T4I SINGLE BOARD COMPUTER

+12V Connector (From ATX12V) · DDR200/266 Memory Up to 2GB · Ultra160 SCSI Interface · Floppy Drive Interface · Dual USB Ports (Rev 2.0) · Dual Ultra ATA/100 EIDE Interfaces · Serial Ports · Enhanced Bi-Directional Parallel Interface · PS/2 Mouse and Keyboard Interface · Speaker Header · SXGA Interface · LAN 2 - 10/100/1000 Base-T Ethernet Interface · LAN 1 - 10/100 Base-T Ethernet Interface

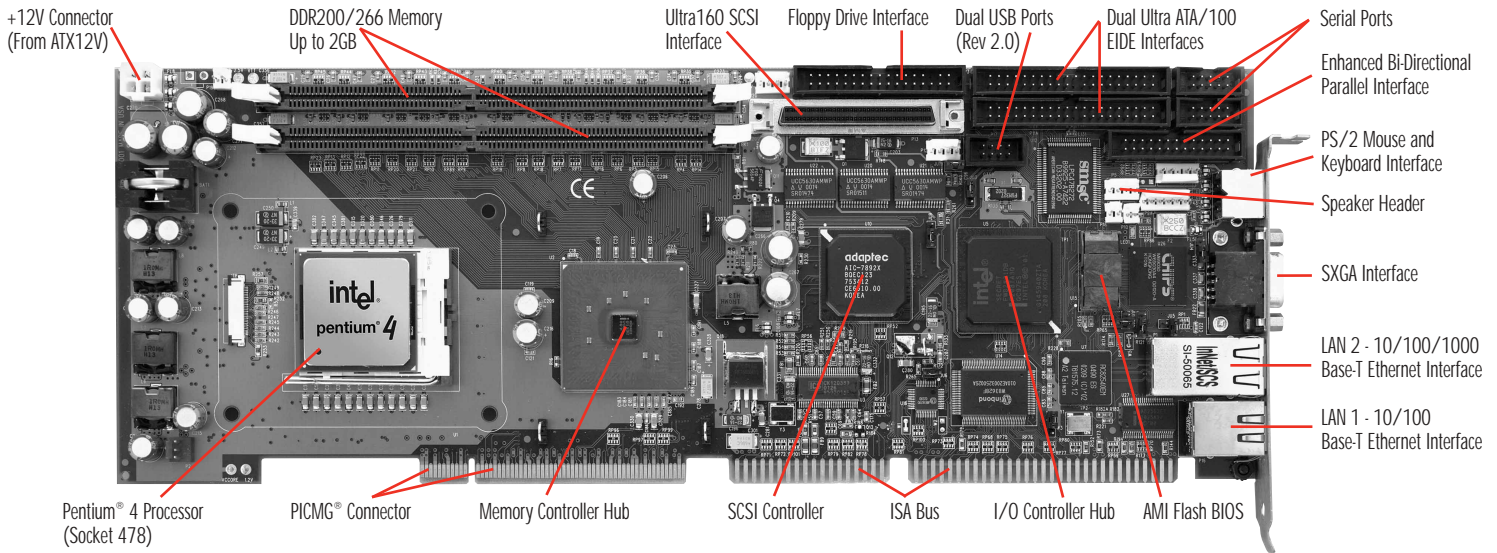Pentium® 4 Processor (Socket 478) · PICMG® Connector · Memory Controller Hub · SCSI Controller · ISA Bus · I/O Controller Hub · AMI Flash BIOS

The T4I single board computer brings an increased level of longevity and innovation to Pentium® 4 applications. When designing a new system or upgrading an older PCI/ISA computing system, the T4I's Pentium 4 processor and 845-E chipset provide the ability to deploy long-life, state-of-the-art technology in a wide variety of robust applied computing applications.

