FlexPort™ Technology SyncServer S650 Series

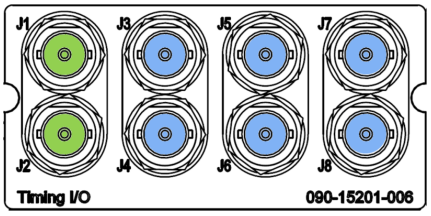
FlexPort™ Technology

FlexPort is an innovative technology that allows on-the-fly configuration of input/output (I/O) signal types such as IRIG time codes, pulse rates, and sine waves for a bank of BNC connectors. In the SyncServer S650 time and frequency standard, these signals are generated by Timing I/O modules, which are locked to the accurate S650 clock. Historically, dedicated circuitry was required to generate each discrete signal type and to output them on fixed signal connectors. The innovative FlexPort technology eliminates this constraint by allowing the user to assign specific input/output signal types to each BNC connector through a web interface.

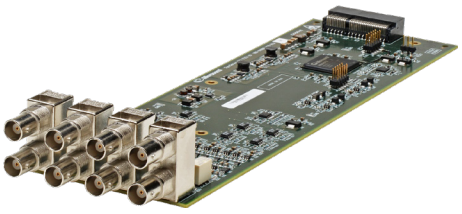
Isolated Inputs and Outputs

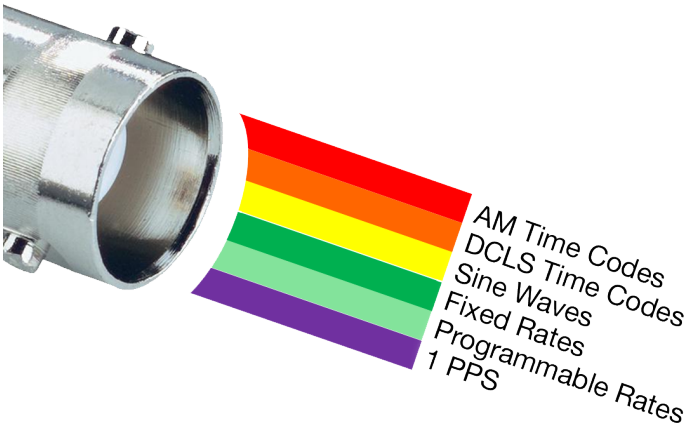
Locking to input signals requires separate circuitry independent of the circuitry used to generate the output signals. In general, the J1 connector handles all input signal types except 1/5/10 MHz sine waves, which are handled by the J2 connector. The J3 through J8 connectors are all generally outputs. FlexPort technology can optionally be enabled for all Timing I/O modules in an S650. (A single FlexPort license enables the feature for all connectors.)

The Standard Timing I/O Module Supports Input Signals (J1/J2) and Output Signals (J3–J8)



Standard SyncServer S650 Timing I/O Module





Advantages of FlexPort Technology

The timing I/O module(s) come standard with a fixed I/O configuration. This configuration provides a set of inputs and outputs commonly used in aerospace and communications applications. The optional FlexPort capability offers several advantages over the standard configuration, including:

- Flexible "any signal, any connector" configuration to accommodate existing and new installations
- Elimination of wasted space (for unused connectors/signals) inherent with legacy style fixed-signal modules/BNCs
- Coherent signals on all outputs
- Software configurability
- Ability to be added without hardware change to the timing I/O module

Standard vs. FlexPort Configuration

→ BNC Connectors / ↓Signals		Input		Output					
		J1	J2	J3	J4	J5	J6	J7	J8
Standard	1PPS	●					●	off	
	IRIG B AM	●		●					
	IRIG B DCLS					●			
	10 MHz		●		●				
FlexPort	IRIG A/B/C37/E/G NASA/2137/XR3 AM/DCLS	■		■	■	■	■	■	■
	Selectable/ Programmable Rates	■		■	■	■	■	■	■
	1/5/10 MHz Sine Wave		■	■	■	■	■	■	■

In the figure, ● represents the standard configuration with fixed signal types while ■ represents the FlexPort configuration with user-configurable and programmable time codes, pulse rates, and sine waves. (Standard Timing I/O module shown here).

