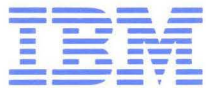
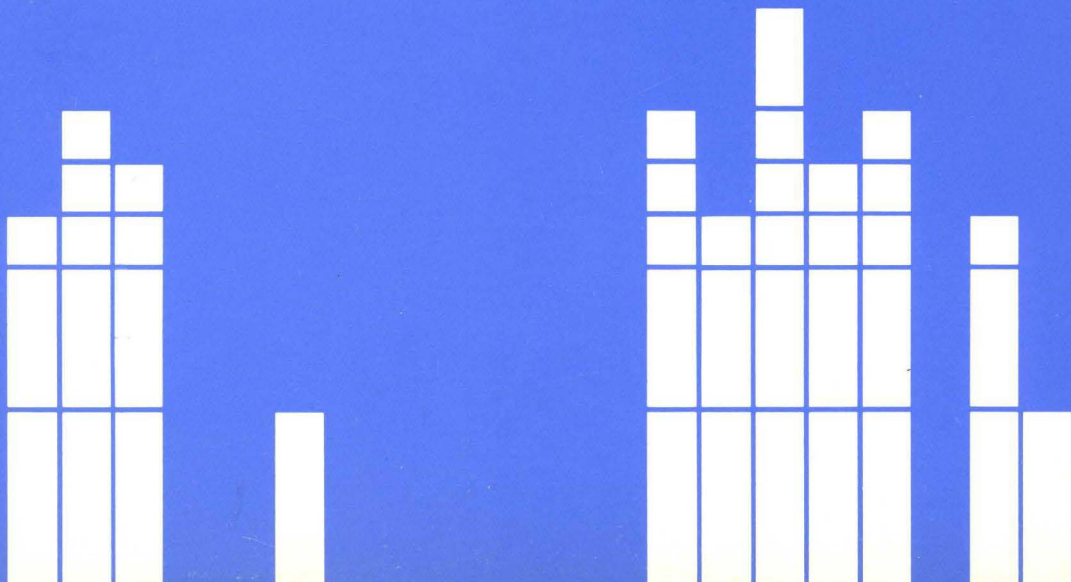


# 4700 Finance Communication System

## System Summary

The IBM logo, consisting of the letters 'IBM' in a bold, blue, sans-serif font with horizontal stripes.

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**4700 Finance  
Communication System**

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**System Summary**

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Publication Number  
GC31-2016-4

File Number  
S370/4300/8100/S34-00

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## Federal Communications Commission (FCC) Statement

**Warning: This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.**

The FCC statement above applies to all machines in the 4700 system. It applies only to machines used in the United States.

In addition to the FCC statement above, the user should be aware of instructions in the *IBM 4700 Finance Communication System: Installation Planning Manual*, GC31-2018.

## Fourth Edition (June 1983)

This edition is for planning purposes only.

This is a major revision of, and obsoletes, GC31-2016-3. This revision also obsoletes GC31-2049-1, GC31-2050-0, and GC31-2052-0.

Changes occur often to the information herein; before using this publication in connection with the operation of IBM systems, consult *IBM System/370 Bibliography of Industry Systems and Application Programs*, GC20-0370, for the editions that are applicable and current.

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## Preface

This publication describes the IBM 4700 Finance Communication System — a modular telecommunication system for finance-oriented industries.

This publication is primarily for executives and data processing personnel (such as system analysts, system programmers, operation specialists, and administrative officers) who are evaluating the 4700 system for use in their institution. The reader should have a general knowledge of data processing operations.

This publication is for planning purposes only. Some photographs show design models. Some of the products and programs described herein are not available at this time, and will not necessarily be made available in all countries. Consult your local IBM sales representative regarding the availability of 4700 products and programs in your location.

The main parts of this publication are:

- An overview of the system and its uses
- A description of the 4700 products: display stations, printers, and controllers
- A description of the types of host computers and programs that communicate with 4700 systems
- A description of the host computer system and 4700 programming.

Although you need no other publication to use this manual, the following publications relate closely to it:

- *IBM 3600 Finance Communication System: System Summary*, GC27-0001.
- *IBM 4700 Finance Communication System: System Configurator*, GC31-2017 — referred to in 4700 publications as the *Configurator*.
- *IBM 4700 Finance Communication System: Installation Planning Manual*, GC31-2018 — referred to as the *Installation Planning Manual*.
- *IBM 4700 Finance Communication System: Physical Planning Template*, GC31-2019 — referred to as the *Template*.
- *IBM 4700 Finance Communication System: COBOL General Information*, GL23-0078 — referred to as *4700/COBOL General Information* manual.

A reading guide in Appendix B indicates the type of information contained in each of the above publications. This reading guide also describes the 4700 library, and lists various related publications.

While IBM makes many basic functions available, the user chooses the functions to be used, and determines in what manner they will be used. It is the user's responsibility to establish and maintain appropriate operating procedures for the equipment. This, of course, includes those related to the integrity and security of the system, together with audit and control measures.



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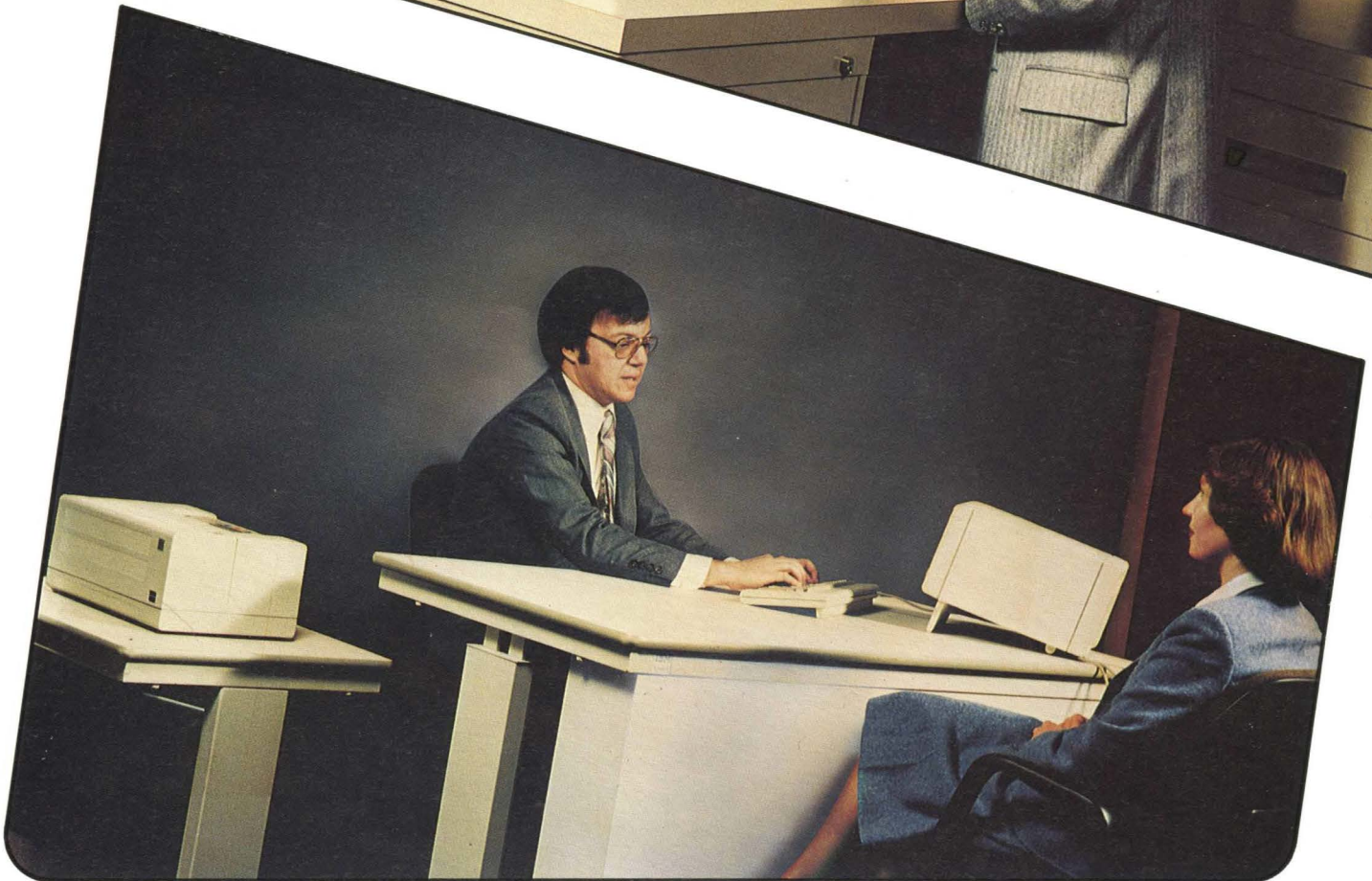
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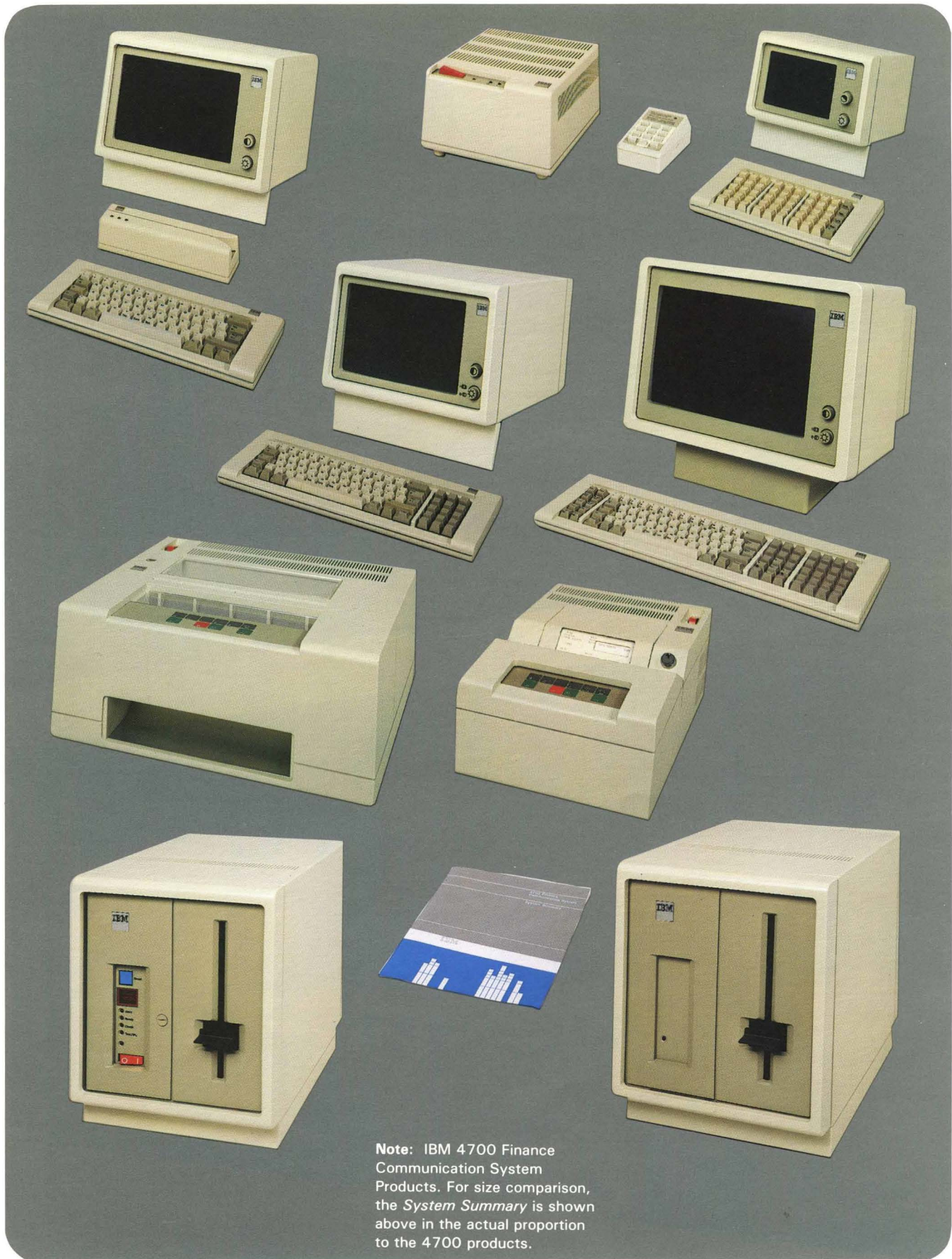
This edition of the *System Summary* reflects these additions to the 4700 Finance Communication System:

- The following 4700 products
  - IBM 4704 Display Station Models 2 and 3
  - IBM 4720 Forms/Passbook Printer Models 1 through 4
  - IBM 4701 Controller Disk-Storage Feature
- Expanded administrative uses through the new displays and printers
- Expanded distributed processing through the disk-storage feature.









**Note:** IBM 4700 Finance Communication System Products. For size comparison, the *System Summary* is shown above in the actual proportion to the 4700 products.

# Chapter 1. Introducing the IBM 4700 Finance Communication System

Today, as never before, business and industry are looking to technology to help them solve the problems of both the present and the future. In finance-oriented industries<sup>1</sup>, these problems include:

- Maintaining and improving the old services that today's customers expect,
- Making available the new services that tomorrow's customers will demand,
- Managing (efficiently) the day-to-day business of serving customers.

These, of course, are only a few of the many problems facing the finance industry. To meet the challenge that these and other problems present, IBM offers the 4700 Finance Communication System.

## What is the 4700 Finance Communication System?

First, it is a system designed to satisfy the needs of the finance industry.

Second, it is a family of products and programs that both share and distribute information, combining the advantages of distributed information processing with the convenience of small, desktop products.

Third, it is a system that offers users of the IBM 3600 Finance Communication System (an earlier, similar system) compatible products and simple conversion.

## Designed for the Finance Industry

The 4700 products, shown on the facing page, are specially designed for both *teller* and *administrative* areas of financial offices. These attractive products fit neatly both in offices and main lobbies. Small in size, these products put information at the fingertips of the users, without taking excessive space from their work areas.

The 4700 products can be used in numerous ways, such as:

- By tellers to debit and credit checking and savings accounts, post interest, record loan payments, and print receipts and statements.
- By accountants to maintain a record of the cash flow through your institution.
- By clerks to enter data or print reports.
- By administrative officers to review and update accounts with your institution's customers.

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<sup>1</sup> Finance-oriented industries include the following institutions: commercial banks, mutual savings banks, savings and loan institutions, credit unions, consumer finance companies, and credit card associations. The 4700 Finance Communication System can also serve nonfinancial institutions such as travel agencies, entertainment industries, distributorships, and other institutions requiring data entry, inquiry, file updating, document printing, or similar operations in a distributed-processing environment.

## Products and Programs that Share and Distribute Information

With a 4700 system, both your branch and main office personnel can inquire into the same set of shared master files to get the current status of each account. Tellers can make changes that are immediately reflected in the master files and are available for later inquiries.

In this inquiry and update process, your 4700 system is connected by communication lines to a central processor (host computer) and its master files. As each employee makes a change at a display station, the 4700 system can send that change to the central site's master files. When an employee needs information regarding an account, the information can be displayed or printed at the branch location.

A 4700 system can also serve as a distributed information system — useful when communication costs are high, when frequent interruptions at the host computer must be avoided, or when some information processing away from the host computer is desirable. As branch personnel enter information at their display stations, the 4700 system can completely process much of the information that is unique to the branch (such as account records and loan records). The system then stores other information on disks or diskettes and transmits the information to the central site later. Also, the 4700 system can provide many branch administrative aids, such as form letters and branch reports, without help from the host computer.

Your 4700 system can be designed to combine the best of both shared inquiry/update processing and distributed information processing.

## Compatible With the 3600 Finance Communication System

The 4700 is an outgrowth of the 3600, an earlier telecommunication system of controllers, displays, and printers designed for the finance industry. The two systems are compatible in several ways:

- 3600 controllers and 4700 controllers can be attached to the same host computer and can share the same multipoint communication line.
- 3600 terminals (listed under “Loop Attachment” on page 2-25) can attach to the 4700 system.
- The 4704 Display Model 1, 4710 printer, and 4720 printer can attach to the 3600 system. (The 4720 requires a programming request for price quotation.)
- Programming is essentially compatible; with minor changes, 3600 application programs run on the 4700 system.
- Certain 3600 terminals are available in an alternative color that matches your 4700 terminals. These terminals are the IBM 3604 Display (Models 5 and 6), the 3610 Document Printer (Models 4 and 5), and the 3616 Passbook and Document Printer (Model 1).

Now that we understand *what* the 4700 Finance Communication System is, let us consider its uses. **Why should you have a 4700 system? Where, in your institution, does it fit?**

## The 4700 in Teller Areas

Banks, Savings and Loan Institutions, and some other financial institutions have tellers who process customer transactions. These transactions differ according to the institution, but they include:

- Cashing checks, which might include
  - Inquiring into the customer's account to ensure that it has funds to cover the check,
  - Placing a hold on funds in the customer's account, and
  - Ensuring that a stop payment has not been issued on the check.
- Processing checking account deposits, which usually includes printing a receipt.
- Processing savings accounts deposits and withdrawals, which might include
  - Printing each deposit and withdrawal into a passbook, and
  - Printing earned interest into a passbook.
- Processing loan payments.

Usually, the teller must examine records, verify the customer's identification, and request an account inquiry. Manual record examination and customer identification can consume time, and inquiry requests often require action by another employee. Also, the teller must calculate totals and operate some type of printer.

Now, with the help of the 4700 system's teller displays and printers, the teller can directly inquire into the account and enter needed information. Receipts and passbooks can be printed automatically. Also, the 4700 system can help the teller to verify the identification of the customer by reading an identification card and/or by accepting a customer's personal identification number.

## The 4700 in Administrative Areas

Most financial institutions have officers or other employees who work directly with customers to:

- Solve problems in customer accounts
- Open new accounts
- Complete and process loan applications
- Approve checks
- Change addresses and other account information.

Additional administrative responsibilities might include:

- Stopping payment
- Updating records of deceased customers

- Generating reports.

Usually, the officer examines records and completes various forms to begin processing these actions. Later, other administrative personnel enter data from the forms into the central financial data base.

Now, with the help of the 4700 system's administrative displays, the officer can examine records quickly by directly displaying data from both the branch data base and the central data base. Also, the officer can enter data directly from the keyboard to generate new records and update existing ones. Thus, before customers leave your office, you have examined and/or updated their records.

