WANG

2200

ICS 2780/3780 Emulation User Guide

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ICS
2780/3780 Emulation
User Guide

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PREFACE

Wang 2200 computer systems can be configured with many data communication capabilities through the 2200 Integrated Communications Services (ICS) product. This document describes only the capabilities provided by one communications software package, the ICS 2780/3780 emulation.

Chapter 1 of this user's guide describes the features of the ICS 2780/3780 emulation package. Chapter 2 details the system hardware and software requirements. Chapters 3-7 describe the operating procedures associated with the package. Screens and descriptions of required information are presented along with valid field values.

Appendix A describes the models of communications controllers available for use in operating the ICS 2780/3780 emulation software. Appendix B contains a glossary of terms applicable to the 2200 ICS product. Appendix C summarizes the operation of the emulation software. Appendix D describes the steps needed for establishing a communications connection. Appendix E describes code translation.

This user guide should be used in conjunction with the 2200 ICS Utilities Manual (700-7102) to operate the ICS 2780/3780 emulation package from a terminal. The user guide emphasizes the 2780/3780 protocol-specific on-line procedures, whereas the utilities manual emphasizes the protocol-independent off-line procedures.

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CHAPTER 1
PRODUCT DESCRIPTION

1.1 OVERVIEW

The 2200 ICS 2780/3780 emulation software is accessible from the 2200 Integrated Communications Services (ICS) system. This emulation software allows batch files and messages to be transmitted to other systems and terminals that support the IBM Binary Synchronous Communications (BSC) protocol with 2780 or 3780 device-type emulation; these systems and terminals can also send batch data to the 2200 processor. A 2200-to-2200 operating mode of the software allows data files, program files, document files, and messages to be transmitted between 2200 processors.

The IBM 2780 Data Transmission Terminal and the IBM 3780 Communication Terminal are remote batch terminals, each of which has a card reader, a printer, and optionally a card punch as input and output devices. These terminals communicate with each other and with IBM host computers using the BSC protocol, which has become the industry standard supported by many non-IBM host systems and remote batch terminals. The BSC protocol was originated by IBM to accommodate a broad range of medium- and high-speed equipment that uses a variety of transmission codes and communication links.

To operate the 2200 ICS 2780/3780 emulation software, a user should know how to schedule jobs for transmission between sites and establish communications with other sites. Chapter 5 describes the steps for scheduling a job for transmission, and Chapter 6 describes the steps for establishing communications and running a session.

1.2 FEATURES

This section lists the 2780/3780 protocol features supported by the 2200 ICS 2780/3780 emulation software. It describes file organization and the way that the software processes the data during telecommunications. Information needed by the 2780/3780 emulation software to establish a communications link is also briefly described. The user, however, need not read this technical material to be able to operate the 2200 ICS 2780/3780 emulation software; the material is presented primarily as background information.

1.2.1 Supported 2780/3780 Protocol Features

The 2200 ICS 2780/3780 emulation software supports the following 2780 and 3780 device features for BSC:

- EBCDIC and ASCII transmission
- Transparent transmission
- Space suppression (2780)
- Space compression (3780)
- Multirecord blocking
- Cyclic Redundancy Checking (CRC) for EBCDIC record blocks
- Longitudinal Redundancy Checking (LRC) for ASCII record blocks
- Automatic extended retransmission
- Wait-before-transmit positive acknowledgment (WACK)
- Component selection for received data
- Print-line format control
- Automatic turnaround
- Terminal identification
- Host identification
- Limited conversational mode
- Reverse interrupt (RVI)

The software also supports, by means of translation tables, data translation from and to ASCII, the standard code for the 2200 system. This feature enables information to be exchanged between 2200 data files that are coded in ASCII and remote systems that use codes other than ASCII. The software also provides for the creation of user-defined translation tables.

The ICS 2780/3780 emulation software is accessed from the 2200 ICS Utilities menu. Either foreground or background operation of the software can be selected from menus called up from the ICS Utilities menu.

1.2.2 File Types Transmitted

Three types of batch data files can be transmitted by the 2200 processor with the ICS 2780/3780 emulation software: telecommunication (TC) files, BASIC-2 catalogued files, and Word Processing (WP) files.

In the TC file format, data records are packed into 248-byte arrays. The records are basically 80-column card images, emulating 2780 or 3780 card reader input to a host computer or a remote 2780 or 3780 compatible terminal. Refer to the 2200 TC Support Utilities 1 User Manual for information on arranging files in TC format.

In the BASIC-2 catalogued file format, data is stored in 256-byte sectors. Both data and computer program files are stored in this format. In the WP file format, documents are stored in records with a maximum record length of 249 bytes.

The ICS 2780/3780 emulation software provides three operating modes for transmitting these files: 2780, 3780, and 2200-to-2200 mode. The 2780 mode uses the standard BSC protocol with 2780 device-type emulation to transmit TC files. The 3780 mode uses the standard BSC protocol with 3780 device-type emulation to transmit TC files. The 2200-to-2200 mode uses a modified version of the 3780 mode to transmit TC, BASIC-2 catalogued, and WP files. If the modified 3780 mode is used, the 2200 processor's sequential-file characteristics are retained, and WP documents need not be translated into a standard record file format before transmission. (The text of WP documents can be transmitted with the standard BSC protocol and either 2780 or 3780 device-type emulation. The documents must be translated into TC-file format, and Wang-specific document control information is not transmitted.)

1.2.3 Data Formatting for Transmission

Each device-type emulation has its own method of organizing data for transmission. This organization occurs prior to transmission of the data, and the original data file stored on disk is not altered. The 2780 emulation allows space suppression and record blocking of TC files, and the 3780 emulation allows space compression and record blocking of TC files. The 2200-to-2200 mode, which does not emulate a particular device, allows space compression during the transmission of TC files.

If space suppression with 2780 emulation or space compression with 3780 emulation is supported at the remote site, the TC-file card images are shortened, when possible, to increase communications efficiency.

The 2780 space suppression feature requires the transmitting system to delete trailing space characters that fill out a record shorter than 80 bytes. The receiving system replaces the space characters. The 3780 space compression feature requires the transmitting system to represent each group of repeated space characters (63 characters maximum) by a 2-character sequence defining the number of compressed (deleted) space characters. The receiving system removes each 2-character sequence and inserts the proper number of space characters. These functions are supported by the ICS 2780/3780 emulation software.

For the ICS 2780 emulation, the block size is 400 characters; this is the line buffer capacity of IBM 2780 terminals. Similarly, for the ICS 3780 emulation, the block size is 512 characters--the line buffer capacity of IBM 3780 terminals. These 400- or 512-byte blocks accommodate line control characters and blocked data records.

1.2.4 Message Formatting

Messages can be composed and queued by the user. Prior to transmission, they are saved as message files in TC-file format (refer to Section 5.3).

1.2.5 Data Transmission

When the 2200 ICS 2780/3780 emulation software is used in any mode to communicate with a system at another site, the receiving site checks each data block for accuracy before transmission continues. A line turnaround follows transmission of a data block to allow the receiving site to reply with a control code. The receiving site sends a positive acknowledgment (ACK) control character to indicate successful reception, or a negative acknowledgment (NAK) control character to signify unsuccessful reception. Automatic retransmission of the data block by the 2200 system follows a NAK unless the retry limit is reached for the data block.

Although TC-file data records are blocked before transmission in the 2780 or 3780 emulation, all the records within a TC-file sector are transmitted as a unit, without blocking, in the 2200-to-2200 mode.

BASIC-2 catalogued and WP files should be transmitted in the 2200-to-2200 mode. The data files and computer program files making up a BASIC-2 catalogued file are transmitted in half-sector (i.e., 128-byte) segments. WP files are transmitted record by record, with a maximum record length of 249 bytes.

When TC files are received from a host computer or remote terminal in the standard BSC protocol with 2780 or 3780 emulation, the emulation software deblocks the data records and performs any necessary space expansion (2780) or space decompression (3780). The data is stored on disk in Wang TC-file format.

In the 2200-to-2200 mode, the received disk streams are stored as TC files, BASIC-2 catalogued files, or WP files.

Further processing, such as printing, can be done later off-line, by means of the ICS Task Scheduling Utilities (refer to Chapter 7).

1.2.6 Code Compatibility, Translation, and Transparency

An IBM 2780 terminal can operate with one of three code structures: Extended Binary Coded Decimal Interchange Code (EBCDIC), American Standard Code for Information Interchange (ASCII), or Six-Bit Transmission Code (Six-Bit Transcode). An IBM 3780 terminal can operate with either EBCDIC or ASCII, but not both. Thus, 2780 or 3780 terminals equipped for a particular code are not compatible with terminals or host front-end processors equipped for a different code. For example, an ASCII-equipped 2780 or 3780 terminal cannot encode or decode EBCDIC or transparent-mode ASCII.

There is no code incompatibility between the 2200 system and either EBCDIC- or ASCII-equipped devices when the 2200 ICS 2780/3780 emulation software is used. This is true because the software supports both EBCDIC and ASCII as transmission and reception code sets. For example, data received in EBCDIC can be translated into ASCII for printing on a Wang printer, and ASCII file data can be translated into EBCDIC for transmission to a site equipped for EBCDIC (refer to Appendix E).

The emulation software also supports transparent-mode communications, which are useful, for example, in the transmission of binary data.

1.2.7 Communications Link

Support personnel supply the ICS system with information describing the communications link to be set up. To do this, they use the ICS Remote Definition function, working when communications are not underway (refer to Chapter 4). The necessary information includes the communications controller device address, the type of communications device that the 2200 system is emulating, the type of line connection between the sites, details on the BSC protocol, and details on the organization of the data to be sent or received. When the user starts a session, the 2200 ICS 2780/3780 emulation software loads the necessary emulation microcode into the Data Link Processor (DLP) in the communications controller.

CHAPTER 2
SYSTEM REQUIREMENTS

2.1 HARDWARE REQUIREMENTS

Operation of the ICS 2780/3780 emulation software requires use of a communications controller and a modem. The communications controller exchanges information with the 2200 processor, and performs the activities associated with the communications network, such as sending and receiving the information over the communications line. The modem interfaces the controller to the leased or switched communications line. A Wang null modem can be used for local connection. The amount of 2200 processor memory partitioned for operation of the ICS 2780/3780 emulation software is determined by the types of files being communicated.

2.1.1 Communications Controller

A 2228D Communications Controller is required for the 2200 LVP or MVP processor, whereas the 2200 SVP processor requires an Option 28D controller. Several models of each type of controller are available (refer to Appendix A). Resident in the controller is an addressable Data Link Processor (DLP), into which emulation microcode can be loaded by a program resident in the 2200 system. The DLP controls the attached communications line, according to the protocol of the loaded microcode.

Two connectors are associated with the controller. The first connector satisfies the specification of the Electronic Industries Association (EIA) Standard RS-232-C. This standard defines the electrical interface between Data Terminal Equipment (DTE), such as a computer or CRT terminal, and Data Communication Equipment (DCE), such as a modem or data set. The EIA RS-232-C specification is compatible with the Consultative Committee on International Telephony and Telegraphy (CCITT) Standard V.24. Thus, the RS-232-C/V.24-compatible connector on the controller accepts the cable from a modem, and the modem becomes the interface between a leased or switched line and the controller.

The second connector allows use of an Automatic Calling Unit (ACU). This connector is compatible with the RS-366/V.25 standards. Although the ICS 2780/3780 emulation package will support use of an ACU, such a device is not required.

2.1.2 Modem

A modem (modulator-demodulator) is used to modulate the digital signals from the controller into a range of frequencies (analog signals) suitable for transmission over communication lines. The modem also demodulates received signals before their transfer to the controller. The suitable modem for the ICS 2780/3780 emulation software is an RS-232-C/V.24-compatible synchronous unit with a line speed not exceeding 19,200 bits per second (bps). Modems at both ends of a communications line must be compatible with each other. For example, the clocking rates for synchronous modems must be the same.

In some countries, modems are available from several independent modem manufacturers. Also, a telephone company that serves the site of an installed 2200 computer system may offer modems for rent. Upon request, Wang representatives will provide a list of modem suppliers and manufacturers.

In the United States, Federal Communications Commission (FCC) regulations (Part 68) specify that before connecting a modem to the switched telephone network, the user must provide the local telephone company with the name of the manufacturer of the device to be attached. The user must also provide the modem model number, FCC registration number, and ringer equivalence number. This information is available from the modem manufacturer.

2.1.3 Null Modem

For communications up to 50 feet (15.2 meters), a pair of RS-232-C/V.24-compatible cables and one Wang Model 2228N Null Modem can be used for local connection of Wang RS-232-C/V.24-compatible DTEs. This small, dual-plug Wang device ensures that the conductor transmitting data (RS-232-C/V.24, Pin 2) from one DTE unit is connected to the conductor receiving data (RS-232-C/V.24, Pin 3) at the other DTE unit. The null modem eliminates the need for other modems or a telephone line for local connection.

To accommodate a null modem, the controller in the DTE unit managing the telecommunications operation generates a clocking signal on Pin 11 in the RS-232-C/V.24 connector to which the null modem cable is attached. This clocking signal synchronizes bit flow between the DTE units. The ICS 2780/3780 emulation software allows a user to set the clocking signal rate to 2400, 4800, 9600, or 19,200 bps.

Because the dual-plug 2228N null modem has polarity, its clocking signal plug must receive the cable from the controller generating the clocking signal. The other plug must receive the cable from the DTE that is being locally connected to the controller. No damage results, however, if the null modem is initially installed incorrectly. If no data transfer takes place, reverse the position of the null modem.

2.1.4 Automatic Calling Unit

The ICS 2780/3780 emulation software supports use of an Automatic Calling Unit (ACU) that is operationally equivalent to a V.25-compatible ACU or to any of the following ACU models: a Bell 801A, Bell 801C, or Bell 801C L1/2. Reference to these ACUs does not imply endorsement of particular manufacturers; however, in the contiguous United States, Bell Telephone ACUs and modems have become standard, and ACUs from other manufacturers are tested against these units to determine their compatibility.

2.1.5 2200 Processor Memory

Table 2-1 summarizes the 2200 processor memory partition sizes required for various activities of the ICS 2780/3780 emulation software. The table lists the activities and the amount of memory to be set aside for each in a partition. The partition serving universal global requirements contains information that needs to be shared among partitions and is accessible from all the other partitions. The ICS communications routing program controls the information flow between the 2200 processor and the communications controller. Refer to the 2200 ICS Utilities Manual for more information on ICS memory configuration requirements.

Table 2-1. 2200 Processor Memory Requirements

Activity	Partition Size
Sending and receiving TC and BASIC-2 catalogued files	28K
Sending and receiving TC, BASIC-2 catalogued, and WP files	52.25K
Universal global requirements	5K
ICS communications routing program	3.75K

2.2 SOFTWARE REQUIREMENTS

The 2200 ICS software required for the operations described in this document is supplied by Wang Laboratories, Inc. on master diskettes. The ICS Utilities software is supplied on three single-sided, single-density diskettes or one double-sided, dual-density diskette. The 2780/3780 emulation software is supplied on two single-sided, single-density diskettes or one double-sided, dual-density diskette. The ICS Utilities software must be installed first. After loading into the diskette drive the first (or single) master diskette containing the Utilities, the user at the terminal loads the INSTLCAP program from the diskette and runs the program. INSTLCAP, the Install Utilities Package function, allows the user to install the ICS Utilities software onto the user's 2200 system. The program pauses, if necessary, to allow mounting of the second and third single-sided diskettes. After the ICS Utilities software is installed, the user can select a function for installing the 2780/3780 emulation software. The installation procedures, initiated from the 2200 ICS Utilities menu, can be used after installation to update all or part of the ICS software, both ICS Utilities and emulations. Refer to the 2200 ICS Utilities Manual for instructions on installing and updating the system software.

CHAPTER 3
GENERAL PROCEDURES

3.1 OVERVIEW OF A COMMUNICATIONS SESSION

A communications session takes place between devices at separate sites; such devices communicate when they have information (referred to as a job) to transmit between them. Table 3-1 lists the procedures for conducting a session. The off-line procedures take place prior to a session, whereas the on-line procedures take place during a session. By answering prompts on a workstation screen, the user participates in the procedures indicated as interactive. The system rather than the user is responsible for the noninteractive procedures. As the table shows, several procedures can be either interactive or noninteractive. Note that all off-line procedures are interactive.

Table 3-1. Procedures for Conducting a Session

Procedure	Off-Line Interactive	On-Line Interactive	On-Line Noninteractive
Specifying a telecommunications connection	X		
Scheduling a job to be transmitted	X	X	
Starting communications processing	X		
Starting a session		X	X
Conducting a session		X	X
Terminating a session		X	X

Several other actions besides those listed in Table 3-1 may be needed to initialize the 2200 telecommunications (TC) software. These other actions are all off-line and are performed before actual communications begin. Many of the actions are the responsibility of the site supervisor or other system support personnel. The actions are briefly described in Chapter 7; the 2200 ICS Utilities Manual discusses them in greater detail. Emphasis in this manual is placed on the following procedures, which are listed in Table 3-1 and which are needed to conduct a TC session:

- Specifying a telecommunications connection -- By means of the ICS Remote Definition function, system support personnel provide the system with information for making the connection with a remote site. Chapter 4 describes the way in which a TC connection is specified.

- Scheduling a job to be transmitted -- The user provides the system, by means of the Schedule Job function, with information about each job to be transmitted. Chapter 5 describes the way in which the user schedules a job off-line. During a manually conducted session, the user can also provide the system with the same information for a single job; Section 6.5 describes this special situation.

- Starting communications processing -- Before going on-line to conduct a session, the user accesses the Establish Communications function. The user then chooses a protocol (Batch Bisync for the emulation described in this user guide) and either manual or automatic processing. Refer to Section 6.2.

- Starting a session -- The system goes on-line to a remote site, either manually or automatically. Refer to Sections 6.3, 6.4, and 6.5.

- Conducting a session -- The system conducts a session with the remote site. The user can either control the session completely from the terminal or delegate some or all of the functions to software control. Refer to Sections 6.3, 6.4, and 6.5.

- Terminating a session -- The system terminates a session, normally after the last job has been transmitted between the local and remote sites. However, the user may be able to terminate a job or a session from the terminal, depending on the choice of manual or automatic processing made above. Refer to Sections 6.4, 6.5, and 6.7.

3.2 ACCESSING THE SOFTWARE FROM A TERMINAL

To begin any of the procedures listed in Table 3-1, the user chooses options from the Integrated Communications Services Utilities menu (Figure 3-1). (Refer to Chapters 4, 5, and 6 for more detailed information.) The complete set of off-line ICS Utilities includes (1) Task Scheduling Utilities, (2) Activate Task Scheduler, (3) Communications Utilities, and (4) Supervisory Utilities. The functions of the ICS 2780/3780 emulation software are accessed from the Establish Communications option. Selecting various functions from the ICS Utilities menu permits the user to configure the TC network, schedule TC sessions, carry out the sessions, and prepare for and undertake various tasks such as file updating and printing.

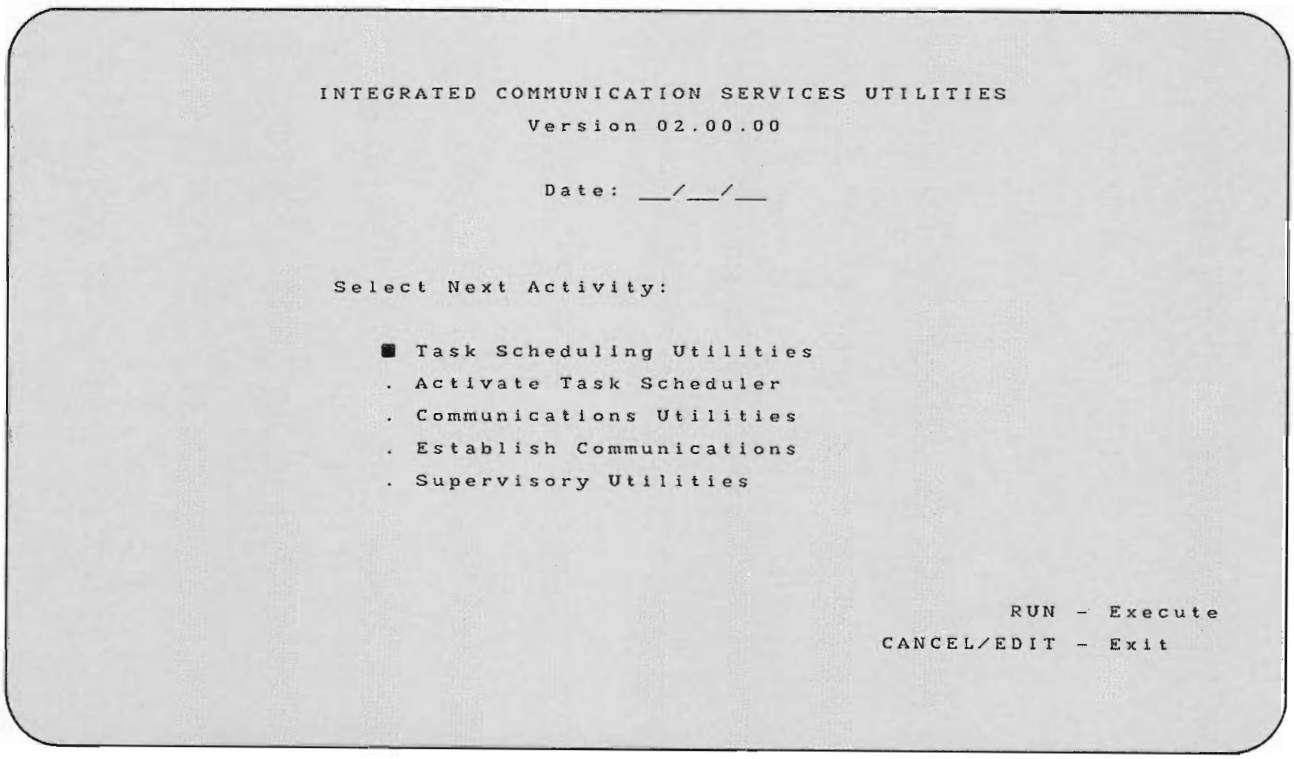

Figure 3-1. Integrated Communication Services Utilities Menu

The remaining chapters of this manual discuss the Supervisory Utilities, Communications Utilities, and Establish Communications procedures, particularly as they apply to the ICS 2780/3780 emulation software.

Refer to Appendix C for a summary of the procedure for operating the 2200 ICS 2780/3780 emulation software.

CHAPTER 4
SPECIFYING A TELECOMMUNICATIONS CONNECTION

4.1 GENERAL INFORMATION

To specify a TC connection, the user provides the 2200 ICS Utilities software with information, called a Remote Definition (RD), that defines the following:

- The communication capabilities of the local 2200
- The line and modem characteristics of the connection
- Aspects of the BSC protocol used in the connection
- The options selected for the device being emulated by the local 2200

During the start of communications processing with a particular site, the ICS 2780/3780 emulation software uses this RD to set up a TC connection between the sites.

NOTE

Information on the addition, modification, and deletion of remote definitions is intended for supervisory or system support personnel. The applicable software modules are contained within the ICS Supervisory Utilities and are password protected.

An RD is created only once for each remote site; it is set up by means of the Remote Definition function. Once the RD information has been specified, it can be selected by the user or the ICS software whenever it applies to the particular connection being made to a remote site. The user makes the selection during manual processing, whereas the software makes the selection during automatic processing. TC connections can be specified all at one time or at different times. The user can describe new RDs by means of the information in RDs already entered on the ICS system.

When the characteristics of a particular connection change, the user needs to modify the RD. When a connection is no longer needed, the user can delete the RD involved. These steps are done by means of the Remote Definition function.

4.2 ACCESSING THE REMOTE DEFINITION FUNCTION

Accessing the ICS Remote Definition function involves making selections on a series of menus. To make a selection from each menu when it is displayed, press the space bar on the terminal to move the acceptance block to the screen entry desired. Press BACK SPACE to move the acceptance block in the reverse direction. Press CANCEL/EDIT to return to the immediately preceding menu.

Accessing the ICS Remote Definition function involves the following:

1. Select Supervisory Utilities from the ICS Utilities menu (Figure 3-1). Press RUN. The following prompt appears: "Please Enter Supervisor's Password".

2. Enter the correct password and press RUN. The Supervisory Utilities menu (Figure 4-1) appears.

3. Select Communications Supervisory Functions from the Supervisory Utilities menu and press RUN. The Communications Supervisory Functions menu (Figure 4-2) appears. The message QUEUE LOCKED or QUEUE UNLOCKED indicates the status of the communications job queue and does not apply when a TC connection is being specified (refer to the 2200 ICS Utilities Manual for more information).

4. Select Remote Definition Functions from the Communications Supervisory Functions menu and press RUN. The Remote Definition Function screen (Figure 4-3) appears.

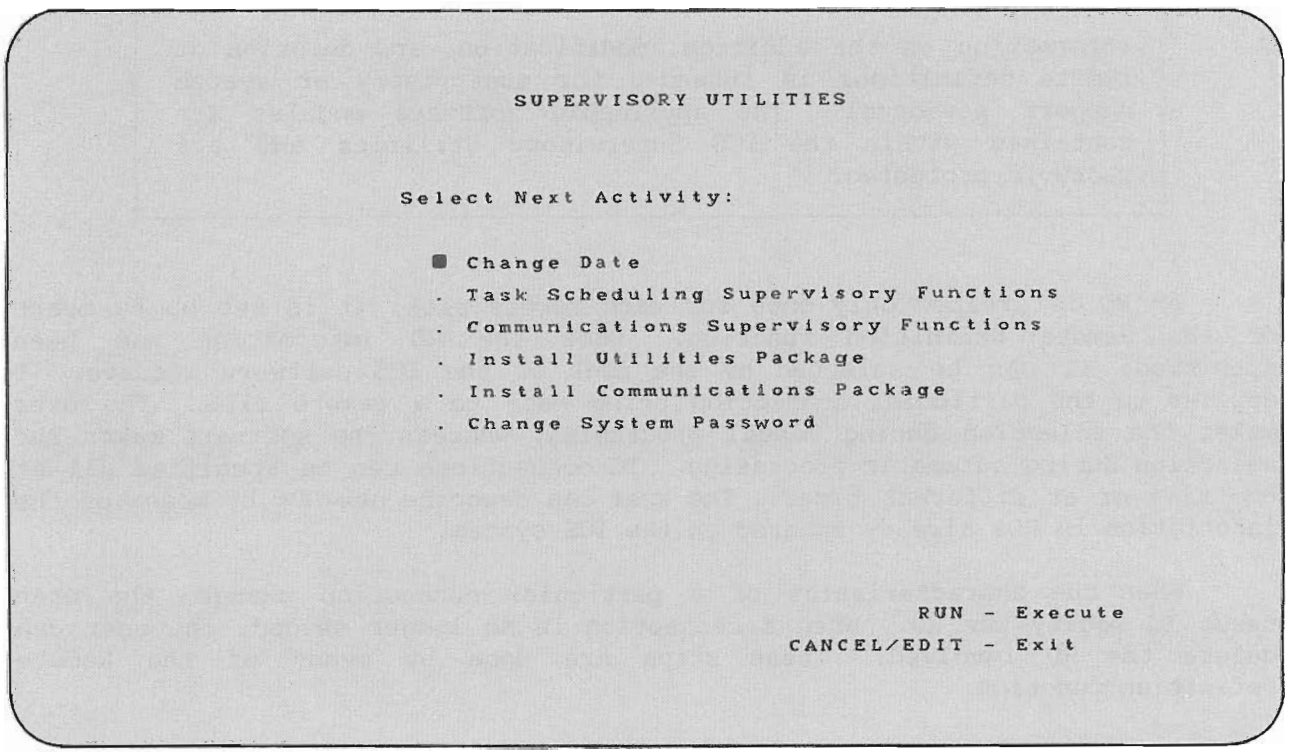

Figure 4-1. Supervisory Utilities Menu

```
                 COMMUNICATIONS SUPERVISORY FUNCTIONS

                        Select Next Activity:

                         ■ Remote Definition Functions
                         . Translation Table Functions
                         . Initialize Remote Definition File
                         . Initialize Translation Table File
                         . Unlock Communications Queue
                         . Initialize Communications Queue
                         . Change Disk Addr for Communications Files

                                                          RUN - Execute
   QUEUE UNLOCKED                                 CANCEL/EDIT - Exit
```

Figure 4-2. Communications Supervisory Functions Menu

```
                        REMOTE DEFINITION FUNCTION

Select Remote Definition Name:

 ■ XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX
 . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX  . XXXXXX - XXXXXXXXXXXX

'2/PREV SCRN - Previous Entries
'3/NEXT SCRN - Next Entries
          '9 - Delete Selected Entry                        RUN - Execute
         '10 - Add Entry                            CANCEL/EDIT - Exit
```

Figure 4-3. Remote Definition Function Screen

The Remote Definition Function screen lists by name and associated protocol all the RDs stored on the ICS system. Other protocol emulators besides BSC (which is labeled Batch Bisync on the screen) may be loaded onto your system. If any of them are loaded, the RD names associated with them appear on the screen, provided that the names have previously been added. These other emulators and the associated RD names are not discussed in this manual.

