



DM9610 L-band Beamforming DownConverter

(preliminary data-sheet)

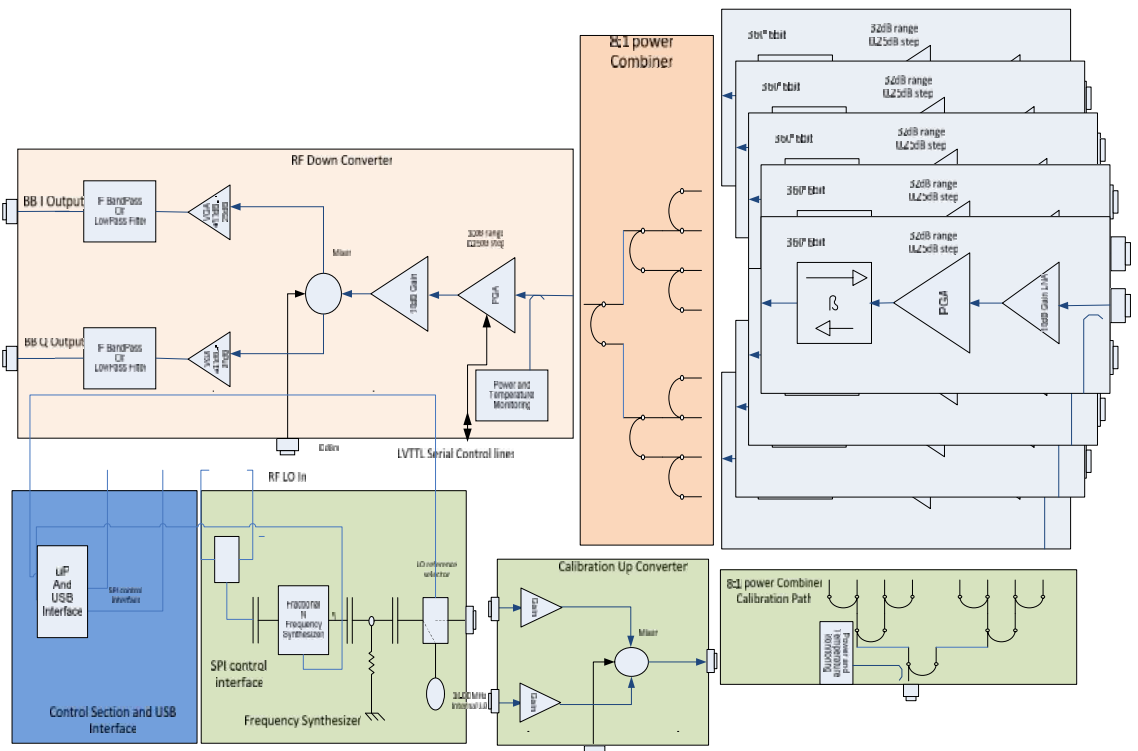
Description

The DM9610 is a RF Down Converter and 8 Nodes Beam-Former in a 3U from factor. The RF input may be in the range of -10dBm to -50 dBm and the demodulator allows direct conversion to Low IF or Baseband complex I/Q Output.
 The Input RF allowed frequency is in the range of 1450MHz to 2400 MHz.
 The Maximum allowed analog bandwidth is 500 MHz when used as a direct IQ demodulator, or 200 MHz when the output is Low IF centered at 140 MHz.
 DM9610 Features a Down-Converter demodulator, fed by 8 Beam Forming Nodes (BFN). Each BFN allow to control phase (360°, 6 bits) and gain (31.75dB control range in 0.25 dB attenuation steps). In order to maintain a low NF (Noise Figure) each node of the DM9610 has an input LNA. Part of DM9610 is the calibration return path, consisting of an internal modulator coupled to each of the 8BFN receiving nodes. A synthesis section to generate LO signals is also present.

Features

- 1 RF Down Converter
- 8 Beam-Forming Nodes
 - 360°, 6 bits phase control;
 - 31.75 dB, 0.25 dB steps attenuation Control;
- Ultra wideband: Up to 500MHz bandwidth (IQ baseband complex) or 200MHz IF centered;
- Input power range: -9 to -55 dBm from each node;
- Output BB/IF and LO Carrier SMA Connectors;
- <4dB Noise Figure;
- BB/IF Input impedance 50 ohm Se AC (IF Input) or DC Coupled (IQ Modulator)
- Input Frequency range 1450MHz to 2400 MHz
 - RF center frequency 1700MHz to 2100 MHz @ 500 MHz bandwidth;
 - RF center frequency 1525MHz to 2325 MHz @ 125 MHz bandwidth;
- On Board Complete Calibration Path Internally coupled with internal Up-Converter;
- On Board LO Synthesis Section, either from external 10 MHz or internal;
- Completely controllable from USB;
- Form Factor : 3U

Complete Block Diagram





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Detailed description

The DM9610 is a 8 BFN Nodes RF Down-converter to Low IF or baseband IQ, in a 3U form factor (highest worldwide integration) suitable for L-Band applications and covering in particular the GPS frequencies with huge bandwidth (up to 500 MHz). It can be used either in instrumentation or in L1 bandwidth of actual and forthcoming second generation navigation systems (GPS, Glonass, Galileo...).

