The DM9300 is a 3 channel BB-IF to RF Up-converter in a 3U form factor. The input may be:
- Baseband IQ complex signal, so to allow direct conversion to RF (Option Q) or
- IF Single component for intermediate frequencies up to 150MHz (Baseline).
The output RF frequency is in the range of 1150MHz to 1600 MHz. Other Frequencies available upon request.

Each Up-converting chain presents:
- An input by-passable filter that allows to reject unwanted frequencies
- Single ended to differential wideband amplifier
- Direct Quadrature Modulator
- Output low noise Gain Amplifier (Optional).
- On Board by-passable RF Filter
- On Board RF Power and temperature monitoring

Internal Microcontroller and USB connector allow to DM9300 to be configured via a PC based GUI. Optionally the board may be mounted in backplane applications.

Features:
- L Band RF Up converter to cover all GPS and Galileo Navigation services
- 3 channels in a single board (any frequency configuration allowed)
- Ultra wideband: Up to 200MHz bandwidth (Option Q) or 100MHz IF centered (Baseline)
- Input BB/IF and LO Carrier SMA Connectors
- Input Level up to 0 dBm (maximum BB/IF, nominal LO)
- BB/IF Input impedance 50 ohm Si AC (Baseline) or DC Coupled (Option Q)
- Optional Input Filter
- Optional Output RF Image rejection Filter (Option A,B,C,N)
- Output Level: up to -20 dBm
- Gain: -24 dB (AC coupled Load, -40 dBm option L)
- Power Consumption (7V<V<20V): 7W total
- Form Factor: 3U
- Optional Hard Metric Connector (IEC 61076-4-101) - Type M (Option M)

Specifications are based on most current or latest revision.
The DM9300 is a 3 channel BB-IF to RF Up-converter in a 3U form factor (highest worldwide integration) suitable for L-Band applications and covering in particular all the frequencies and bandwidth (L1, L2, L5, E5, E6) of the actual and forthcoming second generation navigation systems (GPS, Glonass, Galileo…). Each channel's top level diagram and board level diagram are shown in page 1 and 2 of this datasheet.

The board has no RF carrier synthesis thus allowing the DM9300 to be used in navigation system test equipments, where the synthesis section is usually much more accurate than commercial up-converters. Each Up-converting chain presents:

- An input filter that allows to reject unwanted frequencies.
- Modulator.
- Output RF Filter. Ordering option A, B, C select E5, E6 or L1 center frequencies and bandwidth. Option N has to be used when no internal filtering is required (and filter has to be provided by customer otherwise image will not be suppressed). Customized filters may also be delivered on customer requirements.
- Output low noise Amplifier (Option G).
- Output power control (32 dB range in 0.25 dB steps)
- Output power detector (to monitor output power)
- Temperature sensor.

Each section is provided with its own BB/IF input, LO and output SMA connectors. For commercial backplane applications, is possible to fed BB/IF inputs and LO via a dedicated Hard Metric Connector Type M (IEC 61076-4-101) (Option M) (Not mounted in photographs). Please note that BB/IF and LO signal paths from type M Connectors to each section are not equalized, so for high accuracy, channel synchronous and low noise applications (typical of Test Equipment) is suggested to order the baseline SMA connectorized version.

The presence of an onboard microcontroller and mini USB port allow, using the delivered SW GUI, to easily configure via internal LVTTL serial lines all the features and to monitor power and temperature. When Option M is selected, the control lines are also echoed to the backplane Type M Connector.

The maximum IF input level are is 4dBm and the gain chain is -24dB (-4 dB when the internal LNA is used – option G).

The Complete Part Number of DM9300 is:

DM9300 - X1 X2 X3 - Y1 Y2 Y3 - Z1 Z2 Z3 - W

Where

X1,2,3 = A (E5 100MHz Bandwidth filter), B (E6 60MHz Bandwidth filter), C (L1 60MHz Bandwidth filter), N (No Filter, A filter or a short via MMBX connectors has to be necessarily provided by customer since the gain section is actually unconnected), S (No Filter, an internal short is provided. Image Rejection has to be guaranteed by an external SMA filter).

Y1,2,3 = G (20 dB internal Amplifier is mounted – baseline, may be omitted), L (No Amplifier, specify which chain has no RF amplifier)

Z1,2,3 = Q (Quadrature DC Coupled Baseband Input), I (baseline, IF AC Coupled Input, may be omitted)

W = M (Type M Backplane connector mounted), Nothing (baseline, may be omitted)
## 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. Actual bandwidth are higher than those specified so to keep low Group delay variation

4. G option: gain -24dBm

### Symbol Parameters

<table>
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<tr>
<th>Symbol</th>
<th>Parameters</th>
<th>Min</th>
<th>Typ</th>
<th>Max</th>
<th>Units</th>
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<td>Gain</td>
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<td>Minimum input return loss (up to 2 GHz)</td>
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<tr>
<td>ROut</td>
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<td>Group delay Parabolic</td>
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### Ordering Information (cont. d)

**DM9300 - ABC**: Baseline DM9300 with internal E5 filter on channel 1, E6 on Channel 2 and L1 on Channel 3, No backplane Connector;

**DM9300 - ABC-LGG-QII**: DM9300 with internal E5 filter on channel 1 having DC Coupled IQ Baseband Input, E6 on Channel 2 and L1 on Channel 3 having both IF AC coupled input, No backplane Connector;

Specifications are based on most current or latest revision.

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Digimimic
via dell’Orsa Maggiore 21, 00144 Rome, Italy
Phone +39 (06) 5582904
FAX +39 (06) 5587394
Option A,B,C (E5, E6, L1) Filter Measurements

E5 Filter Gain (vert: 1 dB/div) and group delay Variation (ns) over frequency

S21 versus frequency (zoomed)

E6 Filter Gain (vert: 10 dB/div) and group delay Variation (ns) over frequency

S21 versus frequency (zoomed)

L1 Filter Gain (vert: 1 dB/div) and group delay Variation (ns) over frequency

S21 versus frequency (zoomed)
E5 Output Spectrum (option A)

E6 Output Spectrum (option B)

L1 Output Spectrum (option C)
### Board

<table>
<thead>
<tr>
<th>Section 1</th>
<th>Section 2</th>
<th>Section 3</th>
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<tbody>
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<td>RF MMBX Filter Connector (Option A,B,C,N)</td>
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<td>Type M Connector (OptionM)</td>
<td>Output RF Connector</td>
<td>BB/IF and LO Connectors</td>
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**Mini USB**
### Application Information

**CAUTION:** THIS IS AN ESD SENSITIVE DEVICE

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

### Product Status Definitions

<table>
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<th>Datasheet Identification</th>
<th>Product Status</th>
<th>Definition</th>
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<td>Advanced Information</td>
<td>Formative or or In Design</td>
<td>This datasheet contains the design specifications for product development. Specifications may change in any manner without notice.</td>
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<tr>
<td>Preliminary</td>
<td>First Production</td>
<td>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.</td>
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<td>Full Production</td>
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<td>This datasheet contains specifications on a product that has been discontinued by DIGIMIMIC. The datasheet is printed for reference information only.</td>
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Digimimic
via dell'Orsa Maggiore 21, 00144 Rome, Italy
Phone +39 (06) 5582904
FAX +39 (06) 5587394