

SAFETY PRECAUTIONS

SERVICE WARNING

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

SERVICING THE HIGH VOLTAGE AND CRT

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

X-RAY RADIATION AND HIGH VOLTAGE LIMITS

Be aware of the instructions and procedures covering X-ray radiation. In solid-state receivers and monitors, the CRT is the only potential source of X-rays. Keep an accurate high voltage meter available at all times. Check meter calibration periodically. Whenever servicing a receiver, check the high voltage at various brightness levels to be sure it is regulating properly. Keep high voltage at rated value, NO HIGHER. Excessive high voltage may cause X-ray radiation or failure of associated components. DO NOT depend on protection circuits to keep voltage at rated value. When troubleshooting a receiver with excessive high voltage, avoid close contact with the CRT. DO NOT operate the receiver longer than necessary. To locate the cause of excessive high voltage, use a variable AC transformer to regulate voltage. In present receivers, many electrical and mechanical components have safety related characteristics which are not detectable by visual inspection. Such components are identified by a # on both the schematic and the parts list. For SAFETY, use only equivalent replacement parts when replacing these components.

GENERAL GUIDELINES

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

HORIZONTAL OSCILLATOR DISABLE TEST

Place a jumper between pins 3 and 4 of IC803. Apply 9.0V to the cathode of D001. Connect a high voltage probe to the CRT anode. Set the AC supply to 45VAC. Turn the receiver on and slowly increase the AC supply. Confirm the high voltage does not exceed 27.9kV when the horizontal just begins to pull out of sync. If the high voltage should exceed 27.9kV or the receiver fails to lose horizontal sync, repair the horizontal oscillator disable circuit. Remove jumper.

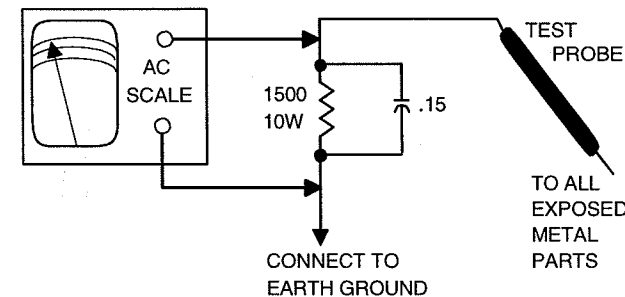
SAFETY CHECKS -- FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

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

Hot Leakage Current Check

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



PHOTOFACT® Technical Service Data

SET 4257

MODEL CT-13R30A (CHASSIS MBP328)

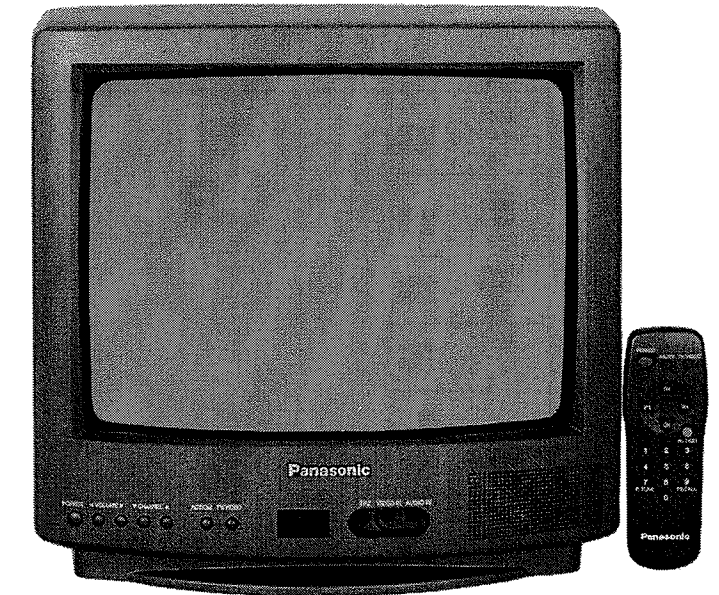
PANASONIC

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PANASONIC

Model CT-13R30A (Chassis MBP328)



Essential coverage
for servicing a television receiver...

- Schematics
- Component locations
- Parts list

Coverage includes these additional models and chassis:

MODELS	CHASSIS
CT-13R30CA	MBP328
CT-13R40A	MBP328
CT-13R40CA	MBP328



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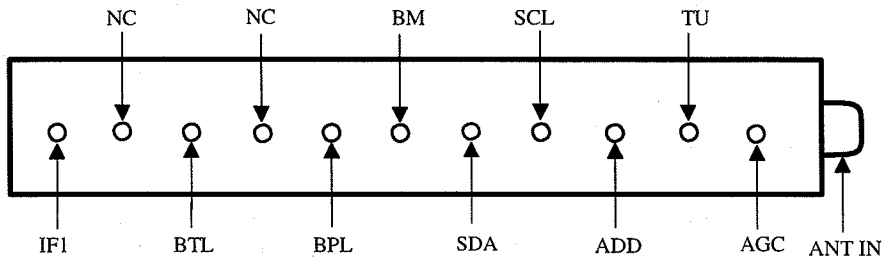
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TUNER INFORMATION

TUNER VOLTAGE CHART			
Pin	VHF Low Band	VHF High Band	UHF Band
AGC	4.4V	5.3V	4.3V
TU	1.1V	4.5V	4.3V
ADD	0V	0V	0V
SCL	5.0V	5.0V	5.0V
SDA	5.0V	5.0V	5.0V
BM	8.8V	8.8V	8.8
BPL	5.0V	5.0V	5.0V
NC	0V	0V	0V
BTL	3.7V	7.1V	7.0V
NC	0V	0V	0V
IF1	0V	0V	0V

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



MISCELLANEOUS ADJUSTMENTS

NOTE: This receiver employs digital customer controls. All adjustments are at normalized position unless otherwise indicated.

B+ CHECK

Connect a digital DC voltmeter to pin 2 of T801 and the common tie point. Set brightness and picture to minimum. With AC line voltage set to 120VAC, B+ should read 130V* ±1.0V*.

* Taken from a common tie point.

HIGH VOLTAGE CHECK

Tune in a picture. Set brightness and picture for a black raster. Connect a high voltage probe to CRT anode. High voltage should read 23kV to 24kV.

PURITY CHECK

Press recall button on remote transmitter to enter purity check mode.

NOTE: Receiver must be in serviceman mode for purity colors to display on screen. Press recall button to cycle through white, red, green, blue, and normal screens.

PURITY

Enter serviceman mode. See "Purity Check" to display a green raster. Loosen deflection yoke and move it back as far as possible. Loosen locking ring and move the purity tabs to center the vertical green band. Slowly slide the deflection yoke forward until a uniform green screen is obtained.

CONVERGENCE

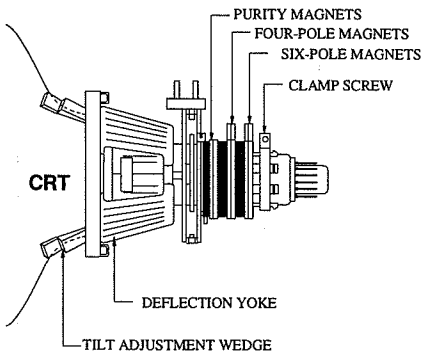
Connect a signal generator to antenna terminal and tune in a dot pattern. Adjust the 4-pole magnets to converge the red and blue dots at the center of the screen. Adjust the 6-pole magnets to converge the red/blue dots over the green dots at the center of the screen.

NOTE: Spread the two tabs of each set of magnets equally and opposite to converge vertically, and rotate both tabs in the same direction to converge horizontally. Since the four and six pole magnets interact, repeat the adjustment until center convergence is correct.

Tune in a crosshatch pattern. Remove rubber wedges between the deflection yoke and 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 left and right sides of the screen. Tilt the deflection yoke left or right to converge the horizontal lines at the top and bottom of the screen and the vertical lines at the left and right sides of the screen. Repeat convergence procedure if necessary to obtain the best overall convergence. Replace rubber wedges.

If the yoke or CRT is replaced, a magnet correction strip (Part No. 0FMK014ZZ) may be required to match the yoke and CRT for optimum convergence. Position the strip between the CRT and yoke for best convergence at corners of screen and secure with tape.

CRT NECK ASSEMBLY



ENTERING SERVICEMAN MODE

Turn the receiver on and momentarily short pins 3 and 8 of connector TP. In the upper left side of the picture, CHK is displayed in yellow. Press the action and volume up buttons on the receiver. The CHK display turns red. The serviceman mode is indicated by CHK displayed in red at the upper left side of the picture.

