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 inner board wiring for pinched wires or wires contacting any high wattage resistors. Check that all control knobs, shields, covers, grounds, and mounting hardware have been replaced. Be sure to replace all insulators and restore proper lead dress.

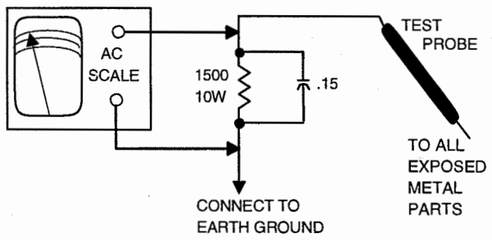
SAFETY CHECKS -- FIRE AND SHOCK HAZARD

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.



HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC and turn receiver on. Set all digital customer controls for normal operation. Momentarily short test point X to test point R. Receiver should lose raster and sound. If the receiver does not lose raster and sound, the shutdown circuit should be repaired. To resume normal operation, remove AC power and wait 30 seconds. After restoring AC power, the receiver should power-up automatically.

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

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Printed in the United States of America 5 4 3 2 1

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SET 3898

MODEL CF19G22 (CHASSIS TAC9700)

TOSHIBA

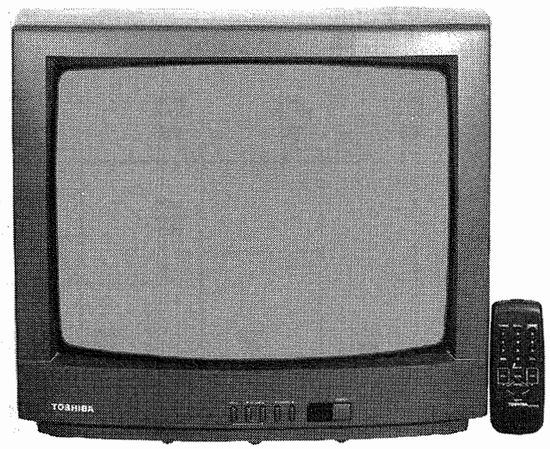
PHOTOFACT® Technical Service Data

INDEX

For Supplier Address,
See PHOTOFACT Annual Index

TOSHIBA

Model CF19G22 (Chassis TAC9700)



Complete coverage for servicing a television receiver...

- Schematics
- Parts list
- Component locations
- Troubleshooting guide

HOWARD W. SAMS & COMPANY

NOVEMBER 1997 SET 3898

3898

TROUBLESHOOTING

POWER SUPPLY

Check F801. If F801 is open, check D801 thru D804, C801, and C810. Check F802. If F802 is open, check Q801. Check F301. If F301 is open, check D301 and Q301. Check F470. If F470 is open, check T401, Q402, and T461. Apply 120VAC and check for 5.0V at cathode of D843. If 5.0V is missing, check T801, D840 thru D843, R841, and C840. If 5.0V is present, press the power button, and check for 153V at the cathode of D801. If 153V is missing, check SR81 and Q843. If the 153V is present at the cathode of D801, check for 134V at pin 4 of Q801. If 134V is missing, check Q801. If 134V is present, refer to the "Horizontal" section of this Troubleshooting guide.

HIGH VOLTAGE SHUTDOWN

NOTE: Care should be taken in defeating the high voltage shutdown circuit as this may cause excessive X-ray radiation and damage to the CRT, T461, and associated components. Monitor the high voltage and troubleshoot.

The high voltage from T461 is monitored and rectified by D471. Should the high voltage increase, Q471, Q472, Q817, Q818, and Q819 will activate, shutting down the set. To troubleshoot, attach a jumper from the emitter of Q472 to ground. If the set fails to return to normal operation, check the horizontal and power supply circuits. If the set returns to normal operation, check for 22.4V across C471. If 22.4V is present, check the high voltage shutdown circuit. If 22.4V is missing, check the horizontal and power supply circuits. Remove jumper.

HORIZONTAL

Determine if receiver is in shutdown, refer to "High Voltage Shutdown" section of this Troubleshooting guide. If set is not in shutdown, inject a horizontal signal at base of Q404. If horizontal deflection is now present, check Q402, T401, and pins 30 thru 34 of Q501. If horizontal deflection is missing, check Q404, D406, D302, D408, Q421, Q101, and T461. The high voltage rectifier is part of T461 and if defective will affect the performance of horizontal circuits. If the horizontal oscillator is off frequency, check pin 34 of Q501. Horizontal linearity or foldover problems may be caused by C440 and C442 being defective.

VERTICAL

Inject a vertical signal at pin 4 of Q301. If vertical deflection is now present, check pins 22, 23, 24, 25, and 29 of Q501. If vertical sweep is still missing, check Q301. Vertical linearity or foldover problems may be caused by vertical feedback and bias circuit, check C305, C306, C315, C301, and C308 for defects.

RASTER

Check the CRT and CRT voltages. Check Q971. If red is missing, check pin 19 of Q501 and Q901. If green is missing, check pin 20 of IC501 and Q902. If blue is missing, check pin 21 of Q501 and Q903. If raster has a keystone shape, check deflection yoke. If raster has height or width problems, refer to the "Vertical", "Horizontal", or "Power Supply" sections of this Troubleshooting guide.

VIDEO/CHROMA

Inject a video signal at pin 37 of Q501 and check for video on the CRT. If video is present, check H001. If video is missing on the CRT, check for proper waveforms at pins 19, 20, and 21 of Q501. If these waveforms are missing, check Q501. Check the 3.58MHz oscillator at pin 12 of Q501. If the color is inadequate or cannot be controlled, check pin 38 of Q501. If the brightness is inadequate or cannot be controlled, check pin 36 of Q501. If the proper waveforms are present at pins 19, 20, and 21 of Q501, refer to "Raster" section of this Troubleshooting guide.

AUDIO

Check for audio waveform at pin 2 of Q501. If the waveform is missing, check pin 10 of H001 and pins 2, 53, and 48 of Q501. If waveform is present at pin 2 of Q501, check Q610.