Initially, 24 RD names are displayed. (Fewer appear if fewer than 24 RDs have been created.) The user can press SF'3 to scroll forward through the list of RD names; each time SF'3 is pressed, the next 24 RD names on the list are displayed. When the last RD names on the list are displayed, pressing SF'3 one more time causes the prompt "End of List" to appear. Pressing SF'2 causes the display to scroll backward through the list of RD names; each time SF'2 is pressed, the previous 24 RD names in the list are displayed. When the first 24 RD names on the list are displayed, pressing SF'2 causes the prompt "Beginning of List" to appear.

Any of the following functions can be chosen from the Remote Definition Function screen: adding an RD (refer to Section 4.3), modifying an RD (refer to Section 4.4), or deleting an RD (refer to Section 4.5).

Table 4-1 summarizes the functions that can be accessed from the Remote Definition Function screen.

Table 4-1. Remote Definition Functions

Key	Meaning	Function
SF'2/PREV SCRN	Previous entries	Press to scroll backward in the list of RD names.
SF'3/NEXT SCRN	Next entries	Press to scroll forward in the list of RD names.
SF'9	Delete selected entry	Move the acceptance block next to the entry to be deleted, and press SF'9 to delete the RD from the ICS system (refer to Section 4.5).
SF'10	Add entry	Call up the first of a series of screens for adding an RD to the system (refer to Section 4.3).
RUN	Execute	Press to review or modify a specific RD after moving the acceptance block next to the entry for that RD (refer to Section 4.4).
CANCEL/EDIT	Exit	Press to exit from the Remote Definition Function screen. The Communications Supervisory Functions menu appears.

4.3 ADDING A REMOTE DEFINITION

Pressing SF'10 from the Remote Definition Function screen (Figure 4-3) calls up the Add Remote Definition screen (Figure 4-4), the first of a series of four screens for adding a 2780/3780 RD to the ICS system. The Add Remote Definition screen allows the user to select the protocol to be used with the TC connection that is being specified. The other three screens allow selection of parameter values for certain characteristics of the TC connection, such as line type, modem operating characteristics, BSC protocol options, and options associated with the device being emulated by the local 2200.

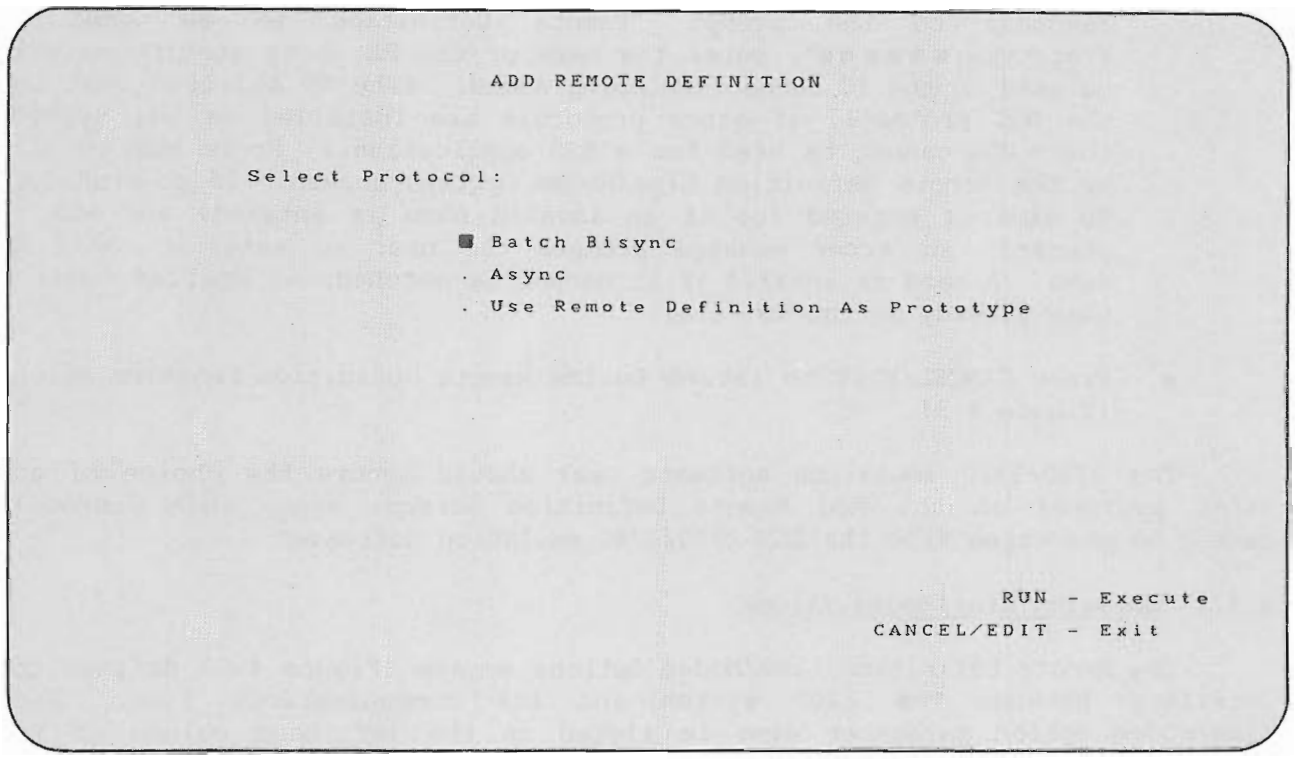

Figure 4-4. Add Remote Definition Screen

The Add Remote Definition screen lists all the protocol emulators available on the user's 2200 system. It allows the user to choose the protocol for the TC connection about to be added to the RD file. In a connection where the 2200 system emulates a 2780 or 3780 terminal (devices that use the BSC protocol), the user should choose Batch Bisync or Use Remote Definition As Prototype. In a 2200-to-2200 connection, the BSC protocol is used, and the user should select Batch Bisync or Use Remote Definition As Prototype.

The selection made from the Add Remote Definition screen influences the information displayed on the remaining three screens. Choosing Batch Bisync calls up parameters containing default values pertaining to the BSC protocol.

(Any parameter fields without default values are set to 0s or spaces.) Choosing an RD prototype calls up parameters containing the same values as the prototype TC connection. If the parameter values of a stored RD closely or completely match the values of the RD about to be added, the user should select the stored RD to serve as the prototype for the new RD.

The following alternative steps can be taken from the Add Remote Definition screen:

- Select Batch Bisync and press RUN. The Remote Definition Line/Modem Options screen (Figure 4-5) appears.

- Select Use Remote Definition As Prototype and press RUN. In response to the prompt "Remote Definition to Be Used as Prototype:■■■■■■", enter the name of the RD whose attributes will be used in the TC connection being added. (The RD selected must use the BSC protocol; if other protocols are installed on the system, their RDs cannot be used for a BSC application.) Press RUN to call up the Remote Definition Line/Modem Options screen. If no prototype RD name is entered (or if an invalid name is entered) and RUN is pressed, an error message prompts the user to enter a valid RD name. A name is invalid if it cannot be matched, as spelled, with a name already on the RD file.

- Press CANCEL/EDIT to return to the Remote Definition Function screen (Figure 4-3).

The 2780/3780 emulation software user should ignore the choice of any other protocol on the Add Remote Definition screen, since such protocols cannot be processed from the ICS 2780/3780 emulation software.

4.3.1 Choosing Line/Modem Values

The Remote Definition Line/Modem Options screen (Figure 4-5) defines the interface between the 2200 system and the communications line. Each line/modem option parameter name is listed in the left-hand column of the screen. A corresponding value is listed in the middle column, and a prompt is given in the right-hand column. The prompt helps the user to choose a valid value.

The middle column may already contain values when the user first views it. These values will have been entered in one of two ways: They may have been entered for a previously stored RD if the Remote Definition as Prototype option is being used, or they may be the ICS 2780/3780 default values.

After entering a valid RD name and pressing RETURN, the user can review and accept or change each parameter value. The parameters are displayed dynamically in groups; i.e., as the user chooses parameter values, the choice made determines which parameters appear in the subsequent groups. The user can accept or change the parameter values within a group before advancing to the next group. Acceptance involves pressing RETURN to advance the cursor to the next parameter within a group or pressing RUN to advance the cursor to the next group. Changing a parameter value involves reentering the contents of specific character positions. The SF'12 (right arrow) and SF'13 (left arrow)

keys can be used, if needed, to move the cursor nondestructively to the positions involved. Each time one of these keys is pressed, the cursor moves one position to the right or left through the displayed parameter values of the group currently being reviewed. If either the start or the end of the group has been reached when one of the keys is pressed, the cursor starts recycling through the group.

Table 4-2 lists the line/modem parameters by groups and the parameter default values; the table also defines the parameters and lists other valid values when applicable. The group numbers show the order of appearance that

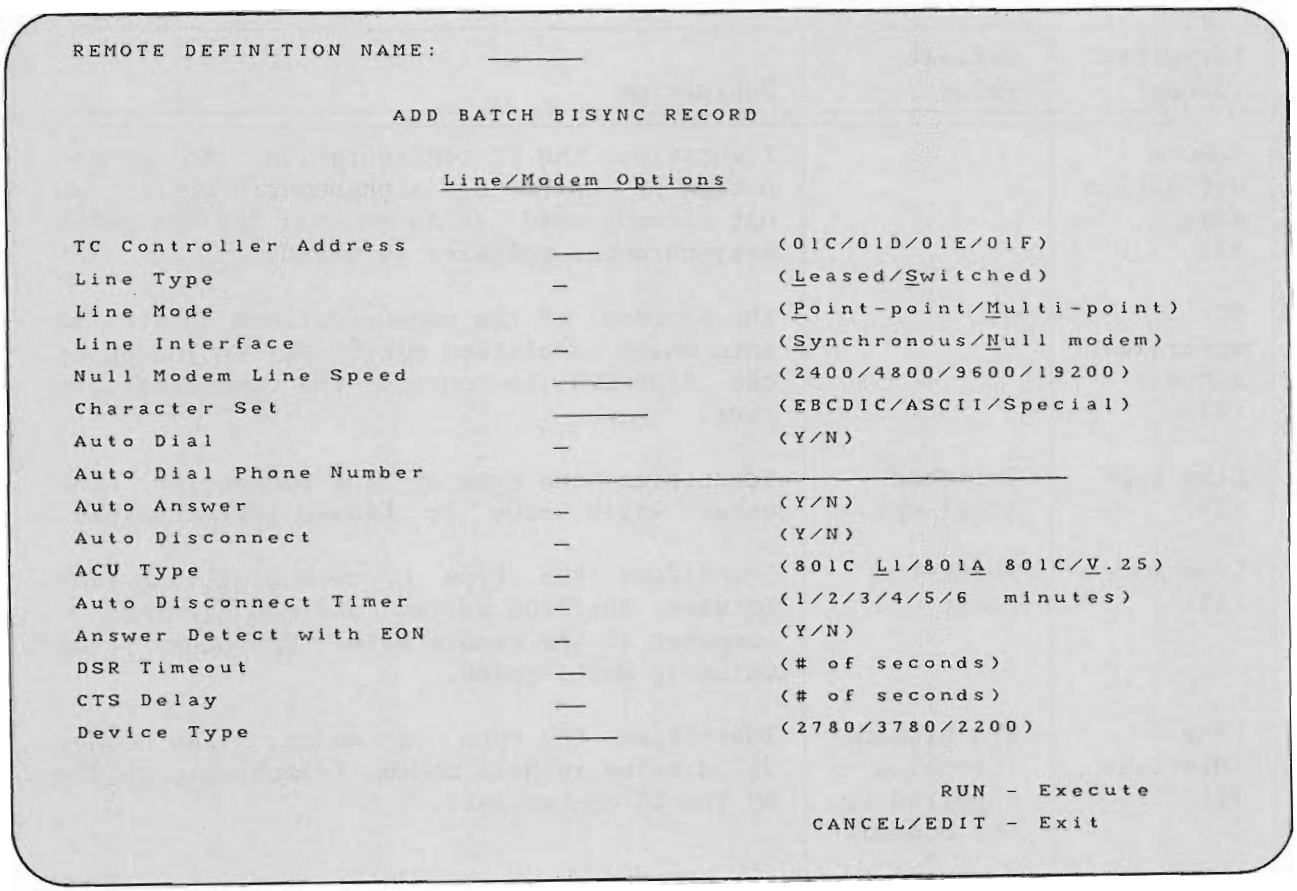

Figure 4-5. Remote Definition Line/Modem Options Screen

NOTE

If this screen is displayed from the Modify RD option (refer to Section 4.4), the following prompt appears on Line 22, in the lower left corner of the display:

'11 - Complete Modification

the parameter groups would have if all parameters were to appear on the screen. However, every parameter does not necessarily appear. For instance, if the user accepts the defaults shown for the Group I parameters, the Group II parameter will be Character Set, not Line Mode, since the intervening parameters do not apply when the Group I default values are accepted. Some conditions that help determine whether a parameter appears in a TC connection specification are described following the table.

Table 4-2. Line/Modem Parameters

Parameter (Group)	Default Value	Definition
Remote definition name (I)		Identifies the TC configuration. Any combination of up to six alphanumeric characters not already used as an RD name for the batch bisynchronous software is valid.
TC controller address (I)	01C	The address of the communications controller into which emulation microcode is loaded by the 2200 CPU to control the communications line.
Line type (I)	Switched (dial-up)	Identifies the type of line connection. The other valid value is Leased (direct-line).
Line mode (II)	Point-to-point	Identifies the type of communications link between the 2200 system and the terminal or computer at the remote site. The other valid value is Multi-point.
Line interface (III)	Synchronous (clocking supplied by the modem)	Identifies the type of modem. The other valid value is Null modem (clocking supplied by the TC controller).
Null modem line speed (IV)	2400 bits per second	Identifies the rate at which data is to be transferred by the null modem connection. The other valid values are 4800, 9600, and 19200 bits per second.
Character set (IV)	EBCDIC	Identifies the character set to be used for communications. ASCII is the alternative standard code set available. A translation table created using the Translation Table functions is another alternative (refer to the 2200 ICS Utilities Manual).
Auto dial (V)	No (manual dialing)	Specifies whether an Automatic Calling Unit (ACU) is to establish the connection. The other valid value is Yes (automatic dialing).

Table 4-2. Line/Modem Parameters (continued)

Parameter (Group)	Default Value	Definition
Auto dial phone number (VI)		Identifies the telephone number of the site to be called by the ACU. A combination of up to 32 of the following characters is valid: 0 through 9, *, and #.
Auto answer (VI)	No (manual answering)	Specifies whether the 2200 system is to respond automatically to a call initiated from another system. The other valid value is Yes (automatic answering).
Auto disconnect (VI)	No (manual discon-necting)	Specifies whether the 2200 system is to disconnect the line automatically if there is no activity on the line for a specified amount of time. The other valid value is Yes (automatic disconnecting).
ACU type (VI)	L (Bell 801C L1)	Specifies the type of automatic calling unit. The other valid values are A (Bell 801A or 801C) and V (V.25 compatible).
Auto disconnect timer (VII)	1 minute	Specifies the number of minutes with no activity the 2200 system should wait before disconnecting the line. The other valid values are all whole numbers from 2 through 6.
Answer detect with EON (VIII)	No (detect the answer without EON)	Specifies whether the automatic calling unit must receive the End-of-Number signal from the local site before detecting the answer to an automatically placed call. The other valid value is Yes (detect the answer after receiving EON).
DSR timeout (IX)	01 second	Specifies the number of seconds to wait for the Data Set Ready signal to be returned by the modem after the Data Terminal Ready signal has been sent by the local site. The other valid values are all whole numbers from 02 through 99.
CTS delay (IX)	01 second	Specifies the number of seconds to wait for the Clear To Send signal to be returned after the Request To Send signal has been sent. The other valid values are all whole numbers from 00 through 99.
Device type (IX)	2780	Specifies the type of device to be emulated by the 2200 system. The other valid values are 3780 and 2200.

Various conditions affect the selection of values for the line/modem parameters and even help determine whether a parameter appears in the specification of a TC connection. The following list details the conditions:

- TC controller address -- For this parameter, device addresses of 01C, 01D, 01E, and 01F are accepted. Each controller installed on a 2200 system is assigned one of these addresses during installation (by means of a hardware switch on the controller). For a program to access the controller for communications, this device address, along with the appropriate secondary device address (09C, 09D, 09E, or 09F), must be specified in the device table of the 2200 system configuration currently loaded. Thus, to be addressable by a software package such as the ICS 2780/3780 emulation, a controller installed with a device address of 01C must be specified in the 2200 system configuration by device address 01C and secondary device address 09C. The user need only specify the 01 address in an RD.

- Line mode -- Appears only when the Line Type selection is Leased.

- Line interface -- Appears only when the Line Type selection is Leased.

- Null modem line speed -- Appears only when the Line Interface selection is Null modem.

- Auto dial -- Appears only when the Line Type selection is Switched.

- Auto dial phone number -- Appears only when the Auto Dial selection is Yes. The wait for a second or third dial tone is denoted by a comma (,). The last character must be a period (.), signifying the end of the phone number. An example of a correctly formatted phone number is 90,12345,4595000., with the period indicating the end.

- Auto disconnect -- Appears only when the Line Type selection is Switched.

- ACU type -- Appears only when the Line Type selection is Switched and the Auto Dial selection is Yes.

- Auto disconnect timer -- Appears only when the Line Type selection is Switched and the Auto Disconnect selection is Yes.

- Answer detect with EON -- Appears when the ACU Type is L or A.

- DSR timeout -- Appears only when the Line Type selection is Leased.

Table 4-3 summarizes the functions that can be accessed from the Remote Definition Line/Modem Options screen during RD addition.

Table 4-3. Line/Modem Functions During RD Addition

Key	Meaning	Function
RUN	Execute	Press to move the cursor to the start of the next group of parameters. If all the line/modem parameters have been displayed, the Remote Definition Protocol Options screen (Figure 4-6) is displayed.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Line/ Modem Options screen (Figure 4-5). The Remote Definition Function screen (Figure 4-3) is restored. The RD is not added.

4.3.2 Choosing Protocol Values

The Remote Definition Protocol Options screen (Figure 4-6) defines the BSC parameters controlling the flow and synchronization of data between the 2200 system and the terminal or host at the other end of a connection. Each protocol option parameter name is listed in the left-hand column of the screen. A corresponding value is listed in the middle column, and a prompt is usually given in the right-hand column. The prompt helps the user to choose a valid value.

The middle column of the Remote Definition Protocol Options screen may already contain values when the user first views it. These values will have been entered for a previously stored RD, or they will be the ICS default values. The question of which they are depends on the user's choice on the Add Remote Definition screen (Figure 4-4) and on the presence of BSC default values on the ICS system.

The user can review and accept or change each parameter value. Acceptance involves pressing RETURN to advance the cursor to the next parameter. Changing a parameter value involves reentering the contents of specific character positions, as described in Section 4.3.1. All the protocol-option parameters appear at the same time on the screen. After all the parameter values are acceptable, the user presses RUN to advance the cursor to the start of the device-option parameters, which are described in Section 4.3.3. RUN can be pressed at any time, and there is no need to step through the whole list.

Table 4-4 lists the protocol parameters and the parameter default values; the table also defines the parameters and lists other valid values. Table 4-5 summarizes the functions that can be accessed from the Remote Definition Protocol Options screen during RD addition.

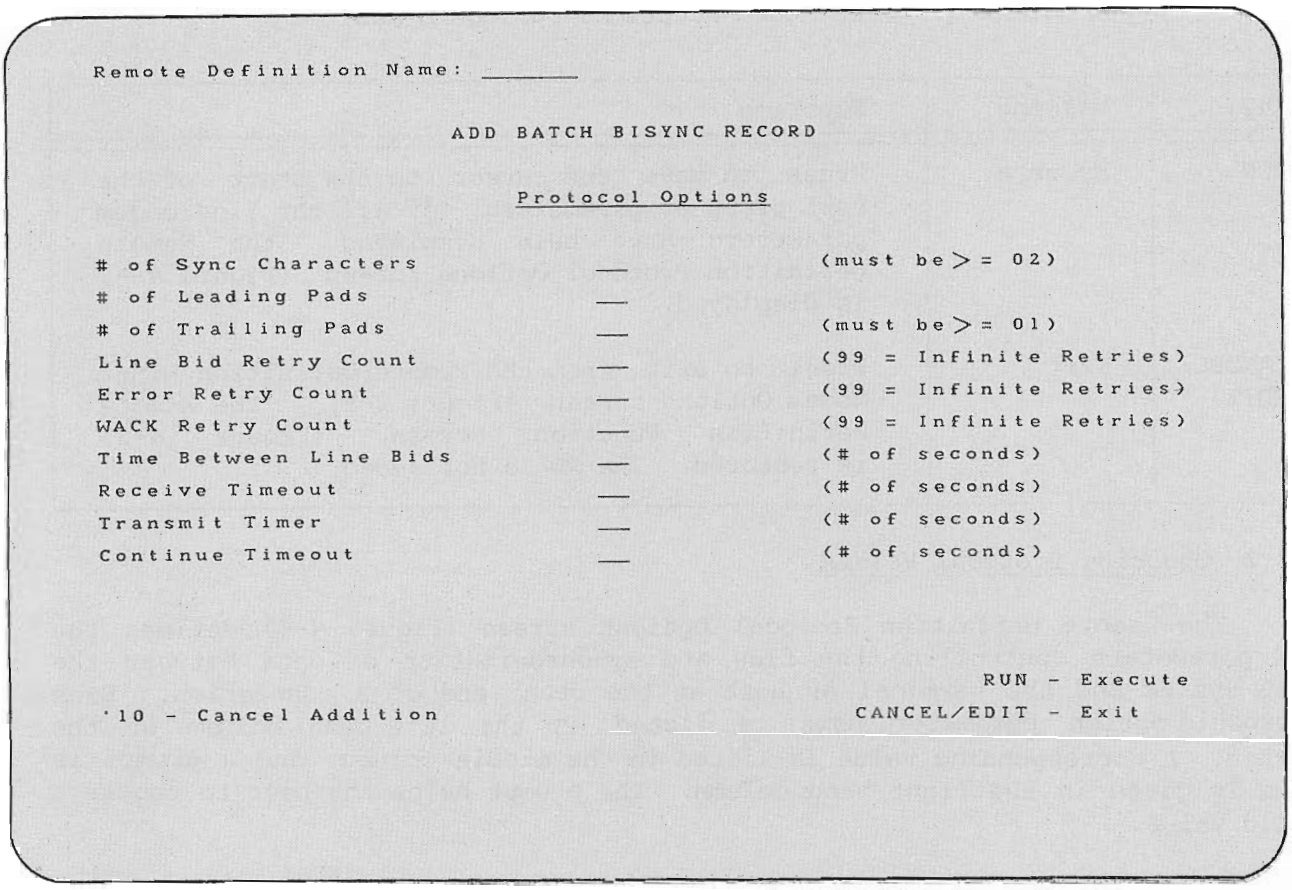

Figure 4-6. Remote Definition Protocol Options Screen

NOTE

If this screen is displayed from the Modify RD option (refer to Section 4.4), the following prompts appear on Lines 21 and 22, in the lower left corner of the display:

'10 - Cancel Modification
'11 - Complete Modification

Table 4-4. Protocol Parameters

Parameter	Default Value	Definition
Number of sync characters	03	The number of synchronization characters (SYN) to be transmitted by the modem before each block of data. The sync characters establish character phase. The other valid values are all whole numbers from 02 through 99.
Number of leading pads	02	The number of pad characters to precede the synchronization characters. The pad characters ensure that the first sync character is not sent before the other station is ready to receive. The other valid values are all whole numbers from 01 through 99.
Number of trailing pads	01	The number of pad characters to follow each block of data. The pad characters ensure that the last significant character (e.g., ETX BCC or NAK) is sent before the modem transmitter turns off. The other valid values are all whole numbers from 02 through 99.
Line bid retry count	15	The number of times the 2200 system bids for the line before a line bid timeout occurs. The other valid values are all whole numbers from 01 through 99 (99 equals an infinite number of retries).
Error retry count	07	The number of times that the 2200 system accepts the repeat of a given error condition before it sends an EOT to terminate the current transmission. Error conditions covered include (1) receive timeouts occurring when the 2200 is transmitting, (2) retransmission of a data block by the 2200 in response to a NAK control character, and (3) reception of a Temporary Text Delay (TTD) control character when the 2200 is receiving. The other valid values are all whole numbers from 01 through 99 (99 equals an infinite number of retries).
WACK retry count	15	The number of wait-before-transmit positive acknowledgment (WACK) control characters that the 2200 system, in transmission mode, accepts before it sends an EOT to terminate the current transmission. The other valid values are all whole numbers from 01 through 99 (99 equals an infinite number of retries).

Table 4-4. Protocol Parameters (continued)

Parameter	Default Value	Definition
Time between line bids	03 seconds	The number of seconds the 2200 system waits after an unsuccessful line bid before trying again. The other valid values are all whole numbers from 01 through 99.
Receive timeout	03 seconds	In transmission mode, the number of seconds the 2200 system waits to receive a response before sending an ENQ. The other valid values are all whole numbers from 01 through 99.
Transmit timer	01 per second	During the transmission of a block of data, sets the rate at which the sync pattern (SYN SYN) is inserted by the 2200 system to maintain the in-step condition between the transmitting and receiving devices. The other valid values are all whole numbers from 02 through 99.
Continue timeout	02 seconds	In transmission mode, the number of seconds the 2200 system waits, after receiving a response, before sending a TTD control character. Alternatively, in receive mode, the number of seconds the 2200 system waits, after receiving a valid block of data, before sending a WACK control character. In either situation, the 2200 system gains time to clear its input/output buffers without aborting the communication currently underway. The other valid values are all whole numbers from 01 through 99.

Table 4-5. Protocol Functions During RD Addition

Key	Meaning	Function
SF'10	Cancel addition	Any parameter additions are cancelled. The Remote Definition Function screen is restored. The RD is not added.
RUN	Execute	Press to move the cursor to the start of the next group of parameters. The Remote Definition Device Options screen (Figure 4-7) appears.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Protocol Options screen. The Remote Definition Line/ Modem Options screen (Figure 4-5) is restored.

4.3.3 Choosing Device Values

The Remote Definition Device Options screen (Figure 4-7) defines the parameters related to the device emulated by the 2200 (i.e., the 2780, 3780, or 2200) during an RD connection. The user selects a Device Type (2780, 3780, or 2200) on the Remote Definition Line/Modem Options screen (Figure 4-5). This choice determines the version of the Remote Definition Device Options screen (2780 Options, 3780 Options, or 2200 Options) that the user sees. Each device-option parameter name is listed in the left-hand column of the screen. A corresponding value is listed in the middle column, and a prompt is usually given in the right-hand column. This prompt helps the user to choose a valid value.

The middle column of the Remote Definition Device Options screen may already contain values when the user first views it. These values will have been entered for a previously stored RD, or they will be the ICS default values. The question of which they are depends on the user's choice on the Add Remote Definition screen (Figure 4-4) and on the presence of BSC default values on the ICS system.

The user can review and accept or change each parameter value. The parameters are displayed dynamically in groups, as explained in Section 4.3.1. The user can accept or change the parameter values within a group before advancing to the next group. Acceptance involves pressing RETURN to advance the cursor to the next parameter within a group or pressing RUN to advance the cursor to the next group. Changing a parameter value involves reentering the contents of specific character positions, as described in Section 4.3.1.

Tables 4-6 through 4-8 describe the device options available when the 2200 system emulates a 2780 or 3780 terminal or when the 2200 system communicates with another 2200 system during bisynchronous operation. The tables list the device parameters by groups and the parameter default values; the tables also define the parameters and list other valid values when applicable. The group numbers show the order of appearance of the parameter groups on the screen. However, not every parameter within a group necessarily appears. For instance, if the user chooses Leased as the value of the Line Type parameter and Multi-point as the value of the Line Mode parameter on the Remote Definition Line/Modem Options screen (Figure 4-5), Terminal Address rather than Terminal ID is the first entry in Group I. This is so because the Terminal ID and Host ID parameters appear only when Line Type is Leased and Line Mode is Point-to-point on the Remote Definition Line/Modem Options screen.