Additionally, your application programs can simplify the entering of data by arranging the data on the display screen into a format similar to a printed form. Thus, your administrative personnel need only fill in the blanks as they would with printed forms.

And, when the officers need printed forms, letters, or reports, administrative printers can quickly respond. Consider this example: shortly after the officer enters a customer's loan application into an administrative display, an administrative printer begins to print the loan application form.

## **The 4700 as a Distributed Information System**

A 4701 controller that has the optional disk-storage feature is more than just a pass-through link to the host system or simple data-collection system. Instead, the controller can independently store, retrieve, and process data in some applications; and it can share part of the storage and processing with the host system in other applications. Thus, each branch that has a controller with the disk-storage feature can process information that is unique to the branch without the aid of the host computer system. Some possible uses are:

- Customer account files, including
  - Account records
  - Loan records
- Tables with identification numbers of other financial institutions for noncash transactions
- Tables with interest and exchange rates
- Automatic teller machine positive (good) and negative (bad) account files
- Inventory control of travelers' checks
- Administrative aids, such as
  - Formatted screens for display terminals
  - Form letters
  - Branch reports
  - Electronic mail and other communications from main office to branches
  - Branch administrative procedures
  - Loan applications and electronic folders in process
- Automated data entry

- Teller cash control
- Temporary storage of data to be transmitted.

## **The 4700 Products**

4700 products include display stations, printers, and controllers. Also, you can use various other products including self-service machines on a 4700 system.

The compactness and modularity of the 4700 products allow you to tailor work stations to individual operators and applications. A teller, for example, can have a keyboard suited to brief inquiry and update operations, while personal consultants might need a keyboard suited for the entry of a customer's loan application. Both might use the same type of display, or they might use displays of different sizes and functions. One teller might need a receipt printer. Another teller might need a receipt and passbook printer. While the personal consultant might need a forms or correspondence printer.

Figure 1-1 (top) shows a possible arrangement for a teller. Figure 1-1 (bottom) shows another arrangement that might be used by a personal consultant.

### ***Display Stations***

Three 4704 Display Station models (1, 2, and 3) are available. These models allow you to select the size and function of each display at each work station. Each station includes a display and keyboard, and each can have a magnetic stripe unit and a keypad.

Displays can be any of three sizes, having a small, medium, or large screen. The medium and large screen units can display either 1920 characters for general-purpose applications, or 480 larger characters when viewing distance is a critical factor. The small unit displays 480 characters only, and is intended for use by tellers and other persons requiring a small, personal-sized display.

The keyboards have a low profile, and are available with 50, 62, 77, and 107 keys grouped in various combinations of alphameric and programmed-function keys.

### ***Printers***

Five printer models (4710 and 4720 Models 1 through 4) are available. Each model includes features that suit the various teller and administrative applications. Thus, you can select printers that print on receipts, passbooks, forms, stationery, envelopes, and journals.

### ***Controllers***

Two controller models are available (4701 Models 1 and 2). These controllers, which contain an operating system and your application programs, communicate with the attached display stations and printers and with the host computer at the central site.

You can tailor each controller for each office or branch by ordering additional controller storage, additional diskette storage, disk storage, additional ports for attaching displays and printers, and various types of host communication facilities.

The controllers can communicate with host computers such as the IBM System/370 (including 303X and 308X), 4300, 8100, and System/34.



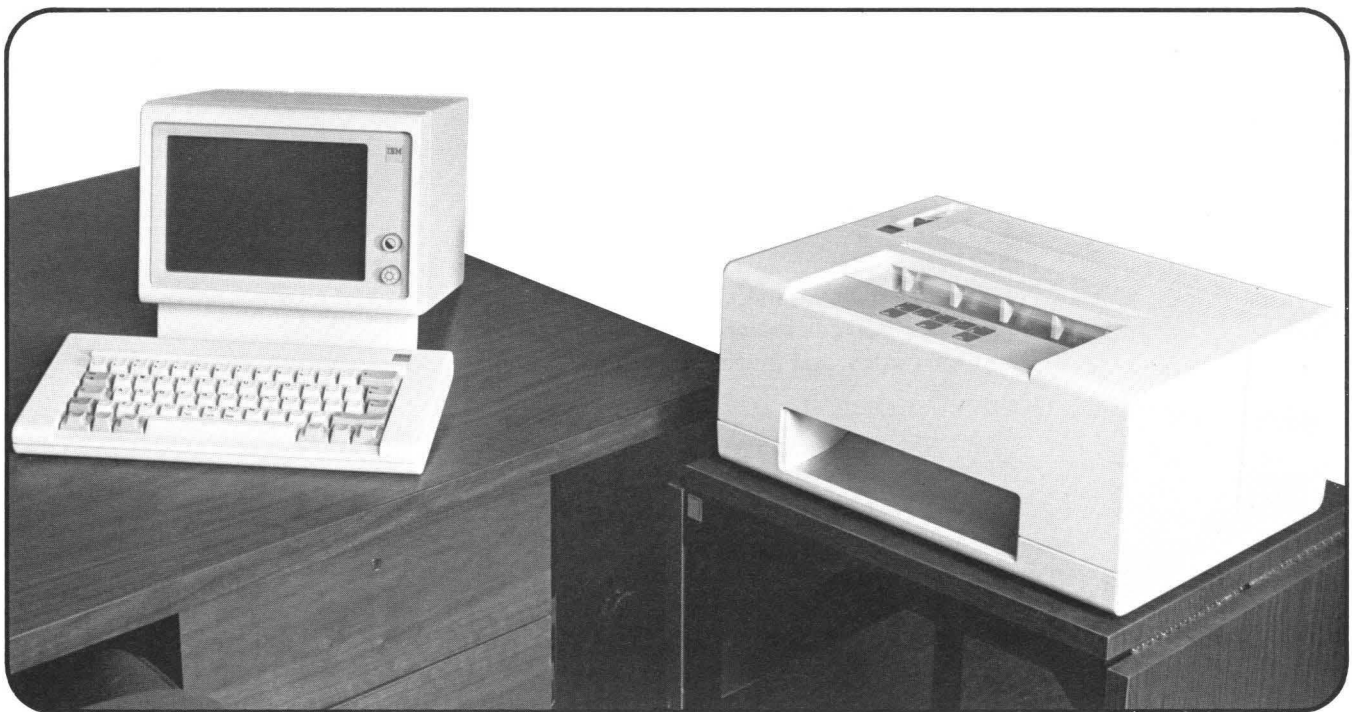


Figure 1-1. Two Examples of 4700 Work-Station Configurations

## **The Programs**

The controller application programs direct the operation of the controller and determine how the attached terminals, host communication facilities, and disk/diskette storage are used to process transactions.

You can program the controller to accept data from a display station, calculate data, send the data to a central site, store the data on disk or diskettes, and send a message back to the display station or to a printer. See Figure 1-2 on page 1-8.

### ***Application Programming***

You can write your application program for the 4700 system using a set of 4700 assembler instructions (either Disk Operating System/VS Extended (VSE), Operating System/VS1 (VS1), or Operating System/VS2 (MVS) is required). The 4700 assembler language produces code that directs the controller to carry out all application program operations — such as communicate with attached devices, move data, calculate, make decisions, and branch to other programs.

For programmers trained on high-level languages, the 4700 system offers the Common Business Oriented Language (COBOL), an English-language based programming language that is especially efficient in handling fields of structured data in business applications (a VSE, VS1, or MVS operating system is required). See *4700/COBOL General Information* manual for more information about this licensed program.

Regardless of the language used, programs are assembled or compiled at the host computer and reside on 4701 disks and diskettes.

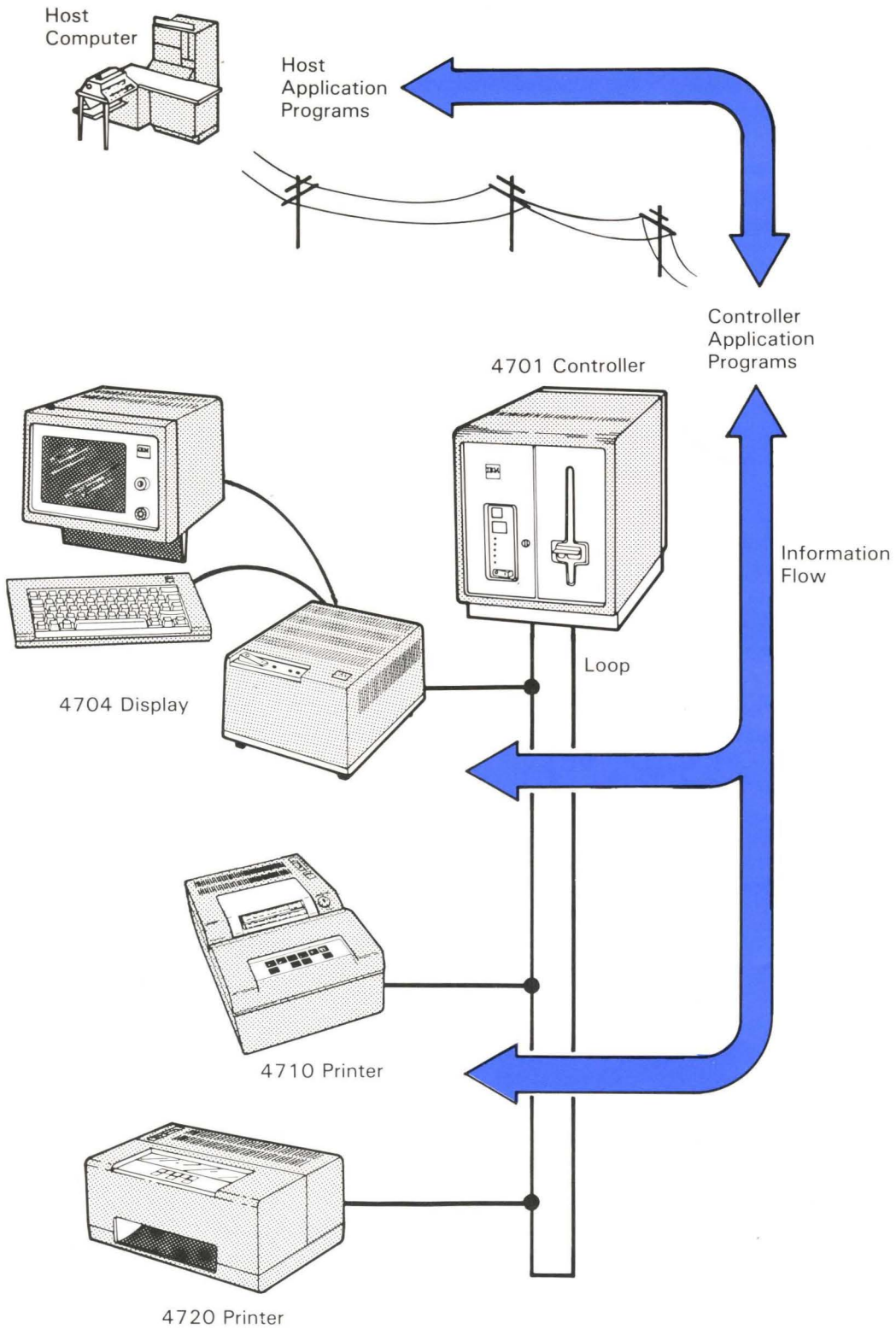
### ***Defining Operational Configurations***

Because each controller can support a variety of devices and functions, you must describe your specific configuration to the controller. The 4700 system offers two different methods of doing this:

- Host configuration, in which the host computer first assembles configuration macro instructions, next places these instructions in a system library together with the assembled programs, then transmits them to the controller.
- Local configuration, in which a local 4701-1 or 4701-2 controller describes the configuration and combines it with application programs. This *local configuration facility* (LCF) is intended for installations having no System/370 processors, but its use is not limited to such users.

### ***Host Support***

The Host Support licensed program (Program Number 5668-989) contains the support required to create and maintain 4700 programs and related data on system libraries, and to send this information to 4700 controllers. The 4700 assembler language support and host configuration support is included in this program. See “4700 Host Support” on page 3-9 and *Host Support User’s Guide*, SC31-0020 for more information.



**Figure 1-2. 4700 Controller Application Programs Communicate with Attached Devices**

## **A Few Other Things You Should Know**

4700 products are designed to simplify your role in preparing the system to operate and keeping it operating. This includes installing, diagnosing, and servicing.

### ***Installing the 4700 System***

All 4700 products are customer setup machines. This offers you early availability and gives you flexibility in future relocations. Setup includes unpacking from the shipping container, connecting power cords (and for a display station, the intercomponent cables), attaching accessories, and verifying that the unit is operational.

After you have set up the devices, you can follow a step-by-step procedure to attach them to the controller's communication facilities and test the system.

For more information, see the *Installation Planning Manual*.

### ***Diagnosing Problems***

All 4700 display stations, printers, and controllers have internal tests that simplify the job of determining if the device is faulty. These diagnostic tests reduce the time you spend isolating a failure. These tests permit you to diagnose device problems offline — that is, while detached from all controller and host communication lines. Offline tests provide a convenient means of verifying that the device you have just set up is operational. Offline testing also allows you to check a device without stopping the system.

Along with the device diagnostic tests, problem determination procedures help you to isolate problems throughout the system to a failing device or program. It is your responsibility to use these procedures when a problem occurs in the system.

If you have difficulty with these procedures, you can get help by telephone, without charge, from qualified IBM personnel. This help is available through the same service telephone number used to get customer-site maintenance. Customer help with 4700 problem determination and equipment setup is available to all 4700 customers during the setup and warranty periods, and to 4700 customers with maintenance contracts after those periods.

### ***Getting Service***

4700 controllers, displays, and printers can be repaired at IBM service locations throughout the United States. (Other service agreements may be in effect in other countries.) Your IBM representative can tell you the location of the nearest IBM facility offering this service.

For an additional charge, you may select a replacement option for 4704 displays and 4710 printers, under which IBM will exchange your faulty machine or machine element for an equivalent machine or machine element in good working condition.

On-site maintenance service for the 4701 controller is also available, for an annual charge, under the terms and conditions of the IBM Maintenance Agreement.



## Chapter 2. A Closer Look at the 4700 Products

The next logical question is, "How does the 4700 system help you solve the problems of the present and the future?" To begin to answer this question, this chapter looks at the 4700 products, including:

- IBM 4704 Display Station Models 1, 2, and 3 — a family of displays, keyboards, magnetic stripe units, keypads, and other accessories for both the teller and the administrative areas.
- IBM 4710 Receipt/Validation Printer — a four-line receipt, validation, and journal printer primarily for the teller area.
- IBM 4720 Forms/Passbook Printer Models 1, 2, 3, and 4 — a family of versatile printers for both the teller and the administrative areas.
- IBM 4701 Controllers — a family of tabletop, programmable units with integrated diskette and disk drives and data encryption capability.

Other IBM products can attach to the 4700 system. These products include other display stations, printers, and self-service terminals. For a complete list of these other products, see "Terminals that Attach to the 4701 Controller" on page 2-30.

### The 4704 Display Stations

The 4704 display station is your operator's primary means of communication with the 4700 system. Three models, each having different sizes or functions, give the 4704 the versatility that satisfies your needs at both teller and administrative work stations. Each model has a cathode-ray-tube (CRT) display, which is similar to a small television set, and a separate keyboard. You can expand each model by adding a personal identification number (PIN) keypad and a magnetic stripe unit.

All models have displays that are easy to position and tilt for comfortable user viewing. The medium and large display screens can display both normal and large characters (for special viewing requirements).

Figure 2-1 on page 2-2 shows the three models and highlights of their features.

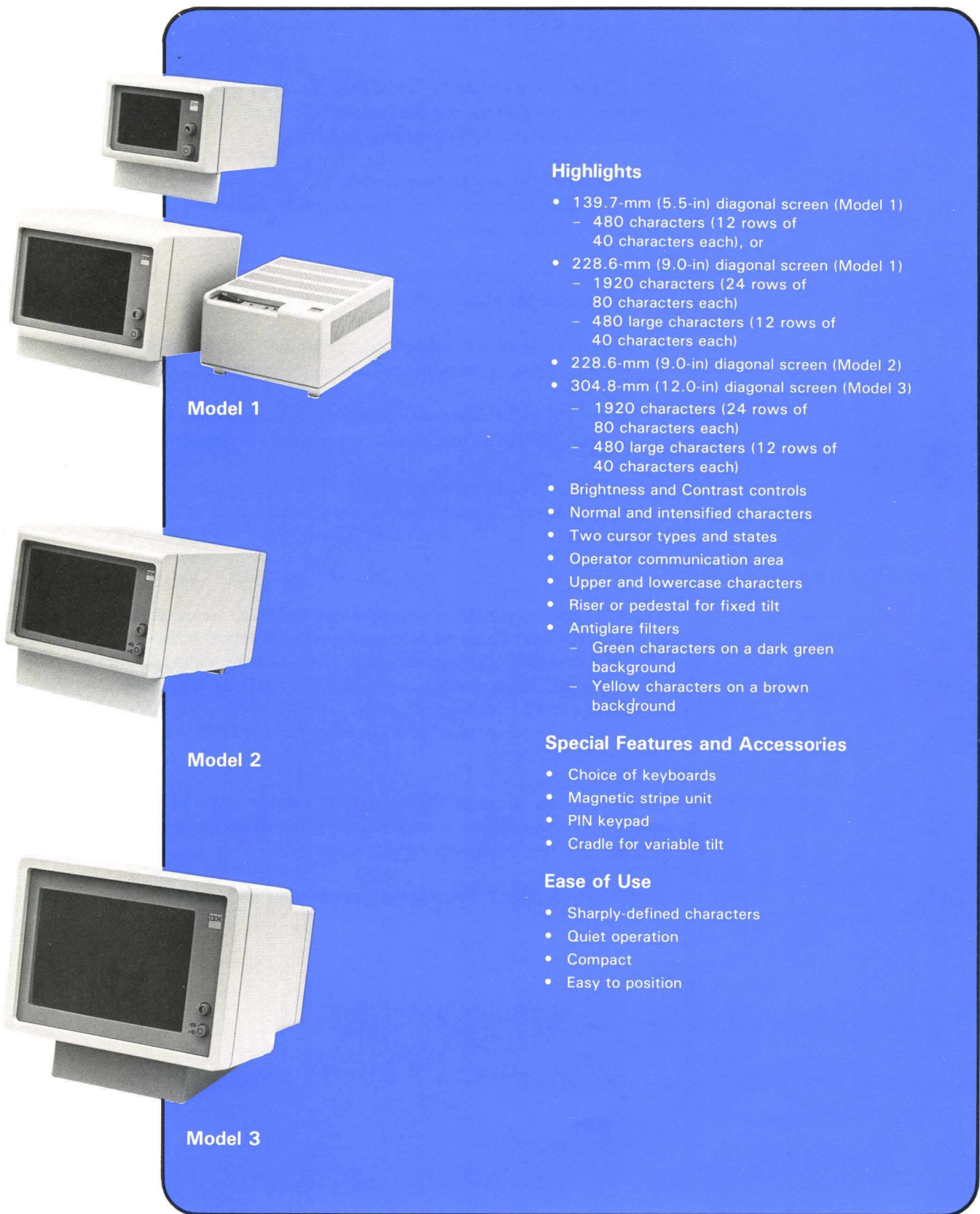


Figure 2-1. IBM 4704 Display Station Models 1, 2, and 3

## ***The Model 1***

The Model 1 is a small, modular display station especially suited for the teller work station. This display offers either a small- or a medium-size display screen and a separate module that controls the display station. This modular design allows you to place these two units conveniently out of the way yet comfortably where the operator can best use them. The Model 1 is available with either of the following screen sizes:

- A 139.7-mm (5.5-in) diagonal screen that can display 480 characters (12 rows of 40 characters each).
- A 228.6-mm (9.0-in) diagonal screen that can display either 480 characters (12 rows of 40 characters each) or 1920 characters (24 rows of 80 characters each) under program control.

