CONTROL DATA
CORPORATION

CYBERDATA™

System
Reference

REVISION RECORD

REVISION	DESCRIPTION
1/23/74	Preliminary edition
3/21/74	First edition
4/30/74	Revision A. Revised pages include 2-4, 2-6, 4-3, 4-6, 4-8, 6-2, 6-5, 6-19, 6-21, 6-45, 7-13, and index.
6/29/74	Revision B. Revised pages include iv, 6-8, 6-9, 6-30, 6-31, 6-32, 6-33, 6-34, 6-35, 6-36, 6-37, 6-38,
	6-39, 6-40, 6-41, 6-42, 6-43, 6-44, 6-45, 6-46, 6-47, 6-48, 6-49, 6-50, 6-51, 6-52, 6-53, 6-54, 6-55,
	6-56, 7-11, 7-12, 7-13, 7-14, 7-15, and Index.
6/30/75	Revision C. Manual has been retyped with updates for level 2.0 release.

Contents

Figures

Tables

The CDC® CYBERDATA™ 970 System (figure 1-1) is a sophisticated shared processor, data entry system, which provides an advanced means of satisfying user data entry requirements. The system uses a powerful minicomputer and provides a broad range of features. Up to 48 high-speed key entry stations can be linked to the system for fast data entry. The system performs extensive on-line validation and may be easily adapted to accomplish unique user-oriented objectives.

Source data is entered by key entry station operators. Data which satisfies the specified validation criteria is stored on disk. If the data does not satisfy the specified validation criteria, the operator is immediately alerted through simultaneous keyboard lock, an audible alarm, and a visual indication of error type. Corrective action must take place before data entry may continue.

If verification is required, selected data fields may be rekeyed and compared with the corresponding data stored on the disk. Data may be located, recalled from the disk memory for visual display at the key entry stations, and changed if necessary. Extensive automatic functions and numerous control keys facilitate the data entry process. Data is transferred from the disk to magnetic tape and is ready for immediate processing.

The activities of each operator are guided by a library of format programs. All system activities are controlled through a supervisory console by means of supervisory commands and system messages. In addition, the system provides effective management control through computer-maintained efficiency statistics for both operators and system utilization.

Real-time programming is utilized, under the control of a modified CDC CYBERDATA Operating System (COS), in which the CYBERDATA System has the highest priority. This allows one of a variety of processing functions, such as media conversion, to operate in the background simultaneously.

The CYBERDATA System achieves cost-effective data entry and efficient data processing due to its powerful processor, operating system, and broad range of features.
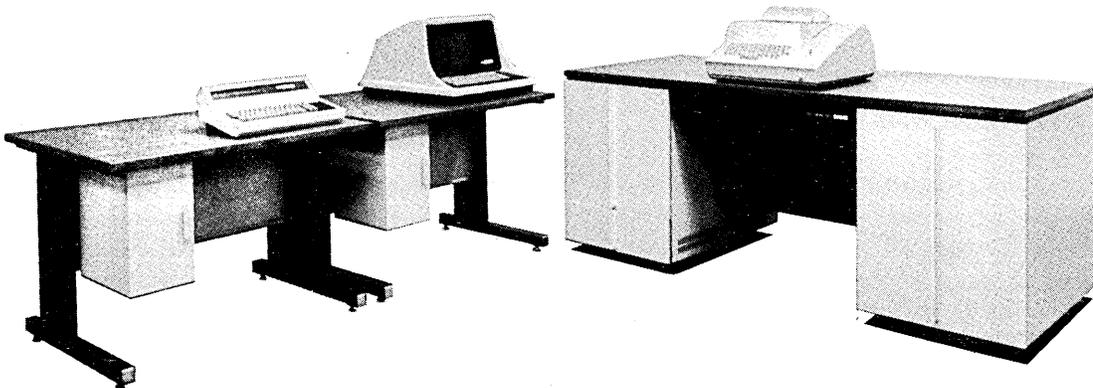
Figure 1-1. CYBERDATA System

BASIC SYSTEM

The basic CDC CYBERDATA System is comprised of up to 48 key entry stations, a supervisory console, a data entry processor, up to four disk storage units, and up to four magnetic tape units.

Supervisor DESC

The supervisor data entry system controller (DESC) (figure 2-1) is the heart of the CYBERDATA System. It contains the data entry processor, a cartridge disk drive, a magnetic tape transport, and a conveniently located autostart panel. The DESC top is large enough for a supervisory console and workspace for the supervisor.
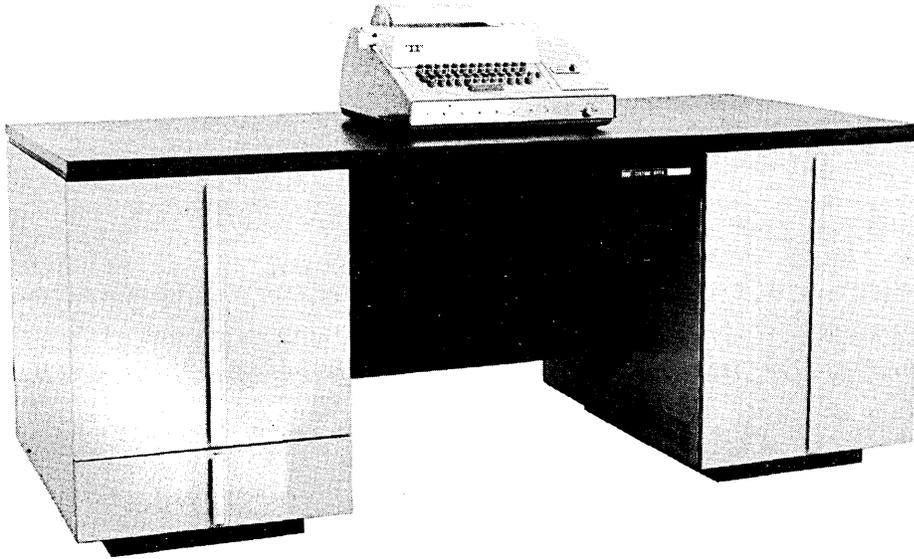
Figure 2-1. Supervisor DESC

Terminal Table

The terminal table (figures 2-2 and 2-3) holds the key entry station and provides workspace for the operator.

Figure 2-2. Table With 970-32 Key Entry Station

Figure 2-3. Table With 970-480 Key Entry Station

Key Entry Stations (970-32 and 970-480)

The operator enters data through a key entry station. Two types of stations are available: the 32-character station (970-32) and the 480-character station (970-480). The CDC 970-32 Key Entry Station display (figure 2-4) is of the gas discharge dot matrix type and can display up to 32 alphanumeric characters. The CDC 970-480 Key Entry Station (figure 2-5) uses a 12-inch cathode-ray tube (CRT) which permits up to 480 characters to be displayed.

The key entry stations use electronic keyboards (029 keypunch layout) which are not limited by mechanical or electro-mechanical delays. The operators, therefore, can work at their fastest effective rates.

The key entry stations are connected via key entry station power distribution units (PDU's) to a controller in the data entry processor (figure 2-6). Up to eight key entry stations may be connected to each PDU. The PDU's may be rack-mounted.

Figure 2-4. 970-32 Key Entry Station

Figure 2-5. 970-480 Key Entry Station
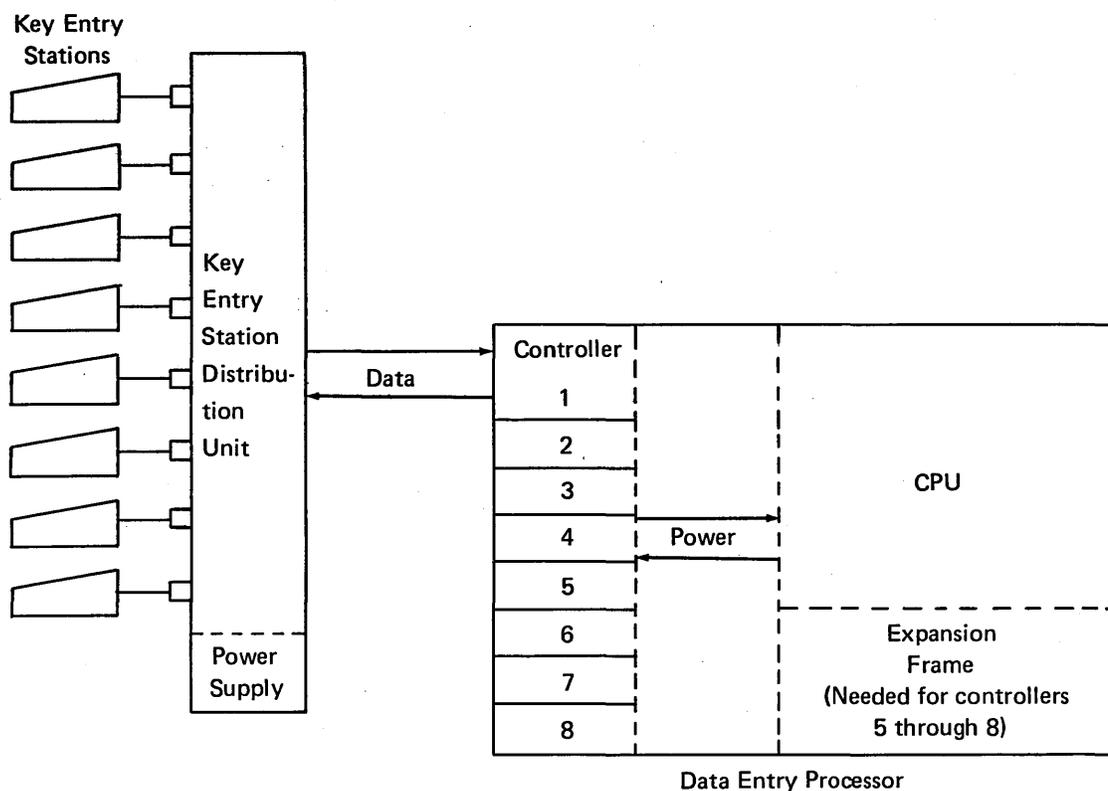
Figure 2-6. Key Entry Station Connection

Supervisory Console (1711-4 or KSR-33, 1711-5 or KSR-35, 1713-4 or ASR-33, and 1713-5 or ASR-35)

The supervisory console (figure 2-7) enables the supervisor to control, monitor, and communicate with the CYBERDATA System. The console consists of a keyboard for command entry and an impact printer for recording commands and messages. The supervisory console controller is contained in the processor frame.

Figure 2-7. 1711-4 Supervisory Console

Data Entry Processor (970-1/2)

The CDC 970-1/2 Data Entry Processor (figure 2-8) is the brain of the CYBERDATA System. Engineered for reliability, adaptability, and economy, this high-speed, modular processor utilizes the latest developments in advanced technology, achieving high system performance and cost effectiveness. The processor is fully software-compatible with the field-proven CDC 1700 Computer System.
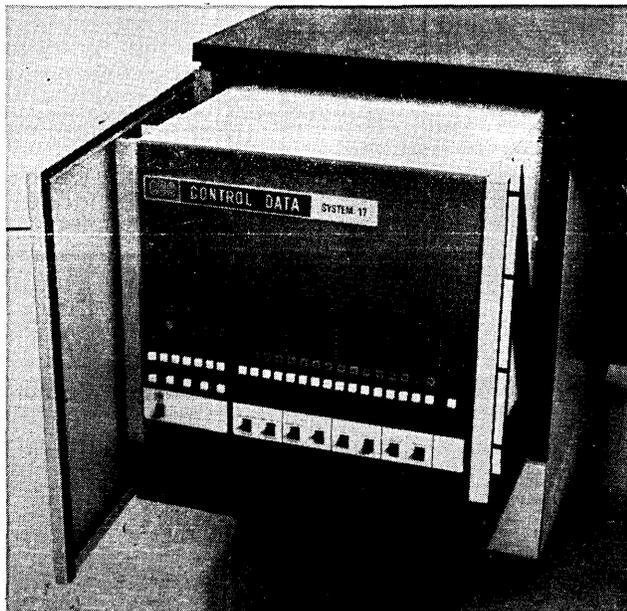
Figure 2-8. Data Entry Processor

The central processor is an 18-bit word (16 data bits, 1 parity bit, and 1 program protection bit),
stored program, general-purpose digital computer with a 4K dynamic metal oxide silicate (MOS)
large-scale integration (LSI) memory, expandable to 64K in 4K increments. Memory cycle time is
900 nanoseconds. The processor provides seven memory addressing modes, hardware multiply-
divide, 16 priority interrupt levels, high-speed direct memory access, and memory protect and parity
check.

CYBERDATA requires between 28K and 64K words of computer memory, depending on the
number of key entry stations and the user-oriented system objectives.

The central processor is available with a wide range of peripherals and software, which provide
extensive flexibility and capability.

Cartridge Disk Drive (856-2 and 856-4)

The CYBERDATA System uses a CDC 856-2/856-4 Cartridge Disk Drive (figure 2-9) for the
temporary storage of data prior to transfer to magnetic tape. The disk drive is also used for storing
parts of the system programs and reference libraries. Two versions are available, one with a capacity
of over four million bytes and one with a capacity of over eight million bytes.

The disk controller is contained in the processor frame. The basic system is offered with one drive
and may be expanded to four drives.
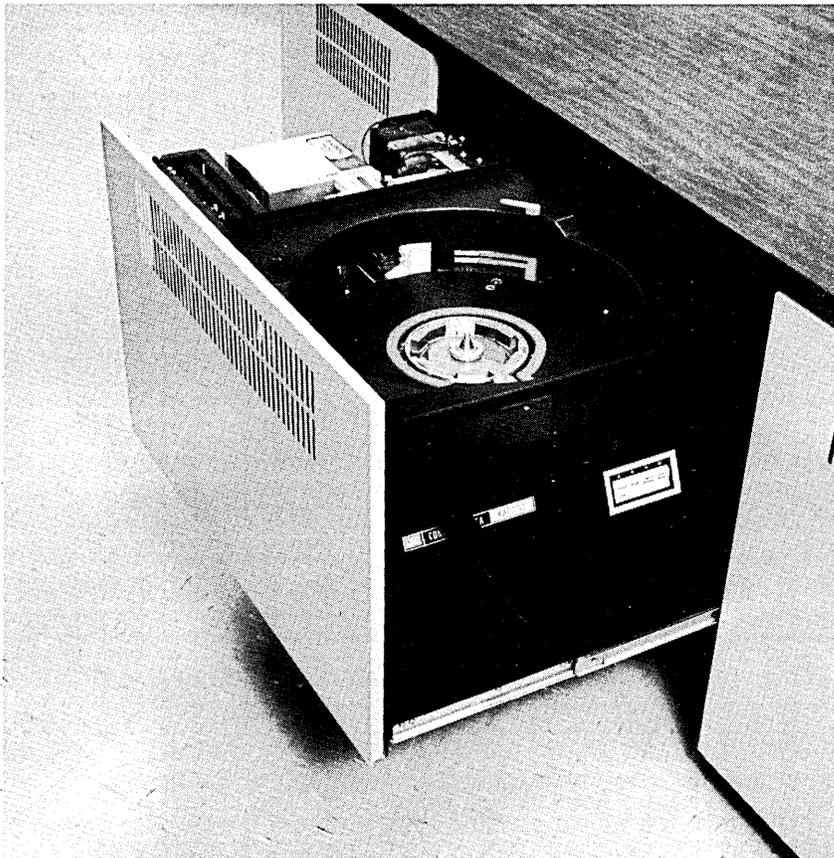
Figure 2-9. Cartridge Disk Drive

Magnetic Tape Transport (615-73 and 615-93)

The 615-73/615-93 Magnetic Tape Transport (figure 2-10) is used with the 970-1 to store the output of the CYBERDATA system. Two autoload versions are available: one employs nonreturn to zero (NRZI) recording; the other has dual-mode, nonreturn-to-zero/phase encoded (NRZI/PE) recording. Positive tape control is achieved via the use of a single capstan. Vacuum columns are used to provide gentle tape handling.

The controller is contained in the processor frame. It uses the processor's high-speed direct storage access channel. A phase encoding option must be added to provide PE capability. The basic key-to-disk system is offered with one transport and may be expanded to four transports by using any combination of seven tracks 556/800 bits per inch (bpi) (NRZI), nine tracks 800 bpi (NRZI), and/or nine tracks 800 bpi (NRZI)/1,600 bpi (PE).

Magnetic Tape Transport (616-72 and 616-92)

The 616-72/616-92 Magnetic Tape Transport (figure 2-11) is used with the 970-2 to store the output of the CYBERDATA System. Two versions are available: one employs nonreturn-to-zero (NRZI) recording; the other has dual-mode, nonreturn-to-zero/phase-encoded (NRZI/PE) recording. Positive tape control is achieved via a single capstan. Two vacuum columns provide gentle tape handling.
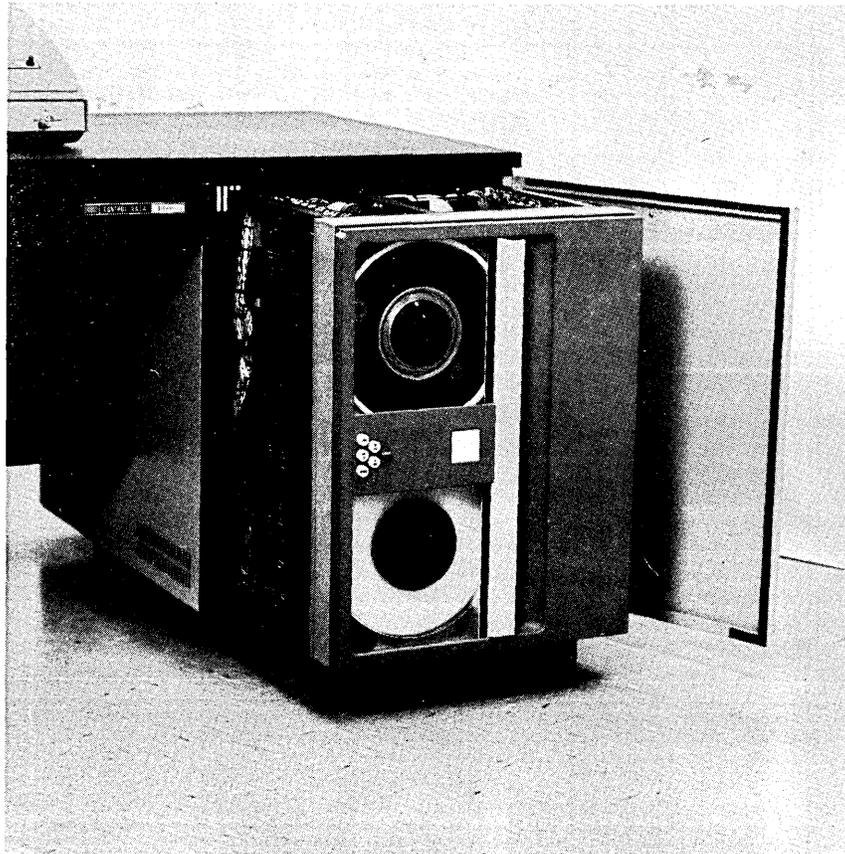
Figure 2-10. 615-73/615-93 Magnetic Tape Transport

The controller, which is contained in the processor frame, uses the processor high-speed, direct-storage-access channel. A phase-encoding option must be added to provide the phase-encoding capability. The basic CYBERDATA System is offered with one transport and may be expanded to four transports by using any combinations of seven-track, 556- or 800-bit-per-inch (bpi), NRZI; nine-track, 800-bpi NRZI; and/or nine-track 800-bpi, NRZI/1,600-bpi, phase-encoded recording.
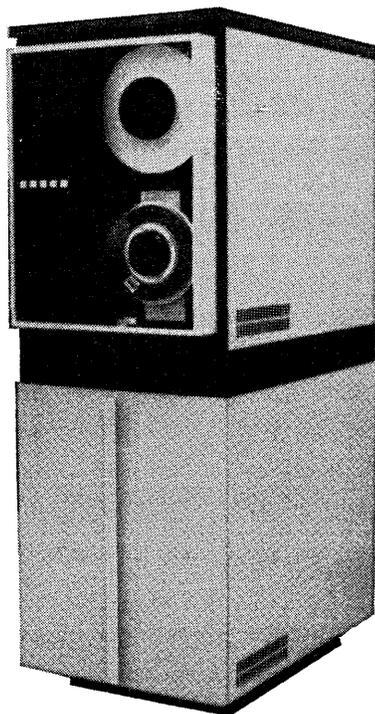
Figure 2-11. 616-72/616-92 Magnetic Tape Transport

EXPANDED SYSTEM

A card reader and line printer are available for system expansion and media conversion; therefore, jobs such as limited, tape-to-print, card-to-tape, and card-to-print may be processed in the background while CYBERDATA operates in the foreground. This reduces main computer cost and load.

In addition, data can be entered from remote sites by the use of optional equipment, and memory can be expanded above 64K.

Card Reader (1729-3)

The CDC 1729-3 Card Reader (figure 2-12) is a 300-card-per-minute reader especially designed for minicomputer systems. This low cost, highly reliable device uses a fiber optics read station. Apart from media conversion, it may also be used to enter format specifications and user-oriented programs into the key-to-disk system. The controller is contained in the processor frame.
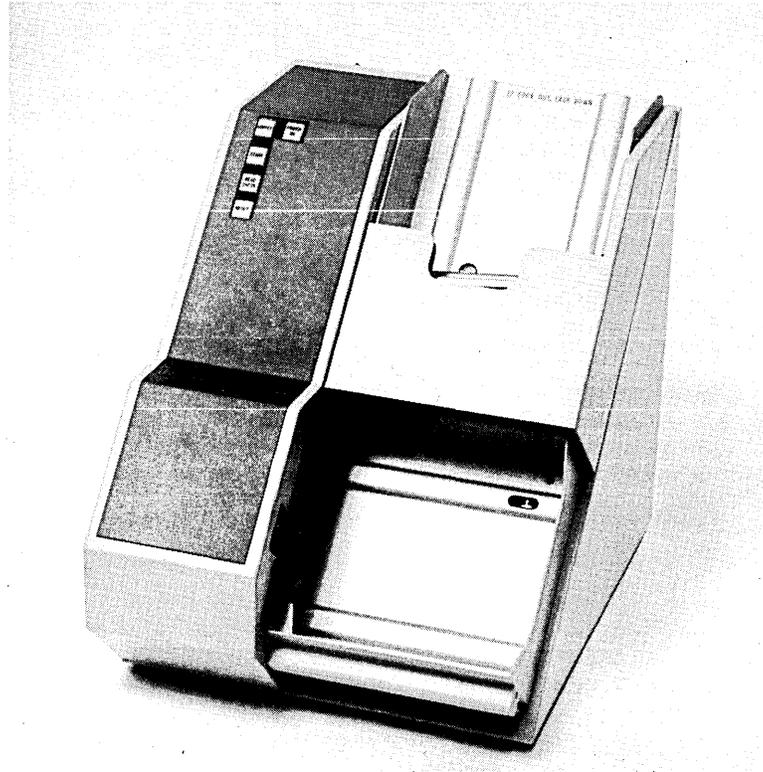
Figure 2-12. 1729-3 Card Reader

Line Printer (1742-30 and 1742-120)

Two versions of the line printer are available; the 300-line-per-minute CDC 1742-30 Line Printer (figure 2-13) and the 1,200 line-per-minute CDC 1742-120 Line Printer (figure 2-14). Either of the printers can be connected to the CYBERDATA System by means of the controller, which is contained in the processor frame.

The line printers which are especially designed for minicomputer systems feature 136-column character printout, a 64- or 96-character set, easy paper alignment, paper fault indicator, paper out and paper tear sensors, and automatic pinwheel locks (for positive paper control).
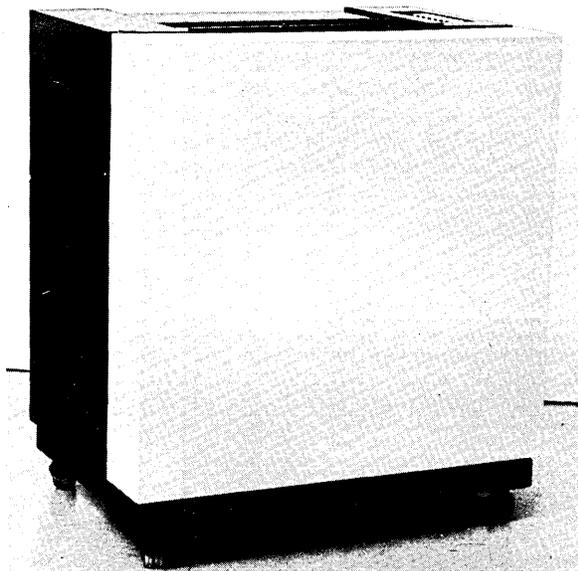
Figure 2-13. 1742-30 Line Printer

Figure 2-14. 1742-120 Line Printer

Distributed Cluster Local Controller (970-25)/
Distributed Cluster Remote Controller (970-26)

Each pair of CDC distributed cluster controllers provides for up to eight remote 970-480 Key Entry
Stations (figure 2-15). This capability can be added via any controller.
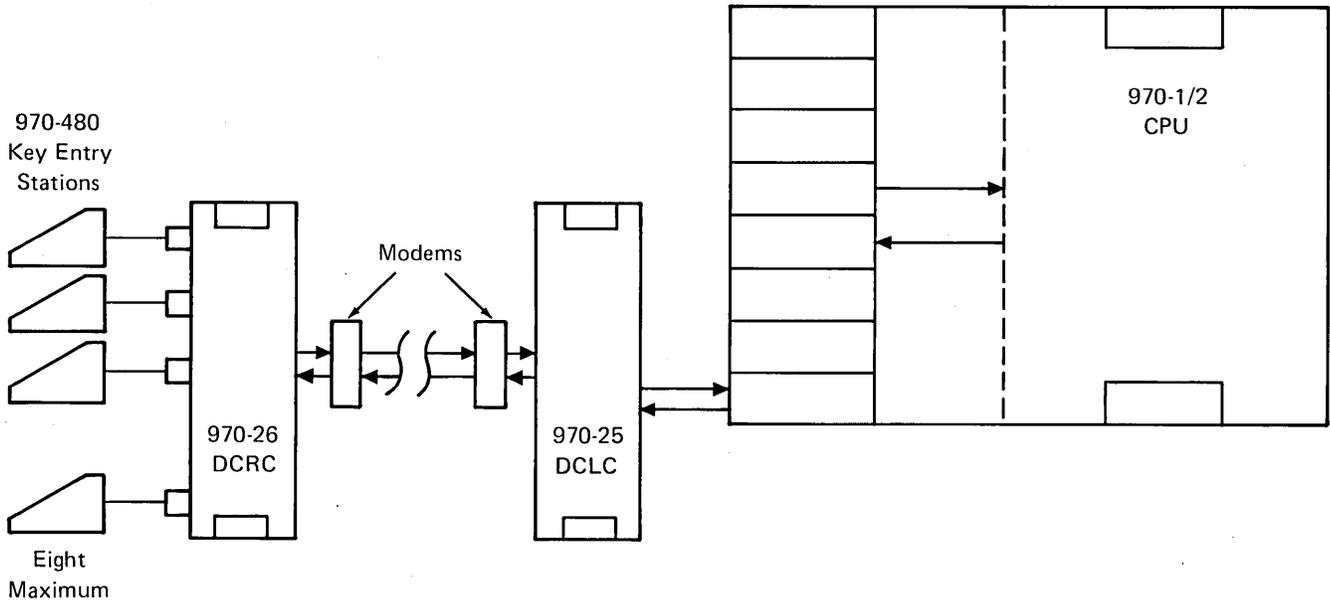
Figure 2-15. 970-25/26 Distributed Data Entry

Memory Expansion Modules (1782-1)

The CDC MOS memory expansion modules provide up to a total of 65K of memory in 4K increments. The expanded memory is housed in either a 10325 Expansion Cabinet or a 10414-2 Tape and Expansion Enclosure depending on the system configuration. A 1786-1 Memory Expansion Controller is also required.

EQUIPMENT SPECIFICATIONS

Specifications for the various equipment are given in the following tabular material.

Supervisor DESC

Features	The supervisor DESC holds the data entry processor, cartridge disk drive, magnetic tape transport (optional), autostart panel, and supervisory console.
Power requirements	The equipment requires 115/230 vac±10 percent, 50/60 Hertz, 2.4 kva.
Dimensions	The DESC is 29.7 inches (0.75 meters) high, 72 inches (1.83 meters) wide, 32 inches (0.81 meters) deep, and weight 998 pounds (449.1 kilograms) when equipped.

Terminal Table

Features	The terminal table holds the key entry station and provides workspace for the operator. It has a conveniently located storage cabinet.
Dimensions	The terminal table is 26 inches (0.66 meter) high, 36 inches (0.92 meter) wide, 30 inches (0.76 meter) deep, and weighs.

Key Entry Station (970-32)

Keyboard	The 029 Keypunch is standard.
Display	The display has a gas discharge dot matrix, a capacity of 32 alphanumeric characters, and a 64-character modified American Code for Information Interchange (ASCII) subset. Each character position is separately addressable.
Environment	The operating temperature is +40°F (+5°C) to 110°F (+45°C), and the operating humidity is 10 to 80 percent (without condensing).
Power requirements	The equipment requires 115/230 vac±10 percent, 60/50 Hertz, and single-phase 250 va (8 terminals).
Dimensions	Dimension specifications are a height of 6 inches (16 centimeters), a width of 17 inches (42 centimeters), a depth of 11 inches (27 centimeters), and a weight of 6.6 pounds (3 kilograms).

