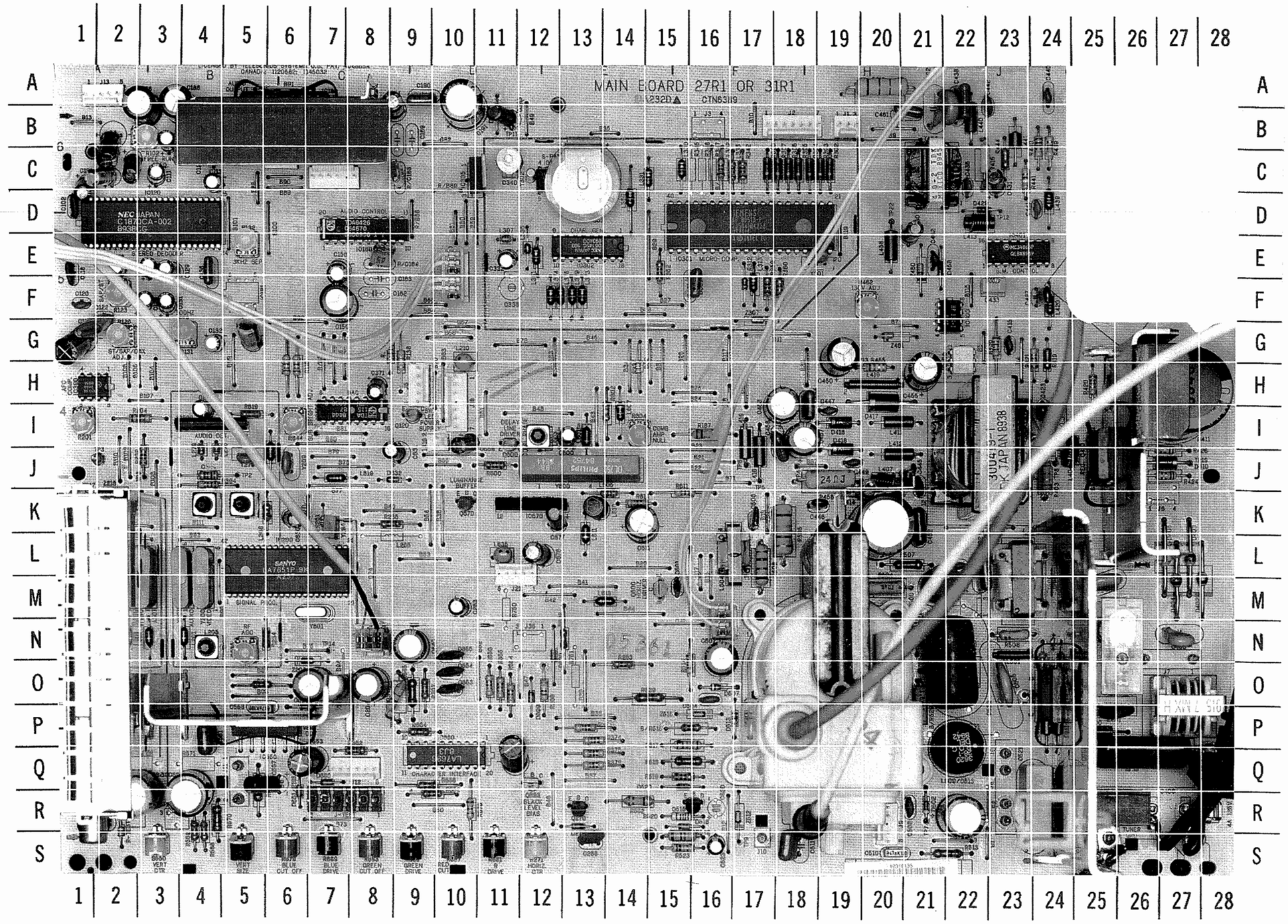


COMMON TIE POINT

NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED

A HOWARD W. SAMS CIRCUITRACE® PHOTO

MAIN BOARD-BOTTOM VIEW

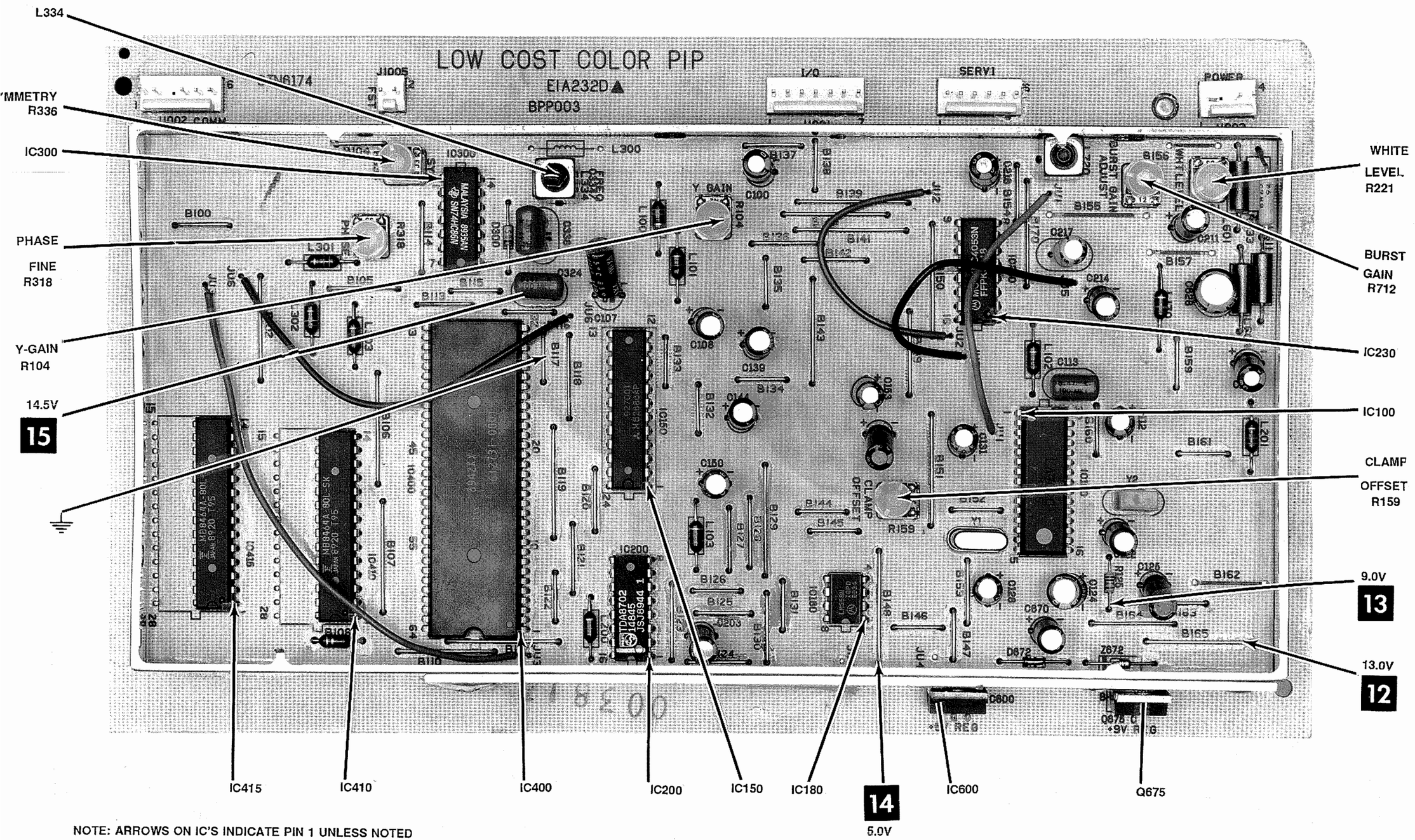


A HOWARD W. SAMS GRIDTRACE™ PHOTO

MAIN BOARD-TOP VIEW

MAIN BOARD-TOP

BT301	C-13
C101	C-1
C102	D-1
C105	B-2
C107	C-2
C108	C-2
C111	C-3
C113	C-4
C114	G-1
C116	E-1
C118	B-3
C120	F-1
C121	B-4
C122	G-2
C123	E-2
C125	E-3
C126	F-3
C129	E-3
C131	F-3
C132	G-4
C134	G-5
C135	E-4
C150	F-7
C156	E-7
C164	E-8
C169	C-9
C181	B-4
C184	B-9
C186	A-3
C188	A-3
C189	B-8
C190	A-9
C191	A-10
C204	O-8
C217	O-1
C222	L-1
C226	N-1
C228	R-2
C263	M-10
C268	S-13
C273	I-4
C309	F-16
C332	E-11
C340	C-11
C363	B-11
C371	H-8
C394	J-4
C400	Q-26
C401	M-26
C402	A-22
C403	N-27
C405	N-25
C411	H-28
C415	G-23
C417	K-26
C422	H-26
C423	I-24
C427	F-24
C428	J-26
C431	C-23
C433	F-23
C436	C-22
C438	A-22



