AUDIO VIDEO SYSTEMS

(161002)

B.E. 6TH SEMESTER

LABORATORY MANUAL

2014

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CERTIFICATE

This is to certify that **Mr. /Ms.**

_____ Roll No.

_____ and Enrolment no._____ Of Sixth

semester of B.E_____ Class has satisfactorily completed his/her one full semester in "**161002 AUDIO VIDEO SYSTEMS**" satisfactorily in partial fulfilment of Bachelor of Electronics and communication Engineering degree to be awarded by Gujarat Technological University.

Faculty
Name:
Signature:
Batch:

Date: - …. /… /…….

H.O.D
(E&C Department)

LIST OF EXPERIMENTS

Lab	Name of Experiments	Page	Date of performance	Assessment	Faculty Signature
1.	To measure frequency response of Horn type loud speaker.				
2.	To measure frequency response of Column type loud speaker.				
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5.	To check various test point and fault finding procedure in RF section in colour TV trainer 2651.				
6.	To check various test point and fault finding procedure in VIF section in colour TV trainer 2651.				
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8.	To check various test point and fault finding procedure in Horizontal oscillator and				

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9	To check various test point and fault finding procedure in Vertical oscillator and output section in colour TV trainer 2651.				
10.	To study of fault simulation and step by step fault finding procedure in Sound output section in colour TV trainer 2651.				

Experiment 1

Date:

AIM:

To measure frequency response of Horn type loud speaker.

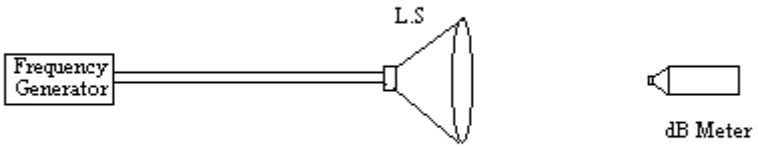
Objective:

To measure signal strength of horn type loud speaker at various frequency and plot it.

Apparatus:

- Horn type loud speaker
- Audio frequency generator
- Sound level meter.

Set up:



Theory:

A horn loudspeaker is a loudspeaker or loudspeaker element which uses a horn to increase the overall efficiency of the driving element, typically a diaphragm driven by an electromagnet. The horn itself is a passive component and does not amplify the sound from the driving element as such, but rather improves the coupling efficiency between the speaker driver and the air. The horn can be thought of as an "acoustic transformer" that provides impedance matching between the relatively dense diaphragm material and the air of low density. The result is greater acoustic output from a given driver.

The narrow part of the horn next to the speaker driver is called the "throat" and the large part farthest away from the speaker driver is called the "mouth".

Horns have been used to extend the low frequency limit of a speaker driver—when mated to a horn, a speaker driver is able to reproduce lower tones more strongly. The flare rate and the mouth size determine the low frequency limit. The throat size is more of a design choice. Horns have been known to extend the frequency range of a driver beyond five octaves.

Acoustic horns convert large pressure variations with a small displacement area into a low pressure variation with a large displacement area and vice versa. It does this through the gradual, often exponential increase of the cross sectional area of the horn. The small cross-sectional area of the throat restricts the passage of air thus presenting high impedance to the driver. This allows the driver to develop a high pressure for a given displacement. Therefore the sound waves at the throat are of high pressure and low displacement. The tapered shape of the horn allows the sound waves to gradually decompress and increase in displacement until they reach the mouth where they are of a low pressure but large displacement.

Procedure:

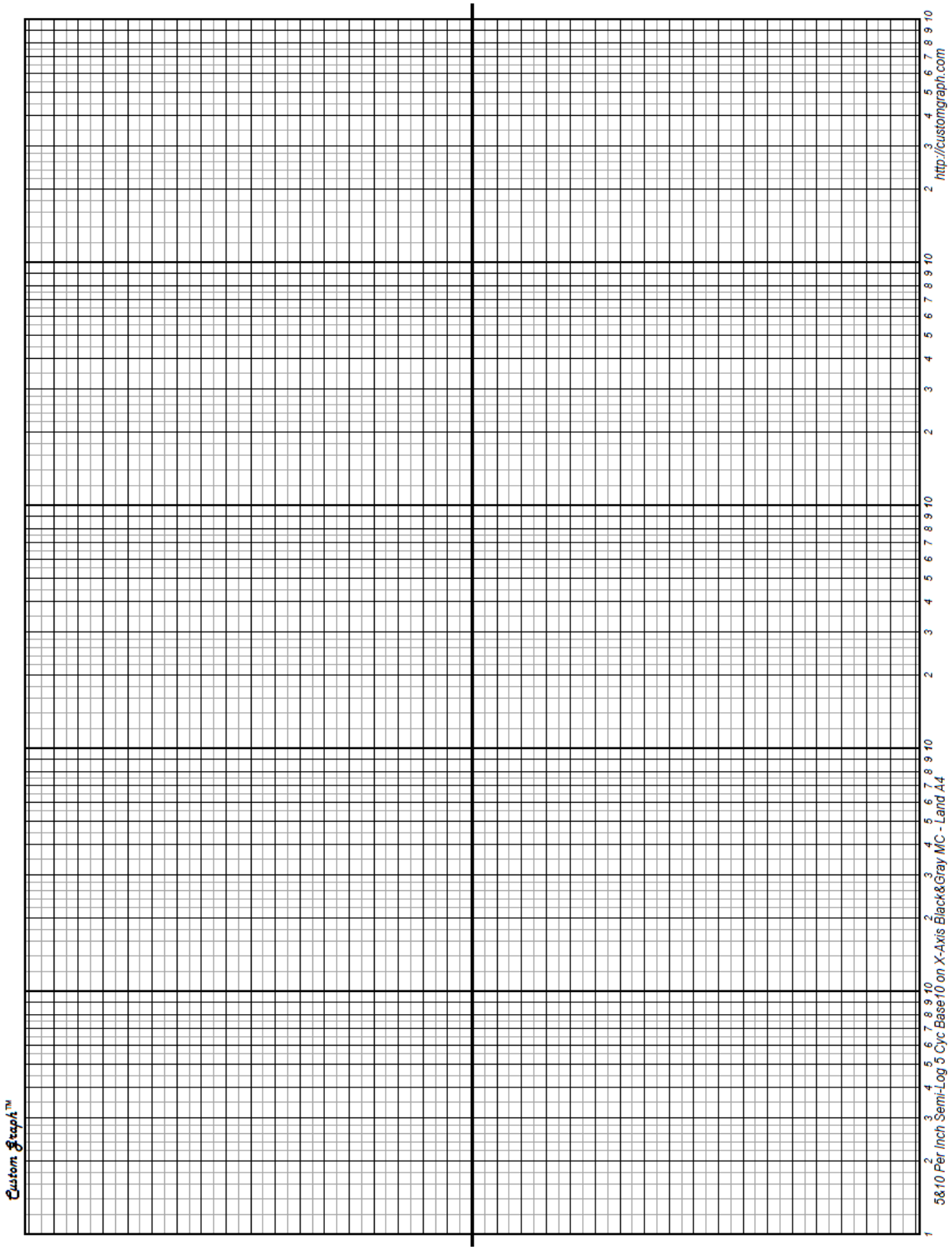
- Connect circuit as shown in figure
- Switch on Audio frequency generator and adjust it for 10 Hz and optimum amplitude (Say 15 V)
- At a certain distance to Loudspeaker (say 100cm), right in front of it, take the readings of sound in dB using the dB meter.
- Vary the frequency from 10 Hz to 1MHz and take different readings.
- Plot the graph of dB v/s freq. on the semi-log paper.

Observation Table:

Frequency	Amplitude (dB)

Conclusion:

Faculty Signature


Custom Graph™
5&10 Per Inch Semi-Log 5 Cyc Base10 on X-Axis Black&Gray MC - Land A4
http://customgraph.com

Experiment 2

Date:

AIM:

To measure frequency response of Column type loud speaker.

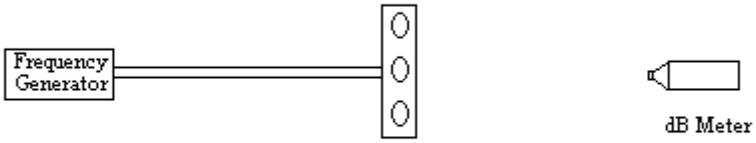
Objective:

To measure signal strength of column type loud speaker at various frequency and plot it.

Apparatus:

- Column type loud speaker
- Audio frequency generator
- Sound level meter.

Set up:



Theory:

Where space for the speaker is at a minimum, the 8-inch size does a reasonably good job; where space is ample the larger speakers give considerably better low frequency performance. It should be realized that, even though the small speaker may actually reproduce the same low tones as the larger ones, it does so with much less efficiency. The response of any speaker is, of course, greatly dependent upon the enclosure with which it works. Therefore, compensations may be introduced into the speaker-enclosure combination to extend the low end of the smaller systems. Because the general purpose loudspeaker must reproduce both low and highs, it must be designed

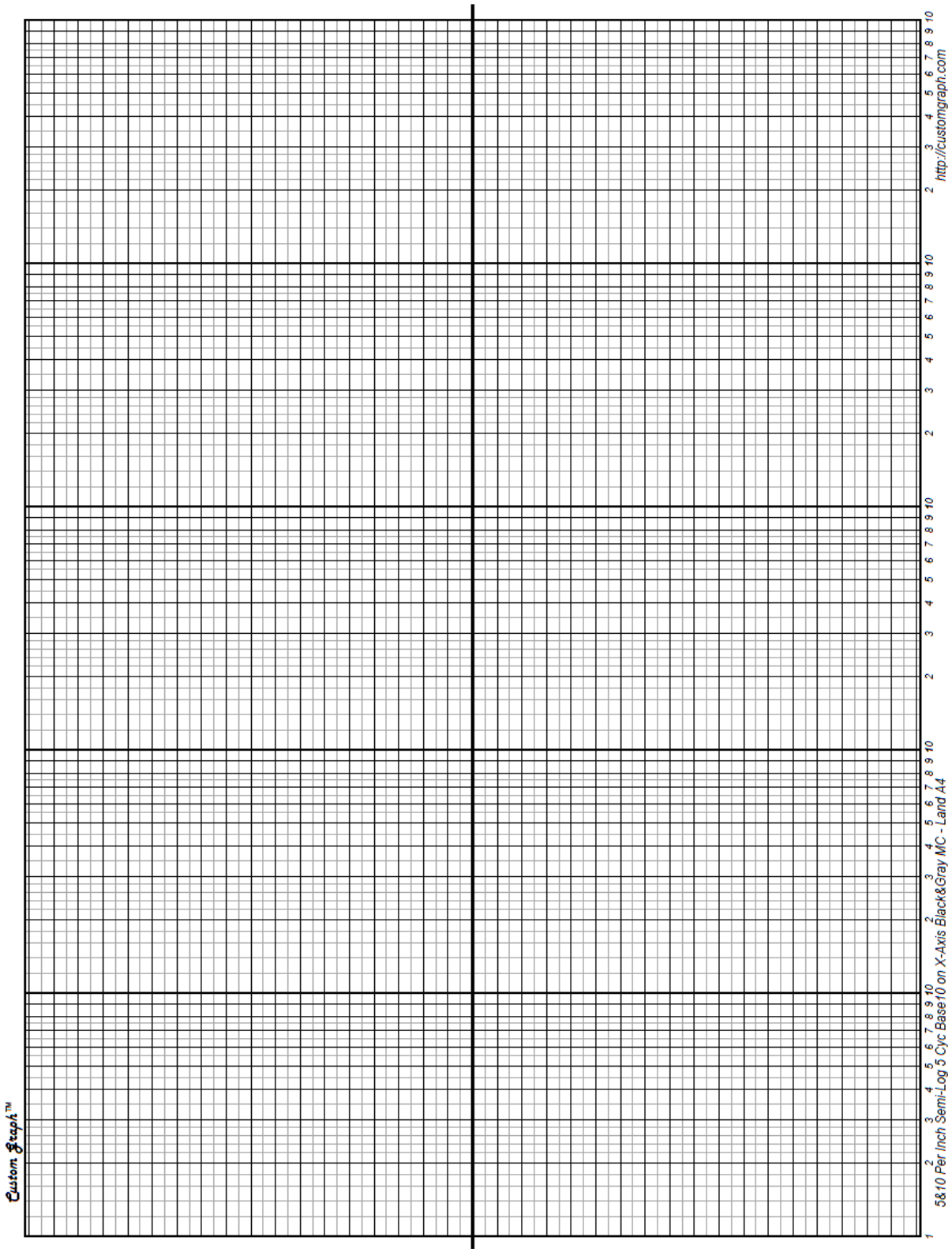
so that the diaphragm is stable enough to be moved as a single whole piston, for good low frequencies depend on the amount of active diaphragm area available to push air into vibration. The frequency response of this speaker is restricted to mid frequencies only. Frequency response of a typical speaker is 200Hz to 5000Hz. It drops for low and high audio frequency.

