DESCRIPTION OF CIRCUIT OF RF-MODULATOR SECTION OF 3IN1 RF-UNIT ASSY "TMLH2-006,-032A"

This RF-Modulator Section of 3in1 RF Unit-Assy "TMLH2-006,-032A" can convert base band signal to RF output channel of 3 or 4 of USA.

ALPS

ALPS ELECTRIC CO., LTD.
RF DEVICES DIVISION

RF-Modulator Section 3in1 RF Unit-Assy
Technical Specifications Detail.

SCOPE-

The device, type TMLH2-006 consists of RF-modulator (RF-converter) and Antenna switch (RF switch). when power source is not supplied to the unit, the output signal of RF-modulator is not generated and TV signals to be supplied to the ANT input terminal is let to the TV output terminal through the RF switch.
In this case, RF switch (TR2, TR3) shall work as a high pass filter (C50 to C56, and L10 to L15, fc=54MHz). when power source is not supplied ,the output signal of the RF modulator is let to the TV output terminal through the RF switch (TR1), but TR2 to TR3 of the switch cut off the signal and do not lead it to the ANT input terminal.

1) Type of Emission
   Video Modulation Type : A5c
   Polarity of Video Modulation : Negative
   TV System : N.T.S.C
   Audio Modulation Type : F2, ±25kHz, 75 μs pre-emphasis.

2) Output Frequency Range
   Low ch : VHF Channel 3, (60MHz to 66MHz)
   High ch : VHF Channel 4, (67MHz to 72MHz)
   CH SW terminal is for switching RF Output channel.
   If switch to Low ch with open and High ch with GND.

3) Range of Operating Power
   Fixed Power Range : 63dB(μV) to 69dB(μV), 66.0dB(μV) typ.
   Means Provided for Changing of Operating Power : Not-Applicable.

4) Maximum Power Rating (INTO 75Ω)
   Low ch : 69.5dB(μV)
   High ch : 69.5dB(μV)

5) Voltage and Current to Modulator
   Voltage : 5V DC.
   Current : 30mA typ.

6) Function of Active Circuit Devices
   IC 1 : Video Clamper, White Clip.
   Video Amplitude Modulator, Video Carrier Oscillator.
   Audio Buffer Amplifier, Audio Frequency Modulator, Audio Carrier Oscillator.
   TR 1 : RF Switching (Converter output)
   TR 2 and TR3 : ANT Switching (IN/OUT)

Type of Devices
IC 1 : HA11585FP(HIATCHI) or Equivalent.
TR1 to TR3 : 2SC4713K(RHOM) or 2SC4680(HITACHI) or 2SC4212(RHOM) or Equivalent.

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The video carrier is made by the video carrier from LC oscillator of IFT (T1,T2) and chip C (C4,C5). Then the video carrier is supplied to the video modulator (IC).
The video to signal to supplied to R1 to R3 having input impedance. Then the video signal is supplied to Clamp (IC) and DC clamped. Then the DC clamped video signal supplied to white clip (IC) and supplied to the video modulator (IC) and the video carrier is amplitude modulated by the video signal.
The video modulator signal is picked up with R11 and supplied to ANT output terminal through the band pass filter (C14 to C16 and Lf1) and RF switch (TR1).
The Audio signal is supplied to C10 and R6,R7 having 75 μ S pre-emphasis time constant.
Then the audio signal is supplied to the amplifier (IC) and the 4.5MHz oscillator is adjusted by T3, both are supplied to audio FM modulator and the 4.5MHz oscillator is frequency modulated by this signal. The frequency modulated signal is supplied to modulator and converted to the sound RF signal.Then this signal is picked up and added to video modulated signal (Picture RF signal). RF switch (TR2 to TR3) can attenuate the RF output signal enough to the ANT input terminal both from the ANT output terminal and RF modulator. output.