DM9610 top level diagram and board level diagram are shown in page 1 of this datasheet.

The board may be used either with external LO (for higher performances test equipment) or with internal Synthesis section (externally 10MHz locked or free running).

DM9610 features:

-Up converter Section

-8 Beam-Forming Nodes

- 360° , 6 bits phase control;
- 31.75 dB, 0.25 dB steps attenuation Control;
- Ultra wideband: Up to 500MHz bandwidth (IQ baseband complex) or 200MHz IF centered;
- Input Frequency range 1450MHz to 2400 MHz
 - RF center frequency 1700MHz to 2150 MHz @ 500 MHz bandwidth;
 - RF center frequency 1525MHz to 2325 MHz @ 125 MHz bandwidth;
- maximum output power: -8 dBm from each node;

-Output BB/IF and LO Carrier SMA Connectors

-Input power range: -9 to -55 dBm from each node;

-Noise Figure : <4dB (@RFIN<-20dBm) ;

-BB/IF Output impedance 50 ohm Se DC Coupled

- On Board Complete Calibration Path Internally coupled with internal Up-Converter used to generate calibration signals;

-The calibration path may also be used in a real time environment to continuously monitor the output power of each one of the 8 BFN nodes separately.

-On Board LO Synthesis Section, either from external 10 MHz or internal;

-Completely controllable from USB;

The presence of an on-board microcontroller and mini USB port allows, using the delivered SW GUI, to easily configure via internal LVTTTL serial lines all the features and to monitor power and temperature. maximum IF Output level are is 4dBm and the maximum gain chain is 45 dB

Electrical Characteristics

1. Electrical characteristics at ambient temperature. Working Temperature range is 0 to 65 °C.

2. Input and output termination: 50 ohm AC Coupled.

3. Specified Bandwidth for +/-0.5dB flatness. Actual bandwidth are higher than those specified so to keep low Group delay variation

Symbol	Parameters	Min	Typ	Max	Units
VDC	Power supply voltage	7	12	24.00	V
VLO	Input LO Drive Level		0		dBm
Gr	Gain Control Range Common		60		dB
Gstep_C	Gain Control Accuracy Common		0.25		dB
Fi	Phase Control Accuracy on each Node		5.625		degrees
Gstep	Gain Control Accuracy on each Node		0.25		dB
Gr	Gain Control Range Each Node		31.75		dB
FRF	Output RF Frequency	1450	1900	2400	MHz
BW	Maximum RF Bandwidth		500		MHz
RLin	Minimum Input return loss	10			dB
NF	Noise Figure @InPow <-20 dBm @InPow >-20 dBm		4 6		dB
IMREJ	Image Rejection With no RF Filter	35	45		dB
InPow	Input Power Range From each Node		-8..-55		dBm
Pd	Power dissipation		20		W

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Specifications are based on most current or latest revision.

