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IBM Systems Reference Library

IBM Teleprocessing Systems Summary

This manual contains brief introductory descriptions of IBM teleprocessing units and systems. It provides an overview of these products primarily for executive and supervisory personnel involved in the decision making and planning of data processing systems.

Publications providing detailed information on these devices are listed at the end of each device description. They are also listed in Systems Reference Library manuals *IBM Teleprocessing Bibliography*, GA24-3089, and *IBM System/360 Bibliography*, GA22-6822.

Information on IBM Line Adapters and common-carrier supplied communications facilities is contained in Appendix A. Appendix B is a summary of IBM System/360 programming support available for teleprocessing systems.

It is assumed that the reader of this manual has a basic familiarity with data processing systems and data communications concepts.

Preface

This manual presents brief introductory descriptions of IBM teleprocessing products. Publications providing in-depth information related to each product are listed at the end of each device description.

The information in this manual may be useful in selecting components for a complete teleprocessing system or in expanding the scope and utility of presently installed central processing units by adding teleprocessing facilities.

This manual is written primarily for executive and supervisory personnel, involved in planning data processing systems and making decisions, who have a basic familiarity with data communications and a specific interest in IBM teleprocessing products.

The descriptions are grouped in broad categories defining the general or primary purpose of the products. Categories included are interactive or operator-oriented terminals, batched data terminals, application-oriented systems, transmission control devices, processor terminals, and audio response units. The beginning of each section briefly explains the grouping. A tab on the first page of each category corresponds with a tab on the contents page, for faster access to the desired category.

Appendix A contains information on IBM Line Adapters and common-carrier supplied communications facilities. Appendix B presents a brief description of IBM System/360 program support available for teleprocessing systems and shows what devices are supported by these programs. Appendix C lists common data communications terms and abbreviations used in this manual, with the meaning of each.

For physical planning information about those terminals and remote multiplexers not having a reference to a standalone manual, refer to the IBM Systems Reference Library publication *IBM Remote Multiplexers and Communications Terminals Installation Manual – Physical Planning,* GA27-3006. For general information about binary synchronous communication procedures, refer to the IBM Systems Reference Library publication *General Information – Binary Synchronous Communications,* GA27-3004.

Sixth Edition (October 1971)

This is a major revision of, and obsoletes, GA24-3090-4. This revision adds descriptions of the IBM 3735 Programmable Buffered Terminal; the IBM 2203 Printer Models A1 and A2; the IBM 2797 Data Entry Unit; and the IBM 2798 Guidance Display Unit. Minor changes have also been made to the text and to several illustrations. Changes or additions to the text or to illustrations are indicated by a vertical line to the left of the change.

Changes are periodically made to the information herein; before using this publication in connection with the operation of IBM systems or equipment, refer to the latest SRL Newsletter for the editions that are applicable and current.

Requests for copies of IBM publications should be made to your IBM representative or to the IBM branch office serving your locality.

This manual has been prepared by the IBM Systems Development Division, Publications Center, Department E01, P. O. Box 12275, Research Triangle Park, North Carolina 27709. A form for readers' comments is provided at the back of this publication. If the form has been removed, comments may be sent to the above address. Comments and suggestions become the property of IBM.

Contents

Illustrations

Teleprocessing is a form of data handling in which a data processing system uses communications facilities. Combining data processing with data communications, teleprocessing can provide direct, economical, rapid, and versatile data handling locally or over thousands of miles (Figure 1).

Input to teleprocessing systems and units may be from manual keyboards, punched cards, magnetic tape, punched paper tape, and various paper documents.

IBM teleprocessing systems and units can help solve the time and distance problems of business, industry, and education, and can be adapted to most applications requiring data processing and data transmission.

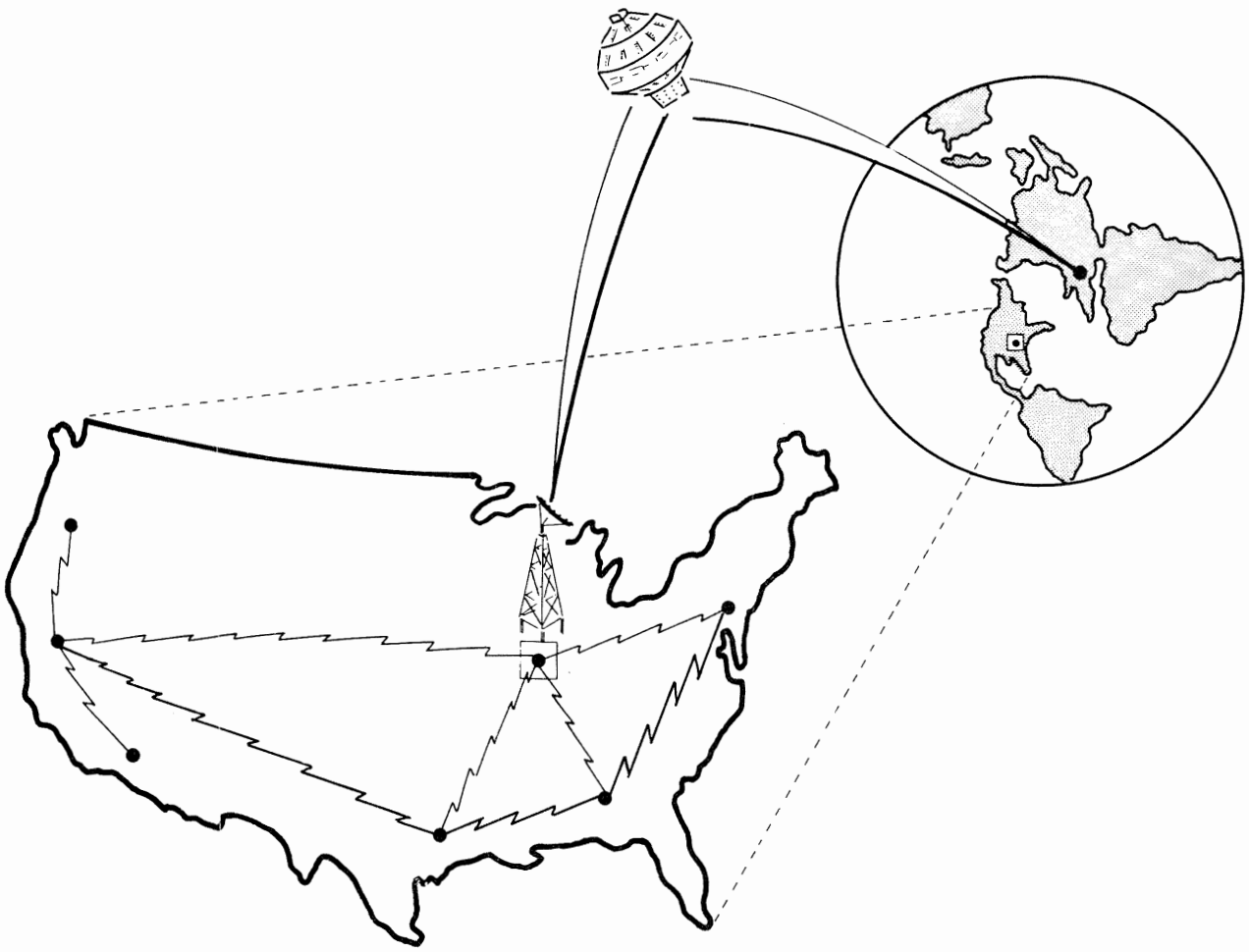


Figure 1. Teleprocessing Links Remote Terminals to a Central Processing Unit

Interactive terminals bring the power and flexibility of a central processing unit (CPU) to terminal users at remote locations, with direct interaction between the two. These devices permit the time sharing of CPU facilities.

Applications include inquiry, file update, transaction processing, information retrieval, text processing, and online problem solving.

IBM 1001 DATA TRANSMISSION SYSTEM

The IBM 1001 Data Transmission System (Figure 2) provides an economical way of sending punched-card data from multiple locations to a central processing location. The 1001 Data Transmission Terminal transmits data to either an IBM 24 or 26 Card Punch equipped with a data translator or to an IBM 7770 or 7772 Audio Response Unit. A speaker in the 1001 reproduces voice responses from a 7770 or 7772. Operation is point-to-point in half-duplex mode over appropriate communications facilities.

Components

IBM 1001 Data Transmission Terminal

The IBM 1001 Data Transmission Terminal is a combination punched-card/ten-key numeric keyboard input unit. The 1001 can send data to an output unit at about 12 columns per second. With the Alphabetic Transmit special feature, the 1001 can send 36 consecutive columns of alphabetic data; without this feature, it sends 22 consecutive columns.

IBM 24 Card Punch

The IBM 24 Card Punch, an output unit, is available in two models. Model 1 is an alphameric punch; Model 2 is a numeric punch. Both models include a data translator to adapt the punch for communicating with the 1001 and a switch that determines whether the punch is to be used as a receiving unit or as an independent unit.

Up to 80 columns of data can be punched into each card.

IBM 26 Printing Card Punch

The IBM 26 Printing Card Punch performs the same functions as the IBM 24 Card Punch. In addition, the 26 provides a character printout over each column punched.

This output station is also available in two models. Model 5 is an alphameric output punch; Model 6 is a numeric output punch.

IBM 7770 or 7772 Audio Response Unit

The IBM 7770 or 7772 Audio Response Unit provides easy access to the stored data of a computer system.

(See "IBM 7770 Audio Response Unit" or "IBM 7772 Audio Response Unit" under "Audio Response Units" in this manual.)

Related Publications

For additional information, refer to the IBM Product Reference Library publication, *IBM 1001 Data Transmission System,* GA24-1029.

Figure 2. IBM 1001 Data Transmission System

IBM 1092 AND IBM 1093 PROGRAMMED KEYBOARDS

The IBM 1092 and IBM 1093 Programmed Keyboards (Figure 3) provide rapid, economical transmission of keyed numeric data from remote locations to a central processing area. The 1092 and 1093 are stand-alone units which can serve either as input terminals transmitting data to a remote CPU over communications facilities or as input units connected directly to an IBM 1050 Data Communication

System. The basic difference between the 1092 and 1093 is the number of columns of data keys each unit has.

The 1092 is available in two models:

- Model 1 is a 10 x 15 (10 data keys and 15 columns) matrix keyboard. It has keymat (prepunched unlettered overlays) ring supports, which permit storing up to ten keymats on the face of the keyboard. Each keymat is slotted to allow insertion. Keymat sensing is not available on this model.
- Model 2 is a 10 x 16 (10 data keys and 16 columns) matrix keyboard with automatic sensing of up to 48 different keymats. This model does not have keymat ring supports.

The 1093 is also available in two models:

- Model 1 is a 10 x 10 (10 data keys and 10 columns) matrix keyboard. Keymat sensing is not available on this model.
- Model 2 is a 10 x 10 (10 data keys and 10 columns) matrix keyboard with automatic sensing of up to 48 different keymats.

Compatible Units

When it is attached to appropriate communications facilities, the 1092 or 1093 can operate point-to-point in half-duplex mode with:

- IBM 24 Card Punch (Model 5 or Model 6)
- IBM 26 Printing Card Punch (Model 5 or Model 6)
- IBM 7770 Audio Response Unit Model 3
- IBM 7772 Audio Response Unit Model 3

Directly attached to a 1050, the 1092 and 1093 function as key-entry input devices.

Transmission Speed

Transmission speed may be 75, 108.5, or 134.5 bps, depending on communications facilities.

Transmission Code

The transmission code is binary coded decimal.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM 1092 and 1093 Programmed Keyboards,* GA24-3266.

IBM 2260 DISPLAY STATION

The IBM 2260 Display Station (Figure 4), operating through an IBM 2848 Display Control (Figure 5), is an efficient, compact visual-display terminal. Display stations can be

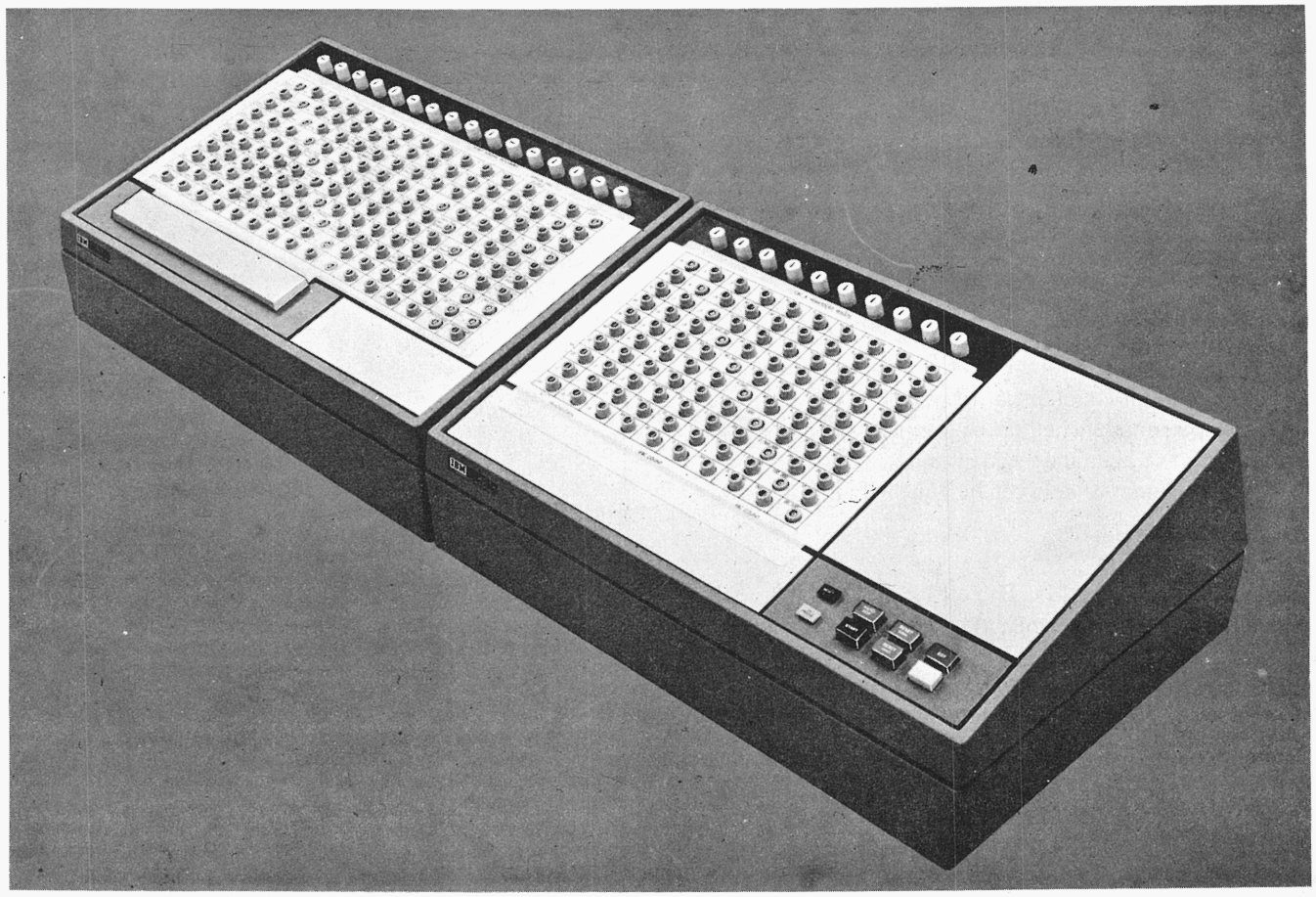


Figure 3. IBM 1092 and 1093 Programmed Keyboards

placed throughout an office building, manufacturing plant, or similar facility, to provide immediate visual access to local or remote IBM System/360 or System/370 storage.

A user can store, retrieve, and display alphameric data from a computer conveniently and quickly with a 2260. Through the 2260 keyboard, an operator can query a computer for information about an account, a transaction, or a production schedule. The inquiry is then quickly processed, and the desired information is displayed on the 2260 cathode ray tube (CRT) screen. Data can be retained on the CRT screen for as long as the user desires.

The user can revise the information, using the keyboard, and return it to the computer for storage or additional processing. If the 2260 has a printer feature, displayed information can be sent to an IBM 1053 Printer, where it is printed in the same format as that displayed on the screen. The basic 2260 (without a keyboard) is used when display-only information is required.

The 2260 is available in two models. The basic difference between Model 1 and Model 2 is the amount of data that can be displayed on the 4 x 9-inch screen (Figure 6).

Three types of keyboards are available for the 2260: alphameric, numeric, and alphameric with numeric inset. All three have special symbol keys and control keys to enter data.

The type of keyboard determines the characters and symbols that can be key-entered from a 2260, but it does not determine which can be transmitted from the computer for display on the CRT screen. For example, a 2260 can display alphameric data although it may have a numeric keyboard.

Figure 4. IBM 2260 Display Station

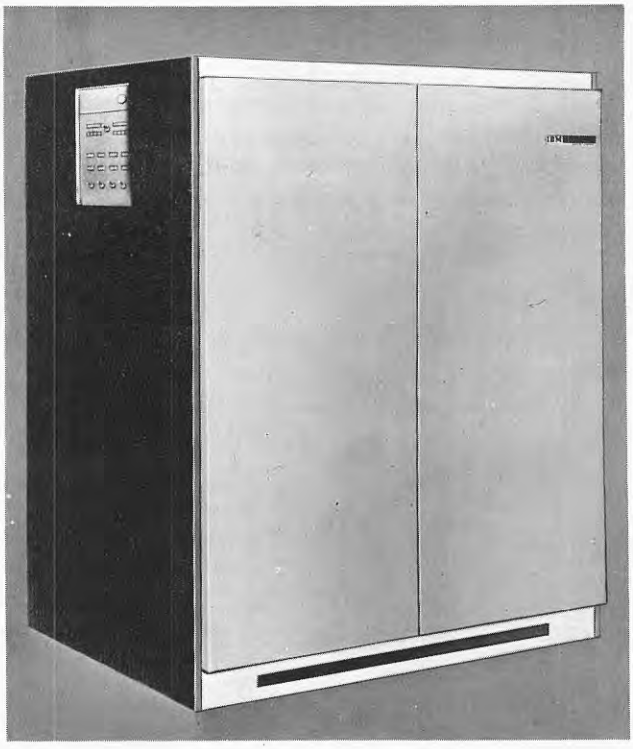


Figure 5. IBM 2848 Display Control

2848 MODEL NO.	2260 MODEL NO.	WITHOUT EXPANSION	WITH EXPANSION	DISPLAY CAPACITY (CHARACTERS)
1	2	4	24	240 (6 lines, 40 Char/Line)
2	2	2	16	480 (12 lines, 40 Char/Line)
3	1	2	8	960 (12 lines, 80 Char/Line)
21*	2	12	24	240 (6 lines, 40 Char/Line)
22*	2	8	16	480 (12 lines, 40 Char/Line)

*Used for local operations only

Figure 6. Maximum Number of 2260's per 2848

The 2848 Models 1, 2, and 3 are used primarily in inquiry-oriented applications. They are designed primarily for low-volume inquiry applications. (Models 1, 2, and 3 can be attached to a System/360 or a System/370 through communications facilities or by direct channel attachment.)

Models 21 and 22 combine the advantages of the other models and, in addition, have greater data input capabilities. These models are designed for high-volume, fast-keying applications. (Models 21 and 22 are designed for direct channel attachment only.)

A destructive cursor is standard on all 2848 models. The cursor symbol appears on the screen of the 2260 as a heavy horizontal bar. This symbol marks the display position of the next character. When the symbol is advanced, back-

spaced, or moved to a display position containing a character, the character is erased. Keying errors can be corrected by backspacing and rekeying.

When the Non-Destructive Cursor special feature is installed on the 2848 the operator can move the cursor anywhere on the screen without erasing the displayed information. This feature allows the operator to rekey selected portions of the displayed data.

Transmission Speed

In remote operation, the transmission speed of the 2260/2848 is 1200 or 2400 bps, depending upon the communications facilities used. In local operation (direct channel attachment) the data rate is 2560 characters per second.

Transmission Code

The 2848 uses the EBCDIC or USASCII transmission code.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/360 Component Description: IBM 2260 Display Station/IBM 2848 Display Control,* GA27-2700.

