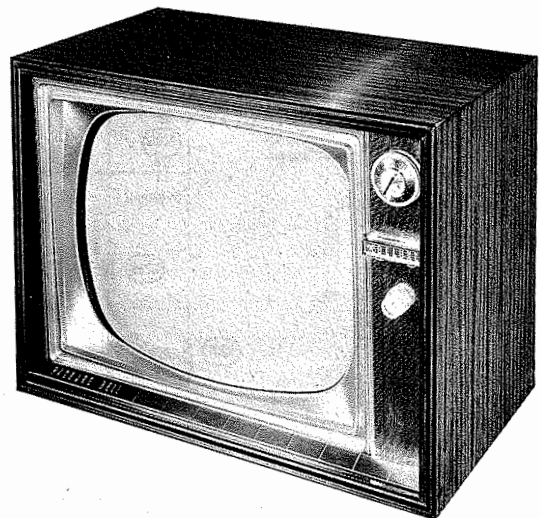




DISASSEMBLY INSTRUCTIONS

CHASSIS REMOVAL

1. Remove metal panel covering Brightness and Vertical Hold knobs by sliding upward.
2. Remove 6 push-on type knobs from front.
3. Remove 6 wood screws holding rear cover. Remove rear cover.
4. Remove speaker leads and pilot light.
5. Remove 4 bottom chassis bolts.
6. Remove 1 metal screw holding tuner bracket. Remove tuner by sliding upward.
7. Remove 1 metal screw holding top chassis brace.
8. Remove chassis.



MODEL 21T1 (Ch. 88-5)

TRADE NAME	Packard-Bell	MODELS 21C1, 21C2, 21T1, 24C1	CHASSIS 88-5
MANUFACTURER	Packard-Bell Co.	Service Div., 11th & Hope Streets, Los Angeles 15, Calif.	
TYPE SET	Television Receiver		
TUBES	Eighteen		
POWER SUPPLY	110-120 Volts AC, 60 Cycle	RATING 225 Watts, 2.03 Amp. @ 117 Volts AC	
TUNING RANGE	Channels 2 thru 13 VHF, 14 thru 83 UHF, Video IF 45.75MC, Sound IF 41.25MC (Intercarrier)		

SERVICING IN THE FIELD

TUNER OSCILLATOR ADJUSTMENTS

Touch-up adjustment of the VHF Oscillator is possible by removing the Channel Selector and Fine Tuning knobs. Set the Fine Tuning at the center of its range. The adjustments are accessible, one at a time, as the Channel Selector is rotated. Adjust for best picture and sound.

PICTURE TUBE SAFETY GLASS CLEANING

Press bottom center of safety glass back firmly. Insert a business card between safety glass and metal trim (left of center). Slide card to right to depress spring. Lift metal trim at bottom straight up.

SPECIAL ADJUSTMENTS

A. AGC
Observe the picture and advance the AGC control to a point where the picture distorts or a buzz is heard in the sound. Back off from this setting until the picture becomes stable with no noise in the sound.

B. Focus
The focus may be varied by means of a Focus control. (For location, see tube placement chart.)

C. Pix Lock
Adjust picture to lock in with hold controls. If picture jitters, tears, etc. adjust Pix Lock until stable. Readjust the hold controls and check operation on all channels in the area.

D. Width
The width may be varied by removing R88 (33K 2W) from the screen grid (pin 8) of Horizontal Output tube (V12) to ground.

FUSE

One fuse is used for low voltage power supply protection and a fuse wire for filament protection.

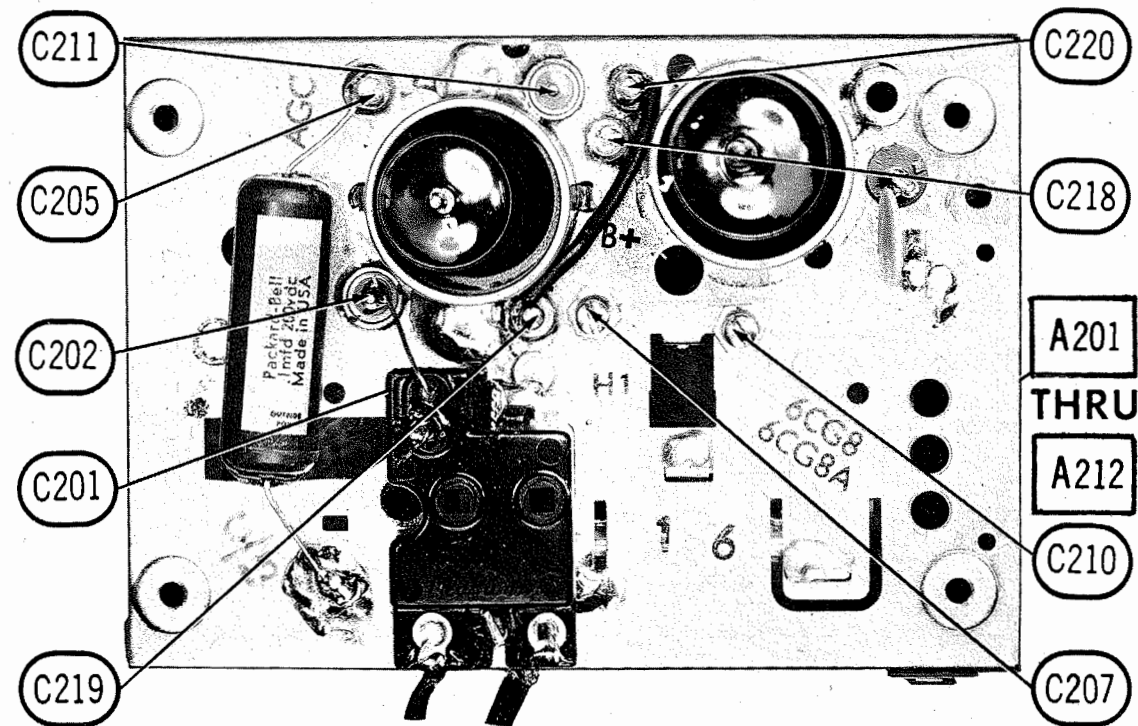
CENTERING

Centering is accomplished mechanically by adjusting two magnetic rings around the neck of the picture. Rotate the two rings around the neck of the tube until the picture is properly centered.

