

# SAMS PHOTOFACT<sup>®</sup>

## AUTO RADIO SERIES



AR-230  
**230**  
DECEMBER, 1976



### CONTENTS

**BOMAN ASTROSONIX**  
BM-1150B

**JIL**  
852CB

**PANASONIC**  
CQ-969EU

**CLARION**  
RE-338A  
RE-338B

**MOTOROLA**  
TM402S

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana

World Radio History



\$3.50

\$4.40 IN CANADA

Cat. No. AR-230



# SAMS PHOTOFAC<sup>®</sup> AUTO RADIO SERIES



VOLUME

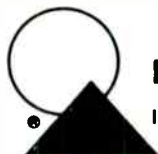
**230**



by the

*Howard W. Sams.*

ENGINEERING STAFF



**HOWARD W. SAMS & CO., INC.**

INDIANAPOLIS, INDIANA

**FIRST EDITION**  
**FIRST PRINTING—DECEMBER, 1976**

**PHOTOFACT®**  
**AUTO RADIO SERIES**  
**VOLUME 230**

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Library of Congress Catalog Card Number: 49-11493



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**AUTO RADIO SERIES**

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## **GENERAL SERVICING INFORMATION**

The following information applies to all tape units in this volume, and should be followed before any adjustments are made or trouble diagnosis is attempted. Any exceptions or additions will be found in the detailed servicing procedures for each tape unit.

### **POWER SOURCES**

Many tape units require full supply voltage for proper operation. Be sure the supply voltage is maintained at the rated value under load while making adjustments.

### **CLEANING**

All head faces should be cleaned with head cleaner or methyl alcohol to remove dust and accumulated oxide. (An applicator may be fashioned from absorbent cotton.) Do not use a screwdriver or any metallic object near the head faces.

*CAUTION: Avoid getting head cleaner on any plastic surface.*

Clean capstans, pressure rollers, and tape guides with alcohol using a soft lint-free cloth. Also use alcohol to remove oil and grease from drive belts and other driving surfaces.

### **LUBRICATING**

Clean all surfaces before lubricating. Apply a few drops of #20 machine oil to all bearings and rotating bushings. Apply a thin film of light, nonhardening grease to all cam surfaces and pawls, if they have been factory lubricated. Always wipe excess oil or grease from parts that have been lubricated.

*CAUTION: Oil and grease must be kept off all driving surfaces as well as any parts which may transfer oil or grease to them.*

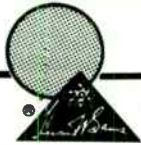
### **DEMAGNETIZING**

Heads require demagnetizing at regular intervals to maintain high-frequency response, dynamic range, and low distortion. (Follow instructions included with the demagnetizing unit.) After demagnetizing the heads, keep all screwdrivers and other metallic objects away from the head faces. Tape guides may also require occasional demagnetizing.

*IMPORTANT: Be sure to demagnetize the heads after making resistance measurements in the head circuits.*

### **CARTRIDGES**

Many problems associated with tape units result from defective cartridges. Always try a cartridge known to be good before attempting repairs.



# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index



MODEL BM-1150B

BOMAN ASTROSONIX MODEL BM-1150B

## ADJUSTMENTS

ADJUST	REMARKS
Head Azimuth	Play a test cartridge and adjust B1 for maximum on an AC VTVM across output.
Head Height	Play a test cartridge, follow instructions with cartridge, and adjust B2 for proper response.

## TROUBLE CHART

SYMPTOM	REMARKS
Capstan does not rotate.	Belt (1) dirty, worn, or broken. Assembly (10) binding. Motor defective or not supplied with power.
Track-shift mechanism inoperative	Switch (VR1d) dirty. Cam (3) binding or worn. Pawl (4) worn. Assembly (6) binding. Solenoid (M3) defective or not supplied with power. Cartridge defective.
Wow or flutter	Belt (1) dirty or worn. Capstan dirty or binding. Cartridge defective. Motor defective.
Sound weak or distorted	Head dirty, misaligned, or defective. Cartridge defective. Amplifiers defective.
Tape is pulled from cartridge.	Cartridge defective. Capstan dirty or scored.

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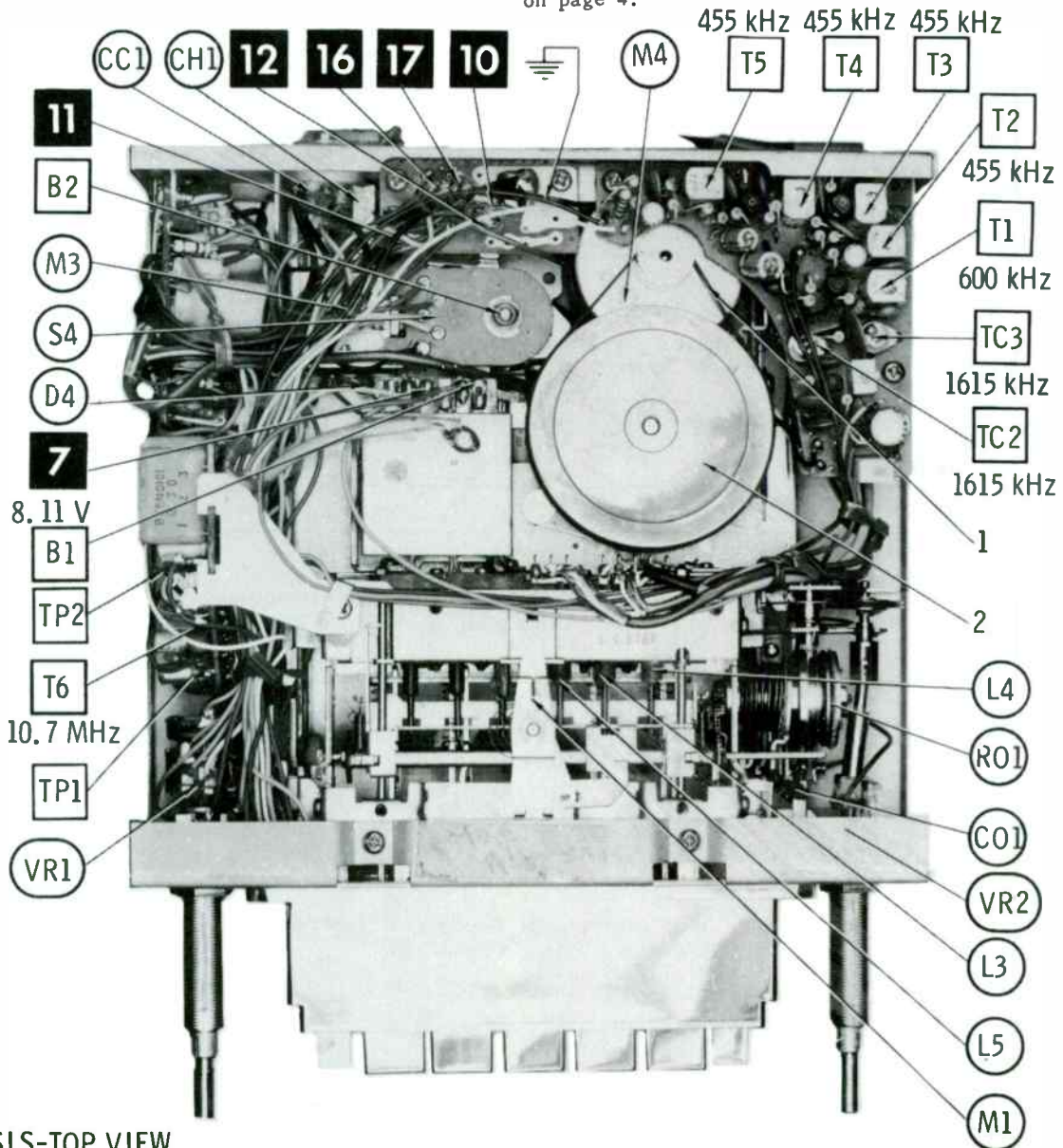
## MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
1		Flywheel Belt	14		Cartridge Detent Roller
2		Flywheel (Assembly)	15		Cartridge Detent Spring
3		Track Changing Cam	16		Switch Lever
4		Push Pawl	17		Cartridge Slide
5		Pull Pawl	18		Detent Lever
6		Head Shifting Assembly	19		Detent Lever Spring
7		Azimuth Spring	20		Cartridge Slide Spring
8		Head Shifting Spring	21		Flywheel Thrust Plate (Assembly)
9		Motor Pulley	22		Detent Arm Lock
10		Capstan Baring (Assembly)	23		Detent Arm Lock Spring
11		Solenoid Spring	24		Detent Arm Spring
12		Head Clamp	25		Eject Acuator Lever
13		Cartridge Detent Arm (Assembly)	26		Eject Actuator Lever Spring

## CLEANING LUBRICATING HEAD DEMAGNETIZING

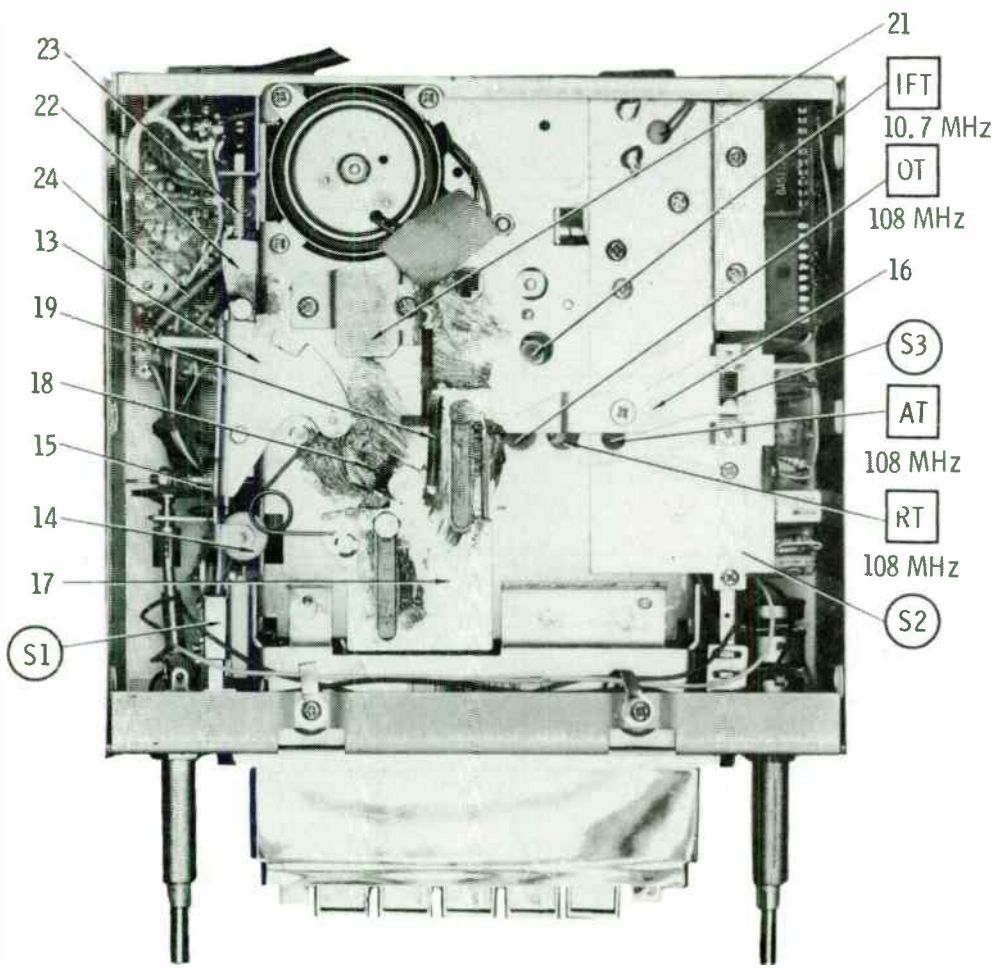
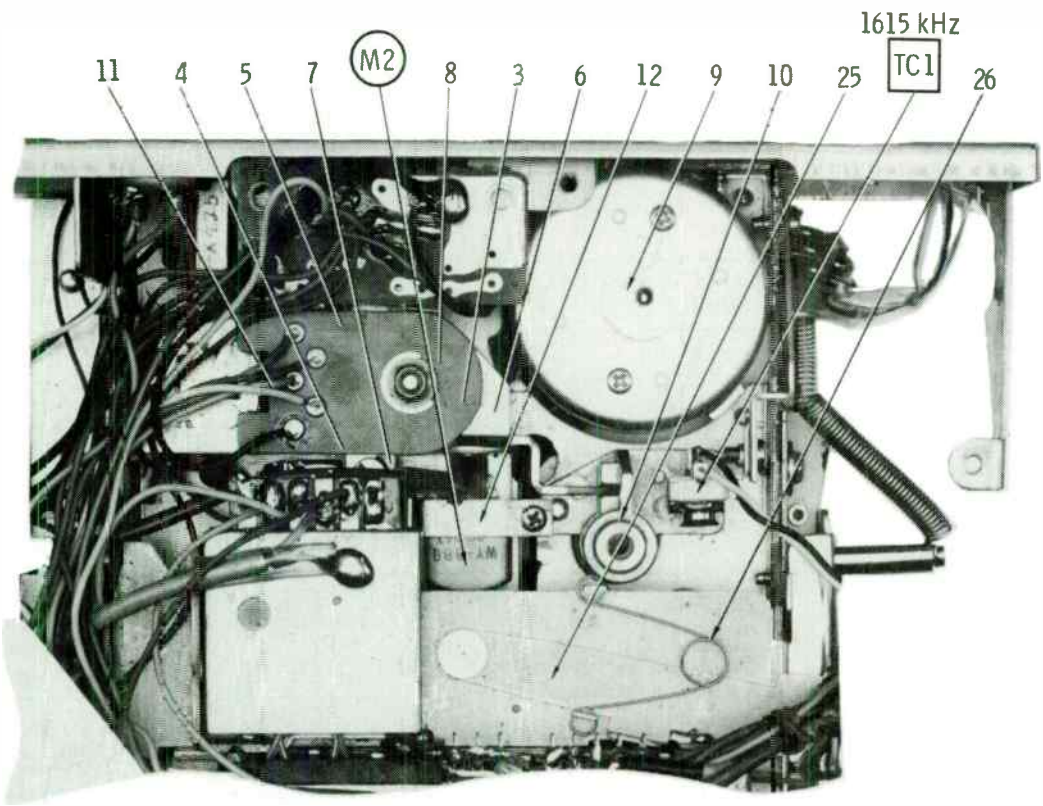
A Howard W. Sams **CIRCUITRACE** Photo

Refer to  
"General Servicing Information"  
on page 4.



CHASSIS-TOP VIEW





TAPE DECK

BOMAN ASTROSONIX MODEL BM-1150B

## ALIGNMENT INSTRUCTIONS

Check for specified source voltage.

Use only enough generator output to provide a usable indication.

Suggested Alignment Tools:

GC Electronics:

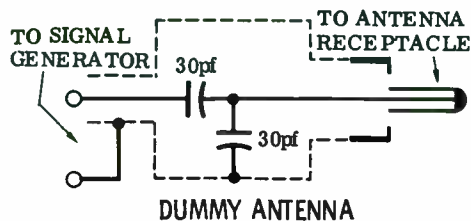
ALL.....8290,8868,9087

### PUSH-BUTTON ADJUSTMENT

1. Pull button out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining buttons.

GENERATOR COUPLING	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
High side thru .1uF to point Ant Input low side to ground.	455kHz 400-Hz mod.	High freq. end stop.	Output meter across voice coil.	T5,T4, T3,T2	Adjust for maximum.
Thru dummy antenna to antenna input.	1615kHz	"	"	TC3,TC2, TC1	"
Tuner alignment is not necessary unless associated components have been disturbed. If necessary, back tuning cores out of coils but not out of forms. Repeat step 2.					
Thru dummy antenna to antenna input.	600kHz	Tune to signal	Output meter across voice coil.	T1	Adjust for maximum. Repeat alignment until no further improvement is noted.

With radio installed in car and antenna extended 36", tune in a weak station near 1400kHz and adjust TC1 for maximum output. Antenna adjustment TC1 is located inside tape door right rear corner.



### FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to Ant Input, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to TP1, common to ground.	(1) T6, IFT	Adjust for maximum.

### FM RF ALIGNMENT—SELECTOR IN FM POSITION

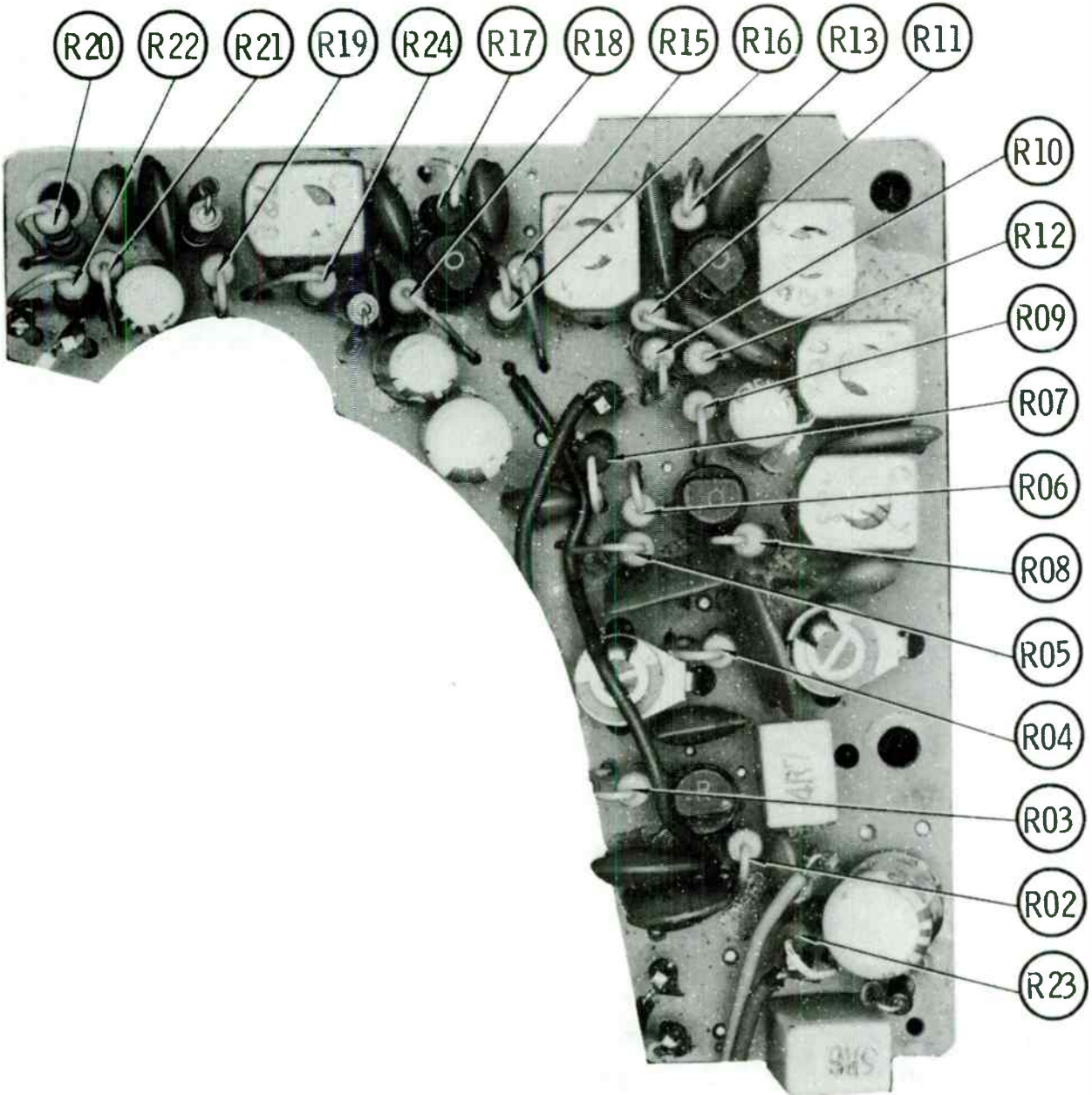
Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
108MHz Unmodulated	High Freq End Stop	DC probe of VTVM to TP1, common to ground.	OT, RT, AT	Adjust for maximum.

(1) Before adjusting, vary generator frequency slightly. Maximum output indicates exact IF.

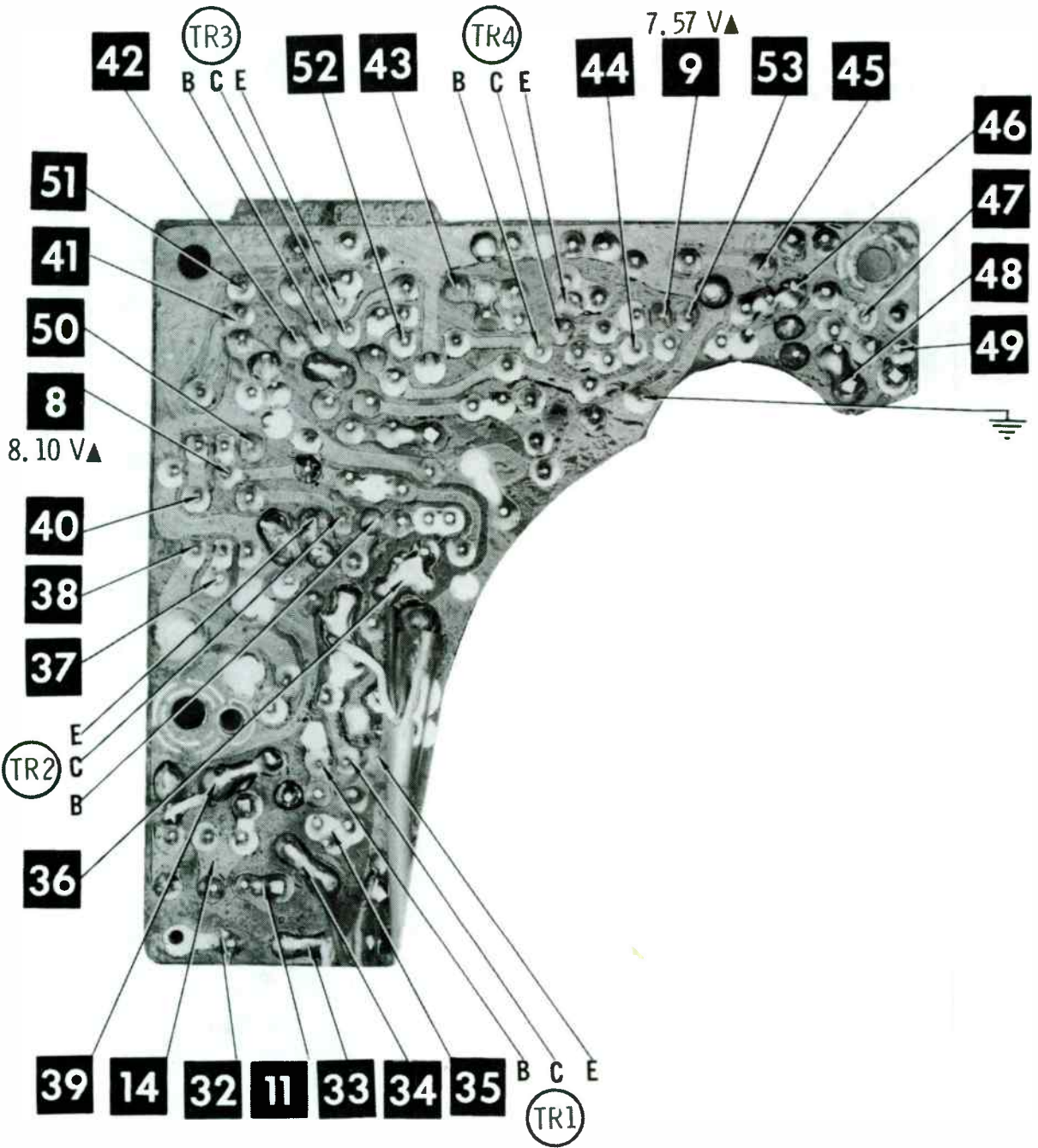
### FM STEREO MULTIPLEX ALIGNMENT

Ground TP1. Connect Freq. Counter to TP2. Adjust VR4 for 19kHz +20Hz.



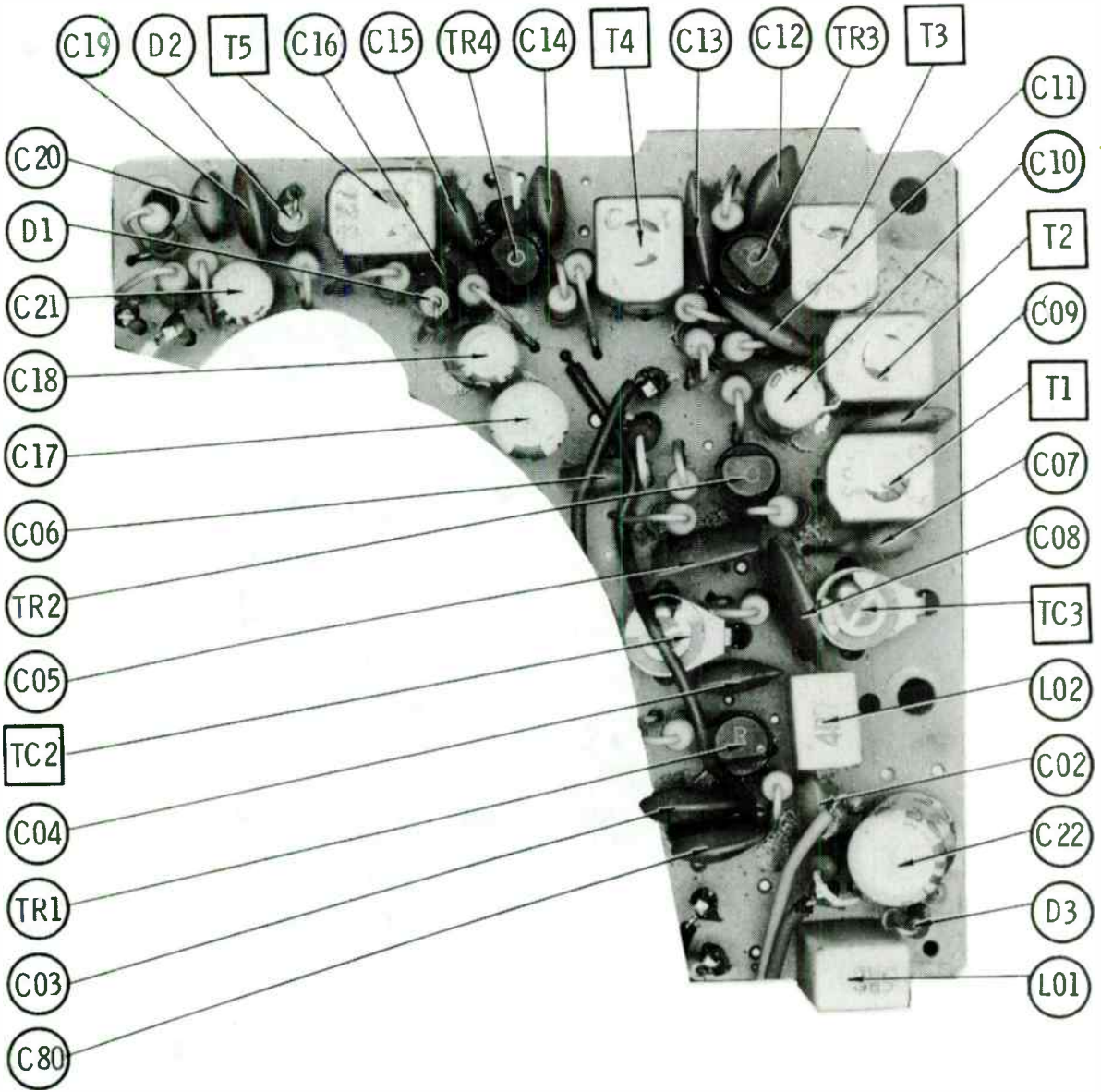
BOMAN ASTROSONIX MODEL BM-1150B

AM BOARD

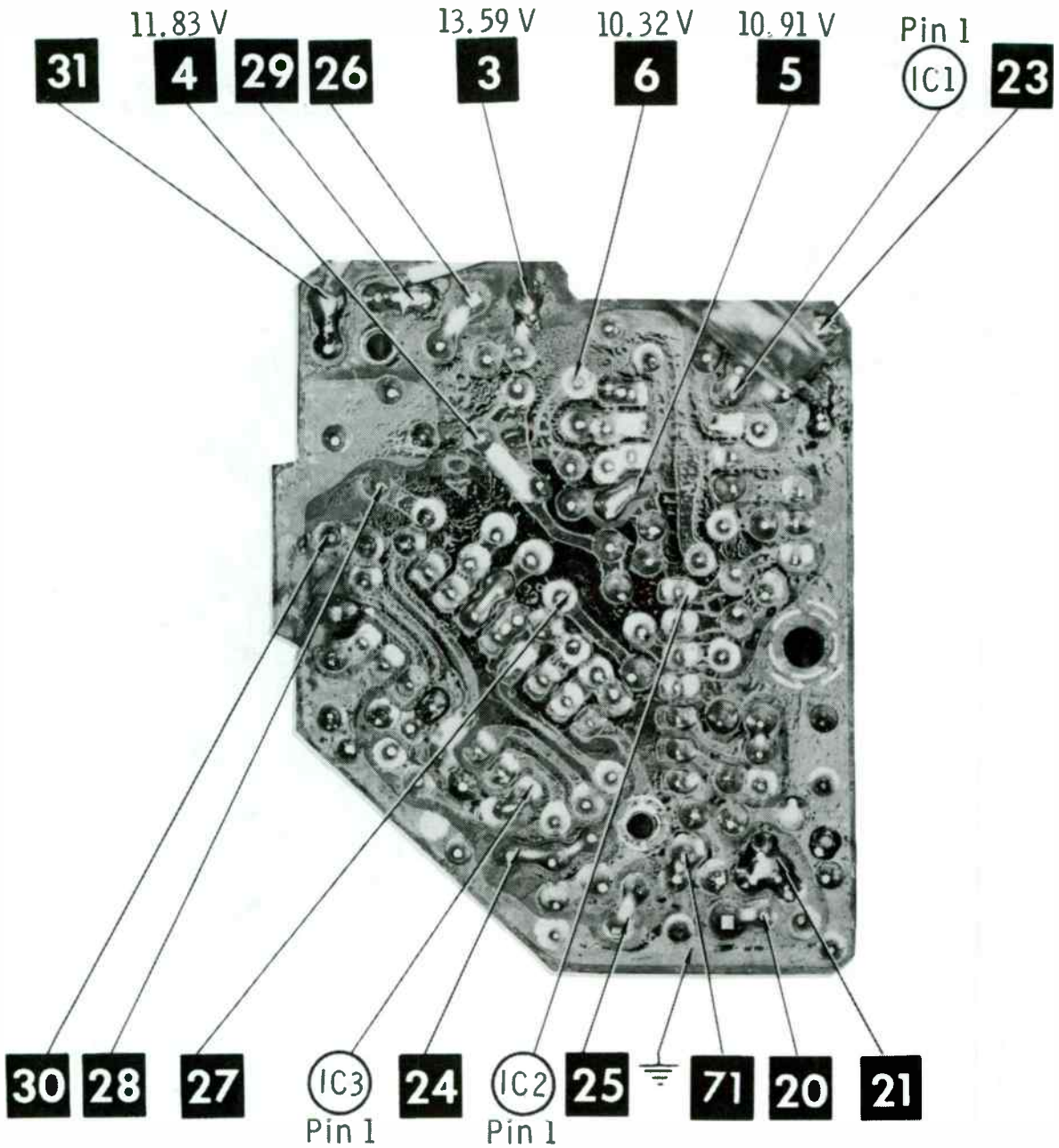


▲ AM

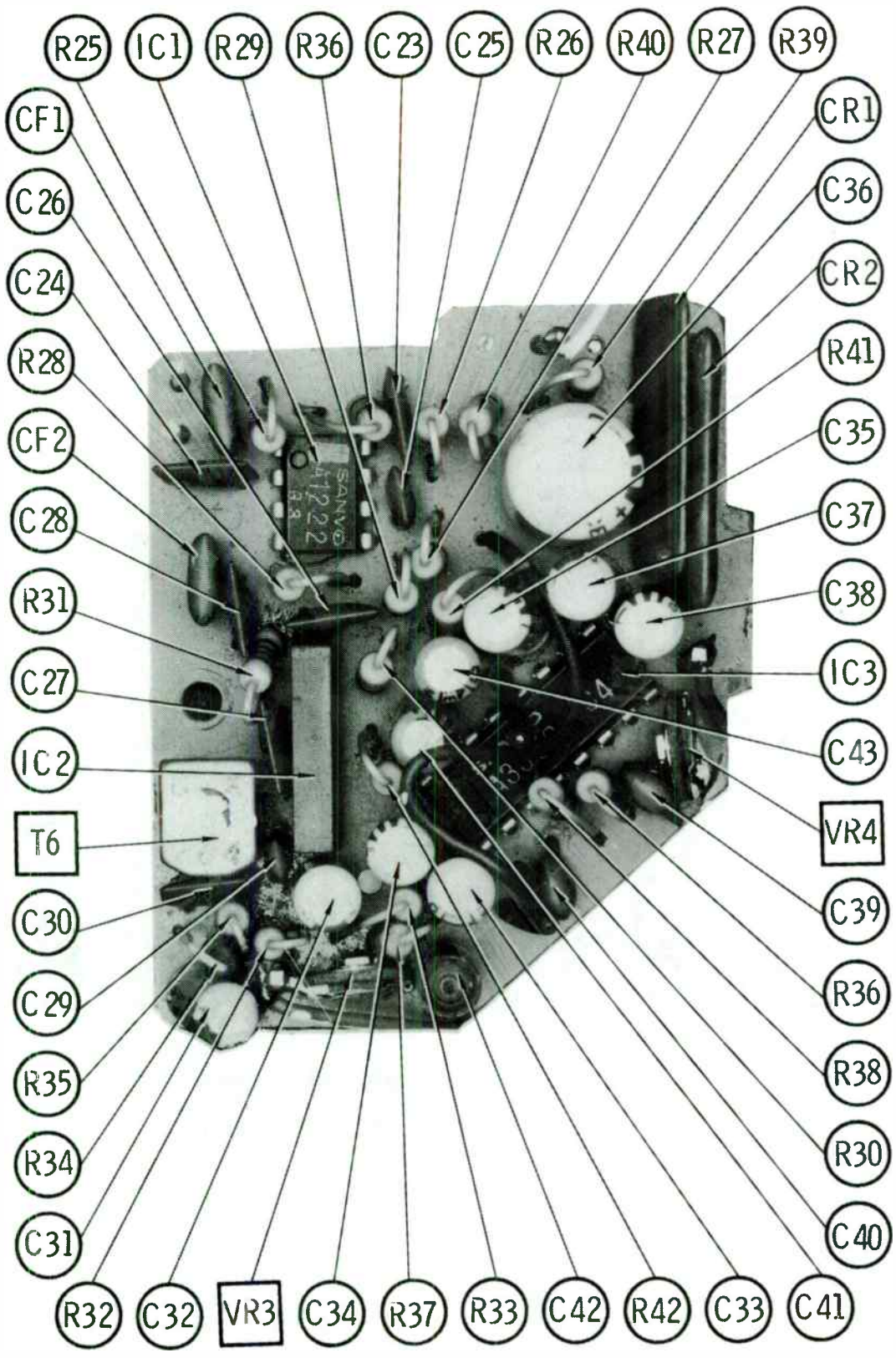
AM BOARD



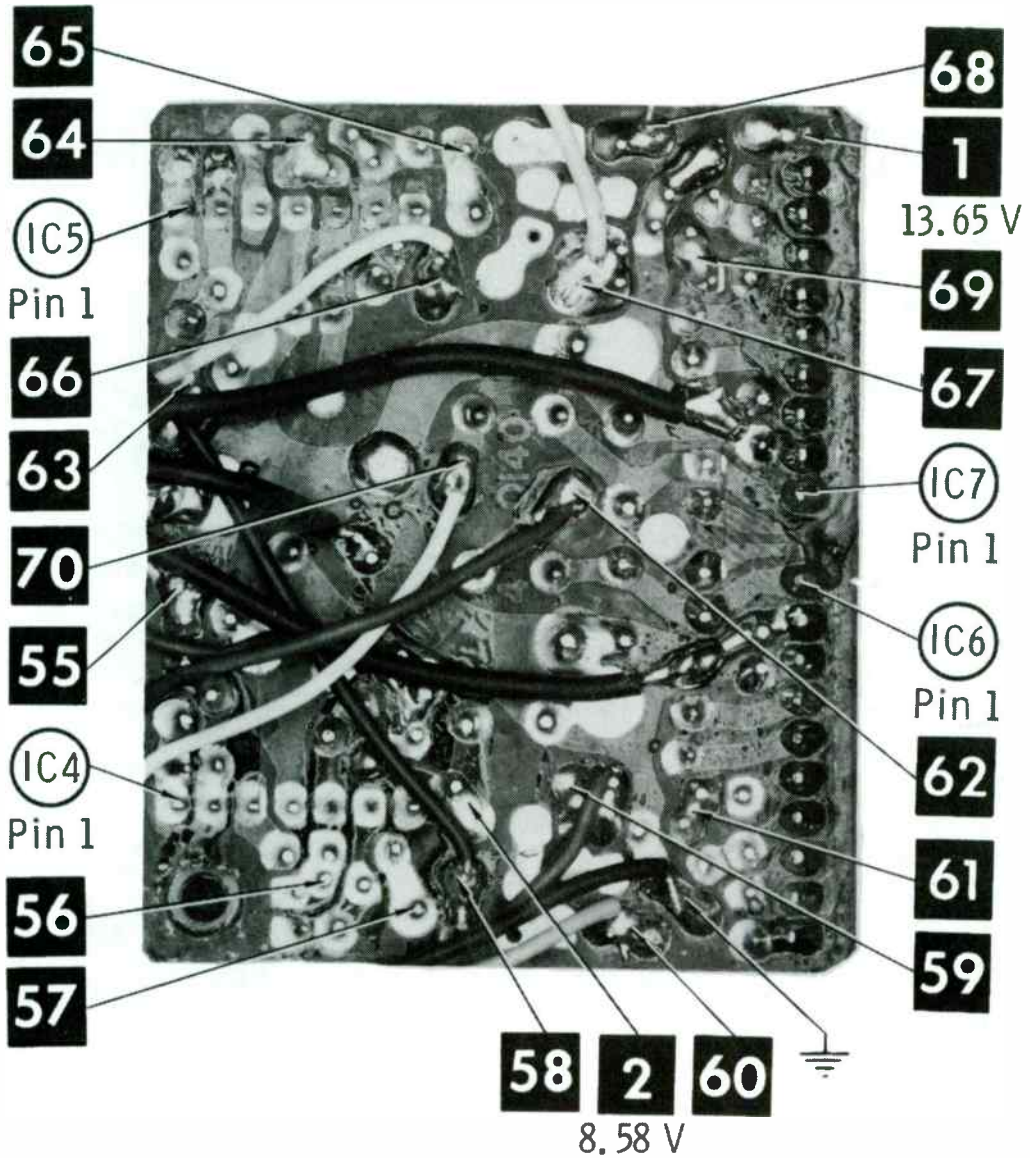
AM BOARD



FM-MPX BOARD

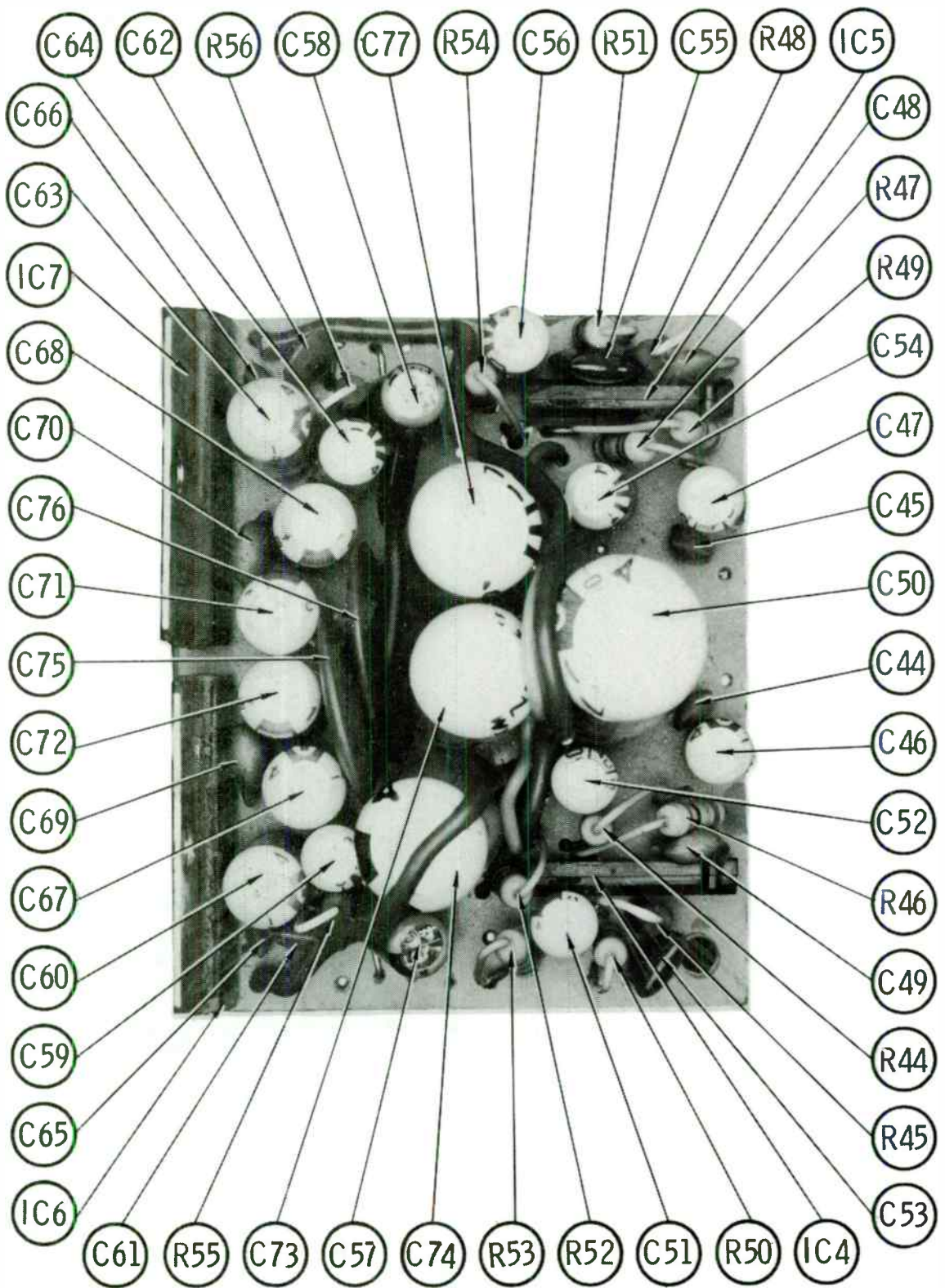


FM-MPX BOARD



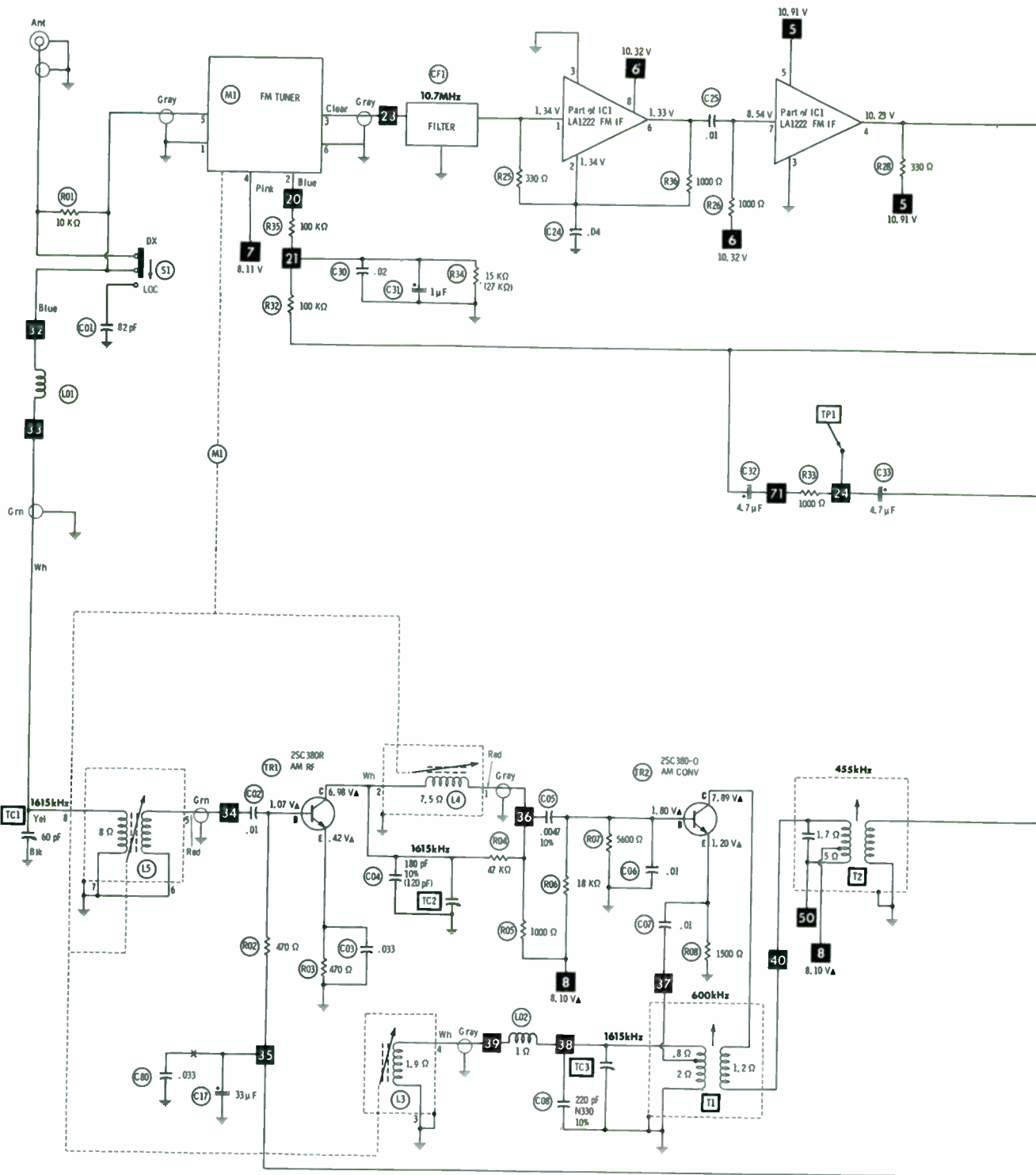
AUDIO BOARD





AUDIO BOARD

**NOTE: DEMAGNETIZE HEADS AFTER SERVICING**

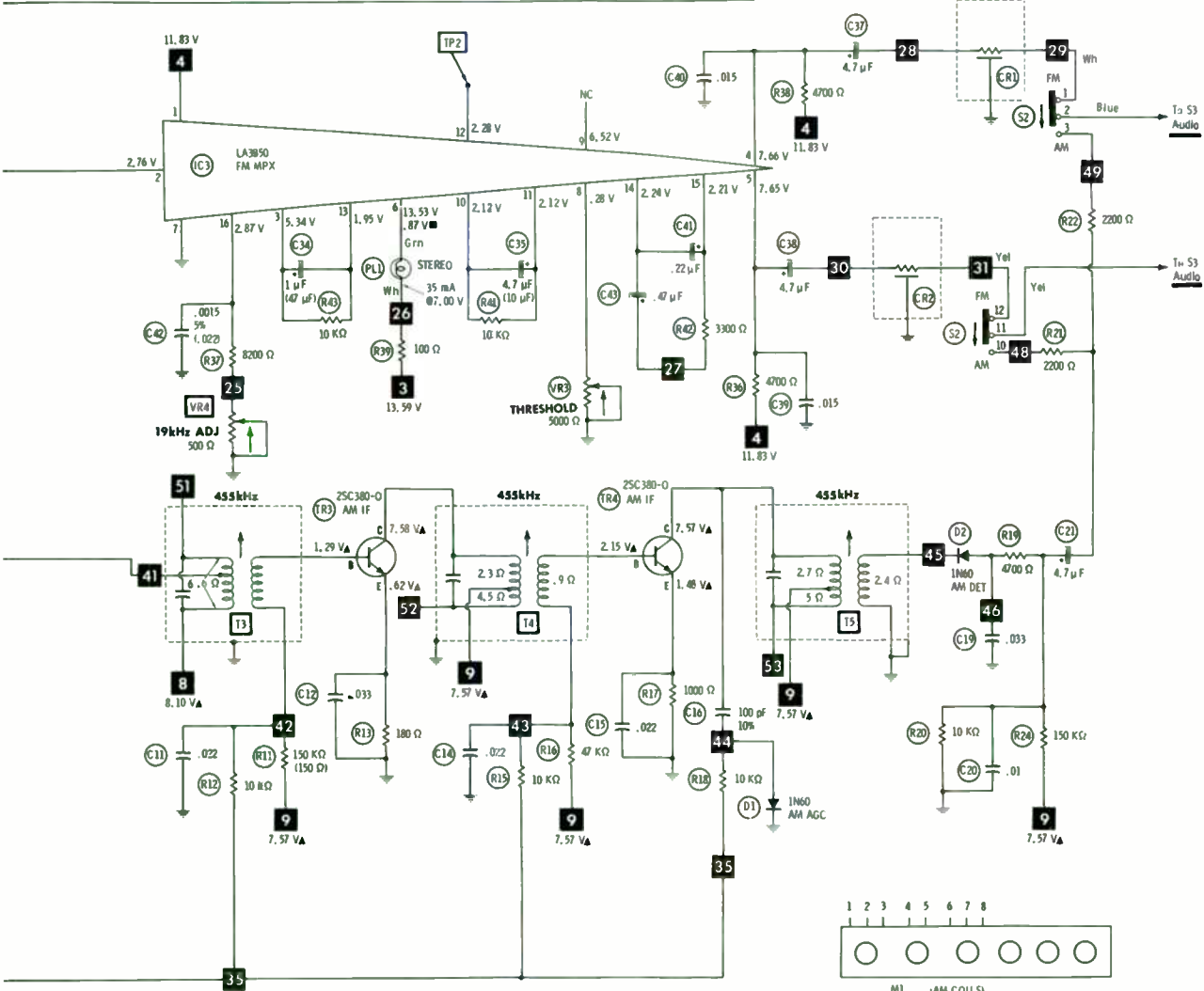
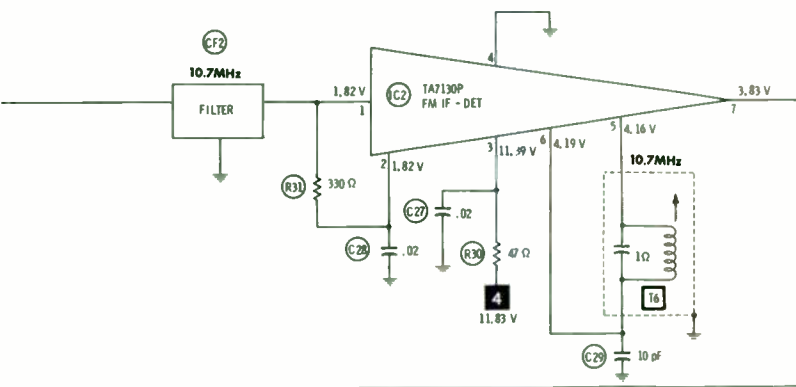


- /— Circuitry not used in some versions
- - - Circuitry used in some versions
- ⊙ See ports list
- ⊛ Nominal value
- ⊕ Ground
- ⊞ Chassis
- ∇ Common tie point

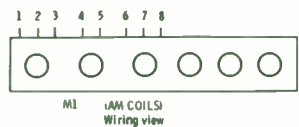
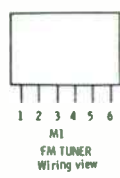
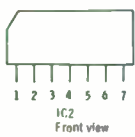
Measurements with switching as shown unless noted:  
 ■ FM Stereo signal    ♦ Tape play    ▲ AM

Supply voltage maintained as shown of input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

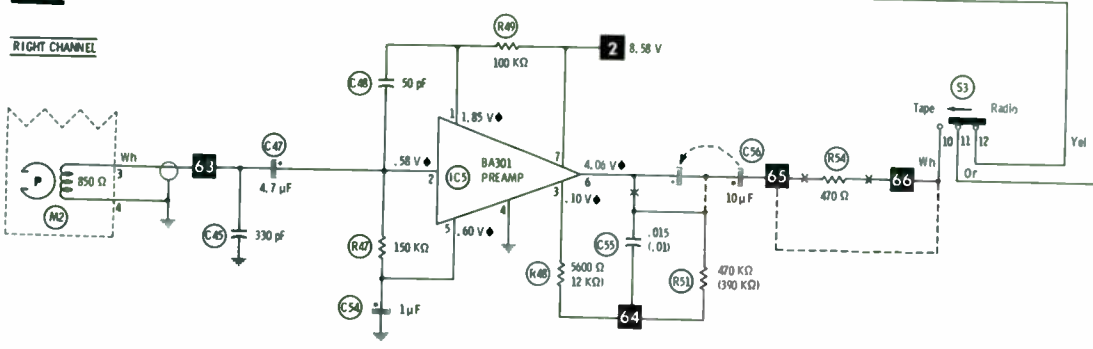
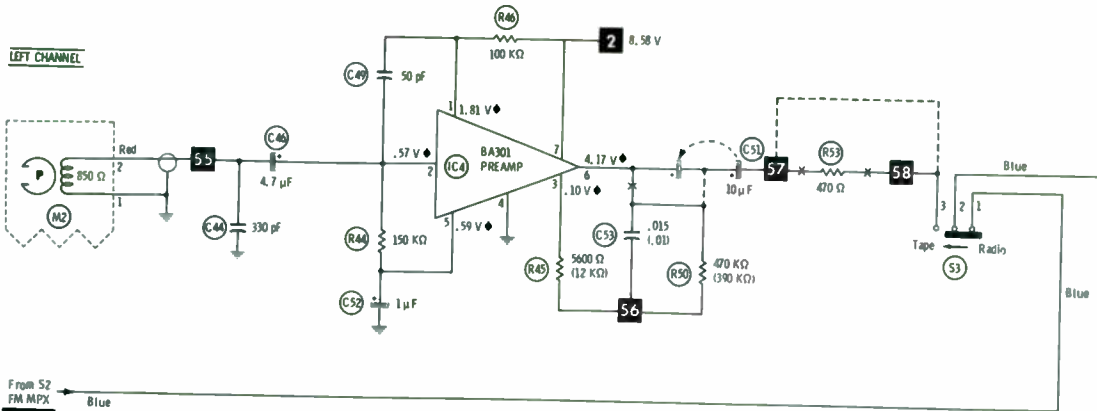
A PHOTOFACIT STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**  
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Terminal Guides



**NOTE: DEMAGNETIZE HEADS AFTER SERVICING**



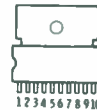
Terminal Guides



S2, S3  
Wiring view



M2  
Wiring view



IC6, IC7  
Front view



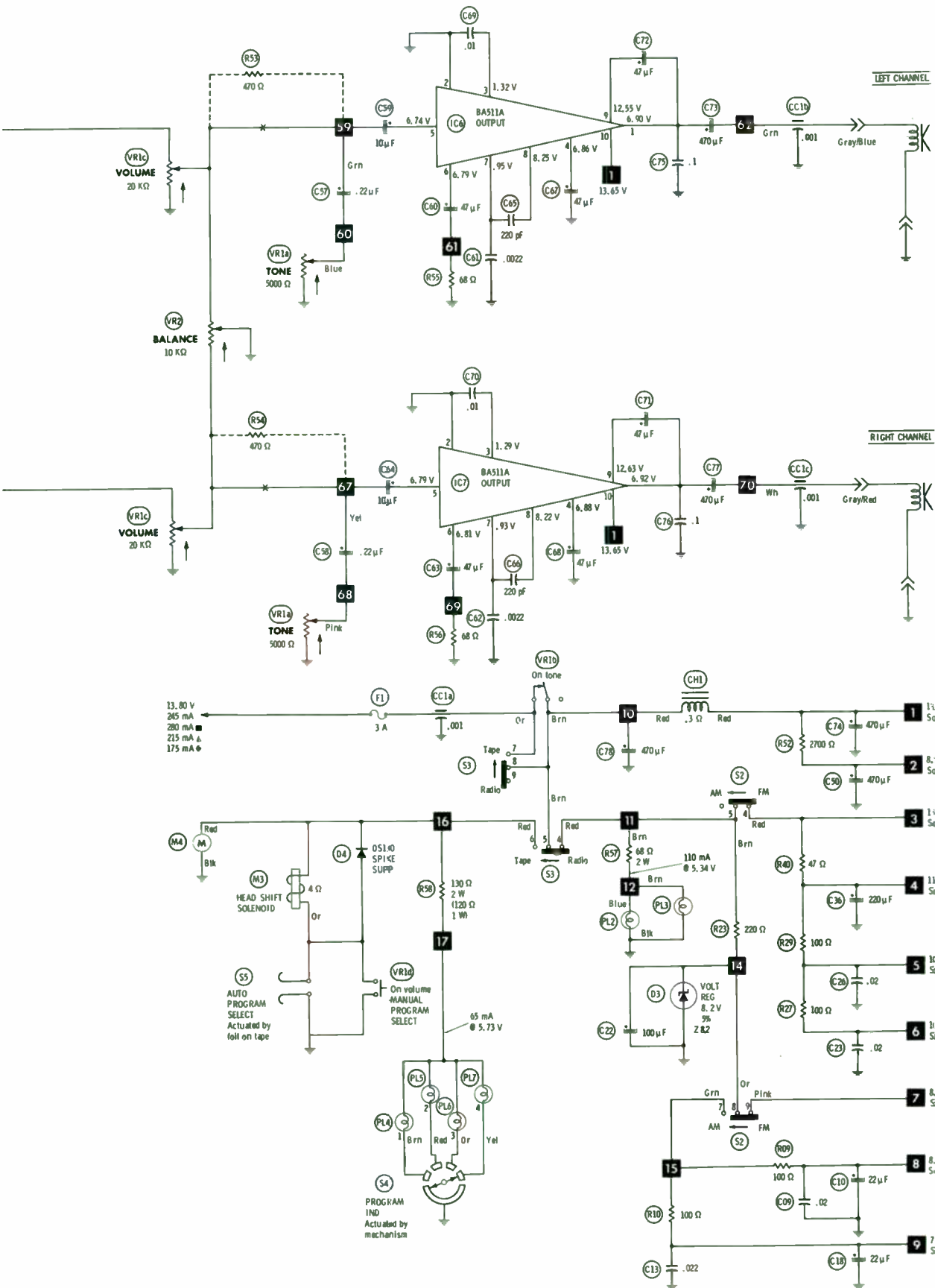
IC4, IC5  
Front view

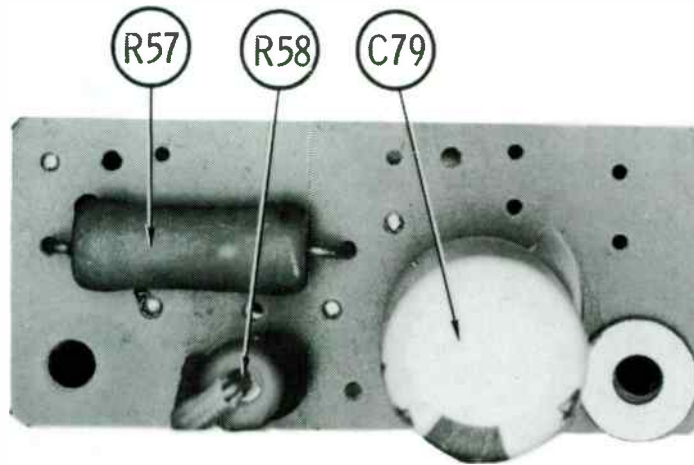
- X — Circuity not used in some versions
  - - - Circuity used in some versions
  - ⊙ See parts list
  - \* Nominal value
  - ⊥ Ground
  - ⌋ Chassis
  - ▽ Common tie point
- Measurements with switching as shown unless noted:
- FM Stereo signal    ♦ Tape play    ▲ AM

Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**

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## PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Sams COUNTER FACTS<sup>®</sup> for the most up-to-date replacement.

### SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D1	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088		
D2	1N60		1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D3	Z8.2		GEZD-8.2		ZM8.2B		RE 112		RT-263	ECG109
D4	DS130		GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-257	ECG5016
IC1	LA1222								RT-218	ECG177
IC2	TA7130P									
IC3	LA3350									
IC4	BA301									
IC5	BA301									ECG1135
IC6	BA511A									ECG1135
IC7	BA511A									
TR1	2SC380R		GE-61	(IR)2SC380AO	PTC136	HEPS0016	RE 9	SK3018		
TR2	2SC380-0		GE-61	(IR)2SC380AO	PTC136	HEPS0016	RE 9	SK3018	RT-107A	ECG107
TR3	2SC380-0		GE-61	(IR)2SC380AO	PTC136	HEPS0016	RE 9	SK3018	RT-107A	ECG107
TR4	2SC380-0		GE-61	(IR)2SC380AO	PTC136	HEPS0016	RE 9	SK3018	RT-107A	ECG107

### ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C10	22 16V			TDC226M015FL	EV-1224
C17	33 6.3V		PC30-25	VTT33A10	EV-1125
C18	22 10V			TDC226M015FL	EV-1224
C21	4.7 25V			VTT4R7A50	EV-1319
C22	100 10V		PC100-10	VTT100E10	EV-1130
C31	1 50V			VTT1B63	EV-1615
C32	4.7 25V			VTT4R7A50	EV-1319
C33	4.7 25V			VTT4R7A50	EV-1319
C34	1 50V			VTT4R7A50	EV-1319
	47 25V	(1)		VTT1B63	EV-1615
C35	4.7 25V			VTT4R7A50	EV-1319
	10 10V	(1)			
C36	220 16V		PC250-25	VTT220G16	EV-1240
C37	4.7 25V			VTT4R7A50	EV-1319
C38	4.7 25V			VTT4R7A50	EV-1319
C41	.22 50V			TDC224M050EL	SD50-R229
C43	.47 50V			VTT4R7B63	EV-1610
C46	4.7 25V			VTT4R7A50	EV-1319
C47	4.7 25V			VTT4R7A50	EV-1319
C50	470 16V			VTT10A25	EV-1222
C51	10 16V			VTT1B63	EV-1615
C52	1 50V			VTT1B63	EV-1615
C54	1 50V			VTT10A25	EV-1222
C56	10 16V			TDC224M050EL	SD50-R229
C57	.22 50V			TDC224M050EL	SD50-R229
C58	.22 50V			VTT10A25	EV-1222
C59	10 16V			VTT47D16	EV-1226
C60	47 10V		PC50-16	VTT47D16	EV-1226
C63	47 10V		PC50-16	VTT10A25	EV-1222
C64	10 16V			VTT10A25	EV-1222

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

### ELECTROLYTIC CAPACITORS(cont)

ITEM No.	RATING	REPLACEMENT DATA			
		MFGR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C67	47 10V		PC50-16	VTT47D16	EV-1226
C68	47 10V		PC50-16	VTT47D16	EV-1226
C71	47 10V		PC50-16	VTT47D16	EV-1226
C72	47 10V		PC50-16	VTT47D16	EV-1226
C73	470 10V				EV-1150
C74	470 10V				EV-1150
C77	470 10V				EV-1150
C79	470 16V		PC500-16	VTT470J16	EV-1250

(1) Used in some versions.

### CAPACITORS

ITEM No.	RATING	MFGR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C01	82		00-820		GP482	10TS-Q82
C02	.01 16V		UK16-103		MAG1611	HY-420
C03	.033 16V		UK16-333		MAG16133	HY-630
C04	180 10%		DO-181		GP318	10TS-T18
C05	.0047 10%				M192P4729R8	192P4729R8
C06	.01 16V		UK16-103		MAG1611	HY-420
C07	.01 16V		UK16-103		MAG1611	HY-420
C08	220 N330 10%				*	
C09	.02		OC-203	HGP02	TA120	TG-S20
C11	.022		OC-203	HGP02	TA120	TG-S20
C12	.033 16V		UK16-333		MAG16133	HY-630
C13	.022		DC-203	HGP02	TA120	TG-S20
C14	.022 16V		UK16-223			HY-625
C15	.022 16V		UK16-223			HY-625
C16	100 10%		DD-101	GP100	GP310	10TS-T10
C19	.033 16V		UK16-333		MAG16133	HY-630
C20	.01 16V		UK16-103		MAG1611	HY-420
C23	.02					
C24	.02					
C25	.01					
C26	.02					
C27	.02					
C28	.02					
C29	10					
C30	.02					
C39	.015 16V				MAG25115	HY-720
C40	.015 16V				MAG25115	HY-720
C42	.0015 5%					
C44	330		DD-331	GP330	GP333	10TS-T33
C45	330		DD-331	GP330	GP333	10TS-T33
C48	50					
C49	50					
C53	.015			WMF1S15	EWF1A115	1PB-S15
C55	.015			WMF1S15	EWF1A115	1PB-S15
C61	.0022					
C62	.0022					
C65	220					
C66	220					
C69	.01					
C70	.01					
C75	.1		DC-104	HGP1	TA010	TG-P10
C76	.1		DC-104	HGP1	TA010	TG-P10
C80	.033 16V		UK16-333		MAG16133	HY-630
CC1A						
CC1B						
CC1C						
TC1	60 Nominal					
TC2						
TC3						

\* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR1a	Tone-Left	5000	C-X696-1				
	Tone-Right	5000					
b	Power Switch						
c	Volume-Left	20K					
	Volume-Right	20K					
d	Manual Program Select Switch						
VR2	Balance	10K					
VR3	Threshold	5000					
VR4	19kHz Adjust	500					

BOMAN ASTROSONIX MODEL BM-1150B

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L01	AM Ant Choke (5.6uH)	(1)		74F566AP 74F476AP	(1) Part of M1.
L02	Image Trap (4.7uH)				
L3	AM Osc Tuning				
L4	AM RF				
L5	AM Ant				
T1	AM Osc				
T2	AM IF (455kHz)				
T3	AM IF (455kHz)				
T4	AM IF (455kHz)				
T5	AM IF (455kHz)				
T6	Quadrature				

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
CH1	90mA	.3	.55mH				

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	3A			AGC3	HDJ	312003	150145	F63-2

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
CF1	Filter	SFE10.7MA (1) (2)	Ceramic, 10.7MHz Red Dot
CF2	Filter	SFE10.7MA (1) (2)	
CR1	Network	B3EN0101 (1)	Ceramic, 10.7MHz Red Dot
CR2	Network	B3EN0101 (1)	
M1	Tuning Coil Assembly	CX-767 (1)	De-emphasis
M2	Tape Head	WY-880 (1)	De-emphasis
M3	Solenoid		Am/FM
M4	Motor	C-X758-2 (1)	8-Track Stereo Play
S1	Switch		Headshift
S2	Switch		Tape Transport (2500 rpm @ 13.67 V)
S3	Switch		Local/DX
S4	Switch		AM/FM
S5	Switch		Tape/Radio
VR1b	Switch		Program Indicator
VR1d	Switch		Auto Program Selector
			Volume
			Manual Program Selector

(1) Number on unit.

(2) When replacing, CF1 and CF2 should also be replaced.

### WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 13 Colors 8524 (Stranded) Available in 13 Colors
Shielded Hook-up Wire .....	Use BELDEN No. 8401 or 8421
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)





# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index



MODEL RE-338A  
RE-338B

CLARION MODELS RE-338A/B

## ALIGNMENT INSTRUCTIONS

Check for specified source voltage.  
Use only enough generator output  
to provide a usable indication.  
Suggested Alignment Tools:

GC ELECTRONICS

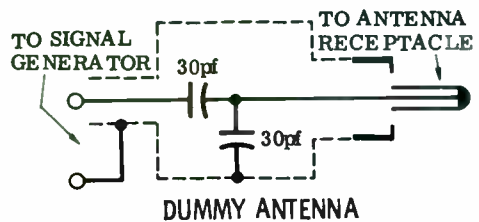
ALL ..... 8290, 8868, 9087

### PUSH-BUTTON ADJUSTMENT

1. Pull button out.
2. Tune manually to desired station.
3. Press button in firmly.
4. Repeat for remaining buttons.

GENERATOR COUPLING	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
High side thru .1uF to ant. input.	262kHz 400-Hz mod.	High freq. end stop.	Output meter across voice coil.	IFT4, IFT5	Adjust for maximum.
Thru dummy antenna to antenna input.	1615kHz	"	"	TC5B, TC5A, TC4	"

With radio installed in car and antenna extended 36", tune in a weak station near 1400kHz and adjust TC4 for maximum output. Antenna adjustment TC4 is located on right side rear corner.



**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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6AN951

## ALIGNMENT INSTRUCTIONS (Continued)

### FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to antenna input, low side to ground.				
GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to TP3, common to ground.	(1) IFT3(Pri.), IFT1	Adjust for maximum.
"	"	DC probe of VTVM to TP3, common to ground.	IFT3(Sec.)	Adjust for zero reading. A positive or negative reading will be obtained on either side of correct setting.

### FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to antenna input, low side to ground. Use 60-hertz, frequency-modulated signal, 450kHz sweep. Use 60-hertz sawtooth voltage in scope for horizontal deflection.				
GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
"	"	Vert input of scope to TP3, low side to ground.	(1) IFT3(Pri.), IFT1, IFT3(Sec.)	Adjust IFT3(Sec.) for maximum amplitude and straightness of line similar to Fig. 2. Adjust IFT3(Pri.), IFT1.

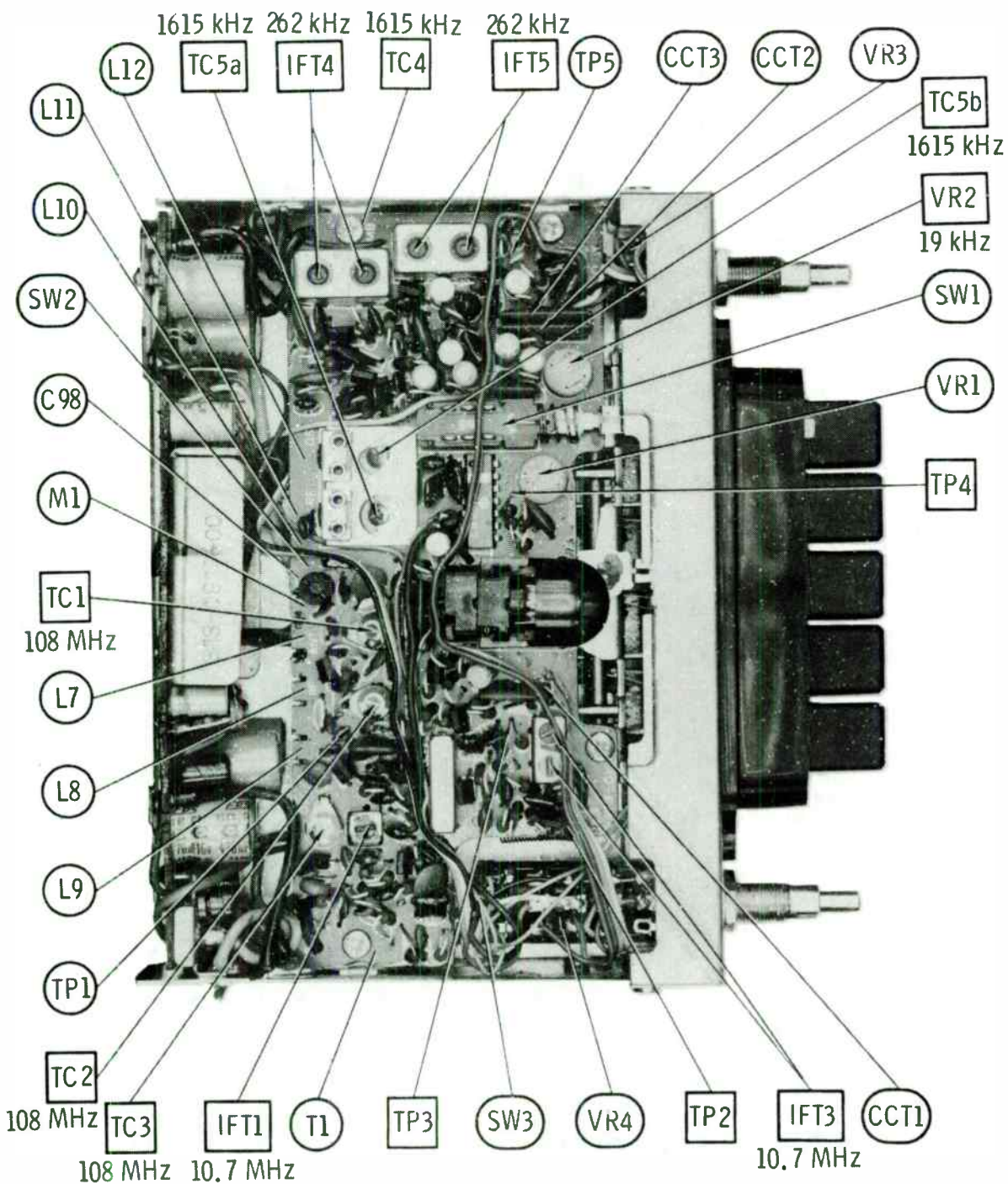
(1) Before adjusting, vary generator frequency slightly. Maximum output indicates exact IF.

### FM RF ALIGNMENT—SELECTOR IN FM POSITION

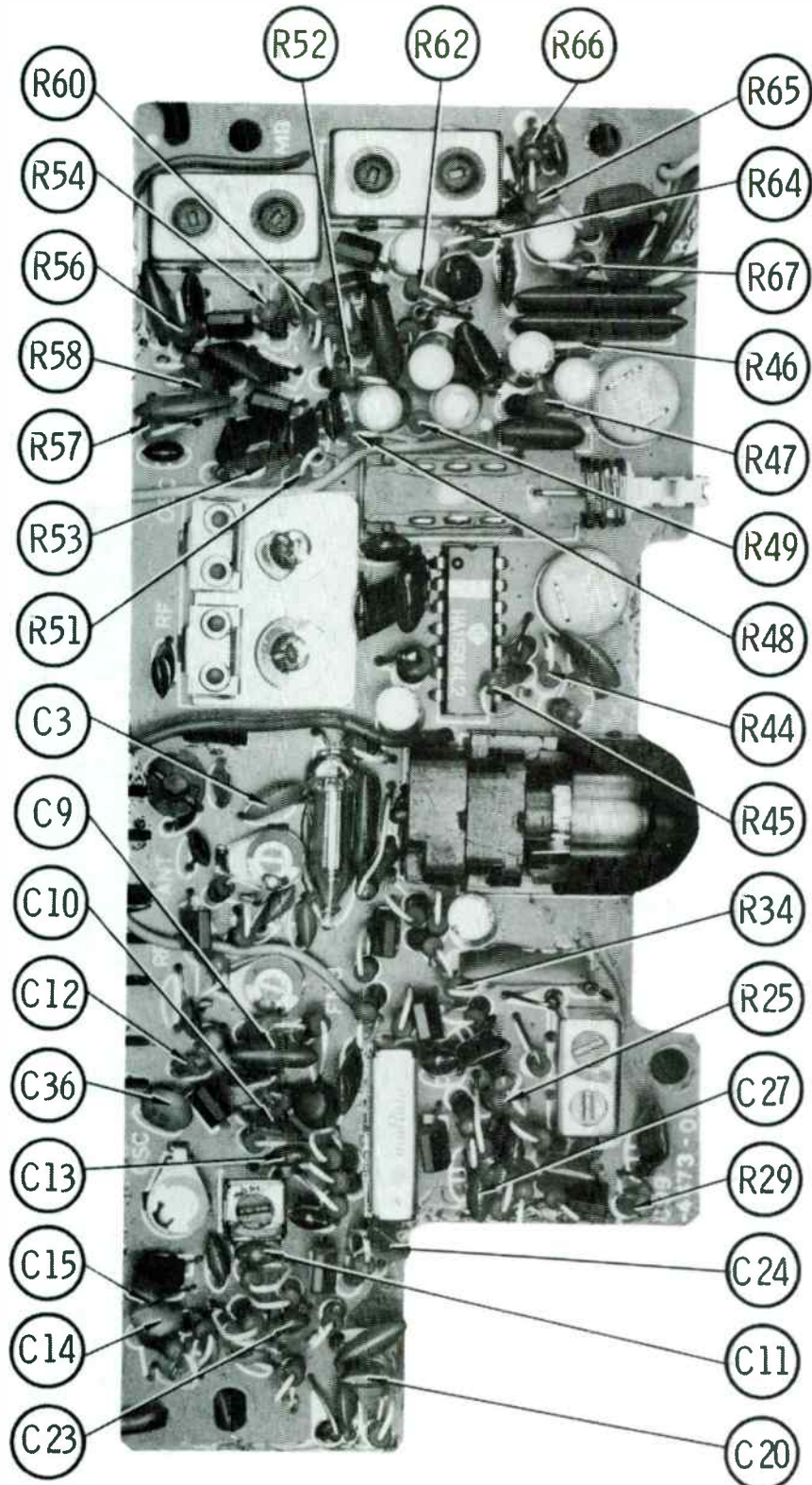
Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.				
GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
108MHz Unmodulated	High Freq End Stop	DC probe of VTVM to TP2, common to ground.	TC3,TC2,TC1	Adjust for maximum.

### FM STEREO MULTIPLEX ALIGNMENT

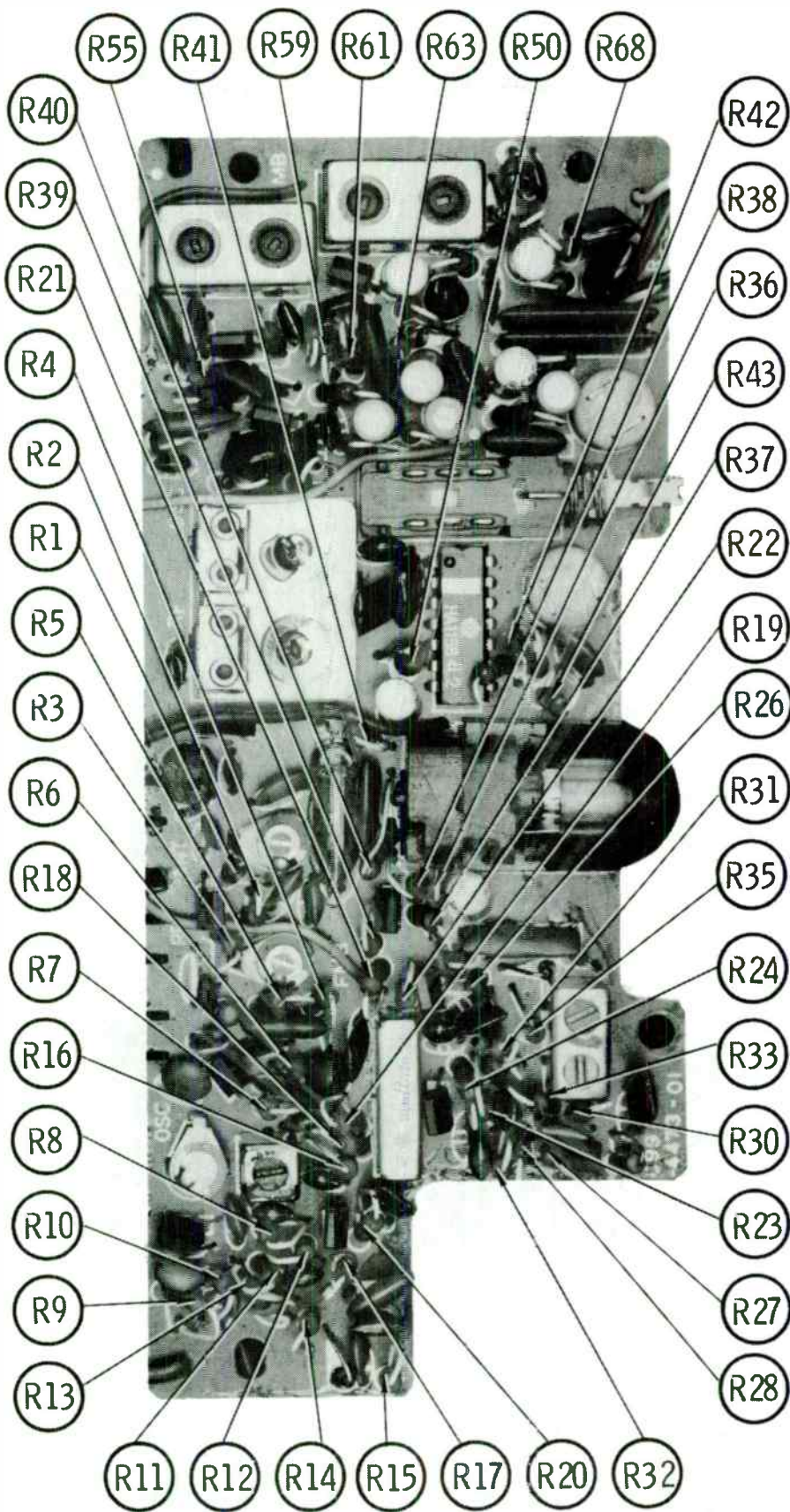
Ground TP3. Connect freq counter to TP4. Adjust VR2 for 19kHz <u>+20Hz.</u>
-----------------------------------------------------------------------------



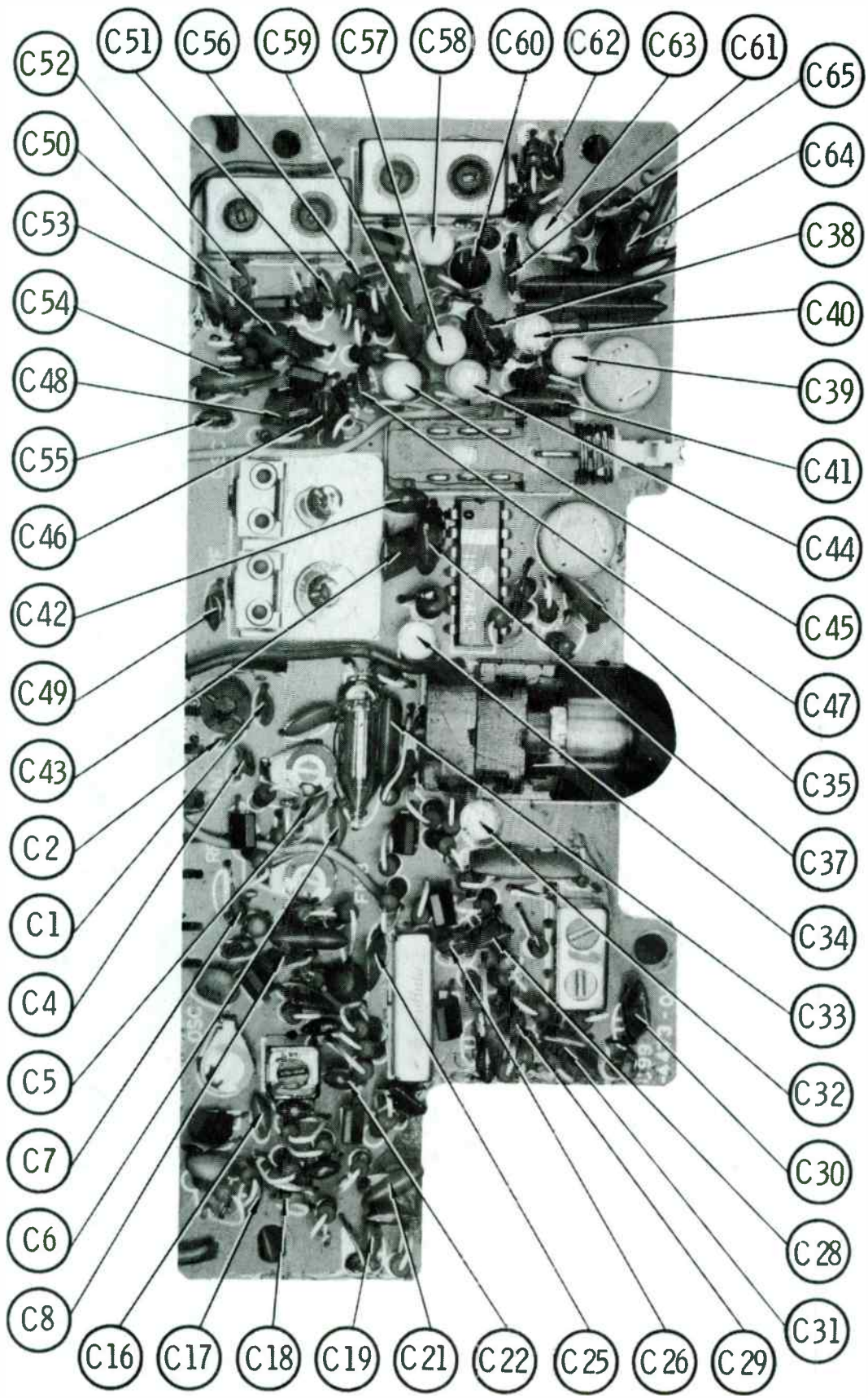
CHASSIS



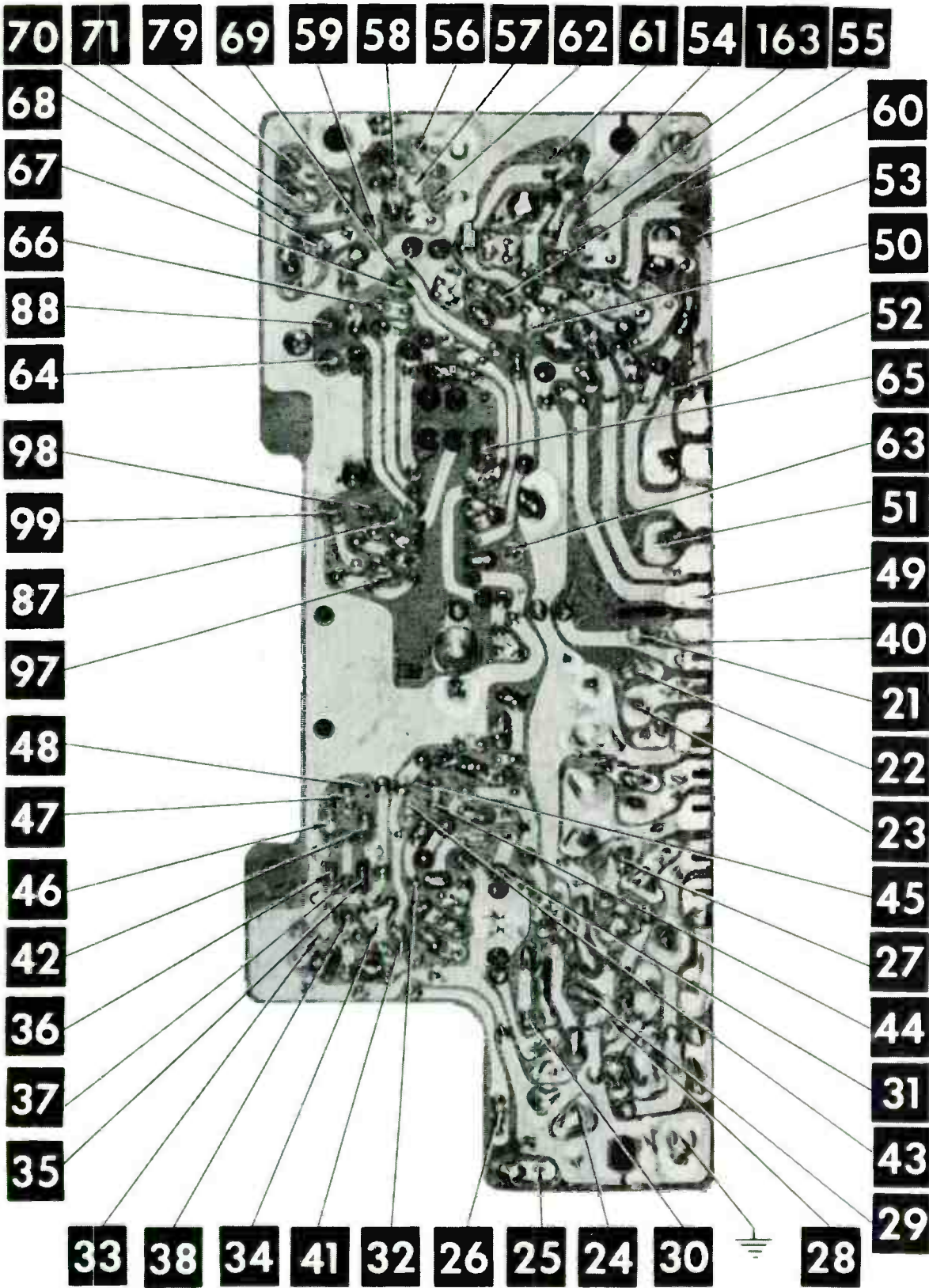
AM-FM BOARD



AM-FM BOARD

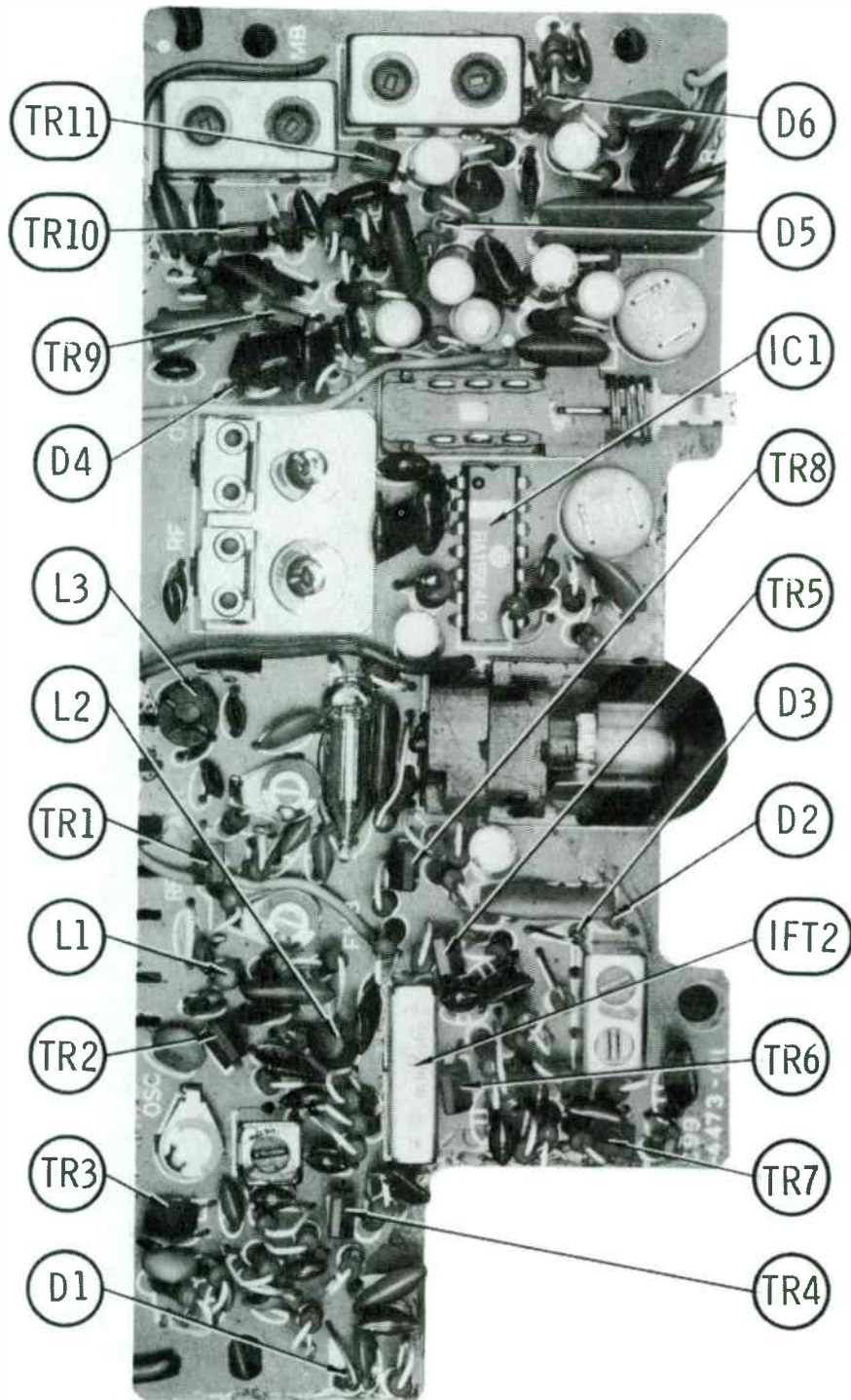


AM-FM BOARD



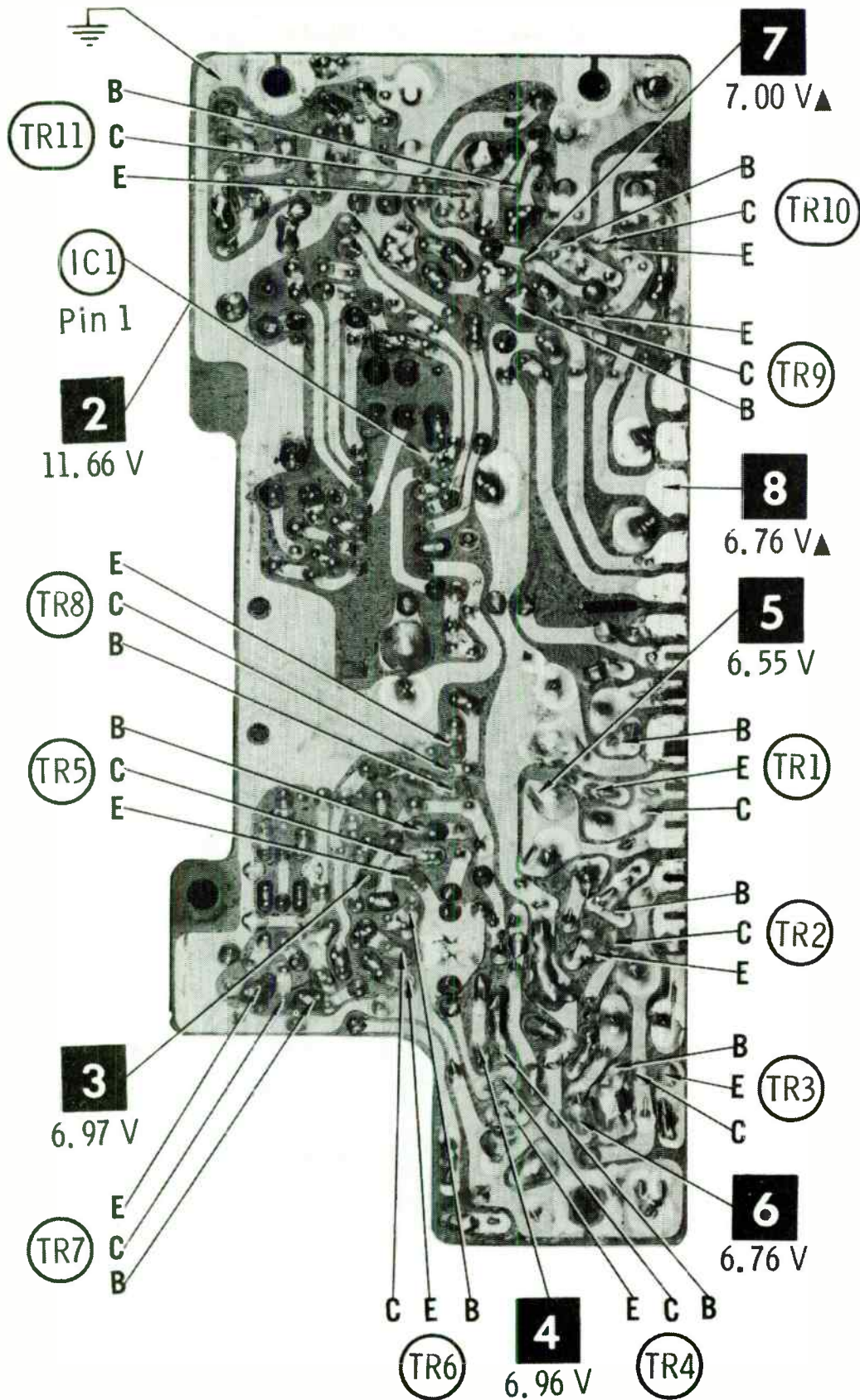
CLARION MODELS RE-338A/B

AM-FM BOARD



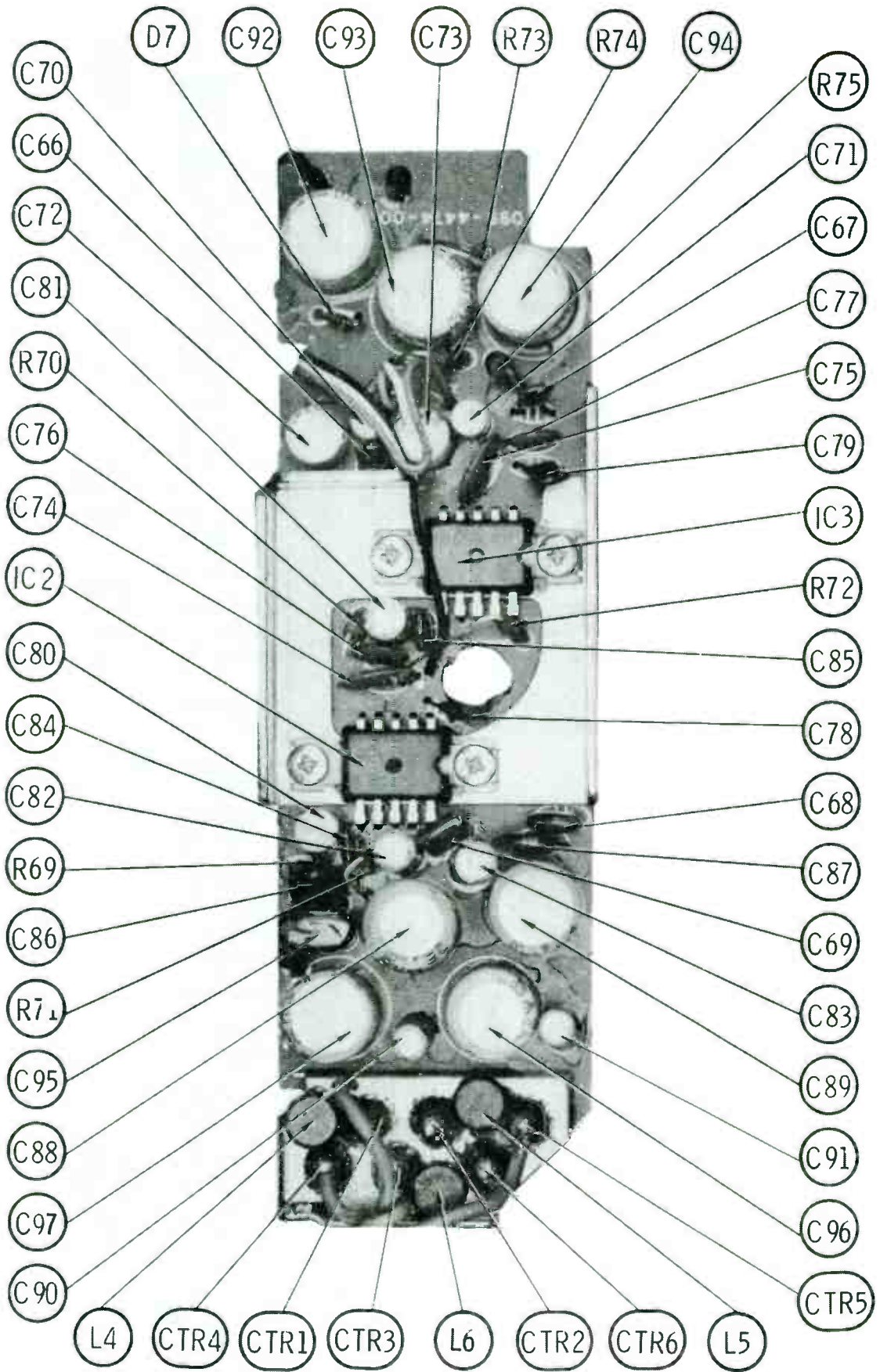
AM-FM BOARD



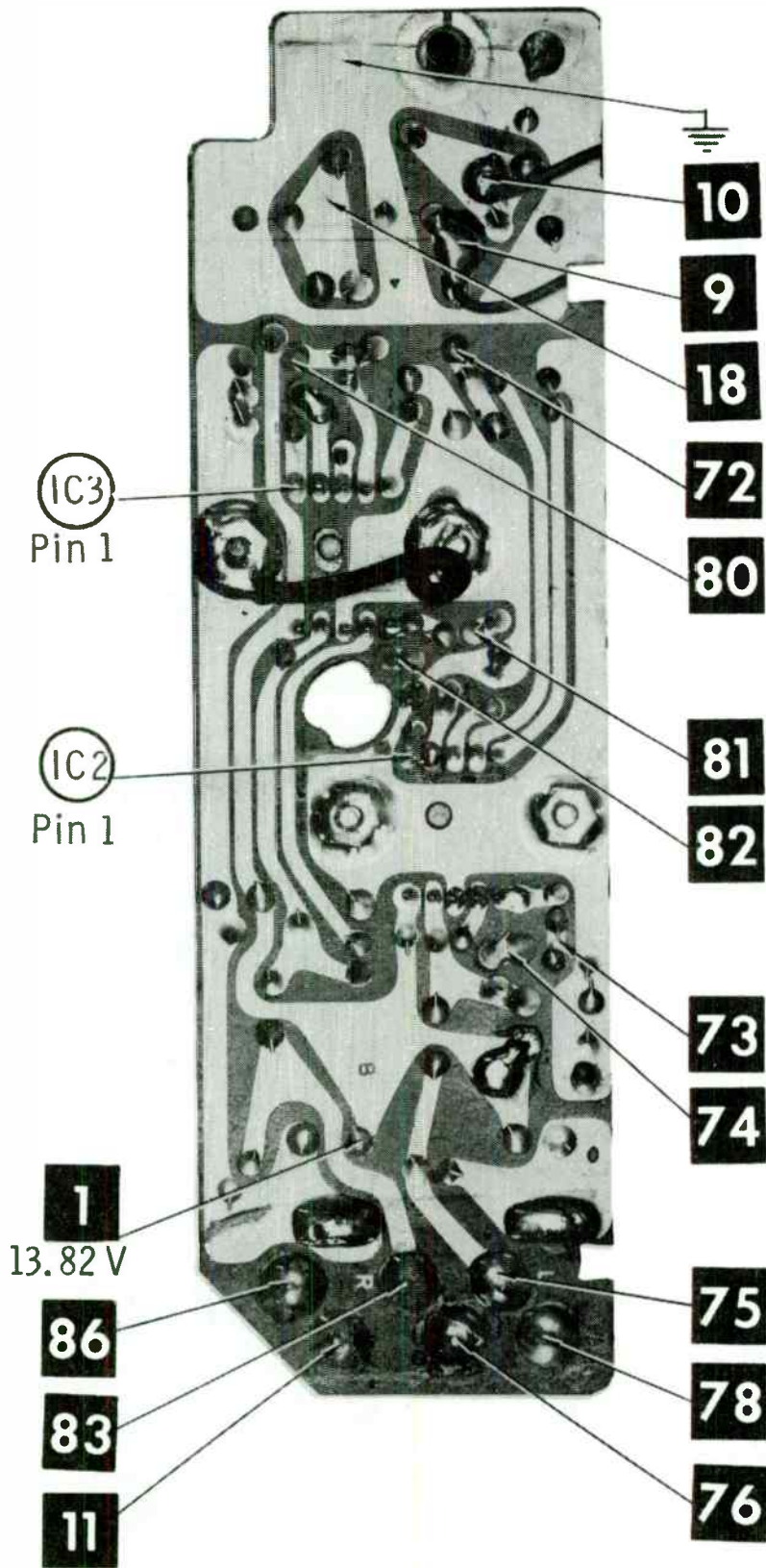


CLARION MODELS RE-338A/B

AM-FM BOARD

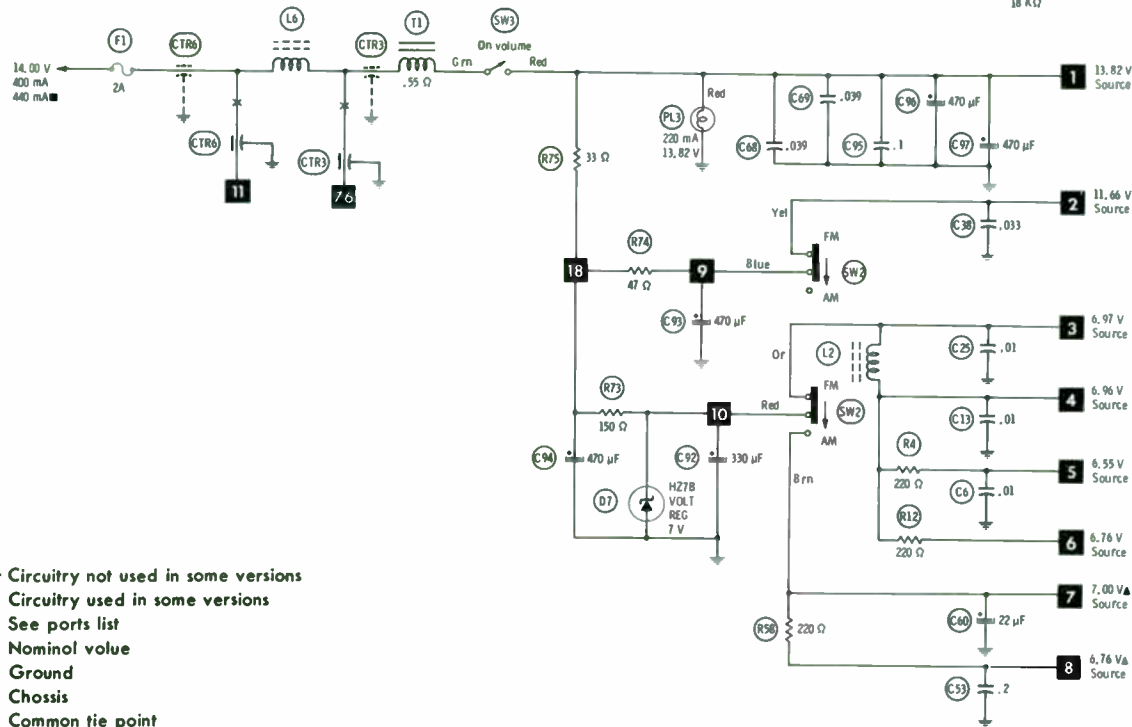
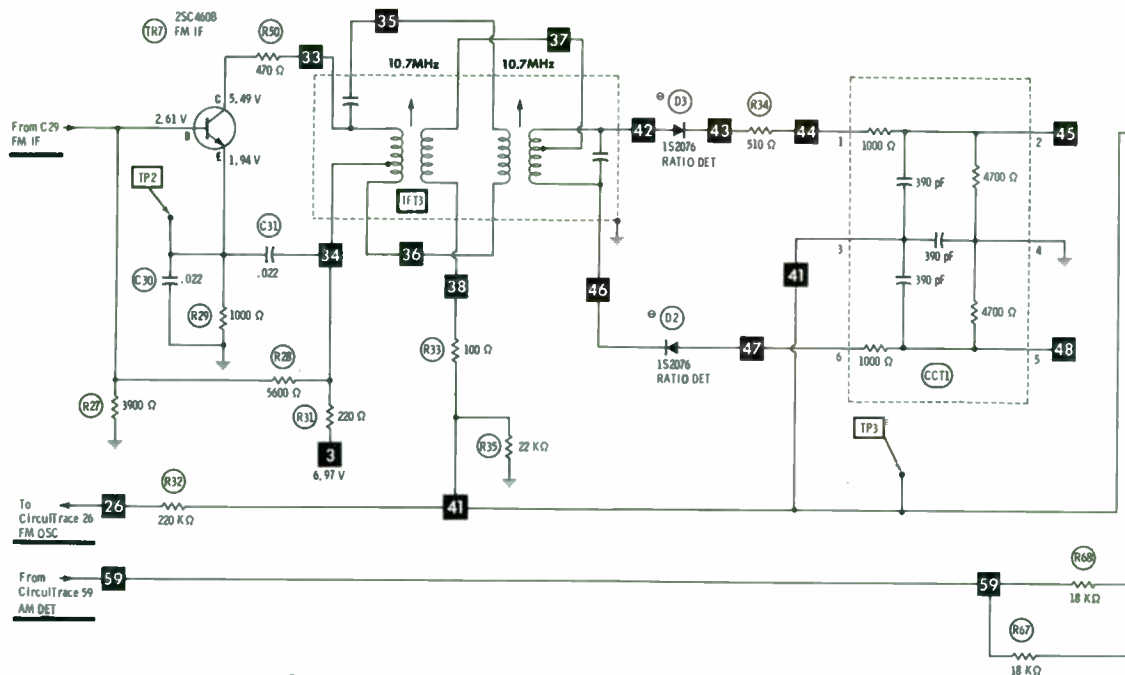


AUDIO BOARD



CLARION MODELS RE-338A/B

AUDIO BOARD

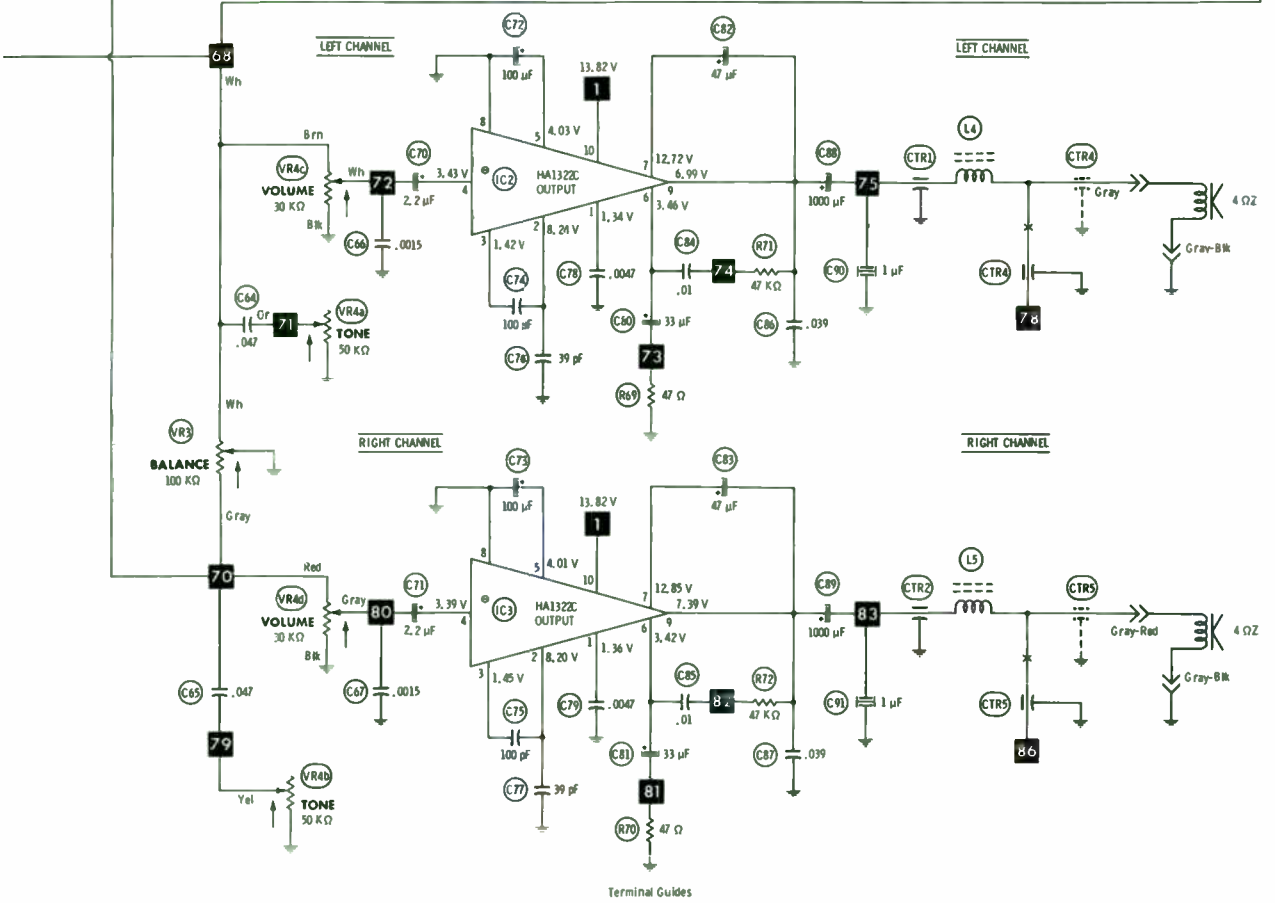
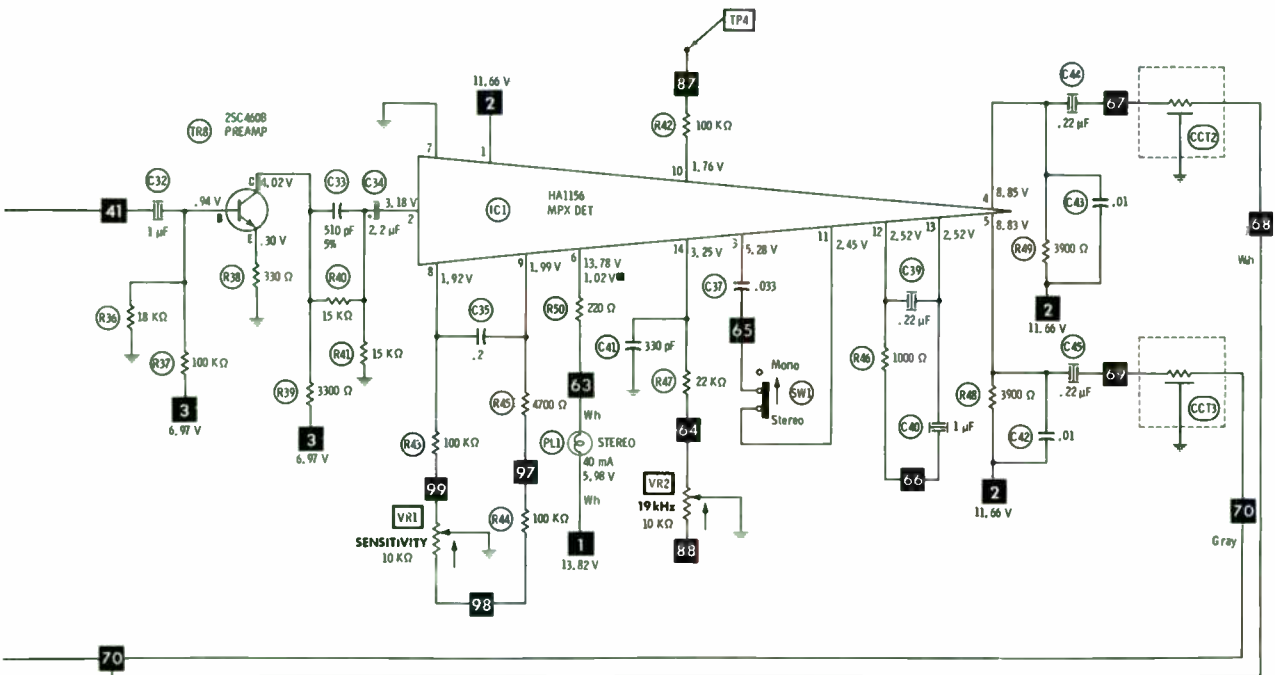


