Systems

IBM 3270
Information Display System
Description, Configuration, and
Physical Planning

IBM 3274 Control Unit
IBM 3276 Control Unit/Display Station
IBM 3278 Display Station
IBM 3287 Printer
IBM 3289 Line Printer

IBM

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Preface

This publication is an interim document that provides customer executives, installation managers and planners, and IBM marketing representatives with descriptions, configurations, and physical planning information about the new units that have been added to the 3270 Information Display System. This publication introduces the following units:

- IBM 3274 Control Unit, Models 1A and 1B (Local)
- IBM 3274 Control Unit, Model 1C (Remote)
- IBM 3276 Control Unit/Display Station, Models 1, 2, 3, and 4 (Remote BSC)
- IBM 3276 Control Unit/Display Station, Models 11, 12, 13, and 14 (Remote SDLC)
- IBM 3278 Display Station, Models 1, 2, 3, and 4
- IBM 3287 Printer, Models 1 and 2
- IBM 3289 Line Printer, Models 1 and 2

Check with your IBM Marketing Representative for details about the programming support that is applicable to remote 3270 systems when they are operating in BSC or SDLC line discipline.

The companion publication to this publication is the:

- *IBM 3270 Information Display System Planning and Setup Guide*, GA27-2827

An addendum publication highlighting Japanese Katakana language capability is available to IBM Japan customers.

This publication contains four chapters and six appendixes. Chapter 1 introduces the reader to the new units that have been added to the 3270 display system, highlighting the more important aspects of each unit. Chapter 2 describes the units, their basic function, and the specify and special features offered on each unit. Chapter 3 deals with the configuration of the new units, providing configurations and feature codes for all units. Chapter 4 discusses physical planning, using cabling schematics, plan views and specifications for each unit. Appendixes A through D contain power plug information. Appendix E contains the I/O interface code chart comparisons, and Appendix F shows cable terminations.

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3270 Information Display System — 3274/3276 Clusters (Design models)

CHAPTER 1.   INTRODUCTION

The IBM 3270 Information Display System has now grown to include additional display stations, control units, and printers. The new display stations can display up to 3440 characters and print speeds are available at up to 400 lines per minute.

The flexibility of the 3270 system continues, and an even greater ability to configure a variety of display systems from one basic group of IBM units is possible.

The new units being introduced in this publication are:

- 3274 Control Unit (Local and Remote)

- 3276 Control Unit/Display Station (Remote)

- 3278 Display Station

- 3287 Printer

- 3289 Line Printer

The 3274 (Model 1C-Remote) and all the 3276s, 3278s, 3287s, and 3289s have been designed to enable a customer to assume responsibility for unpacking, placement, setup, and checkout. These design considerations will provide the earliest possible operational availability. Additionally, they will facilitate relocation for system configuration. The new units are designed with unique customer cable access panels which permit setup and relocation.

3274 CONTROL UNIT HIGHLIGHTS

- A cluster control unit able to control up to 32 display stations and printers for either local channel attachment or for remote half-duplex communications:

  Local Channel Attachment - Two models (1A and 1B) provide for either 3791 or 3272 types of operation.

  - Model 1A (Figure 1-1) attaches to a System/370 via a selector, multiplexer, or block multiplexer channel for local SNA mode of operation.

Host System
IBM System/360
or System/370

Selector,
Multiplexer, or
Block Multiplexer
Channel

⟩ To other Control Units

***3274 Control Unit,
Models 1A or 1B

Type A
Adapter

Type B
Adapter

*
Category
A

3278
Display Station
Models 1, 2, 3, and 4

3287
Printer
Models 1, and 2

3289
Line Printer
Models 1 and 2

A maximum of 32 Category A and Category B
terminals can be attached to the 3274 Control
Unit, one of which must be a 3278 Display
Station with keyboard.

3277
Display Station
Models 1 and 2

3284
Printer
Models 1 and 2

3286
Printer
Models 1 and 2

3288
Line Printer
Model 2

3287
Printer
Models 1 and 2

**
Category
B

Legend

*Up to 32 Category A display stations and
printers can be attached to any one control unit.
A 3278 with keyboard is needed.

**Up to 16 Category B display stations and
printers can be attached to one control unit.

***A 3274 Model 1A operates in SNA mode.
A 3274 Model 1B operates in 3272 compatibility
mode.

Figure 1-1. Locally Attached 3270 Display System Using a 3274 Control Unit, Model 1A or 1B (Local)

- Model 1B (Figure 1-1) attaches to a System/360 or System/370 via a selector, multiplexer, or block multiplexer channel for local 3272 type of operation.

Remote Attachment - One model operates in data half-duplex mode on a duplex or a half-duplex communications line in either Binary Synchronous Communications (BSC) or Synchronous Data Link Control (SDLC) line discipline.

- Model 1C (Figure 1-2) attaches to a System/360 or System/370 via modems and a BSC data link; it operates with one of the following: an IBM 2701 Data Adapter Unit, an IBM 2703 Transmission Control Unit, an IBM 3704 or 3705 Communications Controller or an Integrated Communications Adapter.

- The Model 1C (Figure 1-2) also attaches to a System/370 via modems and an SDLC communications link, and operates in Network Control Program (NCP) mode with an IBM 3704 or 3705 Communications Controller.

- The Model 1C can also attach to a System/3 Models 4, 8, 10, 12, and 15 via System/3 Binary Synchronous Communications Adapter, to the Models 8 and 12 via the Integrated Communications Adapter, to the Models 8, 10, 12 and 15 via the EIA local attachment, or the Models 10 and 15 via the Local Communications Adapter.

- Attachment of the new 3278 Display Stations (3440 characters maximum), 3287 Printers (120 characters per second maximum), and the 3289 Line Printers (400 lines per minute maximum) to a Type A Terminal Adapter.

- Attachment of previously announced 3270 units (3277 Display Stations, 3284 and 3286 Printers, and 3288 Line Printers) and the new 3287 Printer to a Type B Terminal Adapter.

3276 CONTROL UNIT/DISPLAY STATION HIGHLIGHTS

- A cluster control unit able to control up to seven additional display stations and printers (in addition to the integrated display station that is a part of the 3276) for remote data half-duplex communications.

- Display sizes of up to 3440 displayed characters per screen.

    Models 1 and 11 - 960-character display

Host System

IBM System/360
(if using BSC line
control) or
System/370 (if
using BSC or
SDLC line control)

| Integrated Communications Adapter (ICA) | Selector, Multiplexer, or Block Multiplexer Channel |

To other Control Units

Transmission Control Unit (TCU)

— BSC only — or

Modem

Modem

***3274 Control Unit Model 1C

| Type A Adapter | Type B Adapter |

*Category A

3278
Display Station
Models 1, 2, 3, and 4

3287
Printer
Models 1 and 2

3289
Line Printer
Models 1 and 2

3277
Display Station
Models 1 and 2

3284
Printer
Models 1 and 2

3286
Printer
Models 1 and 2

**Category B

3288
Line Printer
Model 2

3287
Printer
Models 1 and 2

A maximum of 32 Category A and Category B
terminals can be attached to the 3274 Control
Unit, one of which must be a 3278 Display
Station with keyboard.

Legend

*Up to 32 Category A display stations and
printers can be attached to any one control unit.
A 3278 with keyboard is needed.

**Up to 16 Category B display stations and
printers can be attached to one control unit.

***The 3274 Model 1C can operate in either BSC or
SDLC protocol.

Figure 1-2. Remotely Attached 3270 Display System Using a 3274 Control Unit, Model 1C (Remote)

```
Models 2 and 12 - 1920-character display
Models 3 and 13 - 2560-character display
Models 4 and 14 - 3440-character display
```

When operating in 3277 compatible format, the 3276
Model 1 will display 480 characters (40 characters
per line), and Models 2, 3, and 4 will display 1920
characters (80 characters per line).

- Models 1, 2, 3, and 4 (Figure 1-3) attach to a
  System/360 or System/370 via modems and BSC protocol,
  and operate with any of the following: an IBM 2701
  Data Adapter Unit, an IBM 2703 Transmission Control
  Unit, an Integrated Communications Adapter, or an IBM
  3704 or 3705 Communications Controller.

- Models 11, 12, 13, and 14 (Figure 1-3) attach to a
  System/370 via modems and SDLC protocol and operate
  with an IBM 3704 or 3705 Communications Controller
  (NCP only).

- Model 2 can also attach to System/3 Models 4, 8, 10,
  12, and 15 via a System/3 Binary Synchronous
  Communications Adapter, Models 8 and 12 via the
  Integrated Communications Adapter, Models 8, 10, 12,
  and 15 via the EIA local attachment, or to Models 10
  and 15 via the Local Communications Adapter.

- Models 1, 2, 3, and 4 can communicate in SDLC protocol
  with the addition of the BSC/SDLC switch feature.

- Attachment of the new 3278 Display Stations (3440
  characters maximum) and the 3287 Printers (120
  characters per second maximum). For specific 3278
  attachment to the 3276, see Chapter 2.

3278 DISPLAY STATION HIGHLIGHTS

- Display sizes of up to 3440 displayed characters per
  screen.

```
Model 1 - 960-character display
Model 2 - 1920-character display
Model 3 - 2560-character display
Model 4 - 3440-character display
```

When operating in 3277 compatible format, the 3278
Model 1 will display 480 characters (40 characters
per line), and Models 2, 3, and 4 will display 1920
characters (80 characters per line).

Host System

IBM System/360
(if using BSC line
control) or System/
370 (if using BSC or
SDLC line control)

| Integrated Communications Adapter (ICA) | Selector, Multiplexer, or Block Multiplexer Channel |

To other Control Units

Transmission
Control Unit
TCU

BSC only ——————————— or

Modem

Switched (SDLC) or
Nonswitched (BSC or
SDLC) Line

*Modem

3276 Control Unit/
Display Station
**Models 1, 2, 3, 4,
11, 12, 13, and 14

3278
Display Station
Models 1, 2, 3, and 4

3287 Printer
Models 1 and 2

***
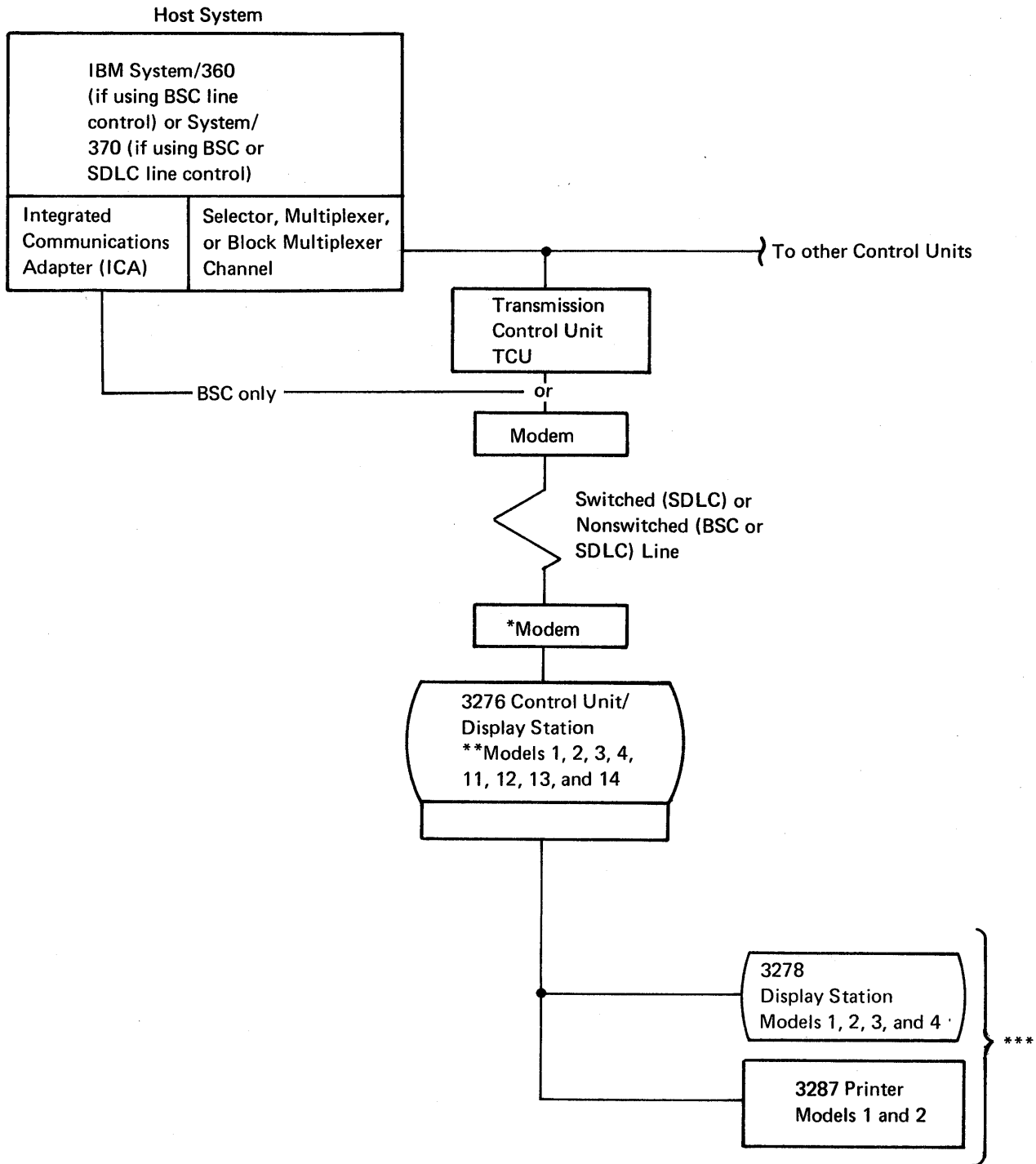
Legend

   *Could be Integrated Modem also.

 **Models 1, 2, 3, and 4 use BSC protocol.
    Models 11, 12, 13 and 14 use SDLC protocol.

***Up to 7 3278s and 3287s can be attached.

Figure 1-3. Remotely Attached 3270 Display System Using a 3276 Control Unit/Display Station (Remote)

- Attachment to either the 3274 Control Unit or the 3276 Control Unit/Display Station.

- Attachment up to 1 500 metres (4,920 feet) maximum cable length from the 3274 or 3276.

3287 PRINTER HIGHLIGHTS

- A table-top printer with bidirectional printing capability.

- Two models whose model numbers relate to print speeds:

  Model 1 - 80-cps maximum print rate.
  Model 2 - 120-cps maximum print rate.

  Note: Actual printer throughput depends upon operational and system characteristics. Factors such as control unit configuration and line transmission speed, output format, and programming application processing must all be considered in determining actual throughput.

- Attachment to either the 3274 Control Unit or the 3276 Control Unit/Display Station.

- Attachment to either Type A or Type B Terminal Adapter on the 3274 Control Unit, depending upon the 3287 attachment feature selected.

- Attachment up to 1 500 metres (4,920 feet) maximum cable length from the 3274 Type A Terminal Adapter or the 3276; or attachment up to 610 metres (2,000 feet) maximum away from the 3274 Type B Terminal Adapter.

3289 LINE PRINTER HIGHLIGHTS

- A floorstanding line printer with integral forms stand/stacker that prints up to 400 lines a minute.

- Two models whose model numbers relate to print speeds:

  Model 1 - Up to 155 lines per minute.
  Model 2 - Up to 400 lines per minute.

  Note: Actual printer throughput depends upon operational and system characteristics. Maximum print speed may be affected by such factors as communication line speed, control unit load, and application program.

- Attachment to the 3274 Control Unit - Type A Terminal Adapter only.

- Attachment up to 1 500 metres (4,920 feet) maximum cable length from the 3274 Control Unit.

OPERATOR CONSIDERATIONS

In addition to the attention given the existing 3270 units, the new units have been designed for further ease of operation.

Keyboards have received attention in the following areas:

- The new keyboards have a lower Home row and provide a full width handrest.

- Control keys on the keyboard have been made more difficult to strike accidentally, and the CLEAR, ERASE INPUT, and TEST keys require two-hand operation to reduce the possibility of operator error.

- The New Line key has been enlarged for increased ease of operation, and a new cursor Home key is now provided to rapidly return the cursor to the first unprotected character position of the display screen.

- A recess is provided for useful articles.

The area around the outside of the display screen has also been changed for easier operations:

- The power on/off switch has been separated from the brightness and contrast controls and has been designed as a rocker-type switch. This makes it more difficult to accidentally turn power off. The new power indicators display, at a glance, the condition of power status.

- Brightness and contrast knobs are two separate and distinct controls which allow an operator greater ease in adjusting the screen controls of the display station.

- The display screen has an anti-glare filter on the face of the CRT.

- When the Audible Alarm feature is installed, the volume of the tone can be adjusted by the operator without removing covers.

Operational status is signaled in a special Operator
Information Area on the bottom of the display screen outside
of the normal data area. These status messages are graphic
in form.

Information concerning all symbols on the keyboard, Operator
Information Area, and on the switches and controls around
the display screen is available in a Problem Determination
Guide located in the keyboard beneath the hand rest. This
feature also allows the operator to determine whether there
is a problem, and, if so, what to do about it.

RELIABILITY, SERVICEABILITY, AND AVAILABILITY

With the growth of online data processing, the availability
of a host system and attached devices becomes an essential
factor in computer operations. The 3274 and 3276 clusters
have been provided with many facilities to achieve a high
degree of reliability, serviceability, and availability.

Reliability improvements include:

- More reliable and densely packed circuitry to help
  reduce the frequency of service calls.

- Control units having the capability to retry a failing
  data transfer to a terminal without impact to the
  application program (unless the retries were
  unsuccessful).

- Basic assurance tests which can be selected at the
  control unit (offline) by customer's option or
  automatically with the application of power or
  initialization.

Serviceability improvements include:

- A maintenance approach using facilities provided by
  IBM (basic assurance tests, concurrent device tests
  within the clusters, host link tests, error logs, and
  problem determination procedures).

- Provisions for the 3278, 3287, and 3289 to have self-
  contained test facilities which permit unit problem
  diagnosis without affecting other units in the cluster.

Availability via problem determination has been improved
by the following:

- Problem Determination Guides are provided for each
  unit.

- The customer can, by using the Problem Determination Guide in conjunction with the basic assurance test and terminal test, perform problem determination on the cluster.

- An Operator Information Area at the bottom of each display screen provides status and error code information.

CHAPTER 2.   DESCRIPTION

3274 CONTROL UNIT, MODELS 1A AND 1B (LOCAL) AND 1C (REMOTE)

The IBM 3274 Control Unit is a floor-standing unit that provides
the capability of controlling and multiplexing concurrently
a maximum cluster of 32 dependent terminals consisting of display
stations, serial matrix printers, and line printers to the host
system either by local channel or, remotely, by a communications
link.

Two types of terminal adapters (Type A and Type B) are used
to attach terminals to the 3274. Type A Terminal Adapters
attach the 3278 Display Station Models 1, 2, 3, and 4, 3287
Printer Models 1 and 2, and the 3289 Line Printer Models 1 and
2. Type B Terminal Adapters attach the 3277 Display Station
Models 1 and 2, the 3284/3286 Printers Models 1 and 2, the 3288
Line Printer Model 2, and the new 3287 Printer Models 1 and
2 described in this publication. A maximum of 32 terminals
attach to the 3274; however, only 16 (maximum) can be attached
to the Type B Terminal Adapters.

At least one 3278 Display Station with a keyboard is needed
(for example; problem determination) to be attached to each
3274 Control Unit (all models). Each attached device can operate
up to 1 500 metres (4,920 feet) maximum cable length from a
Type A Terminal Adapter and up to 610 metres (2,000 feet) maximum
cable length from a Type B Terminal Adapter, allowing host
system access from a display operator's normal working area.
Sharing of the control unit by several devices results in
economical configurations.

The 3274 Control Unit is available in three models:

* Model 1A - 3790 compatible using Data Stream Compatibility
  (DSC) mode of operation. This model attaches locally to
  a System/370 using a selector, multiplexer, or block
  multiplexer channel.

* Model 1B - 3272 compatible mode of operation. This model
  attaches locally to a System/360 or System/370 using a
  selector, multiplexer, or block multiplexer channel.

* Model 1C - This model is used for communicating over remote
  communications facilities with either System/360 or
  System/370 using a 2701 Data Adapter Unit, an IBM 2703
  Transmission Control Unit, an Integrated Communications
  Adapter, or a 3704/3705 Communications Controller with
  Binary Synchronous Communications (BSC) or Synchronous Data
  Link Control (SDLC) protocol. BSC or SDLC operation is
  determined by the configuration code on the diskette used
  with the 3274 Control Unit.

The Model 1C can also attach to a System/3 Models 4, 8, 10, 12, and 15 via System/3 Binary Synchronous Communications Adapter, to the Models 8 and 12 via the Integrated Communications Adapter, to the Models 8, 10, 12 and 15 via the EIA local attachment, or to the Models 10 and 15 via the Local Communications Adapter.

The 3274 Model 1C can operate at 2000, 2400, 4800, 7200, and 9600-bps line speed.

Local attachment allows the installation of the 3274 Model 1A or 1B up to 610 metres (200 feet) maximum cable length from the channel, depending upon system and channel configuration.

A Printer Authorization matrix, stored in the control unit, provides the source-destination relationship for cluster buffer copy operations (including local print) in both operator-initiated and host system-initiated (DSC only) operations. 3274 copy operations are limited by attachment category (Category A attachment units and Category B attachment units). This restriction limits transfers within categories so that units attached to a 3274 Type A adapter cannot be involved in copy operations with units attached to a 3274 Type B adapter and vice-versa.

The matrix must be loaded (under program control) to enable local copy operations from display stations to printers attached to the same control unit (except as provided by the Copy command in BSC operations).

SPECIFY FEATURES

Power

Control units in the United States operate with 120V, 208V, or 240V ac 60 Hz power. All units available through IBM World Trade Corporation can operate from one of several different power sources. See Chapter 3, Configuration, for additional information.

SPECIAL FEATURES

Common Communications Adapter (CCA) (Without Business Machine Clocking)

This feature can be installed on the 3274 Model 1C (Remote). It is required for attachment to communication lines through an external modem which has internal clocking at speeds up to 9600 bps (unless Category B terminals are used). This feature supports both BSC and SDLC protocol.

High-Performance Communications Adapter (HPCA) (Without Business Machine Clocking)

This feature is installed on the 3274 Model 1C (Remote) when
a Type B Terminal Adapter feature is installed and it is desired
to operate at line speeds exceeding 7,200 bps in SNA/SDLC.
This feature supports only SDLC protocol.

External Modem Interface (EMI)

This feature must be installed on the 3274 Model 1C (Remote).
It provides the appropriate cables and interface logic necessary
to attach an external IBM modem (or equivalent) for communication
with the host system processor through teleprocessing facilities.

3274 Type A Terminal Adapter

This feature allows for the attachment of eight additional 3278,
3287, or 3289 terminals for each Type A Terminal Adapter
installed. A maximum of three Type A Terminal Adapters may
be installed per 3274, providing a maximum cluster size of 32.

The 3274 and 3276 clusters provide 127-character (plus space
and null) Japanese Katakana Language support. This represents
a 4-character enhancement to the previously announced 3270
Katakana. The 127-character capability is compatible with
previous support (except for the four additional characters)
for those customers whose programs do not use NL and EM printer
control codes.

3278, 3287, and 3289 Katakana-equipped terminals will not produce
identical output for customers whose 3270 programs use NL and
EM for printer control and/or base their screen layouts on the
expansion of these codes into two character positions in their
respective buffers.

3274 Type B Terminal Adapters (Types B1, B2, B3, and B4)

The following optional features make it possible to attach
previously announced 3277 Display Stations, 3284, 3286, and
3288 Printers, and new 3287 Printers with the 3271/3272
Attachment Adapter feature. These features require the Extended
Function Store (EFS) feature as a prerequisite (Models 1A and
1C only).

- Type B1 Terminal Adapter. Only one may be installed. It
  provides for attachment of four of any 3277, 3284, 3286,
  3288, or 3287 (with 3271/3272 Attachment Adapter Feature)
  to a 3274.

- Type B2 Terminal Adapter. Only one may be installed. It provides the same attachment and support capabilities as the Type B1 adapter. The Type B2 Adapter is a prerequisite.

- Type B3 Terminal Adapter. Only one may be installed. It provides the same attachment and support capabilities as the Type B1 Adapter. The Type B2 Adapter is a prerequisite.

- Type B4 Terminal Adapter. Only one may be installed. It provides the same attachment and support capabilities as the Type B1 Adapter. The Type B3 Adapter is a prerequisite.

