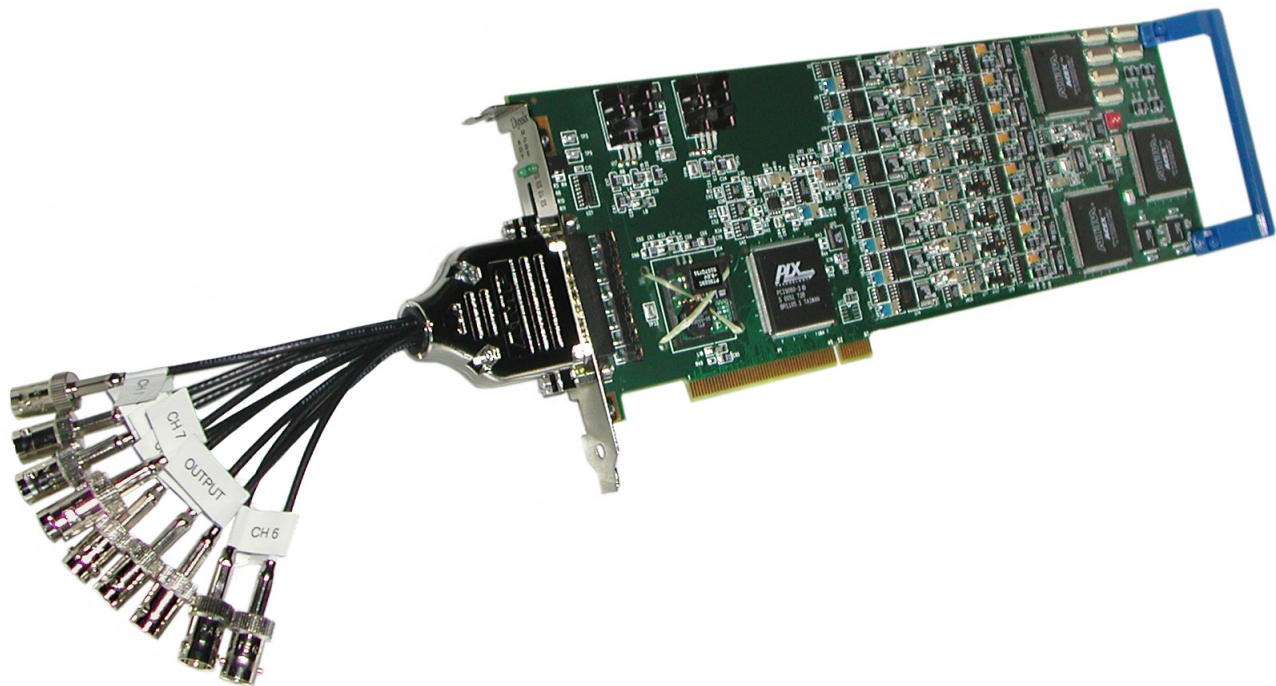


The **Hallux-PCI Digital Modulator/Calibrator**, a companion product to the Ulyssix Syrinx-PCI Digital Baseband Demodulator, is a DSP (Digital Signal Processing) based multi-function card designed around the **PCI** form factor. Modulation modes are software selectable to support FM and FSK modulation techniques. The product also has the ability to be a baseband signal generator for triangle, square, and sawtooth waveforms. DSP algorithms are implemented in state-of-the-art FPGAs (Field Programmable Gate Arrays) allowing for rapid enhancements or customization.

Up to eight digital VCOs can be individually configured as either modulator or calibrator channels with any combination of channel types and modulation schemes. All configured channels are digitally summed creating a single multiplex output. Input data channels are modulated with user supplied data connected to the card through BNC cables. Hallux channels are configured for modulation type, frequency, deviation, and autostep profile. Select from FM or FSK modulation mode for each channel. Fully programmable, all IRIG 106-93 CBW and PBW FM subcarriers are supported as well as non-standard frequencies with a carrier frequency range of 250 Hz to 5 MHz.

Using DSP based algorithms, including Modulated Numerically Controlled Oscillators (MNCO) with 32 bit phase accumulators, the **Hallux-PCI** is extremely accurate and stable. User-friendly Windows based Graphic User Interface (GUI) software is supplied for easy product installation into a Windows based host computer system. As a signal generator, the product allows the test engineer the ability to have an embedded waveform synthesizer without having to use another piece of test equipment

