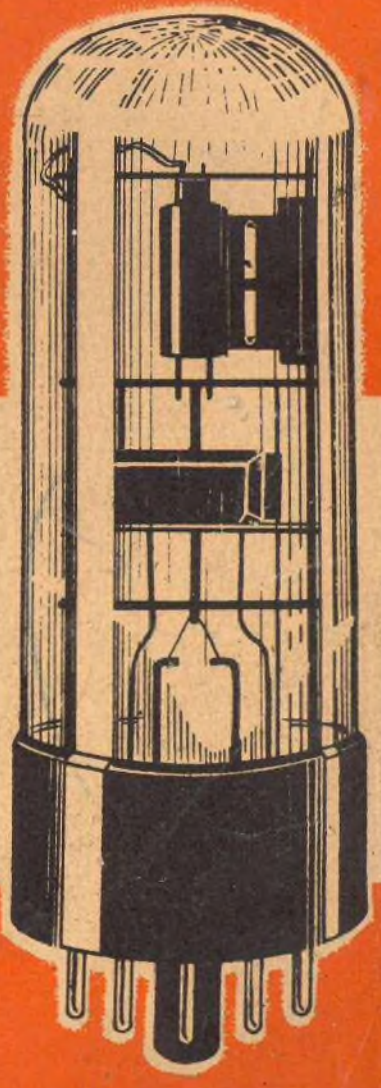
CAT. NO. 139-3

THIRD SUPPLEMENT

RECEIVING TUBE SUBSTITUTION GUIDE BOOK



FEATURING:

- More than 830 receiving tube substitutions.
- More than 200 picture tube substitutions.
- More than 230 American to European tube substitutions.
- More than 200 European to American tube substitutions.
- A cumulative index listing the tube types treated in the basic book and the 3 supplements.

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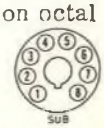
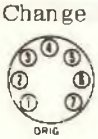
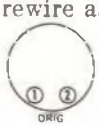
BY H. A. MIDDLETON

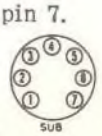
A RIDER PUBLICATION

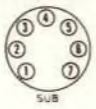
RECEIVING TUBE SUBSTITUTIONS

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
OB3	1266	E	No changes.
1AB6	1AC6	E	Parallel circuits only. No changes.
1AC5	1AG4	G	Change miniature socket to subminiature socket and rewire as follows: Change pin No. 4 on miniature to F-pin on subminiature.  No. 2 to G1 No. 8 to G2 No. 7 to P No. 5 to F + 
1AC6	1AB6	E	No changes.
1AE5			No practical substitute.
1AF4	1AJ4	G	No changes.
1AF6			No practical substitute.
1AG4	1AC5	G	Reverse 1AC5 to 1AG4 procedure.
1AG5	1AJ5	G	No changes.
	1AK5	G	No changes.
1AH4	1AK4	E	No changes.
1AH5			No practical substitute.
1AH6			No practical substitute.
1AJ4	1AF4	G	No changes.
1AJ5	1AG5	G	No changes.
	1AK5	G	No changes.
1AK4	1AH4	E	No changes.
1AK5	1AG5	G	No changes.
	1AJ5	G	No changes.
1AX2	1B3	E	Change socket to octal and rewire as follows:  No. 2 on miniature to No. 2 on octal 9 to 7 
	1X2	E	No changes.
1B3	2B3	P	No changes.
1C3	1E4	G	Change socket to octal and rewire as follows:  No. 1 on miniature to No. 2 on octal 2 to 3 4 to 5 7 to 7 
	1LE3	G	Change socket to octal and rewire as follows:  No. 1 on miniature to No. 1 on octal 2 to 2 4 to 6 7 to 8 

(Cont.)