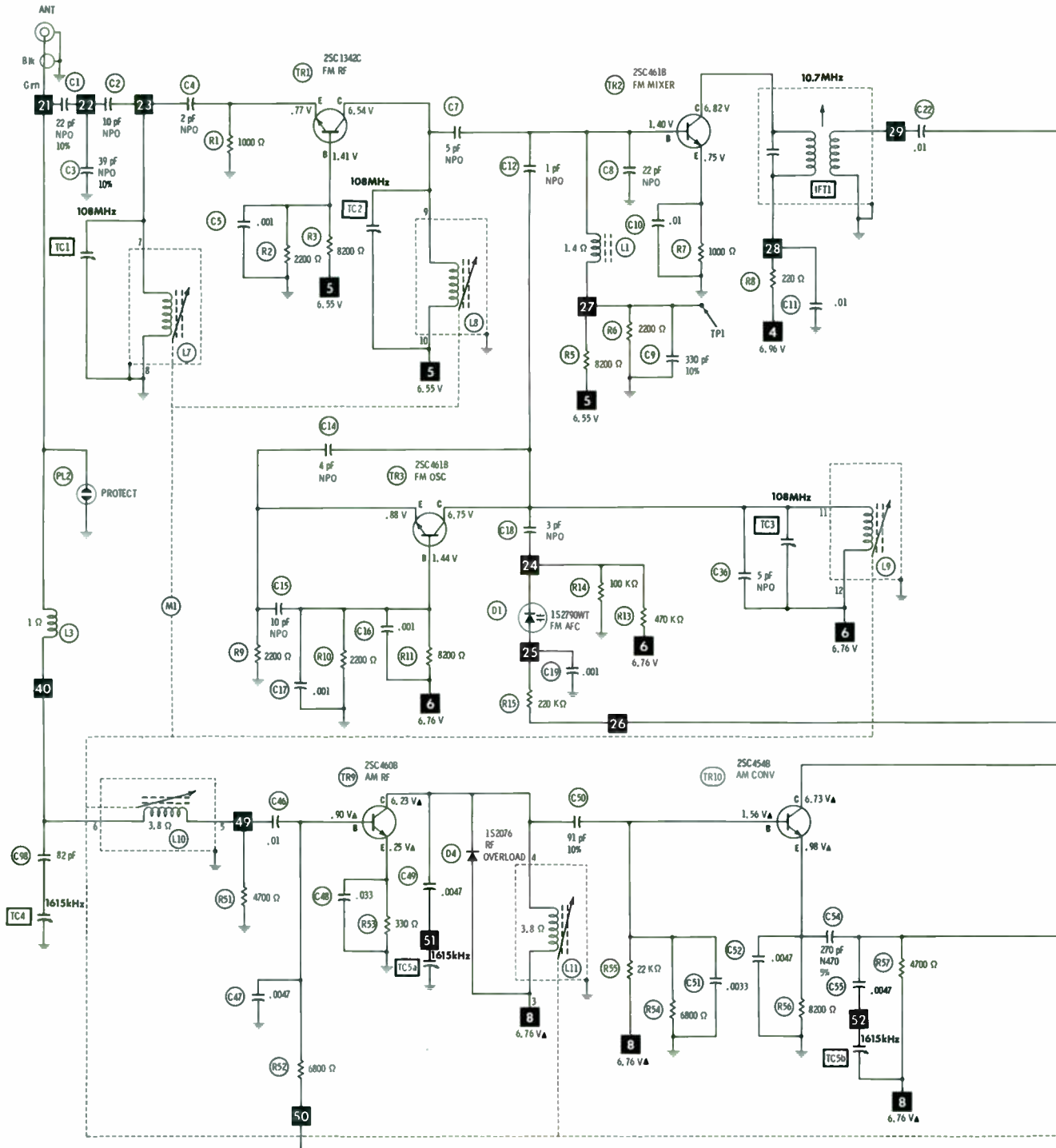
- ✖ Circuitry not used in some versions
  - Circuitry used in some versions
  - ⊙ See ports list
  - ⊛ Nominal value
  - ⊕ Ground
  - ⊞ Chassis
  - ▽ Common tie point
- Measurements with switching as shown unless noted:  
 ■ FM Stereo signal      ▲ AM

Supply voltage maintained as shown of input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow of control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFACIT STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**

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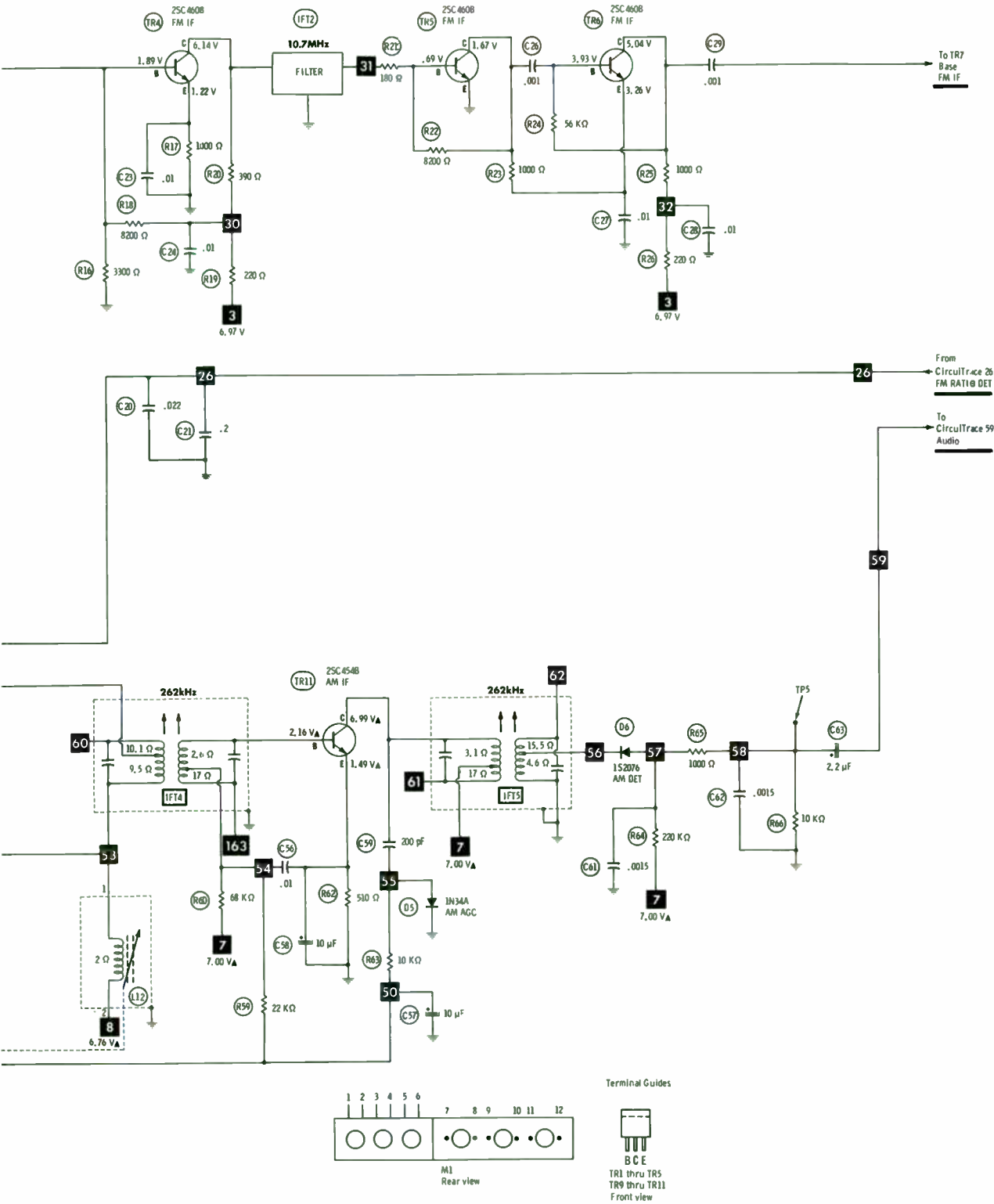
- Circuitry not used in some versions
- - - Circuitry used in some versions
- ⊙ See ports list
- ⊛ Nominal value
- ⊕ Ground
- ⊞ Chassis
- ∇ Common tie point

Measurements with switching as shown unless noted:  
 ■ FM Stereo signal      ▲ AM

Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow of control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH CIRCUITRACE™

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# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 13 Colors 8524 (Stranded) Available in 13 Colors
Shielded Hook-up Wire .....	Use BELOEN No. 8401 or 8421
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D1	1S2790WT	001-0130-00	GE-90	D201		HEPR2503	RE 195	SK3126	RT-262	
D2	1S2076	001-0095-00	GE-300(7)	D200MP(6)	PTC214M(6)	HEPRO602(7)	RE 52(7)	SK3100(7)	RT-218(7)	ECG178MP(6)
	1N60	001-0020-00 (1)	1N60(7)	1N60 (7)	PTC206M(6)	HEPR9135(7)	RE 86(6)	SK3088(7)	RT-263(7)	ECG110(6)
D3	1S2076	001-0095-00 (1)								
	1N60	001-0020-00 (1)	1N60(7)	1N60 (7)	PTC206M(6)	HEPR9135(7)	RE 86(6)	SK3088(7)	RT-263(7)	ECG110(6)
D4	1S2076	001-0095-00	GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D5	1N34A	001-0010-00		TR-81	PTC104	HEPS5011	RE 14	SK3194		ECG124
D6	1S2076	001-0095-00	GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D7	HZ7B	001-0099-01								
IC1	HA1156	051-0050-00 051-0050-01 (1)	GEIC-35		PTC735		RE 33A-IC	SK3160		ECG801
IC2	HA1322C	051-0036-01 051-0036-02 (1)								ECG1037 ECG1037
IC3	HA1322C	051-0036-01 051-0036-02 (1)								ECG1037
TR1	2SC1342C		GE-61	TR-24	PTC136	HEPS0014	RE 9	SK3018	RT-108A	ECG229
TR2	2SC461B		GE-61	(IR)2SC403B	PTC121	HEPS0014	RE 10	SK3018	RT-107A	ECG108
TR3	2SC461B		GE-61	(IR)2SC403B	PTC121	HEPS0014	RE 10	SK3018	RT-107A	ECG108
TR4	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR5	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR6	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR7	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR8	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR9	2SC460B		GE-61	(IR)2SC460B	PTC136	HEPS0014	RE 9	SK3018	RT-134	ECG107
TR10	2SC454B		GE-210	(IR)2SC454B	PTC115	HEPS0015	RE 10	SK3018	RT-187	ECG108
TR11	2SC454B		GE-210	(IR)2SC454B	PTC115	HEPS0015	RE 10	SK3018	RT-187	ECG108

(1) Used in some versions.

(6) Matched pair.

(7) Two required - select matched pair.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C32	1 NP 50V	180-1054-62			
C34	2.2 50V	180-2254-62	133	PC2-100	TCN501A VTT2R2A50
C39	.22 NP 50V	042-0140-00			
C40	1 NP 50V	180-1054-62			TCN501A
C44	.22 NP 50V	042-0140-00			
C45	.22 NP 50V	042-0140-00			
C57	10 16V	180-1064-22	170	PC10-25	VTT10A25
C58	10 16V	180-1064-22	170	PC10-25	VTT10A25
C60	22 10V	042-0199-00			VTT22A16
C63	2.2 50V	180-2254-62	133	PC2-100	VTT2R2A50
C70	2.2 50V	180-2254-62	133	PC2-100	VTT2R2A50
C71	2.2 50V	180-2254-62	133	PC2-100	VTT2R2A50
C72	100 10V	180-1074-22	266	PC100-10	VTT100E10
C73	100 10V	180-1074-22	266	PC100-10	VTT100E10
C80	47 10V	180-4764-22 (1)	246	PC50-16	VTT47D16
C81	47 10V	180-4764-22 (1)	246	PC50-16	VTT47D16
C82	47 10V	180-4764-22	246	PC50-16	VTT47D16
C83	47 10V	180-4764-22	246	PC50-16	VTT47D16
C88	1000 10V	042-0153-00			
C89	1000 10V	042-0153-00			
C90	1 NP 50V	180-1054-62			TCN501A
C91	1 NP 50V	180-1054-62			TCN501A
C92	330 10V	042-0150-00			VTT330G10
C93	470 16V	042-0173-00	317	PC500-16	VTT470J16
C94	470 16V	042-0173-00	317	PC500-16	VTT470J16
C96	470 16V	042-0173-00	317	PC500-16	VTT470J16
C97	470 16V	042-0173-00	317	PC500-16	VTT470J16

(1) Used in some versions.



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA				
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C1	22 NPO 10%	152-3902-13	DTZ-22	NP022	CN0422	10TCC-Q22	
C2	10 NPO		DTZ-10	NP010	CN0410	10TCC-Q10	
C3	39 NPO 10%				CN0439	10TCC-Q39	
C4	2 NPO			DTZ-2R2	NP02P2	CN0522	10TCC-V22
C5	.004			DD-102G	GP1000	GP210	5GA-D10
C6	.001			DD-102G	GP1000	GP210	5GA-D10
C7	5 NPO			DTZ-4R7	NP04P7	CN0547	10TCC-V47
C8	22 NPO			DTZ-22	NP022	CN0422	10TCC-Q22
C9	330 10%			DD-331	GP330	GP333	10TS-T33
C10	.01				WMF1S1	EWFA110	1PB-S10
C11	.01				WMF1S1	EWFA110	1PB-S10
C12	1		153-1096-13			CN0510	10TCC-W10
C13	.01				WMF1S1	EWFA110	1PB-S10
C14	4 NPO	153-4097-70					
C15	10 NPO		DTZ-10	NP010	CN0410	10TCC-Q10	
C16	.001		DD-102G	GP1000	GP210	5GA-D10	
C17	.001		DD-102G	GP1000	GP210	5GA-D10	
C18	3	153-3096-13					
C19	.001		DD-102G	GP1000	GP210	5GA-D10	
C20	.022	141-2233-13			M192P2239R8	192P2239R8	
C21	.2 12V	043-0020-00	UK16-204			HY-470	
C22	.001			DPMS6D1	EWFA1210	1PB-D10	
C23	.01			WMF1S1	EWFA110	1PB-S10	
C24	.01			WMF1S1	EWFA110	1PB-S10	
C25	.01			WMF1S1	EWFA110	1PB-S10	
C26	.001			DPMS6D1	EWFA1210	1PB-D10	
C27	.01			WMF1S1	EWFA110	1PB-S10	
C28	.01			WMF1S1	EWFA110	1PB-S10	
C29	.001			WMF1S1	EWFA110	1PB-S10	
C30	.022	141-2233-13			EWFA1210	1PB-D10	
C31	.022	141-2233-13			M192P2239R8	192P2239R8	
C33	510 5%			CD15FD511J03	M192P2239R8	192P2239R8	
C35	.2 12V	043-0020-00	UK16-204		SX351	MWA-511	
C36	5 NPO		DTZ-4R7	NP04P7	CN0547	10TCC-V47	
C37	.033	141-3333-13			M192P3339R8	192P3339R8	
C38	.033	141-3333-13			M192P3339R8	192P3339R8	
C41	330 10%		DD-331	GP330	GP333	10TS-T33	
C42	.01			WMF1S1	EWFA110	1PB-S10	
C43	.01			WMF1S1	EWFA110	1PB-S10	
C46	.01			WMF1S1	EWFA110	1PB-S10	
C47	.0047	141-4723-12			M192P4729R8	192P4729R8	
C48	.033	141-3333-13			M192P3339R8	192P3339R8	
C49	.0047	141-4723-12			M192P4729R8	192P4729R8	
C50	91	144-9102-14					
C51	.0033	141-3323-12			M192P3329R8	192P3329R8	
C52	.0047	141-4723-12			M192P4729R8	192P4729R8	
C53	.2 12V	043-0020-00	UK16-204			HY-470	
C54	270 N470 5%	156-2711-50					
C55	.0047	141-4723-12			M192P4729R8	192P4729R8	
C56	.01			WMF1S1	EWFA110	1PB-S10	
C59	200		DD-201	GP200	GP320	10TS-T20	
C61	.0015		DD-152G		GP215	5GA-D15	
C62	.0015		DD-152G		GP215	5GA-D15	
C64	.047	141-4733-14					
C65	.047	141-4733-14					
C66	.0015		DD-152G		GP215	5GA-D15	
C67	.0015		DD-152G		GP215	5GA-D15	
C68	.039	141-3933-13			M192P3939R8	192P3939R8	
C69	.039	141-3933-13			M192P3939R8	192P3939R8	
C74	100		DD-101	GP100	GP310	10TS-T10	
C75	100		DD-101	GP100	GP310	10TS-T10	
C76	39			CD15ED390J03	SX439	MWA-390	
C77	39			CD15ED390J03	SX439	MWA-390	
C78	.0047	141-4723-12			M192P4729R8	192P4729R8	
C79	.0047	141-4723-12			M192P4729R8	192P4729R8	
C84	.01			WMF1S1	EWFA110	1PB-S10	
C85	.01			WMF1S1	EWFA110	1PB-S10	
C86	.0015	(1)	DD-152G		GP215	5GA-D15	
C87	.0015	(1)	DD-152G		GP215	5GA-D15	
C95	.1			WMF05P1	EWFO5010	431P1049R5	
C98	82		DD-820		GP482	10TS-Q82	
CTR1		(2)					
CTR2		(2)					
CTR3		(2)					
CTR4		(2)					
CTR5		(2)					
CTR6		(2)					
TC1		004-1496-00					
TC2		004-1496-00					
TC3		004-1502-00					
TC4		004-1489-01					
TC5A		004-1441-00					
B		004-1441-00					

CLARION MODELS RE-338A/B

(1) Used in some versions.

(2) Part of Filter Assembly Part Number 944-0445-00.

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFGR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR1	Sensitivity	10K	012-3394-00				
VR2	19kHz Adjust	10K	012-3394-00				
VR3	Balance	100K	3441-00 (5)				
VR4A	Tone	50K	012-3456-00				
B	Tone	50K					
C	Volume	30K					
D	Volume/Switch	30K					

(5) Number on unit.

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
L1	10.7MHz Trap	010-1570-00			(1) Part of M1.
L2	RF Choke	010-1180-00			
L3	AM Ant. Choke	010-0930-00			
L4	RF Choke	010-1686-00			
L5	RF Choke	010-1686-00			
L6	RF Choke	010-1686-00			
L7	FM Ant.	(1)			
L8	FM RF	(1)			
L9	FM Osc.	(1)			
L10	AM Ant.	(1)			
L11	AM RF	(1)			
L12	AM Osc.	(1)			
IFT1	FM IF (10.7MHz)	005-0698-00			
IFT3	FM IF (10.7MHz)	005-0684-00			
IFT4	AM IF (455kHz)	005-0550-01			
IFT5	AM IF (455kHz)	005-0560-01			

### FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	440mA	.55	5.45mH	009-0181-00			

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA							
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.	
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER
F1	2A	120-0020-00	850-1460-01 (1) 850-1460-00 (2)	AGC-2	HDJ	312002	150145	FG2-2	

(1) Fuse holder female.  
(2) Fuse holder male.

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES	
CCT1	Network	050-0010-00	Ratio Detector	
CCT2	Network	050-0051-00		De-Emphasis
CCT3	Network	050-0051-00		De-Emphasis
M1	Tuning Coil Assembly	937-0148-19 937-0148-20 (1)	AM/FM	
SW1	Switch	013-3149-00	Stereo/Mono	
SW2	Switch	013-3102-00		AM/FM
SW3	Switch			Power (On Volume)
	Cable Assembly	092-0476-02	Ant. Recept.	
	Cable Assembly	851-2120-00	Speakers	
	Printed Circuit Board	099-4473-00	AM/FM	
	Printed Circuit Board	099-4474-00	Audio	

(1) Used in RE-338A model only.

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Escutcheon	370-2803-00 (2)	Support, Dial	377-0153-00 (2)
Scale, Dial	372-2721-00	Button Assembly, AM	965-2246-00
	372-2725-00 (1)	Button Assembly, FM	965-2164-00 (1)
Pointer, Dial	376-0773-01		965-2245-00
	376-0785-00 (1)	Button, Stereo/Mono	965-2163-00 (1)
			382-0086-00
			382-0095-00 (1)

(1) Used in RE-388A model only.  
(2) Used in RE-388B model only.



For Supplier Address See PHOTOFACT Index

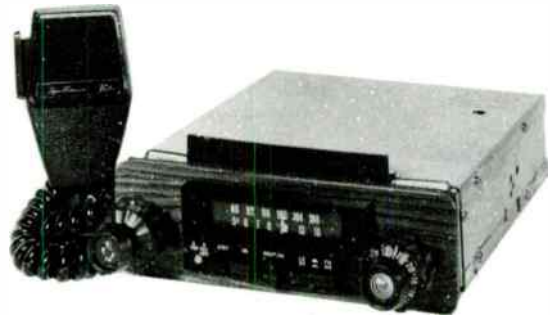
## NOTE

Repair or adjustment of transmitter circuits must be under supervision of a person with first-or second-class radiotelephone license. (Refer to FCC Rules and Regulations Part 95, Subpart C & D.)

The frequency of the transmitter should be checked periodically with a secondary frequency standard to insure proper and legal operation.

Best results will be obtained when adjusting the final RF output circuit if the antenna normally used is connected and the chassis is as nearly in the cabinet as possible.

Connect either 50-ohm dummy load or the normally used antenna system.



MODEL 852CB

## ALIGNMENT INSTRUCTIONS

Alignment Tools	GC ELECTRONICS
T201 thru T203, L202 thru L204.....	9440
ALL other tunable coil and transformers.....	5000,8290

J.I.L. MODEL 852CB

## RECEIVER

Connect an AC VTVM or AF Wattmeter across speaker voice coil. Adjustments made with 14-volt DC input. Adjust volume control to obtain suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
High side thru .01uF to base of Q203, low side to ground.	455kHz, 1000Hz @ 30% modulation.	Any	IFT203 IFT204 IFT205	Set generator output low enough to prevent AGC limiting. Adjust for maximum.
High side thru .01uF to base of Q2, low side to ground.	27.105MHz, 1000Hz @ 30% modulation.	12	T201,T202, T203 IFT201, IFT202, IFT206	Adjust for maximum.

## RECEIVER ADJUSTMENTS

Connect an AC VTVM or AF Wattmeter across speaker voice coil. These adjustments made with 14-volt DC input. Adjust volume control to obtain a suitable reading.

SIGNAL GENERATOR	GEN FREQ	CHANNEL	ADJUST	REMARKS
AGC High side thru .01uF to Antenna Jack, low side to ground.	27.105MHz, 1000Hz @ 30% modulation, output 5uV.	12	VR203	Adjust for 1.4V output.
SQUELCH RANGE High side thru .01uF to Antenna Jack, low side to ground.	27.105Hz, 1000Hz @ 30% modulation, output 200uV.		VR201	Set squelch control fully clockwise, back off 90 degrees. Adjust so that squelch just breaks.

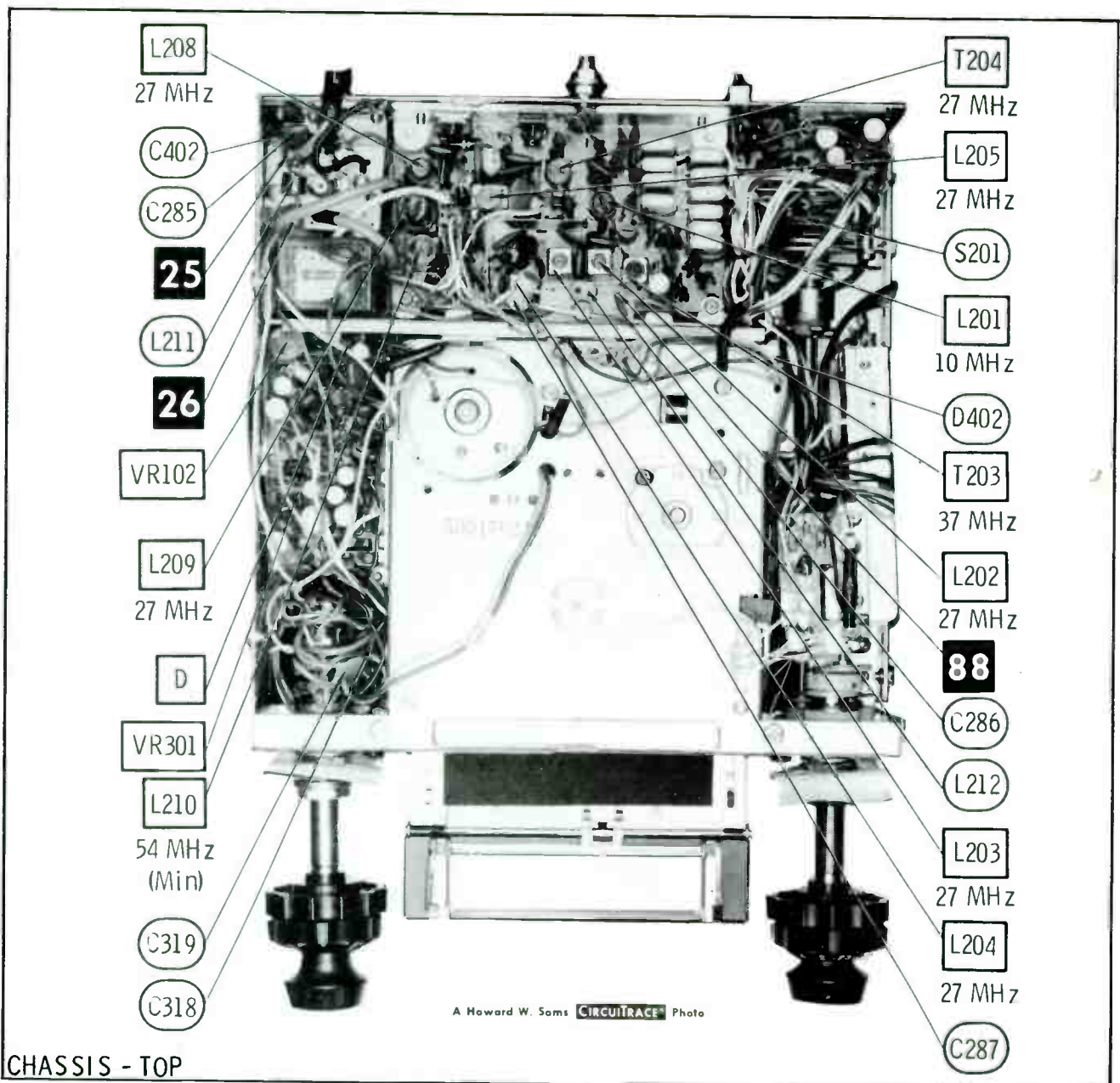
**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

© 1976 Howard W. Sams & Co., Inc. Printed in U. S. of America 6CL321

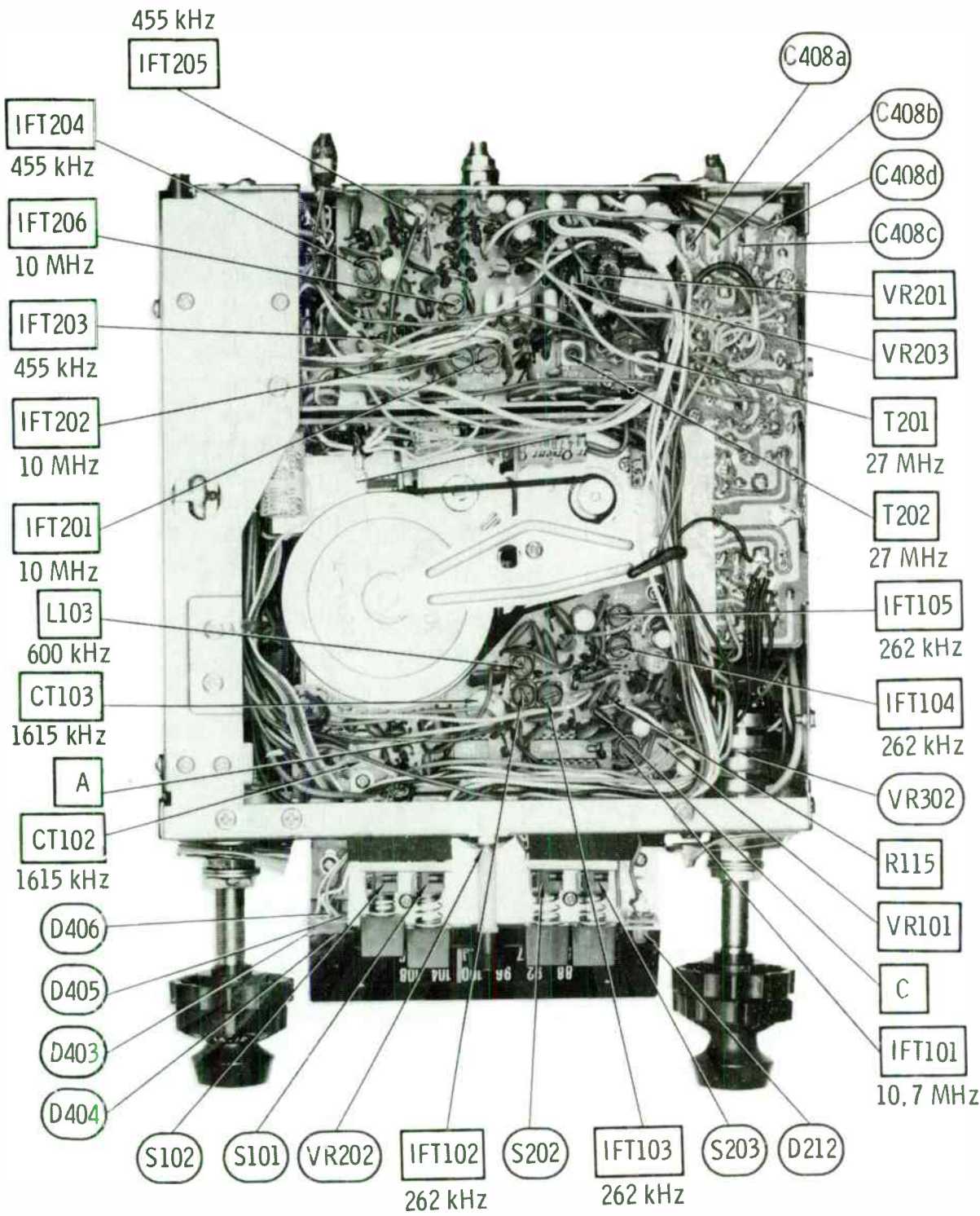
# TRANSMITTER

Connect an RF Wattmeter on 50-ohm, 25-watt dummy load to antenna connector.  
Adjustments made with 14-volt DC input.

INDICATOR	ADJUST	REMARKS
OSCILLATOR, MIXER, BUFFER, DRIVER, FINAL RF Wattmeter	L201 thru L204, T204 L205, L208, L209	Channel selector to Key transmitter. Adjust for maximum.
TVI TRAP TV (Ch. 2)	L210	Key transmitter. Adjust for MINIMUM interference on TV.
FINAL INPUT POWER Remove jumper at TP1 and connect 0-2000DC milliammeter.	L209	Adjust for 5 watts. (Maximum)



CHASSIS - TOP



CHASSIS - BOTTOM

## ALIGNMENT INSTRUCTIONS

Check for specified source voltage.

Use only enough generator output to provide a usable indication.

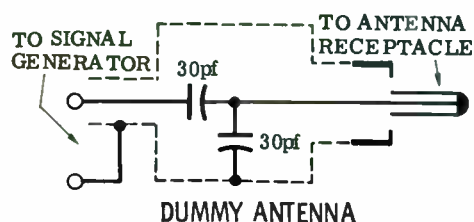
Suggested Alignment Tools:

GC ELECTRONICS

ALL.....8290,8868,9087

GENERATOR COUPLING	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
High side thru .1uF to point A low side to ground.	262kHz 400-Hz mod.	High freq. end stop.	Output meter across voice coil.	IFT102 thru IFT105	Adjust for maximum.
Thru dummy antenna to antenna input.	1615kHz	"	"	CT103 CT102 CT101	"
Thru dummy antenna to antenna input.	600kHz	Tune to signal	Output meter across voice coil.	L103	Adjust for maximum. Repeat alignment until no further improvement is noted.

With radio installed in car and antenna extended 36", tune in a weak station near 1400kHz and adjust CT101 for maximum output. Antenna adjustment CT101 is located in side tape door right rear corner.



### FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to point B, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to point C common to ground.	IFT101 IFT	Adjust for maximum.

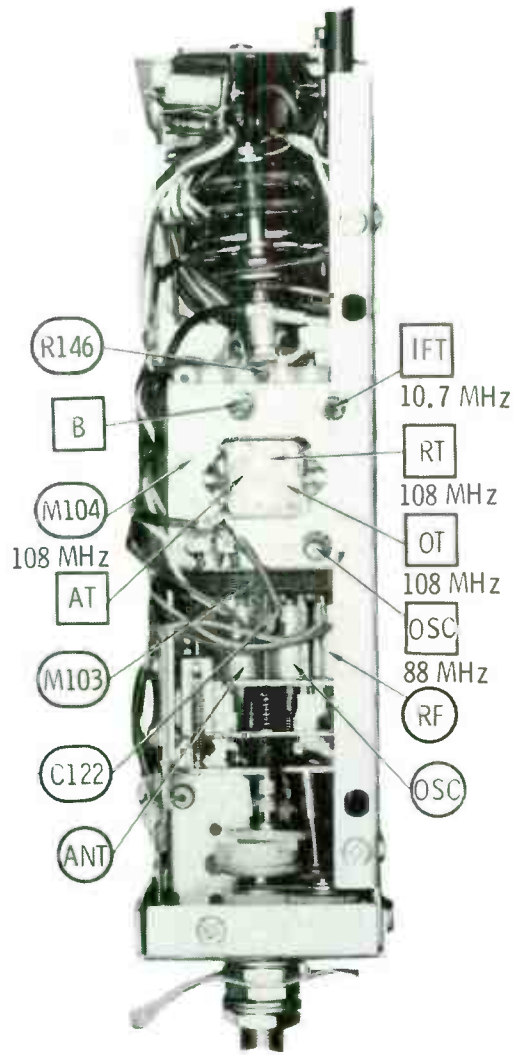
### FM RF ALIGNMENT—SELECTOR IN FM POSITION

Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
88MHz Unmodulated	Low freq end	DC probe of VTVM to point C, common to ground.	Osc	Adjust for maximum.
108MHz Unmodulated	Tune to signal	"	OT, RT, AT	Adjust for maximum. Repeat FM RF steps until no further improvement is noted.

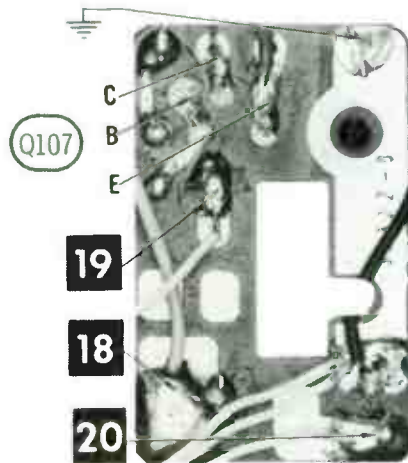
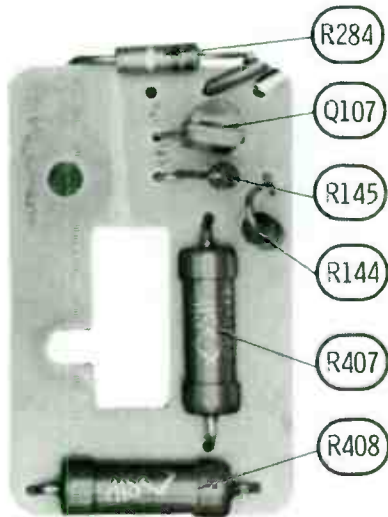
### FM STEREO MULTIPLEX ALIGNMENT

Connect Freq Counter to Point D. Adjust VR102 for 19kHz  $\pm$ 20Hz. Tune to stereo station. Adjust R115 for maximum brightness of stereo indicator. Tune between FM stations. Adjust VR101 for MINIMUM noise level.



CHASSIS - RIGHT SIDE

A Howard W. Sams CIRCUITRACE Photo



FM TUNER B+ SWITCH BOARD

## ADJUSTMENTS

ADJUST	REMARKS
Head Azimuth	Play a test cartridge and adjust B1 for maximum on an AC VTVM across output.
Head Height	Play a test cartridge, follow instructions with cartridge, and adjust B2 for proper response.
Tape Balance	Set the Balance control to the center of rotation, play a test tape and adjust VR301 for an AC VTVM indication at the left output equal to the right output.

## TROUBLE CHART

SYMPTOM	REMARKS
Capstan does not rotate.	Belt (4) dirty, worn, or broken. Assembly (5) binding. Motor defective or not supplied with power.
Track-shift mechanism inoperative	Switch (S402) dirty. Cam (24) binding or worn. Pawl (28) worn. Assembly (14) binding. Solenoid (RY401) defective or not supplied with power. Cartridge defective.
Wow or flutter	Belt (4) dirty or worn. Capstan dirty or binding. Cartridge defective. Motor defective.
Sound weak or distorted	Head dirty, misaligned, or defective. Cartridge defective. Amplifiers defective.
Tape is pulled from cartridge.	Cartridge defective. Capstan dirty or scored.

## MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
3	23796	Cam Tension Spring	18	23589	Head Lifting Spring
4*	23590*	Flywheel Drive Belt*	19	23600	Height Tension Spring
5	23785	Flywheel Housing Assembly	22	23605	Shifting Assembly Tension Spring
9	23791	Flywheel Retainer Bracket			
14	21462	Head Shifting Assembly	24	21372	Track Changing Cam
15	23575	Head Clamp	27	23585	Solenoid Spring
16	23588	Azimuth Spring	28	21381	Pawl Assembly
17	23576	Height Alignment Lever	29	21390	Cartridge Detent Arm
			30	23786	Flywheel

\* Flywheel Drive Belt - E-V/GAME Replacement Number 1425-28  
WALSCO Replacement Number 1425-28

### CLEANING

Clean all tape contact surfaces with a soft, lint-free material and head cleaner or methyl alcohol. Use alcohol to remove oil and grease from all driving surfaces.

CAUTION: Avoid getting head cleaner on any plastic surface.

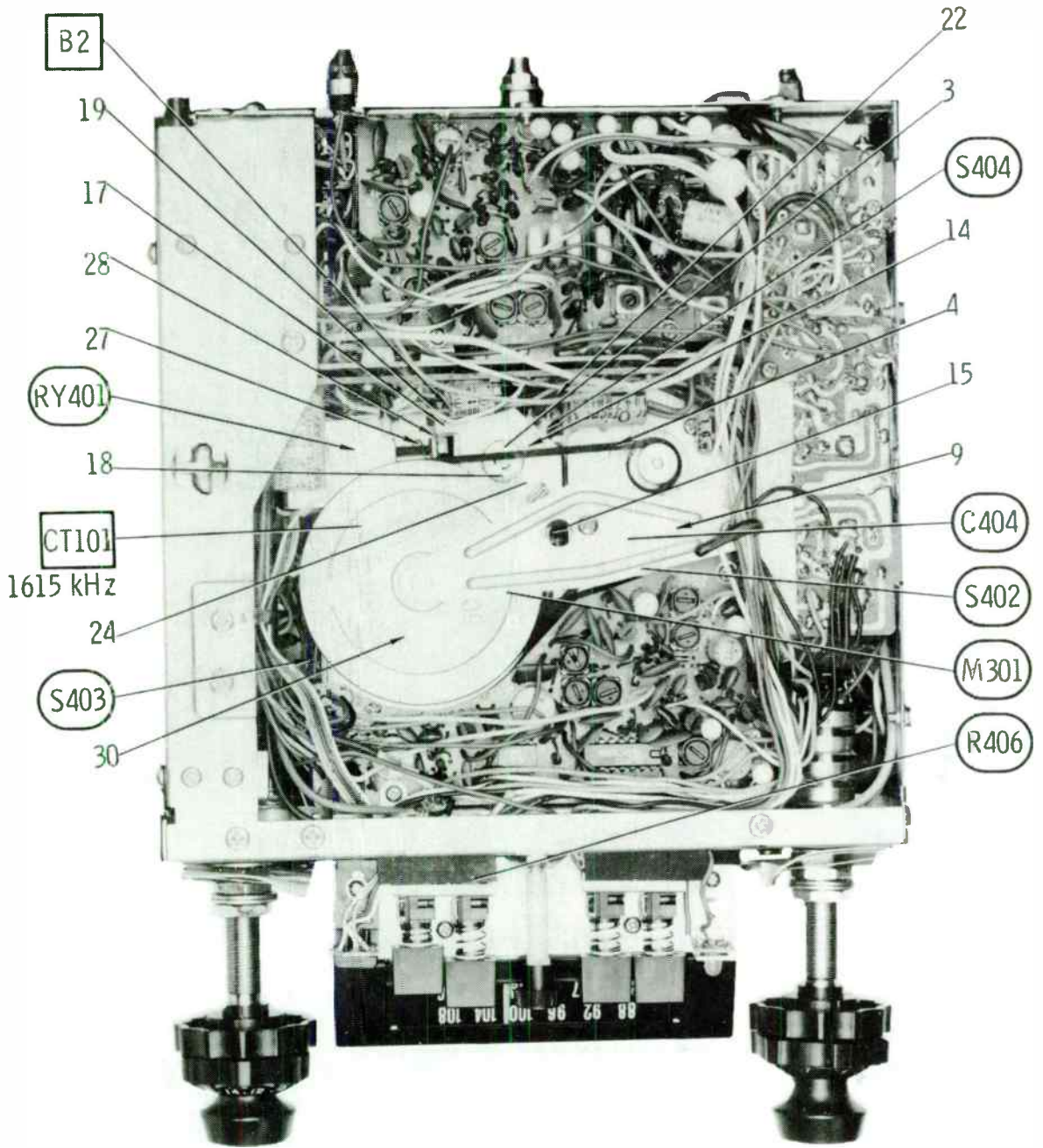
### LUBRICATING

Bearings are oil-less type and do not need lubrication. Lubricate bushings lightly with #20 machine oil. Use a light film of nonhardening grease on cam surfaces.

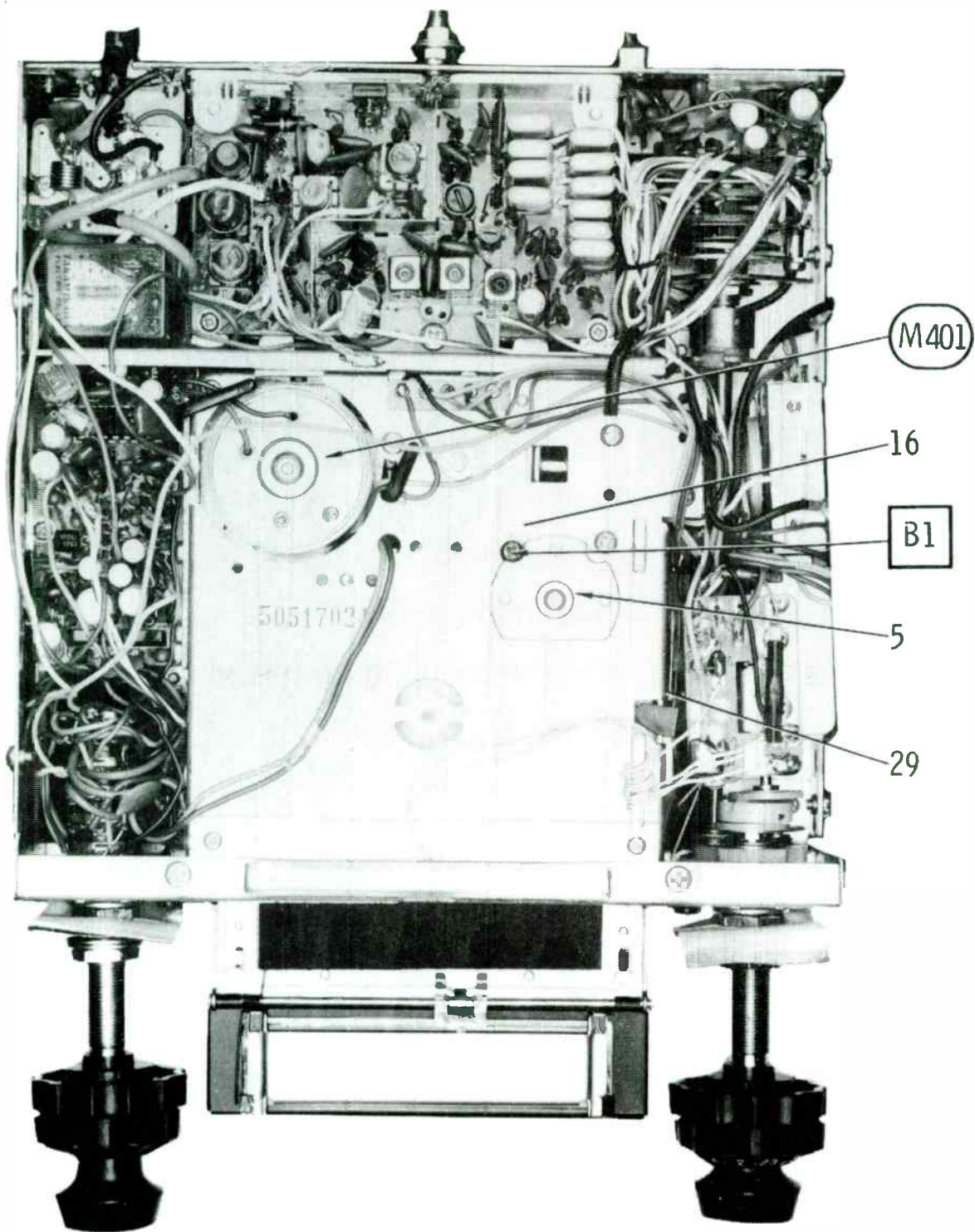
### HEAD DEMAGNETIZING

Demagnetize head when unit is serviced. Avoid using magnetic materials near head.

