

# ***Chapter J***

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## ***Using Microsoft***

## ***Windows NT***

## **J. Using Microsoft Windows NT**

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After having explained the installation of the ICP Controller and the host-drives in chapters B and C, we now explain how to install the operating system Microsoft Windows NT. For a successful installation, we recommend that you take a close look at the manuals which came with your Windows NT package.

### **J.1 Transparency of Host Drives**

The structure of the Host Drives, which have been installed with GDTSETUP (in chapter C), is not known to Windows NT. I.e., the operating system does not recognize that a given Host Drive consists of a number of hard disks forming a disk array. To Windows NT, this Host Drive simply appears as one single SCSI hard disk with the capacity of the disk array. This complete transparency represents the easiest way to operate disk arrays under Windows NT; neither Windows NT nor the PCI computer need to be involved in the administration of these complex disk array configurations.

### **J.2 General Information on Windows NT**

Your ICP Controller may be operated in both operating system variants, the Windows NT *Workstation* variant and the Windows NT *Advanced Server* variant. The ICP Controller is integrated into the Windows NT operating system through the GDTX.SYS driver which is the same for both Windows NT variants. Therefore, in this chapter we shall not distinguish between these two variants. All the information refers both to the Workstation and the Advanced Server variant. Note: At the time this manual was printed, Windows NT 3.5, Windows NT 3.51 and Windows NT 4.0 had been successfully tested.

### **J.3 Preparing the Installation**

The following steps have to be carried out and/or checked before you can begin with the installation of Windows NT.

**Step 1:** If you want to install Windows NT 3.51 or NT 4.0, skip this step. If you intend to install Windows NT 3.50 on your system, please observe the following: The GDT driver for NT 3.50 is located in the subdirectory DRIVERS of the GDT Windows NT disk. Its name is GDTX350.SYS. This file has to be renamed into GDTX.SYS and copied into the root-directory of the GDT Windows NT disk.

**Step 2:** When you do a warm boot by simultaneously pressing the CTRL+ALT+DEL keys, some PCI motherboards carry out a hard reset of the PCI bus. As a consequence, all expansion cards and devices that are connected to the PCI bus, including the ICP Controller, are reset. During the installation procedure of Windows NT this anomaly can cause the contents of the GDT cache RAM to be deleted before the data can be written to the disk(s). If this happens, the installation cannot be completed correctly. Such a warm boot automatically takes place after a FAT partition is converted into an NTFS partition at the end of the Windows NT installation procedure. In order to avoid this problem and prevent the risk of data corruption, **it is advisable to disable the *Delayed Write* function of the GDT cache during complete installation.** To do so, use the GDTSETUP program, choose *Advanced Setup*, *Configure Controller*, *Controller Settings* and switch the *Delayed Write* function OFF. After having completed the Windows NT installation, switch the *Delayed Write* function ON again.



**Step 3:** The size of a Windows NT boot partition is limited to a maximum capacity of 2GB (this is a Windows NT restriction).

**Step 4:** In some cases Windows NT checks the virtual geometric parameters (heads, sectors) of the ICP Controller BIOS Host Drives during the installation process. This can cause Windows NT to calculate wrong parameters. In this case, the first part of the installation procedure (text mode) seems to work fine, but after the first warm boot the installation terminates irregularly because the Windows NT boot loader is no longer available. To avoid this problem (which will inevitably occur with Host Drives larger than or equal to 1GB), we recommend that you first re-create the so-called *master boot record* (MBR) of the given Host Drive, and secondly, to prepare the Host Drive with a little program named NTPREP for the Windows NT installation. NTPREP.EXE is part of the GDT Windows NT disk.

FDISK /MBR <ENTER>                      and                      NTPREP <ENTER>

GDTSETUP includes an option that makes both, FDISK /MBR and NTPREP. Select the *Configure Host Drives* menu and then *Overwr. Master Boot Code*.

**You should never use *Overwr. Master Boot Code* or FDISK /MBR and NTRPEP when the Host Drives already contains valid data.**



**Step 5:** When connecting the various SCSI devices to the SCSI channel(s) of the ICP Controller, please ensure that the SCSI-ID of all *Not-Direct-Access* devices (e.g., CD-ROM, DAT-Streamer, MO-drive, etc.) are adjusted to a value greater than or equal to 2. This applies as well for the CD-ROM drive from which Windows NT is installed.

## J.4 The Installation

First of all, make sure that you have verified or carried out all steps described in section J.3.

