

SUBSTITUTION CHART FOR TELEVISION PICTURE TUBES

THE following tables show some of the possible substitutions which may be made when the required type is temporarily unobtainable. Individual listings of all tube types bearing an A or B suffix have not been included in this table. These letters generally indicate a difference only in face, plate or screen treatment not materially affecting the tube's application. A copy of Sylvania's Television Picture Tube Characteristics Chart lists these types bearing suffixes and indicates their face plate characteristics. The tables have been extended slightly to show a few larger type tubes that may be used when it is desired to increase the size of the picture.

Before undertaking any of the more radical changes, the ease of adjustment provided by the receiver under consideration should be examined. If the focus coil and yoke supporting assembly are not adjustable in the direction of the long axis of the tube, it may be too difficult to use any tube having a longer cone. The wide variety of cabinets will also require that each case be examined carefully to be sure that there is room in the cabinet for the tube. Some designs of deflection and focus coils are longer than others so that short neck tubes cannot be directly interchanged. This fact is indicated in the notes when a short-neck tube would usually be a

good replacement.

The tables indicate the important physical and electrical changes required but it was necessary to make the following assumptions: (a) Since the usual tolerance in the overall length of a picture tube is $\pm \frac{3}{8}$ " the dimension shown under B is given only to the nearest $\frac{1}{4}$ ". (b) Since the new wide-angle picture tubes require more scanning power than the older tubes, and since there is usually some adjustment in the receiver circuit, we have assumed that a major coil change will not be required unless the replacement tube's deflection angle is greater than the original tube's by more than 4 degrees. (c) Besides the major changes in bulb dimensions considered under columns A and B there are also small changes in the radius of curvature of the bulb face and the shape of the picture area. This affects the mask dimensions and might give trouble in some sets if the adjustments are not flexible. Small changes in curvature radius of the cone may also be encountered, particularly between glass and metal types.

In a few cases we have listed replacement types smaller than the originals, because there are few or no tubes of the same or larger sizes which would, in our opinion, make practical substitutes.

For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	ADD ION TRAP MAG.	REMOVE ION TRAP MAG.	CHANGE COILS	CHANGE OPERATING CIRCUIT	CHANGE DEFLECTION	ADD PER CAPACITANCE	REMOVE PER SOCKET	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K		
3KP4.....	3GP1A.....										H	2
	3JP1.....		-1 1/2								H	
3NP4.....	None.....											
5BP4.....	5NP4.....	No changes										
	7EP4.....	A	-1 1/4									
5HP4.....	5NP4.....	No changes										
5TP4.....	None.....											
7DP4.....	10DP4.....	A	+3 1/2								K	
7EP4.....	5BP4-A.....	A	+1 1/4									
	7JP4.....		-1								H	
7GP4.....	7JP4.....	No changes										
	10HP4.....	A	+4 3/4									
	8BP4.....	A	+2									
7JP4.....	7GP4.....										F	
	10HP4.....	A	+4 3/4									
	8BP4.....	A	+2									
8AP4.....	10MP4.....	A	+2 3/4	C	D2							4, 1
	12VP4.....	A	+3 3/4	C	D2							4, 1
	10BP4.....	A	+3 1/2	C	D2							8, 4
	10FP4.....	A	+3 1/2	C		E						1, 8, 4
	12JP4.....	A	+3	C		E						8, 1
	12UP4.....	A	+4 1/2		D2							8, 1
9AP4.....	12AP4.....	A	+4 3/8									
10BP4.....	10CP4.....		-1	C		E						
	10FP4.....					E						
	12JP4.....	A		C		E						K
	12KP4.....	A				E						