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1C3 (Cont.)	1LF3	G	Change socket to octal and rewire as follows: No. 1 on miniature to No. 1 on octal 2 to 2 4 to 6 7 to 8  
1D3			No practical substitute.
1E3			No practical substitute.
1E4	1C3	G	Reverse 1C3 to 1E4 procedure.
	1LE3	G	Rewire as follows: No. 2 pin to No. 1 3 to 2 5 to 6 7 to 8  
	1LF3	E	Rewire as follows: No. 2 pin to No. 1 3 to 2 5 to 6 7 to 8  
1LE3	1C3	G	Change socket to miniature and rewire as follows: No. 1 on octal to pin No. 1 on miniature 2 to 2 6 to 4 8 to 7  
	1E4	E	Rewire as follows: Change No. 1 pin to pin No. 2 2 to 3 6 to 5 8 to 7  
	1LF3	E	No changes.
1LF3	1C3	G	Reverse 1C3 to 1LF3 procedure.
	1E4	G	Reverse 1E4 to 1LF3 procedure.
	1LE3	E	No changes.
1M3			No practical substitute.
1T2	1B3	G	Only where space permits, change socket to octal and rewire as follows: No. 1 on subminiature to No. 2 on octal 2 to 7  
	1X2	G	Only where space permits, change socket to nine pin miniature and rewire as follows: No. 1 on subminiature to No. 2 on miniature 2 to 9  
1U4	5910	E	No changes.
1V6			No practical substitute.
2A3	5930	E	No changes.
2AF4	2T4	G	No changes.
2B3	1B3	P	No changes.
2B5			No practical substitute.
2BN4			No practical substitute.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
2C22	6J5	G	Rewire as follows: Plate Cap to pin No. 3 Grid Cap to pin No. 5  
2C51	6SN7	G	Parallel circuits only. Rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 3 3 to 1 4 to 2 6 to 5 7 to 4 8 to 6 9 to 7  
	5670	E	No changes.
2C52	12SL7	G	Parallel circuits only. No changes.
2CB5			No practical substitute.
2D21	2D21W	E	No changes.
	5727	E	No changes.
2D21W	2D21	G	No changes.
	5727	E	No changes.
2E22			No practical substitute.
2T4	2AF4	G	No changes.
2V2			No practical substitute.
3A2	3A3	E	Change socket to octal and rewire as follows: No. 2 on miniature to No. 2 on octal 9 to 7  
3A3	3A2	G	Reverse 3A2 to 3A3 procedure. Use only where high voltage does not exceed 20KV.
	3B2	G	No changes.
	3C2	G	No changes.
3AF4			No practical substitute.
3AL5			No practical substitute.
3AU6	3BA6	G	No changes.
	3BC5	G	Rewire as follows: Reverse connections on pin 2 and pin 7.  
	3CB6	G	Rewire as follows: Reverse connections on pin 2 and pin 7.  
	3BZ6	G	Rewire as follows: Reverse connections on pin 2 and pin 7.  
3AV6	3BT6	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
3B2	3A3	G	No changes.
	3C2	G	No changes.
3BA6	3AU6	G	No changes.
	3BC5	G	Rewire as follows: Reverse connections on pin No. 2 and pin No. 7.  
	3BZ6	G	Rewire as follows: Reverse connections on pin No. 2 and pin No. 7.  
	3CB6	G	Rewire as follows: Reverse connections on pin No. 2 and pin No. 7.  
3BC5	3AU6	G	Reverse 3AU6 to 3BC5 procedure.
	3BA6	G	Reverse 3BA6 to 3BC5 procedure.
	3BZ6	G	No changes. Tie pin No. 2 and No. 7 together.
	3CB6	G	No changes. Tie pin No. 2 and No. 7 together.
	3CF6	G	No changes. Tie pin No. 2 and No. 7 together.
3BE6			No practical substitute.
3EN4			No practical substitute.
3BN6			No practical substitute.
3BT6	3AV6	G	No changes.
3BU8			No practical substitute.
3BY6	3CS6	G	No changes.
3BZ6	3AU6	G	Reverse 3AU6 to 3BZ6 procedure.
	3BA6	G	Reverse 3BA6 to 3BZ6 procedure.
	3BC5	G	No changes.
	3CB6	G	No changes.
3C2	3A3	G	No changes.
	3B2	G	No changes.
3C4	3C5	G	Change socket to octal and rewire as follows: No. 1 on miniature to No. 2 on octal 2 to 3 3 to 4 5 to 8 6 to 5  
	3Q4	G	Rewire as follows: Change pin No. 3 to pin No. 4 6 to 3  
	3V4	G	No changes.
3C5	3C4	G	Parallel circuits only. Reverse 3C4 to 3C5 procedure.
3CB6	3AU6	G	Reverse 3AU6 to 3CB6 procedure.
	3BA6	G	Reverse 3BA6 to 3CB6 procedure.
	3BC5	G	No changes.
	3BZ6	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
3CE5	3CB6	E	No changes.
	3CF6	E	No changes.
3CF6	3BC5	G	No changes.
	3BZ6	G	No changes.
	3CB6	G	No changes.
	3CE5	E	No changes.
3CS6	3BY6	G	No changes.
3DT6			No practical substitute.
3Q4	3C4	G	Parallel circuits only. Reverse 3C4 to 3Q4 procedure.
	3Q5	G	Change socket to octal and rewire as follows: Change pin No. 1 on miniature to pin No. 2 on octal 2 to 3 4 to 4 5 to 8 6 to 3 7 to 7  
3S4	3C4	G	Parallel circuits only. Rewire as follows: Change pin No. 3 to pin No. 6 4 to 3 6 to 2  
	3Q5	G	Change socket to octal and rewire as follows: Change pin No. 1 on miniature to pin No. 2 on octal 2 to 3 3 to 5 4 to 4 5 to 8 6 to 3 7 to 7  
3V4	3C4	G	Parallel circuits only. No changes.
	3Q5	G	Change socket to octal and rewire as follows: Change pin No. 1 on miniature to pin No. 2 on octal 2 to 3 3 to 4 5 to 8 6 to 5 7 to 7  
	3S4	G	Rewire as follows: Change pin No. 3 to pin No. 4 6 to 2  
4BC5	4CB6	G	No cnanges. Tie pin No. 2 and pin No. 7 together.
4BC8	4BK7	G	No changes.
	4BQ7	G	No changes.
	4BS8	G	No changes.
	4BZ7	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Pins No. 8 and No. 9 are connected internally together.
4BK7	4BC8	G	No changes.
	4BQ7	G	No changes.
	4BS8	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Pins No. 8 and No. 9 are connected internally together.
4BN6			No practical substitute.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
4BQ7	4BC8	G	No changes.
	4BK7	G	No changes.
	4BS8	G	No changes.
	4BZ7	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Pins No. 8 and No. 9 are connected together internally.
4BS8	4BC8	G	No changes.
	4BK7	G	No changes.
	4BQ7	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Pins No. 8 and No. 9 are connected together internally.
4BU8			No practical substitute.
4BX8	4BC8	G	No changes.
	4BK7	G	No changes.
	4BQ7	G	No changes.
	4BS8	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Pins No. 8 and No. 9 are connected together internally.
4BZ7	4BC8	G	No changes.
	4BK7	G	No changes.
	4BQ7	G	No changes.
	4BS8	G	No changes.
	4BZ8	G	No changes.
	4CX7	G	No changes. Remove and tape any wires anchored on pin No. 9.
4BZ8	4BC8	G	No changes.
	4BK7	G	No changes.
	4BQ7	G	No changes.
	4BS8	G	No changes.
	4CX7	G	No changes. Remove and tape any wires anchored on pin No. 9.
4CB6	4BC5	G	No changes.
4CX7	4BC8	G	Rewire as follows: Tie pins No. 8 and No. 9 together.  
	4BK7	G	Rewire as follows: Tie pins No. 8 and No. 9 together.  
	4BQ7	G	Rewire as follows: Tie pins No. 8 and No. 9 together.  
	4BS8	G	Rewire as follows: Tie pins No. 8 and No. 9 together.  
	4BZ8	G	Rewire as follows: Tie pins No. 8 and No. 9 together.  

