

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.

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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Indianapolis, IN 46214-2012

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

SAFETY CHECKS -- FIRE AND SHOCK HAZARD

Cold Leakage Checks for Receivers with Isolated Ground

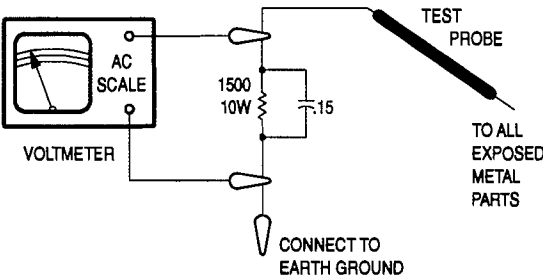
Unplug the AC cord, connect a jumper across the plug prongs, and turn the power switch on (if applicable). Use an ohmmeter to measure the resistance between the jumped AC plug and any exposed metal cabinet parts such as antenna screw heads, control shafts, or handle brackets. Exposed metal parts with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

Hot Leakage Current Check

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

GENERAL GUIDELINES

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



94PF02648



PHOTOFACT® Technical Service Data

SET 3335

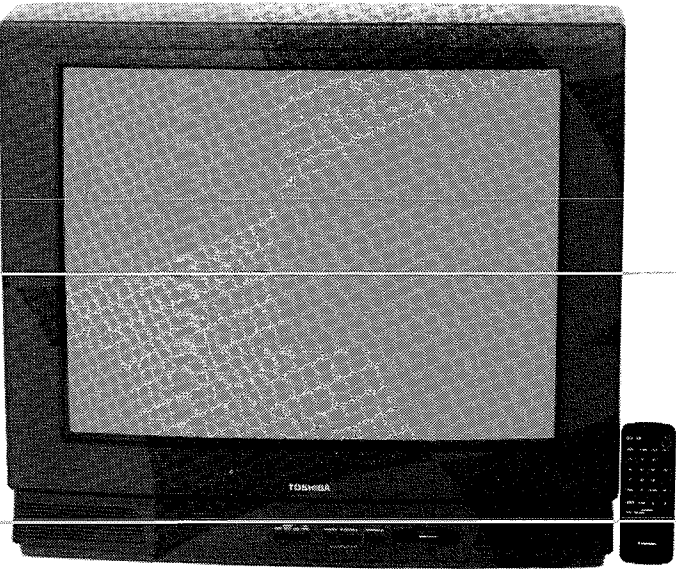
MODEL CF27C30 (CHASSIS TAC9350)

TOSHIBA

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TOSHIBA
Model CF27C30 (Chassis TAC9350)



Complete coverage
for servicing a television receiver...

- Schematics
- Component locations
- Parts list
- Troubleshooting guide

Coverage includes these additional models and chassis:

MODEL	CHASSIS
CF26C30	TAC9360
TV28C30	TAC9365

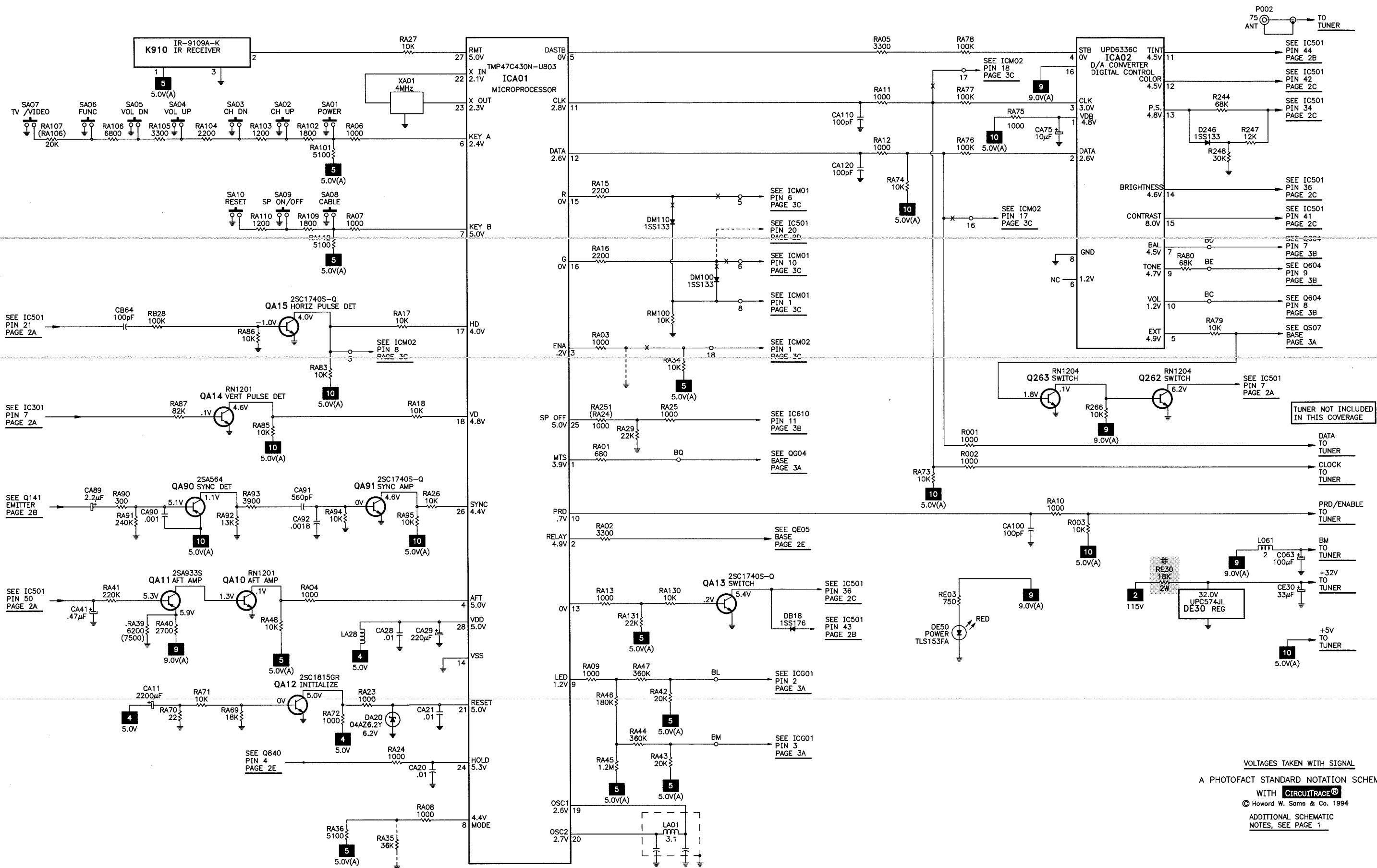


HOWARD W. SAMS & COMPANY

JUNE 1994 SET 3335

For Supplier Address,
See PHOTOFACT Annual Index

SYSTEM CONTROL SCHEMATIC

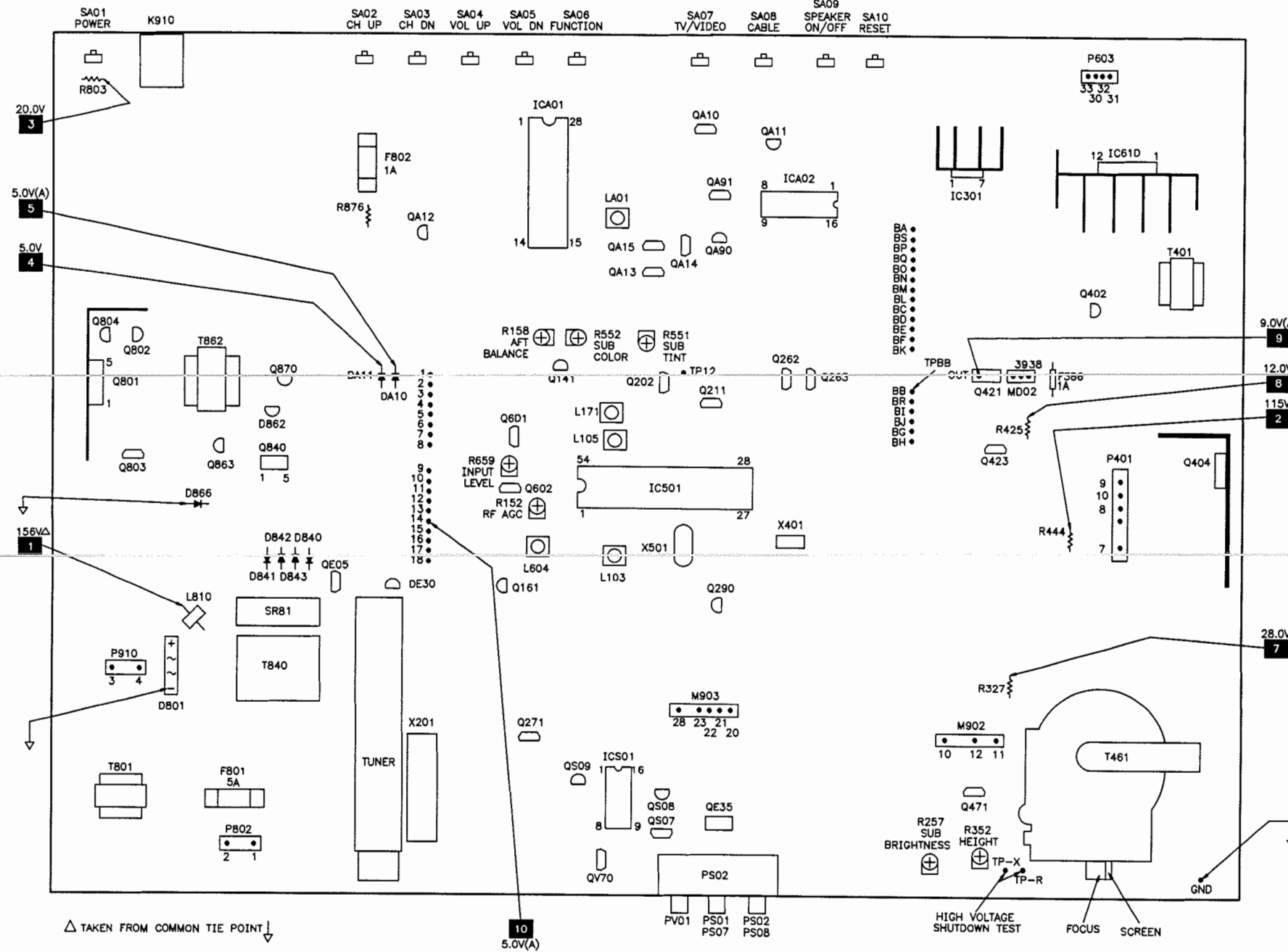


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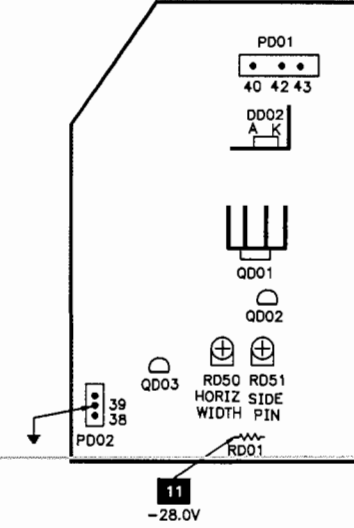
MODEL CF27C30 (CHASSIS TAC9350)

