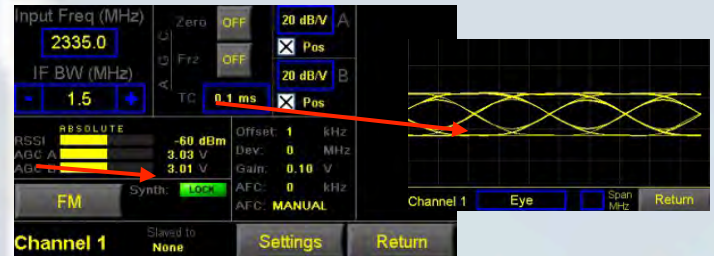
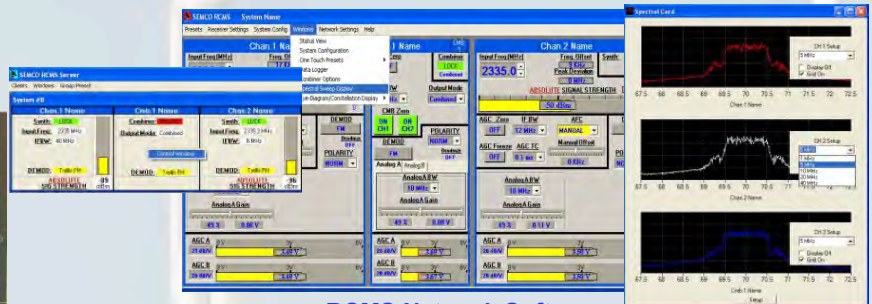
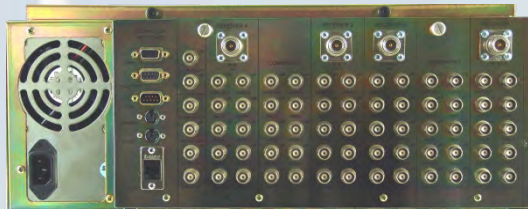




R400A SERIES TELEMETRY RECEIVER



Front Panel Touch Screen Controls and Displays



RCMS Network Software

DESCRIPTION - SEMCO's R400A Series Telemetry Receiver product line consists of 4U rack-mount configurations designed for telemetry data reception and antenna tracking applications. Configurations include receivers with embedded PC processors and peripherals as well as non-PC Ethernet-controlled configurations. All R400A configurations are IRIG 106-15 Tier II phase noise compliant and offer state-of-the-art demodulation capabilities in RF tuning bands from 70 MHz to 5250 MHz.

Additional optional performance features include Adaptive Equalization, Data Quality Encapsulation (DQE), Data Quality Metric (DQM), Low Density Parity Check (LDPC), Space Time Coding (STC), TM over IP and CCSDS Spread Spectrum (Constellation program crew vehicle) Forward SS-UQPSK link and the Return DG1 Modes 1, 2 & 3 links.

STANDARD CONFIGURATION

- Multi-Channel Receivers (Dual or Quad Channels)
- Dual & Quad CH Receiver Combiners (Pre-d & Post-d)
- Embedded PC and Ethernet Control
- 1415-1585, 1650-1850 or 2185-2485 MHz Tuning
- PCM/FM and NTSC Video Demodulation
- Embedded Bit Syncs with De-randomizer (all 3/6 CHs)
- Eye Pattern and Constellation Displays
- 4 User-Configurable Analog/Digital Outputs per CH
- AM and scalable AGC Antenna Tracking Outputs
- Front Panel Removable Solid State Drive
- RCMS Network Software (Ethernet Remote Control)

OPTIONS

- Embedded Stand-Alone Bit Sync/Frame Sync/BERT
- Built-In-Self-Test w/Internal RF BIT Source
- No embedded PC or Peripherals (Ethernet Control)
- 70 MHz, 200-1150 MHz or 4400-5250 MHz Tuning
- Multi-Channel Spectral Sweep
- GUI Selectable 70 MHz Playback

OPTIONS (continued)

- Pre-d Record and Playback (75 kHz to 15 MHz)
- 70 MHz Playback
- IRIG Time Code A/B Generator
- AFC (CFO) Loop Stress Outputs
- 1415-1585, 1650-1850 and 2185-2485 MHz Tuning
- PM, BPSK & A/U/S/O/QPSK Demodulation
- IRIG 106-15 Trellis FM, SOQPSK-TG & Multi-h CPM
- PM/PSK (SGLS) and FM/FM S/C Demodulation
- Coherent AM Demodulation
- Adaptive Equalization
- Data Quality Encapsulation/Metric (DQE/DQM)
- CCSDS Spread Spectrum
- Low Density Parity Check (LDPC) Feature
- Space Time Coding (STC) Feature
- Viterbi Decoder (k=7 rate 1/2)
- Multi-Channel CH10 Compatible TM over I/P
- Selective Turbo Coding