Press the power button on the remote or the action and volume down buttons on the receiver repeatedly to select one of six service modes.

B = DAC Adjustments

C = CRT Adjustments

S= Factory Adjustments for PIP and Clock

M = Stereo Adjustments

X = Comb Filter Adjustments

CHK = Normal operation of channel and volume buttons.

EXIT SERVICEMAN MODE

NOTE: Always exit serviceman mode when finished making adjustments. Press action and power buttons on receiver control panel simultaneously for approximately 2 seconds to exit serviceman mode. The receiver will display a self check menu with audio on channel 3.

DAC ADJUSTMENTS

NOTE: Write down original values in detail before making any adjustments in case a misadjustment occurs. Press channel up or down buttons on remote to select any of adjustment addresses. Press volume up or down buttons on remote to change level of adjustment.

DAC Adjustment Range and Default Levels

Adjustment	Range	Default Level	On-Set Level
Sub Color (B0)	0-63	30	29
Sub Tint (B1)	0-63	42	41
Sub Brightness (B2)	0-255	35	71
Sub Contrast (B3)	0-63	26	31
Killer/ABL/Gamma (B4)	0-7	5	5
Video Adjustment (B5)	0-15	8	9
Audio Adjustment (B6)	0-31	9	12
Vertical Size (B7)	0-63	40	39

Sub Color (B0)

Tune in a color bar signal. Connect oscilloscope to pin 1 of connector C1 on the CRT board. Connect TPD2 to ground. Enter serviceman mode and select DAC adjustment. Select sub color (B0). Adjust waveform for .9Vp-p ±.05Vp-p.

Sub Tint (B1)

Tune in a color bar signal. Connect oscilloscope to pin 1 of connector C1 on the CRT board. Connect TPD2 to ground. Enter serviceman mode and select DAC adjustment. Select sub tint (B1). Adjust waveform so the 1st and 4th peaks are of equal amplitude.

Sub Brightness (B2)

This adjustment must be made after sub picture and color temperature adjustments are made. DO NOT adjust screen after sub brightness is set. Connect a color bar signal with pure white and pure black to the antenna input. Set color to minimum. Enter serviceman mode and select DAC adjustment. Select sub brightness (B2). Adjust until the black bars start to turn gray, then decrease adjustment until bars turn black.

Sub Contrast (B3)

NOTE: This adjustment is factory set, DO NOT adjust unless CRT or CRT board is replaced.

Connect a color bar signal to the antenna input. Connect oscilloscope to pin 2 of connector C1 on CRT board. Connect TPD2 to ground. Enter serviceman mode and select DAC adjustment. Select sub contrast (B3). Adjust for 2.8Vp-p ± .1Vp-p from white to black level. Do not include sync tip in measurement.

Video Adjustment (B5)

Connect a color bar signal to the antenna input. Connect oscilloscope to pin 32 of IC101. Enter serviceman mode and select DAC adjustment. Select video adjustment (B5). Adjust for 1.0Vp-p ± .05Vp-p.

Audio Adjustment (B6)

NOTE: This adjustment is factory set, do not adjust unless IC002 or IC101 has been replaced.

Connect a generator with a 1kHz mono audio tone to the antenna terminal. Connect an oscilloscope to junction of R202 and R203. Enter serviceman mode and select DAC adjustment. Select audio adjustment (B6). Adjust for .7V ±2V.

MISCELLANEOUS ADJUSTMENTS continued

CRT ADJUSTMENTS

Follow same procedure used for DAC adjustments.

CRT Adjustment Range and Default Levels

Adjustment	Range	Default Level	On-Set Level
Red Cutoff (C0)	0 0 thru 1 255	0 126	0 154
Green Cutoff (C1)	0-255	61	64
Blue Cutoff (C2)	0 0 thru 1 255	0 126	0 116
Red Drive (C3)	0-127	66	76
Blue Drive (C4)	0-127	72	85
YNR Switch (C5)	0-1	0	0
AFT (C6)	0 0 thru 1 255	1 114	1 111
RF AGC (C7)	0-127	58	67
YNR (C8)	0-7	0	0
Horiz Centering (C9)	0-31	11	12
Beam Limit (Ca)	0-7	0	4
VCJ Test H (Cb)	0-2	2	0

Color Temperature (C0 thru C4)

NOTE: Observe low and high brightness areas of a B/W picture for proper tracking.
Enter serviceman mode and select CRT adjustments. Set the red cutoff (C0), green cutoff (C1), and blue cutoff (C2) for a gray picture. Set the red drive (C3) and blue drive (C4) for correct white areas.

RF AGC (C7)

Tune in a picture. Enter serviceman mode and select CRT adjustments. Decrease the on-set level until snow appears in picture, then increase the data value to a point just past where snow disappears.

Horizontal Centering (C9)

Tune in a crosshatch pattern. Enter serviceman mode and select CRT adjustments. Select horizontal centering (C9) adjustment and adjust crosshatch pattern for correct horizontal centering.

Beam Limit (Ca)

Tune in a picture. Enter serviceman mode and select CRT adjustments. Adjust beam limit for best picture.

STEREO ADJUSTMENTS

Stereo adjustments can be entered but no adjustments should be necessary.

Stereo Adjustment Range and Default Levels

Adjustment	Range	Default Level	On-Set Level
Input Level (M0)	0-63	33	33
High Level Separation (M1)	0-63	25	25
Low Level Separation (M2)	0-15	6	6

FACTORY ADJUSTMENTS

Factory adjustments for PIP can be entered but no adjustments should be necessary.

Factory Adjustment Range and Default Levels

Adjustment	Range	Default Level	On-Set Level
PIP Color (S0)	0-127	80	80
PIP Contrast (S1)	0-127	52	52
Up 1/9 (S2)	0-255	26	26
Down 1/9 (S3)	0-255	146	146
Left 1/9 (S4)	0-255	9	9
Right 1/9 (S5)	0-255	103	103
Up 1/16 (S6)	0-255	27	27
Down 1/16 (S7)	0-255	163	163
Left 1/16 (S8)	0-255	9	9
Right 1/16 (S9)	0-255	118	118
Freerun (Sa)	-	-	-
Clock Adjustment (Sb)	0-255	89	55
PIP Tint (Sc)	0-63	50	50
Loudness Compensation (Sd)	0-63	52	52

COMB FILTER ADJUSTMENTS

Comb filter adjustments can be entered but no adjustment should be necessary.

Comb Filter Adjustment Range and Default Levels

Adjustment	Range	Default Level	On-Set Level
Comb Gain (X0)	0 - 255	33	152
Comb Switch (X1)	0 - 63	12	12
Comb Limit (X2)	0 - 63	25	24
Comb Core (X3)	0 - 127	6	41
Comb RF Delay (X4)	0 - 127	89	18
Comb Video Delay (X5)	0 - 127	90	18
Comb VMLM (X6)	0 - 127	34	90
Comb VM SW (X7)	0 - 63	0	24
Comb Sharp (X8)	0 - 255	17	67
Comb VM Level (X9)	0 - 255	255	255
Comb VMPKF (Xa)	0 - 1	0	1
Comb Adjust Sharp (Xb)	0 - 63	0	10

SERVICE INFORMATION

CRT PROTECTION

The CRT protection circuit is made up of Q451 and Q452. This circuit blanks out the CRT if vertical deflection failure occurs. It is important for the life of the CRT that this circuit be tested before returning the receiver to the customer. To test, short the base of Q452 to ground. The screen should go blank, if not this circuit needs repair.

TEST EQUIPMENT

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

Equipment	Sencore No.	Equipment	Sencore No.
Oscilloscope	SC3100	Isolation Transformer	PR570
Generators		Capacitance Analyzer	LC102
RGB	CM2125	CRT Analyzer	CR7000
Multiburst Signal	VG91	AC Leakage Tester	PR570
Color Bar	VG91	Inductance Analyzer	LC102
TV Stereo	VG91	Flyback Yoke Tester	TVA92
Digital VOM	SC3100	Field Strength Meter	SL753
Frequency Meter	SC3100	Transistor Tester	TF46
Hi-Voltage Probe	HP200	Horizontal Analyzer	HA-2500
Accessory Probes	TP212	Video Analyzer	VG91, TVA92

Important Parts Information

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

Obtaining Parts

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

800-428-7267

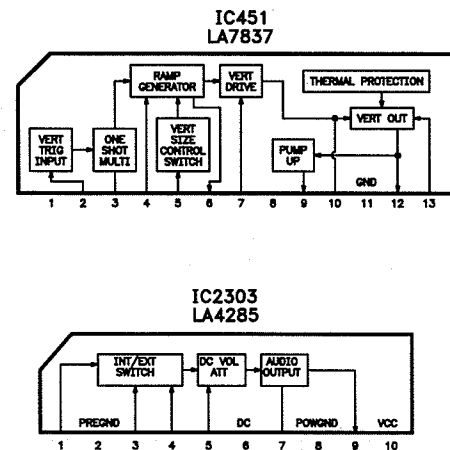
Or consult the Sams *Annual Index* for the address of the original equipment manufacturer.

