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# SR5031

## Programmable High-Voltage I/O Module For SR5000 Digital Test Subsystem

- 16 Input and 16 Output Pins per Module
- 4 Programmable Input and Output Levels per Module
- Voltage Range of ± 12Volts
- 64K Vectors per Channel
- 50 MHz Data Rate
- RAM-Backed and Algorithmic Pattern Generation
- NRZ, RZ, RONE, RTC, and RI Output Data Formats Supported
- 10 Timing Generators per Module
- 100 ps Edge Placement Resolution

## High Voltage I/O

The SR5031 provides a variable voltage interface to the unit under test (UUT). Up to 20 SR5031 I/O modules can be controlled by the SR5010 Timing/Control Module for a total of 320 I/O pins. The inputs and outputs of the SR5031 can operate over a range of -12 volts to +12 volts without any external power required. This range is sufficient to cover TTL, CMOS, ECL, and most military and non-standard logic levels. The SR5031 Programmable High-Voltage I/O Module contains 16 stimulus and 16 response channels on a single VXI C-size card.

## Seven Distinct I/O Memory Types

The SR5031 I/O Module contains seven separate memory banks, each 64K vectors in depth, for generating stimulus patterns, expected response patterns, and recording UUT response data.

The Stimulus Memories contain the Output, Algorithmic and Tristate patterns, which are used to define the stimulus output to the UUT. The Response Memories contain the Expect, Algorithmic, and Mask patterns, which are used to define the expected response from the UUT.

Record Memory is used to store either the UUT response data or the result of the comparison between the UUT response data and the Expect pattern. It is operated independently in a manner much like a logic analyzer. A sixteen-level state machine and nine system-wide digital comparators are used to control what data is saved in the memory. In addition to the record memory, each input channel is provided with a 16-bit CCITT CRC register for Signature Analysis applications.

## Timing and Voltage Control

Each I/O module contains 10 separate timing generators for stimulus and response edge placement. Output pins can select from 4 timing generators to define the leading and trailing edges of each stimulus pin. Groups of eight output pins share an independent set of 4 timing generators for a total of 8 stimulus timing generators per card. Response pins can select from 2 response timing generators to define the sample and compare edges, or the 2 response timing generators can be combined together for window compare with glitch detection.

The output high and low voltages and the input logic threshold voltage are independently user programmable in groups of four channels. The output slew rate is internally controlled according to the output level.

## Multiple Data Formats

Stimulus pins may be independently programmed for any of the following formats: Non Return to Zero (NRZ), Return to Zero (RZ), Return to One (RONE), Return to Complement (RC) and Return to Inhibit (RI).


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# *SR5031 SPECIFICATIONS**

## Channels per Module:

| | |
|---|---|
| Inputs | 16 |
| Outputs | 16 |

## Memory Types:

| | |
|---|---|
| Stimulus | Output, Tristate, Algorithmic |
| Response | Expect, Mask, Algorithmic |
| Record | |

## Memory Depth:

65,500 vectors

## Output Drivers:

| | |
|---|---|
| Type | Variable Voltage |
| Voh | -11.5 V to +12 V, unterminated |
| Vol | -12 V to +11.5 V, unterminated |
| Output Swing | 0.5 V to 24 V p-p, unterminated |
| Output Current | ± 50 mA, maximum |
| Output Protection | Current and temperature |
| Abs Max Volt | -13 V to +13 V (high Z) |
| Output Impedance | 50 ohms, ± 10% |
| Voltage Resolution | 0.01 volt |
| Absolute Accuracy | 0.1 volt |
| Slew Rate | 1 volt/ns, nominal: internally controlled according to output level |

## Data Formats:

| | |
|---|---|
| RZ | Return to Zero |
| NRZ | Non-Return to Zero |
| RONE | Return to One |
| RC | Return to Complement |
| RI | Return to Inhibit/Tristate |

## Output Timing:

| | |
|---|---|
| Clock Pairs | 4 total per card (assert/deny)<br>2 per eight channels |
| Delay Range | One clock period |
| Pulse Width | 10 ns, min. (high or low) |
| Resolution | 100 ps, non-monotonic<br>2.0 ns, monotonic |
| Delay Accuracy | 2.0 ns, typ; 3.0 ns, max. (single channel) |
| Pulse Width | 3.0 ns, typ; 5.0 ns, max. Accuracy |

## Skew:

| | |
|---|---|
| Same Module | ±2 ns typical, ±4 ns maximum |
| SR5030-SR5030 | ±3 ns typical, ±5 ns maximum |

## Input Receivers:

| | |
|---|---|
| Type | Variable Threshold |
| Input Thresh. Range | -12 V to +12 V |
| Vth Resolution | 0.01 V |
| Vth Absolute Accuracy | 0.1 V |
| Input Hysteresis | 60 mV p-p, typical |
| Input Resistance | 30k ohms, typical to Vth |
| Input Termination | Jumper selectable: none, 50 ohms to ground, or 50 ohms to -2.0 V |

## Input Sample / Compare Modes:

| | |
|---|---|
| Formats | Edge / window |
| Range | One period clock cycle |
| Resolution | 100 psec |
| Accuracy | ±1 ns typical; ±2 ns maximum |

## Input Timing:

| | |
|---|---|
| Number of Timing Clocks | Two per card (edge mode); one per card (window mode) |
| Input Delay Range | One clock period |
| Clock Separation | 10.0 ns, minimum |
| Resolution | 100 ps, non-monotonic;<br>2.0 ns, monotonic |

# VXI Specifications

## Interface Compatibility:

| | |
|---|---|
| Type | Register-based, servant only (controlled by SR5010) |
| Revision | 1.3 and 1.4 |
| Size | C-size, single slot |
| Configuration | Static |
| Memory | 2 MB VME A32/D32 |

## Power Requirements:

| | | |
|---|---|---|
| +5.0 volts | 5.0 A | 25.0 W |
| -5.2 volts | 2.5 A | 13.0 W |
| +12.0 volts | 0.1 A | 1.20 W |
| +24.0 volts | 1.4 A | 33.6 W |
| -24.0 volts | 1.4 A | 33.6 W |
| -12.0 volts | 0.1 A | 1.20 W |
| -2.0 volts | 2.0 A | 4.00 W |
| | | -------- |
| Total Power | | 111.6 W (max.) |

## Cooling Requirements:

| | |
|---|---|
| Per-slot Average | 112 W (max.) |
| Airflow | 8 L/sec @ 0.38 mm water pressure for 10°C temperature rise |

## Environmental Specifications:

| | |
|---|---|
| Temperature | Storage = -40°C to +75°C<br>Operating = 0°C to +45°C |
| Humidity | 5% to 95% relative, noncondensing |

## Software Drivers:

| | |
|---|---|
| National Instruments | LabView |
| National Instruments | LabWindows/CVI |

* Specifications subject to change without notice.

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