RSTS/E

2780 User's Guide

DEC-11-ORJEA-A-D

RSTS-11

The HOW TO OBTAIN SOFTWARE INFORMATION page, located at the back of this document, explains the various services available to DIGITAL software users.

The postage prepaid READER'S COMMENTS form on the last page of this document requests the user's critical evaluation to assist us in preparing future documentation.

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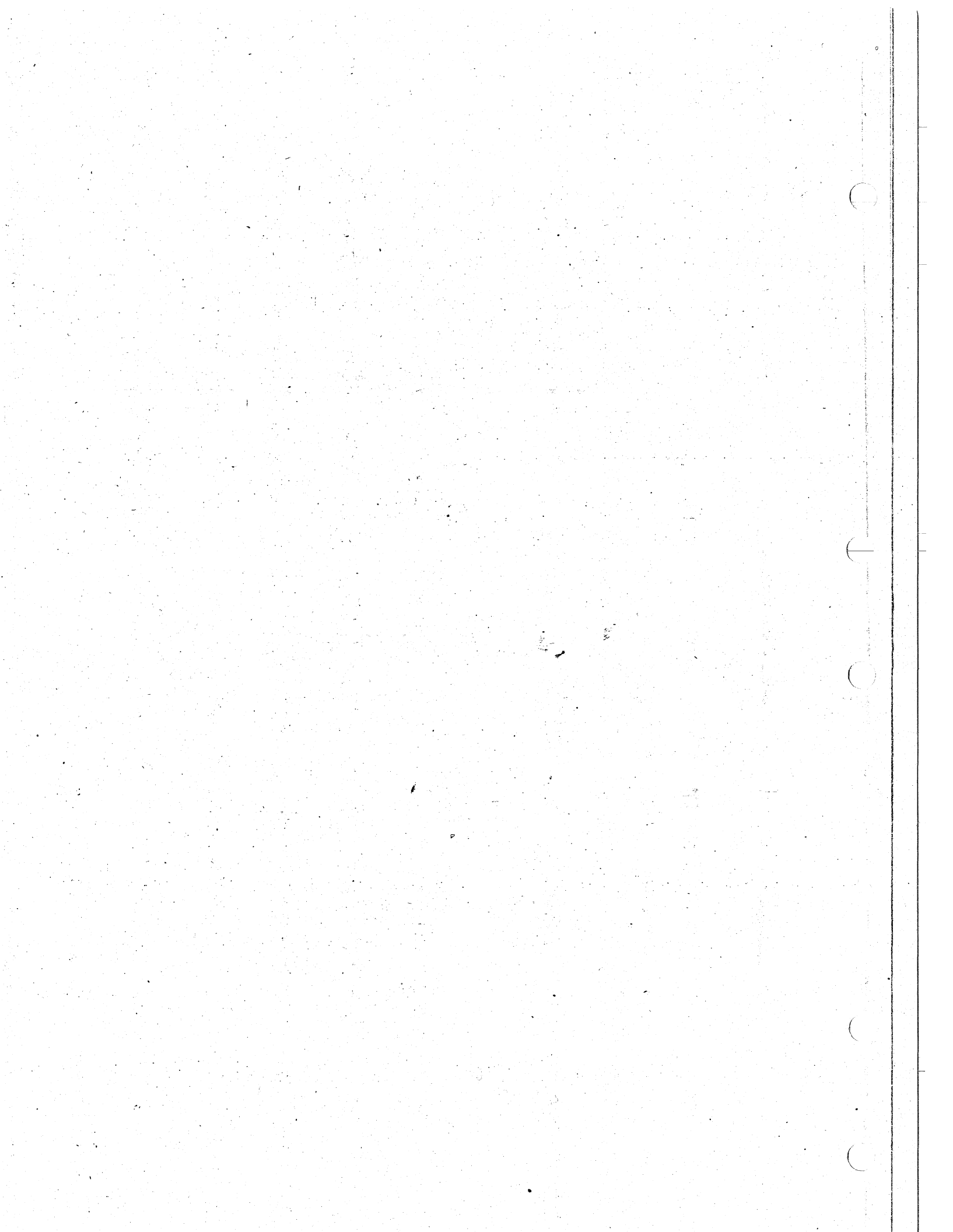|			
CDP	DIGITAL	INDAC	PS/8
COMPUTER LAB	DNC	KA10	QUICKPOINT
COMSYST	EDGRIN	LAB-8	RAD-8
COMTEX	EDUSYSTEM	LAB-8/e	RSTS
DDT	FLIP CHIP	LAB-K	RSX
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PREFACE

This document describes the hardware and software requirements, system installation procedures, and the operational aspects of sending data to and receiving data from a remote computer system which supports the 2780 Data Transmission Terminal or a PDP-11 computer with the 2780 software. The description applies only to RSTS/E (Resource Sharing Time Sharing/Extended) systems capable of supporting the RSTS/2780 software. Features directly related to the 2780 environment itself are described in the document 2780 Remote Computer Systems Installation Notes.

In this document, messages printed by the system or by a program are underlined to differentiate them from responses typed by the user. Shown below are titles and order numbers of related documents the user can obtain from the system manager at the local installation.

RSTS-11 System User's Guide	DEC-11-ORSUA-C-D
RSTS/E System Manager's Guide	DEC-11-ORSMC-A-D
2780 Remote Computer Systems Installation Notes	DEC-11-CCDNA-A-D