Procedure:

- Connect circuit as shown in figure
- Switch on Audio frequency generator and adjust it for 10 Hz and optimum amplitude (Say 15 V)
- At a certain distance to Loudspeaker (say 100cm), right in front of it, take the readings of sound in dB using the dB meter.
- Vary the frequency from 10 Hz to 1MHz and take different readings.
- Plot the graph of dB v/s freq. on the semi-log paper.

Observation Table:

Frequency	Amplitude (dB)



Conclusion:

Faculty Signature

Experiment

3

Date:

AIM:

To measure Directional pattern of Horn type loud speaker.

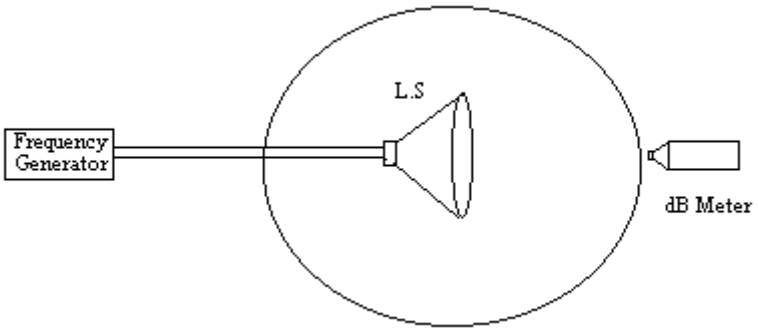
Objective:

To measure signal strength of horn type loud speaker at various angle and plot it.

Apparatus:

- Horn type loud speaker
- Audio frequency generator
- Sound level meter.

Set up:



Theory:

Directional Pattern means that the response of the Loudspeaker in a particular direction. For the horn type the directivity for half powers is about 90° for low frequencies. High frequencies concentrate in a narrow cone in the front. The attachment of a properly shaped horn to a small piston like sound source is observed to result in a marked increase in its acoustic output at low frequencies. Such a horn is essentially an acoustic transformer, which enables the loading impedance of the low-density air to be more effectively matched to that of the relatively massive vibrating piston. In particular, the low- frequency acoustic resistance at the throat of the horn is greater than that which would act on the piston of equal area, vibrating in an infinite

baffle, and the output of the horn loaded source is consequently higher. At high frequencies the effect of the Horn is almost negligible, for these frequencies are radiated by a piston source as a narrow beam, and hence the confining effect of the walls of the horn is of limited significance.

The most important characteristics of the horn is the manner in which its throat impedance varies with frequency. This throat impedance is also a function of throat area, of the mouth area, and of the flare, i.e., of the rate of increase of the horn's cross sectional area. When the area at the mouth is very large, its effect on the throat impedance is negligible, and the variation of this impedance with frequency is then primarily determined by the shape of the horn.

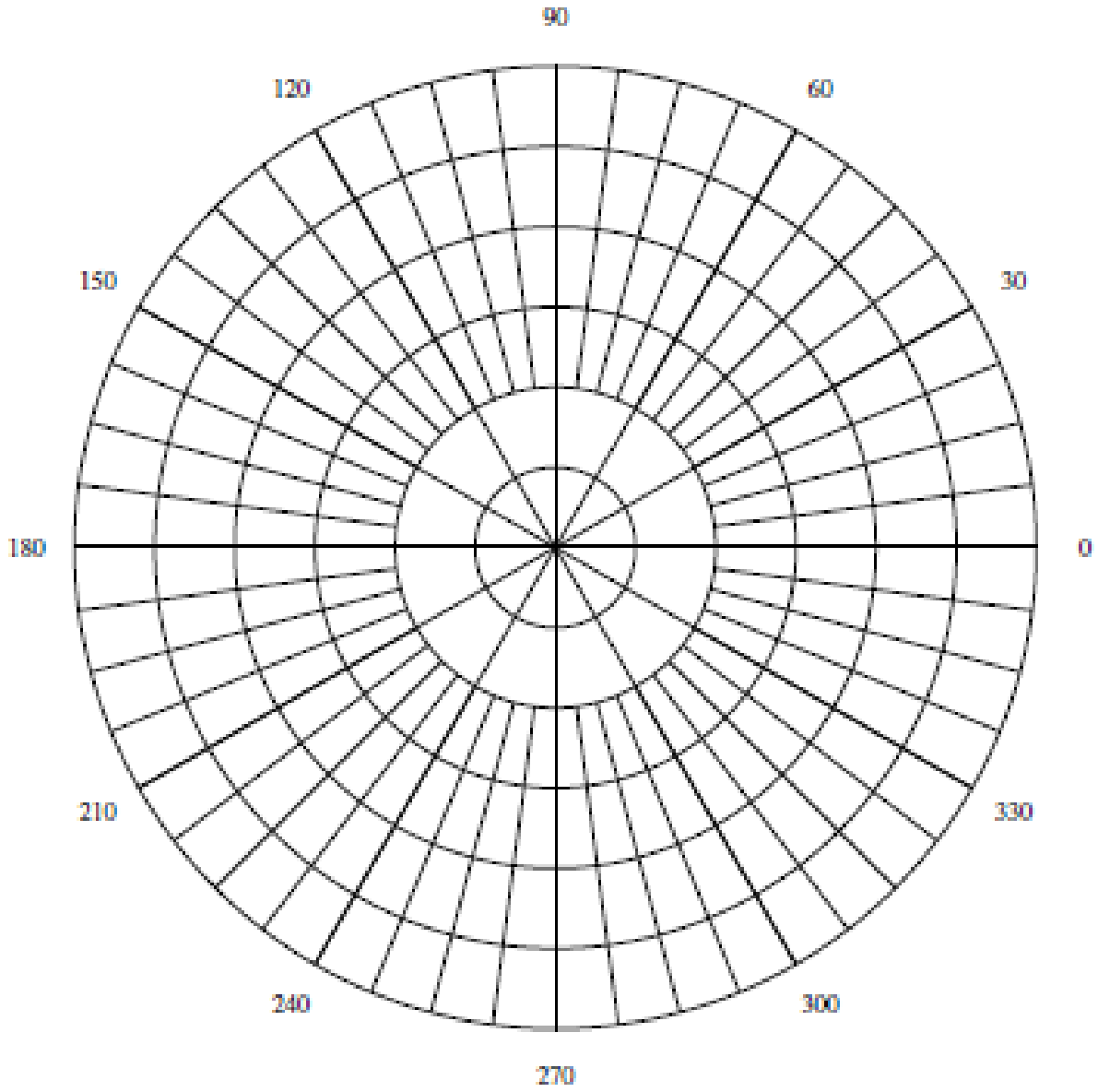
Procedure:

- Connect circuit as shown in figure
- Switch on Audio frequency generator and adjust it for 10 Hz and optimum amplitude (Say 15 V)
- At a certain distance to Loudspeaker (say 100cm), right in front of it, take the axis as a reference and note the reading for every 30° phase angle in dB using the dB meter.
- Plot the graph of dB v/s angle on the polar paper.

Observation Table:

Angle in degree	Amplitude (dB)
0	
30	
60	
90	
120	
150	
180	
210	
240	
270	
300	
330	
360	

Horn Type loud speaker.



Conclusion:

Faculty Signature

Experiment 4

Date:

AIM:

To measure Directional pattern of Column type loud speaker.

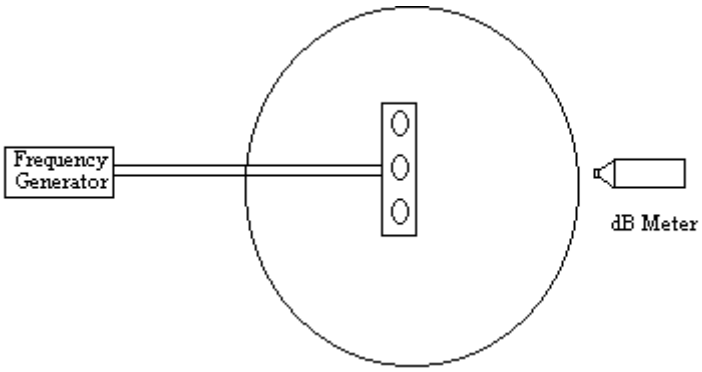
Objective:

To measure signal strength of column type loud speaker at various angle and plot it.

Apparatus:

- Column type loud speaker
- Audio frequency generator
- Sound level meter.

Set up:



Theory:

The Column type Loudspeaker is basically a direct radiating or dynamic Loudspeaker. A loudspeaker is an electro-mechanical device for converting a varying audio voltage into corresponding sound. Some loudspeakers are enclosed in an enclosers or baffles to improve its performance.

Some cone are circular and some are elliptical. The elliptical cone produces larger directivity patterns. Dust caps are attached to the cone at the center. It has basically the same directional characteristics as the simple Cone type loudspeaker.

