WIDEBAND IF RECEIVER HUGIN 1005

DATA SHEET

HUGIN 1005 - Radio OFF

File   Execute   Help

Radio OFF
System Status

Receiver   102: default
fc 52.0000M   Hz   Ref -34.0000   dBm
BW 64.0000M   Hz   Gain 10.0000   dB

Prev Band
Next Band

Events   Commands

12:24:04.564	Program STARTED
12:24:04.566	Loading module set "Radio OFF"
12:24:04.649	Module "System" initialized
12:24:07.581	Module "HUGIN Server User Interfaces" initialized
12:24:08.090	Module "Configuration" initialized
12:24:08.140	Module "Router" initialized
12:24:08.190	Module "TCP/IP Communications" initialized
12:24:08.238	Module "System State Handler" initialized
12:24:13.394	Module "Receiver 101" initialized
12:24:13.408	Module "Receiver 102" initialized
12:24:13.463	Module "Channelizer 1" initialized
12:24:13.897	Settings validated
12:24:14.939	Event view connected

NOVATOR SOLUTIONS

WIDEBAND IF RECEIVER
HUGIN 1005

INTRODUCTION

HUGIN 1005 is a wideband monitoring receiver with up to 2200 MHz real-time bandwidth. Built on a modular platform, HUGIN 1005 provides one or more IF inputs and it comes with run-time configurable DDCs which are ideal for interception of Radar and satellite signals. The timing & synchronization architecture ensures precise offline analysis. A single receiver system provides both real-time IQ data to the operator and records all interceptions of interest.

HUGIN 1005 Strengths

- 1 – 4 IF receiver inputs
- 100 MHz & 1 GHz real-time bandwidth options
- 2200 MHz aggregated bandwidth
- Up to 192 run-time configurable DDCs
- Individual DDC parameters: Centre frequency, bandwidth, filter and gain
- Synchronization to 10 MHz reference, PTP, IRIG-b and GPS
- Records relevant interceptions to disk
- Server/Client architecture that allows remote operations and seamless streaming of intercepted data
- Intuitive API that enables easy integration with any 3rd party COMINT monitoring software

Hardware Architecture

HUGIN 1005 is based on a modular 19" rack-mountable chassis design. Standard configurations support one & two wideband IF inputs with 1GHz real-time bandwidth and optionally two narrowband IF inputs with 100 MHz real-time bandwidth. Each wideband IF input module has 64 narrowband DDCs with 250 MSPS aggregated output rate for I & Q. The narrowband IF input module has two inputs which share 64 narrowband DDCs. All active DDC channels are streamed as UDP packets via two 10 Gb Ethernet interfaces.

In parallel to streaming the channels, all or a subset of the active DDC channels can be stored to in-chassis or external high-speed storage. A single in-chassis module provides 8 TB – 32 TB storage capacity. The storage can be increased by adding multiple storage modules to the system. The external storage, which comes in a separate 2U chassis, supports 24 TB – 96 TB. For applications requiring more than 96 TB storage capacity multiple storage chassis can be used together. HUGIN 1005 comes with an embedded server which is controlled via 1Gb Ethernet.