Key Entry Station (970-480)

Keyboard	The 029 Keypunch is standard.
Display	It has a 12-inch CRT with a capacity of 480 characters (10 lines and 48 characters per line).
Character repertoire	The station character repertoire is comprised of 64 ASCII alphanumerics.
Character generator	The generator consists of a 5 x 7 dot matrix.
Character size	Characters are 0.13 inch high and 0.08 inch wide.
Environment	The operating temperature is +40°F (+5°C) to 110°F (+45°C), and the operating humidity is 10 to 80 percent (without condensing).
Power requirements	The power is 115/230 vac ± 10 percent, 60/50 Hertz, single-phase 100 va.

| Dimensions | The station is 13 inches (33 centimeters) high, 19 inches (48.3 centimeters) wide, 23 inches (58.4 centimeters) deep, and weighs 25 pounds (11.4 kilograms). |

Supervisory Console (1711-4, 1711-5, 1713-4, and 1713-5)

Speed	The supervisory console handles 10 characters per second.
Code	It uses an eight-level ASCII code.
Printer	It has friction paper feed, an 8-½-inch diameter paper tape reel, has 10 characters per inch horizontal spacing, single or double row (three to six lines per inch) vertical spacing, and 72 characters per line.
Keyboard	This is a four-row, eight-level printing and control character keyboard.
Environment	The operating temperature is +40°F (+5°C) to +110°F (+43°C); the operating humidity is up to 90 percent (without condensing).
Power requirements	The equipment must have 115 vac ±10 percent, 50/60 Hertz, single-phase, 250 watts of power.
Dimensions	The dimensions are 32.875 inches (83.5 centimeters) high, 22 inches (55.9 centimeters) wide, 19 inches (47 centimeters) deep, and 56 pounds (25.5 kilograms).

Data Entry Processor (970-1/2)

Memory	It has 4K to 64K words dynamic MOS LSI in 4K increments.
Word length	Eighteen bits (16 data, 1 parity, and 1 protect) comprise the words.
Cycle time	Cycle time is 900 nanoseconds.
Memory addressing modes	There are seven (including multilevel indirect on 32K model).
Priority interrupt levels	There are 16 priority interrupt levels.
Data transfer rate	Data transfer occurs at 1.1 million words per second.
Environment	The operating temperature is +40°F(+5°C)to +120°F (+50°C); the operating humidity is 10 to 90 percent (without condensing).
Power requirements	The equipment requires 104 to 127/198 to 264 vac, 60/50 Hertz, single-phase, 500 va. A backup battery option is available for memory refreshing in the event of power failure.
Dimensions	The equipment height is 15.75 inches (39.95 centimeters), the width is 19 inches (48.3 centimeters), the depth is 17.875 inches (45.7 centimeters), and the weight is 80 pounds (36.36 kilograms).

Cartridge Disk Drive (856-2 and 856-4)

Recording density	Density for recording is 2,200 bpi.
Sector size	A sector is 192 bytes.
Sectors per track	There are 29 sectors per track.
Tracks per surface	There are 200 tracks per surface plus three spares or 400 plus six spares.
Capacity per disk	The capacity of each disk is 2.2 or 4.4 million bytes
Subsystem capacity	The subsystem has a capacity of 4.4 or 8.9 million bytes.
Seek time	Average seek time is 35 milliseconds.

Latency	Average latency is 12.5 milliseconds.
Disk speed	Disk speed is 2,400 revolutions per minute (rpm).
Data transfer	Data is transferred at a rate of 312,000 bytes per second.
Environment	The operating temperature is +60°F (+15°C) to +90°F (+32°C); the operating humidity is 10 to 80 percent (without condensing).
Power requirements	The equipment needs 120/220 vac, 60/50 Hertz, single-phase power.
Dimensions	The equipment is 15 inches (38.1 centimeters) high, 17.5 inches (44.5 centimeters) wide, 29.8 inches (75.7 centimeters) deep, 150 pounds (68.2 kilograms).

Magnetic Tape Transport (615-73 and 615-93)

Recording mode	Recording mode can be either seven track, 556/800 bpi, NRZI, or nine track 800 bpi, NRZI/nine track, 1,600 bpi, PE.
Tape speed	Tape speed is 37.5 inches per second.
Rewind speed	Tape rewind speed is 150 inches per second.
Tape loading	Automatic tape threading and loading onto the take-up reel.
Reel sizes	Tape reels are 7, 8.5, and 10.5 inches in size.
Tape lengths	The length of these tapes is 600, 1,200, and 2,400 feet.
Environment	The operating temperature is 40°F (+5°C) to +105°F (+40°C); the operating humidity is 10 to 90 percent (without condensing).
Power requirements	The equipment requires 108 to 124/190 to 235 vac, 60/50 Hertz, single-phase power.
Dimensions	The equipment is 24.5 inches (62.2 centimeters) high, 19 inches (48.2 centimeters) wide, 18 inches (45.7 centimeters) deep, and weighs 225 pounds (102.3 kilograms).

Magnetic Tape Transport (616-72 and 616-92)

Recording mode	Recording mode can be either seven track, 556/800 bpi, NRZI, or nine track 800 bpi, NRZI/nine track, 1,600 bpi, PE.
Tape speed	Tape speed is 25 inches per second.
Rewind speed	Tape rewind speed is 150 inches per second.
Tape loading	The manual method is used.
Reel sizes	Tape reels are 7, 8.5, and 10.5 inches in size.
Tape lengths	The length of these tapes is 600, 1,200, and 2,400 feet.
Environment	The operating temperature is 40°F (+5°C) to +105°F (+40°C); the operating humidity is 10 to 90 percent (without condensing).
Power requirements	The equipment requires 108 to 124/190 to 235 vac, 60/50 Hertz, single-phase power.
Dimensions	The equipment is 24.5 inches (62.2 centimeters) high, 19 inches (48.2 centimeters) wide, 18 inches (45.7 centimeters) deep, and weighs 130 pounds (59.09 kilograms).

Card Reader (1729-3)

Card type	The card used for the 1729-3 has 80 columns with square or round corners.

Hopper and stacker capacities	The hopper and stacker can each handle 600 cards.
Reading speed	Cards can be read at 300 cards per minute.
Reading method	The fiber optics photoelectric method is used for reading.
Environment	The operating temperature is +60°F (+15°C) to +90°F (+32°C); the operating humidity is 30 to 80 percent (without condensing).
Power requirements	Power is 104 to 128 vac, 57 to 63 Hertz, single-phase; 187 to 228 vac, 57 to 63 Hertz, single-phase; and 198 to 268 vac, 48 to 52 Hertz, single-phase.
Dimensions	The equipment is 17 inches (43.18 centimeters) high, 14 inches (35.56 centimeters) wide, 21 inches (53.34 centimeters) deep, and weighs 55 pounds (23.85 kilograms).

Line Printer (1742-30 and 1742-120)

	300 Line-Per-Minute Printer	**1,200 Line-Per-Minute Printer**
Paper advance speed	Paper is advanced at a 25-millisecond, single-spaced, 15-inch-per-second skip rate.	Paper is advanced at a 13-millisecond, single-spaced, 70-inch-per-second skip rate.
Character set	A 64-character set is standard; 96 characters is optional.	A 48-character set is standard.
Character pitch	Character pitch is 10 characters per inch and 6/8 lines per inch.	Character pitch is 10 characters per inch and 6/8 lines per inch.
Environment	The operating temperature is +40°F (+5°C) to +100°F (+38°C); the operating humidity is 10 to 90 percent (without condensing).	The operating temperature is +60°F (+15°C) to +90°F (+32°C); the operating humidity is 10 to 90 percent (without condensing).
Power requirements	Power is 104 to 128/220 vac, 60/50 Hertz, single-phase	Power is 208 vac, 59 to 60.6 Hertz, three-phase, 15 amperes per phase maximum.
Dimensions	The equipment is 39.25 inches (99.7 centimeters) high, 37.5 inches (95.3 centimeters) wide, 27 inches (68.6 centimeters) deep, and weighs 500 pounds (227.3 kilograms).	The equipment is 53 inches (135 centimeters) high, 63 inches (160 centimeters) wide, 45 inches (104 centimeters) deep, and weighs 1,400 pounds (636 kilograms).

INTRODUCTION

The CYBERDATA System is designed to accept data from source forms transcribed by operators at key entry stations, to validate the data and enforce operator accuracy simultaneously, to allow for verification, and to transfer the error-free data onto magnetic tape. Automatic functions and various tests are performed according to stored specifications.

Batches of source forms are distributed by the supervisor to the operators. Data is then keyed by the operators and transferred to the system memory. There the data is tested for accuracy according to predetermined mathematical and logical tests. If the data passes these tests, it is stored on the disk while the entry process continues. If the data fails a test, the operator is alerted immediately by an audible alarm and by visual indication of error type. Until corrective action is taken, additional keyed data is not accepted by the system.

Data is recalled from disk storage to the system memory for verification. There it is compared by the computer with selected fields being rekeyed. If the comparison is exact, the data stored on the disk is accepted as correct. If the comparison is not exact, the operator is alerted by an audible alarm and a visual indication of error type. As with validation errors, the system does not accept any additional data until corrective action has been taken.

Previously entered data may be located, redisplayed, or changed by recall from system memory at the key entry station.

At the convenience of the supervisor, a command is entered at the supervisory console to transfer batches to tape. The magnetic tape drive automatically performs a read-after-write verification to ensure correct recording.

Monitoring and control are carried out at the supervisory console, where a printed log of all messages is maintained. Efficiency statistics are maintained by the data entry processor. Reports regarding both individual station operators and total shift performance are available on demand at the supervisory console.

DEFINITIONS

Some of the concepts used in the CYBERDATA System are designated by special terms or terms with different meanings outside the field of electronic data processing. The user, therefore, should pay special attention to the following definitions.

Data	Data is information entered by the operator.
Source form	The paper containing the data which the operator keys into the system is called a source form.
Character	A character is the smallest unit of data. A character may be a number, a letter, or a symbol. Each keystroke results in the entry of one character. Numeric characters are sometimes referred to as digits.
Column number	The column number is the position of each character in a record. The first character keyed is in column 1, the second is in column 2, etc.
Field	The field is one or more consecutive characters which have a specific identity collectively, such as name, employee number, salary, etc. The maximum number of characters in a field is 99.
Record	A record is one or more consecutive fields which comprise a unique set, such as all of the information about a particular employee, or a particular piece of equipment. The minimum number of characters unpadded in a record is 18; the maximum number is 1,000. The maximum number of fields in a record is 127.
Format	A description of the characteristics and layout of a particular record type and the tests required is called format. These specifications are entered on format specification sheets (figure 5-3). The maximum number of formats which can be defined in the system at one time is 8,000.

Basic Concepts

Document

A document consists of all records keyed in by one operator while going through the sequence of formulas listed on the CDC® CYBERDATA™ Format Specification sheet once.

The formats and document organization are initially entered into the system by the supervisor. Format advance then takes place completely automatically; that is, after each group of records is keyed by the operator, the next format is selected by the system. When the last record of the last format is keyed, the system automatically selects the first format again in preparation for entering the first record on the next source form. Manual format selection is necessary only when a record to be entered does not correspond with the predefined document.

Figure 3-1 shows a completed source form. This form shows the payroll data for all of the employees in a particular cost center of an organization. There is a similar form for each cost center.

In this example, the document consists of 1 record under format 1, 12 records under format 2, and 1 record under format 3.

The maximum number of documents which can be defined in the system at one time is 255.

Format 1

Cost Center: 521

Date: 31/12/73

Employee Data

Format 2

		Employee Name	Employee Number	Normal Hours	Overtime Hours	Salary
	1	JOHN SMITH	1019	160	–	$ 927
	2	ARTHUR LAWSON	1075	160	–	$ 1,050
	3	STEVEN BRIGHT	1082	160	–	$ 1,112
	4	KEN KILNER	1091	160	–	$ 1,112
	5	MARTIN LEWIS	1057	160	–	$ 950
	6	DAVID GOLDSTEIN	1071	160	10	$ 1,100
	7	JOE KASSANOVA	1029	160	15	$ 1,150
	8	HENRY JONES	1050	160	–	$ 840
	9	FRED CLERK	1042	142	20	$ 1,400
	10	NORMAL CARP	1033	160	–	$ 950
	11	GORDON SANDERS	1027	160	–	$ 1,100
	12	RON HORROR	1049	160	–	$ 978

Format 3 ---- | $12,669

Figure 3-1. Source Form

Batch	A batch is a group of records or documents assigned as a unit of work to a key entry station operator. The number of source forms in a batch may represent a meaningful organization of the data, such as all the transactions for 1 day or the payroll data for 1 week. Alternatively, the batch size may be based on convenience. The number of batches in the system is limited only by the available disk capacity. The maximum number of batches per job is 999.
Job	A job consists of all the data batches which belong to a common group; for example, all of the batches of payroll data make up a payroll job. The maximum number of jobs which may be active in the system at one time is 255.
Validation	Validation consists of mathematical and logic tests on fields in a record to determine whether the fields conform to the user's specifications.
Verification	Verification is the process whereby data is checked visually (sight verification) or keyed in a second time and automatically compared with the data stored on disk from the original keying operation (key verification). All or part of the original data may be verified.
Error flag	An error flag is an indicator set on a field that does not pass a specified validation test. Error flags may be set manually or automatically. The flags enable error fields to be subsequently located and displayed. When displayed, the flag appears as two asterisks immediately preceding the field data. Error flags are not recorded on the output tape.
Own code tests	Disk-resident subroutines written by the user, which enable nonstandard tests to be performed, are called own code tests. These tests are performed either at the end of a field or at the end of a batch.
	The first five own codes are reserved for CDC standard own codes. The first one is used for format adjustment; the rest are reserved for future enhancements.
Special tests	Special tests are memory-resident subroutines, which enable check digit verification and user-written tests to be performed.
Check digit	A check digit is a digit added to a number to allow mathematical tests to be performed on the original (base) number to check it for validity. This test, termed a check digit verification test, is one of the validation tests provided by the CYBERDATA System.
Modulus	The divisor used in a check digit verification test to divide the sum of the weighted digits of a numeric field is called a modulus.
Weight	Weight is the factor applied to each digit of a field as part of the process of determining a check digit.
Counter	A register into which the contents of a numeric field may be added or subtracted (see batch balancing) is called a counter. Two 15-digit signed counters are available for each numeric field, and up to seven counters may be used in a batch.
Batch balancing	Batch balancing is one of the validation tests provided by the key-to-disk system. In this test, the contents of a numeric field may be added to or subtracted from a counter. The counter is initially set to a number such that at the end of the batch or subbatch, the contents of the counter should be zero. A batch is said to be unbalanced if the content of the counter is not zero at this time.
Subbatch	In certain applications, the contents of a counter should be zero before the end of a batch, for example, when all the records of one department have been entered. This logical division of a batch is called a subbatch.

Fill character	A feature enabling variable length fields to be automatically filled to their maximum size on the output tape with characters other than spaces (for alphanumeric fields) or zeros (for numeric fields) is called fill character.
Automatic sequencing	Automatic sequencing is the process whereby records are automatically numbered as data is entered and automatically renumbered when they are transferred to tape to take into account deletions and insertions.
Automatic resequencing	Automatic resequencing is the process whereby fields are keyed by the operator in one sequence but are transferred to tape in a different sequence.
Command	A command is an instruction entered by the supervisor at the supervisor's console to the CYBERDATA system. The command consists of a two- or three-letter mnemonic derived from the command name, which is often followed by additional information (called parameters). The mnemonic plus the parameters comprise the information needed to execute the command.
Volume label	A volume label is a special user designation at the start (volume header) or end (volume trailer) of a reel of magnetic tape. It gives information such as tape serial number, date, continuation on another tape, etc.
File label	A file label is a special user designation at the start (file header) or end (file trailer) of a tape file, giving information about the file. A file usually consists of one or more batches.
Block	A block is the quantity of data between two interrecord gaps.
Magnetic tape format	The format (physical appearance) of data on magnetic tape can be varied to meet the requirements of the tape-processing center. Up to 255 formats can be stored in the system. Variables include volume and file labels (optional headers and trailers, standard and nonstandard), field length (fixed or variable), recording mode (ASCII, BCD, or EBCDIC), overpunching (none, minus, plus/minus), blocking mode (unblocked, fixed length, variable length-decimal, and variable length-binary), record sequencing, field sequencing, fill character, and MFT own code. The system can handle up to 31 label formats.
Parameter	A parameter is an entry which describes, defines, or identifies a unit of data, or indicates how the data is to be treated.
Default value	The COS automatically assigns this value to a parameter in certain instances where the parameter is omitted.
Format adjustment	Adjustment is completed by selecting a new format by using own code 1 and keying in the number of the desired format in the corresponding data field.

MODES OF OPERATION

The key entry station has four modes of operation:

- Entry
- Verify
- Read
- Interrogate

Entry Mode

In Entry mode, data is entered through the keyboard, and the system performs extensive logic tests (validation) on a field-by-field basis, according to previously entered specifications (figure 3-2). If an error is found, the operator is immediately informed by an error indicator and an audible alarm. Furthermore, pressing any keys, other than RESET or DISP (display), has no effect on the system until corrective action is taken.

Validation errors may be manually or automatically overriden. When this occurs, an error flag is set on the appropriate field. Flagged fields may be subsequently located, displayed, and printed. Several automatic functions and control keys (table 5-3) facilitate the data entry process.

Verify Mode

In Verify mode (figure 3-3), data is rekeyed for second-pass character-by-character verification and is compared with the data stored in the system memory from the entry operation. The CYBERDATA System permits a selective verification so only specified fields, erroneous fields, or the fields contributing to unbalanced counters need to be rekeyed. Verification may be performed on the characters of fields which have been validated, although this is usually not necessary. If a field is corrected during verification, it is automatically revalidated.

CYBERDATA also permits sight verification, whereby the field is displayed and the operator compares it visually with the source material.

Read Mode

Read mode is used for locating, redisplaying, and changing previously entered data. The data displayed can be moved backward or forward in increments of character, field, record, and document. The mode can be entered at the beginning of a field from Entry mode or anywhere during Verify mode. On pressing the READ key, the current position of the record is stored in the system memory to enable the operator to return instantly to the original mode of operation.

Error-flagged fields are identified on the key entry station display by two asterisks adjacent to the displayed field, for example:

    **123456

Interrogate Mode

Interrogate mode is used to perform special functions.

- Batch start-up (Entry or Verify mode select)
- Display status
- End of batch
- Search and continue search
- Initialize counter
- Display counter
- Display error message
- Display records
- Turn on/off tutorial facility
- Sign-on as supervisor
- Regenerate display
- Freeze/thaw batches
- Function explanation

BATCH START-UP

This is a mandatory procedure for initiating both data entry and verification. The operator must key in the following information: the required mode of operation (Entry or Verify); job name, batch number, and operator number.

DISPLAY STATUS

This function allows the operator of a 32-character station to display, at will, current batch status information which would be displayed continually on a 480-character station.

END OF BATCH

This function allows the operator to terminate batch entry, at which point batch balancing and own code tests are performed, when specified.

Operator Keys
One Character

Yes — Correct Data Type ? — No → Character Replaced

Stored in Data Buffer

Shown on Station Display

Field Boundary Check ? — Yes → Computer Waits for SKIP

No

End of Field ? — Yes

No

Computer Waits for Next Character of Field

Field Replaced

Validation Error ? — Yes → Manually Overridden and Flagged

No

Automatically Overridden and Flagged

End of Record ? — Yes → Computer Transfers Record to Disk

No

Advance to Next Format If No. Records Keyed Equals No. in Document

End of Batch ? — Yes → Batch Balancing and End of Batch Own Code Test Is Performed, If Specified. Operator May Enter New Batch.

No

Wait for Next Input

Prepare To Enter Next Field

Perform Auto Function — Yes — Auto Field ?

No → Computer Waits for First Character of Next Keyable Field

Figure 3-2. Data Flow in Entry Mode

Operator Keys
One Character

Does
Character
Equal
Character Keyed
in Entry
?

No

Mismatch Error

Yes

Change
Verify Mode
Character

Change
Entry Mode
Character

End
of Field
?

Yes

Field
Boundary
Check
?

Yes

Computer
Waits for
SKIP

No

No

Computer Waits for
Next Character
of Field

Were
Any Entry
Mode Characters
Changed
?

Yes

No

Validation

Field Replaced

Waits in Entry
for Field To
Be Keyed In

Validation
Error
?

Yes

Manually
Overridden
and Flagged

No

Automatically
Overridden
and Flagged

Is
Re-
verification
Specified on
Format
?

Yes

Computer Waits for
First Character
of Field

No

End
of Record
?

Yes

Computer Reads Next
Record From Disk

No

Prepare To
Verify Next Field

End of
Batch
?

Yes

Batch Balancing
Performed.
Operator May
Verify Another
Batch.

No

Computer Examines
First Field of
Next Record

Is
Field
Verifiable
?

No

Yes

Key
or
Sight
?

Key

Sight

Computer Waits
for Next
Character

Field Is
Displayed

Computer Waits
for Continue

Figure 3-3. Data Flow in Verify Mode

SEARCH

This feature allows the key entry station operator to locate and display a record stored on disk. The record may then be modified, deleted, or replaced. Search differs from Read mode in that the sought record is located directly by the system and the intervening records are not displayed. There are three kinds of references which enable the key to disk system to conduct a search.

- Position of record in batch
- Data contents
- Error flag

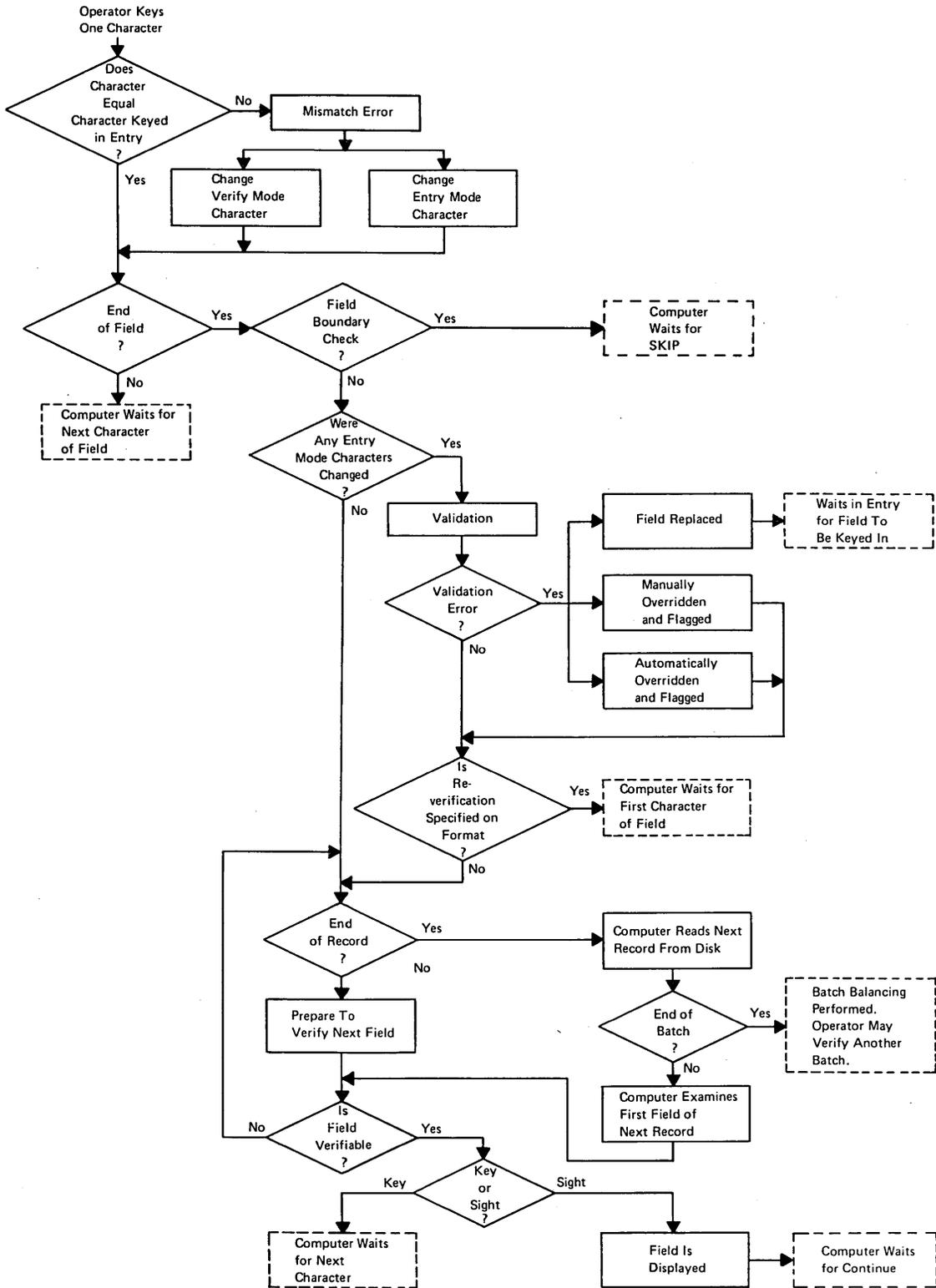Search may be performed forward, backward, or from the start of a batch.

Search by Position of Record in Batch

This function enables the operator to locate and display the beginning of a specified record or a particular field or column in that record. The record, field, or column is identified by its number.

Search by Data Contents

This function enables the operator to locate and display a record by referring to either one or two unique identifiers or values in the record.

Search by Error Flag

This function enables the operator to locate and display the next error-flagged field, a particular field, or a column in the record in which it was found.

CONTINUE SEARCH

This function enables the operator to locate and display a series of records following the record, which has been located initially. If the operator has searched for a record by data contents, continue search locates and displays each subsequent record which contains the same unique contents. If the operator has searched for a record by error flag, continue search locates and displays each subsequent error-flagged field. If the operator has searched by record position, continue search locates and displays the nth record forward or backward from the record number (N) which was originally sought.

INITIALIZE COUNTER

This function is used in batch balancing to preset a counter to an initial value so that at the end of the batch the contents of the counter is zero.

DISPLAY COUNTER

This function enables the operator to examine the contents of the seven counters provided for batch balancing.

DISPLAY [ERROR] MESSAGE

This function enables the operator to display a complete error message corresponding to and explaining each error code. In addition, it is used by an operator in Entry or Verify mode to look at messages sent from the Console Supervisor.

DISPLAY RECORDS

The 970-480 station normally displays each field of data, together with the field number, on a **separate line,** irrespective of the field length. The display records feature maximizes efficient use of the CRT area by showing consecutive fields on the **same line** and continuing the field number. Field separation is provided by two inverse blanks or inverse asterisks, depending on whether the field is flagged. When a complete record cannot be displayed on a single line, it is continued on the next line. Each record begins on a new line.

This function enables the operator of a 970-480 station to pause at end-of-field and learn the description of the next field. When this facility is turned on, the following information is displayed on the bottom line of the screen:

- Field name or number
- Fixed or variable keying mode
- Maximum number of characters in field
- Field data type

This information enables the operator to enter the data promptly and indicates whether the SKIP and sign keys are valid for the field. The key-to-disk system tutorial facility assists the trainee in learning the keying sequence of a record and provides guidance to trained personnel.

SIGN-ON AS SUPERVISOR

This feature enables the key entry stations to assume many of the functions performed by the supervisory console.

REGENERATE DISPLAY

This function enables the last information displayed on the key entry station to be regenerated if the station has been disconnected or switched off.

AUTOMATIC FUNCTIONS

CYBERDATA provides several automatic functions which ease the work of the operator and supervisor and ensure that only error-free data is transferred to magnetic tape.

Automatic Duplication

This feature enables a field keyed into the first record of a format to be automatically duplicated in the corresponding field of all subsequent records until another format is selected.

Automatic Skip

This feature enables an entire field to be automatically filled with either spaces (alphanumeric fields), zeros (pure numeric fields), or specified characters (see automatic fill).

Multilevel Duplicate/Skip

When enabled, this feature allows the contents of an automatic duplication or automatic skip field to be changed manually. When disabled, the original automatic function specified is performed. If this function is automatic duplication, the new data keyed into the last field is duplicated in all subsequent records of the same format.

Automatic Fill

A field, which is specified as variable length keying and fixed recording, may be automatically filled with either trailing spaces (for alphanumeric fields) or leading zeros (for pure numeric fields). The right zero fill feature, however, allows pure numeric fields to be filled with trailing zeros. The left blank fill allows alphanumeric fields to be filled with leading spaces. Characters other than zeros or spaces may be inserted in the output record by use of the fill character feature. The data entered by the fill character actually appears in the field only after the data is written on tape. It, therefore, is not displayed in Read mode.

Automatic Sequencing

This feature enables records to be numbered in sequence, starting either from 1 or from a number entered by the operator at the beginning of the batch. The sequence number is in the first field of the record, but may be changed by means of automatic resequencing. Inserted records receive the temporary number 9999. When the batch is transferred to magnetic tape, the records are renumbered to take deletions and insertions into account. Note that only records for which automatic sequencing has been specified are numbered.

Automatic Resequencing

This feature enables fields to be keyed in one sequence but transferred to tape in a different sequence.

Automatic Format Advance

This feature enables the next format in a document to be selected automatically after the operator has entered all the records controlled by the previous format. When the last record of the last format in the document is entered, the first format is selected again in preparation for entering the first record on the next source form.

Format Adjustment

This feature permits selection of formats via coding contained in the data. The new format is selected by entering a 1 in own code of the field which contains the number of the new (adjusted) format. Once initiated, the feature must be used with all records that use this format specification.

Automatic Error Flag

This feature causes an error flag to be automatically set on each field which fails a validation test. The erroneous records may be subsequently located and displayed. The user may specify which fields are to be automatically flagged. The operator does not receive any indication when an automatic error flag is set.

Validation Tests

CYBERDATA provides several automatic arithmetic and logical tests which, even without subsequent verification, ensure only substantially error-free data is transferred to magnetic tape.

CHARACTER TYPE TEST

Five types of data are recognized by the CYBERDATA System:

- Lower shift
- Upper shift
- Pure numeric (0 through 9)
- Signed numeric (0 through 9 and sign)
- Pure alphabetic (A to Z and space)

If pure numeric, signed numeric, or pure alphabetic is specified and nonspecified data is entered, an error occurs. It is, however, permissible to enter upper shift characters in a lower shift field and lower shift characters in an upper shift field if the SHIFT key is pressed while the character is keyed.

FIELD LENGTH TEST

Data fields may be checked to see if the number of characters keyed in is as specified.

NONZERO/NONBLANK TEST

A numeric field may be tested to determine whether it contains at least one nonzero digit, and an alphanumeric field may be tested to ensure that it contains at least one nonblank character.

BATCH BALANCING

The contents of a numeric field may be added to or subtracted from a counter. At the end of the batch, the contents of the counter must be zero or an error is detected. Seven 15-digit signed counters are assigned to each key entry station for batch balancing.

LIMIT TEST

The contents of a numeric field of up to 15 digits may be tested to determine if it is within (inclusive) or outside (exclusive) a specific range. The test may also be used to determine if it is greater than, greater than or equal to, less than, or equal to a specific value.

