

**Hyperband television tuners****KS-H-96 EA****FEATURES**

- \* Members of the KS-H-90 family  
VHF/Hyperband/UHF tuners
- \* Systems CCIR: B/G, H, L/L'
- \* Off-air channels, S-cable channels and Hyperband
- \* Digitally controlled (PLL) tuning via I<sup>2</sup>C-bus
- \* Compact size
- \* Comply to "CENELEC EN55020" and "EN55013"

**DESCRIPTION**

The KS-H-96 tuners belong to the KS-H-90 family of tuners, which are designed to meet a wide range of applications. It is a combined VHF / Hyperband / UHF tuner suitable for CCIR systems B/G, H, L/L'. The IF output can drive a SAW filter directly and has capability to drive asymmetrical load of 75  $\Omega$ .

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, EN 55020

**MARKING**

The following items of information are printed on a sticker that is on the top cover of the tuner or printed directly on the top cover:

- \* Company logo
- \* Type number
- \* Year and month code
- \* Quality inspection print

**ORDERING INFORMATION**

TYPE	SYSTEM	DESCRIPTION
KS-H-96 EA CCIR	asymmetrical IF output; IEC connector (14.5 mm)	
KS-H-96 EAL	CCIR	asymmetrical IF output; IEC connector (32.2 mm)

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## INTERMEDIATE FREQUENCIES

SIGNALS	FREQUENCY (MHz)		
	SYSTEMS B/G, H	SYSTEM L	SYSTEM L'
Picture carrier	38.90	38.90	33.40
Colour	34.47	34.47	37.83
Sound	33.40	32.40	39.90

## Note

1. 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)
<b>KS-H-94 E</b>	Low band	E2 to C	48.25 to 83.25 <sup>(1)</sup>	S01 to S10	105.25 to 168.25
	Mid band	E5 to E12	175.25 to 224.25	S11 to S39	217.25 to 447.25
	High band	E21 to E69	471.25 to 855.25 <sup>(2)</sup>	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.