For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	ADD ION TRAP MAG.	REMOVE ION TRAP MAG.	CHANGE COILS	CHANGE OPERATING CIRCUIT	CHANGE DEFLECTION	ADD PER CAPACITANCE	REMOVE PER SOCKET	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K		
10BP4.....	12LP4.....	A	+1									
(Continued)	12UP4.....	A	+1	C								K 6
	14BP4 □.....	A										G
	14CP4 □.....	A	-1		D1							G
10CP4.....	10BP4.....		+1	C	D2							
	10FP4.....		+1	C								
	12JP4.....	A	+3/2									
	12KP4.....	A	+1	C								
	12LP4.....	A	+1 1/4	C	D2							
	12UP4.....	A	1 2	C	D2							K 6
	14BP4 □.....	A		C	D2							G
	14CP4 □.....	A		C		E						G
10DP4.....	7DP4.....	A	-3 1/2						F			4
10FP4.....	10BP4.....				D2							
	10CP4.....		-1	C								
	12JP4.....	A		C								K
	12KP4.....	A										
	12LP4.....	A	+1		D2							
	12UP4.....	A	+1	C	D2							K 6
	14BP4 □.....	A	-1		D2							G
	14CP4 □.....	A	-1		D1							G
10HP4.....	7GP4.....	A	-4 3/4								F	
	7JP4.....	A	-4 3/4								F	
	10GP4.....		-3/4									
	8BP4.....	A	-2 3/4									
10MP4.....	8AP4.....	A	-2 3/4	C	D1				F			6
	12VP4.....	A	+1		D1							1, 6
	Also 10" types under 10BP4 but add note											
												8
12AP4.....	9AP4.....	A	-4 1/4									
12JP4.....	12KP4.....	A		C								4

□ Indicates rectangular tubes

SAFETY FIRST: Wear goggles and gloves when handling Picture Tubes. Be sure power supply is turned off before working on high-voltage circuits.

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REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K	NOTE NO.						
											ADD FILTER CAPACITANCE	CHANGE TUBE SOCKET	CHANGE DEFLECTION	CHANGE OPERATING VOLTS	REMOVE ION TRAP MAG.	CHANGE ORBIT	ADD ION TRAP MAG.

REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K
12JP4 (Cont'd)	12LP4	A	+1 1/4	C	D2					4
	12QP4	A			D1					
	12RP4				D1					K
	12TP4	A	+1 1/4	C	D2					
	12UP4	A	+1 1/4	C	D2					6
	14BP4	A	-3/4	C	D2			G		4
	14CP4	A	-3/4	C	D1			G		
12KP4	12JP4	A		C						K
	12LP4		+3/4		D2					
	12QP4			C	D1					K
	12RP4	A		C	D1					K
	12TP4		+3/4		D2					K
	12UP4	A	+1	C	D2					K 6
	14BP4	A	-1		D2			G		
	14CP4	A	-1		D1			G		
	16LP4	A	+4 1/2		D2					
	16TP4	A	+1/2		D1			G		7
12LP4	12JP4	A	-1 1/4	C		E				K
	12QP4		-1 1/4	C	D1					K
	12RP4	A	-1 1/4	C	D1					K
	12TP4									K
	12UP4	A		C						K 6
	14BP4	A	-2					G		
	14CP4	A	-2		D1			G		
	16LP4	A	+3 1/2							
	16TP4	A	-1/2		D1			G		7
	12KP4		-1/4			E				
12QP4	12JP4	A				E				
	12LP4		+1 1/4	C	D2					4
	12RP4	A								
	12TP4		+1 1/4	C	D2					
	12UP4	A	+1	C	D2					6
	14BP4	A	-3/4	C	D2			G		4
	14CP4	A	-3/4	C				G		4
	16LP4	A	+4 1/4	C	D2					K
	16TP4	A	+1/2	C				G		4, 7
	12KP4			C		E				
12TP4	12JP4	A	-1/4	C		E				4
	12LP4									K
	12QP4		-3/4	C	D1					
	12RP4	A	-3/4	C	D1					
	12UP4	A		C						6
	14BP4	A	-2					G		4
	14CP4	A	-2		D1			G		4
	16LP4	A	+3 1/2							4
	16TP4	A	-3/4		D1			G		7
	12KP4		-1			E				4
12UP4	12JP4	A	-1	C		E				
	12KP4		-1	C		E				4
	12LP4			C						4
	12QP4		-1	C	D1					
	12RP4	A	-1	C	D1					
	12TP4			C						
	14BP4	A	-2 1/4	C				G		4
	14CP4	A	-2	C	D1			G		4
	16LP4	A	+3 3/4	C						4
	16TP4	A	-1/2	C	D1			G		4, 7
	16GP4	A	-1		D1			G		7
12VP4	10MP4	A	-1				F			
	8AP4	A		C	D1		F			K 6
	12LP4		+3/4							8
	Other 12" types under 12LP4 but add note									8
14BP4	14CP4				D1					
	14DP4									K
	14EP4		-1/2		D1					7
	16KP4	A	+2		D1					
	16TP4	A	+1 1/2		D1					
	16UP4	A	+1 1/2		D1					K 7

REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K	NOTE NO.						
											ADD FILTER CAPACITANCE	CHANGE TUBE SOCKET	CHANGE DEFLECTION	CHANGE OPERATING VOLTS	REMOVE ION TRAP MAG.	CONNECTOR	BULB LENGTH

REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K
14BP4 (Cont'd)	17AP4	A	+2		D1					7
	17BP4	A	+2 1/4		D1					
<p>If cabinet space permits, round types listed under type 16SP4 may also be used. Add 1" to dimension change B.</p>										
14CP4	14BP4				D2					
	14DP4				D2					K
	14EP4		-1/2							7
	16KP4	A	+2							
	16TP4	A	+1 1/2							7
	16UP4	A	+1 1/2							K 7
	17AP4	A	+2							7
	17BP4	A	+2 1/4							
<p>If cabinet space permits, round types listed under type 16YP4 may also be used. Add 1/4" to dimension change B.</p>										
14DP4	14BP4									4
	14CP4				D1					4
	14EP4		-1/2		D1					4, 7
	16KP4	A	+2		D1					K 4
	16TP4	A	+1 1/2		D1					K 4, 7
	16UP4	A	+1 1/2		D1					4, 7
	17AP4	A	+2		D1					K 4, 7
	17BP4	A	+2 1/4		D1					K 4
<p>If cabinet space permits, round types listed under type 16WP4 may also be used. Add 1" to dimension change B.</p>										
14EP4	14BP4		+1/2		D2					
	14CP4		+1/2							
	14DP4		+1/2		D2					K
	16KP4	A	+2 1/2							
	16TP4	A	+2							
	16UP4	A	+2							K
	17AP4	A	+2 1/2							7
	17BP4	A	+3 1/4							
<p>If cabinet space permits, round types listed under type 16YP4 may also be used. Add 1" to dimension change B.</p>										
15AP4	15CP4		+1	C	D2					
	15DP4				D2					
	16AP4	A	+1 1/4	C	D2					6
	16CP4	A	+1	C	D2					
	16DP4	A	+3/4	C	D2					
	16EP4	A	-1	C	D2					6
	16FP4	A	-3/4		D1					
	16GP4	A	-3	C	D1			G		6, 7
	16HP4	A	+3/4	C	D2					4
	16JP4	A	+3/4	C	D2			G		4
	16KP4	A	-1 1/4	C	D1			G		4
	16LP4	A	+1 1/4	C	D2					4
	16QP4	A	-1 1/2	C	D2			G		
	16RP4	A	-1 1/4	C	D1			G		4
	16SP4	A	-3 1/4	C	D2			G		4, 7
	16TP4	A	-2 1/4	C	D1			G		4, 7
	16UP4	A	-2 1/4	C	D1			G		7
	16VP4	A	-3 3/4	C	D1			G		7
	16WP4	A	-2 3/4	C	D2			G		
	16WP4A	A	-2 3/4	C	D2			G		4
	16XP4	A	-1 1/4	C	D2			G		
	16YP4	A	-3 1/4	C	D1			G		4, 7
	16ZP4	A	+1 1/4	C	D2					4
	17AP4	A	-2	C	D1			G		4, 7
	17BP4	A	-1 1/4	C	D1			G		4
	20BP4	A	+8 1/4	C						
15CP4	15AP4		-1	C		E				
	15DP4		-1	C				G		
	16AP4	A	+3/4	C						6
	16CP4	A								
	16DP4	A	-3/4					G		
	16EP4	A	-2	C				G		6

□ Indicates rectangular tubes

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For details of changes indicated Refer to page 34

