



**WANG**

# 2200

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**Remote Control and  
Maintenance System  
User Manual**

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# Remote Control and Maintenance System User Manual

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## **PREFACE**

This manual describes the 2200 Remote Control and Maintenance (RCM) system. The RCM system allows an RCM-equipped 2200 Series computer to perform extensive maintenance and program functions on one or more remote 2200 systems.

Chapter 1 is an overview of the Remote Control and Maintenance system. The partition requirements and establishment of the telecommunications link are discussed in Chapters 2 and 5. Chapters 3 and 4 discuss the software aspects of the package; the emulator and utilities.

This manual should be used in conjunction with the following manuals.

Wang BASIC-2 Language Reference Manual (700-4080D)

2236DE User Manual (700-5711)

Buffered Asynchronous Communications Controller User Manual (700-4114C)

Synchronous/Asynchronous Communications Controller User Manual (700-4670A)

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# CHAPTER 1

## INTRODUCTION

### 1.1 OVERVIEW

The 2200 Remote Control and Maintenance (RCM) system provides a means for a 2200 series computer equipped with an asynchronous telecommunications controller (henceforth called the "local 2200") to communicate with a terminal port of another 2200 series computer (henceforth called the "remote 2200"). The Remote Control and Maintenance system is designed primarily to be a software maintenance tool. The local 2200 series computer can perform maintenance and program functions on one or more remote 2200 systems. The local 2200 can also be used to provide central control of a network of 2200 series computers. The local operator can monitor and regulate the remote 2200 systems by inspecting each system, checking for errors, loading software, and running tests or maintenance procedures.

RCM should also prove useful in a distributed processing environment for infrequent low-volume data communications between 2200 systems.

The Wang 2200 Remote Control and Maintenance system consists of the following components.

- Remote Control and Maintenance system software
  - Terminal Emulator Program (TEP)
  - File Transfer Program (FTP)
- A Wang communications controller that supports asynchronous transmission at the control system
- One asynchronous modem at the control system (e.g., Wang WA3451)
- One asynchronous modem at each remote system (e.g., Wang WA3451)
- One 2236LRS Switch Box for each 2200SVP remote system
- For local connection (not exceeding 50 feet) between the RCM local system and another 2200 system at the same site, one Wang 2227N Null Modem can be used instead of the two asynchronous modems.

In conjunction with the asynchronous communications components, the Remote Control and Maintenance software (consisting of the Terminal Emulator Program and the File Transfer Program) allows a local 2200 series computer to establish control of a remote 2200 system. The Remote Control and Maintenance software permits a RCM-equipped central processor to emulate a 2236DE Interactive Terminal, and access a partition on the remote system. A RCM operator can thus act as a local operator, accessing and executing the programs and utilities available on the remote 2200 system as if using one of the remote system terminals. In addition, the RCM operator can execute file transfer operations, performing file or program movement to or from the remote system.

## 1.2 HARDWARE AND TELECOMMUNICATIONS REQUIREMENTS

The local system requires a 2200 series computer (LVP, VP, MVP or SVP) equipped with a 2227B, 2228B or 2228C Communications Controller for the 2200 VP, LVP and MVP or Option 27B, 28B or 28C for the 2200SVP. The system must have a 2226, 2236D, 2236DE, or 2236DW terminal and an asynchronous modem. The Terminal Emulator Program must be resident in this system.

Each remote system 2200 series computer (LVP, VP, MVP) must be equipped with the File Transfer Program, a 2236MXD port and an asynchronous modem. The 2200SVP must have the File Transfer Program, a 2236LRS Switch Box, and an asynchronous modem.

The terminal emulator effectively connects the local terminal to the remote 2200. If the local terminal is a 2236DE, the remote 2200 will think the Terminal Emulator Program is a 2236DE. If the local operator has a 2236DW, the remote 2200 will think the Terminal Emulator Program is a 2236DW. If the local terminal is a 2236D or 2226, the remote 2200 will think the Terminal Emulator Program is a 2236D.

A dial-up or leased line can be used between the two systems. Figure 1-1 shows the Remote Control and Maintenance system configuration. Figure 1-2 shows the Remote Control and Maintenance system in a network.

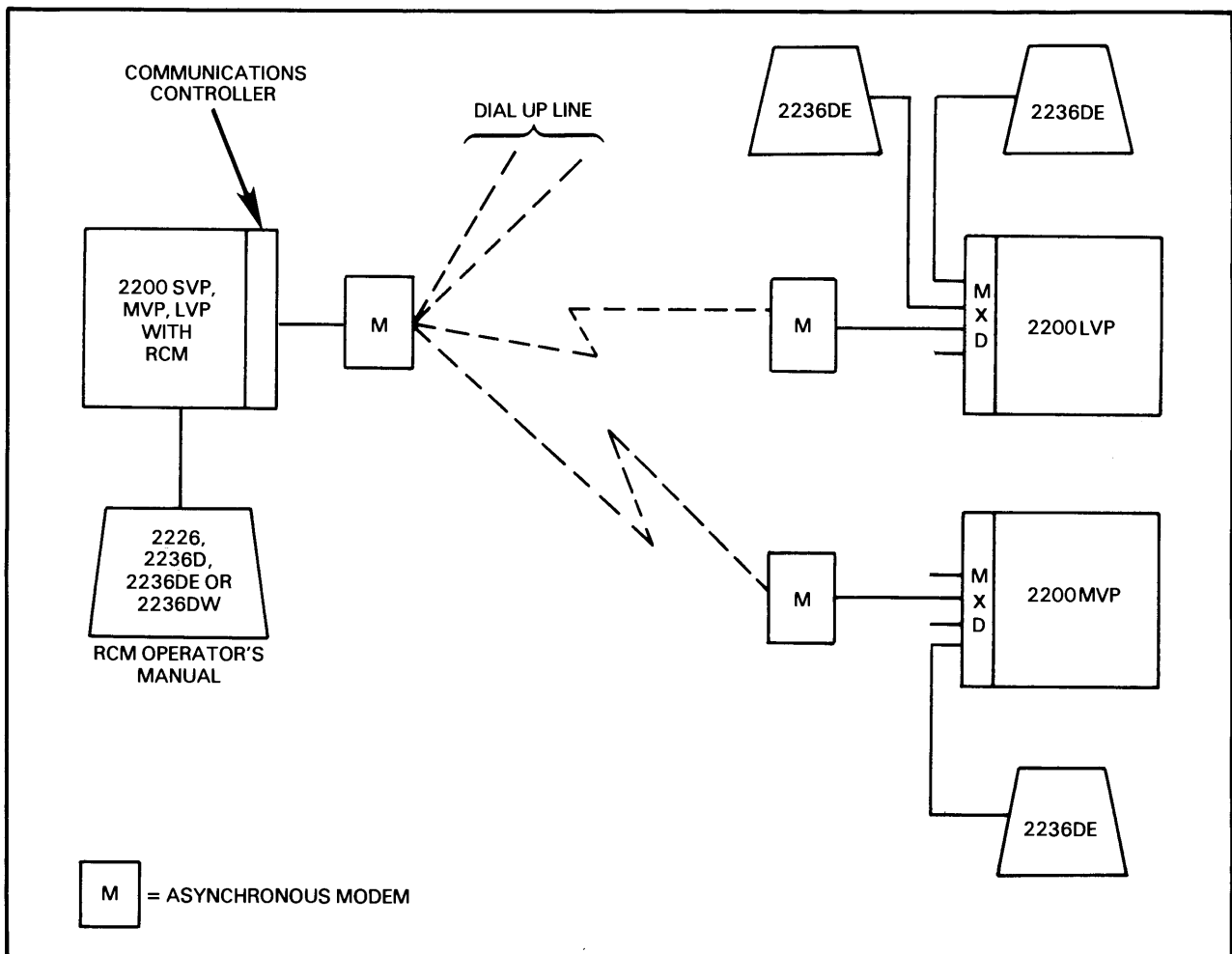
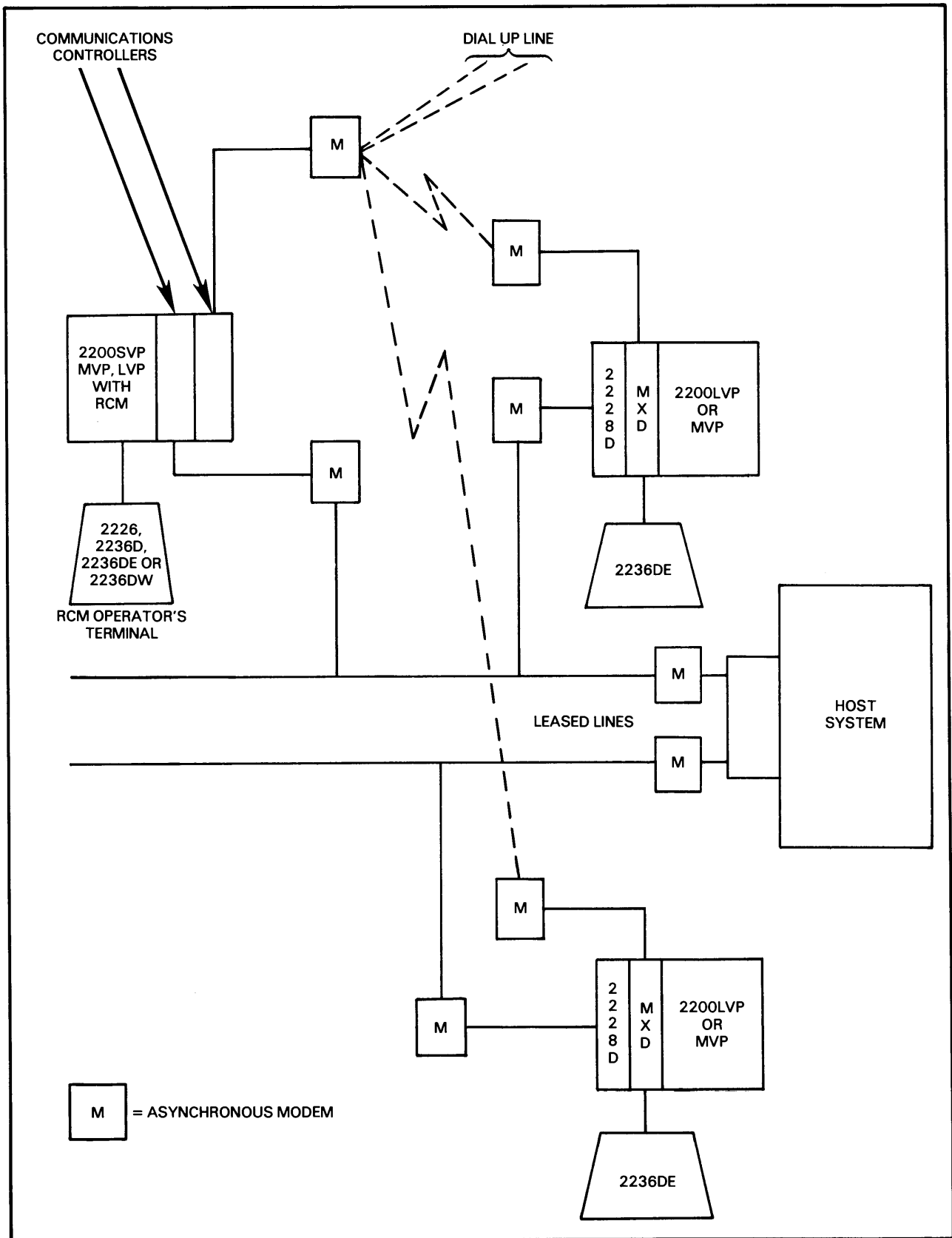