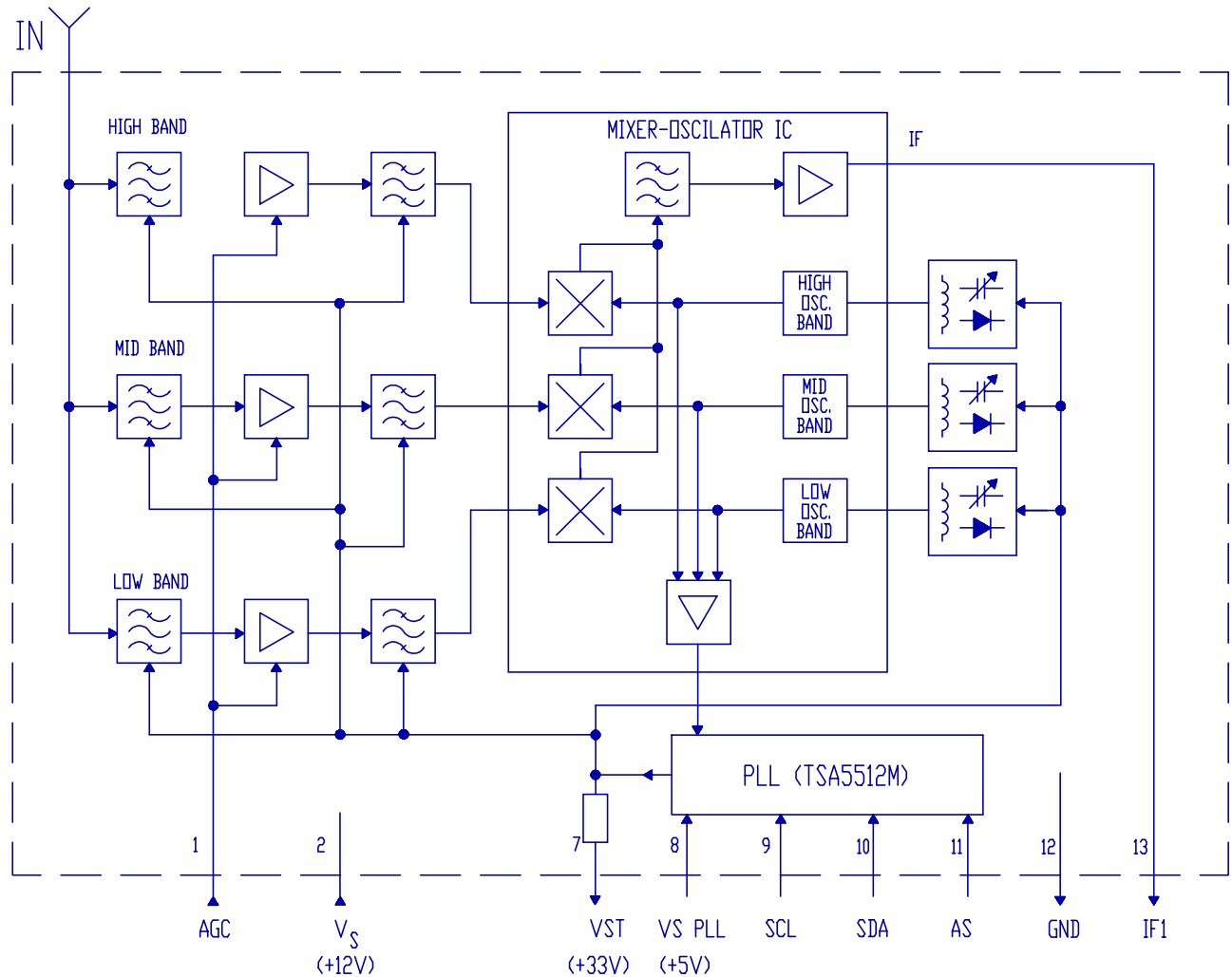


Fig.1 Electrical block diagram

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## PINNING

SYMBOL	PIN	DESCRIPTION
AGC	1	gain control voltage
V <sub>S</sub>	2	supply voltage +12 V
V <sub>ST</sub>	7	Tuning voltage +33 V
V <sub>SPLL</sub>	8	PLL supply voltage +5 V
SCL	9	I <sup>2</sup> C bus-serial clock
SDA	10	I <sup>2</sup> C-bus serial data
AS	11	I <sup>2</sup> C-bus address select
GND	12	Ground
IF1	13	Asymmetrical IF output
GND	MT1, MT2	mounting tags (ground)
	IN	aerial input connector IEC (14.5 mm or 32.2 mm)

## LIMITING VALUES

## Environmental conditions

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
<b>Non-operational conditions</b>					
T <sub>amb</sub>	ambient temperature		-40	+60	°C
RH	relative humidity		85	%	
<b>Operational conditions</b>					
T <sub>amb</sub>	ambient temperature		-10	+60	°C
RH	relative humidity		93	%	

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## Limiting values under operational conditions

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

SYMBOL	PARAMETER	PIN	MIN.	TYP.	MAX.	UNIT
$V_S$ $I_S$	supply voltage supply current	2	10.8	12	13.2 85	V mA
$V_{ST}$ $I_{ST}$	tuning supply voltage tuning supply current	7	30	33	35 1.7	V mA
$V_{SPLL}$ $I_{SPLL}$	PLL supply voltage PLL supply current	8	4.75	5	5.5 55	V mA
$V_{AGC}$ $\Delta V_{AGC}$ $I_{AGC}$	AGC input voltage AGC input voltage range AGC input current	1	0.85	9.2	13.2 9.7 30	V V $\mu$ A
$V_{AS}$ $V_{SCL}$ $V_{SDA}$ $I_{SDA}$	address select input voltage serial clock input voltage serial data input voltage serial data input current	11 9 10	 3.0 3.0 1	   	5.5 5.5 5.5 5	V V V mA