PROCESSOR:

Intel® Pentium® 4 processor at 2.0GHz to 3.06GHz*
Intel® Celeron® processor at 2.0GHz*

Higher speeds as available

The Pentium 4 processor supports a 400/533MHz system bus as well as Intel's NetBurst™ micro-architecture. Both features combine to provide optimum system performance and fast program execution in a PCI/ISA single board computer. Some of the processor features that enable such performance enhancements are:

• Hyper-Pipelined technology
• Streaming SIMD Extensions 2 (SSE2)
• Advanced Dynamic Execution
• 512K Advanced Transfer Cache (L2)
• Execution Trace Cache that stores up to 12K of micro-operations and an 8K Data Cache (L1)

Intel's Hyper-Threading technology makes the Pentium 4, 3.06GHz processor appear as two logical processors. The operating system and application must be optimized for Hyper-Threading. This feature delivers faster program execution by enabling simultaneous instruction processing using the two logical processors.

CACHE MEMORY (L2 AND L1):

The Pentium 4 processor supports a 512K integrated on-die Advanced Transfer Cache (L2). The cache is an 8-way set associative cache running at full processor core frequency. The Celeron processor supports a 128K integrated on-die Advanced Transfer Cache (L2). Both processors include a 12K level one (L1) Execution Trace Cache and 8K L1 data cache.

CHIPSET:

The chipset supports a 400/533MHz system bus, a maximum of two double-sided DIMMs with unbuffered DDR 200/266 (PC1600/PC2100) memory with ECC and a 266MB/s Hub Interface to the ICH4 I/O Controller.

ULTRA160 SCSI INTERFACE:

The Ultra160 SCSI interface uses an Adaptec AIC-7892 SCSI controller chip and supports SCSI device data transfer operations up to 160MB/s. The interface supports up to 15 SCSI devices, complies with the SPI-3 standard and is compatible with both single-ended and Low Voltage Differential (LVD) SCSI I/O. Software drivers are available for most popular operating systems.

DUAL ETHERNET INTERFACES:

LAN 1 provides a 10/100Base-T Ethernet interface using Intel's 82562ET Platform LAN Connect device and the ICH4 I/O Controller Hub. The 82562/ICH4 combination provides high-speed data transfers while offloading communication tasks from the system CPU. LAN 2 supports both 10/100Base-T and 1Gigabit Ethernet interfaces via Intel's 82540 controller.

EIDE ULTRA ATA/100 INTERFACES (DUAL):

Dual high-performance PCI EIDE interfaces are capable of supporting up to two IDE disk drives each in a master/slave configuration. The interfaces support Ultra ATA/100 with synchronous ATA mode transfers up to 100MB per second.

DDR200/266 MEMORY:

The DDR200/266 interface is a single-channel interface coming off the Memory Controller hub and terminating at two DIMM module sockets. The DIMM sockets can be independently populated with either PC1600 or PC2100 unbuffered memory modules with ECC. The memory interface supports auto detection of memory up to 2GB. Depending on the processor's system bus speed and which memory module type is used, the memory interface bandwidth is either 1600MB/s or 2100MB/s.

BUS SPEEDS:

ISA	- 16-bit/8MHz
PCI	- 32-bit/33MHz
Hub Interface	- 266MB/s
System or FSB	- 400MHz/533MHz

BIOS (FLASH):