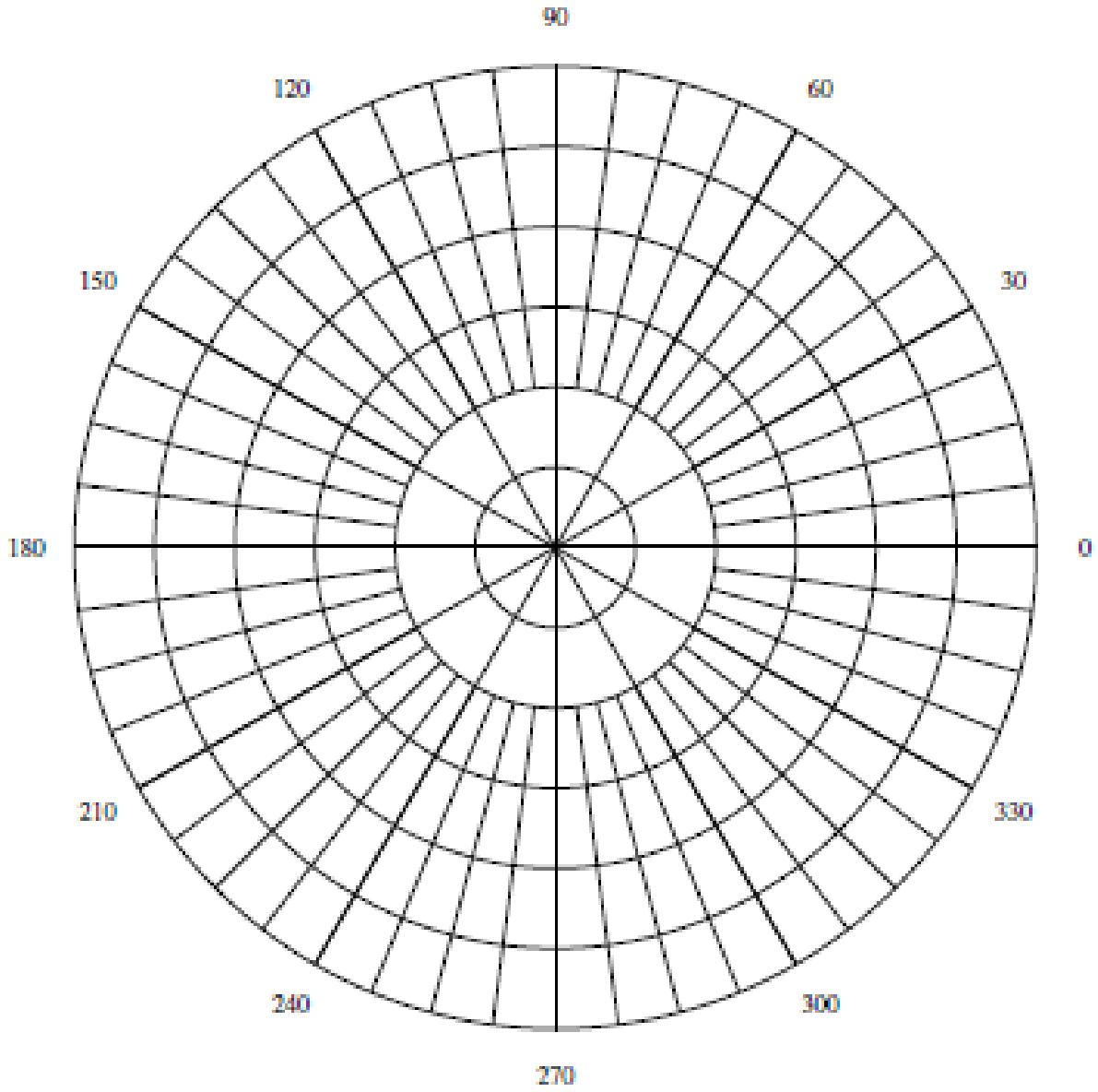
Procedure:

- Connect circuit as shown in figure
- Switch on Audio frequency generator and adjust it for 10 Hz and optimum amplitude (Say 15 V)
- At a certain distance to Loudspeaker (say 100cm), right in front of it, take the axis as a reference and note the reading for every 30° phase angle in dB using the dB meter.
- Plot the graph of dB v/s angle on the polar paper.

Observation Table:

Angle in degree	Amplitude (dB)
0	
30	
60	
90	
120	
150	
180	
210	
240	
270	
300	
330	
360	

Column Type loud speaker.



Conclusion:

Faculty Signature

Experiment 5

Date:

AIM:

To check various test point and fault finding procedure in RF section in colour TV trainer 2651.

Objective:

By using different jumper position, check the test point and fault simulation in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

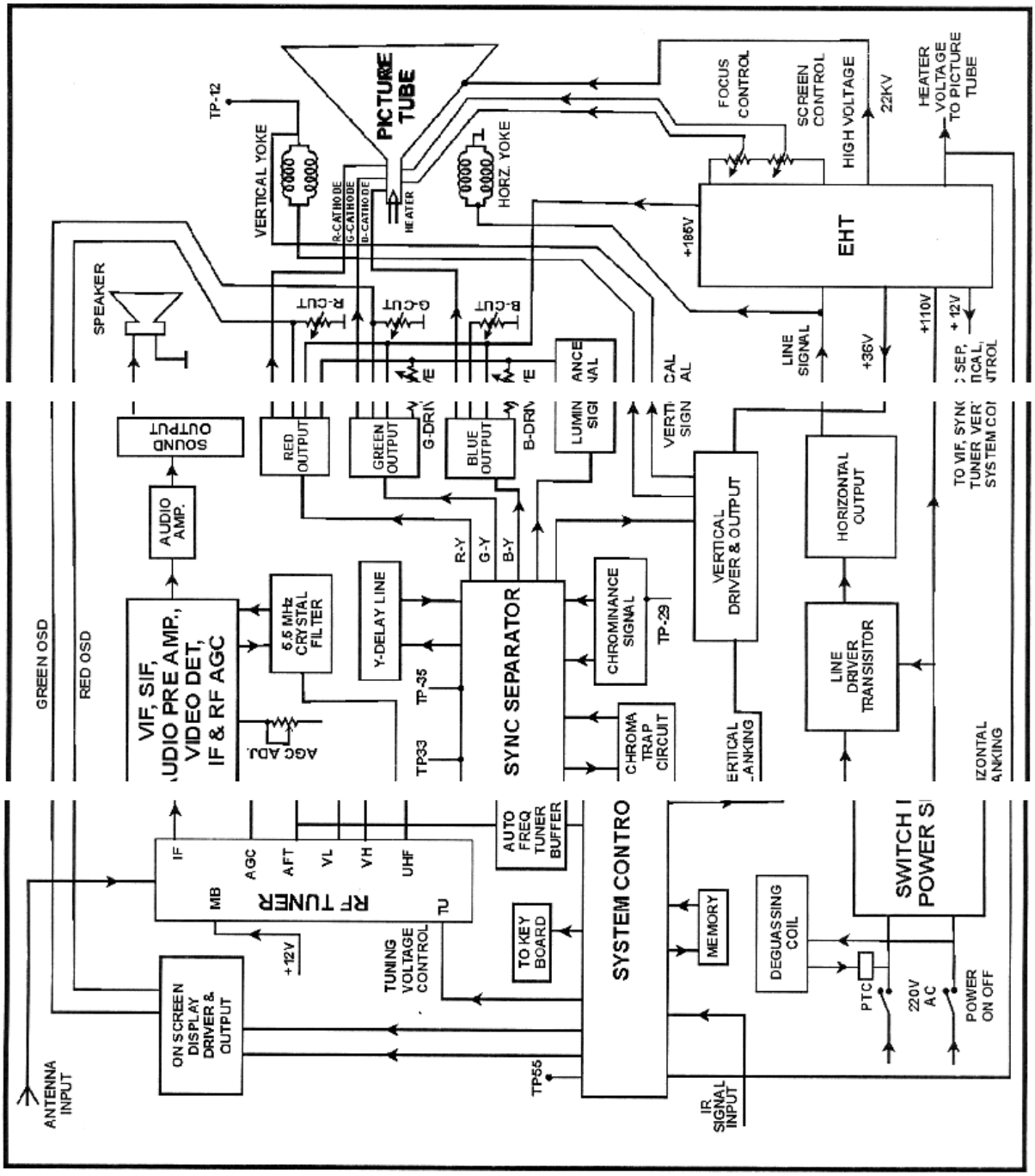
Theory:

The RF-Section is mainly consisting of RF Tuner. This tuner has RF amplifier, a mixer and a local oscillator.

The antenna receives the radio frequency (RF) waves from the atmosphere and converts them into corresponding signal variations. These RF variations are fed to RF tuner. The input impedance of RF Tuner is 75 ohms. The antenna system and co-axial cable should be properly matched. If a co-axial cable of 75 ohms impedance is employed, there is no need of any extra matching device between cable and antenna socket at the receiver. But in case if a feeder wire of 300 ohms is employed then an impedance matching transformer (300-75ohms) is added between feeder and antenna socket at the receiver. There is also a need of impedance matching between output terminals of antenna and co-axial cable or feeder wire. The RF tuner selects the signal of the desired channel, amplifies it and converts in to Intermediate frequencies (IF).

The video IF is at 38.9 MHz and sound IF is at 33.4 MHz.

Tuner section has +12V approximately supply voltage at TP14 (MB). This voltage is used for all the operations. In this section +12V is provided from horizontal output



section. Transistors QA02, QA03, QA04 (BC558) are used for selecting the desired band from tuner section. To switch on these transistors approximately 10.8 V is provided at their base. Output is obtained at IF terminal (TP20). AGC Voltage (2.8V approximately) is obtained from pin 11 of IC7680 (IC101). This voltage is used for automatic gain controlling purpose. AFT voltage is provided from pin 13 of IC7680. It is available at TP16. Tuning pulse output from system control IC is fed in to the base of transistor Q903 (BC547). Which switches on the transistor and so tuning voltage of

0-33V approximately is obtained at TV terminal (TP19). Following are the various terminal of RF tuner, which are provided in the form of Test Points (TP) in our trainer kit.

UB : The system control IC provides the UHF band selection voltage. This voltage switches ON the transistor, hence UHF band is selected.

HB : VHF band III selection voltage available from system control IC through switching transistor at HB pin.

LB : VHF band I selection voltage is available at LB pin from system control IC through switching transistor.

TU : Channel selection voltage is available at this pin through transistor. It varies from 0-33V during channel selection.

AGC : Automatic Gain Control voltage is available at this pin from IC7680.

AFT : Automatic Fine Tuning voltage is available at this pin from IC7680.

MB : It is tuner section's Power Supply pin. Here 12 volt (approximately) is available.

IF : Intermediate frequency output signal from tuner is available at IF pin

Test points:

TP21 Blue:

Tuner section (UB) requires supply of 10.8V approximately if UHF band is selected, otherwise 0V. On selecting the UHF band of system control IC, 10.8V approximately is obtained at pin no. 3 (for other band selection, it is 0V)

TP19 Blue:

Tuner section (TU) selection 0-8V (approximately varying) during channel. Pin 33 of system control IC provides the tuning pulse output to TV terminal through transistor Q903 (BC547)

TP18 Blue:

Tuner section (HB) 10.8V approximately, if VHF III band to selected otherwise 0V. On selecting the VHF III band of system control IC feeds VHF III band to switching output from pin no. 2 (10V approximately). So 10.8V approximately is obtained here & (for other band selection it is 0V)

TP20 Blue:

Tuner section 6.8V approximately (AGC) adjustable, this voltage is used for automatic gain controlling purpose and coming from IC7680.

TP17 Blue:

Tuner section (LB) requires supply of 10.8V (approximately) if VHF I band is selected otherwise 0V. On selecting VL band System control IC provides at pin 1 (10V approximately). So, 10.8V approximately is obtained & for other band selection it is 0V.

