Hyperband television tuner TUN14447/14452

FEATURES

- VHF/Hyperband/UHF tuners
- Systems CCIR: B/G, H
- Voltage synthesized tuning (VST)
- Off-air channels,S-cable channels and Hyperband
- Compact size
- Comply to “CENELEC EN55020” and “EN55013”

DESCRIPTION

TUN14447/14452 belong to the family of tuner, which are designed to meet a wide range of applications. It is a combined VHF/Hyperband/UHF tuner suitable for CCIR systems B/G and H.
The IF output can drive a SAW filter directly and has capability to drive a asymmetrical load.
The tuners comply with the requirements of radiation, signal handling capability and immunity conforming with:

- CISPR 13 (1990) including. amendment 1 (1992) and amendment 2 (1993)
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- European standards CENELEC EN55013, EN55020

ORDERING INFORMATION

TYPE	SYSTEM	DESCRIPTION
TUN14447	CCIR	asymmetrical IF output; IEC connector (22.5 mm)
TUN14452	CCIR	asymmetrical IF output; IEC connector (22.5 mm)

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INTERMEDIATE FREQUENCIES

SIGNAL	FREQUENCY (MHz)	
	SYSTEM B/G, H	
Picture carrier	38.90	
Colour	34.47	
Sound	33.40	

Note
The oscillator frequency is above the input signal frequency.

CHANNEL COVERAGE

Type	BAND	OFF-AIR CHANNELS		CABLE CHANNELS	
		CHANNELS	FREQUENCY RANGE (MHz)	CHANNELS	FREQUENCY RANGE (MHz)
TUN14447 TUN14452	Low band	E2 to Z	48.25 to 83.25	S01 to S9	69.25 to 161.25
	Mid band	E5 to E12	175.25 to 224.25	S10, S11 to S41	168.25, 231.25 to 463.25
	High band	E21 to E69	471.25 to 855.25		

