

**SHENZHEN TENA  
ELECTRONICS CO., LTD.**

**PRODUCT  
SPECIFICATION**

MODEL  
**TNF0170U722**

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DESCRIPTION  
**RF modulator**

**TNF0170U722**

**PLL RF MODULATOR WITHANT BOOSTER**

**CUSTOMER APPROVAL**

**Preliminary Specification File  
Under Integrated Circuits : Tuner**

A	Original Release		
REV.	DESCRIPTION	DATE	SIGN
DESCRIPTION <b>RF modulator</b>		APPROVAL DATE	CHECK DATE 01-01-2002
DRAWING NO.			DESIGN DATE 01-01-2002
REVISIONS	PAGES TOTAL <b>7</b>		

**1.0 General Description**

- 1) Transmission system: Europe standard USA System
- 2) Color system: NTSC M ,PAL –G/I/K
- 3) Output channel: 21~69 CH and 14~83 CH (471.25~885.25MHz)
- 4) Output Impedance :75 unbalanced

**2.0 Rating**

- 2.1 Supply Voltage        MOD:+B:5.0+/- 0.2 V  
                                  BST:+B:5.0+/- 0.5 V

**2.2 Current Consumption**

MOD:90 mA max/65 mA typ.  
BST: 55 mA max/38 mA typ.

**2.3 Video input signal voltage**

Stator step 1 Vp-p +/- 1%,V/S:7/3 ,APL=50%

**2.4 Audio input signal voltage**

Sine wave of 1 KHz +/- 5%:-5 dBs (1.24Vp – p +/- 2%)

**2.5 Operating temperature range**

0~60 deg – C

**2.6 Operating humidity range**

less than 85%

**2.7 External shape**

As per product specification drawing

**2.8 Weight**

24 +/- 3 g

**2.9 Storage humidity range**

less than 90%

**3.0 Electrical specifications**

**3-1 Video Characteristics**

NO	ITEM	CONDITIONS	MIN	TYP	MAX	UNIT
3-1-1	Video input impedance	Measurement: 0 to 5 MHz	0.8	1.0	1.2	K
3-1-2	Video Modulation Factor	Input Signal: 1Vp –p White	72	80	88	%
3-1-3	V/S Ratio	Input Signal: 1Vp-p Star Step V/S =7/3	6.7/3. 3	7/3	7.5/2. 7	
3-1-4	Video Amplitude Frequency Characteristics	Measurement Range :0.5 to 0.5MHz Base on 1MHz	-3		+3	dB
3-1-5	Differential Gain	Input Signal: 1Vp-p Stair Step APL 10 to 90 %			10	%
3-1-6	Differential Phase	Input Signal :1Vp-p Stair Step APL 10 to 90 %			10	deg
3-1-7	Video S/N	Measure by video noise meter at the output of standard demodulator Video band width :10KHz to 5MHz 4.43MHz Trap :ON	45			dB

**3-2 Audio Characteristics**

NO	ITEM	CONDITIONS	MIN	TYP	MAX	UNIT
3-2-1	Audio Impedance	Measurement Range: 0.1 to 10 KHz	10			K
3-2-2	Audio Modulation Factor V/S Ratio	Input Signal: -5dBs (1.23Vp-p), 1KHz sin Wave. Modulation 100%=+/- 50KHz condition of Spectrum Analyzer Frequency SPAN/DIV :10KHz Resolution BW :10KHz	G:80 I:80 D:80 M:70	100 100 100 90	120 120 120 110	%
3-2-3	Audio Amplitude Frequency Characteristics	Measurement Range :0.1 to 10KHz The Value Difference From the theoretical Curve of the Pre-emphasis (50 μ sec) is Measure. Base on the Level of 1KHz Base on 1KHz	-3		+3	dB
3-2-4	Audio S/N	Input Color Bar :CCIR (486-2) Filer	42			dB
3-2-5	Audio Distortion	Input Signal: -5dBs,1KHz Sine Wave			3	%

