



Orbital X-MIC

X-Band Ext Ref LNB with internal Isolator



Designed for the expanding X-Band markets

How to order an Orbital X-MIC, X-Band External Reference LNB

Frequencies (GHz):

LO	Input	Output	Bandwidth
6.30S -	7.25 to 7.75	.95 to 1.45	0.500

Bandwidth in MHz

'X' Signifies External Reference

LNB630S-500X-IWN60-G

Integrated Input Isolator

I - MIC isolator

Input Connector

X LNB is WR-112

Output Connector

F - F, 75 ohm
N - N, 50 ohm
S - SMA, 50 ohm
T - TNC, 50 ohm

Gain

60 - 60 dB
50 - 50 dB

Optional

G - Temperature Compensated Gain Flatness

Orbital Features:

The new X-MIC LNB is the evolution of our high performance X-Band LNB. Orbital has brought the isolator inside to effectively reduce the overall size and weight. Over the sale of thousands of X-Band LNBs, we have learned that the isolator is necessary in ALL applications. Bringing it inside makes the entire LNB hermetically sealed with a more standard overall size.

This change does not negatively effect any of the performance specs.

Improvements:

- Integrated Isolator which provides less weight and smaller (more standard) package
- Increased Transmit Reject filtering: 55 dB
- Switching power supply which provides:
 - Increased input Voltage range: 12 to 28 VDC
 - Lower, constant power consumption: 3.8W max.

The X-MIC requires a 10 MHz reference for it's LO stability and to be on frequency.

Options:

- Temperature Compensation Gain Flatness

Orbital Specs:

- P1 dB >15 dBm (typical)
- IP3 >25 dBm (typical)
- Noise Figure 0.7 ~ 0.8 dB (typical)
- CE, RoHS & REACH compliant

Sales contact:

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Specifications



Frequency Range:

Input RF Frequency: 7.25 - 7.75 GHz
Output IF Frequency: 950 to 1450 MHz
Local Frequency: 6.3 GHz
LO Stability: Phase locked to external
10MHz reference

Gain:

Gain: 60 dB \pm 2 dB over temp & freq
Ripple: \pm 0.5 dB over any 10 MHz segment
Flatness: \pm 2dB max over freq
Stability: \pm 1dB max over 24hr @ +25°C
Temp Compensated Gain Variation (optional)
 \pm 0.75dB max over Frequency band
and -20 to +55°C

VSWR:

Input: 1.3:1 max (integrated input isolator)
Output: 2.0:1 max

Amplitude Response:

10 MHz Band: \pm 0.3dB max
120 MHz Band: \pm 1.0dB max
Receive Band: \pm 1.5dB max

Noise Figure:

0.7-0.8 dB typ. @ +23°C

Interfaces:

Input: CPR-112 flange modified 12-hole
Waterproof (when mated with
matching flange and gasket)
Gasket included
Output: N, 50 Ω female, coax connector.
Optional: SMA (50 Ω)

Power:

DC in: +12 to +28 VDC
Power: 3.8 Watts max
Interface: DC power is multiplexed with the
IF & 10 MHz reference signals on
the output connector

Environmental:

Operating Temp: -40°C to +60°C
Operating Altitude: 10,000 ft ASL
Operating Rel Humidity: 100% condensing
Non-operating Temp: -50°C to +70°C
F Shock: 20g, 11ms, half sine
Vibration: MIL-STD-810F, method 514-4
MTBF: >125,000 hours
Optional Military Mobile Vibration Spec:
Mil-Spec 810F chapter 514.5C-1,
& temp range of -30 to +70°C
Compliances: RoHS & REACH

Other Specs:

LO Leakage: Output: -35 dBm max
Input: -45 dBm max at
waveguide flange
Filter: 55 dB Attenuation
(Transmit Reject)
Image Rejection: -40 dBc max
P1 dB comp pt: +15 dBm (typical)
OIP3: +25 dBm (typical)
Desense level: @ -40dBm, <0.1dB
Overdrive: -20 dBm, non-damaging
In band spurs: -45 dBc max

10 MHz Reference:

Insertion: Multiplexed onto the IF
coaxial connector
Input Level: -5 to +5 dBm
Phase Noise: -135dBc/Hz max. @ 100Hz
-148dBc/Hz max. @ 1kHz
-152dBc/Hz max. @ 10kHz
-155 dBc/Hz max. @ 100kHz