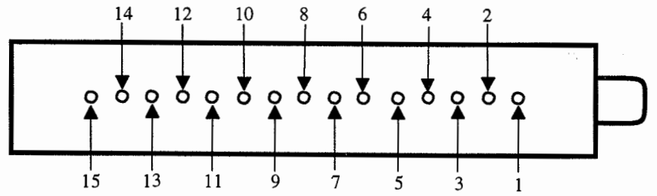
TUNER / IF MODULE INFORMATION

TUNER / IF MODULE VOLTAGE CHART

Pin	VHF Low Band	VHF High Band	UHF Band
1 (NC)	0V	0V	0V
2 (+32V)	32.6V	32.6V	32.6V
3 (SCL)	5.1V	5.1V	5.1V
4 (SDA)	5.2V	5.2V	5.2V
5 (NC)	0V	0V	0V
6 (ADS)	4.6V	4.6V	4.6V
7 (+5V)	5.0V	5.0V	5.0V
8 (RF AGC)	4.1V	4.4V	3.9V
9 (9V)	9.0V	9.0V	9.0V
10 (A OUT)	3.6V	3.5V	3.5V
11 (GND)	0V	0V	0V
12 (AFT)	3.7V	3.4V	3.2V
13 (NC)	0V	0V	0V
14 (GND)	0V	0V	0V
15 (V OUT)	4.4V	4.4V	4.4V

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

TUNER / IF MODULE TERMINAL GUIDE

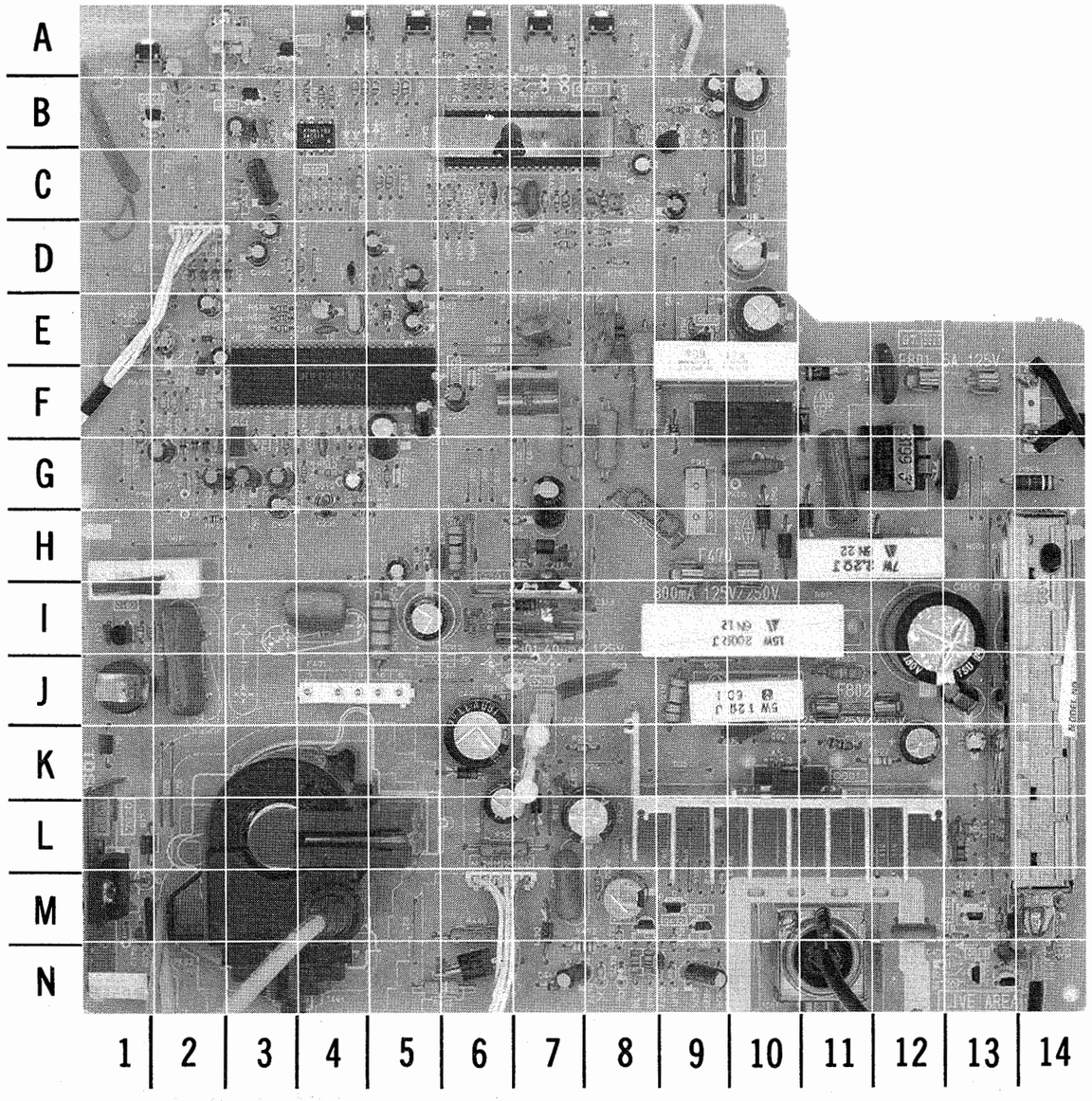


SCHEMATIC NOTES

#	For SAFETY use only equivalent replacement part, see parts list.
-x-	Circuitry not used in some versions.
---	Circuitry used in some versions.
⏚	Ground
⏚	Chassis ground
▽	Common tie point
△	Taken from common tie point
3	Schematic CIRCUITRACE ® Voltage source tie point.
A	Cabling: Heavy lines reduce use of multiple lines.

Waveforms and voltages are taken from ground, unless noted otherwise.
Waveforms taken with triggered scope and colorbar signal. Waveform voltage is peak to peak. Timebase is per division. Waveforms shown at 10 divisions.
Supply voltages maintained as seen at input.
Voltages measured with digital meter and a 1000µV RF signal, with colorbar pattern, applied to antenna terminal.
Controls adjusted for normal operation.
Capacitors are 50 volts or less, 5% or greater unless noted.
Electrolytic capacitors are 50 volts or less, 20% or greater unless noted.
Resistors are 1/2W or less, 5% or greater unless noted.
Value in ( ) used in some versions.
Measurements with switching as shown, unless noted.
Rated voltage shown on zener diodes.