PLACEMENT CHART

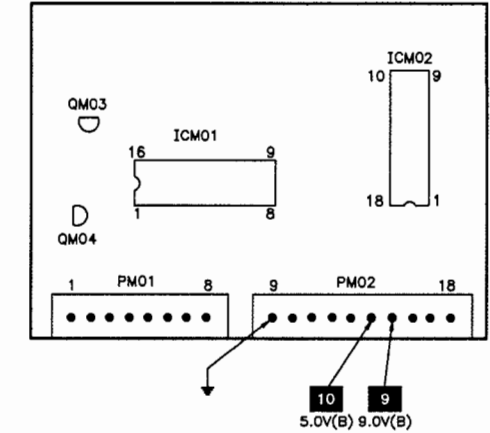
MAIN BOARD



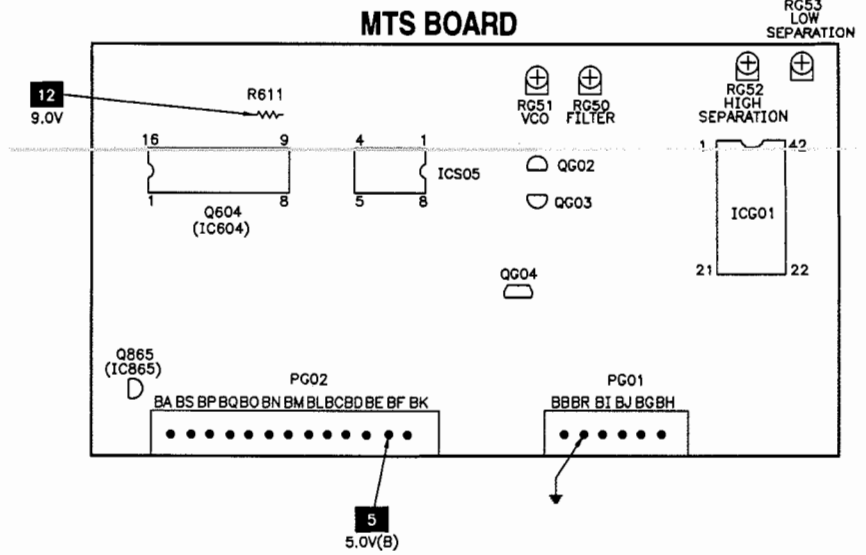
DPC BOARD



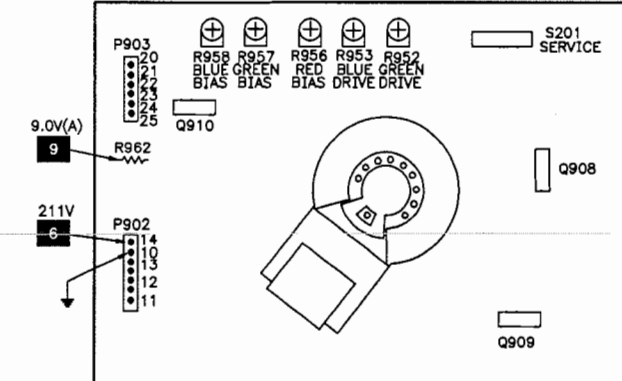
CLOSED CAPTION BOARD



MTS BOARD



CRT BOARD



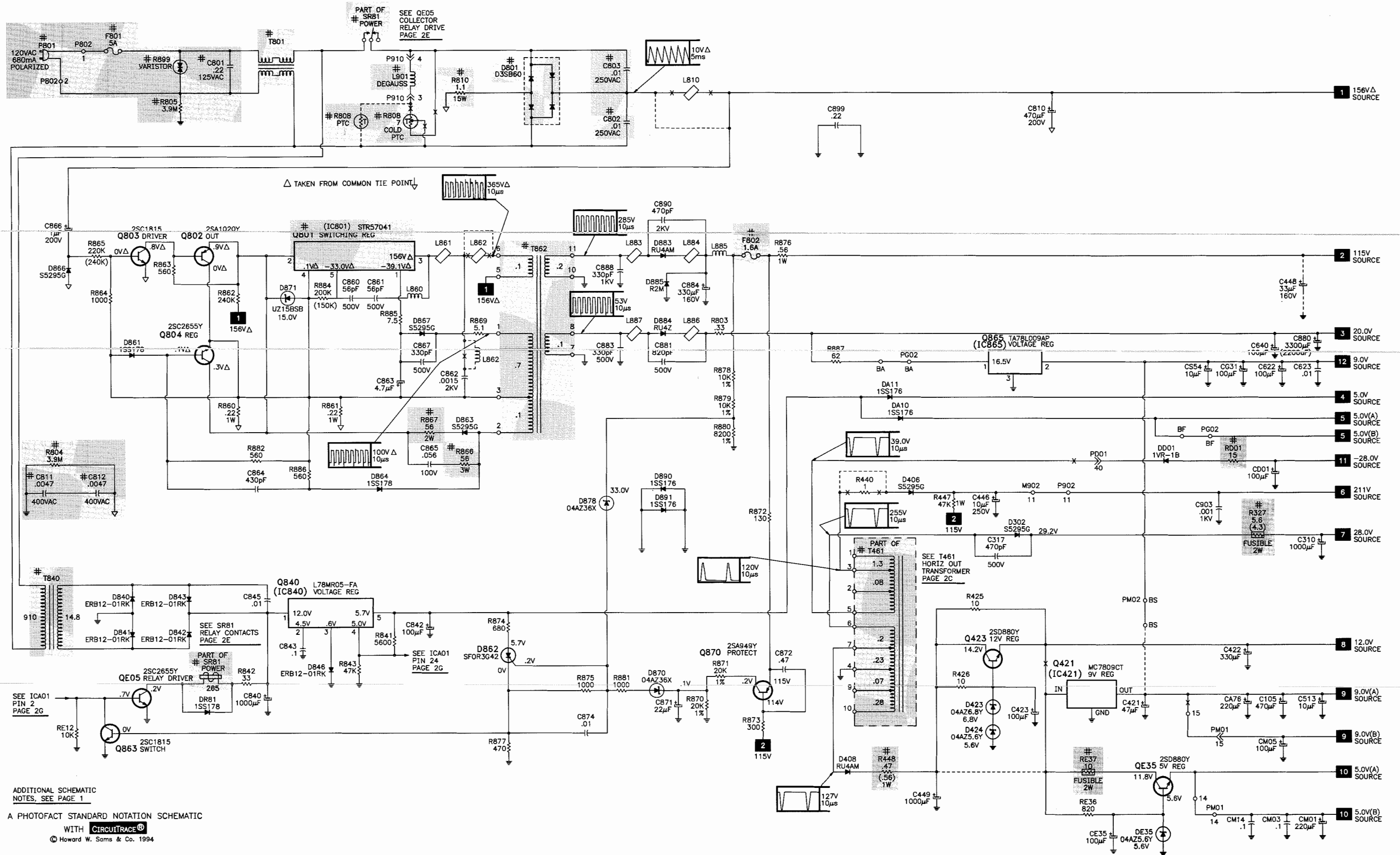
TEST JIG HOOKUP

Function	Chek-A-Color Adapter No.	PC Board Plug No.	Pin	Color
CRT	B239	P401	7	Blue
Yoke	D4137		8	Red
Yoke Setting	YP2A		9	Yellow
Comments	Focus Tap		10	Green

TOSHIBA

MODEL CF27C30 (CHASSIS TAC9350)

POWER SUPPLY SCHEMATIC



ADDITIONAL SCHEMATIC
NOTES, SEE PAGE 1

A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE®**
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MISCELLANEOUS ADJUSTMENTS

HIGH VOLTAGE CHECK

Tune in a picture. Set brightness, contrast, and color to minimum. Connect a high voltage probe to CRT anode. High voltage should read 25.0KV to 27.0KV. High voltage should never exceed 30.4KV.

RF AGC

Tune in a picture. Adjust R152 counterclockwise until snow appears, then clockwise until snow just disappears.

SUB BRIGHTNESS

Tune in a picture. Set brightness, contrast, and color to minimum. Adjust R257 for just visible highlights.

SUB COLOR AND SUB TINT

Tune in a color bar pattern. Connect an oscilloscope to the red cathode. Adjust R552 for 150V p-p. Tune in an active channel. Adjust R551 for proper flesh tones.

AFT BALANCE

Open the link between the IF input and Q161 by unsoldering the base lead. Connect a DC voltmeter to the junction of R173 and R174. Apply 3.0V to pin 7 of IC501. Turn receiver on and adjust R158 for 4.5V. Remove DC supply and restore IF line.

SIDE DPC

Tune in a crosshatch pattern. Adjust RD51, on the DPC board, for straight lines at the right and left sides of the pattern.

WIDTH

Adjust RD50, on the DPC board, so that the width of the picture is equal on the right and left side when the brightness is varied from minimum to maximum.

COLOR TEMPERATURE

Tune in a picture. Set brightness, contrast, and color to minimum. Set R958, R956, and R957 to minimum, set R952 and R953 to midrange, screen control to minimum, and S201 to service position. Adjust screen control until a barely visible line of one predominant color appears. Adjust R958, R956, and R957 for a white line. Return S201 to normal position, set the brightness and contrast to maximum. Adjust R952 and R953 for best white balance of the picture. Check tracking at high and low brightness levels and repeat procedure if necessary.

CONVERGENCE AND PURITY

The yoke is bonded to the CRT and convergence and purity adjustments are not recommended.

STEREO ADJUSTMENTS

Adjustments were made using MTS TV / Stereo Generator connected to antenna terminals.

MPX Level

Select stereo mode on receiver. Select pilot, 1kHz audio frequency, L-R modulating signal. Connect an oscilloscope to pin BB on the MTS board. Adjust R659 for 900mV p-p.

Stereo Filter

Select stereo mode on receiver. Select pilot, 1kHz audio frequency, and L-R modulating signal. Connect an oscilloscope to pin 36 of ICG01. Rotate RG50 fully clockwise, then counterclockwise to a point just past where waveform is at minimum distortion

Stereo VCO

Select stereo mode on receiver. Select pilot, 1kHz audio frequency, and L+R modulating signal. Rotate RG51 fully clockwise, then slowly counterclockwise until stereo indicator on screen appears.

Separation

Select stereo mode on receiver. Select pilot, 300Hz audio frequency, and right modulating signal. Connect an oscilloscope to positive lead of left speaker. Adjust RG53 for minimum amplitude of waveform. Change audio frequency to 8kHz. Adjust RG52 for minimum amplitude of waveform. Repeat until no further adjustment results in an amplitude decrease of waveform.

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.
Oscilloscope	SC3100
Generators	
RGB	CM2000
Multiburst Signal	VG91
Color Bar	VG91
TV Stereo	VG91
Digital VOM	SC3100
Frequency Meter	SC3100
Hi-Voltage Probe	HP200
Accessory Probes	TP212
Isolation Transformer	PR57
Capacitance Analyzer	LC101, LC102
CRT Analyzer	CR70
AC Leakage Tester	PR57
Inductance Analyzer	LC101, LC102
Flyback Yoke Tester	TVA92
TV Stereo Power Monitor	SR68, PA81
Field Strength Meter	SL750
Transistor Tester	TF46
Video Analyzer	VG91, TVA92

TROUBLESHOOTING

VERTICAL

Inject a vertical signal at pin 27 of IC501, if vertical deflection is now present, check pins 27, 28, and 29 of IC501. If the vertical deflection is missing, check IC301 and F386. Vertical linearity or foldover problems may be caused by C301, C305, C306, and C308 being defective.

