

Orbital 694XA & 694XAI Series

Ka BAND EXTERNAL REFERENCE LNB with isolator & anchor posts



Wide range of Frequencies and Bandwidths

How to order an Orbital 694XA & 694XAI Series Ka Ext Ref LNB

Frequencies (GHz):

LO	Input	Output	Bandwidth
16.35M	- 17.3 to 17.8	.95 to 1.45	0.500
17.25M	- 18.2 to 19.2	.95 to 1.95	1.000
18.25M	- 19.2 to 20.2	.95 to 1.95	1.000
19.20M	- 20.2 to 21.2	1.0 to 2.0	1.000
19.25M	- 20.2 to 21.2	.95 to 1.95	1.000
19.50M	- 20.6 to 21.2	1.1 to 1.7	0.600
20.25M	- 21.2 to 22.2	.95 to 1.95	1.000
20.45M	- 21.4 to 22.0	.95 to 1.55	0.600

Bandwidth in MHz

'X' Signifies External Reference

LNB 1925M - 1000 XA-WN60-F4

'' - no Anchor Posts, ribbed case
A - Anchor Posts (smooth case)

Input Connector
Ka LNB is WR-42

Output Connector
F - F, 75 ohm
N - N, 50 ohm
S - SMA, 50 ohm

Gain
50 - 50 dB
60 - 60 dB
70 - 70 dB

F4 - Input Isolator attached
G - Enhanced Gain Flatness

Standard Quality

The Orbital 694XA Series Ka-XR LNBs meet Mil Standard 188-164A specifications. Part of this Mil Standard Interoperability spec is that the output frequency range is 1000 to 2000 MHz. We can provide that output or the traditional commercial frequency range of 950 to 1950 MHz. Orbital can also meet Mil Standard 810F environmental standards on request.

Loss of Lock Alarm as part of LNB - Option

LNBs can lose oscillator lock from internal failure or loss of the 10 MHz reference. The LOLA detects this anomaly and increases the current consumption of the LNB over the IFL cable to trigger a redundant switch or other detector. No extra ports, cables or infrastructure are required.

Simply hookup the LNB with 10 MHz present, set the current windows on the redundancy system so they are just out of triggering, then turn off the 10 MHz to trigger the LNB LOL circuit. The redundant switch should activate. Restore 10 MHz and the LOLA will reset.

It should be noted that these LNBs are exceptionally good for 10 MHz lock range. They will stay locked under adverse 10 MHz conditions and keep the system in sync.

Orbital Features:

Environmental

- O ring sealed connectors for weather resistant operation

Options

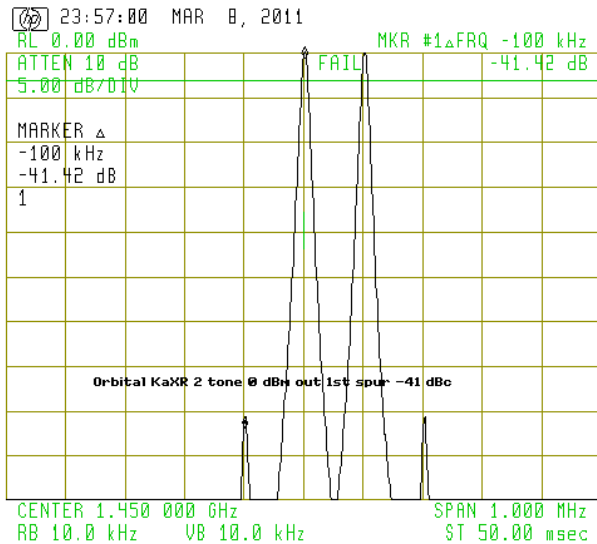
- Other input / output frequency ranges available
- Full test documentation available
- Other colors available
- Ribbed, no anchor posts, and other case styles available