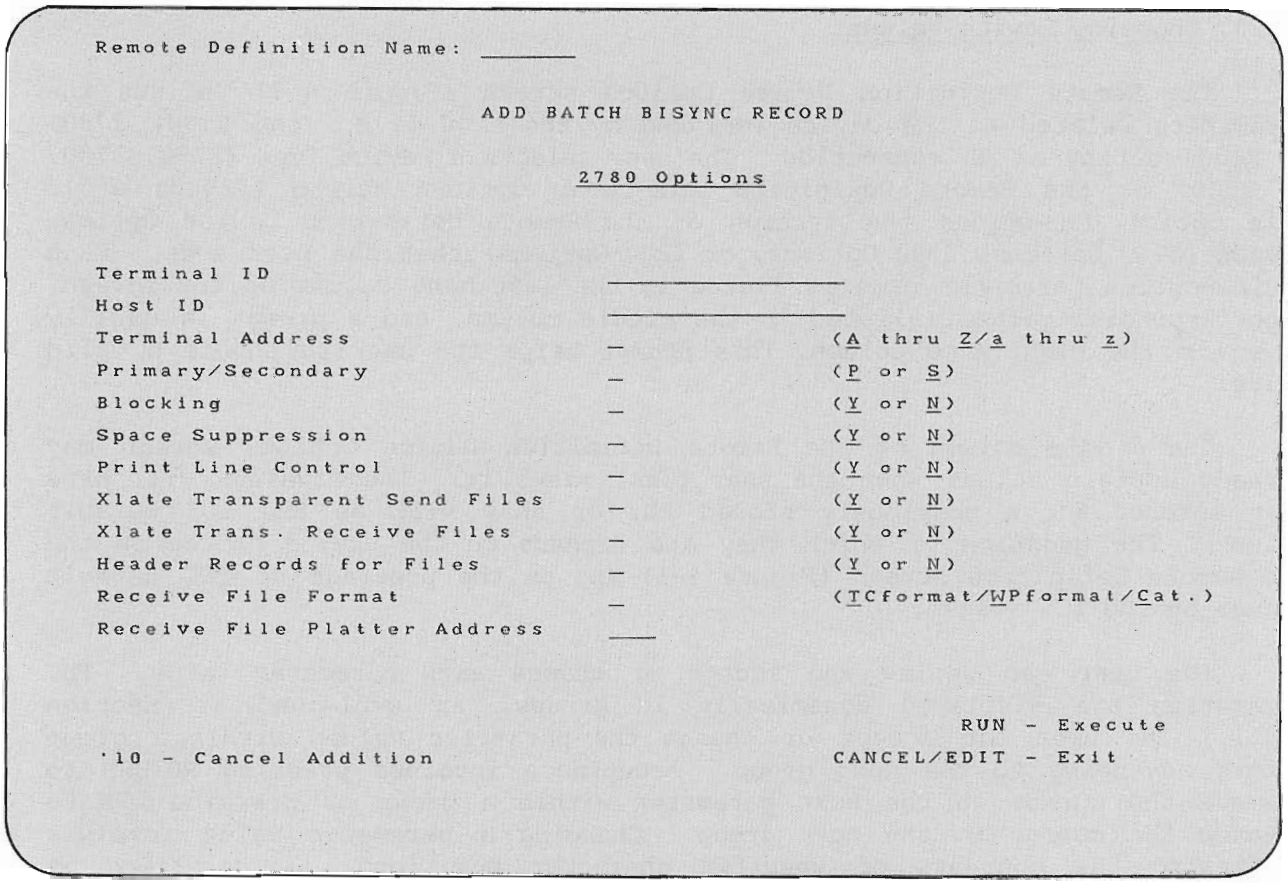

Figure 4-7. Remote Definition Device Options Screen

NOTE

If this screen is displayed from the Modify RD option (refer to Section 4.4), the following prompts appear on Lines 21 and 22, in the lower left corner of the display:

'10 - Cancel Modification
'11 - Complete Modification

Table 4-6. Device Parameters for 2780 Terminal Emulation

Parameter (Group)	Default Value	Definition
Terminal ID (I)		A set of up to 15 alphanumeric characters. When the 2200 system makes a line bid over a switched (dial-up) or leased point-to-point communications line, it uses the terminal ID to identify itself to the host.
Host ID (I)		A set of up to 15 alphanumeric characters. It allows the host to identify itself to the 2200 system in a line bid over a switched (dial-up) or leased point-to-point communications line.
Terminal address (I)	A	A single alphabetic character. During polling or selection, the host uses this character to identify the 2200 system as a terminal in a multipoint configuration. The other valid values are in the ranges B through Z and a through z.
Primary/ secondary (II)	Primary	Designates the priority of the 2200 when it serves as a terminal in (1) a point-to-point configuration with contention or (2) a multipoint configuration with host/nonhost relationships. A line bid by the primary terminal (or host in a multipoint configuration) takes precedence over a bid by the secondary terminal. The other valid value is Secondary.
Blocking (II)	Yes	Indicates whether multiple records are blocked for transmission. The other valid value is No.
Space suppression (II)	Yes	Specifies whether the remote system supports the 2780 convention of suppressing spaces at the end of a data record. The other valid value is No.
Print line control (II)	Yes	Specifies whether print records received by the 2200 are stored on disk preceded by a format control byte. The other valid value is No.

Table 4-6. Device Parameters for 2780 Terminal Emulation (continued)

Parameter (Group)	Default Value	Definition
Translate transparent send files (II)	No	Specifies whether the 2200 system translates data before sending it in transparent mode. Translation is accomplished by means of a 2200-to-remote code translation table that is part of the ICS Supervisory Utilities. Transparency for each send file is determined during job scheduling (refer to Section 5.5). The other valid value is Yes.
Translate transparent receive files (II)	No	Specifies whether the 2200 system translates data after receiving it in transparent mode. Translation is accomplished by means of a remote-to-2200 code translation table that is part of the ICS Supervisory Utilities. Data transparency is determined by the sender. The other valid value is Yes.
Header records for files (II)	No	Specifies whether files sent or received by the 2200 contain a header record as the first record. The other valid value is Yes.
Receive file format (II)	TC format	Specifies the format of files to be received by the 2200 from the remote point. TC format is the only value that should be used.
Receive file platter address (III)		Designates the address of the disk where the files received by the 2200 are to be stored.

Table 4-7. Device Parameters for 3780 Terminal Emulation

Parameter (Group)	Default Value	Definition
Terminal ID (I)		A set of up to 15 alphanumeric characters. When the 2200 system makes a line bid over a switched (dial-up) or leased point-to-point communications line, it uses the terminal ID to identify itself to the host.
Host ID (I)		A set of up to 15 alphanumeric characters. It allows the host to identify itself to the 2200 system in a line bid over a switched (dial-up) or leased point-to-point communications line.
Terminal address (I)	A	A single alphabetic character. During polling or selection, the host uses this character to identify the 2200 system as a terminal in a multipoint configuration. The other valid values are in the ranges B through Z and a through z.
Primary/ secondary (II)	Primary	Designates the priority of the 2200 when it serves as a terminal in (1) a point-to-point configuration with contention or (2) a multipoint configuration with host/nonhost relationships. A line bid by the primary terminal (or host in a multipoint configuration) takes precedence over a bid by the secondary terminal. The other valid value is Secondary.
Blocking (II)	Yes	Indicates whether multiple records are blocked for transmission. The other valid value is No.
Space compression (II)	Yes	Specifies whether the remote system supports the 3780 convention of compressing spaces within a data record. The other valid value is No.
Print line control (II)	Yes	Specifies whether print records received by the 2200 are stored on disk preceded by a format control byte. The other valid value is No.

Table 4-7. Device Parameters for 3780 Terminal Emulation (continued)

Parameter (Group)	Default Value	Definition
Translate transparent send files (II)	No	Specifies whether the 2200 system translates data before sending it in transparent mode. Translation is accomplished by means of a 2200-to-remote code translation table that is part of the ICS Supervisory Utilities. Transparency for each send file is determined during job scheduling (refer to Section 5.5). The other valid value is Yes.
Translate transparent receive files (II)	No	Specifies whether the 2200 system translates data after receiving it in transparent mode. Translation is accomplished by means of a remote-to-2200 code translation table that is part of the ICS Supervisory Utilities. Data transparency is determined by the sender. The other valid value is Yes.
Header records for files (II)	No	Specifies whether files sent or received by the 2200 contain a header record as the first record. The other valid value is Yes.
Receive file format (II)	TC format	Specifies the format of files to be received by the 2200 from the remote point. TC format is the only value that should be used.
Receive file platter address (III)		Designates the address of the disk where the files received by the 2200 are to be stored.

Table 4-8. Device Parameters for 2200-to-2200 BSC Communications*

Parameter (Group)	Default Value	Definition
Terminal ID (I)		A set of up to 15 alphanumeric characters. When the 2200 system makes a line bid over a switched (dial-up) or leased point-to-point communications line, it uses the terminal ID to identify itself to the host.
Host ID (I)		A set of up to 15 alphanumeric characters. It allows the host to identify itself to the 2200 system in a line bid over a switched (dial-up) or leased point-to-point communications line.
Terminal address (I)	A	A single alphabetic character. During polling or selection, the host uses this character to identify the 2200 system as a terminal in a multipoint configuration. The other valid values are in the ranges B through Z and a through z.
Primary/ secondary (II)	Primary	Designates the priority of the 2200 when it serves as a terminal in (1) a point-to-point configuration with contention or (2) a multi-point configuration with host/nonhost relationships. A line bid by the primary terminal (or host in a multipoint configuration) takes precedence over a bid by the secondary terminal. The other valid value is Secondary.
Print line control (II)	Yes	Specifies whether print records received by the 2200 are stored on disk preceded by a format control byte. The other valid value is No.

* "Blocking" does not appear in this table because all data in 2200-to-2200 BSC communications is transmitted unblocked: (1) TC-format data in 248-byte sectors; (2) BASIC-2 catalogued data files and program files in 128-byte (i.e., half-sector) segments that are reassembled as full sectors (i.e., as 256-byte records); and (3) word processing files as separate records with a maximum length of 249 bytes. "Space suppression" does not appear because it is a feature of the IBM 2780 Data Transmission Terminal; "Space compression" does not appear because it is a feature of the IBM 3780 Communication Terminal.

Table 4-8. Device Parameters for 2200-to-2200 BSC Communications (continued)

Parameter (Group)	Default Value	Definition
Translate transparent send files (II)	No	Specifies whether the 2200 system translates data before sending it in transparent mode. Translation is accomplished by means of a 2200-to-remote code translation table that is part of the ICS Supervisory Utilities. Transparency for each send file is determined during job scheduling (refer to Section 5.5). The other valid value is Yes.
Translate transparent receive files (II)	No	Specifies whether the 2200 system translates data after receiving it in transparent mode. Translation is accomplished by means of a remote-to-2200 code translation table that is part of the ICS Supervisory Utilities. Data transparency is determined by the sender. The other valid value is Yes.
Header records for files (II)	No	Specifies whether files sent or received by the 2200 contain a header record as the first record. The other valid value is Yes.
Receive file format (II)	TC format	Specifies the format of files to be received by the 2200 from the remote point. The other valid values are WP format and Catalogued.
Receive file platter address (III)		Designates the address of the disk where the files received by the 2200 are to be stored.
Receive file WP library (III)		Specifies the library into which a file in word processing format is to be placed. The valid value is an upper- or lower-case alphabetic character.

Table 4-9 summarizes the functions that the user can access from the Remote Definition Device Options screen during RD addition.

Table 4-9. Device Functions During RD Addition

Key	Meaning	Function
SF'10	Cancel addition	Any parameter additions are cancelled. The Remote Definition Function screen (Figure 4-3) is restored. The RD is not added.
RUN	Execute	Press to move the cursor to the start of the next group of parameters. If all the device parameters have been displayed, the RD is added to the 2200 ICS system, and the Remote Definition Function screen appears with the new RD name added to the RD list.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Device Options screen. The Remote Definition Protocol Options screen (Figure 4-6) is restored.

Various conditions affect the selection of values for the device parameters and even help determine whether a parameter appears in the specification of a TC connection. The following list details the conditions:

- Terminal ID -- Does not appear when the Line Mode selection on the Remote Definition Line/Modem Options screen (Figure 4-5) is Multi-point. This field is filled only if the host requires terminal identification.

- Host ID -- Does not appear when the Line Mode selection on the Remote Definition Line/Modem Options screen is Multi-point. This field is filled only if the host identifies itself to the terminal.

- Terminal address -- Appears only when the Line Mode selection on the Remote Definition Line/Modem Options screen is Multi-point.

- Print line control -- Applies to TC-format files only.

- Header records for files -- Currently only BASIC-2 catalogued files can contain header records, so Y is valid only for 2200-to-2200 communications.

- Receive file format -- If documents are to be sent or received, the 2200 word processing software must be installed on the same disk as the ICS software prior to the installation of the ICS software.

- Receive file platter address -- Default and other valid values depend on the configuration of the 2200 system currently loaded. Ask system support personnel for help.

4.4 MODIFYING A REMOTE DEFINITION

Selecting an RD name associated with the 2780/3780 emulation software (Batch Bisync) from the Remote Definition Function screen (Figure 4-3) and pressing RUN activates the Modify RD option. This option allows the user to review and, when desirable, change the parameter values currently stored for the RD selected. (These parameter values describe the TC connection associated with the RD.) Modifying an RD involves reviewing parameter values on three screens: the Remote Definition Line/Modem Options screen (Figure 4-5), the Remote Definition Protocol Options screen (Figure 4-6), and the Remote Definition Device Options screen (Figure 4-7). (The Complete Modification function, which cannot be accessed from these screens during RD addition, can be used during RD modification, as shown in Tables 4-10 through 4-12.)

Selecting an RD name associated with a protocol emulator other than Batch Bisync loaded on the 2200 system gives the user access to the parameter values currently stored on the ICS system for that RD and emulator. Selecting "defalt - All" or "defalt - Batch Bisync" gives the user access to any default parameter values currently stored on the ICS system for all the loaded protocol emulators or for the BSC protocol emulator in particular. These parameter values can be modified as well, but they should be modified only with the site manager's approval.

Modifying an RD involves the following steps:

1. Call up the Remote Definition Line/Modem Options screen (Figure 4-5) by choosing a Batch Bisync RD from the Remote Definition Function screen (Figure 4-3) and pressing RUN.

2. Review and accept or change the current values given for the line/modem parameters and press RUN. The Remote Definition Protocol Options screen (Figure 4-6) appears.

3. Review and accept or change the current values given for the protocol parameters and press RUN. The Remote Definition Device Options screen (Figure 4-7) appears.

4. Review and accept or change the current values given for the device parameters and press RUN. The RD, including any changes made to parameter values, is returned to the RD file on the ICS system. The Remote Definition Function screen appears with the RD name and the name of the associated protocol still present in the same location on the screen.

Sections 4.3.1 through 4.3.3 describe the formats of the following screens: Remote Definition Line/Modem Options, Remote Definition Protocol Options, and Remote Definition Device Options. These sections also describe the procedures for accessing individual parameters on these screens. (Remember that the parameters now contain values accepted by the user when the RD was originally added to the ICS system.) Parameter descriptions for the three screens are found in Tables 4-2, 4-4, 4-6, 4-7, and 4-8. Tables 4-10 through 4-12 summarize the functions that can be accessed from the three screens during RD modification.

Table 4-10. Line/Modem Functions During RD Modification

Key	Meaning	Function
SF'11	Complete modification	Parameter modifications entered from any screen are saved on the ICS system. The Remote Definition Function screen (Figure 4-3) is restored.
RUN	Execute	Press to move the cursor to the start of the next group of parameters. If all the line/modem parameters have been displayed, the RD Protocol Options screen (Figure 4-6) is displayed.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Line/Modem Options screen. Any parameter modifications are cancelled. The Remote Definition Function screen is restored.

Table 4-11. Protocol Functions During RD Modification

Key	Meaning	Function
SF'10	Cancel modification	Any parameter modifications are cancelled. The Remote Definition Function screen is restored.
SF'11	Complete modification	The parameter modifications entered from any screen are saved on the ICS system. The Remote Definition Function screen is restored.
RUN	Execute	Press to move the cursor to the start of the next group of parameters. The Remote Definition Device Options screen (Figure 4-7) appears.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Protocol Options screen. The parameter modifications entered from any screen are temporarily saved. The Remote Definition Line/Modem Options screen (Figure 4-5) appears.

Table 4-12. Device Functions During RD Modification

Key	Meaning	Function
SF'10	Cancel modification	Any parameter modifications are cancelled. The Remote Definition Function screen (Figure 4-3) is restored.
SF'11	Complete modification	The parameter modifications entered from any screen are saved on the ICS system. The Remote Definition Function screen is restored.
RUN	Execute	Press to move the cursor to the start of the next group of parameters. If all the device parameters have been displayed, the parameter modifications entered from any screen are saved on the ICS system. The Remote Definition Function screen is restored.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Device Options screen. The parameter modifications entered from any screen are temporarily saved. The Remote Definition Protocol Options screen (Figure 4-6) appears.

4.5 DELETING A REMOTE DEFINITION

When a TC connection to a particular remote site is no longer necessary, the RD for the connection can be deleted. Deletion permanently removes from the ICS system all information about the connection, and it releases the RD name for reuse.

Selecting an RD name and associated protocol from the Remote Definition Function screen (Figure 4-3) and pressing SF'9 activates the Delete RD option. The cautionary message "Press RUN to delete XXXXXX" appears, where XXXXXX is the RD name selected. Pressing RUN removes from the ICS system all information pertaining to the selected TC connection, and the RD name is deleted from the Remote Definition Function screen. Alternatively, pressing CANCEL/EDIT cancels the Delete RD option, and the RD name remains on the Remote Definition Function screen.

NOTE

Be sure that a TC connection is being permanently eliminated before you delete the RD associated with the connection. The information would have to be completely reentered as a new RD if the connection were needed again (see Section 4.3).

CHAPTER 5
SCHEDULING A JOB TO BE TRANSMITTED

5.1 GENERAL INFORMATION

The jobs to be transmitted during a batch session are usually scheduled ahead of time off-line, by means of the ICS Job Scheduling functions. For example, jobs can be queued during the day for communication at night when the line rates are lower. When scheduling a job, the user supplies the 2200 system with such information as the type of TC connection to be made, the job processing priority, and the type of information to be transmitted. The type of TC connection is specified through the RD name.

The user queues each message or file to be transmitted as part of the job. The text of any message is entered at the terminal keyboard, as is pertinent information about each file, such as format, disk location, and name. During job scheduling, file attributes that affect the flow of data between the sending and receiving sites during communication can be modified. The software creates a job number for the job and saves the user-specified job information on the communications job queue.

The user can review and modify scheduled jobs by means of the ICS Review/Modify Scheduled Job functions. This can be done in any of the following situations: when the characteristics or contents of a job change, when erroneous information has been entered during scheduling, or when a job or part of a job is to be deleted altogether.

Although the job scheduling described in this chapter is done before the communication sessions take place, single jobs can be scheduled during manually run sessions. This option is discussed in Section 6.5.

5.2 ACCESSING THE JOB SCHEDULING FUNCTIONS

Accessing the ICS Job Scheduling functions involves the following steps:

1. Select Communications Utilities from the ICS Utilities menu (Figure 3-1) and press RUN. The Communications Utilities menu (Figure 5-1) appears.

2. Select Schedule Job from the Communications Utilities menu and press RUN. The Schedule a Communications Job screen (Figure 5-2) appears. (Press CANCEL/EDIT to return to the ICS Utilities menu.)

After completing the above steps, the user can begin job scheduling by entering an RD name and pressing RUN. If an invalid RD name is entered, the message "Remote Definition Name not Found" appears, and the cursor returns to the start of the RD name field. The user can then enter another RD name. The ICS Schedule Job Utility next assigns a job number; the user chooses the processing priority for the job and again presses RUN. If required to do so because of the priority selected, the user enters time as hours and minutes on a 24-hour clock. This includes entering leading 0s, as in 01 hour and 01 minute. The user also enters a date as month, day, and year, including leading 0s, as in 01/01/83. The user presses RUN after each entry. If "Receive only job" is chosen, the message "Job Added" appears after RUN is pressed, and the Communications Utilities menu returns.

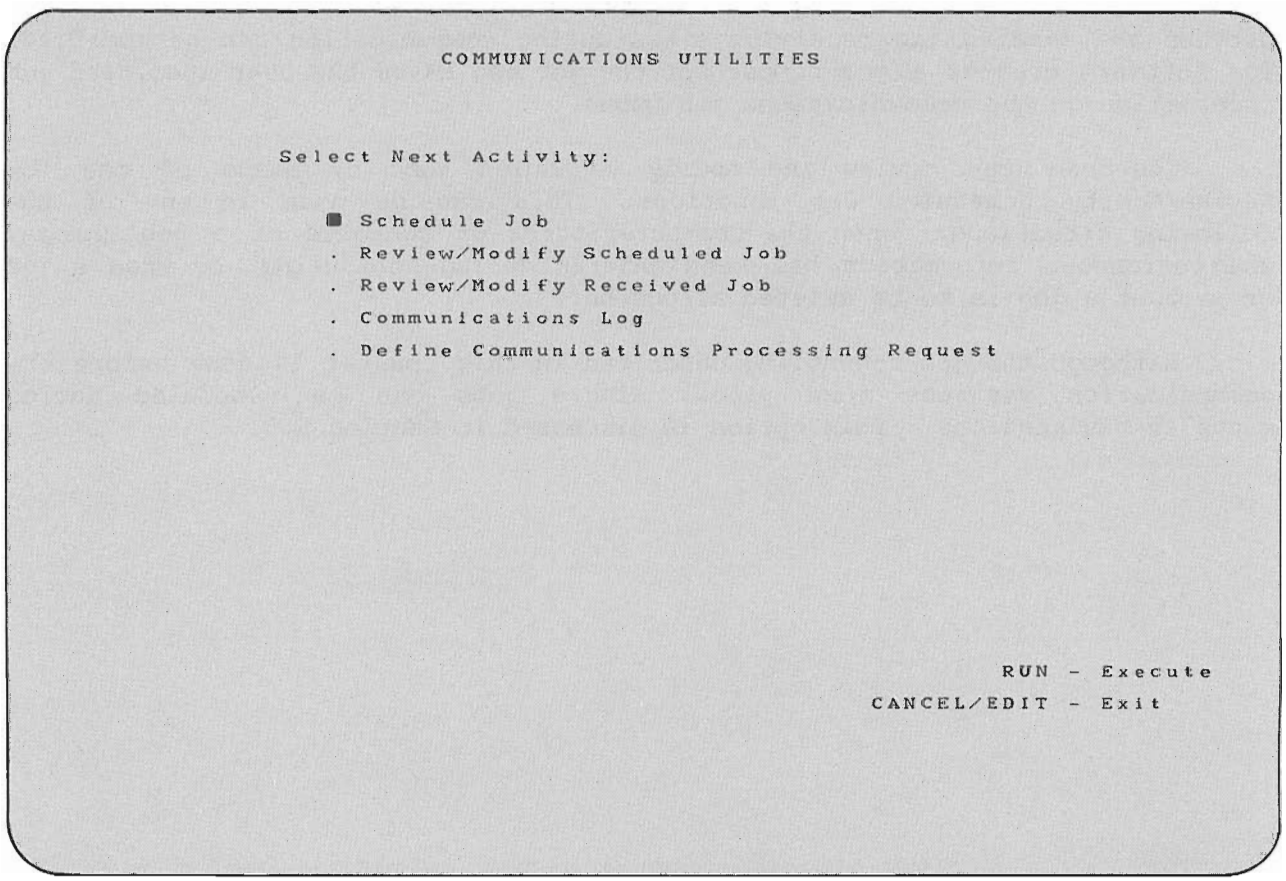

Figure 5-1. Communications Utilities Menu

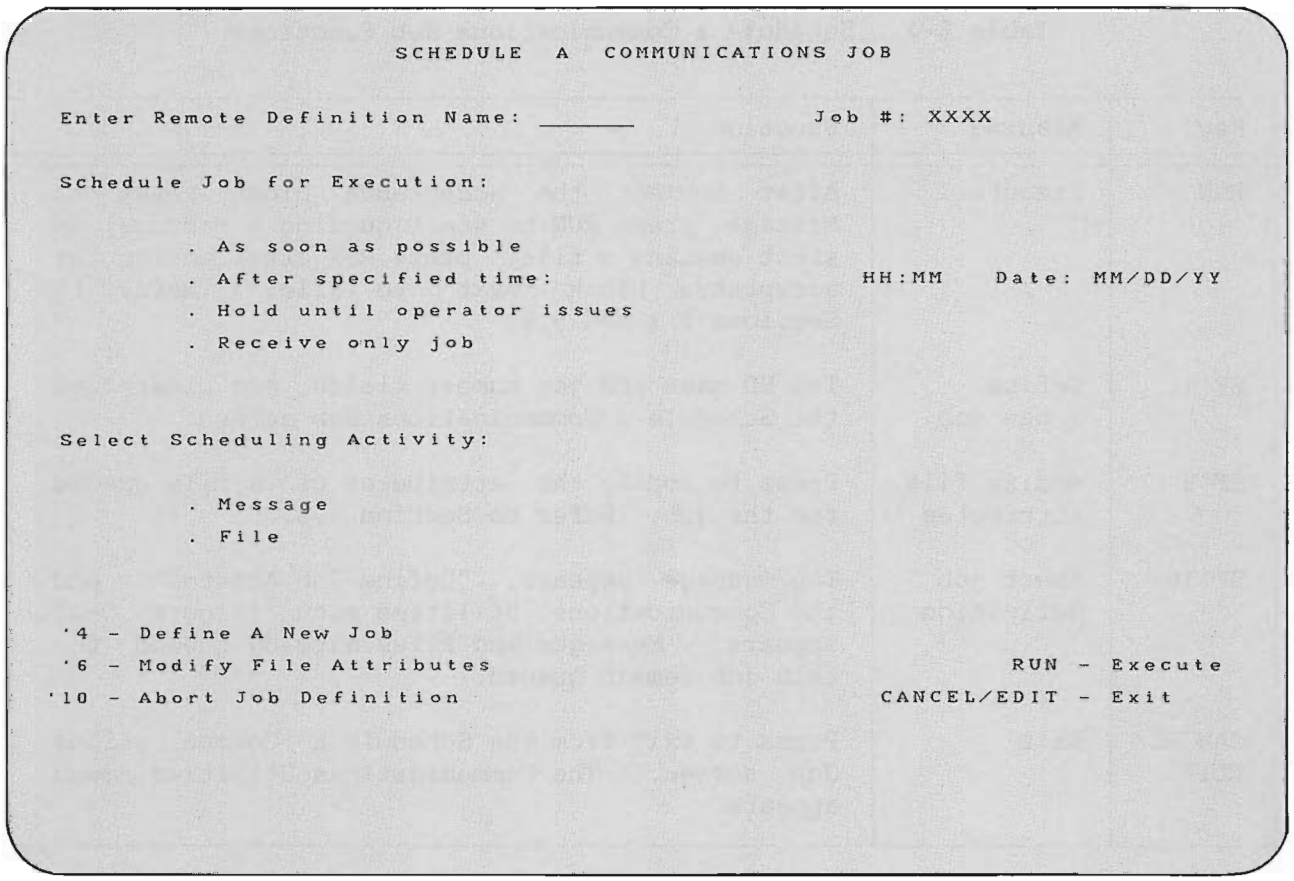

Figure 5-2. Schedule a Communications Job Screen

The user can carry out any of the following functions from the Schedule a Communications Job screen: queuing a message (refer to Section 5.3), queuing a file (refer to Section 5.4), and modifying file attributes (refer to Section 5.5). Table 5-1 summarizes these functions, and Table 5-2 defines processing priorities. For each job, the user can select one of these priorities from the Schedule a Communications Job screen.

The prompts for the SF'4, SF'6, and SF'10 keys appear only after the user returns to the screen after queuing a message or a file.

Table 5-1. Schedule a Communications Job Functions

Key	Meaning	Function
RUN	Execute	After moving the acceptance block next to Message, press RUN to start queuing a message; to start queuing a file, press RUN after moving the acceptance block next to File. Refer to Sections 5.3 and 5.4.
SF'4	Define a new job	The RD name and job number fields are cleared on the Schedule a Communications Job screen.
SF'6	Modify file attributes	Press to modify the attributes of a file queued for the job. Refer to Section 5.5.
SF'10	Abort job definition	The message appears, "Define Job Aborted", and the Communications Utilities menu (Figure 5-1) appears. Messages and files already queued for this job remain queued.
CANCEL/ EDIT	Exit	Press to exit from the Schedule a Communications Job screen. The Communications Utilities menu appears.

Table 5-2. Selectable Job Processing Priorities

Processing Priority	Definition
As soon as possible	The job is scheduled for processing on a First-In First-Out (FIFO) basis. Once a connection for the RD name is made (either automatically or manually), the job is sent as soon as its place on the queue comes up.
After specified time	When the time specified is reached, the job priority is automatically changed to "as soon as possible".
Hold until operator issues	The job will be sent based on the processing priority selected by the operator.
Receive only job	Allows a job with no file-send activity to be defined. This priority should be used only when there are no files to be sent to the remote site.

5.3 QUEUING A MESSAGE

The user can select Message as the scheduling activity on the Schedule a Communications Job screen (Figure 5-2) and then press RUN. This calls up the Add Message to Job screen (Figure 5-3). The RD name and job number associated with this job-scheduling cycle appear at the top of the screen. Queuing (or adding) a message involves the following steps:

1. At the terminal keyboard, enter a message associated with the RD name and job number appearing at the top of the screen. Press BACK SPACE to move the cursor back one position and delete the character entered in that position. Press RETURN to move the cursor to the start of the next line.

2. Press SF'0 to queue the message file. (The ICS Schedule Job Utility automatically generates a name for the file as a concatenation of the RD name and two alphabetic characters.) The Schedule a Communications Job screen appears with the same RD name and job number indicated.

Each message can contain a maximum of 10 lines of text, with each line having a maximum of 80 characters. When queued, the messages are stored as TC-format files on disk. (Section 1.2.2 has a discussion of TC-format files.) The information identifying each message file is stored in the ICS communications job queue, where it is accessed when communication takes place.

Table 5-3 summarizes the functions that can be accessed from the Add Message to Job screen.