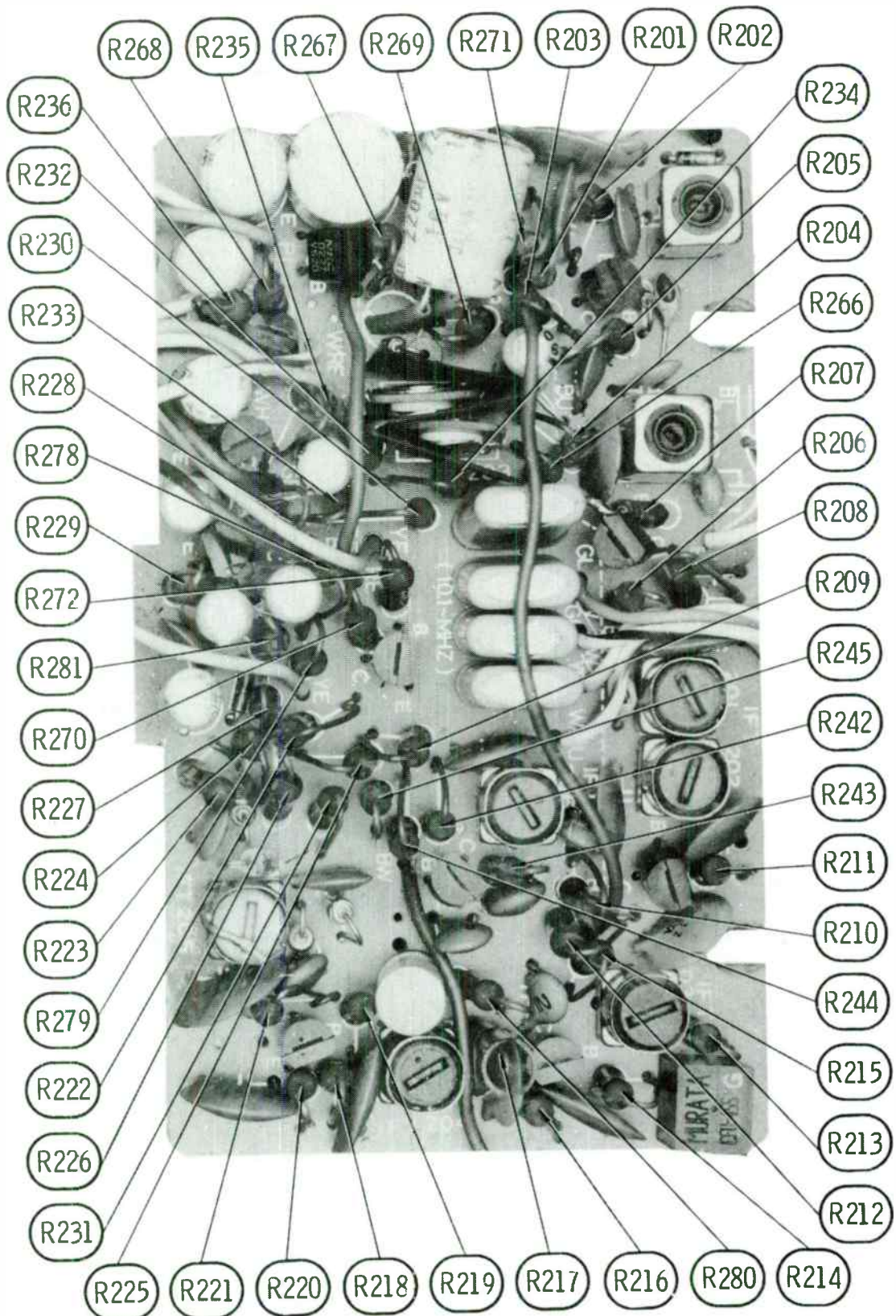




CHASSIS - BOTTOM

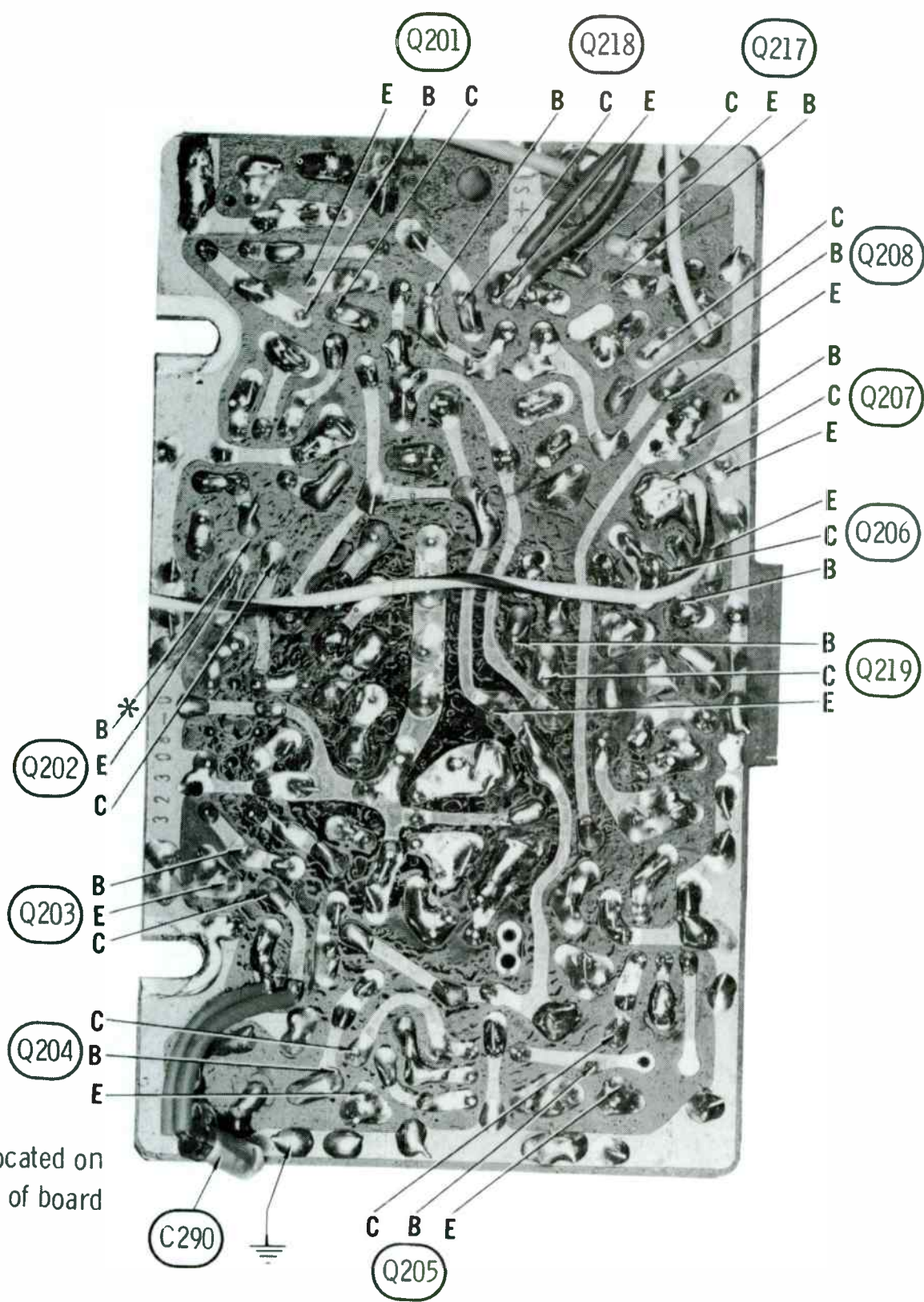


CHASSI S-TOP



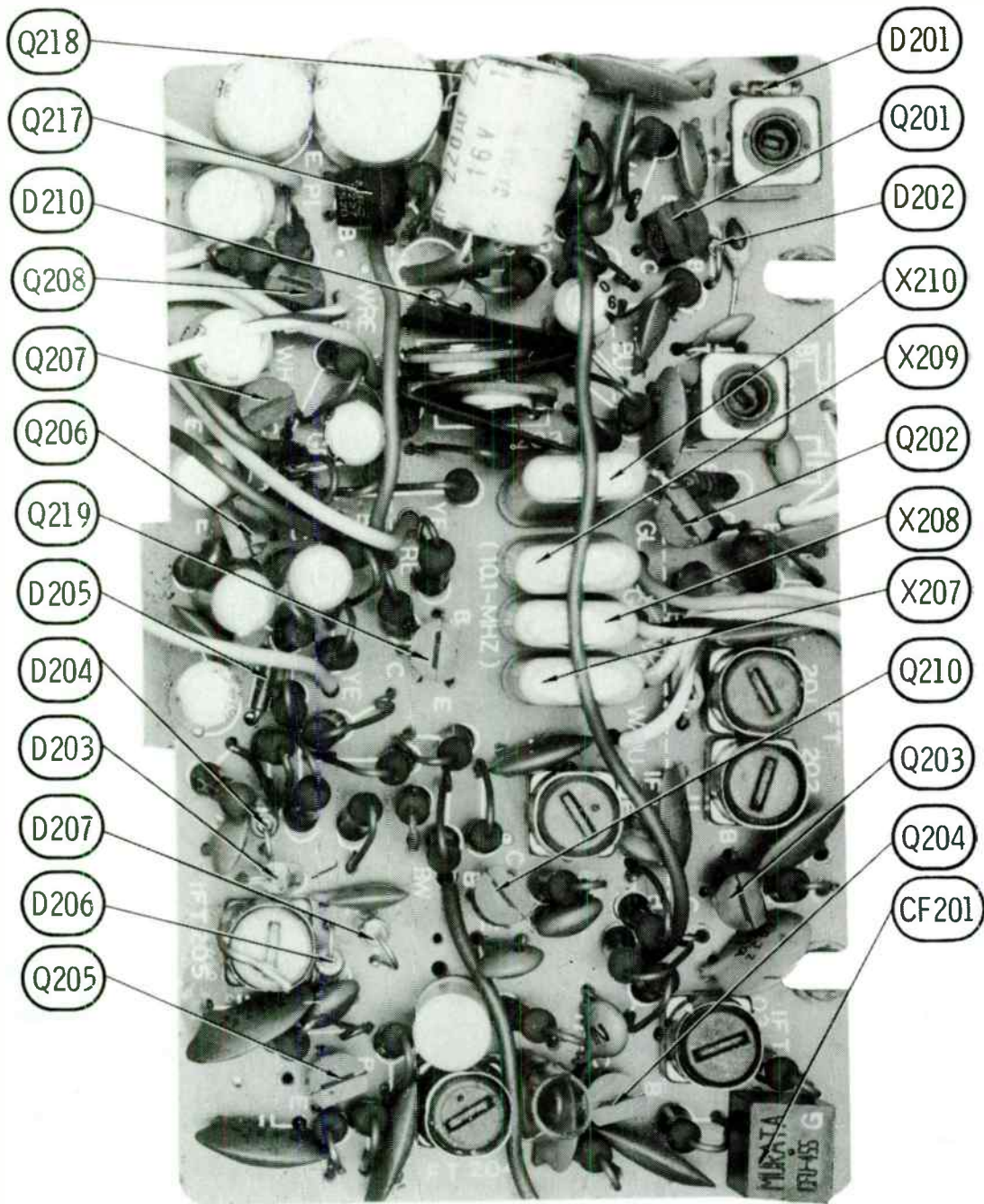
J.I.L. MODEL 852CB

CB RECEIVER BOARD

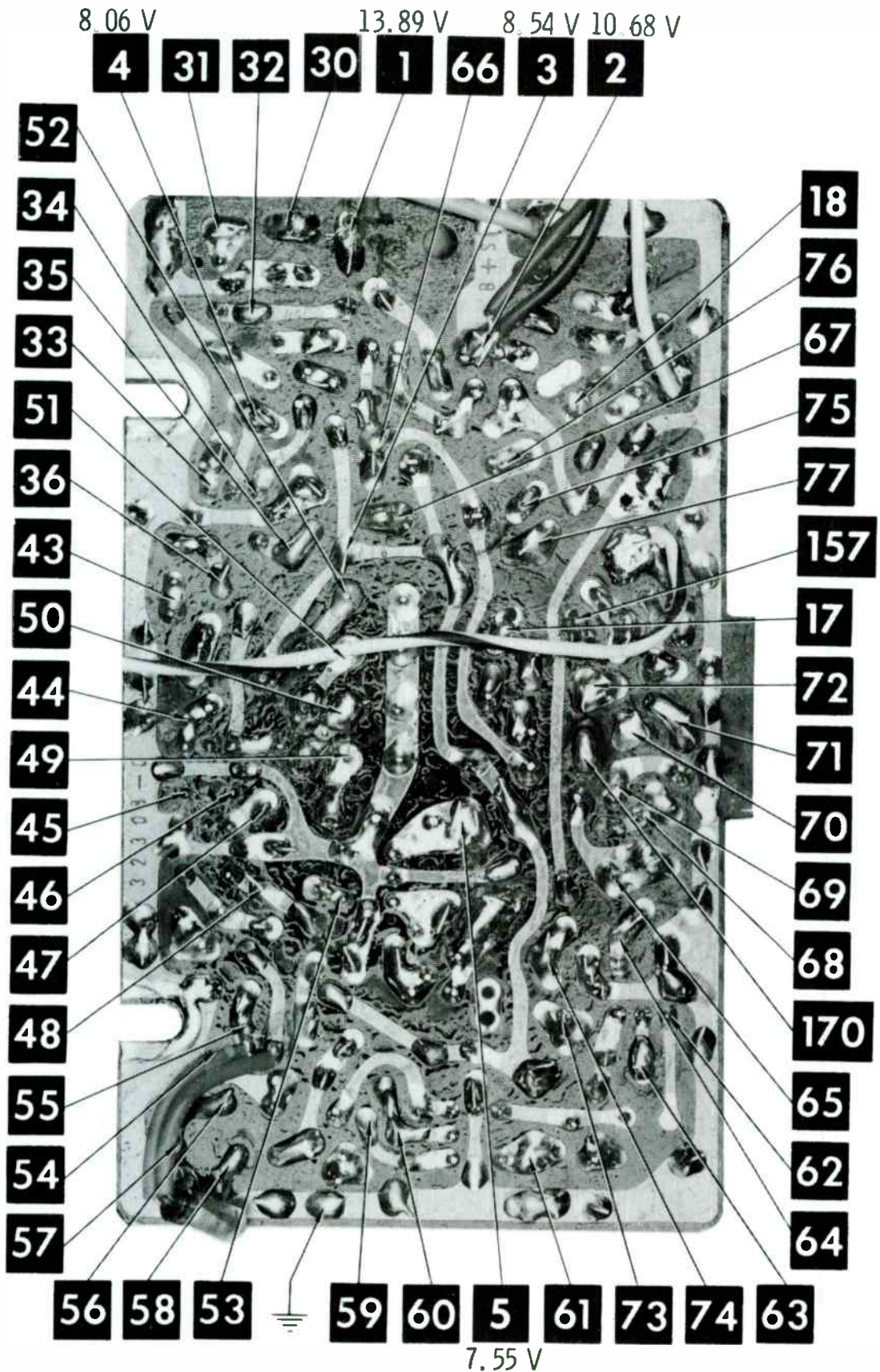


\* Located on top of board

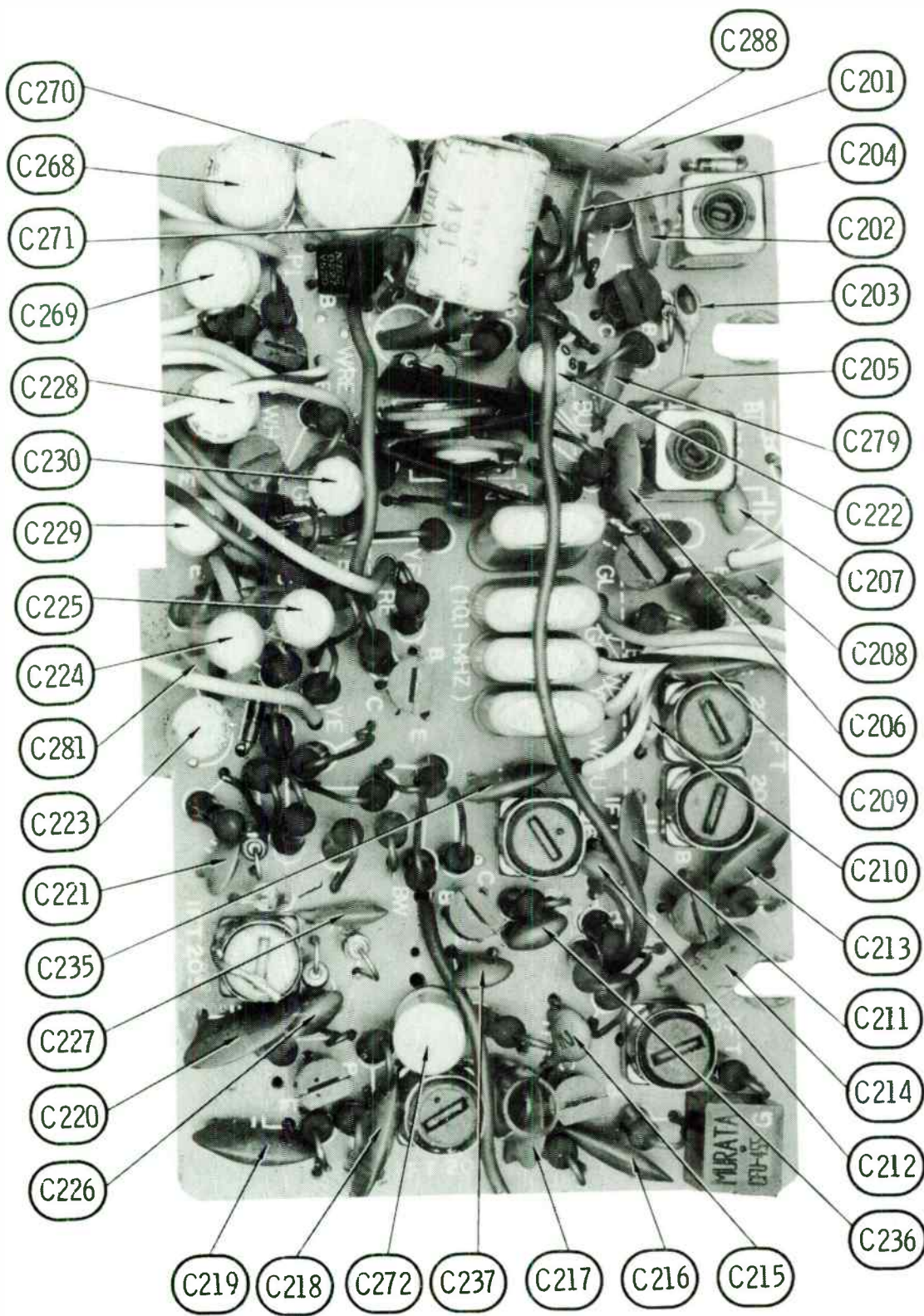
### CB RECEIVER BOARD



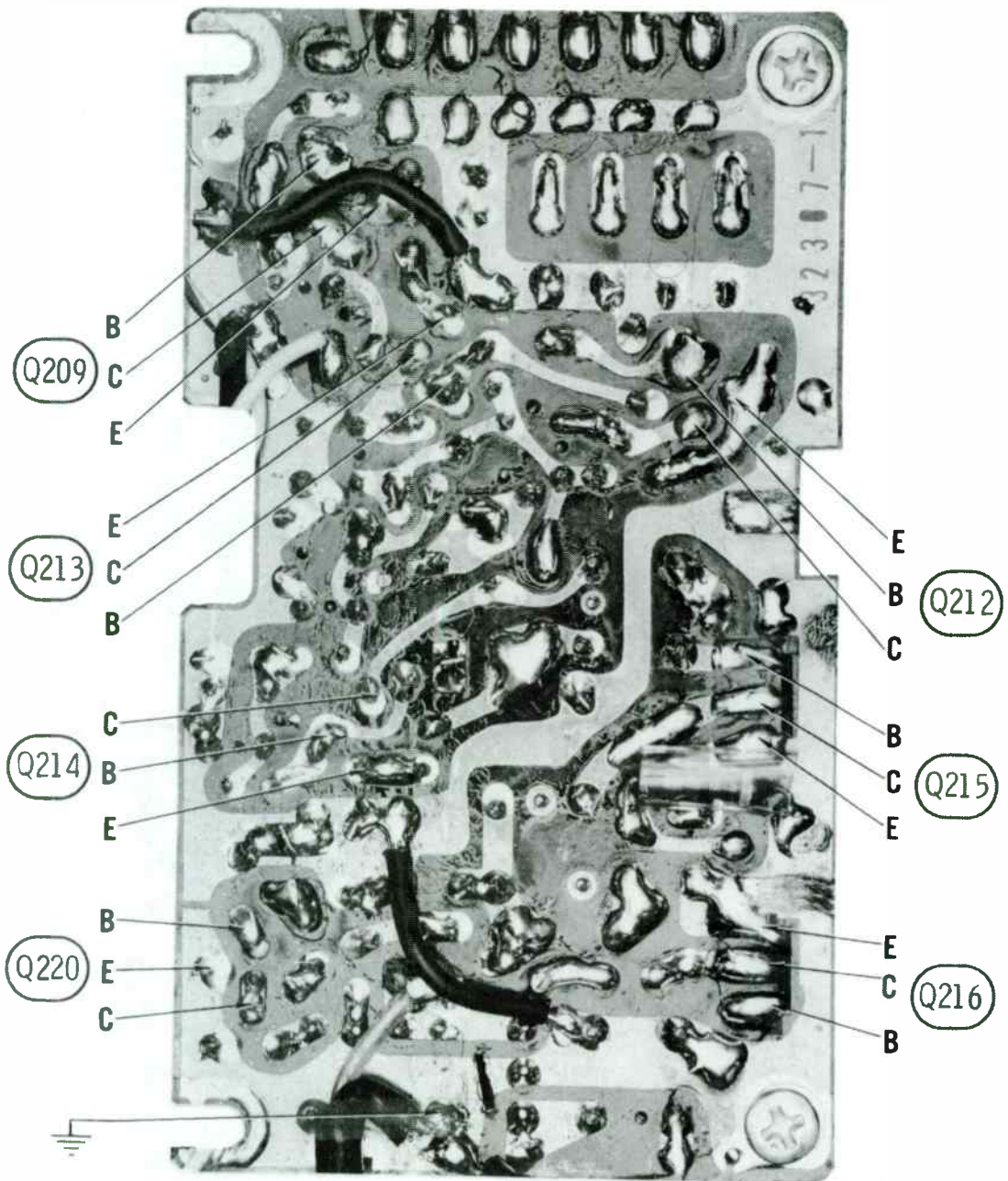
CB RECEIVER BOARD



**CB RECEIVER BOARD**

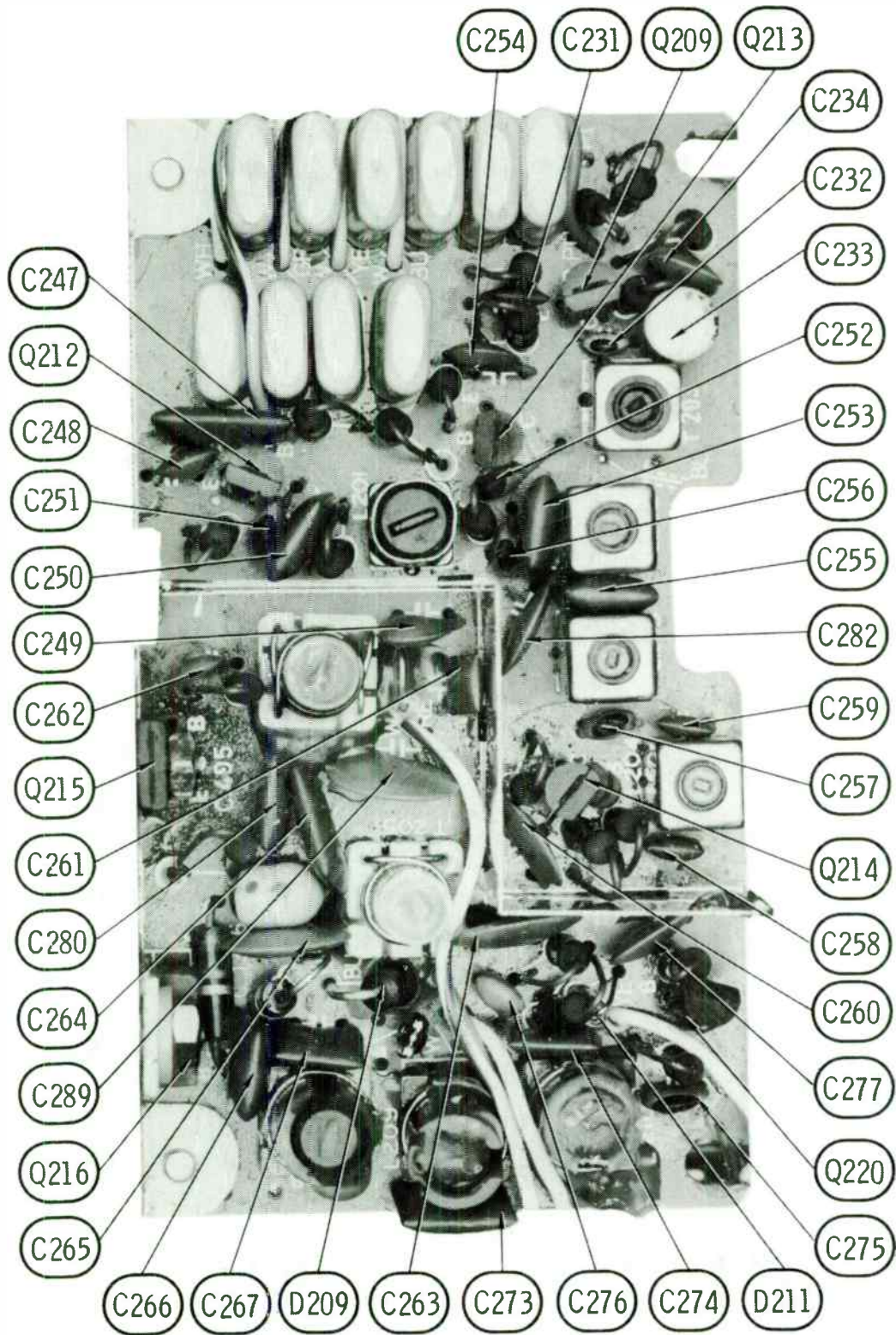


CB RECEIVER BOARD

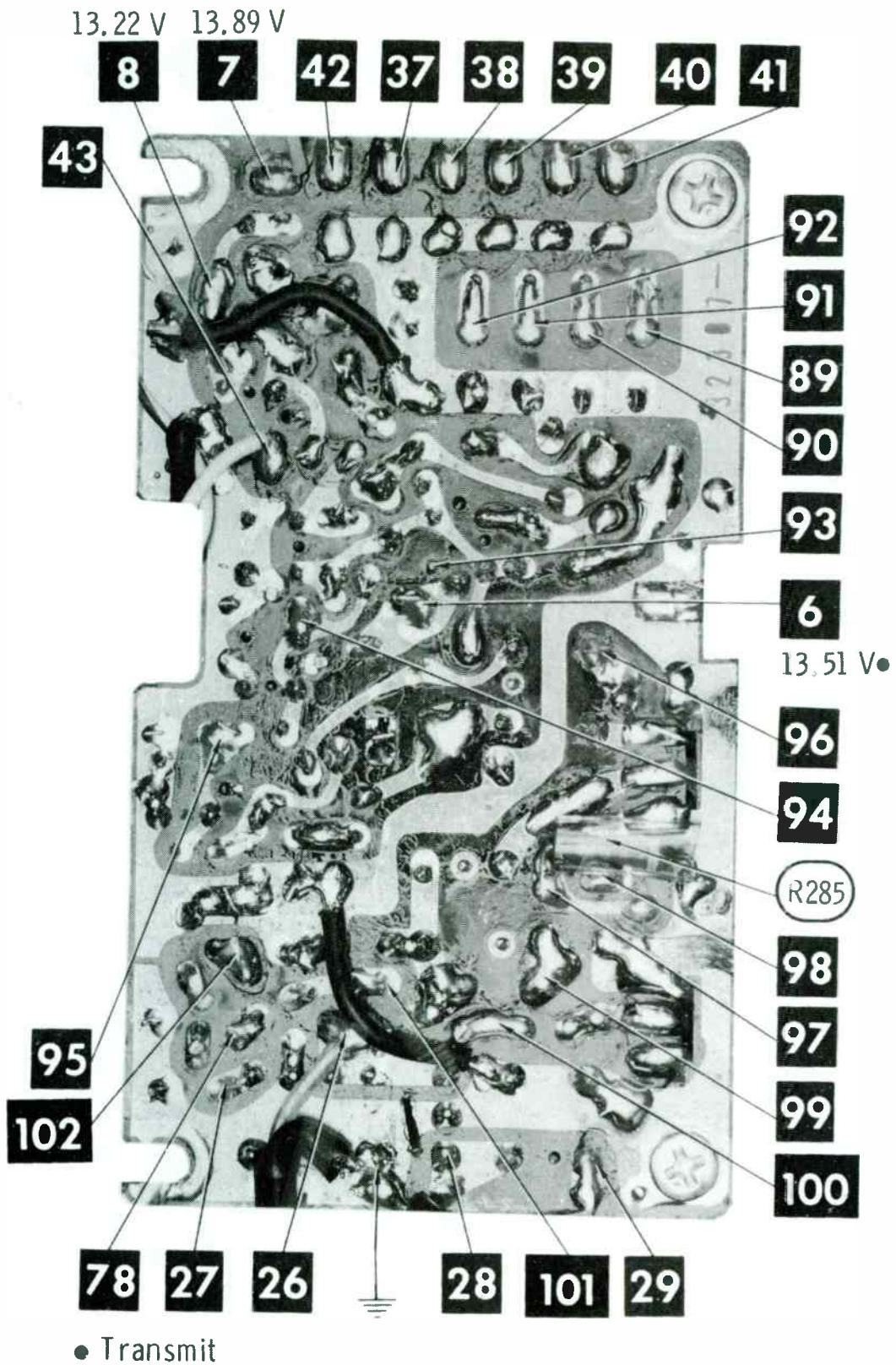


CB TRANSMITTER BOARD

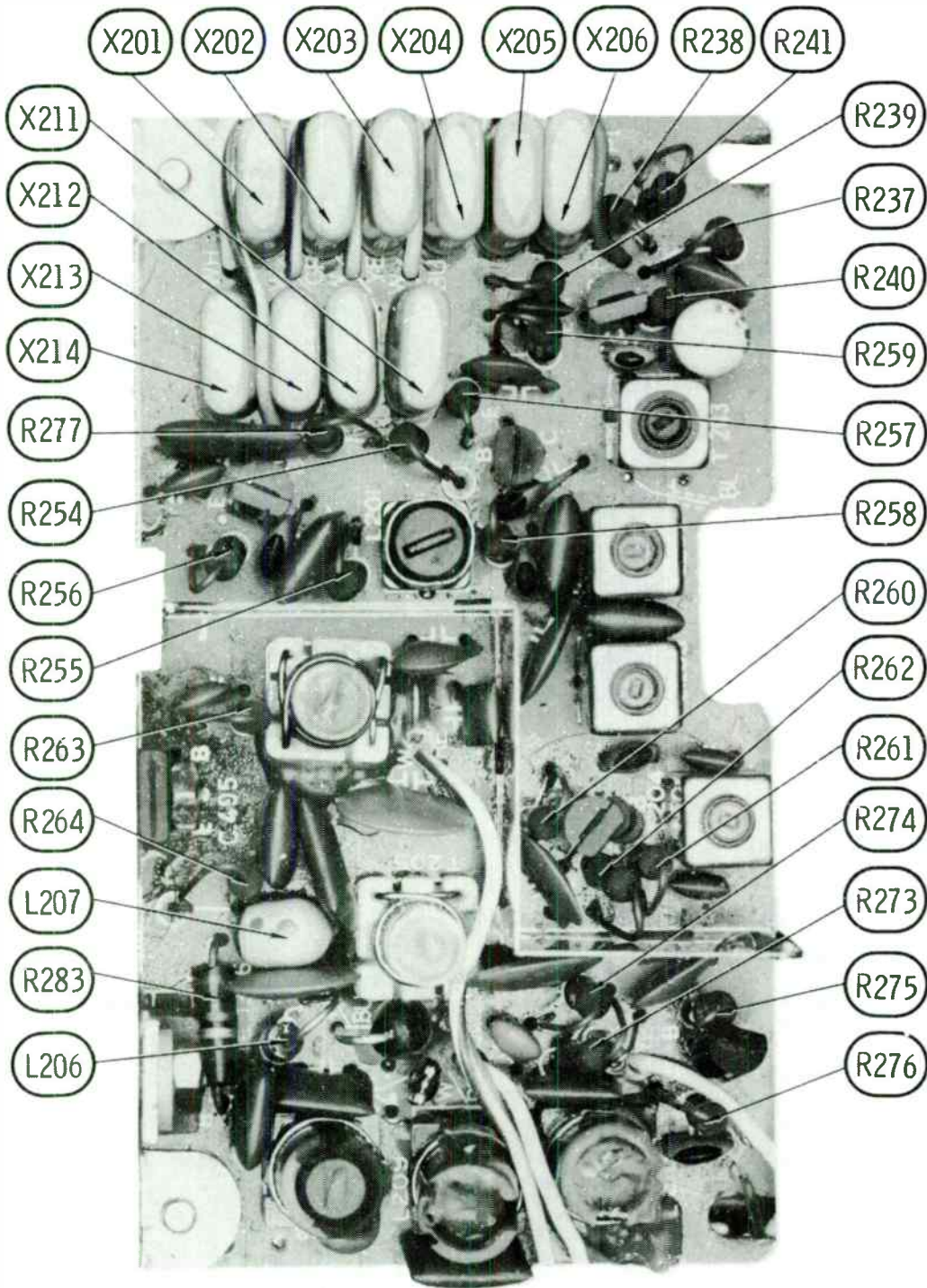




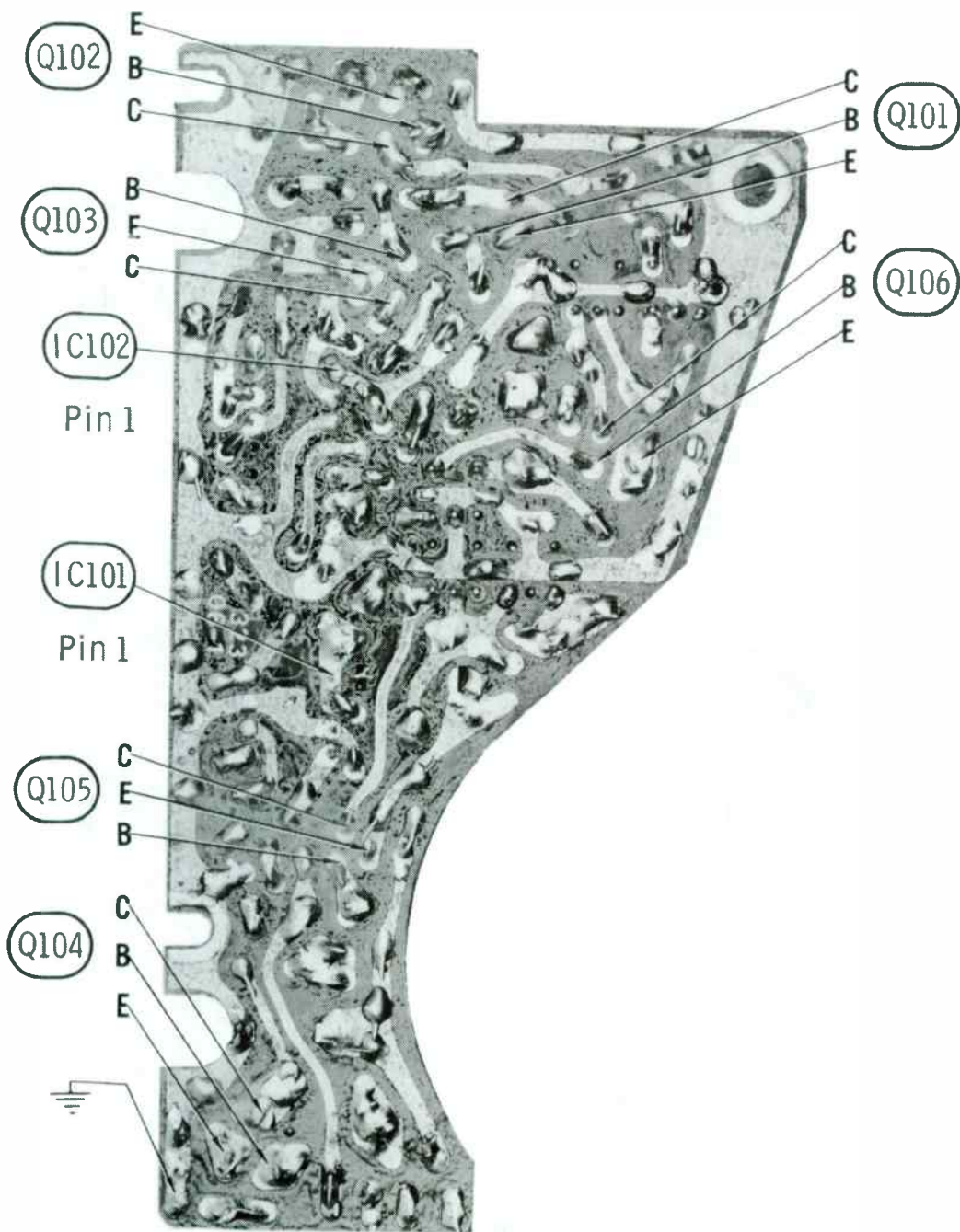
CB TRANSMITTER BOARD



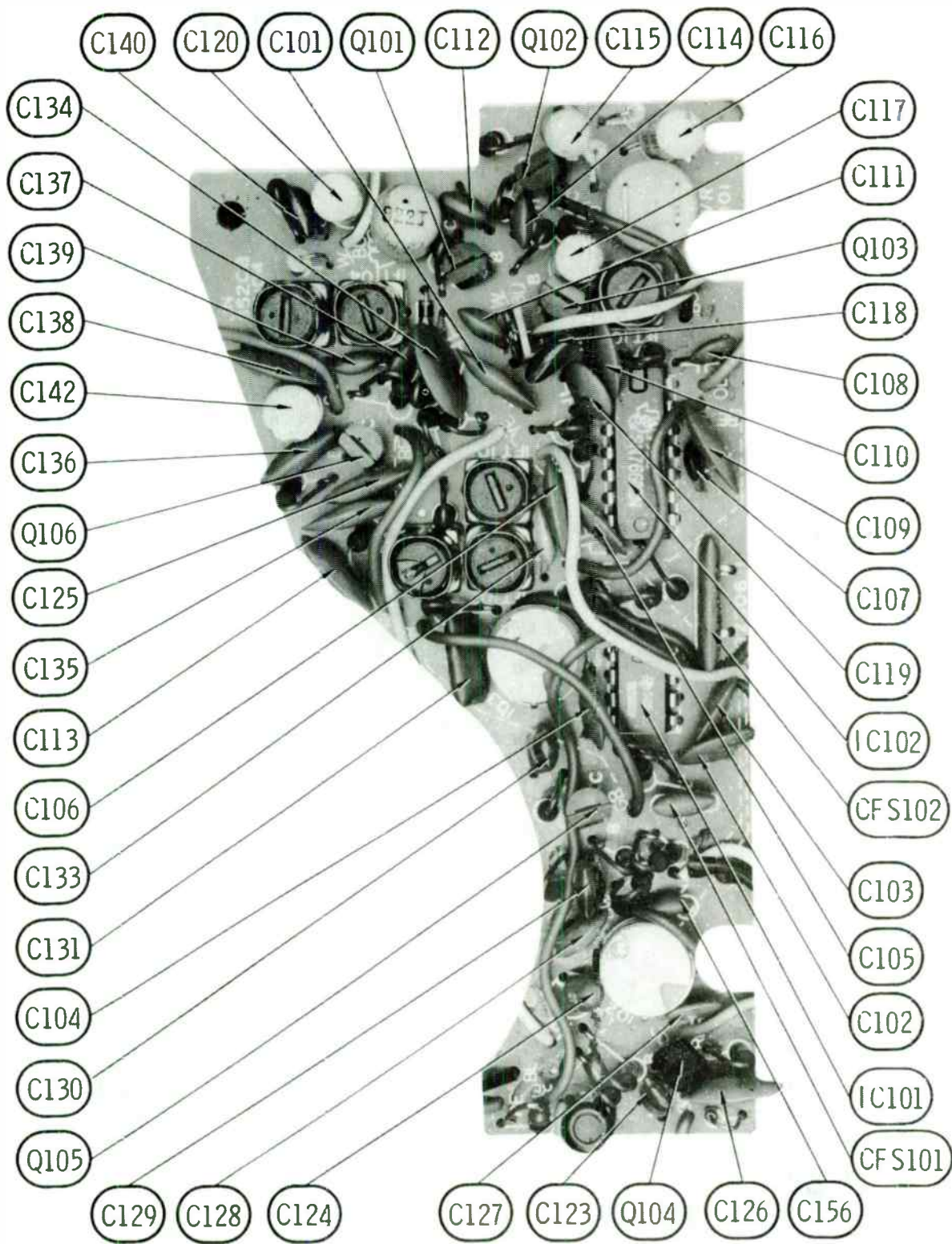
CB TRANSMITTER BOARD



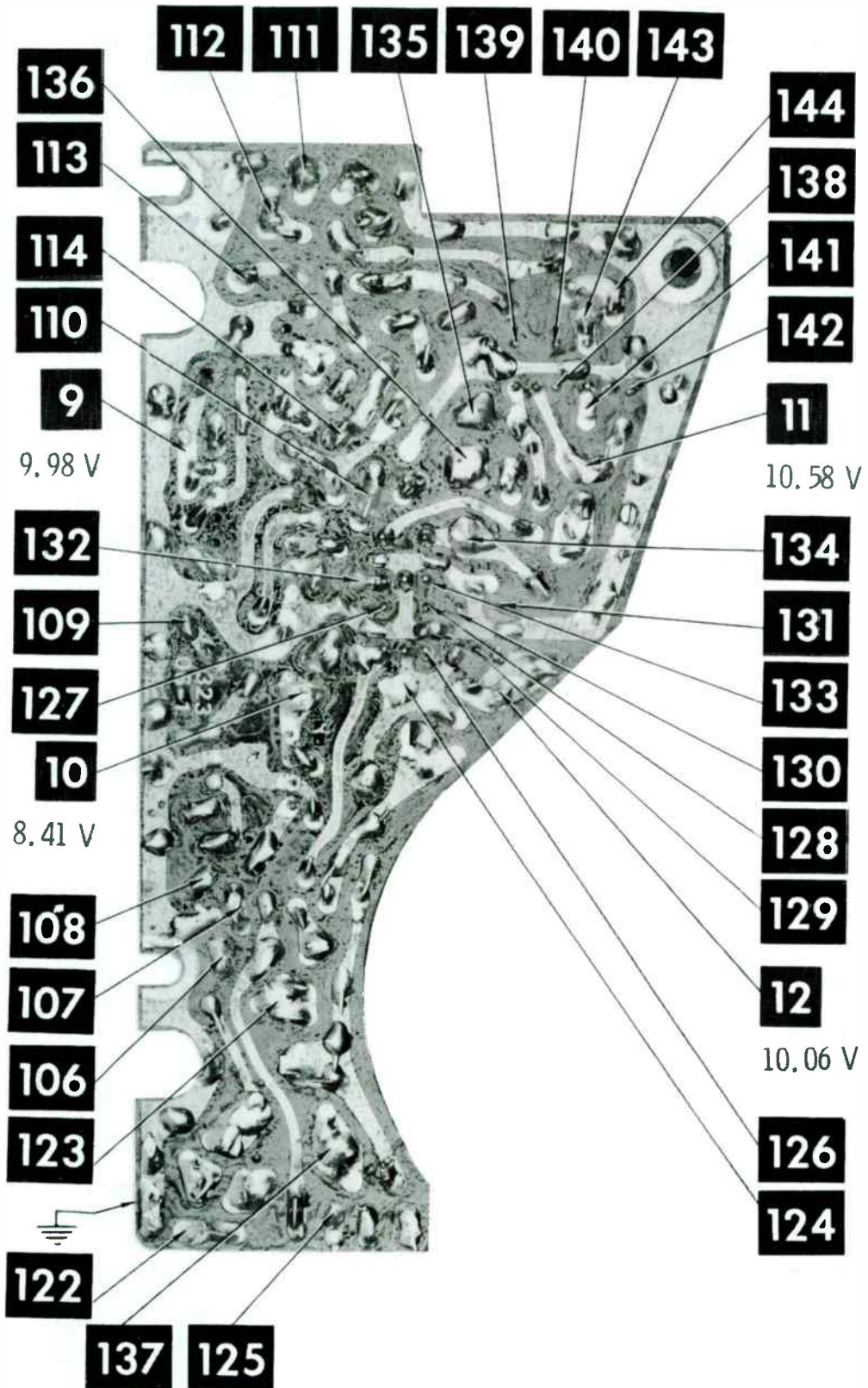
CB TRANSMITTER BOARD



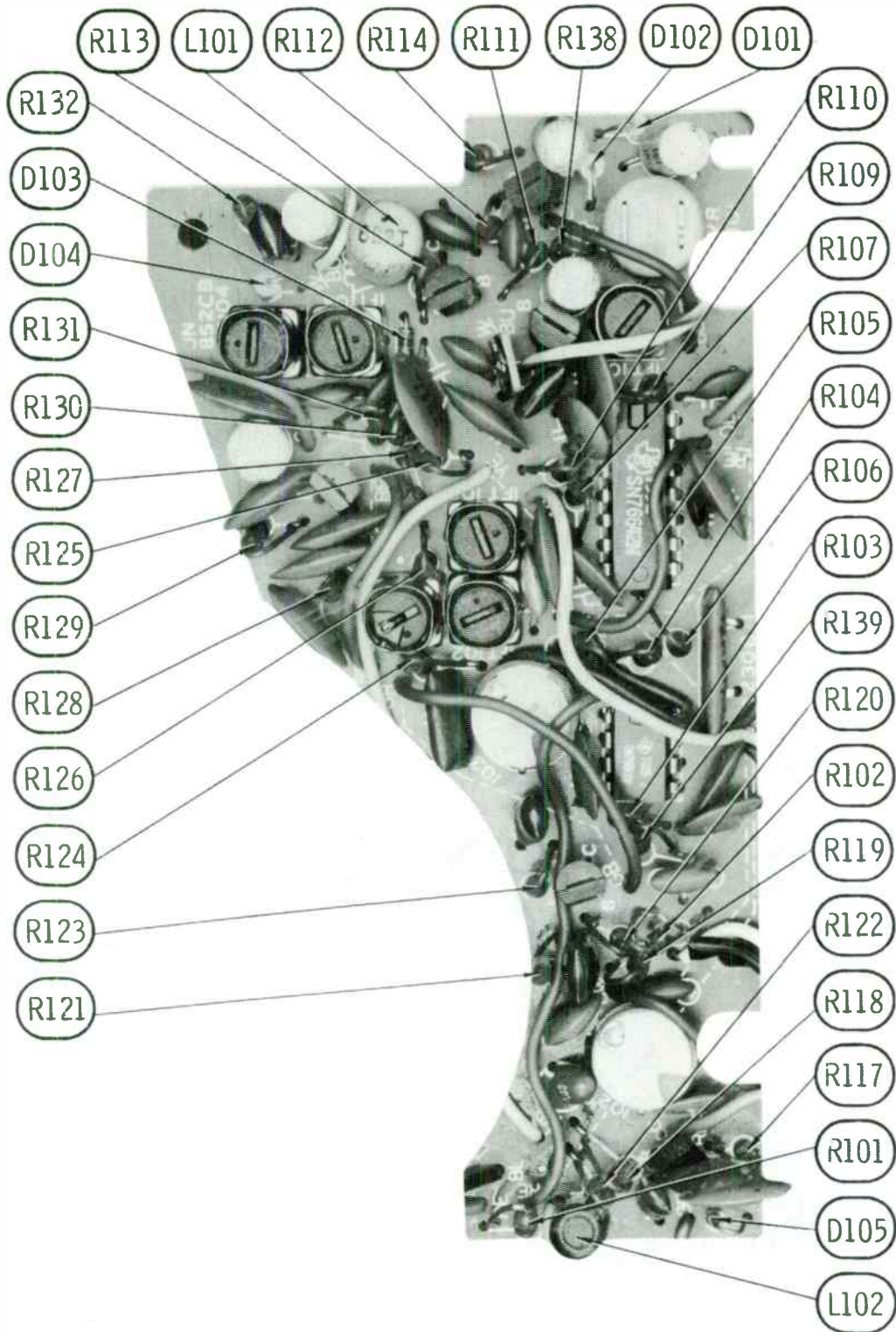
AM-FM IF BOARD



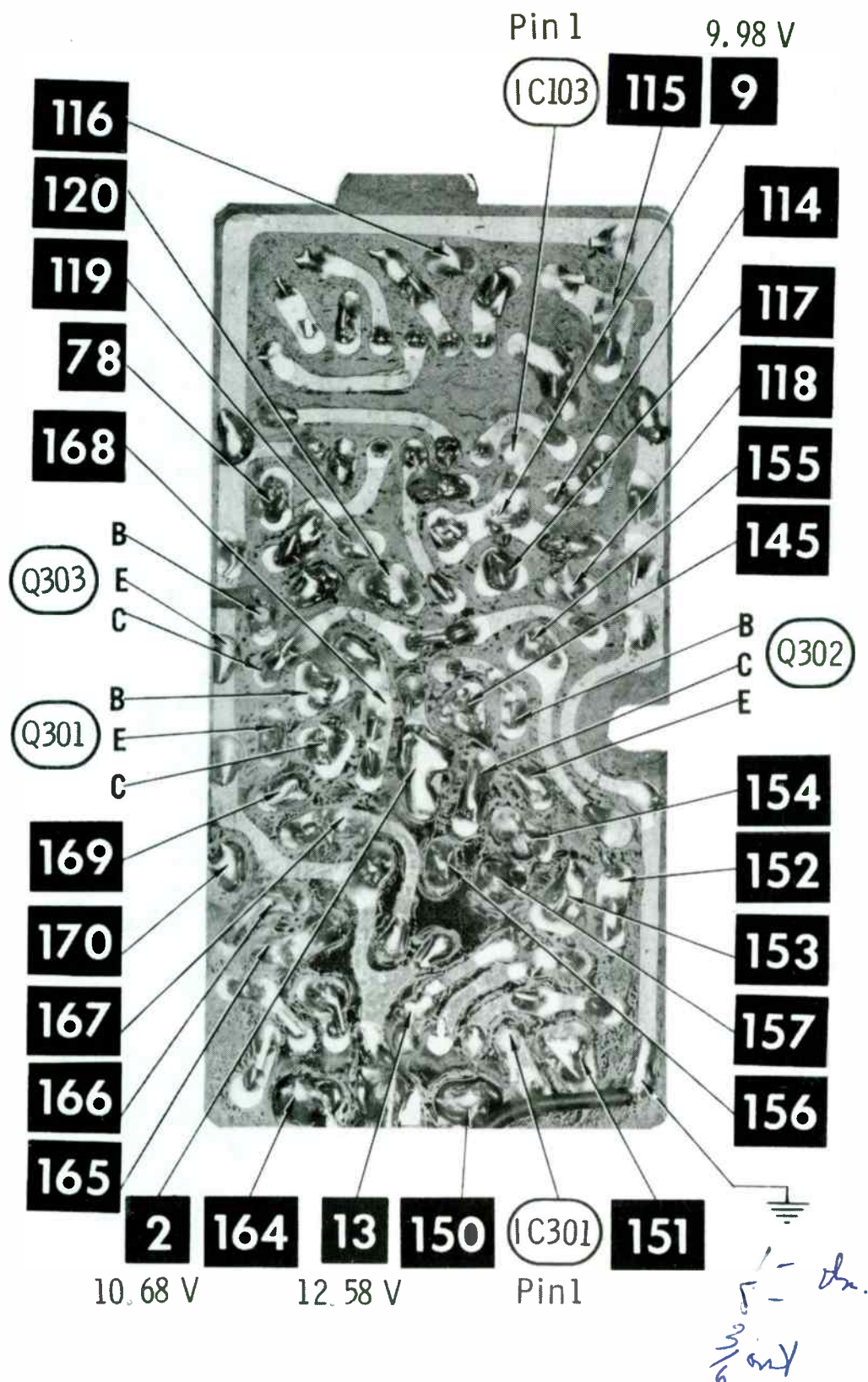
AM-FM IF BOARD



AM-FM IF BOARD

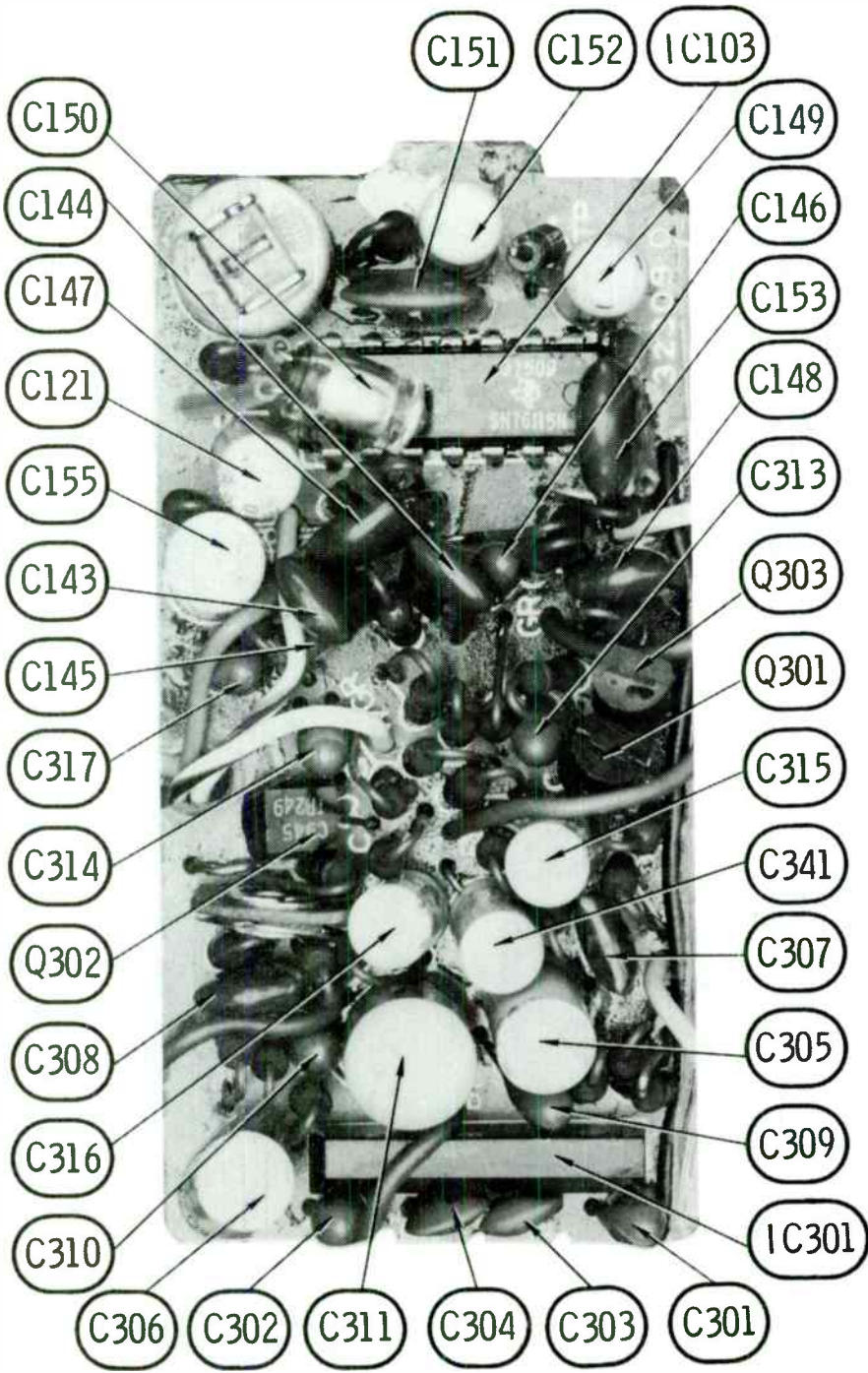


AM-FM IF BOARD

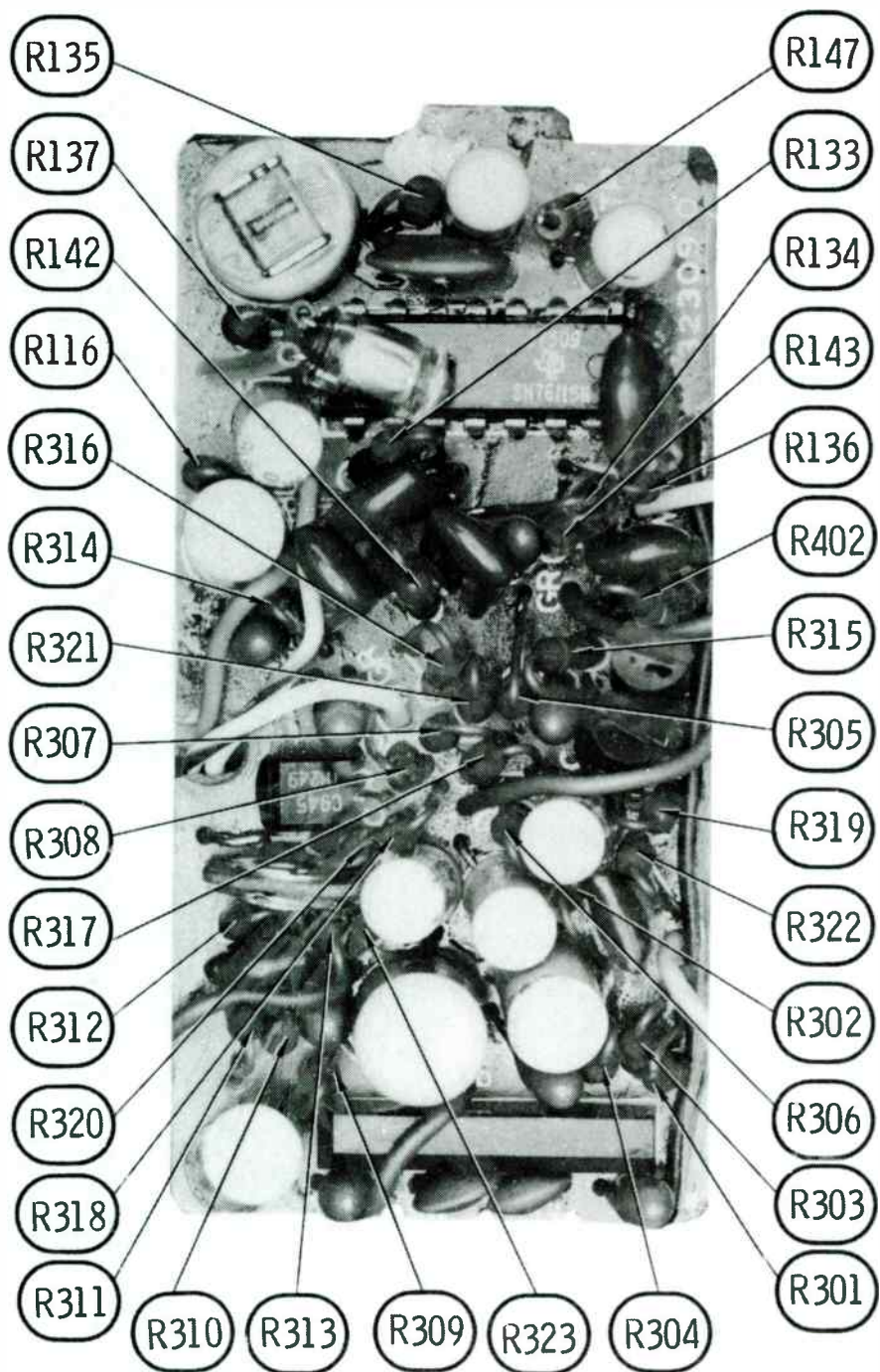


MPX-PREAMP BOARD

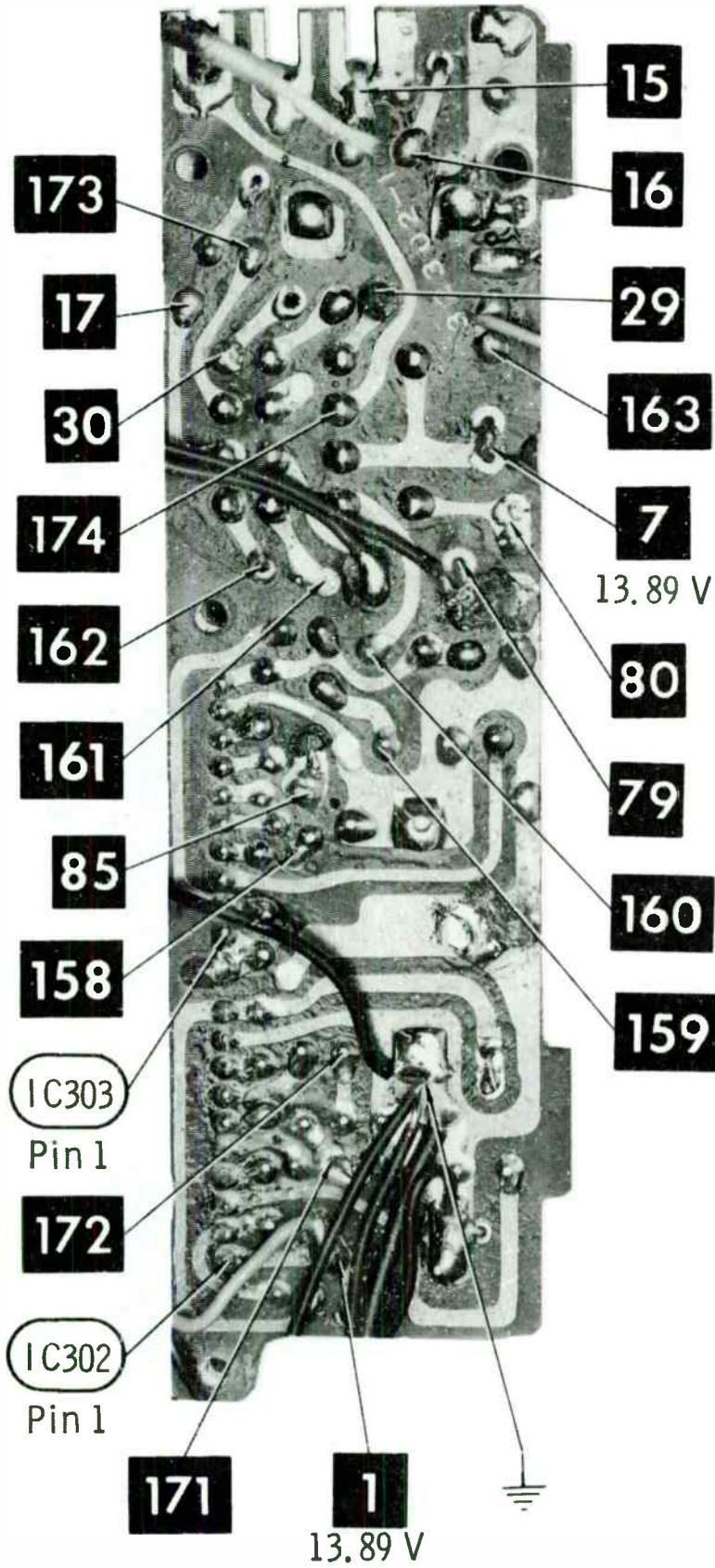




MPX-PREAMP BOARD

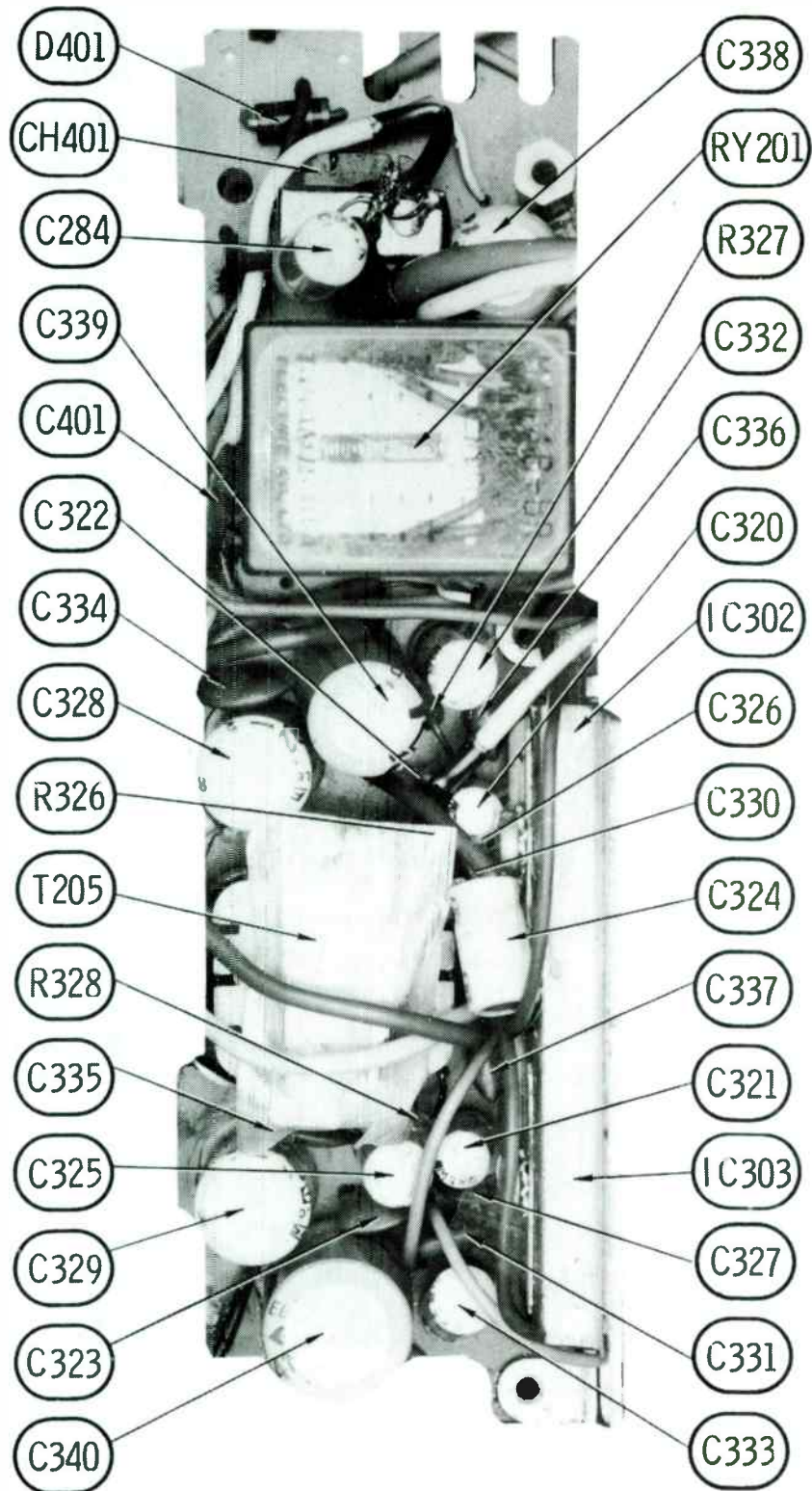


MPX-PREAMP BOARD

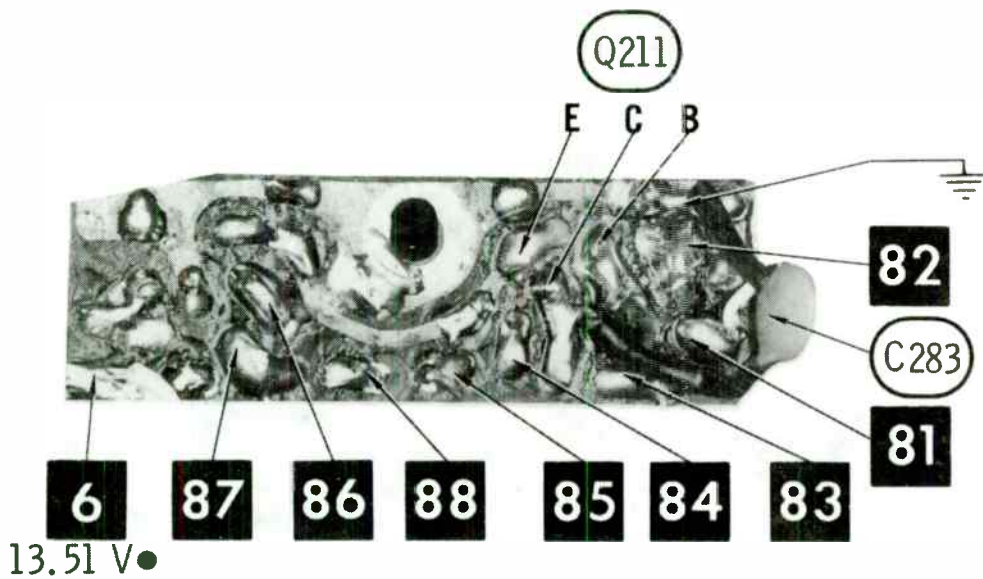


J.I.L. MODEL 852CB

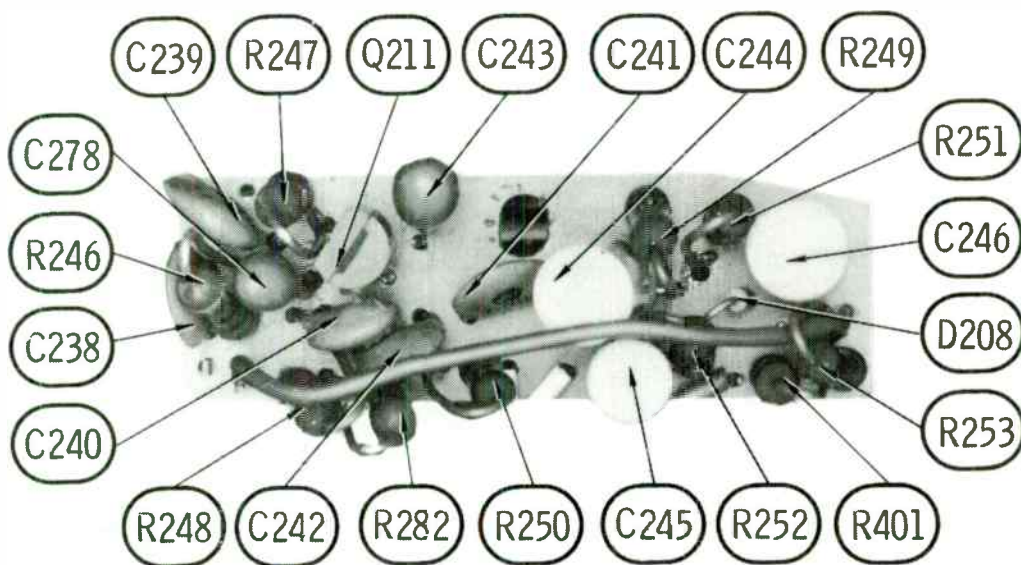
AUDIO BOARD



AUDIO BOARD

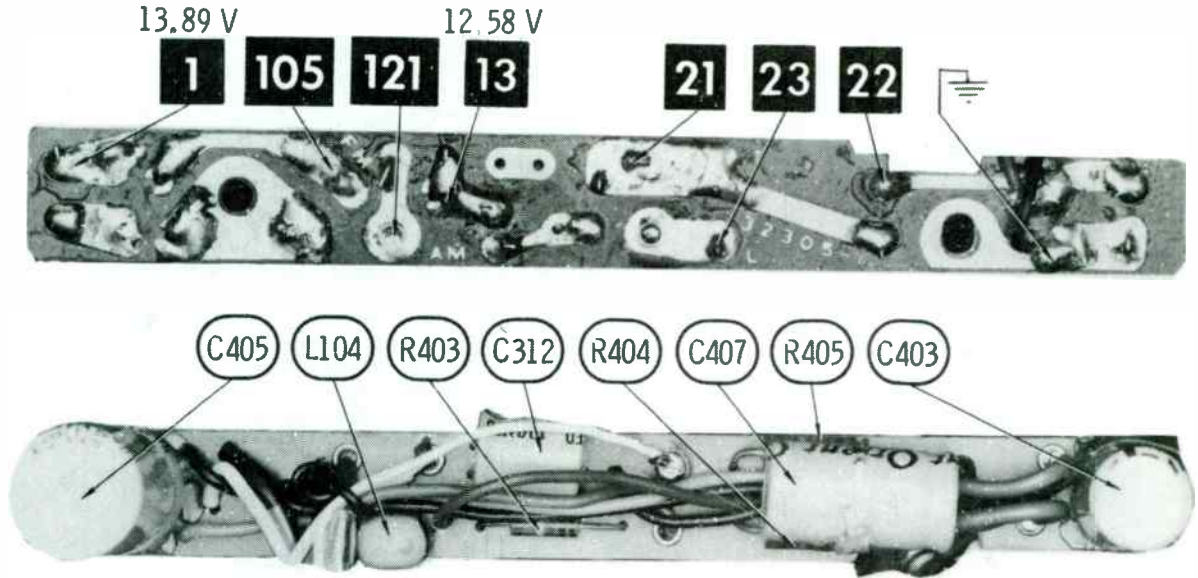


● Transmit



MIC AMP BOARD

J.I.L. MODEL 852CB



**POWER SUPPLY BOARD**

**PARTS LIST AND DESCRIPTION**

*(When ordering parts, state Model, Part Number, and Description.)*

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

**WIRING DATA**

General-use Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Power Cord, 2-Wire .....	Use BELDEN No. 17106 (Plastic) or 17126 (Rubber) -6 feet 17109 (Plastic) or 17129 (Rubber) -9 feet
Shielded Antenna Lead .....	Use BELDEN No. 8214 Lowest-loss (RG-8/U Type) 8237 Low-loss (RG-8/U) 8240 (Solid) Miniature (RG-58/U) 8259 (Stranded) Miniature (RG-58A/U)
Coiled Microphone Cable .....	Use BELDEN No. 8497 3-Conductor (1 shielded for Press-to-Talk) Neoprene 8491 4-Conductor (2 shielded, 2 unshielded) Neoprene
Shielded Hook-up Wire .....	Use BELDEN No. 8885
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)
Ignition Noise Suppression .....	Use BELDEN No. 7300-Series Spark-Plug Sets

**SEMICONDUCTORS (Select replacement transistor for best results)**

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D101	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D102	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D103	WG1010A	922433	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D104	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D105	WG1010A	922433	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D201	WG1010A	922433	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D202	WG1010A	922433	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.  
Have your local distributor check Soms COUNTER FACTS® for the most up-to-date replacement.

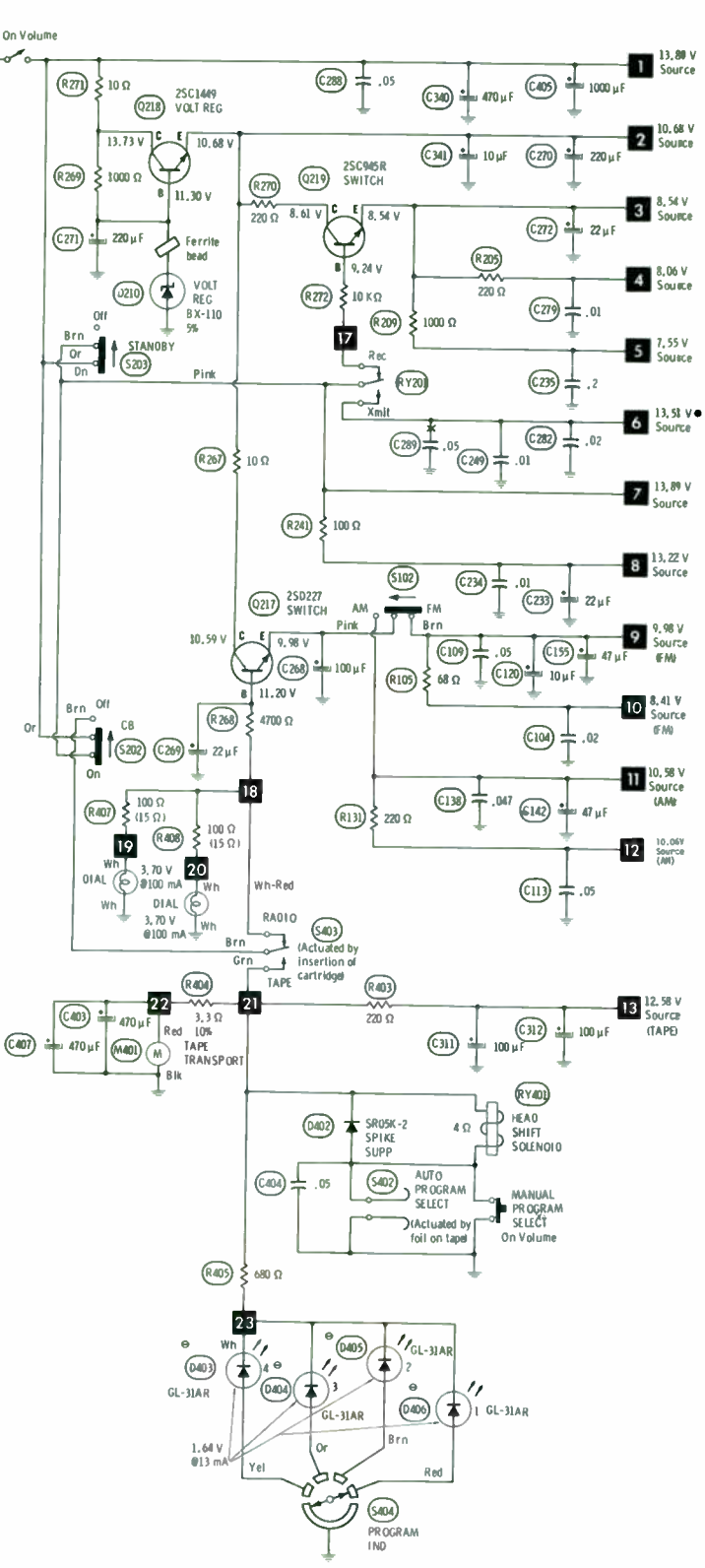
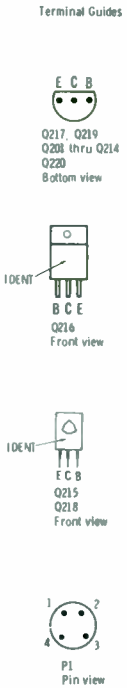
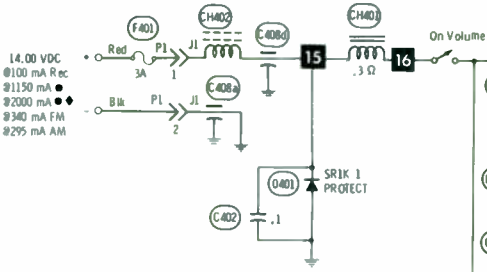
## SEMICONDUCTORS (Select replacement transistor for best results)(cont)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	INTERNATIONAL RECTIFIER PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D203	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D204	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D205	WG1010A	922433	GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D206	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D207	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D208	WG1010A	922433	GE-300	D200	PTC214	HEPRO602	RE 52	SK3100	RT-218	ECG177
D209	SR1K-2	922969	GE-504A	8D4	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D210	8Z-110	922950	GEZD-11		Z8118				RT-242	ECG5074
D211	1S188	922604	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D212	GL-50RG	922983								
D401	SR1K-2	922969	GE-504A		PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D402	SR05K-2	922799	GE-504A	8D4	PTC201	HEPRO052	RE 49	SK3030	RT-213	ECG116
D403	GL-31AR	922878								
D404	GL-31AR	922878								
D405	GL-31AR	922878								
D406	GL-31AR	922878								
IC101	SN76600P	916111				HEPC6059P			TVCM-59	ECG746
IC102	SN76642N	916112	GEIC-11	IC505	PTC703	HEPC6062P	RE 301-IC	SK3135	TVCM-5	ECG709
IC103	SN76115N	916113	GEIC-35		PTC735			SK3160		ECG801
IC301	MS152L	916106								ECG1155
IC302	TA7205P	916110								ECG1155
IC303	TA7205P	916110								ECG1155
Q101	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q102	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q103	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q104	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q105	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q106	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q107	25A640E	916062	GE-65	TR-30	PTC103	HEPS0026	RE 63	SK3114	RT-126A	ECG159
Q201	25C839H	916050	GE-20	TR-21	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q202	25C839H	916050	GE-20	TR-21	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q203	25C839H	916050	GE-20	TR-21	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q204	25C839H	916050	GE-20	TR-21	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q205	25C839H	916050	GE-20	TR-21	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q206	25C900E		GE-62	TR-51	PTC136	HEPS0015	RE 13	SK3124	RT-107A	ECG199
	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q207	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q208	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q209	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
	25C545R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q210	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q211	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q212	25C839H	916050	GE-20	TR-24	PTC121	HEPS0015	RE 13	SK3018	RT-107A	ECG123A
Q213	25C815L	916009	GE-210	TR-25	PTC123	HEPS0015	RE 13	SK3024	RT-172	ECG123A
Q214	25C815L	916009	GE-210	TR-25	PTC123	HEPS0015	RE 13	SK3024	RT-172	ECG123A
Q215	25C495Y	916119(10)								ECG295
Q216	25C1306	916118(11)	GE-215		PTC186		RE 203			ECG235
Q217	25D227	91605	GE-47	TR-86	PTC123	HEPS0011	RE 13	SK3124	RT-172	ECG123A
Q218	25C1449	916114(12)	GE-57		PTC163	HEPS5000	RE 42		RT-194	ECG184
Q219	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q220	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q301	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q302	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199
Q303	25C945R	916052	GE-210	TR-21	PTC121	HEPS0015	RE 13	SK3124	RT-107A	ECG199

- (10) Rating, 5.0 watts @ 800 mA.
- (11) Rating, 12 watts @ 3.0 amps.
- (12) Rating, 5 watts @ 3.0 amps.

J.I.L. MODEL 852CB

**NOTE: DEMAGNETIZE HEADS AFTER SERVICING**



- ✖ Circuitry not used in some versions
- - - Circuitry used in some versions
- ⊙ See parts list
- \* Nominal value
- ⊕ Ground
- ▭ Chassis
- ▽ Common tie point

Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise ◆ 100% modulation  
 ● Transmit

Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.

A PHOTOFACIT STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**

Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement	Chan	Crystal Complement
1	X201, X207, X211	7	X202, X209, X213	13	X204, X207, X211	19	X205, X209, X213
2	X201, X208, X212	8	X202, X210, X214	14	X204, X208, X212	20	X205, X210, X214
3	X201, X209, X213	9	X203, X207, X211	15	X204, X209, X213	21	X206, X207, X211
4	X201, X210, X214	10	X203, X208, X212	16	X204, X210, X214	22	X206, X208, X212
5	X202, X207, X211	11	X203, X209, X213	17	X205, X207, X211		
6	X202, X208, X212	12	X203, X210, X214	18	X205, X208, X212	23	X206, X210, X214





# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA				
		MFGR. PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C115	.47 50V NP	913348				
C116	1 50V NP	913042	EN50-105	WNP1-50	TCN501A	TVAN-1560
C117	4.7 16V	913148	EP50-5	PC5-50	VTT4R7A50	EV-1519
C120	10 16V	913175	EP15-10	PC10-25	VTT10A25	EV-1222
C121	50V NP	913042	EN50-105	WNP1-50	TCN501A	TVAN-1560
C124	10 10V	913042			TOC106M025FL	S020-109
C142	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C145	4.7 10V	913314			TDC475M01OEL	SD10-4R79
C146	4.7 10V	913314			TDC475M01OEL	S010-4R79
C149	.33 NP	913139				
C152	.47 50V NP	913348				
C155	47 16V	913180	EP15-50	PC50-16	VTT47D16	EV-1226
C222	10 16V	913175	EP15-10	PC10-25	VTT10A25	EV-1222
C223	1 50V NP	913042	EN50-105	WNP1-50	TCN501A	TVAN-1560
C224	.33 50V NP	913219				
C225	.33 50V NP	913219				
C228	22 16V	913302	EP15-25	PC25-25	VTT22A16	EV-1224
C229	10 16V	913175	EP15-10	PC10-25	VTT10A25	EV-1222
C230	10 16V	913175	EP15-10	PC10-25	VTT10A25	EV-1222
C233	22 16V	913302	EP15-25	PC25-25	VTT22A16	EV-1224
C243	10 10V	913042			TDC106M025FL	S020-109
C244	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C245	2.2 50V	913143	EP50-2	PC2-100	VTT2R2A50	EV-1517
C246	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C268	100 16V	913097	EP15-100	PC100-16	VTT100F16	EV-1230
C269	22 10V	913369	EP15-25	PC25-25	VTT22A16	EV-1224
C270	220 16V	913026	EP15-250	PC250-25	VTT220G16	EV-1240
C271	220 16V	913180	EP15-250	PC250-25	VTT220G16	EV-1240
C272	22 16V	913302	EP15-25	PC25-25	VTT22A16	EV-1224
C278	10 10V	913175			TDC106M025FL	SD20-109
C284	47 50V	913336	EP50-5	PC5-50	VTT4R7A50	EV-1519
C287	4.7 50V	913075	EP50-5	PC5-50	VTT4R7A50	EV-1519
C301	4.7 10V	913089			TDC475M01OEL	SD10-4R79
C302	4.7 10V	913089	EP15-50	PC50-16	TOC475M01OEL	SD10-4R79
C305	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C306	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C309	4.7 10V	913018			TDC475M01OEL	SD10-4R79
C310	4.7 10V	913018			TDC475M01OEL	SD10-4R79
C311	100 10V	913013	EP15-100	PC100-10	VTT100E10	EV-1130
C312	100 10V	913013	EP15-100	PC100-10	VTT100E10	EV-1130
C313	4.7 10V	913089			TDC475M01OEL	SD10-4R79
C314	4.7 10V	913089			TDC475M01OEL	SD10-4R79
C315	10 10V	913018	EP15-10	PC10-25	VTT10A25	EV-1222
C316	10 10V	913018	EP15-10	PC10-25	VTT10A25	EV-1222
C317	4.7 10V	913089			TOC475M01OEL	SD10-4R79
C320	2.2 50V	913143	EP50-2	PC2-100	VTT2R2A50	EV-1517
C321	2.2 50V	913143	EP50-2	PC2-100	VTT2R2A50	EV-1517
C324	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C325	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C328	220 6.3V	913029	EP15-250	PC250-10	VTT220F10	EV-1140
C329	220 6.3V	913029	EP15-250	PC250-10	VTT220F10	EV-1140
C332	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C333	47 10V	913196	EP15-50	PC50-16	VTT47D16	EV-1226
C338	470 10V	913156	EP15-500	PC500-16	VTT470J16	EV-1150
C339	470 10V	913156	EP15-500	PC500-16	VTT470J16	EV-1150
C340	470 16V	913158	EP15-500	PC500-16	VTT470J16	EV-1250
C341	10 16V	913175	EP15-10	PC10-25	VTT10A25	EV-1222
C403	470 16V	913030	EP15-500	PC500-16	VTT470J16	EV-1250
C405	1000 16V	913061	EP15-1000	PC1000-16	VTT1000L16	EV-1260
C407	470 16V	913030	EP15-500	PC500-16	VTT470J16	EV-1250

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C101	.05		DC-503	MGP05	MAG5015	TGL-550
C102	.02				GP120	5GA-S20
C103	.02				GP120	5GA-S20
C104	.02				GP120	5GA-S20
C105	.02				GP120	5GA-S20
C106	.05				MAG5015	TGL-550
C107	20 NPO		DC-503	MGP05	CN0420	10TCC-Q20
C108	220		DTZ-20	NPO2C	GP322	10TS-T22
C109	.05		DD-221		GP322	10TS-T22
C110	.05		DC-503	MGP05	MAG5015	TGL-550
C111	.001 10%		DC-503	MGP05	MAG5015	TGL-550
C112	100		DD-102		GP210	10TS-D10
C113	.05		DD-101	GP100	GP310	10TS-T10
C114	.001 10%		DC-503	MGP05	MAG5015	TGL-550
C118	.022		DD-102		GP210	10TS-D10
C119	.0022 10%		CPJ-223	DPMS2S22	EFW1A122	1PB-S22
C122	680				GP222	10TS-D22
C123	.005 10%		DD-681	GP680	GP368	10TS-T68
C125	.05		CPJ-502	DPMS6D5	EFW1A250	6PS-D50
C126	.047		DC-503	MGP05	MAG5015	TGL-550
C127	40		DC-503	MGP05	MAG5015	TGL-550
C128	.0022 10%				CN0439	10TCC-Q39
C129	.01 10%				GP222	10TS-D22
