SEMINAR NO. FH3010

NOS OPERATOR TRAINING

STUDENT HANDOUT

PROPRIETARY NOTICE

REVISION RECORD	
REVISION	**DESCRIPTION**
A	Manual Release.
(10-08-82)	
B	Manual Update. Upgrade from 2.0 to 2.1.5
(03-23-84)	
C	Manual Update. Upgrade to NOS Version 2.2
(02-01-84)	
D	Manual Update. Upgrade to NOS Version 2.3
(03-03-84)	
Publication No. FH3010-1	

REVISION LETTERS I, O, Q AND X ARE NOT USED

NOS OPERATOR TRAINING

Address comments concerning this manual to:

CONTROL DATA CORPORATION
National Coordinator
5001 West 80th Street
Bloomington, Minnesota 55437

or use Comment Sheet in the back of this manual.

TABLE OF CONTENTS

NOS OPERATOR TRAINING

GENERAL COURSE DESCRIPTION

COURSE TITLE: Network Operating System Operator Training

COURSE NUMBER: FH3010

COURSE LENGTH: 5 days

CLASS SIZE: 12 Maximum

COURSE DESCRIPTION:

This is a two part lecture and laboratory course. Part I is designed to provide the student with a minimum level of operational knowledge. Part II is designed to supply advanced operations concepts for the Network Operating System.

PREREQUISITES:

Students attending this course should have a background in the following:

Introduction to CYBER 170 -- course number FA3000
Equivalent experience

OBJECTIVES:

- To provide a working knowledge of the Network Operating System from an Operational viewpoint.
- The student will be able to demonstrate an ability to do the following:
  - Query the operating system for information
  - Respond to the information and error messages generated by the operating system
  - Manipulate the system and peripheral equipment via Dynamic System Display Commands
  - Complete a Level Ø, 1, and 3 deadstart
  - Complete an alternate device deadstart and an express deadstart dump
  - Status communication lines
  - Take the system down in an orderly fashion

TESTING:

Exercises and quizzes will be used throughout the course as a means of identifying topics requiring further explanations and student understanding of the material. Reviews of material covered will be conducted each day.

PRACTICE:

A minimum of four hours lab time is included in the course. This time is meant to give students "hands-on" exposure to NOS and to allow more individualized training by the instructor.

COURSE OUTLINE
CYBER 170

CHAPTER/TOPIC DESCRIPTION

1. Hardware Description
   - A. Central processor features
   - B. Central memory features
   - C. Peripheral processor
   - D. Input/Output
   - E. Extended memory

   QUIZ #1

2. System Flow
   - A. Batch jobs
   - B. Job execution
   - C. Messages
   - D. Interactive jobs

3. System Description
   - A. System implementation
   - B. Operating system components
   - C. Subsystems
   - D. Control point concept

   QUIZ #3

4. Dynamic System Displays
   - A. Keyboard
   - B. Special keys
   - C. Display overview
   - D. Display headers and trailers

   QUIZ #4

   LAB #1

5. Equipment Configuration
   A. Logical devices
   B. Channels and controls
   C. E,A. display
   D. System configuration
   QUIZ #5

6. Mass Storage
   A. Family
   B. Permanent files
   C. Temporary files
   D. E,M. and E,C. display
   QUIZ #6

7. Unit Record Devices
   A. I display
   B. Form code
   C. Logical ID
   LAB #2

8. Job Processing
   A. Job processing control
   B. Scheduling control
   C. Batch priority
   D. Service classes
   E. B, S&Q displays

9. Tape Subsystem
   A. Deadlock
   B. Labelled and unlabelled tapes
   C. Tape assignment
   D. E,T. and E,P. displays
   LAB #3

10. Deadstart
    - A. Description
    - B. Panel
    - C. Warmstart and coldstart
    - D. Displays
    - E. CHRDECK, EQPDECK, APRDECK, and IPRDECK
    - F. System startup
    - G. System shutdown
    - H. Troubleshooting

    LAB #4

11. Utilities
    - A. Permanent file
        1. Initial PFS displays
        2. DIS input
        3. Procedure files
        4. Catalog archive (PFATC)
        5. Catalog permanent file device (PFCAT)
        6. Copy archive file (PFCOPY)
        7. Dump permanent file (PFDUMP)
        8. Load permanent file (PFLOAD)
    - B. Queue file
        1. Calling the queue utilities
        2. QDUMP
        3. QLOAD
        4. QREC
        5. QALTER/QFTLIST
        6. QMOVE
    - C. Dayfile
        1. Selective dumping

12. Security
    A. Operating system mode
    B. Security level
    C. Security categories
    D. Equipment security

13. Network Commands
    A. Terms
    B. Network configuration
    C. Summary of control

14. Remote Host Facility
    A. Terms
    B. Loosely coupled network
    C. Configuration
    D. RHF applications

15. Special Displays/Utilities
    A. K display
        1. Initialize
        2. Redefine
        3. Transaction Facility
    B. L Display
        1. Family ordinal table
        2. Logical identifier table
        3. Queue display
        4. Service class type
        5. Subsystem

16. Display Operation (DIS) Commands
    - A. Display selection
    - B. Individual displays
    - C. Special keys
    - D. Control characters
    - E. Keyboard messages
    - F. Keyboard entries
    - G. Memory entries

17. 026 Console Text Editor
    - A. First character entries
    - B. Messages
    - C. System commands
    - D. File commands
    - E. Line entry and data moves
    - F. Display, tab, scan control commands
    - G. Line, record search
    - H. Replace commands
    - I. Miscellaneous commands
    - J. Upper case carriage control

    LAB #5

COURSE CHART
NOS OPERATOR TRAINING

<table>
<tr><th>HOUR</th><th>DAY 1</th><th>DAY 2</th><th>DAY 3</th><th>DAY 4</th><th>DAY 5</th></tr>
<tr><td>1</td><td>Introduc-
tion</td><td>Review</td><td>Review</td><td>Utilities</td><td rowspan="2">DIS</td></tr>
<tr><td>2</td><td rowspan="3">Hardware
Descrip-
tion</td><td rowspan="3">Equipment
Config-
uration</td><td rowspan="2">Job
Process-
ing</td><td rowspan="2">Security</td></tr>
<tr><td>3</td><td>Tape
Commands</td><td rowspan="4">026 Con-
sole Text
Editor</td></tr>
<tr><td>4</td><td>System
Descrip-
tion</td><td>Mass
Storage</td><td rowspan="3">Deadstart</td><td rowspan="3">Network
Commands</td></tr>
<tr><td>5</td><td rowspan="2">Dynamic
System
Display</td><td rowspan="2">Unit
Record
Devices</td><td rowspan="2">Remote
Host
Facility</td><td rowspan="2">Lab
(Optional)</td></tr>
<tr><td>6</td><td>Lab</td><td>Lab</td><td>Lab</td><td>Lab</td><td>Special
Displays
Utilities</td></tr>
</table>

Lesson 1

HARDWARE DESCRIPTION

LESSON PREFACE:

This lesson defines the hardware configuration. Both mainframe and peripheral equipment configurations are discussed.

OBJECTIVES:

After completion the student should be able to:

- Understand the configuration of the system
- Be aware of the various types of configuration that are available
- Understand the configuration that is available at this particular site
- Describe major components of the system

REFERENCES:

Cyber 170-7X0 Hardware Reference Manual - Pub. No. 60456100

Cyber 170-815,825 Hardware Reference Manual - Pub. No. 60469350

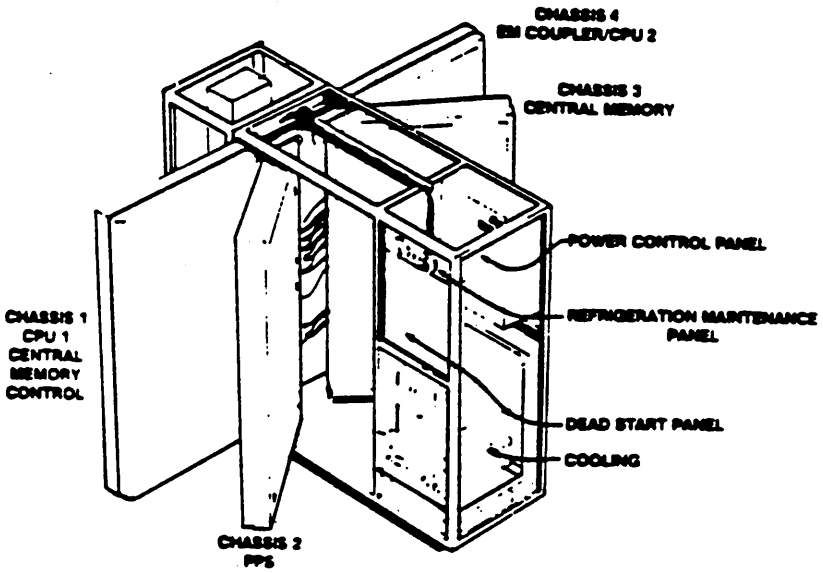
Cyber 170-835,855 Hardware Reference Manual - Pub. No. 60469290

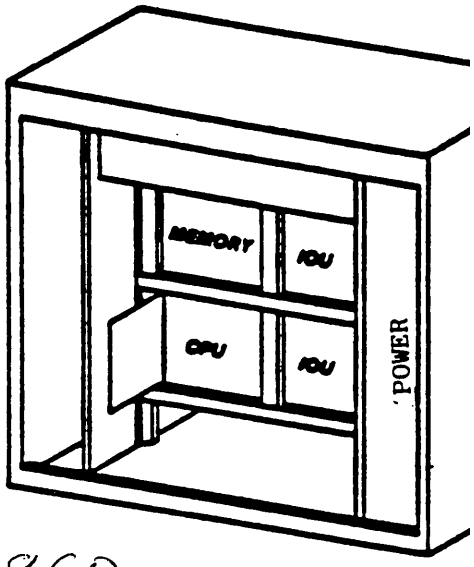
Cyber 170-865,875 Hardware Reference Manual - Pub. No. 60458920

PROJECTS:

Quiz 1

825 DIAGRAM





960
900

CYBER 170 SERIES 800

CYBER 170 SERIES 700

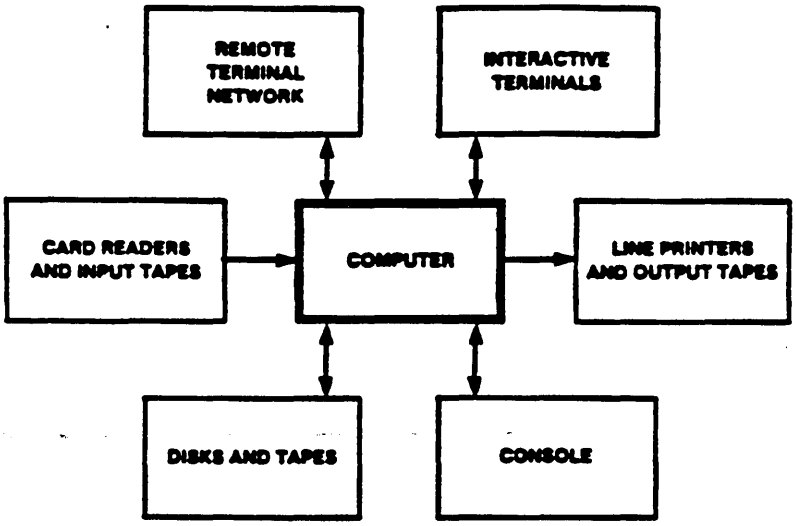
CYBER 170

CYBER 70

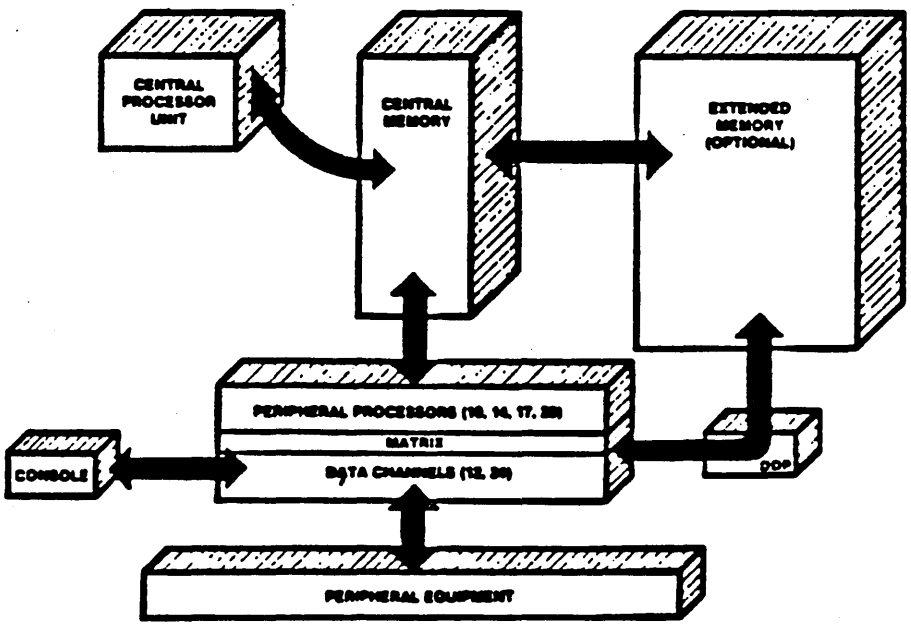
6000

A NEW FAMILY WITH A PROUD HERITAGE

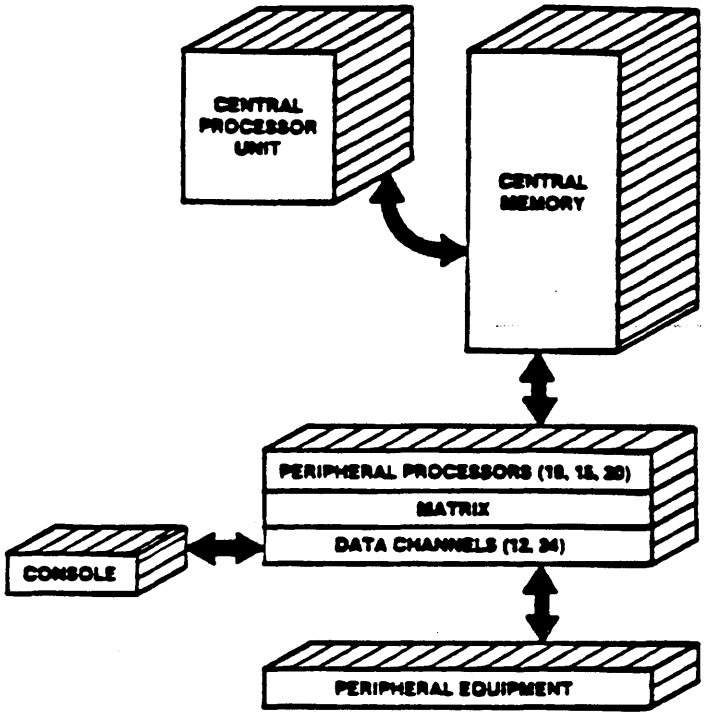
OVERVIEW OF A COMPUTER SYSTEM



CYBER 170 SERIES 700,865 and 875



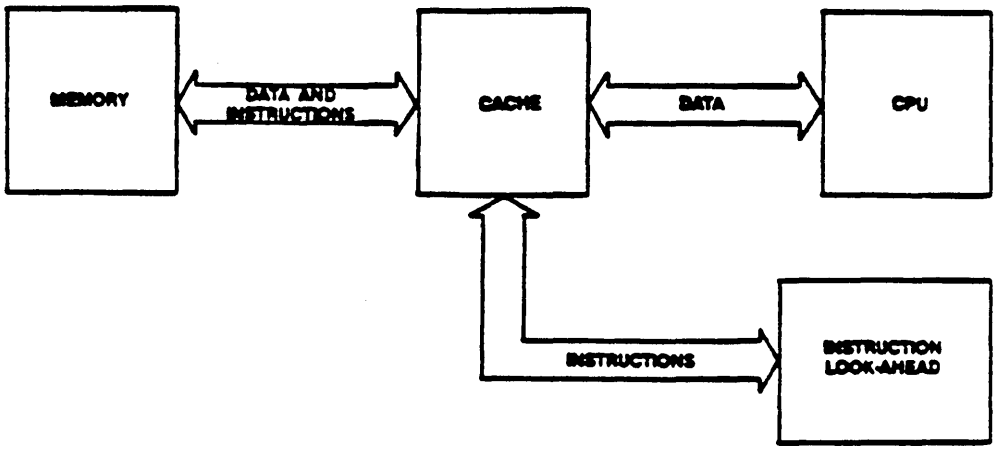
CYBER 170 SERIES 800



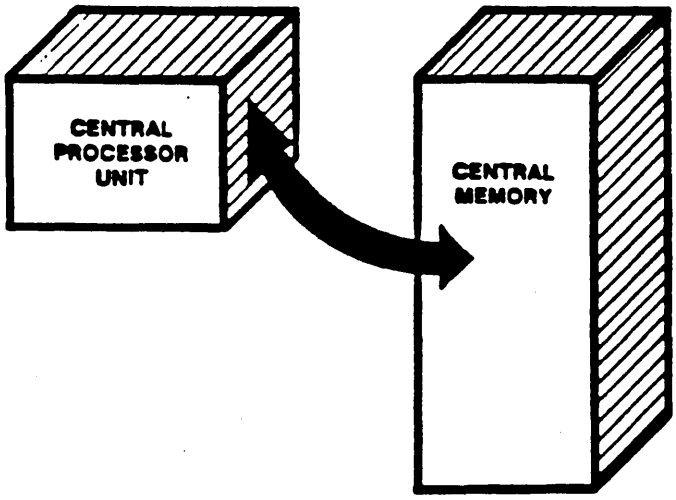
CYBER 170
CENTRAL PROCESSOR FEATURES

- REGISTER TO REGISTER OPERATIONS
- 24 OPERATIONAL REGISTERS
- MULTIPROGRAMMING FEATURES – no interrupts: Except: exchange switching jobs
- 10 6 bit CHARACTERS PER WORD
- UP TO 4 INSTRUCTIONS PER WORD
- INSTRUCTION LOOK-AHEAD

CACHE ARCITECTURE



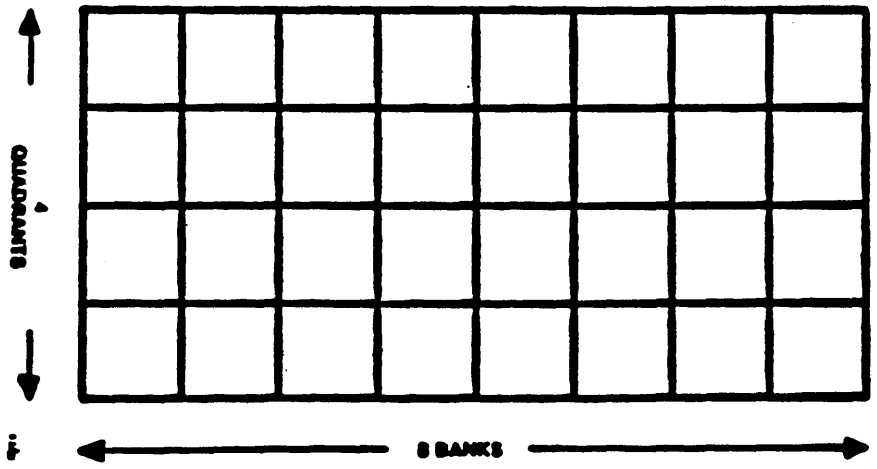
- FEATURED ON MODELS 835 and 855
- 2048-WORD STANDARD, EXPANDABLE TO 4096 60-BIT WORDS
- FAST (BI-POLAR) MEMORY USED AS A HIGH SPEED BUFFER
- TRANSPARENT TO THE USER AND ALL SOFTWARE
- REDUCES EFFECTIVE CENTRAL MEMORY ACCESS TIME


CENTRAL
PROCESSOR
UNIT
CENTRAL
MEMORY

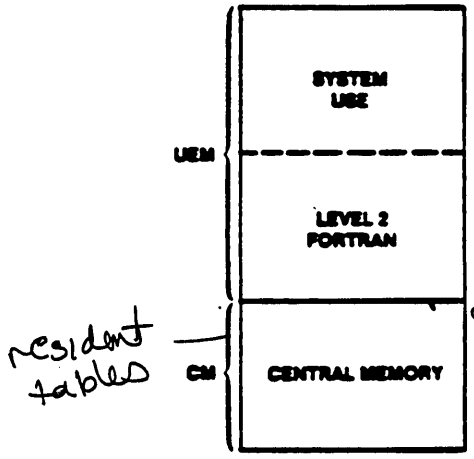
CENTRAL MEMORY FEATURES

- 60 BIT WORDS
- SINGLE ERROR CORRECTION, DOUBLE ERROR DETECTION (SECDED)
- DEGRADABLE FOR RELIABILITY
- PHASED INTO 8 BANKS
- SUPPORTS UP TO 22 PROCESSORS
- FOR SERIES 700, OPTION 98K, 131K, 262K WORDS OF MEMORY
- FOR SERIES 800, OPTION 262K, 1M, 2M WORDS OF MEMORY

CYBER 170 SERIES 700 MEMORY



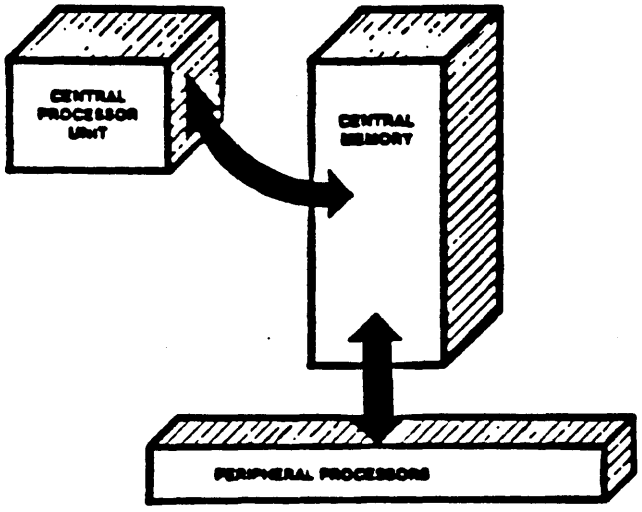
CYBER 170 SERIES 800
TYPICAL MAIN MEMORY ALLOCATION



each cp. has a control pt area, in resident job registers validation limits

control pts = config.

RA = Ref. address



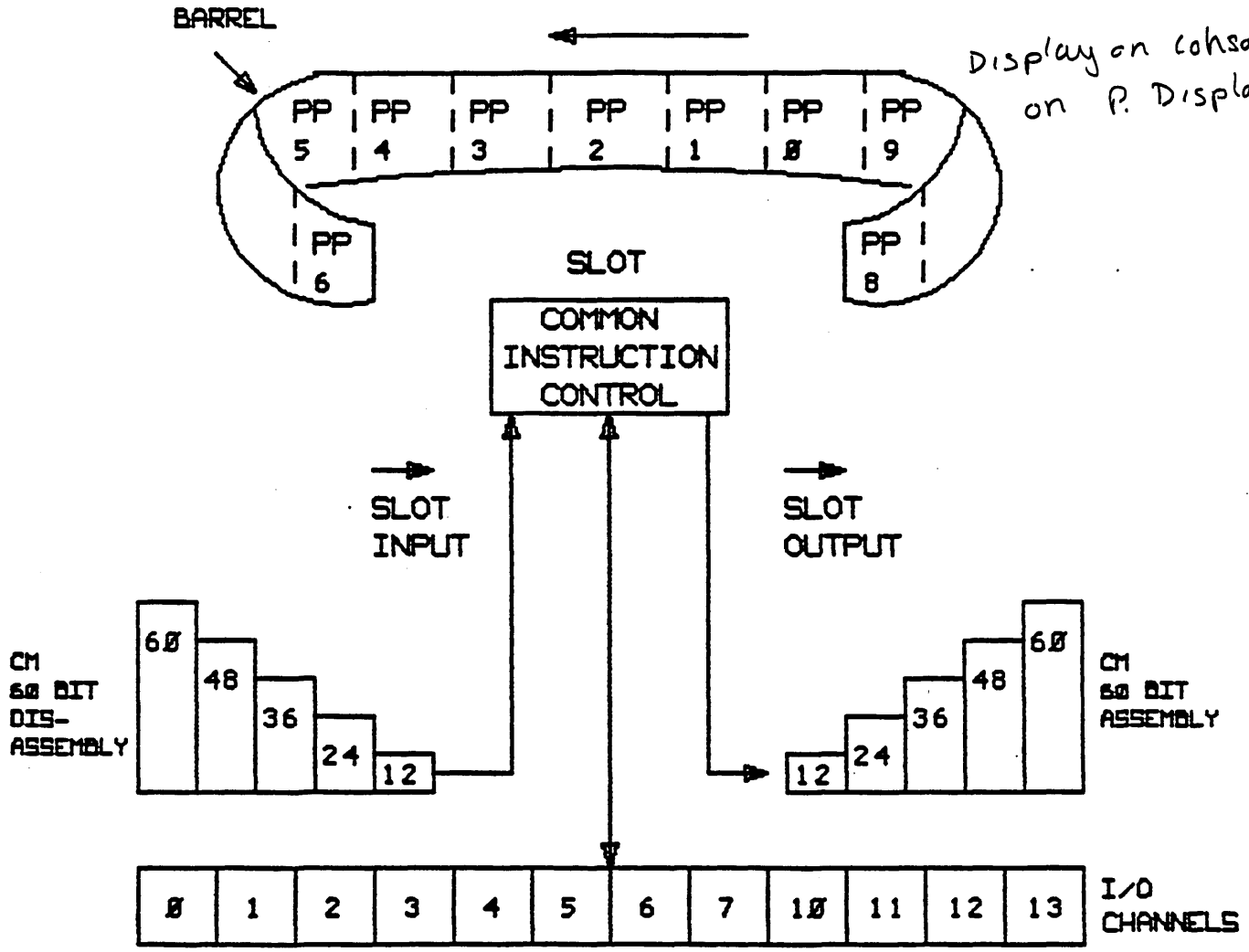
PERIPHERAL PROCESSOR FEATURES

- OPTIONS = 10, 14, 17, 20 PP (SERIES 700)
- OPTIONS = 10, 15, 20, PP (SERIES 800)
- ERROR DETECTION
- MULTIPLE PARALLEL ACCESS TO CENTRAL MEMORY
- ACCESS TO ALL INPUT/OUTPUT CHANNELS

PERIPHERAL PROCESSOR CONCEPT

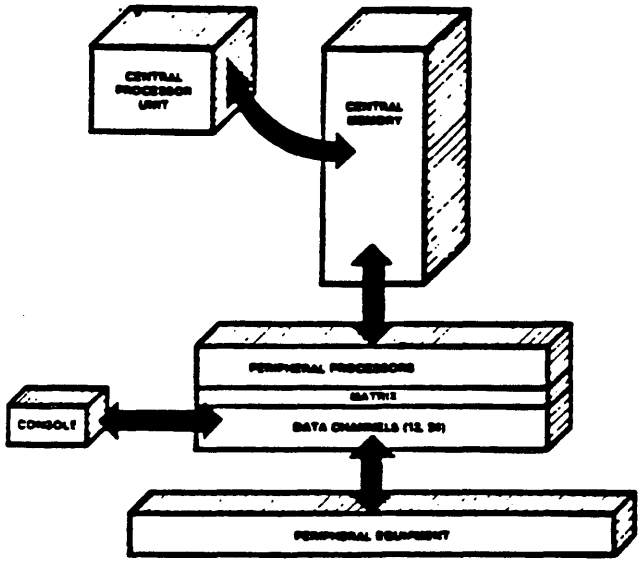
If. hardware fail. won't shutdown system — only pp talking to it

- MULTIPLEXING SYSTEM ORGANIZATION
- TIME SHARE INSTRUCTION CONTROL HARDWARE
- COMMAND DATA PATHS TO AND FROM
  - CENTRAL MEMORY
  - I/O CHANNELS



Display on console or P. Display.