Note: The total number of Category B terminals attached may not exceed 16 and the total of all Category A and B terminals attached may not exceed 32.

If Type B Terminal Adapters are installed, and line speeds of greater than 7,200 bps are required in SDLC line protocol, a High Performance Communications Adapter (HPCA) feature must be installed. Installation of the HPCA feature does not allow BSC operation.

Extended Function Store (EFS) - 16K

This feature may be installed on the 3274 Control Unit and allows 16K increments to be used for storing additional function. Installation of this feature requires the Control Storage Expansion feature. EFS support requirements follow:

Feature	Storage Required
Type B Terminal Adapter (Models 1A and 1C only) (Required one time for Type B1 only)	16K

Control Storage Expansion

The Control Storage Expansion feature must be installed (one time only) in order to accommodate EFS optional features in the 3274 Control Unit. On a 3274 Model 1B, Type B Terminal Adapters may be added without the addition of the Control Storage Expansion feature. A total of 64K may be installed through EFS optional features following installation of the Control Storage Expansion feature.

3276 CONTROL UNIT/DISPLAY STATION, MODELS 1, 2, 3, 4 AND 11, 12, 13, 14

The IBM 3276 Control Unit/Display Station is a table-top cathode-ray tube (CRT) display station and control unit used for displaying alphameric data up to a maximum of 3440 characters,

and entering and retrieving data from a host system. The 3276 can be ordered to provide control and multiplexing capabilities to attach up to seven 3278 Display Stations and 3287 Printers. The 3276 includes one integrated display which allows a maximum 3276 cluster size of eight terminals.

Either a keyboard or a selector light pen, or both, permit an operator to display and manipulate data on the screen in a flexible and efficient manner.

The 3276 is offered in several models. Models and their sizes are:

- Model 1 or 11 - 960 characters (12 lines of 80 characters).

- Model 2 or 12 - 1920 characters (24 lines of 80 characters).

- Model 3 or 13 - 2560 characters (32 lines of 80 characters).

- Model 4 or 14 - 3440 characters (43 lines of 80 characters).

These models have the following line speeds:

- Models 1, 2, 3, and 4 attach and operate via Binary Synchronous Communications (BSC) line protocol at 1200, 2000, 2400, 4800, and 7200 bps.

- Models 11, 12, 13, and 14 attach and operate via Synchronous Data Link Control (SDLC) line protocol at 1200, 2000, 2400, 4800, 7200, and 9600 bps.

Note: Models 1, 2, 3, and 4 equipped with the BSC/SDLC Switch special feature can attach via BSC or SDLC protocol, depending upon the position of the BSC/SDLC switch, at 1200, 2000, 2400, 4800, 7200, and 9600 (SDLC only) bps.

The 3276 Models 1, 2, 3, and 4 attach to a System/360 or System/370 via modems and a BSC data link. These models operate with any of the following: an IBM 2701 Data Adapter Unit, an IBM 2703 Transmission Control Unit, an Integrated Communications Adapter, or an IBM 3704 or 3705 Communications Controller.

The 3276 Models 11, 12, 13, and 14 attach to a System/370 via modems and an SDLC data link using a 3704 or 3705 Communications Controller.

When operating in 3277 compatible format, the 3276 Model 1 will display 480 characters (40 characters per line), and the Models 2, 3, and 4 will display 1920 characters (80 characters per line).

For EBCDIC and ASCII, the 3276 has a 94-character set (plus space and null). For Japanese Katakana, the character set consists of 127 characters plus space and null.

Display Station capabilities are described in the 3278
Description portion of this chapter.

The 3276 provides one additional port for attachment of either
a 3278 Display Station or a 3287 Printer. A keyboard is needed
on every 3276.

A Printer Authorization matrix stored in the 3276 provides the
source-destination relationship for cluster buffer copy
operations.

The matrix is loaded with a default value at power-on time.
The default value is determined by the physical attachment of
3278s and 3287s to the 3276. The value associates a display
to the printer with the next higher terminal address. The
Printer Authorization matrix is utilized on DSC host system
initiated copy operations.

SPECIFY FEATURES

Power

Display Stations in the United States operate with 120V ac,
60-Hz power. All units available through IBM World Trade
Corporation can operate from one of several different power
sources. See Chapter 3, Configuration, for additional
information.

Machine Nomenclature

Eight selections are available for IBM World Trade countries:
Brazilian, Canadian French, English, French, German, Italian,
Japanese, and Spanish speaking.

Character Set Language

Many Character Set Languages are available for IBM World Trade
countries. See Chapter 3, Configuration, for additional
information.

The 3274 and 3276 clusters provide 127-character (plus space
and null) Japanese Katakana Language support. This represents
a 4-character enhancement to the previously announced 3270
Katakana. The 127-character capability is compatible with
previous support (except for the four additional characters)
for those customers whose programs do not use NL and EM printer
control codes.

3278, 3287, and 3289 Katakana-equipped terminals will not produce
identical output for customers whose 3270 programs use NL and
EM for printer control and/or base their screen layouts on the

expansion of these codes into two character positions in their
respective buffers.

Keyboard Language

For countries other than the United States, a keyboard language
must be specified. The keyboard language selected should
correspond to the Character Set Language specified. See Chapter
3, Configuration, for additional information.

SPECIAL FEATURES

Audible Alarm

This feature provides an alarm that sounds when a character
is entered into the next-to-last position on the display screen.
The alarm can also be activated, under program control, to alert
the operator to a special condition. The volume of the alarm
is operator adjustable.

Security Keylock

This feature provides keylock control over the display station
and all attached devices. With the lock in the OFF position,
the terminal will not be available to the host system program,
the display screen data is blanked (except for the Operator
Information Area), and attached devices are inoperative.

Selector Light Pen

This device attaches to any model 3276 display station. The
hand-held light-sensitive pen enables the operator to interact
directly with the display by selecting appropriately designated
character fields. Selections may be either immediate or
deferred, with deferred selections causing a visual indication
that the field was selected.

Numeric Lock Feature (Data Entry Keyboards Only)

This feature provides a means of alerting the display operator
to certain keying errors. With a data entry keyboard (Figure
2-2 and 2-3), when the cursor is positioned within a numeric
input field, the display station automatically upshifts the
keyboard. With the Numeric Lock feature, the keyboard is
electrically locked if any key other than the numerals 0 through
9, minus (-), period (.), or duplicate (DUP) is pressed.

Keyboards

75-Key Typewriter-Like Keyboard - EBCDIC (Figure 2-1): This keyboard has 49 data keys and 26 control keys. Twelve program-function (PF) keys are included in the keyboard.

75-Key Data Entry Keyboard - EBCDIC (Figure 2-2): This keyboard has 35 data keys, 10 PF keys, and 30 control keys.

75-Key Data Entry Keypunch-Like Keyboard - EBCDIC (Figure 2-3): This keyboard has 35 data keys, 10 PF keys, and 30 control keys.

75-Key Typewriter-Like Keyboard - ASCII B (Figure 2-1): This keyboard has 49 data keys and 26 control keys. Twelve PF keys are included in this keyboard.

76-Key Japanese English Typewriter-Like Keyboard (World Trade A/FE): The 76-key Japanese English keyboard has 49 data keys and 27 control keys. 12 PF keys are included in the top row of data keys.

76-Key Japanese Katakana Typewriter-Like Keyboard (World Trade A/FE): The 76-key Japanese Katakana keyboard, which provides 4-level shift capability, has 49 data keys and 27 control keys, including 12 PF keys integrated into the top row of data keys.

76-Key Japanese Katakana Data Entry Keyboard (World Trade A/FE): This keyboard, which provides 4-level shift capability, has 49 data keys, 10 PF keys, and 27 control keys.

BSC/SDLC Switch - Models 1, 2, 3, and 4 Only

This feature provides SDLC transmission control in addition to the basic BSC.

Terminal Adapters 1, 2, and 3

Each adapter provides for attachment of two terminals, either a 3278 display station or a 3287 Printer. A maximum of three terminal adapters can be installed.

Common Communications Adapter (with Business Machine Clocking)

This feature allows the 3276 to be attached to communication lines through a 1,200-bps integrated modem or through any 1,200-bps external modem that does not have internal clocking. This feature supports both BSC and SDLC line disciplines.
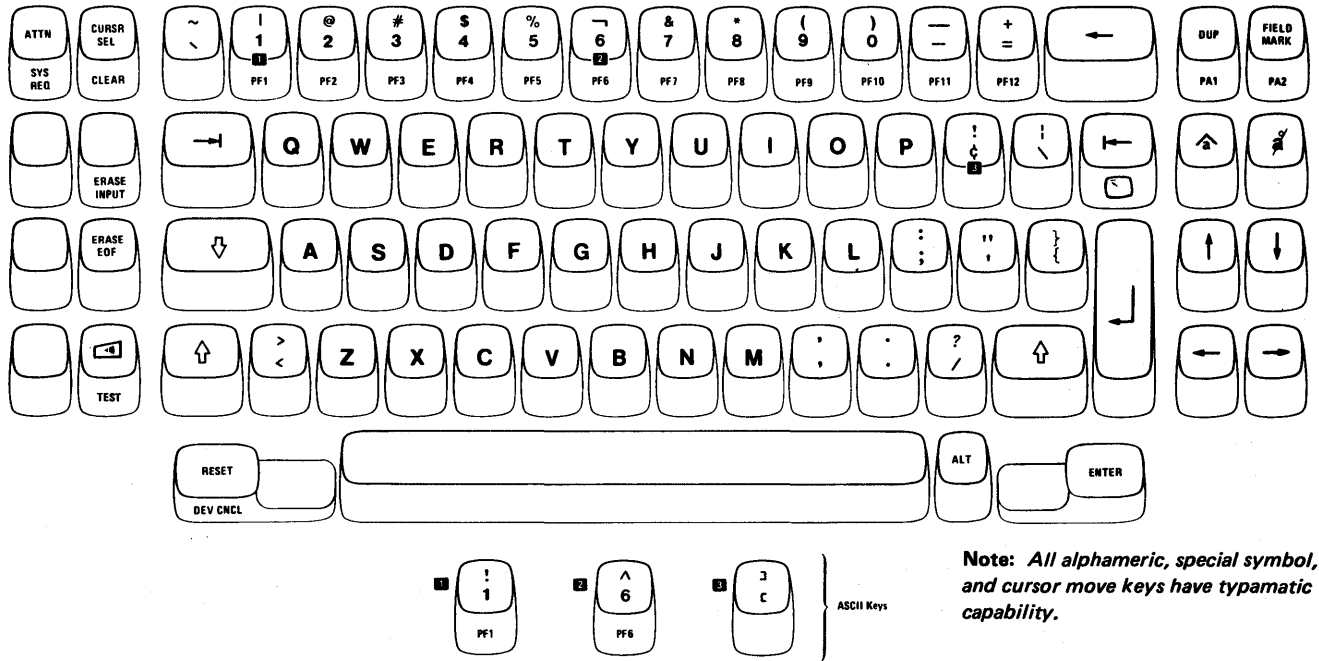
Figure 2-1. 3276 Typewriter-Like EBCDIC and ASCII Keyboard

Figure 2-2. 3276 Data Entry Keyboard

Note: *All alphameric, special symbol, and cursor move keys have typamatic capability.*

Figure 2-3. 3276 Data Entry – Keypunch-Like Keyboard

Common Communications Adapter (without Business Machine Clocking)

This feature allows the 3276 to be attached to communication lines through an external modem that has internal clocking (speeds up to 9,600 bps for SDLC and 7,200 bps for BSC). This feature supports both BSC and SDLC line disciplines.

External Modem Interface

This feature provides an EIA interface for attaching an IBM or other manufacturer's external modem.

Integrated Modems

The following integrated modems are offered for both switched and nonswitched communication lines:

* 1200-bps Integrated Modem, Switched Line with Manual Answer (Models 11, 12, 13, and 14 only).

* 1200-bps Integrated Modem, Nonswitched Line.

* 1200-bps Integrated Modem, Nonswitched Line with Switched Network Backup.

3278 DISPLAY STATION, MODELS 1, 2, 3, AND 4

The IBM 3278 Display Station is a table-top cathode-ray tube
(CRT) display station that attaches to a 3274 Control Unit or
a 3276 Control Unit/Display Station for displaying up to a
maximum 3440 characters and for entering or retrieving data
from a host system. Either a keyboard or selector light pen,
or both, permit an operator to display and manipulate data on
the screen.

Models and their sizes are:

* Model 1 - 960 characters (12 lines of 80 characters).

* Model 2 - 1920 characters (24 lines of 80 characters).

* Model 3 - 2560 characters (32 lines of 80 characters).

* Model 4 - 3440 characters (43 lines of 80 characters).

When operating in 3277 compatible format, the 3278 Model 1 will
display 480 characters (40 characters per line), and the Models
2, 3, and 4 will display 1920 characters (80 characters per
line).

For EBCDIC and ASCII, the 3278 has a 94-character character
set (plus space and null). For Canadian French (3278 attachment
to 3274 only), the character set consists of 116 characters
plus space and null. For Japanese Katakana, the character set
consists of 127 characters plus space and null.

NEW DISPLAY STATION FUNCTIONS (3276 and 3278 except where noted)

Dual Case

Dual Case character sets are basic on the 3276/3278; however,
a switch is provided to select either Mono Case or Dual Case
display of characters.

Operator Information Area

An Operator Information Area is located at the bottom of the
3276/3278 screen (outside of the data area) to communicate
terminal, cluster, or system status to the operator.

Cursor Select Key

The selector light-pen operation can be duplicated by using
the cursor select key. The character field is selected by
positioning the cursor in the field and then pressing the CURSR
SELECT key.

Features are not interchangeable between the 3276/3278 and the 3275/3277 (for example, keyboards). All alphameric, special symbol, and cursor move keys have typamatic capability.

Cursor Home Key

A cursor home key has been added to all 3278 keyboards. Operation of this key repositions the cursor to the first nonprotected character position on the display.

Operator Selectable Alternate Cursor (3278 attachment to 3274 only)

The operator may elect to display either a 3277 type underscore cursor or a reverse image cursor. Either of these two cursor types may be displayed in normal (continuous display) or blinking mode. Cursor selection and display mode are determined by the operator via keyboard control.

Extended Selector Light Pen

The selector light-pen operation has been extended to include a new designator character "&". When this designator is used and a selection performed, Read Modified operation can be performed in response to the interrupt presented to the host system.

Operator-Initiated Print (3278 attachment to 3274 only)

A Print/Identification (IDENT) key has been added to all 3278 keyboards. The operator may use this function (if allowed by the Printer Authorization matrix) to copy the display buffer contents onto a printer attached to the same control unit without host system intervention. Operation of only the Print key causes the buffer to be copied onto the destination printer, as specified in the Printer Authorization matrix. Operation of the IDENT key, followed by a two-digit address entry, permits selection of specific destination printers when more than one printer is authorized.

Display Station to Control Unit Attachment

All 3278 models can attach to any 3276 model operating in SDLC protocol (either 3276 Models 11, 12, 13, and 14 or 3276 Models 1, 2, 3, and 4 with the BSC/SDLC feature installed and operating in SDLC protocol). When the 3278 is attached to a 3276 Model 2, 3, or 4 operating in BSC protocol, the following applies:

- A 3278 Model 2 can only attach to a 3276 Model 2, 3, or 4.

- A 3278 Model 3 can only attach to a 3276 Model 3 or 4.

- A 3278 Model 4 can only attach to a 3276 Model 4.

- A 3278 Model 1 can attach to any 3276 model.

SPECIFY FEATURES

Power

Display Stations in the United States operate with 115V ac, 60-Hz power. All units available through IBM World Trade Corporation can operate from one of several different power sources. See Chapter 3, Configuration, for additional information.

Machine Nomenclature

Eight selections are available for IBM World Trade countries: Brazilian, Canadian French, English, French, German, Italian, Japanese, and Spanish speaking.

Character Set Language

Many Character Set Languages are available for IBM World Trade countries. See Chapter 3, Configuration, for additional information.

Keyboard Language

For countries other than the United States, a keyboard language must be specified. The keyboard language selected must correspond to the Character Set Language specified. See Chapter 3, Configuration, for additional information.

SPECIAL FEATURES

Audible Alarm

This feature provides an alarm that sounds when a character is entered into the next-to-last position on the display screen. The alarm can also be activated, under program control, to alert the operator to a special condition. The volume of the alarm is operator-adjustable.

Security Keylock

This feature provides keylock control over the display station
and all attached devices. With the lock in the OFF position,
the terminal will not be available to the host system program,
the display screen data is blanked (with the exception of the
operator information area), and attached devices are inoperative.

Switch Control Unit

This feature permits switching operational control of the display
station between two different control units.

Selector Light Pen

This device attaches to any model 3278 display station. The
hand-held light-sensitive pen enables the operator to interact
directly with the display by selecting appropriately designated
character fields. Selections may be either immediate or
deferred, with deferred selections causing a visual indication
that the field was selected.

Numeric Lock Feature (Data Entry Keyboards Only)

This feature provides a means of alerting the display operator
to certain keying errors. With a data entry keyboard (Figures
2-5 and 2-6), when the cursor is positioned within a numeric
input field, the display station automatically upshifts the
keyboard. With the Numeric Lock feature, the keyboard is
electrically locked if any key other than the numerals 0 through
9, minus (-), period (.), or duplicate (DUP) is pressed.

Magnetic Reader Control (3278 to 3274 Control Unit Attachment Only)

This feature provides the capability of attaching a Magnetic
Slot Reader.

Magnetic Slot Reader (3278 to 3274 attachment only)

This device is attachable to a 3278 by a cable to read
magnetically encoded cards when the operator passes the card
through a slot containing the reading device.

Keyboards

75-Key Typewriter-Like Keyboard - EBCDIC (Figure 2-4): This
keyboard has 49 data keys and 26 control keys. Twelve program-
function (PF) keys are included in the keyboard.

<u>75-Key Data Entry Keyboard - EBCDIC</u> (Figure 2-5): This keyboard
has 35 data keys, 10 PF keys, and 30 control keys.

<u>75-Key Data Entry Keypunch-Like Keyboard - EBCDIC</u> (Figure 2-6):
This keyboard has 35 data keys, 10 PF keys, and 30 control
keys.

<u>75-Key Typewriter-Like Keyboard - ASCII B</u> (Figure 2-4): This
keyboard has 49 data keys and 26 control keys. Twelve PF keys
are included in this keyboard.

<u>87-Key Typewriter-Like Keyboard - EBCDIC (Figure 2-4)</u>
<u>(3278 To 3274 Attachment Only)</u>: This keyboard has 49 data keys,
26 control keys, and 12 PF keys (on the right side of the
keyboard). The 12 PF keys included in the keyboard plus the
additional 12 PF keys allows program support of 24 PF keys.

<u>87-Key Typewriter-Like Keyboard - ASCII B (Figure 2-4)</u>
<u>(3278 To 3274 Attachment Only)</u>: This keyboard has 49 data keys,
26 control keys, and 12 PF keys (on the right side of the
keyboard). The 12 PF keys included in the keyboard plus the
additional 12 PF keys allow program support of 24 PF keys.