TP16 Blue:

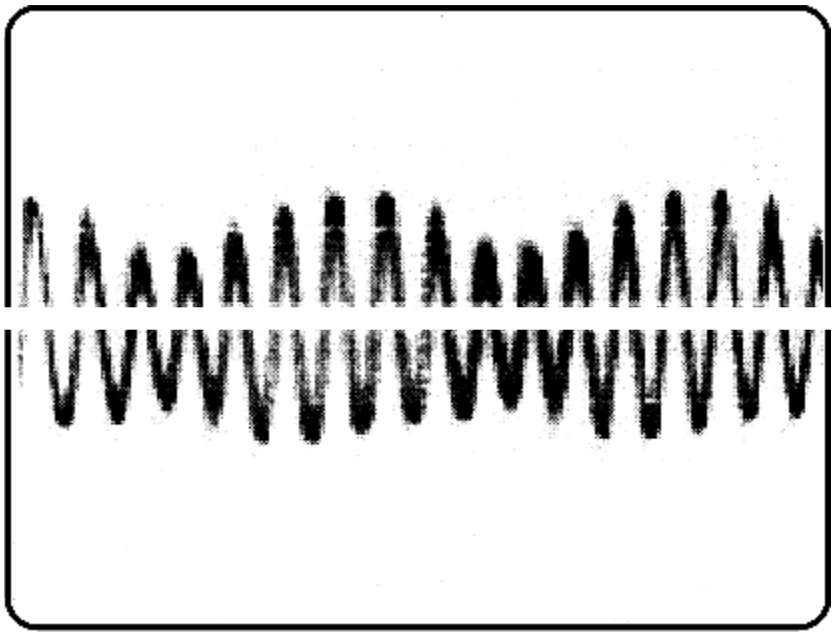
Tuner section AFT required supply of 5.7V approximately, this voltage is obtained from pin no. 13 of IC7680 for the purpose of Automatic Fine Tuning.

TP14 Red:

Tuner section (MB) Supply for Tuner section is 11V (approximately). It is obtained from Horizontal Output Section.

TP15 Red:

Tuner section (IF) Tuner Output signals according to band selection.



Fault Simulation:

Fault Insertion:

Fault 1: No picture, only low contrast snow on screen.

Fault Insertion: Remove the shorting shunt from 2 & 3 pin and place it between pin 1 & 2 of jumpers J1

Symptoms: Even antenna is connected but there is no picture only sound is present with low contrast.

Fault Section: Tuner Section

Procedure:

· Check power supply at TP14 (MB) of tuner section, it should be +12V if not

· Then Check +12V supply at TP13 if it is OK

· Remove the shorting shunt from pin 1 & 2 and place it between pin 2 & 3 of jumpers J1.

Result: Now you should get +12V at TP14.

Fault 2: No picture, No transmitting sound**.**

Fault Insertion: Remove the shorting shunt from 2 & 3 pin and place it between pin 1 & 2 of jumper J3

Symptoms: No picture, No sound and tuning is not possible.

Fault Section: Tuner Section.

Procedure:

· Check the voltage at TP4 (33V approximately) if it is not present then,

· Track may be open or components are faulty.

· Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J3.

Result: Now you should get picture with OK sound.

Fault 3: No Picture, No transmitting sound.

Fault Insertion: Remove the shorting shunt from 2 & 3 pin and place it between pin no. 1 & 2 of jumper J4

Symptoms: No picture, there is only snow on & tuning is not possible

Fault Section: Tuner section.

Procedure:

· First check the antenna wire and antenna. If it is properly connected then,

· Select the auto tuning mode. It starts with VL Band

·During VL Band tuning period 12V will be obtained at TP-17,

·During VH Band tuning period 12V will be obtained at TP-18

·During VHF Band tuning period 12V will be obtained at TP-21, if, it is not present then,

·Check voltage at collector of transistors QA02, QA03, QA04 it should be 12V, if, it is OK then,

·Check the voltage at Emitter of transistor QA02, QA03 and QA04, it should be 12V if, it is OK then

· Transistor may be faulty or track may be open between TP13 and emitter of transistor, QA-02, QA-03, and QA-04.

·Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J4.

Result: Now you should get possible tuning and get picture.

Fault 4: VH Band is not selected

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between pin 1 & 2 of jumper J5

Symptoms: No picture, no transmitting sound, only snow, but signal received from antenna in VH band is of good quality.

Fault Section: Tuner section.

Procedure:

·First check the voltage at TP13, it should be 12V (approximately), if it is not present then

·Check the voltage at TP18, if it is not present then

·Check the voltage at transistor QA03, if it is not present then

·Transistor may be faulty or track may be open between emitter of Transistor QA03 & TP13.

·Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J5.

Result: Now you will get VH Band selected & good picture too.

Fault 5: Picture tilted to one side. Sound OK.

Fault Insertion: Remove the shorting shunt from 2 & 3 pin and place it between pin 1 & 2 of jumpers J6

Symptoms: Horizontal shaking is observed in the picture. (AGC preset is at higher side)

Fault Section: Tuner section

Procedure:

·Vary the preset of AGC. If variation of picture is not found to be OK then.

·Check the voltage variation by keeping the Test Point at TP20 by varying the preset VR151. If no variation is present, check the preset. If it is proper then.

·Resistance R105 may be faulty, if it is OK then,

·Check the continuity between R105 and TP20, if it is not proper then,

·Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J6.

Result: Proper picture without any shaking symptoms is observed.

Conclusion:

Faculty Signature

Experiment 6

Date:

AIM:

To check various test point and fault finding procedure in VIF section in colour TV trainer 2651.

Objective:

By using different jumper position, check the test point and fault simulation in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

Theory:

This section includes VIF and SIF sections. This trainer uses IC101 (CD7680) for VIF and SIF sections. The signals at terminal (TP15) of tuner section are fed at the base of transistor Q161 (C388A) through coupling capacitor C161 (01mf). This amplified IF signals are available at collector of this transistor and then fed to Saw Filter through capacitor C163 (.01mf) collector of pre-amplifies transistor gets positive supply by resistances R164 (220W) and R165 (470W). Base biasing is given by resistance R163 (5.6K) and R162 (1K) to base of pre-amplifier and its emitter is grounded by R166 (27W). Output of saw filter is fed to pin no. 7 and 8 of IC101 (IC7680) by coil L102 (TRF 1452) R101 (820W) and C101 (.01mf) network. Pin no. 7 & 8 are VIF amplifier pins. The signal from this section is fed to video detector after amplification. Video detector detects line video signal and amplified by video preamplified section. Composite colour video signals are obtained at pin no. 15. The signal is shown at TP23.This composite signal also has SIF signal of 5.5 MHz. Ceramic filter Z106 (5.5 MHz) sets sound IF signals 5.5 MHz through capacitor C7 (68pF). This ceramic filter separates the second IF signal from composite video signal. The filtered sound IF signals are fed to pin no. 21 of this IC sound. IF amplifier section amplifies the sound IF signals and

send it to FM detector section where audio signals are obtained. Audio signals are available at pin no. 3 of this IC at pin no. 22 and 24 FM detector circuit is connected with FM detectors coil. Pin no. 1 of this IC gets the volume control signal from pin no. 39 of system control IC through transistor Q901 (BC547). Pin no. 17 and 18 are the pins of video detector section. Here L151 (1445) video detector coil is used. Resistance R108 (3.9K) video detector coil and a capacitor parallel to this coil passes the signal to video detector section for detection. After that the signal reaches to AFT detector section. The detected signals from AFT section are obtained at pin no. 13 which is AFT output pin. AFT signals are fed to AFT terminal of Tuner by resistance R171 (2.7K). From tuner's AFT point this AFT signals are fed to base of buffer transistor Q910A (BC547) which comes out from its emitter. Then the circuit of C196 (4.7KPF) R925 (4.7K) R924 (470W) and diode D903 (IN4148) passes this signal to pin no. 15 of system control IC. It is very important to give the signal to system control section because the channels cannot be locked without this signal. AGC voltage is given to AGC terminal of tuner from pin no. 11 of this IC through resistance R105 (220W). There is (15K) R151 variable resistance for AGC adjustment.

The IC 7680 incorporates the following functions.

a. Gain controlled wide band amplifier providing complete IF gain.

b. Video detection.

c. Video pre-amplification.

d. AFC detection output providing.

e. IF AGC and RF AGC

f. Sound IF limitation and amplification.

g. FM detection.

h. Attenuation and providing audio output.

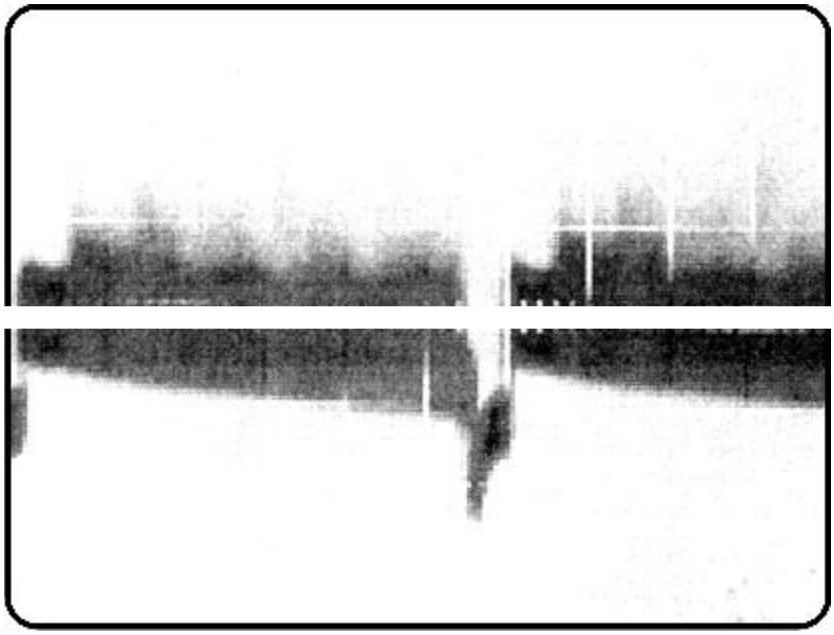
Test points:

Pin 3 of IC VIF section:

Audio output signal from IC7680 fed to sound amplifier 7 VDC.

TP23 Red VIF section:

Composite video signal (Pin no. 15 of IC7680).



Fault Simulation:

Fault 6: No Sound, No Picture only plane raster on the screen.

Fault Insertion: Remove the shorting shunt from 2 & 3 pin and place it between pin 1 & 2 of jumper J2

Symptoms: There is no sound nor picture on the screen. Only plane raster is present.

Fault Section: VIF Section

Procedure:

·Check power supply at pin no. 20 of IC101 (IC7680) If not then,

·Check +12V at TP13 if it is OK

·Then may be track open between TP13 and Pin 20 of IC101

·If not then check the continuity connection between TP13 and TP6.

·Remove the shorting shunt from pin 1 & 2 and place it between pin 2 & 3 of jumper J2.

Result: Now you should get +12V at pin no. 20 of IC101.& good picture with sound

Fault 7: Plane Raster on the Screen.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between pin 1 & 2 of jumper 31

Symptoms: Only plane raster on the screen without any sound.

Fault Section: VIF Section.

Procedure:

·First check the composite colour video signal at pin no15 of IC101. If it is OK then,

·Check the composite colour video signal at pin no. 39 of IC501.

·The components connected between TP23 and pin no. 34 of IC501 may be faulty. If these are OK then,

·Check the track between TP23 and pin no. 39 of IC501.

·Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of Jumper 31.

Result: Now you should get clear picture with sound.