SPECIAL AND OWN CODE TESTS

Special tests and own code tests are user-written subroutines which enable nonstandard tests to be performed. The only exceptions are the first two own code tests used for format adjustment and the four check digit verification (CDV) tests, which are provided as standard special tests. Four different CDV tests are available.

Special Tests

Special tests are integrated into the key-to-disk system at system generation time and reside permanently in computer memory. They are, therefore, less time dependent that the own code tests. A special test may not perform input/output (I/O) operations but may use any CYBERDATA System routine to access data. The CYBERDATA System can accept a maximum of 99 special tests, but only one special test can be specified per field.

Special test numbers 1 through 5 are reserved for check digit verification. Numbers 1 through 4 are currently used; therefore, number 5 is a user check digit verification identifier.

Special test numbers 6 through 10 are reserved for future CDC-developed standard tests which will be available to all users.

Special test numbers 11 through 15 have pointers assigned in the special test jump table, which are then available for customer use. Test numbers 16 through 99 must be linked by pointers (refer to the CDC® CYBERDATA™ Operating System Reference Manual, publication 22263100).

CDV tests are standard with the system. These tests check the accuracy of a base number which has been assigned a check digit. They may be performed on pure numeric fields comprising up to 15 digits as data is entered. (Table 3-1 describes the four CDV tests.) The system supervisor may modify the modules and weights, but the method of calculation remains unchanged. Modules may be in the range 1 to 15 and weights in the range 1 to 15.

Table 3-1. Check Digit Calculation

Special Test No.	Modulus	Description
1	7	The check digit is the remainder resulting from the division of the base number by 7; for example, if the field contains 123454: Base number = 12345 $\dfrac{12345}{7}$ = 1763 with a remainder of 4 (4 is the check digit)
2	9	The check digit is the sum of the digits in the base number subtracted from the next higher multiple of 9; for example, if the field contains 123453: Base number = 12345 Sum = 15 Next higher multiple of 9 = 18 Check digit = 18 – 15 = 3
3	10	The check digit is the sum of every odd digit in the base number multiplied by 2 added to every even digit. The result is subtracted from the next higher multiple of 10. The digits in the base number are numbered from right to left; for example, if the field contains 123455: Base number = 12345 Sum of weighted odd digits = (5 x 2) + (3 x 2) + (1 x 2) = 9 (Note that 5 x 2 = 10 = 1 + 0) Sum of weighted even digits = 4 + 2 = 6 Sum of weighted odd digits plus even digits = 9 + 6 = 15 Next higher multiple of 10 = 20 Check digit = 20 – 15 = 5
4	11*	The check digit is the sum of the weighted digits in the base number, divided by 11, with the remainder subtracted from 11. The weights are in the sequence (from right to left): 2, 3, 4, 5, 6, 7, 2, 3, 4, 5, 6, 7, etc.; for example, if the field contains 123455: Base number = 12345 Sum of weighted digits = (5 x 2) + (4 x 3) + (3 x 4) + (2 x 5) + (1 x 6) = 50 $\dfrac{\text{Sum of weighted digits}}{11} = \dfrac{50}{11}$ = 4 with a remainder of 6 Check digit = 11 – 6 = 5

*Modulus 11 check-digit calculations which result in a remainder of 10 are illegal, and these numbers should be discarded.

Example of modulus remainder:

11 – 1 = 10 illegal
11 – 10 = 1 ok
11 – 0 = 11 ok

Own Code Tests

Own codes are disk-resident subroutines. The CYBERDATA System provides for two types of own code tests: end of field (EOF) and end of batch (EOB). They may perform I/O operations by using standard I/O routines. The maximum subroutine length is 2K words. The maximum number of own codes in the system is established by an installation parameter and may not exceed 127. Own codes 1 through 5 are reserved for special CDC functions.

The EOF own code is specified in the field format information for each field which uses the own code. More than one own code may be called by a given format, but only one may be called per field.

The EOB own codes are specified on a job basis and are called at end of batch in Entry and Verify modes. These routines may have access to all the standard functions of the key-to-disk system. Programming details are given in the CDC® CYBERDATA™ Software Operating System Reference Manual.

Own Code 1

This feature permits format adjustment (selecting a new format) by entering the desired format number into the field which has a 001 in the own code column on the format specification sheet. Once this has been used, all subsequent formats selected must repeat this process by using own code 1. When own code 1 is not specified in a format, that format continues in effect until a format or document is selected manually.

When a new format is selected, it is compared with the existing format on a field-for-field basis up to the field which called it. If the two formats are exactly alike to that point, the new format replaces the old; if they are not exactly alike, the old format remains in effect and an END-OF-FIELD own-code error occurs.

This feature is not performed in either Read or Verify mode. If it is accidentally requested, an own-code error results.

This feature must not be used with document control.

INTRODUCTION

Each job and every document and record in each job must be completely specified before data entry may begin. These specifications are entered on the job sheet, the document description sheet, and the format specification sheet.

JOB SHEET

For convenience and to minimize the possibility of misplacing the descriptive material concerning a job, a job sheet (figure 4-1), which contains the record, document, and job specifications for each job, is provided.

Status

This entry specifies whether the job is new or an existing job is being changed. If a new job is being entered, enter N (new). If an existing job is being changed, enter R (revised).

Job Name

The job name is a unique one- to six-character alphanumeric name which identifies this particular job. A job name must be filled in.

Magnetic Tape Format Number

The data which is created for each job is transferred to magnetic tape in a particular format. As many as 255 unique tape formats can be defined and made available for selection. This entry specifies the particular magnetic tape format to be used for this job. A number in the range 1 to 255 is entered to specify a user-defined format.

Verification Option

This entry determines if verification is to be performed on this job and, if so, the type of verification used. Enter F (format) if verification is to be performed according to the entries on the format specification sheet. Enter E (error) if fields containing errors are to be verified. Enter U (unbalanced) if fields causing out of balance conditions for unbalanced batches are to be verified. Enter N if no verification is required. Any combination of the parameters F, E, and U may be entered. If only F is entered, fields containing errors and fields causing unbalanced batches will not be verified unless verification is specified for these fields on the format specification sheet. If only E is entered, only fields containing errors are verified, regardless of the entries on the format specification sheet. If only U is entered, only those fields which cause unbalanced batch counters will be verified, regardless of the entries on the format specification sheet. An entry of F, E, and U specifies that verification will be performed according to the format specification sheet and, in addition, fields containing errors and fields causing unbalanced conditions, if not already specified on the format specification sheet, will also be verified.

CYBERDATA™ Job
Key-to-Disk Specification

CONTROL DATA

Once Per Job:
Enter With
Job Entry Command EJB

	Status (N, R)		Job Name (1 to 6 characters)		Magentic Tape Format Number (01 to 255)
EJB	☐	,	☐☐☐☐☐☐	,	☐☐☐ ,

Verification Option (F, E, U, N)		End of Batch Own Code (0 or 3 to 127)		Maximum Record Length Per Job (0001 to 1000)
☐☐☐	,	☐☐☐	,	☐☐☐☐

Prepared by _____   _____ Date

Prepared by _____   _____ Date

AA5596

Figure 4-1. Job Sheet

End of Batch Own Code

A job may require a special computer program subroutine (own code) to accomplish a specific task when each batch is complete. A computer programmer or system analyst defines the computer program subroutine (if any) associated with the job. This entry specifies the particular end of batch own code subroutine number, in the range 3 to 127 to be used for this job (1 and 2 are used for format adjustment). The number 0 is entered if a test is not required.

Maximum Record Length Per Job

Enter the maximum number of characters in the range 1 to 1000 of the largest record to be entered for this job. Include all signs in signed numeric fields.

DOCUMENT DESCRIPTION SHEET

A document description sheet describes the order in which the records for a particular job are entered (figure 4-2).

Document Number

The document number is a unique three-digit number in the range 1 to 255 which identifies a particular document.

Format Number

Format number is the four-digit number in the range 1 to 8000 which identifies the format of the first record type to be entered. This number usually refers to a number which appears on the format specification sheet but may refer to the number of any format which is active within the system.

Number of Repetitions

This four-digit number specifies the number of times this record type is entered before a record of another type with a different format is entered. If the number of records is not fixed, leave this entry blank.

These two entries are repeated on the form, line by line, in the order the records are entered, until the entire sequence has been described. If there is no room left on the page, continue on another sheet. The last format number specified describes the last record type to be entered before the sequence begins again, starting with the first record type specified.

Record Description

Additional information that is required for certain records may be written in this column. This can include record names, etc.

FORMAT SPECIFICATION SHEET

The description (format) of each record type to be entered for a particular job is entered on the format specification sheet (figure 4-3). It consists of the format header and the field description parameters. The format must be stored in the system before the document description parameters are entered.

Format Header

The format header entries describe the characteristics of each record type. EFM, status, format number, and maximum record length are required. Except after a comma, the remainder of the field can be terminated by a carriage return and the default values (underlined) will be selected automatically.

STATUS

If the format is being entered for the first time, enter N (new). If an existing format is being changed, enter R (revised).

CYBERDATA™ Document
Key-to-Disk Description

CONTROL DATA

Document Number _____   Sheet _____ of _____

Format Number					Number of Repetitions Per Format	Record Description

Enter the document parameter with an EDC command.

	Document Number	Format Number	Number of Repetitions	Next Format Number	Number of Repetitions
EDC,	[ ][ ] ,	F [ ][ ][ ][ ] ,	R [ ][ ][ ][ ][ ] ,	F [ ][ ][ ][ ] ,	R [ ][ ][ ][ ][ ] ...

Prepared by _____   _____ Date

AA5597

Figure 4-2. Document Description Sheet

Figure 4-3. Format Specification Sheet

CYBERDATA™ Key-to-Disk Format Specification

CONTROL DATA™

Sheet _____ of _____

EFM ☐

STATUS N,R ☐

FORMAT NUMBER ☐☐☐☐ .

MAXIMUM RECORD LENGTH ☐☐☐☐

FORCED REVERIFICATION Y,N ☐

RESEQUENCING Y,N ☐

AUTO-SEQUENCING Y,N ☐

AUTOSEQUENCING FIELD NUMBER 0 ☐☐☐

Column headers (field specification):
- Field Number
- Column Number
- Field Name (None)
- Data Type (A,N,S,L,U)
- Maximum Number of Characters *
- Keying Mode (F,X,V,B)
- Recording Mode (F,V)*
- Verification Type (K,S,N)
- Automatic Function (D,S,R,L,N)
- Nonzero/Nonblank Test (Y,N,B)
- Auto Error Flagging (Y,N)
- Resequencing Field No.
- Current Field No. in Record
- Fill Character (Except N)
- Own Code Number
- Special Test Number
- Function No. 1 (A,S,N)
- Counter Number (0-7)
- Function No. 2 (A,S,N)
- Counter Number (0-7)
- Limit Check (I,E,N)
- Lower Limit (None)
- Sign
- Upper Limit (None)

Row numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0, 1, 2, 3, 4, 5

Reference Only — Enter data from here.

* Except after a comma [CR] can be used at anytime from this point on to terminate a field. Default values automatically selected are underlined.

Prepared by _____ Date _____

Revised by _____ Date _____

AA 5595

FORMAT NUMBER

Enter the unique four-digit number in the range 1 to 8000 which identifies this record type.

RECORD LENGTH

Enter the maximum number of characters in the range 1 to 1000 contained within this record type. If autosequencing is selected, allow for four additional characters per record.

FORCED REVERIFICATION

If errors detected and corrected in Verify mode are to be reverified, enter Y (yes); if not, enter N (no). The default value is N.

RESEQUENCING

If the order of the data fields as they are entered for this record type is different from the order in which the fields appear on magnetic tape, enter Y (yes); if not, enter N (no). The default value is N.

AUTOSEQUENCING

A four-digit sequence number may be automatically assigned and placed in the first field of this record. Enter Y (yes) if automatic sequence number assignment is required; if not, enter N (no). The autosequencing field is serially numbered in a batch. The default value is N.

AUTOSEQUENCING FIELD NUMBER

If the autosequencing feature has been specified, but the assigned sequence number is not to be placed in the first field, enter a number in the range 1 to 127 to specify the field in the record as it appears on magnetic tape, which contains the assigned sequence number. If the autosequencing feature has not been specified, enter 0 (or leave blank [0 is the default value]). If the autosequence field is to be resequenced, then Y must be entered for resequencing.

Field Parameters

The field parameter entries describe each field of the record. Field name (or comma), data type, and field length are required. Except after a comma, the remainder of the field can be terminated by a carriage return and the default values (underlined) will be selected automatically.

FIELD NUMBER

This parameter describes the order in which the data is entered. It is preprinted on the form and is used for reference only.

COLUMN NUMBER

This parameter describes the position that the first character of the field occupies in the record as it is entered. It may range from 1 to 1000. This parameter is used for reference only.

FIELD NAME

A meaningful, left-justified, 1- to 6-character alphanumeric name may be assigned to each field. When a field is unnamed, this parameter should be left blank and just the trailing comma entered.

DATA TYPE

This entry specifies the type of data to be entered in the field. Enter A (pure alphabetic — A to Z and space), L (lower shift), U (upper shift), N (pure numeric — 0 through 9), or S (signed numeric — 0 through 9 and sign) to describe the data.

FIELD LENGTH

This parameter specifies the maximum number of characters to be entered in the field in the range 1 to 99, including the sign in a signed numeric field.

KEYING MODE

If the field as it is entered is always a specific number of characters, enter F (fixed); if fixed with boundary control, enter X. If the field as it is entered may vary in length, enter V (variable); if variable with boundary control, enter B. V must be specified for automatic skip fields (see automatic functions). The default value is V. → SKIP, SIGN

The SKIP key (or the sign key + for signed numeric fields) must be used as the field boundary control key for variable keying fields regardless of the data type specified for the field.

RECORDING MODE

If the field as it appears on magnetic tape is fixed in length, enter F (fixed). If leading zeros (numeric) or trailing spaces (mixed or alphabetic) are to be suppressed in the field as it appears on magnetic tape, enter V (variable). The default value is F.

VERIFICATION TYPE

Enter K (key) if key verification is required; enter S (sight) if sight verification is required; or enter N (none) if verification is not required for this field. The default value is N.

AUTOMATIC FUNCTIONS

If the contents of the field are to be automatically duplicated in the corresponding field of all subsequent records of the same type (format), enter D (automatic duplication). This holds for inserted records if the surrounding records are controlled by the same format. If a variable (V) field is not keyed but is to be automatically filled with zeros (numeric) or spaces (alphabetic or mixed), enter S (automatic skip). If a numeric field is to be left justified and automatically filled wiht trailing zeros, enter R (right-zero fill). If an alphabetic or mixed field is to be right justified and automatically filled with leading spaces, enter L (left-blank fill). If no automatic functions are to be performed, enter N (none). The default value is N.

NONZERO/NONBLANK TEST

To ensure that at least one nonzero character is entered in a numeric field or at least one nonblank character is entered in an alphabetic or mixed field, enter Y (yes); otherwise enter N (no). If B is specified, a skipped numeric field is filled with blanks rather than zeros. The default value is N.

AUTO ERROR FLAG

If a validation error is detected and Y (yes) has been entered for this parameter, the field is automatically flagged for future identification, and the data entry process may continue even though the error was not corrected (operator not aware). If N (no) has been entered, data entry may not continue unless the error is corrected or manually overridden. Note that no indication is given to the operator when a field is automatically flagged. The default value is N.

RESEQUENCING FIELD NUMBER

This parameter specifies the order of this field in the record as it appears on the magnetic tape. The number may range from 1 to 127. If resequencing has not been specified, enter 0. The default value is the current field number in the record.

FILL CHARACTER

Variable-length keyed fields are automatically filled to their maximum size with spaces or zeros unless another character is specified. Numeric fields are right justified and filled from the left. Alphabetic or mixed fields are left justified and filled from the right. An N should be entered in the column for no special fill character. Note that fill characters actually appear in the field only after the data is transferred to tape; therefore, they are not displayed in Read mode. The default value is N.

OWN CODE NUMBER

A special computer program subroutine (own code) may be required to accomplish a task, not otherwise available, when the field has been entered. A computer programmer or systems analyst defines the computer program subroutine (if any) associated with the field. This entry specifies the particular own code number to be used for this field. The number may range from 1 to 127. If an own code subroutine is not required, enter 0. The default value is 0. Remember that entries 1 through 5 are reserved for CDC special functions. Own code 1 is used exclusively for format adjustment.

SPECIAL TEST NUMBER

Additional special functions called special tests may be required when the field has been entered. This entry, in the range 1 to 99, specifies the number of the special test to be used for this field. The key-to-disk system includes check digit verification tests as special tests. The entry of 1, 2, 3, and 4 designate that check digit verification tests using modulus 7, 9, 10, and 11, respectively, are to be performed. An entry of 0 is used if no special tests are required. The default value is 0.

FIRST COUNTER FUNCTION AND NUMBER

If the field is to be added to the counter, enter A (addition); if the field is to be subtracted from the counter, enter S (subtraction). If the counter is not used, enter N (not used). The default value is N.

There are seven 15-position counters assigned to each key entry station for use in batch balancing. A field can be added to one counter and subtracted from a second counter simultaneously. When entry is complete, the batch is considered out of balance if any of the counters are not equal to zero. Counters can be used for numeric fields containing up to 15 digits (plus the sign in signed numeric fields). This parameter specifies the number of the first counter to be used for this field. It may range from 1 to 7. If no counter is to be used for this field, enter 0. The default value is 0.

SECOND COUNTER FUNCTION AND NUMBER

The second counter is the same as the first counter function and number.

LIMIT CHECK

The contents of a numeric field of up to 15 digits may be tested to determine if it is within (inclusive) or outside of (exclusive) a specific range or if it is greater than, less than, or equal to a specific value. Enter I if an inclusive test is required; enter E if an exclusive test is required. If no test is required, enter N (none) and a carriage return. Continue by entering the parameters given on the next line of the Format Specification sheet. N must be entered for alphabetic fields or when a limit test on a numeric field is not required. Note that the limits are included in an inclusive limit check but not in an exclusive check. The default value is N.

LOWER LIMIT

Enter the minimum value of the range which is used for field comparison. Leading zeros may be omitted, but the sign must be entered. If this parameter is being entered on a 970-480, press REL (after the comma) to position the cursor at the beginning of the next line prior to entering it.

UPPER LIMIT

Enter the maximum value of the range following the same procedure as for the lower limit.

INTRODUCTION

The key entry station is the link between the operator and the system. Consequently, it has been designed with the convenience of the operator as the prime consideration. Any 480-character station can be used for data entry, data verification, data modification, or limited supervisory functions. The stations are completely independent, the work being performed at one station having no effect on that of another. Supervisor activities, such as transferring completed batches from disk to tape, also have no effect on the individual stations.

Two types of key entry stations are available: the 32-character and the 480-character station. The two types are essentially similar and are comprised of an electronic keyboard and a video display. The main difference between them is in the quantity of data that can be displayed at one time.

32-CHARACTER STATION DISPLAY

This display uses a gas discharge dot matrix and shows up to 32 alphanumeric characters from a modified 64-character ASCII set. The display panel layout is described in table 5-1 and shown in figures 5-1 and 5-2.

480-CHARACTER STATION DISPLAY

This display (table 5-2 and figures 5-3 and 5-4) uses a 12-inch CRT capable of displaying up to 480 alphanumeric characters that are organized in 10 lines of 48 characters each from a full 64-character ASCII set. The first (top) line is reserved for the header, and the last (bottom) line is reserved for interrogate functions and operator prompting. The eight intervening lines are used for data display.

The header line gives the operator all the information needed to enter the data. It also serves as an orientation facility.

Each line of data is preceded by a three-digit field number, a slash, and two blanks; therefore, 42 positions are available for data. Each field is displayed on a separate line, but if the number of characters in a field exceeds 42, the additional characters are displayed on the following line(s).

KEYBOARD

The 029 keyboard contains control keys and data keys. All the control keys except the INTLK key are blue to differentiate them from data keys (which are gray) and the INTLK key (which is red).

Some keys have an alternate meaning as indicated by their keytop labels. The lower label represents the function executed or data entered when only the key is pressed. The upper label function is performed by pressing the key while the SHIFT key is held down. In addition, eight control keys are interlocked with the INTLK key to prevent inadvertent keying. These are CNCL, CONT, DLT, ERR OVR, ESB, INS, REP FLD, and MLTL DUP/SKIP. The control keys on the 029 Keypunch keyboard are described in table 5-3.

Key Entry
Station

Table 5-1. Description of 32-Character Station Display

Indicator	Description
Operation mode	This has a one-character position which indicates one of the following modes: E - Entry V - Verify R - Read
Format number	This has a four-character position which displays the number of the current format. This number defines the tests and functions to be performed for each field of a record. Up to 8,000 different formats may be entered.
Auto/manual	The one-character position of auto/manual indicates whether the automatic function specified on the format specification sheet is being performed or whether it has been overridden by the MLTL DUP/SKIP key (M for manual, displayed).
Field number	The two-character position of the field number specifies the number of the current field in the record. Each record may comprise up to 127 fields.
Data type	This has a one-character position which specifies the keying mode of the current field, as follows: L - Lower shift (note 2) U - Upper shift (note 2) N - Pure numeric (0 through 9) S - Signed numeric (0 through 9 and sign) A - Alphabetic (A to Z and space)
Column number	The three-character position of the column number specifies the position in the record of the next character to be keyed.
Error code	The two-character position of the error code specifies the type of error that has occurred. The codes are divided into seven logical groups (chapter 8).
Data display	There are 18 alphanumeric character positions in Entry, Verify, and Read modes, and 29 alphanumeric positions in Interrogate mode.

NOTE

1. When a station is not in any operational mode (Entry, Verify, Read, or Interrogate), it is said to be in Idle mode. Characters can be displayed with no effect on the key-to-disk operation.

2. Lower shift characters may be entered in an upper shift field, and upper shift characters may be entered in a lower shift field, if the SHIFT key is pressed while the data characters are keyed.

5-2

Mode · Format · Auto/Manual · Field · Data Type · Column · Error Code · Data

```
┌──────────────────────────────────────────────────┐
│ E0090    01L019      JOHN, SMITH                   │
└──────────────────────────────────────────────────┘
```
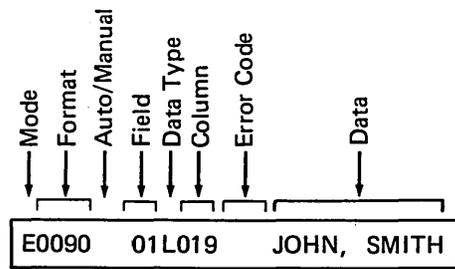
NOTE

The Verify and Read mode displays are
identical to that for Entry mode, except
that the mode position displays V or R,
respectively.

Figure 5-1. 32-Character Station Display, Entry Mode

Mode · Error Code · Data

```
┌──────────────────────────────────────────────────┐
│ E      COUNTER 7 = 123456789012345+                │
└──────────────────────────────────────────────────┘
```
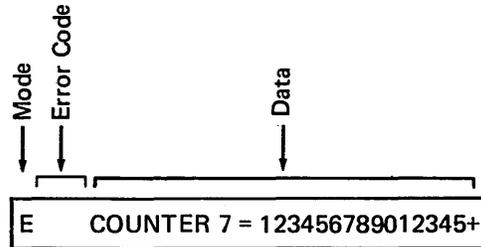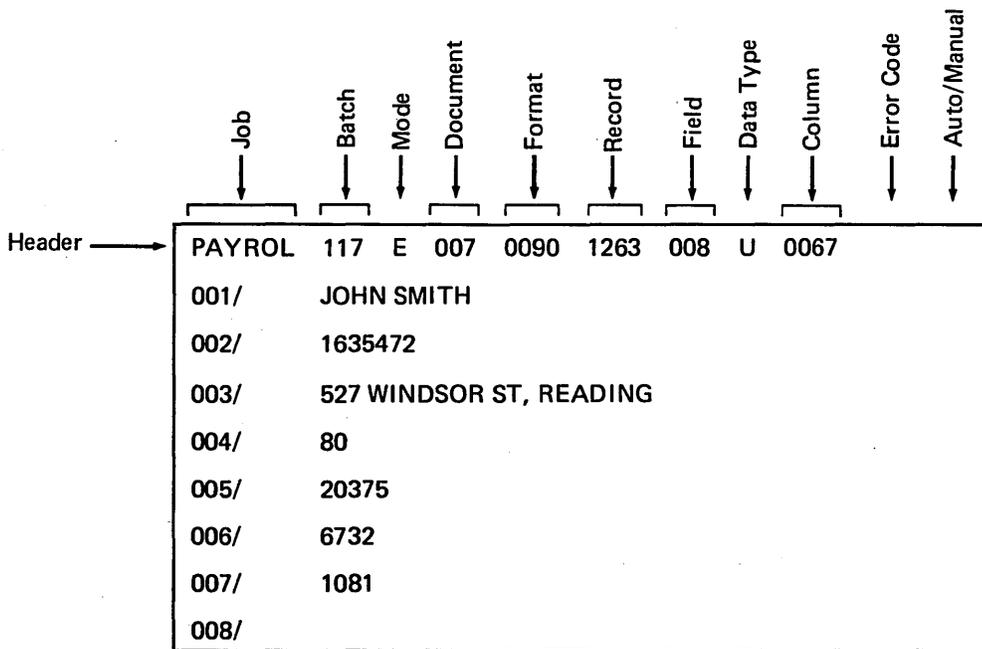
Figure 5-2. 32-Character Station Display, Interrogate Mode (Display Counter Function)

Table 5-2. Description of 480-Character Station Display

Header	Description
Job name	The six-character position of the job name indicates the name of the current job.
Batch number	The three-character position of the batch number specifies the number of the current batch.
Operation mode	The one-character position of the operation mode indicates one of the following modes: E - Entry V - Verify R - Read
Document number	The three-character position of the document number displays the number of the current document.
Format number	The four-character position of the format number reflects the number of the current format. This number defines the tests and functions to be performed for each field of a record. Up to 8,000 different formats are available.
Number of records	The four-character position indicates the number of records entered in the current job.
Field number	The three-character position of the field number specifies the number of the current field in the record. Each record may comprise up to 127 fields.
Data type	The one-character position of the data type indicates the type of characters that may be entered in the current field as follows: L - Lower shift (note 2) U - Upper shift (note 2) N - Pure numeric (0 through 9) S - Signed numeric (0 through 9 and sign) A - Pure alphabetic (A to Z and space)
Column number	The three-character position of the column number indicates the position in the record of the next character to be keyed.
Error code	The two-character position of the error code specifies the type of error that has occurred. The codes are divided into seven logical groups (chapter 8).
Auto/manual	The one-character position of auto/manual indicates whether the automatic function specified on the format specification sheet is being performed or whether it has been overridden by the MLTL DUP/SKIP key (M for manual is displayed).
Data display	The data display has eight 48-character lines.
Interrogate display	The 48-character line at the bottom of the screen is used for displaying interrogation functions, for example, totalize counters, tutorial facility, etc.

NOTE

1. When a station is not in any operational mode (Entry, Verify, Read, or Interrogate), it is said to be in Idle mode. Characters can be displayed with no effect on the key-to-disk operation.

2. Lower shift characters may be entered in an upper shift field, and upper shift characters may be entered in a lower shift field, if the SHIFT key is pressed while the data characters are keyed.

Figure 5-3. 480-Character Station Display, Entry Mode

Columns (left to right): Job, Batch, Mode, Document, Format, Record, Field, Data Type, Column, Error Code, Auto/Manual

Header →

PAYROL	117	E	007	0090	1263	008	U	0067

001/   JOHN SMITH

002/   1635472

003/   527 WINDSOR ST, READING

004/   80

005/   20375

006/   6732

007/   1081

008/

NOTE

The Verify and Read mode displays are identical to that for
Entry mode, except that the mode position displays V or R,
respectively.

Figure 5-3. 480-Character Station Display, Entry Mode

Header →

PAYROL	117	E	007	0090	1263	008	U	0067

001/   JOHN SMITH

002/   1635472

003/   527 WINDSOR ST, READING

004/   80

005/   20375

006/   6732

007/   1081
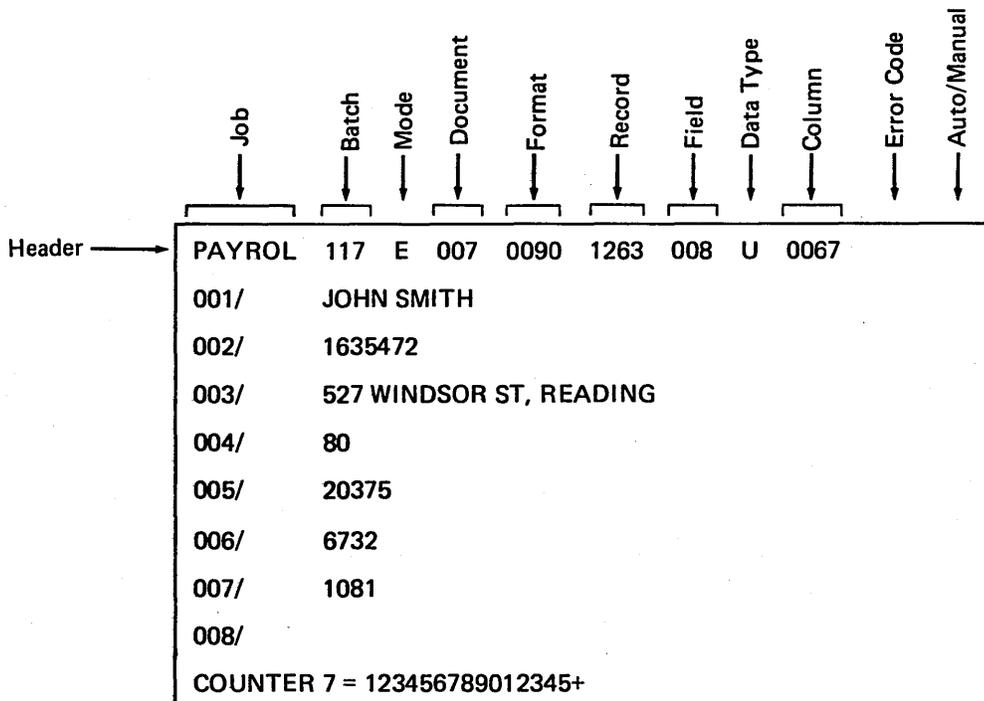
008/

COUNTER 7 = 123456789012345+

Figure 5-4. 480-Character Station Display, Interrogate Mode
(Display Counter Function)

Table 5-3. Description of Control Keys

Key Name	Function
BOR (Beginning of Record)	BOR is used in Read mode to backspace to the first field of the current record.
BSC (Backspace character)	In Entry mode, BSC backspaces to the last character keyed into the record. The character is deleted, and the position indicator display points to the next column to be keyed. In Verify mode, BSC backspaces one character in a field. The character is deleted in key verify; it is not deleted in sight verify. The position indicator is decreased by 1. In Read mode, BSC backspaces one character. The character is not deleted, and the position indicator is decreased by 1. In Interrogate mode, BSC backspaces one character. The character is deleted and the position indicator is decreased by 1.
BSF (Backspace field)	In Entry mode, all fields in a record from the last keyed field to the current field are deleted. All automatically entered fields are skipped over. The position indicator shows the next position to be entered. In Read mode, BSF backspaces to the beginning of the previous field regardless of whether it was keyed or entered automatically and the position indicator shows the new column number in the record. BSF is not allowed in either Verify or Interrogate mode.
BSR (Backspace record)	BSR is used in Read mode to backspace to the corresponding field in the previous record unless the preceding record has a different format. In this case, the first field of the previous record is displayed. The key may not be used in the first record of a batch.
CNCL (Cancel)	CNCL is used with the INTLK key to cancel a function before it has been executed. The key is effective for functions which are time dependent (for example, search) and for those requiring the use of more than one key. For example, a format selection entry may be cancelled by using the CNCL key before the four-digit format number has been completely keyed in. To cancel a delete function in Read and Verify modes, the CNCL key must be used before the COR key is pressed. CNCL is used at the end of a subbatch to reset a nonzero counter to zero and to display the contents of the next nonzero counter. CNCL is used at the end of a batch to cancel end of batch processing after a batch balancing error or end of batch own code error and return to the basic mode. The operator may then key in more records (if the error occurred because the batch was incomplete), or locate the erroneous fields using either Read mode or the search functions. When the key entry station is functioning as a supervisor console, the key is used to cancel command entries.
CONT (Continue)	CONT is used with the INTLK key in multisupervisor operation to continue a report after the screen is full. It is also used after pressing the ESB key to display the contents of the next nonzero counter. CONT is used during sight verification to advance to the next verifiable field.
COR (Correction)	COR is used in Verify mode to replace the character entered in Entry mode. It is used in Read and Verify modes to terminate replacement of a field and insertion and deletion of a record.

