



# Software Product Description

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**PRODUCT NAME:** RT-11/2780, Version 2

**SPD 10.76.1**

**COS-350/2780, Version 1, Remote Data Communications Package (RDCP)**

## SECTION A: RT-11/2780 (COS-350/2780) SPECIFIC INFORMATION

### DESCRIPTION:

RT-11/2780 (COS-350/2780) provides emulation of an IBM 2780 remote batch terminal. It runs under the RT-11 Foreground/Background monitor on a suitably equipped RT-11 (version 2B or later) or COS-350 system. General characteristics of DIGITAL's PDP-11 based 2780 products are given in Section B of this Software Product Description.

Any RT-11 or COS-350 supported disk device, card reader or paper tape reader can be used as a source of transmission files. Any RT-11 or COS-350 supported disk device or line printer except the LS11 and LV11 can be used to receive files. (The LS11 or LV11 can be used in "off-line" mode, however, to print files temporarily stored on disk.)

The performance characteristics for the system vary depending primarily on whether the RT-11/2780 (COS-350/2780) is running the foreground or background. At 4800 baud with the 2780 Emulator running in the foreground on a PDP-11/05, between 50 percent (during transmission/reception) and 70 percent (when the link is idle) of the CPU is available for a background job. Because foreground has priority on system resources, background operation of the 2780 Emulator is possible only with a foreground job that allows the 2780 Emulator at least 90 milliseconds out of every 100 to service time-critical protocol requirements. Hence, computational tasks, for example, should be run in the background, with the 2780 Emulator running in the foreground.

### MINIMUM HARDWARE REQUIRED:

Any valid RT-11 Foreground/Background system configuration (except LSI-11 based systems) with:

- at least 16K words of memory for 2780 operation in the background
- at least 24K words of memory for 2780 operation in the foreground
- KW11-L Line Frequency Clock
- a disk device
- KG11-A Communications Arithmetic Element
- DP11, DU11, or DUP11 Synchronous Line Interface (NOTE: The line interface must have a higher priority than the RX11 floppy disk, should one be present on the system)

OR, Any one of the following DEC Datasystem configurations:

- DS352 RX11 Floppy-based system
- DS354 RK11 DECpack-based system
- DS356 RPR11 Disk pack-based system with:
  - at least 32K bytes of memory for 2780 operation in the background
  - at least 48K bytes of memory for 2780 operation in the foreground

A DU11 Synchronous Line interface and KG11 Communications Arithmetic Element are included in the COS-350/2780 package. (NOTE: The line interface must have a higher priority than the RX11 floppy disk on the DS352 and DS356 systems.)

### OPTIONAL HARDWARE SUPPORTED:

Any disk, paper tape reader, card reader or line printer supported by RT-11 or COS-350 except LS11 and LV11. For COS-350 systems, there is a maximum of one (1) RX11 controller per system.

### PREREQUISITE SOFTWARE:

RT-11 operating system, Version 2B or later

OR, COS-350 System Software, Version 1 or later

### OPTIONAL SOFTWARE SUPPORTED:

None

### TRAINING CREDITS:

None

### SUPPORT CATEGORY:

A, for initial installation, Software Support will be provided as listed in the Software Support Categories Addendum to this SPD. Subsequent licenses can be purchased with Category C support. Sources have Category C support.

### UPDATE POLICY:

During the first year, Update Policy shall be in accordance with the Software Support Categories Addendum to this SPD. After the first year, updates, if any, will be made available according to the then prevailing DIGITAL policies.

**ORDERING INFORMATION:**

This software is furnished under a license for use on a single CPU and can be copied and modified (with inclusion of DIGITAL's copyright notice) only for use on such CPU, except as may otherwise be provided in writing by DIGITAL.

Standard options with no support services are only available after the purchase of one supported license and after either an OEM Agreement or End-User Waiver of Support Agreement is in effect. When a software license is ordered without support services, the category of support applicable to such software is Category C.

Source and/or listing options are only available after the purchase of at least one supported binary license and after a source license agreement is in effect.

The following key (C, D, E, N, R, Y, Z) represents the distribution media for the product and must be specified at the end of the "Q" or "DS" number, i.e., QJD63-AD = binaries on 9-track magnetic tape.