### J.4.1 The ICP Controller is the only Controller in the System

The following instructions 1.) to 12.) assume that the ICP Controller is the only controller in the system and that the operating system is booted from its first Host Drive.

1. Insert the first Windows NT setup disk (Disk #1) into the boot floppy disk drive and reset the system. After a while you are asked to insert Disk #2.
2. Select: **S=Skip Detection**
3. Select: **S=Specify Additional Device**
4. Choose **Other (Requires disk provided by hardware manufacturer)** and press <ENTER>
5. Insert the *GDT Windows NT Disk*.
6. Select the **GDT SCSI Disk Array Controller** and press <ENTER>.
7. Setup tells you that it has recognized the ICP Controller. Press <ENTER> to continue.
8. Insert Disk #3 and press <ENTER>.

9. Now you can adjust the other system configuration parameters of your Windows NT system (graphics adapter, mouse, etc.).
10. Afterwards, the installation program scans the system for existing hard disks (which are identical to the Host Drives of the GDT). Choose the drive on which to install Windows NT and which you want to partition.
11. Now the actual installation of the Windows NT operating system begins. Follow the instructions of the Windows NT installation program.
12. After successful installation, switch the *Delayed Write* function of the ICP Controller ON again by using the GDTSETUP program or the GDTMON program.

#### **J.4.2 The ICP Controller is the Secondary Controller in the System**

If you wish to use the ICP Controller as a secondary controller in your Windows NT system (e.g. Windows NT is installed on an IDE hard disk), follow the instructions a.) to h.) below:

- a) Double click the **My Computer** icon.
- b) Double click **Control Panel**.
- c) Double click **SCSI Adapters**.
- d) Click on **Drivers**.
- e) Click on **Add**.
- f) Click on **Have Disk**.
- g) Insert the GDT Windows NT driver disk and click **OK**.
- h) Select **GDT SCSI Disk Array Controller**.

At the next system boot the GDT driver is loaded and the existing Host Drives are ready to be partitioned under Windows NT.

#### **J.4.3 Using the Hot Plug Function with RAID Host Drives**

In order to be able to use the Hot Plug function under Windows NT, it is necessary to load GDTMON, the monitoring utility program. (Note: GDTMON.EXE is part of the GDT Windows NT Disk).

#### **J.4.4 Installation of a new GDTX.SYS Driver Version**

If it should become necessary to install a new version of the GDTX.SYS driver, the procedure is as follows:

- a) Double click the **My Computer** icon.
- b) Double click **Control Panel**.
- c) Double click **SCSI Adapters**.

- d) Click on **Drivers**.
- e) Select **GDT SCSI Disk Array Controller**.
- f) Click on **Add**.
- g) Click on **OK**.  
Windows NT informs you that this driver is already on the system and asks if you want to use the currently installed driver or a new one.
- h) Click on **New** and insert the GDT Windows NT driver disk.
- i) Click on **Continue** and NT copies the new driver to the disk.

At the next system boot the GDT driver is loaded.

## J.5 Installation of a Removable Hard Disk

Removable hard disks (e.g., SyQuest, IOMEGA or magneto optical devices, MODs) are controlled by the ICP Controller in two fundamentally different modes:

**Mode 1:** The removable hard disk is treated like a normal hard disk. The data passes through the cache of the ICP Controller and the media needs to be initialized with GDTSETUP.

**Mode 2:** The removable hard disk is handled as a *Raw Device*. This means that the removable device is directly controlled by Windows NT without any further interaction of the controller. Consequently, the data is not cached by the GDT cache and the media does not need to be initialized with GDTSETUP. The advantage of mode 1 lies in a decisively better performance due to caching. On the other hand, the relatively complicated procedure of media changing presents a disadvantage. The opposite is true when adopting mode 2: The media change is easy and the media are compatible with other disk controllers (e.g., NCR). The performance is rather low since the data cannot be cached on the ICP Controller.

To install a removable hard disk as a Raw Device, the media must not be initialized with GDTSETUP and the device must be set to a SCSI-ID equal to or greater than 2. In addition, the parameters of the GDT driver GDTX.SYS need to be configured differently in the Windows NT *Registry*

**HKEY\_LOCAL\_MACHINE\SYSTEM\CurrentControlSet\Services\gdtx\Parameters\Device**

To do so, follow these instructions:

1. Load the Registry Editor **regedt32.exe** in **\...\system32**
2. Select the window **HKEY\_LOCAL\_MACHINE on Local Machine**
3. Choose the Key **gdtx** in the directory **SYSTEM\CurrentControlSet\Services\ .**
4. Enter by means of Edit, function Add Key, the name **Parameters** .  
Select **Parameters** .
5. Enter by means of Edit, function Add Key, the name **Device** .  
Select **Device** .
6. Enter by means of Edit, function Add Value, the name **DriverParameter** .