Note: *All alphameric, special symbol, and cursor move keys have typamatic capability.*
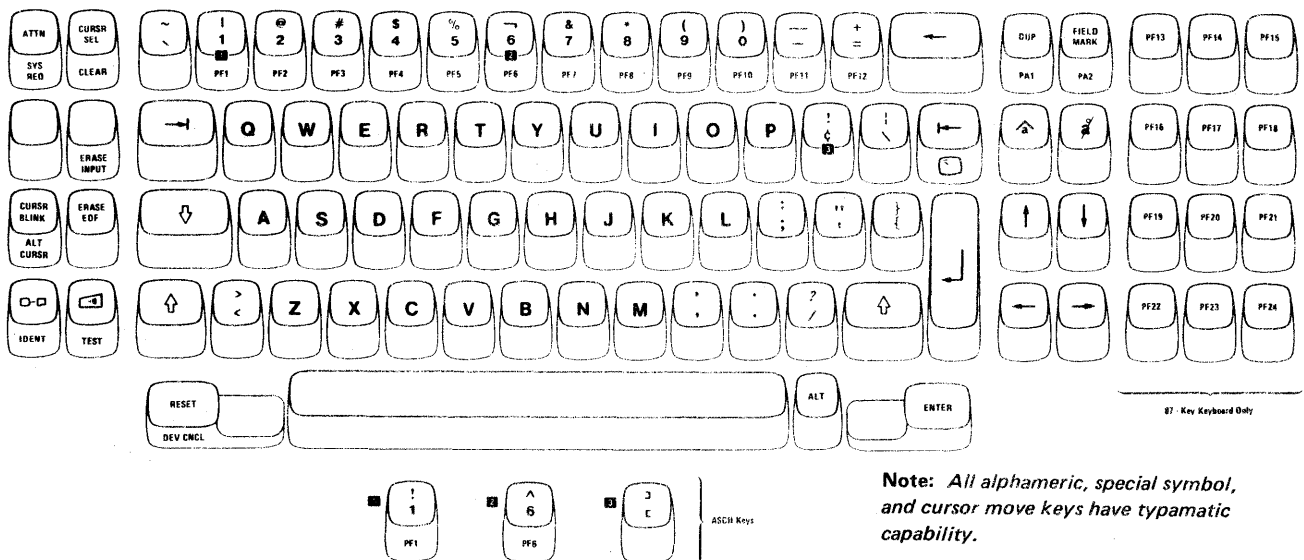
Figure 2-4. 3278 Typewriter-Like EBCDIC and ASCII Keyboard
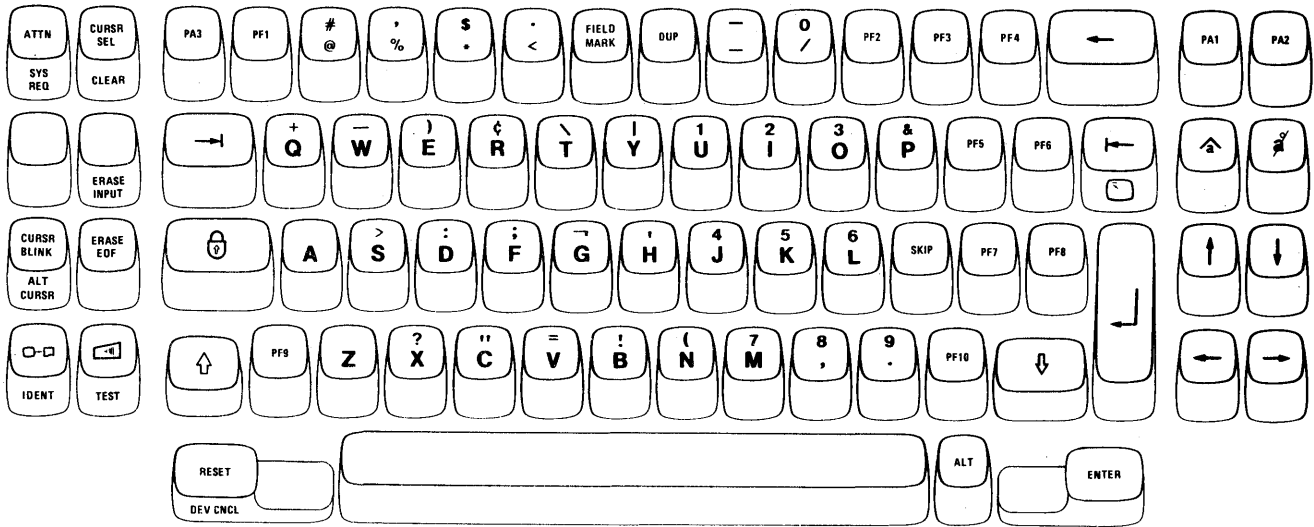
Note: *All alphameric, special symbol, and cursor move keys have typamatic capability.*
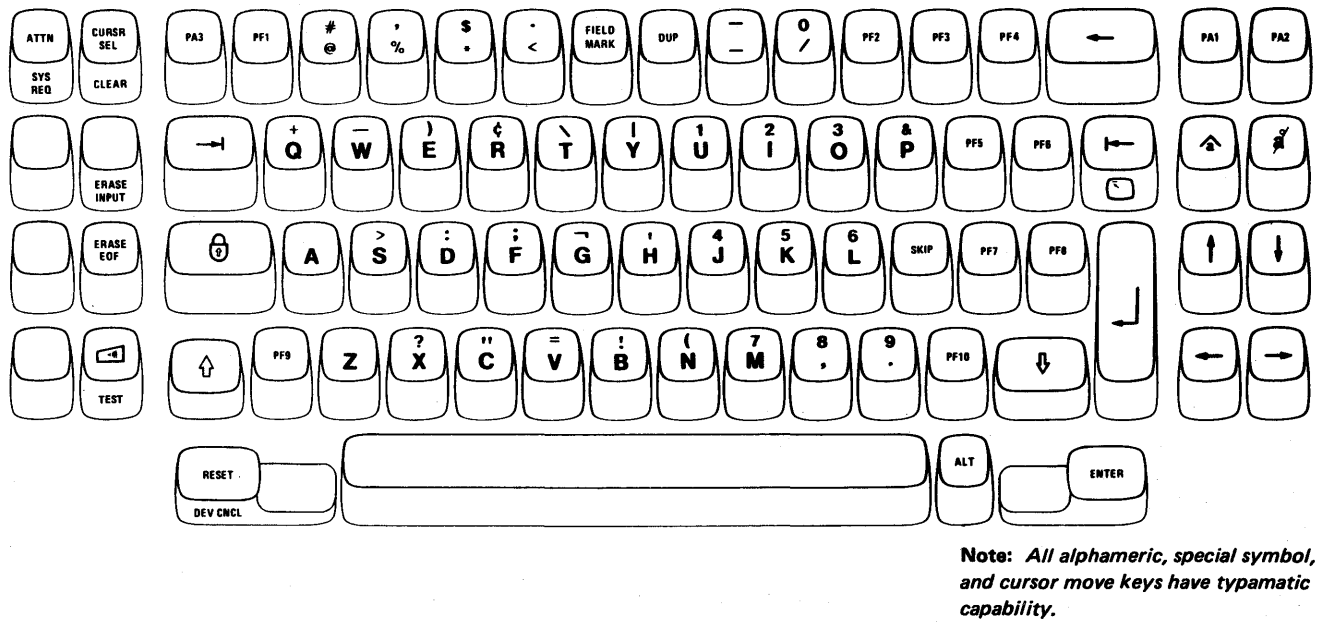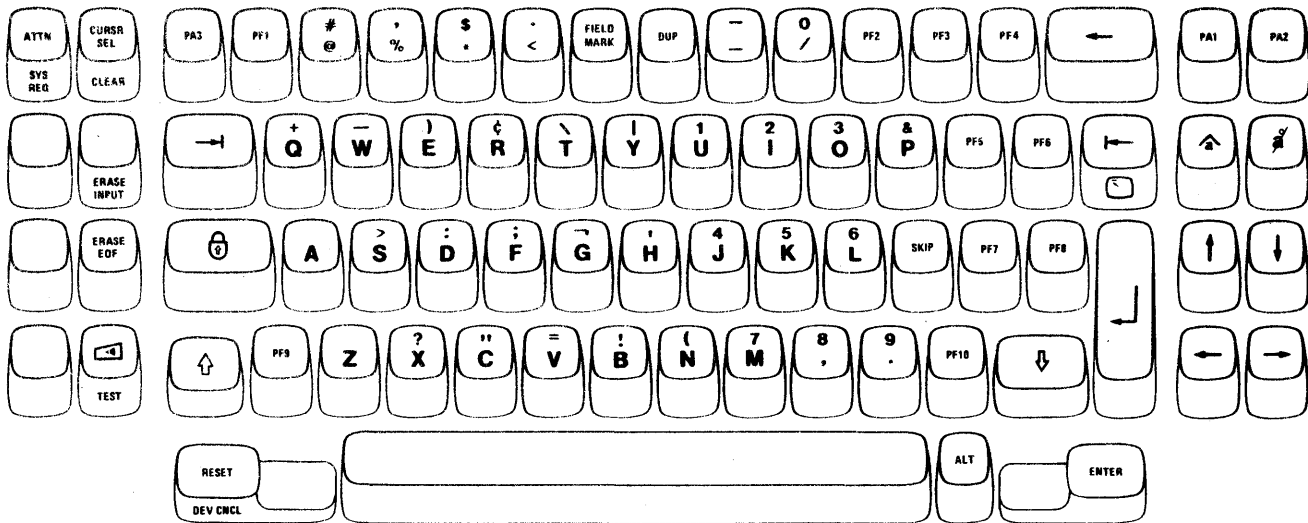
Figure 2-5. 3278 Data Entry Keyboard
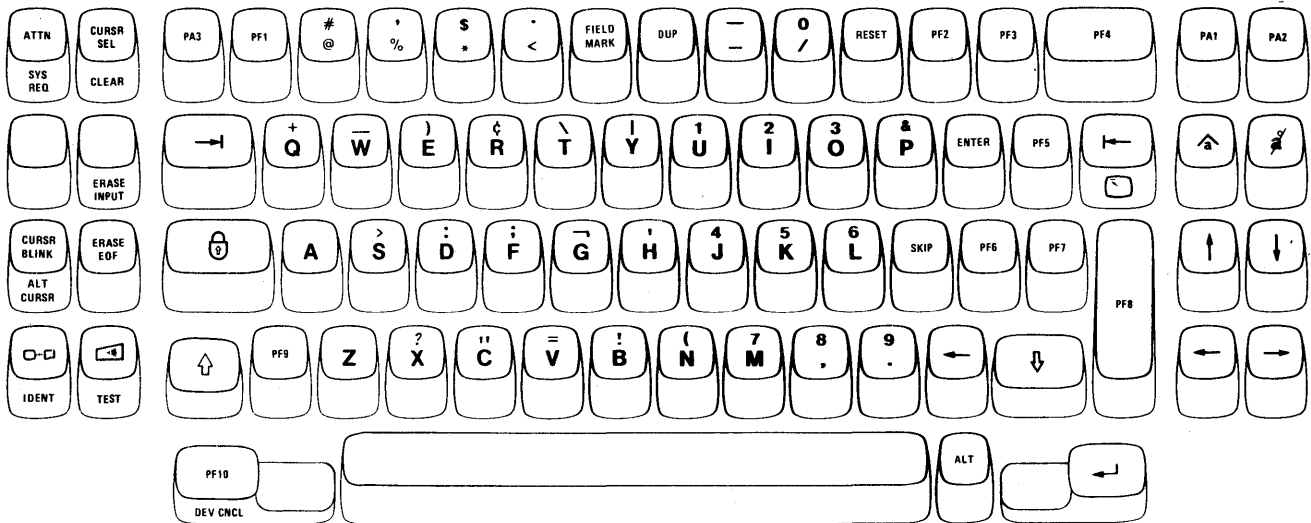
Note: *All alphameric, special symbol, and cursor move keys have typamatic capability.*

Figure 2-6. 3278 Data Entry — Keypunch-Like Keyboard

<u>76-Key Japanese English Typewriter-Like Keyboard (World
Trade A/FE)</u>: The 76-key Japanese English keyboard has 49 data
keys and 26 control keys in addition to the 12 PF keys included
in the top row of data keys.

<u>76-Key Japanese Katakana Typewriter-Like Keyboard (World
Trade A/FE)</u>:

The 76-key Japanese Katakana keyboard, which provides 4-level
shift capability, has 49 data keys and 27 control keys, in
addition to the 12 PF keys integrated into the top row of data
keys.

76-Key Japanese Katakana Data Entry Keyboard (World Trade A/FE):
This keyboard, which provides 4-level shift capability, has
49 data keys and 27 control keys, in addition to 10 PF keys.

<u>88-Key Japanese English Typewriter-Like Keyboard (3278 to
3274 Attachment Only) (World Trade A/FE)</u>: The 88-key Japanese
English keyboard has 49 data keys, 27 control keys, 12 PF keys
included in the top row of data keys, and an additional 12 PF
keys which allows program support of 24 PF keys.

<u>88-Key Japanese Katakana Typewriter-Like Keyboard (3278 to
3274 Attachment Only) (World Trade A/FE)</u>: The 88-key Japanese
Katakana keyboard, which provides 4-level shift capability,
has 49 data keys, 27 control keys, 12 PF keys integrated into
the top row of data keys, and an additional 12 PF keys which
allows program support of 24 PF keys.

<u>3287 PRINTER, MODELS 1 AND 2</u>

The IBM 3287 Printer is a table-top, matrix printer that has
bidirectional printing capability. For physical planning
purposes, both models are the same, differing only in printing
speeds. The 3287 Printers can be attached to the 3274 Control
Unit on either Type A or Type B Terminal Adapters (with the
selection of the correct attachment special feature) and to
the 3276 Control Unit/Display Station.

Models and their speeds are:

• Model 1 - 80 characters per second (maximum).

• Model 2 - 120 characters per second (maximum).

<u>Note</u>: Actual printer throughput depends upon operational and
system characteristics. Factors such as control unit
configuration and line transmission speed, output format, and
programming application processing must all be considered in
determining actual throughput.

The printer uses bidirectional serial matrix printing with a
character dot matrix and character spacing of 10 characters

per inch. Line spacing is 6 lines per inch, with each line
containing up to 132 characters. A 1968-byte character buffer
is provided.

SPECIFY FEATURES

Character Set - EBCDIC or ASCII B

An EBCDIC or ASCII B character set must be specified. The
character set specified must be the same as the character set
used on the control unit to which it is attached. ASCII B is
mutually exclusive with SCS.

Mono Case/Dual Case (3271/3272 Attachment Feature Only)

When the EBCDIC character set is specified, Mono Case or Dual
Case print must also be specified. When the ASCII B character
set is specified, only Mono Case print is available.

Mono Case/Dual Case (3274/3276 Attachment Feature Only)

This function is operator-selectable by use of a Mono/Dual Case
switch; however, this switch is inoperative, and the 3287 is
always in Dual Case when operating in SCS (SNA Character String)
data stream mode or when copying from a display.

Variable Width Forms Tractor Covers

These covers must be specified if the Variable Width Forms
Tractor special feature was selected.

Friction Feed Paper Handling

This feature must be specified on all 3287s without the Variable
Width Forms Tractor Covers. A customer using variable width
forms tractor has the option of ordering friction feed paper
handling at no additional charge once per machine. This feature
friction-feeds single-part non-preprinted continuous roll and
fan-fold paper [minimum width is 20.3 centimetres (8 inches)].
Included in this feature is a paper tear bar for tearing
continuous forms, approximately 6.4 centimetres (2.5 inches)
from the last line printed. An operator can interchange this
feature with the Variable Width Forms Tractor if Variable Width
Forms Tractor Covers were ordered.

Line Spacing - 8 Lines Per Inch

This feature consists of an operator-controlled switch that provides 8 lines-per-inch line spacing in addition to the standard 6 lines per inch.

Page Length Control

An operator-controlled set of switches specifies the form length if this feature is installed. Skipping from form to form is under program control.

Audible Alarm

This feature sounds an alarm that alerts the operator to conditions that require operator intervention. The volume of the alarm is operator-adjustable.

SCS Support (3274/3276 Attachment Feature Only)

This feature provides the capability to receive an SCS (SNA Character String) data stream from the host system.

X Print Error Indication

This feature prints an error graphic X on the line immediately below the last print line of a data buffer when the printer is operating in 3270 data stream mode and detects a parity error.

Character Print Operation

For use with the 3271/3272 Attachment Feature installed on a 3274 Control Unit Type B Terminal Adapter, selection of 480 or 1920 character print must be specified.

For use with the 3274/3276 Attachment Feature installed on a 3274 Control Unit Type A Terminal Adapter or a 3276 Control Unit/Display Station, selection of 960, 1920, 2560, or 3440 character print must be specified.

Power

Printers in the United States operate with 120V ac, 60-Hz power. All units available through IBM World Trade Corporation can operate from one of several different power sources. See Chapter 3, Configuration, for additional information.

Machine Nomenclature

Eight selections are available for IBM World Trade countries:
Brazilian, Canadian French, English, French, German, Italian,
Japanese, and Spanish speaking.

Character Set Language

Many Character Set Languages are available for IBM World Trade
countries. See Chapter 3, Configuration, for additional
information.

SPECIAL FEATURES

3271/3272 Attachment

This feature permits a 3287 Model 1 or 2 to be attached to a
3274 Control Unit (all models) Type B Terminal Adapter. Maximum
coaxial cable length with this attachment feature is 610 metres
(2,000 ft).

3274/3276 Attachment

This feature permits a 3287 Model 1 or 2 to be attached to a
3274 Control Unit (all models) Type A Terminal Adapter or a
3276 Control Unit/Display Station (all models). Maximum coaxial
cable length with this attachment feature is 1 500 metres (4,920
ft).

Variable Width Forms Tractor

This is a forms-feeding device for continuous margin punched
forms (one to six part forms) from 7.6 centimetres (3 inches)
to 38 centimetres (15 inches) wide.

Extended Print Buffer

This feature provides an additional 2K buffer storage (4K total),
which allows 2560 or 3440-character print operations. This
feature is only available on 3287s with the 3274/3276 attachment
feature.

ACCESSORIES - PURCHASE-ONLY

Forms Stand

This accessory permits continuous forms to be placed on a stand
above floor level and provides for forms stacking after printing.

3289 LINE PRINTER MODELS 1 AND 2

The IBM 3289 Line Printer is a floor-standing line printer with integral forms stand/stacker. Print character sets of 48, 64, 94 (EBCDIC and ASCII B), 116 (Canadian French), and 127 (Japanese Katakana) characters are available. Print speed ranges from 40 to 400 lines per minute, depending upon the model and character set selected.

The 3289 prints a maximum of 132 characters per line at 6 or 8 lines per inch print capability, depending upon the control unit and printer control settings. Lines are printed by characters engraved on a revolving metal interchangeable print belt.

The 3289 models and their print speeds in lines per minute (lpm) are:

Model	Print Character Belt			
	116/127	94	64	48
1	40 lpm	80 lpm	120 lpm	155 lpm
2	160 lpm	230 lpm	300 lpm	400 lpm

Note: Actual printer throughput depends upon operational and system characteristics. Maximum print speed may be affected by such factors as communication line speed, control unit load, and application program.

A variable width form tractor for feeding of marginally punched continuous forms (one to six part forms) up to 38 centimetres (15 inches) overall width is provided.

The following functions are standard:

- Paper jam detection

- Front forms loading

- End of forms detection

- Single/double vertical spacing

- 132 print positions

- Character spacing of 10 characters per inch

- 6 or 8 lines per inch line spacing

- 4016-byte character print buffer

- SCS (SNA Character String) data stream handling (EBCDIC only)

The 3289 attaches only to a 3274 Type A Terminal Adapter port, by means of a coaxial cable, up to 1 500 metres (4,920 ft) away from the control unit.

SPECIFY FEATURES

Print Belt Character Set

This feature is available at time of manufacture only. If more than one print belt is required, a separate order must be placed. See "Accessories, Purchase-Only." Print belts are available in 48, 64, 94 characters (EBCDIC and ASCII B), 116 characters (Canadian French), and 127 characters (Japanese Katakana).

Print Error Indication

This feature prints an error graphic Ⓧ on the line immediately below the last print line of a data buffer when the printer is operating in 3270 data stream mode and detects a parity error.

Character Print Operation

This feature specifies the printer buffer size when the printer is used in 3270 data stream mode. 960, 1920, 2560, or 3440 bytes must be specified. When the 3289 is operated in 3271/3272 mode, the 960-buffer size will be formatted as 480 characters and the 2560- or 3440-buffer size will be formatted as 1920 characters.

Power

Printers in the United States operate with 120V ac, 60-Hz power. All units available through IBM World Trade Corporation can operate from one of several different power sources. (See Chapter 3, Configuration, for additional information.)

Machine Nomenclature

Eight selections are available for IBM World Trade countries: Brazilian, Canadian French, English, French, German, Italian, Japanese, and Spanish speaking.

SPECIAL FEATURES

Audible Alarm

This feature sounds an alarm that alerts the operator to
conditions that require operator intervention. The operator
can set loudness level and duration.

ACCESSORIES, PURCHASE-ONLY

Print Belt (Additional)

This accessory permits more than one character set print belt
to be ordered. Additional belts that can be ordered include
48-, 64-, and 94-character EBCDIC or ASCII B, 116-character
Canadian French, and 127-character Japanese Katakana.

IBM HOST PROGRAMMING SUPPORT

IBM Host Programming support for the 3274 and 3276 clusters
is divided into two categories:

- 3270 Compatibility - The 3274 and 3276, with associated
  displays and printers, provide a compatible appearance to
  current 3270 programming subsystems. Although this
  appearance is different for the various attachments, the
  3274 and 3276 appear as a device or cluster previously
  supported by IBM Host Programming.

- 3274/3276 Additional Capabilities - Support for the
  additional capabilities of the 3274 and 3276 clusters will
  be provided by IBM Host Programming.

3270 COMPATIBILITY

The 3274 may be specified to present any of the four following
appearances to the host system:

- SNA/SDLC for remote attachment
- Local (SNA Version) attachment
- BSC for remote attachment
- Local (3272 Version) attachment

The 3276 may be specified to present either of the two following
appearances to the host system:

- SNA/SDLC for remote attachment
- BSC for remote attachment

For each of these appearances, IBM Host Programming support
will be available on the basis of functional compatibility with
the currently supported devices. These appearances are described
as follows:

SNA/SDLC for Remote Attachment - The 3274 Model 1C and the
3276 Models 11 and 12 (and the 3276 Models 13 and 14 when
operating in the 1920-character format) will be supported by
IBM Host Programming under either Data Stream Compatibility
(DSC) support or the SNA Character String (SCS) support. This
support differs from the SDLC support previously provided for
the 3271 Control Unit, Models 11 and 12, and the 3275 Display
Station, Models 11 and 12. For a description of SDLC operation,
see the IBM 3270 Information Display System Component
Description, GA27-2749.

Local (SNA Version) Attachment - The 3274 Model 1A will be
supported by IBM Host Programming as a functionally compatible
device under 3790 Local Channel Support.

BSC for Remote Attachment - The 3274 Model 1C and the 3276
Models 1 and 2 (and the 3276 Models 3 and 4 when operating
in the 1920-character format) will be supported by IBM Host
Programming as functionally compatible devices under 3271 BSC
Support.

Local (3272 Version) Attachment - The 3274 Model 1B will be
supported by IBM Host Programming as a functionally compatible
device under 3272 Local Channel Support.

Functional device compatibility as related to Host Programming
Support is shown in Figure 2-7.

Compatibility Exceptions

The expanded display function of the 3274, 3276, and 3278, and
the expanded printing functions of the 3287 and 3289 printers
could result in some minor changes in customer-written programs
for optimum use of these devices. The publications, IBM 3270
Information Display System Component Description, GA27-2749,
and Introduction to Programming the IBM 3270, GA27-6999, will
provide information relating to usage of the expanded display
and printing functions and any compatibility exceptions. The
following list describes compatibility exceptions:

1. Character Set Compatibility -- Customers using the 94-
   character (plus space and null) character set for additional
   new capability should review existing data sets and
   programming support for sensitivity to the new I/O interface
   codes utilized.

2. Nondisplayable Fields -- The 3274 and 3276 clusters are
   structured to update screen images on a periodic basis
   without removing the previous image from the screen. This
   method of screen updating eliminates the blank screen

Current Device Support			Compatible Devices Supported		
Support Type	Control Unit	Attached Device	Control Unit	Attached Device Category A	Attached Device Category B
SNA/SDLC 3270 DSC (Display)	3791	3277-1,2	3274-1C	3278-1,2	3277-1,2
		3277-1,2	3276-11,12	3278-1,2	
SNA/SDLC 3270 DSC (Printer)	3791	3284-1,2 3286-1,2 3288-2	3274-1C	3287-1,2 3287-1,2 3289-1,2	3284-1,2 3286-1,2 3288-2
		3284-1,2 3286-1,2 3288-2	3276-11,12	3287-1,2 3287-1,2 -	
SNA/SDLC SCS (Printer) (Note 1)	3791	3284-1,2 3286-1,2 3288-2	3274-1C	3287-1,2 3287-1,2 3289-1,2	
		3284-1,2 3286-1,2 3288-2	3276-11,12	3287-1,2 3287-1,2 -	
Local (SNA Version)	3791	3277-1,2 3284-1,2 3286-1,2 3288-2	3274-1A	3278-1,2 3287-1,2 3287-1,2 3289-1,2	3277-1,2 3284-1,2 3286-1,2 3288-2
3270 BSC	3271-1,2	3277-1,2 3284-1,2 3286-1,2 3288-2	3274-1C	3278-1,2 3287-1,2 3287-1,2 3289-1,2	3277-1,2 3284-1,2 3286-1,2 3288-2
		3277-1,2 3284-1,2 3286-1,2 3288-2	3276-1,2	3278-1,2 3287-1,2 3287-1,2 -	
Local (3272 Version)	3272-1,2	3277-1,2 3284-1,2 3286-1,2 3288-2	3274-1B	3278-1,2 3287-1,2 3287-1,2 3289-1,2	3277-1,2 3284-1,2 3286-1,2 3288-2

Note 1: The 3274 and 3276 with attached Category A printers will respond to SCS Format Control Characters which are not included in 3790 SCS Support (the 3287 printers require F.C. 8660-SCS Support). Customers may alter existing 3790 SCS Host Support programs to take advantage of the enhanced format control capabilities when operating the 3274 or 3276 with attached 3287 and 3289 printers.

Figure 2-7. Compatible Device Attachment Support

condition (often referred to as "blink") that normally results from screen updating. To maintain intended data security, existing customer programs should be reviewed to assure that:

a. They do send a nondisplay attribute byte prior to sending the intended new nondisplayable data to preclude its momentary appearance on the screen.

b. They do not overwrite a nondisplay attribute of the currently displayed image when changing screen formats on a partial basis.

3. Copy Function -- The copy function for the 3274 and 3276 clusters in 3270 DSC mode is implemented by using an indicator in the Write type commands. The Copy command is only recognized in the BSC mode of operation.

4. Link Responses -- When operating in BSC mode, the 3274 and 3276, because of their internal structure, may detect error conditions for which they will generate link responses to the host under conditions differing from those occurring in the 3271. The IBM publications mentioned above describe these differing response conditions. It is not expected that programming adjustments will be necessary to accommodate these differing response conditions; no IBM programs have been modified. Customers, however, are encouraged to review these differing conditions to assure that customer-written programs are not affected.

5. 3287 NL Function -- To perform the NL function on the 3284 and 3286 Printers, some customer-written application programs use the Margin Stop Variable (RPQ EB3995) or the fixed margin stop provided with the pin feed platen. To execute this function at fewer than 132 positions, using the 3287 Printer, the application program must write an NL order instead of using either margin stop.

6. Printer Compatibilities -- Printer operations on the 3287 and 3289 are compatible with those on the 3284/3286 and 3288, respectively, except for the following enhancements which require support:

• The split vertical bar character (¦) is printed by the 3287, 3288, and 3289. It is not printed by the 3284 and 3286.

• The Print Authorization matrix in the 3274 and 3276 directs display-to-printer copy operation data transfers (except as provided by the Copy command in BSC operation). For additional information, refer to a discussion of the Printer Authorization matrix at the start of this chapter.

7. Keyboard Compatibilities -- Keyboard types can be mixed; however, keyboard languages can not be mixed on the same control unit.

SNA Support

The 3274 and 3276 clusters will be supported as compatible devices in 3270 DSC and SCS modes for SNA operation by the IBM host programming access methods and program products, shown in Figure 2-8.

Access Methods/ Program Products	3270 DSC		SCS Printer
	Display	Printer	
SNA/SDLC and Local (SNA Version) Support			
VTAM	X	X	X
ACF/VTAM	X	X	X
Network Operation Support Program	X	X	-
MVS/TSO/VTAM	X	-	-
CICS/VS	X	X	X
IMS/VS	X	-	X
SNA/SDLC Support only - Local (SNA Version), Not Supported			
TCAM/NCP Direct	X	X	X
ACF/TCAM	X	X	X
EXTM	X	X	X
TSO/TCAM	X	-	-

Figure 2-8. 3274/3276 Support in 3270 DSC and SCS for SNA Operation

In addition, the following IBM program products, which depend upon the access methods and program products (shown in Figure 2-8 for DSC/SCS services), will be available for use with the 3274 and 3276 clusters:

ATMS-II	PLANCODE
DMS	SPF(TSO) V2
GIS/VS	STAIRS/VS
IFS(EMEA only)	VIDEO/370 (CICS)
IIS	

Support will be provided for 3270 Data Stream Compatibility (DSC) by the access methods and program products, under the specified operating systems, as shown in Figure 2-9.

