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User's Manual for ICP Controllers of the GDT RP Series

PCI-to-Ultra SCSI RAID Disk Array Controllers

Version 2.5/11-97

PN: GDT61/5xyRP

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Contents of this User's Manual:

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ICP vortex Corporation ("ICP vortex") guarantees that this product is free from defects in material and workmanship. Subject to the conditions and limitations set forth below, ICP vortex will, at its own option, either repair or replace any part of this product which proves to be defective by reasons of improper workmanship or materials. Parts used to repair products or replacement products will be provided by ICP vortex on an exchange basis, and will be either new or refurbished to be functionally equivalent to new.
This warranty does not cover any damage to this product, which results from accident, abuse, misuse, natural or personal disaster, Acts of God, or any unauthorized disassembly, repair or modification. The duration of this warranty is one year from the date of original retail purchase.

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This manual has been validated and reviewed for accuracy. The sets of instructions and descriptions were accurate for ICP Disk Array Controllers at the time of this manual's production. However, succeeding Controllers, software and manuals are subject to change without notification. Therefore, ICP vortex assumes no liability for damages incurred directly or indirectly from errors, omissions or discrepancies between the Controller, software and the manual.

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Pick up the phone

if you need technical support
and dial the numbers:
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For the USA: 602-353-0303

or send us a FAX:
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+49-(0)7131-5972-31
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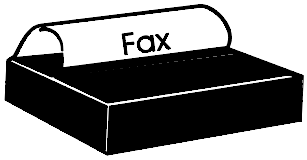

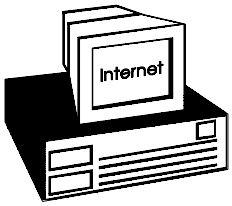

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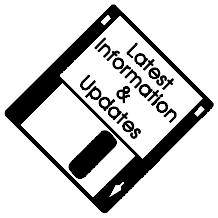

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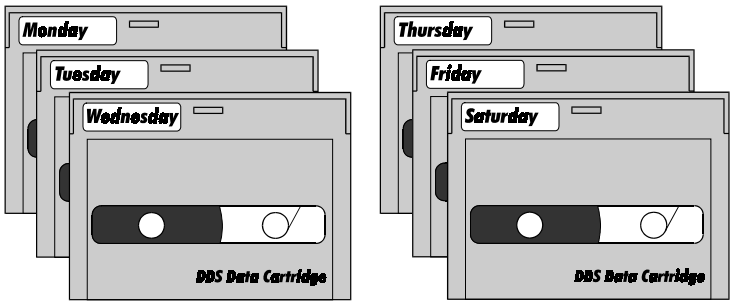
Important Note

Using modern RAID Systems significantly increases data security and availability. *Under no circumstances* does it relieve you from a careful and daily backup on tape or a similar backup media. This is the only method to protect your valuable data against total loss (e.g., through fire or theft), accidental deletion, or any other destroying impacts.



Many Thanks to all my Friends

Monika & Wolfgang (the grandmasters)
AnnDee, Lois, Ken and Andreas (the Phoenix Crew)
Achim, Dieter, Norbert, Otto, Ralph, Wolfgang (WOS), Vitus (GG), (they are the real wizards)
Alfred (AB, "We need ultra2. I say we have it")
Andreas (AK, or "Kopf nur mit ö")
Michael (Mipf, "where is my CPU ?")
Jürgen (Jogo, "Hi, is Jurgen there ?")
Ruth (RA, "she had to proof-read that thing, ...)
Johannes (JS, "I want my ice with a red cap .., or Dr. Oops-Click-Click...")
Jürgen (JB, "diesbezüglich & hinsichtlich or probably")
Klaus (KLM, "..not an Airline..")
Markus (Malu, "Luuuuu....")
Uwe & Steffen (the two from the soldering station, 5 Paninis for Reinhardt)

All the fantastic "rest" of this incredible company.

It is not only a pleasure to work here, it is a passion.

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Table of Contents

FCC Compliance Statement

Information for the User

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in residential installations. This equipment generates, uses, and can radiate radio frequency energy, and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.
If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
- Reorientate or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Plug the equipment into an outlet on a circuit different from that to which the receiver is po wered.
- If necessary, consult the dealer or an experienced radio/T.V. technician for additional sugge stions.
The use of a non-shielded interface cable with the referenced device is prohi bited.
Changes or modifications not expressly approved by ICP vortex Computersysteme GmbH could void the authority to operate the equipment.

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Chapter A

General Information

A. Introduction

GDT RP Series: Hardware RAID Disk Array Controller for PCI Bus Computer Systems with 1 or 2 Narrow & Ultra, or 1, 2, 3 or 5 Wide & Ultra SCSI I/O Channels

In order to take full advantage of modern operating systems, high performance computer systems are needed. When assessing the performance of a computer system, the aspects speed and security of the mass-storage subsystem are gaining increasing importance. As a result of the constantly growing acceptance of the RAID technology (Redundant Array of Inexpensive Disks) in these computer systems, and the identification of the RAID controller as the essential part of a disk subsystem, a strong demand for suitable RAID controllers has emerged during the past few years.

Since 1990, ICP vortex has been intensively engaged in the research and development of RAID products for the highest performance and security requirements. Due to our products' outstanding performance, our expertise and continuity in development, ICP Controllers are accepted and known as top leading-edge products all over the world. ICP Controller products within the GDT RP Series offer customers a wide variety of RAID controllers, suitable for the most different platforms and applications. All ICP Controllers of the GDT RP Series are *pure-bred* ***hardware solutions***. All functionality required for the sometimes very complex tasks is hardware-implemented on the controller. Thus, RAID is fully independent of the computer system (the host) and the operating system.

Thanks to the wide operating system support and easy-to-use installation and maintenance utilities, setting up and using high performance and fault-tolerant mass-storage subsystems for almost every purpose is child's play.

We would like to thank you for purchasing an ICP Controller of the GDT RP Series.

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A.1 Product Identification

In order to meet the various customer and system requirements, ICP vortex offers the GDT RP Series which includes different RAID Disk Array Controllers for PC-based PCI computer systems. The main differences between the various controller models lie in the number of Ultra SCSI channels available (1, 2, 3, or 5), the SCSI bus width (8 Bit: Narrow; 16 Bit: Wide) and the kind of firmware installed (RAID 0, 1, or RAID 0, 1, 4, 5 and 10).