RASTER

Check the CRT and CRT voltages. If red is missing, check pin 15 of IC501 and Q908. If green is missing, check pin 17 of IC501 and Q909. If blue is missing, check pin 18 of IC501 and Q910. If the raster has a keystone shape, check L462. If the raster has height or width problems, refer to "Vertical", "Horizontal", or "Power Supply" sections of this Troubleshooting guide.

IF AGC

Inject a video IF signal at IF input and check for video on CRT. If video is present, check tuner and tuner control circuits. Check for a video waveform at pin 45 of IC501, if the waveform is present, refer to the "Video" section of this Troubleshooting guide. If the waveform is missing, apply AGC bias to pin 5 of IC501. If the waveform is now present at pin 45 of IC501, check pins 2, 5, and 50 of IC501. If the waveform is still missing at pin 45 of IC501, check Q161 and IC501.

AUDIO

Check for an audio waveform at pin 39 of ICG01. If this waveform is missing, check pins 4, 51, and 52 of IC501, Q601, and Q602. If the audio waveform is present at pin 39 of ICG01, check for audio waveforms at pins 4 and 14 of ICS01. If the waveforms on pins 4 and 14 are missing, check ICS01 and ICG01. If the waveforms are present at pins 4 and 14 of ICS01, check Q604, IC305, QS08, QS09, QS07, and IC610. Check pin 8 of Q604 for .2V at minimum volume and 8.8V at maximum volume.

VIDEO

Inject a video signal at pin 45 of IC501 and check for video on the CRT. If video is present, refer to "IF AGC" section of this Troubleshooting guide. If the video is missing, check for a video waveform at pin 16 of IC501. If the waveform is missing at pin 16 of IC501, check Q141, Q202, Q211, Q271, and pins 33, 35, 36, 37, and 38 of IC501. If the waveform is present at pin 16 of IC501, check Q290 and S201.

CHROMA

Check for proper chroma waveforms at pins 15, 17, and 18 of IC501. If waveforms are missing, check IC501. Check the 3.58MHz oscillator at pin 13 of IC501. If the proper chroma is present at pins 15, 17, and 18 of IC501, refer to "Raster" section of this Troubleshooting guide.

POWER SUPPLY

Check F801 and F802. If F801 is open, check D801, C801, C802, C803, C810, Q801 thru Q804, and T862. If F802 is open, check Q404 and T461. Apply 120VAC, check for 115V at cathode of D883. If 115V is missing, check T862, Q801 thru Q804, and Q870.. Check for 5.0V at the cathode of DA11. If 5.0V is missing, check T840, D840 thru D843, Q840, and C842. If 5.0V is present, refer to the "Horizontal" section of this Troubleshooting guide.

HIGH VOLTAGE SHUTDOWN TEST

Apply 120VAC, turn the receiver on, and press reset button. Momentarily short TP-X to TP-R. Receiver should lose raster and sound. If the receiver does not lose raster and sound, the shutdown circuit requires repair. To resume normal operation, remove AC Power, wait 10 seconds then turn receiver on.

HORIZONTAL

Determine if the receiver is in shutdown, refer to "High Voltage Shutdown" section of this Troubleshooting guide. If the receiver is not in shutdown, inject a horizontal signal at base of Q404. If horizontal deflection is now present, check Q402, and pins 21 thru 26 of IC501. If horizontal sweep is missing, check Q404, T461, D302, D406, D408, and D471. The high voltage rectifier is part of T461 and if defective will affect the performance of the horizontal circuits. Horizontal linearity or foldover problems may be caused by C440, C442, C444, C446, and L441 being defective.

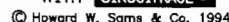
HIGH VOLTAGE SHUTDOWN

CAUTION: When defeating the high voltage shutdown circuit, do not exceed the maximum high voltage specified on the schematic, as this may cause excessive X-radiation and damage to the CRT and associated components. Monitor the high voltage while troubleshooting.

The high voltage is monitored by D471 rectifying pulses from T461. Should the high voltage increase, the voltage at base of Q471, will increase and trigger Q471 to conduct, and shutdown the receiver. To troubleshoot, place a jumper between pin 22 of IC501 and ground. The set should return to normal operation. If the set does not return to normal operation, refer to the "Power Supply" and "Horizontal" sections of this Troubleshooting guide. If the set returns to normal operation, check for approximately 20.3V across C471. If voltage is missing, refer to the "Power Supply" and "Horizontal" sections of this Troubleshooting guide. If the voltage across C471 is correct, troubleshoot the failsafe circuit.

Voltages Taken with TV In Shutdown		
IC501 Pin 22	1.6V	
TP-X	2V	

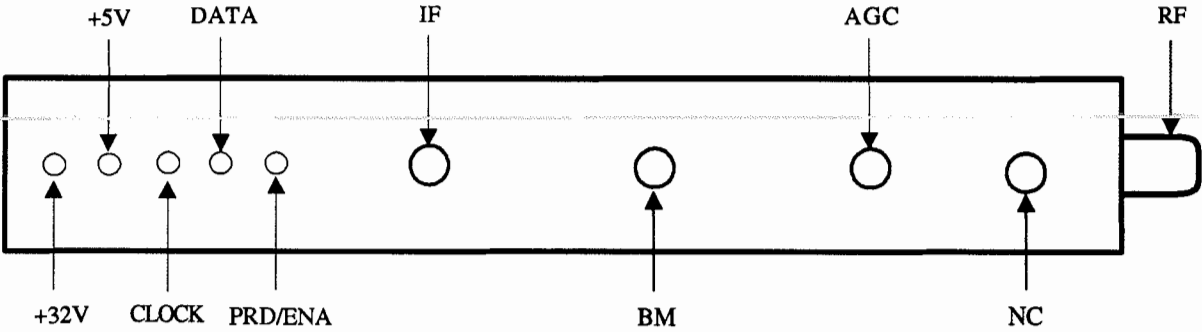
TAKEN WITH BAR
SWEEP GENERATOR



TUNER INFORMATION

TUNER VOLTAGE CHART							
Pin	VHF Low Band	VHF High Band	UHF Band	Pin	VHF Low Band	VHF High Band	UHF Band
+32V	32.0V	32.0V	32.0V	AGC	4.5V	5.9V	6.6V
+5V	5.0V	5.0V	5.0V	NC	1.6V	4.1V	5.6V
CLOCK	2.9V	2.9V	2.9V	NOTE: VHF Low Band voltages taken on channel 2. VHF High Band voltages taken on channel 7. UHF Band voltages taken on channel 14.			
DATA	2.5V	2.6V	2.5V				
PRD/ENA	1.1V	1.1V	1.1V				
BM	8.7V	8.7V	8.7V				

TUNER TERMINAL GUIDE

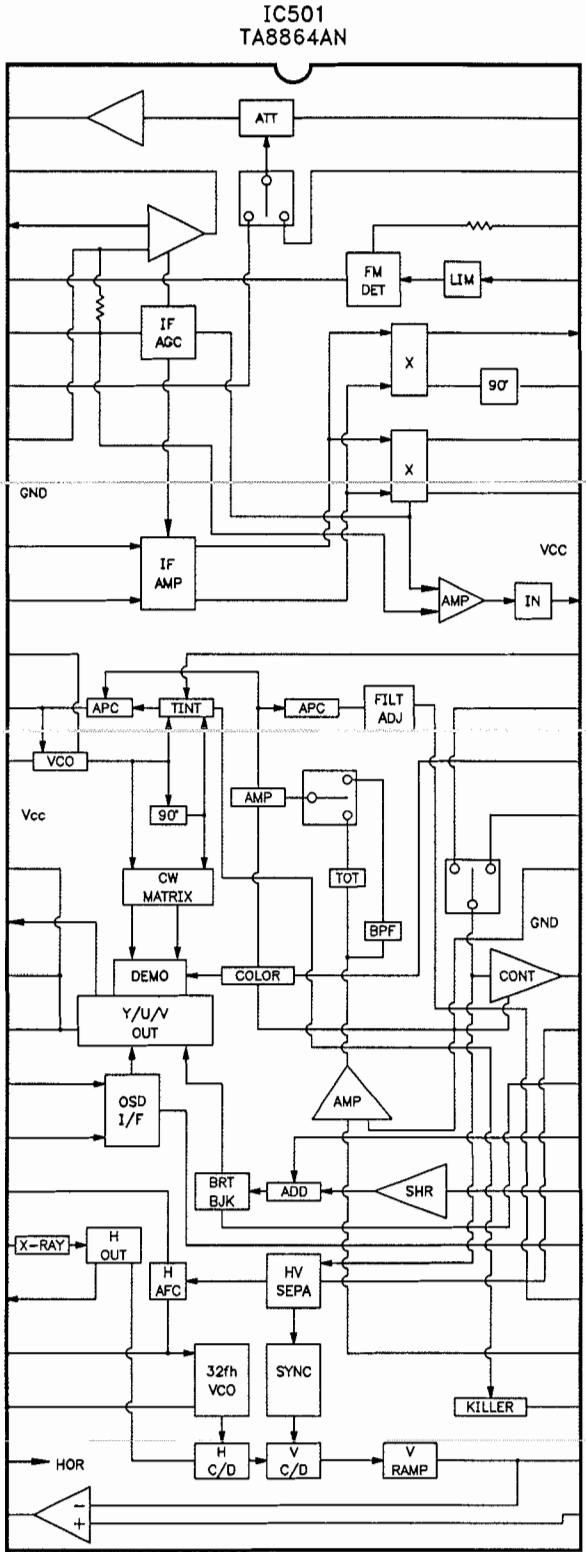
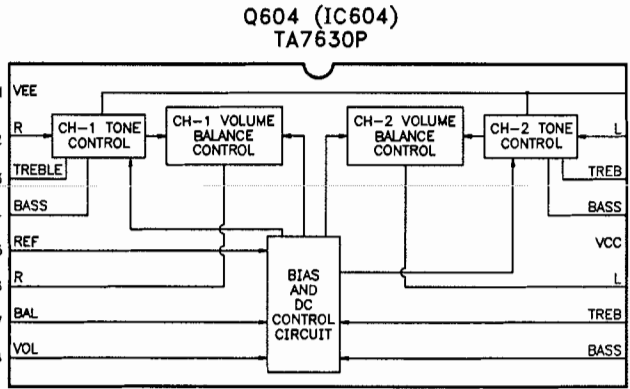
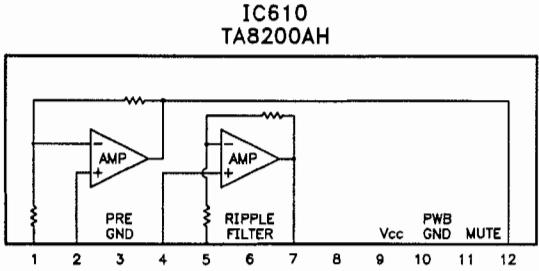
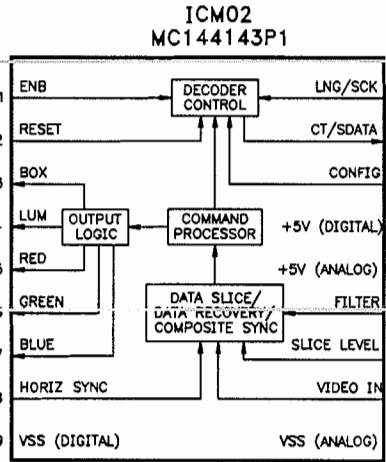
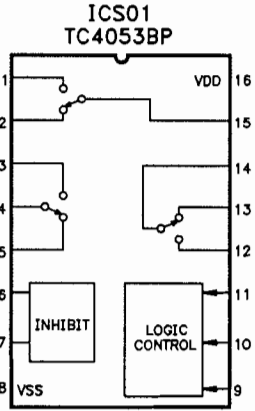
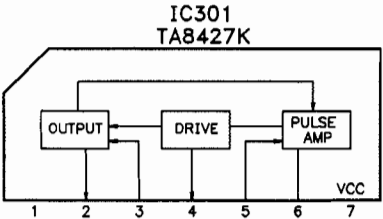


SCHEMATIC NOTES

- # 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 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.

