

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 ground 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 37.1kV when the horizontal just begins to pull out of sync. If the high voltage should exceed 37.1kV or the receiver fails to lose horizontal sync, the horizontal oscillator disable circuit should be repaired. Remove jumper and the 9.0V DC supply.

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

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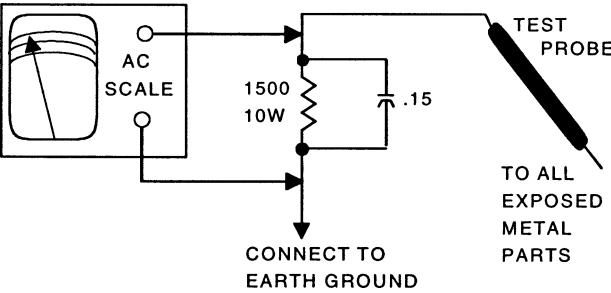
SAFETY CHECKS — FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

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

Hot Leakage Current Check

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



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PHOTOFACT® Technical Service Data

SET 4658

MODEL CT-27D32F (CHASSIS RP338)

PANASONIC

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For Supplier Address,
See PHOTOFACT Annual Index

PANASONIC
Model CT-27D32F (Chassis RP338)



Representative Model

Essential coverage
for servicing a television receiver...

- Schematics
- Component locations
- Parts list

Coverage includes these additional models and chassis:

Models	Chassis
CT-27D12DF	SP338
CT-27D12DUF	SP338
CT-27D12SDF	SP338
CT-27D32UF	RP338
CT-2707DF	TP338
CT-2707DUF	TP338



NOVEMBER 2002 SET 4658

TUNER INFORMATION

MAIN TUNER VOLTAGE CHART

Pin	VHF Low Band	VHF High Band	UHF Band
(1) AGC	2.0V	2.1V	1.6V
(2) TU	1.1V	4.1V	5.1V
(3) ADRS	0V	0V	0V
(4) SCL	3.6V	3.6V	3.6V
(5) SDA	3.6V	3.6V	3.6V
(6) NC	0V	0V	0V
(7) +B	5.0V	5.0V	5.0V
(8) NC	0V	0V	0V
(9) BTL	4.2V	7.5V	8.5V
(10) NC	0V	0V	0V
(11) IF1	0V	0V	0V
(12) IF	0V	0V	0V
(13) BV	9.0V	9.0V	9.0V
(14) AUDIO	.37V	.37V	.37V
(15) GND	0V	0V	0V
(16) AFT	1.9V	1.9V	1.9V
(17) AGC OUT	2.0V	2.1V	1.6V
(18) V	2.1V	2.1V	2.1V
(19) AGC CONT	0V	0V	0V
(20) GND	0V	0V	0V
(21) ST	0V	0V	0V
(22) BIL	0V	0V	0V
(23) MODE	0V	0V	0V
(24) F-MONO	0V	0V	0V
(25) MUTE	0V	0V	0V
(26) R	0V	0V	0V
(27) L	0V	0V	0V

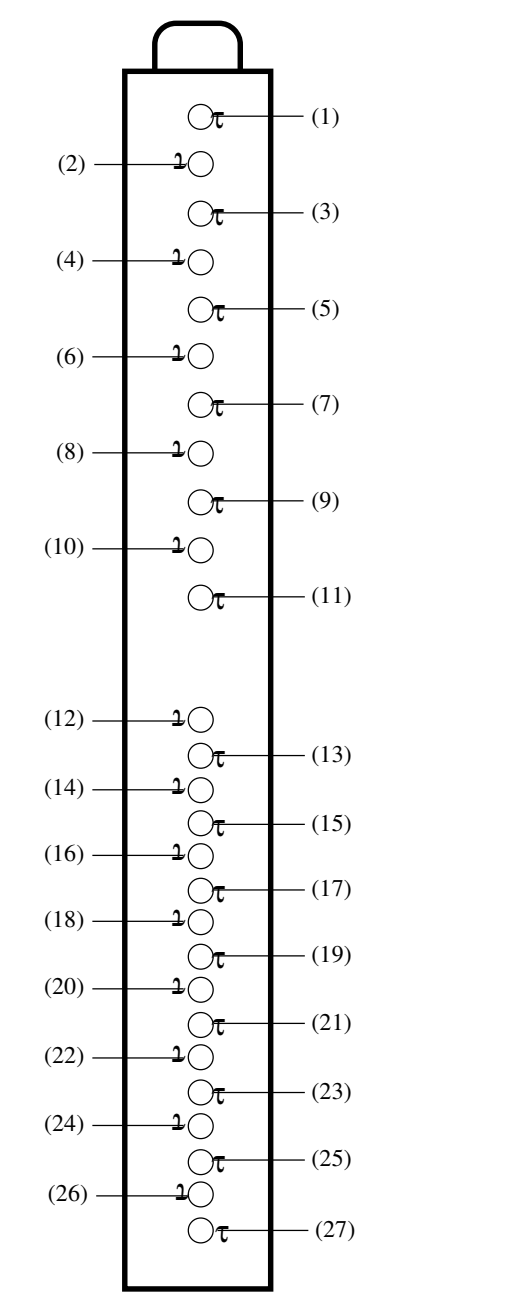
NOTE: VHF Low Band voltages taken on channel 2.
 VHF High Band voltages taken on channel 7.
 UHF Band voltages taken on channel 14.

SUB TUNER VOLTAGE CHART

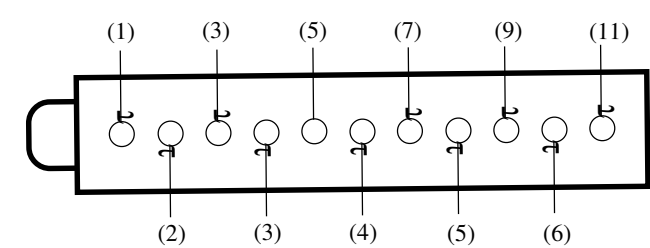
Pin	VHF Low Band	VHF High Band	UHF Band
(1) AGC	1.9V	1.9V	1.8V
(2) TU	1.0V	4.6V	4.7V
(3) ADD	5.0V	5.0V	5.0V
(4) SCL	3.6V	3.6V	3.6V
(5) SDA	3.6V	3.6V	3.6V
(6) BM	0V	0V	0V
(7) BPL	5.0V	5.0V	5.0V
(8) NC	0V	0V	0V
(9) BTL	4.1V	7.7V	7.7V
(10) NC	0V	0V	0V
(11) IF1	0V	0V	0V

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

MAIN TUNER TERMINAL GUIDE



SUB TUNER TERMINAL GUIDE



MISCELLANEOUS ADJUSTMENTS

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 seven service modes.

- B = Sub Adjustments
- D = Pin Cushion Adjustments
- P = PIP Adjustments
- X = Comb Filter Adjustments
- C = Cut-Off Adjustments
- M = Stereo Adjustments
- S = Options 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.

SUB ADJUSTMENTS

NOTE: Write down original On-set 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.

Sub Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
Sub Color (B0)	0-63	31	25
Sub Tint (B1)	0-63	31	47
Sub Brightness (B2)	0-63	31	44
Sub Contrast (B3)	0-31	16	26
Sub Tint Video (B4)	0-31	16	15
Sub Color Video (B5)	0-31	16	16
Sub Tint Component (B6)	0-127	63	58
Sub Color Component (B7)	0-63	31	41
Sub Sharp TV/Video (B8)	0-31	10	13
Sub Sharp Component (B9)	0-31	31	31
Sub Contrast Fixed (Ba)	0-31	15	31

Sub Color (B0)

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

Sub Tint (B1)

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

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 Sub 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 C board is replaced.

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

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 16 (P2) of T801 and the common tie point. Set brightness and picture to minimum. With AC line voltage set to 120VAC, B+ should read 130V* \pm 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 26kV to 28kV.

PURITY CHECK

Press recall button on 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.