A HOWARD W. SAMS CIRCUITRACE™ PHOTO

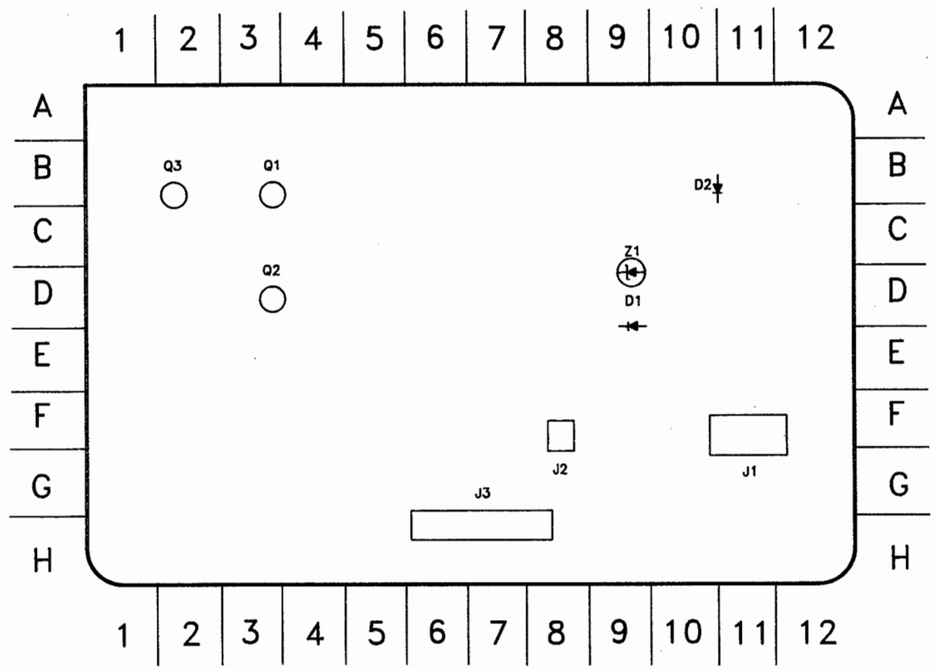
PIP BOARD-TOP VIEW

VIEW-GridTrace LOCATION GUIDE

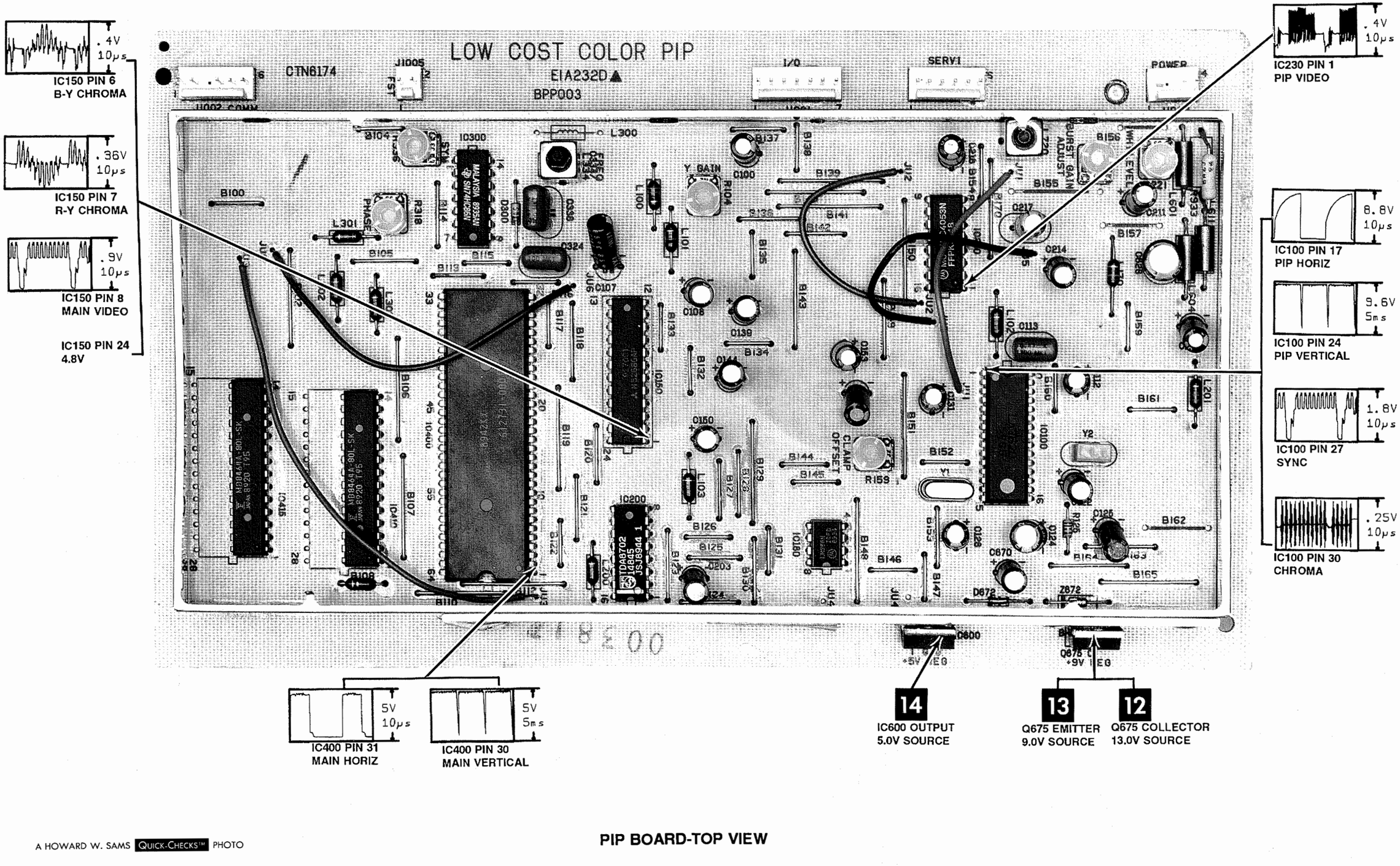
C440	A-24	D458	E-21	L331	C-15	R220	R-1	R429	O-21
C441	D-24	D502	R-21	L335	E-12	R232	J-3	R552	R-14
C442	B-23	D507	O-16	L350	D-14	R234	N-5	R555	R-5
C443	I-26	D513	P-17	L351	E-12	R235	N-5	R566	O-5
C445	J-21	D518	R-15	L373	F-13	R261	K-7	R567	S-5
C446	K-19	D520	Q-15	L374	F-12	R263	O-14	R568	R-4
C447	I-19	D550	P-6	L375	F-13	R265	K-8	R569	R-4
C449	J-19	D630	N-12	L379	F-13	R268	O-12	R570	R-4
C450	G-19	D632	J-9	L400	O-27	R271	S-12	R600	J-11
C451	K-20	D680	Q-7	L404	J-24	R302	C-19	R602	I-14
C452	K-21	D681	R-6	L407	J-20	R303	C-19	R604	I-14
C453	H-18	D699	O-12	L411	I-20	R304	C-18	R611	K-15
C454	I-18	F400	R-28	L412	J-20	R305	C-18	R614	K-14
C455	H-21	IC120	E-1	L413	D-22	R306	C-18	R619	I-5
C457	I-18	IC160	E-7	L416	J-17	R307	C-18	R622	N-13
C458	I-18	IC180	A-7	L418	I-17	R312	F-17	R639	O-15
C460	D-21	IC200	M-5	L419	H-20	R320	C-18	R644	I-6
C461	B-21	IC260	I-4	L420	F-24	R334	C-16	R645	O-9
C462	E-21	IC301	E-15	L421	J-25	R336	C-17	R654	O-11
C501	M-15	IC302	E-14	L422	I-25	R337	H-14	R655	O-11
C502	L-22	IC303	C-14	L423	J-20	R342	C-17	R656	O-11
C503	L-22	IC304	C-13	L439	D-24	R352	E-15	R662	Q-8
C504	O-16	IC305	C-11	L440	B-22	R359	F-7	R664	P-9
C505	O-23	IC330	H-8	L441	B-23	R360	F-8	R675	R-10
C506	K-17	IC390	H-2	L458	E-20	R371	P-13	R679	S-6
C507	N-16	IC400	F-21	L501	N-23	R374	P-13	R681	S-11
C508	R-21	IC401	E-23	L504	L-17	R375	Q-13	R682	R-9
C509	R-22	IC402	G-22	L505	M-21	R379	Q-13	R683	S-8
C510	S-20	IC550	P-5	L509	Q-22	R394	J-4	R685	S-9
C511	S-18	IC670	K-12	L511	P-24	R400	P-25	R686	Q-9
C521	R-24	IC680	Q-11	L601	I-13	R401	P-26	R687	S-10
C522	O-22	J1	B-19	L603	I-12	R403	J-24	R689	S-7
C523	S-16	J2	B-17	L605	K-14	R416	C-22	R707	O-9
C551	O-6	J4	Q-1	L607	I-14	R417	I-24	R TEST	R-2
C553	Q-6	J5	H-5	L610	K-13	R419	G-24	S550	S-3
C558	P-5	J7	N-27	L611	L-13	R420	H-25	SA400	R-26
C561	P-4	J8	Q-23	L618	M-13	R421	G-24	T401	I-23
C565	R-4	J10	S-17	L619	J-7	R424	J-27	T402	C-21
C567	Q-6	J11	Q-5	L635	L-11	R426	J-27	T500	L-23
C600	I-13	J12	Q-7	Q120	I-9	R436	G-23	T501	O-19
C611	K-14	J13	A-1	Q270	R-13	R439	C-24	TP1	I-7
C630	K-6	J14	C-8	Q410	J-25	R440	C-24	TP2	J-5
C631	J-9	J15	N-16	Q500	M-15	R441	C-23	TP4	J-18
C637	Q-11	J16	I-10	Q501	O-24	R444	C-23	TP122	E-1
C645	N-9	J17	F-10	Q518	R-16	R455	H-20	TP123	E-2
C653	O-10	J18	H-10	Q600	I-11	R458	J-19	TP126	F-2
C654	O-10	J20	C-6	Q670	K-10	R462	F-20	TP134	D-3
C655	N-10	J21	L-12	Q693	Q-12	R504	M-20	TP207	M-5
C659	I-10	J23	N-8	R102	B-3	R505	K-18	TP210	M-6
C676	L-12	J TEST	R-8	R115	H-6	R506	L-17	TP610	K-14
C677	K-12	K400	N-26	R123	F-2	R507	L-21	Y200	M-4
D270	R-13	L201	N-4	R126	G-2	R508	N-23	Y201	M-4
D305	B-11	L205	N-4	R131	G-4	R509	N-21	Y209	J-6
D402	M-27	L208	K-6	R132	E-5	R511	O-24	Y264	K-7
D403	L-27	L209	J-6	R138	G-9	R513	S-22	Y279	J-5
D404	M-28	L210	G-10	R139	G-9	R514	O-16	Y301	E-19
D405	L-27	L230	K-4	R187	I-16	R516	P-15	Y302	C-12
D410	J-27	L233	K-5	R199	H-6	R517	P-15	Y600	J-12
D414	J-20	L275	J-4	R201	I-1	R518	Q-15	Y601	M-7
D416	I-19	L279	J-4	R203	O-9	R519	Q-15		
D417	H-20	L307	E-11	R204	I-3	R520	R-15		
D418	J-19	L313	F-17	R215	M-1	R522	S-15		
D429	D-22	L330	C-15	R216	A-20	R523	S-15		

PINCUSHION BOARD-GridTrace LOCATION GUIDE

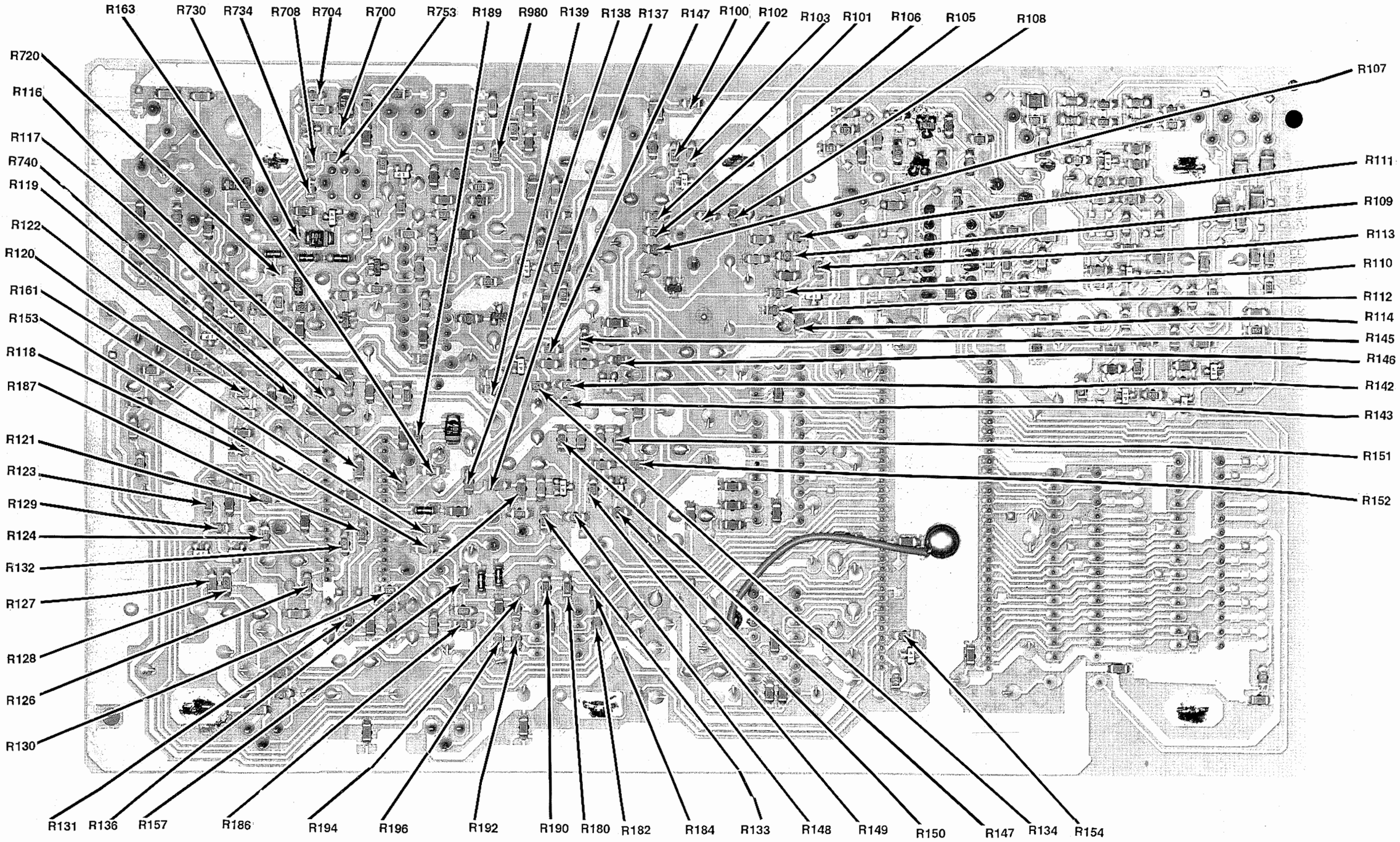
C2	E-9	Q3	B-2
C3	E-11	R2	F-9
C5	B-6	R3	E-11
C7	B-8	R4	E-8
C8	B-5	R5	D-6
C9	B-2	R7	C-7
C10	D-3	R8	C-8
C11	E-3	R9	B-7
C12	E-7	R10	B-6
C13	F-2	R11	C-6
C14	E-9	R12	D-7
C15	B-8	R13	D-5
C16	E-9	R14	C-5
C17	G-3	R15	C-6
D1	E-9	R16	B-5
D2	B-10	R17	B-3
J1	F-11	R18	C-2
J2	F-8	R19	F-4
J3	H-6	R20	B-6
L2	D-2	R21	B-10
L3	E-5	R22	B-11
L4	G-4	R23	D-11
L5	F-3	R24	C-8
Q1	B-3	R25	G-2
Q2	D-3	Z1	D-9



PINCUSHION BOARD



PIP BOARD-TOP VIEW



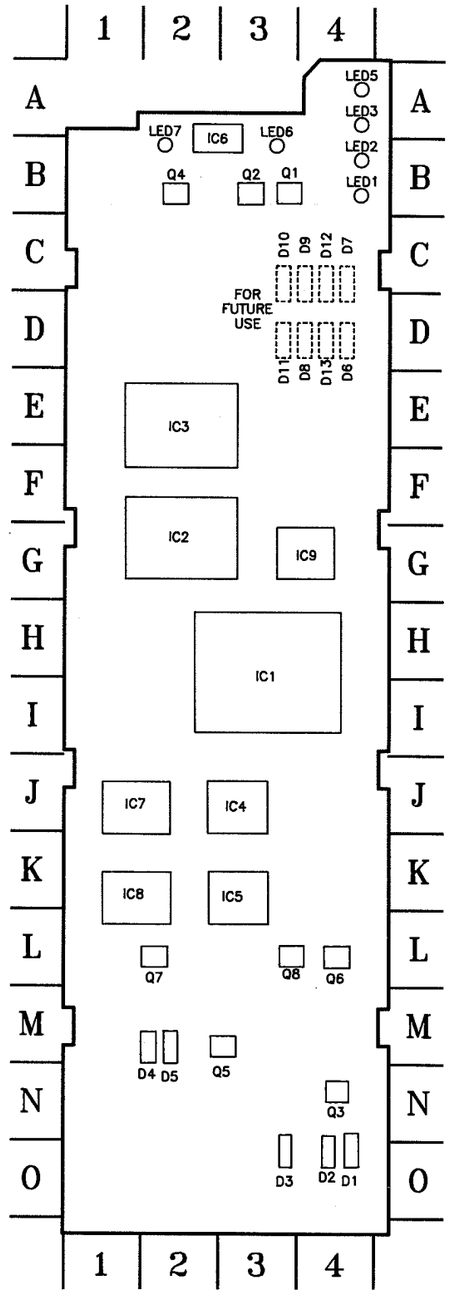
PIP BOARD-BOTTOM VIEW

TOM VIEW-GridTrace LOCATION GUIDE

C322	C-16	C702	N-21	R205	N-25	R388	H-28	R629	K-18
C333	E-15	C703	N-21	R208	M-23	R389	H-27	R630	J-20
C334	E-17	D155	F-22	R209	J-23	R392	G-28	R631	J-21
C335	F-18	D301	F-13	R229	K-23	R393	G-27	R632	K-21
C342	C-16	D302	D-12	R230	L-24	R395	D-17	R633	L-23
C361	C-19	D303	C-17	R231	L-23	R397	D-16	R634	K-20
C362	C-18	D304	B-16	R236	N-24	R404	N-3	R635	K-19
C381	F-16	D307	G-14	R251	G-18	R405	N-4	R636	I-22
C386	H-24	D308	F-16	R252	H-18	R406	G-7	R637	Q-17
C416	F-6	D406	N-3	R253	H-18	R407	F-6	R638	I-23
C429	D-6	D617	N-17	R254	H-18	R408	F-6	R640	N-16
C434	E-7	Q200	J-28	R255	H-17	R409	F-6	R641	I-21
C437	D-6	Q209	I-23	R256	H-17	R410	H-3	R642	J-20
C448	I-9	Q251	G-18	R257	H-16	R422	D-6	R643	J-19
C456	H-8	Q253	H-17	R258	H-17	R428	D-6	R646	L-18
C459	F-8	Q256	H-16	R259	H-16	R429	D-6	R647	L-18
C463	F-9	Q301	F-13	R260	H-17	R434	E-6	R648	M-17
C464	G-10	Q303	G-19	R262	K-22	R452	G-10	R649	L-19
C512	M-10	Q304	L-21	R264	M-20	R453	E-9	R650	K-20
C516	P-13	Q306	E-15	R267	L-22	R456	F-8	R651	M-21
C525	M-13	Q313	G-16	R269	R-16	R458	F-10	R652	R-18
C552	O-23	Q380	F-15	R270	R-16	R459	E-8	R653	R-17
C602	J-18	Q406	M-4	R270	I-24	R460	F-8	R657	M-23
C604	J-14	Q440	A-6	R301	E-12	R461	F-9	R658	M-22
C606	K-15	Q460	E-8	R308	F-11	R464	F-10	R659	L-20
C608	K-15	Q461	F-9	R309	F-12	R465	F-9	R660	R-18
C610	K-16	Q462	G-10	R310	F-13	R467	F-10	R661	L-18
C612	L-16	Q463	G-10	R311	E-12	R469	G-9	R663	L-17
C613	L-15	Q464	F-10	R313	F-12	R470	G-11	R665	P-19
C614	L-15	Q510	M-10	R317	F-13	R502	M-7	R666	P-16
C616	K-19	Q605	J-15	R318	H-20	R503	M-10	R667	R-23
C618	K-20	Q610	J-14	R324	G-15	R510	M-13	R668	L-18
C625	L-18	Q605	L-16	R325	E-14	R524	L-13	R669	K-18
C632	K-19	Q620	M-16	R326	H-21	R553	P-24	R670	M-17
C633	K-16	Q630	N-16	R327	D-11	R556	Q-23	R671	K-16
C635	L-18	Q635	K-17	R328	E-11	R557	Q-23	R673	K-19
C638	Q-17	Q700	N-4	R329	D-18	R559	R-24	R674	Q-18
C642	J-18	Q705	N-21	R330	D-17	R561	R-23	R676	K-16
C644	L-17	R101	E-28	R331	B-17	R563	Q-23	R677	J-18
C646	N-20	R104	C-27	R332	C-14	R565	R-24	R678	L-17
C648	K-18	R105	C-27	R333	C-14	R601	J-17	R680	R-19
C656	J-19	R107	D-27	R335	C-12	R603	J-16	R684	R-19
C658	L-12	R108	D-26	R338	E-15	R605	J-16	R688	R-22
C660	M-22	R120	F-28	R339	L-22	R606	J-18	R690	Q-20
C661	M-20	R122	E-26	R341	L-21	R607	I-18	R692	R-18
C662	L-20	R125	G-26	R348	B-12	R608	K-16	R693	R-17
C665	L-20	R128	G-26	R351	E-14	R609	M-16	R694	R-17
C670	Q-18	R129	F-25	R353	E-13	R610	L-16	R695	R-20
C671	K-18	R130	E-25	R354	E-13	R612	I-18	R696	R-18
C672	Q-18	R137	I-20	R355	E-13	R613	J-14	R697	R-16
C674	R-18	R155	F-22	R356	F-15	R615	K-15	R698	R-22
C678	K-17	R156	E-22	R358	F-12	R616	L-16	R699	O-17
C679	Q-18	R166	C-22	R361	F-11	R617	K-18	R701	N-22
C680	Q-18	R167	C-24	R368	H-21	R618	M-16	R702	N-22
C681	Q-19	R180	B-23	R369	K-20	R620	L-21	R703	N-20
C682	Q-21	R181	B-23	R373	P-16	R621	L-16	R704	N-21
C686	Q-21	R182	B-22	R381	F-16	R623	K-15	R705	N-21
C688	Q-20	R183	C-22	R383	F-15	R624	L-15	Z301	C-17
C689	Q-20	R185	A-26	R383	F-15	R625	L-16	Z304	C-18
C690	P-20	R186	A-24	R385	H-17	R626	L-19		
C693	R-17	R200	I-28	R386	C-16	R627	J-19		
C701	N-20	R202	L-24	R387	H-27	R628	J-19		