Fault 8: No Picture. No transmitting sound.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between pin 2 & 3 of jumper J37

Symptoms: No Picture, there is only snow

Fault Section: VIF Section

Procedure:

·First check the antenna wire and antenna. If it is properly connected then,

·Check the tuner voltage +12V at TP-14. If it is OK then tuner may be faulty.

·Now try to get the picture with the help of Auto tuning/ Fine tuning. If you are not getting the picture then,

·Check the +33volt at TP4 DA13. If it is OK then,

·During the auto mode, check the voltage variation of 0V to 8V at emitter of TR Q902. If it is not varying then,

·Track may be track open between DA13 and Q902.

·Remove the shorting shunt from pin 2 & 3 and connected between 1 & 2 Jumper J37.

Result: Now you should get clear picture with sound.

Fault 9: Picture with distorted Sound.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between pin 2 & 3 of jumper J7

Symptoms: There is picture with snow and distorted sound. (In case of improper antenna plane raster will appear

Fault Section: VIF Section.

Note: To find out this problem take signals from colour pattern generator ST2670 instead of antenna.

Procedure:

·First check the IF signal at TP15, if it is OK then,

·Check the IF Signal at TP22. if it is OK then,

·Check this signal at Base of transistor Q161, If it is OK then,

·Transistor may be faulty. If it is OK then

·Now check the IF signal at the end of capacitor C163 connected to saw filter, if it is weak then

·Check capacitor C163 is connected with ground or not.

·Remove the shorting of shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J7.

Result: Now you should get good picture with OK sound.

Conclusion:

Faculty Signature

Experiment 7

Date:

AIM:

To check various test point and fault finding procedure in Video and CHROMA section in colour TV trainer 2651.

Objective:

By using different jumper position, check the test point and fault simulation in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

Theory:

Scientech Colour TV trainer Scientech 2651 uses IC CD7698 (IC501) for video & chroma section. Vital part of the IC is used for chroma section. For chroma section pin no. 1-23 and pin no. 38-42 are used, other pins are used for Video section. For chroma section following are the main sub sections in the IC:

· Chroma amplifier

· Colour oscillator

· Colour killer detector

· Matrix

· Luminance (Y) signal amplifier.

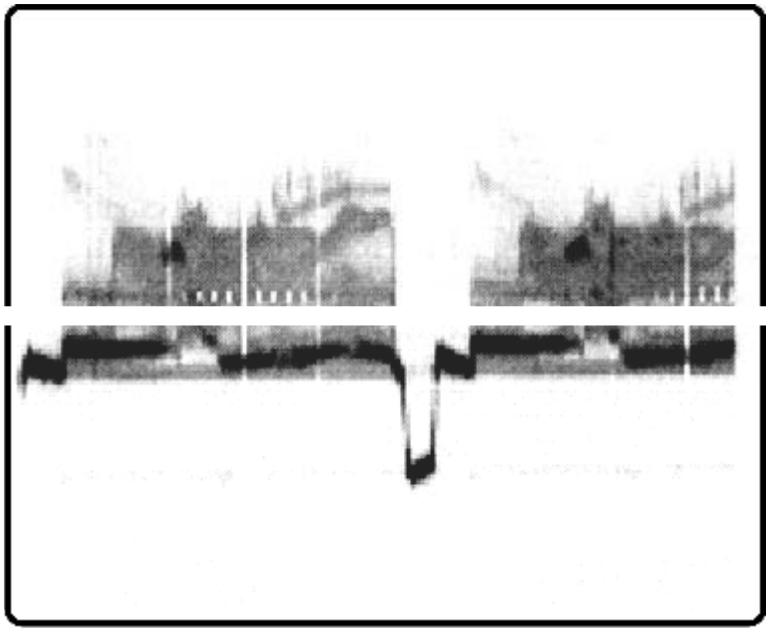
VIF section IC101 (CD7680) pin no. 15 supplies the composite colour video signal to the inverter pin no. 39 of IC501 (CD7698) by circuit made up of L105 (3.3mH) R958 (330W), Trap5.5 MHz (ceramic filter) and L201 (12mH). In inverter section this signal is amplified as well as detected, After detection Y signal goes to Y amplifier which is in built in IC, Remaining amplified composite colour and sink signal are obtained at pin no. 40 of this IC, then fed to pin no. 5 of this IC through resistance R501 (820W), C560 (18pF) and C502 (10pF). Pin no. 5 is Band pass amplifier pin. Signal goes to band

pass amplifier by this pin and amplified here. Amplified signal is obtained at pin no 8. From pin no. 8 the signal fed to pin no. 19 of this IC by passing it through chroma trap circuit. This trap circuit consists of VR551 (1K) C507 (0.01mf), C508 (15Pf), C502 (10mH) X502 (DL701 delay line), L551 (TRF5418) R510 (470W) and C509 (.01mF). From pin no. 8 this signal is also fed to pin no. 17 of this IC in the form of colour sink signal by resistance R509 (1.5K), C510 (.01mF) pin no. 17 is of matrix section. Pin no. 41 is contrast control pin. Pin no. 41 gets the contrast control signal from pin no. 37 of system control IC through resistance R946 (560W), R945 (1.5K) and R213 (47K). Pin no. 4 of this IC is brightness control pin. Pin no. 38 of IC901 (system control section) supplies the brightness control signals at this pin through resistance R941 (1K), R956 A (47K), R212 (10K). Pin no. 7 of IC501 (CD7698) receives the colour control signals from pin no. 36 of IC901 through resistance R947 (1K), R942 (12K) and R505 (2.2K). Pin no. 20 of IC501 (CD7698) is output pin of green colour signal. Green colour output signal from this pin is fed to base of green colour amplifier transistor. In the same way red colour signal obtained at pin no. 21 of this IC and then fed to base of red colour output transistor Q507 (C2310). Blue colour signal obtained at pin no. 22 of this IC and then fed to base blue colour output transistor Q509 (C2310).R-Y signals & B-Y signals. Y signals from pin no. 42 of this IC are fed to pin no. 3 of the same IC through resistance R203 (1.5K), R210 (1.5K) arid capacitor C204 (.47mF) circuit network. Luminance signals are out from pin no. 23 of this IC and fed to base of luminance amplifier transistor. Q202 (2SA 1015) this transistor amplifies the signal and out the signal by its emitter, which is then fed to all the three emitters of three colour output transistors. Pin no. 30 to 37 of IC501 (CD7698) works for horizontal oscillator AFC and sync separator sections.

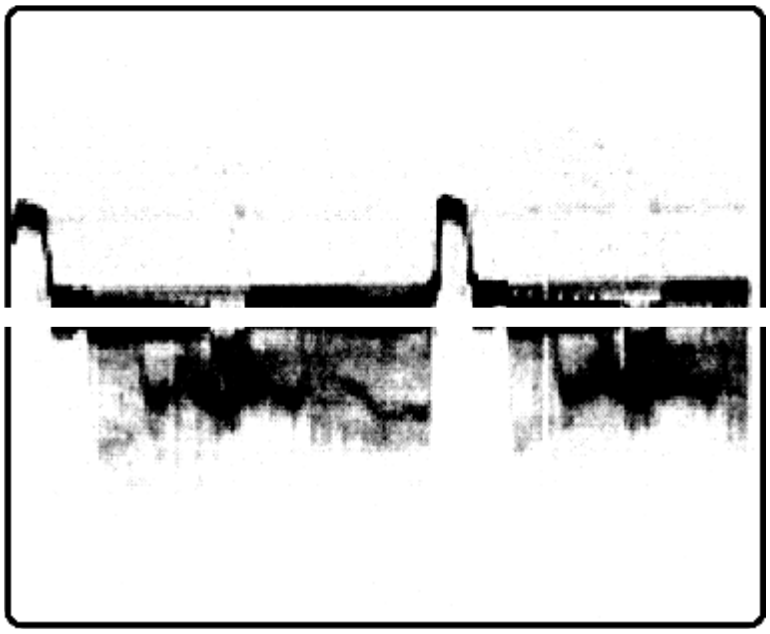
Test points:

TP26 Blue Video & Chroma section +12V (approximately)

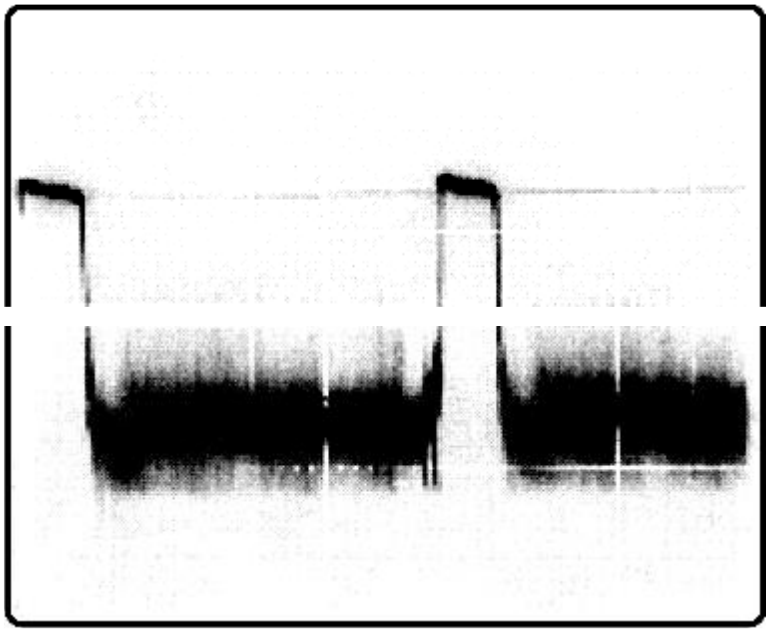
TP28 Blue Video & Chroma section Colour composite video signal



TP29 Red Video & Chroma section Inverted Colour composite Video signal

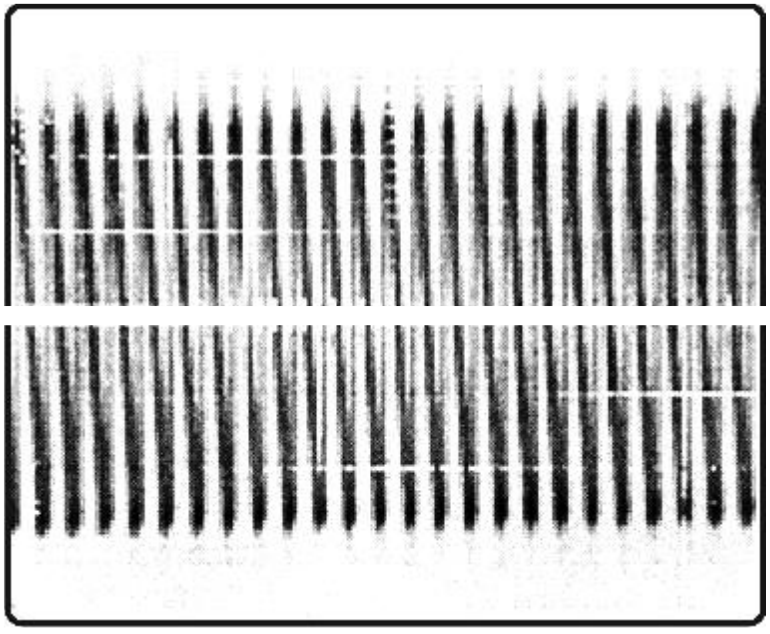


TP 31 Red Video & Chroma section Luminance Signal.