Participating Vendors

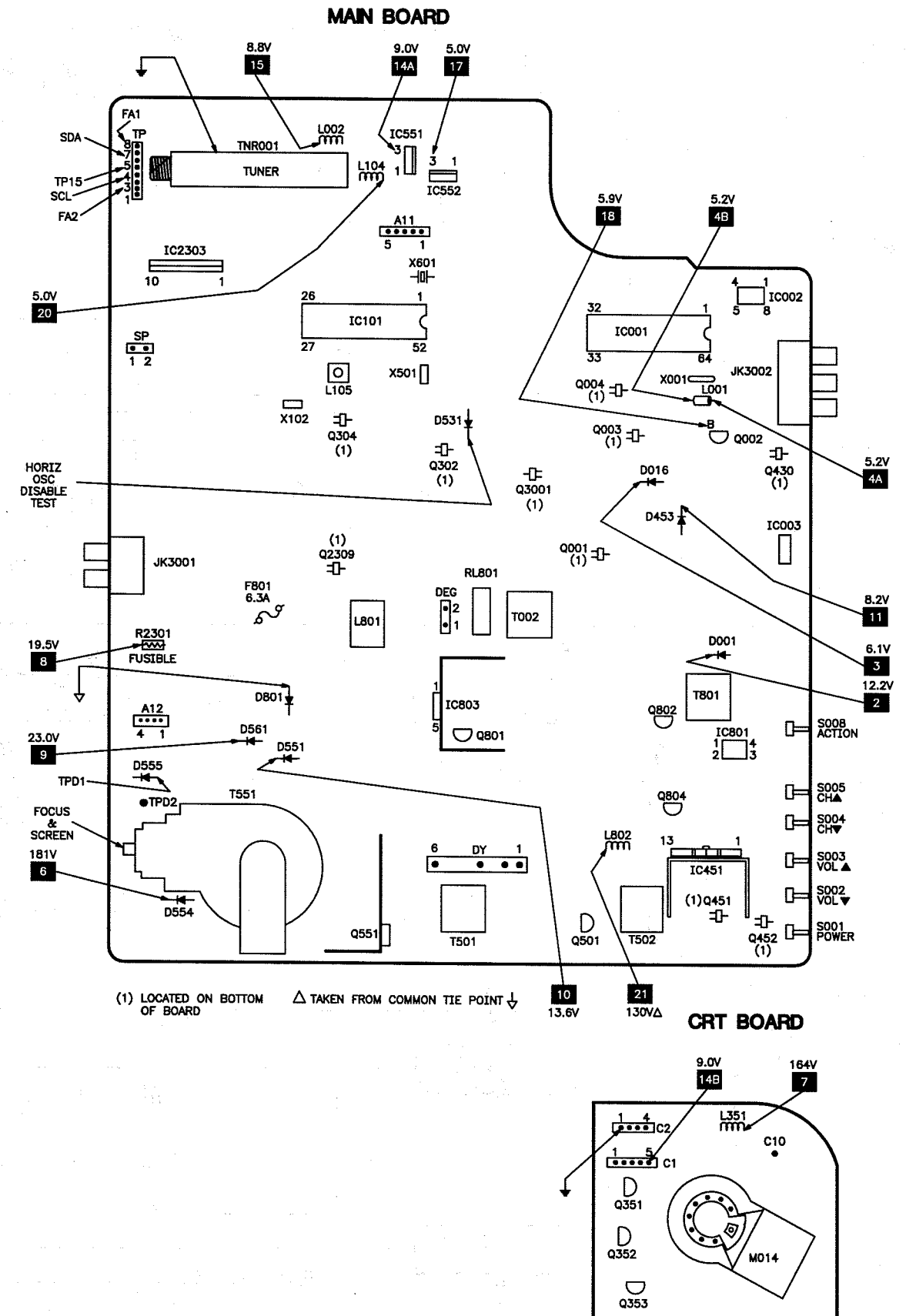
Information on test equipment and replacement parts is listed in these pages for the following participating vendors. Consult the Sams *Annual Index* for their current address.

- Custom Components Corporation (Chek-A-Color)
- NTE Electronics, Inc. (NTE)
- Philips ECG Company (ECG)
- Terrell & Nobis (TNI Electronics)
- Sencore, Inc.