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Technology and Innovation For A Safer World

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R300 SERIES SPECIFICATIONS

RF		DEMODULATORS	
Frequency (MHz)	70, 200-1150, 1415-1585 1650-1850, 2185-2485, 4400-5250 and 1415-2485 (continuous)	Number of Demods	Up to 3 per receiver
LO Tuning Resolution	100 kHz (increments of 1kHz)	Legacy Modes	Rate (NRZ-L)
Internal Stability	≤ +/- 1.0 ppm	FM, PCM/FM	10 kbps to 23 Mbps
AFC Resolution	1 kHz	PM, PCM/PM	2 kbps to 20 Mbps
Dynamic Range	-10 dBm to Threshold	BPSK	10 kbps to 20 Mbps
Noise Figure	≤ 8 dB (nominal)	QPSK, SQPSK, OQPSK	30 kbps to 40 Mbps
Phase Noise	IRIG 106-15 Tier II Compliant	A/UQPSK	30 kbps to 40 Mbps
Maximum Safe Input	+10 dBm	PM/PSK Sub-Carrier	2 kbps to 20 Mbps
VSWR	< 2:1	GMSK	10 kbps to 40 Mbps
ACI	40 dB (min.)/1 dB BER Degradation	DSOQPSK	10 kbps to 40 Mbps
Image Rejection	≥ 60 dB	NTSC/PAIs FM	With Switched De-Emphasis
Spurious Rejection	≥ 60 dB	Coherent AM	For Enhanced Tracking
IF Rejection	70 dB minimum, 80 dB typical	IRIG 106-15 Modes	
IF SAW Filters	8 from 0.3 to 40 MHz	Trellis FM (Tier 0)	20 kbps to 20 Mbps
IF FIR Filters	15 user-selectable per data rate entered + Auto-Set based on data rate; 4 kHz to 37.3 MHz	SOQPSK-TG (Tier I)	50 kbps to 40 Mbps
Pre-d (70 MHz) Outputs	Linear, - 10 ±2 dBm, 2 per Channel	Multi-h CPM (Tier II)	100 kbps to 37 Mbps
AGC TC	0.1, 1, 10, 100 and 1000 mS	Spread Spectrum	SS-UQPSK, SQPN
AGC Outputs/Channel	2 Scalable ± 10, 20 or 50 dB/V with User-selectable Hi/Lo impedance	Acquisition/Tracking	± 250 kHz
AGC Modes	Auto, Manual, Freeze, and Zero	FM/FM Carrier	5 kHz to 12 MHz
AM Outputs	Normal and Inverted; 2 Vpp into user-selectable 50/75 Ω (50% AM)	FM Sub-Carrier	100 bps to 256 kbps
AM Low Pass Filters	User-selectable 30 Hz – 30 kHz	IRIG Time Code Gen.	IRIG A/B Time Code
AM Frequency Response	0 Hz to 30 kHz	TM over I/P	3 CH10 Compatible Channels and in accordance with IRIG 218-07
AFC	±250 kHz	ERROR CORRECTION	
AFC Loop Speeds	1, 5, 20 and 100 Hz	Adaptive Equalization	CMA and Decision Equalization
Record/Playback	Fixed 70 MHz Playback; Select any Channel; Optional Pre-d Record/Playback; 75 kHz to 15 MHz (1 kHz steps)	Data Quality Encapsulation	Supports Best Source Selection in
RF Spectrum Analyzer	3 RF Spectral Sweep Displays w/ CF Measurement & Span Control	/Data Quality Metric	PCM/FM & SOQPSK-TG Modes
COMBINER		Low Density Parity Check	6 SOQPSK-LDPC FEC Codes and de- randomization per IRIG 106-15 and CCSDS
Modes	User-selectable Pre-d and Post-d AM/AGC Optimal Ratio and Best Source Select	Space Time Coding	SOQPSK-STC Per IRIG 106-15 Appendix S
Improvement	3.0 dB (≥ 2.5 dB typical), Equal Signal Inputs; (10Log(C1/N1+C2/N2))-0.5dB (unequal input)	Reed Solomon	Optional
Break Frequency	≥ 50 kHz	Viterbi	Optional (Rate ½ K=7)
Calibration	CH1/CH2 Balance Feature	Turbo	Options per customer specs
		BASEBAND VIDEO	
		Number	Four outputs per Channel
		Output	User-selectable Analog or TTL Clock & Data
		Output Voltage	Analog 0 to ≥ 4Vpp, 75Ω
		Coupling	AC or DC
		FIR Filtering	15 user-selectable per data rate entered + Auto-Set based on data rate; 2 kHz to 18.7 MHz + Bypass
		Displays	Up to 3 Eye Pattern and Constellation Display