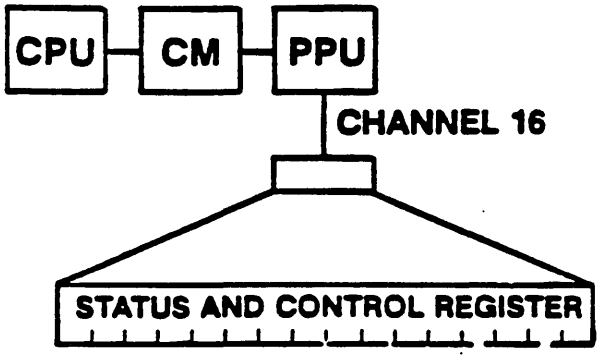
CYBER 170 SERIES



INPUT/OUTPUT CHANNEL FEATURES

- OPTIONS = 12, 24 CHANNELS
- BI-DIRECTIONAL, 12 BITS WIDE
- CHANNEL PARITY
- UP TO 8 CONTROLLERS PER CHANNEL
- MAXIMUM 24 MILLION BITS PER SECOND
- ALL CHANNELS AVAILABLE TO ALL PPU's
- ACTIVITY FLAG
- FULL/EMPTY FLAG

CYBER 170 SERIES 700
STATUS AND CONTROL REGISTER



- 203 BITS
- HARDWIRED TO CHANNEL 16

CYBER 170 SERIES 700
STATUS AND CONTROL REGISTER

- POWER DETECT
- TEMPERATURE DETECT
- VOLTAGE MARGIN VARIATION
- HARDWARE/SOFTWARE MAINTENANCE TOOL
- ON-LINE FAIL-SOFT CAPABILITY

  FORCE PP EXIT

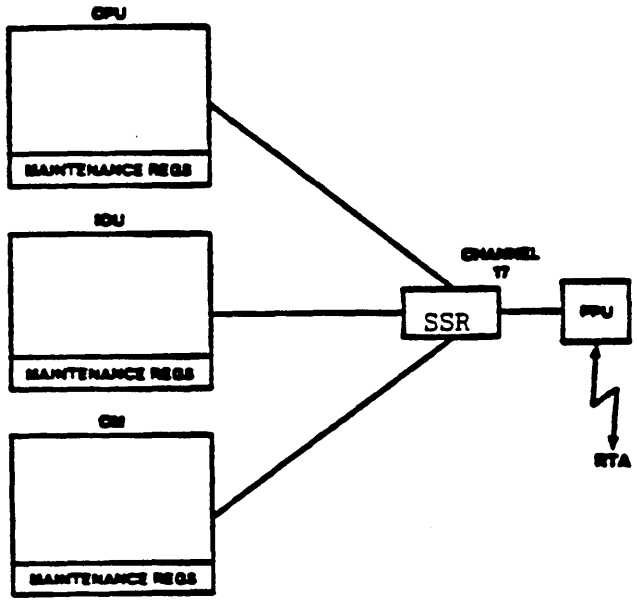
  RENUMBERING OF PP's*

  DOWN SINGLE PP*

  SECDED CONTROL

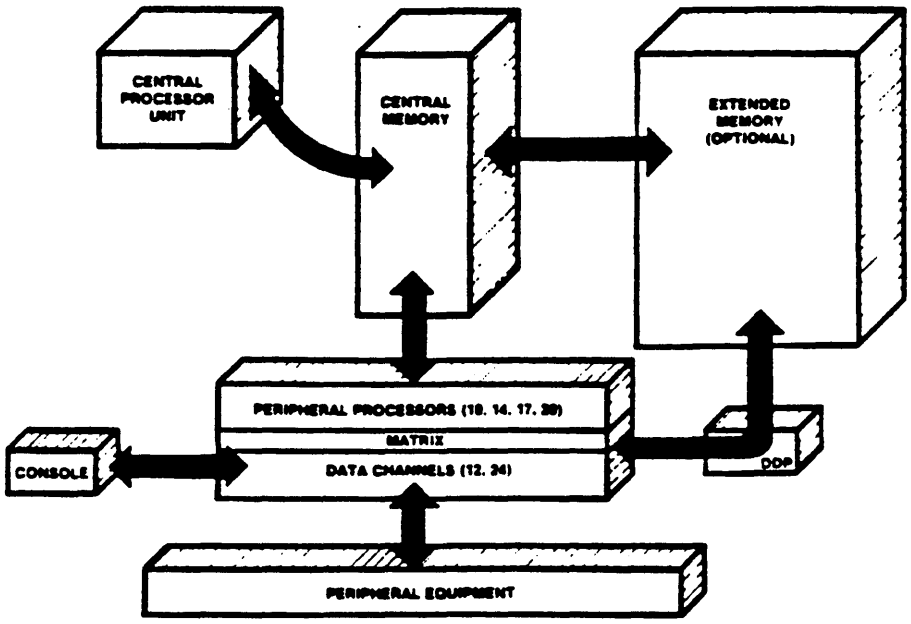
*At deadstart only

CYBER 170 SERIES 800
MAINTENANCE REGISTERS



CYBER 170 SERIES 800
MAINTENANCE REGISTERS

- PROVIDES INITIALIZATION OF REGISTERS, CONTROLS, AND MEMORIES
- MONITORS AND RECORDS ERROR INFORMATION
- RECONFIGURATION CAPABILITY
- VERIFICATION OF ERROR DETECTION AND CORRECTION HARDWARE



Types of Extended Memory

- ECS
- ESM
- UEM (series 800 only)

CYBER 170 SERIES 700
EXTENDED MEMORY

- BULK STORAGE WITH DIRECT CONNECTION TO CENTRAL MEMORY
- EXTREMEMLY HIGH TRANSFER RATES
- ACCESSIBLE BY PERIPHERAL PROCESSORS

EXTENDED MEMORY FEATURES

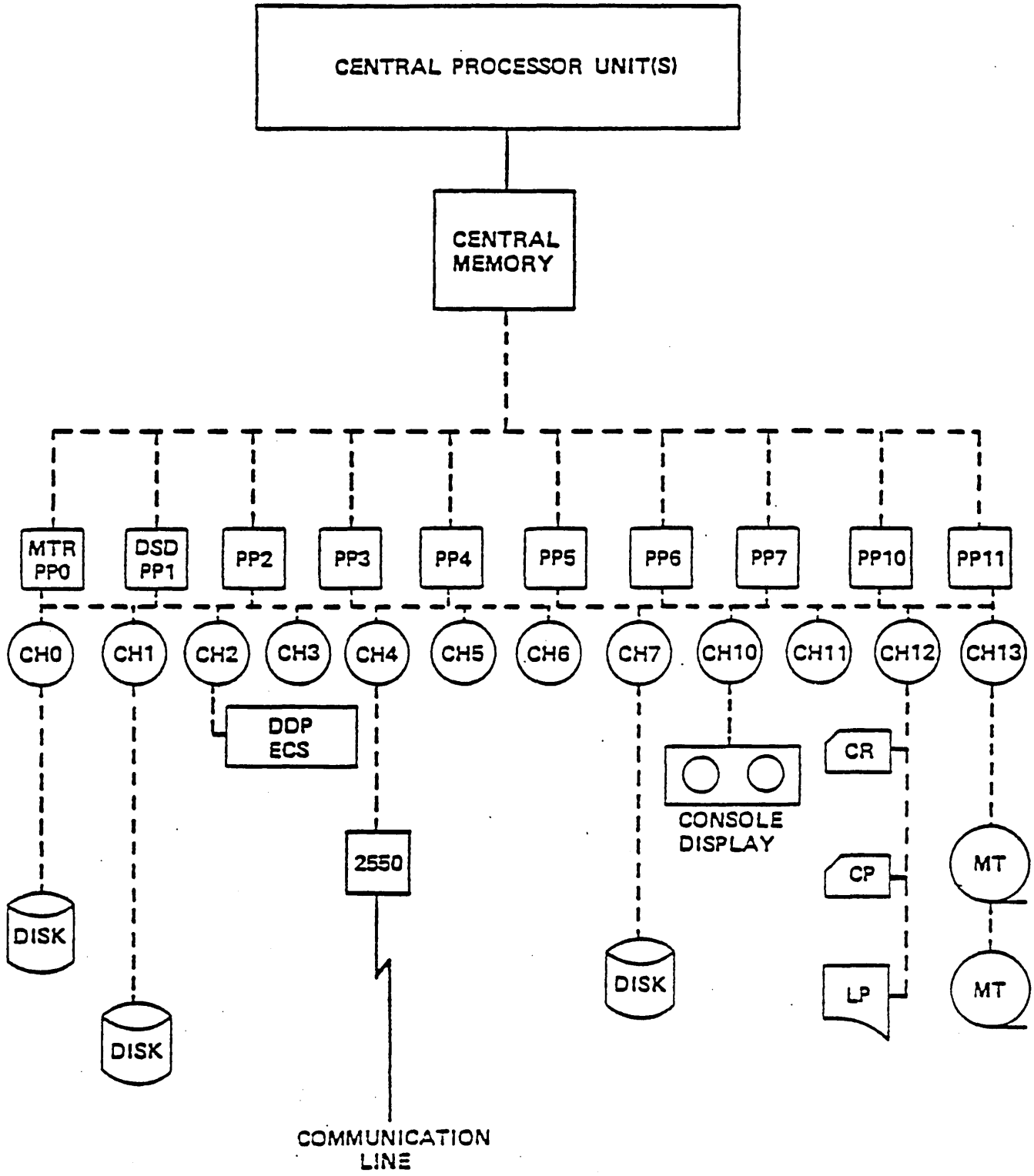
- OPTIONS = 524K, 1M, 2M WORDS
- USED BY MULTIPLE MAINFRAMES (ECS, ESM)
- PHASED 131K WORD BANKS
- TRANSFER RATE UP TO 10 WORDS PER MICROSECOND
- ERROR DETECTION

SECDED/PARITY

- SINGLE ERROR CORRECTION DOUBLE ERROR DETECTION
  - DATA IN CENTRAL MEMORY
  - INSTRUCTIONS IN CENTRAL MEMORY

- PARITY
  - PERIPHERAL PROCESSOR MEMORY
  - I/O CHANNELS
  - CHASSIS TO CHASSIS
  - EXTENDED MEMORY

TYPICAL NOS CONFIGURATION



QUIZ 1

1. What are the major components of the CYBER 170 computer systems?

2. Describe the function(s) of the following:

   Central Processor:

   Central Memory:

   Channel:

   Extended Memory:

3. What function does each of the following perform?

   Disk Subsystem:

   Magnetic Tape Subsystem:

   Unit Record Subsystem:

   Terminal Subsystem:

Lesson 2

SYSTEM FLOW

LESSON PREFACE:

This lesson describes the path a job takes while processing through the system. Topics discussed include batch jobs, execution of a job, system and operator message, and interactive jobs.

OBJECTIVES:

Upon completion, the student will have a basic understanding of the following:

- Job
- Job Step
- Central Memory Layout
- Exchange Packages

REFERENCES:

None

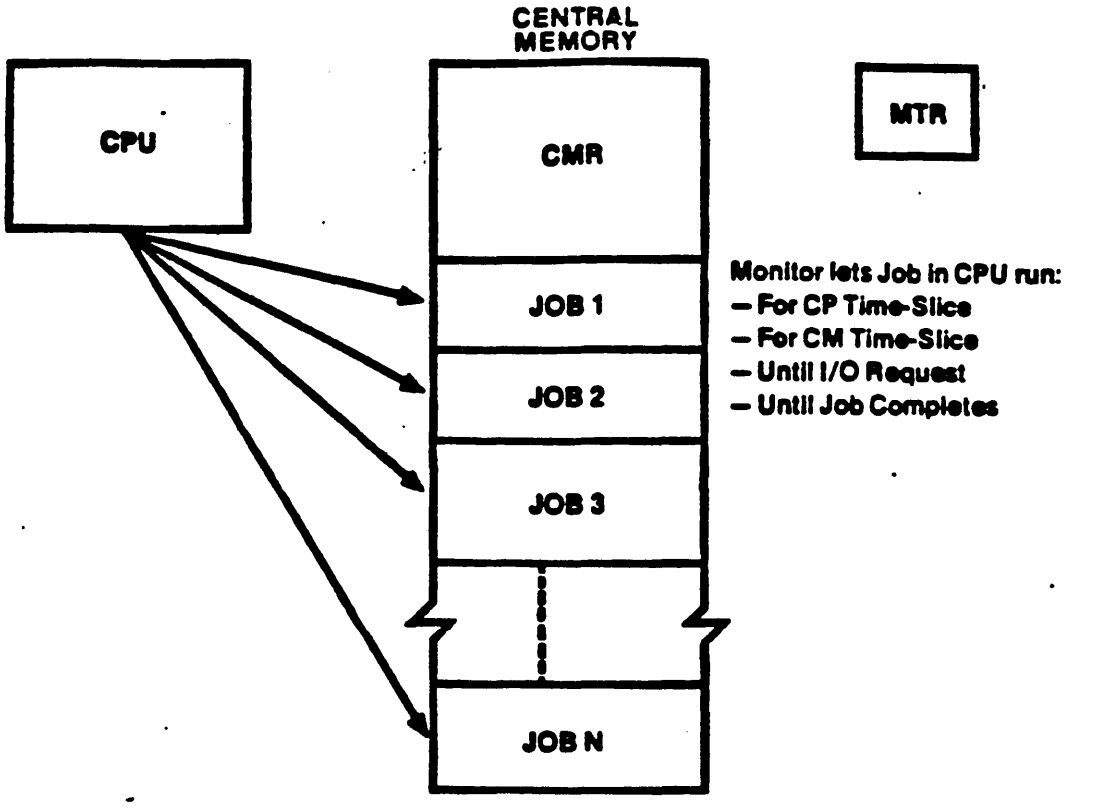
JOB vs. STEP

JOB is a set of commands and the data and directives used by those commands. A batch job must begin with a JOB and USER commands. An interactive JOB is all activity associated with a terminal session from login to logout.

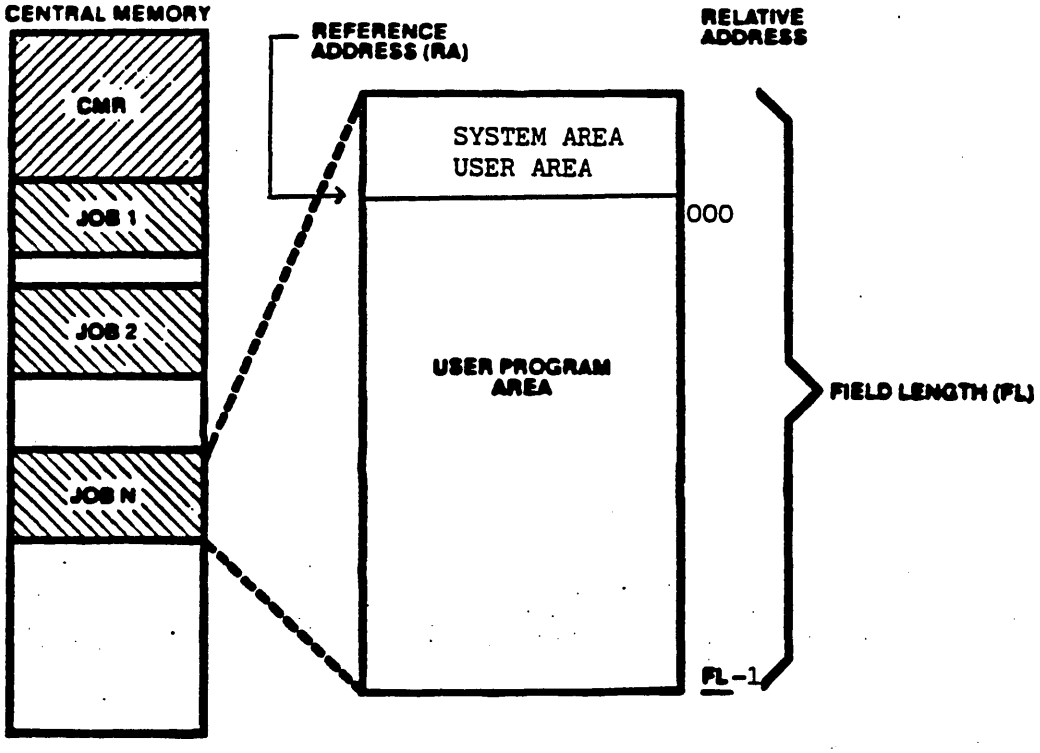
JOB STEP is an individual command or loader sequence. A group of JOB STEPS for a JOB stream or JOB.

A unique JSN (job sequence number) is associated with every job and every output routed by the job.

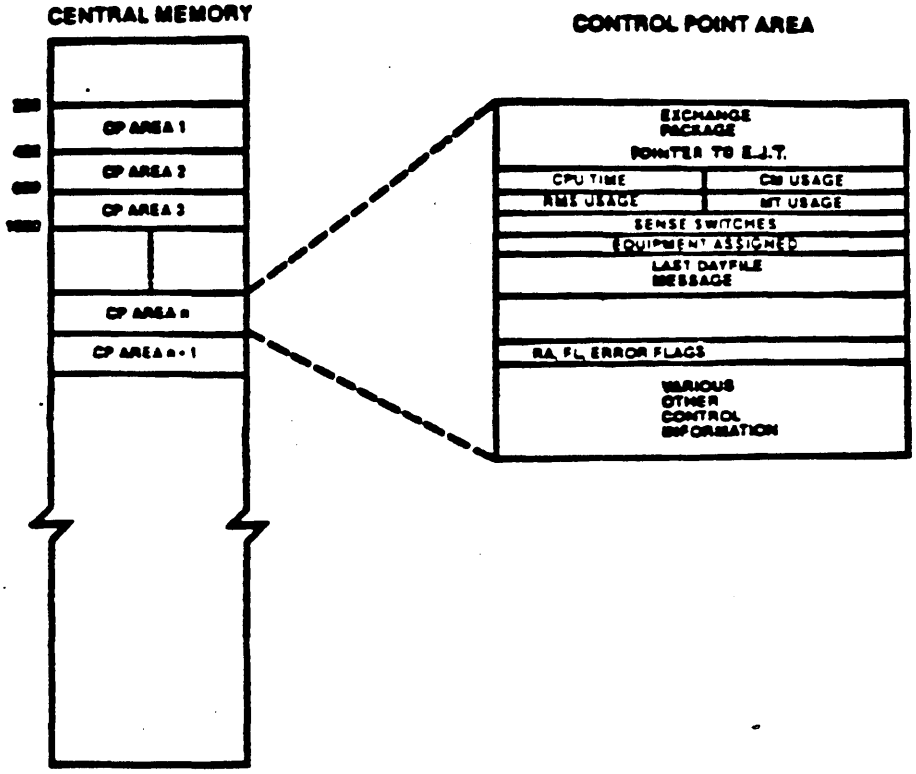
MULTI-PROGRAMMING



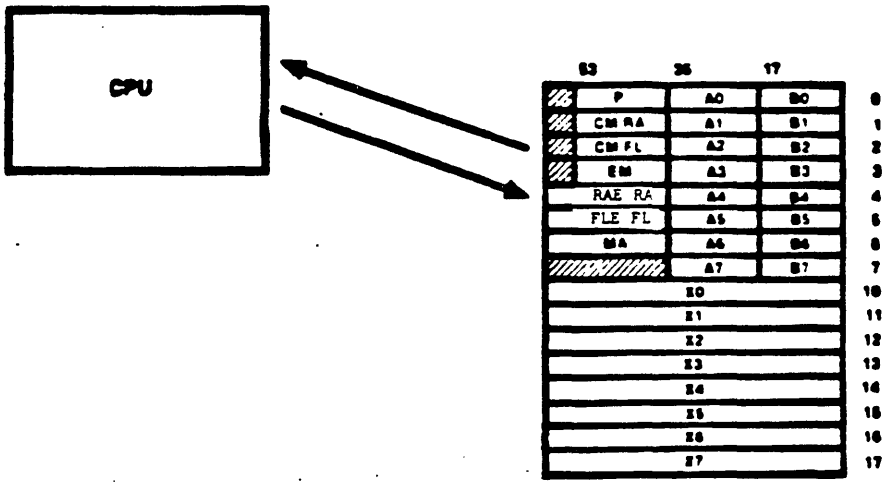
MEMORY PROTECTION



CONTROL POINT CONCEPT



EXCHANGE PACKAGE



USER VALIDATION

- EQUIPMENT USAGE
- FILE USAGE
- MACHINE USAGE
- SYSTEM USAGE
- TERMINAL USAGE
- APPLICATION USAGE

USER LIMITS

- LOCAL FILE SIZE
- DIRECT FILE SIZE
- NUMBER OF DAYFILE MESSAGES
- NUMBER OF CARDS PUNCHED
- NUMBER OF LINES PRINTED
- NUMBER OF TAPES USED

ACCOUNTING DATA

- LOG ON/LOG OFF TIME
- CPU TIME
- SYSTEM SECONDS
- MASS STORAGE TRANSFERS
- MAGNETIC TAPE TRANSFERS
- CARDS READ/PUNCHED, LINES PRINTED
- CORE MEMORY USED (WORDS PER SECOND)
- PROJECT NUMBER
- PERMANENT FILE USAGE

SYSTEM RESOURCE UNIT (SRU)

- CENTRAL MEMORY FIELD LENGTH
- EM FIELD LENGTH
- CPU TIME
- MASS STORAGE USAGE
- MAGNETIC TAPE USAGE
- PERMANENT FILE USAGE

Lesson 3

SYSTEM DESCRIPTION

LESSON PREFACE:

This lesson introduces the student to the basic components that make up the software system. Items covered are the following: operating system, memory management, and subsystems.

OBJECTIVES:

At the completions of this lesson, the student will have a basic understanding of the following:

- Central memory layout
- Operating system subsystems
- Various software packages available
- Controlling of subsystem execution

REFERENCES:

NOS Operating System Reference Manual - Pub. No. 60435400 (Vol. I)

NOS Operating System Reference Manual - Pub. No. 60445300 (Vol. II)

PROJECTS:

Quiz 3

NETWORK OPERATING SYSTEM (NOS)

MULTI-MODE SYSTEM

- LOCAL BATCH
- REMOTE BATCH
- DEFERRED BATCH
- TIME-SHARING
- TRANSACTION PROCESSING
- NETWORK CAPABILITIES

CDC CYBER 170 SERIES
OPERATING SYSTEM GOALS

- PROVIDE MAXIMUM JOB THROUGHPUT
- PROVIDE MAXIMUM SYSTEM RESOURCES TO USER
- PROVIDE SYSTEM RELIABILITY
- PROVIDE FOR SYSTEM MAINTAINABILITY
- PROVIDE SYSTEM FLEXIBILITY

PRIMARY SYSTEMS RESOURCES

- CPU
- CENTRAL MEMORY
- MASS STORAGE
- MAGNETIC TAPE

OPERATOR'S CONSOLE

- MONITOR JOBS IN SYSTEM
- CHANGE SCHEDULING PARAMETERS
- SEE TAPE/PRIVATE PACK STAGING QUEUES
- CHECK/SET EQUIPMENT STATUS
- COMMUNICATE WITH REMOTE AND LOCAL USERS
- MONITOR ALL SYSTEM QUEUES

BASIC SYSTEM IMPLEMENTATION

A. SEPARATION OF SYSTEM FUNCTIONS

1) CPU

2) PPU

1) CENTRAL PROCESSOR FUNCTIONS

- o SUBSYSTEM EXECUTIVE
- o REALTIME MONITOR
- o MEMORY USED AS BUFFERS FOR PP FUNCTIONS

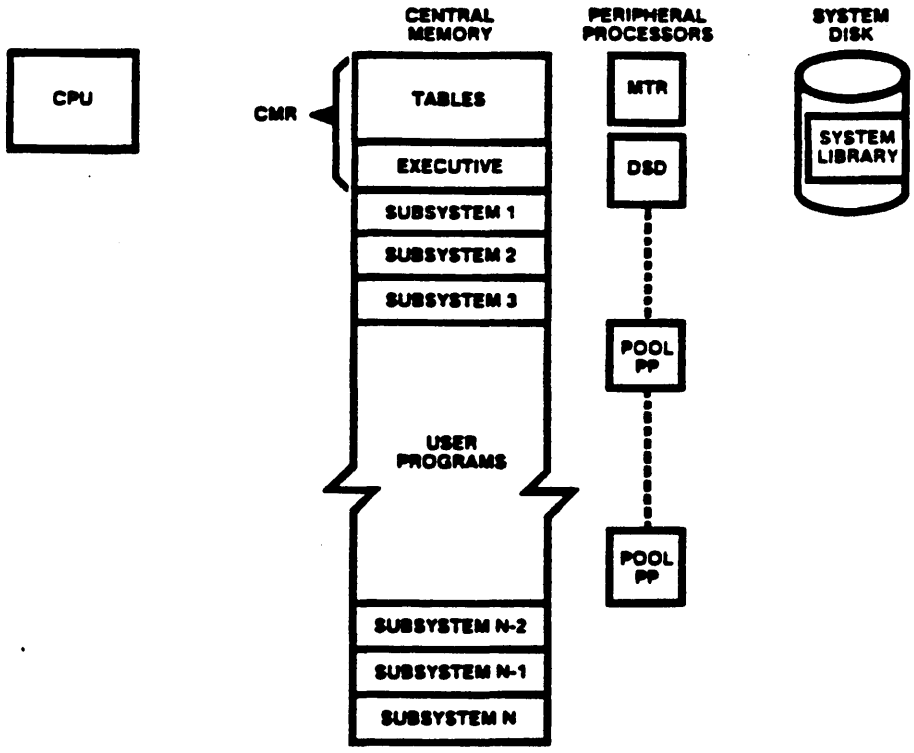
2) PERIPHERAL PROCESSOR FUNCTIONS

- o SYSTEM MONITOR
- o SCHEDULER
- o INPUT AND OUTPUT FUNCTIONS
- o DRIVE CONSOLE DISPLAY
- o FRONT-END SYSTEM TO COMMUNICATION NETWORK
- o ANALYZE TERMINAL STATUS
- o DRIVE ALL PERIPHERAL EQUIPMENTS
- o DRIVE LINK TO OTHER MAINFRAME

OPERATING SYSTEM COMPONENTS

- EXECUTIVE
- SUBSYSTEM
- LOADER
- PRODUCTS (COMPILERS, ASSEMBLERS, ETC.)