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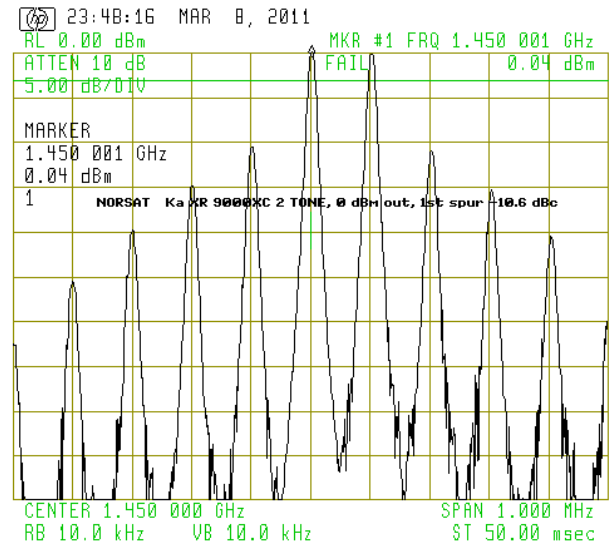
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Two-Tone spec

The two plots below compare gain linearity for the new Orbital design with competitor designs. Two tones at 20.200000 GHz and 20.200100 GHz are injected into the LNBS to provide 0 dBm out. The first spur in the Orbital design is over -40 dBc down compared to the multiple spurs on the competitive LNB starting at only -10 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, versus 55 dB for the competitor LNB.



Orbital LNB



Competitive LNB

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.

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 2 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.

Orbital Ka Isolator

The Orbital isolator is designed to shorten the overall length of conventional Ka LNB/Isolator combinations thus reducing overall weight, cost and waveguide stress on system installations. As well, by tuning the isolator and LNB together, the input insertion loss is reduced and C/N is optimized.

The unique look is in the screws. This custom manufactured isolator has been designed to accept slotted hex standoffs that fit in the body of the unit, allowing it to be flush mounted on the LNB, which in turn allows easy mounting of other components.

ELECTRICAL SPECIFICATIONS

Item	With Isolator (694XA)	Without Isolator (694XA)																					
RF Input Frequency	Standard Frequencies on first page. Others available.	<table border="1"> <caption>Phase Noise Plot Data</caption> <thead> <tr> <th>Frequency</th> <th>Phase Noise Mask (dBc/Hz)</th> <th>LNB Phase Noise (typ) (dBc/Hz)</th> </tr> </thead> <tbody> <tr> <td>10 Hz</td> <td>-40</td> <td>-50</td> </tr> <tr> <td>100 Hz</td> <td>-60</td> <td>-67</td> </tr> <tr> <td>1 kHz</td> <td>-70</td> <td>-80</td> </tr> <tr> <td>10 kHz</td> <td>-80</td> <td>-86</td> </tr> <tr> <td>100 kHz</td> <td>-90</td> <td>-96</td> </tr> <tr> <td>1 MHz</td> <td>-110</td> <td>-112</td> </tr> </tbody> </table>	Frequency	Phase Noise Mask (dBc/Hz)	LNB Phase Noise (typ) (dBc/Hz)	10 Hz	-40	-50	100 Hz	-60	-67	1 kHz	-70	-80	10 kHz	-80	-86	100 kHz	-90	-96	1 MHz	-110	-112
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IF Output Frequency	950 up to 1950 MHz; or 1,000 up to 2,000 MHz																						
LO Frequency	Standard Frequencies on first page. Others available.																						
LO Frequency Stability	Phase locked to external 10MHz reference																						
10 MHz input level	-10 to 0 dBm, multiplexed on to IF output																						
10 MHz Reference	-120 dBc/Hz @ 10 Hz -145 dBc/Hz @ 100Hz -160 dBc/Hz @ 1 kHz -165 dBc/Hz @ 10 kHz -165 dBc/Hz @ 100 kHz																						
LO Phase Noise (meets or exceeds MIL-STD 188-164A phase noise mask)	<table border="1"> <thead> <tr> <th>Phase Noise Mask</th> <th>Offset</th> <th>Phase Noise (typ)</th> </tr> </thead> <tbody> <tr> <td>-32 dBc/Hz</td> <td>10Hz</td> <td>-50 dBc/Hz</td> </tr> <tr> <td>-62 dBc/Hz</td> <td>100Hz</td> <td>-67 dBc/Hz</td> </tr> <tr> <td>-72 dBc/Hz</td> <td>1kHz</td> <td>-80 dBc/Hz</td> </tr> <tr> <td>-82 dBc/Hz</td> <td>10kHz</td> <td>-86 dBc/Hz</td> </tr> <tr> <td>-92 dBc/Hz</td> <td>100kHz</td> <td>-96 dBc/Hz</td> </tr> <tr> <td>-102 dBc/Hz</td> <td>1 MHz</td> <td>-112 dBc/Hz</td> </tr> </tbody> </table>	Phase Noise Mask	Offset	Phase Noise (typ)	-32 dBc/Hz	10Hz	-50 dBc/Hz	-62 dBc/Hz	100Hz	-67 dBc/Hz	-72 dBc/Hz	1kHz	-80 dBc/Hz	-82 dBc/Hz	10kHz	-86 dBc/Hz	-92 dBc/Hz	100kHz	-96 dBc/Hz	-102 dBc/Hz	1 MHz	-112 dBc/Hz	
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LO Leakage	Virtually eliminated (with isolator)	-70 dBm max at RF input; -55dBm max at IF output																					
Noise Figure	1.3 dB typ. @+23°C	Approx. 1.2 dB @+23°C, dependent upon connecting components																					
Gain	60dB nominal. (50dB to 70db optional)																						
Gain Flatness	±0.5 dB max over any 27 MHz segment																						
Gain Variation	±2.0dB max. over Temperature & Frequency																						
Input VSWR	1.3:1 max.	1.5:1 to 2.5:1, dependent upon connecting components																					
Output VSWR	1.8:1 max.																						
Output Stability	Unconditionally stable (no oscillation) for all possible input loads																						
In-Band Spurious Rejection	>50 dBc or <-90 dBm																						
Image Rejection	>45dB																						
P1dB Compression point	+10 dBm nominal																						
3 rd order Intercept	+20 dBm																						
Overdrive	-20dBm @Non-damaging																						
Input DC Power	+12 to +24VDC, 300mA Transient, over & reverse voltage protected Multiplexed on a single coaxial connector with the IF and 10MHz reference signal.																						
Input Interface	WR-42 waveguide, flat	WR-42 waveguide, gasketed																					
Output Interface	50Ω, N-type female coaxial connector, F-type (75Ω) or SMA (50Ω) also available																						