Order Number	*ICP Controller Name*	*Number of Ultra SCSI channels*	*Supported RAID Levels*
7001	GDT6111RP	1 Narrow & Ultra	0, 1
7002	GDT6121RP	2 Narrow & Ultra	0, 1
7005	GDT6117RP	1 Wide & Ultra	0, 1
7006	GDT6127RP	2 Wide & Ultra	0, 1
7017	GDT6511RP	1 Narrow & Ultra	0, 1, 4, 5, 10

Order Number	*ICP Controller Name*	*Number of Ultra SCSI channels*	*Supported RAID Levels*
7027	GDT6521RP	2 Narrow & Ultra	0, 1, 4, 5, 10
7717	GDT6517RP	1 Wide & Ultra	0, 1, 4, 5, 10
7727	GDT6527RP	2 Wide & Ultra	0, 1, 4, 5, 10
7737	GDT6537RP	3 Wide & Ultra	0, 1, 5, 5, 10
7757	GDT6557RP	5 Wide & Ultra	0, 1, 5, 5, 10

The ICP Controllers of the RP Series are capable of controlling SCSI devices with the following specifications:

GDT6xy1RP Narrow & Ultra Controllers:

SCSI Bus Width	*Mode*	*Synchronous Data Transfer Rate*
8 Bit, narrow	Fast	10 MB/sec.
8 Bit, narrow	Fast-20, Ultra	20 MB/sec.
16 Bit, narrow	Fast	10 MB/sec.
16 Bit, narrow	Fast-20, Ultra	20 MB/sec.

GDT6xy7RP Wide & Ultra Controllers:

SCSI Bus Width	*Mode*	*Synchronous Data Transfer Rate*
8 Bit, narrow	Fast	10 MB/sec.
8 Bit, narrow	Fast-20, Ultra	20 MB/sec.
16 Bit, narrow	Fast	10 MB/sec.
16 Bit, narrow	Fast-20, Ultra	20 MB/sec.
16 Bit, wide	Fast	20 MB/sec.
16 Bit, wide	Fast-20, Ultra	40 MB/sec.

A.1.1 RAIDYNE Upgrade

The GDT6117RP and GDT6127RP can easily be upgraded to a GDT6517RP and GDT6527RP. Order the *RAIDYNE Upgrade* with part no. 8740. The GDT6111RP and GDT6121RP can easily be upgraded to a GDT6511RP and GDT6521RP. Order the *RAIDYNE Upgrade* with part no. 8760.

A.1.2 Key Features of the ICP Controllers of the GDT RP Series

- Hardware RAID Controllers with RAID 0, RAID 1, RAID 4, RAID 5 and RAID 10 Array Drives at controller level, completely independent of the computer system and the operating system. Several Array Drives can be operated simultaneously.
- Hot Plug and Auto-Hot Plug (with subsystems, which have Intelligent Fault Bus or SAF-TE support, i.e., pull out and push in disk drives shuttles without any user interaction).

- "Private" (i.e, for one Array Drive) or "Pool" (i.e., for several Array Drives) Hot Fix Drives.
- Online Capacity Expansion. Add one or several new disk drives to an existing Array Drive to expand its capacity. During the Expansion all data are redundant.
- Online RAID Level Migration. Online change of an Array Drive's RAID Level, e.g., from RAID 0 to RAID 5.
- Online Capacity Expansion and RAID Level migration can be performed simultaneously.
- Configuration Utility (GDTSETUP) in ROM. Express Setup option to easily setup Array Drives. Press "CTRL-G" to load GDTSETUP, long before the operating system is booted.
- Advanced Multi-Processor RISC Technology.
- On-Board 32-Bit RISC CPU. Completely offloads the host CPU.
- 1, or 2 Narrow & Ultra, or 1, 2, 3 or 5 Wide & Ultra SCSI channels with third generation 32 SCSI RISC processors and an active, software-switchable termination. With the Wide & Ultra controllers the Low-Byte and High-Byte termination can be switched separately.
- For the 1, 2 and 3 channel Wide & Ultra models, the controllers provide both of the following internal connectors:
  - a standard 50-pin header for 8 Bit SCSI cables and
  - a standard 68-pin receptacle for 16 Bit SCSI cables.
  This saves money because no expensive adapters are required.
- Can control up to 35 SCSI devices (7 per channel). Hard disks, Removable hard disks, CD-ROMs, MODs, DAT-drives, streamers, etc.
- Full SCSI-2 and SCSI-3 protocol support.
- Synchronous data transfer rate per SCSI channel of up to 40MB/sec.
- Cache RAM: 4MB, 8MB, 16MB, 32MB, or 64MB.
  One standard 72 PIN, 32 Bit or 36 Bit PS/2 SIMM.
  FPM (Fast Page Mode) or EDO (Extended Data Out) Dynamic-RAM technology.
  With EDO SIMMs increased performance.
  Automatic Cache RAM detection.
- Optional ECC SIMM (16MB).
- Intelligent multi-level cache-algorithm with adaptive delayed write and read ahead functions. This ensures an optimized cache for various load profiles and system requirements.
- Supports an *Intelligent Fault Bus* (IFB) and the SAF-TE (SCSI Accessed Fault-Tolerant Enclosures) standard.
- On-Board PCI 2.x compatible BIOS (Plug & Play).
- BIOS, Firmware and GDTSETUP in Flash-RAM. Easy update through floppy disk or BBS-download.
- Full Scatter and Gather support.

- GDTMON. Monitor program for the diagnosis (also remote) of ICP Controllers & Array Drives. The tool allows you to optimize existing configurations.
- Drivers for MS-DOS, Novell NetWare, SCO UNIX V/386, Interactive UNIX, UnixWare, Linux, Windows NT, Windows 95 and OS/2. ASPI-Managers for DOS, Windows and Novell NetWare.
- SNMP and MHS support for Novell NetWare. SNMP support for Windows NT.
- I_2O ready controller design.