MAIN BOARD



A HOWARD W. SAMS GRIDTRACE™ PHOTO

MAIN BOARD, GRIDTRACE LOCATION GUIDE

C101	M-14	CA38	D-8	P802	F-14	R430	M-8	RA74	B-4
C102	J-13	CA42	C-8	P910	G-9	R431	M-9	RA75	B-4
C103	N-14	CA43	B-8	Q101	M-13	R432	M-9	RB03	A-3
C113	K-13	CA68	B-3	Q301	I-7	R448	M-6	RB09	B-2
C201	F-6	CA69	B-3	Q402	I-1	R472	N-8	RB26	C-4
C202	D-5	CB01	A-2	Q404	M-1	R475	N-8	RB27	N-9
C205	G-3	CB20	N-9	Q421	F-7	R476	M-8	RB28	N-5
C207	G-3	CR01	C-3	Q471	M-8	R477	N-8	RB30	B-3
C208	G-2	CR02	D-3	Q472	M-9	R478	N-8	RB33	B-9
C209	G-2	CR03	D-3	Q501	F-4	R481	N-9	RB43	B-5
C210	E-4	CS02	3-5	Q610	C-10	R482	N-8	RB44	B-5
C211	E-4	CS03	E-5	Q801	K-10	R495	G-8	RB45	B-2
C230	F-5	CS11	F-5	Q817	N-13	R496	H-9	RR90	D-5
C231	F-5	CT63	C-8	Q818	M-13	R503	E-5	RR91	D-6
C232	G-4	CV06	G-3	Q819	N-13	R504	D-5	RR92	D-6
C233	G-4	D102	M-13	Q843	E-9	R506	E-3	RR93	D-6
C235	H-4	D201	D-3	QA01	B-7	R507	E-3	RT61	D-8
C301	E-2	D204	G-2	QA02	B-4	R508	E-3	RT63	C-7
C302	E-2	D205	G-2	QB03	A-3	R513	G-4	RV01	H-2
C305	H-5	D210	G-2	QB21	M-9	R514	G-4	SA01	A-4
C306	I-5	D301	I-7	QB30	B-3	R602	E-8	SA02	A-5
C307	H-6	D302	L-7	QB33	B-9	R603	B-9	SA03	A-6
C308	G-7	D406	K-6	QB40	B-2	R604	C-9	SA04	A-7
C309	H-7	D408	N-6	R	N-8	R605	C-10	SA05	A-8
C310	L-8	D410	E-2	R101	J-9	R802	K-12	SA07	A-1
C311	H-7	D441	N-7	R103	L-13	R803	J-11	SR81	F-10
C313	I-8	D471	M-7	R199	M-1	R804	G-14	T401	J-1
C314	I-6	D472	N-9	R201	C-3	R806	K-11	T461	L-3
C315	E-2	D501	D-2	R208	G-2	R808	G-10	T801	G-12
C317	K-7	D502	D-2	R218	J-6	R810	H-11	X	N-8
C403	G-2	D503	D-2	R227	K-7	R811	I-10	X101	M-12
C404	E-1	D801	H-10	R230	G-2	R812	J-10	X401	G-3
C417	I-1	D802	H-12	R233	G-3	R816	N-13	X501	E-4
C421	E-8	D803	H-11	R235	G-3	R818	M-13	XA01	C-7
C422	E-7	D804	H-10	R236	E-2	R819	M-13		
C431	E-2	D840	F-11	R237	E-2	R841	E-9		
C440	J-2	D841	F-11	R238	G-4	R845	F-8		
C442	I-4	D842	D-9	R239	G-4	R847	E-9		
C445	M-7	D843	C-9	R241	G-4	R848	E-9		
C446	L-6	D845	F-9	R242	G-4	R897	F-12		
C448	K-6	DB03	A-3	R245	G-4	R899	G-13		
C449	M-8	DB30	B-8	R246	G-5	RA03	B-4		
C463	M-1	F301	I-7	R247	H-4	RA07	A-8		
C471	N-7	F470	H-9	R301	G-7	RA14	B-6		
C474	N-9	F801	F-13	R303	D-4	RA16	B-6		
C504	D-4	F802	J-11	R304	H-7	RA17	B-6		
C510	D-5	G060	B-4	R305	H-6	RA18	B-6		
C514	D-5	G101	N-14	R306	H-4	RA22	C-5		
C607	D-10	G102	L-13	R307	H-5	RA23	C-6		
C609	B-9	G204	E-5	R313	H-5	RA24	C-6		
C610	B-9	G411	K-1	R317	D-3	RA25	C-6		
C611	C-9	H001	J-14	R327	L-6	RA26	C-5		
C613	B-10	KB01	A-3	R336	I-5	RA27	C-5		
C614	B-9	L101	L-13	R337	F-2	RA33	B-8		
C801	G-11	L203A	G-4	R338	F-2	RA35	B-5		
C807	K-12	L203B	G-4	R401	G-3	RA36	C-7		
C808	K-10	L301	H-7	R402	F-1	RA37	C-7		
C810	I-12	L410	L-1	R403	F-2	RA38	C-8		
C819	N-13	LA01	C-8	R405	N-6	RA61	B-5		
C840	E-10	LB01	C-7	R406	F-2	RA62	B-5		
C843	C-9	M601	A-9	R407	F-2	RA67	D-7		
CA28	C-6	M602	A-9	R410	I-1	RA68	D-7		
CA29	C-6	M901	M-6	R411	I-1	RA70	A-4		
CA33	D-7	M902	M-2	R412	M-1	RA71	A-7		
CA36	C-7	P001	N-11	R414	F-7	RA72	A-6		
CA37	D-8	P401	J-4	R416	H-1	RA73	A-6		

MISCELLANEOUS ADJUSTMENTS

SUB BRIGHTNESS (BRTC)

Tune in a picture. Set contrast to minimum. Enter the service mode. Select item BRTC, adjust reference value until vertical retrace line just disappears. Adjust contrast for normal picture. Perform Height (HIT) adjustment.

HORIZONTAL POSITION (HPOS) & VERTICAL POSITION (VPOS)

Enter the service mode. Press the TV/video button on remote until a crossbar pattern is displayed. Select item HPOS or VPOS and adjust reference value for the horizontal and vertical position alternately until the pattern is centered on the screen. Check the position of the picture with off-air signal.

HEIGHT (HIT)

Enter the service mode. Press the TV/video button on remote until a crosshatch pattern is displayed. Select item HIT and adjust reference value for slight underscan. Advance the data value by 8 steps and check the vertical position of the picture.

WHITE BALANCE (RCUT, GCUT, BCUT, GDRV, BDRV)

Turn receiver on. Allow a 10 to 30 minute warm up time. Adjust contrast to center and brightness to maximum. Enter the service mode. Press the TV/video button on remote until the white screen pattern is displayed. Select items RCUT, GCUT, and BCUT, set the reference value for each at 40H. Select items GDRV and BDRV, set the reference value for each at 80H. Press the 100 button on the receiver to obtain a single horizontal line. Advance the screen control until a faint line of one predominant color appears on the screen. Adjust the other two cutoff items to obtain a dim white line. Press the 100 button on the receiver to get full deflection. Select items GDRV and BDRV and adjust reference value of each for the best black and white picture on screen.

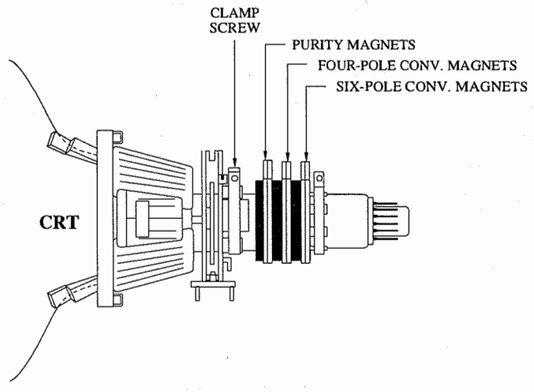
COLOR PURITY

Operate the receiver for 15 minutes. Use a degaussing coil to demagnetize the CRT and mounting hardware. Position the convergence/purity assembly with the purity pole rings over the gun element gap nearest the CRT bell gap (between G2 and G3). See test signal selection and select a green raster. Loosen the clamp screw and remove the yoke wedges. Slide the yoke backward to achieve a vertical green band. Adjust the purity magnets to center the green band. Slide the yoke forward to achieve a full green raster with best purity. Tighten the clamp screw and check red and blue purity. Perform convergence adjustment.