Figure 1-1. Remote Control and Maintenance Configuration



**Figure 1-2. Remote Control and Maintenance System in a Network**

The Terminal Emulator Program requires at least Revision 4 of the 2236MXD firmware. If the system has a 2236DW terminal, 2236MXD firmware of at least Revision 7 is required. Communication speeds up to 1200 bits per second (bps) are supported via modems of a type suitable for use with the 2236DE terminal (asynchronous, full duplex, 11 bits per character: 1 start + 8 data + odd parity + 1 stop). Local connection via Wang modem cables and a 2227N or 2228N Null Modem is also supported, but correct operation is not guaranteed at speeds greater than 1200 bps.

### **1.3 OPERATING SYSTEM REQUIREMENTS**

The Terminal Emulator Program on the local system requires a 15.5K partition; 17K is required if the terminal printer output is to be stored on disk. The package must be run with MVP BASIC-2 Release 1.8 or later, or VP BASIC-2 Release 2.1 or later.

On the remote system the File Transfer Program requires a 6K partition. If other software is to be run that requires more memory, the size of the partition should be greater, or a dedicated partition can be assigned to run FTP. The same operating system requirements hold true for both the local and remote systems.

## **CHAPTER 2 SYSTEM SET UP**

### **2.1 PARTITION REQUIREMENTS**

The local system must be configured with a 15.5K partition to run the Terminal Emulator Program. If the terminal printer output is to be stored on disk, this partition must be set up with 17K.

The remote system must be configured with a 6K partition to run the File Transfer Program.

For detailed information on hardware installation, refer to the *2200MVP Introductory Manual*, *2200LVP Introductory Manual* and *2236DE User Manual*.

### **2.2 TELECOMMUNICATIONS LINKS**

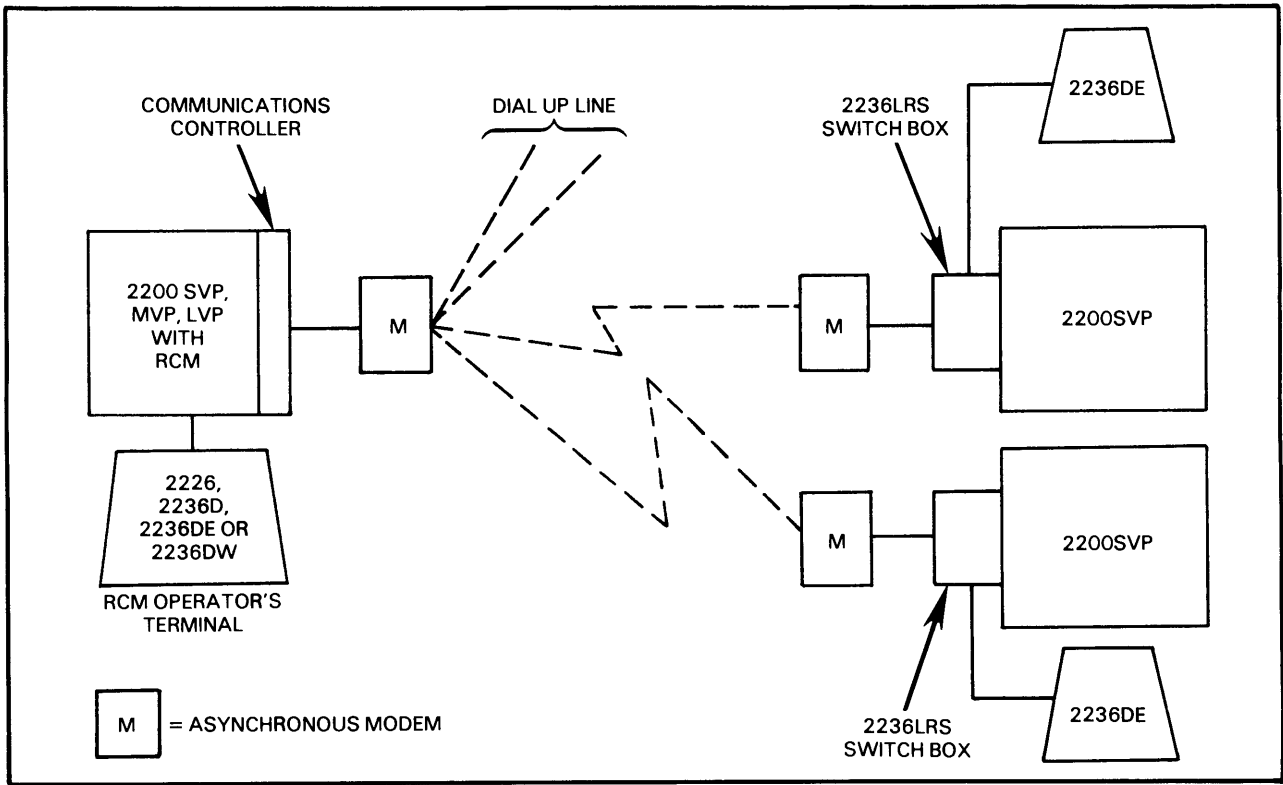
The Wang asynchronous communications controller (2227B, 2228B, 2228C) and the two modems, used with the dial-up or leased line, provide a communications connection between the RCM local processor and a remote 2200 system. For additional remote 2200 systems, a modem is required at each site (refer to Figure 1-1).

To implement RCM, the local 2200 should have a 2226, 2236D, 2236DE, or 2236DW terminal, and each remote 2200 with the exception of an SVP, should have a spare 2236MXD port. On the 2200 SVP a 2236LRS Switch Box is needed to attach the modem to the terminal port (refer to Figure 2-1).

The Remote Control and Maintenance system is intended for use over dial-up lines, but leased line or local connection is also feasible. At the control site, an RS-232-C/CC1TT V.24 compatible cable connects the local modem to the Wang asynchronous communications controller. At the remote site, a RS-232-C/CC1TT V.24 compatible cable connects the modem to a spare terminal port on the 2236MXD Terminal Processor (or to a 2236LRS Switch Box for connection to a 2200 SVP).