## 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, L and L'.

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	$^{\circ}$ C
RH	relative humidity	60 +/- 15	%
$V_S$	supply voltage	12 +/- 0.25	V
$V_{SPLL}$	PLL supply voltage	5 +/- 0.125	V
$V_{AGC}$	AGC input voltage	9.2 +/- 0.25	V
$V_{ST}$	tuning supply voltage	33 +/- 0.5	V
$t_{pr}$	pre-heating time (+12 V at pin 2)	10	minute
$Z_{S(AE)}$	aerial source impedance (unbalanced)	75	$\Omega$

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## Aerial input characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
WSWR	reflection coefficient	referred to 75 $\Omega$ impedance		4	
$V_{ant}$	antenna connection disturbance voltage	< 1.75 GHz; comply to "EN55013 section 3.3"		46	dB $\mu$ V

## General characteristics

SYMBOL	PARAMETER	CONDITIONS	MIN.	MAX.	UNIT
$f_b$	frequency range, low band mid band high band		48.25 175.25 455.25	168.25 447.25 855.25	MHz MHz MHz
$G_v$	voltage gain: all channels gain taper	referred to 75 $\Omega$ impedance	38	7	dB dB
$F$	noise: low band mid band high band			9 10 11	dB dB dB
$\Delta V_{AGC}$	AGC input voltage range: low and mid band high band		45 35		dB dB
$\alpha_i$	image rejection: low band mid band high band		70 60 53		dB dB dB
$\alpha_{IF}$	IF rejection (picture) low and mid band high band		60 70		
$\Delta f$	oscillator characteristics Oscillator tuning resolution lock-in time			note 1 150	kHz msec

Note 1. Resolution 31.25 kHz, 50.00 kHz or 62.5 kHz (see Table "Ratio select bits").

## 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.

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## APPLICATION INFORMATION

## WRITE mode

	MSB							LSB	A <sup>(1)</sup>
Address byte	1	1	0	0	0	MA1	MA0	0	A
Program divider byte 1	0	0	n13	n12	n11	n10	n9	n8	A
Program divider byte 2	n7	n6	n5	n4	n3	n2	n1	n0	A
Control information byte 1	1	CP	0	0	1	1	1	0	A
Control information byte 2	P7	P6	P5	P4	0	P2	P1	P0	A

Notes

1. A = Acknowledge

## Address selection

MA1	MA0	Voltage at pin 11
0	0	GND to $0.1XV_{PLL}$
0	1	don't care
1	0	$0.4XV_{PLL}$ to $0.6XV_{PLL}$
1	1	$0.9XV_{PLL}$ to $2.7XV_{PLL}$

## Programmable divider settings (bytes 1 and 2)

Divider ratio:

$$N = R \times \{ f_{RF,pc} + f_{IF,pc} \},$$

$$R = 16 \text{ with reference divider} = 512$$

$$R = 20 \text{ with reference divider} = 640$$

$$R = 32 \text{ with reference divider} = 1024$$

$$N = (8192 \times n_{13}) + (4096 \times n_{12}) + (2048 \times n_{11}) + (1024 \times n_{10}) + (512 \times n_9) + (256 \times n_8) + (128 \times n_7) + (64 \times n_6) + (32 \times n_5) + (16 \times n_4) + (8 \times n_3) + (4 \times n_2) + (2 \times n_1) + n_0$$

## Control byte 1

CP can be set to either 0 (low current) or 1 (high current).

Charge pump settings:

CP = 1, for fast tuning

CP = 0, for moderate speed tuning with slightly better residual oscillator FM.

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## Ratio select bits

RSA	RSB	REFERENCE DIVIDER	STEP SIZE (kHz)
X	0	640	50.00
0	1	1024	31.25
1	1	512	62.50

Band switching  
(Control byte 2)

Band	Active port	P0	P1	P2	P3	P4	P5	P6	P7
Low band	P4	X	X	X	0	0	1	1	0
Mid band	P5 X	X	X	0	1	0	1	0	0
High band	P6	X	X	X	0	1	1	0	0

## READ mode

	MSB							LSB	
Address byte	1	1	0	0	0	MA1	MA0	1	A
Status byte	POR	FL	I2	I1	I0	A2	A1	A0	-

- Notes
1. A = Acknowledge.
  2. POR = Power On Reset flag (POR=1 at power on).
  3. FL = In-lock flag (FL=1 at loop is phase-locked).