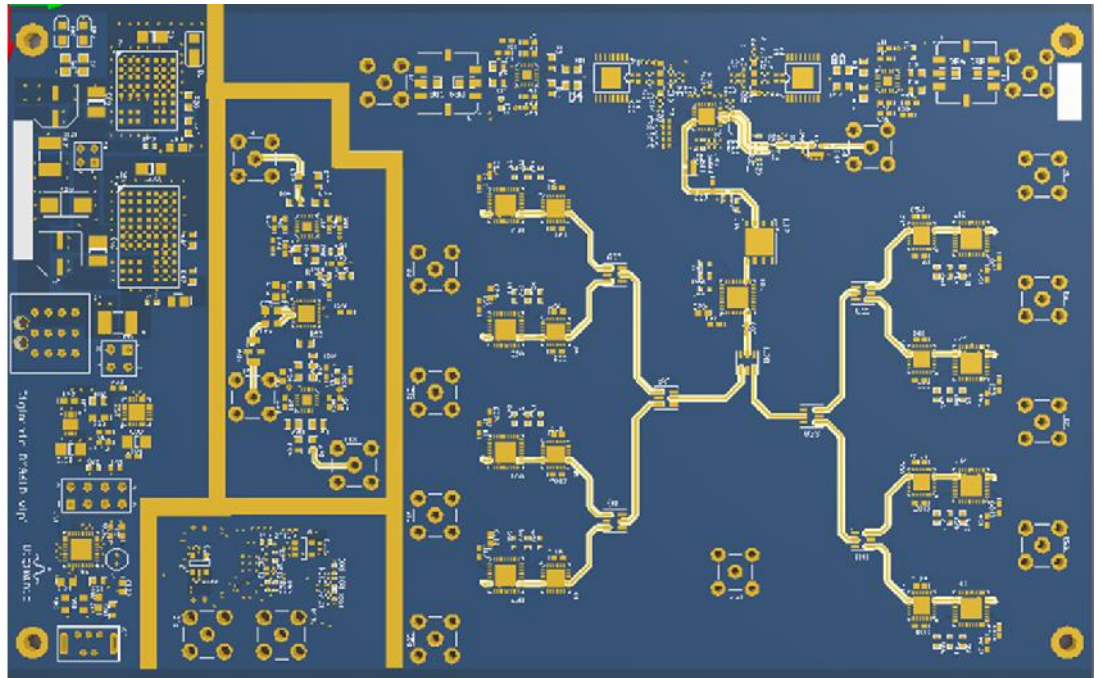
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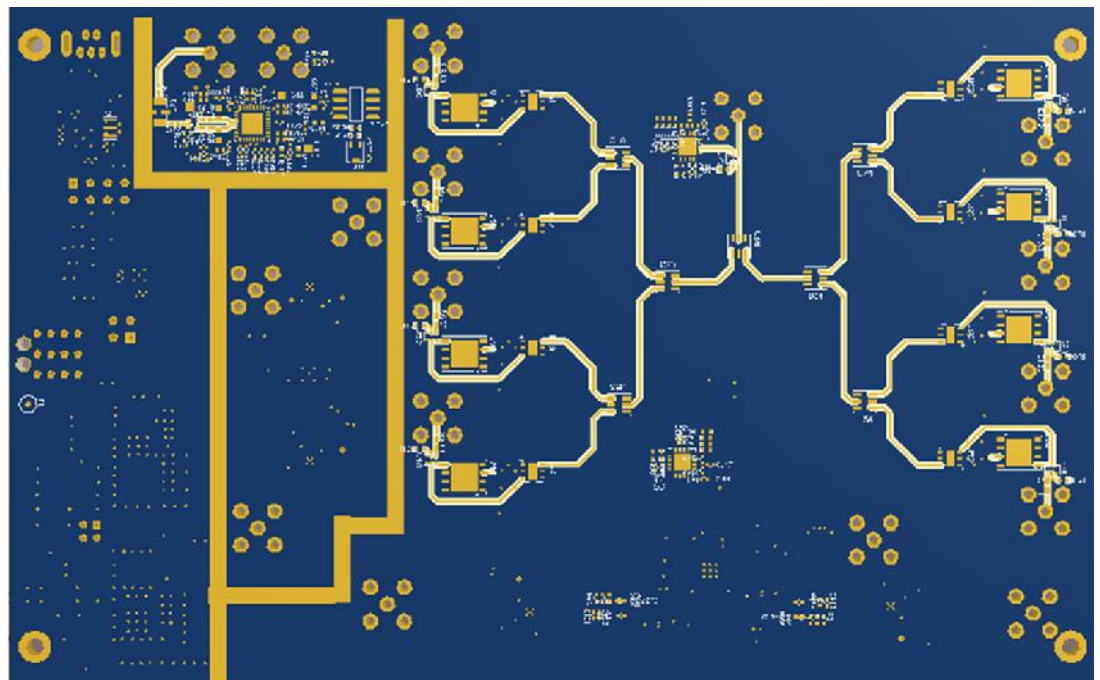
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PCB
Layout
(Top:
Main Sections)



PCB
Layout
(Bottom:
Calibration Path)





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Application Information

CAUTION: THIS IS AN ESD SENSITIVE DEVICE

Manage with care. Please avoid stresses above absolute maximum operating ratings.

Product Status Definitions

Datasheet Identification	Product Status	Definition
Advanced Information	Formative or or In Design	This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.
Preliminary	First Production	This datasheet contains preliminary data, and supplementary data will be published at a later date. DIGIMIMIC reserves the right to make changes at any time without notice in order to improve design.
No Identification Needed	Full Production	This datasheet contains final specifications. DIGIMIMIC reserves the right to make changes at any time without notice in order to improve design.
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