Hyperband television tuner TUN14406

FEATURES

- VHF/Hyperband/UHF tuner
- System CCIR: B/G
- Voltage synthesized tuning (VST)
- Off-air channels, S-cable channels and Hyperband
- World standardized mechanical dimensions and world standard pinning
- Compact size
- Comply to “CENELEC EN55020” and “EN55013”

DESCRIPTION

TUN14406 belongs to the family of tuners, which are designed to meet a wide range of applications. It is a combined VHF/Hyperband/ UHF tuner. The IF output is designed for direct drive of a variety of SAW filters. The output impedance of the asymmetrical IF terminals is approximately 75 Ω to ensure sufficient triple transient suppression of the SAW filter.

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)
- European standards CENELEC EN55013, EN55020

ORDERING INFORMATION

TYPE	SYSTEM	DESCRIPTION
TUN14406	CCIR	asymmetrical IF output; IEC connector (14.5 mm)

INTERMEDIATE FREQUENCIES

SIGNAL	FREQUENCY (MHz)
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)
TUN14406	Low band	E2 to C	48.25 to 82.25[1]	S01 to S10	69.25 to 168.25
	Mid band	E5 to E12	175.25 to 224.25	S11 to S41	231.25 to 463.25
	High band	E21 to E69	471.25 to 855.25[2]	S40 and S41	455.25 to 463.25

Notes
1. Enough margin is available to tune down to 45.25 MHz.
2. Enough margin is available to tune up to 863.25 MHz.

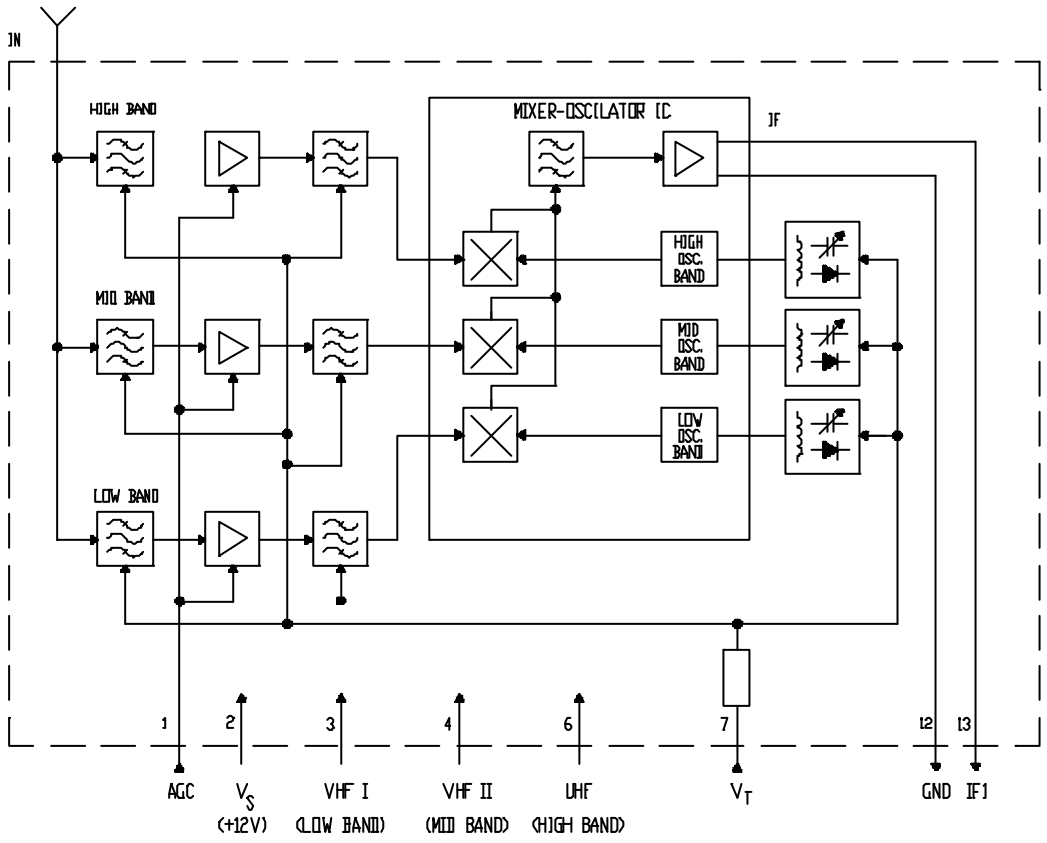


Fig.1 Electrical block diagram

PINNING

SYMBOL	PIN	DESCRIPTION
AGC	1	gain control voltage
V_s	2	supply voltage +12 V
VHF I	3	low band switch +12 V
VHF II	4	mid band switch +12 V
n.c.	5	not connected
UHF	6	high band switch +12 V
V_T	7	tuning voltage 0.5 to 28 V
n.c.	8	not connected
n.c.	9	not connected
n.c.	10	not connected
n.c.	11	not connected
GND	12	ground
IF1	13	asymmetrical IF output
GND	MT1, MT2	mounting tags (ground)
IN		aerial input connector IEC (14.5 mm)