REQUIRED TYPE	POSSIBLE REPLACEMENTS	NOTE NO.											
		A	B	C	D	E	F	G	H	K			
15CP4... (Cont'd)	16FP4	A	-1 1/4	C D1			G						
	16HP4	A	-1/4				G				4		
	16JP4	A	-1/4				G				4		
	16LP4	A	+3/4								4		
	16ZP4	A	+3/4								4		
20BP4	A	+7 1/4	C		E								
15DP4	15AP4					E							
	15CP4		+1	C									
	16AP4	A	+1 1/4	C							6		
	16CP4	A	+1	C									
	16DP4	A	+1/4	C									
	16EP4	A	-1	C							6		
	16FP4	A	-1/4		D1								
	16HP4	A	+3/4	C							4		
	16JP4	A	+3/4	C							4		
	16LP4	A	+1 1/4	C							4		
	16ZP4	A	+1 1/4	C							4		
	20BP4	A	+8 1/4	C		E							
	17AP4	A	-2	C D1			G				4, 7		
	17BP4	A	-1 1/4	C D1			G				4		
	16AP4	16CP4		-1/4	C								
16LP4				C							4		
16ZP4				C							4		
20BP4		A	+6 1/2	C		E							
16GP4			+3 1/4		D1		G				7		
16TP4		A	-4 1/4	C D1			G				4, 7		
17AP4		A	-4 1/4	C D1			G				4, 7		
17BP4		A	-3	C D1			G				4		
19AP4		A	-1/4		D1		G						
19DP4		A	-1/4	C			G				4		
19EP4		A	-1	C D1			G				4		
16CP4		15AP4	A	-1	C		E						
		16AP4		+3/4	C								
	16LP4		+3/4								4		
	16ZP4		+3/4								4		
	16GP4		-4 1/4	C D1			G				6, 7		
	16TP4	A	3 1/2	D1			G				4, 7		
	17AP4	A	-3	D1			G				4, 7		
	17BP4	A	-2 1/4	D1			G				4		
	19AP4	A		C D1			G				6		
	19DP4	A					G				4		
	19EP4	A	-1/4		D1		G				4		
	20BP4	A	+7 1/4	C		E	G						
	16DP4	16AP4		+1 1/2	C							6	
16CP4			+3/4										
16EP4			-1	C							6		
16FP4			-1/2	C D1									
16HP4			+1/2								4		
16JP4											4		
16KP4		A	-2	D1							4		
16LP4			+1 1/2								4		
16QP4		A	-1 1/2										
16RP4		A	-2	D1							4, 7		
16TP4		A	-2 1/2	D1							4		
16UP4		A	-2 1/2	D1							7		
16XP4		A	-2										
16ZP4			+1 1/2								4		
17AP4		A	-2	D1							4, 7		
17BP4		A	-1 1/2	D1							4		
19EP4		A	+1/4	D1							4		
20BP4	A	+8	C		E								
16EP4	16AP4		+2 1/4										
	16CP4		+2	C									
	16DP4		+1 1/4	C									
	16FP4		+3/4	C D1									
	16HP4		+1 3/4	C							4		
	16JP4		+1	C							4		
	16KP4	A	-1	C D1							4		
	16LP4		+2 3/4	C							4		