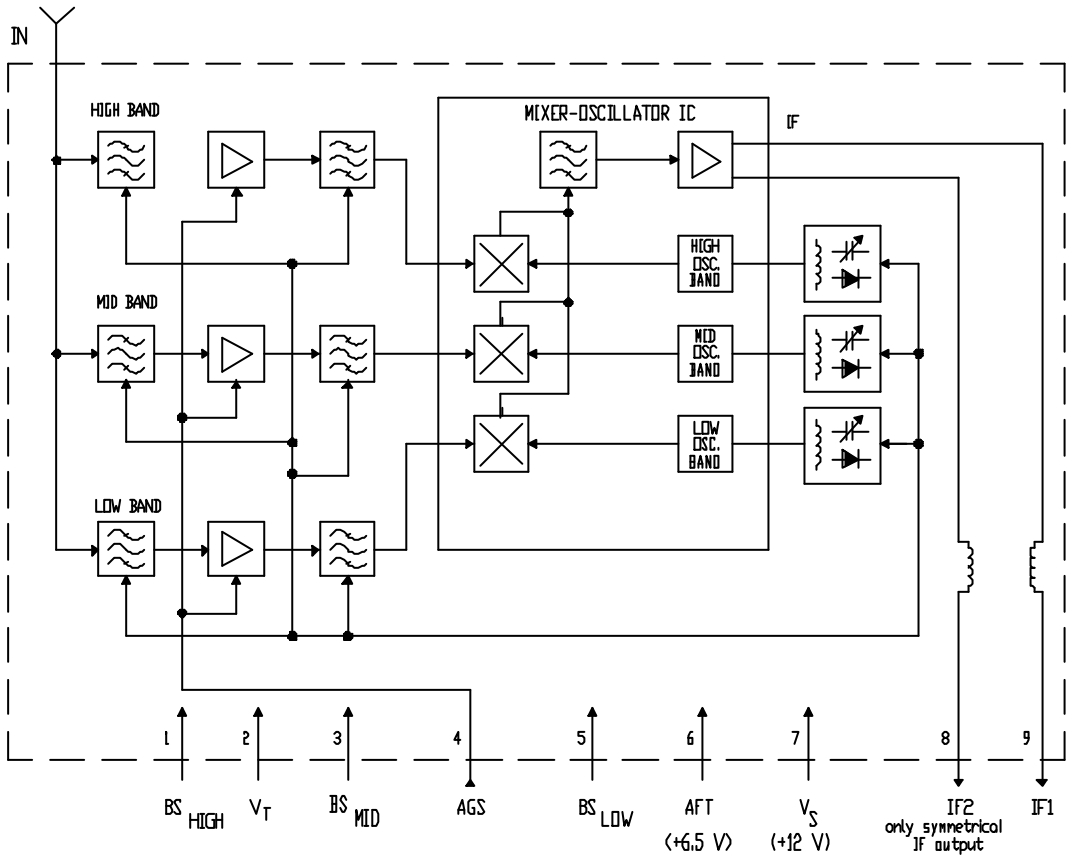


Fig.1 Electrical block diagram

Hyperband television tuner TUN14447/14452

PINNING

SYMBOL	PIN	DESCRIPTION
BS_{HIGH}	1	high band switch
V_T	2	tuning voltage
BS_{MID}	3	mid band switch
AGC	4	gain control voltage
BS_{LOW}	5	low band switch
AFT	6	AFT voltage +6.5 V
V_S	7	Supply voltage +12 V
IF2	8	only symmetrical IF output
IF1	9	asymmetrical IFoutput
GND	MT1, MT2	mounting tags (ground)
IN		aerial input connector

LIMITING VALUES

Environmental conditions

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
Non-operational conditions				
T_{amb}	ambient temperature	-40	+60	^0C
RH	relative humidity	-	100	%
Operational conditions				
T_{amb}	ambient temperature	-15	+60	^0C
RH	relative humidity	-	93	%

Limiting values under operational conditions

The tuner can be guaranteed to function properly under the following conditions

SYMBOL	PARAMETER	PIN	MIN.	TYP.	MAX.	UNIT
V_S	supply voltage	7	11.75	12.0	12.5	V
I_S	supply current		-	-	65	mA
ΔV_T	tuning voltage range	2	0.5	-	28	V
I_T	tuning current		-	-	50.0	uA
V_{AGC}	AGC input voltage	4	-	8.0	8.5	V
ΔV_{AGC}	AGC input voltage range		0.85	-	8.0	V
I_{AGC}	AGC input current		-	-	90	uA
V_{AFT}	AFT input voltage	6	-	6.5	-	V
ΔV_{AFT}	AFT input voltage range		2.0	-	11.0	V
I_{AFT}	AFT input current		-	-	5.0	uA
V_{BS}	bandswitching voltage	1, 3, 5	11.75	12.0	12.5	V
I_{BS}	bandswitching current		-	-	25	mA

Bandswitching

BAND	PIN 1	PIN 3	PIN 5	UNIT
Low	0 or open	0 or open	12	V
Mid	0 or open	12	0 or open	V
High	12	0 or open	0 or open	V

ELECTRICAL DATA

Conditional data

Unless otherwise specified, all electrical values for Chapter “Electrical data” apply at the following conditions and the electrical performance is related both to systems B, G and H.
A proper function is guaranteed within the specified operational conditions but a certain deterioration of performance parameters may occur at the limits of operational conditions.

