RT Logic DTRB70

Digital Transmitter Receiver

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RT LOGIC
technology that connects

DIGITAL TRANSMITTER RECEIVER (DTR-70)

OVERVIEW

The RT Logic Digital Transmitter/Receiver (DTR-70) supports multiple IF and baseband communication functions. The signal processing is digitally implemented, allowing the board to be easily tailored to specific customer requirements. A broad range of modulation and demodulation functions have been developed that support most satellite commanding, ranging, and telemetry functions.

APPLICATION

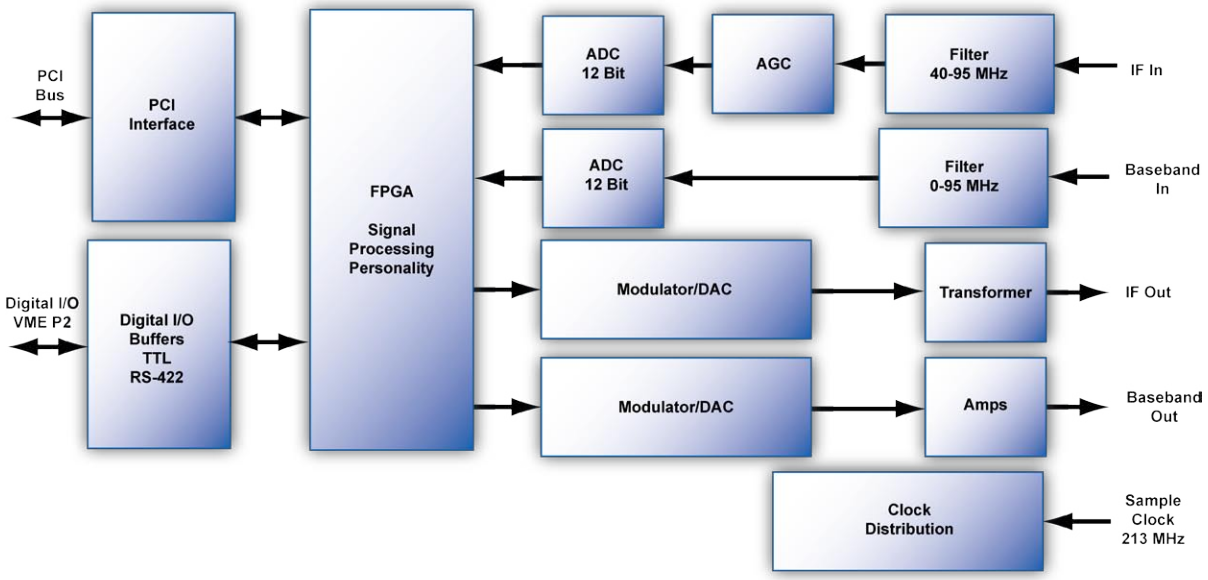
Current software and firmware for the DTR-70 supports SGLS, USB, STDN, and TDRSS waveforms, and other customer signaling formats. This includes various PSK, PM, and FM formats, both direct and on subcarriers. The board can modulate and demodulate all supported signals, which provides transmit and receive capabilities, and loopback testing. The PCI Mezzanine Card (PMC) is designed for use in PCI, cPCI, and VME systems. The DTR-70 is used in RT Logic's Telemetrix™ 70/70 systems (T70/70) for satellite ground station operations and satellite testing, although it is a general purpose communications board that can support many communications applications.

FEATURES

- Direct Modulation and Demodulation Greater Than 20 Msps
  - PSK/BPSK/QPSK/OQPSK (SQPSK)/SQPN
- Subcarrier Processing
- Spread-Spectrum Processing
- SGLS FSK/AM Commanding
- NRZ And Bi-Phase PCM Coding
- Convolutional (Viterbi) Coding
  - Rate 1/2, Length 7
- Ranging
  - SGLS (PRN) Ranging
  - USB (Tone) Ranging
  - TDRSS (Spread Spectrum) Ranging

DIGITAL IMPLEMENTATION

The DTR-70 is available in two implementations: DTRB-70 and DTRD-70. The DTRB-70 is shown herein. It provides both baseband and IF inputs and outputs. The DTRD-70 replaces the baseband input with a second IF input for diversity combining. The signal processing is performed in the Field-Programmable Gate Array (FPGA). Digital signal processing provides tremendous accuracy, capability, and repeatability. The FPGA is loaded over the PCI bus, which allows different personalities to be loaded for different applications. RT Logic can customize existing firmware application personalities or develop new ones for specific customer requirements.



SPECIFICATIONS

- Telemetry Acquisition
  - IF Input Frequency: 50 MHz To 90 MHz
  - IF Input Power Level: <-60 dBm To +10 dBm
  - Acquisition Range: ±1 MHz
  - Maximum Doppler Range: <10 kHz/sec
- Demodulation
  - Direct PSK (BPSK/QPSK/OQPSK/UAQPSK)
  - Symbol Rates: > 20 Msps
  - Subcarrier BPSK/QPSK
  - Subcarrier Frequency: 1 kHz To 20 MHz
  - Viterbi/R-S Decoding: Rate 1/2, CCSDS R-S
- I/O
  - Baseband Input
  - Baseband Output
  - RS-422 Dedicated Inputs (8 Pair)
  - RS-422 Dedicated Outputs (8 Pair)
  - RS-422 Selectable I/O (4 Pair)
  - TLL Selectable I/O (16 Signals)
- Command Generator/Modulator
  - SGLS/USB Commanding
  - Output Frequency: 60 MHz To 80 MHz
  - IF Output Level: -40 dBm To 0 dBm
- Modulation
  - Direct PSK (BPSK/QPSK/OQPSK/UAQPSK)
  - 2 Subcarriers (SGLS/USB)
  - Subcarrier Frequency: 1 kHz To 20 MHz
  - Analog Input (FM/PM/AM)
  - TDRSS Uplink
- Ranging
  - SGLS PRN Ranging
  - USB Tone Ranging
  - TDRSS Ranging
- Operating Environment
  - 0 ºC To 50 ºC
  - 10 % To 90 % Relative Humidity

Specifications subject to change.
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RTL-DST-DTR70 V1.2

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