SUPPORT	DOS/VS	OS/VS1	OS/VS2 (SVS)	OS/VS2 (MVS)
TCAM/NCP	-	X	X	X
VTAM	X	X	X	X
TSO/TCAM	-	-	X	X
EXTM	X	-	-	-
CICS/VS	X	X	X	X
IMS/VS	-	X	X	X
ACF/VTAM	X	X	X	X
Network Operation Support Program	X	X	X	X
ACF/TCAM	-	X	X	X

Figure 2-9. Support for 3270 DSC

MVS/TSO/VTAM will support the 3274 and 3276 as a new device
in 3270 DSC mode for SNA/SDLC operation. The following will
be available in MVS/TSO/VTAM:

• Dynamic Reshow - This capability will allow the TSO Command
  Processors to specify to MVS/TSO/VTAM which Program Function
  Key code to use as a reshow indication, if the default (PA2)
  is not desired.

• Print Inhibit - When a print inhibit input is requested
  from a 3270 display terminal, MVS/TSO/VTAM will prevent
  the displaying of cross memory messages on that 3270 display
  terminal until the requested print inhibited input has been
  entered.

• Break Function - MVS/TSO/VTAM will support the break function
  which will allow users of 3278 terminals in 3270 DSC mode
  to input data at all times. It will also allow an
  application using TPUT BREAKIN to interrupt the user in
  the process of entering data on the screen. (See Guide
  to Writing a Monitor Program and a Command Processor, GC28-
  0648). TSO/TCAM does not support the break function.

• TCAS Messages - The message capability of MVS/TSO/VTAM will
  be enhanced to provide better information to the terminal
  user when the LOGON is not successful.

The ACP Control Program Version 9, Release 2, Modification Level
0, will support the 3274 and 3276 as a new device in 3270 DSC
and SCS modes for SNA/SDLC operation.

BSC and Local (3272 Version) Support

The 3274 and 3276 will operate with 3270 BSC and Local (3272
Version) IBM Host Programming that is supported by IBM at the
time the 3274 and 3276 are available.

VSPC Support -- Virtual Storage Personal Computing (VSPC) can
be executed using the 3274 and 3276 in the same manner as these

applications are executed using the 3271 and 3272 Control Units
without the Data Analysis-APL feature.

ACP Support -- The ACP control Program Version 9, Release 2,
Modification Level 0, will support the 3274 for Local(3272
Version) operation.

3274 AND 3276 ADDITIONAL CAPABILITIES

Support for the additional capabilities of the 3274 and 3276
will be provided by IBM Host Programming. This support, provided
by access methods and program products, is described in the
following paragraphs.

Access Methods

The 3274 and 3276 buffer sizes of 960, 2560, and 3440 bytes
will be supported in ACF/VTAM, ACF/TCAM, BTAM, and EXTM as shown
in Figure 2-10.

Access	Remote		Local	
Method	DSC	BSC	(SNA Version)	(3272 Version)
ACF/VTAM	X	X	X	X
ACF/TCAM (Note 1)	X	X		X
BTAM (Note 2)		X		X
EXTM (Note 3)	X	X		

Notes:

1. The remote attachment of the 3274 and 3276 with these buffer
   sizes will be supported by TCAM Direct, with the exception
   of the TCAM I/O device macro support and TSO/TCAM support
   of these buffer sizes, both of which will be available with
   ACF/TCAM.

2. BTAM will support the BSC remote attachment of the 3274
   and 3276 with these buffer sizes on all current releases
   of BTAM. Support for Local (3272 Version) requires a
   modification to BTAM.

3. EXTM support of the 3274 and 3276 with these buffer sizes
   will be available under CICS/DOS/VS.

Figure 2-10. Access Method Support for the 3274 and 3276 Buffer Sizes of 960, 2560, and 3440 Bytes

Network Operation Support

The 3274 and 3276 buffer sizes of 960, 2560, and 3440 bytes
and the 3274 additional program function keys will be supported
by the Network Operation Support Program.

Time-Sharing Option Support

The 3274 and 3276 buffer sizes of 960, 2560, and 3440 bytes
will be supported by the IBM Time-Sharing Option (TSO) on
ACF/VTAM and ACF/TCAM. The following attachments are supported:

	Remote		Local	
	DSC	BSC	(SNA Version)	(3272 Version)
TSO/ACF/VTAM	X	X	X	X
TSO/ACF/TCAM	X	X		X

TSO/VTAM and TSO/TCAM do not support the 3274 and 3276 printer
attachment.

CICS/VS Support

CICS/VS will provide the following support for the additional
capabilities of the 3274 and 3276 under ACF/VTAM, ACF/TCAM,
EXTM, and BTAM access methods:

- Screen Sizes - Each 3276 and 3278 display screen can be
  used with its full screen size or with a default screen
  size that provides compatibility with existing 3270
  applications. CICS/VS will allow screen sizes to be switched
  between an alternate size and a default size for different
  transactions. This facility will be available through a
  terminal control and Basic Mapping Support (BMS).

- Program Attention Key/SCS Printer - When a 3287 or 3289
  printer attached to a 3274 is operated as an SCS printer
  logical unit, a Program Attention key may be used to
  communicate with the host. CICS/VS will allow CICS/VS
  application programs to receive the attention. The Program
  Attention key may also be used to initiate a transaction.

- Character Sets - Unique character sets will be provided
  for the World Trade countries. Although CICS/VS will not
  support unique character sets directly, it will allow
  hexadecimal character strings, representing character sets
  other than EBCDIC, to be used as transaction identifiers
  and initial data for BMS maps.

CICS/VS will also provide the following support for the 3274
additional capabilities:

- Magnetic Slot Reader - CICS/VS will allow a magnetic slot
  reader attention identification (AID) or operator
  identification card reader to be used to initiate a
  transaction.

- Additional Program Function Keys - A 3278 attached to a
  3274 provides, as an option, the additional program function
  keys, 13 through 24. CICS/VS will support these keys as
  transaction identifiers and BMS paging commands, and will
  allow CICS/VS application programs to reference them.

CICS/VS will support the 3287 and 3289 printers as follows:

- In 3270 BSC or Local (3272 Version) mode of operation,
  buffer sizes are specified and will be selected in a manner
  similar to screen size selection.

- In SNA mode, CICS/VS will use the printers at maximum buffer
  capacity.

IMS/VS Support

IMS will support the 3274 and 3276 for local and remote
attachment under BTAM and ACF/VTAM access methods. In addition,
IMS provides the following support for the additional
capabilities of the 3274 and 3276:

- Display Screens - IMS/VS support of the 3276 and 3278 display
  screens is provided through Message Format Service (MFS).
  To utilize display formats currently designed for 3270
  displays, users of IMS/VS Version 1, with release of 1.1
  or later, will require minor changes to their current MFS
  source definitions unless using IMS/VS default formats.
  Users of releases prior to 1.1 will use currently defined
  MFS conversion procedures. Formats may also be redesigned
  for the new display screens without changing the application
  program.

- Master Terminal - Any 3276 or 3278 display screen may be
  used as the IMS/VS Master Terminal. The special MFS Master
  Terminal Formatting support applies only to 24 x 80 screens.

- Operator Procedures - Terminal operator procedures are
  unchanged from present 3270 operations for equivalent
  function. There are procedural differences based on the
  access method used.

- Program Attention Key/SCS Printer - When a 3287 or 3289
  Printer attached to a 3274 is operated as an SCS printer
  logical unit, a Program Attention key may be used to
  communicate with the host. In addition, the Program
  Attention key can be used to initiate a transaction.

- Character Sets - The 3274 and 3276 clusters will provide unique character sets for the World Trade countries. Although IMS/VS does not support unique character sets directly, it does allow the hexadecimal values representing graphic (X'40' and above) characters in these sets to be used as transaction identifiers, application data, and in MFS formats.

- Additional Program Function Keys - A 3278 attached to a 3274 provides, as an option, the additional program function keys, 13 through 24. IMS/VS support of program function keys has been extended to include the additional keys.

- Magnetic Slot Reader - IMS/VS support of the magnetic slot reader, on a 3278 attached to a 3274 will allow IMS/VS application programs to utilize the expanded capacity of the magnetic slot reader.

ACP Support

ACP will support the 3274 and 3276 buffer sizes of 960, 2560, and 3440 bytes for SNA/SDLC remote attachment. Functional support available to ACP applications will be similar to the support provided in ACP Version 9.2 for the 3270 display cluster.

VM/370 Support

Support for the 3274 and 3276 buffer sizes of 2560 and 3440 bytes will be provided by VM/370 for remote BSC and Local (3272 Version) operation.

Support Summary for Additional Capabilities

IBM Host Programming support for the additional capabilities of the 3274 and 3276 Control Units, under the specified operating system, is summarized in Figure 2-11.

Support	DOS/VS	OS/VS1	OS/VS2 (SVS)	OS/VS2 (MVS)
BTAM	X	X	X	X
EXTM	X	-	-	-
ACF/VTAM	X	X	X	X
ACF/TCAM	-	X	X	X
TCAM/NCP	-	X	X	X (Note 1)
Network Operation Control Program	X	X	X	X
MVS/TSO/VTAM	-	-	-	X
TSO/ACF/TCAM	-	-	X	X
CICS/VS	X	X	X	X
IMS/VS	-	X	X	X

Note 1. I/O Device macro support is not provided.

Figure 2-11. IBM Host Programming Support, 3274 and 3276 Additional Capabilities

Chapter 3. Configuration

This chapter contains the overall configurations for the
3274 Control Unit (both Local and Remote) and the
3276 Control Unit/Display Station (Remote).

It also contains the detailed configuration feature codes
for the 3274 Control Unit, 3276 Control Unit/Display
Station, 3278 Display Station, 3287 Printer, and the
3289 Line Printer.

Cluster Configuration

Figures 3-1 through 3-4 show example configurations of
the 3274 and 3276 clusters. These configuration over-
views also identify Category A and Category B Terminals
and their Special and Specify Features (detailed in
Chapter 2).

3274 Control Unit Models 1A and 1B

8

- Type A
  Terminal
  Adapter
  (3 max)

2 • Type B
  Terminal
  Adapter
  (4 max)

•• Power – WTC*

•• Machine
  Nomenclature – WTC*

- Control Storage
  Expansion

- Extended Function
  Store 16K

3 cables
needed

To/From
System
Channel

6

Cable

One 3278 with
keyboard is
required on
3274s low-order
address.

Cable

Cable

Cable

7

3278 Display Station Models 1, 2, 3, and 4

- Audible Alarm
- Keyboard Numeric Lock
- Security Keylock
- Magnetic Reader Control
- Switch Control Unit
- •• Character Set – EBCDIC or ASCII B
- •• Power – WTC*
- •• Machine Nomenclature – WTC*
- •• Character Set Language – WTC*
- •• Keyboard Language – WTC*

- Magnetic Slot
  Reader (cable
  included)

- Keyboard (cable
  included)

- Selector Light
  Pen (cable
  included)

3289 Line Printer Model 1 or 2

- •• Character Set – EBCDIC or ASCII B
- •• 48, 64, 94 Character Set Print Belt
- •• Print Error Indication
- •• 960, 1920, 2560, 3440 Character Print
- • Audible Alarm
- •• Power – WTC*
- •• Machine Nomenclature – WTC*
- •• Print Belt Character Set – WTC*

Up to 32 Terminals
can be attached, and
no more than 16 of
those terminals can be
Category B Terminals
(3277s, 3284s, 3286s,
3288s, and 3287s) 3
attached to Type B
adapter.

3287 Printer Model 1 or 2

- 1 • 3274/3276 Attachment
- 1 • 3271/3272 Attachment
- •• Character Set – EBCDIC or ASCII B
- 3 •• Mono or Dual Case
- • Variable Width Forms Tractor
- 4 • Extended Print Buffer
- 3 •• 480, 1920 Character Print
- 4 •• 960, 1920, 2560, 3440 Character Print
- •• Friction Feed Paper Handling
- •• Line Spacing 8 per inch
- •• Page Length Control
- •• Audible Alarm
- 4 •• SCS Support
- •• Power – WTC*
- •• Machine Nomenclature – WTC*
- •• Character Set Language – WTC*
- •• X Print Error Indication
- 5 •• Forms Stand

Legend:

- • = Special Feature
- •• = Specify Feature (No charge)
- * = World Trade A/FE or E/ME/A countries.
- 1 = Mutually exclusive
- 2 = Category B terminals that can be attached in addition
  to the 3287s are 3277s, 3284s, 3286s, and 3288s. All
  features are not supported. Consult your local IBM
  Marketing Representative for further information.
- 3 = 3271/3272 Attachment Feature only.
- 4 = 3274/3276 Attachment Feature only
- 5 = Accessory – purchase only
- 6 = All cable lengths connected to base 3274 or Type A
  Terminal Adapters can be 1 500 metres (4,920 ft)
  maximum.
- 7 = All cable lengths connected to Type B Terminal
  Adapters can be 610 metres (2,000 ft) maximum.
- 8 = Eight ports are provided on each 3274 for Category A
  terminal (3278, 3287, and 3289) attachment.

Figure 3-1. Local 3270 Display System Employing a 3274 Control Unit, Model 1A or 1B

3274 Control Unit Model 1C

8

BSC or SDLC
Line Control

Modem

- External Modem
  Interface at:
  - •• 2,000/2,400/
    4,800/7,200/
    9,600 bps
- Common Communications
  1 Adapter
- High Performance
  1 Communications Adapter

•• Power — WTC*

•• Machine
   Nomenclature — WTC*

- Type A
  Terminal
  Adapter
  (3 max)

2 • Type B
  Terminal
  Adapter
  (4 max)

- Control Storage
  Expansion

- Extended Function
  Store 16K

6

Cable

One 3278 with
keyboard is
required on
3274s low-order
address.

Cable

Cable

Cable

7

3278 Display Station Models 1, 2, 3, and 4

- Audible Alarm
- Keyboard Numeric Lock
- Security Keylock
- Magnetic Reader Control
- Switch Control Unit
- •• Character Set — EBCDIC or ASCII B
- •• Power — WTC*
- •• Machine Nomenclature — WTC*
- •• Character Set Language — WTC*
- •• Keyboard Language — WTC*

- Magnetic Slot
  Reader (cable
  included)

- Keyboard (cable
  included)

- Selector Light
  Pen (cable
  included)

3289 Line Printer Models 1 and 2

- •• Character Set — EBCDIC or ASCII B
- •• 48, 64, 94 Character Set Print Belt
- •• Print Error Indication
- •• 960, 1920, 2560, 3440 Character Print
- • Audible Alarm
- •• Power — WTC*
- •• Machine Nomenclature — WTC*
- •• Print Belt Character Set — WTC*

3287 Printer Models 1 and 2

- **3** • 3274/3276 Attachment
- **4** • 3271/3272 Attachment
- •• Character Set — EBCDIC or ASCII B
- **3** •• Mono or Dual Case
- • Variable Width Forms Tractor
- **4** • Extended Print Buffer
- **3** •• 480, 1920 Character Print
- **4** •• 960, 1920, 2560, 3440 Character Print
- •• Friction Feed Paper Handling
- •• Line Spacing 8 per inch
- •• Page Length Control
- •• Audible Alarm
- **4** •• SCS Support (SDLC)
- •• Power — WTC*
- •• Machine Nomenclature — WTC*
- •• Character Set Language — WTC*
- •• X Print Error Indication
- **5** •• Forms Stand

Up to 32 Terminals
can be attached, and
no more than 16 of
those Terminals can
be Category B Terminals
(3277s, 3284s, 3286s,
3288s, and 3287s) **3**
attached to Type B
adapter.

Legend:

- • = Special Feature
- •• = Specify Feature (No charge)
- * = World Trade A/FE or E/ME/A countries.
- **1** = Mutually exclusive
- **2** = Category B terminals that can be attached in addition
  to the 3287s are 3277s, 3284s, 3286s, and 3288s. All
  features are not supported. Consult your local IBM
  Marketing Representative for further information.
- **3** = 3271/3272 Attachment Feature only.
- **4** = 3274/3276 Attachment Feature only
- **5** = Accessory — purchase only
- **6** = All cable lengths connected to base 3274 or Type A
  Terminal Adapters can be 1 500 metres (4,920 ft)
  maximum.
- **7** = All cable lengths connected to Type B Terminal
  Adapters can be 610 metres (2,000 ft) maximum.
- **8** = Eight ports are provided on each 3274 for Category A
  terminal (3278, 3287, and 3289) attachment.

Figure 3-2. Remote 3270 Display System Employing a 3274 Control Unit, Model 1C (BSC or SDLC Application)

BSC or SDLC
Protocol

1 Modem

•• Public Switched or
Private Nonswitched
Communications
Facilities

3276 Control Unit/Display Station Models 1, 2, 3, and 4

4 • 1200-bps non-
switched inte-
grated modem

4 • External Modem
Interface at:

•• 2,000/2,400/
4,800/7,200-bps

5 •• Communications
Feature with
clock

5 •• Communications
Feature without
clock

• Audible Alarm
• Security Keylock
• Selector Light Pen
•• Character Set — EBCDIC or
ASCII B
•• Character Set Language — WTC*
•• Keyboard Language — WTC*
• SDLC/BSC Switch

•• Power — WTC*
•• Machine Nomenclature —
WTC*

• Terminal
Adapter
(3 max)

• Keyboard (cable
included)

• Selector Light
Pen (cable
included)

Cable can be 1 500
metres (4,920 ft) long

Cable

3

Cable

3278 Display Station Models 1, 2, 3, and 4

• Audible Alarm
• Keyboard Numeric Lock
• Security Keylock
• Switch Control Unit
•• Character Set — EBCDIC or ASCII B
•• Power — WTC*
•• Machine Nomenclature — WTC*
•• Character Set Language — WTC*
•• Keyboard Language — WTC*

• Keyboard
(cable included)

• Selector Light
Pen (cable
included)

Up to 7 3278s
and 3287s can
be attached.

3287 Printer Models 1 and 2

• 3274/3276 Attachment
•• Character Set — EBCDIC or ASCII B
• Variable Width Forms Tractor
• Extended Print Buffer
•• 960, 1920, 2560, 3440 Character Print
•• Friction Feed Paper Handling
•• Line Spacing 8 per inch
•• Page Length Control
•• Audible Alarm
•• SCS Support
•• Power — WTC*
•• Machine Nomenclature — WTC*
•• Character Set Language — WTC*
•• X Print Error Indication
2 Forms Stand

Legend:

• = Special Feature
•• = Specify Feature
* = World Trade A/FE or E/ME/A countries
1 = Only when Integrated Modem is not installed.
2 = Accessory — Purchase only.
3 = One port is provided on every 3276 for one 3278 or 3287
attachment.
4 = Mutually Exclusive
5 = Mutually Exclusive

Figure 3-3. Remote 3270 Display System Employing a 3276 Control Unit/Display Station, Model 1, 2, 3, or 4 (BSC Application)

SDLC Protocol

```
┌──────────┐
│ 1  Modem │
└──────────┘
```

•• Public Switched or Private Nonswitched Communications Facilities

3276 Control Unit/Display Station Models 11, 12, 13, and 14

4 • 1200-bps non-switched integrated modem

4 • External Modem Interface at:

•• 2,000/2,400/4,800/7,200/9,600-bps

5 •• Communications Feature with clock

5 •• Communications Feature without clock

• Audible Alarm
• Security Keylock
• Selector Light Pen
•• Character Set — EBCDIC or ASCII B
•• Character Set Language — WTC*
•• Keyboard Language — WTC*

•• Power — WTC*
•• Machine Nomenclature — WTC*

• Terminal Adapter (3 max)

• Keyboard (cable included)

• Selector Light Pen (cable included)

Cable can be 1 500 metres (4,920 ft long

Up to 7 3278s and 3287s can be attached.

3

Cable

Cable

3278 Display Station Models 1, 2, 3, and 4

• Audible Alarm
• Keyboard Numeric Lock
• Security Keylock
• Switch Control Unit
•• Character Set — EBCDIC or ASCII B
•• Power — WTC*
•• Machine Nomenclature — WTC*
•• Character Set Language — WTC*
•• Keyboard Language — WTC*

• Keyboard (cable included)

• Selector Light Pen (cable included)

3287 Printer Models 1 and 2

• 3274/3276 Attachment
•• Character Set — EBCDIC or ASCII B
• Variable Width Forms Tractor
• Extended Print Buffer
•• 960, 1920, 2560, 3440 Character Print
•• Friction Feed Paper Handling
•• Line Spacing 8 per inch
•• Page Length Control
•• Audible Alarm
•• SCS Support
•• Power — WTC*
•• Machine Nomenclature — WTC*
•• Character Set Language — WTC*
•• X Print Error indication
2 Forms Stand

Legend:

•	=	Special Feature
••	=	Specify Feature
*	=	World Trade A/FE or E/ME/A countries
1	=	Only when Integrated Modem is not installed.
2	=	Accessory — Purchase only.
3	=	One port is provided on every 3276 for one 3278 or 3287 attachment.
4	=	Mutually Exclusive
5	=	Mutually Exclusive

Figure 3-4. Remote 3270 Display System Employing a 3276 Control Unit/Display Station, Model 11, 12, 13, or 14 (SDLC Application)

Feature Codes

The following tables list all feature codes, Specify and Special, now available. Prerequisite features and Mutually Exclusive features are also identified.