## ***The Model 2***

The Model 2 is a small, semi-modular display station especially suited for administrative work stations where desk space is limited. This display offers a medium-size display screen in a module that also controls the display station. The Model 2 has a 228.6-mm (9.0-in) diagonal screen that can display either 480 characters (12 rows of 40 characters each) or 1920 characters (24 rows of 80 characters each) under program control.

Designed to meet the high-volume data communication requirements of the administrative work station, the Model 2 has:

- A high-speed device cluster adapter (DCA) that communicates with the controller, and
- Controls in the display (instead of the controller) that enable both the controller and the display to operate efficiently and to minimize response time.

## ***The Model 3***

The Model 3 is a larger semi-modular display station especially suited for administrative work stations in which you need the large screen size and can afford the additional space required by a larger display. The Model 3 has a 304.8-mm (12.0-in) diagonal screen that can display either 480 characters (12 rows of 40 characters each) or 1920 characters (24 rows of 80 characters each) under program control. Except for the size, this display is similar to, and is fully compatible with, the Model 2.



## The Displays

As you probably noticed, the three 4704 models look similar.

Figure 2-2 shows the approximate character sizes and the number of characters per line that are available on each display.

Model	Screen Size Diagonal Measurement	Number of Characters	Characters per line	Character Height/Width Millimeters (Inches)
1	139.7 mm (5.5 in)	480	40	2.7/1.7 (0.11/0.07)
	228.6 mm (9.0 in)	480	40	4.1/2.9 (0.16/0.12)
	228.6 mm (9.0 in)	1920	80	2.8/1.5 (0.11/0.06)
2	228.6 mm (9.0 in)	480	40	4.1/2.9 (0.16/0.12)
	228.6 mm (9.0 in)	1920	80	2.8/1.5 (0.11/0.06)
3	304.8 mm (12.0 in)	480	40	5.6/3.6 (0.22/0.14)
	304.8 mm (12.0 in)	1920	80	3.3/1.8 (0.13/0.07)

Figure 2-2. Characteristics of the 4704 Display Screens

All models display both alphameric and special characters. Alphabetic characters display in both uppercase and lowercase. You can select displayable characters and EBCDIC codes that include:

- A 96-character data processing character set
- A 96-character word processing character set
- An expanded character set (you specify in keyboard tables and translation tables), including
  - Characters from both data processing and word processing sets, or
  - Special fractions or accented characters not in the data processing or word processing sets.

The display screens have dark backgrounds with sharply-defined, illuminated characters. The front of each display screen has an antiglare filter that alters the color of the characters and the background. Two filters are available: one produces green characters on a dark green background, the other produces yellow characters on a brown background.

The operator can adjust the brightness of the illuminated characters by turning a Brightness control on the front of the display. To help your operators even more, the display can intensify selected characters to highlight fields on the screen. Intensification is controlled by the application program, but the operator can control the degree of intensification by turning the Contrast control on the front of the display.

### Operator Visual Aids

The displays have additional visual aids that help the operator. These aids include two selectable cursor types, two selectable cursor states, and an operator communication area with a comprehensive set of indicators.

The cursor, a screen indicator that shows where the next operation will occur, can be one of two types: underscore or reverse-character image. Also, either cursor type can be in one of two states: blink or display continuously. Your operators have the option of setting the display to the cursor type and state that is best for them.

The operator communication area, which is at the bottom of the screen, (Figure 2-3), contains indicators that alert the operator to conditions at the display station. These indicators keep your operators continually informed about the operation of the display station, and signal the operators when they must do specific actions.

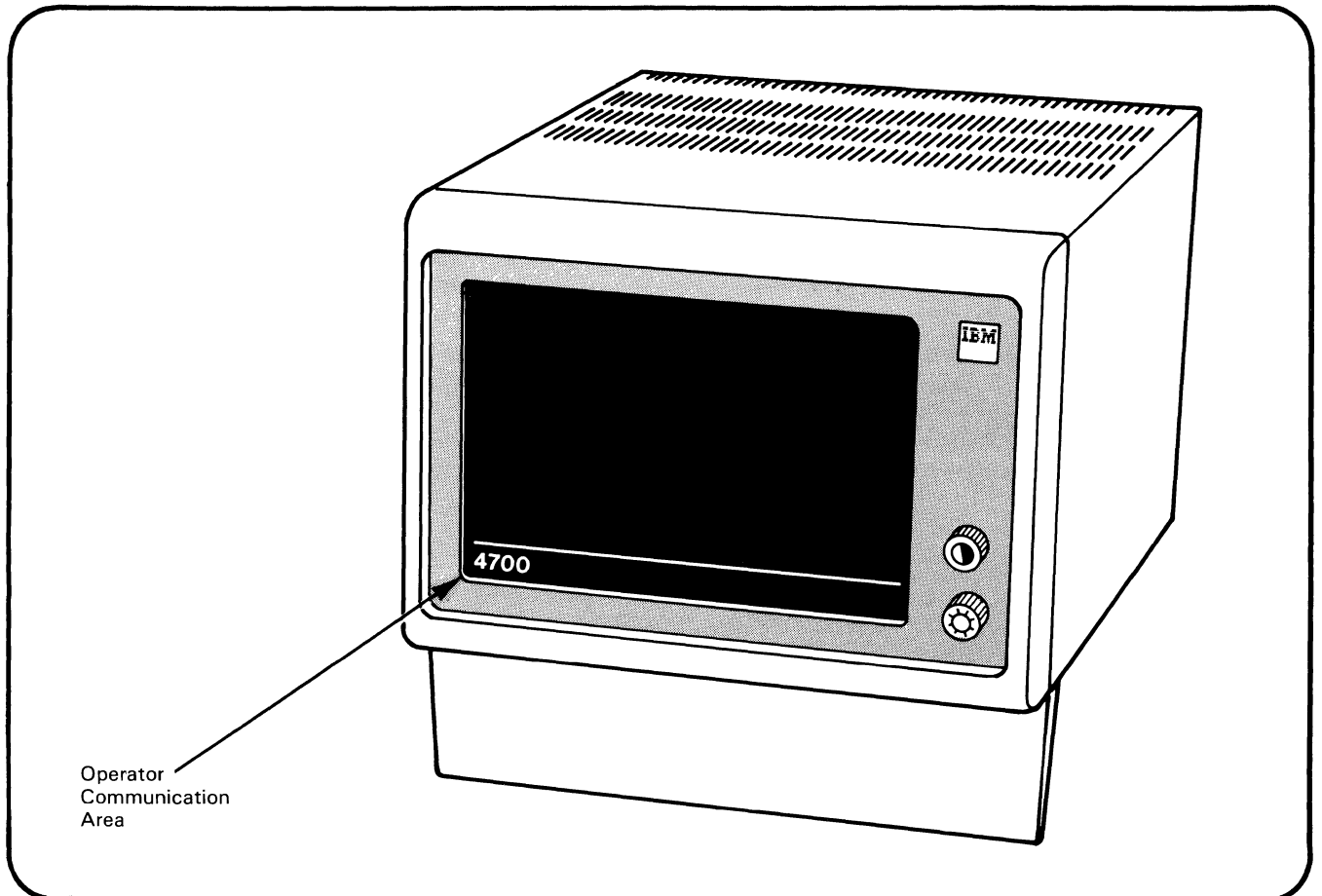


Figure 2-3. Operator Communication Area

### Model-1 and Model-2 Riser and Cradle

Each Model-1 and Model-2 display has a riser that the operator can attach to the bottom of the display. The riser tilts the front of the display upward for comfortable viewing.

The cradle, an optional Model-1 and Model-2 accessory, gives operators additional flexibility in placing the display in the most comfortable location. With it, the display can stand on a desk top (Models 1 and 2) or hang from a shelf (Model 1), and still the operator can tilt and rotate the display to the most comfortable viewing position. Figure 2-4 shows displays with both the riser and the cradle. The cradle is shown both in the hanging and standing positions. The display in the hanging cradle is a Model 1. Model-2 displays should not be mounted in hanging cradles.

### Model-3 Pedestal

Each Model-3 display has a pedestal that the operator can place under the display module. The pedestal supports the display module and tilts it upward for comfortable viewing. The Model 3 does not have a cradle accessory.

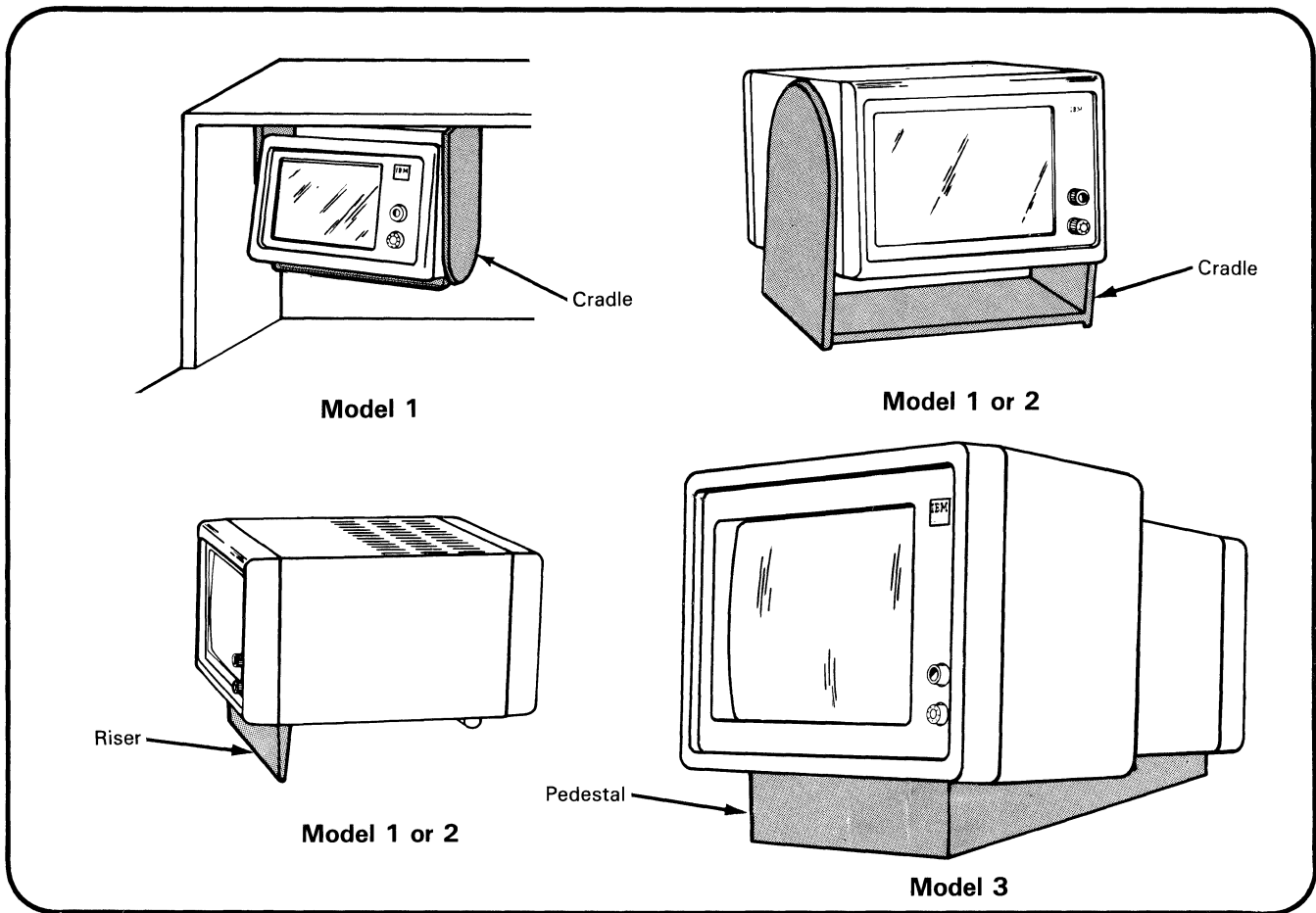


Figure 2-4. Display with Cradle (top) and Riser and Pedestal (bottom)

## Comparing the Model 2 and 3 Displays with Similar IBM Displays

The Model 2 and 3 displays offer either programming compatibility with, or improved performance over, similar display terminals that can attach to the 4700 system. Programming compatibility makes conversion simple, and improved performance can be essential at administrative work stations through which high volumes of information pass.

To offer this programming compatibility or improved performance, the Model 2 and 3 displays operate in either of two modes.

**Controller Key Tracking Mode:** In this mode, the 4704-2 and 4704-3 operate and perform similar to the widely-used IBM 3278 Display Station Model 2 (or IBM 3178 Display Models C1 and C2) attached to a 4701 controller. That is, the display station depends completely on the controller for data conversion, data translation, and screen formatting.

This mode, which is 3278-2 compatible, makes it simple for you to convert from 3278-2 to 4704-2 or 4704-3: you need only to generate the controller configuration macros for 4704-2/4704-3 and change the translation tables, which define the codes transmitted between the display station and controller.

**Local Key Tracking Mode:** In this mode, the display stations perform many functions that otherwise would be performed by the controller. Thus the display station communicates with the controller only when it sends or receives data or when it is performing program-controlled operations, such as programmable functions and program interrupts. The display station controls data conversion, data translation, and screen formatting.

This mode offers faster response times at the displays and more efficient use of the controller. To operate the displays in this mode, you must modify existing application programs, generate controller configuration macros, and change the translation tables.

## **Keyboards**

The keyboard is physically separate from the display; thus, the operator can place the keyboard in the most usable and comfortable position. All 4704 keyboards have a low profile, are easy to position, and can be mounted on risers to give an alternative keying position.

Four keyboards (see Figure 2-5 on page 2-9) are available:

- **Function** — a 50-key teller keyboard
- **Alphameric** — a 62-key administrative keyboard
- **Expanded Alphameric** — a 77-key administrative keyboard
- **Administrative** — a 107-key administrative keyboard

These keyboards operate with any 4704 Model 2, or 3. The 4704 Model 1 supports only the function, alphameric, and expanded alphameric keyboards; it does not support the administrative keyboard. You can use the function and alphameric keyboards together on any model in a two-keyboard configuration.

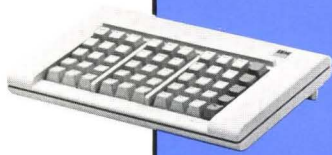
**Function Keyboard:** This keyboard has a custom-key arrangement, which allows you to customize (assign specific use to) 45 keys (and you can label them accordingly). Five additional keys have fixed uses. The custom-key arrangement is ideal for the teller station. Each key is assigned an alphameric value or programmed function during the configuration procedure. Alphameric keys could be used to enter account numbers, amounts, and other alphameric data. Programmed functions could include transactions such as deposit to an account. Thus a teller could initiate a deposit transaction by pressing the key assigned to initiate that transaction.

**Alphameric Keyboard:** This keyboard has a typewriter arrangement with full alphameric input capability and limited (four to six keys) programmed-function capability. It can be used by tellers, personal consultants, and administrative personnel.

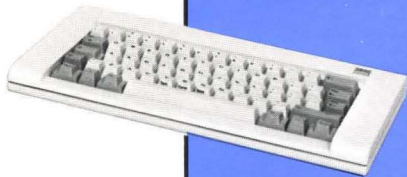
**Expanded Alphameric Keyboard:** This keyboard has a typewriter arrangement the same as the alphameric keyboard and an additional 15 custom keys to the right of the typewriter arrangement. The 15 custom keys, similar to the function keyboard, are assigned during the configuration procedure.

**Administrative Keyboard:** This keyboard has a typewriter arrangement similar to the alphameric keyboard and 45 additional special keys. Two of the special keys are predefined control keys; the other 43 special keys are custom keys similar to the function keyboard. You cannot use this keyboard on the 4704 Model 1.

Figure 2-6 shows examples of function, alphameric, expanded alphameric, and administrative keyboard arrangements.