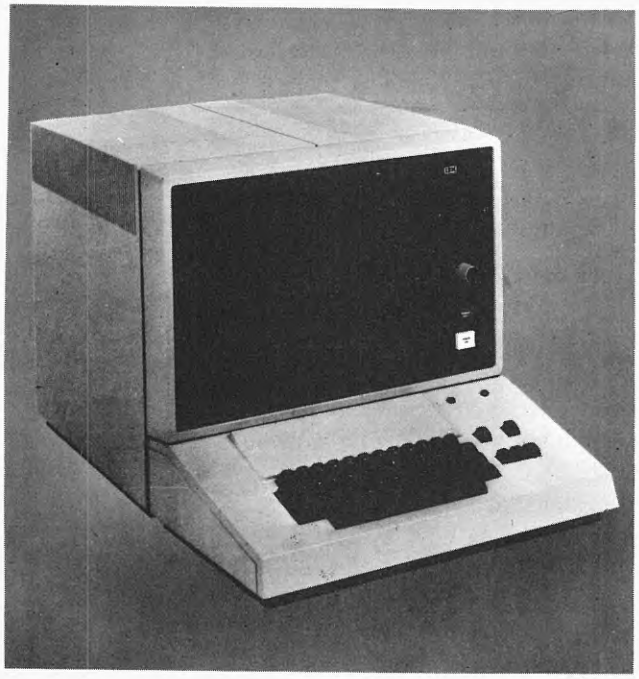
IBM 2265 DISPLAY STATION

The IBM 2265 Display Station (Figure 7), coupled with an IBM 2845 Display Control, forms a display system which provides rapid visual access to data stored in a remotely located IBM System/360 or System/370.

This display system is ideally suited to applications requiring immediate data acquisition capabilities at a relatively low cost. Inquiries about an account, a transaction, or a production schedule can be sent quickly and easily to a remote System/360 or a System/370 from the keyboard of the 2265. After computer processing, the desired visual data is displayed on the 2265 screen and then can be analyzed, modified, and returned to the computer for further processing and storing.

The 2265/2845 display system is similar in function to the 2260/2848 and is fully compatible with these units, but only one 2265 can be attached to each 2845. A 2265 can be placed up to 40 feet from a 2845. As many as sixteen 2845's can be attached to the same communications line.

The 2265 contains a 14-inch cathode ray tube, which can display a maximum of 960 alphameric characters. Two display formats are available; either 15 lines of 64 characters each, or 12 lines of 80 characters each.



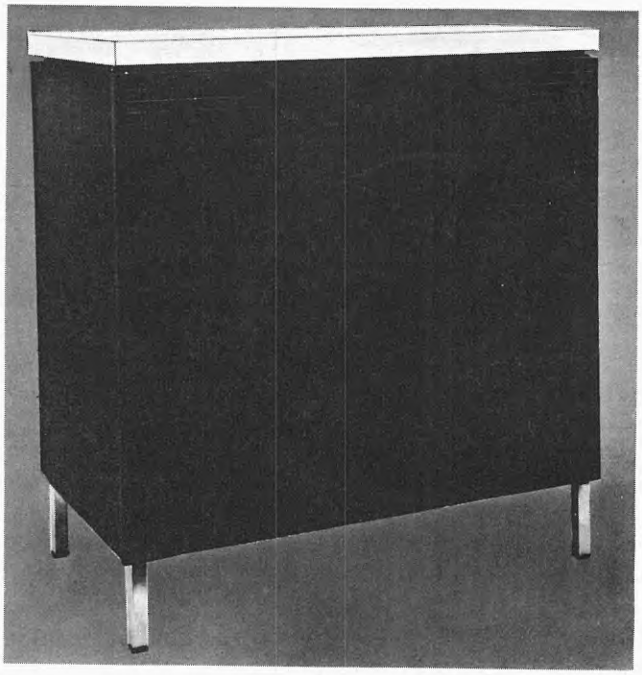


Figure 7. IBM 2265 Display Station and 2845 Display Control

When it is equipped with an alphameric keyboard, the 2265 is an I/O device. The keyboard cable connects to the display screen, and the keyboard can be placed up to five feet from the display screen. When the keyboard and display are positioned together, they appear as a single unit.

The nondestructive cursor is an automatically inserted visual marker denoting the position on the 2265 screen that the next character to be entered will occupy. It is standard on the 2265. It appears immediately below the next character to be entered and may be moved freely, without interference to characters on the screen.

The destructive cursor, added by the Destructive Cursor special feature, appears on the screen as a heavy horizontal bar. When the destructive cursor is moved to a character position containing a character, that character is erased.

To obtain a paper copy of data sent from the CPU or displayed on the 2265 screen, an IBM 1053 Printer Model 4 can be attached to an IBM 2845 Display Control.

Transmission Speed

The transmission speed is 1200 or 2400 bps, depending on the communications facilities.

Transmission Code

The 2265/2845 uses the USASCII transmission code.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/360 Component Description: IBM 2265 Display Station/IBM 2845 Display Control,* GA27-2731.

IBM 2721 PORTABLE AUDIO TERMINAL

The IBM 2721 Portable Audio Terminal (Figure 8) is a portable, lightweight, low-cost terminal that communicates by telephone with an IBM System/360 Model 25 through 85 or Model 195, or with an IBM System/370 Model 155 or 165, through an IBM 7770 Audio Response Unit Model 3. Since any conventional telephone can be used, the 2721 takes advantage of the universal availability of the telephone.

Applications of the 2721 include inquiry/response and data entry to a remote CPU. Audio responses from a 7770 to an inquiry, or audio responses to verify data entered from the keyboard, are amplified by the 2721 and reproduced by a speaker.

The 2721 keyboard consists of 60 flat, pressure-sensitive keys arranged in a 5-row by 12-column matrix. User-changeable overlays can adapt the keyboard to the customer's requirements.

Transmission Code

The 2721 uses an ABB' (3-out-of-12) transmission code, which the ABB' feature on the 7770 translates to a pseudo ABC code. The 7770 then converts this pseudo ABC code to an 8-bit byte which the user's program (within the System/360 or System/370 CPU) can translate into EBCDIC or any other desired code.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

Component Description: IBM 2721 Portable Audio Terminal, GA27-3029

Component Description: IBM 7770 Audio Response Unit Models 1, 2, and 3, GA27-2712.

Figure 8. IBM 2721 Portable Audio Terminal

IBM 2740 COMMUNICATION TERMINAL MODEL 1

The IBM 2740 Communication Terminal Model 1 (Figure 9) features a Selectric ® keyboard-printer appropriately modified for use as a general-purpose communication terminal. The 2740 functions as a data sending and receiving unit in communicate mode or as a typewriter in local mode. In either mode, a typist can operate the 2740 with a minimum of additional training. System control keys and indicator lights are conveniently located alongside the keyboard.

The 2740-1 can communicate with:

- Another 2740-1
- An IBM System/360 Model 25 through 85 or Model 195, via a 2701, 2702, 2703, or 2712
- An IBM System/370 Model 155 or 165, via a 2701, 2702, 2703, or 2712.

Some of the many applications of the 2740-1 are:

- *Intracompany Communications:* The 2740-1 can easily handle internal communication between company departments. The 2740-1 can help the user to maintain

convenient, effective two-way communication between the executive offices and any sales or manufacturing locations.

- *Intercompany Communication:* A 2740-1 installed in the purchasing department of major customers can aid in sales and expedite customer orders.
- *Remote Inquiry and Reply:* Using the 2740-1, persons can handle inquiry and reply operations with the CPU without leaving their department areas.

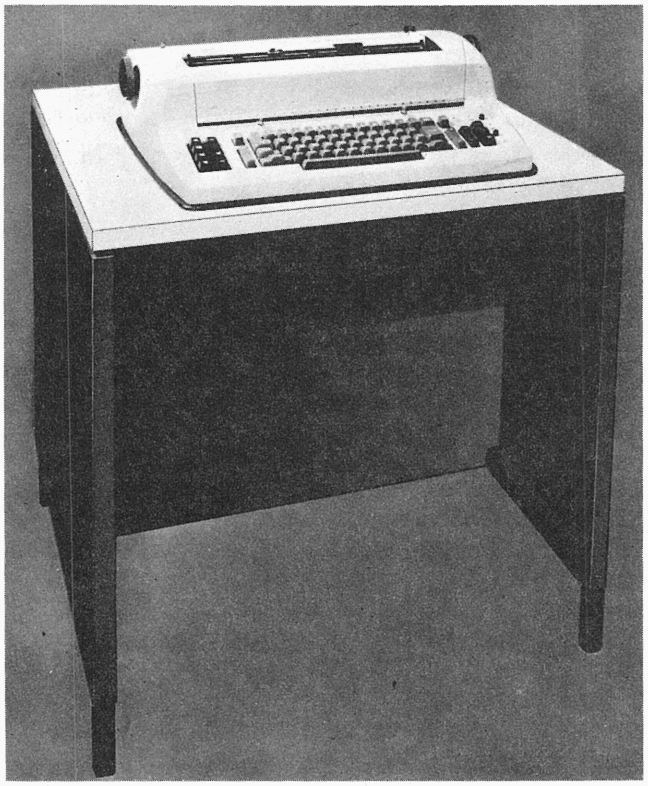


Figure 9. IBM 2740 Communication Terminal Model 1

IBM 2760 Optical Image Unit Attachment

With this feature, the IBM 2760 Optical Image Unit can be attached to the 2740-1 (Figure 10). With the 2760, data can be entered by means of a data selection probe on a translucent screen.

The screen is used to project images of a previously prepared filmstrip. Each filmstrip contains up to 128 frames. Each frame may contain an image of a standard form, a sequence of questions, or any number of tailor-made configurations prepared by the user for his particular application.

A user's inventory form, for example, can be prepared on a filmstrip. When the image of the inventory form is projected onto the 2760 screen, the operator can record inventory data by probing response-sensitive points on the screen. The 2760 screen has 240 response points.

Operator responses are transmitted to the CPU in the form of coordinates, and these are translated by the CPU program. If printed data is desired, the CPU can send stored information to the attached 2740, which then produces a printout.

Data projected on the screen is stored on a 16mm filmstrip, contained in a cartridge, which can be inserted or removed by the operator. Frames on the filmstrip are selected and displayed in a sequence specified by the application program. The film image is projected with an enlargement ratio of 25 to 1.

Film movement (forward or reverse) is under either computer control or operator control. The Image Index Counter checks the accuracy of film movement, and in this way, the CPU is informed of the specific image being viewed by the operator.

Maximum access time (under CPU control) to any frame on a filmstrip containing 128 images is 3.2 seconds.

Transmission Speed

The transmission speed of the 2740-1 is 134.5 bps.

Transmission Code

The 2740 Model 1 uses either the PTTC/BCD, PTTC/EBCD, or correspondence code.

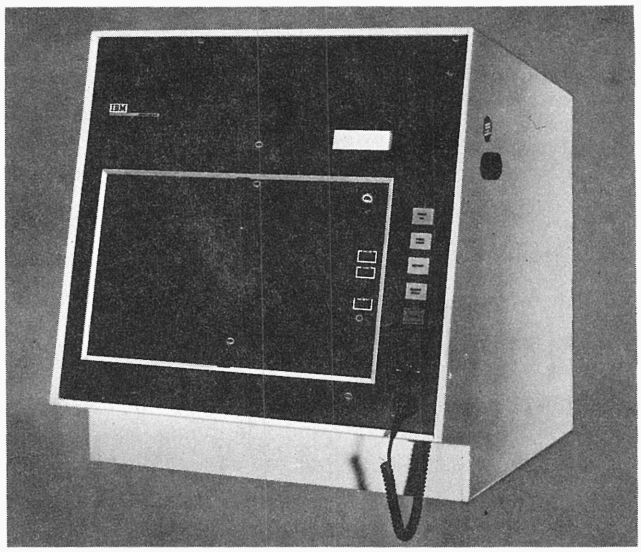


Figure 10. IBM 2760 Optical Image Unit

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

Component Description: IBM 2740 Communication Terminal Models 1 and 2, GA24-3403
Component Description: IBM 2760 Optical Image Unit, GA27-3011.

IBM 2740 COMMUNICATION TERMINAL MODEL 2

The IBM 2740 Communication Terminal Model 2 (Figure 11) is a buffered version of the 2740-1, and is designed exclusively for communicating with an IBM System/360 or an IBM System/370. Communication with either the System/360 or System/370 is through a 2701, 2702, 2703, or 2712. Basically, 2740-2 operation is identical to that of the 2740-1, with the following exceptions: (1) it cannot operate 2740-to-2740, (2) it operates at higher line speeds, and (3) it can be used only on leased lines.

The buffer storage in the 2740-2 makes it well-suited for remote inquiry and reply applications. Among the specific uses of this model are payment entry, journal entry, administrative messages, file updating, and record renewal. Offline, the 2740-2 can be used for normal typing.

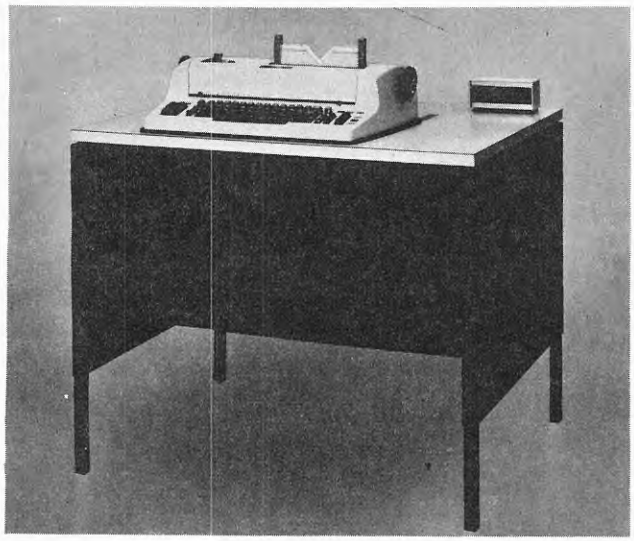


Figure 11. IBM 2740 Communication Terminal Model 2 (with Document Insertion)

Document Insertion Feature

The Document Insertion feature (Figure 11) enables the operator to easily insert and position individual forms so that they can receive all or a portion of the printed output. A typical application of this feature might be printing on a continuous-form journal and simultaneously posting on ledger cards that are manually inserted by the operator.

Transmission Speed

The 2740-2 can transmit data at 75, 134.5, or 600 bps, depending on the communications facilities.

Transmission Code

The 2740-2 uses either the PTTC/BCD or PTTC/EBCD code.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description: IBM 2740 Communication Terminal Models 1 and 2,* GA24-3403.

IBM 2741 COMMUNICATION TERMINAL

The 2741 Communication Terminal (Figure 12) is a Selectric ® keyboard-printer with electronic controls that enable it to operate as a remote input/output terminal. The 2741 provides direct access to a computer through a multiplexer.

The 2741 can be used for text-handling and scientific computations as well as for any application requiring a conversational mode of operation. The 2741 permits persons at remote locations to use the problem-solving capabilities of the IBM System/360 or the IBM System/370.

Compatible Units

The 2741 operates over appropriate communications facilities with the System/360 (Model 25 through 85 or Model 195) or with System/370 Model 155 or 165, in half-duplex mode. The 2741 communicates via an IBM 2701 Data Adapter, an IBM 2702/2703 Transmission Control, or an IBM 2712 Remote Multiplexer.

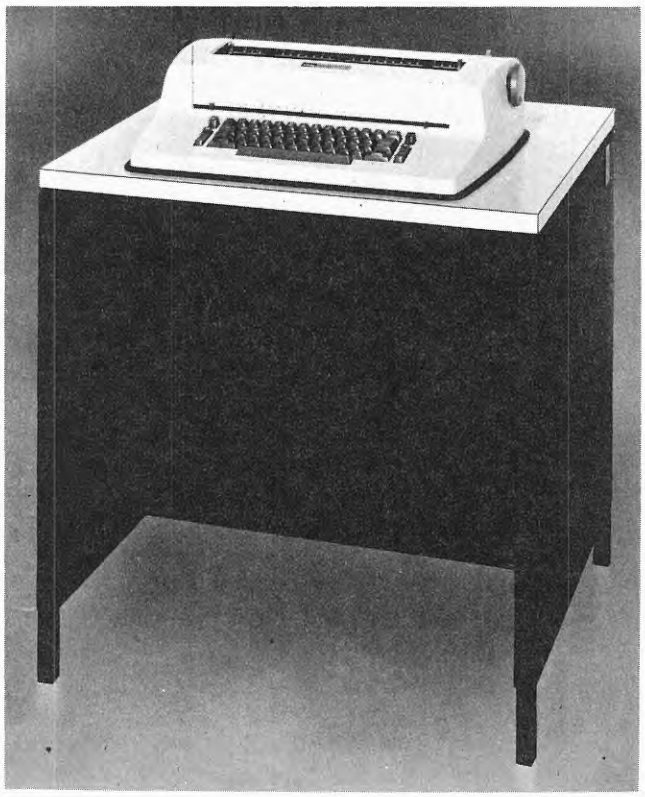


Figure 12. IBM 2741 Communication Terminal

One CPU can serve numerous 2741 units. The maximum number of terminals that can be used in a configuration depends on the communications facilities or on the capacity and equipment of the computer system.

Transmission Speed

Transmission speed is 134.5 bps.

Transmission Code

Codes available with the 2741 are PTTC/BCD, PTTC/EBCD, and correspondence code.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description: IBM 2741 Communication Terminal,* GA24-3415.

These terminals are primarily designed for transferring batched data between remote points. This makes possible accumulating and maintaining central data files. These devices can also perform day-to-day document preparation, offline.

Some of the terminals discussed in this chapter can also be used in certain applications mentioned under "Interactive (Operator-Oriented) Terminals".

IBM 65 AND 66 DATA TRANSCEIVERS

IBM Data Transceivers (Figure 13) send and receive card-punched data over appropriate communications facilities. Communication is point-to-point, in half-duplex mode.

Transceivers operate in transmit mode or in receive mode. In transmit mode, the card unit reads a card (one column at a time) and sends data to the signal unit. The signal unit converts this data into pulses which are sent over communications facilities to another transceiver. In receive mode, the signal unit receives pulses over communications facilities, converts these pulses to punched-card code, and sends the coded data to the card unit for card punching.

Applications include the transfer of accounting, statistical, engineering, and scientific data between two or more locations.

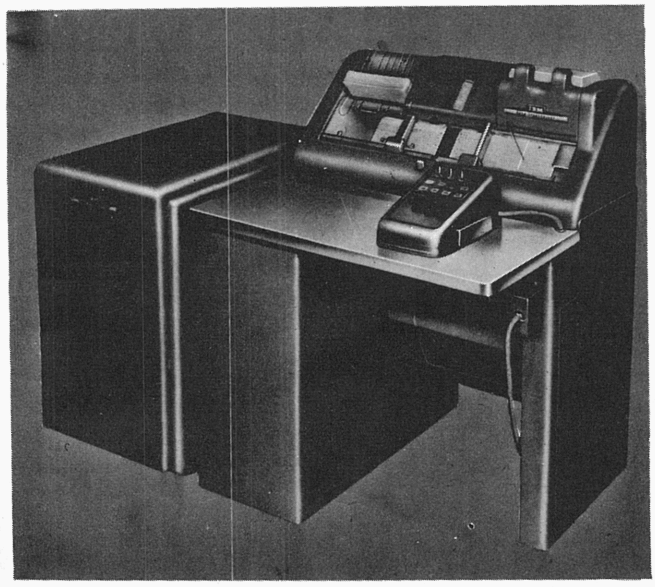


Figure 13. IBM Data Transceiver

Components

The transceiver consists of a control unit, a card unit (IBM 65 Card Unit or IBM 66 Printing Card Unit), and a signal unit (IBM 67 Telegraph Signal Unit or IBM 68 Telephone Signal Unit).

Control Unit

The control unit of a transceiver is an operator-controlled keyboard which contains switches, keys, and signaling lights. It is connected to the card unit by cable, and it can be placed in any position on the reading board of the card unit.

IBM 65 Card Unit and IBM 66 Printing Card Unit

The IBM 65 Card Unit and IBM 66 Printing Card Unit can send and receive card-punched data when used with an IBM 67 Telegraph Signal Unit or IBM 68 Telephone Signal Unit. The 65 and 66 perform identical functions, with one exception: the 66, in addition, prints data along the top edge of the punched card. Each punched card represents a completed and checked transmission.

IBM 67 Telegraph Signal Unit

The IBM 67 Telegraph Signal Unit sends and receives data over telegraph wires, microwave, or long distance radio circuits.

Transmission speed varies with the class of telegraph service. The speed may be 60, 75, or 100 words per minute (wpm). Depending upon the telegraph line speed, three to five 80-column cards can be punched per minute.

IBM 68 Telephone Signal Unit

The IBM 68 Telephone Signal Unit sends and receives data over telephone wires, microwave, and short distance radio circuits. Channel selectors allow up to four transmitting terminals to share the same transmission line.

When the 68 is used with the IBM 65 Card Unit, the input/output rate is about 16 card columns per second, or 11 fully punched, 80-column cards per minute.

When the 68 is used with the IBM 66 Card Unit, the input/output rate is about 14 card columns per second, or 10 fully punched, 80-column cards per minute.

Transmission Code

IBM Data Transceivers use a 4-out-of-8 transmission code.

Related Publications

For additional information, refer to the IBM Product Reference Literature publication, *IBM 65 and 66 Data Transceivers,* GA24-0512.

IBM 1013 CARD TRANSMISSION TERMINAL

The IBM 1013 Card Transmission Terminal (Figure 14) is a stand-alone remote unit which consists of a serial reader-punch, a control unit, and an operator's console. The 1013 reads and transmits data from punched input cards, and punches received data into output cards.

