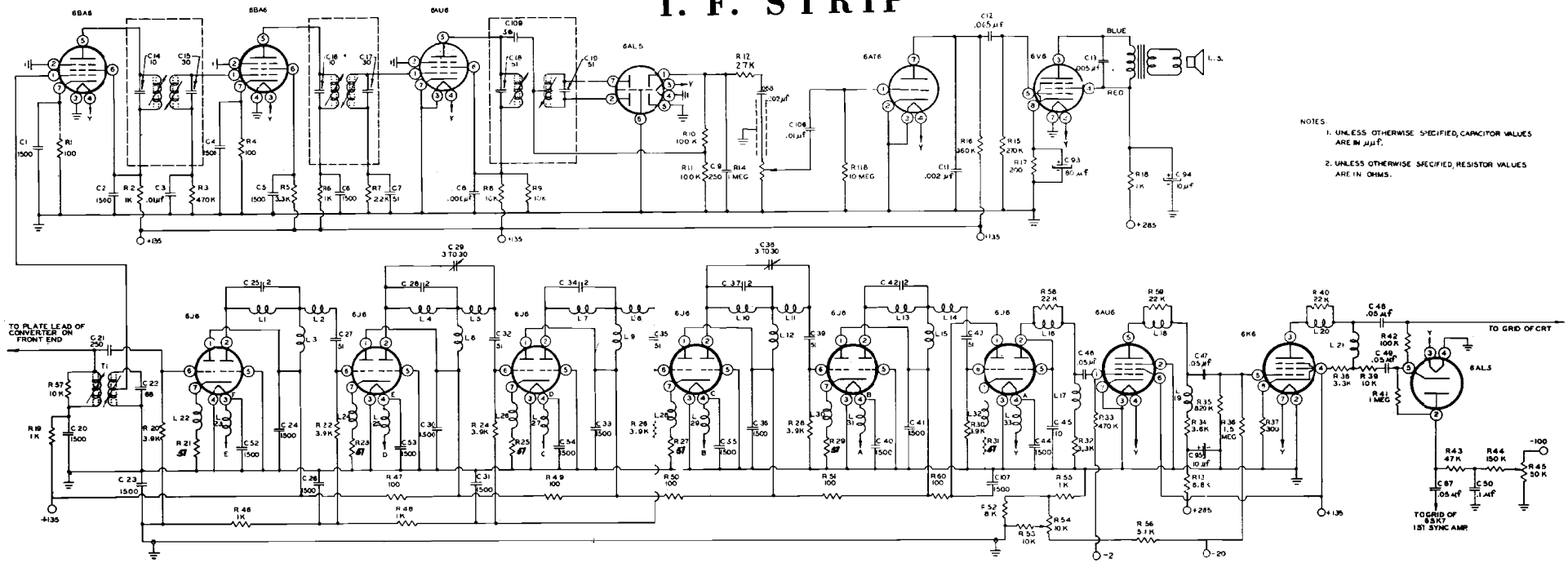
I. F. STRIP



SOUND I.F. AND LIMITER-DISCRIMINATOR SECTIONS

The sound I.F. and Limiter-Discriminator sections of this unit utilize a true F.M. circuit.

Two 6BA6 tubes are employed as I.F. Amplifiers, a 6AU6 is utilized as a noise limiter which in turn feeds a 6AL5 Duo-DIODE as the discriminator or F.M. Detector. From the top of the discriminator DIODE load you will find a 27K resistor feeding a .002MF condenser and from there to a shielded lead carrying the Audio signal to the top of the volume control. This combination of the 27K resistor and the capacity in the shielded lead form a high frequency (audio) de-emphasis circuit, which helps restore the normal proportion of highs to lows in the audio frequency spectrum, which was greatly over or pre-emphasized at the transmitter. This De-emphasis circuit is a form of tone control.

The sound I.F. signal is picked off the tap Lug "B" on the secondary of the converter transformer, and fed to the grid of the first 6BA6 amplifier, which amplifies the F.M. Sound I.F. Signal and feeds it to the first sound I.F. transformer and from there into the grid of the 2nd 6BA6 amplifier. Notice the 470K resistor and .01MFD Condenser from the bottom of the first sound I.F. Secondary to ground. This combination forms an overload control circuit. If the signal is very strong at the 2nd 6BA6 grid and the grid draws current this combination provides an automatic bias, which also helps to level off any serious amplitude variations in signal strength. After the signal is amplified by the second 6BA6, it is fed into the second sound I.F. transformer and then into the grid of the 6AU6 sound I.F. Limiter. This 6AU6 is a sharp cut-off Pentode operating with very low plate and screen voltages and having no Cathode Bias. The only bias is that bias developed across the 22K resistor and 51MMF Condenser combination which is in the lower end of the 2nd Sound I.F. Transformer secondary to ground.

The strong signal on the grid causes it to draw current on the positive half of the signal cycle and charge the 51MMF Condenser providing a bias on the tube. The rate of discharge is governed by the 22K resistor. The time constants in the grid circuit are chosen to effectively limit ignition and other noise pulses by driving the tube grid to cutoff on strong negative variations in amplitude. The 6AU6 reaches plate saturation also on a strong signal and will not pass any variations in amplitude of signal on to the discriminator; thus the 6AU6 tends to feed a constant signal into the ciscriminator primary and prevents any noise pulses from being passed, or any amplitude variations in signal strength from affecting the detector circuit. Thus, looking into the Discriminator circuit, it sees a signal whose *Frequency* is *Continuously Varying* but whose strength or Amplitude (Voltage) is kept relatively constant throughout.

The discriminator circuit is a standard type of circuit and responds to variations in *I.F. Frequency* by *Converting* them into *Variations of Voltage* across the discriminator DIODE load resistors. These voltage variations correspond to the original sound or AUDIO which was used to modulate the sound carrier at the transmitter. The AUDIO voltage appearing at the Discriminator load is sent through the De-emphasis circuit, and from there to the volume control and into the *1st* Audio Amplifier.

For further detailed description of F.M. circuits we ask you to refer to any recent standard textbooks on the subject.

When working on the I.F. Strip keep a Schematic in front of you at all times and use the information provided here in this treatise as a guide.

The Video I.F. Section employs 6J6 Duo-Triode tubes in a unique circuit arrangement. The first Triode section of each tube is used as a cathode follower; the second section is a cathode-coupled grounded-grid amplifier. The transfer of signal from the first triode section to the second triode section is affected by the common impedance in the cathode circuit; for example, L22 and R21 in series in the first video I.F. Amplifier. If you remember correctly, signal can be injected into a triode by either feeding it into grid and grounding cathode, or vice-versa, by grounding grid and injecting into the cathode circuit. The reason we use triodes in this arrangement is because of their low inherent noise characteristics, and also because in a grounded grid triode amplifier at the fairly high frequencies at which they operate, the grounded grid affords excellent isolation between input and output circuits of the amplifier, and also provides better stability than an equivalent pentode tube would, due to interelectrode capacity coupling between input grid and plate output circuits.

The plate (output) of the grounded grid amplifier is then fed to the following stage through a Bridge-T coupling network. The Bridge-T networks in conjunction with their amplifier stages provide a wide band pass of 4.25MC. Five of these stages in cascade are used ahead of the detector-driver in order to provide the necessary gain.

TRAPS

There are three traps used in this unit. Two of them are miniature variables (air dialectric trimmers) of the Phillips type, and have a capacity range of 3 to 30 MMF which is linear in variation. The other trap is incorporated as the slug tuned secondary (top slug) of the converter transformer.

The two capacity type trimmers (Phillips) are used in conjunction with their respective bridge-T networks; the trap between the second and third 6J6 Video I.F. Amplifiers, resonates with the inductances of the Bridge-T network to trap out the associate Sound I.F. signal, which is 21.9 Mc. on the Champion models Television Assembly, and is 21.6 Mc. on the Standard Models. The other trap between the fourth and fifth 6J6 Video I.F. Amplifiers, resonates with the inductances of the Bridge-T network to trap out the Adjacent Sound I.F. signal, which is 27.9 MC. on the Champion models Television Assembly, and is 27.6 Mc. on the Standard models.

VIDEO DETECTOR-DRIVER AND DETECTOR CIRCUIT

The Video I.F. output from the fifth stage is fed to the first triode section of the 6th 6J6, which functions as a Cathode follower, which in turn, by virtue of the common cathode coupling within the tube, and its external cathode loading being both inductive for building up a signal across it, and having a bias resistor in series with it for biasing the first triode, transfers its signal energy developed in the cathode circuit to the second section of the 6J6. This second section has its grid and plate pins #2 and #5 tied together to form a DIODE detector ANODE (Plate). The DIODE ANODE is bypassed to ground with a 10MMF Condenser to eliminate the Video I.F. Component, and leave the Picture and Sync components pass through the peaking circuits and into the grid of the first Video amplifier (6AU6) through a .05MF condenser connected to the junction of both peaking coils in the DIODE load circuit.

VIDEO AMPLIFIERS AND D.C. RESTORER

The function of the video amplifier section of the I.F. strip is to amplify the composite video and sync pulse output of the second detector. The D.C. operating potentials on the grids and plates of these two tubes, 6AU6 and 6K6, are set as values which make these amplifiers, also act as noise limiters or clippers. The gain from the first video amplifier grid to the output plate is 30X and the frequency response extends to approximately 4.25 Mc.

NOISE SATURATION CIRCUIT (Clippers)

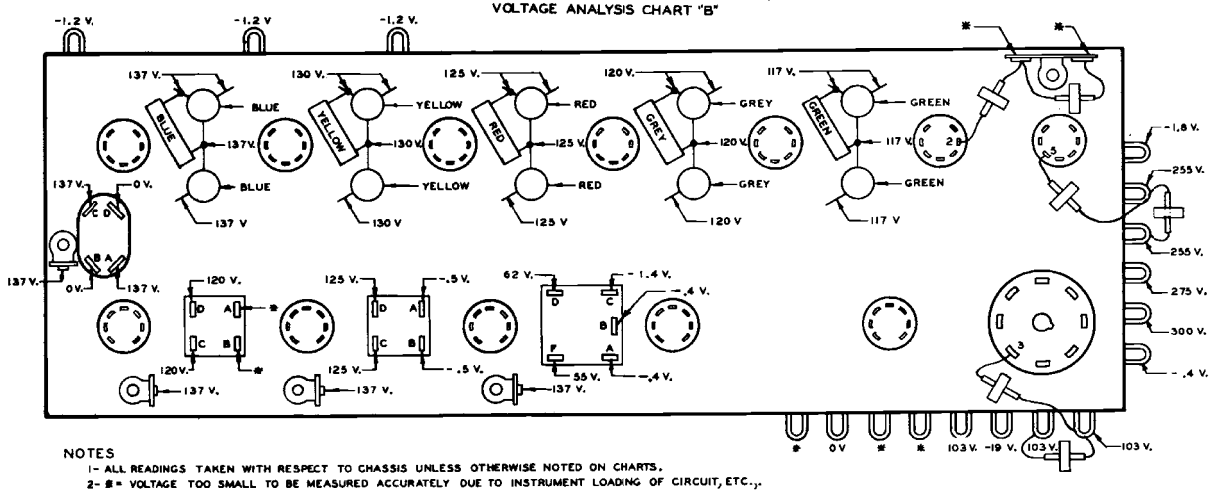
Since the synchronizing pulse is "Blacker than Black" and "Black" information must drive the cathode ray tube grid toward cut-off, this means that the video signal polarity must be such that the sync is negative when applied to the C.R.T. grid. It is obvious that for the two-stage video amplifier as is used, the sync pulse from the second detector must also be negative at the first video amplifier grid. The first stage is designed so that with a normal signal input level at its grid, the tube will be working over most of its operating range. Any large noise signal above sync will drive the grid to Cut-off and the noise will be limited. In effect, the signal to noise ratio is thus improved.

The second video amplifier stage (6K6) starts clipping before the noise signal at the grid of the first video stage (6AU6) is large enough to make the first stage also go into its saturation or clipping point. In effect, we have a dual or cascaded limiter, as well as having two stages of video amplification, thus stabilizing our sync pulses, so that noise signals do not readily tend to throw our sweep oscillators out of synchronization.