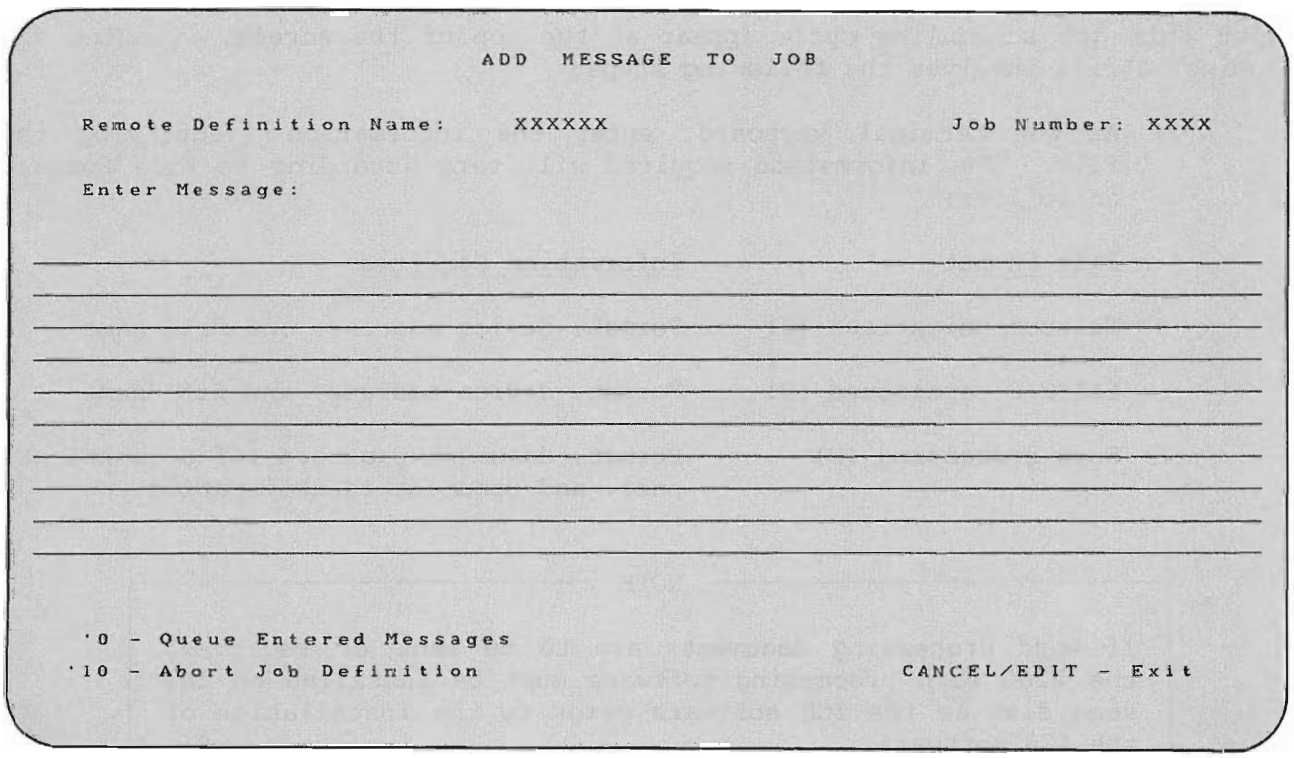

Figure 5-3. Add Message to Job Screen

Table 5-3. Add Message to Job Functions

Key	Meaning	Function
SF'0	Queue entered messages	Press to queue a new message. The prompt "Message(s) Queued Successfully" appears, followed by the Schedule a Communications Job screen (Figure 5-2). The same RD name and job number appear at the top of the screen.
SF'10	Abort job definition	Press to cancel all messages and/or files queued so far for the job. The prompt "Aborting Task" appears, followed by the Communications Utilities menu (Figure 5-1).
CANCEL/ EDIT	Exit	Press to exit from the Add Message to Job screen. The Schedule a Communications Job screen appears, with the same RD name and job number at the top.

5.4 QUEUING A FILE

The user can select File as the scheduling activity on the Schedule a Communications Job screen (Figure 5-2) and then press RUN. This calls up the Add File to Job screen (Figure 5-4). The RD name and job number associated with this job scheduling cycle appear at the top of the screen. Queuing (or adding) a file involves the following steps:

1. At the terminal keyboard, enter the information identifying the file. The information required will vary according to file format, as follows:

File Format	Information Required
Telecommunications (T)	Format, device address, and file name
BASIC-2 catalogued (C)	Format, device address, and file name
Word processing (W)	Format, document password (if document has one), and document identification

NOTE

If word processing documents are to be sent or received, the 2200 word processing software must be installed on the same disk as the ICS software prior to the installation of the ICS software.

Press RUN after entering the information in each field. (There are two exceptions: The information for both the Dev Addr (Device Address) and File Name fields must be entered before RUN is pressed. Also, when a word processing document has no password, press RETURN to advance the cursor to the start of the Document Id (Document Identification) field.) When RUN is pressed after all the information for one file has been entered, the cursor advances to the start of the next file entry line.

2. Press SF'0 to queue a file after all the information for it has been entered. RUN need not be pressed first. The cleared Add File to Job screen appears, with the same RD name and job number at the top.

Successive files for the same job can be queued if Steps 1 and 2 are repeated; however, successive files can be queued more efficiently if Step 1 alone is repeated. After four files have been entered by means of Step 1, the ICS Schedule Job Utility automatically queues the series as separate files and clears the Add File to Job screen for the queuing of more files for the same job. If fewer than four files are entered in Step 1, they must be queued by means of Step 2.

The information identifying each file is stored in the ICS communications job queue, where it is accessed when communication takes place.

Table 5-4 defines the fields on the Add File to Job screen that require information from the user. Table 5-5 summarizes the functions possible from the Add File to Job screen.

```
                              ADD  FILE  TO  JOB

     Remote Definition Name: XXXXXX                          Job Number: XXXX

Enter File Data:

  Format    Dev     Document
  (T/C/W)   Addr    Password    File Name or Document Id

  X         XXX     xxxxxx      XXXXXXXX
  X         XXX     xxxxxx      XXXXXXXX
  X         XXX     xxxxxx      XXXXXXXX
  X         XXX     xxxxxx      XXXXXXXX




  '0 - Queue Listed Files                                  RUN - Execute
 '10 - Abort Job Definition                        CANCEL/EDIT - Exit
```

Figure 5-4. Add File to Job Screen

Table 5-4. User-Supplied Information for the Add File to Job Screen

Field	Definition
Format (T/C/W)	Identifies the arrangement of the file data on disk. Valid values are T (telecommunications), C (BASIC-2 catalogued), and W (word processing). C and W should be used only in TC connections between 2200 systems.
Dev Addr	The 3-character address of the disk where the file is located. This field is valid only for files in TC format or in BASIC-2 catalogued file format.
Document Password	In order to restrict access to the document, its password is assigned through the word processing software. This field is valid only for files in word processing format.
File Name or Document Id	Identifies the file being sent. The name can be up to eight alphanumeric characters for a file in TC format or in BASIC-2 catalogued file format. Four digits and one upper- or lower-case alphabetic character (e.g., 0042A) are required for a file in word processing format.

Table 5-5. Add File to Job Functions

Key	Meaning	Function
RUN	Execute	Press to save the file-identifying information for queuing. The cursor advances to the start of the next file entry line. (After the identification information for four files has been saved, it is automatically queued by the ICS Schedule Job Utility.)
SF'0	Queues listed files	Press to queue a new file or files. The message "File(s) Queued Successfully" appears, followed by the cleared Add File to Job screen.
SF'10	Abort job definition	Press to cancel all messages and/or files queued so far for the job. The message "Aborting Task" appears, followed by the Communications Utilities menu (Figure 5-1).
CANCEL/ EDIT	Exit	Press to exit from the Add File to Job screen. The Schedule a Communications Job screen (Figure 5-2) appears, with the RD name and job number originally entered still displayed at the top.

NOTE

Device address and file name are not validated until communications actually take place. At that time, if either device address or file name is found to be invalid, the file entry on the communications log indicates E (error condition) in the Action column (refer to the 2200 ICS Utilities Manual), and session processing stops. The job containing the file is aborted and deleted from the communications job queue. The job should be rescheduled because there is no guarantee that any of it has been successfully received at the remote site.

If the remote site aborts the session, the session is automatically closed at the local site. Communications can be reestablished as described in Section 6.2. If the session is running in foreground, the user can suspend and then terminate the session locally (refer to Sections 6.4.1 and 6.4.2). If the session is running in background, the user can attach the terminal to the partition where the session is running (refer to Section 6.7), returning the session to foreground, where it can be suspended and terminated.

5.5 MODIFYING FILE ATTRIBUTES

Each file or message queued for a job has associated values for the ETX, EOT, and transparency attributes. The user can change the default values that were supplied for these attributes during queuing.

These values are saved in the ICS communications job queue, not in the file itself. They help in organizing the file on disk after reception and in coordinating the flow of data between the sending and receiving sites during communication.

5.5.1 Modification Procedure

After a file is queued, the user remains at the Add File to Job screen (Figure 5-4); and after a message is queued, the user remains at the Add Message to Job screen (Figure 5-3). To review the ETX, EOT, and transparency attributes, the user must first press CANCEL/EDIT from these screens to return to the Schedule a Communications Job screen (Figure 5-2). Pressing SF'6 then calls up the Modify File Attributes screen (Figure 5-5). The RD name and job number displayed on the Modify File Attributes screen are the same as those displayed during the queuing of the file or message. The default ETX, EOT, and transparency attribute values appear on the same line as the file name.

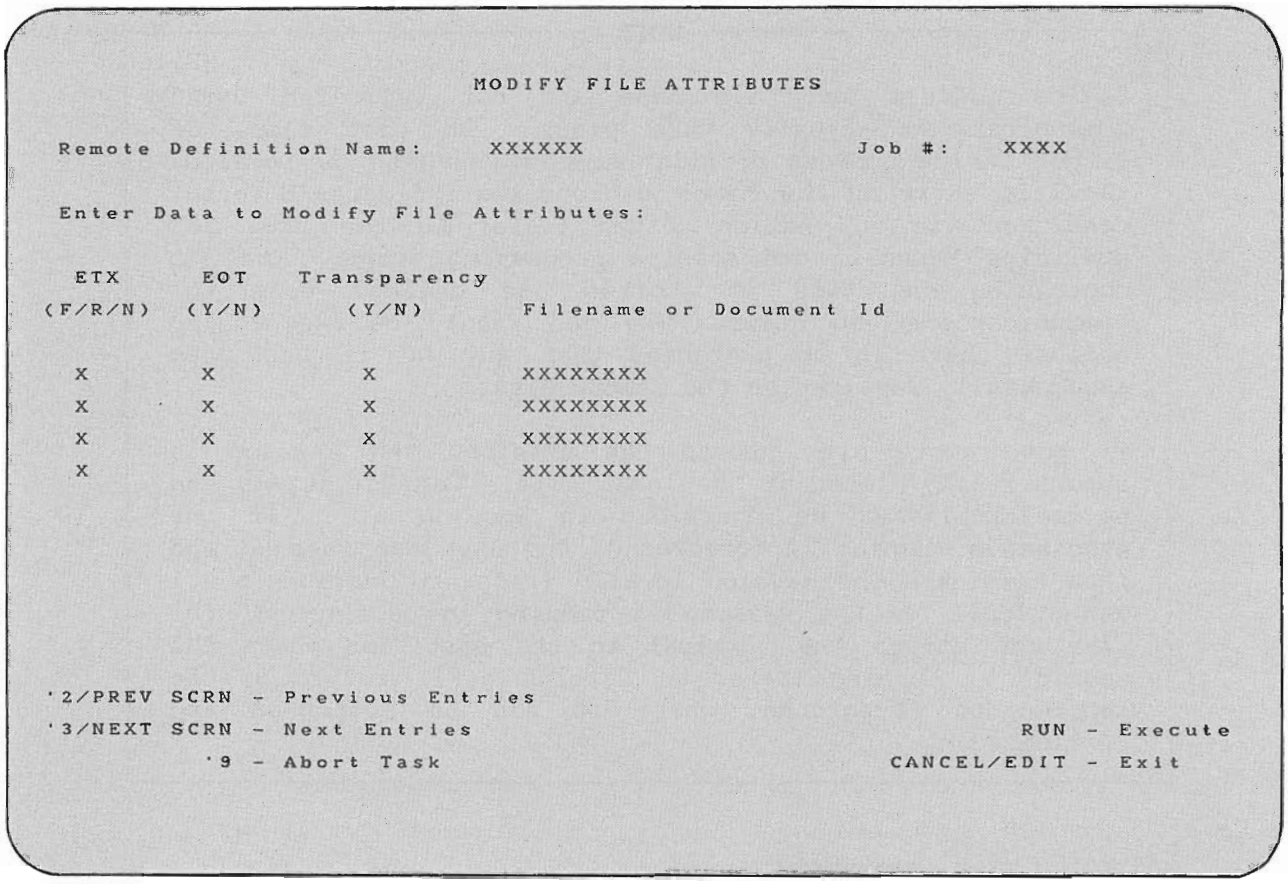

Figure 5-5. Modify File Attributes Screen

Initially, four entries are displayed on the Modify File Attributes screen. The user can press SF'3 to scroll forward through the list of entries; each time SF'3 is pressed, the next four entries in the list are displayed on the screen. When the last entries on the list are displayed, pressing SF'3 again causes the prompt "End of List" to appear on the screen. Pressing SF'2 causes the display to scroll backward through the list of entries; each time SF'2 is pressed, the previous four entries in the list are displayed. When the first four entries on the list are displayed, pressing SF'2 causes the prompt "Beginning of List" to appear on the screen.

Reviewing and modifying the attribute values involves the following steps:

1. Press RETURN to move the cursor to the file entry line and attribute to be modified. Up to four files can be displayed on a single screen. If more than four files have been queued, it may be necessary to call up an additional screen of file entry lines for review. To do this, the user presses SF'3.

2. At the keyboard, enter the change to the attribute. The change is saved as the cursor advances to the next attribute. "Filename or Document Id" is a protected field that cannot be changed on the Modify File Attributes screen; however, this field can be changed by means of the ICS Review/Modify Scheduled Job functions, which are described briefly in Section 5.6 and in more detail in the 2200 ICS Utilities Manual.

3. Press RUN to queue the change.

4. Press CANCEL/EDIT to return to the Schedule a Communications Job screen.

Table 5-6 lists the file attributes changeable by the user and their default values; the table also defines the attributes and other valid values. Table 5-7 summarizes the functions that can be accessed from the Modify File Attributes screen.

Table 5-6. File Attributes Changeable by User

File Attribute	Default Value	Definition
ETX	F (ETX at the end of the file)	The End of Text character, which tells the receiving site that any subsequent text transmitted for this job is to be placed in a new file. The other valid values are R (ETX after each record of the file) and N (the absence of ETX characters in the file).
EOT	No (EOT omitted, following an ETX)	The End of Transmission character, which tells the receiving site that the sending site is relinquishing control of the communications line. The other valid value is Yes (the ETX-EOT sequence transmitted at the end of the file).
Transparency	No (TC-format file); Yes (BASIC-2 catalogued and word processing files)	Indicates whether the file is to be transmitted in transparent mode. The other valid values are Yes (TC-format file) and No (BASIC-2 catalogued and word processing files).

Table 5-7. Modify File Attributes Functions

Key	Meaning	Function
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of file entry lines.
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of file entry lines.
RUN	Execute	Press to change the ETX, EOT, and/or transparency attributes. The message "Attributes Modified Successfully" appears, followed by the display of the next set of file entry lines.
SF'9	Abort task	Press to cancel all messages and/or files queued so far for the job. The message "Aborting Task" appears. The Communications Utilities menu (Figure 5-1) appears.
CANCEL/ EDIT	Exit	Press to exit from the Modify File Attributes screen. The Schedule a Communications Job screen (Figure 5-2) appears, with the RD name and job number originally entered still displayed at the top.

5.5.2 Examples of Attribute Modification

Two examples of attribute modification are presented in the following paragraphs.

If several files being sent in a job to a remote site are to be concatenated into one file at the receiving end, each file in the series except the last must have its ETX attribute changed from F to N. F indicates separation of the file from the subsequent file by an ETX character, and N indicates the absence of the ETX character, and therefore the absence of file separation. The last file must retain F for its ETX attribute, to indicate the end of the newly concatenated file. During communication, an ETX character is automatically placed at the end of the last (or only) file of a job, to ensure that information sent in separate jobs remains in separate files.

Another example of attribute modification involves the transmission of an EOT character following a particular file within a job, to allow the receiving site to respond, possibly with a message. To send an EOT, the user changes the EOT attribute of the file from N to Y. An ETX character must always precede an EOT in the data stream during communication. An EOT character is automatically placed at the end of the last (or only) file of the last (or only) job of a session. The character alerts the remote site that the 2200 is relinquishing control of the communications line.

5.6 REVIEWING/MODIFYING A SCHEDULED JOB

The user may wish to review and possibly modify a scheduled job before communications take place. This section briefly describes how the ICS Review/Modify Scheduled Job functions are accessed, gives examples of their use, and shows the screens involved. A detailed description of the ICS Review/Modify Scheduled Job functions and screens can be found in the 2200 ICS Utilities Manual.

Accessing the ICS Review/Modify Scheduled Job functions involves the following steps:

1. Select Communications Utilities on the ICS Utilities menu (Figure 3-1) and press RUN. The Communications Utilities menu (Figure 5-1) appears.

2. Select Review/Modify Scheduled Job on the Communications Utilities menu and press RUN. The Review/Modify Scheduled Job screen (Figure 5-6) appears.

```
                    REVIEW/MODIFY SCHEDULED JOB

        Select Remote Definition Name:

            ■ XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX
            . XXXXXX        . XXXXXX        . XXXXXX

        '2/PREV SCRN - Previous Entries
        '3/NEXT SCRN - Next Entries                    RUN - Execute
                '9 - Delete Selected Jobs        CANCEL/EDIT - Exit
```

Figure 5-6. Review/Modify Scheduled Job Screen

After completing the above steps, the user can begin to review a scheduled job. Other screens that might be used during such a review are the Modify Job List screen (Figure 5-7), Review Files/Messages for Job screen (Figure 5-8), Add File to Job screen (Figure 5-9), and Add or Review/Modify Message screen (Figure 5-10). Sections 5.6.1 through 5.6.5 discuss job modification procedures, indicating the relationships among the screens shown in Figures 5-6 through 5-10.

5.6.1 Change Job Execution Time

The following steps enable the user to change the time when a job is to be sent or received:

1. On the Review/Modify Scheduled Job screen (Figure 5-6), select the RD name that corresponds to the remote site to which the job under review is to be sent or from which it is to be received. Press RUN. This produces a list of all the jobs scheduled for the remote site, by job number and scheduled execution time (i.e., processing priority). The list appears, four entries at a time, on the Modify Job List screen (Figure 5-7).

2. Select the entry on the list for the job under review. If the present set of entries on the Modify Job List screen does not contain the entry, press SF'2/PREV SCRN or SF'3/NEXT SCRN to access other parts of the list, until the entry is found.

3. Press SF'6, use the space bar to select the proper job execution time, and press RUN. If "After specified time" is selected, enter the time in hours and minutes on a 24-hour clock, including leading 0s, as in 01 hour and 01 minute; and enter the date as month, day, and year, including leading 0s, as in 01/01/83. Press RUN. The change in job execution time is completed.

4. Press CANCEL/EDIT to return to the Review/Modify Scheduled Job screen.

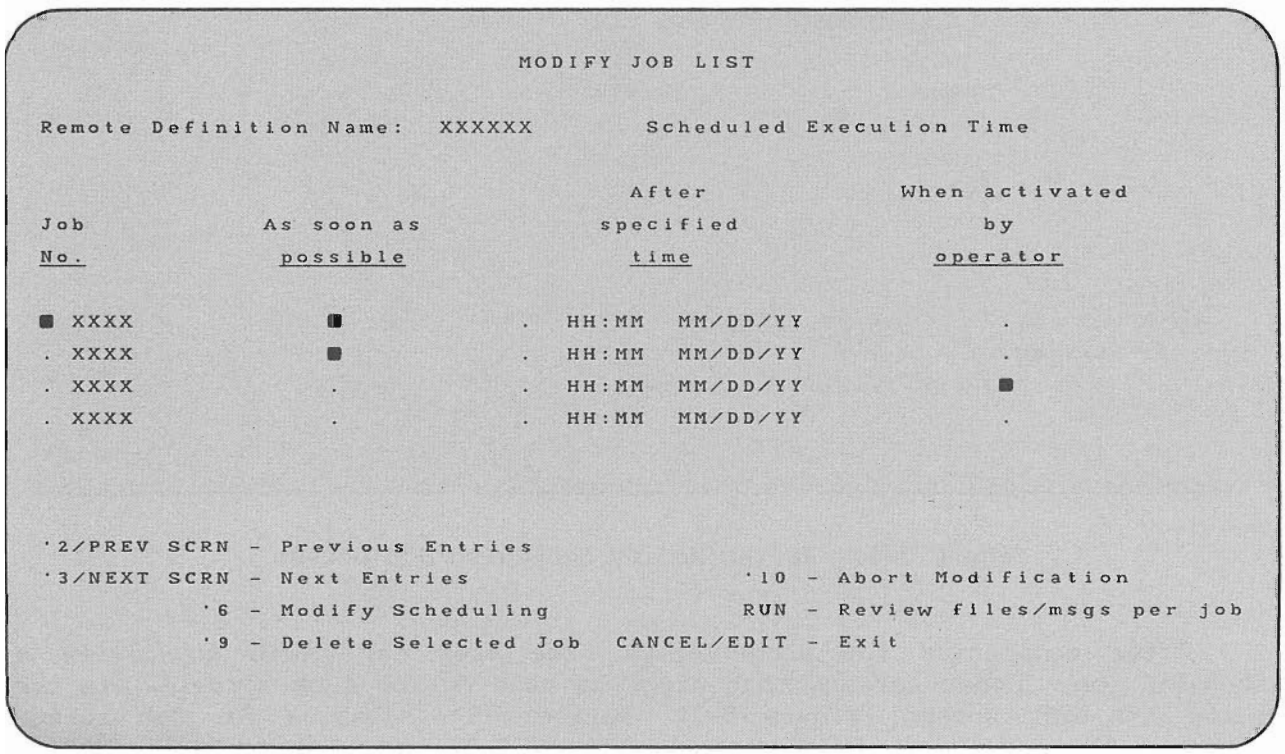

Figure 5-7. Modify Job List Screen

5.6.2 Queue New File for Job Already Scheduled

The user can do the following steps to queue a new file for a job already scheduled:

1. Repeat Steps 1 and 2 of Section 5.6.1 to select the desired job entry on the Modify Job List screen (Figure 5-7).

2. Press RUN from the Modify Job List screen to produce a list identifying the files and messages queued for the job. The list appears, four entries at a time, on the Review Files/Messages for Job screen (Figure 5-8).

3. Press SF'0 on the Review Files/Messages for Job screen. The Add File to Job screen (Figure 5-9) appears, with the RD name and job number indicated for the scheduled job under review.

4. Enter the identifying information for the file being queued (refer to Section 5.4).

5. Press CANCEL/EDIT to return to the Review Files/Messages for Job screen. (An entry is displayed on the screen for the file just queued.)

6. Press CANCEL/EDIT again to return to the Modify Job List screen.

7. Press CANCEL/EDIT a third time to return to the Review/Modify Scheduled Job screen (Figure 5-6).

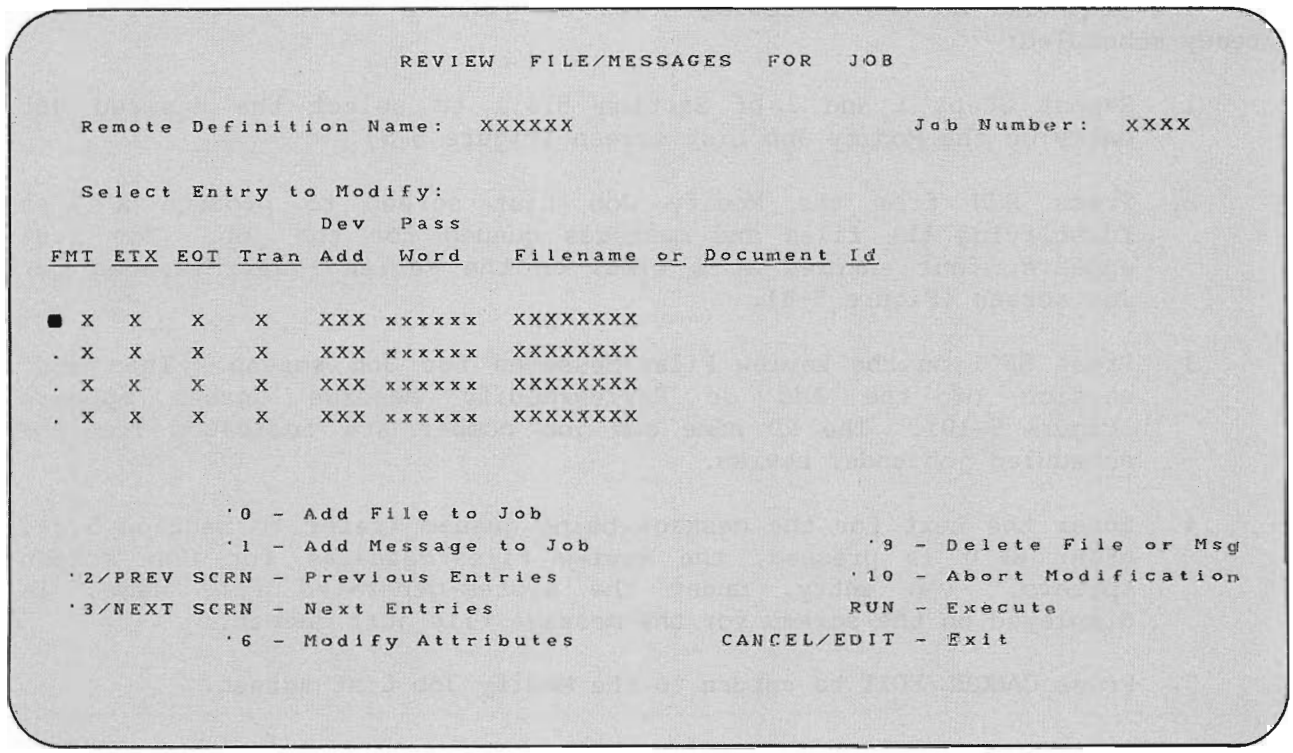

Figure 5-8. Review Files/Messages for Job Screen

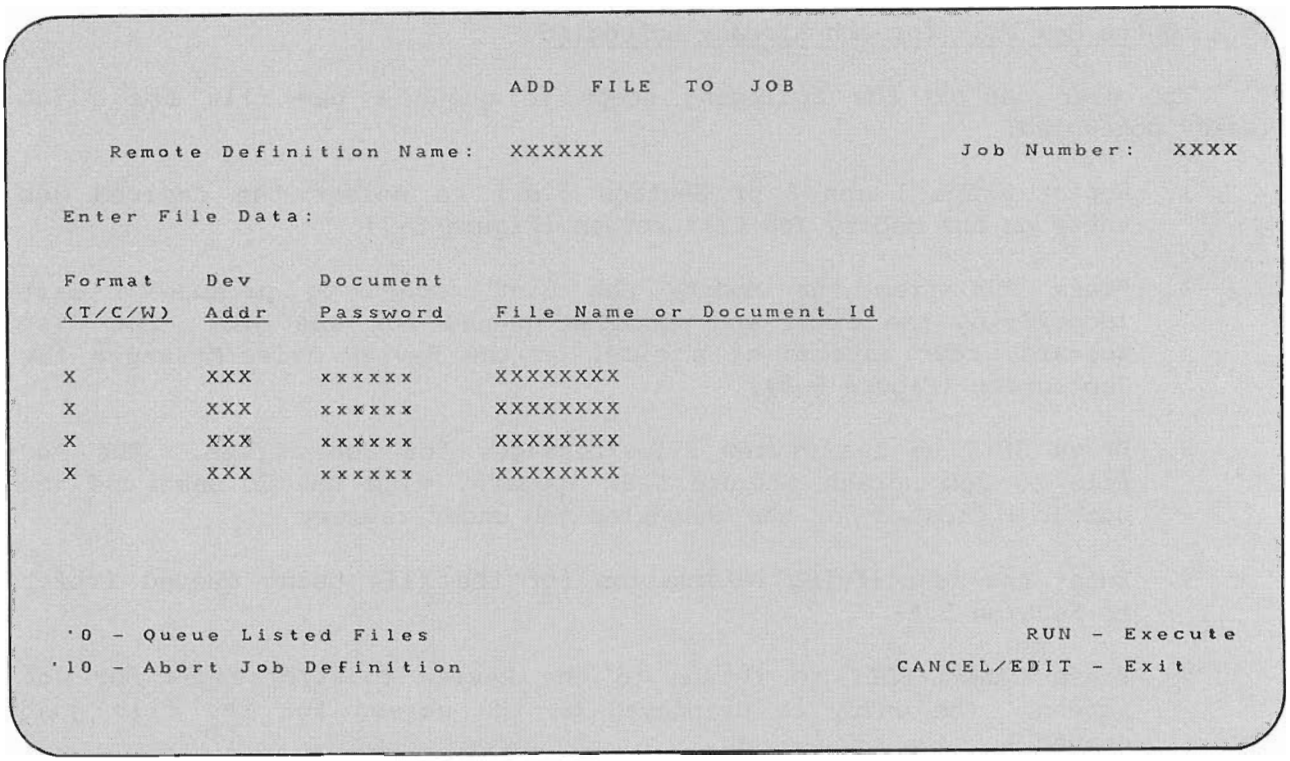

Figure 5-9. Add File to Job Screen

5.6.3 Queue New Message for Job Already Scheduled

The user can do the following steps to queue a new message for a job already scheduled:

1. Repeat Steps 1 and 2 of Section 5.6.1 to select the desired job entry on the Modify Job List screen (Figure 5-7).

2. Press RUN from the Modify Job List screen to produce a list identifying the files and messages queued for the job. The list appears, four entries at a time, on the Review Files/Messages for Job screen (Figure 5-8).