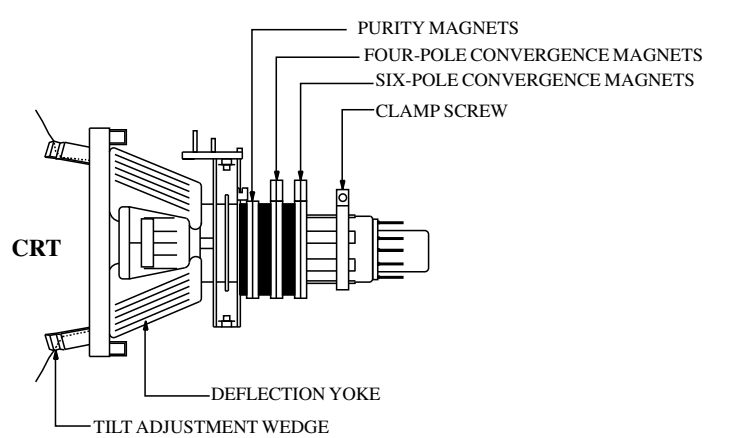
CONVERGENCE

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.

CRT NECK ASSEMBLY



MISCELLANEOUS ADJUSTMENTS continued

CUT-OFF ADJUSTMENTS

Follow same procedure used for Sub adjustments.

Cut-Off Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
Red Cutoff (C0)	0-255	128	62
Green Cutoff (C1)	0-255	128	79
Blue Cutoff (C2)	0-255	128	79
User Brightness (C3)	0-63	31	31
Green Drive (C4)	0-127	64	57
Blue Drive (C5)	0-127	64	56
Drive C Temp (C6)	0-127	8	8
Contrast C Temp (C7)	0-127	5	5

Color Temperature (C0, C1, C2, C4, C5)

NOTE: Observe low and high brightness areas of a B/W picture for proper tracking.

Enter serviceman mode and select Cut-Off adjustments. Set the red cutoff (C0), green cutoff (C1), and blue cutoff (C2) for a gray picture. Set the green drive (C4) and the blue drive (C5) for correct white areas.

OPTIONS ADJUSTMENTS

Follow same procedure used for Sub adjustments.

Options Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
ABL Gain (S0)	0-3	3	3
ABL Point (S1)	0-3	3	3
RGB Brightness (S2)	0-15	8	8
RGB Gamma (S3)	0 , 1	1	1
Color Gamma (S4)	0 , 1	1	1
VSM-G (S5)	0 , 1	0	0
BS Point (S6)	0-7	7	6
Clock Adjust (S7)	0-255	128	109
Loud Comp (S8)	0-31	31	31
Caption Dig Filter SW (S9)	0 , 1	0	0
Caption Scroll (Sa)	0 - 2	1	1
RGB Matrix (Sb)	0-7	6	6
RGB Matrix Comp (Sc)	0-7	5	5

Clock Adjustment (S7)

Connect a frequency counter to pin 13 of IC001. Turn receiver off. Record the frequency. Turn the receiver on and enter the serviceman mode and select options adjustments. Select clock adjustment (S7). Adjust (S7) based on the following formula:

$$(S7) = 128 + .901 \times 1000000 \left[\frac{244.1406 - \text{pin 13 (measured in Hz)}}{244.1406} \right]$$

PIP ADJUSTMENTS

PIP adjustments can be entered but no adjustments should be necessary. They are factory set for normal PIP performance. Write original On-set values in case one of the adjustments is changed by mistake. Confirm that the values are as shown for default level.

PIP Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
PIP Color (P0)	0-127	92	55
PIP Tint (P1)	0-255	54	54
PIP Brightness (P2)	0-31	22	5
PIP Contrast (P3)	0-127	80	55
Up 1/9 (P4)	0-255	26	26
Down 1/9 (P5)	0-255	143	143
Left 1/9 (P6)	0-255	10	10
Right 1/9 (P7)	0-255	101	101
Up 1/16 (P8)	0-255	26	26
Down 1/16 (P9)	0-255	160	160
Left 1/16 (Pa)	0-255	10	10
Right 1/16 (Pb)	0-255	116	116
PIP Freerun (Pc)	N/A	N/A	0
PIP YDL (Pd)	0-15	4	4

STEREO ADJUSTMENTS

All adjustments were made using a MTS TV / stereo generator connected to the antenna terminal. Set the customer controls to normal listening levels and select stereo mode.

MTS Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
Input Level (M0)	0-63	33	30
Low - Level Separation (M1)	0-15	6	7
High - Level Separation (M2)	0-63	25	28

Input Level (M0)

On generator select pilot, 1kHz audio frequency, and L+R modulating signal. Connect an oscilloscope to pin 22 of IC2201. Enter serviceman mode and select stereo adjustments. Select input level (M0). Adjust the data value for 1Vp-p.

High Level Separation (M1) and Low Level Separation (M2)

On generator select pilot, 300Hz audio frequency, and left modulating signal. Connect an oscilloscope to pin 22 of IC2201. Enter serviceman mode and select stereo adjustments. Select low level separation (M1). Adjust the data value for minimum amplitude of waveform. On generator select 8kHz audio frequency. Select high level separation (M2). Adjust the data value for minimum amplitude of the waveform. Repeat until no further decrease in amplitude can be obtained.

COMB FILTER ADJUSTMENTS

NOTE: Write down original On-set values in detail before making any adjustments in case a misadjustment occurs.

Comb Filter Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
Comb Clip Level (X0)	0 - 255	152	152
Comb Switch (X1)	0 - 63	12	12
Comb Limit (X2)	0 - 63	24	24
Comb Core (X3)	0 - 127	41	41
Comb RF Delay (X4)	0 - 127	19	19
Comb Video Delay (X5)	0 - 127	18	18
Comb VMLM (X6)	0 - 127	90	90
Comb VMCO (X7)	0 - 63	24	24
Comb Sharp (X8)	0 - 255	123	123
Comb VM Level (X9)	0 - 255	255	255
Comb VMPKF (Xa)	0 , 1	1	1
Comb H Lock Mode (Xb)	0 , 1	1	1
Comb H Lock (Xc)	0 - 511	60	60
Comb H Sep 1 (Xd)	0 - 511	313	313
Comb H Sep 2 (Xe)	0 - 511	266	266
Comb Sub H Lock Mode (Xf)	0 , 1	0	0
Comb Sub H Lock (X10)	0 - 511	70	70
Comb Sub H Sep 1 (X11)	0 - 511	313	313
Comb Sub H Sep 2 (X12)	0 - 511	266	266

PIN CUSHION ADJUSTMENTS

Follow same procedure used for Sub adjustments.

Pin Cushion Adjustment Range and Default Levels			
Adjustment	Range	Default Level	On-Set Value
H Position (D0)	0 - 31	16	16
V Size (D1)	0 - 63	31	30
V S Correction (D2)	0 - 7	4	4
V Lin Correction (D3)	0 - 15	14	15
E/W Trapezium (D4)	0 - 15	8	8
V AGC (D5)	0 , 1	1	1
V Position (D6)	0 - 7	0	0
V Centering (D7)	0 - 127	63	63
V Centering DAC SW (D8)	0 , 1	0	0
V BLK Start Phase (D9)	0 - 31	7	7
V BLK Stop Phase (Da)	0 - 31	14	14

Horizontal Centering (D0)

Tune in a crosshatch pattern. Enter serviceman mode and select Pin Cushion adjustments. Select horizontal position (D0) adjustment and adjust crosshatch pattern for correct horizontal centering.

Vertical Size (D1)

Tune in a crosshatch pattern. Enter serviceman mode and select Pin Cushion adjustments. Select vertical size (D1) adjustment and adjust crosshatch pattern for little over scan at the top and the bottom of the screen.