Cards feed from the 1200-card hopper of the reader-punch to the reading station, then to the punching station, and on to the stacker. A transmitting 1013 reads cards at rates of 50 to more than 400 cards per minute, depending on the number of characters per card and the number of cards per record. A receiving 1013 can punch from 1 to 80 columns in each card at a speed of 160 columns per second.

The operator can select a fixed or a variable program to control the functions of the 1013. The fixed program transmits directly from cards, on a column-for-column basis. The variable program makes it possible for the 1013 to alter the card record which is being transmitted or received. Variable program data is stored and later used to control the selection of data, column-by-column.

Figure 14. IBM 1013 Card Transmission Terminal

Compatible Units

The 1013 communicates point-to-point with the following terminals and systems:

- Another 1013 Card Transmission Terminal
- An IBM System/360 Model 25 through 85 or Model 195 (via an IBM 2701 Data Adapter Unit)
- An IBM 1130 Computing System with a Synchronous Communications Adapter

Transmission Speed

The 1013 receives and transmits data, in half-duplex mode over appropriate communications facilities, at 1200, 2000, or 2400 bps.

Transmission Code

The 1013 converts punched-card code to 4-out-of-8 transmission code.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM 1013 Card Transmission Terminal,* GA21-1068.

IBM 1050 DATA COMMUNICATION SYSTEM

The IBM 1050 Data Communication System (Figure 15) is a multipurpose office-oriented teleprocessing system. This versatile system is designed for a wide range of applications in such industries as transportation, manufacturing, research, distribution, insurance, and refining.

The 1050 performs such functions as:

- *Document writing* of sales orders, insurance policies, payrolls, engineering specifications, etc.
- *Direct inquiry and response* (realtime operation) with a CPU
- *Remote printing* of business records and invoices, thus supplying to remote locations full documentation of business transactions
- *Exception reporting* of data about work orders, credit ratings, inventory adjustments, traffic movements, etc.
- *Intracompany communication* to provide rapid distribution of memorandums, directives, administrative reports, etc.

When it is directly attached to an IBM System/360 Model 30, the 1050 can also perform such operations as program checking, correction, and job logging.

Input into the 1050 system is by manual keying, punched cards, punched paper tape, or edge-punched documents. Output from the 1050 is in the form of printed documents, punched cards, punched paper tape, or edge-punched documents.

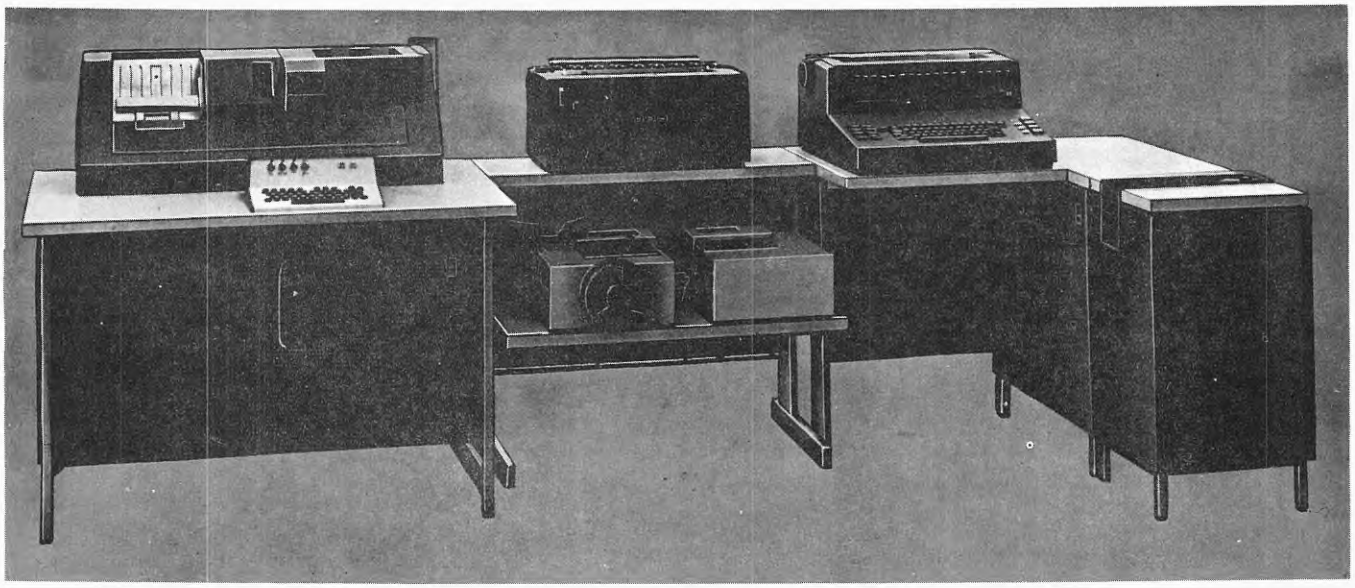


Figure 15. IBM 1050 Data Communication System

Components

Available in a variety of combinations, the components of the 1050 system are:

- IBM 1051 Control Unit
- IBM 1052 Printer-Keyboard
- IBM 1053 Printer
- IBM 1054 Paper Tape Reader
- IBM 1055 Paper Tape Punch
- IBM 1056 Card Reader
- IBM 1057 Card Punch
- IBM 1058 Printing Card Punch
- IBM 1092/1093 Programmed Keyboards

IBM 1051 Control Unit

All configurations of the 1050 system require the IBM 1051 Control Unit. It contains the power supply, code translator, data channels, and control circuitry for the 1050 system. All system components are electrically connected through the control unit. Figures 16 and 17 show remote and local configurations using the various models of the IBM 1051 Control Unit.

The 1051-1 can be used either for remote (on-line) transmission or for direct connection either to an IBM System/360 Model 30 or to an IBM 1447 Console attached to an IBM 1240, 1401, 1440 or 1460 Data Processing System. Directly connected to a CPU, the 1050-1 can simultaneously communicate with other remote 1050's over appropriate communications facilities. This model is also capable of simultaneous on-line operation and off-line document preparation; the 1051-2 can operate on-line only. Model N1 can be used for direct (local) attachment to a System/360 only, and it can be used independently for off-line document preparation.

IBM 1052 Printer-Keyboard

The IBM 1052 Printer-Keyboard is a typewriter-style keyboard (for system input) and printer (for system output). The 1052 prints at a maximum rate of 14.8 characters per second and has a maximum line length of 13 inches.

IBM 1053 Printer

The IBM 1053 Printer Model 1 is similar to the 1052 printer, except that it has no keyboard for data entry. It prints a maximum line length of 13 inches at 14.8 characters per second.

IBM 1054 Paper Tape Reader

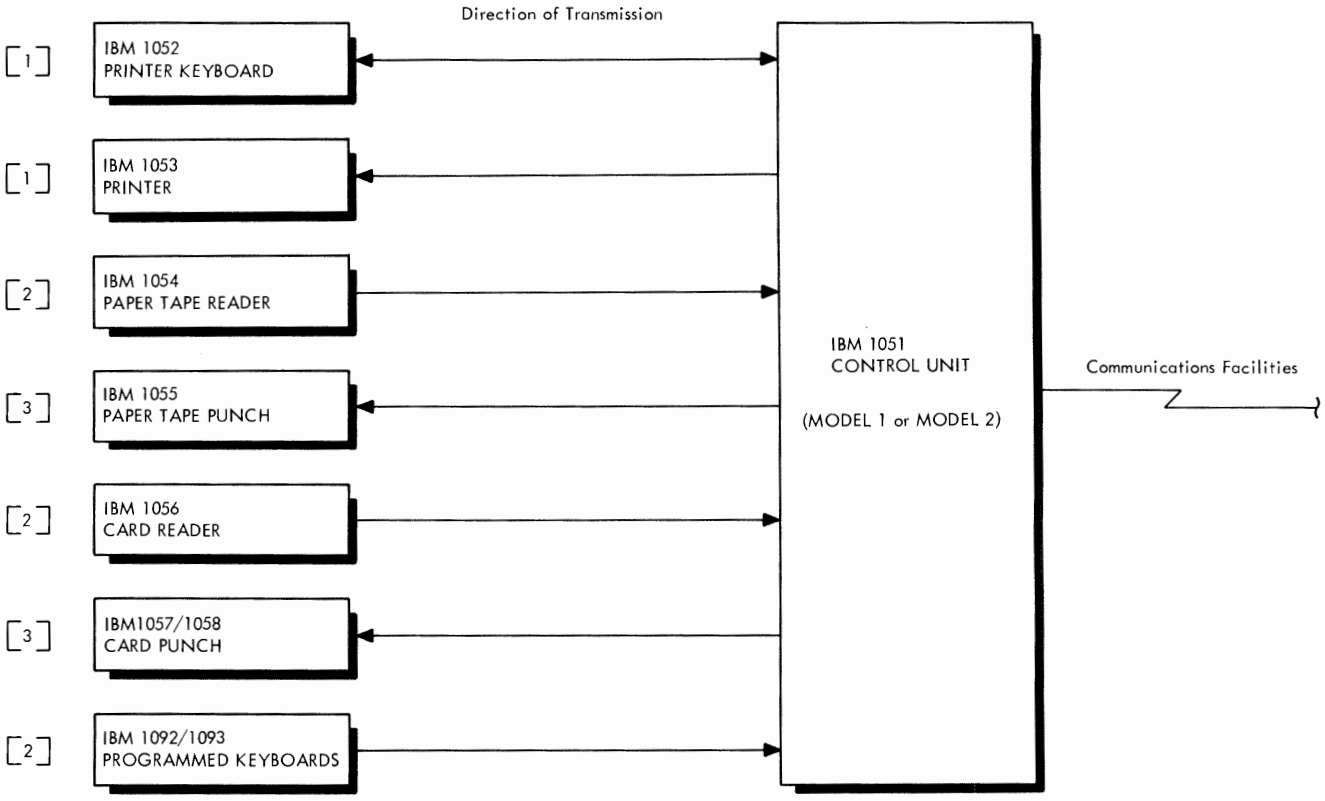
The IBM 1054 Paper Tape Reader Model 1 is a data input unit that reads paper tape and edge-punched cards and documents. It can be connected to all models of the IBM 1051 Control Unit.

IBM 1055 Paper Tape Punch

The IBM 1055 Paper Tape Punch Model 1 is a data output unit that punches paper tape and edge-punches cards and paper documents.

IBM 1056 Card Reader

The IBM 1056 Card Reader is a punched-card data input unit. Models 1, 2, and 3 read standard 80-column cards. Models 1 and 2 are used with PTTC/BCD code; Model 3 is used with PTTC/EBCD code.



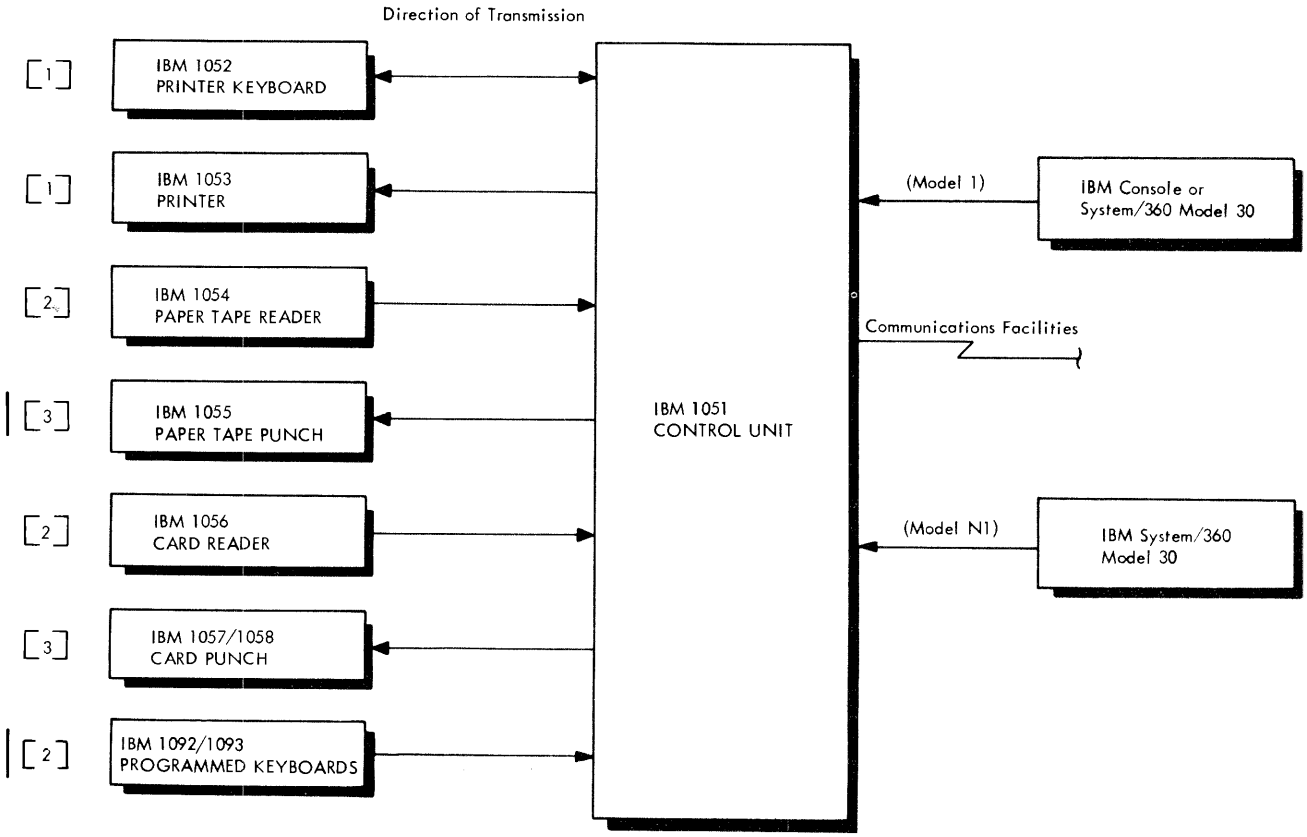
NOTE:

[1] Maximum number of 1052 printer keyboards and 1053 printers in combination is two--only one can be a 1052. Maximum number of 1053 printers without a 1052 is two.

[2] Maximum number of reader (1054's and 1056's) and programmed keyboards (1092/1093's) combination is two--only one can be a 1056 card reader.

[3] Maximum number of punches (1055's and 1057/1058's), in any combination, is two.

Figure 16. IBM 1050 On-Line Remote Configuration



NOTE:

[1] The following combinations of 1052's and 1053's are possible: two 1053's, a 1053 and a 1052, or one 1052.

[2] Maximum number of readers (1054's and 1056's) and programmed keyboards (1092/1093's) in combination is two--only one can be a 1056 Card Reader. System/360 uses one reader interface.

[3] Maximum number of punches (1055's and 1057/1058's), in any combination, is two. System/360 uses one punch interface.

Figure 17. IBM 1050 Off-Line Local Configuration

IBM 1057 Card Punch

The IBM 1057 Card Punch Model 1 punches 80-column cards and uses the PTTC/BCD code.

IBM 1058 Printing Card Punch

The IBM 1058 Printing Card Punch is a punched-card output unit with card codes printed above the punched column. Model 1 is used with PTTC/BCD code; Model 2 is used with PTTC/EBCD code.

IBM 1092 Programmed Keyboard

The IBM 1092 Programmed Keyboard is a tabletop manual-storage keyboard unit used for data input. Model 1 has a 10 x 15 matrix keyboard with keymat ring supports. Model 2 has a 10 x 16 matrix keyboard with automatic sensing of up to 48 different keymats.

IBM 1093 Programmed Keyboard

The IBM 1093 Programmed Keyboard is similar to the 1092, except that the 1093 (Model 1 and Model 2) has a 10 x 10 matrix keyboard. Model 2 has the added function of automatic sensing of up to 48 different keymats. Refer to "IBM 1092 and IBM 1093 Programmed Keyboards" under "Interactive (Operator-Oriented) Terminals", preceding in this manual.

Compatible Units

In a remote configuration, the 1050 communicates in half-duplex mode over appropriate communications facilities with:

- Another IBM 1050 Data Communication System
- An IBM 1240, 1401, 1440, or 1460 Data Processing System
- An IBM 1070 Process Communication System (with an IBM 1071 Control Unit Model 1)
- An IBM System/360 Model 25 through 85 or Model 195, or an IBM System/370 Model 155 or 165 (via an IBM 2701 Data Adapter Unit or an IBM 2702/2703 Transmission Control with appropriate features)
- An IBM System/360 Model 25 with the Integrated Communications Attachment (ICA) special feature

Transmission Speed

Transmission speed of the 1050 is 134.5 bps.

Transmission Code

The 1050 uses either the PTTC/BCD or PTTC/EBCD code.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

IBM 1050 System Summary, GA24-3471
IBM 1050 Data Communication System, Installation Manual – Physical Planning, GA24-3022
IBM 1050 Reference Digest, GA24-3020.

IBM 2770 DATA COMMUNICATION SYSTEM

The IBM 2770 Data Communication System (Figure 18) is a flexible system that can be used for medium-speed on-line data transmission or off-line data preparation. The 2770 can handle batched or inquiry data. With its wide variety of I/O capabilities, the 2770 is adaptable to many applications in various environments. It also provides remote locations with the same I/O operations available at a central processing location.

Control of the 2770 system is by:

- Programmed control from the CPU
- Internal control inherent to the 2770 system
- Manual control by the operator

Line mode and home mode operations are available. In line mode, the 2770 transmits to, and receives from, a CPU or another binary synchronous communications terminal. Device selection in line mode may be done by processor programming, by the operator, or by preplanned job setup. In home mode, the system transmits data from an attached input device to an attached output device. Device selection in home mode may be done by the operator or by preplanned job setup.

Components

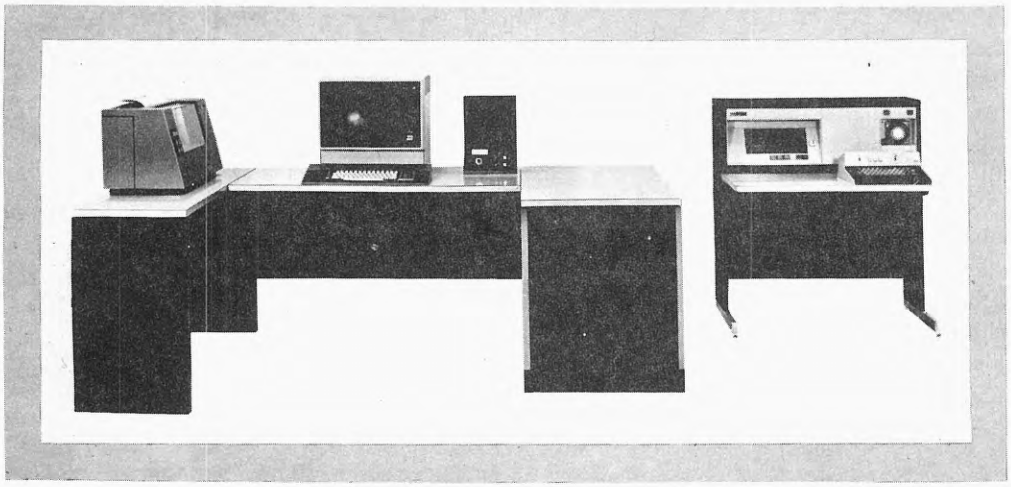
The components of the 2770 system include:

- IBM 2772 Multi-Purpose Control Unit (with keyboard)
- IBM 2502 Card Reader Model A1 or Model A2
- IBM 5496 Data Recorder
- IBM 545 Output Punch (Model 3 or Model 4)
- IBM 1053 Printer Model 1
- IBM 2203 Printer Model A1 or A2
- IBM 2213 Printer Model 1 or Model 2
- IBM 2265 Display Station Model 2
- IBM 1017 Paper Tape Reader
- IBM 1018 Paper Tape Punch
- IBM 50 Magnetic Data Inscriber
- IBM 1255 Magnetic Character Reader

IBM 2772 Multi-Purpose Control Unit

The IBM 2772 Multi-Purpose Control Unit is a buffered transmission unit that controls the flow of data to and from various I/O devices. The 2772 operates in half-duplex mode.