3. Press SF'1 on the Review Files/Messages for Job screen. The "add" version of the Add or Review/Modify Message screen appears (Figure 5-10). The RD name and job number are indicated for the scheduled job under review.

4. Enter the text for the message being queued (refer to Section 5.3). After SF'0 is pressed, the Review Files/Messages for Job screen appears. (An entry, under the system-generated file name, is displayed on the screen for the message file just queued.)

5. Press CANCEL/EDIT to return to the Modify Job List screen.

6. Press CANCEL/EDIT a second time to return to the Review/Modify Scheduled Job screen (Figure 5-6).

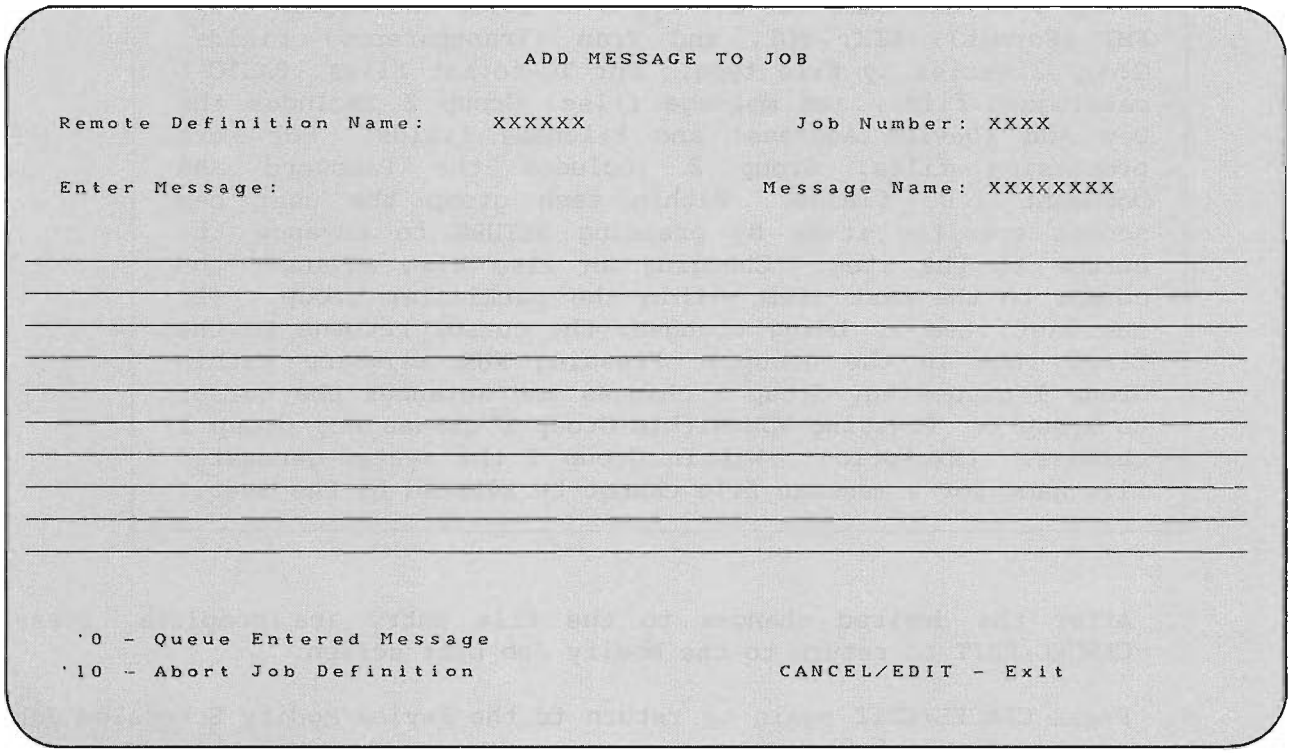

Figure 5-10. Add or Review/Modify Message Screen

5.6.4 Change File Entry for Job Already Scheduled

The user can do the following steps to change individual items in the entry line for a queued file:

1. Repeat Steps 1 and 2 of Section 5.6.1 to select the desired job entry on the Modify Job List screen (Figure 5-7).

2. Press RUN from the Modify Job List screen to produce a list identifying the files and messages queued for the job. The list appears, four entries at a time, on the Review Files/Messages for Job screen (Figure 5-8).

3. Select the list entry to be changed. If the present set of entries on the Review Files/Messages for Job screen does not contain the entry, press SF'2/PREV SCRN or SF'3/NEXT SCRN to access other parts of the list, until the entry is found.

4. Press SF'6. The cursor appears beneath the first item of the list entry selected. Enter any changes and press RUN.

NOTE

The items in each file entry are accessed in two groups. Group 1 is the same for all types of files and includes the FMT (Format), ETX, EOT, and Tran (Transparency) fields. Group 2 varies by file type. For TC-format files, BASIC-2 catalogued files, and message files, Group 2 includes the Dev Add (Device Address) and Filename fields. For word processing files, Group 2 includes the Password and Document I.D. fields. Within each group the user can access specific items by pressing RETURN to advance the cursor to the item. Changing an item also advances the cursor to the next item within the particular group. (If the last item is being changed, the cursor returns to the first item in the group.) Pressing RUN anywhere within Group 1 queues any Group 1 changes and advances the cursor to Group 2. Pressing RUN within Group 2 queues any Group 2 changes. (Exception: Within Group 2 the system-generated file name for a message file cannot be altered by the user.)

5. After the desired changes to the file entry are complete, press CANCEL/EDIT to return to the Modify Job List screen.

6. Press CANCEL/EDIT again to return to the Review/Modify Scheduled Job screen (Figure 5-6).

5.6.5 Change Message for Job Already Scheduled

The user can do the following steps to change a queued message:

1. Repeat Steps 1 and 2 of Section 5.6.1 to select the desired job entry on the Modify Job List screen (Figure 5-7).

2. Repeat Steps 2 and 3 of Section 5.6.4 to select the file entry line on the Review Files/Messages for Job screen (Figure 5-8). FMT is M for message files.

3. Press RUN from the Review Files/Messages for Job screen. The "review/modify" version of the Add or Review/Modify Message screen appears (Figure 5-10). The RD name, job number, message name, and message text are displayed.

4. Enter any text changes and press SF'0. The changes are queued, and the Review Files/Messages for Job screen reappears.

5. Press CANCEL/EDIT to return to the Modify Job List screen.

6. Press CANCEL/EDIT a second time to return to the Review/Modify Scheduled Job screen (Figure 5-6).

5.6.6 Delete File or Message from Job Already Scheduled

The user can do the following steps to delete a file or message from a job already scheduled:

1. Repeat Steps 1 and 2 of Section 5.6.1 to select the desired job entry on the Modify Job List screen (Figure 5-7).

2. Press RUN from the Modify Job List screen to produce a list identifying the files and messages queued for the job. The list appears, four entries at a time, on the Review Files/Messages for Job screen (Figure 5-8).

3. Select the list entry to be deleted. If the present set of entries on the Review Files/Messages for Job screen does not contain the entry, press SF'2/PREV SCRN or SF'3/NEXT SCRN to access other parts of the list, until the entry is found.

4. Press SF'9. The file or message is removed from the job, and the entry disappears from the list. The acceptance block goes to the start of the list.

5. After the desired changes to the file entry are complete, press CANCEL/EDIT to return to the Modify Job List screen.

6. Press CANCEL/EDIT again to return to the Review/Modify Scheduled Job screen (Figure 5-6).

CHAPTER 6
CONDUCTING A TELECOMMUNICATIONS SESSION

6.1 GENERAL INFORMATION

The on-line procedures govern the communication of jobs between sites. The communication of a group of jobs during one connection between sites is called a session. Frequently, several sessions are run each time the on-line procedures are activated. Users have three choices in running a TC session: (1) automatically in background, (2) automatically in foreground, and (3) manually. The extent of user involvement varies with the choice.

User involvement is minimal when a TC session runs automatically in a background partition. The on-line procedures, including selecting the session to be run, are carried out entirely under the control of the 2200 ICS software, with two exceptions: (1) The user establishes the connection with the remote site over the telephone if a manual connection takes place over a switched line (refer to Appendix D), and (2) the user selects the remote site with which the Batch File Driver (BFD)* program establishes a default session. The default session is established during automatic session processing after all the currently scheduled sessions have been run (refer to Section 6.3). (The connection for the default session can be set up by automatic dialing or over a direct line, so the user need not be in attendance.)

If a TC session runs automatically in foreground, user involvement is greater. Besides establishing the connection over the telephone (if the connection is manual) and selecting the site for the default session, the user can suspend the session to review and possibly change its makeup (refer to Section 6.4). For example, the user can delete or reschedule jobs; individual jobs can have files or messages added or deleted; and file attributes or message text can be changed. The user can also abort individual sessions or jobs. Apart from these possibilities, however, the on-line procedures remain under the control of the BFD.

* The Batch File Driver is the ICS program that oversees the transmission of files and messages over the communications line.

User involvement is greatest when a TC session is run manually. The user establishes the connection by manual dial-up, if necessary, and selects the session to be run (refer to Section 6.5). During manual operation, the user can choose an already queued session for running or can schedule a new, single job for immediate communication. The user can also suspend or abort a session. When a manual session is complete, the BFD waits for the user to choose the next session to be run.

The user should refer to Appendix D before beginning the on-line procedures. The appendix lists information that the user should have regarding the connection between the local and remote systems.

6.2 ACCESSING THE ESTABLISH COMMUNICATIONS FUNCTION

Accessing the ICS Establish Communications function involves the following steps:

1. Select Establish Communications from the ICS Utilities menu (Figure 3-1) and press RUN. The Establish Communications screen (Figure 6-1) appears.*

2. Select Batch Bisync from the Establish Communications screen and press RUN. The Communication Processing Mode screen (Figure 6-2) appears. (Press CANCEL/EDIT to return to the ICS Utilities menu.)

After completing the above steps, the user can choose one of three modes of on-line processing: (1) running a TC session automatically in a background partition (refer to Section 6.3), (2) running a TC session automatically in foreground (refer to Section 6.4), or (3) running a TC session manually (refer to Section 6.5).

* When there is only one emulation software package loaded--for example, the Batch Bisynchronous 2780/3780 Emulation--it is not necessary to choose among protocols. This means that when Establish Communications is selected on the ICS Utilities menu (Figure 3-1), the Communication Processing Mode screen (Figure 6-2) is called up rather than the Establish Communications screen (Figure 6-1).

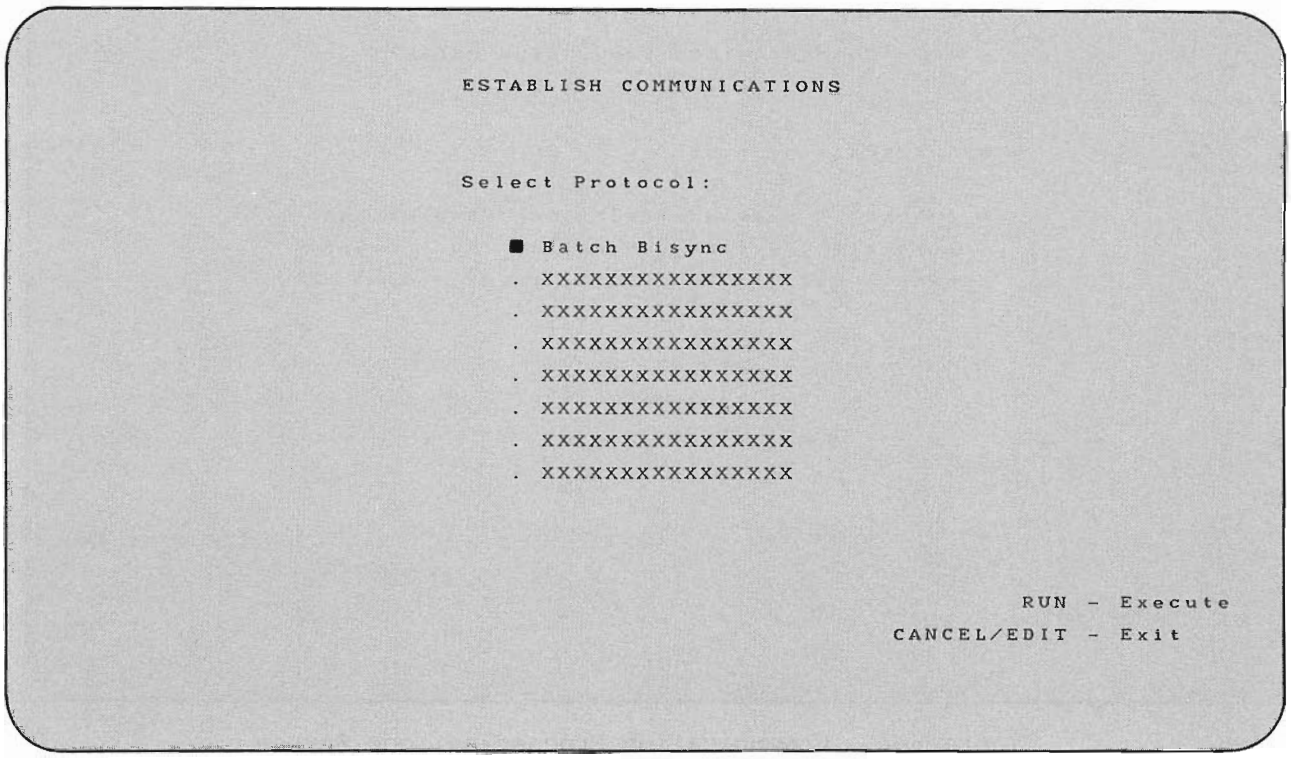

Figure 6-1. Establish Communications Screen

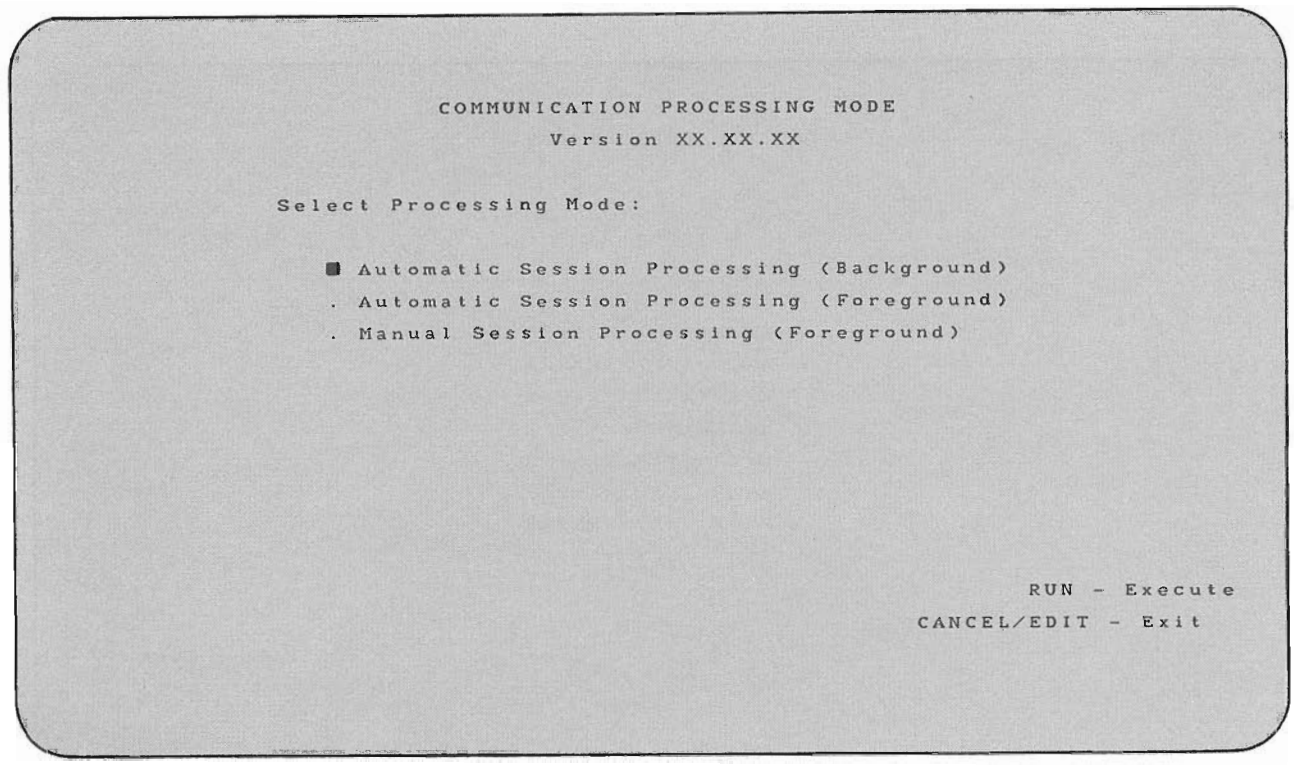

Figure 6-2. Communication Processing Mode Screen

6.3 RUNNING A TC SESSION AUTOMATICALLY IN THE BACKGROUND

If a user selects Automatic Session Processing (Background) from the Communication Processing Mode screen (Figure 6-2) and presses RUN, the message "Loading Automatic Session Processing" is displayed. The Remote Definition Selection (Automatic Processing) screen (Figure 6-3) is also called up, and it lists the RD names for which TC connections have been specified.

The Remote Definition Selection (Automatic Processing) screen allows the user to choose an RD name with which the BFD will later open a session (once all the scheduled sessions have been run automatically). This default session allows the BFD to check for incoming calls and for newly scheduled sessions after the communications job queue is empty. Any RD name defined on the system is eligible for selection, but the site chosen for a default session is usually one with which the local 2200 is in constant contact, such as a MAILWAY dispatch center. Connection to the site should be by automatic dialing or over a direct line, so that the user need not be present when the default session is invoked.

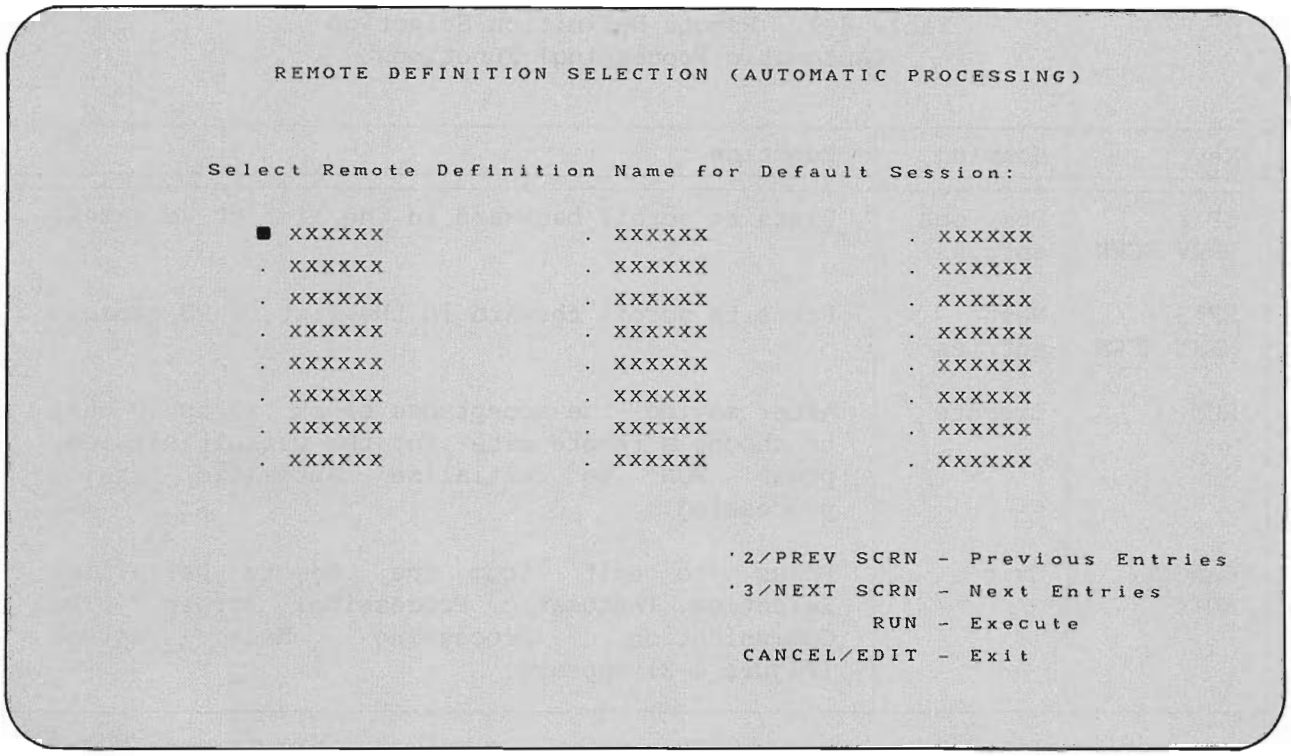

Figure 6-3. Remote Definition Selection (Automatic Processing) Screen

After a default-session site is selected, the BFD tries to attach the terminal to an available partition of the 2200 CPU memory. If this attachment is unsuccessful, the message "Loading Automatic Session Processing (Foreground)" appears. Automatic processing takes place in the foreground, with the user able to interact at the terminal (refer to Section 6.4).

If attachment is successful, the message "Loading Automatic Session Processing (Background)" appears. Automatic processing takes place in a background partition, with the BFD software overseeing the sending and receiving of data between the 2200 system and the various remote sites with which sessions have been scheduled. When all the sessions have been run, the BFD starts the default session to answer incoming calls and periodically check for sessions that have been newly scheduled through the ICS Communication Utilities. (Section 6.6 describes the running of a default TC session.)

Table 6-1 summarizes the functions that can be accessed from the Remote Definition Selection (Automatic Processing) screen during initializing of automatic session processing in background.

Table 6-1. Remote Definition Selection (Automatic Processing) Functions

Key	Meaning	Function
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of RD names.
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of RD names.
RUN	Execute	After moving the acceptance block to an RD name to choose a remote site for the default session, press RUN to initialize automatic session processing.
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Selection (Automatic Processing) screen. The Communication Processing Mode screen (Figure 6-2) appears.

6.4 RUNNING A TC SESSION AUTOMATICALLY IN THE FOREGROUND

If a user selects Automatic Session Processing (Foreground) from the Communication Processing Mode screen (Figure 6-2) and presses RUN, the message "Loading Automatic Session Processing" is displayed. The Remote Definition Selection (Automatic Processing) screen (Figure 6-3) is also called up, and it lists the RD names for which TC connections have been specified. As noted in Section 6.3, the Remote Definition Selection (Automatic Processing) screen allows the user to choose an RD name with which the BFD will later open a session (once all the scheduled sessions have been run automatically). Connection to the default-session site should be by automatic dialing or over a direct line, so that the user need not be present when the default session is invoked.

After a default-session site is selected, the message "Loading Automatic Session Processing (Foreground)" appears, followed by the On-Line BFD (Bisync) screen (Figure 6-4). Automatic session processing starts in the foreground under user control. When all the sessions scheduled have been run, the BFD starts the default session to answer incoming calls and to check periodically for sessions newly scheduled through the ICS Communication Utilities.

During automatic session processing under user control, the On-Line BFD (Bisync) screen provides a record of the progress of each session (refer to Section 6.4.1). Processing continues in much the same way as under ICS software control, but the user can intervene (refer to Section 6.4.2).

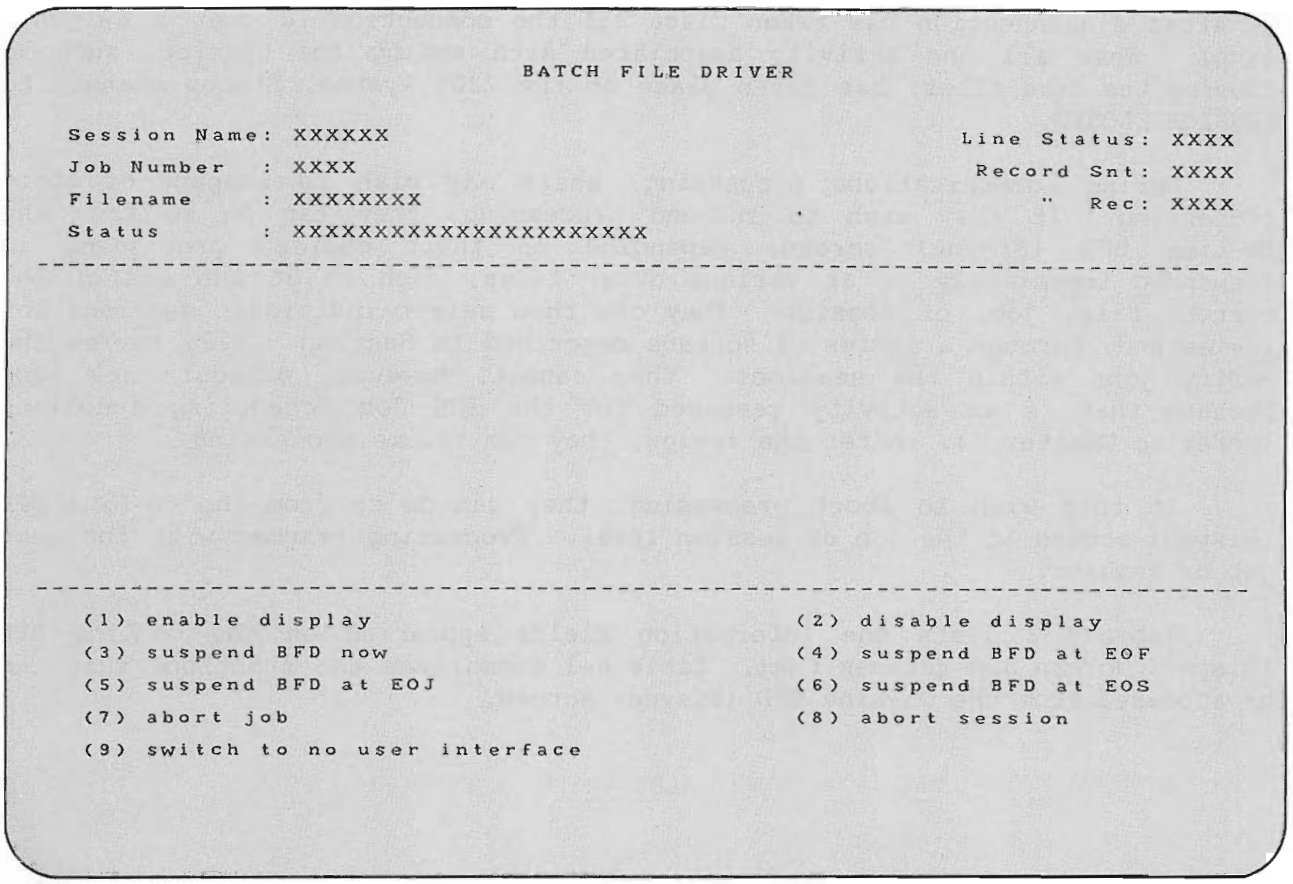

Figure 6-4. On-Line BFD (Bisync) Screen

6.4.1 Overseeing a TC Session

While a TC session is being processed automatically in foreground, the user can oversee the processing from the terminal. This is also true while a TC session is being run manually. The On-Line BFD (Bisync) screen displays information describing the session and its status as processing continues, and the user can also view the data records on the screen as they are being communicated.

As the session opens, its RD name appears in the Session Name field at the top of the screen. As information is retrieved from the RD file to activate the TC connection, Status is shown as OPENING SESSION, and Line Status is shown as DOWN. Once the line connection is made and information identifying the first job of the session has been retrieved from the communications job queue, Line Status changes to UP, Status changes to SESSION OPENED, and the first Job Number and Filename are identified. When data is being sent, Status is SENDING, and a running count of the data records per file sent appears at the top of the screen. When data is being received, Status is RECEIVING, and the running count of data records per file is for the records received. When the last job of the session has been sent or received and activities to end the session begin, Status becomes CLOSING SESSION, but the Line Status entry remains UP. Line Status changes to DOWN after the 2200 system has been released by the host (if the connection is over a leased line)

or after disconnection has taken place (if the connection is over a switched line). When all the activity associated with ending the session, such as closing the data files, has taken place on the 2200 system, Status changes to SESSION CLOSED.

