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**Hyperband television tuner**

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**TUN14447/14452**

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**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		

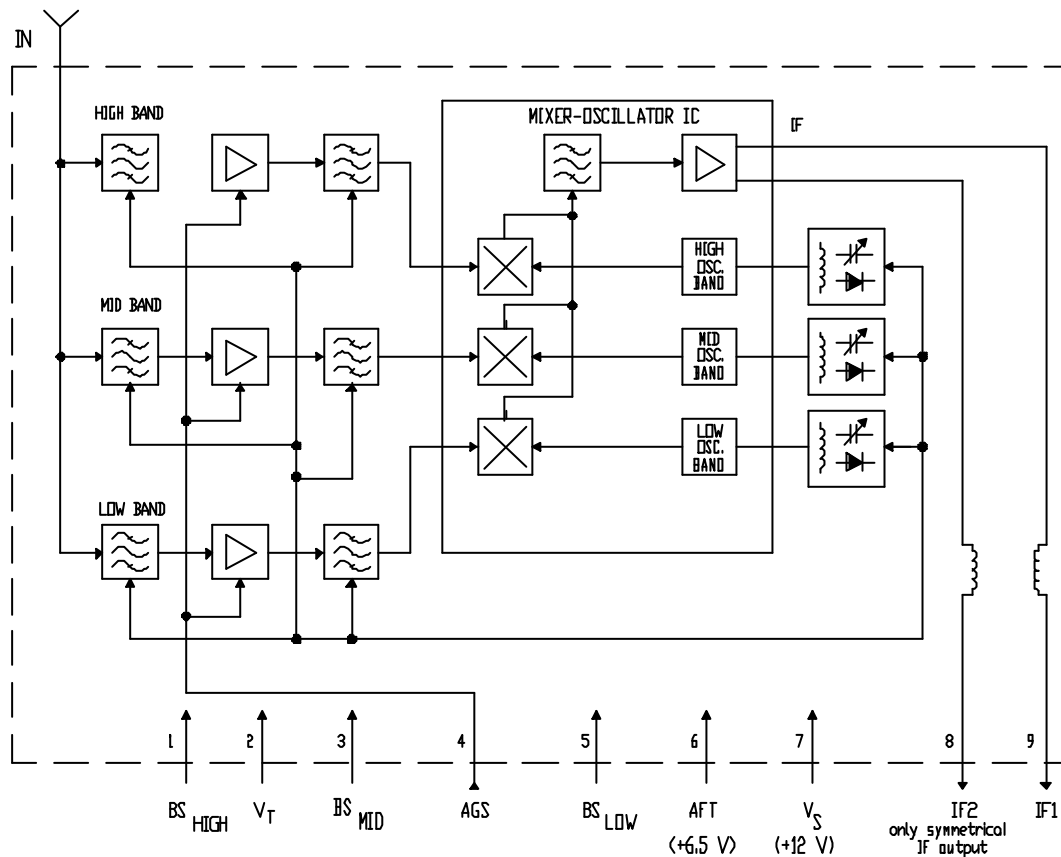


Fig.1 Electrical block diagram

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## PINNING

SYMBOL	PIN	DESCRIPTION
BS <sub>HIGH</sub>	1	high band switch
V <sub>T</sub>	2	tuning voltage
BS <sub>MID</sub>	3	mid band switch
AGC	4	gain control voltage
BS <sub>LOW</sub>	5	low band switch
AFT	6	AFT voltage +6.5 V
V <sub>S</sub>	7	Supply voltage +12 V
IF2	8	only symmetrical IF output
IF1	9	asymmetrical IF output
GND	MT1, MT2	mounting tags (ground)
IN		aerial input connector

## LIMITING VALUES

## Environmental conditions

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
<b>Non-operational conditions</b>				
T <sub>amb</sub>	ambient temperature	-40	+60	°C
RH	relative humidity	-	100	%
<b>Operational conditions</b>				
T <sub>amb</sub>	ambient temperature	-15	+60	°C
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 <sub>S</sub>	supply voltage	7	11.75	12.0	12.5	V
I <sub>S</sub>	supply current		-	-	65	mA
ΔV <sub>T</sub>	tuning voltage range	2	0.5	-	28	V
I <sub>T</sub>	tuning current		-	-	50.0	μA
V <sub>AGC</sub>	AGC input voltage	4	-	8.0	8.5	V
ΔV <sub>AGC</sub>	AGC input voltage range		0.85	-	8.0	V
I <sub>AGC</sub>	AGC input current		-	-	90	μA
V <sub>AFT</sub>	AFT input voltage	6	-	6.5	-	V
ΔV <sub>AFT</sub>	AFT input voltage range		2.0	-	11.0	V
I <sub>AFT</sub>	AFT input current		-	-	5.0	μA
V <sub>BS</sub>	bandswitching voltage	1, 3, 5	11.75	12.0	12.5	V
I <sub>BS</sub>	bandswitching current		-	-	25	mA