Some of the devices, options, and features listed in this publication may not be available in every locale. Consult your local IBM Marketing Representative for information about product availability.
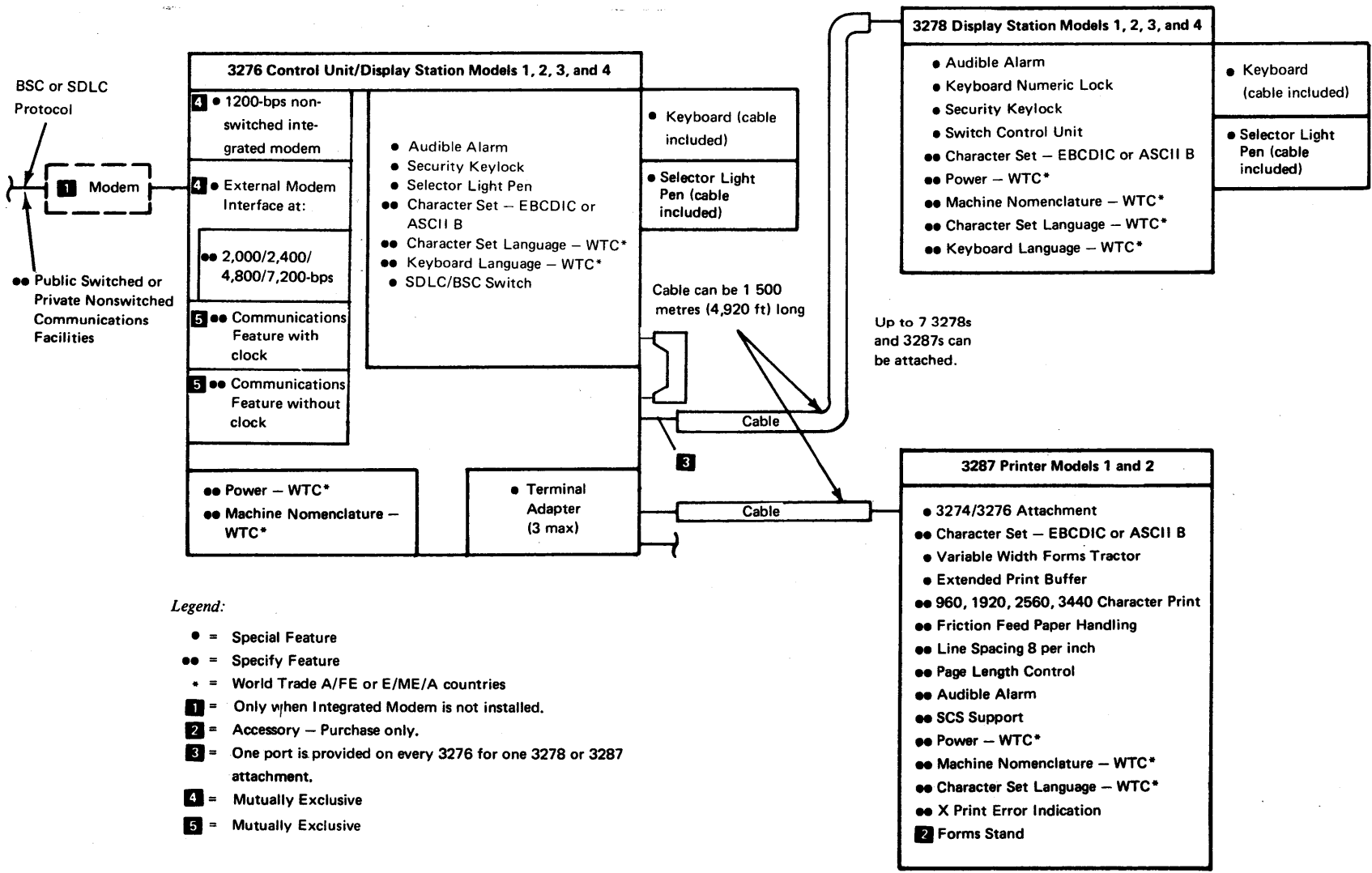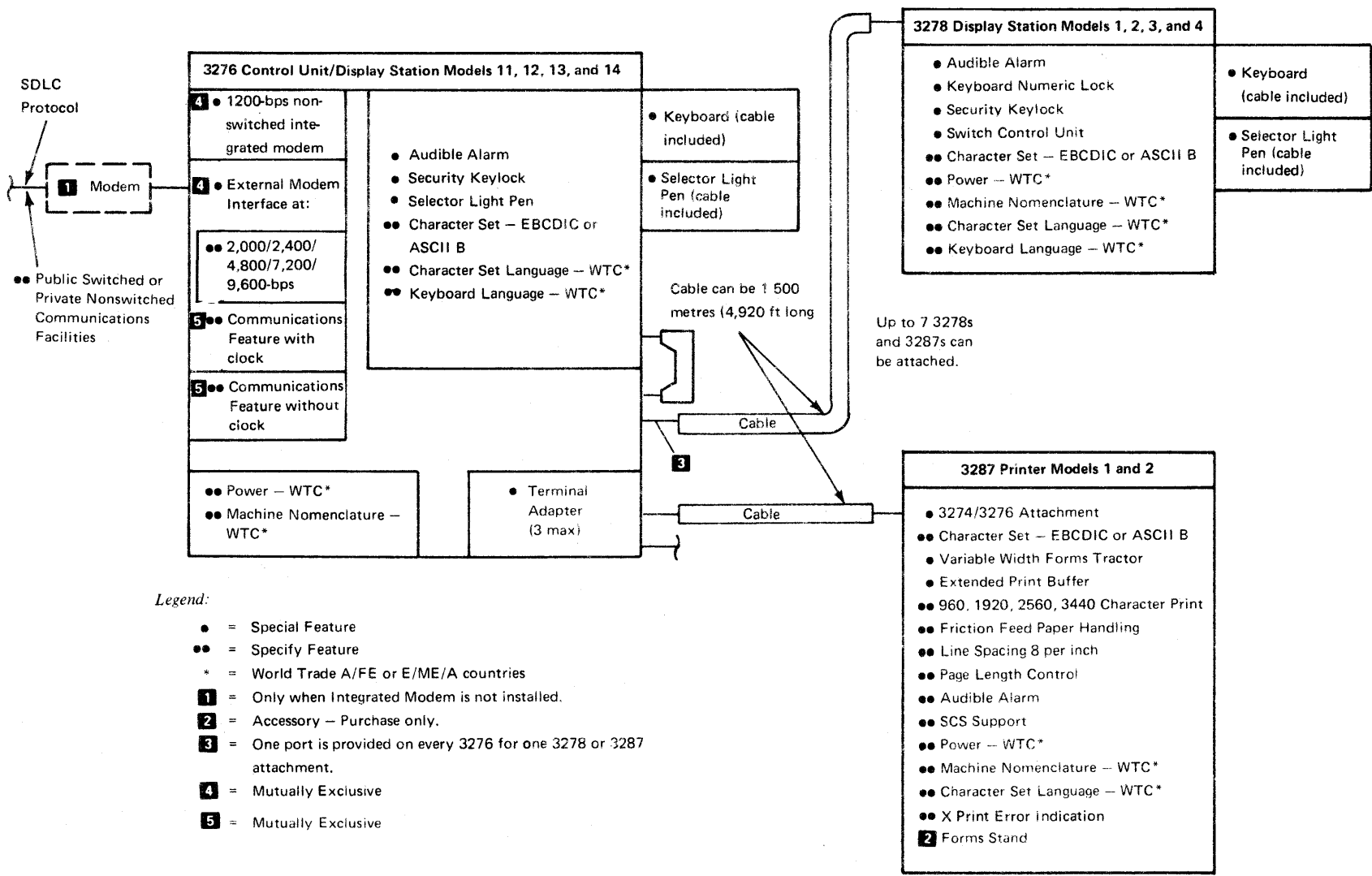
3274/3276 System Attachment — IBM

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
*N Choose one	S/360 Model 30		9572		
	S/360 Model 40		9573		
	S/360 Model 50		9575		
	S/360 Model 65		9576		
	S/360 Model 75		9578		
	S/370 Model 115		9589		
	S/370 Model 125		9586		
	S/370 Model 135		9581		
	S/370 Model 138		9595		
	S/370 Model 145		9582		
	S/370 Model 148		9596		
	S/370 Model 155 or 155II		9583		
	S/370 Model 158 or 158 MP		9587		
	S/370 Model 165 or 165 II		9584		
	S/370 Model 168 or 168 MP		9588		
	S/370 Model 3033		9597		
	S/370 Model 195		9580		
	S/3 Model 4		9594		
	S/3 Model 8		9591		
	S/3 Model 10		9585		
	S/3 Model 12		9593		
	S/3 Model 15		9590		

Legend:
* = For Record Purposes

3274/3276 Unit Attachment

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
*N Choose one	3274-1A (Local)		9549		
	3274-1B (Local)		9550		
	3274-1C (Remote)		9551		
	3276-1, 2, 3, 4 (BSC)		9552		
	3276-11, 12, 13, 14 (SDLC)		9553		

Power Plugs, Locking and Nonlocking

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
O	120V ac Locking Plug		9890		
	120V ac Nonlocking Plug		9891		
	208V ac Locking Plug		9884		
	208V ac Nonlocking Plug		9885		
	230V ac Locking Plug		9886		
	230V ac Nonlocking Plug		9887		
	240V ac Locking Plug		9894		
	240V ac Nonlocking Plug		9895		

3274 Control Unit — IBM

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive; (Must not be ordered with):
1 N Choose one	Power Plug — Locking 120V ac (Model 1C only)		9890		
	Power Plug — Locking — 208V ac		9884		
	Power Plug — Locking — 240V ac		9894		
	Power Plug — Nonlocking 120V ac (Model 1C only)		9891		
	Power Plug — Nonlocking — 208V ac		9885		
	Power Plug — Nonlocking — 240V ac		9895		
O	Power connector — Watertight	8801			
2 O	Power Cable — 1.8 metres (6 ft)		9491		
3 O Choose one	Communication Cable — (Model 1C only) 3.04 metres (10 ft)		9101		
	Communication Cable — (Model 1C only) 9.14 metres (30 ft)		9102		
	Communication Cable — (Model 1C only) 12.19 metres (40 ft)		9103		
O Choose as needed (8 terminals per adapter)	Terminal Adapter — Type A1	6901			
	Terminal Adapter — Type A2	6902		6901	
	Terminal Adapter — Type A3	6903		6902	7804
O Choose as needed. (4 terminals per adapter)	Terminal Adapter — Type B1	7802			
	Terminal Adapter — Type B2	7803		7802	
	Terminal Adapter — Type B3	7804		7803	6903
	Terminal Adapter — Type B4	7805		7804	
O	Extended Function Store — 16K	3622		1801	
N	External Modem Interface (Model 1C only)	3701		6302 or 6303	
N Choose one Specify Feature	2,000 bps		9601		
	2,400 bps		9602		
	4,800 bps		9603		
	7,200 bps		9604		
	9,600 bps		9605		
N Choose one	Common Communications Adapter (Model 1C only)	6302			6303
	High Performance Communications Adapter (Model 1C only)	6303			6302
O	Control Storage Expansion	1801			

Legend

1 = AC voltage, 1-Phase, 3-wire, 60-Hz.

2 = 4.3 metres (14 ft) normally supplied.

3 = 6.09 metres (20 ft) normally supplied.

3274 Control Unit — IBM World Trade Americas/Far East (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade A/FE except Canada		2998		
N	100V ac — 50 Hz		2804		
Choose one	110V ac — 50 Hz		2805		
50 Hz or	200V ac — 50 Hz		2806		
60 Hz voltage	220V ac — 50 Hz		2813		
	230V ac — 50 Hz		2821		
	240V ac — 50 Hz		2801		
	100V ac — 60 Hz		2730		
	110V ac — 60 Hz		2822		
	120V ac — 60 Hz		2800		
	127V ac — 60 Hz		2823		
	200V ac — 60 Hz		2732		
	208V ac — 60 Hz		9902		
	220V ac — 60 Hz		2803		
	240V ac — 60 Hz		2831		
N	Machine Nomenclature				
Choose one	Brazilian/Portuguese		2933		
	Japanese		2930		
	Spanish Speaking		2931		
	English (US)		2950		
	Canadian/English		2934		
	Canadian/French		2935		

3274 Control Unit — IBM World Trade Europe/Middle East/Africa (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade E/ME/A		2999		
N	220V ac — 50 Hz		2813		
Choose one	240V ac — 50 Hz		2801		
N	Machine Nomenclature				
	English (UK)		2927		
Choose one	English (US)		2950		
	French		2928		
	German		2929		
	Spanish/Spanish Speaking		2931		
	Italian		2932		

3276 Control Unit/Display Station — IBM (Sheet 1 of 2)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
O	Audible Alarm	1090			
O	Terminal Adapter — 1	3255			
Choose as	Terminal Adapter — 2	3256		3255	
many as needed	Terminal Adapter — 3	3257		3256	
(2 terminals per adapter)					
N	75-key Typewriter-like Keyboard — EBCDIC	4621		9082	
Choose one	75-key Data Entry Keyboard — EBCDIC	4622		9082	
	75-key Data Entry Keypunch-like Keyboard — EBCDIC	4623		9082	
	75-key Typewriter-like Keyboard — ASCII	4624		9084	
[1] O	1.8 metres (6 ft) Keyboard Cable		9399		
O	Keyboard-Numeric Lock	4690		4622,4623 2716	4621,4624, 2715
O	Security Keylock	6340			
O	Selector Light Pen	6350			
O	SDLC/BSC Switch (Models 1, 2, 3, and 4 only)	6315			
N	Power Plug — Locking (120V ac 60 Hz)		9890		
Choose one	Power Plug — Nonlocking (120V ac 60 Hz)		9891		
[2] O	Power Cable — 1.8 metres (6 ft)		9511		
Choose one	Power Cable — 3.7 metres (12 ft)		9512		
	Power Cable — 4.5 metres (15 ft)		9513		
[3] O	Communication Cable — 3.04 metres (10 ft)		9061		
Choose one	Communication Cable — 9.14 metres (30 ft)		9062		
	Communication Cable — 12.19 metres (40 ft)		9063		
N	Communications Feature with Business Machine Clock	6301			6302
Choose one	Communications Feature without Business Machine Clock	6302			6301
O	External Modem Interface	3701		6301 or 6302	5500
N	• Public Switched Network		9490		5502
Choose one	• Private Nonswitched Communications Facilities		9491		5507
N	• 2,000 bps		9821		
Choose one	• 2,400 bps		9822		
	• 4,800 bps		9823		
	• 7,200 bps		9824		
	• 9,600 bps (SDLC only)		9825		

Legend:

[1] = 91 cm (3 ft) normally supplied
[2] = 2.8 metres (9 ft) normally supplied
[3] = 6.09 metres (20 ft) normally supplied

3276 Control Unit/Display Station — IBM (Sheet 2 of 2)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
O Choose one	**1** 1,200-bps Integrated Modem — Switched — Manual Answer (Models 11, 12, 13, and 14 only)	5502		6301	3701 5500 5507
	1,200-bps Integrated Modem — Non-switched	5500		6301 and 9651 or 9652	3701 5502 5507
	1 1,200-bps Integrated Modem — Non-switched with Switched Network Backup and Manual Answer	5507		6301 and 9651 or 9652	3701 5500 5502
N with 5500, 5507 or 5508	• 4-wire facility		9651	5500, 5507	
	• 2-wire facility		9652		
N Choose one	Character Set — EBCDIC		9082	4621, 4622 4623	4624, 2715, 2716
	Character Set — ASCII B		9084	4624	4621, 4622, 4623, 2715, 2716

Legend:
1 = Data Coupler Type CDT or FCC certified equivalent is required.

3276 Control Unit/Display Station — IBM World Trade Americas/Far East (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade A/FE except Canada		2998		
Choose one	100V ac — 50 Hz		2804		
50 Hz or	110V ac — 50 Hz		2805		
60 Hz voltage	200V ac — 50 Hz		2806		
	220V ac — 50 Hz		2813		
	230V ac — 50 Hz		2821		
	240V ac — 50 Hz		2801		
	100V ac — 60 Hz		2730		
	110V ac — 60 Hz		2822		
	120V ac — 60 Hz		2800		
	127V ac — 60 Hz		2823		
N	Machine Nomenclature				
Choose one	Brazilian/Portuguese		2933		
	Canadian/English		2934		
	Canadian/French		2935		
	Japanese		2930		
	Spanish Speaking		2931		
	English (US)		2924		
N	Character Set Language				
Choose one	Brazilian/Portuguese		2775		
	Japanese (English)		2755		
	Japanese (Katakana)		2773		
	Spanish Speaking		2769		
	English (US)/EBCDIC (WT)		2756		
	International		2750		
N	Keyboard Languages				
Choose one	Brazilian/Portuguese		2975	2775	2715,2716
	Japanese (English)		2955	2755	4621
	Japanese (Katakana)		2973	2773	4621,4622, 4623
	Spanish Speaking		2969	2769	2715,2716
	English (US)		2956	2756	2715,2716
	EBCDIC (WT)		2951	2756	2715,2716
	International		2950	2750	2715,2716
O	76-key Japanese English/Japanese Katakana Typewriter-like Keyboard	2715		2955 or 2973	
	76-key Japanese Katakana — Data Entry Keyboard	2716		2973	2955

3276 Control Unit/Display Station — IBM World Trade Europe/Middle East/Africa (Additions) (Sheet 1 of 2)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade E/ME/A		2999		
N	220V ac — 50 Hz		2813		
Choose one	240V ac — 50 Hz		2801		
O (Germany only)	Communication Cable — D1200S/D2400S Switched or Direct Call Facility Service (Germany only)		2899		
O (UK only)	Communication Cable — Datel 600 Switched Service (UK only)		2835		
O (Germany only)	Dial Disconnect Switch — D1200S/D2400S Switched Service (Germany only)		2898	2899	
N Choose one	Machine Nomenclature				
	English (UK)		2927		
	English (US)		2924		
	French		2928		
	German		2929		
	Spanish/Spanish Speaking		2931		
	Italian		2932		
N Choose one	Character Set Language				
	English (UK)		2758		
	Austrian/German		2757		
	Austrian/German (Alternate)		2748		
	Belgian		2771		
	Danish/Norwegian		2762		
	Danish/Norwegian (Alternate)		2742		
	Finnish/Swedish		2763		
	Finnish/Swedish (Alternate)		2743		
	French		2770		
	Italian		2768		
	Portuguese		2749		
	Spanish		2760		
	Spanish (Alternate)		2740		
	International		2750		
	English (US)/EBCDIC (WT)		2756		

3276 Control Unit/Display Station – IBM World Trade Europe/Middle East/Africa (Additions) (Sheet 2 of 2)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N Choose one	Keyboard Language				
	English (UK)		2958	2758	
	Austrian/German		2957	2748 or 2757	
	Belgian		2971	2771	
	Danish		2965	2762 or 2742	
	Finnish		2963	2763 or 2743	
	French (AZERTY)		2964	2770	
	French (QWERTY)		2970	2770	
	Italian		2968	2768	
	Norwegian		2966	2742 or 2762	
	Portuguese		2959	2749	
	Spanish		2960	2760	
	Swedish		2967	2743 or 2763	
	International		2950	2750	
	English (US)		2956	2756	
	EBCDIC (WT)		2951	2756	

3278 Display Station — IBM

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
O	Audible Alarm	1090			
O	75-key Typewriter-like Keyboard — EBCDIC	4621		9082	
	75-key Data Entry Keyboard — EBCDIC	4622		9082	
	75-key Data Entry Keypunch-like Keyboard — EBCDIC	4623		9082	
	75-key Typewriter-like Keyboard — ASCII	4624		9084	
	[1] 87-key Typewriter-like Keyboard — EBCDIC (12 additional PF keys)	4627		9082	
	[1] 87-key Typewriter-like Keyboard — ASCII (12 additional PF keys)	4628		9084	
O	[4] Keyboard Cable — 1.8 metres (6 ft)		9399		
O	Keyboard Numeric Lock	4690		4622, 4623, or 2716	2715, 2717 4621, 4627 4628, 4624
O	Security Keylock	6340			
O	Selector Light Pen	6350			
O	[1] Magnetic Reader Control	4999		Any Keyboard	
N Choose one	[2] Power Plug — Locking (120V ac, 60 Hz)		9890		
	[2] Power Plug — Nonlocking (120V ac, 60 Hz)		9891		
N Choose one	Character Set — EBCDIC		9082	4621, 4622, 4623, 4627	2715, 2716, 2717, 4624, or 4628
	Character Set — ASCII B		9084	4624, 4628	2715, 2716, 2717, 4621, 4622, 4623, 4627
O	[3] Power Cable — 1.8 metres (6 ft)		9511		
	[3] Power Cable — 3.7 metres (12 ft)		9512		
	[3] Power Cable — 4.5 metres (15 ft)		9513		
O	Switch Control Unit	1720			
O	[1] Magnetic Slot Reader	5005		4999	

Legend:

[1] = Available when attached to 3274 only.

[2] = 120V ac, 1 Phase, 60 Hz (US/Canada)

[3] = 2.8 metres (9 ft) normally supplied.

[4] = 91 centimetres (3 ft) normally supplied.

3278 Display Station — IBM World Trade Americas/Far East (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade A/FE except Canada		2998		
Choose one 50 Hz or 60 Hz voltage	100V ac — 50 Hz		2804		
	110V ac — 50 Hz		2805		
	200V ac — 50 Hz		2806		
	220V ac — 50 Hz		2813		
	230V ac — 50 Hz		2821		
	240V ac — 50 Hz		2801		
	100V ac — 60 Hz		2730		
	110V ac — 60 Hz		2822		
	120V ac — 60 Hz		2800		
	127V ac — 60 Hz		2823		
N Choose one	Machine Nomenclature				
	Brazilian/Portuguese		2933		
	Canadian/English		2934		
	Canadian/French		2935		
	Japanese		2930		
	Spanish Speaking		2931		
	English (US)		2924		
2 N	Character Set Language				
	Brazilian/Portuguese		2775		
	1 Canadian/French		2777		
	Japanese (English)		2755		
	Japanese (Katakana)		2773		
	Spanish Speaking		2769		
	English (US)/EBCDIC (WT)		2756		
	International		2750		
O	Keyboard Languages				
	Brazilian/Portuguese		2975	2775	2715, 2716, 2717
	1 Canadian/French		2977	2777	2715, 2716, 2717
	Japanese (English)		2955	2755	4621, 4627
	Japanese (Katakana)		2973	2773	4621, 4622, 4623, 4627
	Spanish Speaking		2969	2769	2715, 2716, 2717
	English (US)		2956	2756	2715, 2716, 2717
	EBCDIC (WT)		2951	2756	2715, 2716, 2717
	International		2950	2750	2715, 2716, 2717
O	76-key Japanese English/Japanese Katakana Typewriter-like Keyboard	2715		2955 or 2973	
	76-key Japanese Katakana — Data Entry Keyboard	2716		2973	2955
	88-key Japanese English/Japanese **1** Katakana Typewriter-like Keyboard	2717		2955 or 2973	

Legend:

1 = Available when attached to 3274 only.

2 = When attached to a 3276, the character set on the 3278 must be the same as the character set on the 3276.

3278 Display Station — IBM World Trade Europe/Middle East/Africa (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade E/ME/A		2999		
N	220V ac — 50 Hz		2813		
Choose one	240V ac — 50 Hz		2801		
N	Machine Nomenclature				
Choose one	English (UK)		2927		
	English (US)		2924		
	French		2928		
	German		2929		
	Spanish/Spanish Speaking		2931		
	Italian		2932		
N	Character Set Language				
Choose one	English (UK)		2758		
	Austrian/German		2757		
	Austrian/German (Alternate)		2748		
	Belgian		2771		
	Danish/Norwegian		2762		
	Danish/Norwegian (Alternate)		2742		
	Finnish/Swedish		2763		
	Finnish/Swedish (Alternate)		2743		
	French		2770		
	Italian		2768		
	Portuguese		2749		
	Spanish		2760		
	Spanish (Alternate)		2740		
	International		2750		
	English (US)/EBCDIC (WT)		2756		
O	Keyboard Language				
	English (UK)		2958	2758	
	Austrian/German		2957	2748 or 2757	
	Belgian		2971	2771	
	Danish		2965	2762 or 2742	
	Finnish		2963	2763 or 2743	
	French (AZERTY)		2964	2770	
	French (QWERTY)		2970	2770	
	Italian		2968	2768	
	Norwegian		2966	2742 or 2762	
	Portuguese		2959	2749	
	Spanish		2960	2760	
	Swedish		2967	2743 or 2763	
	International		2950	2750	
	English (US)		2956	2756	
	EBCDIC (WT)		2951	2756	

3287 Printer — IBM

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	**1** 3271/3272 Attachment	8330			8331
Choose one	**2** 3274/3276 Attachment	8331			8330
N	**3** Power Plug — Locking		9890		
Choose one	**3** Power Plug — Nonlocking		9891		
4 O	Power Cable — 1.8 metres (6 ft)		9511		
Choose one	Power Cable — 3.7 metres (12 ft)		9512		
	Power Cable — 4.5 metres (15 ft)		9513		
N	Character Set — EBCDIC		9082		
Choose one	Character Set — ASCII B		9084		9660
N Choose one	Mono Case		9384	8330, and 9082 or 9084	9385
	Dual Case		9385	8330 and 9082	9660, 9384
O	Variable Width Forms Tractor Covers		9850		
O	**5** Friction Feed Paper Handling		9180		
O	Line Spacing 8 per inch		9410		
O	Page Length Control		9550	8700	
O	Audible Alarm		9025		
O	SCS (SNA Character String)		9660	8700, 8331	8330 or 9084
O	X Print Error Indication		9488		
N	480-Character Print		9520	8330	8331
Choose one	960-Character Print		9521	8331	8330
	1920-Character Print		9522	8330, 8331	
	2560-Character Print		9523	3880, 8331	8330
	3440-Character Print		9524	3880, 8331	8330
O	Variable Width Forms Tractor	8700		9850	
O	Extended Print Buffer	3880		8331	8330
O	**6** Forms Stand — Accessory	4450			

Legend:
1 = To be attached to the 3274 Type B Terminal Adapter.
2 = To be attached to the 3274 Type A Terminal Adapter or base ports.
3 = 120V ac, 1-Phase, 3-wire, 60 Hz (US/Canada)
4 = 2.8 metres (9 ft) normally supplied.
5 = Required if Special Feature 8700 is not ordered.
6 = Accessory Item-Purchase only

3287 Printer — IBM World Trade Americas/Far East (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade A/FE except Canada		2998		
N	100V ac — 50 Hz		2804		
Choose one	110V ac — 50 Hz		2805		
50 Hz or 60 Hz	200V ac — 50 Hz		2806		
voltage	220V ac — 50 Hz		2813		
	230V ac — 50 Hz		2821		
	240V ac — 50 Hz		2801		
	100V ac — 60 Hz		2730		
	110V ac — 60 Hz		2822		
	120V ac — 60 Hz		2800		
	127V ac — 60 Hz		2823		
N Choose one (Canada only)	Power Plug — Locking — 60 Hz, 120V only (Canada only)		9890		
	Power Plug — Nonlocking — 60 Hz, 120V only (Canada only)		9891		
N Choose one	Machine Nomenclature				
	Brazilian/Portuguese		2933		
	■ Canadian/French		2935		
	English (US)		2924		
	Japanese		2930		
	Spanish Speaking		2931		
N Choose one	Character Set Language				
	■ Canadian/French		2777	8331	8330
	Brazilian/Portuguese		2775	8331	8330
	French		2770	8330	8331
	International		2750	8331	8330
	Japanese (English)		2755	8331	8330
	Japanese (Katakana)		2773	8330 or 8331	
	Portuguese		2749	8330	8331
	Spanish Speaking		2769	8330 or 8331	
	English (UK)		2758	8330 or 8331	
	English (US)		2756	8330 or 8331	

Legend:
■ = Available when attached to 3274 only.