The 2772 has three adapter interfaces for attaching I/O devices. Interface 1 provides for the attachment of a keyboard as input and a printer as output. The keyboard is



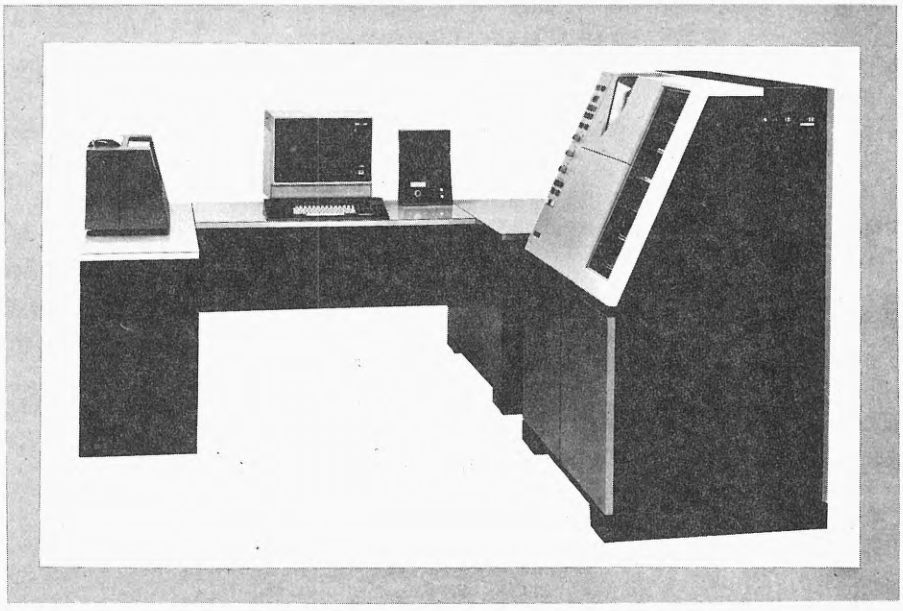


Figure 18. IBM 2770 Data Communication System (Three Typical Configurations)

standard with the 2772 and permits manual input and inquiry applications. Control keys on the keyboard provide for formatting as well as for the control of printer and/or display station function. No other output unit can be substituted for the printer attached to Interface 1, but the printer may be omitted if no output is desired. The printer also can be used as output for any input device (in any media) that might be installed in Interface 2 or Interface 3.

Media selected for Interface 2 and Interface 3 must be compatible across I/O functions; that is, if both input and output are assigned to the same interface, the input media must be the same as the output media. The same media cannot be used on both Interface 2 and Interface 3.

IBM 2502 Card Reader

The IBM 2502 Card Reader is a tabletop, high-speed unit that provides automatic entry of punched-card data to the transmission line or to output units of the 2770 system.

The 2502 is available in two models:

- Model A1 reads approximately 150 cards per minute.
- Model A2 reads approximately 300 cards per minute.

In addition to the standard 80-column card, the 2502 can be equipped to read 51-column cards or 66-column cards.

The Optical Mark Read special feature can be installed for reading up to 40 columns of marked data. Marked and/or punched-hole data can be read from the same card.

IBM 5496 Data Recorder

The IBM 5496 Data Recorder is a stand-alone, operator-oriented machine used for punching, verifying, printing, and reading 96-column cards. The 5496 has a self-contained keyboard that can be used to prepare cards manually.

In manual mode, cards can be punched or verified using the 5496 keyboard. Printing is standard on this unit, with the printing appearing on the card in three tiers above the punched data.

In terminal mode, the 5496 can be used as an output device to punch out data from the 2772 buffer or as an input device to read data into the 2772 buffer. When the 5496 is used in terminal mode as an output device, the card can also be printed.

IBM 545 Output Punch

The IBM 545 Output Punch is a stand-alone card punch unit that can operate in one of two modes. In autopunch mode, the 545 provides punched-card output for the 2770 system, under control of the system. In keypunch mode, the 545 operates as an independent keypunch, under control of the operator and the program card.

The 545 is available in two models:

- Model 3 is a punch-only, nonprinting unit.
- Model 4 is a punch and print unit.

For either model, the skipping and release speed is 80 columns per second.

IBM 1053 Printer

The IBM 1053 Printer Model 1 can be used as an output printer for the 2770 system instead of the IBM 2213 Printer.

IBM 2203 Printer

The IBM 2203 Printer is a freestanding bar printer, available with either a 39- 52- or 63-character set. It is used as an output device on the 2770 system and is available in two models:

- Model A1 operates at 300-425 lines per minute.
- Model A2 operates at 230-300 lines per minute.

Except for speed, the operation of both models is identical.

IBM 2213 Printer

The IBM 2213 Printer is an output printer for the 2770 system. It is available in two models:

- Model 1 has a 15-inch friction-feed platen similar to that used on a typewriter.
- Model 2 has vertical format control and a 12-track tape-controlled tractor carriage, which provides complete flexibility of vertical forms movement under 2772 control.

IBM 2265 Display Station

The IBM 2265 Display Station Model 2 with keyboard and display adapter performs input and output functions for the 2770 system.

The cathode ray tube (CRT) can display 960 characters in one of two formats:

- 12 lines, 80 characters per line
- 15 lines, 64 characters per line

IBM 1017 Paper Tape Reader

The IBM 1017 Paper Tape Reader is a tabletop input unit that reads punched paper tape for input to the 2770 system.

IBM 1018 Paper Tape Punch

The IBM 1018 Paper Tape Punch is a tabletop output device that punches paper tape.

IBM 50 Magnetic Data Inscriber

The IBM 50 Magnetic Data Inscriber is a freestanding input device that reads data from magnetic tape and checks for correct parity. It also performs automatic tape threading and tape rewinding. It records keyboard-entered data on tape in magnetic tape cartridges. Each cartridge contains 100 feet of 16mm tape, and the maximum capacity of each cartridge is 23,000 characters.

IBM 1255 Magnetic Character Reader

The IBM 1255 Magnetic Character Reader is a freestanding input device that can be attached by cable to the IBM 2772 Multi-Purpose Control Unit of the 2770 system. The 1255 reads magnetic-ink-character coded data from intermixed card and paper documents of various sizes and thicknesses into the 2770 system in home or line mode.

The 1255 reads and transfers data into the two buffers of the 2772 control unit, automatically stopping and alternating between buffers after reading a predetermined number of documents. The number of documents held by the 1255 buffer is determined by the number of characters in each document.

The 1255 is used primarily in bank demand-deposit applications. The reader performs on-line data capture from MICR (Magnetic Ink Character Recognition) encoded checks for updating demand-deposit accounts. The 1255 can be used independently for off-line check sorting.

Compatible Units

Over appropriate communications facilities, the 2770 can communicate with:

- IBM System/360 Model 25 through 91* or Model 195 (through the IBM 2701 Data Adapter Unit or IBM 2703 Transmission Control equipped for binary synchronous communication)
- IBM System/360 Model 25 (through an Integrated Communications Attachment special feature equipped for binary synchronous transmission)
- Another IBM 2770 Data Communication System

The 2770 may be multidropped on the same line with other binary synchronous devices:

- IBM System/360 Model 20
- IBM System/3
- IBM 1130 Computing System with a Synchronous Communications Adapter special feature
- IBM 1800 Data Acquisition and Control System
- IBM 2715 Transmission Control Unit
- IBM 2780 Data Transmission Terminal

The 2770 can communicate point-to-point with:

- Another 2770 Data Communication System
- IBM 1130 Computing System with a Synchronous Communications Adapter special feature.
- IBM 1800 Data Acquisition and Control System
- IBM 2780 Data Transmission Terminal
- IBM System/360 Model 25 through 91* or Model 195 equipped for binary synchronous communication
- IBM System/370 Model 155 or 165 equipped for binary synchronous communication

*Excluding Model 44 and excluding Model 67, except when the 67 operates in 65 mode.

Transmission Speed

Binary synchronous transmission permits the 2770 system to transmit data at rates of 1200, 2000, 2400, or 4800 bps. The transmission speed depends on the communications facilities used.

Media

No more than two types of media (in addition to the keyboard and printer) can be installed in each 2770 system from the five media available:

- Card
- Paper tape
- Display
- Magnetic tape
- Magnetic Ink Character Recognition (MICR) paper document.

Transmission Code

The customer has a choice of two codes: EBCDIC or USASCII.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

IBM 2770 System Summary, GA27-3014
Systems Components: IBM 2770 Data Communication System, GA27-3013
IBM 2770 Configurator, GA27-3018
IBM 2770 Data Communication System, Installation Manual–Physical Planning, GA27-3019.

IBM 2780 DATA TRANSMISSION TERMINAL

The IBM 2780 Data Transmission Terminal (Figure 19) permits large volumes of card data to be transmitted at

Figure 19. IBM 2780 Data Transmission Terminal

line speeds, with punched-card or printed output. The 2780 can also be used off-line to perform card reader-to-printer listing operations.

Components

The 2780 is available in four models, allowing a variety of functions. Figure 20 shows the input/output capabilities of each model.

MODEL NO.	INPUT	OUTPUT
1	Punched Card	Printed Page
2	Punched Card	Printed Page and Punched Card
3	No Input	Printed Page
4	Punched Card	Punched Card

Figure 20. Input/Output Functions of the 2780 by Model Number

Control Unit

The 2780 control unit provides two buffers, a line buffer and an I/O buffer. The line buffer services the transmission line; the I/O buffer services the card reader and one output unit, either the printer or the punch. The two buffers enable the read, punch, and print operations to be performed without delaying communications.

Printer

The 2780 printer is a horizontal-bar-type line printer. It provides printed output when operating on-line, and can also be used for card reader-to-printer listing, off-line. The maximum speed of the printer is 300 lines per minute, depending on the communications facilities used and the special features that are installed.

Card Reader/Punch

The card reader/punch unit provides the 2780 with card input and card output capabilities. The card reader/punch unit reads up to 400 cards per minute and punches up to 355 cards per minute, depending on the number of card columns that are read or punched, the code used (Six-Bit Transcode, EBCDIC, or USASCII), and the communications facilities used.

Compatible Units

The 2780 uses the binary synchronous method of communication. It can communicate in half-duplex mode over appropriate communications facilities to:

- Another 2780
- An IBM 1130 Computing System
- An IBM System/360 Model 20 with a Binary Synchronous Communications Adapter special feature
- An IBM System/360 Model 25 with a properly featured Integrated Communications Attachment (ICA)
- An IBM System/360 Model 25 through 85 or Model 195 or an IBM System/370 Model 155 or 165 via a suitably equipped IBM 2701 Data Adapter or IBM 2703 Transmission Control
- An IBM 2770 Data Communication System
- An IBM 1800 Data Acquisition and Control System with a Communications Adapter special feature

Transmission Speed

The transmission speed of the 2780 can be 1200, 2000, 2400, or 4800 bps, depending on the communications facilities used and the special features installed.

Input/Output Rate

Figure 21 shows the maximum input/output rates of the 2780. Actual terminal throughput depends upon the transmission rate, the size of the character set used, the type of line facility and data set used, and the special features installed on the 2780.

MODEL NO.	READ (INPUT)	PUNCH (OUTPUT)	PRINT (OUTPUT)
1	400 Cards/Min	Not Applicable	240 Lines/Min
2	400 Cards/Min	160 Columns/Sec	240 Lines/Min
3	Not Applicable	Not Applicable	240 Lines/Min
4	400 Cards/Min	160 Columns/Sec	Not Applicable

Figure 21. Input/Output Rates of the IBM 2780 Data Transmission Terminal

Transmission Code

One of three transmission codes may be selected for the 2780: Six-Bit Transcode, EBCDIC, or USASCII. The same code must be used for all terminals on the same communications line.

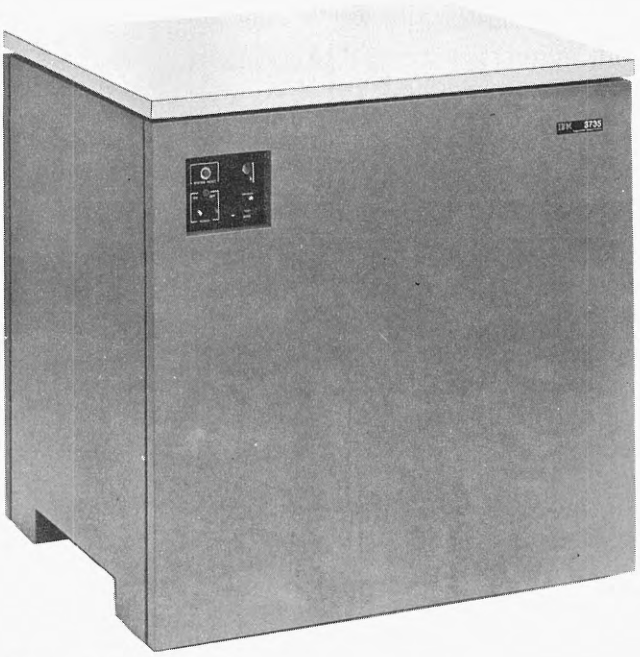
Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description: IBM 2780 Data Transmission Terminal,* GA27-3005.

IBM 3735 PROGRAMMABLE BUFFERED TERMINAL

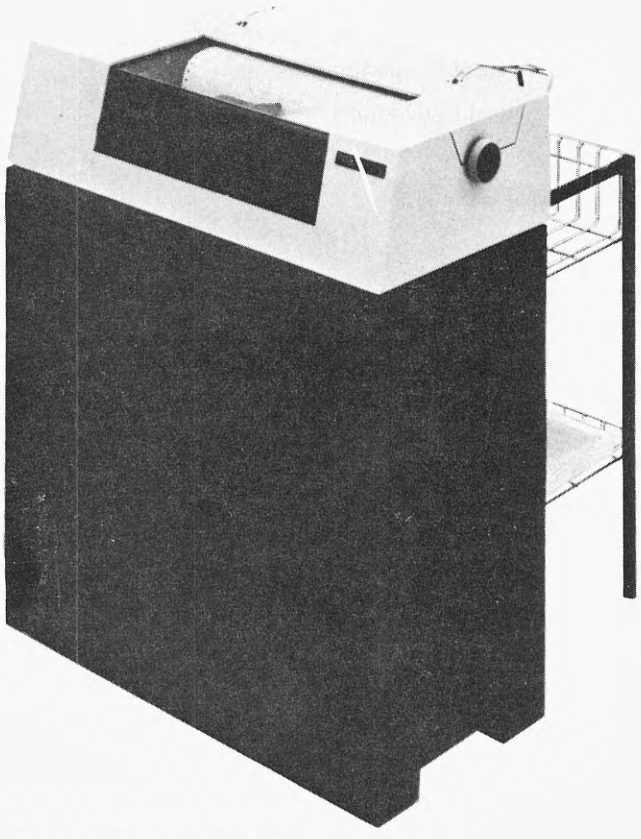
The IBM 3735 Programmable Buffered Terminal (Figure 22) combines the power and flexibility of the interactive terminal with the efficiency of batch transmission. Designed primarily for those applications using preprinted (fixed-format) forms and batch processing, the 3735 can, through its own internal program, be tailored to fit the requirements of a wide variety

IBM Selectric I/O-II Printer-Keyboard



Control Unit for the 3735

IBM 5496 Data Recorder



IBM 3286 Printer Model 3

Figure 22. IBM 3735 Programmable Buffered Terminal Components

of data processing environments. Some applications of the 3735 are:

- Source Recording
- Batch Transmission
- Inquiry
- Combined off-line source recording and on-line inquiry

The 3735 stores, under program control, information generated during document preparation, for later transmission to the CPU. Typically, a full day's operator output can be stored for unattended transmission to the CPU, and the CPU can return processed data for use in the next day's operation.

Two levels of program control are used on the 3735. Form Description Programs (FDPs), generated by the customer, specify the functions desired for processing a specific form type. A Terminal Control Program (TCP), recorded in the control unit during manufacture, interprets the FDPs and provides detailed terminal control. This two-level approach relieves the customer of much of the detailed programming required to provide the many functions available on the 3735; a minimum FDP may exercise thousands of TCP instructions.

During document preparation, the 3735 can provide:

- Operator guidance
- Programmed forms control
- Automatic print-element positioning
- Format and edit operations
- Logical decisions
- Arithmetic operations
- Power typing

Data security features assist in protecting data and preventing unauthorized use of the 3735.

COMPONENTS

The basic configuration of the 3735 consists of an IBM Selectric ® I/O-II Printer-Keyboard and a desk-side control unit (Figure 22). The 5496 Adapter feature allows attaching the IBM 5496 Data Recorder to the 3735. The 3286 Adapter feature allows attaching the IBM 3286 Printer Model 3 to the 3735.

3735 Control Unit

A magnetic disk storage device within the control unit contains the Terminal Control Program, the Form Description Programs, and the user data storage.

Except for turning power on, the 3735 control unit requires no operator attention, and familiarity with its internal operation is unnecessary for operation of the 3735.

IBM Selectric ® I/O-II Printer-Keyboard

The Selectric ® I/O-II printer has the desirable features of other Selectrics. The keyboard is the operator's interface to the 3735 and contains all operating controls and operator guidance indicators used during normal processing.

IBM 5496 Data Recorder

The 5496 is a freestanding, buffered, operator-oriented, key-entry unit used to create and read the 96-column punched card.

IBM 3286 Printer Model 3

The 3286 is mounted on its own stand and is cable-connected to the 3735 control unit. Providing printed output at a speed of 66 characters per second, the 3286 is useful in applications requiring higher printing speed than that provided by the Selectric ® I/O-II.

Designed for use with continuous forms, the 3286 is equipped with one of three possible pinfeed platens which allow print line lengths of 120, 126, or 132 characters.

COMPATIBLE UNITS

Over appropriate communications facilities, the 3735 can communicate in half-duplex mode with a System/360 or a System/370 CPU as shown in Figure 23.

TRANSMISSION CODE

The 3735 operates with either EBCDIC or ASCII transmission code.

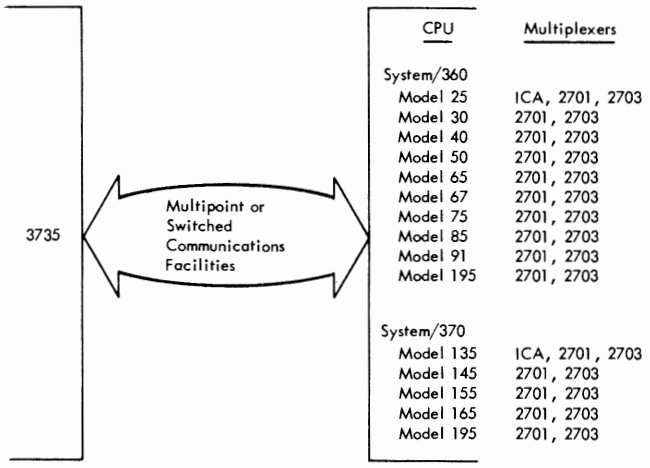


Figure 23. 3735-CPU Compatibility

TRANSMISSION SPEED

Binary synchronous transmission permits the 3735 to transmit data at rates of 1200, 2000, and 2400 bps. Transmission speed depends on the communications facilities used.

RELATED PUBLICATIONS

For additional information, refer to the following IBM Systems Reference Library publications:

IBM 3735 Programmable Buffered Terminal Concept and Application, GA27-3043.

IBM Remote Multiplexers and Communication Terminals Installation Manual–Physical Planning, GA27-3006.

These systems are designed to meet the specific teleprocessing requirements of specialized industrial and business applications. Such applications include data collection, industrial process control, and transaction recording.

IBM 357 DATA COLLECTION SYSTEM

The IBM 357 Data Collection System (Figure 24) collects data from remote input stations, using prepunched cards, plastic identification badges, manual entry units, and data cartridges, and transmits such data to a central location, where the information is punched into cards. These cards are then used as input to a data processing system.

Components

The specific units of the 357 system are:

- IBM 13 Badge Punch
- IBM 24 Card Punch
- IBM 26 Printing Card Punch
- IBM 357 Input Station
- IBM 358 Input Control Unit
- IBM 360 Clock Read-Out Control
- IBM 361 Read-Out Clock
- IBM 372 Manual Entry
- IBM 373 Punch Switch
- IBM 1032 Digital Time Unit

IBM 13 Badge Punch

The IBM 13 Badge Punch is a manually fed numeric unit that punches up to ten digits of coded data into plastic identification badges. These badges can then be read by an IBM 357 Input Station (Model 4 or Model 6).

IBM 24 Card Punch

The IBM 24 Card Punch is the output station of the 357 system. The 24 receives data over multiwire cable from up to 20 input stations and punches the data into output cards. The 24 is also used for manual keypunching; the setting of the Auto/Keypunch switch on the keyboard determines the mode of operation. The punching speed is 20 columns per second.

- Model 7 is an alphameric punch.
- Model 8 is a numeric punch.

IBM 26 Printing Card Punch

The IBM 26 Printing Card Punch performs the same functions as the 24 and, in addition, it can print each character along the top edge of the card column as the column is punched. Punching speed is 18 columns per second.

- Model 7 is an alphameric punch.
- Model 8 is a numeric punch.

IBM 357 Input Station

The IBM 357 Input Station is available in three models, which can be interconnected to meet specific reporting needs.

- Model 4 (Badge Reader) accepts plastic identification badges containing up to ten digits of numeric data. Badges are inserted and removed manually. Badge readout is card-controlled.
- Model 5 (Serial Card Reader) reads numbers, letters, special characters, and instruction codes from standard, unscored 80-column cards. Cards are inserted and removed manually, one at a time.
- Model 6 (Card Reader and Badge Reader) combines serial-reader and badge-reader functions.

