Model SX-5421

Multi-Purpose Communications Processor

Satellite and Range Data Processing Solution

Applications

- Satellite Uplink and Downlink Data Processing
- Range Data Code Conversion and Clock Regeneration
- PCM Code Conversion To/From Common Formats
- SGLS, USB, STDN Format Conversion
- Signal Level Conversion and Conditioning
- Integrated Programmable Multi-Channel BER Test
- Product and Flight Payload Integration, Simulation, Testing

Key Features

- Up to 8 Independent Channels per Chassis
- Conversion Between Most Common Satellite Command and ARTM Range PCM Data Formats
- Integrated Solution Replaces PN Code Generator, BERT and Hours of Calibration
- Data Encoders and Decoders for IRIG 106, PCM Conversion, and Scrambling

- Forward and Reverse Conversions
- Optional Convolutional Encoding/Decoding
- Data Scramble/Randomize and Descramble/Derandomize
- Compact 2U chassis without 3rd party Operating System or Hard Drive for increased reliability and security

The SX-5421 Multi-Purpose Communications Processor (MPCP) combines a state-of-the-art data communications signal conversion and processing capability with a simple user interface to format, re-format, and prepare serial synchronous signals for both uplink command processing and downlink telemetry recovery. An advanced, digital implementation provides for the small form and fit while fully satisfying applications requiring ruggedized packaging, minimum power consumption, and a highly reliable stand-alone non-PC based platform. The design supports a multitude of standard and custom digital formats for Satellite and ARTM Range use.

The SX-5421 MPCP is commonly used in applications requiring format conversion of data streams either before transmission or during reception. Data generation, coding/decoding, scrambling/descrambling and BER testing can be driven from a variety of external digital inputs or via internal pattern generation sources.

The SX-5421 can be used in legacy systems where discrete signal processing elements are common and may require connecting equipment with dissimilar electrical and formatting interfaces.

The SX-5421 continues the field success record of the earlier SX-4221 MPCP and is based around the UCP-4000 engine. This provides programmable capabilities via a pair of high speed Field Programmable Gate Array's (FPGAs) and a Digital Signal Processor (DSP). By installing unique programming the same basic design has been utilized for data encoding, modulation, demodulation/bit-synchronization, data decoding, and other general purpose signal and data processing applications.

The practical design of the SX-5421 MPCP also supports link test and verification applications. A single SX-5421 can replace multiple Bit Error Rate Testers (BERTs) in one small, simple-to-use unit allowing quick and accurate setup and testing without in-depth system knowledge.

Additionally, up to 32 Configuration Profiles can be stored with user-defined link names and recalled with a single command, simplifying fast and accurate configuration changes.

The firmware-intensive implementation of the SX-5421 readily accommodates custom features and signal processing tasks. Using the latest generation digital signal processing techniques often allows upgrades via firmware changes, even for previously fielded systems.

The SX-5421 is not based on a PC platform, avoiding the need for 3rd Party Operating Systems and hard drives and reducing the need for system patches and IT security concerns.

The SX-5421 MPCP is implemented in an industry standard 2U, 19 inch rack mountable chassis and provides full status and control capabilities. Controllable selections are accessible via an optional front-panel display or remotely via an RS-232 serial and 10/100baseT Ethernet. An optional GPIB interface is available for legacy system requirements. Remote control via the Ethernet LAN allows a common Java/Web brower GUI to setup and manage the units.

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Data Inputs

Configurable for up to 8 Data and Clock Input Ports
Factory configured for any combination of electrical levels including:
  TTL Data/Clocks (+5 VDC Compatible)
  RS-422
  RS-232
  LVDS
  LVPECL
Data rates from 50 bps to 40 Mbps

Data Outputs

Configurable for up to 8 Data and Clock Output Ports
Factory configured for any combination of electrical levels including:
  TTL Data/Clocks (+5 VDC Compatible)
  RS-422
  RS-232
  LVDS
  LVPECL
Internal Digital Pattern Generator
Internal Clock Generator (With Output)
Data rates from 50 bps to 40 Mbps

Coding/Decoding Formats

Independently Selectable Input and Output Codes
PCM: NRZ - Mark (NRZ-M), Space (NRZ-S), Level (NRZ-L)
        BIØ - Mark (BIØ-M), Space (BIØ-S), Level (BIØ-L)
Scrambling/Descrambling, Randomize/Derandomize:
    Bypass
    Intelsat (V.36)
    CCITT (V.35)
    RCC IRIG-106, Forward/Reverse
Data Polarity:
    Normal/Inverted
Clock Input/Output Phase:
    Selectable 0°, 90°, 180°, or 270°

Additional Features

Bit-Error-Rate Testing: Monitors Bit Error Rate for Returned Data of
    Standard Data Patterns
PN Code Generators for Industry Standard Patterns
Up to 32 Stored Configuration Profiles Including Power-Up Default

Remote Status/Control Specifications

Serial RS-232, 10/100baseT (GPIB Optional)
Commands: Control Over All Configurable Parameters
Status: Self-Test, Detailed Operational Information
Status/Control via standard Web Browser

Other Specifications

Chassis: 19" Rack Mount, 3.5" H (2U), 14" D (Excl. Connectors)
Front Panel Display/Control: Factory Installed Option
Connectors
        Factory Configured for:
        BNCs (Up to 32)
        25 PIN D (Up to 4)
        High Density 44 Pin D (Up to 2)
        Triax (Up to 32)
        1 9 PIN D for Remote Status/Control
        RJ-45 for 10/100baseT Ethernet
        GPIB (Option, replaces 10/100baseT)
        Standard 3 Prong Male Primary Power Input
Primary Power: 120 VAC (+/- 10%) 50-60 Hz
Temperature: -25° TO 60° C Operational, -45° TO +65° C Storage

* All specifications subject to change without notice or obligation to retrofit.
Consult factory for custom options and/or alternate specifications

Note the SX-5421 Multi-Purpose Communications Processor can be configured to support a variety of inputs, outputs, and conversion tasks. Some specific combinations of features and physical interfaces may not be valid. Consult factory for valid configurations.

Custom Equipment, Interfaces, or Modes of Operation

The firmware intensive nature of these Satellite Telemetry products can support additional modulation formats, coding functions, acquisition strategies, etc., even for previously fielded systems. In support of dynamic project requirements SRI frequently provides custom equipment to interface the existing items with new frequency bands, communication parameters or other unique interface requirements.

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