### **2.3 LRS SWITCH BOX**

The 2236LRS Switch Box permits a remote 2200SVP system to be accessed by a local RCM system. The 2236LRS Switch Box, when connected to an SVP central processor and an appropriate modem, offers a choice between standard operation of a local terminal and remote connection to the Wang Remote Control and Maintenance system over communications lines. The 2236LRS Switch Box has three RS-232-C connectors and a 3-position switch. One RS-232-C cable leads from the 2236LRS to the SVP central processor. One RS-232-C cable attaches the 2236LRS to the local terminal. A third RS-232-C cable is attached from the 2236LRS to the modem that is used to establish the link to the Remote Control and Maintenance system. The 3-position switch offers a choice between 19.2K bps (local), 300 bps (remote), or 1200 bps (remote).



**Figure 2-1. 2200 SVP as Remote System**

## CHAPTER 3 THE EMULATOR

### 3.1 OVERVIEW

The terminal emulator provides a means for a 2200LVP, VP, SVP or MVP equipped with a 2227B, 2228B, or 2228C Communications Controller to communicate with a terminal port of another 2200LVP, VP, or MVP, and with an SVP at the remote location through the LRS Switch Box. The emulator allows the user on the local system to communicate with a remote 2200 in the same manner as if a remote 2236DE terminal were being used.

#### 3.1.1 Terminal Emulator Package

The Terminal Emulator Program tests for modem readiness and displays a prompt to signal either a "Modem Not Ready" condition (allowing operator corrections to the modem or line) or "Emulator Active". When the emulator is active, the TEP connects the local RCM terminal to the remote system central processor. The RCM operator can then load and execute any available utilities or programs. In addition, the RCM operator can direct a printer data stream to either a local printer attached to the local RCM terminal, or to disk storage on the control system.

The emulator causes the local 2200, if equipped with a 2236DE terminal, to appear as a 2236DE terminal to the remote 2200. If the local 2200 has a 2226 or 2236D, it will appear as a 2236D terminal to the remote 2200, and if equipped with a 2236DW terminal it will appear as a 2236DW to the remote 2200. The emulator causes the keystrokes typed on the local terminal to be transmitted to the remote 2200. CRT output (Device 005) is directed to the local terminal. Terminal printer output (Device 204) may be directed to any printer on the local 2200 that is accessible to the partition executing the emulator. Alternatively, the terminal printer output may be SPOOLed to a disk file in Wang TC format.

TEP has a File Transfer mode that interacts with the File Transfer Program, providing RCM operator control of file transfer operations. The TEP's File Transfer mode displays a full menu of prompts for both File Send and File Receive, as well as a Command menu.

The Terminal Emulator package provides a Keyboard Emulator, a SPOOL function, and an Emulator Status program (refer to Section 4.2).

The **Keyboard Emulator** provides the means to do the following.

- Reset the remote 2200 partition.
- Attach the local keyboard to the remote 2200 partition.
- HALT/STEP an operation running in the remote 2200 partition.
- Direct terminal printer output from the remote 2200 to any printer or disk available to the partition in the local 2200 that is running the emulator.
- Allow background execution of file transfer.

- Change default device addresses.
- Exit the emulator.

The **SPOOL function** allows terminal printer output of the remote 2200 to be directed by the user to a specified disk file. The output can be stored in compressed or noncompressed 2236DE fashion.

### 3.1.2 File Transfer Mode

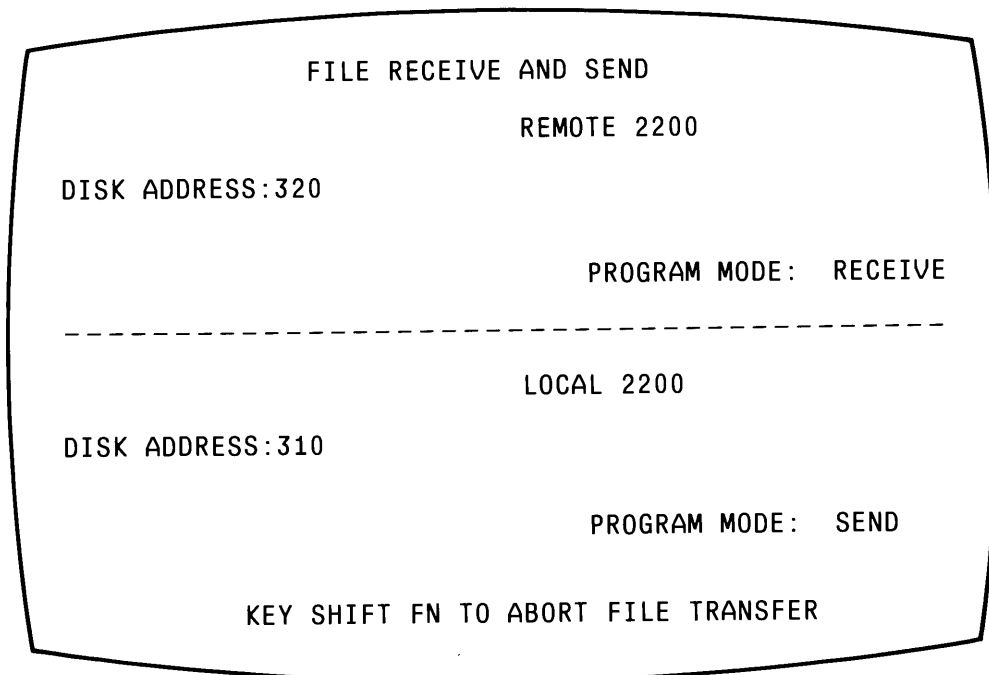
The File Transfer mode provides the capability to either send a file to or receive a file from the remote 2200. TEP File Transfer mode will work with the File Transfer Program FILER&S executing in the remote 2200. The File Transfer Program is activated when the local RCM system operator loads it into the RCM-controlled partition on the remote system, and signals the TEP to enter File Transfer mode.

While running the FTP in File Transfer mode, the RCM operator can control both local and remote operations with the Special Function keys. Optionally, the RCM operator can execute a file transfer as a background job (useful when transferring large files). During the transfer, the RCM operator can also alternate between background and foreground processing to check job status.

**File Send mode** uses a split screen to distinguish between the local and remote 2200. In this mode, transmission of a local file to the remote 2200 can be performed. The file is stored on the disk specified in response to prompts displayed on the remote 2200 portion of the split screen display. Refer to Figure 3-1 for File Send split screen display.

The output disk is automatically checked for the existence of the file. The specifications of the file are displayed and the user is given the option of either overwriting the file on the output disk, or creating a new file.

The FTP allows the file created to have the same file name as the existing file or any other user-specified name.



**Figure 3-1. File Send Mode Display**

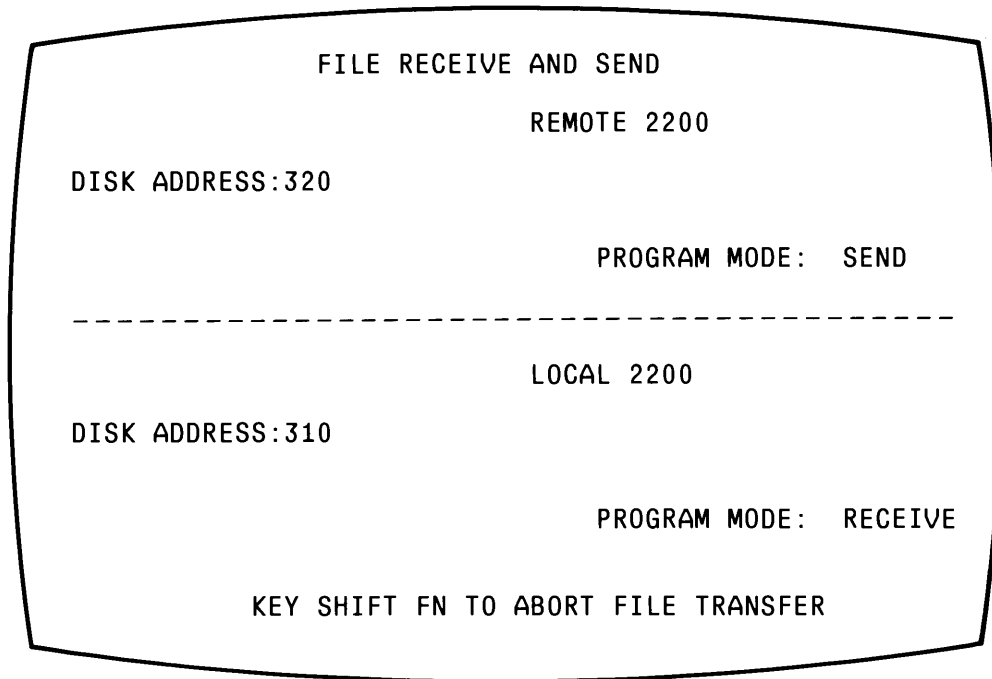


The number of sectors to be transferred may be greater than or equal to the currently used value. If there are not enough sectors available on the output disk, the program will automatically scratch the old file prior to creating the new file.