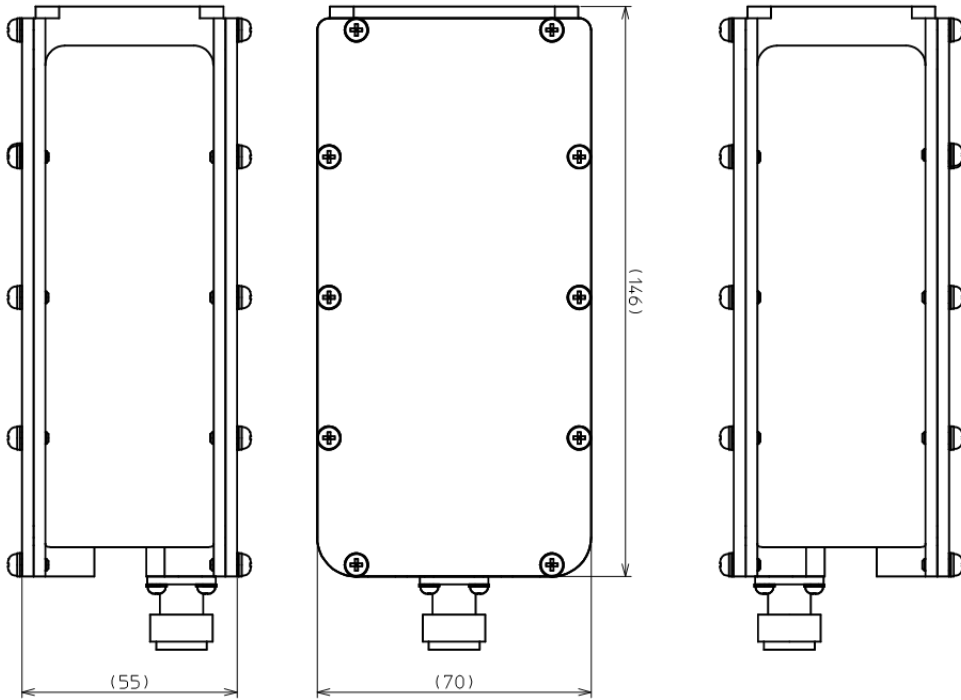
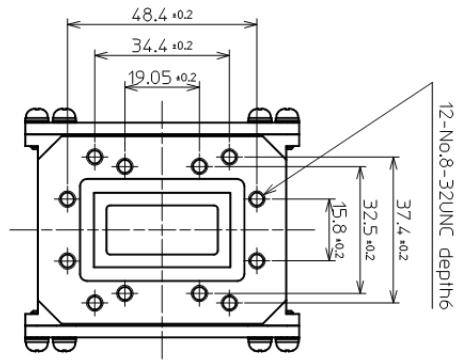
Mechanical:

Dimensions: 70 x 55 x 146 mm
Color: White (standard)
Weight: 750 grams

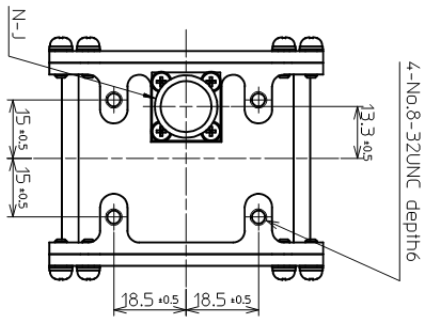
LNB Phase Noise:

-62dBc/Hz max. @ 100 Hz
-72dBc/Hz max. @ 1 kHz
-82dBc/Hz max. @ 10 kHz
-92dBc/Hz max. @ 100 kHz
-102dBc/Hz max. @ 1 MHz

