

## Features and benefits

- Up to 9 Digital Wideband Receiver cards packaged in a small form-factor; 19" 2U high case
- Simultaneous monitoring of up to 36 HF channels
- Supports 4 frequency channel simultaneous DF using up to 9 antennas
- External clock input
- Fully synchronous operation
- Configurable for coherent dual unit operations
- USB2.0 control
- Windows®-based GUI and API



## Description

The unit can be configured for different roles. When operating as a bank of 36 independent HF receivers, the 9 receiver cards are tuned independently. When operating as an "N-Channel" DF receiver, the 9 receivers are tuned phase coherently for use in adaptive array applications, allowing up to 4 simultaneous frequency channels.

The individual Digital Wideband Receiver cards digitise the 500 kHz to 30 MHz band of spectrum from separate RF inputs and subsequently down-convert 4 programmable narrowband channels to complex base-band.

Two multi-channel receiver units may be connected together to form systems with up to 72 independent narrowband channels or 18 coherently tuned receivers (with 4 separate narrowband frequency channels per receiver).

The multichannel receiver is designed to be controlled by software running on a Windows® PC. Receiver control commands to and data from the unit are transferred via an industry-standard USB 2.0 interface. The digitised signal data from each receiver card is multiplexed onto a single data stream and transferred to a PC.

Applications of the multi-channel receiver include standard HF receivers and direction-finding and beamforming applications.

## Receiver Functions

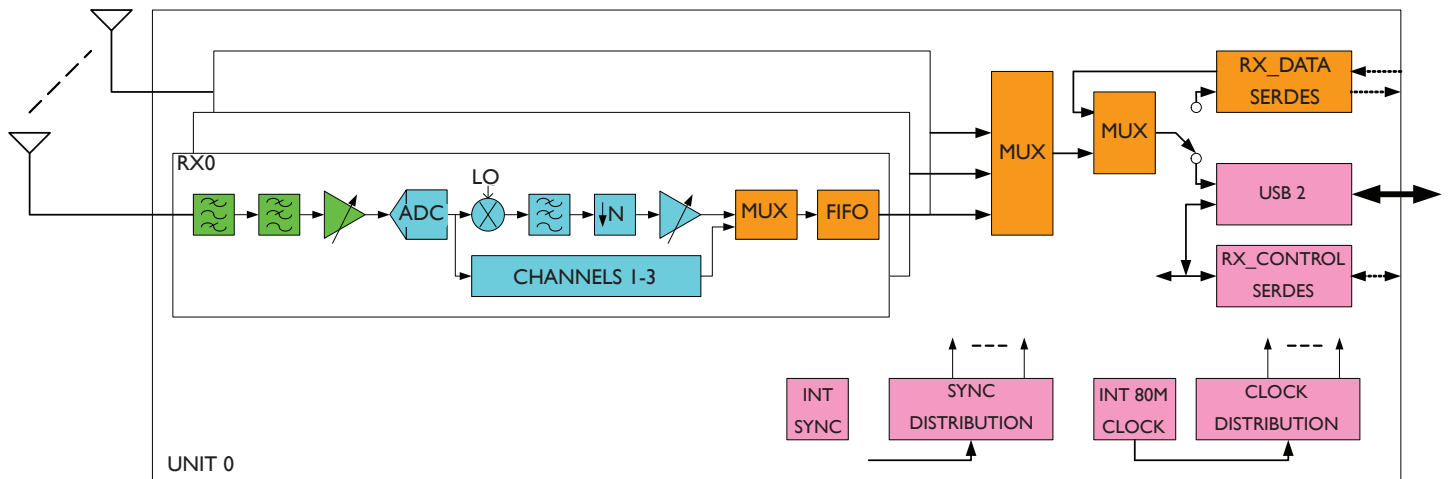
The features of the receiver cards are covered in the DWRI6 datasheet. Features specific to the multichannel system are:

- Coherently sampled receivers permit either independent or coherent tuning.
- Internal or external clock options.
- External synchronisation input for GPS 1pps signal or other hardware sync signal.
- Clock and sync distribution extendable to support second multi-channel receiver unit.
- Control and data channels to/from second multi-channel receiver unit.
- Ganged or independent analogue gain control of the receiver input signals.
- Ganged or independent digital gain control of the narrowband signals.

## Software

The MCDWRI6 is supplied with Windows® software to operate the unit as 36 independent receivers. This allows full control of all receiver settings and provides narrowband filters together with demodulation support for AM, FM, CW, USB, LSB, ISB and I/Q. I/Q mode allows third party demodulators to operate on the data. Audio output to PC soundcard or WAV file is supported. All 36 channels may be recorded at the same time. All 36 channels are represented by frequency and level, whilst 4 channels at any one time are also presented as narrowband spectrum plots.

## Block Diagram



## Example Graphical User Interface



Example GUI displaying four of the 36 simultaneous 'live' channels

## Customisation

An optional high speed interface card provides two 2.5 Gbits/s serial links to a DSP board for processing received signal data. This allows the receiver cards to be operated at bandwidths up to 1.25 MHz. Thus it is possible to digitise 5 MHz blocks of spectrum on each receiver. Configuring the unit with 8 such cards would offer 40 MHz of spectrum coverage. A 9th card could be operated independently in single DWR16 mode with its own USB2 stream to allow wideband spectrum monitoring.

An Application Programmer's Interface (API) is available, allowing full control of the multichannel receiver and extraction of the demultiplexed and filtered data.

This unit is used as part of Roke's N-Channel Superresolution DF system.

This unit, together with the high speed interface, is used as part of Roke's High Speed Wideband Superresolution DF system.

## Specifications

Detailed specifications of the receiver cards appear in the DWR16 datasheet. Specifications specific to the multichannel system appear below.

Internal clock:	80MHz
External clock:	10MHz, 0 dBm into 50Ω
Signal inputs:	1 RF input per receiver; 50 Ω
Configuration:	9 receivers, 4 narrowband channels per receiver; 37 kHz complex base-band (16bit I, 16bit Q) from hardware, additional filtering in the control software provide bandwidths from 56 Hz to 32 kHz
Dimensions:	448mm x 90mm x 315mm (19", 2U high)
Power:	110 – 240VAC, 35W

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