

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.

TEST JIG HOOKUP				
Chek-A-Color Function	Adapter No.	PC Board Plug No.	Pin	Color
CRT	B239	DY	1	Green
Yoke	D482		2	Yellow
Yoke Setting	YP1		4	Blue
Comments	Focus Tap		6	Red

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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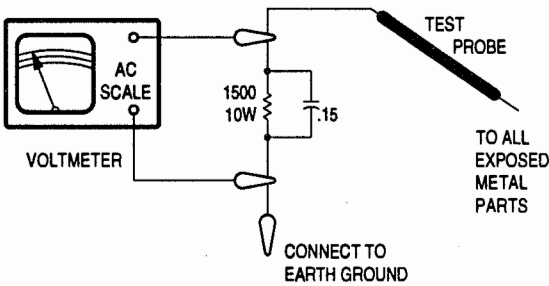
SAFETY CHECKS -- FIRE AND SHOCK HAZARD

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.



HORIZONTAL OSCILLATOR DISABLE TEST

Apply 120VAC and turn on receiver. Set video menu to normal and adjust picture to zero. Turn receiver off and connect a 20K potentiometer in series with a 5600 resistor between pin 1 and 2 of IC801. Monitor the high voltage with a high voltage probe. Turn receiver on and slowly reduce the resistance of the 20K potentiometer. The high voltage should not exceed 37.8kV when the horizontal loses sync. If the high voltage exceeds 37.8kV or the receiver fails to lose horizontal sync, the horizontal oscillator disable circuit needs repair.



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PHOTOFACT® Technical Service Data

SET 3759

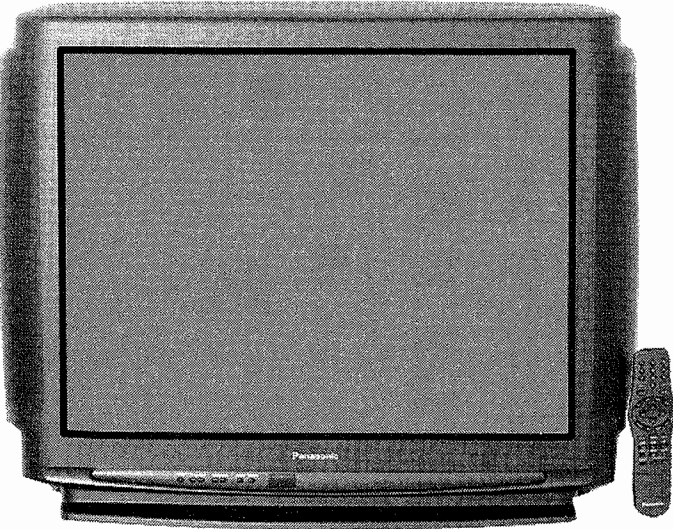
MODELS CT-32G31U/UU (CHASSIS AEDP276)

PANASONIC

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PANASONIC  
Models CT-32G31U/UU (Chassis AEDP276)



Model CT-32G31U  
Essential coverage  
for servicing a television receiver...

- Schematics
- Component locations
- Parts list



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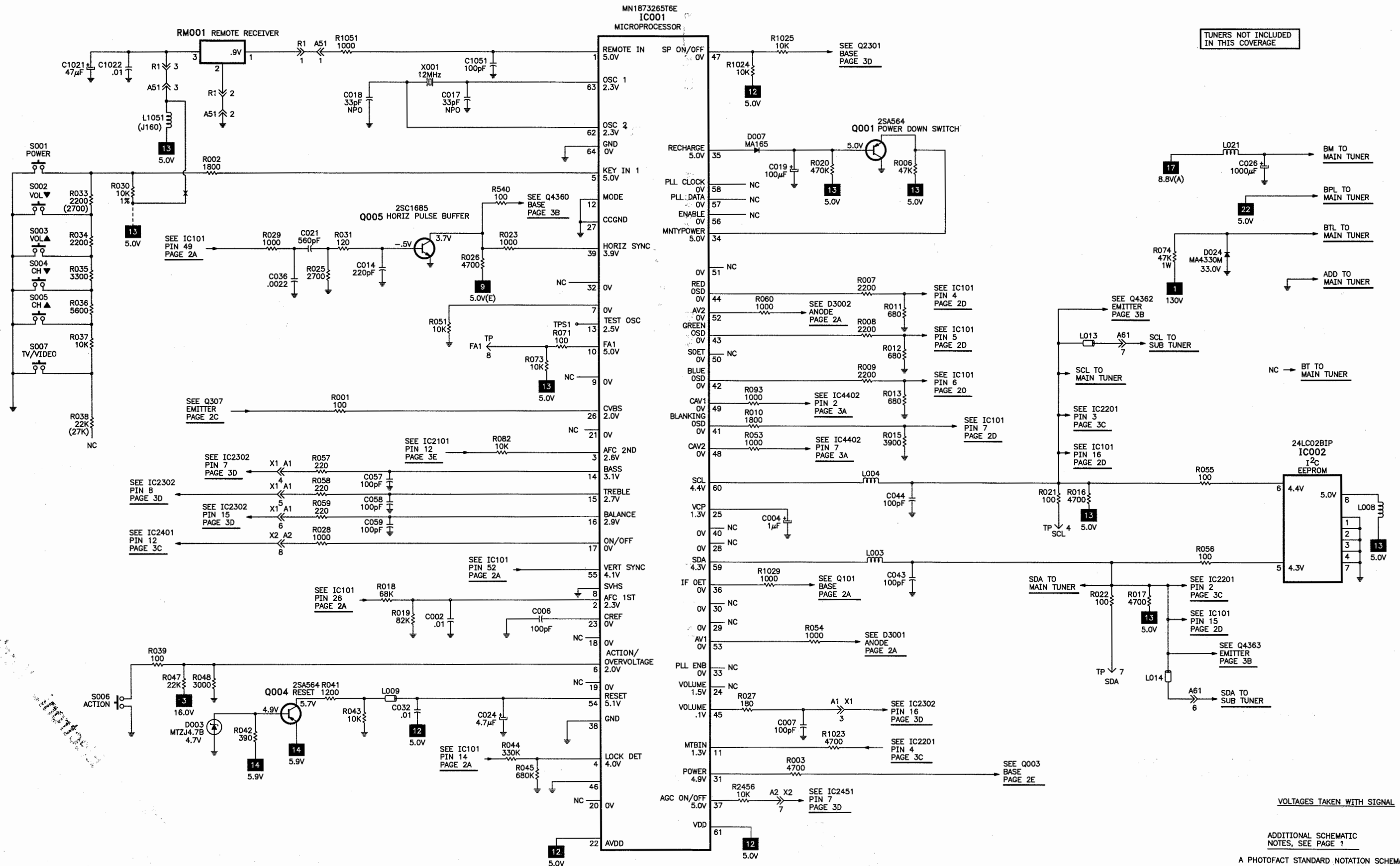
DECEMBER 1996 SET 3759

For Supplier Address,  
See PHOTOFACT Annual Index

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# SYSTEM CONTROL SCHEMATIC

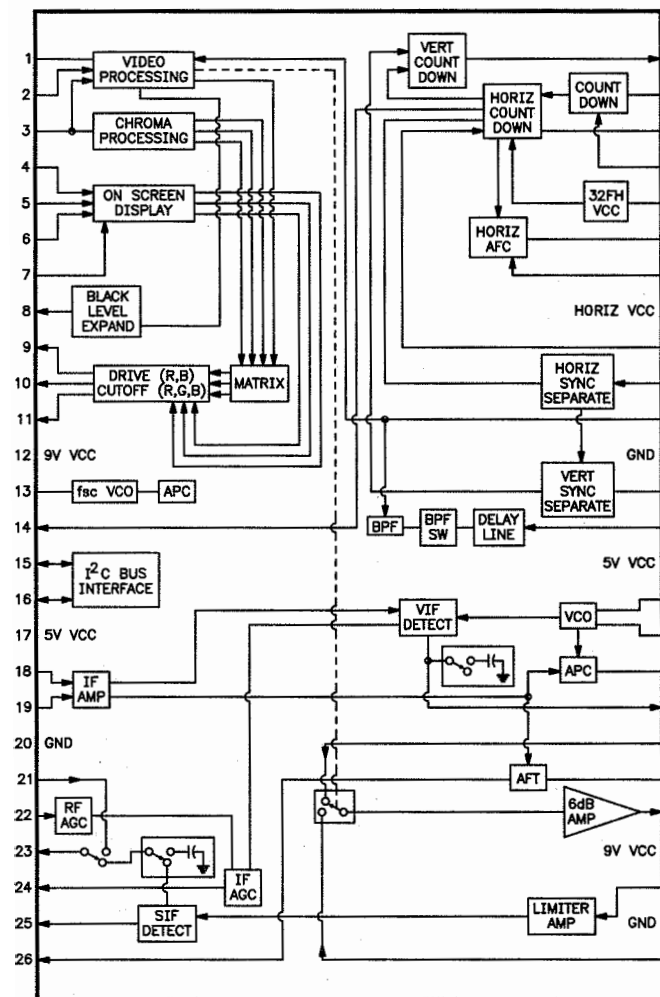


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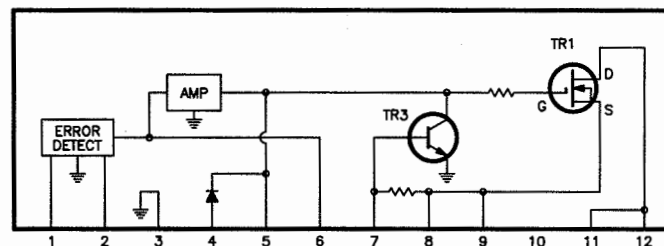
MODELS CT-32G31U/UU (CHASSIS AEDP276)