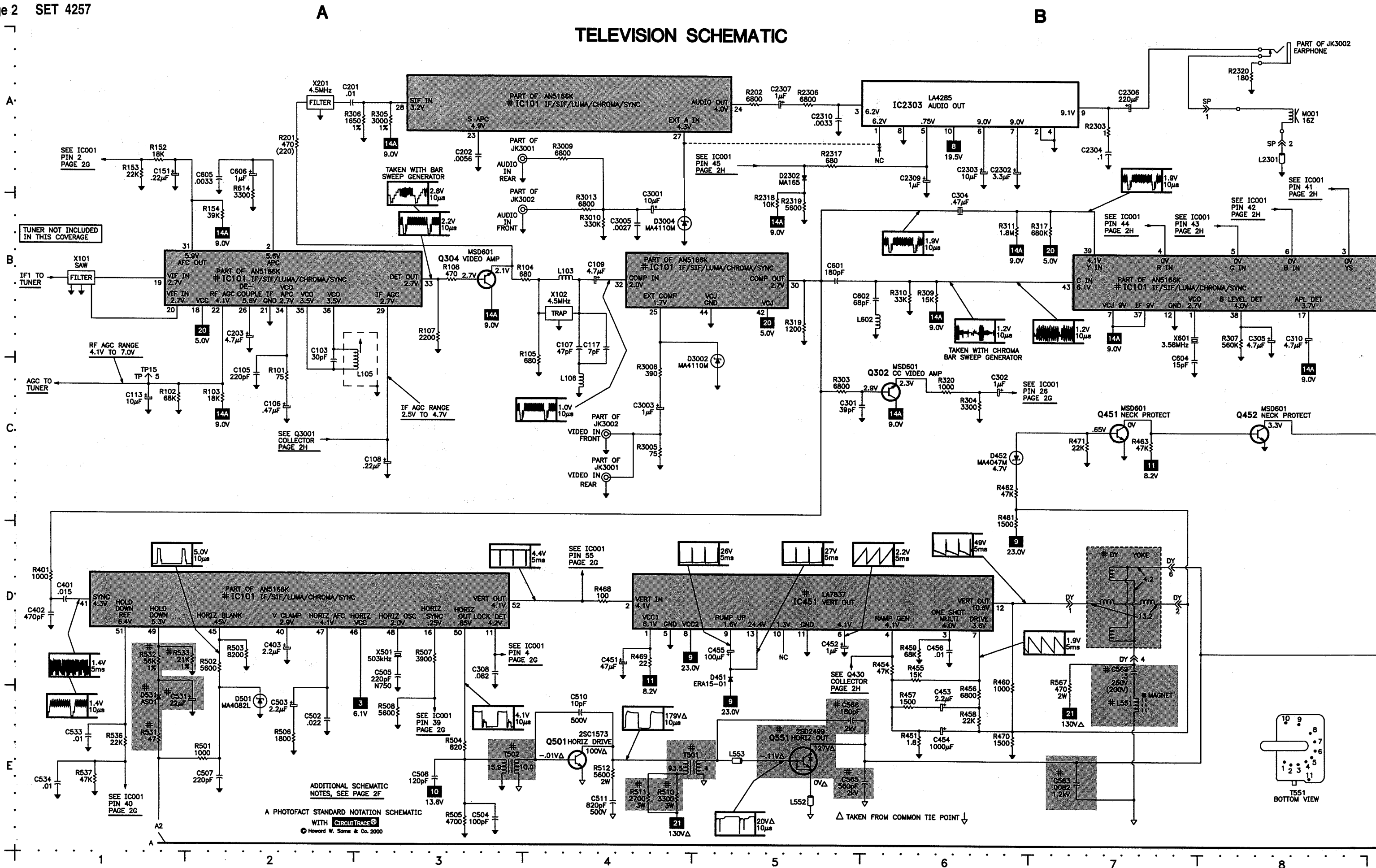
IC FUNCTIONS



PLACEMENT CHART



TELEVISION SCHEMATIC

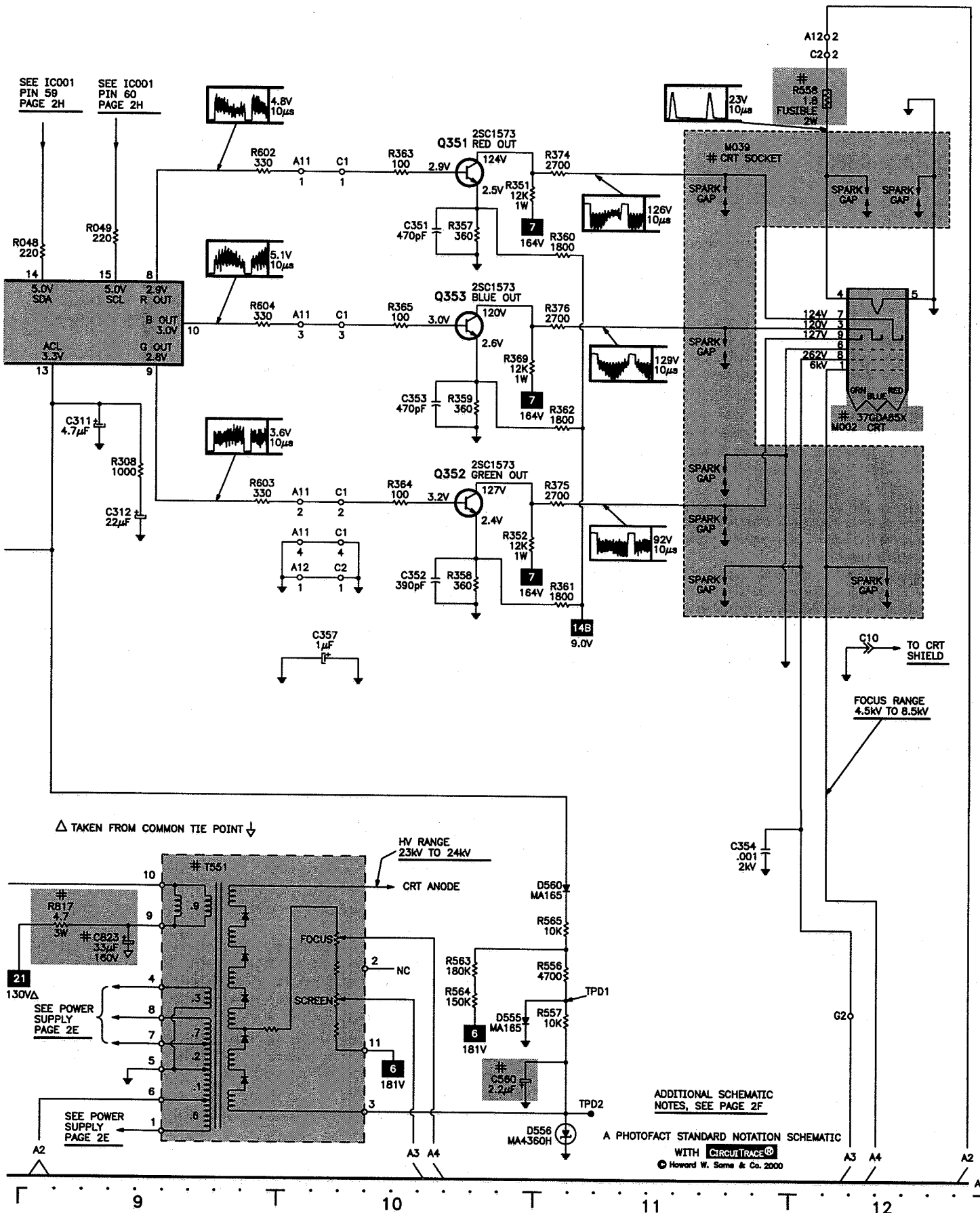


C TELEVISION SCHEMATIC continued

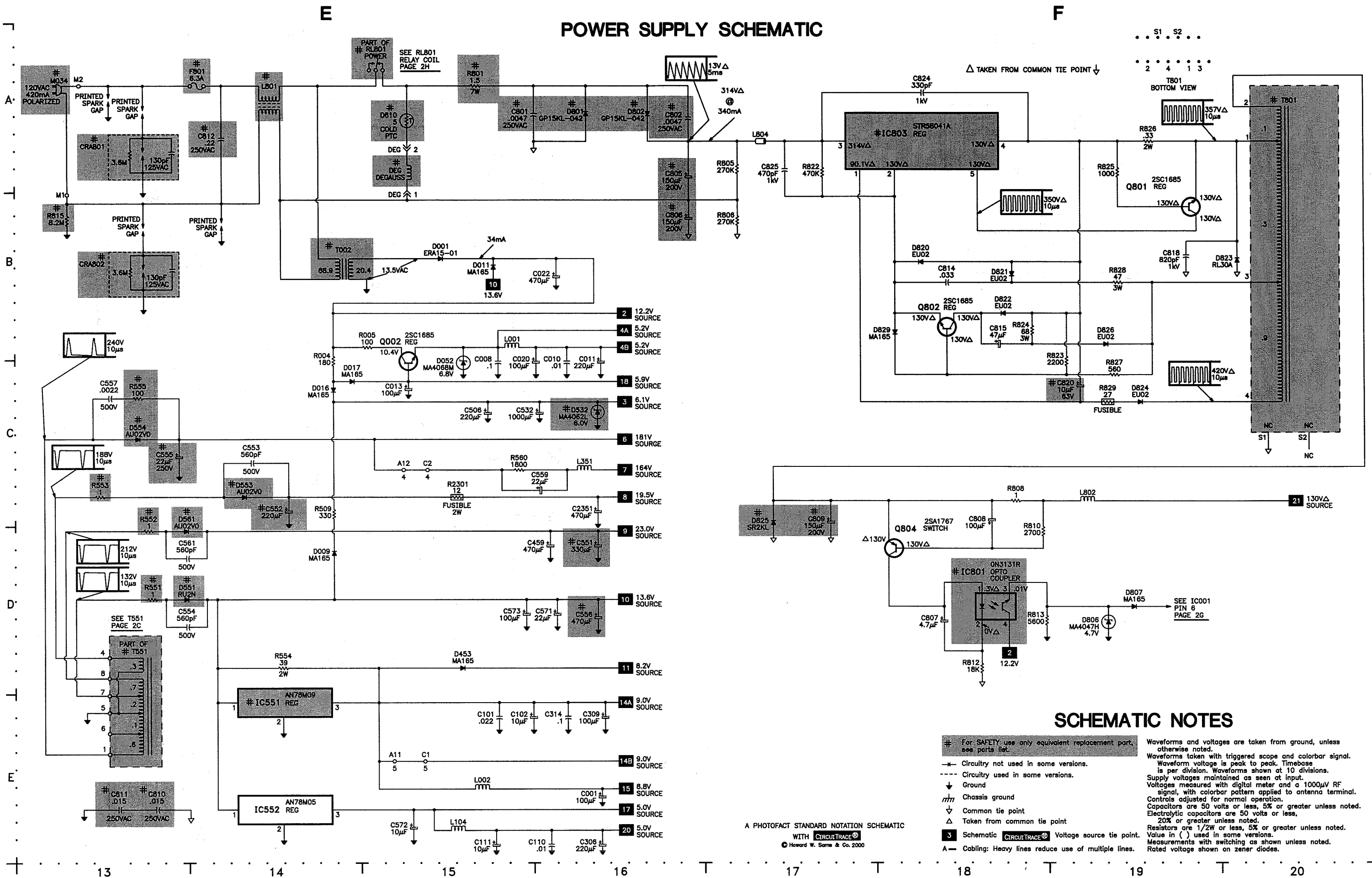
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SCHEMATIC COMPONENT LOCATION GUIDE