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
4DT6			No practical substitute.
5AM8	5AS8	G	Reverse 5AS8 to 5AM8 procedure.
5AN8	5AV8	E	Rewire as follows: Reverse connections on pins No. 1 and No. 3. Change pin No. 6 to pin No. 9 7 to 8 8 to 6 9 to 7  
	5U8	G	Rewire as follows: Change pin No. 2 to pin No. 9 3 to 8 7 to 3 8 to 2 9 to 7  
5AQ5	5V6	G	Change socket to octal and rewire as follows: No. 1 on miniature to No. 5 on octal 2 to 8 3 to 2 4 to 7 5 to 3 6 to 4  
5AS4	5AU4	G	No changes. If transformer will stand 1.5 amperes more.
	5AW4	G	No changes.
	5U4GA	G	No changes.
	5U4GB	G	No changes.
	5V3	E	No changes.
	5931	E	No changes.
5AS8	5AM8	G	Rewire as follows: Change pin No. 1 to pin No. 3 3 to 1 6 to 8 7 to 9 8 to 7 9 to 6  
5AU4	5AS4	G	No changes.
	5AW4	E	No changes.
	5R4GY	G	No changes.
	5T4	G	No changes.
	5U4G	G	No changes.
	5U4GA	E	No changes.
	5U4GB	E	No changes.
	5V3	E	No changes.
	5931	E	No changes.
5AV8	5AN8	E	Reverse 5AN8 to 5AV8 procedure.
	5U8	G	Rewire as follows: Change pin No. 1 to pin No. 8 2 to 9 3 to 1 6 to 2 7 to 7 8 to 3 9 to 6  
5AW4	5AS4	G	No changes.
	5AU4	E	No changes.
	5R4GY	G	No changes.
	5T4	G	No changes.
	5U4G	G	No changes.
	5U4GA	E	No changes.
	5U4GB	E	No changes.
	5V3	E	No changes.
	5931	E	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5AX4	5AS4	E	No changes.
	5AW4	E	No changes. If transformer will stand 1.2 amperes more.
	5T4	G	No changes.
	5U4G	G	No changes.
	5U4GA	E	No changes.
	5U4GB	E	No changes.
	5X3	E	No changes. If transformer will stand 1.3 amperes more.
	5V4	E	No changes.
	5931	E	No changes.
5AZ4	5AX4	E	No changes.
	5V4	E	No changes.
	5Y3	E	No changes.
	5Y4	G	Rewire as follows: Change pin No. 2 to pin No. 7; 4 to 3; 6 to 5  
	5Z4	E	No changes.
5B8			No practical substitute.
5BE8			No practical substitute.
5BK7	5BQ7	G	No changes.
	5BZ7	G	No changes.
5BR8			No practical substitute.
5BT8			No practical substitute.
5CG8			No practical substitute.
5CL8			No practical substitute.
5CM8			No practical substitute.
5J6			No practical substitute.
5T4	5AS4	E	No changes.
	5AW4	E	No changes.
	5R4	E	No changes.
	5U4	E	No changes.
	5U4GA	E	No changes.
	5U4GB	E	No changes.
	5V4	E	No changes.
	5931	E	No changes.
5T8			No practical substitute.
5U4G	5AS4	E	No changes.
	5AW4	E	No changes.
	5U4GA	E	No changes.
	5U4GB	E	No changes.
	5V3	E	No changes.
	5931	E	No changes.
5U4GA	5AS4	E	No changes.
	5AU4	E	No changes. If transformer will stand 1.5 amperes more.
	5AW4	E	No changes.
	5R4GY	E	No changes.
	5T4	E	No changes.
	5U4G	E	No changes.
	5U4GB	E	No changes.
	5V3	E	No changes.
	5931	E	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5U4GB	5AS4	E	No changes.
	5AU4	E	No changes.
	5AW4	E	No changes.
	5R4GT	G	No changes.
	5T4	E	No changes.
	5U4G	G	No changes.
	5U4GA	E	No changes.
	5V3	E	No changes.
	5931	E	No changes.
5U8	5AN8	G	Reverse 5AN8 to 5U8 procedure.
	5AV8	G	Reverse 5AV8 to 5U8 procedure.
5V3	5AS4	G	No changes.
	5AU4	E	No changes.
	5AW4	G	No changes.
	5U4GB	G	No changes.
5V4	5931	G	No changes.
5V6	5AQ5	E	Reverse 5AQ5 to 5V6 procedure.
5W4	5Z4	E	No changes.
	5931	G	No changes.
5X8	5AT8	E	Same as 6AT8 to 6X8 procedure.
5Y3	5AZ4	E	No changes.
	5Y3WGT	E	No changes.
	5Z4	E	No changes.
	5931	G	No changes.
5Y4	5AZ4	E	Reverse 5AZ4 to 5Y4 procedure.
	5Z4	E	No changes.
	5931	G	No changes.
5Z4	5AZ4	E	No changes.
	5V4	G	No changes.
	5W4	G	No changes.
	5Y3	E	No changes.
	5Y4	E	No changes.
	5931	G	No changes.
6AB8			No practical substitute.
6AC7	6006	G	Parallel circuits only. No changes.
	6134	E	No changes.
6AD8			No practical substitute.
6AE7			No practical substitute.
6AF4	3AF4	E	Parallel circuits only. Install 7-ohm 5-watt resistor in series with the filament.
	6T4	G	No changes.
6AG5	6186	E	No changes.
6AH6	6485	E	No changes.
6AK4	6C4	G	Where space permits:

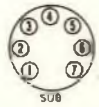
Pin No.		to pin No.	
1	to	6	
3	to	3	
5	to	7	
6	to	4	
8	to	5 & 1	

6AK5	6AK5W	E	No changes.
	5591	E	No changes.
	5654	E	No changes.
	6096	E	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AL5	3AL5	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with the filament.
	6AL5W	E	No changes.
	5726	E	No changes.
	6058	E	No changes.
	6097	E	No changes.
	6663	E	No changes.
6AL6	6BJ5	G	Parallel circuits only. Reverse 6BJ5 to 6AL6 procedure.
	6BS5	G	Reverse 6BS5 to 6AL6 procedure.
6AM6	6064	E	No changes.
6AM8	5AM8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with the filament.
	6AS8	G	Change pin No. 1 to pin No. 3 3 to 1 6 to 9 7 to 8 8 to 6 9 to 7  
6AN8	5AN8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
	6AW8	G	Rewire as follows: Change pin No. 1 to pin No. 3 3 to 1 6 to 9 7 to 8 8 to 7 9 to 6  
6AQ4			No practical substitute.
6AQ5	6AQ5W	E	No changes.
	6CM6	E	Reverse 6CM6 to 6AQ5 procedure.
	6005	E	No changes.
	6669	G	No changes.
6AQ6	6066	E	Parallel circuits only. No changes.
6AR8			No practical substitute.
6AS6	6AS6W	E	No changes.
	5725	E	No changes.
6AS7	5998	G	Parallel circuits only. No changes.
	6080	E	No changes.
6AS8	5AM8	G	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament and use same procedure as 5AM8 to 6AS8.
	6AM8	G	Reverse 6AM8 to 6AS8 procedure.
6AT6	6066	E	No changes.
6AT8	5AT8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
	6BR8	G	Connect pins No. 8 and No. 3 together.
	6X8	E	Rewire as follows: Change pin No. 1 to pin No. 2 2 to 3 3 to 6 6 to 9 7 to 8 8 to 1 9 to 7  
6AU4	6AX4	G	No changes.
	6BL4	G	No changes, where space permits.

(Cont.)

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6AU4 (Cont.)	6U3	G	Change socket to miniature and rewire as follows: No. 3 on octal to pin No. 3 on miniature 5 to 9 7 to 5 8 to 4  
	6V3	G	Change socket to miniature and rewire as follows: No. 3 on octal to cap on miniature 5 to pin No. 2 and 7 7 to 4 8 to 5  
	6W4	G	No changes.
6AU6	3AU6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	4AU6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6AU6WA	E	No changes.
	5749	G	No changes.
	6136	E	No changes.
6AU8	6AW8	G	No changes.
	6BA8	G	No changes.
	6BH8	G	No changes.
	6U8	G	Parallel circuits only. Rewire as follows: Change pin No. 1 to pin No. 8 2 to 9 3 to 1 6 to 7 7 to 2 8 to 3 9 to 6  
6AV4	6BX4	G	No changes.
	6W5	E	Change socket to octal and rewire as follows: No. 1 on miniature to pin No. 3 on octal 3 to 7 4 to 2 6 to 5 7 to 8  
	6X4	G	No changes.
	6X5	G	Same as 6AV4 to 6W5 procedure.
6AV6	3AV6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6066	G	No changes.
6AW8	6AN8	G	Parallel circuits only. Reverse 6AN8 to 6AW8 procedure.
	6AU8	G	No changes.
6AX4	6AU4	G	No changes.
	6BL4	G	No changes.
6AX5	6BW4	G	Reverse 6BW4 to 6AX5 procedure.
6AX8	6U8	G	No changes.
6AZ8			No practical substitute.
6BA6	3BA6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6BA6W	E	No changes.
	6DA6	G	Reverse 6DA6 to 6BA6 procedure.
	5749	E	No changes.
	6136	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BA8	6AU8	G	No changes.
	6AW8	G	No changes.
	6BH8	G	No changes.
6BC4	6AJ4	G	Rewire as follows: Change pin No. 1 to pin No. 5 2 to 3 4 to 7 5 to 8 6 to 2 7 to 3 8 to 3 9 to 5  
6BC5	3BC5	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
6BC8	4BC8	E	Parallel circuits only. Install 3.5-ohm 5-watt resistor in series with filament.
	5BC8	E	Parallel circuits only. Install 1.5-ohm 5-watt resistor in series with filament.
	6BK7	G	No changes.
	6BQ7	G	No changes.
	6BS8	G	No changes.
	6BZ7	E	No changes.
	6BZ8	G	No changes.
	X155	G	No changes.
6BD4A	6BK4	E	No changes.
6BD6	6DA6	G	Reverse 6DA6 to 6BD6 procedure.
	5749	G	No changes.
6BE6	3BE6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6BY6	G	No changes.
	5750	E	No changes.
6BE7			No practical substitute.
6BE8	5BE8	E	Parallel circuits only. Install 1.5-ohm 5-watt resistor in series with filament.
	6U8	E	Rewire as follows: Change pin No. 1 to pin No. 9 2 to 1 3 to 8 6 to 7 7 to 7 8 to 7 9 to 2  
6BG6	6DN6	G	No changes.
6BH5	6BD6	G	Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 6 on miniature. 2 to 1 3 to 2 4 to 3 5 to 4 6 to 5 3 to 7  
	6BJ6 (Cont.)	G	Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 6 on miniature. 2 to 1 3 to 7 4 to 3 5 to 4 6 to 5 3 to 2  