  Note: Models 5 and 6 can be equipped with either an IBM 372 Manual Entry or an IBM 374 Cartridge Reader.

IBM 358 Input Control Unit

The IBM 358 Input Control Unit links up to 20 IBM 357 Input Stations (in any combination of models) with either one 24 or one 26 punch (or two card punches, if an IBM 373 Punch Switch is used). Data, in the form of pulses, is sent over multiwire cable, and is then punched on the 24 or 26 punch.

IBM 360 Clock Read-Out Control

The IBM 360 Clock Read-Out Control controls the time readout from the IBM 361 Read-Out Clock to up to 35 card punches and to as many as 10, simultaneously.

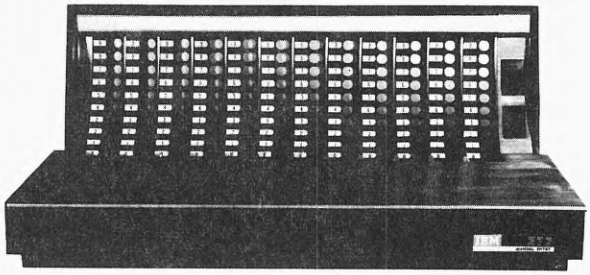
IBM 361 Read-Out Clock

The IBM 361 Read-Out Clock provides a means of punching time into output cards. The Clock Read-In special feature is required on the 24/26 punches to read time into the card punch.

Note: The 360 and 361 must be used together.

IBM 374 Cartridge Reader

IBM 357 Input Station Model 6



IBM 372 Manual Entry

IBM 1032 Digital Time Unit

IBM 26 Output Station

Figure 24. IBM 357 Data Collection System Components

IBM 372 Manual Entry

The IBM 372 Manual Entry unit can be attached to the IBM 357 Input Station Model 5 or 6 to provide numeric entry. The 372 is available in three models:

- Model 1 has six numeric slide columns.
- Model 2 has nine numeric slide columns.
- Model 3 has twelve numeric slide columns.

Each slide has 11 character positions (0 to 9, and a blank). Slides can be locked in any position or can be restored to blank after each transmission. The readout is card-controlled.

IBM 373 Punch Switch

The IBM 373 Punch Switch provides automatic switching to a second output punch, if the first fails to duplicate, jams, or runs out of cards.

IBM 374 Cartridge Reader

The IBM 374 Cartridge Reader can be cable-connected to a 357 Input Station Model 5 or 6, and provides entry of variable numeric data into the system by a 12-column data cartridge. The cartridge can be preset and manually inserted and removed. The readout is card-controlled.

IBM 1032 Digital Time Unit

The IBM 1032 Digital Time Unit provides time-of-day information to as many as twenty 24/26 punches.

- Model 1 has a synchronous motor drive which advances the clock once each minute.
- Model 2 is equipped with a self-regulating impulse-driven clock and it operates from the user's master clock system; the clock advances once each minute.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

System Operation Reference Manual, IBM 357 Data Collection System, GA27-1027
IBM 357 Data Collection System Installation Manual – Physical Planning, GA24-1032
IBM 357/1030/2790 Badge Specifications, GA21-9028

IBM 1030 DATA COLLECTION SYSTEM

The IBM 1030 Data Collection System (Figure 25) provides data collection in an off-line configuration and two-way data communication in an on-line configuration. This system shortens the gap between the time data is originated and the time when it becomes available for use. Some applications of the 1030 system are:

- Scheduling
- Dispatching
- Inventory Maintenance
- Attendance Reporting
- Purchasing
- Production Control

The 1030 collects information from diverse reporting stations and transmits it to a processing system for recording, processing, and analyzing.

The 1030 is available in both on-line and off-line configurations. During on-line operation, the 1030 can communicate with the IBM System/360 or the IBM System/370. Off-line, the 1030 has no connection to the System/360 or the System/370.

Components

The specific units of the 1030 system are:

- IBM 1031 Input Station
- IBM 1032 Digital Time Unit
- IBM 1033 Printer (on-line systems only)
- IBM 1034 Card Punch (off-line systems only)
- IBM 1035 Badge Reader

Note: The IBM 13 Badge Punch can be used to punch the plastic identification badges for the 1030 system.

IBM 1031 Input Station

The IBM 1031 Input Station is a remote data input station. It enables the 1030 system to accept input data in various forms: alphameric data from standard 80-column punched cards or numeric data from punched plastic badges, manual entry units, and data cartridges. As many as 24 1031 stations (in various models) can be attached to one 1030 system.

IBM 1032 Digital Time Unit

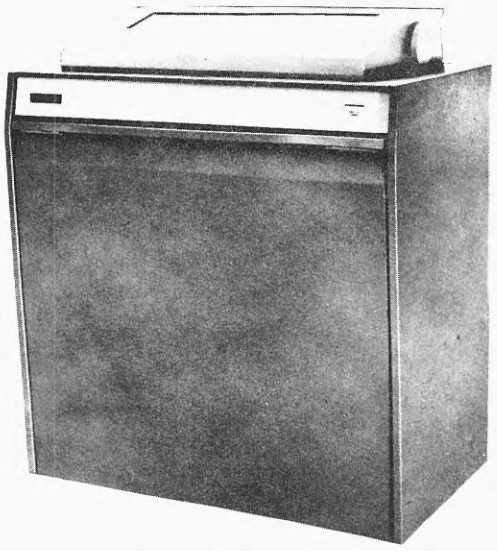
The IBM 1032 Digital Time Unit provides time-of-day information (in hours and hundredths of hours). Model 1 has a synchronous motor-driven clock that advances once each minute. Model 2 has an impulse-driven clock that operates from the user's master clock system; the clock advances once each minute. The 1032 can be used off-line or on-line.

IBM 1033 Printer

The IBM 1033 Printer provides printed page output at remote locations during on-line operation only.

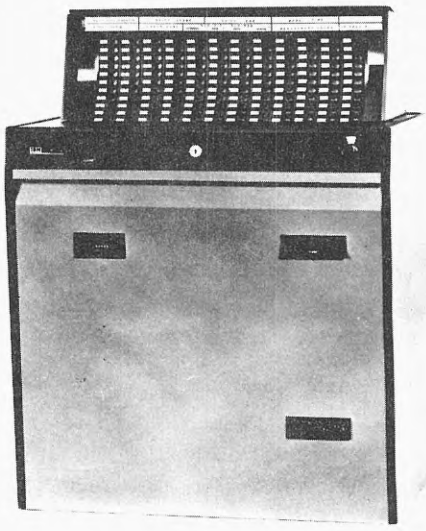
IBM 1034 Card Punch

The IBM 1034 Card Punch is the transmission control and output unit for the off-line 1030 system. When the 1030 operates off-line, the 1034 coordinates transmission from remote stations and punches standard 80-column cards as output records.

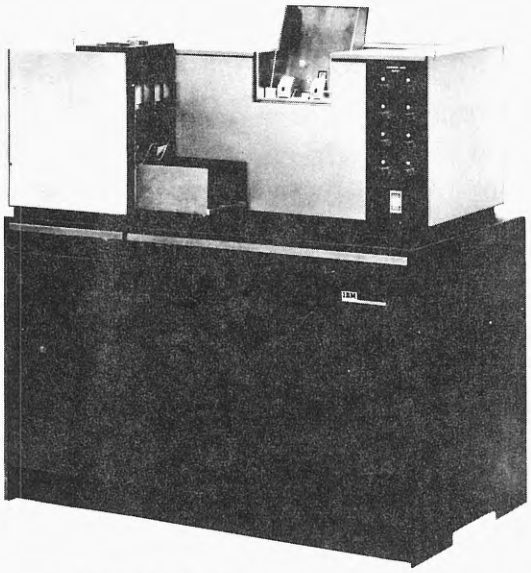


IBM 1033 Printer

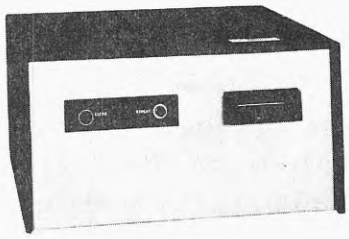
IBM 1032 Digital Time Unit



IBM 1031 Input Station Model 4



IBM 1034 Card Punch



IBM 1035 Badge Reader

Figure 25. IBM 1030 Data Collection System Components

IBM 1035 Badge Reader

The IBM 1035 Badge Reader is an input unit that transmits numeric data from 22-column badges via a 1031 Input Station. As many as four 1035 readers can be connected to one 1031.

Compatible Units

The 1030 operates in half-duplex mode over appropriate communications facilities. Communication is multipoint. The 1030 can communicate with:

- IBM System/360 Model 25 through 85 or Model 195 or IBM System/370 Model 155 or 165 (via an IBM 2701 Data Adapter Unit or an IBM 2702/2703 Transmission Control)
- IBM System/360 Model 25 (with the Integrated Communications Attachment special feature)
- IBM 1240/1401/1440 Data Processing System (via a 1026)
- IBM 1240 or 1440 Data Processing System (via 1448)

Transmission Speed

Transmission speed is 600 bps.

Transmission Code

The transmission code is binary coded decimal.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

IBM 1030 Data Collection System, GA24-3018
IBM 1030 Data Collection System with 1440 - 1448 for 1410 - 7010 Data Processing Systems, GA22-6763
IBM 1030 Data Collection System Installation Manual – Physical Planning, GA24-3021.

IBM 1060 DATA COMMUNICATION SYSTEM

The IBM 1060 Data Communications System (Figure 26) performs many of the accounting functions associated with savings account transactions. Thus, it improves services in such institutions as savings banks, savings and loan associations, and commercial banks.

The 1060 brings the speed and power of the modern computer to the teller's windows. With this system, any teller at any window, at the bank's main office or at any of its widely scattered branch offices, can have access to all necessary records for any customer.

During processing, the 1060 provides the customer with an accurate, updated record of his account, furnishes the teller this same information, and accumulates running totals of the day's transactions.

In addition to operating on-line with a CPU, the 1060 can operate off-line, thus permitting the teller to continue customer transactions even if communication with the CPU is not possible. When on-line communication is re-established, transactions that were handled off-line are entered into the CPU to update account records.

A typical savings and loan application is as follows: When a customer wishes to make a deposit to his account, he presents his passbook and deposit to a teller. The teller enters the customer's account number, old balance, and deposit amount into the system.

If the 1060 is operating on-line, this information, along with identifying codes, is transmitted to the CPU and then printed on the 1062 terminal record tape. The CPU updates the customer's account and assembles a message for transmission to the 1060. This message contains the information for updating the customer's passbook and instructions for adding into, or subtracting from, teller accumulators in the 1061.

A similar operation is performed when the 1060 is off-line, except that a punched program control tape instructs the IBM 1061 Control Unit to perform the arithmetic functions necessary for processing transactions and developing new balances, and all customer transactions proceed normally without reference to the CPU. When communication between the two systems is restored, the off-line transactions are entered into the teleprocessing system for updating by a batch run of the data processing system.

Components

The 1060 Data Communication System consists of two types of units, the IBM 1061 Control Unit and the 1062 Teller Terminal.

IBM 1061 Control Unit

The IBM 1061 Control Unit contains the communications line control, code translators, and balance accumulators for the system. The 1061 also provides power to the teller terminals.

The 1061 is available in two models:

- Model 1, which controls one 1062-1
- Model 2, which controls one 1062-1 and one 1062-2 or, with the Off-Line feature, controls two 1062-1's

The Off-Line feature for the Model 2 provides arithmetic and control circuits for adding machine, teller totals, and off-line functions for the second 1062-1.

IBM 1062 Teller Terminal

The IBM 1062 Teller Terminal has a keyboard with data entry and transaction keys for operator entry and control. It also has a printer similar to an IBM Selectric® typewriter for printing on the terminal record tape and on the customer's passbook or other document inserted in the document feed.

IBM 1062 Teller Terminal

IBM 1061 Control Unit

Figure 26. IBM 1060 Data Communication System Components

After the system has verified the accuracy of the transmitted information and updated its records, the 1062 might, for example, print on the customer's passbook any unposted interest, the current transaction amount, and the new balance. The 1062 can also print a complete record of the transmitted and received data on the teller's terminal record tape. Each 1062 terminal can serve two tellers.

The 1062 is available in two models:

- Model 1, which is used with the 1061-1 or 1061-2 and which provides full off-line, adding machine, and teller functions, as well as on-line operation
- Model 2, which is used only with a 1061-2 and which provides on-line operation only.

Compatible Units

The 1060 communicates over appropriate communications facilities, in half-duplex mode, with:

- IBM System/360 Model 25 through 85 and Model 195 (via an IBM 2701 Data Adapter Unit or an IBM 2702/2703 Transmission Control)
- IBM System/360 Model 25 equipped with the Integrated Communications Attachment special feature
- IBM 1240 Bank Data Processing System (via an IBM 1026 Transmission Control Unit)
- IBM 1401/1440 Data Processing System (via an IBM 1026 Transmission Control Unit)
- IBM 1450 Bank Data Processing System (via an IBM 1026 Transmission Control Unit)

Transmission Speed

The transmission speed is 134.5 bps over appropriate communications facilities.

Transmission Code

The 1060 uses binary coded decimal (BCD) code.

Related Publications

For further information, refer to the following IBM Systems Reference Library publications:

IBM 1060 Data Communication System, GA24-3034
IBM 1060 Configurator, GA21-9001
IBM 1060 Data Communication System Installation Manual – Physical Planning, GA21-9010.

IBM 1070 PROCESS COMMUNICATION SYSTEM

The IBM 1070 Process Communication System (Figure 27) is a data acquisition and control system designed for two-way data communication between remote process locations and a central data processing system.

For example, the 1070 can collect and transmit data at refineries, chemical plants, paper mills, steel mills, or manufacturing areas.

When the 1070 is connected to the IBM System/360, the two systems form an information system that assists management in supervising quality and production, scheduling jobs, and performing on-line accounting.

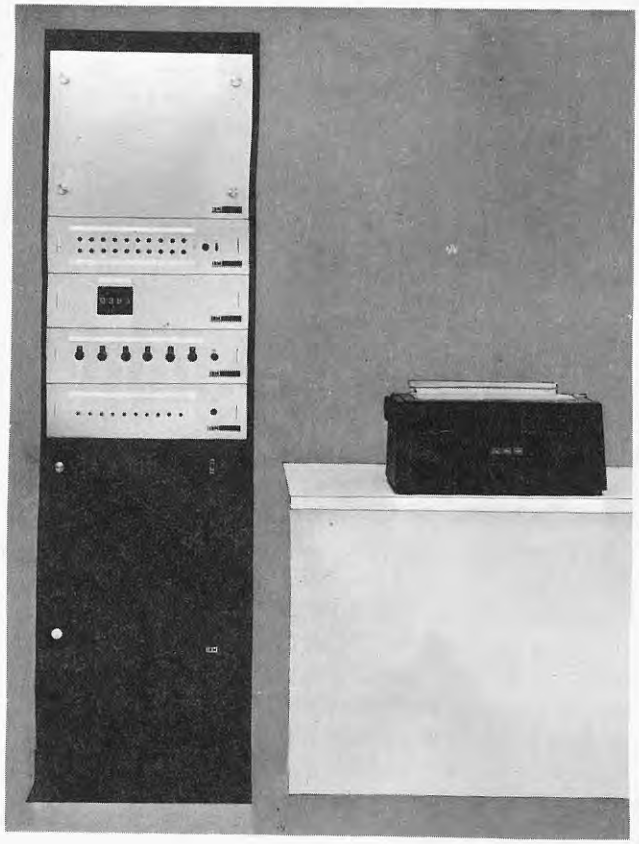


Figure 27. IBM 1070 Process Communication System

Components

The 1070 system consists of the following units:

- IBM 1071 Terminal Control (one required in each 1070 system)
- IBM 1072 Terminal Multiplexer (one required in each 1070 system)
- IBM 1073 Terminal Units
- Any of the following process operator console units:

  IBM 1074 Binary Display
  IBM 1075 Decimal Display
  IBM 1076 Manual Binary Input
  IBM 1077 Manual Decimal Input
  IBM 1078 Pulse Counter
  IBM 1053 Printer

IBM 1071 Terminal Control

The IBM 1071 Terminal Control is the control center of the 1070 system. The basic 1071 contains logic for addressing 50 input/output points, and this capacity can be expanded to 300 points, in modules of 50. (A point is a termination for a pair of wires.) The 1071 controls all operator communication units. Model 1 transmits at 134.5 bps; Model 2, at 600 bps.

1072 Terminal Multiplexer

The IBM 1072 Terminal Multiplexer provides terminal posts and switching relays for up to 50 input/output points.

IBM 1073 Terminal Units

The IBM 1073 Terminal Units sense and control the opening and closing of switches that operate user devices.

Process Operator Console Units

Process operator console units allow the operator at a processing location to enter binary and decimal data, and to count events or rates represented by pulses or switch closures from user input devices. These units also provide binary or decimal display or printed output.

Compatible Units

The 1070 can communicate in half-duplex mode over appropriate communications facilities with:

- IBM System/360 Model 25 through 85 or Model 195 (via an IBM 2701 Data Adapter Unit or an IBM 2702/2703 Transmission Control)
- IBM System/360 Model 25 equipped with the Integrated Communications Attachment special feature
- IBM 1440 Data Processing System (via an IBM 1026 Transmission Control Unit)

For off-line operation, the 1070 can be used with an IBM 1050 Data Communication System or another IBM 1070 Process Communication System.

Transmission Speed

The 1070 system transmits and receives data at 134.5 or 600 bps, depending on the model of the 1071 that is used. The 1050 and 1070 systems operating at 134.5 bps, may be mixed on the same communications line.

Transmission Code

The transmission code is binary coded decimal (BCD).

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

IBM 1070 Process Communication System, GA26-5989
IBM 1070 Process Communication System Configurator, GA26-5963
IBM 1070 Process Communication System Installation Manual – Physical Planning, GA26-5872

IBM 2790 DATA COMMUNICATION SYSTEM

The IBM 2790 Data Communication System (Figure 28) a two-way, in-plant data communication and production reporting system. It provides for a rapid transfer of informa-

tion from Data Entry Units at various plant locations to Area Stations at key locations and then on to a system controller and the CPU.

Among the many applications for this system are status reporting on jobs, equipment, and inventory; inquiry by plant personnel; machine production monitoring; production and inventory control; message routing; and attendance reporting.

The system controller for the 2790 can be either an IBM 2715 Transmission Control Unit Model 1 or Model 2, an IBM 1801 or 1802 Processor-Controller, or a 5010 Processor-Module in System/7. With a 2790 system on a 2715 Transmission Control Unit in a local configuration (directly attached to an IBM System/360 or an IBM System/370 multiplexer channel), the 2715-1 must be used. Data can be collected off-line and stored in the 2715 for later batch transmission to the remote System/360 or System/370 CPU. With a 2790 system on an 1800 system, the 1800/2790 adapter is installed in the 1826-2/3. With a 2790 system on a System/7, the adapter for attaching the System/7 to the 2790 is installed in the 5012 Multifunction Module.

Data transmission between area stations and the system controller is over a closed two-wire loop. This loop begins with the 2715 (or with the 2790 adapter on the 1800 system or on System/7), goes to the area stations, and terminates back in the adapter.

I/O devices of the 2790 system—1053 Printers, 2795/2796/2797 Data Entry Units, 2798 Guidance Display Units (except on the 1800 system), 1035 Badge Readers, and customer-provided digital input devices—can be connected to 2791 Area Stations. 1053s, 2795s, 2796s, and 2797s can be connected to 2793 Area Stations.

Components

The 2790 system and its controller consist of various combinations of the following units:

- System Controller (an IBM 2715 Transmission Control Unit, and IBM 1801 or 1802 Processor-Controller, or a 5010 Processor Module).
- IBM 2791 and 2793 Area Stations
- IBM 2795, 2796, and 2797 Data Entry Units
- IBM 2798 Guidance Display Unit
- IBM 1053 Printers
- IBM 1035 Badge Readers
- IBM 2740-1 Communication Terminal (locally attached to the 2715)
- Customer-provided digital devices

Note: The IBM 13 Badge Punch can be used to punch the plastic identification badges for the 2790 system.

IBM 2715 Transmission Control Unit

The IBM 2715 Transmission Control Unit is a buffered, core-storage, microcoded control unit system controller attached to the 2790 system loop. Operators enter information at the Area Stations, at Data Entry Units, at Guidance Display Units, and at 1035 Badge Readers. The System/360 or System/370 CPU can be interrogated from an Area Station to obtain information for printing at the 1053 Printer attached to the Area Station or for visual display at the 2791 Area Station or the 2798 Guidance Display Unit.

The 2715-1 is used for direct local attachment to a System/360 or System/370 multiplexer channel. As far as the CPU program is concerned, this device appears as a terminal, using the binary synchronous method of communication.

The 2715-2 is used in a remote configuration and has a BSC adapter that permits communication, through communications facilities in either a point-to-point or multipoint network configuration, with the System/360 or System/370 CPU.

