OP5353 16/32 Digital Inputs
User Guide

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OP5353 16/32 DIN SIGNAL CONDITIONING MODULE

DESCRIPTION

The OP5353 is a part of the OP5000 series of optional, versatile signal conditioning modules for OPAL-RT's state of the art HIL (hardware-in-the-loop) systems. Designed for OPAL-RT's simulation systems, the OP5353 provides digital input signals with specific voltage conditioning. The optical isolation of the OP5353 inputs makes it ideal for environments where voltage isolation is required.

The OP5353 features 32 optically isolated input channels. All are sampled simultaneously for additional simulation accuracy. It is perfectly suited to interface real life environment signals to TTL or differential levels for RT-LAB simulator, providing perfect electrical isolation and discharge protection.

REQUIREMENTS

Software

- RT-LAB 8.4.0 and higher.

Hardware

- OP5600 HIL simulator
- OP5600 I/O Expansion Unit
- OP5607 I/O Expansion Unit.

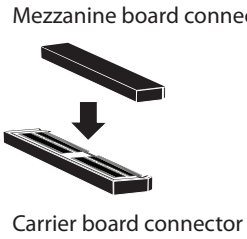
FEATURES

- HYPERSIM compatible
- 32 optically isolated input channels.
- All inputs are sampled simultaneously, at up to 10 MSPS.
- Inputs are read in parallel for any size bus simulation.
- Hardware configurable filters, and conditioning inputs for customization.
- Choice of sink or source inputs connection (anode and cathode side available).
- Minimum current input of 3.6 mA.
- 4V to 50V input voltage range.
- 30V maximum reverse protection.

INSTALLATION AND CONFIGURATION

The OP5353 digital input signal conditioning module must be inserted into the OPAL-RT carrier board using great care. Two polarized connectors fasten the module in the suitable position and four screws affix it for a more secure connection to the carrier.

Make sure that the connectors are properly aligned; they should fit together easily. Use light pressure to push the OP5353 board into the carrier board.



CIRCUIT LAYOUT DIAGRAMS

When the OP5353 is installed on the carrier board, only the top of the circuit board is visible, as shown in Figure 1. The connectors are located on the bottom of the board (see Figure 2) and fit snugly into the connectors on the carrier board .

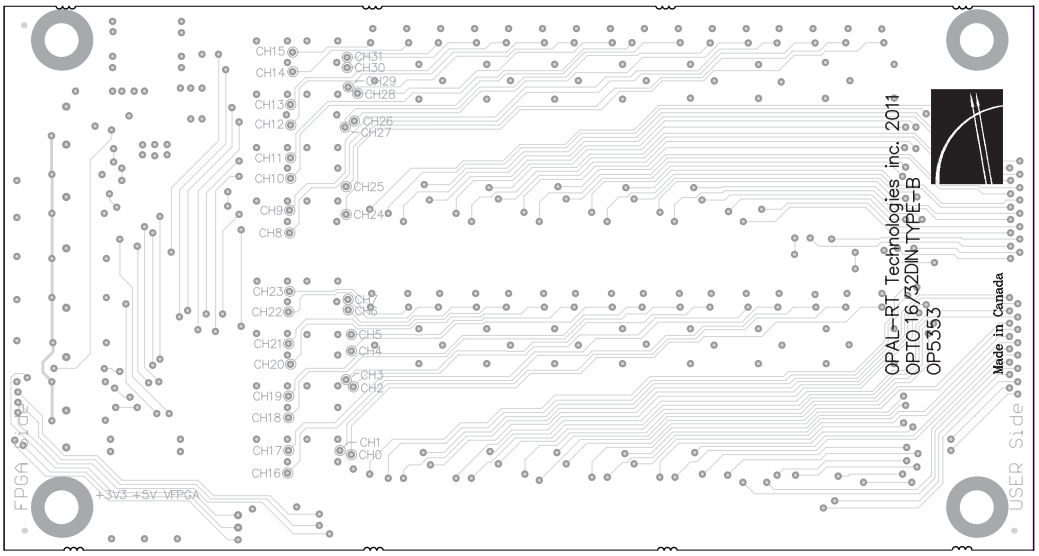


Figure 1: OP5353 digital signal conditioning module (top view)