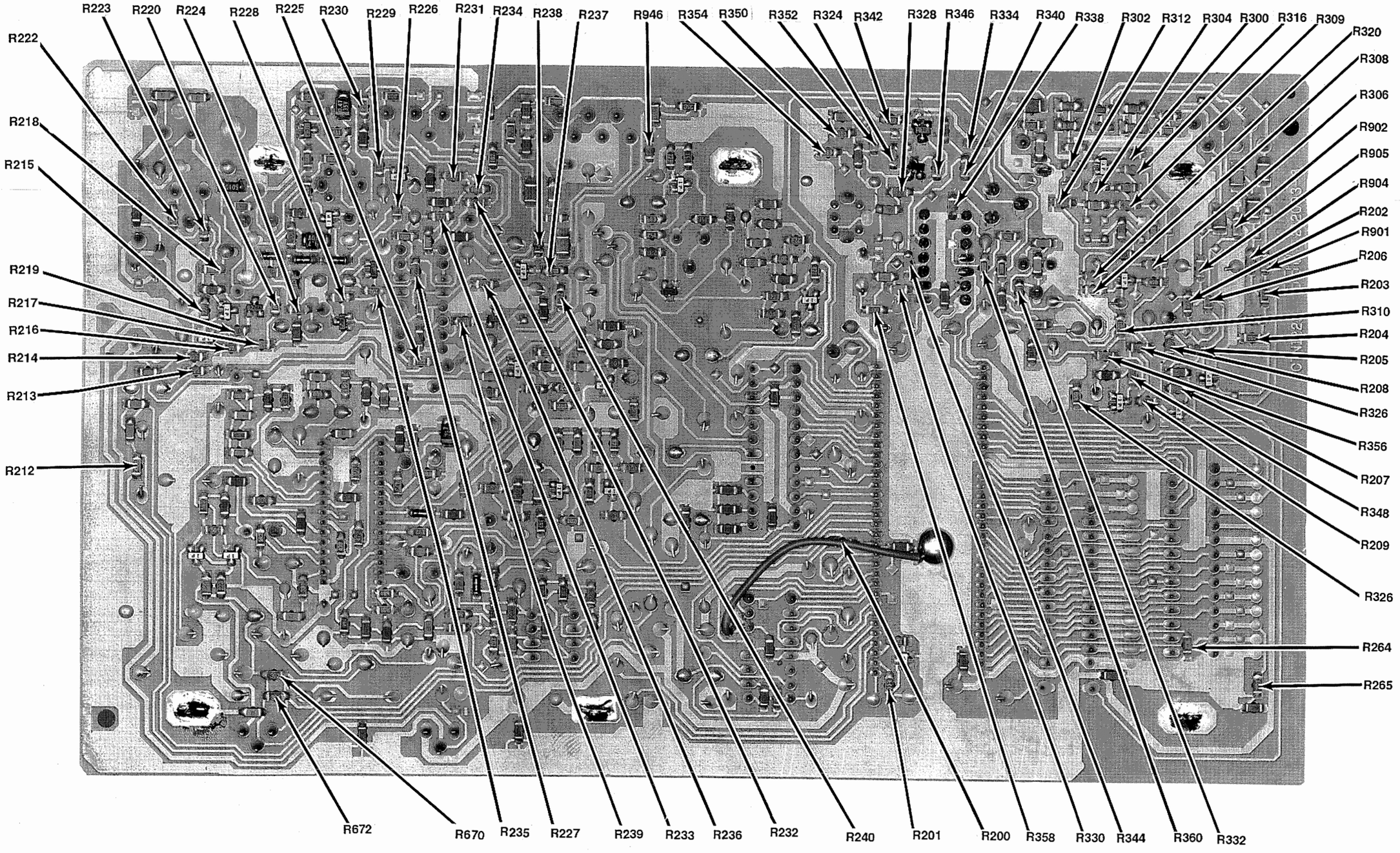
REMOTE TRANSMITTER UR5-GridTrace LOCATION GUIDE

BT5	O-3	R10	B-4		
C1	B-1	R11	B-4		
C2	K-2	R12	A-4		
C3	B-3	R13	C-2		
C4	G-4	R14	M-1		
C5	K-3	R15	C-3		
C6	I-2	R16	M-3		
C7	M-4	R17	M-3		
C8	J-4	R18	M-3		
C9	J-4	R19	M-2		
C10	G-3	R20	F-4		
C11	F-3	R21	E-4		
C12	L-2	R22	F-4		
D1	O-4	R23	F-3		
D2	O-4	R24	F-3		
D3	N-3	R25	E-3		
D4	M-2	R26	E-3		
D5	M-2	R27	E-4		
D6	D-4	R28	I-1		
D7	C-4	R29	I-1		
D8	D-4	R30	M-4		
D9	C-4	R31	N-3		
D10	C-3	R32	M-4		
D11	D-3	R33	N-3		
D12	C-4	R34	M-4		
D13	D-4	R35	M-3		
IC1	I-4	R36	M-3		
IC2	F-3	R37	M-2		
IC3	E-1	R38	J-4		
IC4	J-3	R39	M-2		
IC5	K-3	R40	D-2		
IC6	B-2	R41	D-1		
IC7	J-2	R42	D-1		
IC8	K-2	R43	C-1		
IC9	G-4	R44	C-1		
LED1	B-4	R45	C-2		
LED2	B-4	R46	C-2		
LED3	B-4	R47	D-1		
LED4	A-4	R48	L-3		
LED5	A-4	R49	L-3		
LED6	A-3	R50	L-2		
LED7	A-2	R51	M-3		
Q1	B-3	R52	G-1		
Q2	B-3	Y1	K-4		
Q3	N-4				
Q4	B-2				
Q5	M-2				
Q6	L-4				
Q7	L-2				
Q8	L-3				
R1	C-3				
R2	C-2				
R3	C-3				
R4	C-3				
R5	C-1				
R6	C-2				
R7	C-1				
R8	C-3				
R9	C-4				

