

# ***Chapter F***

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## ***Using***

# ***Novell NetWare***

## **F. Using Novell NetWare**

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After having explained in chapters B and C the installation of the ICP Controller as well as that of the host-drives, we would now like to give you some hints and pieces of advice on how to install Novell's operating system Novell NetWare. We shall mainly focus on NetWare 3.x and NetWare 4.x. For successful installation, it is essential to study the NetWare system manuals thoroughly. The information given in this chapter refers to the loading of the GDT NetWare driver only.

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

The structure of the Host Drives, which have been installed with GDTSETUP (in chapter C), is not known to NetWare. 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 NetWare, 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 NetWare; neither NetWare nor the PCI computer need to be involved in the administration of these complex disk array configurations.

### **F.2 Novell NetWare 3.10, 3.11 and 3.12**

The ICP Controller and the Host Drives previously configured with GDTSETUP are integrated by means of GDT's driver software located on the GDT *Novell NetWare* disk. The driver belongs to the category of so-called NLMs (NetWare Loadable Module).

GDTRP310.DSK	for NetWare 3.10
GDTRP311.DSK	for NetWare 3.11
GDTRP312.DSK	for NetWare 3.12
ASPITRAN.DSK	ASPI manager
CTRLTRAN.DSK	Module for GDTMON

(Note: More information about the GDTMON diagnosis tool can be found in a separate chapter of this manual.). The installation of the fileserver itself is carried out following the Novell NetWare documentation. According to your NetWare version, copy the appropriate driver, the GDT ASPI Manager ASPITRAN.DSK and the GDT CTRLTRAN.DSK module to the boot disk or the DOS boot partition. During installation, instead of LOAD ISADISK, type in,

```
:LOAD GDTRP310 <ENTER> (NetWare 3.10) or
:LOAD GDTRP311 <ENTER> (NetWare 3.11) or
:LOAD GDTRP312 <ENTER> (NetWare 3.12)
```

The GDT ASPI Manager ASPITRAN.DSK and the CTRLTRAN.DSK module will then be automatically loaded by the GDT driver (GDTRP310, GDTRP311 or GDTRP312). If more ICP Controllers are installed in the fileserver (i.e., for controller duplexing), the above mentioned driver has to be called upon several times. But as it is re-entrant, it is only loaded once. A single ICP Controller can be chosen by selecting its PCI slot number.



### **F.3 Novell NetWare 4.x**

The ICP Controller and the Host Drives previously configured with GDTSETUP are integrated by means of GDT's driver software located on the GDT *Novell NetWare* disk. The driver belongs to the category of the so-called NLMs (NetWare Loadable Module).

GDTRP400.DSK	for NetWare 4.x
ASPITRAN.DSK	ASPI manager
CTRLTRAN.DSK	Module for GDTMON

(Note: More information about the GDTMON diagnosis tool may be found in a separate chapter in this manual.)

If you wish to install NetWare 4.x from a CD-ROM, you first have to set up the CD-ROM drive under MS-DOS, following the instructions given in chapter D, section D.6. Then install NetWare following the instructions in the NetWare documentation. During the installation, the NetWare installation program asks you which hard disk driver you want to load, showing a list of available drivers. As the GDT driver is not part of this list yet, you have to boot it from the floppy disk: insert the GDT *Novell NetWare* disk into the floppy drive. Now, select the drivers GDTRP400, ASPITRAN and CTRLTRAN. Complete the installation according to the instructions given by the NetWare installation program. Naturally you can also load the GDT driver directly from the system console, just as with NetWare 3.x:

```
:LOAD GDTRP400 <ENTER>
```

(ASPITRAN.DSK and CTRLTRAN.DSK will be loaded automatically). If more ICP Controllers are installed in the fileserver (i.e., for controller duplexing), the above mentioned driver has to be called upon several times. But as it is re-entrant, it is only loaded once. A single ICP Controller can be chosen by selecting its PCI slot number.

### **F.4 Tips and Tricks**

#### **F.4.1 Optimize Data Throughput**

High performance SCSI controllers are designed for multi-I/O operations and are capable of processing several I/Os simultaneously. Especially cache controllers with powerful on-board RISC CPUs can handle several hundred I/Os per second. NetWare offers the option of adjusting the number of write I/Os which are loaded on the mass storage subsystem. In order to gain optimum performance and speed from modern high performance disk controllers, the amount of the so-called 'maximum concurrent disk cache writes' has been increased with every further development of NetWare. Looking back to NetWare 3.11, only 100 'concurrent disk cache writes' were possible. With NetWare 4.10, this can be as much as 1000. The number of concurrent disk cache writes delivering the best performance is highly dependent on the performance of the installed disk controller, the amount of cache RAM on the controller and the hard disks. The ICP Controllers can easily cope with up to 500 simultaneous requests. The following command line enables the adjustment of a new number under NetWare (default value = 50):

```
set maximum concurrent disk cache writes = xxxx
```

where xxxx represents the required number of concurrent disk cache writes.