D.C. RESTORER AND SYNC TAKE-OFF CIRCUIT

Since the video amplifier is an A.C. amplifier, the D.C. component of the video signal that represents the average illumination of the original scene will not be passed. Unless this D.C. component is restored, difficulty will be experienced in maintaining proper scene illumination. For any given scene, this average illumination could be set properly by the brightness control. However, a change of scene would probably necessitate resetting this control. The D.C. restorer accomplishes this setting automatically thus assuring proper picture illumination at all times. For a detailed explanation of the operation of the D.C. restorer, see any recent standard textbook or publication on television.

IF STRIP DATA
VOLTAGE ANALYSIS CHART "B"



NOTES
1- ALL READINGS TAKEN WITH RESPECT TO CHASSIS UNLESS OTHERWISE NOTED ON CHARTS.
2- # = VOLTAGE TOO SMALL TO BE MEASURED ACCURATELY DUE TO INSTRUMENT LOADING OF CIRCUIT, ETC.,.
3- TOLERANCE ON VOLTAGE MEASUREMENTS = ± 20%.
4- REFER TO VOLTAGE CHART "A" NOTES FOR TEST CONDITONS & SETTINGS OF CONTROLS IN SET.
5- ALL VIDEO COILS HAVE COLOR CODE DOT FOR IDENTIFICATION.

RESISTANCE ANALYSIS CHART "A"

(1) Set not connected to power lines (line plug out of socket).

(2) Volume control on full clockwise rotation position.

(3) Contrast control turned to full clockwise rotation position.

(4) Brightness control turned to full clockwise rotation position.

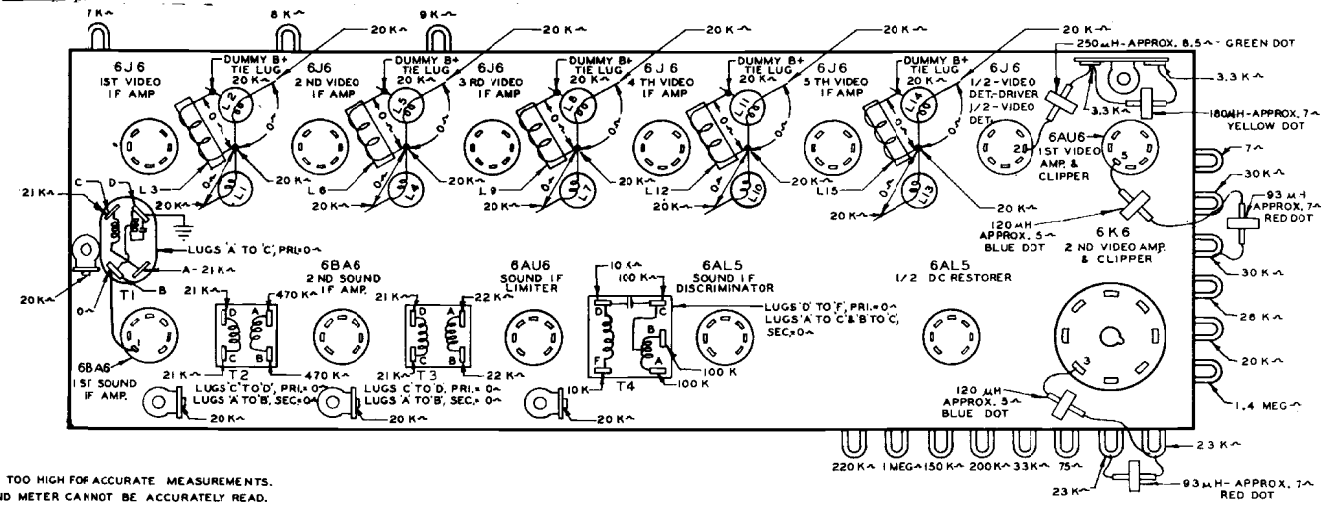
(5) All readings taken with respect to chassis ground unless otherwise noted on charts.

(6) All readings taken with Precision Model #858 20,000 ohm per Volt Meter or equivalent instrument.

(7) NOTATIONS:— ∞ = Infinity, too high in resistance to be measured accurately or open circuit reading.
"0" Ω = Lower than 1 ohm, or can not be accurately ascertained readily on average ohmmeter.

(8) NOTE:—Tolerance on resistance measurements is ± 10%.

TUBE SOCKET	LUG #1	LUG #2	LUG #3	LUG #4	LUG #5	LUG #6	LUG #7	LUG #8
6BA6 1st Sound I.F. Amp.	"0" Ω	"0" Ω	"0" Ω	"0" Ω	21K	21K	100 Ω	
6BA6 2nd Sound I.F. Amp.	470K	"0" Ω	"0" Ω	"0" Ω	21K	23K	100 Ω	
6AU6 Sound I.F. Limiter	22K	"0" Ω	"0" Ω	"0" Ω	10K	10K	"0" Ω	
6AL5 Sound I.F. Discriminator	200K	100K	"0" Ω	"0" Ω	"0" Ω	"0" Ω	100K	
6J6 1st Video I.F. Amp.	20K	20K	"0" Ω	"0" Ω	"0" Ω	11K	50 Ω	
6J6 2nd Video I.F. Amp.	20K +	20K +	"0" Ω	"0" Ω	"0" Ω	12K	50 Ω	
6J6 3rd Video I.F. Amp.	20K +	20K +	"0" Ω	"0" Ω	"0" Ω	13K	50 Ω	
6J6 4th Video I.F. Amp.	20K +	20K +	"0" Ω	"0" Ω	"0" Ω	13K	50 Ω	
6J6 5th Video I.F. Amp.	20K +	20K +	"0" Ω	"0" Ω	"0" Ω	3.9K	50 Ω	
6J6 ½ Video Detector-Driver ½ Video Detector	20K +	3.3K	"0" Ω	"0" Ω	3.3K	3.9K	50 Ω	
6AU6 1st Video Amp. & Clipper	470K	"0" Ω	"0" Ω	"0" Ω	31K	20K	"0" Ω	
6K6 2nd Video Amp. & Clipper	∞	"0" Ω	23K	20K	550K	"0" Ω	"0" Ω	300 Ω
6AL5 ½ D.C. Restorer	∞	200K	"0" Ω	"0" Ω	1.3 Meg.	∞	∞	



IF STRIP DATA
RESISTANCE ANALYSIS CHART "B"

NOTES

1 - ∞ = INFINITY, OPEN CIRCUIT OR, RESISTANCE TOO HIGH FOR ACCURATE MEASUREMENTS.
2 - '0' = LOWER THAN 1Ω IN RESISTANCE AND METER CANNOT BE ACCURATELY READ.
3 - YOU SHOULD GET A READING OF 100Ω FOR EACH DECOUPLING RESISTOR BETWEEN DUMMY LUGS ON L2 TO L5; L5 TO L8; L8 TO L11; L11 TO L14; L14 TO LUG 1 ON 6J6 DETECTOR SOCKET.
4 - REFER TO RESISTANCE CHART 'A' NOTES FOR TEST CONDITONS & SETTINGS OF CONTROLS IN THE SET.
5 - ALL READINGS TAKEN WITH RESPECT TO GROUND ON CHASSIS, EXCEPT WHERE NOTED ON CHART, AS A COIL READING TAKEN BETWEEN TWO LUG POINTS.

BILL OF MATERIAL

WHEN ORDERING PARTS FOR REPLACEMENT, ORDER BY TAC PART NUMBER.

X - Parts on I-F strip * - Parts assembled ** - Parts mounted on chassis

SCHEMATIC NO.	DESCRIPTION	T.A.C. PART NO.
TRANSFORMERS & COILS		
x-T201	Converter Transformer	CL-10
x-T201,402	1st & 2nd Sound Transformer	CL-13
x-T403	Discriminator Transformer	CL-14
**-T501	Audio Output Transformer	TA-01
**-T701	Vertical Output Transformer	TA-02
**-T702	Vertical Oscillator Transformer	TA-04
**-T801	Horizontal Oscillator Transformer	TA-05
**-T802	Horizontal Output Transformer	TA-03
**-T1001	Power Transformer	TP-01
**-L801	Linearity Coil	CL-08
**-L802	Width Coil	CL-11
**-L901	Focus Coil	CL-09
**-L902	Deflection Yoke	CL-12
**-L1001	Filter Choke	CH-02
CONDENSERS		
x-C201,410,*C603	250 MMf, Ceramic, 500wv.	CB-03
x-C202,204,205,207,208 210,213,214,216,218, 223,225,227,229,230, 401,402,404,405,406.	1500 MMf, Ceramic, 500wv.	CB-05
x-C206,211,217,221,226,	2MMf, Ceramic, 500wv.	CB-01
x-C209,215,219,224,228, 407,*C809	51MMf, Ceramic, 500wv.	CB-02
x-C212,222	3MMF to 30MMF air trimmer	CD-01
x-231	10MMf,Ceramic, 500wv.	CB-06
x-C302,304,305	.05Mf, paper, 400v.	CC-06
x-C303, *-C607,704,802,805,808	.05 Mf, paper, 600v.	CC-08
x-C403,*C501,611	.01 Mf, paper 400v.	CC-05
x-C408,	.006 Mf, mica 500wv.	CA-06
x-C409,*C502,608	.002 Mf, mica, 500wv.	CA-04
*-C503,504,609,610,705	.005 Mf, mica, 500wv.	CA-05
*-C602	.05 Mf, paper, 200v.	CC-02
*-C606,612	100 MMF Mica, 500w.v.	CA-01
*-C605,703,706,804	.1 Mf paper, 600v.	CC-09
*-C606	.1 Mf paper, 200v.	CC-03
**-C801	500 MMF, ceramic, 10,000v.	CB-04
*-C803	600 MMF, mica, 500w.v.	CA-02
*-C806	.001 Mf, mica, 500w.v.	CA-03
*-C807	.04 Mf, paper, 600v.	CC-07
*-C1004, C1005	.001 Mf, paper, 400v.	CC-04
ELECTROLYTIC CONDENSERS		
**-C301	4x10/450v.	CE-12
**-C601,1001	2x40/450v., 80/25v.	CE-10
**-C701	1000/12v, 250/12v.	CE-14
**-C702	40/450 v.	CE-13
**-C1002, C1003	80/500v.	CE-09
RESISTORS		
x-R201,316,413,*R303,306	10,000 ohm, ½w.	RA-14
x-R202, 219, 224, 402,406,*308, 611	1,000 ohm, ½w.	RA-06
x-R203,205,207,208,211,213	3,900 ohm, ½w.	RA-10
x-R204,206,209,210,212,214	51 ohm, ½w.	RA-02
x-R215,315,405	3,300 ohm, ½w.	RA-08
x-R218,200,221,222,223	100 ohm, 1w.	RB-01
*-R304	135 ohm, 5w.	RC-01
*-R305,615	5,100 ohm, ½w.	RA-11
*-R307	16,000, ½w.	RA-15
x-R309,403	470,000 ohm, ½w.	RA-26
x-R311	36.00 ohm, ½w.	RA-09
x-R312	520,000 ohm, ½w.	RA-27
x-R313,*R709	1.5 meg, ½w.	RA-29
x-R314	300 ohm,½w.	RA-49
x-R317,410,411,*R805,506,316	100,000 ohm, ½w.	RA-21
x-R412	27,000 ohm, ½w.	RA-17
*-R502,608	4.7 meg, ½w.	RA-31
*-R503,804	360,000, ohm, 1w.	RA-15
*-R504,803	1000 ohm, 10w.	RD-03
*-R505	270,000 ohm, ½w.	RA-24
*-R506	200 ohm, ½w.	RA-04
*-R602	6.8 meg, ½w.	RA-32
*-R601,604,x-R409	5100 ohm, 1w.	RB-02
*-R606	150,000 ohm, ½w.	RA-22
*-R609, x-R310	6,800 ohm, ½w.	RA-12
*-R613,614,707	8,200 ohm, ½w.	RA-13
*-R705,807	2.2 meg, ½w.	RA-30
*-R706	2,700 ohm, ½w.	RA-07
*R708	220,000 ohm, ½w	RA-23
*R710,711	560 ohm, ½w	RA-05
*R809	100 ohm, 2w	RC-02
*R811,812	12,000ohm, 10w	RD-04
*R813	3 ohm, ½w	RA-01
*R814	750,000 ohm, 1w	RB-04
*R815	56,000 ohm, ½w	RA-20
**R1001	200 ohm. 50w	RD-09
*R808	33k, ½w.	RA-40
POTENTIOMETERS (CONTROLS)		
**R301	10,000 ohm 1w contrast	RP-04
**R302	1500 ohm,5w Focus	RP-06A
**R501(Standard)	1 meg, ohm, 1w Volume	RP-09
**R501-sw302(Champion)	1 meg ohm, 1w Volume & on-off	RP-05
**R601	50,000 ohm, 1w Brilliance	RP-03
**R701	20 ohm, 10w Vertical Centering	RP-01A
**R702	5000 ohm, 1w Vertical Linearity	RP-07A
**R703	1 meg ohm, 1w Vertical Frequency	RP-09A
**R704	2.5 meg ohm, 1w Vertical Amplitude	RP-11A
**R801	20 ohm, 10w Horizontal Centering	RP-02A
**R802	10,000 ohm, 1w Horizontal Frequency	RP-04A
**R901	250,000 ohm, 1w Horizontal Amplitude	RP-10A
**SW-301	Rotary switch sp st	ESW-01