3287 Printer — IBM World Trade Europe/Middle East/Africa (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade E/ME/A		2999		
N	220V ac — 50 Hz		2813	■ 2759	
Choose one	240V ac — 50 Hz		2801	■ 2759	
N	Machine Nomenclature				
Choose one	English		2927		
	French		2928		
	German		2929		
	Spanish		2931		
	Italian		2932		
N	Character Set Language				
Choose one	Austrian/German		2757	8331	8330
	Austrian/German (Alternate)		2748	8330 or 8331	
	Belgian		2771	8330 or 8331	
	Danish/Norwegian		2762	8331	8330
	Danish/Norwegian (Alternate)		2742	8330 or 8331	
	Finnish/Swedish		2763	8331	8330
	Finnish/Swedish (Alternate)		2743	8330 or 8331	
	French		2770	8330 or 8331	
	Italian		2768	8330 or 8331	
	International		2750	8331	8330
	Portuguese		2749	8330 or 8331	
	Spanish		2760	8331	8330
	Spanish (Alternate)		2740	8330 or 8331	
	English (UK)		2758	8330 or 8331	
	English (US)		2756	8330 or 8331	

Legend:

■ = Order 2759 for Germany only

3289 Line Printer — IBM

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
1 N Choose one	Power Plug — Locking		9890		
	Power Plug — Non-locking		9891		
2 O Choose one	Power Cable — 1.8 metres (6 ft)		9511		
	Power Cable — 3.7 metres (12 ft)		9512		
	Power Cable — 4.5 metres (15 ft)		9513		
3 N Choose one	48-Character Set Print Belt — EBCDIC		9490		
	64-Character Set Print Belt — EBCDIC		9491		
	94-Character Set Print Belt — EBCDIC		9492		
	48-Character Set Print Belt — ASCII B		9493		
	64-Character Set Print Belt — ASCII B		9494		
	94-Character Set Print Belt — ASCII B		9495		
O	Print Error Indication		9488		
N Choose one	960-Character Print		9521		
	1,920-Character Print		9522		
	2,560-Character Print		9523		
	3,440-Character Print		9524		
O	Audible Alarm	1390			
4 O	48-Character Set Print Belt — EBCDIC (Additional)	5821			
	64-Character Set Print Belt — EBCDIC (Additional)	5822			
	94-Character Set Print Belt — EBCDIC (Additional)	5823			
	48-Character Set Print Belt — ASCII B (Additional)	5811			
	64-Character Set Print Belt — ASCII B (Additional)	5812			
	94-Character Set Print Belt — ASCII B (Additional)	5813			

Legend:

1 = 120V ac, 1 phase, 3 wire, 60 Hz (US/Canada).

2 = 2.8 metres (9 ft) normally supplied.

3 = Available at time of manufacturing only

4 = Accessory Item — Purchase only

3289 Line Printer — IBM World Trade Americas/Far East (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade A/FE except Canada		2988		
N	100V ac — 50 Hz		2804		
Choose one	110V ac — 50 Hz		2805		
50Hz or 60 Hz	200V ac — 50 Hz		2806		
voltage	220V ac — 50 Hz		2813		
	230V ac — 50 Hz		2821		
	240V ac — 50 Hz		2801		
	100V ac — 60 Hz		2730		
	110V ac — 60 Hz		2822		
	120V ac — 60 Hz		2800		
	127V ac — 60 Hz		2823		
O Choose one (Canada only)	Power Plug — Locking — 60 Hz, 120V only (Canada only)		9890		
	Power Plug — Nonlocking — 60 Hz, 120V only (Canada only)		9891		
N Choose one	Machine Nomenclature				
	Brazilian/Portuguese		2933		
	English		2927		
	Canadian/French		2935		
	Japanese		2930		
	Spanish Speaking		2931		
N Choose one each from Groups A and B	Print Belt Character Set				
	Group A				
	48-Character Set		2797		
	64-Character Set		2798		
	94-Character Set		2799		
	116-Character Set — (Canadian/French only)		2820		
	127-Character Set — (Japanese(Katakana) only)		2869		
1	Group B				
	Japanese (English)		2755		
	English (US)		2756		
	Spanish Speaking		2769		
	2 Japanese (Katakana)		2773		
	Brazilian/Portuguese		2775		
	3 Canadian/French		2777		
	International		2750		

Legend:

1 = Group B belts are not interchangeable.

2 = The 127-character Japanese (Katakana) belt is not interchangeable with any other belt.

3 = 116-character Canadian/French is interchangeable with 48, 64, 94 Character Canadian/French belts.

3289 Line Printer — IBM World Trade Europe/Middle East/Africa (Additions)

Necessary (N) or Optional (O)	Feature Name	Special Feature Code	Specify Feature Code	Prerequisite (Must be ordered with):	Mutually Exclusive (Must not be ordered with):
N	Power — World Trade E/ME/A		2999		
N	220V ac — 50 Hz		2813	▮1 2759	
Choose one	240V ac — 50 Hz		2801	▮1 2759	
N	Machine Nomenclature				
Choose one	English		2927		
	French		2928		
	German		2929		
	Spanish		2931		
	Italian		2932		
N	Print Belt Character Set				
Choose one	Group A				
each from	48-Character Set		2797		
Groups A	64-Character Set		2798		
and B	94-Character Set		2799		
▮2	Group B				
	International		2750		
	English (US)		2756		
	Austrian/German (Alternate)		2748		
	Austrian/German		2757		
	English (UK)		2758		
	Portuguese		2749		
	Spanish		2760		
	Spanish (Alternate)		2740		
	Finnish/Swedish		2763		
	Finnish/Swedish (Alternate)		2743		
	Danish/Norwegian		2762		
	Danish/Norwegian (Alternate)		2742		
	Italian		2768		
	Spanish Speaking		2769		
	French		2770		
	Belgian		2771		

Legend:
▮1 = Order SC 2759 for Germany only.
▮2 = Group B Belts are not interchangeable.

Chapter 4. Physical Planning

Notes 5, 7

3201 Selector Channel

3202 Byte Multiplexer Channel

3203 Block Multiplexer Channel

3204 Control Unit

(Note 6)   3205 Channel-to-Channel Adapter

(Note 7)   3206 Sequence and Control (EPO)

| Type A Terminal Adapters | 3274 1A, 1B | Type B Terminal Adapters |

3287 1, 2

h or l

1 500 m (4,920 ft)

1 500 m (4,920 ft)

1 500 m (4,920 ft)

3289 1, 2

h or l

610 m (2,000 ft)

610 m (2,000 ft)

610 m (2,000 ft)

610 m (2,000 ft)

610 m (2,000 ft)

h or l   3284 1, 2

h or l   3286 1, 2

h or l
(Note 4)

h or l
(Note 4)

h or l   3288 2

h or l   3287 1, 2

3278 1, 2, 3, 4

3277 1, 2

Keyboard   (Note 3)

(Note 3)   Keyboard

Selector Light Pen   (Note 1)

(Note 1)   Selector Light Pen

(Note 6)

(Note 2)

Magnetic Slot Reader

ID Card Reader

Refer to notes on following page.

Group No.	No. of Cables	From	To	Max Length metres	(feet)	Notes
h or l	1	3277, 3284, 3286, 3288, 3287 (Category A)	3274	610	(2000)	4
h or l	1	3278, 3287 (Category B), 3289	3274	1500	(4920)	4
3201	2	3274	Selector Channel	61	(200)	5, 7
3202	2	3274	Byte Multiplexer Channel	61	(200)	5, 7
3203	2	3274	Block Multiplexer Channel	61	(200)	5, 7
3204	2	3274	Control Unit	61	(200)	5, 7
3205	2	3274	Channel-to-Channel Adapter	61	(200)	5, 7
3206	1	3274	Channel	46	(150)	

Notes:

1. Fixed cable length of 1.2 metres (4 feet) supplied with selector pen.
2. Fixed cable length of 76 centimetres (2-1/2 feet) supplied with ID card reader.
3. Fixed cable length of 91 centimetres (3 feet) supplied with keyboard.
4. Customer supplied, installed and maintained. Cable h is for indoor use, and cable l is for both outdoor and indoor use. See "Coaxial Cables" in Section 6 of the 3270 IMPP, GA27-2787, for ordering information and specifications.

   Caution: When installing outdoor cables, lightning protection precautions should be taken as specified in the 3270 IMPP to avoid damage to equipment from electrical surges during lightning storms.

   Lightning protectors should not be installed in areas where unauthorized personnel may come in contact with them. They should not be installed, have maintenance performed on them, connected or disconnected, or handled in any way during periods of lightning activity; the same holds true for the coaxial cable that runs from the protector to the terminal. The protectors should be installed so that they can be easily reached for maintenance and elements can be readily replaced.

   Surge protectors vary in initial cost, cost of maintenance, stability, useful life, and fail-safe protection. Rural Electrifica-tion Administration Telephone Engineering and Construction Manual — Section 823, issue #2 dated January 1976, recommends the use of gas-type protectors because of reliability and lower maintenance costs.

   Only the gas element protector is available from IBM.
5. Total cable length of 61 metres (200 feet) is available to attach all control units, unless modified by cabling schematics of individual processing units or control units. Refer to *IBM System 370 Installation Manual — Physical Planning*, GC22-7004, or *IBM System 370 World Trade Installation Manual — Physical Planning*, GC19-0004, for specific channel cabling information.
6. A free-standing magnetic slot reader may be plugged into a 3278 unit. This unit is equipped with a 1.5-metre (59 inches) cable for attachment to a stub cable in the 3278.
7. The local attachment cable for the 3274 Control Unit must be ordered via cable order. The same cables used for the 3272 Control Unit may be used for the 3274 Control Unit.
8. Magnetic slot reader operating environment is as follows:

   Temperature 0.6°C to 51.7°C (33°F to 125°F)
   Relative Humidity 5 — 95%
   Max Wet Bulb 30°C (85°F)

   The magnetic slot reader can operate in an indoor industrial environment. Also, holes in the base plate allow for the attachment of the unit to a horizontal or vertical mounting surface.

3274 CONTROL UNIT, MODEL 1C (REMOTE)
CABLING SCHEMATIC

Communications
Cable (Note 6)

To/From
Communication
Lines

Type A Terminal Adapters	3274 1C	Type B Terminal Adapters

1 500 m (4,920 ft)
1 500 m (4,920 ft)
1 500 m (4,920 ft)

610 m (2,000 ft)
610 m (2,000 ft)
610 m (2,000 ft)
610 m (2,000 ft)

3287 1, 2	h or I

3289 1, 2	h or I

h or I
3284 1, 2

h or I
3286 1, 2

h or I
(Note 4)

h or I
(Note 4)

h or I
3288 2

h or I
3287 1, 2

3278 1, 2, 3, 4

3277 1, 2

Keyboard	(Note 3)

(Note 3)
Keyboard

Selector Light Pen	(Note 1)

(Note 1)
Selector Light Pen

: (Note 5)

(Note 2)

Magnetic Slot Reader

ID Card Reader

Refer to notes on following page.

4-4

Group No.	No. of Cables	From	To	Max Length metres	(feet)	Notes
h or I	1	3277, 3284, 3286, 3288, 3287 (Category A)	3274	610	(2000)	4
h or I	1	3278, 3287 (Category B), 3289	3274	1500	(4920)	4
		3274	Modem	12.2	(40)	6

Notes:

1. Fixed cable length of 1.2 metres (4 feet) supplied with selector light pen.
2. Fixed cable length of 76 centimetres (2-1/2 feet) supplied with ID card reader.
3. Fixed cable length of 91 centimetres (3 feet) supplied with keyboard.
4. Customer supplied, installed, and maintained. Cable h is for indoor use, and cable I is for both outdoor and indoor use. See "Coaxial Cables" in Section 6 of 3270 IMPP, GA27-2787, for ordering information and specifications.

   Caution: When installing outdoor cables lightning protection precaution should be taken as specified in the 3270 IMPP to avoid damage to equipment from electrical surges during lightning storms.

   Lightning protectors should not be installed in areas where unauthorized personnel may come in contact with them. They should not be installed, have maintenance performed on them, connected or disconnected, or handled in any way during periods of lightning activity; the same holds true for the coaxial cable that runs from the protector to the terminal. The protectors should be installed so that they can be easily reached for maintenance and elements can be readily replaced.

   Surge protectors vary in initial cost, cost of maintenance, stability, useful life, and fail-safe protection. Rural Electrification Administration Telephone Engineering and Construction Manual — Section 823, issue #2 dated January 1976, recommends the use of gas-type protectors because of reliability and lower maintenance costs.

   Only the gas element protector is available from IBM.

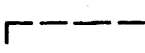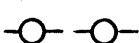5. A free-standing magnetic slot reader may be plugged into a 3278 unit. This unit is equipped with a 1.5-metre (59 inches) cable for attachment to a stub cable in the 3278.
6. IBM supplies the cable that connects the 3274 Control Unit to the external modem or communication lines with the unit. See Appendix F for Cable Terminations. This cable is customer-installed. Unless a different length is specified, IBM supplies a 6.1 metre (20 feet) cable. If a cable length other than 6.1 metres (20 feet) is needed, it must be specified. See your IBM Marketing Representative.

3276 CONTROL UNIT/DISPLAY STATION, MODELS 1, 2, 3, 4, 11, 12, 13, AND 14 (REMOTE) CABLING SCHEMATIC
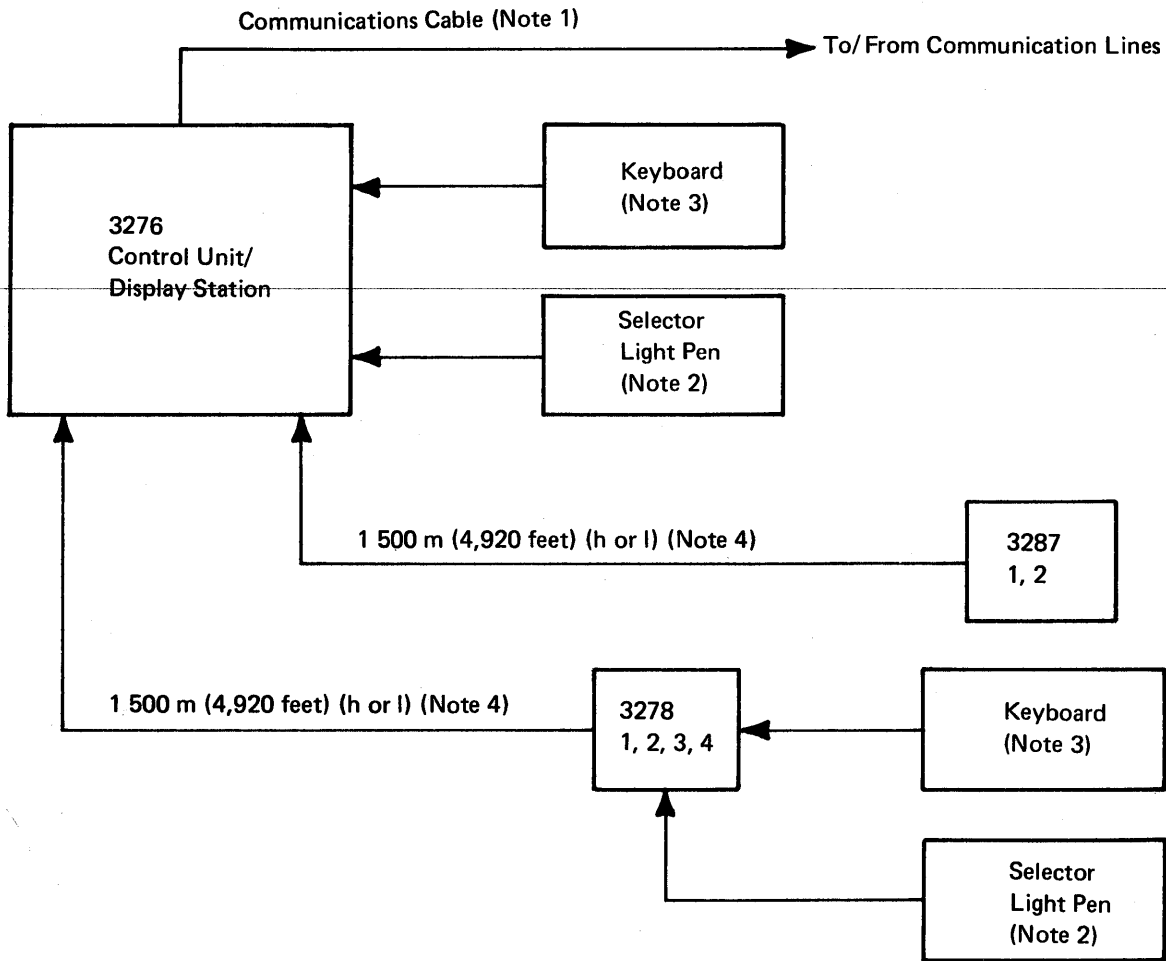
Notes:
1. With the 3276 Control Unit/Display Station, IBM supplies the cable that connects the 3276 to the Communication Lines. See Appendix F for cable terminals. Unless a different cable is specified, IBM supplies a 6.1-metre (20 feet) cable; included with this cable is a short 30.5-centimetre (12 inches) test cable. If a cable length other than 6.1 metres (20 feet) is needed, it must be specified. See your IBM Marketing Representative.
2. With the selector light pen, IBM supplies a 1.22-metre (4 feet) cable that connects the pen to a 3276 or a 3278. This cable is connected to the selector light pen and the display station prior to delivery.
3. With each keyboard, IBM supplies a 0.91-metre (3 feet) cable that is hard-wired into the keyboard. When installing the keyboard, the customer plugs the other end of the cable into the 3276 or 3278.
4. The coaxial cable (h or l) is supplied, installed, and maintained by the customer. Cable h is for indoor use, and cable l is for both outdoor and indoor use. See "Coaxial Cables" in Section 6 of the 3270 IMPP, GA27-2787, for ordering information and specifications.

Caution: When installing outdoor cables, lightning protection precautions should be taken as specified in the 3270 IMPP to avoid damage to equipment from electrical surges during lightning storms.

Lightning protectors should not be installed in areas where unauthorized personnel may come in contact with them. They should not be installed, have maintenance performed on them, connected or disconnected, or handled in any way during periods of lightning activity; the same holds true for the coaxial cable that runs from the protector to the terminal. The protectors should be installed so that they can be easily reached for maintenance and elements can be readily replaced.

Surge protectors vary in initial cost, cost of maintenance, stability, useful life, and fail-safe protection. Rural Electrification Administration Telephone Engineering and Construction Manual — Section 823, issue #2 dated January 1976, recommends the use of gas-type protectors because of reliability and lower maintenance costs.

Only the gas element protector is available from IBM.

UNIT SPECIFICATIONS

This section provides the specifications for the 3274, 3276, 3278, 3287, and 3289 as part of the 3270 Information Display System.

Metric Conversions

In this manual, English units converted into metric units are rounded to the nearest whole number; or to the nearest decimal place, where decimals are used.
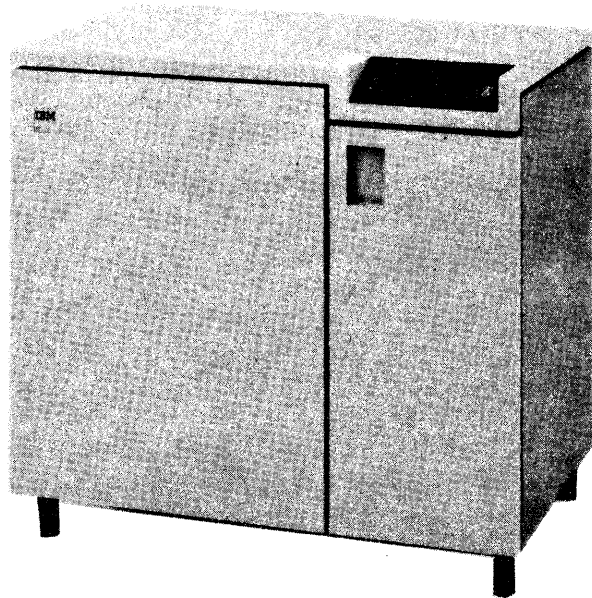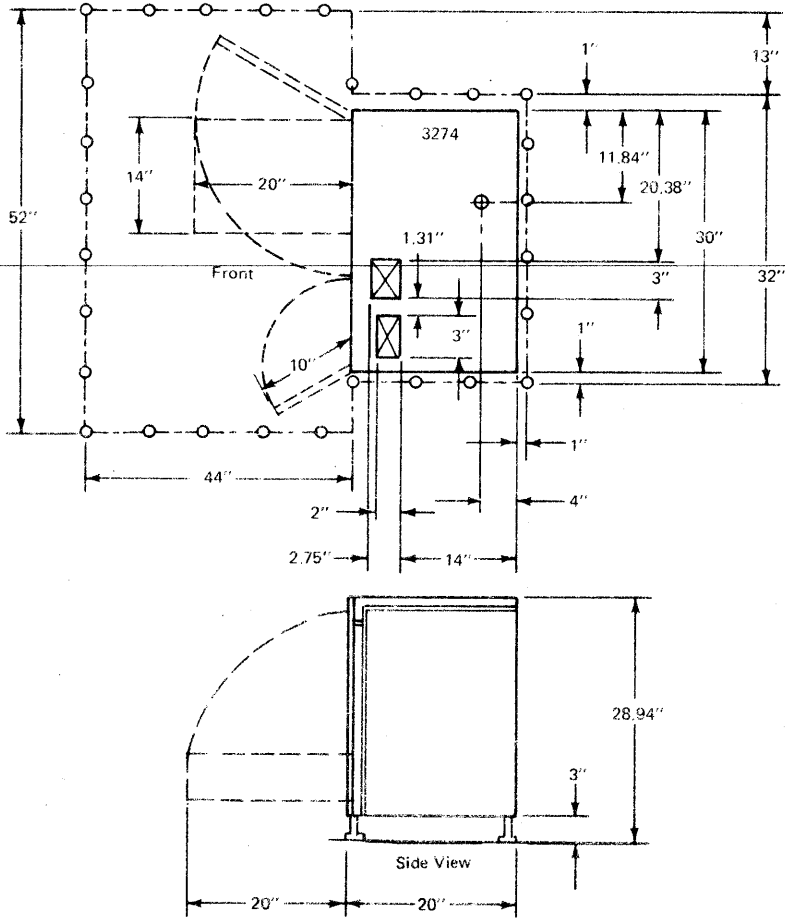
Symbols

The symbols that are used in the plan view are shown below:

⊠	Cable Entry and Exit Area in Base of Unit	┌ − − − −	Optional Equipment Outline
⊕	Power Cord Exit	−○− −○−	Service Area Boundary
▨	Air Intake Area	+	Casters
		○	Leveling Pads or Glides
	Swinging Gate	⊥	Nonraised Floor Cable Exit*
	Standard Equipment Outline	CP	Control Panel

*For table- or counter-top terminals, the space between the bottom of the terminal and the table or counter surface permits signal cable and power cords to enter and exit from any direction. Thus, cutouts in table or counter are not necessary.

Note: *Plan views are not drawn to scale; the dimensions indicated are accurate.*

3274 CONTROL UNIT, MODELS 1A, 1B, and 1C
Plan View

Centimetres	(Inches)
2.54	(1)
3.33	(1.31)
5.08	(2)
7	(2.75)
7.62	(3)
10.16	(4)
25	(10)
30	(11.84)
33	(13)
35.56	(14)
50.80	(20)
51.76	(20.38)
68.8	(27.1)
73.50	(28.94)
76.20	(30)
81.28	(32)
111.7	(44)
132	(52)

Side View

Design Model

3274 Control Unit Functional Clearances:

	cm	(Inches)	
Front	0	(0)	Dimensions are minimum requirements for
Rear	3	(1)	functional operation of the machine.
Left	3	(1)	These dimensions allow sufficient air flow
Right	3	(1)	to provide cooling.
Top	0	(0)	

Bottom   The feet provide space between the bottom of the unit and
the supporting surface to allow airflow for cooling. Care
should be taken that papers, books, etc., do not impede
the air flow in this space.

Note: *If unit is installed with minimum clearance, service access must be provided.*

Specifications

Dimensions:

	F	S	H
cm	76.2	50.8	73.5
(Inches)	(30)	(20)	(28.94)

Service Clearances:

	F	L	R	Rt	Top
cm	111.8				0
(Inches)	(44)				(0)

Weight: 56.7kg (125 lb)

Heat Output: 246 kcal/hr (975 BTU/hr)

Airflow: Forced Air Cooling

Power Requirements:

kVA	0.286	Power Cord Style: See Appendix D.
Phases	1	Power Cord Length: See Appendix B.
		Plug Type: See Appendix A.