SYSTEM LAYOUT



EXECUTIVE

- PPU MONITOR (MTR)
- CPU MONITOR (CPU MTR)
- CONSOLE DRIVER (DSD)
- I/O DRIVERS (1MS . . .)
- SCHEDULER
- COMMUNICATION AREA AND TABLES

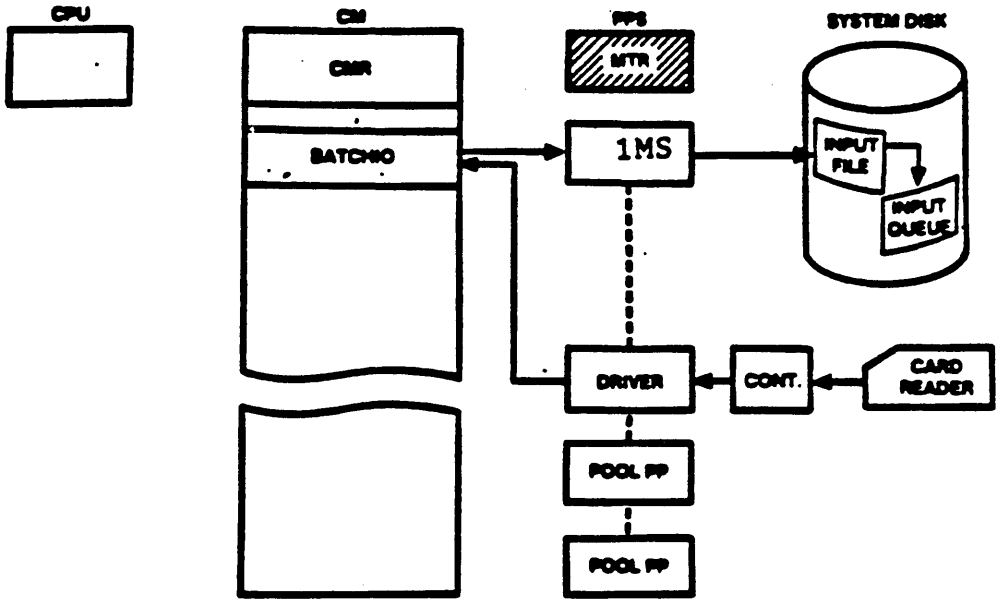
SUBSYSTEMS

- MAG
- BIO
- NAM
- RBF
- IAF
- TAF
- CDC
- MCS
- MSS
- MAP

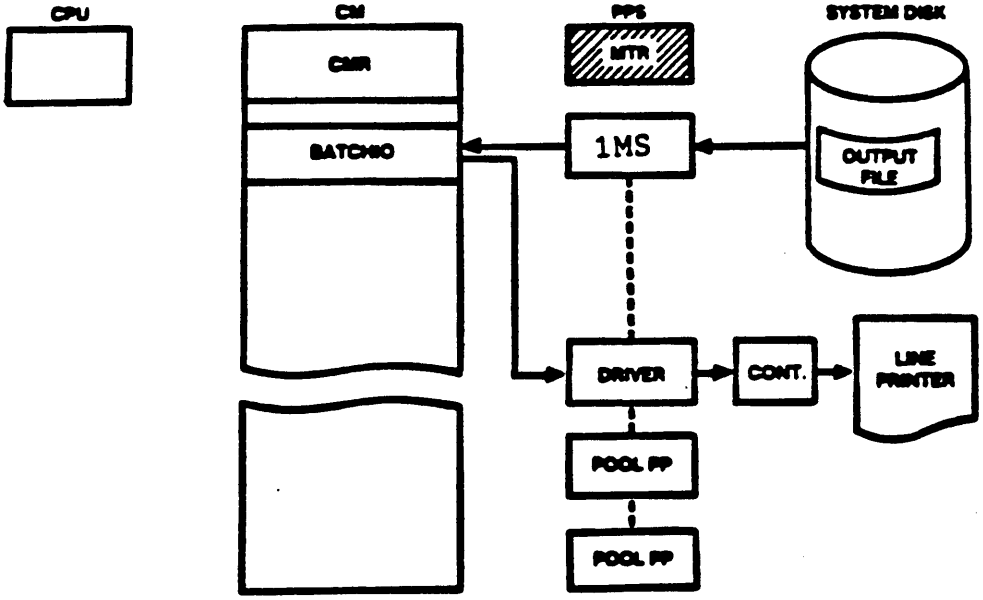
BATCHIO SUBSYSTEM

- DRIVE LOCAL UNIT-RECORD EQUIPMENT
  - CARD READER (1200 CPM)
  - LINE PRINTER (2000 LPM)
  - CARD PUNCH (250 CPM)
- CAN DRIVE SIMULTANEOUSLY 8 EQUIPMENTS (ANY COMBINATIONS OF CR, LP, CP)
- READS CARD READER AND CREATES NEW JOB IN INPUT QUEUE
- SCANS OUTPUT QUEUE AND SENDS OUTPUTS TO APPROPRIATE LINE PRINTER OR PUNCH

BATCH INPUT FLOW



BATCH OUTPUT FLOW

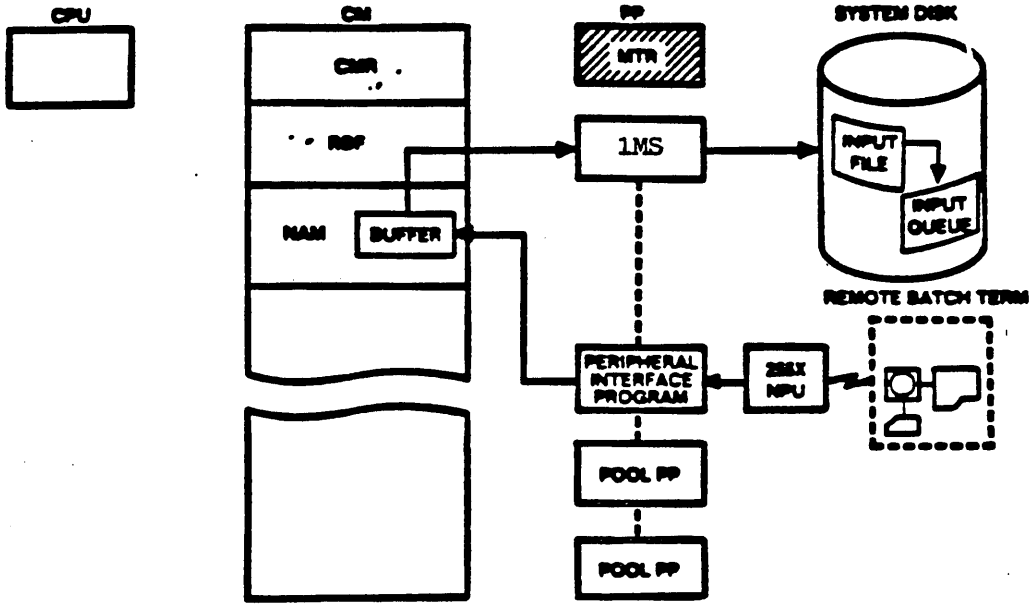


REMOTE BATCH FACILITY (RBF)

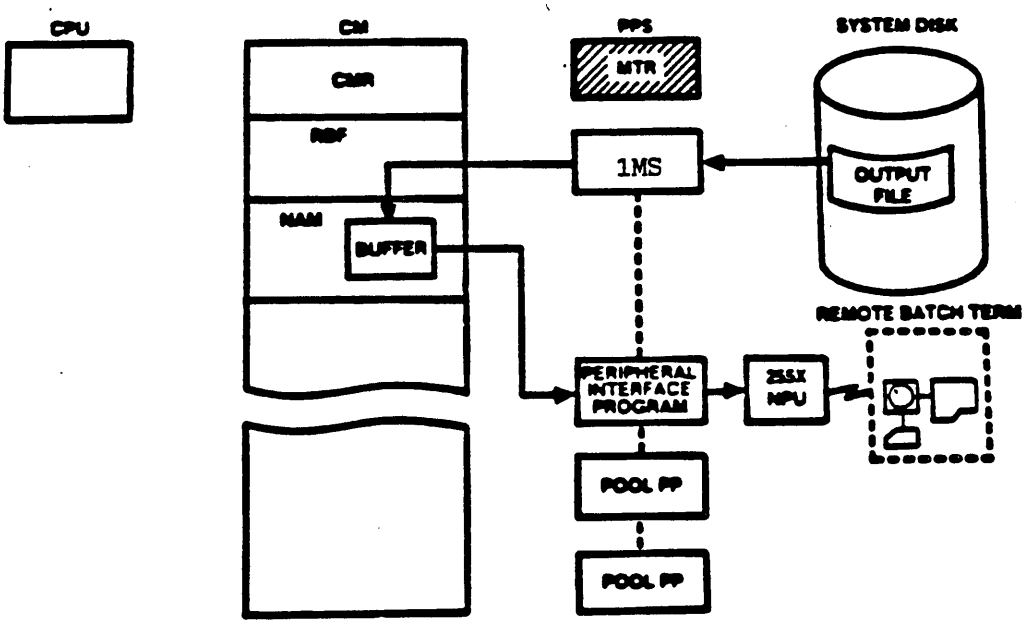
PROVIDE BATCH FILE TRANSMISSION BETWEEN REMOTE TERMINALS AND HOST COMPUTER SYSTEM MASS STORAGE

- BATCH TERMINAL USER INTERFACE TO SYSTEM QUEUES
- USER CONTROL OF FILES VIA COMMAND LANGUAGE
- STATUS OF FILES AND DEVICES
- TERMINAL INDEPENDENCE

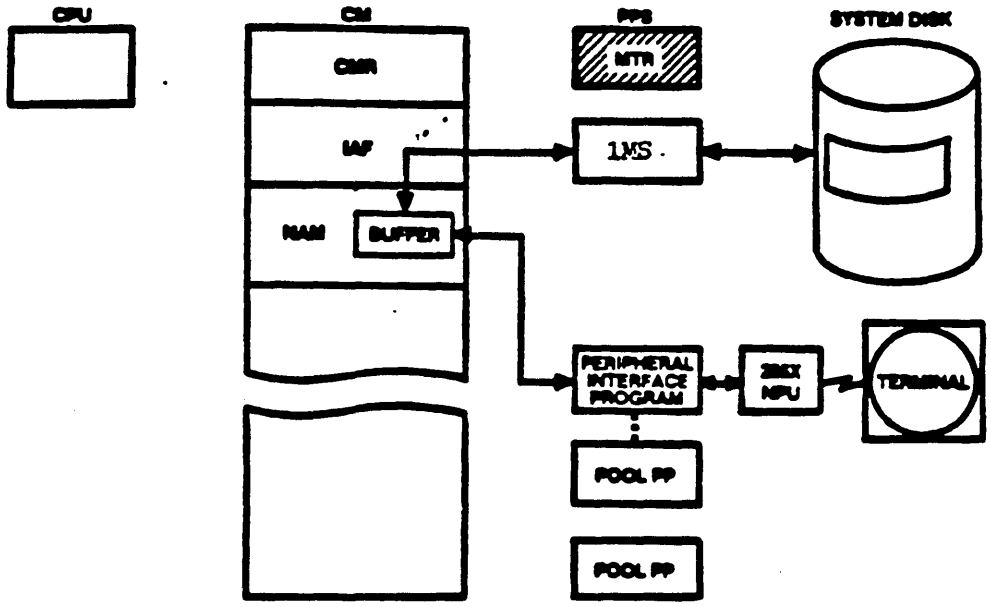
REMOTE BATCH INPUT FLOW



REMOTE BATCH OUTPUT FLOW



INTERACTIVE FACILITY FLOW



FACTORS AFFECTING RESPONSE TIME

- NUMBER OF USERS ON LINE
- SIZE OF USER PROGRAM
- SPEED OF MASS STORAGE (SWAPPING)
- TYPE OF ACTIVITY (EDITING, ETC.)
- SIZE OF TIME-SLICE
- USE OF EXTENDED MEMORY

IAF FUNCTIONS

- CREATE AN INPUT QUEUE ENTRY FOR A TERMINAL LOGIN
- HANDLES ALL I/O TO/FROM A JOB TO A TERMINAL

SUBSYSTEM CONTROL COMMANDS

CDCffff.	CYBER Database Control System (CDCS)
BIO.	Central Site Batch Input/Output
MAGffff.	Magnetic Tape Subsystem
MCSffff.	Message Control System
MSSffff.	Mass Storage Subsystem
NAMffff.	Network Access Method
RBFffff.	Remote Batch Facility
TAFffff.	Transaction Facility
MAPffff.	Mathematical Algorithm Processor
STMffff.	Interactive Stimulator
RDFffff.	Remote Diagnostic Facility
RHFffff.	Remote Host Facility
SMFffff.	Screen Management Facility
SSFffff.	SCOPE 2 Station Facility

---

ffff - Version of subsystem

SUBSYSTEM CONTROL COMMANDS

IAFfffff.	Call the Interactive Facility Subsystem (must be at control point 1)
ONSW,IAF,1.	Detach Jobs (for later recovery by user) and inhibit restart operation
ONSW,IAF,2.	Allows use of delay queue option (response time appears consistent)
ONSW,IAF,3.	Aborts subsystem on all abnormal conditions
ONSW,IAF,4.	Enables dump on normal termination (used after a STOP,IAF. entry)
ONSW,IAF,5.	Dump to OUTPUT file after subsystem is dropped or aborted
ONSW,IAF,6.	Release output file for printing (from ONSW,IAF,5)
IDLE,sub.	Set idledown status for subsystem
STOP,sub.	Drop subsystem (console must be unlocked - use only under analyst supervision)

---

ffff - Version of subsystem desired
sub - Subsystem

AUTO. Calls specific subsystems to control points and initiates automatic job processing

MAINTENANCE. Same functions as AUTO and initiate maintenance routines

ENABLE,op,cp. or DISABLE,op,cp. Enables operation at specified control point for subsystem or system options. Disable operation

op --
- BIO -- Batch input/output subsystem
- CDC -- CYBER Database Control System
- IAF -- Interactive Facility (cannot enter control point)
- MAG -- Magnetic Tape Subsystem
- MAP -- Mathematical Algorithm Processor
- MCS -- Message Control Subsystem
- MSS -- Mass Storage Subsystem
- NAM -- Network Access Methods
- RBF -- Remote Batch Facility
- RHF -- Remote Host Facility Subsystem
- ENGR -- Engineering Mode
- STM -- Stimulator for IAF (cannot enter control point)
- TAF -- Transaction Facility
- SMF -- Screen Management Facility
- LOGGING -- Logging of performance statistics
- FILE STAGING -- Staging of MSF resident permanent files to disk
- MS VALIDATION -- Automatic verification of mass storage table
- MASTER MSS -- Master Mainframe Mode (MSS)
- PF VALIDATION -- Verification of BOI/EOI on preserved files
- REMOVABLE PACKS -- Automatic label checking for mass storage devices defined as removable
- SECONDARY USER CARDS -- More than 1 USER statement per job
- USER ECS -- User has access to extended memory
- RDF -- Remote Diagnostic Facility (always runs at Control Point 1)
- PRIVILEGED RDF -- Priviledged mode of the Remote Diagnostic Facility
- RESIDENT RDF -- Resident mode of the Remote Diagnostic Facility

Lesson 4

DYNAMIC SYSTEM DISPLAYS (DSD)

LESSON PREFACE:

This lesson introduces the student to the displays that are available under DSD. Topics covered are the commands to call the various displays, the format of the display, and the sub-displays that are available.

OBJECTIVES:

At the completion of this lesson the student should have a basic understanding of the displays that are available, how to access them, and what information is available. Explain the right and left screen headers.

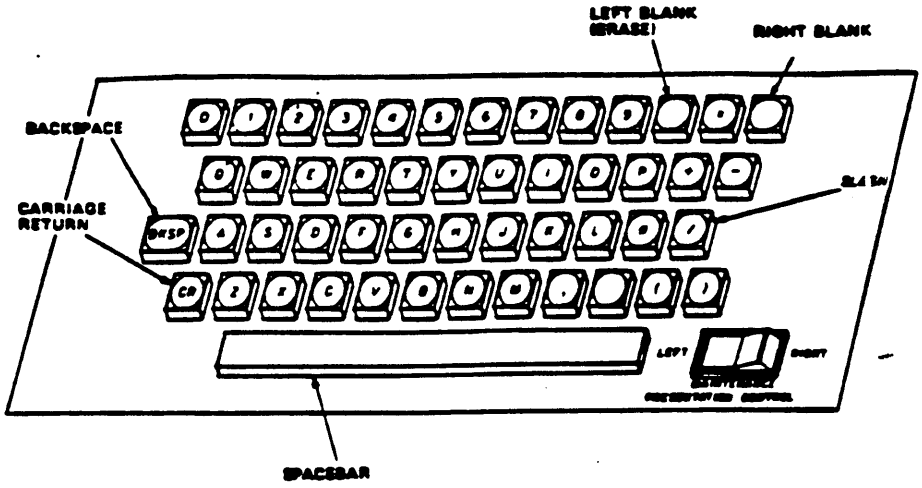
REFERENCES:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

PROJECTS:

Quiz 4

Laboratory 1



CONSOLE KEYBOARD

DISPLAY SELECTION

Select any of the DSD displays with the console command

xy.

x and y represent the letter designation of the displays.

x appears on the left screen and y appears on the right. If x and y are identical, both screens display the same information. A subdisplay may be chosen by entering x, z. Where x is the main display, comma denotes subdisplay, and z denotes which subdisplay. The displays available under DSD are as follows:

Letter Designation	Display	Description
A	Dayfile	Chronological history of system operations. There are five subdisplays. (A,. A, account file A, error log A, operator DISPLAY, jsn)
B	Job Status	Current status of all jobs assigned to control points. There are two subdisplays (B,A BO)

E	Equipment Status	Status of peripheral devices. There are five subdisplays (E,A E,C E,M E,P E,T)

Letter Designation	Display	Description
I	BIO Status	Status of central site unit record devices
J	Executing Job Status	Status of specified job sequence name
K	CPU programmable	Dynamic operator/CPU communication
L	CMR buffer interface program	System utility communication
P	PP communi-cations area	Current contents of PP registers
Q	Queue status	Status of active input/output queues. There are several subdisplays i.e., Q,IN Q,PR
R	Rolled out file status	All rolled out jobs not at control points
S	System control information	Parameters used to control job flow
T	Interactive status	Status of interactive users
Y	Monitor functions	List of all monitor mnemonics and codes
Z	Directory	List of the letter designators and descriptions of all DSD displays.

DISPLAY SET COMMAND
SET,SCREENS.

UNLOCK.	Allows entry of the following restricted commands DATE.yy/mm/dd. STOP, sub. TIME.hh.mm.ss. UNLOAD,xx. (nonremovable shared mass storage device)
LOCK.	Locks the console keyboard

XX - EST ordinal
jsn - Job Sequence Name
sub - subsystem

QUIZ 4

1. Where in UNLOCK displayed when the system is unlock?

2. Name four additional commands available when system is in unlock mode.

3. What is the difference between enters EA. and E,A.?

4. What is the difference between + and - in relation to displays?

5. What is the difference between + and (in relation to displays?

LABORATORY 1

1. Bring up the display which illustrated the following:

   a) The system dayfile

   b) An individual user dayfile

   c) The error log

   d) Subsystem status

   e) Channel activity

   f) Job using the central processor

2. Put the terminal in repeat mode and DROP a job.

3. Get out of repeat mode. Which key did you use?_____

4. Bring up the A display on the right screen and B display on the left screen.

5. Set up four display to be used with the display key.

6. Sequence through the default displays.

   a) Which screen changed?

   b) Where is the display key located?

Lesson 5

EQUIPMENT CONFIGURATION

LESSON PREFACE:

This lesson introduces the student to the concepts of logical devices, controllers, channels, and equipment configuration.

OBJECTIVES:

Upon completion, the student should have an understanding of the system configuration and be able to up and down equipment.

REFERENCES:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

The equipment Status Table (E,. or E,A.)

- List the status of all peripheral equipment
- One entry per each logical device
- Map of 1000B logical device
- First five entries are special cases

  Entry 0 : RD used for on-line reconfiguration

  1 : DS Console

  2 : NE Null device

  3 : TE Tape Equipment

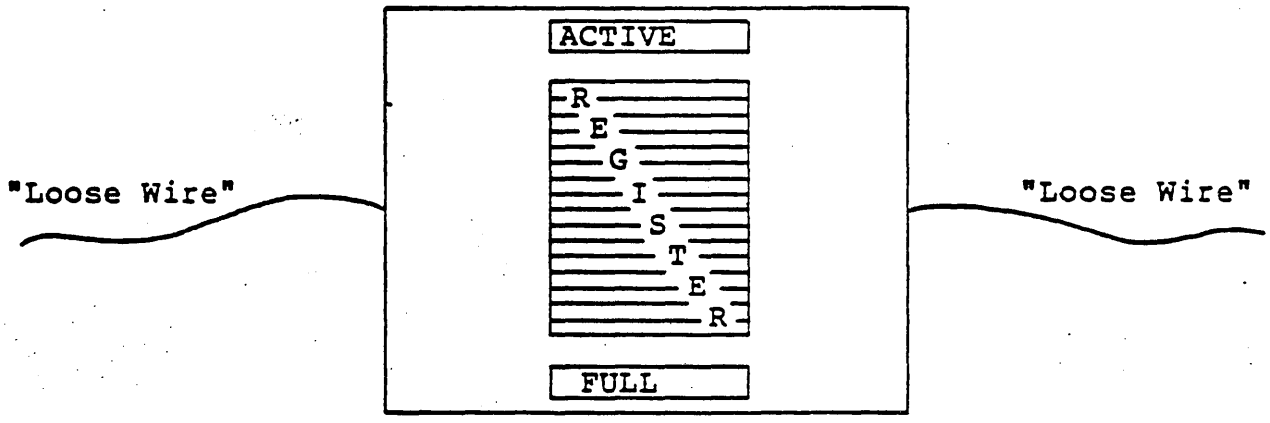
  4 : TT used for assignment of terminal files

- Mass storage devices must be below EST ordinal 310B.

Peripheral processors and external equipment are connected through data channels. The PPs use them to control and perform input/output tasks. CYBER systems have 12 to 24 data channels, depending on the number of PPs in the system. Physically, each data channel is connected to all the PPs so that any PP can access any data channel. But external devices are wired to specific data channels so they can only be accessed on that channel(s).

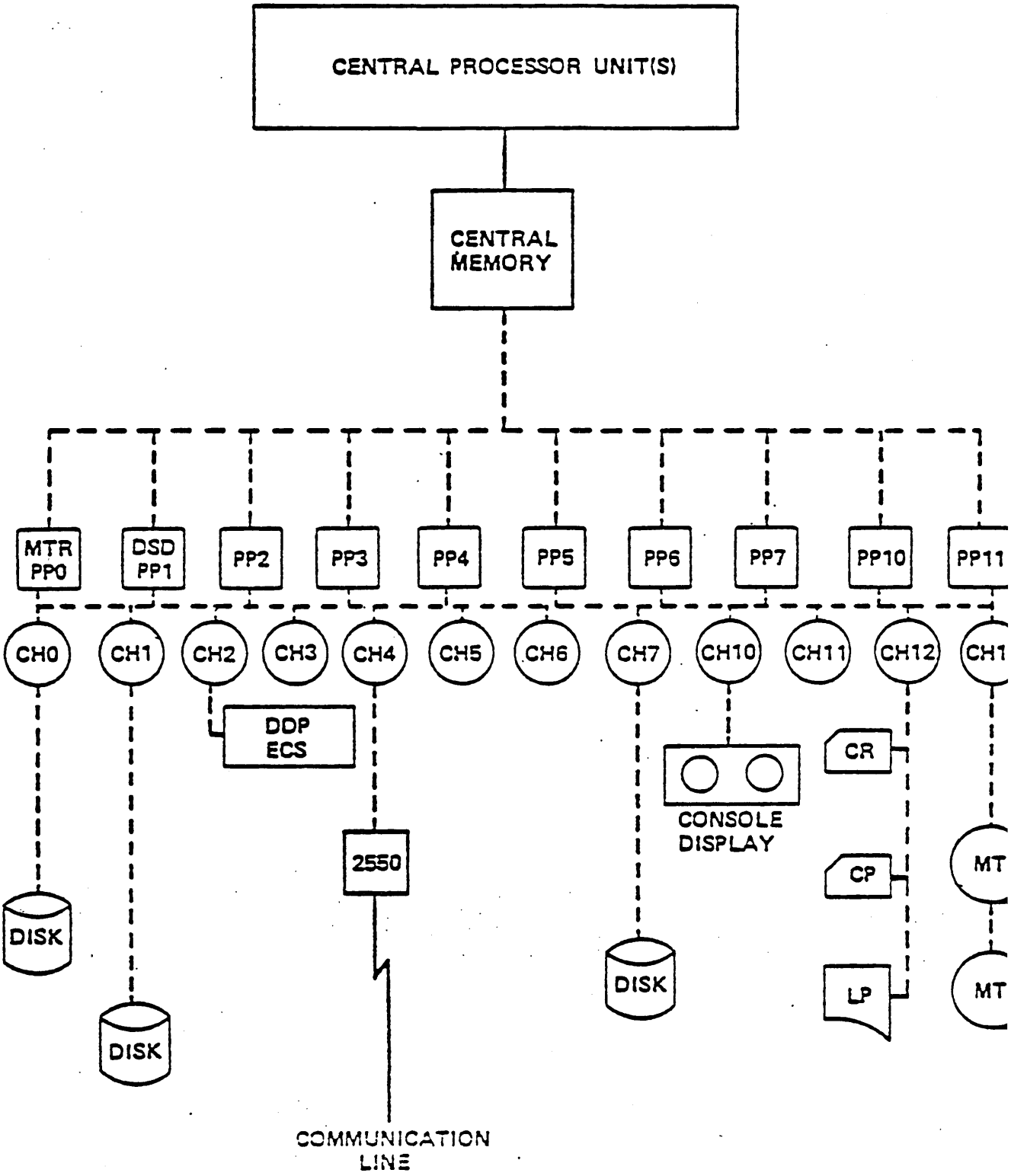
Logically, a data channel can be viewed as a "black box" with a loose wire at each end. When the data channel is in use, one wire is connected to a PP. The other wire may also be connected to a PP, but it is usually connected to a peripheral controller. The protocol for using a data channel transforms the physical possibilities into logical actualities, and the "loose wires" are logically connected.

Inside the "black box" is a 12-bit register and two flags (see Figure below). One of the flags, the active flag, must be turned on to perform I/O. The other flag, the full flag, is turned on by putting data into the 12-bit register and turned off by taking the data out of the register. During a "write" operation, a PP outputs to the channel, filling the register and turning on the full flag. Sensing the full condition, the controller inputs the data from the channel, turning off the full flag. While the controller is recording or displaying the data it inputted, the PP senses the empty condition on the channel and outputs the next 12 bits to the channel.



DATA CHANNEL

TYPICAL NOS CONFIGURATION



PERIPHERAL CONTROL COMMANDS

Discontinue use of channel

- DOWN,CHcc,EQeg.
- DOWN,MCHcc,EQeg.
- DOWN,EQeg.

Resumes normal use of channel

- UP,CHcc,EQeg.
- UP,MCHcc,EQeg.
- UP,EQeq.
- ON,est. logical turns on a device
- OFF,est. logical turns off a device
- REDINE utility used to reconfigure mass storage devices

QUIZ 5

1) PP5 can talk to which devices?

2) Is each tape controller in one logical device?

3) How many devices can be put on a channel?

4) How are PP numbered?

5) How are channels numbered?

Lesson 6

MASS STORAGE

LESSON PREFACE:

The lesson covers Mass Storage as related to family, system devices and temporary and permanent file.