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

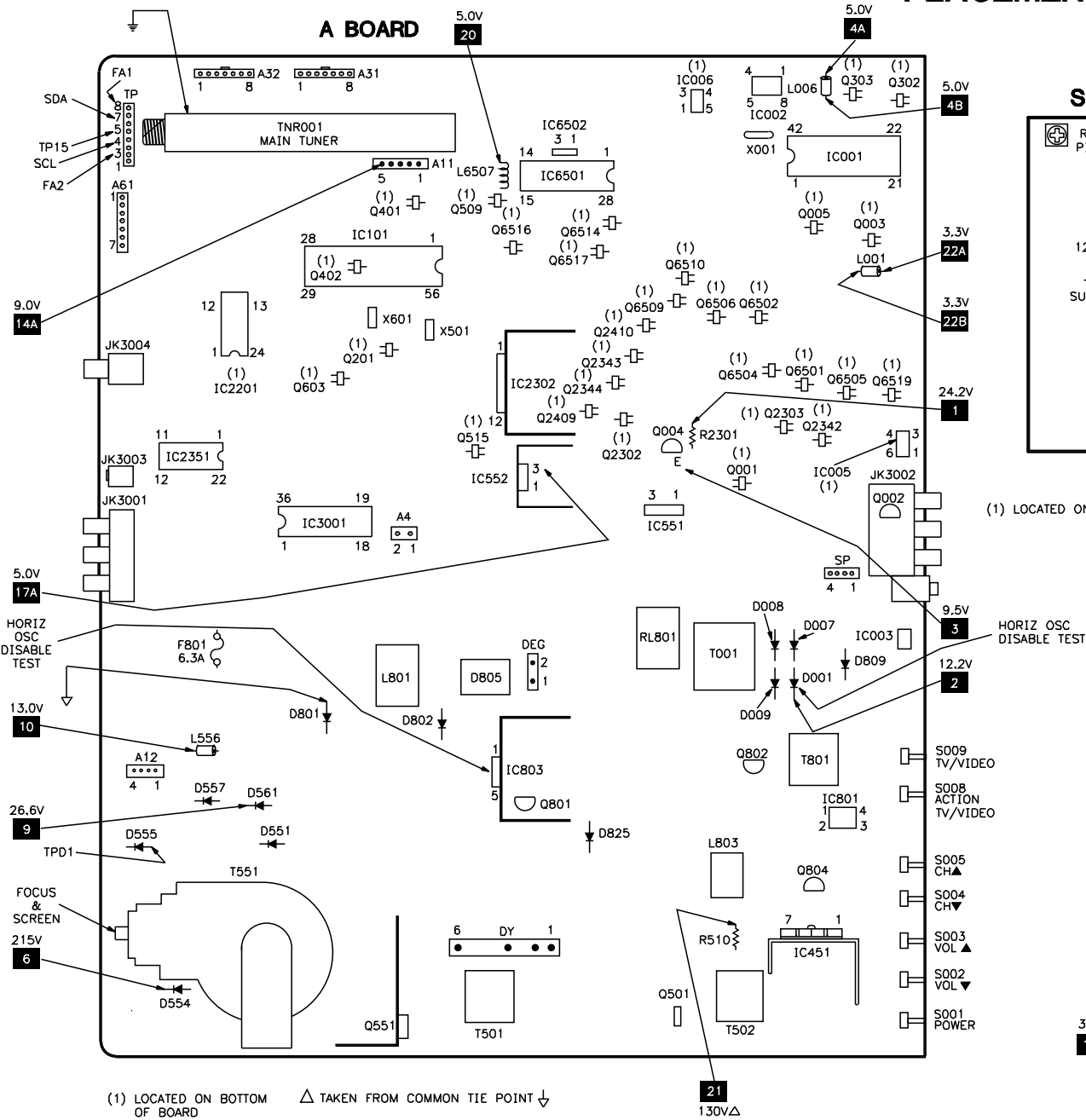
Or consult the Sams *Annual Index* for the address of the original equipment manufacturer.

Participating Vendors

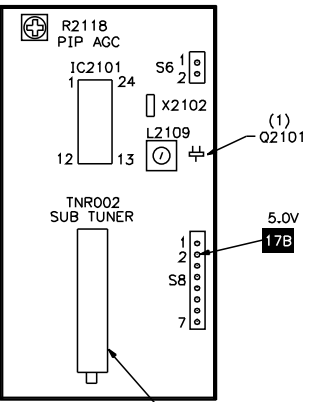
Information on test equipment and replacement parts is listed in these pages for the following participating vendors. Consult the Sams *Annual Index* for their current address.

- ⌵ NTE Electronics, Inc. (NTE)
- ⌵ Sencore, Inc.

