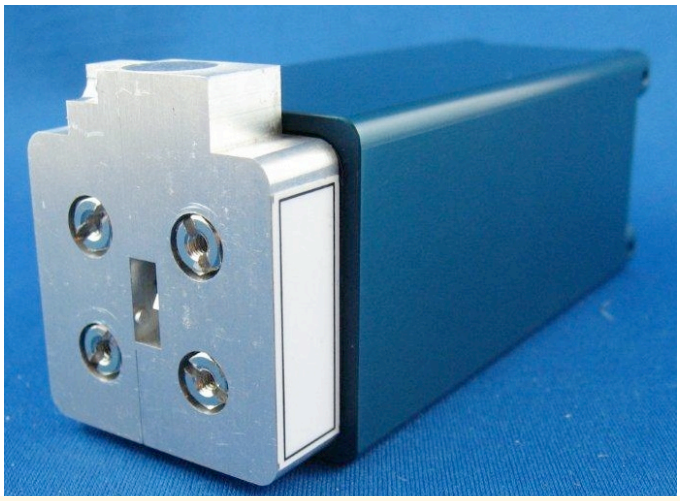

# Orbital 694PA & 694PAI Series

## Ka BAND PLL LNB with isolator & anchor posts

Orbital Research.net

## Wide range of Frequencies and Bandwidths

### How to order an Orbital 694PA or 694PAI Series Ka PLL 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

'P' Signifies PLL

LNB 1925M – 1000 PA-WN60–F4

'A' Signifies Anchor Posts

Input Connector
Ka LNB is WR-42

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

Gain
60 - 60dB (nominal)

F4 - Input Isolator attached
G - Enhanced Gain Flatness

### Standard Quality

Orbital's 694PA Series Ka-PLL 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.

### General Description

In our on-going effort to constantly improve our line-up of LNBs, Orbital has introduced the SWAP initiative. **S**maller, less **W**eight, **A**nd less **P**ower.

With our Orbital designed Ka isolator matched and attached, we have the shortest Ka PLL LNB in the market. Our new design has made the LNB lighter and less power consumptive than our last version. This will ensure a cooler running LNB that can accept a wider range of input DC and has a wider operating temperature range.

Overall, we've improved the quality and lowered the price and lead time.

### Orbital Features:

**Environmental**

- O ring sealed connectors for weather resistant operation

**Options**

- Other input / output frequency ranges available
- Loss-of-Lock-Alarm option for redundant switch operations
- Full test documentation available
- Other colors available


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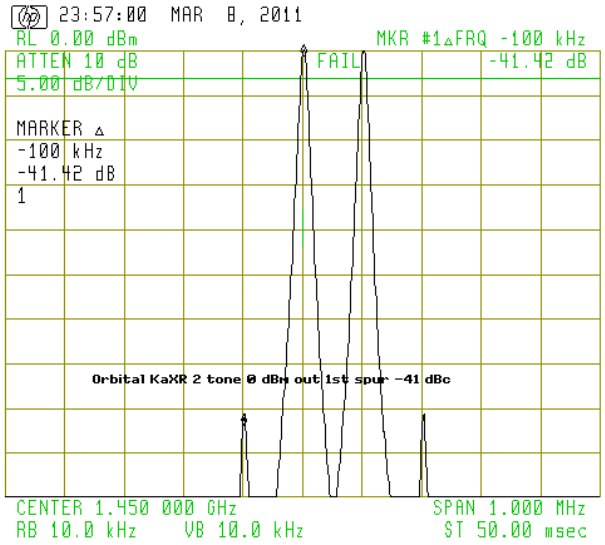
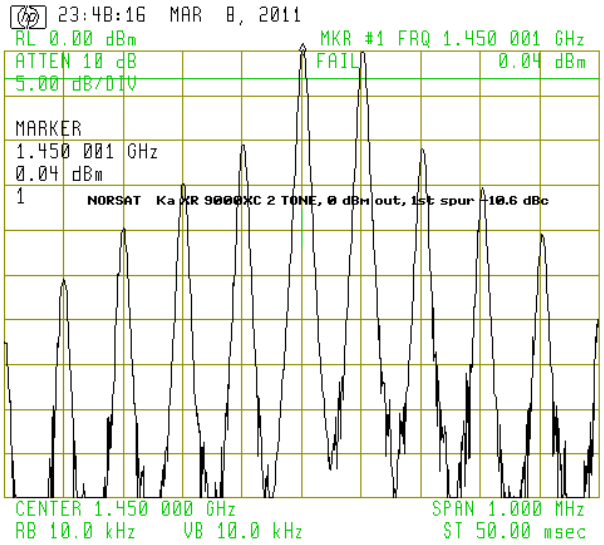
## Two-Tone spec

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.

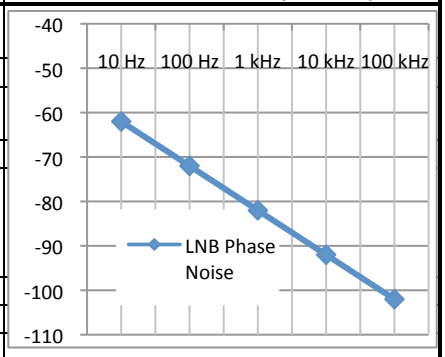
While an LNB would never be operated at 0 dBm output level, the test and design represent the linear conversion quality of each LNB and the P1 dB compression point. The Two Tone tests are proxies for the quality of conversion that is absolutely necessary for low bit error rate satellite transmissions. 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 of the isolator is in the screws. By having tapped holes in the screws, one less spacer is required to mount the LNB.