Table 5-3. Description of Control Keys (cont)

Key Entry
Station

Key Name	Function
DISP (Display)	DISP is used after an error to display the error message. In the case of a mismatch in Verify mode, the original character keyed is displayed in the error message.
DLT (Delete)	DLT is used with the INTLK key to delete the current record. In Entry mode, the DLT key may be used only after the first character of a record is keyed but before the last character of the record is keyed. In Verify mode, the key can be used only at the beginning of a field. In Read and Verify modes, it must be followed by the COR key. The DLT key may not be used in Read mode if it could have been used under the circumstances immediately preceding transfer to Read mode. The DLT key is also used to cancel an insert.
DOC (Document select, document advance, and document backspace)	DOC is used in Entry mode to select a document. After pressing the key, the required document number is selected by keying in an up to three-digit number followed by the REL key.

It is used in Read mode to advance to the next document or to backspace to the previous document. |
| DUP (Duplicate) | DUP is used in Entry mode to duplicate the corresponding field (or the remaining portion of it) from the previous record. The key may not be used in the first record of a batch. An error is displayed if a) the previous record is too short to copy a field from it into the current record or b) the character to be copied do not pass the type check for the current field. DUP is accepted for insertion records.

DUP is used in Verify mode when the current field is the same as the corresponding field in the previous record; that is, manual duplication was performed in Entry mode. |
ERR OVR (Error override)	ERR OVR is used with the INTLK key to manually override a validation test error. When the key is pressed, an error flag is set and data entry may continue. (The flag is set on the batch if an end-of-batch own code or batch balancing error has occurred; in all other cases, the flag is set on the current field.) Error flagged fields may be subsequently located using the search feature or be selectively verified. The ERR OVR key should be used only when data is entered correctly but does not pass the specified validation tests.
ESB (End of subbatch)	ESB is used with the INTLK key in Entry mode to determine the contents of nonzero counters, one at a time, before the end of a batch. The key is followed by the CONT or CNCL key when a counter is nonzero.
FORM (Format advance, format backspace)	FORM is used in Entry mode for data under document control to advance to the next format group in the document or to backspace to the previous format group (SHIFT key pressed). The key is used only when there are fewer or more records in the document than specified. It may be used only at the beginning of a record. Format backspace is not allowed on the first format.
FORM SEL (Format select)	FORM SEL is used in Entry mode to select a format for data not under document control. The operator presses the key followed by an up to four-digit format number and then the REL key. The FORM SEL key may be used only at the beginning of a record.
INS (Insert)	INS is used with the INTLK key in Read mode to insert a record before the one currently being displayed.
INT (Interrogate)	INT is used to perform batch start-up in Entry and Verify modes and to select Interrogate functions.

Table 5-3. Description of Control Keys (cont)

| Key Name	Function
INTLK	INTLK is used with the ERR OVR, INS, DLT, MLTL DUP/SKIP, CNCL, CONT, ESB, and REP FLD keys to prevent inadvertent keying.
MLTL DUP/SKIP (Multilevel duplicate/skip)	This key is used with the INTLK key in Entry mode to insert new data in an automatic duplication or automatic skip field. When the key is pressed, the automatic function specified on the format specification sheet is not performed, and M (for manual) is shown on the key entry station display. New data may be keyed in this field. When the key is pressed again, the M disappears from the display and the specified automatic function is performed.
READ	This key is used to enter Read mode. The key may be used at the end of a field during Entry mode or at any time during Verify mode.
REL (Release)	REL is used in Entry and Verify modes to terminate the current record. The specified automatic functions are performed on the remaining portion of the record. The remaining fields are set to blank or zero according to the type of field. If one of the fields skipped was defined on the format specification sheet as fixed keying, an error occurs. It is used to terminate an Interrogate mode command entry. It is used in Read mode to advance to the corresponding field in the next record unless the record has a different format. In that case, it is used to advance to the first field of the next record. It is used to terminate format and document selection.
REP FLD (Replace field)	This key is used with the INTLK key in Entry, Read, Verify, and Interrogate modes to clear the current field to allow the operator to reenter it. In Read and Verify modes, the reentered field must be terminated by the COR key. The reentered field is automatically submitted to the relevant validation tests.
RESET	RESET is used to unlock the keyboard and clears the error indicators. When the error message corresponding to an error code is required, the key should not be pressed until after the DISP key has been pressed. In addition, it is used after the Interrogate function as DER, TOT to regenerate the display.
RTRN (Return)	RTRN is used to return to the original mode of operation (Entry or Verify) from Read mode. It is also used to return to document control after using a nonstandard format.
SKIP	SKIP must be used in variable length fields in Entry mode to terminate a field before the maximum number of characters has been entered unless variable numeric keying with boundary control (B) is selected; in which case a + or - key is acceptable. If fixed keying with boundary control (X), SKIP must be used even in a signed numeric field. If the key is pressed at the end of a field, the next field is skipped. It is used in Read mode to advance to the beginning of the next field. The key may be used anywhere in a field. SKIP is used in Verify mode to compare the rest of the field to zero or blank.
SPACE	SPACE is used in Entry and Verify modes to produce a space in an alphabetic field or a zero in a pure numeric field. It is used in Read mode to advance one character.
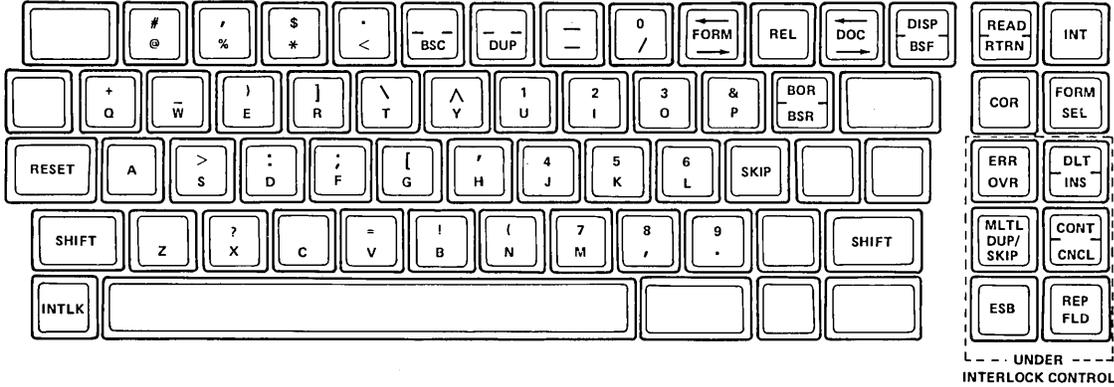
Figure 5-5. 029 Keypunch Keyboard

GENERAL

This section describes system start-up and the supervisory control capabilities provided by the CYBERDATA System which allow effective utilization of the system features. The system also has a comprehensive repertoire of responses and messages, which continually provide the supervisor with complete status information. Supervisory functions may be executed at the same time as data is entered.

Proper supervision is very important for efficient system utilization; therefore, CYBERDATA includes a broad range of features to aid supervisor/system interaction. The normal console through which the supervisor interacts with the system is a Teletype which has a keyboard for command entry and a printer for recording commands and messages. Any key entry station may also be used for limited supervisory control.

The supervisor communicates with the system by keying in commands through the supervisory console keyboard. The command and the associated key-to-disk response are printed on the Teletype printer. Messages which originate with the CYBERDATA System also appear on the supervisory console, which provides a complete audit trail of all activities carried out by the supervisor.

CYBERDATA offers a powerful range of commands with which the supervisor can exercise full control over the total key entry process. The supervisor, for example, has control over the amount of disk space available. In the event that it is desired to temporarily release disk space for a higher priority task, the supervisor executes a dump-disk-to-tape command (DMP). This command transfers a specified part of the disk content to magnetic tape. Batches transferred to tape may be deleted by a delete-batch command (DBT). The transferred information can later be returned to the disk by a load-tape-to-disk command (LOD). The command LOD rewrites on disk the information transferred to tape by the DMP command.

The supervisor may, at any time, suspend the input of a batch of data at a particular key entry station. This may be done when a job of higher priority must be entered. It may also be done while errors on the input forms, discovered by the CYBERDATA System, are returned to the originator for on-the-spot correction. The command which performs the suspense function is freeze batches (FRZ). The supervisor merely enters FRZ with the designated key entry station number. The system generates the required control information for continuing at a later time and then releases the terminal so that its operator can proceed with other work.

Analogously, the freeze can be reversed at any time by the thaw batches (THW) command. Keying of the frozen batch can then continue. Note that the entry process can be continued at any key entry station, not just the one at which the freeze command was carried out.

A series of commands are provided to enable the supervisor to obtain at any time all aspects of the current system status. This series of commands, called status and reports, includes print system status (PSS), print terminal status (PTS), print batch status (PBS), print job status (PJB), and print batch report (PBR). The type of information produced includes the percentage of free memory available, the status of an individual batch, and batch start and finish times.

Supervisory
Command
and Control

SYSTEM START-UP

The following procedure should be performed by the supervisor at the beginning of the day:

1. Mount the system disk on the disk drive unit. Check to ensure that the WRITE PROTECT switch, if provided, on the disk drive is in the OFF position and the drive START/STOP switch is in the START position. Detailed disk operating data is given in appendix D.

2. Set the POWER switch on the peripheral distribution unit (PDU) to the ON position. The indicator should light.

3. Set the S switches on the PDU that correspond to the key stations in use to the ON position. Switches that are used must be in consecutive order, starting with S1.

4. Set the POWER switch on the back panel of each 480-character key station to the ON position. (32-character key stations do not have a separate power switch; they have power whenever the PDU is on.)

5. Set the POWER switch on the Teletype to the ON position.

6. Open the autoload feature door at the front of the desk, and turn the system key to the N (normal) position.

7. Press the START button. This initiates the following chain of events:

    a. Applies power to the central processing unit and disk unit

    b. Creates a 1-minute delay to allow the disk to cycle on and load its heads

    c. Completes an enter/go cycle in the central processor to clear memory

    d. Generates a disk autoload

    e. Sets the central processor to Go mode

    f. Sets program protect condition

8. During the sequence in item 7, turn the LINE/OFF/LOCAL switch on the supervisor console Teletypewriter to the LINE position.

9. Approximately 75 seconds after the START button was pressed, the following message should appear on the supervisor console:

    CYBERDATA LEVEL X.XX LOADED

    If this message does not appear, complete the following checks:

    a. Check the maintenance key switch. It must be in a vertical position.

    b. Check the Teletype switch; it must be set to ON-LINE.

    c. Press the RELOAD button on the desk. If the message still does not appear, open the left desk door and check the following switches on the central processing unit console:

        • POWER switch - down position
        • BREAKPOINT STORE/BREAKPOINT switch - center position
        • PARITY FAULT STOP/AUTO RESTART switch - center position
        • PROGRAM PROTECT/TEST MODE switch - center position
        • ENTER/SWEEP switch - center position
        • SELECTIVE SKIP switch - down position
        • SELECTIVE STOP switch - down position
        • INSTRUCTION/CYCLE switch - center position

The following message appears:

ENTER DATE/TIME MMDDYYHHMM

If one of the following messages appears, take the appropriate action:

- 65K MODE

  The mode switch is set at 65K; however, there is only 32K or less memory in the system. This is a warning message, not a error because the system will run in this mode. No action is necessary.

- SET MODE SWITCH TO 65K

  The switch is in the incorrect position. Reset it.

d. Press the RELOAD button again. If there is still no message, try a back-up system disk by pressing the START button (to power-down), wait 1 minute, and change the disk. Then return to the beginning of the system start-up procedure.

e. If the total system appears dead (disk is not turning, no cooling fan operation, and no central processor on), check the main input power circuit breaker by removing the left rear desk panel). Switch the breaker to the ON position. Then return to the beginning of the system start-up procedure.

10. Type in the date and time (mmddyyhhmm), and press the RETURN key.

11. The date and time are displayed again, acknowledging that this input has been received.

12. The system now displays the following message:

NO. OF STATIONS = _____

Type in the number of key stations to be used, and press the RETURN key. An example of this process is when there is a 16-key-station system, and only 10 stations are to be used during the present work shift. These 10 stations must be sequential (stations 11 through 16 are not to be accessed). This entry reduces polling time and allocates less memory to be used thereby improving system efficiency.

13. The system responds with:

AVERAGE RECORD LENGTH = _____

Type in the average record length of the jobs to be entered. This value is only an estimate and is not critical to the system. It assigns this much room in memory for the data.

An example is where eight terminals have jobs with 4 of 100 characters, 2 of 80 characters, 2 of 40 characters; therefore:

$(4 \times 100 + 2 \times 80 + 2 \times 40) \div 8 = 80$

A maximum of 1,000 characters is allowed with the standard system configuration.

14. Possible system responses are:

a. **WARNING** MEMORY AVAILABLE UNDER EFFICIENCY LIMIT

   The average record length requested requires more memory than is available after basic system requirements have been met.

b. DISK X DESELECTED

   If a disk is selected and either it is not turned on or the write protect is on, the selected disk is deselected, and the system disk is selected. When the system disk is selected the following message appears:

   DISK Y IS SELECTED

c.   BAD TRACKS IN DISK X CLEAR DIRECTORY? (Y/N)

The disk error advisory program logs all bad tracks that are found in CYBERDATA storage. Once logged, they are not available to the user. If the disk which contains the bad tracks is being replaced, enter Y $\boxed{\text{CR}}$; otherwise N $\boxed{\text{CR}}$

d.   jjjjjj, bbb, IS ON DESELECTED DISK
jjjjjj, bbb, ENTERED BY 000 IS FROZEN
jjjjjj, bbb, ENTERED BY 000 IS DELETED

If the system is recalled after a power fail and the batches cannot be reassigned to the original stations, these messages will be printed.

15.   The system is ready and responds with:

CYBERDATA READY

This message indicates the system is fully operational. If any of the system messages are repeated after a command is entered, an error has been made and the command must be re-entered. If one of the following messages is given, the appropriate corrective action must be taken:

System error message	Action
a. INSUFFICIENT MEMORY AVAILABLE FOR REQUESTED CONFIGURATION xxxx WORDS MISSING CYBERDATA TERMINATED	This message indicates the supervisor has specified too large a configuration. Specify a small configuration, and repeat the system start-up procedure from step 9, pressing the RELOAD button.
b. NO CLOCK INTERRUPT CYBERDATA TERMINATED	Check whether the distribution unit is properly connected to the CYBERDATA Key-to-Disk System processor and the key entry stations, and then repeat the system start-up. If the message is repeated, report the failure.
c. DISK I/O ERROR CYBERDATA TERMINATED	Report the failure.
d. ES NOT FOUND IN STATISTICS FILE CYBERDATA TERMINATED	Report the failure.
e. TERMINAL CONTROLLER nn REJECTED, CHECK IF CONNECTED CYBERDATA TERMINATED	This is as indicated; then repeat system start-up.
f. 970-32 KEYSTATIONS NOT AVAILABLE ON THIS SYSTEM CYBERDATA TERMINATED.	Identify the keystations as being 970-480 stations.

16.   Press manual interrupt button, and type SP. The system responds with:

-SV-

This indicates that supervisory commands may be entered.

17.   If the system contains more than one disk unit, additional disk units must be activated by entering command CDS. Once it is selected, however, it remains selected, and is a part of the system until it has been delected.

18.   If a new job is to be worked on, take the job, document, and format specifications. Enter the job specifications using command EJB and the format specifications using command EFM. Enter the document specifications following the procedure described for command EDC. If the system is equipped with a card reader, the commands may be punched on 80-column car

and then entered directly through the card reader, after entering command CIO. They may also be entered from magnetic tape.

19. Assign a batch to each key entry station operator. If batch balancing is required for a batch, do not subdivide it into smaller batches.

20. Give the operator the job name, batch number, document number, and a list of all format numbers used in the job. For each source form, identify the order in which the fields are to be keyed, fields which are not to be keyed, variably keyed fields, and auto dup or auto skip fields. Also, if batch balancing is to be performed, tell the operator whether a counter is to be set to an initial value. If so, give the operator the counter number and initial value. Finally, tell the operator whether to enter the batch or verify it.

21. Prepare the tape drive for the first operation. Detailed tape operating data is given in appendix D.

22. When a batch has been entered and, if necessary, verified, it is available to be transferred to tape. It is not necessary to transfer each batch when it is completed since the system disk may hold numerous completed batches before becoming full. Ordinarily, batches should be transferred to tape only when necessary. The decision should be based on the scheduled completion time for the job and the amount of disk space available for storing new jobs. If a system message shows that 80 percent of the disk space is already used, the batches for any completed jobs should be transferred to tape and deleted from the disk. If disk space is not made available at this time, a system message soon shows that the disk is full and the data entry process will gradually come to a halt, one key entry station at a time.

The transfer process should be started by entering the command HDR followed by the command WBT. When all batches for a job have been transferred, ordinarily the next job is started on another tape. Remove the old tape, mount a new one, and continue with the next job by entering the command HDR followed by the command WBT.

If the message END OF TAPE appears, remove the old tape, mount a new one, and continue with the interrupted batch by entering the command HDR followed by the command WBT. The tapes which have been removed are ready for subsequent computer processing.

23. Transferring the batches to tape will not make disk space available since the data for the batch is still stored on the disk, as well as on the tape. When it is certain that the batches have been successfully transferred to tape and there is no need to keep them stored on disk, delete them from the disk by entering the command DBT. Another system message will show when the amount of used disk space is under 70 percent. At this time, there is enough disk space for new jobs and it is now possible to stop transferring and deleting batches.

24. If the system contains more than one tape drive, 970-480 Key Entry Stations can be authorized for supervisory functions. Then via the CIO command, each operator can use their assigned drive independently and simultaneously.

25. Comprehensive operational information is created by the system and maintained on the system disk. Portions of this information are used in the preparation of the system, job, and operator activity reports. Complete statistical reports can be prepared as a result of subsequent computer processing daily or weekly, according to the requirements of the installation after the statistical information has been transferred to magnetic tape by entering the command DMP,S. The statistical information remains on the disk until it is transferred to tape. If the following message appears on the supervisor console and the information is not transferred to tape, the new information is ignored.

   90% OF SYSTEM STATISTICS FILE USED
   DUMP STATISTICS

26. If all batches for complete jobs have been transferred and deleted and if no system message has indicated that the amount of used disk space is less than 70 percent, additional disk space can be made available by the transfer of batches to magnetic tape temporarily. This transfer is completed by entering the DMP command followed by command DBT. When more disk space becomes available, the batches should be transferred back to the disk to enable their completion. This is accomplished by entering the LOD command.

TAPE LABELLING

The purpose of the CYBERDATA System tape labelling option is to provide a simple and flexible method of writing standard and nonstandard tape labels. The format of each label is determined by the label programs. Each label program is identified in the magnetic tape format by a number between 0 and 31 and has four entry points: one each for volume header, file header, file trailer, and volume trailer.

To create a file or a set of files from the batches of a particular job, the label number must be entered as part of the magnetic tape format for that job. When a WBT command is executed, the system looks for the end of the data trailer (EOD1) on the tape. The system then checks for the beginning of the tape. If the tape is at its load point, control is passed to the first entry point of the appropriate label program to write a volume header and file header, if specified. If data has previously been recorded on the tape, a decision is made according to the **new** parameter in the WBT command and the batch grouping factor in the magnetic tape format, whether to start a new file or to overwrite the last trailer and extend the previous file.

File trailers are written by passing control to the third entry point of the label program at the end of each batch or group of batches or after the last batch pertaining to this WBT command is written.

Volume trailers are written by passing control to the fourth entry of the label program when the system senses an end-of-tape condition.

Writing File Labels

AUTOMATIC FILES

If the magnetic tape format specifies a batch grouping factor, a new file is started after each group. If the batch grouping factor is 10, for example, and in the WBT command the range 1 to 100 was specified, batches between 1 and 10 will be in the first file, those between 11 and 20 will be in the second file, and so on. The number of the last batch written in the command is saved, and if a subsequent WBT command starts with a batch in that range, it is added to the last file. No attention is paid in this case to the ascending sequence in the file.

MANUAL FILES

If no batch grouping factor is specified, each WBT command extends the last file on the tape until the new parameter is encountered or a different job name is specified. Then a new file is started. A new file is also started if the magnetic tape format number specified in the WBT command is different from the one used to record the previous batch on the tape.

Label 0 — No Labelling

When the new parameter is used in WBT, a tape mark is written at the end of the previously recorded data and a new unlabelled file is started. If a batch grouping factor has been specified, a tape mark is written at the end of each group of batches. If the end of tape is reached, the label routine types the following message:

    MOUNT NEW TAPE, TYPE CU/TR TO CONTINUE/TERMINATE

If TR is entered, recovery to the last complete batch is performed, and the tape is closed with two tape marks followed by the CYBERDATA System EOD1 trailer. If CU is entered, recording continues on the new reel that is mounted.

Label 1 — Standard Labels

The system checks for the beginning of tape. If it is at load point, the system asks the supervisor for the variable volume header parameters followed by the file header parameters.

System message	Action
1. VOL HDR 1 SERIAL NO. = _____	Enter up to six characters [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
2. SYSTEM ACCESSIBILITY = _____	Enter one chanracter [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
3. OWNER ID = _____	Enter up to 14 characters [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
4. FILE HDR 1 FILE ID = _____	Enter up to 17 characters [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
5. SET ID = _____	Enter up to six characters [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
6. CREATION DATE (YYDDD) = _____	Enter five-digit Julian date of the form YYDDD [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.
7. EXPIRATION DATE (YYDDD) = _____	Enter five-digit Julian date of the form YYDDD [CR] or Press [CR] to obtain default value. or Enter *E [CR] to default all remaining parameters and stop interactive labelling.

The system writes HDR2 if required and then begins the batch transfer. As each file is completed, a trailer is written. If HDR2 was specified, EOF2 will also be written. Finally, the label parameters option is checked. If S was specified, a file header is written automatically using the last values entered on this volume unless the new option is specified in a subsequent WBT command. In this case, the first file in the series requests parameters. If P was specified, the variable parameters are requested for every file created.

If the end of tape is reached, the label routine does the same as label 0.

The initial default values when the volume header is being written and first file header are given in table 6-1. If these values are changed, the new values become the default values.

Table 6-1. Default Values

Name	Length	Description	Default
Serial number	6	Field 3 of VOL 1	999999
Accessibility	1	Field 11 of VOL 1	Space
Owner identification	14	Field 7 of VOL 1	Spaces
File identification	17	Field 3 of HDR1 and EOF1	
Set identification	6	Field 4 of HDR1 and EOF1	Spaces
Creation date	6	Field 9 of HDR1 and EOF1	System Julian date
Expiration date	6	Field 10 of HDR1 and EOF1	99366
HDR2	1	N - No HDR2, Y - Yes	N

POWER-FAIL RESTART

If a power failure occurs, it is necessary to reactivate the CYBERDATA System. To accomplish this, follow the system start-up procedure. Batches in Entry, Verify, or Read mode are reconnected to their stations provided the stations are initialized and there is enough memory. If a batch cannot be restored because of either of these reasons, it is frozen. If a batch is in entry mode and has less than 16 records, it is deleted. Frozen/deleted messages will appear on the supervisory console:

1.   aaaaaa(1),nnn(2) ENTERED BY nnn(3) ID FROZEN

2.   aaaaaa(1),nnn(2) ENTERED BY nnn(3) IS DELETED

Where:

(1)—job name
(2)—batch number
(3)—operator number

On the 970-480 display, the record count in the CRT header indicates the next record to be entered. On the 970-32 displays or if more information is needed, Read mode should be selected and a quick review of previous data entered indicates the last good record accepted by the system before the failure occurred.

If a magnetic tape output function was in process at the time of the power failure, it is necessary to repeat the command entry. If the WBT command was interrupted, it is necessary to position the magnetic tape to the end of the last completed batch.

DISK ERROR ADVISORY

When a disk error is detected, a disk error advisory message appears on the system comments unit (usually the Teletype). The following message precedes other messages pinpointing the source and type of error.

   MASS STG ERR nn LU uu

Where:

nn — type of error
uu — logical unit

The affected batch is suspended, and the area on the disk will not be used until followup action has been completed. A complete description is given in appendix E.

SUPERVISOR AND EQUIPMENT CONTROL COMMANDS

The supervisor and equipment control commands are discussed on this and the following pages.

Call Supervisor (SP/SUP)

The commands to call in the supervisor functions are as follows:

|MI| SP |CR| — teletype
|MI| SUP |REL| — key entry station

This command is used to obtain control of the system by the supervisor. The CYBERDATA System accepts other commands only after this command is issued.

System response	Action
-SV-	Enter the required command(s).

Deactivate Key-to-Disk System (VX)

The command to deactivate the CYBERDATA System is:

|MI| VX |CR|

This command is used to deactivate the CYBERDATA System as part of the system shutdown procedure at the end of the day.

System response	Action
AB	None

Reactivate System (VL)

The command used for system start is:

|MI| VL |CR|

This command is necessary to activate the CYBERDATA System after command VX has been entered.

System response	Action
NO. OF STATIONS = _____	Enter the number of key entry stations to be used followed by |CR| .
AVERAGE RECORD LENGTH = _____	Enter the average record length followed by |CR| .
BAD TRACK IN DISK X CLEAR DIRECTORY? (Y/N)	If the disk pack is replaced with a new one, enter Y |CR| ; otherwise, N |CR| .
CYBERDATA READY	Action is as desired.

MULTISUPERVISOR OPERATION

Every operator of a 970-480 station has access to a limited number of supervisory commands which may be used without reference to the system supervisor. In addition, the supervisor can authorize the use of a more extensive range of commands. The operator of a 970-32 station may enter supervisory commands only after authorization.

There is no limitation on the number of key entry stations that may operate as supervisory consoles simultaneously. Table 6-2 lists the commands that may be performed by each type of supervisory console with and without authorization.

Table 6-2. Supervisory Control Capabilities

Command Mnemonic	Station Type			
	Teletype	970-480		970-32
	Commands Available After Entering SP	Commands Available After Entering SUP**	Commands Available After Authorization and After Entering SUP**	Commands Available After Authorization and After Entering SUP**
CBS	X*		X	
CDS	X			
CFM	X	X	X	X
CFS	X		X	X
CIO	X		X	
DBT	X		X	
DDC	X		X	X
DJB	X		X	X
DMP	X		X	
DMT	X			
DPR	X			
ECD	X			
EDC	X		X	
EFM	X		X	
EJB	X		X	X
EMT	X		X	
ESH	X			
FRZ	X		X	
HDR	X		X	
LOD	X		X	
LPR	X			
MSG	X		X	
MTC	X		X	
PBR	X	X	X	
PBS	X	X	X	
PDC	X	X	X	
PER	X			
PFM	X	X	X	
PFT	X	X	X	
PJB	X	X	X	
PMT	X		X	
PPR	X		X	
PSS	X		X	
PST	X			
PTS	X		X	

*X indicates that the command may be performed by the device specified.

**Key entry station is an Interrogate mode.

***This is performed by the CNCL key on the key entry station.

Table 6-2. Supervisory Control Capabilities (cont)

Command Mnemonic	Station Type			
	Teletype	970-480		970-32
	Commands Available After Entering SP	Commands Available After Entering SUP**	Commands Available After Authorization and After Entering SUP**	Commands Available After Authorization and After Entering SUP**
SOF	X	X	X	X
SX	X	X***	X***	X***
THW	X		X	
TOF	X		X	
TON	X		X	
TRC	X		X	
TST	X		X	
WBT	X		X	
XPL	X	X	X	

*X indicates that the command may be performed by the device specified.
**Key entry station is in Interrogate mode.
***This is performed by the CNCL key on the key entry station.