R300 SERIES SPECIFICATIONS *(continued)*

PROGRAMMABLE BIT SYNCHRONIZER

Number of Bit Syncs	Up to 3 User-switchable to any Channel; Up to 3 User-switchable External Inputs
Input Level	0.2 to 20 Vp-p Single-ended; 0.2 to 10 Vp-p Differential
Input Impedance	Switchable 4K/75 Ω Single-ended; 150 Ω Differential
DC Offset	20 Volts
Input and Output Codes	NRZ-L/M/S, Bi-Phase- M/S, DBiphase-M/S, DM-M/S, MDM-M/S and RNRZL-L
De-Randomizer	RNRZ-9/11/15/17/23; Forward and Reverse
Data Rate Range	8 bps to 40 Mbps NRZ; 8 bps to 20 Mbps (all other codes)
Tuning Resolution	0.1% of Data Rate
Capture Range	3x Programmed Loop Bandwidth
Tracking Range	+/- 12% of Data Rate
Loop Bandwidth Range	0.1 to 3% of Data Rate
Acquisition Threshold	0 dB Eb/No (NRZ); 3 dB Eb/No Bi- Phase
BER/Code Degradation	< 0.5 dB (all codes)
Static Offset	0-100% for 0-10 Vp-p
Dynamic Offset	80% (max.) for Oscillating Frequency Offset
Dynamic Freq Offset	0.1% of Data Rate
Data Outputs	2 Outputs: 3.3 V TTL/CMOS and RS- 422
Output Impedance	50 Ω
Clock/Data Phase	0°, 90°, 180°, and 270°
Data Polarity	Programmable Normal or Inverted
PN Generator Patterns	PN7, PN9, PN11, PN15, and PN23; Forward and Reverse
PN Output	NRZ-L; 3.3 V TTL/CMOS Levels
Clock Source	Internal Programmable Data Rate
Forward Error Correction	Viterbi (k=7, Rate ½); Optional Turbo Codes per Customer Requirements
Viterbi Options	Differential Decoding; V.35 Descrambling; G2 Invert
Symbol Formats	Serial, Parallel, and Staggered

FRAME SYNC PERFORMANCE

Number of Frame Syncs	Up to 3 User-selectable to any Selected Channel
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Format	Programmable Frame Length and Sync Word
Auto-Detect	I/Q Ambiguity and Polarity
Frame Length	Programmable up to 65k Words
Word Length	Up to 32 Bits
Frame Sync Length	Up to 32 Bits
Frame Sync Mask	Up to 32 Bits

BUILT-IN-SELF-TEST/BERT PERFORMANCE

RF Internal BIT Source	Modulated Multi-Band RF Source for Internal BIT/BERT Loop Testing (all Demod Formats)
Patterns	PN7, PN9, PN11, PN15, Forward and Reverse
BER Sample Periods	Programmable 1×10^{-3} to 1×10^{-6} bits or Cumulative Average
Pattern Synchronization	Automatic with Polarity Detection
Error Insert	Single Bit or 10^{-3}
Background Diagnostics	Health & Status Monitoring of critical receiver performance parameters

OPERATING ENVIRONMENT

Operating Environment	Arm Processors (Linux) with DMZ Buffer design for IA compliance; Two 7" Front Panel Touch Screens Network Control via Ethernet
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POWER

Input Range	90-264 VAC, Auto-Ranging
Input Frequency	47-63 Hz
Redundancy	Dual "Hot Swappable" redundant Power Supplies
Consumption	<400W

PHYSICAL AND ENVIRONMENTAL

Dimensions	17"W x 5.25" H x 22" D
Mounting	19" Rack (3U)
Weight	≤ 50 lbs.
Operating Temperature	0 to 50°C
Storage Temperature	-20 to 70°C
Humidity	Up to 95%, non-condensing
Altitude	Up to 30,000 feet
EMI	Designed to meet MIL-STD-461

Specifications subject to change without notice

