A RIDER PUBLICATION



SUBSTITUTION GUIDE BOOK

BY H. A. MIDDLETON

FIRST EDITION

SECTION 2

RECEIVING TUBE SUBSTITUTION GUIDE

This section includes the actual information on the tube substitutions. Four columns are included. The first column lists the tube type for which a substitute is desired. This listing is in numerical and alphabetical order. For example 6CB6 precedes 6CD6 and 6ZY5 precedes 7A4. We have not indicated any difference between metal and glass tubes of the octal type. The tube listed can thus be considered either as metal or a glass type. The letters G, GT, GT/G, GA, or GP indicates that the tube has a glass envelope, the GT and GT/G are smaller and newer versions of the G type. The glass tubes, in practically all cases, have the same characteristics as the metal types.

One of the primary differences between the glass and metal tubes is that the metal type usually have an internal shield. A pin at the base of these tubes is connected to this shield. In most cases this pin is wired to the common ground or B minus of the set. In a few cases substituting a glass type for a metal type causes the circuit to become unbalanced or feedback occurs due to a lack of proper shielding. Most often this can be overcome by shielding the tube or realigning the set.

The second column lists the various possible substitutes. Quite often more than one substitute is listed for a single tube. In such cases the tube in the first column is not repeated for each substitute but is listed only once.

The third column lists the performance of each tube. Three performance ratings are shown in this list. These are E for ENCELLENT, G for GOOD, and P for POOR. They define the suitability of a substitute predicated upon its electrical characteristics as compared to those of the original and upon the relationship between the characteristics of the substitute to the constants of the circuit, which was designed to function best with the original. The comparison between the characteristics of the tubes excludes the filament or heater voltage and current ratings. It is assumed that whatever may be the performance characteristics of the substitute — the filament or heater voltages and current are correct, even if it requires certain minor circuit modifications to accomplish this condition.

Concerning the E, G, and P ratings, it stands to reason that those tubes which bear E (excellent) ratings are either the exact equivalents differing perhaps in

basing and maybe in filament or heater voltage and current ratings — or so closely approximate the electrical characteristics of the original as to require no significant major modifications. All applicable tube substitutions which might bear an E rating in performance are not shown in the main listing. Some appear on the addendum pages. These represent lastminute additions as the result of information received from television receiver manufacturers and appear at the end of this section.

Concerning the G (good) rating, it reflects more than just moderate differences in tube characteristics between the substitute and the original that is being replaced. It still means a triode substitute for a triode original, or a pentode substitute for a pentode original, and sometimes the conversion of a pentode into a triode, but the plate (and screen) voltage demands of the substitute may be higher than that of the original — or the transconductance or amplification constant of the substitute may be less than the original — all of which means that the circuit demands incorporated in the equipment design are not being met by the substitute tube. Possibly the plate impedance of the substitute is higher or lower, reducing the originally intended over-all amplification : perhaps a slight amount of distortion is added to the signal by the substitute. Yet the substitute may be used even if it is not as good in performance as the original, for again it is a matter of continuing the operation of a device.

Those substitutions which bear P (poor) ratings are used only as a last resort. They represent the extremes in tube substitution when it is a matter of accomplishing a repair job of sorts, rather than none at all because more appropriate substitutes are not available. Of course, modifications can be made in the circuit design and circuit constants so as to accommodate the tube rated poor, in which case, considerable improvement may be accomplished. It must be remembered, of course, that the P rating — or for that matter, the G rating — is not a reflection upon the capabilities of the tube or the brand. It simply means that the tube, so designated in the list, was not intended for use in the type of system for which it is suggested as a substitute. With proper circuit changes, it might. as we said before, become a better performing substitute. But whether or not such design changes are warranted is a matter of individual consideration. As

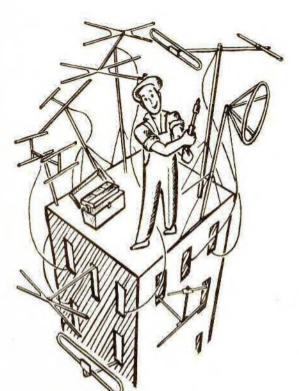
far as circuit modification is concerned, it 'can be a tedious task. Much depends upon comparative reference data and background knowledge of circuits. Finally such changes are possible only if the cost is acceptable to the owner of the equipment.

The fourth or last column lists the circuit changes that are necessary to make the substitute operate properly. In many cases no change whatsoever is required, the original tube is pulled out and the substitute plugged in. Where the reference "parallel circuits only" or "series circuits only" is found, it refers only to the type of filament circuit arrangement in which the substitute tube can be used.

Original and Substitute Sockets

The tube substitution lists contain illustrations of the original and the substitute tube sockets when the tube interchange involves a change in sockets. These are offered as a convenience in wiring. The views are the bottoms of the sockets and these correspond to the pin locations on the bottom of the respective tube bases. The bottom socket view of the original tube will always be found to the left of the change writeup and will bear the designation "ORIG." The bottom socket view of the substitute tube will always be found to the right of the change writeup and will bear the designation "SUB." The instructions given between the two illustrations state the respective socket terminals involved in the rewiring operation. In view of the necessity for removing one socket before mounting the other, it is suggested that as each wire is disconnected from the original socket, it be labeled with a tiny tag showing the appropriate socket connection number. These correspond to the pin numbers on the tube base. Then when being rewired to the new socket, all that is required is to solder the numbered lead to the terminal on the socket as stated in the instructions.

Care must be exercised to see that the socket connections are read in accordance with the location of the key as shown on the pages In order to attain correspondence between the socket mounted on the chassis and the instructions, one or the other should be changed in physical position so that the keys or identifying terminals are in the same relative position. Another precautionary note relates to the grid caps. In many cases capped tubes are replaced by single ended tubes, and vice-versa. The leads must be properly connected. Finally in some substitutions the pin numbers on the original and the substitute are the same, that is, 1 to 1, 2 to 2, 3 to 3 and so on. This is not standard for all the tubes, nor is it standard for all the pins even if it is true for some of them in any one substitution. In other words, the instructions should be read completely. Nothing should be taken for granted.



ATTENTION! TV INSTALLERS

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TV Installation Techniques

By SAMUEL L. MARSHALL

Television Instructor, George Westinghouse Vocational High School

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Nature of Television Radio Propagation Basic Antenna Principles Transmission Lines and Special Antenna Systems Materials and Methods Used in Installations High Mast and Tower Installations Problems Arising in Television Installations Receiver Adjustments and Service in the Home Municipal Regulations Appendix

336 pages

270 illustrations

\$3.60



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A.00	01A 40	E G	No changes.
01 A	00A 00AA 01 B	E E E	No changes.
0A2	0 B2	Р	Where application is not too critical.
0A3	VR75	E	No changes.
0A4	1267	Е	No changes.
0 132	0C3	E	Where space permits. Change socket to octal and rewire as follows:
3			No. 1 on miniature to No. 5 on octal 2 to 2 offic 5 to 5
0 B3	VR90	E	No changes.
0C3	VR105	E	No changes.
	0 B2	Е	Reverse 0B2 to 0C3 procedure.
0D3	VR150	E	No changes.
0Y4	0Y4G	Е	No changes.
0Y4G	0¥4	E	Ground pin No. 1
024	0Y4 0Z4A/1003 1005/CK1005	G E E	No changes.
	6X5	E	Solder socket terminal No. 2 to chassis. Connect 6V hot lead to No. 7. Motorolas and some other car radios have filament wired and the 6X5 may be used without making any changes.
	7Y4	E	Change socket to loctal and rewire as follows:
			No. 3 on octal to No. 3 on loctal to 6 to 7 No. 3 on loctal
	*		Connect No. 8 on locial to chassis and No. 1 on locial to 6V hot lead.
	84	Е	Reverse 84 to 6X5 procedure.
0Z4A	0¥4 1005/CK1005	G G	No changes.
1A3	1 84/1294	E	Where space permits. Change socket to loctal and rewire as follows: No. 1 on miniature to No. 1 on loctal 2 to 4 3 to 7 6 to 4 7 to 8
1 A4	1 B4	E	No changes.

144-147			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1A4	1D5	E	Change socket to octal and rewire as follows:
INT	125	E	No. 1 on four prong to No. 2 on octal
	110	Ц	2 to 3
			$\begin{pmatrix} O_2 & JO \end{pmatrix}$ 3 to 4 $\begin{pmatrix} O & O \\ O & O \end{pmatrix}$
			0'*0 4 to 7 000
			one cap to cap sum
22			
	32	E	No changes.
	34	E	
			and an an of the law in the second
1A5	1C5	G	Parallel circuits only. No changes.
14			
é	1 G4	P	No changes. Emergency but works well in most cases.
	1LA4	E	Change socket to loctal and rewire as follows:
	11.B4	E	No. 2 on octal to No. 1 on loctal
			4 to 3 0 0 5 to 6 0
			0 6 5 to 6 0 6 500 500 500 500 500 500 500 500 5
			1 10 8
	1N6	P	Remove and tape up any wires anchored on No. 6.
			some te une tape up any wires anendret on no, o.
	1Q5	G	Parallel circuits only. No changes.
	104	P	
	154	Р	Same as 3Q5 to 3S4, except do not connect No. 8 on octal to No. 5 on min-
			iature. Parallel circuits only.
	174	Р	Emergency substitution. Tone OK at low volume. Change socket to min-
			iature and rewire as follows:.
			No. 2 on octal to No. 1 on miniature
			00 3 to 2 . 60
			5 to 6
			oria 7 to 7
		8	
	1 T 5	G	No changes. Filament current 10 mils higher but gives satisfactory results.
			Internet and internet and the second second of the second se
	3Q4	P	Electric operation only. Same as 3Q5 to 3S4, except connect nothing to No.
	354		5 on miniature.
	2.75		No shangar providential. For electric propriation suburst the A bettern will be
	3Q5	P	No changes necessary. For electric operation only as the A battery will be too low with 1.4 more filament in the circuit.
			too low with 1.4 more mament in the circuit.
1 4 6	1C6	E	No changes. For parallel operation only as the 1C6 draws 120 mils instead
1110	100		of 60.
	1C7	E	Parallel circuits only. Change socket to octal and rewire as follows:
			No. 1 on six prong to No. 2 on octal
			2 to 3 3
			(02 50) 3 to 6 (0)
			6 6 4 to 5 0 10
			prig 5 to 4 suit
			6 to 7
	1 137	T	Sump on 146 to 107. Fither socies of user 11-1-1
	1D7	E	Same as 1A6 to 1C7. Either series or parallel circuits.
1A7	187	E	Parallel circuits only. No changes.
IAI	1131	15	T ALANTON ON OPPO OUND. THE ONGUECS.
	1C7	Р	Parallel circuits only.
	2.2.1		

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1A7 1D7 P		Р	No changes, unless there is a resistor across 1A7 filament, which must be removed. 1D7 is rated 2V 60 mils and draws slightly less than 50 on 1.4.
	1 L G	G	Same as 1A7 to 1U6.
	1 LA6 1 LC6	E E	Change socket to loctal and rewire as follows: No. 2 on octal to No. 1 on loctal

	NO. 4 ON OCTAL	10 140.	1 On Locial	
~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3	ta	2	-
6002	6	to	3	600
(@()@)	5	to	4	a d
00	4	to	5	00
DRIG	7	to	8	SUB
	630	10	6	

1 R5

G

Make adaptor as follows: Solder rather heavy wires three inches long to all lugs except No. 5 of miniature socket. Break the 1A7, clean out the base and save the cap. Push the wires from miniature socket thru the base pins as follows:

No.	1 on miniature	thru No	o. 2	of base
	2	thru	3	
	3	thru	6	
	4	thru	5	
	7	thru	7	
	6 bring out and	solder	grid	cap on.

The octal socket could be replaced by a miniature using the above connections but it is usually hard to find a place to mount it.

If 1R5 squeals, reduce value of oscillator grid resistor to 75000 ohms or less if necessary. This resistor is connected between terminal No. 5 on the the 1Å7 socket and ground or filament.

An idea we have been using successfully is to dig a trough from pin No. 5 to pin No. 7 on the adaptor, filling this with the graphite preparation made for volume controls, measuring the resistance, and filling the trough until the desired resistance is acquired.

|--|--|

1AD5

1AB5

G

G

Parallel circuits only. Change socket to miniature and rewire as follows: No. 2 on octal to No. 1 on miniature 3 to 2

*1	to	3	
5	to	4	
6	to	3	
7	to	7	
cap	to	6	

16	36	D	16	ĺ.
10	2		C	1
16	5	.1	51	1
6	2	_	5	
	S	38		

or @0030300

on subminiature

1A7-1AD5

Parallel circuits only. Change socket to subminiature and rewire as follows:

	No. 1 on loctal	to No.	4
00	2	to	7
(3,73,0)	3	to	8
	6	to	2
ORIG	7	to	5
	8	to	5

			B to 5
1AC5	1 V5	Е	No changes.
1AD4	1AD5	G	Parallel circuits only.
	1AE4	G	Reverse 1AE4 to 1AD4 procedure.
1 AD5	1AB5	G	Parallel circuits only. Reverse 1AB5 to 1AD5 procedure.

1AD5-187			RECEIVING TUBE	SUBSTITUTION GUIDE			
TUBE	SUB.	PERF.	CIRCUIT	CHANGES NECESSA	RY		· · ·
1 AD5	1 AD4	G	Parallel circuits o	only.		· ·	
	1W5	E	No changes.			1.4	
IAE4	1 AD4	G		subminiature and rev No. 1 on miniature 2		follows: 5 on 1 AD4 1	
				3 5 6	to to to	4	SUB
				7 Pin numbers on 1AD from red mark on ba			t to left
1AF4	1AF5	Р		No. 5 to No. 1 2 to 5 3 to 4 Do not use terminal 1	No. 3 fo	r anchor	
	1 L 4 1 T 4 1 U 4	G G G	No changes. Para	llel circuits only.			
1AF5	1 LD5	Р	rewire as follows:	nly. Where space po No. 1 on miniature 3		Change soch 1 on loctal 4	ket to loctal and
				4 5 6 7	to to to to	3 2 6 8	
	155	G	Parallel circuits o	nly. No changes.			
1 B3	1 X 2	E	Reverse 1X2 to 1B	3 procedure.			
1 84 *	1 A 4	E	No changes.				
	1D5 1E5	E	Same as 1A4 to 1D	5.			
	32 34	E	No changes.				
1 B5	1H6	E		ctal and rewire as fo lo. 1 on six prong 2 3 4 5 6		2 on octal 3 4 5 6 7	
	25S	Е	No changes.				
1 B7	1A7	E	Parallel circuits of	nly. No changes.			
	116	G	Parallel circuits or	nly. Same as 1A7 to	1U6		
	1LA6 1LC6	E E	Parallel circuits or	nly. Same as 1A7 to	1LA6.		

* See Addendum at back of this section.

18	7-1	1021
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1B7	1R5	Ġ	Parallel circuits only. Same as 1A7 to 1R5.
	1 U 6	G	Parallel circuits only. Same as 1A7 to 1U6.
1 B8	1D8	E	No changes.
1C3	1 G4	G	Where space permits. Change socket to octal and rewire as follows:
			No. 1 on miniature to No. 2 on octal
			6 to 3 0 0
			ako. 7 to 7
	1LE3	G	Where space permits. Change socket to loctal and rewire as follows:
			No. 1 on miniature to No. 1 on loctal
			2 to 2 500
			OFFIC. 6 to 2 OFFIC
			7 to 8
1C5	1A5	G	Parallel circuits only. No changes.
	1D8	Р	Remove and tape up any wires connected to 6 and 8. No connection to top cap.
			cap.
	1 L.A4	G	Same as 1A5 to 1LA4. Parallel circuits only.
	1 LB4	G	Same as the to this. Tatanet circuits only.
	1 Q5	G	No changes. Bias different but tone is reasonably good.
	154	G	Same as 3Q5 to 3S4, but connect nothing to No. 5 on miniature.
	1 T5	G	Parallel circuits no changes. Series circuits shunt 35 ohm resistor across filament.
	364	P	Change socket to miniature and rewire as follows:
		P	No. 2 on octal to No. 5 on miniature
	354	P	
			OB 5 to 3 SUB 7 to 1 and 7
			orres 7 to I and 7
	3 Q5	P	Same as 1Q5 to 3Q5.
1C6	1A6	G	Parallel circuits only. No changes.
	1C7	G	Same as 1A6 to 1C7. Either series or parallel circuits.
	1 <b>D7</b>	G	Same as 1A6 to 1C7. Parallel circuits only.
1C7	1A6	G	Reverse 1A6 to 1C7 procedure. Parallel circuits only.
	1C6	Е	Reverse 1A6 to 1C7 procedure.
	1D7	E	Parallel circuits only. No changes.
1C8	1AE5	G	Parallel circuits only.
- 2	1 E 8	E	No changes.
1C21			No practical substitute.
197	5		

THE NUMBER OF THE PERFORMANCE COLLTUBESUB.PERF.CIRCUIT CHANGES NECESSARY1D31A4E 32No. 2 on octal 10to No. 1 on four pront 321B4E 32No. 2 on octal 2to No. 1 on four pront 321B5GNo changes.1D71A6GReverse 1A6 to 1C7 procedure. 1C51D71A6GReverse 1A6 to 1C7 procedure. Parallel circuits only. No changes.1D81B8ENo changes.1D81B8ENo changes.1B4PNo changes.1B5GChange socket to locial and rewire as follows: To No. 2 on octal S1D81B8E1B8ENo changes.1B4PChange socket to four prong and rewire as follows: To No. 2 on octal S1B5GNo changes.1B4PChange socket to four prong and rewire as follows: S1B5GNo changes.1B4PChange socket to four prong and rewire as follows: S1B5ID5GNo changes.1B4PChange socket to four prong and rewire as follows: No 2 on octal S1B5ID5GNo changes.1B7IA6ENo changes.1B8ENo changes.1B5IC5EChange socket to octal and rewire as follows: No 2 on octal S1B6IC5ENo changes.1B7IA6ENo changes.	1D5-1F6			RECEIVING TUBE	SUBSTITUTION GUID	F		
1D31A4 1B4 32 34 34 352 6Change sacket to four prone and rewire as follows: to No. 1 on four prone 3 4 to 3 4 to 3 to 3 to 3 to 4 to 3 to 5 to 6 to 7 to 6 to 7 to 7 <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>÷</td> <td></td>							÷	
1B4ENo. 2 on octalto No. 1 on four prog 2 432E $34$ $6$ $2$ 34E $4$ $6$ $3$ 351E $6$ No charges.1D71A6GReverse 1A6 to 1C7 procedure.1C6EReverse 1A6 to 1C7 procedure.1C7EParallel circuits only. No changes.1D81B8ENo charges.1B4164GNo charges.1B51D5GNo charges.1B51D5GNo charges.1B419Charge socket to four prong and rewire as follows:1B51D5GNo charges.1B419Charge socket to octal and rewire as follows:1B51C8ENo charges.1B4195ECharge socket to octal and rewire as follows:1B51C8ENo chargeso	TUBE	SUB.	PERF.	CIRCUIT	CHANGES NECESS	ARY		
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	1D5			Change socket to				
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IDR1B8ENo changes.1E41G4GNo changes.1LE3GChange socket to loctal and rewire as follows:1LE3GChange socket to loctal and rewire as follows:30PChange socket to four prong and rewire as follows:30PChange socket to four prong and rewire as follows:1E51D5GNo changes.1B4PChange socket to four prong and rewire as follows:1B4PChange socket to four prong and rewire as follows:1B4PChange socket to four prong and rewire as follows:1B4PSocket to four prong and rewire as follows:1B4PSocket to four prong and rewire as follows:1B5IC8EIE7No changes.1F41F5EChange socket to octal and rewire as follows:No 1 on five prongto 32to 33to 34to 35to 71F5IF4E1F61F7E1F61F7E1F61F71F61F71F61F71F61F71F61F71F51F41F61F71F51F41F61F71F51F41F61F71F51F41F61F71F51F41F61F71F51F41F61F7 <tr< td=""><td></td><td>1C6</td><td>E</td><td>Reverse 1A6 to 1</td><td>C7 procedure. Para</td><td>llel circ</td><td>uits only.</td><td>*</td></tr<>		1C6	E	Reverse 1A6 to 1	C7 procedure. Para	llel circ	uits only.	*
1E41G4 1H4G PNo changes.1LE3GChange socket to loctal and rewire as follows: No. 2 on octal 5 7 to 8Io No. 1 on loctal S 5 7 to 830PChange socket to four prong and rewire as follows: No. 2 on octal $5$ 7 to 8Io No. 1 on four prong to 81E51D5GNo changes.1E51D5GNo changes.1A4 1P4 9 951P 951Change socket to four prong and rewire as follows: No. 2 on octal $2$ or No. 1 on four prong $3$ $4$ $2$ or No. 1 on four prong $3$ $4$ $2$ $4$ $2$ $3$ $2$ $3$ $2$ $3$ $3$ $10$ 1E7No practical substitute.1E81C8E1C8ENo changes.1F41F5EChange socket to fort or ord $3$ $4$ $3$ 1F51F4E1F61F4E1F61F7EChange socket to ord and rewire as follows: $No. 1 on four prong103103102103102101F51F4E1F61F7E1F61F7E1F61F71F61F71F51F4 to 1F5 procedure.1F61F71F7Change socket to octal and rewire as follows:No. 2 on octal310310101F61F71F7E1F81F4101F91F4101F61F7$		1C7	E	Parallel circuits	only. No changes.			
1H4P1LE3GChange socket to loctal and rewire as follows: $\frac{3}{5}$ $\frac{10}{6}$ No. 2 on oetal $\frac{10}{5}$ $\frac{10}{7}$ 1 on loctal $\frac{10}{5}$ 30PChange socket to four prong and rewire as follows: $\frac{10}{5}$ Io four prong $\frac{3}{5}$ 10 on four prong $\frac{10}{5}$ 1E51D5GNo changes.1E51D5GNo changes.1A4 $\frac{10}{32}$ PChange socket to four prong and rewire as follows: $\frac{10}{5}$ 1E4P $\frac{32}{2}$ Change socket to four prong and rewire as follows: $\frac{10}{5}$ 1E7No practical substitute.1E81C8E1F41F5E1F5IF4E1F61F4E1F61F41F61F7E1F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F71F61F7<	108	1 B8	E	No changes.				
1LE3       G       Change socket to local and rewire as follows:         30       P       Change socket to four prong and rewire as follows:         30       P       Change socket to four prong and rewire as follows:         No. 2 on octal       to No. 1 on four prong         30       P       Change socket to four prong and rewire as follows:         No. 2 on octal       to No. 1 on four prong         30       P       Change socket to four prong and rewire as follows:         1E5       1D5       G       No changes.         1E5       1D5       G       No changes.         1E4       P       Change socket to four prong and rewire as follows:       1 or four prong         1B4       P       Change socket to four prong and rewire as follows:       1 or four prong         34       P       Signal       3 do to 2       3 do to 2         34       P       Signal       3 do to 2       3 do to 2         34       P       Signal       3 do to 2       3 do to 2         1E7       No practical substitute.       1 or four prong to No. 2 or octal       1 or four prong to No. 2 or octal         1F4       LF5       E       Change socket to octal and rewire as follows:       1 oo four 5         1F5       IF4	1 E 4			No changes.				
$144 \begin{array}{c c c c c c c c c c c c c c c c c c c $		1 H4	P					
$144 \begin{array}{c c c c c c c c c c c c c c c c c c c $		1LE3	G	Change socket to	loctal and rewire as	follows:		
i E5 $i D5$ $i C = 0$				00				100
$144 \qquad P \\ 36 \qquad 105 \qquad 1$				000	3	to	2	(000)
144   16   16   16   16   16   16   16				Co C				6369
$1E5^{*} 1D5 \qquad G \qquad No \ changes,$ $1E5^{*} 1D5 \qquad G \qquad No \ changes,$ $1A4 \qquad P \qquad Oracla is ubstitute.$ $1A4 \qquad P \qquad Oracla is ubstitute.$ $1E7 \qquad No \ practical substitute.$ $1E8 \qquad 1C8 \qquad E \qquad No \ changes,$ $1F4 \qquad 1F5 \qquad E \qquad Change \ socket to \ octal \ and \ rewire \ as \ follows: \\ O \qquad Cap \qquad to \qquad cap \qquad cap \qquad to \qquad cap \qquad cap \qquad cap \qquad c$				URIU	7	to	8	508
$1E5^{*} 1D5 \qquad G \qquad No \ changes,$ $1E5^{*} 1D5 \qquad G \qquad No \ changes,$ $1A4 \qquad P \qquad Oracla is ubstitute.$ $1A4 \qquad P \qquad Oracla is ubstitute.$ $1E7 \qquad No \ practical substitute.$ $1E8 \qquad 1C8 \qquad E \qquad No \ changes,$ $1F4 \qquad 1F5 \qquad E \qquad Change \ socket to \ octal \ and \ rewire \ as \ follows: \\ O \qquad Cap \qquad to \qquad cap \qquad cap \qquad to \qquad cap \qquad cap \qquad cap \qquad c$		30	P	Change socket to	four prong and rewir	e as foll	lows:	
$1E5^{*} 1D5 G No changes.$ $1A4 P G Change socket to four prong and rewire as follows:  1B4 P 32 P 34 P 9 1 to 3 1 to 2 1 1 to No. 1 on four prong 3 to 2 2 0 octal 1 to 3 1 to 3 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 $				142				rong
$1E5^{*} 1D5 G No changes.$ $1A4 P G Change socket to four prong and rewire as follows: 1 on four prong 16 No. 2 on octal 1F4 1F5 E Change socket to octal and rewire as follows: 1F4 1F5 IF4 E Reverse 1F4 to 1F5 procedure. 1F6 1F7 E Change socket to octal and rewire as follows: No. 1 on six prong 16 No. 2 on octal 100 Simplement Simplem$				000		to		10,0
IE5ID5GNo changes.1A4 1B4 32 951PChange socket to four prong and rewire as follows: 1 PNo. 2 on octal to No. 1 on four prong 3 to 2 4 to 3 4 to 3 capto 3 to 2 to capIE7No practical substitute.1E81C8ENo changes.1F41F5EChange socket to octal and rewire as follows: $0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\$								(01 40)
$154 \qquad P \\ 1B4 \qquad P \\ 32 \qquad P \\ 34 \qquad P \\ 951 \qquad P \\ 10 \qquad 10 \ prong to No. 1 on four prong read rewire as follows: (application of the prong read of the prong to No. 2 on octal rewire as follows: (b) (b) (b) (b) (b) (b) (b) (b) (b) (b)$				O BIG	T	to	4	SUB
$1B4 \qquad P \\ 32 \qquad P \\ 34 \qquad P \\ 951 \qquad P \\ 100 \qquad $	1 E5 *	1D5	G	No changes.				
$1B4 \qquad P \\ 32 \qquad P \\ 34 \qquad P \\ 951 \qquad P \\ 100 \qquad $		1A4	P	Change socket to	four prong and rewir	e as foll	ows:	
$\begin{array}{cccccccccccccccccccccccccccccccccccc$			P	6				rong ns
951 P 1E7 No practical substitute. 1E8 1C8 E No changes. 1F4 1F5 E Change socket to octal and rewire as follows: No. 1 on five prong to No. 2 on octal 2 to 3 4 to 4 3 to 5 5 to 7 1F5 1F4 E Reverse 1F4 to 1F5 procedure. 1F6 1F7 E Change socket to octal and rewire as follows; No. 1 on six prong to No. 2 on octal 3 to 5 5 to 7 1F5 1F4 E Reverse 1F4 to 1F5 procedure. 1F6 1F7 E Change socket to octal and rewire as follows; No. 1 on six prong to No. 2 on octal 3 to 6 3 to 6 5 to 7				000	3			0.0
1E7       No practical substitute.         1E8       1C8       E       No changes.         1F4       1F5       E       Change socket to octal and rewire as follows: No. 1 on five prong to No. 2 on octal 2 to 3 4 to 4 3 to 5 5 to 7         1F5       IF4       E       Reverse 1F4 to 1F5 procedure.         1F6       1F7       E       Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 50%         1F6       1F7       E       Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 50%         1 on six prong to No. 2 on octal 3 to 6 5 to 7       2 to 3 50%					4		3	
1E8       1C8       E       No changes.         1F4       1F5       E       Change socket to octal and rewire as follows: No. 1 on five prong to No. 2 on octal 2 to 3 4 to 4 3 to 5 5 to 7         1F5       1F4       E       Reverse 1F4 to 1F5 procedure.         1F6       1F7       E       Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 506         1F6       1F7       E       Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 5 to 6 5 to 7		951	P	O ^D ® ARIG	cap	to	cap	SUB:
1F4 1F5 E Change socket to octal and rewire as follows: No. 1 on five prong to No. 2 on octal 2 to 3 4 to 4 3 to 5 5 to 7 1F5 1F4 E Reverse 1F4 to 1F5 procedure. 1F6 1F7 E Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 10 5 5 to 7 10 10 10 10 10 10 10 10 10 10 10 10 10 1	1E7			No practical subs	titute.			
No. 1 on five prong to No. 2 on octal 2 to 3 4 to 4 3 to 5 5 to 7 1F5 1F4 E Reverse 1F4 to 1F5 procedure. 1F6 1F7 E Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 10 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0 1 0	1 E 8	1C8	E	No changes.				
1F5   1F4   E   Reverse 1F4   to 1F5   procedure. $1F6   1F7   E   Change socket   to octal and rewire as follows:   No. 1   on six   prong   to No. 2   on octal   2   to 3   to 5   5   to 7   to 5   to$	1 F4	1F5	E	Change socket to	octal and rewire as f	ollows:		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				100	No. 1 on five prong	to No.	2 on octal	160
1F5   1F4   E   Reverse 1F4   to 1F5   procedure. $1F6   1F7   E   Change socket   to octal and rewire as follows:   No. 1   on six   prong   to No. 2   on octal   2   to   3   to   6   2   to   3   to   6   0   5   to   5$				60)				6000
1F5   1F4   E   Reverse 1F4   to 1F5   procedure. $1F6   1F7   E   Change socket   to octal and rewire as follows:   No. 1   on six   prong   to No. 2   on octal   2   to   3   to   6   2   to   3   to   6   0   0   0   0   0   0   0   0   0$								(a) c)
1F5       IF4       E       Reverse 1F4 to 1F5 procedure.         1F6       1F7       E       Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal         2       to 3         10       10         15       10         16       16         17       10         16       10         17       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10       10         10				ORIG				SUB
1F6 1F7 E Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 to 3 2 to 3 2 to 4 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	1 85	1 F 4	F	Reverse 1F4 to 11		10	-	
No. 1 on six prong to No. 2 on octal 2 to 3 2 to 3 $\begin{pmatrix} 0 & 0 \\ 3 & 4 \\ 0 & 5 \\ 0 & 5 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & 6 \\ 0 & $						12		
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	1 F6	1F7	Ł	-			2 on estal	
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$				54				10
$\begin{array}{cccccccccccccccccccccccccccccccccccc$				0000				009
5 to 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5				(O2 50)				
				00				00
cap to cap				ORIG				508
					cap	to	cap	

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* See Addendum at back of this section.

1F7-1L4

TUBE	SUB.	PERF,	CIRCUIT CHANGES NECESSARY
1F7	1 <b>F</b> 6	Е	Reverse 1F6 to 1F7 procedure.
1 G4	1 <b>C</b> 3	G	Reverse 1C3 to 1G4 procedure.
	1 E 4 1 H 4	G P	No changes.
	1LE3	G	Same as 1E4 to 1LE3.
	30	P	Same as 1E4 to 30.
1 65	1 J 5	G	No changes.
1 G6	1 J 6	Р	Parallel circuits only. No changes.
1 H4	1E4	Р	No changes.
	1 LE3	P	Same as 1E4 to 1LE3.
	30	P	Same as IE4 to 30.
1145	1 H6	Р	Connect grid cap to socket terminal No. 6. Connect Nos. 4 and 5 together.
	11,05	G	Change socket to loctal and rewire as follows:
	4		No. 2 on octal to No. 1 on loctal 3 to 2 and 3 SPAC
			$\begin{array}{cccccccccccccccccccccccccccccccccccc$
			DRAG cap to 6 SUB
	1 LH4	E	Change socket to loctal and rewire as follows:
			6 3 to 2 6 9 9 9 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
			7 to 8
		-	orig cap to 6
	1 55	G	Charge socket to miniature or make adaptor wiring as follows: No. 2 on octal to No. 1 on miniature
			Image: Open state         3         to         4 and 5         6 ° ©           5         to         3         0         0         0         0
			1 to 7 508
			cap to 6
1H6	1 B5	E	Change socket to six prong and rewire as follows: No. 2 on octal to No. 1 on six prong
			3 to 2
			$\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $
			6 to 4
	+		7 to 6
135	1 G5	G	No changes.
1J8	19	E	Reverse 19 to 1J6 procedure.
11.4	IAF4	G	Parallel circuits only. No changes.
	1SA6	G	Same as 1T4 to 1SA6.
	1 T4	G	No changes.
	1 U4	G	30

1L6-1LA6			RECEIVING TUB	E SUBSTITUTION G	UIDE		
TUBE	SUB.	PERF.	CIRCU	T CHANGES NECH	ESSARY		4
1 L.6	1U6	E	Parallel circuit	s only. No changes	ō .		
ILA4	1A5	G	Same as 1LB4 to	o 1A5.		-	
	1C5	G	Same as 1LB4 to	o 1A5. Parallel ci	rcuits only.	-	
	1 LB4	G	No'changes.				
	1Q5	G	Same as 1LB4 to	o 1A5. Parallel ci	rcuits only.		
	154	G	Same as 1LA4 to	o 3Q4. Parallel ci	rcuits only.		1
	1 T 5	G	Same as 1LB4 to	1A5.			
	1W4	G	Same as 1LB4 to	o 1W4.			
	3Q4	Р		on only. Change s	ocket to min	niature and	rewire as follov
	354	P		No. 1 on loctal		1 on mini	
			(00)	2	to	2	600
			() () (C) (C)	3	to	4	6
			12 4 5	6	to	*	00
			ORIG.	8		7	500
				ō	to	1	
	3Q5	Р	Same as 1LB4 to	1A5. Series circ	uits only.		
1LA6	1A7	E	Change socket to	octal and rewire		2 on octal	
				No. 1 on loctal			
			100	2	to	3	(3.5 Y
			(3 ( S) ( )	3	to	6	(3 C)
			000	4	to	5	COG
			ORIG.	5	to	4	SUB
				6	to	cap	
				8	to	7	
	1B7	E		) 1A7. Parallel cir	reuits only.		
	1L6	E	Same as 1LA6 to	o 1U6.			
	1 L B6	Р	Rewire as follow	75:			
				No. 5 to No. 7			
				Connect pins No.	5 and No. 8		
				together.			
				a			
	1LC6	E	No changes.				
	1R5	G		follows: Break th extension of the pi			
				nect to a miniature No. 1 on miniatu	socket acco		e following:
				2	to	2	100
			(0°3)	3	to	3	0000
			6	4	to	4	000
			CHEIS	6		6	
			or a	0	1.1.2	0	SUB.
				7	to	8	SUB.