SCHEMATIC NO.	DESCRIPTION	T.A.C. PART NO.
TUBES		
xV201	1st Video I.F. Amplifier	6J6
xV202	2nd " " "	6J6
xV203	3rd " " "	6J6
xV204	4th " " "	6J6
xV205	5th " " "	6J6
xV206	½ Video detector driver,½ video detector	6AL5
xV301	1st Video amplifier & clipper	6AU6
xV302	2nd " " "	6K6
xV303	D.C. Restorer	6AL5
xV401	1st Sound I.F. amplifier	6BA6
xV402	2nd Sound I.F. amplifier	6BA6
xV403	Sound limiter	6AU6
xV404	Sound discriminator	6AL5
*V501	1st Audio amplifier	6AT6
*V502	2nd Audio amplifier	6V6GT
*V601	1st Sync amplifier	6SK7
*V602	Sync separator	6SN7
*V603	2nd Sync amplifier	6SN7GT
*V701	Vertical output	6K6
*V702	Vertical oscillator	6J5
*V801	½ Hor. discharge, ½ Hor. Osc.	6SN7GT
*V802	Horizontal Output	6W6G
*V803	Damper	5W4G
*V804	H.V. Rectifier	8016/1B3GT
*V901	Ballast Tube	R1000R
*V1001, 1002	Low Voltage Rectifier	5U4G

DESCRIPTION	T.A.C. PART NO.	DESCRIPTION	T.A.C. PART NO.
		MISCELLANEOUS	
Speaker, 12"	ESP-01	Horizontal Output trans. bracket	MB-04
Speaker, 5x7	ESP-02	Lower focus coil bracket	MB-05
3 prong socket	MS-05	Upper focus coil bracket	MB-06
3 prong plug	MP-03	"Z" bracket for 200 ohm resistor	MB-07
5 prong socket	MS-07	Fuse holder & cover	MM-09
6 prong socket	MS-06	Front End (Standard) Less Tubes	EA-01
6 prong plug	MP-02	Front End (Champion) Less Tubes	EA-02
5 Amp. fuse	SB-02	Dial Kit (Champion)	EA-02A
Pilot light	MS-01	Tubes for Champion Front End:	
Pilot light socket	MS-11	2-6J6	
Dual decal socket & 5 prong plug	MS-04	1-6AK5	
Dual Knob (Standard Kit)	MK-02	Tubes for Standard Front End:	
Brown knob	MK-01	1-6C4	
Ivory knob	MK-03	1-6BH6	
Line cord & plug	MP-01	1-6A95	
H.V.Socket assembly socket	MS-03A		
Deflection yoke bracket	MM-02		
Mounting hood	MB-01		
Front end bracket (Champion)	MB-03A		
Front end bracket (Standard)	MB-03		

VOLTAGE ANALYSIS CHART "A"

(1) **Set connected to 117 Volts 60 cycle power line.**

(2) **Deflection yoke and focus coil assembly plugged into rear of set; Leave C.R.T. 5 prong plug disconnected from set, and make sure high voltage lead is not any where near your body or instruments so as not to get a shock. (Leave speaker plugged in during test operations as a monitor.)**

(3) **To check voltages, turn controls #10 thru #18 to maximum clockwise position.**

(4) **Remove converter (mixer) tube from front end so that you prevent any signal from coming into I.F. Strip when measurements are taken.**

(5) **All D.C. voltages are measured with a meter sensitivity of 20,000 ohm per volt, and all A.C. voltages are measured with a meter sensitivity of 1000 ohm per volt.**

(6) **All readings taken with respect to chassis ground unless otherwise noted on charts.**

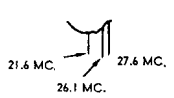
(7) *** = Voltage too small to be measured accurately due to instrument loading of circuits, etc.**

(8) **Tolerance on voltage measurements = ± 20%.**

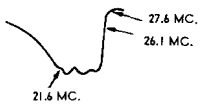
TUBE SOCKET	LUG #1	LUG #2	LUG #3	LUG #4	LUG #5	LUG #6	LUG #7	LUG #8
6BA6 1st Sound I.F. Amp.	0 Volts	0 Volts	0 Volts	6.4 Volts A.C.	120 Volts	120 Volts	1.8 Volts	
6BA6 2nd Sound I.F. Amp.	*	0 Volts	6.4 Volts A.C.	0 Volts	125 Volts	121 Volts	1.8 Volts	
6AU6 Sound I.F. Limiter	— .5 Volts	0 Volts	0 Volts	6.4 Volts A.C.	62 Volts	55 Volts	0 Volts	
6AL5 Sound I.F. Discriminator	*	— .4 Volts	6.4 Volts A.C.	0 Volts	0 Volts	0 Volts	— .4 Volts	
6J6 1st Video I.F. Amp.	137 Volts	137 Volts	6.3 Volts A.C.	0 Volts	0 Volts	— 1.2 Volts	.6 Volts	
6J6 2nd Video I.F. Amp.	130 Volts	130 Volts	0 Volts	6.3 Volts A.C.	0 Volts	— 1.2 Volts	.95 Volts	
6J6 3rd Video I.F. Amp.	125 Volts	125 Volts	0 Volts	6.3 Volts A.C.	0 Volts	— 1.2 Volts	.55 Volts	
6J6 4th Video I.F. Amp.	120 Volts	120 Volts	0 Volts	6.4 Volts A.C.	0 Volts	— 1.2 Volts	.75 Volts	
6J6 5th Video I.F. Amp.	117 Volts	117 Volts	0 Volts	6.4 Volts A.C.	0 Volts	*	.65 Volts	
6J6 ½ Video Detector-Driver ½ Video Detector	117 Volts	— *	0 Volts	6.4 Volts A.C.	— *	—.2 Volts	.75 Volts	
6AU6 1st Video Amp. & Clipper	— .75 Volts	0 Volts	0 Volts	6.4 Volts A.C.	255 Volts	137 Volts	0 Volts	
6K6 2nd Video Amp. & Clipper	0 Volts	0 Volts	103 Volts	137 Volts	— 7.5 Volts	0 Volts	6.4 Volts A.C.	4.2 Volts
6AL5 ½ D.C. Restorer	0 Volts	*	0 Volts	6.4 Volts A.C.	.5 Volts	0 Volts	0 Volts	

REPRESENTATIVE RESPONSE CURVES
Standard Models

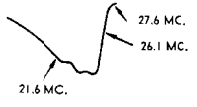
An indication of whether or not the receiver is operating properly can be obtained by taking response curves at indicated points and comparing them with representative curves from a normal receiver. Depending upon the type of oscilloscope used, the response curves may appear inverted from those shown here. A sweep generator, an oscilloscope, and a marker generator will be required in obtaining the curves. CAUTION: When making tests in the signal circuits care must be taken not to disturb any wiring or location of circuit components in order not to affect the original alignment. This is important as these circuits are fixed-tuned. To obtain these response curves, proceed as follows: Connect the oscilloscope from the junction point of C46 and L17 to ground. This capacitor and coil are located between the video detector and the first video amplifier. Set the sweep generator for a sweep of 20 to 30 megacycles, approximately. Beginning at the 5th video i-f stage, connect the sweep generator to the input grid (pin 6) of the 5th video i-f amplifier. A normal response curve will be similar to that shown for the 5th video i-f stage. Markers are used to establish the frequency points indicated. The diminished size is due to insufficient amplification of the signal by the single i-f stage.



5th VIDEO I.F.



4th VIDEO I.F.



3rd VIDEO I.F.

2nd VIDEO I.F.

1st VIDEO I.F.

Leaving the oscilloscope connected as in the first step above, the sweep generator is then moved back progressively from the 5th to the 1st video i-f amplifier tube. In each stage the generator is connected to the input grid (pin 6) of the i-f amplifier tube. The response curves obtained for normal operation should resemble those shown for the respective video i-f stages.

OVERALL VIDEO RESPONSE

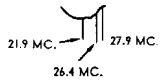
SOUND I.F. RESPONSE


DISCRIMINATOR RESPONSE
APPROX. 300KC

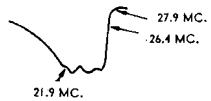
For an over-all video response curve, select any convenient channel not in use. Set the sweep generator to the middle frequency of this channel with a 10-megacycle sweep and connect it to the antenna input terminals. The response curve obtained should be similar to the over-all response curve shown. To check the sound i-f response, set the sweep generator to 21.6 mc with at least a 1-mc sweep on either side, and connect it to the grid (pin 1) of the 6BA6 first sound i-f amplifier. Connect the oscilloscope across resistor R7 in the grid circuit of the 6AV6 limiter tube. The curve should be as shown for the sound i-f response. Leaving the sweep generator connected to the input of the sound i-f section, connect the oscilloscope from the cathode (pin 1) of the 6AL5 discriminator tube to ground. The curve obtained should resemble the discriminator response curve shown with a bandwidth of approximately 300 kc between peaks.

REPRESENTATIVE RESPONSE CURVES
Champion Models

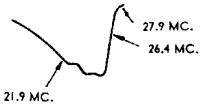
An indication of whether or not the receiver is operating properly can be obtained by taking response curves at indicated points and comparing them with representative curves from a normal receiver. Depending upon the type of oscilloscope used, the response curves may appear inverted from those shown here. A sweep generator, an oscilloscope, and a marker generator will be required in obtaining the curves. CAUTION: When making tests in the signal circuits care must be taken not to disturb any wiring or location of circuit components in order not to affect the original alignment. This is important as these circuits are fixed-tuned. To obtain these response curves, proceed as follows: Connect the oscilloscope from the junction point of C46 and L17 to ground. This capacitor and coil are located between the video detector and the first video amplifier. Set the sweep generator for a sweep of 20 to 30 megacycles, approximately. Beginning at the 5th video i-f stage, connect the sweep generator to the input grid (pin 6) of the 5th video i-f amplifier. A normal response curve will be similar to that shown for the 5th video i-f stage. Markers are used to establish the frequency points indicated. The diminished size is due to insufficient amplification of the signal by the single i-f stage.



5th VIDEO I.F.



4th VIDEO I.F.



3rd VIDEO I.F.

2nd VIDEO I.F.

1st VIDEO I.F.

Leaving the oscilloscope connected as in the first step above, the sweep generator is then moved back progressively from the 5th to the 1st video i-f amplifier tube. In each stage the generator is connected to the input grid (pin 6) of the i-f amplifier tube. The response curves obtained for normal operation should resemble those shown for the respective video i-f stages.

