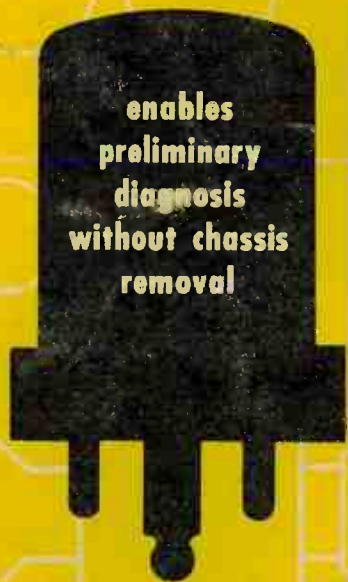


Television Tube Location Guide

(TGL-4)

enables
preliminary
diagnosis
without chassis
removal



A *Howard W. Sams*

PHOTOFACT PUBLICATION TGL-4

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Howard W. Sams

**TELEVISION
TUBE LOCATION GUIDE**

**ENABLES PRELIMINARY DIAGNOSIS
WITHOUT CHASSIS REMOVAL**

FIRST EDITION • OCTOBER, 1953

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P R E F A C E

This is the fourth volume of the Television Tube Location Guide which is a continuing series presented for the purpose of aiding the service technician to quickly and efficiently repair television receivers. Since the greatest percentage of troubles in television receivers are caused by tube failures, this series has proved invaluable in locating and identifying a given tube for replacement purposes.

In this volume, we have continued to show the location of the blank pin or locating key in the tube socket. This aids in replacing the tube in those sockets which cannot be seen by the technician. Thus, the changing of tubes with the chassis in the cabinet is made easier.

This volume also includes data on the fuses employed in the receiver. The location, rating, and circuit which the fuse protects are indicated, thereby enabling the service technician to determine whether the circuit or circuits which have failed are protected with a fuse. This should be very helpful in tracking down the source of trouble.

In many instances alternate tubes types are employed in the receiver. We are continuing to show these alternate types which again should aid in the tube replacement problem. It should be borne in mind, however, that all alternate types are not interchangeable. The alternate types are listed to indicate the various types used as original equipment.

Also presented in this volume is a "Tube Failure Check Chart." This chart is broken down into various symptom categories with a listing of tubes, the failure of which is most likely to cause that particular trouble. Thus, after determining the symptom which is exhibited by the receiver, a reference to the chart will reveal the tubes which should be changed or tested. The tube placement chart can then be referred to, to determine the type and location of these tubes. Many receivers employ a B+ distribution system which places certain stages in series. With this hook-up, the failure of a particular stage might cause the failure of another stage which performs a completely different function.

Howard W. Sams

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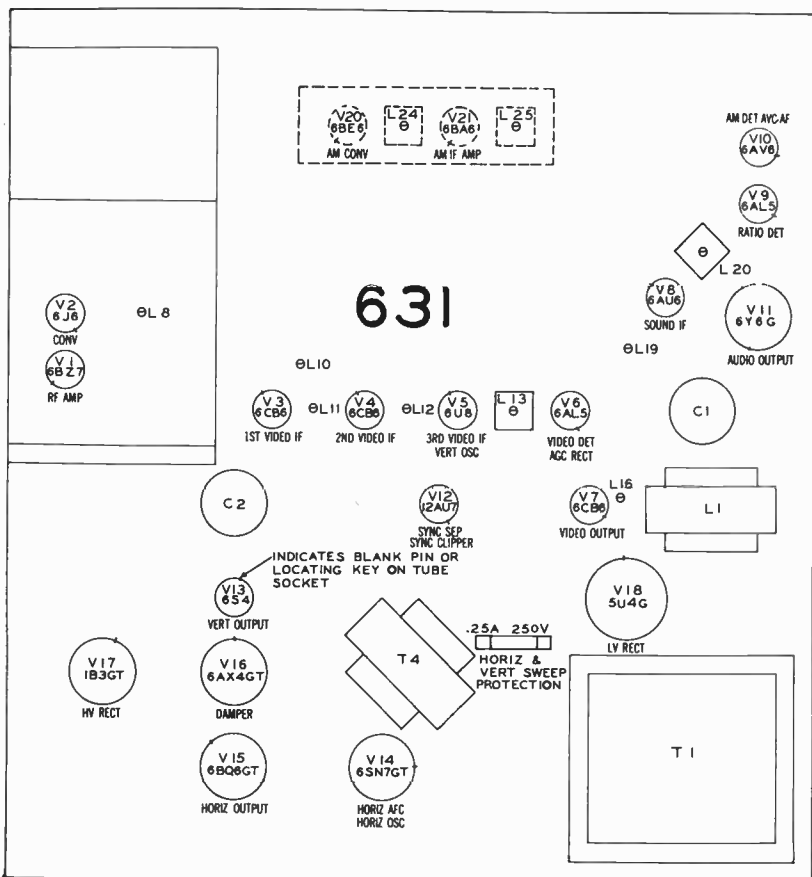
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			D2000A			2		
			D2204			2		
			D2983			2		
			D2985			2		
			D2987			2		
			D2988, D2989			2		
			D2990			2		
			D21088A			2		
			D21089A			2		
			D21089B			2		
			D21091			2		
			D21093A			2		
			D21093A			2		
			D21095			2		
			D21185B			2		
			D21190A, B			2		
			D21194A			2		
			D21224A			2		
			D21230B			2		
			D21235A			2		
			D21315A, D21325A			2		
			D21354A			2		
			D20243A, D20247B			2		
			D20252			2		
			D20253			2		
			D22149A			2		
			D22219A			2		
			D22312A, D22314A			2		
			D22321A			2		
			D22333A			2		

Name & Model or Chassis No.	Vol. No.	Chart No.	Name & Model or Chassis No.	Vol. No.	Chart No.	Name & Model or Chassis No.	Vol. No.	Chart No.
WESTINGHOUSE (Continued)			WESTINGHOUSE (Continued)			WESTINGHOUSE (continued)		
H-605T12 (Ch. V-2150-101).....	2	409	H-654T17 (Ch. V-2175-3, -4 & V-2192, -1).....	3	620	V-2149-1.....	1	209
H-606K12, H-607K12 (Ch. V-2150-111).....	2	410	H-655K17, H-656K17, H-657K17 (Ch. V-2200-1).....	3	623	V-2149-3.....	2	406, 407
H-608C12 (Ch. V-2152-01).....	2	406, 407	H-657K17 (Ch. V-2192-4, -5, -6).....	3	620	V-2150-01, -02.....	1	210
H-609T10 (Ch. V-2150-94C).....	2	411	H-658T17 (Ch. V-2192, -1).....	3	620	V-2150-31.....	1	211
H-610T12 (Ch. V-2150-136).....	2	412	H-659T17 (Ch. V-2204-1).....	3	623	V-2150-41.....	2	405
H-611C12 (Ch. V-2152-16).....	2	413	H-660C17, H-661C17 (Ch. V-2203-1).....	3	625, 626	V-2150-51.....	2	404
H-613K16 (Ch. V-2150-146).....	2	414	H-662K20 (Ch. V-2201-1).....	3	623	V-2150-61, A, B.....	2	405
H-614T12 (Ch. V-2150-136).....	2	412	H-663T17 (Ch. V-2192-2).....	3	620	V-2150-81, -82, -84 V-2150-91A, -94,	2	404
H-615C12 (Ch. V-2152-16).....	2	413	H-663T17 (Ch. V-2204).....	3	623	-94A.....	2	408
V-2150-176, U, -177U).....	2	415	H-664K17 (Ch. V-2200-1).....	3	623	V-2150-94C.....	2	411
H-618T16 (Ch. V-2150-186, A, C, CA).....	2	415	H-667T17, H-668F17 (Ch. V-2216).....	4	798	V-2150-101.....	2	409
H-619T12, U (Ch. V-2150-176, U, -177U).....	2	415	H-678K17, H-679K17 (Ch. V-2216-1, -2, -3).....	4	798	V-2150-111, A.....	2	410
H-620K16 (Ch. V-2150-186, A, C, CA).....	2	415	H-688K24 (Ch. V-2219-1).....	4	799	V-2150-136.....	2	412
H-622K16 (Ch. V-2150-186, A, C, CA).....	2	415	H-699K17 (Ch. V-2216-2, -3).....	4	798	V-2150-146.....	2	414
H-625F12 (Ch. V-2150-197).....	2	416	H-700F17, H-701T17 (Ch. V-2216-2, -3).....	4	798	V-2150-176, U, -177U, -186, A, C, CA.....	2	415
H-626T16, H-627K16 (Ch. V-2171).....	2	417	H-702K17, H-703K17 (Ch. V-2216-2, -3).....	4	798	V-2150-197.....	2	416
H-628K16, H-629K16 (Ch. V-2171).....	2	417	H-704T17 (Ch. V-2216-2).....	4	798	V-2151-01.....	2	406
H-630T14 (Ch. V-2176).....	2	417	H-704T17 (Ch. V-2216-5).....	4	800	V-2152-01.....	2	406, 407
H-633C17, H-634C17 (Ch. V-2173).....	2	418, 419	H-705K17 (Ch. V-2216-2, -3).....	4	798	V-2152-16.....	2	413
H-636F17 (Ch. V-2175).....	2	417	H-706T16 (Ch. V-2207-1).....	4	798	V-2171, V-2172.....	2	417
H-637T14 (Ch. V-2177).....	2	417	V-2207-1.....	4	798	V-2173.....	2	418, 419
H-638K20 (Ch. V-2178).....	3	619	H-707T17 (Ch. V-2216-1, -2, -3, -4, -5).....	4	800	V-2175-1, -3, -4, -5.....	3	620
H-639T17 (Ch. V-2192, -1).....	3	620	H-708T20 (Ch. V-2220-1, -3, -11).....	4	801	V-2175-1, -3, -4, -5.....	3	620
H-640T17 (Ch. V-2175-3, -4).....	3	620	H-710T21 (Ch. V-2217-4, -5).....	4	800	V-2176, V-2177.....	2	417
H-640T17A (Ch. V-2192, -1, -2, -3, -4, -5, -6).....	3	620	H-711T21 (Ch. V-2217-4, -5).....	4	800	V-2178, -1, -3.....	3	619
H-641K17 (Ch. V-2175-1, -5).....	3	620	H-712K21 (Ch. H-712K21, H-715K21 (Ch. V-2217-4, -5).....	4	800	V-2179, -1.....	3	622
H-641K17A (Ch. V-2192, -1, -2, -3, -4, -5, -6).....	3	620	H-715K21 (Ch. V-2220-2).....	4	801	V-2180-9, -10.....	4	792
H-642K20 (Ch. V-2178-1, -3).....	3	619	H-720K21, H-721K21 (Ch. V-2217-4, -5).....	4	800	V-2192, -1, -3, -4, -5, -6.....	3	620
H-642K20A (Ch. V-2194, A, -1).....	3	621	H-722K21, H-723K21 (Ch. V-2217-4, -5).....	4	800	V-2194-2, -3.....	3	619
H-643K16 (Ch. V-2179, -1).....	3	622	H-724T20, H-725T20 (Ch. V-2220-2).....	4	801	V-2200-1.....	3	623
H-646K17 (Ch. V-2192).....	3	620	H-730C21 (Ch. V-2218-1, -2, -11).....	4	802, 792	V-2201-1.....	3	623
H-647K17 (Ch. V-2175-3).....	3	620	H-732C21 (Ch. V-2218-1, -11).....	4	802, 792	V-2202-2.....	3	624
H-648T20 (Ch. V-2201-1).....	3	623	H-733C21 (Ch. V-2218-1, -11).....	4	802, 792	V-2203-1.....	3	625, 626
H-649T17 (Ch. V-2200-1).....	3	620	H-737T17 (Ch. V-2216-5).....	4	800	V-2204, -1.....	3	623
H-650K21 (Ch. V-2192-4).....	3	620	H-751T21 (Ch. H-751T21, H-752T21 (Ch. V-2217-4, -5).....	4	800	V-2207-1.....	4	796
H-650T17 (Ch. V-2200-1).....	3	620	H-754K21, H-756K21, H-757K21, H-758K21, H-759K21 (Ch. V-2217 -4, -5).....	4	800	V-2210-1.....	3	624
H-651K17 (Ch. V-2192).....	3	620	Chassis V-2130-1.....	1	204	V-2216-1, -2, -3.....	4	798
H-652K20 (Ch. V-2194-2, -3).....	3	619	V-2130-HDX, -12DX, -21DX, -22DX, -31DX, -32DX.....	1	206	V-2216-4, -5.....	4	800
H-652K20 (Ch. V-2201-1).....	3	623	V-2137-3.....	2	404A	V-2218-1, -2, -11.....	4	800
H-653K24 (Ch. V-2202-2 & V-2210-1).....	3	624	V-2146-05, -11DX, -21DX, -35DX, -45.....	1	207	V-2219-1, -2, -3, -11.....	4	799
			V-2149.....	1	208	V-2220-1, -2, -3, -11.....	4	801
						WILCOX-GAY		
						G-306, 402, 403, 404.....	2	285
						G-414.....	3	517
						G-426, G-427.....	2	285
						G-614, G-624, G-914.....	3	517
						OD-446M (OD Series) OF-439-1-C (OF Series).....	3	420, 421
						9W Series.....	3	423
						ZENITH		
						G-2322 (Ch. 23G22).....	2	438
						G-2322Z, G-2327Z (Ch. 23G24).....	2	428
						G-2340 (Ch. 23G22).....	2	438
						G-2340RZ, Z (Ch. 23G24).....	2	428
						G-2346R (Ch. 23G22).....	2	438
						G-2350RZ, Z (Ch. 23G24).....	2	428
						G-2353E (Ch. 23G22).....	2	438
						G-2353EZ, G-2356EZ (Ch. 23G24).....	2	428*
						G-2420E (Ch. 24G20).....	1	216, 217
						G-2420-EOX (Ch. 24G20-OX).....	1	216, 217
						G-2420R (Ch. 24G20).....	1	216, 217
						G-2420-ROX (Ch. 24G20-OX).....	1	216, 217
						G-2437RZ, G-2438RZ, Z, G-2439RZ (Ch. 24G26).....	2	429, 430

Name & Model or Chassis No.	Vol. No.	Chart No.
ZENITH (Continued)		
G-2441 (Ch. 24G24)...	2	425, 426
G-2441R (Ch. 24G22/ 24).....	2	425, 426 or 439
G-2441RZ, Z (Ch. 24G26).....	2	429, 430
G-2442R, R (Ch. 24G22/24).....	2	425, 426
G-2442RZ (Ch. 24G26)	2	429, 430
G-2448R (Ch. 24G22/ 24).....	2	425, 426 or 430
G-2448RZ (Ch. 24G26).....	2	429, 430
G-2454R (Ch. 24G21)	1	216, 217
G-2454-ROX (Ch. 24G21-OX).....	1	216, 217
G-2745-ROX (Ch. 27F20-OX).....	1	213, 214
G-2951, R (Ch. 29G20)	1	213, 215
G-2951-OX, ROX (Ch. 29G20-OX).....	1	213, 215
G-2952, R (Ch. 29G20)	1	213, 215
G-2952-OX, ROX (Ch. 29G20-OX).....	1	213, 215
G-2957, R, G-2958R (Ch. 23G23).....	2	427, 438
G-3059R, G-3062 (Ch. 24G23/25).....	2	425, 426
G-3157RZ, Z, G- 3158RZ (Ch. 23G24)...	2	428
G-3173RZ, Z, G- 3174RZ (Ch. 23G24)...	2	428
G-3259RZ, G-3262RZ (Ch. 24G26).....	2	429, 430
G-3275RZ, G-3276RZ (Ch. 24G26).....	2	429, 430
H-2029R, H-2030E, R (Ch. 20H20).....	3	627
H-2041R (Ch. 20H20)	3	627
H-2052R, H-2053E (Ch. 20H20).....	3	627
H-2226E, R, H-2227E, R (Ch. 22H20).....	2	431
H-2229R, H-2230E, R (Ch. 22H21).....	3	628, 629
H-2241R (Ch. 22H21)...	3	628
H-2242E, R (Ch. 22H22).....	3	628
H-2250R (Ch. 22H20)	2	431
H-2252R, H-2253E (Ch. 22H21).....	3	628
H-2255E (Ch. 22H20)	2	431
H-2328E, EZ, R, RZ (Ch. 23H22, Z).....	2	432
H-2329R, RZ, H- 2330E, R (Ch. 23H22).....	2	432
H-2341R (Ch. 23H22)	2	432

Name & Model or Chassis No.	Vol. No.	Chart No.
ZENITH (Continued)		
H-2352R, RZ, H- 2353E, EZ (Ch. 23H22, Z).....	2	432
H-2437E, R, H-2438R, H-2439R (Ch. 24H20)...	2	433, 434
H-2443R (Ch. 24H20)	2	433, 434
H-3445R, H-3447R (Ch. 24H21).....	2	433, 434
H-2449E (Ch. 24H20)	2	433, 434
H-3068R (Ch. 22H21)	3	628
H-3074 (Ch. 20H20)	3	627
H-3267, R (Ch. 24H20)	2	433, 434
H-3273E, H-3274R (Ch. 22H21).....	3	628, 629
H-3284R (Ch. 22H22)	3	628, 629
H-3467R, H-3469E, H-3475R (Ch. 24H20)...	3	433, 434, 435
H-3477R, H-3478E (Ch. 24H21).....	3	433, 434, 435
J-2026R, J-2027E, R, J-2029E, R, J-2030E, R (Ch. 20J21).....	3	630
J-2031R (Ch. 20J21)	3	630
J-2032R (Ch. 20J22)	3	630
J-2040E, J-2042R, J-2043R, J-2044E, R (Ch. 20J21).....	3	630
J-2049R, J-2050R (Ch. 20J21).....	3	630
J-2051E, J-2053R, J-2054R, J-2055R (Ch. 20J22).....	3	630
J-2126R (Ch. 21J21)	3	630
J-2127E, R, J-2129E, R, J-2130E, R (Ch. 21J20).....	3	630
J-2140E, J-2142R, J-2143R, J-2144E, R (Ch. 21J20).....	3	630
J-2151E, J-2153R, J-2154R, J-2155R (Ch. 21J21).....	3	630
J-2968R (Ch. 20J21)...	3	630
J-2968R (Ch. 21J20)	3	630
J-3069E (Ch. 20J21)	3	630
J-3169E (Ch. 21J20)	3	630
K-1812E, R (Ch. 19K22).....	4	803
K-1815E, R, K-1820E, R, K-1846E, R, K-1850E, R, K-1880R (Ch. 19K20)	4	803
K-2229R (Ch. 19K23)	4	803
K-2230E, R, K-2240E, R (Ch. 21K20).....	4	804
K-2258R (Ch. 19K23)	4	803
K-2260R, K-2263E, K-2266, R, K-2267E, K-2268R, K-2270H, R (Ch. 21K20).....	4	804

Name & Model or Chassis No.	Vol. No.	Chart No.
ZENITH (Continued)		
K-2286R (Ch. 19K23)	4	803
K-2287R (Ch. 21K20)	4	804
K-2288E (Ch. 19K23)...	4	803
K-2290R, K-2291E (Ch. 21K20).....	4	804
27T965R (Ch. 28F20)	1	213, 214
28T965E, R (Ch. 28F22)	1	212, 213
28T966E, R (Ch. 28F25).....	1	212, 213
28T960E, R (Ch. 28F20).....	1	212, 213
28T961E (Ch. 28F21)	1	212, 213
28T962R (Ch. 28F20)	1	212, 213
28T963 (Ch. 28F21)	1	212, 213
28T964R (Ch. 28F23)	1	212, 213
37T996RLP (Ch. 28F23).....	1	212, 213, 216
37T996RLPU (Ch. 28F20).....	1	212, 213, 216
Chassis		
6G20.....	2	437
10H20.....	2	435
10H20Z.....	3	629
19K20, 19K22, 19K23	4	803
20H20.....	3	627
20J21.....	3	630
20J22.....	3	630
21J21.....	3	630
21K20.....	4	804
22H20.....	2	431
22H21.....	3	628
22H22.....	3	628
23G22.....	2	438
23G23.....	2	438
23G24.....	2	428
23H22, Z.....	2	432
24G20.....	1	216, 217
24G20-OX.....	1	216, 217
24G21.....	1	216, 217
24G21-OX.....	1	216, 217
24G22/24.....	2	425, 426 or 439
24G23/25.....	2	425, 426
24G24.....	2	425, 426
24G26.....	2	429, 430
24H20.....	2	433, 434
24H21.....	2	433, 434
27F20, -OX.....	1	213, 214
28F20.....	1	212, 213
28F21.....	1	212, 213
28F22.....	1	212, 213
28F23.....	1	212, 213
28F25.....	1	212, 213
29G20, -OX.....	1	213, 215



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V18

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V11

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V21

Has pic, no sound-V8, V9, V10, V11

SYNC FAILURE

No vert. sync.-V5, V12

No horiz. sync.-V12, V14

No vert. or horiz. sync.-V12

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V21 Fuse (M1)

No vertical deflection-V5, V13

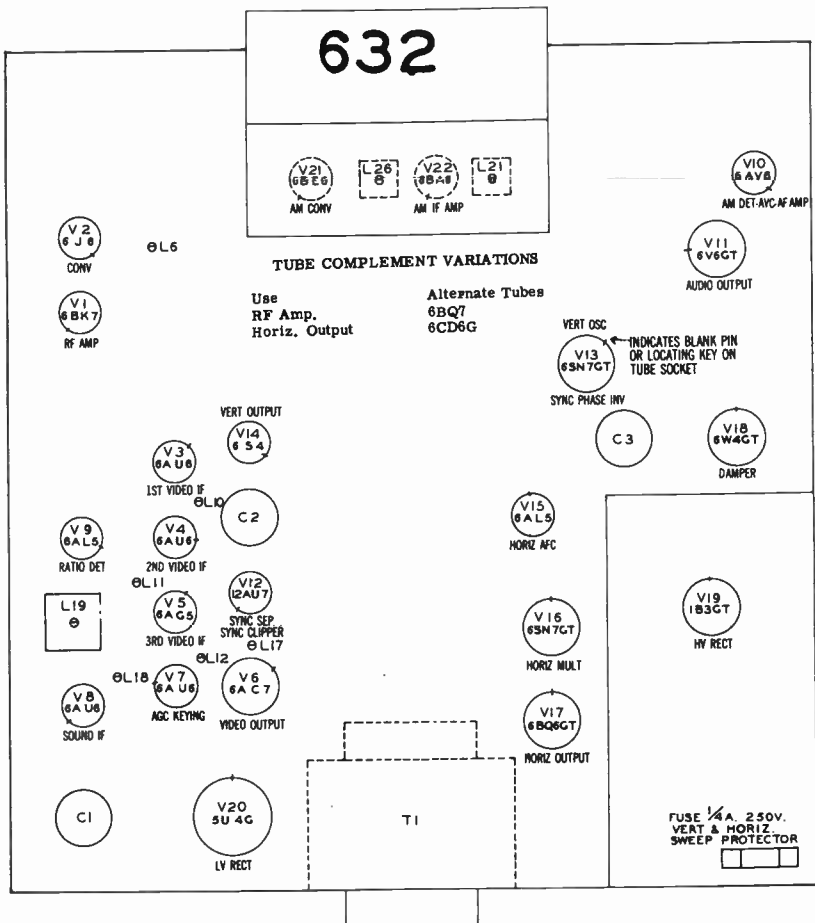
Poor vert. linearity or foldover-V5, V13

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, V18

Vert. off freq.-V5, V12

Horiz. off freq.-V12, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V20

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V6, V23

Has Pic, No Sound, - V8, V9, V10, V11

Overloaded Picture - V7

SYNC FAILURE

No Vert. Sync - V13

No Horiz. Sync - V13, V15, V16

No Vert. or Horiz. Sync - V12, V13

SWEEP FAILURE

No Raster, Has Sound - V16, V17, V18, V19, V23, Fuse (M1)

No Vertical Deflection - V14

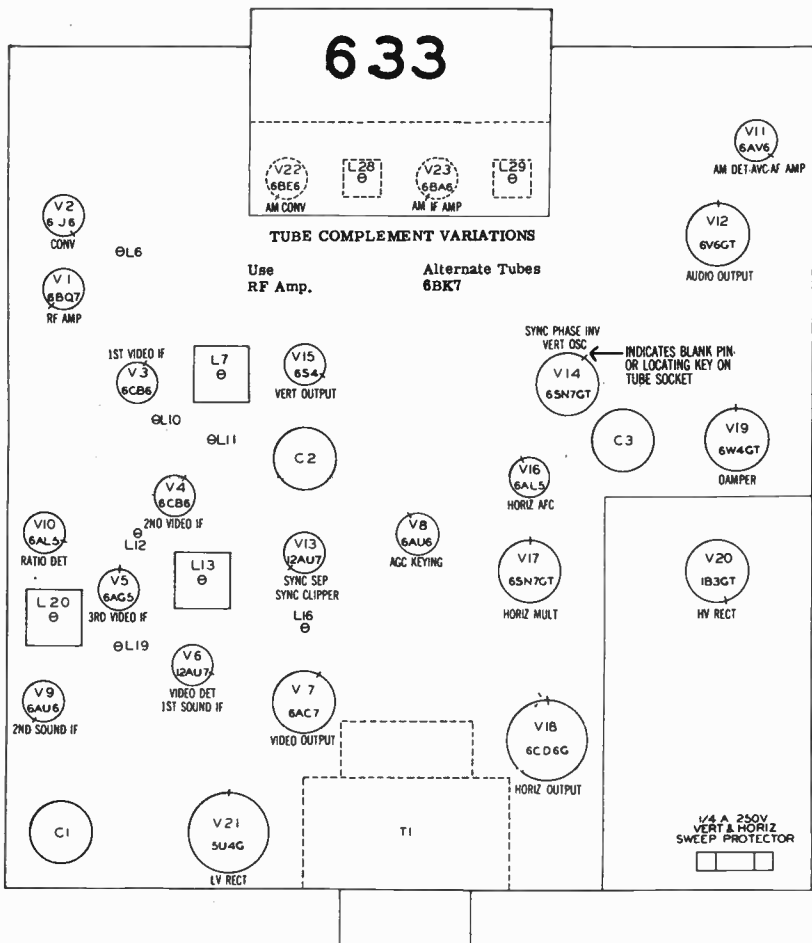
Poor Vert. Linearity or Foldover - V13, V14

Poor Horiz. Linearity or Foldover - V16, V17, V18

Narrow Picture - V16, V17, V18, V20

Vert. Off Freq. - V13

Horiz. Off Freq. - V13, V15, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound has raster-V7, V24

Has pic, no sound-V6, V9, V10, V11, V12

SYNC FAILURE

No vert. sync.-V14

No horiz. sync.-V14, V16, V17

No vert or horiz. sync.-V13, V14

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V24, Fuse (M1)

No vertical deflection -V15

Poor vert. linearity or foldover-V14, V15

Poor horiz. linearity or foldover -V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21

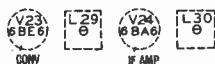
Vert off freq.-V14

Horiz. off freq.-V14, V16, V17

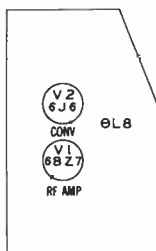
TUBE COMPLEMENT VARIATIONS

Use
Video Det. -Sound
IF Amp.

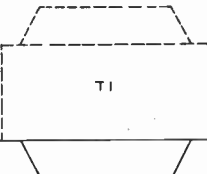
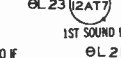
Alternate Tubes
12AU7



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SYNC PHASE INV



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound- V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster,-V7, V24

Has pic, no sound-V6, V9, V10, V11, V12

Overloaded picture-V8

SYNC FAILURE

No vert. sync.-V14

No horiz. sync.-V14, V16, V17

No vert. or horiz. sync.-V13, V14

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V24 Fuse (M1)

No vertical deflection-V14, V15

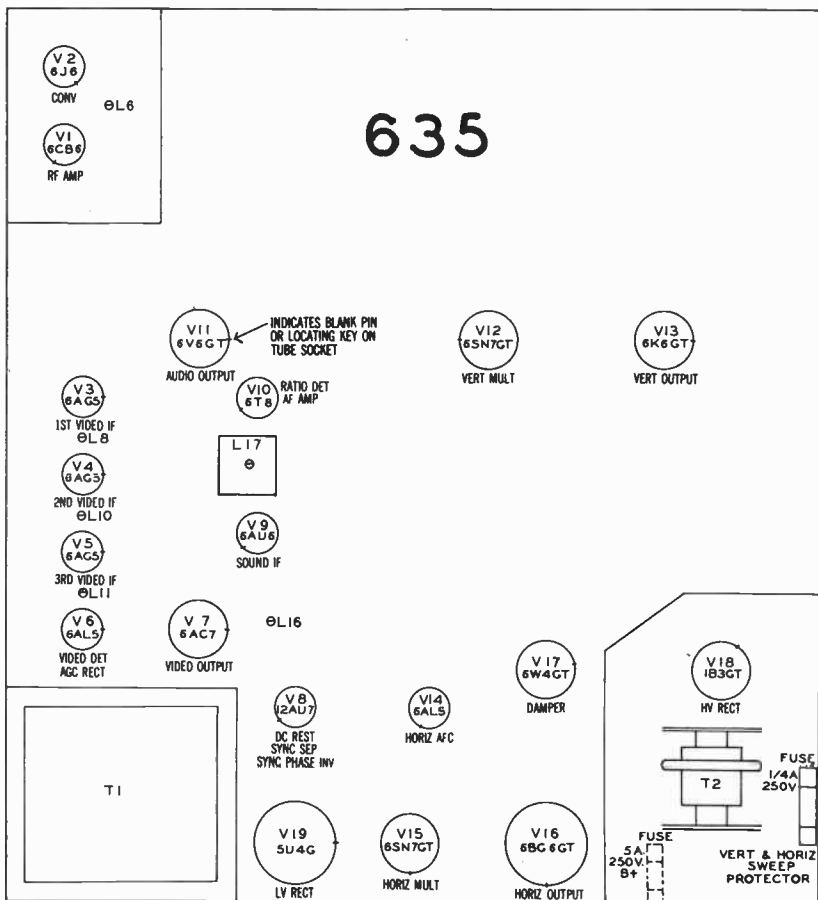
Poor vert. linearity or foldover-V14, V15

Poor horiz. linearity or foldover-V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21

Vert. off freq. -V14

Horiz. off freq. -V14, V16, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V8, V20

Has pic, no sound-V9, V10, V11

Overloaded picture-V6

SYNC FAILURE

No vert. sync.-V8, V12

No horiz. sync.-V8, V14, V15

No vert. or horiz. sync.-V8

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V20 Fuse (M2)

No vertical deflection-V13

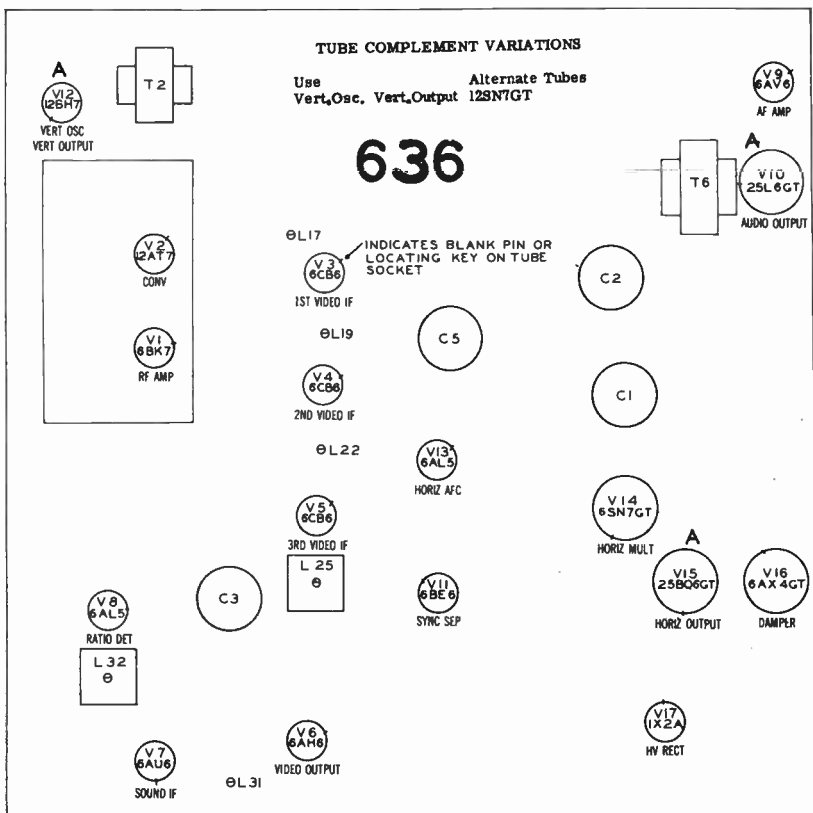
Poor vert. linearity or foldover-V12, V13

Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19

Vert. off freq.-V8, V12

Horiz. off freq.-V8, V14, V15



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V18

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V14, V15, V16

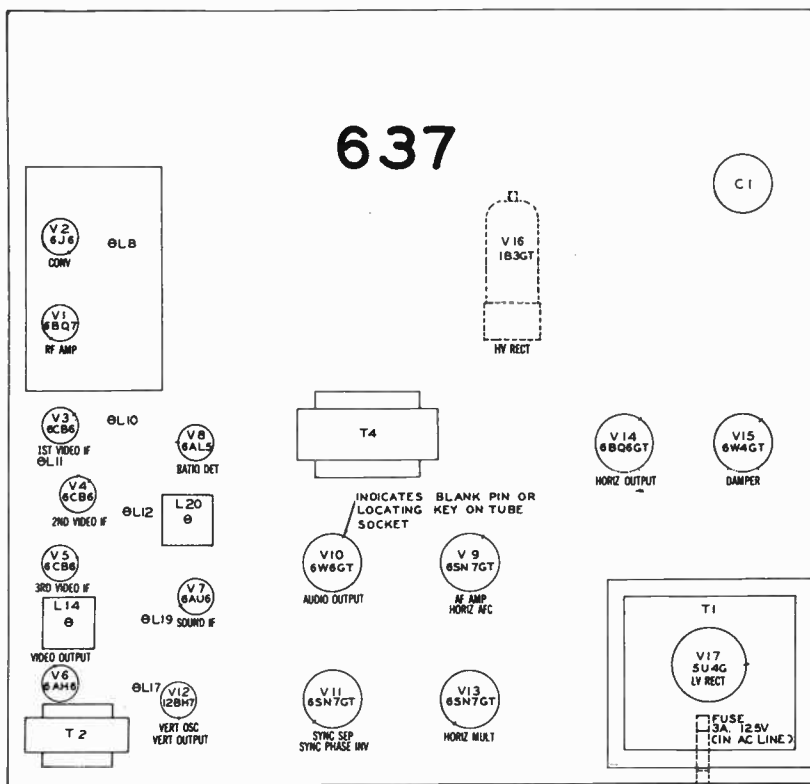
Narrow picture - V14, V15, V16, V17, M1, M2

Vert. off freq. - V11, V12

Horiz. off freq. - V11, V13, V14

NOTE: The tubes marked A on the tube placement chart indicate the tubes in the series string. The filaments of the other tubes operate independently from a filament transformer.

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V17 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V18

Has pic, no sound-V 7, V8, V9, V10

SYNC FAILURE

No vert. sync. -V11, V12

No horiz. sync. -V9, V11, V13

No vert. or horiz. sync. -V11

SWEEP FAILURE

No raster, has sound-V13, V14, V15, V16, V18

No vertical deflection-V12

Poor vert. linearity or foldover-V12

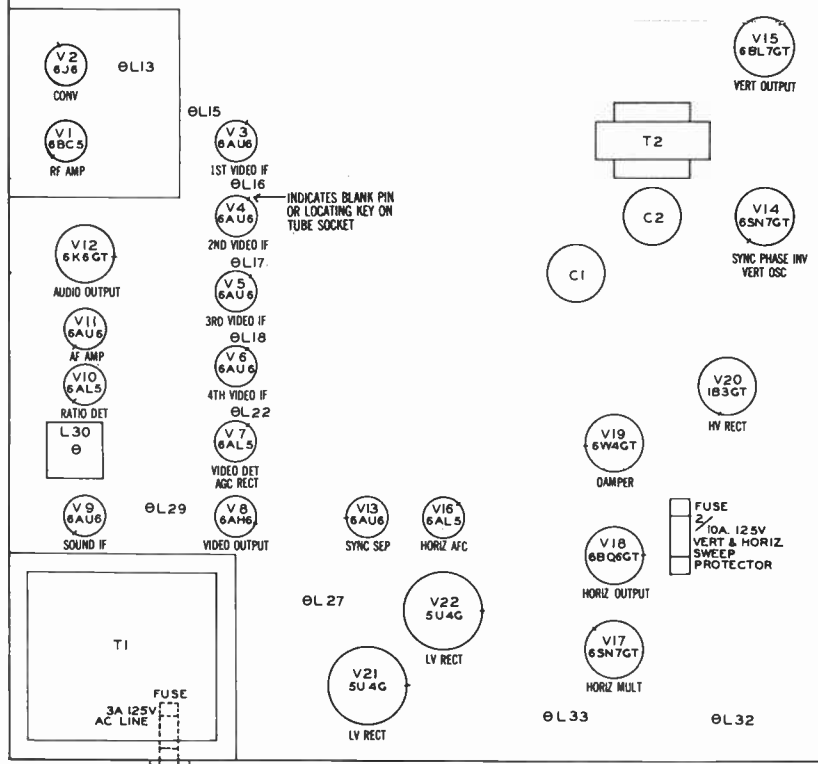
Poor horiz. linearity or foldover-V13, V14, V15

Narrow picture-V13, V14, V15, V16, V17

Vert. off freq. - V11, V12

Horiz. off freq. -V9, V11, V13

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V21, V22, Fuse (M1)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7, V8

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V8, V23

Has Pic, No Sound - V9, V10, V11, V12

Overloaded Picture - V7

SYNC FAILURE

No Vert. Sync - V14

No Horiz. Sync - V14, V16, V17

No Vert. or Horiz. Sync - V13, V14

SWEEP FAILURE

No Raster, Has Sound - V17, V18, V19, V20, V23, Fuse (M2)

No Vertical Deflection - V15

Poor Vert. Linearity or Foldover - V14, V15

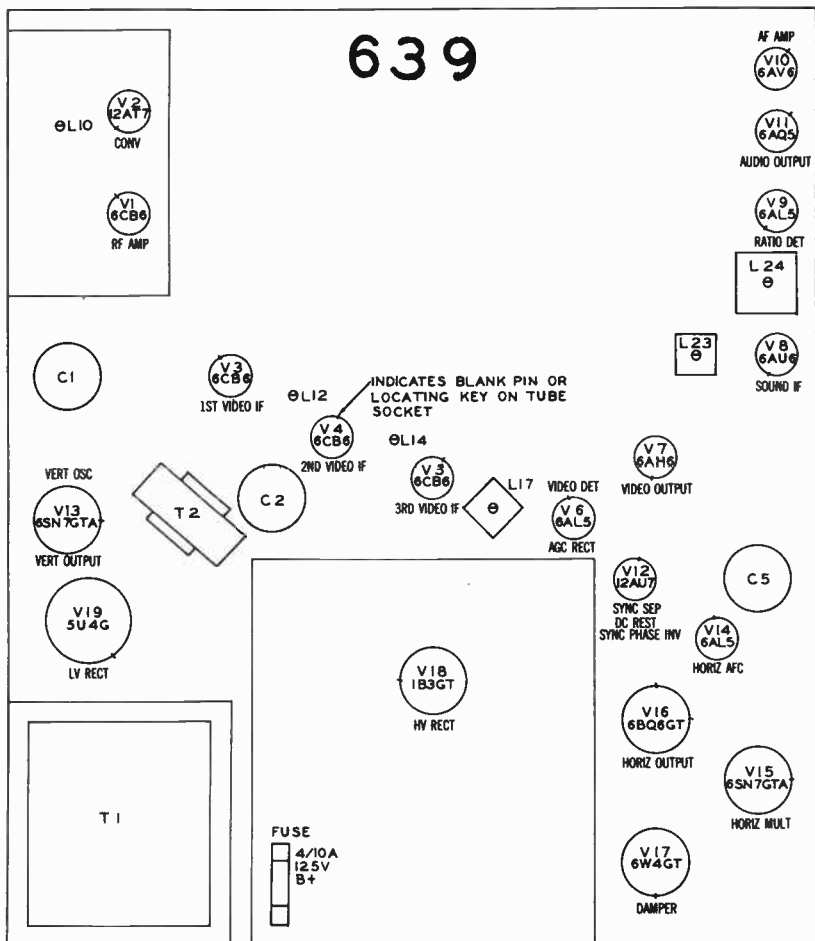
Poor Horiz. Linearity or Foldover - V17, V18, V19

Narrow Picture - V17, V18, V19, V21, V22

Vert. Off Freq. - V14

Horiz. Off Freq. - V14, V16, V17

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V19, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V12, V20

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V12, V13

No horiz. sync - V12, V14, V15

No vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20

No vertical deflection - V13

Poor vert. linearity or foldover - V13

Poor horiz. linearity or foldover - V15, V16, V17

Narrow picture - V15, V16, V17, V18, V19

Vert. off freq. - V12, V13

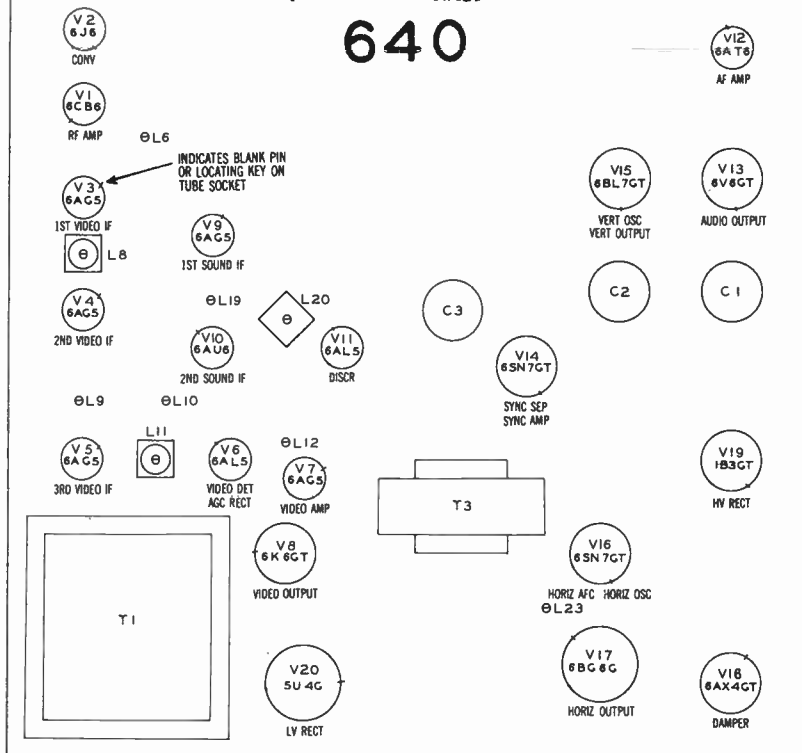
Horiz. off freq. - V12, V14, V15

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.
Damper

Alternate Tubes
6AG5
6W4GT

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V13

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V4, V5, V6, V7, V8, V21

Has pic, no sound - V9, V10, V11, V12, V13

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V14, V16

No vert. or horiz. sync - V14

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, fuse (M1)

No vertical deflection - V15

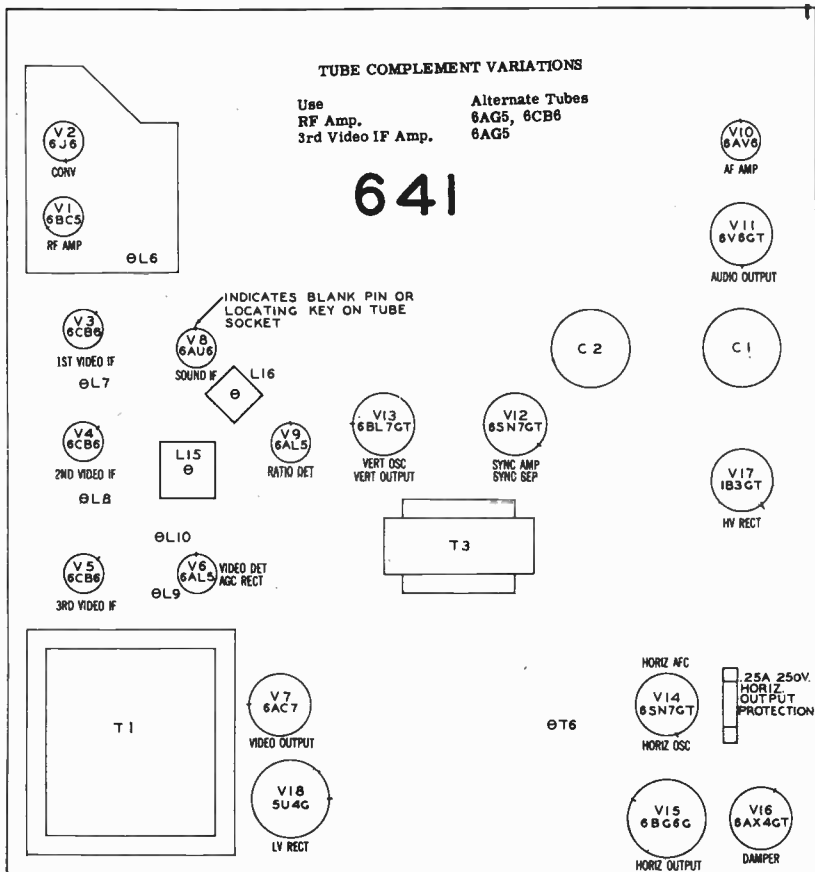
Poor vert. linearity or foldover - V15

Poor horiz. linearity or foldover - V16, V17, V18

Narrow picture - V16, V17, V18, V19, V20

Vert. off freq. - V14, V15

Horiz. off freq. - V14, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V18

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V19

Has pic, no sound-V8, V9, V10, V11

Overloaded picture- V6

SYNC FAILURE

No vert. sync-V12, V13

No horiz. sync-V12, V14

No vert. or horiz. sync-V12

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V19 Fuse (M1)

No vertical deflection-V13

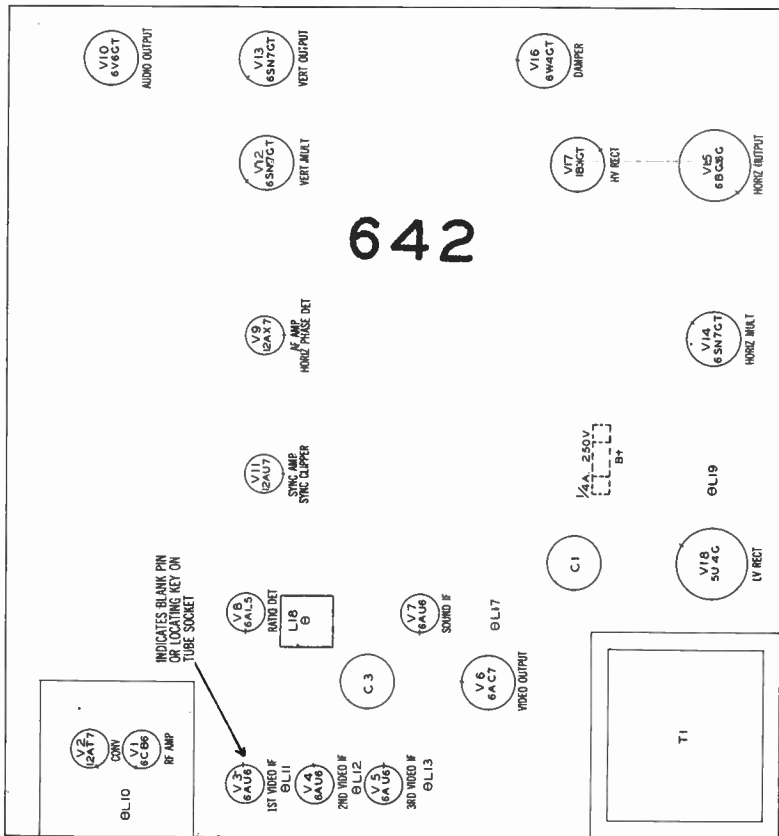
Poor vert. linearity or foldover-V13

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, V18

Vert. off freq-V12, V13

Horiz. off freq-V12, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V18

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5, V6, V10

No pic, No sound, Has snow - V1, V2, V3

No pic, Has sound, Has raster - V6, V19

Has pic, No sound - V7, V8, V9, V10

SYNC FAILURE

No Vert. sync - V11, V12, V13

No Hor. sync - V11, V9, V14

No Vert. or Hor. sync - V11

SWEEP FAILURE

No raster, Has sound - V14, V15, V16, V17, V19, Fuse (M1)

No Vertical deflection - V12, V13

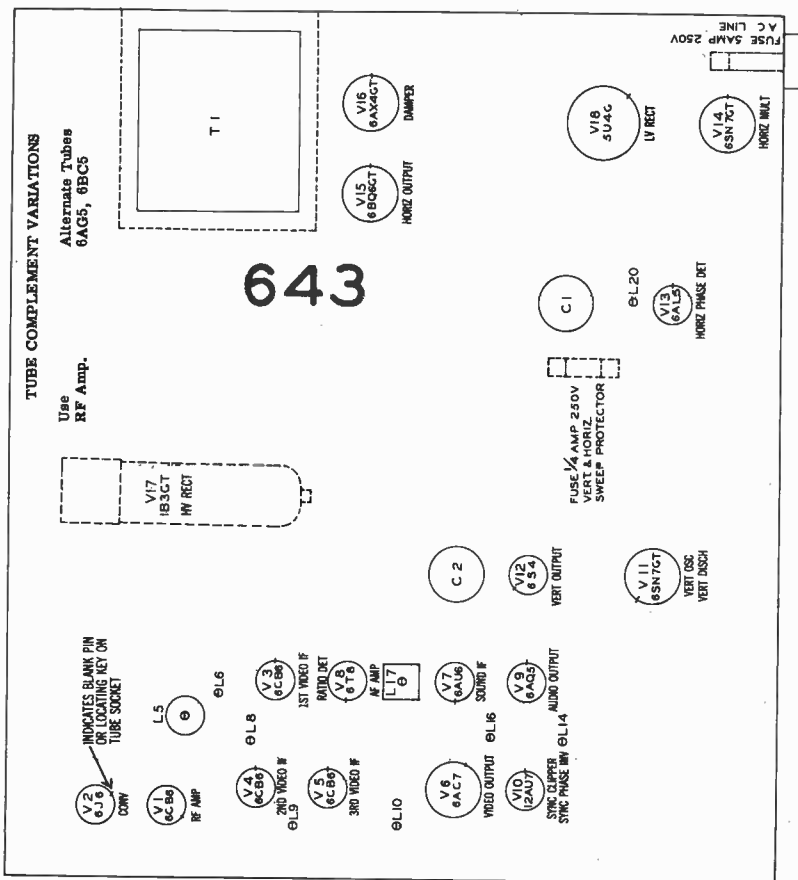
Poor Vert. Linearity or foldover - V12, V13

Poor Horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V18

Vert. off freq. - V12

Horiz. off freq. - V9, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V18, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V9

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V19

Has pic, no sound - V7, V8, V9

SYNC FAILURE

No vert. sync - V10, V11

No horiz. sync - V10, V13, V14

No vert. or horiz. sync - V10

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19, fuse (M2)

No vertical deflection - V11, V12

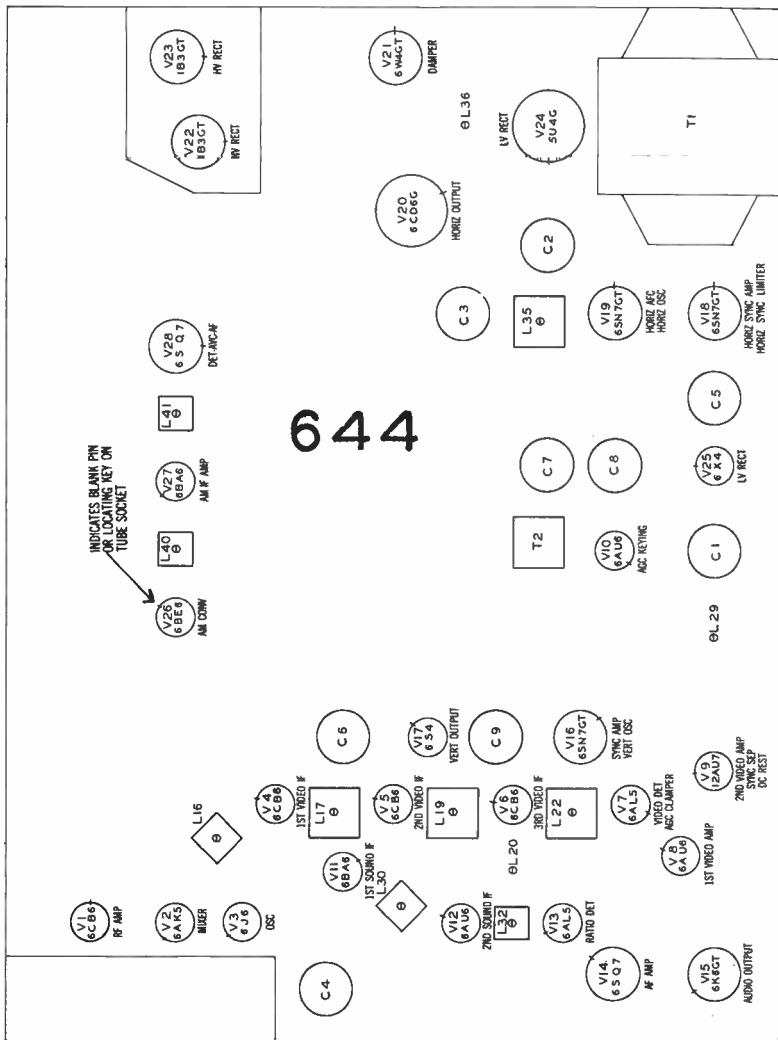
Poor vert. linearity or foldover - V11, V12

Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, V18

Vert. off freq. - V10, V11

Horiz. off freq. - V10, V13, V14



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V5, V6, V7, V8, V9, V29
- Has pic, no sound - V11, V12, V13, V14, V15
- Overloaded picture - V7, V10

SWEEP FAILURE

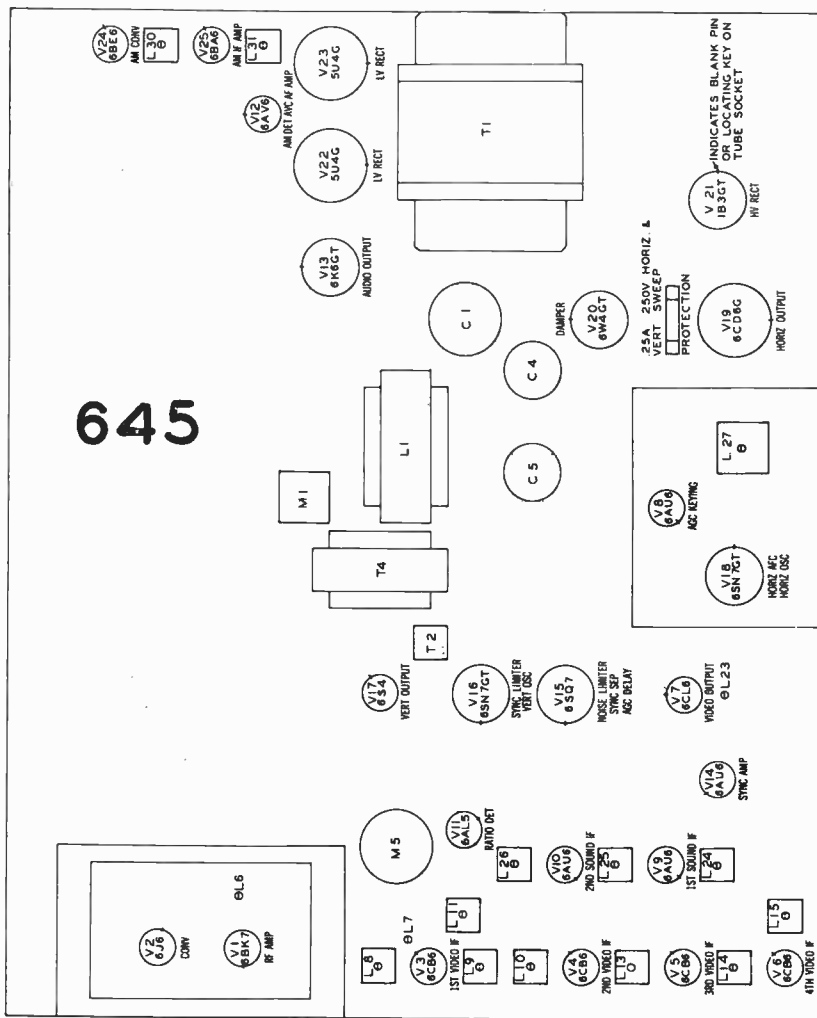
- No raster, has sound - V19, V20, V21, V22, V23, V29
- No vertical deflection - V16, V17
- Poor vert. linearity or foldover - V16, V17
- Poor horiz. linearity or foldover - V19, V20, V21
- Narrow picture - V19, V20, V21, V22, V23, V24, V25
- Vert. off freq. - V16
- Horiz. off freq. - V16, V18, V19

POWER SUPPLY FAILURE

- No raster, no sound - V24, V25, fuse (M1)

SYNC FAILURE

- No vert. sync - V16
- No horiz. sync - V16, V18, V19
- No vert. or horiz. sync - V16



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V7, V26
- Has pic, no sound-V9, V10, V11, V12, V13
- Overloaded picture -V8

SWEEP FAILURE

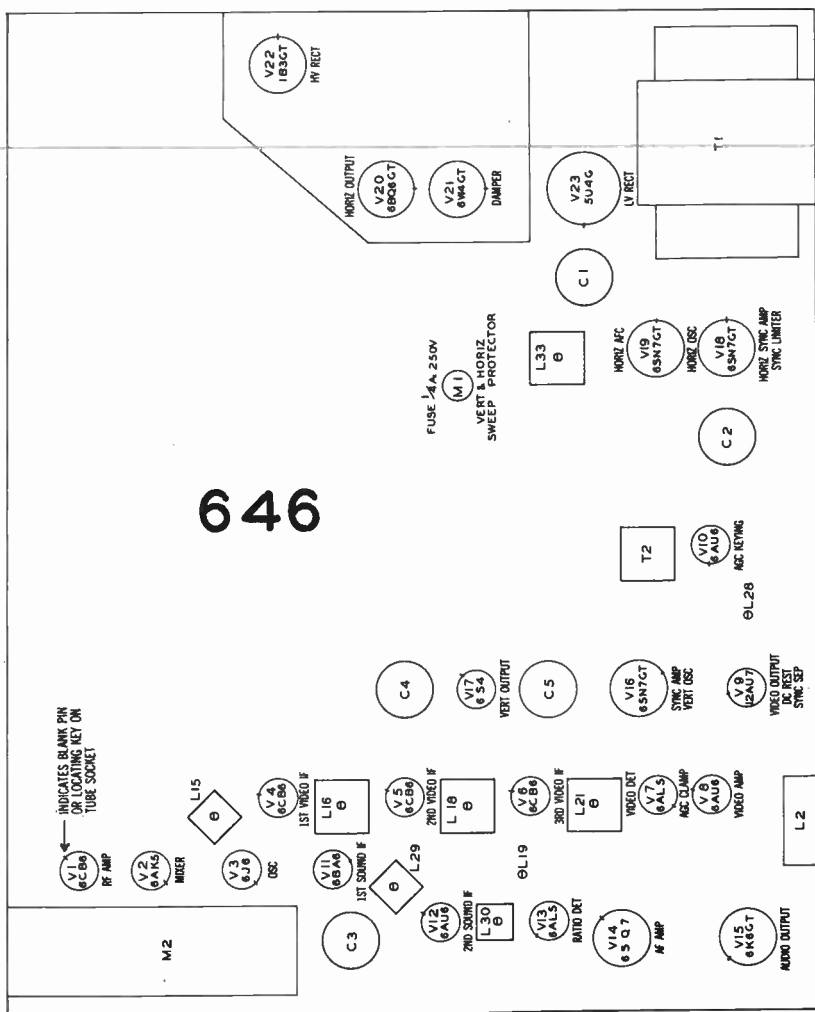
- No raster, has sound-V18, V19, V20, V21, V26 Fuse M2
- No vertical deflection-V16, V17
- Poor vert. linearity or foldover-V16, V17
- Poor horiz. linearity or foldover-V18, V19, V20
- Narrow picture-V18, V19, V20, V21, V22, V23
- Vert. off freq.-V16
- Horiz. off freq.-V16, V18