During communications processing, users may wish to suspend or abort processing. If they wish to suspend processing, they can do so from the On-Line BFD (Bisync) screen; depending on their choice, processing is suspended immediately or at various other times, such as at the end of the current file, job, or session. They can then select individual sessions for review and, through a series of screens described in Section 6.4.2, review and modify jobs within the sessions. They cannot, however, schedule new jobs because that is an activity reserved for the ICS Job Scheduling functions (refer to Chapter 5). After the review, they can resume processing.

If they wish to abort processing, they can do so from the On-Line BFD (Bisync) screen at the job or session level. Processing resumes with the next job or session.

Table 6-2 lists the information fields appearing on the On-Line BFD (Bisync) screen and defines them. Table 6-3 summarizes the functions that can be accessed from the On-Line BFD (Bisync) screen.

Table 6-2. Information Fields on the On-Line BFD (Bisync) Screen

Field	Definition
Session Name	Equivalent to the Remote Definition name. Identifies the remote site with which communication is now underway.
Job Number	A 4-digit number that identifies the job within the session. Assigned by the 2200 ICS Schedule Job Utility when the job is added.
Filename	Identifies the file being communicated. Consists of up to eight alphanumeric characters for a file in TC format or in BASIC-2 catalogued file format. For a message file or a received TC file, consists of a system-generated concatenation of the session name and two alphabetic characters (e.g., EFLIN4AA). For a file in word processing format, consists of four digits and one upper- or lowercase alphabetic character (e.g., 0042A).
Status	Gives the stage of an ongoing session. Stages include: OPENING SESSION, SESSION OPENED, SENDING, RECEIVING, SESSION IDLE, CLOSING SESSION, and SESSION CLOSED.
Line Status	Gives the condition of the communications line for the session underway. UP indicates that the line is operational, and DOWN that it is not.
Record Snt	Gives a running count of the number of records sent during the transmission of a file.
Record Rec	Gives a running count of the number of records received during the reception of a file.
(Display area)	The area in which the data records currently being transmitted or received can be viewed when the Enable Display option is activated. Records are displayed in 80-byte segments. Record segments wrap from top of area to bottom as they are processed. The segment currently being processed is displayed with a highlighted arrow (→) to the left of the segment. Up to nine segments can be displayed at one time. In the 2780 or 3780 mode, each segment contains one card-image record.

Table 6-3. On-Line BFD (Bisync) Functions

Key	Meaning	Function
SF'1	Enable display	Press to display the data records as they are being communicated.
SF'2	Disable display	Press to discontinue the display of the data records as they are being communicated.
SF'3	Suspend BFD now	Press to suspend TC activity immediately. The Session Suspended Module Selection screen (Figure 6-5) appears (refer to Section 6.4.2).
SF'4	Suspend BFD at EOF	Press to suspend TC activity when the current file has been transmitted. The Session Suspended Module Selection screen appears.
SF'5	Suspend BFD at EOJ	Press to suspend TC activity when the current job has been transmitted. The Session Suspended Module Selection screen appears.
SF'6	Suspend BFD at EOS	Press to suspend TC activity when the current session has been transmitted. The Session Suspended Module Selection screen appears.
SF'7	Abort job	Press to abort the current job. The job is deleted from the communications job queue. Processing continues with the next queued job, if any.
SF'8	Abort session	Press to abort the current session. The session is deleted from the communications job queue. If TC processing is underway automatically, processing continues with the next queued session, if any. If TC processing is underway manually, the user can choose the next session to process (refer to Section 6.5).
SF'9	Switch to no user interface	Press to switch to automatic session processing in background. At the end of the current session, the BFD tries to attach the terminal to an available partition. If this action is successful, the message "Loading Automatic Session Processing (Background)" appears, and automatic processing continues in background. If the action is unsuccessful, processing continues in foreground.

6.4.2 Reviewing/Modifying a TC Session

In order to review or modify a TC session, the user first presses any key in the series SF'3 through SF'6 from the On-Line BFD (Bisync) screen. This suspends on-line communications and displays the message "Loading BFD Suspended Module," followed by the Session Suspended Module Selection screen (Figure 6-5). This screen starts the cycle for reviewing and possibly modifying or deleting the jobs scheduled for transmission. This applies whether the screen is called up during automatic session processing in foreground or during manual processing (refer to Section 6.5).

The Session Suspended Module Selection screen lists the RD names for which jobs have been scheduled but not yet communicated. From this screen, the user can select one of these yet-to-be-run sessions for more detailed review or for outright deletion; alternatively, session processing can be either terminated or resumed from this screen. Table 6-4 summarizes the functions that can be accessed from the Session Suspended Module Selection screen.

Selecting a scheduled session for more detailed review calls up a series of screens; the number of screens called up depends on the extent of the review. The screens correspond to the screens shown in Figures 6-6 through 6-9. Tables 6-5 through 6-8 summarize the functions that can be accessed from the screens shown in Figures 6-6 through 6-9.

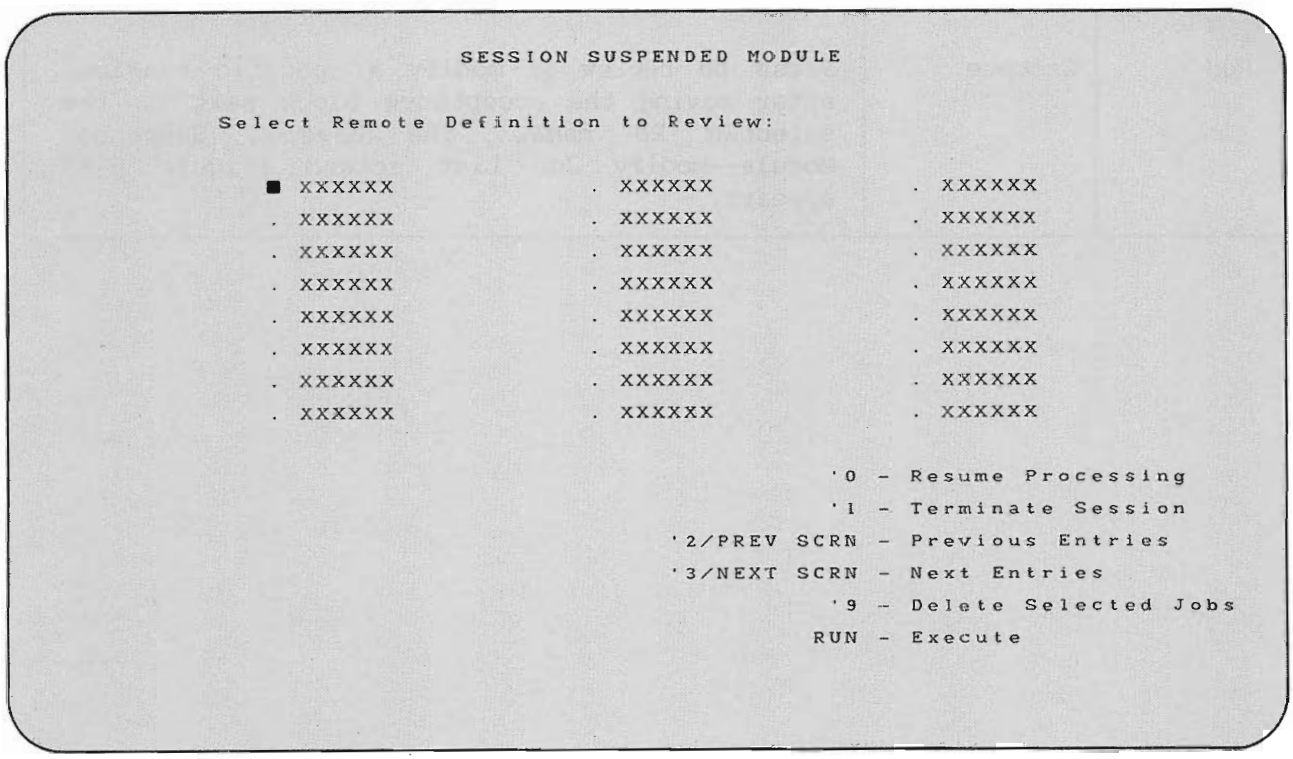

Figure 6-5. Session Suspended Module Selection Screen

Table 6-4. Session Suspended Module Selection Functions

Key	Meaning	Function
SF'0	Resume processing	Press to resume TC activity at the point where it was suspended on the On-Line BFD (Bisync) screen (Figure 6-4). The On-Line BFD (Bisync) screen reappears, so that the user can continue to oversee the processing.
SF'1	Terminate session	Press to terminate TC activity. If a session, job, or file was suspended, it remains in the communications job queue. The ICS Utilities menu (Figure 3-1) appears.
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of RD names.
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of RD names.
SF'9	Delete selected jobs	Move the acceptance block next to an RD name and press SF'9 to delete the session scheduled for that remote site. The RD name disappears from the screen.
RUN	Execute	Press to review or modify a specific session, after moving the acceptance block next to the selected RD name. The Session Suspended Module--Modify Job List screen (Figure 6-6) appears.

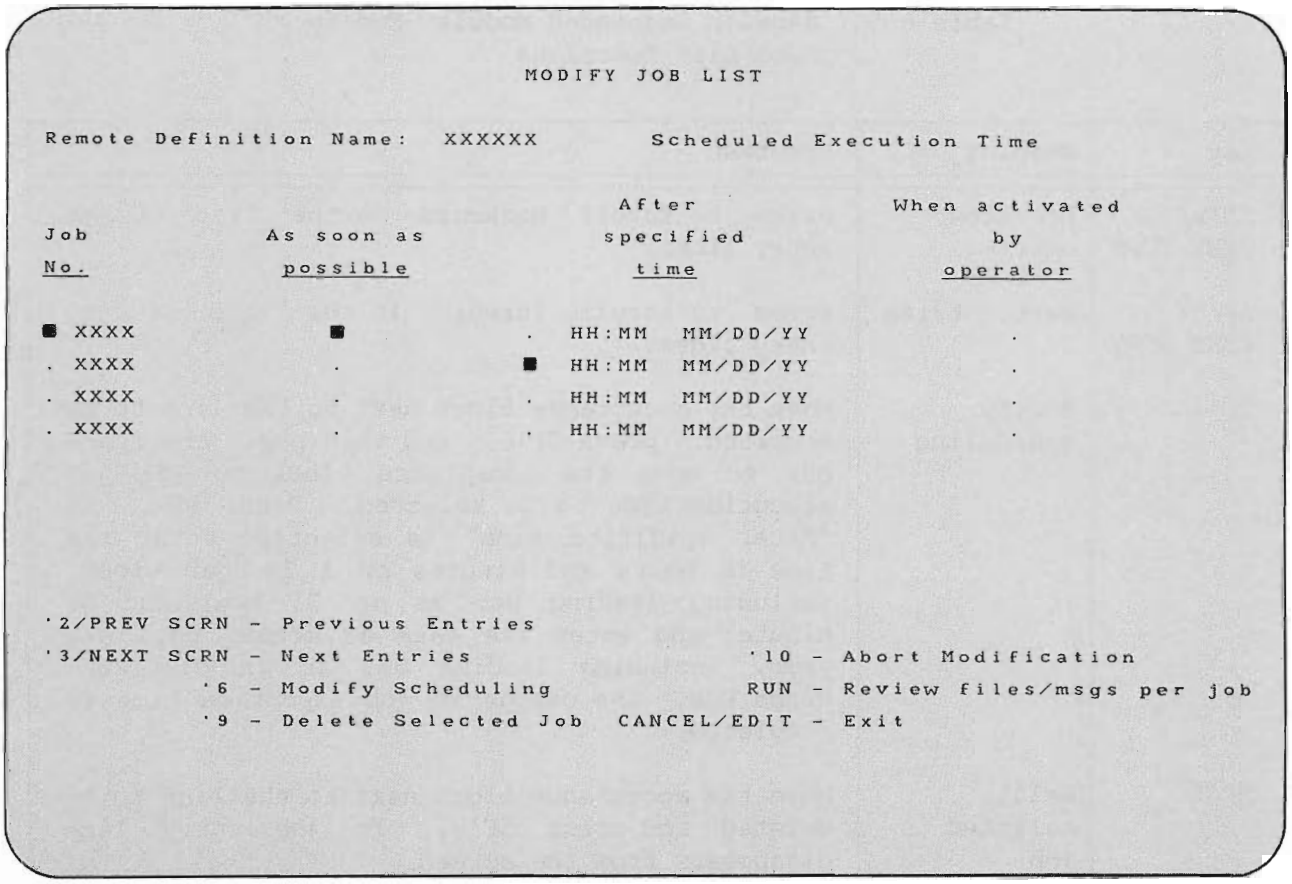

Figure 6-6. Session Suspended Module--Modify Job List Screen

Table 6-5. Session Suspended Module--Modify Job List Functions

Key	Meaning	Function
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of job entry lines.
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of job entry lines.
SF'6	Modify scheduling	Move the acceptance block next to the line to be modified, press SF'6, and then press the space bar to move the acceptance block to the job execution time to be selected. Press RUN. If "After specified time" is selected, enter the time in hours and minutes on a 24-hour clock, including leading 0s, as in 01 hour and 01 minute; and enter the date as month, day, and year, including leading 0s, as in 01/01/83. Press RUN. The change in job execution time is completed.
SF'9	Delete selected job	Move the acceptance block next to the line to be deleted and press SF'9. The job entry line disappears from the screen.
SF'10	Abort modification	Press to abort the job modification underway. The Session Suspended Module Selection screen (Figure 6-5) appears. Any changes already made by pressing SF'6 and then RUN are saved. Messages and files remain if, during this review cycle, they were queued from the Session Suspended Module--Add or Review/Modify Message screen (Figure 6-9) or the Session Suspended Module--Add File to Job screen (Figure 6-8).
RUN	Execute	Move the acceptance block next to a job entry line and press RUN to review the attributes of the files for the selected job. The Session Suspended Module--Review Files/Messages for Job screen (Figure 6-7) appears.
CANCEL/ EDIT	Exit	Press to exit from the Session Suspended Module--Modify Job List screen. The Session Suspended Module Selection screen appears.

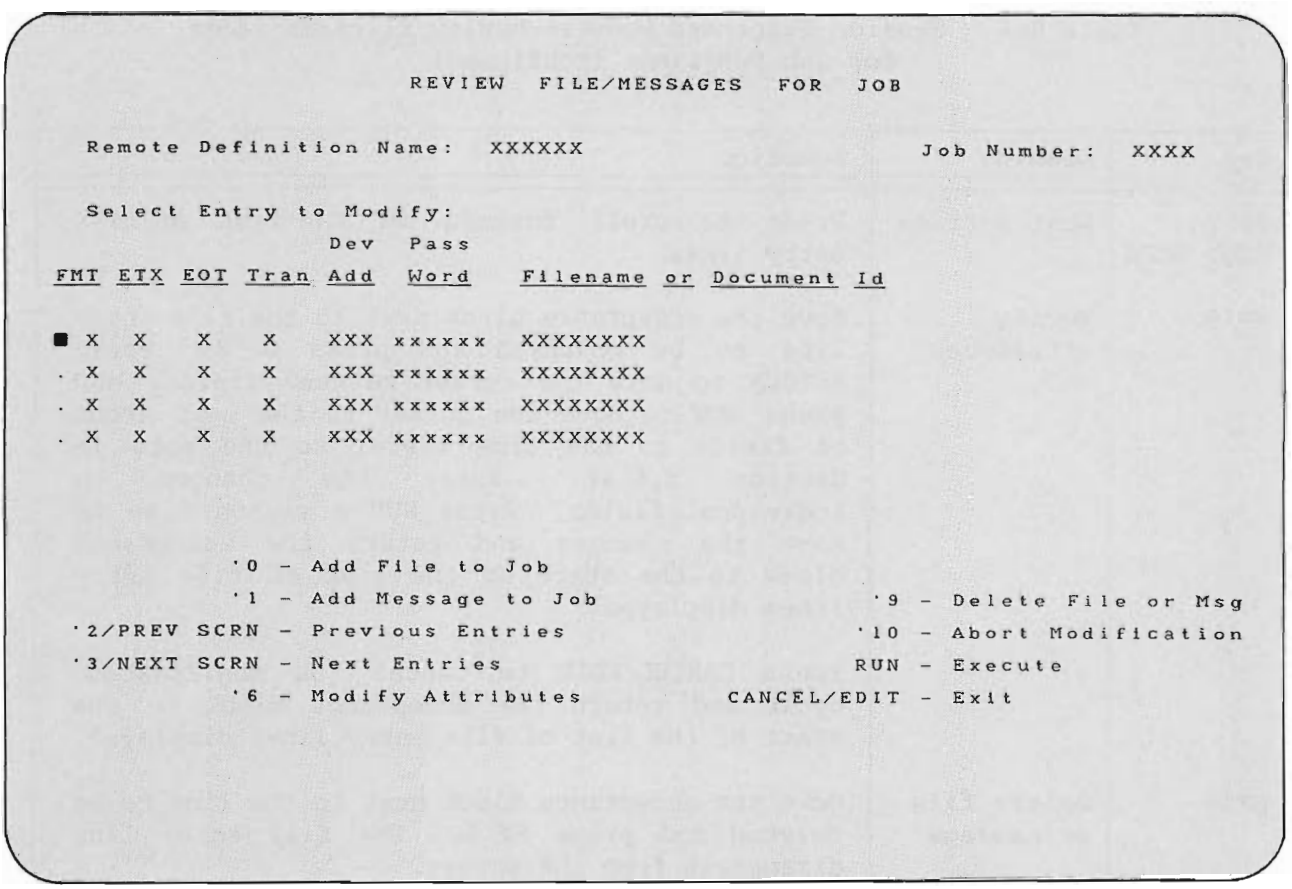

Figure 6-7. Session Suspended Module--Review Files/Messages for Job Screen

Table 6-6. Session Suspended Module--Review Files/Messages for Job Functions

Key	Meaning	Function
SF'0	Add file to job	Press to call up the Session Suspended Module--Add File to Job screen (Figure 6-8). The RD name and job number appear at the top of the screen for the job under review.
SF'1	Add message to job	Press to call up the Session Suspended Module--Add or Review/Modify Message screen (Figure 6-9). The RD name and job number appear at the top of the screen for the job under review, but there is no message name or text.
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of file entry lines.

Table 6-6. Session Suspended Module--Review Files/Messages for Job Functions (continued)

Key	Meaning	Function
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of file entry lines.
SF'6	Modify attributes	Move the acceptance block next to the file entry line to be modified and press SF'6. Press RETURN to move the cursor between fields, and press RUN to move the cursor to the next group of fields in the line (refer to the note in Section 5.6.4). Enter the changes to individual fields. Press RUN a second time to save the changes and return the acceptance block to the start of the list of file entry lines displayed. Press CANCEL/EDIT to cancel the modification cycle and return the acceptance block to the start of the list of file entry lines displayed.
SF'9	Delete file or message	Move the acceptance block next to the line to be deleted and press SF'9. The file entry line disappears from the screen.
SF'10	Abort modification	Press to abort the file modification underway. The Session Suspended Module Selection screen (Figure 6-5) appears. Any modifications underway at the keyboard are cancelled, and any files queued for this job during this review cycle are also cancelled.
RUN	Execute	Move the acceptance block next to a file entry line and press RUN to review the message file selected. The Session Suspended Module--Add or Review/Modify Message screen appears, with the message name and the text of the message displayed. This function is valid only for files whose format (FMT) attribute is M.
CANCEL/ EDIT	Exit	Press to exit from the Session Suspended Module--Review Files/Messages for Job screen. The Session Suspended Module--Modify Job List screen (Figure 6-6) appears.

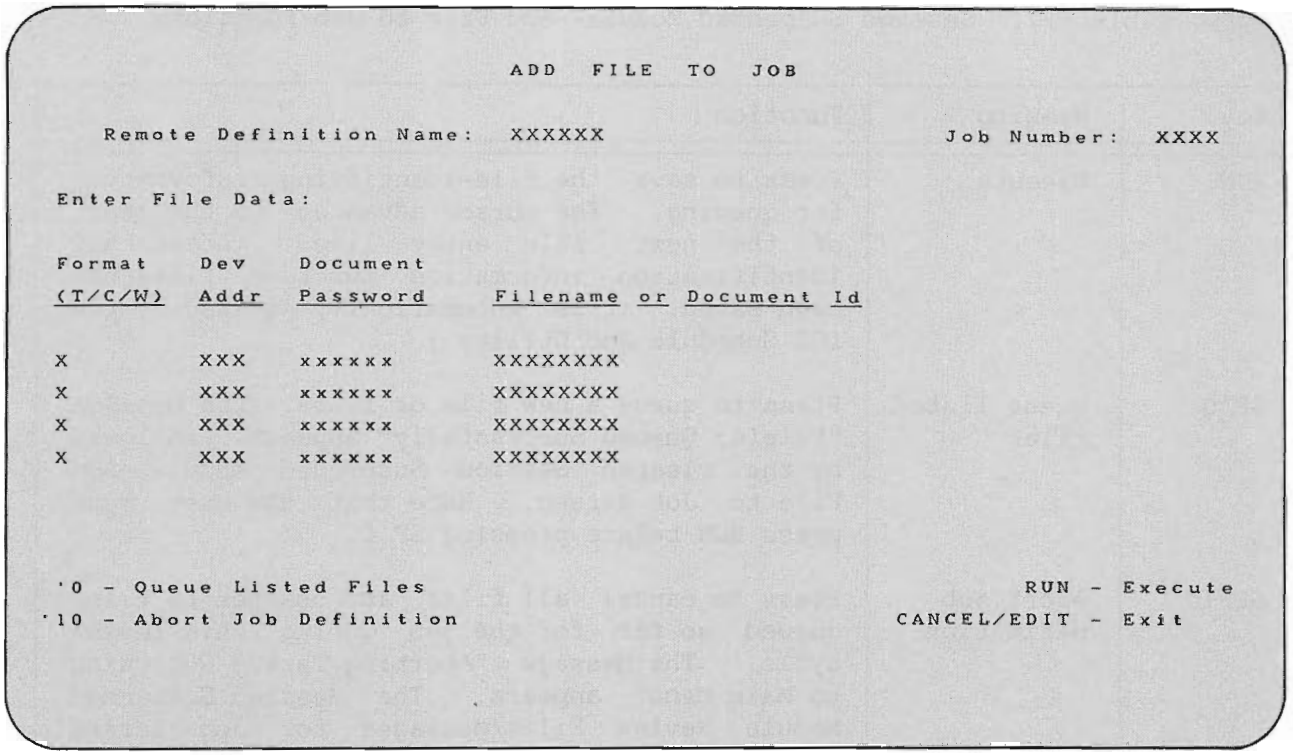

Figure 6-8. Session Suspended Module--Add File to Job Screen

Table 6-7. Session Suspended Module--Add File to Job Functions

Key	Meaning	Function
RUN	Execute	Press to save the file-identifying information for queuing. The cursor advances to the start of the next file entry line. (After the identification information for four files has been saved, it is automatically queued by the ICS Schedule Job Utility.)
SF'0	Queue listed files	Press to queue a new file or files. The message "File(s) Queued Successfully" appears, followed by the cleared Session Suspended Module--Add File to Job screen. Note that the user must press RUN before pressing SF'0.
SF'10	Abort job definition	Press to cancel all files and changes to files queued so far for the job during this review cycle. The message "Aborting Task - Returning to Main Menu" appears. The Session Suspended Module--Review Files/Messages for Job screen (Figure 6-7) appears.
CANCEL/ EDIT	Exit	Press to exit from the Session Suspended Module--Add File to Job screen. The Session Suspended Module--Review Files/Messages for Job screen appears.

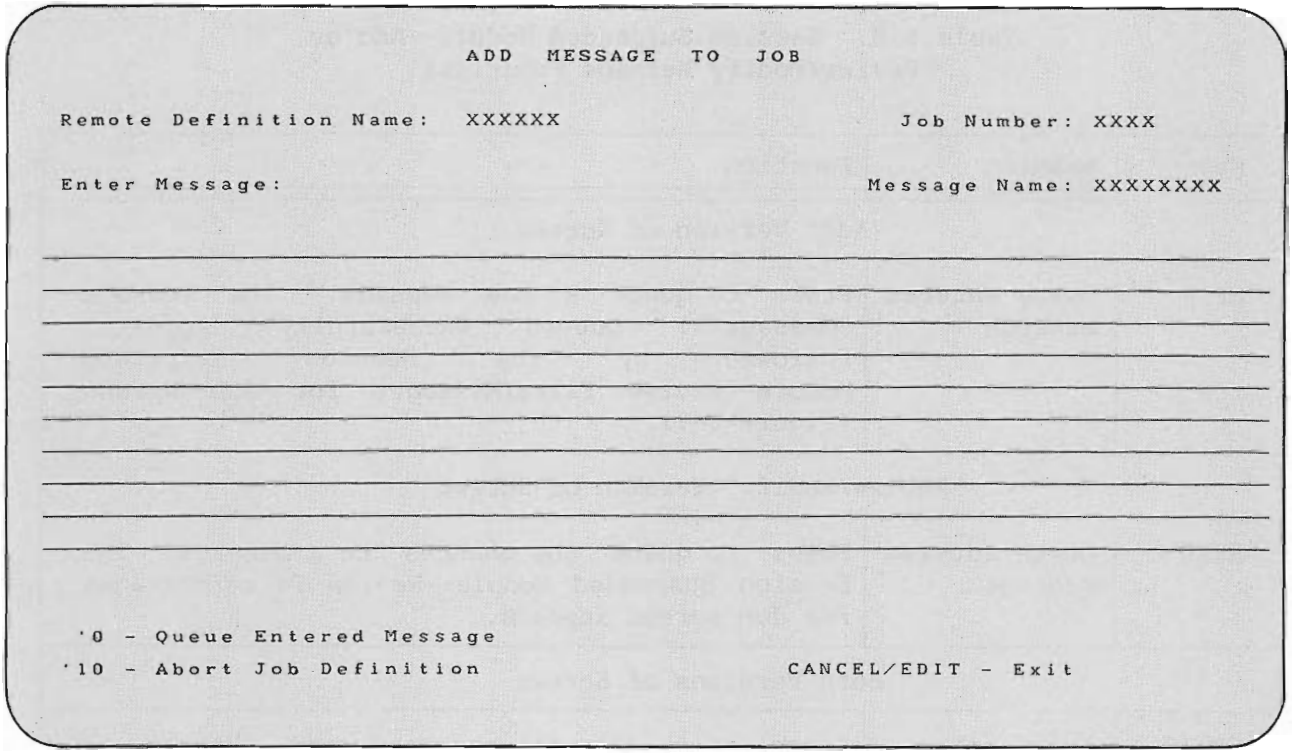

Figure 6-9. Session Suspended Module--Add or Review/Modify Message Screen

NOTE

If the user displays this screen by pressing RUN on the Session Suspended Module--Review Files/Messages for Job screen (Figure 6-7), the Line 2 message changes to REVIEW/MODIFY MESSAGE.

Table 6-8. Session Suspended Module--Add or Review/Modify Message Functions

Key	Meaning	Function
"Add" Version of Screen		
SF'0	Queue entered message	Press to queue a new message. The message "Message(s) Queued Successfully" appears, followed by the Session Suspended Module--Review Files/Messages for Job screen (Figure 6-7).
"Review/Modify" Version of Screen		
SF'0	Queue entered message	Press to queue the changes to a message. The Session Suspended Module--Review Files/Messages for Job screen appears.
Both Versions of Screen		
SF'10	Abort job definition	Press to cancel all messages and changes to messages queued so far for the job during this review cycle. The message "Aborting Task - Returning to Main Menu" appears. The Session Suspended Module--Review Files/Messages for Job screen appears.
CANCEL/ EDIT	Exit	Press to exit from the Session Suspended Module--Add or Review/Modify Message screen. The Session Suspended Module--Review Files/Messages for Job screen appears.

6.5 RUNNING A TC SESSION MANUALLY IN THE FOREGROUND

If a user selects Manual Session Processing (Foreground) from the Communication Processing Mode screen (Figure 6-2) and presses RUN, the message "Loading Manual Session Processing" is displayed. The Remote Definition Selection (Manual Processing) screen (Figure 6-10) is also called up, and it lists the RD names for which TC sessions have been queued. The Remote Definition Selection (Manual Processing) screen allows the user to choose the RD name with which the BFD will open and conduct a session. The session is conducted completely under the user's control.

