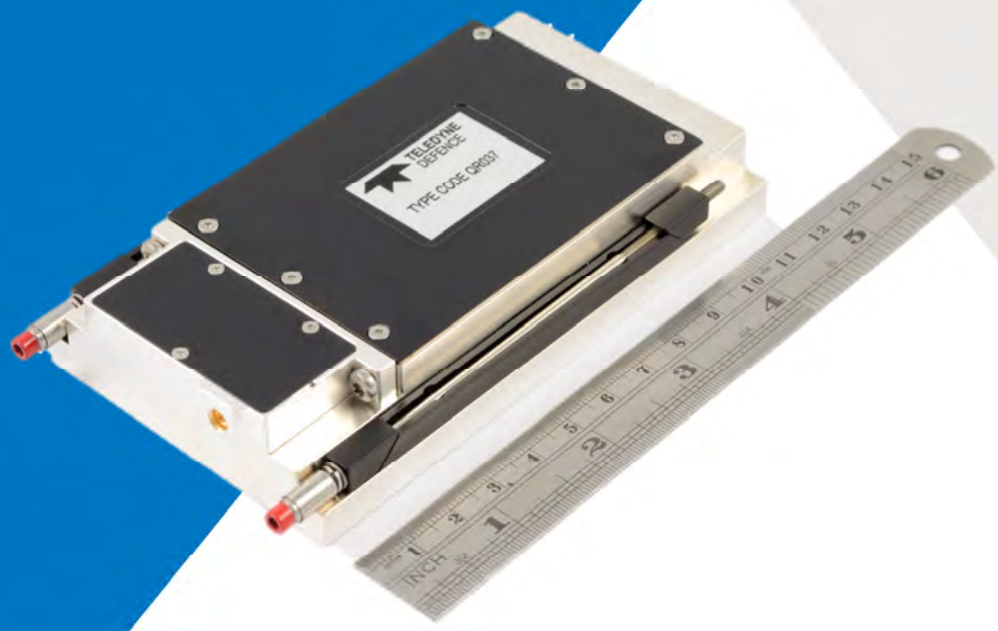
2.0 - 6.0GHz Compact Digital Receiver

QR037

TELEDYNE DEFENCE & SPACE
Everywhereyoulook™



2.0 to 6.0GHz Ultra Compact Digital Receiver

The QR037 digital receiver module combines high dynamic range RF down conversion and LO generation with digitisation and signal processing capabilities to provide a compact solution for a number of ELINT/COMINT and ESM applications.

Excellent dynamic range and linearity is achieved through a combination of RF and digital down conversion stages coupled with high performance pre-selection and IF filtering.

The QR037 is configurable such that a 375MHz wide band within the 2.0 to 6.0GHz RF band is digitised. This data can then be processed by the on-board high performance FPGA platform.

Modular RF preselection allows application specific band coverage to be configured/modified as required.

A high dynamic range 12-bit 1Gsps ADC stage provides low latency digitised data appropriate for rapid intercept and signal identification applications.

Parametric signal data and control is provided by a high speed backplane connector.

The complete receiver is packaged into an ultra-compact outline such that if required, multiple receivers can be integrated together to provide wider instantaneous band coverage.

The QR037 can be supplied with signal intercept and analysis firmware such as frequency measurement or full parametric pulse analysis algorithms.

A 2nd oscillator is included which couples into the RF input port and tunes across the full RF input bandwidth to provide built in test capabilities.

The receiver module is conduction cooled using edge mounted card retainers.

FEATURES

- 2.0 to 6.0GHz Band Coverage
- 375MHz digitised IF Bandwidth
- 60dB SFDR
- 58dB SNR (375MHz BW)
- 1Gsps 12-bit low latency ADC
- On Board FPGA DSP Platform
- BITE Oscillator
- Compact: 120 x 70 x 20mm, 280g

APPLICATIONS

Electronic Support Measures (ESM)
Wideband Signal Intercept
Rapid Signal Activity
Detection High-IF
Microwave Tuner Digitisation

