CONTROL DATA® 6000 SERIES
SCOPE 3.4 OPERATING SYSTEM

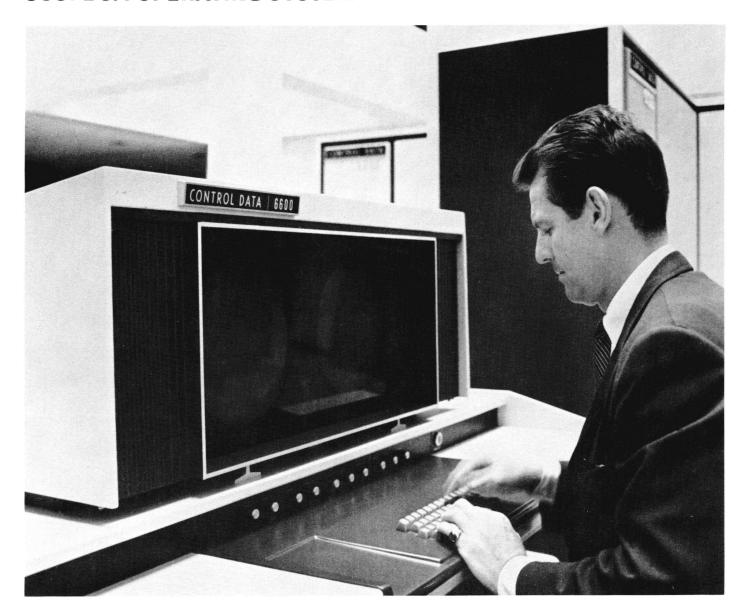**CONTROL DATA**
CORPORATION

The CONTROL DATA SCOPE 3.4 Operating System, with its related set of compiler and utility products, provides extensive support and control for the multiple processor architecture of CDC 6000 Series Computers. This software emphasizes the multiprocessing, multiprogramming, and time-sharing capabilities of the 6000.

SCOPE 3.4 has evolved from previous field-proven versions of the SCOPE Operating System, with the inclusion of additional features which have been requested by users and proven through actual use. Developments in SCOPE 3.4 and its product set stress the following:

Overall System Performance
- Use of extended core storage (ECS) for:
  - Fast loading
  - Immediate access to libraries
  - Swapping of programs to and from central memory
  - Buffering of input and output between mass storage and central memory.
- A new integrated scheduler
- Support of up to 15 control points for multiprogramming

- Improved software products — COBOL, FORTRAN, ALGOL, SORT/MERGE, INTERCOM, COMPASS
- Generalized record manager

More Remote Capability
- Broadened support for terminals
- New multi-user capability
- Remote graphic support (all under INTERCOM software)
- Time-critical capability

More User-Oriented Features
- Library features
- Increased loader flexibility
- Improved permanent file support
- Full NASI COBOL
- Improved SCOPE Index Sequential and New SCOPE Direct Access file support
- New data management products — File Organizer and Record Manager (FORM) and Query/Update.

Extended Core Storage (ECS) Enhancements
ECS is optionally used as an adjunct to main memory, providing the 6000 Series with a true hierarchy of storage levels. ECS can also be used as an allocatable storage device. Any installation has the choice of determining how much ECS should be allotted to each of several uses:

- Library residence
- Direct access by user programs
- Residency of files
- Buffering of input/output files
- Automatic job swapping

These features provide a way for 6000 Systems with smaller central memory to use ECS in obtaining the capabilities available to systems having larger central memories.

Integrated Scheduler — Provides a new coordinated approach to hardware/software resource allocation. It provides for dynamic allocation of control points and central memory between conversational time-sharing, interactive graphics, remote batch, and local batch processing. This also includes full automatic swapping in and out of jobs, using ECS when available. The scheduler allows extensive flexibility in assigning job priorities, permitting the most critical jobs to be completed earlier, and system resources to be used more efficiently.

New Loader — Under SCOPE 3.4 the new loader offers two distinct loading capabilities. The first is the ability to perform fast, efficient loading; the second is provision for loading jobs with complex overlay structures. In addition, the link-loading capability of competitive computers is available for conversion/coexistence with selected non-Control Data systems.

New Library Organization — Allows multiple directories, each of which is logically independent from the others. Each library and its associated directory can be a permanent file, and one or more of these permanent files can be the current system library. Additional permanent files may be formed and identified as user libraries.

Tape Scheduling — This is an extension of magnetic tape staging from previous SCOPE Operating System versions, and includes comprehensive prescheduling capabilities. This allows a user program the use of systems resources, only if all required tapes have been mounted.

Permanent File Extensions — Disk packs may serve as system permanent packs or as removable user permanent packs. New utilities provide for fast selective dumping and loading of permanent files. Individual permanent files may be organized into groups for easier handling.

Three to Fifteen Control Points — An installation can have up to fifteen individual programs under control of SCOPE. This provides greater flexibility in structuring SCOPE 3.4 to a particular installation's requirements, and results in improved throughput via multiprogramming.

Supports 20 PPU's and 24 I/O Channels — This capability allows for expanded peripheral configurations and remote networks to be connected with the system.

Real-Time Capabilities — The SCOPE 3.4 Operating System, supports a time-critical monitor (RTM) package consisting of peripheral processor and central processor programs.

A complete array of product set compilers and service software is available to the SCOPE 3.4 user:

- COMPASS assembly language
- FORTRAN RUN
- FORTRAN Extended
- ANSI COBOL
- ALGOL-60
- SORT/MERGE
- SIMSCRIPT
- SIMULA
- BASIC
- PERT/TIME
- APT (numerical machine tool control)
- OPHELIE (mathematical programming)
- INTERCOM (for remote batch & interactive terminals)
- Interactive Graphics
- Record Manager
- Data Management Software

Under SCOPE 3.4, INTERCOM provides improved remote terminal support to a broadening base of terminals. Support features include:

- A re-entrant program-test editor
- Multiple user program capability
- Interactive access to ALGOL
- Support of 4800 BAUD lines
- ANSI 200-User Terminals

Data Management — SCOPE 3.4 software provides a new Record Manager, which functions as a common input/output interface for compilers and utilities. Data Management facility is provided for three basic file-handling techniques: direct access, index sequential, and sequential, and includes four blocking methods and eight record types. Index sequential and direct access files are supported by SCOPE Advanced Access Methods (SAAM) which is composed of extension modules of the Record Manager. In addition, FORM (File Organizer and Record Manager) is a group of advanced, general, file-handling utilities, which includes file conversion aids. Query/Update provides a language tool for interrogating and updating basic data files and minimizes requirements for user programming.

SCOPE 3.4 provides a broad and stable base for scientific, data processing, communications, and data-management applications.