## IC FUNCTIONS

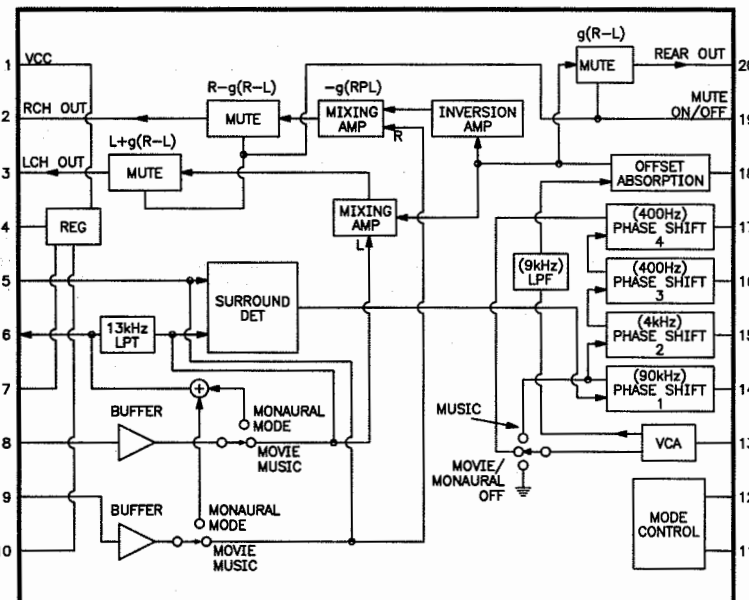
IC101  
AN5163K



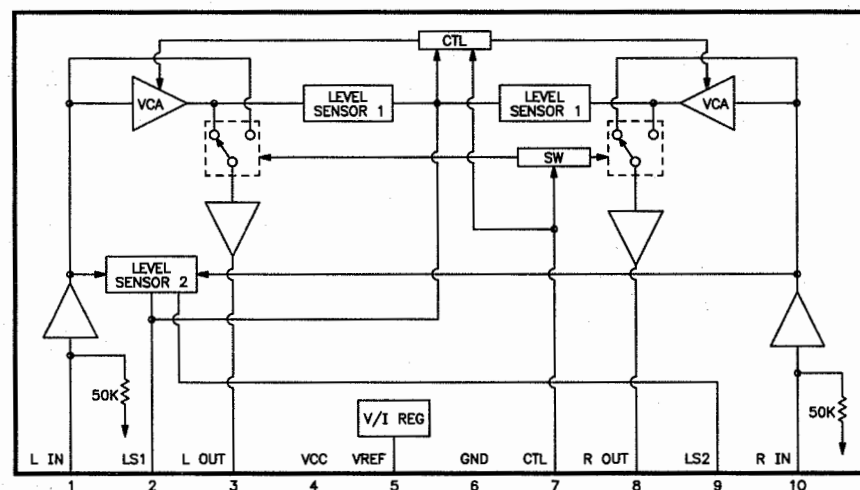
IC801  
STK730-020



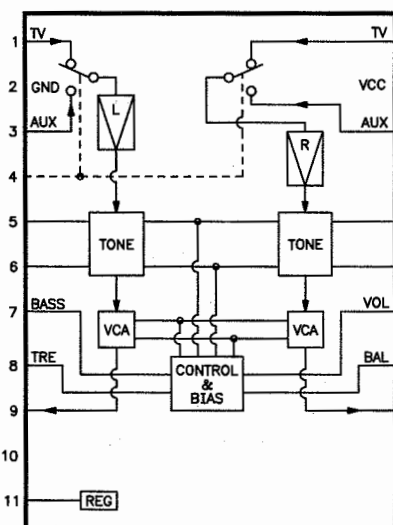
IC2401  
UPC1891AC



IC2451  
AN5285K



IC2302  
CXA1279AS



## 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.

## SERVICE INFORMATION

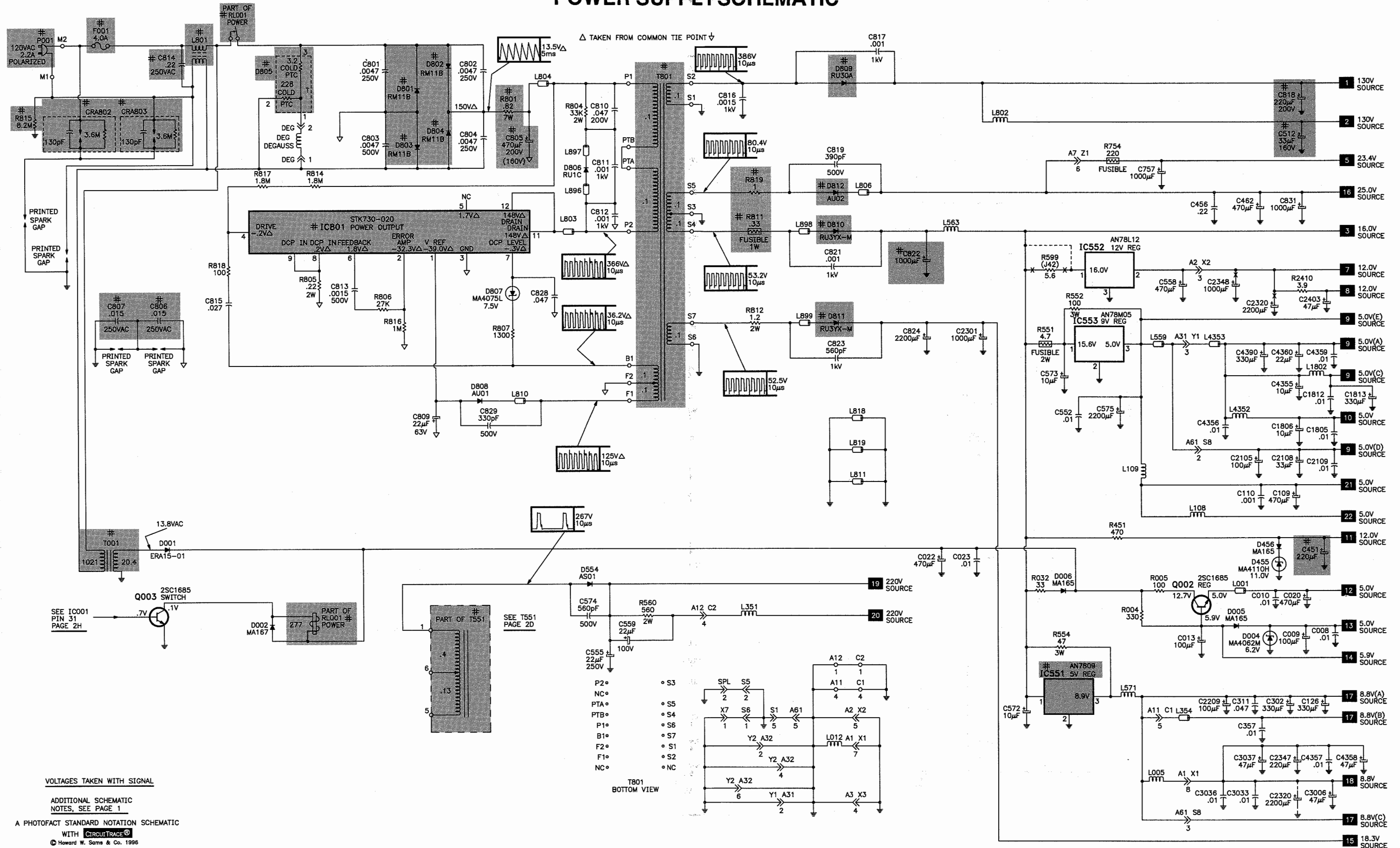
### CRT PROTECTION

The CRT protection circuit is made up of Q451 and Q452. This circuit blanks out the CRT if vertical deflection failure occurs.

It is important for the life of the CRT that this circuit be tested before returning the receiver to the customer.

To test, short the base of Q452 to ground. The screen should go blank, if not this circuit needs repair.

# POWER SUPPLY SCHEMATIC





MISCELLANEOUS ADJUSTMENTS

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

B+ CHECK

Connect a digital DC voltmeter to cathode of D809 and ground. Set brightness and picture to minimum. With AC line voltage set to 120VAC, B+ should read 130V ±1.0V.

HIGH VOLTAGE CHECK

Tune in a picture. Connect a high voltage probe to CRT anode. High voltage must read between 26.5kV and 29.5kV.

RF AGC DELAY

Tune in a picture. Adjust R106 counterclockwise until snow appears in picture, then clockwise to a point just past where snow disappears.

PIP RF AGC DELAY

Tune in a picture on the PIP window. Adjust R2118 counterclockwise until snow appears in picture on the PIP window, then clockwise to a point just past where snow disappears.

COMB FILTER

Tune in a color bar pattern. Set picture menu adjustments to normal. Adjust sharpness to maximum and color to minimum. Connect an oscilloscope to pin 5 of connector A3. Set R3215 fully clockwise. Adjust L3202 and R3215 for minimum burst amplitude.

