

## Initial Design Spec - DISPDOS

This document describes the features and facilities available under the proposed DISPDOS dispersed DOS system. The basic intent of DISPDOS is to provide a comprehensive package of system software to permit a group of 5500s to access disk files physically located on one adjacent 5500 as though those files were directly attached. The goal is to provide multiple processing resources on a single coordinated data base, allowing SORTs, Datashare, RPG, COBOL and DATABUS programs read-only access to a set of shared files while still allowing for read/write/update access to a set of privately held files.

### Communication Technique

All communication between 5500s within the DISPDOS system is implemented over a Fast Resource Intercommunication Link (hereafter referred to as FRIL) operating at a nominal speed of 2.5 megabaud over coaxial cable. The FRIL combox has two 512-byte buffers; buffer transit time through the FRIL network is on the order of two milliseconds. Because the FRIL net is inherently multidropped, only one FRIL combox per processor is required. It is believed that the use of the FRIL net for interprocessor communication should result in relatively slight degradation of system performance over the use of strictly local disk attachment, for most operations.

### Programming Compatibility

One extremely important aspect of DISPDOS is the speed with which it can be implemented and made a part of the product line. Existing software and hardware must be used as much as possible. Minimization of special software will also greatly reduce the support effort required for the maintenance of DISPDOS. It is believed that most existing software can be integrated into the DISPDOS scheme without modification.

### Program Access to Files

Under DISPDOS, it shall be possible to run, for example, two SORTs and two sixteen-tube DATASHARES off of one Datacentral machine in a five-processor network. Datacentral may use either a twenty-megabyte WANGCO or a 9370-series MEMOREX/TELEX disk system. Anywhere from two to eight physical drives are supported for Datacentral. Dataslave machines need not be equipped with a disk controller at all; however, it will be possible to attach a

controller and one or more disk drives (WANGCO/TELEX/MEMOREX) to each Dataslave. Programs running within the Dataslave machine can access both files contained on the disks maintained by Datacentral and at their own local disks simultaneously.

In addition to the remote/local file access (where local disks might be used for, for example, SORT scratch files or the like), several classes of files exist within the Datacentral machine. The first class of files consists of those files which are accessible to every Dataslave. Normally, programming convention will relegate these files to read-only status, which can be enforced for specific files, if desired, through the use of the DOS write/delete protect mechanism. By not using this convention, programmers will be free to provide shared updating of files in this class using any enqueue/update protocol they deem appropriate. The remaining classes of files at Datacentral are normally private to a single Dataslave. Programs may create temporary scratch files, and the like, without fear of conflicting with files in use by another Dataslave. (Such files will be automatically access-reserved to the creating Dataslave processor.) However, for special purposes it will be possible to establish files which are update-available to only a selected subset of Dataslaves. This will permit, for example, multiple Datashare Dataslaves to update a shared database at Datacentral without loss of integrity. The number of such selected Dataslave subnets available is limited by the number of disks present at Datacentral.

Datacentral files which are access-reserved to a Dataslave can be transferred either to another Dataslave's access-reserved status or can be made available to all Dataslaves via a command from the console of the owning Dataslave processor. No special file naming conventions are required to guarantee access-reserved status of a file created by a Dataslave within Datacentral's disk system. Files being created by a Dataslave may be created either within that Dataslave's local disk system (if present) or at Datacentral as determined either by drive number or by symbolic volume reference under the DOS system commands which support the symbolic volume naming facility.

#### Bringup/Takedown of DISPDOS

DISPDOS is brought up at Datacentral by booting DOS.D in the normal way and issuing a console command to invoke the Datacentral system monitor. Dataslaves are brought up in one of two different ways. If a local disk system exists, DOS.D is booted up in the normal way and the Dataslave system monitor invoked via a console command. If no local disk system exists, the Dataslave is established by

placing a tape in the rear deck and depressing the RUN/RESTART keys. DISPDOS operation at a Dataslave is terminated via a console command at the Dataslave; Datacentral operation is likewise terminated via a console command issuable only at Datacentral. Datacentral operation is expected to entirely consume the processing and memory resources of the Datacentral processor; therefore, no "DOS partition" or problem programs can be run at Datacentral while DISPDOS operation is in progress. However, when DISPDOS is not running, the Datacentral machine can be booted and DOS.D run in the normal fashion without impairment. When Datacentral is not running, the Datacentral processor can not only access (and BACKUP) all files regardless of the owning Dataslave, but can identify the owning Dataslave or Dataslave subnet associated with each of the files in its disk system.

It is also possible at Datacentral to additionally restrict the disks to which each Dataslave has access; if, for example, one subset of the Dataslave processor net is not desired access to files on disk "A" and another subnet of Dataslave processors is desired to only be able to access files on disk "B", this is easily established by console command issued at Datacentral.

#### Memory Availability

In Dataslave processors, 48K of user memory space will be available for program use on those systems with the optional local disk system. On processors without the optional local disk system, 44K of user memory space will be available. (However, SNAP, LINK, and most other programs which test for the end of memory should work within the reduced space without difficulty). Since system memory is used for the Datacentral/Dataslave system monitors, DISPDOS and PS cannot be used at the same time. On the other hand, the DISPDOS facility largely satisfies the multiple partition requirement and so this restriction is not considered significant.

#### DISPDOS Network Size

Up to six Dataslaves are supported when a 5500 processor is used as Datacentral. Use of a Tower processor should allow supporting at least eight Dataslaves. It is possible that fifteen Dataslaves could be supported under Tower. At this early stage of system development, it would be premature to state firmly the maximum size of the network obtainable. It is anticipated, however, that the amount of disk processing activity at Datacentral will tend to be the limiting factor due to performance reasons; the use of local disk storage at Dataslaves is expected to relieve this congestion to some degree.

Another design goal for DISPDOS regards system performance under varying load. It is considered desirable to achieve a "graceful degradation" as system utilization increases, rather than a catastrophic thrashing characteristic of some other vendors' systems.

#### Anticipated Development Time Required

It is believed that the system outlined above can be developed, coded, debugged, documented and ready for release within two months from project initiation, assuming reasonable availability of hardware. This figure is believed to be realistic and allowing sufficient leeway for timely completion of the project.