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BH5 (Cont.)	6DA6	G	Rewire as follows: Change pin No. 1 to pin No. 8 3 to 9 6 to 7  
	6SS7	G	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 6 on octal 2 to 4 3 to 3 4 to 2 5 to 7 6 to 8 3 to 5  
6BH6	6065	G	Parallel circuits only. Reverse 6065 to 6BH6 procedure.
	6265	E	No changes.
	6661	E	No changes.
6BH8	6AU8	G	No changes.
	6AW8	G	No changes.
	6BA8	G	No changes.
6BJ5	6AL6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 5 on octal 2 to 8 3 to 2 4 to 7 5 to cap 7 to 4  
	6M5	G	Change miniature socket to noval and rewire as follows: Change pin No. 1 to pin No. 2 2 to 3 3 to 4 4 to 5 5 to 7 7 to 1  
6BJ6	6DA6	G	Reverse 6DA6 to 6BJ6 procedure.
	6662	E	No changes.
6BJ7			No practical substitute.
6BJ8	6BN8	G	No changes.
6BK4	6BD4-A	E	No changes.
6BK6	6066	G	No changes.
6BK7	5BK7	E	Parallel circuits only. Install 2.6-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes.
	6BQ7	G	No changes.
	6BS8	G	No changes.
	6BZ7	G	No changes.
	6BZ8	G	No changes.
	X155	G	No changes.
6BL4	6AU4-GTA	G	No changes.
	6AX4	P	No changes.
6BN4	2BN4	E	Parallel circuits only. Install 6.8-ohm 5-watt resistor in series with filament.
	3BN4	E	Parallel circuits only. Install 7-ohm 5-watt resistor in series with filament.
6BN5			No practical substitute.
6BN6	3BN6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.

(Cont.)

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BN6 (Cont.)	4BN6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
6BN8	6BJ8	G	No changes.
6BQ6	6DQ6	E	No changes.
6BQ7	4BQ7	E	Parallel circuits only. Install 4-ohm 5-watt resistor in series with filament.
	5BQ7	E	Parallel circuits only. Install 2-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes.
	6BK7	G	No changes.
	6BS8	G	No changes.
	6BZ7	G	No changes.
	6BZ8	G	No changes.
	X155	G	No changes.
6BR7	6BS7	E	Reverse 6BS7 to 6BR7 procedure.
	6C6	G	Parallel circuits only. Change socket to six pin socket and rewire as follows:

Change pin No. 2 to grid cap
3 to No. 5
4 to 1
5 to 6
7 to 2
8 to 3
9 to 4

	6J7	G	Parallel circuits only. Change socket to octal and rewire as follows:

Change pin No. 2 to grid cap on octal
3 to No. 8
4 to 2
5 to 7
7 to 3
8 to 4
9 to 5

	6W7	G	Same as 6BR7 to 6J7 procedure.
	7C7	G	Change socket to octal and rewire as follows:

Change pin No. 2 to pin No. 6 on octal
3 to 7
4 to 1
5 to 8
7 to 2
8 to 3
9 to 4

6BR8	5BR8	E	Parallel circuits only. Install 3-ohm 5-watt resistor in series with filament.
6BS5	6AL6	G	Change socket to octal and rewire as follows:

Change pin No. 1 to pin No. 5 on octal
2 to 5
3 to 8
4 to 2
5 to 7
7 to cap
9 to 4

6BS7	6BR7	E	Rewire as follows:

Change grid cap on 6BS7 to pin No. 2.

	6C6	G	Change socket to six pin.
	(Cont.)		

Change pin No. 3 to pin No. 5
4 to 1
5 to 8
8 to 3
9 to 4
7 to 2

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BS7 (Cont.)	6J7	G	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 3 to pin No. 8 on octal 4 to 2 5 to 7 7 to 3 8 to 4 9 to 5  
	6W7	G	Same as 6BS7 to 6J7 procedure.
	7C7	G	Change socket to loctal and rewire as follows: Change pin No. 3 to pin No. 7 on octal 4 to 1 5 to 8 7 to 2 8 to 3 9 to 4  
6BS8	4BS8	E	Parallel circuits only. Install 3.5-ohm 5-watt resistor in series with filament.
	5BS8	E	Parallel circuits only. Install 1.5-ohm 5-watt resistor in series with the filament.
	6BC8	G	No changes.
	6BK7	G	No changes.
	6BQ7	E	No changes.
	6BZ7	G	No changes.
	6BZ8	G	No changes.
	X155	G	No changes.
6BT6	6066	E	No changes.
6BT8	5BT8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
6BU5			No practical substitute.
6BU8	3BU8	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	4BU8	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
6BV7			No practical substitute.
6BV8			No practical substitute.
6BW4	6AX5	E	Change socket to octal and rewire as follows: Change pin No. 1 to No. 5 on octal 4 to 2 5 to 7 7 to 3 9 to 8  
	6V4	G	Rewire as follows: Change pin No. 9 to pin No. 3  
	7Z4	E	Change socket to loctal and rewire as follows: Change pin No. 1 to pin No. 6 on octal 4 to 1 5 to 8 7 to 3 9 to 7  
6BW7	6BX6	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6BX4	6AX5	E	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 3 on octal 3 to 7 4 to 2 6 to 5 7 to 8
	6AV4	G	Parallel circuits only. No changes.
	6X4	G	No changes.
	6X5	G	Same as 6BX4 to 6AX5.
6BX6	6BN7	G	No changes.
6BX8	4BX8	E	Parallel circuits only. Install 3.5-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes.
	6BE8	G	No changes.
	6BK7	G	No changes.
	6BQ7	G	No changes.
	6BS8	G	No changes.
	6BZ7	G	No changes.
	6BZ8	G	No changes.
	X155	G	No changes.
6BY6	3BY6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6CS6	G	No changes.
	5915	G	No changes.
6BY8			No practical substitute.
6BZ6	3BZ6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	4BZ6	E	Parallel circuits only. Install 4.7-ohm 5-watt resistor in series with filament.
	6CB6	E	No changes.
	6DE6	E	No changes.
6BZ7	4BZ7	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
	5BZ7	E	Parallel circuits only. Install 1.5-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes.
	6BK7	G	No changes.
	6BQ8	E	No changes.
	6BS8	G	No changes.
	6BZ8	E	No changes.
	X155	E	No changes.
6BZ8	4BZ8	E	Parallel circuits only. Install 3.5-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes.
	6BK7	G	No changes.
	6BS8	G	No changes.
	6BZ7	G	No changes.
	X155	E	No changes.
6C4	5610	G	No changes.
	6135	E	No changes.
6C6	6BR7	G	Parallel circuits only. Reverse 6BR7 to 6C6 procedure.
6CA5	7A5	G	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 7 on octal 2 to 6 3 to 1 4 to 8 5 to 6 6 to 3 7 to 2