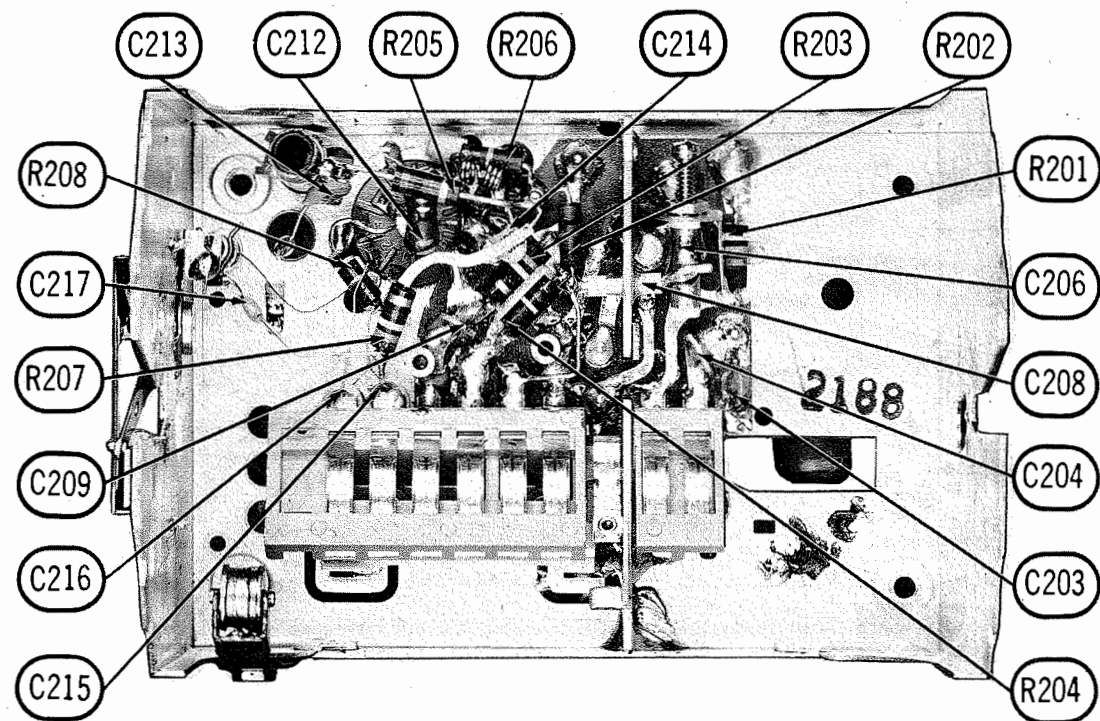
HOWARD W. SAMS & CO., INC. Indianapolis 6, Indiana

The listing of any available replacement part herein does not constitute in any case a recommendation, warranty or guaranty by Howard W. Sams & Co., Inc., as to the quality and suitability of such replacement part. The numbers of these parts have been compiled from information furnished to Howard W. Sams & Co., Inc., by the manufacturers of H930

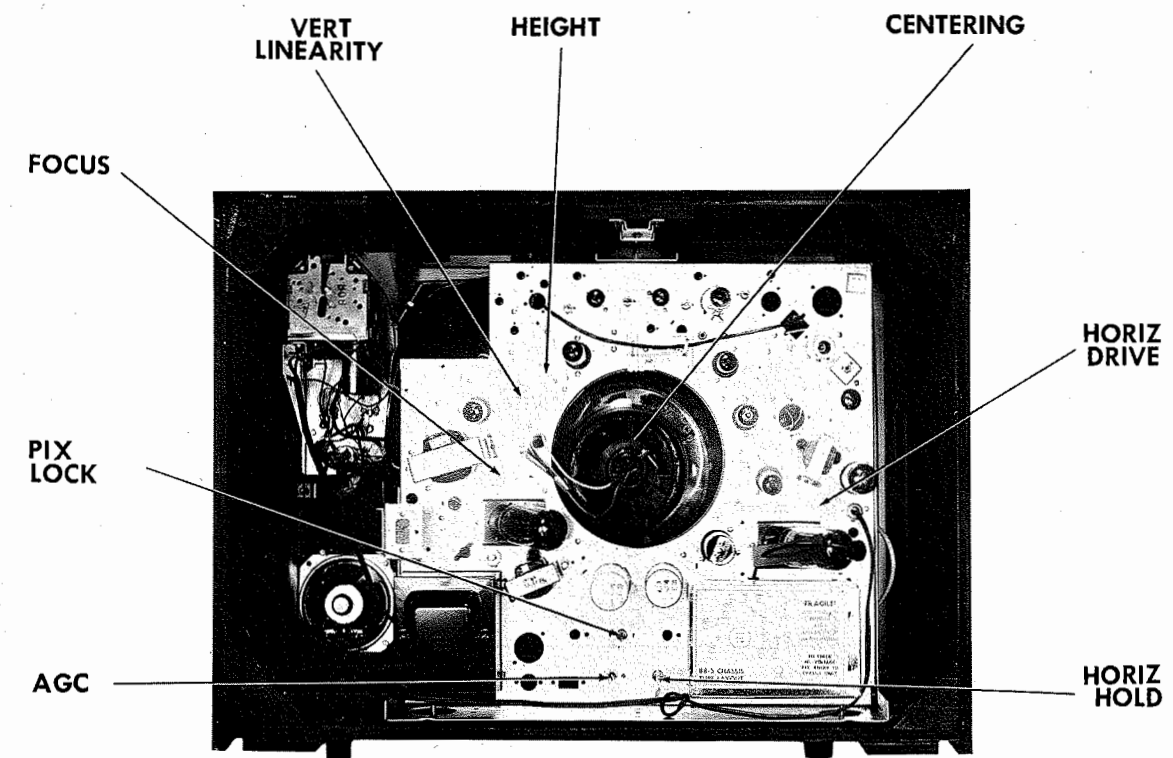
the particular type of replacement part listed. Reproduction or use, without express permission, of editorial or pictorial content, in any manner, is prohibited. No patent liability is assumed with respect to the use of the information contained herein. © 1959 Howard W. Sams & Co., Inc., Indianapolis 6, Indiana. Printed in U.S. of America