**Function**



**Alphameric**



**Expanded Alphameric**



**Administrative**

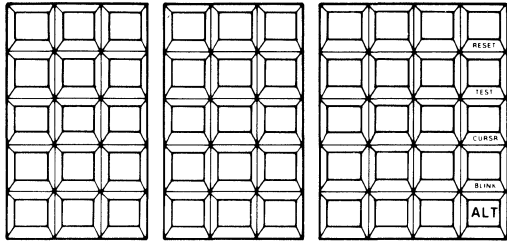
### Highlights

- Function
  - 50 keys (5 fixed-function keys, 45 custom keys)
  - Can combine with the Alphameric keyboard
- Alphameric
  - 62 keys
  - Typewriter arrangement
  - Can combine with the Function keyboard
- Expanded Alphameric
  - 77 keys
  - Typewriter arrangement
  - 15 custom keys
- Administrative
  - 107 keys
  - Typewriter arrangement
  - 43 custom keys

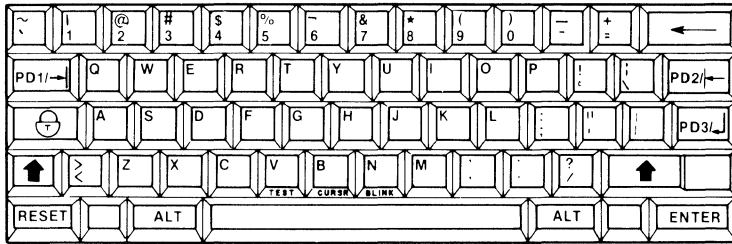
### Ease of Use

- Audible alarm
- Up to four programmable shift cases
- Typematic keys
- Low profile
- Flat or mounted on riser
- Easy to position
- Antiglare key surfaces
- Keystrokes are both heard and felt
- Separate from display (cable-attached)

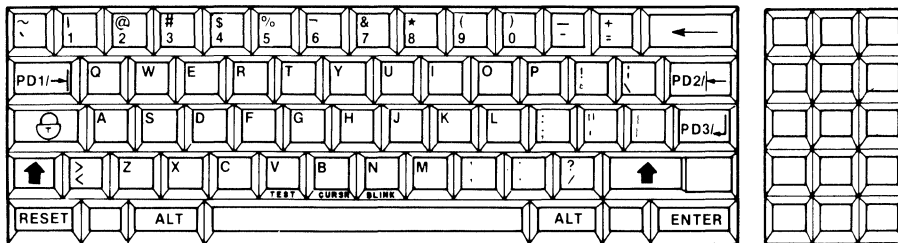
Figure 2-5. Display Station Keyboards



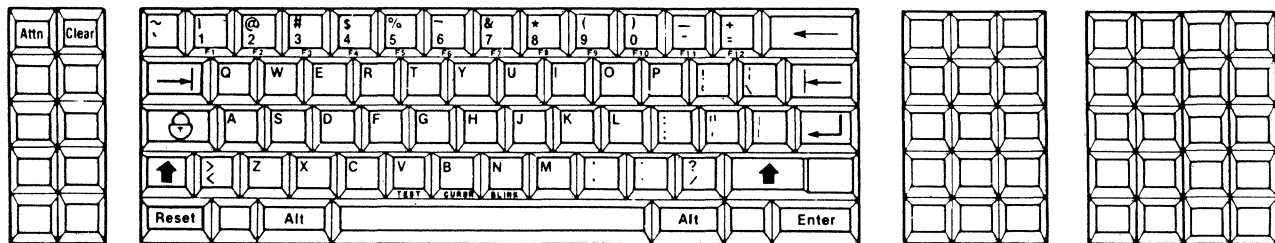
**Function (50 key)**



**Alphanumeric (62 key)**



**Expanded Alphanumeric (77 key)**



**Administrative (107 key)**

**Figure 2-6. Sample Keyboard Arrangements**

## Common Characteristics

**Audible Alarm:** Each keyboard has an integrated audible alarm that, under application program control, alerts your operators to conditions that require attention or action. Programmable screen indicators explain these conditions. The operator can adjust the volume of the alarm.

**Shift Cases:** Each keyboard can have from one to four keys defined by the application program as shift keys. Each shift key corresponds to a shift case that, in turn, relates to a translation table in the controller. By pressing one of these shift keys, a display operator can select the translation table used to translate the codes from the other keys. This capability expands the function of the keyboard to allow multiple languages and expanded character selection.

**Typematic Keys:** Each keyboard can have up to 16 typematic keys, assigned during the configuration procedure, that repeat their action when pressure is continuously applied.

## Keyboard Accessories

**Riser:** Each keyboard has a riser that operators can attach to the keyboard to tilt it toward them. The riser gives your operators a choice between a slanted (12-degree) or flat keying position.

**Key Labels:** Key labels are included with keyboards having custom keys. The labels are blank so that the user can type or print designations on them. The labels then fit into protective caps that snap over the custom keys. Both labels and caps are easily installed by your personnel.

## Language Groups

Keyboard nomenclature is available in the following language groups. Consult your IBM marketing representative for the groups available in your country:

Austrian/German	International	Spanish-Speaking
Belgian	Swiss German	Swedish
EBCDIC	Swiss French	English (UK)
Canadian French	Faroe Islands	English (US)
Danish	Japanese (English)	Hebrew
Finnish	Japanese (Katakana)	Greek
French (AZERTY)	Norwegian	Yugoslavian
French (QWERTY)	Portuguese	Icelandic
Italian	Spanish	Arabic

Figure 2-7. Language Groups



## ***Magnetic Stripe Units***

Magnetic stripes are attached to some credit cards, identification cards, and passbooks. The stripes contain frequently used information, and enable your operators to handle data at the display station quickly. This reduces the amount of data that the operator must key into the keyboard.

One magnetic stripe unit (Figure 2-8 on page 2-13, top) can be attached to each 4704. Two units are available: a magnetic stripe reader and a magnetic stripe reader/encoder. The two are similar in appearance. Both accept documents having a thickness between 0.25 mm and 0.85 mm (0.010 in and 0.033 in). The minimum thickness excludes the thickness of the magnetic stripe itself; the maximum thickness includes the stripe.

***Magnetic Stripe Reader:*** reads credit cards and other plastic cards (not passbooks) prerecorded on Track 2 at 75 bits per inch (bpi) according to American National Standards Institute (ANSI) standard X4.16-1976.

***Magnetic Stripe Reader/Encoder:*** reads ID cards and credit cards prerecorded on Track 2 at 75 bpi according to ANSI standard X4.16-1976; also reads and encodes at 210 bpi on other documents (such as passbooks) in the same relative position as Track 2 of an ANSI-defined credit card. (Reading and encoding at 210 bpi is compatible with 3604 magnetic stripe units.) Magnetic stripes on adhesive-backed labels are available from IBM. You must use these magnetic stripes (IBM PN 428650) or their equivalent.

To read or encode a document with a magnetic stripe, the operator manually passes the document through a slot in the unit. The unit has lights that show the condition of the unit and tell the operator whether the card has been read or encoded correctly.

The magnetic stripe unit is compact, easy to move, and physically separate from the other display station components, enabling your operators to place it in the ideal part of the work area.

## ***Personal Identification Number (PIN) Keypad***

A personal identification number (PIN) can be assigned by your institution to each of your customers. This code is unique to each owner, who uses it as identification in authorizing changes to accounts.

The PIN keypad (Figure 2-8 on page 2-13, bottom) allows your customer to enter their personal identification numbers (or other data) directly into the 4700 system. PIN keypads are available in either nonencrypting or encrypting versions.

***Nonencrypting PIN Keypad:*** sends the PIN to the 4704 in the same form as entered.

***Encrypting PIN Keypad:*** encrypts the PIN according to the United States National Bureau of Standards' data encryption algorithm, then sends the results to the 4704.

A light on the keypad comes on to prompt the customer to enter the number. Instructions for using the keypad are printed near the light.

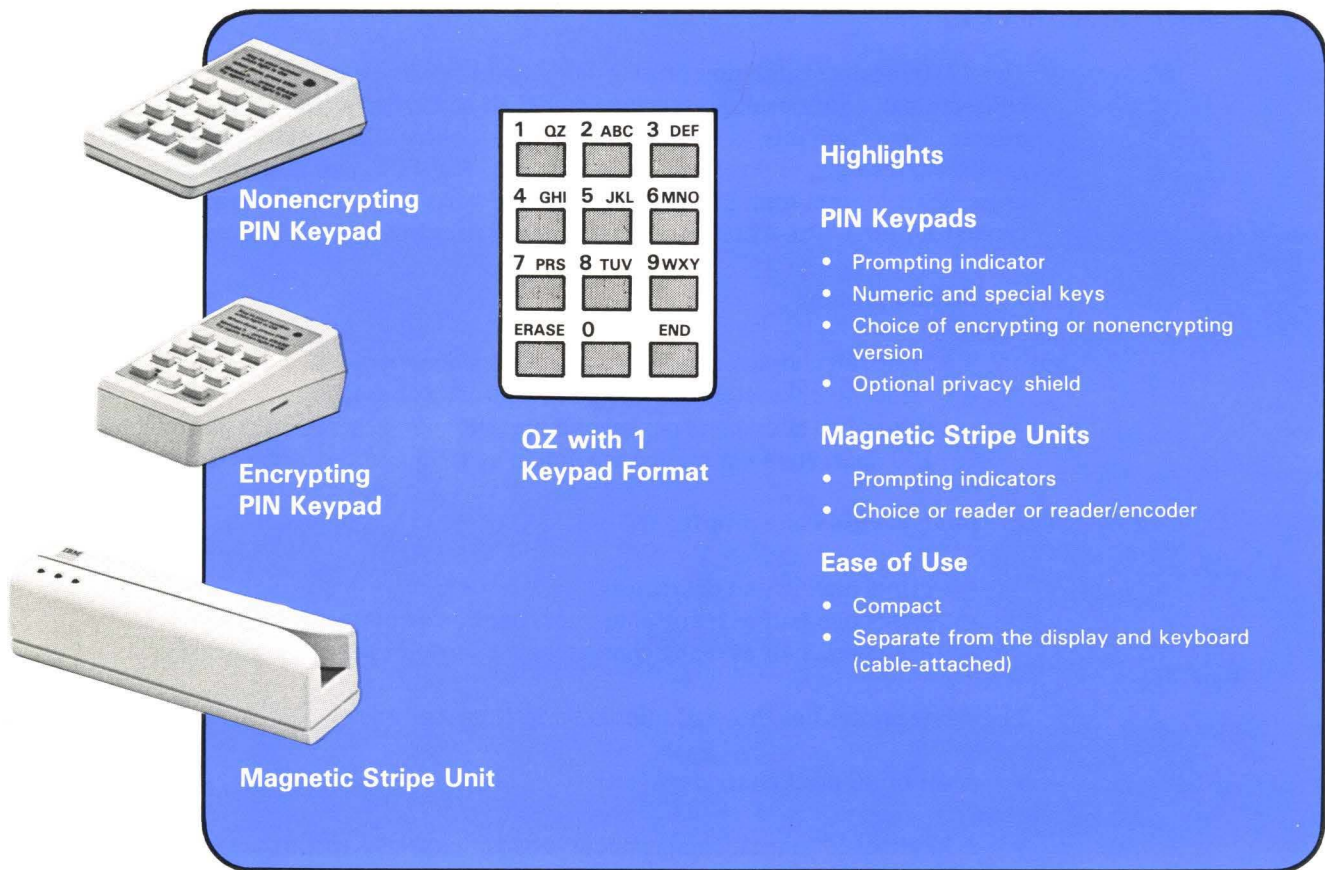


Figure 2-8. Magnetic Stripe Unit and PIN Keypad

This 4704 accessory has keys for numbers zero through nine, and two special keys. Numeric keys are also labeled with alphabetic characters; this gives your customers the option to consider the digits of their PIN as alphabetic characters.

You can order your keypad with the label “QZ” applied above either the “1” key (see Figure 2-8) or above the “0” key. The “QZ with 1” format conforms to a proposed American National Standards Institute (ANSI) standard (X4.A11). If however, your institution (or any institution with which you will be exchanging PINs) already includes PIN keypads have the “QZ with 0” format, it is important that you maintain compatibility with that format.

You can mount the PIN keypad in an optional privacy shield accessory. The privacy shield hinders others from seeing the PIN that your customer is entering.

The encrypting PIN keypad is also used by your security personnel to load the keypad’s cryptographic key. An unmarked, limited-access switch (accessible only by inserting a small tool into a side opening) must be used before the keypad can accept a cryptographic key. The keypad can retain a cryptographic key without external power for several years. A self-erase mechanism in the keypad automatically erases the cryptographic key if the keypad is opened.

## The 4710 Receipt/Validation Printer

The 4710 receipt/validation printer (see Figure 2-9 on page 2-15) is a small bidirectional matrix printer especially suited for the teller work station. This printer prints from one to four lines on single-, double-, and triple-part forms such as checks, receipts, and validation documents. The 4710 can also print on a one- or two-part journal roll. (The total number of parts on both the receipt and journal is four.) The 4710 does these types of printing.

- *Normal printing*
  - Prints 48 characters per line at 12 characters per inch.
  - Prints 40 characters per line at 10 characters per inch.
  - Prints 120 characters per second maximum at 12 characters per inch and 100 characters per second maximum at 10 characters per inch.
- *Bold, double-width printing*
  - Prints highlighted characters.
  - Prints one half as many characters per line as normal printing.
  - Prints one half as many characters per second as normal printing.

The 4710 printer has these additional basic features.

- A set of 96 print characters.
- A key-locked journal compartment that permits operators to see the journal but not remove it.
- An opening through which operators can make notations on the journal.
- The option of feeding the first part of a two-part journal through a tear-off bar in the top of the printer.
- Simple, one-handed insertion of receipts.
- Controller application program control of printing so that the printer can begin printing automatically or wait until the operator presses a Print key.
- Two Print keys, permitting the printer to be shared by two operators. The operators each press their own keys, and the system temporarily dedicates the printer to the correct operator.
- Operator lights that show the condition of the printer and prompt your operators when they must take specific actions.
- Shared addresses with like and unlike devices. This allows you to use the printer on a loop with other devices, without decreasing the response time to any of the devices on the loop.



**4710 Printer**

### **Highlights**

#### **Features**

- Print receipts
- Can print journals
- 96-character set
- Up to four printed lines
- Prints 10 or 12 characters per inch
- Prints bold characters
- Shared work stations
- Address sharing
- Operator indicators

#### **Ease of Use**

- Compact
- Easy to position
- "Clean-hands" ribbon cartridge

**Figure 2-9. IBM 4710 Receipt/Validation Printer**

## **The 4720 Forms/Passbook Printers**

Four 4720 forms/passbook printer models (see Figure 2-10 on page 2-17) permit you to select the printing functions that you need at both teller and administrative work stations. These functions include:

- Printing receipts, statements, and passbooks
- Printing reports, letters, standard correspondence, and envelopes
- Printing Cashier checks
- Recording all transactions.

All models are small, desktop, matrix printers.

### ***The Model 1 Cut Form Printer***

The Model 1 is directed toward the administrative area. This model prints on cut forms such as receipts, stationery, and envelopes.

### ***The Model 2 Cut Form Printer with Journal***

The Model 2 is directed toward the teller area in which passbook printing is not required. This model prints on the same documents as the Model 1; also, this model prints on a journal roll.

### ***The Model 3 Cut Form/Passbook Printer***

The Model 3 is directed toward the teller area in which cut form and passbook printing is required but the journal is not. This model does everything that the Model 1 does, and the Model 3 also prints on horizontal-fold and vertical-fold passbooks.

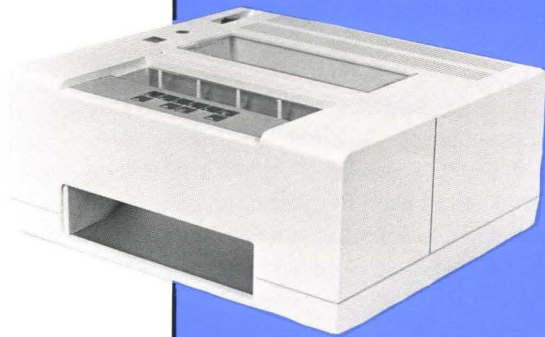
### ***The Model 4 Cut Form/Passbook Printer with Journal***

The Model 4 does everything that the Model 3 does, and the Model 4 also has a journal roll.

The Models 3 and 4 also provide more precise print registration tolerances on cut forms than the Models 1 and 2.



**Models 1 and 3**



**Models 2 and 4**

### **Highlights**

- Model 1 prints cut forms
- Model 2 prints cut forms and journals
- Model 3 prints cut forms and passbooks
- Model 4 prints cut forms, passbooks, and journals
- 192 basic and 16 definable characters
- Prints 10 or 12 characters per inch
- Print bold characters
- Quality print function
- 5 or 6 lines per inch
- Incremental spacing
- Shared work stations
- Address sharing

### **Ease of Use**

- Compact
- Easy to position
- Prints on passbooks without special adjustments

**Figure 2-10. IBM 4720 Forms/Passbook Printers Models 1, 2, 3, and 4**

## **Common 4720 Characteristics**

All models print under program control. All models can do these types of printing:

- *Normal printing*
  - Prints 120 characters per second maximum.
  - Prints 82 characters per line at 10 characters per inch.
  - Prints 99 characters per line at 12 characters per inch.
- *Bold, double-width printing*
  - Prints highlighted characters that can be mixed with normal characters but not with characters printed by the quality print function.
  - Prints 60 characters per second maximum.
  - Prints 41 characters per line at 5 characters per inch.
  - Prints 49 characters per line at 6 characters per inch.
- *Quality print function*
  - Prints characters that have a solid appearance for better readability and a formal appearance.
  - Prints 82 characters per line at 10 characters per inch.
  - Prints 99 characters per line at 12 characters per inch.

This print function is designed for letters, structured correspondence, and envelopes. It can be selected on a per document basis.

With the 4720 printers, you can program line spacing for 5 or 6 lines per inch. You can also program the 4720 to vary the space between lines in incremental steps of 0.275 mm (0.011 inch).

The 4720 printer can print up to 212 pre-defined characters. You can select up to 192 of the 212 characters for your character set. You can also select 16 customer-definable characters. The characters consist of upper and lowercase alphabetic, numeric, and diacritical characters used in most countries. Special characters used in data processing and word processing are also provided. For a list of the characters see Appendix A, "Characters Supported By the 4720 Printers" on page A-1.

IBM provides you with default character sets. Character sets are selected at CPGEN; therefore:

- You can use the default character set, or change it to meet your requirements.
- You can select your own character set from the 212 characters provided.
- You can change your character set to meet new requirements if needed.

The 4720 printers offer these additional advantages:

- Horizontal-fold and vertical-fold-passbook handling, with no additional adjustments or features.

- Single or multipart cut forms and/or journals; up to four parts.
- Cut forms can be a variety of sizes.
- All forms are inserted in the front of the printer and leave through the top.
- Controller application program control of printing so that the printer can begin printing automatically or wait until the operator presses a Print key.
- Two Print keys, permitting the printer to be shared by two operators. The operators each press their own keys, and the system temporarily dedicates the printer to the correct operator.
- Operator lights that show the condition of the printer and prompt your operators when they must take specific actions.
- Shared addresses with like and unlike devices. This allows you to use the printer on a loop with other devices, without decreasing the response time to any of the devices on the loop.
- Loop baud rate can be different from the print rate. This allows you to configure the printers with like or unlike devices. The devices that share addresses should operate at the same baud rate.

## **The 4701 Controllers**

The 4701 controller manages the displays, printers, and other products. The controller also runs your application programs and communicates with the host computer.