**3-3 Output Signal Characteristics**

NO	ITEM	CONDITIONS	MIN	TYP	MAX	UNIT
3-3-1	Video carrier Frequency Accuracy	Measure the deviated frequency From specified channel	-70	Fp	+70	KHz
3-3-2	Audio carrier Frequency Accuracy	Measure the difference between the video carrier and the audio carrier frequencies. The measurement is taken after 0.5 minutes after the power	-2	M:4500 B:5500 I:6000 D:6500	+2	KHz
3-3-3	Video Carrier output Level	On Modulating	65	71	74	dB μ
3-3-4	P/S Ratio	36CH	-2		+2	dB
		other CH	-3		+3	dB
3-3-5	Output Terminal Spurious Response	Measurement Difference Video Of Carrier Frequency Output Level For 0~1GHz. Except of Fp, Fp+/- Fs,2Fp Against Video Carrier Output Level.			46	dB
3-3-6	Spurious Response Within Band Width				9	dB
3-3-7	Chroma Beat	Video input siganl:0.4Vp-p, 4.43MHz sine wave the value is relative to the level of Fp on video modulation	55			dB
3-3-8	Harmonics Level	Video input : None Measurement Range:900~1750MHz			54	dB μ

**3-4 antenna B00ster Characteristics**

if it is not specified ,measurement range is 47~863MHz,and unused RF terminals should be terminated by nominal impedance terminator

NO	ITEM	CONDITIONS	MIN	TYP	MAX	UNIT
3-4-1	Power Gain	ANT IN ~TV OUT	-2	2	5	dB
3-4-2	Noise Figure	ANT IN ~TV OUT Post Amp. NF:3dB MAX			11	dB
3-4-3	V.S.W.R	ANT IN TV OUT			4	
3-4-4	Inter -Modulation (IM1)	ANT IN ~TV OUT F1=175MHz,F2=230MHz F(M2)=F2-F1 Input level =80 dB $\mu$	50			dB
3-4-5	Inter -Modulation (IM2)	ANT IN ~TV OUT F1=600MHz,F2=650MHz F(M3)=2F2-F1 Input level =80 dB $\mu$	50			dB
3-4-6	ANT IN Leakage				46	dB

**3-5 Thermal Stability**

Unless otherwise specified, thermal stability test shall be performed under the following conditions .

Measurement Range :0~60 .Humidity Range should be within 45 to 65% RH .

Test and Measurement order and time

25 (1H)-0 (1H)-25 (1H)-60 (1H)

NO	ITEM	CONDITIONS	MIN	TYP	MAX	UNIT
3-5-1	Video Modulation Factor	Base on the value of 25 C	-12		+12	%
3-5-2	Audio Carrier Factor	Base on the value of 25 C	-250		+250	KHz
3-5-3	Audio Carrier Frequency	Base on the value of 25 C	-10		+10	KHz
3-5-4	Audio Carrier Output Level	Base on the value of 25 C	-5		+5	dB
3-5-5	V/S Ratio	Base on the value of 25 C			8 / 2	
3-5-6	Differential Gain	Base on the value of 25 C			15	%
3-5-7	Differential Gain	Base on the value of 25 C			15	deg
3-5-8	P/S Ratio	Base on the value of 25 C	-5		+5	dB
3-5-9	Audio Modulation Factor	Base on the value of 25 C	-10		+10	%

3-6 Software information  
I<sup>2</sup>C –BUS Data format

Byte	MSb							LSB	
Address byte (Adr)	1	1	0	0	1	0	1	0	ACK
Control byte (C1)	1	0	SO	0	PS	X3	X2	0	ACK
Control byte (C2)	PWC	OSC	ATT	SFD1	SFD0	0	X5	X4	ACK
Ports byte 1 (PB1)	0	TPEM	N11	N10	N9	N8	N7	N6	ACK
Ports byte 2 (PB2)	N5	N4	N3	N2	N1	N0	X1	X0	ACK