TUNER 10591E - TOP VIEW



TUNER 10591E - BOTTOM VIEW



CABINET-REAR VIEW

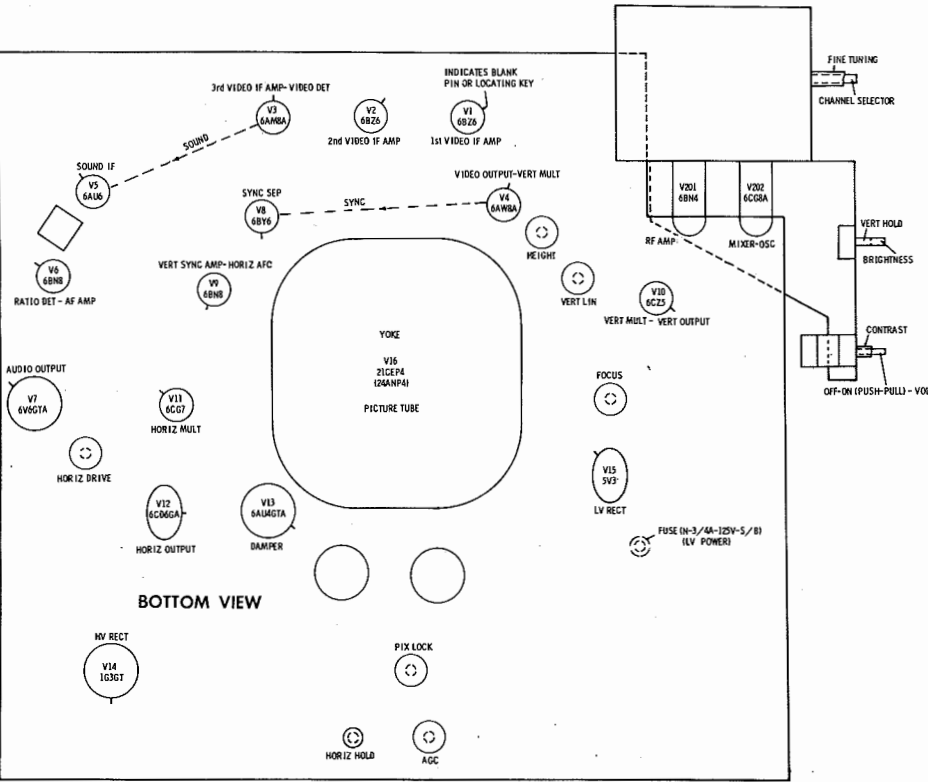
HORIZONTAL SWEEP CIRCUIT ADJUSTMENTS

1. Turn set on and tune in a TV station, preferably with a test pattern.
2. Set the Brightness and Contrast controls for a normal picture.
3. Turn the Horizontal Hold clockwise until the picture loses sync. It may be necessary to switch off channel and back again for picture to lose sync.
4. Turn the Horizontal Hold slowly counterclockwise until the picture just falls into sync.
5. Turn to an unused channel. If vertical lines appear near the center of the screen, slowly adjust the Horizontal Drive control until white lines disappear.
6. If in step 5 the Horizontal Drive was adjusted, tune in a TV station and repeat steps 3 and 4. Check horizontal sync by switching off channel and back again.

RESISTANCE MEASUREMENTS

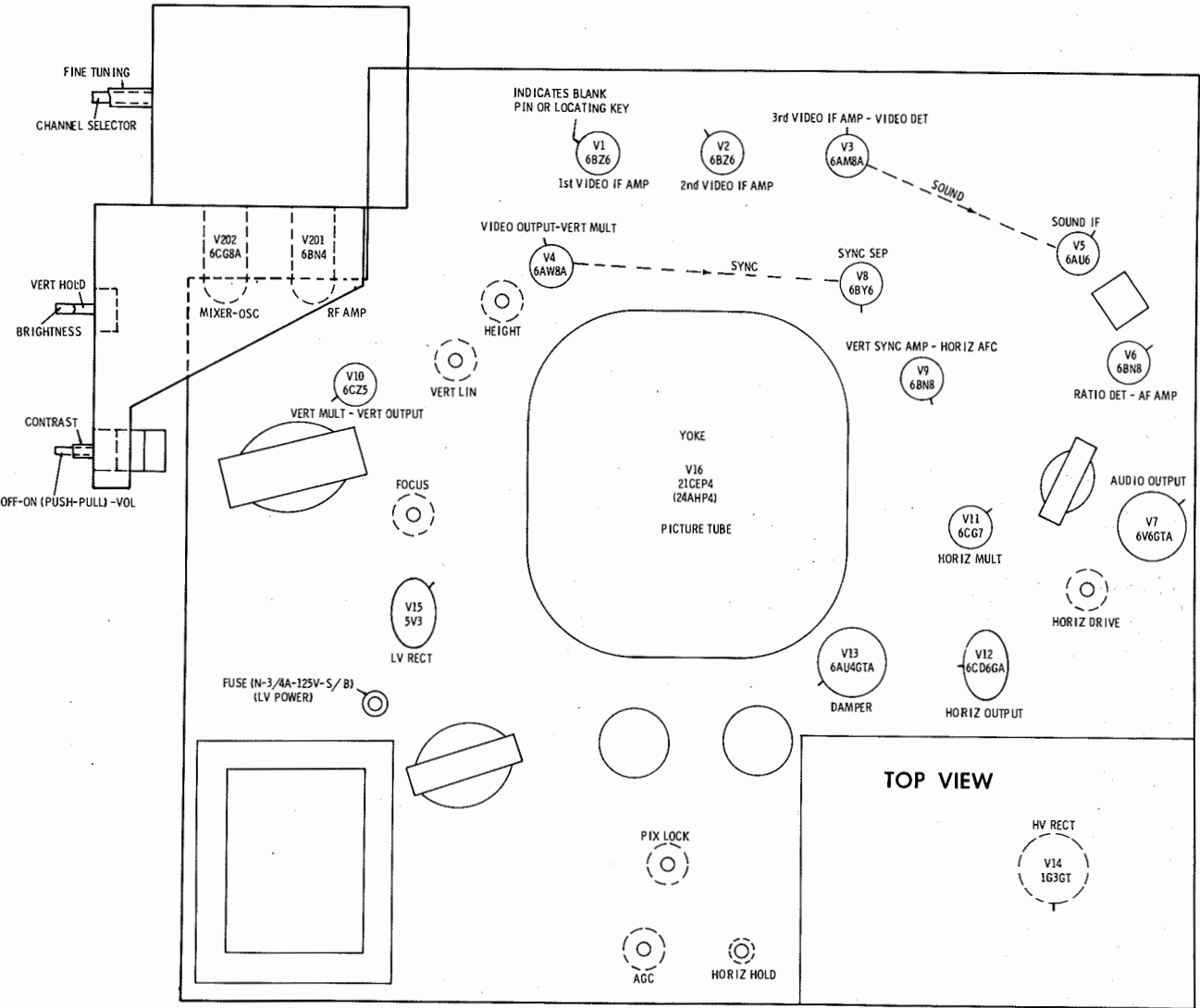
ITEM	TUBE	Pin 1	Pin 2	Pin 3	Pin 4	Pin 5	Pin 6	Pin 7	Pin 8	Pin 9
V1	6BZ6	2.2meg	56Ω	0Ω	.1Ω	††470Ω	††470Ω	0Ω		
V2	6BZ6	††6800Ω	††100Ω	0Ω	.1Ω	†470Ω	†470Ω	70K		
V3	6AM8A	270Ω	.1Ω	†4500Ω	0Ω	.1Ω	†4500Ω	.1Ω	3300Ω	0Ω
V4	6AW8A	0Ω	•1.7meg	•†2.5meg	.1Ω	0Ω	•280Ω	475K	†3500Ω	†4700Ω
V5	6AU6	1Ω	0Ω	0Ω	.1Ω	†6800Ω	†21K	120Ω		
V6	6BN8	INF	0Ω	INF	.1Ω	0Ω	24K	†440K	4.7meg	470Ω
V7	6V6GTA	TP	.1Ω	†428Ω	†0Ω	470K	TP	0Ω	560Ω	
V8	6BY6	1.2meg	0Ω	0Ω	.1Ω	†560K	†12K	2.2meg		
V9	6BN8	2meg	1meg	1meg	0Ω	.1Ω	560Ω	†39K	†560K	10K
V10	6CZ5	†510Ω	NC	2.3meg	0Ω	.1Ω	2.3meg	0Ω	NC	†920Ω
V11	6CG7	†6900Ω	2.5meg	1500Ω	.1Ω	0Ω	†150K	100K	1500Ω	0Ω
V12	6CD6GA	TP	0Ω	0Ω	NC	1meg	TP	.1Ω	†9000Ω	TOP CAP †16Ω
V13	6AU4GTA	NC	TP	†3.5meg	NC	†0Ω	NC	.1Ω	0Ω	
V14	1G3GT	PINS 1 THRU 8 HAVE INFINITE RESISTANCE								TOP CAP †346Ω
V15	5V3	NC	†	NC	21Ω	NC	20Ω	NC	†	
V16	21CEP4	0Ω	4700Ω	†800K	†3.5meg	NC	NC	•230K	.1Ω	
V201	6BN4	0Ω	2.5meg	0Ω	.1Ω	†4500Ω	0Ω	2.5meg		
V202	6CG8A	3900Ω	†7400Ω	0Ω	0Ω	.1Ω	†4500Ω	†13K	0Ω	220K