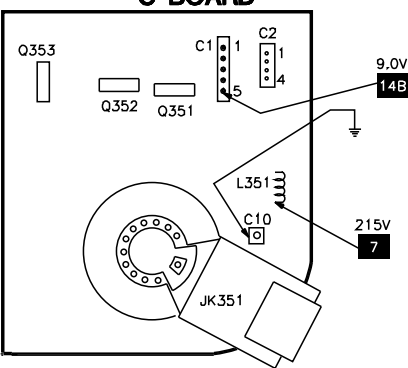
PLACEMENT CHART



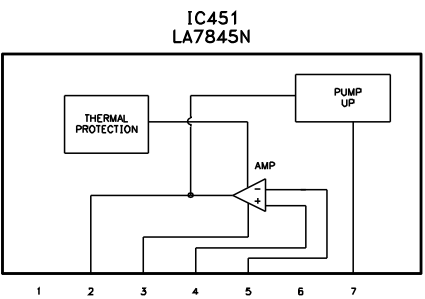
S BOARD



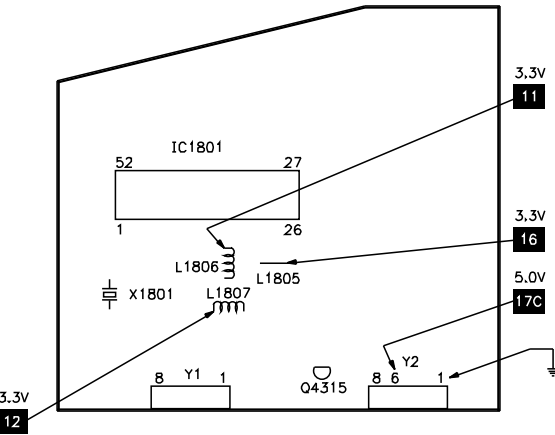
C BOARD



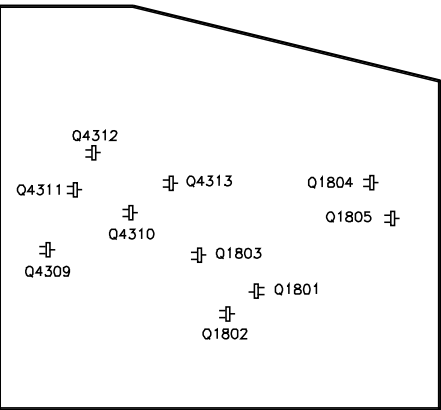
IC FUNCTIONS



Y BOARD - TOP VIEW



Y BOARD - BOTTOM VIEW

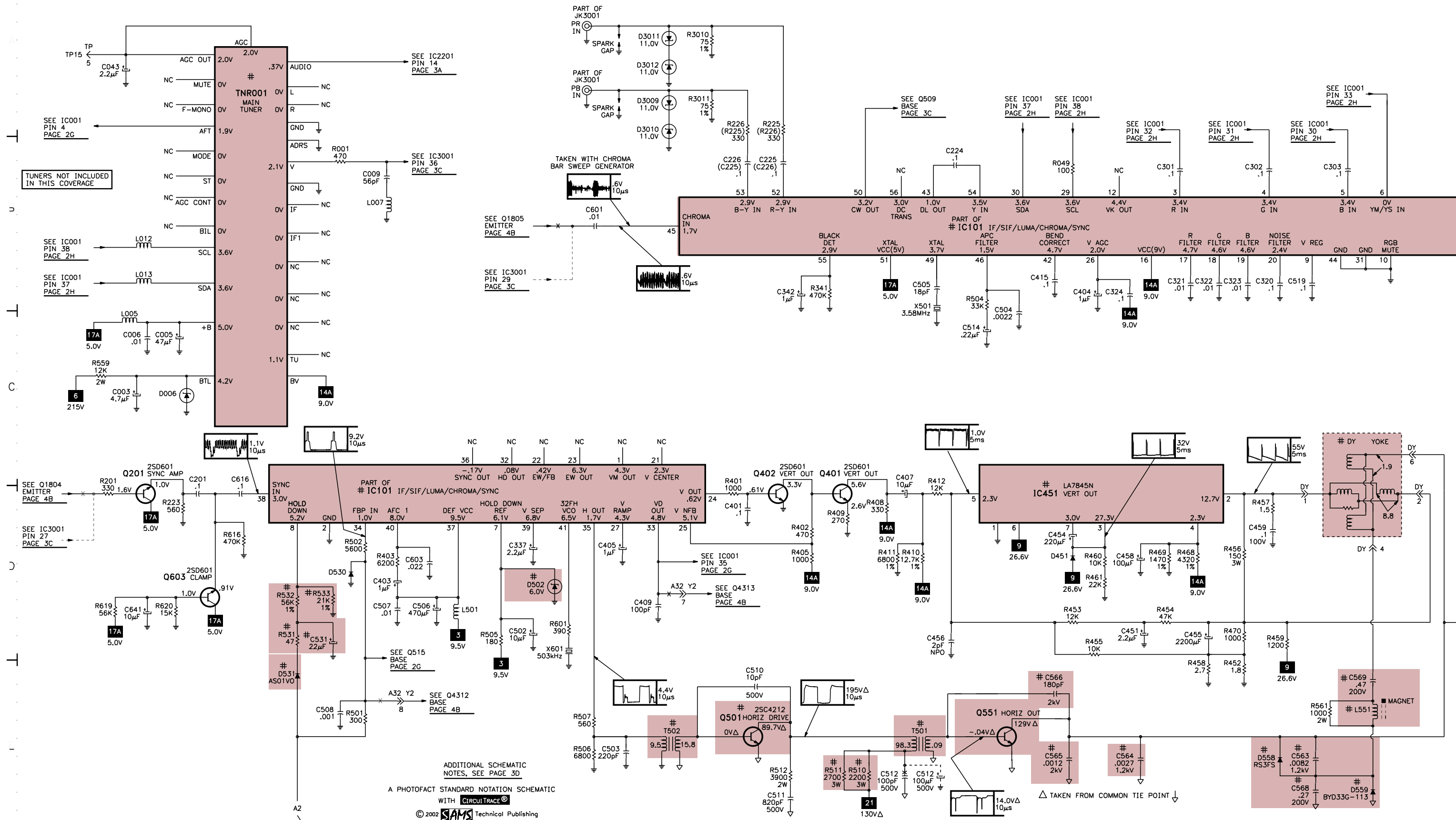


TEST EQUIPMENT

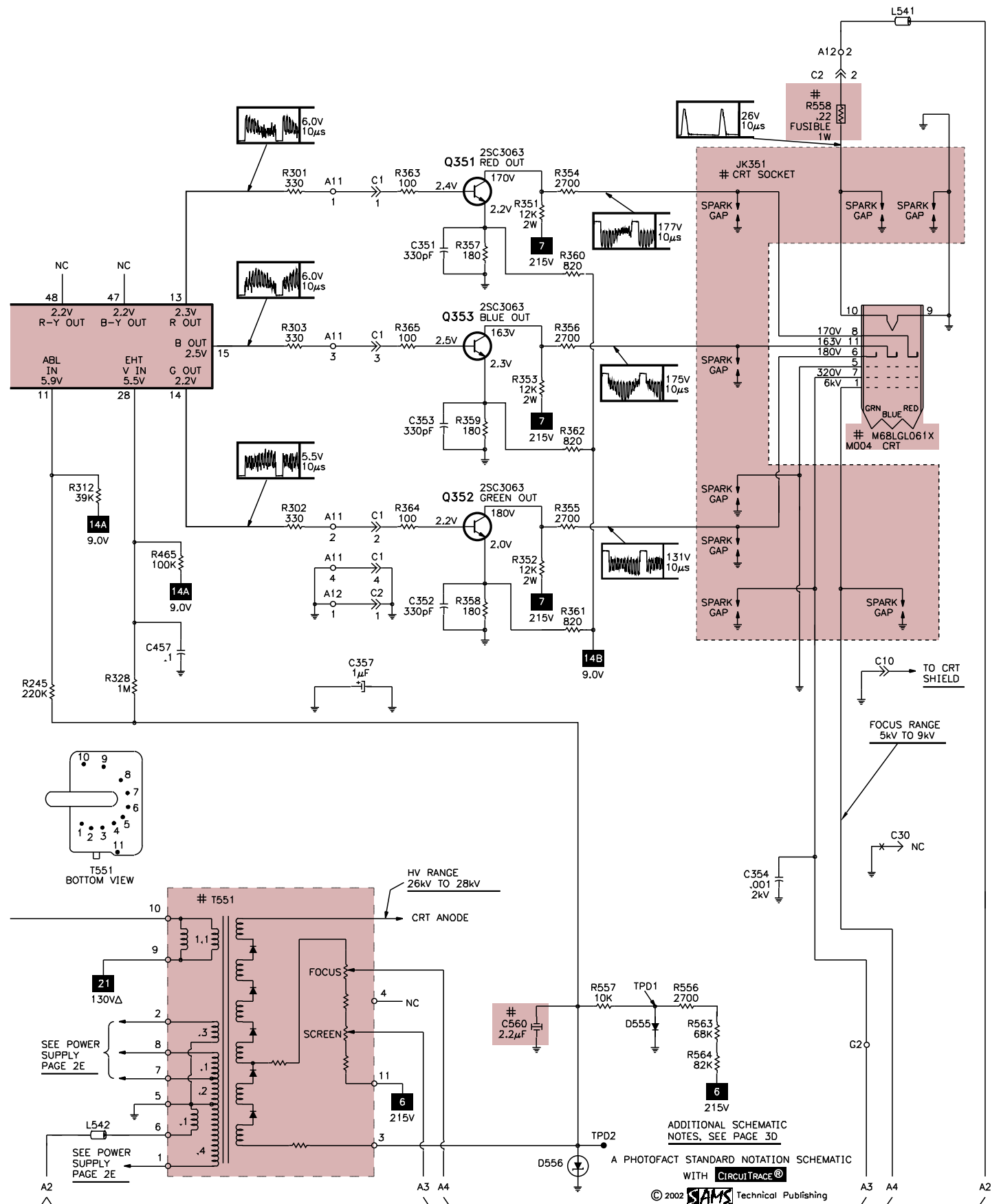
Test equipment listed by participating manufacturer illustrates typical or equivalent equipment used by Sams engineers to obtain measurements. This equipment is compatible with most types used by field service technicians.

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

A PHOTOFACT STANDARD NOTATION SCHEMATIC
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C
TELEVISION SCHEMATIC continued