For details of changes indicated Refer to page 34

REQUIRED TYPE	POSSIBLE REPLACEMENTS	NOTE NO.											
		A	B	C	D	E	F	G	H	K			
16EP4... (Cont'd)	16QP4	A	-1/2	C									
	16RP4	A	-1	C D1							4		
	16TP4	A	-1 1/2	C D1							4, 7		
	16UP4	A	-1 1/2	C D1							7		
	16XP4	A	-1	C									
	16ZP4		+2 3/4	C							4		
	17AP4	A	-1	C D1							4, 7		
	17BP4	A	-1/4	C D1							4		
	19EP4	A	+1 1/2	C D1							4		
	20BP4	A	+9	C		E							
	16FP4	16AP4		+2	C D2							6	
		16CP4		+1 1/4	C D2								
		16DP4		+1/2	G D2								
		16EP4		-1/4	C D2							6	
		16HP4		+1 3/4	C D2							4	
16JP4			+1	C D2							4		
16KP4		A	-1	C							4		
16LP4			+2 1/2	G D2							4		
16QP4		A	-1/2	G D2									
16RP4		A	-1	C							4		
16TP4		A	-1 1/2	C							4, 7		
16UP4		A	-1 1/2	C							7		
16XP4		A	-1	C D2									
16ZP4			+2 1/2	C D2							4		
17AP4		A	-1	C							4, 7		
17BP4	A	-1/4	C							4			
19EP4	A	+1 1/2	C							4			
20BP4	A	+8	C		E								
19GP4	A	+1	C										
16GP4	16EP4		+2		D2								
	16SP4		-1/4	C D2							4		
	16KP4	A	+1 1/4	C							4		
	16QP4	A	+1 1/2	C D2									
	16RP4	A	+3/4	C							4		
	16TP4	A	+1/2	C							4		
	16UP4	A	+1/2	C									
	16VP4		-1/4	C									
	16WP4		-1/4	C D2									
	16WP4A		-1/4	C D2							4		
	16XP4	A	+1 1/4	C D2									
	16YP4		-1/4	C							4		
	17AP4	A	+1	C							4		
	19AP4	A	+4										
	19DP4	A	+4	C D2							4		
19EP4	A	+3 1/2	C							4			
19FP4	A	+4 1/2	C D2										
19GP4	A	+3 3/4	C										
22AP4	A	+5 1/2											
16HP4	16AP4		+1	C							K	6	
	16CP4		+3/4									K	
	16DP4		-1/2									K	
	16EP4		-1 1/2	C							K	6	
	16FP4		-1	C D1								K	
	16JP4		-1/2										
	16KP4	A	-1 1/2	D1									
	16LP4		+1										
	16QP4	A	-2									K	
	16RP4	A	-2 1/2	D1									
	16TP4	A	-3	D1							7		
	16UP4	A	-3	B1							K	7	
	16XP4	A	-2 1/2									K	
	16ZP4		+1										
	17AP4	A	-2 1/2	D1							7		
17BP4	A	-2	D1										
19EP4	A		D1										
20BP4	A	+11	C		E						K		
16JP4	16AP4		+1 1/2	C							6		
	16CP4		+3/4									K	
	16DP4	A										K	
	16EP4		+1	C							6		

□ Indicates rectangular tubes.

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For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	REMOVE ION TRAP MAG	CHANGE ION TRAP MAG	CHANGE VOLTAGE	CHANGE OPERATING CIRCUIT	CHANGE DEFLECTION	ADD FILTER CAPACITANCE	ADD FILTER SOCKET	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K		

16JP4 (Cont'd)	16FP4	-1/2		C	D1							
	16HP4	+1/2										
	16KP4	A	-2		D1							
	16LP4		+1 1/2									
	16MP4		+1									
	16QP4	A	-1 1/2									
	16RP4	A	-2		D1							
	16TP4	A	+2 1/2		D1						7	
	16UP4	A	+2 1/2		D1						7	
	16XP4	A	-2									
	16ZP4		+1 1/2									
	17AP4	A	-2		D1						7	
	17BP4	A	-1 1/2		D1							
	19EP4	A	+1/4		D1							
	20BP4	A	+8	C		E						
16KP4	16RP4											
	16QP4		+1/2		D2						K	
	16TP4		-1/2								7	
	16UP4		-1/2								K	7
	16XP4				D2						K	
	17AP4	A									7	
	17BP4	A	+1/2									
If cabinet space permits, round types listed under 16YP4 may also be used.												
16LP4	15AP4	A	-1/4	C		E					K	
	15CP4	A	-3/4								K	
	16AP4			C							K	6
	16CP4		-3/4								K	
	16ZP4											
	16GP4		-4 3/4	D1		G					K	6, 7
	16TP4	A	-4	D1		G					K	7
	17AP4	A	-3 3/4	D1		G					7	
	17BP4	A	-3	D1		G						
	19AP4	A	-3/4	C	D1	G					K	6
	19DP4	A	-3/4			G						
	19EP4	A	-1	D1		G						
	20BP4	A	+6 1/2	C		E					K	
16MP4	16AP4		+1/2	C							K	6
	16CP4		-1/4								K	
	16DP4		-1								K	
	16EP4		-2	C							K	6
	16FP4		-1 1/2	C	D1						K	
	16HP4		-1/2									
	16JP4		-1									
	16KP4	A	-3	D1		G						
	16LP4		+1/2									
	16QP4	A	-2 1/2			G					K	
	16RP4	A	-3	D1		G						
	16TP4	A	-3 1/2	D1		G					7	
	16UP4	A	-3 1/2	D1		G					K	7
	16XP4	A	-3			G					K	
	16ZP4		+1/2									
	17AP4	A	-3	D1							7	
	17BP4	A	-2 1/2	D1								
	19EP4	A	-3/4	D1								
	20BP4	A	+7	C		E					K	
16QP4	16KP4		-1/2		D1						4	
	16RP4		-1/2		D1						4	
	16TP4		-1		D1						4, 7	
	16UP4		-1		D1						7	
	16XP4		-1/2									
	17AP4	A	-1/2		D1						4, 7	
	17BP4	A			D1						4	
If cabinet space permits, round types listed under 16WP4 may also be used.												
16RP4	16KP4											
	16QP4		+1/2		D2						K	
	16TP4		-3/4								7	
	16UP4		-3/4								K	7