PIP SUB BRIGHTNESS

Tune in a picture and turn on the PIP. Adjust R1814 so that the brightness level of the PIP window matches the brightness level of the main picture.

PURITY CHECK

Enter Serviceman mode. Press recall button on remote to enter purity check mode. Press recall button repeatedly to display white, red, green, and blue raster. Check the purity with each color.

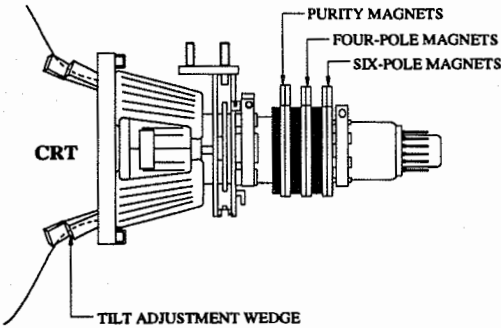
PURITY

Enter Serviceman mode. Press recal button on remote to enter purity check mode. Press recall button again 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 terminals and tune in a dot pattern. Adjust 4-pole magnets to converge the red and blue dots at the center of the screen. Adjust 6-pole magnets to converge the red/blue dots over the green dots at the center of the screen. Rotate the two tabs of each set of magnets equally and opposite to converge vertically and rotate both tabs in the same direction to converge horizontally. The 4- pole and 6-pole magnets interact, repeat adjustment until center convergence is correct. Tune in a crosshatch pattern. Remove rubber wedges between the deflection yoke and CRT. Tilt deflection yoke up or down to converge the vertical lines at the top and bottom of the screen and the horizontal lines at the left and right sides of the screen. Tilt the deflection yoke left or right to converge the horizontal lines at the top and bottom of the screen and the vertical lines at the left and right sides of the screen. Repeat convergence procedure, if necessary, to obtain the best overall convergence. Replace rubber wedges. If the yoke or CRT is replaced, convergence corrector strip (Part No. 0FMK014ZZ) may be required to match the yoke and CRT for optimum convergence. Position the strip between the CRT and yoke for best convergence at corners of screen and secure with tape.

CRT NECK ASSEMBLY



ENTERING SERVICEMAN MODE

NOTE: Write down original values before making any adjustments in case of misadjustment. Always exit Serviceman mode when finished making adjustments. Turn receiver on and momentarily connect connector TP, pin 8 to ground. The set will enter Aging mode, volume up and down buttons will adjust rapidly. Press action button and volume up button on receiver control panel simultaneously. The receiver will enter the Serviceman mode, volume up and down buttons will adjust normally and all customer controls are set to normal. Press power button on remote to select one of four service modes.

- B - DAC Mode Adjustments
- C - CRT Mode Adjustments
- S - Factory Adjustments for PIP
- M - MTS Mode Adjustments
- Normal TV Mode - Normal operation of channel and volume buttons

Press the channel up or down button on the remote to select the adjustments. Press the volume up or down button on the remote to adjust the level of the selected adjustment.

EXIT SERVICEMAN MODE

Press action and power buttons on receiver control panel simultaneously for approximately 2 seconds to exit serviceman mode. The receiver will shut off, then come back on with audio on channel 3.

DAC ADJUSTMENTS

DAC Mode Adjustment Range and Default Levels

Service Adjustment	Range	Default Level	On-Set Level
Sub Brightness (B0)	0 - 127	97	67
Sub Color (B1)	0 - 63	31	45
Sub Tint (B2)	0 - 63	33	37
Sub Picture (B3)	0 - 63	21	26
Video Detector Level (B4)	0 - 15	8	9
Sound Output (B5)	0 - 15	8	8

Sub Brightness (B0)

This adjustment must be made after sub picture (B3) and color temperature (C1 thru C5) adjustments are made. DO NOT adjust screen control after sub brightness (B0) is set. Operate receiver for minimum of 10 minutes before performing adjustment. Connect a color bar signal with pure white and pure black to the antenna input. Switch color off. Enter DAC mode, select sub brightness (B0), and adjust until the black bar starts to turn gray, then decrease adjustment until bar turns black.

Sub Color (B1)

Tune in a color bar signal. Connect oscilloscope to pin 1 of connector C1, low side to ground. Connect TPD2 to ground. Enter DAC mode, select sub color (B1), and adjust waveform for .75Vp-p ±.05Vp-p. Remove the jumper.

Sub Tint (B2)

Tune in a color bar signal. Connect oscilloscope to pin 1 of connector C1, low side to ground. Connect TPD2 to ground. Enter DAC mode, select sub tint (B2), and adjust waveform so the 1st and 4th peaks are of equal amplitude. Remove the jumper.

Sub Picture (B3)

NOTE: This adjustment is factory set do not adjust unless associated circuit, CRT, or CRT board is replaced. Connect a color bar signal to the antenna input. Connect oscilloscope to pin 2 of connector C1. Connect TPD2 to ground. Enter DAC mode, select sub picture (B3), and adjust for 2.9Vp-p ±.1Vp-p from white to black level. Remove the jumper.

Video Detector Level (B4)

Connect a color bar signal to the antenna input. Connect oscilloscope to the base of Q305. Enter DAC mode, select video detector level (B4), and adjust for 1V p-p ±.5Vp-p.

Sound Output (B5)

This adjustment is factory set, do not adjust unless IC002 or IC101 has been replaced. Enter DAC mode and select sound output (B5). Set for clearest sound at all listening levels.

CRT ADJUSTMENTS

CRT Mode Adjustment Range and Default Levels

Service Adjustment	Range	Default Level	On-Set Level
Horizontal Centering (C0)	0 - 15	8	4
Red Cutoff (C1)	0 - 511 *	128	229
Green Cutoff (C2)	0 - 511 *	128	207
Blue Cutoff (C3)	0 - 511 *	128	242
Red Drive (C4)	0 - 255	128	89
Blue Drive (C5)	0 - 255	128	149

\* Adjustment indicated in 2 steps (0-255)... (H0 - H255).

Horizontal Centering (C0)

Tune in a crosshatch pattern. Enter CRT mode, select horizontal centering (C0) adjustment, and adjust crosshatch pattern for correct horizontal centering.

Color Temperature (B0 and C1 thru C5)

Tune in a color bar pattern and set the color to 0. Turn the screen control fully counterclockwise. Enter the CRT mode and select the red cutoff (C1), green cutoff (C2), and blue cutoff (C3). Set the levels to 128. Enter DAC mode and select sub brightness (B0). Connect a jumper between pins 3 and 6 of connector TP. Connect an oscilloscope to pin 2 of connector C1. Adjust the sub brightness level so that the top of the waveform is 2.4VDC above ground. Disconnect the jumper between pins 3 and 6 of connector TP. Enter the CRT mode and select red cutoff (C1). Reconnect the jumper between pins 3 and 6 of connector TP. Connect an oscilloscope to pin 8 of the CRT. Adjust the level so that the bottom of the waveform is 195V above ground. Disconnect the jumper between pins 3 and 6 of connector TP. Enter the CRT mode and select green cutoff (C2). Reconnect the jumper between pins 3 and 6 of connector TP. Connect the oscilloscope to pin 6 of the CRT. Adjust the level so that the bottom of the waveform is 195V above ground. Disconnect the jumper between pins 3 and 6 of connector TP. Enter the CRT mode and select blue cutoff (C3). Reconnect the jumper between pins 3 and 6 of connector TP. Connect the oscilloscope to pin 11 of the CRT. Adjust the level so that the bottom of the waveform is 195V above ground. Turn the screen control clockwise to obtain a just visible line of one dominant color. Adjust the level of the other two cutoffs for a dim white line. Disconnect the jumper between pins 3 and 6 of connector TP and check for a good gray scale. Select red drive (C4) and blue drive (C5) and adjust the levels for correct white areas. Tune in a picture and check for good white balance at high and low brightness. Set color to midrange.

FACTORY ADJUSTMENTS

Factory adjustments for PIP can be entered but adjustments should not be necessary. They are factory set for normal PIP performance. Write original values in case one of the adjustments is changed by mistake.

Factory Mode Adjustment Range and Default Levels

Service Adjustment	Range	Default Level	On-Set Level
PIP Color (S0)	0 - 127	25	25
PIP Tint (S1)	0 - 127	55	55
PIP Sync Level (S2)	0 - 7	4	4
PIP Upper Vertical Position (S3)	0 - 255	229	229
PIP Lower Vertical Position (S4)	0 - 255	111	111
PIP Left Horizontal Position (S5)	0 - 255	32	30
PIP Right Horizontal Position (S6)	0 - 255	128	126
Small PIP Upper Vertical Position (S7)	0 - 255	229	229
Small PIP Lower Vertical Position (S8)	0 - 255	93	93
Small PIP Left Horizontal Position (S9)	0 - 255	32	30
Small PIP Right Horizontal Position (SA)	0 - 255	142	140
MPU Reference Oscillator (SB)	0 - 255	128	137

MPU Reference Oscillator (SB)

Connect a frequency counter to pin 13 of IC001. Turn receiver off. Record the frequency. Turn the receiver on and enter the serviceman mode. Select MPU reference oscillator (SB). Adjust (SB) based on the following formula: (SB) = (128 + 901000) x [244.1406 - pin 13 (measured in Hz) / 244.1406]

MTS ADJUSTMENTS

All adjustments were made using a MTS TV/stereo generator connected to the antenna terminals, with the customer controls set to normal listening levels. Select stereo mode.