OVERALL VIDEO RESPONSE

SOUND I.F. RESPONSE


DISCRIMINATOR RESPONSE
APPROX. 300KC

For an over-all video response curve, select any convenient channel not in use. Set the sweep generator to the middle frequency of this channel with a 10-megacycle sweep and connect it to the antenna input terminals. The response curve obtained should be similar to the over-all response curve shown. To check the sound i-f response, set the sweep generator to 21.9 mc with at least a 1-mc sweep on either side, and connect it to the grid (pin 1) of the 6BA6 first sound i-f amplifier. Connect the oscilloscope across resistor R7 in the grid circuit of the 6AU6 limiter tube. The curve should be as shown for the sound i-f response. Leaving the sweep generator connected to the input of the sound i-f section, connect the oscilloscope from the cathode (pin 1) of the 6AL5 discriminator tube to ground. The curve obtained should resemble the discriminator response curve shown with a bandwidth of approximately 300 kc between peaks.

HELPFUL FIELD SERVICE DATA FOR THE SERVICE TECHNICIAN

Complaint: 3.9K Grid resistors burning; 100 ohms B + decoupling resistors overheated and no contrast control of picture.

Causes: Leaky or shorted 51MMF condensers going to Lug #6 on 6J6 Tubes
Leaky or shorted 250MMF condensers from Lug #A on converter transformer to Lug #6 on first 6J6 video I.F. Socket.
Internally Shorted 6J6 tubes or gassy 6J6 tubes causing positive voltage to appear on grid Lug #6 of 6J6 Tubes. Grids should never be positive, but should show negative voltage of approximately —2 to —8 volts ± 20% tolerance, on the first four 6J6 stages which are controlled by contrast control biasing. The remaining two 6J6 tubes are biased only by their cathode resistors and their grids should also never read positive.

Complaint: No control of brightness; brightness control burns; 10K resistor and 3.3K resistor burn in D.C. Restorer circuit.

Causes: Shorted .05MF condenser on lug #5 of 6AL5 D.C. Restorer socket.
Shorted .05MF condenser coupling 1st Sync amplifier tube to sync take-off point on lug #2 of 6AL5.
Defective 50K brightness control pot.
Defective 6AL5 Tube (D.C. Restorer shorted internally).

Complaint: Horizontal black bar in picture; washed out picture; 300 ohm resistor and 3.3K resistor burning on 6K6 socket.

Causes: Heater-Cathode short in 6K6 2nd Video Amplifier tube.

Complaint: No Picture and resistors burning on 6K6 socket as well as on terminal board of I.F. Strip.

Causes: Shorted .05MF Condenser going to Lug #5 on 6K6 2nd Video Amplifier socket; Parts damaged are as follows: 300 ohm resistor on Lug #8 of 6K6 socket, 3.3K resistor on Lug #4 of 6K6 socket, 3.6K and 6.8K resistors on terminal board of I.F. Strip located near 6K6 Tube socket.

NOTE: Replace .05MF Condensers that are defective with ones having a 600 working Volts D.C. rating.

Complaint: No picture and resistors burning on I.F. strip terminal board near 6AU6 1st Video Amplifier.

Causes: Shorted 6AU6 Tube
Shorted 10MFD Electrolytic Capacitor bypassing Junction of 3.6K and 6.8K resistors on terminal board.

Complaint: Picture weak, erratic, sections of it rip out due to Video I.F. Oscillation.

Causes: Open 1500MMF ceramic capacitors used for filament or B + decoupling and bypassing.
Traps tampered with by customer and set incorrectly to wrong frequencies.

Complaint: Audio weak and distorted.

Causes: Dead or defective 6AL5 discriminator tube
Defective 6AU6 sound limiter tube
Sound I.F. or discriminator adjustments thrown out of alignment.
Shorted audio shielded lead from volume control into I.F. strip.
250MMF capacitor on Lug #1 of 6AL5 socket is open or shorted.

Complaint: Audio oscillation in sound I.F. section.

Causes: Open 1500MMF capacitors in plate, screen or cathode circuits of sound I.F. amplifier stages.
Poor dressing of wires and leads near converter transformer.
Open .006MF mica condenser bypass on screen of 6AU6 limiter stage.

Complaint: Hum in Picture

Causes: Open or leaky filter capacitor in low-voltage power supply.
Defective tubes (shorted heater to cathode, etc.)
Defective decoupling filters in Video amplifier stages.
Pickup due to misplaced leads.

Complaint: Narrow vertical or diagonal lines in picture.

Causes: Interference from nearby radio transmitters for other services such as amateur, communications, F.M., etc.

Complaint: Ghosts

Causes: Poor Antenna orientation
Reflector element required
Mismatched Antenna line to front end, etc.

Complaint: Weak or Distorted Audio

Causes: Tuning control improperly adjusted
Defective tubes
Open filter capacitor
Open or shorted coupling capacitor
Open bypass capacitor
Sound I.F. or discriminator stages misaligned
Defective speaker
Faulty connections

Complaint: Noise in Audio Output

Causes: Noisy tube
Overheated resistors
Faulty capacitors
Defective speaker
Arcing in High-Voltage circuits
Dirty or worn volume control
Loose Tube-Socket contacts
Faulty connections

Complaint: Hum in Audio Output

Causes: Open filter capacitor
Defective tube
Poor ground connections
Pickup due to misplaced leads

Front End

Complaint: No Sound and No Picture; Raster O.K.

Causes: Defective Tubes
Open Antenna Input circuit
Open Coupling capacitors
Short-Circuited bypass capacitors
Open load resistors
Faulty connections
Defective Antenna, R-F, or oscillator stage
Oscillator for all channels incorrectly aligned

Complaint: No Sound; Picture Satisfactory

Causes: Sound I.F. circuits mis-aligned
Defective tubes
Check voltages referring to Voltage and resistance charts

TROUBLE-SHOOTING CHART AND PROCEDURE

In order to facilitate the location of faulty components in defective receivers a systematic troubleshooting procedure should be used by the Service Technician. Before making any tests involving the use of test equipment, it is advisable to first make a visual observation of the receiver performance. This inspection will often give a speedy indication which section of the receiver is not operating correctly so that location of the faulty component can be accomplished with minimum time expenditure.

Following the visual inspection, checks should be made at specific points in the receiver to isolate the defect to a particular section of the receiver, after which a stage by stage analysis of the section is made to determine the faulty stage.

TEST EQUIPMENT

It is assumed that the Technician has the following *Basic Test Equipment* in his shop laboratory:

1) A good A.M. Signal Generator covering up to 30 megacycles on fundamental frequencies; 400 cycle or 1000 cycle AUDIO output available for testing AUDIO stages and VIDEO Amplifier stages.

2a) Vacuum tube Voltmeter of Junior Voltohmyst type or equivalent.

b) 20,000 ohms per Voltmeter

3) A good tube tester

4) Pliers, alignment tools (insulated type), soldering irons, etc.

5) Check all connections to *C.R.T.* socket and cable assembly to make sure that no poor contacts are present to give you trouble.

6) By injecting a strong 23 MC. signal from your A.M. generator, modulated at 30% with 400 cycles modulation into the grid lug #6 of the 5th 6J6 VIDEO I.F. Amplifier you should see a series of Horizontal light and dark bars on screen of C.R.T. By connecting generator to each previous stage, you can roughly check gain per stage if readings are taken with a V.T.V.M. connected to Video detector load resistor (3.3K).

7) To check sound I.F. system, connect output meter across voice coil of speaker and turn volume control up for audible tests. With generator set on A.M. and feeding in correct center frequency (21.9 MC. on Champion Models and 21.6 MC. on Standard Models) into grid lug #1 of 1st 6BA6 Sound I.F. Now, as you vary generator 75 KC. higher or lower than center frequency AUDIO output should rise.

This is only to be used as a rapid check and not for alignment.

The alignment procedure is on the preceding alignment instruction pages.

TROUBLE-SHOOTING CHART

VIDEO SECTION

Complaint: Smeared Picture

Causes: Defective load resistors or peaking coils in Video amplifier stages. Open bypass capacitors.
Video I.F. stages misaligned
Excessive signal input to receiver
Open coupling capacitors

Complaint: Blurred Picture

Causes: Improper adjustment of focus control or defective focus control on receiver.

Complaint: Poor picture definition

Causes: Improper adjustment of focus, contrast, or brightness control
Weak input signal
Incorrect tuning adjustment
Weak tubes
Defective peaking coils (may be open or shorted)

Complaint: Noise in Picture

Causes: Interference due to external causes, such as diathermy, ignition, electronic equipment, etc.
Dirty or worn contacts on switches, sockets, etc.
Noisy tubes
Noisy resistors or capacitors
Arcing in high voltage circuits (corona, etc.)

Complaint: Sound in Picture

Causes: Incorrect trap alignment
Oscillator improperly adjusted (front end tuning)
Oscillations in Video I.F. stages
Sound and Video I.F. leads too close together.
Microphonic tubes in front end or I. F. Strip

STANDARD MODELS ALIGNMENT PROCEDURE

With Sarkes-Tarzian Front Ends

1. Before attempting re-alignment of I.F. Strip, make sure you have carefully checked all tubes in strip to see if they are operating or whether they are shorted, gassy, microphonic, etc. Also check resistances, condensers and voltages to see if they are all O.K.
2. Make sure that no other point in the set is the cause of your trouble, before you arrive at the decision that the I.F. Strip needs adjustment. Many times nothing in the strip is wrong but someone may have tampered with the set. The factory seals all adjustments after unit is aligned to prevent shifting or changing of settings. This unit is noted for its stability and rarely does it have to be re-aligned except where rough shipping or handling of set is encountered.

A) EQUIPMENT NEEDED:—

1) Signal Generator A.M. Type Modulated 30% at 400 Cycles. It must be accurately calibrated and warmed up for at least ½ hour before using. It must cover frequencies to at least 30 Mc. on fundamentals and have a good attenuator system.

2) A voltohmyst V.T.V.M., preferably, with a zero center, D.C. volts scale on it also available for discriminator work. D.C. Probe should have 1 Meg. isolating Resistor contained in it.

3) Use a .05MF 600 Volt D.C. Blocking Condenser in series with "HOT" lead of signal generator at all times. Make sure Gnd. Clip Lead of generator is grounded very close to point where signal is being injected in order to prevent spurious or unwanted Regeneration.

B) ALIGNMENT OF SOUND I.F. SYSTEM IN I.F. STRIP (21.6 MC.):—

1) Turn Generator to 21.6 MC. making sure that set has been warmed up for at least 15 minutes previously. Turn up Attenuator for maximum output to give at least .1 Volt output.

2) Detune Secondary of Disc. Transformer T4 Bottom Slug and Clip Signal Generator "HOT" Lead to Grid of 6AU6 Limiter (Pin #1) connect V.T.V.M. (which is set to lowest range D.C. Volts and having 1 Meg. isolating Resistor connected to probe) onto LUG "C" of Disc. Transformer (Junction R10 & R11). Adjust Primary SLUG on top of T4 for maximum output on V.T.V.M.
Then shift V.T.V.M. probe to Pin #1 on 6AL5 disc. tube socket and adjust Secondary SLUG (bottom of T4) for "0" Volts output.
Now turn Signal Generator slowly from 21.6 MC. to points on the dial which are 75 Kc. higher and lower than the Center or Mean Frequency of 21.6 MC. and observe carefully if V.T.V.M. shows Linear Deflection on Voltage Scale on either + or — deviation of Generator. If Voltages are not equal on either side of Deviation in Frequency you must touch up Primary SLUG in order to compensate for Non-Linearity.
Now recheck Discriminator Action again to make sure that Discriminator Action is Linear on either side of Mean or Center Frequency.

3) CLIP GENERATOR ONTO GRID LUG #1 OF 2ND 6BA6 AND REDUCE OUTPUT SO AS NOT TO OVERLOAD FOLLOWING STAGES. — GENERATOR IS SET AT 21.6 Mc. and V.T.V.M. is clipped onto LUG #A of T3 (Limiter Grid Return). Now peak T3 Primary & Secondary to maximum output on V.T.V.M.

4) CLIP GENERATOR ONTO GRID LUG #1 of 1ST 6BA6 AND PEAK T2 PRIMARY AND SECONDARY TO MAXIMUM OUTPUT ON V.T.V.M.