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6CA7	6L6	G	Parallel circuits only. No changes.
6CB5	6BG6	P	Rewire as follows: Change pin No. 1 to pin No. 8 4 to 5 6 to 3  
	6CD6	P	Same as 6CB5 to 6BG6 procedure.
6CB6	6BZ6	G	No changes.
	6DC6	G	No changes.
	6DE6	E	No changes.
6CD6	6DN6	E	No changes.
6CD7			No practical substitute.
6CE5	3CE5	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	4CE5	E	Parallel circuits only. Install 4.7-ohm 5-watt resistor in series with filament.
	6BZ6	G	Same as 6CE5 to 6CB6 procedure.
	6CB6	E	Rewire as follows: Connect pin No. 7 to pin No. 2
	6DE6	E	Same as 6CE5 to 6CB6 procedure.
6CG7	6BL7	E	Same as 6CG7 to 6SN7 procedure.
	6BX7	G	Parallel circuits only. Same as 6CG7 to 6SN7 procedure.
	6SN7	E	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 2 on octal 2 to 1 3 to 3 4 to 8 5 to 7 6 to 5 7 to 4 8 to 6  
	12AU7	G	Parallel circuits only. Rewire as follows: Reverse wires connected to No. 5 and No. 9
6CG8	5CG8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
	6AT8	G	Rewire as follows: Connect pin No. 8 to pin No. 3
	6X8	G	Rewire as follows: No. 1 to No. 2 2 to 3 3 to 6 6 to 9 7 to 8 8 to 6 9 to 7  
6CH6	6132	E	No changes.
6CH7	6BC8	G	Tie pin No. 8 and No. 9 together.
	6BK7	G	Tie pin No. 8 and No. 9 together.
	6BQ7	G	Tie pin No. 8 and No. 9 together.
	6BS8	G	Tie pin No. 8 and No. 9 together.
	6BZ7	E	Tie pin No. 8 and No. 9 together.
	6BZ8	E	Tie pin No. 8 and No. 9 together.
	X155	E	Tie pin No. 8 and No. 9 together.
6CH8			No practical substitute.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6CJ6	6CD6	G	Where space permits. Change socket to octal and rewire as follows: Change pin No. 2 to pin No. 5 on octal 3 to 3 4 to 2 5 to 7 8 to 8 9 to 3  
6CL6	6677	E	No changes.
6CL8	5CL8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
6CM6	5CM6	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament.
	5V6	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with filament. Change socket to octal. Rewire as follows: Change pin No. 1 to pin No. 4 on octal 3 to 5 4 to 2 5 to 7 6 to 5 7 to 8 9 to 3  
	6AQ5	G	Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 6 on miniature 3 to 1 4 to 3 5 to 4 6 to 7 7 to 2 9 to 5  
	6V6	G	Same as 6CM6 to 5V6 procedure.
	6W6	G	Parallel circuits only. Same as 6CM6 to 5V6 procedure.
6CM7	6CS7	G	Rewire as follows: Change pin No. 3 to pin No. 8 8 to 3  
6CM8	5CM8	E	Parallel circuits only. Install 2.5-ohm 5-watt resistor in series with the filament.
6CN6			No practical substitute.
6CN7			No practical substitute.
6CQ7			No practical substitute.
6CR6	6SF7	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 3 on octal 2 to 5 3 to 8 4 to 7 5 to 6 6 to 4 7 to 2  
6CS5	6CU5 (Cont.)	G	Reverse 6CU5 to 6CS5 procedure.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6CS5 (Cont.)	6K6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 4 on octal 2 to 8 3 to 5 4 to 2 5 to 7 6 to 5 7 to 8 9 to 3  
	6V6	G	Same as 6CS5 to 6K6 procedure.
	6W6	E	Same as 6CS5 to 6K6 procedure.
	6Y6	G	Same as 6CS5 to 6K6 procedure.
6CS6	3CS6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	6BY6	G	No changes.
6CS7	6CM7	G	Reverse 6CM7 to 6CS7 procedure.
6CU5	6CS5	G	Change socket to noval and rewire as follows: Change pin No. 1 to pin No. 2 on noval 2 to 3 3 to 4 4 to 5 5 to 6 6 to 1 7 to 9  
	6V6	G	Same as 6CU5 to 6W6 procedure.
	6W6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 5 3 to 2 4 to 7 5 to 5 6 to 4 7 to 3  
	6Y6	G	Same as 6CL5 to 6W6 procedure.
6CU6	6DQ6	E	No changes.
6CX7	4CX7	E	Parallel circuits only. Install 3.5-ohm 5-watt resistor in series with filament.
	6BC8	G	No changes. Tie pin No. 8 and No. 9 together.
	6BK7	G	Same as 6BC8 to 6CX7.
	6BQ7	E	Same as 6BC8 to 6CX7.
	6BS8	G	Same as 6BC8 to 6CX7.
	6BZ7	G	Same as 6BC8 to 6CX7.
	6BZ8	G	Same as 6BC8 to 6CX7.
	X155	G	Same as 6BC8 to 6CX7.
6DA6	6BA6	G	Change socket to miniature and rewire as follows: Change pin No. 2 to pin No. 1 on miniature 3 to 7 4 to 3 5 to 4 7 to 5 8 to 6 9 to 2  
	6BD6	G	Same as 6DA6 to 6BA6 procedure.
	6BJ6	G	Parallel circuits only. Change socket to miniature and rewire as follows: Change pin No. 2 to pin No. 1 on miniature 3 to 2 4 to 3 5 to 4 7 to 5 8 to 6 9 to 7  