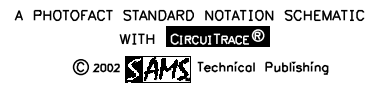
SCHEMATIC COMPONENT LOCATION GUIDE

C000	E15	C554	E13	C2119	D47	C4319	B50	D3010	B4	L1804	D51	R025	C22	R470	D7	R2111	D47	R4339	B50
C002	E15	C555	D16	C2120	D46	C4320	B49	D3011	A4	L1806	E18	R026	B23	R501	E2	R2112	D46	R4340	C49
C003	C1	C556	E14	C2121	D46	C6501	D19	D3012	A4	L1807	E18	R027	B24	R502	D2	R2113	D46	R4341	C50
C005	C1	C557	D14	C2123	D47	C6502	D19	D3017	A38	L1808	E19	R028	C23	R504	C6	R2114	D48	R4342	B49
C006	C1	C558	D17	C2124	C45	C6504	D39	D3018	A38	L2103	D47	R029	D23	R505	D3	R2116	D48	R4344	A49
C008	C16	C560	E10	C2125	C48	C6507	D39	D3019	D31	L2106	D48	R030	C23	R506	E4	R2117	D46	R4345	B49
C009	B3	C561	D13	C2126	C46	C6510	B41	D3020	D31	L2109	D47	R032	B22	R507	E4	R2118	D46	R6501	D38
C010	C16	C562	D17	C2202	C30	C6511	D39	D3021	D31	L2310	E25	R033	B21	R508	B40	R2119	D46	R6502	D38
C013	C14	C563	E8	C2203	C30	C6512	D41	D3022	D31	L4301	A49	R034	B21	R509	B41	R2121	C48	R6503	D39
C016	E25	C564	E7	C2204	C30	C6513	B41	D4301	E18	L6502	D39	R035	B21	R510	E5	R2122	C46	R6505	D39
C017	A24	C565	E6	C2205	C29	C6516	C42	DEG	A15	L6505	B41	R036	B21	R511	E5	R2123	C46	R6509	B40
C018	A23	C566	E6	C2206	C30	C6517	B42	DY	D8	L6507	D18	R037	C21	R512	E5	R2124	D48	R6510	B41
C020	C16	C568	E8	C2207	C30	C6518	C42	F801	A14	L6508	B14	R038	C21	R513	B41	R2127	C48	R6511	D39
C021	A21	C569	E8	C2208	C30	C6520	C43	IC001	A24	M002	A13	R039	E23	R514	B22	R2203	A29	R6512	B41
C022	B16	C571	D16	C2209	D30	C6521	D19	IC002	C28	M004	B12	R040	B26	R515	B23	R2206	A30	R6513	D39
C024	E24	C572	D20	C2210	C29	C6522	C44	IC003	A21	Q001	E26	R041	B26	R516	B23	R2207	B30	R6515	D40
C025	E24	C573	D17	C2211	A29	C6523	D19	IC005	C14	Q002	C14	R042	E23	R517	B23	R2221	D29	R6516	D39
C026	E24	C601	B4	C2212	C29	C6524	B43	IC006	E22	Q003	A25	R043	D24	R531	D2	R2301	C19	R6518	D41
C032	A21	C603	D3	C2215	D20	C6525	B42	IC101	B6	Q004	C14	R044	C24	R532	D2	R2305	C35	R6519	D41
C033	D26	C616	D2	C2218	C29	C6526	B41	IC101	D3	Q005	A22	R045	A22	R533	D2	R2306	C35	R6520	D40
C034	D26	C641	D1	C2301	C20	C6527	D20	IC451	D6	Q201	D1	R046	B24	R550	D13	R2307	C33	R6522	D40
C043	A1	C801	A15	C2302	C32	C6528	D20	IC551	E14	Q302	D23	R047	A23	R551	D13	R2308	D34	R6523	B41
C044	E24	C802	A16	C2305	C32	C6529	B40	IC552	D18	Q303	D23	R049	B6	R552	D13	R2311	E25	R6524	D40
C047	C16	C803	A16	C2306	C33	C6531	A44	IC801	D19	Q351	B10	R060	E24	R553	E14	R2312	E26	R6526	B42
C048	C16	C804	A16	C2307	C35	C6532	D40	IC803	A18	Q352	C10	R066	C25	R556	E11	R2313	E26	R6535	D41
C201	D1	C805	B16	C2309	C35	D001	B15	IC1801	B50	Q353	B10	R067	C25	R557	E11	R2318	D35	R6537	A43
C224	B6	C806	B16	C2311	E27	D002	E27	IC2101	C47	Q401	D5	R068	B25	R558	A12	R2319	D35	R6538	A43
C225	B5	C807	D19	C2313	C34	D003	C14	IC2201	A29	Q402	D5	R072	B25	R559	C1	R2321	C35	R6540	D42
C226	B5	C808	D18	C2314	D35	D006	C1	IC2302	C33	Q501	E5	R073	C25	R560	D15	R2322	C35	R6542	C43
C301	B7	C809	C17	C2315	D34	D007	B15	IC2351	A33	Q509	B40	R074	C25	R561	E8	R2323	D34	R6543	B43
C302	B7	C810	C13	C2321	C35	D008	B15	IC3001	A32	Q515	B23	R075	B26	R563	E11	R2325	E33	R6544	D41
C303	B8	C811	C13	C2324	D34	D009	B15	IC3001	B38	Q551	E6	R076	C26	R564	E11	R2329	C35	R6545	B43
C309	D23	C812	A14	C2325	C35	D011	B15	IC6501	A43	Q603	D2	R077	C26	R566	D17	R2330	C34	R6548	D42
C310	D23	C814	B18	C2326	C34	D014	C25	IC6502	B42	Q801	B19	R078	B26	R569	E46	R2332	C34	R6549	C43
C314	D24	C815	B18	C2327	D34	D015	C26	J118	C23	Q802	B18	R079	B26	R573	D18	R2333	C35	R6553	A42
C315	D24	C818	B19	C2328	C35	D018	D15	J430	E17	Q804	D18	R201	D1	R574	D18	R2334	D35	R6554	B43
C320	B7	C820	C19	C2329	C35	D451	D6	J443	E17	Q1801	D49	R223	D1	R601	D4	R2336	E35	R6555	B40
C321	B7	C821	C18	C2331	E35	D502	D3	J511	E17	Q1802	D49	R225	B5	R616	D2	R2337	C32	R6556	B40
C322	B7	C822	C18	C2333	D35	D530	D2	JK3001	A37	Q1803	C49	R226	B5	R619	D1	R2338	E33	R6557	C43
C323	B7	C823	C20	C2339	E33	D531	E2	JK3001	A37	Q1804	A51	R245	C9	R620	D1	R2339	E33	R6558	B41
C324	B7	C824	A18	C2340	D33	D532	C16	JK3001	A4	Q1805	B51	R301	B10	R801	A15	R2340	C34	R6559	B42
C330	E16	C825	A17	C2342	E34	D533	D14	JK3001	A4	Q2101	C48	R302	C10	R804	B16	R2341	C34	R6560	C42
C331	E15	C1801	E49	C2350	B32	D551	D13	JK3001	B30	Q2302	D34	R303	B10	R805	A17	R2342	C35	R6565	D40
C337	D3	C1802	E49	C2351	B33	D554	D14	JK3001	B30	Q2303	D35	R305	D23	R806	B17	R2343	C35	R6566	D40
C342	B5	C1803	E50	C2352	B34	D555	E11	JK3001	B37	Q2342	E34	R306	D23	R808	D18	R2344	D34	R6567	D40
C351	B10	C1804	E50	C2353	B34	D556	E11	JK3001	C30	Q2343	D34	R309	D24	R809	C18	R2345	E34	R6568	D41
C352	C10	C1805	E50	C2354	B34	D557	D17	JK3001	C30	Q2344	D34	R310	D24	R810	D18	R2346	D34	RL801	A15
C353	B10	C1806	E20	C2355	B34	D558	E7	JK3002	A37	Q2409	E34	R312	C9	R812	D19	R2350	B32	RL801	E27
C354	D11	C1807	E19	C2356	B35	D559	E8	JK3002	C36	Q2410	E33	R328	C9	R813	D19	R2351	B34	S001	B21
C357	C10	C1808	E19	C2357	B34	D561	D13	JK3002	D30	Q4309	A48	R341	B5	R815	B13	R2352	B34	S002	B21
C401	D5	C1809	E19	C2358	A32	D801	A16	JK3002	D30	Q4310	A49	R351	B11	R818	C17	R2353	B33	S003	B21
C403	D3	C1810	D50	C2359	B36	D802	A16	JK3004	D36	Q4311	B49	R352	C11	R820	E22	R2355	A32	S004	B21
C404	B6	C1811	B51	C2360	B35	D805	A15	JK3004	E36	Q4312	C49	R353	B11	R821	E22	R2418	E34	S005	B21
C405	D4	C1812	B51	C2361	B35	D806	D20	JS4309	C50	Q4313	B49	R354	B11	R822	A17	R2419	E33	S008	E22
C407	D5	C1813	E18	C2362	A33	D807	D20	L001	C15	Q4315	E18	R355	C11	R823	B18	R3001	A38	S009	C21
C409	D4	C1814	E20	C2363	B35	D809	C18	L002	A21	Q6501	D39	R356	B11	R824	B18	R3003	D31	SP1	C36
C415	B6	C1815	A50	C2364	B35	D820	B18	L003	D25	Q6502	D38	R357	B10	R825	A19	R3004	D31	SP2	C36
C451	D7	C1816	C51	C2365	E15	D821	B18	L004	D25	Q6504	B40	R358	C10	R826	A19	R3005	B38	T001	B14
C452	D15	C1817	C51	C2366	E15	D822	B18	L005	C1	Q6505	D40	R359	B10	R827	B19	R3006	A38	T501	E5
C453	D16	C1818	C51	C3001	E15	D823	B19	L006	C15	Q6506	D39	R360	B11	R828	B19	R3007	A37	T502	E4
C454	D6	C1819	E20	C3002	E16	D824	C19	L007	B3	Q6509	B41	R361	C11	R829	C19	R3008	A37	T551	D9
C455	D7	C1820	E19	C3003	B38	D825	D17	L008	A21	Q6510	D40	R362	C11	R1801	E49	R3009	C38	T551	E13
C456	D6	C1821	E50	C3004	B31	D826	B19	L010	B25	Q6514	D41	R363	B10	R1802	E50	R3010	A4	TNR001	A2
C457	C9	C1822	E49	C3006	B31	D829	B17	L011	B25	Q6516	B42	R364	C10	R1803	E50	R3011	A4	X001	A24
C458	D7	C1823	D51	C3007	B38	D830	C18	L012	B1	Q6517	C42	R365	B10	R1804	E50	R3012	C37	X501	C6
C459	D7	C1826	C51	C3008	B38	D2101	E45	L013	B1	Q6519	D40	R401	D4	R1805	C51	R3013	C37	X601	D4
C502	D3	C1827	E18	C3009	C31	D2301	E26	L106	B14	R001	B2	R402	D5	R1807	D49	R3014	C38	X1801	E50
C503	E4	C1828	C51	C3010	C38	D2305	B31	L108	C27	R002	B22	R403	D3	R1808	D50	R3015	B31	X2102	D47
C504	C6	C1829	D51	C3011	C31	D2306	B31	L109	C27	R003	E25	R405	D5	R1809	D49	R3016	B31	X2103	C45
C505	B6	C1830	D52	C3012	C38	D2307	C31	L110	C23	R004	C14	R408	D5	R1810	C50	R3017	B38		
C506	D3	C1831	D51	C3013	B38	D2308	C31	L218	B14	R005	C14	R409	D5	R1811	D50	R3018	C31		
C507	D3	C1832	D50	C3014	D31	D2309	E36	L319	B23	R006	D15	R410	D5	R1812	B51	R3019	C31		
C508	E2	C1833	D49	C3016	D31	D2310	D36	L351	D15	R007	E24	R411	D5	R1813	B51	R3020	B38		
C510	E5	C1835	E19	C3018	C39	D2311	E36	L430	D31	R008	A26	R412	D6	R1814	D51	R3021	B39		
C511	E5	C1836	D52	C3019	C38	D2312	E36	L501	D3	R009	E23	R452	E7	R1815	E51	R4310	A48		
C512	E5	E1837	E19	C3020	B31	D2315	D34	L518	B41	R010	B25	R453	D6	R1818	D49	R4311	A47		
C512	E6	C1839	D49	C3021	C38	D2342	E33	L541	A12	R012	C13	R454	D7	R1819	C49	R4326	A48		
C514	C6	C1840	C49	C3022	A31	D2343	E33	L542	E9	R013	D22	R455	E6	R1822	C50	R4327	A48		
C515	B23	C2105	E20	C3023	B37	D3001	A38	L551	E8	R014	C25	R456	D7</						