C130	.005 10%		CPJ-103	DPMS4S1	EFW1A110	1PB-S10
C131	270 10%		CPJ-502	DPMS6D5	EFW1A250	6PS-D50
C132	50		CPR-270J	CD15F0271J03	SX327	424ME2700J501
C133	50		DTZ-50	NPO50	CN0450	10TCC-Q50
C134	.05		OTZ-50	NPO50	CN0450	10TCC-Q50
C135	.05		DC-503	MGP05	MAG5015	TGL-550
C136	.3		OC-503	MGP05	MAG5015	TGL-550
C137	220				GP322	10TS-T22
C138	.047		DD-221		MAG5015	TGL-550
C139	82 10%		DC-503	MGP05	GP482	10TS-Q82
C140	.01 10%		DD-820		GP482	10TS-Q82
C143	.022		CPJ-103	DPMS4S1	EFW1A110	1PB-S10
C144	.022		CPJ-223	DPMS2S22	EFW1A122	1PB-S22
C147	.022		CPJ-223	DPMS2S22	EFW1A122	1PB-S22
C148	.022		CPJ-223	DPMS2S22	EFW1A122	1PB-S22
C150	470 5%		CPJ-223	DPMS2S22	EFW1A122	1PB-S22
C151	.2		CPR-470J	CD15FD471J03	SX347	424ME4700J501
C153	.047				DPMS2S47	EFW1A147
C156	82 10%				GP482	10TS-Q82
C201	25 N330		DD-820		*	10TCS-Q25
C202	.01				*	10TS-S10
C203	3 N330				*	10TCS-V30
C204	.02				GP120	5GA-S20
C205	30				GP120	5GA-S20
C206	.02				GP120	10TCC-Q30
C207	6		OTZ-6R8	NPO6P8	CN0568	5GA-S20
C208	.01					10TCC-V68
C209	.02				GP120	10TS-S10
C210	3 N330				GP120	5GA-S20
C211	.02				GP120	10TCS-V30
C212	25 N330				*	5GA-S20
C213	.02				GP120	5GA-S20
C214	.02				GP120	5GA-S20
C215	2		DTZ-2R2	NPO2P2	CN0522	10TCC-V22
C216	.05		DC-503	MGP05	MAG5015	TGL-550
C217	.02				GP120	5GA-S20
C218	.02				GP120	5GA-S20
C219	.05				GP120	5GA-S20
C220	.05		DC-503	MGP05	MAG5015	TGL-550
C221	.01		DC-503	MGP05	MAG5015	TGL-550
C226	100		DD-101	GP100	GP310	10TS-S10
C227	.01					10TS-T10
C231	80					10TS-S10
C232	10 NPO		DTZ-82	NPO82	CN0482	10TCC-Q82
C234	.01		DTZ-10	NPO10	CN0410	10TCC-Q10
C235	.2					10TS-S10
C236	100		DD-101	GP100	GP310	10TS-T10
C237	300		DD-301	GP300	GP330	10TS-T30
C238	.02				GP120	5GA-S20

J.I.L. MODEL 852CB

# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

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## CAPACITORS(cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C239	.1		DC-104	MGP1	MAG5001	TG-P10
C240	.001		DD-102		GP210	10TS-D10
C241	.02				GP120	5GA-S20
C242	.005					10TS-D50
C247	470 10%		CPR-470J	CD15FD471J03	SX347	424ME4700J501
C248	220		DD-221		GP322	10TS-T22
C249	.01					10TS-S10
C250	100 10%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C251	30 10% NPO					10TCC-Q30
C252	15 HPO		DTZ-15	NP015	CN0415	10TCC-Q15
C253	100 10%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C254	.04				GP140	5GA-S40
C255	100 10%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C256	3 HPO		DTZ-3R3	NP03P3	CN0533	10TCC-V33
C257	3 HPO		DTZ-3R3	HP03P3	CN0533	10TCC-V33
C258	50			CD6ED500J03		
C259	82		CPR-82J	CD10EDG20J03	SX482	424MC62R0J501
C260	.02					10TS-S10
C261	30		CPR-30J	CD6ED300J03	SX430	
C262	500		DD-501	GP500	GP350	10TS-T50
C263	.05		DC-503	MGP05	MAG5015	TGL-S50
C264	330		CPR-330J	CD15FD331J03	SX333	424ME3300J501
C265	.05				GP140	5GA-S40
C266	100 10%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C267	150 10%		CPR-150J	CD7FD151J03	SX315	424MC1500J501
C273	330 10%		CPR-330J	CD15FD331J03	SX333	424ME3300J501
C274	120 10%		CPR-120J	CD10FD121J03	SX312	424MC1200J501
C275	30 10% NPO					10TCC-Q30
C276	2					10TCC-V22
C277	.02		DTZ-2R2	NP02P2	CN0522	5GA-S20
C279	.01				GP120	10TS-S10
C280	100 10%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C281	.01					10TS-S10
C282	.02				GP120	5GA-S20
C283	0047					10TS-D47
C285	100 5%		CPR-100J	CD10FD101J03	SX310	424MC1000J501
C286	.02				GP120	5GA-S20
C288	.05		DC-503	MGP05	MAG5015	TGL-S50
C289	.05		DC-503	MGP05	MAG5015	TGL-S50
C290	250 5%			CD10FD251J03		
C303	200		DD-201	GP200	GP320	10TS-T20
C304	200		DD-201	GP200	GP320	10TS-T20
C307	.022		CPJ-223	DPMS2S22	EWF1A122	1PB-S22
C308	.022		CPJ-223	DPMS2S22	EWF1A122	1PB-S22
C318	.3					
C319	.3					
C322	.022				GP120	5GA-S20
C323	.022				GP120	5GA-S20
C326	50 10%		DTZ-50	NP050	CN0450	10TCC-Q50
C327	50 10%		DTZ-50	NP050	CN0450	10TCC-Q50
C330	.01					10TS-S10
C331	.01					10TS-S10
C334	.2					
C335	.2					
C336	50		DTZ-50	NP050	CN0450	10TCC-Q50
C337	50		DTZ-50	NP050	CN0450	10TCC-Q50
C401	.05		DC-503	MGP05	MAG5015	TGL-S50
C402	.1		DC-104	MGP1	MAG5001	TG-P10
C404	.05		DC-503	MGP05	MAG5015	TGL-S50
C408a						
C408b						
C408c						
C408d						
CT101	70 MAX					
CT102	50 MAX					
CT103	50 MAX					

\* Not normally in distributor's stock. Available thru distributor on order to manufacturer.

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

### CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR101	Noise Level	10K	915399				
VR102	19kHz	5000	915370				
VR201	Squelch Range	50K	915228				
VR202	Squelch	20K					
VR203	AGC	50K	915228				
VR301	Tape Balance	10K	915398				
VR302a	Balance	10K	915373				
b	Tone-Left	10K					
c	Tone-Right	10K					
d	Volume-Left	10K					
e	Volume-Right/ Power Switch/ Manual Program Switch						

J.I.L. MODEL 852CB

### COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
I FT101	Quadrature (10.7MHz)	922501	10741		(1) Part of M103 (AM Tuner)
I FT102	IF (262kHz)	922907	3094N		
I FT103	IF (262kHz)	922907	7ME3094N		
I FT104	IF (262kHz)	922906	7ME3095N		
I FT105	IF (262kHz)	922906	7ME3095N		
I FT201	IF (10MHz)	922501	10741		
I FT202	IF (10MHz)	922501	10741		
I FT203	IF (455kHz)	922594	1899		
I FT204	IF (455kHz)	922594	M402353N		
I FT205	IF (455kHz)	922593	1918		
I FT206	Rec Osc (10MHz)	922501	10741		
L101	RF Choke (8.2uH)	913350			
L102	Image Trap (1.5uH)	913351		74F156AP	
L103	AM Osc	922964	7BR3090N		
L104	AM Ant Choke (4.7uH)	913346		70F476AP	
L201	Xmit Osc (27MHz)	922922	12161		
L202	Xmit Mixer (27MHz)	922943	1413		
L203	Harmonic Suppressor (27MHz)	922942	113KN4911X5225		
L204	Harmonic Suppressor (27MHz)	927942	1412		
L205	Xmit Driver	922940	4Z-1511		
L206	RF Choke (3.3uH)	913353		70F333AI	
L207	RF Choke (3.3uH)	913261		70F333AI	
L208	RF Choke	922938	4Z-1508		
L209	P1 Filter (27MHz)	922941	4Z-1509		
L210	TVI Trap (54MHz)	922938	4Z-1508		
L211	Ant Load	922947			
L212	RF Choke (100uH)	913252			
T201	Rec Ant (27MHz)	922970	113CN4910X5435		
T202	Rec RF (27MHz)	922970	113CN4938N5435		
T203	Synth Osc (37MHz)	922923	4911		
T204	Xmit Buffer (27MHz)	922944	4Z-1303		
Ant	AM Antenna	(1)			
RF	Ant RF	(1)			
Osc	AM Osc Tuning	(1)			
CH402	RF Choke				

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Soms COUNTER FACTS® for the most up-to-date replacement.

### FILTER CHOKE

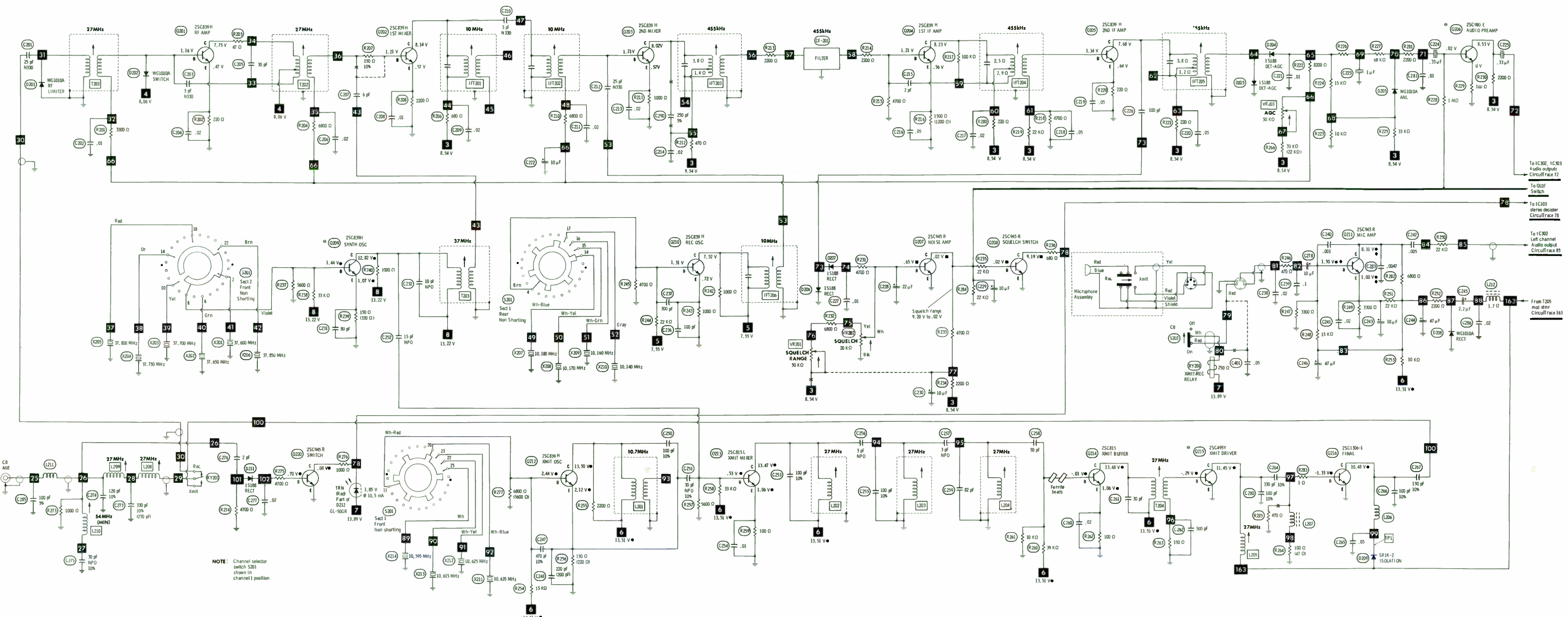
ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
CH401	200mA	.3	.65mH	914023			

### TRANSFORMER (MODULATION)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T205	1.25	1		922924			

### SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
	PM 4-8 ohm PM 4-8 ohm			



NOTE: Channel selector switch S201 shown in channel 1 position

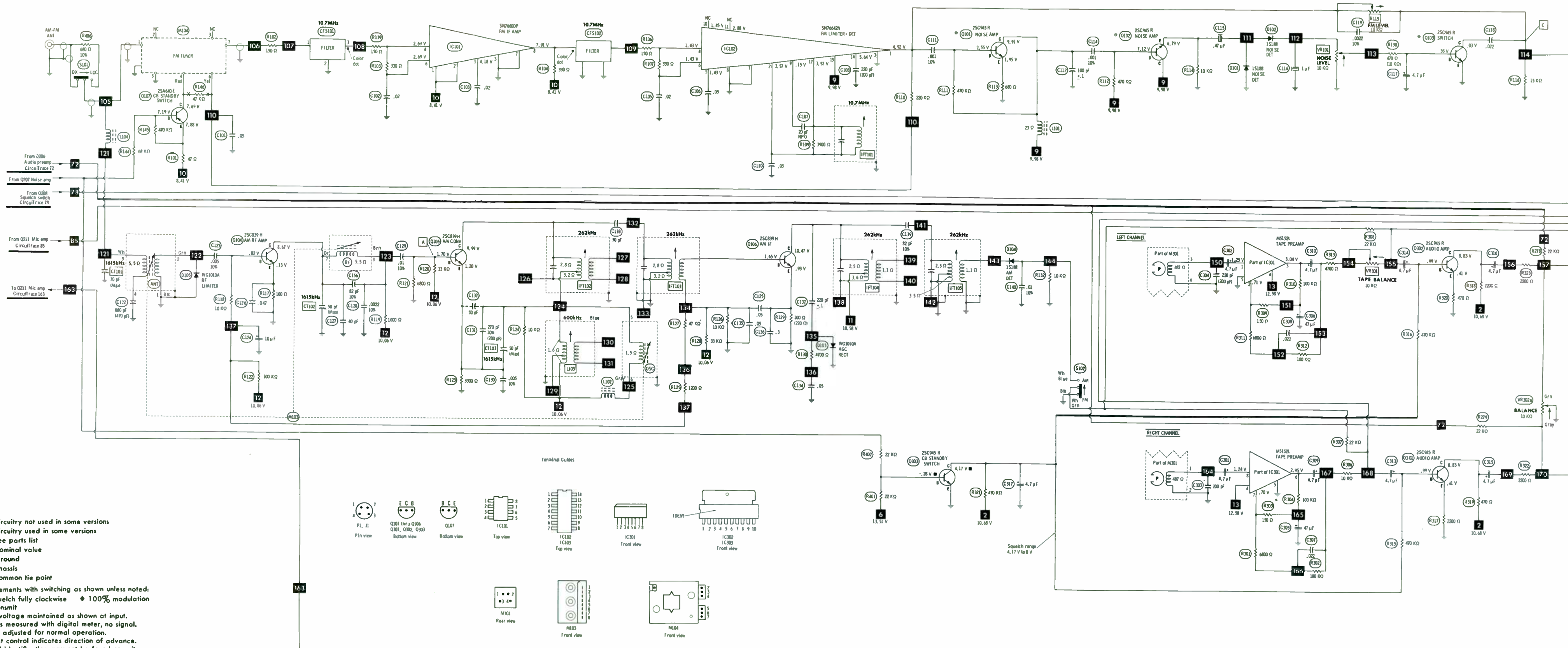
To IC302, IC303  
Audio outputs  
Circuit trace 72

To IC103  
Stereo decoder  
Circuit trace 78

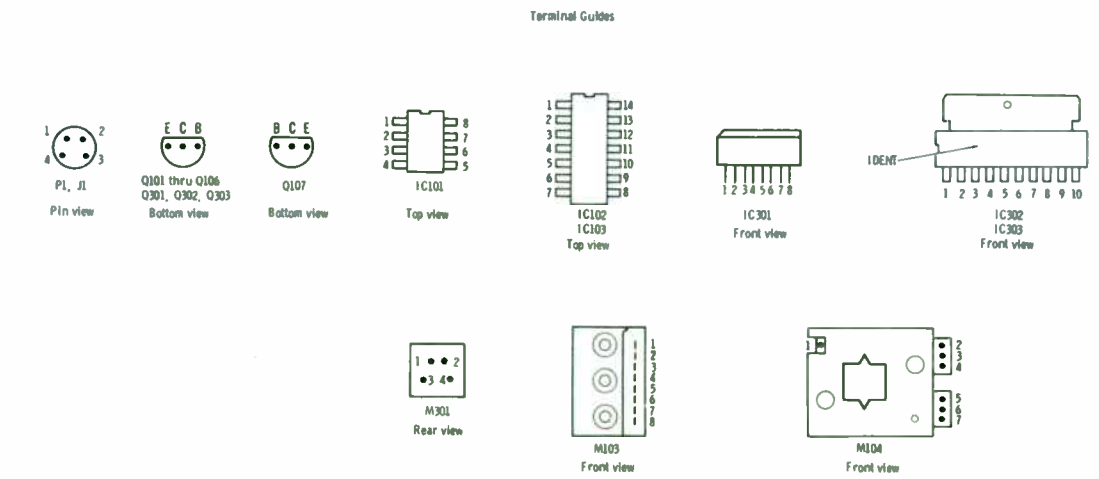
To IC302  
Left channel  
Audio output  
Circuit trace 83

From 1205  
mod. sfr  
Circuit trace 163

NOTE: DEMAGNETIZE HEADS AFTER SERVICING



\* Circuitry not used in some versions  
 --- Circuitry used in some versions  
 ○ See parts list  
 \* Nominal value  
 ⊕ Ground  
 ~ Chassis  
 ∇ Common tie point  
 Measurements with switching as shown unless noted:  
 ■ Squelch fully clockwise    ♦ 100% modulation  
 ● Transmit  
 Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.  
 A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH CIRCUITRACE®  
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## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.  
Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F401	3 Amp			AGC3	HDJ	312003	150145	F63-2

### CRYSTALS

ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL	ITEM No.	CRYSTAL FREQUENCY IN MHz	MFGR. PART No.	CTS KNIGHTS PART No.	CHANNEL
X201	37.600		DA90W37.600	1,2,3,4	X208	10.170		DC90W10.170	2,6,10,14,18,22
X202	37.650		DA90W37.650	5,6,7,8	X209	10.160		DC90W10.160	3,7,11,15,19
X203	37.700		DA90W37.700	9,10,11,12	X210	10.140		DC90W10.140	4,8,12,16,20,23
X204	37.750		DA90W37.750	13,14,15,16	X211	10.635		DBSSW10.635	1,5,9,13,17,21
X205	37.800		DA90W37.800	17,18,19,20	X212	10.625		DBSSW10.625	2,6,10,14,18,22
X206	37.850		DA90W37.850	21,22,23	X213	10.615		DBSSW10.615	3,7,11,15,19
X207	10.180		DC90W10.180	1,5,9,13,17,21	X214	10.595		DBSSW10.595	4,8,12,16,20,23

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
CF201	455kHz Filter	922517	CFU-455
CFS101	10.7MHz Filter	922974	SFE10.7MHz
CFS102	10.7MHz Filter	922975	SFJ10.7MHz
M103	AM Tuning Coil	30514	
M104	FM Tuning Assembly	30514	
M301	Tape Head	917005	8-Track Stereo Play
M401	Motor	911019	Tape Transport (3500 rpm @ 13.68V)
RY201	Relay		Xmit-Rec
RY401	Solenoid	920013	Head Shift
S101	Switch	912050	Loc-Dist. (MFS2U-5)
S102	Switch	912050	AM-FM (MFS2U-5)
S201	Switch	912073	Channel Selector
S202	Switch	912050	CB (MFS2U-5)
S203	Switch	912050	Standby (MFS2U-5)
S402	Switch	21367	Automatic Program
S403	Switch	912043	Tape-Radio
S404	Switch	32203	Program Indicator

J.I.L. MODEL 852CB

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

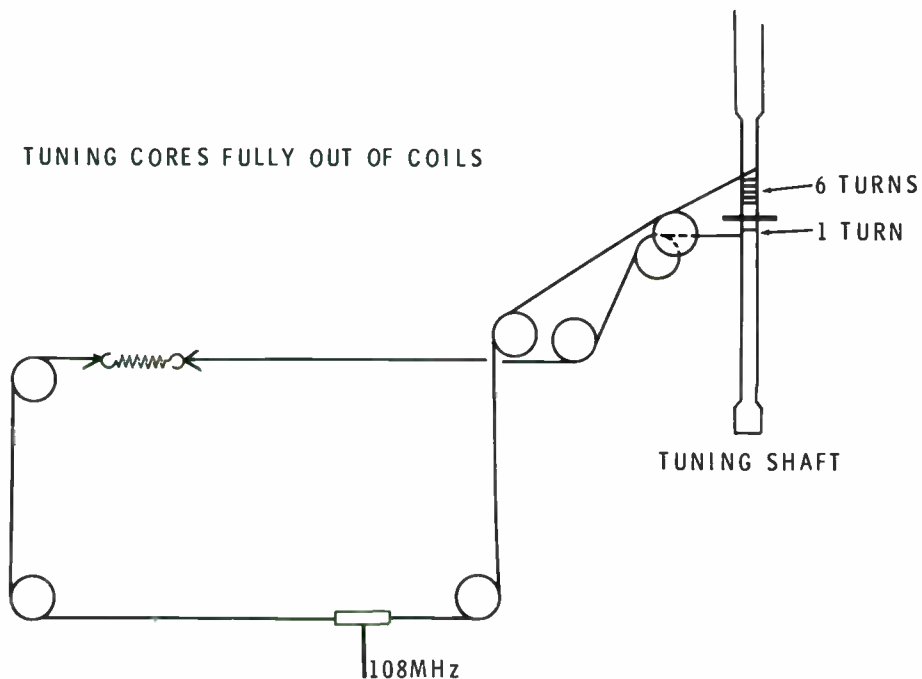
Have your local distributor check Soms COUNTER FACTS® for the most up-to-date replacement.

### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Escutcheon	44592	Case, Top	44590
Tape Door	44613	Case, Bottom	44589
Tape Door Shaft	44620	Case, Side Plate (Left)	44585
Tape Door Shaft Spring	42978	Case, Side Plate (Right)	44586
Dial Scale	44424	Case, Front Plate	44591
Dial Scale Backplate	44594	Case, Rear Plate	44587
Dial Pointer	43974	Connector, AM-FM Ant	922868
Function Trim Plate	44482	Connector, CB Ant	41833
Knob, Squelch	44637	Connector, Mic	922925
Knob, Squelch (Extension)	44603	Connector, Power-Speaker	41500
Knob, Control	44576		

### DIAL CORD STRINGING

TOP VIEW





# PHOTOFACT<sup>®</sup> with CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index



MODEL TM402S

MOTOROLA MODEL TM402S

## ADJUSTMENTS

ADJUST	REMARKS
Head Azimuth	Play a test cartridge and adjust B1 for maximum on an AC VTVM across output.
Head Height	Play a test cartridge, follow instructions with cartridge, and adjust B2 for proper response.

## TROUBLE CHART

SYMPTOM	REMARKS
Capstan does not rotate.	Belt (35) dirty, worn, or broken. Assembly (29) binding. Motor defective or not supplied with power.
Track-shift mechanism inoperative	Switch (SW2) dirty. Cam (47) binding or worn. Pawls (42A) and (42B) worn. Spring (42C) weak or broken. Arms (18A) and (18B) binding. Solenoid (L2) defective or not supplied with power. Cartridge defective.
Wow or flutter	Belt (35) dirty or worn. Capstan dirty or binding. Cartridge defective. Motor defective.
Sound weak or distorted	Head dirty, misaligned, or defective. Cartridge defective. Amplifiers defective.
Tape is pulled from cartridge.	Cartridge defective. Capstan dirty or scored.

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46208

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## MECHANICAL PARTS LIST

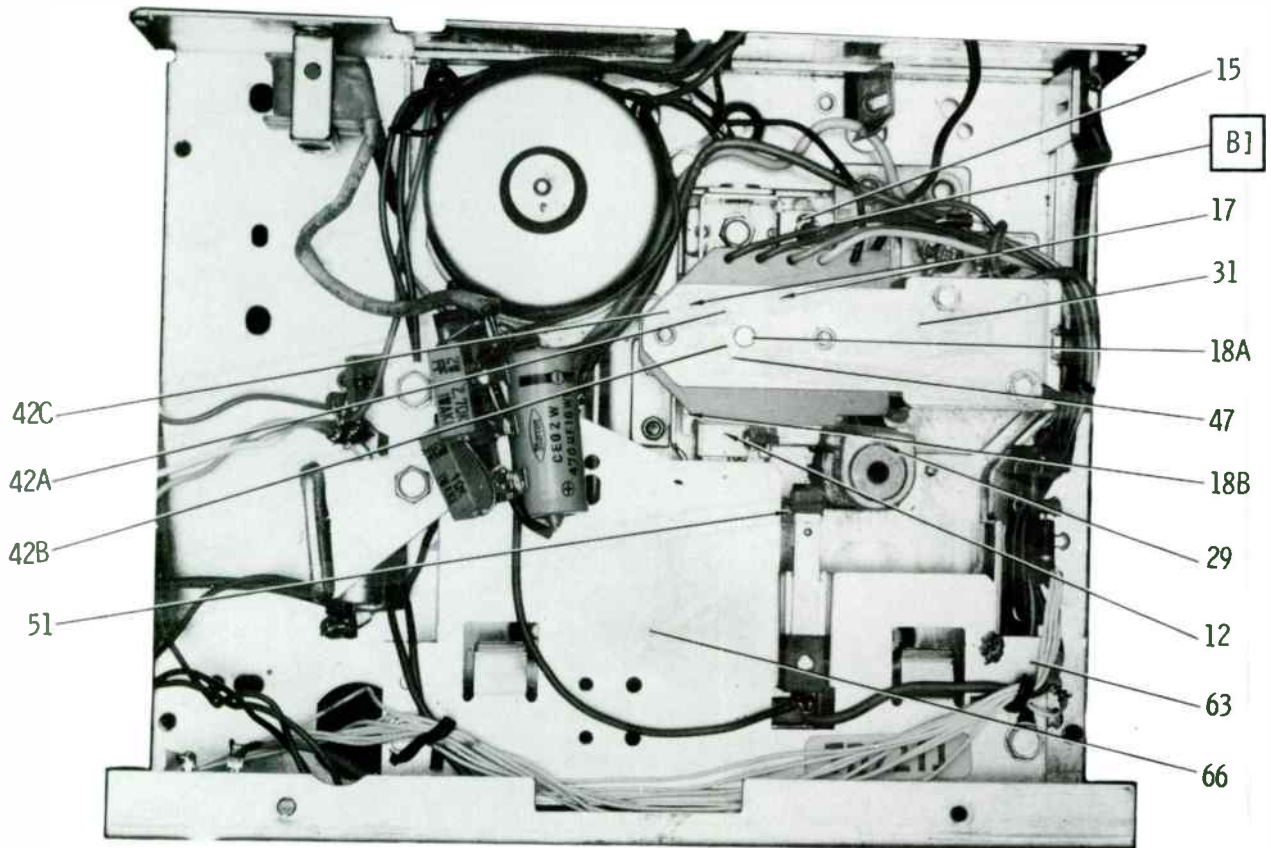
REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
12	7B41491G01	Head Shifting Assembly	35*	42B42683B03*	Flywheel Drive Belt*
15	41A41505G01	Azimuth Spring	42A	(2)	Push Pawl
17	41A40883G01	Head Lifting Springs (2 used)	42B	(2)	Pull Pawl
18A	(1)	Upper Radius Arm	42C	(2)	Pawl Spring
18B	(1)	Lower Radius Arm	47	45B43845G01	Track Changing Cam
21	1V41700G14	Flywheel	51	7A43648G01	Cartridge Slide
29	1V41220G29	Flywheel Housing Assembly	63	1V41220G38	Cartridge Detent Assembly
31	41A41452G01	Solenoid Spring	66	41B43129G01	Eject Spring

\* Flywheel Drive Belt: E-V/GAME Replacement Number 1407-71,  
WALSCO Replacement Number 1424-21.

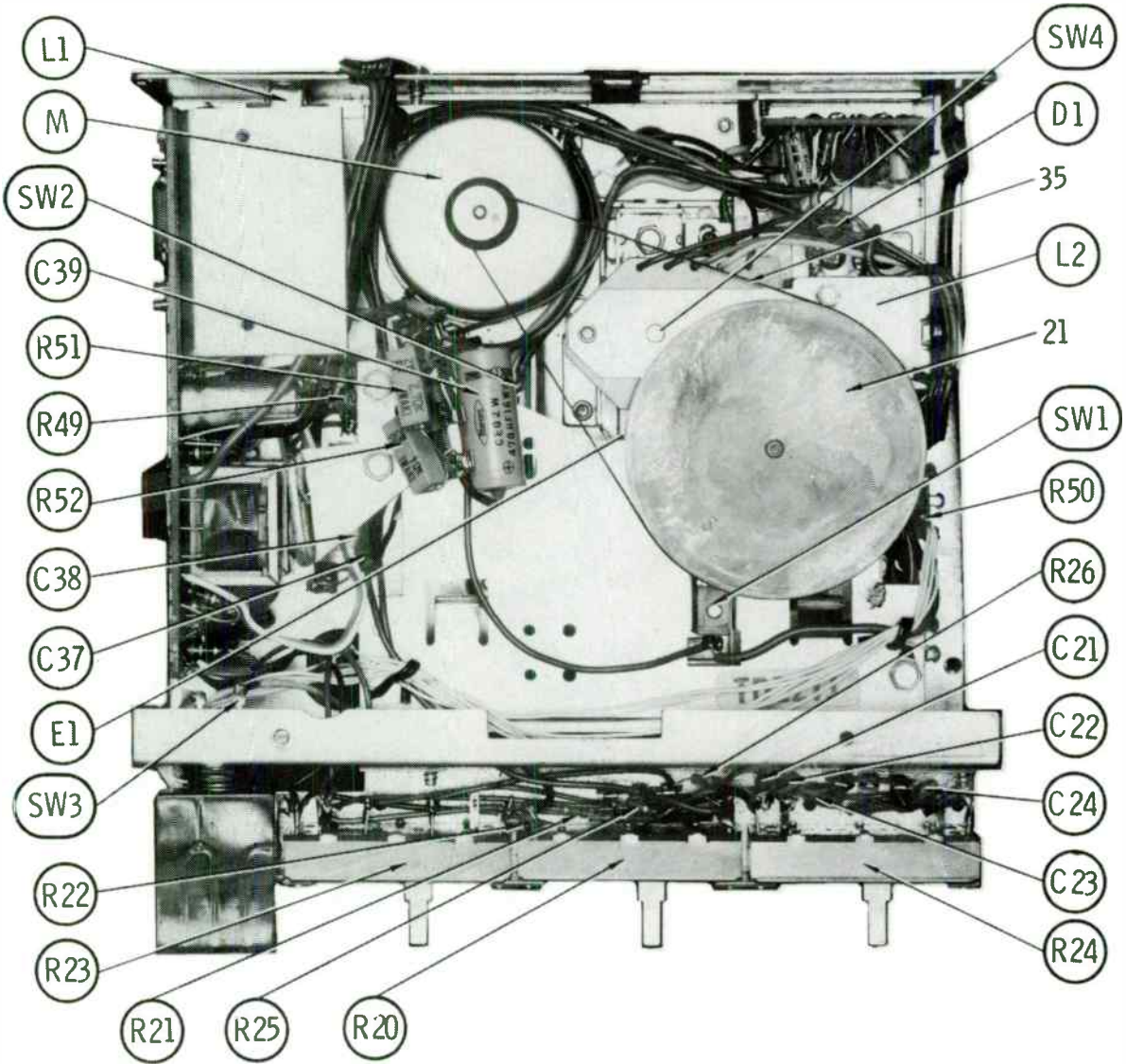
- (1) Part of Head Position Assembly Part #45A41460G01.  
(2) Part of Plunger and Ratchet Assembly Part #1V43500G99.

