

# NetAcquire® PCM Serial I/O with Clear Sync™ Technology

NetAcquire®

Noisy PCM Signals In  
Network Packets Out

## Integrated Digital Bit Sync

NetAcquire's new Clear Sync digital bit sync technology brings new capabilities to the NetAcquire family of field-proven range telemetry products.

The Clear Sync design emphasizes data quality. Its digital design doesn't use analog components that can drift out of calibration and affect performance. Each input channel uses low noise floor digitally controlled and tunable automatic gain control (AGC) and DC offset removal.

Next, the signal is passed into a super high-speed analog-to-digital (ADC) converter having an ultra-low jitter sample clock input. The ADC runs at a much higher resolution (12 bit) than typical systems and at much higher speeds (extreme multiples of the bit rate) to extract the maximum information from the input signal. This extreme "over-sampling" in both amplitude and frequency provides the ultimate in high data quality input fed into the Clear Sync digital signal processor.

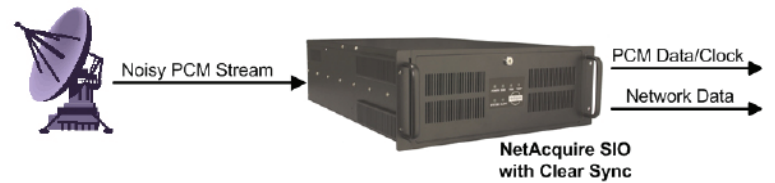
The FPGA-based digital processor implements a high precision phase detector and a sophisticated multi-loop tracking PLL with capabilities that are too challenging to implement in the analog domain. It also offers superior performance monitoring and software tuning. Next generation output clock frequency synthesis tracks to better than 0.1 parts per million (0.0000001%) resulting in highly accurate bit tracking even without data edges and even in the presence of high noise.

NetAcquire's advanced FPGA based design protects your investment. As the algorithms that define the system continue to be enhanced, new capabilities and custom functionality can be added in the field with a simple software upgrade.

NetAcquire's Clear Sync is designed to be remotely controlled and monitored from any authorized, network-connected computer. This capability allows you to view real-time plots of the system's operation and includes the ability to change the input source, loop bandwidth, or other parameters from any computer on the network whether it is in the lab, in a different building or across the range. The built-in enhanced diagnostics interface allows remote system configuration and self test. For example, if the programmed bit sync rate is incorrect and no data is being received, that used to mean a trip to the antenna. Not any longer – now you can change any parameter from your desk.

Better confidence in bit sync tuning means more consistent signal quality. A sophisticated signal quality metric is continuously computed and real-time data quality values can be included in the PCM serial or the network output of the Clear Sync system.

NetAcquire offers the Clear Sync system in both popular configurations: the classic stand-alone bit sync design and the more contemporary integrated design that features the full suite of telemetry front-end capabilities including frame sync, decom, and data recorder. NetAcquire's Clear Sync is also available as an integrated first stage of our market leading Advanced Correlating Source Selector product group.

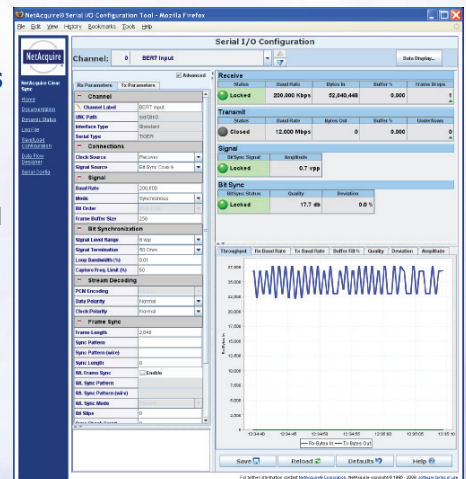


## Clear Sync Features

- Data Rates to 20 or 30 Mbps, with Higher Speeds Available
- Up to 16 Channels in one 4U Rackmount Chassis
- Bit Error Rate within 1dB of Theoretical
- Superior Performance in Harsh Noise Environments
- Network Enabled – remote network configuration and advanced status monitoring
- Network Streaming Data Output with Simultaneous PCM Output
- IRIG-B Packet Time Stamping
- Supports "Reverse Direction" Network Data to PCM Serial Output
- Automatic Tracking Range Limit w/ User Override Option
- 0.2 to 24 Vpp Input Range
- Data Encapsulation feature sends data quality information to remote location as either PCM or network
- Tight Integration with Frame Sync, Decom, and Network Output

## Advanced GUI Status

- Multi-user remote and local access
- At-a-glance continuous signal, bit lock and frame lock status
- Real-time graphing of input signal quality metric (SNR, Eb/N0)
- Frequency tracking or frequency deviation tracking over time
- Signal amplitude level tracking over time



## Powered By NetAcquire™

Every NetAcquire system is built on top of the advanced network-centric NetAcquire software architecture. This means that every system has built-in configuration and monitoring using any standard Web browser, security management with individual user passwords, and real-time parameter monitoring and graphing. All NetAcquire systems support software upgrades via the network so that as networking protocols change, your investment is preserved. Advanced options can include features such as decommutation, correlating source selection, data archiving, data reformatting, publish/subscribe, BERT, simulation, and time synchronization.