POWER SUPPLY FAILURE

- No raster, no sound-V22, V23

SYNC FAILURE

- No vert. sync-V16
- No horiz. sync-V16, V18
- No vert. or horiz. sync-V14, V15, V16



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, No Sound, Has raster - V2, V3, V4
- No pic, No Sound, Has raster - V1, V2, V3, V4
- No pic, Has sound, Has raster - V5, V6, V7, V8, V9, V24
- Has pic, No sound - V11, V12, V13, V14, V15
- Overloaded picture - V7, V10

SWEEP FAILURE

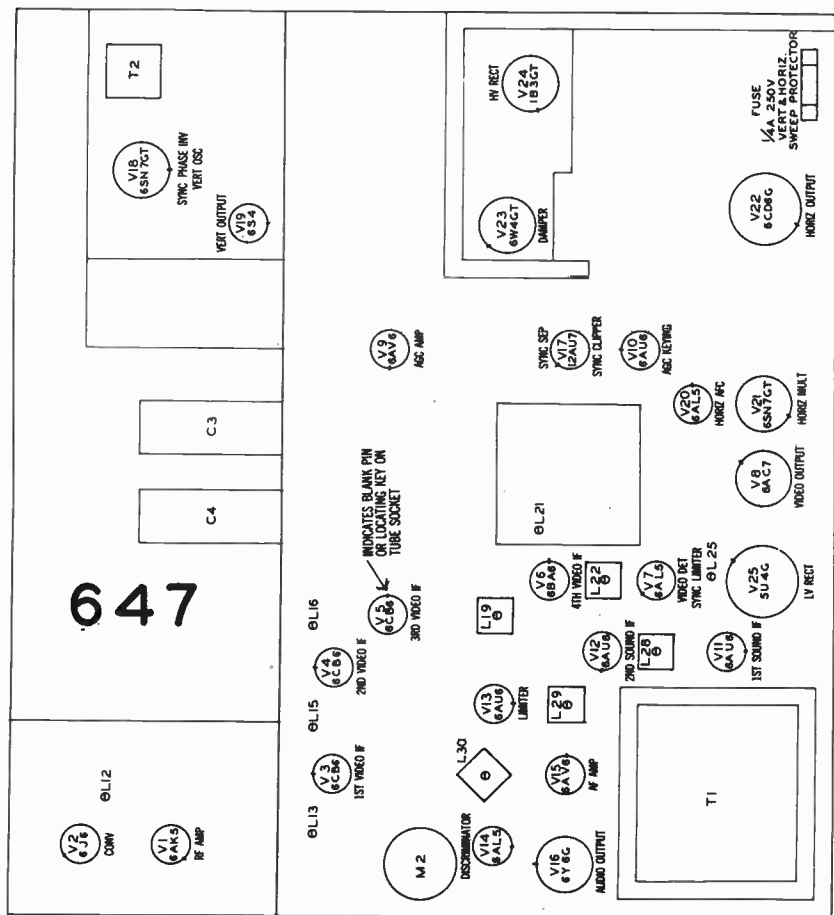
- No raster, has sound - V19, V20, V21, V22, V24 Fuse (M1)
- No Vertical deflection - V16, V17
- Poor Vert. Linearity or foldover - V16, V17
- Poor horiz. linearity or foldover - V19, V20, V21
- Narrow picture - V19, V20, V21, V23
- Vert. off freq. - V16, V17
- Horiz. off Freq. - V18, V19

POWER SUPPLY FAILURE

- No Raster, No Sound - V23

SYNC FAILURE

- No Vert. sync - V16, V17
- No Hor. Sync - V16, V18, V19
- No Vert.-or Hor. sync - V9, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V25

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7, V16

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V8, V26

Has Pic, No Sound - V11, V12, V13, V14, V15, V16

Overloaded Picture - V9, V10

SYNC FAILURE

No Vert. Sync. - V18

No Horiz. Sync. - V18, V20, V21

No Vert. or Horiz. Sync. - V17, V18

SWEEP FAILURE

No Raster, Has Sound - V21, V22, V23, V24, V26, Fuse (M1)

No Vertical Deflection - V19

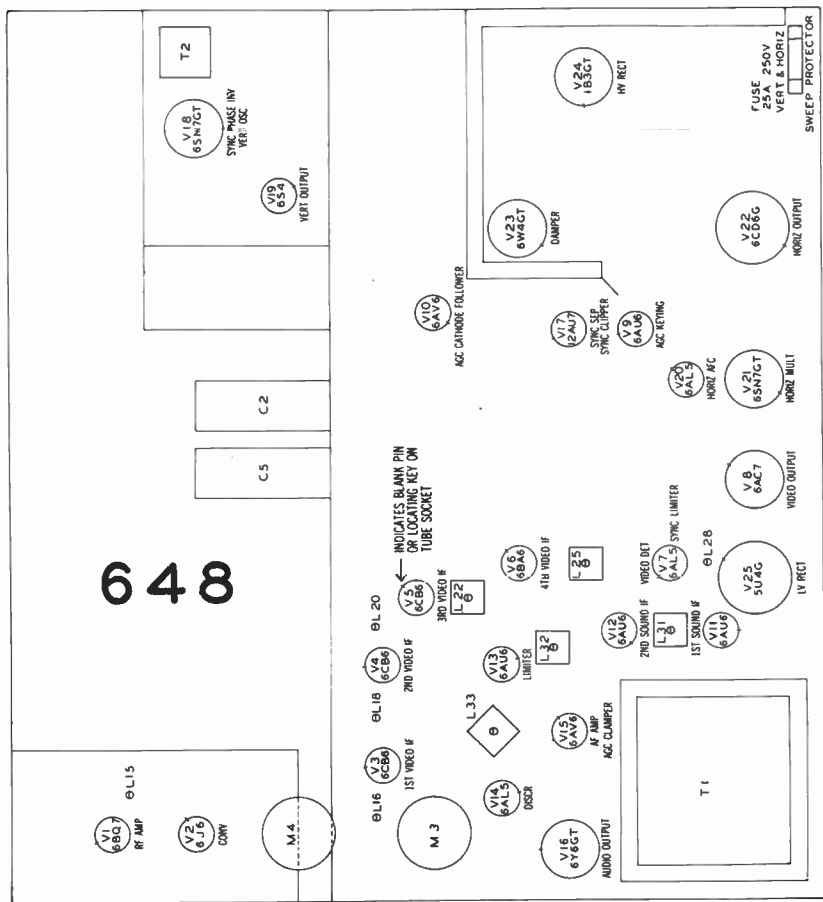
Poor Vert. Linearity or Foldover - V18, V19

Poor Horiz. Linearity or Foldover - V21, V22, V23

Narrow Picture - V21, V22, V23, V24, V25

Vert. Off Freq. - V18

Horiz. Off Freq. - V18, V20, V21



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V25

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V16

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V26

Has pic, no sound-V11, V12, V13, V14, V15, V16

Overloaded picture-V9, V10, V15

SYNC FAILURE

No vert. sync.-V18

No horiz. sync.-V18, V20, V21

No vert. or horiz. sync.-V17, V18

SWEEP FAILURE

No raster, has sound-V21, V22, V23, V24, V26 Fuse (M1)

No vertical deflection-V19

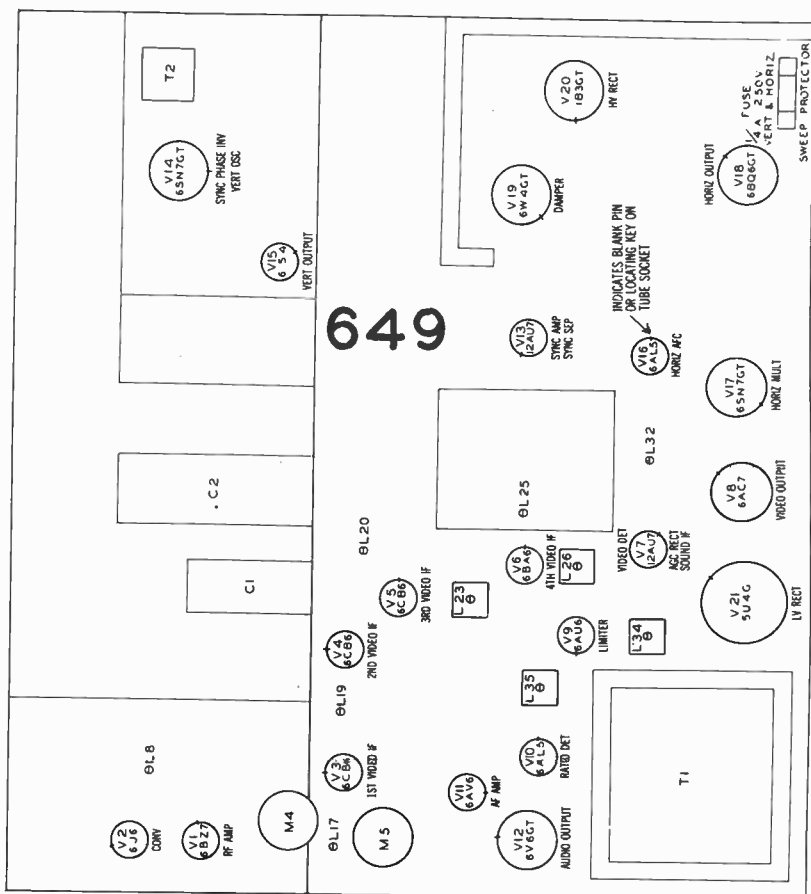
Poor vert. linearity or foldover-V18, V19

Poor horiz. linearity or foldover-V21, V22, V23

Narrow picture-V21, V22, V23, V24, V25

Vert. off freq.-V18

Horiz. off freq.-V18, V20, V21



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V22

Has pic, no sound-V7, V9, V10, V11, V12

Overloaded Picture-V7

SYNC FAILURE

No vert. sync-V14

No horiz. sync-V14, V16, V17

No vert. or horiz. sync-V13, V14

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V21, Fuse (M)

No vertical deflection-V15

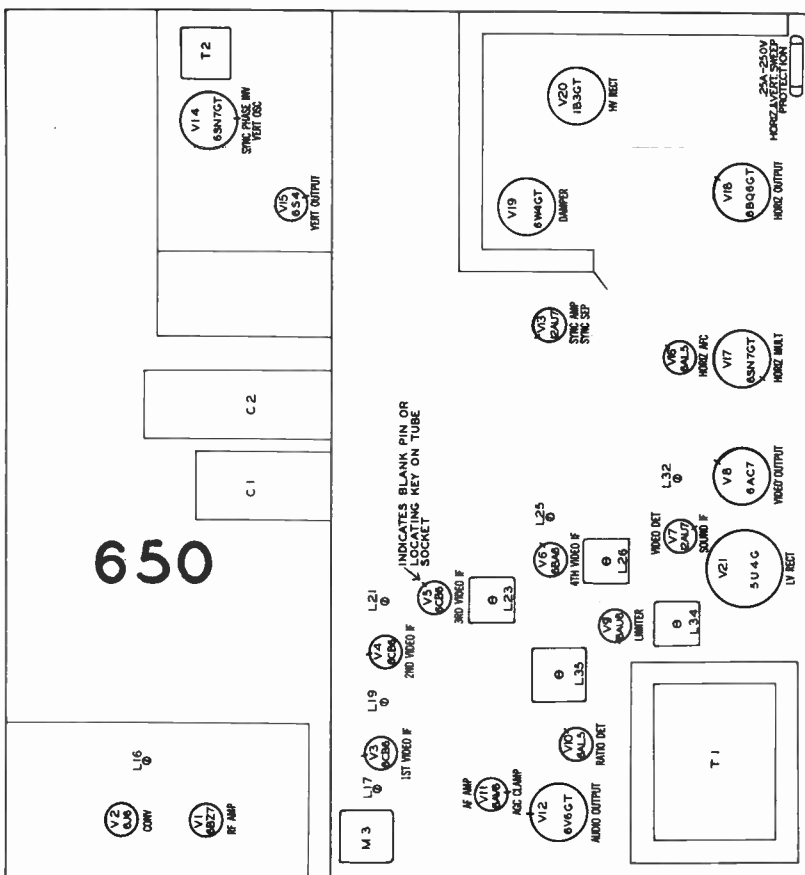
Poor vert linearity or foldover-V14, V15

Poor horiz. linearity or foldover-V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21

Vert off freq.-V14

Horiz. off freq.-V14, V16, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound has snow-V1, V2, V3

No pic, has sound, has raster-V8, V22

Has pic, no sound-V7, V9, V10, V11, V12

Overloaded picture-V7

SYNC FAILURE

No vert. sync-V14

No horiz. sync-V14, V16, V17

No vert. or horiz. sync-V13, V14

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V22 Fase (M1)

No vertical deflection-V14, V15

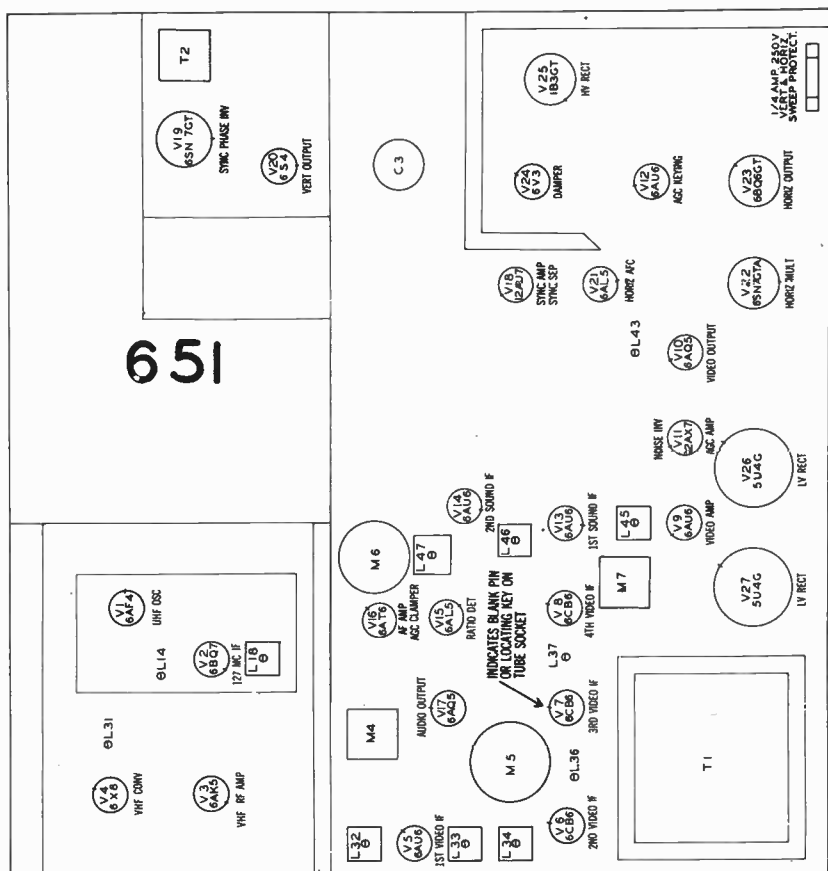
Poor vert. linearity or foldover-V14, V15

Poor horiz. linearity or foldover-V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21

Vert. off freq-V14

Horiz. off freq-V14, V16, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V26, V27

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V4, V5, V6, V7, V8

No pic, no sound, has snow-V3, V4, V5

No pic, has sound, has raster-V9, V10, V28

Has pic, no sound-V13, V14, V15, V16, V17

Overloaded picture-V11, V12, V16

Loss of picture and sound(UHF Only)-V1, V2

SYNC FAILURE

No vert. sync-V19

No horiz. sync-V19, V21, V22

No vert. or horiz. sync-V18, V19

SWEEP FAILURE

No raster, has sound-V22, V23, V24, V25, V28 Fuse (M1)

No vertical deflection-V20

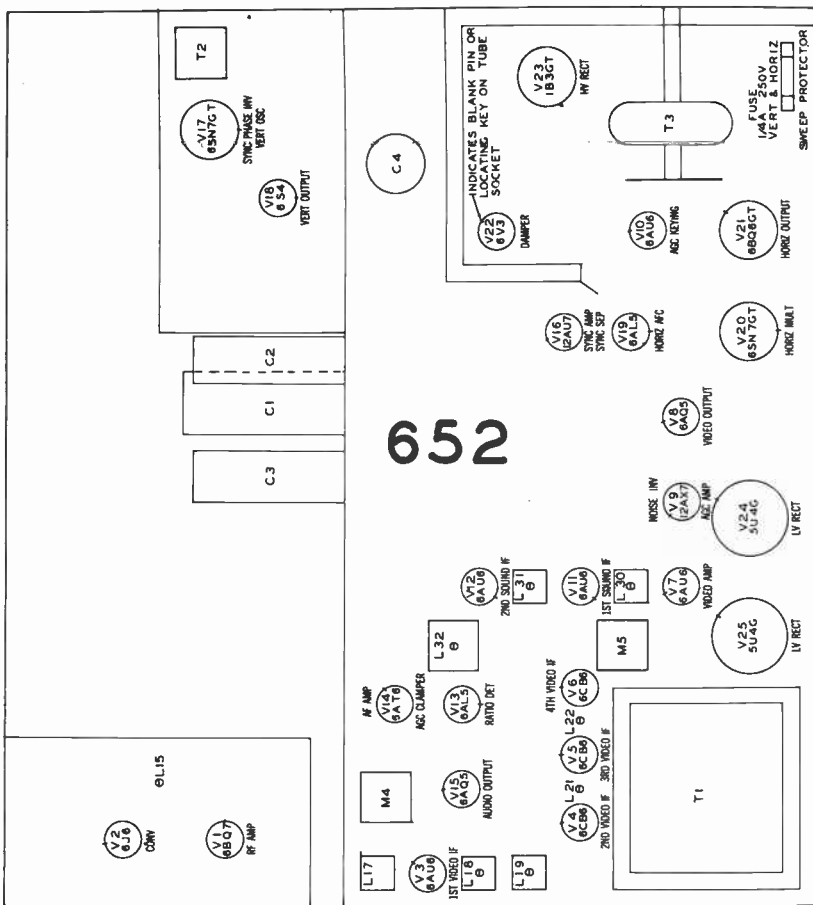
Poor vert. linearity or foldover-V19, V20

Poor horiz. linearity or foldover-V22, V23, V24

Narrow picture-V22, V23, V24, V25, V26, V27

Vert off freq.-V19

Horiz. off freq.-V19, V21, V22



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V24, V25

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V9, V26

Has pic, no sound - V11, V12, V13, V14, V16

Overloaded picture - V9, V10

SYNC FAILURE

No Vert. sync - V17

No horiz. sync - V17, V19, V20

No vert. or horiz. sync - V16, V17

SWEEP FAILURE

No raster, has sound - V20, V21, V22, V23, V26 Fuse (M1)

No vertical deflection - V18

Poor vert. linearity or foldover - V17, V18

Poor horiz. linearity or foldover - V20, V21, V22

Narrow picture - V20, V21, V22, V23, V24, V25

Vert. off freq. - V17

Horiz. off freq. - V17, V19, V20

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TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes
AGC Keying	6AG5
Sync Limiter	6AG5

T5

V2
6J6

CONV

ØL12

V1
6BQ7

RF AMP

Ø

L13

Ø

V3
6BA6

1ST VIDEO IF

ØL15

ØL14

V15
6AU6

SYNC LIMITER

C3

V8
6AU6

AGC KEYING

V14
12AT7

NOISE DIV

V5
6CB6

3RD VIDEO IF

ØL18

V8
6CB6

4TH VIDEO IF

ØL22

V12
6AU6

RF AMP

V13
6W6GT

AUDIO OUTPUT

V5
6CB6

3RD VIDEO IF

V8
6CB6

4TH VIDEO IF

V7
6AH6

VIDEO OUTPUT

V11
6AL5

RATIO DET

L24
G

V10
6AU6

2ND SOUND IF

ØL23

M3
Ø

V9
6AU6

1ST SOUND IF

VERT MULT

V17
6W6GT

VERT OUTPUT

T3

V16
6SN7GT

SYNC CLIPPER
VERT MULT

V18
6AL5

HORIZ AFC

V19
6SN7GT

HORIZ MULT

L25
Ø

V20
6BQ6GT

HORIZ OUTPUT

V21
6W4GT

DAMPER

T1

V23
5U4G

LY RECT

V22
1B3GT

HW RECT

FUSE

2/10A 250V

VERT & HORIZ

SWEEP

PROTECTOR

TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - V23

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5, V6, V13

No pic, No sound, Has snow - V1, V2, V3

No pic, Has sound, has raster - V7, V24

Has pic, No sound - V9, V10, V11, V12, V13

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V16

No Horiz. sync - V18, V16, V19

No Vert. or Horiz. sync - V14, V15, V16

SWEEP FAILURE

No raster, has sound - V19, V20, V21, V22, V23, Fuse (M1)

No vertical deflection - V17

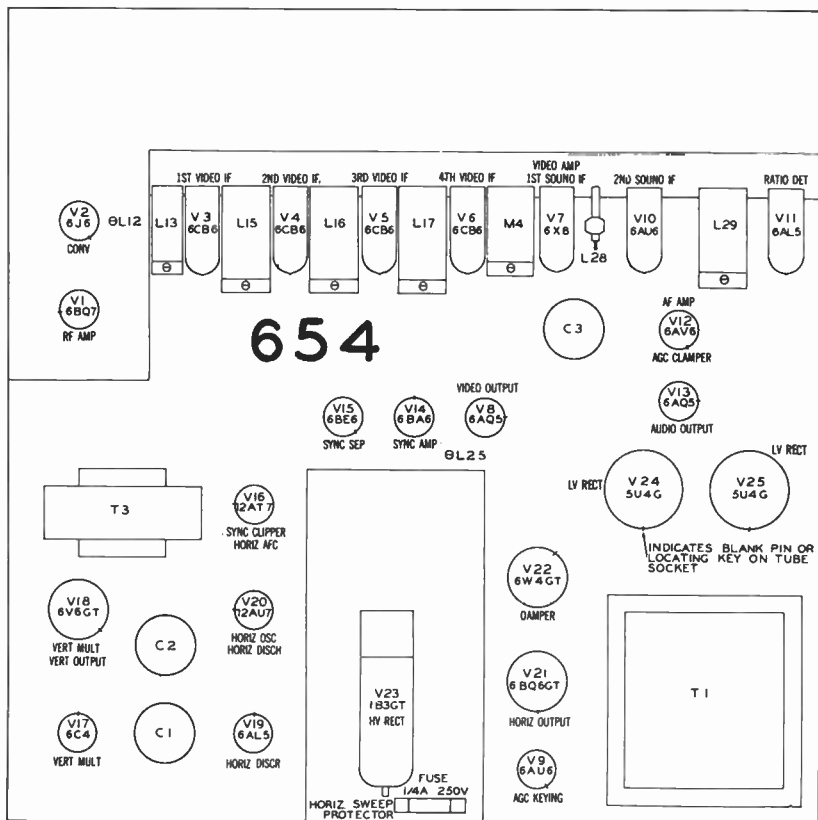
Poor vert. linearity or foldover - V18, V17

Poor horiz. linearity or foldover - V19, V20, V21

Narrow picture - V19, V20, V21, V22, V23

Vert. off freq. - V18

Horiz. off freq. - V18, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - V24, V25

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V26

Has pic, no sound - V7, V10, V11, V12, V13

Overloaded picture - V9, V12

SYNC FAILURE

No vert. sync - V16, V17, V18

No horiz. sync - V16, V19, V20

No vert. or horiz. sync - V14, V15, V18

SWEEP FAILURE

No raster, has sound - V20, V21, V22, V23, V26, Fuse (M1)

No vertical deflection - V18

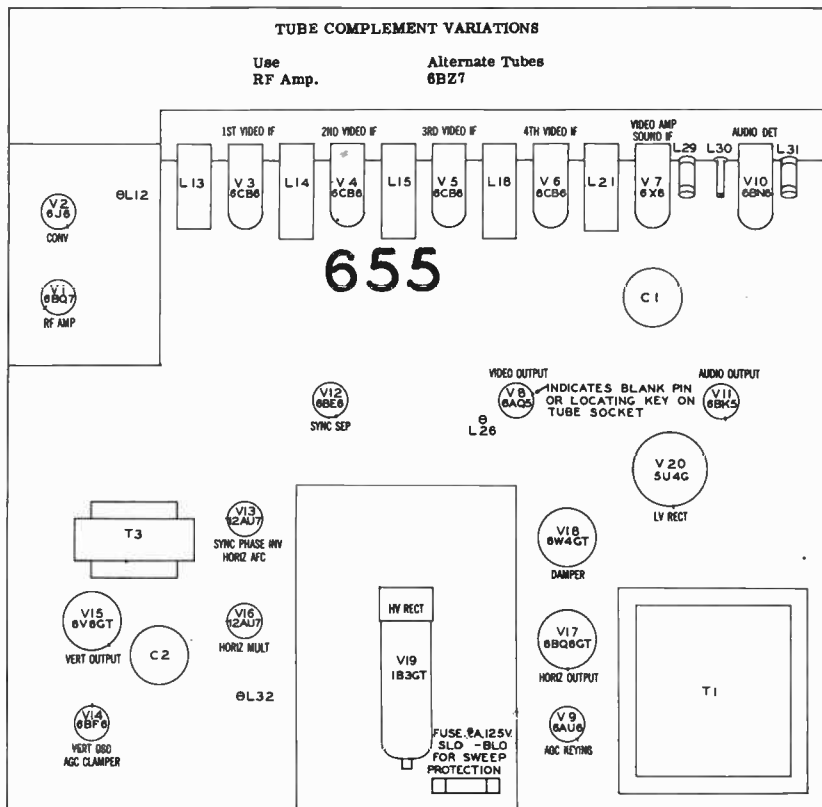
Poor Vert. linearity or foldover - V17, V18

Narrow Picture - V20, V21, V22, V23, V24, V25

Vert. Off freq. - V16, V17, V18

Horiz. Off Freq. - V16, V19, V20

Poor Horiz. linearity or foldover - V20, V21, V22



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V8, V21

Has pic, no sound-V7, V10, V11

Overloaded picture-V9, V14

SYNC FAILURE

No vert. sync-V13, V14

No horiz. sync.-V13, V16

No vert. or horiz. sync.-V12, V13

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V21 Fuse (M1)

No vertical deflection-V14, V15

Poor vert. linearity or foldover-V14, V15

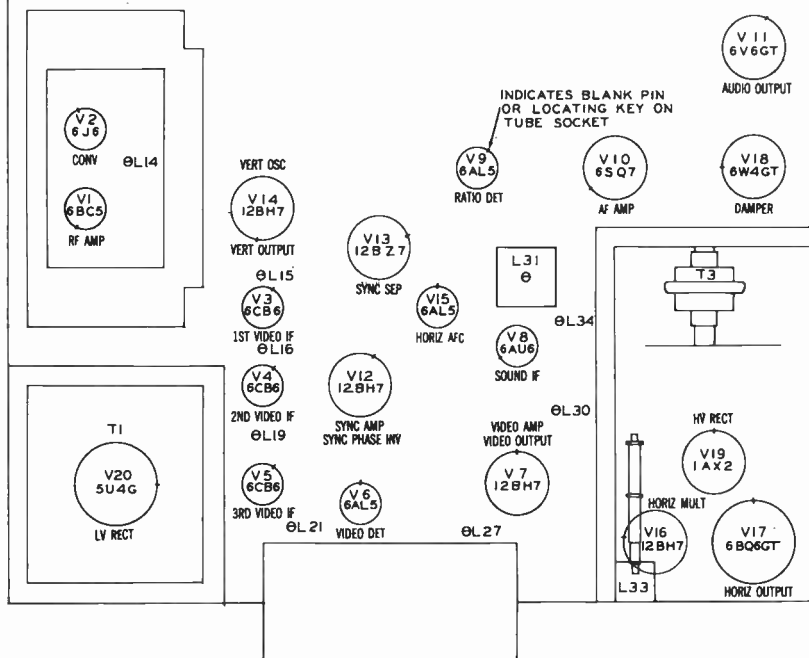
Poor horiz. linearity or foldover-V16, V17, V18

Narrow picture-V16, V17, V18, V19, V20

Vert. off freq.-V13, V14

Horiz. off freq.-V13, V16

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V7, V21
 Has pic, no sound -V8, V9, V10, V11

SWEEP FAILURE

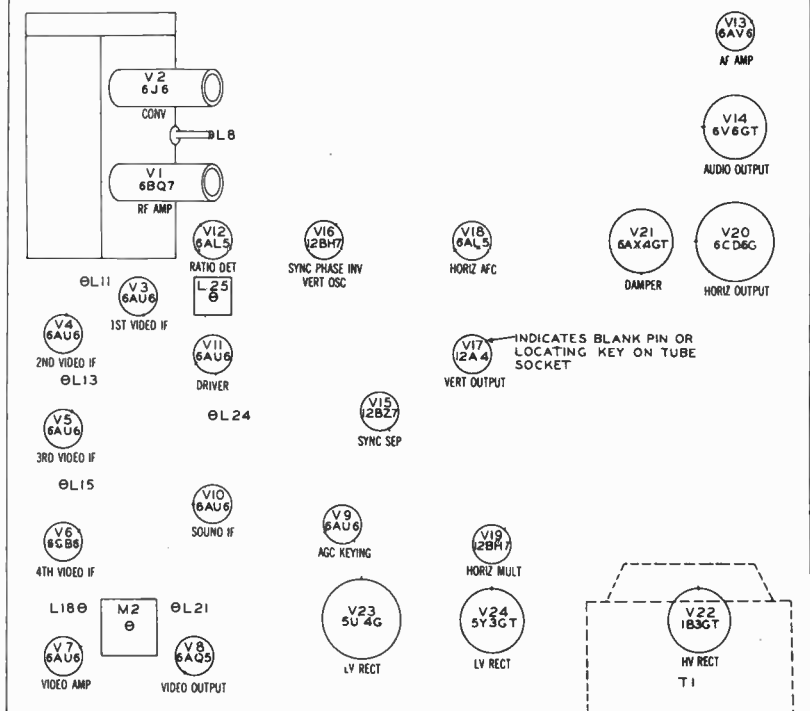
No raster, has sound-V16, V17, V18, V19, V21
 No vertical deflection-V14
 Poor vert. linearity or foldover-V14
 Poor horiz. linearity or foldover-V16, V17, V18
 Narrow picture-V16, V17, V18, V19, V20
 Vert off freq.-V12, V14
 Horiz. off freq.-V12, V15, V16

POWER SUPPLY FAILURE

No raster, no sound-V20

SYNC FAILURE

No vert. sync.-V12, V14
 No horiz. sync-V12, V15, V16
 No vert. or horiz. sync-V12, V13



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V24

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V25

Has pic, no sound - V10, V11, V12, V13, V14

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V16

No horiz. sync - V16, V18, V19

No vert. or horiz. sync - V15, V16

SWEEP FAILURE

No raster, has sound - V19, V20, V21, V22, V25

No vert. deflection - V16, V17

Poor vert. linearity or foldover - V16, V17

Poor horiz. linearity or foldover - V19, V20, V21

Narrow picture - V19, V20, V21, V22, V23, V24

Vert. off freq. - V16

Horiz. off freq. - V16, V18, V19

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TUBE COMPLEMENT VARIATIONS

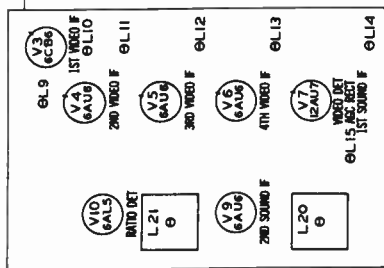
Use
RF Amp.

Alternate Tubes
6BQ7

6L7

V2
6J6
DRY

V1
6BK7
RF AMP



INDICATES BLANK PIN
OR LOCATING KEY ON
TUBE SOCKET

V16
6S4
VERT OUTPUT

V15
6SN7CT
VERT MULT

V14
6SN7CT
SYNC PHASE INV

V17
6AL5
HORZ AFC

V22
5U4C
LV RECT

V21
6X4
HV RECT

V20
6W6
DUMPER

V18
6SN7CT
HORZ MULT

V13
6BE6
SYNC SP

V8
6AC7
VIDEO OUTPUT

V9
6AU6
2ND SOUND F

V10
6AL5
1ST VIDEO F

V11
6AV6
1ST SOUND F

V12
6V6GT
AUDIO OUTPUT

V1
6BK7
RF AMP

V2
6J6
DRY

V3
6BE6
SYNC SP

V4
6AU6
ØL10

V5
6AU6
2ND VIDEO F

V6
6AU6
3RD VIDEO F

V7
6AU7
4TH VIDEO F

V8
6AC7
VIDEO OUTPUT

V9
6AU6
2ND SOUND F

V10
6AL5
1ST VIDEO F

V11
6AV6
1ST SOUND F

V12
6V6GT
AUDIO OUTPUT

TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V8, V23
- Has pic, no sound-V7, V8, V9, V10, V11, V12
- Overloaded picture-V7

SWEEP FAILURE

- No raster, has sound-V18, V19, V20, V21, V23
- No vertical deflection-V16
- Poor vert. linearity or foldover-V15, V16
- Poor horiz. linearity or foldover-V18, V19, V20
- Narrow picture-V18, V19, V20, V21, V22
- Vert. off freq.-V14, V15
- Horiz. off freq.-V14, V17, V18

POWER SUPPLY FAILURE

- No raster, no sound-V22

SYNC FAILURE

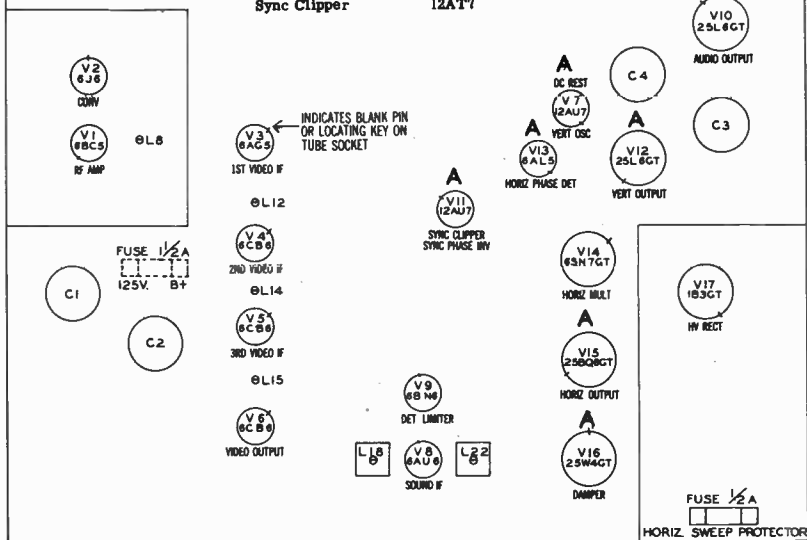
- No vert. sync.-V14, V15
- No horiz. sync.-V14, V17, V18
- No vert. or horiz. sync-V13, V18

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TUBE COMPLEMENT VARIATIONS

Use
RF Amp.
1st Video IF Amp.
Sync Clipper

Alternate Tubes
6AG5, 6CB6
6BC5
12AT7



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifier (M1, M2) fuse (M3)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V7, V18

Has pic, no sound - V8, V9, V10

SYNC FAILURE

No vert. sync - V7, V11

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11, V7

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18, fuse (M4)

No vertical deflection - V12

Poor vert. linearity or foldover - V12, V7

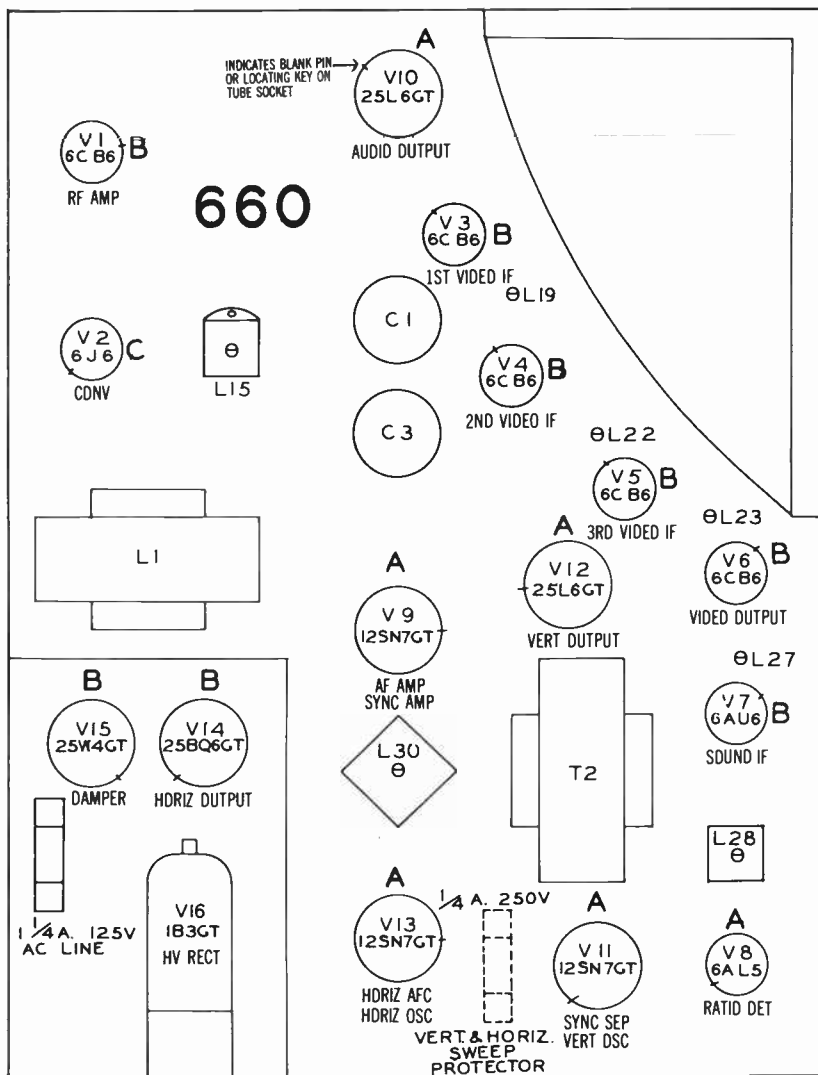
Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V18, M1, M2

Vert. off freq. - V7, V11

Horiz. off freq. - V11, V13, V14

NOTE: The tubes marked A on the tube placement chart indicate the tubes in the series string. The filaments of the other tubes operate independently from a filament transformer.



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V6, V17
 Has pic, no sound - V7, V8, V9, V10

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17, fuse (M4)
 No vertical deflection - V9, V11, V12
 Poor vert. linearity or foldover - V11, V12
 Poor horiz. linearity or foldover - V13, V14, V15
 Narrow picture - V13, V14, V15, M1, M2
 Vert. off freq. - V11, V12
 Horiz. off freq. - V13

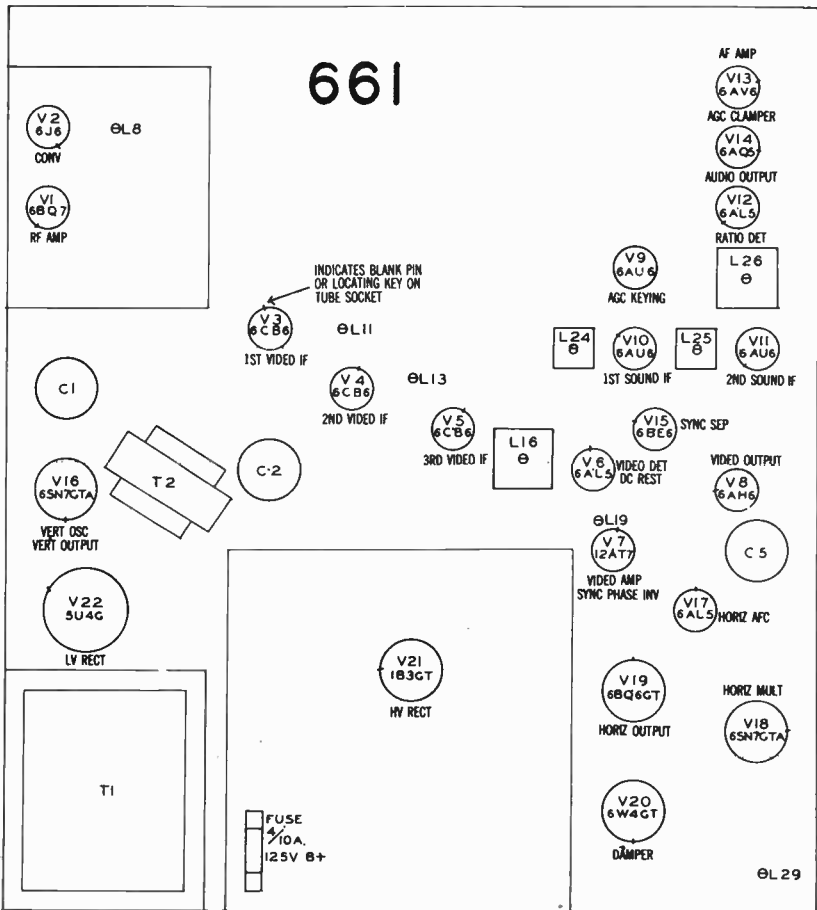
NOTE: The tubes marked A on the tube placement Chart indicate the tubes in one series string while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B-

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers
 (M1, M2) fuse (M3)

SYNC FAILURE

No vert. sync - V9, V11, V12
 No horiz. sync - V9, V13
 No vert. or horiz. sync - V8, V11



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - V22, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5, V6

No pic, No Sound, Has snow - V1, V2, V3

No pic, Has Sound, Has raster - V8, V7, V8, V23

Has pic, No Sound - V10, V11, V12, V13, V14

Overloaded picture - V19, V13

SYNC FAILURE

No vert. sync - V7, V18

No horiz. sync - V7, V17, V18

No vert. or horiz. sync - V7, V15

SWEEP FAILURE

No raster, has sound - V18, V19, V20, V21, V23

No vertical deflection - V18

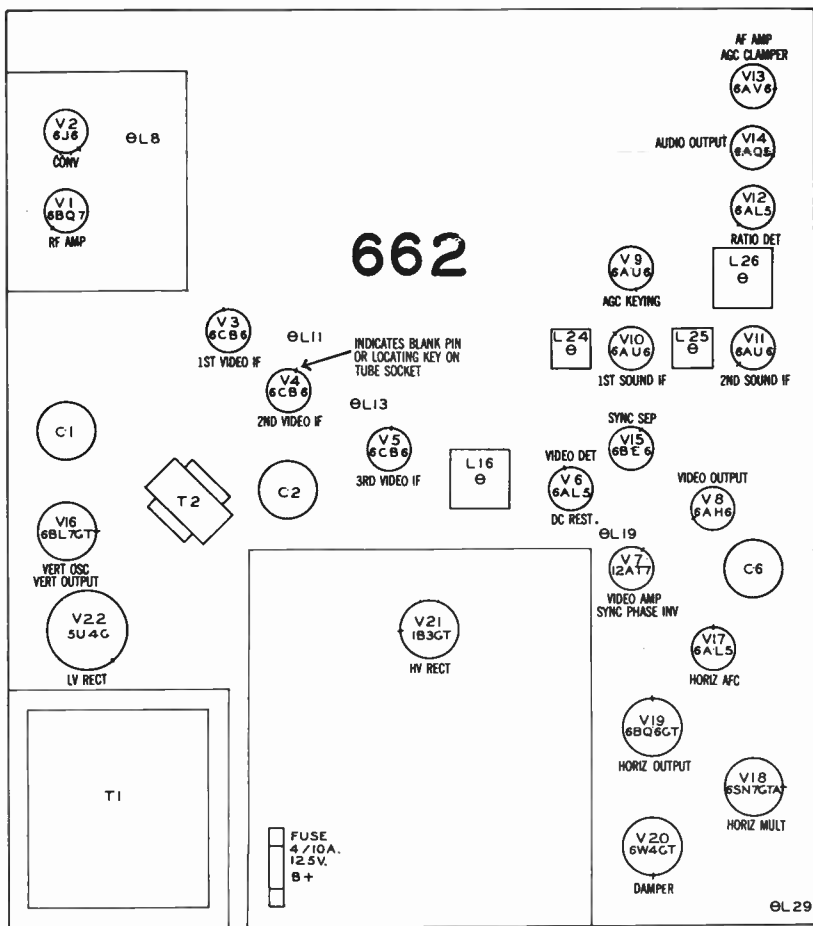
Poor vert. linearity or foldover - V18

Poor horiz. linearity or foldover - V18, V19, V20

Narrow picture - V18, V19, V20, V21, V22

Vert. off freq. - V16

Horiz. off freq. - V7, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V22, Fuse(M)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pid, has sound, has raster-V6, V7, V8, V23

Has pic, no sound-V10, V11, V12, V13, V14

Overloaded picture-V9, V13

SYNC FAILURE

No vert. sync. -V7, V16

No horiz. sync. -V7, V17, V18

No vert. or horiz. sync. V7, V15

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V23

No vertical deflection-V16

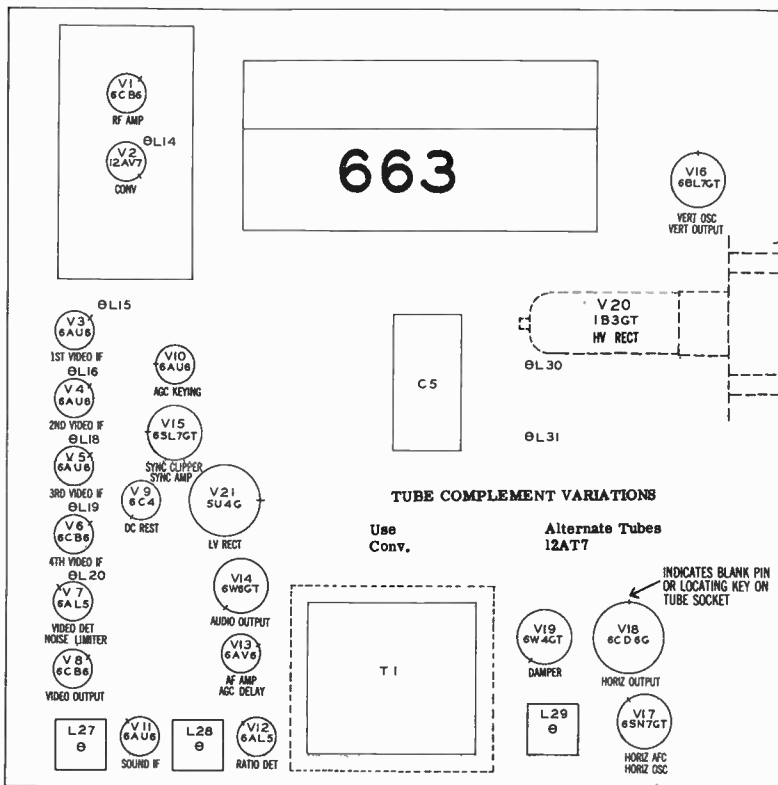
Poor vert. linearity or foldover-V16

Poor horiz. linearity or foldover-V18, V19, V20

Narrow picture-V18, V19, V20, V21, V22

Vert. off freq. -V7, V16

Horiz. off freq. -V7, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V8, V14

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V8, V9, V22

Has pic, no sound - V11, V12, V13, V14

Overloaded picture - V10

SYNC FAILURE

No vert. sync - V15, V16

No horiz. sync - V15, V17

No vert. or horiz. sync - V9, V15

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V22, fuse (M1)

No vertical deflection - V16

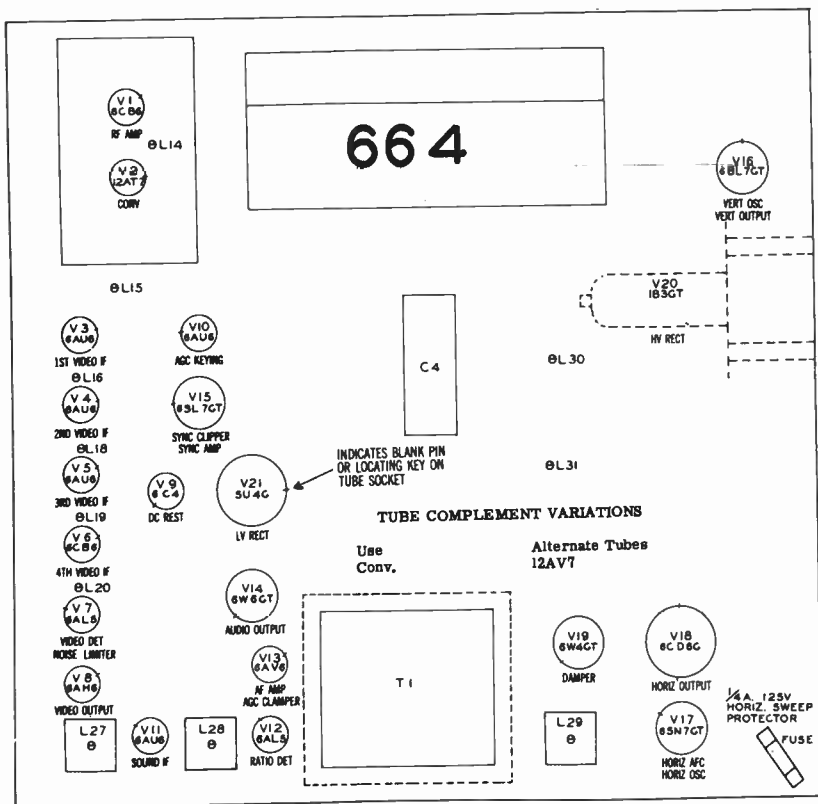
Poor vert. linearity or foldover - V18

Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21

Vert. off freq. - V15, V16

Horiz. off freq. - V15, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V21

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5, V6, V7, V8, V14
 No pic, No sound, Has snow - V1, V2, V3
 No pic, Has sound, Has raster - V8, V9, V22
 Has pic, No sound - V11, V12, V13, V14
 Overloaded picture - V7, V10

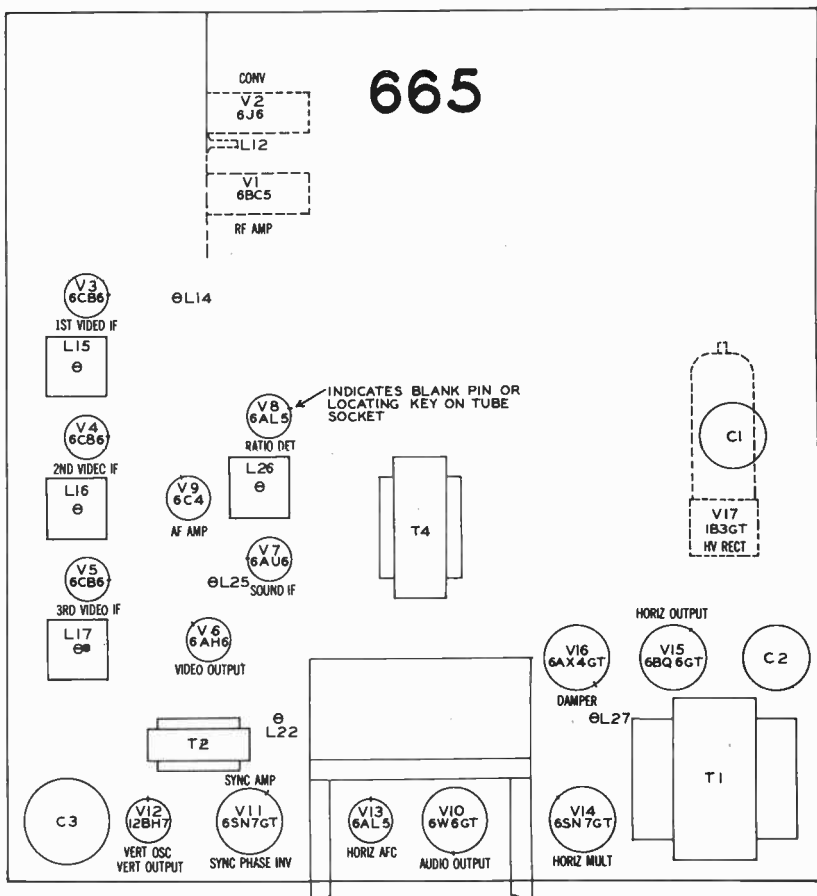
SYNC FAILURE

No Vert. sync. - V15, V16
 No Hor. sync. - V15, V17
 No Vert. or Hor. sync. - V9, V15

SWEEP FAILURE

No Raster, has sound - V17, V18, V19, V20, V22, Fuse (M1)
 No Vertical deflection - V16
 Poor Vert. Linearity or foldover - V16
 Poor Horiz. linearity or foldover - V17, V18, V19
 Narrow picture - V17, V18, V19, V21
 Vert. off freq. - V16
 Horiz. off freq. - V17

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V18

Has pic, no sound-V7, V8, V9, V10

SYNC FAILURE

No vert. sync-V11, V12

No horiz. sync-V11, V13, V14

No vert. or horiz. sync-V11

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V18

No vertical deflection-V12

Poor vert. linearity or foldover-V12

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, V18, M2

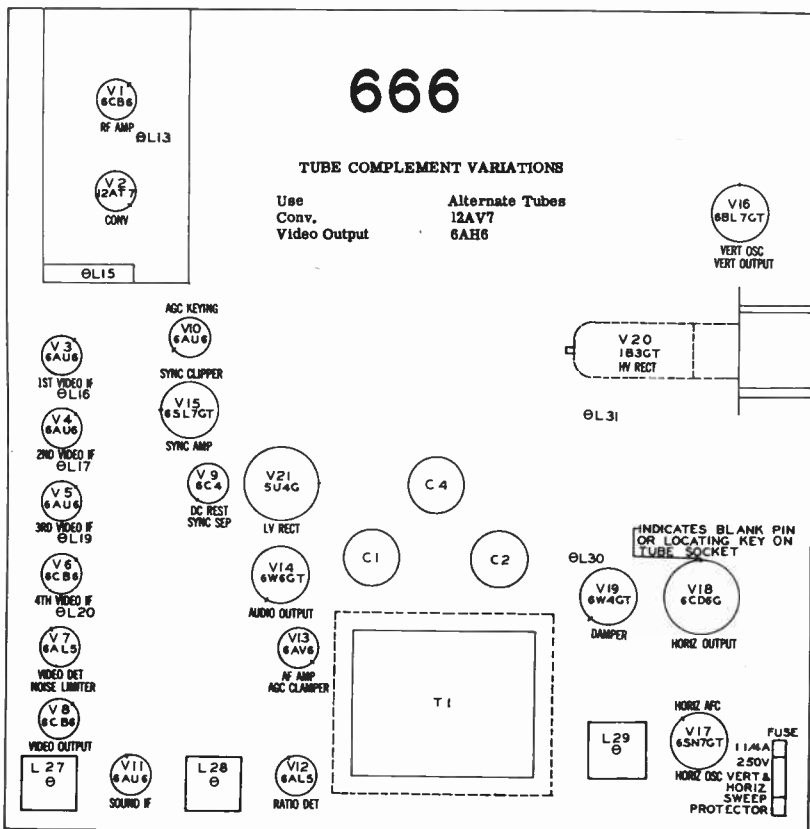
Vert. off freq.-V11, V12

Horiz. off freq.-V11, V13, V14

666

TUBE COMPLEMENT VARIATIONS

Use Alternate Tubes
 Conv. 12AV7
 Video Output 6AH6



TUBE FAILURE CHECK CHART

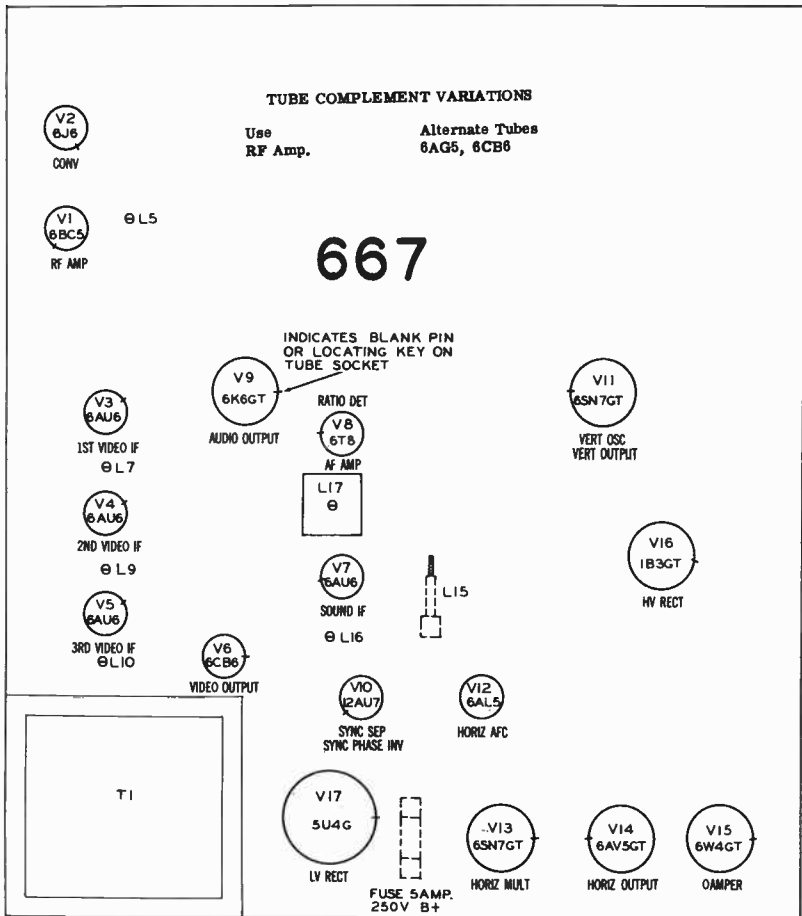
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
 No raster, no sound-V21

LOSS OF PICTURE OR SOUND
 No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V8, V14
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V8, V9, V22
 Has pic, no sound-V11, V12, V13, V14
 Overloaded picture-V7, V10

SYNC FAILURE
 No vert. sync-V15, V16
 No horiz. sync-V15, V17
 No vert or horiz. sync.-V15

SWEEP FAILURE
 No raster, has sound-V17, V18, V19, V20, V22, Fuse (M1)
 No vertical deflection-V16
 Poor vert. linearity or foldover-V16
 Poor horiz. linearity or foldover-V17, V18, V19
 Narrow picture-V17, V18, V19, V20, V21
 Vert. off freq.-V15, V16
 Horiz. off freq.-V15, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V17, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V8