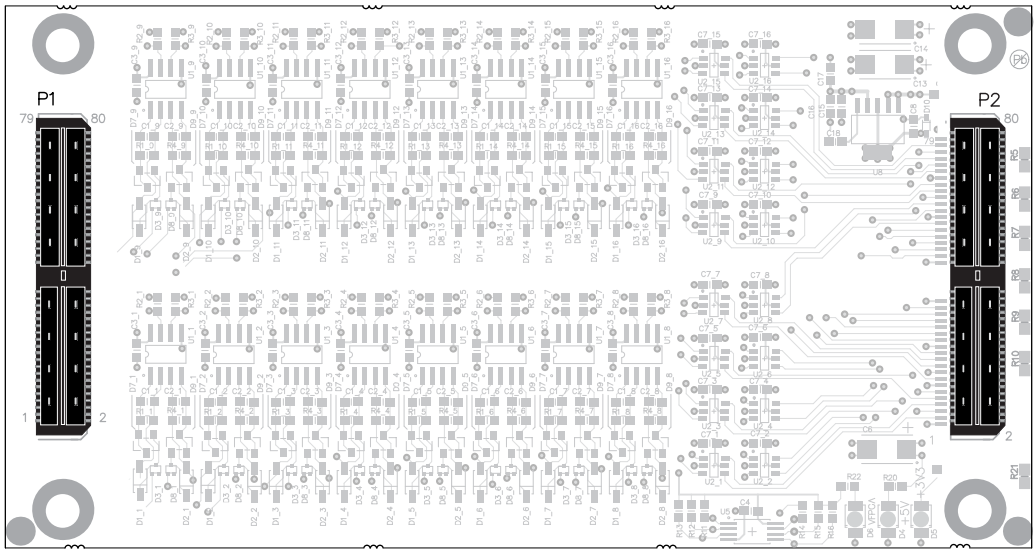


Figure 2: OP5353 digital signal conditioning module (bottom view)

INTERFACES

Inputs

The optically isolated inputs accept a wide input voltage range, from 4 to 50 Volts, according to user requirements. They have a low threshold current; typically 3.6 mA.

Each input has a reverse voltage protection of up to 30 Volts provided by a Schottky diode.

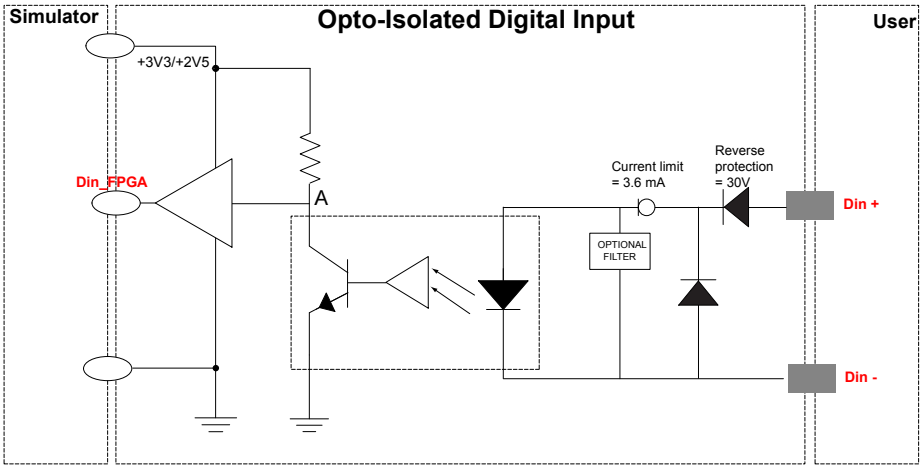


Figure 3: OP5353 isolated digital input drawing

When current flows from Din + to Din -, the output of opto-coupler A is **low** and the Din_FPGA signal is **low.**

When no current flows, the opto-coupler output A is **high** and the Din_FPGA signal is **high.**

The signal conditioning module inputs have both anode and cathode sides available to the user (on the I/O connector).