In case this substitution squeals on the high frequency end of the dial, change the oscillator grid resistor to 100M ohms or less if necessary.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY	
1LA6	1U6	G	Parallel circuits only. Change socket to miniature and rewire a	s follows:
			No. 1 on loctal to No. 1 on miniature	
			(a) (b) 2 to 2	5
			(1) 3 to 3	0
			( , ) ( ) 4 to 4	0)
			0 0 5 to 5	UB.
			onic. 6 to 6	
1			8 to 7	
1LB4	1A5	G	Change socket to octal and rewire as follows:	
	1 T 5	G	No. 1 on loctal to No. 2 on octal	-
			2 to 3	3)
			(2) 3 to 4	) al
			0 6 to 5 0	3)
			and 8 to 7 sui	В
	1C5	G	Same as ILB4 to IA5. Parallel circuits only.	
	ILA4	G	No changes.	
	1 🖓 5	G	Same as 11.84 to 1A5. Parallel circuits only.	
	154	G	Same as 1 LA4 to 3 Q4. Parallel circuits only.	
	1W4	G	Change socket to miniature and rewire as follows:	
			No. 1 on loctal to No. 1 on miniature	
			2 to 2	a la
			(aC)a) 3 to 3	()
			6 to 6	9
			onic 8 to 7	ue.
	3Q4	P	Same as 1LA4 to 3Q4.	
	3 Q5	P	Same as 1LB4 to 1A5. Series circuits only.	
	354	P	Same as 1LA4 to 3Q4.	
1LB6	1 L.A6	Р	Rewire as follows:	
	1LC6	P		
			No. 5 to No. 8 7 to 5	
ILC5	11.4	G	Same as 1LG5 to 1L4.	
	1 LG5	G	No changes.	
	1 LN5	G	No changes.	
	1N5	G	Same as 1LN5 to 1N5.	
	1 P5	Cř		
	154	G	Parallel circuits only. Change socket to miniature and rewire as No. 1 on loctal to No. 1 on miniature	follows:
			(3) 2 to 2	5
			(C)	8
			2 4 to 1	O)
	12		danu 6 to 3	B
			8 to 7	

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1LAG-1LC5

1LC5-1LD	õ		RECEIVING TUBE	UBSTITUTIC	ON GUIDE			
TUBE	SUB.	PERF.	CIRCUIT	CHANGES	NECESSAR	Y		
1LC5	1SA6	G	Change socket to o	etal and re	wire as fol	lows.		
				vo. 1 on los			. 2 on octal	
			(2) (5)	2	1	to	8	001
				3		to	6	
			000	4		to	3	600
		- 200	ORIG	8			4	SUB
	1 T4	G	Same as 1LG5 to 1	L4.				
	1 1/4	G	Same as 1LG5 to 1	1,4.				
1 LCB	1A7	G	Change socket to o					
			r	lo. 1 on loc			2 on octal	
			(00)	2		.0	3	(DO)
			(3 (3)0)	4	. 1	0	5	0000
			0000	5		0	4	
			ORIG	8		0	7	SUB
				6	t	Q	сэр	
	1 B7	G	Reverse 1A7 to 1L	A6 procedu	re. Paralle	el cir	cuits only.	
	16	G	Same as 1LAG to 1	UG.				
	1 LA6	E	No changes.					
	1 L B6	P	Same as 1LA6 to 1	LB6.				
	1 R5	G	Same as 1LA6 to 11	R5.				
	1 U6	G	Same as 1LA6 to 1	16. Parall	el circuits	only.		
1 LD5	1AF5	Ŗ	Parallel circuits or	ly. Rever	se 1AF5 to	1 LD5	procedure.	
	1 N 6	G	Change socket to or	etal and rev o. 1 on loc			2 on octal	
			63	2		0	3	00
			(0 (m))	3	£.	D	4	3 6
				4	te		6	NO CO
			OPIG	6 8	te		5	SUB
				8	t.	D	7	
	1\$5	G	Change socket to m	iniature an	d rewire as	folle	ws:	
				o. 1 on loc			1 on miniat	ure
			(3)	2	te	c	5	600
				3	te		4	0 0
				4	te		3	SUB
			ORIG	8	te		7	
				2				
	1SB6	G	Change socket to oc					
			N	o. 1 on loc			2 on octal	
			00	2	te		3	00
				3	to		4	000
			00	6	to		5	CO'O'
			DHO.	8	to		7	300
				1.51				

1LD5-1LN5

TUBE	SUB.	PERF.	CIRCUIT	CHANGES NECES	SARY		
1LD5	1 U 5	G	Change socket to	miniature and rev	vire as fol	lows:	
				No. 1 on loctal	to No.	1 on minia	ture
			60	2	to	2	-
			OMO	3	to	3	000
			000	4	to	4	0 0
			0.0	6		6	SI.8
			51RO		to		566
				8	to	7	
1 LE3	1C3	G	Reverse 1C3 to 11	E3 procedure.			
	1E4	G	Reverse 1E4 to 11	E3 procedure. N	ot a good o	scillator.	
	1 G4	G	Change socket to c	cial and rewire a	s follows:		
			(0)	No. 1 on loctal	to No.	2 on octal	(A) ON
			(3 (V) ()	2	to	3	3
			0 0	6	tó	5	620
			ORIG	8	to	7	SUB
	10000	1000		-			
	1 H4	Р	Reverse 1E4 to 11	E3 procedure. No	ot a good o	scillator.	
	1293	G	Parallel circuits o	only. No changes.			
1 L G 5	11.4	G	Change socket to n				
	1 T 4	G	1	No. 1 on loctal	to No.	l on minia	fure
	1 U4	G	(0) (5)	2	to	2	600
			(3 (8) (6)	3	to	3	0 0
			(O CO	4	to	5	0 0
			CRIS	6	to	6	SUB
				8	to	7	
	1LC5	G	No changes.				
1LH4	1H5	E	Change socket to o	ctal and rewire as	follows.		
1 4 14 1 4	1110	-		No. 1 on loctal		2 on octal	transition for
			(0) (0)	2	to	3	000
			(OME)	4		5	1300
			640		to		
			ORIS	8	to	7	SUB
	4			õ	to	cap	
	155	G	Make adaptor as fo		5. Con		
			r	No. 1 on base		1 on top	
				2	to 5	and 4	
				4	to	3	
				6	to	6	
				8	to	7	
1LN5	1LC5	E	No changes.				
	1 N5	E	Change socket to o	ctal and rewire as	follows:		
	I P5	G		lo. 1 on loctal		2 on octal	
12.1		-	(@3)	2	to	3	1000
			(OC) (O)	3	to	4	300
				8	to	7	(C) (C)
			ORIG	6	to	cap	SUB
	154	G	Same as 1LC5 to 1	54 Parallel oire	uits only		
	LOT	u	Janie as ILES IO I		TTO OILLY.		

ILN5-1N	6		RECEIVING TUBE S	UBSTITUTION GU	IDE		
TUBE	SUB.	PERF.	CIRCUIT C	HANGES NECES	SARY		
1LNS	155	P	Change socket to m				
			No	s. 1 and 4 on loc	to No.	l on minia	iture
				3	to	4	000
			000	4	to	1	6
			DRIG	6	to	6	SUB
				8 and 5	to	7	
	ISAG	G	Same as 1LC5 to 19	A6.			
	3A8	Р	Electric operation not used.	only. Same as 11	LN5 to 1N5	. Connect r	nothing to pins
1N5	1105	P	No changes. 1D5 r	ated 60 mils on 2	volts and	pulls less th	han 50 on 1.4 vol
	1605	G	Same as 1N5 to 1L	v5.			
	1LN5	E	Change socket to lo	ctal and rewire a	as follows.		
	a side T v	~		o. 2 on octal		1 on loctal	
			000	3	to	2	(B) (B)
			(3) (B)	4	to	3	3 (MG)
			Core Core	7	to	8	6969
			ORIG	cap	to	6	508
				Short loctal te	erminals 4	and 5	
	1 P5	G	No changes.				
	154	Р	Parallel circuits or	ly. Change sock	et to minia	ture and re	wire as follows:
				o. 2 on octal		1 on minia	
				3	to	2	000
			(a) a)	4	to	4	
			OPIG	7	to	7	BUB
				сар	to	3	
	1 55	G	Change socket to m	iniature and rew:	ire as follo	ws:	
				o. 2 on octal		1 on minia	ture
			000	3	to	5	000
			0/0/	4	to	4	
			OFIG	7	to	7	SUB
			ung	cap	to	6	
	ISA6	G	Make adaptor as fol	lows:			
	L DARO			o. 2 on base	to No.	2 on top	
				3	to	8 .	
				4	to	6	
				7	to 7	and 3	
				cap	to	4	
	1 74	G	Change socket to ma				10.00
			and IN	o. 2 on'octal 3	to No.	7 on minia 2	ture.
			(3)	4	to	3	000
			(C) (C)	7	to	1	00
			DRIG.	cap	to	6	908
				his substitution s orks best as r-f		some cases,	
			711. 4 .	1			1 1 1
	3A8	Р	Electric operation of 5, 6 and 8.	niy. Remove an	a tape up w	nre if any a	nchored on Nos.
N6	1 LD5	G	Reverse 1LD5 to 1N	6 procedure.			
				4			

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECH	ESSARY					
1 N 6	ISB6	G	Rewire as follows:						
			No. 5 to No. 8 6 to 5						
1 P5	1 N 5	G	No changes.						
	154	P	Parallel circuits only. Same as 11	N5 to 1S4.					
	1SA6	G	Same as 1N5 to 1SA6.						
	1 T4	G	Same as 1N5 to 1T4.						
1 Q5	1 A 5	G	Parallel circuits only. No changes	5.					
	1C5	Р	No changes. Bias different but ton	ne reasonably good.					
	3 B5 3C5	P P	Move No. 7 to No. 8 and short No.	2 and 7 together.					
	3Q4	P	Same as 1C5 to 3Q4.						
	3Q5	Р	Move No. 7 to No. 8 and short No.	2 and 7 together.					
	354	P	Same as 1C5 to 3Q4.						
1Q6	1 S6 1 T6	E E	Rewire as follows	:					
			No. 1 to No. 4 7 to 1 2 to 3						
1R4/1294	IA3	Р	Reverse 1A3 to 1R4/1294 procedur	ce.					
1R5	1A7	G	Where extra space permits. Reven	rse 1A7 to 1R5 procedure.					
	1 LA6 1 LC6	G G	Where space permits. Reverse 11	A6 to 1R5 procedure.					
184	1 LC5 1 LN5	G G	Where space permits. Parallel cit to 1S4 procedure.	rcuits only. Reverse 1LC5					
	1 N 5 1 P 5	G G	Where space permits. Parallel cit to 1S4 procedure.	rcuits only. Reverse 1N5					
	155	Р	Parallel circuits only. Rewire as Nos.2 and 6 3	to No. 5 to 6					
			5	to 1					
	1 L4 1 T4	P P	Parallel circuits only. Rewire as	follows:					
	1 U4	P	No. 6	to No. 2					
			3 4	to 6 to 3					

154-174			RECEIVING TUB	E SUBSTITUTION GUI	DE		
TUBE	SUB.	PERF.	CIRCUI	T CHANGES NECES	SARY		
154	3E5	G	Parallel circuit	s only. Rewire as fo	Hows		
I D X	0.200	G	A GI GILCI GIL GUL	No. 6	to No.	5	
				3	to No.	6	
				4	to		
				5	to	3	
				7	to	5	
				Connect 1 and 7 toge		5	
155	1AF5	E	Parallel circuit	s only. No changes.			
	1 LD5	G	Where space pe	rmits. Reverse 1LD	5 to 1\$5	procedure.	
	ISB6	G	Where space pe	rmits. Reverse 1888	6 to 185	procedure.	
	1 U 5	E		Rewire as follows:			
				No. 5	to No.	9	
				Reverse 3 and 4	10 190.	6	
				MCACINE S SUG 1			
156	1Q6	E	Rewire as follow	vs:			
				27 0			
				No. 3	to No.		
				1	to	7	
	1 T 6	E	No changes.				
15 4 6		1	Decision 1004 and	1 (7 A P			
1SA6	11.4	G	Reverse 1 T4 to	ISA6 procedure			
	ILC5	G	Reverse 1LC5 to	ISA6 procedure.			
	1LN5	G		rent procedurer			
	1 2110	5					
	1 N5	G	Reverse 1N5 to	ISA6 procedure.			
	1T4	G	Reverse 1T4 to	ISA6 procedure.			
	1 U 4						
15B6	1 H5	G	Extend wire from	n No. 8 to cap.			
	1 LD5	G	Reverse 1LD5 ic	1SB6 procedure.			
	185	G		miniature and rewir			
			-	No. 2 on octal		1 on miniat	ure
			00	3	to	5	600
				4	to	4	00
			000	5	to	3	Q Q
			DINO	7	to	7	SUB
				8	to	6	
1 T4	1AF4	G	Parallel circuits	only. No changes.			
	114	G	No changes.				
	1SA6	E	Where space per	mits. Change socket	to octa	l and rewire	as follows:
		1.00		No. 1 on miniature		2 on octal	
			600	2	to	8	600
			( )	3	LO	6	60
			e o	6	to	4	00
			ORIG	7	tø	7	SUB
				Connect Nos. 2 and 3		r .	

Connect Nos. 2 and 3 together.

114-1	J	V	5
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TURE	SUB.	PERF.	CIRCUIT CHANGES N	IECESSARY			
1 T 4	1 U4	G	No changes.				
1 T 5	1A5	G	No changes. 1T5 pulls 10 mils	more but it w	orks OK.		
1.1	1C5	G	Parallel circuits only. No cha	inges.			
10	ID8	Р	Remove and tape up wires if a circuits only.	ny anchored or	No. 6 and 8. Parallel		
	1 G4	Р	No changes. Emergency work	s good in most	Cases.		
	1 LA4 1 LB4	P P	Same as 1A5 to 1LA4				
	1Q5	G	Parallel circuits only. No cha	inges.			
	154	G	Same as 3Q4 to 3S4 parallel o octal to No. 5 on miniature.	circuits only e	scept omit connection No. 8 on		
	3 <b>Q4</b> 354	P	Electric operation only. Same on miniature.	as 3Q5 to 354	but connect nothing to No. 5		
176	1Q6	E	Rewire as follows:				
			No. 3 1	to No. to	2 7		
	156	E	No changes.				
1U4	1AF4	G	Parallel circuits only. No cha	nges.			
4	114	G	No changes.				
-	185	G	Rewire as follows:				
			No. 5	to No.			
R			2 3	to	5 4		
4	1SA6	G	Where space permits. Same a	s 1T4 to 1SA6.			
	1T4	G	No changes.				
1U5	155	E	Rewire as follows:				
2-41			No. 2	to No.			
16.8			Reverse 3 and		4		
1U6	1L6	E	Parallel circuits only. No cha	nges.			
1 V	GZ3	E	No changes.				
	1223	G	No changes necessary. Series string makes no difference.	circuits only.	Six volts added to the filament		
1 V2			No practical substitute.				
I V5	1AC5	E	No changes.				

184-287			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1W4	1 LA4 1 LB4	G G	Where space permits. Reverse 1LB4 to 1W4 procedure.
	325	G	Rewire as follows:
			No. 7 to No. 5 Connect 1 and 7 together
1W5	1 V.5	P	No changes.
1 X2	1 B3	G	Where space permits. Change socket to octal and rewire as follows:
			Nos. 1,3,4,6 on miniature to No. 2 on octal 2,5,7 to 7 cap to cap
122	1 <b>B</b> 3	G	Where space permits. Change socket to octal and rewire as follows:
			Nos. 1,3,4,6 on miniature to No. 2 on octal 2,7,5 to 7 cap to cap
2A3	45	G	No changes.
2A4G			No practical substitute.
2A5	47	G	Reverse 47 to 2A5 procedure.
	59	G	Change socket to seven prong and rewire as follows: No. 1 on six prong to No. 1 on seven prong 2 to 2
			$\begin{pmatrix} 0^2 & 50 \\ 0 & 2 \end{pmatrix} = \begin{pmatrix} 3 \\ 4 \end{pmatrix} \qquad \qquad$
			DRIG 5 to 6 SUE
			Short Nos. 5 and 6 together.
	1619	G	Parallel circuits only. Make adaptor as follows: No. 1 on base to No. 2 on top
			2 to 3
			3 to 4 4 to 5
			5 to 8
			6 to $7There are or will be many used 1619 tubes available.$
24.0			
2A6	2B7	P	Change socket to seven prong and rewire as follows: No. 1 on six prong to No. 1 on seven prong
			$\begin{array}{cccccccccccccccccccccccccccccccccccc$
			$(O_2  SO)  4  to  5  (O_2  GO)$
			5 to 6
			cap to cap
	55	E	Parallel circuits only. No changes.
0 4 7			
2A7	2A7S	Ė	No changes.
2B7	6B7	E	Heater voltage — current ratings differ.

2875-265

TUBE	SUB.	PERF.	CIRCUI	r changes nec	ESSARY		
2B7S			No practical sub	stitute.			
2B25			No practical sub	stitute.			
2C4			No practical sub	stitute.			
2C21	6SN7	G		octal and rewire No. 1 on seven p			al
a.	14.			2	to	3	
			100 Te	3	to	2	@ C
			(03 4 50)	4	to	4	
			66	5	to	5	
			ORIG	6	to	6	SUB
				7	to	7	
				cap	to	1	
2C22	GAD5	P	Rewire as follow	<b>F</b> +			
2024	6AF5	P		Connect grid cap	to No 5		
	6C5	P		Connect plate cap			
	6J5	P		sourcer place cap	10 100. 0		
	6P5	P					
2C51	7F8	G	Where space per	mits. Change so	cket to loo	tal and rew	ire as follows:
			1	No. 1 on noval		. 2 on locta	
				2	to	4	
			600	3	to	1	(3)
				4	to	3	3000
			Co	6	to	6	
			ORIG.	7	to	8	SU9.
				8	to	5	
				9	to	7	
	5670	G	Parallel circuits	only. No change	5.		
2C52	12SN7	Р	No changes.				
	12SX7	P					
2D21			No practical subs	titute.			
2E5	6E5	Е	Heater voltage-cu	irrent ratings dif	fer.		
	6T5	E	Same as above.				
	6U5	E	Same as above.				
2 <b>E</b> 26			No practical subs	titute.			
2E30	5812	G	No changes.				
<b>2E</b> 31	2 E32	E	No changes.				
2E32	<b>2E3</b> 1	E	No changes.				
2E35	2E36	E	No changes.				
2E36	2E35	E	No changes.				
2E41	2E42	Έ	No changes.				
2E42	2E41	E	No changes.				
2G5	6U5/6G5	E	Heater voltage-cu	rrent ratings diff	ler.		

2621-385	5		RECEIVING TUBE SUBSTITUTION GUIDE
		1000	
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
2G21	2G22	E	No changes.
2G22	2G21	E	No changes.
2S/4S			No practical substitute.
2 V3	2 <b>X</b> 2/879	Р	Parallel circuits only. Change socket to four prong and rewire as follows
	,	×	No. 2 on octal cap 7 to 4 sub sub
2W3	2Z2/G84	E	Reverse 222/G84 to 2W3 procedure.
	82	Р	For half wave operation only. Change socket to four prong and rewire as follows:
			No. 2 on octal to No. 1 on four prong to 2 and 3 to 4 to 4 to 4 to 4 to 4
2X2/879	2 <b>V</b> 3	P	Reverse 2V3 to 2X2/879 procedure. Examine power transformer and de- termine whether it will handle additional filament current.
2 Y2			No practical substitute.
2Z2/G84	2W3	E	Change socket to octal and rewire as follows:
			No. 1 on four prong to No. 2 on octal 2 to 4 4 to 8 500
3A4	3Q4	P	Parallel circuits only, Rewire as follows:
	354	P	Reverse connections on terminals 3 and 4.
	3V4	P	Parallel circuits only. Rewire as follows:
			No. 6 to No. 2 4 to 6
3A5	3C6	Р	Parallel circuits only. Change socket to loctal and rewire as follows: No. 1 on miniature to No. 1 on loctal
			2 to 3 3 to 4 4 to 7 5 to 5 6 to 6 7 to 6
Art status area			7 to 8
3A8GT		21	No practical substitute.
384			No practical substitute.
3B5	3C5	Е	No changes.
	3LE4 3LF4	e E	Same as 3Q5 to 3LF4.

385-3E6

TUBE	SUB.	PERF.	CIRCUIT CH	ANGES NECESS	ARY		
3B5	3Q5	E	No changes.				
	354	G	Same as 3Q5 to 3S4 em miniature.	xcept omit conne	ection o	f No. 8 on octai	l to No. 5 on
387	1291	E	No changes.				
3B7/1291	3A5	Р	Change socket to mini	ature and rewir	e as fo	llows:	
				on loctal		1 on miniatur	e
			2		to	2	
			000		to	3	600
			600 4		to	4	0 0
			00	5	to	5	e de la companya de l
			ORIG	,	to	6	505
			٤		to	7	
	3C6	P	Parallel circuits only	. Rewire as foll	ows:		
			No. 6		to No.	5	
			7		to	6	
			4		to	7	
			3		to	4	
			2		to	3	
			-		10	u	
3C5	3B5	E	No changes.				
	3Q5	E					
	3LE4	E	Same as 3Q5 to 3LF4				
	3LF4	E	the particular in the second second				
3C6	3A5	Р	Parallel circuits only.	Reverse 3A5 t	o 3C6 p	procedure.	
	387/1291	G	Parallel circuits only.	Reverse 3B7/3	1291 to	3C6 procedure	
3D6/1299	3LF4	G	Parallel circuits only.	No changes.			
	354	G	Parallel circuits only.	Change socket	to min	iature and rewi	ire as follows:
			No. 1	on loctal	to No.	l on miniature	2
			2		to	2	()
			3		to	4	000
			6		to	3	6
			OPIG 7		tö	5	SUB
			8		to	7	
	205	-		Dense age 1			
	3Q5	Е	Parallel circuits only.	Reverse 305 to	0 31.K4	procedure.	
	3V4	G	Parallel circuits only.	Change socket	to mi	niature and rew	ire as follows:
				on loctal		1 on miniature	
			2	on abotar	to	2	(alast
			3		to	3	(DO)
			6				0 0
			O O O O O O O O O O O O O O O O O O O		to	6	SUB
			ORIG. 8		to	5	0.000
			0		to		
3E5	354	G	Parallel circuits only.	Rewire as follo	ows;		
			No 2		to No	A	
			_No. 3		to No.	3	
					LU	5	
	2174	C	Domalia) aircuite gala	No obarres			
	3V4	G	Parallel circuits only.	no changes.			
3E6			No practical substitute	2.			
			<b>C 1</b>				

3LE4-3Q5			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
3LE4	3LF4	E	No changes.
	3V4	G	Same as 3D6/1299 to 3V4.
3LF4	3D6/1299	G	Parallel circuits only. No changes.
	3 V4	G	Same as 3D6/1299 to 3V4.
3Q4	3:44	P	Parallel circuits only. Rewire as follows:
			Reverse No. 3 and No. 4
	3D6/1299	G	Parallel circuits only. Reverse 3D6/1299 to 3Q4 procedure.
	3E5	G	Parallel circuits only. Rewire as follows:
			No. 6 to No. 2
			3 to 6 4 to 3
	3LE4	G	Reverse 3D6/1299 to 3Q4 procedure.
	3LF4	G	Reverse abuj 1200 to ave procedure.
	354	G	No changes.
	3V4	G	Rewire as follows:
			No. 6 to No. 2
			3 to 6 4 to 3
	104		
3Q5	1A5 1G4	P P	No changes. For electric operation only. Battery operation requires re- sistor 25 to 30 ohms in one of the A leads.
	1LA4	P	Electric operation only. Same as 1A5 to 1LB4.
	1 L.B4	P	
	1 T4	P	Same as 1A5 to 1T4. Electric operation only. Emergency substitution.
	1 <b>T</b> 5	P	No changes. Electric operation only.
	3B5	E	No changes.
	3C5	E	No changes.
	3LF4	E	Change socket to loctal and rewire as follows: No. 2 on octal to No. 1 on loctal
	3LE4	1Ci	No. 2 on octal to No. 1 on loctal
			(0) (0) 4 to 3 (0) (0) (0)
			5 to 6 500 500 500 500 500 500 500 500 500 5
			8 to 7
	3Q4	G	Change socket to miniature and rewire as follows:
	354	G	No. 2 on octal to No. 1 on miniature
			(a) (b) 4 to 4 (c) (a) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c
			Original of the terminal sum
			8 to 5
			50

TUBE	SUB.	PERF.	CIRCUIT CHAN	IGES NECES	SARY		
3 Q 5	3 V4	G	Change socket to miniat				
			No. 2 o			l on mini:	ature
			3		to	2	000
			( ⁽⁰⁾ ) 4		to	3	(3) (5) (3) (5)
			000 5		to	6	e of
			ORIG. 7		to	7	SUB
			8		to	5	
354	3E5	G	Parallel circuits only.	Same as 3Q4	to 3E5.		
	304	G	No changes.				
	3V4	G	Same as 3Q4 to 3V4.				
3 V 4	3A4	P	Parallel circuits only.	Reverse 3A4	to 3V4 p	procedure.	
	3 E5	G	Parallel circuits only.	No changes.			
	3Q4	G	Reverse 3Q4 to 3V4 prod	cedure.			
	354	G					
4A6			No practical substitute.				
5A6			No practical substitute.				
5AX4	5AZ4	G	No changes.				
	5U4	G	0				
	5V4	G					
	5W4	G					
	5 Y3	G					
	5Z4	G					
5AZ4	5AX4	G	No changes.				
	5U4	G	3				
	5 V4	G					
	5W4	G					
	5 Y.3	G					
	5Z4	G					
5R4GY	514	G	No changes, Use only w	here inverse	neak vo	Itage does r	ot exceed 450
JILIGI	5U4	G	volts per plate.	nore mycroe	peur to.	inge uves i	NOT CAUCOU IOU
	5V4	P	Volte por Plater				
	5 Y3	P					
	5Z4	P					
		-					
	5X4	G	Same as 5T4 to 5Y4				
	5Y4	P					
	5 <b>Z</b> 3	G	Where inverse peak volta	age ner nlate	does no	t exceed 45	0 volts. Change
	80	P	socket to four prong and	rewire as fo	llows		
	83	G	No 2 on			1 on four c	rong
	83 V	G	0 0 4		to no.	2	02 0
		4	C C C C C C C C C C C C C C C C C C C		to	3	O' O'
5T4	5AX4	G	No changes.				
	5AZ4	G					
	5U4	G					
	5U4	G G					
	5 U4 5 V4	G					

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3Q5-5T4

5T4 - 5X4			RECEIVING TUBE SUBSTITUTION G	UIDE		
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECT	ESSARY		
5T4	574	G	Make adaptor as follows:			
			No. 1 on base	to No.	1 on top	
			2	to	8	
			4	to	3	
			6	to	5	
			8	to	7	
F 774	C 4 32 4	G				
5U4	5AX4	G	No changes.			
	5AZ4	G				
	5T4	G				
	5V4	G				
	5W4	G				
	5Y3	G				
	5Z4	G				
	5 Y 4	G	Same as 5T4 to 5Y4.			
	523	E	Same as 5R4GY to 5Z3.			
	80	G	Same as sheet to sol.			
	83	G				
	83 V	G				
	0J V	U				
5 V4	5AX4	G	No changes.			
D T L	5.A.Z.4	G	THE BRITE CON			
	574	G				
	5U4	Ğ				
	5W4	G				
	5¥3	G				
	5Z4	G				
	5 ¥4	G	Same as 5T4 to 5Y4.			
		-				
	5Z3	G	Same as 5R4GY to 5Z3.			
	80	G				
	83	G				
	83 V	G				
Country .	Contraction (	152				
5W4	5 AX4	G	No changes.			
	5AZ4	G				
	574	G				
	5 U4	G				
	5 V4	G				
	5 ¥3	G				
	524	G				
	and and a second se	-	and the second side of second			
	5 Y4	G	Same as 5T4 to 5Y4.			
	5Z3	G	Same as 5R4GY to 5Z3.			
	523 80	G	paine as ourder to vas,			
	83	G				
	83V	G				
	00 4	G				
5X3	5 <b>Z</b> 3	G	No changes.			
	80	G	O. T.			
	83	G				
	83 V	G				
	1275	G				
				•		
5X4	574	G	Rewire as follows:			
	5U4	G				
	5 V4	G	No. 7	to No.		
	5 Y 3	G	3		4	
	5Z4	G	5	to	6	

5×4-5Z3

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5X4	5Y4	G	No changes.
	5Z3	G	Change octal to four prong socket and rewire as follows:
	80	P	No. 3 on octal to No. 2 on four prong
	83	G	$\bigcirc \bigcirc $
	83 V	G	C 20 7 to 1
			OPEC 8 to 4 SUB
5¥3	5AX4	G	No changes.
	5AZ4	G	are anone and
	5T4	G	
	514	G	
	5 V4	G	
	5W4	G	
	5Z4	G	
	5 ¥4	E	Same as 5T4 to 5Y4.
	5Z3	G	Change socket to four prong and rewire as follows:
	80	E	No 2 an octal to No 1 on four prong
	83	G	6 $6$ $4$ to $2$ $(0, 10, 10, 10, 10, 10, 10, 10, 10, 10, 1$
	83 V	G	6 to 3 0 0
	001	U	Orac 8 to 4 sub.
5 Y 4	574	G	Same as 5X4 to 5T4.
TI			Same as SA4 to 514.
	5114	G	
	5V4	G	
	5W4	E	
	5 Y3	E	
	5X4	G	No changes.
	523	G	Same as 5X4 to 5Z3.
	80	E	
	83	G	
	83 V	G	
6Z3	5AX4	G	Same as 80 to 5U4.
	5AZ4	G	
	5 74	G	
	5U4	E	
	5V4	G G	
	5W4	G	
	524	G	
-	5X3	E	No changes.
	80	G	
	83	G	
	83 V	G G G	
	1275	G	
	5X4	E	Change four prong to octal socket and rewire as follows:
			No. 1 on four prong to No. 7 on octal
			$\begin{pmatrix} 2 & 3^{-1} \\ 1 & 1 \end{pmatrix}$ 2 to 3
			6' 6/ 3 to 5
			orice 4 to 8 sus

and the second se	No. in conception of the			- And State of State		
TUBE	SUB.	PERF.	CIRCUIT CHANGES	NECESSARY		
5 <b>Z</b> 4	5AX4	G	No changes.			
	5AZ4	G				
	5T4	G				
	5U4	G	( # )			
	5V4	G				
	5W4	G				
	5Y3	G				
	5¥4	G	Same as 5T4 to 5Y4.			
A3	6A5	E	Same as 6A3 to 6B4. No. 8			).
	6B4	E	Change socket to octal and r			1
			No. 1 on for		o. 2 on octa	
				to	3	
			0' 0 3	to	5	605
			ORIE 4	to	7	SUB
A4	52	G	No changes.			
A4/LA	6F6	G	Parallel circuits only. Char	ge socket to o	ctal and rev	wire as follows.
	6 G 6	G	No. 1 on fiv	-	o. 2 on octa	
	6K6	G			3	100
			0	to		300
	6U6	G		to	5	0
	6 V 6	G	000 4 000 5	to	4 7 and 8	SUB
	41	G	Parallel circuits only. Chan	ge socket to si	x prong and	rewire as follow
	42	G	No. 1 on fiv		o. 1 on six	Drong
			2	to	2	000
			(C (O) 3	to	4	02 501
			0 0 4	to	3	60
			ORIG. 5	to	5 and 6	SUB
A5	6A3	E	Reverse 6A3 to 6B4 procedu	<b>PO</b>		
AJ	UAJ	10	Reverse ons to one procedu.			
	6 <b>B</b> 4	Е	Connect a 20 ohm resistor fr Connect a 20 ohm resistor fr			
A 6	6E6	G	Parallel circuits only. No cl	hanges.		
	6N7	G	Reverse 6N7 to 6A6 procedu	re.		
	79	G	Reverse 79 to 6A6 procedure			
A.7	6:4.8	E	Change socket to oatal and m	avira ar follow		
A7	6A8		Change socket to octal and re			1
	6J8	E		ven prong to No		1
	6K8	E	2	to	3	
			6 2 6 3	to	4	008
			(O2 50) 4	to	6	
			02,00 5	to	5	
			ORIS, 6	to	8	SUB
			7	to	7	
			cap	to	cap	

6A7-6A84

TUBE	SUB.	PERF.	CIRCI	HT CHANGES NECH	ESSARY		
6A7	788	E	Change socket	to loctal and rewire			
	788	15 A		No. 1 on seven pr			
	737	E	690	2	to	2	00
	757	E	3 3	3	to	5	(OAR C)
			667	4	to	3	
			ORIS	5	to	4	SUM
				6	to	7	
				7	to	8	
				cap	to	6	
	707	G	Change socket	to loctal and rewire			
				No. 1 on seven pr	-		
			De	2	to	2	100
			10,00	4	to	3	OFRO
			02, 60)	5	to	4	06201
			6.9	6	to	7 and 5	00
			QAR 13	7	to	8	579
				cap	to	6	
				Must be well shiel	lded.		
6A8	6A7	E	Change socket	to seven prong and	rewire as	follows:	
				No. 2 on octal	to No	. 1 on seven	prong
				3	to	2	14.11
			1000	4	to	3	68
			(I) (I)	5	to	5	10 2 01
				6	10	4	
			ORIS	7	to	7	SIIB
				8	to	6	
				cap	to	cap	
	6D8	E	Parallel circui	ts only. No changes			
	6.18	E	No changes.				
	6 K8	E					
	7A8	G	Same as 6D8 to	7A8 but in parallel	circuit o	nly.	
	<b>7B8</b>	G	Same as 6D8 to	7A8			
							7.
	7.17	G	Same as 6J8 to	7J7			
	7Q7	G	Change socket	to loctal and rewire	as follow	vs: •	
				No. 2 on octal	to No	. 1 on loctal	
				3	to	2	6.0
			6000	5	to	4	
				6	to	3	0000
			CO.	7	to	8	C ®
			ORIG	8	to 7	and 5	505.
				cap	to	6	
				Must be well shiel	ded. Real	ign if necessa	ry.
6AB4	6C4	G	Remove and tap	e up any wires anch	nored on 1	No. 5.	
	6J4	Р	Parallel circui	ts only. Rewire as	follows:		
				No. 7	to No to	. 2	
				Do not use blank c			

Do not use blank connections on socket.