## CLEANING LUBRICATING HEAD DEMAGNETIZING

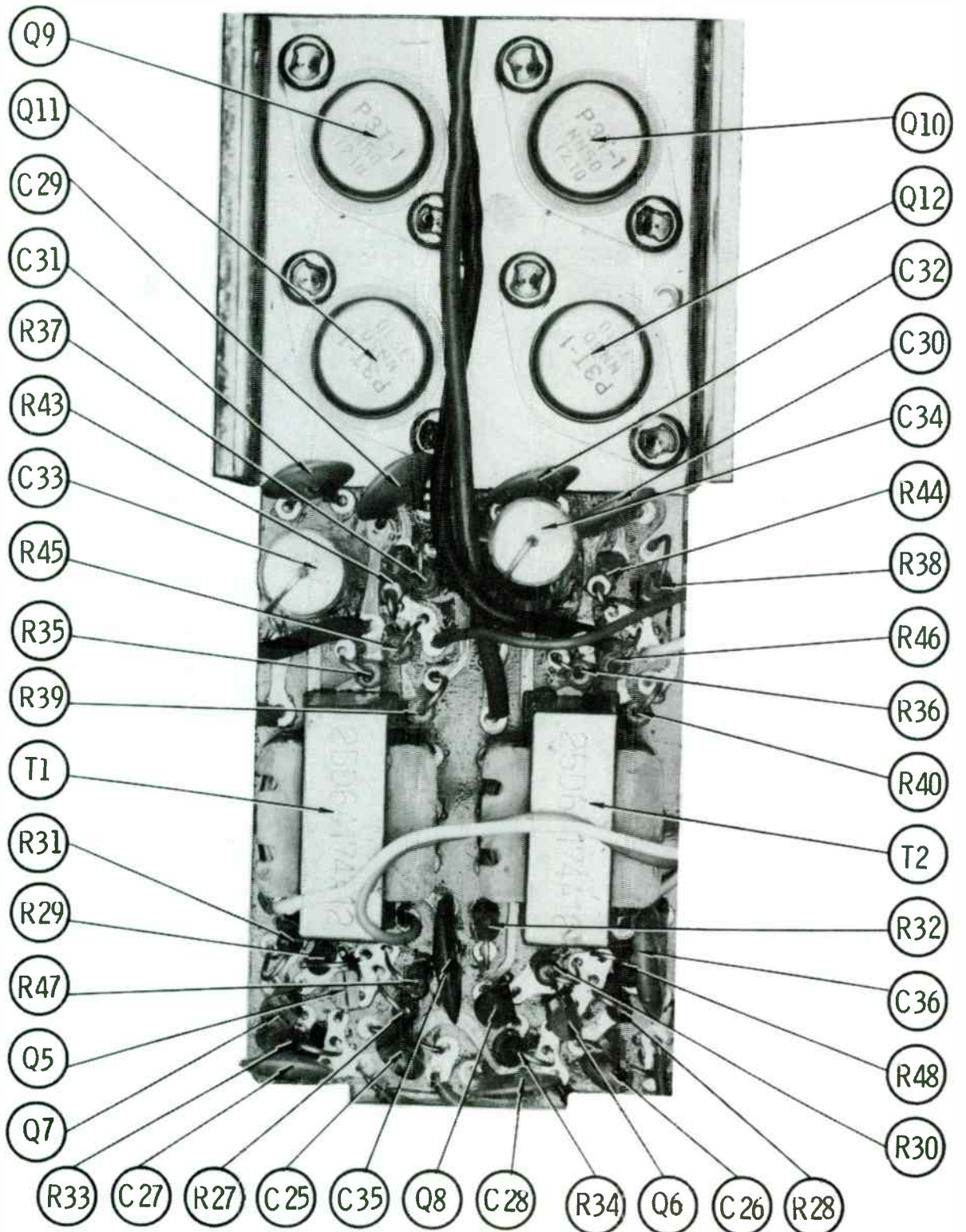
Refer to  
"General Servicing Information"  
on page 4.



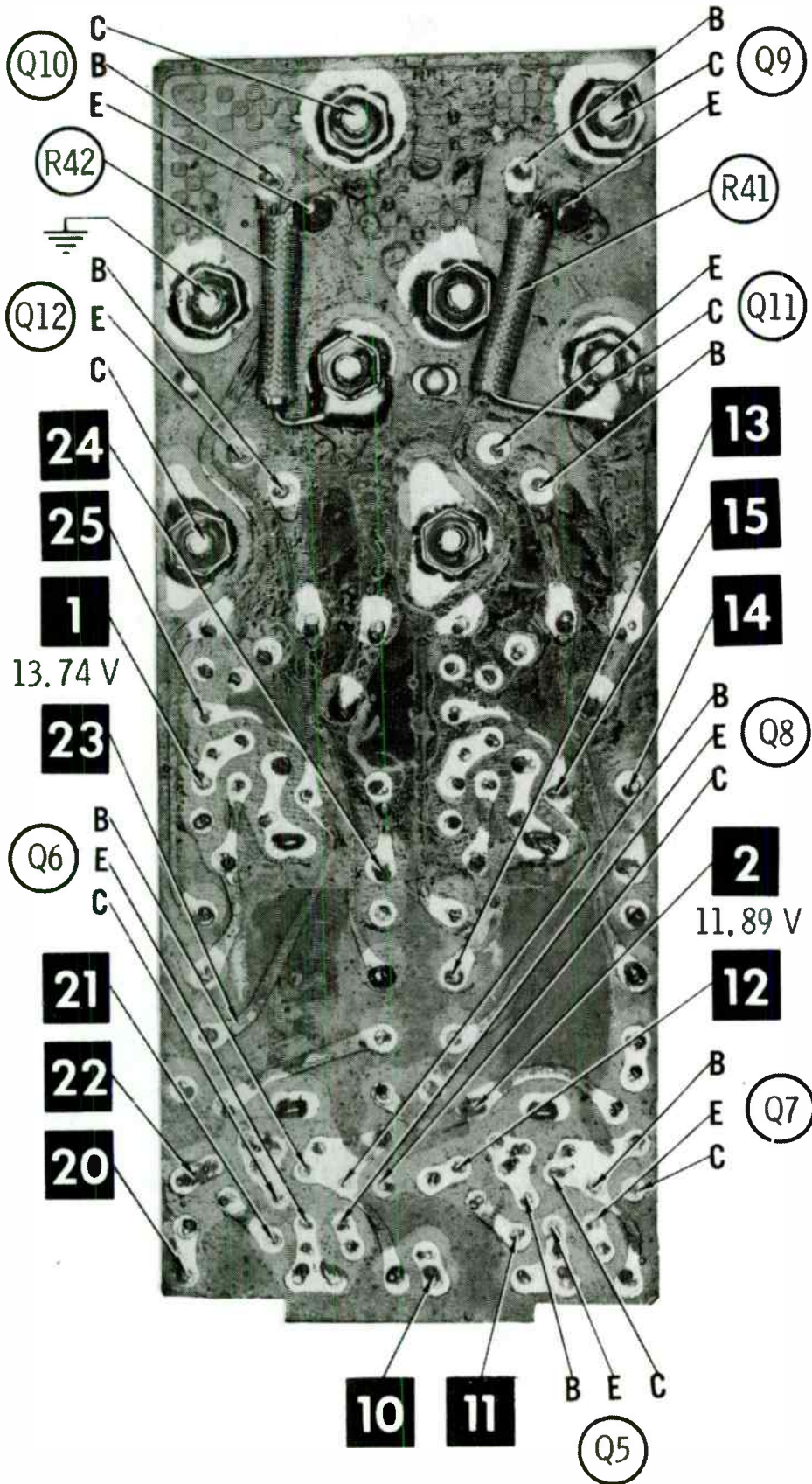
CHASSIS - TOP VIEW



OVERALL

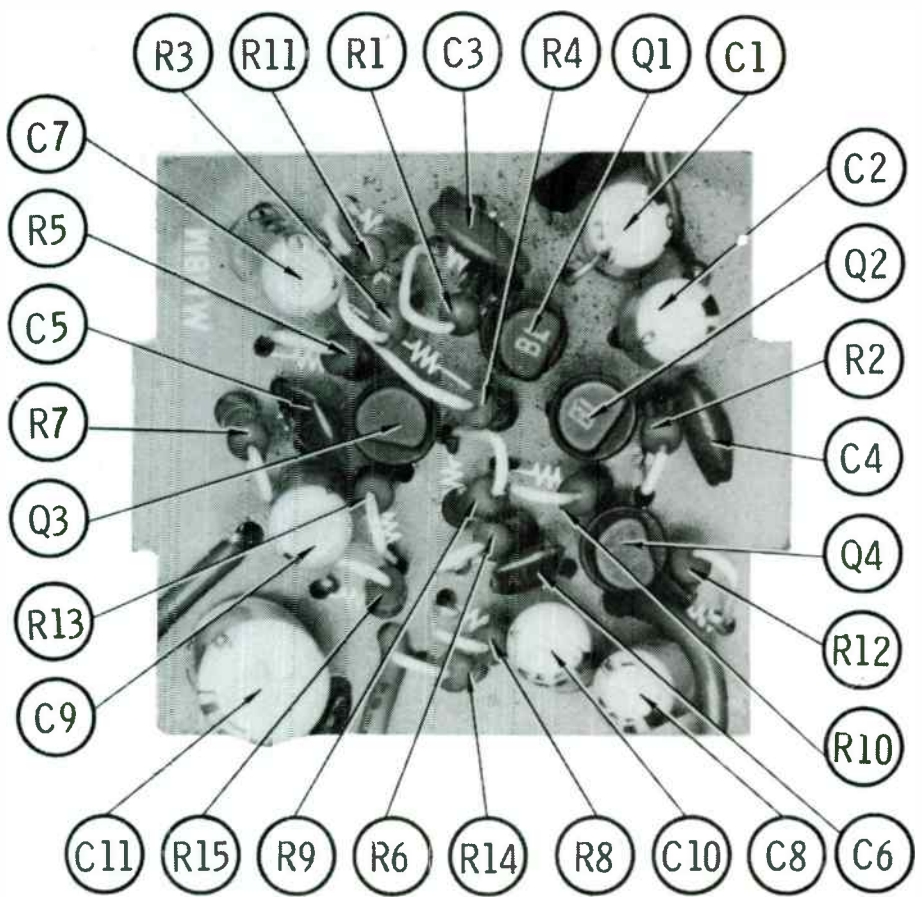
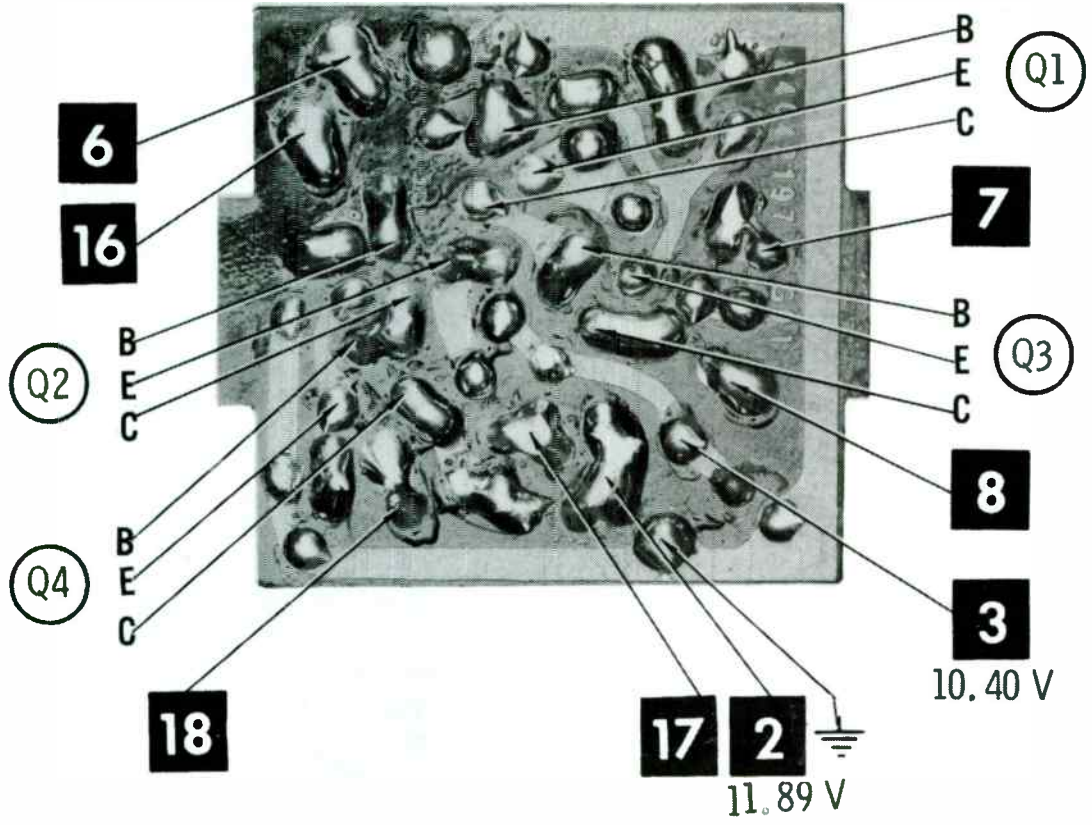


AMP BOARD



MOTOROLA MODEL TM4025

AMP BOARD



PREAMP BOARD



# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.  
 Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D1	T0D2	48C40235G02	GE-504A	5A4D	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
Q1	SR1668	(1)	GE-504A	5A4D	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
Q2	25C732BL	48S40246G01	GE-62	(IR)25C373	PTC139	HEPS0024	RE 192		RT-304	ECG199
Q3	25C732BL	48S40246G01	GE-62	(IR)25C373	PTC139	HEPS0024	RE 192		RT-304	ECG199
	25C373	48S40170G01	GE-212	(IR)25C373	PTC121	HEPS0015	RE 192	SK3122	RT-105	ECG199
		48S134810(1)								
	25C733	48S40247G01	GE-62	(IR)25C372	PTC139	HEPS0025	RE 192	SK3122	RT-302	ECG199
		48S134846(1)								
Q4	25C373	48S40170G01	GE-212	(IR)25C373	PTC121	HEPS0015	RE 192	SK3122	RT-105	ECG199
		48S134810(1)								
	25C733	48S40247G01	GE-62	(IR)25C372	PTC139	HEPS0025	RE 192	SK3122	RT-302	ECG199
		48S134846(1)								
Q5	54D	48S134811(1)	GE-20	TR-24	PTC136	HEPS0033	RE 13	SK3124	RT-102	ECG123A
Q6	54D	48S134811	GE-20	TR-24	PTC136	HEPS0033	RE 13	SK3124	RT-102	ECG123A
Q7	54C	48S134810	GE-20	TR-24	PTC136	HEPS0033	RE 13	SK3124	RT-102	ECG123A
Q8	54C	48S134810	GE-20	TR-24	PTC136	HEPS0033	RE 13	SK3124	RT-102	ECG123A
Q9	P3T	48S137308	GE-30	TR-50	PTC120	HEPG6016	RE 83	SK3082		ECG226
Q10	P3T	48S137308	GE-30	TR-50	PTC120	HEPG6016	RE 83	SK3082		ECG226
Q11	P3T	48S137308	GE-30	TR-50	PTC120	HEPG6016	RE 83	SK3082		ECG226
Q12	P3T	48S137308	GE-30	TR-50	PTC120	HEPG6016	RE 83	SK3082		ECG226

(1) Used in some versions.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	4.7 16V	23C42170G03	PC5-50	VTT4R7A50	EV-1319
C2	4.7 16V	23C42170G03	PC5-50	VTT4R7A50	EV-1319
C7	10 16V	23C42170G07	PC10-25	VTT10A25	EV-1222
C8	10 16V	23C42170G07	PC10-25	VTT10A25	EV-1222
C9	4.7 16V	23C42170G03	PC5-50	VTT4R7A50	EV-1319
C10	4.7 16V	23C42170G03	PC5-50	VTT4R7A50	EV-1319
C11	47 16V	23C42170G12	PC50-16	VTT47D16	EV-1226
C21	.1 15V	23C4328QA14		TDC104M050EL	SD50-R109
C22	.1 15V	23C4328QA14		TDC104M050EL	SD50-R109
C23	.3 10V	23C4328QA35		TDC334M050EL	SD50-R339
C24	.3 10V	23C4328QA35		TDC334M050EL	SD50-R339
C25	2 10V	23C4328QA10		TDC225M035FL	SD35-2R29
C26	2 10V	23C4328QA10		TDC225M035FL	SD35-2R29
C33	470 16V	23S187A29	PC500-16	VTT470J16	EV-1250
C34	470 16V	23S187A29	PC500-16	VTT470J16	EV-1250
C37	1000 16V	23S187A19	WBR1000-16	TC1501C	TVA-1163
C38	470 16V	23S187A29	WBR500-16	TC1505C	TVA-1162
C39	470 16V	23C40134G31	WBR500-16	TC1505C	TVA-1162

MOTOROLA MODEL TM402S

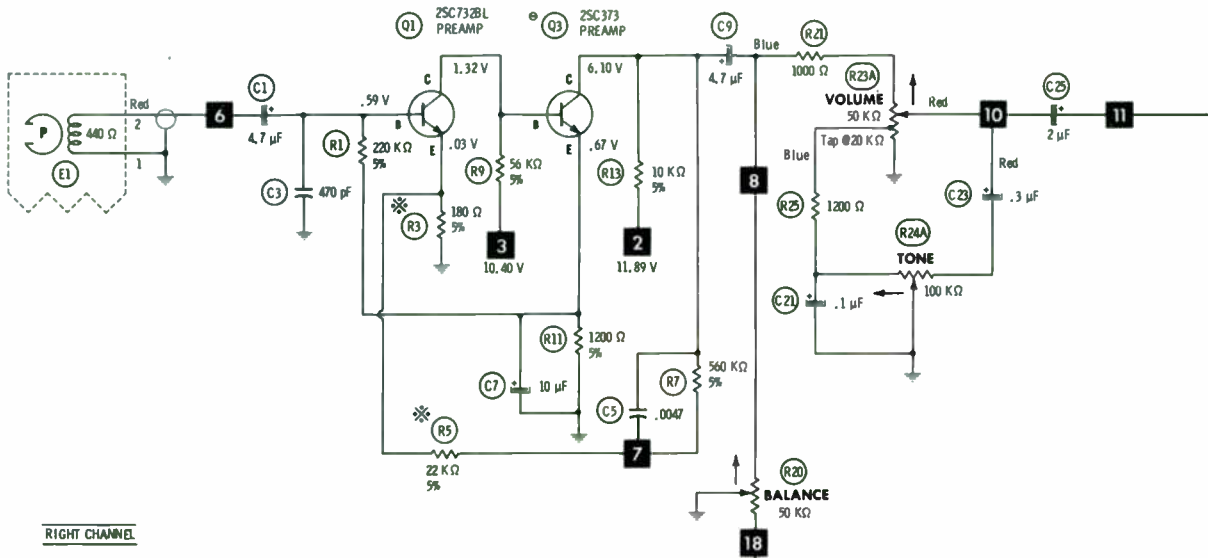
## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C3	470 10%		DD-471	GP470	GP347	10TS-T47
C4	470 10%		DD-471	GP470	GP347	10TS-T47
C5	.0047 10%	8C40135G03			M192P4729R8	192P4729R8
C6	.0047 10%	8C40135G03			M192P4729R8	192P4729R8
C27	.05 16V	21S10003A11	UK50-503		MAG5015	
C28	.05 16V	21S10003A11	UK50-503		MAG5015	
C29	.05 16V	21S10003A11	UK50-503		MAG5015	
C30	.05 16V	21S10003A11	UK50-503		MAG5015	
C31	.05 16V	21S10003A11	UK50-503		MAG5015	
C32	.05 16V	21S10003A11	UK50-503		MAG5015	
C35	.02		DC-203	MGP02	TA120	TG-S20
C36	.02		DC-203	MGP02	TA120	TG-S20

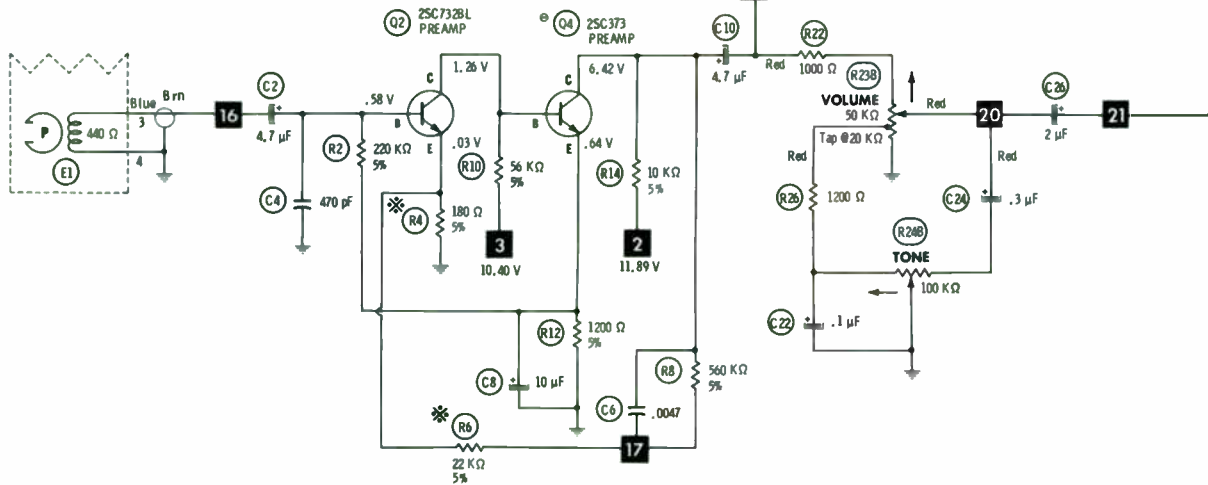
## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESISTANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
R20	Balance	50K	18C40098D01				
R23A	Volume-Left	50K Tap 20K	18C40097D01				
B	Volume-Right	50K Tap 20K					
R24A	Tone-Left	100K	18C40097D02				
B	Tone-Right	100K					

**LEFT CHANNEL**



**RIGHT CHANNEL**

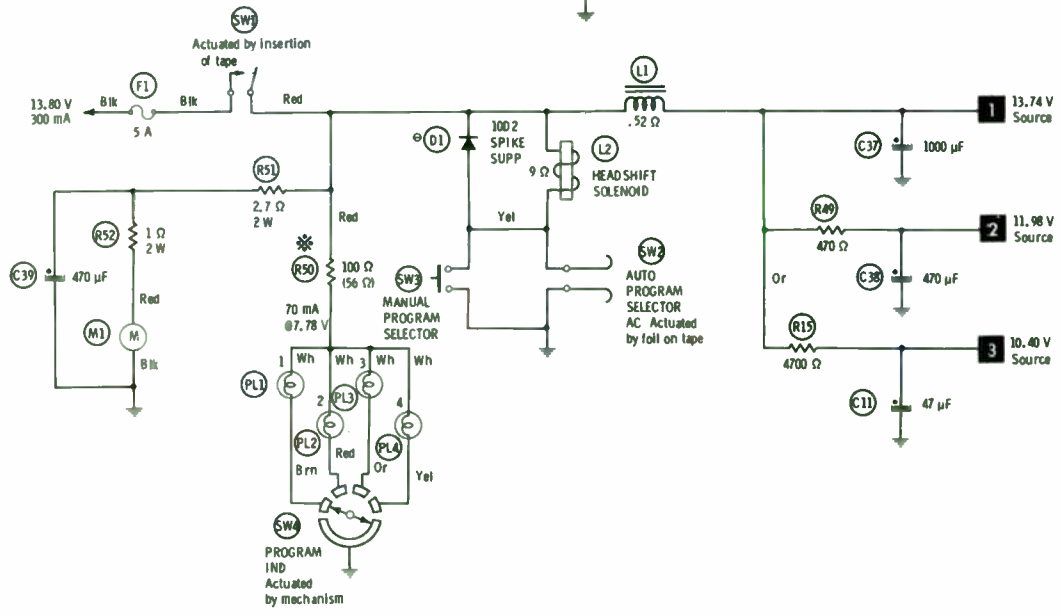
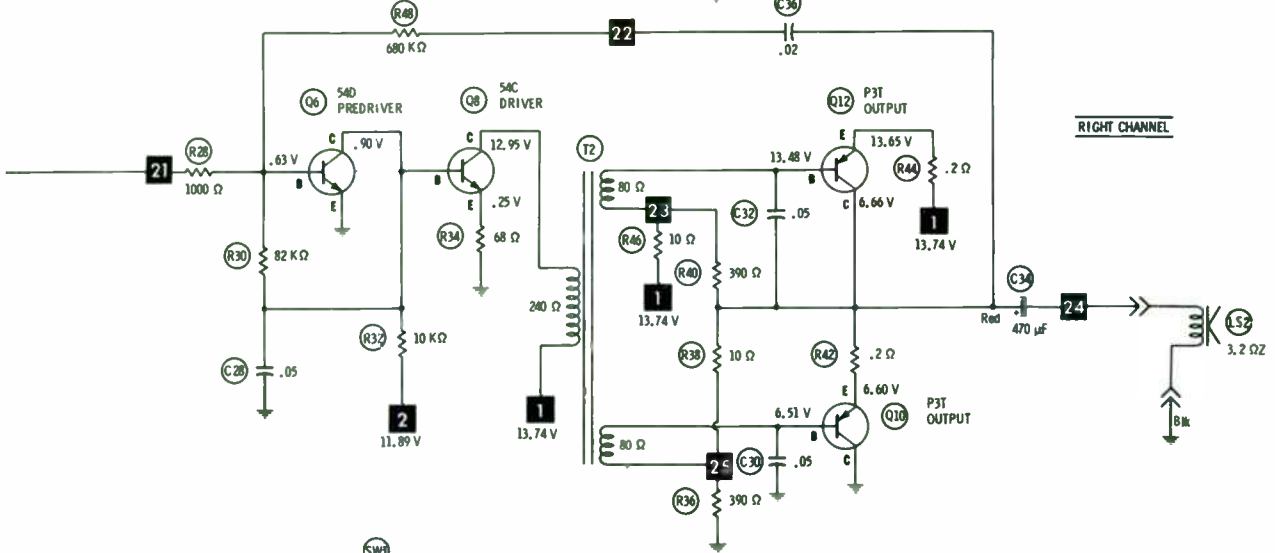
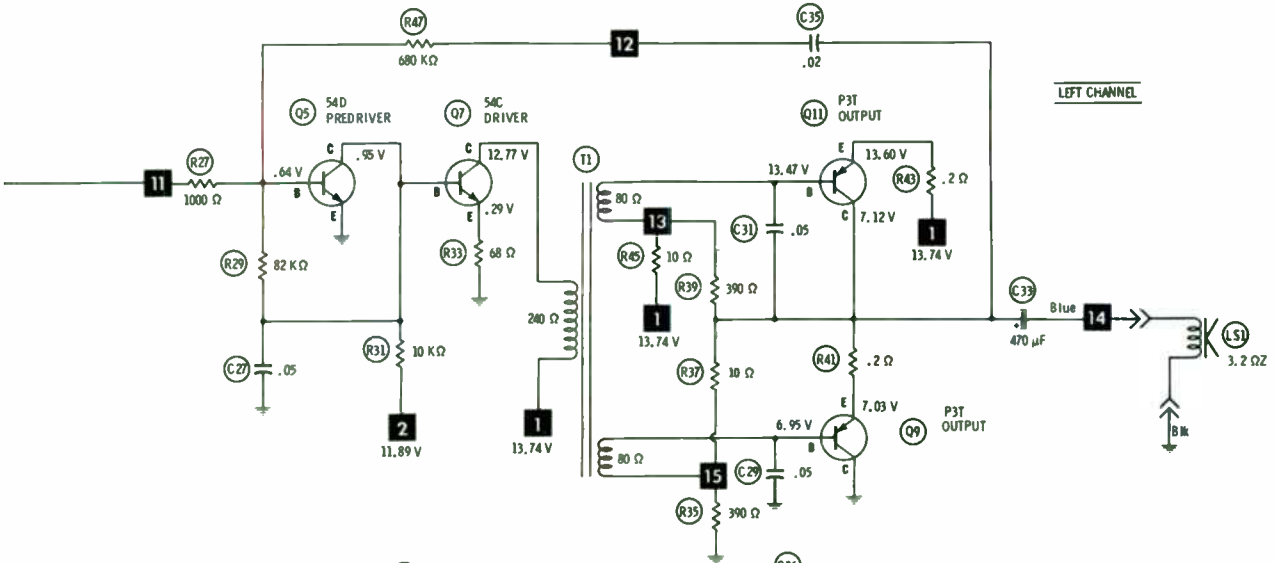


**Terminal Guides**



- \*— Circuitry not used in some versions
- - - Circuitry used in some versions
- ⊕ See parts list
- \* Nominal value
- ⊥ Ground
- ⏏ Chassis
- ▽ Common tie point

Supply voltage maintained as shown at input. Voltages measured with digital meter, no signal. Controls adjusted for normal operation. Arrow at control indicates direction of advance. Terminal identification may not be found on unit. Resistors are 1/2W or less, 10% unless nated. Value in ( ) used in some versions.



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.

Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## RESISTORS (Power and Special)

ITEM No.	RATING	REPLACEMENT DATA		ITEM No.	RATING	REPLACEMENT DATA	
		WORKMAN PART No.	MFGR. PART No.			WORKMAN PART No.	MFGR. PART No.
R41	.2 10% PTC		17C41995A07	R43	.2 10% PTC		17C41995A07
R42	.2 10% PTC		17C41995A07	R44	.2 10% PTC		17C41995A07

## FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L1	100mA	.52	2.6mH	25D64172A36			

## TRANSFORMER (Driver)

ITEM No.	TURNS RATIO			REPLACEMENT DATA			NOTES
	PRI.	SEC. 1	SEC. 2	MFGR. PART No.	THORDARSON PART No.	TRIAD PART No.	
T1	8.4	1	1	25D64174A12			
T2	8.4	1	1	25D64174A12			

## SPEAKER

ITEM No.	TYPE	REPLACEMENT DATA		NOTES
		MFGR. PART No.	QUAM PART No.	
LS1	5 3/4" PM 3.2 Ohms	50D64442B02		
LS2	5 3/4" PM 3.2 Ohms	50D64442B02		

## FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	5A	65S122345	IV64964A32	AGA5	HAF	301005	155004	

## MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
E1	Tape Head	59B40481G01	Stereo
L2	Solenoid	24B40638G01	Head Shift
M	Motor	59B41453G02	Tape Transport (3000 rpm @ 13.24 volts.)
SW1	Switch	40B40825G03	Power
SW2	Switch	40B41236G01	Auto Program Selector
SW3	Switch	40B64735B01	Manual Program Selector
SW4	Switch	1V43500695	Program Indicator
	Printed Circuit Board	84D40147D01	Audio
	Printed Circuit Board	84C42197G01	Pre-Amp (less components)
	Connector Assembly	30C64013B03	Speaker (right channel)
	Connector Assembly	30C64013B04	Speaker (left channel)
	Cable Assembly	30C41564G04	Tape Head

## CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Escutcheon	13D40124D01	Knob, Volume	36B40133D01
Door, Tape	15C40123D01	Knob, Balance	36B40133D01
Shaft, Tape Door	47A40127D01	Knob, Tone	36B40133D01
Spring, Tape Door	41A40142D01	Pushbutton, Channel Select	38P64978A61

## WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Shielded Hook-up Wire .....	Use BELDEN No. 8885
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)
Ignition Noise Suppression .....	Use BELDEN No. 7300-Series Spark-Plug Sets



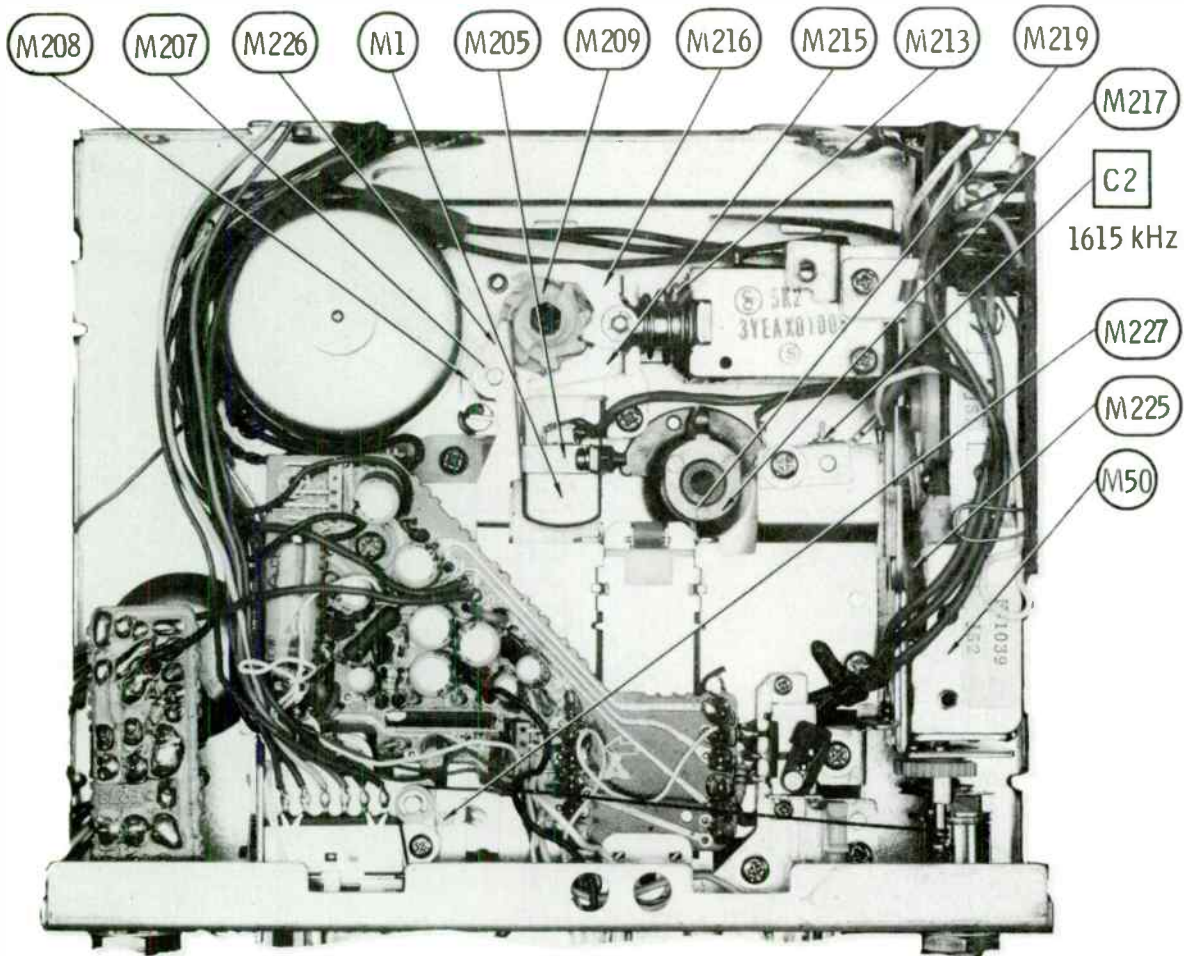
# PHOTOFACT<sup>®</sup> with

# CIRCUITRACE<sup>®</sup>

For Supplier Address See PHOTOFACT Index



MODEL CQ-969EU



PANASONIC MODEL CQ-969

CHASSIS-TOP VIEW

**HOWARD W. SAMS & CO., INC.** Indianapolis, Indiana 46206

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6AL960

## ADJUSTMENTS

ADJUST	REMARKS
Head Azimuth	Play a test cartridge and adjust B1 for maximum on an AC VTVM across output.
Head Height	Play a test cartridge, follow instructions with cartridge, and adjust B2 for proper response.

## TROUBLE CHART

SYMPTOM	REMARKS
Capstan does not rotate.	Belt (M228) dirty, worn, or broken. Assembly (M217) binding. Motor defective or not supplied with power.
Track-shift mechanism inoperative	Switch (SW6) dirty. Cam (M209) binding or worn. Pawls (M215) and (M216) worn. Spring (M213) weak or broken. Assembly (M208) binding. Solenoid (L151) defective or not supplied with power. Cartridge defective.
Wow or flutter	Belt (M228) dirty or worn. Capstan dirty or binding. Cartridge defective. Motor defective.
Tape is pulled from cartridge.	Cartridge defective. Capstan dirty or scored.
Cartridge ejector defective	Ejector mechanism binding. Solenoid (L151) defective. Ejection circuit defective.

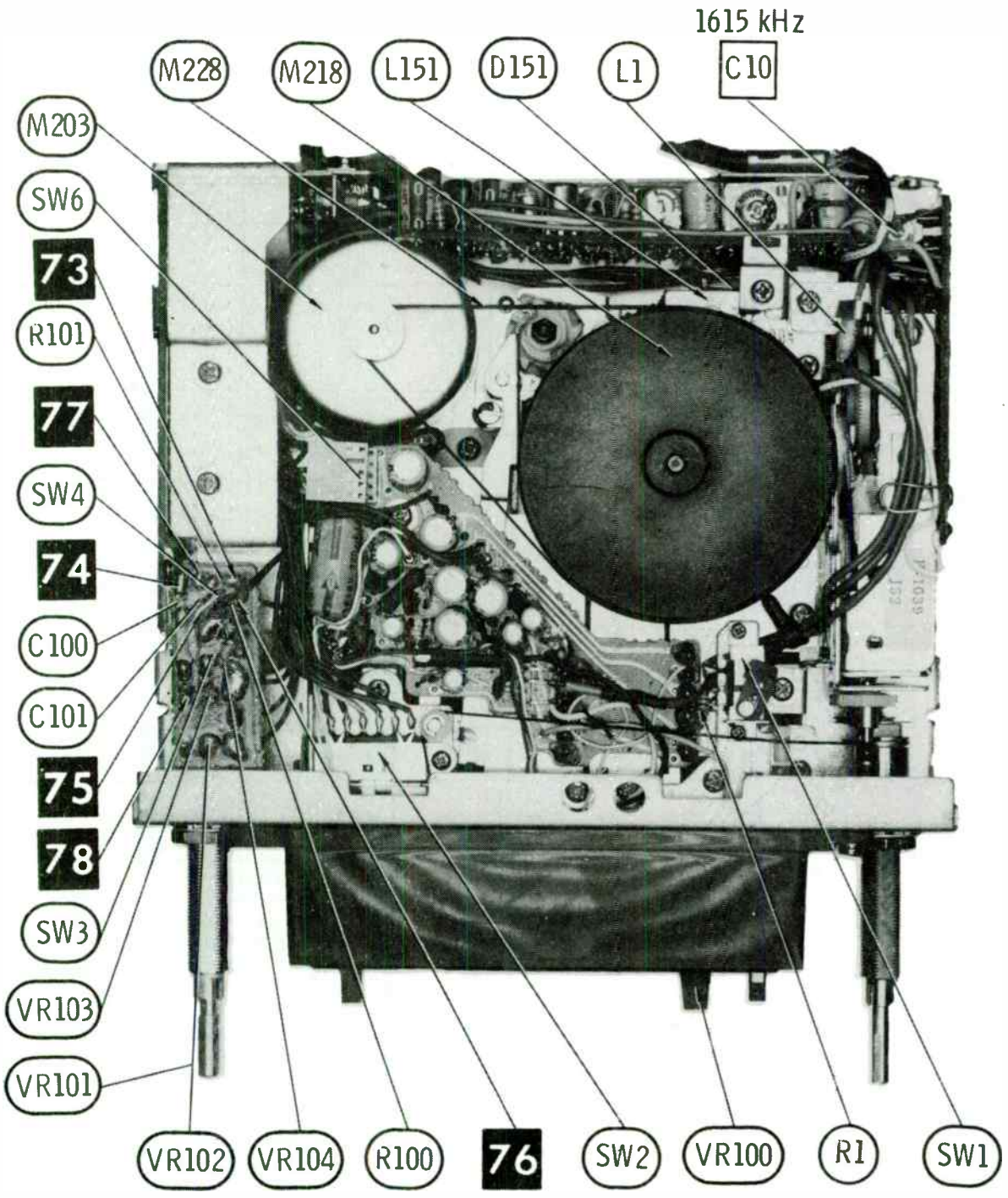
## MECHANICAL PARTS LIST

REF. NO.	PART NO.	DESCRIPTION	REF. NO.	PART NO.	DESCRIPTION
M205	YEFX021241	Head Clamp	M217	YEFX212102	Flywheel Housing Assembly
M207	YEFX005119	Head Lifting Spring	M218	YEFX213103	Flywheel
M208	YEFX236101	Head Shifting Assembly	M219	YAFX025010	Tape Scrapper
M209	YEFX234101	Track Changing Cam	M225	YAFX011188	Cartridge Detent Arm
M213	YEFX005120	Solenoid Spring	M226	YEFJ02008	Channel Indicator Arm
M215	YEFX215101	Push Pawl	M227	YEFX005166	Indicator Arm Spring
M216	YEFX215102	Pull Pawl	M228*	YEFR03004*	Flywheel Drive Belt*

\* Flywheel Drive Belt: E-V/GAME Replacement Number 1407-70.  
WALSCO Replacement Number 1424-15.

## CLEANING LUBRICATING HEAD DEMAGNETIZING

Refer to  
"General Servicing Information"  
on page 4.



PANASONIC MODEL CQ-969

CHASSIS-TOP VIEW

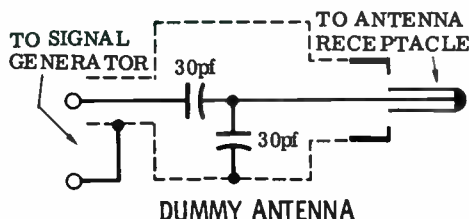
## ALIGNMENT INSTRUCTIONS

Check for specified source voltage.  
 Use only enough generator output to provide a usable indication.  
 Connect low sides of generator and indicator to ground  
 unless specified otherwise.  
 Suggested alignment Tools: GC ELECTRONICS:  
 ALL .....8290, 8868, 9087



GENERATOR COUPLING	GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
High side thru .1 uF to antenna input, low side to ground.	455kHz 400-Hz mod.	High freq. end stop.	Output meter across voice coil.	IFT4, IFT3, IFT2, IFT1	Adjust for maximum.
Thru dummy antenna to antenna input.	1615kHz	"	"	C37, C10, C2	"
Thru dummy antenna to antenna input.	600kHz	Tune to signal	Output meter across voice coil.	T21	Adjust for maximum. Repeat alignment until no further improvement is noted.

With radio installed in car and antenna extended 36", tune in a weak station near 1400kHz and adjust C2 for maximum output. Antenna adjustment C2 is located inside tape door, right rear corner.



### FM IF ALIGNMENT USING AM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to antenna input, low side to ground.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz Unmodulated	Point of non-interference	DC probe of VTVM to + side of C31, common to ground.	(1) IFT T22 Prim.	Adjust for maximum.
"	"	DC probe of VTVM to Junction of R27 & R28.	T22 Sec	Adjust for zero reading. A positive or negative reading will be obtained on either side of correct setting.

### FM IF ALIGNMENT USING FM SIGNAL GENERATOR—SELECTOR IN FM POSITION

High side of generator thru .001uF to antenna input, low side to ground.

Use 60-hertz, frequency-modulated signal, 450kHz sweep.  
 Use 60-hertz sawtooth voltage in scope for horizontal deflection.

GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
10.7MHz 450kHz Sweep	Point of non-interference	Vert input of scope to + side of C31.	(1) T22 Pri.	Disconnect stabilizing capacitor C31. Adjust for maximum gain and symmetry of response similar to Fig. 1 Reconnect C31.
"	"	Vert input of scope to junction of R27 & R28.	T22 Sec.	Adjust T22 Sec. for maximum amplitude and straightness of line similar to Fig. 2. Readjust T22 Prim.

(1) Before adjusting, vary generator frequency slightly. Maximum output indicates exact IF.



## ALIGNMENT INSTRUCTIONS (Continued)

### FM RF ALIGNMENT—SELECTOR IN FM POSITION

Connect generator across antenna terminals with 120-ohm carbon resistor in series with each lead. Adjustment of coils by bending should not be attempted unless the coil is deformed or replaced.

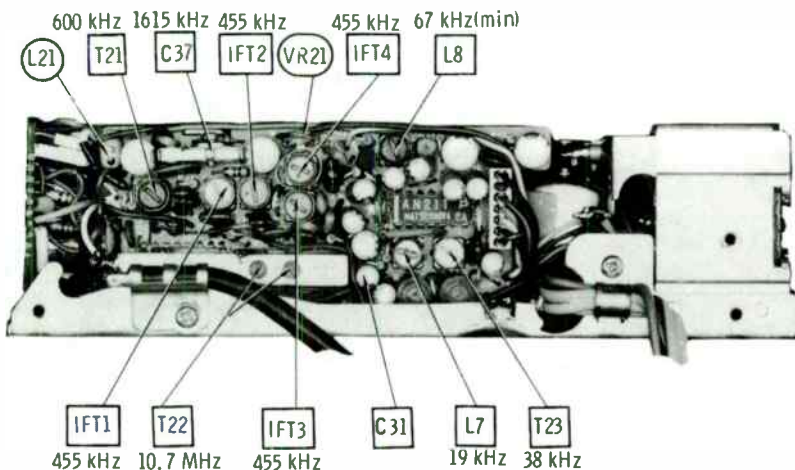
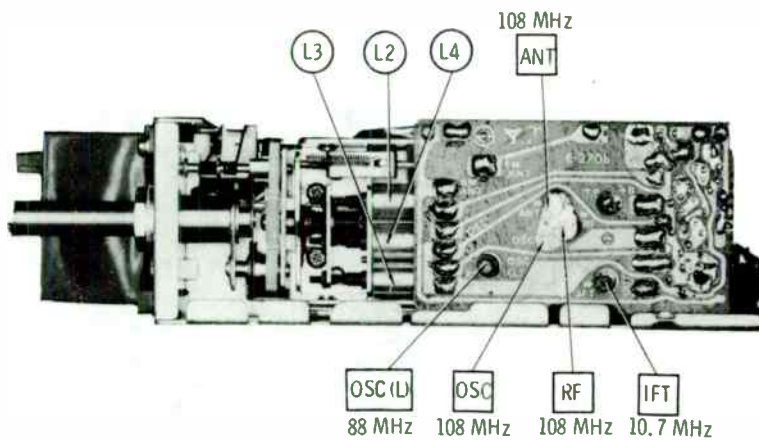
GENERATOR FREQUENCY	RADIO DIAL SETTING	INDICATOR	ADJUST	REMARKS
88MHz Unmodulated	Low Freq. end stop.	DC probe of VTVM to + side of C31.	OSC (L)	Adjust for maximum.
108MHz Unmodulated	High Freq. end stop.	"	OSC, RF, ANT	Adjust for maximum. Repeat FM RF steps until no further improvement is noted.

### FM STEREO MULTIPLEX ALIGNMENT USING FM STEREO SIGNAL GENERATOR ( $\pm .0001\%$ ACCURACY)

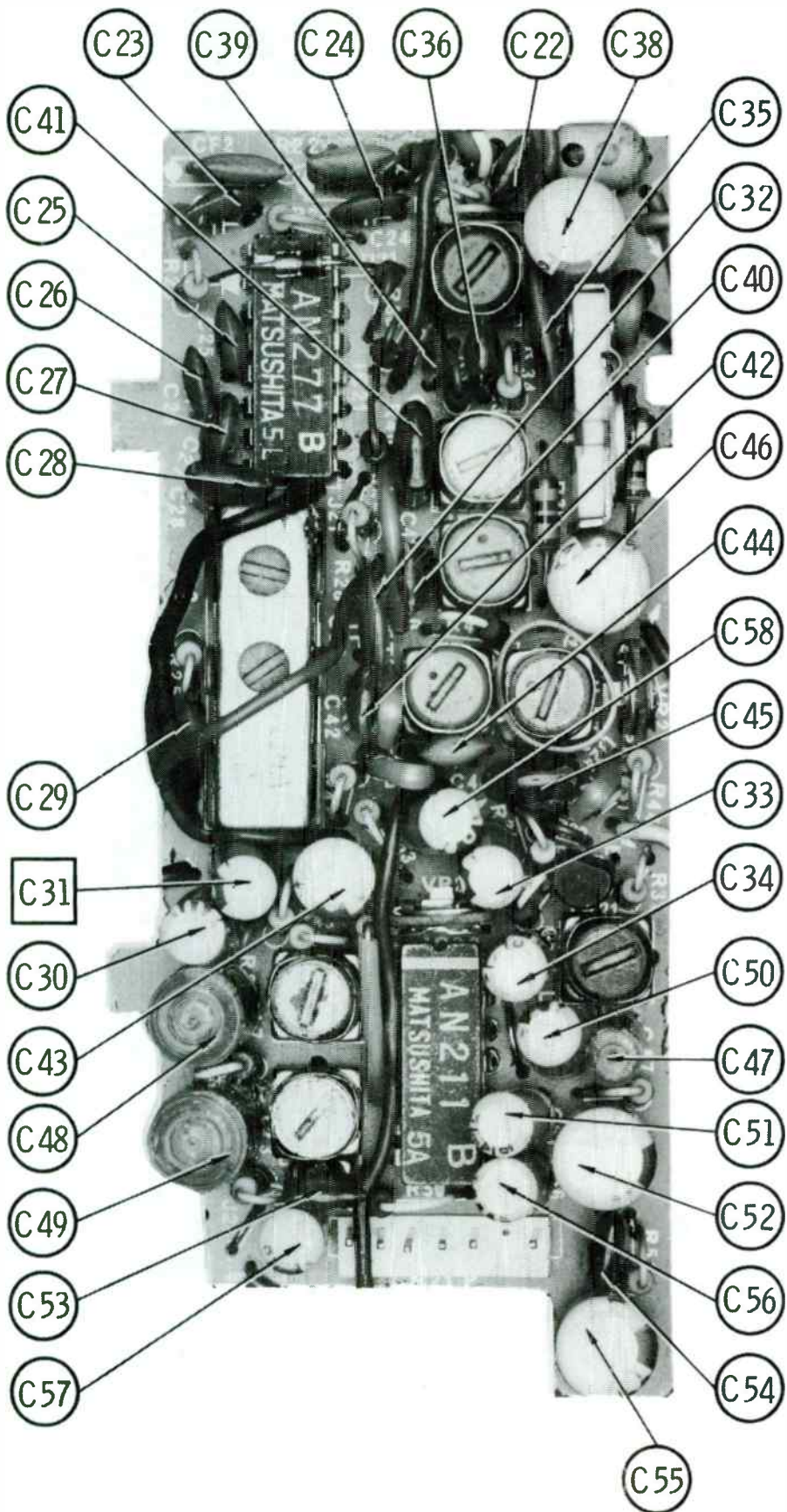
High side of generator thru 47K to antenna input, low side to ground.

GENERATOR FREQUENCY	INDICATOR	ADJUST	REMARKS
67kHz	Vert input of scope thru 47K to pin #14 of IC22.	L8	Adjust for MINIMUM.
Modulated Left Channel	Vert input of scope to - side of C56.	L7, T23, VR22	Adjust for MINIMUM. This step should require only slight adjustment.
Modulated Right Channel	Vert input of scope to - side of C56.		Check for MINIMUM. If necessary, make compromise adjustment of L7, T22, VR22.