C001	E16	C456	D6	C3001	B4	IC801	D18	R015	C26	R364	C10	R806	B17
C003	B28	C459	D16	C3003	C4	IC803	A18	R016	C26	R365	B10	R808	C18
C004	C27	C462	E26	C3005	B4	IC2303	A6	R017	D27	R369	B11	R810	D18
C005	D27	C502	E2	D001	B15	JK3001	A3	R020	B25	R374	B11	R812	D18
C008	C15	C503	E2	D002	E27	JK3001	C4	R021	C26	R375	C11	R813	D18
C010	C16	C504	E3	D003	E22	JK3002	A8	R022	D27	R376	B11	R815	B13
C011	C16	C505	D3	D006	B27	JK3002	B3	R023	C24	R401	D1	R817	E9
C013	C15	C506	C15	D008	B25	JK3002	C4	R025	C24	R430	E25	R820	D22
C016	E25	C507	E2	D009	D14	L001	C15	R026	B23	R432	E25	R821	D22
C017	A24	C508	E3	D011	B15	L002	E15	R027	B23	R451	E6	R822	A17
C018	A23	C510	E4	D014	C25	L003	D25	R028	C24	R454	D6	R823	C19
C019	B25	C511	E4	D015	C25	L004	C25	R030	D23	R455	E6	R824	B18
C020	C15	C531	E2	D016	C14	L006	C28	R032	B22	R456	E6	R825	A19
C022	B16	C532	C15	D017	C14	L008	A22	R033	B21	R457	E6	R826	A19
C024	D24	C533	E1	D052	C15	L009	B27	R034	B21	R458	E6	R827	C19
C025	D24	C534	E1	D451	D5	L012	C26	R035	B21	R459	D6	R828	B19
C026	C25	C551	D16	D452	C6	L013	C27	R036	B21	R460	E6	R829	C19
C031	C25	C552	C14	D453	D15	L103	B4	R037	C21	R461	D6	R2301	C15
C032	A22	C553	C14	D501	E2	L104	E15	R038	C21	R462	C6	R2303	A7
C033	C26	C554	D13	D531	E1	L105	C2	R039	D23	R463	C7	R2306	A5
C035	C25	C555	C13	D532	C16	L106	C4	R046	A23	R465	E25	R2311	E25
C036	C26	C556	D16	D551	D13	L351	C16	R048	B9	R466	E26	R2312	D26
C037	C26	C557	C13	D553	C14	L551	E7	R049	B9	R467	E26	R2313	E26
C038	B26	C559	C15	D554	C13	L552	E5	R053	A25	R468	D4	R2314	E27
C101	E15	C560	E10	D555	E10	L553	E5	R055	A25	R469	D4	R2317	A5
C102	E15	C561	D13	D556	E11	L602	B6	R060	D24	R470	E6	R2318	B5
C103	C2	C563	E7	D560	D11	L801	A14	R065	C25	R471	C7	R2319	B5
C105	C2	C565	E5	D561	D13	L802	C19	R066	C25	R501	E2	R2320	A8
C106	C2	C566	E5	D801	A16	L804	A17	R067	B25	R502	D2	R2321	E28
C107	C4	C569	D7	D802	A16	L2301	A8	R068	B25	R503	D2	R2322	E27
C108	C3	C571	D16	D806	D19	L2302	D25	R070	D23	R504	E3	R3001	D26
C109	B4	C572	E15	D807	D19	M001	A8	R101	C2	R505	E3	R3002	D25
C110	E16	C573	D15	D810	A15	M002	B12	R102	C1	R506	E2	R3005	C4
C111	E15	C601	B5	D820	B18	M034	A13	R103	C2	R507	D3	R3006	C4
C113	C1	C602	B6	D821	B18	Q001	E26	R104	B3	R508	E3	R3009	A4
C117	C4	C604	C7	D822	B18	Q002	C15	R105	C4	R509	C14	R3010	B4
C151	A1	C605	B2	D823	B20	Q003	E22	R107	B3	R510	E4	R3013	B4
C201	A2	C606	A2	D824	C19	Q004	B25	R108	B3	R511	E4	RL801	A15
C202	A3	C801	A15	D825	D17	Q302	C6	R152	A1	R512	E4	RL801	E27
C203	B2	C802	A16	D826	C19	Q304	B3	R153	A1	R531	E1	S001	B21
C301	C5	C805	B16	D829	B18	Q351	B10	R154	B2	R532	D1	S002	B21
C302	C6	C806	B16	D2301	E26	Q352	C10	R201	A2	R533	D2	S003	B21
C304	B6	C807	D18	D2302	B5	Q353	B10	R202	A5	R536	E1	S004	B21
C305	B8	C808	D18	D2312	E27	Q430	E25	R303	C5	R537	E1	S005	B21
C306	E16	C809	D17	D3001	D26	Q451	C7	R304	C6	R551	D13	S008	D22
C308	D3	C810	E13	D3002	C5	Q452	C8	R305	A3	R552	D13	S009	C21
C309	E16	C811	E13	D3004	B4	Q501	E4	R306	A3	R553	C13	T002	B14
C310	B8	C812	A14	D3016	A23	Q551	E5	R307	B8	R554	D14	T501	E4
C311	C9	C814	B18	DEG	A15	Q801	B19	R308	C9	R555	C13	T502	E3
C312	C9	C815	C18	DY	D7	Q802	B18	R309	B6	R556	E11	T551	D9
C314	E16	C818	B19	F801	A13	Q804	D18	R310	B6	R557	E11	T801	A20
C351	B10	C820	C19	FA1	C23	Q2309	E28	R311	B6	R558	A12	TP15	C1
C352	C10	C823	E9	FA2	C23	Q3001	D26	R317	B7	R559	B27	X001	A24
C353	B10	C824	A18	IC001	A24	R002	B22	R319	B5	R560	C15	X101	B1
C354	D11	C825	A17	IC002	C28	R003	E25	R320	C6	R563	E10	X102	B4
C357	C10	C2302	A6	IC003	A22	R004	C14	R351	B11	R564	E10	X201	A2
C401	D1	C2303	A6	IC101	A4	R005	C14	R352	C11	R565	D11	X501	D3
C402	D1	C2304	A7	IC101	B2	R006	E22	R357	B10	R567	E7	X601	B7
C403	D2	C2306	A7	IC101	B4	R007	D23	R358	C10	R602	B9		
C451	D4	C2307	A5	IC101	B7	R008	D23	R359	B10	R603	C9		
C452	D5	C2309	B6	IC101	D2	R010	E24	R360	B11	R604	B9		
C453	E6	C2310	A5	IC451	D5	R011	E24	R361	C11	R614	B2		
C454	E6	C2311	E27	IC551	E14	R012	B26	R362	C11	R801	A15		
C455	D5	C2351	C16	IC552	E14	R014	C25	R363	B10	R805	A17		