## ELECTRICAL SPECIFICATIONS

| Item | With Isolator (694PAI) | Without Isolator (694PA) |
|---|---|---|
| RF Input Frequency | Standard Frequencies on first page.<br>Others available. |  |
| IF Output Frequency | 950 up to 1950 MHz; or 1,000 up to 2,000 MHz | |
| LO Frequency | Standard Frequencies on first page.<br>Others available. | |
| LO Frequency Stability | ±50 kHz | |
| LO Phase Noise (MIL-STD 188-164A phase noise mask) | -72 dBc/Hz @ 100 Hz<br>-82 dBc/Hz @ 1 kHz<br>-92 dBc/Hz @ 10 kHz<br>-102 dBc/Hz @ 100 kHz | |
| Gain | 60dB min. | |
| Gain Flatness | ±0.5 dB max over any 27 MHz segment | |
| Gain Variation | ±2.0dB max. over Temperature & Frequency | |
| LO Leakage | Virtually eliminated | -45dBm max at IF output & input |
| Noise Figure | 1.2 dB typ. @+23°C | Approx. 1.1 dB @+23°C, dependent upon connecting components |
| Input VSWR | 1.3:1 max. | 1.5:1 to 2.5:1, dependent upon connecting components |
| Output VSWR | 2.1:1 max. | |
| Output Stability | Unconditionally stable (no oscillation) for all possible input loads | |
| In-Band Spurious Rejection | >40 dBc | |
| Image Rejection | >40dB | |
| P1dB Compression point | +10 dBm min. | |
| 3rd order Intercept | +20 dBm | |
| Overdrive | -20dBm @Non-damaging | |
| Input DC Power | +12 to +24VDC, 300mA<br>Transient, over & reverse voltage protected<br>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,<br>F-type (75Ω) or SMA (50Ω) also available | |

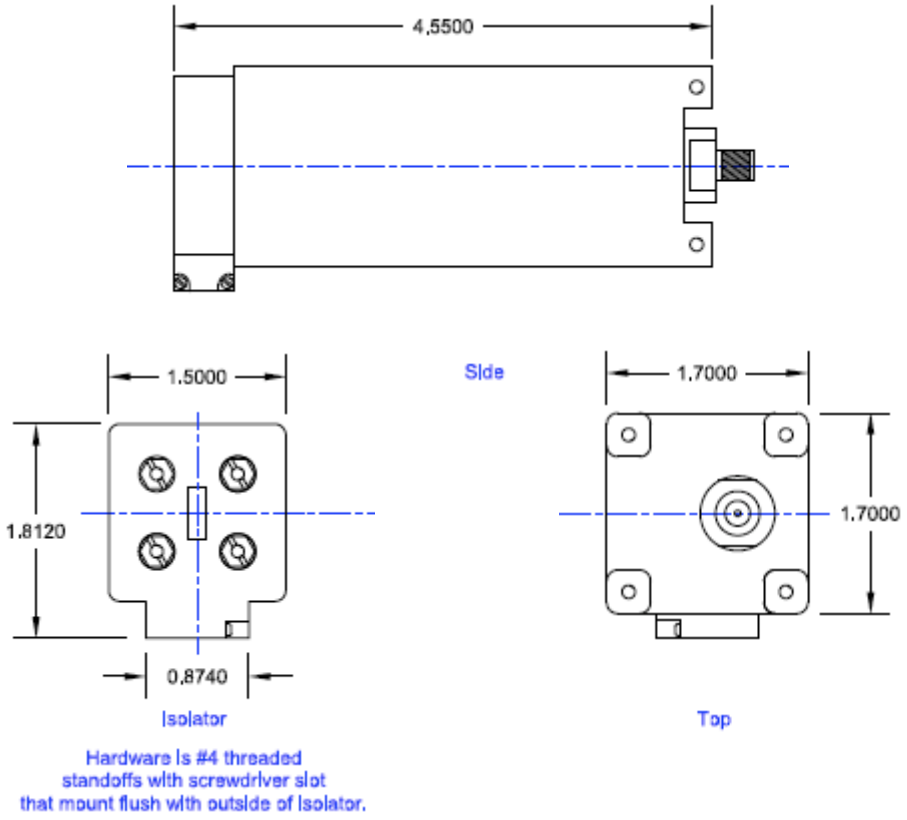
## MECHANICAL SPECIFICATIONS

| | | |
|---|---|---|
| Size | (L) 116mm x (W) 43mm x (H) 46mm<br>4.55 x 1.7 x 1.82 inches | (L) 103mm x (W) 43mm x (H) 43mm<br>4.05 x 1.7 x 1.7 inches |
| Weight | approx. 340g<br>12 oz | Approx. 300 g<br>10.6 oz |
| Color | Blue Anodyzed, MIL-STD-595 | |

## ENVIRONMENTAL SPECIFICATIONS

| | | |
|---|---|---|
| Operating Temperature | -40°C to +60°C | |
| Operating Altitude | 10,000 ft ASL | |
| Operating Relative Humidity | Up to 100%, condensation and frost | |
| Non-operating Temperature | -50°C to +70°C | |
| Non-operating Altitude | 50,000 ft. ASL | |
| F Shock | 20g, 11ms, half sine | |
| Vibration | MIL-STD-810E, method 514-4 | |
| MTBF | >125,000 hours | |

**Outline Drawing – 694PAI**
With isolator




**Outline Drawing – 694PA**
Without isolator