# Specifications

## Systems Configuration

- Performance Options: 10 Mbps, 20 Mbps, 30 Mbps, 40 Mbps, and 60 Mbps maximum bit rates
- Channel Options: 2, 4, 6, 8, 10, 12, 14 or 16 serial channels in one 4U system
- Connection Panel: Separate Quick Connection Panel (QCP) allows back or front of rack signal connections
- IRIG-200 Timing: IRIG-B input and output connections
- Setup: GUI remote configuration via network
- Software Integration: Tight integration with frame sync, decommutation, and networking

## Per-Channel Connections

- Type: Fully bi-directional
- Analog Inputs: 2 multiplexed connectors per analog channel, remote user selection
- Digital Inputs: TTL level digital input with or without clock, remote user selection
- Outputs: 2 independent outputs per channel, standard
- Connector Type: BNC when using QCP

## Analog Input Performance

- Input Termination: 75 ohm and 2K ohm impedance, remote user settable
- Bit Rate Range: NRZ: 40 bps to 60 Mbps, bi-phase 40 bps to 30 Mbps, depending on ordered performance option
- Nominal Bit Rate: User entered value
- Input Level Minimum: Syncs to signals as low as 0.1 Vpp
- Input Level Maximum: Tolerates signals as high as 24 Vpp
- AGC: Automatic gain control signal normalization using digital control loop
- DC Offset Removal: +/-8 Volts
- DC Baseline Variation (i.e. DC Offset Drift, AC Offset Removal): No degradation when voltage offset is up to 2V amplitude or frequency is up to the lesser of 0.1% of the bit rate or 1 KHz
- Loop Bandwidth: Selectable range of 0.1% to 3% of input bit rate in increments of 0.1%—digital control loop avoids analog drift over time
- Automatic Loop BW: User control to dynamically change the loop bandwidth from initial wide bandwidth to capture an off-frequency signal to a narrower bandwidth that provides more noise rejection
- Capture Range: 3 times the selected loop bandwidth
- Tracking Range: Up to 5 times loop bandwidth depending on user settable limit
- Sync Maintenance: SNR -2 dB assuming a transition density of 50%, at 0.1% LBW
- Sync Acquisition: Lock occurs within 128 input bit times or less at 3% LBW
- Sync Retention: Coasts through a minimum of 128 bits without transitions using 0.1% LBW
- Input Codes: NRZ-L, NRZ-M, NRZ-S, Biphase-L, Biphase-M, Biphase-S
- Derandomization: NRZ derandomization per IRIG 106
- Bit Error Rate: Within 1 dB of ideal BER performance curve when using 0.1 % loop bandwidth

## Digital Inputs

- Clocking Mode: Uses input clock or clock recovery
- Termination: 50, 75, 150 and 10K ohm user manual settings

## Outputs

- Outputs: 2 outputs per input channel
- Output Selections: Output may be recovered input data and clock, digital input loop back, or fully independent transmit channel—remote user selectable
- Input Data Use: Internally available recovered data available for frame synchronization, decommutation and other processing—doesn't require use of physical output connection

- Output Connectors: Data and synchronous clock
- Recovered Data Polarity: Normal, inverted, remote user settable
- Recovered Clock Phase: 0 Degrees and 180 Degrees, remote user settable
- PCM Codes: NRZ-L, NRZ-M, NRZ-S, Biphase-L, Biphase-M, Biphase-S
- Tx Clock Source: Internal, external, recovered Rx clock
- Tx Data Sources: Bit Sync recovered data, any user generated data
- Viterbi Decoding Option: K = 7, rate 1/2 with differential decoding and G1/G2 options
- Ambiguity Resolution Option: Supports Viterbi or frame sync pattern
- I/Q Interleave/Resequencing Option: Includes support for bit reorder AB/BA and polarity Invert A or Invert B

## IRIG Time

- Input: Per IRIG 200, B121
- Output: Per IRIG 200, B121
- Time Use: Hardware applied frame time stamping with microsecond accuracy

## Local Status

- LEDs: Individual LEDs for Physical Input Connection In Use, Signal Present, Bit Sync Lock, Frame Sync Lock

## Remote Status

- Simulated LED Status: Signal Input Active, Bit Lock, Frame Lock, and Transmit in use
- Signal Information: Voltage amplitude, bit rate, signal to noise ratio, frequency deviation, bytes received, frame drops, bytes sent
- Status Encapsulation: PCM or Network
- Scrolling Graphs: Real-time graphing of signal noise (Eb/NO), frequency tracking/deviation, signal amplitude, bit rate, Tx rate

## NetAcquire Server Software

- Operating System: Hard real-time with latency guarantees
- Diagnostics: Selectable power-up, continuous, and remotely initiated
- Backup: One-step configuration save/restore
- Open Programming Architecture: Available with NetAcquire Server Extension Toolkit

## Client Software

- User Interface: Web-based with Java GUI and SNMP
- Third-party software support: LabVIEW™, DataViews, Satellite Tool Kit, IADS, MATLAB®, .NET, C, C++, Java, Visual BASIC, CORBA

## Physical

- Frame: Heavy-duty steel
- Operating temperature 32 to 122°F(0 to 50°C)
- Power Requirements: 90-132 VAC or 180-264 VAC with automatic range switching, 250 watts (DC power optional)
- Rack mount: 2U, 4U, and 6U available
- Avionics ruggedization: Optional MIL-STD-820, MIL-STD-461, MIL-STD-704 environmental

### Solutions that Fit

NetAcquire Corporation specializes in real-time distributed systems. We can configure NetAcquire solutions that are customized to your network, input/output, and processing needs.

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