POWER SUPPLY SCHEMATIC



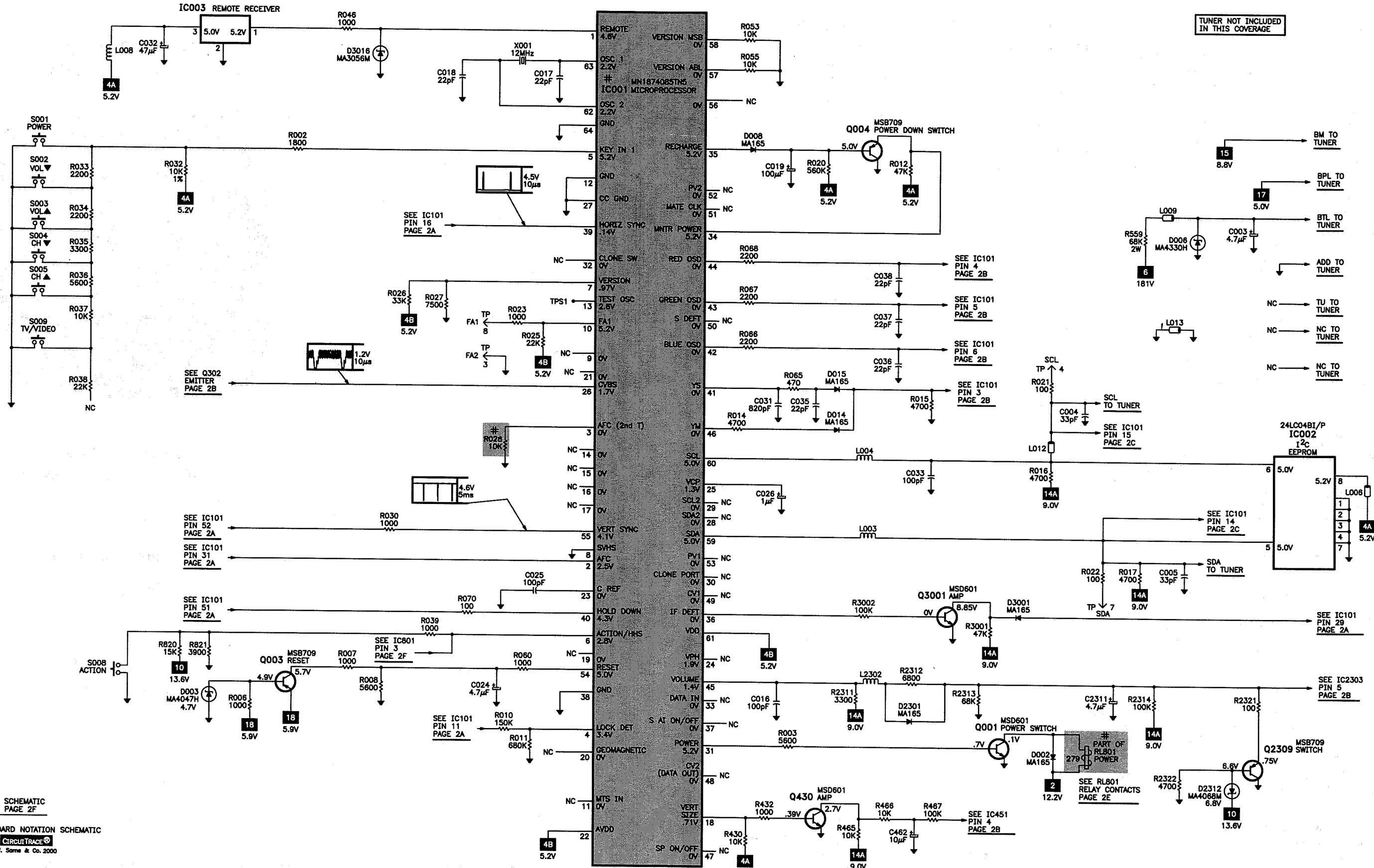
SCHEMATIC NOTES

- # For SAFETY use only equivalent replacement part, see parts list.
 - Circuitry not used in some versions.
 - Circuitry used in some versions.
 - Ground
 - Chassis ground
 - Common tie point
 - Taken from common tie point
 - 3 Schematic Voltage source tie point.
 - Cabling: Heavy lines reduce use of multiple lines.
- Waveforms and voltages are taken from ground, unless otherwise noted.
Waveforms taken with triggered scope and colorbar signal.
Waveform voltage is peak to peak. Timebase is per division. Waveforms shown at 10 divisions.
Supply voltages maintained as seen at input.
Voltages measured with digital meter and a 1000µV RF signal, with colorbar pattern applied to antenna terminal.
Controls adjusted for normal operation.
Capacitors are 50 volts or less, 5% or greater unless noted.
Electrolytic capacitors are 50 volts or less, 20% or greater unless noted.
Resistors are 1/2W or less, 5% or greater unless noted.
Value in () used in some versions.
Measurements with switching as shown unless noted.
Rated voltage shown on zener diodes.

SYSTEM CONTROL SCHEMATIC

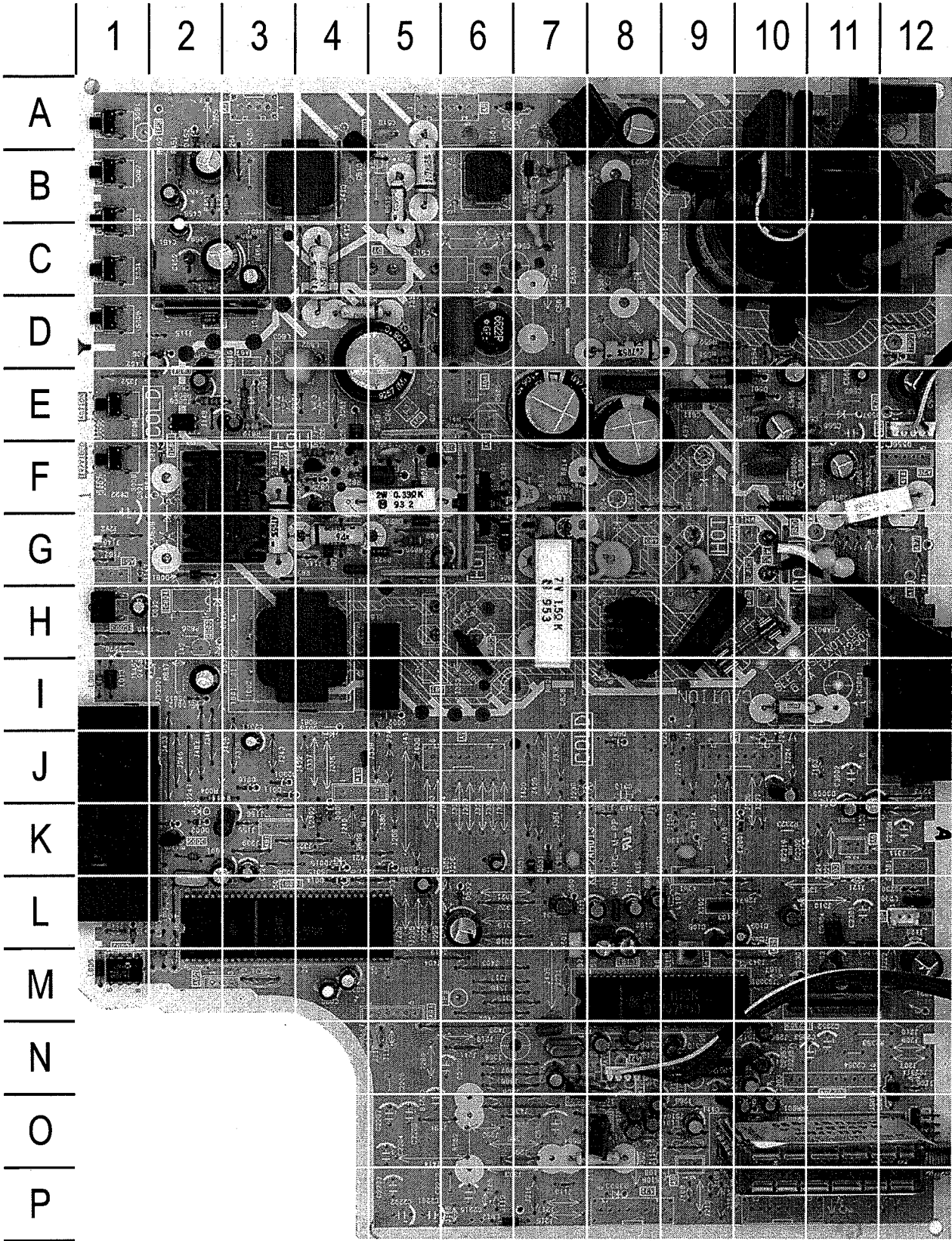
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PANASONIC MODEL CT-13R30A (CHASSIS MBP328)