File Send mode can also be executed in a background partition if preferred. This is particularly useful for transferring files of large size.

**File Receive mode** uses a split screen to distinguish between the local and the remote 2200. The top portion of the screen is for the remote 2200 and the lower half is for the local 2200. In this mode, the contents of a file are transmitted from the remote 2200 to the local 2200 and stored in a file on a specified disk.

The address and name of the disk where the file to be transmitted is currently stored is requested. These prompts, because they pertain to the remote 2200, will be displayed on the remote portion (the top half) of the split screen. Figure 3-2 shows the split screen display.



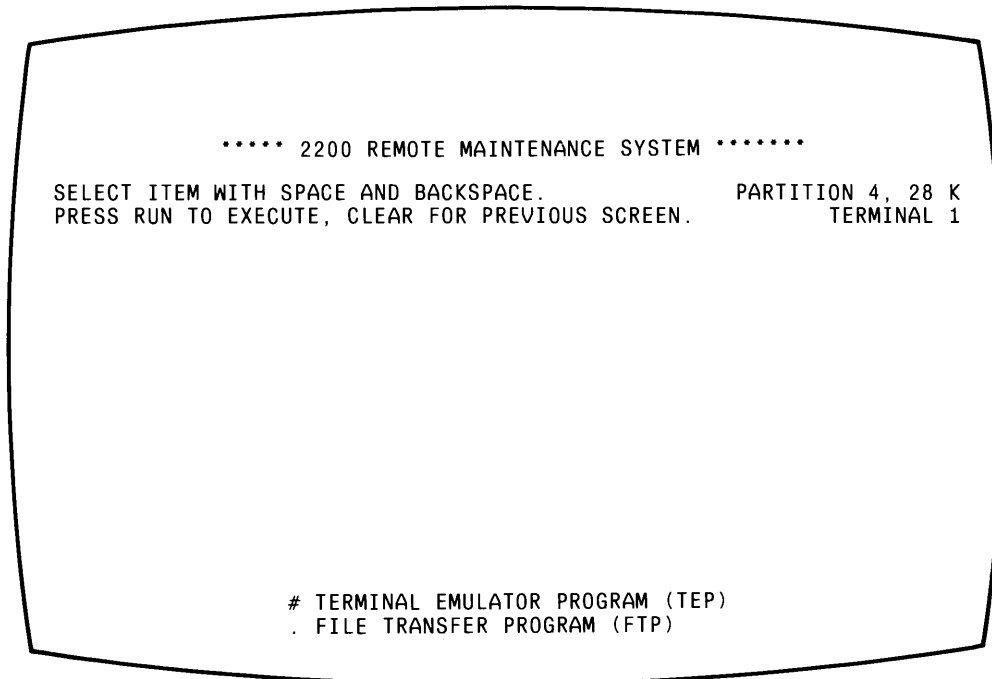
**Figure 3-2. File Receive Mode Display**

The file name may be kept the same or changed. Based on the size of the file being sent from the remote 2200, a file of sufficient size is created on the local 2200 if the file does not already exist. If there is not enough room in the existing file, the program will automatically scratch the file to allocate more file space.

As with File Send, File Receive can also be executed in a background partition.

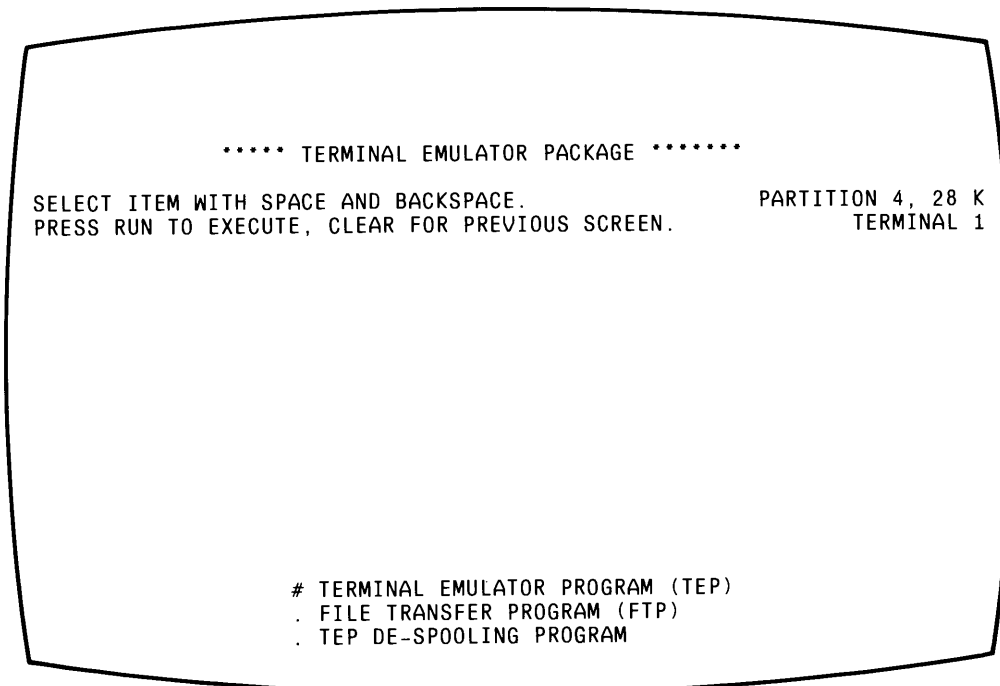
### 3.2 OPERATING INSTRUCTIONS

To begin running the emulator, it must first be loaded from the RCM disk. After selecting the disk device address where the software resides, enter LOAD RUN and press RETURN. The menu in Figure 3-3 is displayed.



**Figure 3-3. Initial Remote Control and Maintenance System Menu**

From the menu select Terminal Emulator Program (TEP) and press RUN. A prompt for the address where the 2236DE emulator is stored is displayed. Type in the disk address and press RETURN. The Terminal Emulator screen in Figure 3-4 is displayed.



**Figure 3-4. Terminal Emulator Package Screen**

To load the Terminal Emulator Program from the menu, select Terminal Emulator Program and press RUN.

The numbered prompts in Figure 3-5 are displayed one at a time. Instructions pertaining to each prompt, although not shown on the screen, are provided in the Figure.

```
2236DE EMULATOR
```

1. ADDRESS of TELECOMMUNICATIONS CONTROLLER: 01C  

The default address 01C is set for the telecommunications controller. The display appears if there is a controller with the 01C address. However, if no controller exists at address 01C, then the program will display Line 1 only and will wait for the operator to enter the correct address. Other possible addresses are 019, 01A, 01B, 01C, and 01D.
2. DATA RATE: 1200  

The data rate defaults to 1200 bps.
3. PRINTER (OR DISK TO SPOOL PRINT FILES): 204  

The terminal printer stream may be directed to any printer accessible to the partition running the emulator. The null printer, Device 000, may also be specified. The terminal printer stream may also be SPOOLED to disk in a TC formatted file. The program E2236PRT (refer to Section 4.3) may be subsequently used to read and print TC formatted files. The TC utilities provided by Wang may also be used to read, print, and perform various functions on files in TC format.
4. DISK FOR SENT AND RECEIVED FILES: 310  

The disk used to send and receive files while in File Transfer mode may be specified. Enter 000 if File Transfer mode is not used. The program checks to see if the specified disk address does exist.
5. TYPE OF TERMINAL ON LOCAL 2200: 2236D  

The type of terminal is specified so that the emulator will know whether to use software timing loops to blink the cursor in edit mode. 2236D is the terminal default value.

CHANGE WHICH ITEM (Key RETURN if all correct)?

**Figure 3-5. Terminal Emulator Display**

After defaults are verified they can be changed by entering the number of the item to be changed.