Authorizing an Operator to Enter Supervisory Commands

The following procedure is followed by the system supervisor in order to authorize a key entry station for the entry of supervisory commands:

1. Press |MI|

2. System response:

    MI

3. Key: VLTP |CR|

4. System response:

    VLTP IN

5. Key: *C,nn(1),nn(2) |CR|

    Where:

    (1)—number of key entry station to be authorized for supervisory command entry
    (2)—key entry station code:
        00 — 970-32 with standard keyboard
        02 — 970-480 with standard keyboard

6. System response:

    VLTP IN

7. Key: *Z

8. System response:

    VLTP OUT

Cancelling an Authorization

The following procedure is followed by the system supervisor to terminate a supervisory command authorization:

1. If necessary, key: SOF [CR]

2. Press [MI]

3. System response:

    MI

4. Key: VLTP [CR]

5. System response:

    VLTP IN

6. Enter: *C,nn(1),nn(2) [CR]

    Where:

    > (1)—number of key entry station for which authorization is to be cancelled
    > (2)—key entry station code:
    >
    > > 01—970-32 with standard keyboard
    > > 03—970-480 with standard keyboard

7. System response:

    VLTP IN

8. Key: *Z

9. System response:

    VLTP OUT

Key Entry Mode Directory

The procedure for a key entry directory is as follows:

1. If necessary, key: SOF [CR]

2. Key: [MI] VLTP

3. System response:

    VLTP IN

4. Key: *P,nn(1)[,nn(2)] [CR]

    Where:

    > (1)—number of first station
    > (2)—number of last station

5. System response:

TER	K/B	DSP	MODE
(1)	(2)	(3)	(4)

    Where:

    > (1)—key entry station number
    > (2)—type of keyboard
    > (3)—type of display (SCN — 32-character of CRT — 480-character)
    > (4)—operation mode (STD — normal data entry or verification or SUP — supervisor)

Command Formats

A command consists of a mnemonic, parameters, and a carriage return. Commas are used to separate the mnemonic and the parameters from one another; however, they are not permitted immediately preceding a carriage return. Mnemonics, other capital letters, and commas must be entered as indicated. Lowercase letters (a - alphabetic and n - numeric) represent variables supplied by the supervisor-operator who is entering the command. Default values are underlined.

Command parameters are identified by a digit enclosed in parentheses. The digit indicates the order in which the parameter appears in the command.

Square brackets indicate optional parameters; i.e., parameters that are not essential to the command and which need not be entered provided they are acceptable and the following rules are observed:

1. If the square brackets enclose all of the parameters, simply enter the mnemonics and press the carriage return.

2. If a parameter enclosed in square brackets is to be changed, all parameters preceding the item to be changed must be entered. An exception exists when numeric default values are assumed if just the leading and trailing commas are keyed in. Remember, however, that a comma must not be used to terminate an optional parameter if it is to precede a carriage return.

Braces indicate mandatory parameters that must be entered. The following rules apply:

1. If the braces enclose a vertical list of parameters, select one and only one of the list.

2. If the braces enclose a horizontal list of parameters, select at least one of the list.

3. If braces enclose all of the parameters, entering the mnemonic and a carriage return enters the underlined default parameter.

If braces are enclosed in square brackets, the rules for square brackets are dominant; conversely, if square brackets are enclosed in braces, the rules for braces are dominant.

Elipses (...) indicate that the previous parameter format can be repeated as many times as is necessary to enter the parameter.

COMMAND ENTRY AND SYSTEM RESPONSES

This section describes the commands used to monitor and control the data entry process and the operation of the system. Each command is noted with a list of the possible system responses which appear on the supervisory console. System error messages, which may result from an attempt to enter each of the commands are listed in appendix H, together with the corrective action to be taken. The general procedrues are as follows:

1. At system start-up or after the message:

    L,04 FAILED 00
    ALT 11

    appears, the supervisor must obtain system control by pressing the manual interrupt (MI) button on the Teletype, entering the command SP, and pressing RTRN. If a key entry station is authorized as a supervisory console, system control is gained during Idle mode by pressing INT, entering SUP, and pressing REL.

    Once the desired commands have been entered, the command SOF (supervisor off) should be entered to remove the console from the polling cycle. This gives the processor more time to process data entry functions.

2. The completion of each line of a command entry must always be followed by pressing the return (CR) key. When a key entry station is functioning as a supervisory console, the release (REL) key is used in place of CR.

3. If a typing error is noticed on the Teletype before the end of a command, the rub out, line feed, and return keys should be pressed, and the command reentered. If an error is noticed during a command entry at a key entry station, the BSC key should be used to backspace to the last correct character or the entire field may be erased using the REP FLD key. The command should then be entered correctly.

4. If a typing error is noticed after the return or REL key is pressed, the error is detected by the system and an appropriate error message results.

5. The printing of reports and the write-batch-to-tape command and the enter-format command can be terminated before completion by pressing the manual interrupt button and entering command SX (or by using the cancel key at a key entry station).

6. After a command has been entered, an appropriate response appears on the supervisory console. The most common response is -SV- which indicates that the previous operation has been completed and that a new command may be entered. The response -SV-BUSY is given when SP is called and the Teletype is already in supervisory mode.

7. To display the continuation of a supervisory report when the 480-character display panel is full, the operator must press the CONT key.

8. The supervisor can freeze (command - FRZ) a batch on one operator's key entry station and thaw (command - THW) it on another operator's key entry station. Operators can freeze and thaw their own batches only.

The following supervisor commands are in alphabetic order.

CBS

Change Batch Status (CBS)

To change the status of the batch, the CBS command is used as follows:

$$\text{CBS,aaaaaa(1),nnn(2),} \quad \begin{Bmatrix} \text{OPN} \\ \text{ORV} \\ \text{VER,aaa(3)} \end{Bmatrix} \quad \boxed{\text{CR}}$$

Where:

(1)   — job name
(2)   — batch number
OPN — reopen complete batch or batch waiting to be verified
ORV — override verification
VER — verify batch (that is, change status to waiting to be verified)
(3)   — verification type (U, E, and/or F; or N)·

This command is used to change the status of a batch. It may be used to reopen a completed batch, to cancel a verification requirement, or to specify that a batch should be verified or reverified.

Examples of the application of the CBS command are:

1. CBS,PAYROL,123,OPN $\boxed{\text{CR}}$

2. CBS,PAYROL,123,VER,UE $\boxed{\text{CR}}$

In example 1, batch 123 of job PAYROL is reopened. In example 2, unbalanced and erroneous fields of batch 123 of job PAYROL must be verified or reverified.

System response	Action
-SV-	None

CDS

Change Disk Status (CDS)

To change disk status, the following command is used:

$$\text{CDS,n(1),} \quad \begin{Bmatrix} \text{S} \\ \text{D} \end{Bmatrix} \quad \boxed{\text{CR}}$$

Where:

    n — disk number (1, 2, 3 or 4)
    S — disk selected
    D — disk deselected

This command is used to designate the availability of disks to the system. Disk 1 is automatically available for storing data and need not be selected unless it has been deselected by a previous CDS command. Command CDS must be entered once for each additional disk unit available.

An example is:

    CDS,2,S [CR]

In the example, disk unit 2 is selected in addition to disk 1.

System responses	Action
1. DISK MAY BE TURNED OFF	This is as indicated.
2. BUSY DISK. DO NOT TURN OFF	None
3. SYS DISK. DO NOT TURN OFF	None
4. ALL OTHER DISKS DESELECTED	None
5. DISK n IS DESELECTED	None

Change Format (CFM)

The change format command is:

    CFM,nnnn(1),nnnn(2) [CR]

Where:

    (1) — current format number
    (2) — new number to be assigned to this format.

The command causes the format to be copied and given a second number.

The CFM command is used as shown in this example:

    CFM,12,24 [CR]

In the example, format 12 is copied and labelled format 24.

System response	Action
-SV-	None

Change Format Status (CFS)

The change format status command is as follows:

$$\text{CFS,n...n(1),} \quad \left\{ \begin{array}{c} A \\ I \end{array} \right\} \quad [CR]$$

Where:

    (1) — format number
    A — active
    I   — inactive

This command is used to designate format specifications as inactive and to subsequently reactivate them.

The CFS command is used as shown in this example:

    CFS,12,I [CR]

In the example, format 12 is designated inactive.

To delete a format, make it inactive by keying:

> CFS,n,I $\boxed{\text{CR}}$

Then perform a squeeze at the end of shift:

> ESH,SQZ $\boxed{\text{CR}}$

System response   **Action**

-SV-   None

CIO

Change Input/Output Units (CIO)

To change the input/output units, the CIO command is used as follows:

1. To select new input/output devices, key:

> CIO { [,In(1)] [,Ln(2)] [,Pn(3)] } $\boxed{\text{CR}}$

Where:

> I   — input device
> (1) — new input device number
> L   — output list device
> (2) — new output device number
> P   — magnetic tape
> (3) — new magnetic tape device number

2. To revert to normal input/output devices, key:

> CIO { [,I] [,L] [,P] } $\boxed{\text{CR}}$

Where:

> I — input device
> L — output device
> P — magnetic tape

This command enables the standard supervisory input and output and magnetic tape output device designations, established at time of installation, to be changed. For example, a card reader or a paper tape may be used for record format entry, and the formats can be printed on a line printer. The command also changes the standard output magnetic tape unit designation. When a key entry station is used as a supervisory console, it may be used only to change the standard output magnetic tape unit designation.

The TAPE I/O ERRORS message is displayed whenever the supervisory output device is not a tape. COS automatically assigns the first tape unit which is logical unit (LU) 6 to the primary supervisor. To prevent errors, only one supervisor can use a device at a time. To use LU6 on a second supervisory terminal, key CIO,P on the Teletype and CIO,P6 on the 480-character station.

Standard logical unit assignment are given in table 6-3.

Table 6-3. Logical Unit Codes

Equipment	Code
Teletype	4
Card reader	5
Tape unit 0	6
Tape unit 1	7
Line printer	9

An example of the CIO command would be:

CIO,I5,L4,P6 $\boxed{\text{CR}}$

In the example, device 5 has been selected as the input unit, device 4 as the output unit, and device 6 as the system output tape.

Note that to revert to normal input/output devices from three different current selections, the supervisor types CIO,I,L,P. If, for example, an alternative input device was not specified, the supervisor types CIO,L,P.

If a specified device fails, the system prints:

Lnn FAILED mm
ACTION

The operator may then repeat the request by entering RP. For further details, refer to the COS Reference Manual.

System response	Action
-SV-	None

Delete Batches from Disk (DBT)

To delete batches from the disk, the DBT command is used as follows:

DBT,aaaaaa(1),nnn(2),nnn(3) $\left\{ \begin{array}{l} \text{[,a(4)]} \\ \text{Selected batches} \end{array} \right\}$ $\boxed{\text{CR}}$

Where:

(1) — job name
(2) — initial batch number
(3) — last batch number
(4) — erase parameter. When B is entered, all specified batches not active on a key station are erased; when B is not specified, only batches transferred to tape by the WBT command are erased.

This command is used to delete specified batches from disk. Once a batch has been erased, it cannot be recovered unless it has been previously recorded elsewhere.

Examples are:

1. DBT,PAYROL,123,789,B $\boxed{\text{CR}}$
2. DBT,PAYROL,123 $\boxed{\text{CR}}$

In the example 1, all of batches 123 through 789 of job PAYROL, which are not being keyed, will be erased from the disk. If B had not been specified, only those batches between 123 and 789 which had already been transferred to tape would be erased.

In example 2, only one batch that has been transferred to tape is erased.

System response	Action
-SV-	None

Delete Document (DDC)

The delete document command is:

DDC,nnn(1) $\boxed{\text{CR}}$

Where:

(1) — document number (1 through 255)

The DDC command is used to delete a document from the system.

The following example shows the DDC command:

DDC,127 [CR]

In the example, document 127 is deleted.

System response	Action
-SV-	None

DJB

Delete Job (DJB)

The delete job command is:

DJB,aaaaaa(1) [CR]

Where:

(1) — job name

This command is used to delete a specified job from the system library. The command cannot be executed when batches for the job are still stored on disk.

An example of the DJB command is as follows:

DJB,PAYROL [CR]

In the example, job PAYROL is deleted from the system library.

System response	Action
-SV-	None

DMP,D

Dump Disk Batches (DMP,D)

To dump disk batches, the following command is used:

$$\text{DMP,D,n(1)} \quad \left\{ \begin{array}{l} [,W] [,C] [,F] \\ \underline{\text{all}} \end{array} \right\} \quad [CR]$$

Where:

D — disk batches dump
n — disk number (1 to 4)
W — written batches
C — completed batches (but not written) or batches waiting to be verified
F — frozen batches

When none of parameters W, C, and F are specified, all written, completed, and frozen batches are transferred to tape.

An example is:

DMP,D,2 [CR]

In the example, all written, completed, and frozen batches on disk 2 are recorded on tape.

System response	Action
DUMP STARTED, FILE nnnn	None
(batch) nnn STARTED	
-SV-	

DMP,F

Formats Save (DMP,F)

To save (dump) formats, the following command is used:

$$\text{DMP,F} \left[\begin{array}{c} ,\text{nnnn(1)} \\ \underline{\text{all}} \end{array} \left[\begin{array}{c} ,\text{nnnn(2)} \\ \underline{\text{last}} \end{array} \right] \right] \quad \text{CR}$$

Where:

    F — formats dump

    (1) — first format to be dumped

    (2) — last format to be dumped (must be greater than (1))

If no format numbers are specified, all the formats in the system are dumped.

An example is:

    DMP,F,125 |CR|

In the example, all the formats in the system from 125 up to the highest format number in the system are recorded on tape.

System responses	Action
1. LAST FORMAT ON TAPE xxxx	None
-SV-	
2. NO ACTIVE FORMATS WITHIN THIS RANGE IN SYSTEM	None
-SV-	

Dump Disk to Tape (DMP)

DMP

This command is used to transfer specified batches or the statistics file to magnetic tape in order to release space on disk. The command allows either batches of a particular job, batches on a particular disk, or the system statistics file to be transferred. DMP programs should be preceded by HDR (no job name can be used).

Dump Job Batches (DMP,J)

DMP,J

The command to dump job batches is as follows:

DMP,J $\left[, \left\{ \begin{array}{l} \text{[aaaaaa(1)]} \\ \text{all} \end{array} \right\} \quad \left\{ \begin{array}{l} \text{[,W][,C][,F]} \\ \text{all} \end{array} \right\} \right]$ |CR|

Where:

    J — job batches dump

    (1) — job name

    W — written batches

    C — completed batches (but not written) or batches waiting to be verified

    F — frozen batches

When none of parameters W, C, and F are specified, all written, completed, and frozen batches of the specified job are transferred to tape. When a job name is not specified, batches from all jobs are transferred.

An example of this command is:

    DMP,J,PAYROL,W,C |CR|

In the example, all written and completed batches of job PAYROL are transferred to tape.

System response	Action
DUMP STARTED, FILE nnnn (batch) nnn STARTED -SV-	None

Dump Statistics File (DMP,S)

The dump statistics file is executed via the following command:

$$\text{DMP,S} \quad \left\{ \begin{matrix} [,D] \\ \underline{R} \end{matrix} \right\} \quad \boxed{\text{CR}}$$

Where:

S — statistics file dump
D — delete statistics file on disk after dump
R — retain statistics file on disk after dump

The default value of the last parameter is R.

System response	Action
DUMP STARTED, FILE nnnn -SV-	None

Delete Magnetic Tape Format (DMT)

This command deletes a magnetic tape format from the system.

DMT,nnn(1) $\boxed{\text{CR}}$

Where:

(1) — magnetic tape format number

System response	Action
-SV-	None

Delete User's Programs (DPR)

To delete a data check own code, key:

DPR,nnn(1),O $\boxed{\text{CR}}$

Where:

(1) — own code number

To delete a magnetic tape program, use:

$$\text{DPR,nn(1),T,} \quad \left\{ \begin{matrix} O \\ L \\ C \end{matrix} \right\} \quad \boxed{\text{CR}}$$

Where:

(1) — program number to be deleted
O — magnetic tape own code
L — tape label
C — code conversion program

System response	Action
-SV-	None

Enter Check Digit Parameters (ECD)

To enter check digit parameters, the following command is given:

ECD,nn(1),nn(2),nn(3) [,nn(4)...,nn(17)] $\boxed{\text{CR}}$

Where:

      (1)   — special test number
      (2)   — modulus (1 through 15)
      (3) to (17) — weight (1 through 15)
               (3) is applied to least-significant digit
               (17) is weight applied to most-significant digit

This command, which is associated with the special test number column on the format specification sheet, is used to modify the modulus and weights of a standard check digit verification test on pure numeric fields containing up to 15 digits. (Check digit verification is described in chapter 3.)

An example of the ECD command is :

    ECD,05,12,01,12,2,5,3,,10 |CR|

In the example, special test 05 is specified using modulus 12. If the field to be checked is 1234567, the following weights are applied to the corresponding digit:

Weight	Digit
1	7
12	6
2	5
5	4
3	3
0	2
10	1

System response	Action
-SV-	None

Enter Document (EDC)

To enter a document specification, the following command is used:

$$\text{EDC,nnn(1),Fnnnn(2),R} \left\{ \begin{array}{c} \text{[nnnnn(3)]} \\ \underline{\text{unspecified}} \end{array} \right\} \left[\text{,Fnnnn(2),R} \left\{ \begin{array}{c} \text{[nnnnn(3)]} \\ \underline{\text{unspecified}} \end{array} \right\} \right] ... \boxed{\text{CR}}$$

Where:

      (1) — document number (1 through 255)
      (2) — format number of first record type specified
      (3) — number of times that records of this format appear. Fnnnn and Rnnnnn are repeated as indicated on the document description sheet until the last format has been specified. If the parameter string is longer than one line, press the carriage return key on the Teletype and then continue on the next line. The carriage return key may only be used immediately after R [nnn], has been entered. When an unlimited number of records are specified for a format, enter R without specifying a number.

This command is used to enter the doucment specifications as they appear on the document description sheet.

An example of the EDC command is:

    EDC,9,F17,R2,F243,R3,F114,R |CR|

Note that selected format numbers must be present in the system or this command will be rejected.

System response	Action
-SV-	None

Enter Format (EFM)

The EFM command is:

EFM, $\begin{Bmatrix} N \\ R \end{Bmatrix}$,nnnn(1),nnnn(2) [,a(3),a(4),a(5),nnn(6)] CR

Where:

N — new format
R — revised format
(1) — format number
(2) — maximum record length
(3) — forced reverification (Y — yes; N — no) default is N
(4) — resequencing (Y — yes; N — no) default is N
(5) — autosequencing (Y — yes; N — no) default is N
(6) — autosequencing number (1 to 999) if (5) is Y, default is 1; if (5) is N, default is 0

This command is used to enter the format specifications as they appear on the format specification sheet or to change the format specifications for an existing job. The command is followed by entry of all the parameters for the format. The cursor is positioned at the proper location for entering the format specifications. The maximum record length specified in the command must equal the sum of the record lengths specified for each field. Note that the maximum record length cannot be changed using this command. When autosequencing is specified, an extra four characters must be allowed in the record length for the autosequencing field.

An example is:

EFM,N,16,71,Y,Y,Y,5 CR

ADDRES,L,32,V,V,N,N,Y,Y,2,N,0,0,N0,N0,N CR

NAME,A,25,V,F,S,N,Y,Y,1,N,0,0,N0,N0,N CR

SALARY,N,4,F,F,K,N,Y,N,4,N,0,0,A1,N0,I,800+3000+ CR

IDNUMB,N,6,F,F,K,N,Y,N,3,N,0,1,N0,N0,N CR

In the example, format 16 is a new format and specifies that the data to be entered under it must have a maximum record length of 71 characters. Forced reverification, resequencing, and autosequencing are also specified. The command is followed by entry of the parameters for the four fields controlled by format 16. The 71-character record is made of 32 characters in the address field, 25 in the name field, 4 in the salary field, 6 in the IDNUMB field, and 4 in the autosequencing field. The autosequencing field will be the fifth field on the output tape.

Note that only the data type and the maximum number of characters must be keyed; the rest have default values. A field, therefore, may be keyed as follows:

,L,32 CR

Keying ,, is the same as keying ,0,.

The EFM,R (revise) option permits easy updating of specific fields. The REL key (970-480) or CR (Teletype) is used at the beginning of a field to indicate no change to that field.

In this example, assume the operator has entered the following information:

EFM,N,22,40,Y,N,Y CR

FLD1,A,6,V,V,K CR

FLD2,S,15,V CR

FLD3,L,2,V,F,N,D CR
FLD4,U,13,V,F,S CR

After this data has been keyed, a decision is made to eliminate verification of FLD4. The EFM in the example is modified by entering:

EFM,R,22,40,Y,N,Y [CR]
    [CR]
    [CR]
    [CR]
FLD4,V,13 [CR]

If it is desirable to have both variations of this format in the system simultaneously, the original format could have been copied by using a CFM command. It can then be modified by using the EFM,R command.

System responses (after the last parameter is entered)	Action
1. -SV-	None
2. Field description (for each field entered)	None
3. FLD=xxx; where xxx is the field number (for each field copied)	None

Enter Job (EJB)

To enter a job, the EJB command is used:

EJB,a(1),aaaaaa(2),nnn(3),aaa(4),nnn(5),nnnn(6) [CR]

Where:

> (1) — job status: N (new) or R (revised)
> (2) — job name
> (3) — magnetic tape format number (1 through 255)
> (4) — verification type: F (format), E (error fields), and/or U (unbalanced fields); if no verification is required, enter N
> (5) — end-of-batch own code number (0 through 127)
> (6) — maximum record length for job (1 through 1000)

This command is used to enter the job specifications as they appear on the job sheet or to change the job specifications for an existing job. If the job specifications are being changed, all parameters must be entered. The maximum record length for an existing job may be increased but may not be reduced. Full details of the job sheet are given in chapter 5.

The EJB command may be used as shown in the following example:

EJB,N,PAYROL,12,FEU,2,120 [CR]

In the example, a new job called PAYROL is entered. This job uses magnetic tape format number 12. Verification is performed on fields specified on the format specification sheet, on erroneous fields, and the fields that cause unbalanced batches. Own code test number 2 is performed, and the maximum record length for the job is 120 characters.

System response	Action
-SV-	None

End of Shift (ESH)

The end-of-shift command is:

ESH [,SQZ] [CR]

This command is used to terminate the CYBERDATA System as part of the system shutdown procedure at the end of the shift or the end of the day.

SQZ performs the following two major functions:

1. Squeezes CYBERDATA System tables to achieve disk area

2. Deletes inactive formats not used by any batch that is stored on the disk

The SQZ request is executed as part of the end-of-shift procedure. It is an optional parameter for the ESH command.

If SQZ is specified, it is performed only if the end-of-shift procedure was performed completely; i.e., all stations are in Idle mode. SQZ squeezes the following tables:

1. Document

2. Format

3. Program

When deleting, changing, or updating one of these tables, disk space can be lost. For the system to be able to use this area again, the SQZ function has to be performed. The frequency of utilization depends on the amount of changes to the tables.

When any of these tables is squeezed, a message is given on the Teletype to make the supervisor aware of what is occurring while the program, which can be executed for some time, is running.

While squeezing the format table, the inactive formats are checked to see whether there is any record stored on the disk which is controlled by the inactive format. If there is no such record, the inactive format is deleted.

The program table which is to be squeezed contains disk-resident programs that were not entered at installation time (most of this type are the user's own codes).

System responses	Action
1. STATIONS STILL ACTIVE	Enter the PTS command to determine the status of the key entry stations, suspend active batches by entering the FRZ command, and reenter the ESH command.
2. ALL STATIONS IDLE - PERFORM VX TO TERMINATE SYSTEM SV OFF	As indicated
3. **END OF SHIFT**	None
4. DOCUMENT TABLE SQUEEZED FORMAT TABLE SQUEEZED PROGRAM LIBRARY SQUEEZED ALL STATIONS IDLE - PERFORM VX TO TERMINATE SYSTEM	As indicated

Enter Magnetic Tape Format Specifications (EMT)

This command is used to enter or modify parameters that specify recording formats.

$$\text{EMT,a(1),nnn(2),a(3)} \quad , \begin{Bmatrix} a(4) \\ E9 \\ B7 \end{Bmatrix} , \begin{Bmatrix} a(5) \\ N \end{Bmatrix} , \begin{Bmatrix} U \\ F,nnnn(6), \\ D,nnnn(7) \\ V,nnnn(8) \end{Bmatrix} \begin{Bmatrix} nnnn(9) \\ per\ job \end{Bmatrix} , \begin{Bmatrix} N \\ Aa(10) \\ Baa(11) \end{Bmatrix} , \begin{Bmatrix} nn(12) \\ 0 \end{Bmatrix} ,$$

$$\begin{Bmatrix} nn(13) \\ 0 \end{Bmatrix} , \begin{Bmatrix} a(14) \\ S \end{Bmatrix} , \begin{Bmatrix} nnn(15) \\ 0 \end{Bmatrix} \quad \boxed{CR}$$

Where:

    (1) — status
        N — new
        R — revised
    (2) — magnetic tape format number (1 to 255)
    (3) — recording mode
        F — fixed
        V — variable
    (4) — recording code
        A — ASCII
   B — BCD
        E — EBCDIC
        Note that 1 through 4 is a special conversion program installed by the user which is
        using LPR. The default is E for the nine-track tape and B for the seven-track tape.
    (5) — overpunching; default is N
        N — none
        Y — plus (+) and minus (-)
        - — minus (-) only
  U   — undefined (every record is a block; 18-character minimum, 4,000-character maximum)
  F   — fixed length block
  D   — variable-length block (record in decimal)
  V   — variable-length block (recorded in binary)
    (6) — actual block length — 18 to 4,000 (even number, 1 to 17 must be padded)
    (7) — maximum block length — 18 to 4,000 (even number, recorded in decimal)
    (8) — maximum block length — 18 to 4,000 (even number, recorded in binary)
    (9) — record length — 1 to 4,000; default is as defined in job (even number)
  N   — no padding character; this is the default value
    (10) — ASCII padding character (if BCD or EBCDIC, (10) is corrected)
    (11) — binary padding character (not permitted with BCD)
    (12) — magnetic tape format own code (OCD) number — 0 to 31; default is 0
    (13) — tape label number — 0 to 31; default is 0
        0 — no file label; tape mark at end of each file
        1 — CYBERDATA System standard
        2 to 31 — user's own file label
    (14) — label parameters option
        S — parameters requested at start of tape or if new option is used in WBT command
        P — parameters requested for every file; default is S
    (15) — batch grouping parameter — 0 to 999; 0 means no labels between batches; default is 0

If any one of the optional parameters is to be entered, all the preceding parameters must be entered as the default value for every item. For numerical items, zeros have to be entered. Form AA5742 (figure 6-1) is helpful in entering this command.

System response   **Action**

-SV-   None
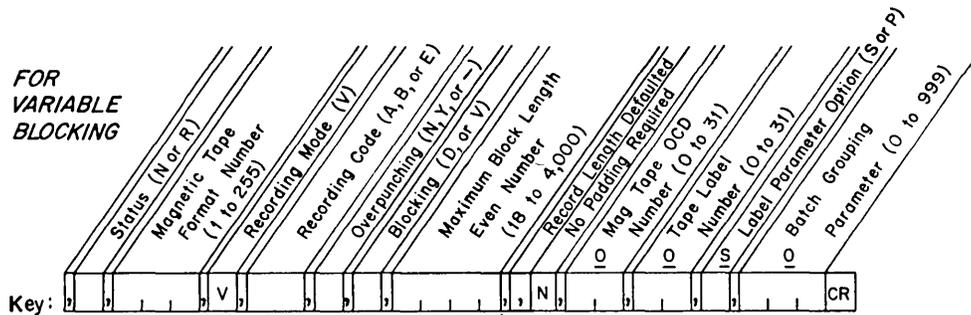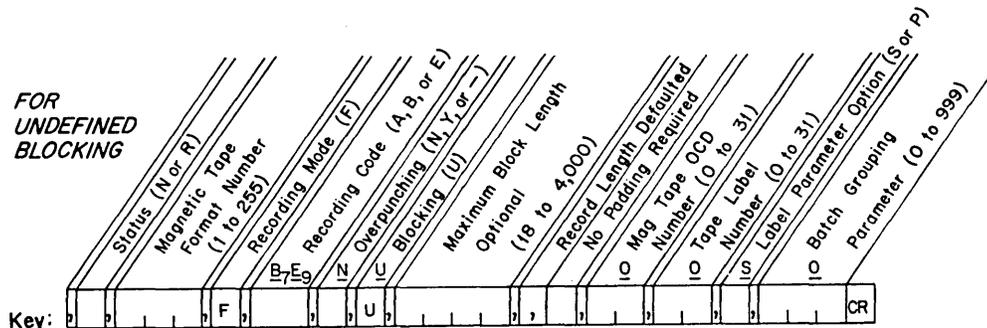
CYBERDATA™ Enter Magnetic Tape Format Specification

CONTROL DATA CORPORATION

1. Key: EMT

FOR FIXED BLOCKING
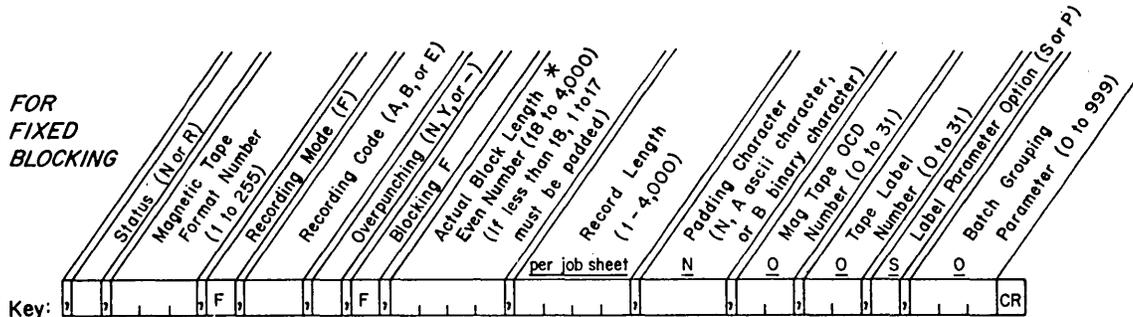
2. Key:

* Must be a whole number multiple of record length

OPTIONAL FROM HERE

FOR VARIABLE BLOCKING

3. Key:

OPTIONAL FROM HERE

FOR UNDEFINED BLOCKING

4. Key:

OPTIONAL FROM HERE

Prepared by _____   Date _____

Prepared by _____   Date _____

AA5742

Figure 6-1. Enter Magnetic Tape Format Specification

Freeze Batches (FRZ)

The command to freeze batches is:

FRZ,nn(1) [,nn(2)] [CR]

Where:

(1) — number of first key entry station
(2) — number of last key entry station

This command is used to freeze the active batches associated with one or more key entry stations. The relevant control information is also frozen. At the end of the freeze operation, the operator can continue to work on another batch. The frozen batch can be recalled by command THW.