CONVERGENCE

Operate the receiver for fifteen minutes. Enter service mode. See test signal selection and select white crossdot. Adjust the 4 pole magnet tabs to converge the red and blue dots at the center of the screen. Adjust the 6 pole magnet tabs to converge the red/blue dots with the green dots at the center of the screen. Spread the two tabs of each set of magnets equally and opposite to converge vertically, and rotate both tabs in the same direction to converge horizontally. Since the 4 and 6 pole magnets interact, repeat adjustment until center convergence is correct. See test signal selection and select white crosshatch. Tilt the deflection yoke up or down to converge the vertical lines at the top and bottom of the screen, and the horizontal lines at the right and left sides of the screen. Tilt the deflection yoke right or left to converge the horizontal lines at the top and bottom of the screen, and vertical lines at the right and left sides of the screen. Repeat convergence procedure as necessary to obtain best overall convergence. Replace rubber wedges.

CRT NECK ASSEMBLY



HIGH VOLTAGE CHECK

Tune in a picture. Set brightness, contrast, and color to minimum. Connect a high voltage probe to the CRT anode. High voltage should read 22kV to 24kV.

ENTERING THE SERVICE AND DESIGN MODES

To enter the service mode, press the mute button on the remote. Press the mute button again and keep pressing while simultaneously pressing the menu button on the receiver. The letter S will appear on the screen indicating that the receiver is in the service mode.

To enter the design mode, enter the service mode and press the recall button on the remote and keep pressing while simultaneously pressing the menu button on the receiver. The letter D will appear on the screen indicating that the receiver is in the design mode.

When in the service mode or design mode, press the menu button on the receiver to display the adjustment menu. To select the item to be adjusted, press the channel up or down button. To adjust the reference value, press the volume up or down button. To exit from the service mode or the design mode, press the power button to turn off the receiver.

TEST SIGNAL SELECTION

Enter the service mode. Press the TV/video button on the remote to display the built-in test patterns in the following order:

Normal picture, red raster, green raster, blue raster, black screen, white screen, black screen with white window, black crossbar, white crossbar, black crosshatch, white crosshatch, black crossdot, white crossdot, and back to normal picture.

NOTE: If a video cable is connected to the video input jack, the built-in test patterns will not be displayed on the screen.

SELF DIAGNOSTIC FUNCTION

Enter the service mode. Press the 9 button on the remote to check for proper execution of IC interfacing. The following is an explanation of what is displayed on screen:

Display	Explanation
No. 23905859	Part number of QA01.
SELF CHECK	Self check function.
POWER : 000	Operation number of protecting circuit. 000 display is normal.
BUS : OK	BUS check. OK is normal. NG indicates a short to ground of the SCL or SDA signal or a short between SCL and SDA.
BUS : OK	Bus acknowledge check. OK is normal. A location number is NG. NG QA02 indicates QA02 is bad.
NO ACK	Blank is normal.

SERVICE AND DESIGN MODE ADJUSTMENT CHART

Item	Adjustment Name	Direct Button	Reference Value	On-set Value
RCUT (1)	Red Cutoff	1	30H	5CH
GCUT (1)	Green Cutoff	2	30H	51H
BCUT (1)	Blue Cutoff	3	30H	4DH
GDRV (1)	Green Drive	-	80H	61H
BDRV (1)	Blue Drive	-	80H	90H
CNTX	Sub Contrast	4	50H	50H
BRTC (1)	Sub Brightness	5	38H	40H
COLC (1)	Sub Color	6	2CH	30H
TNTC (1)	Sub Tint	-	42H	3BH
CNTC (2)	Contrast Center	-	-	2AH
CNTN (2)	Contrast Minimum	-	-	05H
BRTX (2)	Brightness Maximum	-	-	20H
BRTN (2)	Brightness Minimum	-	-	1BH
COLX (2)	Color Maximum	-	-	47H
COLN (2)	Color Minimum	-	-	05H
TNTZ (2)	Tint Maximum	-	-	15H
TNTN (2)	Tint Minimum	-	-	15H
SHPT (2)	RF Sharpness Center	-	-	2BH
VMO (2)	VCD Bit Data	-	-	61H
HPOS (1)	Horizontal Position	-	19H	1AH
VPOS (1)	Vertical Position	-	02H	01H
HIT (1)	Height	-	20H	17H
PWR (2)	-	-	-	00H
BUS (2)	-	-	-	00H
MEM (2)	-	-	-	00H
SYNN (2)	-	-	-	1CH
SYNX (2)	-	-	-	26H
SYCH (2)	-	-	-	18H
SYCX (2)	-	-	-	29H
CHAT (2)	-	-	-	0FH
OPT0 (2)	-	-	-	00H
MFT (2)	-	-	-	FFH
OSD (2)	OSD Horizontal Position	-	-	2DH

(1) May need adjustment when replacing QA02 or Q501.
(2) Only available in design mode.

INITIALIZATION OF QA02

NOTE: QA02 must be initialized after replacement.

Enter the service mode. Press the recall button on the remote and keep pressing while simultaneously pressing the channel up button on the receiver. The initialization of QA02 is complete. Program channels into memory.

SUB COLOR (COLC) & SUB TINT (TNTC)

Tune in a color bar pattern. Set contrast to maximum and brightness to midrange. Connect an oscilloscope to the red cathode. Enter the service mode. Select item COLC and adjust reference value to obtain 150Vp-p. Tune in an active channel. Select item TNTC and adjust reference value for proper flesh tones.