5) CLIP GENERATOR ONTO PRIMARY OF T1 WHERE I.F. LEAD FROM FRONT END CONNECTS TO. Now Peak Secondary SLUG on converter coil T1 (Top SLUG) for maximum output on V.T.V.M.

C) ALIGNMENT OF TRAPS IN VIDEO I.F. SYSTEM.

NOTE:—Do not touch unless Sound Bars appear in picture. These are set at factory very carefully.

1) Accompanying sound trap trimmer C-29 is between 2nd & 3rd 6J6 I.F. stages and adjacent Sound Trap Trimmer C-38 is between 4th & 5th 6J6 I.F. stages.

2) Set Generator to 27.6 MC. and feed strong signal into grid of 1st 6J6 I.F. and connect V.T.V.M. to junction of R-32 and L17 (Load of Video Detector) and using insulated (Fiber) Alignment tool adjust C-38 trap for minimum output.

3) GENERATOR IS NOW SET FOR 21.6 MC. AND C-29 TRAP ADJUSTED FOR MINIMUM OUTPUT. Put a drop of Duco Cement on Screw Threads of Traps and SLUGS adjusted up to present point in order to seal settings.

NOTE:—Bottom SLUG Primary of T1 Converter Coil is to be adjusted for maximum resolution on a test pattern only.

ALL MEASUREMENTS WERE TAKEN WITH A VOLTOHMIST.
ALLOWABLE TOLERANCE PERMISSABLE ON ALL READINGS ± 20%

VOLTAGE CHART

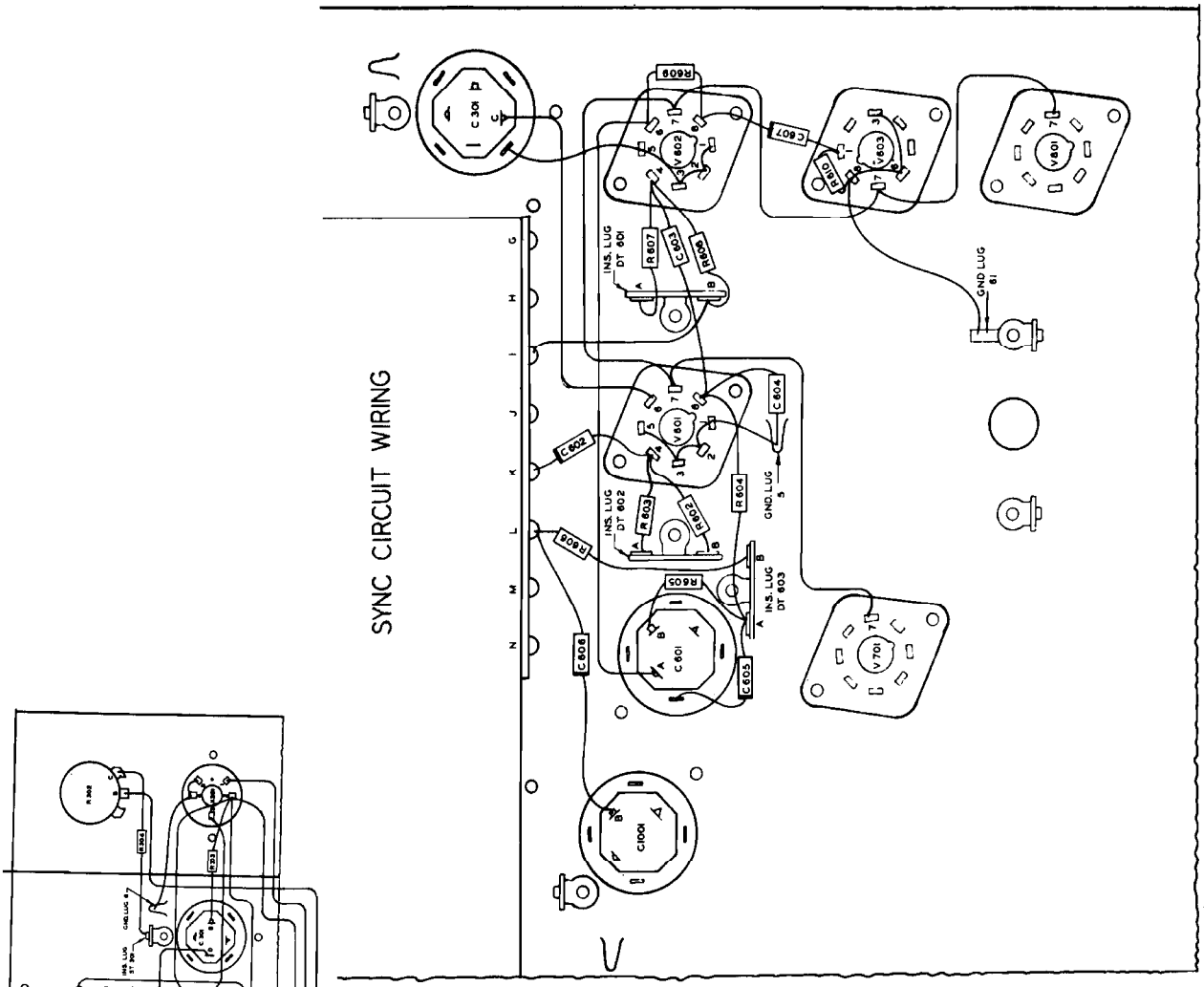
TUBE NO.	TUBE TYPE	FUNCTION	PIN #1	PIN #2	PIN #3	PIN #4	PIN #5	PIN #6	PIN #7	PIN #8	REMARKS
V201	6J6	1st Video I-F Amp.	150 V	150 V	6.3 VAC	0	0	*-8 to -2 V	.5 V		*Depending on setting of control R301
V202	6J6	2nd Video I-F Amp.	145 V	145 V	6.3 VAC	0	0	-8 to -2 V	.9 V		
V203	6J6	3rd Video I-F Amp.	140 V	140 V	6.3 VAC	0	0	-8 to -2 V	.9 V		
V204	6J6	4th Video I-F Amp.	135 V	135 V	6.3 VAC	0	0	-8 to -2 V	.5 V		
V205	6J6	5th Video I-F Amp.	130 V	130 V	6.3 VAC	0	0	-2 to 0 V	1 V		
V206	6J6	½ Video Det. Driver ½ Video Detector	125 V	-10 V	0	6.3 VAC	-10 V	-1.5 to 0 V	.5 V		
V301	6AU6	1st Video Amp. & Clipper	-1.5 V	0	0	6.3 VAC	250 V	150 V	0		
V302	6K6	2nd Video Amp. & Clipper	0	0	120 V	150 V	-7 V	0	6.3 VAC	5 V	
V303	6AL5	D.C. Restorer	0	-50 V	0	6.3 VAC	-45 V	0	0		
*V401	6BA6	1st Sound I-F Amp.	0	0	0	6.3 VAC	140 V	140 V	1.5 V		*Antenna shorted at posts
*V402	6BA6	2nd Sound I-F Amp.	0	0	6.3 VAC	0	140 V	130 V	1 V		*Antenna shorted at posts
*V403	6AU6	Sound Limiter	-.5 V	- 0	0	6.3 VAC	60 V	62 V	0		*Antenna shorted at posts
*V404	6AL5	Sound Discriminator	-5 V	-3 V	6.3 VAC	0	0	0	-30 V		*Antenna shorted at posts
V501	6AT6	1st Audio Amp.	- 1 V	0	0	6.3 VAC	0	0	50 V		
V502	6V6	2nd Audio Amp.	0	6.3 VAC	250 V	280 V	*0 to -3 V	0	0	10 V	*Depending on setting of control R501
V601	6SK7	1st Sync Amp.	0	0	0	-3 V	0	140 V	6.3 VAC	180 V	
V602	6SH7	Sync Separator	0	0	0	*-10 to -80 V	0	150 V	6.3 VAC	140 V	Depending on setting of control R301
V603	6SH7	2nd Sync Amp.	5 V	100	0	-	-	0	6.3 VAC	0	
V701	6K6	Vert. Output	300 V	0	200 V	300 V	-85 V	*-60 to -90 V	6.3 VAC	*-35 tom-60 V	*Depending on setting of control R702
V702	6J5	Vert. Oscillator	0	0	*5 to 250 V	-90 V	-200 V	-90 V	6.3 VAC	-90 V	*Depending on setting of control R704
V801	6SH7	½ Hor. Disch., ½ Hor. Osc.	-150 V	180	- 90 V	-150 V	-60 V	-90 V	6.3 VAC	0	
V802	6BG6	Horizontal Output	-	0	- 80 V	-	-100 V	-90 V	6.3 VAC	180 V	
V803	5V4	Damper	-	400	-	300 V	-	300 V	-	400 V	
V901	R1000R	Ballast	-	300	-	-	150 V	-	-	-	
V1001	5U4G	L.V. Rectifier	-	350	-	400 VAC	-	400 VAC	-	350 V	
V1002	5U4G	L.V. Rectifier	-	350	-	400VAC	-	400 VAC	-	350 V	