6AB4-6AC5G			RECEIVING TUBE SUBSTITUTION GUIDE							
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY							
6AB4	6N4	Р	Parallel circuits only. Rewire as follows:							
			Reverse No. 5 and No. 7 Connect No. 1 to No. 5 Remove and tape any wires connected to unused pins.							
	9002	P	Rewire as follows:							
			Remove and tape up any wires anchored on pins No. 2 and No. 5							
6AB5/6N5	6E 5	P	Parallel circuits only. No changes.							
	6U5/6G5	Р	Parallel circuits only. No changes.							
6AB6	6AC6	G	Parallel circuits only. No changes.							
	6 B5	G	Change socket to six prong and rewire as follows: No. 2 on octal to No. 1 on six prong							
	*		$ \begin{array}{c} 6 & 3 \\ 3 & 6 \\ 6 & 4 \\ 6 & 6 \\ 5 \\ 5 \\ 6 & 4 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 \\ 6 & 6 $							
			0816 7 to 6 sua 8 to 5							
	6N6	G	No changes.							
6AB7/1853	6AC7/1352	G	No changes.							
	GAJ7	G	No changes.							
	6SD7	G	Parallel circuits only. No changes.							
	6SE7	G								
	6SJ7	G								
	6SK7	G								
	6887	G								
	5693	G								
	7 77	G	Change socket to loctal and rewire as follows: No. 2 on octal to No. 1 on loctal							
			0 20 5 to 7 0 20							
			Constant de la 3							
			7 t.o 8							
			8 to 2							
	7W7	G	Change socket to loctal and rewire as follows:							
			No. 2 on octal to No. 1 on loctal							
			3 to 5							
			5 to 4 or 7							
			6 to 3							
			Okig 7 to 8 SUB.							
			8 to 2							
a tora	U A CLE CITA	D	3° - 1							
6AC5G	6AC5GT 6AC5GT/G	E E	No changes.							

6AC5GT-6AD6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AC5GT	6 AC5G 6 AC5GT/G	e E	No changes.
6AC6	6AB6	G	Parallel circuits only. No changes.
6AC7	7W7	G	Same as 6AB7/1853 to 7W7.
6AC7/1852	6AB7/1853	G	No changes.
	6AH6	G	Change socket to miniature and rewire as follows: No. 2 on octal to No. 3 on miniature 3 to 2 4 to 1 5 to 7 6 to 6 3 to 4 8 to 5
	6AJ7	G	No changes.
	6SD7 6SE7 6SJ7 6SK7	GGGG	Parallel circuits only. No changes.
	6557	G	
	5693	G	
	7 V7	G	Same as 6AB7/1853 to 7V7.
6AD4	6K4	G	No changes.
6AD5	6AE5	G	No changes.
	GAF5	G	
	6C5	G	
	6.15	G	
	6P5	G	
	6F5	E	Rewire as follows:
			Remove wires from No. 3 and connect to No. 4. Connect grid lead to No. 5. This pin may be used for anchor. Extend to grid cap.
	6K5	G	Rewire as follows:
			Connect terminal No. 5 to grid cap. This terminal may be used as an anchor.
	7B4	G	Change socket to loctal and rewire as follows: No. 2 on octal to No. 1 on loctal 3 to 2 5 to 6 7 to 8
			ORIG 8 to 7 SUB
6AD6	6AF6	G	No changes.

6AD7-6A	GEG		RECEIVING TUBE SUBSTITUTION GUIDE
THBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AD7	6F7	G	Parallel circuits only. Change socket to seven prong and rewire as follows No. 1 on octal to No. 5 on seven prong 2 to 1
			$ \begin{array}{c} 6 & 6 \\ \hline 6 & 6 \\ \hline 6 & 4 \\ \hline \\ 4 \\ \hline \\ 10 \\ 3 \\ \hline \\ 6 \\ 5 \\ 6 \\ 5 \\ \hline \\ 6 \\ 5 \\ \hline \\ 6 \\ 5 \\ \hline \\ 6 \\ \hline \\ 6 \\ 5 \\ \hline \\ 6 \\ \hline$
			$\begin{array}{c} \bigcirc & \bigcirc & 5 \\ \bigcirc & \bigcirc & 6 \\ \hline & & 7 \\ \hline & & 7 \\ \hline & & & 7 \\ \hline & & & 5 \\ \hline & & & & & 5 \\ \hline & & & & & 5 \\ \hline & & & & & & 5 \\ \hline & & & & & & & & \\ \hline & & & & & & & &$
	6 P7	G	Parallel circuits only. Remove wires from No. 5 and extend to grid cap. Rewire as follows: No. 4 to No. 5
			3     to     4       7     to     3       1     to     7
6AE5	6AD5 6AF5		No changes.
	6C5 6J5 6P5		
6AE6	6AH7	G	Parallel circuits only. Rewire as follows: Remove and tape up any wires on No. 1 No. 8 to No. 4 2 to 8 4 to 6
			Connect No. 4 and No. 2 together Connect No. 1 and No. 5 together
	6N7	Р	Parallel circuits only. Rewire as follows: No. 4 to No. 6 Connect No. 4 and No. 5 together.
6AF5	6AD5 6AE5 6C5 6J5 6P5	G G G G	No changes.
6AF6	6AD6	G	No changes.
6AF7			No practical substitute.
6AG5	6AJ5	Р	Parallel circuits only. No changes.
	6AK5	G	Parallel circuits only. No changes,
	6AU6	G	No changes,
	6BC5	G	No changes.
	5590 5591 9001 9003	G G G	Parallel circuits only. No changes.
6AG6G			No practical substitute.

6AG7-6AJ5	6	A	G	7	-1	6	A	J	5	
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TUBE	SUB.	PERF.	CIRCUIT CHA	NGES NECESS	ARY		
6AG7	6AK7	E	No changes.				
GAH5	6AL6	G	Rewire as follows:				
			No. 4		to cap		
			1		to 4		
			6		to 5		
1	6L6	G	Rewire as follows:				
			No. 4		to No.	3	
			1		to	4	
			6		to	5	
6AH6 *	6AJ5	P	Parallel circuits only.	No changes.			
	6AK5	P					
	6AS6	P	Parallel circuits only.	Rewire as foll	lows:		
			Revers	se No. 2 and No	. 7		
	6AU6	P	Parallel circuits only.	No changes.			
	6BC5	G	Parallel circuits only.	No changes.			
	6 BD6	P	Parallel circuits only.	No changes.			
	EF50	P	Parallel circuits only.	Reverse EF50	to 6BA	6 procedure	
6AH7	6AE6	G	Parallel circuits only.	Reverse 6AE6	to 6AH	17 procedure.	
	6C8	G	Rewire as follows:				
				t wire from No		rid cap.	
			No. 8	e wires from N	to No.	2	
			4		to ito.	8	
			Connec	t wires remove	ed from	No. 2 to No.	. 4.
	8SN7	Р	Parallel circuits only.				
				e No. 2 and No e wîres from N			
			No. 5	e wires from K	to No.	4	
			6		to	5	
			Connec	t wires remove	ed from	No. 4 to No.	6.
	7N7	P	Parallel circuits only. No. 1 o	Change socket on octal		al and rewire 4 on loctal	e as follows:
			. 2		to to	2	
			00 3		to	3	00
					to	7 5	
			CRIG 6		to	5	C C C
			7		to	8	
-			8		to	1	
6AJ5	6AG5	P	Parallel circuits only.	No changes.			
	6AK5	Р	No changes.			*	
	6 Å U 6	Р	Parallel circuits only.	No changes.			
			61	* 6.	SA Add	induin at has	le of this contin

6AJ7-64	MG		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AJ7	6AB7/1853	G	No changes.
01101	6AC7/1852	G	. vo changes.
	6SD7	G	Parallel circuits only. No changes.
	6SE7 6SJ7	G	
	6SK7	G G	
	6557	G	
	5693	G	
6AK5	6 A G 5	G	Parallei circuits only. No changes.
	6AH6	G	Parallel circuits only. Connect No. 2 and No. 7 together.
	VIIIIO	0	A MARKAN ON OTHER ONLY POINT OF A MARKAN POPULATION
	6AJ5	P	No changes.
		-	
	6AU6	P	Parallel circuits only. No changes.
6AK6	6AR5	G	Parallel circuits only. Rewire as follows:
			Connect No. 2 and No. 7 together
6AK7	GAG7	E	No changes.
6AL5	6H5	G	Where space permits. Change socket to octal and rewire as follows:
ULLIU	GIIS	u	No. 1 on miniature 10 No. 8 on octal
			2 to 3 (0.0)
			3 to 2 (0) 6
			4 to 7
			oreid 5 to 4 sure 7 to 5
			7 to 5
6AL6	6AH5	G	Reverse 6AH5 to 6AL6 procedure.
	6L6	E	Rewire as follows:
			cap to No. 3
			cap to no. o
			No approving Laubstituto
6AL7			No practical substitute.
6AM5	6AQ5	P	Parallel circuits only.
			No. 7 to No. 6
-			
	6AR5	Р	Parallel circuits only. Rewire as follows:
			No. 7 to No. 6
6AM6	6AH6	G	Parallel circuits only. Same as 6AM6 to 6AU6.
	6AK6	G	

6	A	M	6	-	6	Δ	Q	7	
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
GAME	GAU6	G	Rewire as follows:
UZINIO			
	GBA6	G	Remove wires from No. 2
	6BD6	G	No. 6 10 No. 2
			7 10 6
			Connect wires removed from No. 2 to No. 7.
6AN5	6AQ5	G	Rewire as follows;
-			No. 7 to No. 2
6ANG			No practical substitute.
6AN7			No practical substitute.
6AQ5	6AM5	P	Parallel circuits only. Rewire as follows:
			No. 7 to No. 1
			6 to 7
	6AN5	G	Parallet circuits only. Rewire as follows:
			No. 7 10 No. 1
			No. 7 10 No. 1
	6AR5	G	Rewire as follows:
			No. 7 to No. 1
	6AS5	G	Parallel circuits only. Reverse 6AS5 to 6AQ5 procedure.
	6BF5	Р	Parallel circuits only. No changes.
	6 V 6	G	Where space permits. Change socket to octal and rewire as follows:
			No. 1 on miniature to No. 5 on octal
			2 to 8
			600 · 3 to 2
			(2) (2) 4 to 7 (2)
			5 to 3
			ORID. SUIS
*			7 to 5
6AQ6	6BD7	G	Parallel circuits only. Reverse 6BD7 to 6AQ6 procedure.
		-	
	6AT6	G	Parallel circuits only. No changes.
	6AV6	G	
	6BF6	G	
	6BK6	G	
	6BT6	G	
	6BU6	G	
6AQ?	6.4W7	G	Rewire as follows: Remove wires from No. 1
			4 to 2
			Connect wires removed from No. 1 to No. 4.
			Remove wires from No. 3
			No. 5 to No. 3
			6 to 5
			Connect wires removed from No. 3 to No. 6.

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6AR5-6AT6			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AR5	6AK6	G	Parallel circuits only. Rewire as follows:
			Connect No. 2 to No. 7 together.
	6AM5	P	Parallel circuits only. Rewire as follows:
			No. 6 to No. 7
	6AQ5	G	Parallel circuits only. No changes. Any wires connected to terminal No. 7 must be removed and taped up.
	6AS5	G	Parallel circuits only. Reverse 6AS5 to 6AR5 procedure.
6AR6	6F6	G	Parallel circuits only. Rewire as follows:
	6 G 6	G	No. 8 to No. 2
	6K6	G	1 to 8
	61.6	G	5 to 4
	6U6	G	7 to 5
	6V6	G	6 to 7
	6W6	G	
	6YG	G	
	5824	G	
6AR7			No practical substitute.
UANI			No praemear substitute.
6AS5	6AN5	G	Parallel circuits only. Rewire as follows:
	E.		Reverse No. 1 and No. 2
			5 to 1
			7 to 5
	6AQ5	G	Parallel circuits only. Rewire as follows:
			Reverse No. 1 and No. 2
			5 and 7
	6AR5	G	Parallel circuits only. Rewire as follows:
			Reverse No. 1 and No. 2
			5 to 1
			7 to 5
6A:36	6AH6	P	Parallel circuits only. Rewire as follows:
			Hoverse No. 2 and No. 7
	0.000.4.0	~	
	6BH6	G	Parallel circuits only. No changes.
	6BJ6	G	
	6CB6	G	
6AS7G			No practical substitute.
6AT6	GAQG	G	Parallel circuits only. No changes.

6AT	6-6	AXG
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AT6	GAV6	G	No changes.
	6BF6	G	
	6BK6		
		G	
	6BT6	G	
	6BU6	Ġ	
	6BD7	G	Parallel circuits only. Reverse 6BD7 to 6AQ6 procedure.
6AU5	6AV5	G	Parallel circuits only. No changes.
OAUS	6BD5	G	Taranci chicuns only. In bhanges,
	0000	U	
6AU6 *	6AG5	Р	No changes.
	6AJ5	P	Parallel circuits only. No changes.
	6AK5	P	
	6BA6	G	No changes.
	6 B116	G	Parallel circuits only. Rewire as follows:
			Reverse No. 2 and No. 7
			*
	EF50	G	Reverse EF50 to 6BA6 procedure.
6AV5	6AU5	G	No changes.
	6BD5	G	
9	GINERO	ų	
	6 BQ6	G	Parallel circuits only. Reverse 6BQ6 to 6BD5 procedure.
6AV6	6AQ6	G	Parallel circuits only. No changes.
011 4 0	OTTAND	ų	a de deros our de serve our de la serve de ser
	6AT6	G	No changes.
	0111.0	U	teo crattinges.
6AW7	6AQ7	G	Reverse 6AQ7 to 6AW7 procedure.
6AX5	6AX6	E	Parallel circuits only. Tie Nos. 4 and 8 together.
	6BY5	E	Parallel circuits only. Rewire as follows:
			Connect Nos. 1 and 8 together;
			also Nos. 3 and 4.
	EW5	C	Parallel airquite only No abanges
	6W5	G	Parallel circuits only. No changes.
	·6X5	G	
	6ZY5	G	
	1274	G	
0.4.74C	0	6	
6AX6	8AX5	G ·	Can be used only where No. 4 and No. 8 in 6AX6 are connected together
	6W5	G	without change.
	6X5	G	
	6ZY5	G	
	1274	G	
		-	

6AX6-6	687			RECEIVING TUBE SUBSTITUTIO	ON GUIDE
TUBE		SUB.	PERF,	CIRCUIT CHANGES	NECESSARY
6AX6		6 B.Y5	E	Parallel circuits only. Rewin	re as follows:
				No. 4	to No. 1 to 4
6. <b>B</b> 4		6A3	G	Reverse 6A3 to 6B4 procedur	e.
		6A5	E	No changes but remove any w	ires anchored on No. 8.
6B5		6AB6	E	Same as 6B5 to 6N6. Paralle	l circuits only.
		6N6	Е	Change socket to octal and re	
				No. 1 on six	
				2	10 3
				(02 °C) 3	to 4
				604	to 5.
				OHIG 5	to 8 sub
				6	to 7
		42	P	No changes.	4 A
6 B6		6Q7	E	No changes.	
0110			14		
		6SQ7	E	Make adaptor as follows:	4
				No. 1 on base	to No. 1 on top
				2	to 8
				3	to 6
				4	t.0 4
				5	to 5
				7	to 7
				-8	to 3
				Extend No. 2	on top to grid connection.
		6T7	E	Parallel circuits only. No cha	anges.
		7B6	G	Change socket to loctal and re	wire as follows;
				No. 2 on octa	to No. 1 on loctal
				A6 3	to 2
				(00× 4	to 5
					to 6
				7	to 8
				GRIG	to 4 or 7
				cap	to 3
		706	E	Same as 6R6 to 7R6. Parallel	circuits only.
		75	E	Change socket to six prong and	
				No. 2 on octal	
				10 C 3	to 2
				( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( ) ( )	to 4
				7	to 6
				64G. 8	to 5
				cap	to cap
687		2137	E	Heater voltage-current ratings	s differ.
				C C	

687-6865

TUBE	SUE.	PERF.	CIRCL	'IT Ci	HANGES NECESS.	ARY		
6137	6B.	E	Change socket	to oct	al and rewire as	follows	*	
					1 on seven prong			
					3	to	3	
			500		3	LO	8	( and
			10, 2,0)		4	to	4	6 ON
			02 60		5			(a) (a)
			00			to	5	00
			GRIG		6	to	8	-SUB
					7	to	7	
					cap	to	cap	
	7E7	G	Change socket	to loc	tal and rewire as	follows	5:	
					I on seven prong			
					2	to	2	
			05		3	to	5	60
			6.9.0		3			600
			02 60		-	to	3	600
			100/		5	to	4	Coo
			ORIG	-	6	to	7	SUB
					7	to	8	
					cap	10	6	
6 8 8	687	E	Reverse 6B7 to	6B8	procedure.			
	767	G	Change cochot t	0 100	tal and rewire as	follows		
	/ 124 /	G	Change Socket i					
							l on loctal	
					3	to	2	
			000		4	to	3	00
			(3) (C)		5	to	4	(3 (3)6)
					6	to	5	COND
			00		7	to	8	AUB .
					8	to	7	
					cap	to	6	
6BA5	6BH6	P	Change to minia		and connect as fol	lows:		
	6BJ6	P		No.	on 6BA5 base	to No.	5 on miniati	ire
			The 6BA5 base		2	to	2	Mart
			numbers 1 to 6		3	to	1	1000
			clockwise; an		4		and 7	0 0
			arrow indicates				6	00
						to		208
			plate lead No. 1	-	6	to	4	
6BA6	GAU6	G	No changes.					
	6 BDS	G						
	EF50	G	Reverse EF50 to	o 6BA	6 procedure.			
6BA7	6BE6	G	Change socket to	o min	iature and rewire	as foll	ows:	
			2				6 on miniatu	Ire
				2	2	to	1	
			: 3	1	3	to	2	
			(DOO)			to	3	000
			Con con			to	4	
			ORIG					BUB
			U.S.			to	2	
						to to	7	
					U.		0	
6BC5	6AG5	P	No changes.					
	6AJ5	P	Parallel circuits	s only	No changes			
	6AK5	P	a di direr cri culti	Jointy	. no changes.			
	9001	P						
	9003	P						

6807-68J	6		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BC7			No practical substitute.
6 BD5	6AU5 6AV5	P P	Parallel circuits only. No changes.
	6BQ6	G	Parallel circuits only. Reverse 6BQ6 to 6BD5 procedure.
6 BD 6	6AH6	P	Parallel circuits only. No changes.
	EP50	G	Reverse EF50 to 6BA6 procedure.
5 BD7	6AQ6 6AT6 6BF6 6BT5 6BU6	0 0 0 0 0	Parallel circuits only. Change socket to miniature and rewire as follows: No. 1 on noval to No. 7 on miniature 2 to 1 3 to 2 4 to 3 5 to 4 6 to 5 8 to 6
6BE6	6BA7	G	Change socket to nine pin noval and rewire as follows: No. I on miniature to No. 2 on noval 2 to 3 3 to 4 4 to 5
			4 to 5 5 to 9 6 to 1 7 to 7
	5915	G	No changes.
6 BF5	6AQ5	E,	Parallel circuits only. No changes.
	6AR5	P	Parallel circuits only. Short No. 7 to No. 1.
KBF6	6 BD7	G	Parallel circuits only. Reverse 6BD7 to 6AQ6 procedure.
	6BU6	G	No changes.
SBE7	6BG7	E	
6BG6	6BQ6	P	Parallel circuits only. Rewire as follows:
			No. 8         to No. 4           3         to         8
	6CD6	Р	Parallel circuits only. No changes. Sometimes it is necessary to increase wallage sating of screen resistor.
61.67	6BF7	E	No changes.
6 6116	6 BJ6	G	No changes.
	6AS6 6BC5 6CB6	G G	Parallel circuits only. No changes.
6BJK	6AS6 6BC5 6CB6	G P G	Parallel circuits only. No changes.

6BJ6-6C4

TUBE	SUB.	PERF.	CIRCUIT CHANGES NE	CESSARY	
6 <b>B</b> J6	6B116	G	No changes.		
6RK6	6AT6	G	No changes.		
	SAVG	G	0		
	SBFU	G			
	6310	G			
	6BU8	G			
6BN6			No practical substitute.		
6306	GAV5	G	Parallel circuits only. Rewire a	as follows:	
	6BD5	G	No. 5	10 No.	1
	0172-0	5	8	10	3
			cap	io	5
			4		
			4	(C)	8
	GRGE	P	Parallel circuits only. Rewire a	s follows:	
			No. 8	to No.	24
			4	to	3
	3		*2	to	8
	6CD6	Ч	Where extra filament current is Rewire as follows:	available. F	Parallel circuits only.
			No. 8	to No.	12
			4	to	8
GBTG	6:AQ6	G	Parallel circuits only. No chang	res.	
011.0	01199	4		,	
	6BD7	G	Parallel circuits only. Reverse	6BD7 to 6AQ	6 procedure.
	6 B K 6	G	No changes.		
6BU6	6BD7	G	Parallel circuits only. Reverse	6 BD7 to 6AG	6 procedure.
	6BF6	G	No changes.		
6BY5	6AX5	G	Parallel circuits only. Where N	o. i and Nc.	are connected together,
	6W 5	Ġ	change connections as follows;		
	6X5	G	6		
	6ZY5	G	No. 4	to No.	3
	1274	G		10.10.	2
	12/4	0			
6C4	6AB4	G	Rewire as follows:		
			Connect No. 5	to No.	1
	6J4	P	Parallel circuits only. Rowire a	s follows:	
			No - 7	to Nu.	2
			1	to ino.	7
			A		

to

				4	14		
604-606			RECEIVING TUBI	E SUBSTITUTION GUID	DE	8	· .
TUBE	SUB.	PERF.	CIRCUI	IT CHANGES NECES	SARY		
6C4	6AD5 6AE5	Р Р	rewire as follow				tket to octal an
	GAF5	P		No. 1 on miniature	to No.	. 3 on octal	
	SC 5	P	() () () () () () () () () () () () () (	3	10	3	(DO)
	6.15	Р	0	4	10	7	6
	6125	P	20	5	to	3	10 ag
		N.	DING	G	τo.	5	SUB CON
				7	to	8	
	6L5	Р	Where space per	rmits. Same as 6C4	10 6AD5	·-	
	6184	P	Parallel circuits	s only. Rewire as fol	llows:		
				No. 1	to No.	. 5	
				Reverse No. 6 and N			
	7A4 7B4	G P	Parallel circuits rewire as follow	souly. Where space	permits	. Change so	eket to loctal
				No. 1 on miniature	to No.	2 on luctal	
				3	10	1 2 On locial	(S. BX
			(J) ~ (J)	4	10	8	CARO
				5	to	2	0.00
			ORIG	6	10	fi	
				7	to	7	100
	9002	Р	No changes.				8
6°C5	6AD5	G	No changes.				
000	6AE5	G	NO changes.				
	6'AF5	G					
	6C4	G	Reverse 6C4 to 6	SAD5 procedure.			
	6F5	G	Make adaptor as	follows:			
				No. 1 on base	to No.	1 on top	
				2	10	2	
				3	10	4	
				5	to	cap	
				7	to	7	
				8	to	ų	
	615	G	No changes.				
	6P5	G	No changes.				
	7A4	G	Same as $6J5$ to 7.	A4.			
	784	G	Same as 6J5 to 7.	A4			
	37	G	0	five prong and rewir			
	76	G	0	No. 2 on octal		1 on five pro	ong
			6000	3	to	2	10)
			620	5	to	3	(2)
			00	7	10	5	VO Q
			PRIC	8	to	4	508
6C6*	6D6	G	No changes.				

See Addendum at back of this section.

606-608

TUBE	SUB.	PERF.	CIRCUI	I CHANGES NECES	SARY		
6C6	6D7 6E7	G G		seven prong and re No. 1 on six prong		follows: 1 on seven ;	
	0 LI I	U		2	to	2	mong
			10 0 De	3	01	3	6030
			(02 30)	4	to	4	(0, 4,0)
			00/	5	10	6	100/
			OR G	6	to	7	SLB
				cap	to	cap	
	617	Е	Change socket to	octal and rewire as	follows	:	
	8K7	G		No. 1 on six prong		2 on octal	
2	617	G	~	2	to	3	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~
- 4			3 0 pa	3	to	4	6002
			(Oz 50)	4	to	5	600)
			201	4 5 6	to	8	00
			CHIG	6	to	7	SUB
				cap	to	cap	
	657	G	Same as 5C6 to 6	J7. Parallel circui	ts only.		
	6SJ7	E	Change socket to	octal and rewire as	follows		
	6SK7	G		lo. 1 on six prong		2 on octal	
				2	to	8	
			(0 0 p3	3	to	6	( O O O
			02 50	4	to	3	
			00	5	to	5	NO CO
			DRIG	6	to	7	348
				cap	to	4	
•	6W7	G	Same as 6C6 to 6.	J7. Parallel circui	ts only.		
	7A7	G	Change socket to	loctal and rewire a	s follows	i:	
				o. 1 on six prong		1 on loctal	
			<u> </u>	2	to	2	
			(3.0 pe	3	to	3	000
			(Oc 50)	4	to	4	(0) (0)
			60	5	to	7	CO'D
			QRIG	6	to	-8	Sua
				cap	to	6	
	7B7	G	Same as 6C6 to 7	A7. Parallel circui	ts only.		
	7C7	· G					
	77	E	No changes.				
	78	E	NO Changes.				
		E					
	1221	E	14. J.				
6C7	6Q7	G	Make adaptor as f				
	6R7	G	N	o. 1 on base	to No.	2 on top	
				2	to	3	
				4	to	4	
				5	to	5	
				G	to	8	
				7	to	7	
	6T7	G	Same as 6C7 to 60	Q7. Parallel circui	ts only.		
0.00							
6C3	6F8	G	rarattet circuits o	only. No changes.			

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608-608			RECEIVING TUBE SUBSTITUTION GUIDE	
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY	
6C8	7.F7	G	Change socket to loctal and rewire as follows:	
			No. 2 on octal to No. 1 on lo	ctal
			3 10 3	
			(0.50) 4 to 2	60
			(0) 5 to 5	(OPAO)
			( 10 6 to 6	0 20
			7 to 8	SUB
			8 to 7	
			cap to 4	
6CB6	6AS6	Р	Parallel circuits only. No changes.	
	6B1:6	P		
	0BJ6	Р		
6CD6	6 BG6	G	Parallel circuits only. No changes.	
	6 BQo	P	Parallel circuits only. Rewire as follows:	
			No. 0 to No. 1	
			No. 8 to No. 4 3 to 8	
		*	3 to 8	
6D4			No practical substitute.	
6D6	6C6	G	No changes.	
	6D7	G	Same as 6C6 to 6D7.	
	6E7	G	Same as 6Cf to 6D7.	
	6J7	G	Same as 6C6 to 6J7.	
	6K7	E		
	6.57	G	Same as 6C6 to 6J7. Parallel circuits only.	
	6SJ7	G	Same as 6C6 to 6SJ7.	
	6SK7	E		
	USILI			
	6U7	G	Same as 6C6 to 6J7.	
	6W7	G	Same as 6C6 to 6J7. Parallel circuits only.	
	7A7	E	Same as 6C6 to 7A7.	
	7B7	G	Same as 6C6 to 7A7. Parallel circuits only.	
	707	G		
	39/44	G	Same as 78 to 39/44.	
	77	G	No changes,	
	78	E		
6D7	GE7	G	No changes.	
6D8	6A7	G	Parallel circuits only. Reverse 6A7 to 6A8 procedure	
	0.4.0	~		
	6A8	G	Parallel circuits only. No changes.	
	6J8	G		
	6 <b>K</b> 8	G		

608-6F5

TUBE	SUB.	PERF.	CIRCUIT CHAN	GES NECESS	ARY		
GD8	7A8	G	Change socket to loctal	and rewire as	follows	5:	
			No. 2 o			1 on loct	al
			3		to	2	
			664		to	5	(00)
			(0) E) 5		to	4	OMO
			6		to	3	0 20
			(1)°(8) 7. (1)°(7) 7.		to	8	00
20			8		to	7	3410
					to	6	
1.0			cap	3	EG.	U	
	7 10 0	0					
	7B8	G	Same as 6D8 to 7A8. Pa	arallel circuits	s only.		
×	737	G					
	757	G					
0			The second respect to the		-		
	7Q7	G	Same as 6A8 to 7Q7. Pa	arallel circuits	s only.		
	12A8	P	Series circuits only. No	changes.			
	12K8	P	Series Streats any the	and a set			
	1200	1					
GES	2 85	E	Heater voltage - curren	at patings diffs	1 20		
024	2100	alian (	meater voltage - currer	ar ratings and			
	6AB5/6N5	P	Parallel circuits only. 1	No oborroos			
	04 PD/ DINO	·P	Faranei circuits only.	no changes.			
	0.015	D	N				
	615	E	No changes.				
	6U5/6G5	E					
		~					
6E6	6A6	G	Parallel circuits only. 1	No changes.			
- north							
6E7	6D7	G	No changes.				
GES			No practical substitute.				
(1 = 2 - 0		-	7. 1				
6F4	6L4	P	No changes.				
d attack	0.01950	~					
6F5	GAD5	G	Make adaptor as follows:		100		
			No. 1 on	base	to No.	I on sock	et
			2		to	2	
			4		LO	3	
			7		to	7	
			8		to	8	
			Con	nect grid cap	ta	5 on base	
				0			
	GC5	G	Reverse 6C5 to 6F5 proc	edure.			
	615	G	interest of the test prop				
	6 K5	E	Change connections as fo	110105 *			
	0.170	14	Change connections as it	TTG ND,			
			No. 4		to No.	0	
			140. 4		CO TADA		
	012 725	17	2.4 L				
	6\$F5	E	Make adaptor as follows:		-		
			No. 1 on			l on top	
	*		2	1	0	8	
			4	1	to	5	
			7		to	7	
			8	1	to	2	
			cap			3	
			K				

6F5-6F	8		RECEIVING TUBE SUBSTITUTION GUIDE	
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY	
6F3	7A4 7B4	G G	Change socket to loctal and rewire as follows; No. 2 on octal to No. 1 on loc 4 to 2 7 to 8 8 to 7 cap to 6	
6F6 *	6A4/LA	P	Parallel circuits only. Reverse 6A4/LA to 8F6 proces	lure.
	6AD7	G	Parallel circuits only. Remove and tape up any wires	on Nos. 1 and 6.
	6AR6	G	Where additional filament current is available. Rever procedure.	se 6AR6 to 6F6
	6G6 6K6 6L6 6U6 6V6 7B5	P G G G G	Parallel circuits only. No changes. Same as 6K6 to 7B5.	
	705	G		
	38	G	Parallel circuits only. Change socket to five prong and No. 2 on octal to No. 1 on five 3 to 2 4 to 3 5 to cap 7 to 5 8 to 4	
	41	G	Same as 6F6 to 42. Parallel circuits only.	
	42	Е	Change socket to six prong and rewire as follows: No. 2 on octal to No. i on six 3 to 2 4 to 3 5 to 4 7 to 6 8 to 5	D2. 50 508
	89	G	Parallel circuits only. Change socket to six prong and No. 2 on octal to No. 1 on six 3 to 2 4 to 3 5 to cap 7 to 6 8 to 5 short 4 and 5 together.	
6F7	6 P7	E	Change socket to octal and rewire as follows: No. 1 on seven prong to No. 2 on octa 2 to 4 0 3 to 5	1
			$\begin{array}{cccccccccccccccccccccccccccccccccccc$	
6F8	6C8	G	Parallel circuits only. No changes.	

