

DI Module 3311S2

This figure is a simplified schematic of the Model 3311S2 DI Module.

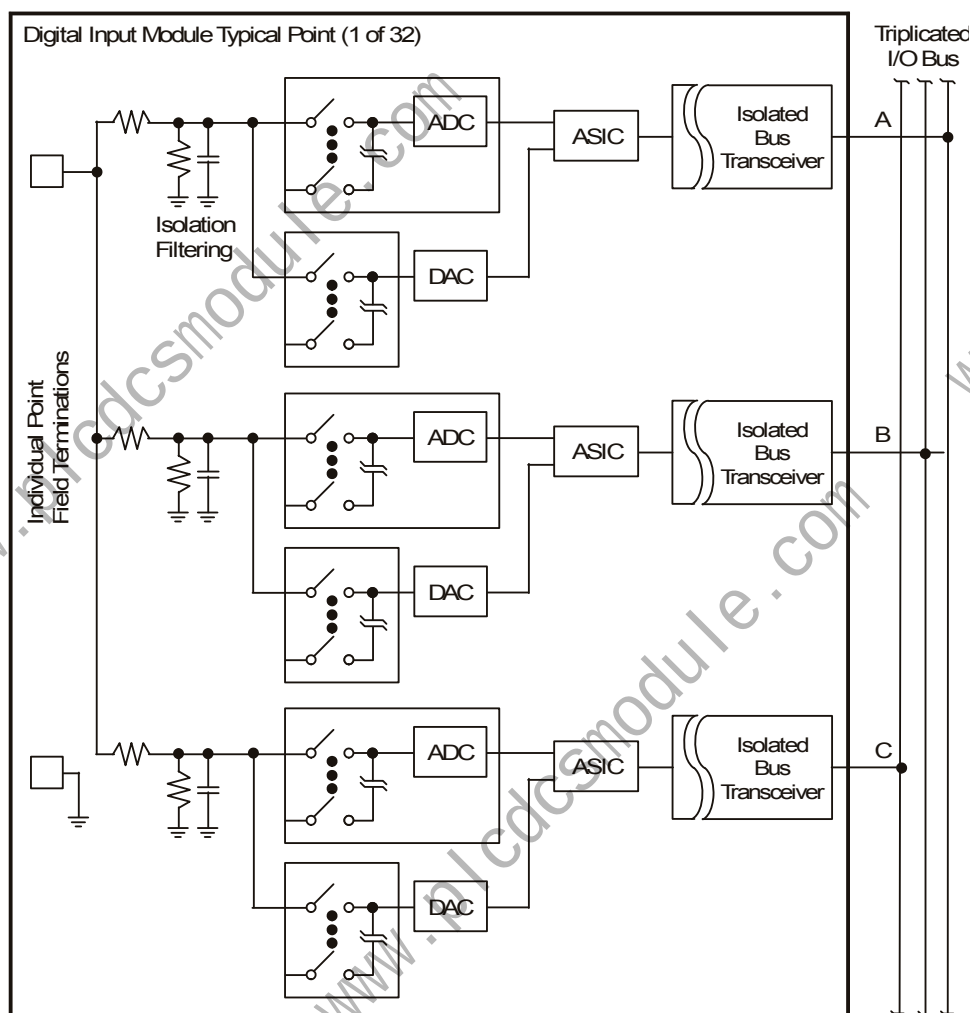


Figure 45 3311S2 DI Module Simplified Schematic

This table lists the specifications for the Model 3311S2 DI Module.

Table 23 3311S2 DI Module Specifications

Feature	Specification
Points	32, commoned
Nominal input voltage	24 VDC
Operational voltage range	19.2–30 VDC
Absolute maximum input voltage	33 VDC
Absolute maximum reverse input voltage	–0.6 VDC
Input delay	ON to OFF or OFF to ON Time constant = 0.13 msec, –3 dB @ 1.2 kHz
Input impedance	>30 k Ω without baseplate $\approx$ 3 k Ω with baseplate
Input power	0.2 W/pt, @ 24 VDC 0.5 W/pt, @ 33 VDC
Input threshold	0–5 VDC = Off region 6–14 VDC = transition region 15–30 VDC = On region
Diagnostic (loss of view)	Force-to-value diagnostic (FVD), <2 ms/test Force-to-trigger diagnostic (FTD), <2 ms/test
Maximum input toggle rate to maintain diagnostic fault coverage	<20/sec
FVD and FTD Off-state glitch	
Duration	<2 ms
Magnitude	$\approx$ 36% test voltage
Output Impedance	0–5 VDC, $\approx$ 100 k Ω
ADC scan time	<1 ms for all 32 points
Functional-to-protective-earth isolation	500 VDC, minimum
Functional-to-functional-earth (logic) isolation	800 VDC, minimum

The Model 3311S2 DI Module reports Sequence of Events (SOE) with a resolution of one millisecond or less and with an accuracy of one millisecond or less.

These are key terms used to describe the operation of the Model 3311S2 DI Module:

- **Transition**—a transition is defined as a point entering the user-defined trip state (SOE Trigger State) for the minimum amount of user-specified time (SOE Trigger Time), with an accuracy of –0/+1 milliseconds.

- Trip state – the trip state is a user-defined property (SOE Trigger State) in TriStation 1131 software that determines if the SOE function is enabled for a point and specifies the state of transitions (Rising, Falling, Rising/Falling) to be reported.
- Trigger time – the trigger time is a user-defined property (SOE Trigger Time) in TriStation 1131 software that specifies the number of milliseconds that a signal must be stable before its change in state (transition) causes the reporting of an event. This is also known as the debounce period. A longer trigger time results in a longer debounce period, so that pulse widths that fall within the debounce period will not be reported as an event.
- Dead time interval – the dead time interval is a user-defined property (SOE Dead Time) in TriStation 1131 software that specifies the length of time (in seconds) that must elapse after a transition, before a subsequent transition will be reported. A longer dead time interval is better able to prevent the higher-level SOE application from being flooded with events, but it also means there is a greater chance of losing subsequent transition events.
- Unreported events – unreported events are events that have been captured and are being processed before being reported to the SOE function block in the control program.

It can take up to three minutes for the Model 3311S2 DI Module to reach the Pass State upon initial power up, which is indicated by a steady green Pass status indicator on the front panel of the module.

When an event is triggered on a point, the amount of time before a subsequent event can be captured on the same point is affected by the number of unreported events in the system and the number of unreported events on the module.

This formula identifies the typical amount of time before a subsequent event can be captured on the same point. However, in the presence of certain diagnostics, the worst case time will be 20 seconds or the calculated time, whichever is greater. The calculated time does not exceed 20 seconds until there are 154 unreported events in the system with 32 unreported events on the individual module.

$$\text{Time} = (0.11 \times T) + (0.091 \times P) + 0.23 \text{ seconds}$$

T = total number of unreported events in the system. The maximum number of T is the total number of SOE-enabled points in the system. The maximum number of T is reached only if all SOE-enabled points in the system are triggered at the same time.

P = unreported events on the individual module. The maximum number of P is the total number of SOE-enabled points on the module. The maximum number of P is reached only if all SOE-enabled points on the module are triggered at the same time.

Additional performance characteristics of the Model 3311S2 DI Module:

- The module may miss transitions after the SOE function block in the control program starts, for a period of time up to the amount of the dead time interval.
- After the module captures a transition for an input point, a subsequent transition for that point is reported only after the user-configured dead time interval (SOE Dead Time) has elapsed.