RESISTANCE CHART

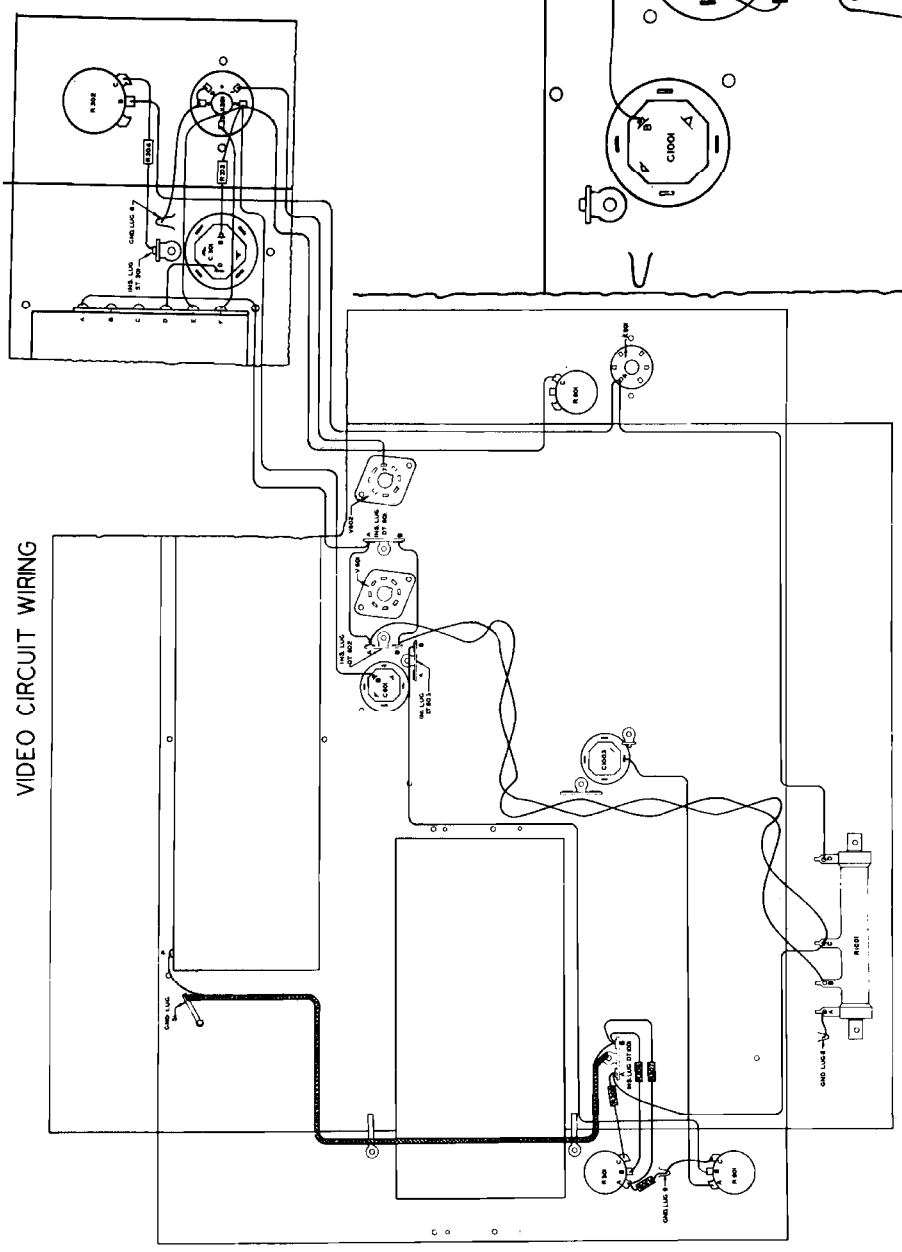
TUBE NO.	TUBE TYPE	FUNCTION	PIN # 1	PIN #2	PIN #3	PIN #4	PIN # 5	PIN #6	PIN #7	PIN #8	REMARKS
V201	6J6	1st Video I-F Amp.	20K ohm	20K ohm	Approx. 0	0	0	12K ohm	30 ohm		
V202	6J6	2nd Video I-F Amp.	20K ohm	20K ohm	0	Approx. 0	0	12K ohm	30 ohm		
V203	6J6	3rd Video I-F Amp.	18K ohm	18K ohm	0	Approx. 0	0	13K ohm	30 ohm		
V204	6J6	4th Video I-F Amp.	18K ohm	18K ohm	0	Approx. 0	0	13K ohm	30 ohm		
V205	6J6	5th Video I-F Amp.	18K ohm	18K ohm	0	Approx. 0	0	13K ohm	30 ohm		
V206	6J6	½Video Det. Driver ½ Video Detector	18K ohm	3K ohm	0	Approx. 0	3K ohm	4K ohm	30 ohm		
V301	6AU6	1st Video Amp.& Clipper	500K ohm	0	0	Approx. 0	25K ohm	12K ohm	0		
V302	6K6	2nd Video Amp. & Clipper	300 ohm	-	0	20K ohm	600K ohm	0	Approx. 0		
V303	6AL5	D.C. Restorer	-	200K ohm	0	Approx. 0	1 meg ohm	-	-		
V401	6BA6	1st Sound I-F Amp.	Approx. 0	0	0	Approx. 0	20K ohm	20K ohm	100 ohm		
V402	6BA6	2nd Sound I-F Amp.	450K ohm	0	Approx. 0	0	15K ohm	20K ohm	100 ohm		
V403	6AU6	Sound Limiter	20K ohm	0	0	Approx. 0	10K ohm	10K ohm	0		
V404	6AL5	Sound Discriminator	200K ohm	100K ohm	Approx. 0	0	0	0	100K ohm		
V501	6AT6	1st Audio Amp.	4.7 meg	0	0	Approx. 0	-	-	400K ohm		
V502	6V6	2nd Audio Amp.	-	Approx. 0	15K ohm	15K ohm	270K ohm	0	0	200 ohm	
V601	6SK7	1st Sync Amp.	0	0	0	1 meg ohm	0	18K ohm	Approx. 0	25K ohm	
V602	6SH7	Sync Seperator	0	0	0	1 meg ohm	0	15K ohm	Approx. 0	25K ohm	
V603	6SH7	2nd Sync Amp.	1 meg ohm	25K ohm	0	-	-	0	Approx. 0	0	
V701	6K6	Vert. Output	20K ohm	0	30K ohm	30K ohm	2.3 meg ohm	*250 to 5K	Approx. 0	3K to 5K	*Depending on setting of control R702
V702	6J5	Vert. Oscillator	0	0	*300K to 2 meg	60K ohm	2 meg ohm	250 ohm	Approx. 0	250 ohm	*Depending on setting of control R704
V801	6SH7	½ Hor. Disch., ½ Hor. Osc.	40K ohm	100K ohm	350 ohm	40K ohm	400K ohm	350 ohm	Approx. 0	0	
V802	6BG6	Horizontal Output	-	0	400 ohm	-	1 meg ohm	350 ohm	Approx. 0	25K ohm	
V803	5V4	Damper	-	30K ohm	-	20K ohm	-	20K ohm	-	30K ohm	
V901	R1000R	Ballast	-	20K ohm	-	-	20K ohm	-	-	-	
V1001	5U4G	L.V. Rectifier	-	20K ohm	-	300 ohm	-	300 ohm	-	25K ohm	
V1002	5U4G	L.V. Rectifier	-	20k ohm	-	300 ohm	-	300 ohm	-	20K ohm	