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6	G	5	-	6	J	4
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
8 G5	6AB5	G	Parallel circuits only. No changes.
	6E5	G	No changes.
	6T5	G	
	6 U5	G	
6 G 6	6A4/LA	G	Parallel circuits only. Reverse 6A4/LA to 6F6 procedure.
	6F6	G	Parallel circuits only. No changes.
	6 K 6	G	
	6 V 6	G	
	12A6	P	Series circuits only. No changes.
	41	G	Same as 6F6 to 42. Parallel circuits only.
	42	G	Same as or o to 42. Thranel Circuits only.
	Ŧω	C	
	89	G	Same as 6F6 to 89. Parallel circuits only.
6H4	6H6	G	Parallel circuits only. Rewire as follows:
			No. 4 to No. 3
			Connect No. 3 and No. 5 together.
			Connect No. 4 and No. 8 together.
10775	are loor	-	
GH5	6U5/6G5	Ε	No changes.
6H6	GAL5	G	Same as 12H6 to 12ALS.
	GW5	P	Parallel circuits only. Tie Nos. 4 and 8 together.
	6X5	P	
	6Z Y 5	P	Tie Nos. 4 and 8 together.
	51.0		
	746	E	Parallel circuits only. Change socket to loctal and rewire as follows:
			No. 1 on octal to No. 5 on loctal
			2 to 1 3 to 3
			5 to 6
			7 to 8
			8 to 7
			0 10 V
	7Y4	P	Parallel circuits only. Change socket to loctal and rewire as follows:
	724	P	No. 2 on octal to No. 1 on loctal
			· (a) 3 to 3
			0 6 4 and 8 to 7 (0,00)
			6 5 to 6 6
-			oric 7 to 8 sue
			8 to 7
6H8			No practical substitute.
			All and a set of the set of the set
6J4	6 A B4	Р	Parallel circuits only. Rewire as follows:
			Nos.1 and 5 to 6
			7 to 1
			2 to 7
			2 10 1

614-617			RECEIVING TUBE SUBSTITUTION GUIDE	
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY	
634	6C4	G	Parallel circuits only. Reverse 6C4 to 6J4 procedure.	
	6N4	G	Parallel circuits only. Rewire as follows:	
			Reverse Nos. 5 and 7 No. 6 to No. 7	
*	9002	G	Parallel circuits only. Rewire as follows:	
			Nos. 1 and 5 to No. 6 7 to I	
6J5	6 A D 5 6 A E 5 6 A F 5 6 C 5	G G G	No changes.	
	GF5	G	Same as 6C5 to 6F5.	
	6 K5	G	Change connections as follows: No. 5 to cap.	
	61.5	G	Parallel circuits only. No changes.	
	6 P 5	G	No changes.	
	7A4 XXL	E E	Change socket to loctal and rewire as follows: No. 2 on octal to No. 1 on loctal 3 to 2 5 to 6 7 to 8 8 to 7	SUB
	37 76	G	Same as 6C5 to 37.	
6J6	5687	P	Parallel circuits only. Change socket to noval and rewire a	s follows:
			No. 1 on miniature to No. 9 on noval 2 to 1 3 to 4 4 to 5 5 to 2 6 to 7 7 to 3 and 6	Constants Sure
6J7 [*]	6C6 6D6	E E	Reverse 6C6 to 6J7 procedure.	
	6D7 6E7	G G	Change socket to seven prong and rewire as follows: No. 2 on octal to No. 1 on seven pro- 3 to 2 4 to 3 5 to 4 7 to 7 8 to 6 cap to cap	
	6K7	G	No changes.	
	657	G	Parallel circuits only. No changes.	

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6J.7	6SH7	G	Make adaptor as follows:
	6SJ7	E	No. 1 on base to No. 1 on top
	6SK7	G	2 to 2
			3 to B
			4 to G
			5 to 3
			7 to 7
			8 to 5
			cap to 4
*	6U7	G	No changes.
	GW7	G	Parallel circuits only. No changes.
	7A7	G	Change socket to loctal and rewire as follows:
	7H7	G	No. 1 on octal to No. 5 on loctal
	717	G	2 to 1
		G	
			<b>3</b> to 2 <b>3</b> <b>4</b> to 3
			cap to 6
	787	G	Same as 6J7 to 7L7. Parallel circuits only.
	7C7	G	
		•	
	7G7	G	Same as 6J7 to 6L7.
	39/44	G	Same as 6K7 to 39/44.
	36	G	
			1
	77	E	Reverse 6C6 to 6.17 procedure.
	7.8	G	
	1221	E	Reverse 6C6 to 6J7 procedure.
	1228	E	No changes.
	1232	E	Same as 6J7 to 8L7.
	1620	E	No changes.
618	6A7	G	Same as 6A8 to 6A7.
	6A8	G	No changes.
	6D8	G	Parallel circuits only. No changes.
	6 K8	G	No changes.
	7.A.8	G	Same as 6D8 to 7.A8. Parallel circuits only.
	7B8	G	

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6J7-6J8

6J8-6K6			RECEIVING TUE	BE SUBSTITUTION G	UIDE	
TUBE	SUB.	PERF.	CIRCU	TT CHANGES NECI	ESSARY	
6J8	7J7 757	G. G	Change socket	to loctal and rewire No. 2 on octal 3 4	to No.	s: 1 on loctal 2 5
				5 6 7 •	to to to	4 3 8 508 508
			*	8 cap	to to	7 6
	7Q7	G	Same as 6A8 to	7Q7.		
6K4	6AD4	Е	No changes.			
6 K5	6AD5	G	Make adaptor a	No. 2 on base 3 7 8 Connect grid cap substitution can al	to to to to No. 5 o so be mad	
	6AE5 6C5 6J5	G G	Change connect:	ion as follows: cap	ιο No. 5.	
	6F5	G	Change connect	ions as follows:		
				No. 3	to No.	4
	6Q7	G	Cut off pins Nos	. 4 and 5.		
	6SF5	G	Make adaptor as	s follows: No. 1 or base 2 3 7 8 cap	to No. to to to to	1 on top 8 5 7 2 3
	7A4 7B4	G G	Change socket to	o loctal and rewire No. 2 on octal 3 7 8 cap		$\begin{array}{c} 1 \text{ on loctal} \\ 2 \\ 8 \\ 7 \\ 6 \end{array}$
<b>6K6</b>	6A4/LA	P	Parallel circuits	s only. Reverse 6A	4/LA 10 6	F6 procedure.
	GAD7	G	Parallel circuits Nos. 1 and 6.	s only. Remove and	l tape up a	ny wires anchored on pins
	6AR6	Р	Where additiona procedure.	l filament current i	s availabl	e. Reverse 6AR6 to 6F6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6K6	6F6	G	Parallel circuits only. No changes.
	6 G 6	P	
	GL6	G	
	6176	G	
	6V6	G	
	010	(1	
	7A5	G	Same as 6K6 to 7B5. Parallel circuits only.
	7B5	E	Change socket to locial and rewire as follows:
			No. 2 on octal to No. 1 on loctal
			5 to 6
			net. 7 to 3 sua
			8 to 7
	7C5	G	Same as 6K6 to 7B5. Parallel circuits only.
	38	G	Same as 6F6 to 38. Parallel circuits only.
	41	E	Same as 6F6 to 42. Parallel or series circuits.
	42	G	Same as 6F6 to 42. Parallel circuits only.
	8.9	G	Same as 6F6 to 59. Parallel or series circuits.
	6AU6	G	Change socket to miniature and rewire as follows:
	6BA6	G	No. 2 on octal to No. 3 on miniature
	6BD6	G	3 to 5
			(0) 4 to 6 (0°)
			(a) (b) = 5 to 2
			7 to 4
			64-G 8 to 7
			cap to 1
	6°C 6	G	Reverse 6C6 to 6J7 procedure.
	6D6	E	
	6D7	G	Same as 6J7 to 6D7.
	6E7	G	
			N. shares
	617	C	
	6J7	G	No changes.
	6J7 6Q7	G P	Cut off pins No. 4 and No. 5. Emergency substitution.
	6Q7	Р	Cut off pins No. 4 and No. 5. Emergency substitution.
	6Q7 657 65117	P G G	Cut off pins No. 4 and No. 5. Emergency substitution. Parallel circuits only. No changes.
	6Q7 6S7 6S117 6SJ7	P G G G	Cut off pins No. 4 and No. 5. Emergency substitution. Parallel circuits only. No changes.
	6Q7 657 65117	P G G	Cut off pins No. 4 and No. 5. Emergency substitution. Parallel circuits only. No changes.
	6Q7 6S7 6S117 6SJ7	P G G G	Cut off pins No. 4 and No. 5. Emergency substitution. Parallel circuits only. No changes.
	6Q7 6S7 6SH7 6SJ7 6SK7	P G G E	Cut off pins No. 4 and No. 5. Emergency substitution. Parallel circuits only. No changes. Same as 6J7 to 6SJ7.

6K7-6L6			RECEIVING TUBE	SUBSTITUTION	GUIDE		
TUBE	SUB.	PERF.		CHANGES NEC			
6 K7	XXL	Р	Change socket to			S:	
	7A-	Р		Remove No. 4			
			1 Sand	No. 2 on octal	to No.	. 1 on l	octal
			( COOX	- 3	ta	2	( AAO)
			(2) (0)	• 8	to	7	000
			O°C.	7	to	8	
			Une a	cap	lö	6	OF E
	7A7	E	Change socket to				
	7/17	G		To. 1 on octal		5 on l	octal
	74.7	G		2	to	1	100
			200)	3	to	2	100
				4	to	3	
			05	5	10	4	00
			09/5	7	- to	8	SUB
				8	to	7	
				cap	to	6	
	7 B7	G	Same as 6K7 to 7.	A7. Parallei e	circuits only.		
	7C7	G					
	7 G7	G					
	39/44	E	Change socket to	five prong typ			
			N	o. 2 on octal	to No.	l on f	live prong
			~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	3	to	2	San Shi
			(3) 3)	4	to	3	CO Y
				5	to	4	((((((((((((((((((((
			00	7	to	5	C O
			ORIG	8	to	4	SUB
				cap	to	cap	
	77	G	Reverse 6C6 to 6.	17 procedure.			
	78	E					
	1232	G	Same as 6K7 to 7	A7. Parallel c	ircuits only.		
5 K Q	5 4 9	G	No obougos				
6 K8	6A8 6J8	G	No changes.				
	010	u					
	737	G	Same as 6J8 to 7J	7.			
	757	G					
	7Q7	G	Same as 12A8 to 1	4B8.			
6L4	6F4	P	No changes.				
	955	G	Parallel circuits of	only. Refer to	base diagram	n for ch	langes.
CIE	CATAS	G	Damuilai sissuita	No abo	XO5		
6L5	6AD5 6AE5	G	Parallel circuits of	miy. No chang	362.		
	OALJ	G					
	6C5	G	Parallel circuits o	only. No chang	ges.		
	7 1 4	G	Cana - Off the	4 52 12 1			
	7A4	G	Same as 6J5 to 7A	4. Parallel ci	reuits only.		
	XXL	G					
	37	G	Same as 6C5 to 37	Parallel ain	cuits only		
	76	G	Same as not to st	· Laranci CII	cares only.		
		-					
6L6	6AD7	G	Remove and tape u	ip any wires a	nchored on pi	ns Nos.	1 and 6.

6L6-6N7

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6L6	6AL6	G	Rewire as follows:
			Connect No. 3 to cap.
	6AR6	G	Reverse 5AR6 to 6F6 procedure.
3	- 6F6	G	Parallel circuits only. No changes.
	6K6	G	r dranci ch cutto only. No changes.
	6U6	G	
	6V6		
	0.00	G	
	1614	E	No changes.
L7	1612	E	No changes.
5M5			No practical substitute.
M6G			No practical substitute.
6M7G			No practical substitute.
MBGT			No practical substitute.
5N4	6AB4	G	Parallel circuits only. Reverse 6AB4 to 6N4 procedure.
	6.14	G	Parallel circuits only. Reverse 6J4 to 6N4 procedure.
IN5	6A B5	E	See 6AB5 substitutes.
N6	6AB6	G	Parallel circuits only. No changes.
	6 B5	E	Change socket to six prong and rewire as follows:
			No. 2 on octal to, No. 1 on six prong
			(0) 3 to 2
			(to 4
			to G
			8 to 5
N7	6A6	G	Change socket to seven prong and rewire as follows:
			No. 2 on octal to No. 1 on seven prong
			3 to 2
			4 to 3 (?)
			5 to 5 0, *0
			6 to 6
			04//s 7 t.0 7
			8 to 4
	6AE6	P	Parallel circuits only. Reverse 6AE6 to 6N7 procedure.
	Transmitter of		
	6 Y.7	G	Parallel circuits only. No changes.
	6Z7	G	

6N7-6Q7			RECEIVING TUBE	SUBSTITUTION G	UIDE		
TUBE	SUB.	PERF,	CIRCUI	T CHANGES NEC	ESSARY		
6N7	70	G	Chanke sonker to	six prong and re	The second	Litting +	
	10	u.		No. 2 on octal		1 on six pr	ong
			62	3	01	2	-
			6000	4	to	3	(0: 0 M
			600	ĉ	O	cap	0.
			Le.	(j)	FO	5	60
			040	2	to	6	204
				-3	to	4	
6 NU	787	P	Change socket to	loctal and rewire	as follows		
				No. 1 on noval		5 on loctal	
				2	03	6	
			No.	3	to	7	A
			(SOOD)	-i	to	1	GARG
			(a. 2)	5	- LO	8	0600
			CHIG	G	to	2	00
				7	to	3	
				88	01	-1	
				9	to	7	
6 P5	6AD5	G	No changes.				
	GAE5	G					
	6AF5	G					
	6C5	G					
	6J5	G					
	61.5	G	Parallel circuits	only. No changes			
	7A4	G	Same as 6J5 to 7.	14.			
	37	G	Same as 6C5 to 3	7.			
	76	G					
6P7	6F7	E	Change socket to	seven prong and i	rewire as f	ollows:	
		_		lo. 2 on octal		1 on seven	prong
				3	to	7	1 0
			660	4	to	2	700
			600	5	to	3	(0, 2,0)
				6	to	4	00,00
			URIG	7	to	5	500
				8	to	6	
				cap	to	cap	
6 P8G			No practical subs	titute.			
6Q5G			No practical subs	titute.			
6Q6			No practical subs	titute.			
6Q7	686	E	No changes.				
	8C7	G	Change socket to				
				o. 2 on octal		1 on seven	prong
			0	3	to	2	-00
			6003	4	to	4	6.80
				4 5			0.00.00
				4 5 7	ta to to	4 5 7	0.000
				4 5	ta to ta	4 5	0, 0, 0 0, 0, 0 0, 0, 0 3 8

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6Q7	6SQ7 6SR7	E. G	Same as 12Q7 to 125Q7.
	6R7	G	No changes.
	6T7	G	Parallel circuits. No changes.
	6V7	G	No changes.
	7 B6	E	Change socket to loctal and rewire as follows:
	7E6	G	No. 2 on octal to No. 1 on loctal
	120	0	
			(3) (3) 4 to 5
			$\begin{pmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ 0 $
			7 to 8
			anno 8 to 7 or 4 sue
			cap to 3
	706	G	Same as above. Parallel circuits only.
	75	E	Change socket to six prong type and rewire as follows:
	85	G	No. 2 on octal to No. 1 on six prong
			3 to 2
			4 to 3 9 0 ps
			$\begin{pmatrix} \odot & \odot \\ \odot & \odot \end{pmatrix}$ 5 to 4 $\begin{pmatrix} Oz & sO \\ s & \odot \end{pmatrix}$
			orie. 8 to 5 sub
			cap to cap
SR4			No practical substitute.
6R6	6K7	G	Rewire as follows:
	6U7	G	
			No. 3 to No. 4
			5 to 3
			Short Nos. 5 and 8 on socket together.
R7	6C7	G	Same as 6Q7 to 6C7.
	6.Q7	G	No changes.
	-	-	
	6597	G	Same as 12Q7 to 12SQ7.
	6SR7	E	
	6T7	G	Parallel circuits only. No changes.
	6 V 7	G	No changes.
	7 B 6	G	Same as 6Q7 to 7B6.
	7C6	E	Parallel circuits only. Same as 6Q7 to 7B6.
	7E:6	G	Same as 6Q7 to 7B6.
	75	G	Samo as 607 to 75
	75 85	E	Same as 6Q7 to 75.
R8	6T.8	G	No changes.
384			No practical substitute.

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607-654

656-6507			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF,	CIRCUIT CHANGES NECESSARY
6S6			No practical substitute.
GSA7	7Q7	G	Same as 12SA7 to 14Q7.
	6SB7Y	G	No changes.
	6SD7	P	Same as 12SA7 to 12SK7.
	6SH7	P	
	6SK7	P	
6S8GT			No practical substitute.
657	6 D 6	G	Parallel circuits only. Reverse 6C6 to 6J7 procedure.
	607	G	Same as 6J7 to 6D7. Parallel circuits only.
	6E7	G	Sant as out to ont. Taranci circuits only.
	11.3.0	-	
	6J7 6K7	G	Parallel circuits only. No changes.
	OKI	G	
	65.17	G	Parallel circuits only. Same as 12K7 to 12SK7.
	6SK7	G	
	6 S \$7	E	Same as 12K7 to 12SK7.
	6U7	G	Parallel circuits only. No changes.
	6W7	G	No changes.
	7.47	G	Parallel circuits only. Same as 12K7 to 7B7.
	7:B7	G	Same as 12K7 to 7B7,
	7C7	G	
	12K7	Р	Series circuits only. No changes.
	125K7	P	Series circuits only. Same as 12K7 to 125K7.
	14A7/12B7	P	Series circuits only. Same as 12K7 to 7B7.
	39/44	G	Parallel circuits only. Same as 6K7 to 39/44.
	77	G	Parallel circuits only. Reverse 6C6 to 6J7 procedure.
	78	G	
	666	G	
6SB7Y	6BE6	G	Change socket to miniature and rewire as follows:
			No. 1 on octal to No. 2 on miniature
			2 to 3
			00 3 to 5 603
			5 to 1
			one 6 to 2 sue
			7 to 4
			8 to 7

6SC7 6C8 G Same as 6SC7 to 6F8.

m1717325							
TUBE	SUE. I	PERF.	CIRCUIT CHANGES NECES:	SAR	Y		
6SC7	6F8	G	Make adaptor as follows:				
			No. 1 on base	to	No.	1 on top	
			2	to		3	
			3	to		cap	
			4	to		5	
			5	to		6	
			6	to	4	and 8	
			7	to		7	
			8.	to		2	
			Parallel circuit	s on	ly.		
	6SL7	G	Make adaptor as follows:				
1			No. 2 on base	to	No.	2 on top	
			3	i.O		1	
			4	to		4	
			5	to		5	
			6	to	3	arid 6	
			7	to		7	
			8	to		8	
	6SN7	G	Same as 6SC7 to 6SL7. Parallel circ	uits	only	у.	
	7F7	G	Change socket to loctal and rewire as	e fol	lows		
	111	U	No. 2 on octal			3 on loc	F-3]
			3			4	Lai
			<u> </u>	to		5	00
				to		6	0000
			6	to	2	and 7	Colo C
			ORIG 7	to	4	I	SUB.
			8	to		8	
6SD7	6AB7/1853		Parallel circuits only. No changes.				
	6AC7/1852						
	6587	G					
	6SE7	G	No changes.				
		-					
	6SJ7	G	No changes.				
	6SK7	G					
	5693 -	G					
6SE7	6AB7/1853	6	Parallel circuits only. No changes.				
OSE ?	6AC7/1852		Paramer encunts only. No changes.				
	6SS7	G					
	0001	G					
	6SD7	G	No changes.				
	6SJ7	G	No changes.				
	6SK7	G					
	5693	G	*				
BSF5	6F5	Е	Reverse 6F5 to 65F5 procedure.				
	6 K5	G	Make adaptor as follows:				
			No. 1 on base	10	No.	l on top	
			2	to		:8	
			3	to		cap	
			5	to		3	
			7	to		7	
			8	to		2	

65F5-65J7	-		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6SF5	7B4	G	Change socket to loctal and rewire as follows. Parallel circuits only: No. 2 on octal to No. 7 on locial
			to 6
			5 to 2 600
			7 to 1
			Dens 8 to 8
6SF7	6SV7	G	No changes.
6SG7	6AB7	G	Parallel circuits only. No changes.
	6AC7	G	
	6AG5	G	Change socket to miniature and rewire as follows:
	6BC5	G	No. 2 on octal to No. 3 on miniature
			$\bigcirc \bigcirc \bigcirc$ 3 and 5 to 2
			$(\bigcirc (\bigcirc ($
			(2, 0) 6 to 6
			Dars 7 to 4 SUB
	~		8 to 5
	6AJ5	G	Same as 6SG7 to 6AG5. Parallel circuits only.
	6AK5	G	
	6AN5	G	
1.00	5591	G	
	9001	G	
	9003	G	91
	6SH7	G	No changes. Cathode and suppressor grid are internally connected in the
	6SJ7	G	6SG7. In a limited number of circuits this substitution does operate, In
	6SK7	G	these cases short pins 3 and 5 together.
COTT	CADO	G	Devellel circuits only. No obanges
6SH7	6AB7 6AC7	G	Parallel circuits only. No changes.
	6AG5	G	Same as 6SG7 to 6AG5.
	6BC5	G	Same as user to orter.
	6AJ5	G	Same as 6SG7 to 6AG5. Parallel circuits only.
	6AK5	G	Sanne as obdi to origo. Further cricuits only.
	6AN5	G	
	5591	G	
	9001	G	
a.	9003	G	
	6SG7	G	No changes.
	6SJ7	G	in changes.
	65K7	G	
			in the standard of the second states and second s
	7G7/1232	G	Parallel circuits only. Change socket to loctal and rewire as follows: No. 1 on octal to No. 5 on loctal
			2 to 1
			3 to 4 (3)
			(a) 4 to 6 (a)
			2 5 to 7 2 6
			onic 6 to 3 sua
			7 to 8
			8 to 2
6SJ7	6C6	Е	Reverse 6C6 to 6SJ7 procedure.
	6D6	G	
	77	E	
	78	G	

6SJ7-6S	κ	7
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TUBE	SUB.	PERF.	CIRCUIT CHANG	ES NECESSA	RY		
6SJ7	6D7	G	Change socket to seven pr	ong type and	rewir	e as follo	ws:
	6E7	G	No. 2 on	octal	to No.	1 on sev	en prong
			3		to	4	-00
			600 4		to	cap	6.9.0
			(a) 5		to	6	02 60
			6		to	3	100
			ORIG 7		to	7	SUB
			8		to	2	
			0		10	2	
	6.17	E	Same as 12SK7 to 12K7.				
	6K7	G					
	6U7	G		1			
	007	1					
	657	G	Same as 12SK7 to 12K7. P	arallel circu	its only	V	
	6W7	G	Same as issue to rant, i	at all of the cu	Ito OIII	3.	
	U VV I	Cr					
	65K7	G	No changes.				
			no changes.				
	5693	E					
	0000	C	Deservite entry No.	a ha a sta a			
	6SS7	G	Parallel circuits only. No	changes.			
	717	0	Server 20 100 17 to 207				
	7A7	G	Same as 12SJ7 to 7B7.				
		-					
	787	G	Same as 12SJ7 to 7B7. Par	callel circuit.	s only.		
	7C7	G					
		~					
6SK7	6AB7	G	Parallel circuits only. No	changes.			
	6AC7	G					
		100	the second second second	In all the second			
	6AH6	G	Same as 6SK7 to 6AU6. Pa	rallel circuit	s only	•	
	6AK6	G					
	1	1	With the second				
	6AU6	G	Change socket to miniature				
	6BA6	G	No. 2 on oc			3 on mini	ature
	6BD6	G	3	to		2	
			(CO) 4	te)	1	000
			(()()) 5	to)	7	(C) (C)
			6	te)	6	00
			ORIG. 7	te)	4	SUB
			8	to		5	
	6C6	G	Reverse 6C6 to 6SJ7 procee	lure.			
	6D6	E					
	77	G					
	78	E					
	10	~	*				
	607	G	Same as 6SJ7 to 6D7.				
	6E7	G	Danie as user to up				
	0L1	Q					
	6J7	G	Same as 12SK7 to 12K7.				
	6K7	E	Sume as Isome to Terres				
	UIN				-		
		G					
	6U7	G					
	6U7		Same as 19587 to 1987 Da	rallel giroui	s only		
	6U7 6S7	G	Same as 125K7 to 12K7. Pa	rallel circuit	s only		
	6U7		Same as 125K7 to 12K7. Pa	rallel circuit	s only	•	
	6U7 6S7 6W7	G G		rallel circuit	s only		
	6U7 6S7 6W7 6SG7	G G	Same as 125K7 to 12K7. Pa No changes.	rallel circuit	s only		
	6U7 6S7 6W7	G G		rallel circuit	s only		
	6U7 6S7 6W7 6SG7	G G		rallel circuit	s only		

TUBESUB.PERF.CIRCUIT CHANCES NECESSARY6587GParallel circuits only. No changes.36GGange socket to five prong and rewire as follows:39/44E N_0 2 on otol 1 to No 1 on five prong 3 and 5 to 4 cap 6 to 37A7ESame as 125J7 to 7B7.7B7ESame as 125J7 to 7B7. Parallel circuits only.65L72C21PReverse 2C21 to 65N7 procedure.678G678G678G678G678G678G678G679F679G6817G679G679G6817G679G6817G6817G6817G767G <t< th=""><th>20112-0012</th><th></th><th></th><th></th><th></th></t<>	20112-0012				
63K7 63S7 C Parallel circuits only. No changes. 36 39/44 $\frac{6}{2}$ Change socket to five prong and rewire as follows: 3 and 5 to 4 4 to 5 to 4 4 to 5 to 4 5 to 5 3 and 5 to 4 4 to 5 to 4 5 to 5 3 to 5 5	65K7-65N7			RECEIVING TUBE SUBSTITUTION GUIDE	
36 30/44G 2Change socket to fee prong mexice as follows: i to 3 and 5 i to 3 i to 368L72C21 2C21P Reverse 2C21 to 6SN7 procedure.68L72C21 2C21P Reverse 2C21 to 6SN7 procedure.68L72C21 2C21P Reverse 4SL7 to 6F6.68L7C 2 3 1 to 4 4 4 1 to 4 5 1 to 6 1 to 4 4 1 to 4 1 to 5 1 to 6 1 to 4 1 to 4 1 to 5 1 to 6 1 to 7 2 268L7C 2 2 2 3 1 to 7 2 3 1 to 7 268L7C 2 2 2If the 65L7 employs the two eathodes separately this substitution matimpractical, Reverse 6SC7 to 65L7 procedure.68N7C 2 2 2 3 4 <td>TUBE</td> <td>SUE.</td> <td>PERF.</td> <td>CIRCUIT CHANGES NECESSARY</td> <td></td>	TUBE	SUE.	PERF.	CIRCUIT CHANGES NECESSARY	
38/44 E No. 2 on neural to No. 1 on five prong and 5 to 4 cap to 2 7A7 E Same as 12SJ7 to 7B7. 7B7 E Same as 05L7 to 6F8. 6C8 G Same as 05L7 to 6F8. 6F8 G Nake adaptor as follows: 6F8 G Nake adaptor as follows: 6F8 G Nake adaptor as follows: 6F8 G If the 65L7 employs the two cathodes separately this substitution mainspractical, Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G If the 65L7 employs the two cathodes separately this substitution mainspractical, Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G If the 65L7 employs the two cathodes separately this substitution mainspractical, Reverse 5SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No in on catal to No. 4 on loctal	6SK7	8557	G	Parallel circuits only. No changes.	
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$					rong
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$			-	Transfer to the second se	a d'
$ \begin{array}{cccccccccccccccccccccccccccccccccccc$				(cap to cap	2 (2)
7to557A7ESame as 125J7 to 7B7.7B7ESame as 125J7 to 7B7.7B7CSame as 125J7 to 7B7.7B7CSame as 125J7 to 7B7.7B7CSame as 65L7 to 6F8.6C8GSame as 65L7 to 6F8.6F8GMake adaptor as follows:6F8GMake adaptor as follows:6S0GSame as 65L7 to 6F8.6F8GMake adaptor as follows:6S07GIf the 65L7 employs the two cathodes separately this substitution main impractical. Reverse 65C1 to 65L7 procedure.6S07GIf the 65L7 employs the two cathodes separately this substitution main impractical. Reverse 65C1 to 65L7 procedure.6S07GParallel circuits only. No changes.6S07GParallel circuits only. No changes.6S07GChange socket to locial and rewire as follows:6S07GChange socket to locial and rewire as follows:77GSame as 85L7 to 7F7. Parallel circuits only.5611ENo changes.5802PNo changes.5801CSame as 55L7 to 7F7. Parallel circuits only.5692PNo changes.5801CReverse 65C7 to 65L7 procedure.65C7GReverse 65C7 to 65				6 to 3	0.01
7AYESame as 12SJ7 to 7B7.7B7ESame as 12SJ7 to 7B7.7B7FSame as 12SJ7 to 7B7.7B7FReverse 2C21 to 6SN7 procedure.6C8GSame as 6SL7 to 6F8.6F8GMake adaptor as follows:6F8GMake adaptor as follows: $3 \\ 4 \\ 5 \\ 7 \\ 1 \\ 6 \\ 7 \\ 1 \\ 7 \\ 1 \\ 7 \\ 1 \\ 7 \\ 1 \\ 7 \\ 1 \\ 7 \\ 1 \\ 1$				ore 7 to 5	SUB
757E GSame as 12SJ7 to 7B7, Parallel circuits only.68L72C21PReverse 2C21 to 6SN7 procedure.6C8GSame as 6SL7 to 6F8.6F8GMake adaptor as follows: 1 on base tr6F8GMake adaptor as follows: $\frac{2}{3}$ to6SC7GIf the 6SL7 employs the two cathodes separately this substitution ma impractical, Reverse 6SC7 to 6SL7 procedure.6SN7GParallel circuits only. No changes.6SU7GNo changes.6SU7GChange socket to loctal and rewire as follows: $\frac{3}{10}$ 7F7GChange socket to loctal and rewire as follows: $\frac{3}{10}$ 7N7GSame as 6SL7 to 7F7. Parallel circuits only.6517GReverse 2C21 to 65N7 procedure.6517GReverse 2C21 to 65N7 procedure.6521GReverse 2C21 to 65N7 procedure.6531GReverse 2C21 to 65N7 procedure.6531GRever				8 to 2	
7C7G6SL72C21PReverse 2C21 to 65N7 procedure.6C8GSame as 65L7 to 6F8. $\delta F8$ GMake adaptor as follows: $\delta F8$ GIf the 65L7 employs the two cathodes separately this substitution main impractical. Reverse 6SC7 to 65L7 procedure.6SN7GParallel circuits only. No changes.6SN7GNo changes,7F7GChange socket to loctal and rewire as follows: No. 1 on octal $\delta S017$ GNo changes,7F7GChange socket to loctal and rewire as follows: $\frac{2}{3}$ $\delta S017$ GSame as 6SL7 to 7F7. Parallel circuits only. $\delta S017$ GSame as 6SL7 to 7F7. Parallel circuits only. $\delta S012$ PSN72C21G $\delta S027$ G $\delta $		7A7	E	Same as 12SJ7 to 7B7.	
7C7G6SL72C21PReverse 2C21 to 65N7 procedure.6C8GSame as 65L7 to 6F8. $\delta F8$ GMake adaptor as follows: $\delta F8$ GIf the 65L7 employs the two cathodes separately this substitution main impractical. Reverse 6SC7 to 65L7 procedure.6SN7GParallel circuits only. No changes.6SN7GNo changes,7F7GChange socket to loctal and rewire as follows: No. 1 on octal $\delta S017$ GNo changes,7F7GChange socket to loctal and rewire as follows: $\frac{2}{3}$ $\delta S017$ GSame as 6SL7 to 7F7. Parallel circuits only. $\delta S017$ GSame as 6SL7 to 7F7. Parallel circuits only. $\delta S012$ PSN72C21G $\delta S027$ G $\delta $		787	E	Same as 12S.I7 to 7B7. Parallel circuits only.	
6C8 G Same as 6SL7 to 6F8. 6F8 G Make adaptor as follows: No. 1 on base to 3 10 3 to 3 to 4 4 to 5 5 to 6 6SC7 G If the 6SL7 employs the two cathodes separately this substitution main impractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F1 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 10 2 10 2 6SU7 G Same as 6SL7 to 7F7. Parallel circuits only. 6SU7 G Same as 6SL7 to 7F7. Parallel circuits only. 6691 E No changes. 707 G Same as 6SL7 to 6F8. Parallel circuits only. 6691 E No changes. 7692 P No changes. 7693 G Same as 6SL7 to 6F8. Parallel circuits only. 6SE07 G Reverse 2C21 to 6SN7 procedure. <td></td> <td></td> <td></td> <td>Jahre as itager to there interest careers only -</td> <td></td>				Jahre as itager to there interest careers only -	
6C8 G Same as 6SL7 to 6F8. 6F8 G Make adaptor as follows: No. 1 on base to 3 10 3 to 3 to 4 4 to 5 5 to 6 6SC7 G If the 6SL7 employs the two cathodes separately this substitution main impractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F1 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 10 2 10 2 6SU7 G Same as 6SL7 to 7F7. Parallel circuits only. 6SU7 G Same as 6SL7 to 7F7. Parallel circuits only. 6691 E No changes. 707 G Same as 6SL7 to 6F8. Parallel circuits only. 6691 E No changes. 7692 P No changes. 7693 G Same as 6SL7 to 6F8. Parallel circuits only. 6SE07 G Reverse 2C21 to 6SN7 procedure. <td>6SL7</td> <td>2C21</td> <td>P</td> <td>Reverse 2C21 to 6SN7 procedure.</td> <td></td>	6SL7	2C21	P	Reverse 2C21 to 6SN7 procedure.	
6F8 G Make adaptor as follows: No. 1 on base to 2 10 3 10 4 10 4 10 4 10 4 10 4 10 4 10 5 10 6 10 7 1					
No. 1 on base to a go not por 2 ito 3 ito 3 ito 4 ito 5 ito 6 ito 10 10 10					
 BSN7 C2 BSN7 C2 C3 C4 C4 C5 C4 C5 C6 C7 C6 C7 C6 C7 C6 C7 C6 <		6F8	G		
Sector G If the 6SL7 employs the two cathodes separately this substitution mainteractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SN7 G Parallel circuits only. No changes. 6SN7 G No changes. 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 7F7 G Change socket to loctal and rewire as follows: 787 G Same as 65L7 to 7F7. Parallel circuits only. 8507 F No changes. 789 P No changes. 789 F No changes. 789 F No changes. 780 G Same as 65L7 to 65N7 procedure. 6580 G Same as 65L7				1 1	
4 to 5 5 to 8 7 to 7 8 to 2 6SC7 G If the 6SL7 employs the two cathodes separately this substitution mainpractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 2 to 3 4 to 5 6507 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 2 to 3 3 to 5 4 to 5 5 to 7 7 G Same as 5SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P No changes. 6502 P No changes. 5691 E No changes. 5692 P No changes.					
 b b c b b c b c b c b c b c c b c c c c					
6 to 8 7 to 7 6 7 to 2 6 6 Parallel circuits only. No changes. 6 6 6 No changes. 10 3 7 6 Change socket to loctal and rewire as follows: 10 3 10 1 10 3 10 2 2 10 3 10 2 10 3 10 2 10 3 10 2 4 10 3 10 2 10 3 10 2 10 3 10 2 10 3 10 2 10 3 10 2 10 3 10 2 10 10 10 10 10 </td <td></td> <td></td> <td></td> <td></td> <td></td>					
7 to 7 8 to 2 6SC7 G If the 6SL7 employs the two cathodes separately this substitution mainpractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7 to 7 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 10 2 10 2 10 2 3 to 2 5 to 6 6 to 7 7 to 1 8 to 8 7 G Same as 6SL7 to 7F7. Parallel circuits only. 5692 P No changes. 65802 P No changes.				5 to 6	
8 to 2 6SC7 G If the 6SL7 employs the two cathodes separately this substitution mainpractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SN7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 2 to 3 4 to 5 5 to 6 6 X 100 octal 2 to 3 4 to 5 5 to 6 6 7 7 7 to 1 8 10 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P No changes. 58N7 2C21 G Reverse 2C21 to 6SN7 procedure. 6F8 G Same as 5SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G					
 6SC7 G If the 6SL7 employs the two cathodes separately this substitution main impractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to 3 to 3 to 2 3 to 2 4 to 5 5 to 6 6 to 7 to 1 8 to 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 7N7 G Reverse 2C21 to 65N7 procedure. 6F8 G Same as 5SL7 to 6F8. Parallel circuits only. 6SL7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G Parallel circuits only. No changes. 					
impractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 2 3 to 2 5 to 6 6 to 7 7 to 1 8 10 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P 8SN7 2C21 G Reverse 2C21 to 6SN7 procedure. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.					
impractical. Reverse 6SC7 to 6SL7 procedure. 6SN7 G Parallel circuits only. No changes. 6SU7 G No changes. 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 2 3 to 2 5 to 6 6 to 7 7 to 1 8 10 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P 8SN7 2C21 G Reverse 2C21 to 6SN7 procedure. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.		6SC7	G		titution may
6SU7 G No changes, 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 2 4 to 5 5 to 6 6 to 7 7 to 1 8 to 8 7N7 G Same as 65L7 to 7F7. Parallel circuits only. 5691 E 5692 P 8 to 8 85N7 2C21 G 6F8 G same as 65L7 to 6F8. Parallel circuits only. 6F8 G same as 65L7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 65L7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.					
6SU7 G No changes, 7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 2 4 to 5 5 to 6 6 to 7 7 to 1 8 to 8 7N7 G Same as 65L7 to 7F7. Parallel circuits only. 5691 E 5692 P 8 to 8 85N7 2C21 G 6F8 G same as 65L7 to 6F8. Parallel circuits only. 6F8 G same as 65L7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 65L7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.			1.1		
7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 5 4 to 5 5 to 6 6 to 7 6 to 7 7N7 G 5691 E 7N0 G 5692 P No changes. 5692 P 83N7 2C21 G 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G Parallel circuits only. No changes.		6SN7	G	Parallel circuits only. No changes.	
7F7 G Change socket to loctal and rewire as follows: No. 1 on octal to No. 4 on loctal 2 to 3 3 to 5 4 to 5 5 to 6 6 to 7 6 to 7 7N7 G 5691 E 7N0 G 5692 P No changes. 5692 P 83N7 2C21 G 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G Parallel circuits only. No changes.		0.0317	-		
No. 1 on octal to No. 4 on loctal to 3 to 2 4 to 5 5 6 to 6 7 to 1 8 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 1 1 1 1 1 1 1 1 1 1 1 1 1		8507	G	No changes.	
No. 1 on octal to No. 4 on loctal to 3 to 2 4 to 5 5 6 to 6 7 to 1 8 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 2 10 1 1 1 1 1 1 1 1 1 1 1 1 1		7F7	G	Change socket to loctal and rewire as follows:	
7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P 8SN7 2C21 G 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.					
N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P 2SN7 2C21 G 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G Parallel circuits only. No changes.				2 to 3	
A to 5 5 to 6 5 to 6 6 to 7 7 to 1 8 to 8 7 To G 5 Same as 65L7 to 7F7. Parallel circuits only. 5 5 5691 E 5 692 P 8 No changes. 5 5 6F8 G 6F8 G Same as 65L7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. 6SL7 G Parallel circuits only. No changes.				3 to 2	00
6 to 7 7 to 1 8 to 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P No changes. 85N7 2C21 G Reverse 2C21 to 65N7 procedure. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.				() () 4 to 5 ()	DADO
6 to 7 7 to 1 8 to 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P No changes. 85N7 2C21 G Reverse 2C21 to 65N7 procedure. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.				(5 to 6	000
8 to 8 7N7 G Same as 6SL7 to 7F7. Parallel circuits only. 5691 E No changes. 5692 P No changes. 85N7 2C21 G Reverse 2C21 to 6SN7 procedure. 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SN7 G Reverse 6SC7 to 6SL7 procedure. 6SN7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes.				ORIG 6 to 7	SUB.
7N7GSame as 6SL7 to 7F7. Parallel circuits only.5691 5692E PNo changes.85N72C21GReverse 2C21 to 6SN7 procedure.6F8GSame as 6SL7 to 6F8. Parallel circuits only.6SC7GReverse 6SC7 to 6SL7 procedure. Parallel circuits only.6SL7GParallel circuits only. No changes.				7 to 1	
5691 5692E PNo changes.85N72C21GReverse 2C21 to 65N7 procedure.6F8GSame as 65L7 to 6F8. Parallel circuits only.6SC7GReverse 6SC7 to 6SL7 procedure. Parallel circuits only.6SL7GParallel circuits only. No changes.				8 to 8	
5692P85N72C21GReverse 2C21 to 65N7 procedure.6F8GSame as 65L7 to 6F8. Parallel circuits only.6SC7GReverse 6SC7 to 65L7 procedure. Parallel circuits only.6SL7GParallel circuits only. No changes.		7N7	G	Same as 6SL7 to 7F7. Parallel circuits only.	
5692P85N72C21GReverse 2C21 to 65N7 procedure.6F8GSame as 65L7 to 6F8. Parallel circuits only.6SC7GReverse 6SC7 to 65L7 procedure. Parallel circuits only.6SL7GParallel circuits only. No changes.		5 2 0 1			
35N72C21GReverse 2C21 to 65N7 procedure.6F8GSame as 65L7 to 6F8. Parallel circuits only.6SC7GReverse 6SC7 to 65L7 procedure. Parallel circuits only.6SL7GParallel circuits only. No changes.				No changes.	
 6F8 G Same as 6SL7 to 6F8. Parallel circuits only. 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes. 		2092	P		
 6SC7 G Reverse 6SC7 to 6SL7 procedure. Parallel circuits only. 6SL7 G Parallel circuits only. No changes. 	BSN7	2C21	G	Reverse 2C21 to 6SN7 procedure.	
6SL7 G Parallel circuits only. No changes.		6F8	G	Same as 6SL7 to 6F8. Parallel circuits only.	
6SL7 G Parallel circuits only. No changes.					
and the second s		6SC7	G	Reverse 6SC7 to 6SL7 procedure. Parallel circuits only.	
7F7 G Same as 6SL7 to 7F7. Parallel circuits only.		6SL7	G	Parallel circuits only. No changes.	
		7F7	G	Same as 6SL7 to 7F7. Parallel circuits only.	