The 2780 Remote Computer Installation Notes document is included as part of the RSTS/2780 software to give the RSTS/E system manager and system programmer guidelines to the requirements that an IBM operating system imposes on his data processing operation. The document presents the information the system manager requires to prepare his IBM installation to support the RSTS/2780 software. Because the operation of various IBM operating systems varies, the user must consult the applicable IBM documentation and the system manager of the host IBM installation.
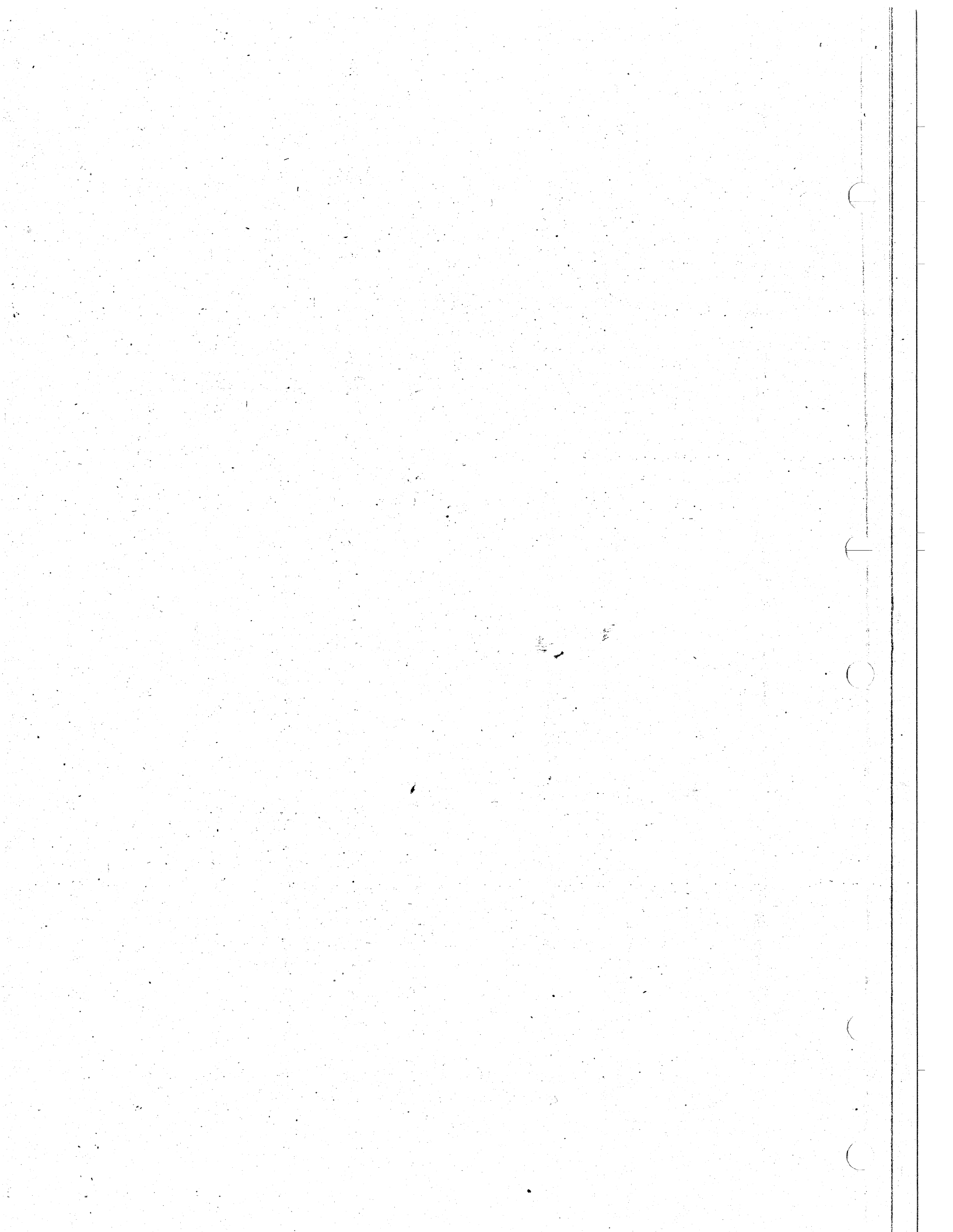
CONTENTS

TABLES

CHAPTER 1

INTRODUCTION TO RSTS/2780 SOFTWARE

The RSTS/2780 software package enables a RSTS/E system to act as a powerful remote job entry terminal. Using RSTS/2780, RSTS/E users can queue data and job control files for transmission to a host IBM 360 or 370 system or to another PDP-11 Remote Computer System.

The RSTS/2780 software consists of two software components: a driver module for the synchronous line interface and a control program for managing the flow of data to and from the driver module. The driver module and the control program are included in the RSTS/E system at system generation time. Thereafter, the user's sole interface with the remote job device is through the control program RJ2780.

The RJ2780 program is coded in BASIC-PLUS and resides in the system library account on the system disk. It provides both interactive and spooled methods of operation. Employed interactively, a single user establishes the data link; he specifies directly the files to be transmitted to the host system and the destination of the received data. In spooled operation, RJ2780 runs as a spooling program and transmits files as they are queued by any RSTS/E user running the standard queueing system program. In spooled operation, received data is appended to one output file or stored in dynamically created separate disk files.

1.1 HARDWARE REQUIREMENTS

To run RSTS/2780 software, the RSTS/E system requires the KG11A communications arithmetic unit and either a DP11 or DU11 serial synchronous line interface unit. The KG11A unit performs error checking for serially transmitted data and is used with either the DP11 or the DU11 device to block and deblock data transmitted over a serial synchronous line. The system software supports only one unit of either the DP11 or the DU11 devices although multiple units can be connected to the computer.

The RSTS/2780 driver module requires 6K words of memory and four big buffers (256-words each). The control program requires a user job area of 16K words to run.

1.2 SOFTWARE REQUIREMENTS

To successfully install the remote job driver (RJ) module and the RJ2780 control program on the RSTS/E system, the media on which the RSTS/2780 software is delivered to the customer must be the same as that which is employed to generate the RSTS/E system. For the RJ2780 program to operate, the user must include the Record I/O software option when he configures his system. Specific system installation information is given in the RSTS/E System Manager's Guide and guidelines for installation are given in Appendix A of this document.

Spooling of jobs on RSTS/E requires the interaction of the QUEMAN and QUE system programs and the specific spooling program. Thus, for RJ2780 to conduct spooled operations, the QUEMAN program must be running on the system. For more information on spooled operations on RSTS/E, see Sections 6.10 and 4.1.3 of the RSTS/E System Manager's Guide.

1.3 OVERVIEW OF RJ2780 OPERATIONS

The user employs the 2780 capability by simply running the RJ2780 program from the system library. By typing responses to questions the program prints, the user indicates the nature of the site he wants to communicate with, the type of transmission he wishes the program to perform, and the name(s) of the file(s) to use as output for received data.

When communicating with an IBM operating system, RJ2780 transmits records of 80 characters and receives records as large as 132 characters. When communicating with another PDP-11 computer having the 2780 capability, RJ2780 transmits and receives records up to 132 characters long.

The user can condition the RJ2780 program to transmit data with or without translation. If the user chooses translation, the program converts the data to EBCDIC format before transmitting it. When receiving, RJ2780 translates the data to ASCII format. During translation, all ESC character sequences are converted to give the proper character and line spacing information. If the user does not wish translation, he merely designates the file as binary and the program transmits it without translation.[1]

Employed in an interactive fashion, the RJ2780 program accepts requests one at a time from the user terminal. To transmit data, the user types a request specifying the remote job device (RJ:) as output and the disk file to transmit as input. The program accesses the file and prepares the data for transmission. The program automatically directs data received to a default disk file unless the user overrides the default by specifying another file as output and the RJ: device as input.