TELEVISION SCHEMATIC

TUNER/IF MODULE NOT INCLUDED IN THIS COVERAGE

P001 ANT IN

R198 3.3M

Z001 270pF 3.2M–5.2M

EL926L2 H001 TUNER/IF MODULE

SEE QA01 PIN 38 PAGE 2G — SDA 5.2V

SEE QA01 PIN 37 PAGE 2G — SCL 5.1V

+5V 5.0V

RF AGC 4.1V

ADS 4.6V

RF AGC RANGE 3.8V TO 6.8V

A OUT 3.6V — CS11 .47µF — TV A. IN 3.1V

PART OF TA1223AN Q501 VIDEO/AUDIO

AUDIO VCC 48 — 10A 9.0V

A. IN EXT 3.1V 55 NC

AUDIO OUT 3.0V — R604 1800 (1000) — C614 .47µF

R603 390 — C609 .01

9V 9.0V — L101 — C102 220µF — 10A 9.0V

AFT 3.7V — SEE QA01 PIN 14 PAGE 2G

SEE QB40 EMITTER PAGE 2H — RV01 75 — RV03 39 — CV06 .47µF

TAKEN WITH BAR SWEEP GENERATOR 1.2V 10µs

C201 .47µF

V OUT 4.4V — V–TV 3.2V

1.6V V–EXT

1.0V 10µs

GND GND NC NC +32V — 32.6V

PART OF TA1223AN Q501 VIDEO/AUDIO

SCL 5.1V — SEE QA01 PIN 37 PAGE 2G — R236 100

SDA 5.2V — SEE QA01 PIN 38 PAGE 2G — R237 100

AUDIO GND — NC 4.2V — NC .1V — NC NC

INTERNAL SYNC

SEE QA01 PIN 36 PAGE 2G — R406 33K — R407 22K — 10A 9.0V

.8V SYNC OUT

R337 22K — R338 22K — 10A 9.0V — SEE QA01 PIN 27 PAGE 2G

4.3V VP OUT

PART OF TA1223AN Q501 VIDEO/AUDIO

AFC FIL 7.8V — C403 .02 — R403 3300 — C404 2.2µF — 4 9.2V

H VCC — 4 9.2V

FBP 1.5V — 9.6V 10µs

DGND

32fH 6.1V — R401 390 — X401 503kHz

HORIZ OUT 1.3V — R411 560 — R410 390 — 3.8V 10µs

VERT SEP 6.3V — C315 2.2µF — 4 9.2V

VERT RAMP 5.4V

NFB 5.3V — R303 1000 — C302 .0015 500V

V OUT .9V — R301 1000 — C314 .056

1.5V 5ms — 33V 5ms — 30V 5ms — 55V 5ms

C311 220pF 500V

TA8403K Q301 VERT OUTPUT

.96V — VCC 25.9V — 13.1V

8 26.0V — D301 TVR–1B — 8 26.0V

C308 100µF — C309 .001

L301 — C313 .0047 100V

R307 910K — R304 68K — R313 180K — C305 2.2µF — C306 1000µF

R336 270 2W — R306 75K

C307 .033 100V

R305 1W

P/J401 10 — P/J401 7 — P/J401 9 — P/J401 8

#L452 YOKE — 2.5

#C442 .33 250V

R317 33K — C301 2.2µF — 1.5V 5ms

R402 10K — D441 UZ9.1BSB 9.1V — R405 3900 1W — RB28 100K — CB20 100pF — QB21 2SC1740 HORIZ SYNC 4.0V — SEE QA01 PIN 26 PAGE 2G — RB27 10K

Q402 2SC2482 HORIZ DRIVER 92.0V — .35V

T401 — 237V 10µs — 23V 10µs

C417 390pF 500V — R416 1800 5W — 1 134V

R412 56 — C463 .0015

Q404 2SD1554 HORIZ OUTPUT 133V — –.2V — 0V — G411

L410 — #C440 .0068 1.5kV

R247 560

IN 1.3V — Q610 TDA2611A AUDIO OUTPUT — OUT 5.7V

GND GND — VCC 11.8V — NC 0V — BST. IN 1.2V — R. FLT 5.9V — F. BACK .1V

C607 1000µF — R602 10 1W — 9 12.0V

C610 22µF

C611 .1 — R605 3.3

C613 470µF — M601 — W661 8Z — M602

NC — 0V O PORT — NC — 4.8V VM OUT — NC — 5.9Yr

1.8V 10µs — .8V 10µs

B. FIL 5.9V — CS02 2.2µF — VCC — 10A 9.0V

V. FIL 1.2V — CS03 .47µF

WPL 5.9V — R246 2.2M

C IN 1.3V — VIDEO OUT 2.7V — Y IN 4.5V

R513 3300 — R233 1500 — C232 .1 — R239 1500

L203A — L203B — C235 18pF (39pF) NPO

R514 3300 — RT61 3300 — SEE QA01 PIN 41 PAGE 2G

1.0V 10µs — .9V 10µs — TAKEN WITH CHROMA BAR SWEEP GENERATOR

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

A PHOTOFACT STANDARD NOTATION SCHEMATIC WITH CIRCUITRACE®

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X — R — A1 — A2 — A

R477 22K — R472 27 — D471 TVR–1B — R478 13K 1% — #R475 220 2% — #R482 5100 1% — R476 82K — C471 4.7µF — #D472 RD6.2E 6.2V