#### **F.4.2 'cache memory allocator out of available memory' in PCI-ISA Systems**

PCI-Systems which are not equipped with an EISA-Bus behave in the same way as an ISA mainboard with regard to the available RAM memory. NetWare therefore does not automatically recognize the available memory above 16 MByte. The command 'Register Memory' allows the registration of memory above 16 MByte. Memory shortage can appear while loading several applications simultaneously on the server, especially where large volumes are concerned. This is because the Register Memory Command is normally carried out in the autoexec.ncf file. This is usually located in the SYS-Volume.

An autoexec.ncf file placed in the DOS-Partition of the NetWare Server helps to get around this problem. In order to carry out this process, the disk driver has to be removed from the startup.ncf and inserted into the autoexec.ncf in the DOS partition. In this case, the disk driver has to be loaded directly after the Register Memory command. An example of an autoexec.ncf file:

```
register memory 1000000 1000000  
LOAD C:GDTRP312  
....
```

In addition, a further start file can be loaded on the SYS volume for differentiation, e.g., with the name 'autonet.ncf'.

#### **F.4.3 Installing NetWare 4.1 - Wrong Drive Name**

The following problem often occurs when installing NetWare 4.1 server: While copying the module cdrom.nlm the system hangs - forever. This problem only occurs when the CD-ROM drive's name under MS-DOS is 'cdrom', i.e., the config.sys/autoexec.bat contains the following files:

```
DEVICE=aspicd.sys /D:cdrom  
and  
mscdex /D:cdrom
```

To avoid this problem, simply change the CDROM's name in DOS to another name, i.e., use '/D:scsicc' instead of '/D:cdrom'.

#### **F.4.4 NetWare-Server Not Stable When High Utilization**

High server utilization, combined with a large number of applications running on the server often leads to the following problem: The number of 'Dirty Cache Buffers' increases tremendously and the server is then not stable. In order to avoid this situation, the following parameters should be modified:

1. Increase the number of concurrent disk cache writes for the disk subsystem:

```
set maximum concurrent disk cache writes
```

This parameter can be increased up to 500 for high performance controllers and fast hard disks.

2. Decrease the delayed write standard parameter:



set dirty disk cache delay time

This parameter sets the time whereafter 'dirty buffers' are written (flushed) from the cache of NetWare to the hard disk. The minimum value is 0.8 seconds which influences the server performance substantially. Therefore, care should be taken not to go below 0.8 seconds.

#### **F.4.5 ICP Controller and Non-ASPI Compatible Controllers**

If an ICP Controller is operated under NetWare together with a further controller / hostadapter which does not support the ASPI standard, SCSI Raw Devices cannot be operated on both controllers (tapes, CD-ROMs).

In general, NetWare gives preference to controllers which support the ASPI Standard (GDT, Adaptec). As soon as ASPITRAN.DSK is loaded (Auto-Loading Module) tapes and CD-Roms on the ASPI non-compatible controller are no longer recognized.

To avoid this problem, the file ASPITRAN.DSK can be deactivated via a modification.

Please note: After this modification, no other Raw Devices (tapes, CD-Roms) are recognized on the GDT (Adaptec,...).

In order to deactivate ASPITRAN.DSK, the string 'ASPI\_Entry' has to be found by using a Disk-Monitor in ASPITRAN.DSK (please pay attention to capitals etc). This string is then modified, e.g., by replacing 'A' with an 'X' (i.e., 'XSPI\_Entry').

This modified ASPITRAN.DSK enables the operation of Raw Devices on the non-ASPI-compatible Controllers.

#### **F.4.6 Last Status Information**

All ICP Controllers temporarily store the status information from all hard disks which are connected. This information can be very useful when searching for possible causes of disk failures or interferences. The last status information consists of a hexadecimal, 8 digit number and can be displayed via the GDTMONitor or can be saved in a SAVE INFORMATION ASCII file. The information is temporarily available in the ICP Controller's RAM. Therefore, it is important to check this information before switching off and before carrying out a Reset if a disk failure has occurred, or if interference was present. The last status information is divided into Controller-specific and SCSI-specific messages. The most important Last-Status codes are described in this manual, a more detailed description can be found in the files LASTSTAT.PDF (Adobe Acrobat format) or LASTSTAT.TXT (ASCII format) at the ICP vortex Website (<http://www.icp-vortex.com>).

#### **F.4.7 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, type "*scan for new devices*" on the server console to recognize the new capacity. Use *Install* to build new partitions and volumes.

### **F.5 Notes on ARCserve**

Please make sure that you always have the latest version of your ARCserve software.

The back-up program ARCserve can be used in connection with the ICP Controller. The communication between the tape device (for example DAT) and the ICP Controller takes place through the ASPI interface. For this purpose, the GDT ASPI Manager ASPITRAN.DSK is needed. When loading the regular GDT NetWare driver (for example GDTRP311.DSK), the ASPI Manager is automatically loaded, too. During the installation of ARCserve, choose **Adaptec ASPI Manager** as interface.



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