Employed in a spooled fashion, the RJ2780 program runs as other RSTS/E spooling programs run. Any user on the system can create requests for RJ2780 by running the QUE program and specifying RJ: as the spooled device. The queue management system program QUEMAN running on the system sends, one by one, the pending requests to the RJ2780 program. RJ2780 executes requests and directs data received to the conventionally established disk file(s).

In either interactive or spooled operations, the user can specify that RJ2780 automatically queue all received data for printing. As a result, for each file received, RJ2780 creates a request which the QUE program assigns to a line printer spooling program SPOOL. Thus, if the RJ2780 program operates in a spooled fashion for both input and output requests, no user intervention is necessary between creating the request for the RJ device and removing the printed output from the line printer.

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[1] The requirements of the host system determine whether or not a file may be transmitted without translation (in binary mode). Binary mode must be used when transmitting between PDP-11 systems.

CHAPTER 2
TRANSMITTING AND RECEIVING DATA

To transmit data to and receive data from a remote computer system,
the user must run the RJ2780 system program, initiate a communica-
tions link with the remote station, and type commands to control the
transmission. The user transmits data interactively as described in
Section 2.3 or conducts spooled operations specified by queued
requests as described in Section 2.4. The RJ2780 system program must
be run from a terminal logged into the system under a privileged
account.

2.1 RUNNING AND TERMINATING RJ2780

To run the RJ2780 program stored in the system library, type the
following system command.

        RUN $RJ2780

The program runs and prints two lines. The first line contains the
program and system names and version numbers. The second line is a
query requesting the type of operation to perform.

For example,

        RJ2780 V01-01 RSTS V05B-24
        GENERAL, 2780, OR RSTS-TO-RSTS?

To condition the program properly, the user must type one of the
responses described in Table 2-1.

To communicate with most IBM operating systems, type 2780 in response
to the GENERAL, 2780, OR RSTS-TO-RSTS query. The program subsequently
prints the NORMAL OR TRANSPARENCY MODE query, the responses to which
are described in Table 2-2. Unless the user wants to transmit a
binary file or unless the remote computer system requires trans-
parency mode,[1] the NORMAL response applies in all cases.

To communicate with another PDP-11 computer having the 2780 capability,
type GENERAL in response to the GENERAL, 2780, OR RSTS-TO-RSTS query.
RJ2780 subsequently prints the NORMAL OR TRANSPARENCY MODE query.
Unless the user wants to transmit binary files, he can type NORMAL
in answer to the MODE query.

_____

[1]Some IBM operating systems require that information be processed
 in transparency mode. The user must determine the requirements
 of the IBM system he is communicating with and run the RJ2780
 program accordingly.

2-1

Table 2-1
RJ2780 Operations

Response	Meaning[1]
2780	Conditions program to transmit 80-character card image records to an IBM system having the 2780 capability and to receive records up to 132 characters long.
GENERAL	Same as 2780 but RJ2780 can transmit records up to 132 characters long. Used to communicate with other PDP-11 computers having the 2780 capability.
RSTS-TO-RSTS	Conditions program to transmit and receive 132 character records while communicating with another RSTS/E system running the RJ2780 program. RJ2780 automatically operates in TRANSPARENCY mode and transmits all files as binary files. ESC character sequences are not processed.
RETURN key or any response not beginning with 2 or R.	Same as typing GENERAL.

Table 2-2
Responses to NORMAL OR TRANSPARENCY MODE Query

Response	Meaning
NORMAL	Treat all data as ASCII characters and translate them to EBCDIC format for transmission. Upon receiving data, assume EBCDIC format and translate characters and ESC character sequences to ASCII format before storing them.
TRANSPARENCY	Similar to NORMAL but transmit characters in EBCDIC transparency mode and allow user to designate a file as binary.
Type RETURN key or any response not beginning with T	Same as typing NORMAL.

[1] Regardless of the operation, the program receives records to a maximum of 132 characters per record.

To communicate with another RSTS/E system having the 2780 capability, type RSTS-TO-RSTS in response to the GENERAL, 2780, OR RSTS-TO-RSTS query. The program subsequently omits the NORMAL OR TRANSPARENCY MODE query and sets the mode to transparency and treats all files as if they were binary.

After the program sets the transmission mode, it prints the DEFAULT OUTPUT FILE query. The response to this query determines how RJ2780 stores jobs received from the remote station.[1] The valid responses are listed in Table 2-3. A filename specification with only an asterisk in the extension field creates a unique file for each job received. The extensions of the specified filename begin with 001 and increase as required to 999. For example, a response of FILE.* causes RJ2780 to create a file named FILE.001 for the first job received, FILE.002 for the second job, and so on as required. A standard file specification given in response to the DEFAULT OUTPUT FILE query creates only a single file. For each job received following the first job, RJ2780 appends the data to that single file.

Table 2-3
Responses to the DEFAULT OUTPUT FILE Query

Response	Meaning
filnam.*	Automatically creates a disk file for each job received. RJ2780 creates the files dynamically with the name specified and extensions 001 through 999.
filnam.ext	Program creates only one output disk file. For each job received, RJ2780 appends data to the file.
filnam.*/Q:n filnam.*/Q	Same as filnam.* response except that RJ2780 automatically creates requests to queue file(s) for output on line printer unit n. If only /Q follows the file name specification, RJ2780 creates the request for any available line printer unit.

To cause RJ2780 to automatically queue the output file for subsequent printing, the user can type /Q:n after the filename specification. If only /Q is typed after the file specification, the QUEMAN system program uses any line printer unit available. If a number for n is given, QUEMAN queues a request for that line printer unit number. The QUEMAN program automatically deletes each file after printing it.[2]

After a response to the DEFAULT OUTPUT FILE query is entered, the program opens the remote job device (RJ:).

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[1] It is strongly recommended that the line printer not be used as the output file. If for any reason the device goes off line, the program possibly terminates and subsequently stops receiving the file.

[2] Refer to Section 6.10 of the RSTS/E System Manager's Guide for more information concerning QUEMAN.

The program indicates its readiness to accept commands by printing
the asterisk (*) character. The following sample dialog shows the
entire procedure.

```
GENERAL, 2780 or RSTS-TO-RSTS?    2780
NORMAL OR TRANSPARENCY MODE?    NORMAL
DEFAULT OUTPUT FILE?    GMB.*/Q:1
*
```

When RJ2780 prints the first * character, the user must put the data
set in the READY state by making the connection with the remote com-
puter. (With a leased line, the connection is made automatically.) In
response to the asterisk, the user can thereafter type a command as
described in Section 2.2.