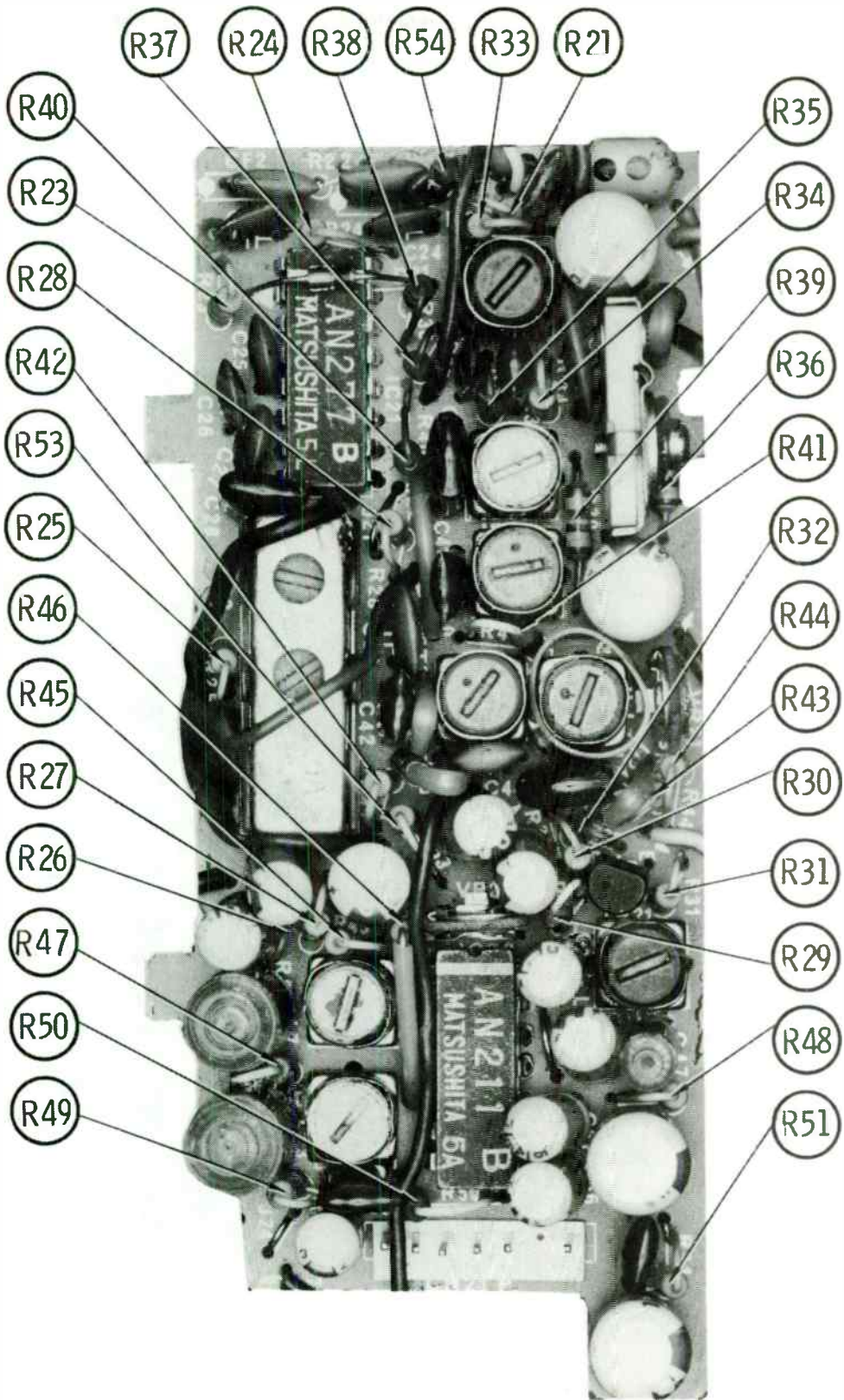
PANASONIC MODEL CG-969



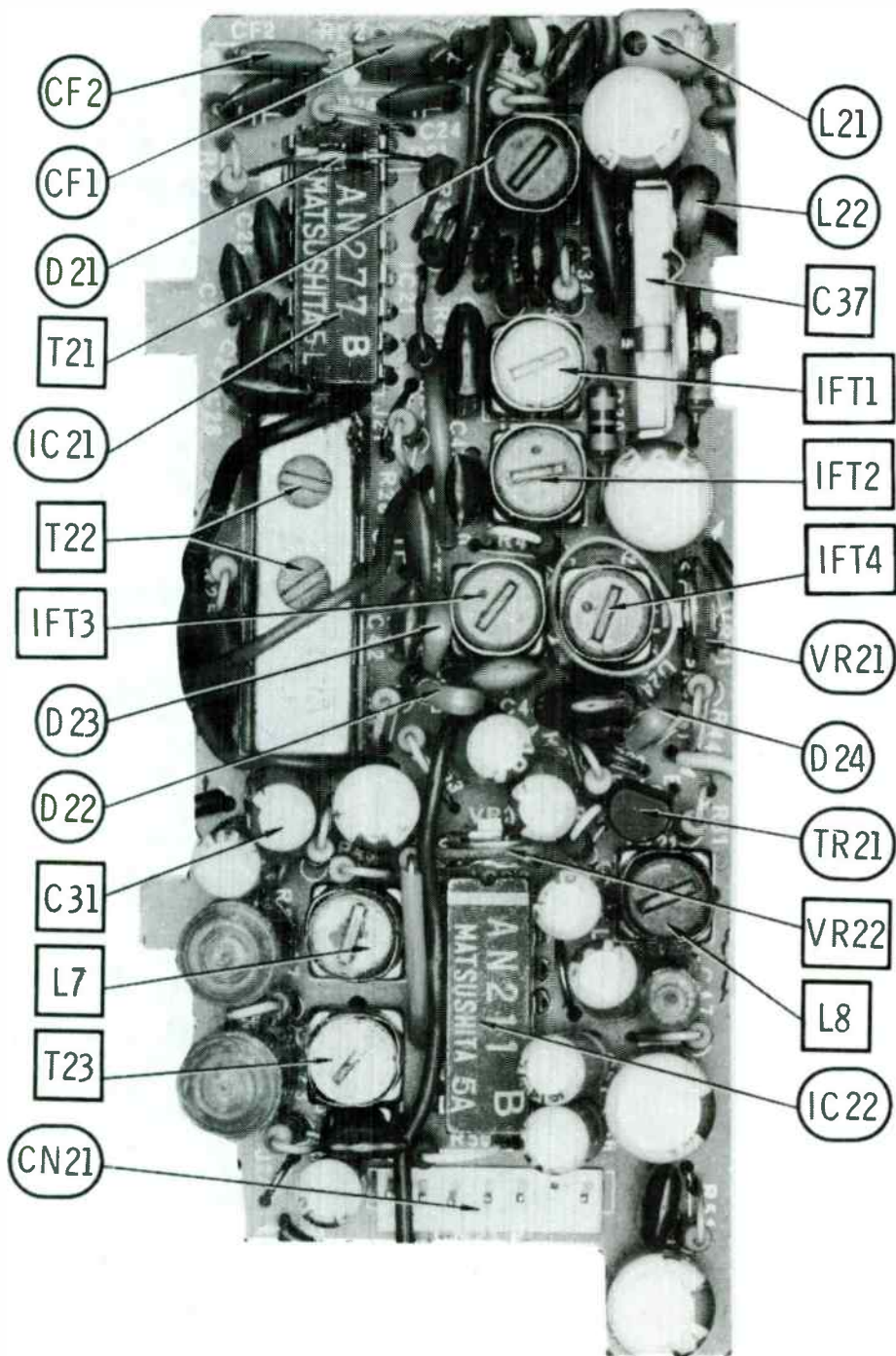
CHASSIS-BACK AND SIDE VIEWS



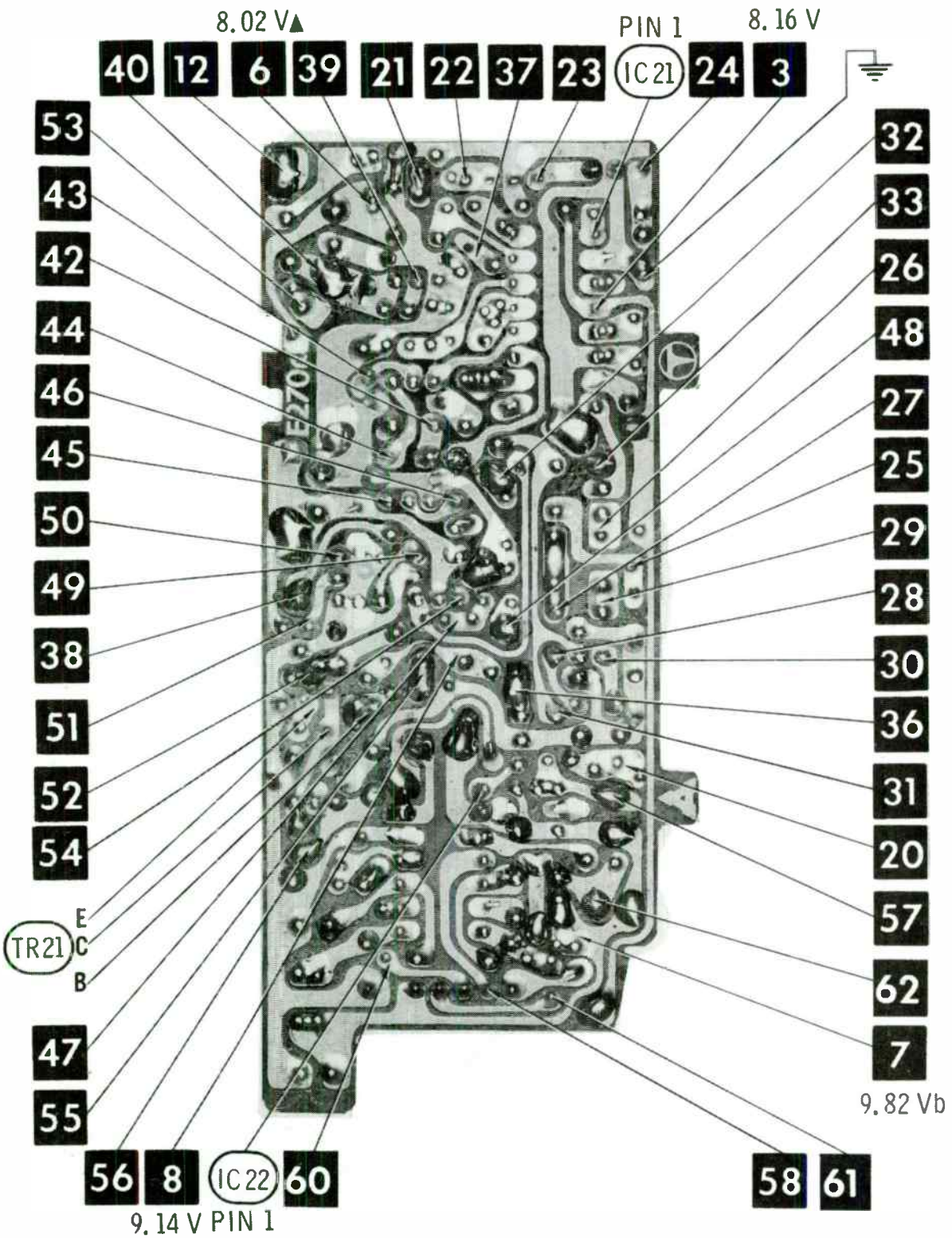
IF/MPX BOARD



IF/MPX BOARD

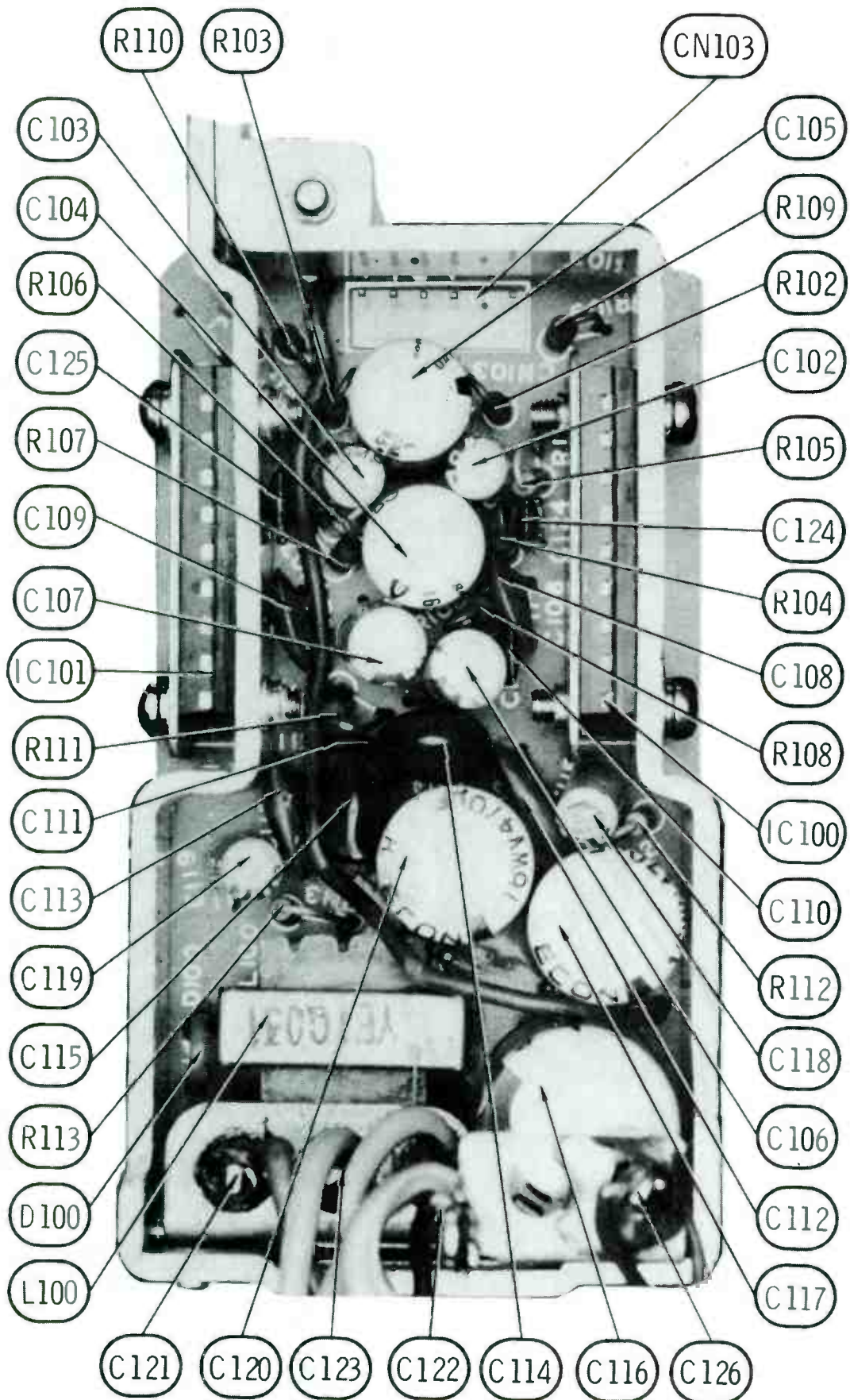


IF/MPX BOARD

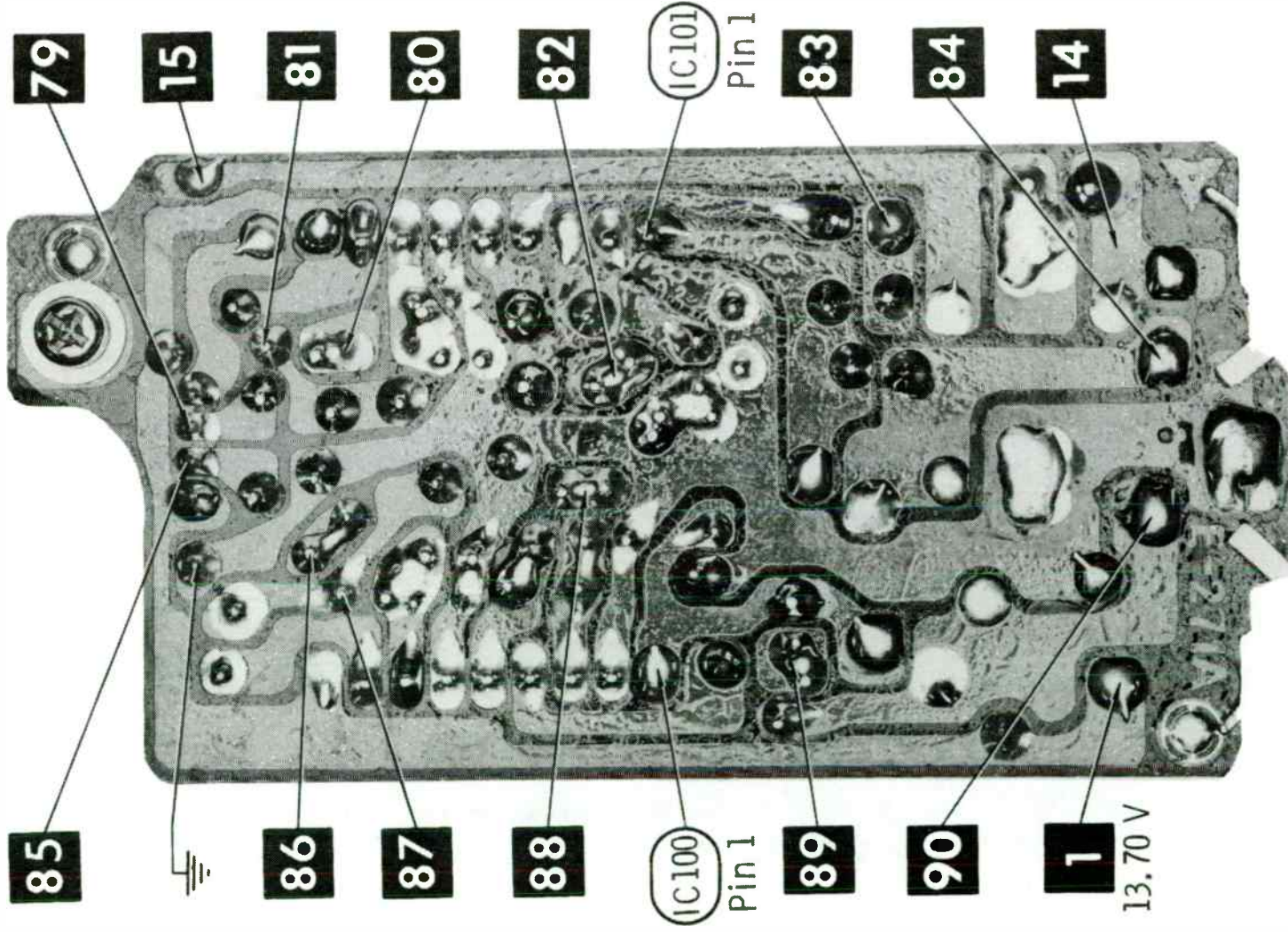


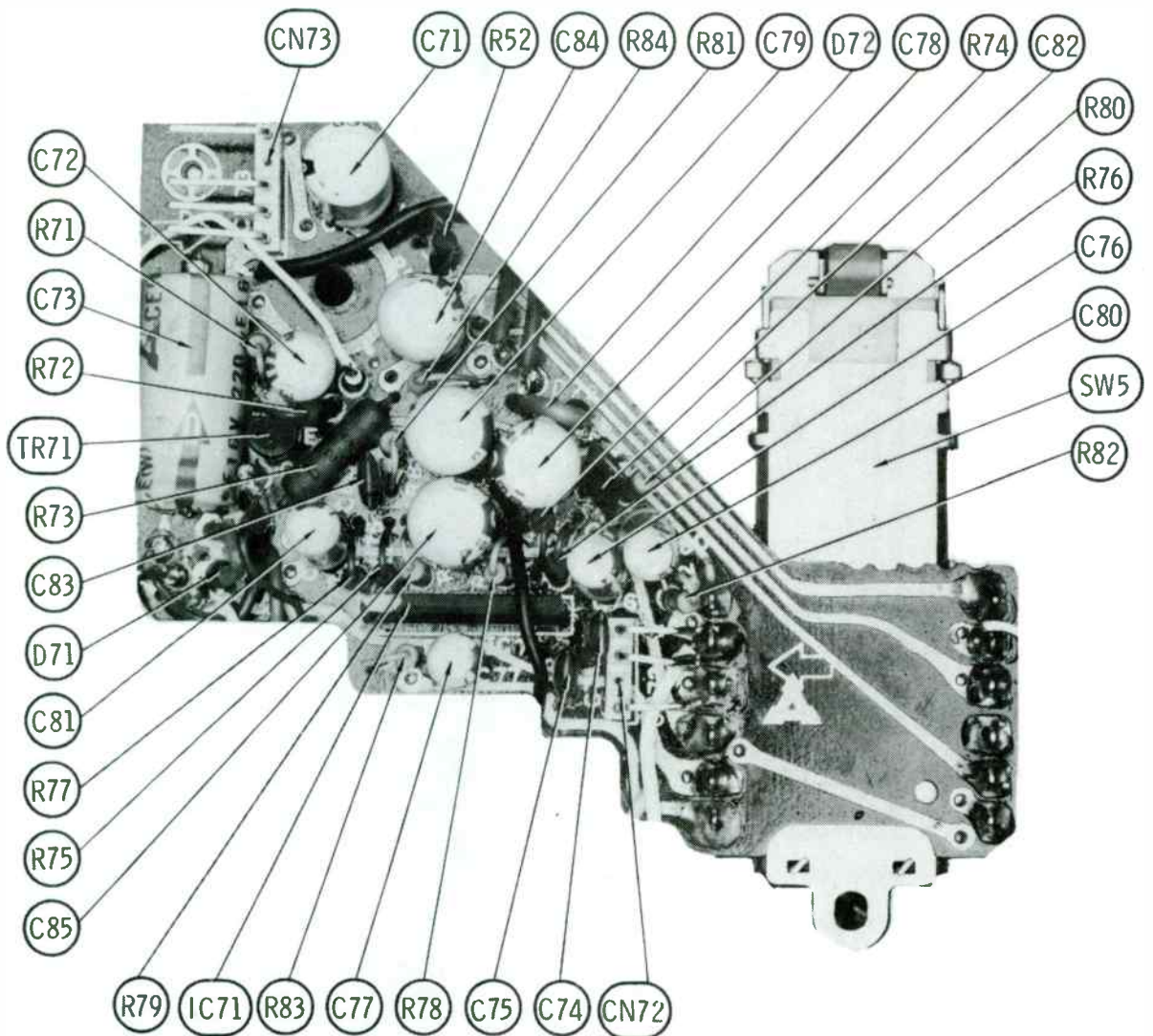
PANASONIC MODEL CG-969

IF/MPX BOARD



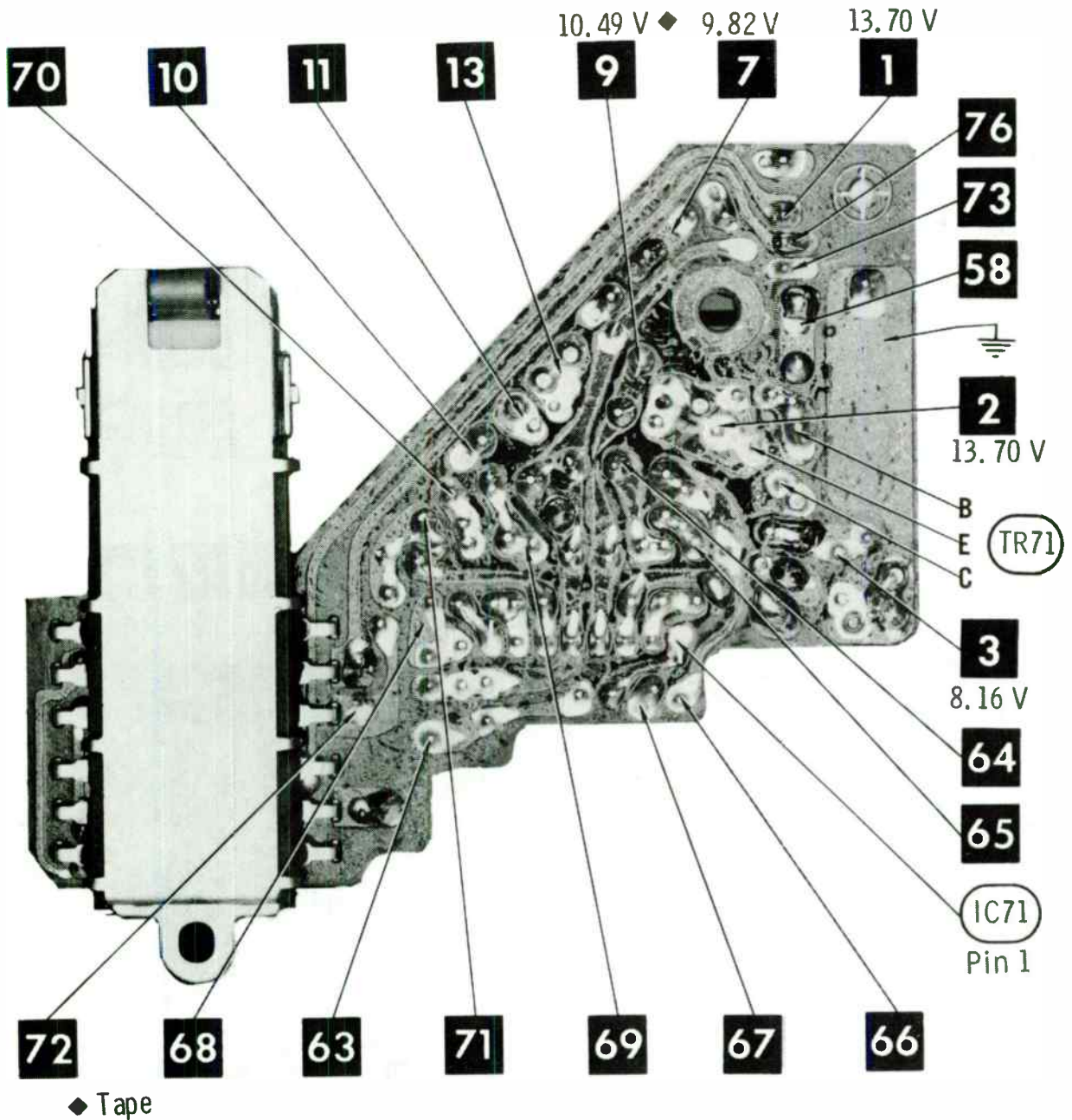
AUDIO BOARD





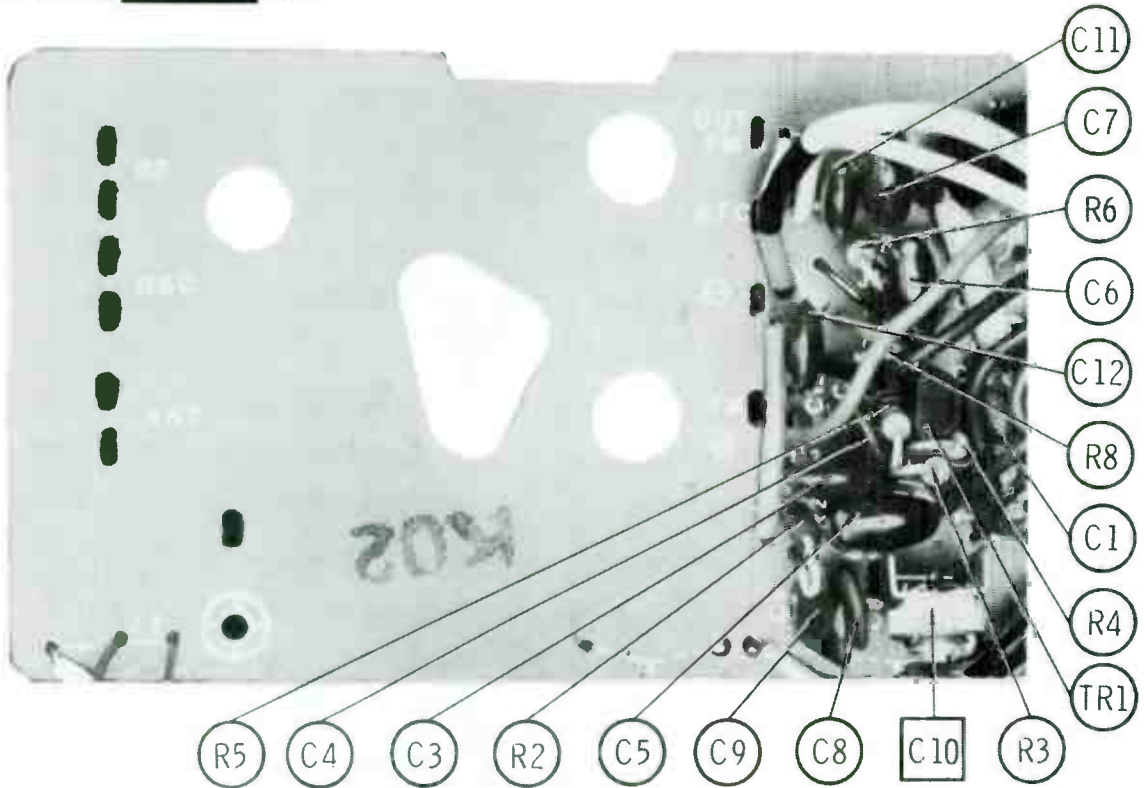
IND CONTROL AND PREAMP BOARD



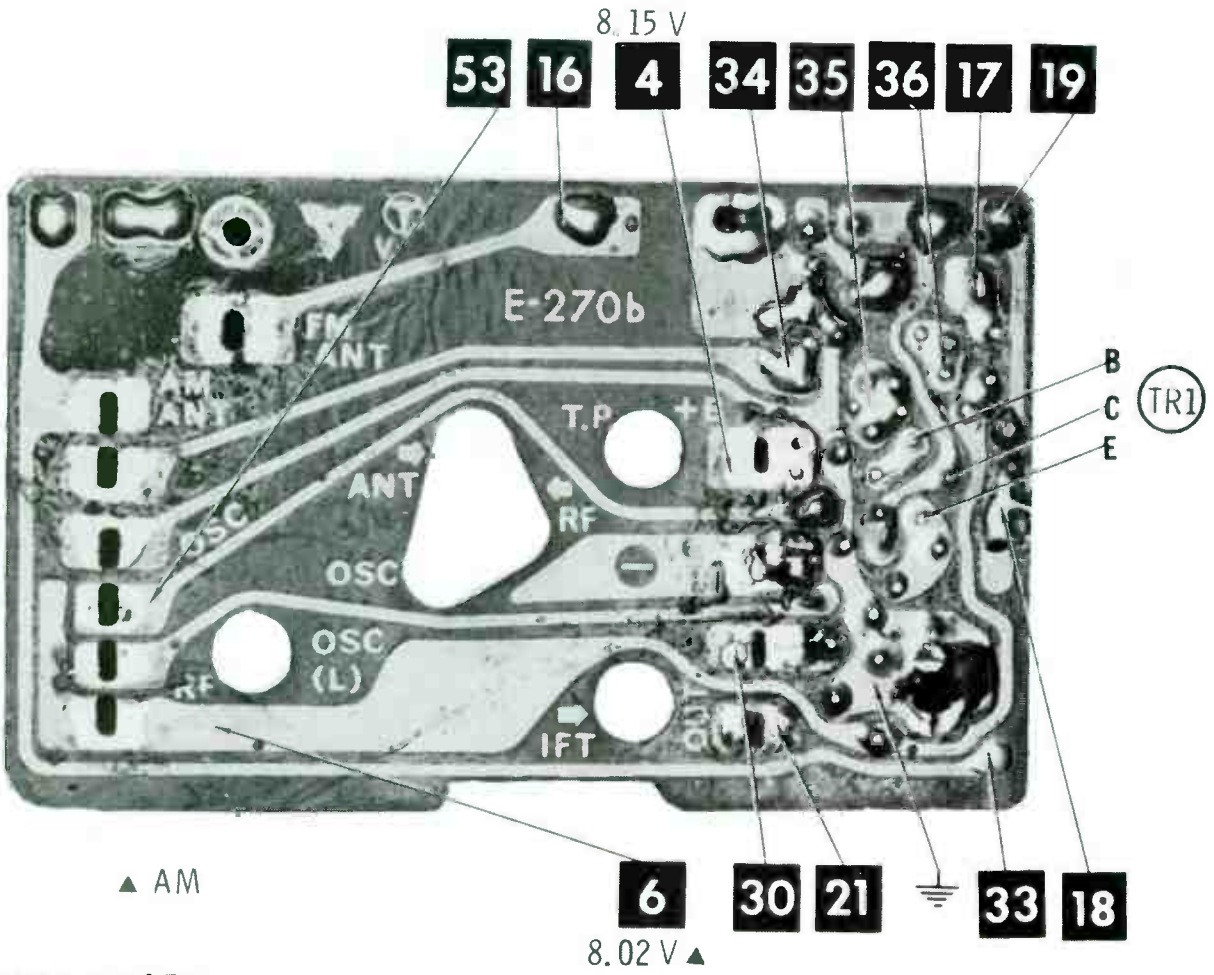


PANASONIC MODEL CQ-969

IND CONTROL AND PREAMP BOARD



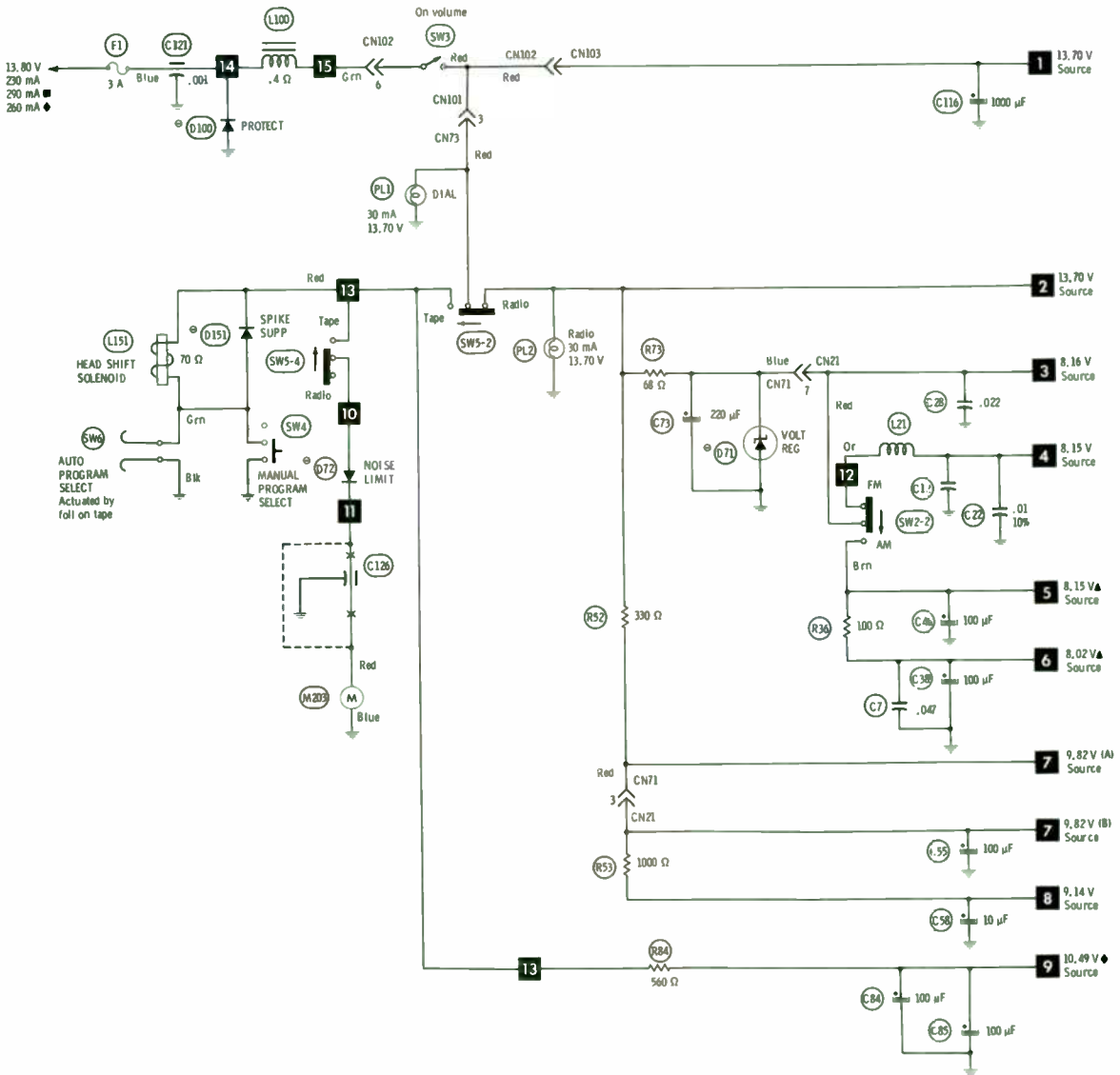
- R5
- C4
- C3
- R2
- C5
- C9
- C8
- C10
- R3
- C11
- C7
- R6
- C6
- C12
- R8
- C1
- R4
- TR1



- 8.15 V
- 53
- 16
- 4
- 34
- 35
- 36
- 17
- 19

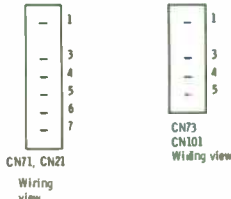
- 6
- 30
- 21
- ⏏
- 33
- 18
- TR1

TUNER BOARD



PANASONIC MODEL CQ-969

Terminal Guides

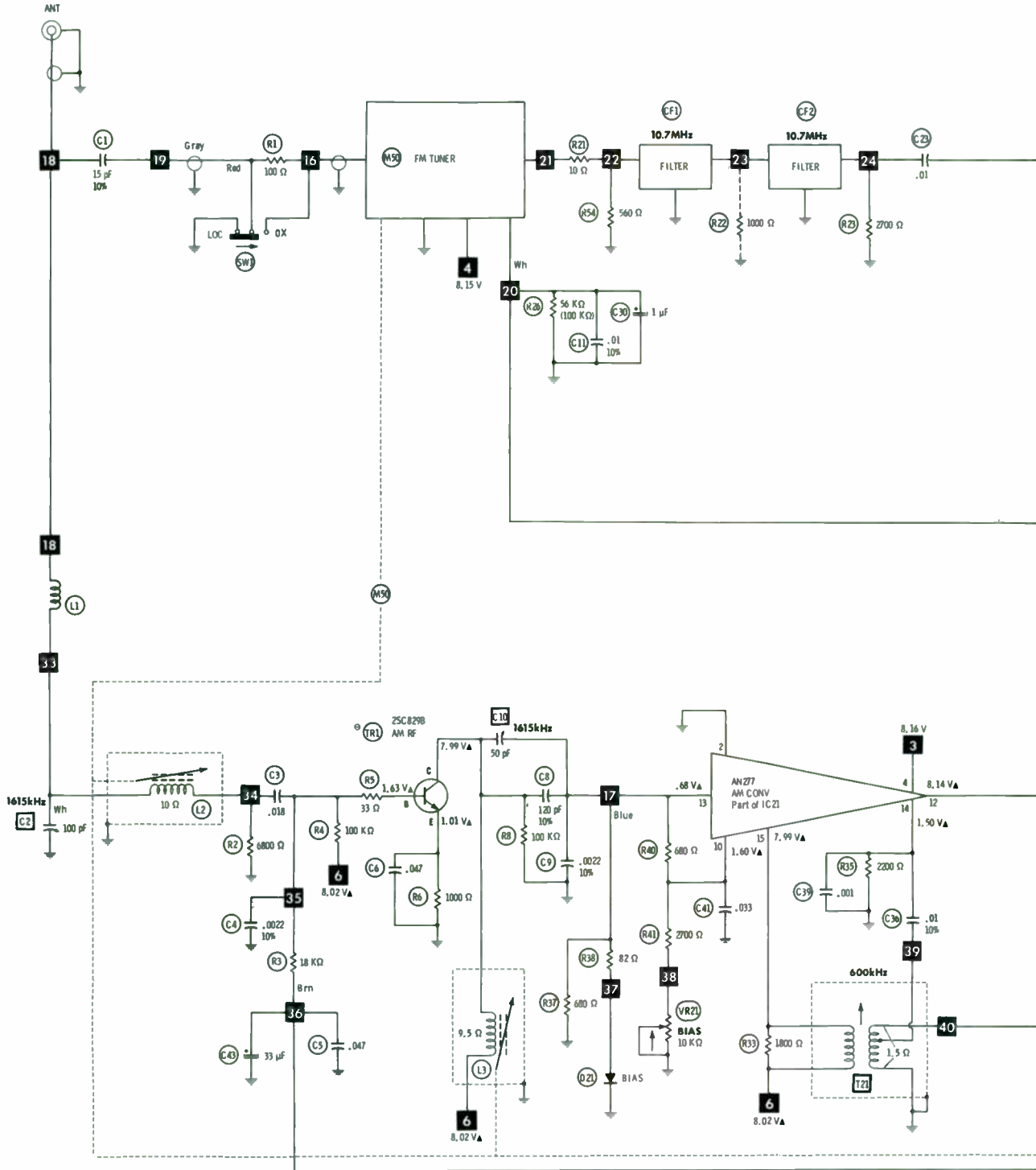


Measurements with switching as shown unless noted:  
 ■ FM Stereo signal ♦ Tape play ▲ AM  
 Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
 Controls adjusted for normal operation.  
 Arrow at control indicates direction of advance.  
 Terminal identification may not be found on unit.  
 Resistors are 1/2W or less, 5% unless noted.  
 Value in ( ) used in some versions.  
 A PHOTOFACIT STANDARD NOTATION SCHEMATIC

- Circuitry not used in same versions
- - - Circuitry used in same versions
- ⊙ See parts list
- \* Nominal value
- ⊥ Ground
- ⏏ Chassis
- ∇ Common tie point

WITH CIRCUITRACE

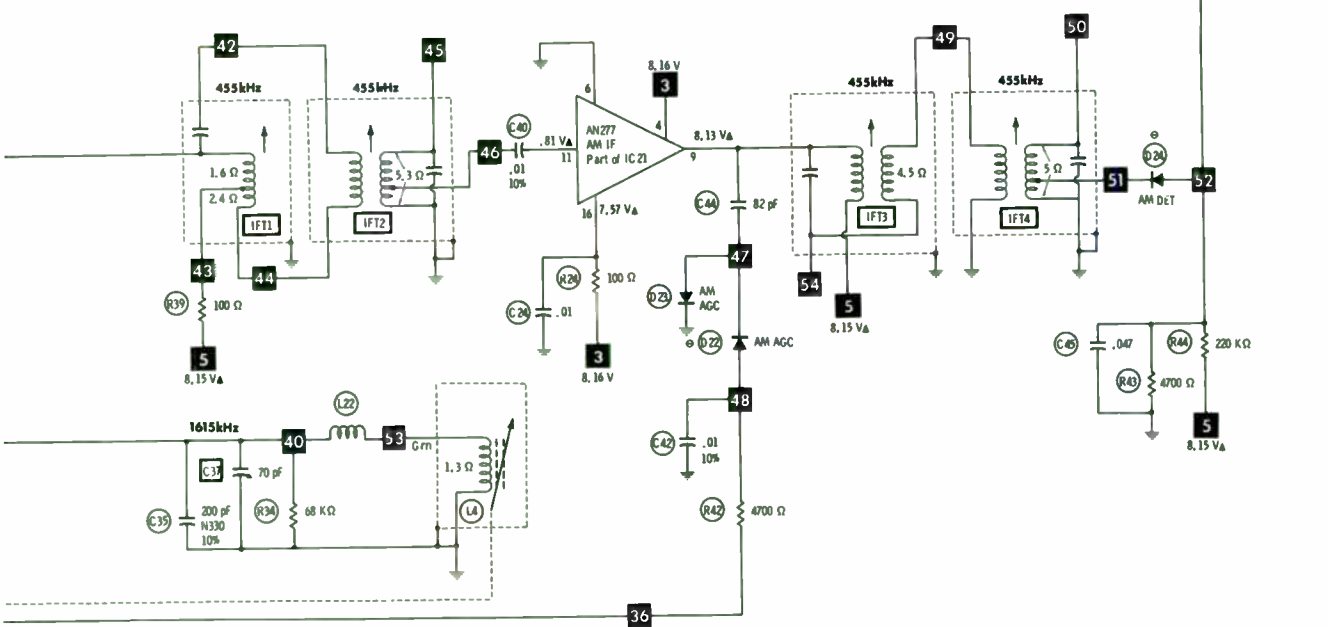
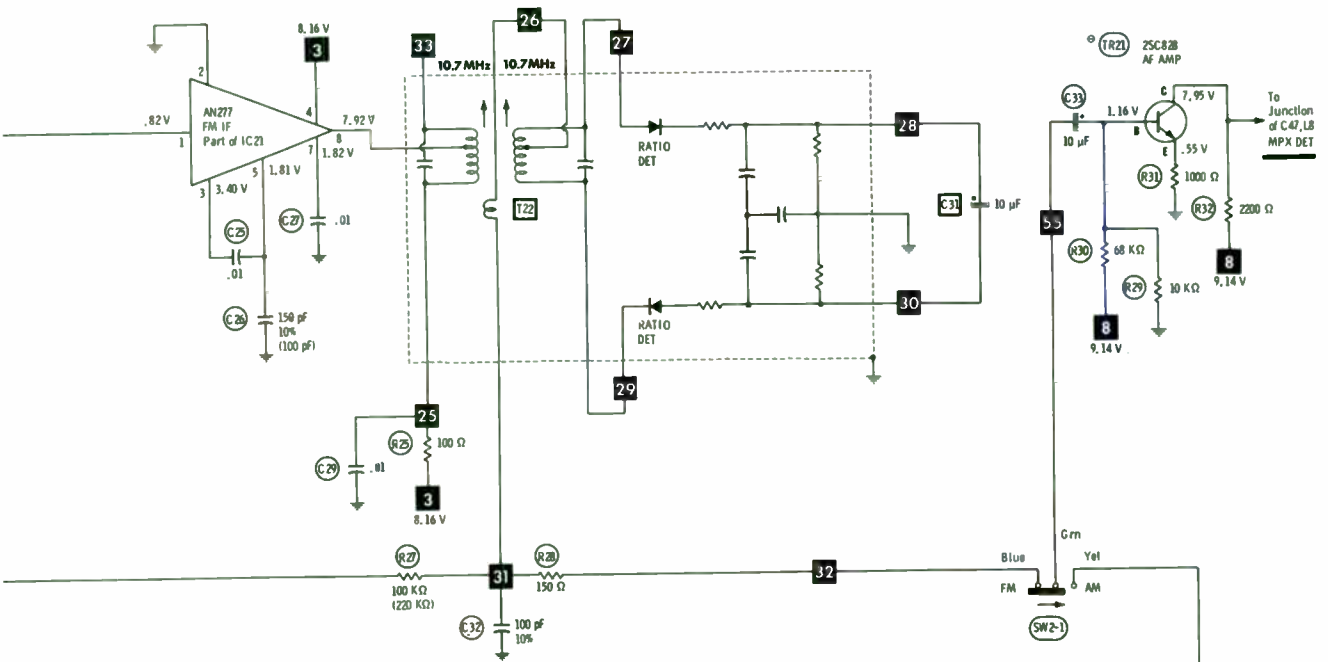
**NOTE: DEMAGNETIZE HEADS AFTER SERVICING**



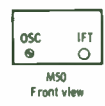
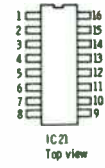
Measurements with switching as shown unless noted:  
 ■ FM Stereo signal    ♦ Tape play    ▲ AM  
 A PHOTOFAC STANDARD NOTATION SCHEMATIC  
 WITH **CIRCUITRACE**  
 © Howard W. Sams & Co., Inc. 1976

Supply voltage maintained as shown at input.  
 Voltages measured with digital meter, no signal.  
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 Terminal identification may not be found on unit.  
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 Value in ( ) used in some versions.

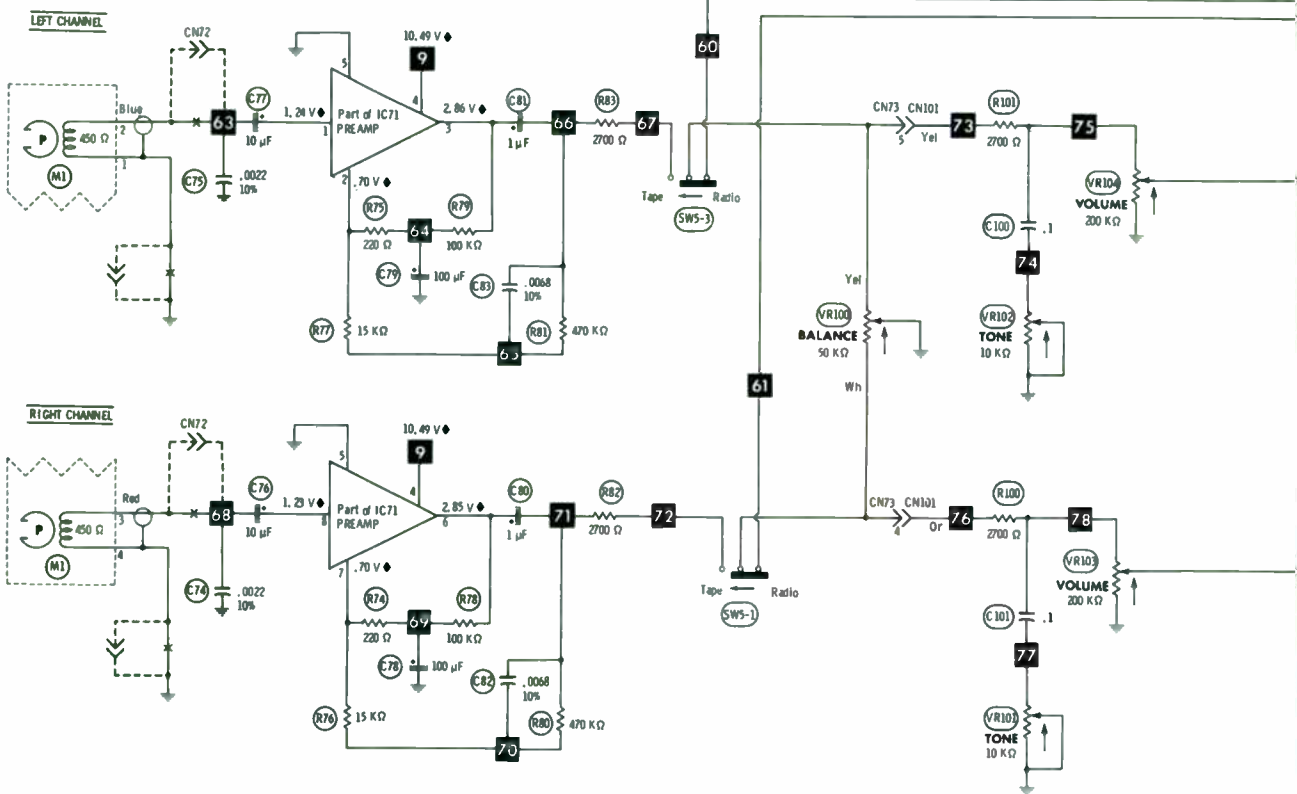
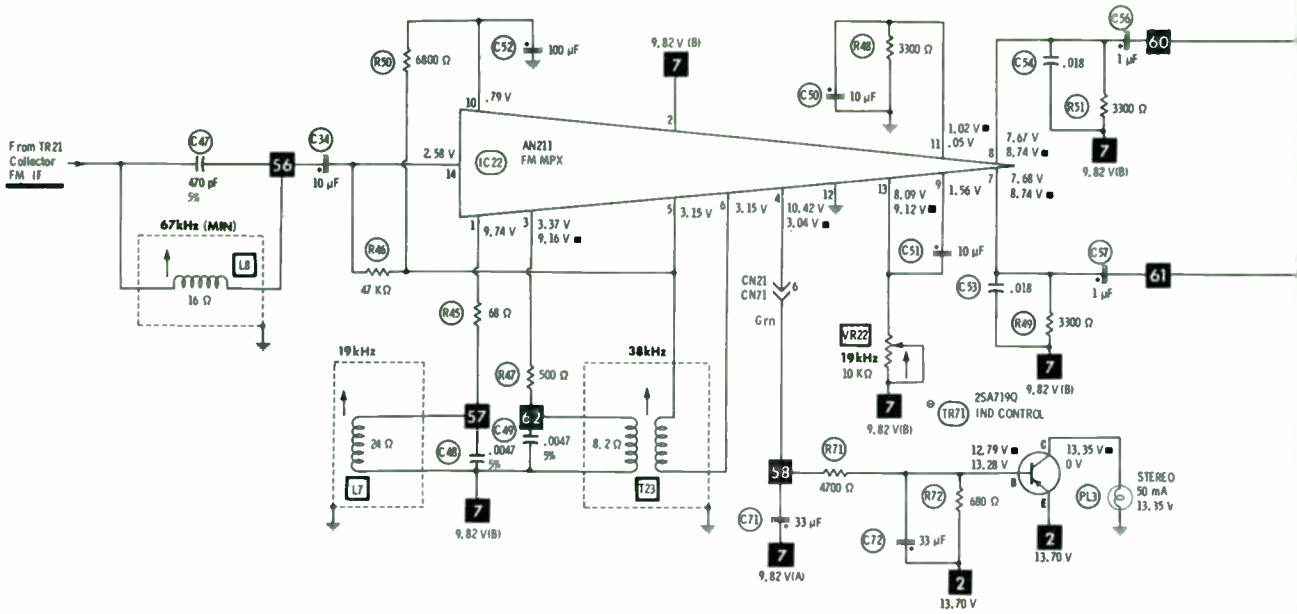
- ✱ Circuitry not used in some versions
- Circuitry used in some versions
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- ⊛ Nominal value
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Terminal Guides



**NOTE: DEMAGNETIZE HEADS AFTER SERVICING**



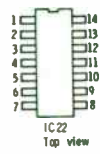
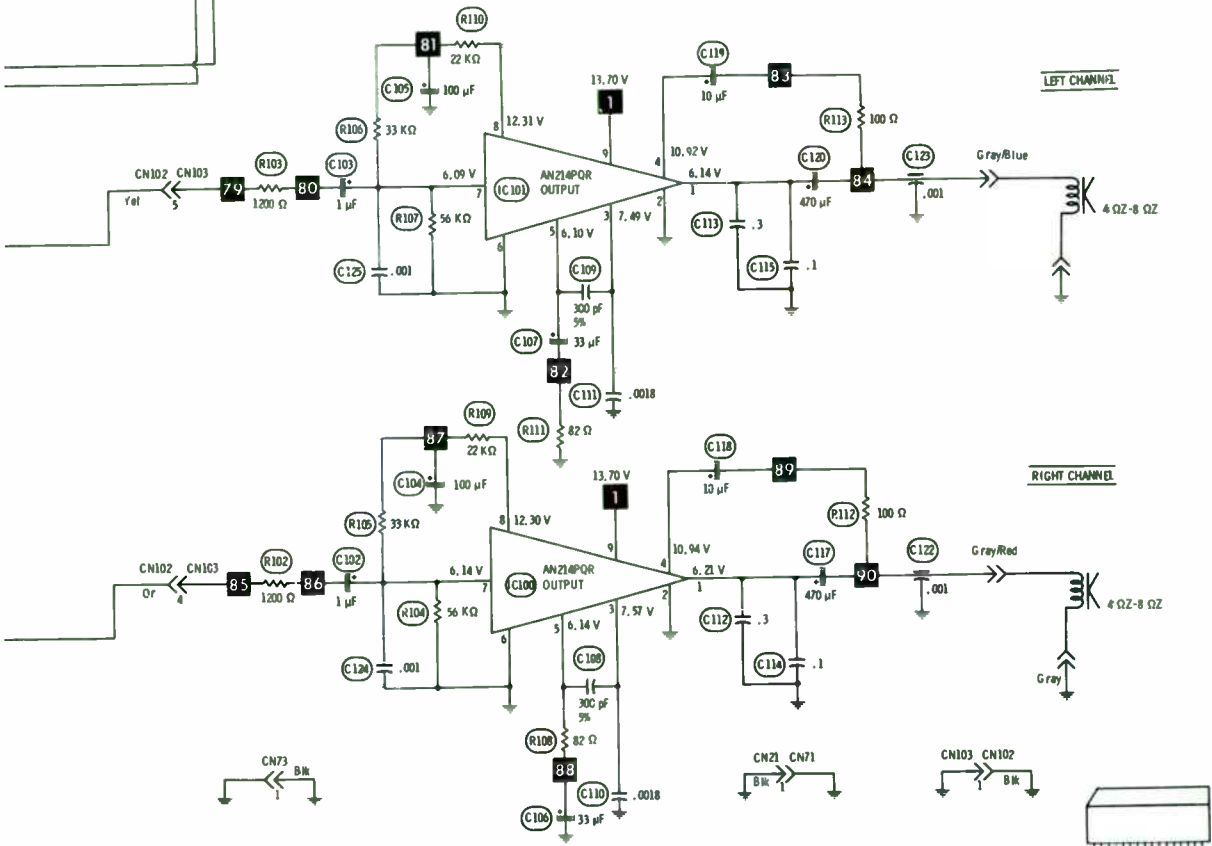
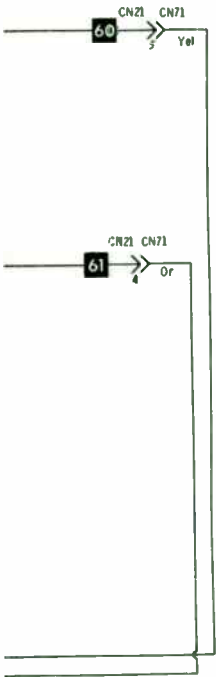
Measurements with switching as shown unless noted:  
 ■ FM Stereo signal    ♦ Tape play    ▲ AM  
 A PHOTOFAC STANDARD NOTATION SCHEMATIC

WITH **CIRCUITRACE**

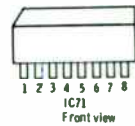
© Howard W. Sams & Co., Inc. 1976

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- ⊕ See parts list
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- ▽ Common tie point



Terminal Guides



# PARTS LIST AND DESCRIPTION

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements. Have your local distributor check Sams COUNTER FACTS® for the most up-to-date replacement.

## SEMICONDUCTORS (Select replacement transistor for best results)

ITEM No.	TYPE No.	MFR. PART No.	REPLACEMENT DATA							
			GENERAL ELECTRIC PART No.	IR WORKMAN PART No.	MALLORY PART No.	MOTOROLA PART No.	RAYTHEON PART No.	RCA PART No.	SPRAGUE PART No.	SYLVANIA PART No.
D21		YAAD010	GE-300	D200	PTC214	HEPR0602	RE 52	SK3100	RT-218	ECG177
D22		YAAD009	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D23		YAAD009	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D24		YAAD009	1N60	1N60	PTC206	HEPR9135	RE 47	SK3088	RT-263	ECG109
D71		YEAD010	GEZD-8.2		Z88.2B		RE 112		RT-257	ECG5072
D72		YAAD004	GE-504A	5A4D	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
D100		YAAD004	GE-504A	5A4D	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
D151		YAAD004	GE-504A	5A4D	PTC201	HEPR0052	RE 49	SK3030	RT-213	ECG116
IC21	AN-277		GEIC-63							ECG116
IC22	AN-211		GEIC-48							ECG1073
IC71		YEAMM5152L								ECG1056
IC100	AN214PQR		GEIC-49		PTC757		RE 338-IC			ECG1058
IC101	AN214PQR		GEIC-49		PTC757		RE 338-IC			ECG1058
TR1	25C829B,C		GE-20	(IR)25C380AO	PTC121	HEPS0015	RE 9	SK3122	RT-308	ECG229
TR21	25C828, RST		GE-20	(IR)25C380AO	PTC121	HEPS0015	RE 9	SK3122	RT-308	ECG229
TR71	2SA719Q		GE-21	TR-28	PTC103	HEPS0012	RE 26	SK3114	RT-126A	ECG159
	2SA564(1)		GE-65	(IR)2SA564A	PTC103	HEPS0019	RE 26	SK3114	RT-303	ECG234

(1) Used in some versions.

## ELECTROLYTIC CAPACITORS

ITEM No.	RATING	REPLACEMENT DATA			
		MFR. PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C30	1 50V	ECEA50V1L	PC1-50	VTT1B63	EV-1615
C31	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C33	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C34	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C38	100 10V	ECEA10V100L	PC100-10	VTT100E10	EV-1130
C43	33 6V	ECEA6V33L	PC30-25	VTT33A10	EV-1125
C46	100 10V	ECEA10V100L	PC100-10	VTT100E10	EV-1130
C50	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C51	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C52	100 6V	ECEA6V100L	PC100-10	MTV100C86	EV-1030
C55	100 10V	ECEA10V100L	PC100-10	VTT100E10	EV-1130
C56	1 50V	ECEA50V1L	PC1-50	VTT1B63	EV-1615
C57	1 50V	ECEA50V1L	PC1-50	VTT1B63	EV-1615
C58	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C71	33 16V	ECEA16V33L	PC30-25	VTT33025	EV-1325
C72	33 6V	ECEA6V33L	PC30-25	VTT33A10	EV-1125
C73	220 16V	ECEB16V220L	WB250-16	TC1502B	TVA-1160.6
C76	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C77	10 16V	ECEA16V10L	PC10-25	VTT10A25	EV-1222
C78	100 6V	ECEA6V100L	PC100-10	MTV100C86	EV-1030
C79	100 6V	ECEA6V100L	PC100-10	MTV100C86	EV-1030
C80	1 50V	ECEA50V1L	PC1-50	VTT1B63	EV-1615
C81	1 50V	ECEA50V1L	PC1-50	VTT1B63	EV-1615
C84	100 10V	ECEA10V100L	PC100-10	VTT100E10	EV-1130
C85	100 10V	ECEA10V100L	PC100-10	VTT100E10	EV-1130
C102	1 50V	ECEA50V1LF	PC1-50	VTT1B63	EV-1615
C103	1 50V	ECEA50V1LF	PC1-50	VTT1B63	EV-1615
C104	100 16V	ECEA16V100L	PC100-16	VTT100F16	EV-1230
C105	100 16V	ECEA16V100L	PC100-16	VTT100F16	EV-1230
C106	33 10V	ECEA10V33LF	PC30-25	VTT33A10	EV-1125
C107	33 10V	ECEA10V33LF	PC30-25	VTT33A10	EV-1125
C116	1000 16V	ECEA16V1000L	PC1000-16	VTT1000L16	EV-1260
C117	470 16V	ECEA16V470Z	PC500-16	VTT470J16	EV-1250
C118	10 16V	ECEA16V10LF	PC10-25	VTT10A25	EV-1222
C119	10 16V	ECEA16V10LF	PC10-25	VTT10A25	EV-1222
C120	470 16V	ECEA16V470Z	PC500-16	VTT470J16	EV-1250

## CAPACITORS

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA			
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.
C1	15 10%	YECTTC35J101	DTZ-15	NP015	CN0415	10TCC-Q15
C2	100 Nominal					
C3	.018					
C4	.0022 10%					
C5	.047					
C6	.047					
C7	.047					
C8	120 10%					
C9	.0022 10%					
C10	50 Nominal					
C11	.01 10%	ECV1Z50X40	DTZ-120	DPMS6D22	M192P1839R8	192P1839R8
C12	.01 10%					
C22	.01 10%					
C23	.01					
C24	.01					
C25	.01					
C26	150 10%					
C27	.01					
C28	.022					
			OC-103	MGP01	TA110	TG-S10
			OC-103	MGP01	TA110	TG-S10
			OD-151		GP315	10TS-T15
			DC-103	MGP01	TA110	TG-S10
				DPMS2S22	EWFA122	1PB-S22



# PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.  
Have your local distributor check Sams COUNTER FACTS<sup>®</sup> for the most up-to-date replacement.