MTS Mode Adjustment Range and Default Levels

Service Adjustment	Range	Default Level	On-Set Level
Input Level (M0)	0 - 63	31	49
VCO (M1)	0 - 63	31	27
Filter (M2)	0 - 63	31	23
Low Level Separation (M3)	0 - 63	31	20
High Level Separation (M4)	0 - 63	31	17

Input Level (M0)

On generator select pilot, 1kHz audio frequency, and L-R modulating signal. Connect an oscilloscope to pin 26 of IC2201. Enter MTS mode, select input level (M0), and adjust for 400mVp-p.

VCO (M1)

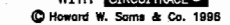
On generator select pilot, 1kHz audio frequency, and L-R modulating signal. Set volume for an audible signal (about 15). Enter MTS mode and select VCO (M1). Set the level to 0 and then increase until a clear signal is heard.

Filter (M2)

Select SAP mode on the receiver. On generator select SAP, 1kHz audio frequency, and L-R modulating signal. Connect an oscilloscope to pin 24 of IC2201. Enter MTS mode, select filter (M2), and adjust for minimum amplitude.

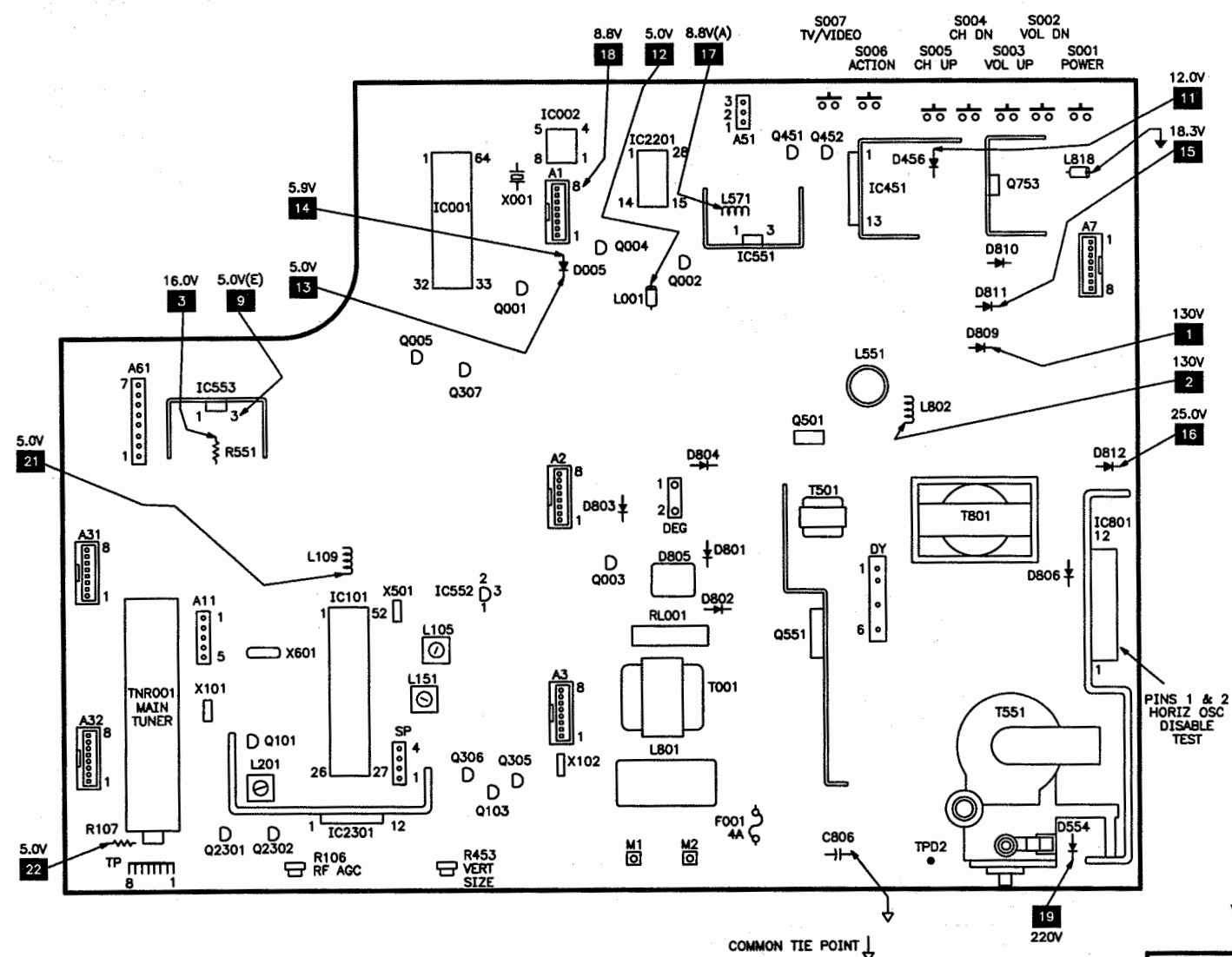
Separation (M3 and M4)

On generator select pilot, 300Hz audio frequency, and left modulating signal. Connect an oscilloscope to pin 25 of IC2201. Enter MTS mode, select low level separation (M3), and adjust for minimum amplitude. Select 8kHz on the generator. Select high level separation (M4) and adjust for minimum amplitude. Repeat for fine adjustment.

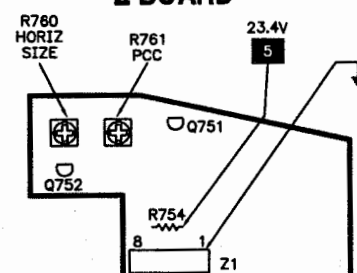


## PLACEMENT CHART

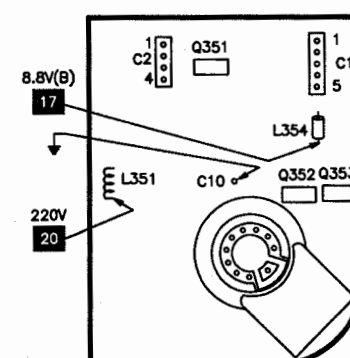
## A BOARD



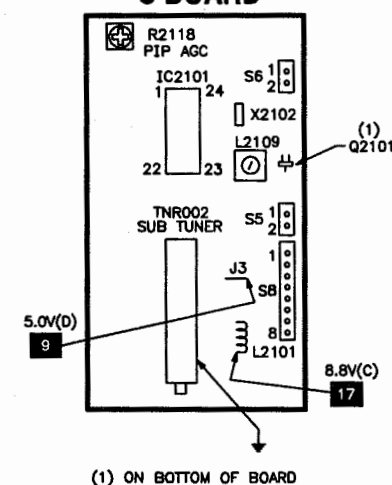
## Z BOARD



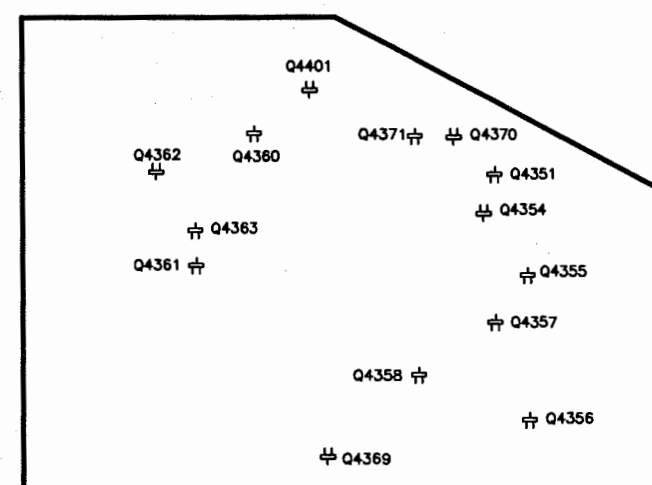
## C BOARD



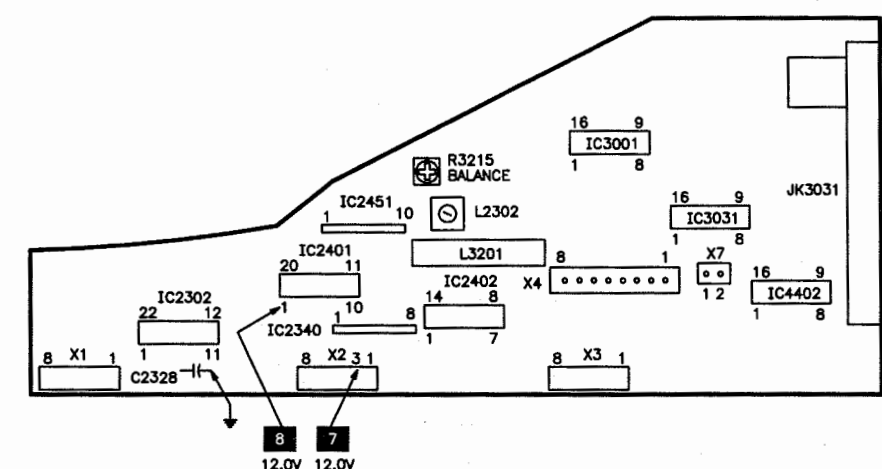
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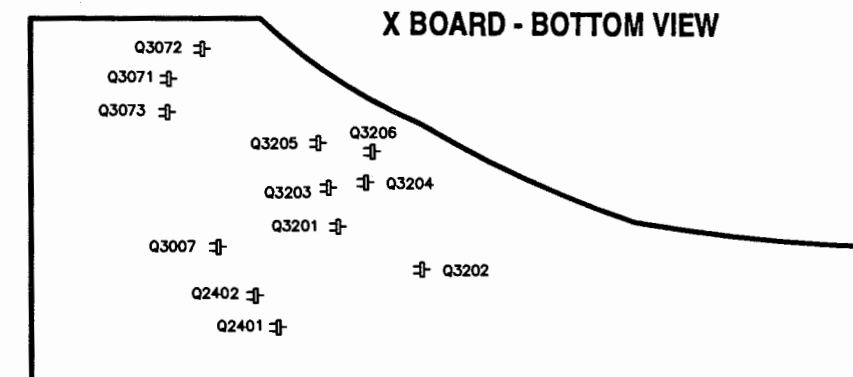
### Y BOARD - BOTTOM VIEW