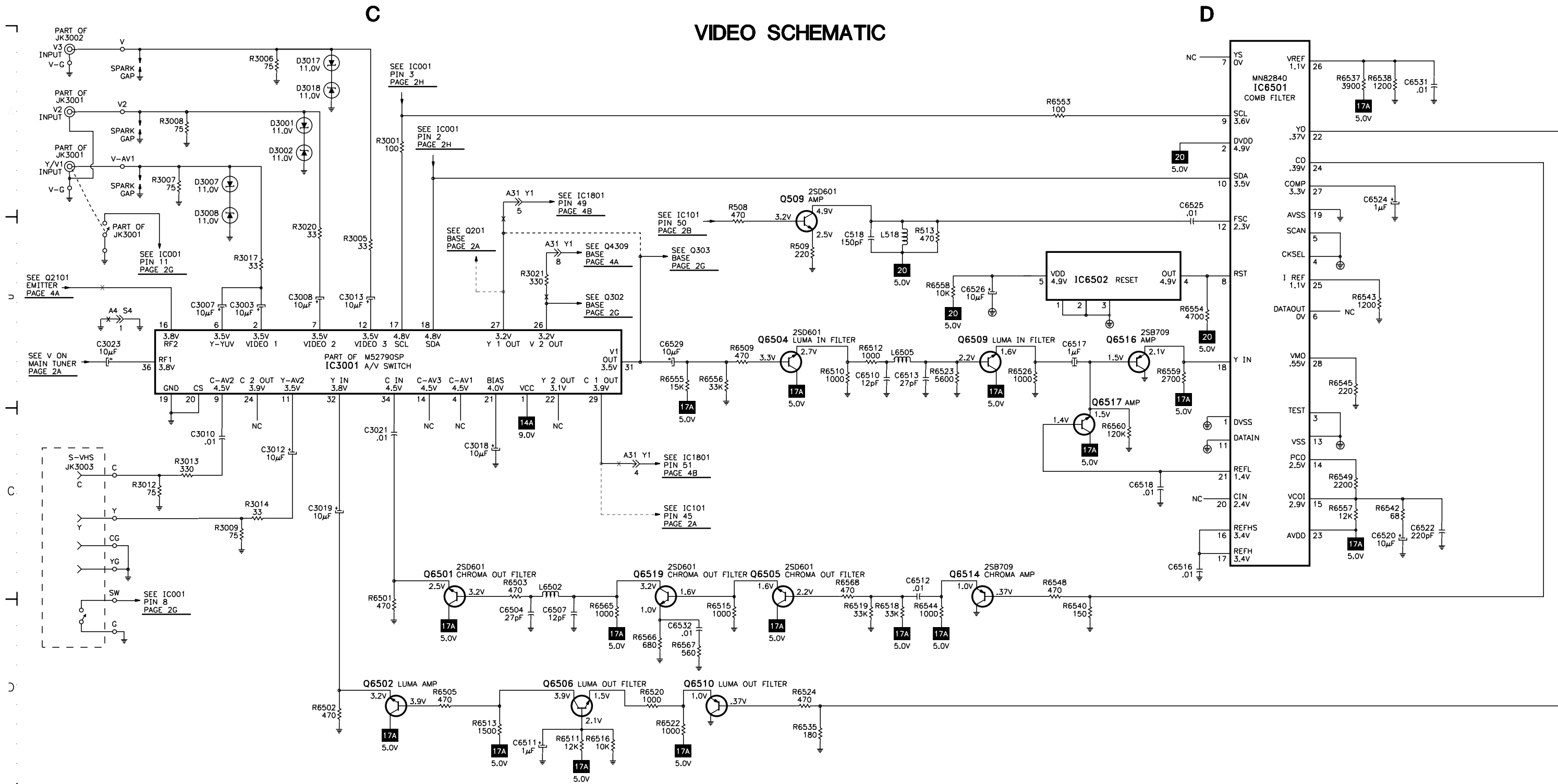
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MODEL CT-27D32E (CHASSIS RP338)