As a standard feature, the real time clock in the 2715 provides time-of-day information for display at the 2791 Area Station and the 2798 Guidance Display Unit, and for time-stamping. For example, an employee entering an attendance or labor-reporting transaction can see the time when he enters it. The same time is then associated with the entry stored in the system controller. Time can also be provided by the customer's master clock, thereby synchronizing the 2715 clock with other clocks in the customer's location.

IBM 2791 Area Station

The IBM 2791 Area Station Model 1 accepts input data from 1035 Badge Readers, from 2795, 2796, or 2797 Data Entry Units, from 2798 Guidance Display Units, or from customer-provided digital input devices. Data can be locally entered from a self-contained 80-column card reader, a badge reader, or from keys in the operator panel. Visual output is provided on the self-contained six-digit display. A 1053 Printer can be attached to provide printed output.

The 2791-2 has no facilities for input from, or output to, external devices, but it provides the same local input/output facilities as the Model 1.

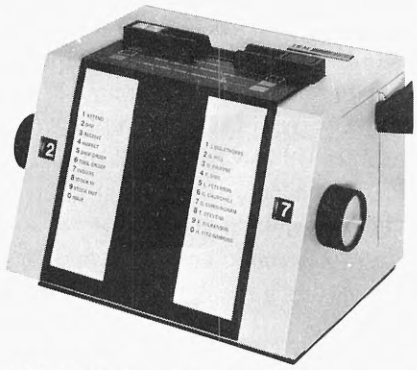
Both models have an operator panel containing program-controlled indicators to direct the operator in entering data. The six-digit visual display for data entered by keys on the panel permits verification of keyed data before transmission to the system controller. Time-of-day from the system controller is also displayed.

IBM 2793 Area Stations

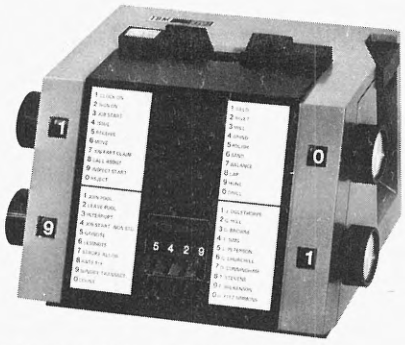
The IBM 2793 Area Station is a controller for 2795, 2796, and 2797 Data Entry Units and 1053 Printers. The 2793 has no operator panel and no facilities for local input/output of data.

IBM 2795, 2796, and 2797 Data Entry Units

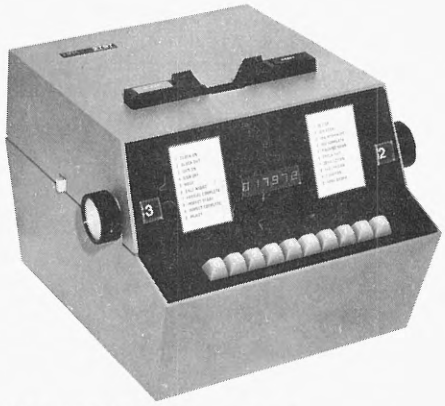
The IBM 2795, 2796, and 2797 Data Entry Units are compact units for reporting job or machine status or production in-



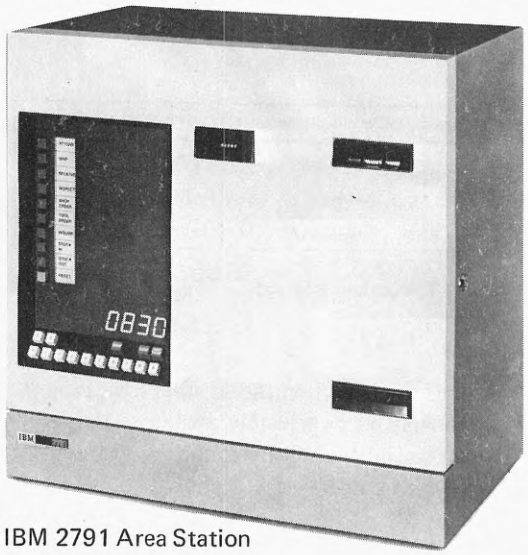
IBM 2795 Data Entry Unit



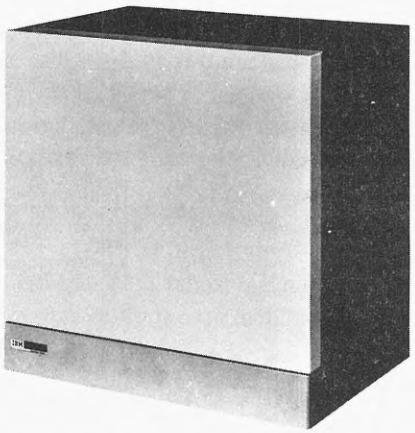
IBM 2796 Data Entry Unit



IBM 2797 Data Entry Unit

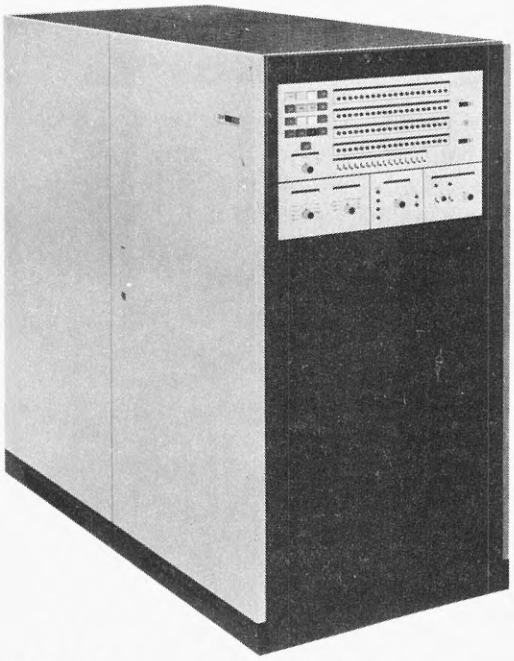


IBM 2791 Area Station



IBM 2793 Area Station

IBM 2798 Guidance Display Unit



IBM 2715 Transmission Control Unit

Figure 28. IBM 2790 Data Communication System Components

formation. These units are designed for use by production personnel at their work location. Data can be entered via the 2795 by card, badge, or two 10-position rotary switches. Data can be entered via the 2796 by card, badge, four 10-position rotary switches, or by a keyed entry of up to four digits. Data can be entered via the 2797 by card, badge, two 10-position rotary switches, or by a keyed entry of up to six digits.

IBM 2798 Guidance Display Unit

The IBM 2798 Guidance Display Unit is an input/output device used for interactive inquiry/response transactions. Applications include initial data entry, updating, and inquiry functions requiring alphameric data input and output related to information concerning personnel, parts, machines, vendors, time, quality, etc.

Transactions are entered by a keyboard and are received by a 16-position visual display and/or up to 16 lines of information on two eight-line guidance panels. The 16-character display permits verification of keyed data before it is transmitted to the system controller, and it also displays time-of-day.

IBM 1053 Printer

The IBM 1053 Printer attached to the 2791 or 2793 Area Station provides printed system output at the rate of about 15 characters per second.

IBM 1035 Badge Reader

The IBM 1035 Badge Reader can be attached to the IBM 2791-1 Area Station and can read up to 10 columns from IBM 357/1030/2790-type identification badges.

IBM 2740 Communication Terminal

The IBM 2740-1 Communication Terminal, attached directly to the IBM 2715 Transmission Control Unit, provides printed message output. The 2740 attachment is standard on the 2715-2 and optional on the 2715-1.

Compatible Units

In a remote configuration, the IBM 2790 Data Communication System can communicate with:

- IBM System/360 Models 22, 25, 30, 40, 50, 65, 67 (in 65 mode), 75, 85, or 195 via a 2701 or 2703.
- IBM System/360 Model 25 equipped with the Integrated Communications Adapter special feature
- IBM System/370 Model 135, 145, 155 or 165 via a 2701 or 2703

In a local configuration, the 2790 system is attached to the IBM 2715 Transmission Control Unit, Model 1 which, in turn, is attached directly to a System/360 or a System/370 multiplexer channel.

Transmission Speed

Transmission speed over a communications line varies, depending on the communications facilities and communications method used, as shown in Figure 29.

TYPE OF COMMUNICATION	COMMUNICATIONS LINES	TRANSMISSION SPEED (bps)
Point-to-Point	Nonswitched	1200, 2000, or 4800 bps
Point-to-Point	Switched	1200 or 2000 bps
Multipoint	Nonswitched	1200, 2000, 2400, or 4800 bps

Figure 29. IBM 2790 Transmission Speeds

Transmission Code

The EBCDIC code is used both on the 2790 system loop and on the common-carrier or privately owned communications line. Data transmitted on the communications line must be in transparent mode.

Related Publications

For additional information, refer to the following IBM System Reference Library publications:

IBM 2790 System Summary, GA27-3016
Component Description: IBM 2790 Data Communication System, GA27-3015
IBM 2790 Data Communication System Installation Manual – Physical Planning, GA27-3017
IBM 2790 Configurator, GA27-3021
IBM 1800 Data Acquisition and Control System, Functional Characteristics, GA26-5918
IBM 357/1030/2790 Badge Specifications, GA21-9028

These devices, with their multiple line capacities, enable a central processing unit to communicate with and control many remote terminal devices, including other CPU's.

IBM 1026 TRANSMISSION CONTROL UNIT

The IBM 1026 Transmission Control Unit (Figure 30) can be attached to the IBM 1401/1440 Data Processing System or the IBM 1240/1450 Bank Data Processing System to provide the system with communications capabilities. Up to four 1026 units can be connected to each processing system. The 1026 controls communication on point-to-point or multipoint configurations.

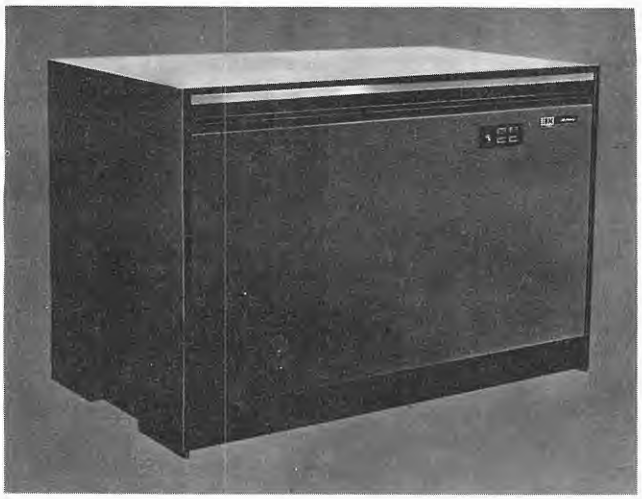


Figure 30. IBM 1026 Transmission Control Unit

Special Features

Special features available for the 1026 include:

- *Automatic Answering,* which provides the 1026 with the ability to automatically answer incoming calls from remote 1050s
- *Automatic Calling,* which provides the 1026 with the ability to automatically initiate outgoing calls to remote 1050s, over appropriate communications facilities

Transmission Speed

The 1026 communicates with the following terminal devices, at various speeds:

- IBM 1030 Data Collection System at 600 bps
- IBM 1050 Data Communication System at 134.5 bps
- IBM 1060 Data Communication System at 134.5 bps
- IBM 1070 Process Communication System Model 1 at 134.5 bps, Model 2 at 600 bps (to communicate with the 1070, the 1026 must be attached to a 1440 system).

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM 1026 Transmission Control Unit,* GA24-3244.

IBM 2701 DATA ADAPTER UNIT

The IBM 2701 Data Adapter Unit (Figure 31) can be attached to an IBM System/360 Model 25 through 85 or Model 195 or to an IBM System/370 Model 155 or 165, via a multiplexer, selector, or block multiplexer channel for communication with local and remote I/O devices. Thus, the data communications and data acquisition capabilities of the System/360 and System/370 are expanded.

Up to eight 2701 units can be attached to a System/360 or System/370 channel. Combinations of attachment features allow the 2701 to communicate with a wide variety of terminal devices (Figure 30). With appropriate features, the 2701 can accommodate up to:

- Four half-duplex start/stop communications lines, with speeds of up to 600 bps, or
- Four (with a maximum of two operating simultaneously) half-duplex synchronous communications lines, with speeds of up to 230,000 bps, or
- Two half-duplex, start/stop display communications lines, with speeds of 1200 or 2400 bps, or
- Four parallel data acquisition devices with word widths of 16 to 48 bits.

Special Features

Special features available for the 2701 include:

- *Autocall,* which provides automatic dialing capabilities on appropriate communications facilities
- *Second Channel Interface,* which provides for the attachment of a second System/360 channel to the 2701
- *Dual Code,* available only with BSC attachment features, which allows either of two codes to be program-selected
- *Station Selection,* which allows the 2701 with a BSC Attachment feature to operate as a tributary station on a leased communications line

- *Transparency,* which provides the capability for a BSC Attachment to transmit and receive 8-bit binary data as well as EBCDIC or USASCII codes, or 6-bit binary data as well as Six-Bit Transcode

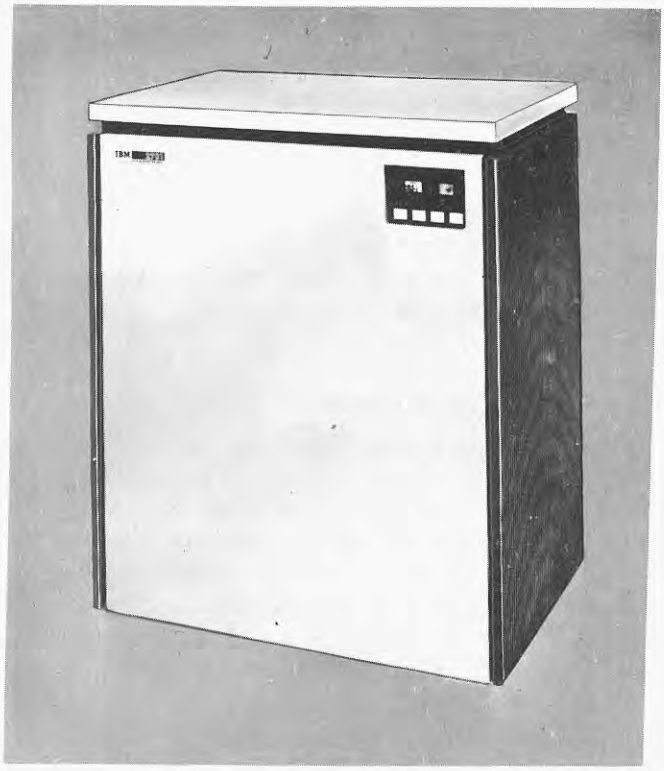


Figure 31. IBM 2701 Data Adapter Unit

ASYNCHRONOUS	
Terminal	Speed (bps)
1030 System	600.0
1050 System 1060 System 2740 Model 1 2741	134.5
1070 System 2740 Model 2	134.5 600.0
AT&T 83B2/83B3 WU 115A	45.5 56.9 74.2
TWX 33/35	110.0
SYNCHRONOUS TRANSMIT/RECEIVE (STR)	
Terminal	Speed (bps)
1013 1130 7702	1200.0 2000.0 2400.0
7711	1200.0 2000.0 2400.0 19.2K 40.8K
REMOTE DISPLAY	
Terminal	Speed (bps)
2845/2265 2848/2260	1200.0 2400.0

BINARY SYNCHRONOUS (BSC)	
Terminal	Speed (bps)
System/3 System/360 Model 20	1200.0 2000.0 2400.0 4800.0 19.2K 40.8K 50.0K
System/360 Model 25 1130 System 1800 System 2703 2780 2790 System	1200.0 2000.0 2400.0 4800.0
2701	1200.0 2000.0 2400.0 4800.0 19.2K 40.8K 50.0K 230.4K
2770 System	1200.0 2000.0 2400.0 4800.0

Figure 32. IBM 2701 Terminal Compatibility

Transmission Speed

The transmission speeds range from 45.5 bps to 230,000 bps.

Transmission Code

The code used for communication can be specified as binary coded decimal (BCD), PTTC/BCD, PTTC/EBCD, USASCII, EBCDIC, or Six-Bit Transcode.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description: IBM 2701 Data Adapter Unit,* GA22-6864.

IBM 2702 TRANSMISSION CONTROL

The IBM 2702 Transmission Control (Figure 33) can be attached to a System/360 Model 25 through 85 or Model 195 or to an IBM System/370 Model 155 or 165, via a multiplexer channel, for communication with remote I/O devices. Because it offers greater line capacities than the 2701, the 2702 provides a natural growth path for those systems communicating with start/stop terminal devices.

Up to 15 communications lines can be attached to the basic 2702, and all lines can operate simultaneously at speeds of up to 180 bps. The Speed Extension feature allows communication at speeds of up to 600 bps. The 31-Line Expansion feature increases the number of lines that can be attached to 31.

Special Features

The 2702 can be feature-equipped to communicate with the terminals listed in Figure 34. Additional features available for the 2702 include:

- *Autocall,* which provides automatic dialing capabilities on appropriate communications facilities
- *Auto Poll,* which provides automatic continuation of polling after a negative response, without program interruption
- *1032 Attachment,* which makes possible the attachment of an IBM 1032 Digital Time Unit

Transmission Speed

The transmission speed ranges from 45.5 to 600 bps.

Transmission Code

Transmission codes are binary coded decimal , PTTC/BCD, or PTTC/EBCD.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/360 Component Description, IBM 2702 Transmission Control,* GA22-6846.

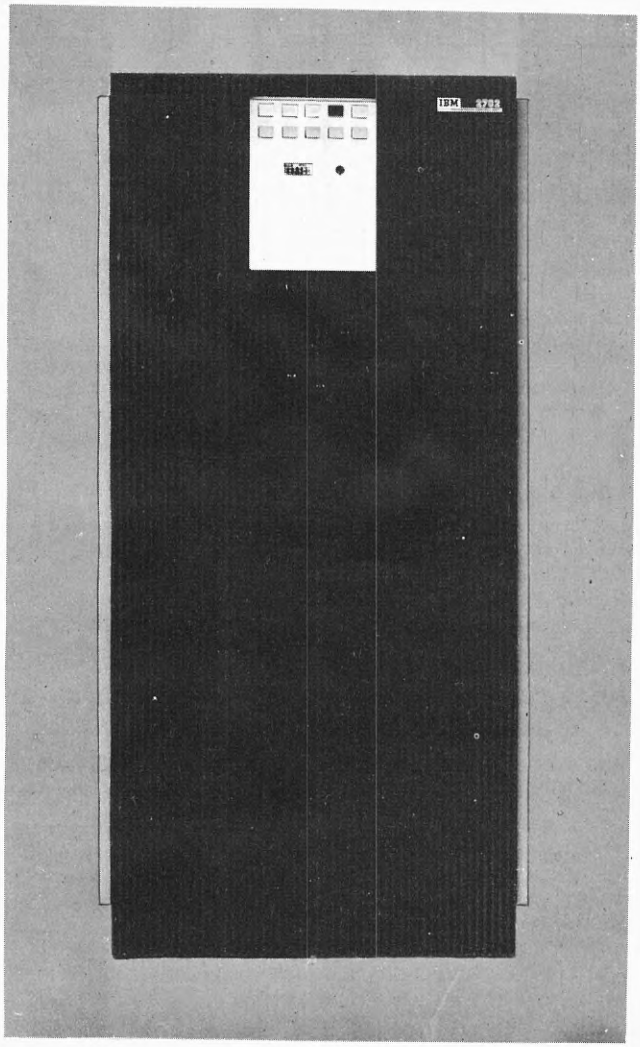


Figure 33. IBM 2702 Transmission Control Unit

ASYNCHRONOUS		ASYNCHRONOUS	
Terminal	Speed (bps)	Terminal	Speed (bps)
1030 System	600.0	2740 Model 2	75.0 134.5 600.0
1050 System	75.0 134.5		
1060 System 2740 Model 1 2741	134.5	AT&T 83B2/83B3 WU 115A	45.5 56.9 74.2
1070 System	134.5 600.0	TWX 33/35	110.0

Figure 34. IBM 2702 Terminal Compatibility

IBM 2703 TRANSMISSION CONTROL

The IBM 2703 Transmission Control (Figure 35) can be attached to an IBM System/360 Model 25 through 85 or Model 195 or to an IBM System/370 Model 155 or 165, via a multiplexer channel, for communication with remote I/O devices. Line expansion features for both asynchronous and synchronous communication allow the 2703 to provide control for large communications networks serving a wide variety of terminal devices. As many as 176 asynchronous, or as many as 48 synchronous, communications lines can be attached to the 2703.