After all defaults are set and accepted by the user, the user will respond to the CHANGE WHICH ITEM prompt by pressing RETURN; there is a short delay and the message «LOADING MAIN EMULATOR PROGRAM» appears. The screen shown in Figure 3-6 is then displayed.

```
«LOADING MAIN EMULATOR PROGRAM»

2236DE EMULATOR

EMULATOR IS NOW ACTIVE.          MODEM:  RTS DTR CARRIER DSR

USE THE CONTINUE KEY TO HALT/STEP THE REMOTE 2200.

ON A 2236D, OR 2236DE TERMINAL, SHIFT FN ESCAPES TO THE MENU BELOW.
ON A 2226, USE STATEMENT NUMBER TO GET TO MENU BELOW.

CONTINUE - SEND CONTINUE
'0 RESET REMOTE 2200; SHIFT FN-SEND SHIFT FN
'1 PRINTER ON; '3 ENTER FILE TRANSFER MODE; '4 GO INTO BACKGROUND;
'7 ATTACH KEYBOARD TO REMOTE 2200; '15 CHANGE DEVICE ADDRESSES; '31-QUIT.
```

**Figure 3-6. Keyboard Emulator Menu**

The emulator tests all modem signals made available by the telecommunications controller. If the modem is ready, the message "Emulator is now active" is displayed. In order for the modem to be ready, the following RS-232-C interface signals must be on: RTS - request to send, DTR - data terminal ready (the TC board supplies these signals to the modem).

If the message "Modem Not Ready" appears, check the modem and TC controller cabling and make the appropriate corrections. Press SF'15 to return to the first emulator display, then press any other key to retest the modem signal.

### 3.2.1 Running the Keyboard Emulator

SHIFT FN acts as a general Abort key. SHIFT FN will cause a menu to appear at the bottom of the screen. It is always safe to press SHIFT FN, even if the remote 2200 is transmitting at the time. No data will be lost by pressing SHIFT FN, but the CRT cursor is moved, so a screen display created by the remote 2200 will be changed.

The functions provided by the Keyboard Emulator and displayed at the bottom of the screen are the following.

- SF'0 — Resets the remote 2200 and then connects the local CRT and keyboard to the remote 2200.
- SF'1 — Opens the print file and allows operation of the terminal printer (Device 204). The Open Printer function is provided so the printer will be hogged by the emulator only while it is being used.

If the output to the terminal printer is to be SPOOLED to a disk file, the name of the file will be requested when the printer is open. The size of the print SPOOL file must be specified, if the file does not already exist.

#### NOTE

If the SPOOL file overflows, loss of one print line may occur.

If the file does exist and it already contains data in TC format, the user may append new data to the end of the existing file. Print data may be stored in the file using the 2236DE compression algorithm. If compression is specified by the user, the file will not be compatible with TC utilities or other software outside the emulator.

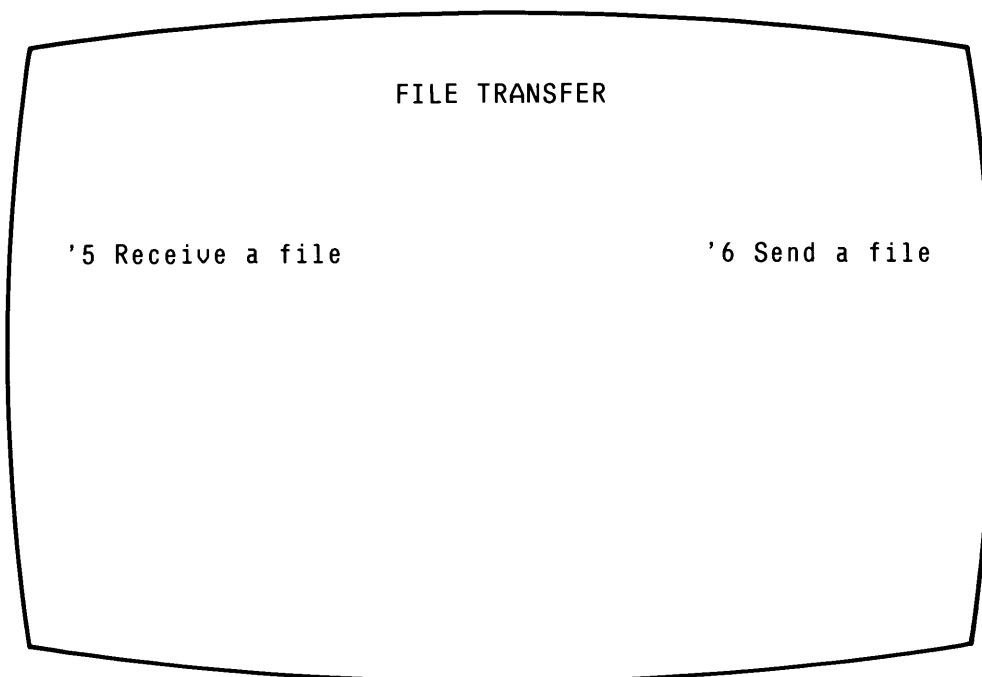
- SF'2 — Closes the printer. If SF'2 is not used, it is possible that some data will not be saved under the SPOOL function.
- SF'3 — Puts the emulator in File Transfer mode. SF'3 produces a subsequent menu asking the user to select File Send or File Receive. File Transfer mode should be entered after the Keyboard Emulator has been used to load the File Send and Receive program FILER&S into the remote 2200. Although not displayed on the menu invoked with SF'3, due to lack of screen space, SF'5 for File Receive and SF'6 for File Send are the keys to press in order to directly access File Receive or File Send.
- SF'4 — Is used on the local system to cause the emulator to release control of the terminal to a background partition. If no background partitions are waiting, a partition may be optionally allocated provided there are partitions waiting for Input/Output (I/O) at Terminal 0. While running in the background, printing to Device 204 can continue. CRT output from the remote 2200 is lost during background operation. To return the emulator to the foreground, enter the appropriate \$RELEASE TERMINAL TO command. If the CRT does not immediately respond, press SHIFT FN.
- SF'7 — Connects the keyboard and CRT to the remote 2200, but nothing is transmitted. Pressing SF'7 is the preferred way to exit from the Keyboard Emulator menu.
- SF'15 — Is used to return to the Main Emulator menu where the device addresses can be changed.
- SF'31 — Is used to exit from the emulator package.

Using the Keyboard Emulator, when the keyboard is attached to the remote 2200, almost every key on the keyboard is directly transmitted to the remote 2200. The only keys that will interact with the local 2200 are RESET, HALT and SHIFT FN. The CONTINUE key HALT/STEPS the remote 2200. SHIFT FN escapes to the Keyboard Emulator menu, Figure 3-5. RESET and HALT should only be used as a last resort.

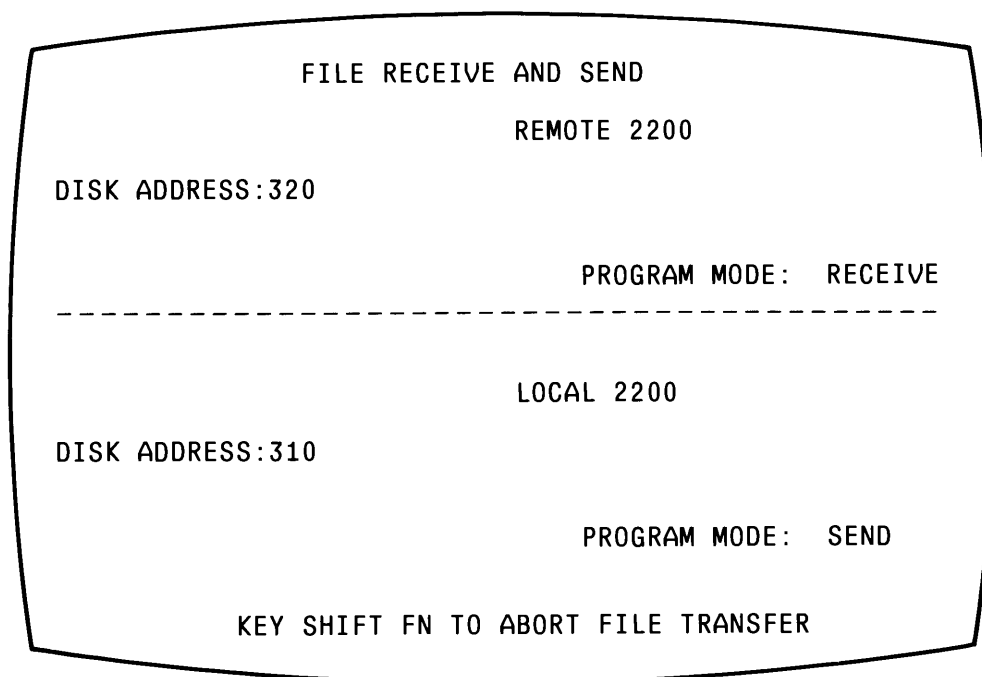
### 3.2.2 Operating in File Send Mode

File Send mode of the terminal emulator in the local 2200 system interacts with the program FILER&S in the remote 2200 system. FILER&S must be present in the remote system's partition in order for File Send mode to operate properly.

After pressing SF'3 from the Keyboard Emulator, the menu in Figure 3-7 is displayed on the bottom of the screen. To enter File Send mode, press SF'6 from the File Transfer menu and the screen in Figure 3-8 appears.