65N7-65Q7

TUBE	SUB.	PERF.	CIRCUIT	CHANGES NECI	ESSARY		
6SN7	7F8	G	Parallel circuits	only. Change so			
			1	No. I on octal		. I on locta	1
			100000	2	to	3	second and
			(0)	3	to	4	(3 3
				4	to	8	(O) (F) O)
			0,00	5	to	6	0.00
				6	to	5	CU CU
			0410.	7	to	7	200
				8	to	2	
					10	L	
	5 0 0 t	D	S* 7				
	5691	P	No changes,				
	5692	G					
10.0 5	0.0.0.0		11 AROT 1	(A (T) () () () () () () () () () () () () ()		2	
65ର୍7	GAQS	G	Same as 6SQ7 to	6AT6. Parallel c	ircuits on	ly.	
	6AT6	G	Change socket to				
	6A V.6	G	N	lo. 2 on octal	to No.	1 on minia	ture
	6BF6	G		3	to	2	
	6BK6	G	00	4	to	5	600
	6BT6	G		5	to	6	0 0
	6BU6	G	2001	6	to	7	10 9
	OPCO	U	ORIG.			4	SUB
				7	to		
				8	to	3	
	686	G	Make adaptor as 1				
			N	lo. 1 on base		1 on top	
				2	to	cap	
				.3	to	8	
				4	to	4	
				5	10	5	
				7	to	7	
				8	to	2	
	6C7	G	Change socket to	seven prong and a	rewire as	follows:	
			N	o. 2 on octal	to	cap on sev	en prong
				3	tc	6	
			(0)	4	to	4	600
			(3) (3)	5	to	5	
				6		2	00
			DRIG		to		SUB
				7	to	1	
				8	to	7	
		in the second					
	6Q7	E	Same as 6SQ7 to 6	B6.			
	GR7	G	Same as 65Q7 to 6	B6.			
	6SR7	G	No changes.				
	6ST7	G	Parallel circuits of	only. No changes			
	6T7	G	Same as 6SQ7 to 6	B6, Parallel cir	cuits only.		
	6V7	G					
	786	E	Change socket to l	octal and rewire	as follows	:	
	7E6	G		o. 2 on octal		3 on loctal	
	120	G	144				
			100	3		or 7	1001
			13 0	4	to	5	(OPA)
			10/20	5	to	6	10 600
			Q.O.	6	to	2	U.C.
			OR:D.	-	10	1	SUB
				7	to	4	

			Secure and the second second second second
6507-6557			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
65Q7	7C6	G	Same as above. Parallel circuits only.
	75	E	Change socket to six prong and rewire as follows:
	85	G	No. 2 on octal to cap on six prong 3 to 5
			(00) 4 to 3 (00)
			$\begin{pmatrix} 0 \\ 0 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \end{pmatrix} = 5$ to 4 $\begin{pmatrix} 0 \\ 2 \\ 0 \end{pmatrix}$
			6 to 2
			omic. 7 to 1 sub
			8 to 6
6SR7	6AQ6	G	Same as 6SQ7 to 6AT6. Parallel circuits only.
	6AT6	G	Same as 6SQ7 to 6AT6.
	6A V6	G	
	6BF6	G	
	6BK6	G	
	6BT6 6BU6	G	
	UBUU	CI.	
	6B6	G	Same as 6SQ7 to 6B6.
	6Q7	G	
	6C7	G	Same as 6SQ7 to 6C7.
	6R7	E	Same as 6SQ7 to 6B6.
	6 V 7	G	
		-	
	6 ⁵ Q7	Ğ	No changes.
	6ST7	G	Parallel circuits only. No changes.
	6SZ7	G	Parallel circuits only. No changes.
	6T7	G	Same as 6SQ7 to 6B6. Parallel circuits only.
	75	G	Same as 6SQ7 to 75.
	85	E	
	0.4.850	~	A ANTIO
6SS7	6AK6	G	Same as 6SK7 to 6AU6.
	6AH6	G	Same as 6SK7 to 6AU6. Parallel circuits only.
	6AU6 6BA6	G G	
	6BD6	G	
	6S7	G	Same as 12SK7 to 12K7.
	6SG7	E	
	6W7	E	
	6SJ7	G	Parallel circuits only. No changes.
	6SK7	G	
	7B7	G	Same as 12SJ7 to 7B7.
	7C7	G	
	12K7	Р	Same as 12SK7 to 12K7. Series circuits only.
	125K7	Р	Series circuits only. No changes.
	14A7/12B7	Р	Same as 12SJ7 to 7B7. Series circuits only.

6ST7-6U6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6ST7	65Ø7 65R7	G G	Parallel circuits only. No changes.
	6.17	E	Same as 6SQ7 to 6B6.
6SU7	651.7 65N7	E P	No changes.
6SV7	6SF7	G	No changes.
6SZ7	6SQ7	G	Parallel circuits only. No changes.
	6SR7	G	
	6ST7	G	No changes.
675	2E5	E	Heater voltage-current ratings differ.
	6AB5	G	Parallel circuits only. No changes.
	6E5	G	No changes.
	6 G5	G	The entry of the second s
	6U5	G	
67.6			No practical substitute.
61.2	6136	G	Parallel circuits only. No changes.
	6Q7	G	Parallel circuits only. No changes.
	6 R7	G	
	6SQ7	G	Same as 12Q7 to 12SQ7. Parallel circuits only.
	6ST7	E	Same as 12Q7 to 12SQ7.
	6 V 7	G	Parallel circuits only. No changes.
	7 B6	G	Same as 6Q7 to 7B6. Parallel circuits only.
	7C6	G	Same as 6Q7 to 7B6.
	12Q7	P	Series circuits only. No changes.
	125Q7	Р	Same as 12Q7 to 12SQ7. Series circuits only.
	75	G	Same as 6Q7 to 75. Parallel circuits only.
	85	G	
6T8	6R8	G	No changes.
6U4	6W4	E	No changes.
6U5/6C5	6N5	Е	Parallel circuits only. No changes.
6U5/6G5	2E5	Е	Heater voltage-current ratings differ.
	6E5	E	'No changes.
6U6	öA4/LA	Р	Parallel circuits only. Reverse 6A4/LA to 6F6 procedure.
	6AR6	Р	Where additional filament current is available. Reverse 6AR6 to 6F6 procedure.

* See Addendum at back of this section.

6U6-6V6			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
616	6F6	G	Parallel circuits. No changes.
	6G6	P	0
	6K6	G	
	6L6	P	
	6 V 6	G	
	6W6	Р	
6U7	6A.U6	G	Same as 6K7 to 6AU6.
0.0.1	6BA6	G	Same as on to on to.
	6BD6	G	
			Concernence in America and a concernence of
	6C6-77	G	Reverse 6C6 to 6J7 procedure.
	6D6-78	G	
	6D7	G	Same as 6J7 to 6D7.
	6E7	G	
	6K7	G	No changes.
	687	G	Same as 6J7 to 6SJ7.
	6SH7	G	Same as out to obser.
	6SJ7	G	
	6SK7	G	*
	6SS7	G	
	6W7	G	
	7A7	G	Same as 6K7 to 7A7.
	787	G	Same as 6K7 to 7A7. Parallel circuits only.
	707	G	Same as okt w thr. Faraner circuits only.
	767	G	
	- GI	0	
	36	G	Same as 6K7 to 39/44.
	39/44	G	
6 V 4	6X4	E	Reverse 6X4 to 6V4 procedure.
	6X5	G	Where space permits, reverse 6X5 to 6V4 procedure.
6 V 6	6A4/LA	Р	Parallel circuits only. Reverse 6A4/LA to 6F6 procedure.
	6AD7	G	Parallel circuits only. Remove and tape up any wires anchored on pins Nos 1 and 6.
	6AQ5	G	Reverse 6AQ5 to 6V6 procedure.
	6AR6	Р	Where additional filament current is available. Reverse 6AR6 to 6F6 procedure.
	6 F 6	G	Parallel circuits only. No changes.
	6 G 6	P	
	6 K 6	G	
	616	G	Parallel circuits only. No changes.
	6 U 6	G	
	6Y6	G	
	7A5	G	Parallel circuits only. Remove and tape up any wires anchored on pins Nos. 1 and 6.

6V6-6W7

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6 V 6	7 B5 7C5	G G	Same as 6K6 to 7B5.
	38	G	Same as 6F6 to 38. Parallel circuits only.
	41 42	G	Same as 6F6 to 41. Parallel circuits only.
	89	G	Same as 6F6 to 89. Parallel circuits only.
6V7	6C7	G	Same as 6Q7 to 6C7.
	6R7	G	No changes.
	65R7	G G	Same as 12Q7 to 12SQ7.
	6T7	Ġ	Parallel circuits only. No changes.
	786	G	Same as 6Q7 to 7B6.
-	7C6	G	Same as 6Q7 to 7B6. Parallel circuits only.
	7E6	G	Same as 6Q7 to 7B6.
	75 85	G G	Same as 6Q7 to 75.
6W4	6U4	E	No changes.
6W 5	024	G	No changes. Do not use where AC plate voltage exceeds 250 volts per plate.
	6A'X5	G	Parallel circuits only. No changes.
	6AX6	E	Parallel circuits only. Tie No. 4 and No. 8 together.
	6BY5	G	Parallel circuits only. Rewire as follows:
			Connect Nos. 1 and 8 together No. 3 to No. 4
	6X5 6ZY5	G G	Parallel circuits only. No changes.
	6Z6	G	Parallel circuits only. Short Nos. 4 and 8.
	7 ¥4 7Z4	G G	Same as 6X5 to 7Y4.
	1274	G	No changes, Parallel circuits only.
6W 6	6AR6	G	Reverse 6AR6 to 6F6 procedure.
	6L6	G	Parallel circuits only. No changes.
6W 7	6C6-77 6D6-78	G G	Parallel circuits only. Reverse 6C6 to 6J7 procedure.
	6D7 6E7	G G	Same as 6J7 to 6D7. Parallel circuits only.
			-4

6W7-6X5	5		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB,	PERF.	CIRCUIT CHANGES NECESSARY
6W7	6J7 6K7	G G	Parallel circuits only. No changes.
	657	G	No changes.
	65H7 65J7 65K7	G G	Same as 6J7 to 6SJ7. Parallel circuits only.
	6U7	G	Parallel circuits only. No changes.
	7A7	G	Same as 6K7 to 7A7. Parallel circuits only.
	7B7 7C7	G	Same as 6K7 to 7A7.
	7H7	G	Same as 6K7 to 7A7. Parallol circuits only.
	71.7	G	Same as 6K7 to 7A7. Parallel circuits only.
	12 J 7 12K7	म म	No change. Series circuits only.
	77-6C6 78-6D6	G G	Reverse 6C6 to 6J7 procedure. Parallel circuits only.
6 X 4	6 V4	E	Change socket to noval and rewire as follows: No. 1 on miniature to No. 1 on noval 3 to 4 4 to 5 6 to 7 7 to 3
	6X5	E	Where space permits. Change socket to octal and rewire as follows: No. 1 on miniature to No. 3 on octal 3 to 2 4 to 7 6 to 5 500 6 to 8
	84/624	G	Parallel circuits only. Where space permits, reverse 84/6Z4 to 6X4 procedure.
	5726	G	Parallel circuits only. Reverse 5726 to 6X4 procedure,
6X5	6AX5	G	Parallel circuits only. No changes.
	6AX6	G	Parallel circuits only, Tie no. 4 and no. 8 together.
	6BY5	G	Parallel circuits only. Rewire as follows:
			Connect Nos. 1 and 8 together No. 3 to No. 4
	6 V4	G	Change socket to noval and rewire as follows: No. 2 on octal to No. 4 on noval 3 to 1 5 to 7 5 to 5 5 to 5 5 to 3

6W7-6X5	5		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6W7	6J7 6K7	G G	Parallel circuits only. No changes.
	657	G	No changes.
	68H7 68J7 68 K7	G G	Same as 6J7 to 65J7. Parallel circuits only.
	6U7	G	Parallel circuits only. No changes.
	7A7	G	Same as 6K7 to 7A7. Parallel circuits only.
	7B7 7C7	G G	Same as 6K7 to 7A7.
	7H7	G	Same as 6K7 to 7A7. Parallel circuits only.
	717	G	Same as 6K7 to 7A7. Parallel circuits only.
	12 J7 12 K 7	P P	No change. Series circuits only.
	77-6C6 78-6D6	G G	Reverse 6C6 to 6J7 procedure. Parallel circuits only.
6X4	6 V4	E	Change socket to noval and rewire as follows: No. 1 on miniature to No. 1 on noval
			7 to 3
	6X5	Е	Where space permits. Change socket to octal and rewire as follows: No. 1 on miniature to No. 3 on octal
	84/624	G	Parallel circuits only. Where space permits, reverse 84/6Z4 to 6X4 procedure.
	5726	G	Parallel circuits only. Reverse 5726 to 6X4 procedure.
6X5	6AX5	G	Parallel circuits only. No changes,
	6AX6	G	Parallel circuits only. Tie no. 4 and no. 8 together.
	6BY5	G	Parallel circuits only. Rewire as follows:
			Connect Nos. 1 and 8 togetherNo. 3to No. 4
	6 V4	G	Change socket to noval and rewire as follows: No. 2 on octal to No. 4 on noval
			und 8 to 3 sue

6X5-6Y6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6X5	6W5	G	Parallel circuits only. No changes.
	6X4	G	Reverse 6X4 to 6X5 procedure.
	6 Y 5	E	Parallel circuits only. Change socket to six prong and rewire as follows: No. 2 on octal to No. 1 on six prong
			a a to 3
			(a) A 5 to 5
			0°0' - 7 to 6
			8 to 4
	0Z4	E	No changes. Do not use where AC plate voltage exceeds 250 volts per plate
	6Z5	G	Same as 6X5 to 6Y5. Parallel circuits only.
	626	G	Same as 6W5 to 6Z6.
	6ZY5	G	Parallel circuits only. No changes.
	7Y4	E	Parallel circuits only. Change socket to loctal and rewire as follows:
	/14	E	No. 2 on octal to No. 1 on loctal
			$\begin{pmatrix} 0 \\ 0 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \end{pmatrix} = 5$ to 6
			0° 7 to 8
			orig 8 to 7 sub
	724	G	Same as 6X5 to 7Y4.
	84	E	Change socket to five prong and rewire as follows:
			No. 2 on octal to No. 1 on five prong
			6 0 3 to 2
			(a) 5 to 3
			T to 5
			8 to 4
	1274	G	Parallel circuits only. No changes.
6X6G			No practical substitute.
6Y3G			No practical substitute.
6Y5	6X5	G	Parallel circuits only. Reverse 6X5 to 6Y5 procedure.
	625	G	Rewire as follows:
			Connect Nos. 2 and 6 together.
6¥6	6AR6	G	Reverse 6AR6 to 6F6 procedure.
	666	Р	Parallel circuits only. No changes.
	6K6	G	t de datos oze odeta onige ano osienteore
	616	G	
	6 U 6	G	
	6V6	G	
	7A5	-G •	Same as 6K6 to 7B5. Parallel circuits only.
	7B5	G	Same as 6K6 to 7B5. Parallel circuits only.
	765	G	Danie as one to the . L'aratter encants only.
	100		

6Y7-6Z1	15		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6¥7	6A6	G	Change socket to seven prong and rewire as follows: No. 2 on octal to No. 1 on seven prong 3 to 2 3 to 3 0° 4 to 3 0° 0° 0
			6 to 6 6 to 7 8 to 4
	6N7 6Z7	G G	Parallel circuits only. No changes.
6Z3	1 V	E	No changes.
624	6 Ý5	G	Parallel circuits only. Change socket to six prong and rewire as follows: No. 1 on five prong to No. 1 on six prong 2 to 3 3 to 5 4 to 4 5 to 6
6Z5	6 ¥5	E	No changes for six volt operation.
6Z7	GAG	G	Same as 6Y7 to 6A6. Parallel circuits only.
	6N7 6Y7	G G	Parallel circuits only. No changes.
6ZY5	074	G	No changes. Do not use where AC plate voltage exceeds 250 volts per plate
	6AX5	G	Paralled circuits only. No changes.
	6AX6	G	Parallel circuits only. Tie Nos. 4 and 8 together.
	6BY5	G	Parallel circuits only. Rewire as follows:
			Connect Nos. 1 and 8 together No. 3 to No. 4
	6W5	G	Parallel circuits only. No changes.
	6X5	G	Parallel circuits only. No changes.
	6¥5 6Z5	G G	Same as 6X5 to 6Y5. Parallel circuits only.
	7¥4 7Z4	G G	Same as 6X5 to 7Y4. Parallel circuits only.
	84	G	Same as 6X5 to 84. Parallel circuits only.
	1274	G	Parallel circuits only. No changes.

744-747

			RECEIVING TUB		IN GUIDE		/A4= /		
TUBE	SUB,	PERF.	CIRCUIT	CHANGES NI	ECESSARY				
7A4	6AE5	G	Change socket t	o octal and re	wire as follows				
			a	No. 2 on lock		3 on oc	tal		
			00	1	to	2	(00)		
				6	to	5	$(\bigcirc \bigcirc \bigcirc)$		
			COO	7	to	8	2009		
			ORIS	8	to	7	211B		
	6C5	G	Reverse 6J5 to 7A4 procedure.						
	6.45	G	Reverse 6J5 to	7A4 procedure	2.				
	61.5	G	Same as 7A4 to 6AE5. Parallel circuits only,						
	784	G	No changes.						
			No changes.						
	XXL	E							
	37	G	Change societ to five many and newing as follows						
	76	G	Change socket to five prong and rewire as follows No. 1 on loctal to No. 1 on five prong						
	10	G	(DB)				e prong		
			(FA ()	2	to	2	6		
			06001	6	to	3			
			03	7	to	4	00		
				8	to	5	2/8		
7A5	6 F 6	E	Parallel circuit	e only Chang	arcacket to only	al and rea	uing as follows		
140	6K6	G	I al allel cli cult	No. 1 on locta		2 on oct			
	GLG	G					Ld I		
			() () () () () () () () () ()	2	to	3	(· · · · · · · · · · · · · · · · · · ·		
	6 LIS	G	(a()a)	3	to	4	(a))a)		
	6 V.6	G	00	6	to	5	00		
	6 Y 6	G	ORIG	7	to	8	SUB		
				8	to	7			
	785	C	Derullal sizewith only. No shares						
	7B5 7C5	G	Parallel circuits only. No changes.						
	100	G							
7A6	6H6	E	Roverse 6H6 to	7A6 procedure					
INU	0110		Reverse 6H6 to 7A6 procedure.						
	5679	E	No changes. Do not use unused terminals for anchor.						
7A7	6C6	G	Reverse 6C6 to 3	7A7 procedure	•				
	6D6	E							
	77	G							
	78	£					1		
	6D7	G	Change socket to seven prong and rewire as follows:						
	6E7	G		No. 1 on locta	1 to No.	1 on sev	ven prong		
			-	2	to	2			
			() () () () () ()	3	to	3	0.00		
			0000	4	to	4	02 60)		
			00	6	to	cap	00		
			DRIG	7	to	6	BUZ		
				8	to	7			
	617	G	Reverse 6K7 to 7	A7 procedure					
	6K7	E							
	1:00	0	Devellel sizevite only Devene CVP to 517 providence						
	6S7	G	Parallel circuits only. Reverse 6K7 to 7A7 procedure.						
	6SH7	G	Reverse 125J7 to 7B7 procedure.						
	6SJ7	G							
	6SK7	E							
	IACU	E							

7A7-7AB	1		RECEIVING TUBE SUBSTITUTION GUIDE					
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY					
7A7	6557	G	Parallel circuits only. Reverse 12517 to 7B7 procedure.					
	6117	G	Reverse to 6K7 to 7A7 procedure.					
	GW7	G	Parallel circuits only. Reverse to 6K7 to 7A7 procedure.					
	7B7	G	Parallel circuits only. No changes.					
	767	Ġ	Falanci circinis only. No enanges.					
	7517	G	No changes.					
	717	G	TO CHURDON					
	39/44	E	Change socket to five prong and rewire as follows:					
			No. 1 on loctal to No. 1 on five prong 2 to 2					
			CO 6 to cap					
			onu 7 to 4 sue					
			8 to S					
7A8	6A7	E	Parallel circuits only. Reverse 6A7 to 7B8 procedure.					
	6A8	E	Parallel circuits only. Reverse 6D8 to 7A8 procedure.					
	5D8	G	Reverse 6D8 to 7A8 procedure.					
	7138	Е	Parallel circuits only. No changes.					
	738	G						
	757	G						
	7Q7	G	Parallel circuits only. Remove and tape up wires on No. 5. Connect Nos and 8 together.					
	1.2 A 8	P	Series circuits only. Reverse 12A8 to 14B8 procedure.					
	14B8	Р	Series circuits only. No changes.					
	14.17	P	Derrow on water and a state of the state of					
	1457	P						
7AB7	7AD7	Р	Same as 7AB7 to 7AG7. Parallel circuits only.					
	7AJ7	P						
	7AK7	P	*					
	767	Ч	A					
	7日7	P						
	717	P						
	7 F 7	P						
	777	р						
	7AG7	G	Rewire as follows:					
	7AH7	G	Remove wires from No. 1					
	787	G	No. 2 to No. 1					
	707	G	3 to 2					
			Connect wires removed from No. 1 to No. 3					
			Remove wires from No. 8					
			No. 7 to No. 8					
			6 to 7					
			5 to 6					
			Connect wires removed from No. 8 to No. 7					
			Connect No. 4 and No. 7 together.					

7487-74K7

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
7AB7	1204	E	No changes.
7AD7	7AG7	Р	Parallel circuits only. No changes.
	7AH7	P	
	7AJ7	Р	
	7AK7	P	
	7137	P	
	707	P	
	767	P	
		P	
	7117		
	717	P	
	7'7 7 V 7	P	
7AF7	7F7	G	No changes.
	7N7	G	Parallel circuits only. No changes.
73(37		C	
7AG7	7AH7	G	No changes.
	7137	P	
	707	р	
	7AJ7	Р	Parallel circuits only. No changes.
	7AK7	P	5. I P
	7G7	G	
	7117	G	
	71.7	G	
	7.1.7	G	
	7 V 7	G	
7AH7	7AG7	G	No changes.
	7B7	P	
	7C7	P	
	7AJ7	G	Parallel circuits only. No changes.
	7AK7	F	
	767	Р	
	7117	P	
	71.7	P	
	7'17	P	
	7V7	Р	
7AJ7	7AH7	G	Parallel circuits only. No changes,
	7AK7	P	
	7B7	P	
	707	P	
	7G7	P	
	7V7	Р	
	7117	Р	No changes.
	71.7	Р	
	717	P	
7AK7	7AH7	Р,	Parallel circuits only. No changes.
	7A.17	[5	
	7137	P	
	707	1.	
	7G7	P	
	7H7	P	
	71_7	Ч	
	7.1.7	P	
	7 V 7	1,	

784-787			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
784	6AD5 6AE5	G	Reverse 6J5 to 7A4 procedure.
	6 7 5	G	Change socket to octal and rewire as follows. No. 1 on loctal to No. 2 on octal
	6J5	G	Reverse 6J5 to 7A4 procedure.
	6 K5	G	Reverse 6K5 to 7B4 procedure.
	6 P5	G	Reverse 6J5 to 7A4 procedure.
	7A4 XXL	G	No changes.
785	6AD7	G	Parallel circuits only. Reverse 6K6 to 7B5 procedure. Remove and t any wires anchored on unused pins.
	6F6	G	Parallel circuits only. Reverse 6K6 to 7B5 procedure.
	6 K6	Е	Reverse 6K6 to 7C5 procedure.
	6L6 6U6	G	Parallel circuits only. Reverse 6K6 to 7B5 procedure.
	6 V.6 6 Y 6	G G	
	7A5 7C5	G G	Parallel circuits only. No changes.
	41 42	G E	Change socket to six prong and rewire as follows: No. I on loctal to No. I on six prong 2 to 2 3 to 3 6 to 4 7 to 5 8 to 6
7B6	686	Е	Reverse 6B6 to 7B6 procedure.
	6Q7 6R7	E G	Reverse 6Q7 to 7B6 procedure.
	65Q7	E	Reverse 6SQ7 to 7B6 procedure.
	6T7	G	Parallel circuits only. Reverse 6Q7 to 7B6 procedure.
	7C6	G	Parallel circuits only. No changes.
	7E6	G	No changes.
	75	E	Reverse 75 to 7E6 procedure.
	85	G	Reverse 75 to 7E6 procedure.
7B7	6C6 6D6	G	Parallel circuits only. Reverse 6C6 to 7A7 procedure.