SYMBOL	PARAMETER	VALUE	UNIT
T_{amb}	ambient temperature	25 +/- 5	^{0}C
RH	relative humidity	60 +/- 15	%
V_S	supply voltage	12.0 +/- 0.1	V
V_{AGC}	AGC input voltage	8.0 +/- 0.1	V
t_{pr}	pre-heating time (+12 V at pin 7)	10	minute
$Z_{S(AE)}$	aerial source impedance (unbalanced)	75	Ω

Aerial input characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
VSWR	reflection coefficient	referred to 75 Ω impedance	-	2	5	
V_{ant}	antenna connection disturbance voltage	< 1.75 GHz; comply to “EN55013 section 3.3”	-	-	46	dBµV

Hyperband television tuner TUN14447/14452

General characteristics

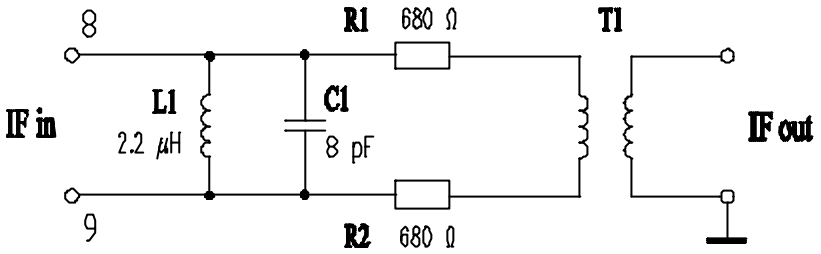
SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f_b	frequency range: low band mid band high band		 48.25 168.25 471.25	 - - -	 161.25 463.25 855.25	 MHz MHz MHz
G_V	voltage gain: all channels gain taper	Symmetrical IF output is loaded with a test circuit according diagram fig.2.	 38 -	 45 -	 52 8	 dB dB
Y	RF-curves, tilt	Symmetrical IF output is loaded with a test circuit according diagram fig.2	-	2.5	4.0	dB
F	noise: low and mid band high band	Symmetrical IF output is loaded with a test circuit according diagram fig.2.	 - -	 5 6	 10 11	 dB dB
ΔG_{AGC}	AGC input voltage range (0.85-8) V: low and mid band high band		 45 40	 60 50	 - -	 dB dB
α_I	image rejection: low band mid band: to 300 MHz over 300 MHz high band		 60 60 55 48	 74 70 65 60	 - - - -	 dB dB dB dB
α_{IF}	IF rejection (picture): Channel E2 low band mid and high bands		 55 60 65	 65 70 78	 - -	 dB dB dB
V_{ESD}	electrostatic discharge(ESD): protection on pins 1 to 9 protection on antenna socket	The tuner meets specifications IEC 1000-4-2 level 1 for pins and level 4 for antenna socket.	 2 8	 - -	 - -	 kV kV
Δf_{AFT}	AFT characteristic At AFT voltage 6,5V+/-4,5V: low and mid band high band		 0,6 0,6	 1.0 1.0	 - -	 MHz MHz
Δf	oscillator drift: Ambient temperature range low band mid band high band Supply voltage change low band mid band high band	 $\Delta T=25^oC+/-2^oC$ (25^oC to 50^oC) +/-5%			 +/-500 +/-1200 +/-1200 +/-250 +/-500 +/-500	 kHz kHz kHz kHz kHz kHz

Visibility test

The tuners meet the requirements of the European norm “EN55020”, when measured in an adequate television receiver

Radiation

The tuners meet the requirements of the European norm “EN55013” and “CISPR13” (1990), when measured in an adequate television receiver.



Dummy Attenuation = 22.6 dB

T1 – RF Transformer.
W – Ratio = 1:4 (IF – IN = 4 / IF – OUT = 1).
Type: MCL T4-1 or equivalent.

Fig. 2 Test circuit

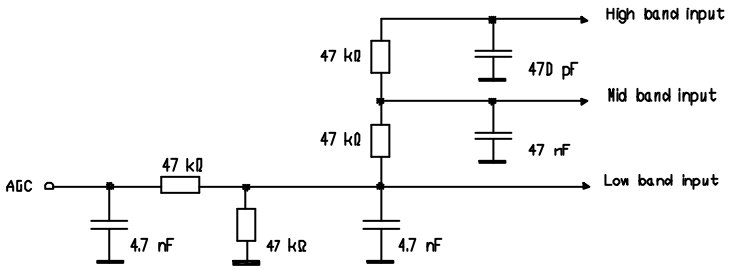


Fig.3 Internal AGC circuit.