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6DB6			No practical substitute.
6DC6	6BZ6	G	No changes.
	6CB6	G	No changes.
	6DC6	G	No changes.
6DE6	6BZ6	G	No changes.
	6CB6	G	No changes.
	6DE6	G	No changes.
6DG6	6K6	G	Parallel circuits only. No changes.
	6V6	G	Parallel circuits only. No changes.
	6W6	E	No changes.
6DN6	6BG6	G	No changes.
	6CD6	E	No changes.
6DQ6	6BQ6	G	No changes.
	6CU6	G	No changes.
6DT6	3DT6	E	Parallel circuits only. Install 5-ohm 5-watt resistor in series with filament.
	4DT6	E	Parallel circuits only. Install 4.7-ohm 5-watt resistor in series with filament.
6F6	1621	E	No changes.
	1622	E	Parallel circuits only. No changes.
6H6	5679	G	Reverse 5679 to 6H6 procedure.
6J4	6J4WA	E	No changes.
6J5	2C22	G	Reverse 2C22 to 6J5 procedure.
6J6	5964	E	No changes.
	6101	E	No changes.
6J7	1221	E	Reverse 1221 to 6J7 procedure.
	6059	G	Reverse 6059 to 6J7 procedure.
	7000	G	No changes.
6K6	1621	E	Parallel circuits only. No changes.
	5871	G	No changes.
6K7	5732	E	No changes.
6L6	1621	G	Parallel circuits only. No changes.
	1622	G	No changes.
	5881	E	No changes.
	5932	E	No changes.
	6550	E	No changes.
6M5	6BJ5	G	Reverse 6BJ5 to 6M5 procedure.
6N7	1635	E	Parallel circuits only. No changes.
6Q5	884	E	No changes.
6S7	5732	G	Parallel circuits only. No changes.
6SA7	5961	E	No changes.
6SB7Y	5961	G	No changes.
6SG7	6006	E	No changes.
6SH7	6006	G	No changes.
6SJ7	6SJ7WGT	E	No changes.
	6006	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6SK7	6006	G	No changes.
	6137	E	No changes.
6SL7	6SL7WGT	E	No changes.
	6113	E	No changes.
6SN7	6SN7WGT	E	No changes.
	6180	E	No changes.
6SU7	6113	E	No changes.
6T4	3AF4	G	Parallel circuits only. Install 7-ohm 5-watt resistor in series with filament.
	6AF4	G	No changes.
6U3	6AU4	G	Parallel circuits only. Reverse 6AU4 to 6U3 procedure.
6U7	5732	G	No changes.
6U8	6AU8	G	Parallel circuits only. Reverse 6AU8 to 6U8 procedure.
	6AX8	G	No changes.
6V3	6AU4	G	Reverse 6AU4 to 6V3 procedure.
6V4	6BW4	G	Parallel circuits only. Reverse 6BW4 to 6V4 procedure.
6V6	1621	G	Parallel circuits only. No changes.
	1622	G	Parallel circuits only. No changes.
	5871	E	No changes.
	5992	E	No changes.
	6061	E	Reverse 6061 to 6U6 procedure.
6W2	6X2	G	No changes.
6X2	6W2	E	No changes.
6X4	6AV4	E	Parallel circuits only. No changes.
	6BX4	G	No changes.
	6X4W	E	No changes.
	6063	E	No changes.
	6202	G	No changes.
6X5	6AV4	G	Parallel circuits only. Reverse 6AV4 to 6X5 procedure.
	6BX4	G	Reverse 6BX4 to 6X5 procedure.
	6X5WGT	E	No changes.
6Y7	1635	E	No changes.
7A5	6CA5	G	Reverse 6CA5 to 7A5 procedure.
7A6	6AL5	G	Parallel circuits only. Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 3 on miniature; 2 to 5; 3 to 2; 6 to 7; 7 to 1; 8 to 4  
7AU7	12AT7	G	Same as 7AU7 to 12AU7 procedure.
	12AU7	E	Rewire as follows: Change pin No. 5 to pin No. 9
	12AV7	G	Same as 7AU7 to 12AU7 procedure.
7C7	6BR7	G	Reverse 6BR7 to 7C7 procedure.
	6BS7	G	Reverse 6BS7 to 7C7 procedure.
7F8	7F8W	E	No changes.
7Z4	6BW4	E	Reverse 6BW4 to 7Z4 procedure.