To terminate the program, the user types the CTRL/Z combination in
response to the asterisk character printed at the terminal.

```
*↑Z
READY
```

The READY message indicates that RJ2780 is terminated and control
is at BASIC-PLUS command level.

2.2 ESTABLISHING A COMMUNICATIONS LINK

Disks containing files to be transmitted or to be used for logging
operations or for job output must be mounted, ready and on line. If
at any time during transmission a device leaves the READY state,
RJ2780 prints the message DEVICE HUNG OR WRITE LOCKED and omits the
job requesting that device.

Once the user establishes the link with the remote station, he can
type RJ2780 commands described in Section 2.3 to control data trans-
missions. For example, to transmit the commands to log the user onto
an IBM remote computer system, the user might type a command to send
a file containing the proper IBM commands.

```
*RJ:=SIGNON.RJE
*
```

The RJ2780 program reads and processes the command in about ten
seconds. If no errors occur, the program prints the asterisk after
processing the command. The program subsequently prints messages
telling the user that it is sending the file and that it has com-
pleted sending the file. It is up to the user to determine the
correct procedures and passwords required by the remote station.
The RJ2780 program receives responses from the remote station and
writes them to the disk file the user specified in the DEFAULT
OUTPUT FILE query.

The following sample dialog shows the process.

```
*01-MAY-74  08:36 PM SENDING: SIGNON.RJE
01-MAY-74   08:36 PM 1 RECORD SENT
```

The program does not print the asterisk again until after the user
types another request. The user can type commands ahead; the program
processes them in the order in which they are entered.

2.3 INTERACTIVE OPERATIONS

A user conducts interactive operations with the remote computer system
by typing commands as shown in Table 2-4. For example, to transmit a
data file DEC.RJE, the user types the following command.

        *RJ:=DEC.RJE
        *

The program opens the file DEC.RJE under the current user's account
on the system disk. If the program cannot access the file for any
reason, it prints a message detailing the type of error, the file-
name and the text of the specific RSTS error. For example, if DEC.RJE
does not exist, the program prints the following text.

        SEND ERROR: DEC.RJE: CAN'T FIND FILE OR ACCOUNT AT LINE 2480

When the program begins transmission, it prints two messages informing
the user that transmission is progressing. When transmission is com-
pleted, RJ2780 prints a message indicating how many records it sent.
The following sample printout shows the process.

        01-MAY-74   08:39 PM SENDING: DEC.RJE
        01-MAY-74   08:39 PM 2 RECORDS SENT

Following the printout, the program does not print the asterisk.

Table 2-4
RJ2780 Program Commands

Format	Meaning
RJ:=d1,d2,...,dn	Transmits the data stored in the disk files denoted by the standard RSTS file specifications d1, d2 through dn. RJ2780 transmits one END OF FILE indicator following the last file in the request.
d=RJ:	Conditions the RJ2780 program to write the next received job to the file denoted by the standard RSTS file specification d. The * character is not allowed in the file specification and the /Q syntax is not allowed.
SPOOL	Puts the RJ2780 program in spooled mode as described in Section 2.4.
CTRL/Z combination	Terminates the RJ2780 program and disconnects the data set.

Alternatively, the user can temporarily override the default output
file by typing a command as shown below.

```
ABC=RJ:
01-MAY-74  8:39 PM RECEIVING FILE:  ABC
01-MAY-74  8:39 PM 2 RECORDS RECEIVED
```

The program conditions the system to write the next data received from
the remote station to the file ABC on the system disk. This specifica-
tion takes precedence for one and only one file and causes the program
not to use the default output file specified at starting time. If file
ABC does not exist, the program creates it. After receiving the file
RJ2780 directs further data to the default output file.

2.4 SPOOLED OPERATIONS

To conduct spooled operations, the user types the SPOOL command. A
requirement to use SPOOL is that the QUEMAN system program be running
on the system. After recognizing the SPOOL command, the program prints
queries as shown below.

```
*SPOOL
LOG FILE NAME?  KB9:
SIGNOFF FILE NAME?  SIGNOF.RJE
DETACHING
```

The query LOG FILE NAME allows the user to specify a disk file or a
keyboard device which the program uses to print a log of messages.
A keyboard device provides a convenient and readily available means of
monitoring the progress of spooled operation. The logging device must
not be the current terminal. Therefore, the user must not type the
designator of the current keyboard. The logging device must not be in
use by another job or be logged into the system. RJ2780 next prints
the query SIGNOFF FILE NAME. The user must supply the specification
of the file containing the appropriate commands to notify the remote
station that the local site desires to terminate operations. RJ2780
sends this file if, while in spooled mode, it receives a shut-down
command from QUEMAN. This procedure prevents loss of data by uncon-
ditional termination and is used by the QUEMAN program when the SHUTUP
system program runs to stop time sharing operations. After the user
types the specification of the signoff file, the program prints the
message DETACHING and detaches itself from the current terminal.

Spooling operations are executed based upon the jobs queued in the
system file QUEUE.SYS. Any user on the system can enter job requests
to be queued by running the QUE system program described in Section
4.11 of the RSTS-11 System User's Guide. The RJ2780 program, when in
spool mode, sends a message to the QUEMAN program to begin spooling.
As a result, QUEMAN extracts jobs from the QUEUE.SYS file and passes
them to the RJ2780 program for processing.

To terminate spooling operations, attach the RJ2780 job to a terminal.
For example,

```
READY

ATTACH 5
ATTACHING TO JOB 5
*
```

In the example, the ATTACH 5 command attaches the RJ2780 job to the terminal. (The example assumes the terminal is logged into the system under the same account RJ2780 uses.) Upon completing any transmission in progress, the program discontinues accepting input from the QUEMAN program and reverts to terminal interaction. An asterisk printed at the terminal indicates that the program is ready to accept commands. RJ2780 continues to receive data from the remote job device. If the QUEMAN program is sending the RJ2780 job a request to process and if, at the same time, the user attaches the job to the terminal, RJ2780 does not process the request. However, the request remains in the QUEUE.SYS file to be processed again when RJ2780 enters SPOOL mode at a later time.

2.5 SENDING BINARY FILES

Translating data is a vital part of communicating with a remote computer system. Character data is stored in RSTS/E in ASCII format. Most computer systems which handle 2780 processing expect character data to be in EBCDIC format. RJ2780 software therefore translates received EBCDIC characters into ASCII to pass to RSTS/E and similarly translates transmitted ASCII characters into EBCDIC format to send to the remote computer system.