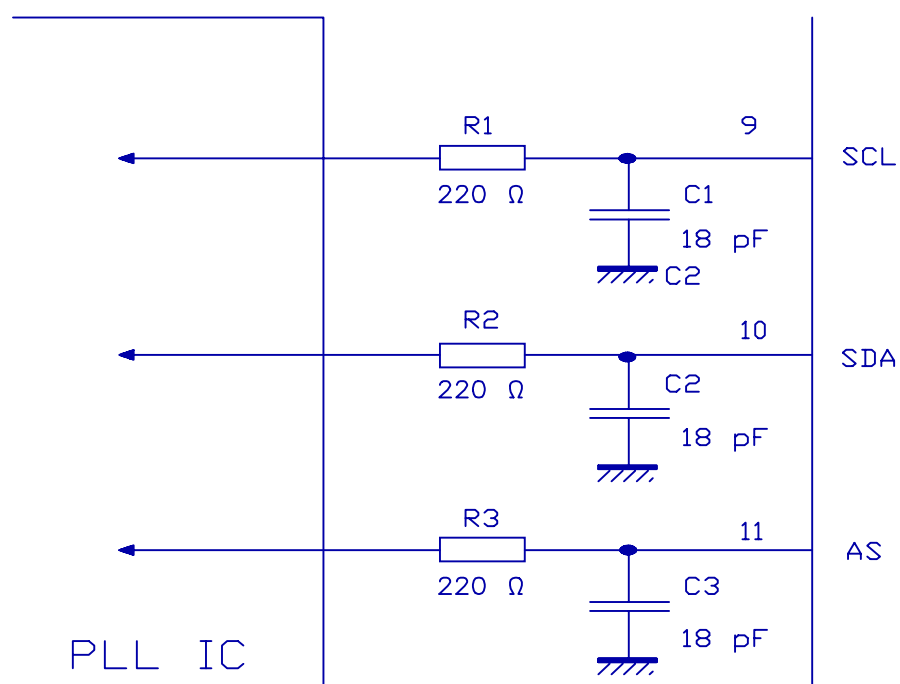
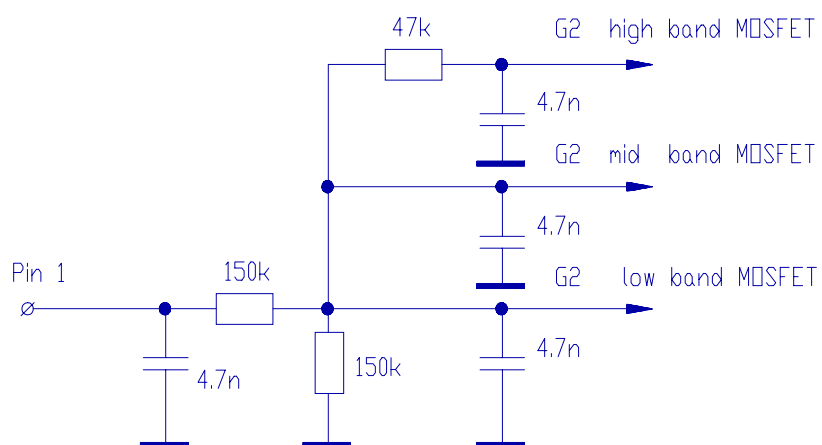
Fig.2 I<sup>2</sup>C-bus load.

Fig.3 Internal AGC circuit.