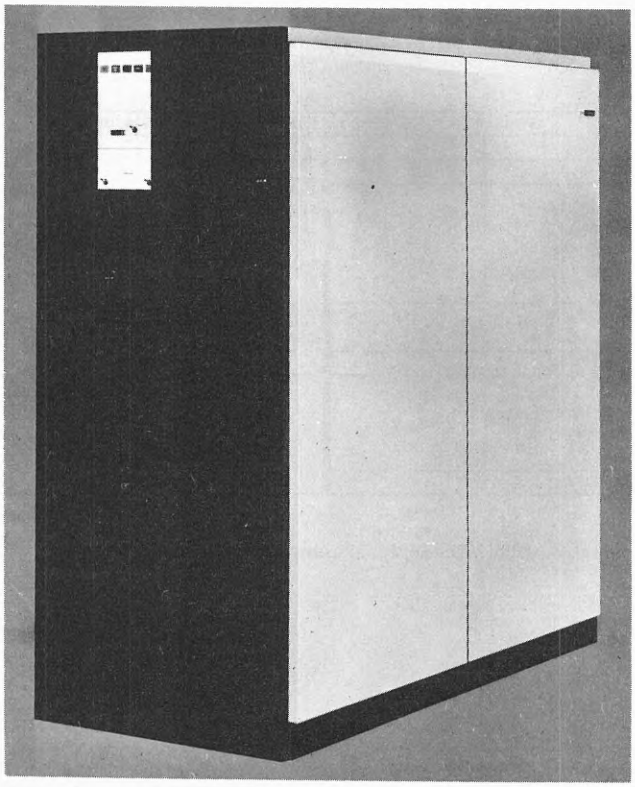


Figure 35. IBM 2703 Transmission Control Unit

Special Features

The 2703 can be feature-equipped to communicate with the terminals listed in Figure 36. Other features available for the 2703 include:

- *Station Selection,* which allows a BSC-equipped 2703 to operate as a tributary station on a leased communications line
- *Autocall,* which provides automatic dialing capabilities on appropriate communications facilities

- *Two Processor Attachment,* which allows switching the 2703 channel interface between two IBM System/360 multiplexer channels.

Transmission Speed

The transmission speeds range from 45.5 to 4800 bps.

Transmission Code

Transmission codes with which the 2703 can operate are binary coded decimal, PTTC/BCD, PTTC/EBCD, USASCII, EBCDIC, or Six-Bit Transcode.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description, IBM 2703 Transmission Control,* GA27-2703.

ASYNCHRONOUS		BINARY SYNCHRONOUS (BSC)	
Terminal	Speed (bps)	Terminal	Speed (bps)
1030 System	600.0		
1050 System 1060 System 2740 Model 1 2741	134.5	System/3 System/360 Model 20 System/360 Model 25 1130 System 1800 System 2701 2703 2715 Model 2 2780	1200.0 2000.0 2400.0 4800.0
1070 System 2740 Model 2	134.5 600.0		
2740 Model 2	75.0		
AT&T 83B2/83B3 WU 115A	45.5 56.9 74.2	2770 System	1200.0 2000.0 2400.0 4800.0
TWX 33/35	110.0		

Figure 36. IBM 2703 Terminal Compatibility

SYSTEM/360 MODEL 25 INTEGRATED COMMUNICATIONS ATTACHMENT (ICA)

Installation of this feature on the IBM System/360 Model 25 allows the Model 25 to communicate with the devices listed in Figure 37. Combinations of up to 24 low-speed and two medium-speed communications lines can be attached to the Model 25 by means of the communications attachment.

Low-speed lines use the start-stop method of transmission; medium-speed lines use the binary synchronous method, with either EBCDIC or USASCII transmission code.

ASYNCHRONOUS		BINARY SYNCHRONOUS (BSC)	
Terminal	Speed (bps)	Terminal	Speed (bps)
1060 System 2740 Model 1 2741	134.5	System/3 System/360 Model 20 System/360 Model 25 1130 System 1800 System 2701 2703 2715 Model 2780	1200.0 2000.0 2400.0 4800.0
1050 System	75.0 134.5		
2740 Model 2	75.0 134.5 600.0		
1070	134.5 600.0		
TWX Model 33/35	110.0		
AT&T 83B2/83B3 WU 115A	45.5 56.9 74.2	2770 System	1200.0 2000.0 2400.0 4800.0

Figure 37. Integrated Communications Attachment for IBM System/360 Model 25 Terminal Compatibility

Special Features

Special features available with the Integrated Communications Attachment include:

- *Autocall,* which provides automatic dialing capabilities on appropriate communications facilities
- *Dual Communications Interface,* which allows attachment of two communications lines to a single synchronous communications interface. (Model 25 programming controls which of the two lines is operational.)

Transmission Speed

The transmission speeds range from 45.5 to 4800 bps.

Transmission Code

Using binary synchronous communications, the transmission code can be specified as either EBCDIC or USASCII.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/360 Model 25 Integrated Communications Attachment Feature,* GA24-3526.

By the addition of a communications adapter, data processing systems that are used primarily for normal data processing applications can also be used for batch transmission of data to other CPU's or terminals.

IBM 1130 COMPUTING SYSTEM SYNCHRONOUS COMMUNICATIONS ADAPTER

This special feature of the IBM 1131 Central Processing Unit permits the 1130 system to function as a remote processor terminal within a communications network. The adapter operates in either binary synchronous (BSC) mode or in synchronous transmit/receive (STR) mode. It communicates with devices listed in Figure 38 and transmits and receives data in half-duplex mode over appropriate communications facilities. Auto-answer capability and an audible alarm are included.

Transmission Code

The adapter operates entirely under control of the 1130 stored program. While most applications require BSC or STR line control procedures to match existing equipment, line control procedures and character coding are not limited by the functional electronics; therefore, compatibility with a variety of devices is possible.

The mode of operation is limited only by the stored program, and only one mode can be accommodated at any one time.

IBM-supplied programs (Type I programs) are available to support BSC and STR operation only.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM 1130 System Summary,* GA26-5917.

BINARY SYNCHRONOUS (BSC)		SYNCHRONOUS TRANSMIT/RECEIVE (STR)	
Terminals	Speed (bps)	Terminals	Speed (bps)
System/360 Model 20 System/360 Model 25 1800 System 2701 1131 2703 2780	1200.0 2000.0 2400.0 4800.0	System/360 Model 20 1131 2701	1200.0 2000.0 2400.0
2770 System	1200.0 2000.0 2400.0 4800.0	1013	600.0 1200.0 2000.0 2400.0

Figure 38. IBM 1130 Computing System – Terminal Compatibility

IBM 1800 DATA ACQUISITION AND CONTROL SYSTEM BINARY SYNCHRONOUS COMMUNICATIONS ADAPTER

This adapter equips the IBM 1800 Data Acquisition and Control System for communication with the terminal devices shown in Figure 39. Installed as a special feature within the IBM 1826 Data Adapter Unit, the adapter provides binary synchronous communications in point-to-point and multipoint configurations. Up to four communications adapters can be attached to an 1800 system. Two line adapters can be attached to each communications adapter.

Transmission Speed

The transmission speeds range from 1200 to 4800 bps.

Transmission Code

Either the EBCDIC or USASCII transmission code can be specified.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM 1800 System Summary,* GA26-5920.

BINARY SYNCHRONOUS (BSC)		BINARY SYNCHRONOUS (BSC)	
Terminal	Speed (bps)	Terminal	Speed (bps)
System/360 Model 20 System/360 Model 25 1130 System (EBCDIC only) 1800 System 2701 2703	1200.0 2000.0 2400.0 4800.0	2770 System	1200.0 2000.0 2400.0 4800.0
		2780	2000.0 2400.0 4800.0

Figure 39. IBM 1800 Data Acquisition and Control System – Terminal Compatibility

IBM SYSTEM/3 BINARY SYNCHRONOUS COMMUNICATIONS ADAPTER

The IBM System/3 Binary Synchronous Communications Adapter (BSCA) makes the System/3 an efficient, low-priced, and highly flexible communications-oriented computer.

Compatible Units

In addition to processing local data, a BSCA-equipped System/3 can communicate over appropriate communications facilities, in half-duplex mode, with:

- Another System/3
- IBM System/360 Model 25 through 85 or Model 195 with an attached 2701 or 2703
- IBM System/360 Model 20 equipped with the Binary Synchronous Communications Adapter
- IBM System/360 Model 25 with the Integrated Communications Attachment special feature
- IBM System/370 Model 155 or 165 with an attached 2701 or 2703

When operating on a switched network, the adapter can automatically answer incoming calls if the attached data set supports this capability.

Special Features

Features available for the System/3 BSCA include:

- *Text Transparency,* which allows the BSCA to transmit and receive 8-bit binary data as well as EBCDIC-coded data (available with the EBCDIC code only)
- *Station Selection,* which allows the System/3 to operate as a tributary terminal in a multipoint network
- *Auto Call,* which provides automatic dialing capabilities, under program control, over appropriate communications facilities

Transmission Speed

The transmission speeds range from 600 to 50,000 bps.

Transmission Code

Either the EBCDIC or USASCII transmission code can be specified by the customer.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/3 Card and Disk System Components Reference Manual,* GA21-9103.

IBM SYSTEM/360 MODEL 20 BINARY SYNCHRONOUS COMMUNICATIONS ADAPTER

Installation of this feature makes the IBM System/360 Model 20* a versatile processor terminal within a communications network. The IBM System/360 Model 20, equipped with the BSCA, can communicate with the terminal devices listed in Figure 40.

Special Features

Special features available to tailor the Model 20 to the desired network configuration include:

- *Automatic Calling,* which provides automatic dialing capabilities on appropriate communications facilities
- *Full Transparent Text Mode,* which makes possible transmitting or receiving 8-bit binary data as well as either the standard EBCDIC or USASCII code.
- *Station Selection,* which allows the Model 20 to operate as a tributary station within a multipoint network
- *High Speed,* which allows operation at speeds of 19,200; 40,000; or 50,000 bps.

Transmission Speed

The transmission speeds range from 600 to 50,000 bps.

Transmission Code

Either EBCDIC or USASCII transmission code can be specified by the customer.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *IBM System/360 Model 20 Input/Output Control System and the Communications Adapter, Operating Procedures,* GC24-9004.

BINARY SYNCHRONOUS (BSC)		BINARY SYNCHRONOUS (BSC)	
Terminal	Speed (bps)	Terminal	Speed (bps)
System/360 Model 25 1130 (EBCDIC only) 1800 2703 2780	1200.0 2000.0 2400.0 4800.0	System/3 System/360 Model 20 2701	600.0 1200.0 2000.0 2400.0 4800.0
2770 System	1200.0 2000.0 2400.0 4800.0		19.2K 40.8K 50.0K

Figure 40. IBM System/360 Model 20 – Terminal Compatibility

*The adapter can be installed only on Model 20 submodel C2, BC2, D2, C4, BC4, D4, C5, BC5, D5, DC6, or E5 with a serial number of 20,000 or above.

These units give voice responses to inquiries made to a CPU. They are used in applications that require no permanent record of the response.

IBM 7770 AUDIO RESPONSE UNIT

The IBM 7770 Audio Response Unit (Figure 41) provides a voice reply to a received inquiry, thereby expanding the IBM System/360's output media to include the spoken word. Inquiries can be entered from an IBM 2721 Portable Audio Terminal, an IBM 1001 Data Transmission Terminal, an IBM 1092 or 1093 Programmed Keyboard, or other suitable devices via appropriate communications facilities.

The 7770 receives inquiries in digital form and transfers them to the CPU of the IBM System/360 or IBM System/370. The CPU composes a reply, in the form of a coded message, to the 7770.

The 7770 translates the coded message into audio form, selecting words from a prerecorded vocabulary stored on a magnetic drum inside the 7770. The selected words are then spoken back to the inquirer over the communications line. The user hears the reply to his inquiry in ordinary spoken words. He can thus obtain a quick voice reply that gives him price quotations, inventory amounts, credit standings, or similar information.

The 7770 has a basic vocabulary of 32 American-English words. This vocabulary can be expanded, in 16-word increments, to a maximum of 128 words.

The 7770 can be connected to the multiplexer channel of an IBM System/360 Model 25, 30, 40, 50, 65, 75, 85, or 195 or to an IBM System/370 Model 155 or 165.

The 7770 can accommodate up to four communications lines. This basic capacity can be expanded, in four-line increments, to a maximum of 48 lines.

Related Publications

For additional information, refer to the IBM Systems Reference Library publication, *Component Description: IBM 7770 Audio Response Unit, Models 1, 2, and 3,* GA27-2712.

IBM 7772 AUDIO RESPONSE UNIT

The IBM 7772 Audio Response Unit performs the same functions as the IBM 7770, but differs in its methods of generating an audio response as well as in the number of words in its vocabulary and the number of communications lines it can accommodate.

The 7772 does not select a reply from a prerecorded vocabulary as the 7770 does. Instead, the 7772 generates its own sounds from sequences of bytes that contain digitally coded voice information.

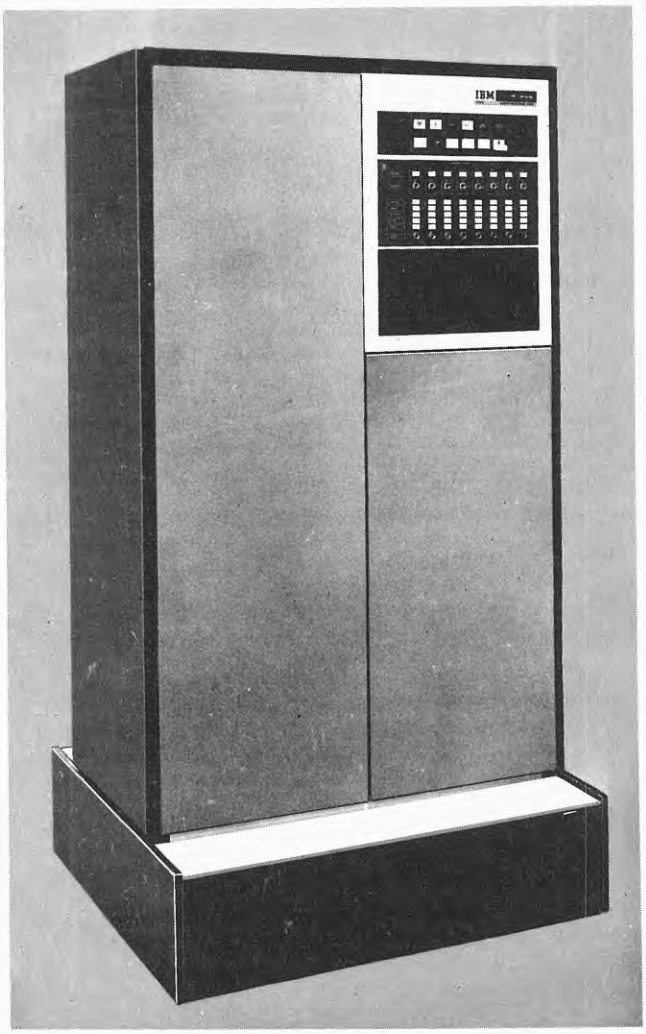


Figure 41. IBM 7770/7772 Audio Response Unit

The basic vocabulary of the 7772 is larger than that of the 7770. The 7772 has a vocabulary library of about 1000 words, which can be stored on punched cards or magnetic tape.

A maximum of two communications lines can be attached to the basic 7772. This capacity is expandable, in two-line increments, to a maximum of eight lines.

Related Publications

For additional information, refer to the following IBM Systems Reference Library publications:

IBM System/360 Component Description – IBM 7772 Audio Response Unit, GA27-2711
IBM 7772 Audio Response Unit Vocabulary, GA27-2710.

All standard IBM communications products transfer data in half-duplex mode; that is, the transmit and receive operations are not performed simultaneously. Most IBM communications products can be modified in the field to operate on either half-duplex or duplex* facilities. Some products require duplex facilities for their proper operation.

Operation with half-duplex facilities requires a longer turnaround time than with duplex facilities, since a modem "clear-to-send" delay occurs before each transmit operation. Duplex facilities permit operation in continuous carrier mode, either at both stations of a point-to-point system or at the control station of multipoint systems.

In continuous carrier mode, a signal is maintained on the line at all times, thereby eliminating the modem clear-to-send delays. Operation in this mode, at both stations in point-to-point systems and at the control station in multipoint systems, is strongly recommended as a means of increasing system throughput.

Although duplex service normally requires four-wire communications facilities, some modems, by their unique frequency-modulation techniques, can provide duplex operation on two- or four-wire half-duplex facilities.

Four-wire facilities do not necessarily permit duplex operation; for example, half-duplex facilities may have single four-wire bridging at intermediate dropping points. For duplex operation, two separate four-way, four-wire bridges are required.

When service is provided by the telephone company, a request for four-wire, half-duplex lines may result in being charged for duplex service. Channels and services provided by the Western Union Telegraph Company normally are furnished on a four-wire, end-to-end basis; thus, for operation as just described, half-duplex rates should apply.

Figure 42 shows the types of communications facilities; the speeds; and the types of data sets for connection of IBM start-stop, binary synchronous, and display devices to common-carrier and privately owned facilities. For example, Figure 42 indicates that the IBM 1030 Data Collection System can be feature-equipped to operate on communications facilities D2 and G1. The definitions of these facilities are also shown. Similarly, Figure 42 shows that the IBM 2701 Data Adapter Unit can be feature-equipped for operation on facilities A1 through A6, B1 through D2, and D5 through G1. In addition, the 2701 can be equipped to operate with automatic calling attachments on facilities C1 through C5.

Consult your IBM marketing representative for information on the required features and for similar information on STR devices.

*"Duplex" indicates the capability for simultaneous transmission in both directions; it is synonymous with "full-duplex".

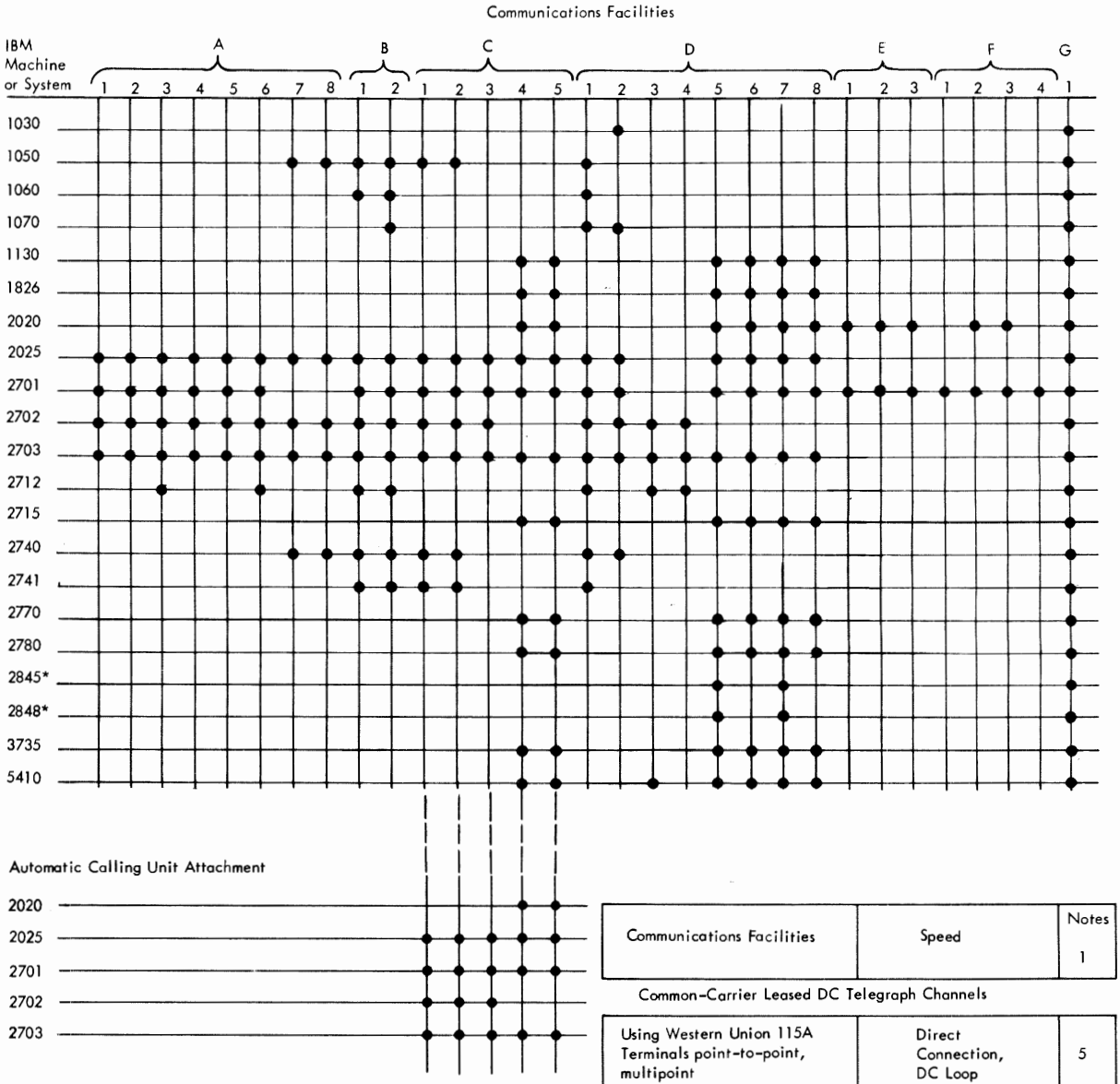
IBM LINE ADAPTERS

IBM Line Adapters perform modulation/demodulation functions on private-line communications facilities, at speeds of up to 600 bps.