OBJECTIVES:

Upon completion, the student should have an understanding of the following:

- Family concept
- How to bring up and down a family
- Permanent vs. temporary files
- Reconfigure disk allocation
- E,M. and E,C. display

REFERENCES:

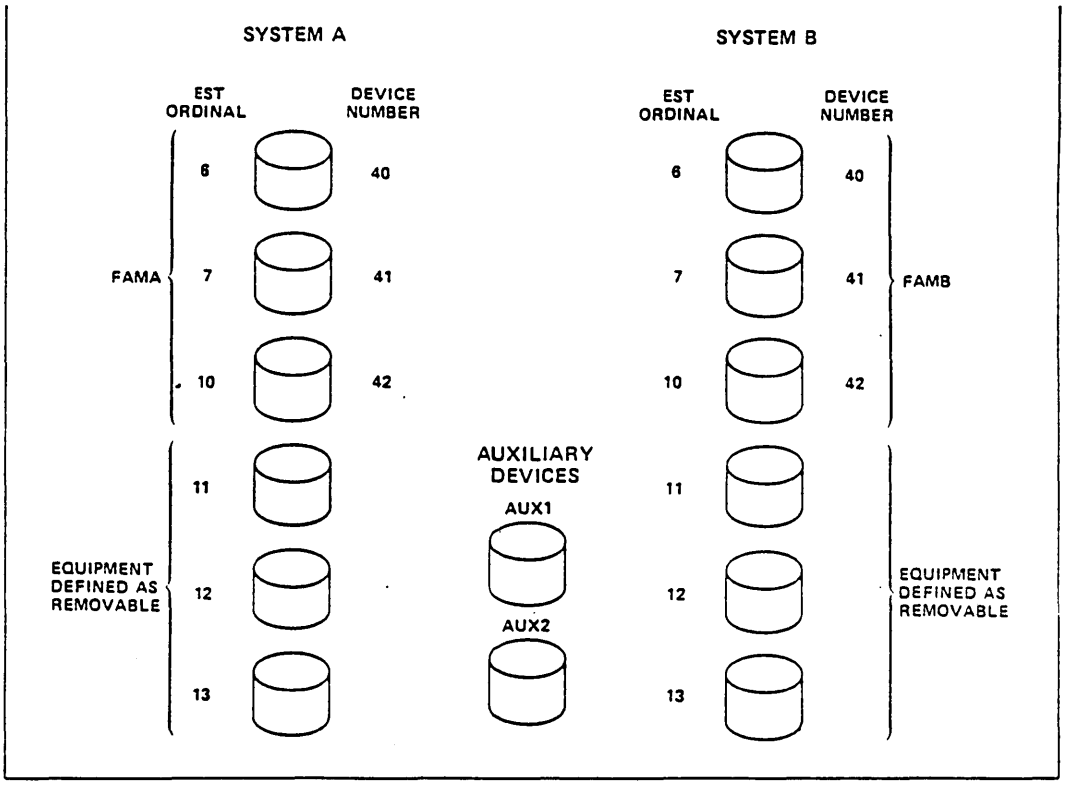
NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310
NOS Version 2 System Program Instant - Pub. No. 60459370

FAMILY

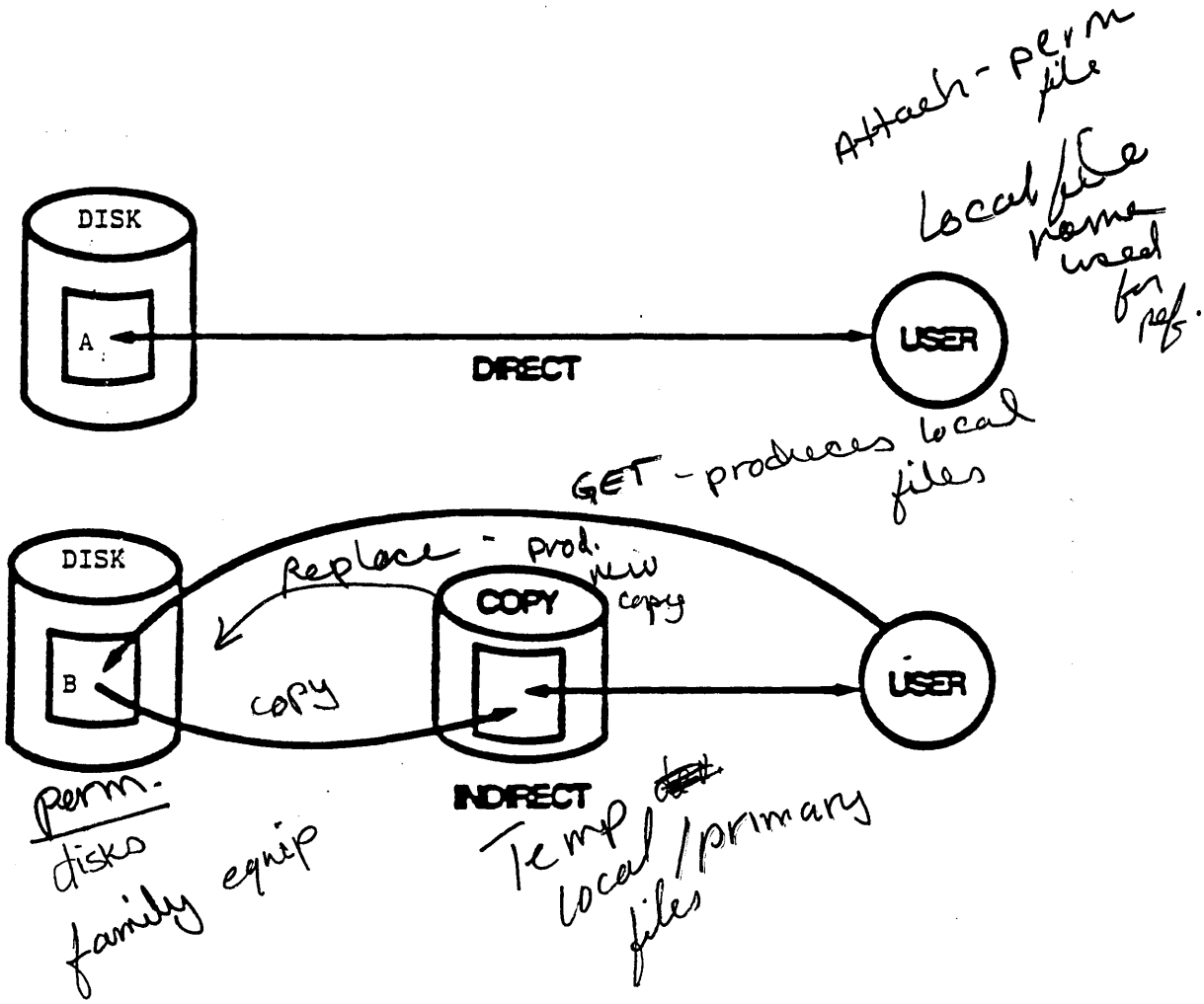
A family is a collection of 1 to 63 logical devices identified by a one- to seven-character family name. Users and their files are grouped together according to the family available to them. Usually, the grouping is within the configuration on which these users normally run jobs. However, a family can be connected to any configuration and still relate to the same users and files.

An auxiliary device, identified by a one- to seven-character pack name, is a single device that is not included in any family and can be accessed by validated users from any family. An auxiliary device provides users with an alternative to the master devices for storing and accessing permanent files. Use of auxiliary devices enables an analyst to provide special sets of permanent files for selected users or for designated periods. For example, an auxiliary device could be made available from 1200 to 1700 every day for any properly validated user.

A permanent file device is either a member of a family or an auxiliary device. Permanent files on family device are accesssed through user catalogs contained on a master device within the family. The user catalogs that reference permanent files on an auxiliary device are contained on that device; that is, an auxiliary device is a self-contained entity.



PERMANENT FILES



PERMANENT FILES SECURITY

PRIVATE

- EXPLICIT PERMISSION
- PASSWORD CONTROL AVAILABLE

SEMI-PRIVATE

- IMPLICIT PERMISSION IN A SPECIFIC MODE
- EXPLICIT PERMISSION FOR OTHER MODES
- PASSWORD CONTROL
- LIST OF ALL ACCESSES AVAILABLE TO ORIGINATOR

PUBLIC

- LIST OF USERS NOT AVAILABLE
- USERS ACCESS FILE IN THE SAME MODE

FILE MODES

- WRITE
- MODIFY
- APPEND
- READ
- EXECUTE
- NULL

PERMANENT vs TEMPORARY

Space is deallocated when user specifically purges file	Space is deallocated at job termination
File exist across deadstart	Files space is returned after a level zero deadstart
File space is allocated relative to family mask (E,C display)	File space is allocated relative to mass storage table (E,M display)

COMMANDS

MOUNT,eg,P.	Clears local and global unload status for a mass storage device and reactivates it.
IdLEFAMILY,eg	Activates or deactivates a family
INITIALIZE,OP,eg_1,...eg_n	Reverses current setting of initialize option for mass storage devices.
MSAL,t=eg_1,eg_2...,eg_n	Assigns job files of type t to mass storage device.
SRST,t.	Change secondary roll-out section threshold.

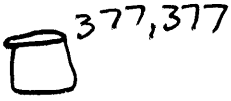
QUIZ 6

1) Name two type of permanent files?

2) What is the difference between temporary and permanent files?

3) Which display shows how many tracks are available on a disk?

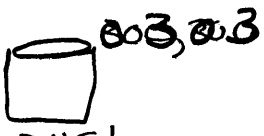
4A Family
SYSDSK
CMRDØØ
EQ20
DN=1
20



EQ21
DN=1
21

Family
NORSDF

EQ42



DN=1
42

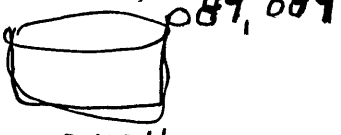
EQ43

DN=2

EQ44

DN=3
44

EQ45



DN=4
45

15 Family
SYSDSK
CMRDØ1
EQ2Ø

DN=1
EQ21

DN=2

EQPDECK

ISHARE=42,43,44,45
LFamily=42.

1) Device number in family — Default family equ. validation file

2) 377,
000,
300,
> = 2008 device masks for sysgt.

P.F Utilities no DN to ident. what dev. runn. utility for.

Console commands: on, off, unload > use Equipment #.

Lesson 7

UNIT RECORD DEVICES

LESSON PREFACE:

This lesson introduces commands having to do with batch I/O devices.

OBJECTIVES:

Upon completion, the student should have an understanding of unit record device commands and the I display.

REFERENCE:

NOS Reference 2 Operators/Analyst Handbook - Pub. No. 60459310

BATCH 10
CARD READERS, CARD PUNCHES
LINE PRINTERS
"I" DISPLAY

ON,xx.	Logically turns on device
OFF,xx.	Logically turns off device
STOP,xx.	Stop printing
END,xx.	End Operation
CONTINUE,xx.	Continut printing
SUPPRESS,xx.	Suppress page eject on print file
REPEAT,xx.yy.	Repeats current operation "yy" times on LP or CP
BKSP,xx.rr.	Backspace "RR" records on print file
BKSPF,xx.ff.	Backspace "FF" files in print file
BKSPRU,xx.ss.	Backspace "SS" PRUs, on print file
SKIP,xx.rr.	Skips forward "RR" records on print file
SKIPF,xx.ff.	Skips forward "FF" files on print file
SKIPPRU,xx.ss.	Skips forward "SS" PRUs on print file
RERUN,xx.yy.	Terminates current operation and re-enters file in its queue with priority "YY"
TRAIN,xx.y.	Assigns print train identification

xx = EST Ordinal

CP,est,id.

CR,est,id.

LP,est,id.

LU,est,id.

LR,est,id.

LS,est,id.

LT,est,id.

Assign Identifier id to the device

Form, est,fc. Assigns forms code fc to the device

LAB 2

1) Assume a logical device used for temporary file is running out of space. Remedy the condition.

2) What channel are the tape units on?

3) Logically turn off a line printer.

4) What channel are the line printers on?

5) Assume a printer has jammed and displays the listing. Remedy the condition.

6) Assume a user calls and requests you get an additional three copies of his printer output. Assist me.

Lesson 8

JOB PROCESSING

LESSON PREFACE:

This lesson introduces the student to the scheduler and the commands available to control a particular job or class of jobs.

OBJECTIVES:

Upon completion, the student should be able to:

- Control the execution of a class of jobs
- Control the execution of a particular job
- Send message to user
- Send commands to jobs
- Explain the S,Q & B displays usage

REFERENCE:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

INTEGRATED SCHEDULER

- Unified Scheduler For Mixed Environments
- Operator Control Of Scheduling Parameters
- Dynamic Central Memory Management
- Automatic Job Swapping
- Improved Terminals Response Time
- Improved Batch Throughout

JOB SCHEDULING QUEUES

- Each Job Origin Type
  - Input Queue
  - Rollout Queue
  - Output Queue
  - CPU Priority and Time Slice
  - CM Time Slice
- Queue Parameters for Each Queue Type
  - Lower Bound Priority
  - Upper Bound Priority
  - Entry Priority

JOB ORIGINS

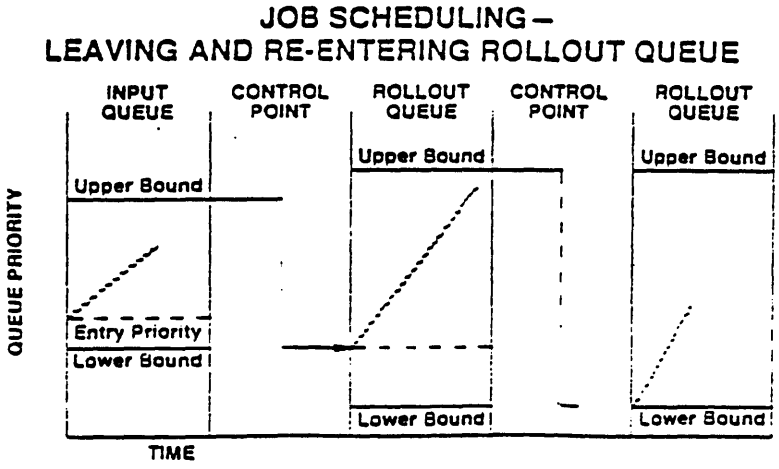
- System Console (SYOT)
- Time Sharing (TXOT)
- Local Batch (BCOT)
- Remote Batch (EIOT)

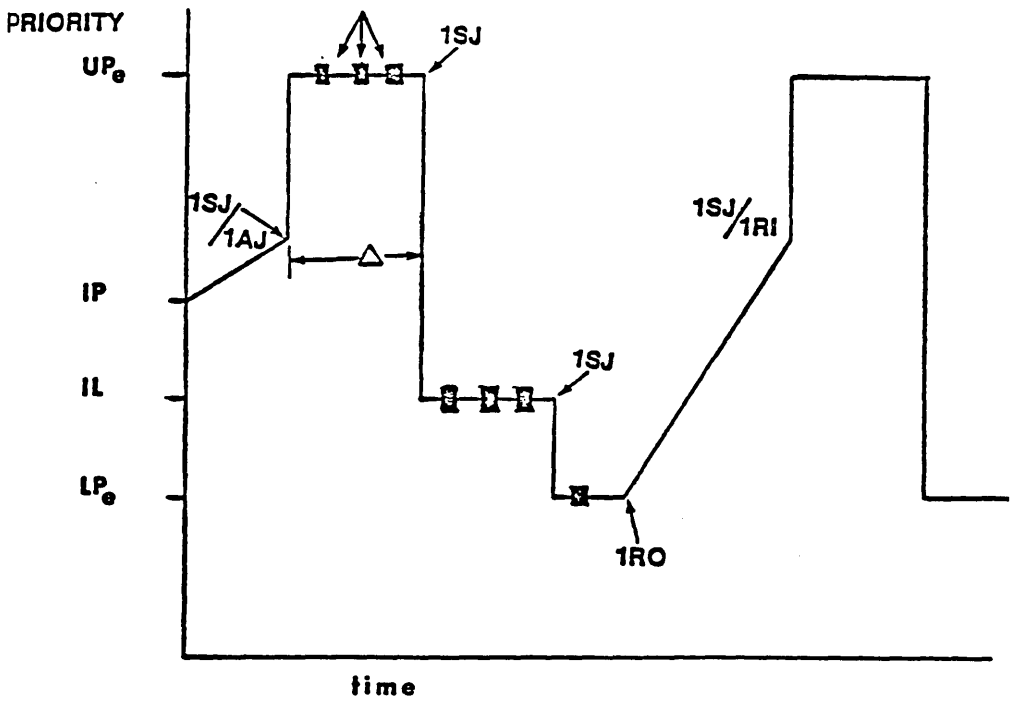
UTILIZES TWO TIME SLICES

- CPU Time Slice

  CPU Time Slot

- Central Memory Time Slice





= MINIMUM (CPU TIME SLICE, CM TIME SLICE)

1SJ moves jobs from the QFT-to EJT and sets the job's entry time so priority calculation is equal to initial priority (IP) for its service class. As time elapses, its priority calculations increase until 1SJ selects it, assigns it to a CPt, and sets its priority (entry time) to actual upper priority value for executing job (UPe) for its service class. The job runs at this priority until it exceeds its CPU or CM time slice. 1SJ then drops the priority (entry time) to the actual lower bound priority value used or initial slice of jobs (IL) for its service class and gives the job another whole time slice.

When the time slice expires, 1SJ drops the priority value to lower bound priority (LPe) value for executing jobs for its service class. The job may continue to execute a this priority, but it is very likely that it will be rolled out. When it is rolled out, 1RO will use priority value to calculate entry time. Its priority calculations will begin to increase until it is rolled in with priority value equal to upper priority (UPe) for executing jobs for its service class. The cycle (this paragraph only) will be repeated until job completes or aborts.

NOTE: Entry time and priority value are both stored in the scheduler field of EJT. Value meaning is dependent on value in Job Status Field of EJT.

JOB PROCESSING CONTROL COMMANDS RELATING TO B&Q DISPLAYS

ROLLIN,jsn,L.	Rollin a job, if L is present the job is not available for rollout (EJT entries only).
ROLLOUT,jsn,n	Rollout a job for n scheduler intervals ($0-7777_8$). If n is 0 or omitted job must be rolled in through operator action.

---

jsn - Job Sequence Name

n - Number of scheduler intervals

t - New sector threshold

DROP,jsn.	Drop a job from the EJT
DROP,jsn, qt,ujn	Drop a job from the specified queue
DROP,,qt.	Drop all jobs from specified queue
ENQP,jsn,pppp	Enter a queue priority for specified jsn
KILL,jsn.	Drop a job from the EJT without exit processing
RERUN,jsn.	Rerun a job from the beginning
OVERRIDE,jsn.	Drop job regardless of job's queue priority

---

jsn - Job Sequence Name
pppp - Priority
qt - Queue type
sc - Service Class
ujn - User job name

CFO,jsn.ccc....ccc.	Sends a message (36 character maximum) to a job
COMMENT,jsn. ccc...ccc.	Puts a message (49 character maximum in job dayfile

---

ccc...ccc - Message text

jsn - Job Sequence Name

pr - Priority

sc - Service Class

GO,jsn.	Clears pause bit for job
OFFSW,jsn,Sw_1,Sw_2..Sw_n	Turns off one or more sense switches for job
ONSW,jsn, Sw_1,Sw_2...Sw_n	Turns on one or more sense switches for job
PAUSE,jsn.	Sets pause bit for job
DIAL,jsn,ccc...ccc	Sends a message (48 character to terminal currently assigned to jsn
WARN,ccc...ccc.	Sends a message (48 character maximum) to all terminals currently logged into IAF. The message is received at a terminal upon completion of the current command. The message is also received by each subsequent user logging on
WARN,.	Clears message entered by WARN,ccc...ccc

---

ccc...ccc - Message text

jsn - Job Sequence Name

Sw - Sense Switch

Job scheduling is determined by a job's service class which is affected by the following:

1) Job's origin

2) User's validation

3) Job's priority

4) System defaults

Valid service classes are:

SYSC	System
BCSC	Batch
RBSC	Remote Batch
TSSC	Interactive
DISC	Detached Interactive
NSSC	Network Supervisor
SSSC	Subsystem
MASC	Maintenance
CTSC	Communication Task
I0SC	
I1SC	
	Installation Class 0,1,2,3
I2SC	
I3SC	

SCHEDULING COMMANDS
RELATED TO S DISPLAY

CLASS,at,sc_1,sc_2,sc_n.	Defines valid service classes for origin type
PCLASS,sc_0,sc_1,...sc_7.	Selects service class of sc_n to be associated with each priority level $_n$
DELAY,p_1,p_2,.p_n.	Changes system delay parameters
QUEUE,sc,qt,qp_1,..qp_n.	Alters the priorities associated with the input, output and excluding queue
SERVICE,sc,p_1,p_2,p_n.	Alters the service limits associated with each service class

Lesson 9

TAPE SUBSYSTEM

LESSON PREFACE:

This lesson introduces the student to the tape commands.

OBJECTIVES:

Upon completion, the student should be able to:

- Assign tape to jobs
- Label tapes
- Use the E,P. and E,T. displays

REFERENCES:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

MAGNET
(MAGNETIC TAPE SUBSYSTEM)

- EXECUTIVE
- AUTOMATIC ASSIGNMENT
- JOB SCHEDULING
- ANSI LABELS
- COMPATIBLE FORMATS AVAILABLE

TAPE SCHEDULING FEATURES

- AUTOMATIC ASSIGNMENT BY VSN/LABEL
- TAPE DRIVE OVERCOMMITMENT
- DEADLOCK PREVENTION
- RESOURCE PREVIEW DISPLAY (E,P.)
- RING/NO RING VALIDITY CHECK

MAGNETIC TAPES

7-TRACK TAPE

- 200,556,800 CPI,NRZI

9-TRACK TAPE

- 800 CPI, NRZI
- 1600 CPI, PE
- 6250 CPI, GCR

RECORDING MODES

- BINARY MODE
- CODED MODE
  - USASCII
  - EBCDIC
  - BCD

UNLABELED TAPES

LABELED TAPES

VSN - VISUAL SERIAL NUMBER

AUTOMATIC ASSIGNMENT BY VSN OR LABEL

LOGICAL TAPE FILES AND PHYSICAL TAPE REELS

- SINGLE-TAPE FILES
- MULTI-TAPE FILES
- MULTI-FILE TAPES
- MULTI-FILE MULTI-TAPE

DEFINITIONS

UNSATISIFED (TAPE) JOB

A job that has not requested the number of tapes specified on its RESOURC card. A satisfied job has been assigned its maximum RESOURC card requirement.

DEADLOCK

Two or more unsatisfied jobs that cannot finish because they are waiting for a tape unit held by the other unsatisfied job, to become free. The tape unit cannot become free because neither job can continue to release a tape until the other job releases a unit.

For example, in an installation with six tape units, a DEADLOCK situation would exist of JOBA and JOBB were at control points, each with three tapes assigned, but both needed four units to continue.

6 TAPE DRIVES

JOBA Control Point 3	JOBB Control Point 4
RESOURC(MT=4)	RESOURC(MT=4)
REQUEST,AA,MT.	REQUEST,A,MT.
REQUEST,BB,MT.	REQUEST,B,MT.
REQUEST,CC,MT.	REQUEST,C,MT.
REQUEST,DD,MT.	REQUEST,D,MT.
ROLL OUT AND WAIT	ROLL OUT AND WAIT

At this point, neither job could continue without dropping the other.

If, however, JOBB had specified "MT3" on his RESOURC card, this would not be a DEADLOCK situation because, even though JOBA would have to wait, we know that JOBB could not request a fourth tape; therefore, he could continue to a point where he would release a tape. At this point JOBA could continue.

DEFINITIONS (Con't)

POTENTIAL DEADLOCK

Two or more unsatisfied tape jobs that are requesting tapes in a situation where there would not be enough free units remaining to satisfy the maximum requirements of any of them.

TAPE SCHEDULING OVERCOMMITMENT

JOB SCHEDULING ALGORITHM:

A job is brought to a control point and its request for a tape is displayed in the "P" display only if its maximum tape requirements are less than or equal to the number of "Potentially Free" tape drives.

POTENTIALLY FREE DRIVES:

Number of drives in the installation, minus total tape requirement of all active jobs, plus the number of drives held by satisfied jobs.

DEADLOCK PREVENTION ALGORITHM

The system will refuse the assignment of tape to a job (even manual assignment) if that assignment creates a potential deadlock situation. This does not apply to System jobs.

TAPE COMMANDS
"E,P" & "E,T" DISPLAYS

UNLOAD,xx.	Unloads tape
ASSIGN,jsn,xx	Assigns tape unit to control point
VSN,xx,vsn.	Assigns VSN to an unlabelled tape
VSN,xx.	Clears current VSN for unlabelled tape unit
SCRATCH,xx.	Declares a tape to be a scratch tape
VSN,xx,.	Declares an unlabelled tape to be a scratch tape
X.BLANK	Utility which writes ANSI standard label on tape

VSN = VOLUMN SERIAL NUMBER
XX = EST Ordinal

LAB 3

1) Bring up the two displays that illustrates what tapes are mounted and which tapes are requested concurrently.

2) Change the VSN on a tape.

3) Assign a tape to a job.

4) Assign an unlabelled tape a VSN to match an entry in the E,P. display.

5) Clear the VSN of a labelled tape.

6) Assign a labelled tape as a scratch tape.

7) Bring up the display that illustrates:

   a) The jobs in all the queues

   b) The jobs in the Output queue

   c) The jobs in the Input queue

   d) The jobs current rolled out

   e) The upper priority that a batch job can age to while in the input queue

   f) The rate at which that job ages (question 4e)

   g) The initial queue priority for a remote batch job the first time it goes to a control point

8) Allow no new batch job.

9) Increase the priority of executing jobs in the interactive service class to 7050.

10) Terminate a job without doing exit processing

11) Terminate a job normally.

Lesson 10

DEADSTART

LESSON PREFACE:

This lesson introduces the student to the deadstart panel, the various options that are available, and the parameters that may be selected. Topics covered include; warmstart, panel settings, keyboard entries, modifying the existing system, and the various levels of recovery available.

OBJECTIVES:

Upon completion of this lesson, the student should be able to:

- Warmstart the system
- Modify the CMRDECK, IPRDECK, and APRDECK, EQ DECK
- Modify the equipment configuration via EQPDECK entries
- Initiate various levels of deadstart
- Execute an express deadstart dump
- Complete a printer dump

REFERENCE:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

NOS Version 2 Installation Handbook - Pub. No. 60459320

PROJECTS:

Laboratory 2

DEADSTART

What is it? System Initialization

- Load CMR programs and read certain programs into the PPs
- Set up or check CMR tables
- Set up or check disk tables and files

What is needed?

- D.S. file
- Proper Panel Setting
- D.S. Commands

2 ways Deadstart

1) Single Display screen (console)

2) CNTL/G - operator access enablee (channel 5)
CC634 [721 VIKING] CNTL/R - init deadstart.