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			RECEIVING TUBE SUBSTITUTION GUIDE
TULE.	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
787	6D7	G	Same as 7A7 to 6D7. Parallel circuits only.
	6E7	G	
	6.17	G	Parallel circuits only. Reverse 6J7 to 7L7 procedure.
	6K7	G	Parallel circuits only. Reverse 6K7 to 7A7 procedure.
	687	G	Reverse 6K7 to 7A7 procedure.
	65117	G	Parallel circuits only. Reverse 12SJ7 to 7B7 procedure.
	6SJ7 6SK7	G G	
			December 10/17 - 707
	6887	G	Reverse 12SJ7 to 7B7 procedure.
	6-U7	G	Parallel circuits only. Reverse 6K7 to 7A7 procedure.
	6W 7	G	Reverse 6K7 to 7A7 procedure.
	7A7	G	Parallel circuits only. No changes.
	707	G	No changes.
	7117	G	Parallel circuits only. No changes.
	12.17	P	Series circuits only. Reverse 6K7 to 7A7 procedure.
	12K7	P	
	12567	р	Series circuits only. Reverse 128J7 to 7B7 procedure.
	125H7	P	
	128J7 128 K7	P	
	14A7/12B7	P	Series circuits only. No changes.
	38/44	G	Same as 7A7 to 39/44. Parallel circuits only.
	77	G	Parallel circuits only. Reverse 6C6 to 7A7 procedure.
	7.5	G	tarance creates only. negative obvito 171 procedure.
7Bo	6A7	G	Reverse 6A7 to 7B8 procedure.
	6A8	G	Reverse as 12A8 to 14B8 procedure.
	6DB	G	Parallel directits only. Reverse 1278 to 1488 procedure.
	6.48	Е	Reverse 12A8 to 14BS procedure.
	6 K.3	E	
	788	G	Parallet circuits only. No changes.
	7.17	G	No changes.
	757	G	No changes.
704		E	No changes.
	(41)	Ci.	Change socket to miniature and rewire as follows:
			No. 1 on loctal to No. 3 on misiature
			(3,0) 4 to 1 (3.0)
			C 1 10 7 C
			8 to 4 55

THRE SUB, PERF. CIRCUIT CHANGES NECESSARY 2C5 6AD7 G Parallel circuits only. Reverse 6K6 to 7B5 procedure. Do not unchore unused piss. 2C6 666 G 4C6 G Parallel circuits only. No changes. 4C6 G Parallel circuits only. No changes. 42 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 637 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 786 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 786 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 786 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 786 G Parallel circuits only. Reverse 6207 to 7B6 procedure. 786	705-707			RECEIVING TUBE SUBSTITUTION GUIDE
2008 Control of the termine of the termin	TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
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RK6 G 81.6 G 81.6 G 81.6 G 81.6 G 81.6 G 81.6 G 74.5 G 74.5 G 74.6 G 74.7 G 74.7 G 8.607 G 6.807 G 6.807 G 8.807 G 9.807 G 9.807 G 12.807 P 9 Ser		6F6	G	Parallel circuits only. Reverse 6K6 to 7B5 procedure.
81.6 6 61.6 6 61.6 6 61.6 6 61.6 6 61.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 6 71.6 7 71.6 7 71.6 7 71.6 7 71.7 6 71.7 6 71.7 6 71.7 6 71.7 6 71.7 6 71.7 6 71.7 7 71.8 7 7.8 7 <		6 G 6	G	
606 6V6 6V6 6V6 6V6 6V6 6V6 6V6 6V6 6V6 G 7A5 G Parallel circuits only. No changes. 7B5 G Parallel circuits only. No changes. 7B6 6G Same as 7B5 to 41. Parallel circuits only. 7C6 66G7 607 G Parallel circuits only. Reverse 6Q7 to 7B6 procedure. 65G7 607 G Parallel circuits only. Reverse 6SQ7 to 7B6 procedure. 65G7 607 G Parallel circuits only. No changes. 7B6 G Parallel circuits only. No changes. 7B6 G Parallel circuits only. No changes. 7B6 G Parallel circuits only. Reverse 6Q7 to 7B6 procedure. 7B7 G Parallel circuits only. No changes. 12G7 P Series circuits only. No changes. 12G7 P Series circuits only. No changes. 13507 P Series circuits only. Reverse 6SQ7 to 7B6 procedure. 755 G Parallel circuits only. No changes. 767 G Parallel circuits only. Reverse 75 to 7E6 procedure. 75 G Parallel circuits only. Reverse 5C6 to 7A7 procedure. 606 G Reverse 12S47 to 0D7. Parallel circuits only		6K6	G	
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755GParallel Circuits only. No changes.11 42G7C6658 677 687G7C66597 687G7C66597 687G7C7G<				
11 12 12 12 126 6 6 6 6 7 6 139 arallel circuits only. Reverse 6Q7 to 7166 procedure. 6507 6 6 6 6 6 6 6 6 6 6 7 69 arallel circuits only. Reverse 6Q7 to 7166 procedure. 6 6 6 6 6 6 6 7 66 6 6 7 6 777 7 66 6 9 Parallel circuits only. Reverse 6Q7 to 7166 procedure. 6 12 13 14 16 14 16 14 16 14 16		7A5	G	Parallel circuits only. No changes.
42G7C6666 6Q7 6R7GParallel circuits only. Reverse 6Q7 to 766 procedure. 6SQ76SQ7GParallel circuits only. Reverse 6SQ7 to 766 procedure. 6ST7 G6SQ7GParallel circuits only. Reverse 6SQ7 to 766 procedure. 12Q7766GParallel circuits only. No changes.12Q7PSeries circuits only. Reverse 6Q7 to 766 procedure. 12SQ712SQ7PSeries circuits only. Reverse 6Q7 to 766 procedure.12SQ7PSeries circuits only. Reverse 6Q7 to 766 procedure.65GParallel circuits only. Reverse 6Q7 to 766 procedure.75GParallel circuits only. Reverse 6C6 to 7A7 procedure.606GGG607G		7B5	G	Parallel circuits only. No changes.
42G7C6666 607 617 618GParallel circuits only. Reverse 6007 to 786 procedure. 6007 6186507GParallel circuits only. Reverse 6507 to 786 procedure. 6517 6176517GReverse 6507 to 786 procedure.7166GParallel circuits only. No changes.7166GParallel circuits only. Reverse 607 to 786 procedure.7187PSeries circuits only. Reverse 607 to 786 procedure.7186PSeries circuits only. Reverse 607 to 786 procedure.7287PSeries circuits only. Reverse 607 to 786 procedure.7287PSeries circuits only. Reverse 75 to 786 procedure.75GParallel circuits only. Reverse 606 to 747 procedure.76GParallel circuits only. Reverse 606 to 747 procedure.77608G78GSame as 747 to 607. Parallel circuits only.657GReverse 667 to 747 procedure.6587GReverse 667 to 747 procedure.6587GReverse 667 to 747 procedure.6597GReverse 667 to 747 procedure.6597GReverse 667 to 747 procedure.6597GReverse 667 to 747 procedure.747GReverse 667 to 747 procedure.747GReverse 667 to 747 procedure.747GReverse 667 to 747 procedure.747GN changes.		41	(7	Same as 7B5 to 41. Parallel circuits only.
6Q7 6R7 G 6SQ1 G Parallel circuits only. Reverse 6SQ7 to 7B6 procedure. 6SQ1 G Reverse 6SQ7 to 7B6 procedure. 6ST7 G Reverse 6SQ7 to 7B6 procedure. 7B6 G Parallel circuits only. No changes. 12Q7 P Series circuits only. Reverse 6Q7 to 7B6 procedure. 12SQ7 P Series circuits only. Reverse 6SQ7 to 7B6 procedure. 12SQ7 P Series circuits only. Reverse 6SQ7 to 7B6 procedure. 12SR7 P Series circuits only. Reverse 5SQ7 to 7B6 procedure. 14B6 P Series circuits only. Reverse 75 to 7E6 procedure. 75 G Parallel circuits only. Reverse 75 to 7E6 procedure. 856 G Parallel circuits only. Reverse 6C6 to 7A7 procedure. 856 G Parallel circuits only. Reverse 6C6 to 7A7 procedure. 656 G Same as 7A7 to 6D7. Parallel circuits only. 657 G Reverse 6K7 to 7A7 procedure. 657 G Reverse 6K7 to 7A7 procedure. 6587 G Reverse 6K7 to 7A7 procedure. 6587 G Reverse 6K7 to 7A7 procedure. 747				
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SST7 BT7G GReverse 65Q7 to 7B6 procedure.7B6GParallel circuits only. No changes.12Q7PSeries circuits only. Reverse 6Q7 to 7B6 procedure.12SQ7 12SR7PSeries circuits only. Reverse 6SQ7 to 7B6 procedure.12SQ7 12SR7PSeries circuits only. Reverse 6SQ7 to 7B6 procedure.14B6 14E6PSeries circuits only. No changes.75 65GParallel circuits only. Reverse 75 to 7E6 procedure.75 				
6T7G786GParallel circuits only. No changes.12Q7PSeries circuits only. Reverse 6Q7 to 7B6 procedure.12SQ7PSeries circuits only. Reverse 6SQ7 to 7B6 procedure.12SQ7PSeries circuits only. Reverse 6SQ7 to 7B6 procedure.12SQ7PSeries circuits only. No changes.14B6PSeries circuits only. No changes.14B6PParallel circuits only. Reverse 75 to 7E6 procedure.75GParallel circuits only. Reverse 6C6 to 7A7 procedure.606GG77GSame as 7A7 to 6D7. Parallel circuits only.657GReverse 6K7 to 7A7 procedure.6587GReverse 6K7 to 7A7 procedure.6587GReverse 6K7 to 7A7 procedure.707GReverse 6K7 to 7A7 procedure.7087GParallel circuits only. No changes.709GNo changes.		65Q7	G	Parallel circuits only. Reverse 6SQ7 to 7Bo procedure.
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7B6GParallel circuits only. No changes.12Q7PSeries circuits only. Reverse 6Q7 to 7B6 procedure.12SQ7PSeries circuits only. Reverse 6SQ7 to 7B6 procedure.12SR7PSeries circuits only. No changes.14B6PSeries circuits only. No changes.14E8PSeries circuits only. Reverse 75 to 7E6 procedure.75GParallel circuits only. Reverse 75 to 7E6 procedure.766C6G6D7GParallel circuits only. Reverse 6C6 to 7A7 procedure.6D7GSame as 7A7 to 6D7. Parallel circuits only.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 6K7 to 7A7 procedure.6W7GReverse 6K7 to 7A7 procedure.747GParallel circuits only. No changes.749GParallel circuits only. No changes.749GNo changes.				neveral oner to the procedure,
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12SR7P14B6 14E6P PSeries circuits only. No changes.75 85G GParallel circuits only. Reverse 75 to 7E6 procedure.7C76C6 6D6 77 78G G6D7 6E7G CSame as 7A7 to 6D7. Parallel circuits only.6S7G Reverse 6K7 to 7A7 procedure.6S87GReverse 6K7 to 7A7 procedure.6W7GReverse 6K7 to 7A7 procedure.6W7GReverse 6K7 to 7A7 procedure.747GParallel circuits only. No changes.787GNo changes.		12Q7	Р	Series circuits only. Reverse 6Q7 to 7B6 procedure.
14E6P75GParallel circuits only. Reverse 75 to 7E6 procedure.85GParallel circuits only. Reverse 6C6 to 7A7 procedure.6C6GG77G78G6D7G6S7G6S7G6S7G73G74G75G75G78G78G78G78G78G78G78G78G78G78G787G787G787G787G787G787G787G787No changes.				Series circuits only. Reverse 65Q7 to 7B6 procedure.
14E6P75GParallel circuits only. Reverse 75 to 7E6 procedure.85GParallel circuits only. Reverse 6C6 to 7A7 procedure.6C6GG77G78G6D7G6B7G6S7G6S87G73G747G747G787G787G787G787G787G787G787G787G787G787G787G787No changes.		1486	P	Series circuits only. No changes.
76 85G GParallel circuits only. Reverse 75 to 7E6 procedure.7C76C6 6D6 77 78G G G GParallel circuits only. Reverse 6C6 to 7A7 procedure.6D7 6E7G GSame as 7A7 to 6D7. Parallel circuits only.6D7 6E7GReverse 6K7 to 7A7 procedure.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ7 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.				Deries chedrin only. No ondegan
85G7C76C6 6D6 77 72GGParallel circuits only. Reverse 6C6 to 7A7 procedure. 6D7 G6D7 6E7GSame as 7A7 to 6D7. Parallel circuits only. 6E76D7 6E7GReverse 6K7 to 7A7 procedure.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ3 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.		1410	1	
85G7C76C6 6D6 77 72GGParallel circuits only. Reverse 6C6 to 7A7 procedure. 6D7 G6D7 6E7GSame as 7A7 to 6D7. Parallel circuits only. 6E76D7 6E7GReverse 6K7 to 7A7 procedure.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ3 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.		75	G	Parallel circuits only. Reverse 75 to 7E6 procedure.
6D6G77G78G6D7G6E7G6S7G6S87G6S87G6S87G787G787G787G787G787G787No changes.				
6D6G77G78G6D7G6E7G6S7G6S87G6S87G6S87G787G787G787G787G787G787No changes.	7.0.7	6C6	G	Parallel circuits only. Reverse 6C6 to 7A7 procedure.
77 78G G6D7 6E7G GSame as 7A7 to 6D7. Parallel circuits only.6D7 6E7GReverse 6K7 to 7A7 procedure.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ7 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.				
78G6D7 6E7GSame as 7A7 to 6D7. Parallel circuits only.6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ7 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.				
6E7C6S7GReverse 6K7 to 7A7 procedure.6SS7GReverse 12SJ7 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.				
6E7C6S7GReverse 6K7 to 7A7 procedure.6SS7GReverse 12SJ7 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.		2007	C	Same as 747 to fill? Parallel circuits only.
6S7GReverse 6K7 to 7A7 procedure.6S87GReverse 12SJ3 to 7B7 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.				Same as INT to obt. Faranci en cuits only.
5587GReverse 12837 to 787 procedure.6W7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.		DE.I	U	
GW7GReverse 6K7 to 7A7 procedure.7A7GParallel circuits only. No changes.7B7GNo changes.		6S7	G	Reverse 6K7 to 7A7 procedure.
7A7GParallel circuits only. No changes.787GNo changes.		6887	G	Reverse 12SJ7 to 7B7 procedure.
727 G No changes.		6W 7	G	Reverse 6K7 to 7A7 procedure.
		7.47	G	Parallel circuits only. No changes.
7H7 G Parallel circuits only. No changes.		787	G	No changes.
		7.87	G	Parallel circuits only. No changes.

70	7	-7	F	7
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
707	12J7 12K7	P	Series circuits only. Reverse 6K7 to 7A7 procedure.
	125G7	P	Series circuits only. Reverse 12SJ7 to 7B7 procedure.
	12SH7	P	
	12SJ7 12SK7	P P	
	14A7/12B7	P	Series circuits only. No changes.
	36	G	Same as 7A7 to 39/44. Parallel circuits only.
	39/44	G	
707			No practical substitute.
7E5	7A4	Р	Parallel circuits only. Rewire as follows:
	784	P	Remove wires from No. 1
			No. 2 to No. 1
			3 and 7 to 2
			4 and 6 to 7
			5 to 6
			Connect wires removed from No. 1 to No. 6
	1201	E	No changes.
E6	686	G	Reverse 6Q7 to 7B6 procedure.
EU	6.027	G	Reverse out to the procedure.
	6R7	G	Reverse 6Q7 to 7B6 procedure.
	65Q7	G	Reverse 6SQ7 to 7B6 procedure.
	65R7	G	Reverse 65Q7 to 7B6 procedure.
	677	G	Parallel circuits only. Reverse 6Q7 to 7B6 procedure.
	75	G	Reverse 75 to 7E6 procedure.
	85	G	Reverse 75 to 7E6 procedure.
	7B6	G	No changes.
	766	G	Parallel circuits only. No changes.
iE7	6 B8	G	Reverse 6B8 to 7E7 procedure.
	787	G	No changes.
7F7	6C8	C	Reverse 6C8 to 7F7 procedure.
	6 1 8	G	Parallel circuits only. Reverse 6C8 to 7F7 procedure.
	6SC7	G	Reverse 65C7 to 7F7 procedure.
	6SL7	G	Reverse 651.7 to 7F7 procedure.
	7AF7	G	No changes.
	7178	G	Reverse 7F8 to 7F7 procedure.
	7N7	G	Parallel circuits only. No changes.

7F8-7J7			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
7F8	2C51	Р	Reverse 2C51 to 7F8 procedure.
÷.	6 F.8	р	Parallel circuits only. Change socket to octal and rewire as follows:
			No. 1 on loctal to cap on octal
			2 to 2
			(00) 3 to 3 (00)
			$\begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} 0 \\ 0 \\ 0 \end{pmatrix} \begin{pmatrix} 4 \\ c \\$
			5 to 8 6 to 6
			08/6 6 to 6 SUB 7 to 7
			8 to 5
			0 10 5
	7AF7	P	Same as 7F8 to 7F7.
	7F7	Р	Rewire as follows:
			Remove wires from No. 1
			No. 2 10 No. 1
			4 to 2
			Connect wires removed from No. 1 to No. 4
			Remove wires from No. 8 No. 7 to No. 8
			No. 7 to No. 8 5 to 7
			Connect wires removed from No. 8 to No. 5
	7N7	Р	Same as 7F8 to 7F7. Parallel circuits only.
	5670	E	Parallel circuits only. Reverse 2C51 to 7F8 procedure.
767	7A7	G	Parallel circuits only. No changes.
	787	G	
	7C7	G	
	7117	G	
	717	G	
	777	G	No changes.
	1000	G	Parallel circuits only. No changes.
	1232	G	
767/1232	6J7	Cř	Parallel circuits only. Reverse 6J7 procedure.
	6K7	G	
	617	G	
7 EI 7	747	G	No changes.
	7137	G	Parallel circuits only. No changes.
	707	G	territer ercare only. He changes,
	71.7	G	No changes.
	717	G	
	7.17	G	Parallel circuits only. No changes.
	1231	G	titt drive averagene offens the openSing.
	1273	G	No changes.
7.1-7	CAS	E	Reverse 6J2 to 747 procedure.
	EF-1 3	Ð	
	688	Ŀ	
	7.158	iCi.	No changes.
	757	4	1. S. S. B. S. S.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
7K7	7B6	G	Rewire as follows:
	7E6	G	No. 2 to No. 7
			3 to 2
			4 to 3
	7X7	G	Rewire as follows:
			Remove wires from No. 2
			No. 3 to No. 2
			4 to 3 Connect wires removed from No. 2 to No. 4
7L7	6.17	G	Reverse 6J7 to 7L7 procedure.
	6K7	G	Reverse 6K7 to 7A7 procedure.
	7A7	G	No changes.
	7 <u>G</u> 7	G	Parallel circuits only. No changes.
	7H7	G	No changes.
	777	G	No changes.
	777	G	Parallel circuits only. No changes.
7N7	6C8	G	Parallel circuits only. Reverse 6C8 to 7F7 procedure.
	6F8	G	Reverse 6C8 to 7F7 procedure.
	7AF7	G	Parallel circuits only. No changes.
	7F7	G	Parallel circuits only. No changes.
7Q7	6SA7	G	Reverse 12SA7 to 14Q7 procedure.
7R7	7E7	G	No changes.
757	6A7	G	Reverse 6A7 to 7B8 procedure.
	6A8	G	
		~	
	6J8 6K8	G	Reverse 6J8 to 7J7 procedure.
	0110	G	
	788	G	No changes.
	737	G	
777	7A7	G	No changes.
	7B7	G	Parallel circuits only. No changes.
	707	G	Parallel circuits only. No changes.
	767	G	Parallel circuits only. No changes.
	7117	G	No changes.
	7L7	G	No changes.
	777	G	No changes.
	1231	G	Parallel circuits only. No changes.

105

767-777

7T7-12A			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
7T7	1273	G	No changes.
7 V 7	7B7 7C7	G G	Parallel circuits only. No changes.
	7G7 1232	G	No changes.
	7W7	Ĕ	Rewire as follows: No. 4 to No. 5 Do not use No. 4 for anchor
			Do not use No. 4 for anchor
7W 7	777	Е	Rewire as follows:
			No. 4 to No. 7
			5 10 4
7X6	7¥4	G	Parallel circuits only. Rewire as follows:
170	72.4	G	Connect Nos. 2 and 7 together. Cannot be used where 7X6 is employed as a doubler.
7.87	7K7	G	Rewire as follows:
		C.	Remove wires from No. 2
			No. 4 to No. 2
			3 to 4
			Connect wires removed from No. 2 to No. 3
	XXFM	E	No changes.
7 ¥4	6 X 5	E	Reverse 6X5 to 7Y4 procedure.
1	7:X6	G	Parallel circuits only. No changes. If it is convenient, connect No. 2 and 7 together.
	724	G	Parallel circuits only. No changes.
724	GW 5	G	Parallel circuits only. Reverse 6X5 to 7Y4 procedure.
	6 X 5	Е	
	6ZY5	G	
	7X6	G	No changes. If it is convenient, connect Nos. 2 and 7 together.
	7.¥4	G	Parallel circuits only. No changes.
10	10Y	E	No changes
	RKIO	E	
	50	G	
	210	E	
	310	E	
10¥	10	E	No changes.
IUE	RK10	E	and consider as
	50	G	
	210	E	
	310	Е	
L2A	71.A	G	No changes.

		14	RECEIVING TUBE SUBSTITUTION	GUIDE	12A5-12AL5
TUBE	SUB.	PERF.	CIRCUIT CHANGES NI	ECESSARY	
12A5	12A6	G	12 volt operation only. Paralle rewire as follows:	l circuits only. Chai	nge socket to octal and
				prong to No. 2 on c	octal
<u>^</u>	-		2	to 3	00
			0, 4,0) 3	to 4	(°))
			4	to 5	62.67
			onis 5	to 8 to 7	sue,
12A6	6 G 6	Р	No changes. Series circuits.		
	14/3	C	Same as 35L6 to 35A5.		
	14/13	G	Same as 35L0 to 35A5.		
12A8	12K8	G	No changes.		
	14A7/12B7	Р	Change socket to loctal and rew		
			No. 2 on octal	to No. 1 on 1	octal
			(a) (a) (b) (b) (b) (b) (b) (b) (b) (b) (b) (b	to 2	100
				to 6	0000
				to 3 to 8	U
			01410 8	to 7	SUM
			cap	to 4	
10-				nielded. Realign if n	ecessary
	14B8	G	Change socket to loctal and rev		
	14J7	G	No. 2 on octal	to No. 1 on l	octal
	14S7	G	3	to 2	100 M
			6000 5	to 4	6000
			6	to 3	040
			0 ¹ 0 7	10 8	100
			• 8	10 7	
			cap	to 6	
10 4 117	12AT7	G	Change socket to noval and rewi	ing as follows:	
12AH7	12A11	G	No. 1 on octal	to No. 2 on n	oval
			2	to Ro. 2 off h	ovar
			3	to 1	
			600 4	to 8	(S ^O Q)
			0 20 5	to 7	6. 2
			0°® 6	to 6	808
			7	to 5	
			8	to 4	
	14AF7/XXD	G	Change socket to loctal and rew	ire as follows:	
	14F7	G	No. 1 on octal	to No. 4 on h	octal
		11	2	to 2	
			3	to 3	00
			(3) (C) 4	to 7	
			25-59 5	to 5	600
			OF10 6	to 6	51.14
			7	to S	
			8	to 1	

12AT6-124	AYZ		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
12AT6	121120	C	No shares
14A.10	12AV6	G	No changes.
	12BF6	P	
	12BK6	G	
	12BT6	Р	
	12BU6	Р	
	12SQ7	G	Where space permits. Reverse 12SQ7 to 12AT6 procedure.
	12SR7	P	
	12SW7	P	
12AT7	12AH7	G	Where space permits. Reverse 12AH7 to 12AT7 procedure.
	12AU7	G	No changes.
	12AV7	G	Parallel circuits only. No changes.
	12AX7	G	No changes.
	12AY7	G	
	12BH7	G	Parallel circuits only. No changes.
12AU6	12AW6	G	Reverse Nos. 2 and 7.
	12BA6	G	No changes.
	12BD6	G	No entraços.
12AU7*	12AT7	G	No changes.
	12AV7	G	Parallel circuits only. No changes.
	12AX7	G	No changes.
	12AY7	G	
12AV6	12AT6	G	No changes.
LOLLEG	12BF6	P	Tto onengeor
	12BK6	G	
	12BT6	G	
	12BU6	G	
12AV7	12AT7	G	Parallel circuits only. No changes.
IGUAN			taranci circuits only. no changes.
	12AU7	G	
	12AX7	G	
	12AY7	G	
	12BH7	G	
10 4100	13 4 116	C	Rewire as follows:
12AW6	12AU6	G	
	12BA6	G	Reverse No. 2 and No. 7
12AX7	12AT7	G	No changes.
	12AU7	G	
	12AV7	G	Parallel circuits only. No changes.
	12AY7	G	No changes.
	12BH7	G	Parallel circuits only. No changes.
	1 in 6 im h	17	No observed
12AY7	12AT7	G	No changes.
	12AU7	G	
	12AV7	G	Parallel circuits only. No changes.

* See Addendum at back of this section.

12AY7-128T6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
12AY7	12AX7	G	No changes.
	12BH7	G	Parallel circuits only. No changes.
12B6M			No practical substitute.
1287	14A7	E	No changes.
12B8GT			No practical substitute.
12BAG	12AU6	G	No changes.
	12AV6 12AW6	G G	Reverse 12AW6 to 12AU6 procedure.
12BA7	12 BE6	G	Change socket to miniature and rewire as follows:
			No. 1 on noval to No. 6 on miniature
			2 to 1
			3 to 2
			4 to 3
			5 to 4 6 0
			oris B to 2 sue
			7 10 7
			9 to 5
12BD6	12AU6	G	No changes.
	12AW6	G	Rewire as follows: Reverse No. 7 and No. 2
	12BA6	G	No changes.
12BE6 .	12 BA7	G	Same as 6BE6 to 6BA7.
	125A7	G	Where space permits. Reverse 125A7 to 12BE6 procedure.
12BF6	12AT6	P	No changes.
	12AV6	P	
	12 BK6	P	
	12BTG	P	
	121306	G	
12817	12AT7	Ci-	Parallel circuits only. No changes.
	13AU7	G	
	12AV7	G	
	12AX7	G	
	12.1.87	G	
12 BK6	12A TB	G	No changes:
1313560		G	Tark Percendid Ang -
	12AVB	9	
	12886		
	12BF6 12866	G G	
14676		1.	New Automatic
17.816	12 15	Ci.	ha changes.
	124.16	O'	
	1.2111-5	1.0	
	12 REG	G	
	12810	G	

12806-12	2K7		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
12BU6	L2AT6	Р	No changes.
12200	12AV6	P	ito changes.
	12BF6	G	
	12BK6 12BT6	P P	
	12DIQ	F	
12C8	14E7	G	Change socket to loctal and rewire as follows:
	14R7	G	No. 2 on octal to No. 1 on loctal
			3 to 2
			(0.0 ¹) 4 to 3 (0.0
			(3) (6) 5 to 4 (0) (7)
			6 to 5
			0.0
			8 to 7
			cap to 6
12E5	1626	G	Parallel circuits only. No changes.
10.05	10:70	~	
12F5	12J5	G	Rewire as follows:
			No. 4 to No. 3. Connect grid wire to No. 5.
	12SF5	E	Same as 6F5 to 6SF5.
12G7G			No practical substitute.
12010			No practical substitute.
12H6	12AL5	E	Change socket to miniature and rewire as follows;
			No. 2 on octal to No. 3 on miniature
			(A) 3 to 2
			(3) (6) 4 to 5
			(0) 5 to 7 (0)
			DRIG 7 to 4 SUB
			8 to 1
12J5	12 F 5	G	Rewire as follows:
	1.1		No. 3 to No. 4
			Connect wire from No. 5 to grid cap.
	12SF5	G	Same as 12SF5 to 12J5.
	14A4	G	Same as 6J5 to 7A4.
	1626	G	Parallel circuits only. No changes.
1237	657	Р	Series circuits only. No changes,
	6W 7	P	
	707	73	Came of 1987 to 787 but in carine chrowite calu
	7B7	P	Same as 12K7 to 7B7 but in series circuits only.
	707	P	
	12B7	E	
	12K7	G	No changes.
	12SG7	G	Same as 12K7 to 12SK7.
	12SH7 12SJ7	G	
		E	
		~	
	125 K7	G	
		G E	Same as 12K7 to 7B7 but in series circuits only.

12K7-12SA7

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECH	ESSARY				
12K7	6SS7	G	Same as 12K7 to 12SK7. Series ci	rcuits only				
	6W7	E	Series circuits only. No changes.					
	787	Р	Change socket to loctal and rewire	as follows	, series circuits only:			
	7C7	P	No. 1 on octal		5 on loctal			
	12B7	E	2	to	1			
	14A7	E	3	to	2 30			
	14C7	E	(3) (3) 4	to	3 (3/7)6)			
			0 5	l:O	4 (2 4 2 0)			
			7	to	8 508			
			8	to	7			
			cap	to	6			
	12J7	G	No changes.					
	12SK7	Е	Make adaptor as follows:					
			No. 1 on base	to No.	1 on lop			
			2	to	2			
			3	to	8			
			4	to	6			
			5	to	3			
			7	ta	7			
			8	t.o	5			
			cap	to	4			
12K8	12A8	G	No changes.					
	14B8	G	Same as 12A8 to 14B8.					
	14.J7	G						
	1457	G						
1218	1644	G	No changes.					
12Q7	65T7	Р	Same as 12Q7 to 12SQ7. Series circuits only.					
	677	Р	Series circuits only. No changes.					
	706	P	Series circuits only. Same as 6Q7	to 7B6.				
	14136	ŦC						
	14E6	G						
	125Q7	E	Make adaptor as follows:					
			No. 1 on base		1 on top			
			2	1:0	8			
			3	10	6			
			4	to	4			
			5	to	5			
			7	to	7			
			8	to	3			
12SA7	6557	P	Same as 12SA7 to 12SK7 series cir	cuits.				

12SA7-12	SC7		RECEIVING TUBE SUBSTITUTION GUIDE						
TUBE	SUB.	PERF.	CIRCUI	CIRCUIT CHANGES NECESSARY					
12SA7	7AB	Ŀ	Series circuits only. Change socket to locial and rewire as follows: No. 1 on octal to shield connection on locial socket 2 to No. 1						
			60	2		to NO.	1	575	
			600	4		to	5	6000	
			620	5		to	4	0 0	
			20	6		10	7	60	
			100	7		10	8		
				8		to	6		
			The 7A8 hears must be connec very short.	faster the	an the othe ss the filor	er tubes and	l a 200 ol nais 2 an	lm. $1/2$ wall resistor of 7 or its life will be	
	787	E,	Series circuits	only. Cl	hange sock	cet to loctal	and rew	re as follows:	
	707	P		No. 2 0			1 on loc		
	1287/14A7			3		to	2	and the second sec	
			6000	4		to	3	6000	
			600	5		TO	6	603	
			60	6		10	in a	60	
			QK.G	7		10	8	10.0	
				8		to	4		
	12BE6	G	Chango socket					in the second	
				No. 20	noctal		3 on mit	niature	
			Taxies	3		to.	6	100	
			600	4		to	6	6.0	
			620	5		to	1	6 0	
			and a	6		to	2	10	
				1		to	4		
				0		10	1		
	1237	12	Make adapter a	s follows					
	12K7	1>	112 miles	No. 1 01		10 No.	1 on top	j	
				2		to	2		
				3		to	3		
				4		to	4		
				5		to	cap		
				6		6.25	8		
				8		t ci	5		
	12837 128K7	P R	Change connect	Reverse	Nos. 2 an				
					wire from				
				Move Wa	ire from N				
					from	5 10 4 6 10 5			
						or mid as	contro g	frid and castrol	
	1407	G	Change socket	to luctal i	nd rew.ro	as follows			
				No. 2 or			I on loct	tal	
				3		to	2	in the	
			6000	4		to	3	(BRA)	
			600	5		to	4	040	
			52792×	6		10 7	and 5	29	
			04.0	7		to	8	YOR	
				8		lo	6		
12SC7	12:51.7	G	Same as BSC7 h	o ssly.					
	1634	G	No changes.						
	1072		the monthese						

125F5-125K7

THILT	(* T T T)	DEDE	CIDCHID CHANGES NEDECARDY
TUBE	SUB.	PERF.	
12SF5	12F ³ 5	G	Reverse 6F5 to 6SF5 procedure.
	12J5	G	Rewire as follows:
			Reverse No. 2 and No. 8
			Reverse No. 3 and No. 5
125F7	12SK7	P	Rewire as follows:
I DUIL! I	and	-	Move wire from No. 2 to No. 4
	Germanium		5 to 8
	Diode		8 to 2
			4 to 6
			Remove wires from No. 5 Connect No. 3 and No. 5 together
			Diode crystal from No. 3 or 5 to wires
			removed from No. 3
2SG7	12AU6	G	Change socket to miniature and rewire as follows:
2301	12 BA6	G	No. 2 on octal to No. 3 on miniature
	12BD6	G	3 to 7
			6 5 4 to 1 5 6
			6 to 6 sub Oki6 7 to 4
			8 to 5
	12SH7	G	No changes.
	125J7	G	
	125K7	G	
2SH7	12AU6	G	Same as 12SG7 to 12BA6.
	12BA6	G	
	12BD6	G	
	12567	G	No changes.
	12537	G	5
	12SK7	G	
2SJ7	657	P	Same as 125K7 to 12K7. Series circuits only.
. 2 30-1	6W7	P	Sunte de l'abril to l'artic de red dire diregt
			And the second in the last the second second
	1287	G	Change socket to loctal and rewire as follows:
	14A7 14C7	G	No. 2 on octal to No. 1 en loctal 3 to 4
	1101	u	$\begin{array}{cccccccccccccccccccccccccccccccccccc$
			6) 5 to 7 6)
			6 to 3
			onis 7 to 8 sus 8 to 2
			8 to 2
	12J7	G	Same as 12SK7 to 12K7.
	12K7	G	
2SK7	657	P	Same as 12SK7 to 12K7. Series circuits only.
	6W7	P	
	0007	D	Na abangos - Somies gizquits anly
	6557	P	No changes. Series circuits only.