For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	REMOVE ION TRAP MAG	CHANGE ION TRAP MAG	CHANGE VOLTAGE	CHANGE OPERATING CIRCUIT	CHANGE DEFLECTION	ADD FILTER CAPACITANCE	ADD FILTER SOCKET	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K		

16RP4 (Cont'd)	16XP4				D2						K	
	17AP4	A										7
	17BP4	A	+1/2									
If cabinet space permits, round types listed under 16YP4 may also be used.												
16SP4	16AP4		+5	C							K	6
	16CP4		+4 1/4								K	
	16DP4		+3 1/2								K	
	16EP4		+2 1/4	C							K	6
	16FP4		+3	C	D1						K	
	16GP4		+1/4	C	D1						K	6
	16HP4		+4									
	16JP4		+3 1/2									
	16KP4	A	+1 1/2		D1							
	16LP4		+5									
	16MP4		+4 1/2									
	16QP4	A	+1 3/4								K	
	16RP4	A	+1 1/2		D1							
	16TP4	A	+3/4		D1							
	16UP4	A	+3/4		D1						K	
	16VP4				D1						K	
	16WP4		+1/2								K	
	16WP4A		+1/2									
	16XP4	A	+1 1/2								K	
	16YP4				D1							
	16ZP4		+5									
	17AP4	A	+1 1/4		D1							
	17BP4	A	+2		D1							
	19AP4	A	+4 3/4	C	D1						K	6
	19DP4	A	+4 3/4									
	19EP4	A	+3 3/4		D1							
	19FP4	A	+4 3/4								K	
	19GP4	A	+4		D1						K	
	20BP4	A	+11 1/2	C		E					K	
	22AP4	A	+5 1/2	C	D1						K	6
16TP4	16KP4		+3/4									
	16QP4		+1		D2						K	
	16RP4		+3/4									
	16UP4										K	
	16XP4		+3/4		D2						K	
	17AP4	A	+1 1/2									
	17BP4	A	+1 1/4									
If cabinet space permits, round types listed under 16YP4 may also be used.												
16UP4	Same as listed above for type 16TP4 with deletion of note K when present and addition of note 4 for types not having note K.											
16VP4	16AP4		+5	C	D2							6
	16CP4		+4 1/4		D2							
	16DP4		+3 1/2		D2							
	16EP4		+2 1/4	C	D2							6
	16FP4		+3	C								
	16GP4		+1/4	C								6
	16HP4		+4		D2							4
	16JP4		+3 1/2		D2							4
	16KP4	A	+1 1/2									4
	16LP4		+5		D2							4
	16MP4		+4 1/2		D2							4
	16QP4	A	+1 3/4		D2							4
	16RP4	A	+1 1/2									4
	16SP4				D2							4
	16TP4	A	+3/4									4
	16UP4	A	+3/4									4
	16WP4		+1/2		D2							4
	16WP4A		+1/2		D2							4
	16XP4	A	+1 1/2		D2							4
	16YP4											4
	16ZP4		+5		D2							4
	17AP4	A	+1 1/4									4

□ Indicates rectangular tubes.

SAFETY FIRST: Wear goggles and gloves when handling Picture Tubes. Be sure power supply is turned off before working on high-voltage circuits.