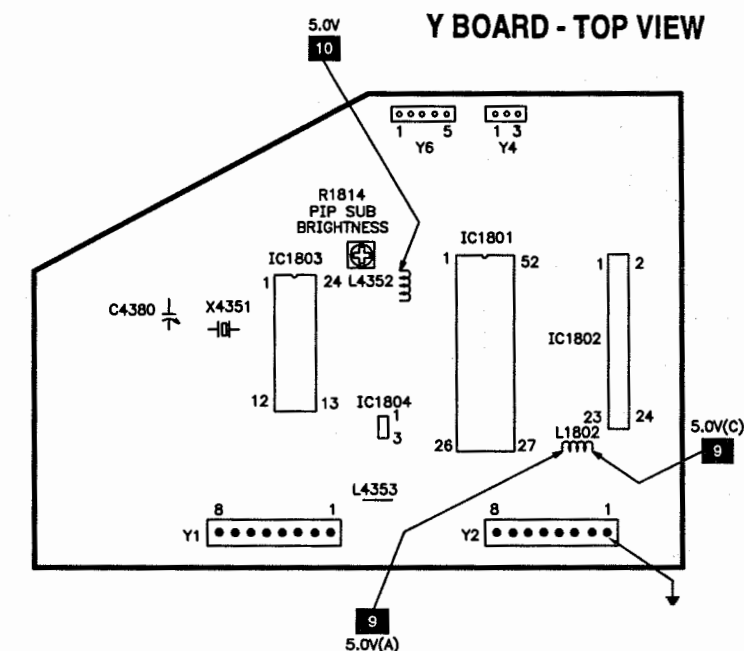
### X BOARD - TOP VIEW



**X BOARD - BOTTOM VIEW**



### Y BOARD - TOP VIEW

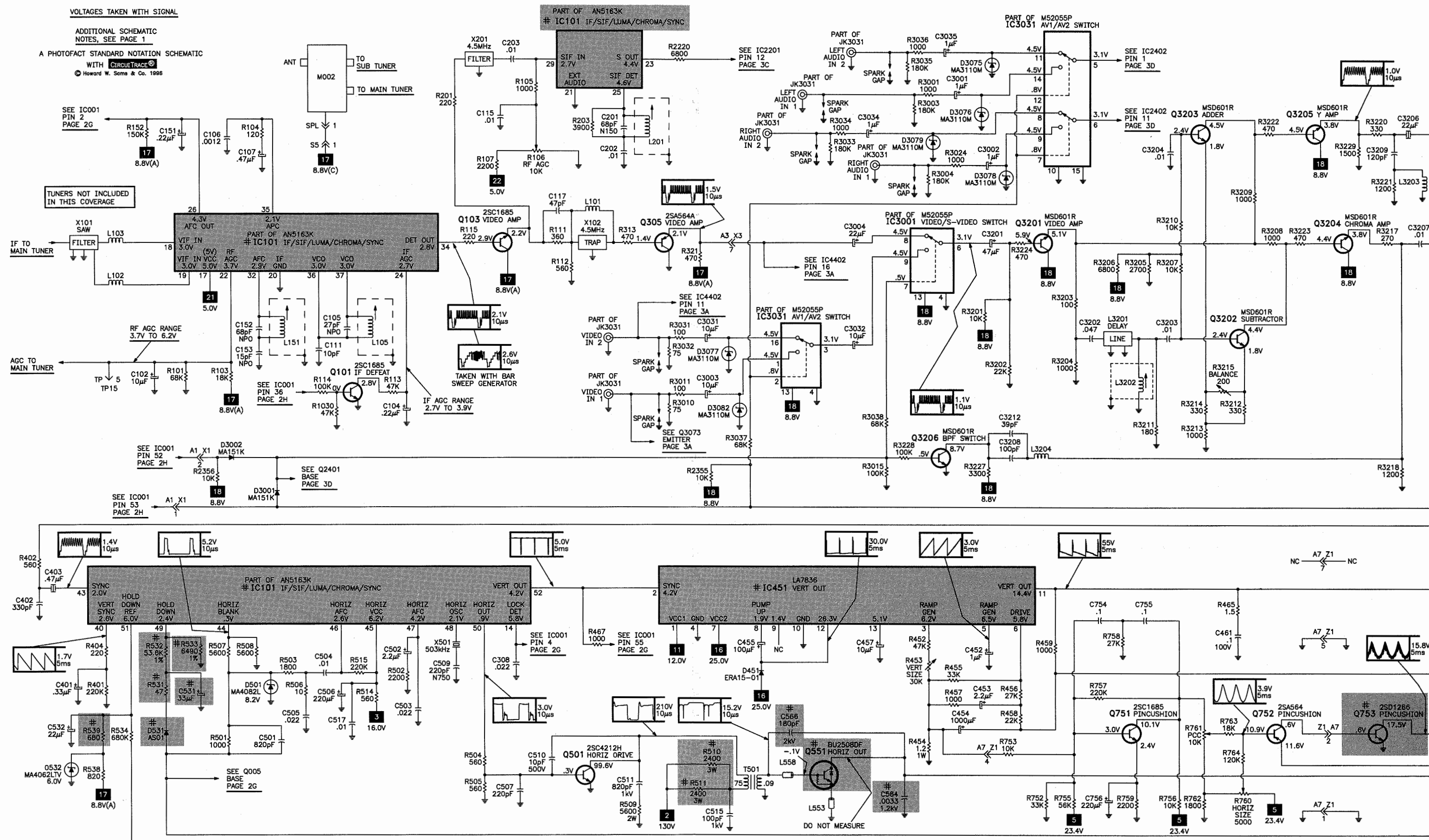


## VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC  
NOTES, SEE PAGE 1

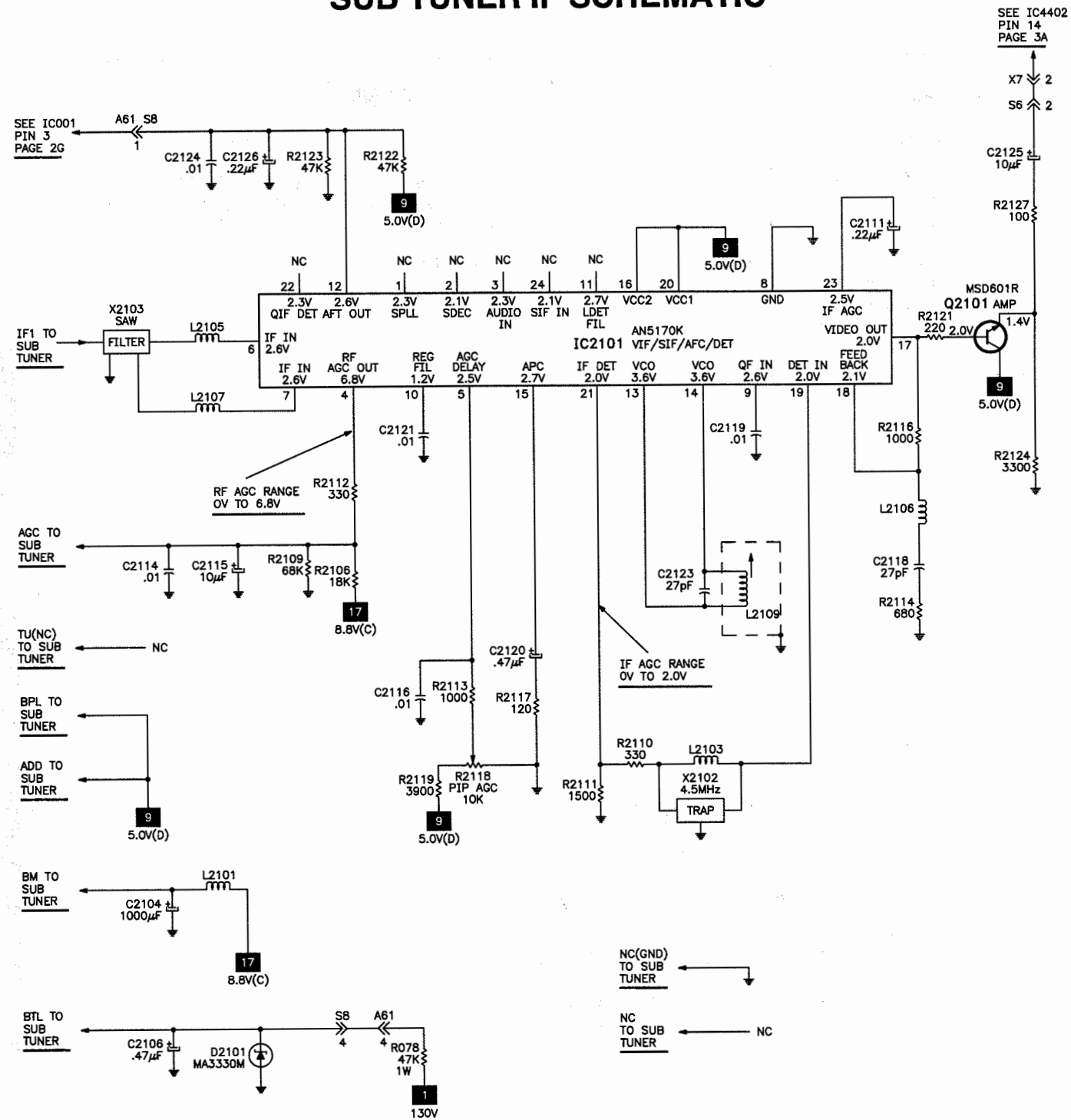
### A PHOTOFACT STANDARD NOTATION SCHEMATIC

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SUB TUNER IF SCHEMATIC

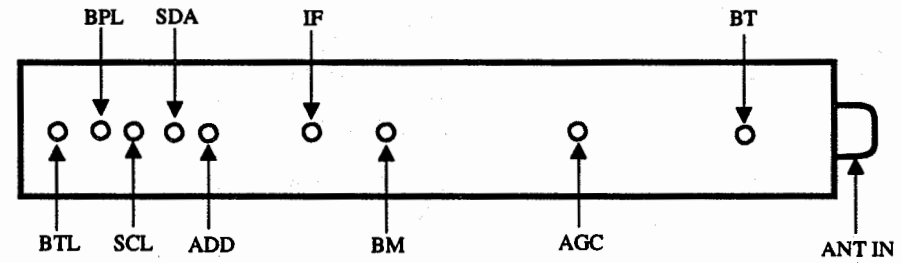


TUNER INFORMATION

MAIN TUNER VOLTAGE CHART (TNR001)

Pin	VHF Low Band	VHF High Band	UHF Band	Pin	VHF Low Band	VHF High Band	UHF Band
BT	1.1V	4.6V	5.4V	SCL	4.2V	4.2V	4.2V
AGC	3.9V	4.5V	4.1V	BPL	5.0V	5.0V	5.0V
BM	8.4V	8.4V	8.4V	BTL	3.7V	7.2V	7.9V
IF	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.			
ADD	0V	0V	0V				
SDA	4.2V	4.2V	4.2V				

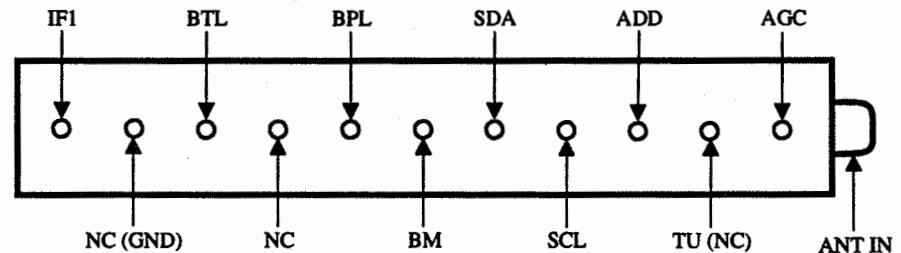
MAIN TUNER TERMINAL GUIDE (TNR001)



SUB TUNER VOLTAGE CHART (TNR002)

Pin	VHF Low Band	VHF High Band	UHF Band	Pin	VHF Low Band	VHF High Band	UHF Band
AGC	6.8V	4.8V	4.3V	NC (GND)	0V	0V	0V
TU (NC)	4.6V	4.6V	5.0V	IF1	0V	0V	0V
ADD	5.0V	5.0V	5.0V	NOTE: VHF Low Band voltages taken on channel 2. VHF High Band voltages taken on channel 7. UHF Band voltages taken on channel 14. Voltages taken with the PIP window displaying a color bar pattern.			
SCL	4.2V	4.2V	4.2V				
SDA	4.2V	4.2V	4.2V				
BM	8.6V	8.6V	8.6V				
BPL	5.0V	5.0V	5.0V				
NC	0V	0V	0V				
BTL	7.2V	7.2V	7.6V				

SUB TUNER TERMINAL GUIDE (TNR002)



PARTS LIST continued

COILS & TRANSFORMERS

Item No.	Function/Rating	Mfr. Part No.
DEG	Degaussing	0LK19050A
L001	Ferrite Bead	EXCELSA24
L003	4.7µH	TLUABTA4R7K
L004	4.7µH	TLUABTA4R7K
L005	10µH	TLUABTA100K
L008	12µH	TLUABTA120K
L009	Ferrite Bead	EXCELSA35
L012	1µH	TLUABTA1R0K
L013, 14	Ferrite Bead	EXCELSA24
L021	39µH	TLUABTA390K
L101	1.5µH	TLTACT150K
L102	1.5µH	TLQ015J205C
L103	1.5µH	TLQ015J205C
L105	VCO	EIV7EN053B
L108	1µH	TLUABTA1R0K
L109	1µH	TLUABTA1R0K
L151	AFT	EIV7EN041B
L201	Quadrature	EQS7EN053B
L351	150µH	TLUABTA151K
L352, 53	Ferrite Bead	EXCELSA35
L354	Ferrite Bead	EXCELDLDR25C
