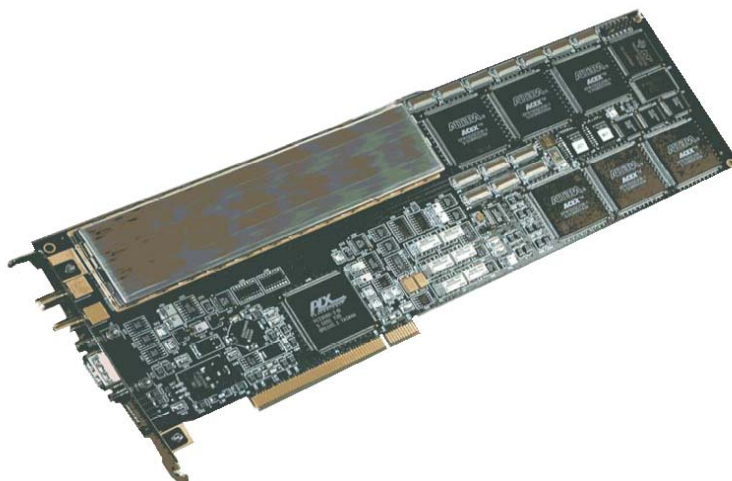


Ground Systems

PCI-2070 Digital Telemetry Receiver with Tracking Ground Products

FEATURES

- User friendly Windows 2000 and Windows XP based setup and operation
- FM, FSK, PM, BPSK, QPSK, OQPSK demodulators
- Selectable 300 kHz – 28 MHz IF Data Bandwidth
- RF inputs of Upper/Lower-L and S Bands, single or Tri-Band
- PCI form factor
- High Input Dynamic Range of -70 to -10 dBm for Standard IF
- High speed transfer of the output data to PCI bus for FFT analysis
- IF Tracking feature compensates for Doppler effect and other transmitter anomalies
- Analog reconstructed data is available on BNC connectors for easy user interface
- Fully programmable digital FIR output filter can be bypassed for higher PCM data rates
- Digitally time synchronized sampled output data available for FFT analysis and direct capture capability
- 100 kHz Input Frequency Tuning Resolution
- AM and Level AGC testpoints available for antenna tracking on BNC outputs



The PCI-2070 Telemetry Receiver is a fully programmable DSP (Digital Signal Processing) based Upper/Lower L and S band tracking receiver with on-board FM only or Multi-Mode Digital Demodulation designed around the PCI form factor. The DSP algorithms are implemented in state-of-the-art FPGAs (Field Programmable Gate Arrays) allowing for rapid enhancements or customization. Versions are available for single RF frequency or full RF coverage for Lower-L, Upper-L and S Bands.

Capable of accepting RF input signals from -10 dBm to -70 dBm, the PCI-2070 will receive the RF signal, condition, and digitally demodulate FM, FSK, PM, BPSK, QPSK, OQPSK data. The IF Bandwidth is selectable from 300 kHz to 28 MHz. The AFC (auto frequency control) tracking feature compensates for Doppler shift and other transmitter anomalies by using DSP algorithms to determine if the input spectrum is centered at the programmed center frequency. If the input spectrum is not symmetrical, the digital downconverter is automatically stepped to track the input frequency. Using these DSP algorithms and other programmable features make the PCI-2070 a key element of any Telemetry or Satellite Communications receiving system.

By using DSP based algorithms including Finite Impulse Response (FIR) filters, multi-stage recursive decimation filters, Modulated Numerically Controlled Oscillators (MNCO) and DSP implemented Phase-Locked Loops (PLL), the PCI-2070 has no need for calibration and tuning. User-friendly Windows based Graphic User Interface (GUI) software is supplied for easy product installation into a Windows based host computer system.

The RF input telemetry frequencies are downconverted to 70 MHz IF prior to digitizing. The final demodulation stage is received by a digital auto gain control circuit and a 14-bit digitizer. AGC test points are available from both the AGC detector level as well as the AGC AM signal. The output data is reconstructed using a programmable reconstruction filter, then normalized to user specified output levels and offsets. The digital data is available through a high speed 128 KB DualPort Memory circuit for direct storage to the host computer for FFT analysis.



communications
Telemetry & RF Products

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SPECIFICATIONS

Input Specifications

- Input Frequency Range
Lower-Band 1429-1545 MHz
Upper L-Band 1700-1850 MHz
S-Band 2185-2485 MHz
(Optional 70 MHz input)
- IF Bandwidth
Selectable 0.3, 0.5, 0.75, 1.0, 1.5, 2.4, 3.3, 4.0, 6.0, 10.0, 15.0, 20.0, 28.0 MHz BW. (Additional BWs upon request)
- Frequency Tuning Resolution
100 kHz steps
- Nominal Input Impedance
50 Ohms
- VSWR Ratio
2.0:1 maximum, 1.5:1 typical in band
- Dynamic Range
-70 dBm to -10 dBm
- Maximum Safe Input
+10 dBm
- Noise Figure
6 dB Typical, 8 dB, maximum
- IF Rejection
55 dB minimum > -60 dB typical
- Spurious Rejection
50 dB