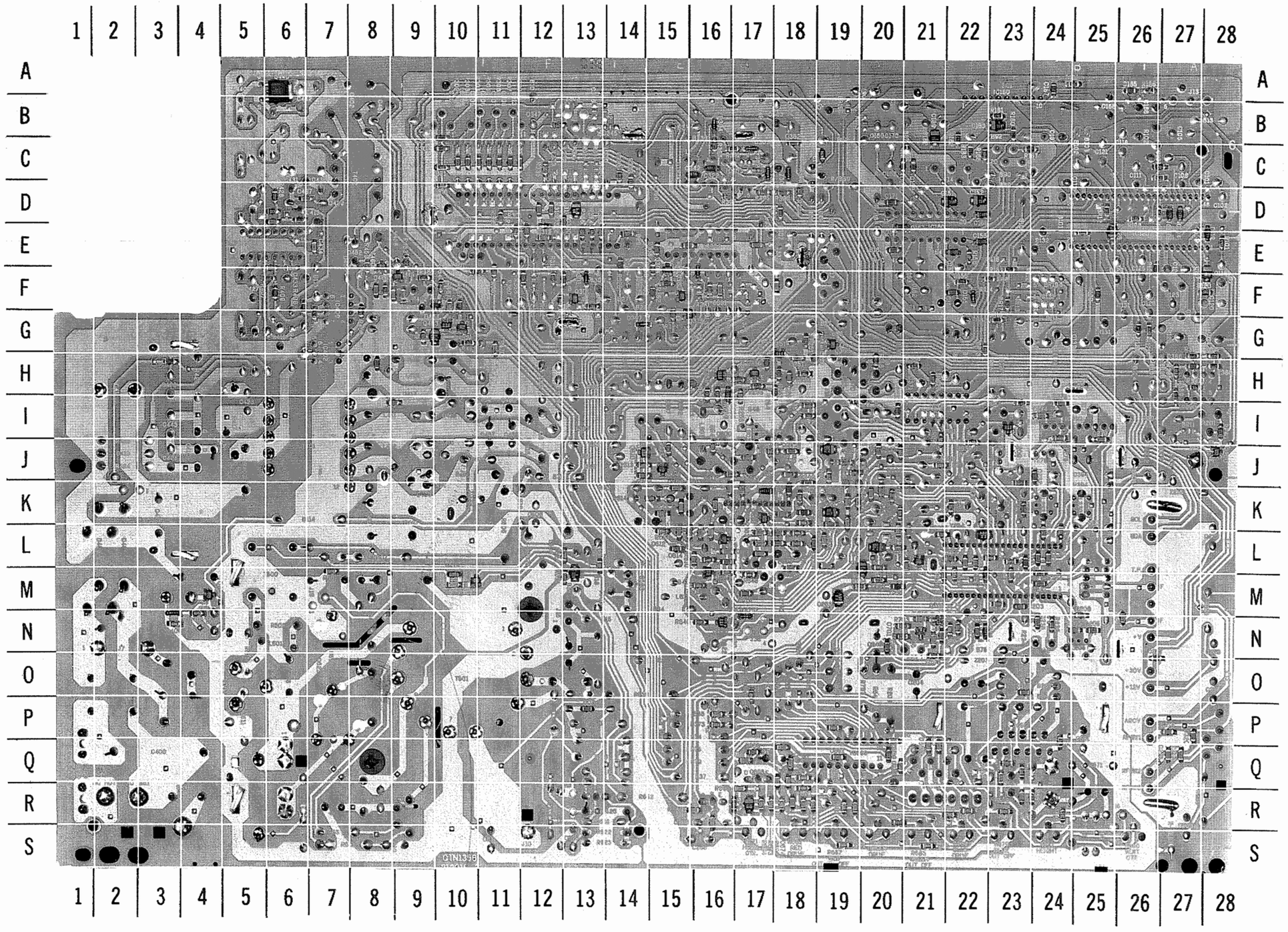


REMOTE TRANSMITTER UR5

PHILIPS CHASSIS 20R101,27R101/4/6,31R102/3



PIP BOARD-BOTTOM VIEW



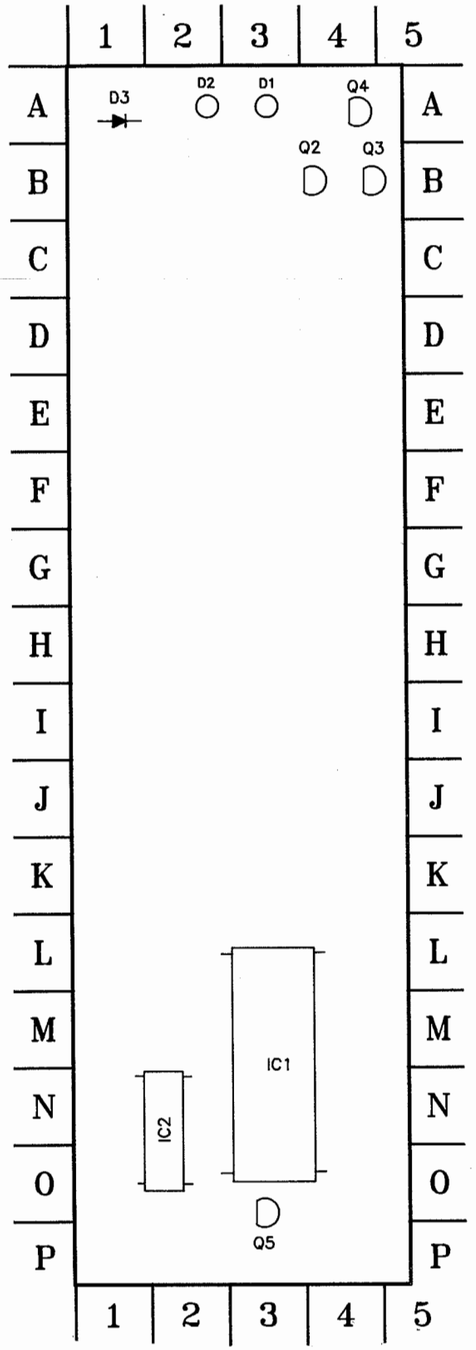
A HOWARD W. SAMS GRIDTRACE™ PHOTO

MAIN BOARD-BOTTOM VIEW

MAIN BOARD-BO

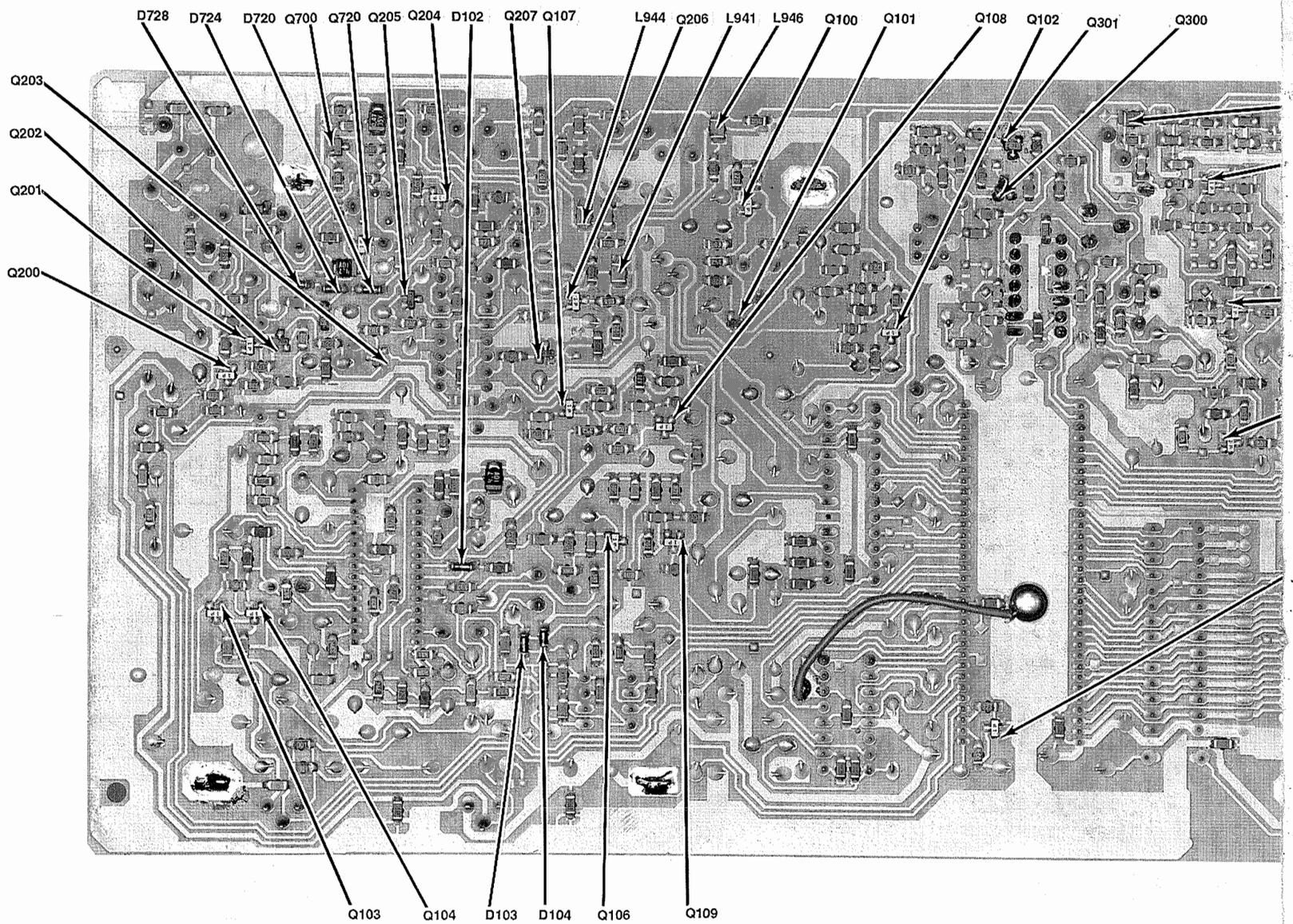
C104	D-27
C110	D-27
C117	F-28
C119	E-28
C128	E-25
C151	D-22
C152	D-22
C153	E-22
C154	E-22
C155	F-22
C159	C-21
C160	C-21
C165	E-20
C166	D-22
C167	D-21
C171	D-20
C182	B-21
C183	B-23
C185	A-26
C187	A-24
C201	N-26
C203	M-23
C205	N-25
C206	N-25
C218	P-27
C219	Q-27
C220	Q-27
C221	M-24
C224	M-24
C227	N-27
C230	L-23
C231	L-24
C232	J-24
C234	L-24
C235	N-24
C236	N-22
C237	N-22
C251	H-18
C253	H-18
C255	H-16
C261	K-19
C262	L-22
C264	M-19
C265	L-21
C266	M-20
C274	I-24
C275	I-24
C279	I-25
C300	D-13
C301	C-10
C302	B-10
C303	C-10
C304	C-10
C305	C-11
C306	C-11
C307	C-11
C308	C-11
C310	D-12
C311	D-13
C312	D-12
C313	C-12
C320	P-27

REMOTE TRANSMITTER UR8
GridTrace LOCATION GUIDE



C2	B-2
C3	L-5
C4	L-5
C5	P-4
C6	C-2
C7	O-1
D1	A-4
D2	A-3
D3	A-1
IC1	L-4
IC2	N-2
Q2	B-4
Q3	B-5
Q4	A-5
Q5	O-3
R1	M-1
R2	M-2
R3	M-2
R4	M-2
R5	L-2
R6	L-2
R7	L-2
R8	P-1
R9	P-1
R10	P-3
R11	P-2
R12	P-2
R13	P-2
R14	L-5
R15	B-5
R16	B-5
R17	A-4
R18	B-5
R19	A-4
R20	A-2
R21	A-2
R22	O-4
R23	O-4
R24	L-2
R25	M-5
R26	M-5
R27	M-5
Y1	K-5

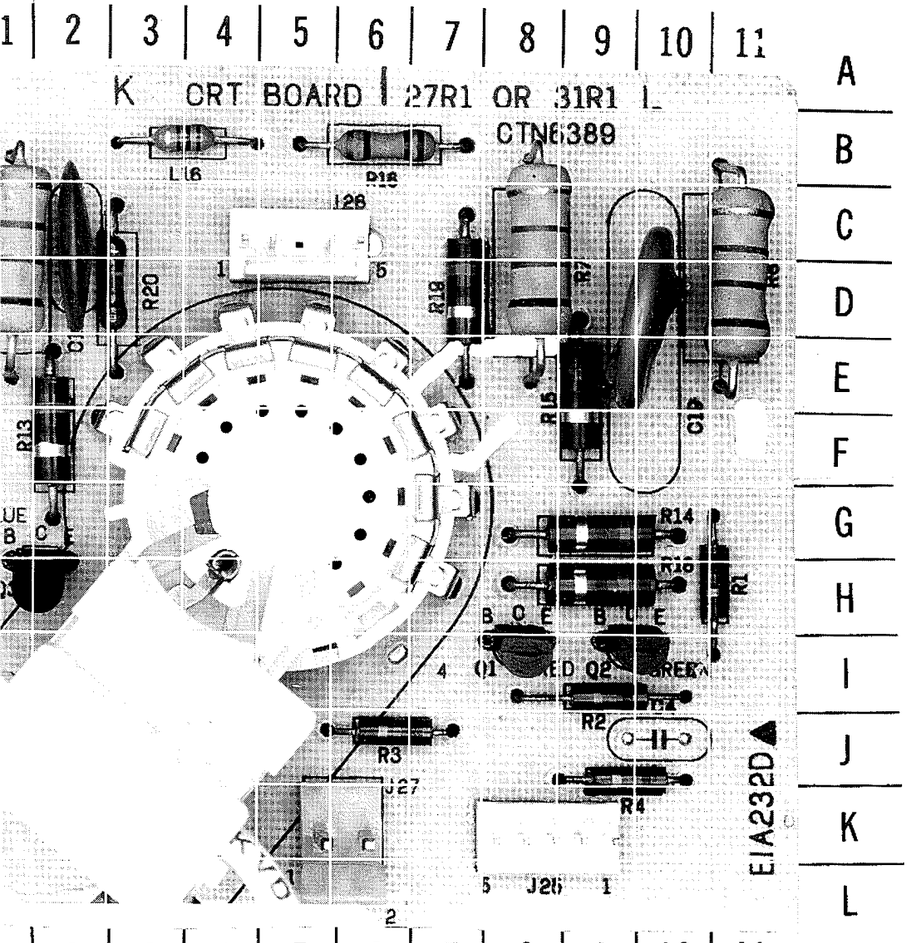
REMOTE TRANSMITTER UR8



PIP BOARD-BOTTOM VIEW

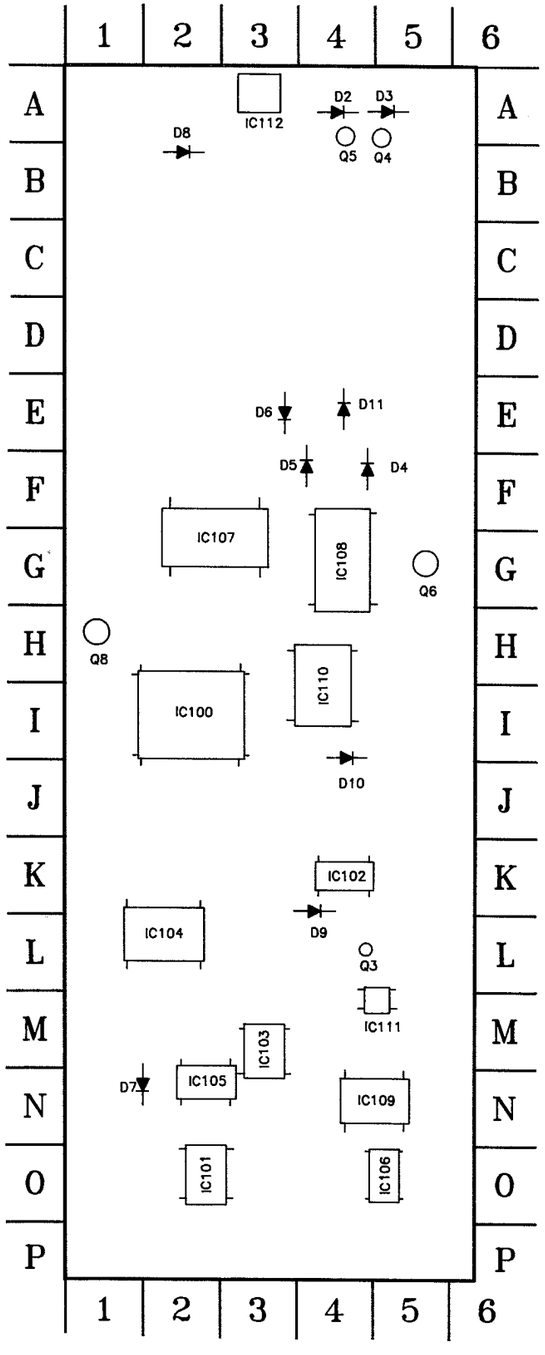
BOARD-GridTrace LOCATION GUIDE

C-2	Q2	I-10	R7	D-8	R16	B-6
D-10	Q3	H-2	R8	D-11	R18	H-9
J-8	R1	H-11	R9	C-1	R19	D-7
C-5	R2	I-9	R13	F-2	R20	D-3
K-6	R3	J-6	R14	G-9		
I-8	R4	J-9	R15	E-9		



EDWARD W. SAMS GRIDTRACE™ PHOTO

CRT BOARD



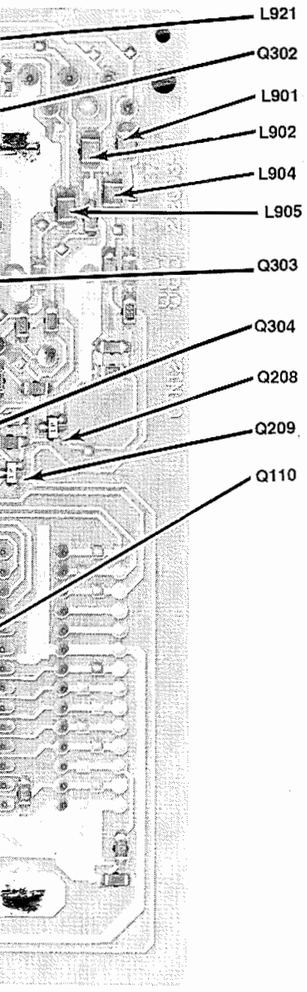
REMOTE TRANSMITTER UR4

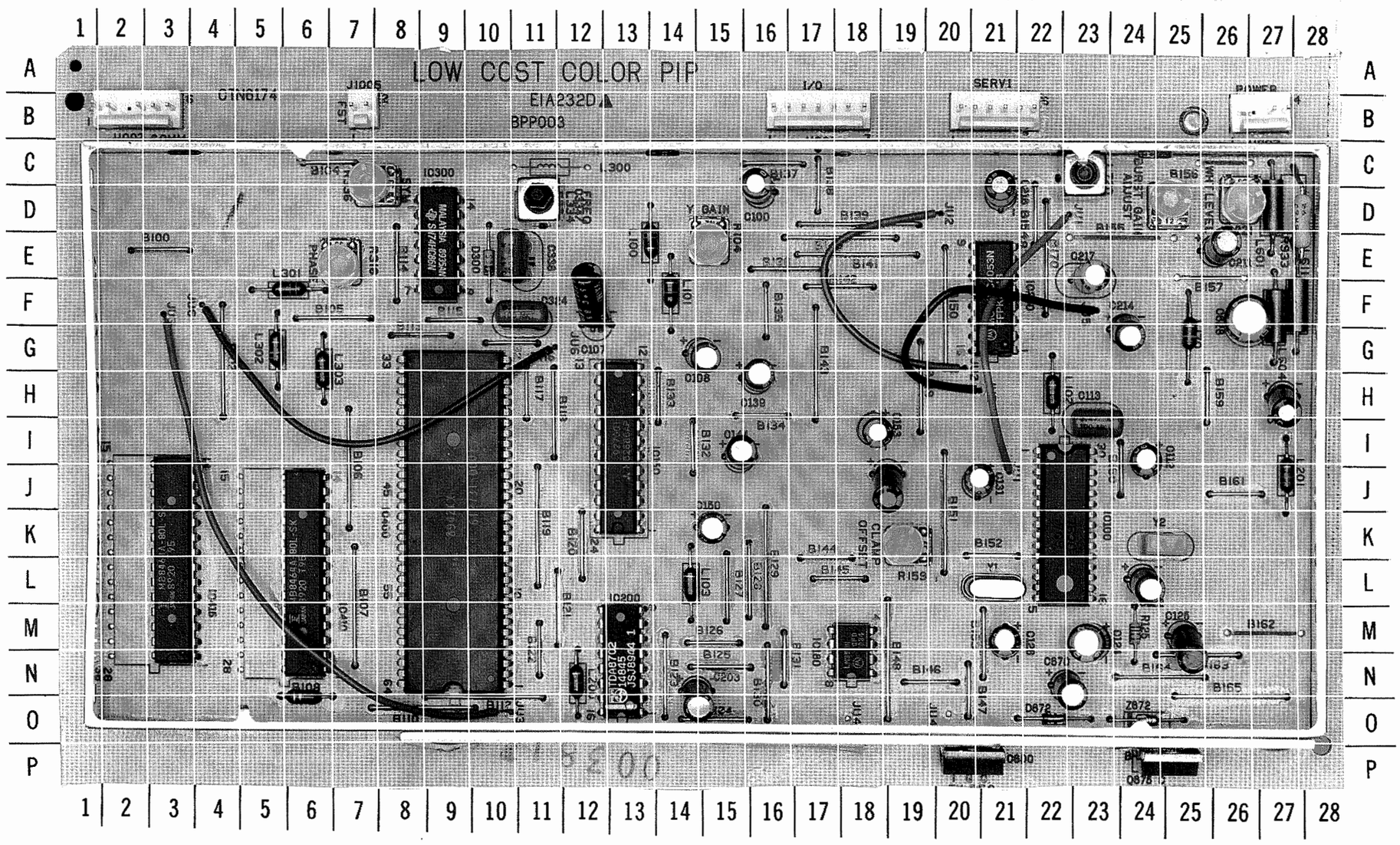
REMOTE TRANSMITTER UR4 GridTrace LOCATION GUIDE