**Figure 3-7. File Transfer Menu**



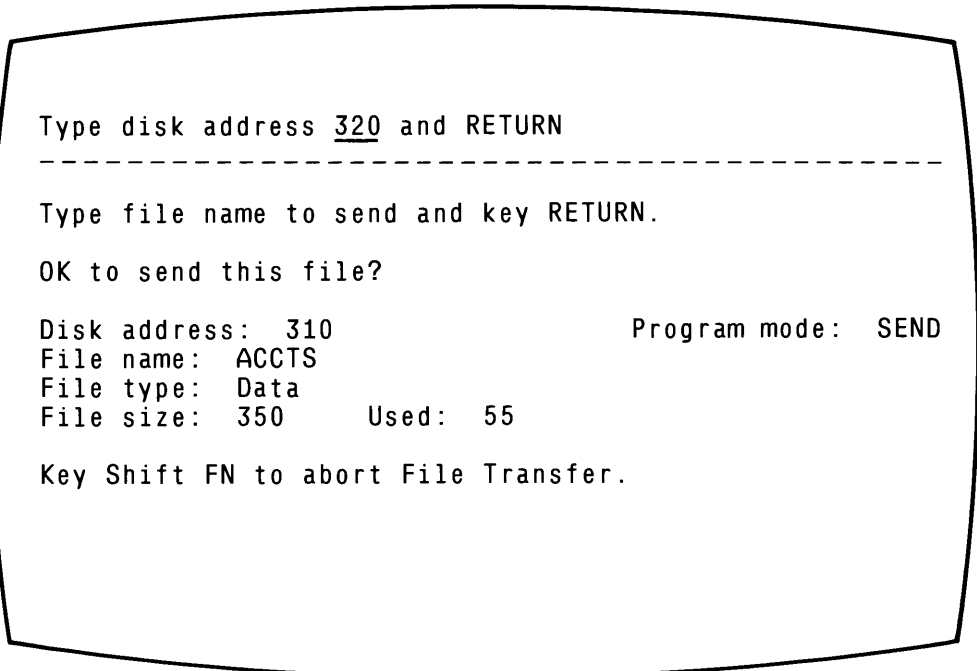
**Figure 3-8. Initial File Send Screen**

If the screen does not appear after pressing SF'6, FILER&S is not present on the remote system. Press SHIFT FN and return to the Keyboard Emulator. Use the Keyboard Emulator to interact with the remote 2200 in order to load FILER&S into the partition and have it run.

As can be seen from the menu in Figure 3-8, the screen is divided into a split screen while in File Send or Receive mode. There are two 12-line areas separated by a row of underscores. The FILER&S program running in the remote system will display messages on the upper half of the screen. The lower half is used by the emulator running in the local 2200.

While the cursor is visible in the upper portion of the CRT screen the same functions are available as when using the Keyboard Emulator. The keyboard is connected to the remote system. By pressing SHIFT FN, File Send mode can be aborted.

Following the selection of the File Send mode, the screen in Figure 3-9 will appear.



**Figure 3-9. File Send Mode Screen**

On the remote portion of the screen, enter the disk address where the received file will be stored.

On the local portion of the screen, the disk address to be used by the emulator to send files is already known and will be displayed. The emulator will therefore ask for the name of the file to be transmitted. In this example, ACCTS is the name of the file. Size and type of file as well as sectors used are displayed.

The remote 2200 prompts for the name of the output file. At this point the user can select a different name for the file on the remote system than on the local system. If the file is already in existence on the remote 2200, the size and type of file will be displayed and a prompt will be displayed requesting if the file may be updated. If the file does not already exist on the remote system, the user is asked if it can be created. The prompts concerning this file will be repeated until the user decides either to create or update the file. At this point should the user wish to abort the File Send procedure, SHIFT FN is pressed.

The number of sectors to be transmitted is now requested by the local 2200. The default value that is displayed is the number of sectors that contain data. If the file did not have an end-of-file record, then the number of sectors displayed is the total number of sectors in the file. If the default value is accepted, file transmission will be completed in minimum time. At least the number of active sectors must be specified. If extra space is required in the output file, a number larger than the file on the input disk may be input by the user. The receiver program will create a file based on the number of sectors input by the user.

Both the remote and local 2200 now have the necessary information needed to perform the transmission of the file. The emulator will answer the prompts from the remote system concerning file size and type. If the remote 2200 is unable to open the output file the emulator again prompts for the name of the output file and the sequence of prompts is repeated.

After the output file is successfully opened, the user is given the option of running the File Send transmission in the background. Should the user decide to do this, the emulator may be brought back to the foreground for brief periods to check on the progress of the File Send. The emulator status program E2236ST (refer to Section 4.2) is a means of monitoring the progress of the file transmission.

### 3.2.3 Operating in File Receive Mode

File Receive mode will also interact with the FILER&S program running on the remote 2200. FILER&S, therefore, must be present on the remote 2200.

From the menu displayed in Figure 3-5 press SF'5 to enter File Receive mode. If the following screen does not appear after pressing SF'5, FILER&S is not present on the remote 2200 system. Select SHIFT FN to return to the Keyboard Emulator. Using the Keyboard Emulator, load and run the FILER&S program in the remote 2200. The screen in Figure 3-10 is displayed.

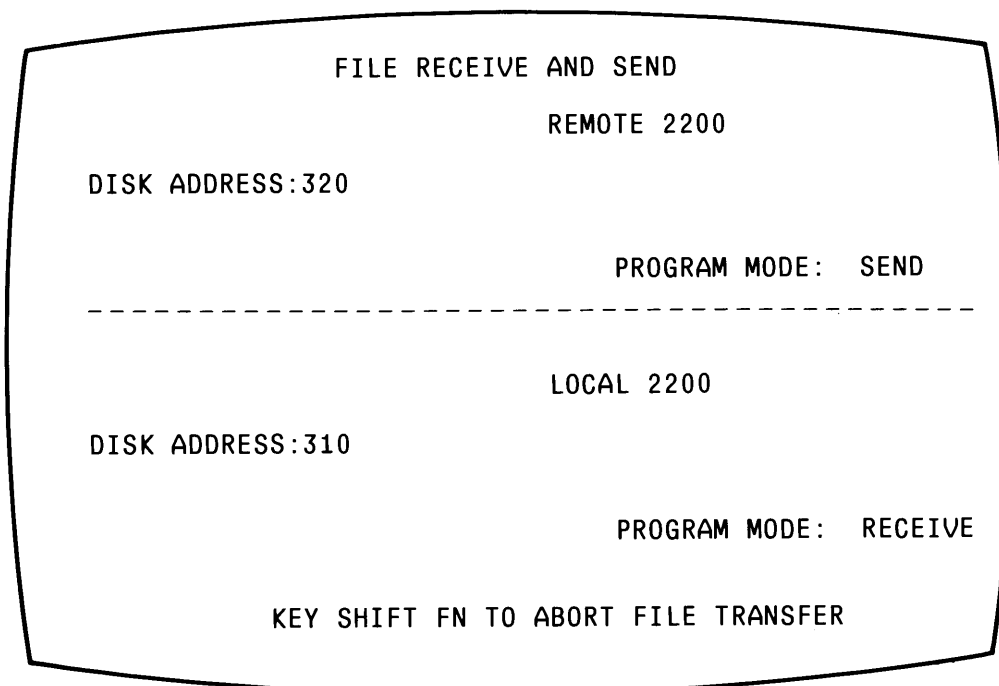


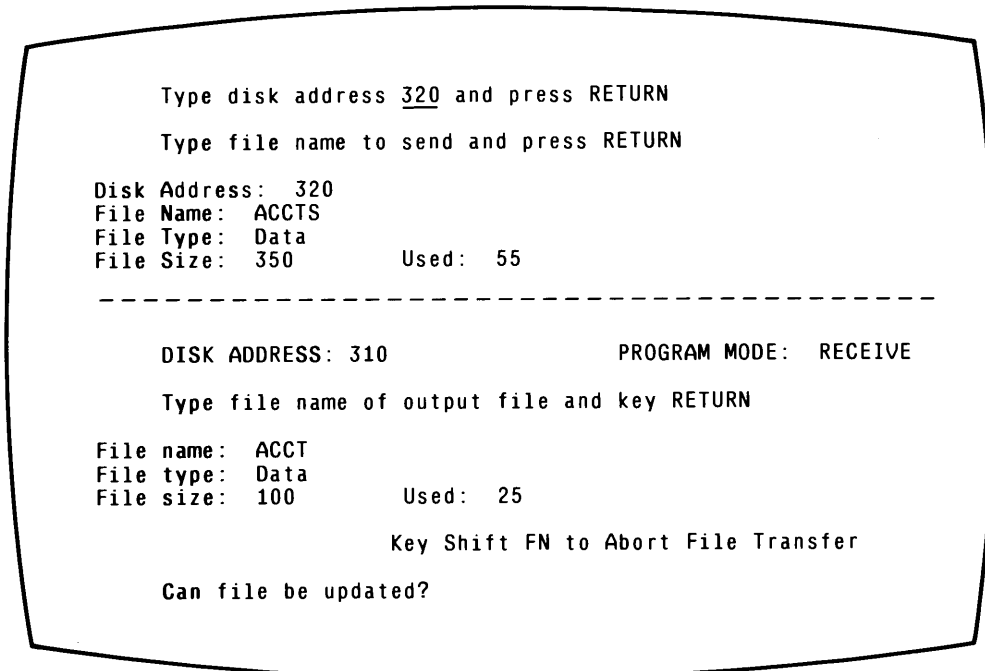
Figure 3-10. Initial File Receive Screen



The screen is divided into two 12-line areas. The program running in the remote 2200 will display messages on the upper half of the screen and the local 2200 messages are displayed on the bottom of the screen by the emulator. When the cursor is visible in the upper portion of the display, the keyboard is connected to the remote system. SHIFT FN is used to abort the File Receive procedure.