# L551	Horizontal Linearity	TLH6663P
L553	Ferrite Bead	EXCELSA24
L558	Ferrite Bead	EXCELSA24
L559	Ferrite Bead	EXCELSA35
L563	33µH	ELEIE330KA
# L570	Yoke	TLYA007
	Horiz .9mH	
	Vert 20.6mH	
L571	68µH	ELEIE680KA
L601	10µH	TLTACT100K
# L751	Pincushion	TLH15727
# L801	Line Filter	TLPD008
L802	33µH	ELEIE330KA
L803	Ferrite Bead	EXCELSA39
L804	Ferrite Bead	EXCELSA39
L806	Ferrite Bead	EXCELSA35
L810	Ferrite Bead	EXCELSA24
L811	Ferrite Bead	EXCELSA35
L818, 19	Ferrite Bead	EXCELSA35
L1051	150µH	TLUABTA151K
L1802	10µH	TLTACT100K
L2101	12µH	TLTACT120K
L2103	15µH	TLTACT150K
L2105	1.2µH	TLTACT1R2K
L2106	56µH	TLTACT560K
L2107	1.2µH	TLTACT1R2K
L2109	VCO	EIV7EN053B
L3001	10µH	TLTACT100K
L3201	Delay Line	EFDEN645B35B
L3202	Trap	EIK1EG024B
L3203	18µH	TLTACT180K
L3204	10µH	TLTACT100K

# For SAFETY use only equivalent replacement part.

COILS & TRANSFORMERS continued

Item No.	Function/Rating	Mfr. Part No.
L4351	2.2µH	TLTACT2R2K
L4352	10µH	TLTACT100K
L4353	Ferrite Bead	EXCELDLDR25C
L4402	10µH	TLTACT100K
# T001	Power Supply	TLP16297
T501	Horizontal Driver	TLH15452
# T551 (1)	Horizontal Output	OLF04508F
# T801	Power	ETS39AG115AC

# For SAFETY use only equivalent replacement part.  
(1) Focus and screen controls are part of T551.

CABINET PARTS

Item	Mfr. Part No.
Cabinet Front	TXFKY1496SER
Cabinet Rear	TXFKU1196SER
Pushbutton	TBX2A50251G
Remote Transmitter	
Battery Cover	TKP2AA00501



Created with pride by the employees  
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J. Barker, N. Beck, A. Bonner,  
B. Bryant, B. Buchanan, T. Clensy,  
G. Farrell, B. Fink, M. Herkless,  
J. Kocha, F. Malek, B. Medaris,  
R. Raus, B. Skinner

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

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) | ▪ Sencore, Inc.                                |
| ▪ NTE Electronics, Inc. (NTE)                  | ▪ Terrell & Nobis (TNI Electronics)            |
| ▪ Philips ECG Company (ECG)                    | ▪ Thomson Consumer Electronics, Inc. (SK, TCE) |
| ▪ PTS Electronics Corporation (PTS)            |  |

