

# NetAcquire® Bit Sync with Clear Sync™ Technology

NetAcquire®

Noisy PCM Signals In  
Network Packets Out

NetAcquire Clear Sync technology integrates a state-of-the-art bit sync front end into the field-proven PCM serial capabilities of any NetAcquire product.

## Highlights

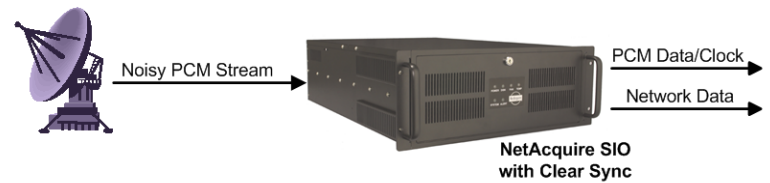
- 20, 30, 40, and 60 Mbps performance options
- Maximum data quality and noise rejection
- Data encapsulation feature sends data quality information to remote location as either PCM or network
- Integrated in one unit with frame sync, decommutation, and networking
- Remote network configuration and advanced status monitoring
- Up to 16 channels in one unit

Clear Sync design emphasizes data quality; its digital design has no analog components that could drift out of calibration and affect performance. Each input channel uses a digitally controlled low noise floor, tunable automatic DC offset removal, and automatic gain control (AGC). The system's super high-speed analog-to-digital (ADC) converter features an ultra-low jitter sample clock input. The ADC runs at a higher resolution, 12 bit and higher speed extreme multiples of the bit rate, to extract maximum information from the input signal. Over-sampling in amplitude and frequency provides the ultimate data quality input to the Clear Sync digital signal processor.

The FPGA-based digital processor implements a high precision phase detector and sophisticated multi-loop tracking PLL with capabilities well beyond the analog domain while offering 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 without data edges -- even in the presence of high noise. Best of all, as NetAcquire algorithms advance, Clear Sync provides in-field software and FPGA upgradeability, protecting your investment for the long term.

Clear Sync operation is controlled and monitored from any authorized, network-connected computer. This feature allows users to view real-time plots of the operation and 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. Better confidence in the bit sync tuning yields more consistent signal quality. A sophisticated signal quality metric is continuously computed; this real-time data quality value is user-optional included in the PCM serial or network output from the Clear Sync system.

Built-in enhanced diagnostics allow remote system configuration and adjustments. For example, if the programmed bit sync rate is incorrect and no data is being received, a technician no longer needs to go to the antenna to adjust parameters. Now users can change any parameter from their desk.

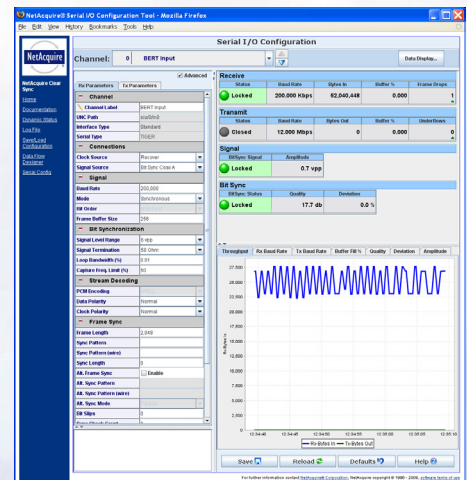


## Features

- Advanced network-based GUI control and scrolling chart status
- Tight integration with frame sync, decom, and network output
- Leading edge digital design
- Bit sync up to 60 Mbps, 16 input channels per 4U chassis
- 0.1 to 3% Loop Bandwidth adjustable in 0.1% steps
- 0.2 to 24 Vpp input range with DC offset removal
- Automatic tracking range limit with user override option
- Viterbi decoding and ambiguity resolution options
- Industry-unique "reverse direction" network data to PCM serial output
- Real-time data quality measurement can be included in output PCM or network data stream

## Advanced GUI Status

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



## Powered By NetAcquire™

Every NetAcquire system is built on top of advanced network-centric NetAcquire software architecture; benefits include 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; as networking protocols change, your investment is preserved. Advanced optional features include 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/N0), 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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