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V18

Has pic, no sound-V7, V8, V9

SYNC FAILURE

No vert. sync-V10, V11

No horiz. sync.-V10, V12, V13

No vert. or horiz. sync.-V10

SWEEP FAILURE

No raster, has sound-V13, V14, V15, V16, V18

No vertical deflection-V11

Poor vert. linearity or foldover-V11

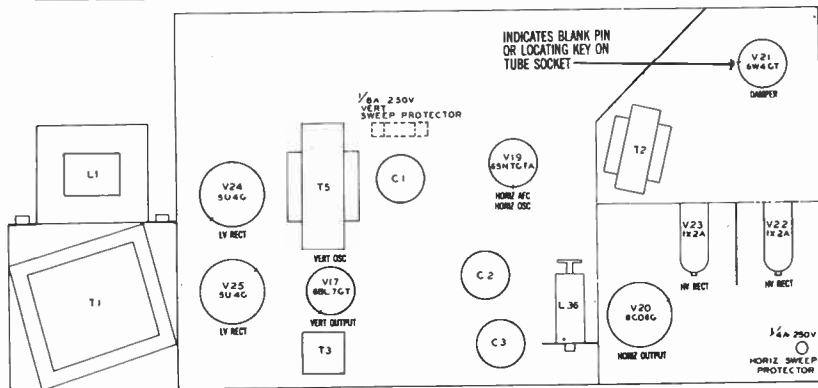
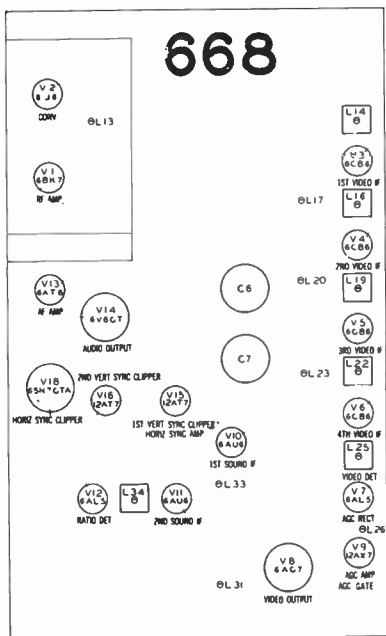
Poor horiz. linearity or foldover-V13, V14, V15

Narrow picture-V13, V14, V15, V16, V17

Vert. off freq.-V11

Horiz. off freq.-V10, V11, V13

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster-V2, V3, V4, V5, V6, V7

No pic, No sound, Has snow-V1, V2, V3

No pic, Has sound, Has raster-V8, V26

Has pic, No sound-V10, V11, V12, V13, V14

Overloaded picture-V7, V9

SWEEP FAILURE

No raster, Has sound-V19, V20, V21, V22, V23, V26, Fuse (M2)

No vertical deflection-V17, Fuse (M1)

Poor vert. linearity or foldover-V17

Poor horiz. linearity or foldover-V19, V20, V21

Narrow picture-V19, V20, V21, V22, V23, V24, V25

Vert. off freq.-V16, V17

Horiz. off freq.-V18, V19

POWER SUPPLY FAILURE

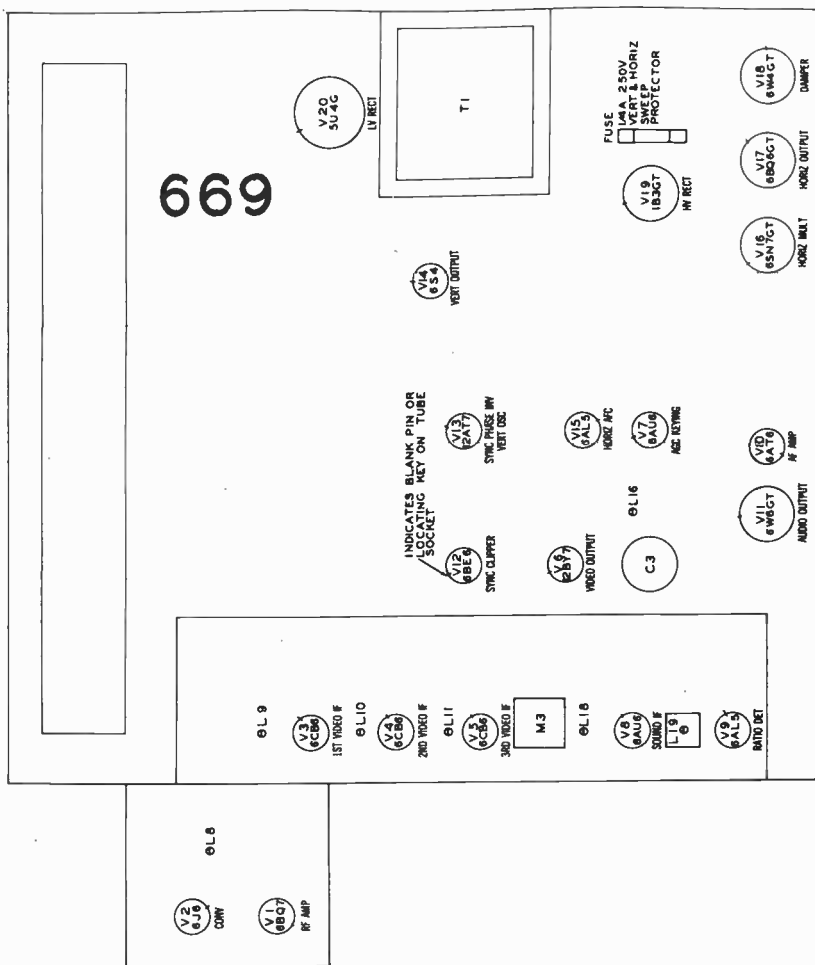
No raster, No sound-V24, V25

SYNC FAILURE

No vert. sync.-V15, V16, V17

No hor. sync.-V15, V18, V19

No vert. or hor. sync.-V15



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V11
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V6, V21
- Has pic, no sound-V8, V9, V10, V11
- Overloaded picture-V7

SWEEP FAILURE

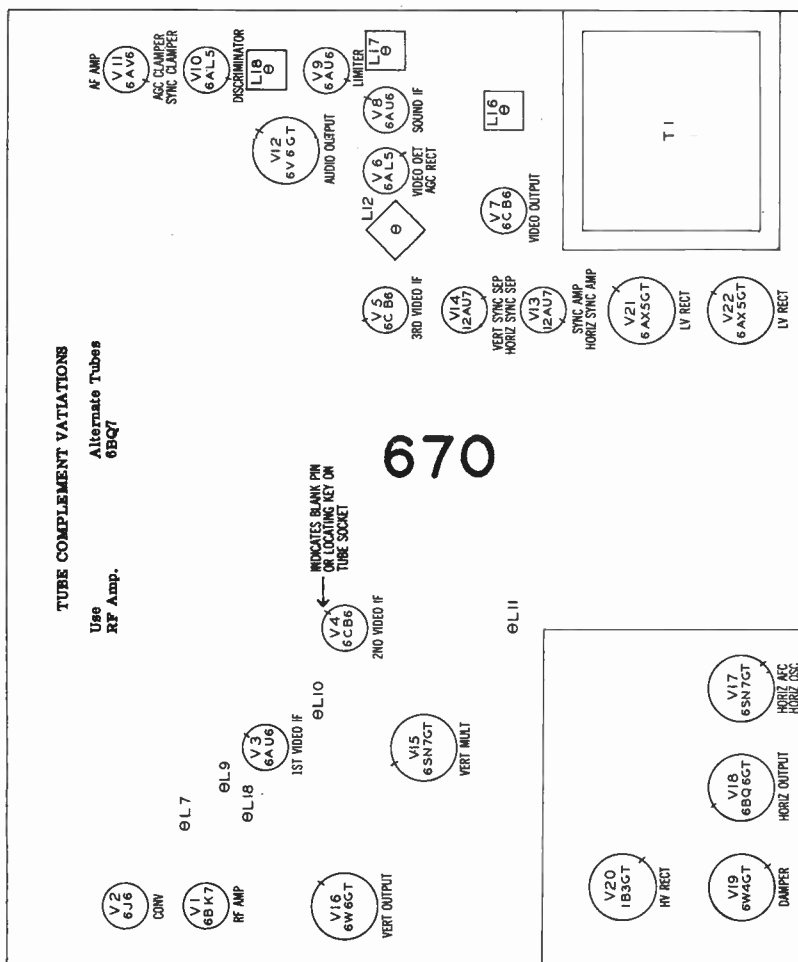
- No raster, has sound-V16, V17, V18, V19, V21 Fuse (M1)
- No vertical deflection-V13, V14
- Poor vert. linearity or foldover-V13, V14
- Poor horiz. linearity or foldover-V16, V17, V18
- Narrow picture-V16, V17, V18, V19, V20
- Vert. off freq.-V13
- Horiz. off freq.-V13, V15, V16

POWER SUPPLY FAILURE

- No raster, no sound-V20

SYNC FAILURE

- No vert. sync-V13
- No horiz. sync-V13, V15, V16
- No vert. or horiz. sync.-V12, V13



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V7, V23
Has pic, no sound - V8, V9, V10, V11, V12
Overloaded picture - V6, V11

SWEEP FAILURE

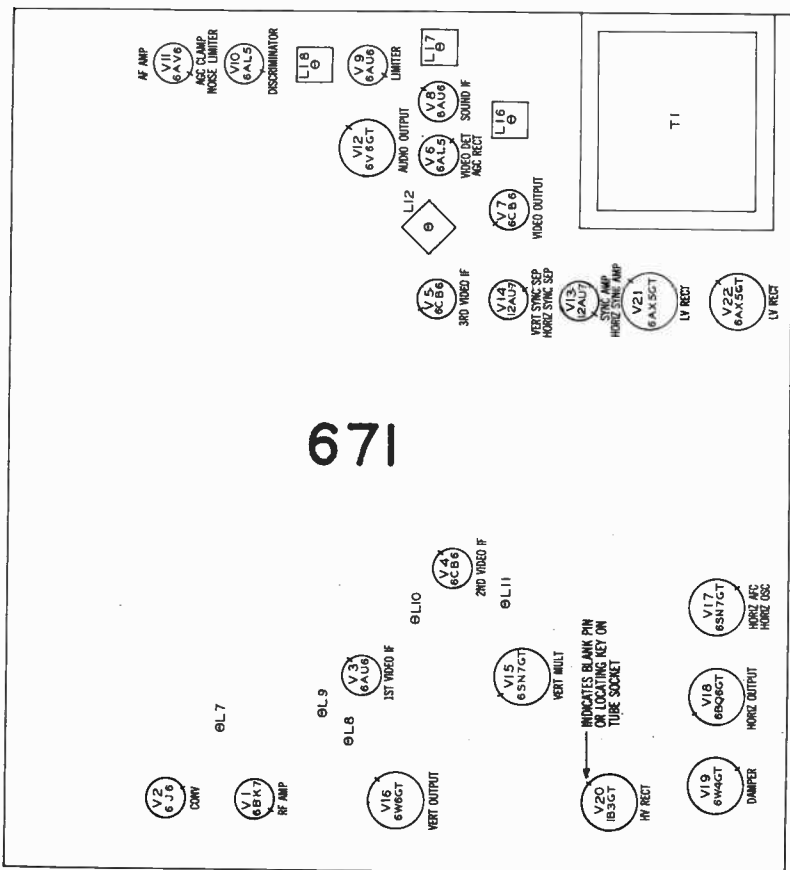
No raster, has sound - V17, V18, V19, V20, V23
No vertical deflection - V15, V16
Poor vert. linearity or foldover - V15, V16
Poor horiz. linearity or foldover - V17, V18, V19
Narrow picture - V17, V18, V19, V20, V21, V22
Vert. off freq. - V14, V15
Horiz. off freq. - V13, V14, V17

POWER SUPPLY FAILURE

No raster, no sound - V21, V22, fuse (M1)

SYNC FAILURE

No vert. sync - V14, V15
No horiz. sync - V13, V14, V17
No vert. or horiz. sync - V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V21, V22, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V23

Has pic, no sound - V8, V9, V10, V11, V12

Overloaded picture - V6, V11

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V13, V14, V17

No vert. or horiz. sync - V13, V14

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V23

No vertical deflection - V15, V16

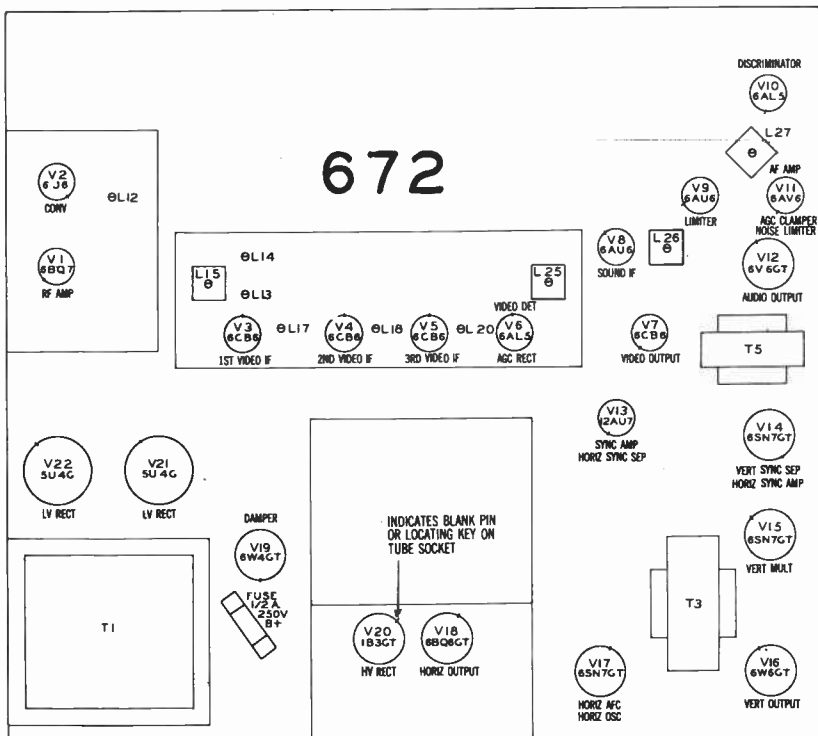
Poor vert. linearity or foldover - V15, V16

Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22

Vert. off freq. - V14, V15

Horiz. off freq. - V13, V14, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - V21, V22, (Fuse (M1))

LOSS OF PICTURE OR SOUND

No pic., No sound, Has raster - V2, V3, V4, V5, V6

No pic., No sound, Has snow - V1, V2, V3

No pic., Has sound, Has raster - V7, V23

Has pic., No sound - V8, V9, V10, V11, V12

Overloaded picture- V6, V11

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V13, V14, V17

No vert or horiz. sync - V13

SWEEP FAILURE

No raster, Has sound - V17, V18, V19, V20, V23

No vertical deflection - V16

Poor vert linearity or foldover - V15, V16

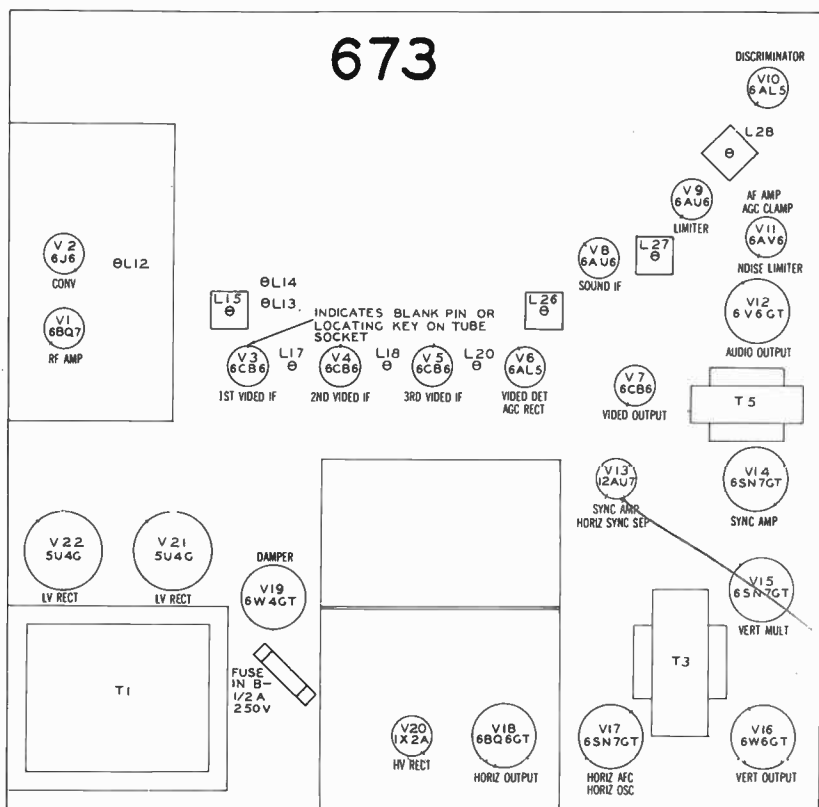
Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22

Vert off freq. - V14, V15

Horiz. off freq. - V13, V14, V17

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster no sound-V21, V22 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V23

Has pic, no sound-V8, V9, V10, V11, V12

Overloaded picture-V6

SYNC FAILURE

No vert. sync-V13, V14, V15

No horiz. sync-V13, V14, V17

No vert. or horiz. sync-V13

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V23

No vertical deflection-V18

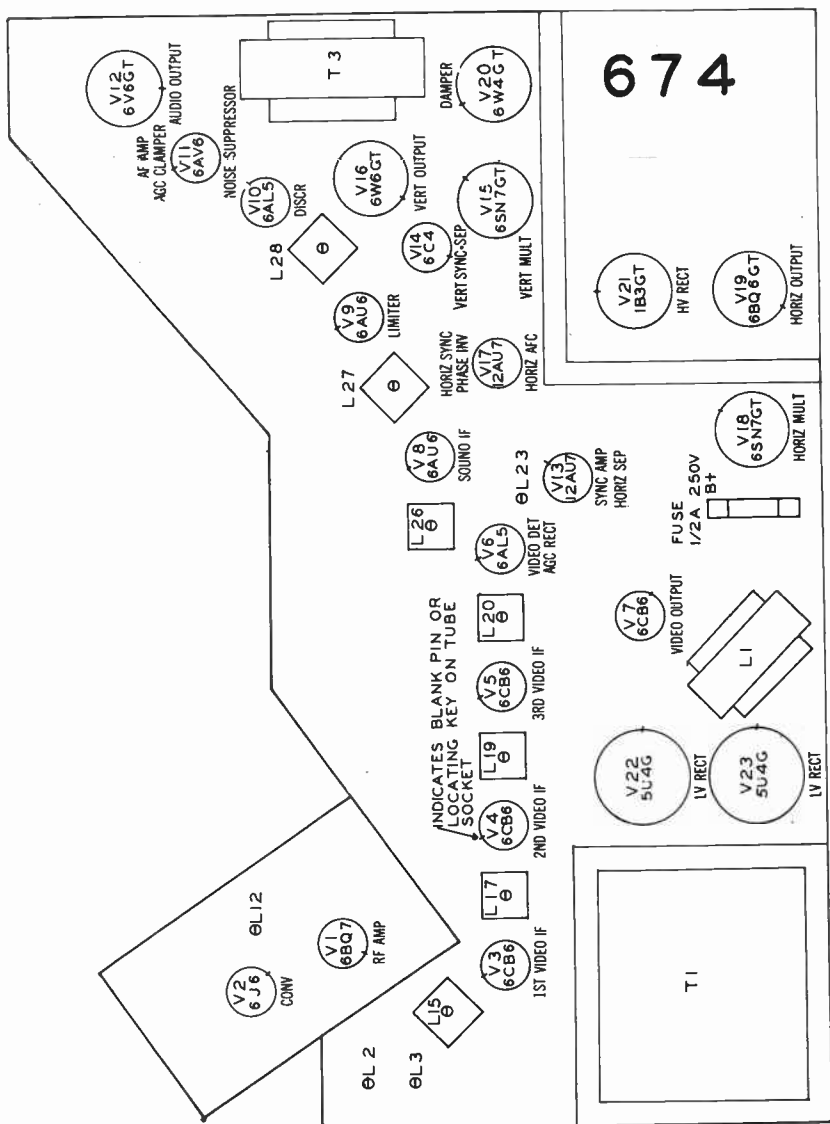
Poor vert. linearity or foldover-V15, V16

Poor horiz. linearity or foldover-V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21, V22

Vert. off freq.-V14, V15

Horiz. off freq.-V13, V14, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V22, V23, Fuse (M1)

LOSS OF PICTURE OR SOUND

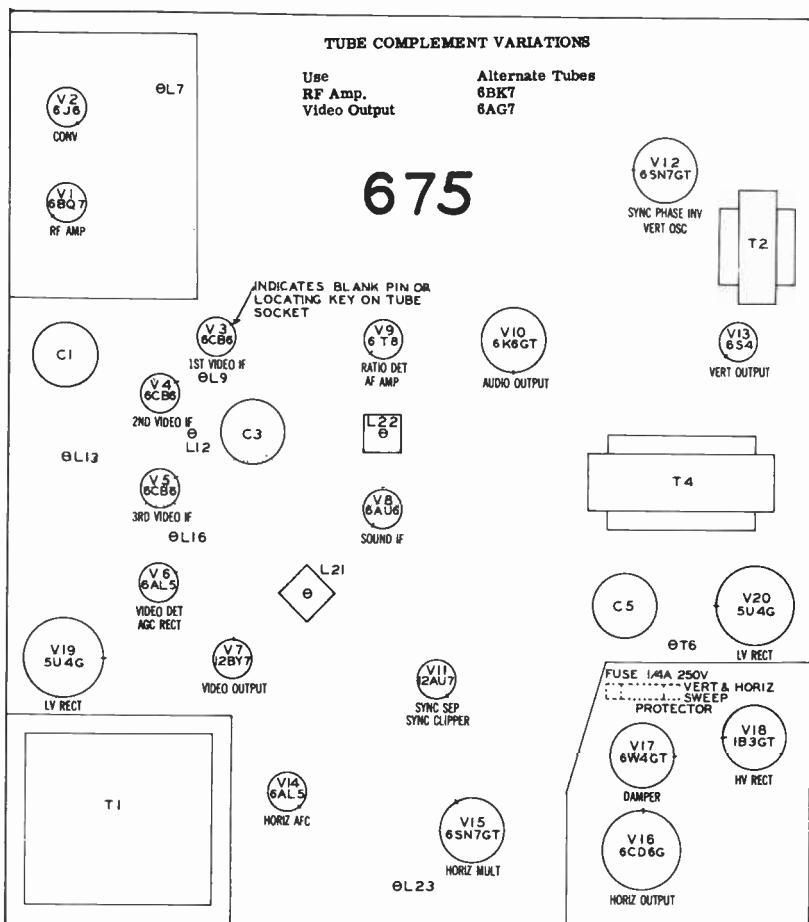
No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V24
 Has pic, no sound - V8, V9, V10, V11, V12
 Overloaded picture - V6, V11

SYNC FAILURE

No vert. sync - V14, V15
 No horiz. sync - V13, V17, V18
 No vert. or horiz. sync - V13

SWEEP FAILURE

No raster, has sound - V18, V19, V20, V21, V24
 No vertical deflection - V15, V16
 Poor Vert. linearity or foldover - V15, V16
 Poor Horiz. linearity or foldover - V18, V19, V20
 Narrow picture - V18, V19, V20, V21, V22, V23
 Vert. off freq. - V14, V15
 Horiz. off freq. - V13, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V18, V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V21

Has pic, no sound-V8, V9, V10

Overloaded picture-V6

SYNC FAILURE

No vert. sync.-V12

No horiz. sync.-V12, V14, V15

No vert. or horiz. sync.-V11, V12

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V21 Fuse (M)

No vertical deflection-V12, V13

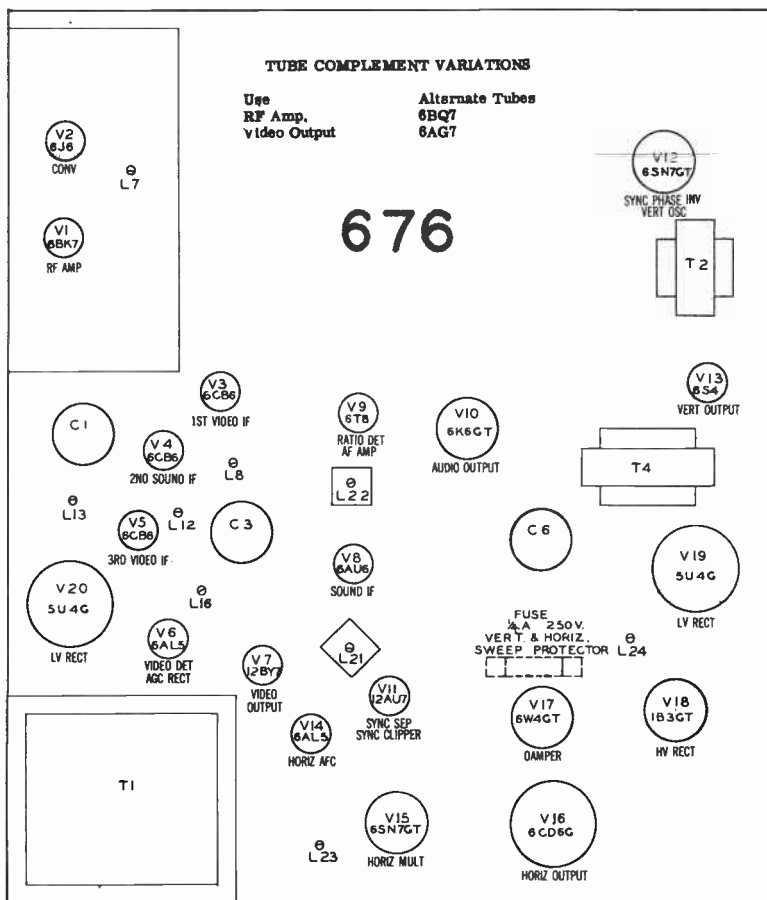
Poor vert. linearity or foldover-V12, V13

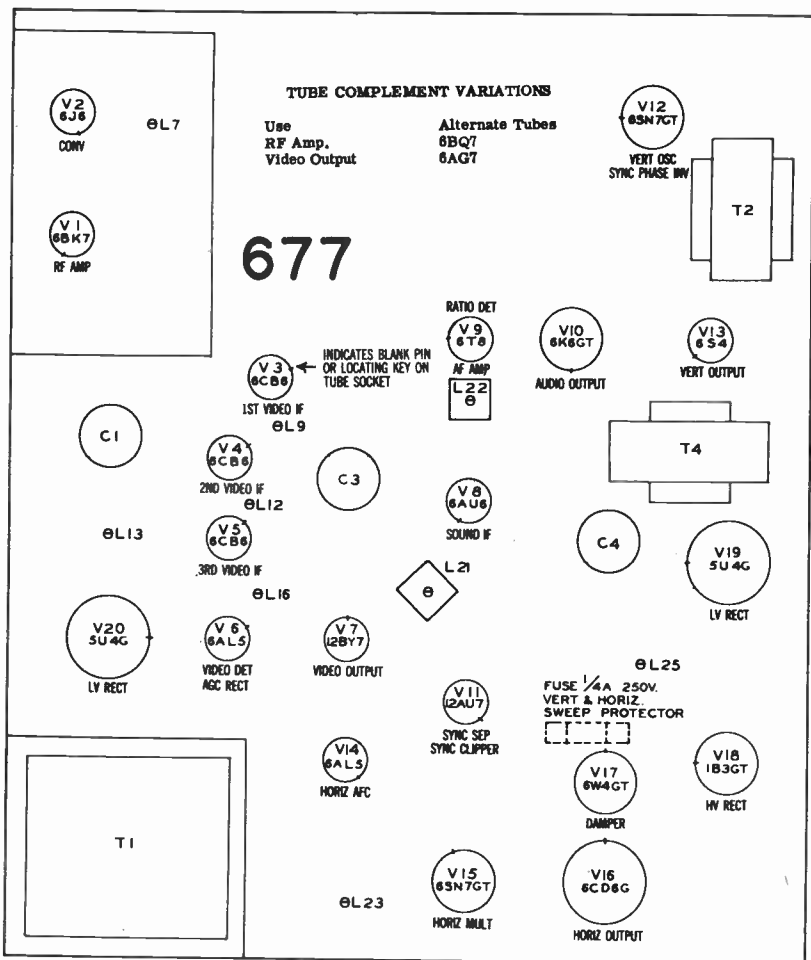
Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19, V20

Vert. off freq.-V12

Horiz. off freq.-V12, V14, V15





TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7
- No Pic, No Sound, Has Snow - V1, V2, V3
- No Pic, Has Sound, Has Raster - V7, V21
- Has Pic, No Sound - V8, V9, V10
- Overloaded picture - V6

POWER SUPPLY FAILURE

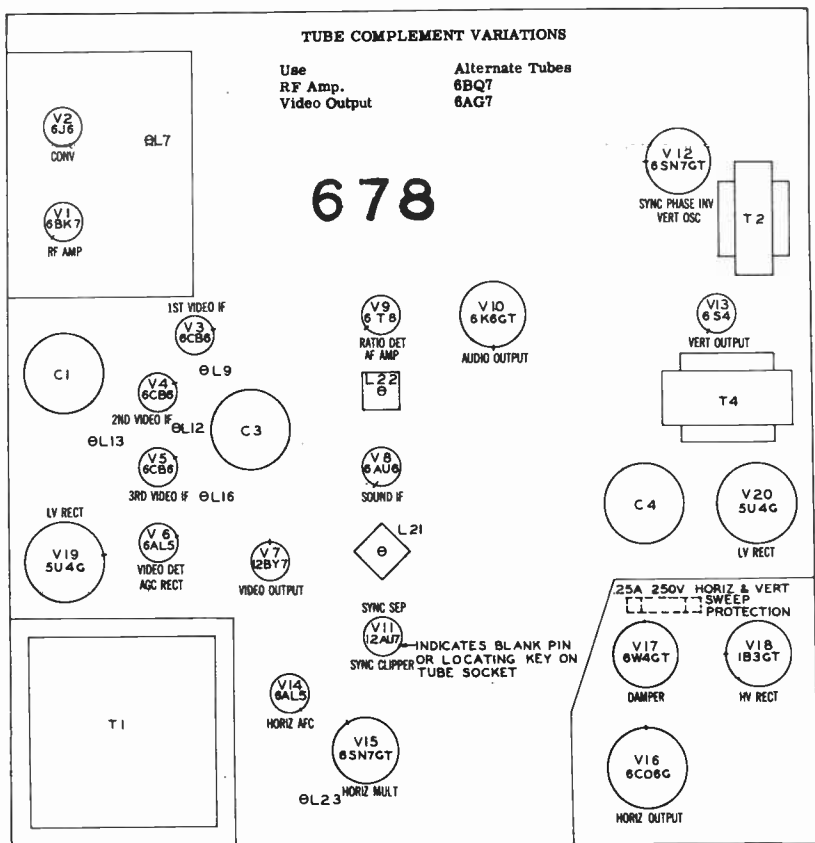
- No Raster, No Sound - V19, V20

SWEEP FAILURE

- No Raster, Has Sound - V15, V16, V17, V18, V21, Fuse (M1)
- No Vertical Deflection - V13
- Poor Vert. Linearity or Foldover - V12, V13
- Poor Horiz. Linearity or Foldover - V15, V16, V17
- Narrow Picture - V15, V16, V17, V19, V20
- Vert. Off Freq. - V12
- Horiz. Off Freq. - V14, V15

SYNC FAILURE

- No Vert. sync - V12
- No Horiz. sync. - V12, V14, V15
- No Vert. or Horiz. Sync - V11, V12



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V19, V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V8, V9, V10

SYNC FAILURE

No vert. sync - V12

No horiz. sync - V12, V14, V15

No vert. or horiz. sync - V11, V12

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V21, FUSE (M1)

No vertical deflection - V12, V13

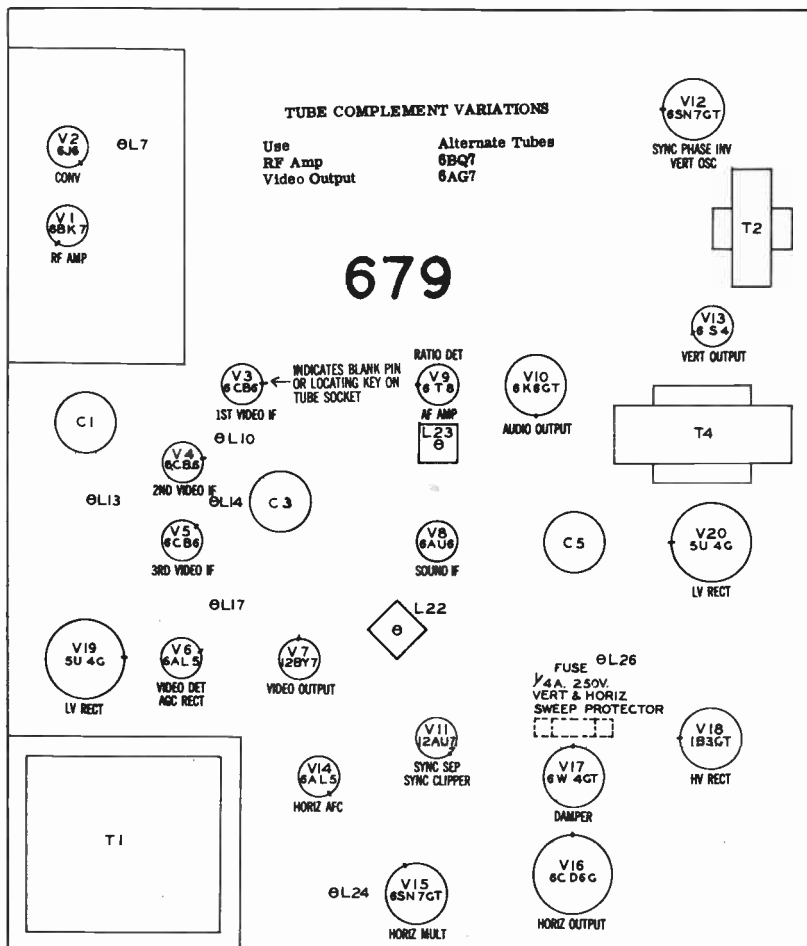
Poor vert. linearity or foldover - V12, V13

Poor horiz. linearity or foldover - V15, V16, V17

Narrow picture - V15, V16, V17, V18, V19, V20

Vert. off freq. - V12

Horiz. off freq. - V12, V14, V15



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19-V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V21

Has pic, no sound, -V8, V9, V10

Overloaded picture-V6

SYNC FAILURE

No vert. sync. -V12

No horiz. sync. -V12, V14, V15

No vert. or horiz. sync. -V11, V12

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V21

No vertical deflection-V13

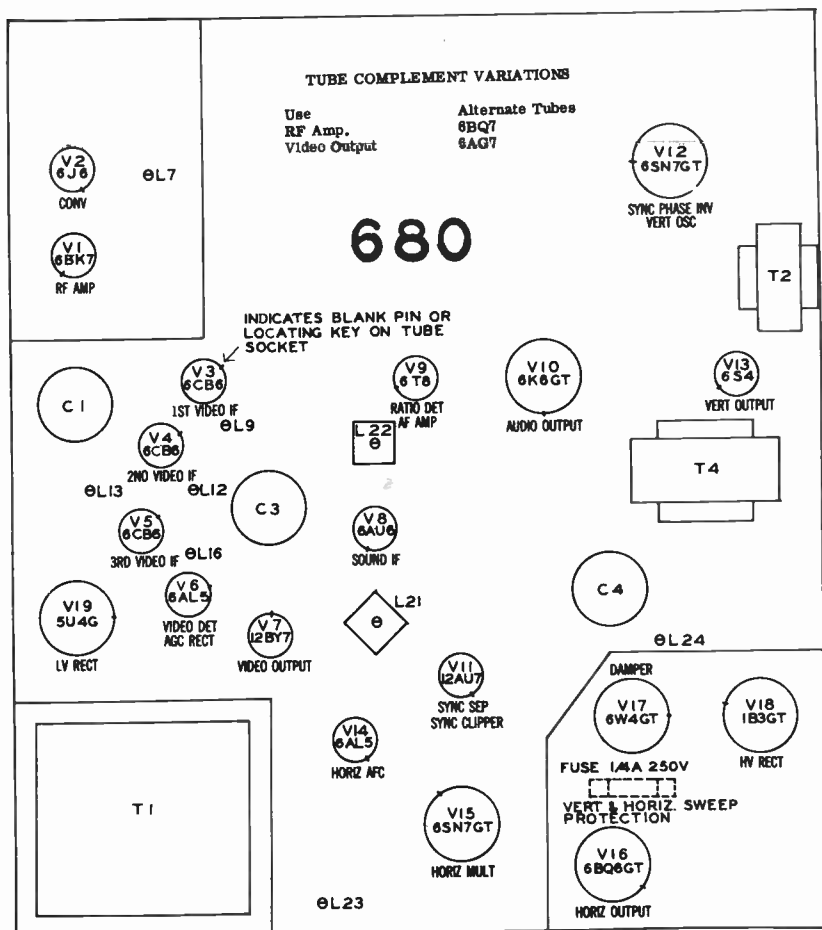
Poor vert. linearity or foldover-V12, V13

Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19, V20

Vert off freq. -V12

Horiz. off freq. -V12, V14, V15



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V20

Has pic, no sound-V8, V9, V10

Overloaded picture-V6

SYNC FAILURE

No vert. sync-V12

No horiz. sync-V12, V14, V15

No vert. or horiz. sync-V11, V12

SWEPP FAILURE

No raster, has sound-V15, V16, V17, V18, V20 Fuse (M1)

No vertical deflection-V13

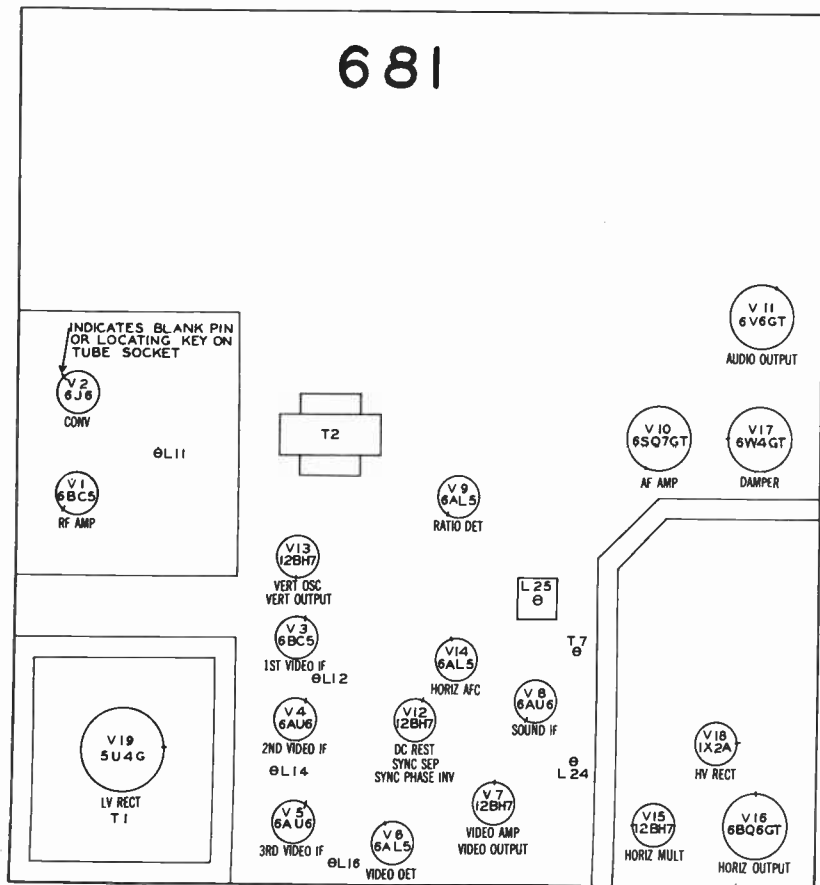
Poor vert. linearity or foldover-V12, V13

Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19

Vert. off freq-V12

Horiz. off freq.-V12, V14, V15



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V19

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster, - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V20

Has pic, no sound - V8, V9, V10, V11

SYNC FAILURE

No vert. sync - V12, V13

No horiz. sync - V12, V14, V15

No vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20

No vertical deflection - V13

Poor vert. linearity or foldover - V13

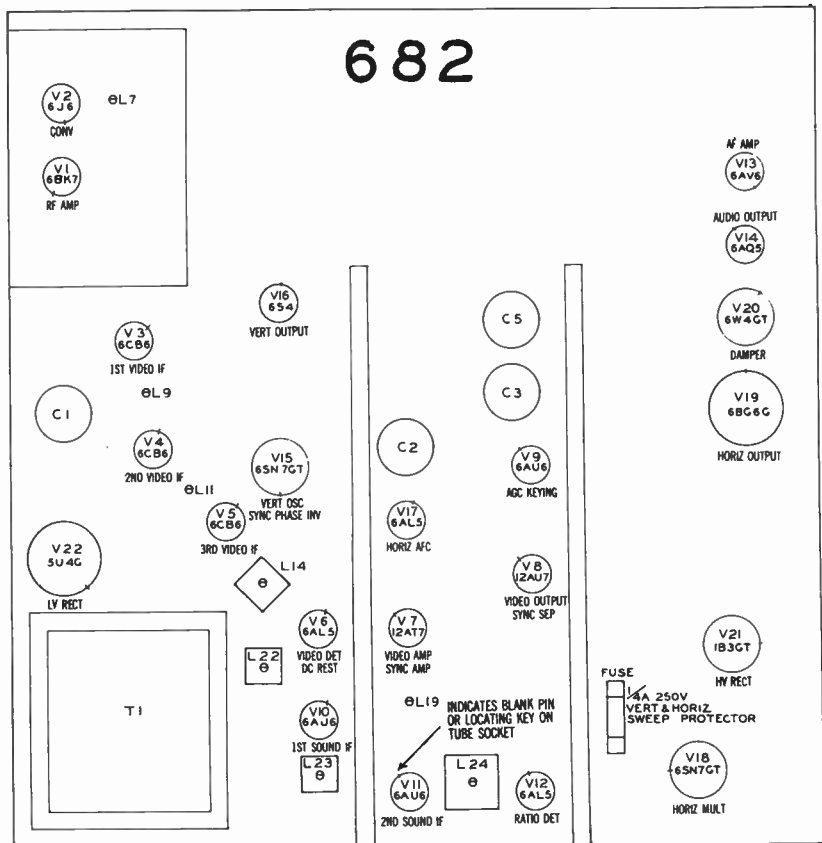
Poor horiz. linearity or foldover - V15, V16, V17

Narrow Picture - V15, V16, V17, V18, V19

Vert. Off Freq. - V12, V13

Horiz. Off Freq. - V12, V14, V15

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound-V22

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster-V2, V3, V4, V5, V6
 No pic, No sound, Has snow-V1, V2, V3
 No pic, Has sound, Has raster-V6, V7, V8, V23
 Has pic, No sound-V10, V11, V12, V13, V14
 Overloaded picture-V9

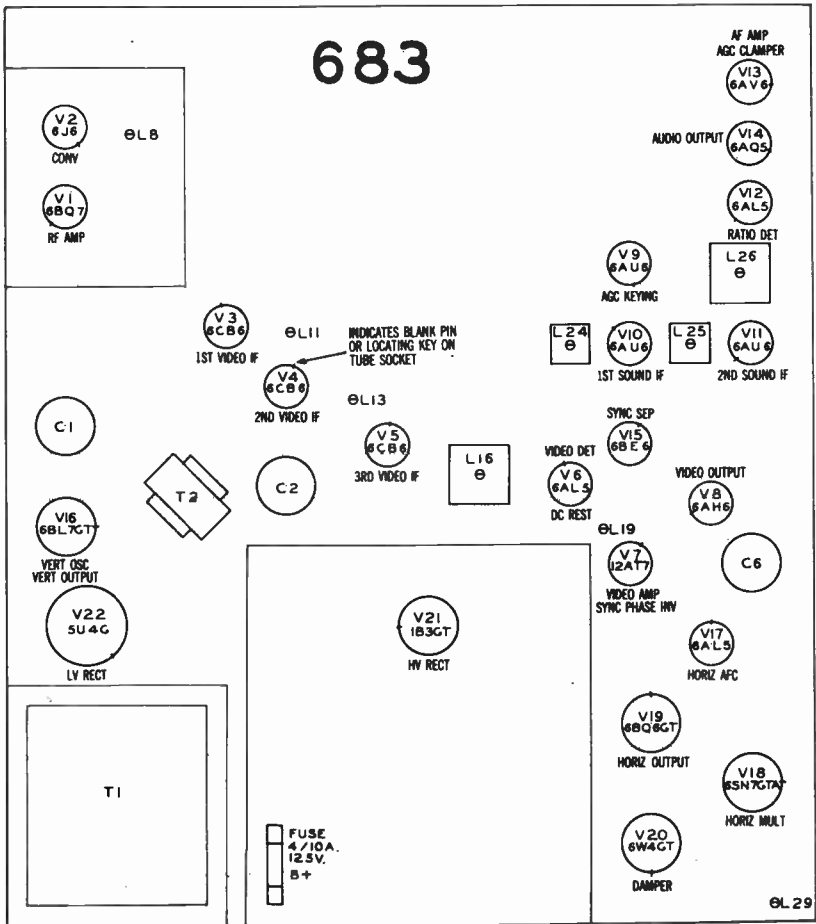
SYNC FAILURE

No vert. sync-V15
 No hor. sync.-V15, V17, V18
 No vert. or hor. sync.-V7, V8, V15

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V23, Fuse(M1)
 No vertical deflection-V16
 Poor vert. linearity or foldover-V15, V16
 Poor horiz. linearity or foldover-V18, V19, V20
 Narrow picture-V18, V19, V20, V21, V22
 Vert. off freq.-V15
 Horiz. off freq.-V15, V17, V18

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V22, Fuse(M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V7, V8, V23

Has pic, no sound-V10, V11, V12, V13, V14

Overloaded picture-V9, V13

SYNC FAILURE

No vert. sync.-V7, V18.

No horiz. sync.-V7, V17, V18

No vert. or horiz. sync. V7, V15

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V23

No vertical deflection-V16

Poor vert. linearity or foldover-V16

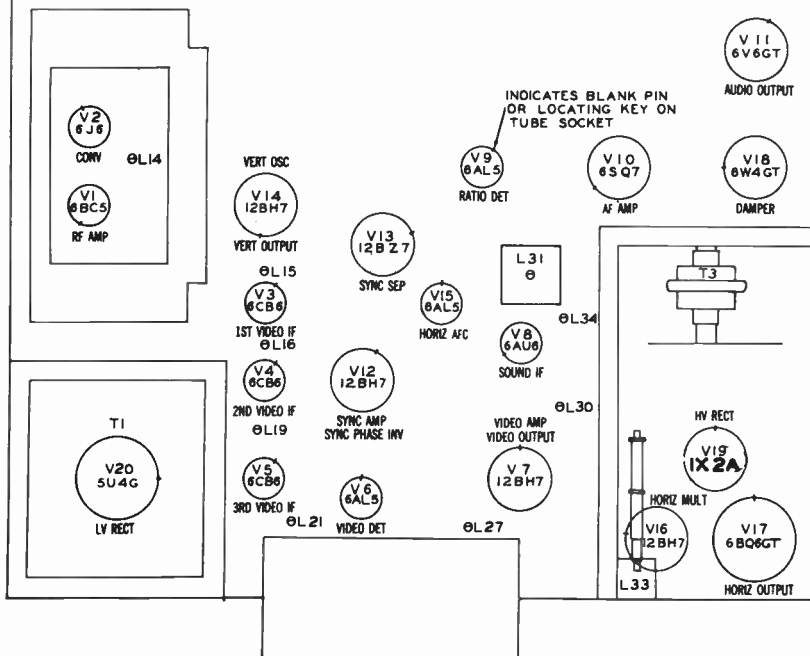
Poor horiz. linearity or foldover-V18, V19, V20

Narrow picture-V18, V19, V20, V21, V22

Vert. off freq.-V7, V16

Horiz. off freq.-V7, V17, V18

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V7, V21
 Has pic, no sound -V8, V9, V10, V11

POWER SUPPLY FAILURE

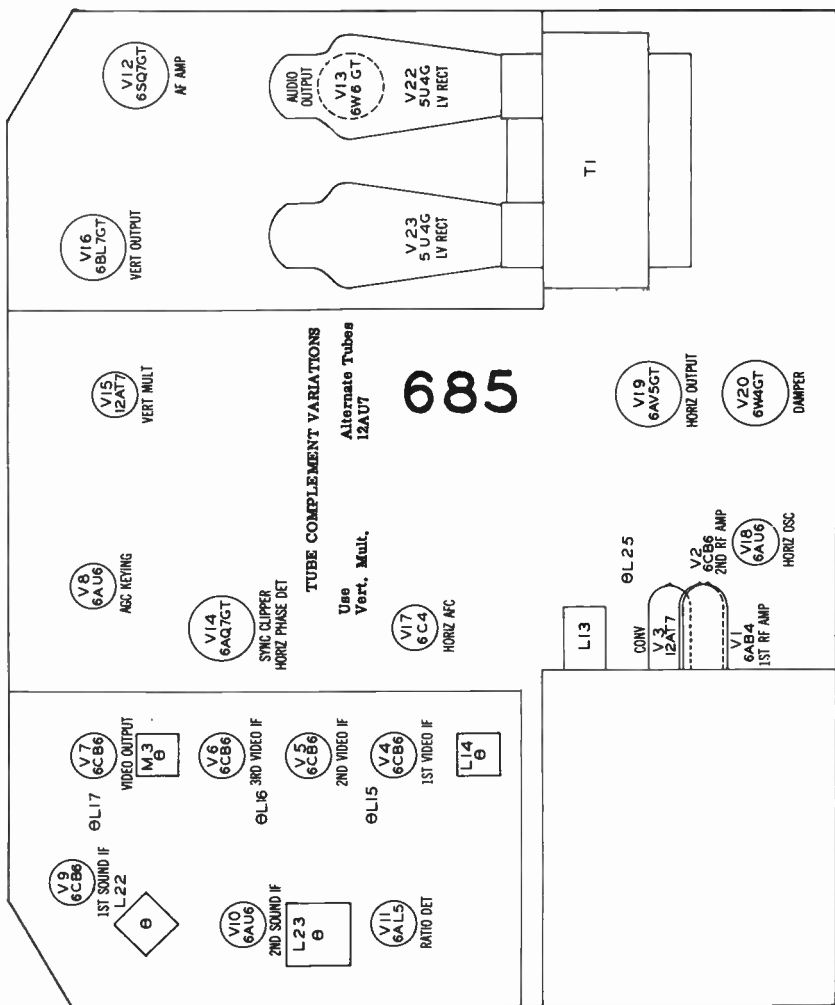
No raster, no sound-V20

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V21
 No vertical deflection-V14
 Poor vert. linearity or foldover-V14
 Poor horiz. linearity or foldover-V16, V17, V18
 Narrow picture-V16, V17, V18, V19, V20
 Vert off freq.-V12, V14
 Horiz. off freq.-V12, V15, V16

SYNC FAILURE

No vert. sync.-V12, V14
 No horiz. sync.-V12, V15, V16
 No vert. or horiz. sync-V12, V13



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6
- No pic, no sound, has snow-V1, V2, V3, V4
- No pic, has sound, has raster-V7, V24
- Has pic, no sound-V9, V10, V11, V12, V13
- Overloaded picture-V8

SWEEP FAILURE

- No raster, has sound-V18, V19, V20, V21, V24, Fuse (M1)
- No vertical deflection-V16
- Poor vert linearity or foldover-V15, V16
- Poor horiz. linearity or foldover-V18, V19, V20
- Narrow picture-V18, V19, V20, V21, V22, V23
- Vert. off freq. -V14, V15
- Horiz. f. off freq. -V14, V17, V18

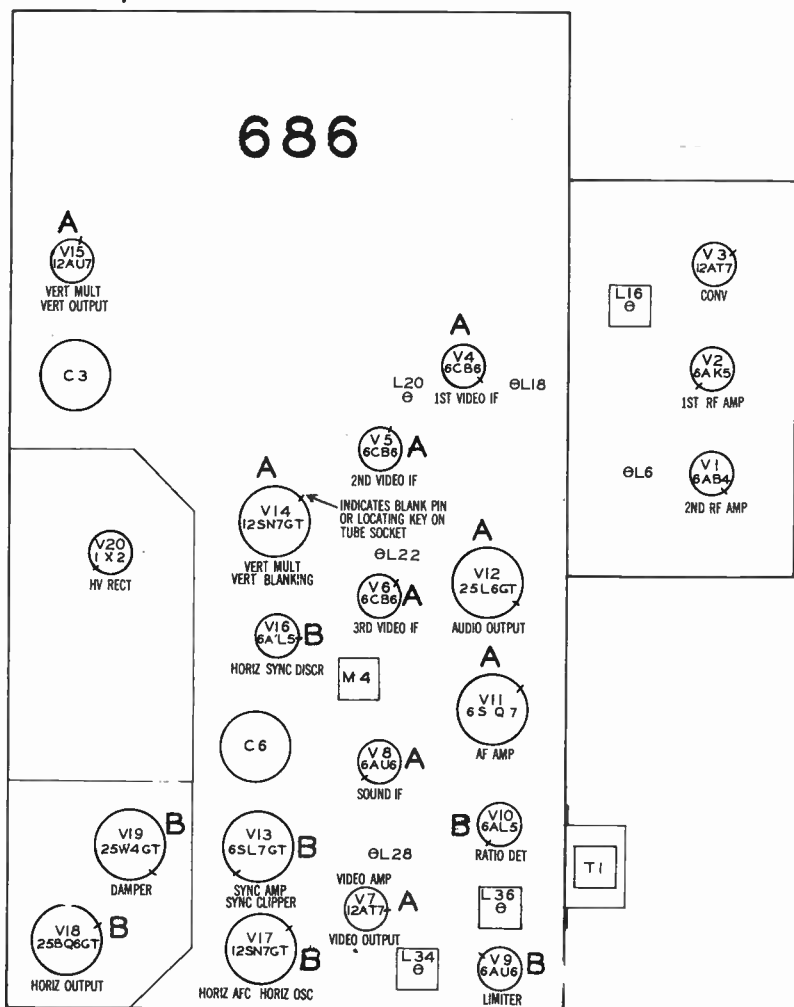
POWER SUPPLY

- No raster, no sound-V22, V23

SYNC FAILURE

- No vert. sync-V14, V15
- No horiz. sync. -V14, V17, V18
- No vert. or horiz. sync. -V14

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3, V4
 No pic, has sound, has raster - V7, V21
 Has pic, no sound - V8, V9, V10, V11, V12

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V21
 No vertical deflection - V14, V15
 Poor vert. linearity or foldover - V14, V15
 Poor horiz. linearity or foldover - V17, V18, V19
 Narrow picture - V17, V18, V19, V20, M1, M2
 Vert. off freq. - V13, V14, V15
 Horiz. off freq. - V13, V16, V17

POWER SUPPLY FAILURE

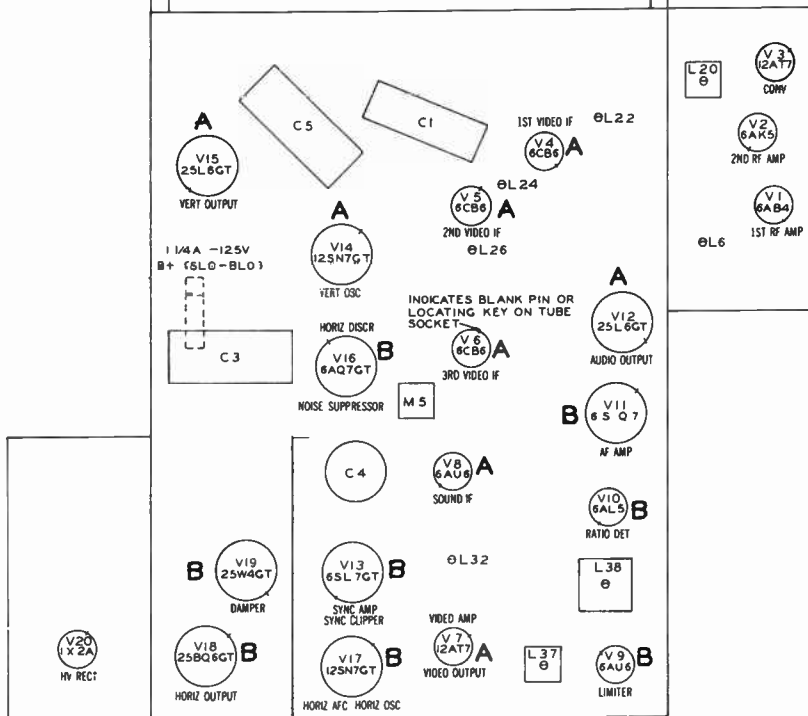
No raster, no sound - Selenium Rectifier (M1 & M2)

SYNC FAILURE

No vert. sync - V13, V14, V15
 No horiz. sync - V13, V16, V17
 No vert. or horiz. sync - V13

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then parallelled and are connected thru the picture tube filament to B-.

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6
- No pic, no sound, has snow - V1, V2, V3, V4
- No pic, has sound, has raster - V7, V21
- Has pic, no sound - V8, V9, V10, V11, V12

SWEEP FAILURE

- No raster, has sound - V17, V18, V19, V20, V21
- No vertical deflection - V14, V15
- Poor vert. linearity or foldover - V14, V15
- Poor horiz. linearity or foldover - V17, V18, V19
- Narrow picture - V17, V18, V19, V20, M1, M2
- Vert. off freq. - V13, V14
- Horiz. off freq. - V13, V16, V17

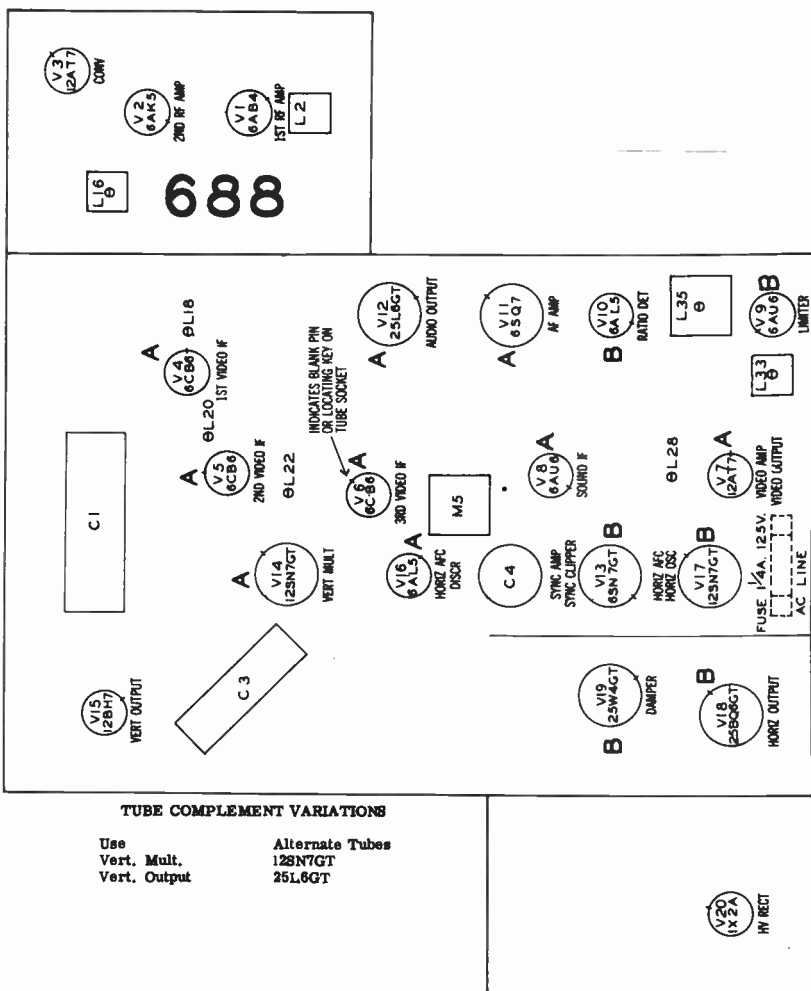
POWER SUPPLY FAILURE

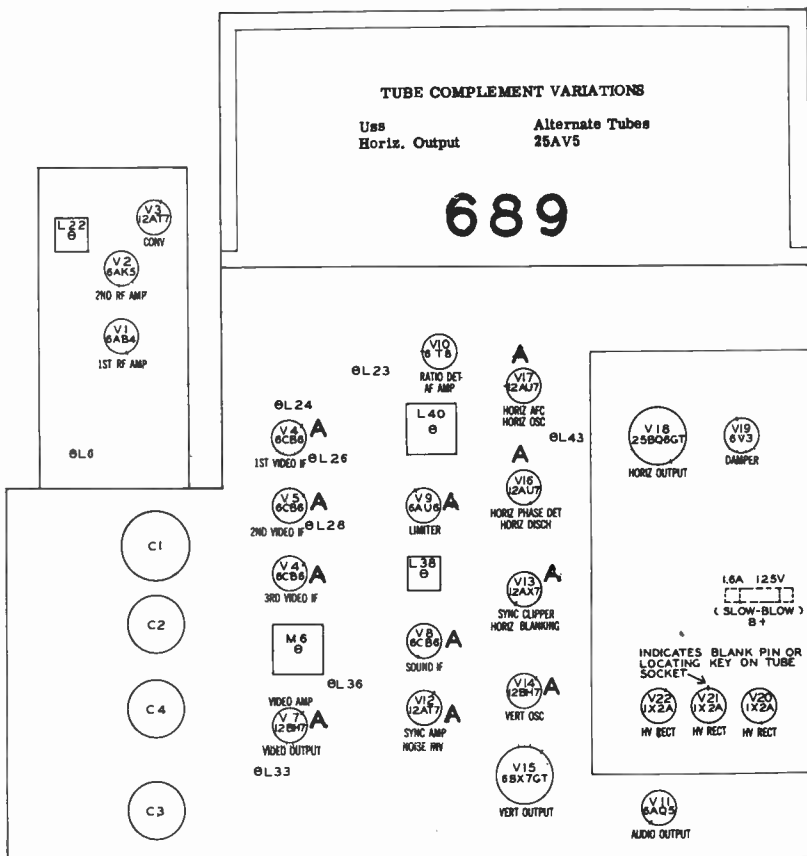
- No raster, no sound - Selenium Rectifier's (M1, M2), fuse (M3)

SYNC FAILURE

- No vert. sync - V13, V14
- No horiz. sync - V13, V16, V17
- No vert. or horiz. sync - V13, V16

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament to B-.





TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1, M2), fuse (M3)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V8

No pic, no sound, has snow - V1, V2, V3, V4

No pic, has sound, has raster - V7, V23

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V12

SYNC FAILURE

No vsrt. sync - V13, V14

No horiz. sync - V13, V16, V17

No vsrt. or horiz. sync - V12, V13

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V20, V21, V22, V23

No vertical deflection - V14, V15

Poor vert. linearity or foldover - V14, V15

Poor horiz. linearity or foldover - V16, V17, V18, V19

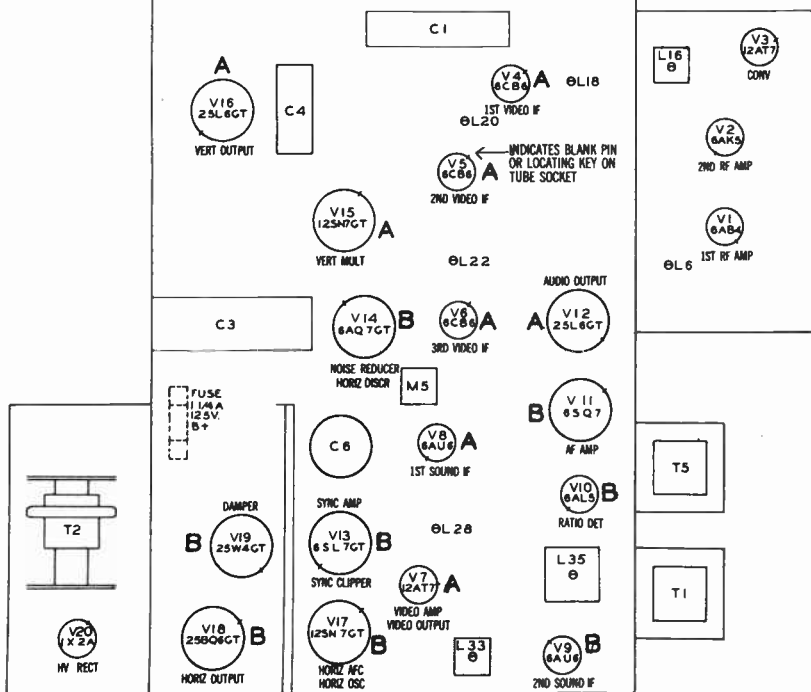
Narrow pictures - V16, V17, V18, V19, V20, V21, V22, M1, M2

Vsrt. off frsq. - V13, V14

Horiz. off frsq. - V13, V16, V17

NOTE: The tubes marked A on the tube placement chart indicate the tubes in the series string. The filaments of the other tubes operate independently from a filament transformer.

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No raster, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3, V4
 No pic, has sound, has raster - V7, V21
 Has pic, no sound - V8, V9, V10, V11, V12

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V21
 No vertical deflection - V16
 Poor vert. linearity or foldover - V15, V16
 Poor horiz. linearity or foldover - V17, V18, V19
 Narrow picture - V17, V18, V19, V20, M1, M2
 Vert. off freq. - V15
 Horiz. off freq. - V13, V14, V17

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers
 (M1, M2) fuse (M3)

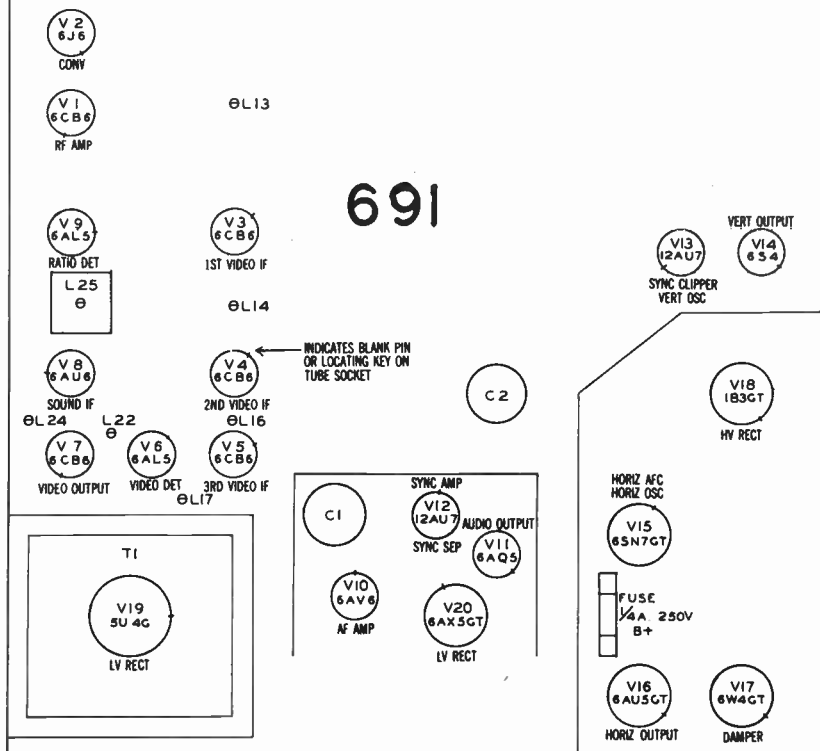
SYNC FAILURE

No vert. sync - V13, V15
 No horiz. sync - V13, V14, V17
 No vert. or horiz. sync - V13, V14, V17

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament to B-.

TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes
AF Amp.	68Q7
Sync Amp.-Sync Sep.	68N7GT
Sync Clip.-Vert. Osc.	68N7GT
Horiz. Output	6AV5GT



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V20
 No pic, no sound, has snow- V1, V2, V3
 No pic, has sound, has raster-V7, V21
 Has pic, no sound-V8, V9, V10, V11
 Overloaded picture-V6

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V21
 No vertical deflection-V14
 Poor vert. linearity or foldover-V13, V14
 Poor horiz. linearity or foldover-V15, V16, V17
 Narrow picture-V15, V16, V17, V18, V19
 Vert. off freq. -V13
 Horiz. off freq. -V13, V15

POWER SUPPLY

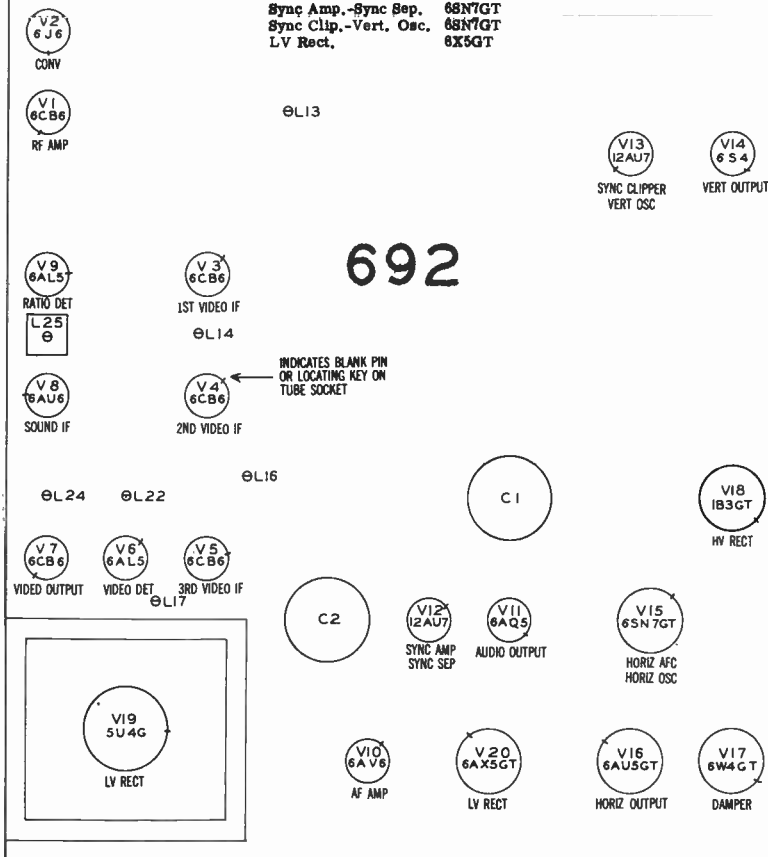
No raster, no sound-V19, V20 Fuse (M1)

SYNC FAILURE

No vert. sync. -V13
 No horiz. sync. -V13, V15
 No vert. or horiz. sync. -V12, V13

TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes
AF Amp.	68Q7GT
Sync Amp.-Sync Sep.	68N7GT
Sync Clip.-Vert. Osc.	68N7GT
LV Rect.	6X5GT



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V8, V9
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V21
 Has pic, no sound - V8, V9, V10, V11

SWEEP FAILURE

No raster, has sound - V15, V18, V17, V18, V21
 No vertical deflection - V13, V14
 Poor vert. linearity or foldover - V13, V14
 Poor horiz. linearity or foldover - V15, V16, V17
 Narrow picture - V15, V16, V17, V18, V19, V20
 Vert. off freq. - V13
 Horiz. off freq. - V13, V15

POWER SUPPLY FAILURE

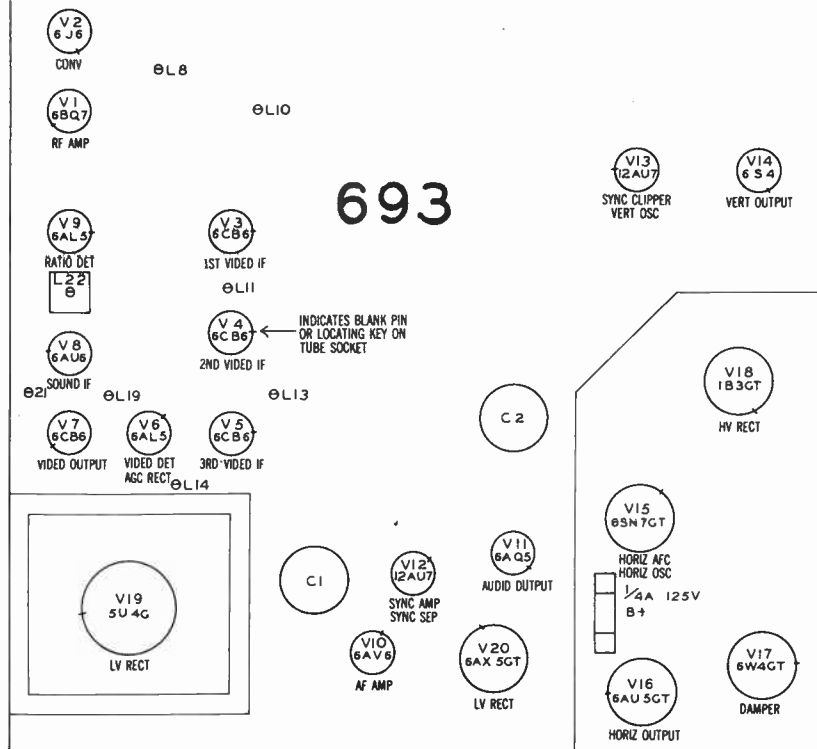
No raster, no sound - V19, V20, fuse (M1)

SYNC FAILURE

No vert. sync - V13
 No horiz. sync - V13, V15
 No vert. or horiz. sync - V12, V13

TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes
RF Amp.	6BK7
AF Amp.	6SQ7
Sync Amp.-Sync Sep.	6SN7GT
Sync Clip.-Vert. Osc.	6SN7GT



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7
 No Pic, No Sound, Has Snow - V1, V2, V3
 No Pic, Has Sound, Has Raster - V7, V21
 Has Pic, No Sound - V8, V9, V10, V11
 Overloaded Picture - V8

SWEEP FAILURE

No Raster, Has Sound - V15, V16, V17, V18, V21
 No Vertical Deflection - V14
 Poor Vert. Linearity or Foldover - V13, V14
 Poor Horiz. Linearity or Foldover - V15, V16, V17
 Narrow Picture - V15, V16, V17, V18, V20
 Vert. Off Freq. - V13
 Horiz. Off Freq. - V13, V15

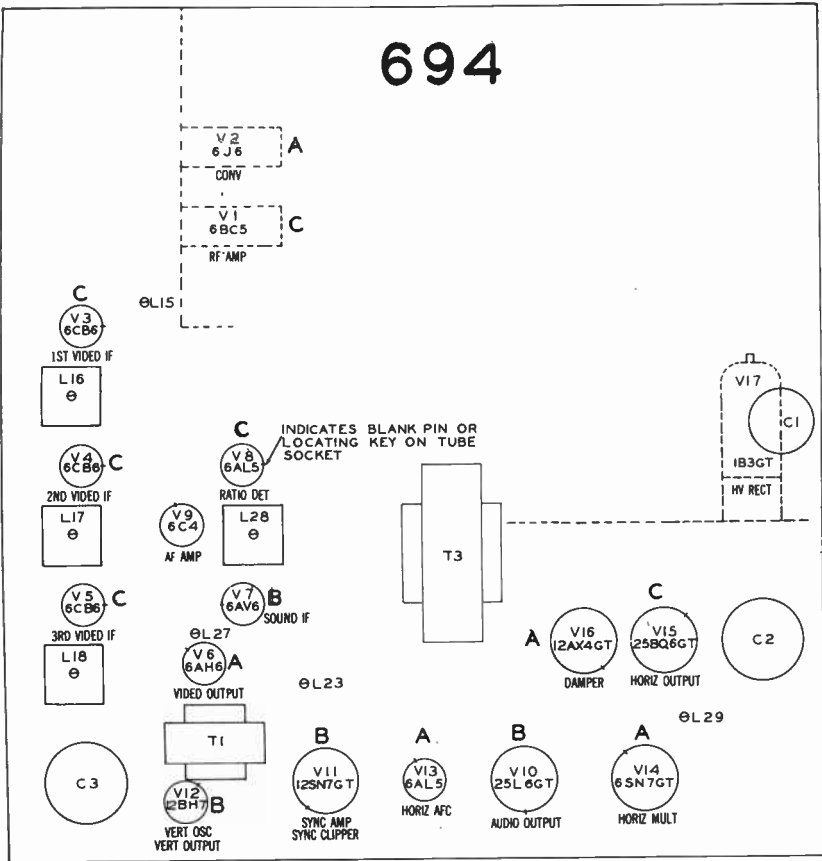
POWER SUPPLY FAILURE

No Raster, No Sound - V19, V20, Fuse (M1)

SYNC FAILURE

No Vert. Sync - V13
 No Horiz. Sync - V13, V15
 No Vert. or Horiz. Sync - V12, V13

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V8, V18

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, M1, M2

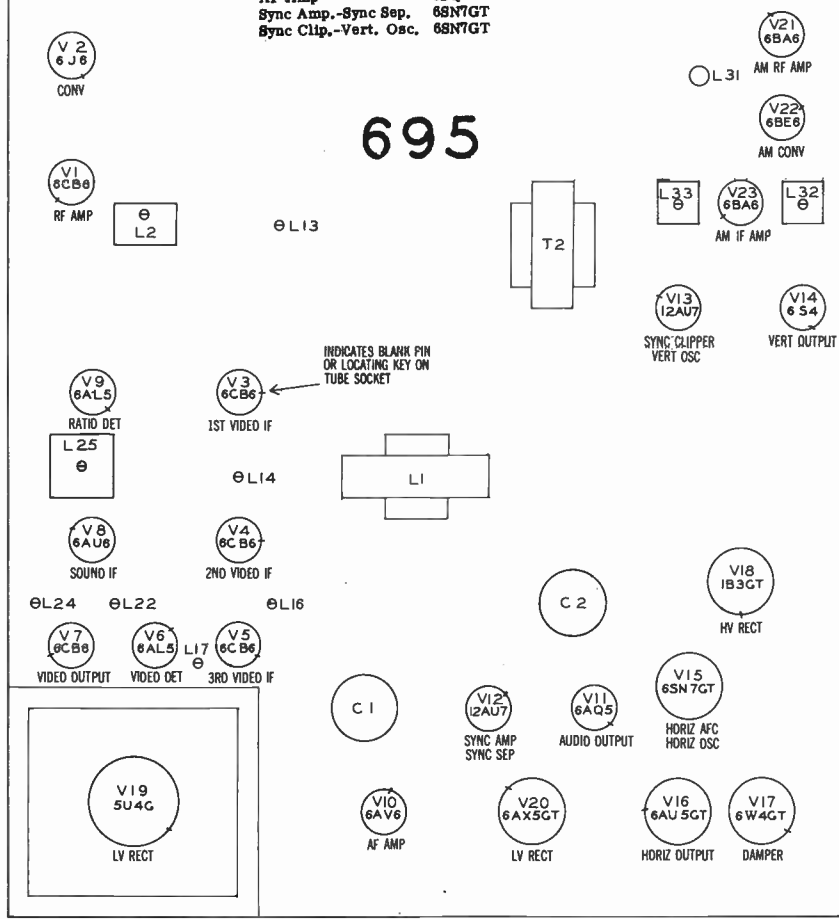
Vert. off freq. - V11, V12

Horiz. off freq. - V11, V13, V14

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B.

TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes
AF Amp	6SQ7
Sync Amp.-Sync Sep.	6SN7GT
Sync Clip.-Vert. Osc.	6SN7GT



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V7, V24
- Has pic, no sound - V8, V9, V10, V11

SWEEP FAILURE

- No raster, has sound - V15, V16, V17, V18, V24
- No vertical deflection - V13, V14
- Poor vert. linearity or foldover - V13, V14
- Poor horiz. linearity or foldover - V15, V16, V17
- Narrow picture - V15, V16, V17, V18, V19, V20
- Vert. off freq. - V13
- Horiz. off freq. - V13, V15

POWER SUPPLY FAILURE

- No raster, no sound - V19, V20, fuse (M1)

SYNC FAILURE

- No vert. sync - V13
- No horiz. sync - V13, V15
- No vert. or horiz. sync - V12, V13

TUBE COMPLEMENT VARIATIONS

Use RF Amp. AF Amp. Sync Amp.-Sync Sep. Sync Clip.-Vari. Osc. Horiz. Output	Alternate Tubes 6AG5 6BQ7 6SN7GT 6SN7GT 6AV5GT
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ØL6 ØL8

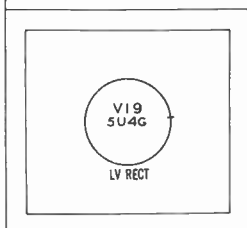


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INDICATES BLANK PIN OR LOCATING KEY ON TUBE SOCKET



ØL19 ØL17



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V8, V7
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V7, V21
- Has pic, no sound - V8, V9, V10, V11

SWEEP FAILURE

- No raster, has sound - V15, V16, V17, V18, V21
- No vertical deflection - V13, V14
- Poor vert. linearity or foldover - V13, V14
- Poor horiz. linearity or foldover - V15, V18, V17
- Narrow picture - V15, V16, V17, V18, V19, V20
- Vert. off freq. - V13
- Horiz. off freq. - V13, V15

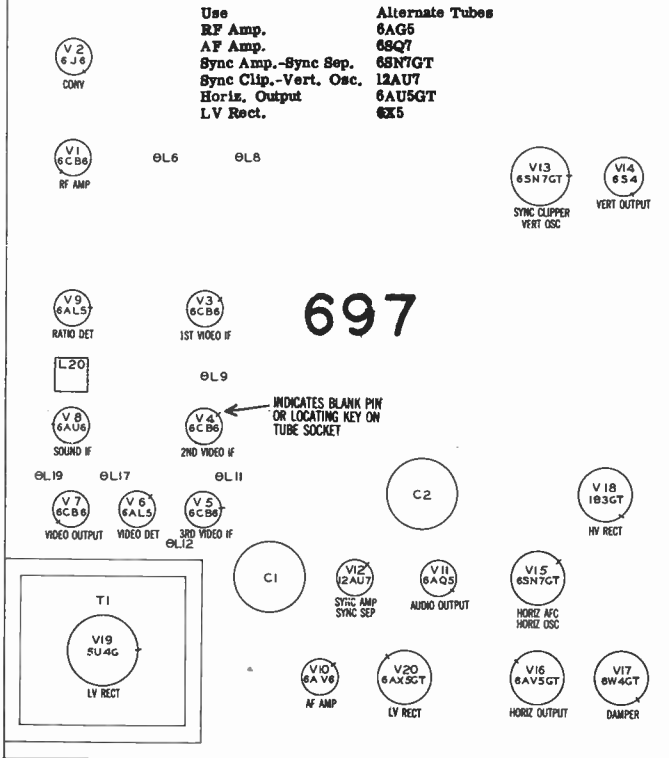
POWER SUPPLY FAILURE

- No raster, no sound - V19, V20, fuse (M1)

SYNC FAILURE

- No vert. sync - V13
- No horiz. sync - V13, V15
- No vert. or horiz. sync - V13, V13

TUBE COMPLEMENT VARIATIONS



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V19, V20, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V8, V9, V10, V11

SYNC FAILURE

No vert. sync - V13

No horiz. sync - V13, V15

No vert. or horiz. sync - V12, V13

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V21

No vertical deflection - V13, V14

Poor vert. linearity or foldover - V13, V14

Poor horiz. linearity or foldover - V15, V18, V17

Narrow picture - V15, V16, V17, V18, V19, V20

Vert. off freq. - V13

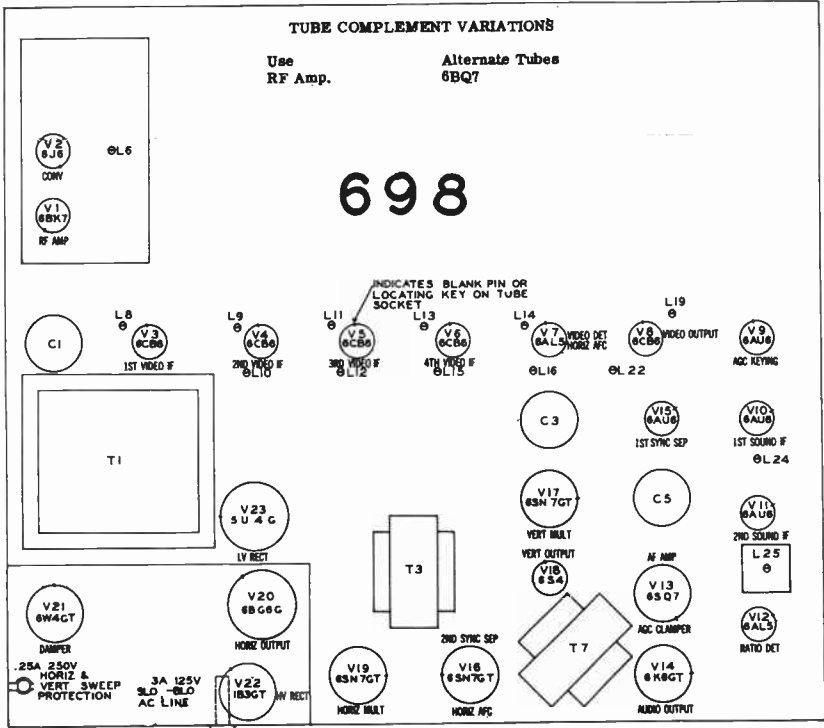
Horiz. off freq. - V13, V15

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BQ7

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V23 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V24

Has pic, no sound-V10, V11, V12, V13, V14

Overloaded picture-V9, V13

SYNC FAILURE

No vert. sync.-V16, V17

No horiz. sync.-V7, V16, V19

No vert. or horiz. sync.-V15, V16

SWEEP FAILURE

No raster, has sound-V19, V20, V21, V22, V24 Fuse (M2)

No vertical deflection-V17, V18

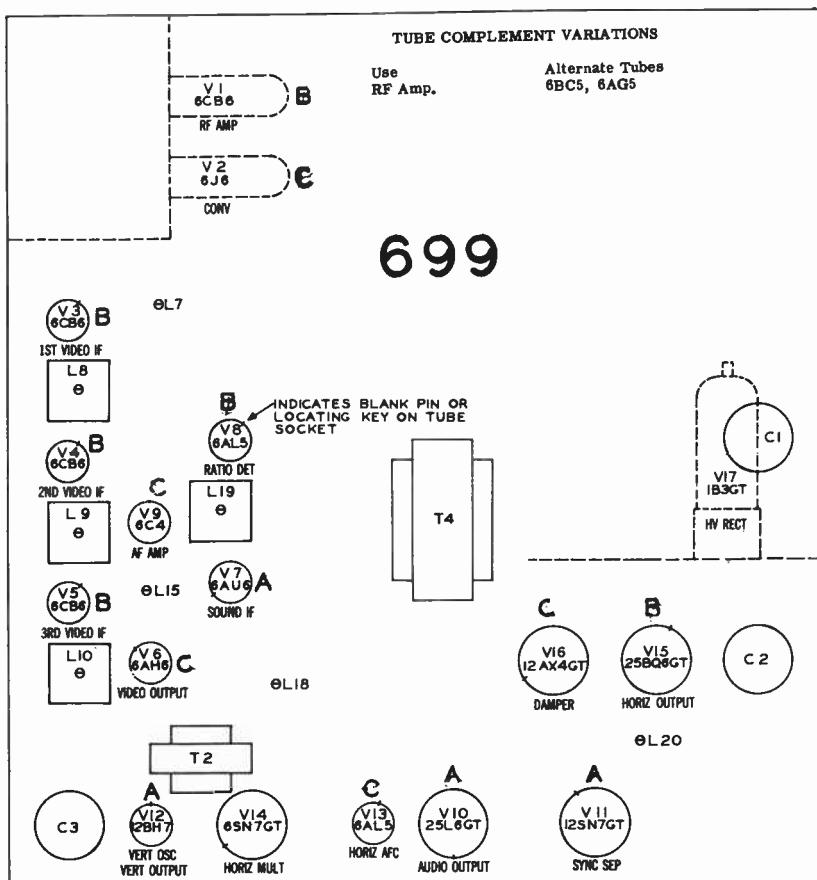
Poor vert. linearity or foldover-V17, V18

Poor horiz. linearity or foldover-V19, V20, V21

Narrow picture-V19, V20, V21, V22, V23

Vert. off freq.-V16, V17

Horiz. off freq.-V7, V16, V19



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V6, V18
 Has pic, no sound - V7, V8, V9, V10

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1, M2

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18
 No vertical deflection - V12
 Poor vert. linearity or foldover - V12
 Poor horiz. linearity or foldover - V14, V15, V16
 Narrow picture - V14, V15, V16, V17, M1, M2
 Vert. off freq. - V11, V12
 Horiz. off freq. - V11, V13, V14

SYNC FAILURE

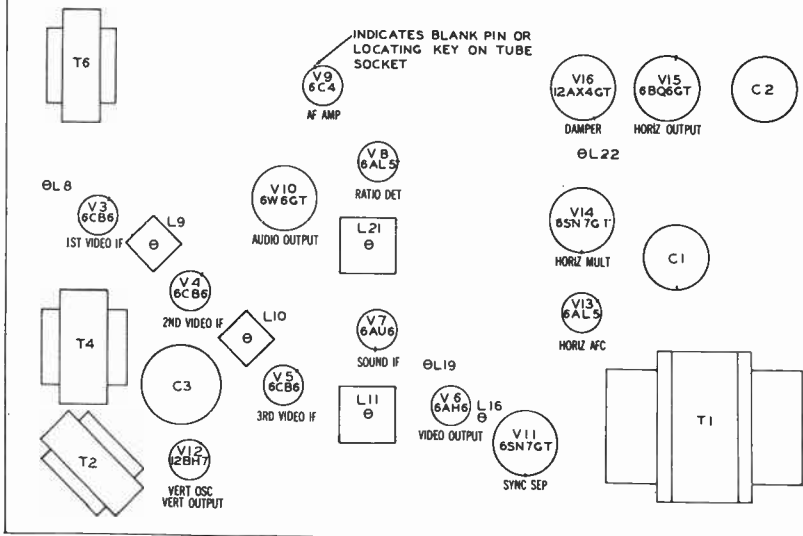
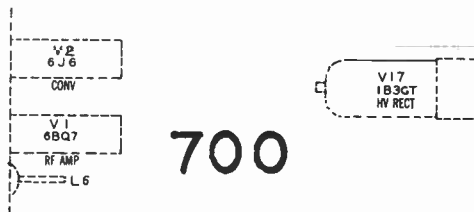
No vert. sync - V11, V12
 No horiz. sync - V11, V13, V14
 No vert. or horiz. sync - V11

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and connected thru the picture tube filament and those tubes marked C to B.

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BK7



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V70

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V18

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync.-V11, V12

No horiz. sync.-V11, V13, V14

No vert. or horiz. sync.-V11

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V18

No vertical deflection-V12

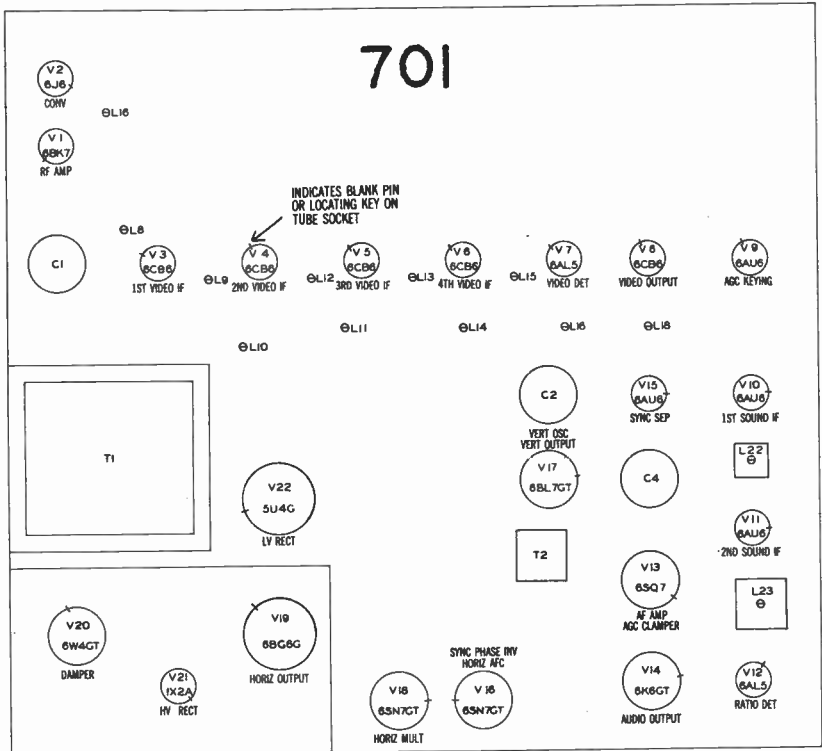
Poor vert. linearity or foldover-V12

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, M1, M2

Vert. off freq.-V11, V12

Horiz. off freq.-V11, V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V22, fuse (M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V5, V6, V7, V8, V23

Has pic, no sound - V10, V11, V12, V13, V14

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V16, V17

No horiz. sync - V16, V18

No vert. or horiz. sync - V15, V16

SWEEP FAILURE

No raster, has sound - V16, V19, V20, V21, V23, fuse (M1)

No vertical deflection - V17

Poor vert. linearity or foldover - V17

Poor horiz. linearity or foldover - V16, V19, V20

Narrow picture - V16, V19, V20, V21, V22

Vert. off freq. - V16, V17

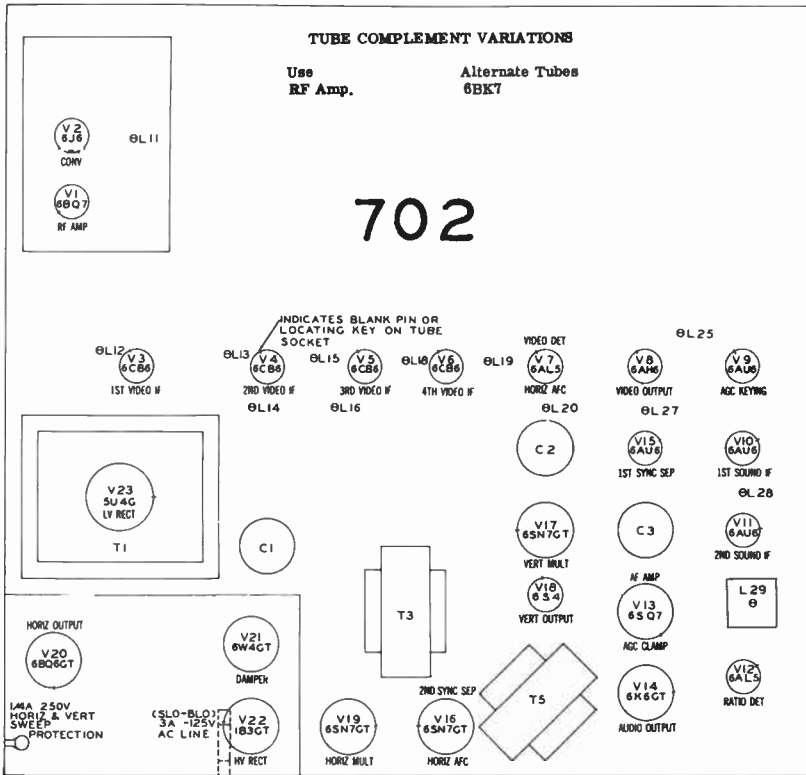
Horiz. off freq. - V16, V18

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BK7

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V23 Fuse M1

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V24

Has pic, no sound-V10, V11, V12, V13, V14

Overloaded picture-V9, V13

SYNC FAILURE

No vert. sync.-V16, V17

No horiz. sync.-V7, V16, V19

No vert. or horiz. sync.- V15, V16

SWEEP FAILURE

No raster, has sound-V19, V20, V21, V22, V24 Fuse (M2)

No vertical deflection -V17, V18

Poor vert. linearity or foldover-V17, V18

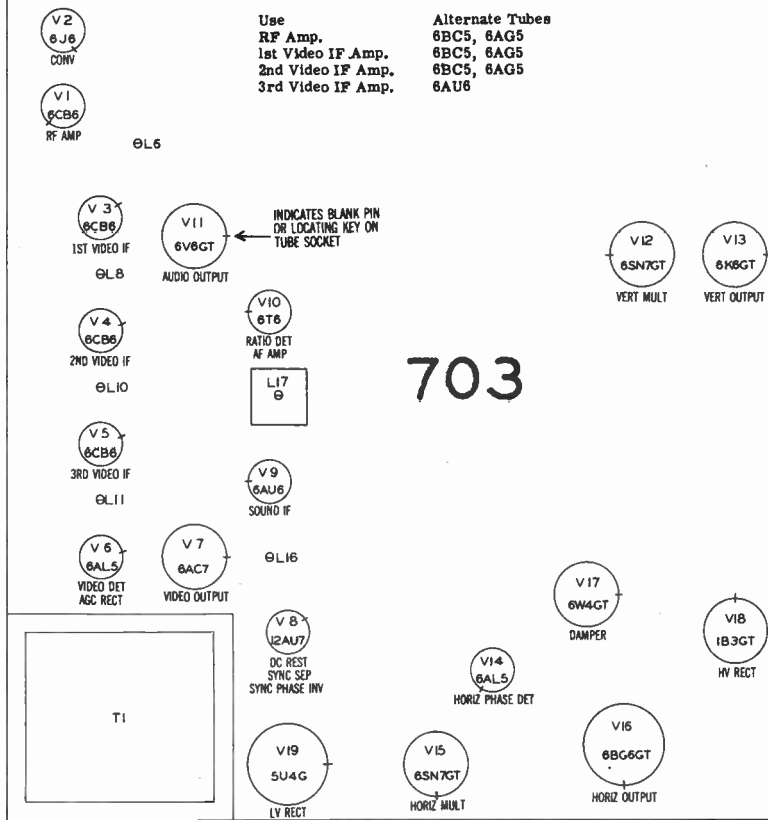
Poor horiz. linearity or foldover-V19, V20, V21

Narrow picture-V19, V20, V21, V22

Vert. off freq.-V16, V17

Horiz. off freq.-V7, V16, V19

TUBE COMPLEMENT VARIATIONS



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V19, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V6, V20

Has pic, no sound - V9, V10, V11

Overloaded picture - V8

SYNC FAILURE

No vert. sync - V6, V12

No horiz. sync - V8, V14, V15

No vert. or horiz. sync - V6

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20, fuse (M2)

No vertical deflection - V12, V13

Poor vert. linearity or foldover - V12, V13

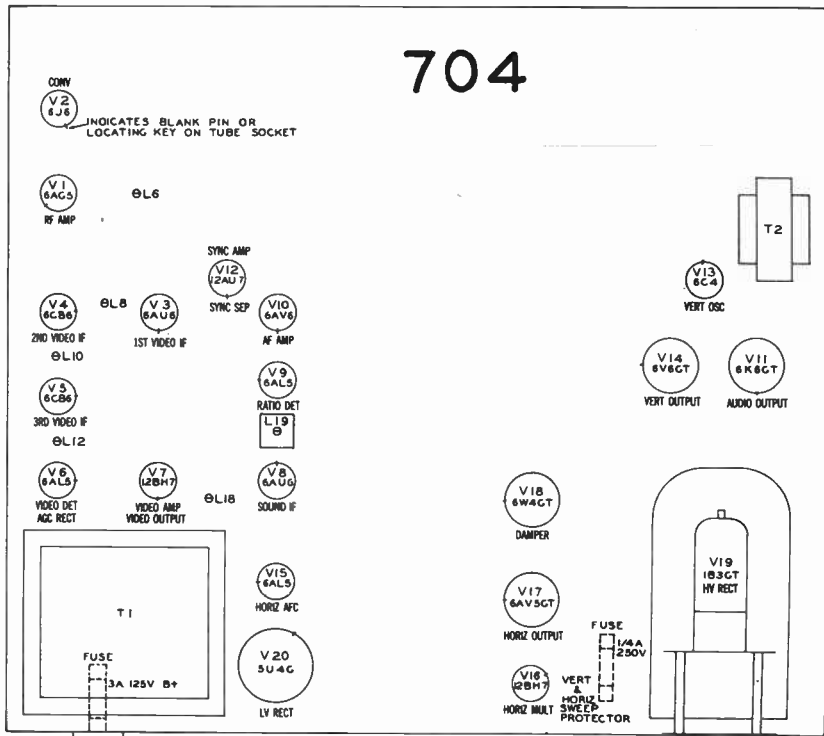
Poor horiz. linearity or foldover - V15, V18, V17

Narrow picture - V15, V18, V17, V16, V19

Vert. off freq. - V8, V12

Horiz. off freq. - V8, V14, V15

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY

No raster, no sound-V20 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V21

Has pic, no sound-V8, V9, V10, V11

Overloaded picture-V6

SYNC FAILURE

No vert. sync.-V12, V13

No horiz. sync.-V12, V15, V16

No vert. or horiz. sync.-V12

SWEEP FAILURE

No raster, has sound-V16, V17, V19, V21 Fuse (M2)

No vertical deflection-V14

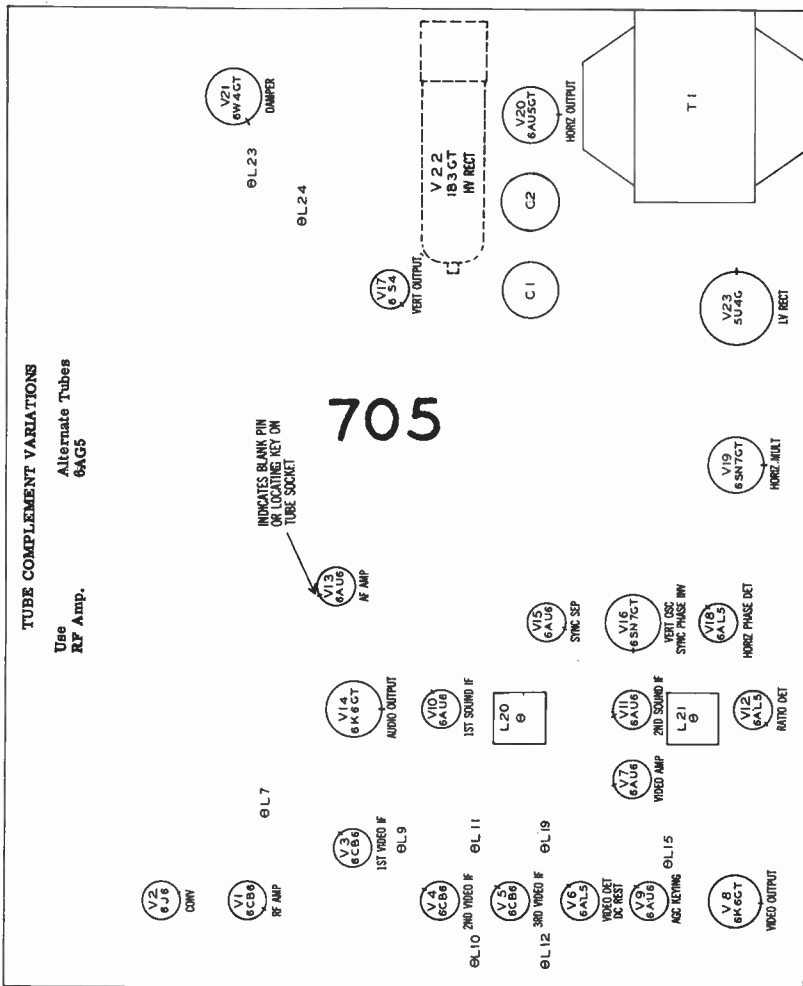
Poor vert. linearity or foldover-V13, V14

Poor horiz. linearity or foldover-V16, V17, V18

Narrow picture-V16, V17, V18, V19, V20

Vert off freq.-V12, V13

Horiz. off freq.-V12, V15, V16



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V6, V7, V8, V24
- Has pic, no sound - V10, V11, V12, V13, V14
- Overloaded picture - V9

SWEEP FAILURE

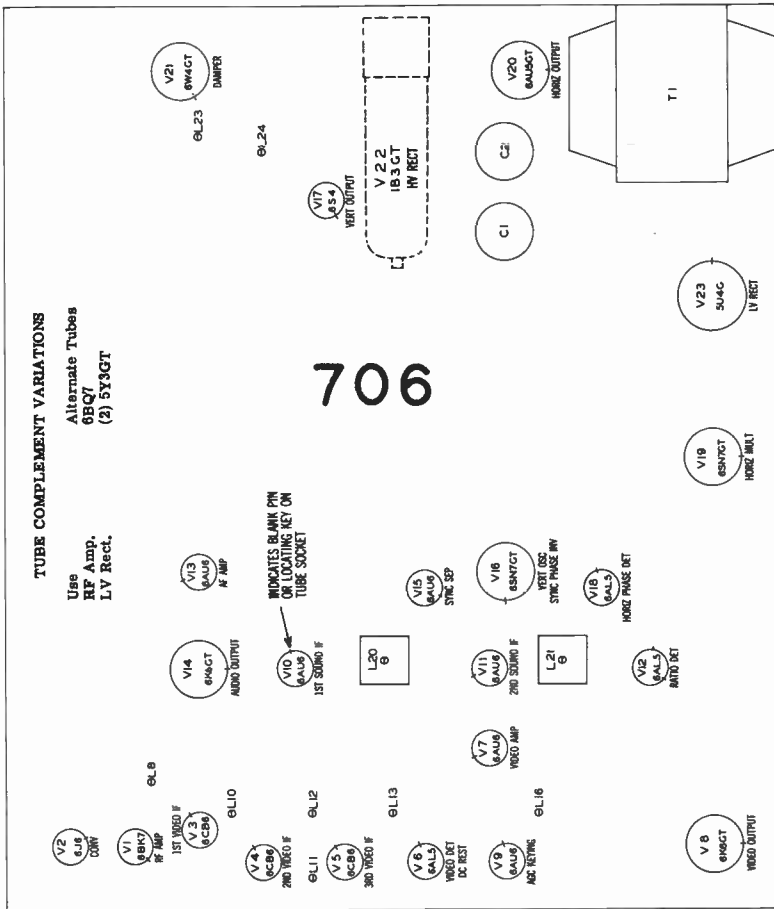
- No raster, has sound - V10, V20, V21, V22, V24, fuse (M1)
- No vertical deflection - V16, V17
- Poor vert. linearity or foldover - V16, V17
- Poor horiz. linearity or foldover - V10, V20, V21
- Narrow picture - V10, V20, V21, V22, V23
- Narrow, off freq. - V18
- Horiz. off freq. - V16, V18, V19

POWER SUPPLY FAILURE

- No raster, no sound - V23

SYNC FAILURE

- No vert. sync - V16
- No horiz. sync - V16, V18, V19
- No vert. or horiz. sync - V15, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V23, V24

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V7, V8, V25

Has pic, no sound - V10, V11, V12, V13, V14

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V16

No horiz. sync - V16, V18, V19

No vert. or horiz. sync - V15, V16

SWEEP FAILURE

No raster, has sound - V19, V20, V21, V22, V25, fuse (M1)

No vertical deflection - V16, V17

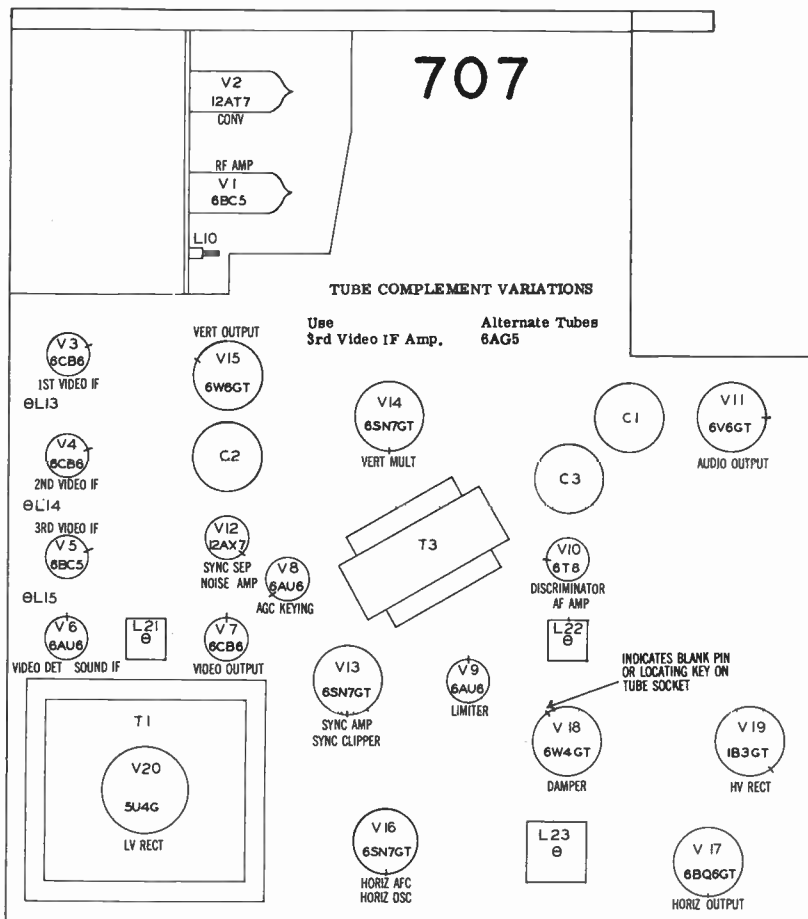
Poor vert. linearity or foldover - V16, V17

Poor horiz. linearity or foldover - V19, V20, V21

Narrow picture - V19, V20, V21, V22, V23, V24

Vert. off freq. - V16

Horiz. off freq. - V16, V16, V19



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V8

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V9, V10, V11

Overloaded picture - V8

SYNC FAILURE

No vert. sync - V13, V14

No horiz. sync - V13, V16

No vert. or horiz. sync - V12, V13

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21

No vertical deflection - V14, V15

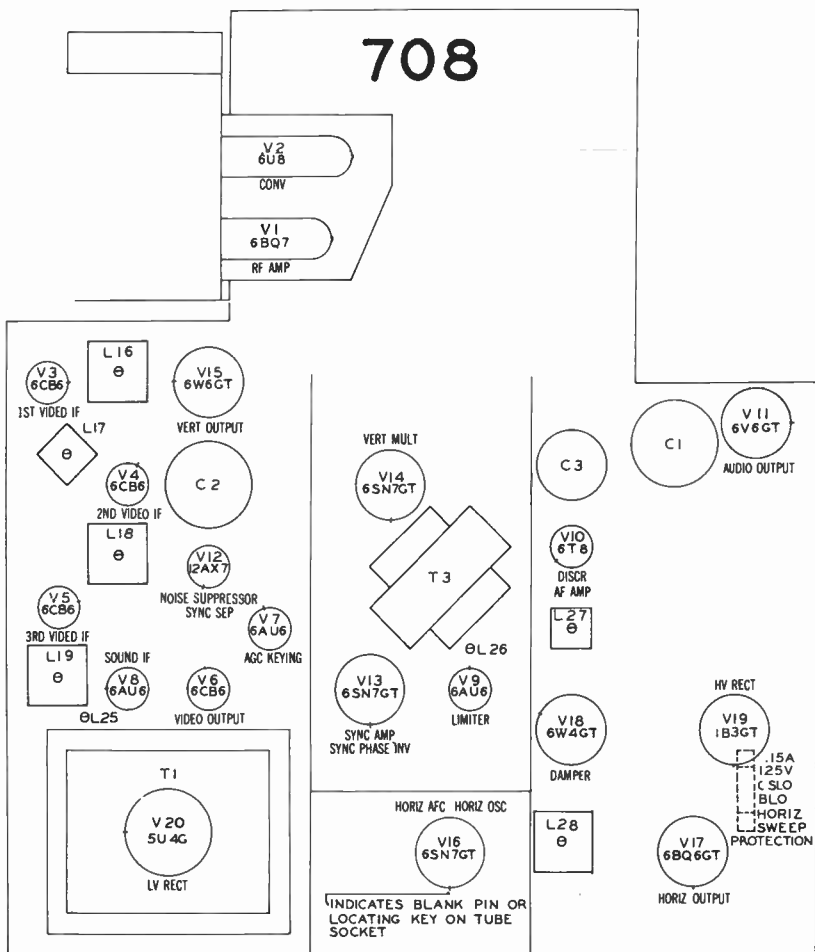
Poor vert. linearity or foldover - V14, V15

Poor horiz. linearity or foldover - V16, V17, V18

Narrow picture - V16, V17, V18, V19, V20

Vert. off freq. - V13, V14

Horiz. off freq. - V13, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5,

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V21

Has pic, no sound-V8, V9, V10, V11

Overloaded picture-V7

SYNC FAILURE

No vert. sync.-V13, V14

No horiz. sync.-V13, V16

No vert. or horiz. sync.-V12, V13

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V21 Fuse (M1)

No vertical deflection-V14, V15

Poor vert. linearity or foldover-V14, V15

Poor horiz. linearity or foldover-V16, V17, V18

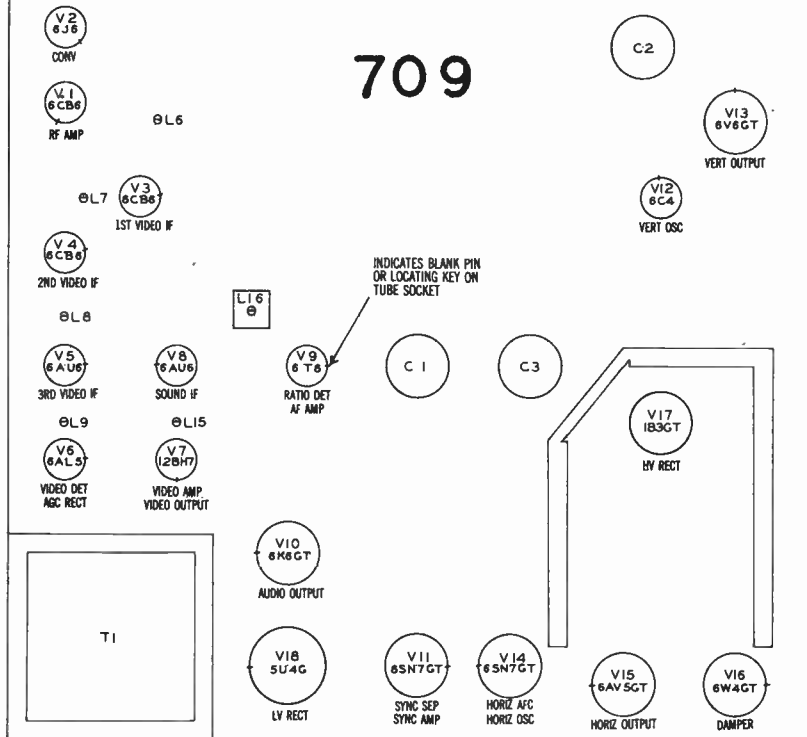
Narrow picture-V16, V17, V18, V19, V20

Vert. off freq.-V13, V14

Horiz. off freq.-V13, V16

TUBE COMPLEMENT VARIATIONS

Use Alternate Tubes
 RF Amp. 6BC5, 6AG5
 Video Amp.-Video Out 12AU7



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V18, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V19

Has pic, no sound - V8, V9, V10

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19, fuse(M2)

No vertical deflection - V12, V13

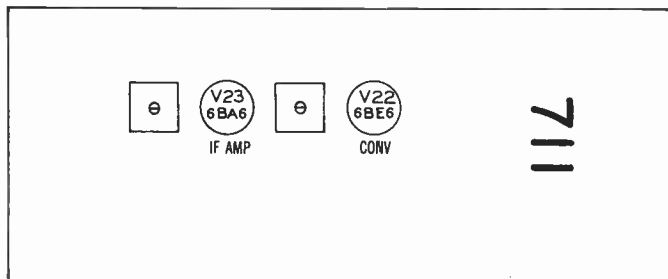
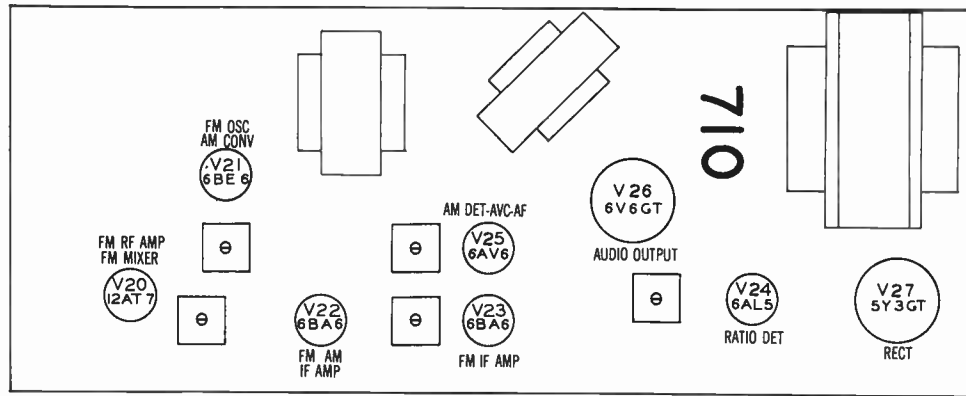
Poor vert. linearity or foldover - V12, V13

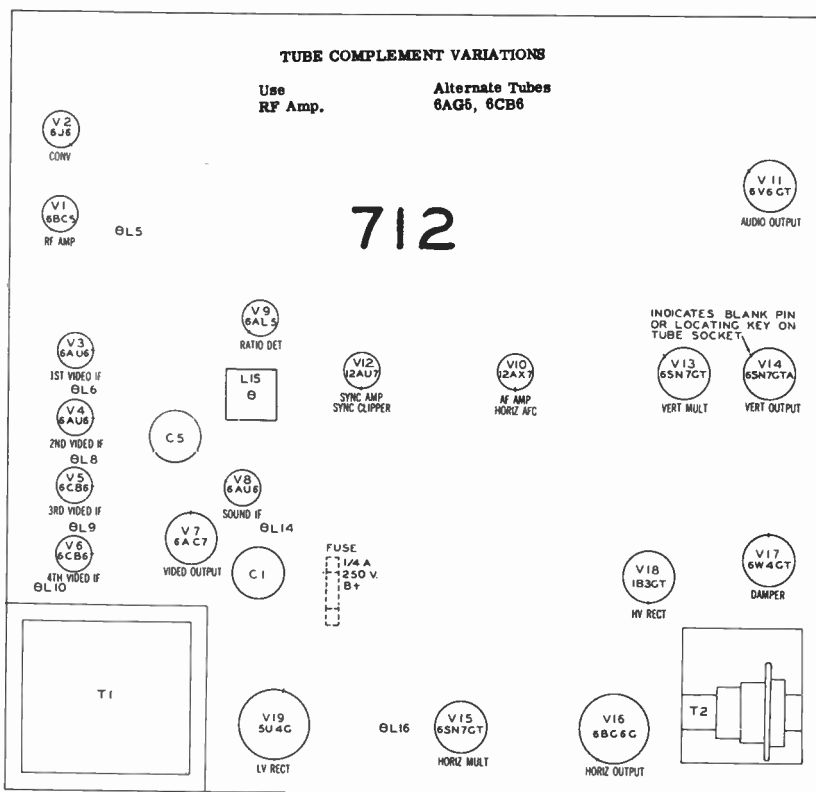
Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, V18

Vert. off freq. - V11, V12

HORIZ. off freq. - V11, V14





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

POWER SUPPLY FAILURE

No raster, no sound - V19, Fuse (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, No sound, Has Raster - V2, V3, V4, V5, V6, V7, V11