C1	A-3	R30	M-4
C2	I-6	R31	P-2
C3	J-4	R32	O-2
C4	J-4	R34	B-3
C6	O-4	R35	L-4
C7	O-2	R36	O-1
C8	E-6	R37	M-4
C9	M-2	R39	O-4
C10	N-6	R40	N-1
C11	G-4	R41	H-5
D2	A-4	R42	H-6
D3	A-5	R43	H-5
D4	F-5	R44	I-5
D5	F-4	R45	I-5
D6	E-4	R47	K-4
D7	N-2	R48	A-1
D8	B-2	R50	H-3
D9	L-4	R51	H-4
D10	I-5	R52	F-1
D11	E-5	R53	F-1
IC100	J-2	R54	F-1
IC101	O-3	R55	G-1
IC102	K-5	R56	G-1
IC103	M-3	R57	H-2
IC104	L-2	R58	M-5
IC105	N-3	R59	L-5
IC106	O-6	R60	H-1
IC107	F-2	R61	A-2
IC108	G-5	SW1	G-1
IC109	O-5	Y1	I-6
IC110	I-4		
IC111	M-5		
IC112	A-3		
L1	K-5		
LITHIUM BATTERY	E-3		
Q3	L-5		
Q4	B-5		
Q5	B-5		
Q6	G-6		
Q8	H-1		
R11	O-4		
R12	P-4		
R13	P-5		
R14	P-5		
R15	P-6		
R16	N-5		
R17	N-5		
R18	M-4		
R19	F-1		
R21	J-5		
R22	B-6		
R23	A-6		
R24	A-6		
R25	B-4		
R26	F-5		
R27	G-6		
R28	L-5		
R29	L-4		

PIP BOARD-TOP VIEW-GridTrace LOCATION GUIDE

C100	D-16	C139	H-16	C217	E-23	IC200	O-13	J1005	B-7	L302	G-5	R159	K-19		
C107	F-12	C144	I-15	C324	F-11	IC130	G-21	L100	E-13	L303	G-6	R221	C-26		
C108	G-15	C150	K-15	C338	E-11	IC300	D-9	L101	F-14	L334	D-11	R318	E-7		
C112	I-24	C153	I-18	C628	F-27	IC400	N-10	L102	H-22	L601	D-27	R336	C-7		
C113	I-23	C155	J-19	C670	N-22	IC410	N-6	L103	L-14	L604	F-27	R712	D-25		
C122	L-24	C203	N-14	D300	E-10	IC405	N-4	L108	O-6	L611	F-28	R933	D-28		
C124	M-23	C310	H-27	D672	O-22	IC600	P-20	L170	F-25	L720	C-23	SERVICE	B-21		
C125	M-25	C211	E-26	IC100	I-22	J1001	B-17	L200	N-12	Q675	P-25	Y1	L-21		
C128	M-21	C214	F-24	IC150	K-13	J1002	B-2	L201	J-27	R104	E-15	Y2	K-25		
C131	J-20	C216	D-21	IC180	N-18	J1003	B-27	L301	F-6	R125	M-24	Z672	O-24		





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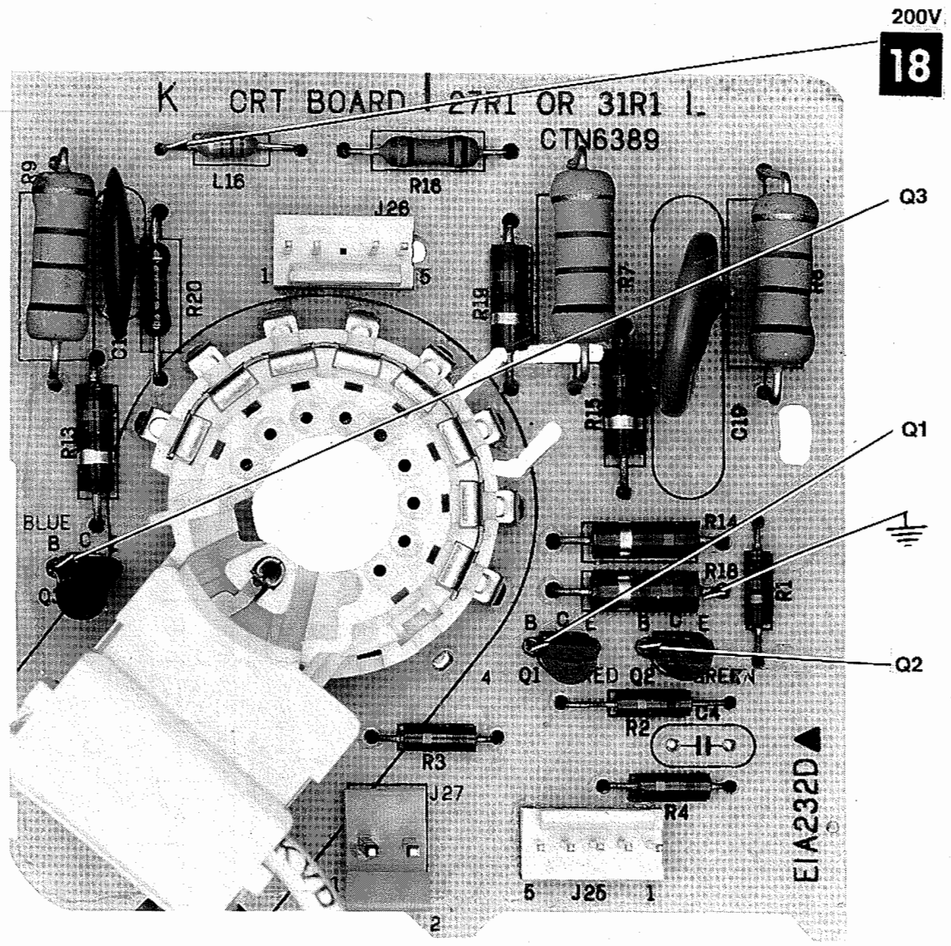
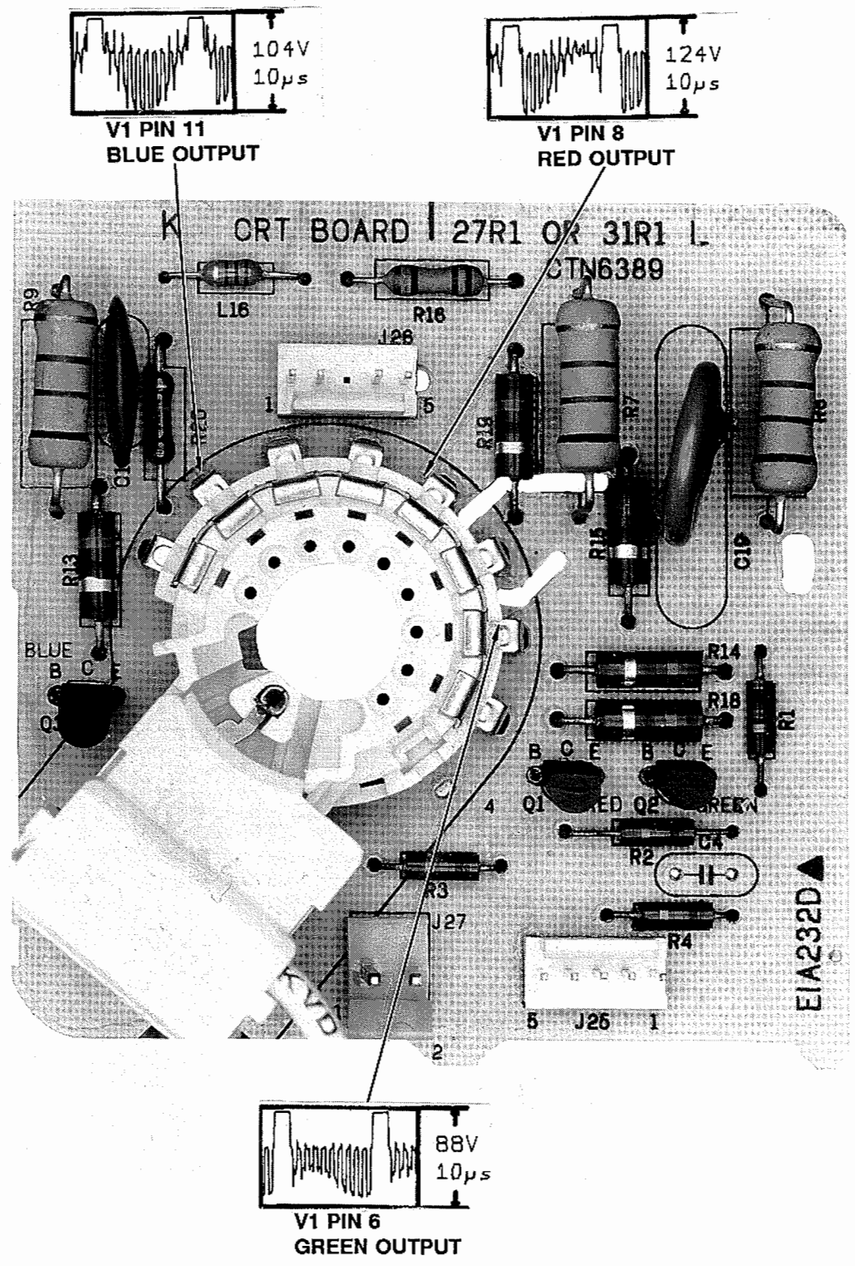
PIP BOARD-TOP VIEW



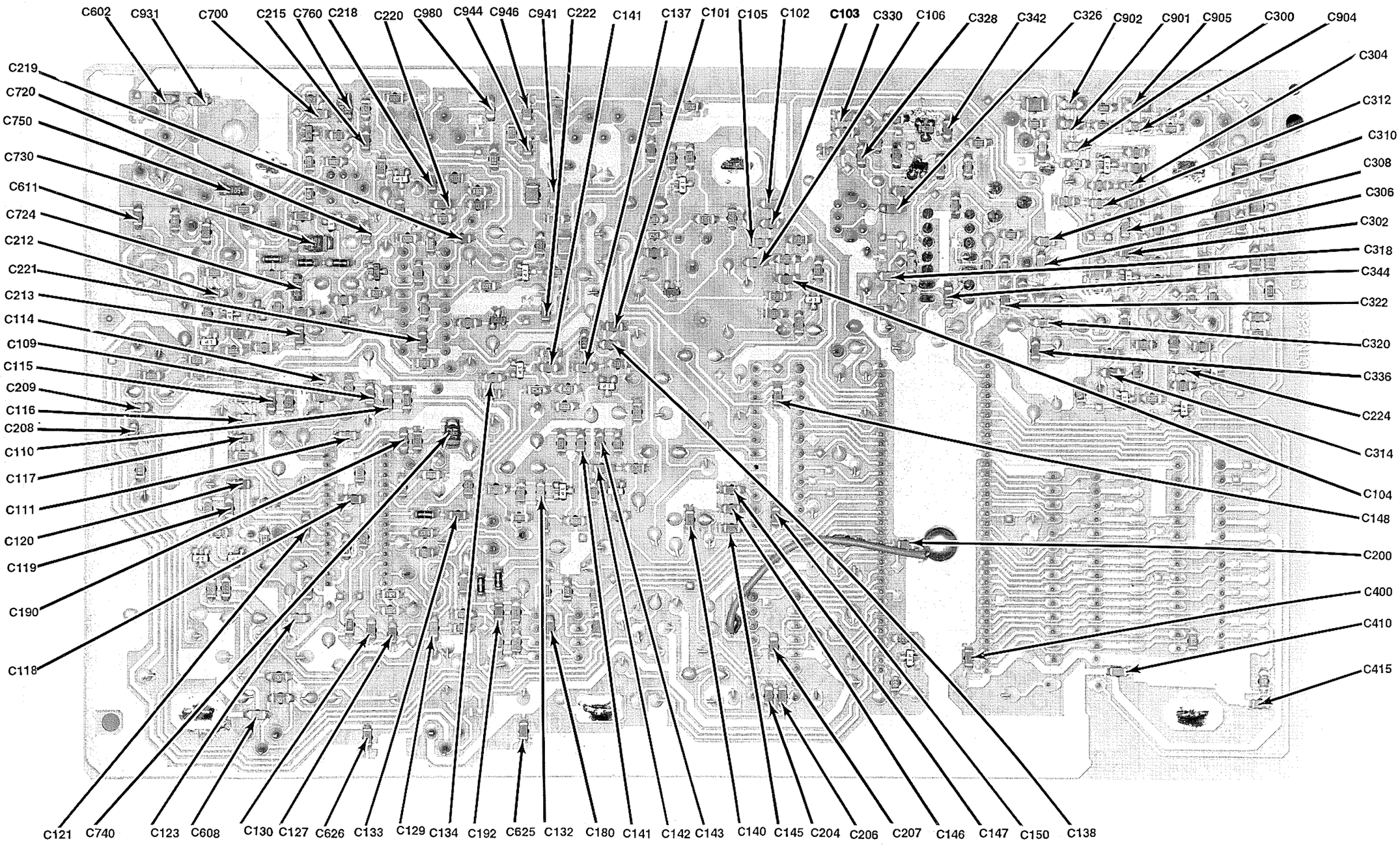
NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED



CRT E

C16
C19
J25
J26
J27
Q1

A
B
C
D
E
F
G
H
I
J
K
L



PIP BOARD-BOTTOM VIEW

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	NOTES
IC120	C1870CA-002				
	4835-209-47063				
IC121	4835-209-87081	NTE943M	ECG943M	SK9278	SOME VERSIONS
IC160	TDA8426				
	4835-209-87087				
IC180	LA4270	NTE1798	ECG1798	SK9745	
	4835-209-87085	NTE1798	ECG1798	SK9745	
IC200	LA7651P				
	4835-209-47062				
IC260	LA7510				
	4835-209-87086				
IC301	4835-209-87057				
IC302	D6145C				
	4835-209-17024				
IC303	PCF8583P				
	4835-209-47059				
IC304	4835-209-47058				
IC305	612479-1	NTE960	ECG960	SK3591	
	4835-209-87067	NTE960	ECG960	SK3591	
IC330	TDA8444				
	4835-209-87084				
IC390	LM393N	NTE943M	ECG943M	SK9278	
	4835-209-87081	NTE943M	ECG943M	SK9278	
IC400	4835-130-97006	NTE3092	ECG3092	SK9770	#
IC401	MC34065P				
	4835-209-87071				
IC402	4835-130-37057				#
IC550	TDA8174				
	4835-209-87091				
IC670	LA7222				
	4835-209-87089				
IC680	LA7696				
	4835-209-87088				
Q120	4835-130-47055	NTE123AP	ECG123AP	SK3854	
Q200	4835-130-47086				
Q209	4835-130-47087				
Q251	4835-130-47087				
Q253	4835-130-47086				
Q256	4835-130-47087				
Q270	4835-130-47055	NTE123AP	ECG123AP	SK3854	
Q301	4835-130-47086				
Q303,4,6	4835-130-47086				
Q313	4835-130-47087				
Q380	4835-130-47086				
Q406	4835-130-47086				
Q410	4835-130-47092				
Q440	4835-130-47098				
Q460,1,2	4835-130-47086				
Q463	4835-130-47087				
Q464	4835-130-47085				
Q500	2SC2482	NTE399	ECG399	SK9352	
	4835-130-47099	NTE399	ECG399	SK9352	
Q501	2SD1878	NTE2331	ECG2331		#
	4835-130-47091	NTE2331	ECG2331		
Q510	4835-130-47086				
Q518	4835-130-47053	NTE159	ECG159	SK3466	
Q600	4835-130-47055	NTE123AP	ECG123AP	SK3854	