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## 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	$^{\circ}\text{C}$
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	$\Omega$

## Aerial input characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
VSWR	reflection coefficient	referred to 75 $\Omega$ impedance	-	2	5	
$V_{ant}$	antenna connection disturbance voltage	< 1.75 GHz; comply to "EN55013 section 3.3"	-	-	46	dB $\mu$ V

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## General characteristics

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

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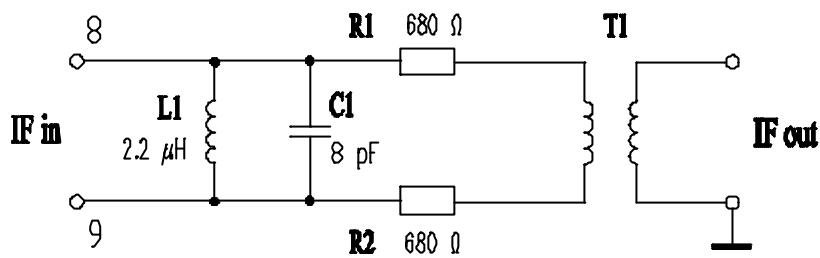
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Visibility test

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

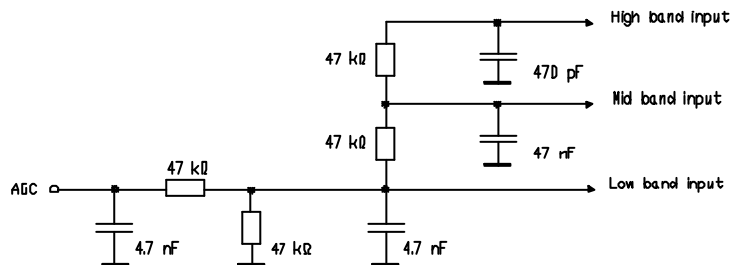


Fig.3 Internal AGC circuit.