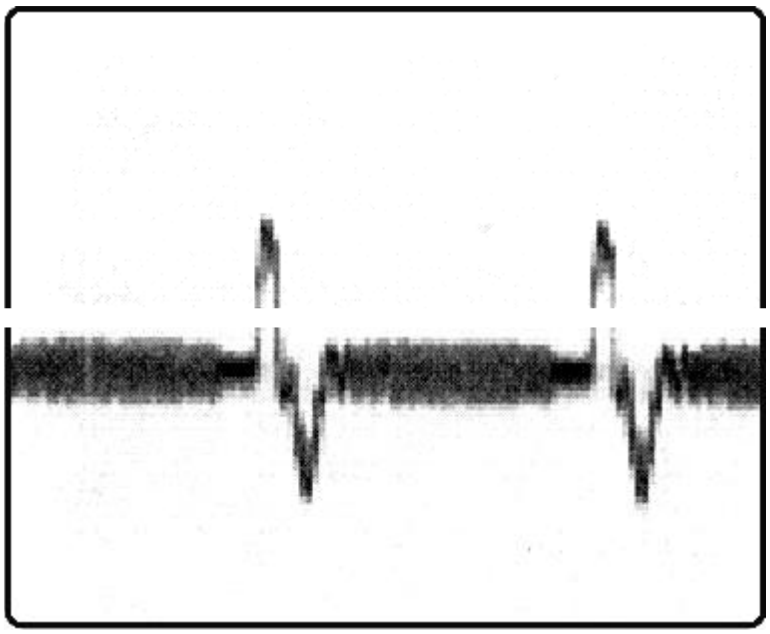
TP34 Blue Video & Chroma section + 10V (approximately)

TP37 Blue Video & Chroma section 4.43 MHz sub carrier frequency



TP38 Blue Video & Chroma section + 12 V (approximately)

TP39 Red Video & Chroma section for colour adjustment. To observe Colour burst signal at Pin no. 5 of IC501, connect pattern generator (colour bar pattern) at antenna socket.



Fault Simulation:

Fault 10: There is yellow colour on the screen with OK Picture.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J25.

Symptoms: There is good picture on the screen with yellow shade colour

Fault section: Video & Chroma section

Procedure:

· Check pin no. 22 of IC501 (IC7698) it should be + 7.2V approximately. If it is not then IC may be faulty.

· We know that if there is yellow shade on the screen it means blue colour is absent.

· Check circuit of pin no. 22 of IC501 (B-Y output) it should be +7.2V approximately at B terminal (Berg strip pin), if it is not.

· There may be track open between this B terminal and pin no. 22 of IC501.

· Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J25.

Result: Now you should get picture in normal colours.

Fault 11: There is cyan colour on the screen with OK picture.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J24

Symptoms: Sound and picture OK only screen has cyan colour shade

Fault section: Video & Chroma section

Procedure:

· We know that if there is cyan colour on the screen it means that red. colour is absent

· Check pin no. 21 of IC501. It should be 7.2V approximately, if not IC may be faulty

· Check this voltage at R terminal, if it is not then,

There may be track open between pin no. 21 of IC501 & R terminal.

· Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J24.

Result: Now you should get picture with normal colours.

Fault 12: There is magenta shade colour on the screen with OK picture.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J23

Symptoms: Sound and picture OK with magenta shade

Fault Section: Video & Chroma section.

Procedure:

· We know that if there is magenta colour on the screen it means that green colour is absent

· Check pin no. 20 of IC501 it should be +7.2V approximately (if not then IC may be faulty) if OK then,

· Check this voltage at G terminal. If it is not then,

There may be track open between pin no. 20 of IC501 & G terminal

· Remove the shorting shunt from pin 2 & 3 of and connect it between 1 & 2 of Jumper J23

Result: Now, you should get picture with normal colours

Fault 13: Dull Coloured Picture

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J19

Symptoms: There is dull picture (Negative type) on the screen with full colours.

Fault Section: Video and Chroma Section

Procedure:

· Check the luminance signal at pin no. 23 of IC501. If it is not then IC may be faulty, if it is OK then,

· Check this luminance signal at base of Q202 (1015). If it is not here then, there may be track open between pin no. 23 of IC501 and base of T202.

· Replace the shorting shunt from 2 & 3 and connect it between 1 & 2 of Jumper J19.

Result: Turn on the instrument, you should get good picture on the screen.

Fault 14: Picture is vertically rolling with OK sound

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J21

Symptoms: There is OK sound from the trainer kit but picture is vertically rolling.

Fault Section: Video and Chroma Section

Procedure:

· Check vertical sync pulse at pin no. 36 of IC501 (CD7698). If it is OK then,

· Check the pulse at pin no. 28 of IC. If it is not then,

There may be track open between these two pins or R330 (30K) or capacitor,

· Replace the shorting shunt from pin 2 & 3 and connect it between 1 & 2 Jumper J21.

Result: Now should get clear picture with sound.

Fault 15: No colour variation.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J27

Symptoms: There is good picture without colour variation it means black & white picture.

Fault Section: Video and Chroma section.

Procedure:

·First check the voltage variation of IC501 at pin no. 7, it should be 3.5V to 6.5V approximately. If it is not then,

·Check the voltage variation at TP52. If it is OK then, check the continuity of track between TP52 & pin no. 7 of IC501. If no continuity is present, then,

·Remove the shorting shunt from 1 & 2 connect it between 2 & 3 of jumper J27.

Result: Now you should get colour picture with proper variation.

Fault 16: No colour with OK sound.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J28

Symptoms: Good picture without colour when colour control is set to max.

Fault Section: Video & Chroma section.

Procedure:

We know that if there is B/W picture on the screen it means colour burst is absent.

·So first check signal at R501 (820R), there should be composite video signal, if it is OK then,

·Check the colour brust signal at pin no. 5 of IC501, if it is not present then,

·There may be track open between IC501 at pin no. 5 and R501 (820R).

·Remove the shorting shunt from pin 1 & 2 of jumper J28 and connect between pin 2 & 3.

Result: Now you should get colour picture.

Fault 17: No colour with OK sound.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J26

Symptoms: Good picture without colour when colour control is set to max

Fault Section: Video and Chroma section

Procedure:

·First check the sub carrier frequency 4.43 MHz at TP37. If it is not present then, Crystal may be faulty, if it is OK then,

Check the continuity of track of pin no. 13 & 15 of IC501. If no continuity is present then,

·Remove the shorting shunt from pin 1 & 2 connect it between 2 & 3 of Jumper J26.

Result: Now you should get colour picture.

Fault 18: There is blue shade colour picture with OK Sound

Fault Insertion1: Remove the shorting shunt from pin no. 1 & 2 and connect it between 2 & 3 of jumper J23

Fault Insertion2: Remove the shorting shunt from pin no. 1 & 2 and connect it between 2 & 3 of jumper J24

Symptoms: Sound and picture OK only screen has blue colour shade.

Fault Section: Video and Chroma section.

Procedure:

·Check pin no. 21 of IC501 it should be 7.2V approximately, if not present, IC may be faulty

·Check this voltage at R terminal, if it is not then,

There may be track open between pin no. 21 of IC501 & R terminal.

·Check pin no. 20 of IC501 it should be +7.2V approximately (if not then IC may be faulty) if OK then,

·Check this voltage at G terminal. If it is not then there may be track open between pin no. 20 of IC501 & G terminal

Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J24

Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of jumper J23

Result: Now proper picture with sound is observed.

Fault 19: There is green colour picture**.**

Fault Insertion1: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J25

Fault Insertion2: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J24

Symptoms: Sound and picture OK only screen has Green colour shade.

Fault Section: Video and Chroma section.

Procedure:

·Check pin no. 22 of IC501 (IC7698) it should be + 7.2V approximately, if it is not then IC may be faulty.

·Check circuit of pin no. 22 of IC501 (B-Y output) it should be + 7.2V approximately at B terminal (Berg strip pin), if it is not then, There may be track open between this B terminal and pin no. 23 of IC501

·Check pin no. 21 of IC501 it should be 7.2V approximately, if not IC may be faulty

·Check this voltage at R terminal, if it is not then, There may be track open between pin no. 21 of IC501 & R terminal

·Remove the shorting shunt from pin 2 & 3 place it between 1 & 2 jumper J25, if, it is not proper then,

·Remove the shorting shunt from pin 2 & 3place it between 1 & 2 of jumper J24

Result: Proper picture with sound is observed.

Fault 20: There is red colour shade picture.

Fault Insertion1: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J25

Fault Insertion2: Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J23

Symptoms: Sound and picture OK only screen has red colour shade.

Fault Section: Video and Chroma section.

Procedure:

·Check pin no. 22 of IC501 (IC7698) it should be + 7.2V approximately, if, it is not then IC may be faulty.

·Check circuit of pin no. 22 of IC501 (B-Y output) it should be +7.2V approximately at B terminal (Berg strip pin), if it is not then, There may be track open between this B terminal and pin no. 22 of IC501.

·Check pin no. 20 of IC501 it should be +7.2V approximately (if not then IC may be faulty) if OK then, check this voltage at G terminal. If it is not then, There may be track open between pin no. 20 of IC501 & G terminal.

·Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J25, if it is not proper.

·Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J23.

Result: Proper picture with sound is observed.

Conclusion:

Faculty Signature

Experiment 8

Date:

AIM:

To check various test point and fault finding procedure in Horizontal oscillator and horizontal output section in colour TV trainer 2651.

Objective:

By using different jumper position, check the test point and fault simulation in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

Theory:

Horizontal Oscillator:

Pin no. 40 of IC501 (CD7698) supplies the composite sync signal to pin no. 37 (Sync Separator) of this IC through the circuit of R301 (750W), R302 (560K), capacitor C301 (1mF), C302 (.01mF), C303 (560PF) R513 (15K) and diode D301 (IN4148). Sync separator section separates the horizontal sync and vertical sync. Horizontal sync signals are supplied to AFC section in built in IC from sync separator section. This horizontal section produces the signal of frequency 15625 Hz. These signals are fed to burst gate inside the IC and also to phase detector section at pin no. 35. At pin no. 35 fly back pulses are supplied from pin no. 10 of EHT through resistance R402 (27K), C402 (.47mF) R403 (3.9K). The phase detector section compares the phase and frequency of horizontal sync pulses and fly back pulses and difference control voltage is produced. This control voltage is responsible for constant frequency 15625 Hz of horizontal oscillator. for controlling the frequency of horizontal oscillator horizontal hold circuit is used which is made up of R410 (15K), R406 (150K), C405 (3KPF) and VR451 (10K). This tuned circuit is connected with pin no.34 of IC7698. On varying the horizontal hold preset the voltage at pin no. 34 is varying which affects the frequency

produced by horizontal oscillator. For working of horizontal oscillator section positive supply is given at pin no. 33 of IC7698. Here voltage is supplied from +110V supply by resistance R416 (6K8). When horizontal output section is working then 12V supply is converted in to DC by R448 (6R2, 2W), D408 (BY159) and passed through R30 (3K3) and diode D1 (IN4148) and obtained at pin no. 33 of this IC. Pin no. 30 and 31 are the negative supply pins which are grounded.

Horizontal Driver:

IC501 gives the Horizontal drive signals at pin no. 32. These signals are fed to the base of Horizontal driver transistor T402 (C2310) through coil L407 (1mH), and resistance R 411 (33W). At Collector, amplified signals are obtained. It goes to the primary coil of horizontal driver transformer. From secondary of this transformer signals are fed to the base of horizontal output transistor Q404 (BU508DF). At one end of horizontal driver transformer primary coil, + 110V is supplied by resistance R416A (1.5K) which reach up to the collector of horizontal driver, transistor through the other end of primary emitter of horizontal driver transistor is directly grounded.