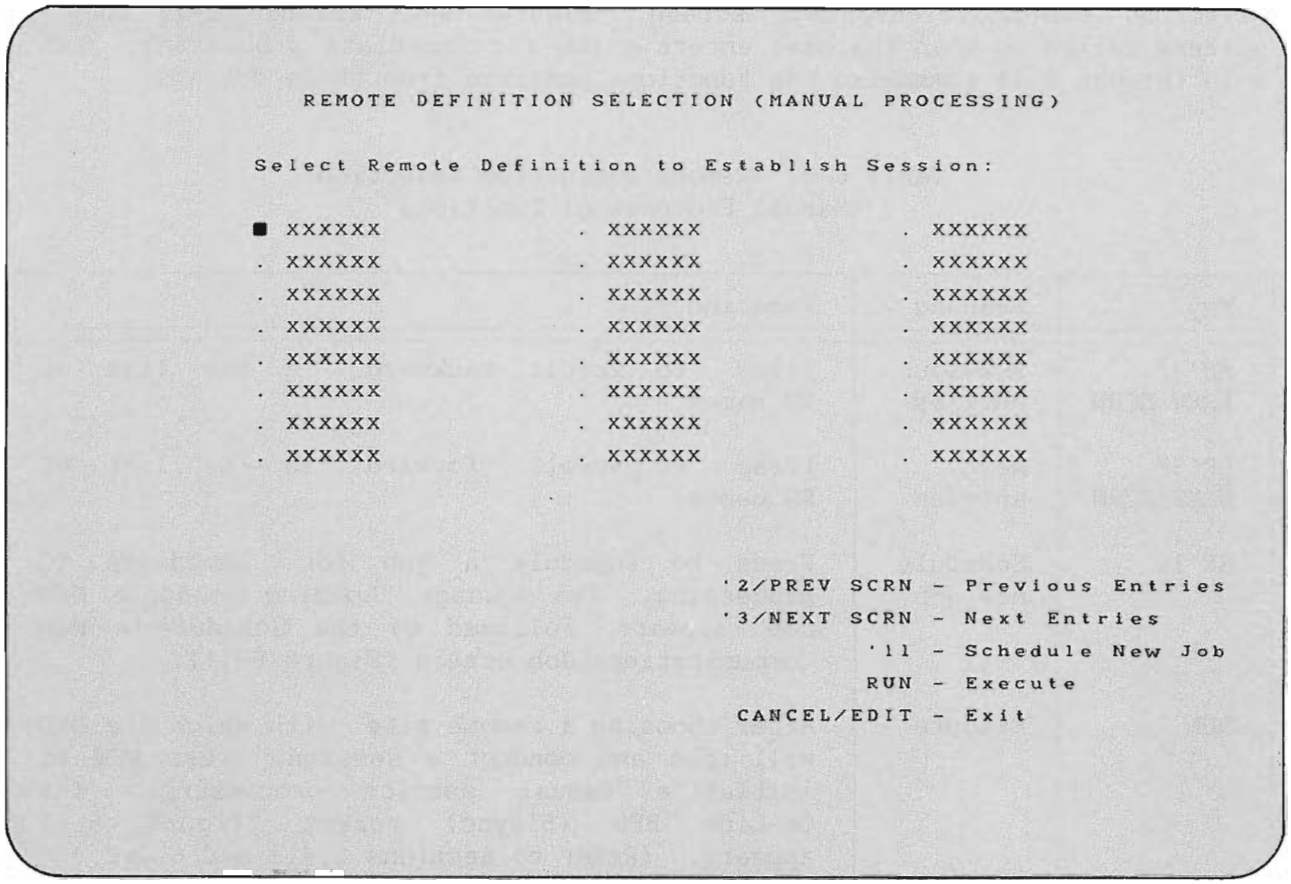

Figure 6-10. Remote Definition Selection (Manual Processing) Screen

After choosing the site for the manual session, the user presses RUN. The message "Loading BFD On-Line Processing" appears on the screen, followed by the On-Line BFD (Bisync) screen (Figure 6-4). The session initialization activities that take place are the same as those described in Section 6.4.1. The user has the options described in Sections 6.4.1 and 6.4.2; however, at the end of the session, processing stops, and the Remote Definition Selection (Manual Processing) screen reappears. The user can select another session for processing.

It may be that no TC sessions are scheduled. The message "No Sessions Queued" appears on the Remote Definition Selection (Manual Processing) screen. The user can then enter a job for immediate processing.

The user may choose to enter a job for immediate processing instead of queuing the job. In this type of processing the communications job queue is not utilized. This option is particularly useful in a system with low TC volume. The user should be aware, however, that only one job at a time can be processed when this option is used; on the other hand, the job can contain up to four messages, four files, or a combination of four messages and files.

Table 6-9 summarizes the functions possible from the Remote Definition Selection (Manual Processing) screen. Figures 6-11 through 6-14 show the screens called up when the user enters a job for immediate processing. Tables 6-10 through 6-13 summarize the functions possible from these screens.

Table 6-9. Remote Definition Selection (Manual Processing) Functions

Key	Meaning	Function
SF'2/ PREV SCRN	Previous entries	Press to scroll backward in the list of RD names.
SF'3/ NEXT SCRN	Next entries	Press to scroll forward in the list of RD names.
SF'11	Schedule new job	Press to schedule a job for immediate TC processing. The message "Loading Schedule New Job" appears, followed by the Schedule a New Communications Job screen (Figure 6-11).
RUN	Execute	After choosing a remote site with which the BFD will open and conduct a session, press RUN to initialize manual session processing. The On-Line BFD (Bisync) screen (Figure 6-4) appears. (Refer to Sections 6.4.1 and 6.4.2.)
CANCEL/ EDIT	Exit	Press to exit from the Remote Definition Selection (Manual Processing) screen. The Communication Processing Mode screen (Figure 6-2) appears.

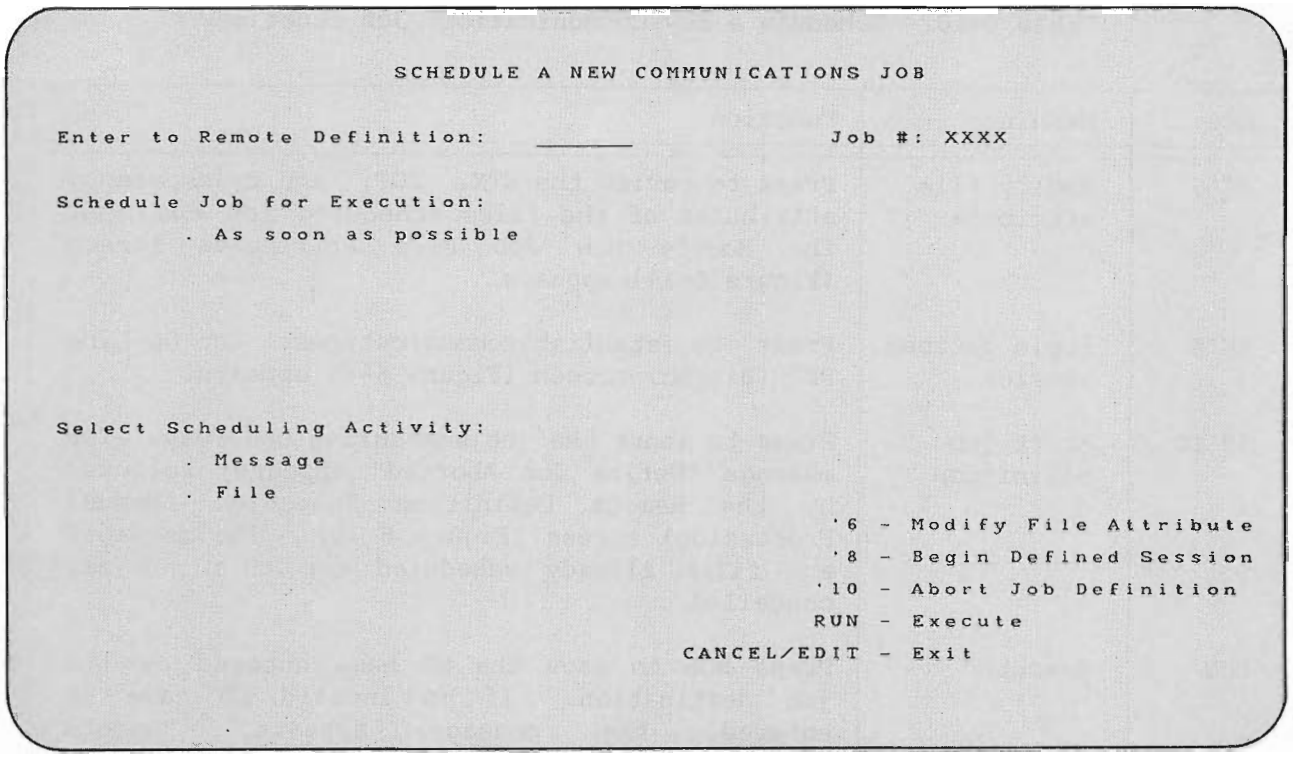

Figure 6-11. Schedule a New Communications Job Screen

Table 6-10. Schedule a New Communications Job Functions

Key	Meaning	Function
SF'6	Modify file attribute	Press to review the ETX, EOT, and transparency attributes of the files scheduled for the job. The Modify New Job File Attributes screen (Figure 6-14) appears.
SF'8	Begin defined session	Press to establish communications. The On-Line BFD (Bisync) screen (Figure 6-4) appears.
SF'10	Abort job definition	Press to abort the job scheduling underway. The message "Define Job Aborted" appears, followed by the Remote Definition Selection (Manual Processing) screen (Figure 6-10). The messages and files already scheduled for this job are cancelled.
RUN	Execute	Press RUN to save the RD name entered as the job destination. If an invalid RD name is entered, the message appears, "Remote Definition Name not Found", and the cursor returns to the start of the RD name field. The user can enter a valid name and press RUN to move the acceptance block to Message on the activity list. By pressing RUN again, the user can call up the Add Message to New Job screen (Figure 6-12). Alternatively, the user can move the acceptance block to File and press RUN to call up the Add File to New Job screen (Figure 6-13). The attributes of the files entered for this job earlier in this job entry cycle appear on the Add File to New Job screen. The cursor is at the start of the next available entry line.
CANCEL/ EDIT	Exit	Press to abort the job scheduling underway. The message "Define Job Aborted" appears, followed by the Remote Definition Selection (Manual Processing) screen (Figure 6-10). The messages and files already scheduled for this job are cancelled.

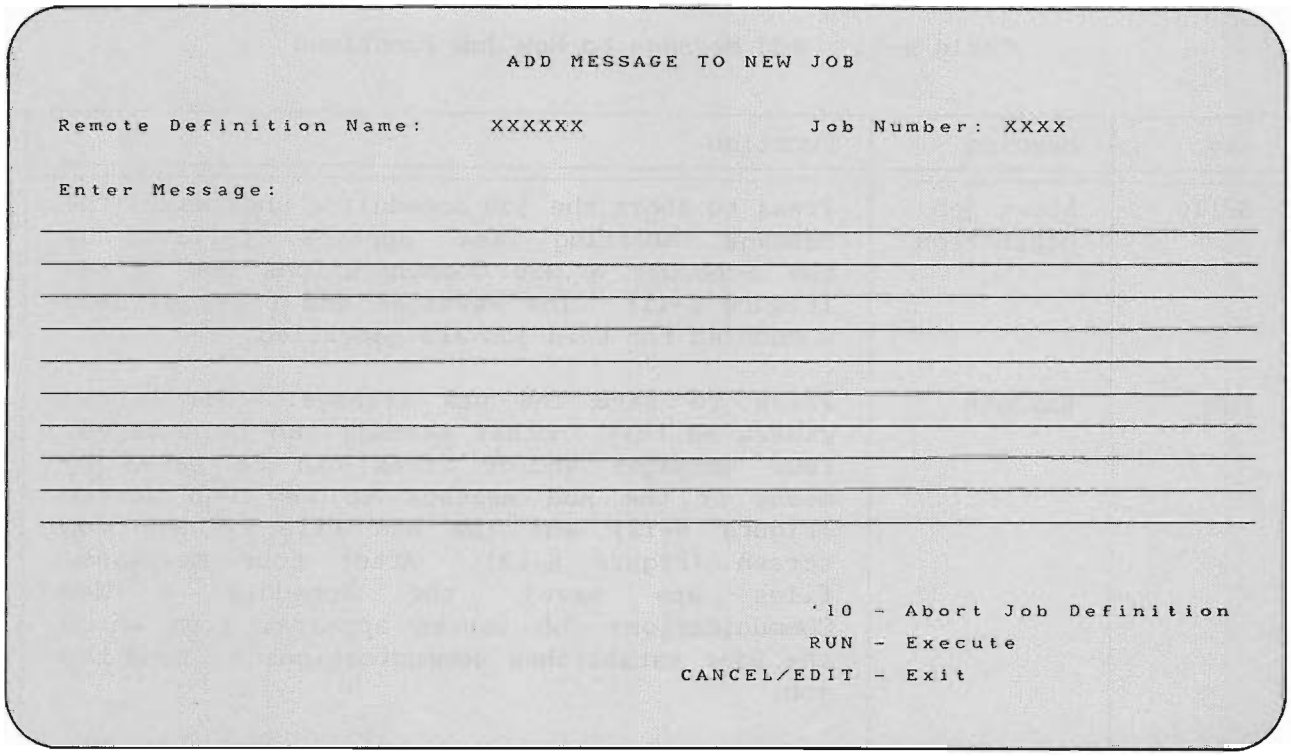

Figure 6-12. Add Message to New Job Screen

Table 6-11. Add Message to New Job Functions

Key	Meaning	Function
SF'10	Abort job definition	Press to abort the job scheduling underway. The message "Aborting Task" appears, followed by the Schedule a New Communications Job screen (Figure 6-11). The messages and files already scheduled for this job are cancelled.
RUN	Execute	Press to save the new message. The screen clears so that another message can be entered. Four messages and/or files can be saved by means of the Add Message to New Job screen (Figure 6-12) and the Add File to New Job screen (Figure 6-13). After four messages/ files are saved, the Schedule a New Communications Job screen appears, from which the user establishes communications to send the job.
CANCEL/ EDIT	Exit	Press to exit from the Add Message to New Job screen. Any new messages saved (when RUN was pressed) are queued. The message "Messages Queued Successfully" appears, followed by the Schedule a New Communications Job screen.

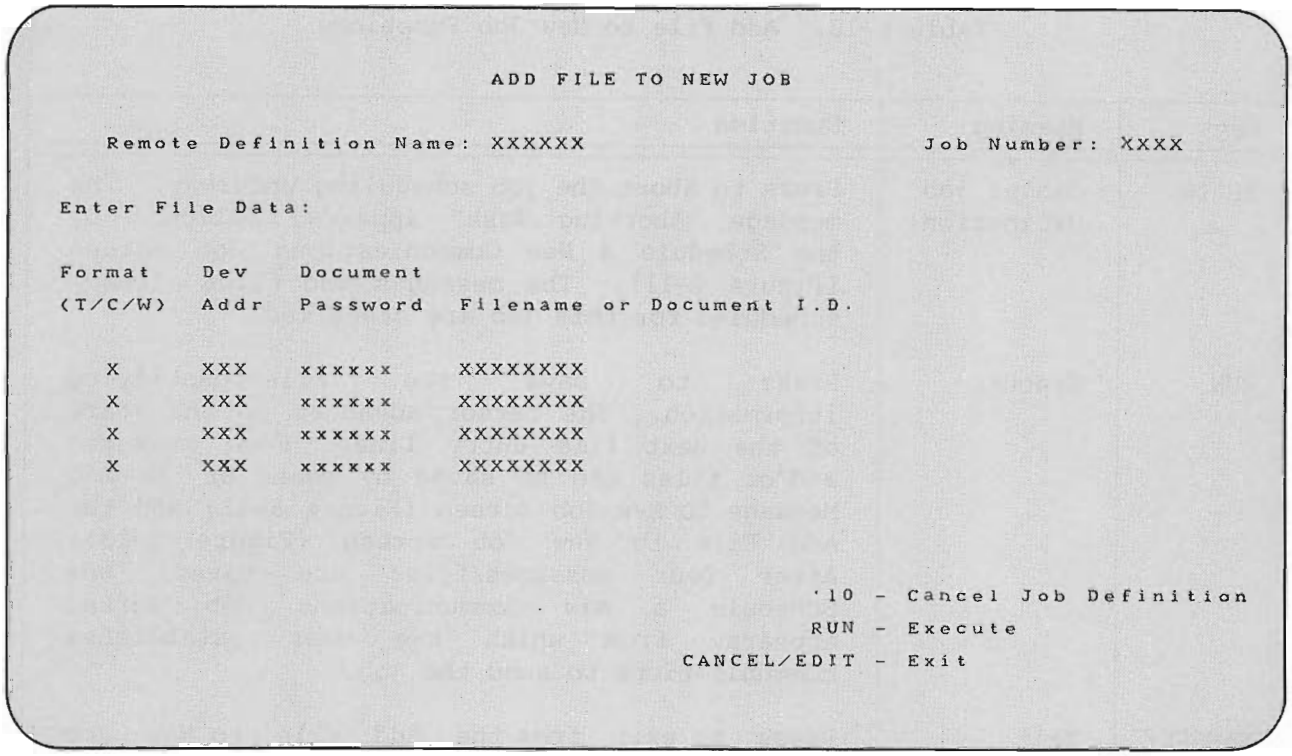

Figure 6-13. Add File to New Job Screen

Table 6-12. Add File to New Job Functions

Key	Meaning	Function
SF'10	Cancel job definition	Press to abort the job scheduling underway. The message "Aborting Task" appears, followed by the Schedule a New Communications Job screen (Figure 6-11). The messages and files already scheduled for this job are cancelled.
RUN	Execute	Press to save the file-identifying information. The cursor advances to the start of the next file entry line. Four messages and/or files can be saved by means of the Add Message to New Job screen (Figure 6-12) and the Add File to New Job screen (Figure 6-13). After four messages/files are saved, the Schedule a New Communications Job screen appears, from which the user establishes communications to send the job.
CANCEL/ EDIT	Exit	Press to exit from the Add File to New Job screen. Any new files saved (when RUN was pressed) are queued. The message "Files Queued Successfully" appears, followed by the Schedule a New Communications Job screen.

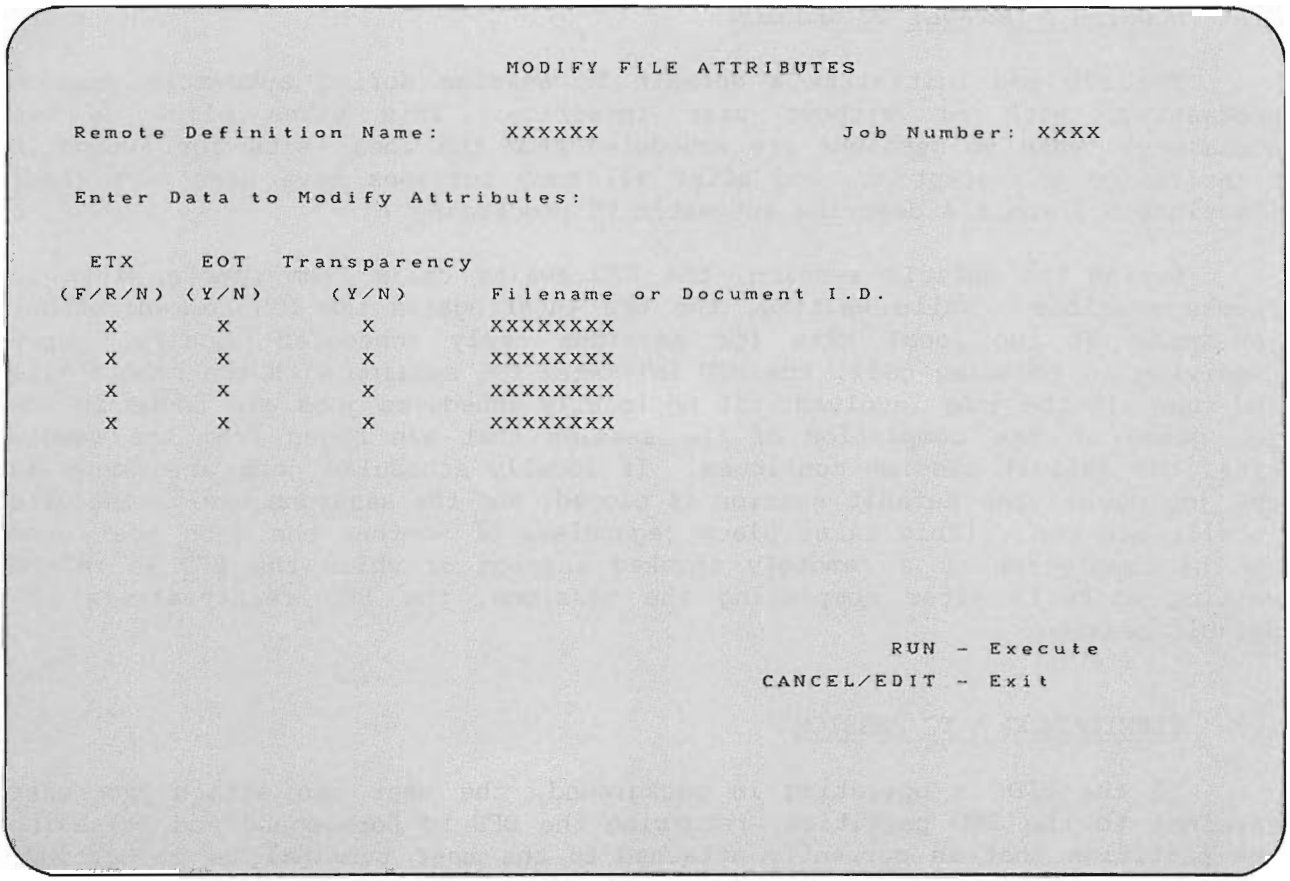

Figure 6-14. Modify New Job File Attributes Screen

Table 6-13. Modify New Job File Attributes Functions

Key	Meaning	Function
RUN	Execute	Press RETURN to move the cursor to the file entry line and attribute to be changed. Press RUN to save the changes. The message "Attributes Modified Successfully" appears, followed by the Schedule a New Communications Job screen (Figure 6-11).
CANCEL/ EDIT	Exit	Press to exit from the Modify New Job File Attributes screen. The Schedule a New Communications Job screen appears.

6.6 RUNNING A DEFAULT TC SESSION

The BFD can initialize a default TC session during automatic session processing, with or without user interface. This takes place on two occasions: when no sessions are scheduled from the local site for automatic transmission or reception, and after all such sessions have been completed. (Sections 6.3 and 6.4 describe automatic TC processing.)

During the default session, the BFD awaits calls from remote sites to invoke sessions. While waiting, the BFD interrogates the ICS communications job queue at the local site for sessions newly scheduled locally. Upon receiving an incoming call, the BFD initiates the session with the remote site and runs all the jobs involved. If no locally scheduled jobs are found in the job queue at the completion of the session that was begun from the remote site, the default session continues. If locally scheduled jobs are found in the job queue, the default session is closed, and the sessions newly scheduled locally are run. (This takes place regardless of whether the jobs are found at the completion of a remotely invoked session or while the BFD is in the waiting state.) After completing the sessions, the BFD reinitializes the default session.

6.7 TERMINATING A TC SESSION

If the BFD is operating in background, the user can attach the user terminal to the BFD partition, returning the BFD to foreground and releasing the partition that is currently attached to the user terminal to background. To attach to the BFD operating in background, perform the following steps:

1. Be sure that all operations being performed in the partition currently attached to the user terminal are completed.

2. Press RESET.

3. Enter the following Immediate Mode statement (substituting the BFD partition number for the question mark):

```
$RELEASE TERMINAL TO ?
```

4. Press RETURN.

Alternatively, the user can attach to the BFD operating in background by running the program "@PSTAT" (if it is available), and pressing SF'0 to attach to the BFD partition. From the On-Line BFD (Bisync) screen (Figure 6-4), the user can then monitor or cancel BFD processing, or release the BFD to background again.

NOTE

If neither of the previously discussed methods allows the user to change the BFD processing mode from background to foreground, it is probable that the user's terminal is not allowed access to the BFD partition. Access is determined by the 2200 system configuration currently loaded. If the terminal cannot be attached to the BFD in background, the user should contact the appropriate 2200 system support personnel.

CHAPTER 7
ICS UTILITIES

7.1 GENERAL INFORMATION

Chapter 7 summarizes the 2200 ICS Utilities. These Utilities are off-line procedures, which are run before and after TC sessions, to support the on-line TC operation. The procedures are grouped as follows: (1) Task Scheduling Utilities, (2) Activate Task Scheduler, (3) Communication Utilities, and (4) Supervisory Utilities. The procedures and their functions are briefly described in the following paragraphs. References are also given to more detailed discussions of these points in the 2200 ICS Utilities Manual.

7.2 TASK SCHEDULING UTILITIES

Information sent from the 2200 system can undergo processing before transmission, and information sent to the 2200 system can undergo processing after reception. The 2780/3780 emulation user can define and schedule this processing by means of the Task Scheduling Utilities. The processing (either printing or the running of other, user-written programs) can then take place in a background partition to free the terminal for other processing. Through the Task Scheduling Utilities, the user can define and schedule new processing, review and modify processing already scheduled, and review processing currently underway in the background.

Chapter 2 of the 2200 ICS Utilities Manual describes the following functions of the Task Scheduling Utilities in detail:

- Schedule processing request -- Allows a file processing request to be queued for Normal mode processing by a processing program. The user enters the name of the file, the program that will process the file, and other information about the file and the processing required. This information is added to the Batch Job Queue (BJQ), and is used by an active Task Scheduler program to initiate background processing.

- Schedule exclusive processing request -- Allows a file processing request to be queued for Exclusive mode processing by a processing program. Exclusive mode processing requests are processed by a Task Scheduler program running in Exclusive mode. The program processes only Exclusive mode requests while in Exclusive mode. Several Exclusive mode requests can be queued to run in succession without interruption by other processing requests. The procedure for queueing an Exclusive mode request is similar to the procedure for queueing a Normal mode processing request.

- Review/modify requests by directive -- Allows the user to review or modify previously queued Normal or Exclusive mode processing requests, listed by processing directive. Also allows the user to review the Exclusive mode control directives on the BJQ, and to review the status of Normal or Exclusive mode requests that have been processed already.

- Review/modify requests by printer/nonprinter processing key -- Allowst he user to review or modify previously queued Normal or Exclusive mode processing requests, listed by processing key. A processing key is a printer address or a 3-character code assigned by the user to a Task Scheduler program. Each processing request on the BJQ is also assigned a processing key by the user. The Task Scheduler program monitors the BJQ by searching for and activating processing requests that were scheduled with one of the processing keys assigned to the Task Scheduler program.

- Review currently processing requests -- Allows a user to examine a list of processing requests being executed by the Task Schedulers currently active on the system.

- Review active task schedulers -- Allows a user to determine the status of Task Scheduler programs currently running on the 2200 system.

7.3 ACTIVATE TASK SCHEDULER

The Task Scheduler program can be started to do further processing on the files sent or received by the 2780/3780 emulation user. The Task Scheduler can be activated before or after batch bisynchronous communications. This activation comprises the following three steps: (1) selecting 2200 system printers (by means of printer keys) for print jobs to be performed by the scheduler; (2) assigning to the scheduler the 3-character codes (nonprinter keys) representing jobs, other than simple printing, to be performed by the scheduler; and (3) starting operation of the scheduler in background or foreground.

Chapter 3 of the 2200 ICS Utilities Manual describes the following functions of the Activate Task Scheduler in detail:

- Select system printer keys -- Allows the user to select 2200 system printers by choosing their printer keys. The Task Scheduler can then perform the jobs that were assigned those printer keys.

- Select nonprinter keys -- Allows the user to select nonprinter keys for scheduler action. The Task Scheduler can then perform the jobs that were assigned those nonprinter keys.

- Activate the Task Scheduler -- Allows the user to activate the Task Scheduler.

7.4 COMMUNICATION UTILITIES

Before actually communicating with another site, the 2780/3780 emulation user must provide information to the 2200 ICS system about the job or jobs to be communicated. Through the Communication Utilities, the user schedules each job for execution and describes the information to be sent and its source on a 2200 storage device. The user also employs these Utilities when reviewing or modifying jobs to be sent, reviewing jobs received, or undertaking miscellaneous monitoring and scheduling activities.

Chapter 4 of the 2200 ICS Utilities Manual describes the following functions of the Communication Utilities in detail:

- Schedule job -- Allows the user to schedule the transfer of files, messages, or documents to and from various remote sites.
- Review/modify scheduled job -- Allows the user to review or modify jobs scheduled for transmission.
- Review/modify received job -- Allows the user to review jobs received.
- Review communications log -- Allows the user to review the log of TC activities.
- Define communications processing request -- Allows the user to enter a request for further background processing of a single job. The processing takes place just before the job is sent or after it is received.

7.5 SUPERVISORY UTILITIES

Five main tasks are done intermittently by system support personnel to maintain the operation of the 2200 ICS 2780/3780 emulation package. These tasks are as follows:

- Installing on a 2200 system disk the software for executing the off-line and on-line procedures described in this manual
- Initializing the queues and files
- Maintaining the remote definitions and code translation tables to be used with the remote sites
- Changing the system password
- Changing the system date

Chapter 6 of the 2200 ICS Utilities Manual describes the following functions of the Supervisory Utilities in detail:

- Install utilities package -- Allows the user to install the ICS Utilities package from the software diskette onto a disk platter, or to install the package onto a new disk platter. Because the Install Utilities Package option also allows the user to specify several installation parameters, it can be used for installation, software updates, and system backup.

- Install communications package -- Allows the user to install an ICS communications package from the software diskette onto a disk platter or to install the package onto a new disk platter. The Install Communications Package option also can be used for software updates and system backup.

- Perform task scheduling supervisory functions -- Help the user regulate and maintain the off-line task scheduling functions of the ICS Utilities. These functions are concerned primarily with control of the task scheduling queue.

