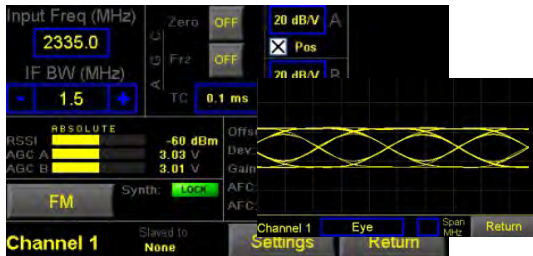
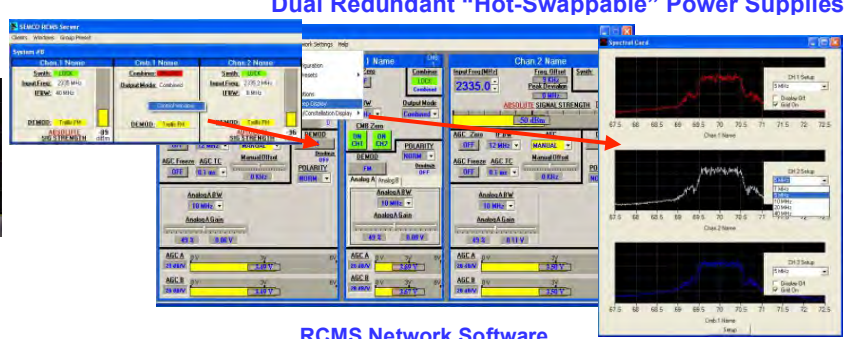




R200A SERIES TELEMETRY RECEIVER



Front Panel Touch Screen Controls and Displays



RCMS Network Software

DESCRIPTION - SEMCO's R200A Series Telemetry Receiver product line consists of 2U 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 R200A 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 features include Adaptive Equalization, Data Quality Encapsulation/Metric (DQE/DQM), Low Density Parity Check (LDPC), Space Time Coding (STC), CCSDS Spread Spectrum (Constellation program crew vehicle) Forward SS-UQPSK link and the Return DG1 Modes 1, 2 & 3 links.

STANDARD CONFIGURATION	OPTIONS (continued)
<ul style="list-style-type: none"> Single or Dual Channel Receivers Dual Channel Receiver Combiner (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 (3 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) 	<ul style="list-style-type: none"> 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 106-13 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
<p>OPTIONS</p> <ul style="list-style-type: none"> 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 	

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R200A SERIES SPECIFICATIONS

RF

Frequency (MHz)	70, 200-1150, 1400-1600 1650-1850, 2185- 2485, 4400-5250 1415-2485 (continuous)
LO Tuning Resolution	100 kHz (increments of 1 kHz in AFC Manual Mode)
Internal Stability	≤ +/- 1.0 ppm with internal 10 MHz reference
AFC Resolution	1 kHz
Dynamic Range	-10 dBm to Threshold
Noise Figure	≤ 8 dB (maximum)
Phase Noise	IRIG 106-15 Tier II Phase Mask Compliant
Maximum Safe Input	+10 dBm
VSWR	< 2:1
ACI	40 dB (min.)/1 dB BER Degradation with presence of interfering signal at 2 times IFBW
Image Rejection	≥ 60 dB (> 65 dB, typical)
Spurious Rejection	≥ 60 dBc
IF Rejection	70 dB minimum, 80 dB typical
IF SAW Filters	8 from 0.3 to 40 MHz
IF FIR Filters	15 user-selectable per data rate entered + Auto-Set based on data rate; 4 kHz to 37.3 MHz
Pre-d (70 MHz) Outputs	Linear, - 10 ±2 dBm, 2 Outputs per Channel
AGC TC	0.1, 1, 10, 100 and 1000 mS
AGC Outputs/Channel	2 Scalable (± 10, 20 or 50 dB/V); customer-specified scaling; Hi/Lo impedance selection
AGC Modes	Auto, Manual, Freeze, and Zero
AGC Dynamic Range	Up to 100 dB from a 6 dB C/N threshold to -10 dBm
AGC Voltage Display	AGC voltages on Touchscreen, local GUI, and Network GUI
AM Outputs/Channel	Normal and Inverted; adj. 2 Vp-p into 50/75 Ω @ 50% AM
AM Low Pass Filters	User-selectable 30 Hz–30 kHz (Bessel Filters)
AM Frequency Response	User-selectable 0 – 30 kHz
AFC	±250 kHz
AFC TC	1, 5, 20 and 100 Hz
Record/Playback	Fixed 70 MHz Playback; Optional Pre-d Record/Playback; 75 kHz to 15 MHz (1 kHz steps)
RF Spectrum Analyzer	Up to 3 RF spectral sweep displays with CF measurement indicator and selectable span control; simultaneous displays during receiver and demodulator operation

DIVERSITY COMBINER

Combiner Type	Post-d and Pre-d Frequency and polarization diversity
Combiner Method	User Selectable AM/AGC Optimal Ratio and Best Source Select
Combiner Modes	User selectable CH1, CH2 or Combined
Break Frequency	>50 kHz
Auto Adjust	CH1/CH2 Balance feature
Combiner Improvement	3.0 dB (>2.5 dB typical) improvement (equal signals input); (10Log(C1/N1+C2/N2))–0.5dB (unequal input)
Loop Bandwidth	Selectable 0.5 to 50 kHz