Note that the stations being used in Supervisory mode or Idle mode are not affected by this command, and their numbers do not appear in the system response.

Examples of the applied use of the freeze batches command are:

1. FRZ,20,27 [CR]
2. FRZ,4 [CR]

In example 1, the active batches associated with key entry stations 20 through 27 are frozen. In example 2, the batch associated with key entry station 4 is frozen.

System responses	Action
1. FRZ DONE AT THESE STATIONS: nn(1),nn(2),-SV-	None
2. BATCH FROZEN (appears at appropriate stations)	None

Write Volume Header (HDR)

This command is as follows:

$$\text{HDR} \left[, \left\{ \begin{matrix} [aaaaaa(1)] \\ \underline{\text{system use}} \end{matrix} \right\} \left\{ \begin{matrix} ,nnnnn(2)] \\ \underline{0} \end{matrix} \right\} \right] \boxed{\text{CR}}$$

Where:

(1) — job name; if missing, this tape will be dedicated to system use; i.e., Dump
(2) — number of blocks to be skipped before writing the special CYBERDATA System label (0 to 32,767)

This command must be used to open tape volume. It writes a special CYBERDATA System label, which is checked by the write batches to tape (WBT) command. If this label is not found, the WBT command is rejected.

System response	Action
-SV-	Enter the next command (usually WBT or DMP).

Load Tape to Disk (LOD,J)

This command is used to transfer to disk either specified batches of a particular job which have been dumped on tape or to transfer all batches.

LOAD JOB BATCHES

To load job batches, the command is:

$$\text{LOD,J,aaaaaa(1)} \left[,nnn(2) \left[,nnn(3) \left[,nnn(4) \left\{ \begin{matrix} [,W][,C][,F] \\ \text{all} \end{matrix} \right\} \right] \right] \right] \boxed{\text{CR}}$$

Where:

(1) — job name
(2) — initial batch number; default value is 1
(3) — last batch number; default value is 999
(4) — initial magnetic tape file number; default value is 1
     (each batch is a file on the tape)
W — written batches
C — completed batches (but not written) or batches waiting to be verified
F — frozen batches

An example of the LOD command is:

LOD,J,PAYROL,123,789,77,C,F |CR|

In the example, all completed and frozen batches from 123 through 789 of job PAYROL, which have been recorded on tape (by command DMP) and deleted from disk, are transferred again to disk. The data transfer starts from tape file number 77.

System response	Action
(batch) nnn (job) aaaaaa STARTED -SV-	None

LOD,J

Load All Batches (LOD,J)

The procedure to load all batches is accomplished via the LOD command. This is as follows:

$$\text{LOD,J} \left\{ \begin{matrix} ,,\text{nnn}(1) \\ \underline{\text{all}} \end{matrix} \left\{ \begin{matrix} [,W][,C][,F] \\ \underline{\text{all}} \end{matrix} \right\} \right\} \boxed{\text{CR}}$$

Where:
W — written batches
C — completed batches (but not written) or batches waiting to be verified
F — frozen batches
(1) — initial magnetic tape file number (default value is 1)

An example of the LOD command is:

LOD,J,,123,C |CR|

In the example, all completed batches are transferred to disk, starting from file number 123.

System response	Action
(batch) nnn (job) aaaaaa STARTED -SV-	None

LOD,F

Formats Restore (LOD,F)

To restore (load) formats to disk, use the following command:

$$\text{LOD,F} \left[\begin{matrix} ,\text{nnnn}(1) \\ \underline{\text{all}} \end{matrix} \left[\begin{matrix} ,\text{nnnn}(2) \\ \text{last} \end{matrix} \right] \right] \boxed{\text{CR}}$$

Where:

F — formats load
(1) — first format to be loaded
(2) — last format to be loaded

If no format numbers are specified, all the formats on the tape will be loaded.

An example is:

    LOD,F,18 CR

In the example, formats from 18 and up will be loaded from tape to disk.

System response   **Action**

LAST FORMAT LOADED TO DISK xxxx   None
-SV-

Load Program/Own Code (LPR)

The command to load a program or an own code is:

1.   LPR,nnn(1), $\left\{ \begin{matrix} M \\ K \\ I \\ S \\ Q \end{matrix} \right\}$ CR

2.   LPR,nn(2),T, $\left\{ \begin{matrix} O \\ L \\ C \end{matrix} \right\}$ CR

Where:

    (1) — system function number (supplied by systems analyst) (own code #)
    (2) — program number to be loaded
    M — miscellaneous function
    K — key function
    I — interrogate function
    S — supervisor function
    T — tape function
    O — own code function –
    L — tape label
    C — code-conversion program

These commands are used by the system analyst to incorporate a new system function or own code in the CYBERDATA system library. To load a new function, the analyst assembles the program and puts it in the proper form in the scratch area of the disk using the standard COS procedure for absolutizing a program.

The second format is used to load magnetic tape programs.

Note that when an own code is to be incorporated, the system function number is associated with the own code number on the format specification sheet. Also, note that the magnetic tape format number, file labels, and volume labels are incorporated into the tape functions.

The LPR command can be applied as shwon in the following example:

    LPR,123,0 CR

System response   **Action**

-SV-   None

Message to Keystation Operation (MSG)

The central supervisor in supervisor mode can send a message to a specific keystation operator by entering:

    MSGnn, text CR

Where:

    nn — keystation number
    text — any message up to 40 characters in length

An example of this is as follows:

    MSG12, VERIFY JOB 17 NEXT $\boxed{\text{CR}}$

This example instructs the operator of keystation 12 to verify job 17 next.

Magnetic Tape Control (MTC)

MTC

This command is used to rewind, advance, and backspace tape, to write tape marks, and to select the recording density.

REWIND TAPE (MTC)

To rewind the tape, the magnetic tape control command is used in the following manner:

$$\text{MTC, } \begin{Bmatrix} \text{RW} \\ \text{RU} \end{Bmatrix} \boxed{\text{CR}}$$

Where:

    RW — rewind to beginning of tape
    RU — rewind and unload tape

An example of the MTC command is:
    MTC,RW   CR

In the example, the tape is rewound to the beginning of tape.

System response	Action
-SV-	Remove tape reel (if RU specified).

ADVANCE AND BACKSPACE TAPE AND WRITE TAPE MARKS (MTC)

The magnetic tape control command is used for advance and backspace tape as well as write tape marks as follows:

$$\text{MTC, } \begin{Bmatrix} \text{AR} \\ \text{BR} \\ \text{AF} \\ \text{BF} \\ \text{TM} \end{Bmatrix} \begin{Bmatrix} [,nnnn(1)] \\ \underline{1} \end{Bmatrix} \boxed{\text{CR}}$$

Where:

    AR — advance record
    BR — backspace record
    AF — advance file
    BF — backspace file
    TM — write tape mark
    (1) — number in range 1 to 4,095 which represents the number of records/files advanced or backspaced, or number of tape marks written. The default value of this option is 1.

An example would be:

    MTC,BR,12 $\boxed{\text{CR}}$

In the example, the tape is backspaced 12 records.

System response	Action
-SV-	None

SELECT RECORDING DENSITY (MTC)

The magnetic tape control command is used to select recording density as follows:

    MTC,DN,nnn(1) |CR|

Where:

    DN — density
    (1) — 800 or 1,600 bpi (556 is selectable only at the tape drive)

Seven-track tapes can use either 556 or 800 bpi. Nine-track tapes normally use 800 bpi, or with an optional phase-encoding controller, use 1,600 bpi.

An example of the use of MTC to select recording density is:

    MTC,DN,800 |CR|

In the example, a recording density of 800 bpi is selected.

System response	Action
-SV-	None

Print Batch Report (PBR)

To print a batch report, the PBR command is given in the following form:

$$PBR \left\{ \begin{array}{l} [,J,aaaaaa(1)] \\ [,O,nnn(2)] \\ all \end{array} \right\} \boxed{CR}$$

Where:

    (1) — job name
    (2) — operator number

This command prints a summary report on all batches in a particular job, all batches entered or verified by a particular operator or all batches completed in the system since the statistics file was started. The report consists of the job names, operator and batch numbers, start and elapsed times, number of records keyed, keying rate (hundreds of characters per hour), number of error corrections, and modes of operation of the key entry stations.

Example commands to print a batch report are:

1.   PBR,J,PAYROL |CR|

2.   PBR,O,111 |CR|

3.   PBR |CR|

In example 1, a report is printed for all the batches of job PAYROL. In example 2, a report is printed for all the batches entered by operator 111 only. In example 3, the report is printed for all jobs.

System response   **Action**

JOB	OPR	BCH	STRT	RNTM	RECDS	KPH	ERECS	MODE	
PAYROL	001	003	1671	0006	1	0	0	ENTR	None
PAYROL	001	004	1672	0007	1	0	0	ENTR	
PAYROL	001	101	1712	0009	7	3	0	ENTR	
PAYROL	001	102	1492	0006	30	21	0	VERI	
PAYROL	001	103	1493	0006	10	18	0	ENTR	
PAYROL	001	105	1674	0003	1	0	0	ENTR	
PAYROL	006	106	1671	0005	5	5	0	VERI	
PAYROL	001	229	1919	0037	20	8	0	ENTR	
PAYROL	001	223	1919	0037	20	8	0	ENTR	

-SV-

Where:

JOB	— job name
OPR	— operator number
BCH	— batch number
STRT	— start time
RNTM	— elapsed time (run time in minutes)
RECDS	— number of records keyed
KPM	— keying rate (characters per hour — in hundreds)
ERECS	— number of error corrections
MODE	— mode of operation

PBS

Print Batch Status (PBS)

To print the status of the batch, the command PBS is used as follows.

$$\text{PBS} \left\{ {[,\text{aaaaaa}(1)] \atop \underline{\text{all}}} \right\} \boxed{\text{CR}}$$

Where:

(1) — job name

This command is used to print the batch numbers, mode, verification options, error status of all batches, and the number of the disk which contains the linked batches in a specified job or of all batches in the system.

Examples of the PBS command are:

1.   PBS,PAYROL $\boxed{\text{CR}}$

2.   PBS $\boxed{\text{CR}}$

In example 1, the status of all the batches of job PAYROL is required. In example 2, the status of all batches is required.

System response   **Action**

JOB	BATCH	MODE	VER-OP	STATUS		DISK	Action
PAYROL	003	WRIT				1	None
PAYROL	004	WRIT		UB		1	
PAYROL	101	COMP		UB		1	
PAYROL	102	COMP				1	
PAYROL	103	COMP				1	
PAYROL	105	COMP				1	
PAYROL	106	COMP		UB		1	
PAYROL	124	EFRZ				1	
PAYROL	223	COMP		UB	ER	1	
PAYROL	229	COMP		UB	ER	1	
PAYROL	501	EFRZ				1	
PAYROL	503	VFRZ	FEU			1	
PAYROL	505	WAIT	FEU			1	
PAYROL	507	ENTR				1	
PAYROL	508	VERI	FEU			1	

-SV-

Where:

JOB	— job name
BATCH	— batch number
MODE	— batch status
	ENTR — batch being entered
	EFRZ — batch frozen in Entry mode
	WAIT — entry completed, waiting to be verified

```
VERI  — batch being verified
VFRZ  — batch frozen in Verify mode
COMP — batch completed
WRIT  — batch completed and transferred to tape
MAIN  — station used as supervisory console after WRIT entry
```
VER-OP — verification options
```
F — according to format
E — erroneous fields
U — fields of unbalanced batches
```
STATUS — error status
```
UB — unbalanced fields
ER — erroneous fields
```
DISK   — disk which contains the linked batches

Print Document (PDC)

PDC $\left\{ \begin{matrix} [,nnn(1)] \\ \underline{all} \end{matrix} \right\}$ |CR|

Where:

(1) — document number

This command is used to print out the description of a specified document or the numbers of all the documents in the system.

Examples of the PDC command are:

1.   PDC,111 |CR|

2.   PDC |CR|

In example 1, the parameters for document 111 are printed. In example 2, all the document numbers in the system are printed.

System response						**Action**
1.	FMT	RECS	FMT	RECS	FMT	RECS	None
	101	20	102	50	105	10	

					Action
2.	ACTIVE DOCUMENTS IN SYSTEM:				None
	109	115	127	224	229

		Action
3.	NO ACTIVE DOCUMENTS IN SYSTEM	None

Print User Programs (PPR)

To list data check own codes, key:

PPR,O |CR|

Where:

O — own code number

To list magnetic tape programs, key:

PPR,T, $\left\{ \begin{matrix} O \\ L \\ C \end{matrix} \right\}$ |CR|

Where:

O — magnetic tape own code
L — tape label
C — code conversion program

System response	Action
-SV-	None

Print Error Records (PER)

The print error records command is given as follows:

PER,aaaaaa(1),nnn(2)[,nnn(3)][,A] [CR]

Where:

(1) — job name
(2) — number of first batch
(3) — number of last batch
A — print all records of erroneous batches

This command is used to print either the erroneous records in one or more batches or all the records of specified erroneous batches. Records are printed in sequence on the standard key-to-disk system output unit, with three spaces between each field. Erroneous fields are preceded by a space and two question marks instead of the three spaces. Erroneous records are identified by the record sequence number and the format number printed on the previous line.

Examples of the PER command are:

1.   PER,PAYROL,111,113 [CR]

2.   PER,PAYROL,111,113,A [CR]

3.   PER,PAYROL,111 [CR]

In example 1, the erroneous records in batches 111 through 113 are printed. In example 2, all the records in erroneous batches 111 through 113 are printed. In example 3, the erroneous records of batch 111 are printed.

System responses	Action
1. BATCH 111	None
RECORD 1001 FORMAT 16	
??DICC STEVENS 18 STATION STREET	
RECORD 1002 FORMAT 16	
ARTHUR DAVIS ??83 ROCKEFELLER PLAZA	
2. NO ERRONEOUS RECORDS	None

Print Format (PFM)

The print format command is given in the following form:

PFM $\left\{ \begin{array}{c} [,nnnn(1)][,nnnn(2)] \\ \underline{all} \end{array} \right\}$ [CR]

Where:

(1) — number of first format
(2) — number of last format

This command is used to print out a single format or a series of formats. The command may also be used to print out all the format numbers in the system, together with an indication of whether each format is active or inactive.

Examples of the PFM command forms are:

1.   PFM,2027 [CR]

2.   PFM,2027,2030 [CR]

3.   PFM [CR]

In example 1, the parameters for format 2027 are printed. In example 2, the parameters for format 2027 through 2030 are printed. In example 3, all the format numbers in the system are printed.

System response   **Action**

```
FORMAT=1003 STATUS=A REC-LNG=20 FRV=N RESEQ=Y        None
NAME    T CH K R V A Z E RSQ F OC SP 1CF 2CF L
AUTSEQ N 4    V F N N N N 5                    N
CHD BY A 10   V F N N N N 4    N               N
MONTH  N 2    F F N N N N 1    N               J
 LIMITS          001+                  012+
DAY    N 2    F F N N N N 2    N               I
 LIMITS          001+                  031+
YEAR   N 2    F F N N N N 3    N               I
 LIMITS          073+                  073+
-SV-
```

Where:

    FORMAT — format number
    STATUS   — format status
           A — active
           I — inactive
    REC-LNG — record length
    FRV   — forced reverification
           Y — yes
           N — no
    RESEQ   — resequencing
           Y — yes
           N — no
    NAME   — field name
    T   — data type
           A — pure alphabetic
           L — lower shift
           U — upper shift
           N — pure numeric
           S — signed numeric
    CH   — field length
    K   — keying mode
           F — fixed
           X — fixed with boundary control
           V — variable
           B — variable with boundary control
    R   — recording mode
           F — fixed
           V — variable
    V   — verification type
           K — key
           S — sight
           N — no verification
    A   — automatic functions
           D — automatic duplication
           S — automatic skip
           R — right-zero fill
           L — left-blank fill
           N — no automatic functions

Z	— nonzero/nonblank test	
	Y — yes	
	N — no	
	B — fill blanks	
E	— automatic error flagging	
	Y — yes	
	N — no	
RSQ	— resequencing field number	
F	— fill character (N signifies no fill character)	
OC	— own code number	
SP	— special test number	
1CF	— first counter number and function	
	A — addition	
	S — subtraction	
2CF	— second counter number and function	
	A — addition	
	S — subtraction	
L	— limit check	
	I — inclusive	
	E — exclusive	
	N — no limit check	

When the format parameters are printed on a line printer, the limits appear on the same line as the other field specifications.

PFT

Print Format From Tape (PFT)

To list formats stored on tape, enter the command:

PFT $\left\{ \begin{array}{l} [,nnnn(1)] \, [,nnnn(2)] \\ \underline{all} \end{array} \right\}$ $\boxed{CR}$

Where:

(1) — number of first/only format
(2) — number of last format

This command is used to print out a single format or a series of formats from tape.

Examples of the PFT command are:

1. PFT,1420 $\boxed{CR}$

2. PFT,1420,1425 $\boxed{CR}$

3. PFT $\boxed{CR}$

In example 1, the parameters for format 1420 are printed. In example 2, the parameters for formats 1420 through 1425 are printed. In example 3, all the format numbers stored on the tape are printed.

System response   **Action**

FORMAT=1003 STATUS=A REC-LNG=20 FRV=N RESEQ=Y   None

NAME	T	CH	K	R	V	A	Z	E	RSQ	F	OC	SP	1CF	2CF	L
AUTSEQ	N	4		V	F	N	N	N	N	5					N
CHD BY	A	10		V	F	N	N	N	N	4	N				N
MONTH	N	2		F	F	N	N	N	N	1	N				I
LIMITS					001+									012+	
DAY	N	2		F	F	N	N	N	N	2	N				I
LIMITS					001+									031+	
YEAR	N	2		F	F	N	N	N	N	3	N				I
LIMITS					073+									073+	

-SV-

Where:

    FORMAT — format number
    STATUS — format status
                    A — active
                    I — inactive
    REC-LNG — record length
    FRV   — forced reverification
                    Y — yes
                    N — no
    RESEQ   — resequencing
                    Y — yes
                    N — no
    NAME   — field name
    T   — data type
                    A — pure alphabetic
                    L — lower shift
                    U — upper shift
                    N — pure numeric
                    S — signed numeric
    CH   — field length
    K   — keying mode
                    F — fixed
                    X — fixed with boundary control
                    V — variable
                    B — variable with boundary control
    R   — recording mode
                    F — fixed
                    V — variable
    V   — verification type
                    K — key
                    S — sight
                    N — no verification
    A   — automatic functions
                    D — automatic duplication
                    S — automatic skip
                    R — right-zero fill
                    L — left-blank fill
                    N — no automatic functions
    Z   — nonzero/nonblank test
                    Y — yes
                    N — no
                    B — fill blanks
    E   — automatic error flagging
                    Y — yes
                    N — no
    RSQ   — resequencing field number
    F   — fill character (N signifies no fill character)
    OC   — own code number
    SP   — special test number
    1CF   — first counter number and function
                    A — addition
                    S — subtraction
    2CF   — second counter number and function
                    A — addition
                    S — subtraction

L   — limit check
                    I — inclusive
                    E — exclusive
                    N — no limit check

When the format parameters are printed on a line printer, the limits appear on the same line as the other field specifications.

PJB

Print Job (PJB)

The print job command is as follows:

PJB $\left\{ \begin{array}{l} [,aaaaaa(1)] \\ \underline{all} \end{array} \right\}$ CR

Where:

(1) — job name

This command is used either to print all the job names in the system or all the parameters for a particular job.

Examples of the PJB command are:

1. PJB CR

2. PJB,PAYROL CR

In example 1, the names of all active jobs are printed. In example 2, all the parameters of job PAYROL are printed.

System responses	**Action**
1. 5 ACTIVE JOBS IN SYSTEM PAYROL BANK1 BANK2 INSUR1 INSUR2 -SV-	None
2. JOBNAME MTFN VER.OPT EOC MRL PAYROL 00 F 080 -SV-	None

Where:

MTFN   — magnetic tape format number
VER.OPT — verification type
                    F — according to format
                    E — erroneous fields
                    U — fields of unbalanced batches
                    N — not required
EOC   — end of batch own code number
MRL   — maximum record length for job

PMT

Print Magnetic Tape Format Specifications (PMT)

This command prints the magnetic tape format numbers used by the system and/or the parameters specified for each magnetic tape format.

PMT $\left\{ \begin{array}{l} ,nnn(1) [,nnn(2)] \\ \underline{list of all MT formats} \end{array} \right\}$ CR

Where:

(1) — first magnetic tape format
(2) — last magnetic tape format

System responses	Action
1. ACTIVE MAG. TAPE FORMATS IN SYSTEM 1 2 4 6 102 113 115 120 195	None
2. MTN RM RC O/P BM BLKL RECL PAD OCD LBL OPT BGF 4 V A Y F 400 80 N 1 S	None

See command EMT for description of these parameters.

Abbreviations table is as follows:

MTN — magnetic tape format number
RM   — recording mode
RC   — recording code
O/P   — overpunch option
BM   — blocking mode
BLKL — block length
RECL — record length
PAD   — padding character
OCD   — magnetic tape own code number
LBL   — file label program number
OPT   — label parameter option
BGF   — batch grouping factor

Print System Status (PSS)

A system status report is printed after the PSS command is entered.

PSS CR

This print out gives the percentage of memory available, the percentage of disk space used, and the number of active jobs in the system. The message also indicates whether the disk is active or inactive and whether it is selected or deselected.

System response	Action
59% FREE MEMORY	None
17% TIME-CONTROLLED MEMORY	
08% OF DISK 1 USED, DISK ACTIVE AND	
SELECTED	
009 ACTIVE JOBS IN SYSTEM	
-SV-	

Print Statistics Report (PST)

Complete operational records are maintained in a statistics file. In addition to the data input which may be reported on the supervisory console for each batch, the following information is recorded but not printed. This file may be written on magnetic tape and processed by the user in order to obtain additional statistical reports and error analyses.

The statistics report includes:

• Job name

• Batch number

• Operator number

• Mode of operation

• Start time

• Accumulated time

- Number of records
- Number of key strokes
- Number of verify corrections
- Number of erroneous records
- Date

These records are written to the statistics file (on the desk) at the end of batch (entry or verify) and after batch thaw with a different operator number. The DMP,S command writes unblocked, 80-character records, each record of which represents an entry on the statistics file. The statistics report can be printed from tape by using the PST (print statistics) command. The header layout on tape is given in table 6-4, and the record layout on tape is given in table 6-5.

Table 6-4. Header Layout on Tape

Word	Description
1 to 2	DMPS
3	Month (01 to 12)
4	Day (01 to 31)
5	File number (binary)
6 to 16	Undefined (binary zeros)

Table 6-5. Record Layout on Tape

Characters	Description
1 to 6	Job name
7 to 9*	Batch number
10 to 12*	Operator number
13 to 22	Batch start time (MMDDYYHHMM)
23 to 28	Batch duration (HHMMSS)
29 to 33*	Number of keystrokes
34	Mode (E or V)
35 to 37	Verification options (35—F 36—E 37—U)
38 to 39	Unbalanced batch indicator (UB or blank)
40 to 44*	Number of records
45 to 49*	Number of erroneous records
50 to 54*	Number of verify corrections
55 to 59	Number of verifiable records
60 to 80	Blank

*Numeric fields are right-adjusted and filled with zeros.

To print the statistics report, use the following command:

$$PST, \begin{Bmatrix} D \\ O \\ J \end{Bmatrix} \begin{bmatrix} \begin{Bmatrix} ,nnnnnn(1) \\ \underline{first\ date} \end{Bmatrix} \begin{Bmatrix} ,nnnnnn(2) \\ \underline{last\ date} \end{Bmatrix} \begin{Bmatrix} ,E \\ ,V \\ \underline{b} \end{Bmatrix} \end{bmatrix} \boxed{CR}$$

Where:

D — daily report
O — operator report
J — job report

(1) — start date (ddmmyy)
(2) — finish date (ddmmyy, must be later than start date)
E — Entry mode report
V — Verify mode report
b — both Entry and Verify mode

NOTE

Remember, a comma must not immediately precede a carriage return.

System response   **Action**

aaaa(1) CYBERDATA STATISTICS REPORT (nnnn(2)-nnnn(3))   None

bbbb(4)	KEYING TIME	NO.OF RECORDS	ERRONEOUS RECORDS	VERIFY CORRECT	KEYS/ HOUR	KEYS/ RECORD	KEY STROKES
yyyy(5)	xxxx.xx	xxxxxxxx	xxxxxxxx	xxxxxxx	xxxx	xxxx	xxxxx
...							
TOT.	xxxx.xx	xxxxxxxx	xxxxxxxx	xxxxxxxx	xxxx	xxxx	xxxxxxxx

Where:

(1) — ENT, VER, or spaces
(2) — "from" date
(3) — "to" date — not printed when D option is selected
(4) — DATE, OP NO., or NAME
(5) — date, operator number, or job name
x — numerical data or space

NOTE

Year is not printed

Print Terminal Status (PTS)

Terminal status is printed at the request of a PTS command:

PTS,nn(1) [,nn(2)] |CR|

Where:

(1) — first station number
(2) — last station number

This command is used to determine the status of one or more key entry stations. The system provides the following information for each station: type of display, type of keyboard, mode, job name, batch number, and whether or not it is locked.

The PTS command generates the status report after the command is given as shown in these examples:

1. PTS,11 |CR|

2. PTS,11,14 |CR|

In example 1, the status of key entry station 11 is required. In example 2, the status of key entry stations 11 through 14 is required.

System response   **Action**

TER	DSP	KB	MODE	JOB	BATCH	L	None
11	CRT	029	SUPER			L	
12	CRT	029	ENTRY	BANK	112	N	
13	SCN	029	VERIFY	INVENT	117	N	
14	SCN	029	IDLE			N	

-SV-

Where:

    TER   — station number

    DSP   — type of display: SCH (32
                 characters) or CRT (480 characters)

    KB   — type of keyboard
                 (029 keypunch configuration)

    MODE — super (supervisory console), Entry,
                 Verify, and Idle; in Read and
                 Interrogate modes, the mode in
                 which the batch was initiated
                 is displayed; that is, Entry or
                 Verify

    JOB   — job name

    BATCH — batch number

    L   — locked/unlocked: Y (yes - Station
                 turned off by command TOF); N
                 (no - Station not turned off)

SOF

Supervisor Off (SOF)

The supervisor off command is:

    SOF   CR

SOF is entered after the last command to release the system from supervisory control. To return to supervisory control, the supervisor enters command SP.

System response   **Action**

SV OFF   None

SX

Stop Command Execution (SX)

To stop the command execution, the following command are used:

    MI SX CR — Teletype

          CNCL — key entry station

SX is used to terminate the execution of the DMP, EFM, and WBT commands and all status and report commands; that is, PSS, PTS, PBS, PJB, PDC, PFM, PBR, PMT, and PER. It may be entered only at the Teletype. When the supervisor enters, for example, a print-batch-status command (PBS), it may not be necessary to obtain the entire printout and command SX can be used to terminate it before completion.

When a key entry station is functioning as a supervisory console, the cancel CNCL key is used to terminate the execution of a command.

System response   **Action**

FUNCTION TERMINATED   None

Thaw Batches (THW)

Batches are thawed via the THW command, which is used as follows:

THW,aaaaaa(1),nnn(2),nn(3) [,nnn(4)] CR

Where:

(1) — job name
(2) — batch number
(3) — number of station where work is to be resumed
(4) — operator number

This command recalls a frozen batch and makes it available at a designated key entry station. Note that the batch may be made available to any station, not necessarily the one where it was frozen. If no operator number is specified, the number already relating to the batch is assumed. If a different number is entered, a statistics record is written to the statistics file, and the following statistical counters are reinitialized:

1. Operator number

2. Start time of current run

3. Accumulated time

4. Number of times key is pressed

An example of THW command is:

THW,PAYROL,111,27 CR

In the example, batch 111 of job PAYROL is thawed and made available to key entry station 27.

System response	Action
-SV-	None

Turn Off Key Entry Station (TOF)

To turn off the key entry station, the following command is used:

TOF,nn(1), [,nn(2)] CR

Where:

(1) — number of first key entry station
(2) — number of last key entry station

This command is used to turn off one or more specified key entry stations. After the command has been entered, inputs from the station are ignored. To turn on the station again, the supervisor uses command TON.

Examples of the application of the TOF command are:

1. TOF,12 CR

2. TOF,12,15 CR

In example 1, key entry station 12 is turned off. In example 2, key entry stations 12 through 15 are turned off.

System response	Action
TOF DONE AT THESE STATIONS: nn(1),nn(2),-SV-	None

Turn On Key Entry Station (TON)

The command for turning of the key entry station is:

TON,nn(1) [,nn(2)] CR

Where:

(1) — number of first key entry station
(2) — number of last key entry station

This command is used to bring one or more specified key entry stations back into operation after they have been turned off by command TOF. Note that a TON command is required only after a TOF command.

Examples of the TON command are as follows:

1. TON,12 CR

2. TON,12,15 CR

In example 1, key entry station 12 is brought back into operation. In example 2, key entry stations 12 through 15 are brought back into operation.

System response	Action
TON DONE AT THESE STATIONS: nn(1),nn(2),-SV-	None

Tape Recovery (TRC)

To use the TRC command, enter:

TRC,nn(1) CR

Where:

(1) — recovery area number from last WBT message

This command is used to recover data on magnetic tape if a failure occurred while batches were being recorded.

System response	Action
TAPE RECOVERED, LAST BATCH RECORDED IS bbb -SV-	Continue to transfer batches to tape.