Horizontal Output Section:

This section includes one transistor and EHT transformer. From secondary of horizontal driver transformer signals are fed to the base of horizontal output transistor Q404 (BU508DF). Its collector gets the positive supply from primary winding pin no. 1 and 5 of EHT transformer and R410A (1W, 1W). Its emitter is directly grounded when Q404 gets the signal of frequency 15,625 Hz then it works as a switch, when it is ON then current is flowing through Pin no. 1 and 5 of EHT transformer and for 'Off' there is no current. In this way this transistor works as a current supplier for limited time for the time gaps. Because of this time gaps current pulses are also produced. The frequency of these pulses is also 15,625 Hz. EHT works on these current pulses. This induced current in primary produces voltage in secondary coil; this signal is fed to the horizontal yoke coil. The function of yoke coil is electron beam spreading in left and right direction on picture tube screen.

Test points:

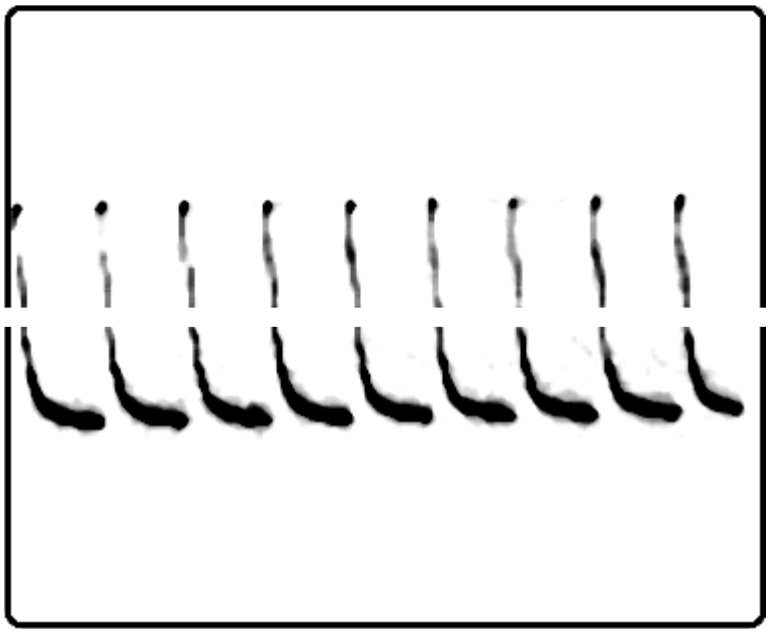
TP5 Red Horizontal output section +110V (approximately)

TP6 Red Horizontal output section +12V (approximately) for VIF Section

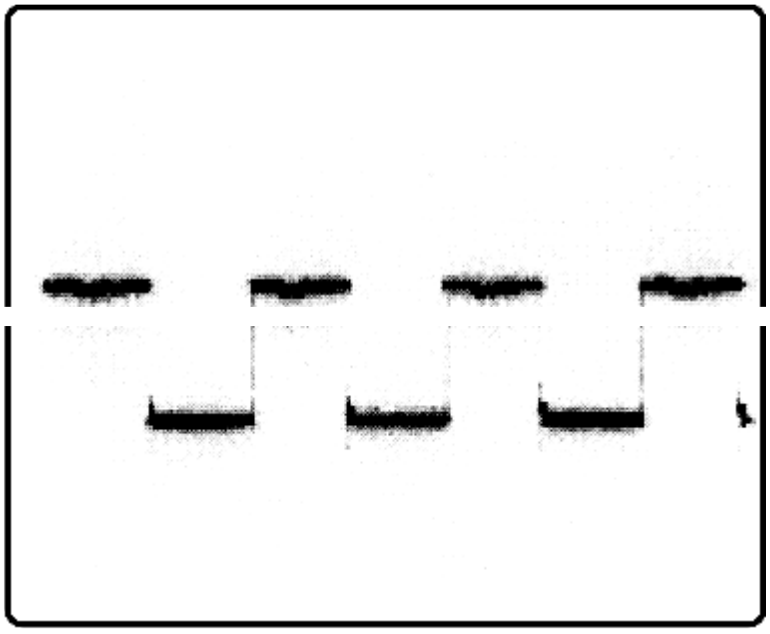
TP7 Red Horizontal output section +185V (approximately) for R-G-B video output section (CRT base PCB)

TP8 Red Horizontal output section Filament Voltage 6.3V AC (approximately)

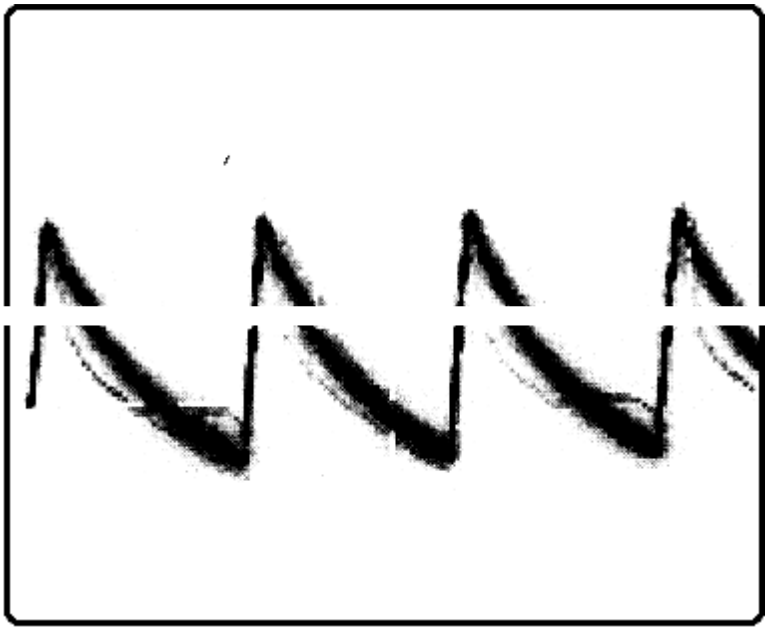
TP27 Red Horizontal Oscillator Ident (Sync) signal part of Video & Chroma IC501



TP30 Red Horizontal Oscillator Horizontal driver signal part of Video & Chroma IC501



TP35 Red Horizontal Oscillator fly back pulse part of Video & Chroma IC501



TP36 Red Horizontal Oscillator Input for Sync. Separator part of Video & Chroma IC501 (composite colour video signal)

TP40 Blue Horizontal output Horizontal blanking pulse

Fault Simulation:

Fault 21: There is no clear picture on the screen and screen is shaking horizontally.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J11.

Symptoms: Clear sound without clear picture. Horizontal shaking is present on the screen.

Fault section: Horizontal output section

Procedure:

· Check fly back pulse of frequency 15625 Hz at pin no. 35 of IC501 (IC7698) if not then,

· Check this fly back pulse at resistance R402 (27Kohm) if it is not then, Track may be open between pin no. 10 of EHT and this resistance.

· Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J11.

Result: now you should get fly back pulse of frequency 15,625 Hz at pin no. 35 of IC501 and so good picture with good sound is observed.

Fault 22: Dark Screen, (Neither Raster nor snow) No sound

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J12.

Symptoms: There is no picture no sound condition even raster or snow are also absent.

Fault section: Horizontal output section

Procedure:

· First check whether LED for power indication is glowing or not, If it is not then,

· Check AC mains cord and fuse of trainer kit, if LED is glowing then,

· Check +110V at TP5 if it is OK

· If it is not then it may be problem of regulation circuit which should be serviced by service personal only

· Then check pin no. 33 of IC501 (IC7698) it should be 6.9V approximately

· Check pin no. 32 of IC501 it should be 15625 Hz (Horizontal frequency) if it is present then,

· If not then IC501 may be faulty or related circuit may be faulty Check the same signal at R411 (33ohm) it is OK then,

· Check same signal at base of transistor Q402. If it is not then, Track may be open between base of Q402 and resistance R411.

· Remove the shorting shunt from Pin 2 & 3 and place it between 1 & 2 of jumper J12.

Result: Now you should get good picture with good sound.

Fault 23: Set Dead i.e. Dark Screen

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J22

Symptoms: There is no picture no sound from trainer kit.

Fault Section: Horizontal Oscillator Section (part of Video& chroma IC501)

Procedure:

· First check whether LED for power indication is glowing or not.

· If it is not then check AC mains cord and fuse of trainer kit. If it is OK then,

· Check +110V at TP5 if not then it may be the problem of regulation circuit which should be serviced by service personal only

· Check 6.9V approximately at pin no. 33 of (IC7698). If it is OK then,

· Check horizontal frequency at pin no. 32 of IC501 it is 15625 Hz. If it is OK then,

· If it is not then that may be the fault of IC or related circuitry

· Check this signal at base of Q402, if it is not then,

· Track may be open between pin no. 32 of IC501 and base of Q402.

· Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J22.

Result: Now you should get picture & sound both from the trainer kit.

Fault 24: Horizontal sync out

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J20

Symptoms: Horizontal sync is not adjustable (Preset VR451)

Fault Section: Horizontal Oscillator

Procedure:

· Check the signal at pin no. 39 of IC501 If it is OK then,

· Check the inverted video signal at pin no. 40 of IC501, If it is OK then if it is not then IC may be faulty

· Check the video signal at pin no. 37 of IC501. If it is not then IC may be faulty.

· If it is OK then components connected between pin no. 37 and 40 of IC501 are faulty. If these are OK then,

·Track may be open between pin no. 37 and 40 of IC501.

·Remove the shorting shunt from pin 2 & 3 and connect it between 1 & 2 of Jumper J20.

Result: You should get clear picture.

Fault 25: Dark Screen & OK Sound

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J15

Symptoms: Power indicators are glowing & all voltages are OK, but No picture sound. is OK.

Fault Section: Horizontal Output Section.

Procedure:

·Check the voltage at TP3 & TP5 (110V DC approximately). If it is OK then,

·Check the voltage at TP34 (8V approximately). If it is OK then,

·Check the voltage at TP7 (185V DC approximately).

·If the above mentioned voltages are present, then EHT is working properly.

·Check the filament voltage at TP8 (6.3V AC approximately). If it is present.

·Either CRT may be faulty or the connection between CRT (Pin no. 9) & TP8 is open.

·Remove the shorting shunt between 2 & 3 & connect it between 1 & 2 of jumper J15.

Result: Now you should get Raster/snow and sound.

Fault 26: Dark Screen.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J13

Symptoms: Power indicator is glowing, but no picture & no transmitting sound.

Fault Section: Horizontal output section.

Procedure:

·Check the voltage at TP3 it should be 110V DC(approximately) if it is OK then,

·Check the voltage at TP5 it should be 110V (approximately), if it is not there then. Check the voltage at TP34 8V approximately if it is not present then,

·It means horizontal output section is dead & there may be open track between TP3 & TP5.

·Remove the shorting shunt from 2 & 3 connect it between 1 & 2 of jumper J13.

Result: Now you should get picture & sound.

Fault 27: Negative type picture (dull picture)

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J14

Symptoms: Picture without contrast.

Fault Section: Horizontal output section.