VIDEO SCHEMATIC



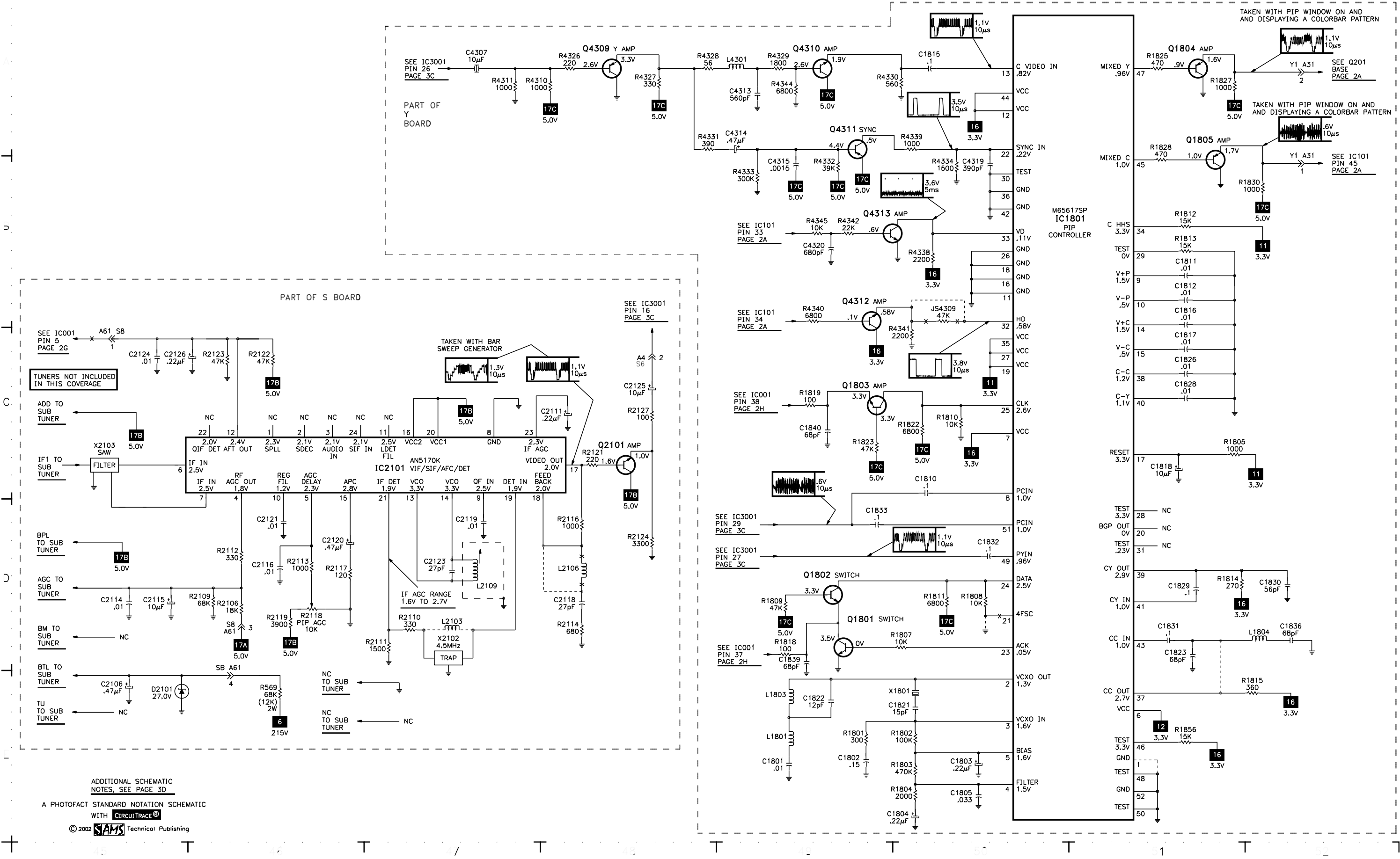
PANASONIC
MODEL CT-27D32F (CHASSIS RP338)

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.
- A 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.