HUGIN 1005

PRODUCT ARCHITECTURE

Simplified HUGIN 1005 Data Flow
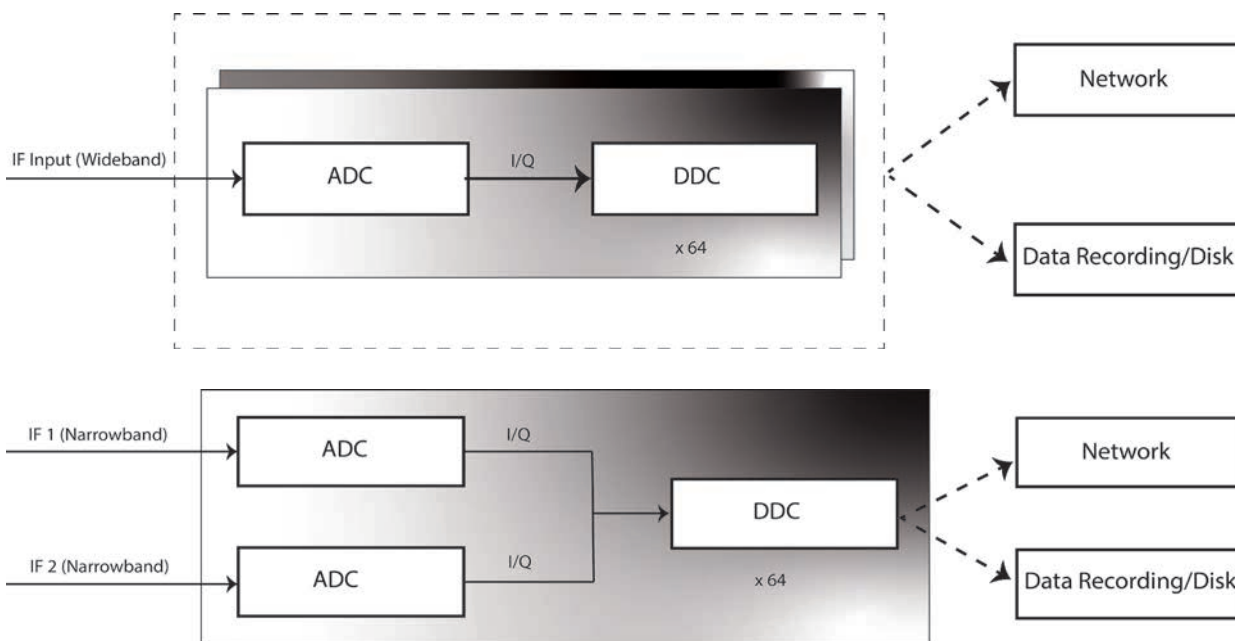
Product Functionality

HUGIN 1005 IF inputs have individually configurable center frequencies. All narrowband DDCs can be configured and controlled during run-time. Each DDC can be individually activated and assigned its own IP address and port. Configurable parameters such as center frequency, bandwidth, filter, and gain can be set independent from other DDCs. The channelized IQ data of all active channels is being streamed as complex IQ data via the 10Gb Ethernet interfaces. For applications requiring a single DDC wider than 40MHz one optional wideband DDC per IF input can be added. The user selects which of the active DDCs to store to disk.

The data can be offloaded via the 10 Gb Ethernet, USB or Thunderbolt interfaces. The receiver system supports precision timestamping and synchronization with PPS, PTP, external 10 MHz ref, IRIG-B or the build-in GPS receiver. This allows offline data synchronization and analysis with external timestamped data. Standard and user-defined header data is being stored with each individual channel. In addition, real-time user provided header data can be added as a custom option. HUGIN 1005 provides out of the box software playback capabilities for one channel at a time. A playback option can be added allowing playback of a recorded channel or other signal from file via an IF output.

HUGIN 1005

PRODUCT SPECIFICATIONS

Receiver		
	Wideband Input	**Narrowband Input**
IF Receiver Channels (Rx)	1 or 2	2 (option)
Connector Type	SMA	
Input Impedance	50 Ohm	
Input Coupling	AC	
Full-scale Input Range (at 10 MHz)	1,25 Vpp (5.92 dBm)	2,03 Vpp (10.15 dBm)
Center Frequency	Configurable	
Sample Rate	6.4 GS/s	500 MS/s
Sample Clock	3.2 GHz	500 MHz
Bandwidth (-3dB)	500 kHz to 6 GHz	70 kHz to 225 MHz
Instantaneous Bandwidth per IF Receiver Channel	1000 MHz	2 MHz – 100 MHz
SFDR	-62 dBc	-88 dBc
FFT	4 k - 256 k	
Synchronization	1 PPS, PTP, external 10 MHz reference & IRIG-B, SMB connector Build-in GPS receiver, SMB connector	
DDC Channel Specifications		
Wideband DDC	1 Wideband DDC per IF input (option)	
Narrowband DDCs	64 DDCs per IF Module, Run-Time Configurable	
DDC Frequency Resolution	1 Hz	
Channel (DDC) Bandwidth	100 kHz to 40 MHz	
IQ Filter	Default: 80% of IQ Rate	
Digital Output	IQ; Vita-49 Compliant (option)	
IQ Data Format	Complex (32 bit)	
IQ Output Rate per Narrowband DDC	Configurable from 125 kSPS to 50 MSPS	
Aggregated IQ Output Rate per IF Module	Up to 250 MSPS for I and 250 MSPS for Q	