- Perform communications supervisory functions -- Help the user regulate and maintain the communication functions of the ICS Utilities. These functions are concerned primarily with control of the ICS communications job queue, the ICS Remote Definition file, and the ICS Translation Table file.

- Change system password -- Allows the user to create an ICS system password or to change an already created ICS system password. The ICS system password provides system security by enabling the user to restrict access to the ICS Supervisory Utilities.

- Change system date -- Jobs are communicated or held according to the date set on the 2200 ICS system by system support personnel.

APPENDIX A
2228D/28D DATA COMMUNICATIONS CONTROLLER OPTIONS

Table A-1 summarizes the Wang data communications controllers that can be used with the 2200 ICS 2780/3780 emulation software. The table indicates the model number, controller memory size, and supported connection standards for each controller. Model 2228D controllers can be used with 2200 MVP and 2200 LVP processors. Option 28D controllers can be used with 2200 SVP processors.

Table A-1. 2200 Data Communications Controllers

Controller Model No.	2200 Processor	Controller Memory	Compatible Connection Standards
2228D-4	MVP, LVP	64K	RS-232-C/V.24 and RS-449
2228D-4E	MVP, LVP	64K	RS-232-C/V.24 and RS-366/V.25
2228D-8E	MVP, LVP	128K	RS-232-C/V.24 and RS-366/V.25
OP-28D-4	SVP	64K	RS-232-C/V.24 and RS-449
OP-28D-4E	SVP	64K	RS-232-C/V.24 and RS-366/V.25
OP-28D-8E	SVP	128K	RS-232-C/V.24 and RS-366/V.25

APPENDIX B
2200 ICS 2780/3780 EMULATION
GLOSSARY

Acceptance block	A square character displayed on the terminal screen to mark the currently selected item on a screen or menu.
American Standard Code for Information Interchange (ASCII)	A 7- or 8-bit data and control character code for data transfer, adopted by the American National Standards Institute to enhance compatibility between data devices. Used for both binary synchronous communications and asynchronous communications.
Automatic Calling Unit (ACU)	A dialing device supplied by the communications common carrier (or purchased by the user) that permits a DTE to automatically dial calls over a communications network.
Automatic extended retransmission	In data communications, the resending of the current block of data (from the last ETB or ETX) a prescribed number of times, or until it is entered correctly or accepted.
Automatic session	A TC session activated by the ICS software rather than by the user. In foreground mode of operation, the user oversees the session from the terminal; in background mode of operation, the ICS software controls the session entirely.
Automatic turnaround time	The actual time required to reverse the direction of transmission from send to receive or vice versa when a half-duplex circuit is being used. For most communication facilities, this involves line propagation time, line effects time, modem timing requirements, and machine reaction time. A typical time is 200 milliseconds on a half-duplex telephone connection.
Background processing	Processing performed in a 2200 system partition that does not have a user terminal logically attached. Compare noninteractive processing.
BASIC-2	The programming language used with the 2200 processor; the code set corresponds to the ASCII character set, with additional characters used for programming and display.

Batch File Driver (BFD)	The ICS program used for the batch transmission of files and messages by the ICS 2780/3780 emulation software.
Batch transmission	Sending data (files, documents, etc.) from one site to another, without intervening responses from the receiving unit.
Binary Synchronous Communications (BSC) protocol	A batch communications protocol allowing the interchange of record-oriented data between DTEs. The DTEs operate continuously at substantially the same frequency and maintain, by clocking, a desired phase relationship.
Blocking	Grouping records prior to transmission to increase the average length of the physical record being sent; this can reduce the process time per record and increase the total number of records sent in one transmission.
Catalogued file format	A Wang 2200 disk-file format in which data and program files are indexed for efficient access; records are stored in 256-byte sectors.
Communications line	The medium over which data is sent from one point to another. This medium can be a switched or dedicated line over a common carrier or private network.
Communications controller	A device used to process various communications control operations.
Communications Job Queue (CJQ)	A 2200 ICS system file which contains the job and session queues and the communications log; this file is used to coordinate the scheduling of batch communications for the ICS 2780/3780 software.
Connector	The electrical interface between a DTE and the DCE, such as a modem or an automatic calling unit. The specifications for data interfaces used by 2200 systems conform to EIA and CCITT standards.
Consultative Committee on International Telephony and Telegraphy (CCITT)	An advisory committee of the International Telecommunication Union (ITU) established to recommend worldwide TC standards.
CCITT Standard V.24	A standard for the interface between a DTE and a DCE used for serialized binary data interchange. The standard applies primarily to international data communications. Functionally, a superset of the EIA Standard RS-232-C.
Cursor	A blinking underscore displayed on the terminal screen, often indicating the position for the user to enter data.

Cyclic Redundancy Checking (CRC)	In data communications, a method of error checking performed at both the sending and receiving sites. The receiving site generates a check character based on the contents of a data block received and compares it with a similar check character sent from the transmitting site. A match indicates the transmission was probably correct. This method is more comprehensive than longitudinal redundancy checking.
Data Communication Equipment (DCE)	In common reference, a device, such as a modem, used to interface a DTE to a common carrier network or other communications line.
Data Link Processor (DLP)	A microprocessor functioning as a TC front-end processor for a system (for a 2200 system, the communications controller).
Data Terminal Equipment (DTE)	In common reference, a device, such as a processor or a workstation, serving as a data source and destination. The DTE performs the necessary data communications control functions in accordance with a link protocol.
Default session	A TC session initialized by the ICS BFD when there are no pending jobs on the CJQ during automatic session processing. During a default session, the BFD processes calls from remote sites, queries the CJQ for newly scheduled local sessions, and closes the default session to resume automatic session processing when a new session is discovered on the CJQ.
Device address	On a 2200 system, the 3-character address of a system device, such as a disk drive or a printer.
Document password	A password of 6 or fewer characters for a Wang word processing document, assigned by a user to restrict access to the document.
Electronic Industries Association (EIA)	A United States standards organization, responsible for the RS-232-C interface standard.
EIA Standard RS-232-C	A standard for the interface between a DTE and a DCE, employing serialized binary data interchange over a 25-pin connector. The standard is used primarily for data communications within the United States. Functionally, a subset of the CCITT Standard V.24.
End-of-Text (ETX) control character	A BSC control character transmitted to indicate the end of a character sequence (such as a file) that is to be treated as a unit by the receiving site.

End-of-Transmission-Block (ETB) control character	A BSC control character transmitted to indicate the end of a block of data. The receiving site replies with a positive acknowledgment (ACK) or a negative acknowledgment (NAK) control character, depending upon the success of the reception of the data block.
End-of-Transmission (EOT) control character	A BSC control character transmitted to indicate the end of a transmission. Line control reverses, and the receiving unit can reply, possibly with a transmission of its own.
Enquiry (ENQ) control character	A BSC control character transmitted to indicate the end of a polling or selection sequence. ENQ seeks a reply, such as terminal status or identification.
Extended Binary Coded Decimal Interchange Code (EBCDIC)	An 8-bit data and control character code used for data transfer under the BSC protocol.
Field	An area in a record that contains a predefined type of information, such as a file name or data.
File	A group of related records, stored under a file name.
File attribute	A characteristic of a file that affects its organization or the way the file is transmitted during data communications.
File name	A name identifying a set of data records. A file name consists of up to 8 alphanumeric characters for a 2200 TC or BASIC-2 catalogued file, or 4 digits and 1 uppercase or lowercase alphabetic character for a file in word processing format.
Foreground processing	Processing performed in a 2200 system partition that has a user terminal logically attached. Compare interactive processing.
Format	The arrangement of the file data on disk.
Function	A set of steps, either interactive or noninteractive, performed to accomplish a task, such as setting up a remote definition or establishing communications.
Half-duplex	Data exchange during communications in either direction, but not in both directions simultaneously.
Host	The primary or controlling site in a data communications system.

IBM 2780 Data Transmission Terminal	A data communications terminal, used primarily for remote job entry, that batch transmits under the BSC protocol. The transmission codes available are Six-Bit Transcode, EBCDIC, and ASCII; and transmission speeds range from 1200 to 4800 bits per second. Space suppression is supported. The terminal has a card reader, a printer, and, optionally, a card punch as input and output devices.
IBM 3780 Communication Terminal	A data communications terminal, used primarily for remote job entry, that batch transmits under the BSC protocol. The transmission codes available are EBCDIC and ASCII, and transmission speeds range from 1200 to 7200 bits per second. Space compression is supported. The terminal has a card reader, a printer, and, optionally, a card punch as input and output devices.
ICS communications package	A communications or emulation software package installed on a 2200 system as part of the ICS. A communications package sends and receives data over a communications line, according to the rules of a specific data communications protocol or discipline. For example, the ICS 2780/3780 emulation package emulates IBM 2780 or 3780 terminals, using the BSC protocol.
ICS system password	A user-assigned password that restricts access to the ICS Supervisory Utilities.
ICS Utilities package	A software package installed on a 2200 system as part of the ICS. The ICS Utilities allow a user to perform on-line and off-line operations from a terminal or a background partition, in support of any communications packages installed on the 2200 system. The Utilities also provide programs for the supervision of the ICS system.
Interactive processing	The user has access to the 2200 system during the performance of a task; compare foreground processing.
Job	A set of files and/or messages scheduled for transmission using the ICS Communications Utilities.
Job number	A number assigned by the 2200 ICS Utilities software to each communications job entered onto the ICS system; the number identifies the job on all queues and through all stages of processing.
Leased line	A dedicated, nonswitched communications line, usually rented from a common carrier, for the exclusive use of two or more sites.

Limited conversational mode	A data transmission mode that allows the host to transmit heading or text data, rather than an ACK control character, in response to a completed file or message from the terminal. The limited conversational mode can be used during transparent as well as nontransparent transmission. The terminal receiving the conversational response cannot transmit another conversational response in turn. With the ICS software, the 2200 system can serve only as a terminal in the limited conversational mode.
Longitudinal Redundancy Checking (LRC)	In data communications, a method of error checking performed at both the sending and receiving sites. The check characters generated at both sites are based on the bit total in each row of bits in the data block. Compare cyclic redundancy checking.
Manual session	A TC session activated under user control rather than through the ICS job scheduling functions. The user chooses the site with which the session will be run and oversees the session until it is completed.
Menu	A list of options displayed on the terminal screen, from which the user can select a function to be performed.
Message	The ICS Communication Utilities allow a message of up to ten 80-character lines to be defined and sent as information or instructions between sites during a communications session.
Microcode	Machine-level instructions that regulate the input and output of 2200 system devices. Microcode for ICS communications is loaded to the communications controller, allowing it to pass information between the 2200 processor and the attached DCE.
Modem	A device that modulates the digital signals from the DTE into a range of frequencies (analog signals) suitable for transmission over communication lines. The modem also demodulates received signals before their transfer to the DTE.
Multipoint configuration	In data communications, a configuration in which more than two terminals are connected. The configuration may include switching facilities.
Negative acknowledgment (NAK) control character	A control character transmitted by the receiving site to indicate that an error was encountered in the previous transmission and that the receiving site is ready to accept another transmission.
Noninteractive processing	The computer system performs a task without user intervention. Compare background processing.

Null modem	A device that eliminates the need for modems or a telephone line for local data communications up to a distance of 50 feet (15.2 meters).
Off-line processing	An ICS system procedure that does not involve direct communication with a remote site.
On-line processing	An ICS system procedure that does involve direct communication with a remote site.
Pad character	In data communications, a filler character that uses up time or space while a function (usually mechanical) is being accomplished. Examples of these functions include the synchronization of the sending and receiving equipment, a carriage return, or a form ejection.
Partition	A block of 2200 processor memory, with specified address boundaries, that can be accessed by a user terminal.
Point-to-point	A communications line connecting two sites; the connection may include switching facilities.
Positive acknowledgment (ACK) control character	A control character transmitted by the receiving site to indicate that the previous transmission has been accepted.
Priority	The level of processing urgency that a user assigns to each communications job.
Queue	A list formed by items in a system waiting for service. For example, the ICS CJQ is a list of user-defined jobs that is processed by an ICS communications package.
Remote batch terminal	A terminal from which a batch job is submitted to the central processor from a remote site. The job enters the system for normal processing, and the output is later returned to the remote printer. The remote batch terminal consists of a card reader, a line printer, and possibly other devices.
Remote Definition (RD)	The information supplied by the user to the 2200 ICS Remote Definition functions software, specifying the parameters for a TC connection.
Reverse Interrupt (RVI)	The capability of the host computer to interrupt the terminal while the terminal is transmitting, to send a higher priority message to the terminal.
Session	Communication between devices to transmit information, following a set of procedures defined for this communication. For ICS, a session is an on-line activity that can consist of interactive communications, or the batch communication of one or more jobs.

Site	The location of a data station, such as a terminal, cluster controller, or computer, that is connected to a communications network.
Six-Bit Transcode	Same as Six-Bit Transmission Code.
Six-Bit Transmission Code	A 6-level data and control character code used with the IBM 2780 Data Transmission Terminal for data transfer under the BSC protocol. This code is not supported by the ICS 2780/3780 emulation software.
Space compression	An IBM 3780 Communication Terminal feature that requires the transmitting terminal or host to represent each group of repeated space characters (63 characters maximum) by a 2-character sequence defining the number of compressed (deleted) characters.
Space decompression	An IBM 3780 feature that requires the receiving terminal or host to remove each 2-character space-compression sequence and insert the proper number of space characters.
Space expansion	An IBM 2780 feature that requires the receiving terminal or host to replace in a record the trailing space characters deleted by the transmitting terminal or host.
Space suppression	An IBM 2780 feature that requires the transmitting terminal or host to delete trailing space characters filling out a record that is shorter than 80 bytes.
Special Function (SF)	The name applied to the top row of keys on Wang 2200 Series interactive terminals. These keys are used, together with the standardized screens of the ICS Utilities software, to operate the software.
Switched line	A TC connection established with the use of switching facilities, such as a common carrier network. Typically referred to as a dial-up line.
Synchronization	The process of adjusting a receiving device's clock to match the clock of the transmitting device.
Synchronization (SYN) control character	A control character transmitted between communicating sites, to keep the sending and receiving equipment synchronized, particularly when the line is otherwise idle; used during binary synchronous communications.
Synchronization pattern	The sequence of SYN characters inserted by the 2200 system into transmitted text to maintain the in-step condition between the sending and receiving devices.
Telecommunications (TC) connection	A set of user-selectable parameters used to specify a compatible connection to another site having known communication characteristics; an ICS TC connection is identified by a Remote Definition name.

Telecommunications file format	A Wang disk-file format in which records, basically 80-column card images, are packed into 248-byte sectors, primarily for transmission by Wang 2200 communications software.
Temporary-Text-Delay (TTD) control character	A control character transmitted to indicate to the receiving site a temporary delay in transmission.
Terminal	A device, usually equipped with a keyboard and some kind of display, capable of sending and receiving information over a communications channel.
Translation	The replacement of a character in one code set by a character in another code set by means of a translation table. The translation is processed by the software either before sending or after receiving the character, depending on user instructions.
Transmission code	A code for sending information over communication lines.
Transparent transmission	A mode of binary synchronous communication in which only control characters that are preceded by the Data Link Escape (DLE) character are acted upon as line control characters. All other bit patterns are treated as data.
Wait-before-transmit positive acknowledgment (WACK)	A control character returned by the receiving site to indicate that the last data block was received satisfactorily, but that a temporary delay in further transmission is requested.
Word processing file format	A Wang disk-file format, in which individual records are stored, with a maximum record length of 249 bytes.
2200-to-2200 mode	The employment of (1) a straight 3780 BSC protocol to transmit TC-format files and messages and (2) a modified 3780 BSC protocol to transmit word processing documents and BASIC-2 catalogued data and program files between 2200 systems.

APPENDIX C
OPERATING THE EMULATION SOFTWARE

The steps used to operate the 2200 ICS 2780/3780 emulation software are as follows:

1. Be sure a Remote Definition (RD) exists for the session planned. Choose the Establish Communications function on the ICS Utilities menu (Figure 3-1) and Batch Bisync on the Establish Communications screen (Figure 6-1). Choose Automatic Session Processing in background or foreground on the Communication Processing Mode screen (Figure 6-2). Review the Batch Bisync RD names displayed on the Remote Definition Selection (Automatic Processing) screen (Figure 6-3). This screen lists the RD names for which TC connections have been specified on the 2200 ICS system. (Refer to Sections 6.2 and 6.3.)

   System support personnel periodically update the RD names stored on the 2200 ICS system through the Supervisory Utilities function on the ICS Utilities menu. Access to this function is password protected. (Refer to Chapter 4 for a detailed description of an RD.)

2. Schedule the job to be transmitted from the ICS communications job queue. (If the job is to be transmitted immediately, omit this step and do Steps 3 and 4.) Choose the Communications Utilities function on the ICS Utilities menu and then the Schedule Job function on the Communications Utilities menu (Figure 5-1). Use the Add Message to Job screen (Figure 5-3) to enter any required sign-on messages. Use the Add File to Job screen (Figure 5-4) to enter the attributes of any disk files to be transmitted. (Refer to Chapter 5.)

3. Activate the Establish Communications function. Choose Establish Communications on the ICS Utilities menu and Batch Bisync on the Establish Communications screen (Figure 6-1). (Refer to Section 6.2.)

   On the Communication Processing Mode screen (Figure 6-2), choose a mode of operating the 2200 ICS software: automatically under software control, automatically under user control, or manually. (Refer to Sections 6.3, 6.4, and 6.5.)

4. Schedule the job to be transmitted immediately. This step can be done if the software is operated manually and the job is not to be run from the communications job queue. Press SF'11 from the Remote Definition Selection (Manual Processing) screen (Figure 6-10). Use the Add Message to New Job screen (Figure 6-12) to enter any required sign-on messages. Use the Add File to New Job screen (Figure 6-13) to enter the attributes of any disk files to be transmitted. Press SF'8 from the Schedule a New Communications Job screen (Figure 6-11) to start communications processing. (Refer to Section 6.5.)

5. Choose the RD for the default session. This step is done if the software is operated automatically. Choose the RD from the Remote Definition Selection (Automatic Processing) screen (Figure 6-3). Press RUN to start communications processing. (Refer to Sections 6.3 and 6.4.)

6. Choose the RD for the planned session. This step is done if the software is operated manually and jobs are run from the communications job queue. Choose the RD from the Remote Definition Selection (Manual Processing) screen (Figure 6-10). Press RUN to start communications processing. (Refer to Section 6.5.)

7. Establish the connection. This step is automatic unless manual dialing is required to establish the connection.

8. Perform the desired communication functions. These functions can be performed automatically under software control, automatically under user control, or manually. (Refer to Section 6.3, 6.4, or 6.5, respectively.)

9. Sign off. When all communication functions are completed, fulfill any sign-off or other host requirements (including disconnecting the communications line, if appropriate). End processing by pressing RESET. (Refer to Section 6.7.)

APPENDIX D
PREPARATION FOR SUCCESSFUL COMMUNICATIONS

Before starting the on-line procedures, users should obtain the following information about the connection characteristics at both the local and remote sites:

1. As indicated in Section 4.3, several parameters related to the local 2200 system must be defined and saved on the local system. Examples include TC controller address, call placing and answering procedures, type of device emulated, and receive file organization and disk address. Values appropriate for each connection must be determined by the system support personnel and affirmed, where appropriate, by the supervisory personnel at the remote facility.

2. As indicated in Section 4.3, several parameters related to the remote facility must be defined and saved on the local system. Examples include line type, line mode, line interface, and character set, as well as the parameters defining the BSC protocol between the sites. Values appropriate for each connection must be determined by the system support personnel and affirmed by the supervisory personnel at the remote facility.

3. If a dial-up connection is being used, the telephone number to be called for data transfer and the appropriate dialing procedure must be determined. (In large data centers, different telephone numbers access different remote lines. One remote line may be set up for 2780 protocol communications at a line speed of 2400 bps; another remote line may be set up for 2780 protocol at a line speed of 4800 bps; other remote lines may accept various synchronous and asynchronous communications protocols. Thus, some of the data center's telephone numbers may not be appropriate for the communications link desired. Determine the data center telephone number that is appropriate for the line discipline and line speeds to be used with the ICS software and the 2200 system.)

4. The telephone number at the remote system's facility to be called for information must be determined. Information may be needed concerning the intended communications link or problems encountered during operation of the link.

5. The normal sequence of operations to be followed after a communications connection is established must be determined.

   a. The 2200 system may transmit first. If so, a particular sign-on message may be required.

   b. The remote system may transmit first. If so, a particular message from the remote system may be used, and a particular response may be required.

Once successful communications with a particular facility have been established, construct a step-by-step outline of the procedure to be used for subsequent sessions. Give telephone numbers for the connection(s) and the names and telephone numbers of support personnel who can be contacted for assistance. This communications procedure should then be posted near the 2200 terminal used for ICS bisynchronous communications.

APPENDIX E
CODE TRANSLATION

The ICS 2780/3780 emulation software accommodates, as standards, two specific 8-bit transmission code sets:

1. EBCDIC (Extended Binary Coded Decimal Interchange Code), with 256 assignment positions

2. USASCII (United States of America Standard Code for Information Interchange), with 128 assignment positions (also referred to as the ASCII code set)

Tables E-1 and E-2 illustrate the ASCII and EBCDIC character sets, with hex code assignments for each character.

The software also allows the user to create a nonstandard code set.

Since ASCII is the internal code set of the 2200 system, any accommodation with a remote site in a TC connection using standard EBCDIC, a modified version of ASCII or EBCDIC, or a code set different from ASCII or EBCDIC requires code translation tables. (Even the use of standard ASCII at both sites requires a translation table. With the table, any unintelligible sent or received bit configurations can be translated into substitute null or space characters, respectively.) The code translation tables associated with the 2780/3780 emulation software are contained in the emulator microcode modules. Wang Laboratories, Inc. does not support user access to the standard code translation tables. However, refer to Chapter 6 of the 2200 ICS Utilities Manual for information on creating modified translation tables based on the standard tables and on creating a translation table for a nonstandard code set.

In Chapter 6 of the utilities manual, each translation table associated with a Remote Definition (RD) name is divided into two parts: the 2200-to-remote code translation and the remote-to-2200 code translation. The rest of this appendix describes the results achieved in the 2200-to-remote and remote-to-2200 code translations when the standard ASCII code set is the internal code on the local 2200 system and the standard EBCDIC code set is the internal code on the computer system at the remote site.

Standard ASCII-to-EBCDIC Code Translation

Before transmission from the 2200 system in either the transparent or nontransparent mode, data is converted from ASCII to EBCDIC as follows:

1. The following ASCII control characters are converted to NUL (HEX 00) to avoid possible interference with data link control characters: RS (IRS), US (IUS), ETB, ETX, ENQ, SYN, DLE.

2. The following ASCII control characters have EBCDIC counterparts and are converted to the equivalent EBCDIC code: ACK, SOH, STX, EOT, NAK, NUL, SUB, ESC, DEL, BEL, EM, FS (IFS), GS (IGS), SP, BS, HT, CR, LF, VT, FF, SO, SI, DC1, DC2, DC3, DC4.

3. ASCII graphic characters having EBCDIC counterparts are converted to the equivalent EBCDIC code:

   a. Alphanumeric characters: A through Z, a through z, 0 through 9

   b. Punctuation symbols: . ? : ; , " '

   c. Common special graphics: # $ % & * / @ + - = ( ) _

   d. Other special graphics: < > { } \ ` (grave accent) ~ (tilde) ¦ (split vertical line)

4. ASCII graphic characters having no EBCDIC equivalents are converted as follows.

ASCII graphic	EBCDIC character
↑ (up arrow)	¬ (logical NOT symbol)
[(left bracket)	¢ (cent sign)
] (right bracket)	¦ (logical OR symbol)

Standard EBCDIC-to-ASCII Code Translation

After reception at the 2200 system in either the transparent or nontransparent mode, data is converted from EBCDIC to ASCII as follows:

1. EBCDIC control characters having no ASCII counterparts are converted to NUL (HEX 00): PF, LC, RLF, SMM, RES, NL, IL, CC, DS, SOS, RS, BYP, SM, FS, PN, UC.

2. EBCDIC characters having no control or graphic assignments are converted to NUL (HEX 00).

3. EBCDIC control and graphic characters having ASCII counterparts are converted to the equivalent ASCII code. (See the characters listed under 2 and 3 in the ASCII-to-EBCDIC translation list.) The characters RS(IRS), US(IUS), ETB, ETX, ENQ, SYN, and DLE are not legal data characters and do not occur in received data.

4. EBCDIC graphic characters having no ASCII counterparts are converted as follows.

EBCDIC character	ASCII graphic
¬ (logical NOT symbol)	↑ (up arrow)
¢ (cent sign)	[(left bracket)
| (logical OR symbol)	] (right bracket)

NOTE

Wang 2200 Series terminals and printers use the ASCII code set. Some peripherals may not display all EBCDIC or ASCII graphic characters. Furthermore, substitute graphic characters may be displayed. For details, refer to the manual that accompanies the particular peripheral.

Table E-1. ASCII Code

	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
0_	NUL	SOH	STX	ETX	EOT	ENQ	ACK	BEL	BS	HT	LF	VT	FF	CR	SO	SI
1_	DLE	DC1	DC2	DC3	DC4	NAK	SYN	ETB	CAN	EM	SUB	ESC	FS	GS	RS	US
2_	sp	!	"	#	$	%	&	'	(	)	*	+	,	-	.	/
3_	0	1	2	3	4	5	6	7	8	9	:	;	<	=	>	?
4_	@	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
5_	P	Q	R	S	T	U	V	W	X	Y	Z	[	\	]	↑	_
6_	`	a	b	c	d	e	f	g	h	i	j	k	l	m	n	o
7_	p	q	r	s	t	u	v	w	x	y	z	{	¦	}	~	DEL

NOTE

The notation "sp" is used in Table E-1 to represent the space character (HEX 20).

ASCII Control and Function Characters

ACK Acknowledgment (positive)

BEL Bell (audible signal)
BS Backspace

CAN Cancel
CR Carriage Return

DC1 Device Control 1 (X-ON)
DC2 Device Control 2 (PN for Punch On)
DC3 Device Control 3 (X-OFF)
DC4 Device Control 4 (PF for Punch Off)
DEL Delete
DLE Data Link Escape

EM End of Medium
ENQ Enquiry
EOT End of Transmission
ESC Escape
ETB End of Transmission Block
ETX End of Text

FF Form Feed
FS Field or File Separator

GS Group Separator

HT Horizontal Tab

LF Line Feed

NAK Negative Acknowledgment
NUL Null

RS Record Separator

SI Shift In
SO Shift Out
SOH Start of Header
STX Start of Text
SUB Substitute
SYN Synchronous Idle

US Unit Separator

VT Vertical Tab

Table E-2. EBCDIC Code

	_0	_1	_2	_3	_4	_5	_6	_7	_8	_9	_A	_B	_C	_D	_E	_F
0_	NUL	SOH	STX	ETX	PF	HT	LC	DEL		RLF	SMM	VT	FF	CR	SO	SI
1_	DLE	DC1	DC2	DC3	RES	NL	BS	IL	CAN	EM	CC		IFS	IGS	IRS	IUS
2_	DS	SOS	FS		BYP	LF	ETB	ESC			SM			ENQ	ACK	DEL
3_			SYN		PN	RS	UC	EOT					DC4	NAK		SUB
4_	sp										¢	.	<	(	+	|
5_	&										!	$	*	)	;	¬
6_	-	/									¦	,	%	_	>	?
7_										`	:	#	@	'	=	"
8_		a	b	c	d	e	f	g	h	i						
9_		j	k	l	m	n	o	p	q	r						
A_		~	s	t	u	v	w	x	y	z						
B_																
C_	{	A	B	C	D	E	F	G	H	I						
D_	}	J	K	L	M	N	O	P	Q	R						
E_	\		S	T	U	V	W	X	Y	Z						
F_	0	1	2	3	4	5	6	7	8	9						

NOTE

The notation "sp" is used in Table E-2 to represent the space character (HEX 40).

EBCDIC Control and Function Characters

ACK	Acknowledgment (positive)
BEL	Bell (audible signal)
BS	Backspace
BYP	Bypass
CAN	Cancel
CC	Cursor Control
CR	Carriage Return
DC1	Device Control 1 (X-ON)
DC2	Device Control 2 (PN for Punch On)
DC3	Device Control 3 (X-OFF)
DC4	Device Control 4 (PF for Punch Off)
DEL	Delete
DLE	Data Link Escape
DS	Digit Select
EM	End of Medium
ENQ	Enquiry
EOT	End of Transmission
ESC	Escape
ETB	End of Transmission Block
ETX	End of Text
FF	Form Feed
FS	Field or File Separator
HT	Horizontal Tab
IFS	Interchange Field Separator
IGS	Interchange Group Separator
IL	Idle
IRS	Interchange Record Separator
IUS	Information Unit Separator
LC	Lowercase Shift
LF	Line Feed
NAK	Negative Acknowledgment
NL	New Line
NUL	Null
PF	Punch Off
PN	Punch On
RES	Restore
RS	Record Separator
SI	Shift In
SM	Set Mode
SMM	Start Manual Message
SO	Shift Out
SOH	Start of Header
SOS	Start of Significance
STX	Start of Text
SUB	Substitute
SYN	Synchronous Idle
UC	Unit Shift
VT	Vertical Tab

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