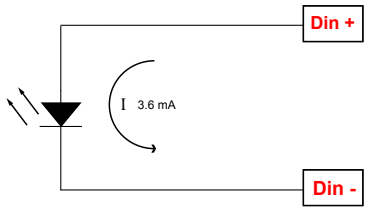


Figure 4: Both Din + and Din - are available to the user

TYPICAL APPLICATIONS

The diagrams below illustrate typical application examples.

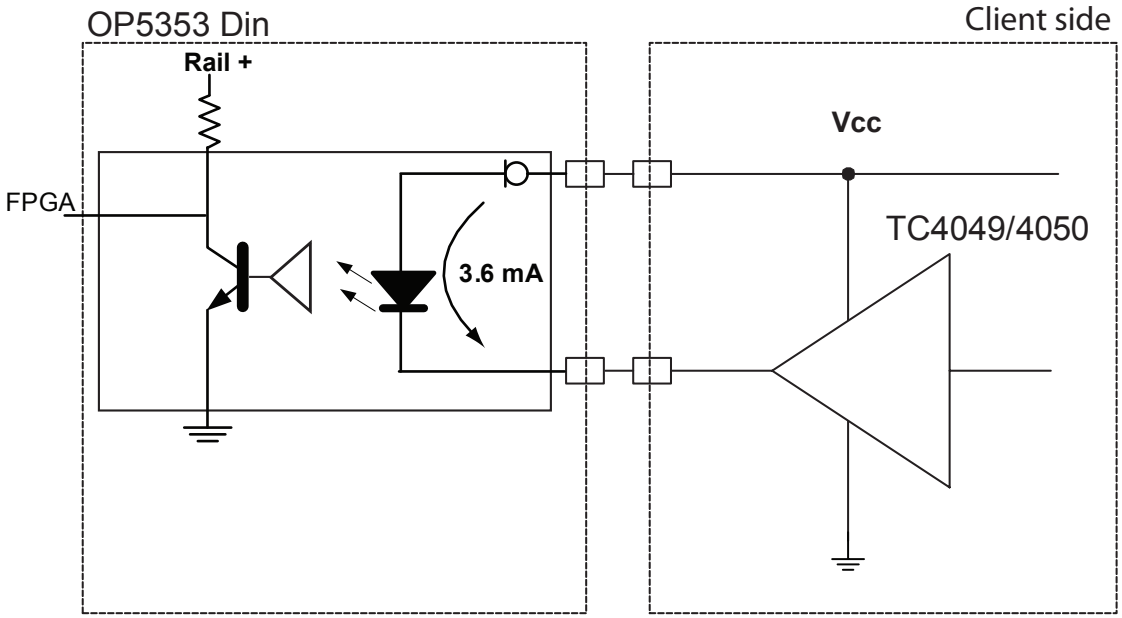