C = DECTape  
 D = 9-track Magnetic Tape  
 E = RK Disk (DECpack)  
 F = 7-track Magnetic Tape  
 R = Microfiche  
 Y = Floppy Disk  
 Z = No hardware dependency

*Standard Options*

QJD63 -A- Single-use license, binaries, documentation, support services (RT-11 not included) (media: C, D, E, F, Y)

QJD63 -D- Single-use license only, no support services (media: Z)

*Restricted Standard Options*

DS3CC -A- Single-use license, binaries, documentation, communications subsystem, support services (media: E, Y) for COS-350 systems only

DS3CC -D Single-use license only, with communications subsystem, no support services (media: Z) for COS-350 systems only

*Source/Listing Options*

QJD63 -E- All sources (RT-11 not included) (media: C, D, E, F, Y)

QJD63 -F- Listings (RT-11 not included) (media: R)

**ADDITIONAL SERVICES:**

None

## SECTION B: 2780 EMULATOR GENERAL DESCRIPTION

2780 Emulator is the collective name for the set of software products that allows various DIGITAL operating systems to emulate the operation of an IBM 2780 Model 1 or 2 Data Transmission Terminal with the multiple record option. Emulation of the 2780 permits communication between such DIGITAL systems and (1) the following IBM Remote Job Entry programs supporting the device: OS/HASP, OS/ASP, DOS-POWER and OS/RJE, or (2) a second DIGITAL supplied 2780 Emulator.

The following DIGITAL operating systems support the Emulator for the 2780 Model 2:

DOS/BATCH-11 (Version 8-08 or later), RSTS/E (CTS-500/E), RSX-11D, RSX-11M, RT-11 (COS-350) and DECsystem-10<sup>1</sup>. In addition, a COS-310 based emulator and a PDP-11 memory-only 2780 are available. These emulate the Model 1 2780. Section A gives the distinguishing features of the particular 2780 Emulator described by this SPD. The remainder of this section describes items common to all PDP-11 2780 emulators.

### OPERATION:

After the system operator starts the 2780 Emulator, it solicits and responds to console command input.

*Transmission:* All 2780 Emulators can transmit data from card readers, if they are present in the system, and (except for the memory-based 2780) transmit data files from disk storage devices. The RSTS/E 2780 Emulator has the added capability of spooling or queueing transmission requests from timesharing users.

All 2780 Emulators transmit EBCDIC and binary data. Since the host systems use the ASCII character set, however, they accept ASCII characters for transmission and then perform automatic character conversion.<sup>2</sup> No conversion is performed on binary data.

The physical units of data that are transmitted are called blocks. Blocks are divided into logical units called records. Maximum block size is 400 characters; maximum record size when transmitting to IBM operating systems is 80 characters, and when communicating with other 2780's or 2780 Emulators, the record size is variable up to 132 characters. Records that are less than maximum allowable are either extended to the maximum by blank filling, or transmitted as is, at the user's option. Up to seven (7) records can be transmitted per block.

<sup>1</sup>Limited to 2780 mode only for PDP-11 communication.

<sup>2</sup>CORE and DOS/BATCH packages will accept full EBCDIC character set from cards; the others accept only the subset that has an ASCII equivalent.

*Reception:* All 2780 Emulators can print received character data on a line printer, if one is present in the system. In most cases, the software simulates limited-function vertical format control (VFC) by providing Top of Form (Skip to Channel 1), Print-and-Space-1, -2, or -3 line(s) functions, and skip to channels 2 through 8, all of which cause modulo 8 line space operation--i.e., skip to the next line which is an even multiple of 8 from Top-of-Form. Both 64- and 96-character line printers are supported. However, support of line printers which are too slow to keep up with the speed of the communications link (i.e., LS11 and LV11) is limited to "off-line" or DIGITAL-to-DIGITAL usage, because their speed can cause timeout errors in an IBM system.

All Emulators except the memory-based can write files onto disk storage devices. In such cases, a separate file is created for each received file.

All 2780 Emulators receive EBCDIC or binary data. They can automatically convert EBCDIC data to ASCII upon reception, or EBCDIC data can be written to a file by the use of the binary mode.

Maximum receive block size is four hundred (400) characters. The maximum receive record size is a two-character escape code, plus one hundred thirty-two (132) data characters. Up to seven (7) records can be received per block.

All Emulators provide automatic answer to dial-in rings.

*Modems and Data Links:* All 2780 Emulators support operation over synchronous data links, in Point-to-Point Contention mode only, at speeds up to 4800 baud. Some Emulators will operate at speeds up to 9600 baud over full duplex private or leased lines. Bell 201 or 208 modems or equivalent are specified. Operation with other modems is not precluded, but warranted support does not apply in these cases.

Data link control characters are supplied automatically by the Emulators. On transmission errors, the Emulators will re-try up to seven (7) times before declaring the link dead.

