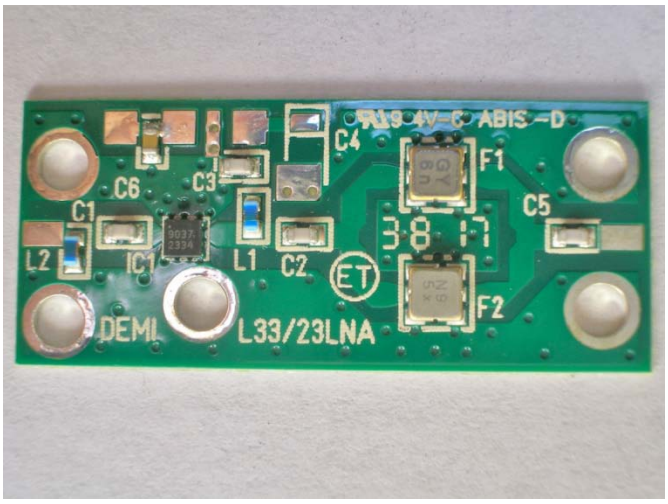
DEM L33 / L23LNA Low Noise Amplifier Kit and Complete Kit

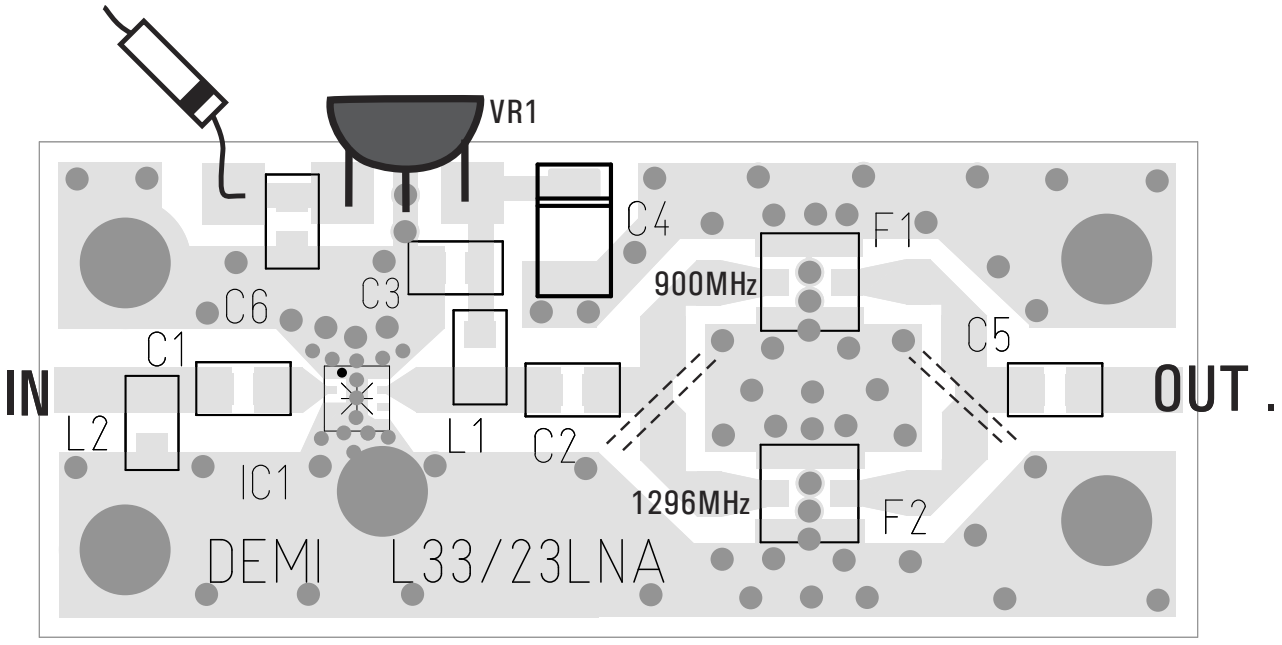
Description:

The DEM L33/23LNACK is a simple kit utilizing a preassembled PC board a and machined Enclosure. All that is required is to select the desired band pass filter and to install three components on the board before installing the circuit board in the supplied enclosure.