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ELECTRICAL SPECIFICATION

Parameter	Specification
RF Input Frequency Range:	2.0-6.0GHz
Max RF Input (Full Scale ADC)	+0dBm
Max RF Input (No Damage)	+25dBm
Sensitivity (375MHz BW)	-58dBm Note: System sensitivity is dependent on post digitisation signal processing detection bandwidth.
Gain Variation (375MHz IF BW) signal in the IF bandwidth	+/-2.5dB max
Group Delay Variation (375MHz IF BW)	3ns over the central 67% BW; 6ns over the full BW
Single Tone SFDR	60dB
Internally Generated Spurious	-60dBc max equiv. Input power
Digitisation Rate	1Gsps
Digitisation Resolution	12-bits
FPGA Resources	Xilinx XC7K160T
Tune Accuracy	+/-10ppm
Tune Resolution	1kHz
Phase Noise	100kHz: -80dBc/Hz 1MHz: -130dBc/Hz 10MHz: -150dBc/Hz
VSWR (RF In)	2.5:1
Interface: RF Input	SMP
Interface : Digital I/O	80-way SEARAY Connector
Power Supply	+12V @ 1A , +24V @ 25mA
Total Power Consumption:	15W
Size	120 x 70 x 20 mm
Weight:	< 280g
Operating Temperature Range	-10°C to +60°C
Note: These specifications are valid when the receiver is configured with fixed preselection filter	

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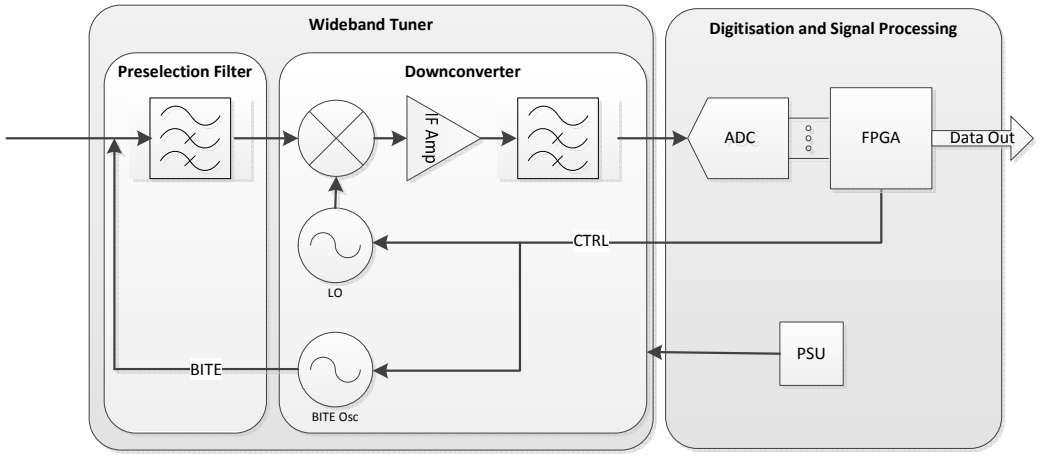
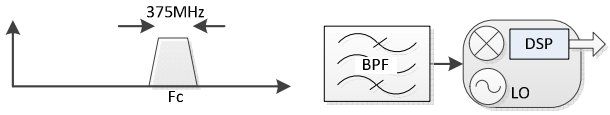
SYSTEM ARCHITECTURE



TYPICAL APPLICATION CONFIGURATIONS

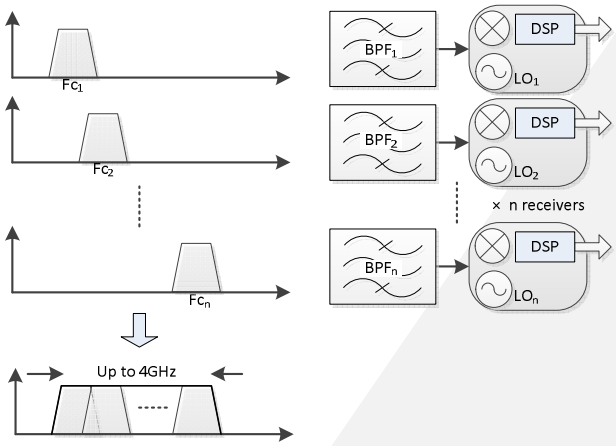
Single Fixed Band Digital Receiver

A single QR037 is configured with a specific fixed preselection filter and a fixed LO to enable digitisation and analysis of an application specific 375MHz band of interest. The pre-selection filter can be lab or field replaceable such that the band of interest can be modified to suit requirements. This configuration allows integration with an existing wideband microwave tuner/converter with an IF centred anywhere between 2.0 and 6.0GHz.



Multiple Fixed Band Digital Receivers

A multitude of QR037 receivers are configured with fixed preselection filters and -fixed LOs. Preselection filters and LO frequencies are chosen such that a contiguous band is covered. In this use-case, a wideband digital receiver is realised, with high receiver linearity being preserved with the use of a channelized architecture.



Single Tuneable Digital Receiver

A single QR037 is configured without a preselection filter to allow coverage across the full 2.0 to 6.0GHz RF band. LO tuning is provided by a serial control interface. External RF preselection must be included to provide rejection of image and mixer products.

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