7) Tune up procedure over the Power range or at specifications Operating power level Not Adjustable (*)

* The consumer can not adjust it.
* Tune up procedure

R1~R3 : Video Modulation (Degree) Adjust.
R7 : Audio Modulation (Degree) Adjust.
T1 : Low channel Video Carrier oscillator Frequency Adjust.
T2 : High channel Video Carrier oscillator Frequency Adjust.
T3 : 4.5MHz Inter Carrier Frequency Adjust.

8) All Circuitry and Devices provided for Determining and Stabilizing Frequency
The video carrier of LC oscillator is used. Composition for the Capacitor of C4,C5 (Temperature compensation for type LH) and IFT of T1,T2 with schematic.
The audio carrier is produced from LC oscillator, capacitor of C12 or the schematic, have suitable temperature coefficient like LH and other in order to compensate terminal frequency drift.

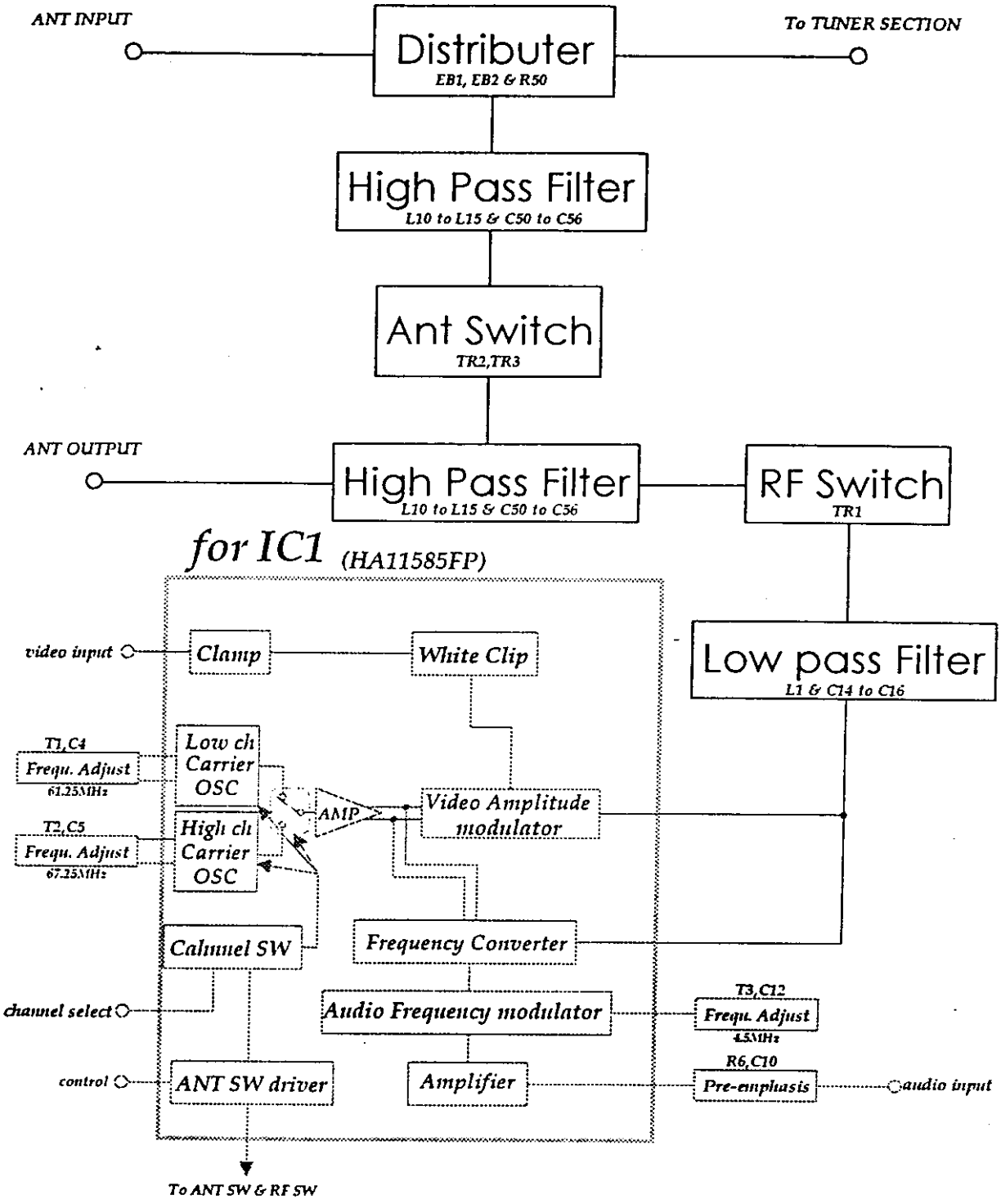
9) Any Circuitry and Devices Employed for Suppression of Spurious Radiation, for limiting the Operating Power

