05 October 1998

DESCRIPTION OF CIRCUIT OF RF-MODULATOR SECTION OF 3IN1 RF-UNIT ASSAY "TMDH2-006A"

This RF-Modulator Section of 3in1 RF Unit-Assay "TMDH2-006A" can convert base band signal to RF output channel of 3 or 4 of USA.

ALPS

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RF-Modulator Section 3in1 RF Unit-Assay

Technical Specifications Detail.

SCOPE-

The device, type TMDH2-006A 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 (C1,C4,C5,C6 and L1,L3,L4,L5, 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, 75μs 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(Hi level) and High ch with GND(Low level).

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 : 35mA 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 : LA7160M(SANYO) or Equivalent.
TR1 to TR3 : 2SC4713K(RHOM) or 2SC4680(HITACHI) or 2SC4212(RHOM) or Equivalent.

The video carrier is made by the video carrier from Hi stability Phase Locked Loop oscillation system of IFT (T1) and chip C (C18). Then the video carrier is supplied to the video modulator (IC).
The video to signal to supplied to R12 to R15 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 & Audio modulator signal is picked up with ATTENUATOR (R6 & R7) and supplied to ANT output terminal through the band pass filter (C10,C11 and C15 and L7) and RF switch (TR1).

The Audio signal is supplied to C26 and R16,R17 having 75μS pre-emphasis time constant.
Then the audio signal is supplied to the amplifier (IC) and the 4.5MHz oscillator is adjusted by Internal PLL oscillation system, 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.

(PLL : Phase Locked Loop)

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

R12,R14,R15 : Video Modulation (Degree) Adjust.
R17 : Audio Modulation (Degree) Adjust.
T1 : Oscillator Coil.
C13 : Picture & Sound Carrier Ratio Adjust.

8) All Circuitry and Devices provided for Determining and Stabilizing Frequency

The Video & Audio carrier of Hi Stability PLL oscillator is used. Composition for the Capacitor of C18 (Temperature compensation for type UJ) and IFT of T1 with schematic.

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 R6 & R7. (Picture & Sound Mixtures Carrier Level)

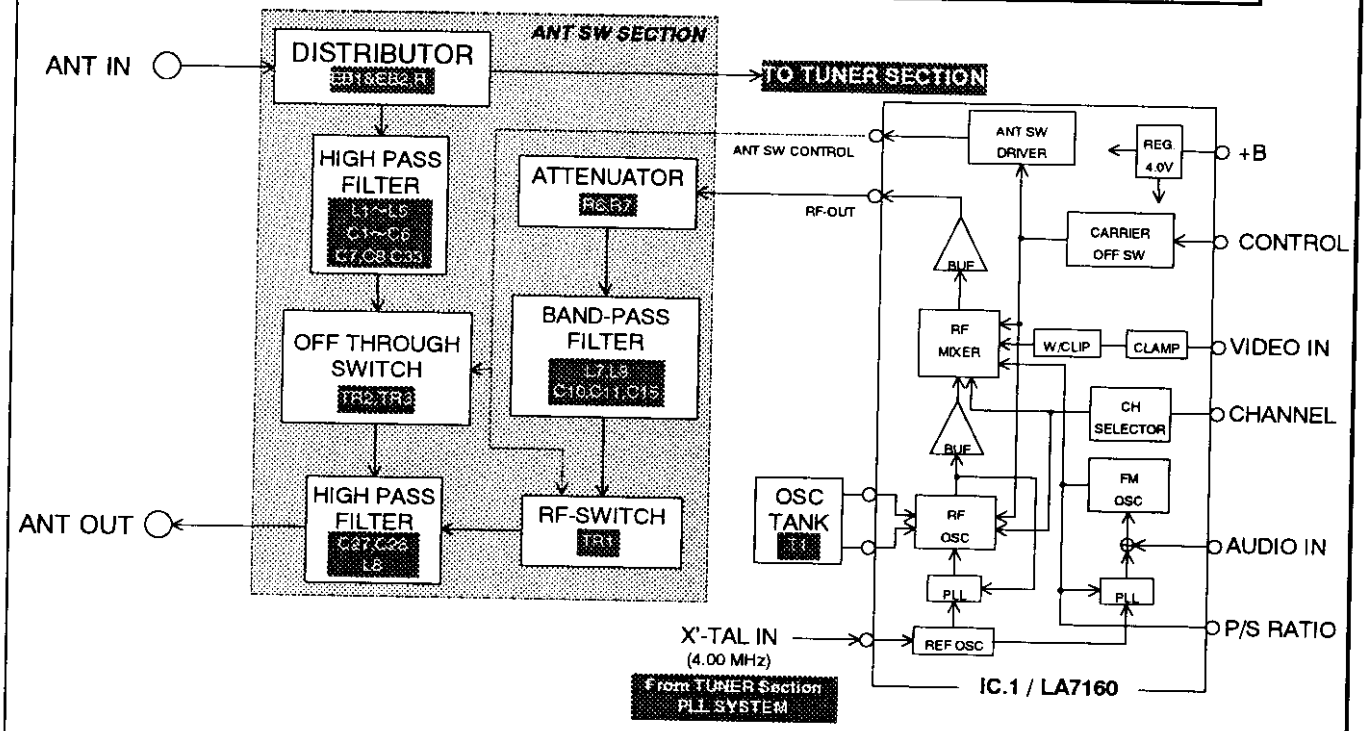
10) Block Diagram and Circuit Diagram

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 out band spurious.
c) Entire circuit board is covered and shielded by metal case.

NTSC 3IN1 TUNER RF-CONVERTERPLL SYSTEM SECTION
BLOCK DIAGRAM FOR IC1(LA7160)



NTSC 3IN1 TUNER RF-CONVERTERPLL SYSTEM SECTION
SCHEMATIC FOR TMDH2-006A