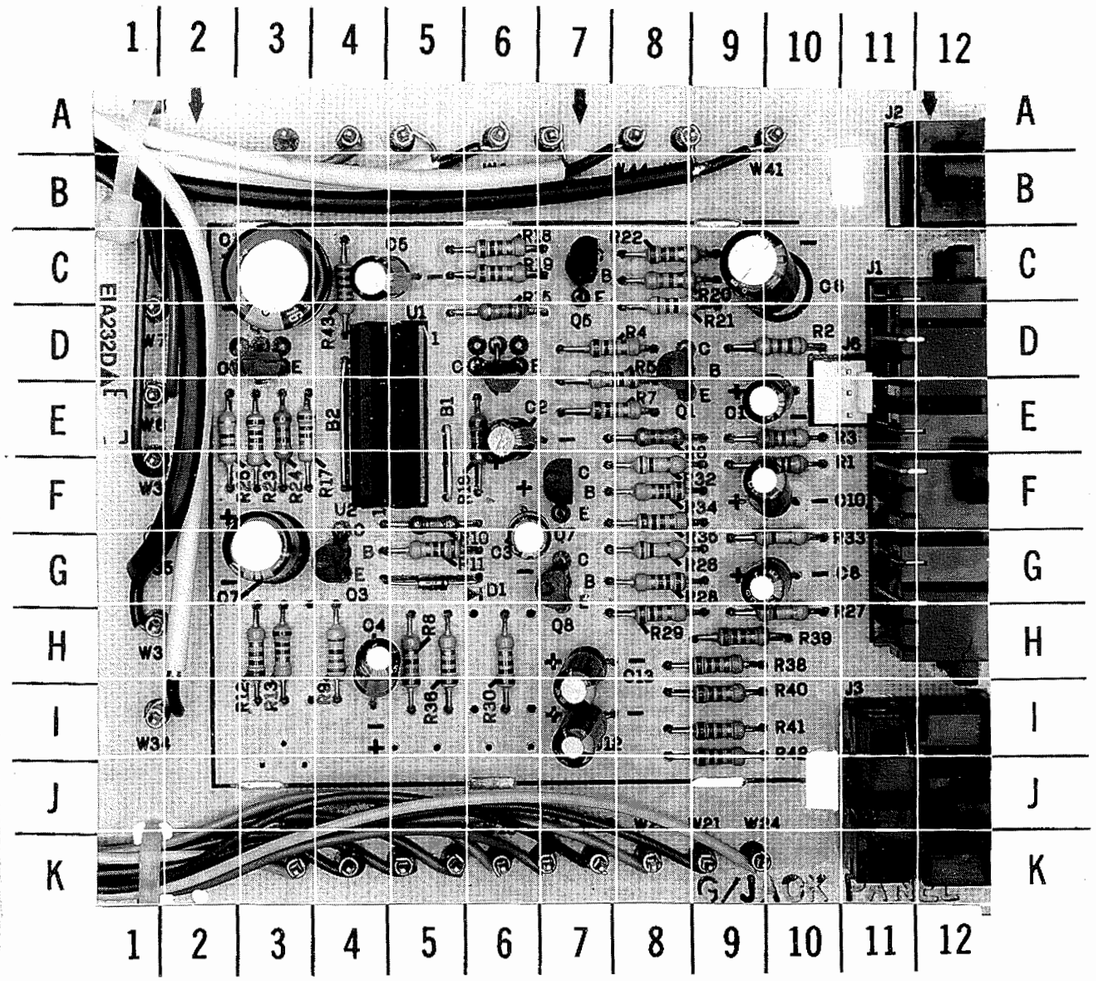
SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	NOTES
Q605	4835-130-47086				
Q610	4835-130-47087				
Q615	4835-130-47086				
Q620	4835-130-47087				
Q630	4835-130-47087				
Q635	4835-130-47086				
Q670	4835-130-47055	NTE123AP	ECG123AP	SK3854	
Q693	4835-130-47053	NTE159	ECG159	SK3466	
Q700	4835-130-47088				
Q705	4835-130-47096				
Z203	4835-130-37086	NTE5018A	ECG5018A	SK9A1	
Z216	4835-130-37082	NTE5035A	ECG5035A	SK30A	
Z301,4	4835-130-37098				
Z307	4835-130-37084	NTE5011A	ECG5011A	SK5A6	
Z460,1	4835-130-37068	NTE5011T1	ECG5011T1		
Z512	4835-130-37092	NTE5037A	ECG5037A	SK36A	#
Z516	4835-130-37091	NTE5033A	ECG5033A	SK27A	
PIP MODULE APP003					
D102,3,4	4835-130-37066				
D300	4835-130-37088				
D672	4835-130-37048	NTE519	ECG519	SK3100	
D720,24,28	4835-130-37066				
IC100	LA7620	NTE1845	ECG1845		
	4835-209-87094	NTE1845	ECG1845		
IC150	M52686AP				
	4835-209-87092				
IC180	LM358N	NTE928M	ECG928M	SK3692	
	4835-209-87079	NTE928M	ECG928M	SK3692	
IC200	TDA8702				
	4835-209-47015				
IC230	MC74HC4053N				
	4835-209-17005				
IC300	SN74HC86N				
	4835-209-17004				
IC400	612731-0001				
	4835-209-17026				
IC410,15	MB8464A-80L-SK				
	4835-209-17021				
IC600	612479-1	NTE960	ECG960	SK3591	
	4835-209-87067	NTE960	ECG960	SK3591	
Q100	4835-130-47066				
Q101	4835-130-47065				
Q102,3,4	4835-130-47066				
Q106 - Q110	4835-130-47066				
Q200,1	4835-130-47066				
Q202,3	4835-130-47065				
Q204	4835-130-47066				
Q205	4835-130-47094				
Q206	4835-130-47066				
Q207	4835-130-47065				
Q208,9	4835-130-47066				
Q300,1	4835-130-47095				
Q302,3,4	4835-130-47066				

PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3

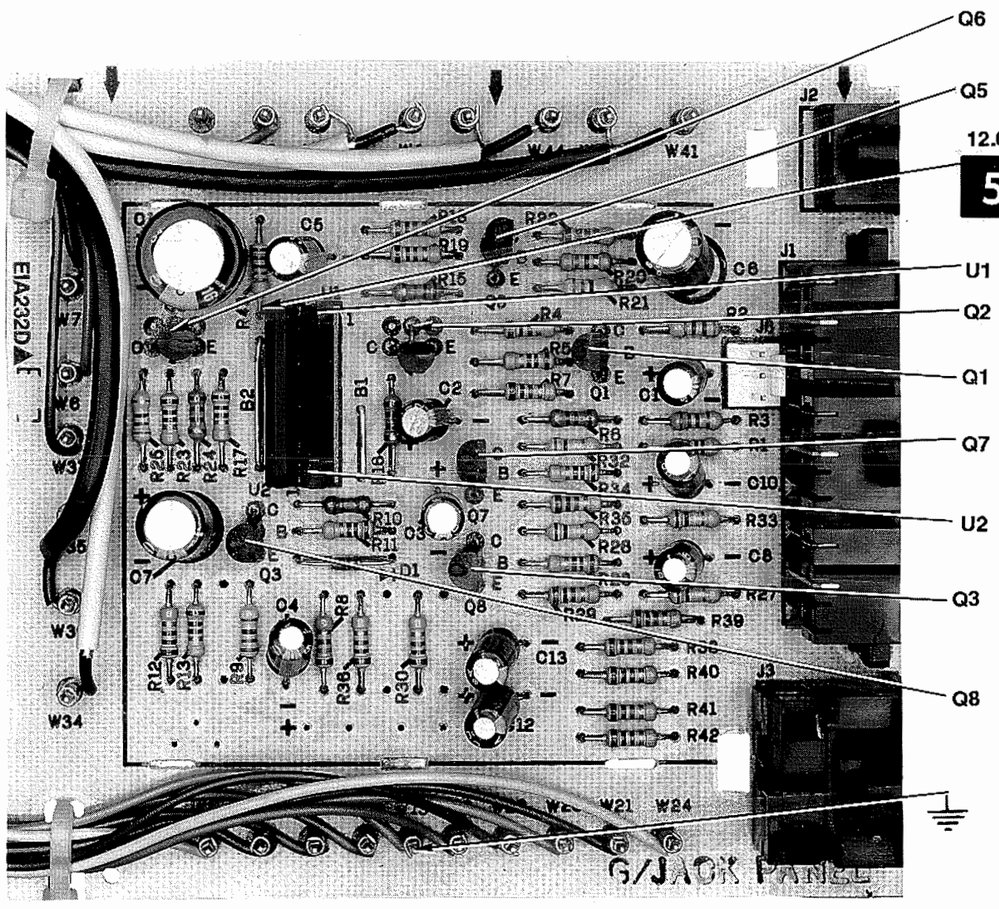
AUDIO/VIDEO SWITCH BOARD-GridTrace LOCATION GUIDE

C1	E-10	Q3	G-4	R15	D-6	R34	F-8
C2	E-6	Q5	C-7	R16	E-6	R35	F-8
C3	G-6	Q6	D-3	R17	E-3	R36	H-5
C4	H-4	Q7	F-7	R18	C-6	R38	H-9
C5	C-5	Q8	G-7	R19	C-6	R39	H-9
C6	C-10	R1	F-10	R20	C-8	R40	I-9
C7	G-3	R2	D-10	R21	D-8	R41	I-9
C8	G-10	R3	E-10	R22	C-8	R42	I-9
C10	F-10	R4	D-7	R23	E-3	R43	C-4
C12	I-7	R5	D-7	R24	E-3	U1	D-5
C13	H-7	R6	E-8	R25	E-2	U2	F-4
C14	C-3	R7	E-7	R26	G-8		
D1	G-5	R8	H-5	R27	H-10		
J1	F-12	R9	H-4	R28	G-8		
J2	B-12	R10	F-5	R29	H-8		
J3	J-12	R11	G-5	R30	H-6		
Q1	D-8	R12	H-3	R32	F-8		
Q2	D-6	R13	H-3	R33	G-10		



A HOWARD W. SAMS GRIDTRACE™ PHOTO

AUDIO/VIDEO SWITCH BOARD



NOTE: ARROWS ON TRANSISTORS INDICATE BASE UNLESS NOTED

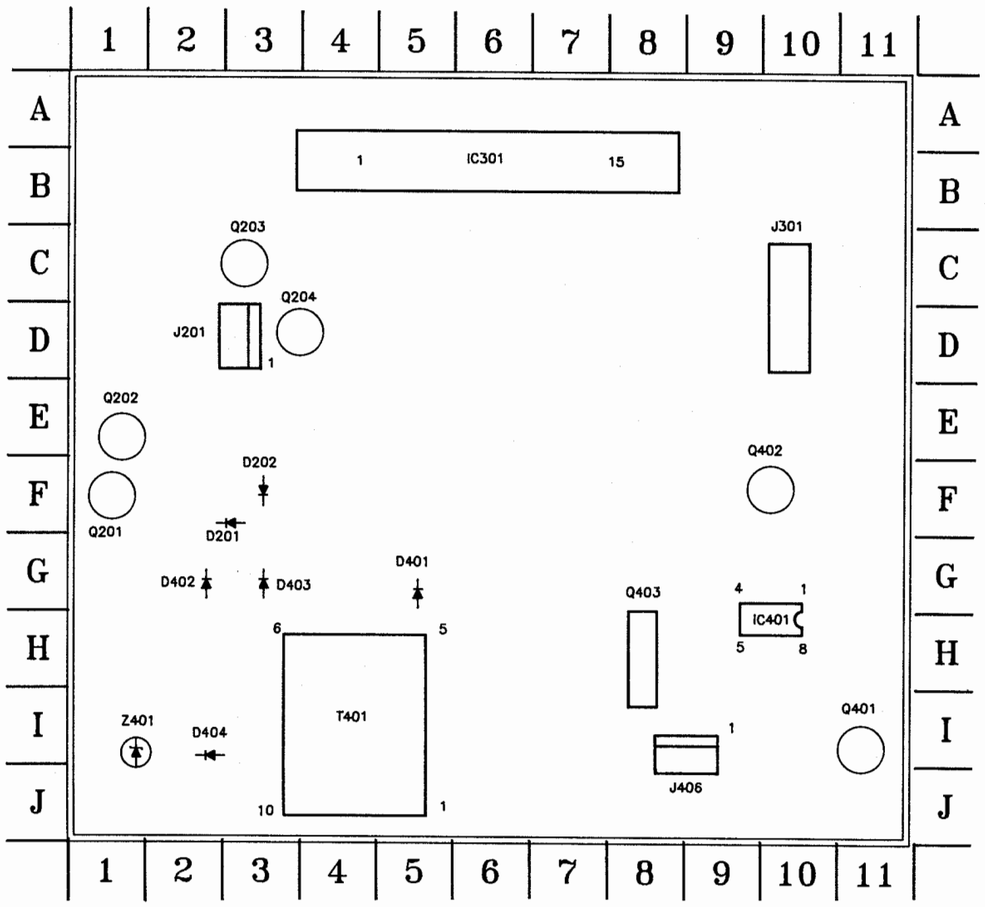
A HOWARD W. SAMS CIRCUITRACE™ PHOTO

AUDIO/VIDEO SWITCH BOARD

PHILIPS
CHASSIS 20R101,27R101/4/6,31R102/3

10 WATT STEREO BOARD-GridTrace LOCATION GUIDE

C201	E-2	C402	I-7	C419	H-9	L402	J-7	R202	D-3	R311	B-8
C202	F-1	C403	H-5	C420	D-7	L403	H-6	R203	C-2	R312	B-4
C301	B-1	C404	F-6	C421	H-8	L404	G-7	R204	D-3	R313	C-11
C302	B-3	C405	F-10	C422	E-8	L405	H-2	R205	E-3	R314	D-9
C303	A-1	C406	H-10	C423	I-10	L406	C-5	R206	E-3	R401	E-7
C304	B-3	C407	G-9	D201	F-3	L407	H-9	R207	E-3	R403	I-6
C305	C-7	C408	G-9	D202	F-3	L408	C-2	R208	E-2	R404	F-8
C306	D-6	C409	G-7	D401	G-5	L409	I-3	R209	F-2	R405	F-8
C307	C-7	C410	H-3	D402	G-3	L410	F-7	R301	B-2	R406	F-9
C308	C-5	C411	E-5	D403	G-2	Q201	E-1	R302	D-4	R407	I-10
C309	B-10	C412	G-4	D404	I-2	Q202	F-1	R303	C-5	R408	J-11
C310	D-8	C413	I-3	IC301	B-5	Q203	C-3	R304	C-4	R409	F-10
C311	B-9	C414	I-2	IC401	G-9	Q204	D-4	R305	C-6	R410	G-10
C312	B-4	C415	G-1	J201	D-3	Q401	I-11	R306	C-6	R411	H-8
C313	B-11	C416	H-1	J301	C-10	Q402	F-9	R307	C-6	R413	I-8
C314	D-9	C417	H-2	J406	I-9	Q403	J-8	R309	B-7	R414	G-8
C401	G-5	C418	H-9	L401	J-7	R201	B-2	R310	B-5	R415	I-7
										R416	G-2
										R417	G-3
										R418	G-2
										R420	I-6
										T401	I-4
										Z401	I-2



