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CommIO-IP™

TMS320C40 DSP with Modular I/O for VMEbus



48 MFLOPS floating-point DSP

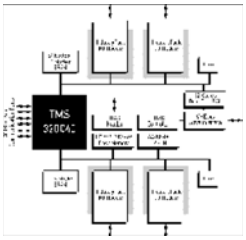
Up to 8 Mbytes zero wait-state SRAM

Four IndustryPack™ I/O Sites on-board

Supports JTAG debug over VMEbus

Comprehensive software support

[System Specs] [Processor Specs] [Software Specs] [Ordering Info]



COMMIO-IP System Specifications

processor
Texas Instruments TMS320C40 DSP; 48 MHz clock

static memory
Two banks of 64 Kbytes zero wait-state SRAM (one per bus). Global- and Local- bus SRAM expandable up to 4 Mbytes each.

dual-port memory
32 Kbytes dual-port RAM between the C40 and VMEbus.

non-volatile memory
128 or 512 Kbytes user-accessible flash EEPROM; 64 Kbytes EPROM.

communication ports
Six 20-Mbytes/sec bi-directional ports. Four comm ports are accessible externally on the front panel, the remaining two are available via an on-board connector.

IndustryPack bus
Two 8 MHz IP buses, each with two 16-bit or one 32-bit module sites.

IndustryPack I/O
50 pins from each IP site brought to on-board connectors; transition modules available for front-panel access.

timers
Two dual timers for sample clock generation;one timer dedicated to each IP site.

debug port
JTAG P1149.1 boundary scan with extensions for in-circuit emulation. Accessible over VMEbus or via on-board 14-pin header for direct connection to Texas Instruments XDS-510 or Ariel UXDS debuggers.

host interface
6U VMEbus. Slave-only dual-port memory interface. Memory-mapped to 128 Kbytes in VMEbus memory space. Host interrupts and DMA are supported.

power
2.25A at 5V typical.

size and weight
262 x 187 x 21 mm overall, 417 grams; 10.3 x 7.4 x 0.8 in. overall, 0.92 lbs.

[Back to top of page]

TMS320C40 Processor Specifications

Texas Instruments specifies the TMS320C40 as a 50 MHz device. The C40 on CommIO-IP operates at 48 MHz to provide optimal synchronization to the board's 8 MHz IndustryPack bus for the highest possible I/O throughput.

processing rate
50 MHz, 40 nsec basic instruction rate, 50 MFLOPS, 25 MIPS.

on-chip memory
2 x 1K x 32 bits.

off-chip memory
Up to 16 Gbytes (C40), long-word addressable.

arithmetic
32/40-bit floating point, 32-bit integer.

other features
Dual 32-bit memory buses; six high-speed communication ports; six channel DMA coprocessor; JTAG interface; 512-byte program cache.



THE HYDRA FAMILY

Ariel's Hydra family provides system-level solutions to compute- and I/O-intensive DSP applications. The family features a full range of TMS320C4x-based products, including single, dual, quad, and octal processor configurations.

As the single-C40 member, CommIO-IP combines a TMS320C40 with tightly-coupled modular I/O. The board and its flexibly-configured I/O modules can operate as a self-contained DSP and data acquisition system, or can provide any size multiprocessor network of Hydras with the front-end and back-end I/O interfaces needed for a particular application. And since CommIO-IP connects to Hydra boards via comm ports, there is no VMEbus overhead for data transfers.

With complete inter-product compatibility, each Hydra family member enjoys the same software support and identical application programming interface. Hydra-family multiprocessor products use the performance-optimized Hydra Architecture which takes full advantage of the dual-bus C4x architecture and uses C4x comm ports for I/O and inter-processor communication.

[Back to top of page]

Software Specifications

system interface
Device drivers for SunOS, Solaris, MS-DOS, and VxWorks. JTAG interface via Texas Instruments XDS-510 or Ariel UXDS series debuggers.

base software
SunOS and Solaris device drivers, MS-DOS interface library, diagnostics, utility and example programs with source code.

optional software
Ariel AXDS or UXDS debuggers, DSP Expert Library; TI C compiler, assembler, simulator, XDS-510 debugger; Spectron Microsystems SPOX; ISI Virtuoso; 3L Parallel C; Tartan compilers and libraries; VxWorks device drivers.

distribution media
3 1/2" floppy disk or 1/4" tape.

documentation
User's Guide, Hardware Reference Manual, Software Reference Manual, release notes, and application notes.

IndustryPacks provide modular, real-world input/output for Ariel's CommIO-IP. Each IndustryPack (IP), slightly larger than a business card, performs a related group of I/O functions. Developed by GreenSpring Computer, IndustryPack is an open industry standard which defines the mechanical and electrical interface to the carrier board including I/O, memory, identification PROM, interrupts, and DMA.