A.2 Copyrights, Patents

Europe:
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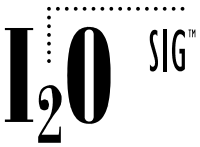
ICP vortex Corporation ▪ 4857 West Van Buren Street ▪ 85043 Phoenix, Arizona ▪ Phone: 602-353-0303 ▪ Fax: 602-353-0051 ▪ E-Mail: support@icp-vortex.com ▪ WWW: http://www.icp-vortex.com

ICP vortex is member of the RAID Advisory Board, the PCI Special Interest Group (PCI SIG) and founding member of the I_2O Special Interest Group (I_2O SIG):



A.3 Software License Agreement

Please read this Software License Agreement before opening the disk packaging and before starting to use the programs. Each loading of a program covered by this license agreement, each transmission within any existing network to another computer, as well as each copy on a mass storage system, regardless of what kind (floppy disk, hard disk etc.), represents a duplication of the program according to copyright regulations. Duplication is permitted only with the authorization of ICP vortex Computersysteme GmbH.
This authorization will be granted only on the condition that the Software License Agreement stated hereafter is observed.

By opening the disk packaging you expressly acknowledge the Software License Agreement of ICP vortex.

1. You are authorised to use the software contained on the enclosed disks, CD-ROMs and EPROMs/Flash-RAMs on a single computer system only. The restriction to this one computer system also applies if the disk packaging contains a double set of software, for example one set of 3.5" floppy disks and a CD-ROM. It is further valid if the package contains several versions of software adapted to different operating systems. A multi-utilization of the software is only permitted when a multi-user license has been purchased. The number of further computer systems authorized for usage under a multi-user license is evident from and limited by that license.

2. It is permitted to produce one single copy disk of the software for back-up purposes only. Furthermore, it is permitted to copy the software onto the hard disk of one single computer. It is not permitted to duplicate the contents of the EPROMs and/or Flash-RAMs on the ICP Controller.

3. The permanent conferring (by sale or donation) of the software is permitted. The new proprietor must be registered with vortex and must assume all rights and obligations resulting from this Software license agreement. Each and any other kind of transfer, especially leasing, is not permitted. Copies made by the first user for security reasons must be destroyed upon transfer.

4. It is not allowed to change the software in its functions or its appearance (especially trade mark, firm name and copyright reference) or to edit it in any other way. Neither is it permitted to de-compile or disassemble the software.

5. The enclosed software has been carefully copied on floppy disks and/or CD-ROM(s) by ICP vortex. However, if the floppy disks and/or CD-ROM(s) should prove to be faulty, ICP vortex will exchange them within 4 weeks from the date of purchase.

6. ICP vortex makes no warranties, express or implied, including without limitation the implied warranties of merchantability, functionality and fitness for a particular purpose. In particular, vortex is not liable to you for any consequential, incidental or indirect damage arising out of the use of this product.

7. This agreement is subject to the laws of the Federal Republic of Germany. Place of jurisdiction for both parties is the domicile of ICP vortex Computersysteme GmbH.

A.4 General Information

The ICP Controller should be installed by an authorized ICP vortex distributor. Precondition for the safe installation is an anti-static work place (earthed mat on the table with wrist bands connected to an earth). ICP vortex does not take any responsibility for damage arising out of improper installation. This manual contains all the information available at the time it was written. Errors and/or incomplete information are possible. We are grateful for any ideas or suggestions for improvement. Additional information may be found in the information file **"README.GBR"** on the enclosed System Disk "DOS". Besides up-to-date information, this file also contains a list of all programs on the ICP System Disks.

The contents of the file README.GBR must be read before the ICP Controller is used for the first time. Output is possible on printer or screen.

This **User's Manual** explains the installation and the operation of the ICP ICP Controller. For information on the use of the computer system and its operating system, please refer to the corresponding system manuals. A short list of recommended literature can be found in the appendix of this manual.

A.4.1 Unpacking the ICP Controller

Open the show box and take out the ICP Controller (leaving it in its anti-static bag), the disk package and this manual.
WARNING: Never take the GDT PCB (Printed Circuit Board) out of the anti-static bag unless this is done at an anti-static work place, and the person handling the ICP Controller is secured with wrist bands against electrostatic charge. If these instructions are not observed, the CMOS components on the ICP Controller may be damaged or destroyed.
Store the show box in a safe and dry place.

A.4.2 Delivery Contents

The following items are delivered with the ICP Controller:

1. ICP Controller in a sealed anti-static bag.
2. Sealed GDT disk package with driver and installation disks.
3. This User's Manual.

A.4.3 Contents of the GDT Driver Disks

A list of the files delivered with GDT can be found in the file **README.GBR** on the enclosed GDT System Disk DOS. The contents of this file can be viewed on screen or output on your printer. You should not use the GDT System Disks as your working disks. Use an appropriate utility program (for example DISKCOPY of MS-DOS) to make functional copies of all system disks (please observe the software license agreement). Store your original system disks in a safe and dry place.

A.4.4 Before You Start

In order to avoid damage caused by improper or faulty usage or handling, **we strongly recommend** reading this manual carefully before installation or first operation.

A.5 Product Description

A.5.1 Intel i960Rx (TM) I/O Processor

The i960Rx (TM) I/O processor is the first member of a new RISC CPU generation which was specifically designed for I/O applications. This CPU on a ICP Controller can reach a performance of **30 MIPS** and supervises all tasks of the SCSI devices, the RAID controlling and the communication with the PCI computer. In doing so, it significantly offloads the PCI computer, leaving it free to perform its original tasks.

A.5.2 Architecture - General 32 BIT

To meet the demands on a high performance controller, the bus architecture of the ICP Controller has a general **32-bit** layout.