## CAPACITORS (cont)

ITEM No.	RATING	MFR. PART No.	REPLACEMENT DATA							
			CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.				
C29	.01	YECCD05201KS	DC-103 DD-101	MGPO1	TA110	TG-S10				
C32	100 10%			GP100	GP310	10TS-T10				
C35	200 N330 10%			WMF1S1	EWF1A110	*	10TCS-T20			
C36	.01 10%					1PB-S10				
C37	70 Nominal					YECTTH70	DD-820	DPMS6D1	EWF1A210	1PB-D10
C39	.001							EWF1A110	1PB-S10	
C40	.01 10%							DPMS6S33	EWF6133	6PS-S33
C41	.033							WMF1S1	EWF1A110	1PB-S10
C42	.01 10%							CD15FD471J03 CD19FD472J03 CD19FD472J03	GP482	10TS-Q82
C44	82								EWF1A147	1PB-S47
C45	.047	DPMS2S47	SX347						MMA-471	
C47	470 5%	SX247	MWC-472							
C48	.0047 5%	SX247	MWC-472							
C49	.0047 5%	M192P1839R8 M192P1839R8	192P1839R8	192P1839R8						
C53	.018		192P1839R8							
C54	.018		DPMS6D22 DPMS6D22 WMF1D68 WMF1D68	EWF6222	6PS-D22					
C74	.0022 10%			EWF6222	6PS-D22					
C75	.0022 10%			EWF1A268	1PB-D68					
C82	.0068 10%			EWF1A268	1PB-D68					
C83	.0068 10%			UK16-104 UK16-104	MAG1601	HY-650				
C100	.1 12V				MAG1601	HY-650				
C101	.1 12V				CD15FD301J03 CD15FD301J03 DPMS6D2 DPMS6D2	SX330	MMA-301			
C108	300 5%					SX330	MMA-301			
C109	300 5%	PVC622				6PS-D20				
C110	.0018	PVC622				6PS-D20				
C111	.0018	MAG12033 MAG12033 MAG12033 MAG12033 MAG12033 MAG12033 MAG12033 MAG12033 MAG12033 MAG12033	HY-375			HY-375				
C112	.3 12V		HY-375			HY-375				
C113	.3 12V		431P1049R5			431P1049R5				
C114	.1		431P1049R5			431P1049R5				
C115	.1		WMF05P1 WMF05P1	EWF05010		EWF05010				
C121	.001			DPMS6D1 DPMS6D1		EWF1A210	1PB-D10			
C122	.001				EWF1A210	1PB-D10				
C123	.001				YECCCL510277 YECCCL510277 YECCCL510277					
C124	.001									
C125	.001									
C126	.001									

\*Not normally in distributor's stock. Available thru distributor on order to manufacturer.

## CONTROLS (All wattages 1/2 watt, or less, unless listed)

ITEM No.	FUNCTION	RESIST-ANCE	REPLACEMENT DATA				
			MFR. PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	MALLORY PART No.	TRW PART No.
VR21	Bias	10K	EVN-J0AAU00B14	T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)
VR22	19kHz	10K	EVN-J0AAU00B14	T-10K (2)	C-103 (2)	MTC14L1 (2)	X201R103B (2)
VR100	Balance	50K	EVA-LOAS20G54				
VR101	Tone - Right	10K	ENK-MTRS41699				
VR102	Tone - Left/Power Switch	10K	ENK-MTRS43854 (6)				
VR103	Volume - Right	200K					
VR104	Volume - Left Program Selector Switch	200K					

(2) Cut off one of the end terminals and bend to fit PC board.  
(6) Alternate part, may be used in some versions.

## COILS (RF-IF)

ITEM No.	FUNCTION	REPLACEMENT DATA			REMARKS
		PART No.	OTHER IDENTIFICATION	MILLER PART No.	
IFT1	IF (455kHz)	YE1A07S7076A			(1) Part of M50
IFT2	IF (455kHz)	YE1A07S7077B			
IFT3	IF (455kHz)	YE1A07S7078C			
IFT4	IF (455kHz)	YE1A07S7079D			
L1	RF Choke (8.2uH)	YELQ05C040			
L2	AM Antenna	(1)			
L3	AM RF	(1)			
L4	AM Osc Tuning	(1)			
L7	19kHz	YELM07S912			
L8	67kHz Trap	YELM07S913			
L21	RF Choke (3uH)	YELQ09C006		74F335A1	
L22	Image Trap (5.6uH)	YELT06C003			
T21	AM Osc	YELL07S073			
T22	Ratio Detector	EULBFD116A			
T23	38kHz	YELM07S911			

## FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA			NOTES
	CURRENT (Measured)	DC RES.	INDUCTANCE (0 CURRENT 1000~)	MFR. PART No.	THORDARSON PART No.	TRIAD PART No.	
L100	290mA	.4 .4	1.8mH 1.8mH	YETQ031 (1) YETQ020F014(2)			(1) On Unit (2) Alternate

PANASONIC MODEL CQ-969

## PARTS LIST AND DESCRIPTION (CONTINUED)

(When ordering parts, state Model, Part Number, and Description.)

Replacement parts shown may be superseded by the availability of newly introduced replacements.  
Have your local distributor check Sams COUNTER FACTS<sup>®</sup> for the most up-to-date replacement.

### FUSE DEVICES

ITEM No.	DESCRIPTION	REPLACEMENT DATA						
		PART No.		BUSS PART No.		LITTELFUSE PART No.		WORKMAN PART No.
		DEVICE	HOLDER	DEVICE	HOLDER	DEVICE	HOLDER	DEVICE
F1	3A	XBB1F30HR1	YAAJ01038 (Female) YAAJ01039 (Male)	AGC3	HDJ	312003	150145	FG3.2

### MISCELLANEOUS

ITEM No.	PART NAME	PART No.	NOTES
CF1	Ceramic Filter	YEIN09N5004(1)	(10.7MHz)
CF2	Ceramic Filter	YEIN09N5004(1)	(10.7MHz)
L151	Solenoid	YEAX01004	Head Shift
M1	Head	YEAN1482DZ	
M50	Tuner	YEAU01039	
M50-1	Tuner	YEAU01042	FM
M50-2	Tuner	YEAU01043	AM
M203	Motor	YASAK01027	Tape Transport (3000rpm @ 13V DC)
SW1	Switch	YAAS09036	Local/DX
SW2	Switch	YEAS07025	AM/FM Selector
SW3	Switch		Power (On Volume)
SW4	Switch		Manual Program (On Volume)
SW5	Switch	YAAS07012	Radio/Tape
SW6	Switch	YEFX235101	Automatic Program

(1) When replacing, CF1 and CF2 should also be replaced.

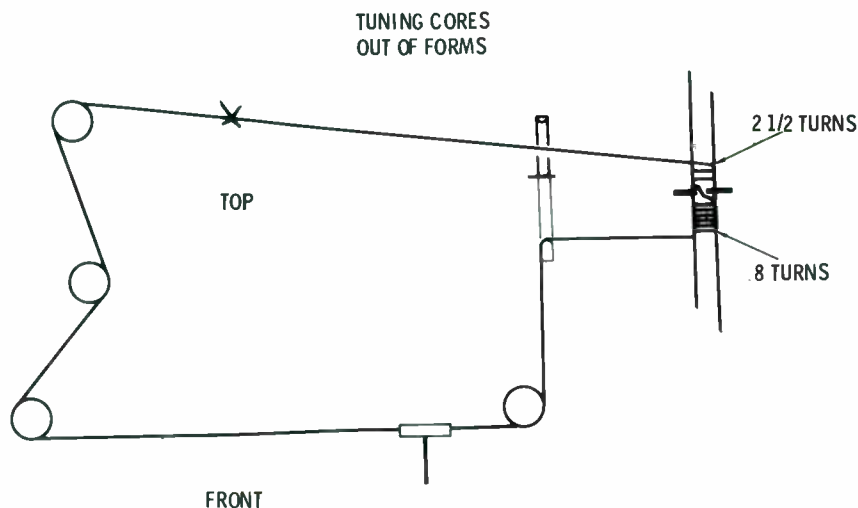
### CABINETS & CABINET PARTS (When ordering specify model, chassis & color)

ITEM	PART No.	ITEM	PART No.
Escutcheon	YEF02144	Pointer, Program	YEFJ02015
Tape Door Ass'y. (Includes Dial Plate and Back Plate)	YEFX002026	Knob, Tuning or Volume	YEFE07027
Tape Door	YEFX002023	Knob, Tone and Dummy	YEFE08024
Tape Door Shaft	YEFW06126	Knob, Balance	YEFE02011
Tape Door Shaft Spring	YEFX005154	Knob, Selector (AM-FM)	YEFE17026
Dial Pointer	YEFH01105	Knob, DX-Local	YEFE17023

### WIRING DATA

General-use Unshielded Hook-up Wire .....	Use BELDEN No. 8530 (Solid) Available in 12 Colors 8524 (Stranded) Available in 12 Colors
Shielded Hook-up Wire .....	Use BELDEN No. 8885
Rear Seat Speaker Extension Cable .....	Use BELDEN No. 8782 (Stranded) Coded Parallel Leads
Bonding Strap .....	Use BELDEN No. 8661 (3/8 In.) or 8670 (3/4 In.)
Ignition Noise Suppression .....	Use BELDEN No. 7300-Series Spark-Plug Sets

### DIAL CORD STRINGING



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DTN-610-FM (Pg. 5)	....93	OL-74-PB	....174	CP-4050 64 Chev.	....28	CP-504N 65 Chev.	....29	ECL-4259 74 Ford	....172	GFL-4294 74 Pont.	....169	
DTN-620-FM (Pg. 5)	....94	OL-75-CXP	....218	CP-4050A 64 Chev.	....37	CP-504N 65 Chev.	....29	ECL-4055 74 Ford	....160	GFP-3733 73 Pont.	....171	
DTN-1200-FM	.....154	OL-75-MXD	....216	CP-4504 64 Chev.	....37	CP-504N 65 Chev.	....29	ECN-5055 69-73 Ford	....159	GPP-4733 74 Pont.	....171	
DTN-1200-PB	.....154	OL-75-QDX	....226	CP-4505 64 Chev.	....37	CP-504N 65 Chev.	....29	EM-29	.....21	GPP-4459 74 Pont.	....170	
DTN-73-FM (Pg. 5)	....137	OL-75-TPX/A	....219	CP-5004N 65 Chev.	....37	CP-6052 66 Chev.	....39	EM-2121	.....119	GXP-3459 73 Pont.	....167	
DTN-73-PB (Pg. 5)	....137	OLF-73-FM-MPX	....181	CP-6052 66 Chev.	....39	CP-825AT 68 Chev.	....60	EM-29	.....119	GXP-3459B 73 Pont.	....170	
DTN-74-FM (Pg. 5)	....137	OLF-73-PB	....174	CPA-3047 63 Chev.	....28	CPA-3047 63 Chev.	....28	EM-29	.....119	GXP-3665 73 Pont.	....165	
DTN-74-MPX	.....177	OLF-74-FM-MPX	....181	CPB-3714 73 Chev.	....171	CPB-3714 73 Chev.	....171	EM-29	.....119	H-4 58 Hillman	....12	
DTN-74-PB (Pg. 5)	....138	OLF-75-CXP	....218	CPB-4542 74 Merc.	....168	CPB-4542 74 Merc.	....168	EM-29	.....119	H-9 58 Hillman	....12	
DTN-75-CXP	.....218	OLF-75-MXD	....216	CPD-4006 74 Merc.	....172	CPL-4006 74 Merc.	....161	F-100 49-50 (Rev.)	....6	H-400 49-50-51	....12	
DTN-75-TPX/A	.....219	OLF-75-QDX	....226	CPL-4006 (UP-2645)	....161	CPL-4006 (UP-2645)	....161	F-128/C 58 Ford	....12	Hudson	.....6	
DVA-73-FM (Pg. 5)	....137	OLF-75-TPX/A	....219	Ford	.....161	Ford	.....161	F-139 59 Ford	....11	HO-3093 72-73	....159	
DVA-73-MPX	.....177	OMA-73-FM (Pg. 21)	....133	ATC-60 59-60 Chev.	....15	CP-370 73 Chev.	....171	F-151 52 Ford (Rev.)	....6	Amer. Motors	.....159	
DVA-74-FM (Pg. 5)	....137	OMA-73-MPX (Pg. 45)	....136	ATC-3127 (APP-2567)	....161	CPV-3013	.....171	F-241 54 Ford	....6	H-1 58 Hillman	....12	
DVA-74-MPX	.....177	OMA-74-PB (Pg. 21)	....136	AUF-2565A	.....172	CPV-3013	.....171	F-322A	.....19	H-15 58 Hillman	....12	
DVA-75-CXP	.....218	OMA-74-FM (Pg. 21)	....136	AUX-2340	.....174	CPV-3013	.....171	F-3016 63 Ford	....23	HRL-4093 74	....174	
DVA-75-TPX/A	.....219	OMA-74-MPX (Pg. 45)	....136	AVA-3105 73 Chev.	....161	CPV-3013	.....171	F-4055 64 Ford	....27	HRL-4093 74	....174	
ECO-73-FM (Pg. 5)	....138	OMA-74-PB (Pg. 21)	....136	BAP-9 59 Buick	....28	CPV-3013	.....171	F-5058N 65 Ford	....36	Amer. Motors	.....159	
ECO-73-MPX	.....177	OPF-71-FM (Sim. to Pg. 5)	....137	BAP-20 60 Buick	....28	CPV-3013	.....171	F-6105P 65/66 Ford	....40	HRX-4444	.....222	
ECO-73-PB (Pg. 5)	....138	OPF-71-PB (Sim. to Pg. 5)	....137	BAP-4530 64 Buick	....28	CPV-3013	.....171	F-6105P 65/66 Ford	....40	IDC-3224	.....222	
ECO-74-FM (Pg. 5)	....137	OPF-71-PB (Sim. to Pg. 5)	....137	BAR-8209 68 Ply.	....60	CPV-3013	.....171	F-6105P 65/66 Ford	....40	IPP-3732 73 Chev.	....171	
ECO-74-MPX	.....177	OPF-75-TPX/A	....219	BBP-2256 72 Buick	....131	CPV-3013	.....171	F-6105P 65/66 Ford	....40	IXP-3445 73 Chev.	....167	
ECO-74-PB (Pg. 5)	....138	OTN-73-FM-MPX	....181	BP-3280 75 Buick	....169	CPV-3013	.....171	F-6105P 65/66 Ford	....40	IXP-3445B 73 Chev.	....167	
ECO-75-CXP	.....218	OTN-73-PB	....173	BP-340 60 Buick	....14	CPV-3013	.....171	F-6105P 65/66 Ford	....40	K-700 51 Henry J	....6	
ECO-75-TPX/A	.....219	OTN-74-FM-MPX	....181	BP-668 57-58 Buick	....12	CPV-3013	.....171	F-6105P 65/66 Ford	....40	KGF-4231 74 V.W.	....172	
ECO-75-MPX	.....177	OTN-74-PB	....174	BP-679 59 Buick	....13	CPV-3013	.....171	F-6105P 65/66 Ford	....40	KOG-4087 (Sim. to Pg. 5)	....159	
FCC-73-FM (Pg. 5)	....137	PAC-75-CXP	....218	BP-3081 63 Buick	....23	CPV-3013	.....171	F-6105P 65/66 Ford	....40	KGX-4418 74 V.W.	....174	
FCC-73-MPX	.....177	PAC-75-TPX/A	....219	BP-3095 (BP-2094D)	....23	CPV-3013	.....171	F-6105P 65/66 Ford	....40	L-559 59 Stude. (EP)	....11	
FCC-74-FM (Pg. 5)	....137	PAT-75-QDX	....226	72 Buick	.....159	CPV-3013	.....171	F-6105P 65/66 Ford	....40	L-559 59 Stude. (LP)	....14	
FCC-74-MPX	.....177	PF-73-FM (Pg. 21)	....136	BP-4050 64 Buick	....28	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LA-448 59 Stude.	....11	
FDT-73-PB	.....174	PF-73-PB (Pg. 21)	....136	BP-7160 66-67 Buick	....62	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LAP-29 59 Stude.	....11	
FDT-74-FM-MPX	.....181	PF-74-FM (Pg. 21)	....136	BUE-4539 74 Buick	....168	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LAP-40 59-60 Stude.	....14	
FDT-74-PB	.....174	PF-74-MPX (Pg. 45)	....136	BUF-4280 74 Buick	....169	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LMA-4127 74 Pont.	....176	
FDT-75-CXP	.....218	PG-73-FM (Pg. 21)	....136	BUL-4095 (Pg. 5)	....159	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LME-4293 74 Pont.	....169	
FDT-75-TPX/A	.....219	PG-74-FM-MPX	....181	BUX-4485 74 Buick	....170	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LME-4527 74 Pont.	....168	
FGA-75-CXP	.....218	PGP-73-FM-MPX	....181	BUX-4682 74 Buick	....177	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LME-4293 74 Pont.	....169	
FGA-75-FDX	.....222	PGP-74-FM (Pg. 21)	....181	BXP-3485 75 Buick	....167	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LML-4028 74 Pont.	....159	
FGA-75-PFX	.....223	PGP-74-PB (Pg. 21)	....181	BXP-3671 73 Buick	....165	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LMP-4737 74 Pont.	....171	
FGA-75-QDX	.....226	PGP-75-CXP	....218	C-12	.....11	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LMX-4487 74 Pont.	....170	
FGA-75-TPX/A	.....219	PGP-75-MXD	....216	C-300	....40-50 (Rev.)	.....2	CPV-3013	.....171	F-6105P 65/66 Ford	....40	LN-929 59 Stude.	....11
FMK-73-FM-MPX	.....181	PGP-75-QDX	....226	C-349 59 Chev.	.....11	CT-356 55-56 Chev.	....13	F-6105P 65/66 Ford	....40	M-15 59 Stude.	....11	
FMK-74-FM-MPX	.....181	PGP-75-TPX/A	....219	C-358-C 58 Chev.	.....12	CT-387 57 Chev.	....12	F-6105P 65/66 Ford	....40	MAP-99 60 Merc. (EP)	....11	
FMK-74-PB	.....174	PGP-75-MXD	....216	C-349 59 Chev.	.....11	CT-4058 64 Merc.	....27	F-6105P 65/66 Ford	....40	MAP-99 60 Merc. (LP)	....11	
FMK-75-CXP	.....218	PGP-75-QDX	....226	C-382AT	.....19	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-3063 63 Merc.	....23	
FMK-75-FDX	.....222	PGP-75-TPX/A	....219	C-382AT 62 Chev. (LP)	....24	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMK-75-FDX	.....222	PO-73-PB	....174	C-3001 63 Chev.	....23	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMK-75-QDX	.....226	PO-74-FM-MPX	....181	C-4049 64 Chev.	....28	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMK-75-TPX/A	.....219	PO-75-CXP	....218	C-4049 64 Chev.	....28	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-73-FM-MPX	.....181	PO-75-MXD	....216	C-5003 65 Chev.	....29	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-73-PB	.....174	PO-75-QDX	....226	C-5003N 65 Chev.	....29	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-74-FM-MPX	.....181	PNV-73-FM (Pg. 21)	....133	C-6051 66 Chev.	....39	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-74-PB	.....174	PNV-73-MPX (Pg. 45)	....136	CA-109 59 Chev.	....11	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-75-CXP	.....218	PNV-73-PB (Pg. 21)	....136	CA-3041 63 Chev.	....23	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMJ-75-TPX/A	.....219	PNV-74-FM (Pg. 21)	....136	CA-4560 63 Chev.	....28	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
FMX-20	.....196	PNV-74-PB (Pg. 21)	....136	CA-4569 64 Chev.	....37	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-73-FM	.....174	PNV-74-MPX (Pg. 45)	....136	CA-5503N 65 Chev.	....37	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-74-FM-MPX	.....181	PNV-74-PB (Pg. 21)	....136	CAE-3064 63 Olds	....23	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-74-PB	.....174	PNV-74-MPX (Pg. 45)	....136	CAP-49 59 Chev.	....14	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-75-CXP	.....218	QD-1000	.....226	CAP-60 59-60 Chev.	....14	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-75-FDX	.....222	TM-2000	.....219	CAP-3042 63 Chev.	....23	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 65/66 Ford	....40	MAP-4561 64 Merc.	....27	
Fo-75-QDX	.....226	TM-2500	.....219	CAP-4550 64 Chev.	....28	CT-4001 (Sim. to Pg. 5)	.....159	F-6105P 6				



BUICK (CONT.)		BUICK (CONT.)		CADILLAC (CONT.)		CARTAPE (CONT.)		CHEVROLET (CONT.)		CHEVROLET (CONT.)	
	VOL.		VOL.		VOL.		VOL.		VOL.		VOL.
34BPB1 73	139	7295614 66	36	15CMN2 (Sim. to Pg. 19)	102	X-8100	119	21BPB2 72	125	91VFM2 69	70
34BPB2 73	144	7295656 66	37	15CT411 71	97	15H3LSC	209	21HPB1 72	112	91VFM1 69	71
34BPT1 73	138	7295664 66	38	25CFMT1/MT2		514FS	211	21HPB2 72	120	91VPM1 69	70
41XPB1, 41XPBK1 74	167	7295674 66	38	(7937005) 72	114			21HPBK1 72	112	91ZPB1 69	59
(Sim. to Pg. 51)		7295684 66	38	25CFP1 (7930015) 72	112			21HPBK2 72	120	985036 61	16
44AFM1 74	175	7295694 66	38	25CMH1/MW2 72	110			21TFP1 72	117	985158 62	17
44AFM2 74	172	7295704 66	38	25CT411 72	112			21TFP2/P3 72	127	985203 62	18
44AFMT1 74	173	7295714 66	36	36CFM1 73	139			21TPB1 72	110	985227 62	18
44AFP1 74	170	7295724 66	44	36GM1 73	144			21TPB2 72	124	985264 62	17
44APB1 74	171	7298904 67	44	36CMN2 73	178			21TT411 72	112	985312 62	18
44APBK1 74	171	7298934 67	43	46CFM1/T2 74	170			21VFM1 72 (Sim. to		985332 62	18
44APPT1 74	169	7298944 67	45	46CFP1 74	175			Pg. 25)	78	985363 62	17
44BFM1 74	175	7298954 67	43	46CMN2 74	178			21VPF1 72	117	985396 63	20
44BFM2 74	172	7298964 67	44	46CMW2 74	179			21VPF2/P3 72	127	985431 63	19
44BFMT1 74	173	7298974 67	45	56CFM1/T2/T3 75	194			21VMPA1/H1 72 (Sim.		985432 63	19
44BFP1 74	170	7302504 68	54	56CFM2 75	213			to Pg. 39)	78	985443 63	19
44BPB1 74	171	7302514 68	50	56CFM1 75	190			21XPB1 72	115	985447 63	19
44BPT1 74	169	7302524 68	51	56GM1/M2 75	192			31APB1 73	137	985449 63	19
50APB1 75	192	7302524-6 B 68	58	66CFP1 76 (Pg. 35)	190			31APB2 73	145	985455 63	19
50APB3 75 (Pg. 29)	192	7302534 68	50	66GM1 76 (Pg. 39)	213			31APBK1 73	137	985471 63	20
50APBK1 75	192	7302544 68	51	95CFM2 69	63			31APBK2 73	145	985672 64	24
50APBK3 75	192	7303994 67	48	95CFM3 69	63			31BFM1 73 (PCB AR-151) 40	140	985686 63	21
50BFM1	192	7303984 A 68	51	95CFP1 69	74			31BFMT2 73	142	985776 64	23
75 (Pg. 103)	188	7306914 69	70	95CFM2 69	74			31BFP1/PK1 73	138	985815 64	24
50BFPMT1/T2 75	151	7306934 69	69	95CFM1 69	63			31BPB1 73	137	985831 64	24
50BFPMT3 75	210	7306964 69	70	95CFM1/T2 75	213			31BPB2 73	145	985832 64	23
50BFPMT1/PK1 75	191	7307554 72	112	95CM1/2	189			31BPBK1 73	139	985875 64	24
(Pg. 103)	191	7313514 (14AFP1) 71	101	95CFM1 69	63			31FMT1 (Pg. 19)	75	985876 64	23
50BPB1	191	7313514 (24AFP1) 72	118	95CFP2 69	74			31FPBT1 (Pg. 57)	74	985921 64	24
50BPB2 75	190	7313514 (24AFP2) 72	129	95CFM1 69	63			31TBP1 (Pg. 47)	124	985958 64	24
50BPB3 75 (Pg. 29)	192	7313604 (14APB1) 71	106	95CFM1 69	63			31TCTP1 (Pg. 47)	124	985996 65	25
50BPBK1	192	7313604 (24APB1) 72	115	95CT411/12 69	71			31XPB1 (Pg. 25)	127	986096 65	25
50BPBK3 75 (Pg. 29)	192	7895851-1 76	229	(7307205) 69	70			31XPB1 73 (Pg. 47)	124	986101 65	29
50BPBT2 75	190	7264165 54	6	990552 66	37			31YF1 (Pg. 25)	78	986113 65	29
50BPBT3 75	215	7264185 54	6	990555 66	37			31YFM1 (Pg. 25)	127	986133 66	38
50BFM1 (Pg. 103)	188	7265825 55	6	7265845 56	6			41APB1	165	986158 66	31
50BPT1/PK1 75	191	7266505 56	6	7266505 56	6			41APBK1 74	165	986186 66	31
(Pg. 103)	191	7266505 57	7	7268035 57	7			41BFM1 74	174	986205 65	31
50HPT1 75	191	7268085 58	8	7270405 58	8			41BFM2 74	169	986206 65	29
51XFP1 75	190	7270555 58	8	7270555 58	8			41BFW1 74	171	986208 65	29
51XFPMT1/T2 75	182	7272505 59	10	7272505 59	10			41BFT1/PK1	168	986209 65	29
51XFP1, 51XFPK1 75	189	7274925 60	12	7274925 60	12			41BPB1 74	165	986245 65	29
51XPB1 75	186	7279615 62	18	7279615 62	18			41BPT1 74	166	986250 65	31
51XBP2/BK2	217	7279615 62	18	7282315 63	19			41BFT1 74 (Pg. 19)	75	986252 65	29
51XBPK1 75	186	7279615 62	18	7283295 63	19			41FPB1 74 (Pg. 17)	101	986281 65	31
51XPBT1 75	193	7283295 63	19	7283295 63	19			41SVPB1 74	167	986330 65	29
54BFP1/M2 75	189	7283295 63	19	7283295 63	19			41TFP1 74 (Pg. 29)	109	986339 65	29
54BFP1, 54BFPK1 75	189	7283295 63	19	7283295 63	19			41XFP1/PK1 75 (Pg. 25)	127	986374 65	29
60APB1/BK1 76 (Pg. 29)	192	7286315 (LP) 63-64	25	7290255 65	31			41XPB1/BK1 74	167	986376 65	29
60BFP1 76 (Pg. 13)	189	7290255 65	31	7290545 65	31			41YF1 74 (Pg. 25)	127	986521 66	38
60BFP1/PK1 76 (Pg. 21)	182	7290545 65	31	7290545 65	31			41YF2 74 (Sim. to		986522 66	36
60BFP1/PK1 76 (Pg. 29)	192	7290545 65	31	7290545 65	31			Pg. 25)	127	986526 66	38
60BFP1 76 (Pg. 57)	191	7293015 66	38	7293015 66	38			50HFM1 75 (Pg. 103)	188	986528 66	36
60HFM1 76	221	7293025 66	38	7293025 66	38			50HFM2 (Sim. to Pg. 47)	221	986529 66	38
60HFM1 76 (Pg. 27)	186	7293025 66	38	7293025 66	38			51F1M3 76	229	986544 66	38
60HFM1/BK1 76 (Pg. 65)	120	7293025 66	38	7293025 66	38			94AFP1 69	70	986545 66	38
60HPT1/T2 76	171	7293025 66	38	7293025 66	38			94APB1 69	61	986546 66	37
60XFM1 76 (Pg. 85)	191	7293025 66	38	7293025 66	38			94BPM1/EFM1 69	67	986546 66	37
60XFP1/PK1 76 (Pg. 85)	189	7293025 66	38	7293025 66	38			94BPM2/EFM2 69	67	986644 66	37
60XBP1/BK1 76 (Pg. 87)	186	7293025 66	38	7293025 66	38			94BFP1 69	62	986668 63	4
61HFMT2 (Sim. to Pg. 47)	221	7293025 66	38	7293025 66	38			94BT1 69	62	986669 63	4
51F1M3 76	229	7293025 66	38	7293025 66	38			94B2 69	68	986731 66	37
94AFP1 69	70	7293025 66	38	7293025 66	38			94BT2 69	68	986769 66	36
94APB1 69	61	7293025 66	38	7293025 66	38			94EFP1 69	70	986771 66	36
94BPM1/EFM1 69	67	7293025 66	38	7293025 66	38			94EPB1 69	62	986789 66	37
94BPM2/EFM2 69	67	7293025 66	38	7293025 66	38			94EPB2 69	62	986807 67	41
94BFP1 69	62	7293025 66	38	7293025 66	38			980051 60	13	986823 67	41
94BFP2 69	62	7293025 66	38	7293025 66	38			980052 60	12	986824 67	42
94BPB1 69	62	7293025 66	38	7293025 66	38			980132 61	15	986835 67	41
94BPT1 69	62	7293025 66	38	7293025 66	38			980134 61	16	986845 67	42
94BT2 69	68	7293025 66	38	7293025 66	38			980135 61	14	986846 67	42
94EFP1 69	70	7293025 66	38	7293025 66	38			980296 62	17	986847/A 67	42
94EPB1 69	62	7293025 66	38	7293025 66	38			980297 62	18	986852 67	43
94EPB2 69	62	7293025 66	38	7293025 66	38			980316 62	19	986853 67	43
980051 60	13	7293025 66	38	7293025 66	38			980462 63	21	986863 67	41
980052 60	12	7293025 66	38	7293025 66	38			980463 63	21	986864 67	41
980132 61	15	7293025 66	38	7293025 66	38			980464 (LP) 63	20	986865 67	43
980134 61	16	7293025 66	38	7293025 66	38			980626 63	21	986868 67	41
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7302721 69	73	7933641 (31APB1)	73.137	724 68	55			OBDS 70-71	92	CF 24)	57
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7303121 68	48	7933641 (51APB1)	75.187	250786 68 (Sim. to				IBBC 71	89	2884631 69	61
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7303201 69	70	7935021 (31APBK1)	73.137	2820635 68	51	3108	91	1BVC 70	94	2884658 70	85
7303211 68	53	7935021 (31APBK2)	73.145	2864724 68	55	3110/A	55	1CH513 75	214	2884749 70	89
7303211 69	70	7935021 (51APBK1)	75.187	2864746 68	55	3116	95	1CH4007 70	90	2884750 70	94
7303231 68	48	7935201 (41APBK1)	74.165	2864924 68	55	3117	89	1CH402 74	180	2884750 72	128
7303241 68	48	7935241 (51APBK1)	75.187	2864966 68	55	3119	90	1CH4405 74	181	2884752 (OBBC) 70	94
7303311 68	48	79356011 (11HPF2)	71.93	2884095 70	83	3120	83	1CH4507 75	195	2884752 (CF75203) 70	88
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		D4AA-19A168-AA 74	183	O4BF 60 (LP)	30	6TBT 66	41	26TRMP2 72	124		
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		D0KA-18810 70 (Sim. to	59	1TMC 61	15	9FBF 69	73	96TT412 69	73	S-100	176
		Fig. 51)	59	1TMS 61	15	9FBF 69	73	96TT412 69	73	S-405	174
		D0LA-19A241 70	79	2B7B 72	114	9FBF 69	73	96TT412 69	73	S-505	213
		D0LA-18806 70	83	2B7T 72	114	9FBF 69	73	96TT412 69	73	S-705A	143
		D0SA-19A241 70	96	2BWT 72 (Sim. to	59	9FBF 69	73	96TT412 69	73	S-900	119
		D0SA-19A242 70	84	Pg. 51)	59	9FBF 69	73	96TT412 69	73	S-900A	178
		D0SA-18806 70	83	2FBF, 2FBFAK 72	127	9FBF 69	73	96TT412 69	73	S-1000	149
		D0TA-18806 (Sim. to	77	2FBO 72	127	9FBF 69	73	96TT412 69	73	S-4001	197
		Fig. 55)	77	2FBT8, 2FBTPAC 72	126	9FBF 69	73	96TT412 69	73	S-4200	187
		D0TJ-18806 (Sim. to	77	2FBZ 72	127	9FBF 69	73	96TT412 69	73	V102	41
		Fig. 55)	77	2FD3 71	104	9FBF 69	73	96TT412 69	73	V302	41
		D0UA-18806 (Sim. to	77	2FD4103 71	104	9FBF 69	73	96TT412 69	73	VX101	41
		Fig. 55)	77	2FD4607 76	223	9FBF 69	73	96TT412 69	73	WAF-609	129
		D0YA-19A243 70	84	2FD4608 76	223	9FBF 69	73	96TT412 69	73	WV-209A	125
		D0ZA-19A241 70	79	2M24101 70	104	9FBF 69	73	96TT412 69	73	WV-509	122
		D0ZA-19A242 70	86	2TBA109 71	102	9FBF 69	73	96TT412 69	73	WV502	122
		D0ZA-18806 70	81	2TBO 62	19	9FBF 69	73	96TT412 69	73	WVX101	41
		D1AA-19A241 70	94	2TMC 62	18	9FBF 69	73	96TT412 69	73	WVX-103	48
		D1AA-19A242-AD 71	104	3MF 53	4	9FBF 69	73	96TT412 69	73	WVX502	42
		D1AA-18806 71	94	3MF 53	4	9FBF 69	73	96TT412 69	73	X100	27
		D1DA-18806 71	94	3MF 53	4	9FBF 69	73	96TT412 69	73	X101	41
		D1DJ-19A241AA 71	108	3SF755 53	4	9FBF 69	73	96TT412 69	73	X102	41
		D1HA-18806 71	94	3TBD 63	19	9FBF 69	73	96TT412 69	73	X-103	48
		D1DA-19A241 71	94	3TBO 63	19	9FBF 69	73	96TT412 69	73	X-302	41
		D1SA-19A242-AB 71	102	3TMC 63	23	9FBF 69	73	96TT412 69	73	X-400	122
		D1TA-18806AB 71	101	4BF 54 (See Model M4B)	4	9FBF 69	73	96TT412 69	73	XFM-304	41
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OLDSMOBILE (CONT.)	VOL.	OLDSMOBILE (CONT.)	VOL.	OLDSMOBILE (CONT.)	VOL.	PANASONIC (CONT.)	VOL.	PLYMOUTH (Also See MoPar)	VOL.	PLYMOUTH (CONT.)	VOL.
03BPM1 70 Olds.....	80	51XPBK1 (7933501).....	186	7294753 982689 66 Olds	36	CR-119EU.....	140	1BVD 71 Valiant		3501328 (1CH4405,	
03BPM2 70 1/2 Olds...	88	51XPBT1, 51XPBT2		7297564 66 Olds	36	CR-143EU.....	138	(Similar to page 45) .	.94	3501328(1CH4507,	.181
03BPB1 70 Olds.....	73	(7932371) 75 Omega.....	193	Reverb. Unit.....	36	CR-501EJA.....	150	2CH1605 76.....	223	5CH4507 75 Fury.....	195
03BT411 70 F-85 & Olds	78	53APB1 (9346723)		7298413 67 Oldsmobile	45	CR-514EU.....	140	2CH2602 76.....	228	3501329 (1CH4402,	
03EFM1 70 Toronado.....	80	75 Cutlass.....	190	7299563 67 F-85.....	43	CR-515EU.....	220	5CH1605 76.....	223	5CH4402) 74 Plymouth.	180
03EFM2 70 1/2 Toronado	88	53APB2 75 Olds		7299573 67 Toronado	45	CR-656EU.....	167	5CH2602 76.....	228	3501329 (1CH4508,	
03EPB1 70 Toronado...	73	(See page 93).....	190	7299583 67 Toronado	42	CR-657EU/658EU.....	217	244 (8BBA,9BBA)		5CH4508)75 Fury.....	192
03ET411 70 Toronado...	78	53APBK1 (9346733)		7300083 67 Toronado	44	CR-700EU.....	139	68-69 Barracuda.....	61	3501376.....	189
03ET412 70 1/2 Toronado	87	75 Cutlass.....	190	7300093 67 Oldsmobile	44	CR-701EU.....	166	245 (8BVA,9BVA)		3501472 76.....	228
13AFM1 (7932753)		53APBK2 75 Olds		7300103 67 Oldsmobile	42	CR-714EU.....	174	68-69 Valiant.....	61	3501501 (1PD2208)	
71 F-85.....	105	(See Page 93).....	190	7300513 67 F-85.....	46	CX-131EU.....	143	250 68 Fury.....	51	72 Barracuda.....	135
13APB1 (7937443)		53BFM1 (9346763)		7300753 67 Toronado	44	CX-325EU.....	151	251 (8BBE,9B8CC)		3501501 (1PD2312)	
71 F-85 & Olds.....	91	75 Cutlass, Olds,		7301703 67 Oldsmobile	46	CX-326EU.....	151	68-69 Belvedere.....	61	73 Barracuda	
13AT411 (7932763)		Toronado.....	188	7302013 68 F-85.....	52	CX-351EU.....	111	384 (8FBFC) 68 Ply.....	58	3501502 (1PF2205)	
71 F-85.....	107	53BFMT1		7302023 68 Olds,F-85	50	CX-375EU.....	177	388 (8FBCC) 68		72 Fury.....	135
13BFM1 (7930033).....	98	(9346783) 85 Cutlass,		7302503 67 Toronado	46	CX-385EU.....	221	Belvedere.....	58	3501502 (1PF2310)	
13BFM2 71 Olds,		Oldsmobile, Toronado.....	193	7303143 68 Oldsmobile	51	CX-475EU.....	183	390 68 Fury.....	55	3501503 (1PD2207)	
Toronado.....	98	53BFMT2		7303153 68 Oldsmobile	49	CX-568EU.....	172	398 (8FBBA).....		3501505 (1PD2207)	
13BFMT1 (7930063)		(9346783) 85 Cutlass,		7303203 68 Toronado	49	(Similar to page 95).....	172	Barracuda.....	58	3501506 (1PD1207)	
71 Olds & Toronado...	97	53BFM1 (9346743)		7303223 68 Toronado	49	CR-601EU (PCB).....	144	399 (8FBVA) 68 Valiant	58	3501506 (1PD1207)	
13BFMT2 (7930063)		53BFM2 (9346753)		7303253 68 Toronado	51	CX-601EU.....	144	2864 515 (88BD,9BDD)		3501506 (1PD1207)	
71-1/2 Olds, Toronado.....	117	75 Cutlass, Oldsmobile,		7305203 68 Oldsmobile,		CX-601EU (PCB).....	176	68-69 Barracuda (Simi-		72 Barracuda.....	131
13BPB2 (7930013) 71		Toronado.....	191	7305933 68 Olds, F-85	50	CX-675EU.....	181	lar to page 93).....	61	3501506 (1PD1313)	
Olds & Toronado.....	101	53BPB1 (9346703)		7307313 69, 69 1/2		CX-7775U.....	99	2864 527 (8BVA, 9BVA)		73 Barracuda.....	156
13BPBT1 (7930053)		Toronado.....	190	7307813 69 69 1/2		CX-8075U.....	66	68-69 Valiant (Similar		3501507 (1PD1208)	
71 Olds, Toronado.....	96	53BPB2 75 Olds		Toronado.....	74	CX-830EU.....	111	to page 93).....	61	3501508 (1PF1206)	
13BPBT2 (7930053)		(See Page 93).....	190	7895851-1 76.....	229	CX-880EU (PCB).....	164	2864 756 (8FBPD) 68		3501508 (1PF1312)	
71 1/2 Olds, Toronado.....	118	53PBK1 (9346713)		7933244.....	217	CR-880EU.....	95	Fury (Similar to		3501521 (1PD2209)	
23AFM1 (7935013) 72		75 Oldsmobile,		7933401.....	217			page 41).....	58	72 Fury.....	133
F-85.....	112	53PBK2 75 P,ds		7934001.....	217			2864 767 (8BBE, 9B8CC)		3501521 (1PD2209)	
23AFP1 (7938303)		(See page 93).....	190	9346783.....	219			68-69 Belvedere (Simi-		3501521 (2DP2313)	
72 F-85.....	115	53PBPT1/T2 (9346773)		9347740 76.....	221			lar to page 93).....	61	73 Fury.....	159
23AFP2/P3 (7938303).....	128	75 Cutlass, Oldsmobile,		9349780 75-76.....	220			2864963 (390) 68		3501622 (1PD1506,	
23APB1 (7935003)		Toronado.....	195					Belvedere, Fury.....	55	2PD1506, SPD1506)	
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23APB2 (7935003)		75 Cutlass, Olds,						Belvedere, Fury.....	55	3501622 (2PD1306)	
72 F-85.....	128	Toronado.....	210					2884 056 (8FBBA)		73 Valiant.....	157
23AT411 (7937413) 72		60BFM1 76 (Pg.13).....	189					68 Valiant (Similar		3501623 (1PD2307)	
F-85.....	112	60BFF1/PK1 76 (Pg.21)	188					to page 41).....	58	3501623 (1PD2307)	
23BFM1 (7935033)		60BFP1/BK1 76 (Pg.29)	192					2884 057 (8FBVA, 9BVA)		3501623 (1PD2509),	
72 Olds, Toronado.....	110	60HFM1 76 (Pg.57).....	191					68-69 Barracuda (Simi-		2PD2509, SPD2509)	
23BFM1 (7938313)		60HFM2 76.....	221					lar to page 41).....	58	75 Duster, Valiant.....	194
72 Olds, Toronado.....	114	60HFP1/PK1 76 (Pg.27)	186					2884 063 (8FBCC) 68		3501625 (1PD2308)	
23BPB1 (7935023)		60HFT1/T2 76 (Pg.25)	220					Belvedere (Similar		3501633 (1PD2349)	
72 Olds, Toronado.....	115	60KFM1 76 (Pg.85).....	191					to page 41).....	58	73 Barracuda.....	158
23BPB2 (7935023)		60KFP1/PK1 76 (Pg.85)	191					2884065 (250) 68 Fury		73 Fury.....	158
72 Olds, Toronado.....	125	60KP1/BK1 76 (Pg.87)	186					2884 101 (CF10103)			
23BPBT1 (7935063)		61HFM2 (Sim.to Pg.47)	221					70 Fury.....			
72 Olds & Toronado.....	118	61HFM3 76.....	229					2884103 (254) 69 Fury			
23AFM1 (7937983)		63AFM1 76 (Pg.103).....	188					2884 610 (CF61003)			
73 F-85 (PCB AR-151).....	139	63AFP1/PK1 76 (Pg.103)	189					70 Barracuda.....			
23AFM1 (7935053)		63APB1/BK1 76 (Pg.93)	190					2884631 69 Plymouth.....	61		
73 F-85.....	145	93AFM1/M2 69 F-85.....	68					2884 633 (1CH4007)			
23AFM2 (7935053)		93AFP1 (7307863)						70 Belvedere.....			
73 F-85.....	144	69 F-85.....	70					2884 649 (OBDS)			
23AFP1 (7938323)		93APB1 69 F-85.....	63					70 Valiant Duster.....			
73 F-85.....	146	93BFM1/M2 69 Olds.....	68					2884658 (CF65803)			
23AFP2 (9342563)		93BFM1 (7307313)						70 Barracuda.....			
73 F-85.....	146	69 Olds.....	74					2884 748 (CF74803)			
23APB1 (7936143)		93BFM2 (7307313)						70 Fury.....			
73 F-85.....	142	93BPB1/2 (7307303) 69	71					2884 755 (CF75503)			
23APB2 (7936143)		93BT41 69 F-85, Olds	69					70 Fury.....			
73 F-85.....	142	93BT412 69 1/2 F-85,	69					2884750 (1PD1211,			
23APB1 (7938003)		Olds.....	69					2PD1211) 72 Valiant.....			
73 F-85.....	142	93EFM1/M2 69						2884 752 (OB8CC)			
23APBK1 (7938003)		Toronado M/AC.....	68					Belvedere.....			
73 F-85.....	142	93EFM1/M2 69						2884 753 (1DC2002)			
23APBK2 (7938003)		94LFB1 69.....	192					70 Plymouth.....			
73 F-85.....	142	93EPM1/W/HR.....	68					2884 755 (CF75503)			
23APBT1 (7935043)		93EPM1 (7307813)						70 Fury.....			
73 F-85.....	140	69 Toronado.....	74					2884 755 (2PF1007)			
23BFM1 (7937953)		93EFT2 (7307813)						Fury 70.....			
73 Olds, Toronado		69 1/2 Toronado.....	74					2884 759 (OB8J, 1B8J)			
(PCB AR-151).....	139	93EPB1 (7308203)						70-71 Barracuda.....			
23BFM2 (7937973)		69 Toronado.....	71					2884759 (2PD1212)			
73 Olds, Toronado.....	145	93ET411 69 Toronado	69					72 Barracuda.....			
23BFMT2 (7937973)		93ET412 69 1/2	69					2884759 (2PD1315)			
73 Olds, Toronado.....	144	Toronado.....	69					73 Barracuda.....			
23BPB1 (7938333)		982029 62.....	17					2884 795 (CF79503)			
73 Olds, Toronado.....	146	982030 62.....	18					70 Fury.....			
23BPB1 (7937943)		982136 63.....	19					3420558 (1PF2903)			
73 Olds, Toronado.....	142	982137 63.....	20					69 Fury.....			
23BPB2 (7937943)		982149 63 F-85.....	20					5420 888 (1PF2009)			
73 Olds, Toronado.....	147	982212 63.....	21					70 Plymouth.....			
23BPBT1 (7937963)		982249 64.....	25					501 013 (1BC)			
73 Olds, Toronado.....	140	982250 64.....	25					71 Coronet, Satellite.....			
41XPB1, 41XPBK1		982251 64.....	25					3501013 (CG01303)			
74 Omega (Similar to		982252 64 F-85.....	25					71 Belvedere.....			
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43APB1 (9343283),		983004 53.....	4					2PD1209) 72 Satellite.....			
43APBK1 (9343303)		983090 54.....	5					3501013			
74 Cutlass.....	173	983091 54.....	5					73 Satellite (Similar			
43BFM1 (9343343) 74		983204 55.....	5					to page 73).....			
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Toronado.....	171	983334 56.....	6					73 Satellite.....			
43BFMT1 (9343363) 74		983336 56.....	6					3501013 (74 Satellite).....			
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43BFP1 (9343323) 74		989002 57.....	7					71 Belvedere.....			
Cutlass, Olds,		989127 58.....	7					3501156 (2PF1203)			
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43BFPK1 (9343333) 74		989129 58.....	8					73 Fury.....			
Cutlass, Olds,		989131 58.....	8					3501231 (1CH1401,			
Toronado.....	176	989170 59.....	10					2CH1401, SCH1401)			
43BPB1 (9343293),		989171 59.....	11					74 Fury.....			
43BPBK1 (9343313)		989272 60.....	12					3501232/33/34			
74 Olds, Toronado.....	173	989387 61 F-85.....	15					74 Fury.....			
43BPBT1 (9343353)		989392 61.....	15					3501237 74 Fury.....			
74 Cutlass, Olds,		989393.....	14					3501239 (1CH2402,			
Toronado.....	172	989393.....	14					2CH2402, SCH2402)			
50HPBT1 75.....	220	7284893.....	22					74 Plymouth.....			
51XFM1 (7933261)		7289313 65 Oldsmobile	30								
75 Omega.....	191	7289333 65.....	31								
51XFM1, 51XFM2		7289353 65.....	31								
(7933281) 75 Omega.....	192	7289373 982687 66 F-85	35								
51XFP1 (7933251),		7291063 65 F-85.....	30								
51XFPK1 (7933511)		7292643 66 Toronado.....	37								
75 Omega.....	189	7292663 66 Oldsmobile	39								
51XPB1 (7933241).....	186	7293653 982690 66 Olds	38								
51XPB2/BK2.....	217	7294743 982688 66 Old									

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12BPB2 (7930012)		22GFP3 (See Page 89)	120	42GPBK3 74 Grand Prix		92FFBI 69 Beaumont,		1VM2323 (Sapphire XIX)		TC-200PB	23
12BPBK2 (7930202)		22GFPK1, 22GFPK2,		(See Page 85)	175	Firebird, Tempest	66	73 911, 914	154	TC-200-PB	32
71 Pontiac	105	22GFPK3 (7312942)	120	50HPBT 75	220	92CFMI, 92CFM2	66	1VM2335 (Sapphire XXV)		TC-300M 64 VW	23
12BPBT1 (7930242)		72 Grand Prix		51APB1 (7935641),		69 Grand Prix	66	73 914	181	Similar to page 144	23
71 Pontiac	101	22GFP (7307332)	120	51APB1 (7935021)		92GPM3 Grand Prix	69	1VM2427 74 911T, 914	199	TC-300M, MD 65 Prod.	23
12BPBT2 (7930242)		22GPB (7307332)	114	75 Astre	187	92GPF1 (7307432) 69		1VM3401 74 914	193	TC-300M 5-041	36
71-1/2 Pontiac	117	72 Grand Prix		51BPM1, 51BPM2		Grand Prix	69	1VM4112 (Sapphire XXII)		TC-400PB 64 VW	23
12BT411 (7934782)		22GPB2 (7307332)		(7314211) 75 Astre	191	92GPF2 69 Grand Prix		71 911, 911T, 914	124	TC-400PB 65 Prod.	23
71 Pontiac	97	22GPBK2 (7312912)		51BPM1 (7936011),		(Similar to page 93)	64	1VM4309 (Sapphire XXI)		Similar to page 144	23
12FFM1 (7313542)		72 Grand Prix	126	51BPM1 (7933301)		92GFP6 69 1/2		73 914	179	TRM-604	23
71 Firebird	106	22XT411(7936232) 72		75 Astre	186	Grand Prix		1VM4412, SVM4412		TRT	52
12FFP1 (7313532)		Ventura II	112	51XFM1 (7933261)		(Similar to page 63)	69	74 911, 914	201	VW-64PB 64 VW	23
71 Firebird	97	32AFM1 (7935042)		75 Ventura II	191	92GPM1 (7307332)		74 914	191	51T (100007-253)	208
12FFP1 (7313532)		73 Grand Prix, Tempest. 144		51XFM1, 51XFM2		69 Grand Prix	72	74 914	191	53T (Ch. 100007-255)	213
71-1/2 Firebird	120	32AFM2 73 GP, Tempest. 154		(7933281) 75 Ventura		92GPG6 69 1/2		5VM1327 (Sapphire XVIII)		54T	220
12FFPK1 (7313562)		32AFM3 73 GP, Tempest. 154		II	193	Grand Prix		5VM1327 73 914	155	77T (Ch. 100017-219)	212
71 Firebird	97	32AFM1 (7935102)		51XFP1 (7933251)		(Similar to page 89)	72	5VM1419 (Sapphire		86T	216
12FFPK1 (7313562)		73 Grand Prix, Tempest. 152		51XFP1 (7933511)		983578 62	17	XVIII) 74 914	192	93MPX	217
71-1/2 Firebird	120	32AFM2 (7935102)		75 Ventura II	189	983579 62	18				
12FP31 (7313522)		73 Grand Prix, Tempest. 148		51XPM1 (7933241)		983687 62	20				
71 Firebird	98	32AFP1 (7935022),		51XB2/BK2	186	98373 63	20				
12FPBK1 (7313552)		32AFP2 (9340432)		51XB2/BK2	217	98373A Similar to					
71 Firebird	98	73 Grand Prix, Tempest. 149		51XPM1 (7935011)		page 105 63 Pontiac	24				
12FT451 (7930492)		32AFP1 (7935032)		75 Ventura II	186	983874 63 Tempest	19				
71 Firebird (Console).	97	73 Grand Prix, Tempest. 137		51XPBT1, 51XPBT2		983875 63	21				
12GFM1 (7312332)		32AFP2 (9340432)		(7933271) 75		983945 63	21				
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12GFP1 (7307432)		32APB1 (7935002)		52AFM1 (9340452)		984076 64	23				
71 Grand Prix	97	73 Grand Prix, Tempest. 140		75 Grand Prix, LeMans	190	984077 64 Pontiac	24				
12GFP1 (7307432)		32APB2 (7935002)		52AFM1, 52AFM2		984078 64 Pontiac	24				
71-1/2 Grand Prix	120	32APBK1 (7935012)		(7935102) 75 Grand		984078 64 Pontiac	24				
12GFP1 (7312942)		73 Grand Prix, Tempest. 140		Prix, LeMans	187	984823 67 1/2					
71-1/2 Grand Prix	120	32APBK2 (7935012)		Prix, LeMans	187	Firebird	46				
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12GPBK1 (7312912)		73 Grand Prix, Tempest. 145		52AFP1 (9340442)		984817 53-54	4				
71 Grand Prix	98	32BPM1 (7939142)		75 Grand Prix, LeMans 189		984961 55	5				
12IAMI (7933261)		73 Pontiac	144	52APB1 (7935002)		98568 56 See 984961	5				
72 Ventura II	113	32BPM2 (7939162)		52APBK1 (9347172)		98569 56	6				
12IAP1 (7933251)		75 LeMans	193	75 LeMans	193	98571 57	7				
72 Ventura II	120	32BMT2 (7939162)		52APBT1, 52APBT2		98573 57	7				
12IAPK1 (7933511)		73 Pontiac	148	(793502) 75 Grand		98822 58	8				
72 Ventura II	120	32BEP1 (7939122),		Prix, LeMans	192	98823 58	8				
12IAPB1 (7932441)		32BEP2 (7939132)		52APBT3 75	213	98837 58	8				
71 Pontiac	106	73 Pontiac	137	52BPM1 (9343502)		98879 59	10				
12IAPB2 (7932441)		32BPM1 (7939102)		75 Pontiac	190	98879 59	11				
71 Pontiac	98	73 Pontiac	140	52BPM1, 52BPM2		98879 59	11				
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72 Ventura II	126	32BPBK1 (7939112),		Prix, LeMans	187	98916 60	13				
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72 Ventura II	115	32BPBK2 (7939112)		52BPM1 (934482)		98969 61	14				
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72 Ventura II	117	32BPT1 (7939152)		75 Pontiac	189	98981 61 Tempest	15				
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72 Tempest	113	32BPM2 (7939152)		52BPM2 (7939112)		728474 42	22				
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72 Tempest	120	32FP1 (Pg. 81)	113	52BPM1, 52BPM2		728752 65 Pontiac	29				
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CX-362T (86260-20030) Corona	.180	DC4055	106			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
CX-363FUT (86021-21030) Van	.180	DC4056	93			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
SS-90 Series Ten	.180	DC4060	160			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
SS-90A	.41	DC4200	18			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
TO-71-FM	.135	DC4203	26			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
TO-71-HPX 73 Corolla, Corona	.156	DC4203B	31			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
73 Corolla, Corona/ TO-71-PB Corolla/ Corona	.135	DC4203C	35			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
08600-20010 Corona	.41	DC4205B	18			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
08600-30010 Crown	.41	DC4205C	18			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
08600-35010 Stout	.41	DC42068	18			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
08600-60010 Landcruiser	.41	DC4208	23			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
08690-00010 (CS11102/TM2)	.57	DC4603	39			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
81120-22080 (CR-582FUT/FCT)	.150	DC4606	39			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
Corona Mark II	.150	DC5554	183			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86011-22110	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86011-23020	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86021-22030	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86021-22051	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-20090 (CR-127FT) Carina	.114	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-20110 (CR-528FT) Corona	.117	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-22010 (RT-60DFT)	.122	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-22040 (RT-60LPT) Corona Mark II	.115	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-22050 (CR-201FUT/FCT)	.146	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86120-22110	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86260-14010 (CX-165FTB) Carina	.114	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86260-20011 (CX-161FTB) Corona	.114	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86260-22010 (CX-171FUT) Corona Mark II	.146	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86260-22020	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
86260-22021	.214	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
TRIUMPH		DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
R2BT4 0-01000 62	.19	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
2FBPT (2FBP)	.129	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
72 Triumph	.26	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
4BTBR V-350	.33	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
5BTR V-350 65 Triumph	.33	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
5BTRP V-350DP 65 Triumph	.33	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
6BTR 66 Triumph	.39	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
6SMTR 66 TR-4, Herald 200 and Spitfire 4	.51	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
7BTR Similar to page 125	.39	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
7BTR 67 Triumph	.49	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
7BTRX 67	.53	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
7SMTR 67 TR-4, Herald 1200 and Spitfire 4	.51	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
8BTR 68 GT-6, Spitfire 4, TR-250	.64	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
9BTR 69, 9BTRA 69 GT-6, TR-6, Spitfire 9BTRB 69 MBG, MG Midget, Austin American (Sim- ilar to page 107)	.64	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
9BTR 69	.113	DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
TRUETONE		DC5560	184			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4118, B	.4	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4320	.4	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4320B	.4	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4321, A	.4	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4425B	.5	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4426A	5	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4623A	7	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4624A	7	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4625A	7	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
D4726A	7	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
04826A	7	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia	40		
DC4050	72	DC4700A	178			VW4119 (Sapphire XXI) 75 Custom Beetle, Dasher, Karmann Ghia, Super Beetle, Trans-	179	68VM 66 Sedan ..... 37 68V3 66 Type 3 ..... 37 68V6 66 Karmann Ghia			



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