HUGIN 1005

PRODUCT SPECIFICATIONS

Data Recording Specification (option)		
Form Factor	Single Slot In-Chassis Module	External RAID Chassis 2U
RAID	Software Controller	Hardware Controller
RAID Configurations	0, 1, 5, 10	0, 1, 5, 6, 10, 50 & 60
Capacity	8 TB – 32 TB per module	24 TB – 96 TB per chassis
Disk Type	NVME SSD	SATA III SSD
Disk Reliability	0,4 or 3 DWPD for 5 years	1 or 3 DWPD for 5 years
Server		
Operating System	Windows 10 Professional, 64 bit	
CPU: Intel® Xeon®	E3-1515 M, Base: 2.8 GHz, 4 Cores	W-2245, Base: 3.9 GHz, 8 Cores
DRAM	32 GB DDR4-2133	32-64 GB DDR4-2666
Hard Drive	960 GB Removable SSD	500 GB (or greater) SSD
Network Interface	2x 1 Gbit (TCP/IP: Control) 2x 10 Gbit SFP+ Copper/Fiber (UDP Multicast: Channel & Spectrum Data)	
I/O Ports	2x USB 3.0, 4x USB 2.0, 2x Thunderbolt 3	
Video	1x DisplayPort 1.1, 1x DisplayPort 1.2	1x DisplayPort 1.2
Mechanical / Environmental		
Power Supply	100-240 VAC 50/60 Hz, 100-120 VAC 400 Hz	
Power Consumption	605 W – 1120 W Dependent on System Configuration	
Form Factor	4U - 19" Rack Mountable Chassis	
Dimensions	Small System: 177,1 x 303,3 x 463,6 mm (HxWxD) Large System: 177,1 x 445,5 x 463,6 mm (HxWxD)	
Operating Temperature	0-55 C	
Relative Operating Humidity Range	10% to 90%, Noncondensing	
Operating Altitude	3.000 m	

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## SOFTWARE ARCHITECTURE

HUGIN 1005 has a server application, a client applications and an API for integration in any 3rd party software environment.

HUGIN 1005 Server

Configuration & control access via server application with GUI or Windows service.

- Separates all time critical tasks from non-time-critical tasksEnables configuration of receiver, DDC, storage and demodulation settings during run-time
- Provides control and configuration access to clients
- Manages UDP multicast streams of wideband spectrum and narrowband DDCs
- Logs all server events and server/client communication
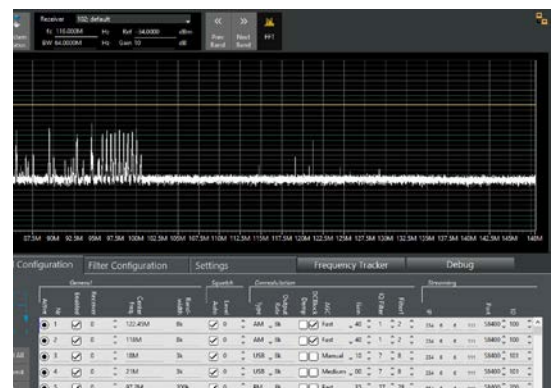- Authorizes remote software updates
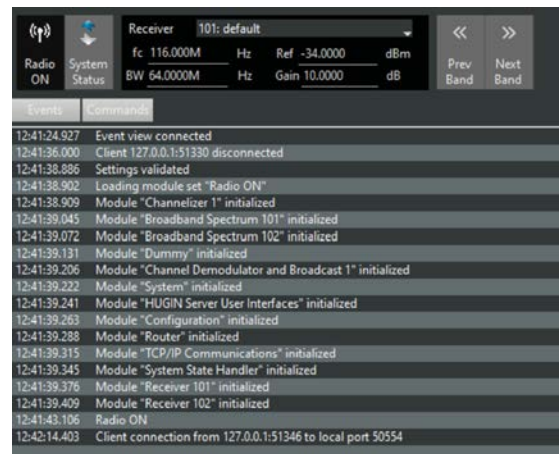
HUGIN 1005 Server GUI