No pic, No Sound, Has Snow - V1, V2, V3

No pic, Has sound, Has raster - V7, V20

Has pic, No sound - V8, V9, V10, V11

SYNC FAILURE

No vert. sync - V12, V13

No horiz. sync - V12, V10, V15

No Vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20

No vertical deflection - V14

Poor vert. linearity or foldover - V13, V14

Poor horiz. linearity or foldover - V15, V16, V17

Narrow picture - V15, V16, V17, V18, V19

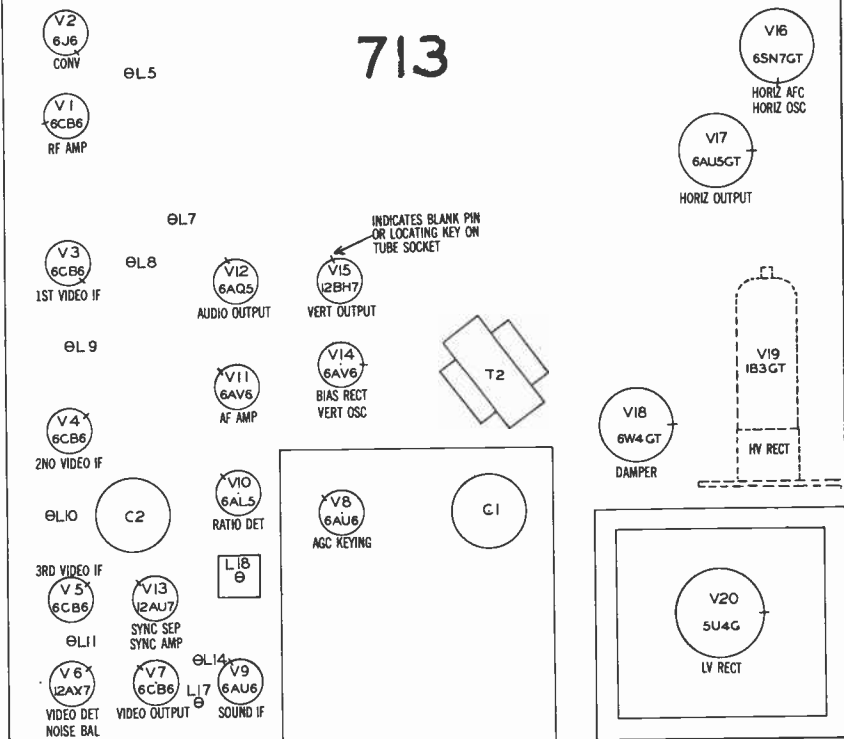
Vert. off freq. - V12, V13

Horiz. off freq. - V12, V10, V15

TUBE COMPLEMENT VARIATIONS

Use Alternate Tubes
RF Amp. 6BC5, 6AG5

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V12
 Has pic, no sound - V9, V10, V11, V12
 Overloaded picture - V8, V14

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, fuse (M1)
 No vertical deflection - V14, V15
 Poor vert. linearity or foldover - V14, V15
 Poor horiz. linearity or foldover - V16, V17, V18
 Narrow picture - V16, V17, V18, V19, V20
 Vert. off freq. - V13, V14
 Horiz. off freq. - V13, V16

POWER SUPPLY FAILURE

No raster, no sound - V20

SYNC FAILURE

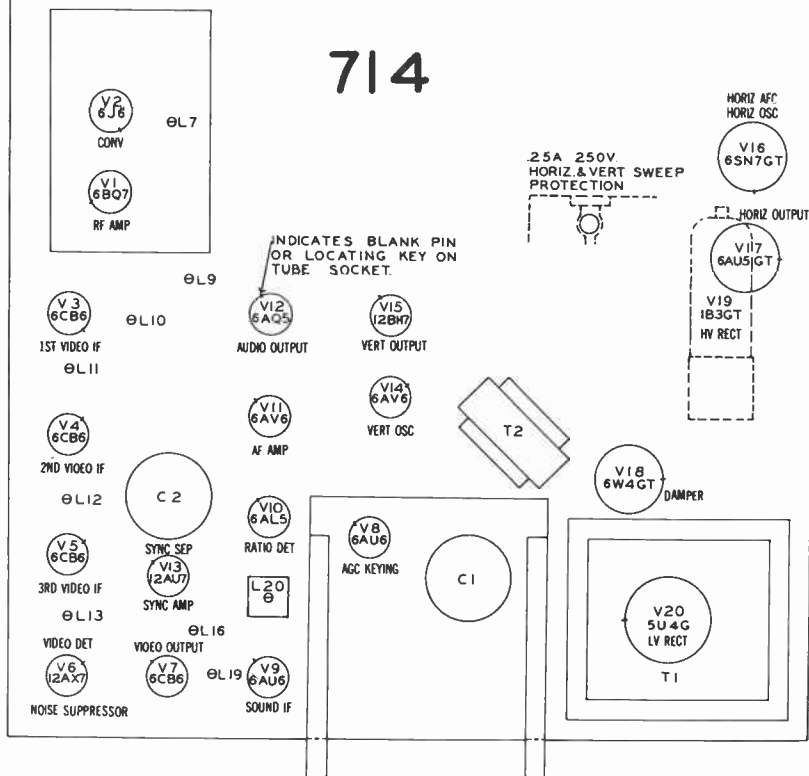
No vert. sync - V13, V14
 No horiz. sync - V13, V16
 No vert. or horiz. sync - V13

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BK7

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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V8, V21
- Has pic, no sound - V8, V10, V11, V12
- Overloaded picture - V8

SWEEP FAILURE

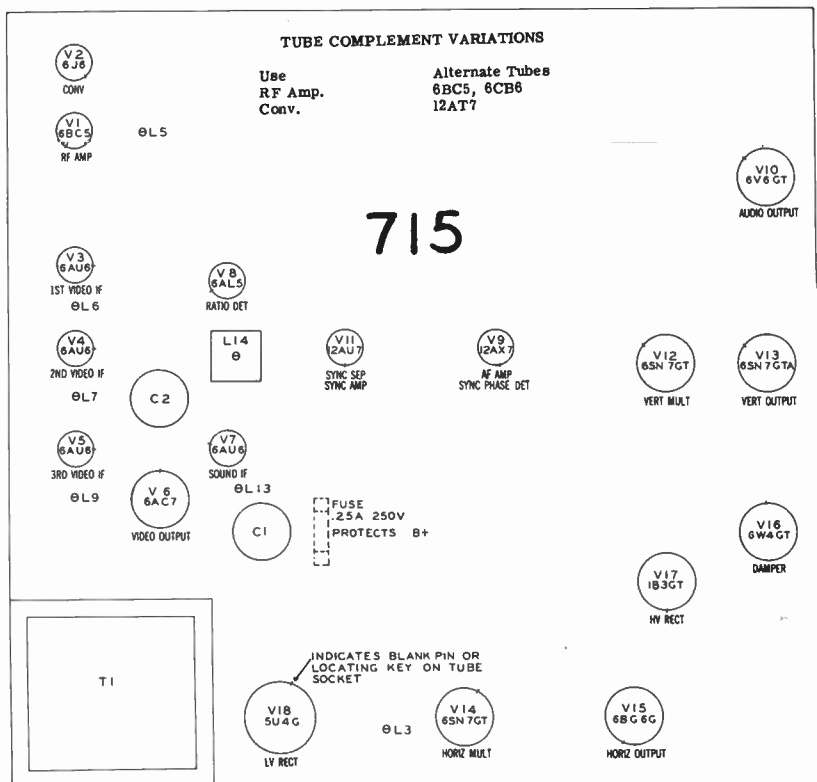
- No raster, has sound - V16, V17, V18, V19, V21, Fuse (M1)
- No vert. deflection - V14, V15
- Poor vert. linearity or foldover - V13, V14, V15
- Poor horiz. linearity or foldover - V16, V17, V18
- Narrow picture - V16, V17, V18, V19, V20
- Vert. off freq. - V13, V14
- Horiz. off freq. - V13, V16

POWER SUPPLY FAILURE

- No raster, no sound - V20

SYNC FAILURE

- No vert. sync - V13, V14
- No horiz. sync - V13, V16
- No vert. or horiz. sync - V6, V13



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V18, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V19

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19

No vertical deflection - V12, V13

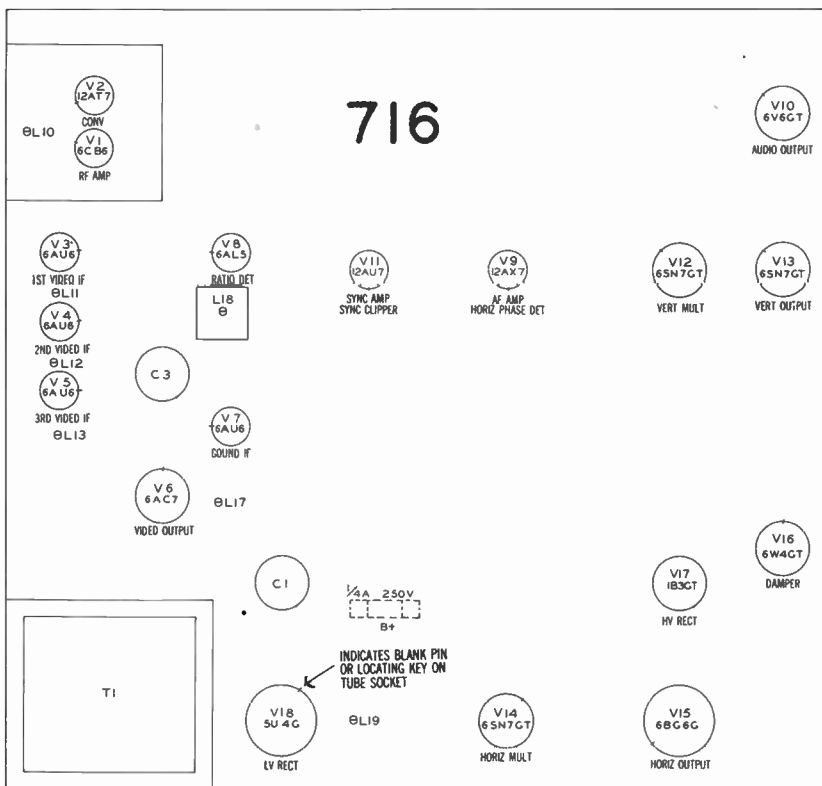
Poor vert. linearity or foldover - V12, V13

Poor Horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, V18

Vert. Off Freq. - V11, V12

Horiz. Off Freq. - V9, V11, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V18

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5, V6, V10

No pic, No sound, Has snow - V1, V2, V3

No pic, Has sound, Has raster - V6, V19

Has pic, No sound - V7, V8, V9, V10

SYNC FAILURE

No Vert. sync - V11, V12, V13

No Hor. sync - V11, V9, V14

No Vert. or Hor. sync - V11

SWEEP FAILURE

No raster, Has sound - V14, V15, V16, V17, V19, Fuse (M1)

No vertical deflection - V12, V13

Poor Vert. Linearity or foldover - V12, V13

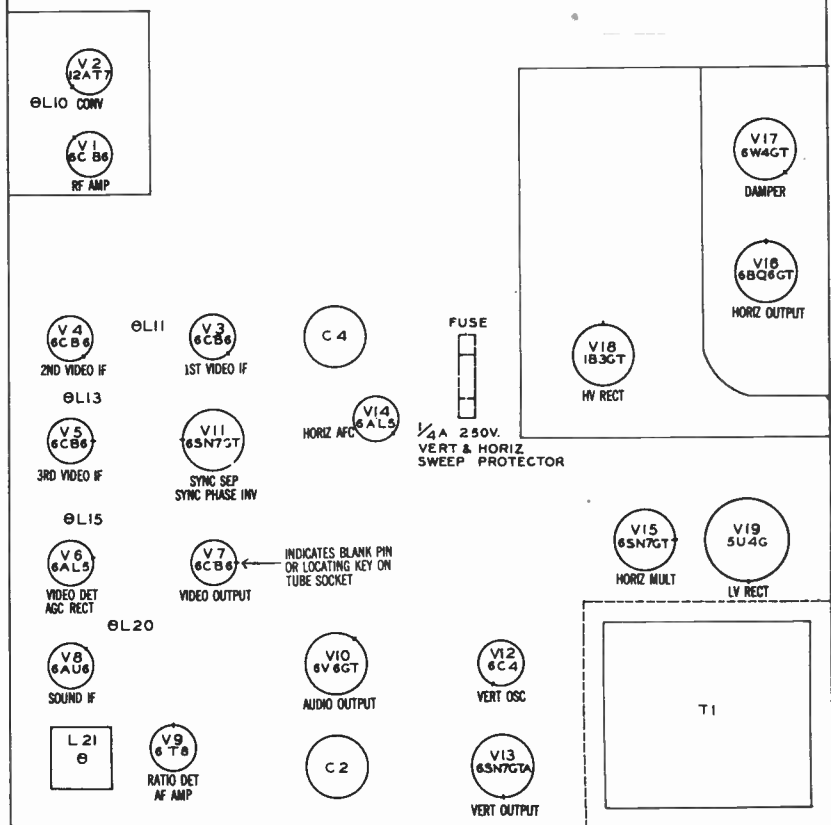
Poor Horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V18

Vert. off freq. - V12

Horiz. off freq. - V9, V14

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V20

Has pic, no sound-V8, V9, V10

Overloaded picture-V6

SYNC FAILURE

No vert. sync.-V11, V12

No horiz. sync.-V11, V14, V15

No vert. or horiz. sync.-V11

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V20, Fuse (M1)

No vertical deflection-V13

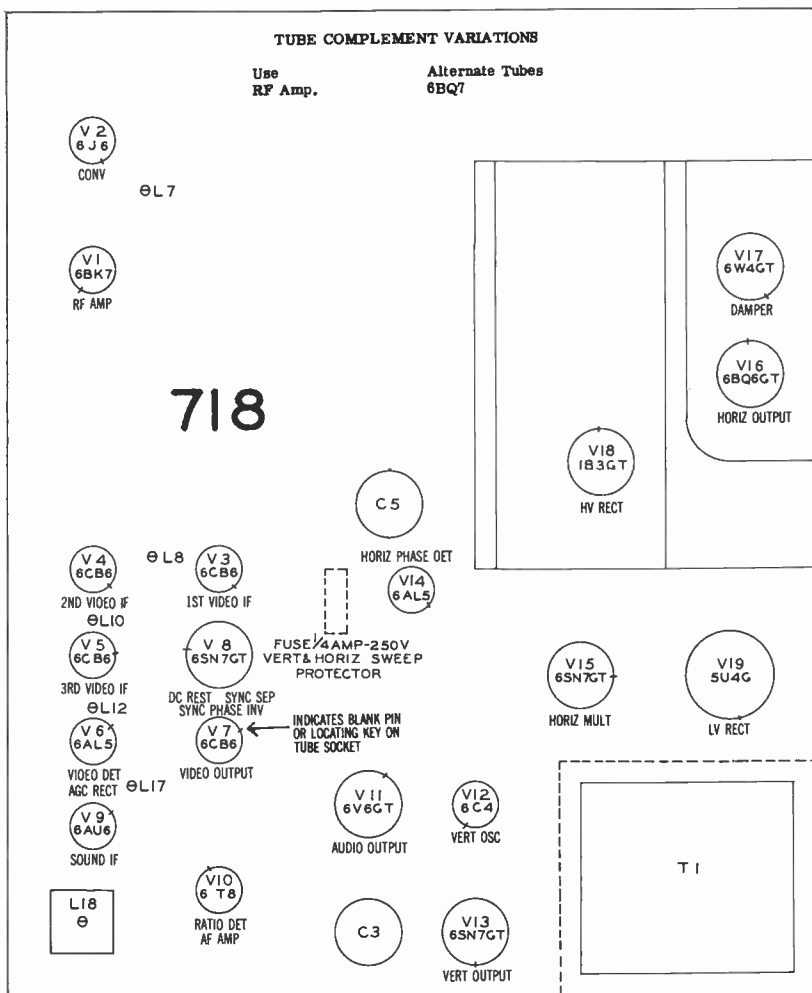
Poor vert. linearity or foldover-V12, V13

Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19

Vert off freq.-V12

Horiz. off freq.-V11, V14, V15



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V11
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V7, V20
- Has pic, no sound - V9, V10, V11
- Overloaded picture - V6

SWEEP FAILURE

- No raster, has sound - V15, V16, V17, V18, V20, fuse (M1)
- No vertical deflection - V12, V13
- Poor vert. linearity or foldover - V12, V13
- Poor horiz. linearity or foldover - V15, V16, V17
- Narrow picture - V15, V16, V17, V18, V19
- Vert. off freq. - V8, V12
- Horiz. off freq. - V8, V14, V15

POWER SUPPLY FAILURE

- No raster, no sound - V19

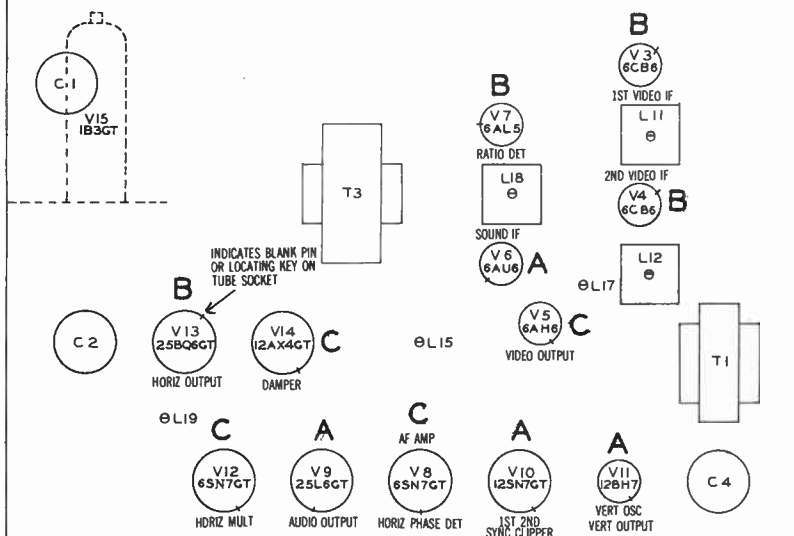
SYNC FAILURE

- No vert. sync - V8, V12
- No horiz. sync - V8, V14, V15
- No vert. or horiz. sync - V8

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B V1
6CB6
RF AMP

C V2
6UB
CONV



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V9

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V5, V16

Has pic, no sound - V6, V7, V8, V9

SYNC FAILURE

No vert. sync - V10, V11

No horiz. sync - V8, V10, V12

No vert. or horiz. sync - V10

SWEEP FAILURE

No raster, has sound - V12, V13, V14, V15, V16

No vertical deflection - V11

Poor vert. linearity or foldover - V11

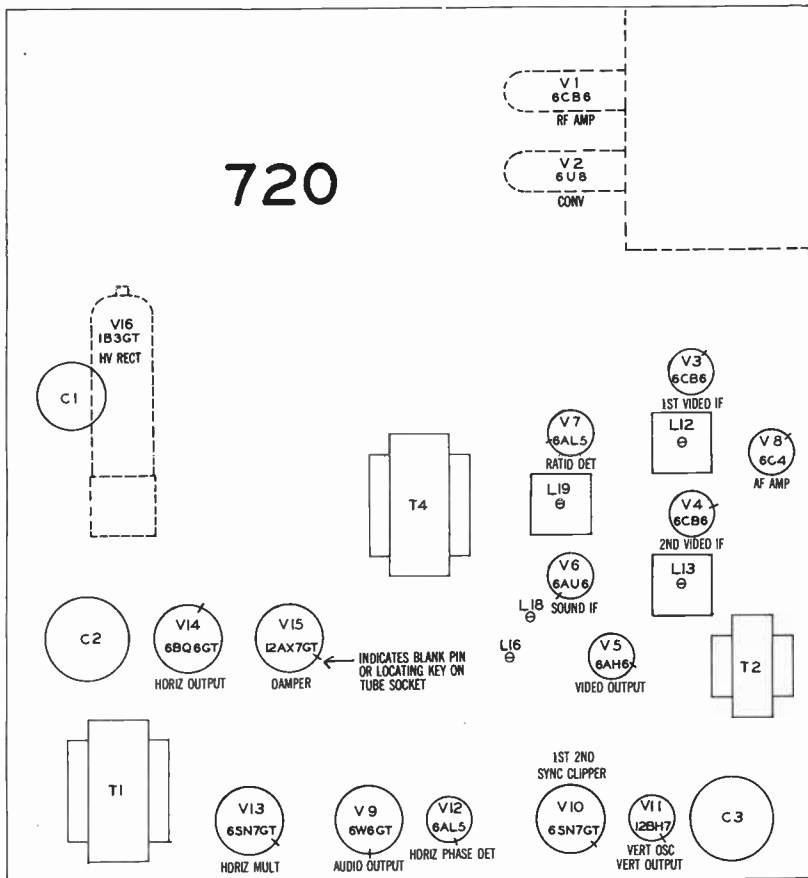
Poor horiz. linearity or foldover - V12, V13, V14

Narrow picture - V12, V13, V14, V15, M1, M2

Vert. off freq. - V10, V11

Horiz. off freq. - V8, V10, V12

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B-.



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifier (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V9

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V5, V17

Has pic, no sound - V6, V7, V8, V9

SYNC FAILURE

No vert. sync - V10, V11

No horiz. sync - V10, V12, V13

No vert. or horiz. sync - V10

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V11

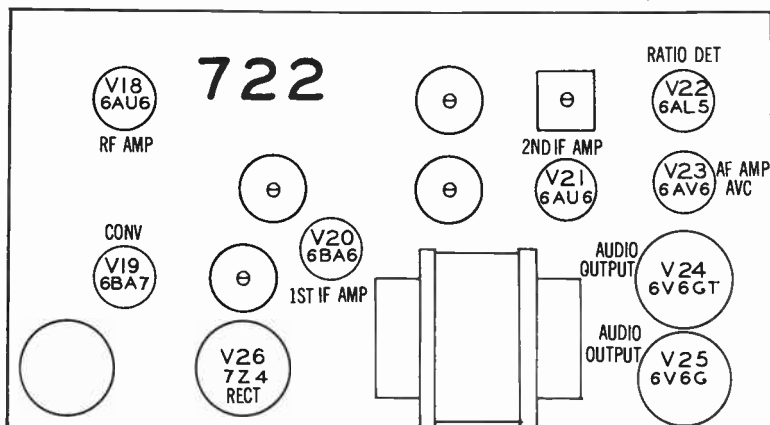
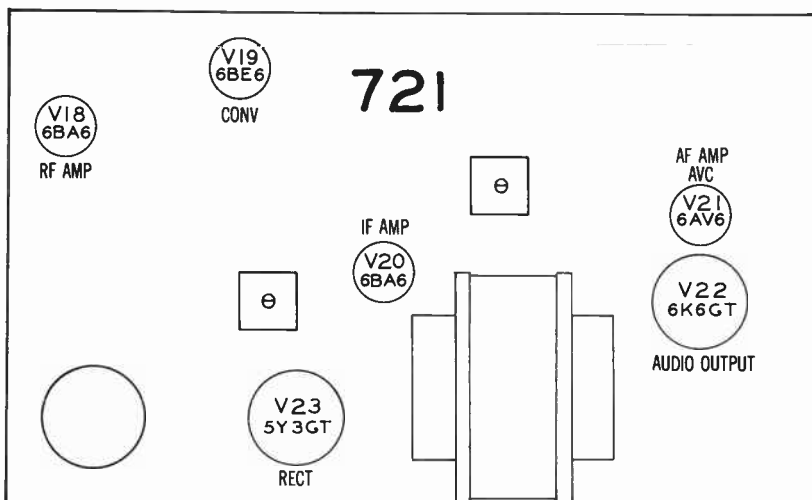
Poor vert. linearity or foldover - V11

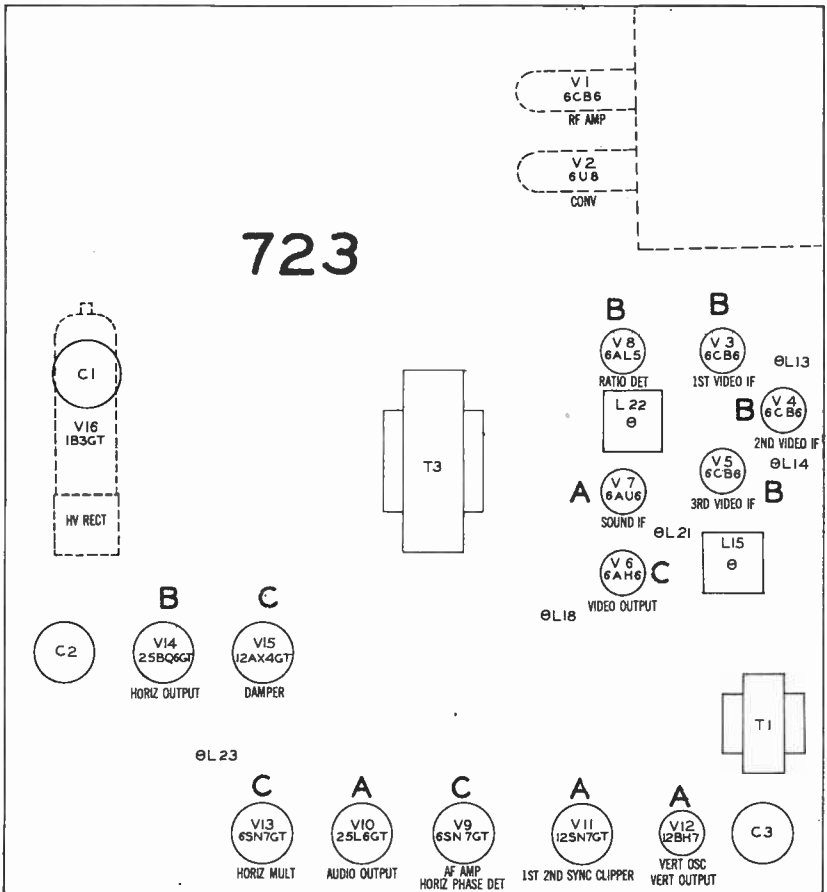
Poor horiz. linearity or foldover - V13, V14, V15

Narrow picture - V13, V14, V15, V16, M1

Vert. off freq. - V10, V11

Horiz. off freq. - V10, V12, V13





TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1 & M2

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V17

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V13

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V13, V14, V15

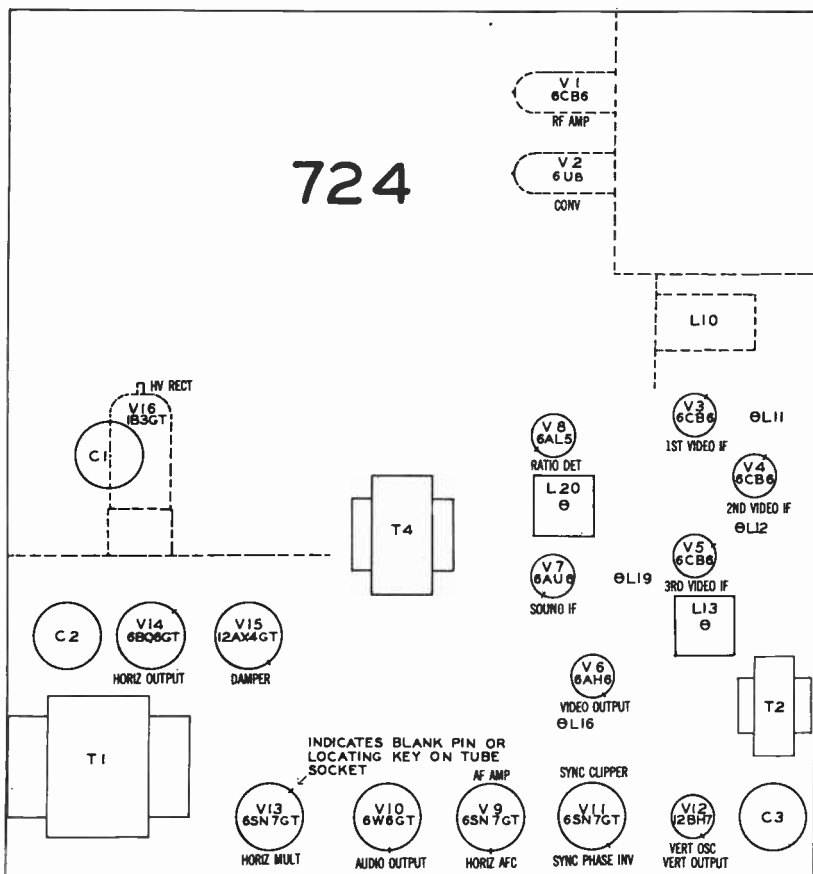
Narrow picture - V13, V14, V15, V16 (M1 & M2)

Vert. off freq. - V11, V12

Horiz. off freq. - V9, V11, V13

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B-.

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster -V2, V3, V4, V5, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster -V6, V17

Has pic, no sound-V7, V8, V9, V10

SYNC FAILURE

No vert. sync.-V11, V12

No horiz. sync.-V9, V11, V13

No vert. or horiz. sync.-V11

SWEEP FAILURE

No raster, has sound-V13, V14, V15, V16, V17

No vertical deflection-V12

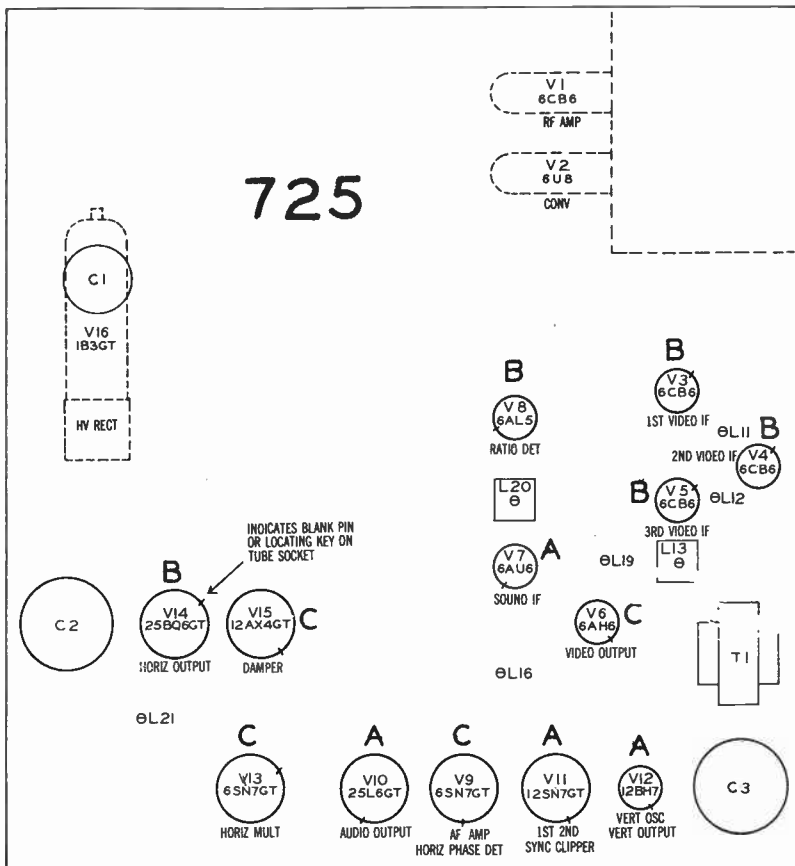
Poor vert. linearity or foldover-V12

Poor horiz. linearity or foldover -V13, V14, V15

Narrow picture-V13, V14, V15, V16, M1, M2

Vert. off freq.-V11, V12

Horiz. off freq.-V9, V11, V13



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V17

Has pic, no sound - V7, V6, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V13

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V13, V14, V15

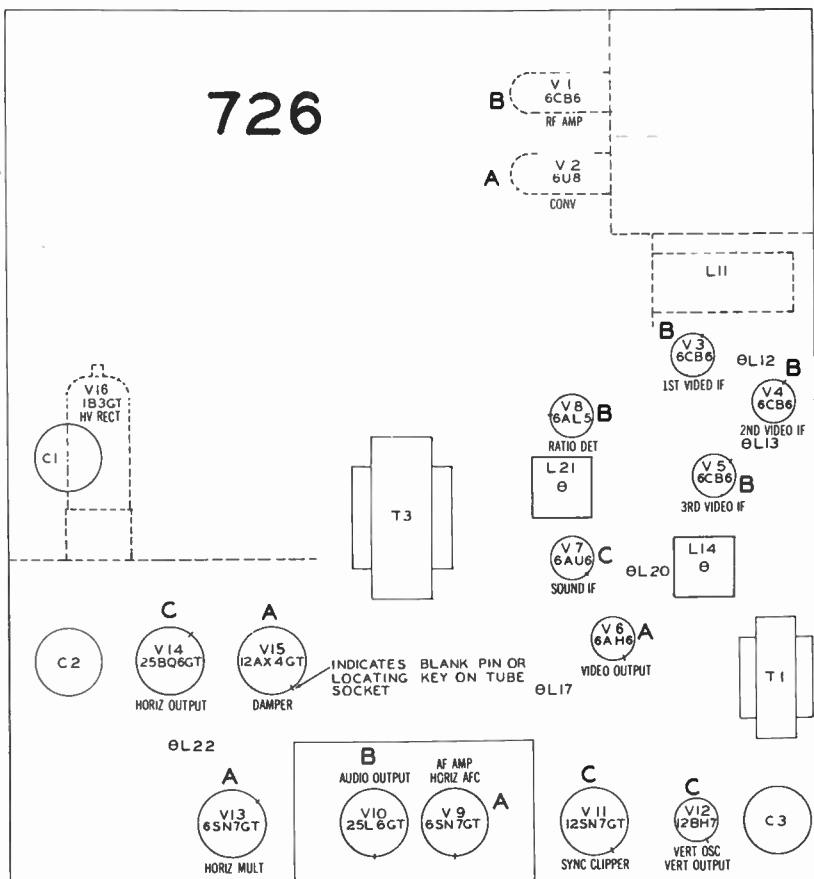
Narrow picture - V13, V14, V15, V16, M1 & M2

Vert. off freq. - V11, V12

Horiz. off freq. - V9, V11, V13

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B.

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound; has raster - V6, V17

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V13

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V13, V14, V15

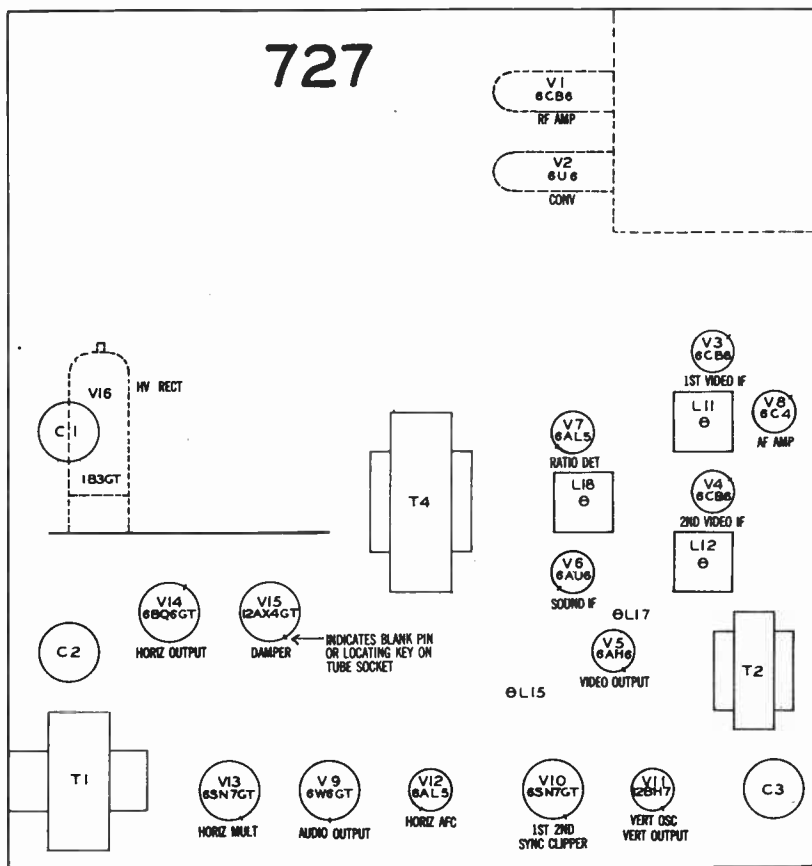
Narrow picture - V13, V14, V15, V16, M1, M2

Vert. off freq. - V11, V12

Horiz. off freq. - V9, V11, V13

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B-.

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster - V2, V3, V4, V5

No pic, No sound, Has snow - V1, V2, V3

No pic, Has sound, has raster - V5, V17

Has pic, No sound - V6, V7, V8, V9

SYNC FAILURE

No vert. sync - V10, V11

No horiz. sync - V10, V12, V13

No vert. or horiz. sync - V10

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V11

Poor vert. linearity or foldover - V11

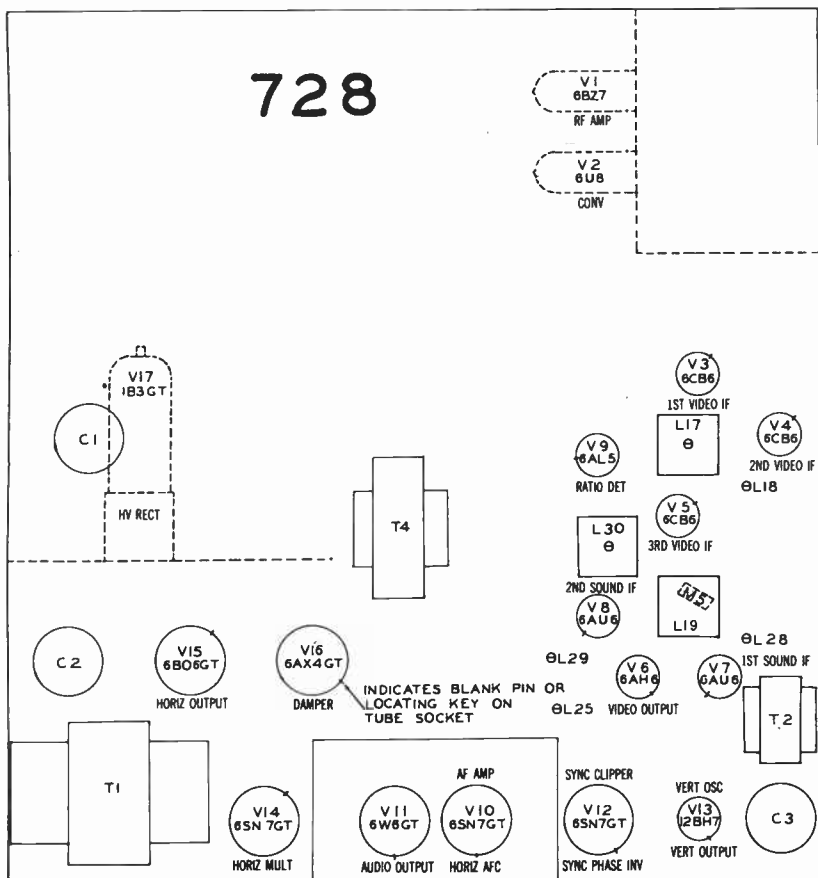
Poor horiz. linearity or foldover - V13, V14, V15

Narrow picture - V13, V14, V15, V16, M1, M2

Vert. off freq. - V10, V11

Horiz. off freq. - V10, V12, V13

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V11

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V18

Has pic, no sound-V7, V8, V9, V10, V11

SYNC FAILURE

No vert. sync-V12, V13

No horiz. sync-V10, V12, V14

No vert. or horiz. sync-V12

SWEPT FAILURE

No raster, has sound- V14, V15, V16, V17, V18

No vertical deflection-V13

Poor vert. linearity or foldover-V13

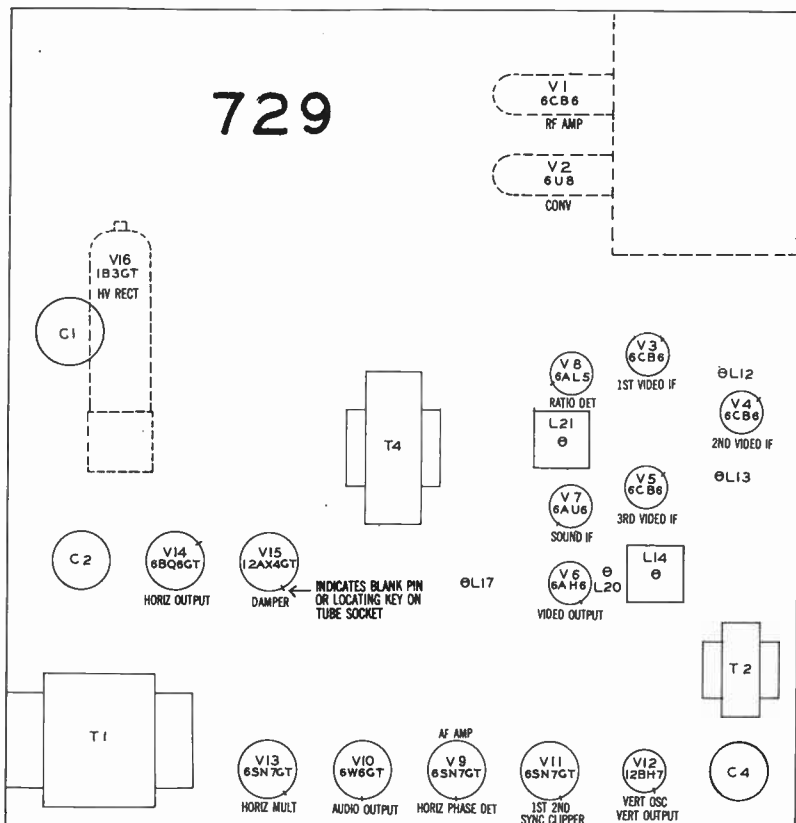
Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, M1, M2

Vert. off freq.-V12, V13

Horiz. off freq.- V10, V12, V14

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1 & M2

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V17

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V13

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V13, V14, V15

Narrow picture - V13, V14, V15, V16, M1, M2

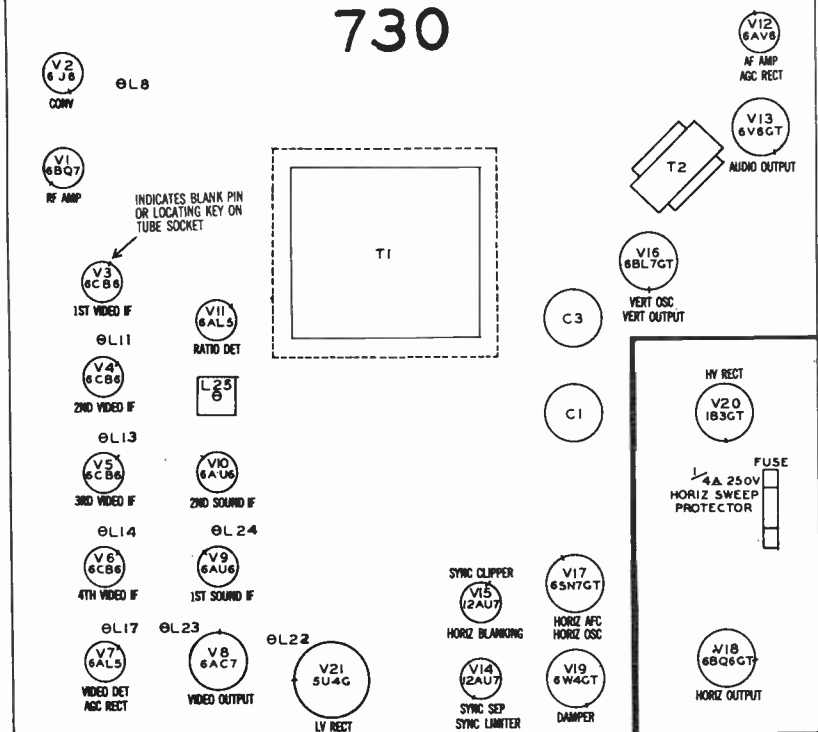
Vert. off freq. - V11, V12

Horiz. off freq. - V9, V11, V13

TUBE COMPLEMENT VARIATIONS

Use Alternate Tubes
RF Amp. 6BK7

730



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V13

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster- V8, V22

Has pic, no sound-V9, V10, V11, V12, V13

Overloaded picture-V7

SYNC FAILURE

No vert. sync.-V15, V16

No horiz. sync.-V15, V17

No vert. or horiz. sync. V14, V15

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V22, Fuse (M1)

No vertical deflection-V16

Poor vert. linearity or foldover-V16

Poor horiz. linearity or foldover-V17, V18, V19

Narrow picture-V17, V18, V19, V20, V21

Vert. off freq.-V16

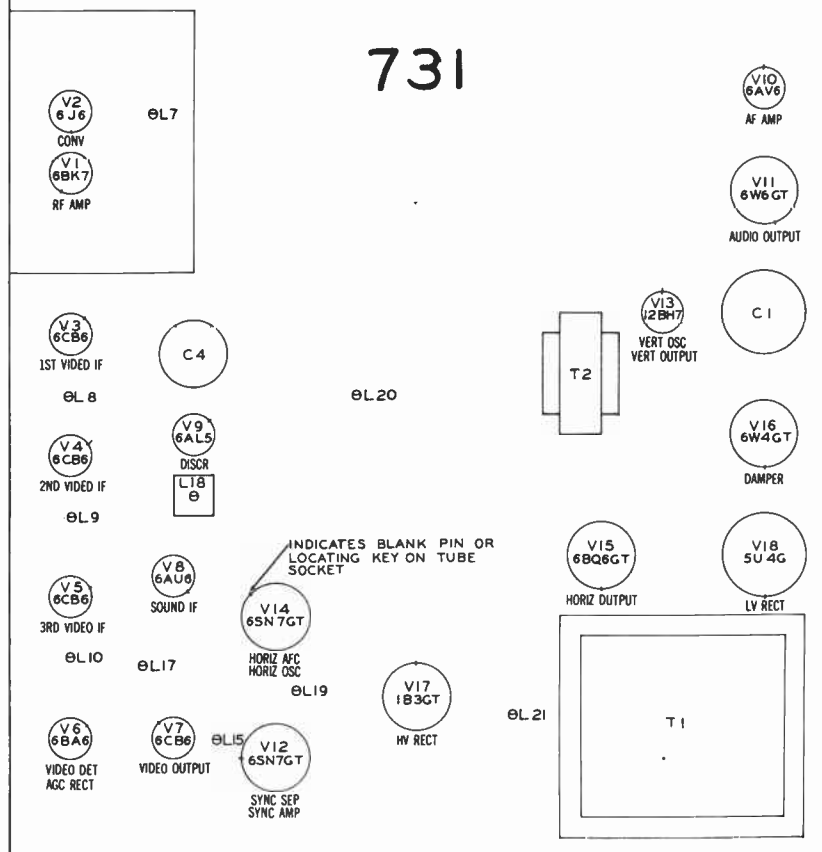
Horiz. off freq.-V15, V17

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BQ7

731



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V19
 Has pic, no sound - V8, V9, V10, V11
 Overloaded picture - V6

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19
 No vertical deflection - V13
 Poor vert. linearity or foldover - V13
 Poor horiz. linearity or foldover - V14, V15, V16
 Narrow picture - V14, V15, V16, V17, V18
 Vert. off freq. - V12, V13
 Horiz. off freq. - V12, V14

POWER SUPPLY FAILURE

No raster, no sound - V18

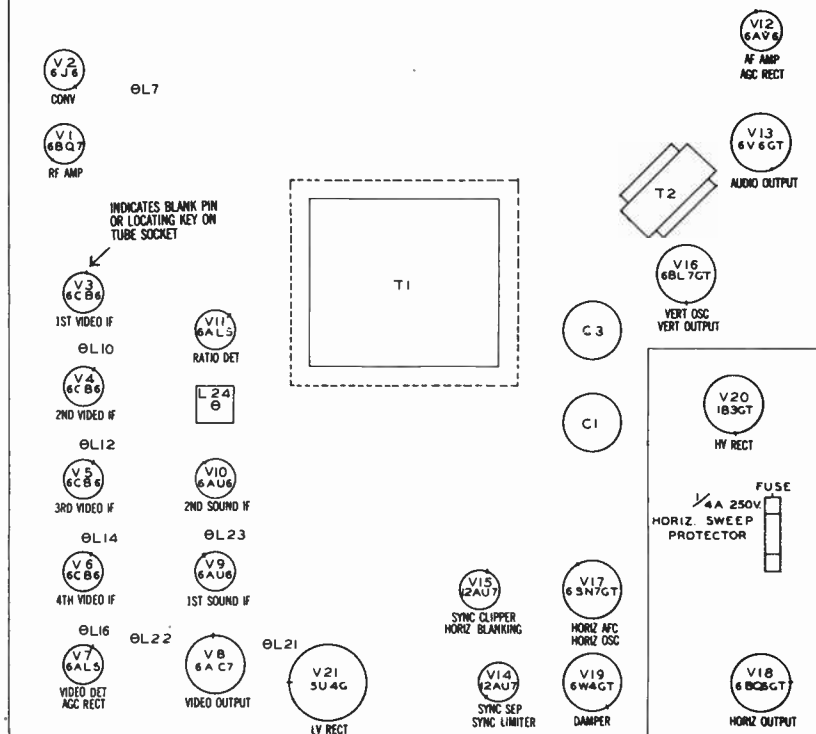
SYNC FAILURE

No vert. sync - V12, V13
 No horiz. sync - V12, V14
 No vert. or horiz. sync - V12

732

TUBE COMPLEMENT VARIATIONS

Use RF Amp. Alternate Tubes 6BK7



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7, V13
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V8, V22
 Has pic, no sound-V9, V10, V11, V12, V13
 Overloaded picture-V7

SWEEP FAILURE

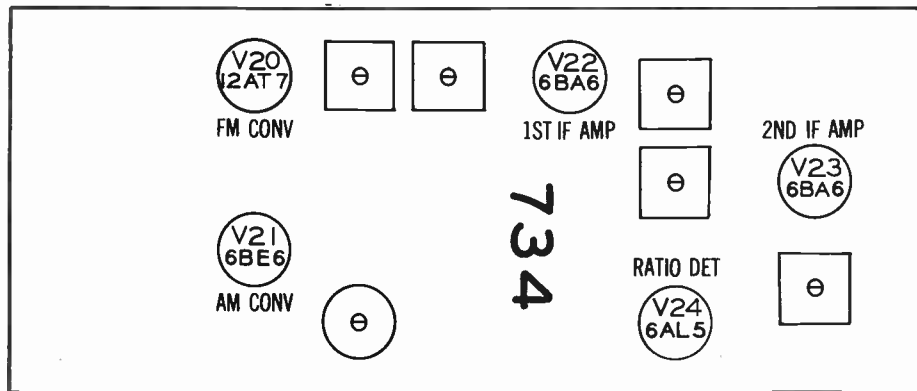
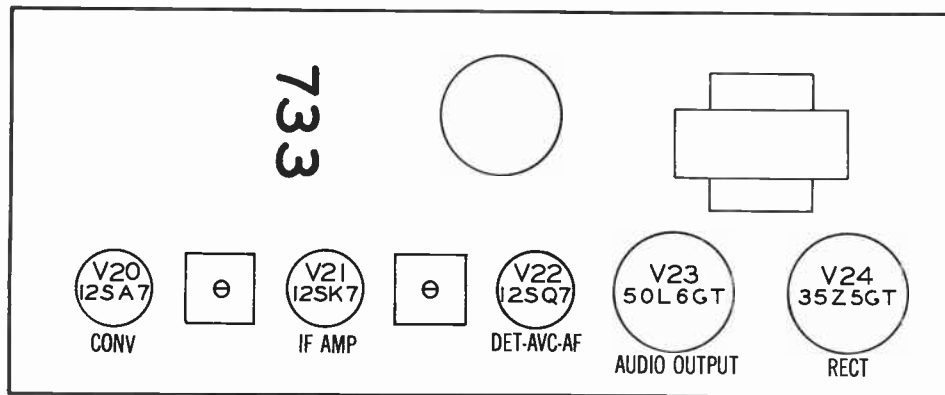
No raster, has sound-V17, V18, V19, V20, V22, Fuse (M)
 No vertical deflection-V16
 Poor vert. linearity or foldover-V16
 Poor horiz. linearity or foldover-V17, V18, V19
 Narrow picture-V17, V18, V19, V20, V21
 Vert. off freq.-V16
 Horiz. off freq.-V15, V17

POWER SUPPLY FAILURE

No raster, no sound-V21

SYNC FAILURE

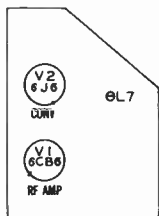
No vert. sync. V15, V16
 No horiz. sync. -V15, V17
 No vert. or horiz. sync. -V14, V15



TUBE COMPLEMENT VARIATIONS

Use
RF Amp.
Damper

Alternate Tubes
6AG5, 6BC5
6U4GT



735



6L9



INDICATES BLANK PIN OR LOCATING KEY ON TUBE SOCKET



AUDIO OUTPUT



VERT OSC
VERT DISCH



VERT OUTPUT



3RD VIDEO IF

6L11



VIDEO DET
DC REST

6L14

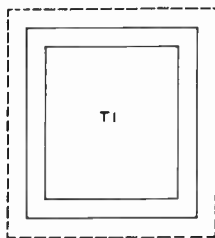


VIDEO AMP
VIDEO OUTPUT

6L18



SOUND IF



DAMPER



6L20



SYNC SEP
SYNC AMP



HORIZ AFC



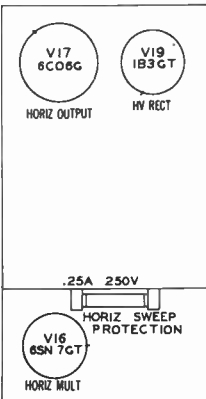
HORIZ OUTPUT



HV RECT



LY RECT



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V11

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V7, V21

Has pic, no sound-V8, V9, V10, V11

SYNC FAILURE

No vert. sync-V12, V13

No horiz. sync-V12, V15, V16

No vert. or horiz. sync.-V12

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V21, Fuse (M1)

No vertical deflection-V13, V14

Poor vert. linearity or foldover-V13, V14

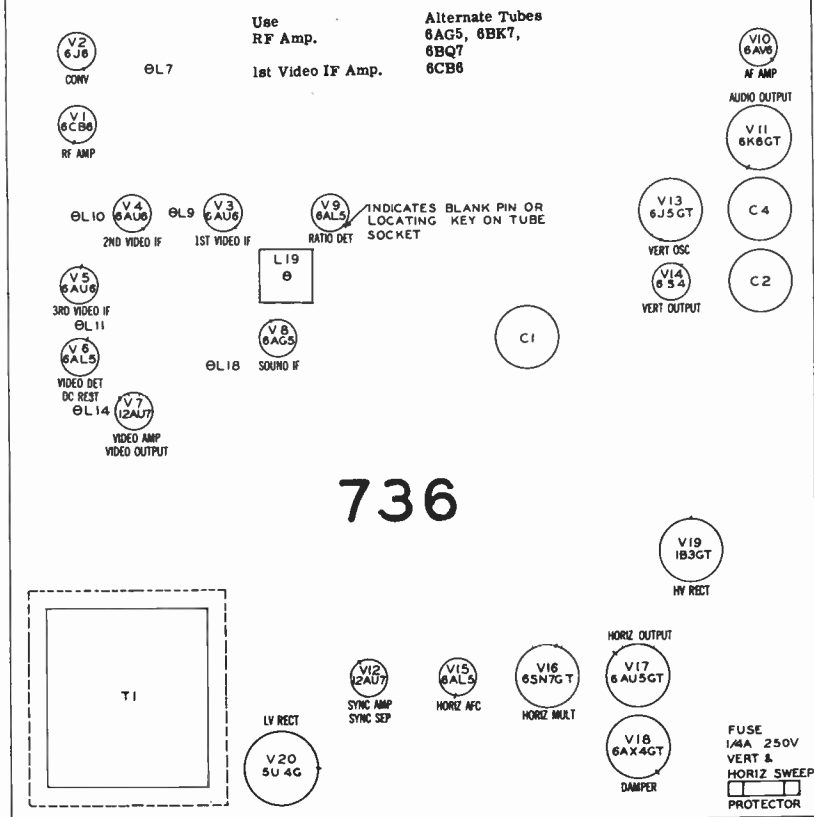
Poor horiz. linearity or foldover-V16, V17, V18

Narrow picture-V16, V17, V18, V19, V20

Vert. off freq.-V12, V13

Horiz. off freq.-V12, V15, V16

TUBE COMPLEMENT VARIATIONS



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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V11

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V8, V9, V10, V11

SYNC FAILURE

No vert. sync - V12, V13, V14

No horiz. sync - V12, V15, V16

No vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, FUSE (M1)

No vertical deflection - V13, V14

Poor vert. linearity or foldover - V13, V14

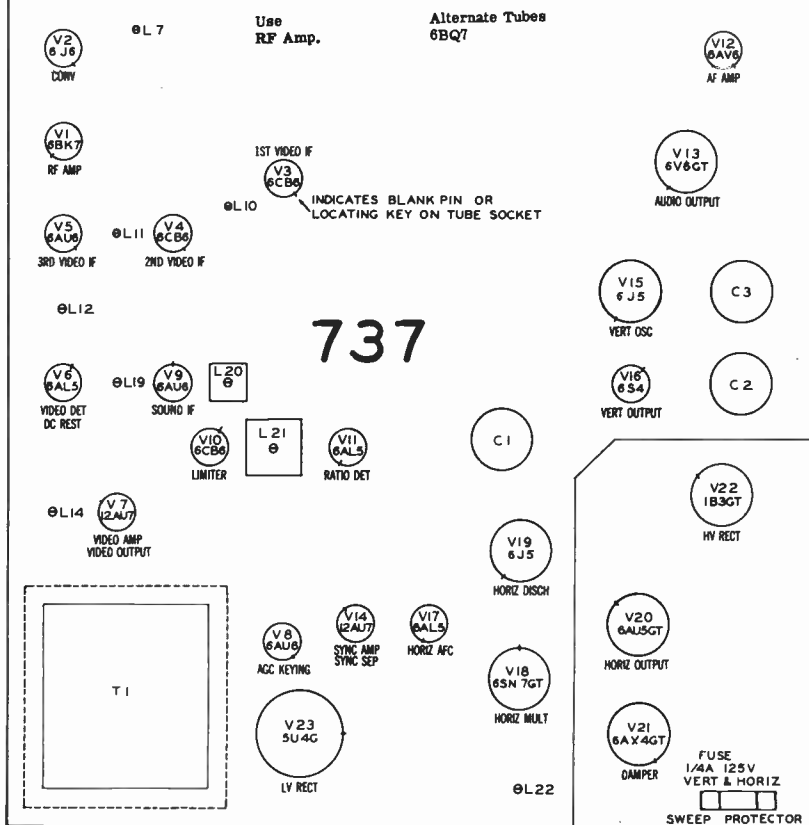
Poor horiz. linearity or foldover - V16, V17, V18

Narrow picture - V16, V17, V18, V19, V20

Vert. off freq. - V12, V13, V14

Horiz. off freq. - V12, V15, V16

TUBE COMPLEMENT VARIATIONS



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V13

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V7, V24

Has pic, no sound-V9, V10, V11, V12, V13

Overloaded picture-V8

SYNC FAILURE

No vert. sync.-V14, V15, V16

No horiz. sync.-V14, V17, V18

No vert. or horiz. sync.-V14

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V22, V24 Fuse (M)

No vertical deflection-V16

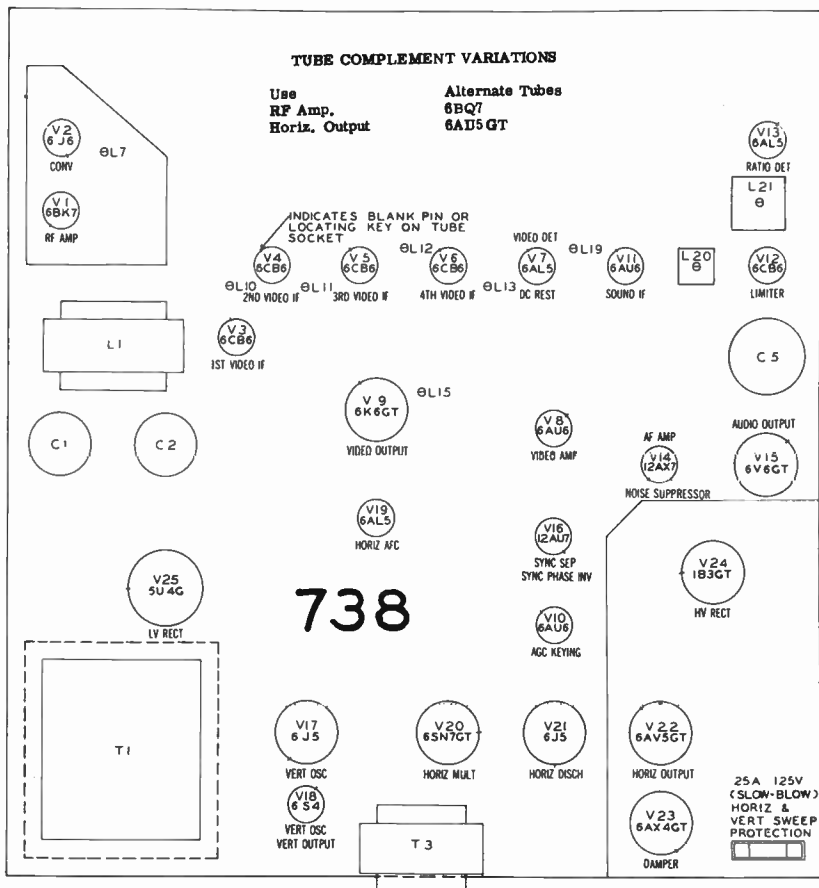
Poor vert. linearity or foldover-V15, V16

Poor horiz. linearity or foldover-V18, V19, V20, V21

Narrow picture-V18, V19, V20, V21, V22, V23

Vert. off freq.-V14, V15, V16

Horiz. off freq.-V14, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V25

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V15

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V9, V26

Has pic, no sound - V11, V12, V13, V14, V15

Overloaded picture - V10

SYNC FAILURE

No vert. sync - V16, V17

No horiz. sync - V16, V19, V20

No vert. or horiz. sync - V16

SWEEP FAILURE

No raster, has sound - V20, V21, V22, V23, V24, V26, Fuse (M1)

No vertical deflection - V17, V18

Poor vert. linearity or foldover - V17, V18

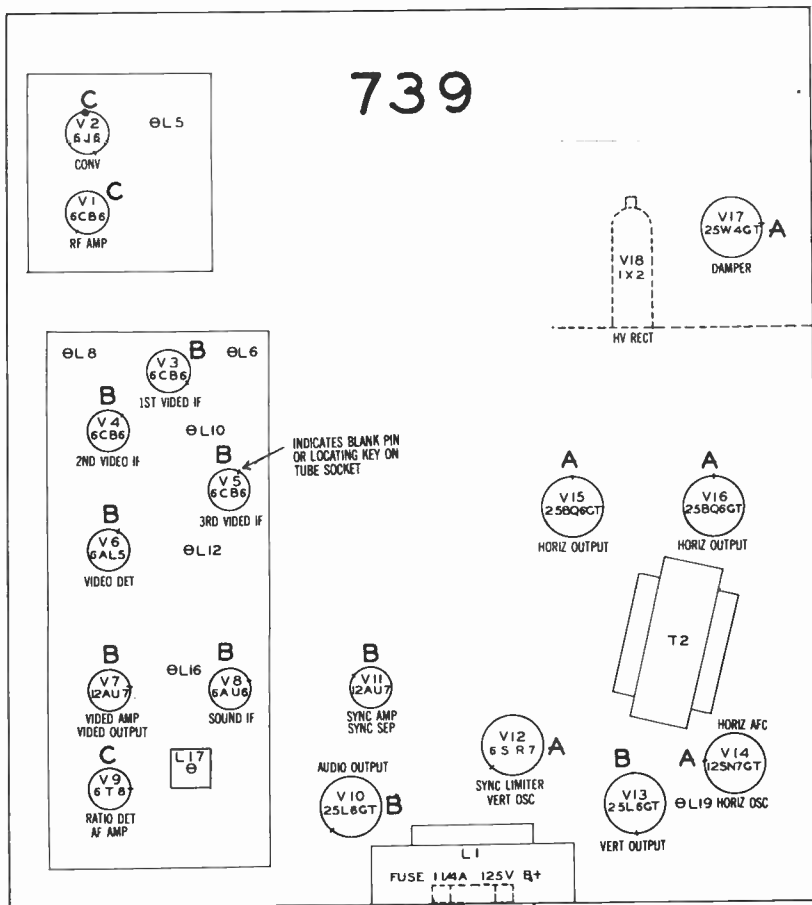
Poor horiz. linearity or foldover - V20, V21, V22, V23

Narrow picture - V20, V21, V22, V23, V24, V25

Vert. off freq. - V16, V17

Horiz. off freq. - V16, V19, V20

739



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
- No pic, no sound, has snow - V1, V2, V3
- No pic, has sound, has raster - V7, V19
- Has pic, no sound - V8, V9, V10
- Overloaded picture - V6

SWEEP FAILURE

- No raster, has sound - V14, V15, V16, V17, V18, V19
- No vertical deflection - V13
- Poor vert. linearity or foldover - V12, V13
- Poor horiz. linearity or foldover - V14, V15, V16, V17
- Narrow picture - V14, V15, V16, V17, V18, M1
- Vert. off freq. - V11, V12
- Horiz. off freq. - V11, V14

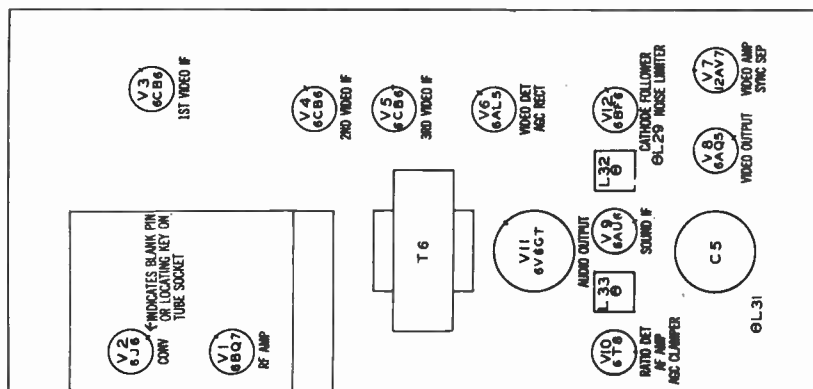
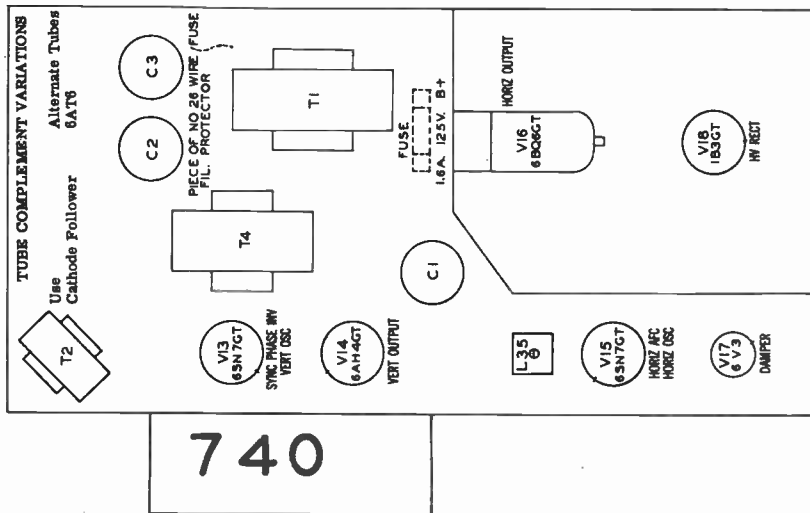
POWER SUPPLY FAILURE

- No raster, no sound - Selenium Rectifier (M1), fuse (M2)

SYNC FAILURE

- No vert. sync - V11, V12
- No horiz. sync - V11, V14
- No vert. or horiz. sync - V11

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and connected thru the picture tube filament and those tubes marked C to B-.