Two models and a selection of special features allow you to tailor each controller to satisfy the needs of each office. Both models are small, tabletop units that fit easily where you want them and have no special power or cooling requirements. Either model can have an optional expansion unit for special features. This expansion unit stands next to, looks like, and is about the same size as the controller. Figure 2-11 on page 2-21 shows the controller and expansion units.

### ***The Model 1***

The Model 1 controller comes with the following basic features:

- 192K bytes of controller storage
- One integrated diskette drive for diskettes with a storage capacity of 0.5Mb
- Encryption
- Host computer attachment using the synchronous data link communication (SDLC) protocol
- Two communication loops for communication with terminals.

You can add the following special features:

- Additional controller storage in 64K-byte increments to a maximum of 320K bytes (makes a total of 512K bytes controller storage)
- An additional diskette drive for diskettes with a storage capacity of either 0.5Mb or 1.0Mb



- Alternative host computer attachment using either binary synchronous communication (BSC) protocol or X.21 switched or nonswitched interface with SDLC protocol
- Two additional loops for communication with terminals
- A device cluster adapter (DCA) with eight ports for high-speed communication with terminals.

## ***The Model 2***

The Model 2 controller comes with the following basic features:

- 192K bytes of controller storage
- One integrated diskette drive for diskettes with a storage capacity of 1.0Mb
- Encryption
- Host computer attachment using the synchronous data link communication (SDLC) protocol
- Two communication loops for communication with terminals.

You can add the following special features:

- Additional controller storage in 64K-byte increments to a maximum of 320K bytes (makes a total of 512K bytes controller storage)
- An additional diskette drive for diskettes with a storage capacity of 1.0Mb
- Disk storage with a capacity of 15, 30, or 60Mb
- Alternative host computer attachment using either binary synchronous communication (BSC) protocol or X.21 switched or nonswitched interface with SDLC protocol
- Two additional loops for communication with terminals
- A device cluster adapter (DCA) with eight ports for high-speed communication with terminals.

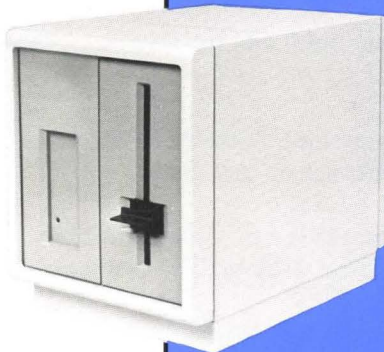
Figure 2-11 on page 2-21 highlights the characteristics of the 4701-1 and 4701-2 controllers.



**4701 Controller**



**Diskette Expansion Unit**



**Disk Expansion Unit**

### Highlights

#### Controllers

- Tabletop design
- Customer relocatable
- Loop attachment for 4700 and 3600 terminals
- Diskette and controller storage
- System monitor
- SDLC host computer attachment
- Encryption
- Executes 3600 controller application programs (reassembly and minor modifications might be required)

#### Special Features

- Device Cluster Adapter attachment
- Up to 320K bytes of additional controller storage
- 0.5Mb of auxiliary diskette storage (Model 1 only)
- 1.0Mb of auxiliary diskette storage (Model 1 or Model 2)
- 15Mb, 30Mb, or 60Mb of disk storage (Model 2 only)
- Alternative host computer attachments

#### Ease of Use

- Compact
- Lightweight, easy to move
- Can be stored out of sight
- Built-in diagnostic capability

Figure 2-11. IBM 4701 Controller Models 1 and 2 and Expansion Units

## ***Controller Storage***

Each model has at least 192K bytes of storage for application programs, controller data, and configuration data.

You can add up to five 64K-byte increments of controller storage. Figure 2-12 shows the total storage and how much of this storage is available for controller data and your application programs.

Refer to *4700 Finance Communication System: System Configurator* for guidance on estimating how much controller storage you need.

<b>Controller Storage Features</b>	<b>Total Storage</b>	<b>Available Storage</b>
Basic	192K	116K
Plus 1 increment	256K	180K
Plus 2 increments	320K	244K
Plus 3 increments	384K	308K
Plus 4 increments	448K	372K
Plus 5 increments	512K	428K

**Figure 2-12. Available Program/Controller Data Storage**

## ***Controller Data***

Controller data is supplied by IBM. This data, together with configuration data and your application programs, resides on diskette storage and is loaded into the controller to make it operational. Controller data supports the basic and optional features of the controller, and must be loaded into the controller to make it operational.

## ***Diskette Storage***

Each model has an integrated diskette drive. The diskette provides space for application programs and controller data (which must be loaded into controller storage before the controller can function), plus space for user data.

The 4701-1 controller supports the Diskette 1 (one side) and the Diskette 2 (two sides) with storage up to 0.5Mb.

The 4701-2 controller supports the Diskette 1 (one side), Diskette 2 (two sides), or Diskette 2D (two sides, double density) with storage up to 1.0Mb.

You can add one auxiliary diskette drive supporting Diskette 1, Diskette 2, or Diskette 2D to either model as a special feature. This diskette drive resides in an expansion unit.

## ***Disk Storage***

As a special feature, you can add disk storage to the Model 2 controller. This feature resides in an expansion unit that can contain:

- One 15Mb or 30Mb disk drive, or
- Two 30Mb disk drives (total of 60Mb), or

- One 15Mb or 30Mb disk drive and one 1Mb diskette drive.

The disk storage feature permits you to store some large data files at remote branch offices. Thus you can distribute information to those places where it is needed and reduce the need to get that information from the host computer. This decreases the use of the common carrier and shortens response times at branch terminals.

The disk storage feature includes a disk drive and disk adapter that controls the drive.

### **The Disk Drive**

The disk drive contains a permanently-mounted, rigid disk that is formatted with 443 cylinders with each cylinder having either two or four tracks. The 15Mb disk has two tracks per cylinder. The 30Mb disk has four tracks per cylinder. Each track contains sixty-eight 256-byte sectors.

The disk rotates at a speed of 3151 revolutions per minute, providing an instantaneous data transfer speed of 1.25Mb per second. The maximum data transfer speed between the disk-storage feature and the controller is 330K bytes per second. Actual data transfer speeds depend on your application program and controller data. The average access time (seek) is 40 milliseconds.

### **The Disk Adapter**

The disk adapter controls all disk input and output operations. The adapter also automatically assigns alternative sectors, corrects certain disk errors, and controls overlapped operations between disk/diskette or two disks.

***Automatic Alternative Sector Assignment:*** The adapter automatically reassigns any sector that develops a defect that prohibits writing of data to the sector. This decreases the probability of permanent write errors.

***Error Detection and Correction:*** The adapter automatically detects errors caused by invalid commands and incorrect data parity. Also, with the aid of error recovery or retry, the adapter automatically provides burst error correction of up to 15 consecutive bits before the data is transferred to the controller.

***Overlapped Operations:*** The adapter controls overlapped operations. If you have application programs that use either disk and diskette or two disks (60Mb in two 30Mb disks), your programs can start two disk/diskette operations (except data transfers on two 30Mb disks) without waiting for completion of the first operation. These overlapped operations decrease the time the controller waits between the completion of operations.

### ***Encryption***

Both models can encipher and decipher data using the data encryption algorithm described in American National Standards Institute (ANSI) Standard X3.92 and in United States National Bureau of Standards' Federal Information Processing Standards 46 and 81.

4701 encryption is compatible with 3600 encryption. 3600 application programs currently using ENCODE and DECODE instructions (with the DES option) can continue to use them without change on the 4701 controller.

But 4701 encryption also has these additional functions:

- Its data encryption algorithm and cryptographic-key storage reside in hardware; keys and personal identification numbers (PINs) need not appear in the clear to application programs.
- It can encipher and decipher data with encrypted keys.
- It can translate PINs from one format to another and from one key to another, without exposing PINs in clear form.
- It can authenticate messages.
- It has a physical key that must be unlocked before a cryptographic key can be loaded into the controller. (The cryptographic key is loaded through a 4704 or 3604 display station.)
- It can retain the cryptographic key for several years, even if power is switched off.
- It automatically destroys the cryptographic key if the cryptographic key circuits are removed from the controller.

### ***Host Computer Attachment***

Unless you specify otherwise, both models communicate through an external modem with host computers at speeds up to 9600 bits per second (bps) using the Synchronous Data Link Control (SDLC) protocol. The controller supports both local and remote attachment to the host computer.

Depending on your country, you can select alternative means of communicating with host computers (all are special features):

- A controller can communicate with host computers at speeds up to 4800 bps using the Binary Synchronous Communication (BSC) protocol.
- A controller can be equipped with an X.21 adapter for attachment to digital networks. This adapter provides an interface with electrical characteristics that match those described in the Electrical Industries Association Standard RS-422 and the International Telegraph and Telephone Consultative Committee (CCITT) Provisional Recommendation X.27, and with operating characteristics that match those described in CCITT Recommendation X.21.

Two types of X.21 adapters are available: one for nonswitched lines (both point-to-point and multipoint), another for switched lines. Both operate at speeds up to 9600 bps.

- A controller can be equipped with an adapter for attachment to the multiuse communication loop of an IBM 8100 Information System (IBM World Trade locations only). This adapter operates at speeds of 4800 and 9600 bps when attached remotely, and at a speed of 9600 bps when attached locally.

See Chapter 3 for more detailed information regarding the manner in which 4700 controllers are attached to host computers.

## ***Loop Attachment***

Most 4700 display stations and printers, and 3600 Finance Communication System terminals, attach to a controller *loop*. Either model can be equipped with up to four loops.

A loop can have a maximum length of about 610 meters (2000 feet) between powered-on terminals.

The maximum number of terminals that can be attached varies depending on the speed of the loop (three speeds are available), the type and speed of the host computer attachment, and the minimum acceptable response time at the terminal.

The following list identifies the terminals that can be attached to a loop:

- 4704 Display Station Model 1
- 4710 Receipt/Validation Printer
- 4720 Forms/Passbook Printer
- 3603 Terminal Attachment Unit
- 3604 Keyboard Display
- 3606 Financial Services Terminal
- 3608 Printing Financial Services Terminal
- 3610 Document Printer
- 3611 Passbook printer
- 3612 Passbook and Document Printer
- 3615 Administrative Printer
- 3616 Passbook and Document Printer
- 3624 and 3614 Consumer Transaction Facilities

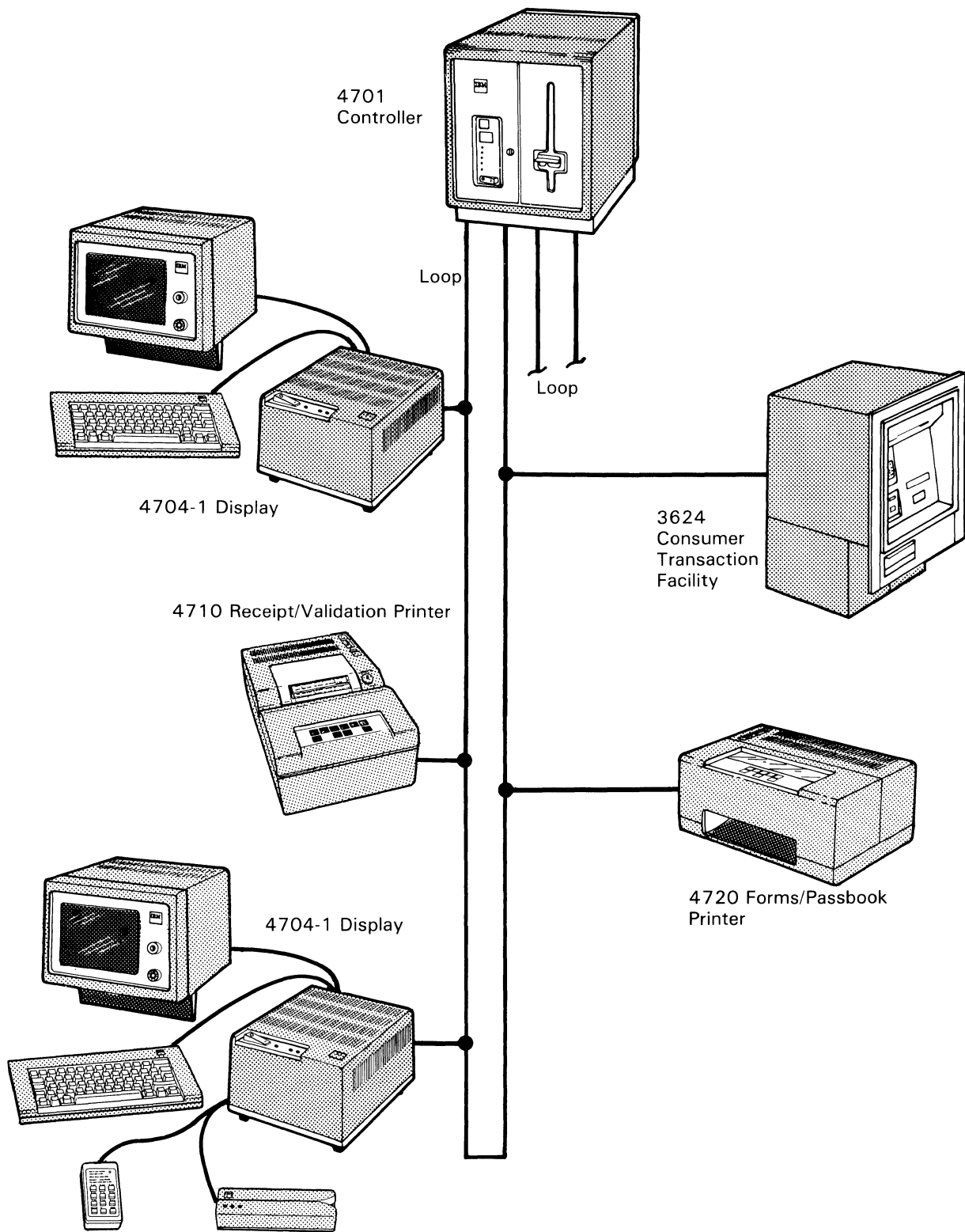
Figure 2-13 illustrates a 4701 controller loop with attached terminals.

An application program in the controller sends and receives data on the loop. Data flows in one direction around the loop, first from the controller to the first terminal on the loop, then from that terminal to the next, until the data returns to the controller. When a terminal's power is off, it automatically closes the loop, allowing the data to continue. The loop design ensures that data intended for a certain display station or printer is not recognized by other display stations or printers, and that data entered at a keyboard is not mixed with data being entered at other keyboards.

The loop illustrated in Figure 2-13 is a local loop — that is, the loop attaches directly to the controller. Remote loops attach to the controller over telecommunication facilities.

Two 3603 Terminal Attachment Units are required for a remote loop — one attached directly to the controller and another in the remote location. The same terminals can be attached to a remote 3603 as can be attached to a local loop.

The 3624 and 3614 Consumer Transaction Facilities and some models of the IBM 3604 Keyboard Display can serve as a remote 3603.



**Figure 2-13. Loop Configuration**

## ***Device Cluster Adapter (DCA) Attachment***

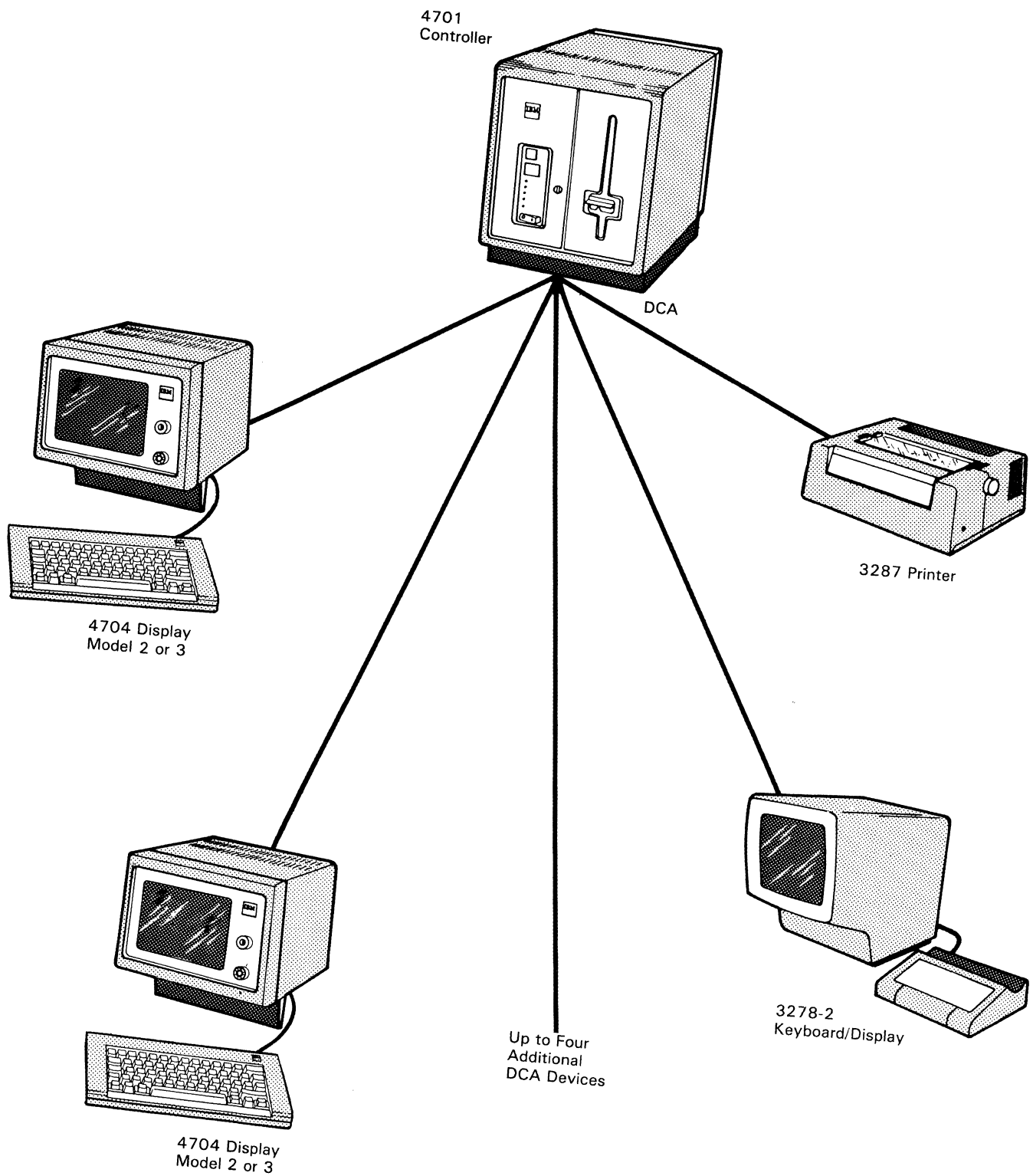
The Device Cluster Adapter (DCA) supports the local attachment of the following IBM 3270 Information Display System devices to 4701 controllers:

- 4704 Display Station Models 2 and 3
- 3178 Display Models C1 and C2
- 3278 Display Station Model 2
- 3287 Printer Models 1 and 2
- 3262 Line Printer Models 3 and 13
- 3279 Color Display Station Models S2A, 2A, S2B, 2B, and 02X
- 5210 Printer Models G01 and G02

The Device Cluster Adapter supports any mixture of these devices, but the total number of devices cannot exceed eight.

