

TECHNICAL RECOMMENDATIONS

ASTRA Universal Quatro LNB



VERSION 1.0

SEPTEMBER 2007

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This document is a technical specification for the kind of equipment currently called ASTRA Universal Quatro LNB.

Scope

The ASTRA Quatro LNB is a LNBF for Ku-band satellite reception from one ASTRA orbital position. It is intended for combination with commercially available satellite dishes.

The combination of the satellite dish and the ASTRA Universal Quatro LNB shall be compliant with the antenna gain pattern mask. The gain pattern mask is defined in the [2] SES ASTRA Technical Recommendations – DTH Antenna Gain Pattern Mask. This combination enables ASTRA reception with the target availability and interference protection.

Functional characteristics

The ASTRA Universal Quatro LNB is intended for the reception of all signals from the ASTRA satellites of one orbital position in combination with a satellite dish (as described in the previous section).

It features a frequency range of 10.70 to 12.75 GHz, divided into Low Band (10.70 to 11.70 GHz) and High Band (11.70 to 12.75 GHz). It receives waves with horizontal and vertical polarisation.

The ASTRA Universal Quatro LNB provides four IF outputs. The outputs carry also the LNB power supply. The output sockets are F type according to [1] ISO 60169-24.

Each output provides a particular band and polarisation:

- High Band in vertical polarisation.
- High Band in horizontal polarisation.
- Low Band in vertical polarisation.
- Low Band in horizontal polarisation.

A functional diagram of the ASTRA Universal Quatro LNB is shown in Figure 1.

The ASTRA Universal Quatro LNB has one feed which shall be mounted into the feed clamp of the satellite dish, rotated by an angle that depends on the location on earth.

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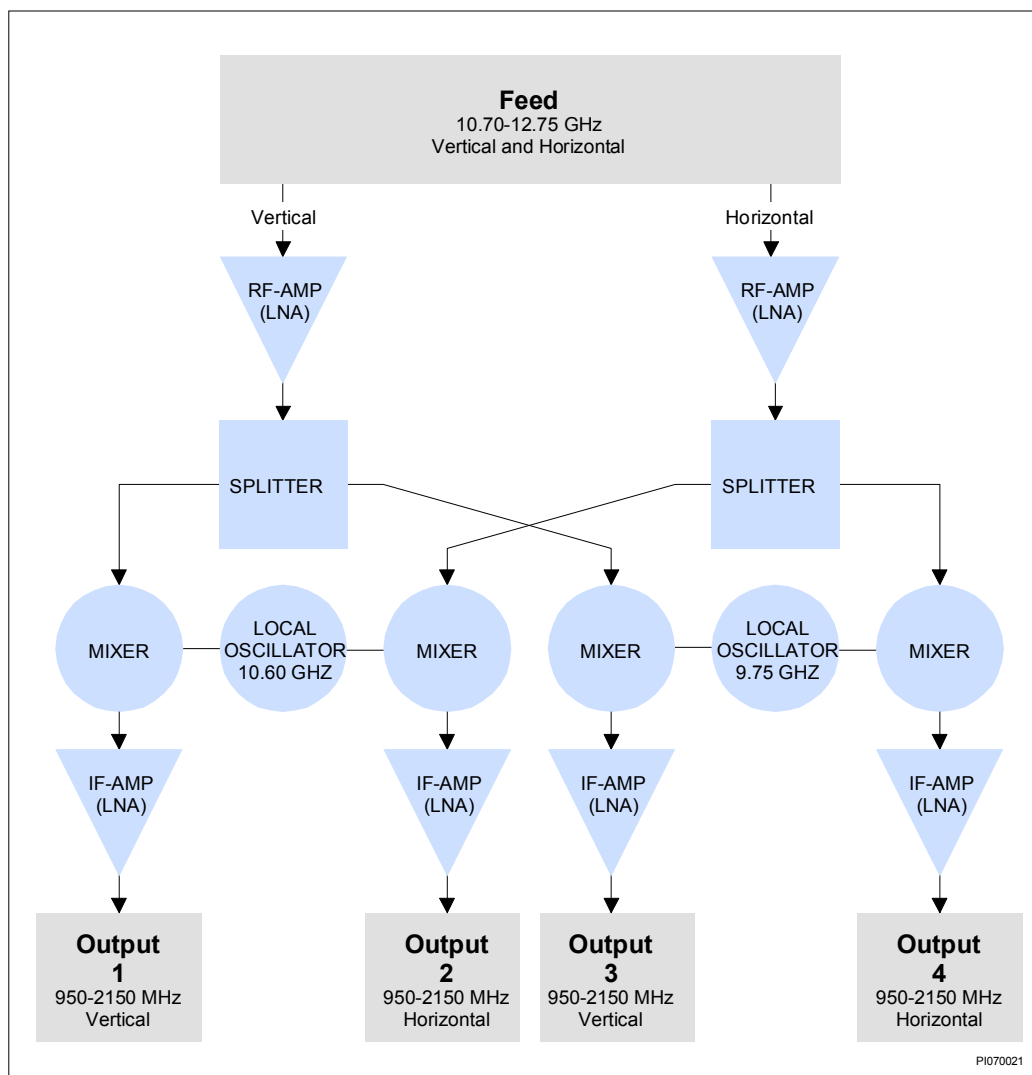