FlexPort Input Signal Choices

Separate input connectors accommodate the distinct circuitry requirements for locking and tracking different supported signal types. If multiple inputs of the same kind are needed, a second Timing I/O module can be installed. Signal types are divided between J1 and J2 connectors as follows:

- **J1:** Inputs to this connector are time codes (AM and DCLS) and pulses
- **J2:** 1/5/10 MHz (with the exception of the Timing I/O with HaveQuick module which supports additional signal types on this connector)
- **J7:** The Timing I/O module with Telecom signals can accommodate T1 and E1 input

FlexPort Output Signal Choices

FlexPort output circuitry is versatile in terms of the different signal types that can be output from the J3 to J8 connectors, depending on which Timing I/O module is installed. These include:

- Time codes
- Fixed rate pulses
- Programmable pulse rates
- Sine waves

All time-code signals are time-aligned with the accurate internal S650 clock. The fixed-rate output signals are phase-aligned with the 1PPS output of the clock and are coherent with other fixed signal types and amongst each other. Sine waves with 1/5/10 MHz sine waves are not phase-aligned with the 1PPS output. These sine waves exhibit the frequency stability of the S650 clock but without a zero crossing exactly on time with the 1PPS edge. ***It is also important to note that these sine wave outputs are not designed to be low-phase noise 1/5/10 MHz signals.*** For applications sensitive to 10 MHz phase noise, Microchip recommends the Low Phase Noise modules. The Timing I/O Module 10 MHz outputs are not meant for low phase noise applications.

Selectable and Programmable Pulses

To make it easy to quickly configure common output rates, some rates are directly selectable and are preconfigured menu choices. These include 10/5/1MPPS, 100/10/1KPPS, 100/10/1/0.5PPS, and 1PPM rates, which are phase-aligned to the S650 1PPS output and coherent with one another. The S650 1PPS output is aligned to the extremely accurate (15 ns RMS to UTC (USNO) while tracking GPS) internal S650 clock.

The programmable pulse rates out are configured by specifying the desired pulse period. The incremental pulse period step size is 10 ns for all available pulse rates. With the FlexPort option, each of the output connectors can have a different rate.

Dual Timing I/O Card Support

Some applications may require additional inputs or more than six outputs. The S650 is equipped to cater to the needs of such applications as it can accommodate two Timing I/O modules. A single Flex Timing license option enables the FlexPort functionality for all installed modules. With two Timing I/O modules installed, for example, the S650 can accommodate up to four inputs of similar or different kinds and up to 12 outputs, all of which are user-definable. This allows for very efficient use of connectors and rack space.

Distribution Chassis Alternative

With two Timing I/O modules supporting up to 12 outputs, the S650 alone can serve as a cost-effective alternative to both a GPS clock and a signal distribution chassis that would otherwise need to be installed separately. For example, configuring the same signal to be output from all 12 connectors eliminates the need for a distribution chassis to fan out the signal.

Easy Port Configuration

Configuring one or all of the Flex ports is a simple task. Individual ports are first configured via logical drop-down menus on the ***Port Configuration*** web page for each installed module. User entered, nanosecond caliber phase offsets for each BNC output accommodates variable cable lengths. Once this is done, all inputs and outputs are instantly reconfigured by a single press of the ***Apply*** button.

Connector and Signal I/O Choices

There are four variations on the Standard Timing I/O Module. Variations accommodate telecom signals such as T1/E1 I/0, HaveQuick time codes, PTTI outputs and the use of fiber connectors in place of BNCs. See SyncServer Options sell sheet DS00002920 for the configuration choices.

Accuracy and Flexibility Where It Matters

FlexPort technology is designed to deliver the most desirable time and frequency signals with a high degree of accuracy and precision while providing signal-configuration flexibility to economically meet application requirements. This flexibility provides cost and space savings and effectively meets changing application requirements. Users can standardize a single hardware configuration for the S650 to meet a wide range of existing and future timing demands.

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