- 32-bit control processor (i960Rx (TM) I/O Processor)
- 32-bit SCSI processors
- 32-bit bus-interface (PCI)
- 32-bit Cache RAM

A.5.3 Cache RAM - Expandable to 64MB

The cache RAM of a ICP Controller consists of one standard PS/2, 72 PIN, 32-bit or 36-bit, SIMM (**S**ingle **I**nline **M**emory **M**odule). This can be a Fast Page Mode (FPM) SIMM with an access time of 60ns (or less), or an Extended Data Out (EDO) SIMM with an access time of 50ns. Operation of the controller with an EDO SIMM increases the controller's overall performance.
The cache size is flexible as different memory sizes can be obtained by using different SIMMs. Thus, the memory can be expanded to 4MB, 8MB, 16MB, 32MB, or 64MB. In addition, it is possible to use an ECC SIMM (16MB).
An intelligent multi-level cache algorithm ensures that a high hit rate (cache hit) is achieved. Both, look-ahead and special delayed-write cache functions are implemented. With the GDT configuration program "GDTSETUP" and the monitoring utility GDTMON, the user can adjust various cache parameters.

A.5.4 Compatibility - PCI

The controllers of the GDT series have been developed in accordance with the 2.1 PCI-Bus specifications. They perform full bus-master DMA.

A.5.5 Up to 5 Independent Wide & Ultra SCSI channels

The ICP Controller is equipped with up to five Wide & Ultra SCSI channels which are based on 32-bit RISC SCSI-processors. By using this third generation SCSI processor, the SCSI overhead is reduced to a minimum, and maximum speed on the SCSI channel is achieved. Up to **35 SCSI devices** can be connected. All SCSI devices complying with the laid down SCSI-2 & SCSI-3 specifications can be operated. The maximum data transfer rate per channel is **40MB/sec.**

The ICP Controller is equipped with a SCSI-2-compliant (*alternative 2*), active, and software-switchable SCSI bus termination, which allows for a separate termination of the lower and higher byte of the SCSI bus.

A.5.6 ICP Controller Firmware, PCI-BIOS and GDTSETUP

The firmware, the BIOS of the ICP Controller and the configuration program GDTSETUP are stored in a Flash-RAM on the ICP Controller PCB. The firmware is designed for parallel processing and it controls all resources of the ICP Controller. This means that the entire administration of SCSI devices and RAID is exclusively carried out by the ICP Controller. Thus, the host is significantly offloaded. In addition, this hardware-implemented solution guarantees the highest achievable security. The controller-BIOS provides a complete PCI compatible INT13 interface (with 8GB DOS-partition extension) and expands the respective functions of the system BIOS. It also ensures that operating systems using the INT13 (i.e. MS-DOS, OS/2) can be booted directly from a SCSI device / RAID Array Drive connected to the ICP Controller. According to the various product expansion levels of the GDT RP Series, two different firmware levels are available. Installed upon delivery are the

Standard-Firmware (RAID 0, 1)	in	GDT6111RP, GDT6121RP, GDT6117RP, GDT6127RP
RAIDYNE-Firmware (RAID 0, 1, 4, 5, 10)	in	GDT6511RP, GDT6521RP, GDT6517RP, GDT6527RP, GDT6537RP, GDT6557RP

A controller originally equipped with the Standard-Firmware can be easily upgraded by the user with the RAIDYNE-Firmware. The Standard-Firmware offers the RAID Levels 0 and 1. As controllers have the RAIDYNE-Firmware, RAID Levels 0, 1, 4, 5, 10 and security features such as *Hot Fix* or *Hot Plug* become available. RAIDYNE is also capable of performing an on-line capacity expansion of an existing array by adding one ore more new hard disks. During expansion the array is fully operational. Another feature of RAIDYNE is the online RAID Level Migration of an existing array, e.g., from RAID 0 to RAID 5.

A.5.7 Configuration Program GDTSETUP

GDTSETUP is either loadable from the Flash-RAM of the ICP Controller (press <CTRL><G> after the ICP shows the controller BIOS), or from the command prompt under MS-DOS. GDTSETUP has a graphical user interface. It provides besides others the following functions:

- Configuration of SCSI devices connected to the ICP Controller and administrated by the GDT cache. Devices not controlled by the cache (CD-ROM, DAT, DLT, WORM, MOD, etc.) are either operated by means of the ASPI interface, or are directly supported by the operating system.
- EXPRESS and ADVANCED configuration of single disks, or RAID 0, 1, 4, 5 and 10 Host Drives.
- Configuration of the ICP Controller's cache and intelligent fault bus.

A.5.8 Diagnosis Program GDTMON

The diagnosis program (or simply *monitor*) GDTMON (GDT MONitor) is a very flexible software tool that offers many different diagnosis and maintenance functions during full-operation conditions. GDTMON can be used on the fileserver, or remotely from an authorized workstation. The main functions of GDTMON are:

- Monitoring the disk subsystem performance (KB/sec and I/Os per sec. of host-, cache- and physical drives)
- Monitoring the utilization of the on-board GDT cache
- Online configuration of the GDT cache memory

- Online changes of SCSI device parameters (SCSI protocol, Disk Cache, Tagged Queues, synchronous/asynchronous transfer, transfer rate)
- Online check of the parity information of RAID 4 and RAID 5 Array Drives
- Online capacity expansion of existing Array Drives
- Hot Plug and Hot Fix
- Saving all configuration data to floppy disk or hard disk

A.5.9 Operating System Driver Software

Drivers for the following operating systems are available:

Operating System	Driver included with the Controller Package	Driver can be down-loaded from BBS (*)	Driver can be downloaded from the WWW (**)
MS-DOS 3.3 to 6.x	Yes	Yes	Yes
Novell NetWare 3.11, 3.12, 4.x	Yes	Yes	Yes
SCO UNIX System V/386 3.2v5.x	Yes	Yes	Yes
Interactive UNIX V/386 3.2v3, 3.2v4	No	Yes	Yes
SCO UnixWare 2.x	Yes	Yes	Yes
IBM OS/2 2.x, Warp 3, Warp 4	Yes	Yes	Yes
Windows NT 3.5x, 4.x	Yes	Yes	Yes
Windows 95	Yes	Yes	Yes
Linux 1.2.13, 1.3.37, 1.3.97, 2.0.00, 2.0.18	No	Yes	Yes
QNX 4.22	No	Yes	Yes

(*) BBS: +49-(0)-7131-5952-15 ▪ (**) http://www.icp-vortex.com

The following table shows how various SCSI devices are integrated by different operating systems. Please refer to the corresponding chapters of this User's manual and the operating system documentation for detailed installation information.