125K7-125Q7			RECEIVING TUBE SUBSTITUTION GUIDE					
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY					
125K7	12Å V6 12BA6 12BD6	G G	Change socket to miniature and rewire as follows: No. 2 on octal to No. 3 on miniature 3 to 2 4 to 1 5 to 7 6 to 6					
			6 to 6 7 to 4 8 to 5					
	12B7 14A7 14C7	E E G	Change socket to loctal and rewire as follows: No. 1 on octal 2 to 1 2 to 1 3 to 4 4 to 6 5 to 7 5 to 7 5 to 3 7 to 8 8 to 2					
	1237 12K7	G E	Make adaptor as follows:No. 1 on baseto No. 1 on top2to2to3to4to5to6to7to8to					
	125G7 125H7 125J7	G G G	No changes.					
12SL7	125C7	G	Reverse 63C7 to 6SL7 procedure. If the 12SL7 employs the two cathodes separately this substitution may be impractical.					
125N7	12517	р	Parallel circuits only. No changes.					
	125X7	G	No changes.					
12SQ7	6S T 7	P	Series circuits. No changes.					
	6T7	P	Same as 12SQ7 to 12Q7. Series circuits only.					
	706	P	Same as 12SQ7 to 14B6. Series circuits only.					
	12AT6 12ÅV6 12BK6 12BT6 12BU6	G G G P	Change socket to miniature and rewire as follows: No. 2 on octal to No. 1 on miniature 3 to 2 4 to 5 5 to 6 6 to 7 7 to 3					

to

12SQ7-14A4

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
125Q7	12Q7	E	Make adaptor as follows:
			No. 1 on base to No. 1 on top
			3 10 8
			4 to 4
			5 to 5
			6 La 3
			7 to 7
			3 to 2
	12SR7	G	No changes.
	LESIN	0	no changes.
	12SW7	P	No changes.
	1486	E	Change socket to loctal and rewire as follows:
	14E6	G	No. 2 on octal to No. 3 on loctal
			3 to 7
			6 to 2 00
			04/6 7 to 8 5/8
			8 1.0 1
12SR7	194 700	D	Same as 12SQ7 to 12AT6.
12581	IZAT6	P	Same as 125Q/ to 12A16.
	12AV6	P	
	12BK6	P	
	12BT6	Р	
	12BU6	G	
	12Q7	G	Same as 125Q7 to 12Q7.
	12SQ7	G	No changes.
	12SW7	G	No changes.
	14B6	G	Same as 12SQ7 to 14B6.
	14E6	G	Same as raby, to reno.
	1420	G	
125W7	12AT6	P	Same as 12SQ7 to 12AT6.
16011	12AV6	P	
	12BK6	P	
	12BT6	P	
	12BU6	G	
	10507	5	St. 1
	125Q7	P	No changes.
	12SR7	G	
12SX7	12SL7	р	Parallel circuits only. No changes.
	125N7	G	No changes.
125 77	12SA7	G	No changes.
	14Q7	G	Same as 12SA7 to 14Q7.
1223	1 V	G	Series Circuits only. No changes.
	14Z3	G	No changes.
1225			No practical substitute.
14A4	1235	E	Reverse 6J5 to 7A4 procedure.

14A5-14E7			RECEIVING TUBE SUBSTITUTION GUIDE				
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY				
14A5	12A6	E	Reverse 35L6 to 35A5 procedure.				
	1284	Р	No changes. Connect No. 4 to No. 7 for best results.				
14A7/12B7	657 6W7	P P	Reverse 12K7 to 7B7 procedure. Series circuits only.				
	6557	Р	Reverse 12SJ7 to 7B7 procedure. Series circuits only.				
	7B7 7C7	P P	Series circuits only. No changes.				
	12B7	E	No changes.				
	14C7	G					
	14H7	G					
	1280	G					
	1284	E					
	12.17	G	Reverse 12K7 to 7B7 procedure.				
	12K7	E					
	190117	C	Percence 19917 to 787 proceedure				
	12SH7	G	Reverse 12SJ7 to 7B7 procedure.				
	12SJ7 12SK7	G E					
14AF7/XXD		G	Reverse 12AH7 to 14AF7/XXD procedure.				
THAT I AND							
	14F7	G	No changes.				
	14N7	G	Parallel circuits only. No changes.				
1 4B 6	7C6	Р	Series circuits only. No changes.				
	12Q7	E	Reverse 6Q7 to 7B6 procedure.				
	14E6	G	No changes.				
14B8	7A8	Р	Series circuits only. No changes.				
	12A8	G	Reverse 12A8 to 14B8 procedure.				
	1437	G	No changes.				
	1457	G					
14C5	14A5	G	Parallel circuits only. No changes.				
14C7	7B7	р	Series circuits only. No changes.				
	7C7	P	······································				
	12B7	E	No changes.				
	14A7	G					
	14H7	G					
	1280	G					
	1284	Е					
14E6	12Q7	G	Reverse 6Q7 to 7B6 procedure.				
	14B6	G	No changés.				
14E7	12C8	G	Reverse 12C8 to 14E7 procedure.				

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
14E7	14R7	G	No changes.
14F7	12AH7	G	Reverse 12AH7 to 14AF7/XXD procedure.
	14AF7/XXD	G	No changes.
	14F8	G	Reverse 7F8 to 7F7 procedure.
14F8	14F7	G	Same as 7F8 to 7F7.
14117	12.B7	G	No changes.
	14A7	G	
	14C7	G	
	1280	G	
2	1284	G	
14.17	7A8	Р	Series circuits. No changes.
	1100	0	
	14BS	G	No changes.
	1487	G	
14N7	14AF7/XXD	G	Parallel circuits only. No changes.
14Q7	125A7	G	Reverse 12SA7 to 14Q7 procedure.
14127	12C8	G	Reverse 12C8 to 14E7 procedure.
	14E7	G	No changes.
1457	7A8	Р	Series circuits only. No changes.
			Put 200 or 250 ohm 1/2 watt resistor across filament terminals when sub- stituting 7 volt for 12 volt types to compensate for faster heating.
	14B8	G	No changes.
	14J7	G	No changes.
14V7			No practical substitute.
14W7	1287	G	No changes.
	14A7	G	0
	14C7	G	
	14H7	G	
	1280	G	
	1284	G	
14¥4			No practical substitute.
15	1A4	G	Same as 15 to 1B4. Battery operation only. Parallel circuits.
	1 B4	G	For battery operation only. Parallel circuits. Change socket to four prong
	1 137	U.	type and rewire as follows:
			No. 1 on five prong to No. 1 on four prong

	No. 1 on five prong	10 No.	1 on four	prong
() ()	2	10	2	10
0	3	to	3	102 30'
00	4	to	4	10 0
ORIG.	5	to	4	
	cap	10	cap	1440

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14E7-15

TUBE	SUB.	PERF.	CIRCUIT	HANGES NECES	SARY		
15	1 E 5	G	For battery opera			s Change	sociation
10	120	U	rewire as follows		in circuit	5. Change	SUCKETTO
			N	o. 1 on five prong			1
			000	23	ta	3	2000
			2	-1	10	4 .	600
			00	5	to	7	O'B SLE
			URIU.	eap	'O	cap	700
	32	G	Same as 15 to 184	. Battery operati	ion only.	Parallel c	irelits.
	34 951	G					
	JUI	G					3
7			No practical subst	itute.			
18			No practical subst	itute.			
19	1J6	E	Change socket to d				
			N	o. 1 on six prong		2 on octa	1
			00	2	LO	3	600
			02 50	3 4	to	4 5	600
			O O	5	10	6	SUP
			Great Ing , 1	6	10	7	
9BG6	25 BQ6	Р	Rewire as follows				
			N	0. 5	to No.		
				3	to	8	
9.C8	1978	G	No changes.				
978	19C8	G	No changes.				
0	X99	G	Parallel circuits c	nly. No changes.			
810			No practical subst	itute.			
1A7			No practical subst	itute.			
2			No practical subst	itule.			
4A	35/51	G	Use as IF or RF a	mplifier. Does no	ot make g	ood detecto)r.
	57	G	Change socket to a			lows:	
	58	E	No	. 1 on five prong		1 on six p	ong
			(The second sec	2	to	2 3	(0 0 pa
				3 4	to 4	and 5	02 50
			0.60	5	to	6 .	SUB
			00	сар	to	cup	
5A6	25B6	G	No changes.				
	25 C 6	G					
	2516	G					
	4.3	G	Change socket to s				
				. 2 on octal	to No.	1 on six p	rong
			00	3	lo	2	00
				4	to	3 4	(02 30)
			(D) (B)				00
			OPIG	7	to	G	SUB

25A6-25C6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
25A6	5824	G	No changes.
25A7	32L.7	Έ	No changes.
25AC5			This is a positive bias triode output tube. Operation can be accomplished by rewiring circuit and installing standard power amplifier tube.
25A V5	25 BQ6	G	Rewire as follows: No. 8 to No. 4 3 to 8 5 to cap 1 to 5
25B5	25N6 25B6 25C6 25L6	G G G	Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 0.1 = 0.1
	43	G	No changes.
25 B6	25A6	G	No changes.
	25 B5	E	Reverse 25B5 to 25N6 procedure.
	25G6 25L6 25N6	G G G	No changes.
	43	G	Reverse 43 to 25L6 procedure.
	5824	E	No changes.
25B8GT			No practical substitute.
25 BQ6	19BG6	G	Rewire as follows: No. 8 to No. 3 4 to 8 Insert 20 ohm 10 walt resistor in series with filament circuit.
	25AV5 .	G	Rewire as follows: No. 5 to No. 1 cap to 5 8 to 3 4 to 8
25C6	25A6	G	No changes.
	25 B5	G	Reverse 25B5 to 25N6 procedure.
	25B6 25LG	G G	No changes.
	25N6	G	No changes.
	43	G	Reverse 43 to 251.6 procedure.
	5824	G	No changes.

25D8GT-2	2525		RECEIVING TUBE SUBS	TITUTION GUID	E		
TUBE	SUB.	PERF.	- CIRCUIT CHAN	IGES NECESSAI	RY		
25D8GT			No practical substitute				
2516	25A6	G	No changes.				
	25B5	G	Reverse 25B5 to 25N6	procedure.			
	25 B6 25 C 6	G	No changes.				
	25N6	G	No changes.				
	43	G	Reverse 43 to 25L6 pro	ecedure.			
	5824	E	No changes.	Juduara.			
25N6	2585	G	Reverse 25B5 to 25N6	ovocetiure.			1.0
255	185	E	No changes.	procedure.			
25W4	2526	E	Rewire as follows:		B.I	0	
			No. 8 3		to No). Z	
				ct No. 4 and No. 3 and	. & tog	gether gether	
25X6	2526	G	Where 25X6 is used by No changes.	itself only. Re	place	line c	ord with 310 ohms.
	50X6	G	with 445 ohms. Change		al and	rewir	filament dropping resistor re as follows: n loctal
			3		10	3	00
					to	2	$(\bigcirc \bigcirc \bigcirc)$
			5		to	6	- 60
			DRIC 7 8		to	8 7	SUR
	50¥6	G	Where 25%6 is used by with 445 ohms.	itself, replace	line c	cond or	r filament dropping resistor
	50Y7	G	When 25×6 is used by i	itself replace]	ine er	and or	filament dropping resistor
	5027	G	with 445 ohms. Do not				mament dropping resistor
25 ¥4			No practical substitute				
25¥5	2525	E	No changes.				
	2576	E	Same as 2525 to 2526.				
2523			No practical substitute.				
2524	2526	E	No changes. Remove a	nd lape up wire	s on t	unused	terminals.
2525	6 J 5	P		uit. If one cathe			ment circuit, will not work by itself for field excitation
	25 Y5	E	No changes.				

25Z5-27

TUBE SUE. PERF. CIRCUIT CHANGES NECESSARY 25Z5 2526 E Change socket to octal and rewire as follows: No. 1 on six prong to No. 2 on octal 2 3 tO 3 4 to 4 8 to 5 5 to 6 7 to 2526 615 P Connect 60 ohm 5 watt resistor in series with filament circuit, will not work in voltage doubler circuit. If one cathode is used by itself for field excitation connect 4 and 3 together. Make adaptor as follows: No. 1 on base to No. 2 on lop 2 and 5 3 and 5 to 3 and 4 to 3 7 6 to Can be used only in half wave circuits. If the cathodes are separate supplies in a half wave circuit connect 4 and 8 together. Insert 10 watt 75 or 100 ohm resistor in series with the filament string. Insert 75 or 100 ohm 10 watt resistor in series with the filament string. 6SL7 P P 6SN7 25AC5 P No changes. Use only where 4 and 8 are connected together. Will not work in voltage doubler circuit. If one cathode is used by itself for field excitation tie 4 and 8 together. 25W4 G When 2526 is used as straight half wave rectifier. Rewire as follows: No. 3 to No. 5 4 and 8 to 3 2 to 3 Where 25Z6 is used as straight half wave rectifier only. Rewire as follows: 2524 G No. 3 to No. 5 4 10 8 2525 E Change octal to six prong socket and rewire as follows: No. 2 on octal to No. I on six prong 3 to 2 4 3 to 5 5 to 7 6 to 8 to 4 35Z6 G No changes. No practical substitute. 26 26A6 No practical substitute. 26A7 No practical substitute. 26BK6 26C6 P No changes. Ρ No changes. 26C6 26 BK6 26D6 No practical substitute. 27 56 G No changes. P 485

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
28D7	28D7W	Е	No changes.
28D7W	28D7	Е	No changes.
2825			No practical substitute.
30	1E4	P	Change socket to octal and rewire as follows:
	164	E>	No. 1 on four prong to No. 2 on octal
	1 H4	Ē	$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
	31	G	Parallel circuits only. No changes.
31	30	G	Parallel circuits only. No changes.
32	1A4	G	No changes. 34 does not make good detector.
	1134	G	
	34	G	
	951	G	
32L7	25A7	E	No changes.
	70A7	G	No changes. Difference in filament current makes necessary line resistant the same. Use only where 32L7 does not have other tubes in series with it.
	701.7	G	Reverse 5 and 8. Cord is correct. Use only where 32L7 does not have other tubes in series with it.
	117L7 117M7	G	Remove or short out the filament resistor and reverse connections 4 and 5 to socket.
	117N7	G	Remove or short out filament resistor. Change connections as follows:
	117P7	G	No. 6 to 7
			8 to 6
			1 to 8
			4 to 5 5 to 4
			5 to 4
			Use only in conventional circuits where rectifier is first in the string and A.C. is connected to No. 7.
33	1F4	G	Parallel circuits only. No changes.
	950	E	
34	1A4	G	No changes.
	1 134	G	
	32	G	
	951	G	
35A5	6 G 6	Р	Same as 35A5 to 35L6 but put a 250 ohm 10 watt resistor in series with the filament circuit.
35A5		P	

35A5-35C5

TUBE	SUB.	PERF.	CIRCUIT CHANGES NEC	ESSARY		
35A5	35B5	E	Change socket to miniature and	rewire as fo	llows:	
	50B5	G	No. 1 on loctal		3 on minia	ture
			2	to	5	600
			(OO) 3	to	6	0 0
			6	to	1	00
			096. 7	to	2	SUB.
			3	to	4	
			Do not use No.	7 on miniatu	re.	
	35C5	E	Change socket to minature and r			
	50C5	G	No. 1 on loctal	to No.	3 on minia	ture
			05 2	to	7	600
			(O) (O) 3	to	6	0 0
			6	to	2	0 0
			ORIG 7	to	1	SUB
			8	to	4	
			Do not use No.	5 on miniatur	e.	
	3516	Е	Change socket to octal and rewin	re as follows		
	5016	G	No. 1 on loctal		2 on octal	
	00110	9		1.0	3	60
			3	to	4	(J) (E)
			6			6 10
				to	5	CO
			ORIG 7	to	8	SUB
			8	1.0	7	
	50A5	G	No changes.			
35 B5	35 A 5	E	Where space permits. Change s	ocket to loct	al and rewir	e as follows.
	50A5	G	No. 1 on miniat	ure to No.	6 on loctal	
			2	to	7	
			(DO) 3	to	1	00
			2 © 4	to	8	(OO)
			ORIG 5	to	2	66
			оніз.	to	3	SUB
			7	to	6	
	35C5	E	Rewire as follows:			
	50C5	G	Reverse No. 1	and No 2		
	5003	G		and 7		
	3516	E	Where space permits. Change s	acket to acta	land rewire	as follows:
	5016	G	No. 1 on míniat			. a3 10110 W3.
	00H0	G	2	to	8	
						(0) (5)
			000	to	2	3 6
				to	7	050
			0Rig. 5	to	3	SUB
			6	lo	4	
			7	to	5	
	50B5	G	No changes.			
35C5	35A5	E	Where space permits, change so	cket to locta	l and rewire	as follows:
	50A5	C	No. 1 on miniat	ure to No.	7 on loctal	
			2	to	6	-
			300 3	to	1	000
			© © 4	to	8	(O)
			5	to	6	COO
			ORIG. 5	to	3	SUB
			7		2	
			1	to	4	

35L6-35	Y4		RECEIVING TUBE	SUBSTITUTIO	N GUIDE		
TURE	SUB.	PERF.	CIRCUIT	CHANGES NE	CESSARY		
361.6	6G6	P	Put 250 ohm 10 v	watt resistor i	n series with	filamen	t circuit.
	12A6	P	Insert 150 ohms	resislance in	series with th	e filam	ent circuit.
	12.15	P	Insert 150 ohms	resistance in	<mark>series with</mark> th	e filam	ent circuit.
	35A5	E	Change socket to	loctal and re-	wire as follow	s:	
	50.A5	G		No. 2 on octal		. 1 on l	octal
			00	5	to	2	(3)
				4	10	3	(D) (D) (D)
			(C) (O)	5	to	6	000
			GRIS	8	10	7	sua
				7	to	8	
	35 B5	Ð	Change socket to	ministure and	d rewire as fo	llows:	
	50B5	G		No. 2 on octal			niniature
	O D D D	G	60	3	te	5	
			3 6	4	to	6	600
			10/0/	5	to	1	VO O
			_O°®:∕	7	to	4	SUB
			Circle 7	g	to	2	
			1	Do not use No.			
	4.500.5					17	
	3505	E	Change socket to				
	50°C5	G		No. 2 on octal		. 3 on n	niniature
			6000	3	to	r r	000
			600	4	to	6	0 0
			COO	57	to	2	BUR
			DRIG	0	to	4	
			1	o Do not use ter:	to minal No. 5 or	n miniat	ure.
	50C6	G	No changes.				
	50116	G					
35W4	35¥4	E	Where space per	mits. Reverse	e 35 Y4 to 35W	4 proce	dure.
	3523	E					
	3525	E					
	117Z3	G	dropping resistor I I I	r and replace w Remove and ta No. 7 Pilot light will	with ordinary pe up any wir to No. not burn. In	line cor es on No 6 order to	nd resistor or filame nd. Rewire as follow o. 6 o light pilot light, con th filament and conne
35 ¥4	35W4	E	F Change socket to	vilot light acro	oss it. I rewire as foi	llows:	niniature
			C C C S C C C S Rice	4 7 8	to to	6 7 4	SUE SUE
	3523	E	No change is nece same method as t			ot light.	Pilot light can be li

35Y4-35Z5

TUBE SUB. PERF. CIRCUIT CHANGES NECESSARY 35 Y4 3525 E Change socket to octal and rewire as follows: to No. 2 on octal No. 1 on loctal 2 to 5 4 to 3 7 8 to 8 7 LO 35Z3 7.A.6 P Move wire from No. 2 to No. 3. Short 3 and 6 together and 2 and 7 together. Connect 200 ohm 10W resistor in series with filament circuit. 35W4 È Change socket to miniature and rewire as follows : No. 1 on loctal to No. 3 on miniature 2 5 to 7 7 to 8 to 4 Do not anchor on unused terminals. 35Y4 E No changes. Remove wires, if any, from pin No. 4 and tape them up. E 3574 Change socket to octal and rewire as follows: to No. 2 on octal 35Z5 E No. 1 on loctal 2 5 to 7 δ 10 8 7 to Same as 35Z3 to 35Z4. G 45Z5 35Z4 P Add 150 ohm 5W resistor in series with filaments. Short Nos. 3 and 5. 12J5 35W4 E Change socket to miniature and rewire as follows: No. 2 on octal to No. 3 on miniature 5 to 5 7 to 4 8 7 to Do not connect to unused terminald. 35Y4 Change socket to loctal and rewire as follows: \mathbf{E} 35Z3 \mathbf{E} No. 2 on octal to No. I on loctal 5 2 to 7 to 8 8 to 7 35Z5 E No change is necessary but remove wires, if any, from pin No. 3 and tape them up. 35Z5 1235 P Add 150 ohm 5W resistor in series with filaments. Remove wires from No. 3 and connect to No. 2 through 25 or 30 ohm 1W resistor. Short Nos. 3 and 5. Change socket to miniature and rewire as follows: 35W4 Е No. 2 on octal to No. 3 on miniature. 3 to 6 5 5 to 7 to 4 8 7 tio Do not connect to unused terminals. Change socket to loctal and rewire as follows: 35Y4 E No. 2 on octal to No. 1 on loctal 3 4 to 5 2 to 7 8 to 7 8 to

3525-40			RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
35 Z 5	35 Z4	E	No change is necessary but pilot light will not light. In order to light the pilot light, put a 40 ohm resistor in series with the filaments and connect the pilot light across it. This resistor must have a 1 watt mating.
	4525	G	No changes.
35Z6	25Z6	G	No change, unless 35Z6 is used singly in which case put 35 ohm 10 watt resistor in filament string.
	5026	G	No changes. Where a full set of five or six tubes are used, httle change in operation will be noted. If 35Z6 is used by itself, this substitution may not be satisfactory.
35/51	241	G	No changes.
36	6C6 6D6	EG	Same as 37/44 to 6D6.
	39/44	G	No changes.
	77 78	E G	Same as 39/44 to 6D6.
37	76	E	No changes.
38	41 42	G G	Parallel circuits only. Reverse 41 to 38 procedure.
39/44	6C6 6D6 77 78	G E G E	Change socket to six prong and rewire as follows: No. 1 on five prong to No. 1 on six prong to 2 to 2 to 3 to 3 to 3 to 4 to 4 and 5 solution solution to cap
	6J7 6K7	G E	Reverse 6K7 to 39/44 procedure.
	657	G	Reverse 6K7 to 39/44 procedure. Parallel circuits only.
	6SH7 6SJ7 6S K 7	G G E	Reverse 65K7 to 39/44 procedure.
	6SS7	G	Reverse 65K7 to 39/44 procedure. Parallel circuits only.
	6U7 6W7	G G	Reverse 6K7 to 39/44 procedure.
	7A7 7H7 7L7	E G G	Reverse 7A7 to 39/44 procedure.
	7B7 7C7	G G	Reverse 7A7 to 39/44 procedure. Parallel circuits only.
	36	G	No changes.
40	00A 01A	G G	No changes.
	12A	G	

41-42

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
41	6A4/LA	G	Parallel circuits only. Reverse 6A4/LA to 42 procedure.
	6AD7	G	Reverse 6F6 to 41 procedure. Parallel circuits only. Connect nothing to unused pins.
	6AR5	G	Change socket to miniature and rewire as follows:
			No. 1 on six prong to No. 3 on miniature
			0 0 2 to 5
			(Or sO) 3 to 6
			d to 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
			6 to 4
	6F6	G	Parallel circuits only. Reverse 6F6 to 41 procedure.
	6 G 6	Р	
	GL6	G	
	6U6	G	
	6 V 6	G	
	6 K6	E	Reverse 6F6 to 41 procedure.
	7A5	G	Parallel circuits only. Reverse 7B5 to 41 procedure.
	7B5	E	Reverse 7B5 to 41 procedure.
	7C5	G	Parallel circuits only. Reverse 7B5 to 41 procedure.
	38	G	Parallel circuits only. Change socket to five prong and rewire as follows: No. 1 on six prong to No. 1 on five prong
			$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$
	42	G	No changes.
	89	G	Change socket connections as follows: Move wire from No. 4 to cap. Short Nos. 4 and 5 together.
42	6A4/LA	G	Parallel circuits only. Reverse 6A4/LA to 42 procedure.
	6AD7	G	Parallel circuits only. Reverse 6F6 to 41 procedure. Remove and tape up any wires connected to unused pins.
	6AR5	G	Same as 41 to 6AR5. Parallel circuits only.
	6B5	G	No changes.
	6F6	E	Reverse 6F6 to 41 procedure.
	6G6	Р	Parallel circuits only. Reverse 6F6 to 41 procedure.
	6 K6	G	
	6L6	G	
	6U6	G	
	6 V 6	G	
	7A5	G	Reverse 7B5 to 41 procedure.
	785	G	Parallel circuits only. Reverse 7B5 to 41 procedure.
	7C5	G	ratation on carlo only. Horor be the to at proclautor
	.00		

			RECEIVING TUBE SUBSTI	TUTION GUIDE		
TURE	SUP.	PERF.	CIRCUIT CHANG	ES NECESSARY		
4:3	32	G	Same as 41 to 38. Paral	lel circuits only.		
	41	G	No changes.			
	89	G	Same as 41 to 89, Paral	llef circuits only.		
43	25A6	G	Reverse 25A6 to 4% proc	edurc.		
	2516	E	Change soeket to octal an No. 1 or		v5: 0. 2 01: octal	
			6 0 2	io in	3	Tax as
				to	4	000
				to	5	20
			OFIG S	10	3	20.8
			DRIG D	to	7	
45	2A3	G	No changes.			
45Z3	35W4	G	Where 4523 is used by it			
			filament dropping resiste			ewire as follows:
			No. 1	to No		
			2	10	5	
			6	to	5	
				Nos. 4 and 7		
			Do not a	nchor to unused ter	rminals.	
	11723	G	Where 4523 is used by it dropping resistor and re No. 7		y line cord. F	
			2 and 6 4 1	to to	5 6 4	
4525	3525	G	2 and 6 4	to	56	
45Z5 46	3525 47	G G	2 and 6 4 1	to to	5 6 4	n tied together.
			2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop	to to as class A with pl ng type and rewire	5 6 4 late and scree	n tied together.
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop	to to as class A with pl ng type and rewire	5 6 4 late and scree	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2	to to as class A with pl ng type and rewire	5 6 4 late and scree as follows:	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3	to to as class A with pl ng type and rewire five prong to No	5 6 4 late and scree as follows: 5. 1 on six pr 2 4	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4	to to as class A with pl ng type and rewire five prong to No to	5 6 4 as follows: b. 1 on six pr 2 4 3	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5	to to as class A with pl ng type and rewire five prong to No to to to to	5 6 4 late and scree as follows: 5. 1 on six pr 2 4	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5	to to as class A with pl ng type and rewire five prong to No to to to	5 6 4 as follows: b. 1 on six pr 2 4 3	
46	47	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to	5 6 4 as follows: b. 1 on six pr 2 4 3 6	ong O2 50 Sub
46	47 2A5	G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5 Connect Remove wire from No. 4	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 as follows: b. 1 on six pr 2 4 3 6 nd 4 together.	ong O2 50 Sub
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 as follows: b. 1 on six pr 2 4 3 6 and 4 together. s follows:	ong O2 50 Sub
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 as follows: b. 1 on six pr 2 4 3 6 nd 4 together.	ong O2 50 Sub
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prop No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p	to to as class A with pl ng type and rewire five prong to No to to to 5 and 6 together. and short Nos. 2 a rong and rewire as five prong to No	5 6 4 as follows: b. 1 on six pr 2 4 3 6 nd 4 together. s follows: b. 1 on seven	
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect	to to as class A with pl ng type and rewire five prong to No to to to to 5 and 6 together. and short Nos. 2 a rong and rewire as five prong to No to	5 6 4 as follows: b. 1 on six pr 2 4 3 6 nd 4 together. s follows: b. 1 on seven 2	ong O2 50 Sub
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4	ong O2 50 Sub
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect	to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4 3 5,6 and 7	
46	47 2A5 46	G G P	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect	to to to as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4 3 5,6 and 7 lows:	
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect	as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4 3 5,6 and 7 Hows: 5. 2 on top	
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect No. 1 on 2 3 4 5 Connect Seven p	as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 0. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 0. 1 on seven 2 4 3 5,6 and 7 Hows: 0. 2 on top 3	
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Parallel circuits only. M No. 1 on 2 3 4 5	as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4 3 5,6 and 7 lows: 5. 2 on top 3 5	
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Parallel circuits only. M No. 1 on 2 3 4 5	as class A with pl ng type and rewire five prong to No to to to to 5 and 6 together. and short Nos. 2 a rong and rewire as five prong to No to to to to to to to to to to to to to	5 6 4 Late and scree as follows: 5. 1 on six pr 2 4 3 6 and 4 together. 5 follows: 5. 1 on seven 2 4 3 5,6 and 7 lows: 5. 2 on top 3 5 4	
46	47 2A5 46 59	G G G	2 and 6 4 1 No changes. Only when 46 is operated Change socket to six prov No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove wire from No. 4 Change socket to seven p No. 1 on 2 3 4 5 Connect Remove No. 1 on 2 3 4 5 Connect Remove No. 1 on 2 3 4 5 Connect No. 1 on 2 3 4 5 Connect No. 1 on 2 3 4 5 Connect Seven p No. 1 on 2 3 4 5 Connect Seven p Seven p	as class A with pl ng type and rewire five prong to No to to to to to to to to to to to to to	5 6 4 late and scree as follows: b. 1 on six pr 2 4 3 6 nd 4 together. s follows: b. 1 on seven 2 4 3 5,6 and 7 lows: b. 2 on top 3 5 4 7 and 8	prong O2 50 Sub

48-50L6

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
48			No practical substitute.
49			No practical substitute.
50	10	G	No changes.
50A5	35A5	E	No changes. Place 100-ohm resistor in filament circuit.
	35 B5	E	Same as 35A5 to 35B5. Place 100-ohm 10-W resistor in series with filaments.
	35°C5	E	Same as $35A5$ to $35C5$. Place 100-ohm 10-W resistor in series with filament.
	3516	E	Same as 35A5 to 35L.6. Place 100-ohm resistor infilament circuit.
	5035	E	Same as 35A3 to 35B5.
	50C5	E	Same as 35A5 to 35C5.
	50C6 50L6	G E	Same as 35A5 to 35L6.
50AX6	5026	G	No changes.
50135	35 B5	E	Place 100 ohms 5 watts in series with filament.
	50A5	G	Where space permits, Same as 35B5 to 35A5.
	50C5	E	Same as 35.B5 to 35C5.
	50L6	G	Where space permits. Same as 35B5 to 35L6.
50C5	50A5	G	Where space permits. Same as 35C5 to 35A5.
	50L6	E	Where space permits. Reverse 35L6 to 35C5 procedure.
50C6	35 L/G	G	Place 100-ohm 10-W resistor in series with filament.
	50A5	G	Same as 351.6 to 35A5.
	50L6	G	No changes.
5016	12A6	Р	No changes. Connect a 250-ohm 10-W resistor in series with the filament circuit.
	12J5	प	Emergency substitution. Works well at low volume. Put 250-ohm 10-w resistor in series with filaments.
	35A5	E	Same as 35L6 to 35A5. Place 100-ohm 5-w resistor in series with filaments.
	35 B5	E	Same as 35L6 to 35B5. Place 100-ohm 10-w resistor in series with filament.
	35C5	E	Same as 351.6 to 35C5. Place 100-ohm 10-w resistor in series with filament.
	3516	E	Place 100-ohm 5-w resistance in series with filaments.
	50B5	Е	Same as 35L6 to 35B5.
	50C5	E	Same as 351.6 to 35C5.
	70A7	P	Remove and tape up wires connected to No. 6 or cut off No. 6 pin on 70A7.