PARTS LIST continued

CAPACITORS & ELECTROLYTICS

Item No.	Rating	Mfr. Part No.
C017	33pF 5% 50V NPO	TACCQ330T50V
C018	33pF 5% 50V NPO	TACCQ330T50V
C105	27pF 5% 50V NPO	TACCQ270T50V
C152	68pF 5% 50V NPO	TACCQ680T50V
C153	15pF 5% 50V NPO	TACCQ150T50V
C201	68pF 5% 50V N150	ECCF1H680JP
C301	10µF 16V NP	ECEA1CN100U
C309	1µF 50V NP	ECEA1HN010U
C355	.001 10% 2kV	ECKD3D102KB
C403	.47µF 50V NP	ECEA1HNR47U
# C451	220µF 16V	ECEA1CGE221
C452	1µF 25V Tantalum	ECSF1EE105
C509	220pF 5% 50V N750	ECCF1H221JU
C511	820pF 10% 1kV	ECKD3A821KB
# C512	33µF 160V	ECEA160V33Z
C515	100pF 10% 1kV	ECKD3A101KB
# C531	33µF 25V	ECA1EM330GB
# C563	.013 5% 1.2kV	TAC4R6B133JC
# C564	.0033 5% 1.2kV	TAC4R6B332JC
# C566	180pF 5% 2kV	ECKD3D181JB
# C569	.43 5% 200V	ECQF2H434JS
C602	15pF 5% 50V N750	ECCF1H150JU
# C805	470µF 200V	-
	470µF 160V	EC0S2DA471B4
# C806	.015 20% 250VAC	ECQU2A153MN
# C807	.015 20% 250VAC	ECQU2A153MN
C811	.001 10% 1kV	ECKD3A102KB
C812	.001 10% 1kV	ECKD3A102KB
# C814	.22 20% 250VAC	ECQU2A224MN
C816	.0015 10% 1kV	ECKD3A152KB
C817	.001 10% 1kV	ECKD3A102KB
# C818	220µF 200V	EC0S2DA221B4
C821	.001 10% 1kV	ECKD3A102KB
# C822	1000µF 25V	ECEA1EGE102
C823	560pF 10% 1kV	ECKD3A561KB
C2201	3.3µF 16V	AP335K016CAE
C2219	10µF 16V	AP106K016CAE
C2308	47µF 25V NP	ECEA1EN470U
C2310	10µF 16V NP	ECEA1CN100U
C2311	47µF 25V NP	ECEA1EN470U
C2325	3.3µF 50V NP	ECEA1HN3R3U
C2326	3.3µF 50V NP	ECEA1HN3R3U
C2455	1µF 50V NP	ECEA1HN010U
C2456	1µF 50V NP	ECEA1HN010U
C3206	22µF 10V NP	ECEA1AN220U
C4380	30pF Trimmer	ECRHA030E81
C4412	10µF 16V NP	ECEA1CN100U
C4414	10µF 16V NP	ECEA1CN100U

# For SAFETY use only equivalent replacement part.

MISCELLANEOUS

Item No.	Description	Mfr. Part No.	Notes
# CRA802, 03	Capristor	EXNG131P365	130pF/3.6M
# F001	Fuse	0BA1C40NU100	4Amp, 125V, Slow Blow
JK3031	Jack	TJB18619	Assembly
M002	Antenna Unit	ENPE620	-
# P001	Line Cord	TSX2AA0011	AC, Polarized
# RL001	Relay	TSEH8007	Power
RM001	Receiver	RPM-637CBRS	Remote
S001	Switch	EVQQKH06K	Power
S002	Switch	EVQQKH06K	Volume Down
S003	Switch	EVQQKH06K	Volume Up
S004	Switch	EVQQKH06K	Channel Down
S005	Switch	EVQQKH06K	Channel Up
S006	Switch	EVQQKH06K	Action
S007	Switch	EVQQKH06K	TV/Video
SP1, SP2	Speaker	TSA2A9D07	5" X 2 1/4", 8 Ohms
TNR001 (1)(2)	Main Tuner	ENV568Q8G3	UHF/VHF
TNR002 (1)(2)	Sub Tuner	ENV56DQ2G3	UHF/VHF
# V1	CRT	M80JUA061X	-
X001	Crystal	TSS2080MX	12MHz
X101	Filter	EFCKM1963M	SAW
X102	Trap	EFCWS4504AB	4.5MHz
X201	Filter	EFC4S4R5MS4W	4.5MHz
X501	Crystal	EF0A503KS41	503kHz
X601	Crystal	TS816M32	3.58MHz
X2102	Trap	EFCWS4504AB	4.5MHz
X2103	Filter	EFCKM1958M	SAW
X4351	Crystal	TSS2163-M	14.3MHz
	Magnet	0FMK014ZZ	Correction Strip
	PC Board (1)	TNPH0042AB	A
	PC Board (1)	TNPA0203AA	C
	PC Board (1)	TNP111805	R
	PC Board (1)	TNPA0190AB	S
	PC Board (1)	TNPA0205	X
	PC Board (1)	TNP111804DZ	Y
	PC Board (1)	ONP19080AZ	Z
#	Socket	TJS1A5050	CRT
	Transmitter	TNQ2AE006	Remote

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



(1) TAKEN WITH PIP WINDOW ON AND DISPLAYING A COLOR BAR PATTERN.

VOLTAGES TAKEN WITH SIGNAL

ADDITIONAL SCHEMATIC NOTES, SEE PAGE 1

A PHOTOFAC STANDARD NOTATION SCHEMATIC WITH CIRCUITTRACE®

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## 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.
Q103	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q305	2SA564AQ	2SA564AQRS	NTE290A	ECG290A	SK3932
Q306	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q307	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q351	2SC3063RL	2SC3063	NTE157	ECG157	SK3747
Q352	2SC3063RL	2SC3063	NTE157	ECG157	SK3747
Q353	2SC3063RL	2SC3063	NTE157	ECG157	SK3747
Q451	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q452	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q501	-	2SC4212H	-	-	-
# Q551	-	BU2508DF	NTE2353	ECG2353*	-
Q751	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q752	2SA564AQ	2SA564AQRS	NTE290A	ECG290A	SK3932
# Q753	-	2SD1266	NTE377	ECG377	SK9112
Q2101	-	MSD601R	-	-	-
Q2301	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q2302	2SA564AQ	2SA564AQRS	NTE290A	ECG290A	SK3932
Q2401	-	MSD601R	-	-	-
Q2402	-	MSD601R	-	-	-
Q3007	-	MSB709R	-	-	-
Q3071	-	MSD601R	-	-	-
Q3072	-	MSD601R	-	-	-
Q3073	-	MSD601R	-	-	-
Q3201	-	MSD601R	-	-	-
Q3202	-	MSD601R	-	-	-
Q3203	-	MSD601R	-	-	-
Q3204	-	MSD601R	-	-	-
Q3205	-	MSD601R	-	-	-
Q3206	-	MSD601R	-	-	-
Q4351	-	MSB709R	-	-	-
Q4354	-	MSB709R	-	-	-
Q4355	-	MSB709R	-	-	-
Q4356	-	MSB709R	-	-	-
Q4357	-	MSD601R	-	-	-
Q4358	-	MSB709R	-	-	-
Q4360	-	MSD601R	-	-	-
Q4361	-	MSD601R	-	-	-
Q4362	-	MSD601R	-	-	-
Q4363	-	MSD601R	-	-	-
Q4369	-	MSB709R	-	-	-
Q4370	-	MSB709R	-	-	-
Q4371	-	MSD601R	-	-	-
Q4401	-	MSB709R	-	-	-

# For SAFETY use only equivalent replacement part.

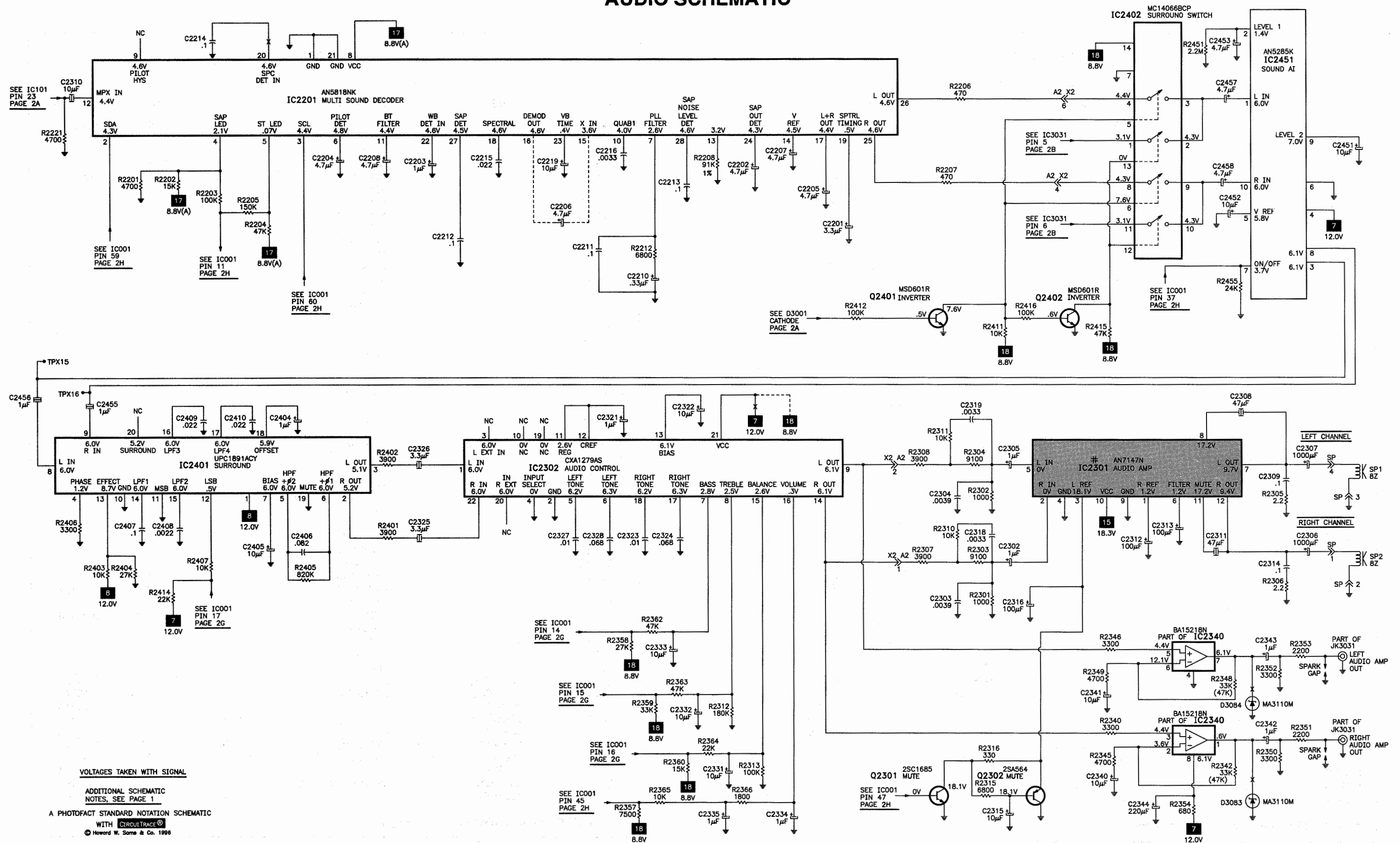
\* Lead configuration may vary from original.