† THIS READING WILL VARY DEPENDING UPON THE CONDITION OF THE ELECTROLYTIC CAPACITOR CONNECTED IN THE ASSOCIATED CIRCUIT. THIS READING WILL VARY. CONTROL SET FOR NORMAL OPERATION.
† MEASURED FROM 270V SOURCE.
†† MEASURED FROM PIN 7 OF V2. NC NO CONNECTION.
† MEASURED FROM PIN 3 OF V13. TP TIE POINT.



TUBE PLACEMENT CHART

TUBE PLACEMENT CHART



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce indicated symptoms. Refer to tube placement chart for location and type of tube.

- POWER SUPPLY FAILURE**
No raster, no sound Fuse (3/4A), Fuse Wire (F11), V15

SWEEP FAILURE
No raster, has sound V9, V11, V12, V13, V14, V16
No vertical deflection V4, V10
Poor vert. linearity or foldover V4, V10
Poor horiz. linearity or foldover V11, V12, V13
Narrow picture V11, V12, V13, V15
Vert. off freq. V4, V10
Horiz. off freq. V11
- LOSS OF PICTURE OR SOUND**
No pic, no sound, has raster V1, V2, V3
No pic, no sound, has snow V201, V202, V1
No pic, has sound, has raster V4, V16
Has pic, no sound V5, V6, V7

SYNC FAILURE
No vert. sync V8, V9
No horiz. sync V8, V9
No vert. or horiz. sync V8, V9

PACKARD-BELL MODELS 21C1, 21C2, 21T1, 24C1 (Ch. 88-5)

FOLDER 1

ALIGNMENT INSTRUCTIONS

PREF-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools: A1 thru A6 General Cement #5003, 8721, 8722
Walsco #2512, 2519, 2525
A7, A8 General Cement #8606, 8606L, 8282, 9295
Walsco #2526, 2543, 2544, 2545

VIDEO IF ALIGNMENT

Set signal generator output to obtain 3 to 4 volts on VTVM.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
1. Direct	High side to ungrounded tube shield floating over Mixer-Osc. tube (V202). Low side to chassis.	44.8MC (Unmod)	Any non-interfering channel	DC probe to point \diamond . Common to chassis. (Across Video Det. load)	Mixer Plate Coil	Adjust for maximum deflection.
2. "	"	42.5MC	"	"	A1	"
3. "	"	45.0MC	"	"	A2	"
4. "	"	43.25MC	"	"	A3	"
5. "	"	44.0MC	"	"	A4	Adjust for maximum deflection. Repeat steps 1 thru 5.

OVERALL VIDEO IF RESPONSE CHECK

Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection. The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms. Use a separate marker generator and connect the high side to the ground connection of the tuner output cable. Leave low side disconnected.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
6. Two 120 Ω Carbon Resistors	Across antenna terminals with 120 Ω in each side.	63MC (10MC Swp)	Not used	3	USE VTVM DC probe to point \diamond . Common to chassis.	AGC Control (R6)	Adjust sweep generator output to produce -4 volts AGC at point \diamond . Adjust AGC control (R6) so that voltage at points B & \diamond are the same. If necessary, readjust sweep output so that the AGC voltage is again -4 volts.
7. "	"	"	41.25MC 43.3MC 45.0MC 45.75MC	"	Vert. Amp. thru 22K to point \diamond . Low side to chassis. (Across Video Det. load)	Mixer Plate Coll, A1, A2, A3, A4	Check for response similar to Fig. 1 with markers as indicated. Retouch A1 for overall bandwidth, Mixer Plate Coll to place 45.75MC marker at 50% on curve, A2 for correct position of 45.0MC marker, A3 to place 41.25MC marker and to correct bottom portion of response curve, and A4 to control shape of curve on low side. Note position of 45.0MC marker on response curve. It must not exceed 97% on channel 3 or a smeared picture may result on higher channels.

4.5 MC TRAP ALIGNMENT

Turn Contrast control fully clockwise.
If a 4.5MC signal generator of crystal accuracy capable of at least one volt output is not available, tune in a TV station and adjust A5 for MINIMUM 4.5MC beat interference in the picture.

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
8. .01mfd	High side to point \diamond . Low side to chassis. (Across Video Det. load)	4.5MC (Unmod)	Any non-interfering channel	RF probe to point \diamond . Common to chassis.	A5	Adjust for MINIMUM deflection with 1 volt or more input.

SOUND IF ALIGNMENT

DUMMY ANTENNA	SIGNAL GENERATOR COUPLING	SIGNAL GENERATOR FREQUENCY	CHANNEL	CONNECT VTVM	ADJUST	REMARKS
9. .01mfd	High side to point \diamond . Low side to chassis. (Across Video Det. load)	4.5MC (Unmod)	Any non-interfering channel	DC probe to point \diamond . Common to chassis.	A6, A7	Adjust for maximum deflection.
10. "	"	"	"	DC probe to point \diamond . Common to point \diamond .	A8	Adjust for zero reading. A positive and negative reading will be obtained on either side of the correct setting.