Each DCA device attaches directly to the controller through a coaxial cable that has a maximum length of 1500 meters (4921 feet). DCA does not permit remote attachment through telecommunication facilities.





**Figure 2-14. DCA Configuration**

## ***The System Monitor***

4700 operating functions such as creating and updating operating diskettes, checking terminal operation, and monitoring starting operations are under the control of the system monitor.

The system monitor is included on the diskette that the controller operator loads into the controller. In place of the buttons and switches on a control panel, the system monitor recognizes commands entered through an attached 4704 display station.

Two levels of system monitor are available: a basic level and a full-function level. Capabilities present only with the full-function system monitor include the ability to create an operating diskette, print a dump of a controller application program, and accept commands from a controller application program or host application program.

## ***The Local Configuration Facility***

The local configuration facility provides a means of defining a configuration and creating an operating diskette at the controller site. Through a display station dialog with the controller, an operator at the controller site can:

- Define an initial controller configuration.
- Review and edit the configuration parameters.
- Update an existing controller configuration.
- Receive source configuration parameters that you create on your host system and send to the controller.
- Change host-transmitted source configuration parameters.
- Receive controller application programs that you send to the controller.
- Place controller application programs (obtained via transmission or available at the controller site on separate diskettes) on the operating diskette.
- Transfer permanent diskette files to any locally-defined configuration.

## ***Terminals that Attach to the 4701 Controller***

The following list identifies the terminals that can be attached to a 4701 controller:

- 3178 Display Models C1 and C2
- 3278 Display Station Model 2
- 3287 Printer Models 1 and 2
- 3262 Line Printer Models 3 and 13
- 3279 Color Display Station Models S2A, 2A, S2B, 2B, and 02X
- 3603 Terminal Attachment Unit
- 3604 Keyboard Display
- 3606 Financial Services Terminal
- 3608 Printing Financial Services Terminal
- 3610 Document Printer
- 3611 Passbook printer
- 3612 Passbook and Document Printer
- 3615 Administrative Printer
- 3616 Passbook and Document Printer
- 3614 Consumer Transaction Facility
- 3624 Consumer Transaction Facility
- 4704 Display Station (all models)
- 4710 Receipt/Validation Printer
- 4720 Forms/Passbook Printer (all models)
- 5210 Printer Models G01 and G02

## Chapter 3. A Closer Look at the System and Programs

Now finally, **how do the system and programs work with the 4700 products to help you solve the problems of the present and the future?** To answer this question and to complete our look at the 4700 system, this chapter looks at the system and programs, including:

- The host computers and how they attach to the 4700 system
- Host computer programs
- 4701 controller programs
- Host support programs.

### Host Computers

The 4701 controller can attach to any of the following host computers:

- Any IBM System/370 processor (including the 303X and 308X series)
- Any IBM 4300 processor
- Any IBM 8100 Information System processor
- Any IBM System/34 processor.

On some systems, the 4701 can attach by direct cable or communication loop. This is a local attachment. On all systems, the 4701 can attach through common carrier or user-owned telecommunication facilities. This is a remote attachment.

### ***Local Attachment***

The controller attaches directly to the following host computers (Figure 3-1 on page 3-3, top):

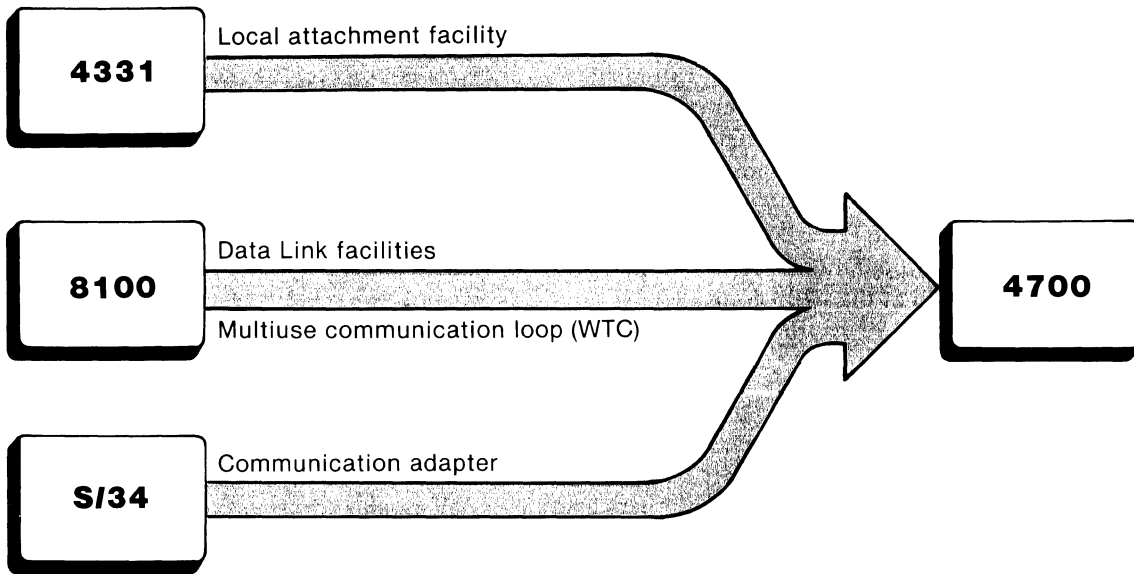
- A 4331 processor, through the processor's local attachment facility
- An 8100 processor through 8100 unit data link features, or (in World Trade countries only) through multiuse communication loop
- A System/34 processor, through the processor's communication adapter.

### ***Remote Attachment***

The controller attaches remotely to the following host computers (Figure 3-1 on page 3-3, bottom):

- A System/370 (including 303X and 308X) or 4300 processor through the IBM 3704 or 3705 Communications Controller
- A 4331 processor through the processor's Integrated Communication Adapter (ICA)
- An 8100 processor, through 8100 unit data link features, or (in World Trade countries only) through a multiuse communication loop (3843 Loop Control Unit required)
- A System/34 through the processor's Communication Adapter (CA).

### Local Attachment



### Remote Attachment

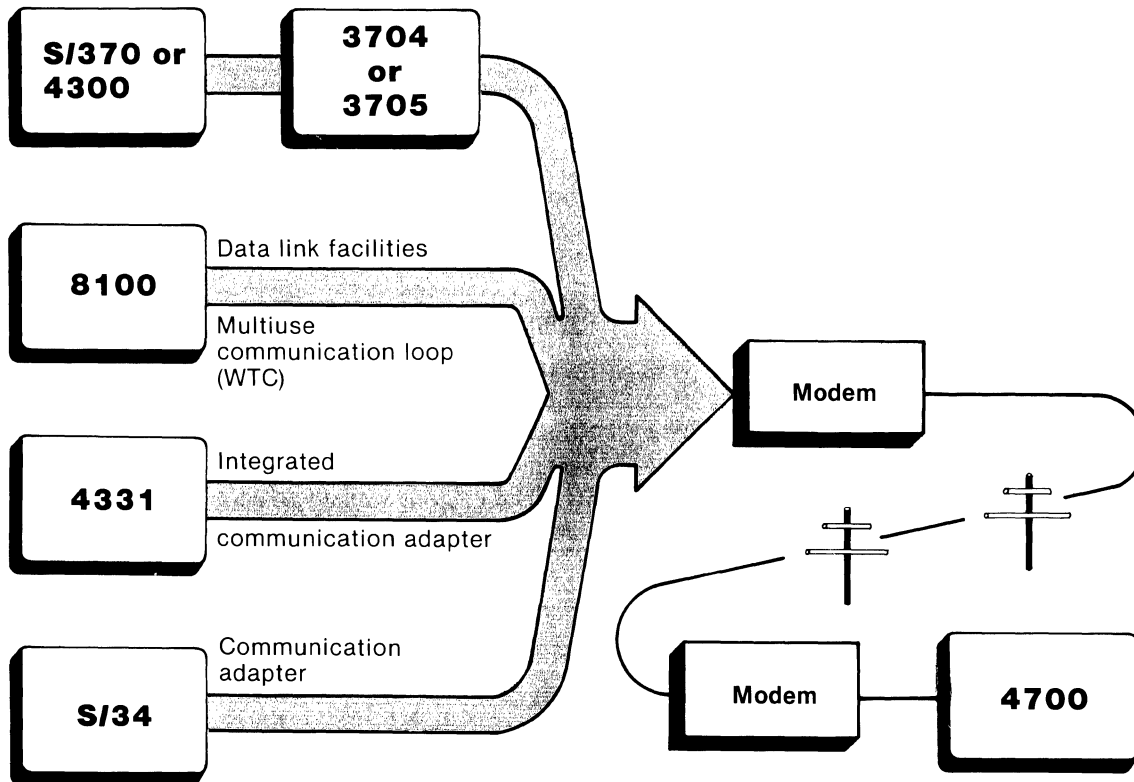


Figure 3-1. Local and Remote Host Computer Attachments

## Communication Facilities

Telecommunication facilities are the means by which signals are exchanged between the host computer and a remotely attached controller. A telecommunication facility can include a variety of components — such as modems, voice-grade telecommunication lines, digital lines, microwave and satellite links. Telecommunication facilities can operate point-to-point or multipoint; point-to-point facilities can be switched or nonswitched.

Voice-grade facilities carry only data that is modulated. Modulation of transmitted data and demodulation of received data is done by modems at the host and at the 4700 controller.

## Communication Modes and Protocols

Data communication facilities operate in either half-duplex mode (data is transmitted in both directions, one way at a time) or duplex mode (data is transmitted simultaneously in both directions over two channels). Although remotely attached 4700 controllers operate in half-duplex transmission mode, multiple 4700s can attach to duplex communication facilities. On SDLC duplex facilities with multiple 4700 controllers attached, one controller can send data to a host computer while another controller receives data from the host computer.

Communication protocols can be either synchronous data link control (SDLC) or binary synchronous communication (BSC). With SDLC protocol, the 4700 controllers can operate on switched facilities at speeds up to 4800 bits per second (bps) and on nonswitched facilities at speeds up to 9600 bps. With BSC protocol, they operate on nonswitched facilities at speeds up to 4800 bps.

## Modems

Remotely attached 4700 controllers require external modems. Modem types must be the same throughout the communication facility; they cannot be mixed. You can use any of the modems shown in Figure 3-2 or their equivalents.

Modems	Speed (bps)	Facility
3863	2400	Switched or nonswitched voice-grade lines
3864	4800	Switched or nonswitched voice-grade lines
3865	9600	Nonswitched voice-grade lines
3872	2400	Switched or nonswitched voice-grade lines
3874	4800	Switched or nonswitched voice-grade lines
5979-L41*	9600	Limited-distance privately-owned line

Figure 3-2. IBM Modems for 4700 Attachment

\* = available in certain World Trade countries only

## The Host Computer Programs

The host computer can have many programs running concurrently. Several of these programs work together to enable the host system to communicate with the 4700 system. This section describes briefly these programs. For a list of publications on IBM-provided programs, refer to the *IBM System/370 Bibliography*, GC20-0001. Figure 3-3 shows an overview of the host computer programs and how they are related.

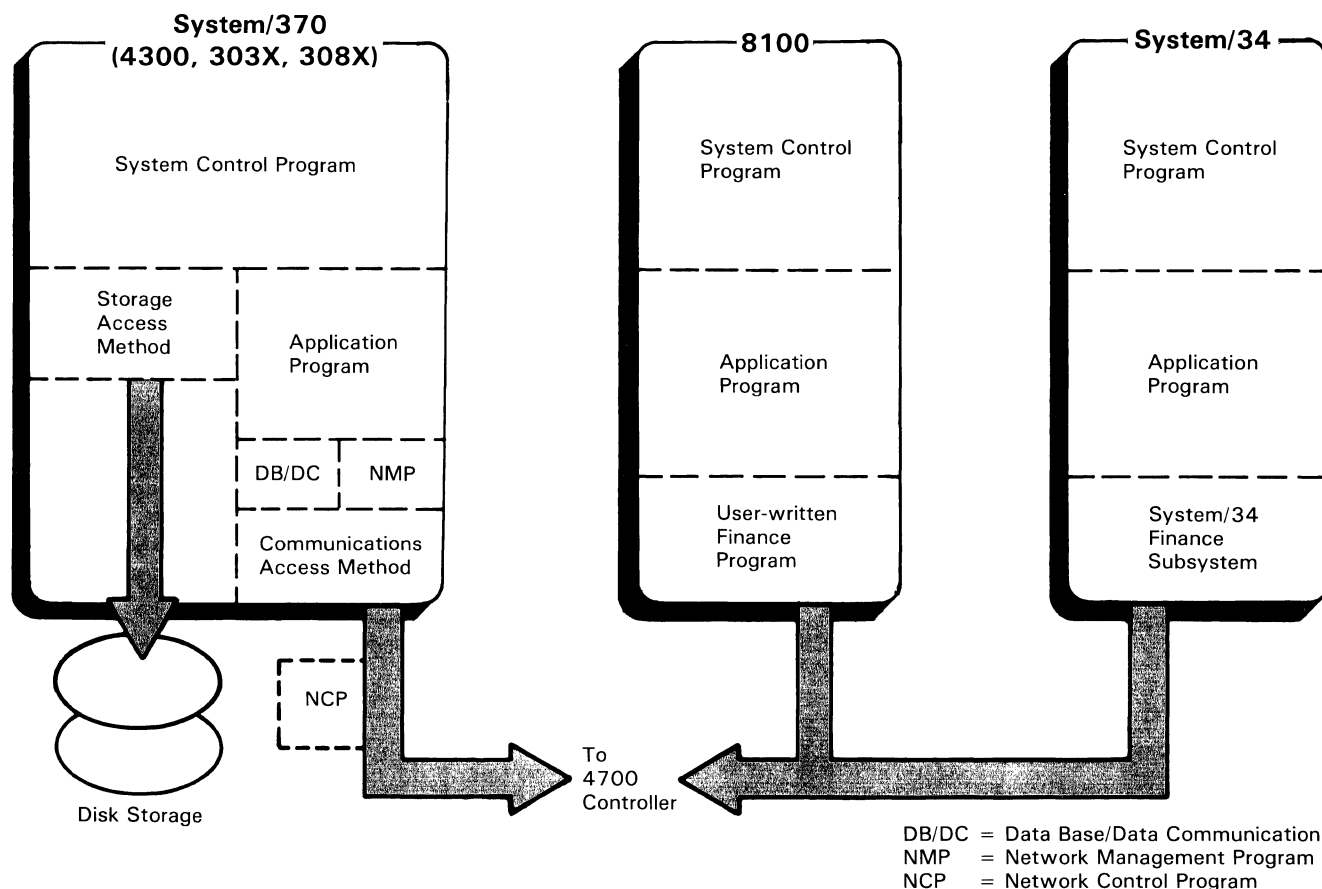


Figure 3-3. Overview of Host Programs

### System Control Programs

System Control Programs (SCP) for IBM host computers are supplied by IBM. These programs are fundamental to the operation and maintenance of the system. The SCP serves as an interface with the other programs in the host computer.

In System/370 (including 303X, 308X, and 4300 computers), these SCPs can be any one of the virtual storage (VS) operating systems: Disk Operating System/VS (DOS/VS), Disk Operating System/VS Extended (VSE), Operating System/VS1 (VS1), or Operating System/VS2 (MVS). In System/34 computers, the SCP is the System Support Program (SSP). In 8100 Information System computers, the SCP is Distributed Processing Program Executive (DPPX).



## ***Storage Access Methods***

Along with the SCP, the Virtual Storage Access Method (VSAM or VSE/VSAM) enables System/370 application programs to store and retrieve data from various IBM direct access storage devices.

## ***Host Computer Application Programs***

Host computer application programs are those that apply to the host computer user's work. Usually, this user's programming staff writes these programs. At least one of these programs communicates with the 4700 Finance Communication System, enabling you to run 4700 application programs that communicate with the host computer.

## ***Data Base/Data Communication Programs***

Data base/data communication system (DB/DC) programs serve as an interface between the System/370 data base and the terminals. You can obtain the DB/DC programs from sources outside your own institution, or your own staff can write them. IBM offers two DB/DC program products, the Customer Information Control System (CICS/VS) and the Information Management System (IMS/VS) that support 4700 systems.

## ***Communication Access Methods***

Communication Access Methods transfer data between the System/370 application program and the 4701 application programs. These access methods include:

- Virtual Telecommunications Access Method (VTAM), which runs on VS1 and MVS
- Advanced Communication Function/Virtual Telecommunication Access Method (ACF/VTAM), a program product that runs on VSE, VS1, and MVS
- Advanced Communication Function/Virtual Telecommunication Access Method Entry (ACF/VTAME), a program product that runs on VSE
- Telecommunication Access Method (TCAM), which runs on VS1 and MVS
- Advanced Communication Function/Telecommunication Access Method (ACF/TCAM), a program product that runs on VS1, and MVS.

## ***Network Control Programs***

Network Control Programs control the operation of the System/370 host communications controller. The host programming staff generates these programs with a set of modules supplied by IBM.

## ***Network Management Programs***

A host computer program can monitor and control many 4700 operations if the 4700 controller is equipped with the full-function system monitor. When communication between the program and the controller is established, the program can issue most system monitor commands. The 4700 system monitor responds as though the command had been entered by an operator at the controller site.

An operator at the central site using such a program becomes, in effect, a remote controller operator. You can conduct network management and problem determination more efficiently when you place each controller's operations in the hands of a central site operator.