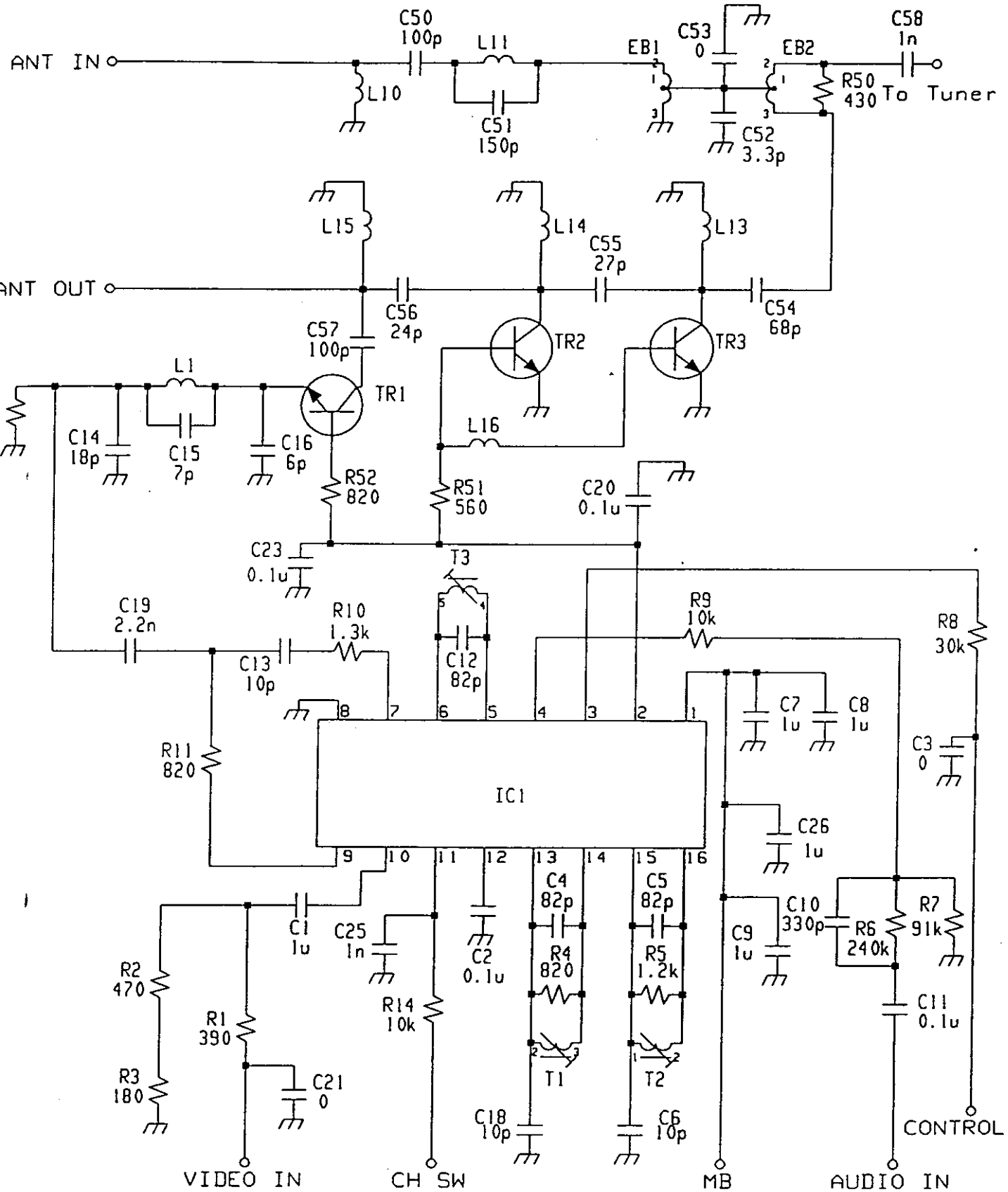
a) Suppression of Spurious Radiation
On the RF OUTPUT, there is low pass filter to suppress spurious.
b) Limiting the Operating Power
The modulation degree is set with R11 (Video) and R10 (Audio).