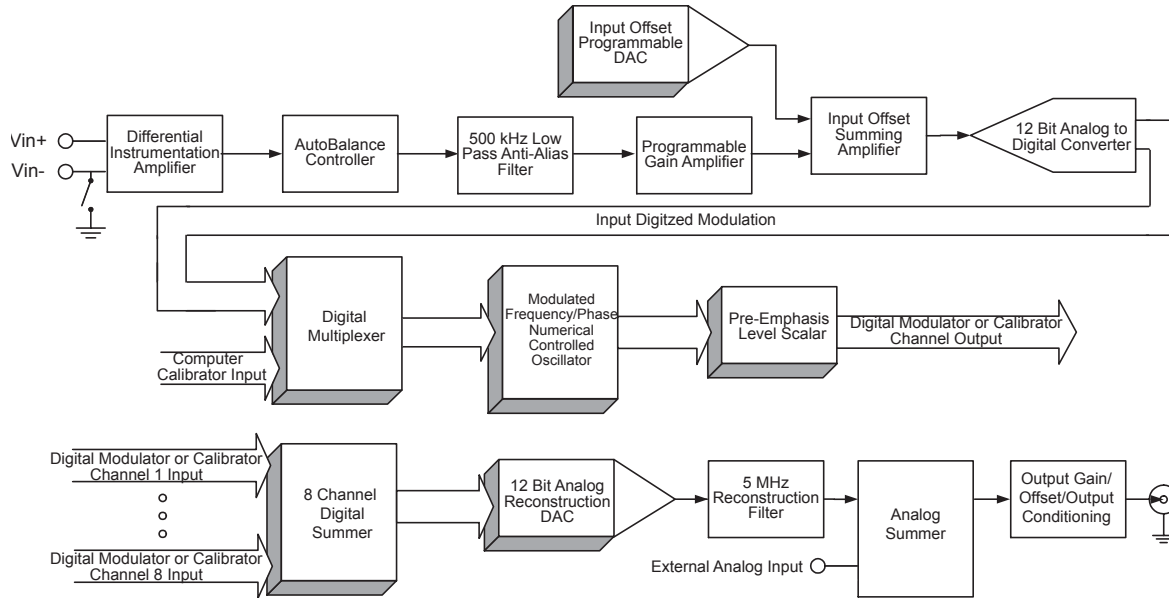
The **Hallux-PCI Digital Modulator/Calibrator** is a natural addition to any Telemetry or Satellite Communications ground station. It can function as an FM Demultiplex System Calibrator, FM Multiplexer, Data Insertion Converter, satellite command and control tone generator, etc.



FEATURES

- Each channel is configurable as either Calibrator or Modulator
- Program selectable for FM or FSK
- Up to eight (8) calibrator or modulator channels per card
- Summing input for higher channel capacity
- Fully programmable for all IRIG 106-93 FM CBW and PBW subcarriers as well as non-standard channels
- Signal generation capability for square, triangle and sawtooth waveforms
- Subcarrier harmonic distortion less than -56dB
- Independent 12 bit digitizer for each VCO channel
- Subcarrier frequency range of 250 Hz to 5 MHz
- Automatic and Manual calibration modes
- Modulated output level programmable from 1.0 to 10.0 Vpp
- Input data voltage range of 0.5 Vpp to 5 Vpp, selectable
- Programmable Pre-Emphasis scheduling, if desired
- FM subcarrier deviations from 0.5% to 50% of the center frequency and PM deviations from 0.3 to 2.3 radians
- User friendly Windows based setup and operation
- PCI form factor

SPECIFICATIONS



Hallux-PCI Block Diagram

SPECIFICATIONS

Physical Specifications

- PCI Form Factor 32 bit PCI form factor, +5 Volt System
- Interface Connectors DB25 connector with breakout cable to individual BNC connectors for Output, Channel Input, and Summing Input
- 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: +5V 1.0 Amp
+12V 0.9 Amp
-12V 0.0 Amp

Overall Card Specifications

- VCOs / Calibrators per card Eight (8)
- Independent Digitizers per card Eight (8)
- Summing External Analog Input 5.0 Vpp for max input resolution for single channel. Auxiliary Summing Input sums external analog input for higher channel multiplex capacities
- Multiplex Output Level Programmable from 1.0 to 10.0 Vpp into a 1K Ohm load
- Frequency Range 250 Hz to 5 MHz
- Analog Output Noise Less than 10 mVRMS

Signal Generator Specifications

- Waveform Synthesizer Modes Square, Triangle, Sawtooth

Calibrator Specifications

- Calibration Modes Manual or Automatic (Autostep)
- Calibration Steps 3 to 21 steps from -100% to +100% deviation Selectable
- Autostep Dwell Time 0.5 to 10 seconds per step Programmable in 0.1 second increments

Input Modulation Specifications

- Modulation Modes FM, FSK
- Input Frequency Response DC to 500KHz
- Input Configuration Single ended or differential using BNC connectors, Jumper selectable
- Input Voltage Range 0.5 Vpp to 5.0 Vpp, selectable
- Maximum Safe Input ± 40 VDC
- Input Offset Programmable from center to either band edge
- Range to Range Gain Error 0.03 % at 25°C

Individual Subcarrier VCO/Calibrator Specifications

- Subcarrier Frequency Range 250 Hz to 5.0 MHz
- Center Frequency Resolution 0.0002 ppm (1 part in 2³²)
- FM Deviation Range 0.5% to 50.0% of center frequency
- PM Deviation Range 0.3 to 2.3 radians, programmable
- Subcarrier Input Dev Resolution 0.0244% (12 bit digitizer)
- Subcarrier Harmonic Distortion All harmonic terms are below -53 dB
- Input Data Harmonic Distortion All harmonic terms are below -60 dB
- Input Modulation Linearity Less than 0.02%
- Pre-emphasis Scheduling Programmable from 0 to -20 dB per subcarrier
- Deviation Accuracy 0.0244% of the programmed center frequency
- Linear Deviation Range ±125% of the programmed deviation
- Frequency Stability 25 ppm over the full operation range

Ordering Information

- Hallux-PCI-01 Standard Eight Channel Calibrator/Multiplexer Unit

Specifications subject to change without notice.