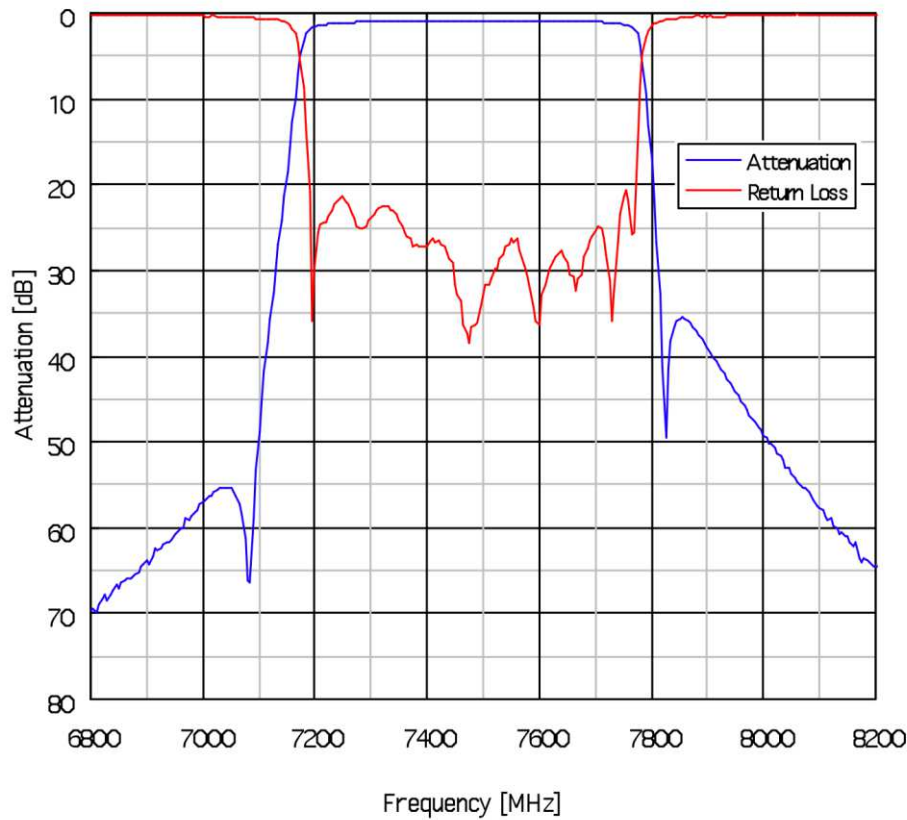
Mechanical drawing



X-LNB with built-in isolator outline drawing

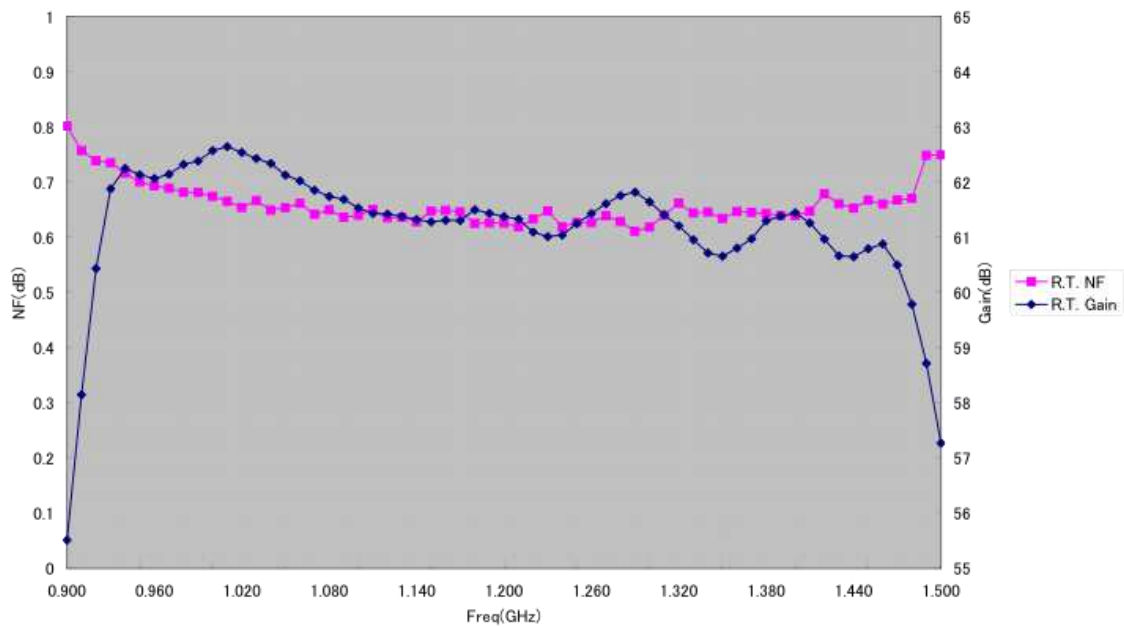


UNIT mm



There is both a receive bandpass and transmit reject filter inside the X-MIC. The receive bandpass filter has a minimal insertion loss and ripple in the 7.25 to 7.75 GHz range. The transmit reject filter has 55 dB of attenuation in the guard band. But to get the necessary amount of transmit rejection, an external input transmit reject filter needs to be added.