IBM offers a set of program products and features that support network management and problem determination at central sites having VS1, MVS, or VSE:

- Network Communications Control Facility (NCCF) — provides access method control from multiple local and remote operator stations, operator-to-operator communication, user-defined command lists, user-written command processors with customized operator commands, and communication and data base facilities for collecting, storing, and retrieving data on network errors.
- Network Problem Determination Application (NPDA) — works with NCCF to collect, organize, and display error statistics and data about communication controllers, lines, and attached controllers, assists the operator in locating the source of a problem, provides alert messages on line error thresholds, uses the 3863, 3864, and 3865 modems to establish the probable cause of network errors, and displays formatted modem test results.
- Threshold Analysis and Remote Access — an NPDA feature that records, analyzes, and displays system management data collected from 3600 and 4700 controllers, and provides alert messages to NPDA based on user-defined loop quality and response time thresholds.

### ***System/34 Programs***

The IBM System/34 Finance Subsystem, operating with the System Support Program and Interactive Communication Feature, allows a System/34 to communicate with 4700 controllers through the SDLC protocol. An application program can send procedure start requests to the System/34. When a program is loaded in the System/34, the Finance Subsystem allows program-to-program communication between the 4700 controller and the System/34. The 4700 controller application program controls the devices attached to the controller; the devices appear as command-capable work stations to the System/34.

An IBM-supplied 4700 controller application program communicates with System/34 processors and 4704, 4710, 4720, 3610, 3611, 3616, and 3624 (multiline display only) devices attached to the controller. This program, the IBM 4700 Online Terminal Support for System/34 (Program Number 5799-BGB), is a Programming Request for Price Quotation (PRPQ) program.

## The 4701 Controller Programs

The 4701 controller, like the host computer, can have multiple programs running at the same time. Primarily, these programs are the application programs that relate to your work. These programs reside either on a diskette or on the controller disk storage feature and are loaded or called into controller storage.

Along with the application programs, the controller can have a disk/diskette access method. Figure 3-4 shows the relationship of the controller programs.

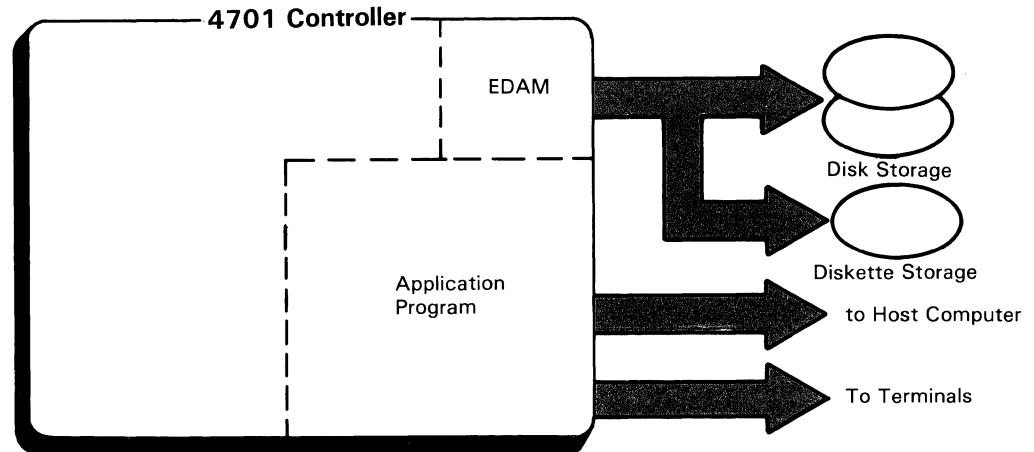


Figure 3-4. 4701 Controller Programs

### *Controller Application Programs*

The controller application programs direct the operation of the finance communication system, such as communicating with the host computer, communicating with terminals, transferring information from and to diskettes and disks, operating the timer, and processing arithmetic and logical operations. A typical commercial bank might have an application program for savings and demand deposit, another for loans, and another for account inquiry.

Your staff can write these programs, or you can select from IBM-developed programs. Your staff can write these programs either in 4700 assembler language (also known as Finance Communication Language) or in Common Business Oriented Language (COBOL). You can mix these languages, and you can divide your programs into sections to simplify the distribution of coding to different programmers and at different times.

Each application program has controller storage and terminals assigned. Together, the program, storage, and terminals compose a logical work station. The same program and different storage and terminals compose a different logical work station. A controller can have up to 60 logical work stations. The typical commercial bank, mentioned above, might have four logical work stations for

savings and demand deposit, two logical work stations for loans, and two logical work stations for account inquiry. Each logical work station's transaction data is processed in its assigned storage; thus the transaction data does not appear at other work stations.

### ***Disk/Diskette Access Method***

Your controller application programs can communicate with the disk-storage feature and diskette through the extended disk/diskette access method (EDAM), an IBM-provided access method that supports both disk and diskette.

Disk records can be:

- Fixed length unspanned (contained in one block) to a maximum of 256 bytes,
- Fixed length spanned (contained in more than one block) to a maximum of 9999 bytes, or
- Variable length to a maximum of 32 767 bytes.

EDAM can either sequentially or randomly access these records. Files can be either temporary or permanent. Each disk can have up to 512 data sets.

EDAM accesses disk and diskette records by data record number, not by cylinder and track locations; thus your programs do not have to include locations of data on the disk or diskette. Instead, the data appears as a consecutive string of numbered data records. This gives your programs a simple way of accessing disk and diskette data.

This access method allows you to move files easily between diskette and disk. So, whether you occasionally transfer files between diskette and disk (both ways) or permanently convert diskette files to disk, EDAM makes it simple.

4700 EDAM is not compatible with the IBM 3602 Finance Communication Controller disk access method.

### **4700 Host Support**

The 4700 Host Support (Program Number 5668-989) enables you to develop, maintain, and transmit programs and data for use in 4700 controllers and 3624 consumer transaction facilities (see Figure 3-5 on page 3-11).

With this licensed programming installed in your System/370, 303X-series, 308X-series, or 4300-series processor, you can:

- Use the host assembler to assemble 4700 assembler language macro instructions and controller configuration macro instructions.
- Place the assembled 4700 assembler language macro instructions (controller application program data), assembled configuration macro instructions (configuration data), and IBM-supplied controller data on a 4700 library.
- Obtain a formatted assembler listing.
- Combine sections of controller application program data into a single application program.

- Define a controller load image (combination of application program, configuration, and controller data).
- Define a 3624 load image (combination of controller and customization data).
- Create a sequential load image that you can later transmit to a controller via your own program.
- Transmit the load image or any of its components (controller data, configuration data, or application program data) to a controller or group of controllers.
- Maintain a log of load image transmissions.
- Receive a dump from the controller and print it.

### ***Host Requirements for Installing the 4700 Host Support***

The prerequisite programming for the 4700 Host Support is similar to that required for the IBM 3600 Finance Communication System. The 4700 Host Support prerequisites are:

- A VSE, VS1, or MVS operating system
- A VSAM or VSE/VSAM storage access method
- An ACF/VTAM, ACF/VTAME, ACF/TCAM (Version 2), BTAM, or BTAM-ES telecommunications access method
- An ACF/NCP/VS (for 3704 or 3705 communication controllers)

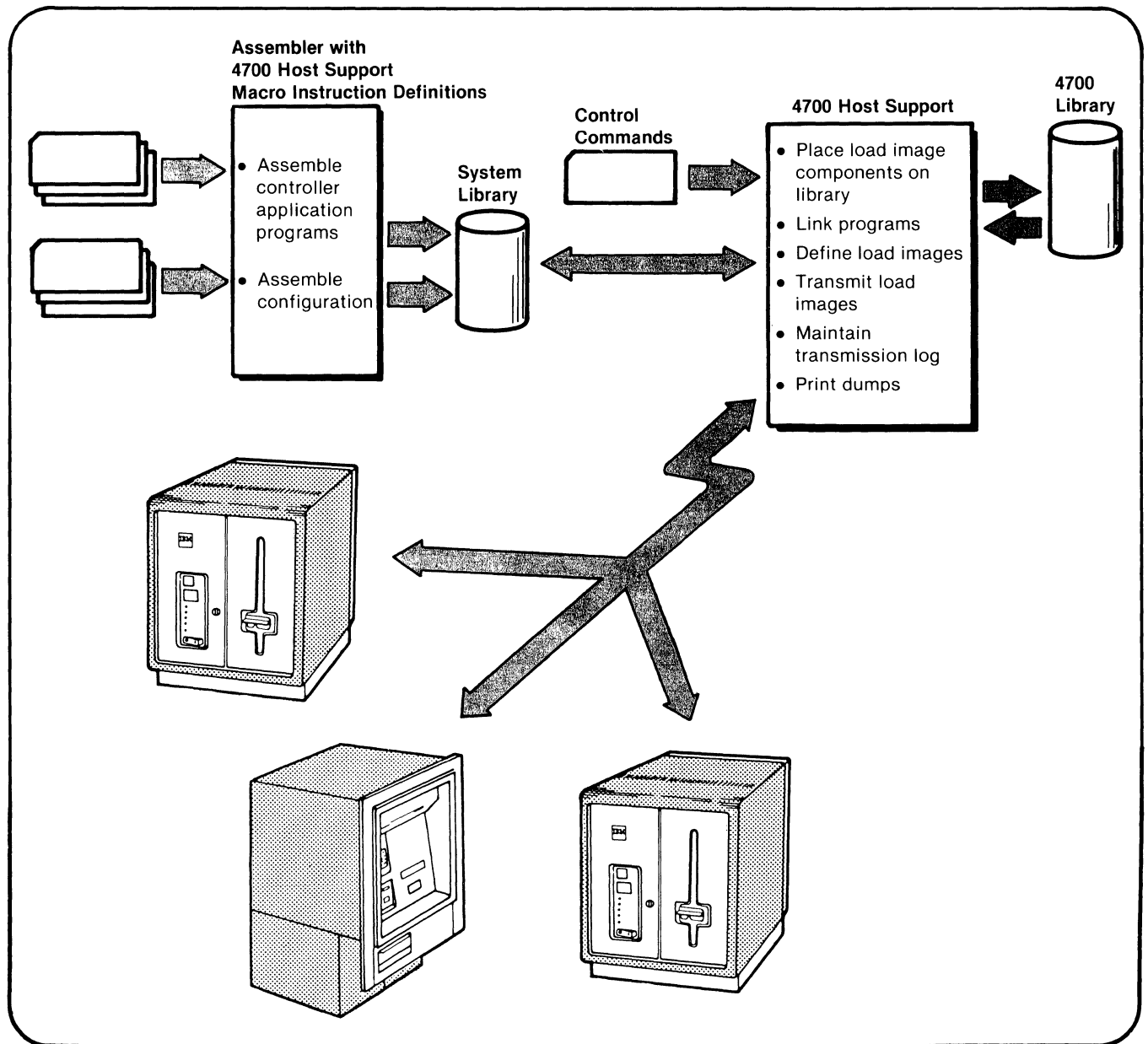


Figure 3-5. 4700 Host Support Overview

### ***Application Program Support***

The 4700 Host Support includes a set of macro definitions that expand 4700 assembler language macro instructions into application program code usable by 4700 controllers. These definitions are installed on your operating system's macro library; the macro instructions you code are processed by the assembler.

The resulting controller application programs direct the actual operations of the 4700 controllers.

Most of the macro instructions in the 4700 assembler language are identical to corresponding macro instructions in the 3600 assembler language. The 4700 assembler language has been expanded to include new 4700 controller capabilities (such as the ability to call 4700/COBOL application programs). Existing 3600 controller application programs that do not use such nonsupported functions will assemble satisfactorily.

4700 controller application programs do not have to be assembled as a single program, but can be assembled in sections. This capability allows you to develop portions of a program independently and to modify or add one section without having to reassemble the entire program.

Program sections can also be designated as *overlay* sections; such sections are brought into controller storage only when necessary, and temporarily overlay other program sections. This provides a more efficient use of controller storage.

The 4700 Host Support provides the support needed to place the program sections on the 4700 library and link them together.

Because controller application programs can call other programs, you can maintain called programs (subprograms) individually in the 4700 library. This enables you to create a controller application program much larger than could otherwise be developed.

### ***Configuration Support***

A complete 4700 controller load image must include a description of the controller's physical configuration (such as its host communication capabilities, the number of attached loops, and the number and type of attached devices) and its "logical" configuration (association of programs, terminals, and storage).

You define each controller's configuration by coding a set of configuration macro instructions. The 4700 Host Support includes the macro definitions needed to expand these instructions. Like the 4700 assembler language support, these macro definitions are installed on your operating system's macro library. After you have assembled the configuration macro instructions, you use the 4700 Host Support to place the results on the 4700 library.

Most of the 4700 configuration macro instructions are identical to corresponding 3600 configuration macro instructions. If you are replacing a 3600 controller with a 4700 controller, and are not using 4700 terminals, you can use your existing set of instructions with minor changes.

### ***Controller Data***

A complete 4700 controller load image must also include controller data.

Controller data is provided by IBM in the form of a distribution tape reel (DTR) and an installation diskette. You use the 4700 Host Support to install the controller data on the 4700 library.

The controller data carries a label designating its level of currency. When you later build and transmit a load image to a controller, the 4700 Host Support helps prevent sending an incorrect level of controller data.

### ***Defining Load Images***

To define a load image, you use the 4700 Host Support to associate the three components of a complete load image: controller application programs, configuration data, and controller data.

The 4700 Host Support allows you to maintain an image definition that is not associated with a particular controller. You can also build separate tables that you later use to direct particular images to particular controllers.

The 4700 Host Support also enables you to define a load image for an IBM 3624 Consumer Transaction Facility. The customization macro instructions needed to build the 3624 image are provided by the 4700 Host Support.

### ***Creating Sequential Load Images***

If you wish to use your own host application programs to transmit a load image to a controller, you can direct the 4700 Host Support to create a load image from an existing 4700 load image in the 4700 library as a sequential data set. You can later transmit the load image to a controller without using the 4700 Host Support.

### ***Transmitting Load Images***

After the load image has been created, the 4700 Host Support transmits the load image to the appropriate controller or controllers. The 4700 Host Support transmits the load image using either Synchronous Data Link Control (SDLC) protocols or Binary Synchronous Communication (BSC) protocols.

All 4700 controllers can receive the load image and create an operating diskette from it. A 4701 controller equipped with two diskette drives can create a new operating diskette on its secondary drive while the existing operating diskette is in use on the primary drive.

The 4700 Host Support can initiate the transmission at the central site, or respond to a transmission request from a controller. When the transmission is initiated by the 4700 Host Support, the controller can receive the load image whether the controller is attended or unattended.

When transmission is requested by the controller, you must define a table that links that particular controller with the appropriate load image definition.

When you initiate transmission at the central site, you have two ways to link a controller with a load image definition:

- Explicitly identify the controller and its load image definition.
- Refer to a previously-defined table that associates controllers and load image definitions.

In this table you can specify a number of controllers, and for each controller, a load image definition. This table could, for example, indicate that one load image is to be transmitted to controllers "BRANCH1," "BRANCH2," and "BRANCH3," while a second load image is to be transmitted to "BRANCH4."

The 4700 Host Support enables you to transmit load images to many controllers at the same time.

If the 4700 Host Support encounters a recoverable problem during transmission, it attempts to retransmit the load image up to a limit that you specify.



It is not necessary to build and transmit an entire load image. The 4700 Host Support enables you to update a part of the load image (application programs, configuration data, or controller data) and to transmit only the updated part to the controller.

### ***Transmission Log***

The 4700 Host Support maintains a log of its load image creation and transmission activities.

- Date and time of the transmission
- Name of the load image
- Identity of the receiving controller or 3624
- Whether the transmission was for a new or an updated load image
- Identity and currency level of the load image components
- Whether the transmission was successful or unsuccessful.

The 4700 Host Support maintains this log in a sequential data set that you have previously defined. You can use this data set as input to your own application programs. Your program could, for example, select particular items from the log, compile a report, and print it.

### ***Printing Controller Dumps***

4700 controllers can dump an application or data to a diskette, and transmit the results to the central site. Because the dumping and the transmitting are invoked by separate system monitor commands, you can take the dump at one time and transmit the dump later.

When the 4700 Host Support receives one of these dumps, it writes the data to a VSAM data set that you have previously defined. You can later invoke the 4700 Host Support to format and print the dump.