Omitting the translation of characters is sometimes required to prevent destruction of data. For example, if a numeric data file (as opposed to a character data file) is to be transmitted, translating it possibly destroys the data. Because of the need to transmit data without translation, RJ2780 recognizes an option which indicates a file is to be transmitted as a binary file.

To transmit a file as binary, the user must run RJ2780 in transparency mode and supply the /B option with the file specification. For example, if the user is running interactively, he types a command similar to the following.

```
*RJ:=ABC.DAT/B
*
```

The program subsequently transmits the data without translation. Running in transparency mode ensures that a control character bit pattern in the data does not terminate the transmission at an indeterminate place. If RJ2780 is running as a spooling program and in transparency mode, the user indicates the binary file by supplying the /B option in the QUE command. For example,

```
QUE RJ:STAT=STAT.RJE,ABC.DAT/B
READY
```

QUE runs and creates the job STAT to transmit to the remote computer system. RJ2780 performs the required translation for the file STAT.RJE but suppresses translation for the file ABC.DAT. For more information on queuing files, refer to Section 4.11.2 of the RSTS-11 System User's Guide.

The receiving system must be conditioned to receive a binary file. The /B option must be specified for the output file except when running in RSTS-TO-RSTS mode at both ends.

2.6 ERROR MESSAGES

Errors occurring during 2780 operations are reported by the RJ2780 program and described in Table 2-5. The program prints the error messages on either the current terminal or on the logging device. Certain errors should never occur on a system and are denoted by the abbreviation SPR following their descriptions. If such an error occurs, the user should report it and the conditions under which it occurred. The procedure for filing a Software Problem Report (SPR) is in the SOFTWARE PROBLEMS section of the HOW TO OBTAIN SOFTWARE INFORMATION page at the back of this manual. Errors marked FATAL cause RJ2780 to return to BASIC-PLUS command level during interactive operations or to kill itself during spooled operations. In either case, the user must correct the problem and rerun the request.

Table 2-5
RJ2780 Error Messages

Error Text	Meaning
BYTE COUNT TOO LARGE IN XMT	Byte count of record to be transmitted is greater than 80 (for 2780 type operation) or greater than 132 (for RSTS-TO-RSTS or GENERAL type operations.)
LINE DISCONNECT RECEIVED	Disconnect sequence received from the remote computer system. User must redial. (FATAL)
2780 HANDLER FAILURE	The 2780 device handler failed. (FATAL)
Ø BYTE COUNT	The byte count of a record to be transmitted is zero. This error indicates a failure of the RSTS/E monitor (SPR).
DATA-SET-READY TIME-OUT	Once a transmission starts, the RJ2780 program waits 30 seconds if the data set READY condition is not present. If, after 30 seconds, the program does not detect the data set READY condition, the program terminates. The user must run RJ2780 again and redial the remote system. (FATAL)
GET/PUT INTERLOCK ERROR	The RJ2780 program attempted an invalid input or output operation on the RJ device. (SPR) (FATAL)

Table 2-5 (Cont.)
RJ2780 Error Messages

Error Text	Meaning
2780 BUFFER OVERRUN	RJ2780 employs 7 buffers in memory to transmit and receive records. Somehow this mechanism has failed. (SPR) (FATAL)
NAK/TIMEOUT ON LINE	The RJ2780 attempts to elicit a valid response from the remote computer system by retrying an operation eight times. If, after eight attempts, only invalid responses are received, the program terminates. Ensure that neither the communications line nor the remote computer system is generating errors. (FATAL)
REMOTE SYSTEM NOT RESPONDING	Remote system has gone off the air. (FATAL)
QUEMAN NOT RUNNING--CAN'T RUN	To conduct spooling operation, the QUEMAN system program must be running. (FATAL)
REMOTE SYSTEM BROKE FILE	The remote computer system transmitted an ETB and EOT character sequence within a message when RJ2780 expected an ETX and EOT character sequence. This condition indicates an unexpected end of the transmission. The program continues processing.
REMOTE SYSTEM DEMANDED LINE (BID OVERRIDE)	An attempt to transmit to a remote computer is overridden by its attempt to transmit to the local site.
REMOTE SYSTEM DEMANDED LINE (RVI)	While sending a file, RJ2780 detects a high priority message from the remote computer. Program enters receive state. After receiving the message, program resumes sending the interrupted file.

Table 2-5 (Cont.)
RJ2780 Error Messages

Error Text	Meaning
FATAL SYSTEM I/O FAILURE	RJ2780 requires four big buffers to run. If heavy DECtape usage leaves less than four big buffers available, RJ2780 prints this message and terminates. User must inhibit usage of DECtape drives temporarily and rerun the program so that RJ2780 can claim the four buffers it needs.

APPENDIX A

BUILD PROCEDURES

To incorporate the RSTS/2780 software in RSTS/E, the user must include the driver module and control program code when he generates the RSTS/E system. The RSTS/2780 software must reside on the same medium the user employs to generate the system. For example, if RSTS/E software resides on magtape, the RSTS/2780 software must also be on magtape.

To include the driver module software on the system, perform the system generation procedure as described in Chapter 2 of the RSTS/E System Manager's Guide and do each of the following steps.

    (a)   answer YES to the question concerning the 2780,

    (b)   designate the proper device in response to the
           2780 INTERFACE question, and

    (c)   answer YES to the RECORD I/O question.

Four big buffers are automatically included in the system when RSTS/2780 software is included in the configuration. Record I/O software is automatically included and the RECORD I/O question is not printed if the multiple terminal feature is included.

As a result of answering these questions, the system generation batch stream prints messages telling the user to mount the tape or disk containing the software for the driver. The batch stream subsequently links the driver module into the RSTS/E system.