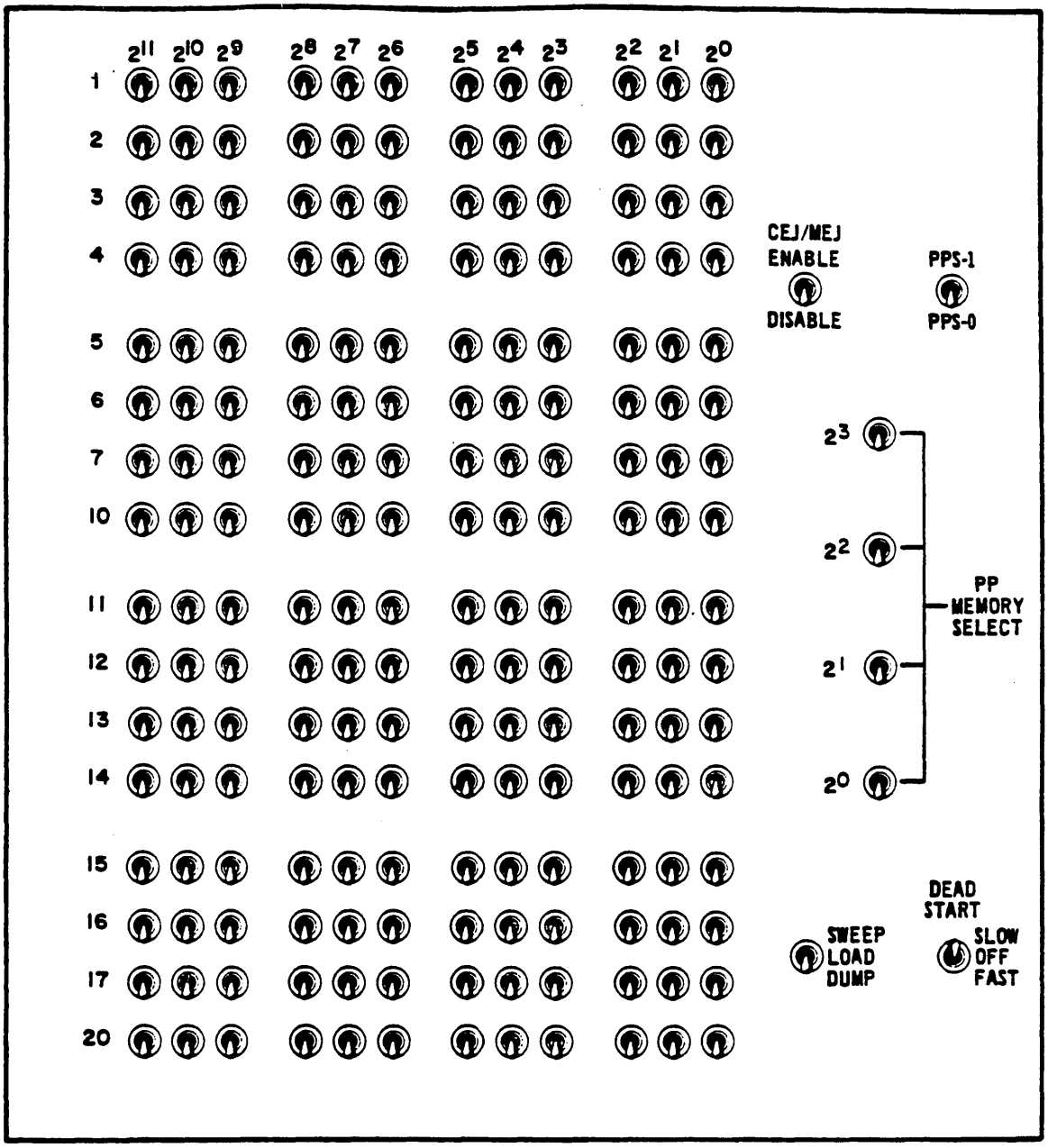
DEADSTART

Deadstart is the process that makes the system operational and ready to process jobs. System deadstart requires that you intervene occasionally. You initiate the deadstart procedure by momentarily activating the deadstart switch.

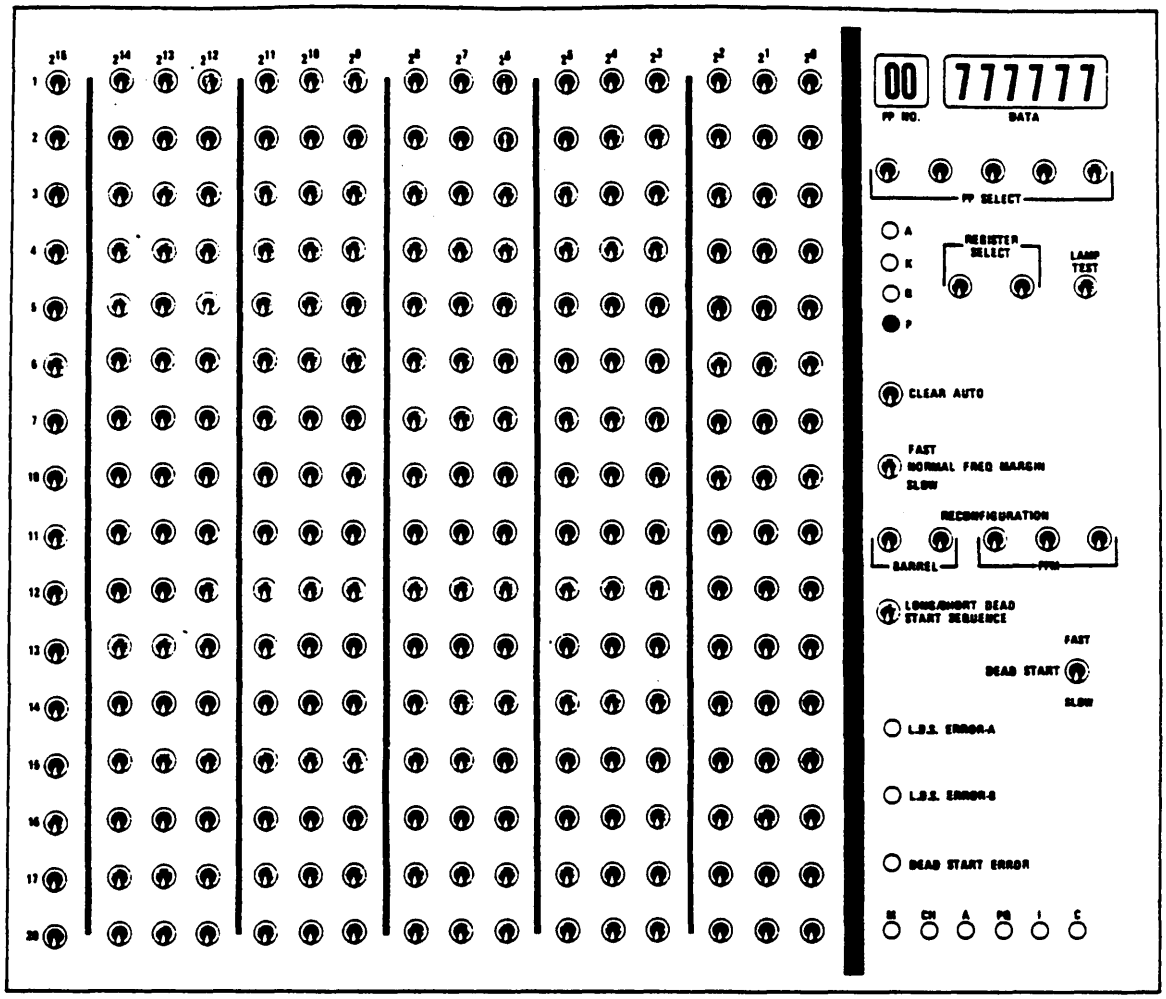
The coldstart procedure loads the tape and disk controller with controlware. The tape controlware can be loaded from a card reader or a tape unit depending on the type of controller.

Warmstart is the deadstart procedure used when the controlware is loaded and functioning properly.

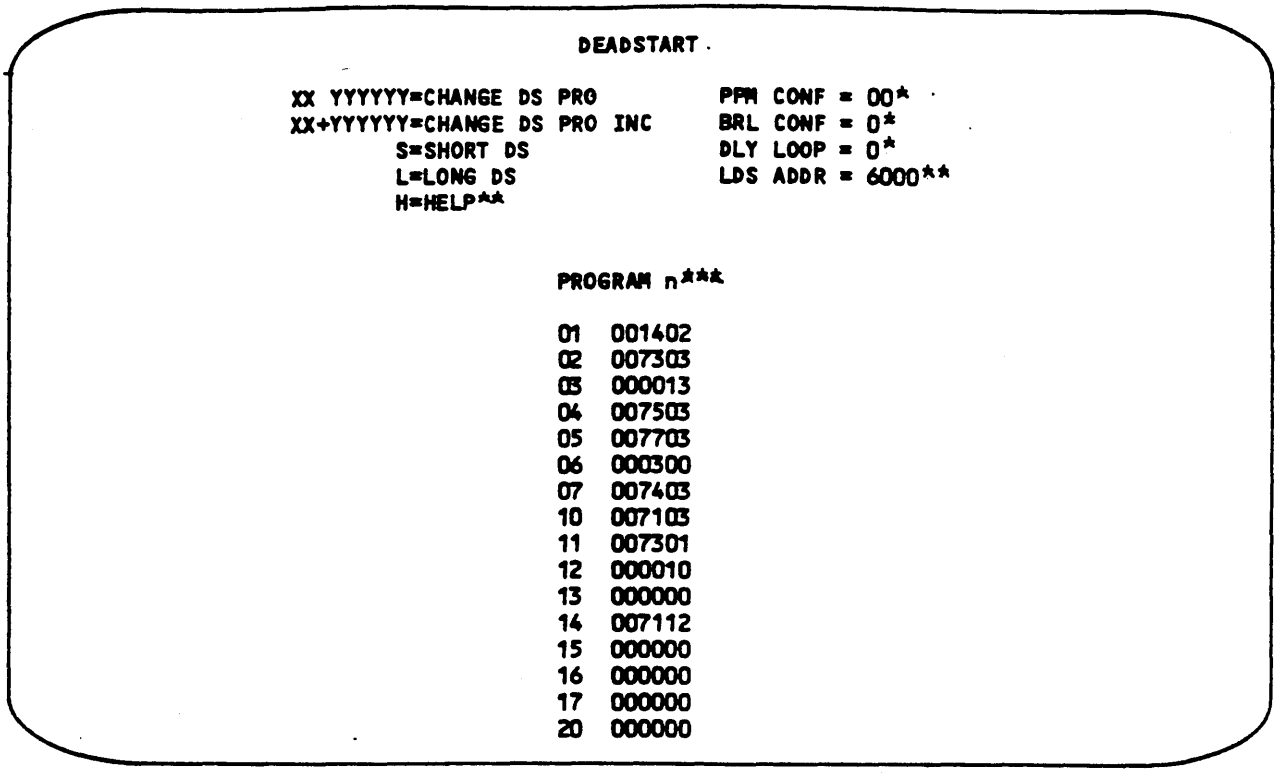
For the deadstart panel setting that applies to your particular configuration, consult section 2 of the NOS Version 2 Operator/Analyst handbook.



CYBER 170 DEADSTART PANEL



CYBER 170 MODELS 835, 845 AND 855 DEADSTART PANEL

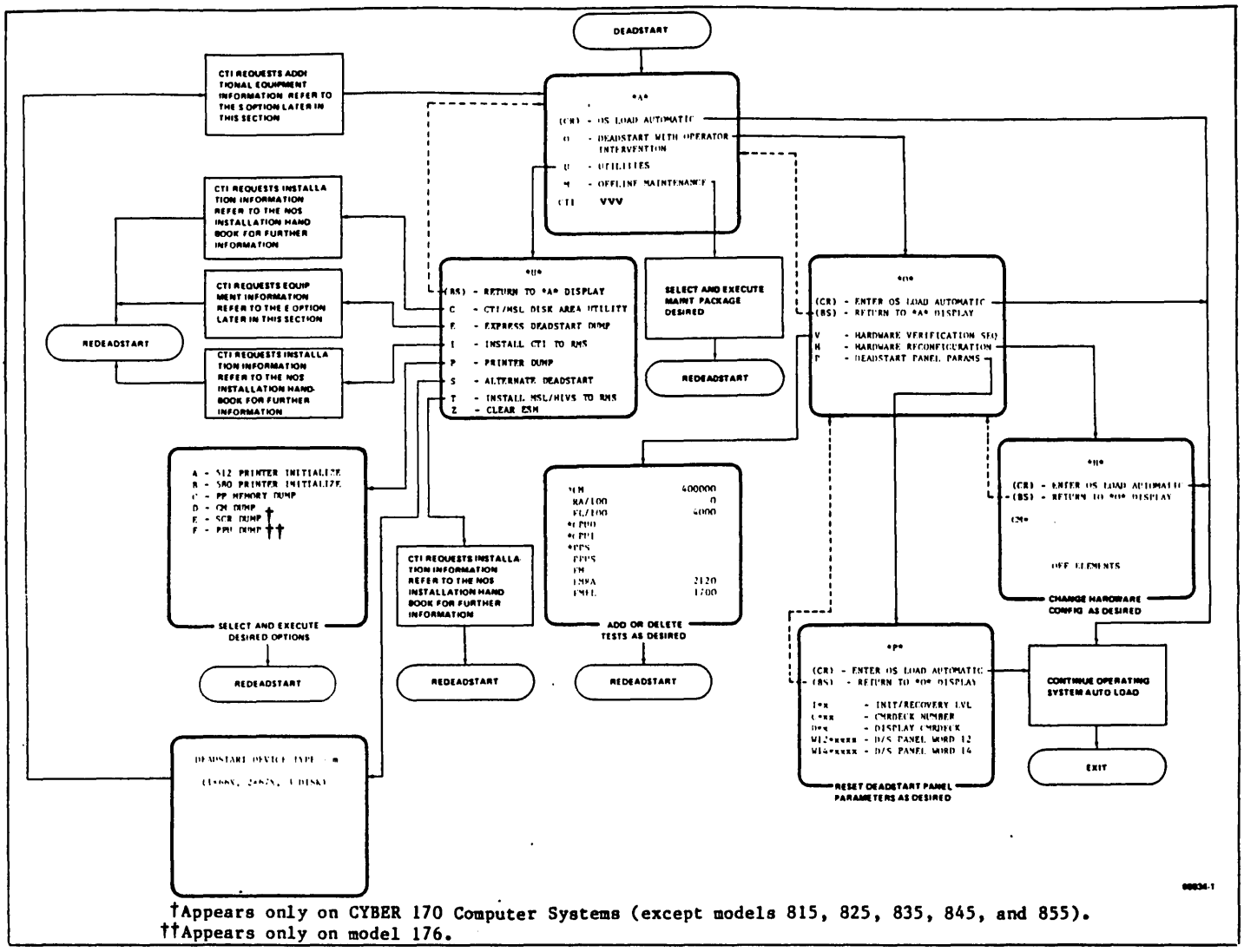


* Refer to appendix I in Operator/Analyst Handbook for explanation of these entries.

** Refer to the CYBER 170 Models 815 and 825 Hardware Operator's Guide for explanation of these entries.

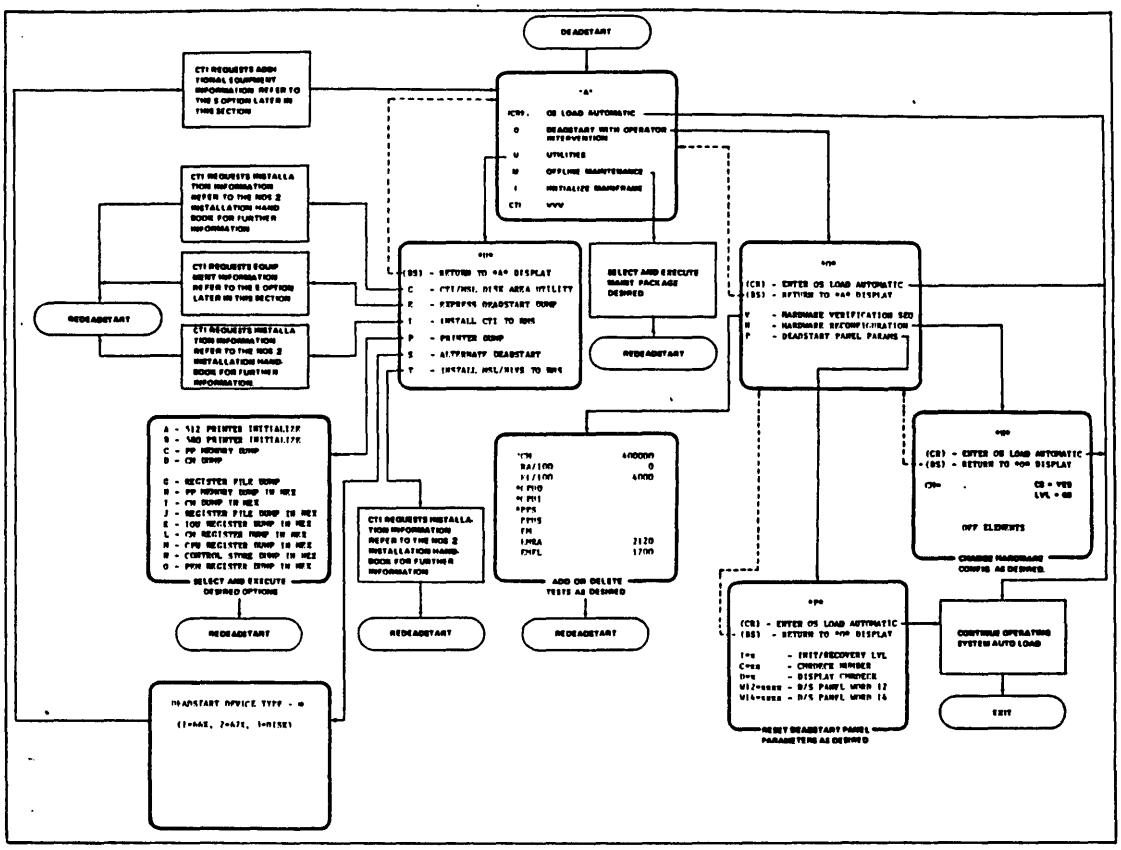
*** n is the number of the most recently used deadstart program number; the program contents are those most recently used to deadstart.

INITIAL DEADSTART DISPLAY FOR MODELS 815 AND 825



†Appears only on CYBER 170 Computer Systems (except models 815, 825, 835, 845, and 855).
††Appears only on model 176.

SELECT CORRECT CTI OPTIONS (EXCEPT MODELS 815, 825, 835, 845 AND 855)



SELECT CORRECT CTI OPTIONS (EXCEPT MODELS 815, 825, 835, 845, AND 855)

RECOVERY DEADSTARTS

Level 0	o	System loaded from DS file
	o	Preserved files recovered
Level 1	o	System restored from checkpoint file
	o	Jobs and files recovered from checkpoint file
	o	Successful CHECKPOINT SYSTEM
	o	All mass storage intact
	o	CMRDECK entries same as last Level 0 or match reconfigurations (if any)
Level 2	o	System loaded from DS tape
	o	Jobs and files recovered from checkpoint file
	o	Successful CHECKPOINT SYSTEM
	o	All mass storage intact
	o	CMRDECK entries same as last Level 0 or match reconfigurations (if any)

RECOVERY DEADSTARTS

Level 3

- System, FNT, MST/TRT, low core CMR and control points recovered from central memory
- FNT, MST/TRT, low core CMR and control points must be intact
- Jobs at control points restarted (rerun)
- CMRDECK entries same as last Level 0 or match reconfigurations (if any)

Recovers from Central mem tables
only PP are recovered.

ALL "Rolled" Jobs Recovered
"as is"
ALL Jobs at central pms.
restart from beginning

use qfam [No Reruns]

Tape Jobs abort
w/ position lost errors

RECOVERY DEADSTARTS
WHEN NOT?

Level 0

Level 1 - Unsuccessful checkpoint system

- Running after checkpoint system

- Unsuccessful Level 3

- MREC → multi mainframe operation

machine Recovery utility

Level 2 - Same as for Level 1

Level 3 - After Level 0, 1, 2, is not successful

- MREC has been run for this machine
  * on any other machine in the complex. sharing equipt. w/ this mach.
- If memory has been destroyed

Recover everything intakkt.

RECOVERY DEADSTARTS
WHEN?

Level 0
- Initial deadstart
- Restart from unsuccessful Level 3
- After MREC

Level 1
- Controlled idle down by checkpoint system
- Allow scheduled interruption of production for maintenance or "systems time"

Level 2
- Controlled idle down by checkpoint system
- Systems test situations

Level 3
- Equipment malfunction hang
- System hang

SYSTEM CONFIGURATION

The system configuration is the identification and grouping of peripheral devices used by the mainframe. These peripheral devices include disk drives, tape drives, line printers, controllers, network processing units, and so forth. The identification and grouping of these devices is defined in four types of files on the deadstart file; the CMRDECK, the EQPDECK, the APRDECKSs, and the IPRDECK.

SYSTEM DEFINITION

The CMRDECK, EQPDECK, APRDECKs, and IPRDECK files together define the system configuration and set the initial operating system limits and priorities.

Each of these files can exist in many versions on the deadstart file. You specify which CMRDECK and EQPDECK to use during a level 0 (initial) deadstart. (On level 3 deadstarts, the CMRDECK and EQPDECK specified during the last level 0 deadstart remains in effect.) APRDECK specifies which APRDECK is needs. If an APRDECK is not specified, a default APRDECK (usually APRDOO) is supplied. One of the entries in the CMRDECK is a command that specifies which IPRDECK is required for this particular system configuration. Thus, by specifying a particular CMRDECK and EQPDECK you can also select the unique combination of APRDECKs and IPRDECK needed to deadstart the system.

All of these files are prepared by site analysts during the installation process. You do not interact with these files unless there is an error or your elect to display the CMRDECK during deadstart. You control when the CMRDECK is displayed during deadstart by the setting of bit 6 in word 13 of the deadstart panel.

If the display CMRDECK switch is set in the up position, the system halts after CTI has completed and displays the CMRDECK. The CMRDECK, the EQPDECK, the APRDECKs, and the IPRDECK can be viewed and changed.

LEVEL 1 OR 2 RECOVERY DEADSTART

All system activity should have closed before deadstarting and all mass storage checkpoints should have been completed.

The following is a sequence to take a checkpoint.