Voltages That Can Be Specified

	60 Hz								50 Hz					
	100	110	120	127	200	208	220	240	100	110	200	220	230	240
IBM (United States/Canada)			X			X		X						
IBM World Trade Americas/Far East	X	X	X	X	X	X	X	X	X	X	X	X	X	X
IBM World Trade Europe/Middle East/Africa												X		X

*Model 1C only.

3276 CONTROL UNIT/DISPLAY STATION, MODELS 1, 2, 3, 4, 11, 12, 13, AND 14

Plan View

17" – 75 Keys
17" – 76 Keys Kat
19" – 87 Keys
20" – 88 Keys Kat

Front

2" x 3"

6"

2"

16"

16"

13"

3276

4 1/4"

Light Pen Cable

30"

21"

12"
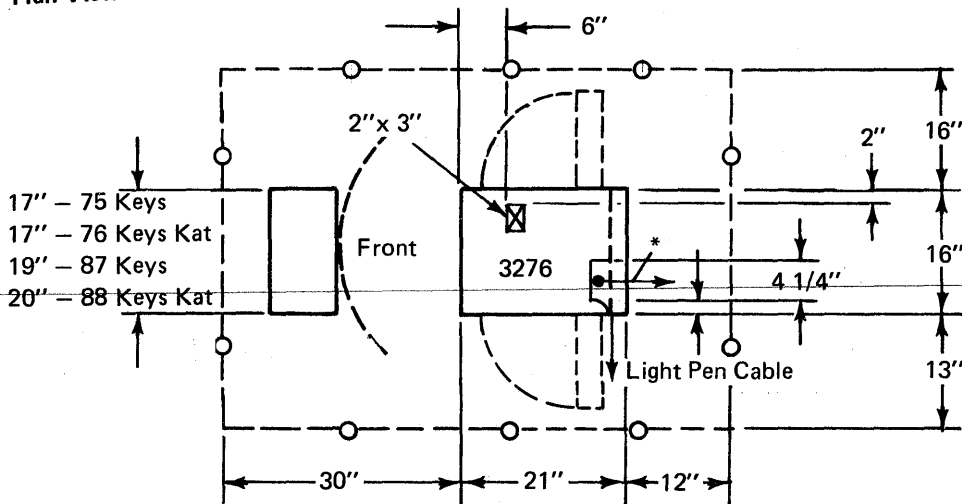
*I/O area for 3278 Display and/or 3287 Printer attachment (7 units max.)
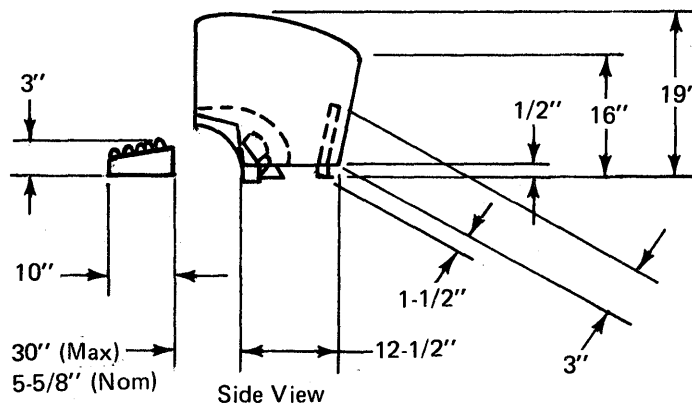
Centimetres	(Inches)
1.3	(1/2)
3.8	(1-1/2)
5.1	(2)
7.6	(3)
10.2	(4)
10.6	(4-1/4)
14.3	(5-5/8)
15.2	(6)
22.9	(9)
25.4	(10)
30.5	(12)
31.8	(12-1/2)
33	(13)
40.6	(16)
43.2	(17)
48.3	(19)
50.8	(20)
53.3	(21)
76.2	(30)

3"

10"

30" (Max)
5-5/8" (Nom)

Side View

1/2"

16"

19"

1-1/2"

12-1/2"

3"

Design Model

Display Unit Functional Clearances

	cm	(Inches)	
Front	0	(0)	Dimensions are minimum
Rear	3	(1)	requirements for functional
Right	8	(3)	operation of the machine.
Left	8	(3)	These dimensions allow
Top	15	(6)	sufficient airflow to provide cooling.

Bottom: The feet provide space between the bottom of the unit and the supporting surface to allow airflow for cooling. Care should be taken that paper, books, etc., do not impede the airflow in this space.

Note: *If unit is installed with minimum clearance; service access must be provided.*

Specifications

Dimensions:

	Front	Side (Note 1)	Height (Note 2)
cm	40.6	53.3	48.3
(Inches)	(16)	(21)	(19)

Service Clearances:

	Front (Note 3)	Left	Rear	Right	Top
cm	76.2	27.9	30.5	27.9	15.2
(Inches)	(30)	(11)	(12)	(11)	(6)

Weight (Note 4): 45kg (100 lb)

Heat Output: 194 kcal/hr (770 BTU/hr)

Airflow: Natural convection.

Power Requirements:

kVA	0.260
Phase	1

Notes:
1. This dimension does not include keyboard. See plan view.
2. The 3276 is installed on a customer-supplied desk or table. Recommended keyboard height (measured from the floor to the bottom of the 3276) is 66.0 cm (26 inches).
3. Keyboard feature adds 25.4 cm (10 inches) to front of display and can be moved up to 76.2 cm (30 inches) away from lower front of display.
4. Keyboard feature adds about 6kg (13 lb).

Voltages That Can Be Specified

	60 Hz				50 Hz					
	100	110	120	127	100	110	200	220	230	240
IBM (United States/Canada)			X							
IBM World Trade Americas/Far East	X	X	X	X	X	X	X	X	X	X
IBM World Trade Eurpoe/Middle East/Africa								X		X

Power Cord Style: See Appendix D.
Power Cord Length: See Appendix B.
Plug Type: See Appendix A.

3278 DISPLAY STATION, MODELS 1, 2, 3, AND 4
Plan View

17" — 75 Keys
17" — 76 Keys Kat
19" — 87 Keys
20" — 88 Keys Kat

Front

3278

6"

2"x 3"

2"

11"

16"

Light Pen Cable

13"

30"

21"

1"
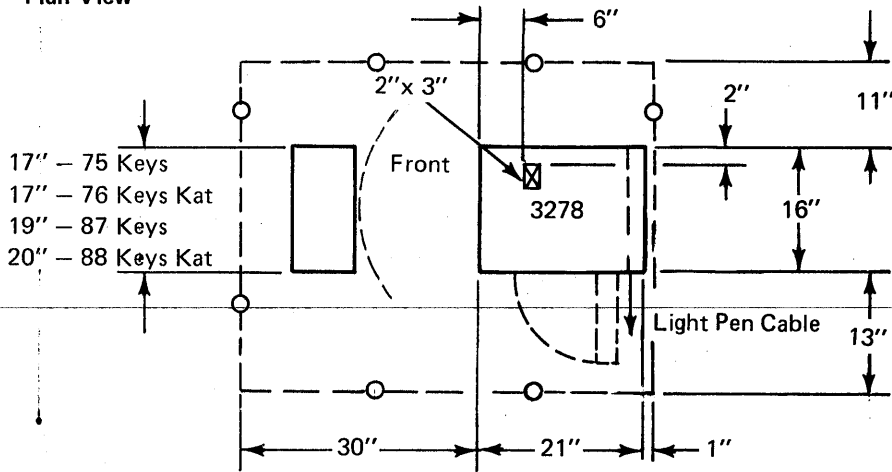
Centimetres	(Inches)
1.3	(1/2)
2.5	(1)
5.1	(2)
7.6	(3)
10.2	(4)
14.3	(5-5/8)
15.2	(6)
22.9	(9)
25.4	(10)
27.9	(11)
31.8	(12-1/2)
33	(13)
40.6	(16)
41.9	(16-1/2)
43.2	(17)
48.3	(19)
50.8	(20)
53.3	(21)
61.0	(24)
76.2	(30)

3"

1/2" 16" 19"

10"

30" Max
5-5/8" (Nom)

12-1/2"
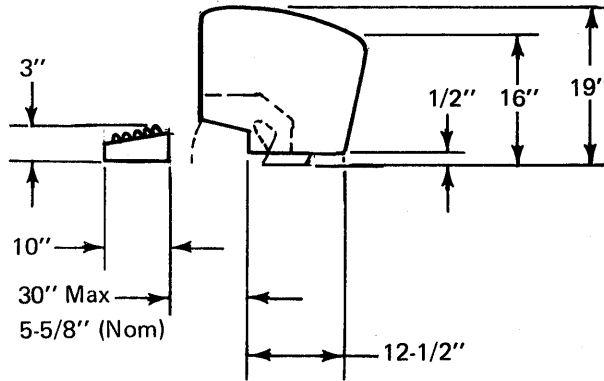
Side View
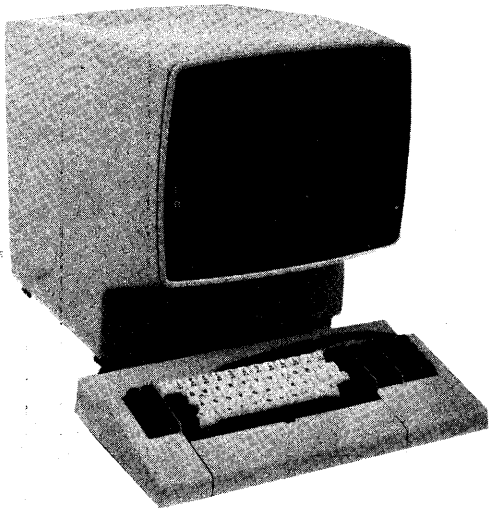
Display Unit Function Clearances:

	cm	(Inches)
Front	0	(0)
Rear	3	(1)
Right	8	(3)
Left	8	(3)
Top	15	(6)

Dimensions are minimum requirements for functional operation of the machine. These dimensions allow sufficient airflow to provide cooling.

Bottom: The feet provide space between the bottom of the unit and the supporting surface to allow airflow for cooling. Care should be taken that paper, books, etc., do not impede the airflow in this space.

Note: *If unit is installed with minimum clearance, service access must be provided.*

Design Model

Specifications

Dimensions:

	Front	Side (Note 1)	Height (Note 2)
cm	40.6	53.3	48.3
(Inches)	(16)	(21)	(19)

Service Clearances:

	Front (Note 3)	Left	Rear	Right	Top
cm	76.2	27.9	2.54	27.9	15.2
(Inches)	(30)	(11)	(1)	(11)	(6)

Weight (Note 4): 36.3kg (80 lb)

Heat Output: 106 kcal/hr (420 BTU/hr)

Airflow: Natural convection

Power Requirements:

kVA	0.155
Phase	1

Notes:
1. This dimension does not include keyboard. See plan view.
2. The 3278 is installed on a customer-supplied desk or table. Recommended keyboard height (measured from the floor to the bottom of the 3270) is 66.0 cm (26 inches).
3. Keyboard feature adds 25.4 cm (10 inches) to front of display and can be moved up to 76.2 cm (30 inches) away from lower front of display.
4. Keyboard feature adds about 6 kg (13 lb).

|	Voltages That Can Be Specified									
	60 Hz				50 Hz					
	100	110	120	127	100	110	200	220	230	240
IBM (United States/Canada)			X							
IBM World Trade Americas/Far East	X	X	X	X	X	X	X	X	X	X
IBM World Trade Europe/Middle East/Africa								X		X

Power Cord Style: See Appendix D.
Power Cord Length: See Appendix B.
Plug Type: See Appendix A.

3287 PRINTER, MODELS 1 AND 2
Plan View
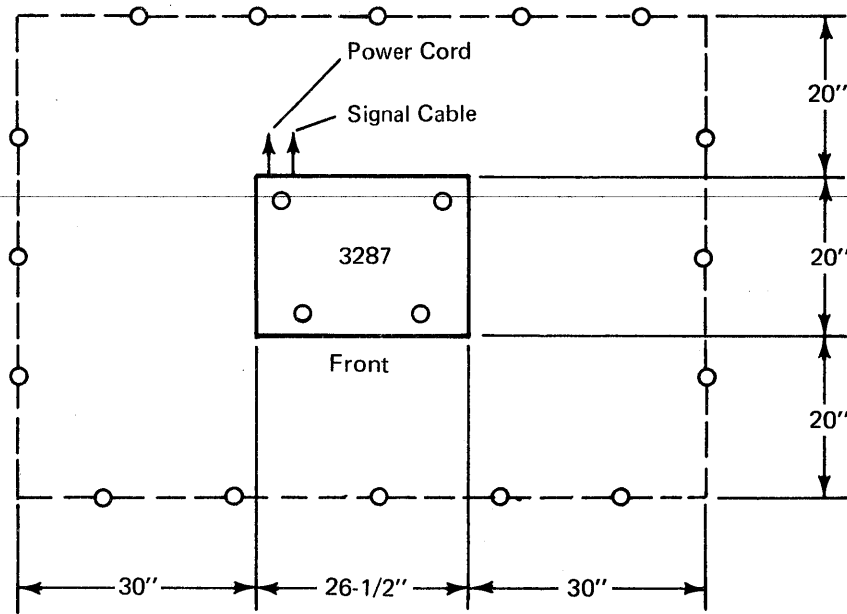
Centimetres	(Inches)
50.8	(20)
67.3	(26-1/2)
76.2	(30)

Power Cord

Signal Cable

3287

Front

20"

20"

20"

30"   26-1/2"   30"
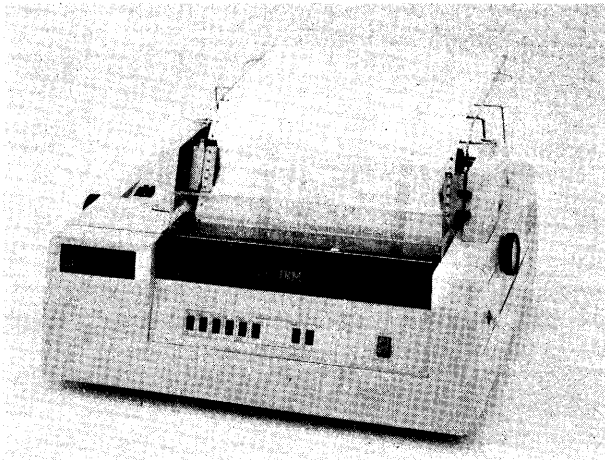
Design Model

Specifications

Dimensions:

	Front	Side	Height (Note 1)
cm	67.3	50.8	25.4
(Inches)	(26-1/2)	(20)	(10)

Service Clearances (Note 2)

	Front	Left	Rear	Right	Top
cm	50.8	76.2	50.8	76.2	101.6
(Inches)	(20)	(30)	(20)	(30)	(10)

Weight: 30.8kg (68 lb)

Heat Output: 215 kcal/hr (853 BTU/hr)

Airflow: 2m³/min (70 CFM)

Power Requirements:

kVA	0.25
Phase	1

Notes:
1. Height is 29.2 cm (11-1/2 inches) with forms tractor.
2. 102 cm (40 inch) clearance above the table (measured from the table) is needed for logic gate which swings up from the top of the unit.
3. The 76.2 cm (30 inches) on each side are needed for:
   Right — To adjust line space emitter timing.
   Left — To service page length control switch and power transformer.

	Voltages That Can Be Specified									
	60 Hz				50 Hz					
	100	110	120	127	100	110	200	220	230	240
IBM (United States/Canada)			X							
IBM World Trade Americas/Far East	X	X	X	X	X	X	X	X	X	X
IBM World Trade Europe/Middle East/Africa								X		X

Power Cord Style: See Appendix D.
Power Cord Length: See Appendix B.
Plug Type: See Appendix A.

3289 LINE PRINTER, MODELS 1 AND 2
Plan View
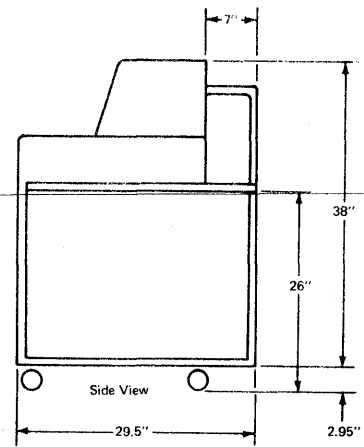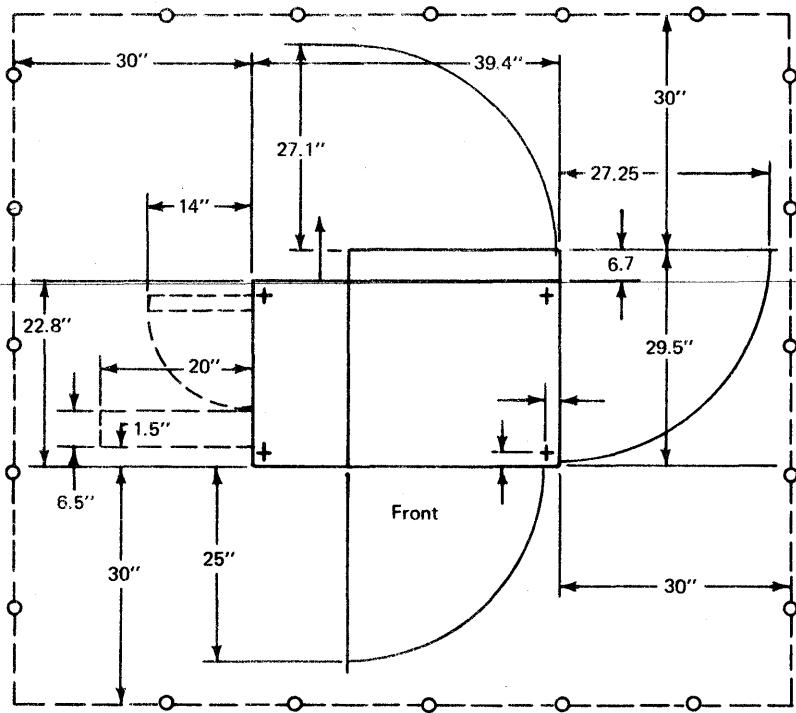
Note:

Common Cable: RG62A/U commercial type or
equivalent BNC Connectors.
(Customer provided and installed 1 500 m
(4,920 feet) maximum length.)
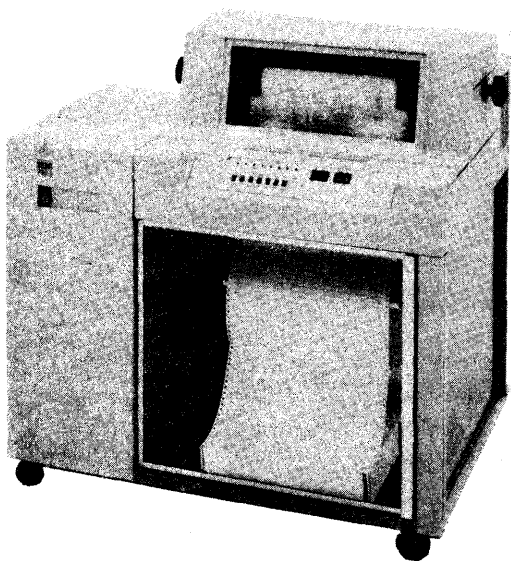
Design Model

Centimetres	(Inches)
3.81	(1.5)
7.5	(2.95)
16.5	(6.5)
17	(6.7)
18	(7.0)
36	(14.0)
51	(20.0)
58	(22.8)
60	(23.5)
64	(25.0)
66	(26.0)
69	(27.1)
69.6	(27.25)
75	(29.5)
76	(30.0)
96.5	(38.0)
100	(39.4)

Specifications

Dimensions:

	Front	Side	Height
cm	100	75	104
(Inches)	(39.4)	(29.5)	(40.95)

Service Clearances:

	Front	Rear	Left	Right
cm	76	76	76	76
(Inches)	(30)	(30)	(30)	(30)

Weight: 150 kg (330 lb)

Heat Output: 348 kcal/hr (1380 BTU/hr)

Airflow: Convection

Power Requirements:

kVA	0.6
Phase	1

	Voltages That Can Be Specified									
	60 Hz				**50 Hz**					
	100	110	120	127	100	110	200	220	230	240
IBM (United States/Canada)			X							
IBM World Trade Americas/Far East	X	X	X	X	X	X	X	X	X	X
IBM World Trade Europe/Middle East/Africa								X		X

Appendix A. Power Cord Plug Types

IBM supplies power cords with attached plugs for the United States and for most IBM World Trade Corporation countries (Figure A-1, A-2). The customer must provide the corresponding power outlet receptacle. For the 3276, 3278, 3287, and 3289 units in the United States or Canada, the customer may specify one of the following power cords (Figure A-3):

With Nonlocking Plug	NEMA 5-15P	125V ac rating	Specify Code 9891
With Locking Plug	NEMA L5-15P	125V ac rating	Specify Code 9890

For other World Trade countries, IBM supplies the power cord with attached plug (nonlocking) that corresponds to the power outlet receptacle that is most used in that country. Refer to Appendix C, Figures A to K (B, F, G, and I not used), for illustrations of power cord plugs that are supplied and for the ampere/voltage rating of these plugs.

Plug Type	3274 *		3276	3278	3287	3289
	1A, 1B	1C				
A	X					
H		X	X	X	X	X
J		X	X	X	X	X
K	X	X				
L	X	X				
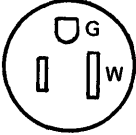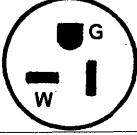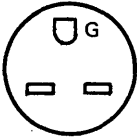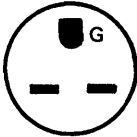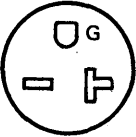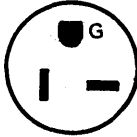
*Order watertight plug (if needed) by Feature Code for 3274.

Figure A-1. Power Cord Plugs Supplied in U.S. and Canada

Provided by IBM					Provided by Customer					
	Plug Cap Types				Service Rating					
Plug Type	Water-Proof	Non-Lock	Lock	IBM Reference	Volts	Amps	Phase	Wires	In-Line Connector	Receptacle
A	3720			Russell-Stoll	208/240	20	1	3	3913	3743
H		5-15P		NEMA	125	15	1	3	5-15R	5-15R
J			L5-15P	NEMA	125	15	1	3	L5-15R	L5-15R
K		6-15P		NEMA	208/240	15	1	3	6-15R	6-15R
L			L6-15P	NEMA	208/240					

Figure A-2. Descriptions of Plugs and Receptacles

Nonlocking Plugs and Receptacles

	15 Amperes		20 Amperes	
	Receptacle	Plug	Receptacle	Plug
125V	5-15R	5-15P	5-20R	5-20P
250V	6-15R	6-15P	6-20R	6-20P

Locking Type Plugs and Receptacles
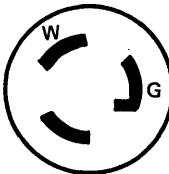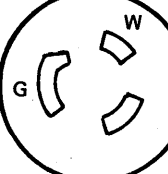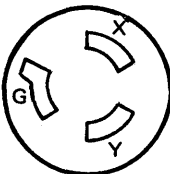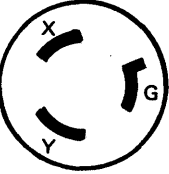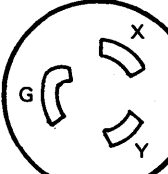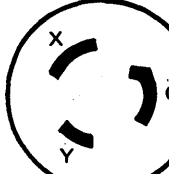
	15 Amperes		20 Amperes	
	Receptacle	Plug	Receptacle	Plug
125V	L5-15R	L5-15P	L5-20R	L5-20P
250V	L6-15R	L6-15P	L6-20R	L6-20P

Figure A-3. NEMA Configurations

A-2

Appendix B. Power Cable Lengths

Unit	Cable Length
3274	1.8 metres (6 ft) *4.3 metres (14 ft)
3276	1.8 metres (6 ft) *2.8 metres (9 ft) 3.7 metres (12 ft) 4.5 metres (15 ft)
3278	1.8 metres (6 ft) *2.8 metres (9 ft) 3.7 metres (12 ft) 4.5 metres (15 ft)
3287	1.8 metres (6 ft) *2.8 metres (9 ft) 3.7 metres (12 ft) 4.5 metres (15 ft)
3289	1.8 metres (6 ft) *2.8 metres (9 ft) 3.7 metres (12 ft) 4.5 metres (15 ft)

*Cable length normally supplied.