## Appendix A. Characters Supported By the 4720 Printers

Alphabetic Characters	Description	Alphabetic Characters	Description
A	A Capital	a	a Small
B	B Capital	b	b Small
C	C Capital	c	c Small
D	D Capital	d	d Small
E	E Capital	e	e Small
F	F Capital	f	f Small
G	G Capital	g	g Small
H	H Capital	h	h Small
I	I Capital	i	i Small
J	J Capital	j	j Small
K	K Capital	k	k Small
L	L Capital	l	l Small
M	M Capital	m	m Small
N	N Capital	n	n Small
O	O Capital	o	o Small
P	P Capital	p	p Small
Q	Q Capital	q	q Small
R	R Capital	r	r Small
S	S Capital	s	s Small
T	T Capital	t	t Small
U	U Capital	u	u Small
V	V Capital	v	v Small
W	W Capital	w	w Small
X	X Capital	x	x Small
Y	Y Capital	y	y Small
Z	Z Capital	z	z Small

<b>Numeric Characters</b>	<b>Description</b>
0	Zero
1	One
2	Two
3	Three
4	Four
5	Five
6	Six
7	Seven
8	Eight
9	Nine

Extended Alphabetic Characters	Description	Extended Alphabetic Characters	Description
á	a Acute Small	Á	A Acute Capital
à	a Grave Small	À	A Grave Capital
â	a Circumflex Small	Â	A Circumflex Capital
ä	a Diaeresis Small	Ä	A Diaeresis Capital
ã	a Tilde Small	Ã	A Tilde Capital
å	a Overcircle Small	Å	A Overcircle Capital
æ	ae Diphthong Small	Æ	AE Diphthong Capital
ć	c Acute Small	Ć	C Acute Capital
č	c Caron Small	Č	C Caron Capital
ç	c Cedilla Small	Ç	C Cedilla Capital
đ	d Stroke Small	Đ	D Stroke Capital
ð	eth Icelandic Small		
é	e Acute Small	É	E Acute Capital
è	e Grave Small	È	E Grave Capital
ê	e Circumflex Small	Ê	E Circumflex Capital
ë	e Diaeresis Small	Ë	E Diaeresis Capital
ġ	g Breve Small	Ġ	G Breve Capital
í	i Acute Small	Í	I Acute Capital
ì	i Grave Small	Ì	I Grave Capital
î	i Circumflex Small	Î	I Circumflex Capital
ï	i Diaeresis Small	Ï	I Diaeresis Capital
ı	i Dotless small	İ	I Overdot Capital
ḷ	l Middle Dot Small	Ł	L Middle Dot Capital
ñ	n Tilde Small	Ñ	N Tilde Capital
ⁿ	High comma n Small		
ó	o Acute Small	Ó	O Acute Capital
ò	o Grave Small	Ò	O Grave Capital
ô	o Circumflex Small	Ô	O Circumflex Capital
ö	o Diaeresis Small	Ö	O Diaeresis Capital
õ	o Tilde Small	Õ	O Tilde Capital
ø	o Slash Small	Ø	O Slash Capital
š	s Caron Small	Š	S Caron Capital
ș	s Cedilla Small	Ș	S Cedilla Capital
ß	Sharp s Small		
þ	Thorn Icelandic Small	Þ	Thorn Icelandic Capital

<b>Extended Alphabetic Characters</b>	<b>Description</b>	<b>Extended Alphabetic Characters</b>	<b>Description</b>
ú	u Acute Small	Ú	U Acute Capital
ù	u Grave small	Ù	U Grave Capital
û	u Circumflex Small	Û	U Circumflex Capital
ü	u Diaeresis Small	Ü	U Diaeresis Capital
ý	y Acute Small	Ý	Y Acute Capital
ÿ	y Diaeresis Small		
ž	z Caron Small	Ž	Z Caron Capital

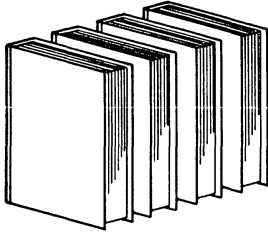
Special Characters	Description	Special Characters	Description
+	Plus	±	Plus or Minus
<	Less Than	=	Equal Sign
>	Greater Than	÷	Divide
	Space	!	Exclamation Point
¡	Inverted Exclamation Point	"	Quotation Mark
'	Apostrophe	(	Left Parenthesis
)	Right Parenthesis	,	Comma
—	Underline	-	Hyphen
.	Period	/	Slash
:	Colon	;	Semicolon
?	Question Mark	¿	Inverted Question Mark
<<	Left Angle Quotes	>>	Right Angle Quotes
#	Number Sign	%	Percent Sign
&	Ampersand	*	Asterisk
@	At Sign	[	Left Bracket
\	Backslash	]	Right Bracket
==	Double Underscore	{	Left Brace
	Vertical Bar	}	Right Brace
—	Overline	ℓ	Liter Symbol
μ	Micro	°	Degree/Overcircle
♂	Ordinal, Masculine	♀	Ordinal, Feminine
§	Section Symbol	¶	Paragraph Symbol
®	Registered Trademark Symbol	¬	Logical Not
¥	International Currency Symbol	£	Pound Sign
\$	Dollar Sign	¢	Cent Sign
¥	Yen Sign	Pts	Peseta Sign
f	Florin, Guilder	½	One Half
¼	One Quarter	¾	Three Quarters
⅛	One Eighth	⅜	Three Eighths
⅝	Five Eighths	⅞	Seven Eighths
²	Two (Superscript)	³	Three (Superscript)
'	Acute Accent	`	Grave Accent
^	Circumflex Accent	••	Diaeresis Accent

<b>Special Characters</b>	<b>Description</b>	<b>Special Characters</b>	<b>Description</b>
~	Tilde Accent	¸	Cedilla Accent
	Error, Check Protect		

## Appendix B. 4700 System Reading Guide

This appendix describes documents that provide further information on the 4700 system (Figure B-1). Publications for related systems are listed at the end of the appendix. These publications can be ordered through your local IBM branch office.

### 4700 Finance Communication System Publications



#### Planning

- *System Summary* – GC31-2016
- *System Configurator* – GC31-2017
- *Installation Planning* – GC31-2018
- *Physical Planning Template* – GC31-2019
- *COBOL General Information* – GC23-0078

#### Installation

- *4701 Setup Instructions* – GC31-2021
- *4704-1 Setup Instructions* – GC31-2024
- *4704-2 Setup Instructions* – GC31-2058
- *4704-3 Setup Instructions* – GC31-2059
- *4710 Setup Instructions* – GC31-2027
- *4720-1, 3 Setup Instructions* – GC31-2062
- *4720-2, 4 Setup Instructions* – GC31-2063

#### Unit Operation

- *4701 Operating Instructions* – GC31-2022
- *4704 Operating Instructions* – GC31-2025
- *4710 Operating Instructions* – GC31-2028
- *4720 Operating Instructions* – GC31-2064

#### Subsystem Operation

- *4700 Subsystem Operating Procedures* – GC31-2032

#### Unit Problem Determination (PD)

- *4704-1 PD Card* – GC31-2035
- *4710 PD Card* – GC31-2036
- *4720-1, 3 PD Card* – GC31-2065
- *4720-2, 4 PD Card* – GC31-2079

#### Subsystem Problem Determination (PD)

- *4700 Subsystem PD Guide* – GC31-2033

Figure B-1 (Part 1 of 2). The 4700 Publication Library



#### Controller Programming (4700 Assembler)

- *IBM 4700 Finance Communication System: Programming Library Volumes 1 through 6*, GBOF-1387

#### Controller Programming (4700 COBOL)

- *COBOL Licensed Program Specifications for OS/VS* – GL23-0079
- *COBOL Licensed Program Specifications for VSE* – GL23-0080
- *COBOL Language Reference* – GL23-0081
- *COBOL Programmer's Guide* – SL23-0082
- *COBOL Problem Diagnosis* – SL23-0083

#### Host Support

- *Host Support Licensed Program Specifications* – GC31-0019
- *Host Support User's Guide* – GC31-0020
- *Host Support Problems Diagnosis and Logic Overview* – SC31-0021

#### Service

- *4701 Repair Instructions* – SC31-3511
- *4704-1 Repair Instructions* – SC31-3512
- *4704-2,3 Repair Instructions* – SC31-2051
- *4710 Repair Instructions* – SC31-3513
- *4720 Repair Instructions* – SC31-2053

Figure B-1 (Part 2 of 2). The 4700 Publication Library

*Planning publications* help you evaluate, order, and prepare for the installation of a 4700 system. The following planning publications are available:

- *IBM 4700 Finance Communication System: System Configurator*, GC31-2017, lists the basic, specify, and special (optional) features for each 4700 device. The *Configurator* also tells how to estimate the amount of required controller storage. This book assists data processing specialists in specifying an order for a 4700 system.
- *IBM 4700 Finance Communication System: Installation Planning Manual*, GC31-2018, addresses systems installation tasks that you should accomplish between placement of an order for a 4700 system and the installation of the system. Topics include:
  - Summary of installation tasks and their interdependencies
  - Site preparation considerations
  - Obtaining and installing system cabling
  - Planning for the installation of 4700 devices (Customer Setup)
  - Planning for the interconnection and testing of 4700 system components.

- *IBM 4700 Finance Communication System: Physical Planning Template*, GC31-2019, is a plastic overlay depicting the plan view of each 4700 device. The *Template* is drawn to a scale of 1:25 and helps you to determine how devices will be placed in the work area.
- *IBM 4700 Finance Communication System: COBOL Compiler and Library Program General Information*, GL23-0078, provides an introductory view of 4700's COBOL compiler support, together with a description of its warranty, required resources, testing period, and service categories. This licensed program provides ANS Level X3.23 (1974) support, and is available for users of VSE, VS1, and MVS operating systems.

*Hardware installation* documentation is used by persons performing Customer Setup (CSU) operations for individual 4700 devices, and for persons installing and checking out the 4700 system. Installation instructions are shipped with each device; system installation information is shipped with the controllers. This information can be used by persons with little or no background in data processing operations. The following hardware installation documentation is available:

- *IBM 4701 Controller Setup Instructions*, GC31-2021 (includes subsystem attachment and testing instructions)
- *IBM 4704-1 Display Station Setup Instructions*, GC31-2024
- *IBM 4704-2 Display Station Setup Instructions*, GC31-2058
- *IBM 4704-3 Display Station Setup Instructions*, GC31-2059
- *IBM 4710-1 Receipt/Validation Printer Setup Instructions*, GC31-2027
- *IBM 4720-1,3 Forms/Passbook Printer Setup Instructions*, GC31-2062
- *IBM 4720-2,4 Forms/Passbook Printer Setup Instructions*, GC31-2063

*Unit operating* instructions describe basic device operations, such as how to replace ribbons in a printer and how to pass a card through a magnetic stripe unit. They also show how optional accessories, such as display monitor filters are attached, and what to do when the problem determination procedures indicate that your device is not working properly. These instructions are for persons with little or no data processing background, and can be extracted into user-written procedures. The following unit operating instructions are available:

- *IBM 4701 Controller Operating Instructions*, GC31-2022 (includes 4701 problem determination procedures)
- *IBM 4704 Display Station Operating Instructions*, GC31-2025
- *IBM 4710 Receipt/Validation Printer Operating Instructions*, GC31-2028
- *IBM 4720 Forms/Passbook Printer Operating Instructions*, GC31-2064

*Subsystem operating* information includes controller commands, messages, and procedures, together with other system-level reference information. This documentation is for persons experienced in data processing who use the 4700 system monitor. The system operating information is described in:

- *IBM 4700 Finance Communication System: Subsystem Operating Procedures*, GC31-2032 (shipped with each controller)

*Unit problem determination* documentation tells how to determine if a 4700 device is operating properly. This documentation, which is shipped with the individual 4700 devices, can be used by persons with little or no data processing background. The following problem determination documents are available:

- *IBM 4704-1 Display Station Problem Determination Card*, GC31-2035
- *IBM 4704-2,3 Display Station Problem Determination Card*, GC31-2060
- *IBM 4710 Receipt/Validation Printer Problem Determination Card*, GC31-2036
- *IBM 4720-1,3 Forms/Passbook Printer Problem Determination Card*, GC31-2065
- *IBM 4720-2,4 Forms/Passbook Printer Problem Determination Card*, GC31-2079

*Subsystem problem determination* information describes procedures that can be used to isolate a problem in a 4700 system to a particular 4700 component (such as a device or a licensed program) or to user programming. This information is for persons experienced in data processing operations. These problem determination procedures are described in:

- *IBM 4700 Finance Communication System: Subsystem Problem Determination Guide*, GC31-2033 (shipped with each controller)

*Controller programming* information tells you how to design and code a controller application program, and how to define a controller configuration. Controller programming information is described in:

- *IBM 4700 Finance Communication System: Programming Library Volumes 1 through 6*, GB0F-1387

*COBOL language and programming* information describes how to design and code a 4700/COBOL program, and how to use the compiler and libraries in the host operating system. The following 4700/COBOL publications are available:

- *IBM 4700/COBOL Licensed Program Specifications for OS/VS*, GL23-0079
- *IBM 4700/COBOL Licensed Program Specifications for VSE*, GL23-0080

- *IBM 4700/COBOL Language Reference Manual*, GL23-0081
- *IBM 4700/COBOL Programmer's Guide*, SL23-0082
- *IBM 4700/COBOL Problem Diagnosis*, SL23-0083

*Host Support* documentation describes how to use the 4700 Host Support program to build and maintain controller application programs, configuration data, and controller data on VSE, VS1, and MVS library files, and how to transmit them to a 4700 controller. The three Host Support publications are:

- *IBM 4700 Host Support: Licensed Program Specifications*, GC31-0019
- *IBM 4700 Host Support: User's Guide*, SC31-0020
- *IBM 4700 Host Support: Problem Diagnosis and Logic Overview*, SC31-0021

*Service* documentation contains internal troubleshooting and repair procedures for the 4700 devices. The following service manuals are available:

- *IBM 4701 Controller Repair Instructions*, SC31-3511
- *IBM 4704-1 Display Station Repair Instructions*, SC31-3512
- *IBM 4704-2, 3 Display Station Repair Instructions*, SC31-2051
- *IBM 4710 Receipt/Validation Printer Repair Instructions*, SC31-3513
- *IBM 4720 Forms/Passbook Printer Repair Instructions*, SC31-2053

## **Related Publications in Other Libraries**

These introductory publications contain information about other publications in their system libraries:

- *IBM 3600 Finance Communication System: System Summary*, GC27-0001
- *IBM System/370 System Summary: Processors*, GA22-7001
- *Advanced Function for Communications: System Summary*, GA27-3099
- *Systems Network Architecture (SNA) Concepts and Products*, GC30-3072
- *Systems Network Architecture (SNA) Technical Overview*, GC30-3073
- *IBM Cryptographic Subsystem Concepts and Facilities*, GC22-9063
- *An Introduction to the IBM 3270 Information Display System*, GA27-2739
- *Introduction to the 3704 and 3705 Communications Controllers*, GA27-3051
- *OS/VS1 Planning and Use Guide*, GC24-5090
- *OS/VSE MVS Overview*, GC28-0984
- *Introduction to DOS/VSE*, GC33-5370

- *Introduction to Advanced Communications Function, GC30-3033*
- *Network Communications Control Facility (NCCF): General Information Manual, GC27-0429*
- *Advanced Communications Function for VTAM: General Information Manual, GC38-0254*
- *Advanced Communications Function for VTAME: Introduction, GC27-0438*
- *IBM System/34 Introduction, GC21-5153*
- *Introduction to the 8100 Information System, GA27-2875*
- *Customer Information Control System/Virtual Storage (CICS/VS): General Information Manual, GC33-0066*
- *Information Management System Virtual Storage (IMS/VS): General Information Manual, GH20-1260*

# Glossary

This glossary defines 4700 Finance Communication System terms and other data processing and data communication terms as used in this publication. This glossary includes terms and definitions from the *IBM Vocabulary for Data Processing, Telecommunications, and Office Systems, GC20-1699*.

**central site.** In a data processing network, the location of the host computer and master files. In 4700 publications, the term *central site* also refers to the location of the programming, operations, and problem determination specialists of the financial institution.

**configuration.** In 4700 systems, the collection of programs and devices that make up the 4700 system, and that are defined to the 4700 controller in the configuration procedure.

**configuration data.** The information produced from the assembly of the configuration macro instructions.

**configuration macro instruction.** A macro instruction, coded by the user at the host computer during the configuration procedure, that defines a portion of the 4700 system to a controller.

**configuration procedure.** In the 4700 system, the process of defining the configuration of a specific 4700 system to a controller. The configuration procedure can be performed either at the host computer using configuration macro instructions, or at the controller using the Local Configuration Facility (LCF).

**control module.** See *display control module*.

**controller.** (1) a programmable unit in a communication network that collects data, directs inquiries, and controls communications of attached terminals. (2) In this publication, the term *controller* refers to the IBM 4701 Controller.

**controller data.** Modules of operating information stored in the 4700 library and used to construct load images for controllers. During the configuration procedure, selected modules of controller data are combined with information taken from the assembled configuration macro instructions, and with assembled application program, to form a load image for the controller.

**customization data.** Modules of operating information stored in the 4700 library and used to construct load images for the IBM 3624 Consumer Transaction Facility.

**diagnostic aid.** In the 4700 system, a feature built into a device that indicates that the device needs repair or replacement. Generally, a diagnostic aid is actuated when invoked by the operator or when the device is powered on.

**diagnostic diskette.** An IBM-supplied diskette that enables the 4700 controller to perform a variety of problem determination procedures.

**display control module.** In a 4700 system, a device that provides the power and logic for a display station. Display monitors, keyboards, and magnetic stripe units are attached to and receive their power from a display control module.

**display monitor.** In a 4700 system, the device that presents data on the surface of a cathode-ray tube (CRT) display screen. The display monitor contains the display screen, but relies on an external source for power and logic.

**display station.** In a 4700 system, the collection of devices attached to a single display control module.

**Host Support.** A licensed program that executes in the host computer to provide services for 4700 controllers.

**installation diskette.** An IBM-supplied diskette that enables the 4700 controller to perform a variety of installation-related procedures—for example, creating an operating diskette.

**keypad.** A small keyboard designed for one-handed use. For example, a PIN keypad is a small, limited-function keyboard with which an operator uses one hand to enter a personal identification number.

**load image.** A combination of formatted controller data, configuration data, and application program data that defines an operating environment for a 4700 controller. Load images for the IBM 3624 Consumer Transaction Facility contain customization data rather than configuration data, and include no application program data.

**local configuration procedure.** The process of defining the configuration of a 4700 system to a controller by responding to prompting messages at the 4700 location rather than assembling configuration macro instructions at the host computer.

**loop.** In a 4700 system, the continuous one-way electric circuitry that enables data to pass from the controller to the display stations and printers and back to the controller.

**operating diskette.** The diskette containing the load image relating to the operation of a particular controller.

**operator communications area.** The bottom portion of a display screen, where both the application program and the 4700 system can display indicators to guide the operator in using the remainder of the screen.

**personal consultant.** An employee or officer of a financial institution who advises or counsels the institution's customers; examples are customer service representative, platform officer, and personal banker.

**pre-operating diskette.** Supplies the control data for use in the Local Configuration Facility. It becomes an operating diskette as a result of the configuration procedure.

**telecommunication link.** The combination of data link, communication controller, and telecommunication line that connects a 4700 controller to a host computer.

**translation table.** In the 4700 controllers, a customer-selected relationship between a set of numeric codes and a set of alphameric characters and special characters. An input translation table translates input from a keyboard into alphameric data into codes understood by the display monitor or printer.

**work station.** In the 4700 system, the collection of devices used by a single operator. A work station can include a display station and a printer.

**3600 library.** A portion of the Subsystem Support Services (SSS) subsystem library at the host computer that is used to store data, modules, and images related to a 3600 Finance Communication System.

**4700 assembler instruction.** One of the instructions with which a 4700 controller application program can be written. See also *4700 Assembler Language*.

**4700 Assembler Language.** The formal name for the set of instructions that can be used to write application programs for execution in 4700 controllers. Programs written in this language are assembled in the host computer.

**4700 library.** A library at the host system that is used to store application programs, configuration data, customization data, and controller data for eventual transmission to a controller.

**4700 system.** A 4701 controller and all of its attached devices and attendant programming support. In 4700 publications, the term *4700 system* generally refers to everything from the 4700 controller outward to the end user. From the point of view of the entire installation, the 4700 system is a subsystem.

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IBM 4700  
Finance Communication System  
System Summary  
Order No. GC31-2016-4

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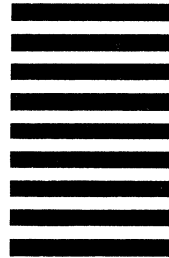
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