UNLOCK.	
ONSW,IAF,1.	If timesharing subsystem is up
STOP,IAF.	
K,NAM.	Use NAM's K display to bring down network
IDLE.	Don't allow any new jobs into memory (NOTE: only enter after NAM no longer active)
CHECKPOINT SYSTEM	Writes contents of memory to disk
E,M.	Check for DEVICE checkpoint (c in display)
STEP.	Enter if and only if no C's on E,M. display

```
CMRINST
INSTRUCTIONS FOR INITIAL SETUP OF THE OPERATING SYSTEM.
USE + KEY TO SEE NEXT PAGE.

NEXT. WILL CAUSE THE LOAD TO CONTINUE.
IPR. WILL CONTINUE THE LOAD TO THE *IPRDECK* DISPLAY.
GO. WILL CONTINUE THE LOAD WITHOUT FURTHER DISPLAYS.
THE RIGHT BLANK KEY ADVANCES THE DISPLAY.

CLT=N.     SET CLT LENGTH = N OCTAL ENTRIES.
             N=0-100B.  DEFAULT IS 0.
EJT=N.     SET EJT LENGTH = N OCTAL ENTRIES.
             N=3-77777B.  DEFAULT IS 620B.
EQP=NN.    ASSEMBLE EQUIPMENT PARAMETER DECK EQPDNN.
             NN=00-77B.  DEFAULT IS SAME NUMBER AS CMRDECK.
FNT=N.     SET FNT LENGTH = N OCTAL ENTRIES.
             N=3-77777B.  DEFAULT IS 23B.
FOT=N.     SET FOT LENGTH = N OCTAL ENTRIES.
             N=3-100B.  DEFAULT IS 10B.
IPD=NN.    ASSEMBLE INSTALLATION PARAMETER DECK IPRDNN.
             NN=00-77B.  DEFAULT IS FIRST IPRDECK FOUND.
LIB=NN.    BUILD SYSTEM USING LIBDECK LIBDNN.
             NN=00-77B.  DEFAULT IS LIBDDO.
LIDT=N.    SET THE MAXIMUM NUMBER OF LIDS ALLOWED = N.
             N=0-144B.  DEFAULT IS 5.
MID=MM.    SET MACHINE IDENTIFIER = MM.
             MM=TWO ALPHANUMERIC CHARACTERS.  DEFAULT IS AA.
MINCM=N.   SET THE MINIMUM AMOUNT OF CENTRAL MEMORY = N
           HUNDRED OCTAL WORDS.  THE ACTUAL AMOUNT OF
           MEMORY USED AS CENTRAL MEMORY WILL BE PHYSICAL
           SIZE - UEM SIZE.
             N=ONE TO FOUR DIGIT OCTAL VALUE.
             N=ONE TO FIVE DIGIT OCTAL VALUE FOR 8X5 MODELS.
             DEFAULT AND MINIMUM IS 1400B (49K).
NAME=CC-CC.  SET THE SYSTEM NAME = CC-CC.
             CC-CC IS .LE. 38 ALPHANUMERIC CHARACTERS.
NCP=N.     SET THE NUMBER OF CONTROL POINTS = N.
             N=2-34B.  DEFAULT IS 12B.
OPSECM=N.  SET THE SECURITY MODE OF THE SYSTEM.
             N =0-3 (SECURITY MODE).
             DEFAULT IS 0 (UNSECURED MODE).
PPB=N.     SET NUMBER OF 102B WORD CM BUFFERS FOR BUFFERED
           I/O DEVICE TRANSFERS = N.
             N=1-17B.  DEFAULT IS 1.
PPU=P1,...,PN.  TOGGLES ACTIVE STATUS OF THE PHYSICALLY
           AVAILABLE PP-S, EXCEPT FOR PP-S 0, 1, 2 AND 10.
             PN=3-7, 11B, AND 20B-31B.  * TOGGLES THE STATUS
             OF PP-S 20B-31B.  DEFAULT IS ALL PP-S ACTIVE.
QFT=N.     SET QFT LENGTH = N OCTAL ENTRIES.
             N=3-77777B.  DEFAULT IS 620B.
VERSION=CC-CC.  SET VERSION NAME = CC-CC.
             CC-CC IS .LE. 18 ALPHANUMERIC CHARACTERS.
```

```
EQPINST
 INSTRUCTIONS FOR EQUIPMENT DEFINITION.
 USE + KEY TO SEE NEXT PAGE.

 NEXT. WILL CAUSE THE LOAD TO CONTINUE.
 IPR. WILL CONTINUE THE LOAD TO THE *IPRDECK* DISPLAY.
 GO. WILL CONTINUE THE LOAD WITHOUT FURTHER DISPLAYS.
 THE RIGHT BLANK KEY ADVANCES THE DISPLAY.

 LBC,CT,C1,C2,...,CN.
     LOADS CONTROLWARE RECORD TYPE *CT* ON DISK CHANNELS
     C1,C2,...,CN.
     CT = CONTROLWARE TYPE TO LOAD.
          HT = LOAD HALF TRACK CONTROLWARE.
          NH = DO NOT LOAD HALF TRACK CONTROLWARE.
          FT = LOAD FULL TRACK CONTROLWARE.
          NF = DO NOT LOAD FULL TRACK CONTROLWARE.
          FM = LOAD FMD CONTROLWARE.
          NM = DO NOT LOAD FMD CONTROLWARE.
          AD = LOAD FSC ADAPTOR CONTROLWARE.
          NA = DO NOT LOAD FSC ADAPTOR CONTROLWARE.
          PH = LOAD HSIO CONTROLWARE.
          NP = DO NOT LOAD HSIO CONTROLWARE.
          NN = DO NOT LOAD NAD CONTROLWARE.
     CN = CHANNELS TO LOAD.
 RESET=X1,X2,...,XN.
     RESET CHARACTERISTICS FOR EQUIPMENTS WITH EST ORDINALS
     X1,X2,...,XN.  ONLY THE EQUIPMENT INFORMATION ENTERED
     VIA THE *EQXXX=* COMMAND WILL BE RETAINED.
 XM=MID,IIII,UUUU,EM.
     ALLOCATE EXTENDED MEMORY.
     MID  = MACHINE ID.
     IIII = HIGH SPEED DISK BUFFER SPACE/1000B.
     UUUU = USER EXTENDED MEMORY SPACE/1000B.
     EM =  FORCES USER EXTENDED MEMORY TO UEM IF SPECIFIED
           (8XX SERIES MAINFRAMES ONLY).
 XM=MID.
     CLEAR ALLOCATION FOR MACHINE *MID*.

 THE FOLLOWING ENTRIES DEFINE DAYFILE RESIDENCE AND CM
 BUFFER SIZE.  IF EQUIPMENT IS DELETED (EQXXX=0.), RESET
 OR REDEFINED, THE DAYFILE RESIDENCE IS RESET TO THE
 DEFAULT (NULL EQUIPMENT).

 ACCOUNT=XXX,BL.  ACCOUNT DAYFILE.
 DAYFILE=XXX,BL.  SYSTEM DAYFILE.
 ERRLOG=XXX,BL.   ERRLOG DAYFILE.
 MAINLOG=XXX,BL.  MAINTENANCE LOG.
     XXX = EST ORDINAL (DEVICE CANNOT BE REMOVABLE).
     BL = CM BUFFER LENGTH (MUST BE A MULTIPLE OF 100B).

 THE FOLLOWING ENTRIES MUST BE MADE AFTER THE EQUIPMENT HAS
 BEEN DEFINED.  IF EQUIPMENT IS DELETED (EQXXX=0.), RESET
 OR REDEFINED, THEN THESE DEFINITIONS ARE CLEARED AND MUST
 BE REENTERED AFTER NEW EQUIPMENT IS DEFINED.

 X1,X2,...,XN = EST ORDINALS OF EQUIPMENT.
```

```
ACCESS,LLVL,ULVL,X1,X2,...,XN.
    SET SECURITY ACCESS LEVEL LIMITS ON X1,X2,...,XN.
    LLVL = ACCESS LEVEL NAME FOR THE LOWER LIMIT.
    ULVL = ACCESS LEVEL NAME FOR THE UPPER LIMIT.
ASR=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS ALTERNATE SYSTEM DEVICES.
DOWN=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS DOWN (AND OFF) DEVICES.
FAMILY=XXX.
    DEFINE EQUIPMENT WITH EST ORDINAL *XXX* AS THE
    DEFAULT FAMILY.
INITIALIZE,OP,X1,X2,...,XN.
    INITIALIZE MASS STORAGE DEVICES X1,X2,...,XN.
    OP = INITIALIZATION OPTION.
         AL = TOTAL INITIALIZE.
         AF = INITIALIZE ACCOUNT DAYFILE.
         DF = INITIALIZE SYSTEM DAYFILE.
         EF = INITIALIZE ERRLOG DAYFILE.
         FP = FORMAT PACK (AUTOMATIC SELECTION OF *AL*).
         MF = INITIALIZE MAINTENANCE LOG.
         PF = INITIALIZE PERMANENT FILES.
         QF = INITIALIZE QUEUED FILES.
ISHARE=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS INDEPENDENT SHARED DEVICES.
MSAL,TY,X1,X2,...,XN.
    ALLOW ALLOCATION TYPE *TY* ON X1,X2,...,XN.
    (XN MUST BE .LT. 608).
    TY = B FOR *LGO* FILES.
         D FOR USER DAYFILES.
         I FOR INPUT FILES.
         L FOR LOCAL FILES.
         O FOR OUTPUT FILES.
         P FOR PRIMARY FILES.
         R FOR ROLLOUT FILES.
         S FOR SECONDARY ROLLOUT FILES.
         T FOR TEMPORARY FILES.
PF=XXX,F,DM,SM,FM,DN,NC.
    DEFINE EQUIPMENT WITH EST ORDINAL *XXX* AS A PERMANENT
    FILE FAMILY DEVICE.
PF=XXX,X,PN,NC.
    DEFINE EQUIPMENT WITH EST ORDINAL *XXX* AS A PERMANENT
    FILE AUXILIARY DEVICE.
    APPLIES IF INITIALIZE,AL,XXX. IS USED.
    DM = DEVICE MASK (0-3778).
    SM = SECONDARY MASK (0-3778).
    FM = FAMILY NAME (1-7 ALPHANUMERIC CHARACTERS).
    PN = PACK NAME (1-7 ALPHANUMERIC CHARACTERS).
    DN = DEVICE NUMBER (1-778).
    NC = CATALOG TRACKS (POWER OF 2 .LE. 2008).
REMOVE=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS REMOVABLE DEVICES.
SHARE=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS SHARED DEVICES.
    THIS ENTRY IS NOT ALLOWED FOLLOWING *PRESET*.
```

```
EQ=N.           EQUIPMENT (CONTROLLER) NUMBER.
                  N = 0-7.
FC=XX.          FORMS CODE.
                  XX = 2 ALPHANUMERIC CHARACTERS (AA-99).
HT=N.           LENGTH OF HASH TABLE SEGMENT.
                  N = 10B-400B, MUST BE A POWER OF 2.
ID=N.           IDENTIFIER.
                  N = 0-67B.
MA=XX.          MAINTENANCE MODE (EM HALF SIZE).
                  XX = ON OR OFF.
MC=N.           ESM SIDE DOOR PORT CHANNEL NUMBER.
                  N=0-13B, 20-33B.
MI=N.           MSA MSID.
                  N = 0-17B.
ND=N.           NPU NODE NUMBER.
                  N = 1-37B.
PI=N.           PIP INDEX.
                  N = 1-4.
PS=X.           PAPER SIZE.
                  X = S OR L.
PT=N.           PORT NUMBER OR NUMBER OF PORTS.
                  N = 0-7 IF *TY* IS *CS* OR *CT*.
                    = 0 OR 1 IF *TY* IS *RM*.
                    = 1-1000B IF *TY* IS *TT*.
SA=XX.          SYSTEM AUTOSTART MODULE (SAM) FLAG.
                  XX = ON - *SAM* IS PRESENT.
                  XX = OFF - *SAM* IS ABSENT.
ST=XX.          DEVICE STATUS.
                  XX = ON OR OFF.
SZ=N.           EXTENDED MEMORY SIZE.
                  N = 400B, 1000B, 2000B, 4000B, OR
                      10000B IF ECS 1, ECS 2, ESM OR
                      LCME.
                    = 10B - (10000B-MINCM) IF UEM.
TF=XXX.         TAPE FLAG.
                  XXX = ATS - 67X (ATS) UNIT.
                      = FSC - FSC UNIT.
                      = MTS - 66X (MTS) UNIT.
                      = ATSGE - ATS UNIT/GE CAPABILITY.
                      = FSCGE - FSC UNIT/GE CAPABILITY.
TN=N.           PRINTER WITH TRAIN CARTRIDGE N.
                  N = 0-7.
UI=N.           UNIT MSID.
                  N = 0-377B.
UN=U1/.../UN.   UNIT NUMBER(S).
UN=U1-UN.       (HORIZONTALLY CONTIGUOUS UNITS)
                  N = 0-77B.
W0=N.           EST ENTRY WORD 0 (20 OCTAL DIGITS).
W1=N.           EST ENTRY WORD 1 (20 OCTAL DIGITS).
```

```
TY  REQUIRED KEYWORDS        OPTIONAL KEYWORDS

CC  EQ,CH                    ST
CP  EQ,CH                    ST,ID,FC
CR  EQ,CH                    ST,ID
CS  EQ,UN,CH,CI,MI,UI,PT     ST
CT  EQ,UN,CH,CP,MI,UI,PT     ST
DA  UN,CH                    ST,AP
DB  UN,CH,HT                 ST,AP
DE  SZ                       ST,MA,ET,AP,MC
DI  UN,CH                    ST,AP
DJ  UN,CH                    ST,AP
DK  UN,CH                    ST,AP
DL  UN,CH                    ST,AP
DM  UN,CH                    ST,AP
DP  SZ,CH                    ST,MA,ET,AP,MC
DQ  UN,CH                    ST,AP
DV  UN,CH,HT                 ST,AP
DW  UN,CH,HT                 ST,AP
DX  UN,CH                    ST,AP
DY  UN,CH                    ST,AP
DZ  UN,CH                    ST,AP
LP  EQ,CH                    ST,ID,FC,TN,PS
LQ  EQ,CH                    ST,ID,FC,TN,PS
LR  EQ,CH                    ST,ID,FC,TN,PS
LS  EQ,CH                    ST,ID,FC,TN,PS
LT  EQ,CH                    ST,ID,FC,TN,PS
MP  CH                       ST
MT  EQ,UN,CH,TF              ST
NC  CH                       ST
NP  EQ,CH,PI,ND,SA           ST
NT  EQ,UN,CH,TF              ST
RM  CH,PT                    ST
TT  EQ,CH                    ST,PT
**  WO                       W1

K1,...,KN ARE THE FOLLOWING KEYWORDS -

 AP=N.              APRDECK NUMBER.
                      N = 0-77B.
 CH=C1/.../CN.      CHANNEL NUMBER(S).
                      CN = 2, 4 OR 6 IF *TY* IS *DV* OR *DW*.
                         = 15B IF *TY* IS *RM*.
                         = 0-13B, 20-33B FOR ALL OTHER TYPES.
 CI=X.              CSU IDENTIFIER.
                      X = A-M.
 CP=N.              POSITION OF MST ON THE CSU.
                      N = 0-3.
 ET=MT/PT.          EXTENDED MEMORY TYPE (DEFAULT = E1/D1).
                    MT = MEMORY TYPE.
                         E1 - ECS 1.
                         E2 - ECS 2.
                         LE - LCME.
                         EM - UEM.
                         ES - ESM.
                    PT = PATH TYPE (*DP* EQUIPMENT ONLY).
                         D1 - DC135 DDP.
                         D2 - DC145 DDP / ESM LOW SPEED PORT.
```

```
SYSTEM=X1,X2,...,XN.
    DEFINE X1,X2,...,XN AS SYSTEM DEVICES.
    ALL EQUIPMENTS SPECIFIED MUST BE OF THE SAME TYPE.
    *MXSY* (5) SYSTEM DEVICES MAY BE DEFINED.
    (XN MUST BE .LT. 40B).
PRESET,N.
    PRESET LINK DEVICE FOR MULTI-MAINFRAME OPERATION.
    N = OPTIONAL PARAMETER SPECIFYING MAXIMUM NUMBER OF
        SHARED DEVICES (N .LT. 377B).
PRESET=X1,X2,...,XN.
    PRESET INDEPENDENT SHARED DEVICES X1,X2,...,XN.

DEADSTART OPTIONS.

AUTOLOAD.
    DISABLE AUTOLOADING OF BUFFER CONTROLLERS.
GRENADE.
    SELECT GRENADE OPERATION AFTER AUTOLOADING.
EST DEFINITION

EQXXX=TY,K1=V1,...,KN=VN.  DEFINE EQUIPMENT WITH EST
ORDINAL *XXX* AS FOLLOWS.

TY = DEVICE TYPE (2 CHARACTERS)

MASS STORAGE -
DE = EXTENDED MEMORY          DP = DDP/EXTENDED MEMORY
DI = 844-21, HALF TRACK       DK = 844-21, FULL TRACK
DJ = 844-41/44, HALF TRACK    DL = 844-41/44, FULL TRACK
DM = 885-11/12, HALF TRACK    DQ = 885-11/12, FULL TRACK
DV = 819, SINGLE DENSITY      DW = 819, DOUBLE DENSITY
DX = 3330-1, FULL TRACK       DY = 3330-11, FULL TRACK
DZ = 3350, FULL TRACK         DA = 33502, FULL TRACK
DB = 885-42, FULL TRACK

UNIT RECORD -
FOR LINE PRINTERS, EQXXX=TY-P SPECIFIES A 580 PFC
PRINTER.

CP = 415 CARD PUNCH           CR = 405 CARD READER
LP = ANY LINE PRINTER         LQ = 512 LINE PRINTER
LR = 580-12 LINE PRINTER      LS = 580-16 LINE PRINTER
LT = 580-20 LINE PRINTER

OTHER -
FOR MAGNETIC TAPES, EQXXX=TY-N SPECIFIES *N* CONSECUTIVE
EST ENTRIES BEGINNING AT EST ORDINAL *XXX*.

CC = 6683 SATELLITE COUPLER   CS = MSS CARTRIDGE SELECTOR
CT = MSS CARTRIDGE TRANSPORT  MP = MAP III
MT = 7-TRACK MAG TAPE DRIVE   NC = NETWORK ACCESS DEVICE
NP = 255X NETWORK             NT = 9-TRACK MAG TAPE DRIVE
     PROCESSING UNIT (NPU)    RM = TWO PORT MUX
TT = TIME-SHARING MUX         ** = NONSTANDARD EQUIPMENT
```

```
APRINST
INSTRUCTIONS FOR ENTERING DISK FLAWS.

BELOW IS A LIST OF ENTRIES WITH WHICH TO SET TRACK
FLAWS IN TRTS.

TRACK RESERVATION ENTRIES.

CTK.              CLEAR PREVIOUS RTK, STK AND TTK ENTRIES.
STK=NNNN.         SET RESERVATION ON LOGICAL TRACK NNNN.
TTK=NNNN.         TOGGLE RESERVATION ON LOGICAL TRACK NNNN.
RTK=AIIIIII.      RESERVE ECS BLOCK, ADDRESS AIIIIII.
RTK=AIIIIIII-AJJJJJJJ.  RESERVE ECS BLOCK FROM ADDRESS IIIIIII
                        TO JJJJJJJ.
TKF=CNNN,TBB,SCC.  RESERVE 819 TRACK.
RTK=CNNN,TBB,SCC.  RESERVE 819 TRACK.
    CNNN = CYLINDER NNN.
    TBB = HEAD GROUP BB.
    SCC = SECTOR CC.
```

QUIZ 6

1) What is the deadstart panel and what is its function?

2) A PP instruction is how many bits long?

3) What word is set to change the deadstart device?

4) The following are examples of word 13 settings. What do they mean?

   a) 011 000 000 000

   b) 000 011 010 001

   c) 011 001 000 001

   d 000 010 000 000

5) In an 800 series machine deadstart panel, what function does word 12 have?

6) In doing an alternate device deadstart, what sequence of displays is used?

7) In doing a printer dump to dump a portion of central memory, what steps are taken?

8) On an 800 series mainframe, what is the difference between long and short deadstart sequences?

9) What mainframe or mainframes have no deadstart panel?

QUIZ 6 (Con't)

10) What is WARMSTART?

Identify the following:

1) Express deadstart dump

2) CMRDECK

3) Control Store

4) APRDECK

5) IPRDECK

6) CTI

7) Deadstart file

8) EQPDECK

9) HIVS

10) Deadstart

LABORATORY OUTLINE

1. Perform a level 0 deadstart.

    a) Display the CMRDECK, EQPDECK, APRDECK and IPRDECK.

    b) Make changes to the CMRDECK, and EQPDECK (to be supplied by instructor)

2. Take the system down.

3. Re-deadstart doing a level 0 from an alternate device.

4. Take the system down.

5. Take a printer dump (particulars supplied by the instructor).

6. Complete an express deadstart dump.

7. Assume a PP hung, bring the system up.

8. Take a system checkpoint.

9. Bring the system up.

Lesson 11

UTILITIES

LESSON PREFACE:

This lesson introduces the student to some of the system utilities that are available to the operator. Topics discussed include: loading, dumping, and copying permanent files; loading, dumping, moving, recovering, listing, and changing queued file characteristics; and dumping, listing, and terminating dayfiles.

OBJECTIVES:

Upon completion of this lesson, the student should be able to:

- Dump permanent files
- Load permanent files
- Dump input/output queues
- Load input/output queues
- Recover input/output queues
- Change characteristics of a queue file
- Dump system day files
- List system dayfiles

REFERENCE:

NOS Version 2 System Maintenance Reference Manual - Pub. No. 60459300 (Sections 1, 2)

PERMANENT FILE UTILITIES

PFDUMP	Dump permanent files to an archive file
PFLOAD	Load permanent files from an archive file
PFCOPY	Copy archive file(s) to a local file(s)
PFCAT	Produce a catalog directory of permanent files on a device
PFATC	Produce a catalog directory from an archive file

CALLING THE UTILITIES

Permanent file utility operations can be initiated through console input to a K display, card input (batch), or terminal entries. However, for batch or terminal input, the user must be validated for system origin privileges and the system must be in DEBUG mode.

CONSOLE INPUT

Input from the console requires the following sequence of entries and responses.

1. Call PFS by typing:

   ```
   X.PFS.
   ```

   The B display indicates the job sequence name (jsn) of PFS. To the right of the entry appears the following message:

   ```
   REQUEST *K* DISPLAY
   ```

2. Activate the K display for that control point by typing:

   ```
   K,jsn.
   ```

   (jsn is the Job Sequence Name of PFS specified on the B display)

3. Activate the right K display by typing:

   ```
   KK.
   ```

4. Choose options

5. Initiate execution by typing:

   ```
   K.GO.
   ```

PROCEDURE FILES

Calling the PF utilities can be made simpler with site defined procedure files. If these procedures are defined on file PROCFIL under user name SYSTEMX (user index 377777_8), they can be called by operator entry from DSD. Since user name SYSTEMX is valid only from system origin jobs, the file PROCFIL should be write-permitted to another user name; this will allow easier maintenance of site defined procedures.

For example, when called in the following manner, the procedure DUMPIT provides a full dump of device 1 of the system default family on archive tapes with VSNs of PFB11, PFB123, ..., PFB16.

```
X.BEGIN(DUMPIT,,DEVICE=1,SET=B)
```

The SETJOB command is used to set the UJN of the job so that the banner page indicates the dump operation performed. In this case it is FULL1B.

```
.PROC,DUMPIT,DEVICE=O,LISTOP=E,SET=A.

SET JOB,UJN=FULL_DEVICE_SET.

VSN,TAPE=PF_SET_DEVICE_1/PF_SET_DEVICE_2/PF_SET_DEVICE_3/

PFPF_SET_DEVICE_4/PF_SET_DEVICE_5/PF_SET_DEVICE_6.

LABEL,TAPE,D=GE,PO=W,W,FI=$FULL DUMPS.

PFDUMP,DN=DEVICE,LO=LISTOP.
```

PARAMETERS FOR THE PERMANENT FILE UTILITIES

Table 1-1 indicates the parameter options accepted by each permanent file utility. An X indicates that the parameter option is accepted; a blank indicates that the parameter option is not accepted.

QUEUE/DAYFILE UTILITIES

Several utility programs provide control over queued input, print, wait, and punch files and over system, account, binary maintenance log, and error log dayfiles.

- There are ten utilities under the control of the queue file supervisor program QFSP. These utilities select for processing queue files or dayfiles that share certain user-specified characteristics such as device residence, origin type, and job sequence name.
- The dayfile dumping utilities are four independent utilities that dump all or selected parts of the active system, account, error log or binary maintenance dayfiles. These utilities each process the contents of a single file according to user-specified criteria.

QUEUE FILE UTILITIES

The names and functions of the queue file utilities follow.

Utility	Description
QREC	Deactivates or activates selected queued files; purges inactive queued files.
QLIST	Lists inactive queued files.
QDUMP	Dumps queued files to tape or mass storage.
QLOAD	Loads files dumped by QDUMP as queued files.
QMOVE	Moves queued files from one mass storage device to another.
LDLIST	Lists queued files present on a QDUMP dump tape/file.
QALTER	Alters routing information associated with active queued output files; purges active queued files.
QFTLIST	Lists detailed information about active queued files.
DFTERM	Terminates an active or inactive dayfile and retains it as a direct access permanent file.
DFLIST	Lists dayfiles that have been made permanent files by the DFTERM utility.

CALLING THE QUEUE FILE UTILITIES

All queue file utility operations, except for DFLIST, LDLIST, and QLIST, can be initiated through console input to a K display. All queue utilities except DFLIST, QALTER, QFTLIST and DFTERM can be initiated through direct keyboard entries (under DIS or DSD control), card input (batch), or terminal entries. DFTERM, QFTLIST, DFLIST and QALTER operation can be initiated only through direct keyboard entries. However, in all cases, for batch and terminal input, the user must be validated for system origin privileges, the console must be in DEBUG mode and the user must observe certain parameter order dependencies. Since LDLIST, QDUMP and QLOAD require preassignment of the dump file, only DIS, batch, or terminal input is appropriate for these
utilities.

CONSOLE INPUT

Input from a console through a K display requires the following sequence of entries and responses. These procedures do not apply to DFLIST, QLIST, or LDLIST, because K displays are not available for these utilities.

1. Call QFSP by typing:

   ```
   X.QFSP.
   ```

   The B display indicates the job sequence name of QFSP. To the right of the entry the following message appears:

   ```
   REQUEST *K* DISPLAY
   ```

2. Activate the K display for that control point by typing:

   ```
   K,jsn.
   ```

   (jsn is the Job Sequence Name of QFSP specified on the B display.)

3. Activate the right K display by typing:

   ```
   KK.
   ```

4. Choose options

5. Initiate execution by typing:

   ```
   K.GO.
   ```

TYPES OF DAYFILES

Account Dayfile	-	records all resources charged to a job and is used for customer billing
Binary Maintenance Log Dayfile	-	records information used in maintenance in a binary format
Error Log Dayfile	-	records system error messages
Job Dayfile	-	records entries for individual jobs
System Dayfile	-	History of all commands for all jobs processed

DAYFILE COMMANDS

X.DFD.	Dump system dayfile
X.AFD.	Dump accounting file
X.ELD.	Dump the error log file
X.MAINLOG.	Dump the Binary Maintenance Log

Lesson 12

SECURITY

LESSON PREFACE:

This lesson introduces the student to the concept of security available in NOS. Topics covered are the commands available and restrictions they impose.

OBJECTIVES:

Upon the successful completion of this lesson, the student should be able to:

- Define operating system modes
- Describe Security Administration capability
- Define restrictions at different security levels.

REFERENCES:

NOS Version 2 Operator/Analyst Handbook

OVERVIEW

NOS Multi-Level Security is based upon two mechanisms for ensuring the privacy of a set of data, mechanisms in addition to the standard NOS privacy mechanisms. These are (1) hierarchical security access levels, and (2) security categories (often referred to as "compartments"). The access level and category(s) of a set of data are attributes of that data, determined and defined by the owner of the data in accordance with applicable security policy.

Some of the major features are:

- Provision of eight hierarchical access sensitivity levels for classification of data and other system resources.
- Provision of thirty-two security categories (compartments) for classification of permanent files.
- Mandatory access control and flow control policy enforcement.
- Separate passwords for interactive and batch use.
- Password encryption.
- User password expiration terms.
- Permanent file password expiration terms.
- Permanent file PERMIT expiration terms.
- Overwrite (clearing) of directly accessible mass storage files.
- Classified output labeling.
- Clearing of storage after job rollout.

OPERATING SYSTEM MODE

There are defined two modes of operation of the NOS Operating System: the secured mode and the unsecured mode.

In the secured mode, a user may access the same files with the added constraint of access levels and access categories.

In the unsecured mode, a user may access all his files and other users' files for which explicit/implicit permission had been given him.

SECURITY ACCESS LEVELS

Tight security access levels are available for the classification of data, ranging from 0, the lowest (unsecured or unclassified) level, to 7, the highest level. These levels are hierarchical, level "x" being defined as less sensitive than level "x+1." The creator, or owner, of the data file - permanent file, local file, or magnetic tape - may assign an access level to that file depending upon the owner's individual validations and upon operating system constraints. Alternatively, the owner may allow the file's access level to be assigned automatically by the operating system.

SECURITY CATEGORIES

In addition to the eight access levels, there are thirty-two categories available for the classification of data. The owner of a permanent mass storage data file may assign any or all of the thirty-two categories to that file, depending upon the owner's individual validations and upon operating system constraints.

Like security access levels, it should be noted that it is also the responsibility of the owner of a permanent file to determine the security category(s) appropriate for the data in accordance with the privacy and security policies applicable to the data contained within the file.

MANDATORY SECURITY

In conjunction with the formal security access level and category designations associated with classified data (the "mandatory" classification designations), there is a corresponding set of formal clearances which users must have in order to access classified information. Compromise is defined as "the disclosure of classified information to persons not authorized access thereto." A user may not obtain access to classified information if the user is not cleared to the classification level of the information.

A requirement of the above is that classification labels associated with sensitive data cannot be arbitrarily changed,, since this could permit indiviuals who lack the appropriate clearance to access classified information. An additional requirement is that the system must control the flow of information so that data from a higher classification cannot be placed in a storage object of lower classification unless its "downgrading" has been authorized.

OPERATING SYSTEM ACCESS LIMITS

Control of access to the operating system when the system is in the secured mode (OPSECM CMRDECK entry equal to 1, 2, or 3) is accomplished by setting the highest and lowest security access levels that are allowed in the system. These levels are referred to as the system access limits. They define an inclusive range of access levels: no job may execute at an access level below the lower bound or above the upper bound. Similarly, no file or device may be accessed below the lower bound or above the upper bound.

Options available are described below:

OPSECM=n Sets the operating system security mode to the value "n." The values of "n" are as follows:

- 0 Sets the system to the unsecured mode. This is the default value and is selected when the OPSECM IPRDECK entry or parameter value is omitted.
- 1 Multi-level security is enabled. The value(s) of the system access level limits may be set either by the SECURES IPRDECK entry or by console command. The SECURES console command may be used to either raise or lower system access level limits.
- 2 Multi-level security is enabled. The value(s) of the system access level limits are set by the SECURES IPRDECK entry. The SECURES console command may be used to raise but not to lower system access level limits.
- 3 Multi-level security is enabled. The value(s) of the system access level limits are set by the SECURES IPRDECK entry only; the SECURES console command is invalid.

ORIGIN TYPE ACCESS LIMITS

In addition to the operating system access limits, access limits may be defined for each origin type. The system access limits are by definition the access limits for System origin. Unless redefined by deadstart IPRDECK entry or by console command, all origin type limits will be the same as the system access limits.

This feature will be useful for limiting, for instance, interactive jobs to be certain range of access levels while batch jobs are permitted a greater range of access levels.

The access limits defined for an origin type other than System (which set the system access limits) must lie within the system access limits. If the system access limits are reset with the SECURES,SY command, all origin type limits will also be reset.

EQUIPMENT ACCESS LEVEL LIMITS

In a secure system, access level limits may be assigned to individual equipment. The access level limits define the lowest and highest access levels of data that may be written to or read from that equipment.

MASS STORAGE DEVICE ACCESS LEVEL LIMITS

When a mass storage or ECS device is initialized, the access level limits of data permitted to reside on the device will be recorded in the MST in the device label. No files may be assigned to that device that have access levels outside the device access level limits. Existing files on the device may not have their access levels changed to levels outside the access level limits.

SECURITY ADMINISTRATOR

Although the operator can be considered cleared for normal system control functions, there are certain system control functions which are more sensitive in a multi-level security system environment. These include the ability to change users' validations, to modify system security control parameters, or to directly interrogate or alter user programs or data.

In order to provide a higher, more sensitive level of access to system control, NOS Multi-Level Security will use the concept of Security Administrator Privilege, a validation privilege for the individual in the user validation file. This privilege will allow an installation to designate a certain individual or individuals as security administrator(s) in accordance with the installation security procedures. Those system control functions which require this privilege are described in various portions of this document.

See lesson on Modval for other user validations.

SECURED SYSTEM CONTROL COMMANDS

The following commands are allowed on a secured system.

OQSH=level.

Specifies the output queue special handling level on a secured system. The output queue special handling level is set initially during deadstart by the OQSH IPRDECK entry. Output files with an access level greater than or equal to the output queue special handling level specified in this command are not printed but remain in the queue until released by the operator (refer to RELEASE command). If level is set to the lowest access level or no level is specified, no files are held in the queue.

RELEASE,jsn.

Allows the operator to release a file from the output queue whose level is equal to or above the output queue special handling level on a secured system. Other restrictions based on device access levels and file access levels set by your site continue to apply.

SECURES,ot,LA=lowerlevel,UA=upperlevel.

Sets the system access level limits (ot=SY) or the origin type access level limits for a particular origin type (ot=IA, BC, or RB). The system access level limits determine the range of access levels allowed in the system; jobs may not execute at an access level outside this range, and files may not be created or accessed at an access level outside this range. Origin type access level limits determine the range as it applies to jobs of one particular origin type. By default, all origin type access level limits are the same as the system access level limits.