MAIN BOARD - TOP VIEW



MAIN BOARD - TOP VIEW, GRIDTRACE LOCATION GUIDE

A11	N8	C455	C3	C810	E8	D452	A2	FA2	O12	Q551	A7	R827	F4
A12	E12	C456	C2	C811	E9	D453	I1	IC001	M2	Q801	F5	R828	G3
C001	O10	C459	C2	C812	H9	D501	L7	IC002	M1	Q802	F4	R829	G5
C003	O10	C462	D2	C814	G4	D531	K7	IC003	H1	Q804	D2	R2301	F12
C011	K2	C502	L8	C815	F4	D532	L6	IC101	M8	R004	J2	R2303	L11
C013	K3	C503	L8	C818	F5	D551	E10	IC451	D1	R451	B2	R2319	K10
C019	L5	C506	L8	C820	G5	D553	F11	IC551	O8	R460	C3	RL801	I5
C020	M4	C510	A5	C823	A8	D554	A11	IC552	N7	R461	B2	S001	A1
C022	I2	C511	C5	C824	F7	D555	D12	IC801	E2	R470	B3	S002	B1
C024	K3	C531	L7	C825	G7	D556	F12	IC803	F6	R509	K4	S003	B1
C026	M4	C532	L6	C2302	M11	D560	J8	IC2303	M10	R510	C4	S004	C1
C032	H1	C551	E10	C2303	M11	D561	E10	L001	K2	R511	B5	S005	D1
C102	L9	C552	F11	C2304	L11	D801	G9	L002	P11	R512	B5	S008	E1
C106	L9	C553	E11	C2306	K11	D802	G7	L003	M2	R531	K7	S009	F1
C108	L10	C554	D10	C2307	M10	D806	D2	L004	M2	R551	D9	SCL	O12
C109	L10	C555	E12	C2309	M11	D807	F2	L006	M1	R552	D9	SDA	O12
C111	O9	C556	E10	C2311	J3	D810	H6	L008	I1	R553	E11	SP	L12
C113	N10	C557	A11	C2351	M12	D820	G5	L009	N12	R554	O8	T002	H3
C151	N10	C560	E11	C3001	K11	D821	G5	L012	P6	R555	A11	T501	B6
C203	N10	C561	E10	C3003	J10	D822	G4	L013	I1	R559	I10	T502	B4
C302	K6	C563	C8	CRA801	H11	D823	F5	L103	L9	R563	A11	T551	B10
C304	L8	C565	C7	CRA802	F10	D824	F5	L104	O9	R564	A11	T801	F2
C305	L9	C566	A8	D001	G2	D825	E4	L105	M9	R567	D4	TNR001	P11
C306	L8	C569	D6	D002	I5	D826	F3	L106	K9	R801	H7	TP15	O12
C308	N7	C571	O8	D003	K2	D829	F4	L551	D6	R805	F7	TPD1	D13
C309	N8	C572	O8	D006	O10	D2301	J3	L552	B7	R806	E6	TPD2	D13
C310	N9	C573	N7	D008	K5	D2302	K10	L553	A7	R808	E2	X001	L2
C311	O8	C606	N8	D009	K4	D2312	J9	L602	K7	R810	E3	X101	N9
C312	O8	C801	G9	D011	J3	D3001	K10	L801	H8	R812	E3	X102	L9
C401	L8	C802	G8	D014	L4	D3002	N9	L802	D4	R815	F10	X201	K9
C403	L8	C805	E7	D015	K4	D3004	M10	L804	F7	R817	D8	X501	L7
C451	C2	C806	E8	D016	J3	DEG	H5	L2301	L12	R822	G6	X601	N7
C452	C2	C807	E3	D017	K2	DY	C5	L2302	K4	R823	G4		
C453	B2	C808	E2	D052	L1	F801	H10	Q002	K2	R824	G4		
C454	B2	C809	D5	D451	D3	FA1	P12	Q501	A4	R826	F5		

MAIN BOARD - BOTTOM VIEW



MAIN BOARD - BOTTOM VIEW, GRIDTRACE LOCATION GUIDE

C004	O2	C533	M5	R015	K9	R068	L9	R454	D11	R602	N5
C005	O2	C534	M6	R016	M12	R070	M7	R455	C11	R603	N5
C008	L12	C601	K5	R017	M12	R101	M4	R456	C11	R604	N5
C010	K11	C602	K5	R020	K8	R102	O2	R457	B11	R614	N5
C016	K9	C604	N6	R021	P2	R103	O2	R458	B11	R813	E11
C017	K11	C605	N6	R022	O2	R104	L4	R459	C11	R820	J10
C018	K11	C2310	M2	R023	P3	R105	L4	R462	A10	R821	F12
C025	L9	C3005	J2	R025	M9	R107	M4	R463	B11	R825	E8
C031	K9	D3016	L11	R026	M10	R108	L4	R465	J11	R2306	M2
C033	L12	Q001	I9	R027	M10	R152	N1	R466	I10	R2311	K9
C035	K9	Q003	K10	R028	L11	R153	P2	R467	D11	R2312	J10
C036	L9	Q004	K8	R030	K10	R154	O3	R468	D11	R2313	I10
C037	N7	Q302	J6	R032	I12	R201	L4	R469	C11	R2314	J5
C038	L9	Q304	L4	R033	A12	R202	M3	R471	A11	R2317	M2
C101	M4	Q430	K12	R034	B12	R303	J5	R501	K6	R2318	K3
C103	M4	Q451	B11	R035	C12	R304	K5	R502	L6	R2320	I12
C105	M4	Q452	B11	R036	C12	R305	M3	R503	M5	R2321	J4
C107	K4	Q2309	J5	R037	D12	R306	M3	R504	M6	R2322	J5
C110	M4	Q3001	J8	R038	D12	R307	M4	R505	L6	R3001	J4
C117	K4	R002	L11	R039	J11	R308	O5	R506	K6	R3002	K8
C201	L3	R003	L8	R046	I12	R309	K6	R507	M5	R3005	I2
C202	M3	R005	J11	R048	O4	R310	M5	R508	M6	R3006	J3
C301	K6	R006	K11	R049	O4	R311	L5	R532	L6	R3009	J2
C314	N5	R007	K10	R053	L11	R317	M5	R533	M5	R3010	J2
C402	K5	R008	K10	R055	K11	R319	L3	R536	M6	R3013	J2
C504	L6	R010	M9	R060	K10	R320	K6	R537	M6		
C505	L5	R011	L11	R065	K9	R401	K5	R556	D1		
C507	K6	R012	K8	R066	L9	R430	K11	R557	D2		
C508	K7	R014	K9	R067	L9	R432	K11	R565	I3		

PARTS LIST

SEMICONDUCTORS

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	ECG Part No.	NTE Part No.
D001	-	ERA15-01	ECG116	NTE552
D002	-	MA165	ECG519	NTE519
D003	-	MA4047H	ECG5009A	NTE5009A
D006	-	MA4330H	-	-
D008, 09, 11	-	MA165	ECG519	NTE519
D014 Thru	-	-	-	-
D017	-	MA165	ECG519	NTE519
D052	-	MA4068M	ECG5014A	NTE5014A
D451	-	ERA15-01	ECG116	NTE552
D452	-	MA4047M	ECG5009A	NTE5009A
D453	-	MA165	ECG519	NTE519
D501	-	MA4082L	-	-
# D531	-	AS01	ECG552	NTE552
# D532	-	MA4062L	ECG5012A	NTE5012A
# D551	RU2N	TVSRU2N	ECG552	NTE552
# D553, 54	AU02V0	AU02	ECG552	NTE552
D555	-	MA165	ECG519	NTE519
D556	-	MA4360H	-	-
D560	-	MA165	ECG519	NTE519
# D561	AU02V0	AU02	ECG552	NTE552
# D801, 02	-	GP15KL-042	-	-
D806	-	MA4047H	ECG5009A	NTE5009A
D807	-	MA165	ECG519	NTE519
D820, 21, 22	EU02	EU02V1	ECG552	NTE551
D823	-	RL30A	-	-
D824	EU02	EU02V1	ECG552	NTE551
# D825	SR2KL	TVSSR2KL	-	-
	-	TVSSR2KLV	-	-
D826	EU02	EU02V1	ECG552	NTE551
D829	-	MA165	ECG519	NTE519
D2301, 02	-	MA165	ECG519	NTE519
D2312	-	MA4068M	ECG5014A	NTE5014A
D3001	-	MA165	ECG519	NTE519
D3002	-	MA4110M	-	-
D3004	-	MA4110M	-	-
D3016	-	MA3056M	-	-
# IC001	-	MN1874085TN5	-	-
IC002	24LC04BI/P	24LC04BIP	-	-
# IC101	-	AN5166K	-	-
# IC451	LA7837	LA7837-TV	ECG7104	NTE7104
# IC551	-	AN78M09	ECG1910	NTE1910
IC552	-	AN78M05	ECG960	NTE960
# IC801	-	0N3131R	ECG3098	NTE3098
	-	PC817X2	-	-
# IC803	-	STR58041A	ECG7078	NTE7078
IC2303	-	LA4285	-	-
Q001	2SD601AR	2SD601ARTX	ECG2408	NTE2408
	MSD601	-	-	-
Q002	2SC1685Q	2SC1685QRS	ECG85	NTE85
	JC501PQ	-	ECG85	NTE85

For SAFETY use only equivalent replacement part.

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	ECG Part No.	NTE Part No.
Q003, 04	2SB709AR	2SB709ARTX	ECG2409	NTE2409
	MSB709	-	-	-
Q302, 04	2SD601AR	2SD601ARTX	ECG2408	NTE2408
	MSD601	-	-	-
Q351, 52, 53	2SC1573Q	2SC1573NC	ECG399	NTE399
Q430, 51, 52	2SD601AR	2SD601ARTX	ECG2408	NTE2408
	MSD601	-	-	-
Q501	2SC1573A	2SC1573AH	ECG399	NTE399
# Q551	2SD2499LB	2SD2499MA2	-	-
Q801, 02	2SC1685RS	2SC1685RSTA	ECG85	NTE85
	JC501RS	-	-	-
Q804	-	2SA1767Q	-	-
Q2309	2SB709AR	2SB709ARTX	ECG2409	NTE2409
	MSB709	-	-	-
Q3001	2SD601AR	2SD601ARTX	ECG2408	NTE2408
	MSD601	-	-	-

For SAFETY use only equivalent replacement part.