Test Remote Clusters (TST)

A diagnostic check of the transmission lines and remote keystations is initiated by keying:

TST,nn(1),n(2) CR

Where:

(1) — equipment number of the controller to be checked
(2) — number of stations in this cluster to be checked

System response	Action	Result
1. READY?	N CR	Request cancelled and -SV- returned
2. READY?	Y CR	Executes test three times before printing error log

3. READY?   C CR̲   Executes test 50 times
                                          before printing error
                                          log. To cancel this
                                          request enter M̲I̲ SX C̲R̲

Prior to initializing this command, the keystations to be checked must be set to Idle mode, and the remote site customer engineer must loop back the cluster. When the command is executed, the characters 01 through 7F (hexadecimal) are sent to the cluster and automatically returned (looped back) to the supervisor desk. On their return, they are checked for accuracy.

The following report is typed on the Teletype:

    S#   ERR   S#   ERR   . . .
    n(1) nnn(2) n(1) nnn(2) . . .

Where:

    (1) — the station number
    (2) — number of errors counted for this station

       Errors counted are:

       • Internal or external rejects

       • No response received in 10 interrupt cycles

       • Error flags on input data

       • Character received does not
         match the transmitted character

Write Batches to Tape (WBT)

To write batches to the tape, use the WBT command as follows:

WBT,aaaaaa(1) [,nnn(2) [,nnn(3) {[,UB=a(4)] / UB=N} {[,ER=a(4)] / ER=N} {[,WR=a(4) / WR=N}

{[,STOP] / all "as is"} {[,NEW] / cont old} {[,MTF=nnn(5)] / per job sheet} CR̲

Where:

  (1)   — job name
  (2)   — number of first batch to be transferred
  (3)   — number of last batch to be transferred
  UB   — unbalanced batches
  ER   — batches containing error-flagged fields
  WR   — batches already written
  (4)   — Y — only batches of type specified are included
          N — no batches of type specified are included (N is default value)
          B — batches are included regardless of type specified
  STOP — if operator is still working on one of the specified batches, or if it is uncompleted or
          does not meet one of the conditions, command execution terminates
  NEW — position the tape after last file trailer and open new file; if no labels are specified, a
          tape mark separates previously recorded data from batches about to be written
  MTF — magnetic tape format number
  (5)   — magnetic tape format number to be used for this command; specified if different
          from that defined for the job; if magnetic tape format number differs from the last
          used on this tape, a new file is started.

This command is used to transfer completed batches of data from disk to magnetic tape. All batches of data from a certain job may be transferred or only specified batches. The batches written on tape are not deleted from the disk. To delete the batches, command DBT must be used.

WBT

The use of the WBT command is shown via these examples:

1. WBT,DEPT10,3,7 |CR|
2. WBT,DEPT10,3,7,UB=Y,ER=Y |CR|
3. WBT,DEPT10,3,7,UB=Y,ER=Y,WR=B |CR|
4. WBT,DEPT10,,,STOP |CR|

In example 1, batches 3 through 7 of job DEPT10 which are balanced, without errors, and not written on tape are transferred.

In example 2, batches 3 through 7 of job DEPT10 which are unbalanced and erroneous are transferred to tape, except those that have already been transferred.

In example 3, batches 3 through 7 which are unbalanced and contain errors are transferred, irrespective of whether they are already written.

In example 4, batches 1 through 999 of job DEPT10 which are balanced, without errors, and not already transferred to tape are transferred. If an operator is still working on one of the batches or if it is frozen, execution of the command stops. This also occurs if one of the batches is unbalanced, erroneous, or already recorded on tape.

Note that command WBT cannot be used to write on a tape which has not been initialized by the command HDR. Subsequent labeling is handled by the system according to the label program defined in the magnetic tape format for the batches to be written.

System response	Action
1. WBT STARTED, RECOVERY AREA nn	None — start
2. (batch) bbb,FILE fff	None — current
3. TOTAL NUMBER OF BLOCKS nnnnn -SV-	None — end

Explanation to Supervisor (XPL)

The system provides the supervisor with a list of all commands available and the layout of each command.

To display a list of all commands and their mnemonics or the parameters for a specific command on the Teletype, enter:

$$\text{XPL} \begin{Bmatrix} \text{,aaa(1)} \\ \text{all} \end{Bmatrix} \boxed{\text{CR}}$$

Where:

(1) — three-letter command mnemonic

The following are examples of supervisor-entered commands:

Operator entered	System response
XPL |CR|	
	TON/TURN ON TERMINAL
	TOF/TURN OFF TERMINAL
	THW/THAW BATCHES
XPL,THW |CR|	THAW BATCHES
	THW, JOB NAME, BATCH, STATION, OPERATOR -SV-

GENERAL

The CYBERDATA System key entry station has three basic operating modes (Entry, Verify, and Read) and a mode for performing special functions (Interrogate).

Entry Mode

This mode is used when data is keyed in from the source forms. Validation tests are performed at this time according to specifications entered by the supervisor.

Verify Mode

The operator may be told to verify all or just part of the data that was keyed in Entry mode. The operator will also be told whether to use key verification or sight verification. In key verification, the data is keyed in on the source forms, and the system automatically compares the two keying operations. In sight verification, the operator visually compares the data keyed in during Entry mode, which is displayed on the key entry station, with the source forms.

Read Mode

This mode is used to locate, display, and change data which was entered previously.

Interrogate Mode

This mode is used when the operator wishes to perform special functions; for example, it is used when the operator wishes to start or end a batch, turn on a tutorial facility on the 970-480 Key Entry Station, or enter a total into a balance register.

DATA ENTRY

The following description is in terms of the 32-character key entry station. The 480-character key entry station is similar but also displays the job name and the numbers of the current batch and document and the number of records keyed.

After the batch start-up and document/format selection procedures for Entry mode have been completed, the mode position displays E (Entry mode). The format number position displays the format number of the first record, the data type position displays the type of data to be keyed into the first field to be keyed, a 01 is displayed in the field number position, the manual (M) position is blank, and a 001 is displayed in the column number position. If batch balancing is to be performed, the operator may set one or more counters to an initial value at this time, using the initialize counter interrogate function.

When the first character of the batch is entered, a 002 is displayed in the column number position and the character is shown in the data section of the display. As each character is entered, the column number position is incremented by one; and as each field is completed, the field number position is incremented by one. Data entered into an auto dup field in the first record is automatically copied in the corresponding field of subsequent records. Auto skip fields are automatically filled with zeros or spaces, depending on the field data type. The presence of an automatic field causes the column number position to be incremented by the maximum number of characters specified for that field on the format specification sheet. When automatic fields are adjacent to one another, the field number position is incremented in accordance with the number of such fields. The contents of the format and data type positions change in accordance with the document and format specifications.

When data under document control contains fewer than the specified number of records for a particular format, the operator presses the FORM key to advance to the next format of the document. When the data contains more records than specified, the format is automatically advanced. When the number of records specified on the document for this format has been entered, therefore, the operator presses the FORM key with the SHIFT key held down to return to the previous format and continue to enter the records. If the format is again advanced before the last record is keyed, the operator selects the original format once more. This procedure continues until the last record of the format has been entered. If the number of records entered since the format was last selected equals the number specified in the document, the next format is selected automatically. Otherwise, the operator presses the FORM key again to advance to the next format manually.

When new data is to be entered in a field specified as auto dup or auto skip, the operator presses the MLTL DUP/SKIP key at the beginning of the record. An M appears on the display, which indicates that the subsequent auto fields will be entered manually. The SKIP key or the sign key (+/-) for signed numeric (B) fields, therefore, must be used as the field boundary control key to enter variable keying fields regardless of the data type specified for the field. This, however, does not exclude use of the DUP key. The auto field will be entered manually until the MLTL DUP/SKIP key is pressed again (or by entering Read mode). When this occurs, the M disappears from the display and the original automatic functions are performed. In the case of an auto dup field, the last data keyed into it is copied in the corresponding field of all subsequent records of the format unless the MLTL DUP/SKIP key is used again.

When an incorrect character has been keyed in, the operator presses the BSC key and then enters the data correctly. If the incorrect character is at the beginning of the field, the operator presses the REP FLD key, and then rekeys the data. When there is an error in a previous field of a 970-480 station, either the DLT key is used to delete the current record or the BSF key is used to delete the previous field (one field at a time) and the field is rekeyed. Erroneous fields can be corrected in Read mode.

If a validation error occurs during data entry, an error is detected (unless automatic error flagging has been specified on the format specification sheet). When this occurs, the operator is alerted by a buzzer and further data entry is not accepted until the error is corrected. A two-character error code corresponding to the type of error that has been detected is shown on the display. This code may be expanded into a complete error message by pressing the DISP key.

When a validation error is detected, the operator may press the DISP key to see the entire error message. Then the RESET key is pressed to cancel the error, followed by the REP FLD key. The incorrect field is then rekeyed correctly. Alternatively, after the RESET key is pressed, the operator may override the validation error by means of the ERR OVR key and then continue to key in data. The incorrect record may be subsequently located through use of either the search feature, selective verification, Read mode, or by the print-error-records supervisory command.

At the end of the batch, the operator presses the INT key, followed by the letters EOB, and then presses the REL key. A batch balancing test is automatically performed and if no error occurs, a new batch may be entered or the present batch may be verified.

Echo Mode

The key station remains in Echo mode until a command is entered.

| INT | command | REL |

Roll-Over Keying

When a key is pressed while another key is held down, the CYBERDATA System accepts the character of the key which was first pressed, followed by the character of the key last released.

Error Indications

The CYBERDATA System provides a wide range of tests on data and parameters that are entered in the system. In the event of an error, a buzzer sounds and data entry is not accepted. In addition, a two-character error code is displayed corresponding to the type of error that has occurred. Table 7-2 gives a cross-reference between codes displayed and the error messages. The appropriate message may be displayed after an error by pressing the DISP key in Entry mode.

BATCH START-UP

Data cannot be entered or verified until the operator has entered the job name, the batch number, and her operator number. In Entry mode, the initial value for the autosequencing field of each record may be entered. If the desired initial value is 1, no value needs to be specified.

To perform batch start-up, the operator must press the INT key followed by ENT (Entry mode) or VER (Verify mode), as required. Then the job name (up to six characters), the batch number (up to three digits), and the operator number (up to three digits) must be keyed in. This may be followed in Entry mode by the initial value of the autosequencing number (up to four digits). Parameters are separated by a comma. Batch start-up is completed by pressing the REL key. Normally this procedure and others like it are given in standard notation.

1. Press │ INT │

2. ENT,aaaaaa(1),nnn(2),nnn(3)[,nnnn(4)]

    Where:

    (1) — job name
    (2) — batch number
    (3) — operator number
    (4) — autosequencing number; initial value

3. Press │ REL │

DOCUMENT CONTROL

A key station remains in a selected format for the number of records specified in the current document. It then automatically advances to the next format. When all formats that are included in the document have been used, the system returns to the first format.

DOCUMENT SELECTION

After performing batch start-up, the required document must be selected by the operator before data can be entered. When data that is not under document control is to be entered, the required format must be selected.

To select a document:

1. Press │ DOC │

2. Key: nnn(1)

    Where:

            (1) — document number

3. Press │ REL │

Error Recovery

If an incorrect document number is keyed in, but the REL key has not been pressed:

1. Press INTLK / REP FLD

2. Reenter the number

   Note that the BSC key can be used to make corrections digit-by-digit.

If the REL key had already been pressed, repeat the command.

If DOC is pressed erroneously:

1. Press INTLK / CNCL

2. Continue keying

FORMAT SELECTION

To select a format:

1. Press FORM SEL

2. Key: nnn(1)

   Where:

   (1) — format number

3. Press REL

To advance to the next format in a document:

1. Press FORM

To return to the previous format:

1. Press SHIFT / FORM

To return to document control after a format which is not in the current document has been selected:

1. Press RTRN

Error Recovery

If an incorrect format number has been keyed in, but the REL key has not been pressed,

1. Press INTLK / REP FLD

2. Repeat the command

   Note that the BSC key can be used to make corrections digit-by-digit.

If the REL key had already been pressed, repeat the command.

If FORM is pressed erroneously:

1. Press INTLK / CNCL

2. Continue keying

MULTILEVEL DUP/SKIP

To enter new data into an auto dup or auto skip field.

1. Before completing the preceding field, press INTLK / MLTL DUP/SKIP
    M appears on display.

2. Key in data.

3. To return to automatic mode, press INTLK / MLTL DUP/SKIP

The system automatically stops for the operator to key in new dup fields at the beginning of the
batch or whenever there is a change in formats.

ERROR CORRECTION IN ENTRY MODE

To display error message:

1. Do not press RESET

2. Press SHIFT and DISP on the CYBERDATA System 480-character key entry station.

    Information is displayed at bottom of CRT.

3. Press RESET to clear or see page 6-1 for list

Correcting One Character:

1. Press BSC

2. Key in the correct character

Correcting Current Field:

1. Press INTLK / REP FLD

2. Key in the field

Correcting a Previously Entered Field:

1. Press BSF

2. Key in the field

3. Continue keying in next field

Wrong Data Type Character Entered

When the wrong data type character has been entered, an A1 error code is given. This means there is
an alpha character in a numeric field or a number in an alpha field.

1. To clear error indicator, press RESET

2. Key correct character

This type of error cannot be overridden.

Validation Error (C Group)

1. To clear error indicator, press $\boxed{\text{RESET}}$

2. Press $\boxed{\text{INTLK}}$ / $\boxed{\text{REP FLD}}$ and rekey entire field
   or
   press $\boxed{\text{INTLK}}$ / $\boxed{\text{ERR OVR}}$

   Do this second step only if instructed to do so by the supervisor.

To Delete Current Record

1. Press $\boxed{\text{INTLK}}$ / $\boxed{\text{SHIFT}}$ / $\boxed{\text{DLT}}$

2. Rekey record

VERIFICATION

The extensive validation tests provided by the CYBERDATA System are normally sufficient to ensure that data entered is entirely error-free; however, it is conceivable that data may pass the validation tests and yet contain some errors. To ensure that only completely correct data is entered, verification may also be performed.

The CYBERDATA System permits selective verification. The options available to the user are as follows. Options 2, 3, and 4 may be specified in any combination (see job sheet).

1. No verification

2. Verification of fields specified on the format specification sheet

3. Verification of erroneous fields (error-flagged fields)

4. Verification of fields which are unbalanced at end of batch

Once a batch has been entered and stored temporarily on disk, and the batch start-up procedure for Verify mode has been performed, the data is ready to be recalled for the verification pass as specified on the job sheet.

Two types of verification are available: key verification and sight verification. When key verification is used, the data is rekeyed and the system compares it with the data originally entered. If a mismatch occurs, a buzzer warns the operator and corrective action must be taken before verification can continue. The action taken by the operator depends on whether the original Entry mode character is correct or whether the character keyed in Verify mode is correct. If the error occurred in Verify mode, the operator presses the RESET key and then keys in the correct characters. If the error occurred in Entry mode, the operator presses the RESET key, followed by the COR key, which causes the original Entry mode character to be replaced by the character entered in Verify mode.

In sight verification, the key entry station display shows the data keyed in Entry mode, and the operator compares this visually with the source form. When the field length is larger than the number of characters that can be shown, the operator uses the SPACE key to shift the next character into the display area. When the visual comparison has been completed, the operator advances to the next field specified to be verified by pressing the CONT key.

The determination of which fields are to be verified depends on the entries on the format specification sheet and the verification type(s) specified on the job sheet. Note that these may be modified by the supervisor through use of the change-batch-status command. The different verification possibilities are shown in table 7-1. At the end of the batch, the operator presses the INT key followed by the letters EOB and then presses the REL key, for example:

1. Option F is specified. Only specified fields are verified. Fields causing unbalanced batches and error flagged fields are not verified unless they were specified as such on the format specification sheet.

2. Options F and E are specified. If validation errors occur during Entry and are not corrected in this mode, the fields specified in the format specification sheet and erroneous fields are verified (see FE boxes and FE column). Note that if an erroneous field was specified in the format specification sheet, it would have been verified even if the E option had not been specified.

Table 7-1. Verification Possibilities

Status at End of Batch (Entry Mode) \ Verification Type*	N	F	U	E	UE	FU	FE	FEU
Batch Is Balanced and No Errors	N	F	N	N	N	F	F	F
Batch Is Balanced With Errors in It	N	F	N	E	E	F	FE	FE
Batch Is Unbalanced and No Errors	N	F	U	N	U	UF	F	FU
Batch Is Unbalanced With Errors in It	N	F	U	E	UE	UF	FE	FEU

* N - No verification
F - Verify fields as specified on the format specification sheet
U - Verify fields that affect unbalanced counters only
E - Verify erroneous fields only

Entering Verify Mode

To enter Verify mode:

1. Press ‎⎡INT⎤

2. Key VER,aaaaaa(1),nnn(2),nnn(3)

    Where:

    > (1) — job name
    > (2) — batch number
    > (3) — operator number

3. Press ⎡REL⎤

Key Verification

To key verify, the operator must rekey the original data.

Sight Verification

Sight verification is accomplished in the following manner:

1. Sight check the field

2. Press ⎡INTLK⎤ / ⎡SHIFT⎤ / ⎡CONT⎤

    This enables the operator to proceed to the next verifiable field.

If a field is longer than can be displayed on the 32-character key entry station, the space bar is used to display the remaining portion of the data.

ERROR CORRECTION

When a mismatch occurs during verification, the error tone sounds, and the error code A5 is displayed. To display the mismatch:

1. Press ⎡SHIFT⎤ / ⎡DISP⎤

System response	Action
MISMATCH CHARACTER y(z)	Select the correct entry.

Where:

> y — character keyed in during Verify mode
> z — character keyed in during Entry mode

If the z character is correct, rekey it and continue verification. If the y character is correct:

1. Press ⎡RESET⎤

2. Press ⎡COR⎤

FORCED REVERIFICATION

If forced reverification is specified, reverify the entire field.

To correct the current field:

1. Press ⬚RESET⬚

2. Press ⬚INTLK⬚ / ⬚REP FLD⬚

3. Rekey the field

4. Press ⬚COR⬚

If forced reverification is specified, reverify the corrected field before normal verification is continued.

READ MODE

Read mode may be used to locate, display, and change previously entered data. It is entered at the beginning of a field from Entry and anywhere in the field during Verify by pressing the READ key. The current position of the record is stored to enable the operator to return instantly to the original mode of operation by pressing the RTRN key. Error flagged fields are identified on the key entry station by two asterisks adjacent to the displayed field.

To insert a record in Read mode immediately before the one currently displayed, the operator presses the INS key, keys the record in, and presses the COR key. To cancel the insertion, the operator presses the DLT key.

To correct a keying error noticed in a previous field while entering data, the operator selects Read mode, backspaces to the erroneous field, presses the REP FLD key, rekeys the field and presses the COR key. Then the operator presses the RTRN key and continues to enter data from the point where Entry mode was interrupted.

Movement in Read mode may be either forward or backward, and in terms of a character, field, record, or document, for example:

Movement	Key Used Forward	Key Used Backward
Character	Space bar	BSC
Field	SKIP	BSF
Record	REL	BSR
Document	DOC	DOC

Read mode can only be entered at the beginning of a field during data entry but at any time during data verification.

Entering Read

1. Press ⬚SHIFT⬚ / ⬚READ⬚

Returning to Original Mode

1. Press ⬚RTRN⬚

Entry or verification continues from the position where Read mode was entered.

All error flagged fields will be displayed with ** (two asterisks) to the immediate left of the field.

POSITIONING BACKWARD

| BSC | — backspaces one character at a time in a record

| BSF | — backspaces one field at a time

| SHIFT | / | BOR | — backspaces to beginning of current record only

| BSR | — backspaces to corresponding field in the previous record; if both formats are the same; otherwise, backspaces to beginning of the previous record

| SHIFT | / | DOC | — backspaces to the first record of the current document (if not at column 1 of the first format of current document) or to the first record of the previous document (if at beginning of current document)

POSITIONING FORWARD

| SPACE | — advances one character at a time

| SKIP | — advances one field at a time

| REL | — advances to corresponding field in next record or to column 1 of next record if the format is different

| DOC | — advances to first record of next document

Error Correction

To change a previous field in Read mode:

1. Press | SHIFT | / | READ |

2. Press | BSF | until reaching the beginning of the field to be changed

3. Press | INTLK | / | REP FLD |

4. Key in field

5. Press | SKIP | if the field is not filled

6. Press | COR |

    This is done if Read mode has been entered from data Verify mode. If forced reverification is specified, field should be reverified.

7. Press | RTRN |

    This returns to original mode of operation.

INSERT RECORD

Column 1 of the record that follows inserted record(s) must be displayed.

1. Press INTLK / INS

    If a format different from the one following the record to be inserted is being used:

    a. Press FORM SEL

    b. Key format number

    c. Press REL

2. If Read mode has been entered from Verify mode, key in the record. Verify each field immediately after keying (if specified by forced reverification).

3. Press COR

If records are being inserted when autosequencing is being used, all inserted records have an auto-sequence number of 9999.

DELETE RECORD

1. Press INTLK / SHIFT / DLT at beginning of field

2. Press COR

Error Recovery

To cancel delete record function:

1. Press INTLK / CNCL before pressing COR

Do not go into Read mode to delete the current record. Delete it in data Entry or data Verify modes.

INTERROGATE MODE

Interrogate mode is used to perform the following functions:

- Entry or Verify mode select
- Freeze/thaw batches
- Search
- Continue search
- Display status
- End of batch
- Display counter
- Initialize counter
- Display error message/message from console supervisor
- Display record
- Turn on/off tutorial facility
- Sign-on as supervisor
- Regenerate display
- Function explanation

Operator

Commands

and Data

Entry

The following are general procedures for Interrogate mode.

1. In order to select Interrogate mode, the operator must press the INT key.

2. To complete an Interrogate mode entry, the operator must press the REL key.

3. Interrogate functions may comprise several items of information in which case each item, except for the last, must be followed by a comma.

4. In the descriptions of the interrogate functions which follow, the designation n signifies a numeric variable item, capital letters signify constant alphabetic items, and numeric digits signify constant numeric items. When items are enclosed in braces, one of the items must be selected.

5. If a function consists of more than one item of a particular type, each item of that type is followed by a digit, enclosed within parentheses, to indicate the order in which the item appears.

AID

Turn On/Off Tutorial Facility (AID)

To turn the tutorial facility on and off, the following function is used:

| INT | AID | REL |

The tutorial facility causes the main features of the current field to be displayed on the bottom line of the 970-480 station. The tutorial function may be selected in either Entry or Verify mode. To terminate the function, the operator rekeys:

| INT | AID | REL |

The information displayed on the bottom line of the key entry station is as follows:

aaa(1) FIELD aaaaaa(2) WITH nn(3) aaa(4) aaa(5) CHARACTERS

Where:

(1) — mode of operation:
    KEY — Entry or key Verify mode
    CHK — sight Verify mode
(2) — field name (or number, if no name assigned)
(3) — number of characters in field
(4) — keying mode:
    FIX — fixed
    VAR — variable
(5) — data type:
    NUM — numeric (0 through 9)
    SNU — signed numeric (0 through 9 and sign)
    ALP — alphabetic (A to Z and space)
    UPP — upper shift
    LOW — lower shift

Note that key verification can be distinguished from sight verification because the data section of the display remains blank until a character is keyed.

Display Error Message (DER)

The display error message is:

| INT | DER,an(1) | REL |

This function is used by the operator to display the error message associated with a particular two-character error code (table 7-2), for example:

(1) — two-digit error code

Table 7-2. Error Codes

Code	Message
A1	Data type error x
A2	Sign missing
A3	Invalid character x
A4	Invalid function key
A5	Mismatch character y (z)
B1	Beginning of data
B2	End of data
C1	Limit error
C3	Special test error
C3	Check digit error
C4	Own code test error
C5	Nonzero error
C6	Balancing error
D1	Invalid operator number
D2	Invalid format number
D3	Invalid document number
D4	Invalid job name
D5	Invalid batch number
D6	Invalid auto sequence count
E1	Invalid request
E2	Invalid parameter
F1	Format number in document error
F2	Own code not on disk
F3	Disk full
F4	Memory full (try again)
F5	Function busy (try again)
F6	Disk deselected
F7	Batch full
LL	System lock (wait)
PP	Parity error
**	Field with error flag
SM	Message from supervisor

Note that x equals incorrect character, y equals character entered in Verify mode, and z equals character entered in Entry mode.

Display Console Supervisor Message (DER)

A 970-480 Key Entry Station is notified of a pending message from the console supervisor in a variety of ways, depending on the mode of the 970-480.

- In IDLE mode:

1. The screen is cleared.

2. The error alarm sounds.

3. The first 10 characters of the message are displayed.

- In SUP mode:
  (Not in MSG mode)

1. The error alarm sounds.

2. The first 10 characters of the message are displayed.

- In ENTRY, VERIFY or READ mode:

1. The error alarm sounds.

2. SM is displayed.

If the 970-480 operator wishes to see the messages sent, enter:

DER, SM [REL]

The screen is cleared and the last eight messages (40 characters each) are displayed.

To again enter data:

1. Press [RESET] or [CNCL]

Note

Each message can be displayed only once.

DRL

Display Record (DRL)

The following function is used to display a record:

[INT] DRC [REL]

This function is used by the operator of a 970-480 station to display consecutive fields of data on the same CRT line. The field numbers are omitted. When a complete record cannot be displayed on a single line, it is continued on the next line. Each record begins on a new line.

To display the next record, the operator presses the CONT key. The function may be selected in Read mode only.

DST

Display Status (DST)

Status display is accomplished via the following function:

[INT] DST [REL]

This function is used by the operator of the 32-character key entry station to display batch status information not otherwise displayed, for example, the document and record numbers.

End of Batch (EOB)

The end-of-batch function is:

| INT | EOB | REL |

This function is used by the operator to end a batch. Batch balance tests and end-of-batch own code tests are performed at this time by the system.

To recover from an EOB error:

1. Press | INTLK | / | ERR OVR |

This is done for each out-of-balance accumulator.

Operator Freeze (FRZ)

The operator freeze function is used to suspend the batch on the terminal.

The command format is:

| INT | FRZ | REL |

The batch is frozen, the message BATCH FROZEN appears on the screen, and the key station reverts to the Idle mode.

The command is valid whenever the INT key is valid except for the idle state.

Message to Supervisor (MSG)

To initiate a message to the supervisor (970-480 or Teletype only):

1. | INT | SUP | REL | or | CR | (If not in SUP mode)

2. | INT | MSG | REL | or | CR |

When the supervisor console is not in SUP mode, MSGnn is printed or displayed. The supervisor responds by keeping MSGnn followed by an acknowledging message. Following this permission to proceed, key in the message. Each message must be terminated by | REL | (970-480) or | CR | (Teletype).

To terminate a conversation:

1. END | REL | or | CR |

To abort a conversation:

1. | CNCL | by the operator

      or
2. | MI | SX by the supervisor.

Regenerate Display (REG)

The regenerate display function appears as follows:

| INT | REG | REL |

This function is used by the operator to regenerate the last situation on the display if the key entry station has been turned off or disconnected. If the key entry station is accidentally turned off or disconnected, the display panel remains blank after it has been restored to normal operation.

Search for Record Containing Specific Content (SDM)

The operator uses this function as follows:

$$\boxed{INT}\ SDM, \begin{Bmatrix} F \\ B \\ S \end{Bmatrix}, \left\{ \begin{matrix} nnnn(1),Fn(2) \\ \begin{Bmatrix} nnnn(1) \\ \underline{all} \end{Bmatrix},Cn(3) \end{matrix} \right\}, nnnnnnnnnn(4)\ \boxed{REL}$$

Where:

F — forward
B — backward
S — from start of batch
(1) — format number used in Entry mode
(2) — field number
(3) — column number
(4) — identifier

This function is used by the operator to locate and display a record containing a single unique identifier.

Note the following items:

1. When Fn is specified, nnnn(1) must be specified.

2. If Fn is a numeric field, the identifier is compared with the nth field in the record; otherwise, comparison starts from left to right until the end of the identifier.

3. When one of the characters of the identifier is a comma, two commas must be specified.

Search for Record Containing Two Specific Contents (SDM)

This function is set up in the following form:

$$\boxed{INT}\ SDM, \begin{Bmatrix} F \\ B \\ S \end{Bmatrix}, \left\{ \begin{matrix} nnnn(1),Fnnn(2),nnnnnnnnnn(4) \begin{Bmatrix} Cnnnn(6),nnnnnnnnnn(7) \\ Fnn(5),nnnnnnnnnn(7) \end{Bmatrix} \\ \begin{Bmatrix} nnnn(1) \\ \underline{all} \end{Bmatrix},Cnnnn(3),nnnnnnnnnn(4),Cnnnn(6),nnnnnnnnnn(7) \end{matrix} \right\}\ \boxed{REL}$$

Where:

F — forward
B — backward
S — from start of batch
(1) — format number used in Entry
(2) — field number of first identifier
(3) — column number of first identifier
(4) — first identifier (10 characters maximum)
(5) — field number of second identifier
(6) — column number of second identifier
(7) — second identifier (10 characters maximum)

This function is used by the operator to locate and display a record containing two unique identifiers.

Search for Erroneous Record (SER)

To search for an erroneous record, the operator uses:

$$\boxed{INT}\ SER, \begin{Bmatrix} F \\ B \\ S \end{Bmatrix}\ \boxed{REL}$$

Where:

F — forward
B — backward
S — from start of batch

Search for Specified Field or Column in Erroneous Record (SER)

This function is used in the following form:

$$\boxed{\text{INT}} \quad \text{SER,} \begin{Bmatrix} F \\ B \\ S \end{Bmatrix}, \begin{Bmatrix} \text{Fnnnn(1)} \\ \text{Cnnnn(2)} \end{Bmatrix} \quad \boxed{\text{REL}}$$

Where:

F — forward
B — backward
S — from start of batch
(1) — field number
(2) — column number

This function is used by the operator to locate and display a specified field or column in an error-flagged record.

Initialize Counter (SET)

To initialize a counter, the operator keys:

$$\boxed{\text{INT}} \quad \text{SET,n(1),n(2)} \quad \boxed{\text{REL}}$$

Where:

(1) — counter number
(2) — initial counter value

This function is used by the operator to set a counter from zero to a specific value at the beginning of a batch.