To include the RJ2780 control program on the system, the user must follow the guidelines and procedures for using the RJ2780.CTL file when building the system library files as described in Chapter 4 of the RSTS/E System Manager's Guide. As a result of following the proper procedures, the BUILD program stores the compiled form of the RJ2780 program in the system library and changes its protection code to <232>.
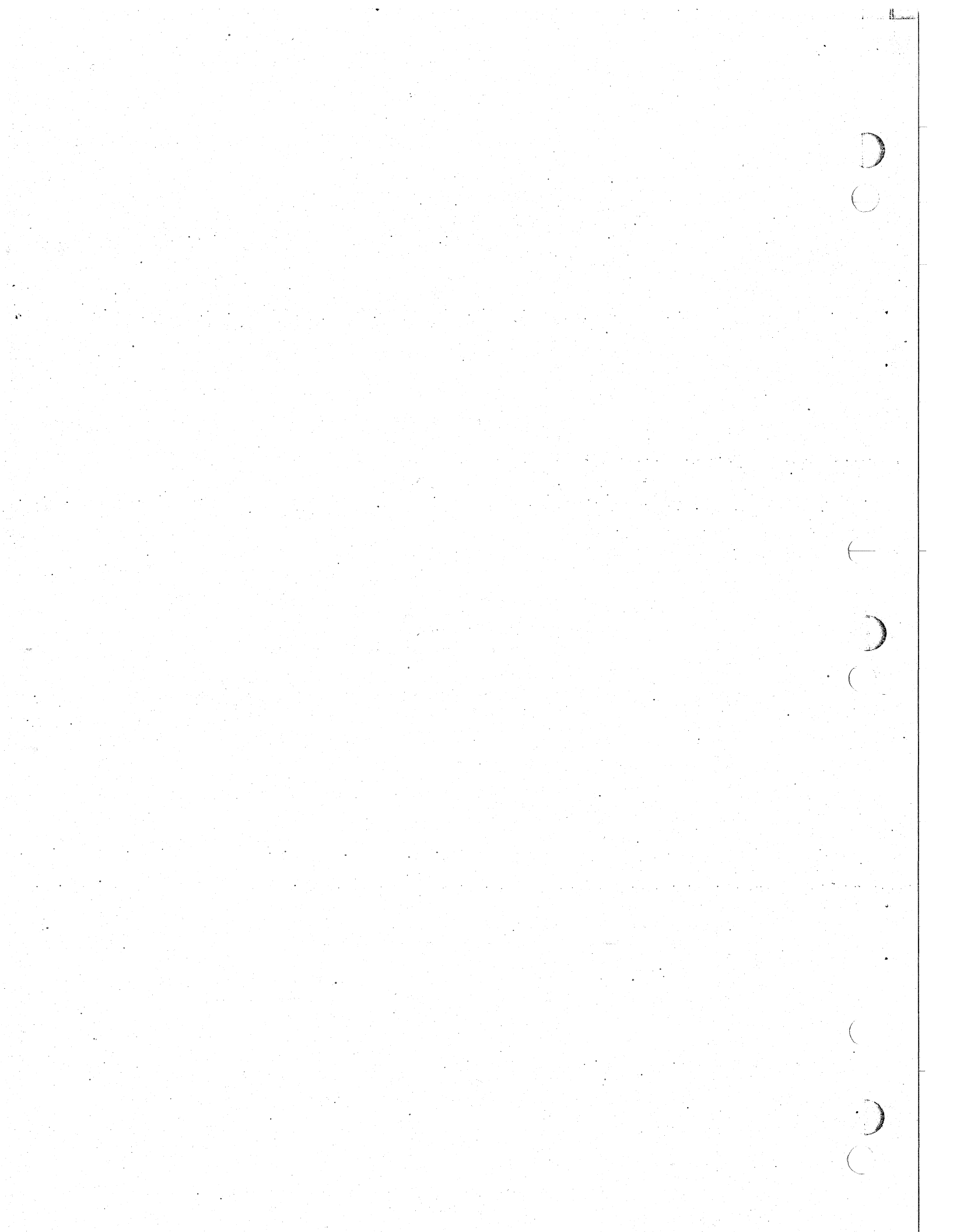
APPENDIX B

ESC CHARACTER TRANSLATION

The RJ2780 program translates certain special formatting characters
appearing at the beginning of records received from a remote computer
system. When the program is performing a 2780 or GENERAL operation,
it treats ESC character sequences found in the first two bytes of the
received record as described in Table B-1. ESC sequences are treated
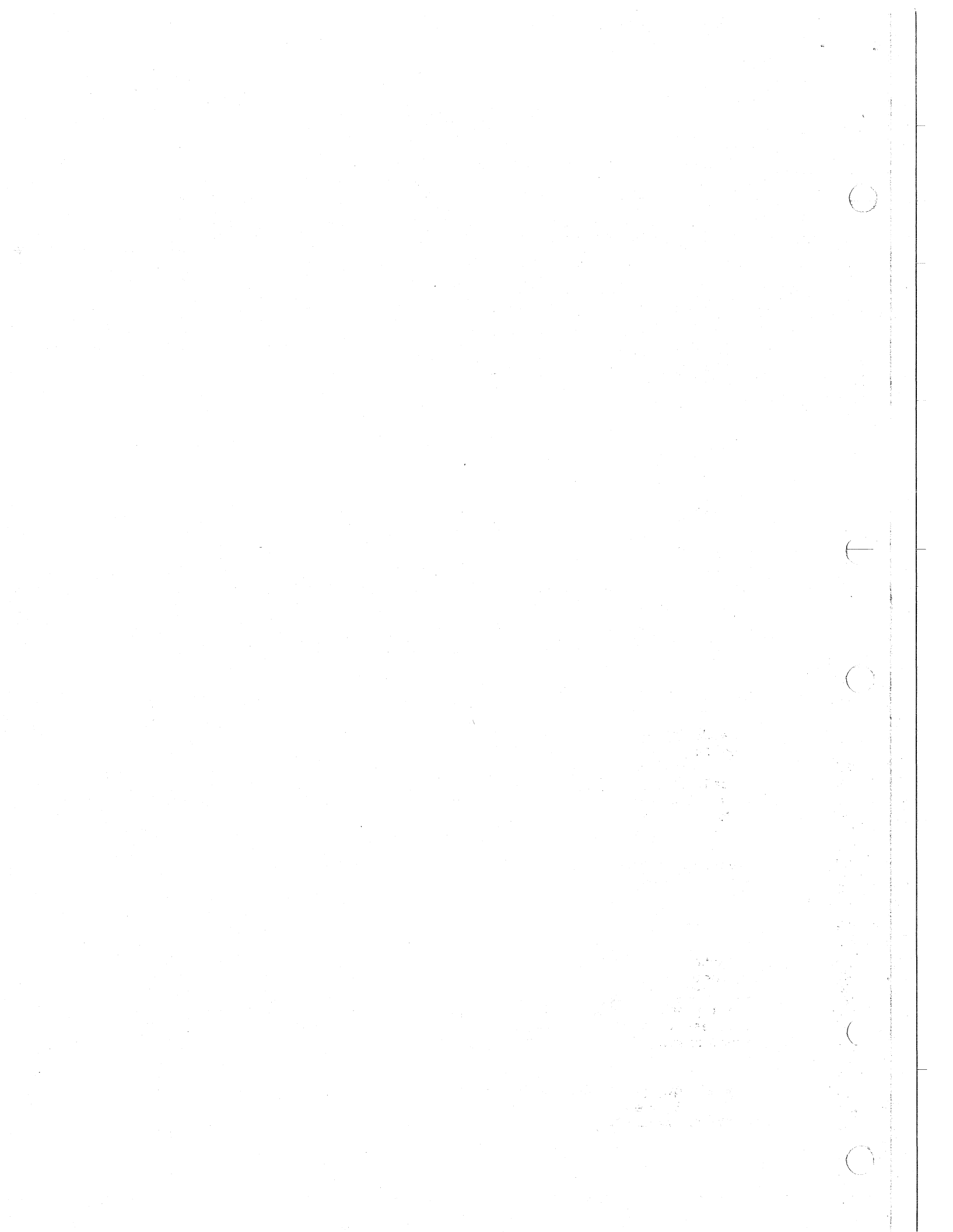as pure data when RJ2780 operates in RSTS-TO-RSTS (binary) mode.

