DOWNLOADING PROGRAMS FROM THE TERAK TO THE IS-11

DUMAND NOTE 81-13
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An interim system has been set up to allow users to download programs from the Terak to the IS-11, so that CAMAC modules may be checked and routines using CAMAC may be debugged. Once downloaded, the IS-11 runs independently of the Terak (there is no communication between the microprocessors). A terminal attached to the IS-11 allows control of the program and printing of results. The complete operating system including MULTI should be operational by late summer. Users should write modular routines that can be easily imbedded into the final system.

A complete core image is downloaded so that one has available the RT11 operating system, console terminal driver, etc. This means that one can do many of the things that are available on the Terak. For instance, one can read and write to the console terminal, use Fortran routines, use the RT11 library, use clock functions, etc. However, one can not access the disk! The full capabilities (and limitations) of this system have not yet been fully explored. Please report any problems to me.

I.)Terak Disk Usage

Before describing downloading, it is necessary to describe the Terak system. There are two double density disk drives. The bottom drive (QB0:) is used for RT11 system programs like the Fortran compiler. The top drive is used for user files. The system disk should normally be left in place, unless you are doing disk copies. Also, you should never write on this disk (It's too bad we don't have disk protection).

Each user has his own disk. Place your disk on the top drive. Press the boot switch on the drive, and the system will boot up. Type in the date: 'DATE 15-JUN-81'. System programs are assumed to be on QB0:, and user programs are assumed to be on QB1:. For instance, when you edit, you create a file on QB1:, but the edit program is taken from QB0:.

II.)Linking

The program that is downloaded is composed of two parts: the part that does the downloading and the user part. The user part (entry) must be called SUBROUTINE USER and have a RETURN at the end. It may, of course, call other subroutines. Each user should have a command file on his own disk to link the downloading part to the user part. An example command file is:

```
LINK/MAP/EXE:BOOTFH SY:BOOTDN,SY:CPINIT,SY:CPDOWN,SY:DOWNLD,USERFH
```

The object modules on the system disk are the routines that do the downloading. Do not change these! If the command file is called LNKDWN.COM, then one links the object modules by typing @LNKDWN. This example command file gives a map on the printer and names the .SAV file BOOTFH.SAV. If you have more modules to link, you can do this:

```
LINK/MAP/EXE:BOOTFH SY:BOOTDN,SY:CPINIT,SY:CPDOWN,SY:DOWNLD/PROMPT

USERFH

 .

 .

OTHER ROUTINES (ONE PER LINE)

 .

 .

LAST ROUTINE//
```

You can also make your object modules into a library.

III.)Downloading

To download, one must put the bootstrap into the IS-11 (if it isn't already there). By hitting the break key on the IS-11 terminal, one gets into ODT (hardware). One can examine memory locations by typing 'address/'. ODT will type the present contents. To change, just type the desired contents. A CR closes the memory location. Use a line feed to access the next location. To load the bootstrap, one must fill locations beginning at address 1000 with the bootstrap program listed in the appendix. When this is done (and has been checked), type '1000G'. The Run light on the front of the IS-11 should come on.

Normally, if the IS-11 has been running the bootstrap will already be there, and one only need type '1000G'. Only when the power has been turned off is it necessary to type in the bootstrap. Note that the clock switch should be set to off when booting for the first time. Next type 'RUN BOOTFH' (or whatever name you called your .SAV file). It should type out 'TYPE "R" AND (CR) WHEN READY'. When you do, it should type 'COMPUTROL INITED' followed by 'MESSAGE SENT'. You are now done with the Terak.

The IS-11 should HALT and print out the location where it halted. If the downloading was sucessful, it should HALT at location 1074. Otherwise it will HALT at location 1066, and you should try again. If you wish to use the clock, switch it on at this time if it isn't already on. To start execution, just type 'P'. The HALT is placed here, so you can use ODT if you wish before starting program execution.

You are now running (hopefully successfully) on the IS-11.

IS11 Boot strap

Location	Contents
1000	106427
1002	340
1004	5
1006	5037
1010	160010
1012	12737
1014	110000
1016	160012
1020	12737
1022	10
1024	160014
1026	5037
1030	160014
1032	12737
1034	400
1036	160014
1040	5037
1042	160014
1044	32737
1046	200
1050	160014
1052	1774