10 WATT STEREO BOARD

PARTS LIST AND DESCRIPTION

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	NOTES
AUDIO/VIDEO JACK PANEL AVJ05/053/054/055					
D1	4835-130-37048	NTE519	ECG519	SK3100	
Q1	4835-130-47052	NTE123AP	ECG123AP	SK3854	
Q2	4835-130-47049	NTE159	ECG159	SK3466	
Q3	4835-130-47052	NTE123AP	ECG123AP	SK3854	
Q5,6	4835-130-47049	NTE159	ECG159	SK3466	
Q7,8	4835-130-47052	NTE123AP	ECG123AP	SK3854	
U1,2	LA7016	NTE1781	ECG1781	SK9746	
	4835-209-87074	NTE1781	ECG1781	SK9746	
CRT BOARD APT073					
Q1,2,3	4835-130-47073	NTE399	ECG399	SK9352	
MAIN BOARD EMR102/103/104/105/110					
D155	4835-130-37066				
D270	4835-130-37066				
D301	4835-130-37066				
D302	4835-130-37066				
D303	4835-130-37066				#
D304	4835-130-37066				
D305	4835-130-37048	NTE519	ECG519	SK3100	
D307,8	4835-130-37066				
D402 - D405	BYW95C	NTE580	ECG580	SK5036	#
	4835-130-37059	NTE580	ECG580	SK5036	
D406	4835-130-37066				
D410					
D414	4835-130-37061				
D416	4835-130-37052	NTE580	ECG580	SK5036	
D417	4835-130-37061				
D418	4835-130-37052	NTE580	ECG580	SK5036	
D429	4835-130-37058	NTE587	ECG587		
D458	4835-130-37058	NTE587	ECG587		
D502	4835-130-37094	NTE580	ECG580	SK5036	
D507	4835-130-37011				
D513	4835-130-37099	NTE580	ECG580	SK5036	#
D518	4835-130-37048	NTE519	ECG519	SK3100	
D520	4835-130-37048	NTE519	ECG519	SK3100	
D522	4835-130-37095				SOME VERSIONS
D523	4835-130-37059	NTE580	ECG580	SK5036	
D550	4835-130-37011				
D617	4835-130-37066				
D630,32	4835-130-37048	NTE519	ECG519	SK3100	
D680,81	4835-130-37048	NTE519	ECG519	SK3100	
D699	4835-130-37048	NTE519	ECG519	SK3100	

PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

SEMICONDUCTORS (Select replacement for best results)

ITEM No.	MFGR. PART No./ TYPE No.	NTE PART No.	ECG PART No.	TCE PART No.	NOTES
Q675	4835-130-47089				
Q700	4835-130-47095				
Q720	4835-130-47066				
Z672	4835-130-37096	NTE5018A	ECG5018A	SK9A1	
SWITCH/LED BOARD ASW081/085					
D71	4835-130-37056				
D72	4835-130-37069				
D73	4835-130-37065				

For SAFETY use only equivalent replacement part.

ELECTROLYTIC CAPACITORS Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR PART No.
	MAIN BOARD	
C132	3.3uF 50V 1%	4835 124 47096

	ITEM No.	RATING	MFGR PART No.
#	C523	22uF 50V	4835 124 47051

For SAFETY use only equivalent replacement part.

CAPACITORS Items not listed are normally available at local distributors.

ITEM No.	RATING	MFGR PART No.
	MAIN BOARD	
C253	470pF 50V 1%	4835 122 87068
C262	330pF 50V 1%	4835 122 87065
C340	2-40pF Variable	4835 125 57001
# C400	.22 125VAC 20%	4835 121 47013
# C401	.0047 125V 20%	4835 121 97002
# C403	470pF 125V 20%	4835 121 97001
C433	.0048 63V 2%	4835 121 47087
C437	330pF 50V 1%	4835 122 87065
C443	100pF 500V 1%	4835 122 47028
	CRT BOARD	
# C19	.033 3000V 20%	4835 122 47036

	ITEM No.	RATING	MFGR PART No.
	C501	22pF NPO 500V 5%	4835 122 47073
#	C505	820pF 2000V 10%	4835 122 57004
#	C505	270pF 2000V 10%	4835 122 47075
#	C521	.011 1500V 5%	4835 121 47055
#	C521	.013 1500V 5%	4835 121 47077
	C653	180pF NPO 50V 5%	4835 122 47043
	C654	180pF NPO 50V 5%	4835 122 47043
	C655	180pF NPO 50V 5%	4835 122 47043
		STEREO AMP BOARD	
	C407	.0047 63V 2%	4835 121 47085
#	C420	.0047 100V	4835 122 87069

For SAFETY use only equivalent replacement part.

CABINETS & CABINET PARTS (When ordering specify model, chassis & color.)

ITEM	PART No.	PART No.	PART No.	PART No.
Models:	P0K171,20K171	P0K261,27K261	27K251	27K471(1),27K472(2)
Brace, Cabinet		483540257018		
Button			483541097014	483541037015
Cabinet Back	483543297194	483543297108	483543297199	483543297207(1) 485343297172(2)
Cabinet Front		483543067011	483543067008	
Crystal, Overlay	483538117051	483538117051	483538117054	483538117059
Foot, Base Stop				483546247017
Grille, Speaker	483521947141	483545947023	483543217235/6	483544557001
Housing, 10 Pushbutton	483543217217	483543217217	483526597204	
Frame, Inner				483543217239(2)
Jack Panel		483521957238/027	483521957238	483521957207/38
Keypad-10 Pushbutton (Power,Volume Up/Down, Channel Up/Down,Status, +,-,Advance,Menu)				483541037108
Mask				483543277037
Swivel				483543217136

COILS & TRANSFORMERS

	ITEM No.	FUNCTION	MFGR PART No.	OTHER IDENTIFICATION	NOTES
#	DY1	Yoke 100° Horiz 1.38mH Vert 18.5mH	483515017009 (2) 483515017013 (3) 483515017002 (4) 483515017067 (5) 483515017042 (6)		
	L509	Linearity	483515057002 (7)	362028-1 (1)	
#	T401	Switched Mode	483514067008	300409-1 (1)	
#	T402	Stand-by	483514537001	410-2 (1)	
	T500	Driver	483514247001	320403-6 (1)	
#	T501	Horizontal Output	483514067012 (7) 483514067011 (8)	00362093-0003 (1)	
		STEREO AMP BOARD			
#	T401	Power	483514067007		

For SAFETY use only equivalent replacement part.
(1) Number on unit.
(2) Used in Models P0K171,20K171.
(3) Used in Model 27K251;P0K261,27K261 (SB01,2,3,4);27K471,472 (SA04).
(4) Used in Models P0K261,27K261 (B105).
(5) Used in Models P0K261,27K261 (B106); 27K471,472 (A106).
(6) Used in Models 27K471,472 (A105).
(7) Used in Chassis 27R101.
(8) Used in Chassis 31R102,103.

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PARTS LIST AND DESCRIPTION (Continued)

When ordering parts, state Model, Part Number, and Description

COILS (RF-IF)

ITEM No.	RATING	MFGR PART No.
	MAIN BOARD	
L201	Peaking (.47uH)	4835 157 57091
L205	Audio Detector	4835 157 57113
L208	Peaking (1.2uH)	4835 157 57094
L209	Peaking (4.7uH)	4835 157 57101
L210	Peaking (180uH)	4835 157 57108
L230	45.75MHz Detector	4835 157 57112
L233	AFT	4835 157 57112
L275	RF Choke (4.7uH)	4835 157 57124
L279	Peaking (2.2uH)	4835 157 57122
L307	RF Choke (3.3uH)	4835 157 57123
L313	Peaking (4.7uH)	4835 157 57101
L330	Peaking (4.7uH)	4835 157 57101
L331	Peaking (4.7uH)	4835 157 57101
L335	Peaking (27uH)	4835 157 57119
L350	RF Choke (6.8uH)	4835 157 57105
L351	RF Choke (6.8uH)	4835 157 57105
L373	Peaking (6.8uH)	4835 157 57105
L374	Peaking (6.8uH)	4835 157 57105
L375	Peaking (6.8uH)	4835 157 57105
L379	Peaking (6.8uH)	4835 157 57105
	CRT BOARD	
L16	RF Choke (100uH)	4835 157 57047
	PIP BOARD	
L100	Peaking (47uH)	4835 157 57066
L101	Peaking (56uH)	4835 157 57067
L102	Peaking (15uH)	4835 157 57073
L103	RF Choke (100uH)	4835 157 57047
L170	RF Choke (180uH)	4835 157 57896
L200	RF Choke (56uH)	4835 157 57067
L201	Peaking (27uH)	4835 157 57052
L301	Peaking (27uH)	4835 157 57052
L302	Peaking (68uH)	4835 157 57104
L303	Peaking (10uH)	4835 157 57092
L334	Tank Circuit	4835 157 57111
	Tank Circuit	4835 157 57115
L720	Tank Circuit	4835 157 57109
	Tank Circuit	4835 157 57114
L999	Peaking	

ITEM No.	RATING	MFGR PART No.
# L400	Line Filter	4835 152 17001
L404	Peaking (.6uH)	4835 157 57127
L407	RF Choke (.6uH)	4835 157 57127
L413	RF Choke	4835 157 57128
L419	RF Choke (5.3uH)	4835 157 57054
L420	Peaking (2.2uH)	4835 157 57097
L439	RF Choke (2.2uH)	4835 157 57097
# L501	Peaking (3.6uH)	4835 157 57081
L504	RF Choke (42uH)	4835 150 57003
L505	RF Choke (3.3uH)	4835 150 17019
L601	RF Choke (10uH)	4835 157 57093
L603	Chroma Amp Null	4835 157 57116
L605	RF Choke (10uH)	4835 157 57092
L607	Peaking (18uH)	4835 157 57095
L610	Peaking (8.2uH)	4835 157 57118
L611	Peaking (10uH)	4835 157 57093
L618	Peaking (5.6uH)	4835 157 57103
L619	Peaking (2.7uH)	4835 157 57098
L635	Peaking (12uH)	4835 157 57107
	UR4 REMOTE TRANSMITTER	
L1	RF Choke (560uH)	4835 157 57102
	PINCUSHION AMP	
L2	SCR Regulator	4835 153 57002
L3	RF Choke	4835 157 57106
L4	Linearity	4835 150 17022
L5	Peaking (3.3uH)	4835 150 17019

For SAFETY use only equivalent replacement part.

SPEAKERS

ITEM No.	TYPE	REPLACEMENT DATA MFGR PART No.	REPLACEMENT DATA QUAM PART No.	NOTES
	Speaker, Full Range, 3"x 5" (2 used)	4835 240 97005 (1)(2)(3)		
	Speaker, Piezo (2 used)	4835 240 27002 (1)		
	Speaker, Full Range 4"x 6" (2 used)	4835 240 47005 (3)		

(1) Used in Models P0K171,20K171.
(2) Used in Model P0K261,27K251,261,472.
(3) Used in Model 27K471.

MISCELLANEOUS

	ITEM No.	DESCRIPTION	MFGR PART No.	NOTES
		MAIN BOARD		
#	BT301	Battery	4835 138 17008	Lithium
#	F400	Fuse	4835 253 37003	4 Amp @ 125VAC
#	K400	Relay	4835 277 27011	Power
	L411	Ferrite Bead	4835 526 17001	
	L412	Ferrite Bead	4835 526 17001	
	L416	Ferrite Bead	4835 526 17001	
	L418	Ferrite Bead	4835 526 17001	
	L421	Ferrite Bead	4835 526 17002	
	L422	Ferrite Bead	4835 526 17002	
	L423	Ferrite Bead	4835 526 17002	
	L440	Ferrite Bead	4835 526 17001	
	L441	Ferrite Bead	4835 526 17003	
	L458	Ferrite Bead	4835 526 17001	
#	L511	Ferrite Bead	4835 526 17003	
	S550	Switch	4835 273 57001	Vertical Centering
#	SA400	Surge Absorber	4835 116 97001	2400V
	Y200	SAW Filter	4835 153 97006	Video
	Y201	SAW Filter	4835 153 97007	
	Y209	Trap	4835 154 17001	4.5MHz
	Y264	Resonator	4835 153 97004	503kHz
	Y279	Filter	4835 153 57004	For Production Groups F and H.
	Y279	Filter	4835 153 57003	For Production Group E or below.
	Y301	Resonator	4835 157 57129	12MHz
	Y302	Crystal	4835 242 77023	32.768kHz
	Y600	Delay Line	4835 157 57089	
	Y601	Crystal	4835 242 77022	3.58MHz
		Tuner	4835 210 47005	
#	L499	Degaussing	4835 157 97003	Coil (27 inch), Models P0K171,20K171
			4835 157 97013	Coil (27 inch), Models P0K261,27K251,261,471,472
#	P400	Cord, AC	4835 321 17005	AC Line, Polarized, Models P0K261,27K251,261,471,472
			4835 321 17006	AC Line, Polarized, Models P0K171,20K171
		CHASSIS		
		Balun	4835 218 27003	UHF/VHF
		Battery	4835 138 17007	Remote Transmitter, Models P0171,20K171
		Battery	4835 138 17001	Remote Transmitter, Models P0K261,27K251,261,471,472
		LED	4835 130 37056	Power
		LED	4835 130 37069	SAP
		LED	4835 130 37065	Stereo
		Receiver	4835 219 77011	I.B. Mini, Models P0K261,27K251,261,471,472
		PC Board	4835 219 57029	Main Board, Production H or Previous, Models 20k161,171,P0K171 (1)
		PC Board	4835 219 57031	Main Board, Production Group H or Previous Models 27K251,261,471,472,P0K261,T0K261,471 (1)
		PC Board	4835 219 57032	Main Board, Production Group H or Previous Models 27K271,PK7605,P0K271,T0K271 (1)
		PC Board	4835 219 27049	Main Board, Production Group H or Previous
			4835 219 57035	Models 31K371,31K571,P0K371 (1)

CONTROLS (All wattages 1/2 watt ot less, unless listed.)