HUGIN 1005 Clients

HUGIN has a client application HUGIN 1005 CONFIG.

- Allows remote configuration and control of the receiver
- Grants access to view and control individual DDC parameters during run-time
- Provides one live wideband spectrum view and up to five narrowband signal views

HUGIN 1005 CONFIG GUI

HUGIN 1005 API

HUGIN has an intuitive TCP/IP API and comes with an Interface Control Manual. It includes over 50 well documented JSON coded commands. The API includes integration examples for C, PYTHON and LabVIEW.
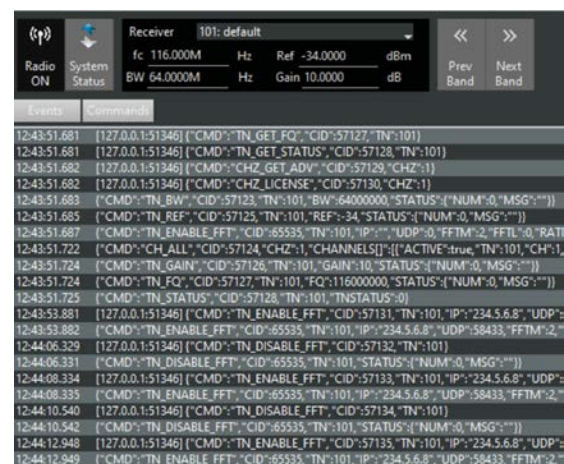
API commands log

HUGIN 1005

PRODUCT CONFIGURATIONS

HUGIN 1005 flexible architecture enables flexible configuration of one or more wideband & narrowband IF inputs and storage tailored to project & mission requirements.

HUGIN 4000 Standard Configurations - Other Configurations on Request

Model	Wideband IF inputs	Narrowband IF inputs	Narrowband DDCs	Aggregated IQ output rate	System size
HUGIN 1005-1WB	1	0	64 DDCs	250 MSPS I & Q	4U – Small
HUGIN 1005-2WB	2	0	128 DDCs	500 MSPS I & Q	4U – Small
HUGIN 1005-1WB2NB	1	2	128 DDCs	500 MSPS I & Q	4U – Small
HUGIN 1005-2WB2NB	2	2	192 DDCs	750 MSPS I & Q	4U – Large

Options

- REPLAY-WB: Wideband IF playback output
- RAID1-xx: In-chassis storage module 8 TB – 32 TB
- RAID1-08R: In-chassis storage module 8 TB with removable storage
- RAID2-xx: External RAID storage 24 TB – 96 TB in 2U chassis
- VITA49: VITA-49 compliant data format (VITA-49.0)
- DDC-WB: Wideband DDC, one per IF input
- CHASS-L: 4U – Large system chassis
- RACK-S/L: 19" rack-mount kit for small/large system chassis
- EDUC: On-site training
- CUSTOM-DATA: User provided real-time data

Customization

HUGIN 1005 can be customized to any of your projects or mission requirements upon request. The versatile platform combined with our business model helps you to get the best possible receiver system fulfilling your requirements while being cost effective.

About Novator Solutions

Novator Solutions AB, part of Novator Consulting Group, is a leading provider of products & system development within SIGINT & EW domains. Our highly skilled R&D team applies its extensive know-how in high-speed data processing and software defined radio "SDR" technology to develop next generation COMINT receivers and ELINT signal recorders. Our software expertise combined with a modular hardware architecture allows us to provide customized products and complete turn-key solutions tailored to specific project or mission requirements.

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