10) Block Diagram and Circuit Diagram
Attached.

11) Limiting Spurious

a) The oscillator circuit is to get as small as possible the oscillator power.
b) Low pass filter in output circuit to suppress outband spurious.
c) Entire circuit board is covered and shielded by metal case.


ANT INPUT
Distributer
EB1, EB2 & R50
To TUNER SECTION
High Pass Filter
L10 to L15 & C50 to C56
Ant Switch
TR2,TR3
ANT OUTPUT
High Pass Filter
L10 to L15 & C50 to C56
RF Switch
TR1
for IC1 (HA11585FP)
video input
Clamp
White Clip
Low pass Filter
L1 & C14 to C16
T1,C4
Frequ. Adjust
61.25MHz
Low ch Carrier OSC
T2,C5
Frequ. Adjust
67.25MHz
High ch Carrier OSC
AMP
Video Amplitude modulator
Channel SW
Frequency Converter
channel select
Audio Frequency modulator
T3,C12
Frequ. Adjust
4.5MHz
control
ANT SW driver
Amplifier
R6,C10
Pre-emphasis
audio input
To ANT SW & RF SW



PROVISIONAL DRAWING

ALPS

TUNER, RF / TU / IF

TYPE 115-V-A095AQ
(VA095AQ)

(For UL and FCC Applications)

CONTENTS:

SANYO Tuner Industries Co., LTD.
1-1, SANYO-CHO, DAITO CITY,
OSAKA, JAPAN

APPROVED	CHECKED	CHECKED	WRITTEN
Oct. 27, '98	—	Oct. 27, '98	Oct. 27 '98
F. Kakeki		H. Takagi	H. Miyauchi