Bus Data Transmission:   Adr+C1+C2+Pb1+Pb2   or  
                                   Adr+ Pb1+Pb2 +C1+C2   or  
                                   Adr+C1+C2                    or  
                                   Adr+Pb1+Pb2

$$N=(F/8) \times (128/4)$$

$$N=2084 \times N11+1024 \times N10+\dots\dots\dots+4 \times N2+2 \times N1+N0$$

3-6-1. WRITE MODE

<b>PS</b>				<b>Picture to Sound Ratio [dB]</b>			
0				12			
1				16 (Recommend)			
<b>SO</b>				<b>Sound Oscillator</b>			
0				Sound Oscillator ON (Normal mode)			
1				Sound Oscillator Disabled (PLL sections bias turned OFF)			
<b>UHF</b>							
<b>OSC</b>				<b>UHF Oscillator</b>			
0				UHF Oscillator Disabled (PLL sections bias turned OFF)			
1				Normal operation			
<b>ATT</b>							
0				Normal operation			
1				Modulator Output Attenuated (Video and Sound Modulators sections bias turned OFF)			
<b>STANDBY MODE</b>							
<b>OSC</b>	<b>SO</b>	<b>ATT</b>	<b>Combination of these 3 bits</b>				
0	1	1	Modulator Stanby mode (Sound & UHF Osc, Sound & Video Mod. Sections bias turned OFF, and 12C bus sections Stanby mode)-BST is active				

3-6-2 SFD1—SFD0:Sound inter frequencies setting,

SFD1	SFD0	Sound inter carrier frequency
0	0	4.500MHz
0	1	5.500MHz
1	0	6.000MHz
1	1	6.500MHz

3-6-3 TPEN: Control of test pattern signal Generator

1.....ON

0.....Off (Normal Operation )

3-6-4 TEST MODE1 :VHF RANGE

X2	X1	X0	RF frequency divided for low frequency tesing or VHF range
0	0	0	Normal operation
0	0	1	RF frequency $\times 1/2$
0	1	0	RF frequency $\times 1/4$
0	1	1	RF frequency $\times 1/8$
1	0	0	RF frequency $\times 1/16$

3-6-5 TEST MODE2 :

X5,X4,X3=0, Normal Operation

3-6-6 PWC

0 peak white clip on

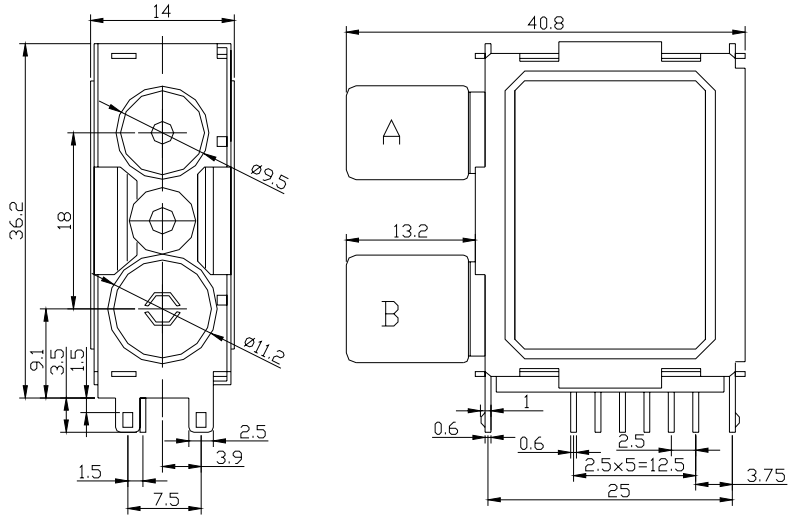
1 peak white clip off

3-6-7 READ MODE

CHIP ADDRESS	1	1	0	0	1	0	1	1	ACK
R-Status byte	-	-	-	-	-	Y2	Y1	OOR	ACK

OOR	
0	Normal operation: VCO is in range
1	VCO is out of range
Y1	
0	VCO is out of range, freq too low ; Only valid if OOR = 1
1	VCO is out of range, freq too high ; Only valid if OOR = 1
Y2	
0	High VCO is active
1	Low VCO is active

**MECHANICAL DIMENSIONS**



UNIT :mm

▽  $\pm 0.2\text{mm}$

PIN	FUNCTION
1	MB+
2	VIN
3	AIN
4	LOP
5	SDA
6	SCL