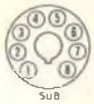
TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
8AU8	8AW8	G	No changes.
	8BA8	G	No changes.
	8BH8	G	No changes.
8AW8	8AU8	G	No changes.
	6BH8	G	No changes.
8BA8	8AU8	G	No changes.
	8AW8	G	No changes.
8BH8	8AU8	G	No changes.
	8AW8	G	No changes.
8BN8			No practical substitute.
8CG7	8SN7	G	Same as 6CG7 to 6SN7 procedure.
8CM7	8CS7	G	Rewire as follows: Change pin No. 3 to pin No. 8 8 to 3  
8CN7			No practical substitute.
8CS7	8CM7	G	Same as 8CM7 to 8CS7 procedure.
8SN7	8CG7	G	Same as 6CG7 to 6CSN7 procedure.
9BM5	9BW6	G	Rewire as follows: Change pin No. 1 to pin No. 2 on noval 2 to 3 3 to 4 4 to 5 5 to 7 6 to 8 7 to 1  
9BW6	9BM5	G	Same as 9BM5 to 9BN6 procedure. Tie pin Nos. 3 and 9 together.
12A7			No practical substitute.
12AB5			No practical substitute.
12AC6	12AF6	G	No changes.
12AD6	12AG6	G	No changes.
12AD7	12AX	E	Parallel circuits only. No changes.
	12SL7	G	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 2 on octal 2 to 1 3 to 3 4 to 8 5 to 7 6 to 5 7 to 4 8 to 6  
12AE6	12AT6	G	No changes.
	12AV6	G	No changes.
12AF6	12AC6	G	No changes.
12AG6	12AD6	G	No changes.
12AJ5			No practical substitute.
12AQ5	12CM6 (Cont.)	E	Reverse 12CM6 to 12AQ5 procedure.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
12AQ5 (Cont.)	12V6	E	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 5 on octal 2 to 8 3 to 2 4 to 7 5 to 3 6 to 4 7 to 5  
12AS5			No practical substitute.
12AT7	12A7WA	E	No changes.
	6060	E	No changes.
	6201	E	No changes.
	6679	E	No changes.
12AU7	12AU7WA	E	No changes.
	5814	E	No changes.
	5963	G	No changes.
	6067	E	No changes.
	6189	E	No changes.
	6680	E	No changes.
12AV5	12BQ6	E	Same as 12CU6 to 12AV5 procedure.
	12CU6	E	Same as 12CU6 to 12AV5 procedure.
	12DQ6	E	Same as 12CU6 to 12AV5 procedure.
12AV7	5965	G	No changes.
12AX7	12AD7	E	No changes.
	5751	E	No changes.
	6057	E	No changes.
	6681	E	No changes.
12AY7	6072	E	No changes.
12BH7	6350	G	Reverse 6350 to 12BH7 procedure.
12BJ7			No practical substitute.
12BK5	6BK5	E	Parallel circuits only. Install 6-ohm 20-watt resistor in series with filament.
12BL6			No practical substitute.
12BQ6	6BQ6	E	Parallel circuits only. Install 6-ohm 20-watt resistor in series with filament.
	12AV5	G	Reverse 12AV5 to 12BQ6 procedure.
	12CH6	E	No changes.
	12DQ6	E	No changes.
12BR7			No practical substitute.
12BV7	12BY7	E	No changes.
12BW4	6BW4	E	Parallel circuits only. Install 7-ohm 20-watt resistor in series with filament.
	12X4	G	Parallel circuits only. Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 6 on miniature 4 to 3 5 to 4 7 to 1 9 to 7  
12BY7	12BV7	E	No changes.
12C5	12CA5 (Cont.)	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY.
12C5 (Cont.)	12L6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 5 3 to 2 4 to 7 5 to 5 6 to 4 7 to 3  
12CA5	6CA5	E	Parallel circuits only. Install 5-ohm 20-watt resistor in series with filament.
	12C5	G	No changes.
	12L6	G	Same as 12C5 to 12L6.
12CM6	5CM6	E	Parallel circuits only. Install 14-ohm 20-watt resistor in series with filament.
12CM6	6CM6	E	Parallel circuits only. Install 14-ohm 20-watt resistor in series with filament.
	12AQ5	E	Change socket to miniature and rewire as follows: Change pin No. 1 to pin No. 6 on miniature 3 to 1 4 to 3 5 to 4 6 to 7 7 to 2 9 to 5  
	12V6	E	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 4 on octal 3 to 5 4 to 2 5 to 7 6 to 5 7 to 8 9 to 3  
12CN5			No practical substitute.
12CR6			No practical substitute.
12CS6	3CS6	E	Parallel circuits only. Install 16-ohm 20-watt resistor in series with filament.
	6CS6	E	Parallel circuits only. Install 21-ohm 20-watt resistor in series with the filament.
	6BY6	G	Parallel circuits only. Install 21-ohm 20-watt resistor in series with filament.
12CT8			No practical substitute.
12CU5	6CU5		Parallel circuits only. Install 5-ohm 20-watt resistor in series with filament.
	12L6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 5 3 to 2 4 to 7 5 to 5 6 to 4 7 to 3  
	12W6	G	Same as 12CU5 to 12L6 procedure.
12CU6	12AV5	G	Rewire as follows: Change pin No. 4 to pin No. 8 5 to 1 P. Cap to 5 8 to 3  
	12BQ6	E	No changes.
	12DQ6	E	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
12D4	12AX4	G	No changes.
12DQ6	12AV5	G	Reverse 12AV5 to 12DQ6 procedure.
	12BQ6	G	No changes.
	12CU6	G	No changes.
12F8			No practical substitute.
12G4	12H4	E	Remove, connect, and tape up any wires on pin No. 2.
	12J5	E	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 3 on octal 3 to 2 5 to 3 4 to 7 6 to 5 7 to 8  
	14A4	E	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 2 on octal 3 to 1 4 to 8 5 to 2 6 to 6 7 to 7  
12G8			No practical substitute.
12H4	12G4	E	No changes.
	12J5	E	Change to octal and rewire as follows: Change pin No. 1 to pin No. 3 on octal 3 to 2 5 to 3 4 to 7 6 to 5 7 to 8  
	14A4	E	Same as 14A4 to 12G4 procedure.
12J5	12G4	E	Reverse 12G4 to 12J5 procedure.
	12H4	E	Reverse 12H4 to 12J5 procedure.
12J8			No practical substitute.
12K5			No practical substitute.
12L6	12W6	E	No changes.
	1632	E	No changes.
12R5	12W6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 5 3 to 2 4 to 7 5 to 5 6 to 4 7 to 3  
12SL7	2C52	E	Parallel circuits only. No changes.
12SN7	5814	G	Parallel circuits only. Reverse 5814 to 12SN7 procedure.
12U7			No practical substitute.
12V6	12CM6	E	Reverse 12CM6 to 12V6 procedure.
12W6	12L6	E	No changes.
	12R5	G	Reverse 12R5 to 12W6 procedure.
	1632	E	No changes.
12X4	12BW4	E	Reverse 12BW4 to 12Y4 procedure.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
14A4	12G4	E	Reverse 12G4 to 14A4 procedure.
	12H4	E	Reverse 12H4 to 14A4 procedure.
15A6			No practical substitute.
15A8			No practical substitute.
16A5			No practical substitute.
17AV5	6AV5	E	Parallel circuits only. Install 8.7-ohm 25-watt resistor in series with filament.
	12AV5	E	Parallel circuits only. Install 7-ohm 10-watt resistor in series with filament.
	17DQ6	E	Same as 12CU6 to 12AV5 procedure.
17AX4	6AX4	E	Parallel circuits only. Install 18-ohm 20-watt resistor in series with filament.
	12AX4	E	Parallel circuits only. Install 10-ohm 20-watt resistor in series with filament.
17C5			No practical substitute.
17CA5	6CA5	E	Parallel circuits only. Install 9-ohm 20-watt resistor in series with filament.
	12CA5	E	Parallel circuits only. Install 10-ohm 20-watt resistor in series with filament.
17DQ6	6DQ6	E	Parallel circuits only. Install 9-ohm 20-watt resistor in series with filament.
	12DQ6	E	Parallel circuits only. Install 10-ohm 20-watt resistor in series with filament.
	17AV5	E	Same as 12CU6 to 12AV5 procedure.
17H3			No practical substitute.
17Z3	17AX4	E	Where space permits change socket to octal and rewire as follows: Change pin No. 4 to pin No. 8 on octal cap to 3 5 to 7 9 to 5  
18A5			No practical substitute.
19AU4	6AU4	E	Parallel circuits only. Install 7-ohm 30-watt resistor in series with filament.
	19X3	G	Parallel circuits only. Change socket to miniature and rewire as follows: Change pin No. 3 to pin No. 3 on miniature 5 to 9 7 to 4 8 to 5  
19X3	19AU4	G	Parallel circuits only. Reverse 19AU4 to 19X3 procedure.
19X8			No practical substitute.
21A6			No practical substitute.
25AV5	25CU6	G	Reverse 25CU6 to 25AV5 procedure.
	25DQ6	G	Reverse 25DQ6 to 25AV5 procedure.
25AX4	17AX4	E	Parallel circuits only. Install 18-ohm 10-watt resistor in series with filament.
	25U4	G	No changes.
	25W4	G	No changes.
25C5	25CA5 (Cont.)	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
25C5 (Cont.)	25L6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 8 on octal 2 to 5 3 to 2 4 to 7 5 to 5 6 to 4 7 to 3  
	25W6	G	Same as 25L6 to 25C5 procedure.
25CA5	25C5	G	No changes.
	25L6	G	Same as 25C5 to 25L6 procedure.
	25W6	G	Same as 25C5 to 25W6 procedure.
25CD6	25DN6	G	No changes.
25CU6	25AV5	G	Rewire as follows: Change pin No. 5 to pin No. 1 cap to 5 8 to 3 4 to 8  
	25BQ6	E	No changes.
	25DQ6	E	No changes.
25DN6	25CD6	G	No changes.
25DQ6	25AV5	G	Same as 25CU6 to 25AV5 procedure.
	25BQ6	G	No changes.
	25CU6	G	No changes.
25L6	6046	G	No changes.
25U4	25AX4	E	No changes.
	25W4	E	No changes.
25W4	25U4	G	No changes.
25W6	25L6	E	No changes.
28D7	28D7W	E	No changes.
	1238	E	No changes.
40A1	40B2	G	No changes.
40B2	40A1	G	No changes.
50A1			No practical substitute.
50BK5	25BK5	E	Parallel circuits only. Install 84-ohm 20-watt resistor in series with filament.
X155	6BC8	G	No changes.
	6BK7	G	No changes.
	6BQ7	G	No changes.
	6BS8	G	No changes.
	6BZ7	G	No changes.
	6BZ8	E	No changes.
807	5933	E	No changes.
884	6Q5	G	No changes.
1221	6J7	G	Rewire as follows: Change socket to octal. Change pin No. 1 to pin No. 2 on octal 2 to 3 3 to 4 4 to 5 5 to 8 6 to 7  