7. Use data type **REG\_SZ**.  
Now enter the parameter string (e.g.): **/reserve:0,0,4,0** .  
(This string causes the SCSI device connected with ICP Controller 0, SCSI channel 0, SCSI ID 4, LUN 0 to be reserved as a Raw Device. ICP Controller 0 is the ICP Controller which is detected and configured first after switching on your computer system).
8. The reservation of the SCSI device becomes active after completing regedt32, exiting and rebooting the system.

## **J.6 Tips & Tricks**

### **J.6.1 ICP Controller not Found During Windows NT Installation**

We have observed situations where Windows NT can not find the ICP Controller when installing the GDT driver. This problem is usually caused by one of the standard drivers which Windows NT loads automatically during the first installation phase.

If this is the case, we recommend that Windows NT Setup be started again and carried out in the mode 'user defined'. If this process is carried out correctly, the scan for hard disk controllers carried out by Windows NT can then be omitted. Instead of carrying out a scan, the GDT driver will be installed manually immediately. The ICP Controller should then be easily found. If other disk controllers are in the system, they can also be specified manually after the ICP Controller.

### **J.6.2 Installation and Upgrade of Windows NT 3.5x / 4.x**

Windows NT in the latest Versions 3.51 and 4.0 offers various methods for the installation and the upgrade.

**Method 1:** The corresponding Setup - Disks 1 to 3 are generated and Windows NT (the Upgrade) is installed by booting the disks.

In general, it is recommended to use method 1 for installing Windows NT, as the operating system always enables the user to insert an OEM disk (e.g., the driver disk of the ICP Controllers). In addition, installation is much faster if method 1 is used as not all Windows NT raw files have to be copied to a temporary directory.

Installation according to method 1 affords that 3 setup disks are generated. This is carried out via the program Winnt.exe on the Windows NT CD, i.e., by entering the command line:

```
WINNT /OX
```

The switch '/OX' ensures that the Setup disks are generated.

**Method 2:** Windows NT generates a temporary directory on an existing partition and installs the operating system (i.e., the upgrade) from there.

This installation is only possible if there is already a partition with enough free disk space (around 150 MByte). Depending on whether it is an upgrade or a new installation, either WINNT.EXE has to be started with the corresponding command line option (e.g., 'WINNT /B' during a new installation via a temporary directory on a DOS Partition), or the Upgrade Icon on the CD-ROM symbol of the inserted Windows NT CD-ROM can be clicked on.

In any of these circumstances, Windows NT does not automatically enable the user to be able to insert an OEM disk. With all hard disk controllers, where the driver is not on the Windows NT CD-ROM, the following problem occurs: The access to the hard disk is not pos-

sible after the first reboot of the computer during the installation procedure. Normally, the error message 'Inaccessible Boot Device' appears and the installation is stopped. To avoid this error message, a 'hidden key' of Windows NT should be used. As soon as the NT operating system has restarted the computer (reset), and the setup program starts, the key F6 has to be pressed and held down when the Setup screen appears. The Setup screen appears before the symbol for the Windows NT-Version and the system RAM is displayed in the upper corner of the screen. This is easily recognizable by a blue background color. In contrast to the 'Boot-Screen' with the version message and RAM message, the setup screen uses the large screen font. After pressing F6, a window is opened and Windows NT offers the opportunity of specifying an additional device driver. Now insert the floppy disks with the Windows NT driver for the ICP Controller. If the whole process described above has been carried out correctly, a window is displayed in the middle of the screen with the message 'GDT Disk Array Controller'. If the function key F6 was not pressed at the correct point, the procedure can be easily repeated by rebooting the computer (hard reset). Otherwise, Windows NT restarts the driver of the ICP Controllers after confirming by pressing the <ENTER>-key. Installation can be carried out in the usual way. The GDT driver disk will be needed again later to allow Windows NT to copy the gdtx.sys to the boot partition.

### **J.6.3 Adding Additional Capacity After An Online Capacity Expansion**

The additional capacity resulting from an online capacity expansion of an existing Array Drive is introduced to the system as a new Host Drive. In order to be able to make use of the new capacity without having to down the server, use the *Disk Administrator*. When loading, it detects the new Host Drive.