The following is just a partial list of the classes of IndustryPack functions available:



- Multichannel precision analog I/O
- High-speed analog I/O to 10 MHz
- Digital I/O
- OPTO-22 I/O
- Programmable DIO

- High-current, high-voltage drivers
- High-speed serial I/O
- Async/bisync inputs
- RS-232 and RS-422 to 38.4 kbaud
- T1/E1 digital telephony
- SCSI interface
- Super VGA graphics
- IEEE 802.1 interface
- GPIB instrumentation interface
- Optoisolated DIO
- Relay drivers
- Motor control
- Quadratrue decoders
- Precision counters
- Signal conditioning

Please call Ariel to discuss your specfic I/O requirements.

[Back to top of page]

ORDERING INFORMATION

CommIO-IP: CommIO-IP is a single-processor TMS320C40 board for flexible, modular I/O in VMEbus systems. CommIO-IP can be used as a self-contained I/O and DSP system or as an I/O subsystem for use with DSP boards based on the Texas Instruments TMS320C4x processor family. I/O functionality is provided by up to four IndustryPack™ modules fitted to the CommIO carrier; two of the IP sites are connected to each of the C40's memory buses for maximum I/O throughput. A VMEbus slave interface via a bank of dual-port SRAM supports software development and debugging as well as I/O for external VMEbus master boards. When used as an I/O subsystem, the CommIO-IP card communicates with one or more external C4x processors via the C40's high-speed parallel communication ports; four comm ports are available on front-panel connectors that are compatible with standard Ariel cables (not included). I/O connections to the IndustryPack module are available via on-board 100-pin connectors and may be brought out to the front panel by means of connector transition modules (ordered separately). CommIO is a 6U VME board which includes a 50 MHz TMS320C40 processor (running at 48 MHz for optimum synchronization with the 8 MHz IP bus), a bank of zero wait-state SRAM on each memory bus of the C40, a 128K x 8-bit bank of flash memory, a JTAG interface header, and an on-board JTAG test bus controller to support use of Ariel's AXDS-series debuggers. CommIO-IP is sold without IndustryPacks, connector transition modules, documentation, or software.

COV251M1
COMMIO-IP Carrier Card with 2 x 64 Kbytes SRAM

COV251M2
COMMIO-IP Carrier Card with 2 x 256 Kbytes SRAM

COV251M3
COMMIO-IP Carrier Card with 2 x 1 Mbyte SRAM

Other SRAM configurations and/or larger flash memory (up to 512K x 32) are available on a special-order basis. Please contact Ariel for availability and pricing.

Accessories

CTM-50 and CTM-100 transition modules provide generic front-panel I/O connections for one or two IndustryPack modules installed on a single bus of CommIO's C40 processor. CommIO-IP configurations with two IPs generally require two transition modules because IPs are preferentially attached to separate processor memory buses.

DOCSET-CIO
Documentation and software set for CommIO-IP; includes driver software for SunOS and embedded PC hosts

CBL-COM-VP6
Passive Hydra-series comm port cable, 6" (15 cm)

CBL-COM-VP12
Passive Hydra-series comm port cable, 12" (30 cm)

CTM-50
50-pin transition module for single IndustryPack in either preferred IP mounting site

CBL-FAN-50
Fan-out cable for 50-pin transition module

CON-CTM-50
Unterminated IDC-type mating connector for 50-pin transition module

CTM-100
100-pin transition module for two IndustryPack modules on a single bus of the CommIO-IP processor

CBL-FAN-100
Fan-out cable for 100-pin transition module

Development Tools and Software

The following tools and libraries for SunOS development platforms represent only a fraction of the software that is available for CommIO-IP and Hydra-series products. Please contact an Ariel sales engineer for more information on additional development environments, operating systems, and PC-hosted tools.

C40-CC-SUN
Texas Instruments TMS320C4x C compiler with Assembler/Linker; Sun version

TAR-C-SUN
Tartan high-performance TMS320C4x C compilation system with FasTar library; Sun version

AXDS-SUN
Ariel Sun-resident debugger for CommIO or Hydra debugging via VMEbus; Sun version

RAXDS-VXW
Ariel Sun-resident remote debugger for CommIO or Hydra debugging via VxWorks VMEbus host; Sun version

UXDS-SPARC
Ariel SPARC-resident C4x emulator/debugger with SBus JTAG interface; Sun version

XDS510-WS
Texas Instruments SPARC-resident C4x emulator/debugger with SCSI JTAG interface; Sun version

UXDS-PC-SP
Ariel PC-resident single-processor C4x emulator/debugger with ISA JTAG interface; DOS/Windows

UXDS-VISTA

Ariel PC-resident parallel-processor C4x emulator/debugger with ISA JTAG interface; Windows 3.x

XDS510-XL
Texas Instruments PC-resident C4x emulator/debugger with ISA JTAG interface; OS/2

VXDRV-CIO
VxWorks device driver for CommIO-IP

AXL-C40-SUN
Ariel DSP Expert Library, optimized vector math and signal processing library for TMS320C4x; Sun version

FASTAR-SUN
Tartan FasTar optimized run-time C library for TMS320C4x; Sun version

FLOTAR-SUN
Tartan FloTar double precision math library for TMS320C4x; Sun version

[Back to top of page]

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