



Monobit Channelizer & Digital RF Memory Design Example

1.0

Design Example Datasheet

Description

Monobit Digital RF Memory reference design demonstrates the usage of FPGA integrated high-speed transceivers as a wideband front-end stage. In Electronic Warfare (EW), SIGINT and other applications it is required to achieve extremely wide instantaneous bandwidth. Monobit is a solution for such systems, where dynamic range of single bit is sufficient.

To implement high-speed Monobit sampler and transmitter, the high speed integrated transceivers are utilized. The input signal is sampled using RX channel and digitized using high-speed reference clock. The digitized data is available to FPGA fabric as a parallel word of samples.

Due to different non-linearities and quantization the sampled signal constrained undesired harmonics. Intel demonstrated innovative approach to implement digital dithering to mitigate the spurious spectral content and suppress undesired harmonics.

The sampled signal is processed with 2048 points digital channelizer which improves SNR and enables processing of wide band signals - a low latency, low power and a low-cost solution to wide band analysis.

In addition to receive path it's possible to implement the Monobit transmitter in similar way using TX channel of the high-speed transceiver.

Features

- Monobit Receiver / Transmitter
- 12.5GHz Instantaneous Bandwidth
- Digital Dithering
- Digital Channelizer - 2048 Frequency Bins
- Stratix-10 GXT FPGA
- System-In-Loop with MATLAB API

Applications

- Electronic Warfare
- Signal Intelligence (COMINT / ELINT)
- Communication Systems

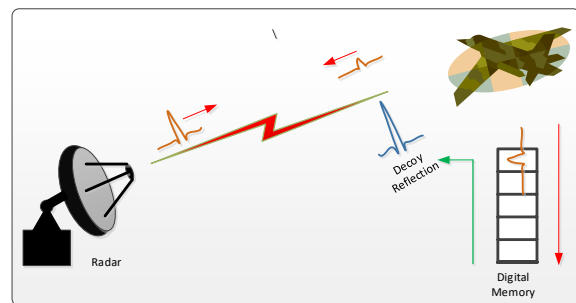


Fig. 1: Digital RF memory in electronic warfare system

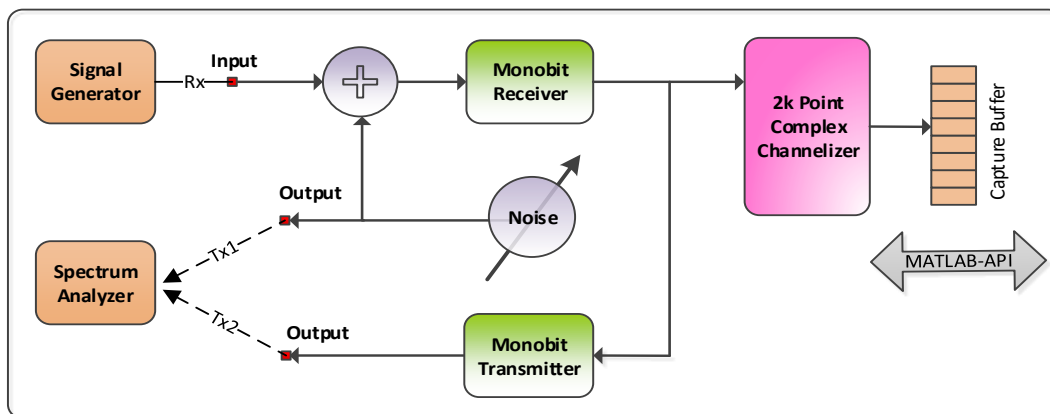


Fig. 2: Monobit channelizer block diagram

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March 2017 Intel



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