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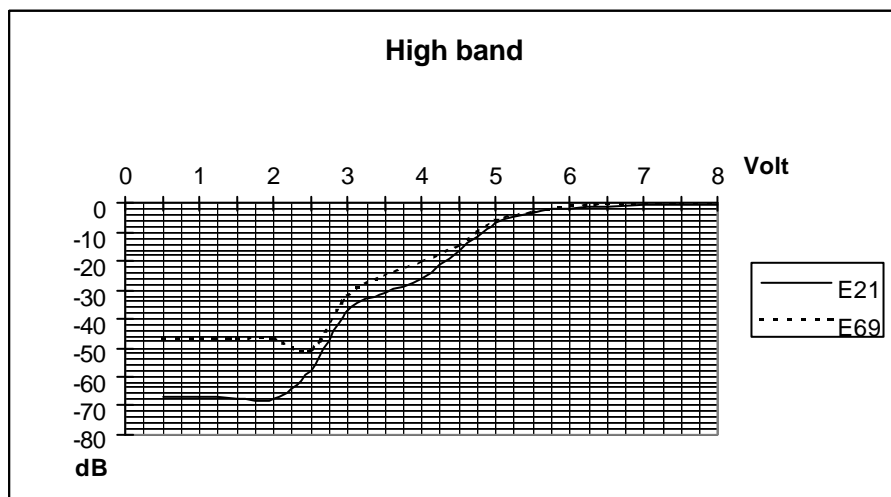
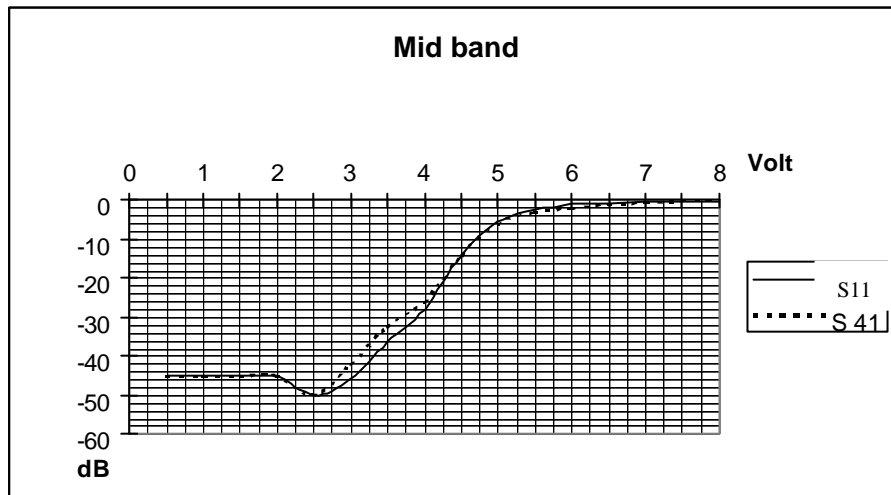
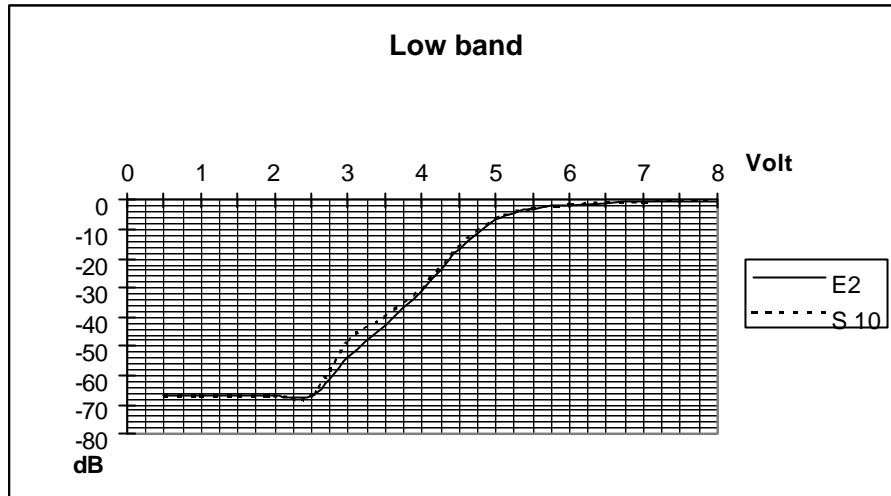
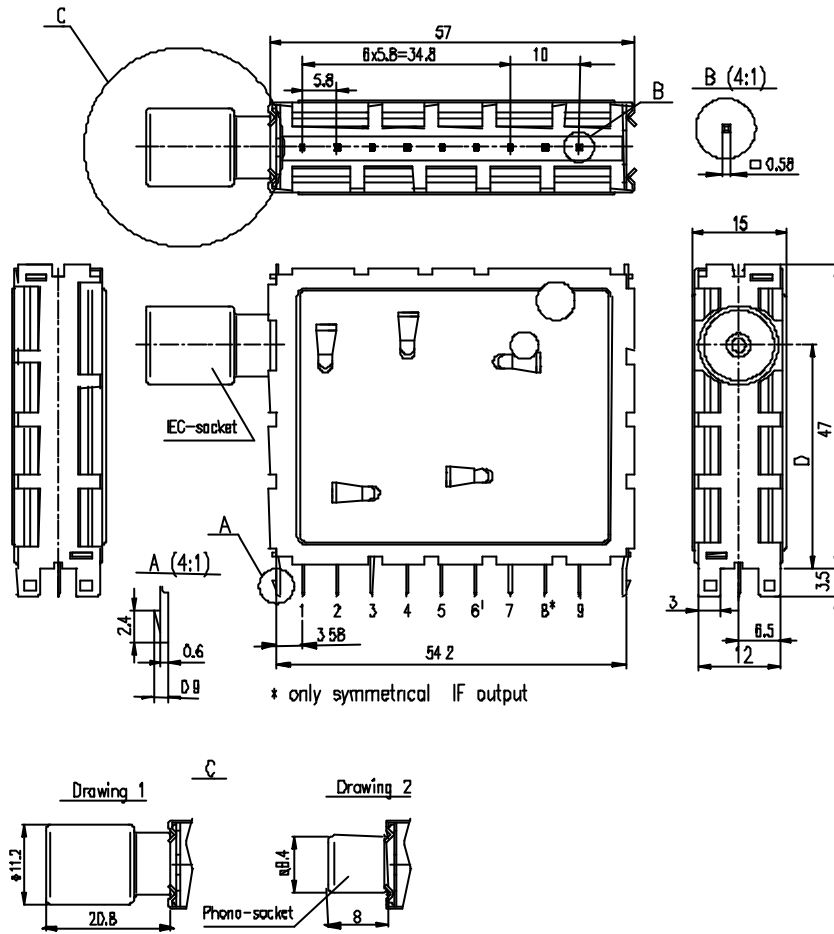


Fig.4 AGC characteristics

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

Fig.5 Mechanical outline

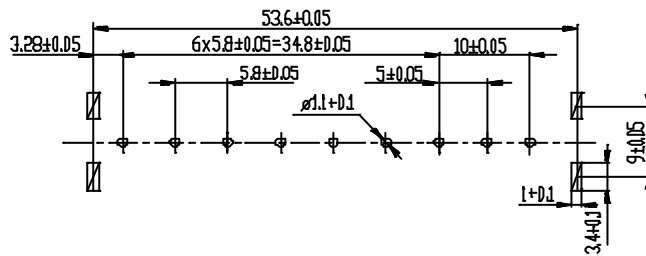


Fig.6 Punching pattern seen from solder side

**Aerial connections**

Standard IEC socket female 75 Ω