Figure 1: ASTRA Universal Quatro LNB Functional Diagram

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LNB Characteristics

The following characteristics apply to the part of the ASTRA Universal Quatro LNB between the input wave-guide and the output sockets.

No.	Parameter		Value			Unit
			Min.	Typ.	Max.	
1	Input Frequency	Low Band	10.70 to 11.70			GHz
		High Band	11.70 to 12.75			GHz
2	Output Frequency	Low Band	950 to 1950			MHz
		High Band	1100 to 2150			MHz
3	Local Oscillator Frequency	Low Band	9.745	9.750	9.755	GHz
		High Band	10.595	10.600	10.605	GHz
4	Phase Noise	Low Band and High Band	At 1 kHz offset		-50	dBc/Hz
			At 10 kHz offset		-75	dBc/Hz
			At 100 kHz offset		-95	dBc/Hz
			At 1 MHz offset		-105	dBc/Hz
			At ≥ 10 MHz offset		-115	dBc/Hz
5	Conversion Gain		50		60	dB
6	Gain Ripple	in 26 MHz Bandwidth			1	dB
		Low Band		3	5	dB
		High Band		3	5	dB
7	Noise Figure	Low Band		1.1	1.3	dB
		High Band		1.3	1.5	dB
8	Image Rejection		40			dB
9	1 dB Compression Point		0			dBm
10	3 rd Order Intermodulation (Two Tones)	Intercept Point	10			dBm
11	Output Impedance			75		Ω
12	Return Loss		8			dB
13	Cross-Polar Rejection		22			dB
14	In Band Spurious			-65	-60	dBm
15	Output Gain Difference (Between the Outputs)	in 26 MHz Bandwidth			3	dB
16	LNB Supply Voltage		11.5		19.0	V
17	Current Consumption per LNB			200	250	mA

Table 1: LNB Characteristics

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Parameter notes:

- 2 For certain applications, operators may want to distribute content on channels within the Satellite IF but outside of the dedicated frequency range of the Low Band and High Band.
- 3 The 10.60 GHz Local Oscillator frequency has been specified in order to maintain compatibility between SMATV and DTH reception systems with regard to channelized pre-programming of satellite receivers and to minimise potential interference to ASTRA channels by in-band intermodulation products caused by two simultaneously operating local oscillators.
- 5 The total gain shall not exceed 60 dB to avoid overloading of the RF front-end in a consumer receiver, which shall have at least a maximum RF input level of -25 dBm (see [3] SES ASTRA Technical Recommendations – Digital Satellite Receiver Front-End). Regarding the whole IF band it is recommended to implement a positive gain slope (+5 dB @ 2150 MHz / 0 dB @ 950 MHz) to at least partially equalise the losses of coax cable and other distributing components.
- 6 A high gain ripple could result in a relatively high gain difference at the IF outputs and therefore deteriorate significantly the crosstalk isolation.
- 7 State of the art LNBs usually have a noise figure of less than 1 dB.
- 14 The technical constraint of LNBs with multiple outputs is the need to operate two local oscillators continuously. This requires a high degree of care in the LNB design in order to minimise any spurious products. With the given maximum value the spurious products are sufficiently below the wanted signal.

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Acronyms

CENELEC	Comité Européen de Normalisation Electrotechnique
DTH	Direct To Home
IF	Intermediate Frequency
ISO	International Organization for Standardization
LNB	Low Noise Block converter
LNBF	Low Noise Block converter with Feed
RF	Radio Frequency
SES	Société Européenne des Satellites
SMATV	Satellite Master Antenna TeleVision

References

ISO Publication

[1] ISO 60169-24

Radio-frequency connectors - Part 24: Radio-frequency connectors with screw coupling, typically for use in 75 ohm cable distribution systems (Type F)

SES ASTRA Publications

[2] SES ASTRA Technical Recommendations – DTH Antenna Gain Pattern Mask

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[3] SES ASTRA Technical Recommendations – Digital Satellite Receiver Front-End

August 2007 – Version 1.1