

Digital Telemetry Receiver

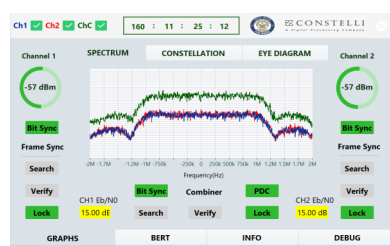
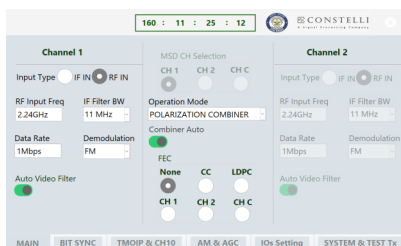
A Dual Channel IF & RF Data Receiver



Overview

Constelli Digital Telemetry Receiver (CDTR) is dual channel IF & RF receiver supporting L, S or C-bands. The state-of-the-art telemetry receiver supports Automatic Gain Control, AM Tracking, Diversity Combining, Equalization, Demodulation of PCM-FM & SOQPSK-TG, Bit Synchronization, Frame Synchronization, LDPC and Convolutional Decoding, and Telemetry Over IP (TMOIP) as per IRIG Standard. In addition to featuring front panel touch screens, it supports display over Ethernet & HDMI making it convenient to operate.

DTR comes with a built-in test generator which generates modulated signals at IF and RF for loop back tests. The form factor of CDTR ranges from 2RU to 8RU and custom form factors can be developed on request.



Graphical User Interface of Constelli Digital Telemetry Receiver

Key Features

Dual Channel IF & RF (L, S, C Bands) Receiver

Data rates up to 40 Mbps

Supports FM, MPSK, and Tier-0, Tier-I Waveforms

Trellis Detection for improved performance

Diversity Combiner and Equalizer

Convolutional and LDPC Decoding

Frame Synchronization

AM Demodulation for Tracking and AFC

Telemetry over IP (TMOIP) Support s per IRIG-106 Chapter 10

Inbuilt test signal generator, to test receiver at IF and RF

Hosts various types of IOs to access independent blocks such as Bit Sync and Frame Sync

Front Panel Displays

Supports display over Ethernet and HDMI

Customizable for various other modulation schemes and data rates

Available in 2U, 3U and customizable form factors

CDTR Specifications

RF	
No. of Input channels	2 RF or 2 IF
RF Receiver type	Dual Stage Superheterodyne Receiver
Input RF Frequency	L-Band: 1415 – 1585 MHz S-Band: 2200 – 2300 MHz C-Band: 4400 – 5250 MHz Other options can be provided on demand.
IF frequency	70 MHz
Impedance	50 Ω
VSWR	1.5: 1 typical, 2:1 max
Dynamic Range	Threshold to -10 dBm
Non-Destructive Input level	+10 dBm
Noise Figure	9 dB Typical, 12dB Max
Image and spurious rejection	>60 dB
Tuning Resolution	100 kHz or better
Frequency Stability	\pm 1 ppm
Phase Noise	IRIG-106 Complied
External reference	10 MHz, 0 dBm
IF	
Filters	SAW Filter Bank: 8 filters with user selectable bandwidths (500kHz-36MHz) Digital FIR Filters: 100kHz to 40 MHz in steps < 10kHz
IF Output	2 Channels, 50 Ω
AGC	
AGC Range	> 90 dB
AGC Time Constant	0.1,1,10,100, 1000 ms
AGC output	Two outputs, 5 Vp-p, 75 Ω , User configurable Scale and Offset Automatic, Manual, Zero and Freeze modes
AM Response	
Number of Demodulators	2 (for Ch1 & Ch2)
AM output	2 Outputs, 4 Vp-p max into 75 Ω @ 50% modulation
AM Response	50 kHz Max, independent of AGC time constant
AFC	
Acquisition and tracking range	\pm 250 kHz
Tracking Rate	500 Hz/sec for 100 kbps Tier-0 & Tier-1
Diversity Combiner	
Features	Polarization & Frequency, AGC controlled together with AM detector for
S/N Improvement	>2.5 dB typical (for equal inputs in Ch1 & Ch2)
Pre-D output	IF Out at 70 MHz
Other Features	
Equalization	CMA Equalization for PCM/FM & SOQPSK-TG
Data Logging	With Respect to System Time or IRIG Time

For sales and support, write to us on support@constelli.com

The information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice.
© Constelli Signals Pvt Ltd.

 **CONSTELLI**
A Signal Processing Company

CDTR Specifications (Contd..)

