



**Q Microwave**  
An **Amphenol** company

# RF Upconverter

## 0.5 to 18 GHz Frequency Range

## 500 MHz Bandwidth Wideband



### Features

- RF Frequency Range 0.5 to 18 GHz
- IF Frequency Range 950 to 1450 MHz
- 500 MHz Instantaneous Bandwidth
- External LO's Required
- Frequency Agile across Entire Band
- Voltage +/- 6 VDC
- Small Size 6.0 x 2.7 x 0.55 inch
- Rugged Hermetic Package
- DC Test Cables Available Upon Request

### Advantages

- SWAP-C Smaller Size
- Lighter Weight
- Lower Power
- Cost Competitive

### Typical Applications

- Frequency Conversion
- Electronic Warfare Systems
- Radar Systems

### General Description

Q Microwave's PN 102260 is a frequency-agile RF Upconverter capable of converting frequencies centered between 0.5 and 18 GHz, with 500 MHz of instantaneous bandwidth.

The 500 MHz IF frequency range is centered at 1200 MHz (950 to 1450 MHz).

This module is configured to use two externally provided Local Oscillator (LO) inputs in order to provide a higher degree of flexibility and customized applications.

Digital control is provided through a Micro-D connector.

The unit is packaged in a rugged housing with hermetical seals and internal potting in order to provide higher reliability in difficult environments.

**All specifications are customizable upon request.**

**Q Microwave is an AS9100 / ISO9001 Certified Supplier.**

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# 0.5 to 18 GHz Wideband RF Upconverter With 500 MHz Instantaneous Bandwidth

**Table 1: Electrical Specifications using Table of Applicable Test Conditions\***

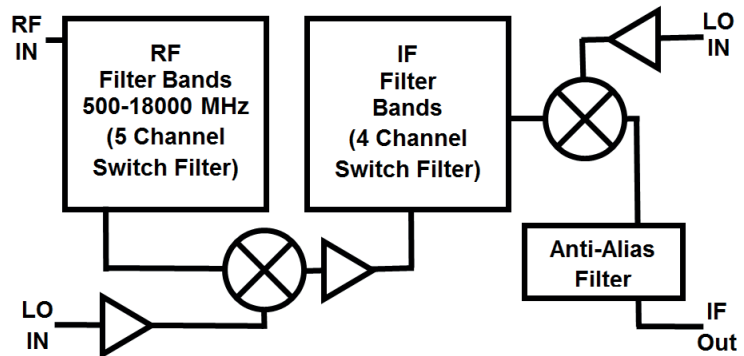
| Parameter                                  | Min.        | Typ.       | Max.                        | Units |
|--------------------------------------------|-------------|------------|-----------------------------|-------|
| RF Input Frequency Range                   | 0.5         |            | 18                          | GHz   |
| IF Output Center Frequency                 | 950         | 1200       | 1450                        | MHz   |
| L01 Input Frequency Range                  | 1.0 *       |            | 19                          | GHz   |
| L02 Input Frequency Range                  | 3.5 *       |            | 9.5                         | GHz   |
| L01 & L02 Input Power                      | +13         |            | +17                         | dBm   |
| Instantaneous 3 dB bandwidth               |             | 500        |                             | MHz   |
| Insertion Loss                             | 10          | 12         | 17                          | dB    |
| Gain Flatness (0.5 to 18 GHz)              |             | 9          |                             | dB    |
| Gain Variation over IF Passband (1000 MHz) |             | < +/- 1.75 |                             | dB    |
| Noise Figure (NF)                          |             |            | 16                          | dB    |
| IIP3                                       | +30         |            |                             | dBm   |
| Output 1 dB Compression Point (OP1dB)      | +10         |            |                             | dBm   |
| Spurious L01 x L02                         |             |            | -65                         | dBm   |
| L0 to Input Isolation                      |             |            | -60                         | dBm   |
| L0 to Output Isolation                     |             |            | -60                         | dBm   |
| Switching Speed                            |             |            | 1                           | usec  |
| Max Power In                               |             |            | +10                         | dBm   |
| Operating Voltage (+6 VDC)                 |             |            | 270                         | mA    |
| Operating Voltage (-6 VDC)                 |             |            | 70                          | mA    |
| VSWR IF Port                               |             |            | 2.0:1 / 50%<br>2.5:1 / 100% | mA    |
| VSWR RF Port                               |             |            | 2.0:1 / 50%<br>2.5:1 / 100% | mA    |
| Filter Specifications                      | Per Table 2 |            |                             |       |
| Digital Switch Logic                       | Per Table 3 |            |                             |       |