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

LOSS OF PICTURE OR SOUND

- No pic, No sound, Has raster-V2, V3, V4, V5, V6, V7
- No pic, No sound, Has snow-V1, V2, V3
- No pic, Has sound, Has raster-V8, V19
- Has pic, No sound-V9, V10, V11
- Overloaded picture-V6

SWEEP FAILURE

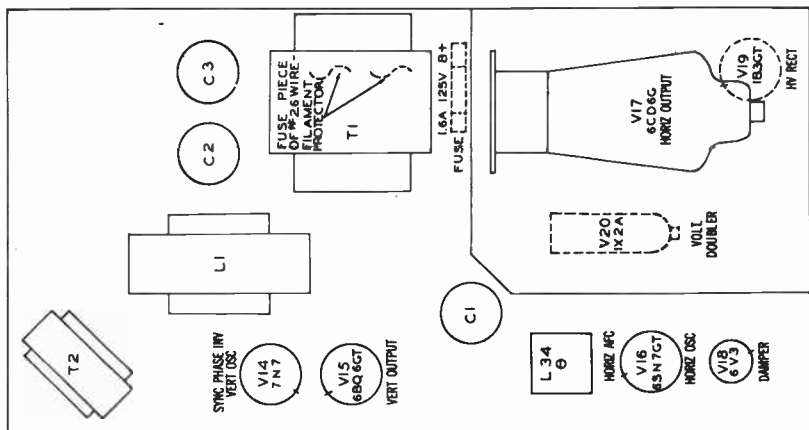
- No raster, has sound-V15, V16, V17, V18, V19
- No vertical deflection-V14
- Poor vert. linearity or foldover-V13, V14
- Poor horiz. linearity of foldover-V15, V16, V17
- Narrow picture-V15, V16, V17, V18, M1, M2
- Vert. off freq. -V13
- Horiz. off freq. -V13, V15

POWER SUPPLY FAILURE

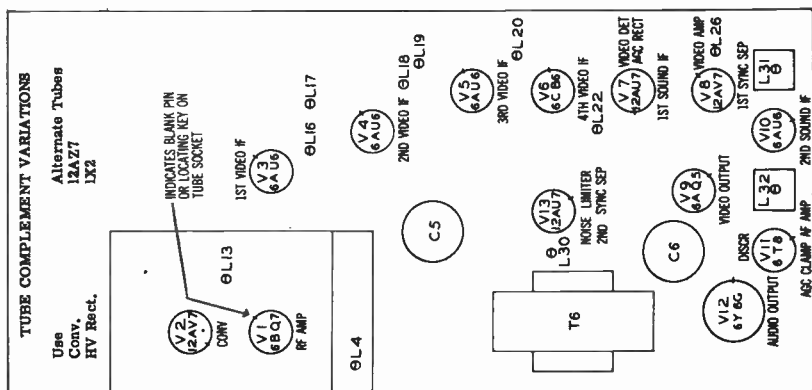
- No Raster, No Sound-Selenium Rectifiers
(M1, M2) Fuse (M3, M4)

SYNC FAILURE

- No vert. sync.-V13
- No horiz. sync. -V13, V15
- No vert. or horz. sync. -V12, V7, V13



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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V8, V9, V21
- Has pic, no sound-V7, V10, V11, V12
- Overloaded picture-V7

SWEEP FAILURE

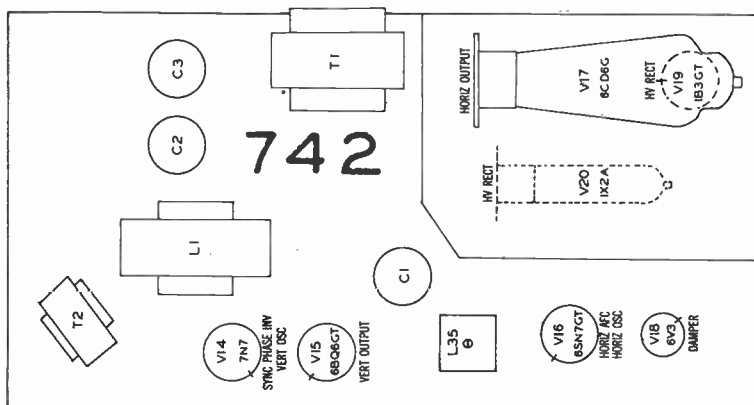
- No raster, has sound-V16, V17, V18, V19, V20, V21
- No vertical deflection-V15
- Poor vert. linearity or foldover-V14, V15
- Poor horiz. linearity or foldover-V16, V17, V18
- Narrow picture-V16, V17, V18, V19, V20, M1, M2
- Vert off freq. -V14
- Horiz. off freq. -V14, V16

POWER SUPPLY FAILURE

- No raster, no sound-Selenium Rectifiers (M1, M2) Fuse (M4)

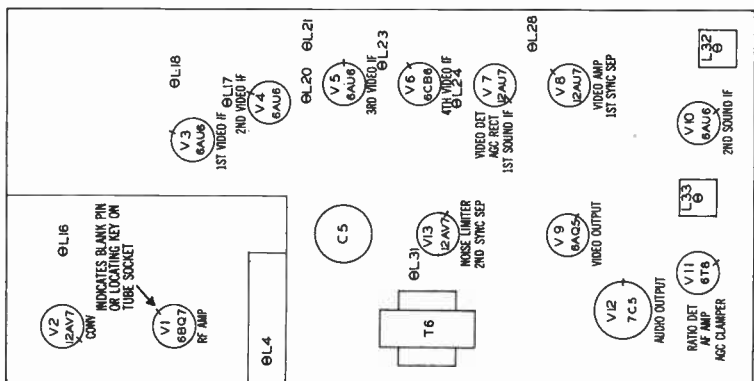
SYNC FAILURE

- No vert. sync-V14
- No horiz. sync. -V14, V16
- No vert. or horiz. sync. -V8, V13



TUBE COMPLEMENT VARIATIONS

Use	Alternate Tubes	Noise Lim. -	
Conv.	12A27	2nd Sync Sep.	12AU7
Video Amp. -		HV Rect.	1X2
1st Sync Sep.	12AV7		



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1, M2, M3, fuse (M4)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V8, V9, V21

Has pic, no sound - V7, V10, V11, V12

Overloaded picture - V7

SYNC FAILURE

No vert. sync - V14

No horiz. sync - V14, V16

No vert. or horiz. sync - V8, V13, V14

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V20, V21

No vertical deflection - V14, V15

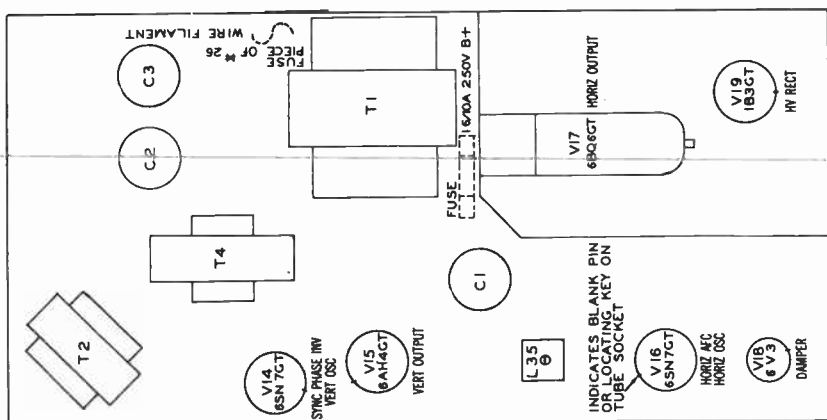
Poor vert. linearity or foldover - V14, V15

Poor horiz. linearity or foldover - V16, V17, V18

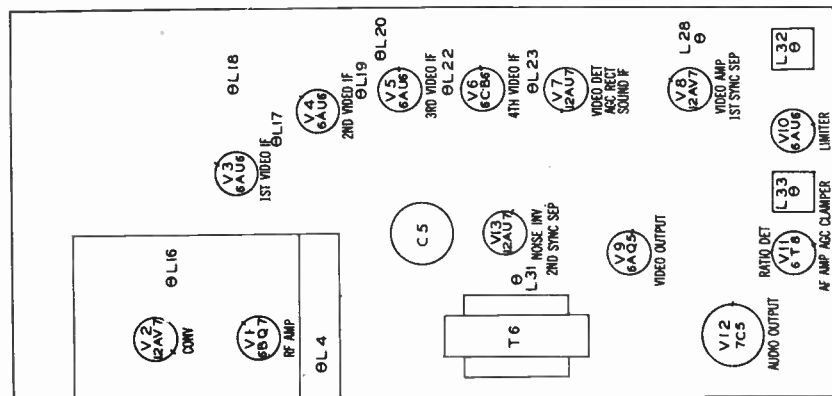
Narrow picture - V16, V17, V18, V19, V20, M1, M2, M3

Vert. off freq. - V14

Horiz. off freq. - V14, V16



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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6, V7
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V8, V9, V20
- Has pic, no sound-V7, V10, V11, V12
- Overloaded picture-V7, V11

SWEEP FAILURE

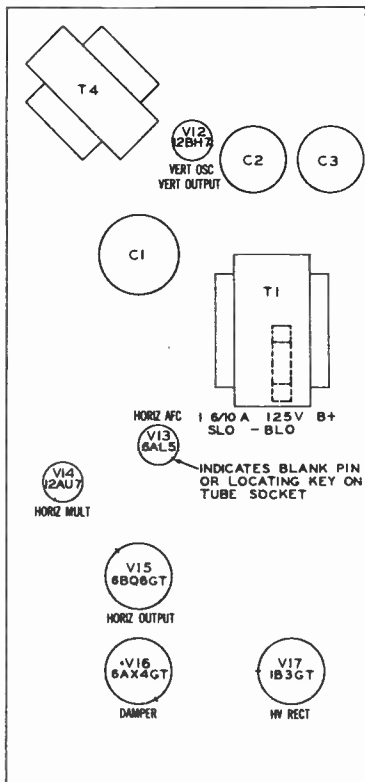
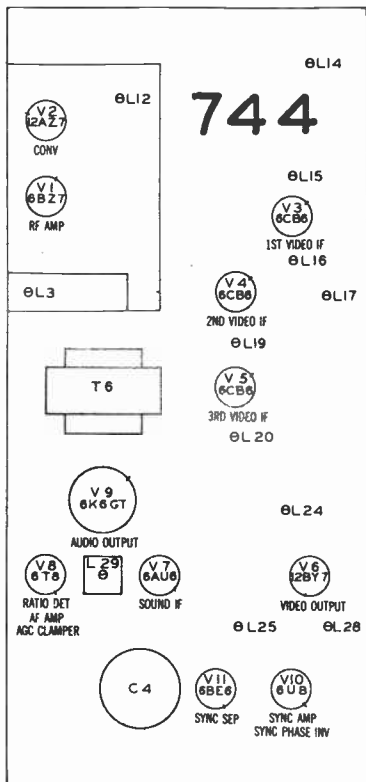
- No raster, has sound-V16, V17, V18, V19, V20
- No vertical deflection-V15
- Poor vert. linearity or foldover-V14, V15
- Poor horiz. linearity or foldover-V16, V17, V18
- Narrow picture-V16, V17, V18, V19, VM1, VM2
- Vert. off freq. -V14
- Horiz. off freq. -V14, V16

POWER SUPPLY FAILURE

- No raster, no sound-Selenium Rectifiers (M1, M2), Fuse (M3)

SYNC FAILURE

- No vert. Sync.-V14
- No horiz. sync.-V14, V16
- No vert. or horiz. sync.-V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound- Selenium Rectifiers (M1 & M2), Fuse (M3)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V18

Has pic, no sound- V7, V8, V9

Overloaded picture-V8

SYNC FAILURE

No vert. sync.-V10, V12

No horiz. sync.-V10, V13, V14

No vert. or horiz. sync.-V10, V11

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17

No vertical deflection-V12

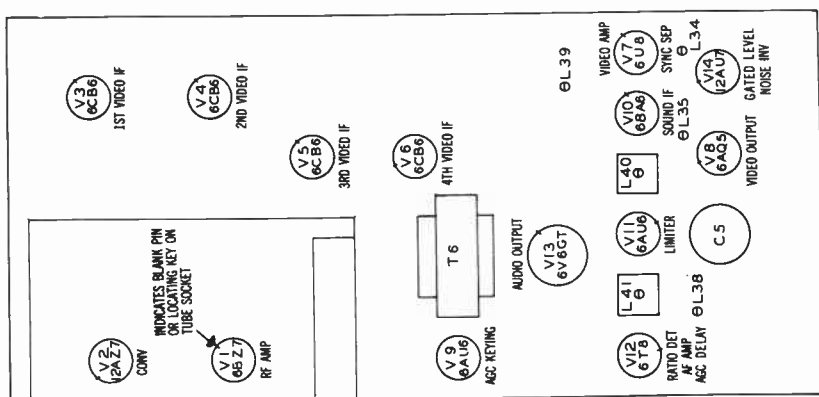
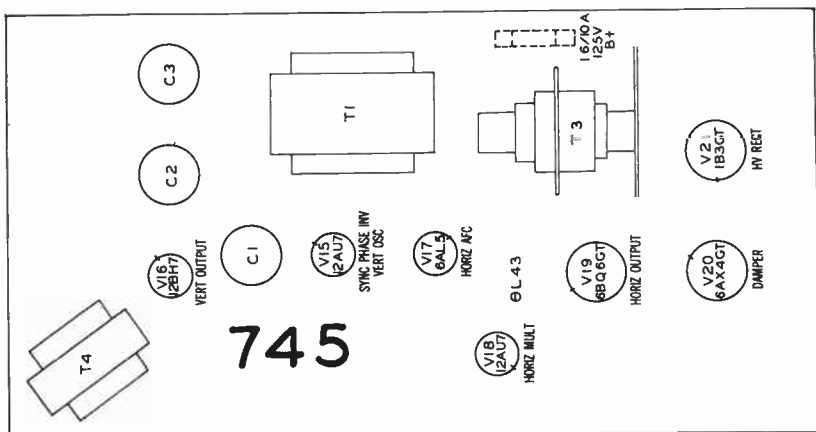
Poor vert. linearity or foldover-V12

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, M1, M2

Vert. off freq.-V10, V12

Horiz. off freq.-V10, V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound—Selenium Rectifiers (M1, M2) Fuse (M3)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster—V2, V3, V4, V5, V6

No pic, no sound, has snow—V1, V2, V3

No pic, has sound, has raster—V7, V8, V22

Has pic, no sound—V10, V11, V12, V13

Overloaded picture—V19

SYNC FAILURE

No vert sync—V15

No horiz. sync—V15, V17, V18

No vert or horiz. sync—V7, V14, V15

SWEEP FAILURE

No raster, has sound—V18, V19, V20, V21, V22

No vertical deflection—V16

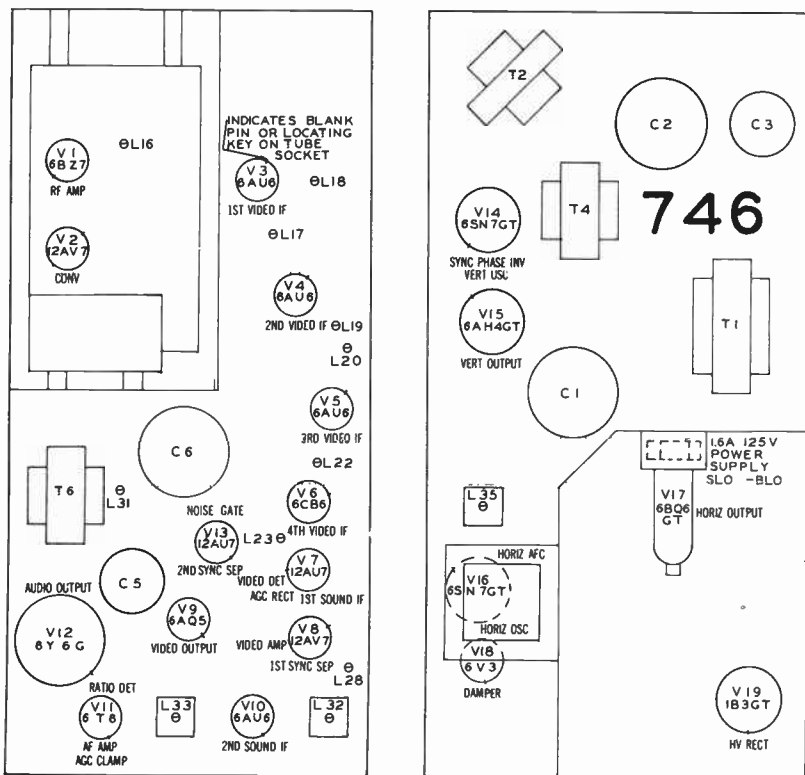
Poor vert. linearity or foldover—V15, V16

Poor horiz. linearity or foldover—V18, V19, V20

Narrow picture—V16, V19, V20, V21, M1, M2

Vert. off freq.—V15

Horiz. off freq.—V15, V17, V18



TUBE COMPLEMENT VARIATIONS

TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-Selenium Rectifiers (M1 & M2) Fuse (M3)

LOSS OF PICTURE OR SOUND

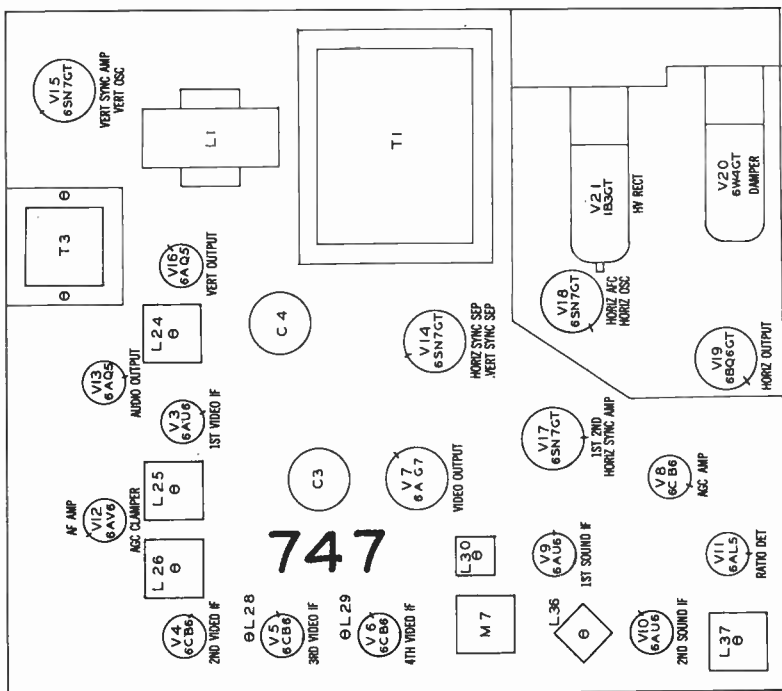
No pic, no sound, has raster-V2, v3, V4, V5, V6, V7
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V8, V9, V20
 Has pic, no sound-V7, V10, V11, V12
 Overloaded picture-V7, V11

SYNC FAILURE

No vert. sync-V14
 No horiz. sync-V14, V16
 No vert. or horiz. sync-V13, V14

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V20
 No vertical deflection-V14, V15
 Poor vert. linearity or foldover-V14, V15
 Poor horiz. linearity or foldover-V16, V17, V18
 Narrow picture-V16, V17, V18, V19, M1, M2
 Vert. off freq-V14
 Horiz. off freq-V14, V16



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V22
 Has pic, no sound - V9, V10, V11, V12, V13
 Overloaded picture - V8, V12

SWEEP FAILURE

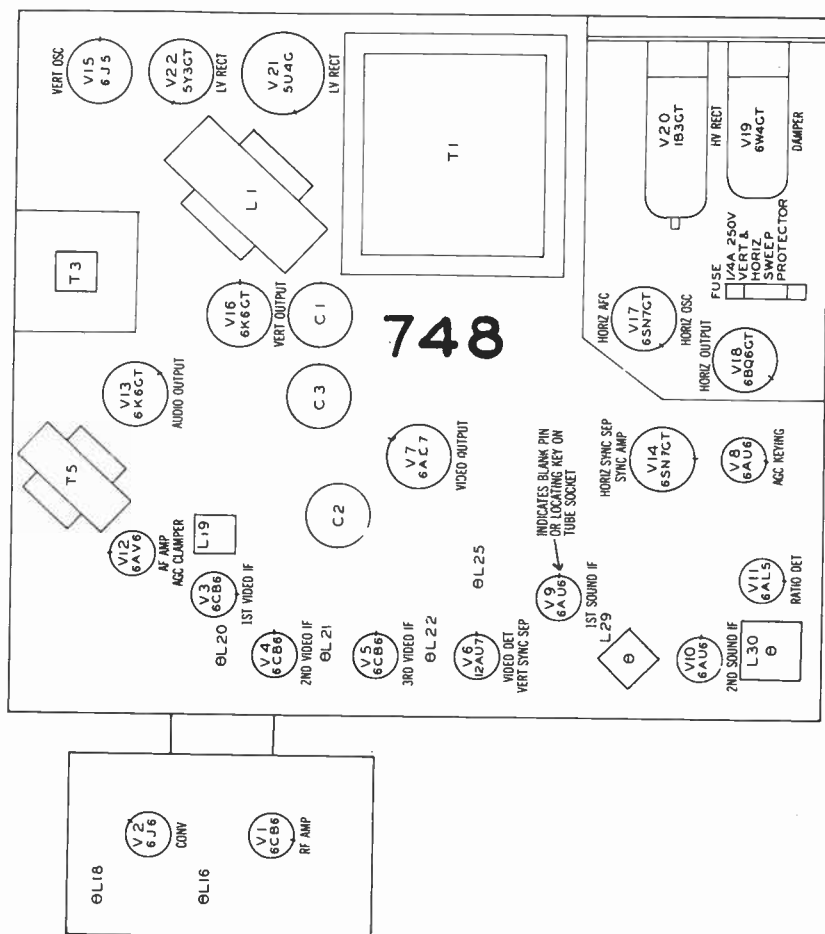
No raster, has sound - V18, V19, V20, V21, V22, fuse (M3)
 No vertical deflection - V15, V16
 Poor vert. linearity or foldover - V15, V16
 Poor horiz. linearity or foldover - V18, V19, V20
 Narrow picture - V18, V19, V20, V21, (M1), (M2)
 Vert. off freq. - V14, V15
 Horiz. off freq. - V14, V17, V18

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifier (M1 & M2)

SYNC FAILURE

No vert. sync - V14, V15
 No horiz. sync - V14, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V21, V22

LOSS OF PICTURE OR SOUND

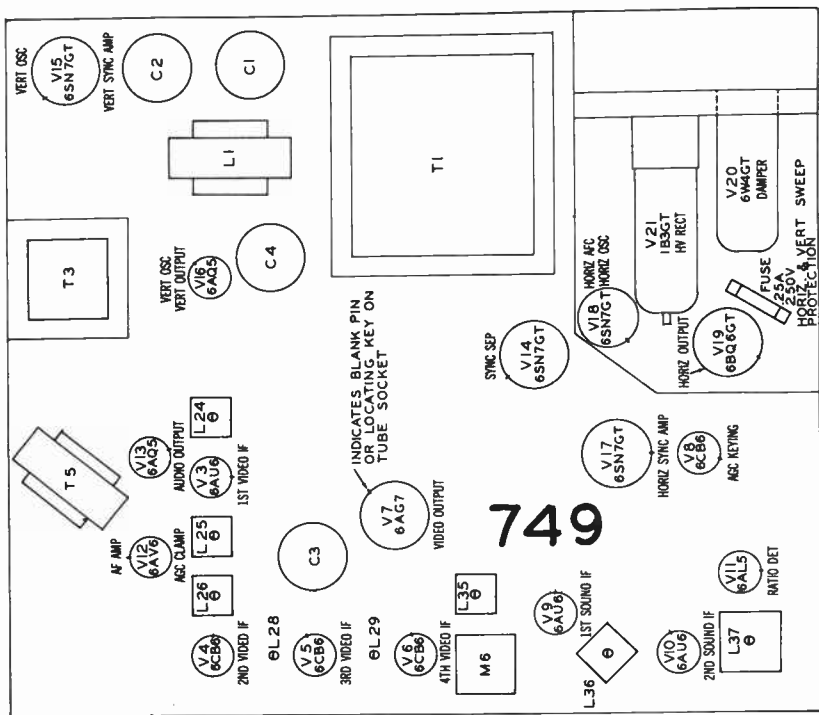
No pic, no sound, has raster-V2, V3, V4, V5, V6
 No pic, no sound, has snow-V1, V2, V3
 No pic, has sound, has raster-V7, V23
 Has pic, No sound-V9, V10, V11, V12, V13
 Overloaded picture-V8

SYNC FAILURE

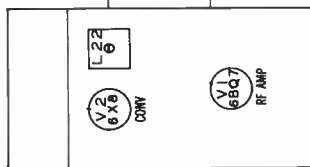
No vert. sync.-V6, V14, V15
 No horiz. sync.-V14, V17
 No vert. or horiz.sync-V14

SWEEP FAILURE

No raster, has sound-V17, V18, V19, V20, V23 Fuse (M1)
 No vertical deflection-V16
 Poor vert. linearity or foldover-V15, V16
 Poor horiz. linearity or foldover-V17, V18, V19
 Narrow picture-V17, V18, V19, V20, V21, V22
 Vert. off rfreq.-V14, V15
 Horiz. off freq.-V14, V17



TUBE COMPLEMENT VARIATIONS



Use
Video Output

Alternate Tubes
6CL6

TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1 & M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V22

Has pic, no sound - V9, V10, V11, V12, V13

Overloaded picture - V8, V12

SYNC FAILURE

No vert. sync. - V14, V15

No horiz. sync. - V14, V17, V18

No vert. or horiz. sync. - V14

SWEEP FAILURE

No raster, has sound - V18, V19, V20, V21, V22 Fuse (M3)

No vertical deflection - V15, V16

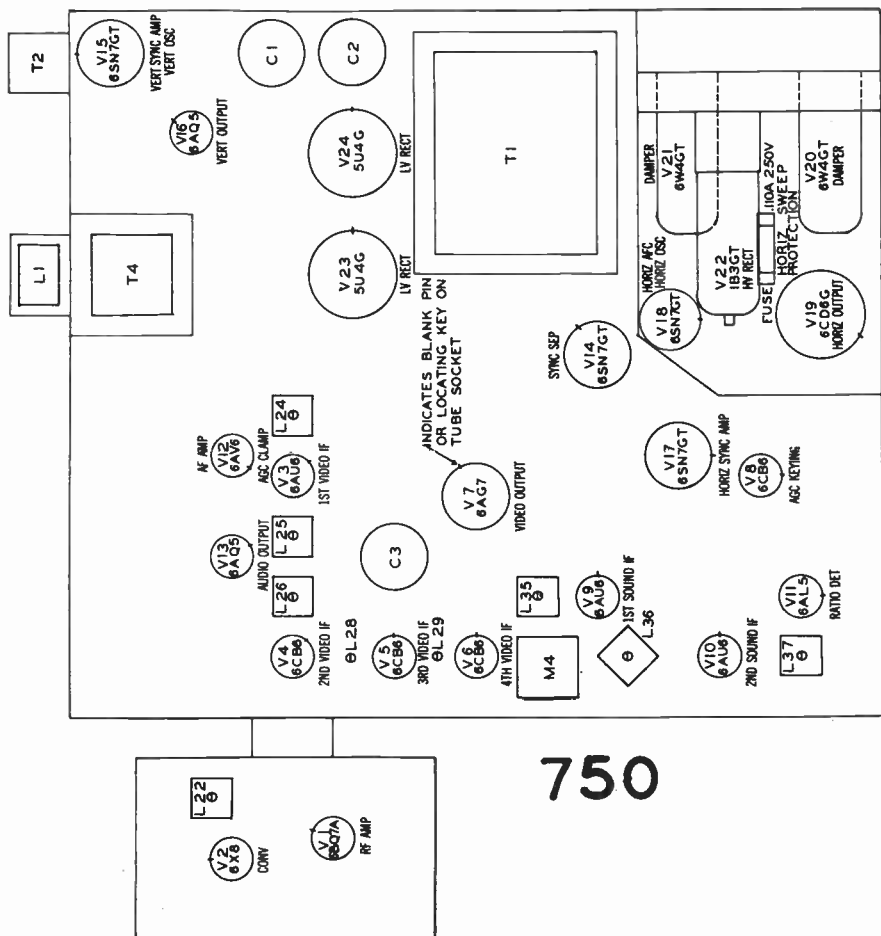
Poor vert. linearity or foldover - V15, V16

Poor horiz. linearity or foldover - V18, V19, V20

Narrow picture - V18, V19, V20, V21, M1, M2

Vert. off freq. - V14, V15

Horiz. off freq. - V14, V17, V18



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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V23, V24

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V25

Has pic, no sound-V8, V10, V11, V12, V13

Overloaded picture-V8, V12

SYNC FAILURE

No vert. sync.-V14, V15

No horiz. sync- V17, V18

No vert. or horiz. sync-V14

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V22, V25 Fuse (M)

No vertical deflection-V15, V16

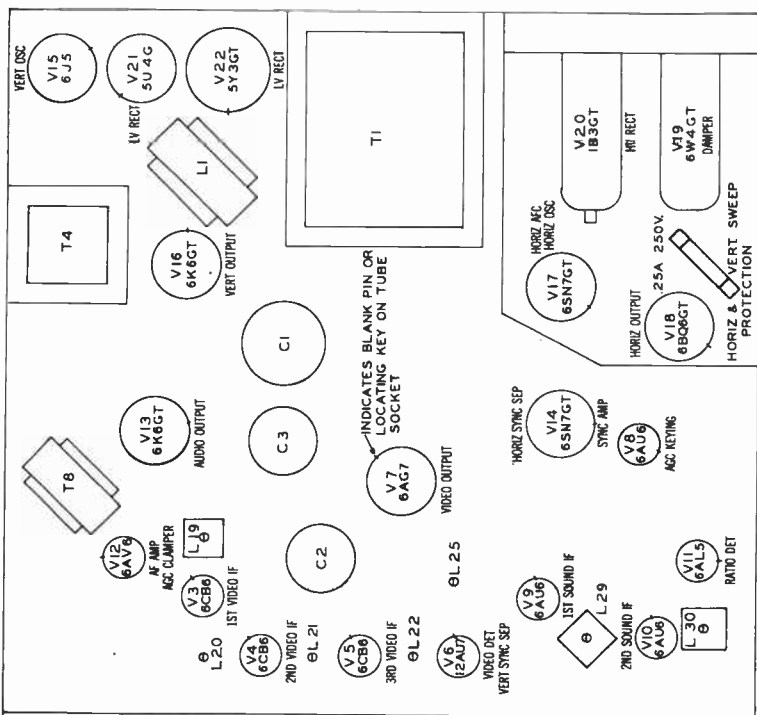
Poor vert. linearity or foldover-V15, V16

Poor horiz. linearity or foldover-V18, V19, V20, V21

Narrow picture-V18, V19, V20, V21, V22, V23, V24

Vert. off freq-V15

Horiz. off freq-V17, V18



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TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4, V5, V6
- No pic, no sound has snow-V1, V2, V3
- No pic, has sound, has raster-V7, V23
- Has pic, no sound-V9, V10, V11, V12, V13
- Overloaded picture-V8, V12

SWEEP FAILURE

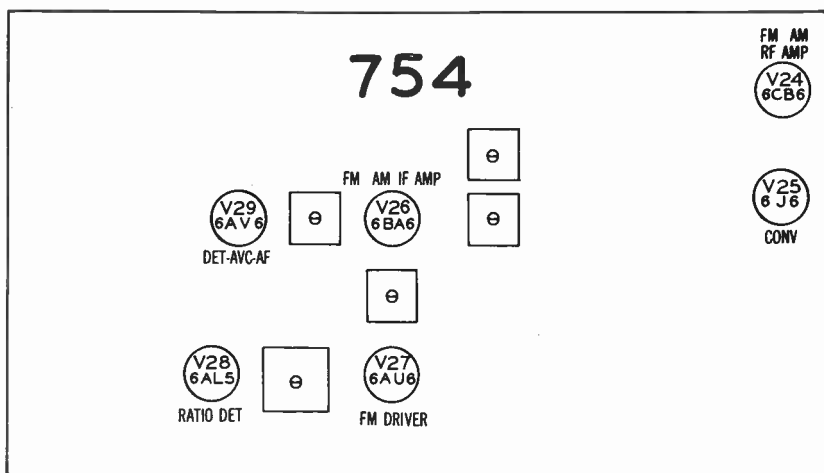
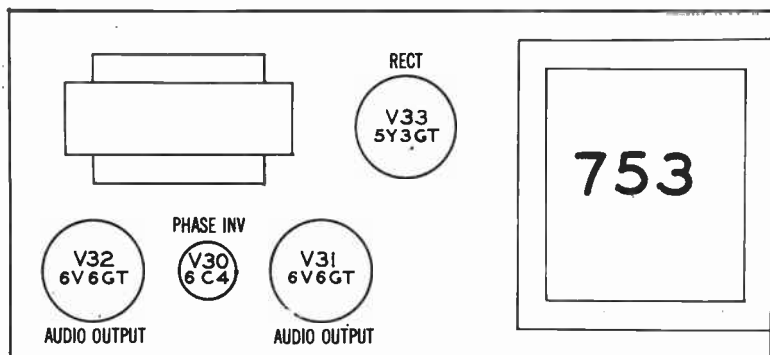
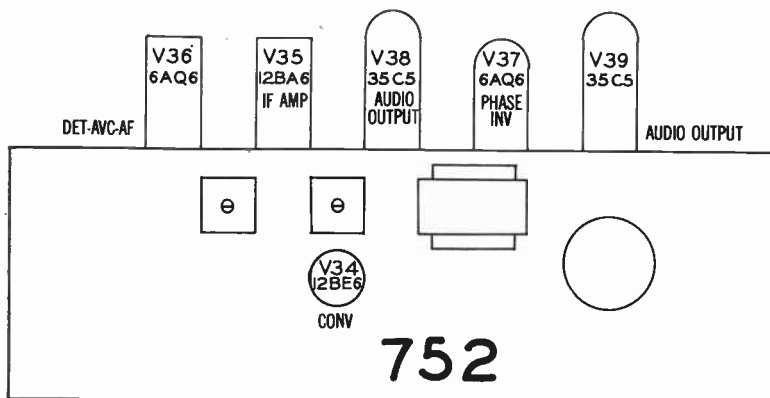
- No raster, has sound-V17, V18, V19, V20, V23 Fuse (M1)
- No vertical deflection-V15, V16
- Poor vert. linearity or foldover-V15, V16
- Poor horiz. linearity or foldover-V17, V18, V19
- Narrow picture-V17, V18, V19, V20, V21, V22
- Vert. off freq.-V14, V15
- Horiz. off freq.-V14, V17

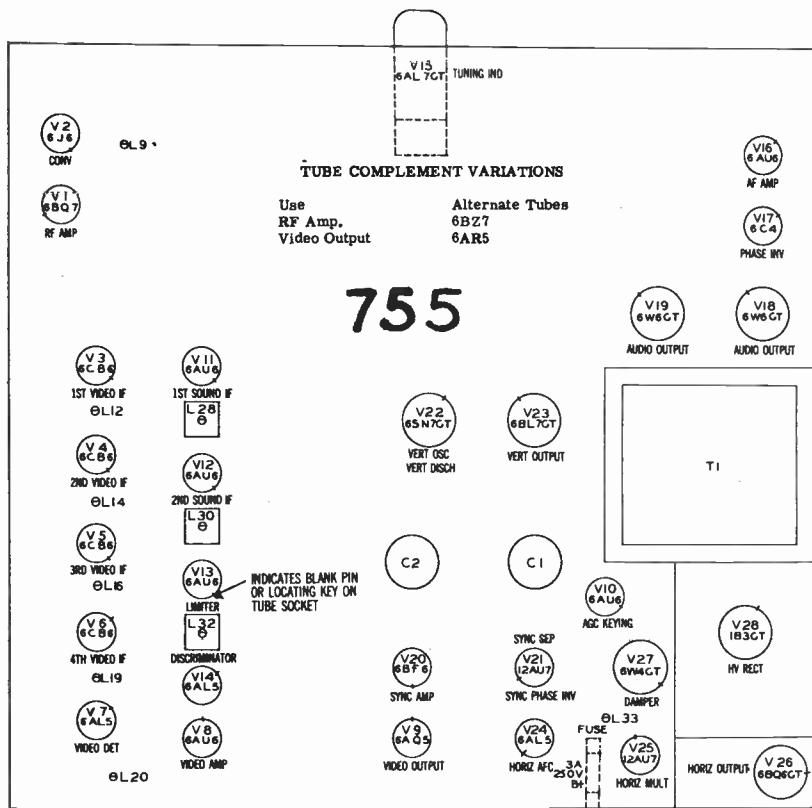
POWER SUPPLY FAILURE

- No raster, no sound-V21, V22

SYNC FAILURE

- No vert. sync.-V14, V15
- No horiz. sync.-V14, V17
- No vert. or horiz. sync.-V6, V14





TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound - Selenium Rectifiers (M1, M2, M3, M4), Fuse (M5)

LOSS OF PICTURE OR SOUND

No pic, No sound, has raster - V2

No pic, No sound, has snow - V1, V2

No pic, has sound, has raster - V3, V4, V5, V7, V8, V9, V29

Has pic, No sound - V11, V12, V13, V14, V16, V18, V19

Overloaded picture - V10

SYNC FAILURE

No vert. sync - V21, V22

No horiz. sync - V21, V24, V25

No vert. or horiz. sync - V20, V21

SWEEP FAILURE

No raster, has sound - V25, V26, V27, V28, V29

No vertical deflection - V23

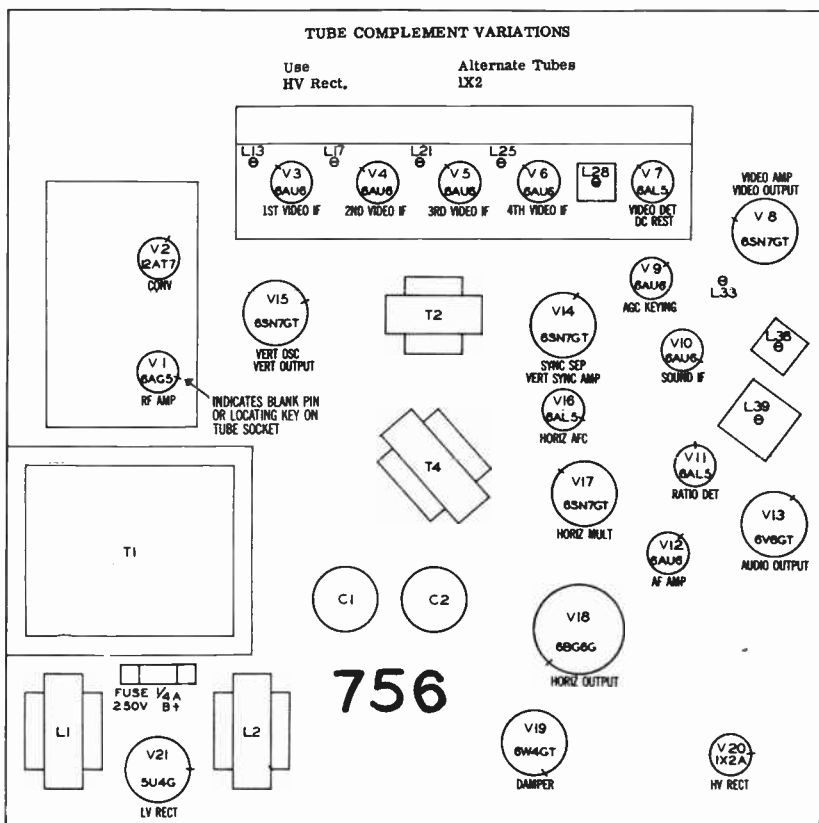
Poor vert. linearity or foldover - V22, V23

Poor horiz. linearity or foldover - V25, V26, V27

Narrow picture - V25, V26, V27, V28, M1, M2, M3, M4

Vert. off freq. - V21, V22

Horiz. off freq. - V21, V24, V25



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V21, Fuse (M1)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V7, V8, V22

Has Pic, No Sound - V10, V11, V12, V13

Overloaded Picture - V9

SYNC FAILURE

No Vert. Sync - V14, V15

No Horiz. Sync - V14, V16, V17

No Vert. or Horiz. Sync.- V14

SWEEP FAILURE

No Raster, Has Sound - V17, V18, V19, V20, V22

No Vertical deflection - V15

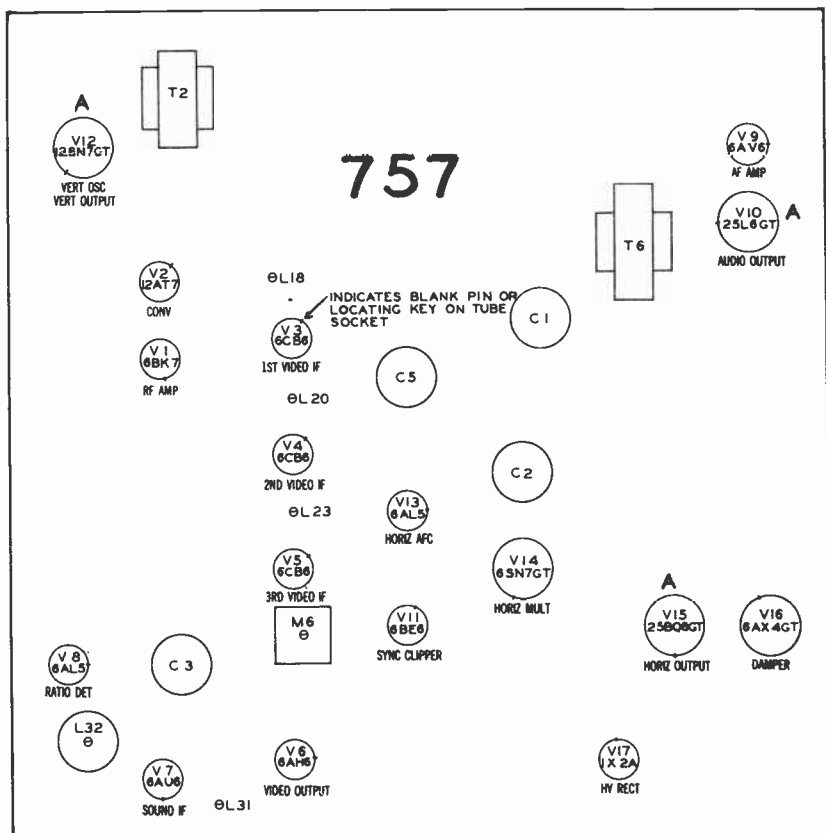
Poor Vert. Linearity or Foldover - V15

Poor Horiz. Linearity or Foldover - V17, V18, V19

Narrow Picture - V17, V18, V19, V21

Vert. Off Freq. - V14, V15

Horiz. Off Freq. - V14, V16, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers (M1, M2)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V8

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18

No vertical deflection - V12

Poor vert. linearity or foldover - V12

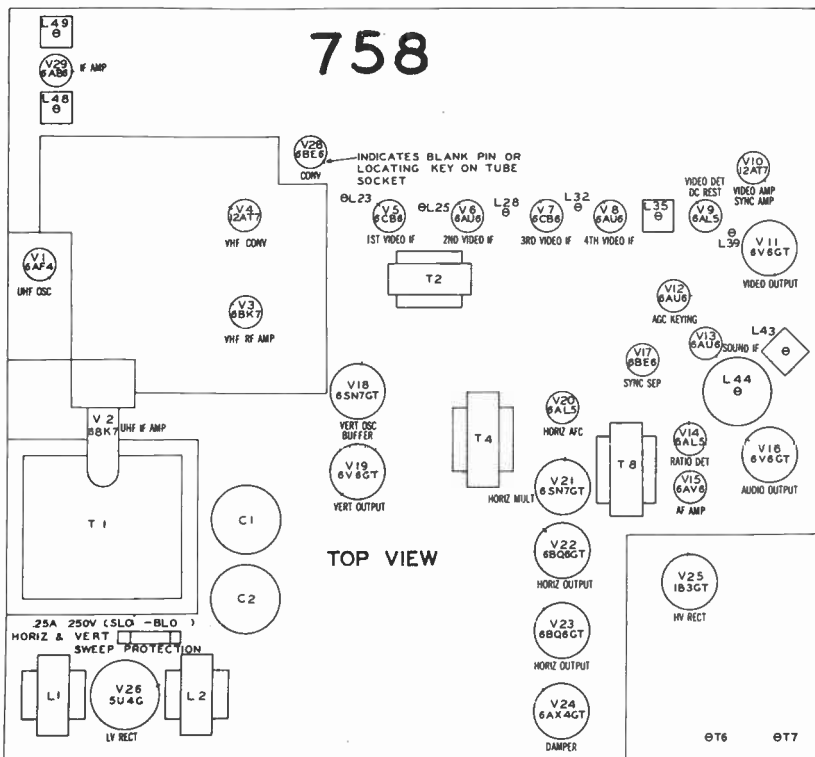
Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, M1, M2

Vert. off freq. - V12

Horiz. off freq. - V13, V14

NOTE: The tubes marked A on the tube placement chart indicate the tubes in the series string. The filaments of the other tubes operate independently from a filament transformer.



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V26

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V4, V5, V6, V7, V8, V9 (V1, UHF only)

No pic, no sound, has snow-V3, V4, V5

No pic, has sound, has raster-V10, V11, V 29

Has pic, no sound-V13, V14, V15, V16

Overloaded picture-V12

SYNC FAILURE

No vert. sync-V10, V18

No horiz. svnc-V17, V20, V21

No vert. or horiz. sync-V17

SWEEP FAILURE

No raster, has sound-V21, V22, V23, V24, V25, V29 Fuse (M1)

No vertical deflection-V18, V19

Poor vert. linearity or foldover -V18, V19

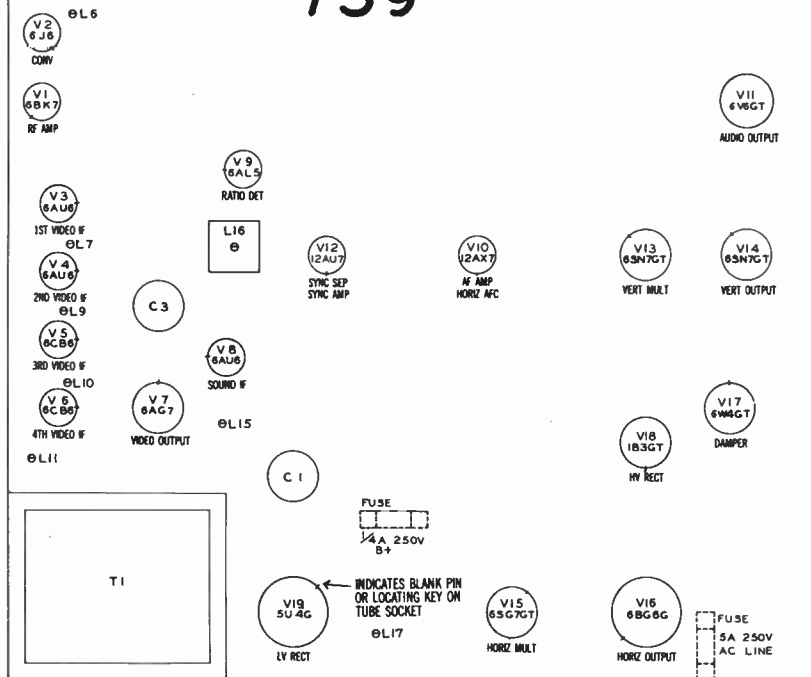
Poor horiz. linearity or foldover-V21, V 22, V23, V24

Narrow picture-V21, V22, V23, V24, V25, V26

Vert. off freq.-V10, V18

Horiz. off freq.-V17, V20, V21

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V19, Fuse (M1, M2)

LOSS OF PICTURE OR SOUND

No pic., No sound, Has raster - V2, V3, V4, V5, V6, V7, V11

No pic., No sound, Has snow - V1, V2, V3

No pic., Has sound, Has raster - V7, V20

Has pic., No sound - V8, V9, V10, V11

SYNC FAILURE

No Vert. sync. - V12, V13

No Horiz. sync. - V12, V10, V14

No Vert. or Horiz. sync. - V12

SWEEP FAILURE

No raster, has sound - V15, V16, V17, V18, V20

No Vertical deflection - V14

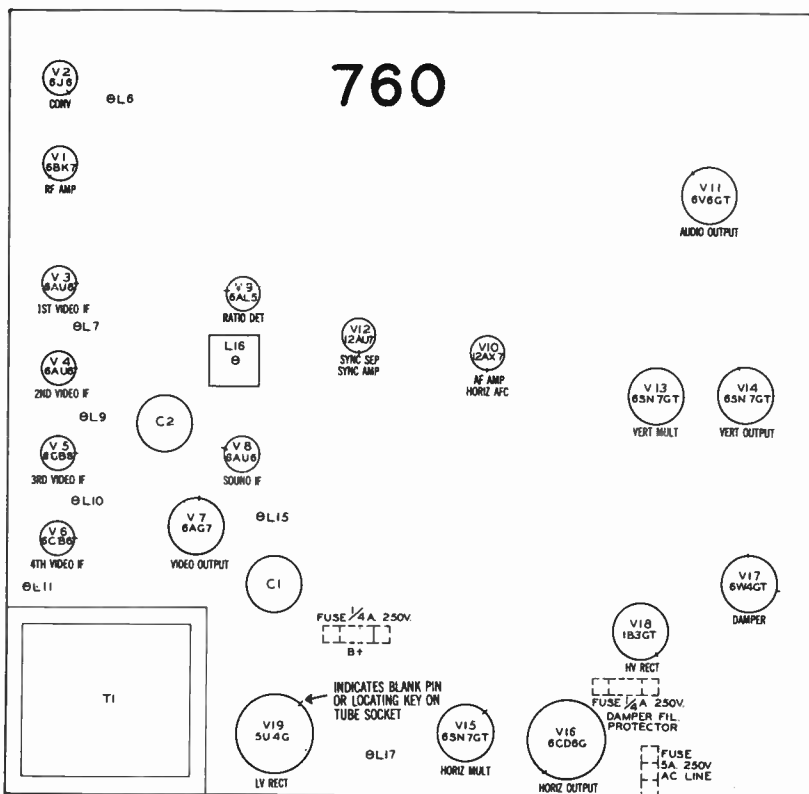
Poor Vert. Linearity or foldover - V13, V14

Poor Horiz. Linearity or foldover - V15, V16, V17

Narrow picture - V15, V16, V17, V19

Vert. off freq. - V12, V13

Horiz. off freq. - V12, V10, V15



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound-V19, Fuse (M1, M3)

LOSS OF PICTURE OR SOUND

No pic, No sound, Has raster-V2, V3, V4, V5, V6, V11

No pic, No sound, Has snow-V1, V2, V3,

No pic, Has sound, Has raster-V7, V20

Has pic, No sound-V8, V9, V10, V11

SYNC FAILURE

No Vert. sync-V12, V13

No Hor. sync-V12, V10, V15

No Vert. or Hor. sync-V12

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V20 Fuse (M2)

No Vertical deflection-V13, V14

Poor Vert. Linearity or foldover-V13, V14

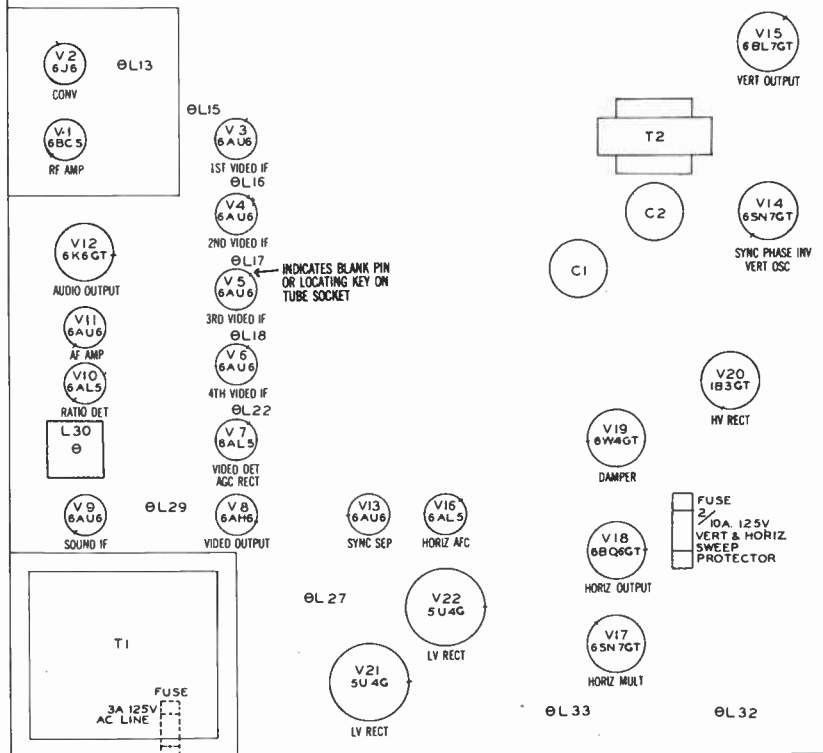
Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19

Vert. off freq.-V12, V13

Horiz. off freq.-V12, V10, V15

761



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V21, V22, Fuse (M1)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7, V8

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V8, V23

Has Pic, No Sound - V9, V10, V11, V12

Overloaded Picture - V7

SYNC FAILURE

No Vert. Sync - V14

No Horiz. Sync - V14, V16, V17

No Vert. or Horiz. Sync - V13, V14

SWEEP FAILURE

No Raster, Has Sound - V17, V18, V19, V20, V23, Fuse (M2)

No Vertical Deflection - V15

Poor Vert. Linearity or Foldover - V14, V15

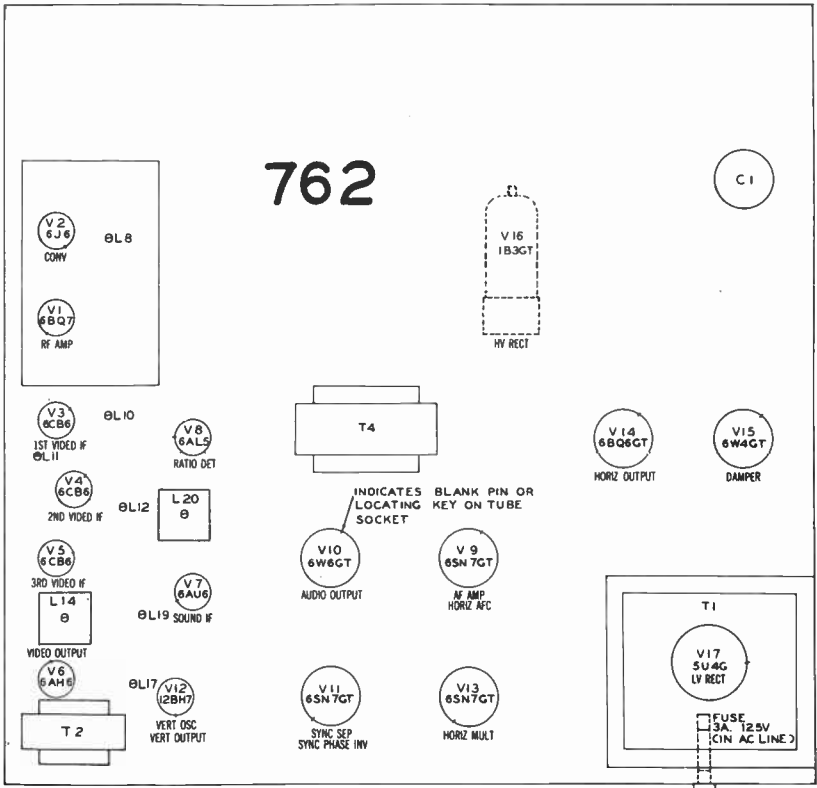
Poor Horiz. Linearity or Foldover - V17, V18, V19

Narrow Picture - V17, V18, V19, V21, V22

Vert. Off Freq. - V14

Horiz. Off Freq. - V14, V16, V17

762



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V17 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V18

Has pic, no sound-V 7, V8, V9, V10.