The T4I uses AMIBIOS8. The flash BIOS resides in the 82802 Firmware Hub (FWH). AMIBIOS8 contains useful features such as:
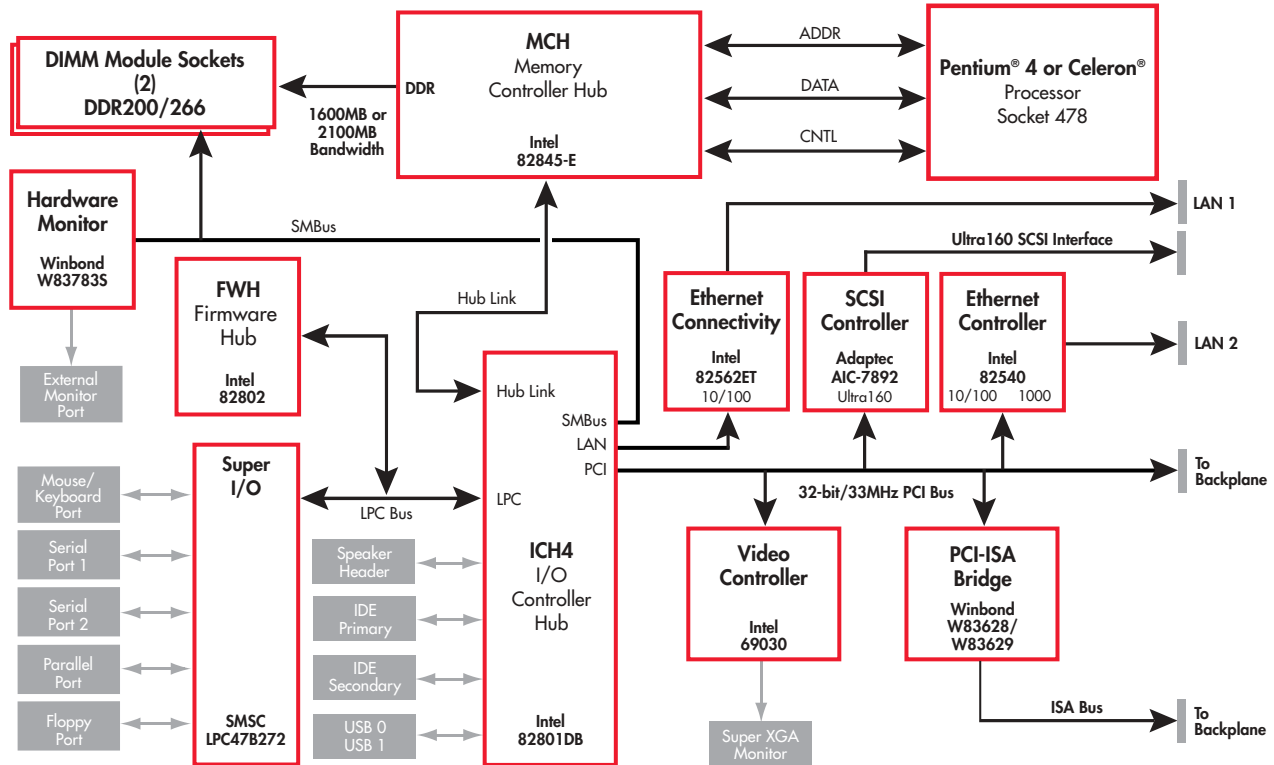
• CMOS setup for system parameters
• Peripheral management for configuring on-board peripherals
• PCI-to-PCI bridge support and PCI interrupt steering
• Support for flash devices for BIOS upgrading via floppy interface

Some of the new AMIBIOS8 features supported on the T4I include:

• Integrated support for USB mass storage devices such as USB CD-ROM, CD-RW, etc.
• Faster POST execution
• Improved BIOS code modularity which streamlines the BIOS customization process while offering a higher degree of BIOS customization

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DIMM Module Sockets (2) DDR200/266

MCH — Memory Controller Hub — Intel 82845-E — DDR — 1600MB or 2100MB Bandwidth

Pentium® 4 or Celeron® Processor Socket 478 — ADDR — DATA — CNTL

Hardware Monitor — Winbond W83783S — SMBus — External Monitor Port

FWH Firmware Hub — Intel 82802 — Hub Link

LAN 1 — Ultra160 SCSI Interface

Ethernet Connectivity — Intel 82562ET 10/100

SCSI Controller — Adaptec AIC-7892 Ultra160

Ethernet Controller — Intel 82540 10/100 1000 — **LAN 2**

Super I/O — SMSC LPC47B272

Mouse/Keyboard Port — Serial Port 1 — Serial Port 2 — Parallel Port — Floppy Port

LPC Bus — Hub Link — SMBus — LAN — PCI — LPC

ICH4 I/O Controller Hub — Intel 82801DB

Speaker Header — IDE Primary — IDE Secondary — USB 0 USB 1

Video Controller — Intel 69030 — Super XGA Monitor

PCI-ISA Bridge — Winbond W83628/W83629

To Backplane — 32-bit/33MHz PCI Bus — ISA Bus — **To Backplane**

SUPER XGA INTERFACE:

The Intel 69030 video controller has 4MB of on-chip memory and supports up to 1280 x 1024 pixel resolutions. Software drivers are available for most popular operating systems.