Q471 2SA933 SWITCH — 6.7V — .1V — 6.2V

Q472 2SC1740 SWITCH — R431 10K — R432 2200 — .1V — 9 12.0V — SEE Q818 COLLECTOR PAGE 2H

R481 33K — C474 10µF

TELEVISION SCHEMATIC continued

SEE QA01 PIN 22 PAGE 2G
SEE QA01 PIN 24 PAGE 2G
SEE QA01 PIN 23 PAGE 2G
SEE QA01 PIN 25 PAGE 2G
CR01 .47µF
CR03 .47µF
CR02 .47µF
15 4.9V R IN
17 4.9V B IN
16 4.9V G IN
14 0V YS IN
PART OF TA1223AN Q501 VIDEO/AUDIO
XTAL 4.5V 12
APC FLT 6.0V 11
GND 13
ILL VCC 3.3V 18
BLACK DET 5.2V 40
R-Y LMT 7.4V 10
RGB VCC 8.9V 9
DC ADJ 4.6V 42
B. SP 4.6V 44
ABL 3.0V 36
ACL 2.9V 38
G OUT 2.2V 20
B OUT 2.4V 21
19 2.2V R OUT
X501 3.58MHz
C504 9pF NPO
C514 .022
C510 2.2µF
R504 3300
C211 .01
C210 47µF
D201 UZ3.3BSA 3.3V
R201 390
C207 10µF
R235 150K
R503 330K
G204
C202 22µF
R245 180K
R238 3300
C233 10µF
R241 43K
R242 47K
C208 1µF
R208 120K
C205 22µF
R230 22K
D210 1SS131
D204 1SS131
C209 2.2µF
D205 1SS131
R227 62K
R218 100K
R430 1000
10A 9.0V
11 5.0V
1 134V
C445 .022 200V
T461 BOTTOM VIEW
HV RANGE 22kV TO 24kV
CRT ANODE
SEE POWER SUPPLY PAGE 2E
FOCUS
SCREEN
SEE POWER SUPPLY PAGE 2E
X SEE CRT FILAMENT PAGE 2D
A2 A1 A3 A4
R506 100
D503 UZ9.1BSA 9.1V
R508 100
D501 UZ9.1BSA 9.1V
R507 100
D502 UZ9.1BSA 9.1V
M902 15 15
M902 17 17
M902 19 19
M902 16 16
M901 26 26
R911 100
R913 100
R912 100
5.2V 10µs
6.2V 10µs
4.4V 10µs
Q901 2SC2482 RED OUTPUT
Q903 2SC2482 BLUE OUTPUT
Q902 2SC2482 GREEN OUTPUT
2.2V 143V 2.0V
2.4V 132V 2.3V
2.2V 146V 2.1V
C921 680pF
C923 680pF
C922 680pF
R931 1000 (1200)
R933 1000 (1200)
R932 1000 (1200)
R921 330
R923 330
R922 330
R901 4700
R903 4700
R902 4700
R961 18K 2W
R963 18K 2W
R962 18K 2W
7 190V
150V 10µs
170V 10µs
114V 10µs
Q971 2SA1015Y BIAS
1.9V 1.2V
D903 1SS131
D902 1SS131
R971 820
R974 330
C971 .01
R972 1000
R973 390
10B 9.0V
C902 .001 2kV
D445 BYD33J
SEE T461 PIN 9 PAGE 2C
X
M901 24
M901 24
R920 5.1 1W FUSIBLE
23V 10µs
PART OF V901A CRT SOCKET
4 5
143V 7
35V 3
145V 9
6
26.6V 8
7.5kV 1
GRN BLUE RED
A48KZL70X V901 CRT
FOCUS RANGE 4kV TO 8kV
TO CRT SHIELD
GZ
A3 A4
A
ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1
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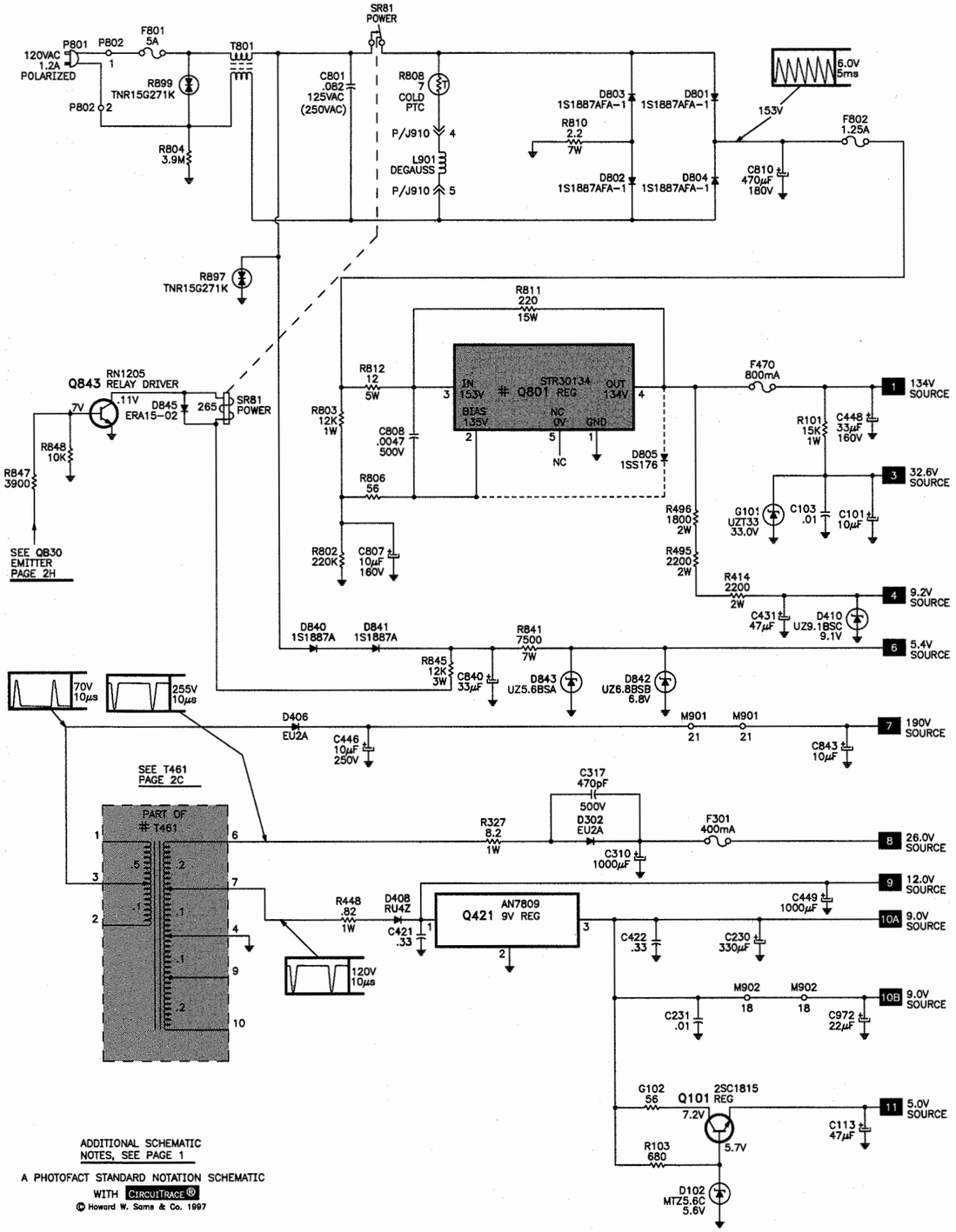
POWER SUPPLY SCHEMATIC



ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

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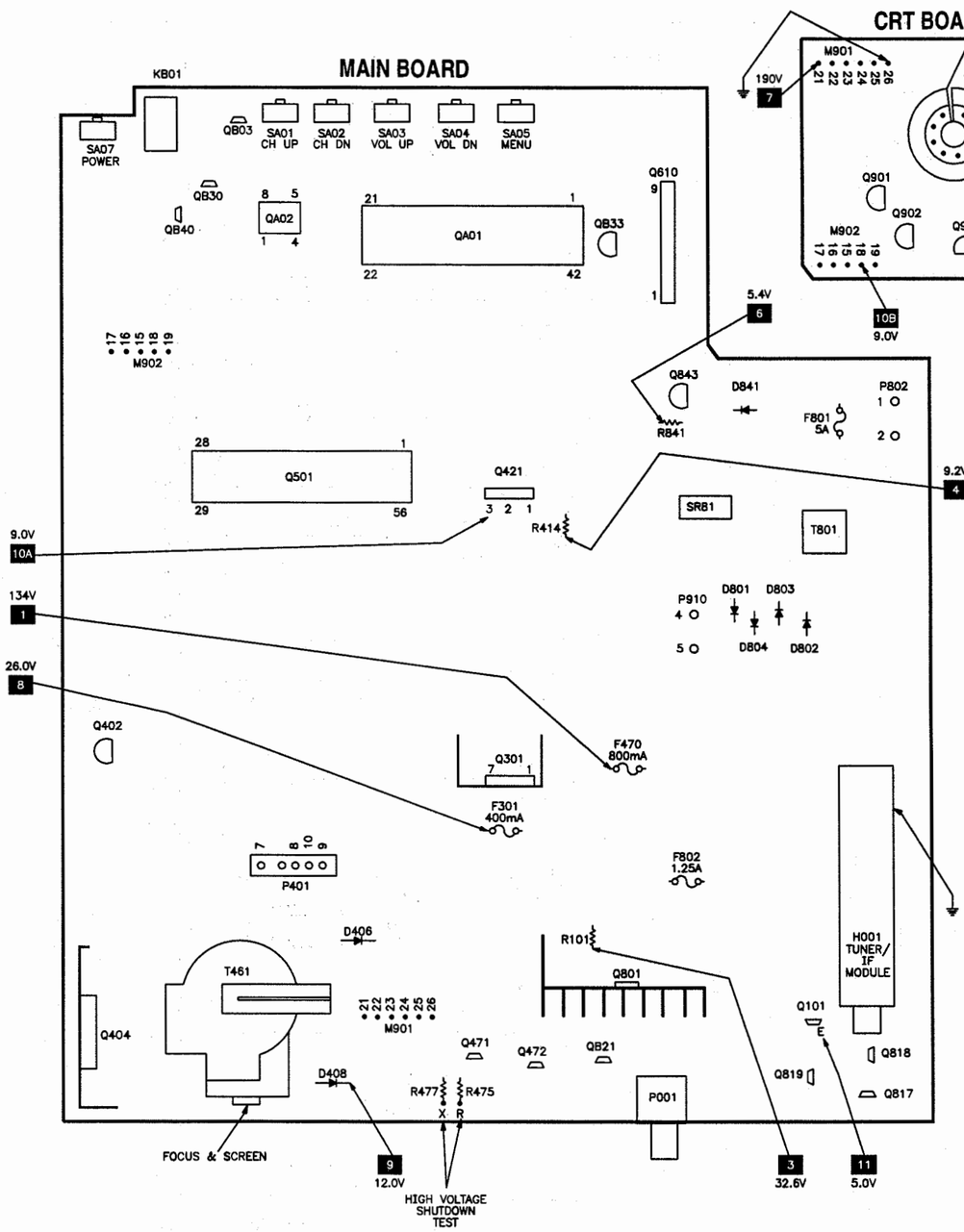
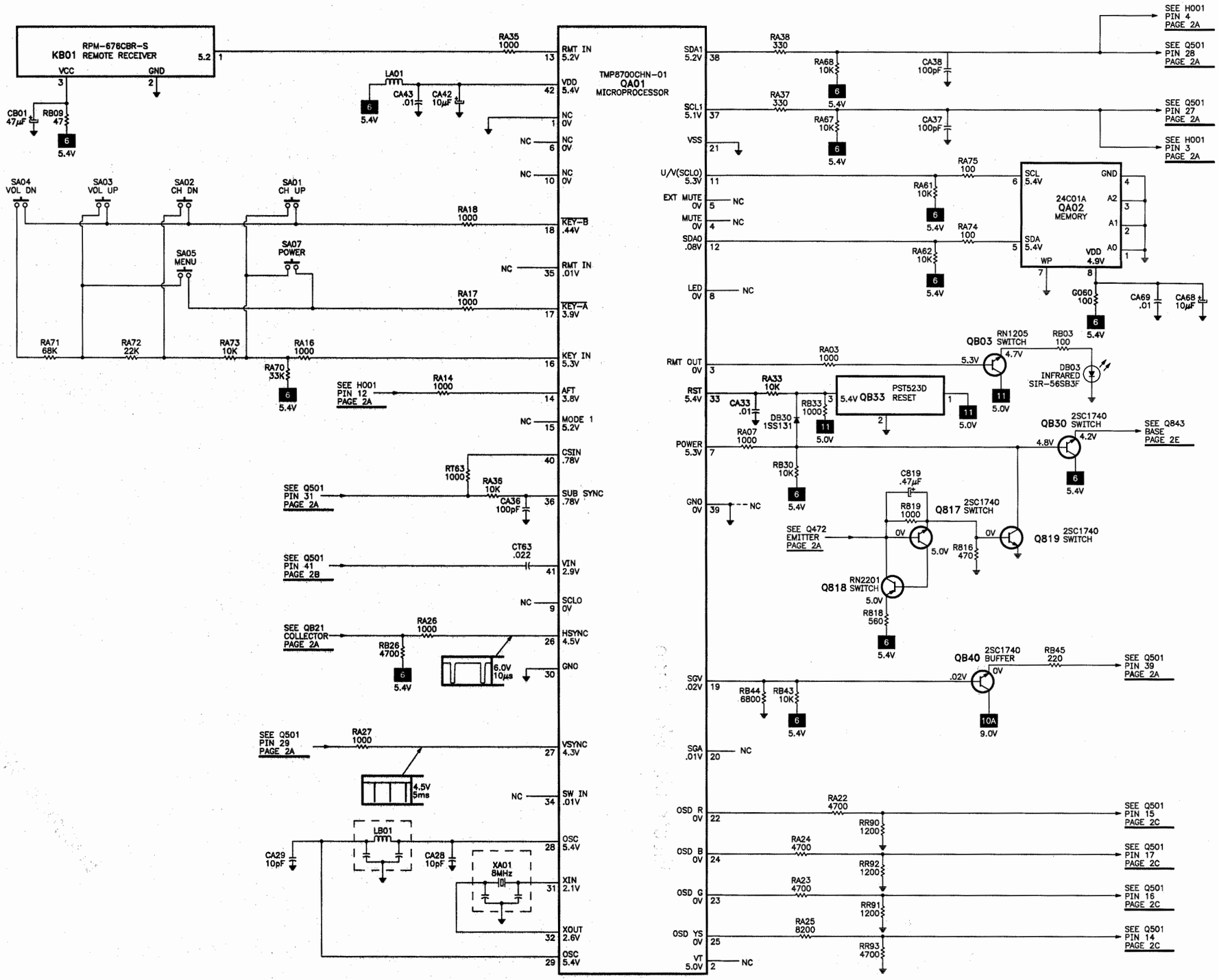
PLACEMENT CHART



E

SYSTEM CONTROL SCHEMATIC



G H

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

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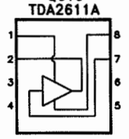
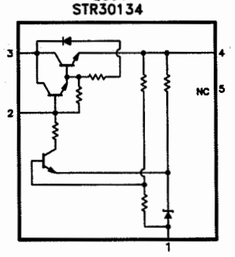
IC FUNCTIONS