Demodulator Specifications

- Demodulation Modes
FM/FSK (Standard)
PM/BPSK/QPSK/OQPSK (Optional)
- Post Detection Video Filters
Programmable FIR from 60 kHz to 28 MHz
- Data Rates
30kps to 20 Mbps
- AFC Tracking
 ± 250 kHz of programmed center frequency
- AFC Time Constants
Automatic selection based on IF filter selection.
- Anti-Side Band Control
PM, BPSK demodulation modes
- Doppler Tracking Output
 ± 20 kHz max. Accessible via PCI interface
- AGC Controls
Automatic, Manual, AGC Freeze and AGC zero

Output Specifications

- Video (Data) Output Impedance 75 Ohm
- Video (Data) Outputs 2 DC coupled outputs with programmable offset control, polarity and level. +/- 5VPP max into a 75 Ohm load impedance
- AGC Output 0 to -4 VDC into a 1000 Ohm. Gain = -20dB/V
- AGC Time Constants 0.1, 1.0, 10, 100, 1000 msec selectable
- AGC Linearity +/- 2 dB of best straight line over any 30 dB range
- AM Output 2V_{PP} into a 75 Ohm load for 50% AM Mod.
- AM Distortion 5% maximum for a 30% AM modulated signal at 5 kHz
- AM Frequency Response Low end set by AGC Time Constant to 50 kHz maximum
- IF Output 70 MHz at -10 dBm into 50 Ohms

Physical Specifications

- PCI Form Factor 32 bit PCI form factor, +5 Volt System
- Interface Connectors
RF input: SMA Female
IF Output: SMA Female
Analog Outputs: MDM-21SCBR

Break out BNC cable assembly available
- Manufacturing The design utilizes Surface Mount Technology (SMT), manufactured with robotic assembly techniques to IPC-610B Class 2 manufacturing standards
- Temperature Range: Operating: 0°C to 50°C
Storage: -20°C to 60°C
- Power Consumption Less than 25 Watts total, for all supplies

Control Software and Spectrum Displays

Control software for operation on Windows 2000 Pro and XP Pro is included with the receiver at no extra cost. The GUI (Figure 1) allows operators to monitor the IF spectrum and data output waveforms (Figure 2).

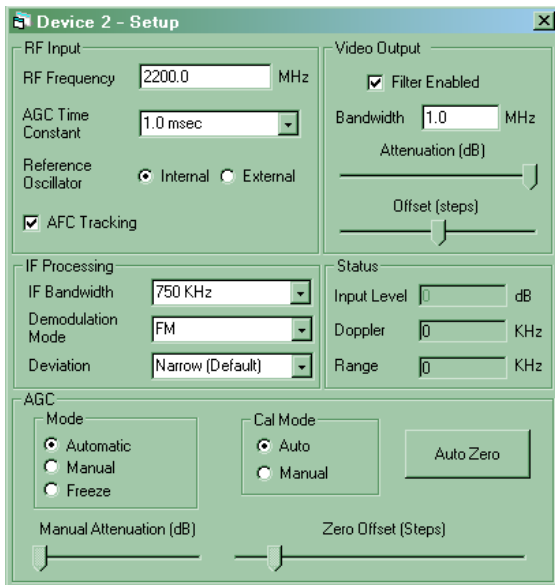


Figure 1 – Operating GUI

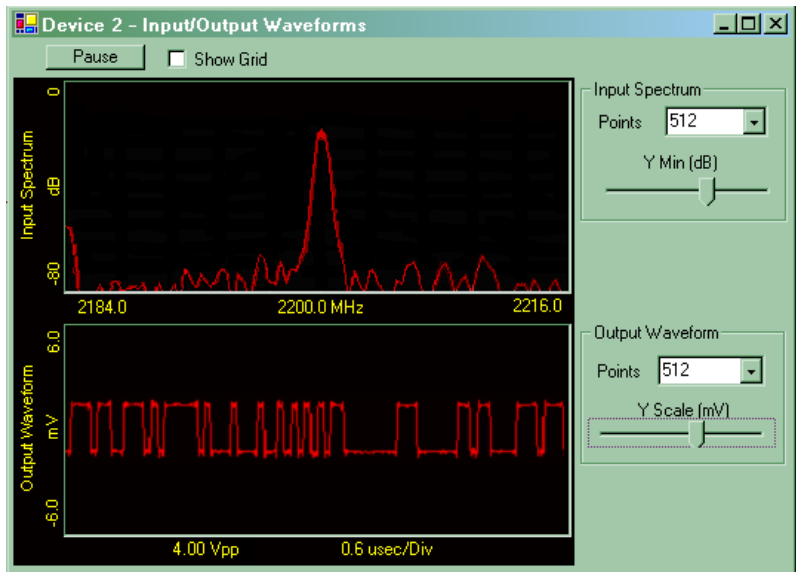


Figure 2 – Spectrum / Waveform Displays

Ordering Information

PCI-2070SLLF	Single RF Band Version, Lower L, FM only
PCI-2070SULF	Single RF Band Version, Upper L, FM only
PCI-2070SFSF	Single RF Band Version, Full S Band, FM only
PCI-2070SIFF	Single RF Band Version, 70 MHz IF Input, FM only
PCI-2070TTRF	Tri-Band Version, FM only
PCI-2070SLLM	Single RF Band Version, Lower L, Multi-Demodulator
PCI-2070SULM	Single RF Band Version, Upper L, Multi-Demodulator
PCI-2070SFSM	Single RF Band Version, Full S Band, Multi-Demodulator
PCI-2070SIFM	Single RF Band Version, 70 MHz IF Input, Multi-Demodulator
PCI-2070TTRM	Tri-Band Version, Multi-Demodulator

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