



*Positioning Leadership*

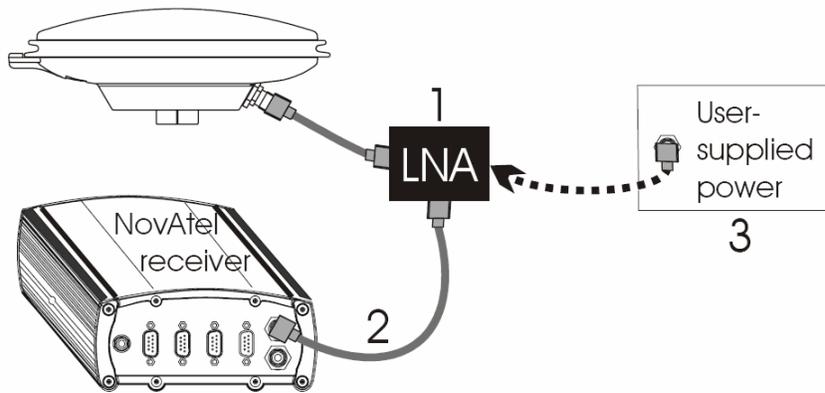
APN-035 Rev 0B

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This technical note is provided to summarize the required setup for the GPS-704-X passive wideband antenna. NovAtel has used this setup in the testing of our units. We have also provided details on the mini-circuits LNA used for our testing.

To Setup the Antenna follow the following instructions:

Attach the male TNC connector of the coaxial cable to the antenna's TNC connector. Mount an LNA close to the RF output of the antenna; see *LNA Setup* later in this application note. Attach the other end of the coaxial cable to an LNA (1 below), see the *LNA Setup* section of this guide. All NovAtel GPS receivers provide a 5 V power source for the LNA through their antenna RF connectors (2).



**Figure 1 - GPS-704-X Antenna Setup**

The LNA may either receive power from a NovAtel receiver or a separate power source. If you provide separate power (3) to the LNA, you must insert a DC block between the LNA and the receiver.

It is recommended that an external Low Noise Amplifier (LNA) and cables are used with the GPS-704-X antenna. Cable lengths are determined by their loss. A short cable should be connected between the antenna and the LNA with a maximum loss of 1 dB. A longer cable with a maximum loss of 10 dB is permitted between the LNA and the receiver. The following table provides some recommended specifications for choosing the external parts.

LNA Noise Figure	1.5 dB
LNA Bandwidth	1100-1700 MHz
Group Delay Variation Across LNA Bandwidth	5 ns max
LNA Gain	25 dB min
LNA VSWR	2:1 max
Cable Loss Between Antenna and LNA	1 dB max
Cable Loss Between LNA and Receiver	10 dB max
Connectors	TNC
LNA and Cable Impedance	50 $\Omega$

NovAtel has set up this antenna using the ZEL-1217LN LNA from Mini-Circuits ([www.minicircuits.com](http://www.minicircuits.com)). It has specified bandwidth of 1200-1700 MHz but actually covers L5 as well.

Spectrum Microwave ([www.specwave.com](http://www.specwave.com)) also has a L1/L5 (L1/E5a for Galileo) external LNA that will also work with the GPS-704-X antenna if L1/L5 tracking is all that is required.

### ***Final Points***

If you require any further information regarding the topics covered within this application, please contact:

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