

Chapter H

Using

Interactive UNIX

H. Using Interactive UNIX

After having explained the installation of the GDT Host Drive in chapters B and C as well as that of the Host Drives, we would now like to give you a few hints regarding the installation of the operating systems

Interactive UNIX V/386 3.2v3 and 3.2v4.

For successful installation, it is essential to read the Interactive system manuals thoroughly. Besides the Interactive UNIX disks and documentation, the following GDT disks are needed (they may be downloaded from our BBS or Website):

GDT Interactive UNIX 3.2v3&4 for sysadm
GDT Interactive UNIX 3.2v4 - for boot installation
(only for Interactive UNIX 3.2v4 and the boot installation)

H.1 Transparency of Host Drives

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

H.2 Installation as an additional Controller

Install the driver software with the help of *sysadm*, using the menu options *Software, Install a package*. (The driver software for Interactive UNIX is on the **GDT Interactive UNIX floppy disk**.) Now specify the drive containing the driver disk and select the floppy disk type (720KB) (reading the floppy disk can take some time). During installation, a GDT driver corresponding to the IRQ used by the ICP Controller has to be selected. As discussed in chapter B of this user's manual, the PCI System BIOS automatically assigns an IRQ to a PCI INT. The IRQ used by a ICP Controller is displayed by the GDT BIOS after a cold boot. After having successfully completed the installation of the GDT driver, you may introduce another GDT Host Drive into the system by using *kconfig* and its menu options *Configure, HPDD, Reconfigure HPDD*. In the next menu you enter the connected SCSI devices (type of device, SCSI-ID and LUN). After this, link a new kernel in *kconfig* by using *Build, Build a kernel*, then install with *Install*. At the next system reboot, the GDT displays a screen listing all its connected devices. Connected tapes are instantly ready for use, they can be accessed immediately with programs such as *mt* for rewinding, deletion etc. Host Drives have to be prepared with *sysadm* first, using the options *Disk, Fixed Disk Management, Add a Fixed Disk to the system* (Partition Disk and Create UNIX Partitions), and *mount* to connect the file systems. Please note that the hard disks must have been prepared (initialized) before with *GDTSETUP* (the DOS configuration-program on the System Disk - DOS), and the Host Drives must have been defined.

H.3 Installation as Boot Controller

First initialize a hard disk connected to the ICP Controller (using GDTSETUP under DOS), and install it as a Host Drive (see chapters C and I "Configure Host Drives"). The Host Drive on which you wish to install the Interactive UNIX system must be assigned number 0 (GDTSETUP menu option *Configure Host Drives*). Now you can start the installation procedure. During installation, a GDT driver corresponding to the IRQ used by the ICP Controller has to be selected. As discussed in chapter B of this user's manual, the PCI System BIOS automatically assigns an IRQ to a PCI INT. The IRQ used by a ICP Controller is displayed by the GDT BIOS after a cold boot. After having successfully installed the basic Interactive system, use *InstallPkg* to install the software package *OS File Management*, *kernel Configuration*, and afterwards the GDT driver software. After having installed other desired software, choose the menu option *kconfig* to configure the ICP Controller as boot controller and to enter any other device connected to it. Then, a new kernel must be linked and installed (see above). After *Exit* and a system reboot, you can partition and mount Host Drives with *sysadm* (see above). You can integrate the GDT driver into the kernel of the copy of the boot disks in two different ways:

a) There is already a bootable system on another computer

In this case, the easiest method is to install the driver software for the ICP Controller on this system and to link a kernel containing the ICP Controller as boot controller (see above). Then copy this kernel to the Interactive boot disk copy. This can be easily done since this floppy disk contains a mountable file system. You can then start the installation with this boot disk. Make sure that the controller's IRQ is set according to the entry in *kconfig*.

b) There is no bootable system available.

For Interactive UNIX 3.2v4, only.

When using this UNIX version, you have to use the GDT Interactive disk called GDT Interactive UNIX 3.2v4 - for boot installation. The installation is carried out according to the Interactive UNIX 3.2v4 documentation.

H.4 UNIX Target-ID/LUN of a Host Drive Number

Target-IDs 0 and 1 with LUN 0 to 7 are reserved for "Direct Access Devices" (devices behaving like a hard disk or a removable hard disk and therefore configurable with GDTSETUP). There is a fixed correlation between the Host Drive number in GDTSETUP (menu "Configure Host Drives") and the target-ID and LUN. When a host-drive has been installed with GDTSETUP, it has to be communicated to the UNIX system (in *kconfig*) by assigning a target-ID and LUN which are determined with the following formula:

$$\text{Host-Drive Number} = 8 * \text{Target-ID} + \text{LUN}$$

The host-drive number is the number the drive has in the list of available host-drives in the GDTSETUP program. The following exemplary screen shows a list of host-drives in which only one host-drive is installed.