The options available for using this command to change the system limits (that is, whether they can be raised, lowered, or both) are controlled by the OPSECM CMRDECK entry. The origin type access level limits for ot=IA, BC, and RB can be changed to any values within the system access level limits. When the system access level limits are changed (ot=SY), all origin type access level limits are reset to the new system limits.

The parameters LA and UA specify the lower and upper access level limits. Both parameters must be specified. The access level value corresponding to the lower access level must be less than or equal to the access level value corresponding to the upper access level.

UNLOCK,username,password.

Unlocks the console keyboard. When this command is active, the message SECURITY UNLOCK appears in the header on the left screen display. The following commands are restricted to entry only when the console is in security unlock status.

DEBUT.
DIS,jsn.
ENABLE,ENGR.
ENABLE,RDG.
QDSPLAY,jsn.
SECURES,ot,LA=lowerlevel,UA=upperlevel.
SECUREQ,est,LA=lowerlevel,UA=upperlevel. (est is the EST ordinal)
All memory entry commands.
All memory display commands.

Lesson 13

UTILITIES

LESSON PREFACE:

This lesson introduces the student to Network Access Methods (NAM). NAM initializes and controls the 255X Network Processing Units (NPU's), trunks, lines, terminals, and application programs under network supervision.

OBJECTIVES:

At the completion of this lesson, the student should be able to:

- Initialize the network
- Enable/disable the various elements in the network
- STATUS the various elements in the network
- Send messages to various elements in the network

REFERENCE:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310 (Section II-5)

TERMS ASSOCIATED WITH NAM

NAM - Network Access Method - Acts as an interface between the host computer application programs at one end and the terminals at the other end.

NCF - Network Configuration File - Establishes the configuration of NPU's, trunks, and logical links in the network.

NS - Network Supervisor - Loads CCP into the NPU's. Establishes the logical linkages through which messages are transmitted and received to and from the terminals for each application program.

HOP - Host Operator - Controls the network elements (NPU's, trunks, and logical links) by communicating with NS.

LCF - Local Configuration File - Establishes the applications, lines, and terminals in the network.

CS - Communication Supervisor - Coordinates the network activities of the host computer and all its communication elements. Establishes logical connection between the application programs and the terminals as they become available.

NOP - Network Operator - Controls applications and communication elements (lines and terminals) by communication with
CS.

CCP - Communications Control Program - The software program of the NPU.

DOP - Diagnostic Operator - Monitors and tests communication lines.

NPU - Network Processing Unit - A communications controller that transmits data between a terminal and a host computer.

CLA - Communication Line Adapter - Matches the characteristics of the NPU and the device it is connected to.

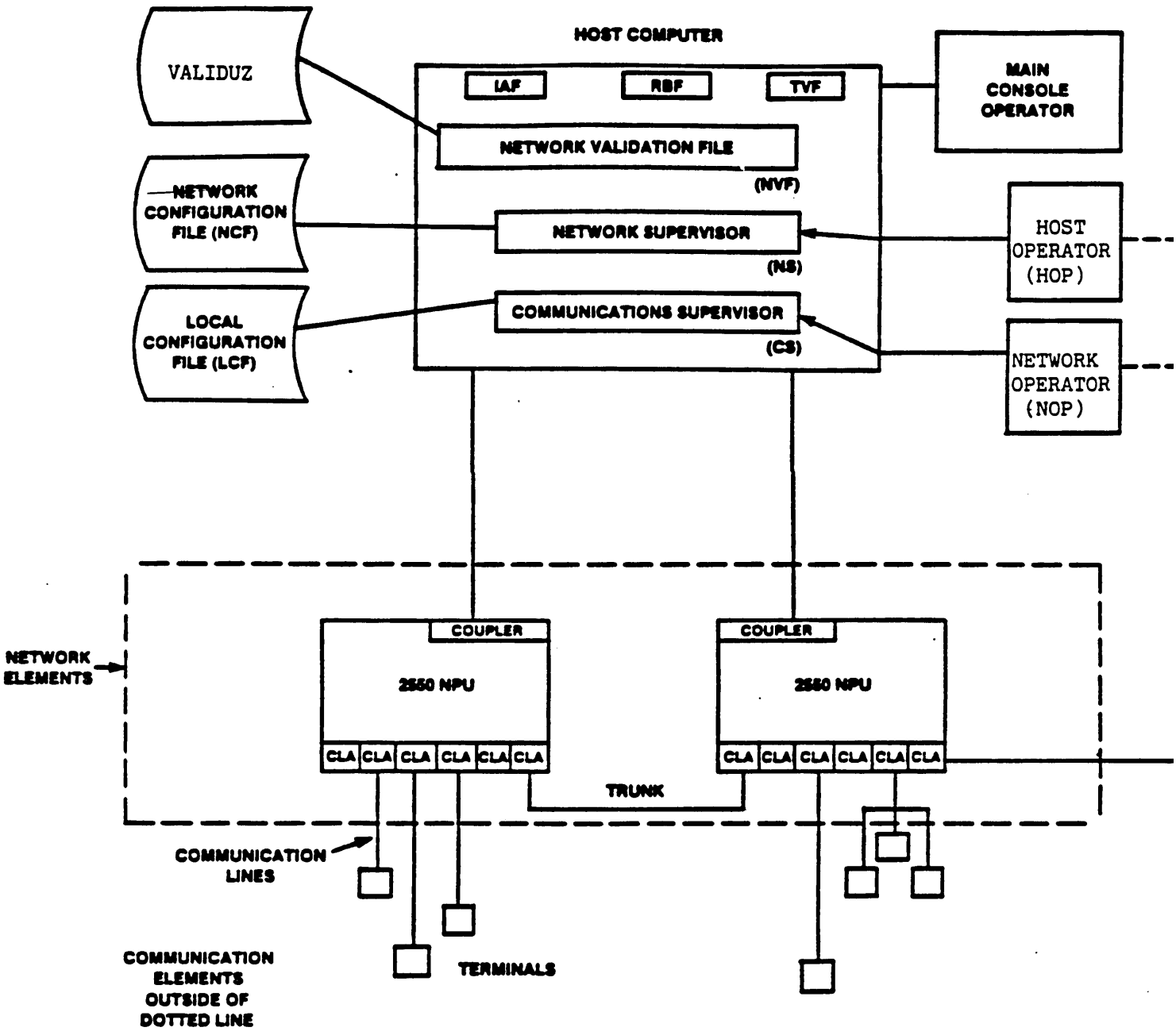
TERMS ASSOCIATED WITH NAM (Con't)

NVF - Network Validation Facility - Provides login access security. Verifies the user name, family name, and password. Upon successful login, causes the Communication Supervisor (CS) to notify the application program (identified in the login) that a terminal requests connection. NVF also performs switching between application programs and terminal disconnection. NVF will perform automatic application selection whenever the terminal is allowed to access only one application. NVF will not allow more than one terminal with the same user name from logging into RBF.

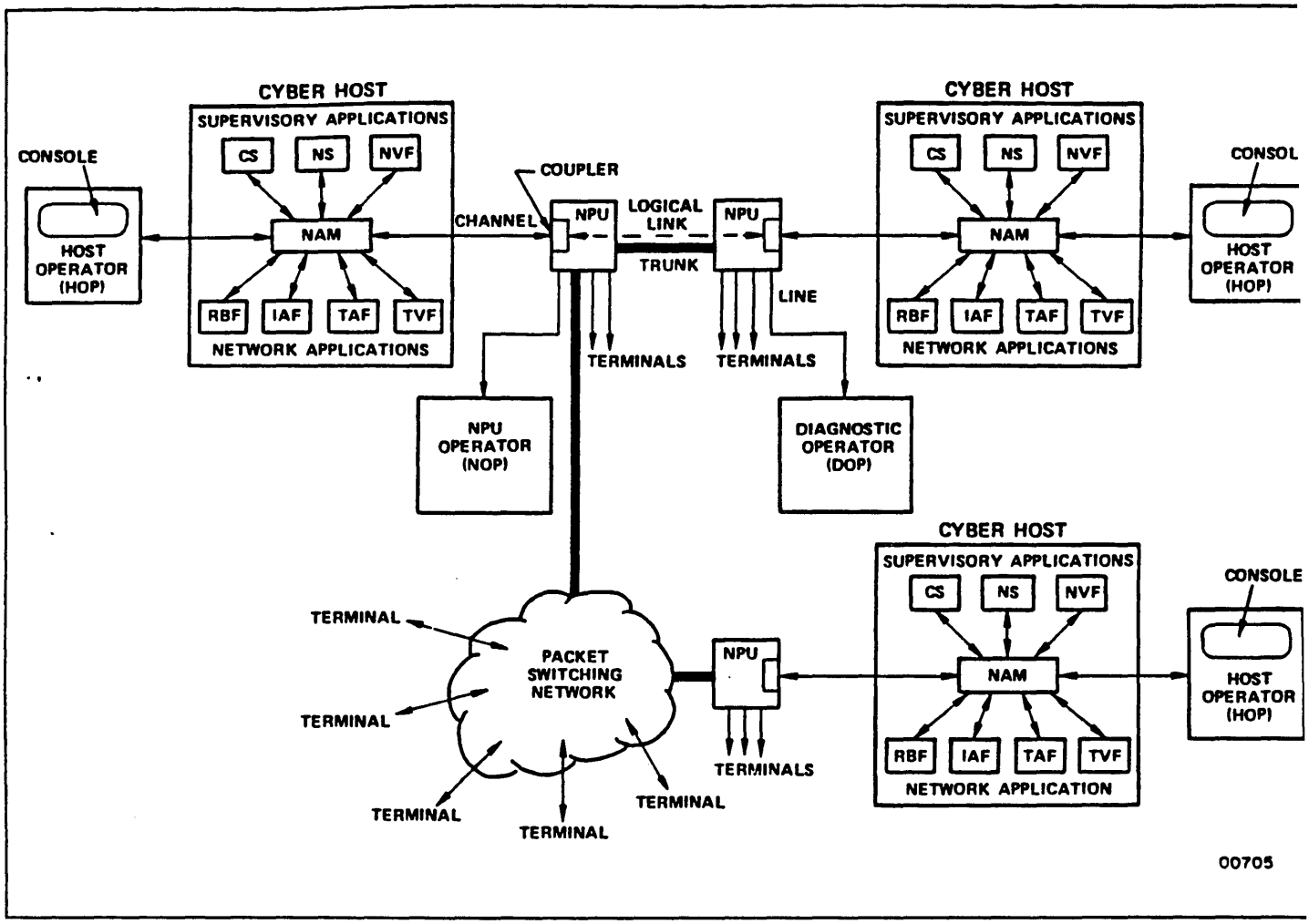
NETWORK ORGANIZATION

The network consists of couplers, lines, logical links, NPU's, terminals, and trunks connected to the host computer by a channel.

- A CHANNEL is a data channel on which a peripheral device controller can be accessed.
- A COUPLER is a hardware element that links an NPU to a channel.
- A LINE is the circuit that connects a terminal to an NPU.
- A LOGICAL LINK is a logical path connecting a coupler and an NPU or two couplers.
- An NPU is the communications controller that transmits data between terminals and a host computer or between two host computers.
- A PUBLIC DATA NETWORK is an X.25 packet switching network (PSN). Terminals, NPU's and foreign hosts can be connected to a PSN to exchange data.
- A TERMINAL is a device by which a user supplies input messages to, and accepts output messages from, an application program.
- A TRUNK is the communication line connecting two NPU's.



Network Configuration



Sample Network

NAM

- Communicate through the K Display
  - NAM Mode
  - Application Mode
- Start Up (Type):
  - NAM.
- Shutdown (Type):
  - K. APPL=NVE.
  - K. DISABLE,HOST.
  - K.IDLE,HOST.

NAM COMMANDS

The following commands entered under NAM K display allow the operator to status, enable and disable an applicaltion, NPU, terminal, user, coupler, line, logical link, trunk, or network.

STATUS

DISABLE

ENABLE

LABORATORY 3

1. On your (live) system, dump a user index to tape (your instructor will decide which).

2. Run a PFCAT on all devices.

3. Do a QDUMP.

4. Do a QFTLIST.

5. Dump the system dayfile based on criteria provided by your instructor.

6. Bring up the network.

7. Status lines and terminals.

8. Bring the network down.

Lesson 14

REMOTE HOST FACILITY

LESSON PREFACE:

This lesson introduces the student to the Loosely Coupled Network (LCN) and the subsystem Remote Host Facility (RHF). RHF initializes and controls the LCN.

OBJECTIVES:

At the completion of this lesson, the student should be able to:

- Initialize RHF.
- Control the LCN process on his machine

REFERENCES:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

REMOTE HOST FACILITY (RHF) K DISPLAY

The Remote Host Facility (RHF) links NOS to a loosely coupled network (LCN) providing transfer of permanent files, queued files, and maintenance facilities for the LCN hardware. Each system in an LCN configuration is connected to one or more LCN trunks by network access devices (NADs). Several types of NADs are available, allowing the connection of various types of computer systems to an LCN. Each system has an RHF that provides some or all of the following capabilities.

RHF runs at a control point and contains an operator interface package, control tables, and a network application code, and the PP routines that drive the RHF network hardware.

The following applications are also available as part of RHF:

Application	Description
PTF,FTFS	Permanent file transfer facility (PTF) and permanent file transfer facility servicer (PTFS). PTF and PTFS provide users access to remote permanent files. A local user activates PTF with the MFLINK command. When a remote user enters the MFLINK command, RHF activates a PTFS application on the local host to service the remote request.
MLTF	Maintenance log transfer facility (MLTF). MLTF provides maintenance logging capabilities for local and remote mainframe NADs. All local NAD errors are logged to the binary maintenance log (BML). All remote mainframe errors that have error logging enabled log errors. This application starts automatically when RHF is initiated.
QTF,QTFS	Queue file transfer facility (QTF) and queue file transfer facility (QTFS). QTF and QTFS allow the user to transfer input and output files to a remote system. When RHF is initiated, the system automatically activates QTF. When a remote host QTF applicaton has a file to transfer, RHF initiates QTFS on the local host to service the remote request.

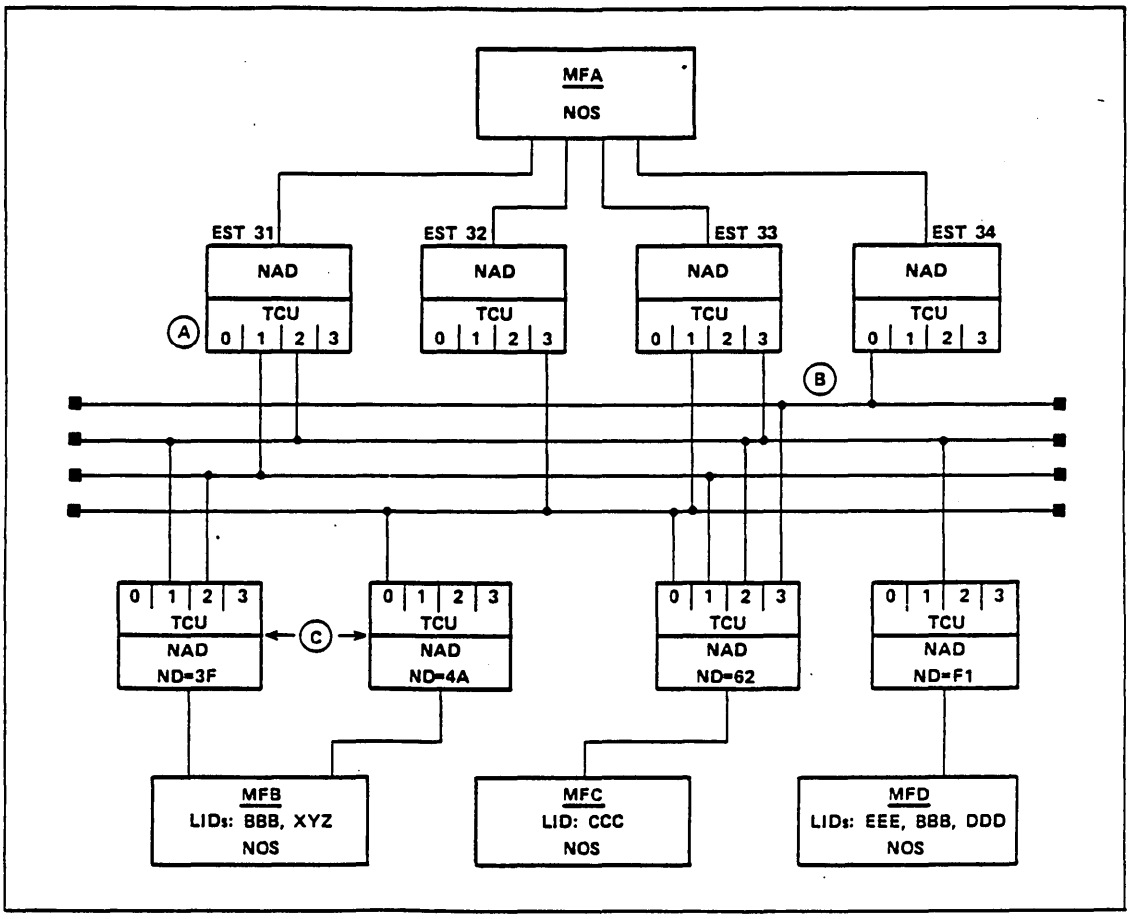
After initiation, both QTF and MLTF periodically roll in to check for files to transfer or to log NAD errors.

OPERATOR INTERFACE

The operator interface for RHF consists of using the following displays.

Display	Description
Application Table	Lists all active applications.
Network ID Table	Lists the logical and physical identifiers of the remote host.
Network Path Status	Shows how the remote host is connected to the local host.

An example of each display is shown later. To understand how to use the information provided in the displays it is helpful to understand the sample LCN network.



Sample LCN Network

MFA is the local NOS host and MFB, MFC and MFD are the remote NOS hosts. MFA has four EST ordinals set up during installation (EST 31, 32, 33, and 34) to be used with the three remote hosts. Each NAD can connect to a maximum of four channels which can be used to communicate with NADs. These trunk control units (TCUs) are represented by the numbers 0, 1, 2, and 3 in the diagram.(A)

The horizontal lines between the NADs of the local mainframe (MFA) and the NADs of the the remote mainframe (MFB, MFC, and MFD) depict the connections between the NADs. For example, the top horizontal line shows the connections between the channels starting at TCU 0 of the local host and TCU 3 of the remote host.(B)

Also during the installation process each remote NAD is given a remote NAD address to uniquely identify that particular NAD. For example, the remote host MFB has two NADs associated with it. Their remote NAD addresses are 3F and 4A.(C)

RHF COMMANDS UNDER K DISPLAY

Use the RHF K display to communicate with RHF. Bring up this display with the following DSD command:

```
K,RHF.
```

The following commands are available under RHF the K display:

Command	Description
APPL	Displays the application table.
ID	Displays the network identification table.
IDLE	Begins the idle down process of RHF and all its associated applications.
PATH	Displays the network path status.
ord,ND=rna AC=rnac,DD=dd RT=rteb,LT=lteb, LOG=status	Modify entries associated with path ordinal ord.
+	Pages the current display forward.
-	Pages the current display backward

Lesson 15

SPECIAL DISPLAYS/UTILITIES

LESSON PREFACE:

This lesson will review some of the utilities which are available via K and L displays.

OBJECTIVES:

After completing this lesson, the student should be able to:

- Initialize a mass storage device
- Reconfigure a mass storage device on-line
- Explain the contents of the RBF
- Display a queue file
- Identify valid service classes according to origin type

REFERENCE:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

K DISPLAYS

CYBERLOG	-	gathers information on system's performance
Flaw	-	disk flaw mapping
*Initialize	-	disk initialization
Machine Recovery	-	multimainframe device recovery
*Redefine	-	on line reconfiguration
*Remote Batch Facility	-	RBF subsystem
Transaction Facility	-	TAF subsystem

L DISPLAYS

*FOTD	-	displays family ordinal table (FOT)
*LIDOU	-	displays logical identifier table (LID)
*QDSPLAY	-	displays the contents of a file in the queued file table (QFT)
*SCTD	-	displays the contents of the validated service class for each origin type
*SUBSYST	-	displays subsystem information

L DISPLAY

This section documents the following four L displays and the utilities used to present them.

Utility	Description
FOTD	Displays family ordinal table (FOT).
LIDOU	Displays logical identifier table (LID)
QDSPLAY	Displays the contents of a file in the queued file table (QFT)
SCTD	Displays the contents of the validated service class for each origin type in the service class control table.
SUBSYST	Displays subsystem information

The L display is like the existing K display. The operator must start the program by typing the name of the utility. When L display is ready for use, DSD assigns it to the left screen automatically.

Using the display you can run any utility program you have created. The L display is an interface between your program and DSD.

All entries must be prefixed by L period (L.). However, when pressing CR after the first entry, everything but the L. is erased. This allows another command to be entered without entering L. first.

After you call a specific utility, the first command is entered in the following format.

L.commandstring.

commandstring is any input (command, data, or parameter) that is defined by the job as valid input.

You can execute your own L display utility by entering the following command

LDISopt.

opt The last three characters of the utility called LDIS.

Lesson 16

DISPLAY (DIS) OPERATION

LESSON PREFACE:

This lesson describes the display operation (DIS) of a single job at a control point.

OBJECTIVES:

Upon completion of this lesson, the student should be able to:

- Stop a job
- Initiate a job that was halted

REFERNCE:

NOS Version 2 Operator/Analyst Handbook - Pub. No. 60459310

OPERATION UNDER DIS CONTROL

DIS displays information about a single job. Under DIS, the B display shows the exchange package area for the job. Central memory addresses relative to the job's reference address are used for the data program displays.

Initiate DIS at a control point to monitor the progress of a job with any of the following mehtods.

- Command in the form DIS (job must be system origin or have system origin privileges).

- On an unsecured system, before you can call DIS, the console must be unlocked. When the system display console shows UNLOCK status, you can call DIS by entering the command

  DIS,jsn.

  where jsn is the job sequence name to which you want DIS assigned.

- On a secured system, before you can call DIS, the console must be unlocked by the security administrator. When the system display console shows SECURITY UNLOCK status, you can call DIS by entering the command

  DIS,jsn.

  where jsn is the job sequence name to which you want DIS assigned.

- You can call to DIS by typing X.DIS. This brings DIS to an empty control point to initiate a program.

  The operator may become any user by entering a USER command with appropriate username password and family.

DISPLAY SELECTION

xy. Brings the x and y displays to the left and right screens, respectively.

The right screen display must be B, C, D, N, T, or U.

Letter Designation	Display	Description
A	Dayfile	Dayfile message and files attached to the job
B	Job status	Job status, messages, commands and exchange package
C,D	Data storage	Five groups of four octal digits with display code translation
F	Data storage	Four groups of five octal digits with display code translation
G	Program storage	Four groups of five octal digits per group with COMPASS mnemonic translation
H	Job local files	Local file name table entries for this job
M	Extended memory	Five groups of four octal digits per group with display code translation
N	Blank screen	Blank screen
T,U	Test display	Displays text from central memory in coded lines
V	Central memory buffer	Displays 512 words directly from central memory
Y	Monitor functions	Displays mnemonics and values of all monitor functions
Z	Directory	Lists available DIS displays

CONSOLE OPERATION

Unlike DSD, DIS is not interpretive. You must complete every type-in and signal DIS to act upon the message by pressing CR. The following rules apply to all DIS commands.

- Spaces in an octal field are ignored but can be inserted for readability.
- All octal fields are right-justified with leading zero fill; excess octal digits are ignored.

SPECIAL KEYS

*	If DSD has relinquished the main display console to DIS, * acts as a quick hold, and DIS drops the display channel so that DSD can use it.
+	Advances by 40 octal locations the address of any of the following displays: C, D, F, G, M, T, and U on the left screen.
-	Decrements by 40 octal locations the address of any of the following displays: C, D, F, G, M, T, and U on the left screen.
(	Breakpoint program to (P + 1).
)	Breakpoint program to (P - 1).
/	Advances left screen memory display address by the value in the lower 18 bits of the first word displayed (applicable only to memory displays C, D, F, G, and M).
.	Sets AUTO MODE (initiates automatic command processing). This key performs the same function as the RCS command described under DIS Keyboard Entries in this section.
8	Advances the pointer indicating the first address of managed table for the left screen (applicable only to memory displays C, D, F, and G).
9	Decrements the pointer indicating the first address of managed tables for the left screen.
Right blank (display key)	Advances the left screen display sequence established by the SET,screen.command (refer to Display Selection Commands).

CR (carriage return)	Sets repeat entry flag; message REPEAT ENTRY is displayed on the error message line of the left screen. The subsequent command entry is processed but is not erased after completion. That command is processed each time the carriage return key is pressed. To clear the repeat entry mode, press the left blank (erase) key.

The following keys are interpreted as control characters by DIS.

Left blank (erase)	Clears current DIS keyboard entry and any resultant error message; AUTO MODE (automatic command processing) is also cleared.
BKSP (backspace)	Deletes last character displayed and clears error message (if one exists).
CR (carriage return)	Initiates processing of an entered command.

KEYBOARD ENTRIES

BEGIN,pname,pfile.	Sets AUTO mode and calls CCL procedure pname from file pfile.
BKP,xxxxxx.	Breakpoints to address xxxxxx. Central processor execution begins at current value of P and stops when P = xxxxxx and DIS is the only PP active at user's control point.
BKPA,XXXXXX.	Breakpoints to address xxxxxx. Central processor execution begins at current value of P and stops when P = xxxxxx.
DCP.	Drops the central processor and displays the exchange package on the B display.
DIS.	Reloads main DIS overlay.
DROP.	Drops DIS; does not drop the job if there are commands remaining in the buffer (unless the error flag is set).
ELS.ccc...ccc.	Enters command ccc...ccc in the command buffer after the last command, if there is space.
ENAi,xxxxxx.	Sets register Ai = xxxxxx in the exchange package area.
ENBi,xxxxxx.	Sets register Bi = xxxxxx in the exchange package area.
ENEM,m.	Sets CPU program exit mode to m ($0 \leq m \leq 7$).
ENFL,xxxxxx.	Sets central memory FL = xxxxxx. xxxxxx $\geq 10000_8$ if user EM is assigned.
ENFLE,xxxx.	Sets EM field length (FLE) to xxxx0000. If xxxx=0, (set by ENFL) must be 10000_8.
ENP,xxxxxx.	Sets P = xxxxxx (next instruction address).
ENPR,xx.	Sets job priority to xx ($2 \leq xx\ 70_8$).
ENS.ccc...ccc.	Allows entry of command ccc...ccc as the next unprocessed statement in the command buffer. Command can then be processed using RNS, RSS or DROP.

KEYBOARD ENTRIES (Con't)

ENTER./cccccc./dddddd./	Allows entry of command cccccc and dddddd from the keyboard and sets AUTO mode.
ENTL,xxxxx.	Sets the job time limit to xxxxx. 77777_8 is infinite.
ENXi,xxxxx xxxxx xxxxx xxxxx.	Sets register Xi = xxxxx xxxxx xxxxx xxxxx in the exchange package area.
ENXi,Lzzz...zzz.	Sets register Xi to zzz...zzz, left-justified
ENXi,Dccc...ccc.	Sets register Xi to ccc...ccc display code characters.
ENXi,b,zzzz.	Sets byte b of register Xi to zzzz.
ERR.	Sets forced error flag, terminates program execution, and clears AUTO mode if set. (Stops programs that won't quit - use caution.)
GO.	Restarts a program which has paused.
HOLD.	DIS relinquishes the display console, but the job is held at the present status.
M.ccc...ccc.	Enters ccc...ccc as a CPU program command. Data is stored at RA + CCDR.
N.ccc...ccc.	Sets DIRECT CPU INPUT Mode. Characters entered from the keyboard are passed one character at a time, right-justified, directly into central memory at RA + CCDR.
OFFSWx.	Turns off sense switch x for the job (1x6).
ONSWx.	Turns on sense switch x for the job (1x6).
026.	Call 026 file editor to the control point.
RCP.	Requests central processor. Depending on job priority, execution begins at the address specified by the P register for a job suspended by a DCP request.