CONTROLS & RESISTORS

Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
# D810	5 Cold PTC	TAP104XM05	-
# R028	10K 5% 1/10W	ERJ6GEYJ103	-
R032	10K 1% 1/10W	ERJ6ENF1002	-
R305	3000 1% 1/10W	ERJ6ENF3001	-
R306	1650 1% 1/10W	ERJ6ENF1651	-
# R510	3300 5% 3W	ERG3FJ332H	3W233
# R511	2700 5% 3W	ERG3FJS272H	3W227
# R531	47 5% 1/4W	ERD25FJ470	QW047
# R532	56K 1% 1/10W	ERJ6ENF5602	-
# R533	21K 1% 1/10W	ERJ6ENF2102	-
# R551, 52, 53	1 5% 1/2W	ERDS1FJ1R0	HW1D0
# R555	100 5% 1/2W	ERDS1FJ101	HW110
# R558	1.8 5% 2W Fusible	ERQ2CJP1R8	F2W1D8
# R801	1.5 10% 7W Wirewound	ERF7ZK1R5	-
# R815	8.2M 20% 1/2W	ERC12ZGM825	HW582
# R817	4.7 5% 3W	ERX3FJ4R7	3W4D7
R824	68 5% 3W	ERG3FJ680	3W068
R828	47 5% 3W	ERG3FJ470H	3W047
R829	27 5% 1/4W Fusible	ERQ14AJ270	-
R2301	12 5% 2W Fusible	ERQ2CJP120	F2W012

For SAFETY use only equivalent replacement part.

CABINET PARTS

Item	Mfr. Part No.
Model CT-13R30A	
Badge (PANASONIC)	TBM2A30832
Buttons 7-key	TBX2AA00701G
Cabinet Front	TXFKY10ASER
Cabinet Rear	TXFKU0397SER
Transmitter	
Battery Cover	UR50EC1151A
Model CT-13R30CA	
Badge (PANASONIC)	TBM2A30832
Buttons 7-key	TBX2AA00701G
Cabinet Front	TXFKY10ASER
Cabinet Rear	TXFKU11ASER
Transmitter	
Battery Cover	UR50EC1151A
Model CT-13R40A	
Badge (PANASONIC)	TBM2A30832
Buttons 7-key	TBX2AA00702G
Cabinet Front	TXFKY09ASER
Cabinet Rear	TXFKU0597SER
Transmitter	
Battery Cover	UR50EC1151B
Model CT-13R40CA	
Badge (PANASONIC)	TBM2A30832
Buttons 7-key	TBX2AA00702G
Cabinet Front	TXFKY09ASER
Cabinet Rear	TXFKU09ASER
Transmitter	
Battery Cover	UR50EC1151B

PARTS LIST continued

CAPACITORS & ELECTROLYTICS

Item No.	Rating	Mfr. Part No.
C304	.47µF 20% 50V NP	ECEA1HNR47U
C354	.001 10% 2kV	ECKD3D102KB
C452	1µF 25V Tantalum	ECSF1EE105
C505	220pF 5% 50V N750	ECUX1H221JUX
# C531	22µF 20% 25V	ECA1EM220
# C551	330µF 20% 35V	ECA1VM331
# C552	220µF 20% 25V	ECA1EM221
# C555	22µF 20% 250V	ECA2EM220
# C556	470µF 20% 16V	ECA1CM471
# C560	2.2µF 20% 25V	EEANA1E2R2B
# C563	.0082 5% 1.2kV	ECWH12H822JS
# C565	560pF 5% 2kV	ECKD3D561JB
# C566	180pF 5% 2kV	ECKD3D181JB
# C569	.3 5% 250V	-
	.3 5% 200V	ECWF2304JBB
# C801, 02	.0047 +80% -20% 250VAC	ECKDAE472ZED
# C805, 06, 09	150µF 20% 200V	ECOS2DG151DG
# C810, 11	.015 20% 250VAC	ECQU2A153MV
# C812	.22 20% 250VAC	ECQU2A224MV
C818	820pF 10% 1kV	ECKD3A821KB
# C820	10µF 20% 63V	ECA1JHG100B
# C823	33µF 20% 160V	ECEA160V33UE
C824	330pF 10% 1kV	ECKD3A331KB
C825	470pF 10% 1kV	ECKD3A471KB

For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS

Item No.	Function/Rating	Mfr. Part No.
# DEG	Degaussing	TSP2AA010
# DY	Yoke Horiz 3.1mH Vert 24.2mH	OLY15311F
L001	2.2µH	TLTABT2R2K
L002	39µH	ELESN390KA
L003, 04	2.2µH	TLTABT2R2K
L006	Ferrite Bead	EXCELSA24T
L008	47µH	TLTABT470K
L009	Ferrite Bead	EXCELSA35
L012	Ferrite Bead	EXCELSA24T
L013	Ferrite Bead	EXCELSA35
L103	12µH	TLTAB120K
L104	1.0µH	TLTABT1R0K
L105	VCO	EIV7EN053B
L106	18µH	ELESN180JA
L351	47µH	TLUABTA470K
# L551	Horizontal Linearity	TLH6622P
L552, 53	Ferrite Bead	EXCELSA24T
L602	12µH	ELESN120JA
# L801	Line Filter	ELF15N013A
L802	68µH	ELEIE680KA
L804	Ferrite Bead	EXCELSA39
L2301	Ferrite Bead	EXCELD25C
L2302	4.7µH	TLTABT4R7K
# T002	Power	TLP16297
# T501	Horizontal Driver	TLH15412
# T502	Horizontal Coupling	ETE19Z30AY
# T551 (1)	Horizontal Output	KFT2AB118F
# T801	Power	ETS25AD139NC

For SAFETY use only equivalent replacement part.

(1) Screen and focus controls are part of T551.

MISCELLANEOUS

Item No.	Description	Mfr. Part No.	Notes
# CRA801, 02	Capristor	EXNFGV	470pF 125VAC, 3.6M, Spark Gap
# F801	Fuse	XBA2A00101	6.3Amp, 125V
IC003	Receiver	RPM-637CBRS1	Remote
JK3001	Jack	TJB2A90661B	Assembly
JK3002	Jack	TJB2AA0041	Assembly
M001	Speaker	EASG7D504A2	1 5/8" X 2 3/4", 16 Ohms
M014	Socket	TJSC00200	CRT
# M034	Line Cord	TSX2AA0131	AC, Polarized
# M039	CRT	37GDA85X(M)	37GDA85X
# RL801	Relay	TSEH0005	Power
S001	Switch	EVQPF106K	Power
S002	Switch	EVQPF106K	Volume Down
S003	Switch	EVQPF106K	Volume Up
S004	Switch	EVQPF106K	Channel Down
S005	Switch	EVQPF106K	Channel Up
S008	Switch	EVQPF106K	Action
S009	Switch	EVQPF106K	TV/Video
# TNR001 (3)	Tuner	ENV56D37G3R	UHF/VHF
X001	Crystal	TSS2080MX	12MHz
X101	Filter	M1969M	SAW
X102	Trap	EFCWS4504AB	4.5MHz
X201	Filter	EFCS4R5MS4	4.5MHz
X501	Crystal	TAFCSB503F38	503kHz
X601	Crystal	TSS2AA001	3.58MHz
	Adapter	TJB2A20701	Antenna 75 To 300 Ohms
	Antenna	TSA2AA001	Rod
	Magnet	0FMK014ZZ	Correction Strip
	Magnet	ETC26X42NA	Purity/Convergence
	PC Board	TNP2AH013EA	A
	PC Board	TNP2AA046AC	C
	Transmitter (1)	EUR501371	Remote
	Transmitter (2)	EUR501372	Remote
	Wedge	TMM2A30702	Yoke Positioning (3 Used)

For SAFETY use only equivalent replacement part.

(1) Used in models CT-13R30A and CT-13R30CA.

(2) Used in models CT-13R40A and CT-13R40CA.

(3) Contact TNI Electronics for replacement; order by manufacturer's part number.