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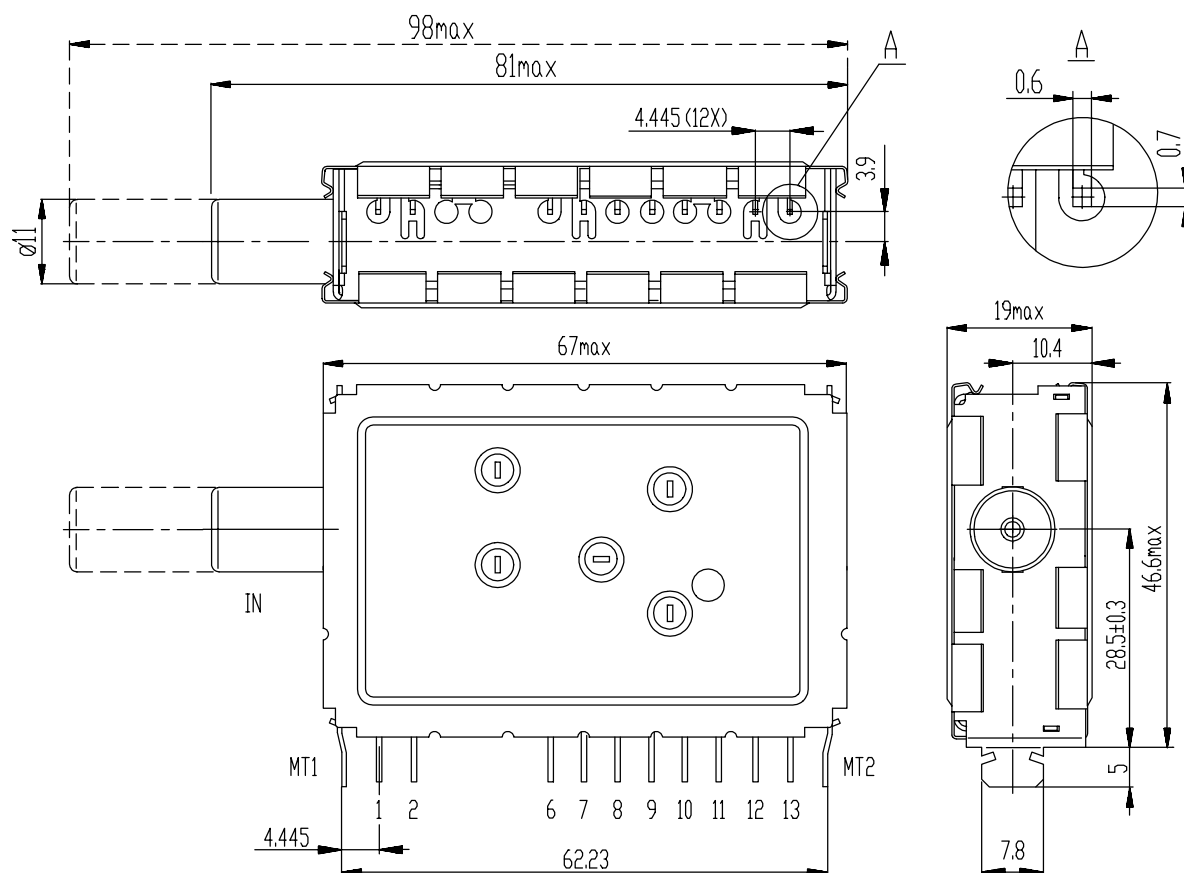


Fig.4 Mechanical outline

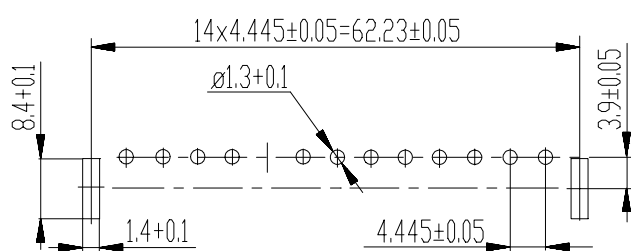


Fig.5 Punching pattern seen from solder side

**Aerial connections**

Standard IEC socket female 75  $\Omega$ .

**LIFE SUPPORT APPLICATIONS**

These products are not designed for use in life support appliances, devices, or systems where malfunction of these products can reasonably be expected to result in personal injury. Selteka customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify Selteka for any damages resulting from such improper use or sale.