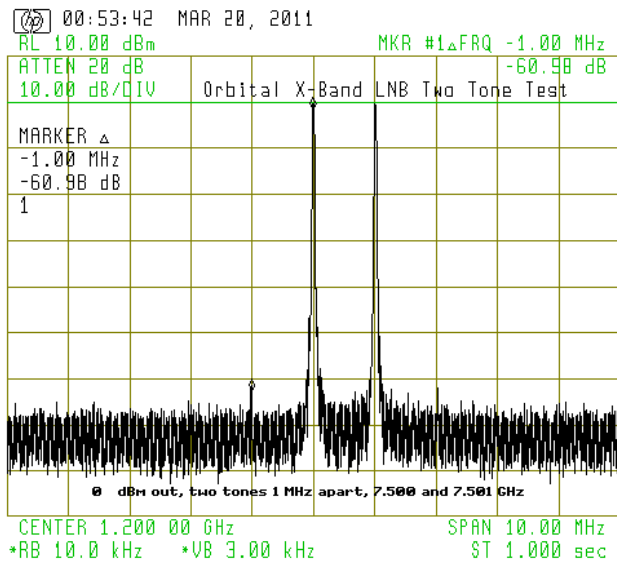
Internal Filter Frequency Response



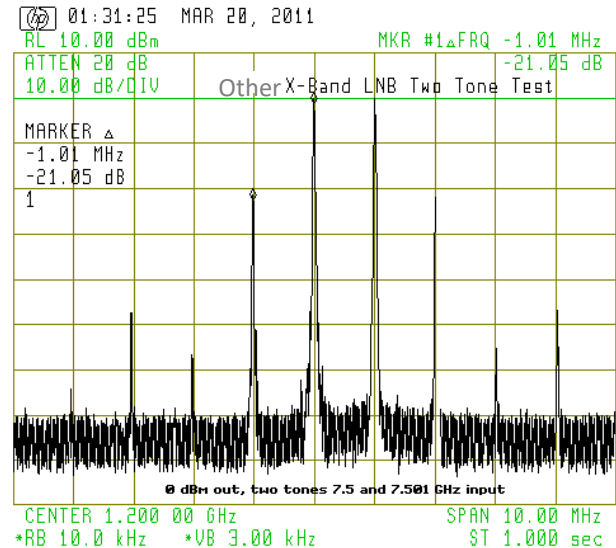
Noise Figure and Gain

Two Tone Test

What it means - The two plots below compare gain linearity for the Orbital design with competitor designs. Two tones at 7.500 GHz and 7.501 GHz are injected into the LNBS to provide 0 dBm out. The first spur in the Orbital design is over -60 dBc down compared to the multiple spurs on the competitive LNB starting at only -20 dB down. Intermodulation (IM) distortion for a given output is reduced in the Orbital LNB while providing higher overall gain, 60 dB minimum for the Orbital LNB.



Orbital LNB



Competitor LNB

How it works - The LNB has to amplify the multiple signals from the satellite by a factor of a million (60 dB) without adding significant noise (noise figure), but also to perform this conversion without adding distortion. The above graphs represent the comparative levels of distortion between the Orbital design and competitive designs. Basically, if you put two signals into the LNB, you should get two signals, and only two signals, out. You can imagine the mess using a poor quality LNB when you amplify and convert the dozens or even hundreds of signals from the satellite.

What it shows - While an LNB would never be operated at 0 dBm output level, the test and design represent the linear conversion quality of each LNB and the P1 dB compression point. The Two Tone tests are proxies for the quality of conversion that is absolutely necessary for low bit error rate satellite transmissions. LNB non-linearity starts at much lower levels than 0 dBm output, and the Two tone test is the best method of comparing the quality of design and manufacture of LNBS. The ultimate benefit to the end user is lower noise figure, higher conversion gain, and most importantly, lower bit error rate for their digital transmissions.

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