MECHANICAL SPECIFICATIONS

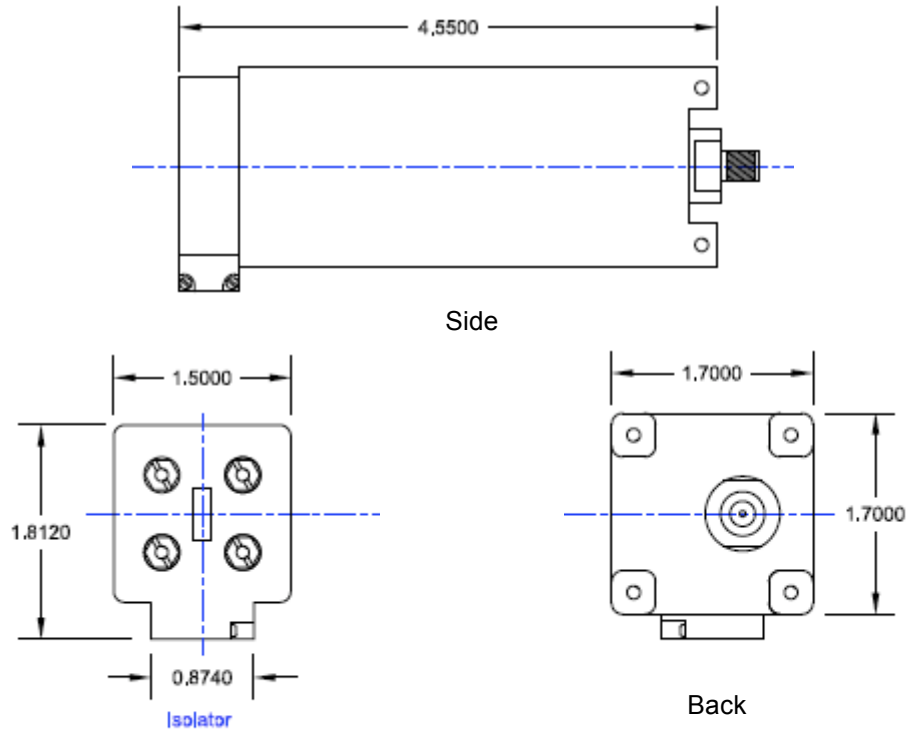
Size	(L) 116mm x (W) 43mm x (H) 46mm 4.55 x 1.7 x 1.82 inches	(L) 103mm x (W) 43mm x (H) 43mm 4.05 x 1.7 x 1.7 inches
Weight	approx. 360g (anchor), 410g (ribbed) 12.7 oz (anchor), 14.5 (ribbed)	approx. 300g (anchor), 350g (ribbed) 10.6 oz (anchor), 12.3 oz (ribbed)
Color	Blue or Gold Anodized, MIL-STD-595 paint	

ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-40°C to +70°C	
Operating Altitude	10,000 ft ASL	
Operating Relative Humidity	Up to 100%, condensation and frost	
Non-operating Temperature	-50°C to +90°C	
Non-operating Altitude	50,000 ft. ASL	
F Shock	40g, 11ms, half sine	
Vibration	MIL-STD-810E, method 514-4	
MTBF	>125,000 hours	

Outline Drawing – 694XA1

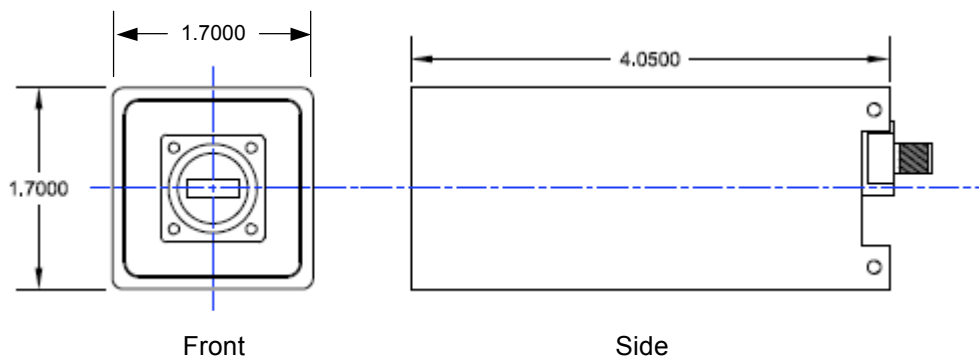
Smooth case with anchor posts and isolator



Hardware is #4 threaded standoffs with screwdriver slot that mount flush with outside of Isolator.

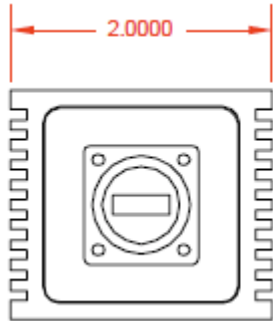
Outline Drawing – 694XA

Smooth case with anchor posts, without isolator

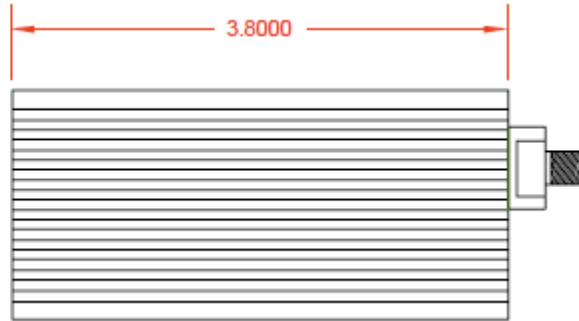


Outline Drawing – 694X

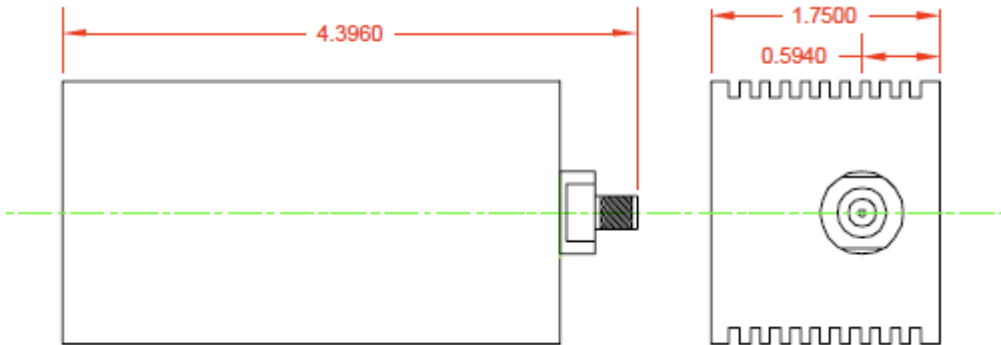
Ribbed case, without anchor posts or isolator



Front



Side



Top

Back