Demodulation

No. of Demodulators	3 (Ch1, Ch2 and Channel combined)
Input Sources	Internal IF or External Regulated IF at 70 MHz: 2 Inputs; SMA, 50 Ω
Demodulation	AM, FM, PM, BPSK, QPSK, OQPSK, PCM/FM, Multi symbol PCM/FM, SOQPSK-TG
Video Output	4 Outputs (Ch1, Ch2, Combined, Extra) 4 V p-p max, 50 Ω / 75 Ω , AC/DC Coupled
IRIG Time Input	01 Input, BNC, 50 Ω

Forward Error Correction

Low Density Parity Check	1/2 Rate, 2048 Block Size for Tier-1
Convolutional Coding	Viterbi, (k=7, Rate 1/2) for Tier-0 & Tier-1

Bit Synchronization

Input Sources	Internal Video or
Number of Bit Sync Channels	3 Parallel Channels
PCM code	NRZ L, M, S; Bi-phase L, M, S and RNRZ (PN-9/11/15)
Min & Max data rate	100 kbps to 30 Mbps (NRZL)
Data rate resolution	1 bps
Reacquisition Time	250 bits for Tier-0 and 350 bits for Tier-1
BER Performance	10 ⁻⁶ at Eb/N0 of 10 dB (Trellis FM) 10 ⁻⁶ at Eb/N0 of 12 dB (legacy PCM/FM & Tier-1)
De Randomizer	RNRZL 9/11/15
Loop Bandwidth	Selectable from 0.01% to 3%
Clock Phase Setting	0°, 90°, 180°, 270°
Bit Sync Outputs	No of Channels: 03 Data and 03 Clock; TTL, BNC Selectable to any channel

Frame Synchronization

Input Sources	Internal Data & Clock or External Data & Clock: 1 Data & 1 Clock; TTL, BNC
No of Frame Sync	3 Channels (Ch1, Ch2 & Combined)
Format	Search, Verify & Lock mechanism
Programmable Features	Bits per Word, Words per Frame, Minor & Major Frames, Sync Word Length, Sync Word, Number of Errors Allowed
TM over IP	02 Outputs on 10 GbE over UDP (any two of Ch1, Ch2 or Combined) IRIG 106 Complied

Built-in-Test (Optional)

Built in RF Test Generator	Single Channel RF Source for Testing
Test Generator Output	RF: 2.2 - 2.3 GHz; IF: 70 MHz
Modulation	AM, FM, PM, BPSK, QPSK, OQPSK, PCM/FM, Multi symbol PCM/FM, SOQPSK-TG

For sales and support, write to us on support@constelli.com

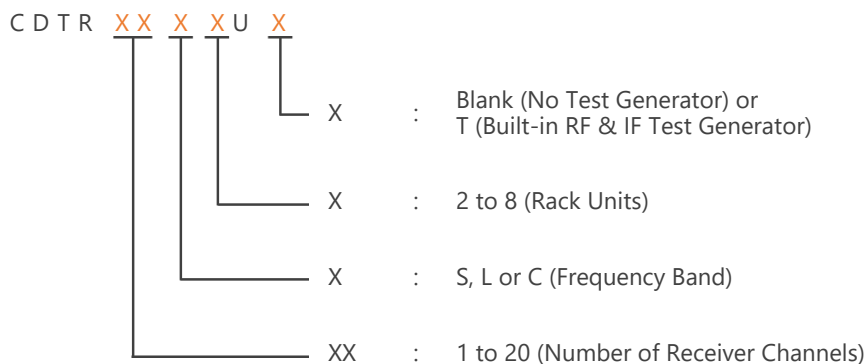
The information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice.
© Constelli Signals Pvt Ltd.

 **CONSTELLI**
A Signal Processing Company

CDTR Specifications (Contd..)

Built-in-Test (Optional) (Contd..)	
Data rate	100 kbps to 20 Mbps (NRZL)
PN Generator Pattern	PN7, PN9, PN11, PN15; Forward and Reverse
PN Output	NRZ-L; 3.3 V TTL Levels 1 Data & 1 Clock
Pattern Synchronization	Automatic with Polarity Detection
Error Insert	Single Bit or Configurable from 10^{-3} to 10^{-6}
BER Measurement	Automatic PN Sync
Background Diagnostics	Health & Temperature Monitoring of critical systems
General Characteristics	
Graphical Displays	Spectrum, Eye Pattern and Constellation Displays
Application Software	Windows based GUI (Local & Remote) Command set for Remote UI Integration
HMI	Front panel displays for monitoring & control Dual USB for Keyboard/Mouse set connectivity
Interfaces	HDMI for External Monitor Display 1 GbE RJ45 for Networking 10 GbE RJ45 for TMoIP N-Socket for RF; SMA Socket for IF BNC for all others (Type of Ports change based on form factor 1U/3U)
Power	100 - 260 VAC, 47 - 60 Hz
Dimensions & Weight	19" Rack Mountable, 1U/3U Height (other heights on request) < 15 Kg weight
Temp	10°C to 50°C (Operating) 0°C to 70°C (Storage)
Humidity	Up to 95% non-condensing

Part Number Selection



Example:

'CDTR02S2UT' for a 2-Channel S-Band Receiver with Built-in Test Generator in 2RU form factor

For sales and support, write to us on support@constelli.com

The information in this document gives only a general indication of the product capacity, performance and suitability, none of which shall form part of any contract. We reserve the right to make design changes without notice.
© Constelli Signals Pvt Ltd.

 **CONSTELLI**
A Signal Processing Company