\*Note 1: Table of Final Test Sweeps & L01/L02 Inputs used to test the converter are on Website

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## RF Block Diagram

Q PN 102260 Wideband RF Upconverters have a dual-stage upconverter approach as is depicted in the Block Diagram below. It will upconvert an IF Input signal, centered at 1250 MHz IF, with up to 500 MHz of Instantaneous Bandwidth.



## Mechanical Outline & Dimensions

### 1. Material:

- A. Housing: aluminum 6061-T6
- B. Cover: aluminum 4032 or 4047

### 2. Seal method: Laser Weld (Vacuum bake 2 hrs. min @ 125°C ± 5°C before sealing)

### 3. Hermeticity:

- A. Gross-leak level per mil-std-202, M112, cond. d.

### 4. Finish:

- A. Lid surface and weld zone: chemical conversion coat per mil-dtl-5541, class 1a
  - B. DC connector shell: chemical conversion coated per mil-c-5441, class 1a
  - C. Threaded holes: unplated (bare aluminum)
  - D. SMA connectors: passivated stainless steel
  - E. All other surfaces: high phosphorus nickel plated
- Per ASTM B733, type V (10%- 13%), .001-.0015 in thick

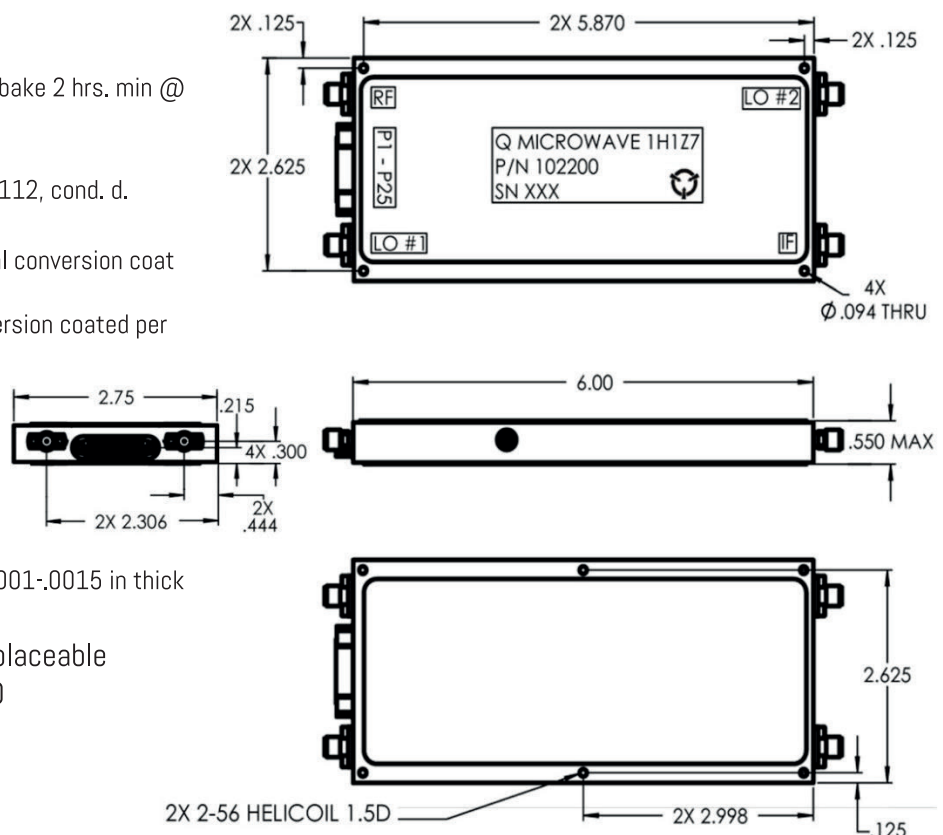
### 5. Inputs/outputs

- A. RF connectors- SMA, field replaceable
- B. DC connector: 25 pin micro-D

### 6. Marking: label as shown

### 7. Notes:

- A. Weight 11 oz. max.
- B. ESD handling precautions to be observed
- C. All dimensions are prior to plating.