For this reason, this host-drive has target-ID 0 and LUN 0. The formula for determining target ID and LUN from the existing host-drive numbers yields the following possible combinations for "Direct Access Devices":

Host Drive number	Target ID	LUN	Host Drive No.	Target ID	LUN
0	0	0	8	1	0
1	0	1	9	1	1
2	0	2	10	1	2
3	0	3	11	1	3
4	0	4	12	1	4
5	0	5	13	1	5
6	0	6	14	1	6
7	0	7	15	1	7

This conversion is necessary because the single SCSI devices are not declared to the host operating system in the order of their SCSI-IDs, but according to the host-drive numbers of GDTSETUP. The ICP Controller needs host-drives in order to be able to link several SCSI devices to form a higher structure (i.e., RAID 5). The sequence of the single host-drives can be changed very easily by having GDTSETUP sort them in its "Configure Host Drives" menu. In this way, it is also possible to change the boot drive (it had previously been selected as boot drive because it has the lowest drive number, that is, 0, and is therefore the first drive to be communicated to the system). There is one restriction that has to be observed with Interactive UNIX: Even though gaps are allowed when numbering the host-drives, if there are several Host Drives, a certain number for a device having a LUN greater than 0 may only be selected if this number already exists for another device with LUN 0. In other words, a certain number can only be assigned to a LUN >0 position if the LUN 0 position has also been assigned.

Example: If a host-drive no. 13 exists (target-ID=1, LUN=5), there also has to be a host-drive with number 8 (target-ID=1, LUN=0). Please keep this in mind when assigning the numbers in GDTSETUP. Target ID and LUN of "**Not Direct Access Devices**" (devices such as streamers, tapes, CD-ROMS, etc., not configurable with GDTSETUP) must be determined on the basis of the SCSI-ID and the SCSI channel used by the ICP Controller. These devices can only be configured with SCSI-IDs 2 to 6. SCSI-ID 0 and 1 are reserved for hard disks, SCSI-ID 7 for the ICP Controller. If "Not Direct Access Devices" are configured on SCSI-ID 0 or 1, they are not recognized during the scanning process and can therefore not be used. The Target IDs of *Not Direct Access Devices* are identical to their SCSI-IDs, the LUN depends on the SCSI channel used (LUN 0 for SCSI channel A and LUN 4 for SCSI channel B). Note: After a cold boot, the GDT BIOS displays all connected devices with their physical coordinates, i.e., their SCSI-ID and SCSI-LUN, (see "Chapter B, ICP Controller Function Check").

SCSI-ID of Not Direct Access Devices	Used GDT SCSI channel	UNIX Target ID	UNIX LUN
2	A	2	0
3	A	3	0
4	A	4	0
5	A	5	0
6	A	6	0
2	B	2	4
3	B	3	4
4	B	4	4
5	B	5	4
6	B	6	4

Having to determine the Target ID and LUN in such a complicated manner might seem rather awkward. However, it is necessary to do so because the ICP Controllers have more than one SCSI channel, whereas UNIX can only manage host adapters with one SCSI channel. Therefore, the GDT UNIX driver has to make the appropriate transformations.

Configuration Example:

In the PCI computer are two ICP Controllers (HA 0 = 1st GDT, HA 1 = 2nd GDT), each having two SCSI channels.

- 1 hard disk as Host Drive no. 0 on HA0
- 1 hard disk as Host Drive no. 0 on HA1
- 1 hard disk as Host Drive no. 1 on HA1
- 1 Streamer SCSI-ID 2, LUN 0 on SCSI channel A of HA0
- 1 CD-ROM SCSI-ID 3, LUN 0 on SCSI channel A of HA0
- 1 DAT SCSI-ID 2, LUN 0 on SCSI channel B of HA1

Result:

HA	Target-ID	LUN	Device
0	0	0	1 st hard disk, Host Drive no. 0 (boot- and installation drive)
0	2	0	Streamer
0	3	0	CD-ROM
1	0	0	hard disk, Host Drive no. 0
1	0	1	hard disk, Host Drive no. 1
1	2	4	DAT

H.5 Further Information

- During the installation of the GDT driver, additional tools are copied into the /etc directory. Before you can use them you have to create a special device file named /dev/rgdth by means of "link"; this device file has to be placed on a device of a GDT Host Drive.
For example, on ICP Controller 0 we have the Host Drive 1 which is HA 0, Target-ID 0, LUN 1 under Interactive Unix. The corresponding special device file is /dev/rdisk/c0t0d1s0 (c0 = HA, t0 = Target-ID 0, d0 = LUN 0, s0 = Unix partition).
By means of "ln /dev/rdisk/c0t0d1s0 /dev/rgdth", the required special device file is generated.
- A media change can be made with UNIX commands **MOUNT** and **UNMOUNT**. Please make sure that the removable hard disk keeps its GDTSETUP drive number when changing the media, otherwise a separate ID/LUN entry is necessary for each single media (since the drive number depends on the media and not the device containing it).
- If you change the hardware configuration of your PCI computer system, it may happen that the GDT is assigned to a different IRQ, as it was assigned during the installation and operation of UNIX. In this case you need to run the installation again with a GDT driver for the new IRQ, or change the hardware configuration so that the old IRQ is available for the GDT again.