Appendix C. WTC Power Plug Requirements

World Trade Corporation (Except Canada) Plugs —
Customer Setup Units Only

| Country	Figure	Country	Figure
Algeria	E	Israel	J
Argentina	J	Italy	E
Australia	J		
Austria	A	Jamaica	D
		Japan	D
Bahamas	D		
Barbados	D	Malaysia	E
Belgium	E	Mexico	D
Bermuda	D		
Bolivia	D	Netherlands	A
Brazil	J	New Zealand	J
Bulgaria	A	Nicaragua	D
		Netherlands Antilles	D
Chile	J	Norway	A
Colombia	J		
Costa Rica	D	Panama	D
		Paraguay	J
Denmark	A	Peru	D
Dominican Rep	D	Philippines	D
		Poland	A
Ecuador	D	Portugal	A
El Salvador	D		
		Rumania	A
Finland	A		
France	E	South Africa	K
		Spain	A
Germany	A	Sweden	A
Guatemala	D	Switzerland	C
Honduras	D	Taiwan	D
Hungary	E	Thailand	D
Iceland	A	United Kingdom	H
Indonesia	A	Uruguay	J
Iran	A		
Ireland	H	Venezuela	J
		Yugoslavia	E

Notes:

- *World Trade E/ME/A countries not listed will receive power cords with attached plug as shown in Figure A.*
- *World Trade A/FE countries not listed will receive power cords with attached plugs as shown in Figure D (for voltages under 200V) or as shown in Figure J (for voltages of 200V and above).*
- *World Trade A/FE countries listed will receive power cords with attached plugs (for voltages under 200V) as shown in Figure D.*
- *World Trade A/FE countries listed in Figure D, and that specify voltages of 200V and above, will receive power cords without plugs.*
- *World Trade A/FE countries listed will receive power cords with attached plugs (for voltages of 200V and above) as shown in Figure J.*
- *World Trade A/FE countries listed above, but not listed in FigureD, that specify voltages under 200V will receive power cords without attached plugs.*
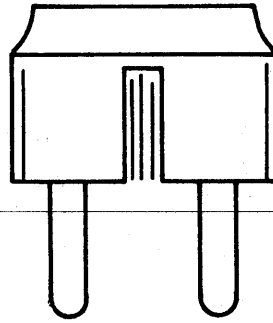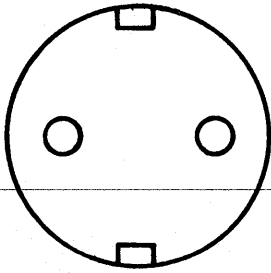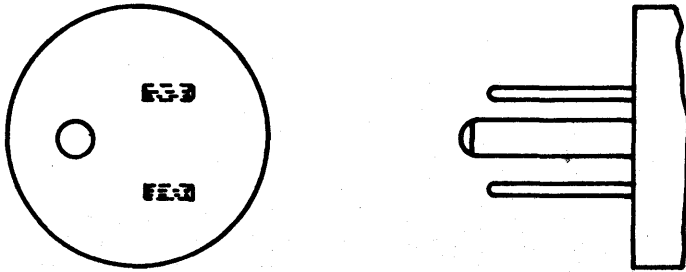
Austria   Netherlands
Bulgaria   Norway
Denmark   Poland
Finland   Portugal
Germany   Rumania
Iceland   Spain
Indonesia   Sweden
Iran
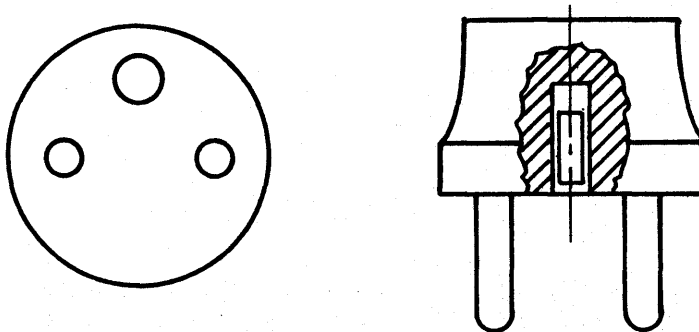
Figure A. Plug with Side Earthing Pin – 16A Max, 250V
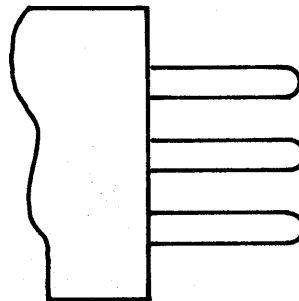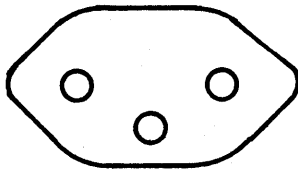
Switzerland

Figure C. Plug with Earthing Pin – 10A Max, 250V

|	
Bahamas	Jamaica
Barbados	Japan
Bermuda	Mexico
Bolivia	Nicaragua
Costa Rica	Netherlands Antilles
Dominican Republic	Panama
Ecuador	Peru
El Salvador	Philippines
Guatemala	Taiwan
Honduras	Thailand

Figure D. Plug with Earthing Pin — (Same plug as required for U.S.) 15A Max, 125V

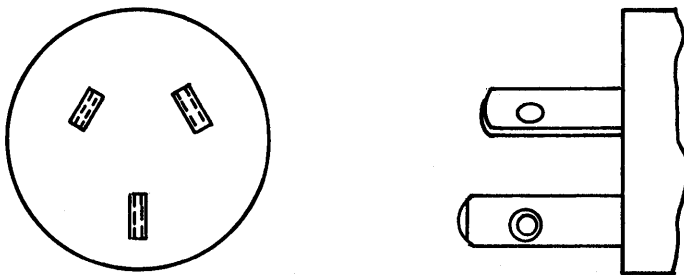|	
Algeria	Italy
Belgium	Malaysia
France	Yugoslavia
Hungary	

Figure E. Plug with Female Ground Connection — 16A Max, 250V
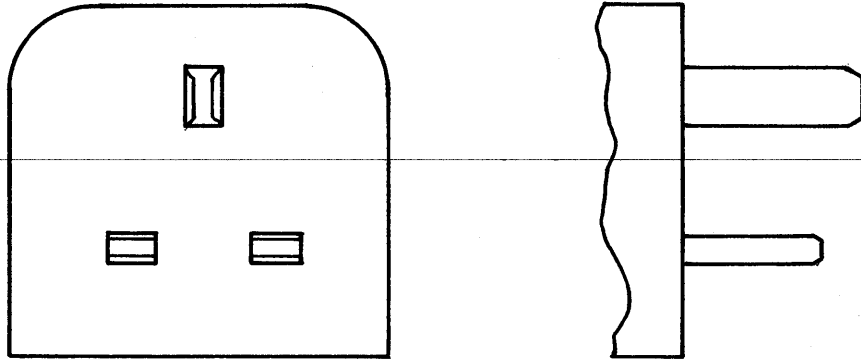
Ireland
United Kingdom

Figure H. Plug with Earthing Pin — 13A Max, 250V

Argentina	Israel
Australia	New Zealand
Brazil	Paraguay
Chile	Uruguay
Colombia	Venezuela

Figure J. Plug with Earthing Pin — 10A Max, 250V
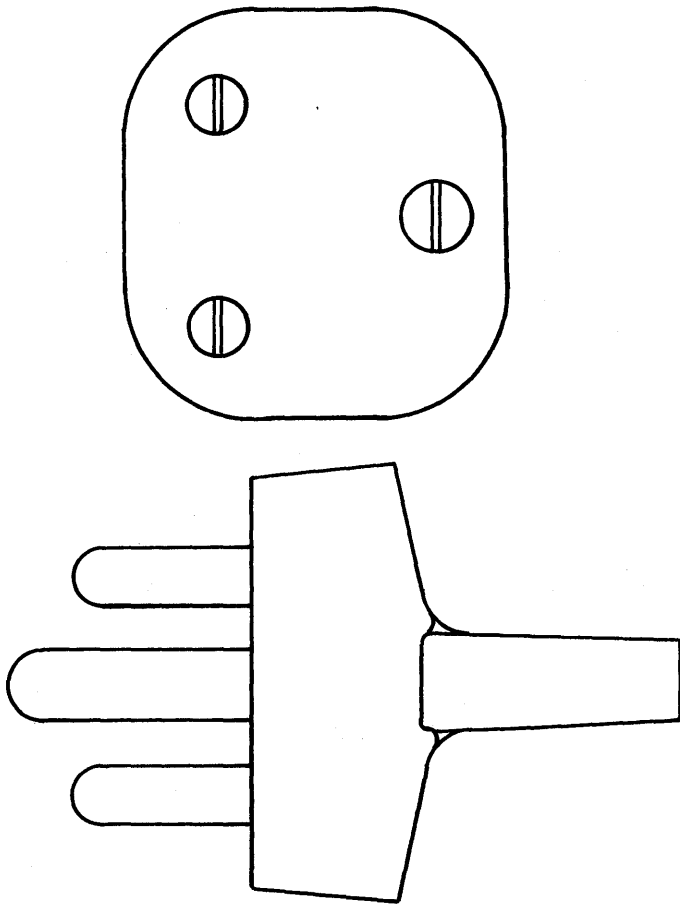
South Africa

Figure K. Plug with Earthing Pin — 13A Max, 250V

Appendix D. Power Cord Specifications

	Cables				Conductors		
Unit	Nominal Measurement	O.D. M/M	No. of Shields	Quantity	Nominal Measurement	O.D. M/M	AWG No.
3274	0.9 cm (0.350 in.)	9	1	3	0.1 cm (0.040 in.)	1	18
3276	0.9 cm (0.350 in.)	9	1	3	0.1 cm (0.040 in.)	1	18
3278	0.9 cm (0.350 in.)	9	1	3	0.1 cm (0.040 in.)	1	18
3287	0.9 cm (0.360 in.)	9	1	3	0.1 cm (0.040 in.)	1	18
3289	0.9 cm (0.360 in.)	9	1	3	0.1 cm (0.040 in.)	1	18

Appendix E. I/O Interface Code Chart Comparisons

Character Set \ Code Key (Note 1)	1	2	3	4	5	6	7	8	9	10	11	12	13	14
U.S. English	¢	|	!	$	¬	¦	´	#	@	"	~	{	}	\
Austria/Germany	Ä	|	Ü	$	^	ö	´	#	§	"	β	ä	ü	Ö
Austria/Germany (Alternate)	ö	|	ü	Ü	¬	β		Ä	Ö	ä				
Denmark/Norway	#	|	Ӿ	Å	^	ø	´	Æ	Ø	"	ü	æ	å	\
Denmark/Norway (Alternate)	ø	|	å	Å	¬	¦		Æ	Ø	æ				
Finland/Sweden	§	|	Ӿ	Ä	^	ö	é	Ä	Ö	"	ü	ä	å	É
Finland/Sweden (Alternate)	ö	|	å	Ä	¬	¦		Ä	Ö	ä				
France	°	|	§	$	^	ù	´	£	à	"	¨	é	è	ç
Italy	°	|	é	$	^	ò	ù	£	§	"	ì	à	è	ç
Portugal (Note 2)	[	|	]	$	^	õ	`	Ã	Õ	"	ç	ã	´	Ç
Spain	[	|	]	Pts	¬	ñ	˜	Ñ	@	"	¨	{	}	\
Spain (Alternate)	¢	|	!	Pt	¬	¦		Ñ	@	ñ				
United Kingdom	$	|	!	£	¬	¦	´	#	@	"	—	{	}	\
Belgium	[	|	]	$	^	ù	´	#	à	"	¨	é	è	ç
Brazil	É	|	$	Ç	^	ç	ã	Õ	Ã	"	~	õ	é	\
Japan English (Note 3)	£	|	!	¥	¬	¦	`	#	@	"	—	{	}	$
Spanish Speaking	[	|	]	$	¬	ñ	˜	Ñ	@	"	¨	{	}	\
Canadian French	à	!	´	$	^	ù	´	#	@	"	¨	é	è	ɔ
International	[	|	]	$	^	¦	`	#	@	"	~	{	}	\

Notes:
1. See Sheet 2 and Figure E-2 for code points.
2. Portugal a. Host system to control unit — 4C or E0 is Ç
              b. Control unit to host system — E0 is Ç
              c. Control unit to host system — 4C (<) is removed
3. For Japanese Katakana see the addendum publication highlighting Japanese Katakana language capability.

Figure E-1. National Use Differences I/O Interface Code (3274/3276/3278/3287/3289) Sheet 1 of 2

Bits 4567	Hex 1	00				01				10				11			
		00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL	DLE			SP	&	—						[12]	[13]	[14]	0
0001	1	SOH	SBA					/	É	a	j	[11]		A	J		1
0010	2	STX	EUA		SYN	â	ê	Â	Ê	b	k	s		B	K	S	2
0011	3	ETX	IC				ë		Ė	c	l	t		C	L	T	3
0100	4							À	È	d	m	u		D	M	U	4
0101	5	PT	NL							e	n	v		E	N	V	5
0110	6		BS	ETB			î		Î	f	o	w		F	O	W	6
0111	7			ESC	EOT		ï		Ï	g	p	x		G	P	X	7
1000	8					ç		Ç		h	q	y		H	Q	Y	8
1001	9		EM						[7]	i	r	z		I	R	Z	9
1010	A					[1]	[3]	[6]	:								
1011	B					.	[4]	,	[8]					ô	û	Ô	Û
1100	C	FF	DUP		RA	<	*	%	[9]						ü		Ü
1101	D	CR	SF	ENQ	NAK	(	)	_	'								Ù
1110	E		FM			+	;	>	=								
1111	F		ITB		SUB	[2]	[5]	?	[10]								

Bits 0,1 — Bits 2,3 — Hex 0

Notes:
[1] through [14] are the National use differences. They are shown in Sheet 1.

[ ] = Canadian French characters

Figure E-1. National Use Differences I/O Interface Code (3274/3276/3278/3287/3289) Sheet 2 of 2

Bits 4321	Hex 1	000	001	010	011	100	101	110	111
		0	1	2	3	4	5	6	7
0000	0	NUL	DLE	SP	0	@	P	`	p
0001	1	SOH	SBA	!	1	A	Q	a	q
0010	2	STX	EUA	"	2	B	R	b	r
0011	3	ETX	IC	#	3	C	S	c	s
0100	4	EOT	RA	$	4	D	T	d	t
0101	5	ENQ	NAK	%	5	E	U	e	u
0110	6		SYN	&	6	F	V	f	v
0111	7		ETB	'	7	G	W	g	w
1000	8	BS		(	8	H	X	h	x
1001	9	PT	EM	)	9	I	Y	i	y
1010	A	NL	SUB	*	:	J	Z	j	z
1011	B		ESC	+	;	K	[	k	{
1100	C	FF	DUP	,	<	L	\	l	|
1101	D	CR	SF	–	=	M	]	m	}
1110	E		FM	.	>	N	^	n	~
1111	F		ITB	/	?	O	_	o	

Bits ◄— 7, 6, 5

◄— Hex 0

Figure E-2. United States (ASCII B) I/O Interface Code (3274/3276/3278/3287/3289)

Figure E-3. United States (EBCDIC) I/O Interface Code (3274/3277)

Bits 4567	Hex 1	00				01				10				11			
		00	01	10	11	00	01	10	11	00	01	10	11	00	01	10	11
		0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
0000	0	NUL	DLE			SP	&							(	)	AA	0
0001	1	SOH	SBA					/		a	j	-		A	J		1
0010	2	STX	EUA		SYN					b	k	s		B	K	S	2
0011	3	ETX	IC							c	l	t		C	L	T	3
0100	4									d	m	u		D	M	U	4
0101	5	PT	NL							e	n	v		E	N	V	5
0110	6		BS	ETB						f	o	w		F	O	W	6
0111	7			ESC	EOT					g	p	x		G	P	X	7
1000	8									h	q	y		H	Q	Y	8
1001	9		EM						'	i	r	z		I	R	Z	9
1010	A					¢	!	6A	:								
1011	B					.	$	,	#								
1100	C	FF	DUP		RA	<	*	%	@								
1101	D	CR	SF	ENQ	NAK	(	)	_	'								
1110	E		FM			+	;	>	=								
1111	F		ITB		SUB	|	⌐	?	"								

Bits 0,1 ← (top)
2,3 ←
Hex 0 ←

Legend:

▰ = Stored as a 'lower case' symbol. Displayed on Mono Case display only. Blank on Dual Case display. Cannot be entered from keyboard.

6A or AA = Stored as Hex code shown. Non-displayed on Mono and Dual Case displays.

Appendix F. Cable Terminations

Feature Codes 5500 & 5502
U. S. and Canada

Switched Network
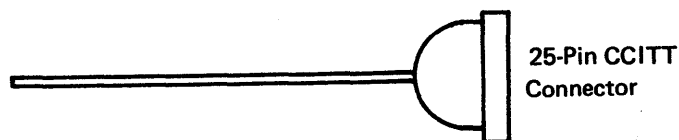
Manual Answer - 5502

or

Nonswitched Lines - 5500

Switched Line

1 WE-283B Plug
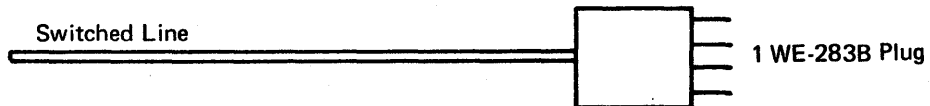
Feature Code 5507
U.S. and Canada

Nonswitched Lines

SNBU - Manual Answer

Nonswitched Line

1 WE-283B Plug

Switched Line M.A.

1 WE-283B Plug

Two cables with a common connector.
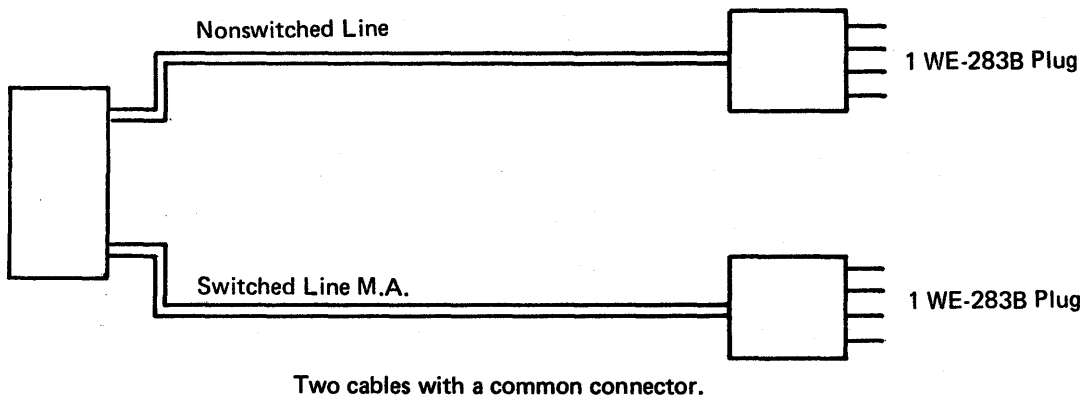
Feature Code 3701
All countries

Nonswitched/Switched/SNBU

25-Pin CCITT
Connector

Short test cables and other short cables required for certain countries between this cable and modem will have the same type of connector.

Feature Code 5500
All countries
except U.S. and Canada

Nonswitched Lines

Nonswitched Line

(-)   (+)
Transmit Pair: White, Red

(+)   (-)
Receive Pair: Black, Yellow
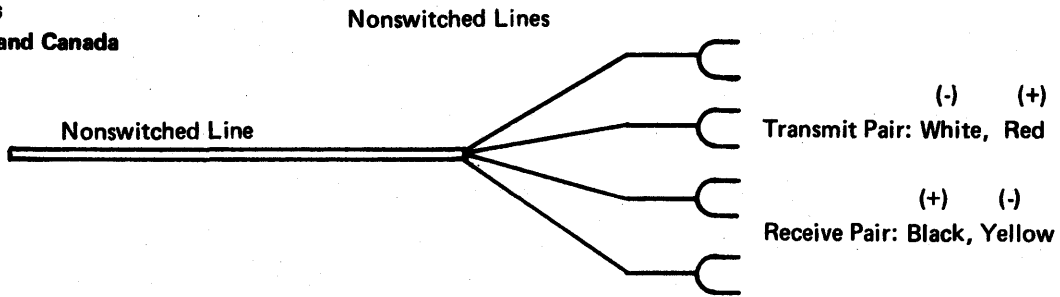
Feature Codes 5501 and 5508
All countries
except U.S. and Canada

Switched Network
Auto Answer - Manual Answer - 5501
or
Nonswitched Lines - SNBU - 5508

Nonswitched Line

(-)   (+)
Transmit Pair: White, Red

(+)   (-)
Receive Pair: Black, Yellow

Switched Line

Switched Lines   Telephone
                          Line

Phone for Answering   Telephone
                          Set
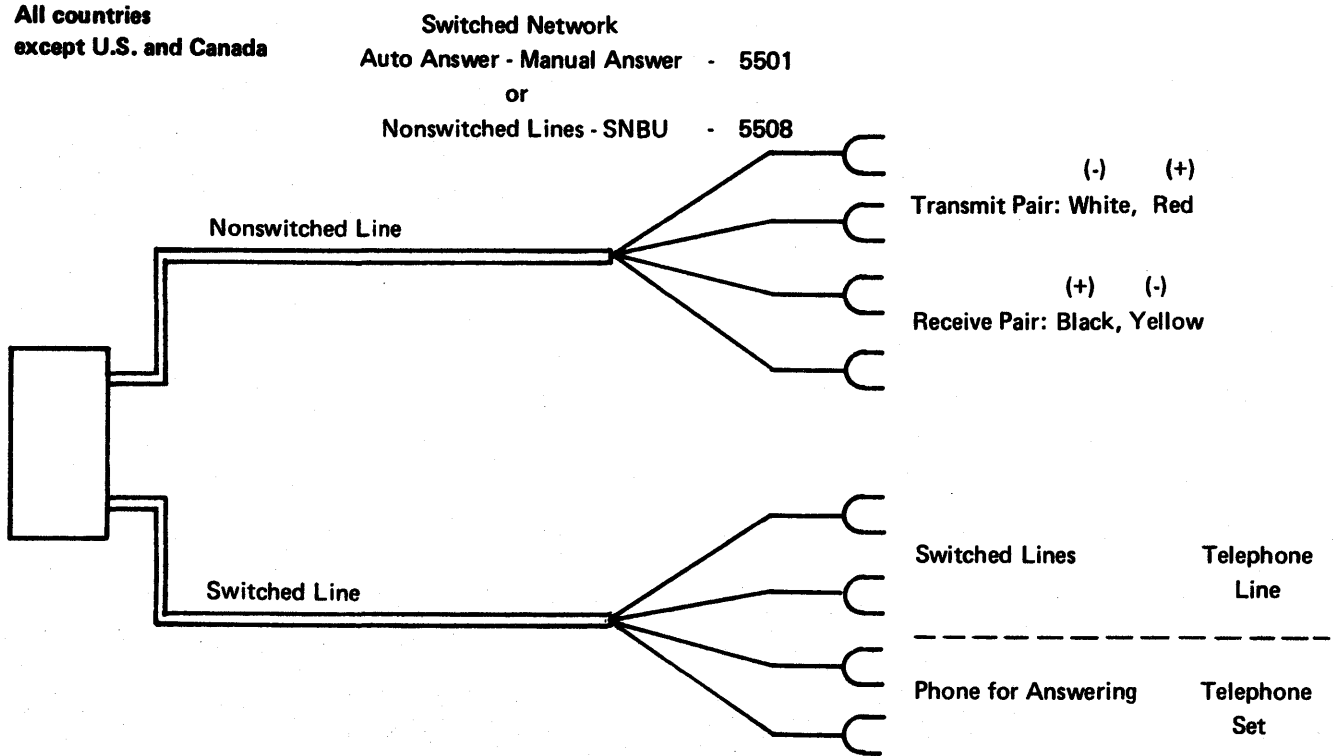
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[ ]   As a reference manual   [ ]   As a text (instructor)

[ ]   For another purpose (explain) _____

_____

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IBM branch office serving you _____

Thank you for your cooperation. No postage stamp necessary if mailed in the U.S.A. (Elsewhere, an IBM office or representative will be happy to forward your comments.)

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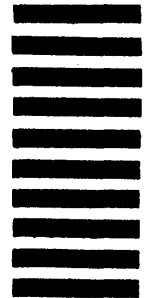
GA27-2851-0

Reader's Comment Form

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GA27-2851-0

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