For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	ADD ION TRAP MAG.	REMOVE ION TRAP MAG.	CHANGE OPERATING VOLTS	CHANGE REFLECTION CIRCUIT	CHANGE TUBE SOCKET	ADD FILTER CAPACITANCE	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K	
16VP4	17BP4 □	A	+2								4
(Cont'd)	19AP4	A	+4 1/4	C							6
	19DP4	A	+4 3/4	D2							4
	19EP4	A	+3 3/4								4
	19FP4	A	+4 3/4	D2							
	19GP4	A	+4								
	20BP4	A	+11 1/2	C	E						
	22AP4	A	+5 1/2	C							6
16WP4	16AP4		+4 1/2	C							6
	16CP4		+4								
	16DP4		+3								
	16EP4		+1 3/4	C							6
	16FP4		+2 1/2	C	D1						
	16GP4		-1/4	C	D1						7
	16HP4		+3 1/2								4
	16JP4		+3								4
	16LP4		+4 1/2								4
	16MP4		+4								4
	16QP4 □	A	+1 1/4								4
	16KP4 □	A	+1	D1							4
	16RP4 □	A	+1	D1							4
	16SP4		-1/2								4, 7
	16TP4 □	A	+1/4	D1							4, 7
	16UP4 □	A	+1/4	D1							7
	16VP4		-1/2	D1							7
	16WP4A										4
	16XP4 □	A	+1								4, 7
	16YP4		-1/4	D1							4, 7
	16ZP4		+5 1/2								4
	17AP4 □	A	+3/4	D1							4, 7
	17BP4 □	A	+1 1/2	D1							4
	19AP4	A	+3 3/4	C	D1						6
	19DP4	A	+3 3/4								4
	19EP4	A	+3 3/4	D1							4
	19FP4	A	+4 1/4								
	19GP4	A	+3 1/2	D1							
	20BP4	A	+11	C	E						
	22AP4	A	+5	C	D1						6
16WP4A	Same as listed above for type 16WP4 with addition of note K for types not having note 4.										
16XP4 □	16KP4 □			D1							4
	16QP4 □		+1/2								
	16RP4 □			D1							4
	16TP4 □		-1/2	D1							4, 7
	16UP4 □		-1/2	D1							7
	17AP4 □	A		D1							4, 7
	17BP4 □	A	+1/2	D1							4
	If cabinet space permits, round types listed under 16WP4 may also be used.										
16YP4	Same types as listed for 16VP4 with addition of note K for types not having note 4.										
16ZP4	16LP4	Also any type listed under 16LP4 with same changes.									
17AP4 □	16QP4 □	A	+1/2	D2							K
	16KP4 □	A									
	16RP4 □	A									
	16TP4 □	A	-1/2								
	16UP4 □	A	-1/2								K
	16XP4 □	A		D2							K
	17BP4 □		+1/4								
	If cabinet space permits, round types listed under 16KP4 may also be used.										
17BP4 □	17AP4 □		-1/4								7
	16QP4 □	A		D2							K
	16KP4 □	A	-1/2								
	16RP4 □	A	-1/2								
	16TP4 □	A	-1								7
	16UP4 □	A	-1								K
	16XP4 □	A	-1/2	D2							K