50X6-55	S		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NFCESSARY
50X6	25X6	G	Insert 160-ohm 10-w resistor in series with filament. Reverse $25X6$ to $50X6$ procedure.
	50 Y 6	G	Reverse 25X6 to 50X6 procedure.
	50Y7	E	Change socket to octal and rewire as follows:
	5027	E	No. 1 on local to No. 2 on octal 2 to 4
			(0,00) 3 to 3 (0,00)
			6 to 5 6 7 to 8
			8 to 7
			Do not use No. 6 for anchor.
50Y6	50Z7	E	No changes. Disconnect wires from pin No. 6, if any.
50Y7	25X6	G	Insert 160-ohm 10-w resistor in series with filament. Reverse 25X6 to 50Y7 procedure.
	50X6	G	Only when No. 7 filament tap on 50Y7 is not used. Reverse 50X6 to 50Y7 procedure.
	50¥6	G	Only when No. 7 filament tap on $50Y7$ is not used. Reverse $25X6$ to $50Y7$ procedure.
	5027	G	No changes.
5026	2526	E	No changes. Place 83-ohm 20-w resistor in series with filament.
	35Z6	E	Place 50-ohm resistor in series with filament,
	50AX6	E	No changes.
5027	50 ¥6	E	No changes are necessary but pilot light will not light. You may light pilot light by inserting 40 ohms resistance in series with the filament circuit and connecting the pilot light across it.
	50Y7	G	No changes.
EF50	6AH6	G	Same as EF50 to 6AU6. Parallel circuits only.
	6AK6	G	
	6AU6	G	Change socket to miniature and rewire as follows:
	6BA6 6BD6	G	No. 1 on noval to No. 3 on miniature 2 to 6
	0110	0	
			6 6 4 to 2 6 6
			office 6 to 7 sub 7 to 1
			9 to 4
52			No practical substitution.
VT52	10 50	P P	Parallel circuits only. No changes.
53	5608-A	E	No changes.
55	2A6	E	No changes.
55S	2A6 55	E	No changes.
	00	20	

56-70L7

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
56	27	G	No changes.
	485	G	No changes.
56AS	37 76	E E	Parallel circuits only. No changes.
56S	27 56	E	No changes.
57	58	G	No changes.
57AS	6C6 77	E	Parallel circuits only. No changes.
578	57 58	E E	No changes.
58	57	G	No changes. 58 is not a good second detector.
58AS	6D6 78	E	Parallel circuits only. No changes.
58S	57 58	E E	No changes.
59	47	G	Reverse 47 to 59 procedure.
	1619	G	Parallel circuits only. Make adaptor as follows:No. 1 on baseto No. 2 on top2to3to4to5and 67to7to7to7to7to7to7to7to7There are or will be many used 1619 tubes available.
70A7	32L7	G	No changes. Where no other tubes in series with the 70A7 which has 150 mil filament instead of 0.3 amp.
	70L7	E	Change connection as follows: No. 8 to No. 6 6 to 8 Connect Nos. 7 and 8 together. Pilot light will not light but may be lit by same procedure as 50Z7 to 50Y6.
	117L7 117M7	E E	Remove the line cord resistor and replace with straight AC cord. Reverse connections to 4 and 5.
	117N7 117P7	E E	Remove line resistor cord and replace with straight AC cord. Remove wire from No. 8 Move No. 1 to No. 8 Reverse Nos. 4 and 5 Move No. 6 to No. 7 Place No. 8 on No. 6
70L7	321.7	G	Cord is correct. If 32L7 is alone in circuit. Reverse Nos. 6 and 8.
	70A7	Ε	Change connections as follows:No. 6to No. 88to 6

0L7-76			RECEIVING TUBE	SUBSTITUTION GUI	IDE		
UBE	SUB.	PERF.	CIRCUIT	CHANGES NECESS	ARY		
017	117L7 117M7	E	1	istor cord and repl Reverse Nos. 4 and Reverse 6 and 8		n straigh	t AC cord.
	117N7	E	Remove line cord	resistor and repla	ace with	straight	AC cord.
	117P7	E	H	Reverse Nos 4 and to. 8 on No. 7 1 on 8		5	
А	4 82 4 83	G	No changes. If pu	ash-pull circuit, bo	th tubes	must be	e changed to avo
	6AQ6	G	Same as 75 to 6A	T6. Parallel circu	its only		
	6AT6	G	Change socket to	miniature and rew:	ire as f	ollows:	
	6AV6	G		o. 1 on six prong			niniature
	6BFG	G	10 anie	2	to	7	
	6BK6	G	10° a De	3	to	5	000
	6BT6 6BU6	G	66	4 5	to	6 2	
	0000	CT.	DPIG	6	to	4	SUB
				cap	to	1	
	686	E	Change socket to	octal and rewire as	föllow	5:	
	697	E		o. 1 on six prong		. 2 on o	etal
	6R7	G	600	2	to	3	6.00
			103 0 Do	3	to	4	
			0.0	4	to	5	(2) (1)
			ORIG	6	to	0	SUB
				cap	to	cap	
	6C6	Р	Emergency substi	tution. No changes	but co:	nsiderabl	le loss of volum
	65Q7 65R7	E G	Reverse 65Q7 to 7	5 procedure.			
	6T7	G	Same as 75 to 6Q7	. Parallel circuits	s only.		
	6V7	G	Same as 75 to 6Q7				
	7B6	E	Change socket to l	octal and rewire a	s follow	5:	
	7E6	G	N	o. 1 on six prong		. 1 on lo	ctal
			0000	2	to	2 5	00
			02 50	3 4.	to	6	000
			100/	5	to	4 or 7	
			OR G	6	to	8	8475
				cap	lo	3	
	7C6	G	Same as above. P	arallel circuits on	ly.		
	85	G	No changes. Some	times works excel	lent, oth	her times	s not so well.
	6AE5	G	Reverse 6C5 to 37	procedure.			
÷	6C5	E	Reverse 6C5 to 37	procedure,			
4.5	6.15	G	Reverse 6C5 to 37	procedure.			
20							
-			*	20			
			1	32			

76-78

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
76	6 L.5	G	Reverse 6C5 to 37 procedure.
	6 P5	G	Reverse 6C5 to 37 procedure.
	7A4 7B4 XXL	E G E	Reverse 7A4 to 37 procedure.
	37	E	No changes.
77	6C6	E	No changes.
	6D7	G	Same as 6C6 to 6D7.
	6E7	G	
	6J7	E	
	6K7	G	Same as 6C6 to 6J7.
	657	G	Same as 6C6 to 6J7. Parallel circuits only.
	6SH7	G	Same as 6C6 to 6SJ7.
	6SJ7	E	Same as 6C6 to 6SJ7.
	65 K 7	G	Same as 6C6 to 6SJ7.
	6U7	G	Same as 6C6 to 6J7.
	6W7	G	Same as 6C6 to 6J7. Parallel circuits only.
	7A7	G	Same as 6C6 to 7A7.
	7B7 7C7	G G	Same as 6C6 to 7A7. Parallel circuits only.
	7H7	G	Same as 6C6 to 7A7.
	717	G	Same as 6C6 to 7A7.
	1221	Е	No changes.
78	6D6	E	No changes.
	6D7	G	Same as 6C6 to 6D7.
	6E7	G	
	0.10	-	Company CCC In CT7
	6J5 6K7	G E	Same as 6C6 to 6J7.
	657	G	Same as 6C6 to 6J7. Parallel circuits only.
	6SH7	G	Same as 6C6 to 6SJ7.
	6SJ7	G	Same as 6C6 to 6SJ7.
	6SK7	E	Same as 6C6 to 6SJ7.
	6U7	G	Same as 6C6 to 6J7.
	6W7	G	Same as 6C6 to 6J7. Parallel circuits only.
	7A7	E	Same as 6C6 to 7A7.

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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY	
78	787	G	Same as 6C6 to 7A7. Parallel circuits only.	
	707	G	Same as 6C6 to 7A7. Parallel circuits only.	
	7H7	G	Same as 6C6 to 7A7.	
	717	G	Same as 6C6 to 7A7.	
	39/44	E	Change socket to five prong type and rewire as follows: No. 1 on six prong to No. 1 on five pr	rong
			2 to 2	Ci Ci
			0 0 pe 3 to 3	109
			$\binom{O^2}{50}$ 4, remove and tape up	(2 (3)
			5 to 4	00
			DRIG 6 to 5	SWE
			cap cap	
79**	6A6	G	Parallel circuits only. Change socket to seven prong and No. 1 on six prong to No. 1 on seven	
			$\frac{2}{10} \frac{10}{2} \frac{10}{2}$	PA ONE
			0 0 H ⁶ 3 to 3	690
			$\begin{pmatrix} O_2 & A_3 \\ O_2 & SO \end{pmatrix}$ 4 to 4	(03 5C)
			5 to 6	60
			DRIG	STUB
	0110	6		
	6N7	G	Parallel circuits only. Reverse 6N7 to 79 procedure.	
	6Y7G	G	Reverse 6N7 to 79 procedure.	
	627	G	Parallel circuits only. Reverse 6N7 to 79 procedure.	
10	514	G	Change socket to octal and rewire as follows:	
	5U4	G	No. 1 on four prong to No. 2 on octal	00
	5V4	G	$\begin{pmatrix} c \\ b \\ c \\$	600
	5W4	G	0 0 3 to 6	6-6
	5 Y 3	E	OAIG 4 to 8	SUB
	5Z4	G		
	5Z4 5X4 5Y4	G G E	Reverse 5X4 to 5Z3 procedure.	
	5X4 5Y4	G G E		
	5X4 5Y4 83V	G G E G	Reverse 5X4 to 5Z3 procedure. No changes.	
	5X4 5Y4	G G E		
	5X4 5Y4 83V	G G E G		
1	5X4 5Y4 83V 83 5Z3	G E G G	No changes.	
1	5X4 5Y4 83V 83 5Z3	G E G G P	No changes.	
1	5X4 5Y4 83V 83 5Z3	G E G G	No changes.	
	5X4 5Y4 83V 83 5Z3 10 50	G E G G P P	No changes. No changes. No changes.	
	5 X4 5 Y4 83 V 83 5Z3 10 50 2A3	G E G G P P P	No changes.	
	5X4 5Y4 83V 83 5Z3 10 50	G E G G P P	No changes. No changes. No changes.	
2	5X4 5Y4 83V 83 5Z3 10 50 2A3 45	G E G G P P P P	No changes. No changes. No changes.	
2	5X4 5Y4 83V 83 5Z3 10 50 2A3 45 5T4	G G G G P P P G	No changes. No changes. No changes.	
2	5X4 5Y4 83V 83 5Z3 10 50 2A3 45	G E G G P P P P	No changes. No changes. No changes.	
2	5X4 5Y4 83V 83 5Z3 10 50 2A3 45 5T4	G G G G P P P G	No changes. No changes. No changes.	
-1 -2 -3	5X4 5Y4 83V 83 5Z3 10 50 2A3 45 5T4 5U4	G G G G P P P C G G	No changes. No changes. No changes. Same as 80 to 5U4.	

83V-85

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
83 V	514	G	Same as 80 to 5U4.
0.5 4	5.U4	G	Skale as by to bot.
	5V4		
		G	
	5W4	G	
	5 Y 3	G	
	523	G	No changes,
	5Z4	G	Same as 80 to 5U4.
	80	G	No changes.
	83	G	
84	7¥4	E	Change socket to loctal and rewire as follows:
			No. 1 on five prong to No. 1 on loctal
			(1) 2 to 3
			0 0 4 to 7 00
			ORIG 5 to 8
			5 10 6
8 4/6 Z 4	6X4	G	Parallel circuits only. Change socket to miniature and rewire as follows:
			No. 1 on five prong to No. 3 on miniature
			2 to 1 600
			$ \begin{array}{cccccccccccccccccccccccccccccccccccc$
			2 4 to 7
			oria. 5 to 4 sue
	6X5	E	Change socket to octal and rewire as follows:
			No. 1 on five prong to No. 2 on octal
			2 to 3
			() 3 to 5
			4 to 8
			DAIG 5 to 7
85	6AQ6	G	Same as 75 to 6AT6. Parallel circuits only.
	6AT6	G	Same as 75 to 6AT6.
	6AV6	G	Same as is to bait.
	0A 70	G	
	686	G	Same as 75 to 6Q7.
	6BF6	G	Same as 75 to 6AT6.
	6BKG	G	
	6B16	G	
		G	
	6B116	G	
	6Q7	G	Same as 75 to 6Q7.
	GR7	E	and the state of the state
	6SQ7	G	Reverse 65Q7 to 75 procedure.
	6SR7	Е	
	617	G	Same as 75 to 6Q7. Parallel circuits only.
	6 V7	G	Same as 75 to 6Q7.
	7B6	G	Same as 75 to 7E6.
-			
	700	G	Same as 75 to 7E6. Parallel circuits only.
	7 F.6	G	Same as 75 to $7E6$.

85-117N7			RECEIVING TUBE SUBSTITUT	ION GUIDE		
TURE	SUB.	PERF.	CIRCUIT CHANGES	NECESSARY		
85	75	G	No changes.			
85A5 89	85 6 K 6 41	E G	No changes. Same as 6F6 to 89. Paralle Reverse 41 to 89 procedure		uits.	
	42	G	Parallel circuits only. Rev	erse 41 to 89 pr	ocedure.	
99 V			No practical substitution.			
X99	20	G	Parallel circuits only. No o	hanges,		
1171.7	3217	G	Place 280-ohm cord or 50-x socket connections Nos. 4 as		ries with filaments.	Reverse
	70A7	G	Place 300-ohm cord or 10-v socket connections Nos. 4 a		ries with filaments.	Reverse
	70L7	G	Place 300-ohm 10-w resiste connections Nos. 4 and 5, al		filaments. Reverse	socket
	117M7	E	No changes.			
117L7	117N7	E	Make adaptor as follows:			
or	or		No. 1 on ba		. 8 on top	
117M7	117P7	E	2 3	to	2	
			4	to	4	
			5	to	5	
			7	1.0.	7	
			8	to	G	
				ist connect to No		
117L7/M7	25A7	G	Connect 300-ohm line cord i follows:		ord and change conne	ections as
			Reverse No	s. 4 and 5.		
I17M7	3217	G	Same as 117L7 to 32L7.			
	70A7	G	Same as 117L7 to 70A7.			
	701.7	G	Same as 117L7 to 70L7.	*		
117N7	25A7	G	Connect 300-ohm line cord i follows:	n place of AC co	ord and change conne	ections as
			No. 6	to No		
			:8	to	6	
			l Reverse No	to 15.4 and $5.$	8	
	32L7	G	Remove and tape up any wir			
			50-w resistor in series with and 5. Move No. 8 to No. 1.	illaments. Rev	erse socket connecti	ons Nos. 4
	70A7	G	Place 300-ohm cord or 10-w socket connections Nos.4 and			
	7017	G	Remove and tape up any wire 10-w resistor in series with to No. 1 and short Nos. 7 and is connected to No.7.	filaments. Rev	verse Nos. 4 and 5, m	nove No. 8

117N7-954

TUBE	SUB,	PERF.	CIRCUIT CHANGES NECESSARY
117N7	117P7	E	No changes.
117177	25A7	G	Same as 117N7 to 25A7. Cord or resistor must dissipate 90 w.
117Z3	35W4	G	Replace line cord with 533-ohm resistor cord. Rewire as follows: No. 6 to No. 7 Do not use No. 6 for anchor.
	45Z3	G	Replace line cord with 960-ohm resistor cord. Rewire as follows. No. 3 to No. 1 4 to 7 5 to 2 6 to 4 Do not use unused terminals for anchors.
	11724	G	Where space permits. Change socket to octal and rewire as follows: No. 3 on miniature to No. 2 on octal 4 to 7 5 to 5 6 to 6 to 6
11724	11723	G	Reverse 117Z3 to 117Z4 procedure.
	11726	Е	No change except to remove and tape up any wires which may be anchored to Nos. 3 and 4.
117Z6	6X5	Р	Connect 200-ohm 100-w resistor in series with filament. Use only where Nos. 4 and 8 are tied together.
	25Z6	G	Connect 300-ohm line cord or 50-w resistor in series with filament.
	50Y6	E	No change except that a 450-ohm 20-w resistor or line cord must be used in series with the filament.
	50Z6	E	Connect 220-ohm line cord in place of AC cord.
	5027	E	Connect 440-ohm line cord in place of AC cord.
182B/482B	71A 183/483	E	No changes.
183/483	71A 182B/482B	E	No changes.
210T	VT52 10 50	P E G	No changes.
485	27	G	No changes in connections but put one inch piece of screen wire doubled in series with one side of filament winding.
	56	G	Same as 485 to 27.
864			No practical substitute.
950	1F4	G	No changes.
	33	G	Parallel circuits only. No changes.
954	956	E	No changes.

955-1274

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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
955	5731	P	No changes.
956	954	E	No changes.
957	958A	G	Parallel circuits only. No changes.
958A	957	G	Parallel circuits only. No changes.
959			No practical substitute.
FM1000			No practical substitute.
1005/CK100	5 0Y4 0Z4A	G G	No changes.
CK1013	5517	E	No changes.
1201	7E5	E	No changes.
1203	7C4	E	No changes.
1204	7AB7	E	No changes.
1206	7G8	E	No changes.
1221	6C6 77	E	No changes.
1223	6J7	E	No changes.
1229	1 A4 1 B4 32 95 1	E E E	No changes.
1230	30	E	No changes.
1231	7G7 7V7	G G	No changes.
1232	7G7	E	No changes.
1247			No practical substitute.
1265			No practical substitute.
1266			No practical substitute.
1267	0A4	G	No changes.
1273	7A7	G	No changes.
	7AJ7	G	
	7H7	G	
	717	G	
	777	G	
1974	6AX5	G	Parallel circuits only. No changes.
1274	6W5	G	T AT ATTA OF CATE ONLY. TO CHANGED.
	6ZY5	G	
	0215	G	
	6AX6	G	No change necessary but tie Nos. 4 and 8 together if convenient.

1274-	5517
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TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1274	6BY5	G	Parallel circuits only. Rewire as follows: Connect Nos. 1 and 8 together No. 3 to No. 4
	6X5	E	No changes.
		-	and an and an and an and an and a second
	7 7 4	E	Same as 6X5 to 7Y4. Parallel circuits only.
	724	E	
1275	5X3	G	No changes.
1210	523	E	Ito changes.
	80	G	
	83	G	
	83V	G	
1276			No practical substitute.
1280	12B7	G	No changes.
		-	
	14A7	G	No changes.
	14C7	G	
	14H7	E	
	1284	G	
1284	12B7	G	No changes.
1207	14A7	G	no changes.
	14C7	G	
	14H7	G	
	1280	G	
	1200	G	
1291	3B7	E	No changes.
1293	1 LE3	G	Parallel circuits only. No changes.
1294	1 R4	E	No changes.
1299	3D6	E	No changes.
1612	6L7	E	No changes.
1614	6L6	E	No changes.
1619	2A5	G	Reverse 2A5 to 1619 procedure.
1620	6J7	E	No changes.
1626	12E5 12J5	G G	Parallel circuits only. No changes.
1629			No practical substitute.
1634	12SC7	G	No changes.
1644	12L8	G	No changes.
1654			No practical substitute.
2050	2051	Е	No changes.
2051	2050	E	No changes.
5517	CK1013	E	No changes.
			120

5517/CK	1013-5691		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5517/CKI	013		No practical substitute.
5590	6AG5 6BC5	P G	Parallel circuits only. No changes.
	5591 9001 9003	G G	No changes.
5591	6BC5 6AG5	Р G	Parallel circuits only. No changes.
	5590 9001 9003	G G	No changes.
5608-A	53	E	No changes.
5618	2E30 5812	G G	Parallel circuits only. Rewire as follows: Remove wires from No. 4 No. 1 to No. 4 6 to 1 3 to 6 7 to 3 5 to 7 2 to 5 Connect wires removed from No. 4 to No. 2.
5635			No practical substitute.
5636			No practical substitute.
5643			No practical substitute.
5646			No practical substitute.
5647			No practical substitute.
5654	6AJ5 6AK5	G G	No changes.
5670	7 F 8	G	Where space permits. Same as 2C51 to 7F8. Parallel circuits only.
5672	5678	G	No changes.
5676	5677	P	Parallel circuits only. No changes.
5677	5676	G	Parallel circuits only. No changes.
5678	5672	G	No changes,
5679	7A6	E	Where No. 4 is not used on 5679. No changes.
5686			No practical substitute.
5687	6.16	G	Parallel circuits only. Reverse 6J6 to 5687 procedure.
5691	6SL7	E	Parallel circuits only. No changes.
	6SN7 5692	P P	No changes.

5692-5897

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5092	6SN7 5691	G P	No changes.
5693	65J7 85K7	E P	No changes.
5694			No practical substitute.
5697			No practical substitute.
\$702	5784	G	No changes.
5703	5744	Р	No changes.
5704			No practical substitute.
5718	5719	P	No changes.
5719	5718	Р	No changes.
5722			No practical substitute.
5725	6AJ5 6AK5	P	No changes.
5726	6X4	G	Parallel circuits only.Rewire as follows:No. 7to No. 61 and 5to2to
5731	95.5	P	No changes.
5744	5703	P	No changes.
5788			No practical substitute.
5784	5702	G	No changes.
5785			No practical substitute.
5787			No practical substitute.
5812	2E30	G	No changes.
5823			No practical substitute.
5824	25A6 25B6 25C6 25L6	P E F	No changes.
5840	5899 5900 5901	G G	No changes.
5847			No practical substitute.
5879			No practical substitute.
5896			No practical substitute.
5897	5898	Р	No changes.

5898-XX	L		RECEIVING TUBE SUBSTITUTION GUIDE
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5898	5897	P	No changes.
5899	5840	G	No changes.
	5900	G	
	5901	G	
5900	5840	G	No changes.
	5899	G	
	5901	G	
5901	5840	G	No changes.
	5899	G	
	5900	G	
5910			No practical substitute.
5915	6BE6	E	No changes.
5931			No practical substitute.
5932			No practical substitute.
9001	5590	P	No changes.
	5591	G	
	9003	G	
9002	6AB4	Р	Rewire as follows:
			No. 2 to No. 7 5 to 1
9003	5590	G	No changes.
	9001	G	
9004			No practical substitute.
9005			No practical substitute.
9006			No practical substitute.
X6030			No practical substitute.
XXFM	7X7	E	No changes,
XXL	6C5	E	Reverse 6J5 to XXI, procedure.
	6 J 5	E	Reverse 6,15 to XXL procedure.
	6 K?	E	Reverse 6K7 to XXL procedure.
	7A4	E	No changes.

ADDENDUM

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TUBE.	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AH6	6AC7	G	Change socket to octal and rewire as follows: No. 1 on miniature to No. 4 on octal 2 to 3 3 to 2 4 to 7 5 to 8 6 to 6 7 to 5 Connect pin 1 on octal to common ground on chassis.
6AU6	6 B J6	G	Parallel circuits only. Rewire as follows: Interchange leads between pins 2 and 7.
6 T 8	6AL5) 6AQ6]	G	The 6TB is a triple-diode triode tube. If a 6R8 is not available as a substitute, two tubes can be used if space permits. Of the tube combinations listed here are tube is a double diade (the 6AL5) while the sthere tubes are
	6AL5 6AT6 }	G	listed here one tube is a double diode (the 6AL5) while the other tubes are double-diode triode types. Of the substitute tubes only those elements nece- ssary to perform the required functions are used.
	6AL5 6AV6 J	G	
	6AL5 1 12AV6 J	G	
12AT7 12AU7	7F8 6SN7	G	Change socket to loctal and rewire as follows: No. 1 on noval to No. 3 on loctal 2 to 1 3 to 4 4 to 2 5 to 2 6 to 6 7 to 8 8 to 5 9 to 7 Change socket to octal and rewire as follows: No. 1 on noval to No. 2 on octal 2 to 1 3 to 3 6 to 3 9 to 7
	12BH7	G	4 to 7 5 to 7 6 to 5 7 to 4 8 to 6 9 to 8 The above filament rewiring applies only if the leads from pins 4 and 5 on the noval are tied together or to the same point. Parallel circuits only. No changes.
1 B4	1E5GP	E	No changes.
1E5GP	1 B4	E	No changes.
6C6	1603 7700	E	No changes.
6 F 6	1611	E	No changes.
GJ7	7000	E	No changes.

ADDENDUM

RECEIVING TUBE SUBSTITUTION GUIDE

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
GY7G	79	G	Reverse 6N7 to 79 procedure.
79	6 Y 7 G	G	Reverse 6N7 to 79 procedure.
1603	6C6 7700	E E	No changes.
1611	6F6	E	No changes.
7000	637	E	No changes.
7700	6C.6 1603	E	No changes.

IDENTICAL TUBES WITH UNLIKE HEATER VOLTAGE AND CURRENT RATINGS

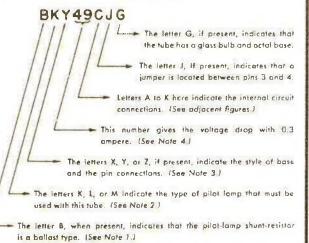
Substitute high voltage tubes for low voltage tubes in series circuits only with suitable shunt resistor when required. Substitute low voltage tubes for high voltage tubes in parallel circuits with voltage dropping resistor in series with filament -- in series circuits with suitable shunt resistor. For all cases see instructions in Section 1. The performance for each substitution is excellent.

2A36A37B614B62A5427B814B82A6757E614E6	14B8 14E6 14E7 14F7	788 786 787
	14E7 14F7	
2A6 75 7E6 14E6	14F7	7E7
2A7 6A7 7E7 14E7		7F7
2B7 6B7 7F7 14F7	14F8	718
6A3 2A3 7F8 14F8	14.17	737
1276 7J7 14J7	14N7	7.87
6A6 53 7N7 14N7	14N7	7N7
6A7 2A7 7Q7 14Q7	14Q7	7Q7
6A8 12A8GT 7R7 14R7	14R7	7R7
6B7 2B7 12A8GT 6A8	25 B8GT	12B8G
6B8 12C8 12B8G 25B8GT	2516	1632
6F5 12F5GT 12C8 6B8	30	RK42
6H6 12H6 12F5GT 6F5	42	2.45
6J5 12J5GT 12H6 6H6	53	6 A 6
6J7 12J7GT 12J5CT 6J5	55	85
6K7 12K7GT (2J7GT 6.17	56	56AS
6K8 12K8 12K7GT 6K7		76
6L6 1631 12K8 6K8	56A5	56
6Q7 12Q7GT 12Q7CT 6Q7		76
6SA7 12SA7 12SA7 6SA7	57	57AS
6SC7 12SC7 12SC7 6SC7	57AS	57
1634 12SF5 6SF5	58	58AS
6SF5 12SF5 12SF7 6SF7	58AS	58
6SF7 12SF7 12SG7 6SG7	75	2A6
6SG7 12SG7 12SH7 6SH7	76	56
6SH7 12SH7 12SJ7 6SJ7	85	55
6SJ7 12SJ7 12SK7 6SK7	1276	2 A 3
6SK7 12SK7 125L7GT 6SL7GT		6A.3
6SL7GT 12SL7GT 12SN7GT 6SN7GT	1631	GLG
6SN7GT 125N7GT 1633	1632	251.6
1633 12SQ7 6SQ7	1633	6SN7GT
6SQ7 12SQ7 12SR7 6SR7		12SN7GT
6SR7 12SR7 14A4 7A4	1634	6SC7
7A4 14A4 14B6 7B6	RK42	30

BALLAST TUBE AND RESISTOR NUMBERING CODES FOR AC DC RECEIVERS USING 0.3 AMP. SERIES CONNECTED HEATERS

There are two numbering codes now in use for ballast and resistor tubes. Both codes use parts of the type designation to indicate the various divisions of the tube's service. For example, type numbers in the first system (A) might be BKX51DJ or L55B and, in the second system (B), might be 200R44 or 200R. These letter and number combinations are explained by the following examples.

SYSTEM A



NOTE 1.

"Ballost" action indicates that the pilot lamp shunt resistor has low starting resistance when cold, protecting the lamp filament from the initial current surge, and has much higher resistance when hat, applying full operating voltage to the lamp.

N	0	Т	E	2.
1.1	\sim		has 1	di •

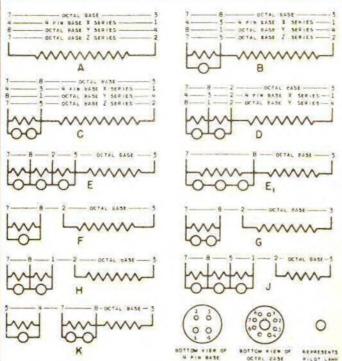
Tube Letter	Lamp No.	Volts	Amperes	Bead Color
К	40 and 47	6.3	0.15	Brown
L	44 and 46	6.3	0.25	Blue
M	50 and 51	7.5	0.2	White

NOTE 3.

X denotes a 4 pin base and metal shell. Y or Z denote octal bases but with different pin connections. (See Figures A to K.)

NOTE 4.

This number includes the drop in the series resistor plus the drop in the pilot lomp and its shunt. The number represents the difference between the sum of the heater voltages and the line valtage of 117.5 valts. Tubes are made with the following numbers: 98, 92, 86, 80, 73, 67, 61, 55, 49, 42, 36_{*} 30, 23, 17, 11. The number to be used is the one closest to the voltage difference mentioned above.



SYSTEM B

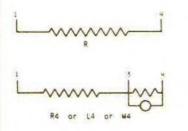
All tubes under System B have glass bulbs and 4 pin bases and their type designations start with a number.

EXAMPLE

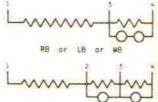
The numbers 4, 8, or 44, In combination with the preceding letter, indicate the internal tube connections, (See below)

The letters R, L, or M, when followed by a number, indicate the type of pilot lamp which must be used with this tube. See Note 2, using the letter R in place of K. (The letter R, alone, indicates only a form of internal tube connection without pilot lamp.)

This number indicates the equivalent resistance in ohms at 0.3 ampere. Thus, $200 \times 0.3 = 60$ value drop.



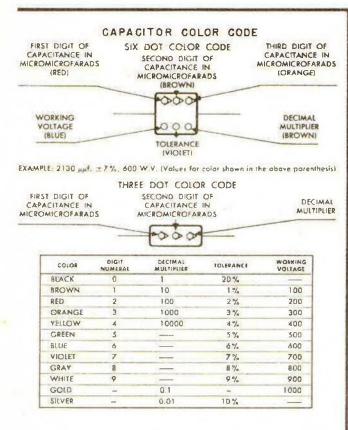
200R44



R44 or L44 or M44

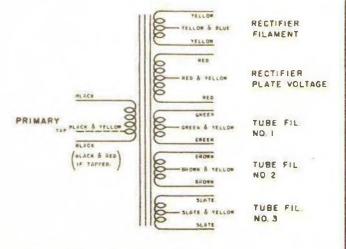
Courtisy TUNG-SOL Lamp Works, Inc.

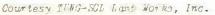
RTMA CAPACITOR, RESISTOR, AND TRANSFORMER COLOR CODES

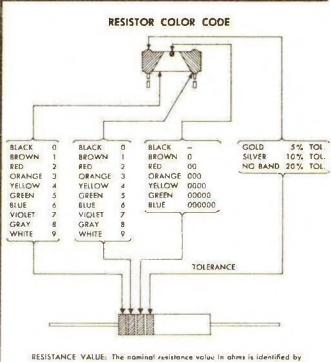


POWER TRANSFORMER LEAD COLOR CODE

Power transformer leads in radio receivers may be identified by the following colors (or color patterns) on the lead coverings.







STANCE VALUE: The nominal resistance volue in ahms is identified by o three digit symbol. The first hwa digits are the first two figures of the resistance value in ahms. The third digit specifies the number of zeros which follow the first two figures.

I-F TRANSFORMER LEAD COLOR CODE

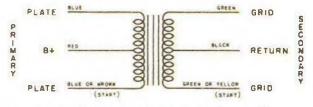
I-F transformer leads in radio receivers may be identified by the following colors on the lead coverings.

PLATE LEAD	BLUE	GRID (or diode lead)	GREEN
B+ LEAD	RED	GRID RETURN	BLACK

FOR "FULL-WAVE" TRANSFORMER SECOND DIODE LEAD WILL BE GREEN-BLACK.

AUDIO TRANSFORMER LEAD COLOR CODE

Interstage and Output Audia Transformer leads in radio receivers may be identified by the colors on the lead coverings as shown.



In cases where use is made of a single primary and/or a single secondary, the upper half of the diagram indicates the color coding. The brown and yellow leads indicate the start of the primary and secondary windings respectively and will be used in place of the blue and green (as shown) where polarity indications are required.

214

		PILOT I	AMP TAE	BLE	
Lamp No.	Volts	Amperes	Bead	Miniature Base	Bulb Type
100.	VOITO	.unpert J	Givior	Destit	A) PC
40	6-8	0.15	Brown	Serew	T-3 1 4
41	2.5	0.50	White	Screw	T-3 1/4
42	3.2	0.35	Green	Screw	T-3 1/4
4.3	2.5	0.50	White	Bayonet	T-3 1/4
41	65 - 85	0.25	Blue	Bayonet	T-3 1 4
45	3.2	0.35	White	Bayonet	T-3 1/4
st 65	6-8	0.25	Blue	Screw	T-3 1/4
47	6~8	0.15	Brown	Bayonet	T-3 1/4
48	2.0	0.06	Pink	Screw	1-3 1/4
49	2.0	0.06	Pink	Bayonet	T-3 1/4
50	6-8	0.20	White	Screw	G-3.1/2
51	5-8	0.20	White	Bayonet	G-3 1/2
55	G-8	0.40	White	Bayonet	G-4 1/2
232	2.9	0.17	White	Serew	T-8 1/4
292A	2.9	0.17	White	Bayonet	T-8-1/4
1455	18.0	0.25	Brown	Screw	C-5
1455A	18.0	0.25	Brown	Bayonet	G-5
1490	3.2	0.15	12 2 12	Bayonet	1-31,4

GERMANIUM CRYSTAL DIODE CHARACTERISTICS

	Min. Forward	Max. Reverse	Peak	Average Anode Reet.	Peak Anode Rect.
Germanium	Current at +1w	Current	Voltage	Current	Currem
Crystal	(Ma)	(Microamp.)	(Volts)	(Ma)	(Ma)
1N34] 1N34A]	5.0	1 50 at -10v	75	40	150
1N35 °	7.5	10 at -3v	75	22.5	fi O
1 N38] 1 N387A]	0.E	6 at -3v 1625 at -100v	120	40	150
1999	3.0	{200 at -100v {200 at -200v	225	40	150
1.N40 00	f 12.75 [(at 1.5 vol:s)	50 at -10v	75	22.5	60
15(4)1 4/4	f 12.75 (at 1.5 volts)	50 at -10v	75	22.5	60
1.N42 0.0	r 12.75 (at 1.5 volts)	f 6 at -3v 1625 at -100y	120	22.5	80
1548	4.0	833 at -50y	85	50	150
1 N51	2.5	1670 at -50%	50	25	100
1.152	4.0	150 at -50v	85	50	150
1N54]	5.0	10 at -10v	75	40	150
1 N55 1 1 N55 A J	3.0	7300 at -100v 800 at -150v	170	40	150
1N56A	15.0	300 at -30v	50	50	200
1N57	4.0	500 at -75v	9.0	40	150
1 N58 1	4.1	800 at -1:00v	115	40	150
N60T	T	+	70	40	150
1N63	4.0	50 at -50v	125	50	150
1864	Tested for	officiency in 44	Mc vide	o detector cir	cuit.
1865	2.5	250 at -50v	85	50	150
18697	5.0	350 at -50v	75	40	125
1N70*	3.0	410 at -50v	125	30	90
INFLIT	15.0	300 at -30v	50	50	200

NOTE: Crystals (N48, 1851, 1862, 1863, 1864, and 1865 are General Electric types, all others are Sylvania types utless otherwise indicated. • Units are matched in the forward direction at +1 volt so that the current flowing

• Units are matched in the forward direction al +1 voit so that the current flowing through the higher resistance unit is within 10% of that in the lower resistance unit. Ratings shown are for each diode.

¹⁰ Consists of 4 specially selected and matched germanium diodes whose resistances are balanced within ± 2.5% in the forward direction at 1.5 volts. For addltional balance, the forward resistance of each pair of variator crystals are matched within 3 ohms. Ratings shown above are for each diode. ¹ Units are tested in a circuit employing an input of 1.8 volts rms at 40 mc. 70% modulated at 400 cycles. Demodulated output across a 4700 ohm resistor shunted by a 5 mmf capacitor is a minimum of 1.1 volts peak to peak.

1 JAN types

th Consists of four matched low impedance germanium diodes each of which, with a voltage of one volt impressed in the forward direction, will pass a current within one ma of the average current of the four. Ratings shown above are for each diode.