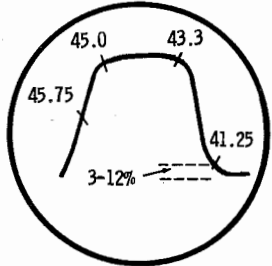
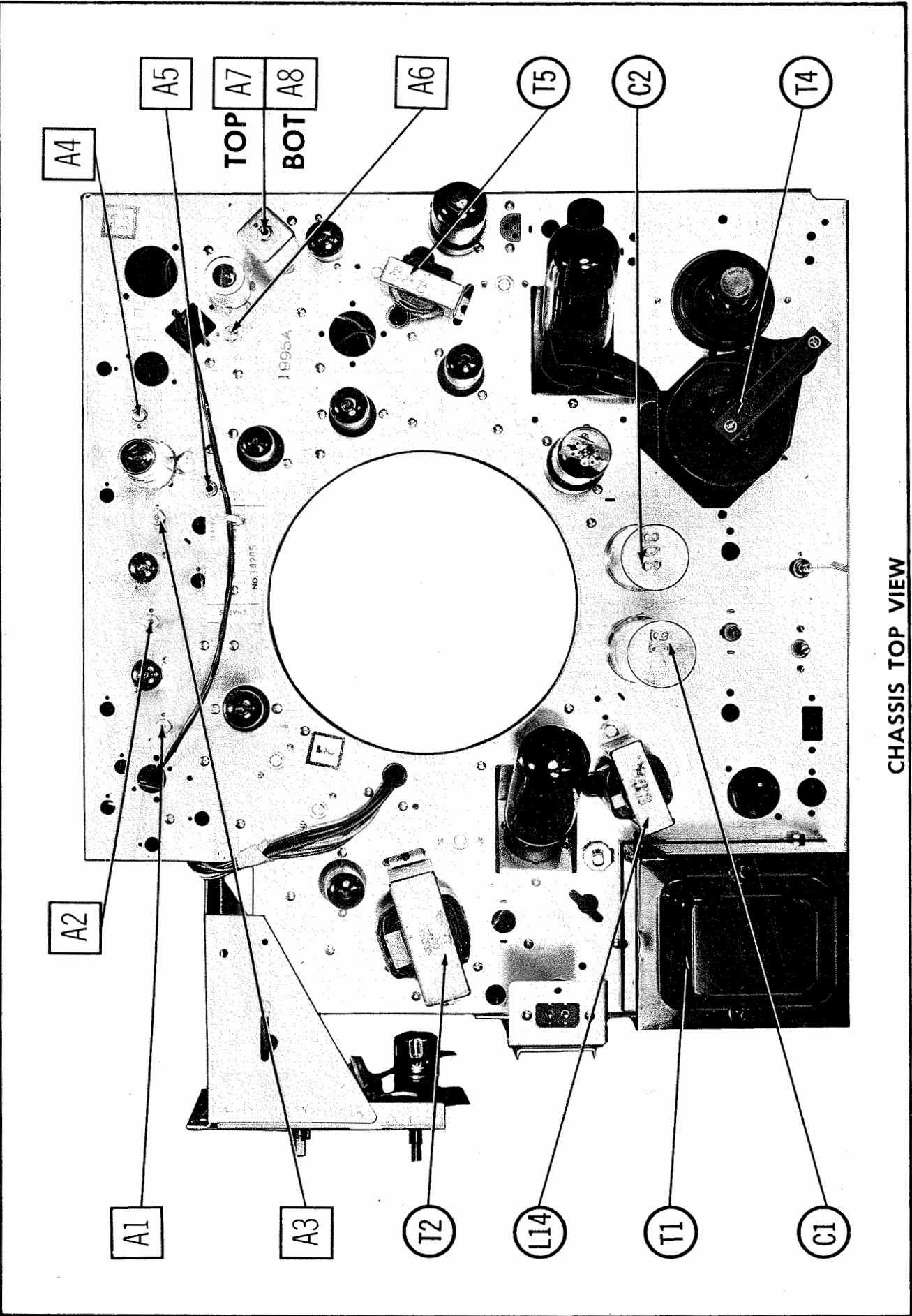
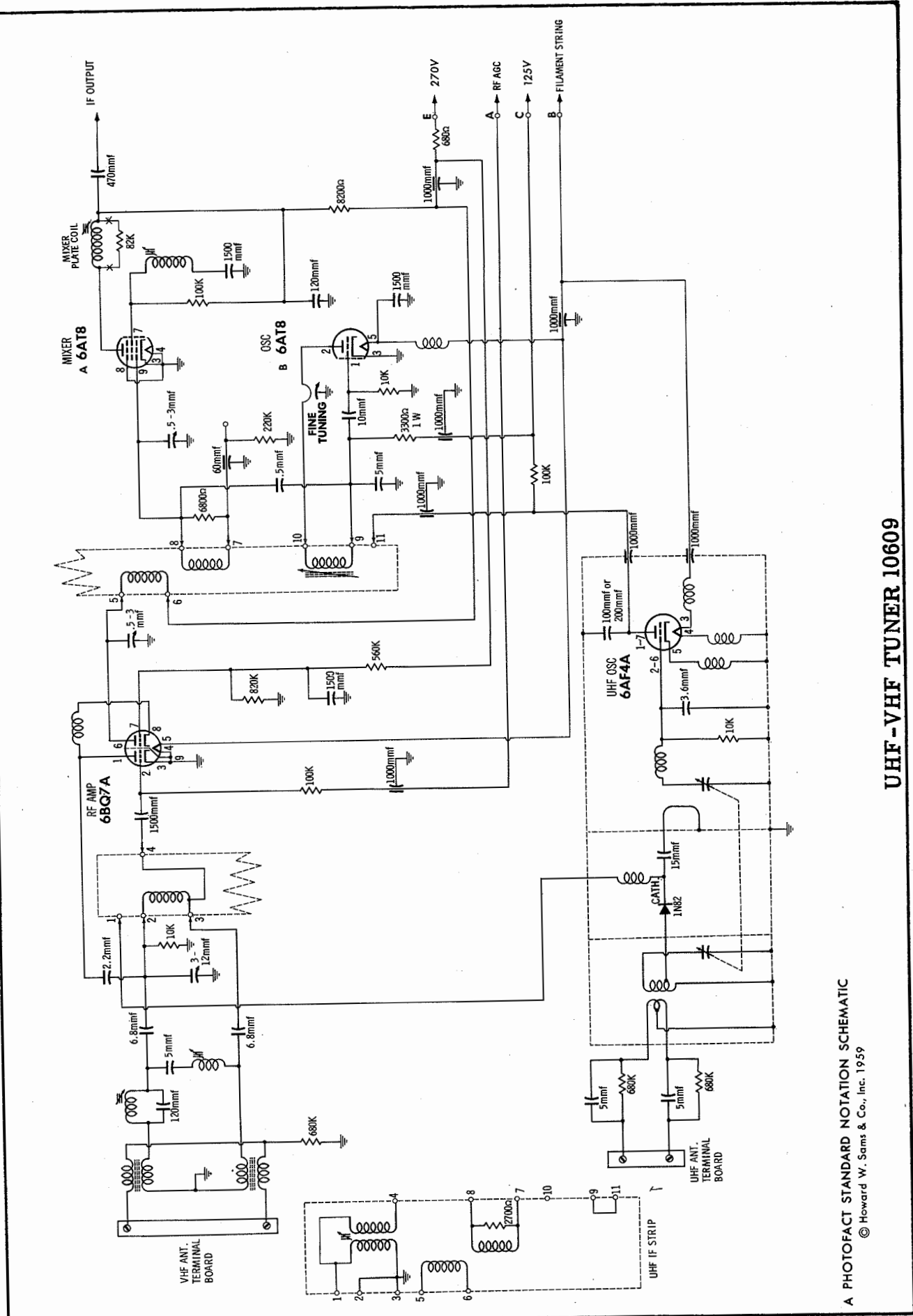


