

# MON3500

## Tri-Band Down-Converter

### Description

Designed for use with cellular radio systems the MON3500 is a companion product to MAC Ltd's MON3100 low power signal processing platform. It provides four switched down-conversion channels, three of which can be configured at the time of manufacture to operate in any cellular radio band and a fourth for use with an external filter.

The IF output from the MON3500 is designed to be sampled directly by the analogue-to-digital converter (ADC) of the MON3100. Together, the MON3100 and MON3500 form a compact multi-band receiver consuming less than 7W in a typical operating mode.

The high-IF sampling capability of the MON3100 permits the use of a single-stage down-converter, whilst maintaining good RF performance, which in turn minimises the design complexity and reduces size and power consumption.

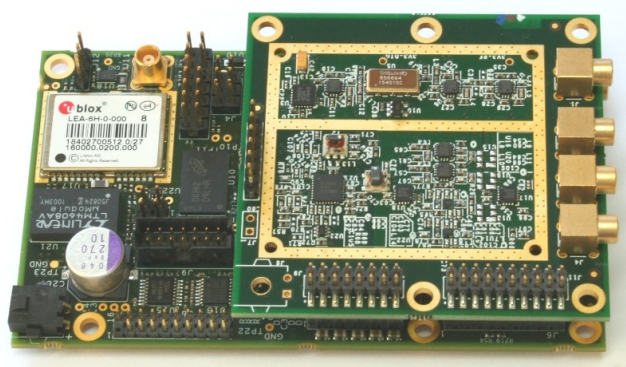
Band selection and image rejection is provided by SAW filters, similar to those found in typical cellular handsets. Any RF band between 200 MHz and 2500 MHz for which a 3x3 mm SAW filter is available can be configured at the time of manufacture. A high-selectivity IF SAW filter provides good rejection of close out-of-band signals.

A wide range of gain control is available to tailor the down-converter to the prevailing signal conditions; high gain provides the best noise figure, whilst reducing the gain improves the 1 dB compression point.

Control of the down-converter is via a simple command-response protocol over a logic level UART. An on-board low power processor interprets the high level commands and converts these into the required control signals for each of the on-board devices.

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### The MON3500 and MON3100



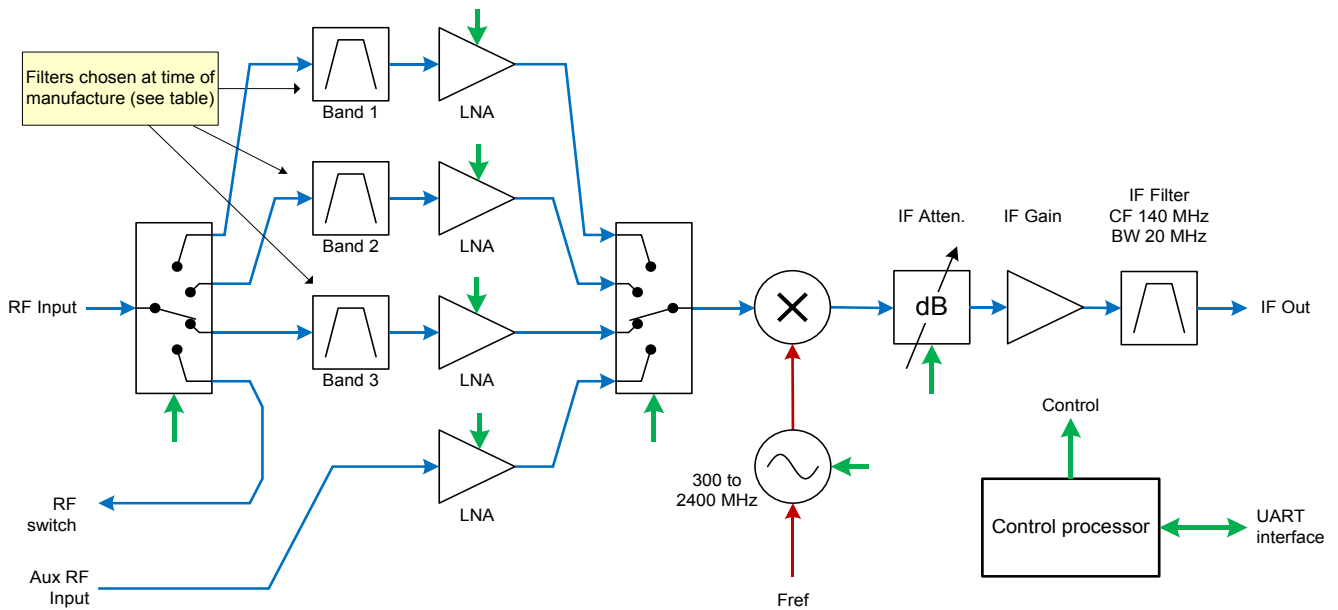
### Features

- Covers all common cellular frequency bands
- Separate unfiltered input for custom frequencies
- Frequency range 200 MHz to 2500 MHz
- Receive bandwidth 20 MHz
- Wide gain control range
- Simple UART-based control interface
- Low power, less than 1 W

### Specification

Parameter	Min	Max
Rx input frequency range	200 MHz	2500 MHz
IF output frequency	130 MHz	150 MHz
Rx noise figure		< 10 dB
IF bandwidth		20 MHz
Rx gain	46dB	52 dB
Phase noise @ 800 MHz		
10 kHz offset		-88 dBc/Hz
25 kHz offset		-88 dBc/Hz
100 kHz offset		-97 dBc/Hz
Input gain compression		
Max gain	-40 dBm	
Min gain	-10 dBm	
IF ripple		± 1 dB
Image rejection	25 dB	
IF attenuation	0 dB	31.5 dB
IF rejection	50 dB	
Reference frequency	10 MHz	100 MHz
Power consumption @ 5V		1 W
Size		60 x 60 mm

## MON3500 block diagram



## Available Frequency Bands

The most common frequency bands are listed in the table below.

Others are available, so if your band of interest is not shown, please contact us to discuss your requirements.

Band	Min	Max
A	824 MHz	849 MHz
B	869 MHz	894 MHz
C	791 MHz	821 MHz
D	832 MHz	862 MHz
E	880 MHz	915 MHz
F	925 MHz	960 MHz
G	1710 MHz	1785 MHz
H	1805 MHz	1880 MHz
I	1920 MHz	1980 MHz
J	2110 MHz	2170 MHz

## Description

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The local oscillator is provided by an on-board fractional-N synthesiser, which is locked to an external reference clock. When used with the MON3100 this is the system/ADC clock.

The synthesiser can be tuned in frequency increments down to a few Hertz, though with a 20 MHz IF bandwidth this is rarely necessary. The local oscillator may be used either low or high-side.

The card draws approximately 200 mA and is powered from a single DC supply of nominally 5V. If available a lower supply voltage (down to 3.6 V) may be used to reduce the overall power consumption.

## Ordering Information

To order please contact MAC Ltd at the address below.

Custom systems based on the MONITOR product range as well as a full software and FPGA design service are available on request. Please contact MAC Ltd for further details.



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