SYNC FAILURE

No vert. sync. -V11, V12

No horiz. sync. -V9, V11, V13

No vert. or horiz. sync. -V11

SWEEP FAILURE

No raster, has sound-V13, V14, V15, V16, V18

No vertical deflection-V12

Poor vert. linearity or foldover-V12

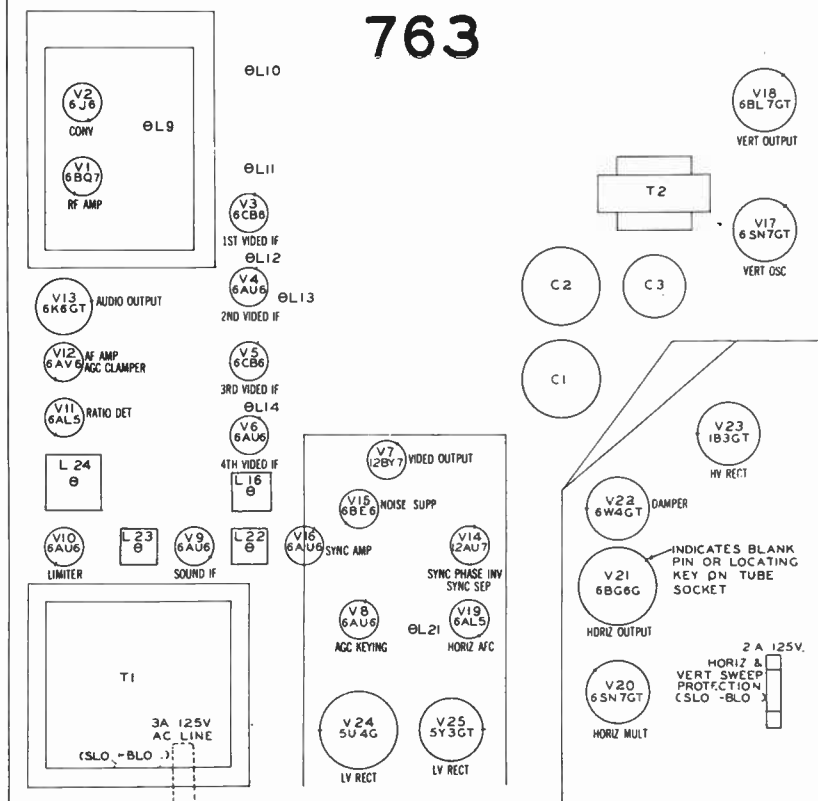
Poor horiz. linearity or foldover-V13, V14, V15

Narrow picture-V13, V14, V15, V16, V17

Vert. off freq. - V11, V12

Horiz. off freq. -V9, V11, V13

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V24, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V25

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V26

Has pic, no sound - V9, V10, V11, V12, V13

Overloaded picture - V8, V12

SYNC FAILURE

No vert. sync - V16, V17

No horiz. sync - V16, V19, V20

No vert. or horiz. sync. - V14, V15, V16

SWEEP FAILURE

No raster, has sound - V20, V21, V22, V23, V26, Fuse (M2)

No vert. deflection - V17

Poor vert. linearity or foldover - V17

Poor horiz. linearity or foldover - V20, V21, V22

Narrow picture - V20, V21, V22, V23, V24, V25

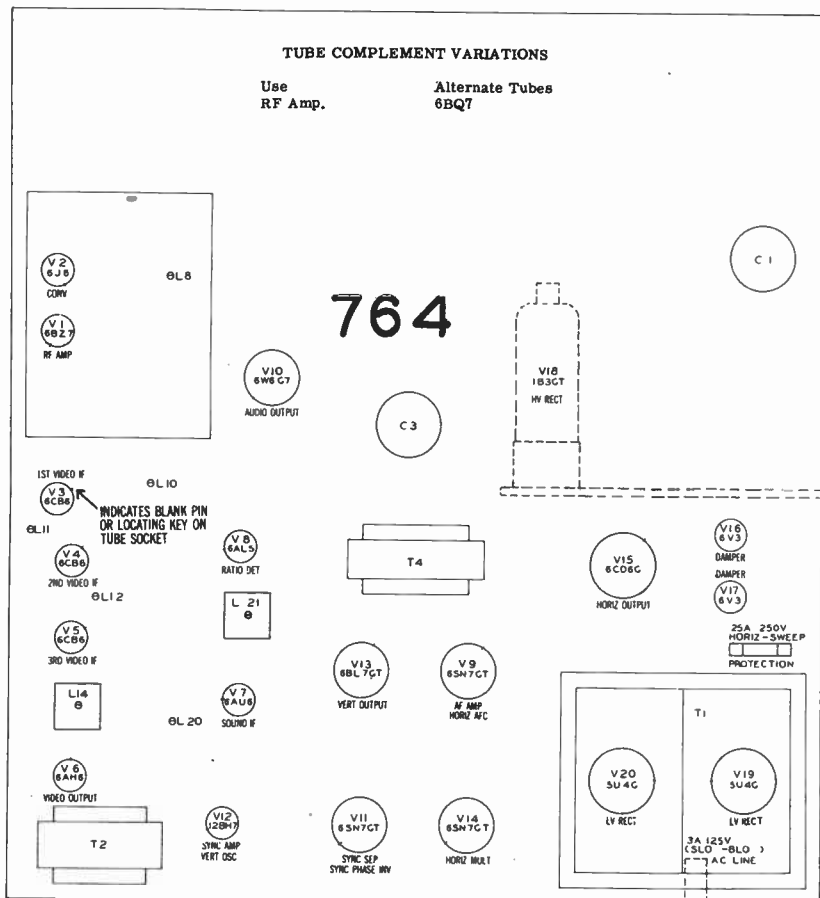
Vert. off freq. - V16, V17

Horiz. off freq. - V16, V19, V20

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BQ7



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19, V20 Fuse M1

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V10

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V21

Has pic, no sound-V7, V8, V9, V10

SYNC FAILURE

No vert. sync.-V11, V12

No horiz. sync.-V9, V11, V13

No vert. or horiz. sync.-V11, V12

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V18, V21 Fuse M2

No vertical deflection.- V12, V13

Poor vert. linearity or foldover-V12, V13

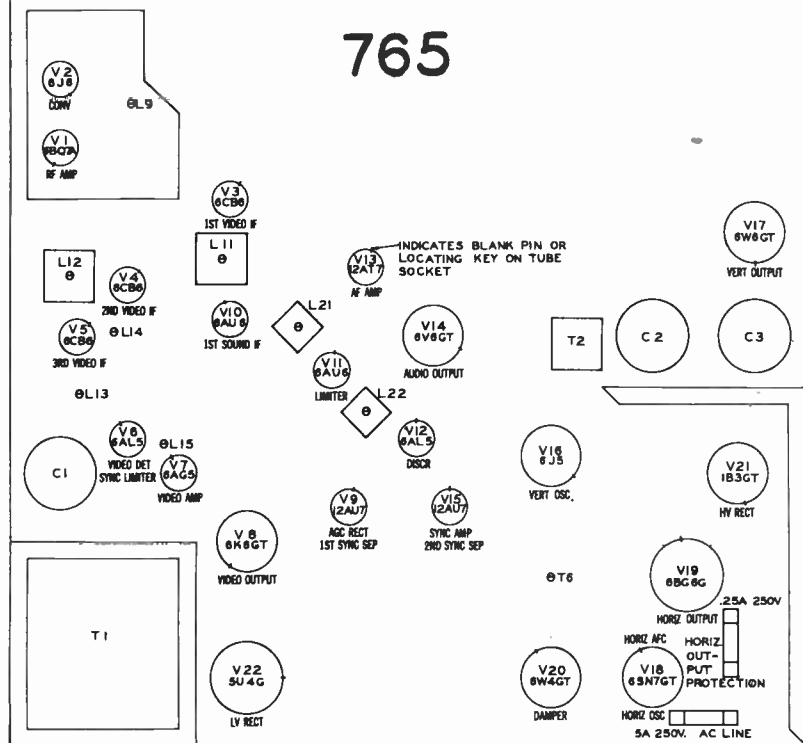
Poor horiz. linearity or foldover-V14, V15, V16, V17

Narrow picture-V14, V15, V16, V17, V18, V19, V20

Vert. off freq.-V11, V12

Horiz. off freq.-V9, V11, V13

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TUBE FAILURE CHECK CHART

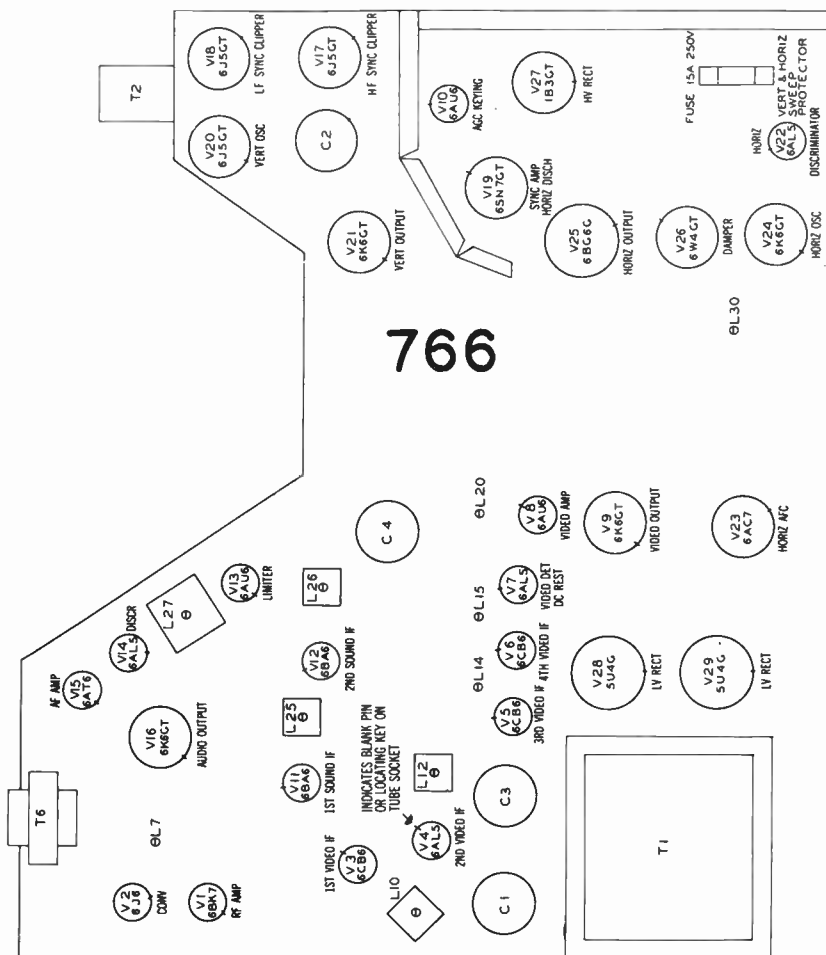
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V22 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V4, V5, V6, V7, V8, V23
Has pic, no sound-V10, V11, V12, V13, V14
Overloaded picture-V9

SYNC FAILURE
No vert. sync-V15, V16
No horiz. sync-V15, V18
No vert. or horiz. sync-V6, V9, V15

SWEEP FAILURE
No raster, has sound-V18, V19, V20, V21, V23 Fuse (M2)
No vertical deflection-V16, V17
Poor vert. linearity or foldover-V16, V17
Poor horiz. linearity or foldover-V18, V19, V20
Narrow picture-V18, V19, V20, V21, V22
Vert. off freq.-V15, V16
Horiz. off freq.-V15, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V28, V29

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V4, V5, V6, V7, V8, V9, V30

Has Pic, No Sound - V11, V12, V13, V14, V15, V16

Overloaded Picture - V10

SYNC FAILURE

No Vert. Sync - V19, V20

No Horiz. Sync - V19, V22, V23, V24

No Vert. Or Horiz. Sync - V17, V18, V19

SWEEP FAILURE

No Raster, Has Sound - V24, V19, V25, V26, V27, V30, Fuse (M1)

No Vertical Deflection - V20, V21

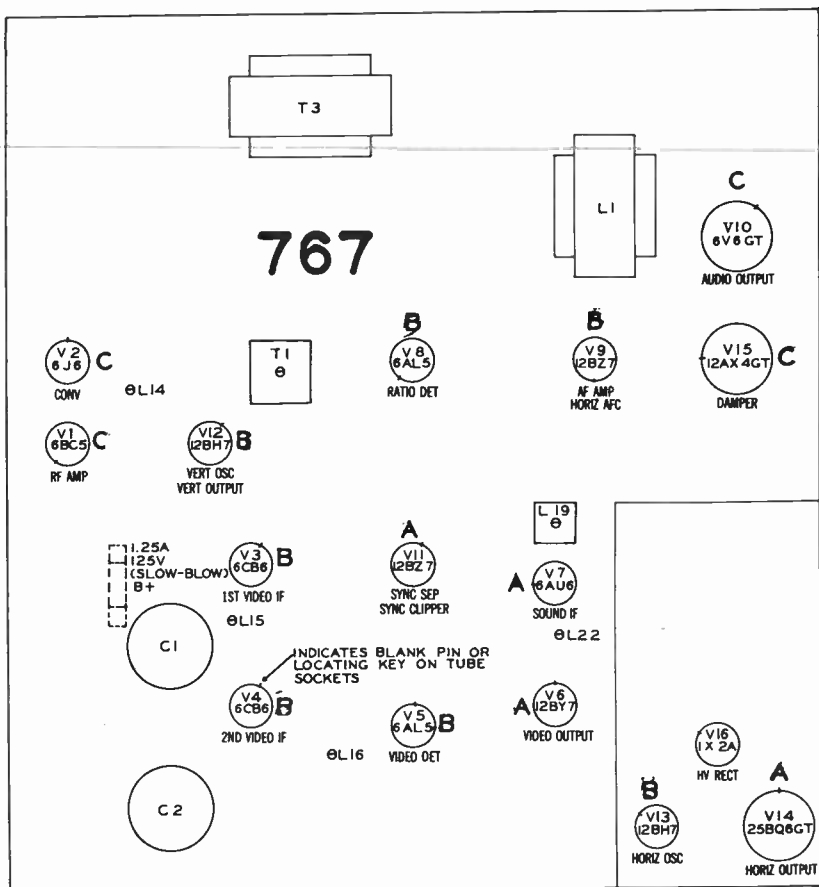
Poor Vert. Linearity or Foldover - V20, V21

Poor Horiz. Linearity or Foldover - V24, V19, V25, V26

Narrow Picture - V24, V19, V25, V26, V28, V29

Vert. Off Freq. - V19, V20

Horiz. Off Freq. - V19, V22, V23, V24



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1, M2, fuse (M3)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V17

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V9, V11, V13

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V13, V14, V15, V16, V17

No vertical deflection - V12

Poor vert. linearity or foldover - V12

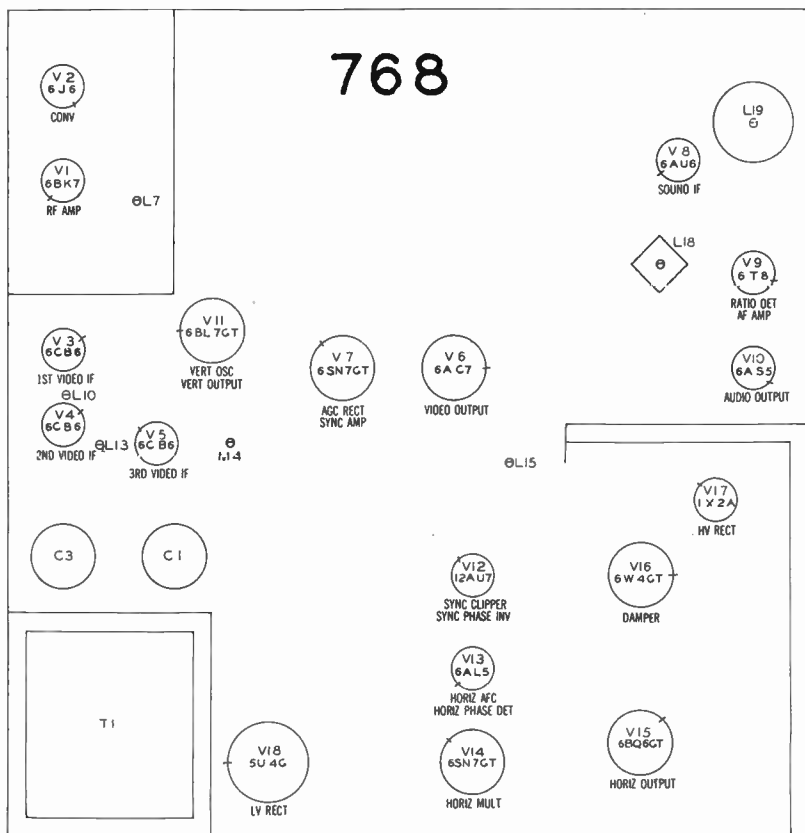
Poor horiz. linearity or foldover - V13, V14, V15

Narrow picture - V13, V14, V15, V16, M1, M2

Vert. off freq. - V11, V12

Horiz. off freq. - V9, V11, V13

NOTE: The tubes marked A on the tube placement chart indicate the tubes in one series string, while those marked B are in another series string. These two strings are then paralleled and are connected thru the picture tube filament and those tubes marked C to B-.



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V18, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V19

Has pic, no sound - V8, V9, V10

Overloaded picture - V7

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V7, V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19, fuse (M2)

No vertical deflection - V12

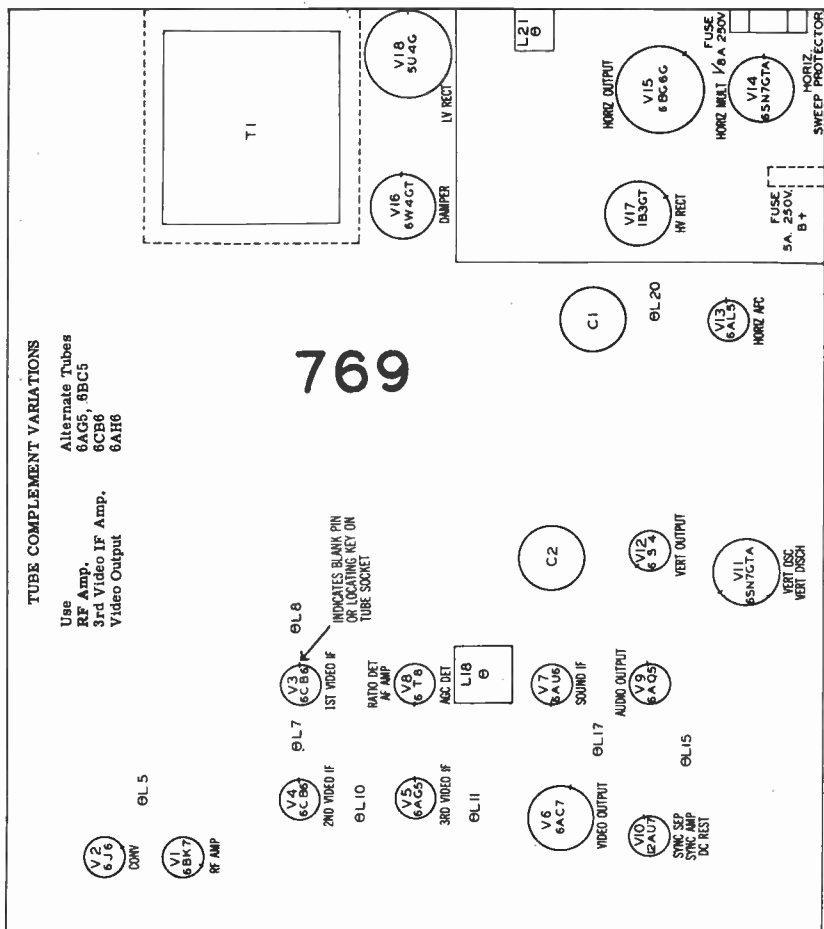
Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, V18

Vert. off freq. - V11, V12

Horiz. off freq. - V11, V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

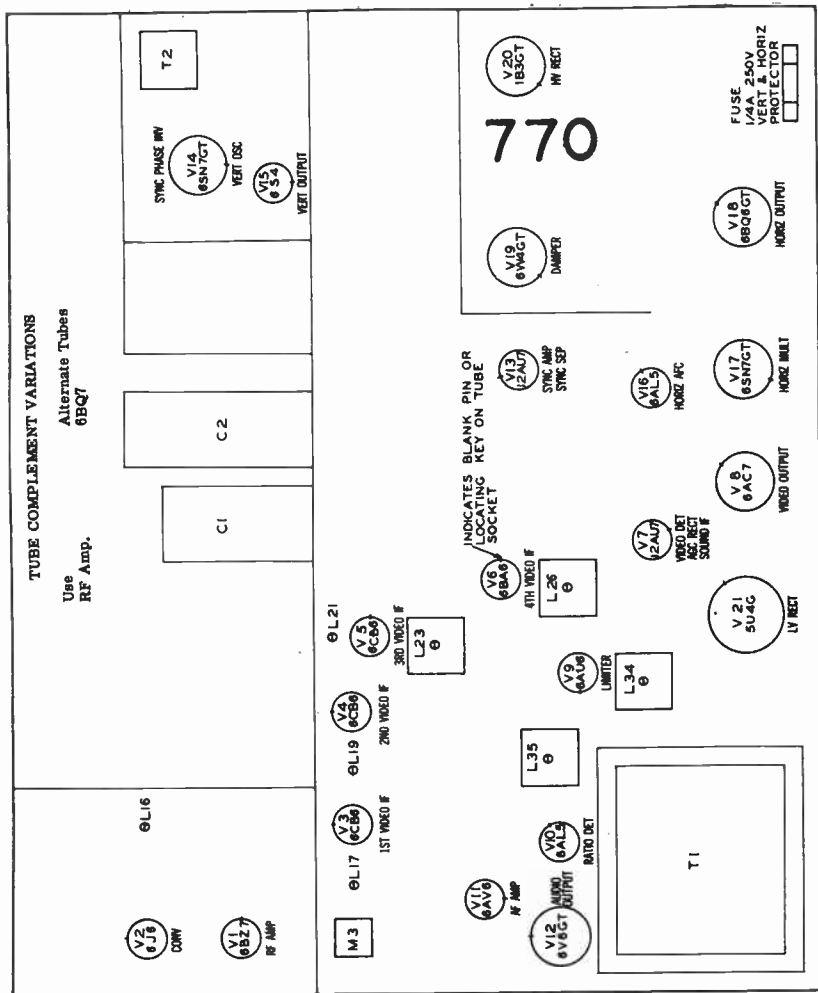
- No Pic., No Sound, Has Raster - V2, V3, V4, V5, V6, V9
- No Pic., No Sound, Has Snow - V1, V2, V3
- No Pic., Has Sound, Has Raster - V6, V10, V19
- Has Pic., No Sound - V7, V8, V9
- Overloaded Picture - V8

SYNC FAILURE

- No Vert. Sync - V10, V11
- No Horiz. Sync - V10, V13, V14
- No Vert. or Horiz. Sync - V10

SWEEP FAILURE

- No Raster, Has Sound - V14, V15, V16, V17, V19, Fuse (M1)
- No Vert. Deflection - V12
- Poor Vert. Linearity or Foldover - V11, V12
- Poor Horiz. Linearity or Foldover - V14, V15, V16
- Narrow Picture - V14, V15, V16, V17, V18
- Vert. Off Freq. - V10, V11
- Horiz. Off Freq. - V10, V13, V14



TUBE FAILURE CHECK CHART

The following chart lists tubes whose failures are most likely to produce the indicated symptoms.

Refer to tube placement chart for location and type of tube.

LOSS OF PICTURE OR SOUND

- No pic., no sound, has raster - V2, V3, V4, V5, V6, V7
- No pic., no sound, has snow - V1, V2, V3
- No pic., has sound, has raster - V8, V22
- Has pic., no sound - V7, V9, V10, V11, V12
- Overloaded picture - V7

SWEEP FAILURE

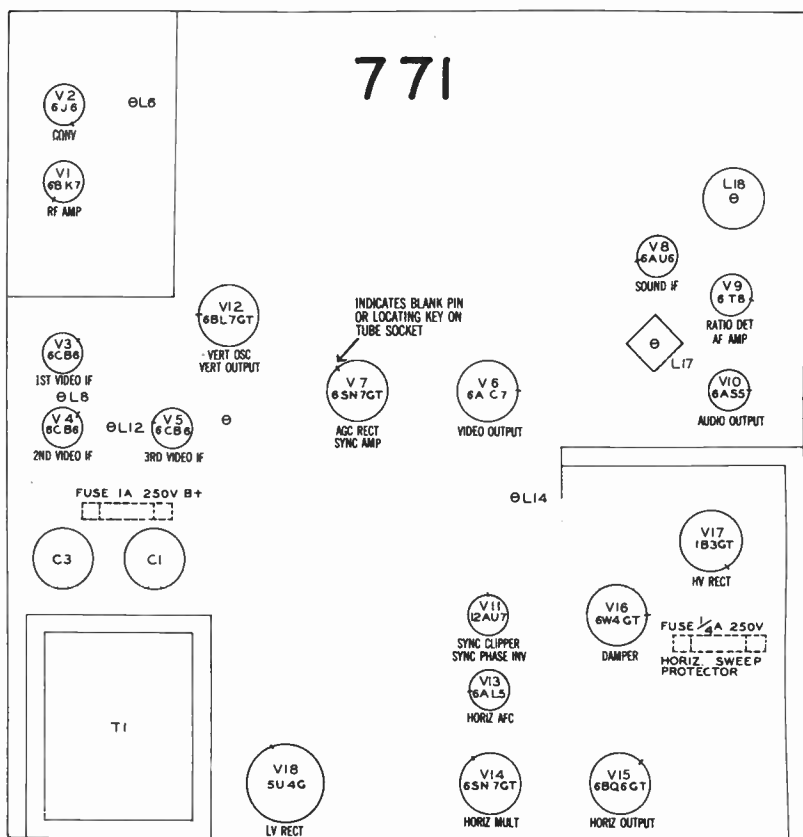
- No raster, has sound - V17, V18, V19, V20, V22, Fuse (M)
- No vert. deflection - V14, V15
- Poor vert. linearity or foldover - V14, V15
- Poor horiz. linearity or foldover - V17, V18, V19
- Narrow picture - V17, V18, V19, V20, V21
- Vert. off freq. - V14
- Horiz. off freq. - V14, V16, V17

POWER SUPPLY FAILURE

- No Raster, no sound - V21

SYNC FAILURE

- No vert. sync - V14
- No horiz. sync - V14, V16, V17
- No vert. or horiz. sync. - V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V18, Fuse (M1)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V10

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V6, V19

Has Pic, No Sound - V8, V9, V10

Overloaded Picture - V7

SYNC FAILURE

No Vert. Sync - V11, V12

No Horiz. Sync - V11, V13, V14

No Vert. or Horiz. Sync - V7, V11

SWEEP FAILURE

No Raster, Has Sound - V14, V15, V16, V17, V19, Fuse (M2)

No Vertical Deflection - V12

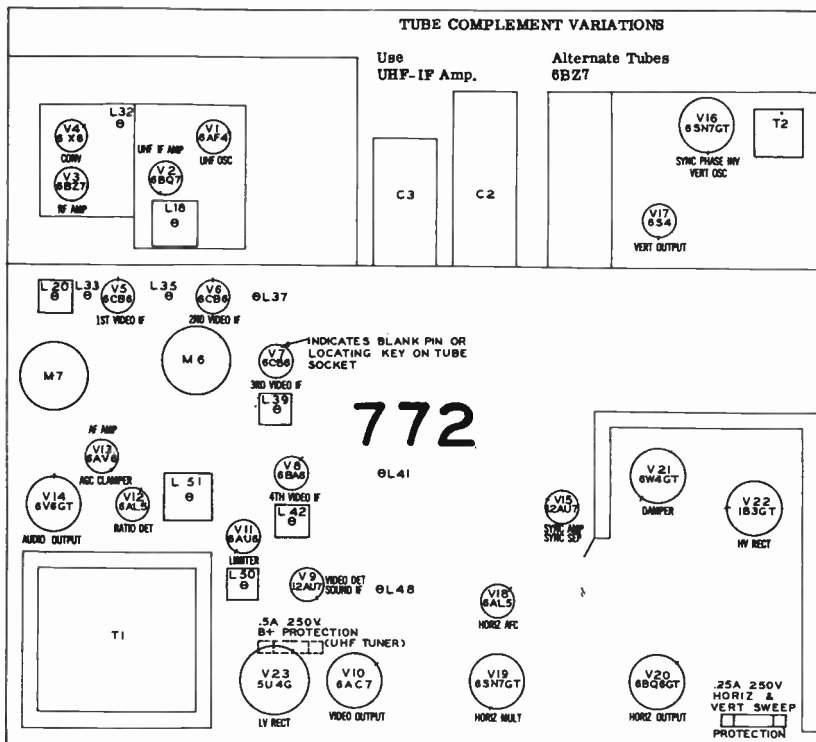
Poor Vert. Linearity or Foldover - V12

Poor Horiz. Linearity or Foldover - V14, V15, V16

Narrow Picture - V14, V15, V16, V17, V18

Vert. Off Freq. - V11, V12

Horiz. Off Freq. - V11, V13, V14



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V4, V5, V6, V7, V8, V9 (V1, Selenium Rectifiers)

No pic, no sound, has snow - V3, V4, V5 (M1, M2), Fuse(M4)-UHF only.)

No pic, has sound, has raster - V10, V24

Has pic, no sound - V9, V11, V12, V13, V14

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V16

No horiz. sync - V16, V18, V19

No horiz. or vert. sync - V15, V16

SWEEP FAILURE

No raster, has sound - V19, V20, V21, V22, V24, Fuse (M3)

No vertical deflection - V16, V17

Poor vert. linearity or foldover - V16, V17

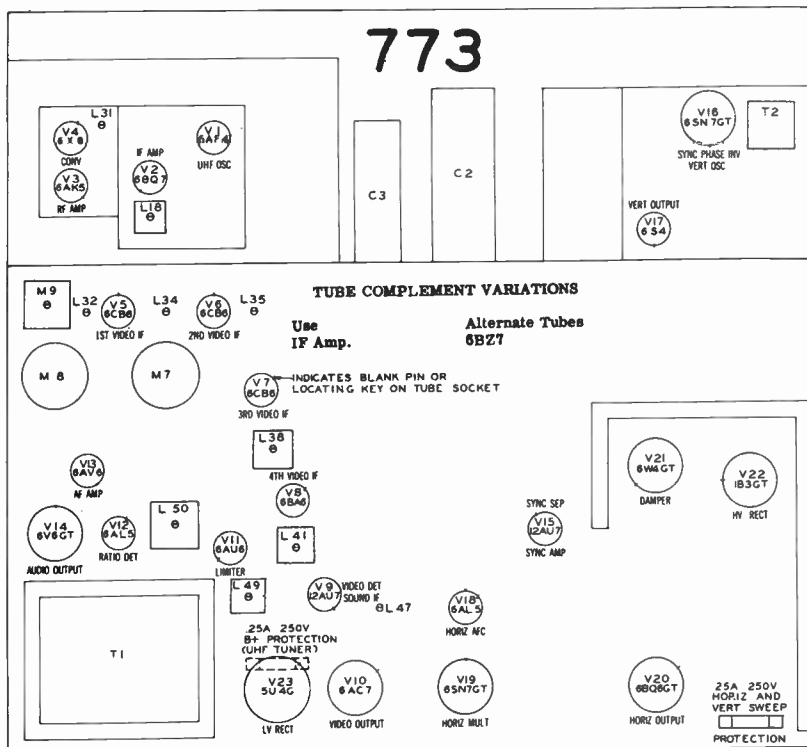
Poor horiz. linearity or foldover - V19, V20, V21

Narrow Picture - V19, V20, V21, V22, V23

Vert. off freq. - V16

Horiz. off freq. - V16, V18, V19

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V4, V5, V6, V7, V8, V9 (V1, Sel. Rect's M1, M2, Fuse M4 UHF Only)

No pic, no sound, has snow-V3, V4, V5

No pic, has sound, has raster-V10, V24

Has pic, no sound-V9, V11, V12, V13, V14

SYNC FAILURE

No vert. sync. -V16

No horiz. sync. -V16, V18, V19

No vert. or horiz. sync. -V15, V16

SWEEP FAILURE

No raster, has sound-V19, V20, V21, V22, V24 Fuse (M3)

No vertical deflection-V16, V17

Poor vert. linearity or foldover-V16, V17

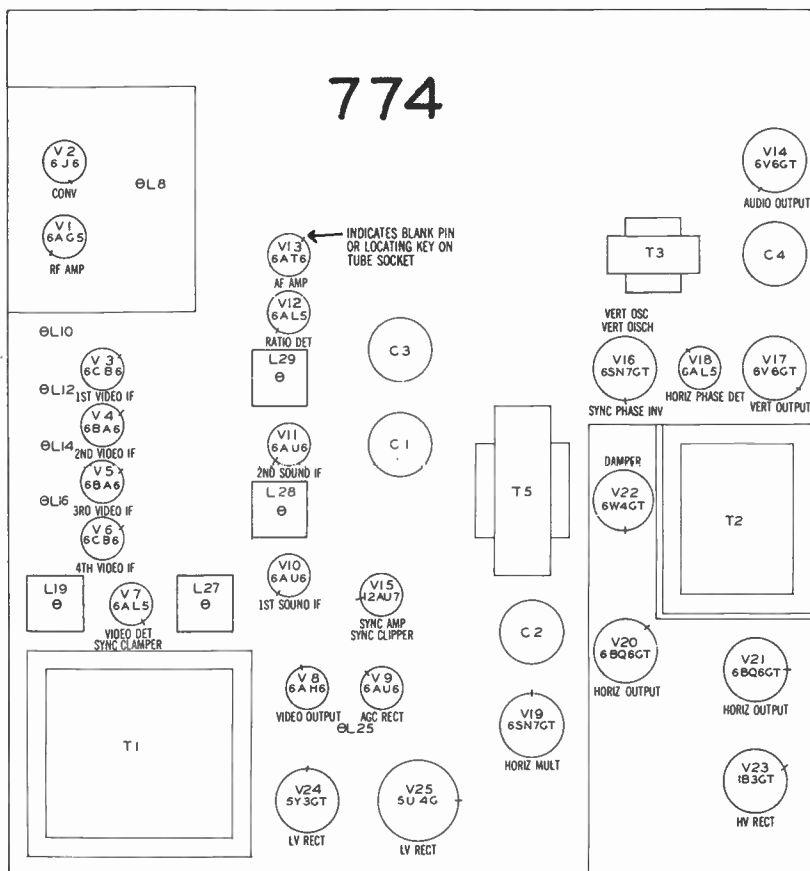
Poor horiz. linearity or foldover-V19, V20, V21

Narrow picture-V19, V20, V21, V22, V23

Vert. off freq. -V16

Horiz. off freq. -V16, V18, V19

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TUBE FAILURE CHECK CHART

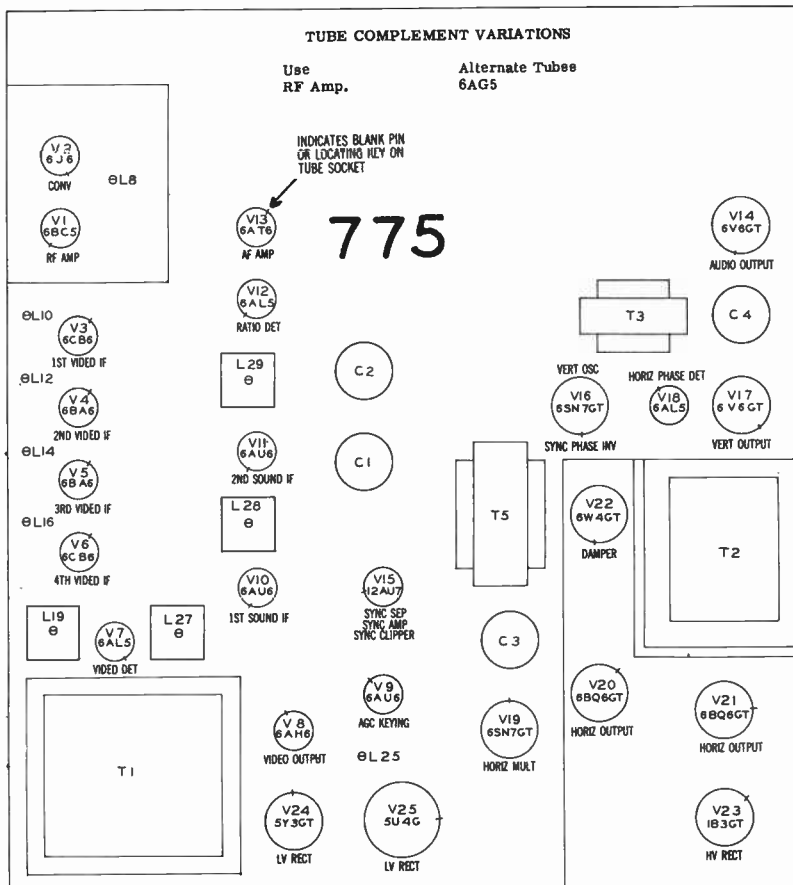
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound - V24, V25

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster - V2, V3, V4, V5, V6, V7
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V8, V28
Has pic, no sound - V10, V11, V12, V13, V14
Overloaded picture - V9

SYNC FAILURE
No vert. sync - V16
No horiz. sync - V18, V18, V19
No vert. or horiz. sync - V7, V15, V16

SWEEP FAILURE
No raster, has sound - V19, V20, V21, V22, V23, V26, fuse (M1)
No vertical deflection - V18, V17
Poor vert. linearity or foldover - V16, V17
Poor horiz. linearity or foldover - V19, V20, V21, V22
Narrow picture - V19, V20, V21, V22, V23, V24, V25
Vert. off freq. - V16
Horiz. off freq. - V16, V18, V19



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V24, V25

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6 V7

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V8, V26

Has pic, no sound - V10, V11, V12, V13, V14

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V16

No horiz. sync - V16, V18, V19

No vert. or horiz. sync - V7, V15, V16

SWEEP FAILURE

No raster, has sound - V19, V20, V21, V22, V23, V26, fuse (M1)

No vertical deflection - V16, V17

Poor vert. linearity or foldover - V16, V17

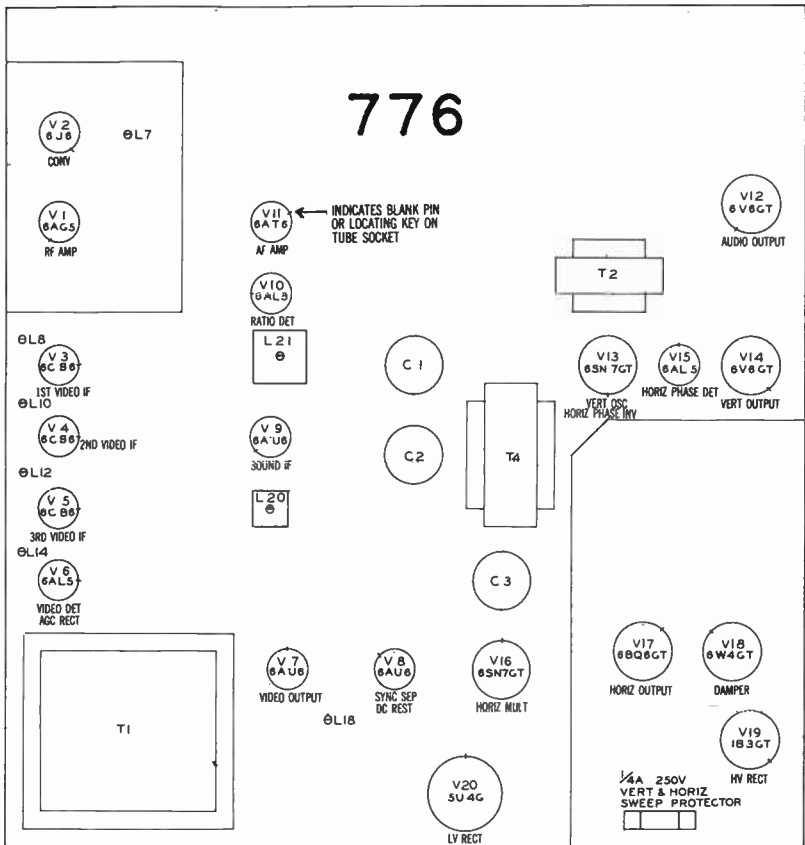
Poor horiz. linearity or foldover - V19, V20, V21, V22

Narrow picture - V19, V20, V21, V22, V23 V24, V25

Vert. off freq. - V16

Horiz. off freq. - V16, V18, V19

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6
 No pic, no sound, has snow - V1, V2, V3
 No pic, has sound, has raster - V7, V8, V21
 Has pic, no sound - V9, V10, V11, V12
 Overloaded picture - V6

SYNC FAILURE

No vert. sync - V13
 No horiz. sync - V13, V15, V16
 No vert. or horiz. sync - V8, V13

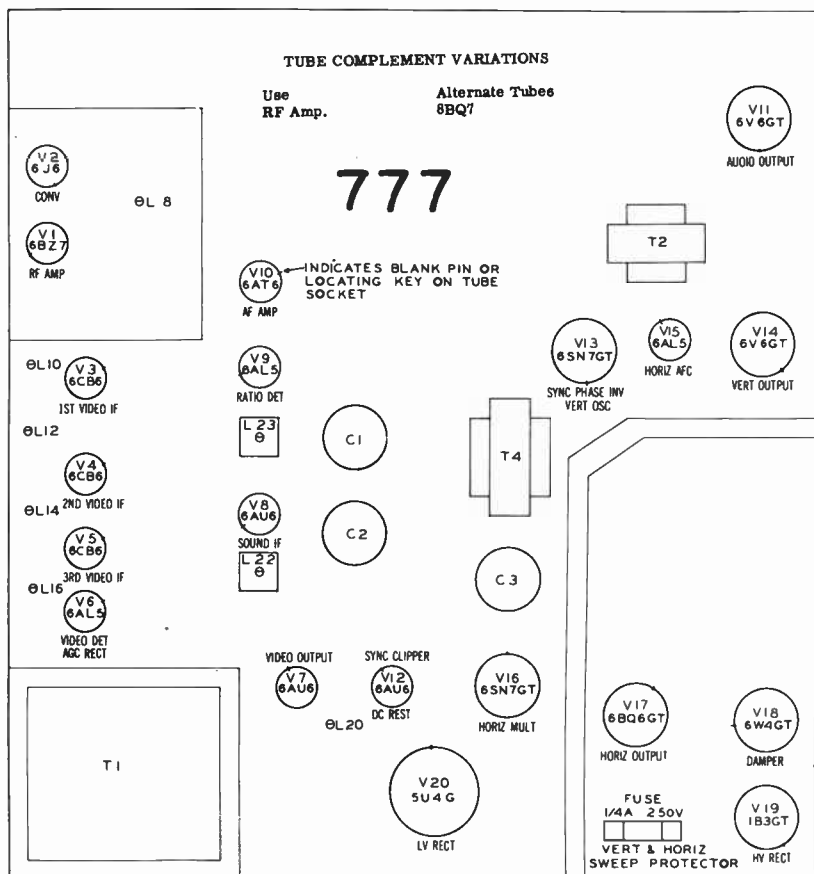
SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, fuse (M1)
 No vertical deflection - V13, V14
 Poor vert. linearity or foldover - V13, V14
 Poor horiz. linearity or foldover - V16, V17, V18
 Narrow picture - V16, V17, V18, V19, V20
 Vert. off freq. - V13
 Horiz. off freq. - V13, V15, V16

TUBE COMPLEMENT VARIATIONS

Use Alternate Tubes
RF Amp. 6BQ7

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V21

Has pic, no sound-V8, V9, V10, V11

Overloaded picture-V6

SYNC FAILURE

No vert. sync.-V13

No horiz. sync.-V13, V15, V16

No vert. or horiz. sync.-V12, V13

SWEEP FAILURE

No raster, has sound-V16, V17, V18, V19, V21 Fuse (M1)

No vertical deflection-V13, V14

Poor vert. linearity or foldover-V13, V14

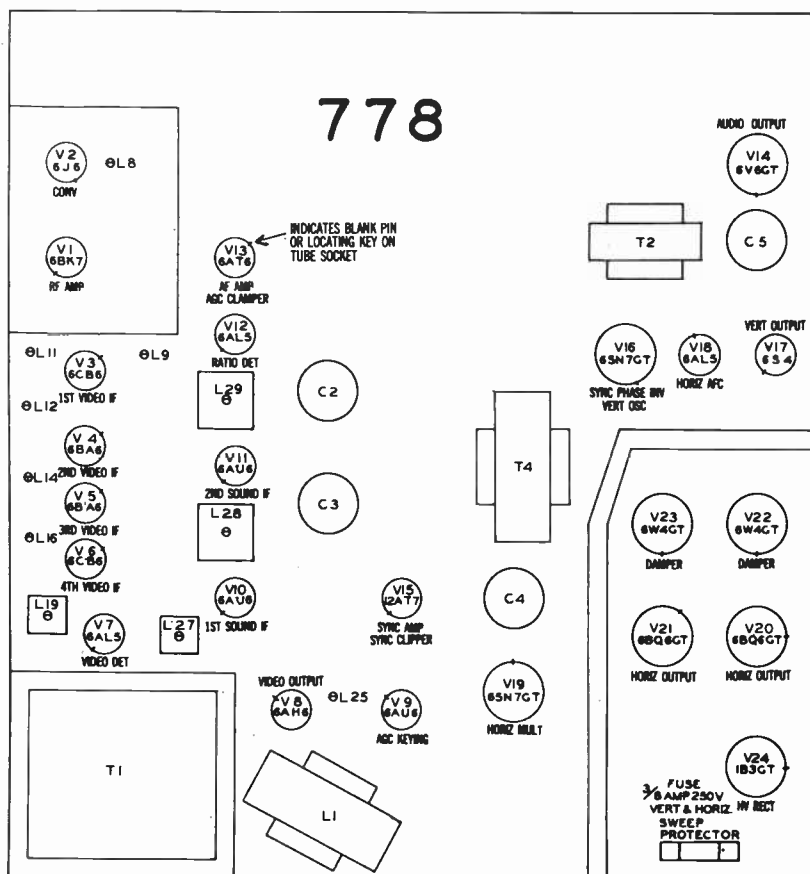
Poor horiz. linearity or foldover-V16, V17, V18

Narrow picture-V16, V17, V18, V19, V20

Vert. off freq.-V13

Horiz. off freq.-V13, V15, V16

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - Selenium Rectifier (M1), (M2)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V8, V25

Has Pic, No Sound - V10, V11, V12, V13, V14

Overloaded Picture - V7, V9

SYNC FAILURE

No Vert. Sync - V16

No Horiz. Sync - V16, V18, V19

No Vert. or Horiz. Sync - V15, V16

SWEEP FAILURE

No Raster, Has Sound - V19, V20, V21, V22, V23, V24, V25

No Vert. Deflection - V17

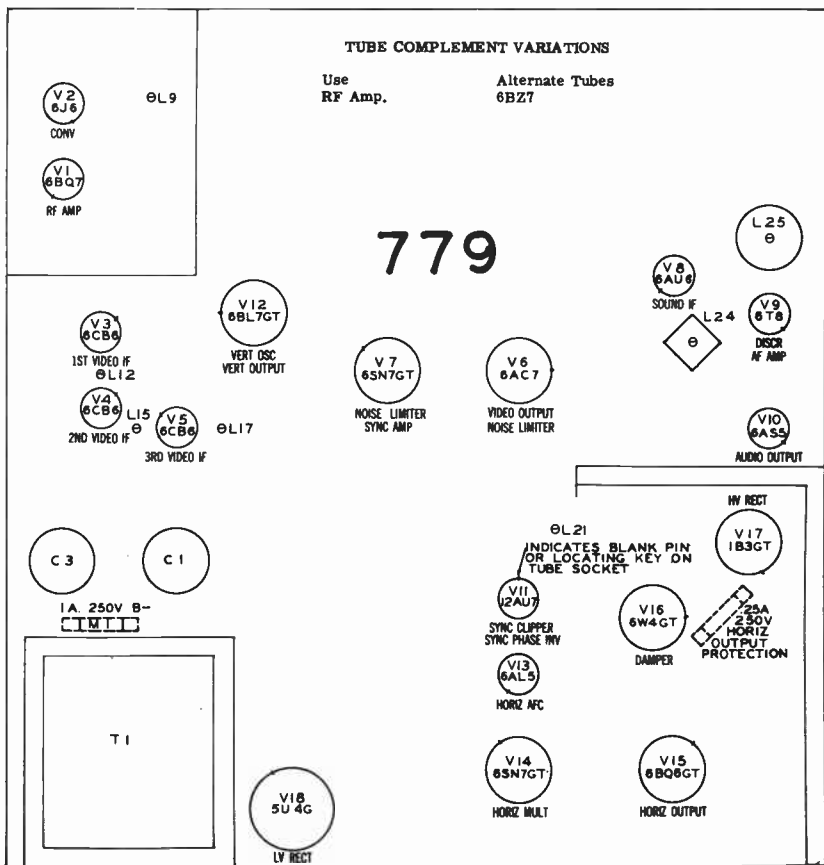
Poor Vert. Linearity or Foldover - V16, V7

Poor Horiz. Linearity or Foldover - V19, V20, V21, V22, V23

Narrow Picture - V19, V20, V21, V22, V23, M1, M2

Vert. Off Freq. - V16

Horiz. Off Freq. - V16, V18, V19



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V18 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V10

No pic, no sound has snow-V1, V2, V3

No pic, has sound, has raster-V6, V19

Has pic, no sound-V8, V9, V10

Overloaded picture-V7

SYNC FAILURE

No vert. sync-V11, V12

No horiz. sync-V11, V13, V14

No vert. or horiz. sync-V7, V11

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V19, Fuse (M2)

No vertical deflection-V12

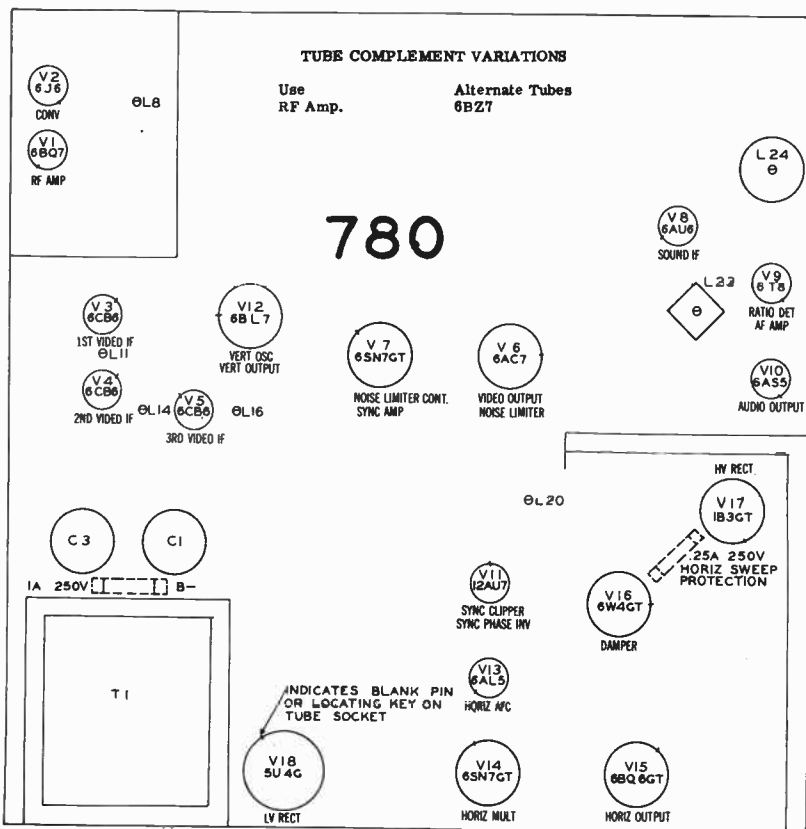
Poor vert. linearity or foldover-V12

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, V18

Vert. off freq.-V11, V12

Horiz. off freq.-V11, V13, V14



TUBE FAILURE CHECK CHART

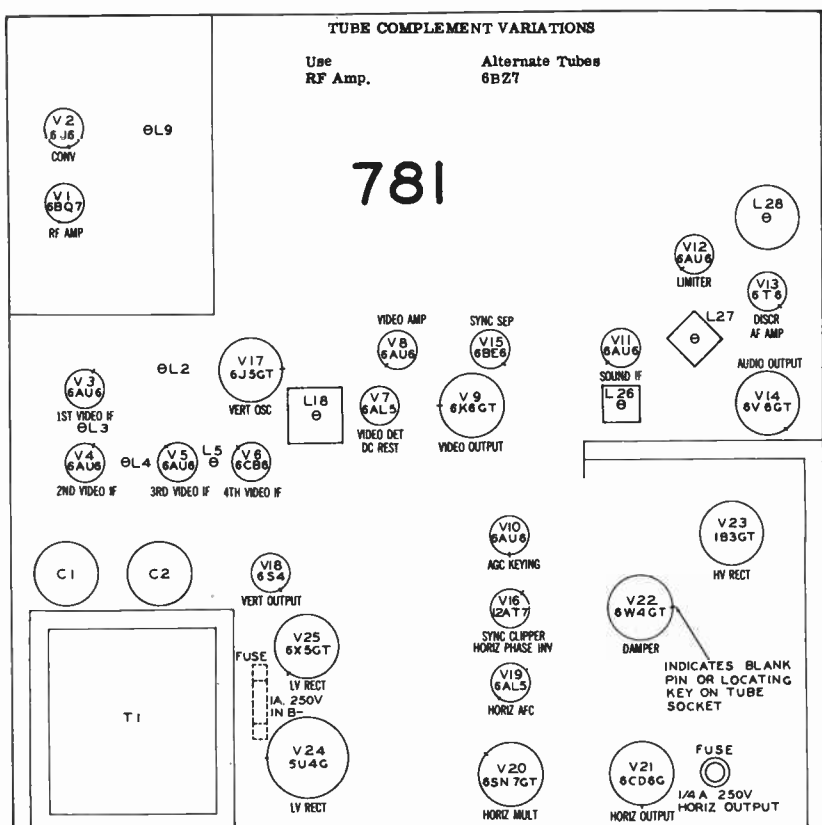
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V18 Fuse (M1)

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5, V6, V10
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V19
Has pic, no sound-V8, V9, V10

SYNC FAILURE
No vert. sync.-V11, V12
No horiz. sync.-V11, V13, V14
No vert. or horiz. sync.-V7, V11

SWEEP FAILURE
No raster, has sound-V14, V15, V16, V17, V19 Fuse (M2)
No vertical deflection -V12
Poor vert. linearity or foldover-V12
Poor horiz. linearity or foldover-V14, V15, V16
Narrow picture-V14, V15, V16, V17, V18
Vert. off freq-V11, V12
Horiz. off freq-V11, V13, V14



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

POWER SUPPLY FAILURE

No raster, no sound - V24, V25, Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V25

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V9, V26

Has pic, no sound - V11, V12, V13, V14

Overloaded picture - V10

SYNC FAILURE

No vert. sync - V16, V17

No horiz. sync - V16, V19, V20

No vert. or horiz. sync - V15, V16

SWEEP FAILURE

No raster; has sound - V20, V21, V22, V23, V26, Fuse (M2)