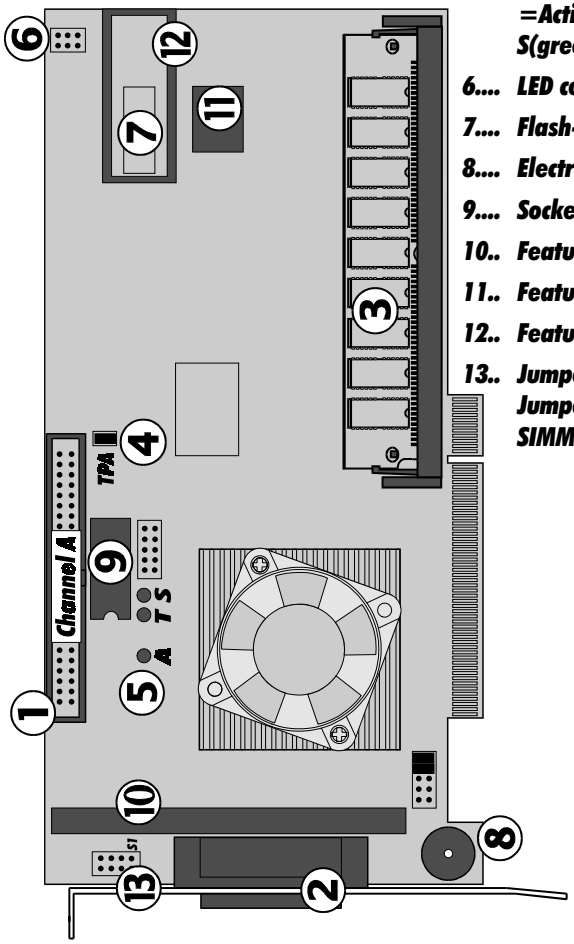
	Hard Disk	Remov. HDD	CD-ROM	Streamer	WORM	MOD
MS-DOS	GDT	ASPI or GDT	ASPI	ASPI	ASPI	ASPI/GDT
NetWare	GDT	GDT	ASPI	ASPI	ASPI	ASPI/GDT
UNIX	GDT	GDT	UNIX	UNIX	UNIX	UNIX/GDT
Win. NT	GDT	Win.NT or GDT	Win.NT	Win.NT	Win.NT	Win.NT
OS/2	GDT	OS/2 or GDT	ASPI	ASPI	ASPI	ASPI or GDT

GDT: Configurable with GDTSETUP (some MODs are recognized as a hard disk (see your MOD manual). In this case, they too can be configured with GDTSETUP). **ASPI:** Integration by means of an ASPI interface. **UNIX, OS/2, Win.NT:** Supported by the operating system.

A.5.10 ICP Controller GDT RP Series Board Layout

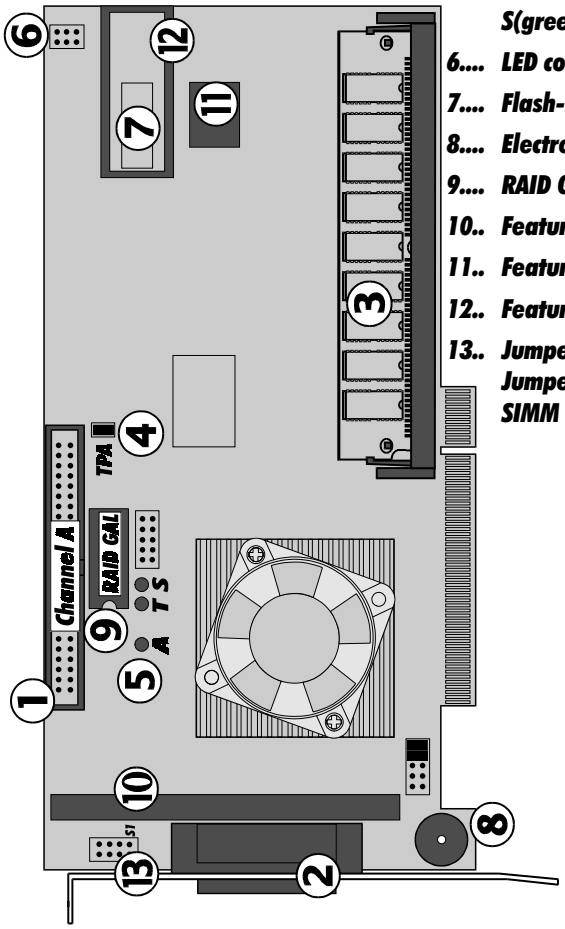
The ICP Controller PCB (Printed Circuit Board) has several jumpers. In the following illustrations, all jumpers are shown in their factory setting. No other jumpers except the TPA, TPB, TPC, TPD, TPE and S1 jumpers are user-serviceable and must remain in their displayed position. An installed TPA, TPB, TPC, TPD or TPE jumper means that the ICP Controller supplies the termination power on the SCSI cable of the corresponding SCSI channel. The S1 Jumper has to be installed if the ICP Controller is operated with an EDO SIMM. For operation with a Fast Page Mode SIMM, the jumper must not be set.
The cooler on your ICP Controller may look different from the one on the following pages. Depending on the type of i960 Rx CPU installed on the ICP Controller, with some models, the cooler is completely missing. This is intended !
All variants fully comply to the specifications laid down in this User's Manual.