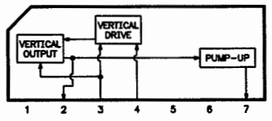
Q610
TDA2611A



Q801
STR30134



Q301
TA8403K



Important Parts Information

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

Obtaining Parts

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

800-428-7267

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

Participating Vendors

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

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

TEST EQUIPMENT

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

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

PARTS LIST

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D102	MTZ5.6C	23316673	-	-	-
	UZ5.6BSC	-	-	-	-
	RD5.6ESAB3	-	-	-	-
D201	UZ3.3BSA	23316292	-	-	-
D204, 05, 10	1SS131	23115537	NTE519	ECG519	SK3100
D301	TVR-1B	A7568460	NTE552	ECG552	SK9000
D302	EU2A	23118094	NTE552	ECG552	SK9000
	ERB44-06	-	NTE552	ECG552	SK9000
D406	EU2A	23118094	NTE552	ECG552	SK9000
	ERB44-06	-	NTE552	ECG552	SK9000
D408	RU4Z	23118052	NTE580	ECG580	SK5036
D410	UZ9.1BSC	23316325	NTE5018A	ECG5018A	SK9A1
D441	UZ9.1BSB	23316324	-	-	-
	RD9.1ESAB2	-	-	-	-
D445	BYD33J	23118479	NTE580	ECG580	SK5036
D471	TVR-1B	A7568460	NTE552	ECG552	SK9000
# **D472**	RD6.2E	23115774	NTE5013A	ECG5013A	SK6A2
D501	UZ9.1BSA	23316323	-	-	-
D502	UZ9.1BSA	23316323	-	-	-
D503	UZ9.1BSA	23316323	-	-	-
D801	1S1887AFA-1	A7568754	NTE116	ECG116	SK3312
D802	1S1887AFA-1	A7568754	NTE116	ECG116	SK3312
D803	1S1887AFA-1	A7568754	NTE116	ECG116	SK3312
D804	1S1887AFA-1	A7568754	NTE116	ECG116	SK3312
D840, 41	1S1887A	A7568752	NTE552	ECG552	SK9000
D842	UZ6.8BSB	23316315	NTE5014A	ECG5014A	SK6A8
D843	UZ5.6BSA	23316308	-	-	-
D845	ERA15-02	23118486	NTE552	ECG552	SK9000
D902	1SS131	23115537	NTE519	ECG519	SK3100
D903	1SS131	23115537	NTE519	ECG519	SK3100
DB03	SIR-56SB3F	23358522	-	-	-
DB30	1SS131	23115537	NTE519	ECG519	SK3100
G101	UZT33	23316694	-	-	-
	HTZ33-12	-	-	-	-
Q101	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
Q301	TA8403K	B0377890	-	-	-
Q402	2SC2482	-	NTE399	ECG399	SK9352
	2SC2482FA-1	A6330069	NTE399	ECG399	SK9352
Q404	2SD1554FA,E	A6871242	-	-	-
Q421	MCT7809BT	23904844	-	-	-
	AN7809	-	NTE1910	ECG1910	-
Q471	2SA933S-Q	23114530	NTE290A	ECG290A	SK9132
	2SA1015Y	-	NTE290A	ECG290A	SK9132
Q472	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
Q501	TA1223AN	B0385424	-	-	-
Q610	TDA2611A	23119668	NTE1566	ECG1566	SK7726
# **Q801**	STR30134	23114420	NTE1778	ECG1778	SK9744
Q817	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
Q818	RN2201	A6012010	-	-	-
Q819	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A

 # For SAFETY use only equivalent replacement part.

SEMICONDUCTORS continued

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
Q843	RN1205	A6002050	-	-	-
Q901	2SC2482(C)	A6330059	NTE399	ECG399	SK9352
Q902	2SC2482(C)	A6330059	NTE399	ECG399	SK9352
Q903	2SC2482(C)	A6330059	NTE399	ECG399	SK9352
Q971	2SA1015Y	-	NTE290A	ECG290A	SK9132
	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
QA01	TMP8700CHN-01	23905859	-	-	-
QA02	24C01A	-	-	-	-
	AT24C01A-10PC	-	-	-	-
QB03	RN1205	A6002050	-	-	-
QB21	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
QB30	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
QB33	PST523D	70119743	-	-	-
QB40	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A

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PARTS LIST continued

CONTROLS & RESISTORS

	Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
	R416	1800 5% 5W Wirewound	24510182	5W218
#	**R475**	220 2% 1/6W	24367221	-
#	**R478**	13K 1% 1/4W	24327133	-
#	**R482**	5100 1% 1/4W	24327512	-
	R808	7 PTC Cold	24000269	-
	R810	2.2 5% 7W Wirewound	24568229	-
	R811	220 5% 15W Wirewound	24007851	-
	R812	12 5W Wirewound	24510120	-
	R841	7500 5% 7W Wirewound	24568752	-
	R845	12K 5% 3W	24384123	3W312
	R897	Varistor, TNR15G271K	24000902	-
	R899	Varistor, TNR15G271K	24000902	-
#	**R920**	5.1 5% 1W Fusible	24000880	-

 # For SAFETY use only equivalent replacement part.

CAPACITORS & ELECTROLYTICS

	Item No.	Rating	Mfr. Part No.
	C235	18pF NPO	-
		39pF 5% 50V	24353390
#	**C440**	.0068 20% 1.5kV	24082580
#	**C442**	.33 5% 250V	24082694
	C504	9pF ±.25pF NPO	24353090
	C801	.082 20% 250VAC	24082296
		.082 125VAC	-
	C902	.001 10% 2kV	24211102

 # For SAFETY use only equivalent replacement part.

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J. Barker, N. Beck, A. Bonner,
B. Buchanan, T. Clensy,
G. Farrell, B. Fink, M. Herkless,
J. Kocha, F. Malek, B. Medaris,
R. Raus, B. Skinner

CABINET PARTS

Item	Mfr. Part No.
Back Cover	23427104
Front Cover	23510119
Power Button	23443924

COILS & TRANSFORMERS

	Item No.	Function/Rating	Mfr. Part No.
	G204	-	23238714
	G411	Ferrite Bead	23103880
	L101	-	23289220
	L203A	-	-
	L203B	-	-
	L301	Ferrite Bead	23103880
	L410	Ferrite Bead	23103880
#	**L462**	Yoke Horiz 3.0mH Vert 18.7mH	23231180
	L901	Degaussing	23200919
	LA01	-	23289100
	LB01	-	23289560
	T401	Horizontal Drive	23224983
#	**T461** (1)	Horizontal Output	23236533
	T801	Line Filter	23211668

 # For SAFETY use only equivalent replacement part.
(1) Focus and screen controls are part of T461.

MISCELLANEOUS

	Item No.	Description	Mfr. Part No.	Notes
	F301	Fuse	23144727	400mA, 125V, Fast Acting
	F470	Fuse	23144495	800mA, 125V, Fast Acting
	F801	Fuse	23144888	5A, 125V, Slow Blow
	F802	Fuse	23144785	1.25A, 125V, Fast Acting
	H001 (1)(2)	Module	23321265	Tuner/IF, UHF/VHF, EL926L2
	KB01	Receiver	23905177	Remote, RPM-676CBR-S
	P801	Line Cord	23176004	AC, Polarized
	SA01	Switch	23145227	Channel Up
	SA02	Switch	23145227	Channel Down
	SA03	Switch	23145227	Volume Up
	SA04	Switch	23145227	Volume Down
	SA05	Switch	23145227	Menu
	SA07	Switch	23145227	Power
	SR81	Relay	23146566	Power
#	**V901**	CRT	23312676	A48KZL70X
#	**V901A**	Socket	23902021	CRT
	V901M	Magnet	23102399	Purity/Convergence
	W661	Speaker	23351112	3" Round, 8 Ohms
	X401	Resonator	23153721	503kHz
	X501	Crystal	23153961	3.58MHz
	XA01	Resonator	23153325	8MHz
	Z001	CR-GAP	23134187	3.2M-5.2M, 270pF
		Fuse Holder	23165433	-
		PC Board (1)	-	CRT, PB6849-2
		PC Board (1)	-	Main, PB6849-1
		Transmitter	2306185	Remote
		Wedges	23848729	Yoke Positioning (3 Used)

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

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