IC FUNCTIONS



SEE QA11
BASE
PAGE 2G

SEE Q262
COLLECTOR
PAGE 2H

SEE QA90
BASE
PAGE 2G

SEE QA13
COLLECTOR
PAGE 2H

SEE ICA02
PIN 11
PAGE 2H

SEE ICG01
PIN 39
PAGE 3A

RF AGC RANGE
3.9V TO 6.7V

IF AGC RANGE
4.9V TO 7.0V

TAKEN WITH BAR
SWEEP GENERATOR

1.7V
10μs

2.2V
10μs

1.8V
10μs

3.58MHz

2SC388A
Q161 IF AMP

2SC1740S-Q
Q601 AUDIO AMP

2SC1740S-Q
Q602 AUDIO AMP

2SC1740S-Q
Q211 AMP

2SA1015
Q141 VIDEO AMP

2SC1815
Q202 VIDEO AMP

PART OF TA8864AN
IC501 IF/VIDEO/CHROMA/DEF

PART OF TA8864AN
IC501 IF/VIDEO/CHROMA/DEF

PART OF TA8864AN
IC501 IF/VIDEO/CHROMA/DEF

UGL31GKNT
XZ01 COMB FILTER

2SA1015Y
QV42 CHROMA AMP

RV411
220Ω

TPBB

TP12

BB

RV551
SUB TINT
10K

RV565
220K

RV505
68K

RV504
10K

RV512
.1

RV511
2.2μF

RV501
11pF NPO

RV502
.022

RV503
3.58MHz

RV504
10K

RV505
68K

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RV722
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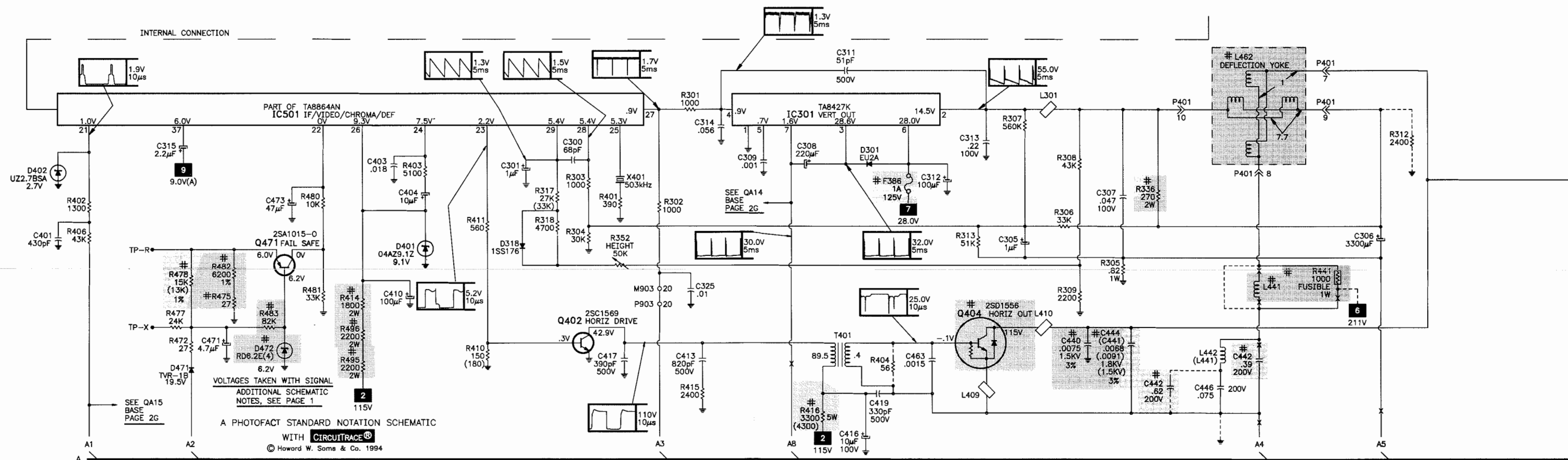
RV723
10K

RV724
10K

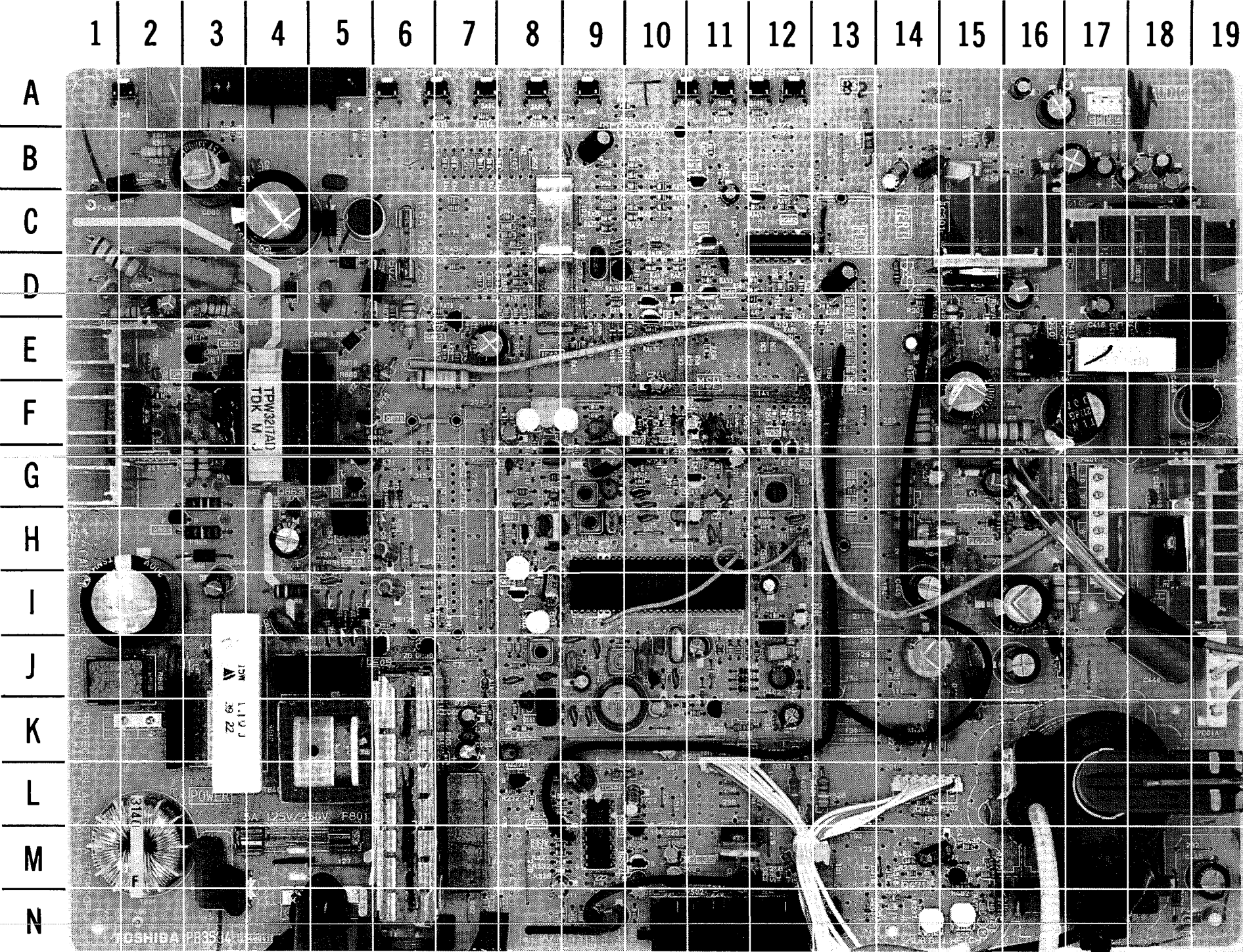
RV725
10K

RV726
10K

RV727
10K



MAIN BOARD




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PARTS LIST continued

CAPACITORS & ELECTROLYTICS		
Item No.	Rating	Mfr. Part No.
# C440	.0075 3% 1.5KV	24082352
# C441	.0091 3% 1.5KV	24082356
# C442	.39 5% 200V	24095947
# C442 (1)	.62 5% 200V	24095758
# C444	.0068 3% 1.8KV	24082290
C445	4.7µF 160V NP	24085978
C504	11pF NPO	24353110
# C801	.22 20% 125VAC	24095670
# C802, 03	.01 +80% -20% 250VAC	24092300
# C811, 12	.0047 20% 125VAC	24092270
	.0047 400VAC	-
C862	.0015 10% 2KV	24092347
C888	330pF 10% 1KV	24215331
C890	470pF 10% 2KV	24092341
C902	.001 10% 2KV	24211102
C903	.001 10% 1KV	24215102
# CD02	.018 3% 630V	24082095
CG25	3.3µF 20% 16V Tantalum	24704335
CG27	10µF 20% 16V Tantalum	24704106
CM04	10µF 20% 16V NP	24085970
# For SAFETY use only equivalent replacement part. (1) Used in models CF26C30 and TV28C30.		