No vert. deflection - V18

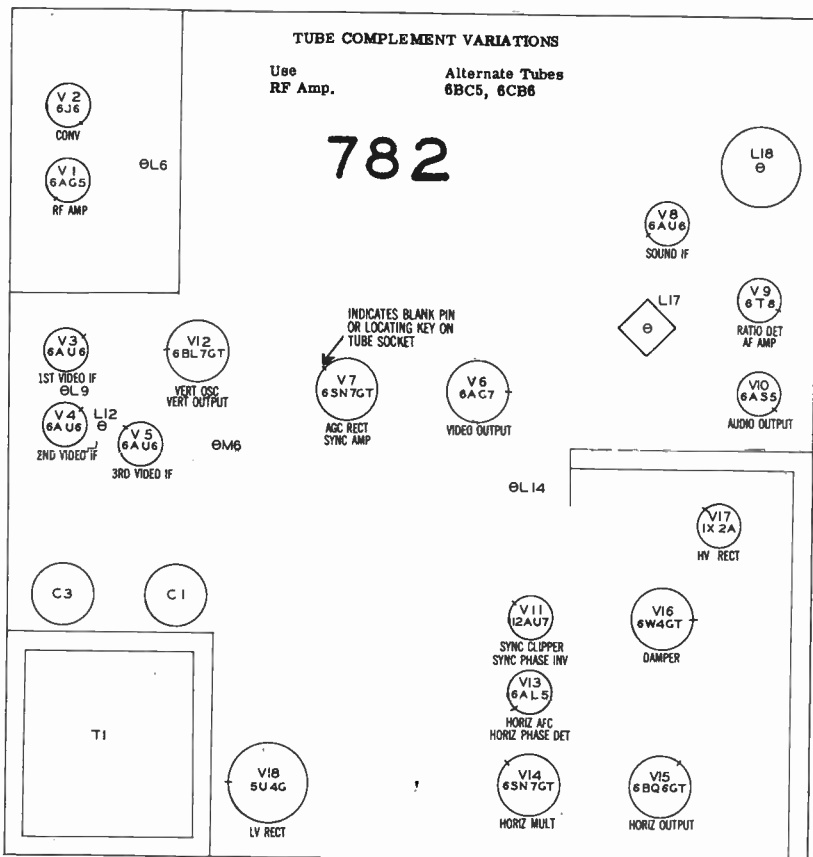
Poor vert. linearity or foldover - V17, V18

Poor horiz. linearity or foldover - V19, V20, V21

Narrow picture - V20, V21, V22, V23, V24

Vert. off freq. - V16, V17

Horiz. off freq. - V16, V19, V20



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V18, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V10

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V19

Has pic, no sound - V8, V9, V10

Overloaded picture - V7

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V7, V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V19, fuse (M2)

No vertical deflection - V12

Poor vert. linearity or foldover - V12

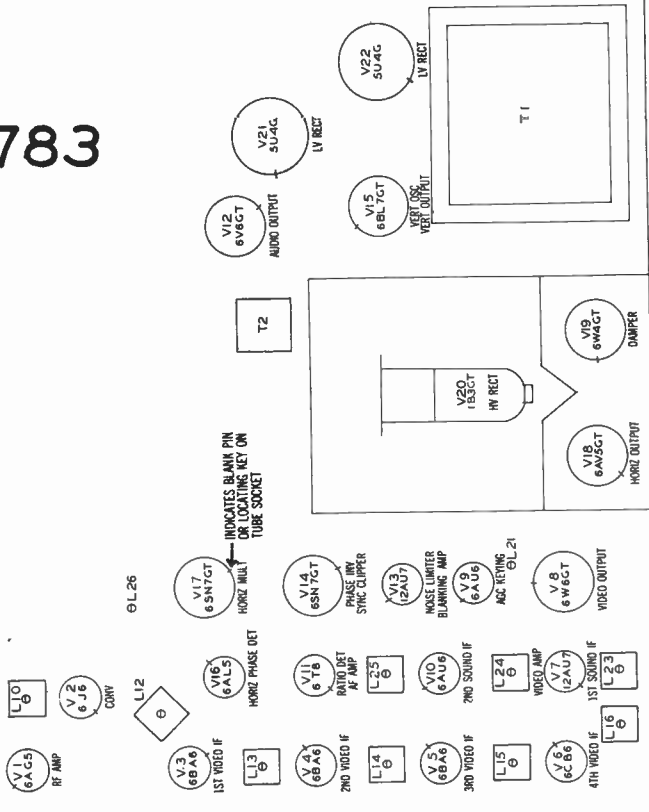
Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, V18

Vert. off freq. - V11, V12

Horiz. off freq. - V11, V13, V14

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

POWER SUPPLY FAILURE

No raster, no sound - V21, V22, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V23

Has pic, no sound - V7, V10, V11, V12

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V14, V16, V17

No vert. or horiz. sync - V13, V14

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V23, fuse (M2)

No vertical deflection - V15

Poor vert. linearity or foldover - V15

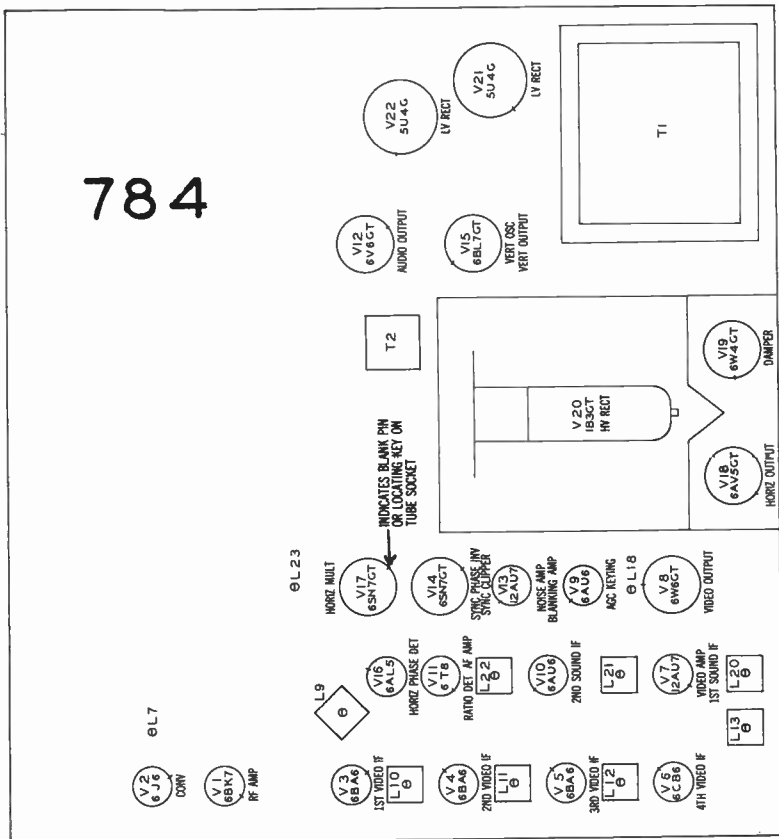
Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22

Vert. off freq. - V14, V15

Horiz. off freq. - V14, V16, V17

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V21, V22, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V23

Has pic, no sound - V9, V10, V11, V12

Overloaded picture - V9

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V14, V16, V17

No vert. or horiz. sync - V13, V14

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V23, fuse (M2)

No vertical deflection - V15

Poor vert. linearity or foldover - V15

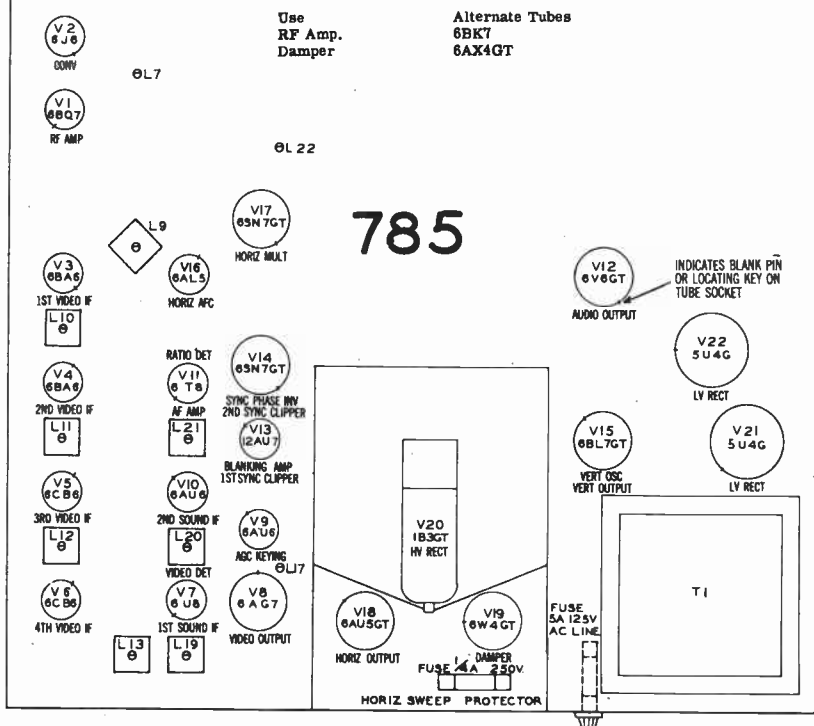
Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22

Vert. off freq. - V14, V15

Horiz. off freq. - V14, V16, V17

TUBE COMPLEMENT VARIATIONS



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No Raster, No Sound - V21, V22, Fuse (M1)

LOSS OF PICTURE OR SOUND

No Pic, No Sound, Has Raster - V2, V3, V4, V5, V6, V7

No Pic, No Sound, Has Snow - V1, V2, V3

No Pic, Has Sound, Has Raster - V8, V23

Has Pic, No Sound - V7, V10, V11, V12

Overloaded Picture - V9

SYNC FAILURE

No Vert. Sync. - V14, V15

No Horiz. Sync - V14, V16, V17

No Vert. or Horiz. Sync - V13, V14

SWEEP FAILURE

No Raster, Has Sound - V17, V18, V19, V20, V23, Fuse (M2)

No Vertical Deflection - V15

Poor Vert. Linearity or Foldover - V15

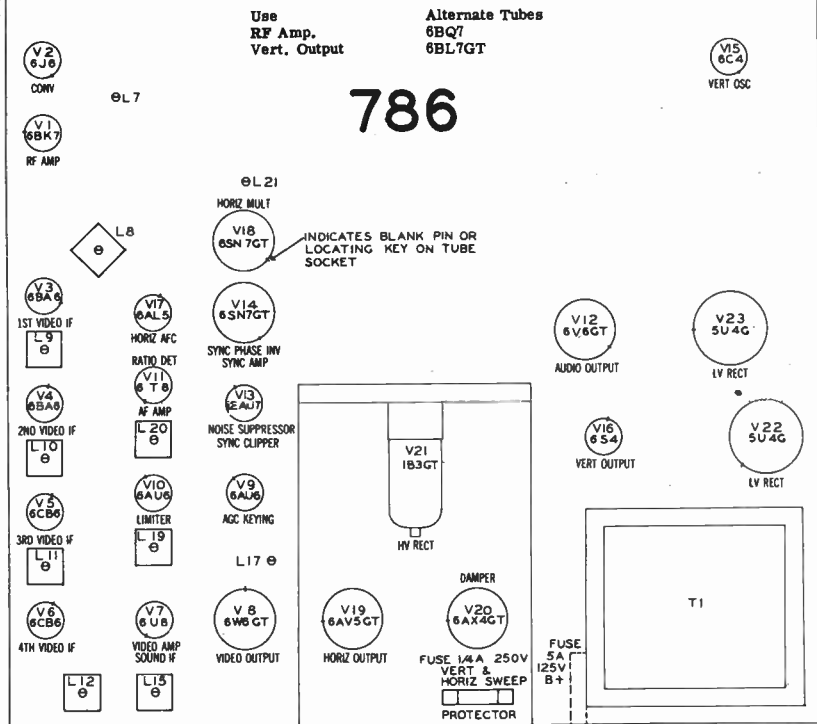
Poor Horiz. Linearity or Foldover - V17, V18, V19

Narrow Picture - V18, V17, V19, V21, V22

Vert. Off Freq. - V14, V15

Horiz. Off Freq. - V14, V16, V17

TUBE COMPLEMENT VARIATIONS



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V22, V23 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V8, V24

Has pic, no sound-V7, V10, V11, V12

Overloaded picture-V9, V11

SYNC FAILURE

No vert. sync-V14, V15

No horiz. sync-V14, V17, V18

No vert. or horiz. sync-V13, V14

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V24 Fuse (M2)

No vertical deflection-V15, V16

Poor vert. linearity or foldover-V15, V16

Poor horiz. linearity or foldover-V18, V19, V20

Narrow picture-V18, V19, V20, V21, V22, V23

Vert. off freq-V14, V15

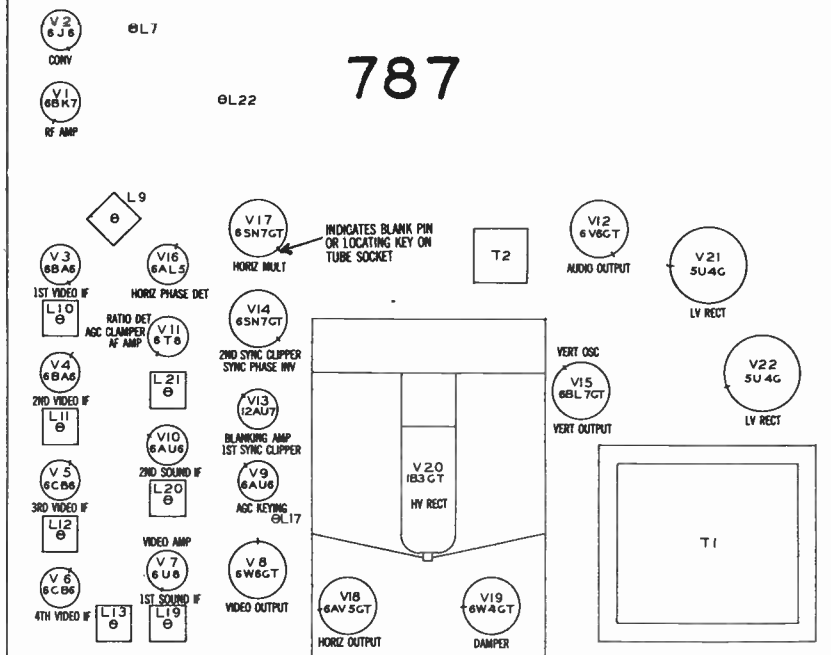
Horiz. off freq-V14, V17, V18

TUBE COMPLEMENT VARIATIONS

Use
RF Amp.

Alternate Tubes
6BQ7

787



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V21, V22, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V8, V23

Has pic, no sound - V7, V10, V11, V12

Overloaded picture - V9, V11

SYNC FAILURE

No vert. sync - V14, V15

No horiz. sync - V14, V16, V17

No vert. or horiz. sync - V13, V14

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V23, fuse (M2)

No vertical deflection - V15

Poor vert. linearity or foldover - V15

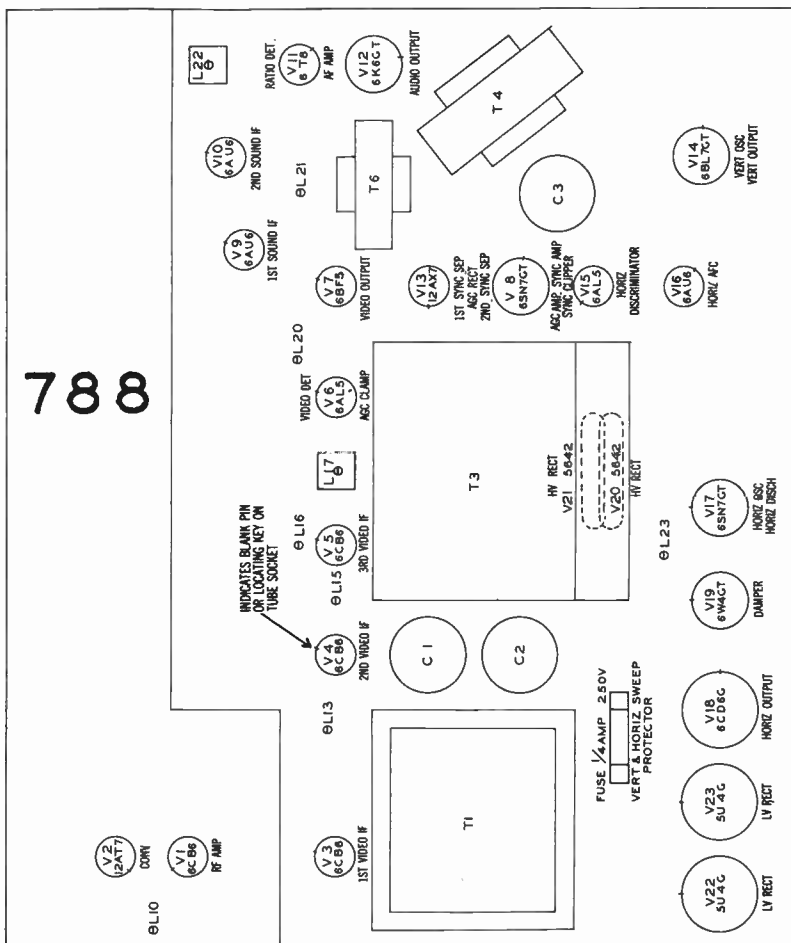
Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22

Vert. off freq. - V14, V15

Horiz. off freq. - V14, V16, V17

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V22, V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V24

Has pic, no sound - V9, V10, V11, V12

Overloaded picture - V8, V13

SYNC FAILURE

No vert. sync - V8, V14

No horiz. sync - V8, V15, V16, V17

No vert. or horiz. sync - V8, V13

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V21, V24, fuse (M1)

No vertical deflection - V14

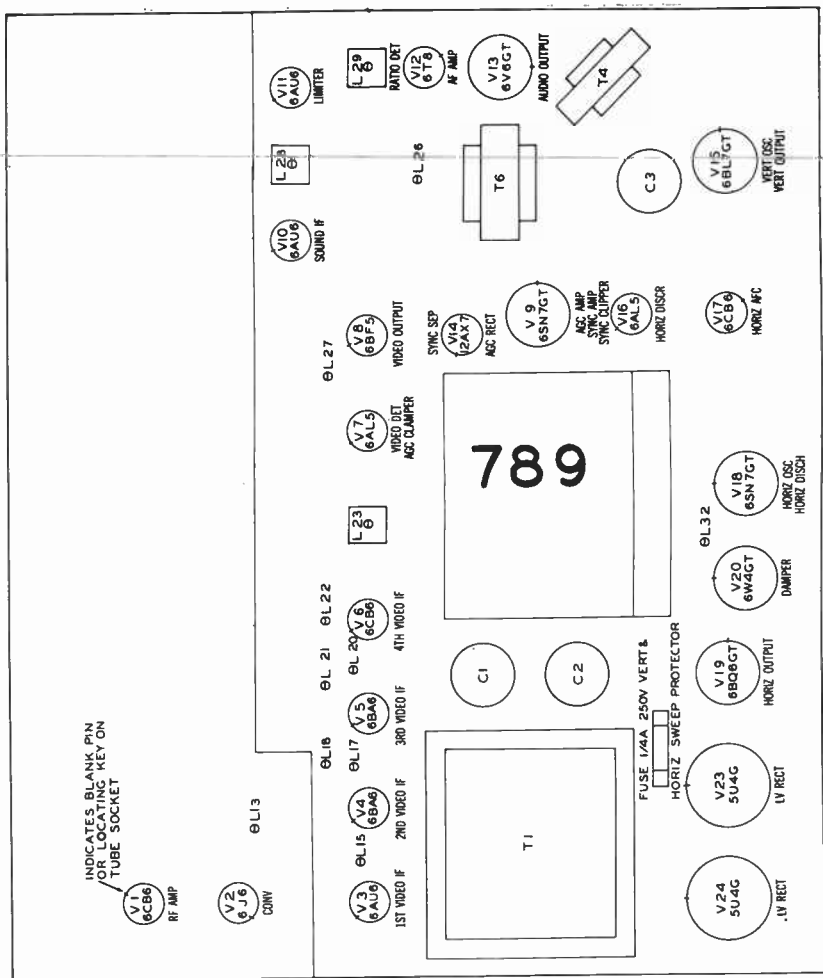
Poor vert. linearity or foldover - V14

Poor horiz. linearity or foldover - V16, V17, V18, V19

Narrow picture - V16, V17, V18, V19, V20, V21, V22, V23

Vert. off freq. - V8, V14

Horiz. off freq. - V8, V15, V16, V17



TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6, V7

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V8, V25

Has pic, no sound-V10, V11, V12, V13,

Overloaded picture-V7, V8, V14

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V22, V25, Fuse (M1)

No vertical deflection-V15

Poor vert. linearity or foldover-V15

Poor horiz. linearity or foldover-V18, V19, V20

Narrow picture-V18, V19, V20, V21, V22, V23, V24

Vert off freq.-V9, V15

Horiz. off freq.-V9, V16, V17, V18

POWER SUPPLY FAILURE

No raster, no sound-V23, V24

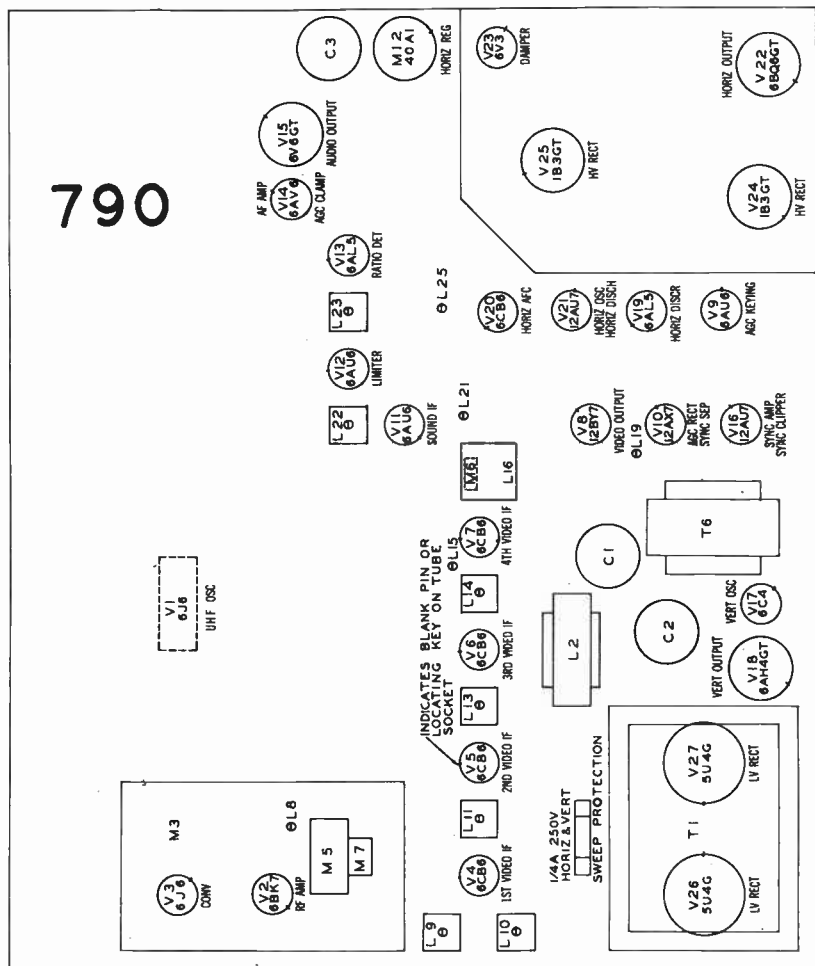
SYNC FAILURE

No vert. sync-V9, V15

No horiz. sync.-V9, V16, V17, V18,

No vert. or horiz. sync - V9, V14

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V27, CV28

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V3, V4, V5, V6, V7 (V1, UHF only)

No pic, no sound, has snow - V2, V3, V4

No pic, has sound, has raster - V8, V29

Has pic, no sound - V11, V12, V13, V14, V15

Overloaded picture - V9, V10, V14

SYNC FAILURE

No vert. sync - V16, V17

No horiz. sync - V16, V19, V20, V21

No vert. or horiz. sync - V10, V16

SWEEP FAILURE

No raster, has sound - V21, V22, V23, V24; V25, V26, V29 Fuse (M)

No vertical deflection - V18

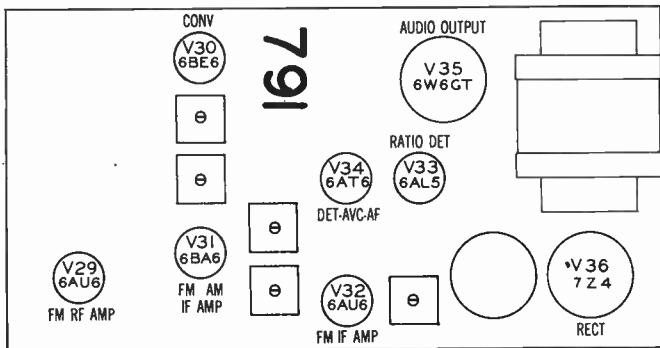
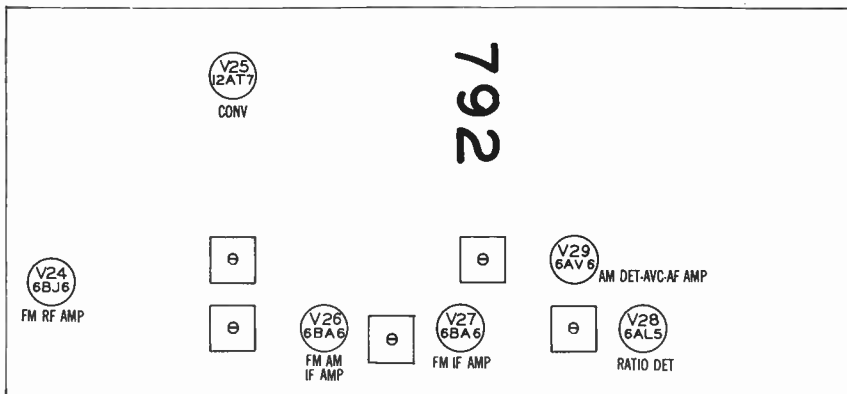
Poor vert. linearity or foldover - V17, V18

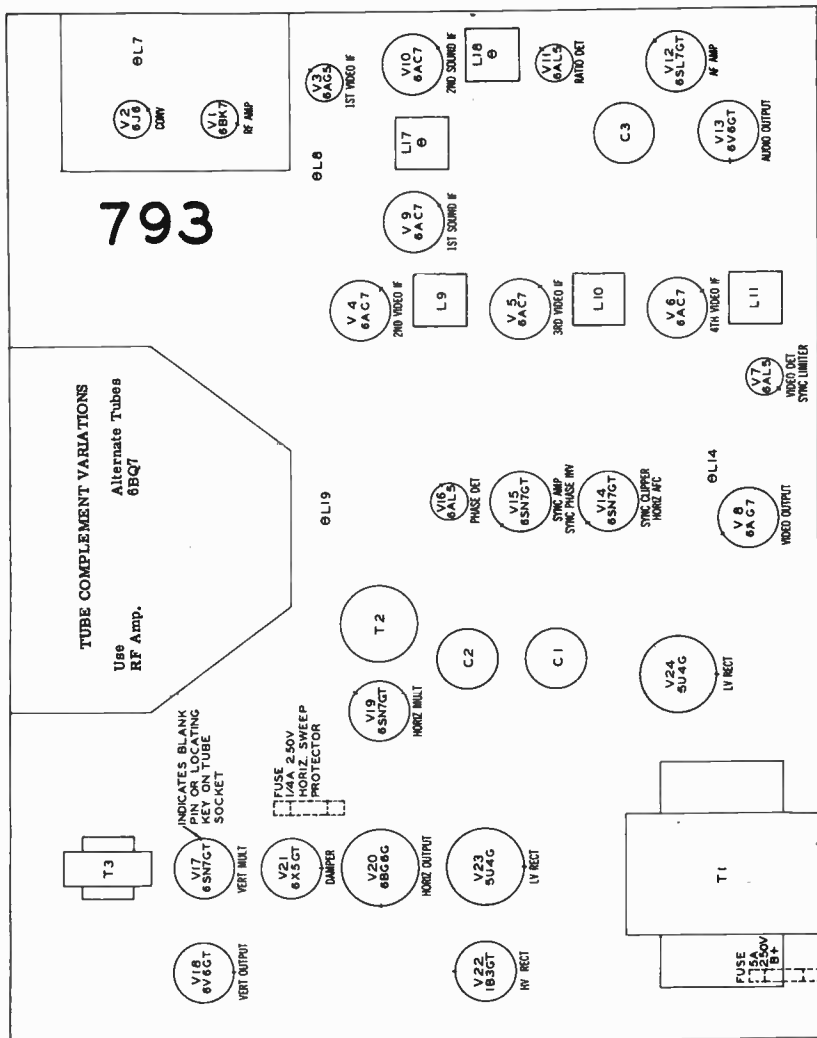
Poor horiz. linearity or foldover - V21, V22, V23, V24

Narrow picture - V21, V22, V23, V24, V25, V26, V27, V28

Vert. off freq. - V16, V17

Horiz. off freq. - V16, V19, V20, V21





TUBE FAILURE CHECK CHART

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

LOSS OF PICTURE OR SOUND

- No pic, no sound, has raster-V2, V3, V4
- No pic, no sound, has snow-V1, V2, V3
- No pic, has sound, has raster-V5, V6, V7, V8, V25
- Has pic, no sound-V9, V10, V11, V12, V13

SWEEP FAILURE

- No raster, has sound-V19, V20, V21, V22, V25 Fuse (M2)
- No vertical deflection-V17
- Poor vert. linearity or foldover-V16, V17
- Poor horiz. linearity or foldover-V19, V20, V21
- Narrow picture-V19, V20, V21, V22, V23, V24
- Vert. off freq.-V15, V16
- Horiz. off freq.-V14, V15, V18, V19

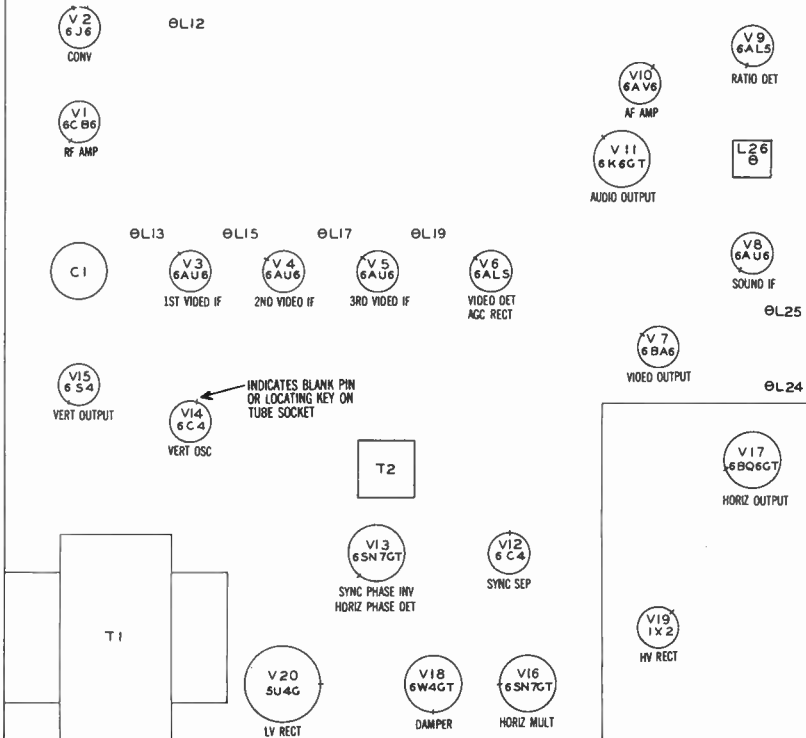
POWER SUPPLY FAILURE

- No raster, no sound-V23, V24 Fuse (M1)

SYNC FAILURE

- No vert. sync-V15, V16
- No horiz. sync-V14, V15, V18, V19
- No vert. and horiz. sync-V14, V15

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V11

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V13, V14

No horiz. sync - V13, V16

No vert. or horiz. sync - V12, V13

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, fuse (M2)

No vertical deflection - V14, V15

Poor vert. linearity or foldover - V14, V15

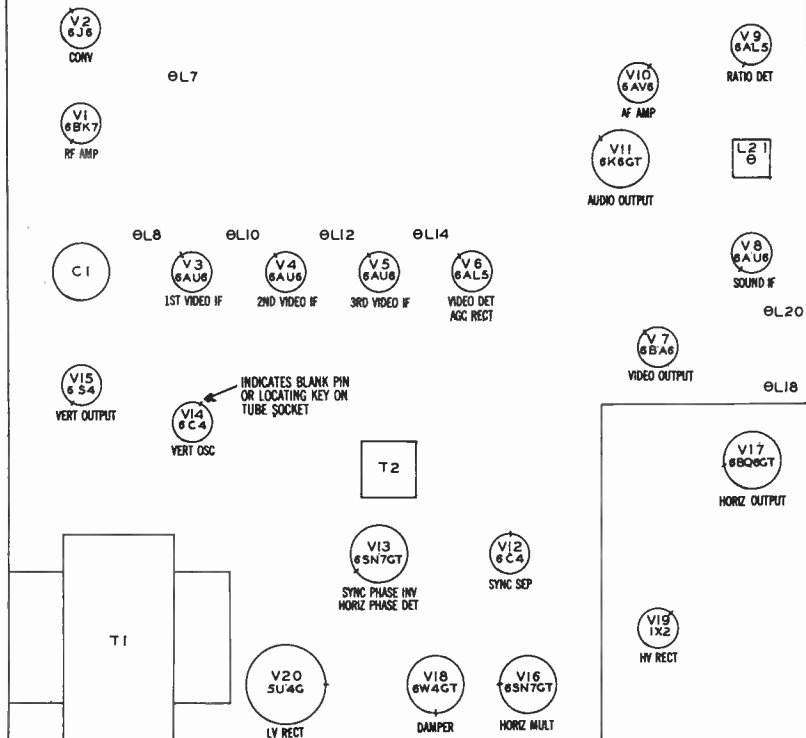
Poor horiz. linearity or foldover - V16, V17, V18

Narrow picture - V16, V17, V18, V19, V20

Vert. off freq. - V13, V14

Horiz. off freq. - V13, V16

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V20, fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V6, V7, V11

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V7, V21

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V6

SYNC FAILURE

No vert. sync - V13, V14

No horiz. sync - V13, V16

No vert. or horiz. sync - V12, V13

SWEEP FAILURE

No raster, has sound - V16, V17, V18, V19, V21, fuse (M2)

No vertical deflection - V14, V15

Poor vert. linearity or foldover - V14, V15

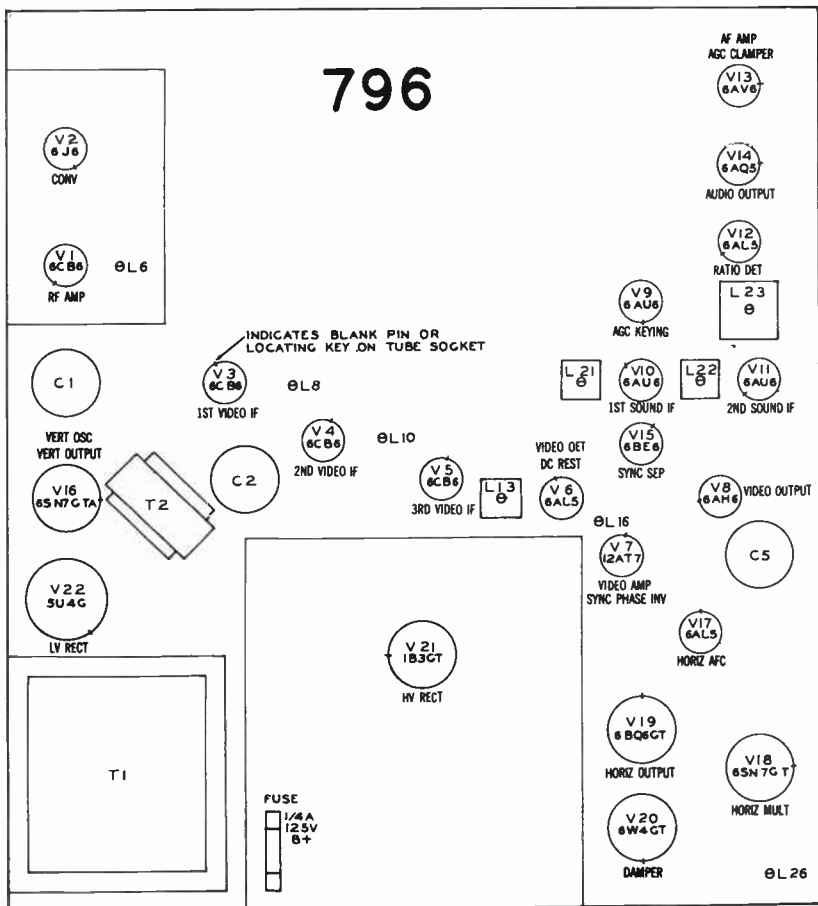
Poor horiz. linearity or foldover - V16, V17, V18

Narrow picture - V16, V17, V18, V19, V20

Vert. off freq. - V13, V14

Horiz. off freq. - V13, V16

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TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V22 Fuse (M1)

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V7, V8, V23

Has pic, no sound-V10, V11, V12, V13, V14

Overloaded picture-V9, V13

SYNC FAILURE

No vert. sync-V7, V16

No horiz. sync-V7, V17, V18

No vert or horiz. sync-V7, V15

SWEEP FAILURE

No raster, has sound-V18, V19, V20, V21, V23

No vertical deflection -V16

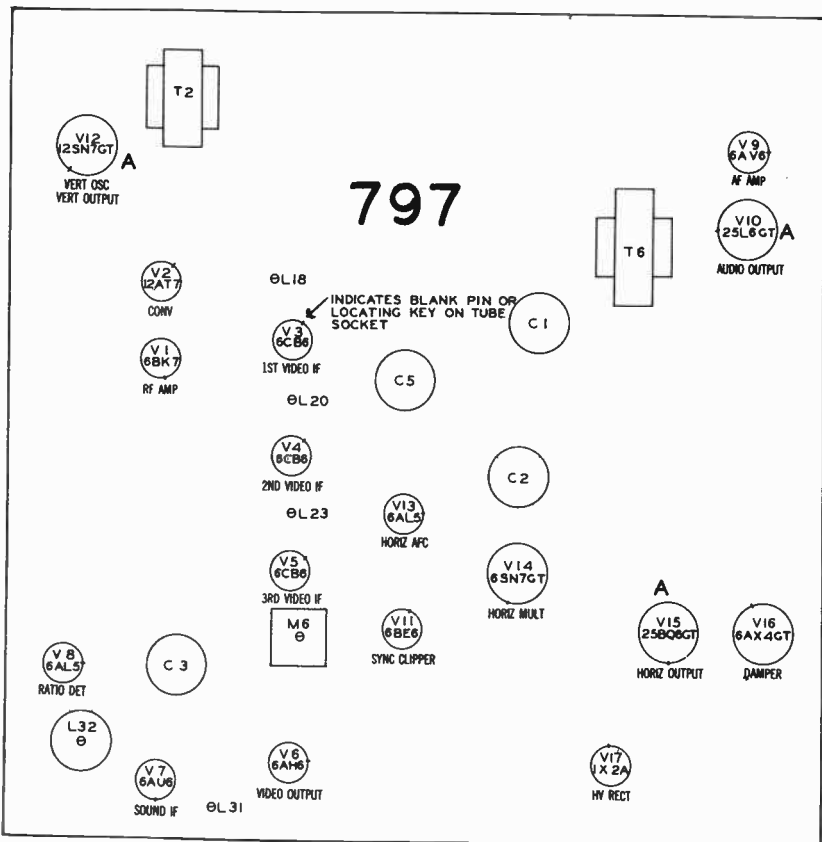
Poor vert. linearity or foldover-V16

Poor horiz. linearity or foldover-V18, V19, V20

Narrow picture-V18, V19, V20, V21, V22

Vert. off freq.-V7, V16

Horiz. off freq.-V7, V17, V18



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - Selenium Rectifiers M1, M2

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V8

Has pic, no sound - V7, V8, V9, V10

SYNC FAILURE

No vert. sync - V11, V12

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound - V14, V15, V16, V17, V18

No vertical deflection - V12

Poor vert. linearity or foldover - V12

Poor horiz. linearity or foldover - V14, V15, V16

Narrow picture - V14, V15, V16, V17, M1, M2

Vert. off freq. - V12

Horiz. off freq. - V13, V14

NOTE: The tubes marked A on the tube placement chart indicate the tubes in the series string. The filaments of the other tubes operate independently from a filament transformer.

798

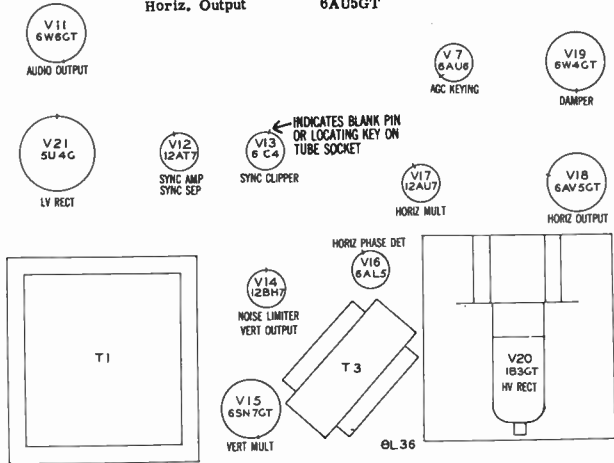
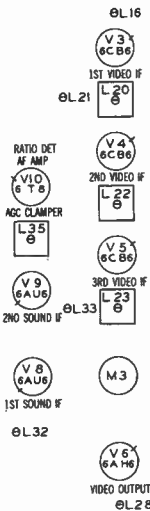
V2
6X8
CONV

ØL14

V1
6AK5
RF AMP

TUBE COMPLEMENT VARIATIONS

Use Horiz. Output Alternate Tubes 6AU5GT



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V21

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V22

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V7

SYNC FAILURE

No vert. sync - V12, V15

No horiz. sync - V13, V16, V17

No vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V22

No vertical deflection - V14, V15

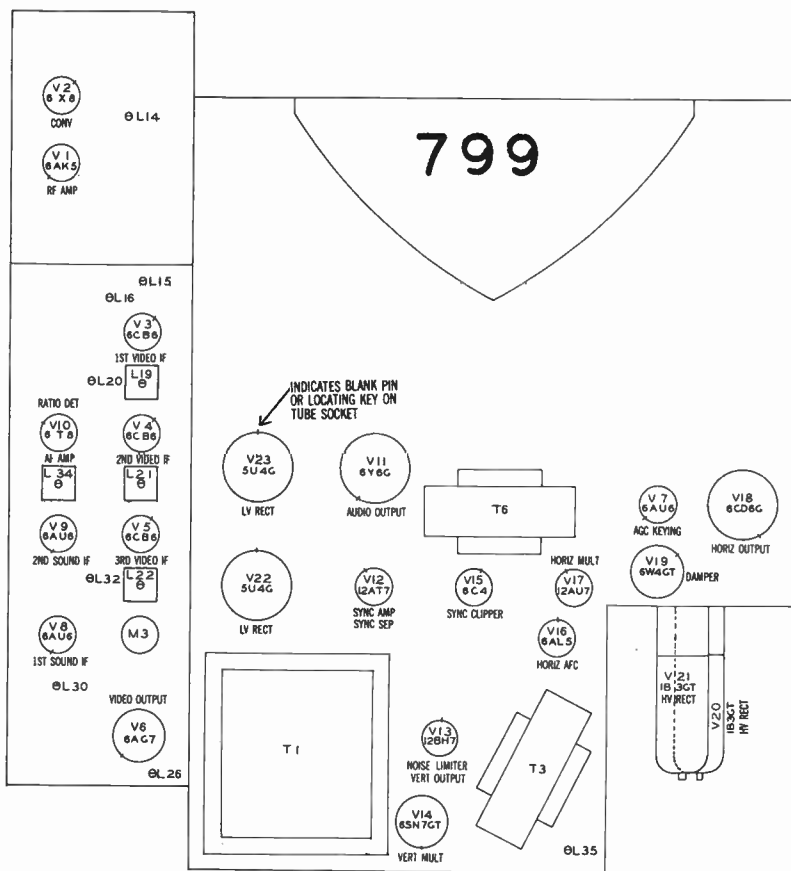
Poor vert. linearity or foldover - V14, V15

Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21

Vert. off freq. - V12, V15

Horiz. off freq. - V12, V13, V16, V17



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound - V22, V23

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster - V2, V3, V4, V5, V11

No pic, no sound, has snow - V1, V2, V3

No pic, has sound, has raster - V6, V24

Has pic, no sound - V8, V9, V10, V11

Overloaded picture - V7

SYNC FAILURE

No vert. sync - V12, V14

No horiz. sync - V15, V16, V17

No vert. or horiz. sync - V12

SWEEP FAILURE

No raster, has sound - V17, V18, V19, V20, V21, V24

No vertical deflection - V13, V14

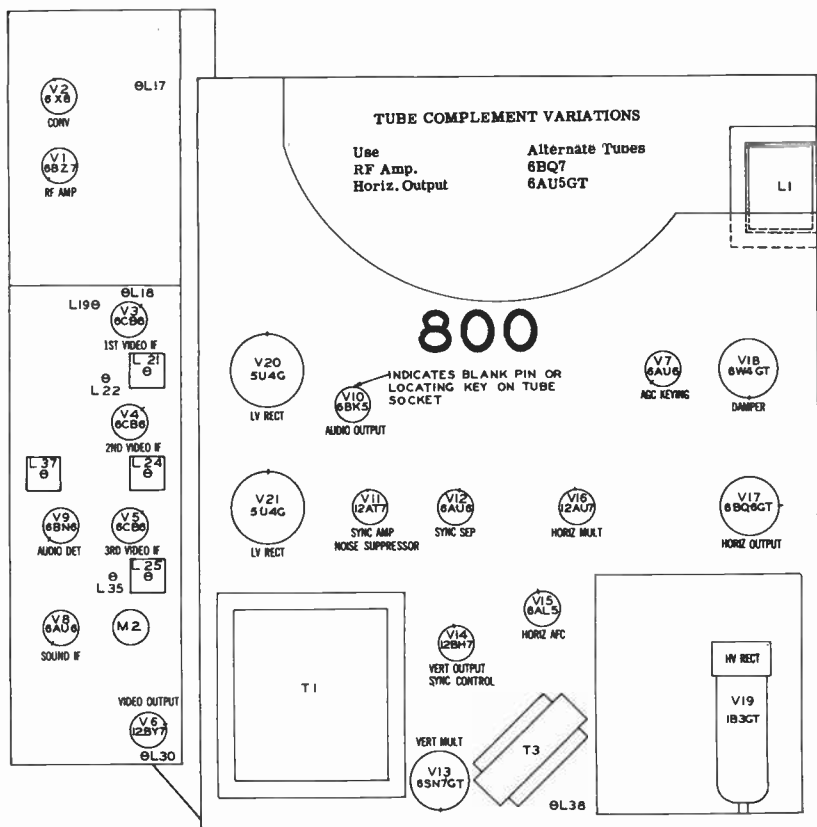
Poor vert. linearity or foldover - V13, V14

Poor horiz. linearity or foldover - V17, V18, V19

Narrow picture - V17, V18, V19, V20, V21, V22, V23

Vert. off freq. - V12, V14

Horiz. off freq. - V15, V16, V17



TUBE FAILURE CHECK CHART

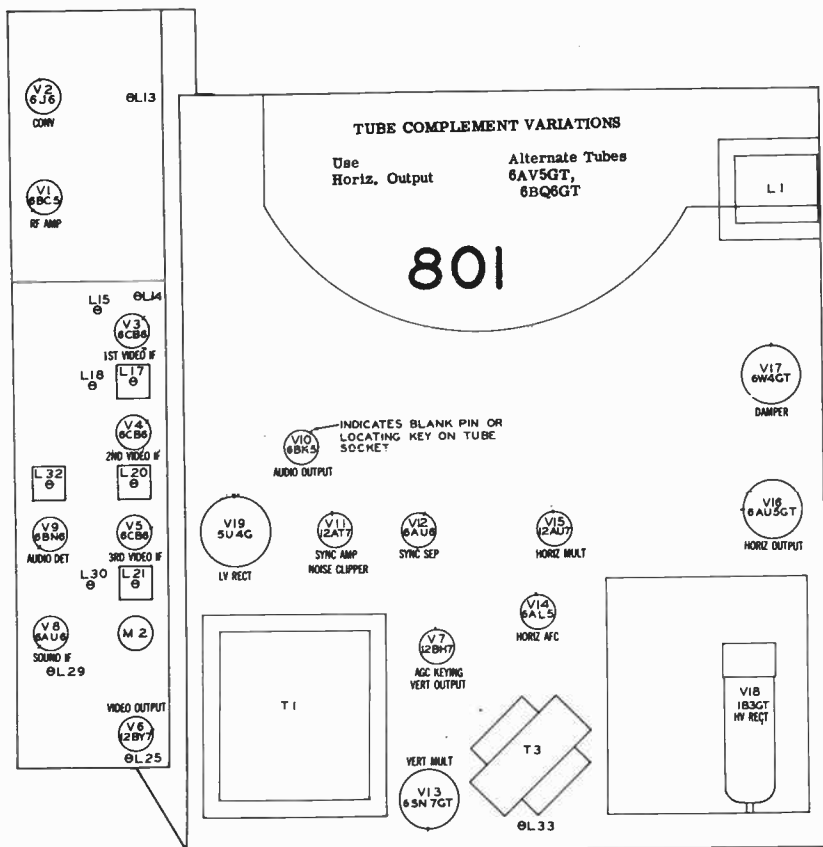
The following chart lists tubes whose failures are most likely to produce the indicated symptoms. Refer to tube placement chart for location and type of tube.

POWER SUPPLY FAILURE
No raster, no sound-V20, V21

LOSS OF PICTURE OR SOUND
No pic, no sound, has raster-V2, V3, V4, V5
No pic, no sound, has snow-V1, V2, V3
No pic, has sound, has raster-V6, V22
Has pic, no sound-V8, V9, V10
Overloaded picture-V7

SYNC FAILURE
No vert. sync-V12, V13
No horiz. sync-V12, V15, V16
No vert. or horiz. sync-V11, V12

SWEEP FAILURE
No raster, has sound-V16, V17, V18, V19, V22
No vertical deflection-V13, V14
Poor vert. linearity or foldover-V13, V14
Poor horiz. linearity or foldover-V16, V17, V18
Narrow picture-V16, V17, V18, V19, V20, V21
Vert. off freq.-V12, V13
Horiz. off freq.-V12, V15, V16



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5.

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster -V6, V20

Has pic, no sound-V8, V9, V10

Overloaded picture-V7

SYNC FAILURE

No vert. sync.-V12, V13

No horiz. sync.-V12, V14, V15

No vert. or horiz. sync.-V11, V12

SWEEP FAILURE

No raster, has sound-V15, V16, V17, V18, V20

No vertical deflection-V7, V13

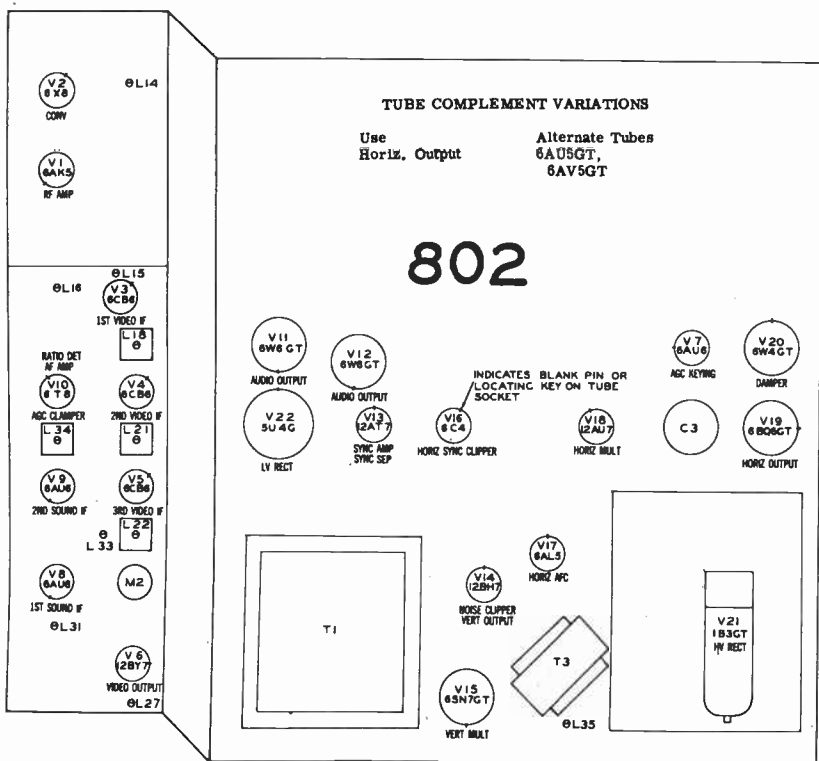
Poor vert. linearity or foldover-V13, V17

Poor horiz. linearity or foldover-V15, V16, V17

Narrow picture-V15, V16, V17, V18, V19

Vert. off freq.-V12, V13

Horiz. off freq.-V12, V14, V15



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

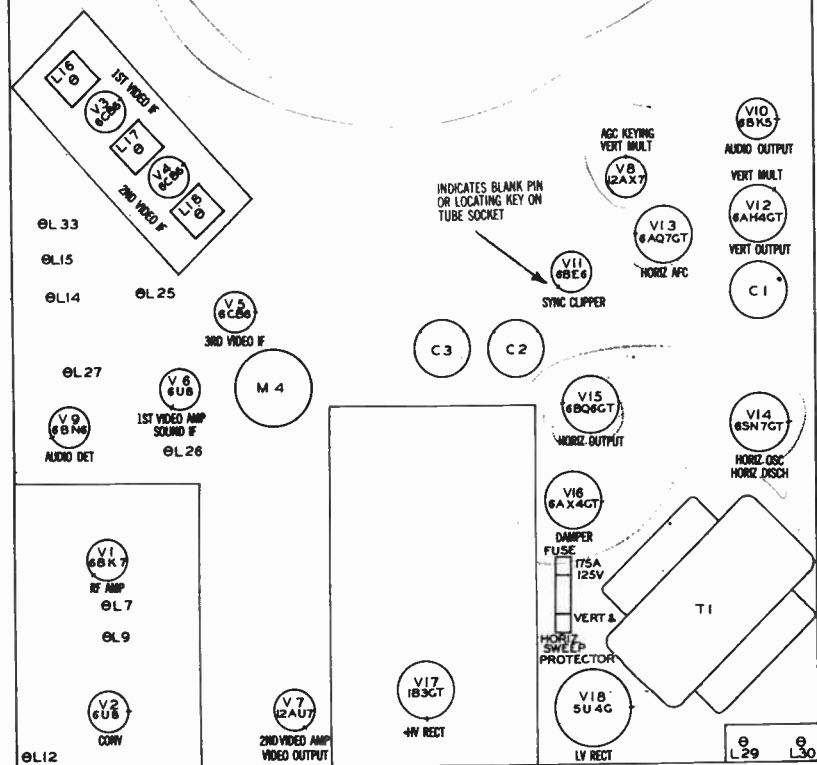
POWER SUPPLY FAILURE
No raster, no sound - V2

LOSS OF PICTURE OR SOUND
No pic, No sound, has raster - V2, V3, V4, V5, V11, V12
No pic, no sound, has snow - V1, V2, V3
No pic, has sound, has raster - V6, V23
Has pic, no sound - V8, V9, V10, V11, V12
Overloaded picture - V7, V10

SYNC FAILURE
No vert. sync - V13, V15
No horiz. sync - V13, V16, V17, V18
No vert. or horiz. sync - V13

SWEEP FAILURE
No raster, has ound - V18, V19, V20, V21, V23
No vertical deflection - V14
Poor vert. linearity or foldover - V14, V15
Poor horiz. linearity or foldover - V18, V19, V20
Narrow picture - V18, V19, V20, V21, V22
Vert. off freq. - V13, V15
Horiz. off freq. - V13, V16, V17, V18

803



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, No sound-V18

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5, V6

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V7, V19

Has pic, no sound-V6, V9

Overloaded picture-V8

SYNC FAILURE

No vert. sync - V8, V11

No horiz. sync - V11, V13, V14

No vert. or horiz. sync - V11

SWEEP FAILURE

No raster, has sound-V13, V14, V15, V16, V17, V19 Fuse (M)

No vertical deflection-V8, V12

Poor vert. linearity or foldover-V8, V12

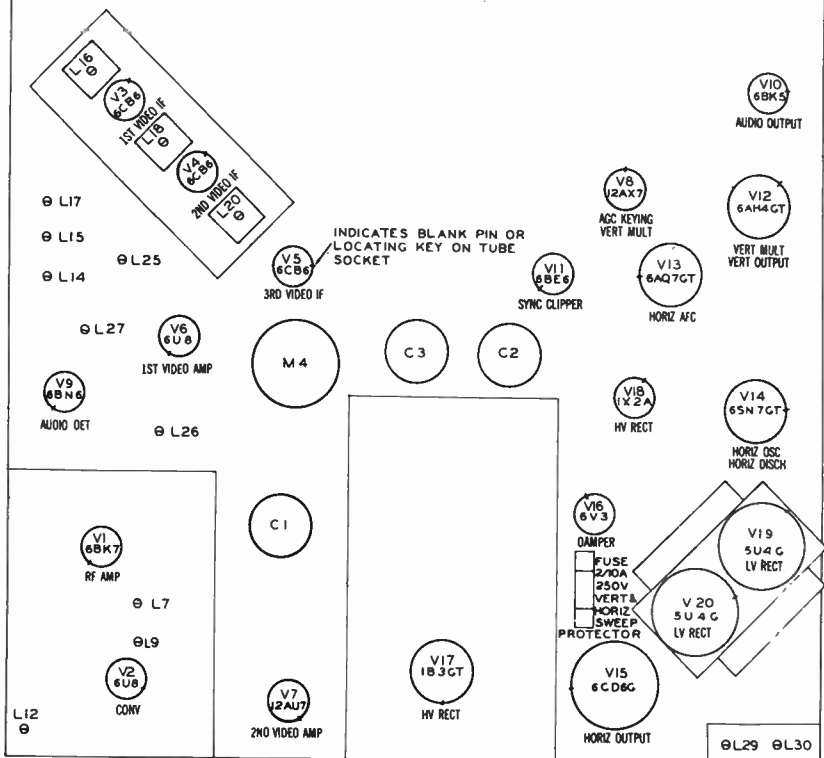
Poor horiz. linearity or foldover-V13, V14, V15, V16

Narrow picture-V13, V14, V15, V16, V17, V18

Vert. off freq.-V 8

Horiz. off freq.-V11, V13, V14

804



TUBE FAILURE CHECK CHART

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

POWER SUPPLY FAILURE

No raster, no sound-V19, V20

LOSS OF PICTURE OR SOUND

No pic, no sound, has raster-V2, V3, V4, V5

No pic, no sound, has snow-V1, V2, V3

No pic, has sound, has raster-V6, V7, V21

Has pic, no sound-V8, V9, V10

Overloaded picture-V8

SUNC FAILURE

No vert. sync-V11, V8, V12

No horiz. sync.-V11, V13, V14

No vert or horiz. sync-V11

SWEEP FAILURE

No raster, has sound-V14, V15, V16, V17, V18, V21 Fuse (M1)

No vertical deflection-V12

Poor vert. linearity or foldover-V8, V12

Poor horiz. linearity or foldover-V14, V15, V16

Narrow picture-V14, V15, V16, V17, V18, V19, V20

Vert. off freq.-V11, V8, V12

Horiz. off freq.-V11, V13, V14