Assembly:

Start by locating the PCB as shown to the right and understanding its structure. It requires the correct filter to be enabled and the 5VDC regulator to be installed with its bypass capacitor (C4). F1 is required for 33 cm operation (890 -930 MHz) and F2 is required for 23 cm operation (1280 -1320 MHz). Place the circuit board on a flat stable surface such as your work bench and with a razor knife; make the appropriate cuts to remove the filter and its circuitry that is ***not required***. The pictorial below shows the 23 cm circuit ***removed*** enabling the 33 cm circuit activity and use. Make two cuts to be sure that the circuit is still not connected through a fine sliver of copper circuitry. **NOTE:** The LNA will not operate correctly on both bands simultaneously if the circuitry is left uncut.



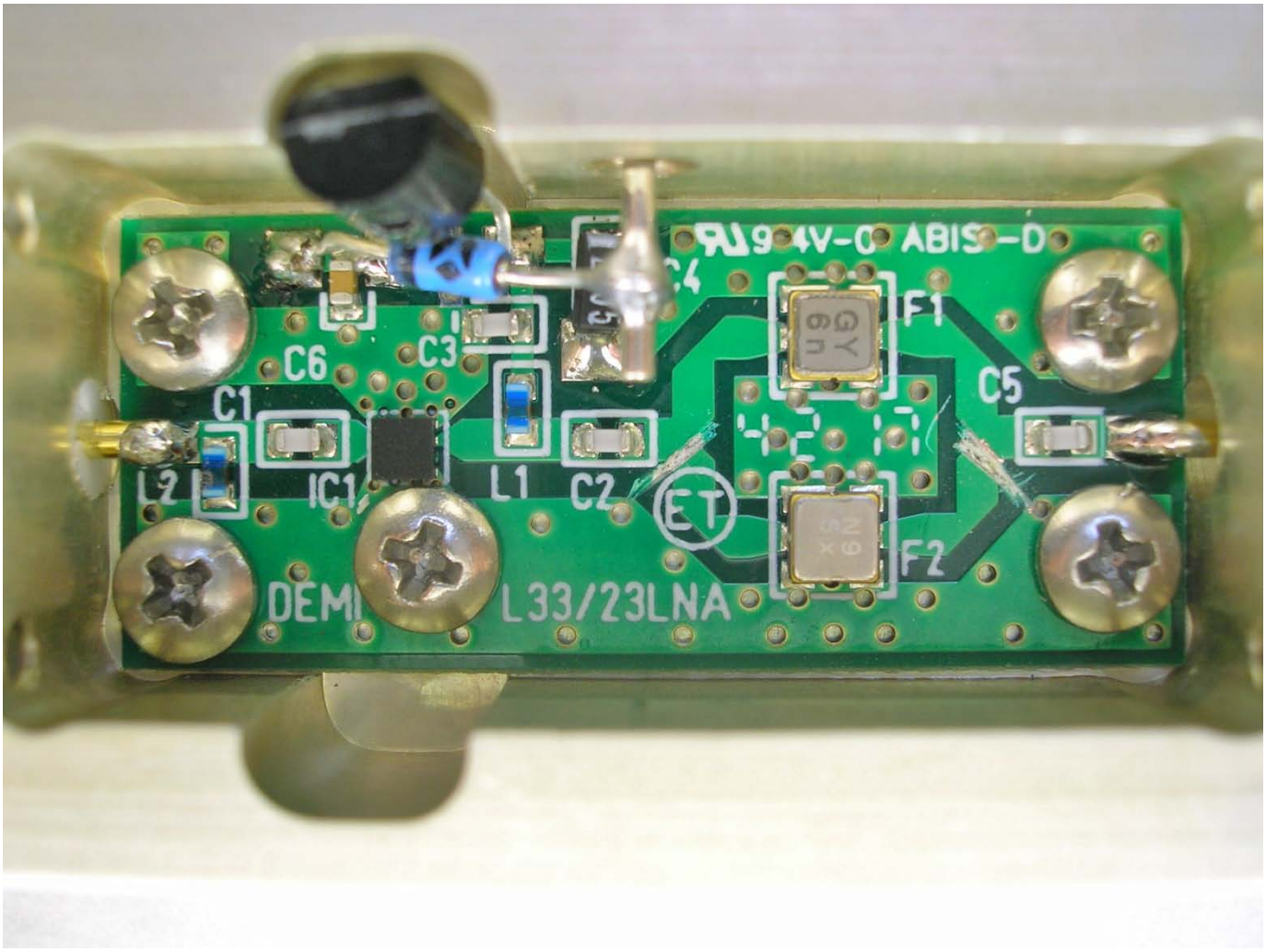
After the correct filter is selected by disabling the other, install the 78L05 regulator VR1, and C4 as shown above. Cut the leads of the regulator to 3/8' or less and attach to the circuit board. Then be sure to observe the polarity of C4 before installing. The banded end is the Positive. Then install the Diode as shown above.