MISCELLANEOUS			
Item No.	Description	Mfr. Part No.	Notes
# F386	Fuse	23144778	1 Amp, 125V
# F801	Fuse	23144945	5 Amp, 125V, Slow Blow
# F802	Fuse	23144805	1.6 Amp, 250V, Fast Acting
# H001 (3)	Tuner	23321078	UHF/VHF (EL852L1)
# H001 (1)(3)	Tuner	23321071	UHF/VHF (EL852LX1)
# H001 (2)(3)	Tuner	23321072	UHF/VHF (EL462L)
K910	IR Receiver	23120220	(IR-9109A-K)
# P001	Antenna Terminal	23864007	75 Ohms
# P801	Line Cord	23176006	AC, Polarized
PS01	Jack	23365578	EXT Audio Left
PS02	Jack	23365578	EXT Audio Right
PS07	Jack	23365578	Left Variable Audio Out
PS08	Jack	23365578	Right Variable Audio Out
PV01	Jack	23365578	Video
S201	Switch	23344130	Service
SA01	Switch	23145227	Power
SA02	Switch	23145227	Channel Up
SA03	Switch	23145227	Channel Down
SA04	Switch	23145227	Volume Up
SA05	Switch	23145227	Volume Down
SA06	Switch	23145227	Function
SA07	Switch	23145227	TV/Video
SA08	Switch	23145227	Cable
SA09	Switch	23145227	Speaker On/Off
SA10	Switch	23145227	Reset
# SR81	Relay	23146916	Power
# V901	CRT	23312372	A68AEG20X05
# V901 (1)(2)	CRT	23312099	A66ADT18X02
# V901A	Socket	23902068	CRT
W661, 62	Speaker	23151226	3.5" X 2 3/8", 18 Ohms, 2W
XZ01 (2)	Filter	23303008	Comb
X201	Delay Line	23250138	-
X201 (2)	Delay Line	23250875	-
X401	Crystal	23153721	503kHz
X501	Crystal	23153961	3.58MHz
XA01	Crystal	23153011	4MHz
Z101	Filter	A5610690	SAW
Z141	Filter	23107976	4.5MHz
Z601	Filter	23107920	4.5MHz
	PC Board (3)	23701662	Close Caption (PB3492)
	PC Board (3)	23369229	CRT (PB2454)
	PC Board (2) (3)	23369322	CRT (PB2516)
	PC Board (3)	23701665	DPC (PB3535)
	PC Board (3)	23701664	Main (PB3534)
	PC Board (1) (3)	23701762	Main (PB3609)
	PC Board (2) (3)	23702042	Main (PB3871)
	PC Board (3)	23701663	MTS (PB3420)
	Transmitter	23120038	(CT-9584)
# For SAFETY use only equivalent replacement part. (1) Used in model CF26C30. (2) Used in model TV28C30. (3) Contact PTS Electronics Corporation for replacement; order by manufacturer's part number.			

CABINET PARTS	
Item	Part No.
Model CF27C30	
Cabinet Front	23419903
Cabinet Back	23425509
Knob, Control	23443586
Knob, Power	23443594
Models CF26C30/TV28C30	
Cabinet Front	23419922
Cabinet Back	23423485
Knob, Control	23443546
Knob, Power	23443545



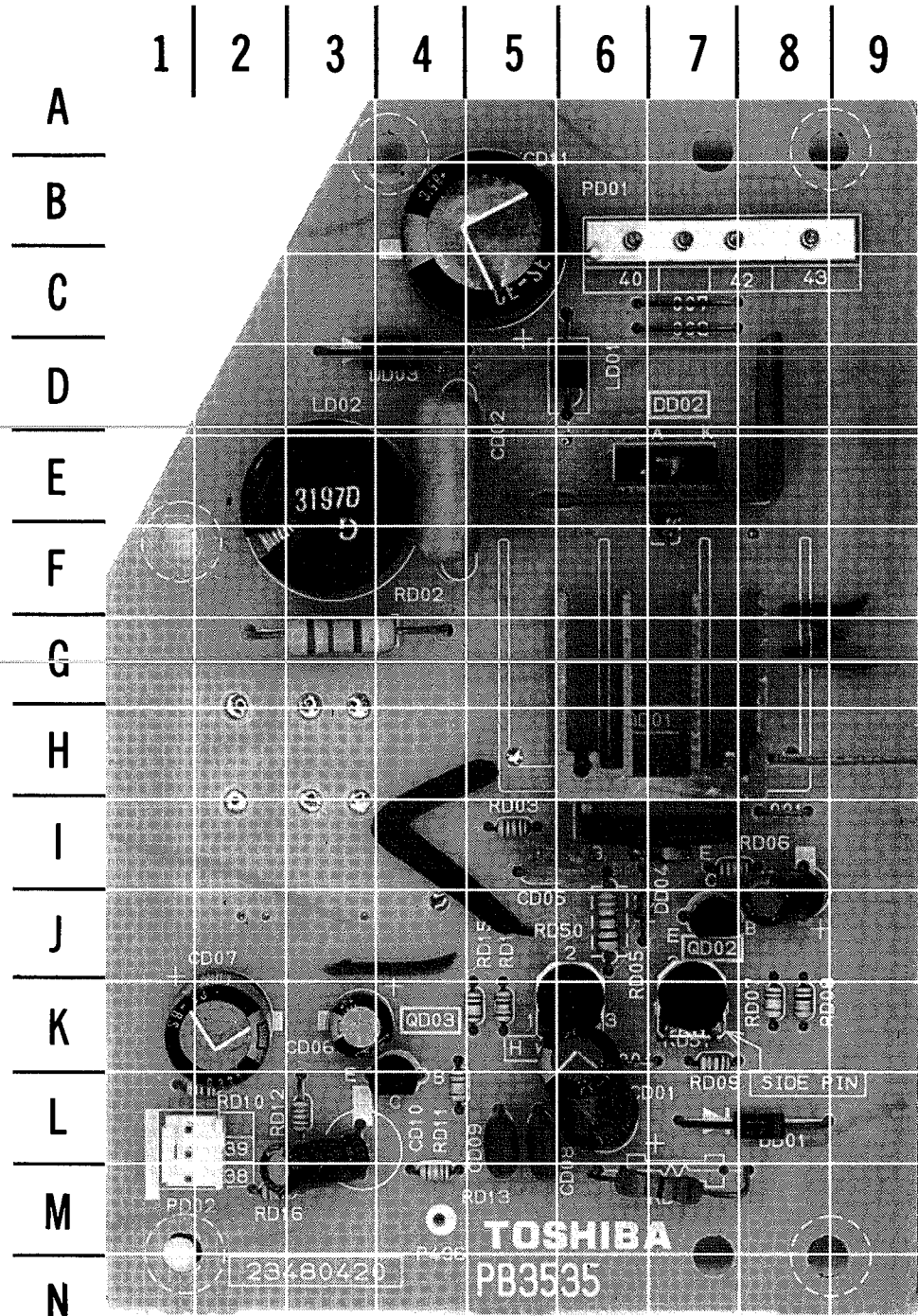
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*J. Barker, B. Bryant,
B. Buchanan, T. Clensy,
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M. Herkless, J. Kocha,
J. Limp, F. Malek, B. Medaris,
R. Raus, B. Skinner, J. Young*

TOSHIBA

MODEL CF27C30 (CHASSIS TAC9350)

DPC BOARD



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DPC BOARD,
GRIDTRACE LOCATION
GUIDE

CD01	L-6	QD02	J-7
CD02	E-4	QD03	L-4
CD05	I-5	RD01	M-7
CD06	K-3	RD02	G-3
CD07	K-2	RD03	I-5
CD08	L-5	RD05	J-6
CD09	L-5	RD06	I-7
CD10	L-3	RD07	K-8
CD11	B-5	RD08	K-8
CD15	J-8	RD09	K-7
DD01	L-8	RD10	L-2
DD02	E-7	RD11	L-4
DD03	D-4	RD12	L-3
DD04	J-6	RD13	M-4
LD01	D-6	RD14	K-5
LD02	E-3	RD15	K-5
PD01	B-6	RD16	M-2
PD02	M-1	RD50	K-6
QD01	I-6	RD51	K-7

PARTS LIST

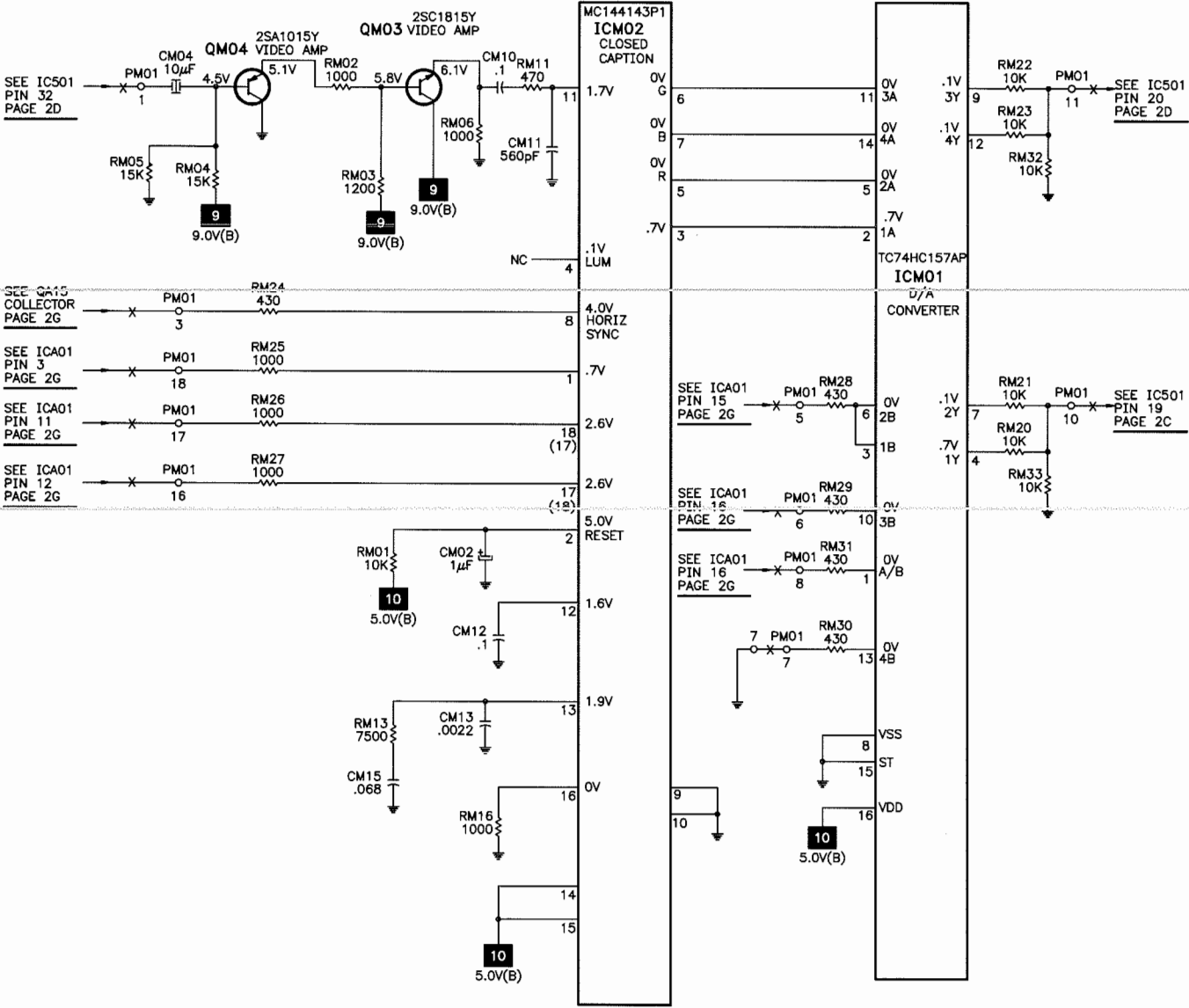
SEMICONDUCTORS

(Select the replacement that gives the best results.)

Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D204, 05	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	23118859	NTE177	ECG177	SK9091
D206, 10, 11	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176	A7150258	NTE177	ECG177	SK9091
D246	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176	A7150258	NTE177	ECG177	SK9091
D290, 91	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176	A7150258	NTE177	ECG177	SK9091
D301	EU2A	23118094	NTE552	ECG552	SK9000
	ERB44-06	-	NTE552	ECG552	SK9000
D302	S5295G	A7978850	NTE552	ECG552	SK9000
	EU2A	23118094	NTE552	ECG552	SK9000
D318, 31, 70	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	23118859	NTE177	ECG177	SK9091
D401	04AZ9.1Z	-	NTE5018A	ECG5018A	SK9A1
	UZ9.1BSC	23316325	NTE5018A	ECG5018A	SK9A1
	RD9.1ESAB3	-	NTE5018A	ECG5018A	SK9A1
D402	UZ2.7BSA	23316288	-	-	-
D406	S5295G	A7978850	NTE552	ECG552	SK9000
	EU2A	23118094	NTE552	ECG552	SK9000
D408	RU4AM	23118338	NTE580	ECG580	SK5036
	3JH41	-	-	-	-
D423	04AZ6.8Y	-	NTE5014A	ECG5014A	SK6A8
	UZ6.8BSB	23316315	NTE5014A	ECG5014A	SK6A8
	RD6.8ESB2	-	NTE5014A	ECG5014A	SK6A8
D424	04AZ5.6Y	-	NTE5011A	ECG5011A	SK5A6
	UZ5.6BSB	23316309	NTE5011A	ECG5011A	SK5A6
	RD5.6ESB2	-	NTE5011A	ECG5011A	SK5A6
D471	TVR-1B	A7568460	NTE552	ECG552	SK9000
# D472	RD6.2E(4)	23115774	NTE5013A	ECG5013A	SK6A2
D491, 92	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176	A7150258	NTE177	ECG177	SK9091
D506, 07, 08	04AZ12X	A7117205	NTE5021T1	ECG5021T1	SK9971
D561	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176	A7150258	NTE177	ECG177	SK9091
D610, 11, 12, 13	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	23118859	NTE177	ECG177	SK9091
# D801	D3SB60	23316391	NTE5310	ECG5310	SK5030
	RBV406M	-	NTE5330	ECG5330	SK9972
D840, 41, 42, 43	ERB12-01RK	23115532	NTE552	ECG552	SK9000
D846	ERB12-01RK	23115532	NTE552	ECG552	SK9000
D861	1SS178	A7150351	NTE519	ECG519	SK3100
D862	SFOR3G42	A7801233	NTE5405	ECG5405	SK3951
D863	S5295G	A7978850	NTE552	ECG552	SK9000
D864	1SS178	A7150351	NTE519	ECG519	SK3100
D866	S5295G	A7978850	NTE552	ECG552	SK9000
	EU2A	23118094	NTE552	ECG552	SK9000
D867	S5295G	A7978850	NTE552	ECG552	SK9000
	EU2A	23118094	NTE552	ECG552	SK9000
D870	04AZ36X	A7118305	-	-	-

For SAFETY use only equivalent replacement part.

C
CLOSED CAPTION SCHEMATIC

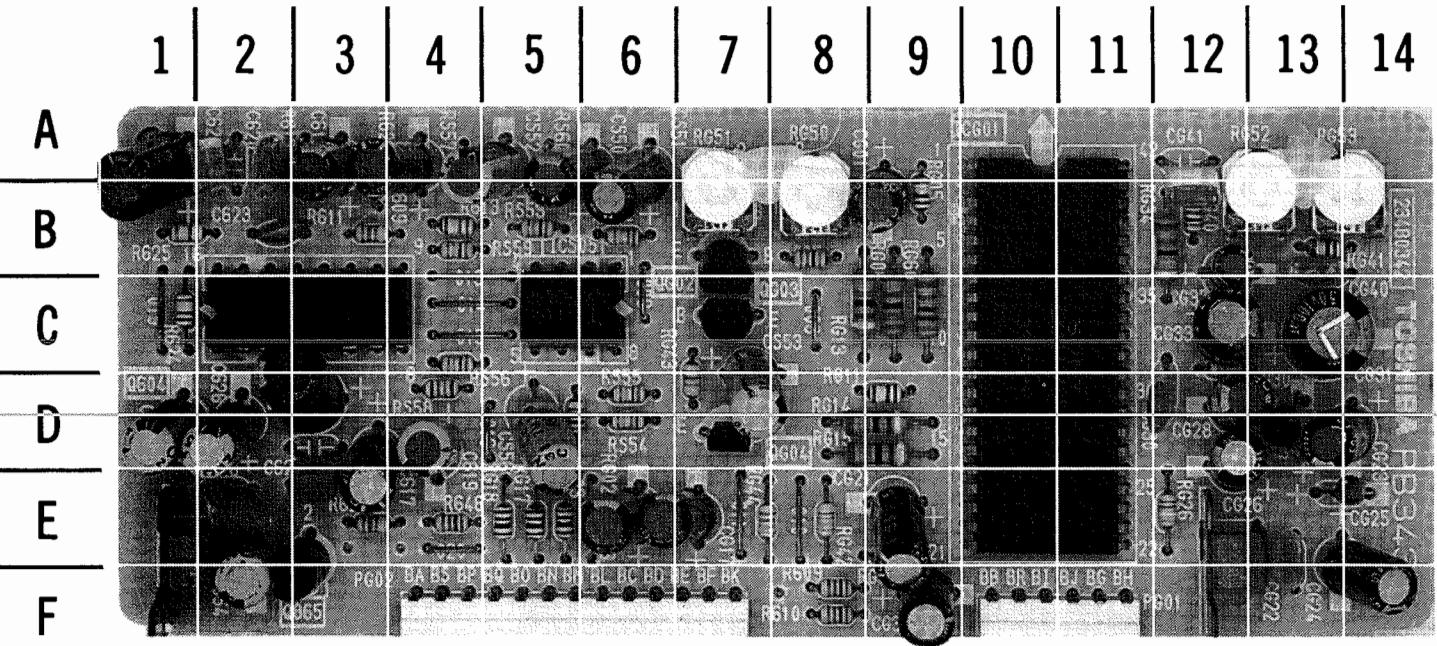


VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC
NOTES, SEE PAGE 1

A PHOTOFAC STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE**
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MTS BOARD



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MTS BOARD, GRIDTRACE LOCATION GUIDE

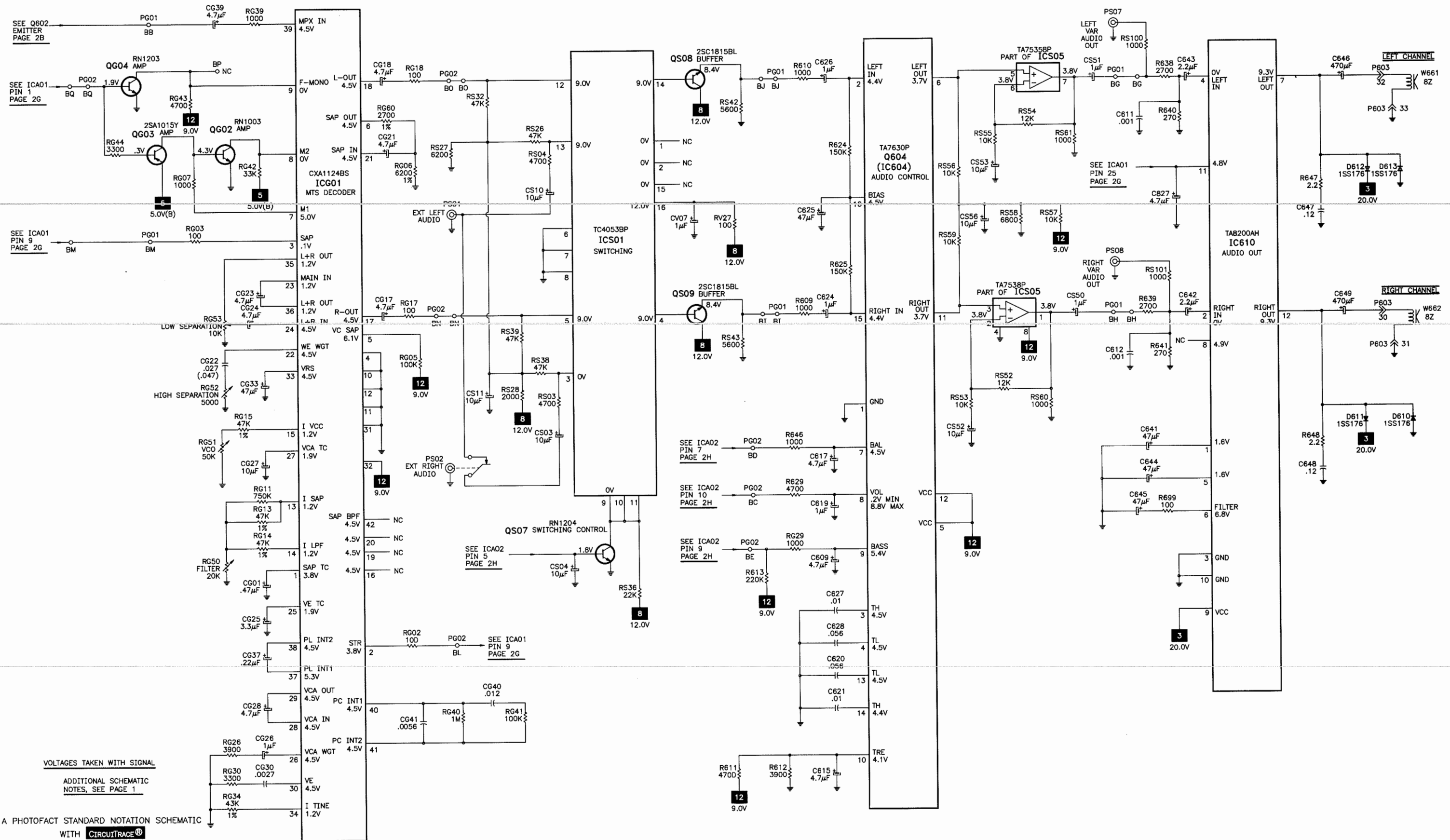
C609	A-4	CG23	D-13	CS56	D-5	R646	E-4	RG42	E-8
C615	A-3	CG24	F-14	ICG01	A-10	RG02	E-6	RG43	D-7
C617	E-3	CG25	E-14	PG01	F-10	RG03	E-5	RG44	E-7
C619	D-4	CG26	D-12	PG02	F-4	RG05	B-9	RG50	B-8
C620	A-2	CG27	D-13	Q604	C-2	RG06	C-9	RG51	B-7
C621	A-2	CG28	D-12	Q865	F-3	RG07	B-8	RG52	B-13
C622	D-3	CG30	D-12	QG02	B-7	RG11	D-9	RG53	B-14
C623	B-2	CG31	C-13	QG03	C-7	RG13	C-8	RG60	C-9
C624	D-1	CG33	C-12	QG04	D-7	RG14	D-9	RS52	B-6
C625	A-1	CG37	B-12	R609	F-8	RG15	D-9	RS53	B-5
C626	D-2	CG39	F-9	R610	F-8	RG17	E-5	RS54	D-6
C627	D-3	CG40	C-13	R611	B-3	RG18	E-5	RS55	D-6
C628	E-2	CG41	A-12	R612	A-3	RG26	E-12	RS56	C-4
CG01	B-9	CS50	A-6	R613	B-4	RG30	C-12	RS57	A-4
CG17	E-7	CS51	A-6	R624	C-1	RG34	B-12	RS58	D-4
CG18	E-6	CS52	A-5	R625	B-1	RG39	E-9	RS59	B-4
CG21	E-9	CS53	D-7	R627	A-3	RG40	B-12	RS60	A-5
CG22	E-13	CS54	F-2	R629	E-3	RG41	B-13	RS61	D-5