KEYBOARD ENTRIES (Con't)

RCS.	Sets AUTO mode and initiates automatic control statement processing. All succeeding commands are read from the command buffer and processed automatically until an SCS command or an error is encountered or until job completion.
RNS.	Reads and processes the next control statement in the DIS command buffer.
ROLLOUT.	Allows the job to roll out.
ROLLOUT,xxxx.	Places job in the rollout queue for xxxx job scheduler delay intervals; job is automatically rolled back in after this period of time.
RSS.	Reads the next command and stops prior to CPU execution. This is used to initiate breakpointing of a program.
RSS,ccc...ccc.	Reads command ccc...ccc and stops before execution. Command buffer is not cleared.
SCS.	Clears AUTO Mode and stops automatic command processing.
T,xxxxxx.	Changes the T display to start at address xxxxxx.
U,xxxxxx.	Changes the U display to start at address xxxxxx.
UCC = c	Sets the uppercase character to c. Command does not terminate with a period.
V,xxxxxx.	Changes the V display to start at address xxxxxx.
X.ccc...ccc.	Processes ccc...ccc as the next command.
* xxx.	If an asterisk is followed by a blank and xxx is encountered during automatic command processing, xxx is interpreted as a direct DIS command rather than a command. Using this feature, it's possible to set up procedure files that use DIS to breakpoint a program to a desired stopping point.

xxxx.	xxxx is processed as a command if it is not a recognizable DIS command.
SUI,userindex	Allows access to a user index above 377700_8. This command is not accepted by a secured system.

MEMORY ENTRY COMMANDS

- Commands are used in conjunction with C, D, F, G and M memory displays.

- 12-bit bytes, 15-bit parcels, 30-bit parcels or 60-bits can be changed.

- Bytes are numbered 0 through 4 from left to right.

- Address and contents are right-justifited with leading zero fill. Leading zeros may be omitted.

- On a secured system no memory entry commands are allowed unless the security UNLOCK status is set. The memory display shows the message.

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****SECURED AREA****
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MEMORY ENTRY COMMANDS (Con't)

ADDR,cont. or ADDR+cont.	Changes the contents of memory location ADDR to cont. The second form does the same but leaves the address at ADDR+1 allowing immediate entry for the next memory location.
ADDR,b,cont. or ADDR+b,cont.	Changes the contents of byte b at memory location ADDR to cont.
ADDR,Dcont. or ADDR+Dcont	Changes the contents of memory location ADDR to display code characters cont (left-justified and zero filled).
ADDR,Lcont. or ADR+Lcont.	Changes the contents of memory location ADDR, left-justified to cont.
ADDR,In,cont. or ADDR+In,cont.	Changes the contents of instruction n (0 through 3 from left to right) at memory location ADDR to cont; cont may be a 15 or 30 bit instruction.
EADDR,cont. or EADDR+cont.	Changes the contents of extended memory location ADDR to cont.
EADDR,b,cont. or EADDR+b,cont.	Changes the contents of byte b at extended memory location ADDR to cont.
EADDR,D cont. or EADDR+D cont.	Changes the contents of extended memory location ADDR to display code characters cont (left-justified and zero-filled).

Lesson 17

026 CONSOLE TEXT EDITOR

LESSON PREFACE:

This lesson describes the 026 file editor. Topics covered include the following: first character entries, system commands, file commands, line entry and data move commands, display, tab and tab control commands, line record search commands, replace commands, miscellaneous commands, and special characters.

OBJECTIVES:

Upon completion of this lesson, the student should be able to:

- Create a file
- Modify that file
- Search for character strings within the file
- Display all or portions of that file

REFERENCES:

NOS System Programmers Instant - Pub. No. 60459370

FILE EDITOR (026) COMMANDS

026 DESCRIPTION

026 enables the user to create or edit a file from the console. A central memory buffer is used to store and edit the display code lines before writing the file. Like DSD, 026 is interpretive.

- Special first character entries
- Messages
- System commands
- File commands
- Line entry and data move
- Display, tab, scan control commands
- Line record search
- Replace commands
- Miscellaneous commands
- Special characters

Note: Operators should use 026 sparingly as it does not make the best use of system resources. 026 requires a dedicated peripheral processor and control point.

SPECIAL FIRST CHARACTER ENTRIES

0	Sets insert at 1st line.
1	Sets insert at 4th line on screen.
2	Sets insert at 8th line on screen.
3	Sets insert at 12th line on screen.
4	Sets insert at 16th line on screen.
5	Sets insert at 20th line on screen.
6	Sets insert at 24th line on screen.
7	Sets insert at 32nd line on screen.
8	Sets instert 8 at insert line.
9	Sets instert 9 at insert line.
+	Displays next page.
-	Backs up 18 lines or to start of buffer.
*	Holds display and returns control to DSD. When * is entered under DSD, control returns to 026.
/	Starts or stops roll.
(	Advances insert by one line.
)	Decrements insert by one line.
=	Clears insert flag.
'	Finds insert line and starts display at insert marker.
.	Deletes the line following the insert line.
CR (Carriage return)	Sets REPEAT ENTRY flag
space	Sets the characters P. into buffer.

SYSTEM COMMANDS

DIS.	Writes the buffer, rewinds the file, and transfers control back to DIS.
DROP.	Writes the buffer, rewinds the file, and drops the display.
ERR.	Sets error flag.
GO.	Clears pause flag.
HOLD.	Releases display to DSD.
XDIS.	Transfers control back to DIS. Buffer is not written and file is not rewound.
XDROP.	Drops display unit; does not write file.

FILE COMMANDS

BKSP.lfn.	Backspaces file lfn one logical record. If lfn is missing, previously specified file is used.
BKSPRU,x.	Backspaces current file x physical record units.
BKSPRU.lfn.	Backspaces file lfn one PRU. If lfn is missing, previously specified file is used.
FILE.lfn.	Changes name of current file to lfn.
RC.lfn.	Reads compile file. Rewinds, reads, and rewinds file lfn. If lfn is missing, file name read is COMPILE.
*READ.lfn.	Clears buffer and rewinds, reads, and rewinds lfn. If lfn is missing, previously specified file is used.
READI.lfn.	Skips to end-of-information, backspaces twice, and reads lfn. If lfn is missing, previously specified file is used.
READN.lfn.	Reads file lfn with no rewind. If lfn is missing, previously specified file is used; stops read on buffer full or end-of-record encountered.
READNS.lfn.	Reads file lfn nonstop with no rewind. If lfn is missing, previously specified file is used; stops read on buffer full or end-of-file encountered.
*RETURN.lfn.	Returns file lfn. If lfn is missing, previously specified file is returned to system.
REWIND.lfn.	Rewinds file lfn. If lfn is missing, previously specified file is used.
*RFR.lfn.	Clears buffer and rewinds and reads file lfn. If lfn is missing, previously specified file is used. (Reads first record.)
*RI.lfn.	Rewinds, reads, and rewinds file lfn. If lfn is missing, file INPUT is read. (Read INPUT.)

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* Commands more frequently used by operator.
** For these commands, if no file was previously specified, INPUT is used.

FILE COMMANDS (Con't)

RLR.lfn	Clears buffer and reads last record on file lfn. If lfn is missing, previously specified file is used. (Read last record.)
*RNR.lfn. **	Clears buffer and reads next record on file lfn. If lfn is missing, previously specified file is used. (Reads next record.)
*RO.lfn.	Clears buffer and rewinds, reads, and rewinds file lfn. If lfn is missing, file OUTPUT is used. (Read output.)
RPR.lfn. **	Reads previous record from file lfn (that is, backspaces twice and reads).
SKIPEI.lfn.	Skips to end-of-information on lfn. If lfn is missing, previously specified file is used.
UNLOAD.lfn.	Unloads file specified by lfn. If lfn is missing, previously specified file is unloaded.
WRITE.lfn.	Writes buffer on file lfn. If lfn is missing, previously specified file is used.
WRITEF.lfn.	Writes buffer on file lfn and places an EOF mark after the data written. If lfn is missing, previously specified file is used.
WRITEW.lfn.	Writes data from start of buffer up to insert line on file lfn. If lfn is missing, previously specified file is used.

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* Most commonly used by operator.

** May want to use the repeat entry if searching through a file with many records.

LINE ENTRY AND DATA MOVE

Command that read a subsequent line for character merging (A., L., M., and N.) save that line in the DUP buffer. This line can be referenced at a later time with the D. command.

A.ccc...ccc.	Merges specified characters with the line following insert marker except for tabbed or spaced-over area up to carriage return.
C.ccc...ccc.	Enters specified characters into buffer; ccc...ccc may consist of up to 90 characters.
COPY.	Copies data block starting at insert 8 and ending at insert 9 into block at insert marker.
DEL.	Deletes all lines after insert marker. If insert is not set, deletes all lines.
D,*.	Deletes block from insert 8 through insert 9.
D.ccc...ccc.	Merges line from DUP buffer with characters ccc...ccc of keyboard buffer. Tab rules for A. command apply.
E.ccc...ccc.	Merges characters ccc...ccc with remainder of characters in DUP buffer except for tabbed or spaced-over area.
L.ccc...ccc.	Merges characters ccc...ccc with remainder of following line except for tabbed or spaced-over area.
M.ccc...ccc.	Merges characters ccc...ccc with remainder of following line.
MOVE.	Moves data starting at insert 8 and ending at insert 9 into block starting at insert marker.
N.ccc...ccc.	Merges characters ccc...ccc with following line except for tabbed area.
P.ccc...ccc.	Enters characters ccc...ccc into buffer (up to 96 characters). User can set data entry mode by typing P. or typing a space.

DISPLAY, TAB, SCAN CONTROL COMMANDS

DFL.	Displays first line.
DLL.	Displays last part of file.
DS,nnn	Start display at line nnn of file.
DS,	Count the number of lines from the start of the display up to the insert mark or EOI.
TAB,x,y,...,z	Sets tabs x,y,...,z. If x equals 0, the command clears all tabs. Default is TAB,11,18,30,40,50,60,73,80.
SCAN,x,y,...,z	Sets word scan to x,y,...,z. If x equals 0, the command clears scan.

LINE, RECORD SEARCH COMMANDS

F.ccc...ccc.	Searches for matching field in line. Search is end-around.
S.ccc...ccc.	Starting with the first line displayed, searches for a line beginning with the characters ccc...ccc. Search is end-around.
GET,lfn.rname	Searches file lfn for record rname. If lfn is missing previously specified file is used.
GET.rname	Searches current file for record name.
GETR,lfn.rname	Reads random file lfn for TEXT record rname. If lfn is missing, previously specified file is used.
GETR.rname	Gets random record rname from current file. If a record of that name and type TEXT exists, reads that record.
GTR,lfn.rname	Reads random file lfn for record rname. If lfn is missing, previously specified file is used.
GTR.rname	Gets random record rname from current file. If a record of that name and type TEXT exists, reads that record; otherwise, reads record rname of any type.
LIST.	Lists directory of current file.
LIST,lfn.	Lists directory of file lfn. If lfn is missing, previously specified file is used.

REPLACE COMMANDS

RC,x,c.	Replaces character x of the line following insert marker with character c (extend line if necessary).
RM/ aaa...aaa/ next line	Replaces multiple; works the same way as RS command, but this command does not advance to next line. (REPEAT ENTRY does not have to be set.) "1" may be any character.
RS/ aaa...aaa/ bbb...bbb/	Replaces character string aaa...aaa from the following line with character string bbb...bbb. The / can be any delimiting character.
R,x./ aaa...aaa/ bbb...bbb/	Replaces character string aaa...aaa from the following line starting with character position x with character string bbb...bbb. The / can be any delimiting character.

MISCELLANEOUS COMMANDS

ENFL. — Sets field length to buffer size plus 1000_8.

ENFL,xxxxx. — Sets field length to $xxxxx_8$.

UCC=c — Sets uppercase control character to c. If c is missing, clears the uppercase control character. To enter a character which has been previously specified as the uppercase control character, enter that character twice. To enter $:

```
UCC = Z
      ZS
```

RWRITE. — Rewrite record.

Cautions:

1. Number of PRUs may not change. Rewrite not allowed if condition exists.
2. An ** will appear to the right of the *RS=* field when a no rewrite condition exists.
3. Rewrite to another file may produce unpredictable results.

SP. — Toggle the option of clearing special characters from a file before displaying it. Clearing special characters will cause the console screen to flicker when displaying large files, or displaying files containing many special characters.

UPPER CASE CARRIAGE CONTROL

To enter:	Enter uppercase control character and:
$	S
¤	Ø
[	1
]	2
%	3
✕	4
→	5
V	6
^	7
↑	Q
↓	W
<	E
>	R
≤	T
≥	Y
≠	U
:	I
✕	=
^	A
<	(
>	)
≤	+
≥	-
≠	,
:	Z

LABORATORY 5
(Optional)

1. Use DIS and 026 to create, modify and print a file.

2. Backup all files on a logical disk.

3. Produce a report of terminal status under NAM.

4. Which RHF applications are active?

5. Basically, experiment.

GLOSSARY

Abort	To terminate a program, or job when an error condition exits.
Access level	A property of each file, job and equipment on a secured system that is used to indicate the sensitivity of information in the file or job, or the sensitivity of information that can be processed by the equipment. On a secured system, there are up to eight access levels corresponding to increasing levels of sensititivity. You are authorized to access some or all of those levels.
Account Dayfile	Provides a history of system usage necessary for accurate billing and system usage analysis.
Address	The location of a word in memory.
AFD	Account File Dump. A dump of the system account file to a printer.
ANSI	American National Standards Institute.
APRDECK	Auxiliary mass storage parameter deck.
ACN	Application Connection Number - A number assigned by the Communications Supervisor program to identify a particular logical connection within an application.
Archive Files	A dump of permanent files to tape to protect them from loss due to device failure.
ASCII	American National Standard Code for Information Interchange.
Auto Recall	The act of program releasing control of the CPU until a requested function is complete.

Auxiliary Device	Mass Storage device that is not part of a permanent file family.
BIO	Central site batch I/O.
Bit	Binary digit, either a 1 or 0.
Breakpoint	A designated location in a program where, if reached during program execution, a break or suspension in execution occurs.
Buffer	An intermediate storage area.
Byte	A group of 12 bits.
Cache	A high speed memory that resides in the central processor.
Catalog	The list of names of files belonging to a particular user.
Catalog (CIR) - Image Record	A record written at the beginning of the archive file on which the permanent files are dumped for each incremental dump. When a file is loaded, this CIR information is placed in the permanent file catalog of the device being loaded.
CCL	Cyber Control Language.
CCP	Communications Control Program. A portion of the network software that resides in a 255 x series NPU.
Central Memory (CM)	The main storage device whose storage cells (words) can be addressed by a computer program and from which instructions and data can be loaded directly into registers from which the instructions can be executed or the data manipulated.
Central Processing Unit (CPU)	The high speed arithmetic unit that performs various instructions needed to execute programs.

Checkpoint	The process of writing a copy of your job's central memory, the system information used for job control, and the names and contents of all assigned files that are identified in a CHECKPT request.
CLA	Communication Line Adapter - Hardware that provides the interface between NPUs and modems.
CMRDECK	The central memory resident deck.
CTI	Common Testing and Initialization - Common deadstart process that resides on the deadstart file and the maintenance system library.
Communication Line	A complete communication circuit between a terminal and its network processing unit (NPU).
Communication Network	The portion of the total network comprising the linked network processing units. It excludes the host computer and the terminals.
Communications Supervisor (CS)	A portion of th network software which coordinates the network - oriented activities of the host computer and of the lines and terminals logically linked to it.
Connection Number	A number assigned to an IAF terminal when it logs in and an entry is made for the job in the executing job table (EJT).
Connection Status	A job attribute kept in the job's EJT entry. It is used to determine the job's relationship with IAF.

Control Point	The portion of central memory that is assigned to a job. When a job is allocated a portion of central memory, it becomes eligible for assignment to the central processor for execution.
Controlware	A special type of software that resides in a peripheral controller. The controlware defines the functional characteristics of the controller.
cpi	Characters per inch.
cps	Characters per second.
DAT	Device access table. A table that contains the logical description of each mass storage device which is accessible by any machine in multimainframe complex.
Dayfile	A chronological file created during job execution which forms a permanent accounting and job history record.
DDP	Distributive Data Path.
Deadstart	The process of initializing the system.
Detached Job	An interactive service class job removed from control of the interactive subsystem. It may or may not continue to execute.
Device Mask	An 8-bit quantity that identifies the group of users who have the particular device as their master device.
DFD	Dayfile Dump. A dump of the system dayfile to a printer.
DFLIST	A utility that generates a printer listing of all permanent files created by the DFTERM utility.

DFTERM	A utility that terminates an active or an inactive dayfile and retains it as a direct access permanent file.
DIS (Job Display)	A system peripheral processor program similar to system display (DSD) that provides communication between a job in central memory and an operator, and permits the operator to control program execution through the console keyboard.
DOP	Diagnostic Operator. An NPU operator who resides at a terminal and has permission only to status and test the network.
DSD (System Display)	The operating system program that provides communication between the operator and the system. DSD is permanently assigned to peripheral processor 1.
EBCDIC	Extended Binary Coded Decimal Interchange Code.
ECS	Extended Core Storage - An extension to central memory which is physically located outside of the machine.
EDD	A utility that may run at deadstart time after a system malfunction has occurred. It generates the express deadstart dump file on tape.
EI	Environment interface.
EJT	A central memory resident table with entries for all executing jobs.
EJT Ordinal	An index into the EJT. It uniquely identifies an EJT entry.
ELD	Error Log Dump. A dump of the sytem error log to a printer.

EOI	End of information. The end of data on a file.
EQPDECK	Equipment description deck.
Equipment Access Levels	A range of access levels specified for each equipment on a secured system. In order for a file to be stored or output on a given equipment the file's access level must be within the equipment access levels for that equipment.
ESM	Extended Semiconductor Memory.
EST	Equipment Status Table - A central memory resident table listing all defined equipments, parameters affecting their operation, and the status of the equipments.
EST Ordinal	A number designating position in the EST. Sometimes referred to as equipment number.
Family Device	A mass storage permanent file device associated with a specific system. A family may consist of 1 to 63 logical devices.
Family Ordinal (FO)	An index into the FOT. It is used to uniquely identify a family.
FAT	Fast attach table.
FET	File environment table.
Field Length	The area in central memory allocated to a particular job; the only part of central memory that a job can directly access.

Field Access Level	A property of each file on a secured system used to indicate the sensitivity of information contained on the file. A file is assigned the current job access level by default when it is created or stored; the file creator may specify any access level for that file that is within the set of access levels valid for the job, the system, the file creator, and the communication line to the host mainframe.
FNT	File name table. A system managed table that contains the local file name, the file type and other job control information. All active files have an FNT entry.
FOT	Family Ordinal Table - A central memory resident table used to map family names to family ordinals.
FSE	Full Screen Editor.
Full Dump	A dump to tape of all files in the system or those cataloged on a specific device.
GCR	Group-coded recording.
GE	Group encoded.
HIVS	Hardware Initialization and Verification Software - the software package that assists CTI during deadstart and provides deadstart confidence level testing (HIVS).
HVS	Hardware Verification Sequence - A subset of HIVS. It tests the ability of memory to hold patterns of data and execute instructions.

IAF	Interactive Facility - An application that provides a terminal operator with interactive processing capability.
Incremental Dump	A dump to tape of those permanent files modified after a specified date. Each incremental dump writes a catalog image record at the beginning of the archive file on which the permanent files are dumped.
Incremental Load	A load that builds up an accumulation of the most recently modified versions of the files extracted from the archive files for loading. A series of archive files is read in the reverse order of creation. The CIR is read and checked against the archive files. If a file matches an entry on the CIR, that file is a candidate for loading.
Input	Information flowing upline from terminal to host.
Input Queue	A set of input files waiting to be assigned to control points by the operating system.
I/O	Input/Output.
IOU	Input/Output Unit - A collection of all PPs, PP channels and related hardware.
Job	All activity associated with a terminal session from login to log off.
Job Access Level	On a secured system, each job has an access level. This is the default access level that is assigned to files that are created or stored in the job. A job's initial access level is the lower access level limit for the job. The job's access level is automatically raised to the access level of any file from which information is read. You can also change job access level.

Job Access Level Limits	An upper limit and lower limit that determine the range of access levels that are valid for a particular job on a secured system. All files used in a given job must have an access level within the job's access level limits.
JSN	Job Sequence Name - the unique, system difined name assigned to every executing job or queued file. It is a string of four alphabetic characters.
LCF	Local Configuration File - Any file that is currently associated with a job. Local files include all temporary files and attached direct access files.
LDLIST	A utility that generates a printer listing of queued files present on a dump tape produced by the QDUMP facility.
Load Point	A metallic strip marking the beginning of the recording portion of a magnetic tape. Data, including labels, is written after the load point.
LID	Logical Identifier - A three character alphanumeric string used to identify a mainframe in a loosely coupled network.
LCN	Loosely Coupled Network - A network of physically connected computer systems.
MAG	Magnetic tape subsystem.
Mass Storage Device	An extended memory or disk unit which has defined logical attributes such as family, file residency, etc.
Master Device	A mass storage device that contains your permanent file catalog entries; all your indirect access files; and all, part or none of your direct access files.
MMF	Multimainframe.
MSL	Maintenance software library.

MST	Mass storage table. A table that contains an entry for each logical device in the configuration of mass storage devices.
MST	Mass Storage Test.
MUX	Multiplexor.
NAD	Network Access Device - The primary element in a loosely coupled network.
NAM	Network Access Method - A software package that provides a generalized method of using a communications network.
NCF	Network configuration file. A network definition file in the host computer, containing information on the network elements and permissable linkages between them.
NOS	Network Operating Systems.
NPU	Network Processing Unit - The collection of hardware and software that switches, buffers, and transmits data between terminals and host computers.
NS	Network Supervisors - A portion of the network software, written as a NAM application program. NS coordinates all of the NPUs in the communication network.
NVF	Network Validation Facility - A portion of the network software, written as a NAM application program. NVF performs all terminal login validation processing and supports login dialog with terminal user.
NOP	Network Operation - The operator who, through a terminal, controls network elements.

Origin Type	A job attribute that indicates how a job entered the system.
Output	The information flowing downline from host to terminal.
PF	Preserved file; permanent file. A mass storage file that is cataloged by the system so that its location and identification are always known to the system.
PFATC	A utility that produces a cataloged directory of file information derived from an archive file previously created by the PPFDUMP utility.
PFCAT	A utility that produces a cataloged directory of file information derived from catalog tracks on a master device.
PFCOPY	A utility that extracts files from an archive file and copies them to one or more files at a control point.
PFDUMP	A utility that dumps permanent files to an archive file. Dumps can be reloaded by the PFLOAD utility and can be accessed by the PFATC and PFCOPY utilities for cataloging and copying.
PFLOAD	A utiluty that loads archived files produced by the PFDUMP utility back into the permanent file system.
PFS	Permanent file supervisor. The PFS processes parameters in utility command and loads the correct overlays.
PP	Peripheral Processor - the hardware unit within the host computer that performs physical input and output through the data channels.
Programmable Format Control (PFC)	Spacing and format control for 580 line printers provided by the use of software and a microprocessor instead of a carriage control format tape.

PRU	Physical Record Unit - 64 words or 640 characters.
QALTER	A utility that displays, lists, and/or alters routing and other information about active queued files.
QDUMP	A utility that dumps selected queued files from a single device, a family of devices, or all devices on the system.
QFT	Queued File Table - A central memory resident table containing an entry for all active input and output queue files.
QFTLIST	A utility that displays and/or lists routing and other information about active queued files.
QLIST	A utility that lists inactive queued files, which may include all inactive queued files in the system or a selected subset.
QLOAD	A utility that processes the dump file generated by QDUMP.
QMOVE	A utility that moves queued files from one mass storage device to another.
QREC	A utility that deactivates or activates selected queued files and purges selected inactive queued files.
RBF	Remote Batch Facility.
RDF	Remote Diagnostic Facility.
Recall	The state of a program when it has released control of the CPU until a fixed time has elapsed (periodic recall) or until a requested function is completed (auto recall). Recall is a system action request as well as an optional parameter of some file action requests.

Seminar Evaluation

Your feedback will be very useful in improving the quality of our seminars!

Seminar Title _____

Dates ___/___/___ to ___/___/___ Location _____

Instructor _____

	Strongly Disagree	Disagree	Not Sure	Agree	Strongly Agree
CONTENT					
1. The objectives were clearly stated at the beginning of the seminar. Please explain.	SD	D	NS	A	SA
2. All of the seminar objectives were adequately covered. Please explain.	SD	D	NS	A	SA
FACILITIES					
3. The seminar facilities were comfortable. Please explain.	SD	D	NS	A	SA
INSTRUCTOR					
4. The instructor demonstrated a thorough knowledge of the content. Please explain.	SD	D	NS	A	SA
5. The instructor presented the information in a clear and understandable manner. Please explain.	SD	D	NS	A	SA
PARTICIPANT					
6. I had the necessary prior knowledge for this seminar. Please explain.	SD	D	NS	A	SA

7. Indicate your knowledge level of the content prior to this seminar. (Circle one)

No knowledge ← 1 2 3 4 5 6 7 8 9 10 → Knew everythir covered in semin

8. Indicate your knowledge level of the content after this seminar. (Circle one)

No knowledge ← 1 2 3 4 5 6 7 8 9 10 → Knew everythir covered in semin

GENERAL COMMENTS

9. Considering all aspects of the seminar, how would you rate it overall? (Circle one)

Poor ← 1 2 3 4 5 6 7 8 9 10 → Excellent

10. What did you like best about the seminar?

_____

_____

_____

11. What did you like least about the seminar?

_____

_____

_____

12. Please use the space below to make any other general comments about the seminar.

_____

_____

_____

13. Please list colleagues who should receive advance notices of similar seminars.

Name _____ Name _____

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14. Would there be enough interested people in your organization to warrant offering the seminar at your site?

Yes ☐ No ☐

If yes, who should be contacted to manage it?

Name _____ Title _____

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Signature _____ Company _____

PARTICIPANT INFORMATION FORM

In order for our seminars/courses to be most effective, they need to take into account the characteristics, needs and objectives of the people who attend them. The information asked for below will assist us in keeping our presentations relevant to the participants and in developing and scheduling new presentations that will meet participant needs. Please complete this form and leave it with the presenter at the next break.

Seminar/Course Title _____ **Date of Presentation** _____

Name _____ **Field or Type of Business** _____

Title _____ **Years of Experience** _____

Business Address _____ **Supervisor's Title** _____

_____ **Last professional degree** _____

_____

List your three primary objectives in attending this seminar.

1. _____
2. _____
3. _____

Will this course/seminar be credited toward certification/training requirements? _____

Rank in order of importance in your choice of this seminar session.

Instructor _____ **Date** _____ **Location** _____ **Employer's Preference** _____

Previous courses/seminars attended relating to this topic.

1. _____
2. _____
3. _____

Topics for additional courses/seminars in which you would be interested.

1. _____
2. _____
3. _____

What trade journals/magazines do you regularly read or subscribe to in order to keep abreast in your profession?

1. _____
2. _____
3. _____

How did you become aware of this course/seminar?

Schedule/Catalogue _____,

Direct Mail Brochure _____,

Recommendations of Supervisor _____,

Recommendation of Colleague _____,

Corporate Training Department _____,

Other _____.

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