FIG.1



PACKARD-BELL MODELS 21C1, 21C2,
21T1, 24C1 (Ch. 88-5)
WELA DOL SSSVHD

FOLDER 1



A PHOTOFACT STANDARD NOTATION SCHEMATIC
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UHF-VHF-TUNER 10609

TUNER PARTS LIST AND DESCRIPTIONS

10591E

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES
V201	RF Amp.	6BN4	
V202	Mixer-Osc.	6CG8A	

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING CAP.	VOLT	REPLACEMENT DATA						NOTES
			Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C201	120								N2200 10%
C202	30								
C203	28								
C204	12								
C205	800			EF-001	MFT-1000			503C-D1	
C206	5-10								
C207	1-4.5				829-4		CT-551		
C208	47								
C209	47				829-4		CT-551		N1500
C210	1-4.5								
C211	30								
C212	2								
C213	470								N220 N150
C214	1000			BPD-00047	DD-471	LI0T47	B-347	5GA-T47	
C215	18			BPD-001	DD-102	LI0D1	B-210	5HK-D1	
C216	7.5								
C217	1000			BPD-001	DD-102	LI0D1	B-210	5HK-D1	
C218	800			EF-001	MFT-1000			503C-D1	
C219	800			EF-001	MFT-1000			503C-D1	
C220	800			EF-001	MFT-1000			503C-D1	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING		Packard-Bell PART No.	NOTES
	OHMS	WATT		
R201	4700Ω			
R202	1000Ω			
R203	3900Ω			
R204	220K			
R205	1000Ω			
R206	10K			
R207	3900Ω			
R208	3900Ω			

TUNER ALIGNMENT INSTRUCTIONS

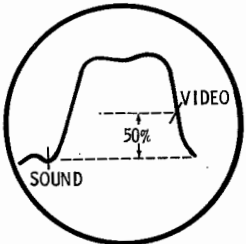
PRE-ALIGNMENT INSTRUCTIONS

The high voltage lead should be securely taped and kept away from the chassis.
Allow a 20 minute warm-up period for the receiver and test equipment.
Suggested alignment tools General Cement #8274, 8275, 8282, 8607, 8728, 8987, 9087, 9089, 9291
Walsco #2520, 2522, 2523, 2528, 2531, 2532, 2534, 2537, 2541

OSCILLATOR ALIGNMENT

Connect variable bias to IF AGC line. Adjust bias to obtain response curve which shows no indication of overloading.
Connect the synchronized sweep voltage from the sweep generator to the horizontal input of the oscilloscope for horizontal deflection.
The sweep generator output lead should be terminated with its characteristic impedance, usually 50 ohms.
Set the Fine Tuning to the center of its range.
Use only enough sweep generator output to provide a usable pattern on scope.
Use 10MC sweep unless otherwise noted.

DUMMY ANTENNA	SWEEP GENERATOR COUPLING	SWEEP GENERATOR FREQUENCY	MARKER GENERATOR FREQUENCY	CHANNEL	CONNECT SCOPE	ADJUST	REMARKS
1. Two 120Ω Carbon Resistors	Across antenna terminals with 120Ω in each lead.	213MC	211.25MC	13	Vert. Amp. thru 47K across Video Detector load.	A201	Adjust to place sound marker in trap notch as in Fig. 201. Video marker should fall at 50%.
		207MC	205.25MC	12		A202	
		201MC	199.25MC	11		A203	
		195MC	193.25MC	10		A204	
		189MC	187.25MC	9		A205	
		183MC	181.25MC	8		A206	
		177MC	175.25MC	7		A207	
		85MC	83.25MC	6		A208	
		79MC	77.25MC	5		A209	
		69MC	67.25MC	4		A210	
		63MC	61.25MC	3		A211	
		57MC	55.25MC	2		A212	
			59.75MC				

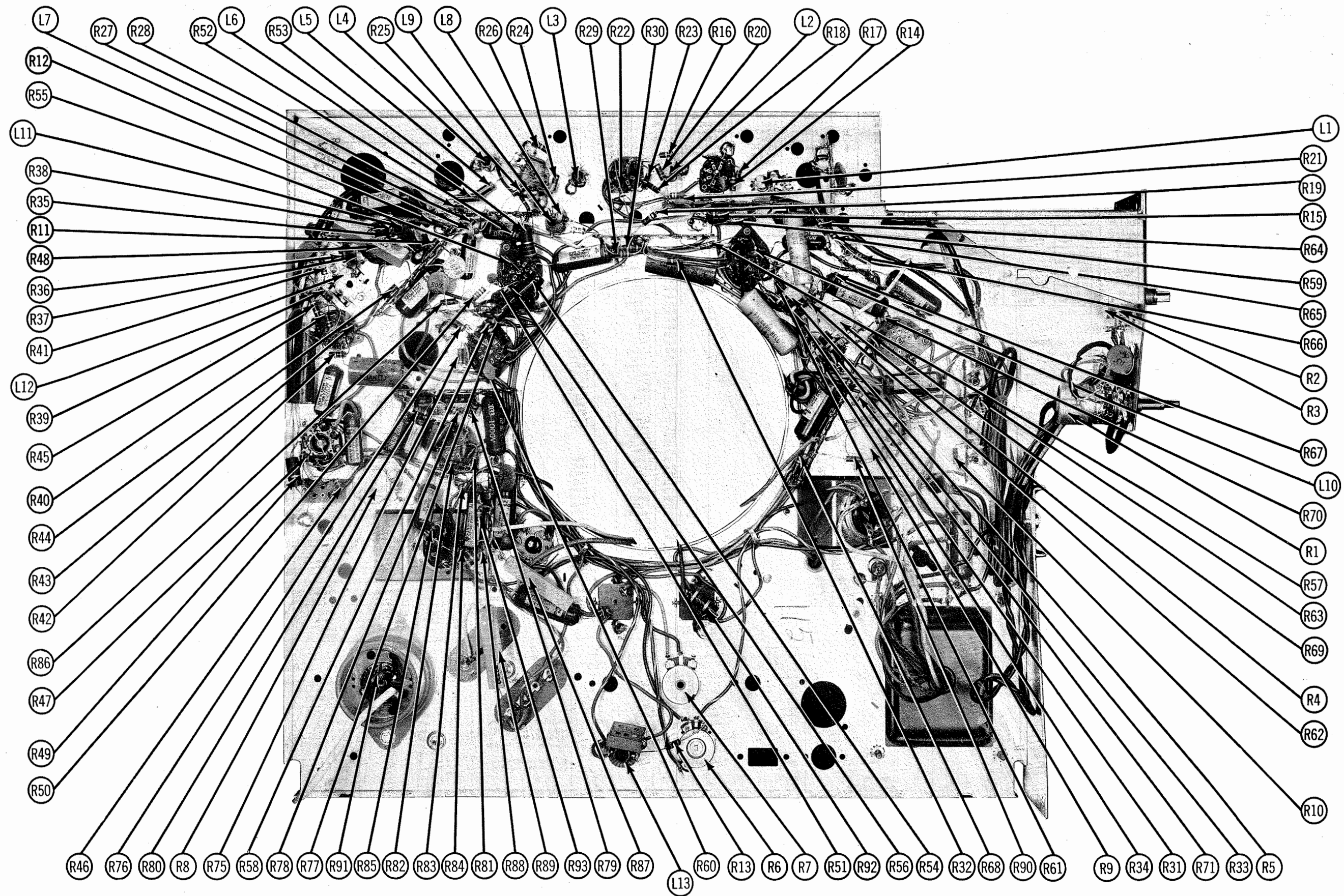


RF AND MIXER ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.