PARTS LIST continued

SEMICONDUCTORS continued					
(Select the replacement that gives the best results.)					
Item No.	Type No.	Mfr. Part No.	NTE Part No.	ECG Part No.	TCE Part No.
D871	UZ15BSB	23316339	-	-	-
	04AZ15X	-	NTE5024A	ECG5024A	SK15A
	04AZ15Y	-	NTE5024A	ECG5024A	SK15A
	04AZ15Z	-	NTE5024A	ECG5024A	SK15A
D878	04AZ36X	-	-	-	-
	UZ36BSA	23316370	-	-	-
D883	RU4AM	23118338	NTE580	ECG580	SK5036
D884	RU4Z	23118052	NTE580	ECG580	SK5036
D885	R2M	23118339	NTE570	ECG570	-
D890, 91	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	23118859	NTE177	ECG177	SK9091
DA10, 11	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	A7150258	NTE177	ECG177	SK9091
DA20	04AZ6.2Y	-	NTE5013A	ECG5013A	SK6A2
	UZ6.2BSB	23316312	-	-	-
DB18	1SS176	A7150258	NTE177	ECG177	SK9091
	1SS133	23118859	NTE177	ECG177	SK9091
DD01	TVR-1B	A7568460	NTE552	ECG552	SK9000
DD02	ERC20-06	23316582	NTE598	ECG598	SK9859
DD03	1S1887A	A7568752	NTE552	ECG552	SK9000
DD04	1SS176	A7150258	NTE177	ECG177	SK9091
DE30	UPC574JL	-	NTE615P	ECG615A	SK9976
	UPC574JM	23115922	NTE615P	ECG615A	SK9976
DE35	04AZ5.6Y	-	NTE5011A	ECG5011A	SK5A6
	UZ5.6BSB	23316309	NTE5011A	ECG5011A	SK5A6
	RD5.6ESB2	-	NTE5011A	ECG5011A	SK5A6
DE50	TLS153FA	A8636541	-	-	-
DM100, 110	1SS133	23118859	NTE177	ECG177	SK9091
	1SS176FA	-	NTE519	ECG519	SK3100
DR81	1SS178	A7150351	NTE519	ECG519	SK3100
IC301	TA8427K	B0378560	-	-	-
IC501	TA8864AN	B0384703	-	-	-
IC610	TA8200AH	B0376795	NTE7068	ECG7068	-
ICA01	TMP47C430N-U803	23904309	-	-	-
ICA02	UPD6336C	23318627	-	-	-
ICG01	CXA1124BS	23904295	-	-	-
ICM01	TC74HC157AP	B0487885	-	-	-
ICM02	MC144143P1	23319985	-	-	-
ICS01	TC4053BP	B0470532	NTE4053B	ECG4053B	SK4053B
ICS05	TA75358P	B0347500	NTE928M	ECG928M	SK3692
Q141	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
Q161	2SC388ATM	A6708871	NTE85	ECG85	SK3132
Q202	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
Q211	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
Q262, 63	RN1204	A6002040	NTE2359	ECG2359	SK9959
Q271	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
Q290	2SA562TM-Y(T)	A6509154	NTE290A	ECG290A	SK3114A
Q402	2SC1569FA-5	A678971D	NTE376	ECG376	SK3219
# Q404	2SD1556(E)	A6871313	NTE2302	ECG2302	SK9422
Q421 (IC421)	MC7809CT	23319202	NTE1910	ECG1910	-
# 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.
Q423	2SD880-Y	A6848520	NTE152	ECG152	SK3440
	2SD2023E	-	NTE152	ECG152	SK3440
Q471	2SA1015-O(TE)	A6534036	NTE290A	ECG290A	SK9132
Q601, 02	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
Q604 (IC604)	TA7630P	B0356190	NTE1576	ECG1576	SK7672
# Q801 (IC801)	STR57041	23319592	-	-	-
Q802	2SA1020-Y	A6534145	NTE25	ECG25	SK3841
Q803	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
Q804	2SC2655-Y(C)	A6333346	NTE293	ECG293	SK3849
Q840 (IC840)	L78MR05-FA	23318299	-	-	-
Q863	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
Q865 (IC865)	TA78L009AP	B0372960	NTE1902	ECG1902	SK3962
Q870	2SA949-Y(C)	A6532853	NTE383	ECG383	SK9138
Q902, 03, 04	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
Q908, 09, 10	2SC2068	A6319400	NTE376	ECG376	SK3219
QA10	RN1201	A6002010	-	-	-
QA11	2SA933S-Q	23114530	NTE290A	ECG290A	SK9132
	2SA1015Y	-	NTE290A	ECG290A	SK9132
QA12	2SC1815-GR	A6317764	NTE85	ECG85	SK3124A
QA13	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
	2SC1815Q	-	NTE85	ECG85	SK3124A
QA14	RN1201	A6002010	-	-	-
QA15	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
QA90	2SA564A-Q	23314055	NTE290A	ECG290A	SK3932
	2SA1015Y	-	NTE290A	ECG290A	SK9132
QA91	2SC1740S-Q	23114528	NTE85	ECG85	SK3122
	2SC1815Y	-	NTE85	ECG85	SK3124A
QD01	2SB688-O(BS)	A6625365	NTE37	ECG37	SK9415
QD02	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
QD03	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
QE05	2SC2655-Y(C)	A6333346	NTE293	ECG293	SK3849
	2SC1815-Y	-	NTE85	ECG85	SK3124A
QE35	2SD880-Y	A6848520	NTE152	ECG152	SK3440
	2SD2023E	-	NTE152	ECG152	SK3440
QG02	RN1003	A6000030	NTE2357	ECG2357	SK9742
QG03	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
QG04	RN1203	A6002030	NTE2357	ECG2357	SK9742
QM03	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
QM04	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
QS07	RN1204	A6002040	NTE2359	ECG2359	SK9959
QS08, 09	2SC1815BL(T)	A6317499	NTE85	ECG85	SK3124A
QV42	2SA1015-Y(TE)	A6534053	NTE290A	ECG290A	SK9132
QV70	2SC1815-Y	A6317440	NTE85	ECG85	SK3124A
# For SAFETY use only equivalent replacement part.					

AUDIO SCHEMATIC



A PHOTOFACT STANDARD NOTATION SCHEMATIC
WITH **CIRCUITRACE®**
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PARTS LIST continued

Important Parts Information

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

Obtaining Parts

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

800-428-7267

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

Participating Vendors

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

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

CONTROLS & RESISTORS			
Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
R152	10K RF AGC	24066926	-
R158	200K AFT Balance	24066922	-
R257	2000 Sub Brightness	24066928	-
# R327	5.6 5% 2W Fusible	24339569	F2W5D6
# R327 (1)	4.3 5% 2W Fusible	24000173	F2W4D3
# R336	270 5% 2W	24383271	2W127
R352	50K Height	24066924	-
# R370	1000 5% 1/2W	24552102	HW210
# R414	1800 5% 2W	24383182	2W218
# R416	3300 5% 5W Wirewound	24510332	5W233
# R416 (2)	4300 5% 5W Wirewound	24510432	5W243
# R441	1000 5% 1W Fusible	24532102	F1W210
# R448	.47 5% 1W	24338478	1WD47
# R448 (2)	.56 1W	24338568	-
# R475	27 5%	24366270	-
# R478	15K 1% 1/4W	24327153	-
# R478 (2)	13K 1% 1/4W	24327133	-
# R482	6200 1% 1/4W	24327622	-
# R495, 96	2200 5% 2W	24383222	2W222
R551	10K Sub Tint	24066926	-
R552	10K Sub Color	24066926	-
R659	5000 Input Level	24066927	-
# R804, 05	3.9M 10% 1/2W	2496395	HW539
# R808	7 PTC Cold Thermistor	24019002	-
# R810	1.1 5% 15W Wirewound	24007873	-
# R866	56 5% 3W	24384560	3W056
# R867	56 5% 2W	24383560	2W056
R870, 71	20K 1% 1/4W	24327203	-
R878, 79	10K 1% 1/4W	24327103	-
R880	8200 1% 1/4W	24327822	-
# R899	Varistor	24000902	-
# R920	1.2 5% 2W Fusible	24000921	F1W1D2
R952	200 Green Drive	24066595	-
R953	200 Blue Drive	24066595	-
R956	5000 Red Bias	24066599	-
R957	5000 Green Bias	24066599	-
R958	5000 Blue Bias	24066599	-
# R960, 61, 62	15K 5% 2W	24383153	2W315
# RD01	15 5% 1/2W	24000211	HW015
# RE30	18K 5% 2W	24383183	2W318
# RE37	10 5% 1/4W Fusible	24545100	-
RG06	6200 1% 1/4W	24327622	-
RG13, 14, 15	47K 1% 1/4W	24327473	-
RG34	43K 1% 1/4W	24327433	-
RG50	20K Filter	24066925	-
RG51	50K VCO	24066924	-
RG52	5000 High Separation	24066927	-
RG53	10K Low Separation	24066926	-
RG60	2700 1% 1/4W	24327272	-
# For SAFETY use only equivalent replacement part.			
(1) Used in model TV28C30.			
(2) Used in models CF26C30 and TV28C30.			

COILS & TRANSFORMERS			
Item No.	Function/Rating	Mfr. Part No.	On-Unit No.
L061	Peaking	23289101	-
L101	RF Choke	23252923	-
L102	Peaking	23237977	-
L103	PIF	23262828	-
L104	Peaking	23237999	-
L105	PIF	23262827	-
L141	Peaking	23238712	-
L142	Peaking	23237984	-
L145	Peaking	23238562	-
L161	Peaking	23238560	-
L171	PIF	23262827	-
L202	Peaking	23238562	-
L205	Peaking	23238705	-
L301	Ferrite Bead	23103940	-
L409, 10	Ferrite Bead	23103880	-
# L441	Linearity	23233092	-
L442	Choke	23221962	-
# L462 (1)	Yoke 110° Horiz 1.2 mH Vert 21.4 mH	-	2G27007505
L501	Peaking	23238702	-
L603	Peaking	23238709	-
L604	SIF	23252905	-
L810	Ferrite Bead	23103880	-
L860 Thru	Ferrite Bead	23103880	-
L864	Ferrite Bead	23103880	-
L885	Choke	23221746	-
L886	Ferrite Bead	23103880	-
# L901	Degaussing	23200664	-
LA01	IF	23262996	-
LA28	Peaking	23238562	-
LD01	Ferrite Bead	23103880	-
LD02	Choke	23221686	-
T401	Horizontal Drive	23224915	TLN1068
# T461 (2)	Horizontal Output	23236254	TFB4100AD
# T801	Line Filter	23211892	F3140
# T840	Power	23213513	TPW1459AZ
# T862	Converter	23217126	TPW3217AD
# For SAFETY use only equivalent replacement part.			
(1) Bonded part of CRT.			
(2) Focus and screen are part of T461.			