GDT6111RP Overall View



1.... SCSI connector
2.... External SCSI connector
3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)
4.... Terminator Power
5.... LEDs: T(green)=DMA; A(yellow) =Activity SCSI channel; S(green)=Status OK
6.... LED connector
7.... Flash-RAM for Firmware/BIOS
8.... Electronic loudspeaker
9.... Socket for the RAID GAL
10.. Feature Connector B
11.. Feature Socket A
12.. Feature Socket B
13.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6511RP Overall View



1.... SCSI connector

2.... External SCSI connector

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power

5.... LEDs: T(green)=DMA; A(yellow) =Activity SCSI channel; S(green)=Status OK

6.... LED connector

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... RAID GAL

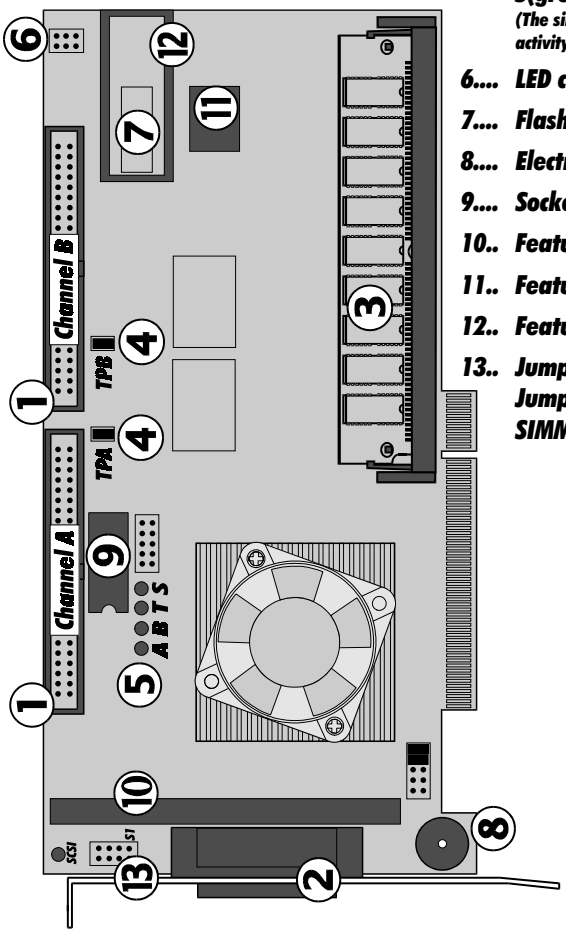
10.. Feature Connector B

11.. Feature Socket A

12.. Feature Socket B

13.. Jumper S1 set: EDO SIMM installed Jumper S1 open: Fast Page Mode SIMM installed

GDT6121RP Overall View



1.... SCSI connectors channels A,B

2.... External SCSI connector channel A

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B

5.... LEDs: T(green)=DMA; A,B(yellow) =Activity SCSI channels A,B; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is activity on the SCSI channels)

6.... LED connector

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... Socket for the RAID GAL

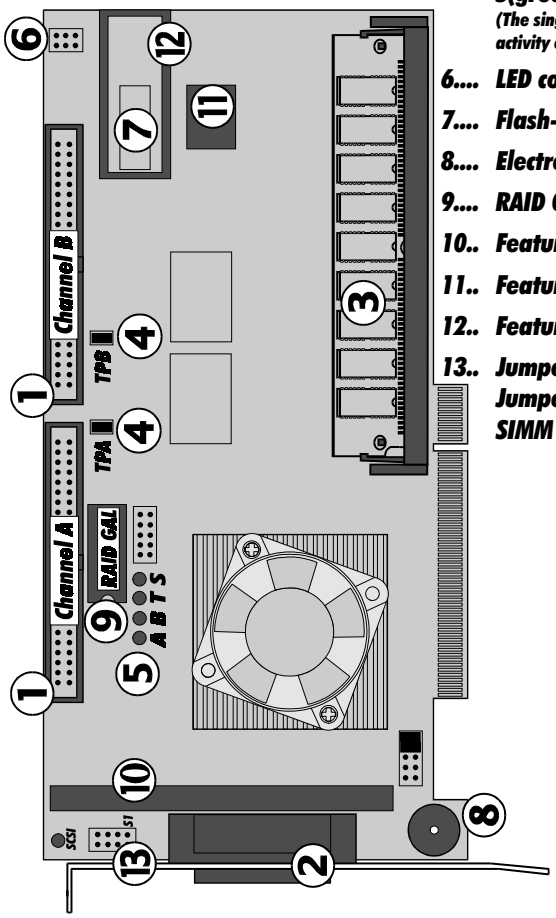
10.. Feature Connector B

11.. Feature Socket A

12.. Feature Socket B

13.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6521RP Overall View



1.... SCSI connectors channels A,B

2.... External SCSI connector channel A

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B

5.... LEDs: T(green)=DMA; A,B(yellow) =Activity SCSI channels A,B; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is activity on the SCSI channels)

6.... LED connector

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... RAID GAL

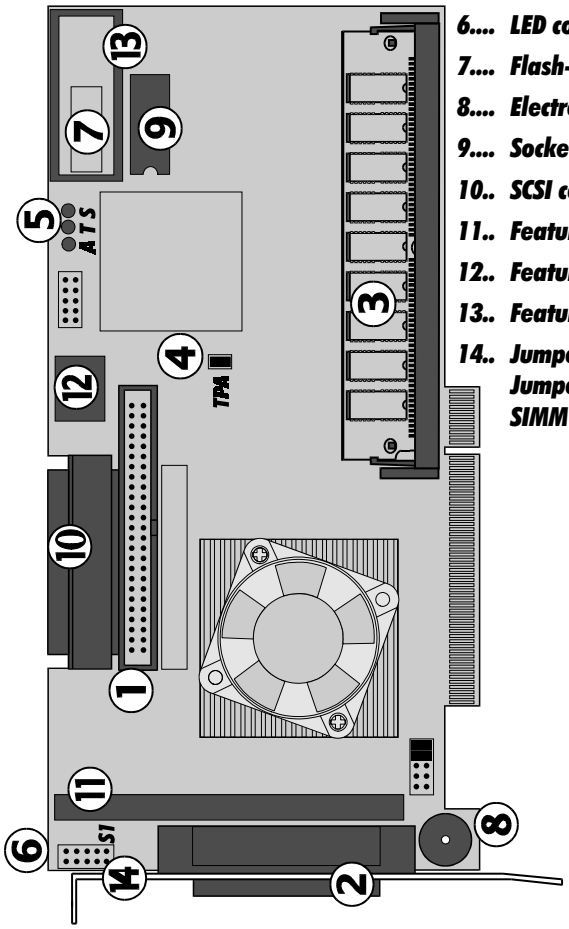
10.. Feature Connector B

11.. Feature Socket A

12.. Feature Socket B

13.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6117RP Overall View



1.... SCSI connector for 8-Bit cable

2.... Ext. SCSI connector for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power