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
1238	28D7	G	No changes.
1266	OB3	G	No changes.
1621	6F6	G	No changes.
	6K6	G	Parallel circuits only. No changes.
	6L6	G	Parallel circuits only. No changes.
	6V6	G	Parallel circuits only. No changes.
	5881	E	Parallel circuits only. No changes.
1622	6F6	G	Parallel circuits only. No changes.
	6L6	E	No changes.
	6V6	G	Parallel circuits only. No changes.
	5881	E	No changes.
1631	6L6	G	Parallel circuits only. Install 7-ohm 20-watt resistor in series with the filament.
1632	12L6	E	No changes.
	12W6	E	No changes.
1633			No practical substitute.
1635	6N7	G	Parallel circuits only. No changes.
	6Y7	G	No changes.
5591	6AK5	G	No changes.
	5654	G	No changes.
5610	6C4	G	No changes.
5633	5634	E	No changes.
5634	5633	E	No changes.
5637	5646	G	Rewire as follows: Change pin No. 2 to pin No. 4 3 to 3 4 to 5 5 to 2  
5638			No practical substitute.
5654	5591	G	No changes.
	6096	E	No changes.
5670	2C51	G	No changes.
	5670WA	E	No changes.
5670WA	5670	G	No changes.
5679	6H6	G	Parallel circuits only. Rewire as follows: Change pin No. 1 to pin No. 2 2 to 4 6 to 5 7 to 8 8 to 7  
5692	6180	E	No changes.
5725	6AS6	G	No changes.
	6AS6W	E	No changes.
	6187	E	No changes.
5726	6AL5	G	No changes.
	6AL5W	E	No changes.
	6058	E	No changes.
	6097	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5727	2D21	G	No changes.
	2D21W	E	No changes.
5732	6K7	G	No changes.
5749	6BA6	G	No changes.
	6BA6W	E	No changes.
5750	6BE6	G	No changes.
5751	12AX7	G	No changes.
	5751WA	E	No changes.
	6057	G	No changes.
5751WA	12AX7	G	No changes.
	5751	G	No changes.
	6057	G	No changes.
5814	12AU7	G	No changes.
	12SN7	G	Parallel circuits only. Change socket to octal. Rewire as follows: Change pin No. 1 to pin No. 2; 2 to 1; 3 to 3; 4 to 8; 5 to 7; 6 to 5; 7 to 4; 8 to 6.  
	5814WA	E	No changes.
	6067	E	Parallel circuits only. No changes.
5824	6046	G	No changes.
5838	5839	E	Parallel circuits only. No changes.
5839	5838	E	Parallel circuits only. No changes.
5871	6V6	G	No changes.
	5992	G	Parallel circuits only. No changes.
5881	1621	G	Parallel circuits only. No changes.
	1622	G	No changes.
	5932	G	No changes.
5899	5900	E	No changes.
5900	5899	E	No changes.
5910	1U4	G	No changes.
5915	6BY6	G	No changes.
5930	2A3	G	No changes.
5931	5U4GB	E	No changes.
5932	6L6	G	No changes.
	5881	G	No changes.
5933	807	G	No changes.
5961	6SA7	G	No changes.
5963	12AU7	G	No changes.
5964	6J6	G	No changes.
5965	12AV7	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
5992	6V6	G	No changes.
	5871	G	Parallel circuits only. No changes.
5998	6AS7	G	Parallel circuits only. No changes.
6005	6AQ5	G	No changes.
	6AQ5W	E	No changes.
	6095	E	No changes.
6006	6SG7	G	No changes.
6046	25L6	G	No changes.
	5824	G	No changes.
6057	12AX7	G	No changes.
	5751	G	No changes.
6058	6AL5	G	No changes.
	5726	G	No changes.
6059	6J7	G	Parallel circuits only. Change socket to octal and rewire as follows: Change pin No. 2 to cap on octal 3 to pin No. 8 4 to 2 5 to 7 7 to 3 8 to 4 9 to 5  
6060	12AT7	G	No changes.
	6201	G	No changes.
6061	6V6	G	Change socket to octal and rewire as follows: Change pin No. 1 to pin No. 5 on octal 2 to 5 3 to 8 4 to 2 5 to 7 7 to 3 8 to 4  
6063	6X4	G	No changes.
6064	6AM6	G	No changes.
6065	6BH6	G	Parallel circuits only. Rewire as follows: Change pin No. 6 to pin No. 7 7 to 6
6066	6AT6	G	No changes.
6067	12AU7	G	No changes.
	5814	E	Parallel circuits only. No changes.
6072	12AY7	G	No changes.
6080	6AS7	G	No changes.
6095	6AQ5	G	No changes.
	6AQ5W	E	No changes.
	6005	E	No changes.
6096	6AK5	E	No changes.
	5654	G	No changes.
6097	6AL5	G	No changes.
	5726	G	No changes.
6101	6J6	G	No changes.
6113	6SL7	G	No changes.

TUBE	SUB.	PERF.	CIRCUIT CHANGES NECESSARY
6132	6CH6	G	No changes.
6134	6AC7	G	No changes.
6135	6C4	G	No changes.
6136	6AU6	G	No changes.
6137	6SK7	G	No changes.
6180	6SN7	G	No changes.
	5692	F	No changes.
6186	6AG5	G	No changes.
6187	6AS6	G	No changes.
	6AS6W	E	No changes.
	5725	E	No changes.
6189	12AU7	G	No changes.
	12AU7WA	E	No changes.
6201	12AT7	G	No changes.
	6060	G	No changes.
6202	6X4	G	No changes.
6265	6BH6	G	No changes.
6350	12BH7	G	Rewire as follows: Change pin No. 2 to pin No. 3 3 to 2 7 to 8 8 to 7
6485	6AH6	G	No changes.
6550	6L6	G	No changes.
6661	6BH6	G	No changes.
6662	6BJ6	G	No changes.
6663	6AL5	G	No changes.
6669	6AQ5	G	No changes.
6677	6CL6	G	No changes.
6679	12AT7	G	No changes.
6680	12AU7	G	No changes.
6681	12AX7	G	No changes.
7000	6J7	G	No changes.