Table B-1

ESC Character Translation

Sequence	2780 Translation
ESC 4	Removes ESC sequence, suppresses tab expansion and suppresses all forms control. RJ2780 automatically inserts a CR and LF character sequence after each record.
ESC /	Removes sequence and inserts one LF character after the record.
ESC S	Removes ESC sequence and inserts two LF characters after the record.
ESC T	Removes sequence and inserts three LF after the record.
ESC A	Removes ESC sequence and inserts FF and CR character sequence after the record.
ESC CHR$(9)	Uses this record to define tab positions for printer horizontal format control. See the description of this special feature in the component description of the IBM 2780 Data Transmission Terminal. (The CHR$(9) character is a horizontal tab.)
ESC other	No translation. Passed to the output file as is.

INDEX

SOFTWARE NEWSLETTERS, MAILING LIST

The Software Communications Group, located at corporate headquarters in
Maynard, publishes newsletters and Software Performance Summaries (SPS)
for the various Digital products. Newsletters are published monthly,
and contain announcements of new and revised software, programming
notes, software problems and solutions, and documentation corrections.
Software Performance Summaries are a collection of existing problems
and solutions for a given software system, and are published periodi-
cally. For information on the distribution of these documents and how
to get on the software newsletter mailing list, write to:

                    Software Communications
                    P. O. Box F
                    Maynard, Massachusetts 01754

SOFTWARE PROBLEMS

Questions or problems relating to Digital's software should be reported
to a Software Support Specialist. A specialist is located in each
Digital Sales Office in the United States. In Europe, software problem
reporting centers are in the following cities.

            Reading, England   Milan, Italy
            Paris, France   Solna, Sweden
            The Hague, Holland   Geneva, Switzerland
            Tel Aviv, Israel   Munich, West Germany

Software Problem Report (SPR) forms are available from the specialists
or from the Software Distribution Centers cited below.

PROGRAMS AND MANUALS

Software and manuals should be ordered by title and order number. In
the United States, send orders to the nearest distribution center.

    Digital Equipment Corporation   Digital Equipment Corporation
    Software Distribution Center   Software Distribution Center
    146 Main Street   1400 Terra Bella
    Maynard, Massachusetts 01754   Mountain View, California 94043

Outside of the United States, orders should be directed to the nearest
Digital Field Sales Office or representative.

USERS SOCIETY

DECUS, Digital Equipment Computer Users Society, maintains a user ex-
change center for user-written programs and technical application in-
formation. A catalog of existing programs is available. The society
publishes a periodical, DECUSCOPE, and holds technical seminars in the
United States, Canada, Europe, and Australia. For information on the
society and membership application forms, write to:

    DECUS   DECUS EUROPE
    Digital Equipment Corporation   Digital Equipment Corporation
    146 Main Street   International (Europe)
    Maynard, Massachusetts 01754   PO Box 340
                                       1211 Geneva 26
                                       Switzerland
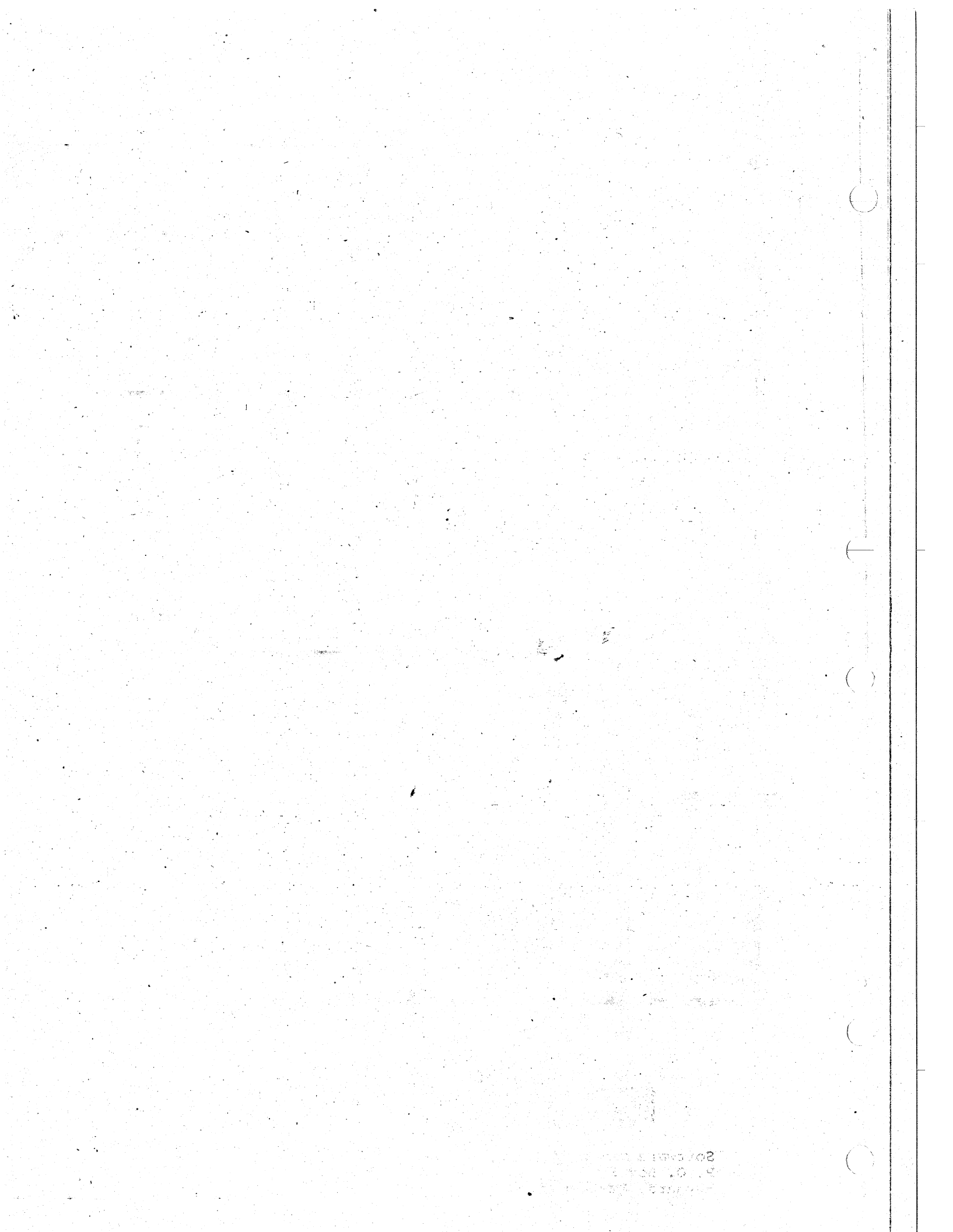
READER'S COMMENTS