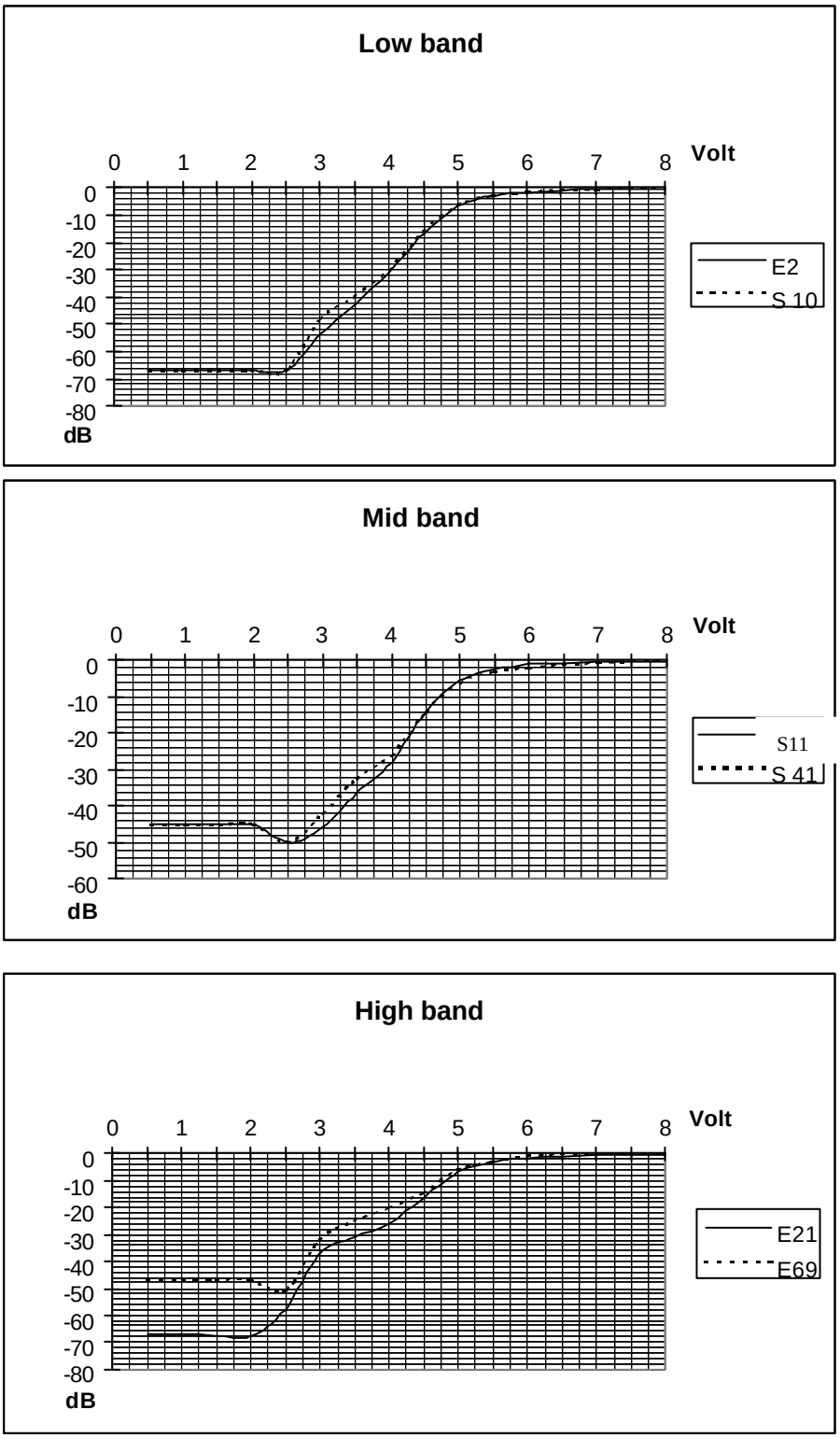
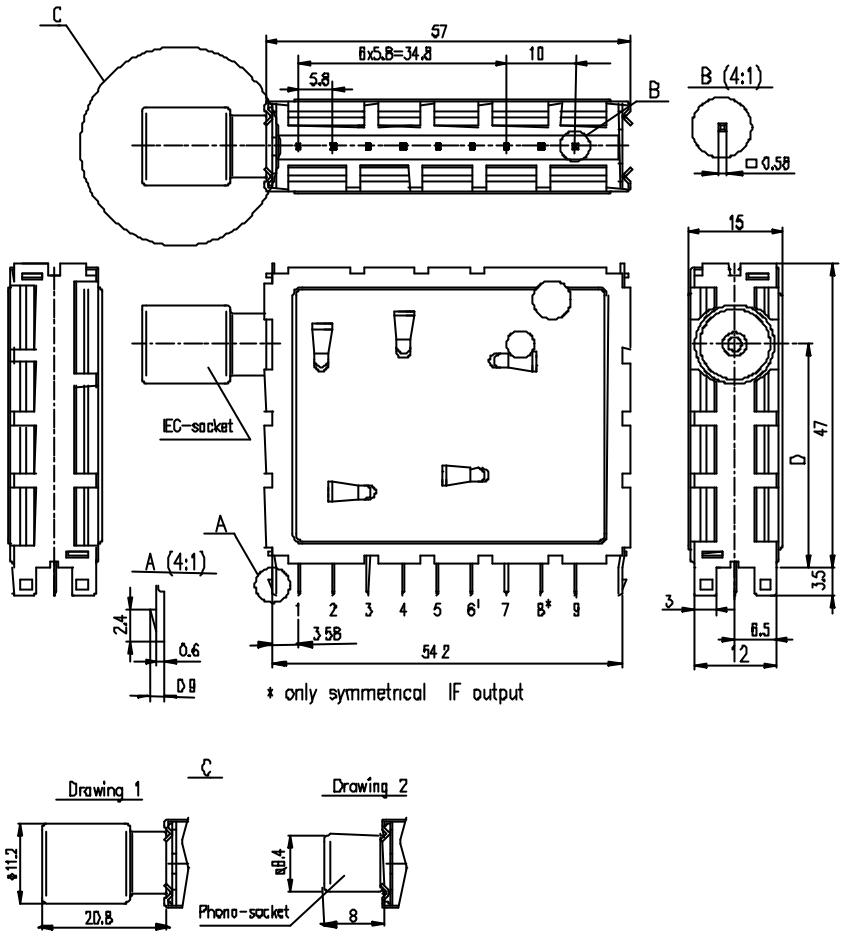


Fig.4 AGC characteristics



TUN14447 D=31,7mm
TUN14452 D=37,1mm

Fig.5 Mechanical outline

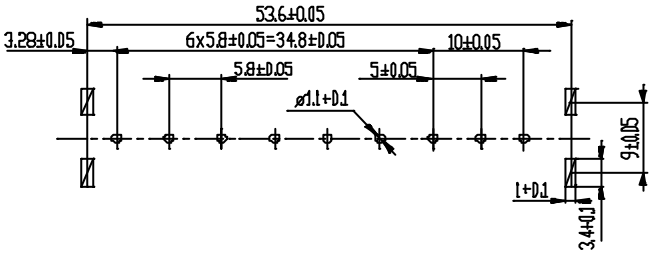


Fig.6 Punching pattern seen from solder side

Aerial connections

Standard IEC socket female 75 Ω