PIP SCHEMATIC



PARTS LIST

Item No.	Type No.	Mfr. Part No.	NTE Part No.	Item No.	Type No.	Mfr. Part No.	NTE Part No.	Item No.	Function/Rating	Mfr. Part No.	Notes
D001	-	ERA15-01V3	NTE116	Q4310	2SD601A	2SD601ARTX	NTE2408	L2103 (4)	15µH	ELESN150KA	-
D002	-	MA165TA5VT	NTE519	Q4311	2SB709A	2SB709ARTX	NTE2409	L2106 (4)	56µH	ELESN560KA	-
D003	-	MA4056MTA	-	Q4312, 13	2SD601A	2SD601ARTX	NTE2408	L2109 (4)	VCO	EIV7EN053B	-
D006	-	MA4330HTA	-	Q4315	2SC1384Q	2SC1384QR	NTE293	L2310	2.2µH	TLTABT2R2K	-
D007, 08, 09	-	ERA15-01V3	NTE116	Q6501, 02	2SD601A	2SD601ARTX	NTE2408	L4301	3.9µH	ELESN3R9KA	-
D011, 14	-	MA165TA5VT	NTE519	Q6504, 05, 06, 09	2SD601A	2SD601ARTX	NTE2408	L6502, 05	33µH	ELESN330JA	-
D015	-	MA700ATA	-	Q6510, 14, 16	2SB709A	2SB709ARTX	NTE2409	L6507	15µH	ELESN150KA	-
D018	-	MA165TA5VT	NTE519	Q6517, 19	2SD601A	2SD601ARTX	NTE2408	L6508	Ferrite Bead	EXCELSA26T	-
D451	-	ERA15-01V3	NTE116					# M002	Line Cord	TSX2AA0112-I	AC, Polarized
# D502	-	MA4062LTVA	-					# M004	CRT	M68LGL061X	-
D530	-	MA4082LTA	-					R032	10K 1% 1/10W	ERJ6ENF1002V	-
# D531	-	AS01VO	NTE552	C354	.001 10% 2kV	ECKW3D102KBN	-	R410	12.7K 1% 1/10W	ERJ6ENF1272V	-
D532, 33	-	MA4091LTA	-	C456	2pF 50V NPO	ECCR1H020CC5	-	R411	6800 1% 1/10W	ERJ6ENF6801V	-
# D551	RU2N	TVSRU2NV1	NTE552	# C531	22µF 25V	ECA1EM220B	-	R456	150 5% 3W	ERG3FJ151H	-
# D554	-	BYD33G-163	-	# C551, 52, 53	330µF 16V	ECA1CM331B	-	R468	4320 1% 1/4W	EROS2THF4321	-
D555	-	MA165TA5VT	NTE519	# C555	22µF 250V	ECA2EM220E	-	R469	1470 1% 1/4W	EROS2THF1471	-
D556	-	MA4360HTA	-	# C556	1000µF 16V	ECA1CM102B	-	# R510	2200 5% 3W	ERG3FJ222H	-
# D557	RU2N	TVSRU2NV1	NTE552	# C558	220µF 16V	ECA1CM221B	-	# R511	2700 5% 3W	ERG3FJ272H	-
# D558	-	RS3FS	NTE506	# C560	2.2µF 50V NP	ECEA1HN2R2UB	-	# R531	47 5% 1/4W	ERD25FJ470P	-
# D559	-	BYD33G-113	-	# C561	560pF 10% 500V	ECKR2H561KB5	-	# R532	56K 1% 1/10W	ERJ6ENF5602V	-
# D561	-	BYD33G-163	-	# C563	.0082 5% 1.2kV	ECWH12H822JS	-	# R533	21K 1% 1/10W	ERJ6ENF2102V	-
# D801, 02	-	GP15KL-042	-	# C564	.0027 5% 1.2kV	ECWH12H272JS	-	# R550, 51	1 5% 1/2W	ERDS1FJ1R0P	-
# D806	-	MA4047MTA	NTE5009A	# C565	.0012 5% 2kV	ECKW3D122JBR	-	# R552	1 5% 1/2W	ERDS1FJ1R0T	-
# D807	-	MA165TA5VT	NTE519	# C566	180pF 5% 2kV	ECKW3D181JBP	-	R553	27 5% 3W	ERG3FJ270H	-
# D809	-	RU3YX-MV1	NTE588	# C568	.27 5% 200V	ECQM2274JZW	-	# R558	.22 10% 1W Fusible	ERQ1CZKPR22S	-
D820, 21, 22	EU02	EU02V1	NTE552	# C569	.47 5% 200V	TACFV2E474J	-	R560	-	TLTABT101K	-
D823	-	RL30A	-	# C801 Thru				# R566	1 5% 1/2W	ERDS1FJ1R0P	-
D824	EU02	EU02V1	NTE552	# C804	.0047 +80% -20% 500V	ECKWAE472ZED	-	R573	22 5% 3W	ERG3FJ220H	-
# D825	SR2KL	TVSSR2KLV1	-	# C805, 06	220µF 200V	ECOS2DA221BB	-	# R801	1.5 10% 7W Wirewound	ERF7ZK1R5	-
D826	EU02	EU02V1	NTE552	# C809	150µF 200V	ECOS2DG151DG	-	# R815	8.2M 20% 1/2W	ERC12ZGM825D	-
D829	-	MA165TA5VT	NTE519	# C810, 11	.015 20% 250VAC	ECQU2A153MVA	-	# R818	.56 5% 1/2W Fusible	ERQ12HJR56P	-
# D830	-	MA4270MTA	-	# C812	.22 20% 250VAC	ECQU2A224MVA	-	R824	39 5% 3W	ERG3FJ390H	-
D2101 (4)	-	MA3330MTX	-	# C814	.082 5% 50V	ECQB1H823JF3	-	# R826	.22 10% 2W	ERF2AKR22P	-
D2301	-	MA165TA5VT	NTE519	C818	820pF 10% 1kV	ECKW3A821KBP	-	R828	47 5% 3W	ERG3FJ470	-
D2305 Thru	-			# C820	10µF 63V	ECA1JHG100B	-	R829	6.8 5% 1W Fusible	ERQ14AJ6R8P	-
D2312	-	MA4110MTA	-	# C822	220µF 25V	ECA1EM221B	-	R2118 (4)	10K PIP AGC	EVND8AA03B14	-
D2315, 42, 43	-	MA165TA5VT	NTE519	# C823	33µF 160V	ECA160V33UE	-	R2301	2.2 5% 2W Fusible	ERQ2CJP2R2S	-
D3001 Thru	-			C824	330pF 10% 1kV	ECKW3A331KBP	-	R3010, 11	75 1% 1/10W	ERJ6ENF75R0V	-
D3012	-	MA4110MTA	-	C825	470pF 10% 1kV	ECKW3A471KBP	-	# RL801	Relay	TSEH8007	Power
D3017 Thru	-			C2204	10µF 16V Tantalum	AP106K016CAE	-	S001	Switch	TSE2AD001	Power
D3022	-	MA4110MTA	-	C2207	3.3µF 16V Tantalum	AP335K016CAE	-	S002	Switch	TSE2AD001	Volume Down
D4301	-	MA3036HTX	-	C4307	10µF 16V NP	ECEA1CKN100B	-	S003	Switch	TSE2AD001	Volume Up
# IC001	-	MN101C46FTH	-	C6517	1µF 50V NP	ECEA1HN010UB	-	S004	Switch	TSE2AD001	Channel Down
IC002	-	TVR2AJ126	-	# CRA801, 02	Capristor	TP00842-51	-	S005	Switch	TSE2AD001	Channel Up
IC005	-	PQ1R33	-	# D805	4.6 Cold PTC / 218	TAP111M003	-	S008	Switch	TSE2AD001	Action
IC006	-	PST9128NR	-	# DEG (1)	Degaussing	TLK2AA0011	-	S009	Switch	TSE2AD001	TV/Video
# IC101	-	TA1310DN	-	# DEG (2)	Degaussing	TSP2AA017	-	SP1, 2	Speaker	TAS2AA0015	8 Ohms, 5W
# IC451	-	LA7845N	-	# DY	Yoke	TLY2AA006	Horiz 1.26mH, Vert 18.1mH	# T001	Power	TLP16297	-
IC551	-	AN78M09LB	NTE1910	# F801	Fuse	XBA2A00101	6.3Amp, 125V	# T501	Horizontal Driver	TLH15452	-
IC552	-	AN7805LB	NTE960	IC003	Receiver	PIC-37042SR	Remote	# T502	Horizontal Coupling	ETE19Z30DY	-
# IC801	PC817	PC817X2	NTE3098	J118	Ferrite Bead	-	-	# T551 (3)	Horizontal Output	TLF2AA002	-
# IC803	-	STR58041A	NTE7078	J430	Ferrite Bead	-	-	# T801	Power	TLP2AA003	-
IC1801	-	M65617SP	-	J443	Ferrite Bead	-	-	# TNR001 (4)	Main Tuner	ENG6101G	-
IC2101 (4)	-	AN5170K	-	J511	Ferrite Bead	-	-	# TNR001 (5)	Main Tuner	ENG36604GR	-
IC2201	-	AN5849S-E1V	-	# JK351	Socket	TJSC00300	CRT	# TNR002 (4)	Sub Tuner	ENV56D61G3	PIP
IC2302	-	AN5272	-	JK3001	Jack	TJB2AA0221	Assembly	X001	Crystal	TSSA092	14.31818MHz
IC2351	-	CXA2021S	-	JK3002	Jack	TJB2AA0046	Assembly	X501	Crystal	TSS2AA001	3.58MHz
IC3001	-	M52790SP	-	JK3003	Jack	TJB2AA0171	S-VHS	X601	Crystal	TAFCSB503F30	503kHz
IC6501	-	MN82840	-	JK3004	Jack	TJB2AA0211-1	Assembly	X1801	Crystal	TSSA092	-
IC6502	-	PST9142NR	-	L001	Ferrite Bead	EXCELSA26T	-	X2102 (4)	Trap	EFCS4R5MW5BA	4.5MHz
Q001	2SD601A	2SD601ARTX	NTE2408	L002, 03, 04	2.2µH	TLTABT2R2K	-	X2103 (4)	Filter	M1972M	SAW
Q002	2SC1685	2SC1685QRSTA	NTE85	L005	33µH	ELESN330KA	-		Magnet	JH291U-009	Purity/Convergence
Q003	2SD601A	2SD601ARTX	NTE2408	L006	Ferrite Bead	EXCELSA24T	-		PC Board (2)	TNP2AH017AJ	A
Q004	2SC1685	2SC1685QRSTA	NTE85	L007	18µH	ELESN180JA	-		PC Board (4)	TNP2AH017AK	A
Q005	2SD601A	2SD601ARTX	NTE2408	L008	47µH	TLTABT470K	-		PC Board (6)	TNP2AH017AL	A
Q201	2SD601A	2SD601ARTX	NTE2408	L010 Thru					PC Board	TNP2AA047AX	C
Q302, 03	2SD601A	2SD601ARTX	NTE2408	L013	2.2µH	TLTABT2R2K	-		PC Board (4)	TNPA0190AL	S
Q351, 52, 53	-	2SC3063RL	NTE157	L106, 08, 09	Ferrite Bead	EXCELSA26T	-		PC Board (7)	TNPA1059BD	Y
Q401, 02	2SD601A	2SD601ARTX	NTE2408	L110	Ferrite Bead	EXCELSA39V	-		Transmitter	EUR7613Z30	Remote
# Q501	2SC4212	2SC4212HLB	NTE2501	L218	Ferrite Bead	EXCELSA26T	-		Wedge	TMM2A30702	Yoke Positioning (3 Used)
Q509, 15	2SD601A	2SD601ARTX	NTE2408	L319, 51	-	TLTABT101K	-				
# Q551	2SC5339	2SC5339LBMA1	-	L430	Ferrite Bead	EXCELSA39V	-				
	2SD2539	2SD2539LBMA1	NTE2353	L501	3.3µH	ELESN3R3KA	-				
Q603	2SD601	2SD601ARTX	NTE2408	L518	12µH	ELESN120IA	-				
Q801	2SC1685RS	2SC1685RSTA	NTE85	L541	Ferrite Bead	EXCELDJR35V	-				
Q802	2SC1384	2SC1384RS	NTE293	L542	Ferrite Bead	EXCELSA39V	-				
Q804	2SA1767Q	-	-	# L551	Horizontal Linearity	ELH5L7103	-				
Q1801, 02, 03	2SD601A	2SD601ARTX	NTE2408	L554, 55, 56	Ferrite Bead	EXCELSA24T	-				
Q1804, 05	2SB709A	2SB709ARTX	NTE2409	# L801	2µH	ELF20N020A	-				
Q2101	2SD601A	2SD601ARTX	NTE2408	# L803	Line Filter	ELF17N007A	-				
Q2302	2SB709A	2SB709ARTX	NTE2409	L804	Ferrite Bead	EXCELSA39V	-				
Q2303	2SD601A	2SD601ARTX	NTE2408	L1801	1.5µH	ELESN1R5KA	-				
Q2342	2SB709A	2SB709ARTX	NTE2409	L1803	2.2µH	ELESN2R2KA	-				
Q2343, 44	2SD601A	2SD601ARTX	NTE2408	L1804	15µH	ELESN150JA	-				
Q2409, 10	2SD601A	2SD601ARTX	NTE2408	L1806, 07	1µH	ELESN1R0KA	-				
Q4309	2SB709A	2SB709ARTX	NTE2409	L1808	Ferrite Bead	EXCELDJR25V	-				

PANASONIC

MODEL CT-27D32F (CHASSIS RP338)

For SAFETY use only equivalent replacement part.
% Use insulating hardware supplied with replacement.
(1) Used in models CT-27D12DF, CT-27D12DUF, CT-27D12SDF, CT-27D32F and CT-27D32UF.
(2) Used in models CT-2707DF and CT-2707DUF.
(3) Screen and focus controls are part of T551.
(4) Used in models CT-27D32F and CT-27D32UF.
(5) Used in models CT-2707DF, CT-2707DUF, CT-27D12DF, and CT-27D12DUF.
(6) Used in models CT-27D12DF, CT-27D12DUF, and CT-27D12SDF.
(7) Used in models CT-27D32F, CT-27D32UF, CT2707DF, and CT-2707DUF.