Procedure:

·Check the voltage at TP7; it should be 180V DC approximately If it is not then,

·Check the voltage at D406, it should be 180V approximately If it is OK then,

·There is no continuity of track between D406 & TP7

·Remove the shorting shunt from 2 & 3 connect it between 1 & 2 of jumper J14.

Result: Now you should get proper picture.

Fault 28: Retrace line on picture.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J16

Symptoms: Picture and sound OK. But retrace line on the picture

Fault Section: Horizontal output section.

Procedure:

·Check the luminance signal at pin no. 23 of IC501it should be 6 Vpp, if it is not present then,

·Check the vertical blanking pulses at D202. If it is not present then, It means signal is present without blanking pulses or the components between TP31 and D202 are faulty or track may be open.

·Remove the shorting shunt from 2 & 3 and connect it between 1 & 2 of jumper J16.

Result: Now you should get picture without retrace.

Conclusion:

Faculty Signature

Experiment 9

Date:

AIM:

To check various test point and fault finding procedure in Vertical oscillator and output section in colour TV trainer 2651.

Objective:

By using different jumper position, check the test point and fault simulation in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

Theory:

Vertical Oscillator:

Vertical oscillator is also built in IC501 (CD7698) & pin no. 24, 25, 26, 27, 28, 29 are its connection pins. As we have already studied that vertical sync signal is present at pin no. 36 after sync separation. The vertical sync signal from pin no. 36 passes from circuit network of R304 (10K), R330 (3K), R305 (2.4K) and capacitor C310 (.47mF) and obtained at pin no. 28. Vertical oscillator produces 50 Hz frequency which is amplified inside the IC and available at pin no. 24 which is vertical driver pin. This vertical driver signal from pin no. 24 is fed to base of vertical driver transistor Q303 (C2229) by resistance R325 (330W). Collector of this transistor provides amplified output which is supplied to vertical output section for amplification.

Vertical Output:

Vertical driver signal is given to the vertical output section. In vertical output section two push-pull transistors are used. One is NPN transistor Q306 (C2073) and another one is PNP transistor Q307 (A940). Vertical signal from the collector of vertical driver transistor Q303 (C2229) are fed to the base of both vertical output transistors Q306 and Q307. Pin no. 8 of EHT transformer provides the positive supply to vertical output

section. There is approximately 36V AC at pin no. 8 of EHT transformer. It is rectified by R327 (10W, 2W) and diode D302 (BY159) and supplied to vertical output section by R355 (27R) and R317 (680W). Capacitor C311 (330mF) is filter capacitor of this supply. Amplified signal after amplification is obtained at common point of both the emitters of both vertical output transistors Q306 & Q307. This signal is fed to vertical yoke coil by capacitor C316 (330mF).Other end of vertical yoke coil is grounded by resistance R323 (1R8, 1W). The same end of vertical yoke coil provides the vertical feedback to pin no. 26 of vertical oscillator section by C317 (4.7mF / 63V) and R321 (1KW)

Vertical Height Control:

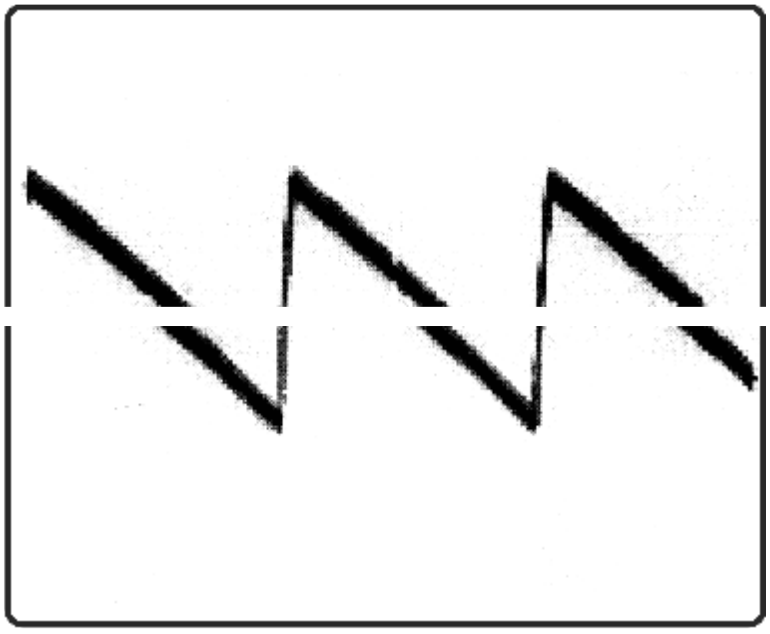
At pin no. 27 of IC501 (CD7698) vertical height control is connected. VR225 (47K) is vertical height adjustment preset and from its centre point vertical linearity preset is connected which is VR316 (10K).Pin no. 40 of IC50

Test point:

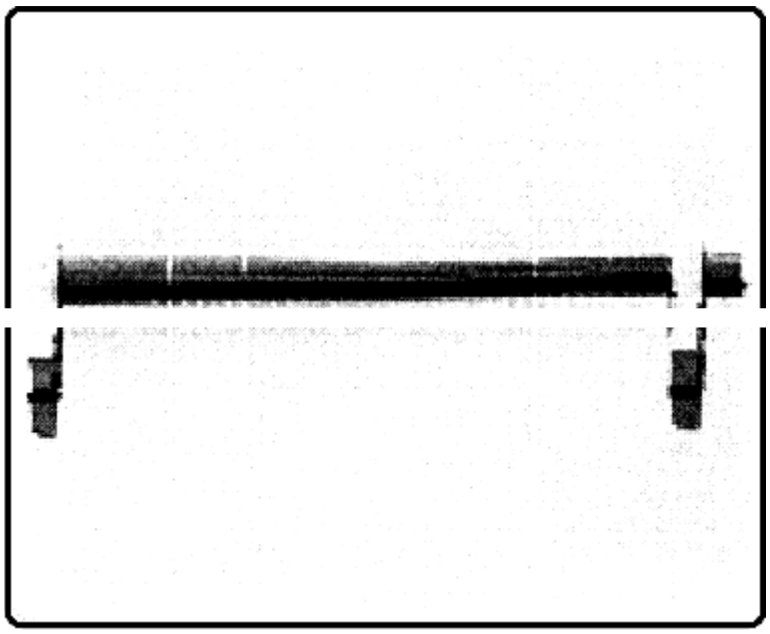
TP11 Red Vertical Output V Yoke

TP12 Red Vertical Output V Yoke

TP32 Red Vertical oscillator Vertical feedback Part of video & Chroma IC



TP33 Blue Vertical Oscillator Vertical driver Part of Video & Chroma IC



TP41 Red Vertical output section +17 V (approximately)

Fault Simulation:

Fault 29: There is Horizontal Line on the screen.

Fault Insertion: Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J18

Symptoms: No picture OK sound. Only Horizontal line is present on the screen.

Fault Section: Vertical oscillator (part of video & chroma IC501)

Procedure:

· Check vertical frequency of 50 Hz at pin no. 24 of IC501 (IC7698) if it is OK

then,

· If it is not then IC or related circuit may be faulty

· Check this signal at base of transistor Q303, if it is not then

· Faulty R325 or track may be open between pin no. 24 of IC501 and base of Q303.

· Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J18.

Result: Now you should get picture on the screen.

Fault 30: Bottom fold over the picture on the screen.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J17

Symptoms: The 90% of picture screen is OK only bottom side 10% picture is folded over on the original picture.

Fault Section: Vertical output Section.

Procedure:

· Check output of the vertical driver pin no. 24 of IC501 It is vertical frequency of 50 Hz. If it is OK then,

· Check output of vertical output section at R333 (1R). It should be amplified signal. It is not correct then,

· Faulty components in its circuit or ground may be open.

· Check R313 (15K) and its ground connection.

· Remove the shorting shunt from pin 1 & 2 and connect it between 2 & 3 of jumper J17.

Result: Now you should get clear picture.

Conclusion:

Faculty Signature

Experiment

10

Date:

AIM:

To study of fault simulation and step by step fault finding procedure in Sound output section in colour TV trainer 2651.

Objective:

By using different jumper position, simulate fault in colour TV trainer.

Apparatus:

- Colour television trainer Scientech 2651.
- Probes. Multi meter

Theory:

Colour TV trainer Scientech 2651 uses most commonly used sound amplifier ICTDA 2611. In our circuit it is IC601. As we have already studied that audio signals are available at pin no. 3 of IC101 (CD7680)-which is supplied to base of audio amplifier transistor Q601 (2SA 1015) by capacitor C608 (10mF/63V) Resistance RS1 (10K), R102 (2.2K). Collector of transistor Q601 (25A1015) gives amplified signals. This amplified signal is fed to pin no. 7 of sound output by resistance R605A (4.7K) and C605 (.1mF).Audio signals are amplified up to the sufficient level by this IC and obtained at pin no. 2 of this IC. It is provided to speaker by a capacitor C601 (470mF, 16V), pin no. 1 of IC601 is positive supply pin. SMPS transformer in power supply section provides AC voltage from pin no. 2 which is rectified by diode D810 (BY159) 22V approximately voltage is obtained which is given to pin no. 1 of IC1601 (TDA2611).Pin no. 4 of IC601 is grounded. Other pins 3, 5 and 9 are no contact pins or not connected pins.

Fault Simulation:

Fault 31: There is no sound from speaker.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J9

Symptoms: Good Picture on the screen but without sound.

Fault Section: Sound Section.

Procedure:

·Check power supply +20V at pin no. 1 of IC601 (IC2611) if it is OK then,

·Check audio input signal at pin no. 7 of IC601 it should be low gain audio signal. If it is OK then,

·Check audio output signal at pin no. 2 of IC601 it should be amplified audio signal. If it is OK then,

·If it is not then IC may be faulty

·Check this amplified audio signal at speaker pin (connected with speaker)

·If it is not then track may be open between IC601 (pin no. 2) and speaker pin, if it is OK then speaker may be faulty.

·Remove the shorting shunt from pin 1 & 2 and place it between 2 & 3 of jumper J9.

Result: Now you should get (sound) audio signal from speaker.

Fault 32: No sound but good picture.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J10

Symptoms: Sound is not present but good picture.

Fault Section: Sound section.

Procedure:

·First check the speaker, if it is OK then,

·Check the voltage of IC601 at Pin no. 1 it should be 20V approximately, if it is not present then,

·Check the voltage of D810 it should be 20V approximately If it is OK then,

·Check the continuity of track between D810 & IC601 at pin no. 1 if no continuity present then,

·Remove the shorting shunt between 1 & 2 connect it 2 & 3 of jumper J10.

Result: Now you should get sound.

Fault 33: Very low sound. But ok picture.

Fault Insertion: Remove the shorting shunt from pin 2 & 3 and place it between 1 & 2 of jumper J8

Symptoms: Sound is not varying by the volume control but OK picture.

Fault Section: Sound section.

Procedure:

·First check the audio at the base of Q601 by touching any metallic thing like screw driver.

·Check the SIF signal of IC101 at Pin no. 3, if it is OK, then

·Check SIF signal at Base of transistor Q601, if it is not then

·Transistor may be faulty or track may be open between Pin no. 3 of IC101 and Base of Transistor Q601

·Remove the shorting shunt between 1 & 2 and connect it 2 & 3 jumper J8

Result: Now you should get volume variation.

Conclusion:

Faculty Signature