5.... LEDs: T(green)=DMA; A(yellow) =Activity SCSI channel; S(green)=Status OK

6.... LED connector

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... Socket for the RAID GAL

10.. SCSI connector for 16 Bit cable

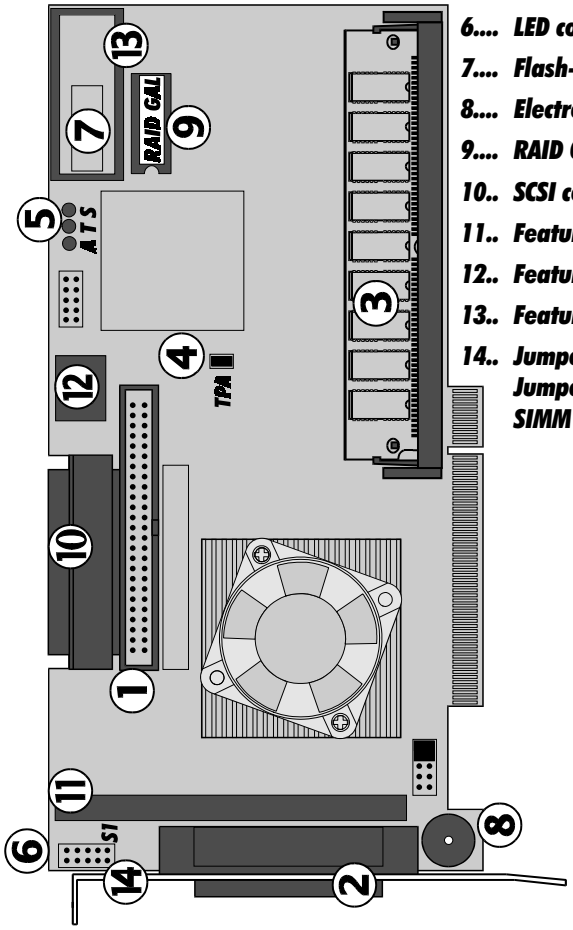
11.. Feature Connector B

12.. Feature Socket A

13.. Feature Socket B

14.. Jumper S1 set: EDO SIMM installed Jumper S1 open: Fast Page Mode SIMM installed

GDT6517RP Overall View



1.... SCSI connector for 8-Bit cable

2.... Ext. SCSI connector for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power

5.... LEDs: T(green)=DMA; A(yellow) =Activity SCSI channel; S(green)=Status OK

6.... LED connector

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... RAID GAL

10.. SCSI connector for 16 Bit cable

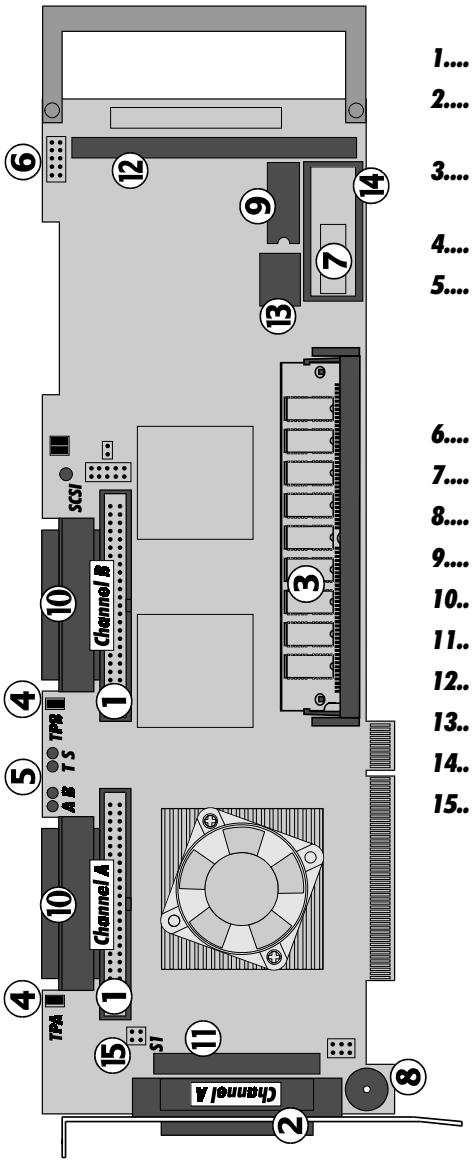
11.. Feature Connector B

12.. Feature Socket A

13.. Feature Socket B

14.. Jumper S1 set: EDO SIMM installed Jumper S1 open: Fast Page Mode SIMM installed

GDT6127RP Overall View



1.... SCSI connectors A,B for 8-Bit cable

2.... External SCSI connector channel A for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B

5.... LEDs: T(green)=DMA; A,B (yellow) =Activity SCSI channels A,B; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is activity on the SCSI channels)

6.... LED connector channels A,B

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... Socket for the RAID GAL

10.. SCSI connectors A,B for 16 Bit cable

11.. Feature Connector A

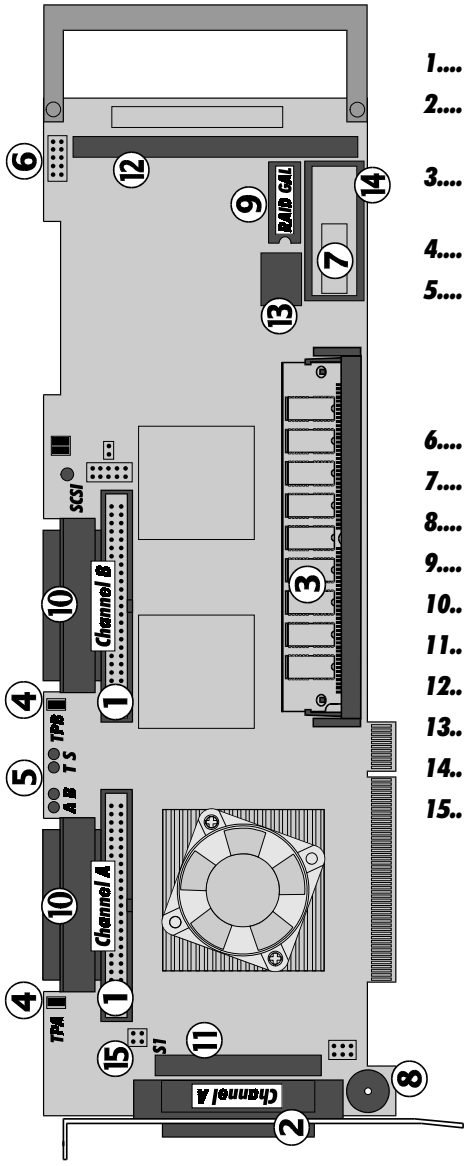
12.. Feature Connector B

13.. Feature Socket A

14.. Feature Socket B

15.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6527RP Overall View



1.... SCSI connectors A,B for 8-Bit cable

2.... External SCSI connector channel A for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B