Figure 43 will assist in selecting the proper IBM Line Adapter for specific machine configurations. For applications listed in Figure 43 in which either the two-wire or four-wire version may be used, select the line adapter with the clear-to-send delay (line adapter turnaround time) best suited to your application.

Systems Reference Library publication, *Planning and Installation of a Data Communications System Using IBM Line Adapters,* GA24-3435, is the best source of information on communications facilities requirements for IBM Line Adapters. A few pertinent requirements relative to common-carrier facilities are:

1. Point-to-point systems using IBM Leased or Shared Line Adapters require common-carrier Type 3002 Service or equivalent privately owned communications facilities, or better.
2. Multipoint systems using IBM Leased or Shared Line Adapters require four-wire communications facilities. (A multipoint system is defined as one having a communications channel connected to three or more data communication devices.) Half-duplex facilities may be utilized unless duplex facilities are required for situations described in item 3 following. Specifying four-wire half-duplex lines in most areas results in being charged for half-duplex service. The customer should consult the carrier to clarify whether half-duplex or duplex rates apply. The grades of facilities required for multipoint systems are shown in Figure 44.
3. Duplex facilities are required for systems using IBM Leased or Shared Line Adapters with the 2741 with Interrupt feature and also for multipoint or point-to-point systems in which it is desired that a 'continuous carrier' signal be maintained on the line from the control station, thereby eliminating the control station clear-to-send delays.
4. Two- and four-wire versions of the IBM Line Adapter cannot be intermixed on the same communications facility.



* Specify Four-Wire Duplex

Definitions of Facilities:

Communications Facilities		Speed	Notes 1
Common-Carrier, Leased, DC Telegraph Channels			
Using Telephone Company 83B2/83B3 Terminals point-to-point, multipoint		Direct Connection, DC Loop	4
A1	Type 1002	45.5 bps	
A2	Type 1002	56.9 bps	
A3	Type 1005	74.2 bps	

Communications Facilities		Speed	Notes 1
Common-Carrier Leased DC Telegraph Channels			
Using Western Union 115A Terminals point-to-point, multipoint		Direct Connection, DC Loop	5
A4	Type 1002	45.5 bps	
A5	Type 1002	56.9 bps	
A6	Type 1005	74.2 bps	
Using IBM Terminals		Direct Connection, DC Loop	
A7	Type 1005 point-to-point, multipoint	75 bps	
A8	Type 1005 point-to-point, multipoint	75 bps	
Common Carrier, Leased Subvoice-grade Channels			
B1	Type 1006 point-to-point, multipoint	134.5 bps	
B2	Type 1006 point-to-point, multipoint	134.5 bps	

Figure 42. Communications Facilities Requirements for IBM Communications Products (Part 1 of 2)

Communications Facilities		Speed	Notes
			1
Common Carrier Public Switched Facilities			
C1	Switched Telephone Network	134.5 bps	
C2	CE-TWX Network	134.5 bps	6
C3	CPT-TWX Network with Mdl 33/35 TTY Terminals (8 level code only)	110 bps	6
C4	Switched Telephone Network	1200 bps	
C5	Switched Telephone Network	2000 bps	
Common Carrier Leased Voice Grade Channels			
D1	Type 3002 pt-to-pt, multipoint	134.5 bps	
D2	WU Type 3002 (specify 4-wire Duplex) pt-to-pt, multipoint	600 bps	
D3	Type 3002 with C1 Conditioning (specify 4-wire Duplex) pt-to-pt only	1200 bps	
D4	Type 3002 with C2 Conditioning (specify 4-wire Duplex) pt-to-pt only	1500 bps	
D5	WU Type 3002 with C1 Conditioning (or better) (2 or 4-wire) pt-to-pt, multipoint	1200 bps	
D6	Type 3002 with C2 Conditioning (or better) (2 or 4-wire) pt-to-pt, multipoint	2000 bps	
D7	Type 3002 with C2 Conditioning (or better) (2 or 4-wire) pt-to-pt, multipoint	2400 bps	2
D8	Type 3002 (specify 4-wire Duplex) pt-to-pt only	4800 bps	3
Common Carrier Type 8800 Wideband Service			
E1	Type 8801-40.8K bps Wideband Service pt-to-pt only	40.8K bps	
E2	Type 8801-50K bps Wideband Service pt-to-pt only	50K bps	
E3	Type 8803-19.2K bps Wideband Service pt-to-pt only	19.2K bps	
Common Carrier Type 5700 and 5800 Wideband Services			
F1	Type 5701 pt-to-pt only	40.8K bps	
F2	Type 5702 pt-to-pt only	50K bps	
F3	Type 5703 pt-to-pt only	19.2K bps	
F4	Type 5751 pt-to-pt only	230.4K bps	
Privately Owned Communications Facilities			
G1	Privately Owned Communications Facilities equivalent to, or better than, those listed above. For IBM devices listed in Figure 43, privately owned facilities conforming to specifications in SRL GA24-3435 can be used.		

Notes:

1. Speed shown is IBM machine operating speed.
2. See SRL GA27-3004, General Information, Binary Sychronous Communications, for restrictions and limitations of 2400 bps operation.
3. Grade of line required is dependent upon modem (data set). The customer should consult the modem manufacturer for line requirements. Clocking for 4800 bps must be furnished by the modem.
4. The 83B2/83B3 Systems are Telephone Company Data Selective Calling (line control) Systems which include Telephone Company terminal equipment.
5. The 115A System is a Western Union Data Selective Calling (line control) System which includes Telephone Company terminal equipment.
6. "CE-TWX" indicates all "Customer Equipment"; for example , an IBM 2025, 2701, 2702, or 2703 communicating with similarly arranged terminals such as the IBM 1050, via the TWX network. "CPT-TWX" indicates "Customer Provided Terminal" on the TWX network, such as an IBM 2025, 2701, 2702, or 2703 communicating with conventional Telephone Company provided TWX terminals.

Figure 42. Communications Facilities Requirements for IBM Communications Products (Part 2 of 2)

5. For multipoint systems of ten or more points, the customer should make a service inquiry to the common carrier to assure availability of service to the desired number of points.

NON-IBM DATA SETS

Non-IBM data sets may be used to perform the modulation/demodulation functions on switched network and on private line facilities when IBM Line Adapters or Modems are not used. In addition, IBM Telegraph Adapters are used to interface directly to common-carrier telegraph lines; in this case, no data sets are required.

USER RESPONSIBILITIES

The user must arrange for price quotations, installation, and cost (initial and recurring) of common-carrier communications facilities and services. He is responsible for toll charges incurred during installation and maintenance of the IBM equipment. When using IBM Line Adapters, the user should investigate the cost of providing alternate voice service to facilitate installation and maintenance.

The user must be prepared to relinquish the system for service when servicing aids or available error message printouts do not permit localization of a malfunction to the communications facility or terminal location. For further information, consult your IBM marketing representative.

APPLICATION	NETWORK CONFIGURATION	IBM LINE ADAPTER	VERSION NO. OF WIRES	CLEAR TO SEND DELAY (milliseconds)
Local Use -- up to 4.75 miles: 2702/2703 to 2740	Multipoint or Point-to-Point	Limited Distance Line Adapter Type 1A	2	25-66
2702/2703 to 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point			
2702/2703 to 2741 (w or w/o Interrupt)	Point-to-Point			
2712 to 2740	Multipoint or Point-to-Point	Limited Distance Line Adapter Type 1B	4	25-66
2712 to 2741 (w or w/o Interrupt)	Point-to-Point			
Limited Distance -- up to 8 miles: 2701/2702/2703 to 1031A, 1051, 1061, 1071, 2740 2025 w 2711 to 1031A, 1051, 1061, 1071, 2740 1051 to 1051 or 1071, or 1034 to 1031A	Multipoint or Point-to-Point	Limited Distance Line Adapter Type 2	2	8-17
2701/2702/2703 to 2741 (w/o Interrupt) 2025 w 2711 to 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point			
Unlimited Distance on common corrier or privotely owned voice grade facility: 2025/2702/2703 w 2711 to 1031A, 1051, 1061, 2740 1051 to 1051 or 1034 to 1031A	Multipoint or Point-to-Point	Leased Line Adapter Type 1B	4	15-25
2702/2703 w 2711 to 2741 (w or w/o Interrupt) 2025 w 2711 to 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point			
2025/2702/2703 w 2711 to 1061, 2740, 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point	Leased Line Adapter Type 1A	2	145-255
Unlimited Distance on one of four subchannels of single common carrier leased or privately owned voice grade facility: 2025/2702/2703 w 2711 to 1051, 1061, 2740 1051 to 1051	Multipoint or Point-to-Point	Shared Line Adapter Type 1B	4	15-25
2702/2703 w 2711 to 2741 (w or w/o Interrupt) 2025 w 2711 to 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point			
2025/2702/2703 w 2711 to 1061, 2740, 2741 (w/o Interrupt) 2740 to 2740 (Model 1 only)	Point-to-Point	Shared Line Adapter Type 1A	2	145-255

Figure 43. IBM Line Adapter Application Guide

Multipoint Application	IBM Line Adapter	Speed (bps)	Communication Facility
Distances not exceeding 50 miles and within three or fewer exchange areas.	Leased Line Adapter	134.5 or 600	Common Carrier Type 3002 Service, or equivalent privately owned facility, or better.
	Shared Line Adapter	134.5	
Distances exceeding 50 miles or not within three or fewer exchange areas.	Leased Line Adapter	134.5	Same as above
	Leased Line Adapter	600	Common Carrier Type 3002 Service with Type C1 Conditioning, or equivalent privately owned facility, or better.
	Shared Line Adapter	134.5	

Figure 44. Common Carrier Communications Facilities Requirements for IBM Line Adapters

IBM SYSTEM/360 TELEPROCESSING ACCESS METHODS

IBM provides programming support for teleprocessing systems in the form of access methods under the data management portions of the IBM System/360 Operating System (OS) and the IBM System/360 Disk Operating System (DOS).

Telecommunications access methods control the transmission of information between a computer and remote terminals in much the same manner as other access methods support local input and output devices.

Basic Telecommunications Access Method (BTAM)

BTAM provides facilities that enable an assembler-language programmer to write a teleprocessing control program that effects communications at the read/write level between the IBM System/360 and a variety of computers and terminals connected to the System/360 over common-carrier or privately owned communications networks.

BTAM supports both start/stop (asynchronous) and binary synchronous communications (BSC) devices.

BTAM provides facilities to control data transmission, but it does not provide facilities for message queuing or for message processing.

Queued Telecommunications Access Method (QTAM)

QTAM provides the same facilities to control data transmission as BTAM and, in addition, includes facilities for message queuing and message processing. QTAM, however, supports only start/stop (asynchronous) communications devices.

QTAM is written at the get/put level and enables the programmer to process messages from a telecommunications network with easy-to-use macro instructions similar to those he uses for local I/O devices.

Telecommunications Access Method (TCAM)

TCAM combines the wide range of device support provided by BTAM with the message queuing and message processing facilities of QTAM.

TCAM is especially useful in situations where several terminal types (asynchronous, binary synchronous, display stations, etc.) are present on a system or where the same terminal is used for several applications. TCAM operates only with the IBM System/360 Operating System.

REMOTE JOB PROCESSING

The remote job processing programs provided for use with the IBM System/360 Operating System and BTAM allows jobs to be entered into a CPU from remote terminals. The CPU processes the job, and returns the results either to the remote station which submitted the job, to another remote station, or to an output device at the CPU.

Remote Job Entry (RJE)

This program uses binary synchronous communications techniques and is used with the batch-oriented remote BSC terminals shown in Figure 45.

Conversational Remote Job Entry (CRJE)

This program allows remote access to an IBM System/360 CPU from asynchronous (start/stop) printer-keyboard terminals, as shown in Figure 46.

Access Method	Terminal Devices Supported	Related SRL Publications
BTAM	1030, 1050, 1060, 1130, 1800, 2260/2848, 2265/2845, 2715, 2770, 2780, 3735, and System/360 Models 20, 25, 30, 40, 50, 65, 67 (in 65 mode), 75, 85, and 195	IBM System/360 Operating System Basic Telecommunications Access Method, GC30-2004; IBM System/360 Disk Operating System Basic Telecommunications Access Method, GC30-5001
QTAM	1030, 1050, 1060, 2260/2848, 2265/2845, and 2740	IBM System/360 Operating System Queued Telecommunications Access Method Message Control Program, GC30-2005; IBM System/360 Disk Operating System QTAM Message Control Program, GC30-5004
TCAM	1030, 1050, 1060, 1130, 1800, 2260/2848, 2265/2845, 2715/2790, 2740, 2741, 2760, 2770, 2780, 3735, and System/360 Models 20, 25, 30, 40, 50, 65, 67 (in 65 model) 75, 85, and 195	IBM System/360 Operating System Planning for a Telecommunications Access Method, GC30-2020

Note: Refer to the related SRL publication for specific system and network configurations and communications methods (synchronous and asynchronous) supported by BTAM, QTAM, and TCAM.

Figure 45. IBM System/360 Access Methods

Service Program	Terminal Devices Supported	Related SRL Publications
RJE	1130 Model 20, 2770, 2780, System/360 Model 20, and System/360 using BOS/BPS	IBM System/360 Operating System Remote Job Entry, GC30-2006
CRJE	2740, 2741, 1050	IBM System/360 Operating System Conversational Remote Job Entry Concepts and Facilities, GC30-2012

Figure 46. IBM System/360 Remote Processing Programs

Appendix C. Abbreviations and Glossary

alphameric: (Same meaning as "alphanumeric".) An inclusive generic term for alphabetic letters, numerical digits, and special characters which are machine-processable. This term is used to refer to a character set that contains both letters and digits and, usually, other characters such as punctuation marks and symbols.

asynchronous: Without a regular time relationship or pattern.

asynchronous transmission: Transmission in which each information character is individually synchronized, usually by the use of start and stop elements.

batch processing: A system of accumulating and grouping a number of similar input items for processing at one time.

binary synchronous communications: (See "BSC".) A line control procedure for communicating. It can be expressed in several data codes: 8-bit EBCDIC, 7-bit USASCII, or 6-bit transcode. The only requirements are that the code should include the required line control characters and that these characters should be used according to specified rules.

bit: A binary digit, the smallest unit of information in a binary system.

bps: (bits per second) In serial transmission, the instantaneous bit speed within one character, as transmitted by a machine or channel.

BSC: (See "binary synchronous communications".)

BTAM: Basic Telecommunications Access Method

buffer: A routine or a device used to compensate for a difference in the rate of flow of data, or in the time of occurrence of events, when transmitting data from one device to another.

cathode ray tube: A device that presents data in visual form by means of controlled electron beams.

channel: A path for electrical transmission between two or more stations. A channel may consist of wire or radio waves, or both. It is sometimes referred to as a circuit, line, link, facility, or path. (See "half-duplex channel" and "full-duplex channel".)

character: The actual or coded representation of a digit, letter, or special symbol.

circuit: A communications path between two points.

code: A system of symbols and rules for use in representing information.

core storage: A form of high-speed storage using magnetic cores.

cps: Characters per second

CPU: Central processing unit

CRJE: Conversational remote job entry

CRT: Cathode ray tube

cursor: A character-position marker which may be moved manually, used in IBM graphic displays.

data: A representation of facts, concepts, or instructions in a formalized manner suitable for communication, interpretation, or processing by human beings or automatic means; any representation, such as characters, to which meaning might be assigned.

data acquisition: The process of identifying, isolating, and gathering source data to be centrally processed in a usable form.

data collection: The act of bringing data from one or more points to a central point.

data communication: The transmission of data from one point to another.

data processing: (Same as "information processing".) The execution of a systematic sequence of operations performed upon data.

data processing system: A network of machine components capable of accepting information, processing it according to a plan, and producing the desired results.

data set: A device which performs the modulation/demodulation and control functions needed to provide compatibility between business machines and communications facilities.

data transmission: The sending of data from one part of a system to another part.

demodulation: The process of retrieving data from a modulated carrier wave; the reverse of modulation.

digital data: Information represented by a code consisting of a sequence of discrete elements.

disk storage: A storage device which uses magnetic recording on flat rotating disks.

duplex channel: (Same as "full duplex".) A channel providing simultaneous transmission in both directions.

EBCDIC: (Extended Binary Coded Decimal Interchange code) This 8-bit code is one of the two basic codes used in the IBM System/360. The other is an extended version of the USASCII code, called 8-bit USASCII (USASCII-8).

facility: Communications equipment used, or available for use, in furnishing communications service.

feedback: The return of part of the output of a machine, process, or system, to the computer as input for another phase, especially for self-correcting or control purposes.

four-out-of-eight code: A code useful in transmission because each character must contain exactly four 1-bits and four 0-bits.

four-wire channel: A two-way circuit where signals simultaneously follow separate and distinct paths in opposite directions in the transmission medium.

full-duplex channel: (Same as "duplex".) Pertaining to a simultaneous two-way independent transmission in both directions.

half-duplex channel: A channel capable of transmitting and receiving signals, but in only one direction at a time.

home loop: An operation involving only those input and output units associated with the local terminal.

ICA: Integrated Communications Attachment

interface: A shared boundary; for example, the physical connection between two systems or two devices.

list processing: A method of processing data in the form of lists.

magnetic drum: A right circular cylinder with a magnetic surface on which data can be stored by selective magnetization of portions of the curved surface.

medium: (plural: media) The material on which data is recorded; for example, paper tape, cards, or magnetic tape.

MICR: (Magnetic Ink Character Recognition) The machine recognition of characters printed with magnetic ink.

microwave: Radio transmission which uses a very short wave length. Microwave systems transmit long-distance telephone calls, sound, television broadcasts, and telegraph signals from one terminal to another.

millisecond: One thousandth of a second; abbreviated "ms".

mode: A method of operation; for example, line mode, home mode, local mode, communicate mode, etc.

modem: (A contraction of "modulator-demodulator".) A device which modulates and demodulates signals transmitted over communications facilities.

modulation: The process used to convert business machine signals from data processing equipment to a form compatible with communications facilities.

multidrop circuit: (Same as "multipoint circuit".)

multidrop line: (Same as "multipoint line".)

multiplex: To interleave or simultaneously transmit two or more messages on a single channel.

multiplexing: The division of a transmission facility into two or more channels.

multipoint circuit: A circuit connecting several locations, making information transmitted over it available at all locations simultaneously; also called "multidrop circuit".

multipoint line: A line connecting several stations; also called a "multidrop line".

network: A series of points interconnected by communications channels.

off-line: Pertaining to equipment or devices *not* under direct control of the central processing unit (CPU).

off-line system: A system which is disconnected from the communications line.

on-line: Pertaining to equipment and devices under the direct control of the central processing unit (CPU).

on-line system: A system in which the input data enters the computer directly from the point of origin and/or in which output data is transmitted directly to the location where it is used.

point-to-point transmission: Transmission of data between two points.

private-line network: A network confined to the use of one customer.

PTTC/BCD: Abbreviation for Perforated Paper Tape Transmission Code for Binary Coded Decimal.

PTTC/EBCD: Abbreviation for Perforated Paper Tape Transmission Code for Extended Binary Coded Decimal.

QTAM: Queued Telecommunications Access Method

remote station: Data terminal equipment for communicating with a data processing system from a location that is distant in time or space.

RJE: Remote Job Entry

STR: (See "synchronous transmitter/receiver".)

switched telephone network: A network of telephone lines normally used for dialed telephone calls.

synchronous: Occurring concurrently, and with a regular or predictable time relationship.

synchronous transmission: Transmission in which the sending and receiving instruments are operating continuously at substantially the same frequency and are maintained, by means of correction, in a desired phase relationship.

synchronous transmitter/receiver: (STR) The transmission unit of the class of IBM terminals using synchronous transmission. The STR unit maintains line synchronization, transmits and receives characters, and transmits and receives checking and control information.

TCAM: Telecommunications Access Method

teleprocessing: A form of information handling in which a data processing system uses communications facilities.

time sharing: Participation in available computer time by multiple users, via terminals; pertaining to the interleaved use of the time of a device.

USASCII: (USA Standard Code for Information Interchange) The standard code, using a coded character set consisting of 7-bit coded characters (eight bits, including parity check), used for information interchange among data processing systems, communications systems, and associated equipment. The USASCII set consists of control characters and graphic characters.

wpm: Words per minute

Related Publications

For additional information on the preceding terms and abbreviations and others used in this manual, refer to the following IBM Data Processing Techniques publications:

A Data Processing Glossary, GC20-1699
Data Communications Glossary, GC20-1666.

(Where more than one page reference is given, the major reference is first.)

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