For details of changes indicated Refer to page 34		BULB DIAMETER	BULB LENGTH	CONNECTOR	ADD ION TRAP MAG.	REMOVE ION TRAP MAG.	CHANGE OPERATING VOLTS	CHANGE REFLECTION CIRCUIT	CHANGE TUBE SOCKET	ADD FILTER CAPACITANCE	NOTE NO.
REQUIRED TYPE	POSSIBLE REPLACEMENTS	A	B	C	D	E	F	G	H	K	
17BP4	If cabinet space permits, round types listed under (Cont'd) 16YP4 may also be used.										
19AP4	17AP4 □	A	-3	C							4, 6, 7
	17BP4 □	A	-2 1/4	C							4, 6
	19DP4			C	D2						4, 6
	19EP4	A	-1/2	C							4, 6
	19FP4		+1/2	C	D2						6
	19GP4		-1/4	C							6
	20BP4	A	+7 1/4	C	E						6
	22AP4	A	+1 1/2								
	Also other types listed under 16GP4 with addition of change A and 4" decrease in length differential.										
19DP4	17AP4 □	A	-3	D1							7
	17BP4 □	A	-2 1/4	D1							
	19AP4			C	D1						K
	19EP4	A	-1/2	D1							
	19FP4		+1/2								K
	19GP4		-1/4	D1							K
	20BP4	A	+7 1/4	C	E						K
	22AP4	A	+1 1/2	C	D1						K
	Also any 16" types listed under 16SP4 with addition of change A and 4 1/4" decrease in length differential										
19EP4	17AP4 □	A	-2 1/2								7
	17BP4 □	A	-2								
	20BP4	A	+7 1/2	C	E						K
	22AP4	A	+1 3/4	C							K
	Also 16" types listed under 16YP4 with 3 3/4" decrease in length differential.										
19FP4	17AP4 □	A	-3 1/2	D1							7, 4
	17BP4 □	A	-2 3/4	D1							4
	19AP4		-1/2	C	D1						6
	19DP4		-1/2								4
	19EP4	A	-1	D1							4
	19GP4	A	-1/4	D1							
	20BP4	A	+6 3/4	C	E						
	22AP4	A	+1	C	D1						6
	Also 16" types listed under 16WP4 with 4 1/4" decrease in length differential.										
19GP4	17AP4 □	A	-2 3/4								7, 4
	17BP4 □	A	-2								4
	19AP4		+1/4	C							6
	19DP4		+1/4	D2							4
	19EP4	A	-1/4								4
	19FP4		+3/4	D2							
	20BP4	A	+7 1/2	C	E						
	22AP4	A	+1 1/2	C							6
	Also 16" types listed under 16VP4 with 4" decrease in length differential.										
20BP4	16AP4	A	-6 1/2	C	D2						
	16CP4	A	-7 1/4	C	D2						
	16LP4	A	-6 1/2	C	D2						4
	16ZP4	A	-6 1/2	C	D2						4
	16KP4 □	A	-10	C	D1						G
	16QP4 □	A	-9 1/2	C	D2						G
	16RP4 □	A	-10	C	D1						G
	16TP4 □	A	-10 1/2	C	D1						G
	16UP4 □	A	-10 1/2	C	D1						G
	16XP4 □	A	-10	C	D2						G
	17AP4 □	A	-10	C	D1						G
	17BP4 □	A	-9 1/2	C	D1						G
	22AP4	A	-6	C	D1						G
22AP4	19AP4	A	-1 1/2								
	19DP4	A	-1 1/2	C	D2						4
	19EP4	A	-1 3/4	C							4
	19FP4	A	-1	C	D2						
	19GP4	A	-1 1/2	C							
	20BP4	A	+6	C	E						
	Also 16" types listed under 16GP4 with 5" decrease in length differential.										

□ Indicates rectangular tubes.

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SYLVANIA SUBSTITUTION MANUAL

NOTES FOR PICTURE TUBE SUBSTITUTION CHART

- A. Make adjustment for different bulb diameter or shape.
- B. Number of inches the replacement tube is longer (+) or shorter (-) than the original tube.
- C. Change anode connector to type required for the substitute tube.
- D. Add or change permanent magnet type ion trap magnet. D1 indicates single field and D2 double field type required. When no change is indicated by notes D or E the type of ion trap magnet used on the original tube should be used.
- E. Remove the ion trap magnet. If the ion trap magnet is the permanent magnet type, just remove it with the tube; if it is the coil type magnet leave it in the circuit and put it somewhere in the cabinet, out of the way, so that no circuit changes will be necessary.
- F. Suggested only if the operating conditions of the receiver do not exceed the maximum ratings of the substitute tube.
- G. Requires change of deflection yoke to 70° type and possibly a new horizontal output transformer and/or tube.
- H. Change in picture tube socket is required.
- K. Original tube had an external coating which provided a high voltage filter capacitor. Additional external capacitance may be required to replace that normally supplied by the original picture tube.
- (1) Increase in power supply voltage may be necessary for optimum performance.
- (2) May be used only when no potential is required between heater and cathode.
- (4) Replacement type has coating on bulb which provides filter capacitance. Be sure this coating is grounded. The underwriter's safety code requires that the total high voltage filter capacity be limited to 2000 $\mu\mu\text{f}$ at the usual operating voltage. The original filter capacitance should be disconnected in most cases.
- (6) Substitution of a metal cone tube for a coated glass tube may also require rearrangement of any parts near the metal cone to prevent corona discharge and removal of any contacts formerly grounding the bulb coating. Additional insulation is usually necessary at the cone lip since a wood cabinet alone is not sufficient to protect the user.
- (7) Substitution of a short-neck, wide-angle picture tube for a long-neck tube may require a change in focus coil and/or deflection coil.
- (8) Substitution of tetrode types for this triode type requires the addition of a 250-300 volt source of accelerator voltage. A voltage divider drawing 25 μa is a possible solution.
- Indicates rectangular tubes.

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