Figure 5: Typical digital input circuit

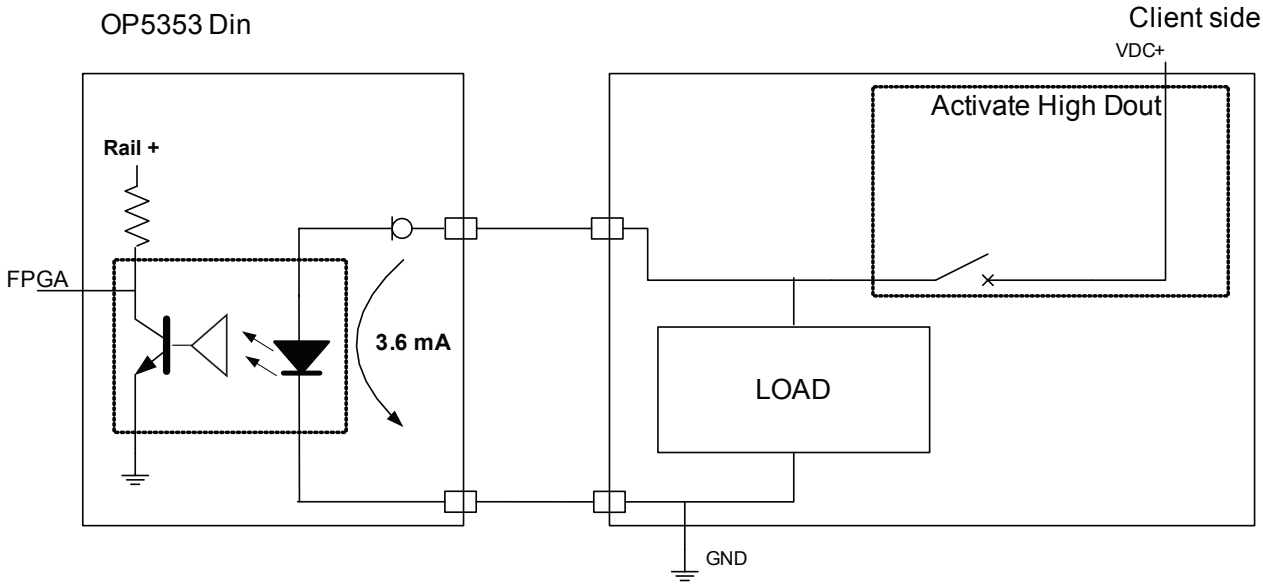


Figure 6: Typical high side activation (user high Dout)

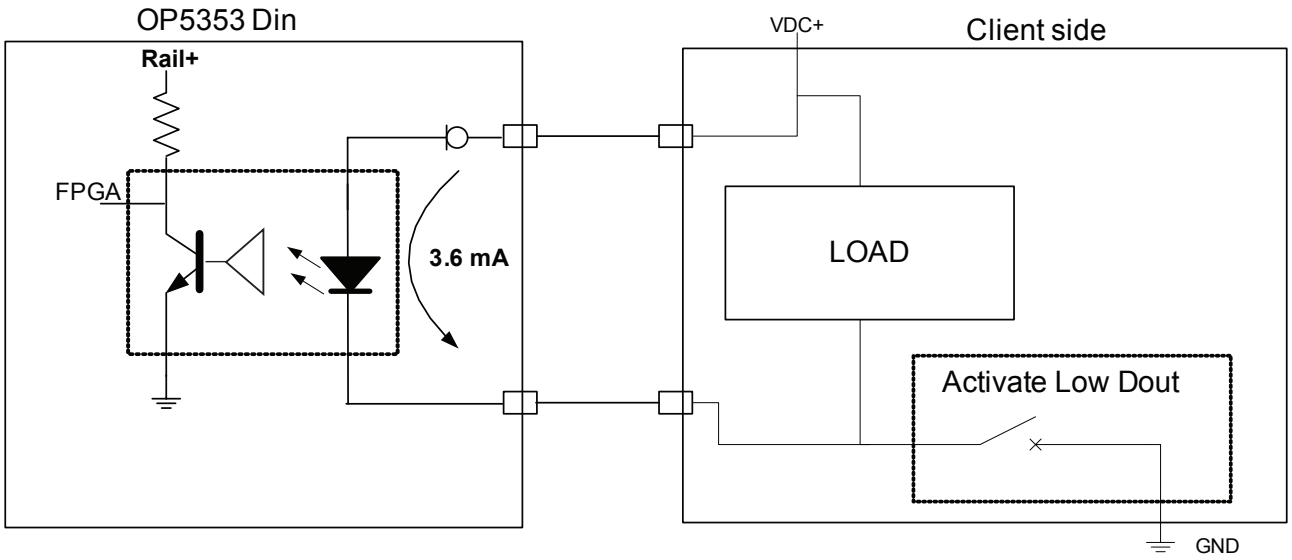


Figure 7: Typical low side activation (user low Dout)