ITEM No.	FUNCTION	RESISTANCE	MFGR PART No.
	MAIN BOARD		
R102	Free Run Frequency	47K	4835 100 97033
R123	SAP/Stereo	10K	4835 100 97032
R126	SAP/Stereo/DBX	47K	4735 100 97033
R131	300Hz Sep	100K	4835 101 37003
R132	300KHz Sep	220K	4835 101 37006
R201	Base Band Level	2200	4835 101 37005
R235	RF AGC	470K	4835 100 17001
R271	Horizontal Center	10K	4835 100 17002
R462	130V Adj	470	4835 100 97038
# R500A	Focus		(1)
# R500B	Screen		(1)
R567	Vertical Size	330K	4835 100 17003
R604	Chroma Null	470	4835 100 97038
R644	Sub Brightness	10K	4835 100 97032
R679	Blue Cut-Off	4700	4835 100 97036
R681	Red Drive	2200	4835 100 97035
R683	Green Cut-Off	4700	4835 100 97036
R685	GreenDrive	2200	4835 100 97035
R687	Red Cut-Off	4700	4835 100 97036
R689	Blue Drive	2200	4835 100 97035
	A/V JACK BOARD		
VR1	Video	1000	4835 101 37001
	UR4 REMOTE TRANSMITTER		
R61	Contrast	2000	4835 100 17004
	PINCUSHION BOARD		
R7	Side Trap	1000	4835 100 97031
R9	Side Amplitude	10K	4835 100 97032
R12	Width	10K	4835 100 97032
R23	Corner Pin	10K	4835 100 97032
	PIP BOARD		
R104	Y Gain	330	4835 101 37007
R159	Clamp Off-Set	220	4835 101 37004
R221	White Level	4700	4835 100 97039
R318	Phase Fine	2200	4835 101 37005
R336	Symmetry	2200	4835 101 37005
R712	Burst Gain	100	4835 101 37002

For SAFETY use only equivalent replacement part.

(1) Part of Horizontal Output Transformer T501. Part Number 4835 140 67012 or 4835 140 67011.

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA MFGR PART No.	REPLACEMENT DATA NTE PART No.
	MAIN BOARD		
# R101	36 5% 1/4W Carbon Chip	4835 111 37094	
R128	549K 1% 1/4W Metal Film	4835 116 57093	
# R155	47 5% 1/4W Carbon Chip	4835 111 37107	
# R185	2.2 5% 1/4W Carbon Chip	4835 111 37076	
# R186	2.2 5% 1/4W Carbon Chip	4835 111 37076	
# R187	1 5% 1/2W Metal Film	4835 116 57082(1)	HW1D0
# R187	2400 5% 1/4W Carbon Film	4835 110 47045(2)	QW224
# R203	43 5% 1W Metal Film	4835 116 67014	1W043
# R215	13 5% 1/3W Metal Film	4835 116 57089	
# R216	15K 5% 3W Metal Film	4835 116 67018	3W315
# R220	51 5% 1/3W Metal Film	4835 116 57092	
# R331	100K 5% 1/4W Carbon Chip	4835 111 37024	
# R368	82 5% 1/4W Carbon Chip	4835 111 37126	
# R400	4.7M 5% 1/2W Carbon Film	4835 110 47024	HW547
# R401	11.9 PTC Cold	4835 116 47001	
# R403	.27 5% 1W Metal Film	4835 116 57056	1WD27
# R416	56K 5% 1W Metal Film	4835 116 57039	1W356
# R417	24 5% 3W Metal Film	4835 116 57043	3W024
# R417	24 5% 3W Metal Film	0023 033 72405(3)	3W024
R434	5760 1% 1/8W Carbon Chip	4835 111 27007	
# R436	22 5% 1/3W Metal Film	4835 116 57091	
# R453	2200 5% 1/4W Carbon Chip	4835 111 37072	
# R455	.56 5% 1/2W Metal Film	4835 116 67006	HWD56
# R458	24 5% 3W Metal Film	4835 116 57043	3W024
R460	510 1% 1/8W Carbon Fhip	4835 111 37039	
R460	110K 1% 1/8W Carbon Chip	4835 111 27001	
R461	4990 1% 1/8W Carbon Chip	4835 111 27005	
R465	110K 1% 1/8W Carbon Chip	4835 111 27001	
R469	5620 1% 1/8W Carbon Chip	4835 111 27006	
R470	6810 1% 1/8W CarbonChip	4835 111 27008	
# R505	2400 5% 3W Metal Film	4835 116 67019	3W224
# R506	15 5% 2W Metal Film	4835 116 57077	2W015
# R508	.47 5% 1W Metal Film	4835 116 57038	1WD47
# R511	68 5% 1/4W Carbon Film	4835 110 57008	QW068
# R513	2 5% 1/2W Metal Film	4835 110 47028(1)	HW2D0
# R513	1.1 5% 1W Metal Film	4835 116 67012(2)	1W1D1
# R514	1 5% 1/3W Metal Film	4822 111 30483	
# R516	100 5% 1/4W Carbon Film	4835 110 57003	QW110
R517	2670 1% 1/2W Metal Film	4835 116 57087	
R520	5620 1% 1/4W Metal Film	4835 116 57086	
# R522	3650 1% 1/4W Metal Film	4835 116 57079(1)	
# R523	20K 5% 1/4W Carbon Film	4835 110 57078(1)	QW320
# R524	100 5% 1/4W Carbon Chip	4835 111 37021	
# R529	1000 5% 2W Metal Film	4835 116 57057(1)	2W210
# R552	1 5% 1/2W Metal Film	4835 116 57082	HW1D0
# R553	2.2 5% 1/4W Carbon Chip	4835 111 37076	
R558	2430 1% 1/8W Carbon Chip	4835 111 27004(2)	
R559	2740 1% 1/4W Carbon Chip	4835 111 37045(2)	
R561	562 1% 1/4W Carbon Chip	4835 111 27009(2)	
# R611	47 5% 1/4W Carbon Film	4835 110 57019	QW047
# R629	47 5% 1/4W Carbon Chip	4835 111 37107	
# R637	22 5% 1/4W Carbon Chip	4835 111 37077	
# R645	75 5% 1/2W Carbon Film	4835 110 47031	HW075
R662	2200 2% 1/4W Carbon Film	4835 11057079	QW222
# R677	82 5% 1/4W Carbon Chip	4835 111 37126	

RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA MFGR PART No.	REPLACEMENT DATA NTE PART No.
	CRT BOARD		
# R4	100 5% 1/4W Carbon Comp	4835 110 57066	QW110
# R7	15K 5% 3W Metal Film	4835 116 67018	3W315
# R8	15K 5% 3W Metal Film	4835 116 67018	3W315
# R9	15K 5% 3W Metal Film	4835 116 67018	3W315
# R16	100 5% 1/2W Metal Film	4835 116 57081	HW110
	PIP BOARD		
R123	2200 25 1/4W Carbon Chip	4835 111 37072	
# R933	5.6 5% 1W Metal Film	4835 116 67015	1W5D6
	STEREO AMP BOARD		
# R305	100 5% 1/3W Metal Film	4835 116 87002	
# R311	330 5% 1/4W Carbon Film	4835 110 57012	QW133
# R312	330 5% 1/4W Carbon Film	4835 110 57012	QW133
# R401	56K 5% 1W Metal Film	4835 116 57039	1W356
# R403	750 5% 1W Metl Film	4835 116 67016	1W175
R404	20K 1% 1/4W Metal Film	4835 116 57083	
R405	4750 1% 1/4W Metal Film	4835 116 57085	
R410	3010 1% 1/4W Metal Film	4835 116 57084	
# R415	.82 5% 1/2W Metal Film	4835 116 67007	HWD82
# R416	.51 5% 1/2W Metal Film	4835 116 67001	HWD51
# R417	.51 5% 1/2W Metal Film	4835 116 67001	HWD51
# R420	1 5% 1/2W Metal Film	4835 116 57082	HW1D0
	A/V JACK BOARD		
# R02	39 5% 2W Metal Film	4835 116 67008	2W039
# R03	82 5% 3W Metal Film	4835 116 67009	3W082
# R04	82 5% 3W Metal Film	4835 116 67009	3W082
# R05	8.2 5% 2W Metal Film	4835 116 57133	2W8D2
# R06	8.2 5% 2W Metal Film	4835 116 57133	2W8D2
# R12	150 5% 1/4W Carbon Comp	4835 110 57072	QW115
# R24	330 5% 1/4W Carbon Comp	4835 110 57012	QW133
# R43	15 5% 1/3W Metal Film	4835 116 57064	
	PINCUSHION BOARD		
# R2	1 5% 1/3W Metal Film	4822 111 30483	
# R19	1000 5% 2W Metal Film	4835 116 57057	2W210
# R25	39 5% 2W Carbon Comp	4835 110 57065	2W039

For SAFETY use only equivalent replacement part.
(1) Used in 27 inch Chassis.
(2) Used in 31 inch Chassis.
(3) May be used in some versions.

MISCELLANEOUS

ITEM No.	DESCRIPTION	MFGR PART No.	NOTES
	PC Board	4835 219 77002	PIP Board, Production Group D or Previous Models 27K271,31K371,571,PK7605,P0K371,T0K271
	PC Board	4835 219 57028	CRT Board, Production Group A Models 20K161,171,P0K171
	PC Board	4835 219 57037	CRT Board, Production Group A All Models Except 20K161,171,P0K171
	PC Board	4835 219 57039	Switch/LED Board, Production Group A All Models
	PC Board	4835 219 57043	A/V Jack Board, Production Group A Models 20K161,171,P0K171
	PC Board	4835 219 57044	A/V Jack Board, Production Group A Models 27K251,261,271,471,472,P0K261,271, T0K261,271,471,PK7605
	PC Board	4835 219 57014	A/V Jack Board, Production Group A Models 31K371,P0K371
	PC Board	4835 219 57046	A/V Jack Board, Production Group A Model 31K571
	PC Board	4835 219 77011	Remote Receiver, Production Group B Models 20K161,171,27K251,261,471,472, P0K171,261,T0K261,471
	PC Board	4835 219 77001	Stereo Amp Board, Production Group D Models 31K571
	PC Board	4835 219 57013	Stereo Amp Board, Production Group A Models 31K371,P0K371
	PC Board	4835 219 57027	Pincushion Board, Production Group B or Previous Models 31K571
	PC Board	4835 219 57012	Pincushion Board, Production Group B or Previous Models 31K371,P0K371
#	CRT	4835 131 27011	27 inch, Models P0K171,20K171
#	CRT	4835 131 27037	27 inch, Models P0K261 (SB01,2,3,4,5), 27K251, 27K261(SB01,2,3,4,5),27K471 (A105,SA04), 27K472 (A105,SA04)
#	CRT	4835 131 27046	27 inch, Models P0K261 (B106),27K261 (B106), 27K471 (A106),27K472 (A106)
#	Magnet	4835 150 27001	Convergence and Purity Assembly Models P0K171,261,20K171,27K261
#	Magnet	4835 150 27002	Convergence and Purity Assembly Models 27K251,27K471 (A105,SA04), 27K472 (A105,SA04)
#	Magnet	4835 150 27004	Convergence and Purity Assembly Models 27K471 (A106),27K472 (A106)
	Transmitter	4835 219 17294	Remote, Models P0K171,20K171
	Transmitter	4835 219 17311	Remote, Models P0261,27K251,261
	Transmitter	4835 219 37108	Remote, Models 27K471,472
	Wedge	4835 535 27002	Yoke, 2 used in models 27K251,261,471,472,P0K261
	Wedge	4835 535 27001	Yoke, 3 used in models P0K171,20K171; 1 used in Models 27K251,261,471,472,P0K261
	CRT		
#	Socket	4835 255 77006	CRT
	PIP BOARD		
L601	Ferrite Bead	4835 526 17001	
L604	Ferrite Bead	4835 526 17001	
L611	Ferrite Bead	4835 526 17001	
L901	Ferrite Bead	4835 526 17004	
L702	Ferrite Bead	4835 526 17004	
L904	Ferrite Bead	4835 526 17004	
L905	Ferrite Bead	4835 526 17004	
L921	Ferrite Bead	4835 526 17004	

MISCELLANEOUS

ITEM No.	DESCRIPTION	MFGR PART No.	NOTES
L941	Ferrite Bead	4835 526 17004	
L944	Ferrite Bead	4835 526 17004	
L946	Ferrite Bead	4835 526 17004	
Y1	Crystal	4835 242 77001	3.58MHz
Y2	Resonator	4835 153 97005	503.5kHz
	STEREO AMP BOARD		
L401	Ferrite Bead	4835 526 17001	
L402	Ferrite Bead	4835 526 17001	
L403	Ferrite Bead	4835 526 17001	
L404	Ferrite Bead	4835 526 17001	
L405	Ferrite Bead	4835 526 17001	
L406	Ferrite Bead	4835 526 17001	
L407	Ferrite Bead	4835 526 17001	
L408	Ferrite Bead	4835 526 17001	
L409	Ferrite Bead	4835 526 17001	
L410	Ferrite Bead	4835 526 17001	
	A/V JACK BOARD		
S02	Switch	4835 277 27009	Speaker, Used in Models 27K251,261,271,471,472, P0K261,271,PK7605,T0K261,271,471
S02	Switch	4835 277 27014	Speaker, Used in Models 31K371,571,P0K371
	Panel	0014 636 50008	Rear, Used in Models 27K251,261,271,471,472, P0K261,271,PK7605,T0K261,271,471
	Panel	0014 636 50009	Rear, Used in Models 31K571
	Panel	0014 636 50010	Rear, Used in Models 31K371,P0K371
	UR4 REMOTE TRANSMITTER		
S1	Switch	4835 277 27013	Mode
Y1	Crystal	4835 242 77011	4MHz
	Battery	4835 138 17009	Lithium, 3V
	Case	4835 432 37014	Bottom
	Case	4835 432 37008	Top
	Door	4835 432 37015	Battery
	UR5 REMOTE TRANSMITTER		
BT5	Battery	4835 138 17011	Lithium, 3V
SW1	Switch	4835 277 27012	Cable, VCR, TV
Y1	Crystal	4835 242 77021	8.0MHz
	Case	4835 432 37017	Bottom
	Case	4835 432 37013	Top
	Door	4835 432 37018	Battery
	Keypad	4835 410 37025	UR5
	URA8 REMOTE TRANSMITTER		
S43	Switch	4835 277 27007	TV, VCR, CATV
Y1	Crystal	4835 242 77011	4.0MHz
	Case	4835 432 37005	Back
	Case	4835 432 37004	Front
	Door	4835 432 37006	Battery
	Keypad	4835 410 37024	36 Button
	Keypad	4835 410 37032	40 Button

For SAFETY use only equivalent replacement part.
(1) Manufacturer indicates "non-replaceable/repair only" assembly.