仮 称	VA095AQ
月／日	1998.10.27
改 正	

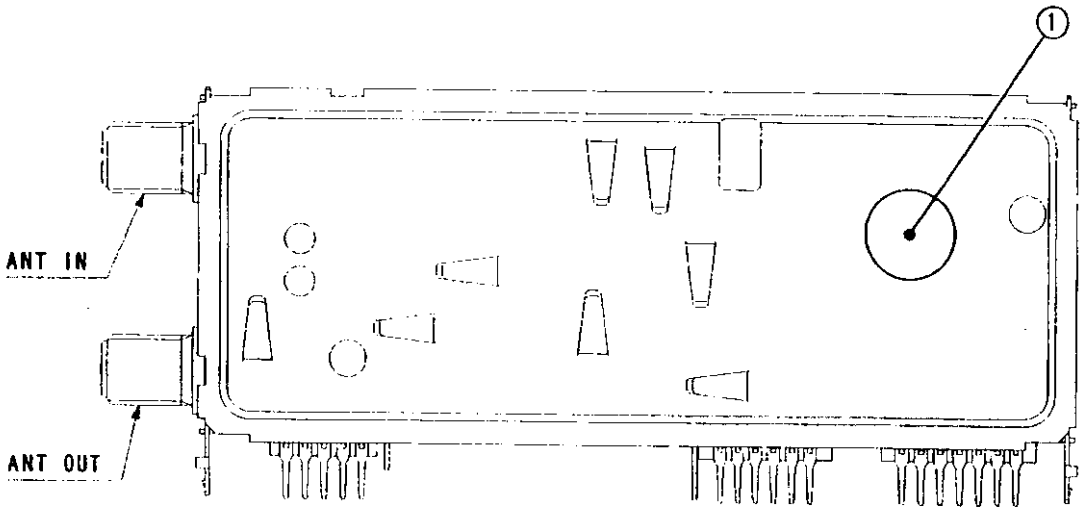
Series T - 364

PROJECT DEVICE TUNER, RF/TU/IF MFR.

MODEL NO. 115-V-A095AQ (VA095AQ) DATE

Component Part	SANYO Type NO.	Material Used			Flame Class		Hot Bar		Hot Wire		High Amp Arc		CTI		UL File No.	Application
		Generiec ID	Type	Mfr	Reqd	Used	Reqd	Used	Reqd	Used	Reqd	Used	Reqd	Used		
INTED WIRING BOARD		EPOXY GLASS RESIN ⇒	KPC 6294V-0	KYOTO PRINTED CIRCUIT CO., LTD.		94V-0									E55888	UL796
				(symbol mark: KPC 6294V-0)												
		(MATERIAL : MATSUSHITA ERECTRIC WORKS, LTD : R-1781)				94V-0			120			200		600	E81336	
			TCI A48S	TAI HONG CIRCUIT IND. CO., LTD.		94V-0									E58528	UL796
				(symbol mark: TCI-A48S)												
		(MATERIAL : NANYA PLASTCS CORPORATION : CEM-3-86)				94V-0			120			200+			E98983	
			JTE 020V-0	TAI JING ELECTRONICS INC.		94V-0									E55879	UL796
				(symbol mark: JTE-020V-0)												
		(MATERIAL : SUMITOMO BAKELITE CO., LTD : ELC-4970)				94V-0									E95831	

x shows material being used.



	仕様書番号
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5	

RF Modulator Technical Specifications Detail

SCOPE

The devise, type 115-V-A095AQ consists of RF modulator (RF converter) and Antenna switch (RF switch). When control switch is OFF (supply 0V or open), the output signal of RF modulator is not generated and TV signals which is supplied to the ANT input terminal is let to the ANT output terminal through the RF switch.
In this case, RF switch (Q1 and Q2) shall work as a high-pass filter (C19 to C22 and L4 to L7, fc = 54MHz).
When control switch is ON (supply +5v DC), the output signal of the RF modulator is let to the ANT output terminal through the RF switch (D1) but Q1 and Q2 of this switch cut off the signal and do not lead it to the ANT input terminal.

1) Type of Emission
   Video Modulation Type : A5c
   Polarity of Video Modulation : Negative
   TV System : N.T.S.C.
   Audio Modulation Type : F3, ±25KHz, 75μS pre-emphasis

2) Output frequency Range
   Low CH : VHF Channel 3, (60MHz to 66MHz)
   High CH : VHF Channel 4, (66MHz to 72MHz)

3) Range of Operating power : Fixed, 66.5dBμ Typ.
   Means Provided for changing of Operating Power : Not Applicable

4) Maximum Power Rating (Into 75 ohms)
   Low CH : 69dBμ
   High CH : 69dBμ

5) Voltage and Current to Modulator : 5V DC, 30mA typ.