When the PC Board work is complete, trial fit the RF connectors and trim the Teflon if necessary so that it will not extend past the inside wall of the enclosure. Then trim the pin length to extend past the wall by 1/8". Do not install the connectors.

The picture below should be utilized for the next steps. Notice that the 23 cm filters are disabled in this sample.

Drop the circuit board in the enclosure as shown. You may need to bend the regulator up a bit more and position the polarity diode so that it does not interfere with the board placement. It is OK for the regulator to come on contact with the enclosure wall. The Cut out in the wall is for the Regulator's position. Then using the five 3-48 x 3/16" screws, start all five screws through the board and ***do not tighten***. Next, install one RF connector being careful of the pin length in that it does not touch L2 or C5. If so, re-trim its length. If the clearance is OK, bolt the connector in place using four 4-40 x ¼" screws. Then install the last RF connector again observing the pin length. Checking the pin alignment with the circuit board, then tighten the circuit board screws. When complete, solder the pins to the circuit board.

Last, install the +DC feed through connector and ground lug. Put a right angle bend on the lug before installing. Use a 3/16" wrench or nut driver to "Snug Fit "the feed through. Then connect and solder the diode to it. The LNA is ready to test.



(900MHz version shown above)

Testing:

Testing is simple. There are no adjustments to make. It is a wide band MMIC with a band pass filter. The filter is the only band sensitive component in the LNA therefore; If you have selected the correct filter for your application, you are ready to go! Install the LNA in your system, or with the test equipment of choice to verify the units Gain and Noise Figure. Once connected, apply a DC voltage between 7 and 19VDC, and the LNA should have a current drain of 60 – 70 ma. Gain and Noise Figures should be as specified in the specifications listed last in this document. If there is little to no current drain, verify the polarity of the diode and the connections of the regulator. If there is excessive current drain, verify that there are no DC shorts around the regulator and that C4 is installed correctly. If the current drain is correct and the gain of the LNA is not near specification, verify that the proper filter is in use and /or that the cuts made to the circuit board are correct without shorts. Also verify that the RF connector pins are soldered or not shorted but understand that the input connector is DC shorted by the L1 inductor. If you desire to pre-test the LNA in a test bench environment before installation, do not apply more than -10dBm to the input if testing for linear response. At levels above -10dBm, expect some gain compression but the LNA will tolerate +22dBm before damage.

Installation and Operation:

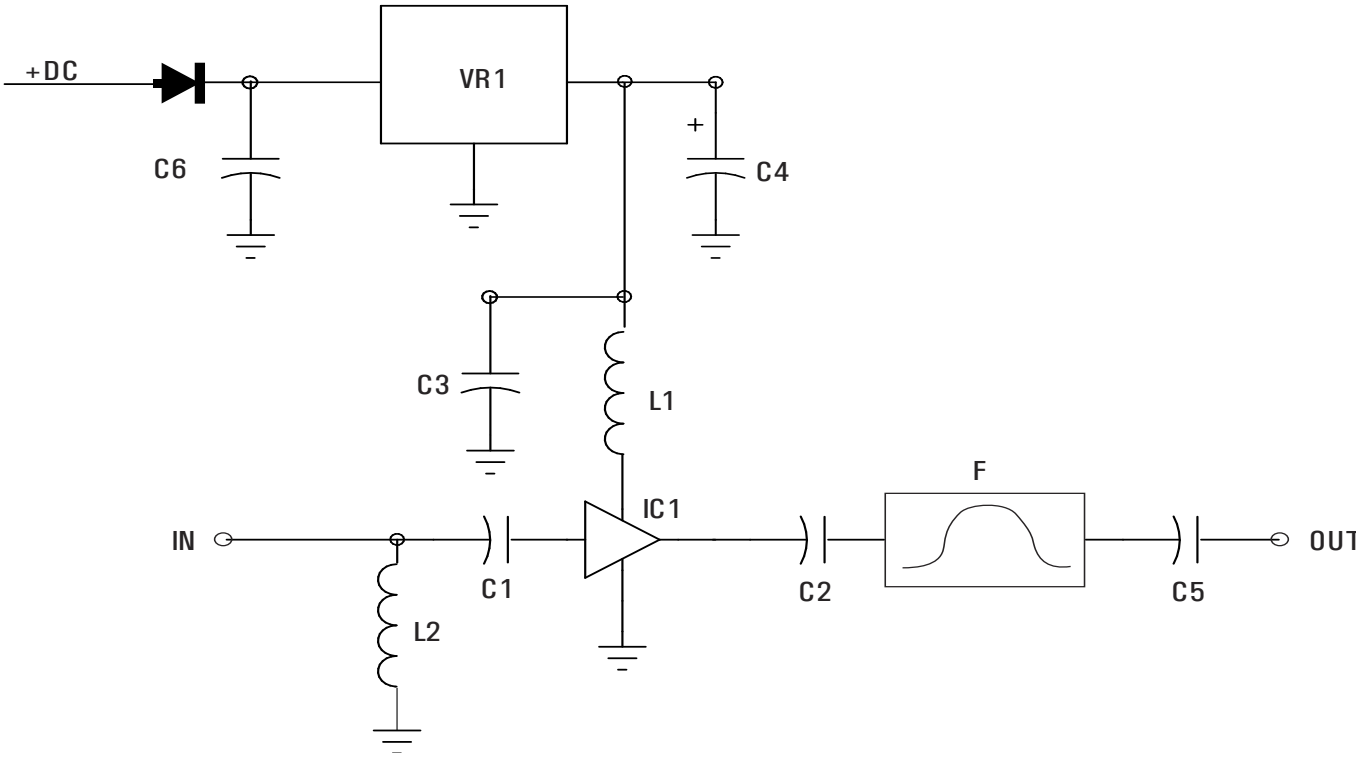
Depending on your application, the LNA may be installed anywhere in your system to increase gain. To maintain or improve the systems noise figure requires the LNA to be installed as close to the systems antenna as possible. If you plan to utilize this LNA in a transceive system with transmit bypass relays, be sure of their isolation characteristics and transmit power handling capabilities before transmitting. Use only interconnecting cables and/or adapters that are rated for use at or above the intended frequency of use. Inadequate cabling or cables with poor shielding may cause system instabilities, signal loss, or undesirable intermittent operation. Test any sequenced scheme before applying transmits power to avoid mishaps.

Expected performance with the LNA correctly installed should be overall improvement in gain and system noise figure of the receive system. The proper installation of an LNA becomes more important if you make this installation in a harsh RF environment. The gain bandwidth of the LNA is just wide enough at the specified operating frequency to obtain a low noise figure. This still may result in the passing of strong but “close in frequency” signals that may cause the overloading of your receiver resulting in increased inter-modulation. This design utilizes a SAW band pass filter in the output circuit that will eliminate all but the strongest of interfering signals.

The input is protected with a DC path to ground to eliminate static build up from rain or wind but may not survive levels of EMP developed by lightning. Please use standard lightning protection for all installations.

L33LNAK or L23LNAKComponent Bag	
(1) 1N914 diode	(1) 1.0 μF Tant Chip Cap
L33LNA or L23LNA Hardware Bag	
(5) 3-48 x 3/16” screw	(1) 8-32 Feed Thru
(12) 4-40 x ¼” screw	(1) #8 GND Lug

Schematic Diagram:



Specifications:

Model:	L33LNA	L23LNA
Gain:	17dB nominal	16dB nominal
Frequency Range	895 – 930 MHz	1280 – 1320 MHz
Noise Figure:	<0.5dB	<0.5dB
P1dB:	+20dBm output	+20dBm output
Input VSWR:	>6dB 500 - 3500 MHz	>6dB 500 - 3500 MHz
Output VSWR:	>10dB @. design frequency	>10dB @ design frequency
Voltage:	+7 - +22 VDC	+7 - +22 VDC
Current Drain	70 mA nominal	70 mA nominal
Max RF input power	+22dBm	+22dBm