5.... LEDs: T(green)=DMA; A,B (yellow) =Activity SCSI channels A,B; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is activity on the SCSI channels)

6.... LED connector channels A,B

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... RAID GAL

10.. SCSI connectors A,B for 16-Bit cable

11.. Feature Connector A

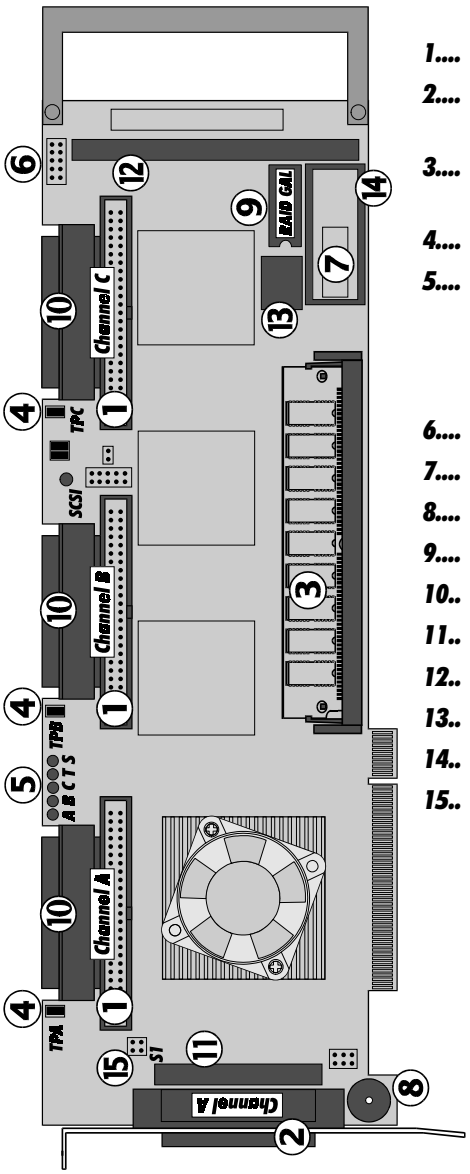
12.. Feature Connector B

13.. Feature Socket A

14.. Feature Socket B

15.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6537RP Overall View



1.... SCSI connectors A,B,C for 8-Bit cable

2.... External SCSI connector channel A for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B,C

5.... LEDs: T(green)=DMA; A,B,C (yellow) =Activity SCSI channels A,B,C; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is a c-tivity on the SCSI channels)

6.... LED connector channels A,B,C

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... RAID GAL

10.. SCSI connectors A,B,C for 16-Bit cable

11.. Feature Connector A

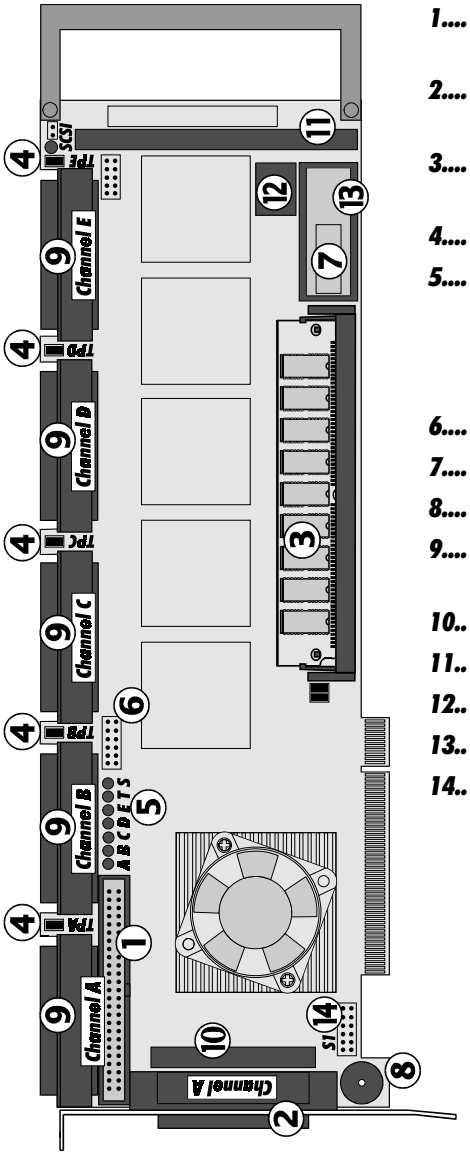
12.. Feature Connector B

13.. Feature Socket A

14.. Feature Socket B

15.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

GDT6557RP Overall View



1.... SCSI connector for 8-Bit cable channel A

2.... External SCSI connector channel A for 16-Bit cable

3.... 72-PIN SIMM; 60ns FPM, or 50ns EDO (no SIMM included)

4.... Terminator Power channels A,B,C,D,E

5.... LEDs: T(green)=DMA; A,B,C,D,E (yellow) =Activity SCSI channels A,B,C,D,E; S(green)=Status OK
(The single LED "SCSI" flashes whenever there is activity on the SCSI channels)

6.... LED connector channels A,B,C,D,E

7.... Flash-RAM for Firmware/BIOS

8.... Electronic loudspeaker

9.... SCSI connectors A,B,C,D,E for 16-Bit cable

10.. Feature Connector A

11.. Feature Connector B

12.. Feature Socket A

13.. Feature Socket B

14.. Jumper S1 set: EDO SIMM installed
Jumper S1 open: Fast Page Mode SIMM installed

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