MODELS Standard, Champion

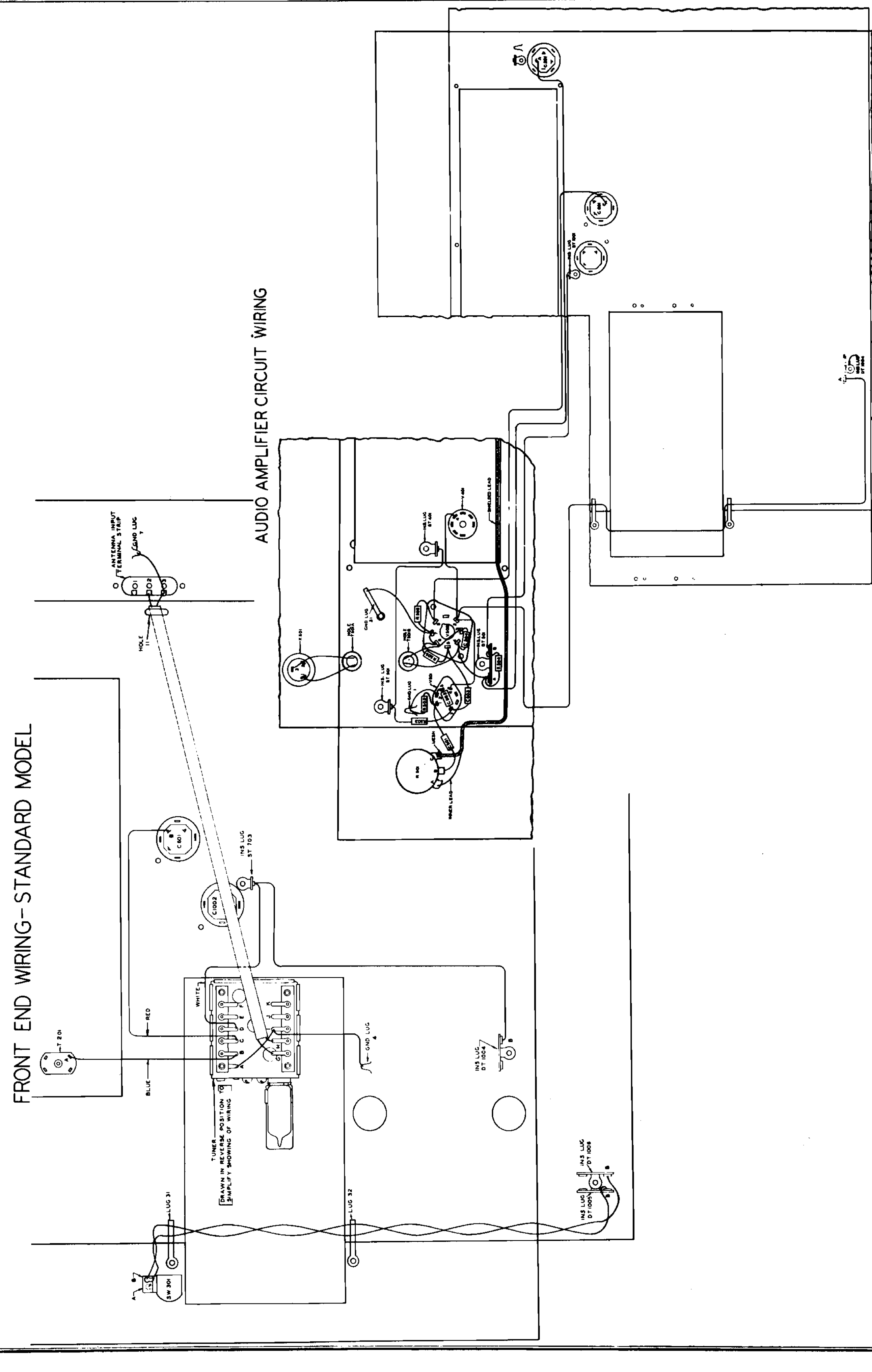
SYNC CIRCUIT WIRING



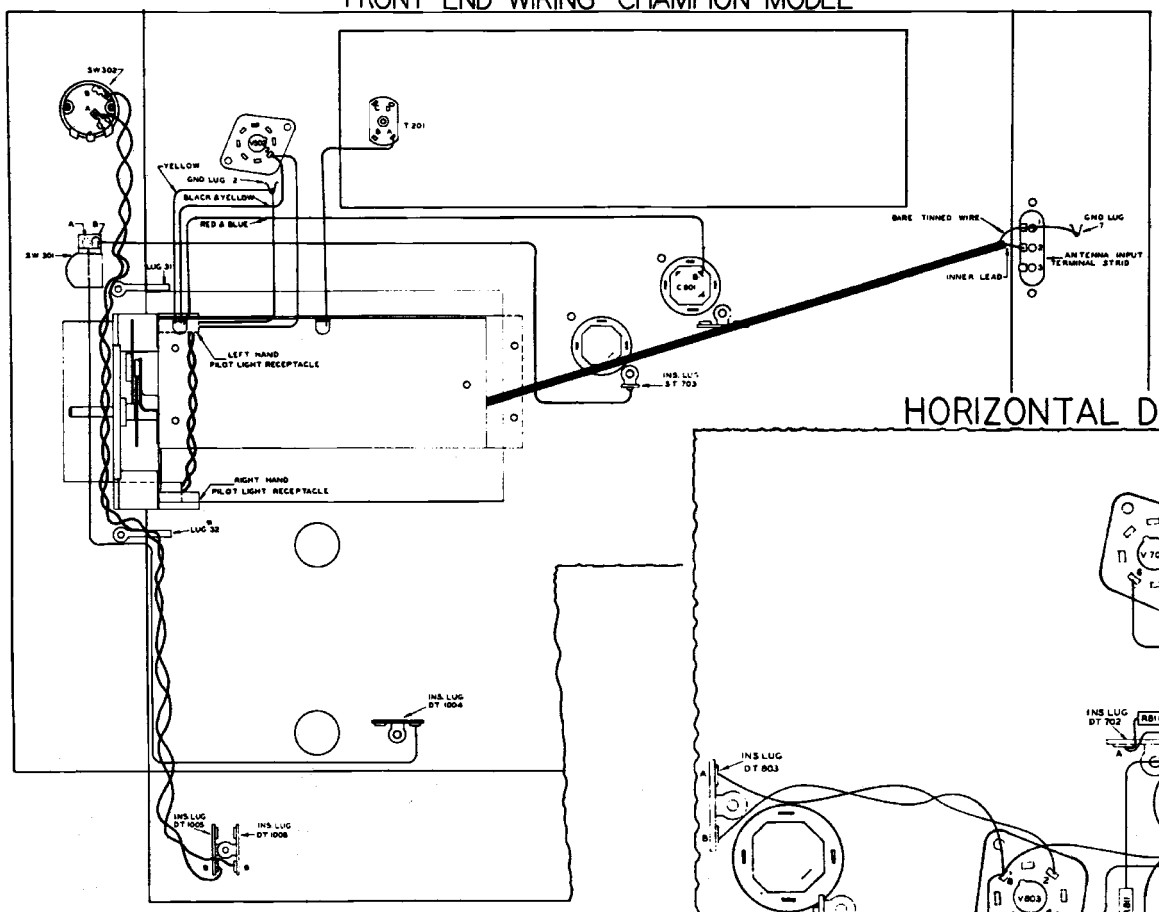
VIDEO CIRCUIT WIRING

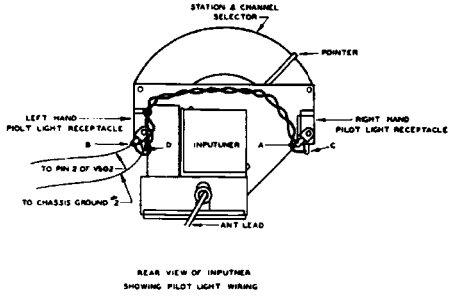


MODELS Standard,
Champion



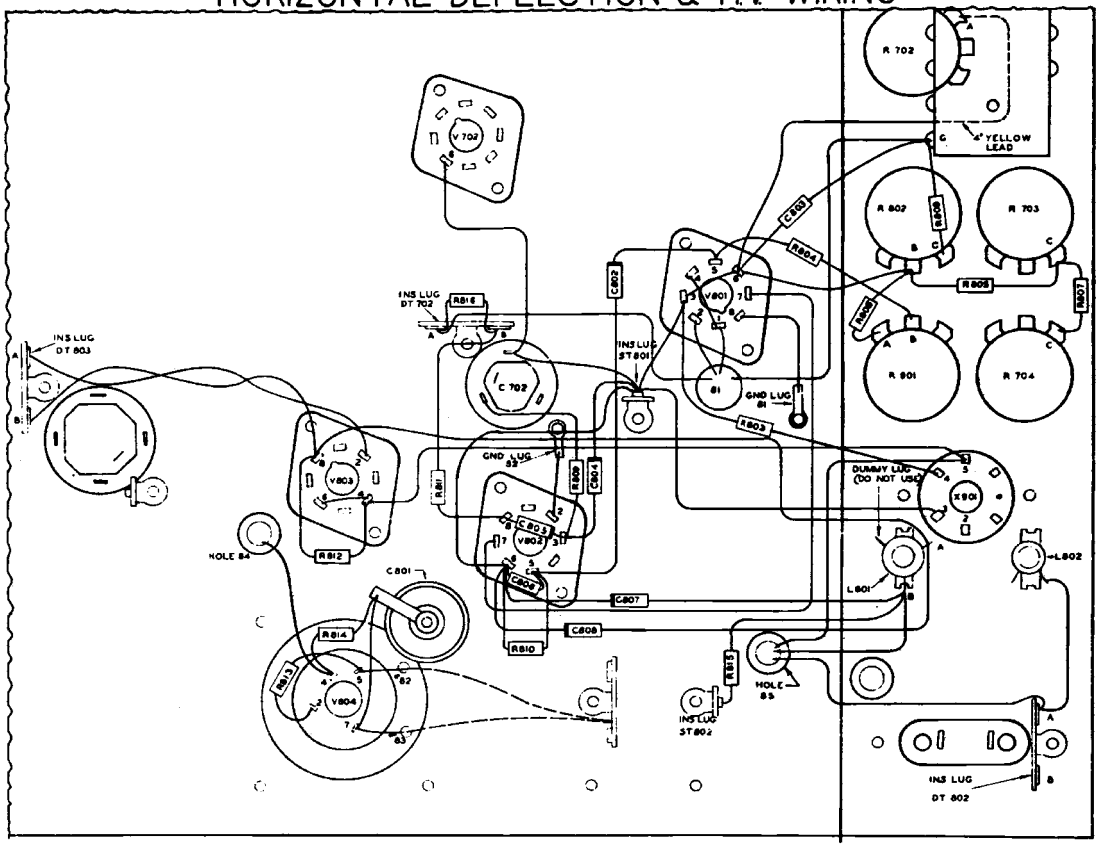
FRONT END WIRING - CHAMPION MODEL





REAR VIEW OF INPUTNER
SHOWING PILOT LIGHT WIRING

HORIZONTAL DEFLECTION & H.V WIRING



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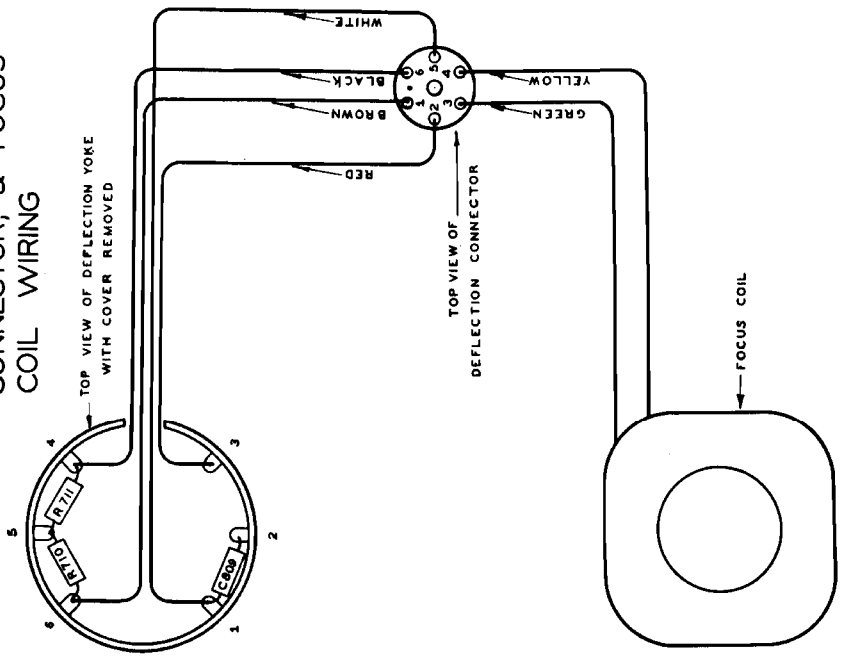
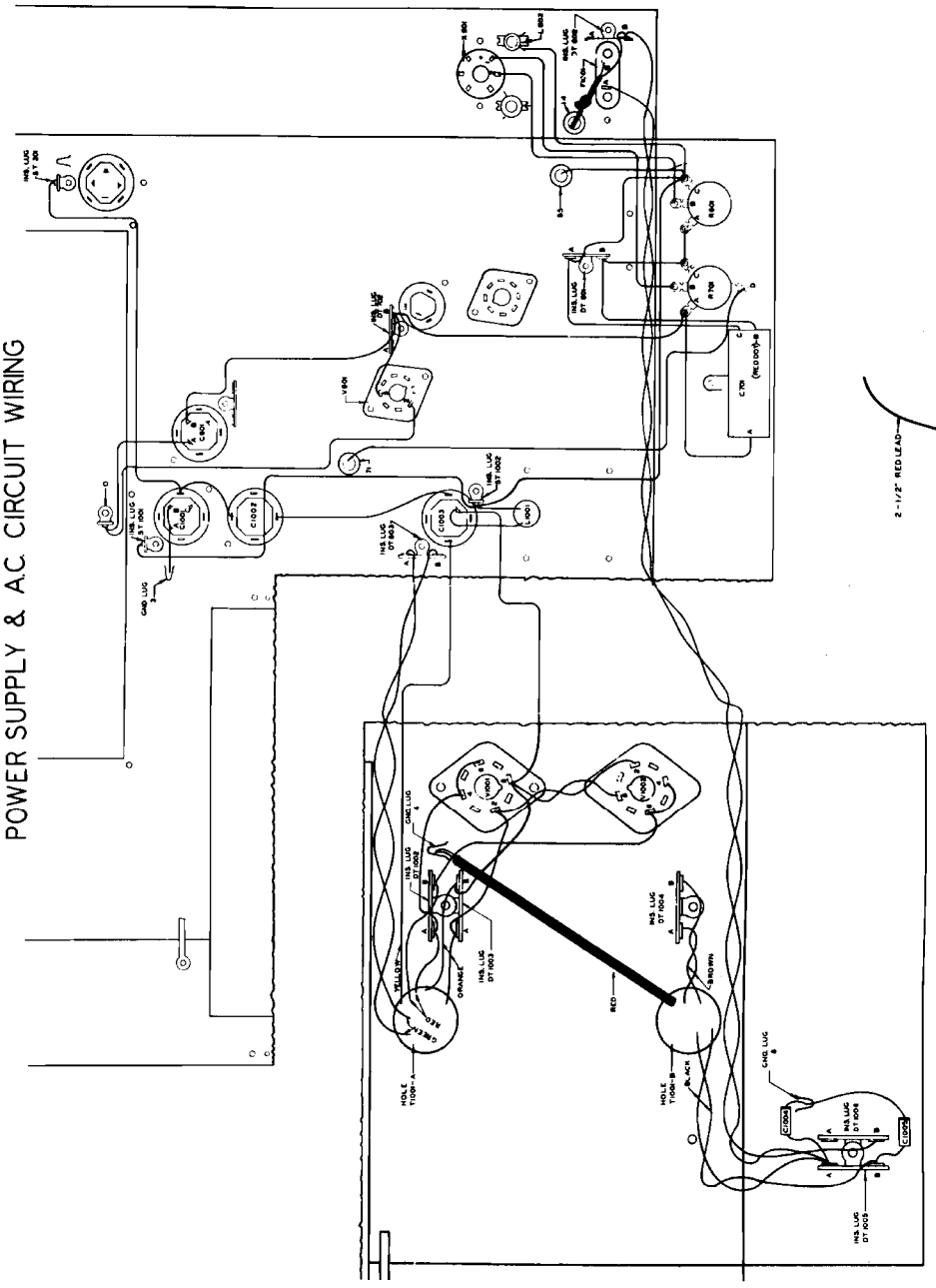
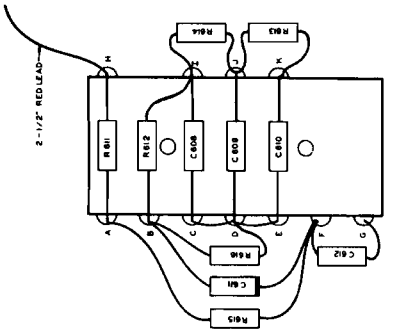
DEFLECTION YOKE, CONNECTOR, & FOCUS COIL WIRING