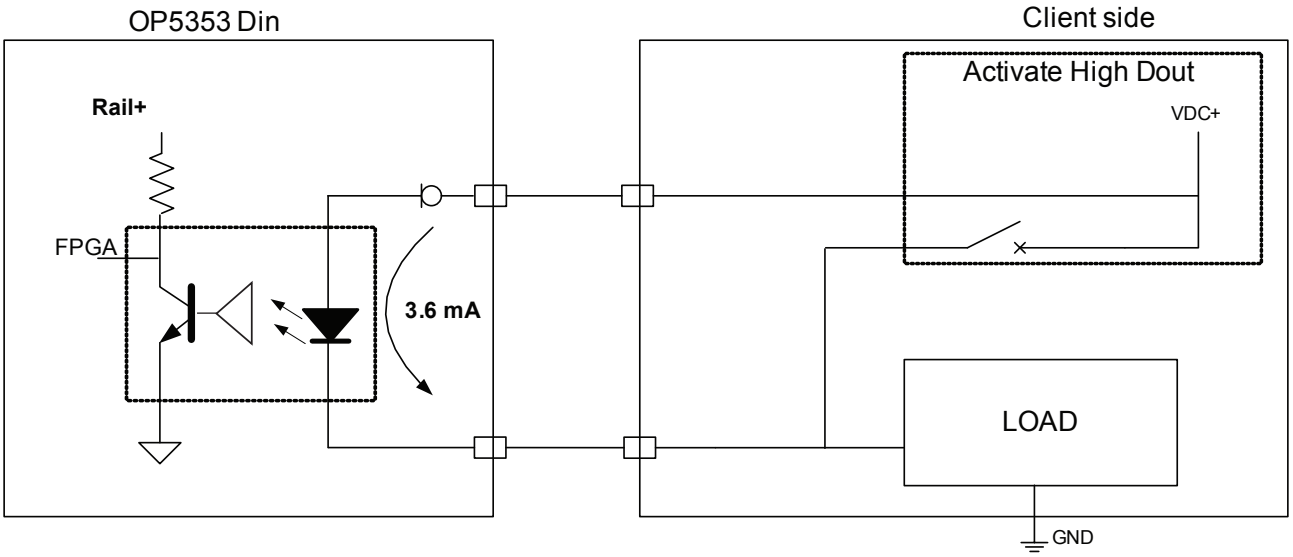


Figure 8: Typical high side open circuit detection

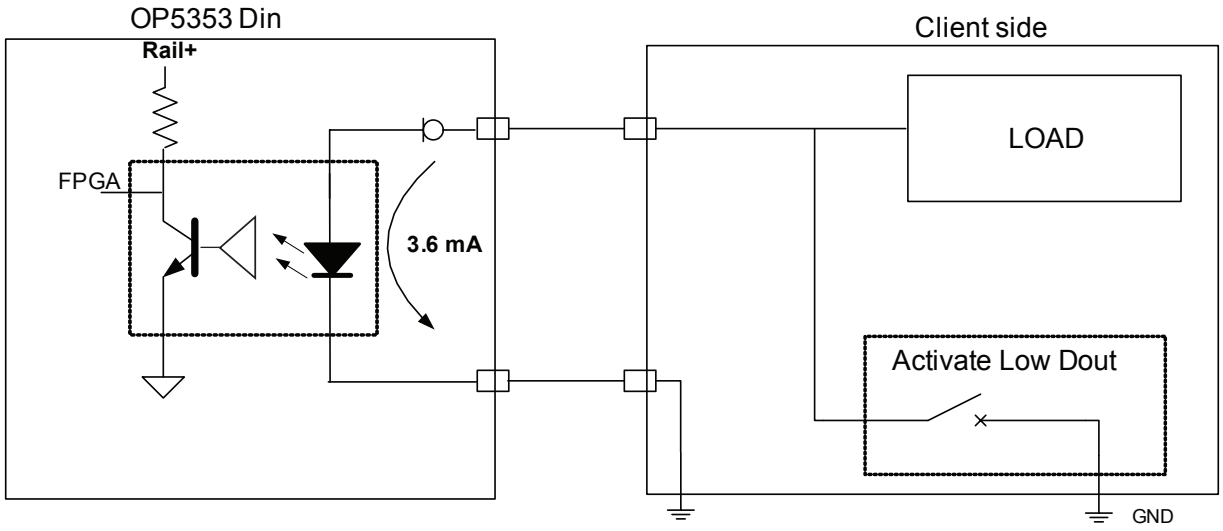
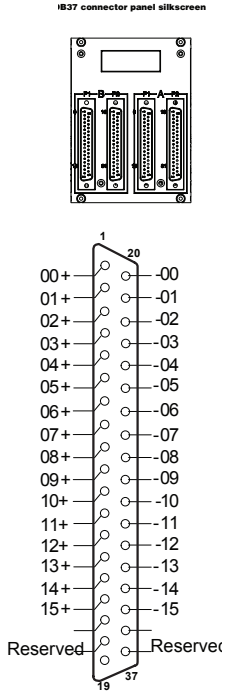