The remote 2200 requests the name of the file to be sent and the address of the disk where this file resides. The remote 2200 then verifies this information.

The disk address to which the emulator will receive the file on the local 2200 is already known and will be displayed. The name of the output file is requested. If this file does not exist, the user is prompted to create the file. If the name of an existing active file is entered, the size and type of file are displayed and the user is prompted to update the file. This information is displayed in Figure 3-11.



**Figure 3-11. File Receive Mode Screen**

The remote 2200 will request the number of sectors to be sent. The default is the number of sectors containing active data. If the default is accepted, the file transfer will take place in a minimum amount of time. The number of active sectors is the minimum number of sectors that can be specified. A larger number can be specified if additional sectors are needed in the output file. The emulator in the local 2200 will create a file of the number of sectors specified.

Since the File Receive program can be run in the background the user is given this option. If Background option is selected, the emulator can be brought back to the foreground in order to check the progress. The emulator status program E2236ST (refer to Section 4.2) is the best means of monitoring the progress of the File Transfer Program.

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## CHAPTER 4 THE UTILITIES

### 4.1 OVERVIEW

There are two support programs provided in the RCM software package in addition to the emulator. These two utilities are the E2236ST program, which will display the status of the emulator as it operates, and the E2236PRT program, which prints TC formatted disk files created by the emulator or by other compatible software, on a printer or on the CRT.

The E2236ST program is particularly useful when the File Send and Receive program is selected to run as a background job. Through E2236ST, the progress of the transfer can be monitored periodically.

### 4.2 EMULATOR STATUS PROGRAM, E2236ST

E2236ST, the Emulator Status program, is used to monitor the progress of the 2236DE emulator. The program can be run in any partition in the same memory bank as the emulator. From the Terminal Emulator Package screen in Figure 3-4, select TEP Status Program and press RUN.

The emulator status display that appears, is shown in Figure 4-1. The TEP Status program monitors the status of the device streams. A 2236DE terminal is able to turn the output stream to each of its devices (CRT and printer) ON and OFF. The status program reflects the ON/OFF status of each stream by the words STOPPED or GO.

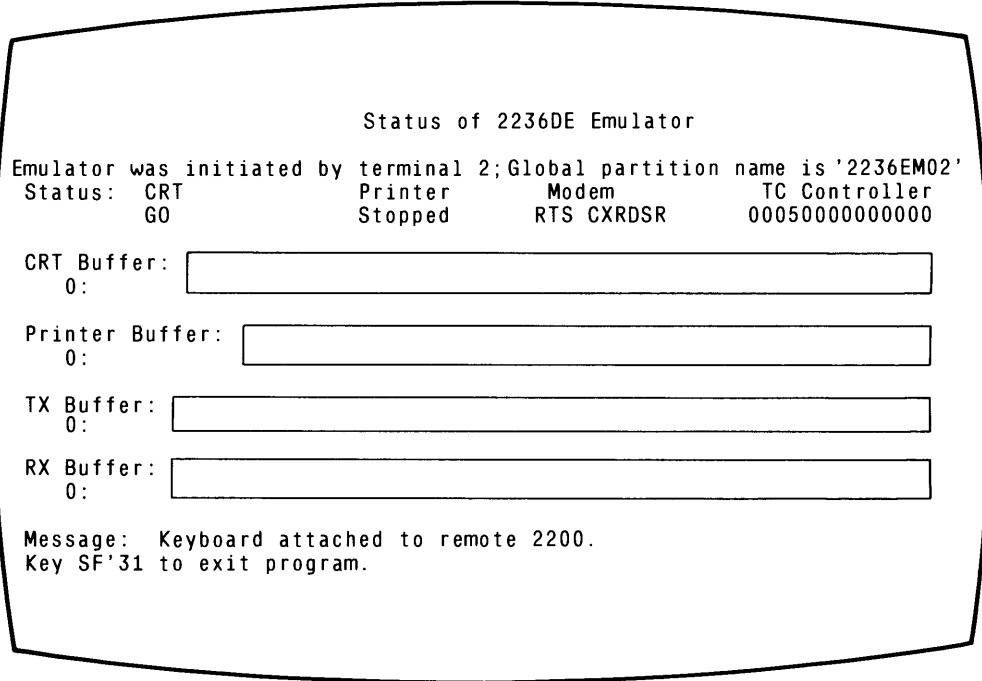
The modem signals provided to the CPU by the telecommunications controller are displayed. RTS is Request to Send, CXR is Carrier Detect, DSR is Data Set Ready. All of these signals must be present for communications to proceed.

The string of hexadecimal digits below the heading "TC Controller" is the "communications status vector". Space is reserved in the random access memory of the telecommunications controller for a communications status vector whose byte and bit positions are used. (Refer to Section 2.4 of the *Buffered Asynchronous Communications Controller User Manual*.)

The emulator software receives data from the telecommunications controller into the 255-byte receiving (RX) buffer. The data is then separated and decompressed into the CRT and printer buffers. The transmitting (TX) buffer is used to hold data to be sent to the remote 2200. Because the transmitting buffer in the telecommunications controller is so large, the TX buffer is rarely used.

At the bottom of the screen in Figure 4-1, is a status message that is the most meaningful part of the display for the user.

If the status display, as shown in Figure 4-1, remains the same for more than 10 or 15 seconds while in File Send or File Receive mode, something has gone wrong. Pauses of 5 seconds may be caused by line noise, and may also occur during the transmission or reception of the first part of the file trailer as the portion of the file not transferred is zeroed out.



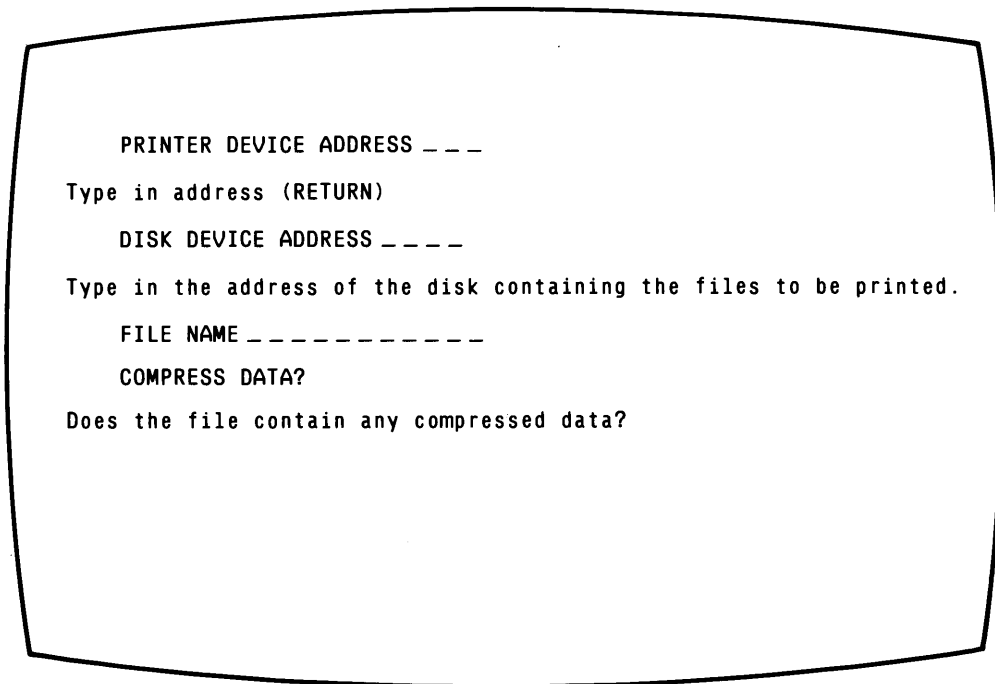
**Figure 4-1. E2236ST Display**

### **4.3 TELECOMMUNICATIONS FORMAT FILE PRINTER, E2236PRT**

E2236PRT is used to print a TC format file on a printer. E2236PRT requires an 8K partition. The TC format file is produced by the emulator when the remote 2200 terminal printer output is SPOOLED to a disk on the local 2200. The TC files that are created are compatible with several other Wang software packages.