6) Function of Active Circuit Devices

IC1 : Video Clamper, Video Clipper, Video Amplitude modulator, RF Carrier Oscillator, Audio Buffer Amplifier.
FM modulator, Audio Carrier Modulator

D1, Q1, Q2 : RF Switcher

Type of Devices

IC1 : HA11585FP (HITACHI) or Equivalent

Q1 to Q2 : 2SC4713K (ROHM) or Equivalent

D1 : DAN217 (ROHM) or Equivalent

The video carrier is made by the RF carrier oscillator (IC). Then the RF carrier is supplied to the video modulator (IC) and the audio carrier modulator (IC).
The video modulator signal is picked up with R9 and supplied to the ANT output terminal through the low-pass filter (C15 to C17 and L2) and RF switch (D1).
The audio signal is supplied to C4, R3 having 75μS pre-emphasis time constant. Then the audio signal is supplied to the FM modulator (IC).
The frequency modulated signal is supplied to audio carrier modulator (IC) and converted to the SOUND RF SIGNAL. Then this signal is picked up with R10 and added to video modulator signal (PICTURE RF SIGNAL).
RF switch (Q1 and Q2) can attenuate the RF output signal enough to isolate the ANT input terminal both from the ANT output terminal and RF modulator output.

7) Tune Up Procedure over the Power Range or at Specific Operating Power Level : Not Adjustable (※)

※ The consumer can not adjust it.

※ Tune Up procedure :

L1 : 4.5MHz Frequency Adjust.

L3 : Video Carrier Frequency Adjust.

8) All Circuitry and Devices Provided for Determinating and Stabilizing Frequency :

The video carrier is produced from L. C oscillator.

Capacitor of C10 and C12 on the schematic. have suitable temperature coefficient like PH and other to compensate terminal frequency drift.

The audio carrier is produced from L.C oscillator, Capacitor of C3 on the schematic. have suitable temperature coefficient like RH and other to compensate terminal frequency drift.

9) Any Circuitry or Devices Employed for Suppression of Spurious Radiation, for Limiting the Operating Power :

a) Suppression of Spurious Radiation

On the RF OUTPUT, there is low-pass filter to suppress spurious.

b) Limiting the Operating Power

The modulation degree is set with R6, R7 (Video)

and R1, R2 (Audio).

10) Block Diagram and Circuit Diagram : Attached.

UHF - NOISE FIGURE

Model: Toshiba M785

Chassis: 99 NTSC

Tuner: TMLH2X032A

Date: 14th Oct 1998

Tester: Donnie Wong

Remarks:

CHANNEL	DB
14	11.4
20	11.5
26	11.6
32	11.5
38	11.3
44	10.7
50	10.4
56	10.1
62	10.2
69	10.6
WORST CH.	11.6
AVG.	10.93
STD DEV	0.589
N.F.	12.46

Measuring Procedure : FCC / OST MP-2 (1982) Plan C
Regulation Applied: Part 15 / Subpart B 15.117g (1989)
Limits : 14dB (TV), 18dB (VCR, if using a power splitter)

Remarks :

THOMSON MULTI MEDIA

PRODUCT DEVELOPMENT LABORATORIES, SINGAPORE

EVALUATION & COMPLIANCE LAB (ECL)

UHF - NOISE FIGURE

Model: Toshiba M785

Chassis: 99 NTSC

Tuner: Sanyo 115-V-A095AQ

Date: 14th Oct 1998

Tester: Donnie Wong

Remarks:

CHANNEL	DB
14	9.1
20	9.2
26	9.4
32	9.8
38	10.2
44	11.0
50	11.8
56	11.4
62	10.9
69	10.0
WORST CH.	11.8
AVG.	10.28
STD DEV	0.95
N.F.	12.75

Measuring Procedure : FCC / OST MP-2 (1982) Plan C
Regulation Applied: Part 15 / Subpart B 15.117g (1989)
Limits : 14dB (TV), 18dB (VCR, if using a power splitter)

Remarks :