UHF ALIGNMENT

This portion of the receiver has been properly aligned at the factory and is very stable. Alignment of this portion should not be required in the field.



CHASSIS BOTTOM VIEW-RESISTOR AND INDUCTOR IDENTIFICATION

PACKARD-BELL MODELS 21C1, 21C2,
21T1, 24C1 (Ch. 88-5)

FOLDER 1

PARTS LIST AND DESCRIPTIONS

TUBES (GENERAL ELECTRIC, SYLVANIA)

ITEM No.	USE	TYPE	NOTES	ITEM No.	USE	TYPE	NOTES
V1	1st Video IF Amp.	6BZ6		V9	Vert. Sync Amp. - Horiz. AFC	6BN8	
V2	2nd Video IF Amp.	6BZ6		V10	Vert. Mult. - Vert. Output	6CZ5	
V3	3rd Video IF Amp. - Video Det.	6AM8A		V11	Horiz. Mult.	6CG7	
V4	Video Output-Vert. Mult.	6AW8A		V12	Horiz. Output	6CD6GA	
V5	Sound IF Amp.	6AU6		V13	Damper	6AU4GTA	
V6	Ratio Det. -AF Amp.	6B8T		V14	HV Rect.	1G3GT	
V7	Audio Output	6V6GTA		V15	LV Rect.	5V3	
V8	Sync Sep.	6BY6					

PICTURE TUBE

ITEM No.	REPLACEMENT DATA	GENERAL ELECTRIC PART No.	RCA PART No.	SYLVANIA PART No.	NOTES
V16	2ICEP4 24AHP4		2ICEP4 ① 24AHP4 ①	2ICEP4 ② 24AHP4 ②	① "Silverama" ⑤ ② "Silver Screen 85"

ELECTROLYTIC CAPACITORS

RATING			REPLACEMENT DATA						
ITEM No.	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	PYRAMID PART No.	SANGAMO PART No.	SPRAGUE PART No.
C1A	100	350	24166	AFH2-41-50	B0332	FP227.7	TMS-61	[S-232 MT-4520	TVL-2641
C1B	100	350					TD-100-450		
C2A	140	350	24158	AFH3-29-75	D0044	FP228.3	TMS-62		TVLS-2642*
C2B	120	350					TD-20-350		
C3	25	25	24006A	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205
C4	5	50	24038	PRS50V5	BBR5-50	TT50X5	TD-5-50	MMT-0505	TVA-1303
C5	25	25	24006A	PRS25V25	BBR25-25	TC36	TD-25-25	MT-0225	TVA-1205

* Not normally in distributors stock. Available thru distributor on order to manufacturer.

FIXED CAPACITORS

Capacity values given in the rating column are in mfd. for Paper Capacitors, and in mmfd. for Mica and Ceramic Capacitors.

ITEM No.	RATING		REPLACEMENT DATA						NOTES
	CAP.	VOLT.	Packard-Bell PART No.	AEROVOX PART No.	CENTRALAB PART No.	CORNELL-DUBILIER PART No.	MALLORY PART No.	SPRAGUE PART No.	
C6	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C7	5000		23931	BPD-005	DD-502	L10D5	B-250	5GA-D5	
C8	.22	200	23109	P288N-22		CUB2P22	GEM-2022	2TM-P22	
C9	1000		23880	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C10	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C11	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C12	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C13	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C14	1000		23983			JL-210	5GA-D1S10%*		10%
C15	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C16	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C17	1000		23860	BPD-001	DD-102	BYA6D1	B-210	5GA-D1	
C18	5		23908	SI 5	D6-050	LT6V5	ZT-555	5GA-V5	
C19	.022	200	23103	P288N-022		CUB2S22	GEM-4122	2TM-S22	
C20	.047	200	23105	P288N-047		CUB2S47	GEM-4147	2TM-S47	
C21	10		23636		TCZ-10	TCZ-10	ZT-541	5TCC-Q1S 5%*	NPO 5%
C22	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C23	10		23636		TCZ-10	TCZ-10	ZT-541	5TCC-Q1S 5%*	NPO 5%
C24	75			N750-D1 75	DTN-75	C10Q75U	ZT-5475	5TCU-Q75S 10%*	N750 10%
C25	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C26	1500		23639	DI-1500			JL-215	5GA-D1S5 10%*	10%
C27	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C28	1200		23889	DI-1200			JL-212	5GA-D1S2 10%*	10%
C29	2000		23974	DI-2000	DD-202	L10D2	B-220	5GA-D2	
C30	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C31	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C32	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C33	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C34	.1	800	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C35	.022	400	23122	P488N-022	DD-203	CUB4S22	GEM-4122	4TM-S22	
C36	.01	600	23139	P688N-01	DD-103	CUB6S1	GEM-611	6TM-S1	
C37	220		23915	DI-220	DD-221	L10T22	B-322	5GA-T22	
C38	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C39	.0033	400	23117	P488N-0033	DF-303	CUB4D33	GEM-6233	4TM-D33	
C40	220		23915	DI-220	DD-221	L10T22	B-322	5GA-T22	
C41	.01	600	23139	P688N-01	DD-103	CUB6S1	GEM-611	6TM-S1	
C42	.001	600	23333		DD-102		GEM-1621	6TM-D1S 10%*	10%
C43	47		23833	NPO-DI 47	DTZ-47	C10Q47U	CNO-447	5TCC-Q47S 10%*	NPO 10%
C44	.0047	600	23337				GEM-16247	6TM-D47S 10%*	10%
C45	.033	600	23142	P688N-033	DD-333	CUB6S33	GEM-6133	6TM-S33	
C46	.047	600	23143	P688N-047	DD-473	CUB6S47	GEM-6147	6TM-S47	
C47	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C48	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C49	.1	200	23145	P688N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C50	68		23992		DTZ-68		CNO-468	5TCC-Q68S 5%*	NPO 5%
C51	68		23992		DTZ-68		CNO-468	5TCC-Q68S 5%*	NPO 5%
C52	.0047	600	23137	P688N-0047	DD-472	CUB6D47	GEM-6247	6TM-D47	
C53	.15	200	23108	P288N-15		CUB2P15	GEM-2015	2TM-P15	
C54	1000		23983	BPD-001			JL-210	5GA-D1S 10%*	
C55	91		23819						
C56	4000		23208	1484-004		1R5D4	MCB463	MS-24	NPO 5%
C57	470		23236	1469-00047		5R5T47		MS-347	5%
C58	330		23221	1469-00033		5R5T33		MS-333	10%
C59	.022	600	23141	P688N-022	DD-223	CUB6S22	GEM-6122	6TM-S22	
C60	5000		23931	BPD-005	DD-502	BYA6D1	B-250	5GA-D5	
C61	.1	200	23107	P288N-1	DF-104	CUB2P1	GEM-201	2TM-P1	
C62	.1	600	23145					6TM-P1S 10%*	10%
C63	.0022	600	23316					6TM-D2S 10%*	10%
C64	.1	600	23145	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C65	10000		23939	BPD-01	DD-103	BYA10S1	B-110	5GA-S1	
C66	.033	1000	23074	PI088N-033	DD-333	CUB10S35	GEM-10133	10TM-S35	
C67	200	2500	23958		DD30-201	HVB30T2		30GA-T2	
C68	200	2500	23958		DD30-201	HVB30T2		30GA-T2	
C69	100	2000		HVD-30-100		HVB20T1	2HV-310	20GA-T1	
C70	120	2000		HVD-30-120		HVB20T12	2HV-312	20GA-T12	
C71	120	2000		HVD-30-120		HVB20T12	2HV-312	20GA-T12	
C72	.1	600	23745	P688N-1	DF-104	CUB6P1	GEM-601	6TM-P1	
C73	.8				DTZ-68		CNO-468	5TCC-Q68S 5%*	NPO 5% ①