LIMITING VALUES

Environmental conditions

SYMBOL	PARAMETER	MIN.	MAX.	UNIT
Non-operational conditions				
T_{amb}	ambient temperature	-40	+60	^{0}C
RH	relative humidity	-	100	%
Operational conditions				
T_{amb}	ambient temperature	-15	+60	^{0}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_S	supply voltage	2	11.4	12.0	12.6	V
I_S	supply current		-	-	65	mA
ΔV_T	tuning voltage range	7	0.5	-	28	V
I_T	tuning current		-	-	0.5	µA
V_{AGC}	AGC input voltage	1	-	9.2	9.7	V
ΔV_{AGC}	AGC input voltage range		0.85	-	9.2	V
I_{AGC}	AGC input current		-	-	30	µA
V_{BS}	bandswitching voltage	3,4 and 6	11.4	12.0	12.6	V
I_{BS}	bandswitching current		-	-	18	mA

Bandswitching

BAND	PIN 3	PIN 4	PIN 6	UNIT
Low	12	0 or open	0 or open	V
Mid	0 or open	12	0 or open	V
High	0 or open	0 or open	12	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, H and D, K.
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	9.2 +/- 0.1	V
t_{pr}	pre-heating time (+12 V at pin 2)	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	4	
V_{ant}	antenna connection disturbance voltage	< 1.75 GHz; comply to “EN55013 section 3.3”	-	-	46	dBµV

General characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN.	TYP.	MAX.	UNIT
f_b	frequency range:					
	low band		48.25	-	168.25	MHz
	mid band		175.25	-	463.25	MHz
	high band		455.25	-	855.25	MHz
G_V	voltage gain:	The IF output is loaded with 75 Ω				
	all channels	impedance	38	44	50	dB
	gain taper		-		7	dB
F	noise:	The IF output is loaded with 75 Ω				
	low band	impedance	-	6.0	9	dB
	mid band		-	7.0	10	dB
	high band		-	8.0	11	dB
ΔV_{AGC}	AGC input voltage range:					
	low and mid band		40	55	-	dB
	high band		30	40	-	dB
α_i	image rejection:					
	low band		70	75	-	dB
	mid band		66	70	-	dB
	high band		53	60	-	dB
α_{IF}	IF rejection (picture):					
	channel E2		50	62	-	dB
	low and mid bands		60	70	-	dB
	high band		70	76	-	dB
V_{ESD}	electrostatic discharge (ESD):	note 1				
	protection on pins 1 to 4 and 6, 7, 12,13		2		-	kV
	protection on antenna socket		8		-	kV
Δf	oscillator drift:					
	Ambient temperature range	ΔT=25°C+/-2°C				
	low band	(25°C to 50°C)			+/-500	kHz
	mid band				+/-750	kHz
	high band				+/-1000	kHz
	Supply voltage change	+/-5%				
	low band				+/-250	kHz
	mid band				+/-500	kHz
	high band				+/-500	kHz

Note

1. The tuner meets specifications IEC 1000-4-2 level 1 for pins and level 4 for antenna socket.

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.