To operate E2236PRT, select TEP DE-Spooling Program from the Terminal Emulator Package Screen in Figure 3-4 on the local 2200 system. The screen in Figure 4-2 will be displayed.

Initially the program will request the device address of the printer to be used, if no default was provided through a previous overlay.



**Figure 4-2. E2236PRT Display**

The program now requests the name of the file to be printed. Type in the file name and press RETURN. If the file cannot be found, the prompt for the disk address is displayed.

Since this program can be run in the background, a prompt for that is now displayed. Running in the background is a good idea when a file of substantial size is to be printed. Background operation may be specified even if no other partitions are currently controlled by the user.

If background operation was requested, the option is given to the user to release the partition when the operation has been successfully completed. This releases the partition for use by others on the system. The Release Partition option will only be possible if E2236PRT can find a menu program to load upon completion. (Refer to Chapter 5.)

The program now verifies that the printer selected is ready. If PRINTER BUSY is displayed, the printer may be in use by another partition. At this time the user can abort the print using SF'31, or continue to wait until the printer is available. If Background mode was selected, the waiting will occur in the background. If TESTING PRINTER is displayed either the printer is powered OFF or it is off-line.

If background operation has been specified, the program will attempt to go into the background. If there are no other partitions currently waiting to perform I/O to the terminal, the user will be asked if a partition should be allocated, if possible, from the pool of spare partitions assigned to Terminal 0.

The message PRINTING will be displayed if Background mode was not selected. Output will be printed. When the printing is completed a list of errors, if any, will be displayed.

SF'31 may be used at any time to abort E2236PRT. This key gives the user the opportunity to stop the printing, and is useful for freezing the output when looking at a file on the CRT.

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## **CHAPTER 5**

### **PACKAGE INSTALLATION AND INTERFACE**

#### **5.1 PACKAGE INSTALLATION**

All emulator subroutines are on the same disk. The software is menu driven and all overlaying is done via the LOAD T command. The cooperating File Transfer Program, FILER&S, must be installed on the remote 2200 so it can be accessed by a remote terminal. It is wise to make a backup copy of the software.

#### **5.2 INTERFACING EMULATOR SOFTWARE ON LOCAL 2200**

Every 2200 installation has its own setup of menus. In an attempt to adapt to the many varying environments, the following interface procedure is provided.

##### **5.2.1 Emulator Input Parameters**

The analyst interfaces with the 2236DE emulator package by using the following variables and conventions. These variables should be treated by the analyst as write only. Entry to the 2236DE emulator package is made by loading file E2236DE. The analyst may customize E2236DE to set up common variables D\$( ), and O9\$. It is not necessary for all parameters of D\$( ) to be specified. The emulator will validate the parameters passed in D\$( ) and O9\$ and default parameters not specified; therefore to set up the file numbers, E2236DE does not have to contain SELECT statements. The parameters specified in D\$( ) are sufficient. Module E2236DE passes control to the emulator by loading file E2236o1.

##### **5.2.2 Exiting for Emulator**

The emulator and utility programs, E2236ST and E2236PRT, exit by loading program file O9\$8 on #0 (SELECT DISK). If O9\$ is left blank (or not commoned by interface program), the default file is START. None of the programs in the emulator package change SELECT DISK. The emulator and E2236PRT perform a COM CLEAR D\$( ) upon exit. E2236ST performs a COM CLEAR O9\$. Table 5-1 shows the variables and file numbers used by the emulator and a description of their use.

**Table 5-1. File Numbers and D\$(7)3**

<b>Variable</b>	<b>File No.</b>	<b>Description</b>
D\$(2),	2	File send/receive disk, default: 310
D\$(3),	3	Printer or disk to SPOOL print data default: 204
D\$(4),	4	TC board, default: 01C
D\$(5)		Data rate per 10 bps, default: 120, indicating 1200 bps
D\$(6)		Type of terminal on local 2200: 2236DE = DE 2236D = 36D 2226 = 26
D\$(7),	7	Address of CRT, or /000 if background. PRINT is also SELECTed appropriately. This parameter is automatically controlled by the emulator and cannot be overridden.
O9\$8		Name of program on #0 (SELECT DISK) to load upon exit from emulator. Default is START. The emulator package does not change SELECT DISK.

### 5.2.3 Input Interface to E2236PRT

The utility program to print TC formatted files may also be passed input parameters in D\$(7)3. D\$(2) is the disk containing TC formatted files. D\$(3) is the printer to be used.





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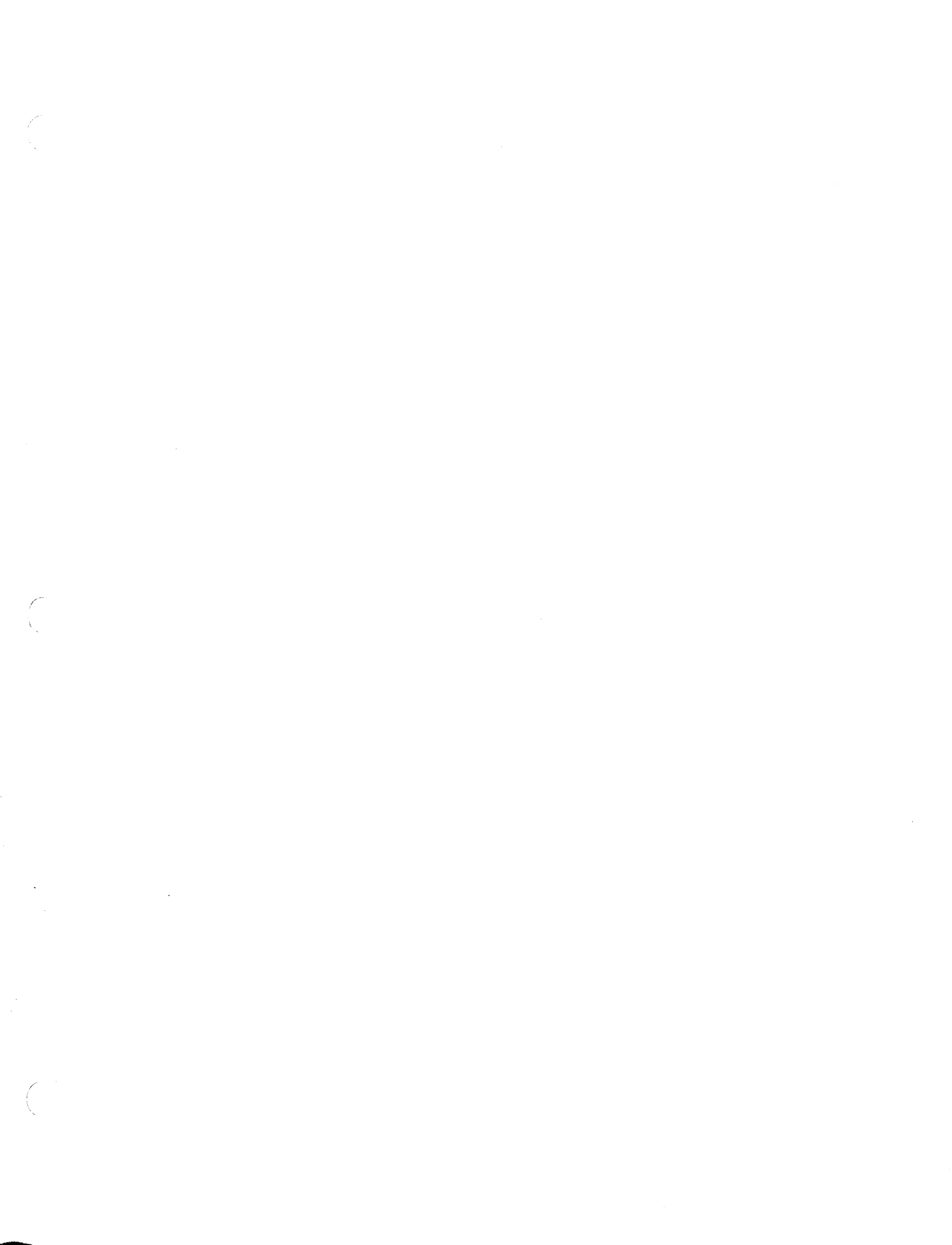
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