Figure 9: Typical low side open circuit detection

OP5600 DB37 PIN ASSIGNMENTS

Connector P1 Ch. 0-15				Connector P2 Ch. 16-31			
DB37F	**OP5353 pin assignment**	**DB37F**	**OP5353 pin assignment**	**DB37F**	**OP5353 pin assignment**	**DB37F**	**OP5353 pin assignment**
1	+DIN00	20	-DIN00	1	+DIN16	20	-DIN16
2	+DIN01	21	-DIN01	2	+DIN17	21	-DIN17
3	+DIN02	22	-DIN02	3	+DIN18	22	-DIN18
4	+DIN03	23	-DIN03	4	+DIN19	23	-DIN19
5	+DIN04	24	-DIN04	5	+DIN20	24	-DIN20
6	+DIN05	25	-DIN05	6	+DIN21	25	-DIN21
7	+DIN06	26	-DIN06	7	+DIN22	26	-DIN22
7	+DIN07	27	-DIN07	8	+DIN23	27	-DIN23
9	+DIN08	28	-DIN08	9	+DIN24	28	-DIN24
10	+DIN09	29	-DIN09	10	+DIN25	29	-DIN25
11	+DIN10	30	-DIN10	11	+DIN26	30	-DIN26
12	+DIN11	31	-DIN11	12	+DIN27	31	-DIN27
13	+DIN12	32	-DIN12	13	+DIN28	32	-DIN28
14	+DIN13	33	-DIN13	14	+DIN29	33	-DIN29
15	+DIN14	34	-DIN14	15	+DIN30	34	-DIN30
16	+DIN15	35	-DIN15	16	+DIN31	35	-DIN31
17		36		17		36	
18	Reserved	37	Reserved	18	Reserved	37	Reserved
19				19			



Standard OPAL-RT
Simulator DB37 Connector

SPECIFICATIONS

Product name	**OP5353 (32 opto-isolated digital inputs)**
Part number	126-0312
Number of channels	32 digital inputs
Isolation	Optical isolator
Connection mode	Anode and cathode available on connector
Input current	3.6 mA, current limiting diode
Reverse voltage protection	Schottky diode
Maximum reverse voltage protection	30 Volts
Detection threshold	Separate Schmitt Trigger
Voltage range	4 to 50 Vdc
Delay Low-to-High	110 ns
Delay High-to-Low	60 ns
Rise/Fall times	6 ns/6 ns
Form factor	Mezzanine Type B
Dimensions	6.60 cm x 12.50 cm (2.6” x 4.92”)
I/O connector	80-pin high speed header to carrier (internal connection DB37F (external connection)
Operating temperature	10 to 40 ºC (50 to 104ºF)
Storage temperature	-55 to 85ºC (-67 to 185ºF)
Relative humidity	10 to 90%, non condensing
Maximum altitude	2,000 m (6562 ft.)

CONTACT

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