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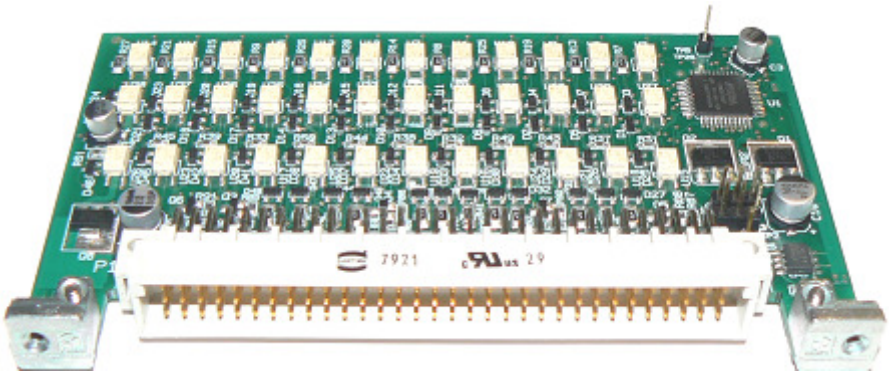
Digital Modules for Boundary Scan Parallel I/O Access

Model: BSPIO-OPTO1212



Features

- 12 Optoisolated input channels
- 12 Optoisolated output channels
- High reliabilty DIN41612 I/O connector
- Reliable screw lock brackets
- Size 122mm X 70mm
- I/O organized in 1 segment
- 96 bit Boundary-scan Register Length
- Each segment can be independently bypassed
- Medium-speed 10MHz TCK for high reliability at the best cost/performance ratio
- Fully-compatible JTAG/IEEE 1149.1 Test Access Port (TAP)
- Operating power 3.3V, 5.0V
- Optional LVDS TCK interface can be used in large fixtures to avoid noise and skew problems.

General Description

The BSPIO-OPTO1212 provides parallel-scan controlled access to up to 24 optically isolated electrical lines for driving up to 12 signal inputs or sensing up to 12 signal outputs. This module adds to the JTAG fixtures the capability to handle lines without common ground. The output cell has 3 terminals on the output transistor, one on the emitter (E), and two that share the collector with a different series resistance (R and CR). The output cell is protected from overcurrent and provides feedback for the self test. The input cell has 3 terminals on the input diode, one on the anode (A), and two that share the cathode with different series resistance (R and KR). The input cell is protected from overcurrent and has an integrated driver for the self test.

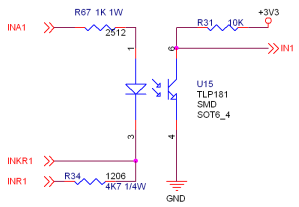


Fig.1 Input Cells

The BSPIO-OPTO1212 is available in two basic versions, both of them compatible with standard DIN41612 female connectors in a test fixture. One version, the BSPIO-OPTO1212-A1, is primarily intended for test fixtures with few BSPIOs, and contains a standard TTL interface on the TAP's TCK signal. This module facilitates boundary-scan interconnection testing using a direct connection to the JTAG/IEEE 1149.1 Test Access Port (TAP). The other version, the BSPIO-OPTO1212-A2, is intended for test fixtures with many BSPIOs and contains a balanced LVDS interface on the TAP's TCK signal. This module facilitates boundary-scan interconnection testing using a small interface connection to a JTAG/IEEE 1149.1 TAP. All BSPIO I/O interfaces have an internal loopback for self test capability

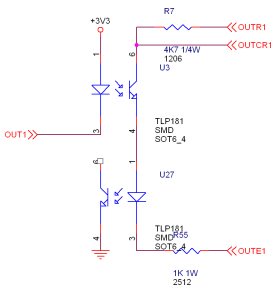
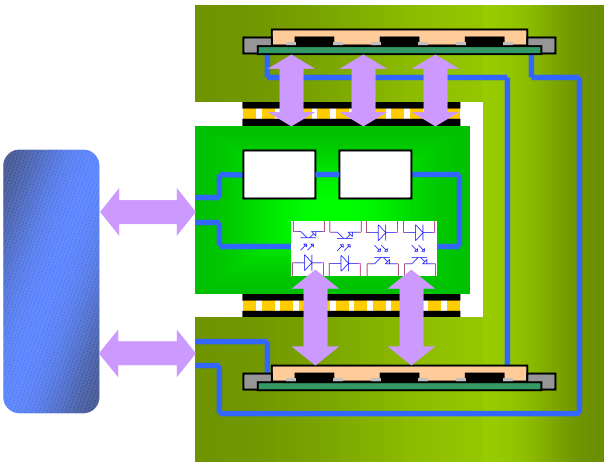