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**Table 2: Filter Specifications**

| Band       | Fc (MHz) | 1.5 dB BW (MHz) | Lower Rejection (dB) | Lower Rejection (MHz) | Upper Rejection (dB) | Upper Rejection (MHz)         |
|------------|----------|-----------------|----------------------|-----------------------|----------------------|-------------------------------|
| RF1        | 1550     | 500 - 2600      | 50                   | 20 - 400              | 50<br>40             | 2990 - 11000<br>11000 - 18000 |
| RF2        | 3740     | 2380 - 5100     | 50                   | 20 - 2050             | 50<br>40             | 5840 - 11000<br>11000 - 18000 |
| RF3        | 6490     | 4880 - 8100     | 50                   | 20 - 4250             | 50                   | 9260 - 18000                  |
| RF4        | 9990     | 7880 - 12100    | 50                   | 20 - 6750             | 50                   | 13820 - 18000                 |
| RF5        | 14940    | 11880 - 18000   | 50                   | 20 - 10350            | 50                   | at 24000                      |
| IF1        | 3610     | 3120 - 4100     | 50                   | 20 - 2700             | 50                   | 4700 - 13000                  |
| IF2        | 4343     | 3865 - 4820     | 50                   | 20 - 3330             | 50                   | 5560 - 13000                  |
| IF3        | 6625     | 6150 - 7100     | 50                   | 20 - 5300             | 50                   | 8125 - 13000                  |
| IF4        | 7363     | 6900 - 7825     | 50                   | 20 - 6000             | 50                   | 8980 - 13000                  |
| Anti-Alias | 1200     | 950 - 1450      | 50                   | 20 - 800              | 50                   | 2050 - 15000                  |

**Table 3 Digital Switch Logic**

| B0R              | B1R | B2R | B0I | B1I | Filter | Filter |
|------------------|-----|-----|-----|-----|--------|--------|
| 1                | 0   | 0   | 0   | 0   | RF1    | IF1    |
| 1                | 0   | 0   | 1   | 0   | RF1    | IF2    |
| 1                | 0   | 0   | 0   | 1   | RF1    | IF3    |
| 1                | 0   | 0   | 1   | 1   | RF1    | IF4    |
| 0                | 1   | 0   | 0   | 0   | RF2    | IF1    |
| 0                | 1   | 0   | 1   | 0   | RF2    | IF2    |
| 0                | 1   | 0   | 0   | 1   | RF2    | IF3    |
| 0                | 1   | 0   | 1   | 1   | RF2    | IF4    |
| 1                | 1   | 0   | 0   | 0   | RF3    | IF1    |
| 1                | 1   | 0   | 1   | 0   | RF3    | IF2    |
| 1                | 1   | 0   | 0   | 1   | RF3    | IF3    |
| 1                | 1   | 0   | 1   | 1   | RF3    | IF4    |
| 0                | 0   | 1   | 0   | 0   | RF4    | IF1    |
| 0                | 0   | 1   | 1   | 0   | RF4    | IF2    |
| 0                | 0   | 1   | 0   | 1   | RF4    | IF3    |
| 0                | 0   | 1   | 1   | 1   | RF4    | IF4    |
| 1                | 0   | 1   | 0   | 0   | RF5    | IF1    |
| 1                | 0   | 1   | 1   | 0   | RF5    | IF2    |
| 1                | 0   | 1   | 0   | 1   | RF5    | IF3    |
| 1                | 0   | 1   | 1   | 1   | RF5    | IF4    |
| All Other States |     |     |     |     | OFF    | OFF    |