CLOSED CAPTION BOARD

MAIN BOARD, GRIDTRACE LOCATION GUIDE

C063	K-7	C473	I-12	CA89	F-8	D890	A-14	PV01	N-10	R212	G-11	R477	N-15	R882	E-3	RA104	A-7
C065	K-7	C501	H-12	CA90	E-11	D891	A-14	Q141	G-8	R216	G-11	R478	M-15	R884	F-2	RA105	A-8
C101	K-9	C502	H-12	CA91	D-11	DA10	G-6	Q161	K-8	R217	L-14	R480	N-14	R885	D-2	RA106	A-9
C102	J-9	C504	J-10	CA92	C-11	DA11	G-6	Q202	G-10	R218	F-14	R481	M-14	R886	D-3	RA107	A-10
C104	H-9	C509	H-12	CA100	D-8	DA20	C-10	Q211	G-11	R223	D-12	R482	M-15	R887	B-13	RA109	A-11
C105	G-9	C510	K-10	CA110	D-8	DB18	F-10	Q262	G-12	R227	K-14	R483	M-15	R899	N-3	RA110	A-12
C110	J-9	C511	G-10	CA120	D-8	DE30	J-6	Q263	G-12	R229	G-11	R491	L-13	RA01	C-8	RA112	C-7
C111	J-9	C512	J-10	CB64	L-12	DE35	M-12	Q271	L-8	R230	G-10	R495	F-16	RA02	C-8	RA130	E-10
C112	J-9	C513	K-10	CE30	I-6	DE50	A-3	Q290	K-11	R233	D-12	R496	F-14	RA03	C-8	RA131	E-10
C113	H-12	C514	J-10	CE35	M-11	DM100	E-9	Q402	E-16	R236	M-14	R501	H-12	RA04	C-8	RA251	C-9
C141	F-9	C517	G-10	CS03	M-10	DM110	E-9	Q404	H-18	R237	N-14	R504	J-10	RA05	C-8	RB28	L-13
C142	G-9	C601	G-8	CS04	M-10	DR81	H-5	Q421	G-15	R238	N-14	R505	G-10	RA06	D-8	RE03	B-3
C161	J-8	C602	G-8	CS10	M-10	F386	G-16	Q423	H-14	R240	F-10	R506	J-11	RA07	D-8	RE12	I-6
C162	K-9	C604	J-8	CS11	N-9	F801	M-4	Q471	M-15	R241	E-12	R507	J-11	RA08	D-8	RE30	E-7
C173	G-8	C606	I-8	CV06	F-11	F802	C-6	Q601	H-8	R244	D-12	R508	J-12	RA09	D-8	RE36	M-12
C176	H-9	C608	I-8	CV07	L-10	IC301	D-15	Q602	I-8	R246	E-13	R517	G-10	RA10	D-7	RE37	M-12
C201	G-10	C611	B-16	CV70	N-9	IC501	I-9	Q801	F-2	R247	D-12	R551	F-10	RA11	D-7	RM100	E-10
C202	G-12	C612	B-15	D204	F-10	IC610	C-18	Q802	E-3	R248	D-13	R552	F-9	RA12	D-7	RS03	M-9
C205	H-10	C630	H-8	D205	N-13	ICA01	C-8	Q803	H-2	R257	N-14	R560	D-12	RA13	E-8	RS04	M-10
C207	G-12	C640	B-17	D206	N-14	ICA02	C-12	Q804	E-3	R260	F-12	R561	D-12	RA15	D-9	RS26	M-8
C209	F-11	C641	C-18	D210	G-11	IC501	L-9	Q840	H-5	R261	G-12	R562	F-9	RA16	D-9	RS27	M-8
C213	J-11	C642	B-18	D211	F-10	K910	A-2	Q863	H-4	R262	H-11	R564	D-12	RA17	D-10	RS28	L-8
C214	J-10	C643	B-18	D246	D-12	L061	K-7	Q870	F-5	R265	H-12	R565	F-9	RA18	D-10	RS32	M-8
C215	G-11	C644	B-18	D290	J-11	L101	K-8	QA10	B-11	R266	F-12	R601	G-8	RA23	E-9	RS36	M-10
C216	I-10	C645	D-18	D291	J-11	L102	K-8	QA11	C-12	R271	L-8	R603	J-8	RA24	E-9	RS38	L-8
C222	G-11	C646	A-16	D301	E-16	L103	J-9	QA12	E-7	R272	L-8	R606	H-8	RA25	B-11	RS39	M-8
C223	G-12	C647	D-18	D302	K-14	L104	G-9	QA13	D-10	R273	L-9	R607	H-8	RA26	C-9	RS42	L-10
C241	F-10	C648	D-17	D318	M-14	L105	H-9	QA14	D-10	R276	L-8	R618	H-8	RA27	C-8	RS43	M-8
C260	H-11	C649	B-17	D331	B-14	L141	G-8	QA15	D-10	R293	K-11	R619	I-8	RA29	B-11	RS100	N-12
C271	L-9	C801	M-3	D370	K-12	L142	F-9	QA90	D-11	R294	K-10	R638	B-15	RA34	C-7	RS101	N-12
C300	H-12	C802	K-3	D401	J-12	L145	H-9	QA91	C-11	R295	K-11	R639	B-15	RA36	D-7	RV01	N-10
C301	I-12	C803	J-2	D402	J-12	L161	J-7	QE05	J-6	R301	D-14	R640	B-16	RA39	C-12	RV27	L-10
C305	E-14	C810	I-2	D406	J-16	L171	G-9	QE35	M-11	R302	K-12	R641	B-15	RA40	C-13	RV70	N-9
C306	F-15	C811	I-4	D408	J-15	L202	J-11	QS07	M-10	R303	E-14	R647	C-18	RA41	C-12	RV71	N-9
C307	E-15	C812	I-4	D423	H-15	L205	G-12	QS08	M-10	R304	E-14	R648	C-17	RA42	B-7	RV72	N-9
C308	D-16	C827	A-16	D424	H-16	L301	E-15	QS09	L-8	R305	E-15	R659	H-8	RA43	B-7	RV73	N-9
C309	B-15	C840	H-4	D471	N-18	L409	H-18	QV70	N-9	R306	E-15	R699	B-18	RA44	B-7	RZ35	N-7
C310	J-14	C842	H-6	D472	M-15	L410	I-18	R001	I-7	R307	D-15	R803	B-2	RA45	B-7	SA01	A-2
C311	D-15	C843	H-5	D491	K-12	L441	F-17	R002	I-7	R308	E-15	R804	I-4	RA46	B-7	SA02	A-6
C313	B-14	C845	I-5	D492	K-12	L442	F-19	R003	C-10	R309	D-15	R805	N-5	RA47	B-8	SA03	A-7
C314	B-15	C860	E-2	D506	J-11	L501	I-12	R065	K-7	R313	E-15	R808	J-1	RA48	B-10	SA04	A-7
C315	H-10	C861	E-2	D507	J-11	L603	G-8	R103	J-9	R317	J-14	R810	K-3	RA69	E-7	SA05	A-8
C317	K-14	C862	F-2	D508	J-11	L604	J-8	R104	I-10	R318	M-14	R841	H-5	RA70	D-7	SA06	A-9
C325	K-12	C863	D-2	D561	D-12	L810	J-3	R106	J-8	R327	K-15	R842	H-5	RA71	E-7	SA07	A-10
C330	B-14	C864	E-3	D610	C-17	L860	F-1	R110	J-9	R336	E-16	R843	G-6	RA72	E-7	SA08	A-11
C401	N-13	C865	D-1	D611	C-17	L861	F-1	R111	H-12	R352	N-15	R860	G-3	RA73	B-10	SA09	A-12
C403	J-12	C866	I-3	D612	C-18	L862	G-3	R115	J-8	R370	D-14	R861	G-3	RA74	B-10	SA10	A-12
C404	J-12	C867	D-2	D613	C-18	L883	E-5	R141	G-8	R401	I-12	R862	G-3	RA75	C-12	SR81	J-5
C410	K-12	C871	G-5	D801	J-2	L884	D-5	R142	G-8	R402	L-12	R863	E-3	RA76	B-10	T401	E-19
C413	E-17	C872	F-5	D840	I-5	L885	C-5	R143	G-9	R403	J-12	R864	F-3	RA77	C-10	T461	L-17
C416	D-17	C874	G-5	D841	I-5	L886	B-2	R152	I-8	R406	M-12	R865	H-3	RA78	C-10	T801	M-2
C417	E-18	C880	B-3	D842	I-5	L887	D-4	R158	F-8	R410	E-17	R866	D-3	RA79	B-13	T840	K-5
C419	F-18	C881	B-2	D843	I-5	LA01	D-9	R161	K-7	R411	F-16	R867	D-1	RA80	E-12	T862	F-4
C421	G-14	C883	G-5	D846	G-6	LA28	E-7	R162	K-8	R414	G-14	R869	D-3	RA83	D-10	TP-R	M-15
C422	G-15	C884	C-4	D861	E-3	M902	L-14	R163	J-8	R415	E-18	R870	F-6	RA85	D-10	TP-X	M-15
C423	H-16	C888	E-5	D862	G-5	M903	L-11	R164	K-8	R416	E-17	R871	F-6	RA86	D-10	TP12	G-10
C440	J-18	C890	D-5	D863	D-3	MD02	G-16	R166	K-9	R425	H-15	R872	E-5	RA87	E-10	TPBB	G-13
C442	F-17	C899	B-5	D864	D-3	P401	H-17	R173	F-8	R426	H-16	R873	F-6	RA90	E-11	X201	L-7
C444	H-18	CA11	E-7	D866	H-3	P603	A-17	R174	G-8	R430	M-15	R874	G-5	RA91	D-11	X401	I-12
C445	M-19	CA20	C-9	D867	D-2	P0802	N-4	R204	F-10	R440	J-17	R875	G-5	RA92	D-11	X501	J-10
C446	F-18	CA21	C-9	D870	G-6	P910	K-2	R206	G-12	R441	G-17	R876	D-6	RA93	D-11	XA01	D-9
C446	J-16	CA28	B-9	D871	F-3	PD01A	K-19	R207	G-9	R444	I-17	R877	H-4	RA94	D-11	Z101	K-9
C448	I-16	CA29	B-9	D878	G-6	PS01	A-11	R208	G-11	R447	I-16	R878	D-6	RA95	C-10	Z141	G-8
C449	I-14	CA41	C-11	D883	D-6	PS02	A-12	R209	J-11	R448	H-15	R879	E-5	RA101	C-7	Z601	H-8
C463	G-18	CA75	C-12	D884	B-2	PS07	N-11	R210	G-12	R472	M-15	R880	E-5	RA102	A-6		
C471	M-15	CA76	D-13	D885	C-5	PS08	N-12	R211	G-10	R475	N-15	R881	H-6	RA103	A-7		