ADDITIONAL T4I FEATURES:

System Hardware Monitor:

- The Winbond W83783S chip supports hardware monitoring. The functions monitored are:
  - Voltage: +3.3V, +/-12V, +5V and VCORE
  - Fan speed
  - Temperature
- The T4I hardware monitor driver allows the user to program the monitor limits to provide a trigger point for the application software. The user's application program can monitor these trigger points in order to send system alert messages or perform corrective actions.

Watchdog Timer:

- The programmable watchdog timer provides a system reset with a total range of 30ms to 60 seconds. The programmable increments of the watchdog are 30ms, 10s and 60s.

I/O Features:

- Two high-speed serial ports
- Enhanced bi-directional parallel interface
- Dual Universal Serial Bus (USB, Rev 2.0)
- PS/2 mouse/keyboard interface
- Floppy drive interface

STANDARDS:

- IEEE P996, Personal Computer Bus Standard
- PCI Local Bus Specification 2.1
- PICMG 1.0 Specification
- Ultra160 SCSI, SPI-3 Standard

T4I APPLICATION CONSIDERATIONS:

Power Requirements (Typical Values):

Pentium 4: CPU	+5V*	+12V**	+3.3V*
3.06GHz/533MHz	4.05A	6.75A	2.75A
2.8GHz/533MHz	4.05A	4.68A	2.75A
2.6GHz/400MHz	3.98A	4.40A	2.75A
2.4GHz/533MHz	3.96A	3.91A	2.75A
2.0GHz/400MHz	4.00A	3.38A	2.75A

Celeron: CPU	+5V*	+12V**	+3.3V*
2.0GHz/400MHz	4.01A	3.43A	2.75A

-12V* @ <100mA

* From Backplane via PICMG® Connector

** From ATX12V power supply or equivalent via P4 connector

The processor's power requirements created the need for an additional on-board 4-pin power connector (P4). This connector requires +12V from an external power supply that conforms to the ATX12V power specification. This external power supply should have a minimum wattage rating of at least 250W. The T4I also requires that 3.3V be applied to the backplane from the power supply.

Temperature/Environment:

Operating Temperature:	0° to 45° C.
Storage Temperature:	- 40° to 70° C.
Humidity:	5% to 90% non-condensing

The high-performance Pentium 4 processor used on the T4I can consume as much as 70 Watts of power. The T4I's cooling system uses a high-reliability fan mounted to the SBC.

Mechanical:

SBCs with processor options less than 2.8GHz use a low-profile (1.65" height) active cooling system. Overall dimensions for the T4G with these processor options, including the active cooling system are 13.3"L (338mm) x 4.8"H (121.9mm) x 1.65"W (49.1mm). SBCs with processor speeds 3.06GHz or greater use a taller active cooling system and have overall dimensions of 13.3"L (338mm) x 4.8"H (121.9mm) x 2.18"W(55.37mm).

AGENCY APPROVALS:

- Designed for UL1950, CAN/CSA C22.22 No. 950-95, EN55024: 1998; EN55022: 1998 Class B; EN61000-3-2: 2000; EN61000-3-3: 1995

ORDERING INFORMATION:

Model Name: T4I

Model #	CPU Speed
Pentium® 4	
6053-108-xM	3.06GHz
6053-107-xM	2.8GHz
6053-006-xM	2.6GHz
6053-104-xM	2.4GHz
6053-002-xM	2.0GHz
Celeron®	
6053-502-xM	2.0GHz

(xM = Memory)

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PCI INDUSTRIAL COMPUTERS — **PICMG**

Intel® Applied Computing Platform Provider

TRENTON Technology Inc. • 2350 Centennial Drive, Gainesville, Georgia 30504 • Sales: (800) 875-6031 • Phone: (770) 287-3100 • Fax: (770) 287-3150
E-mail: Sales@TrentonTechnology.com • Web: www.TrentonTechnology.com

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