To Sign Off as a Supervisor (SOF)

To terminate a supervisory command entry:

1.   Press $\boxed{\text{INTLK}}$ / $\boxed{\text{CNCL}}$ for the following commands:

DMP   PJB
EFM   PDC
WBT   PFM
PTS   PBR
PBS

To display the continuation of a report when the CRT screen is full:

1.   Press $\boxed{\text{INTLK}}$ / $\boxed{\text{SHIFT}}$ / $\boxed{\text{CONT}}$

To return to Idle mode, the operator keys:

$$\boxed{\text{SOF}}$$

The system response is:

$$\boxed{\text{SV OFF}}$$

SON

SRN

SRN

Continue Search (SON)

A special function is used to continue a search process. It appears as follows:

$\boxed{\text{INT}}$ SON $\boxed{\text{REL}}$

Search enables a record of a particular type to be located and displayed. Continue search enables a subsequent record of the same type (record number, content, or error flag) to be located and displayed by repeating the last search command from the record currently displayed. When a continue search function is performed after a SDM function, the search begins from the next record. After the last record which complies with the search specification has been located, the next continue search function locates the last record of the batch.

Search for Record n (SRN)

Records may be sought by record number, content, or error flag (validation error). The function may be selected in Read mode only.

The operator uses the search for record n function as follows:

$\boxed{\text{INT}}$ SRN, $\left\{ \begin{matrix} F \\ B \\ S \end{matrix} \right\}$,n(1) $\boxed{\text{REL}}$

Where:

    F — forward
    B — backward
    S — from start of batch
    (1) — record number

This function is used by the operator to locate and display the beginning of a specified record.

Search for Specified Field or Column in Record n (SRN)

To search for a specified field or column in a specified record, the operator uses:

$\boxed{\text{INT}}$ SRN, $\left\{ \begin{matrix} F \\ B \\ S \end{matrix} \right\}$,n(1) $\left[\begin{matrix} ,Fn(2) \\ ,Cn(3) \end{matrix} \right]$ $\boxed{\text{REL}}$

Where:

    F — forward
    B — backward
    S — from start of batch
    (1) — record number
    (2) — field number
    (3) — column number

This function is used by the operator to locate and display a specified field or column in a specified record.

Sign-On as Supervisor (SUP)

Signing on as supervisor is done as follows:

|INT| SUP |REL|

This function is used by the operator to enable supervisory commands to be entered through the key entry station. Every operator of a 970-480 station has access to a limited number of supervisory commands which may be used without reference to the supervisor. In addition, the supervisor can authorize the use of a more extensive range of commands. The operator of a 970-32 station may enter supervisory commands only after prior authorization. The commands that may be performed by each type of key entry station, with and without authorization, are given in table 6-2.

A key entry station may be signed on as a supervisor from Idel mode only. When a key entry station is signed on, -SV- is shown on its display.

Operator Thaw (THW)

The operator thaw function recalls a previously frozen batch. It can be entered only when the key-station is in the idle state.

The command format is:

|INT| THW,aaaaaa(1),nnn(2),nnn(3) |REL|

Where:

   (1) — job name, up to six alphanumeric characters
   (2) — batch number (1 to 999)
   (3) — operator number (1 to 999)

The operator number must be identical to that assigned to the frozen batch for the batch to be thawed to the requesting terminal. Table 7-2 gives a cross-reference between error codes displayed and the messages.

Display Counter (TOT)

This function appears in the following form:

|INT| TOT,n(1) |REL|

Where:

   (1) — counter number

This function is used by the operator to display the contents of one of the seven counters provided for batch balancing.

Explanation to Operator (XPL)

To display the layout of an interrogate function on a 970-480 Key Entry Station, enter:

   XPL,aaa(1) |REL|

Where:

   (1) — a three-letter interrogate mnemonic

An example entered from the 970-480 is:

Operator entered

XPL,VER |REL|

System response

VER,JOB,BATCH,OPERATOR

APPENDIXES

SYSTEM CAPACITY

System capacity remains as specified by the following items unless modified during installation.

Jobs per system	255 maximum
Batches per job	999 maximum
Documents per system	255 maximum
Formats per system	8,000 maximum
Fields per record	127 maximum
Characters per record	1,000 maximum
Characters per field	99 maximum*
Balance registers per field	2 maximum
Balance registers per batch	7 maximum
Digits per balance register	15 maximum, plus sign
Batches per system	Depends on disk type and number of drives
Formats per document	Unrestricted
Records per format group	Unrestricted
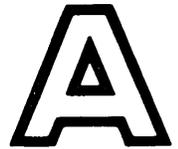
MODES OF OPERATION

Operation modes are itemized as follows.

Entry Mode

On-line data entry
On-line validation
On-line error detection and correction
On-line error flagging

Verify Mode

Selective key verification by field
Selective sight verification by field

Conditional verification by:
   Format
   Unbalanced batch
   Erroneous fields in batch

Correction and revalidation
Forced reverification

Read Mode

Data movement backward and forward by increments of:
   Character
   Field
   Record
   Document

Redisplay
Insert
Delete
Modify and replace

---

*This includes the sign in a signed numeric field.

Interrogate Mode

Batch startup
Record search by:
   Record number
   Data content
   Error flag

Display status
Display counters
Display error message/message from console supervisor
Terminate batch
Display record
Initialize counter
Tutorial feature
Multisupervisor mode
Freeze batch
Thaw batch
Regenerate display
Explain interrogate function parameters

DATA FORMATS

The data formats consist of the following items:

Variable input/output
Fixed input/output
Variable input/fixed output
Fixed input/variable output
Free form

AUTOMATIC FUNCTIONS

The automatic functions are:

Automatic duplication*
Automatic skip to end of field
Automatic skip to end of record
Automatic left zero fill
Automatic right zero fill
Automatic right blank (space) fill
Automatic left blank (space) fill
Automatic counter operation
Automatic record sequencing

FIELD DATA TYPES

Field data consists of the following types of characters:

Lower shift
Upper shift
Pure numeric
Signed numeric
Pure alphabetic

---

*The CYBERDATA System allows manual modification of auto dup field.

VALIDATION TESTS

The following tests are applied for validation purposes:

Maximum record size
Maximum number of fields
Data type
Nonzero
Nonblank (space)
Range (inclusive and exclusive)
Field comparison
Check digit
Balance field
Special customer validation tests
   Up to 99 in memory
   Up to 127 on disk

SYSTEM OUTPUT

The output for the system is:

Thirty-two different magnetic tape layouts
Tape labels (standard or user defined)
   File header and trailer
   Volume header and trailer

Maximum block size of 4,000 characters
Record editing
Code conversion
Record sequencing
Field resequencing
Variable/fixed recording
Supervisor monitoring of writing on tape
Tape recovery after power-fail
Tape positioning
Selectable output device

KEY ENTRY STATION KEYBOARD FUNCTIONS

The keyboard functions for the key entry station are:

Read
Interrogate
Return to basic mode
Correct
Display error
Error override
Insert
Delete
Backspace character
Backspace field
Backspace record
Backspace to beginning of record
Backspace document
Advance character
Advance field
Advance record
Advance document
Skip to end-of-record
Multilevel dup/skip
End of subbatch
Format select
Format advance
Format back
Manual dup
Manual skip
Replace field
Reset error
Document select
Return to document
Continue
Cancel

SUPERVISOR COMMANDS

The supervisor directs the system via the following commands:

VL	— Reactivate system
VX	— Deactivate Key-to-Disk System
CDS	— Change disk status
TON	— Turn on key entry station
TOF	— Turn off key entry station
ESH	— End of shift
SP/SUP	— Call supervisor
SOF	— Supervisor off
CIO	— Change input/output units
SX	— Stop command execution
HDR	— Write volume header
WBT	— Write batches to tape
DBT	— Delete batches from disk
MTC	— Enter Magnetic tape control
DMP	— Dump disk to tape
LOD	— Load tape to disk
EJB	— Enter job
DJB	— Delete job
EDC	— Enter document

DDC   — Delete document
EFM   — Enter format
CFS   — Change format status
LPR   — Load program/own code
ECD   — Enter check digit parameters
CBS   — Change batch status
FRZ   — Freeze batches
THW   — Thaw batches
PSS   — Print system status
PTS   — Print terminal status
PBS   — Print batch status
PJB   — Print job
PDC   — Print document
PFM   — Print format
PBR   — Print batch report
PER   — Print error records
PPR   — Print program (own code) numbers
DPR   — Delete program (own code)
DMT   — Delete mag tape
PFT   — Print formats from tape
CFM   — Copy formats
XPL   — Explain supervisor functions
MSG   — Send message
TST   — Test remote equipment
EMT   — Enter magnetic tape format specifications
PMT   — Print magnetic tape format specifications
PST   — Print statistics
TRC   — Tape recovery

SYSTEM MESSAGES

The types of system messages are as follows:

Responses
Error
Warning

SYSTEM REPORTS

The reports which can be attained from the system are:

Job name list
Job description
Batch status (system and job)
System status
Key entry station status
Document number list
Document description
Error records list
Format description
Format number list
Batch reports (system, job, and operator)
Own code numbers
Format numbers and descriptions saved on tape

STATISTICS DATA

Data to be accumulated for general statistics is as follows:

Job name
Batch number and status
Operator number
Start time
Mode of operation
Elapsed time
Number of keystrokes
Number of verifiable records
Number of verify corrections
Number of erroneous records
Number of records

SPECIAL TESTS—OWN CODE

User written routines
Allows individual adaptability for special requirements.
Accessible to all jobs
Special tests memory resident: 99

The CYBERDATA System is run under CYBERDATA Operating System (COS). It operates in foreground (protected area) and, therefore, allows other processing to take place simultaneously in the background (unprotected area). The most common background application is device-to-device transfer, for example, tape-to-print, card-to-tape, etc. If sufficient mainframe memory is provided, program compilation and other tasks may also be performed at the same time as CYBERDATA. COS provides an extensive library of programs to perform these functions. For further information, refer to the CDC® CYBERDATA™ COS Reference Manual.

B

**Foreground/
Background
Operation**

READY 615-73/93 TAPE DRIVE

Readying the 615-73/93 magnetic tape drives requires three steps: power-up, tape loading, and status check.

Power-Up

Power is applied to the drive by pressing the red POWER switch/indicator on the front of the drive.

Tape Loading

The 615-73 and 615-93 Tape Drives have an autoload feature for easy tape loading.

1. Open the tape drive door and pull the reel lock knob on drive hub to ensure that it is in the release position.

2. Check the reel cover release pin to ensure that it is at the upper left position of the semicircle track. If it is not in position, move it manually.

3. Place reel on the hub so that reel alignment blocks fit into detents on the drive. Note that the magnetic tape reel should be carried by gripping the center and outside edges rather than by squeezing the sides together. Squeezing can damage the tape and cause loss of data.

4. Apply pressure to inner edge of reel to seat it firmly against the drive hub; then press the reel lock knob in until the locking pins snap into place.

5. Close the door.

6. Press LOAD. If tape fails to load, retry after ensuring that the corners of the leading edge of the tape have been rounded off.

Status Check

A status check is completed as follows:

1. LOAD switch/indicator is lighted when the tape is at the load point.

2. The WR EN (write enable) indicator is lighted if the write ring is installed on the tape reel.

3. The ON LINE switch/indicator is lighted when the drive is controlled by the CYBERDATA System processor.

4. The POWER switch/indicator is lighted when the power is on.

5. The HI DEN indicator is lighted when 800 bpi is selected for seven-track tapes or 1,600 bpi is selected for nine-track tapes. Density selection is controlled by the MTC command.

Removing Tape Reel

A tape reel is removed by following these steps:

1. Press REWIND. If the tape is at load point, the tape is rewound onto the supply reel, the reel stops turning, and the protective seal closes around the reel. If the tape is not at load point it is necessary to press REWIND once to rewind the tape to the load point and rewind it a second time to unload it.

2. Open the door. If the door is opened prematurely, the drive will not have completed its rewind cycle before the door interlock switch cuts power to the unit. Tape removal should not be attempted until the reel's protective seal is in place.

3. Pull the tape reel lock on the drive hub to free the reel.

4. Gently remove the reel from the hub.

5. Press the POWER switch/indicator to remove power from the unit.

READY 616-72/92 TAPE DRIVES

Readying the 616-72/92 magnetic tape drives requires three steps: power-up, tape loading, and status check. Removal of the tape reel is discussed following the three steps.

Power-Up

To apply power:

1. Pull open the tape drive door.

2. Press the top of the rocker-action switch located on the right side of the tape deck between the drive and take-up reels.

Tape Loading

The 616-72/92 Tape Drives are manually loaded.

1. Pull open tape drive door and pull reel lock knob on drive hub to ensure that it is in the release position.

2. Place reel on the hub so that the reel is snug with the rim at the back of the drive hub. Note that the magnetic tape reel should be carried by gripping the center and outside edge rather than by squeezing the sides together. Squeezing can damage the tape and cause loss of data.

3. Apply pressure to the inner edge of reel to seat it firmly against the drive hub; then press the reel lock knob until the locking pins snap into place.

4. Thread the tape as per the diagram located on the back of the door. Wind three turns of tape onto the take-up reel.

5. Close the door.

6. Press LOAD/REWIND. The TAPE LOADED indicator will light.

7. When the EOT/BOT indicator lights, press READY.

Status Check

A tape loaded status check is completed as follows:

1. The TAPE LOADED indicator is lighted.

2. The EOT/BOT indicator is lighted.

3. The READY indicator is lighted.

4. If the tape does not have a write ring installed, the FILE PROTECTED indicator is lighted.

5. The POWER switch indicator is lighted.

Removing Tape Reel

A tape reel is removed by following these steps:

1. If the READY indicator is lighted, press CLEAR; otherwise, go to step 2.

2. Press UNLOAD.

3. Open the door.

4. Wind the loose end of the tape onto the drive reel.

5. Pull the tape reel lock on the drive hub to free the reel.

6. Gently remove the reel from the hub.

7. Press the bottom of the POWER switch/indicator to remove power from the unit.

8. Close the door.

DISK DRIVE OPERATION

Disk Cartridge Installation

Three steps are necessary to install a disk cartridge: drive preparation, cartridge preparation, and mating.

Drive Preparation

Disk drives are prepared as follows:

1. Apply power to the CYBERDATA System.

2. Pull out drive from the back of the supervisor DESC if it is a system disk or open the cover of a free-standing disk.

3. Ensure that the cartridge locking clamps on the drive are in the open position.

Cartridge Preparation

This procedure removes the protective bottom cover from the cartridge.

1. Place the cartridge in the palm of the left hand.

2. Slide the blue insert on the handle to the left.

3. Lift the handle. Steps 2 and 3 break the magnetic lock.

4. Lift the cartridge out of the bottom cover.

Mating

It is important that the following procedure is completed correctly.

1. Position the cartridge on the drive so the alignment blocks around the periphery and the centers of the drive match the recesses in the cartridge. Two of these blocks are visible through the window on the drive.

2. Lower the handle.

3. Turn the bottom cover over and place on the top of the cartridge.

4. Snap the cartridge locking clamps on the drive over the bottom cover.

Power-Up

Power is applied as follows:

1. Press START on the START/STOP switch. During the power-up cycle, the cartridge reaches its normal operating speed and the disk is cleaned. The position of the cleaning brushes is shown by the indicator sweeping over the top of the cartridge.

2. Ensure that the WRITE PROTECT switch is off (indicator not lighted).

3. Slide the drive back into DESC (or close the cover).

Disk Cartridge Removal

A cartridge disk is removed in the following manner:

1. Apply power to the CYBERDATA System if it is not already on.
2. Press STOP on the START/STOP switch if the indicator above it is lighted. The pack can be removed only when this indicator is not lighted.
3. Snap the cartridge locking clamps open.
4. Slide the blue insert on the handle to the left, and hold it until the handle is lifted.
5. Lift the handle.
6. Lift the cartridge out.
7. Place the cartridge in the bottom cover.
8. Lower the handle.

The cartridge handle can be raised for normal carrying as long as the insert is centered in its slide.

SYSTEM SAVE

A program called DTLP (disk, tape load program) is provided to:

1. Save the contents of the system disk by dumping the absolute image to magnetic tape.

2. Load a new disk with the CYBERDATA System software previously saved on a magnetic tape.

This **system save** operation should be performed immediately on installation and thereafter to provide:

1. Magnetic tape master file

2. Back-up system disk

Detailed instructions will be provided for the supervision with each installation. Reference material is contained in the CDC® COS Reference Manual.

OPERATING SYSTEM ERROR RECOVERY

The CYBERDATA operating system (COS) utilizes this standard error message format to describe all input/output device failures (an exception is the disk mass storage device).

    L,XX FAILED YY
    ACTION

Where:

    XX — logical unit number of the failing device
    04 — supervisor console device
    05 — card reader
    06 — magnetic tape unit 0
    07 — magnetic tape unit 1
    09 — magnetic printer
    YY — failure code

Failure codes are listed in the equipment malfunction code section of the CDC® COS Reference Manual.

Failure Examples

1. **L, 05 FAILED 06**
    ACTION

    This means the card reader is not reset.

2. **L, 06 FAILED 13**
    ACTION

    This indicates magnetic tape unit 0 is attempting a write on operation with no write ring.

3. **L, 09 FAILED 02**
    ACTION

    This message says the line printer is out of paper or has a paper tear, a fuse is blown, or an interlock is open.

RECOVERY

Failures examples of this type must be correctly diagnosed and the failure conditions must be removed. Recovery is then accomplished by typing RP   CR   at the supervisor console. If the message is repeated, the problem has not been properly corrected.

Disk Mass Memory Device Errors

Disk error messages generally appear in the following format:

MM ERR XX LU=08 T=XXXX:XX S=XXXX

    Error Code   Time   Hardware Status

Reference the equipment malfunction code section of the COS Reference Manual.

RECOVERY

Any disk error is usually fatal. The current recovery method is to:

1. Freeze all terminals

2. Attempt to dump (using DMP and/or WBT) all the data on the disk.

3. Load the system onto another disk pack.

4. Load the dumped batches.

If problems still appear, report the problem.

Disk Error Advisory

When a disk error occurs, the system will print:

MASS STG ERR nn LU uu

Where:

nn = type of error

uu = logical unit

and one or more of the following:

Message	Meaning
JOB jjjjjj, BATCH bbb FROZEN	The batch was frozen at the last checkpoint if the checkpoint was within 16 records of the last record entered or verified.
JOB jjjjj, BATCH bbb DELETED	The batch was deleted because less than 16 records were entered.
DISK ERROR IN SYSTEMS TABLE ERROR OCCURRED IN FORMAT ffff	Ther error was detected in a format
DISK ERROR IN SYSTEMS TABLE ERROR OCCURRED IN tttttttt TABLE	Ther error was detected in a table.
DISK n NOT READY	Disk n (n=1, 2, 3, 4) is either not turned on or non-existent. The batch is not frozen and no record of the track involved is kept.
DISK ERROR DURING RECOVERY	As indicated.
DISK ERROR DURING RECOVERY STATION nn LOCKED	Error due to a disk I/O performed for a station other than the primary supervisor; the station will be turned off (as if a TOF command had been performed).

The system logs all bad tracks and will not permit reuse of the tracks even though DBT or ESH, SQZ commands are given.

Except for the case when "STATION nn LOCKED" occurs, the station will be in idle mode after recovery.

In table F-1 codes are represented in hexadecimal.

Table F-1. Standard Codes for the CYBERDATA System

Symbol	ASCII Code	BCD Code	EBCDIC Code
SPACE	20	10	40
!	21	2A	5A
"	22	0F	7F
#	23	3F	7B
$	24	2B	5B
%	25	1D	6C
&	26	1D	50
' (apostrophe)	27	0C	7D
(	28	1C	4D
)	29	3C	5D
*	2A	2C	5C
+	2B	30	4E
, (comma)	2C	1B	6B
-	2D	20	60
.	2E	3B	4B
/	2F	11	61
0	30	0A	F0
1	31	01	F1
2	32	02	F2
3	33	03	F3
4	34	04	F4
5	35	05	F5
6	36	06	F6
7	37	07	F7
8	38	08	F8
9	39	09	F9
:	3A	0D	7A
;	3B	2E	5E
<	3C	3E	4C
=	3D	0B	7E
>	3E	0E	6E
?	3F	3A	6F
@	40	1F	7C
A	41	31	C1
B	42	32	C2
C	43	33	C3
D	44	34	C4
E	45	35	C5
F	46	36	C6
G	47	37	C7
H	48	38	C8
I	49	39	C9
J	4A	21	D1
K	4B	22	D2
L	4C	23	D3
M	4D	24	D4
N	4E	25	D5
O	4F	26	D6
P	50	27	D7

CYBERDATA
System
Standard Codes

Table F-1. Standard Codes for the CYBERDATA System

Symbol	ASCII Code	BCD Code	EBCDIC Code
Q	51	28	D8
R	52	29	D9
S	53	12	E2
T	54	13	E3
U	55	14	E4
V	56	15	E5
W	57	16	E6
X	58	17	E7
Y	59	18	E8
Z	5A	19	E9
[	5B	3D	C0
\	5C	1E	E0
]	5D	2D	D0
∧	5E	2F	5F
—	5F	1A	6D

System error messages are divided into two groups; those requiring a correct rekeying of the command and those requiring other action besides rekeying (table G-2).

The messages which require rekeying the command are as follows:

ALL FIELDS AUTO FIELDS
BATCH NOT FROZEN
BATCH STILL ACTIVE ON DESELECTED DISK
DUPLICATE FORMAT NO.
FIELD LENGTH ERROR
FIELD NAME TOO LONG
FORMAT STRING TOO LONG
INCOMPLETE COMMAND
INCOMPLETE LINE
INVALID BATCH NUMBER
INVALID BLOCKING PARAMETER
INVALID CHARACTER
INVALID CHECK DIGIT MODULUS
INVALID CHECK DIGIT TEST NO.
INVLAID CHECK DIGIT WEIGHT
INVALID COMMAND FORMAT
INVALID DEVICE OPTION
INVALID DOCUMENT NO.
INVALID FILE LABEL NO.
INVALID FORMAT NUMBER
INVALID FUNCTION NUMBER
INVALID FUNCTION TYPE
INVALID JOB NAME
INVALID LABELING PARAMETER
INVALID LOGICAL UNIT
INVALID MAG. TAPE FMT NO.
INVALID NO. OF RECORDS
INVALID OPERATOR NO.
INVALID OWN-CODE NO.
INVALID O-PUNCH PARAMETER
INVALID PADDING CHARACTER
INVALID PARAMETER
INVALID PROGRAM HEADER
INVALID RECORD LENGTH
INVALID RECORDING MODE
INVALID RECOVERY AREA NO.
INVALID SPECIAL TEST NO.
INVALID STATION NUMBER
INVALID STATUS OPTION
INVALID VAR RECORDING OPTION
INVALID VERIFICATION OPTION
JOB MAXIMUM RECORD LENGTH TO SHORT
PREVIOUS BATCH SKIPPED
RECORD LENGTH OVERFLOW
RESEQUENCE FIELD NO. ERROR
TOO MANY PARAMETERS xxxxxx
UNDEFINED FORMAT NUMBER
UNDEFINED JOB NAME

Table G-1. Error Messages Requiring Specific Operator Actions

Message	Action
ABT FULL	Delete the written batches, using command DBT
ALL INACTIVE FORMATS REMAIN	Reselect the disk
ANOTHER JOB RECORDED ON THIS TAPE TYPE CU/TR TO CONTINUE/ TERMINATE	As indicated
BATCH xxx ON DESELECTED DISK	Select proper disk
BLOCK TOO LONG FOR 7 TRACK TAPE	Change block length in magnetic tape format, and reenter the command
CHARACTER a ILLEGAL FOR FIELD nn	If a field description is incorrect, reenter the line correctly. To cancel the entire format, enter command SX.
CMD INVALID FROM THIS STATION	Check start-up procedure
DISK n DESELECTED	To dump the rejected batch, change the status of the disk to the selected status, using the command CDS; then reenter the command DMP. Select the disk by using the CDS command; then reenter command THW.
DISKS FULL	Make space available using command DBT; then reenter LOD. If the batches deleted from disk are to be retained in the system, perform command DMP before DBT.
DOC DIR FULL	Enter command DDC to delete unwanted documents from the system; then reenter command EDC.
DUPLICATE JOB NAME	Reenter the command using a job name not already in the system.
E1 (ILLEGAL REQUEST)	Check whether the station is in Idle mode and/or is permitted to be supervisor.
END OF DATA ERROR	End of data is reached before the number of blocks that were defined were skipped. Check if the correct tape and number of blocked were used.
END OF DATA ERROR	Either the number of the recovery area is incorrect, or the wrong tape has been mounted. Check and reenter command.
END OF TAPE	Mount a new tape; then reenter the command. Either the number of the recovery area is incorrect, or the wrong tape has been mounted. Check, and reenter command. None; action will be taken by the volume trailer portion of the label program.

Message	Action
END OF TAPE	Change the tape or number of blocks and reenter the command.
END OF TAPE-MOUNT NEW TAPE AND TYPE CU	This is as indicated.
ER	Reenter the command correctly.
FMTLNK TABLE FULL	Delete unwanted formats using CFS and ESH, SQZ; then reenter the command.
FORMAT LINK TABLE FULL	Refer to the systems analyst.
FORMAT nnnn INVALID FOR THIS BATCH	Delete the incorrect format, using the command CFS, execute the squeeze function, then enter the correct format using command EFM.
FORMAT nnnn NOT IN SYSTEM	Reenter the format, using command EFM.
FUNCTION BUSY	Command LOD is being performed by another supervisor; reenter the command when it has been executed.
FUNCTION TERMINATED	As indicated.
INPUT DEVICE ERROR	Reenter the command. If the message is repeated, report the problem. Note that when a 970-480 station is used, the command may be entered without authorization.
INVALID COUNTER NO.	If a field description is incorrect, reenter the line correctly. To cancel the entire format, enter command SX.
INVALID FORMAT NO.	Reenter format number(s) correctly. Note that formats must be written to tape in ascending order.
INVALID LIMITS	If a field description is incorrect, reenter the line correctly. To cancel the entire format, enter command SX.
INVALID MAG. TAPE OCD	The routines specified by the magnetic tape format have been deleted. Reload the required own code or label program by using LPR, or change the magnetic tape format number.
INVALID MTF NUMBER OR PARAMETER	Either the magnetic tape format number specified is invalid, in which case, reenter the command; or the recording code specified by the magnetic tape format is unsuitable for the tape being used. In this case, the magnetic tape format should be changed by using EMT, or writing should be performed on a different unit. BCD cannot be specified, for example, for a nine-track tape.

Table G-1. Error Messages Requiring Specific Operator Actions (cont)

Message	Action
INVALID TAPE LABEL NO.	The routines specified by the magnetic tape format have been deleted. Reload the required own code or label program by using LPR, or change the magnetic tape format number.
JOB aaaaaa NOT IN SYSTEM	Reenter the job, using command EJB.
LIMIT EXCEEDS MAXIMUM SIZE	If a field description is incorrect, reenter the line correctly. To cancel the entire format, enter command SX.
LONG RECORD	Adjust the magnetic tape format via the EMT command to accept longer records, or change to another magnetic tape format.
MAX. NO. OF JOBS EXCEEDED	Delete unwanted jobs using command DJB, then reenter command EJB.
MEMORY FULL-RETRY	This is as indicated.
NO FIELD TO COPY	Enter the specifications of this line manually.
PROGRAM LIB FULL	Refer to the systems analyst.
REQUEST DEVICE BUSY	Reenter the command when the device is not being used.
REQUESTED FORMATS NOT ON TAPE	Mount correct tape, then reenter the command.
REQUESTED JOB ACTIVE	Reenter the command correctly if an incorrect job name is entered. If the job name is correct, ensure that all batches still stored on disk can be deleted. Perform DBT, then enter command DJB.
RJ	No action is required. The CYBERDATA system is started.
STATISTICS FILE EMPTY	As indicated.
-SV- BUSY	No action is required. The key-to-disk system is already under supervisory control.
TAPE I/O ERROR	Check if the correct tape is being used and if it has a write ring. If everything seems to be in order, reenter the command, and report the problem.
	Check if tape is ON; if so, reenter the command using a different tape transport and report the problem.
TAPE RECOVERED, LAST RE-CORDED BATCH IS bbb	None

Table G-1. Error Messages Requiring Specific Operator Actions (cont)

Message	Action
TAPE RECOVERY AREA FULL	Release tape recovery areas by the TRC command or by the ESH command with SQZ parameter (either of these commands erases the tape recovery areas).
UNDEFINED MAG. TAPE FORMAT	Define the magnetic tape for job aaaaaa(1) by using the EMT command.
WRONG TAPE	Mount the correct tape; then reenter the command.
xxxJOB NAME REJECTED; DISK n DESELECTED	Select proper disk.
(batch) nnn (job) aaaaaa ALREADY IN SYSTEM	The message is self-explanatory.
(batch) nnn (job) aaaaaa REJECTED DISK n DESELECTED	To dump the rejected batch, change the status of using command CDS; then reenter the command DMP.
(batch) nnn (job) aaaaa REJECTED; BATCH IN MAIN-TENANCE MODE	The batch is being referred to by another supervisor; reenter DMP,D when the command entered by other supervisor has been executed.
(batch) nnn REJECTED, MODE = E / V / C / W / M UB = Y / N ER = Y / N	If STOP was specified, the WBT command will be terminated. Otherwise, writing of the next batch commences, and the rejected batch should be dealt with later. If the batches are to be written in a particular order, the whole tape may need to be rewritten.

Index

COMMENT SHEET

MANUAL TITLE _____ CDC® CYBERDATA™ System Reference Manual _____

PUBLICATION NO. ____22262200_____   REVISION _____C_____

FROM: NAME: _____

BUSINESS
ADDRESS: _____

COMMENTS:

This form is not intended to be used as an order blank.   Your evaluation of this manual will be welcomed by Control Data Corporation.   Any errors, suggested additions or deletions, or general comments may be made below.   Please include page number references and fill in publication revision level as shown by the last entry on the Record of Revision page at the front of the manual.   Customer engineers are urged to use the TAR.

STAPLE   STAPLE

FOLD — FOLD

```
┌─────────────────────────────┐
│      FIRST CLASS            │
│      PERMIT NO. 8241        │
│                             │
│      MINNEAPOLIS, MINN.     │
└─────────────────────────────┘
```

┌──┐
│   **BUSINESS REPLY MAIL**   │
│   NO POSTAGE STAMP NECESSARY IF MAILED IN U.S.A.   │
└──┘

POSTAGE WILL BE PAID BY

CONTROL DATA CORPORATION

Publications Department
Peripheral Subsystems Division
2200 Berkshire Lane
Plymouth, Minnesota 55441

FOLD — FOLD

CUT ALONG LINE