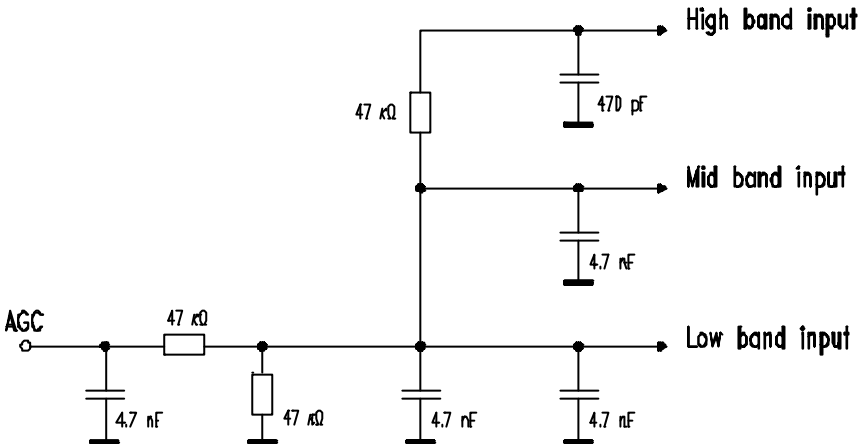
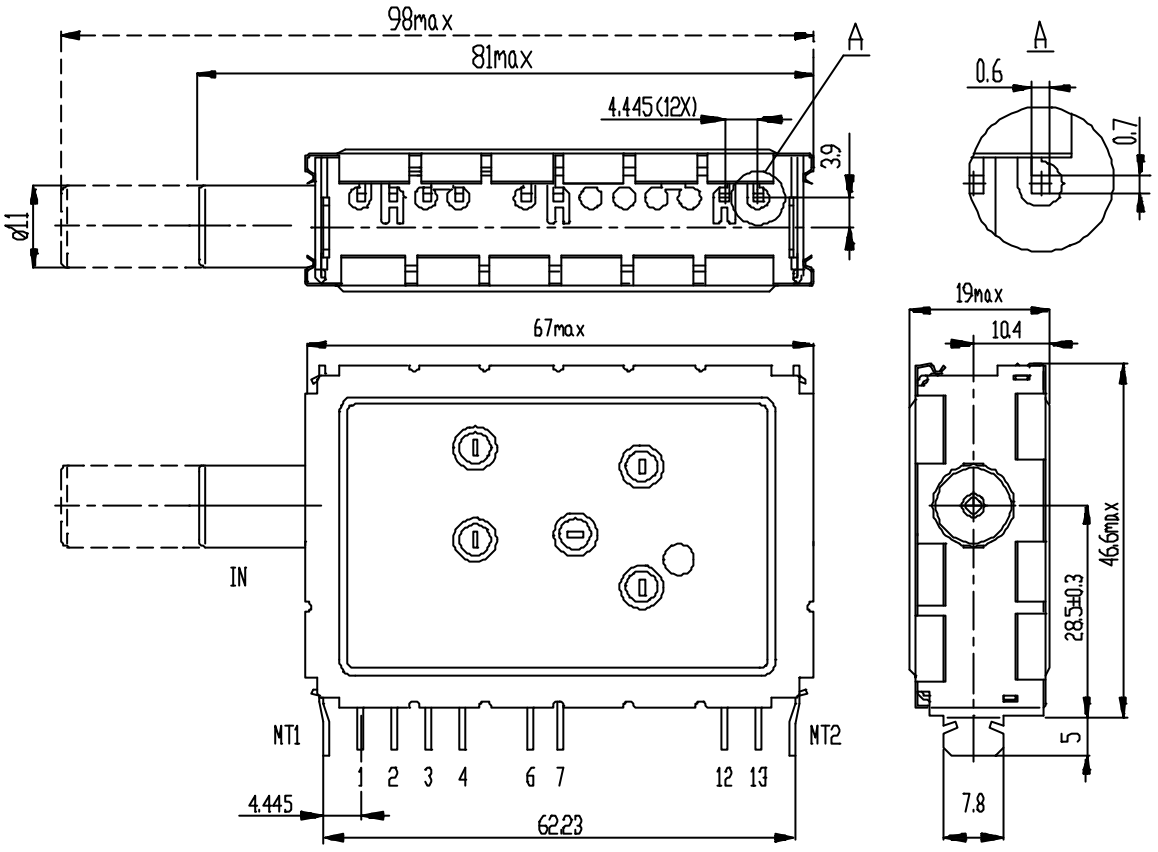


Fig.2 Internal AGC circuit.

Fig.3 Mechanical outline



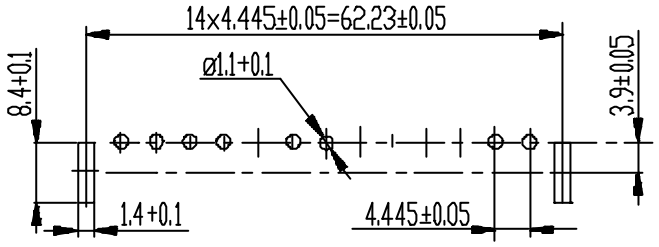


Fig.4 Punching pattern seen from solder side

Aerial connections

Standard IEC socket female 75 Ω.