> NOTE: This form is for document comments only. Problems
> with software should be reported on a Software
> Problem Report (SPR) form (see the HOW TO OBTAIN
> SOFTWARE INFORMATION page).

Did you find errors in this manual? If so, specify by page.

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Did you find this manual understandable, usable, and well-organized?
Please make suggestions for improvement.

_____
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Is there sufficient documentation on associated system programs
required for use of the software described in this manual? If not,
what material is missing and where should it be placed?

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Please indicate the type of user/reader that you most nearly represent.

- ☐ Assembly language programmer
- ☐ Higher-level language programmer
- ☐ Occasional programmer (experienced)
- ☐ User with little programming experience
- ☐ Student programmer
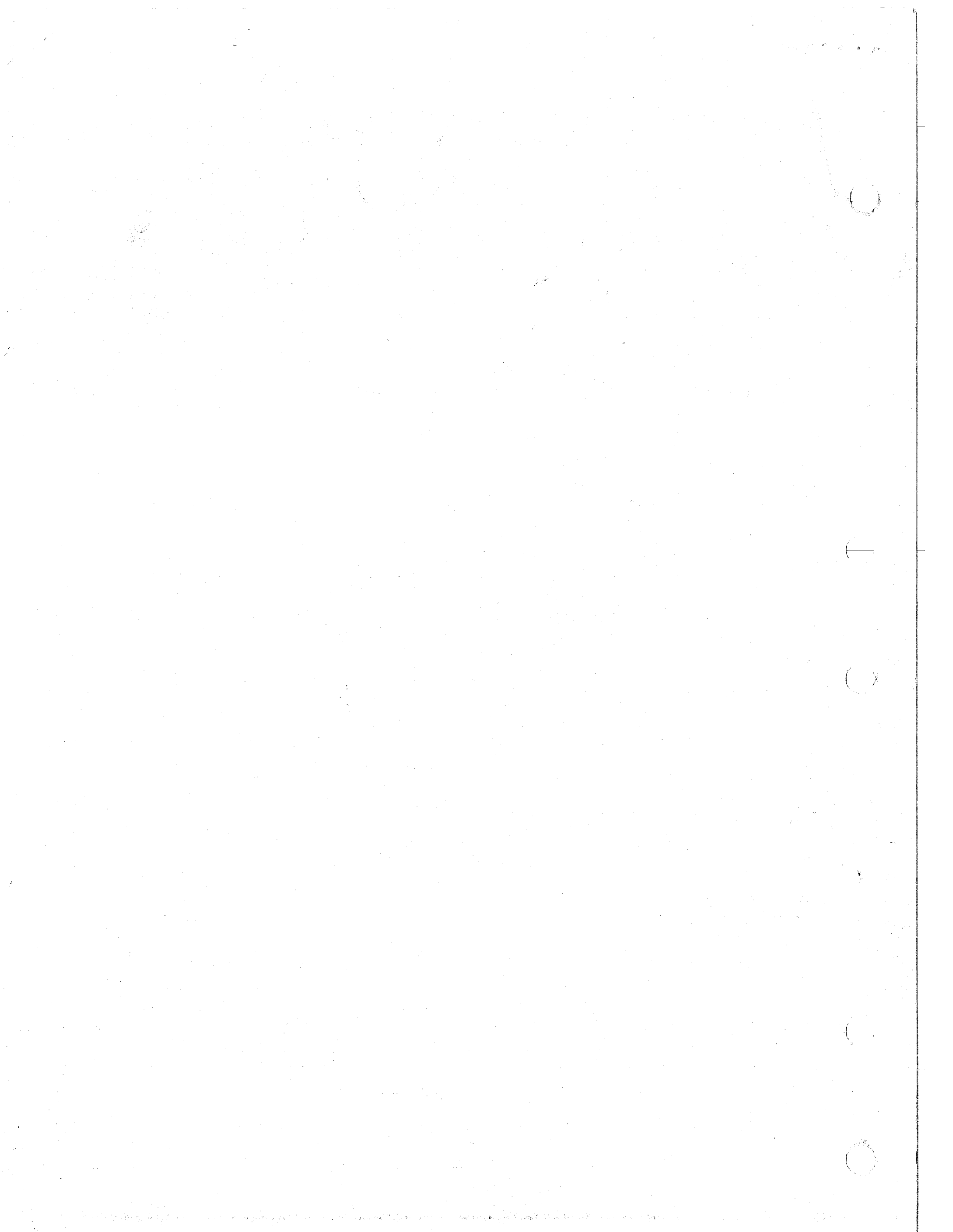- ☐ Non-programmer interested in computer concepts and capabilities

Name_____ Date _____

Organization_____

Street_____

City_____ State_____ Zip Code_____
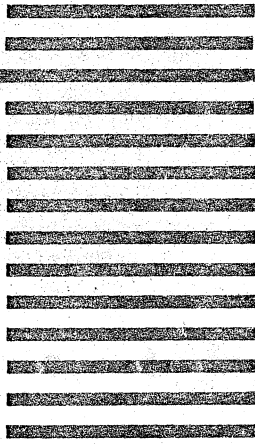   or
                                                    Country

If you do not require a written reply, please check here. ☐