*Configuring PDP-11 2780 Emulator Systems:* Configuration requirements for each Emulator are defined in Section A. Briefly, the PDP-11 2780 Emulators require the following hardware beyond the standard operating system configurations:

- DP11, DU11 or DUP11 Synchronous Line Interface
- KG11-A Communications Arithmetic Element
- KW11-L or KW11-P clock
- 8K words of additional memory beyond the minimum may be required (refer to Section A)

**TRAINING CREDITS:**

No training credits are included in the 2780 Emulator Software License charges. Training courses are not required in order to operate the product.

**SUPPORT CATEGORY:**

The initial binary package carries Category A support. Sources have Category C support.

Installation will be deemed complete in the case of connection with IBM when:

- The customer's 360/370 configuration includes a 2701 Data Adapter, a 2703 Transmission Control Unit, a 3704 or 3705 Transmission Controller, or a System/370 Model 135 Integrated Communications Adapter.
- A DIGITAL sample procedure included with the software has been successfully executed.

Installation in DIGITAL-to-DIGITAL operation will be deemed complete when DIGITAL supplied files can be successfully transmitted in both directions.

**CUSTOMER RESPONSIBILITIES:**

BEFORE installation of the SOFTWARE, the customer must:

1. Obtain, install, and demonstrate operational to DIGITAL's satisfaction any modems and other equipment and facilities necessary to interface to DIGITAL's communications line interfaces and terminals.

2. Install or have installed all hardware, including terminals, to be used on the system.
3. Generate for terminal support any and all IBM systems that will be communicating with the Emulator, to DIGITAL's satisfaction.
4. Make available to DIGITAL personnel all hardware, including communications facilities and terminals, to be used during installation and acceptance testing for a reasonable period of time each day as mutually agreed upon by DIGITAL and customer, until acceptance criteria are satisfied.
5. Provide access privileges and machine time on any and all IBM systems on which the installation is to be performed.
6. When communicating with IBM, make available to DIGITAL personnel an IBM 360/370 job stream with data, to run via the 2780 Emulator on-line to a 360/370 in accordance with the configuration specifications outlined above.

Delays caused by any failure to meet these responsibilities will be charged at the then prevailing rate for time and materials.

The following table summarizes some of the features of the PDP-11 2780 Emulators.

CHARACTERISTIC EMULATOR NAME	MINIMUM CONFIGURATION SUMMARY (see Section A)	HOST OPERATING SYSTEM	MAXIMUM SPEED	OUTPUT DEVICES SUPPORTED	INPUT DEVICES SUPPORTED	FORMS CONTROL SUPPORTED	SPOOLING SUPPORTED	MODEMS AND IBM OPERATING SYSTEMS SUPPORTED
CORE/2780	Any PDP-11 except LSI-11 based products. 8K words of memory, clock, card reader, line printer, terminal, DU11 or DP11, KG11, paper tape reader or cassette	None	9600 baud	Line printer Note: Binary output not supported	Card reader	Top of form. Skip 1, 2, or 3 lines. Skip modulo 8	No	Bell 208 or 201 or equivalent; OS/RJL, OS/HASP, DOS/POWER, OS/ASP
DOS/2780	Standard DOS/BATCH configuration with at least 16K words of memory, clock, DU11 or DP11, KG11, card reader and line printer	DOS/BATCH-11	9600 baud	Line printer or any disk	Card reader or any disk	Line printer: same as above All others: Top of form. Horizontal forms control	No	Same as above
RSX-11D/2780 RSX-11M/2780	Any standard RSX-11D or RSX-11M configuration with at least 16K words of memory (for 11M), at least 56K words of memory (for 11D), DU11, DP11 or DU11, KG11	RSX-11D or RSX-11M	4800 baud	Line printer or any disk except device except DECtape and paper tape punch	Card reader or any other Files-11 device except DECtape	Top of form. Skip 1, 2, or 3 lines. Skip modulo 8. Horizontal forms control	RSX-11D: Yes on reception, no on transmission RSX-11M: No	Same as above
RSTS/2780 (CTS-500/E-2780)	Minimal RSTS/E or CTS-500/E system consistent with number of users and expected application, plus 8K words of memory, DU11, DU11 or DP11, KG11	RSTS/E (CTS-500/E)	4800 baud	Line printer or any disk except flexible diskette, magnetic tape (limited)	Card reader or any disk, magnetic tape (limited)	Top of form. Horizontal forms control	Yes	Same as above
RT-11/2780 (COS-350/2780)	Disk-based Foreground/Background RT-11 system with 16K words of memory, DU11 or DP11 or DU11, KW11-U, KG11-A	RT-11 (COS-350)	4800 baud	Line printer or any disk supported by RT-11 (COS-350)	Card reader, paper tape reader, or any disk supported by RT-11 (COS-350)	Top of Form. Skip 1, 2 or 3 lines. Skip modulo 8. Horizontal forms control	No	Same as above