DEMODULATOR

Number of Demods	Up to 3 User-switchable to any selected Channel
Demodulator Modes	
PCM/FM	10 kbps to 23 Mbps
PM/PSK	2 kbps to 20 Mbps
S/O/QPSK	30 kbps to 40 Mbps
Trellis FM	20 kbps to 23 Mbps
SOQPSK-TG	50 kbps to 40 Mbps
Multi-h CPM	100 kbps to 37 Mbps
GMSK	10 kbps to 40 Mbps
FM/FM	5 kHz to 12 MHz
FM Sub-Carrier	100 bps to 256 kbps
Differential Decoding	Per IRIG and the CCSDS Standards
Sub-carrier Demods	2 per Demodulator
Sub-carrier Modulation	Up to 1.8
Index	
Loop Bandwidth	User-selectable 0.1 - 3%
Spread Spectrum	SS-UQPSK, SQPN
Acquisition/Tracking	+/- 1 kHz to +/- 500 kHz;
Adaptive Equalization	AE option mitigates harsh multi- path environments using CMA and Decision Equalization
Data Quality Metric	DQE/DQM option for Best Source Selector Applications by embedding data quality information within the PCM/FM and SOQPSK-TG demodulator formats
Low Density Parity Check	6 SOQPSK-LDPC FEC Codes and de- randomization per IRIG 106-15 and CCSDS
Space Time Coding	SOQPSK-STC Per IRIG 106-15 Appendix S



R200A SERIES SPECIFICATIONS *(continued)*

DEMODULATOR (cont.)

IRIG Time Code IRIG A/B Time Code Stamping

TM over I/P 3 CH10 Compatible Channels and in accordance with IRIG 218-07

Displays Eye-Pattern and Constellation Displays; simultaneous displays without interference with demodulator function

BASEBAND VIDEO

Number of Outputs Four outputs per Channel
User-selectable Analog or TTL clock & Data

Output Voltage Analog 0 to $\geq 4V_{pp}$, 75 Ω

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

STAND-ALONE EMBEDDED BIT SYNC/BERT OPTION

Number of Available Bit Sync Channels User-switchable dual CH bit sync to any selected Channel plus up to 2 user-switchable external inputs

Input Level 0.2 to 20 Vp-p Single-Ended
0.2 to 10 Vp-p Differential

Input Impedance 4K/75 Ω Single-ended or 150 Ω Differential

DC Offset 20 Volts

Input/Output Codes NRZ-I/L/M/S
Bi-Phase- L/M/S
DBiphase-M/S
DM-M/S
MDM-M/S
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 3 times 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 Levels

Output Impedance 50 ohms

Clock/Data Phase 0°, 90°, 180°, and 270°

Data Polarity Normal/Invert

Forward Error Correction (FEC) Viterbi (k=7, Rate 1/2); Optional Turbo Codes per customer requirements

Viterbi Options Differential Decoding; V.35 Descrambling; G2 Invert

Symbol Formats Serial, Parallel, and Staggered Parallel

FRAME SYNCHRONIZER OPTION

Number Dual CH User-selectable to any selected Channel

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

BIT/BERT OPTION

RF Internal BIT Source Modulated Multi-Band Source for Internal BIT/BERT Loop Testing (all demod formats)

Sequence Generator 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 and bit slip detection

Error Insert Single Bit or 10^{-3}

Background Diagnostics Health & Status Monitoring f critical receiver performance parameters

ADDITIONAL OPERATING FEATURES

System and AGC Data Logging Time tags and stores all system and AGC parameters and readings during a mission into a user-named file; outputs both System and AGC data logging files as Comma-delimited text files

Mission Presets Virtually infinite number of receiver settings can be named and stored to a file for recall; one touch presets feature provides for 10 presets for instant recall





R200A SERIES SPECIFICATIONS *(continued)*

ADDITIONAL OPERATING FEATURES (cont.)

Channel Slaving and Naming User ability to separately name the receiver and channels as well as slave receiver settings between channels

TM Receiver Operation without host Processor System operation (PC-based, or optional non-PC configuration) is independent of host Processor (uses Processor for serial communications only); provides ability to bypass host Processor and use any external PC com port; provides for instant restoration of TM operation after power is lost and then restored

OPERATING ENVIRONMENT

Operating Environment Windows 7/10 Operating System; Optional Non-PC/Processor configuration (Ethernet Only); 4.3" Front Panel Touch Screen; Local display, Keyboard, and Mouse controls; Removable Front Panel SSD; RCMS Network Software for Remote Control (all configurations)

POWER

Power Input 100-264 VAC, 47-63 Hz; Auto-ranging; dual, hot-swappable redundant power supplies

Consumption <300 W

PHYSICAL AND ENVIRONMENTAL

Dimensions 17"W x 3.5" H x 22" D (19", 2U Rack Mount)

Weight <35 lbs.

Temperature 0 to 50°C (operating)
-20 to 70°C (storage)

Humidity Up to 95%, non-condensing

Altitude Up to 30,000 feet

EMI Designed to meet MIL-STD-461