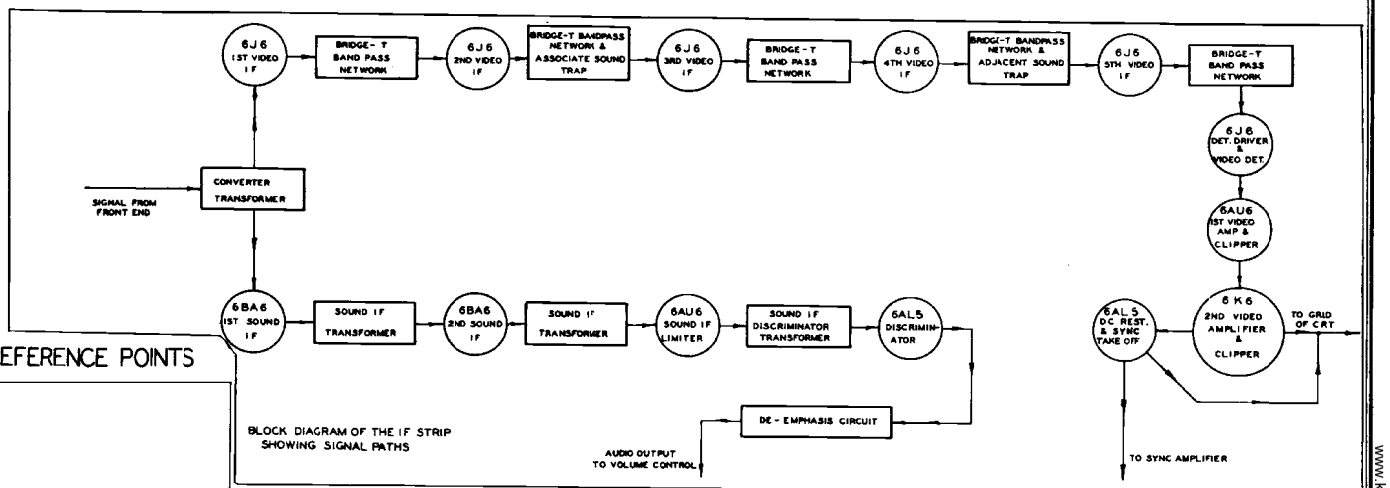


POWER SUPPLY & A.C. CIRCUIT WIRING



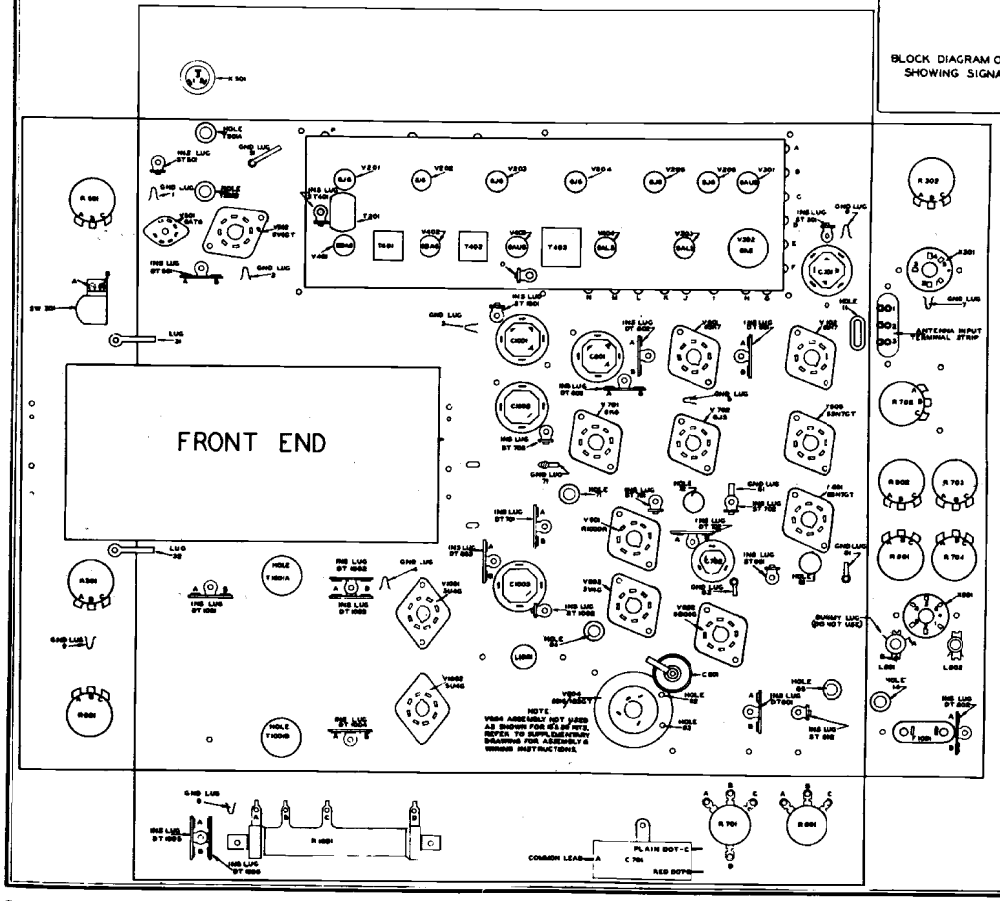
TERMINAL BOARD ASSEMBLY WIRING



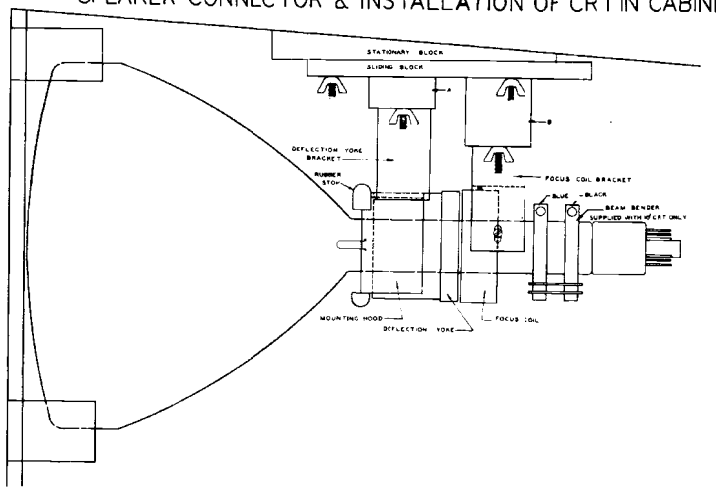


BLOCK DIAGRAM OF THE IF STRIP SHOWING SIGNAL PATHS

BOTTOM VIEW OF CHASSIS SHOWING REFERENCE POINTS



SPEAKER CONNECTOR & INSTALLATION OF CRT IN CABINET



CHAMPION MODELS ALIGNMENT PROCEDURE

With Dumont Inputuner Front Ends

1. **Before attempting re-alignment of I.F. Strip, make sure you have carefully checked all tubes in strip to see if they are operating or whether they are shorted, gassy, microphonic, etc. Also check resistances, condensers and voltages to see if they are all O.K.**
2. **Make sure that no other point in the set is the cause of your trouble, before you arrive at the decision that the I.F. Strip needs adjustment. Many times nothing in the strip is wrong but someone may have tampered with the set. The factory seals all adjustments after unit is aligned to prevent shifting or changing of settings. This unit is noted for its stability and rarely does it have to be re-aligned except where rough shipping or handling of set is encountered.**

A) **EQUIPMENT NEEDED:—**

1) **Signal Generator A.M. Type Modulated 30% at 400 Cycles. It must be accurately calibrated and warmed up for at least ½ hr. before using. It must cover frequencies to at least 30 Mc. on fundamentals and have a good attenuator system.**

2) **A Voltohmyst V.T.V.M., preferably, with a zero center, D.C. Volts scale on it also available for discriminator work. D.C. Probe should have 1 Meg. isolating Resistor contained in it.**

3) **Use a .05MF 600 Volt D.C. Blocking Condenser in series with "HOT" lead of signal generator at all times. Make sure Gnd. Clip Lead of generator is grounded very close to point where signal is being injected in order to prevent spurious or unwanted Regeneration.**

B) ALIGNMENT OF SOUND I.F. SYSTEM IN I.F. STRIP (21.9 MC.):—

1) **Turn Generator to 21.9 MC. making sure that set has been warmed up for at least 15 minutes previously. Turn up Attenuator for maximum output to give at least .1 volt output.**

2) **Detune Secondary of Disc. Transformer T4 Bottom Slug and clip Signal Generator "HOT" Lead to Grid of 6AU6 Limiter (Pin #1) connect V.T.V.M. (which is set to lowest range D.C. Volts and having 1 Meg. isolating Resistor connected to probe) onto LUG "C" of Disc. Transformer (Junction R10 & R11). Adjust** Primary SLUG on top of T4 for maximum output on V.T.V.M.
Then shift V.T.V.M. probe to Pin #1 on 6AL5 disc. tube socket and adjust Secondary SLUG (bottom of T4) for "0" Volts output.
Now turn Signal Generator slowly from 21.9 MC. to points on the dial which are 75 Kc. higher and lower than the Center or Mean Frequency of 21.9 Mc. and observe carefully if V.T.V.M. shows Linear Deflection on Voltage Scale on either + or — Deviation of Generator. If Voltages are not equal on either side of Deviation in Frequency you must touch up Primary SLUG in order to compensate for Non-Linearity.
Now recheck Discriminator Action again to make sure that Discriminator Action is Linear on either side of Mean or Center Frequency.

3) CLIP GENERATOR ONTO GRID LUG #1 OF 2ND 6BA6 AND REDUCE OUTPUT SO AS NOT TO OVERLOAD FOLLOWING STAGES. — GENERATOR IS SET AT 21.9 MC. and V.T.V.M. is clipped onto LUG #A of T3 (Limiter Grid Return). Now peak T3 Primary & Secondary to maximum output on V.T.V.M.

4) CLIP GENERATOR ONTO GRID LUG #1 of 1ST 6BA6 AND PEAK T2 PRIMARY AND SECONDARY TO MAXIMUM OUTPUT ON V.T.V.M.

5) CLIP GENERATOR ONTO PRIMARY OF T1 WHERE I.F. LEAD FROM FRONT END CONNECTS TO. Now Peak Secondary SLUG on converter coil T1 (Top SLUG) for maximum output on V.T.V.M.

C) ALIGNMENT OF TRAPS IN VIDEO I.F. SYSTEM.

NOTE:—Do not touch unless Sound Bars appear in picture. These are set at factory very carefully.

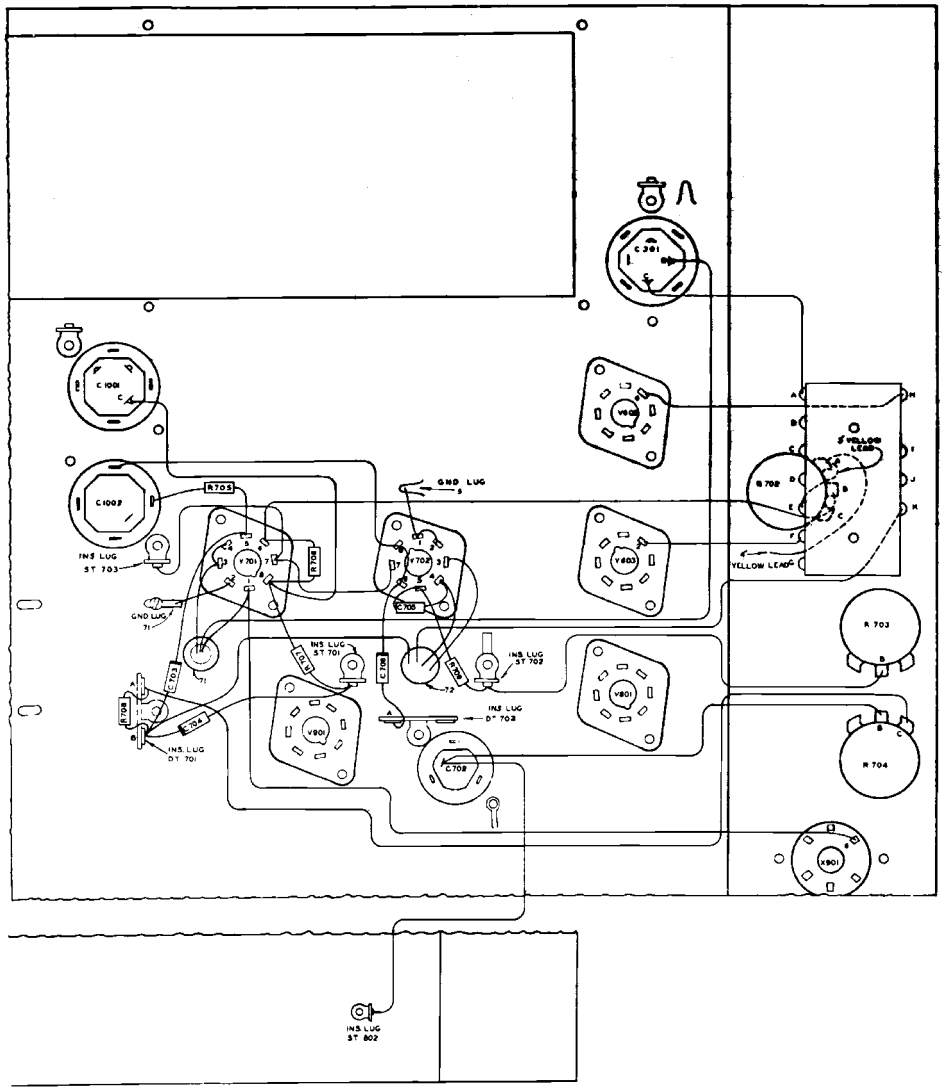
1) Accompanying sound trap trimmer C-29 is between 2nd & 3rd 6J6 I.F. stages and adjacent Sound Trap Trimmer C-38 is between 4th & 5th 6J6 I.F. stages.

2) **Set Generator to 27.9 MC. and feed strong signal into grid of 1st 6J6 I.F. and connect V.T.V.M. to junction of R-32 and L17 (Load of Video Detector) and using insulated (Fiber) Alignment tool adjust C-38 trap for minimum output.**

3) GENERATOR IS NOW SET FOR 21.9 MC. AND C-29 TRAP ADJUSTED FOR MINIMUM OUTPUT. Put a drop of Duco Cement on Screw Threads of Traps and SLUGS adjusted up to present point in order to seal settings.

NOTE:—Bottom SLUG Primary of T1 Converter Coil is to be adjusted for maximum resolution on a test pattern only.

VERTICAL DEFLECTION CIRCUIT WIRING



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