* Not normally in distributors stock. Available through distributor on order to manufacturer.

① Chassis using Tuner #10816A use 82mmf 5% in this application (Part #23628).

CONTROLS

ITEM No.	RATING		REPLACEMENT DATA					INSTALLATION NOTES
	RESIST- ANCE	WATTS	Packard-Bell PART No.	CENTRALAB PART No.	CLAROSTAT PART No.	IRC PART No.	MALLORY PART No.	
R1A	1500Ω	$\frac{1}{2}$	25964				UE161-S	Contrast
B	500K	$\frac{1}{2}$					Not Req.	Volume
C	Switch						Not Req.	Push-Pull Type
R2A	50K		25952	B-31	A47-50K-S	Q11-123	U35	Bright
B	Shaft			Not Req.	K88-3	Not Req.	Not Req.	
R3A	3meg	$\frac{1}{2}$	25954	B-84	A47-3meg-S	Q11-140	U59	Vert. Hold
B	Shaft			Not Req.	K88-3	Not Req.	Not Req.	
R4A	3meg	$\frac{1}{2}$	25867	AB-84	B47-3meg-S	Q11-140	TA361	Vert. Linearity
B	Shaft			Not Req.	AK-1	Not Req.	Not Req.	
R5A	5meg	$\frac{1}{2}$	25910	AB-87	B47-5meg-S	Q11-141	PTA56L	Height
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	
R6A	1meg	$\frac{1}{2}$	25915	BT-173	A47F5-1meg		UT-438	AGC, Tap @ 350K
B	Shaft			Not Req.	FKS-1/4		Not Req.	
R7A	7.5meg	$\frac{1}{2}$	25911	AB-98	B47-7.5meg-S	Q11-142	PTA755L	Pix Lock
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	
R8A	50K	$\frac{1}{2}$	25908	AB-31	B47-50K-S	Q11-123	PTA54L	Horiz. Drive
B	Shaft				Not Req.	Not Req.	Not Req.	
R9A	5meg	$\frac{1}{2}$	25910	AB-87	B47-5meg-S	Q11-141	PTA56L	Focus
B	Shaft			AK-1	Not Req.	Not Req.	Not Req.	

RESISTORS

All wattages 1/2 watt, or less, unless otherwise listed.

ITEM No.	RATING	Packard-Bell PART No.	NOTES
OHMS	WATT		
R10	2.2meg	73165	
R11	56K	73046	
R12	2.2meg	73165	
R13	8.2meg	73072	
R14	10K	73037	
R15	1200	73014	
R16	470Ω	73021	
R17	56Ω	73010	
R18	12K	73038	
R19	120K	73050	
R20	6800Ω	73035	
R21	120K	73050	
R22	470Ω	73021	
R23	100Ω	73013	
R24	6800Ω	73035	
R25	1000Ω	73025	
R26	270Ω	73018	
R27	1500Ω	73027	
R28	1800Ω	73028	
R29	470K	73157	
R30	4700Ω	73033	
R31	4700Ω	73433	
R32	180Ω	73016	
R33	82K	73448	
R34	220K	73153	
R35	33K	73043	
R36	3300Ω	73031	
R37	15K	73039	
R38	120Ω	73014	
R39	12K	73038	
R40	12K	73038	
R41	39K	73044	
R42	4.7meg	73169	
R43	220K	73153	
R44	220K	73153	
R45	470Ω	73021	
R46	6800Ω	73035	
R47	470K	73157	
R48	3500Ω 5%	73733	
R49	560Ω	73422	
R50	39K	73044	
R51	150K	73151	

Note 1. Not used in some versions.

COILS (RF-IF)

ITEM No.	USE	REPLACEMENT DATA					NOTES
		Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rom PART No.	
L1	1st Video IF	29584A	17-4534	TV-131		VF-4	180 Microhenries, wound on 39K resistor 93 Microhenries, wound on 3900Ω resistor 400 Microhenries, wound on 18K resistor
L2	2nd Video IF	29585	17-4523	TV-130	6219	VF-3	
L3	3rd Video IF	29585	17-4523	TV-130	6219	VF-3	
L4	4th Video IF	29587A	17-4523	TV-130	6219	VF-3	
L5	RF Choke	29566	19-1005	BC-566	4612		
L6	RF Choke	29566	19-1005	BC-566	4612		
L7	Series Peaking Coil	29508	19-4180	TV-183	6179	VP-5 *	
L8	Series Peaking Coil	29552	19-3093	TV-181	6177	VP-3	
L9	4.5MC Trap	29548A			1470		
L10	Shunt Peaking Coil	29577	19-4400	TV-202	6136		
L11	Sound IF	29053 C		TV-119			
L12	Ratio Detector	29694	17-3477				

* Parallel with 39K resistor. ▲ Parallel with 3900Ω resistor. ◆ Disregard tap. ▲ Parallel with 18K resistor.

TRANSFORMER (HORIZ. OSC.)

ITEM No.	DC RES.		REPLACEMENT DATA						NOTES
			Packard-Bell PART No.	Meissner PART No.	Merit PART No.	Miller PART No.	Rom PART No.	Thordanson PART No.	
	PRI.	SEC.							
L13	74Ω		29703		TV-185 ▲	6211 ▲	H-102		Horiz. Freq. ▲ Disregard tan.

FILTER CHOKE

ITEM No.	RATINGS			REPLACEMENT DATA						
	CURRENT (Measured)	DC RES.	INDUCTANCE (10 CURRENT 1000 \sim)	Packard-Bell PART No.	Hollidson PART No.	Merit PART No.	Ram PART No.	Slancor PART No.	Thordorson PART No.	Triad PART No.
L14	.260A	38 Ω	9 Hy.	27006D	C5037 ①	C-2996 ①		C-2328 ③	26C44 ①	C-27X