## CONTROLS &amp; RESISTORS

Item No.	Function/Rating	Mfr. Part No.	NTE Part No.
# D805	3.2/228 Cold PTC	TRPW5BOM030D	-
R030	10K 1% 1/4W	ER0S2CKF1002	-
R106	10K RF AGC	EVND2AA03B14	-
R453	30K Vertical Size	EVND2AA03B34	-
# R510	2400 5% 3W	ERG3ANJ242	3W224
# R511	2400 5% 3W	ERG3ANJ242	3W224
# R531	47 5% 1/4W	ERD25FJ470	QW047
# R532	53.6K 1% 1/4W	ER0S2CKF5362	-
# R533	6490 1% 1/4W	ER0S2CKF6491	-
# R539	680 5% 1/4W	ERDS2TJ681	QW168
R551	4.7 5% 2W Fusible	ERQ2CJ4R7	F2W4D7
R552	100 5% 3W	ERG3SJ101	3W110
R554	47 5% 3W	ERG3SJ470	3W047
R558	2.4 5% 2W Fusible	ERQ2CJP2R4	F2W2D4
R754	220 5% 1/4W Fusible	ERQ14AJ221	-
R760	5000 Horizontal Size	EVND8AA03B53	-
R761	10K PCC	EVND8AA03B14	-
R768	10 5% 2W Fusible	ERQ2CJP100	F2W010
# R801	.82 10% 7W Wirewound	ERF7ZKR82	-
# R811	.33 10% 1W Fusible	ERQ1CKPR33	-
# R815	8.2M 20% 1/2W	ERC12ZGM825	HW582
# R819	1 5% 1/2W	ERDS1FJ1R0	HW1D0
R1814	2000 PIP Sub Brightness	EVND8AA03B23	-
R2118	10K PIP AGC	EVND8AA03B14	-
R2208	91K 1% 1/4W	ER0S2CKF9102	-
R3215	200 Balance	EVND8AA03B22	-

# For SAFETY use only equivalent replacement part.

## AUDIO SCHEMATIC



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.
D001	-	ERA15-01	NTE552	ECG552	SK9000
D002	-	MA167	NTE519	ECG519	SK3100
D003	MA4047M	-	NTE5009A	ECG5009A	SK4A7
	MTZJ4.7B	MTZJT-774.7B	-	-	-
D004	MA4062M	-	NTE5013A	ECG5013A	SK6A2
	MTZJ6.2C	MTZJT-776.2C	-	-	-
D005	-	MA165	NTE519	ECG519	SK3100
D006	-	MA165	NTE519	ECG519	SK3100
D007	-	MA165	NTE519	ECG519	SK3100
D024	MA4330M	-	-	-	-
	MTZJ36B	MTZJT-7736B	-	-	-
D352	MA4062L	-	NTE5012A	ECG5012A	SK6A0
	MTZM6.2A	MTZMT-776.2A	-	-	-
D353	MA4062L	-	NTE5012A	ECG5012A	SK6A0
	MTZM6.2A	MTZMT-776.2A	-	-	-
D355	MA4062L	-	NTE5012A	ECG5012A	SK6A0
	MTZM6.2A	MTZMT-776.2A	-	-	-
D451	-	ERA15-01	NTE552	ECG552	SK9000
D452	-	MA165	NTE519	ECG519	SK3100
D453	-	MA165	NTE519	ECG519	SK3100
D455	MA4110H	-	-	-	-
	MTZJ12A	MTZJT-7712A	-	-	-
D456	-	MA165	NTE519	ECG519	SK3100
D501	MA4082L	-	-	-	-
	MTZJ8.2B	MTZJT-778.2B	-	-	-
# D531	-	AS01	NTE552	ECG552	SK9000
D532	MA4062LTV	-	NTE5012A	ECG5012A	SK6A0
	MTZM6.2A	MTZMT-776.2A	-	-	-
D554	-	AS01	NTE552	ECG552	SK9000
	-	AU01	NTE552	ECG552	SK9000
	-	ERA2204	NTE552	ECG552	SK9000
D555	-	MA165	NTE519	ECG519	SK3100
D556	MA4360H	-	-	-	-
	MTZJ39D	MTZJT-7739D	-	-	-
# D558	-	RS3FS	NTE552	ECG552	SK9000
# D559	RU2M	TVSRU2MV1	NTE552	ECG552	SK9000
D560	-	MA165	NTE519	ECG519	SK3100
D563	-	MA165	NTE519	ECG519	SK3100
# D801	RM11B	TVSRM11B	NTE125	ECG125	SK3081
	EM02BM	-	NTE125	ECG125	SK3081
# D802	RM11B	TVSRM11B	NTE125	ECG125	SK3081
	EM02BM	-	NTE125	ECG125	SK3081
# D803	RM11B	TVSRM11B	NTE125	ECG125	SK3081
	EM02BM	-	NTE125	ECG125	SK3081
# D804	RM11B	TVSRM11B	NTE125	ECG125	SK3081
	EM02BM	-	NTE125	ECG125	SK3081
D806	RU1C	TVSRU1C	NTE558	ECG558	SK3998
D807	MA4075L	-	NTE5015A	ECG5015A	SK7A5
	MTZJ7.5B	MTZJT-777.5B	-	-	-
D808	-	AU01	NTE552	ECG552	SK9000
# D809	RU30A	RU30ALFS1	-	-	-
# D810	RU3YX-M	RU3YX-MLF-C2	-	-	-
# D811	RU3YX-M	RU3YX-MLF-C2	-	-	-

# 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.
# D812	-	AU02	NTE552	ECG552	SK9000
D1801	-	MA151K	NTE593	ECG593	SK9942
D2101	-	MA3330M	-	-	-
D3001	-	MA151K	NTE593	ECG593	SK9942
D3002	-	MA151K	NTE593	ECG593	SK9942
D3071	-	MA3110M	-	-	-
D3072	-	MA3110M	-	-	-
D3073	-	MA3110M	-	-	-
D3074	-	MA3110M	-	-	-
D3075	-	MA3110M	-	-	-
D3076	-	MA3110M	-	-	-
D3077	-	MA3110M	-	-	-
D3078	-	MA3110M	-	-	-
D3079	-	MA3110M	-	-	-
D3080	-	MA3110M	-	-	-
D3081	-	MA3110M	-	-	-
D3082	-	MA3110M	-	-	-
D3083	-	MA3110M	-	-	-
D3084	-	MA3110M	-	-	-
IC001	-	MN1873265T6E	-	-	-
IC002	-	24LC02BIP	-	-	-
# IC101	-	AN5163K	-	-	-
# IC451	LA7836	LA7836-TV	NTE7085	ECG7085	-
# IC551	-	AN7809	NTE1910	ECG1910	-
IC552	-	AN78L12	NTE950	ECG950	SK9169
IC553	-	AN78M05	NTE960	ECG960	SK3591
# IC801	-	STK730-020	-	-	-
IC1801	-	M65607SP	-	-	-
IC1802	-	M4C264AL-12	-	-	-
	-	MN47464L-12	-	-	-
IC1803	-	M52694P	-	-	-
IC1804	-	MN1280-R	NTE15044	-	SK9854
IC2101	-	AN5170K	-	-	-
IC2201	-	AN5818NK	-	-	-
# IC2301	-	AN7147N	-	-	-
IC2302	-	CXA1279AS	-	-	-
IC2340	-	BA15218N	NTE778S	ECG778S	SK10139
IC2401	-	UPC1891ACY	-	-	-
IC2402	-	MC14066BCP	NTE4066B	ECG4066B	SK4066B
IC2451	-	AN5285K	-	-	-
IC3001	-	M52055P	-	-	-
IC3031	-	M52055P	-	-	-
IC4402	-	M52055P	-	-	-
Q001	2SA564AQ	2SA564AQRS	NTE290A	ECG290A	SK3932
Q002	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q003	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q004	2SA564AQ	2SA564AQRS	NTE290A	ECG290A	SK3932
Q005	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A
Q101	2SC1685Q	2SC1685QRS	NTE85	ECG85	SK9229
	JC501PQ	-	NTE85	ECG85	SK3124A

# For SAFETY use only equivalent replacement part.