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SBS Technologies, Inc.

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IP-Altera-TTL

Customizable IndustryPack Module with Altera FPGA Design File-Set and TTL I/O Interface

Application Information

The IP-Altera-TTL is a single size IndustryPack with 48 lines of buffered TTL I/O. It comes with a complete Altera design file-set that can be used as an effective starting point for customers implementing their own custom digital interface or protocols in Altera logic. It is ideally suited for interfacing to systems using non-standard communication protocols such as satellite and other aerospace test systems. It can also be used to emulate prototype hardware for early software development and system integration.

The IP-Altera-TTL uses an Altera EPF10K40RQFP208-3 chip. Users must have an Altera development environment in order to implement their own designs. The example design supplied with IP-Altera-TTL was implemented with Altera MAX+Plus II Revision 8.3 software and includes the IndusytryPack bus interface, 48 bits of buffered bidirectional TTL level I/O, 16 bits of unbuffered bidirectional TTL, an interrupt implementation, a RAM block, a DMA implementation and an ID PROM. The basic IndustryPack bus interface and ID PROM take up only 58 of the 2304 logic cells and one of the eight EABs, while the entire example design takes up 285 logic cells and 7 EABs. Designers may either add logic to the supplied design or replace logic elements they do not need in their custom implementation.

I/O is performed through six banks of byte wide bidirectional FCT245 style buffers, each one with separate direction and output enable controls. The buffers have high current capabilities and have a power-off disable feature allowing live insertion. The upper 16 bits have socketed pull up/pull down parallel termination resistor networks. The factory default value is 220 Ohms to +5V and 330 Ohms to ground. The upper 16 bits are also wired directly to the Altera 10K40 part through SBS GreenSpring's patented LineSafe ESD protection circuit. These are intended for bi-directional signals where it may not be convenient or possible to switch all lines eight at a time via parallel buffers.

The IP-Altera-TTL also has space for an optional half-size crystal oscillator. A shunt block allows either the output of this oscillator or an I/O connector pin to be run into one of the dedicated clock inputs on the 10K40. This allows designs with frequency requirements other than 8 or 32 MHz.

The Altera design is normally loaded from a socketed eight pin DIP EPC1 load PROM. For debugging purposes, a 10 pin surface mount header provided in the engineering kit may be soldered onto the back side of the IndustryPack for connection to an Altera Bit or Byte Blaster cable.

Purchase of IP-Altera-TTL entitles the customer to a royalty free license to use and modify the provided design.

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Specifications

Form Factor	Single-wide Type I IndustryPack
IndustryPack Interface	Complies with ANSI/VITA-4 8 and 32 MHz bus operation.
Total number of I/O lines	48
Buffered I/O lines	32 without termination, configurable as inputs or outputs in blocks of eight 16 with socketted 330/220 resistor termination, individually configurable as inputs or outputs All have +64 mA, -32 mA drive current max
Unbuffered I/O lines	16 wired in parallel with 16 buffered lines, individually configurable as inputs or outputs All have LineSafe ESD protection All have +25 mA, -25 mA drive current max
ESD Protection	Present on 16 unbuffered lines. Measured per IEC 1000-4-2 level 4, 8 kV contact discharge, 15 kV air discharge.
IndustryPack Cycles Supported	I/O, memory, ID, DMA, and interrupt
Interrupts	Two: IntReq0* and IntReq1*
DMA supported	Two channels: DMAReq0* and DMAReq1*
Clock	IndustryPack bus, external I/O, or user on-board oscillator
Initialization	200 ms delay from reset Supports both on-board serial PROM and download cable
Access Modes	Byte or word in I/O, memory, ID, and interrupt spaces
Wait States	8 MHz: Zero, 32 MHz: two, as delivered. User configurable.
Dimensions	1.8 inches x 3.9 inches
Weight	0.039 kg (0.94 lb)
Power Requirements	+5 VDC, 400 mA typ
Environmental	Operating temperature: 0 to +70°C Humidity: 5 to 95% non-condensing Storage: –40 to +85°C

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Ordering Information

IP-ALT-TTL	IndustryPack module with configurable Altra FPGA and TTL I/O. Includes printed user manual and engineering kit. Select engineering kit according to carrier connector type.
IP-ALT-TTL-RO	Repeat order for IP-Altera-TTL. Use this order code for all units after the first
EK-IP-ALT-IP50	Engineering kit for IP-Altera if mounted on a carrier with 50-pin ribbon cable header front panel I/O connectors. Contains: Six foot 50 conductor ribbon cable (CABLE-IP50-6) 50 screw terminal block with ribbon cable connector (IP-TERM-IP50) *More items as below*
EK-IP-ALT-HD50	Engineering kit for IP-Altera if mounted on a carrier with HD50 front panel I/O connectors. Contains: Six foot HD50 male to HD50 male cable (CABLE-HD50-HD50) 50 screw terminal block with female HD50 connector (IP-TERM-HD50) *More items as below*
EK-IP-ALT-CH50	Engineering kit for IP-Altera if mounted on a carrier with Champ50 front panel I/O connectors. Contains: Six foot Champ50 male to HD50 male cable (C-HD50-CHAMP50) 50 screw terminal block with female HD50 connector (IP-TERM-HD50) *More items as below*
Included in all IP-Altera engineering kits	Two surface-mount 10-pin headers Floppy disk containing: Altera MAXPlus II rev. 9.1 Example design schematic Altera MAXPlus II rev. 9.1 ACF file for placing the Example design Altera MAXPlus II rev. 9.1 simulation of the Example design Altera MAXPlus II rev. 9.1 simulation files for all supported IP Cycles VIEWLogic Workview Office rev.7.4 board schematic files Bill of Materials Board Schematics Assembly Diagram Altera 10K30 data sheet IDT 74FCT16245T data sheet Sipex SP485 data sheet AVX Transguard data sheet

Associated Products

IP-ALT	IndustryPack with configurable Altera FPGA and EIA-422/TTL I/O
CABLE-IP50-6	Six foot 50 conductor ribbon cable
CABLE-HD50-HD50	Six foot HD50 male to HD50 male cable
C-HD50-CHAMP50	Six foot Champ50 male to HD50 male cable
IP-TERM-IP50	50 screw terminal block with ribbon cable female connector
IP-TERM-HD50	50 screw terminal block with HD50 female connector

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