Fig.2 Output Cells

Functional Description

Test and programming application development tools from JTAG Technologies support automatic integration of the BSPIO-OPTO1212 with the target board design by adapter file. This allows the inputs and outputs of the BSPIO-OPTO1212 to be driven and sensed via a boundary-scan Optoisolated interface, thereby providing increased scan access. The 24 channels of the BSPIO are capable of operating at a 10 MHz TCK clock rate. The TAP interface available on the DIN41612 connector is the actual test access port for the module. It can be used to daisy-chain the module to other modules or to scan chain on the target board.



The OPTO1212's input circuit is equivalent to a Ri series resistor with a Vdi generator (photodiode threshold). The input circuit ensures low input current (lid) and can safely handle relatively high currents (limax). The output circuit is equivalent to a Ro series resistor with a Vce voltage generator (output transistor).

Typical Application

Its typical application is in circuit interface driving and/or sensing both with and without common ground, with a current sink and current source interface. Figures 4 through 7 show some examples of connections between BSPIOs and UUTs.

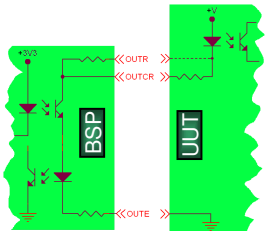


Fig. 4 Current sink BSPIO out driven UUT input.

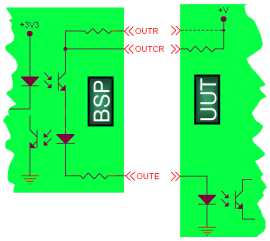


Fig. 5 Current source BSPIO out driven UUT input.

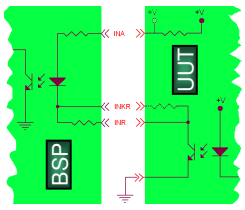


Fig. 6 Current sink UUT out sensed by BSPIO input.

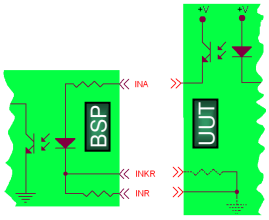


Fig. 7 Current source UUT out sensed by BSPIO input.

Specifications

Length of ID Register	32 bits
Length of Boundary-scan Register	96 bits
Maximum Shift Frequency	10MHz
Power Consumption	typ<20mA, max depending on the target I_{ID}

DC Operating Conditions

OPTO OUT	V_{ce}<2.0V I_o<30mA $R_{O(E-CR)}$= 1KΩ $R_{O(E-R)}$= 5,7KΩ
OPTO IN	V_d<1.8V I_{ID}>0.5mA I_{MAX}<30mA $R_{O(A-KR)}$= 1KΩ $R_{O(A-R)}$= 5,7KΩ
TAP (*1)	All V_{IL}<0.8V V_{IH}>2.0V
TAP TCK(*2)	1<V_{OS}<1.65 V_{TH}/V_{TL}=+/-100mV

(*1) Not Applicable to TCK version A2
(*2) Applicable to TCK version A2

Ordering Information

GEB P.N. (*)	Description
BSPIO-OPTO1212-A1/A2	12 Opto Inputs, 12 Opto Outputs
BSPIO-OPTO1212-A3/A4	8 Opto Inputs, 8 Opto Outputs
BSPIO-OPTO1212-A5/A6	12 Opto Inputs
BSPIO-OPTO1212-A7/A8	12 Opto Outputs

(*) Odd-numbered versions (A1,A3…) have LVTTL level on TCK input, Even numbered versions (A2,A4…) have balanced LVDS levels on TCK input

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