CHAPTER 11
WANG PROFESSIONAL COMPUTER 2200 TERMINAL EMULATION

## 11.1  INTRODUCTION

The Wang Professional Computer 2200 Terminal Emulation allows a Wang PC to be connected either locally or remotely to a 2200 LVP, MVP, or SVP system.  Once connected to the 2200, the PC emulates a 2200 terminal and has full access to all 2200 Series data processing applications.

To implement the 2200 Terminal Emulation software, the following equipment is required.

- A Wang PC configuration consisting of the keyboard, the electronics unit, and the Wang Monochrome Monitor and its card

- A 2200 system (LVP, MVP, or SVP with Option-W)

- Cable for connecting the Wang PC and the 2200

The following limitations exist on Release 1.0 of the 2200 Terminal Emulation software.

- No support for a baud rate of 19,200 bits per second (bps)
- No box graphics support
- No remote screen dump support
- No file transfer capability

The procedure for installing and running the 2200 Terminal Emulation software consists of the following steps.

1. Establishing a physical connection between the 2200 and Wang PC
2. Master initializing the 2200
3. Starting up the Wang PC
4. Loading the emulation software

The following sections discuss each step and reference appropriate 2200 documentation where necessary.

## 11.2  ESTABLISHING A CONNECTION BETWEEN THE 2200 AND THE WANG PC

In order to use the Wang PC for terminal emulation, you must first establish a communication link between the Wang PC and the 2200.  A Wang PC can be attached locally to the 2200LVP, 2200MVP, or 2200SVP with Option-W at distances up to 2000 feet (609.6 meters).  The Wang PC can also be attached remotely via modems and telephone lines.  The additional equipment necessary to make this physical hookup depends on whether you intend to communicate with a local or a remote 2200.

When configured with a 2200LVP or 2200MVP, the Wang PC is connected to a port on either a Model 2236MXD or Model 2236MXE Terminal Processor.  When configured with a 2200SVP, the Wang PC is connected to a port on the Option-W Terminal Processor.  For local communication between the Wang PC and the 2200, you need the following cables.

- One direct connection cable (available in lengths from 25 feet (7.6 meters) to 2000 feet (609.6 meters))

- One 6-in (15.2-cm) adaptor cable (Part Number = 220-0315)

The adaptor cable works with all new and existing direct connection cables. The terminal end of the 2200 cable plugs into the adaptor cable, which in turn plugs into the PC.  A pair of RS-232-C/V.24-compatible cables that are joined by a null modem can also serve as the local communication link between the two systems.

The Wang PC is connected to a port on the terminal processor.  For local communication, the transmission rate for this port should be set to 9600 baud.  Refer to the 2200 terminal manual for information on setting the transmission rate.

In order for the Wang PC and the 2200 to communicate via telephone lines, you must install a modem.  The modem performs the required conversions between the digital signals used by computers and the analog signals transmitted over telephone lines.  The modem you use must be asynchronous and RS-232-C-compatible.  A Wang Asynchronous Modem is available to support communication at two commonly used rates of transmission:  300 and 1200 bps.

For communication links that use modems, begin by following the manufacturer's instructions for installing the appropriate type of modem or null modem.  Then attach the Wang PC to the modem or null modem via the RS-232-C/V.24-compatible cable with 25-pin male, RS-232-C/V.24-compatible plugs at both ends.  The back panel of the electronics unit is equipped with an appropriate female 25-hole plug (called an RS-232-C serial asynchronous port) that enables you to make this connection.

## 11.3  MASTER INITIALIZING THE 2200

Master Initialization is the process of powering up components of the 2200 system, mounting the system platter, loading the operating system and BASIC-2 interpreter, and exercising the CPU to determine if any malfunctions exist. When the operating system is loaded, the 2200 loads and runs the Partition Generation program from the system platter.

With the Partition Generation program, you can create a system configuration by dividing the resources of the 2200 system among the various users. Since the emulation software regards the Wang PC as a 2200 terminal, a partition must be available for the Wang PC. Therefore, the configuration must include at least one partition assigned to the port corresponding to the Wang PC, or at least one partition assigned to Terminal 0. Refer to the 2200 Introductory Manuals for a detailed description of both Master Initialization and Partition Generation.

## 11.4  STARTING UP THE WANG PC

You must load the System Software to start up the Wang PC system. The System Software contains the operating system and system menu programs.

NOTE:
If the power is already on and the System Software is loaded, press 2ND + COMMAND (i.e., while holding down the 2nd key, press the Command key); press CANCEL. Once the Main System Menu is displayed, load the emulation software. Refer to Section 11.5.

To load the System Software, perform the following steps.

1.  Insert the System Software diskette into Drive A.

    Drive A is the start-up default diskette drive. The system assumes that you will start from Drive A unless you change the default.

    As you insert the diskette into the drive, use the Insert and Up arrows on the orientation label to ensure that the position of the diskette is correct. The Insert arrow should point into the drive, and the Up arrow should point toward the Wang logo on the front of the electronics unit.

    Figure 11-1 shows the correct orientation of the diskette for insertion into the diskette drive. Slip the diskette completely into the diskette drive and close the door of the drive.

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**NOTE:**
If your system includes a Winchester disk drive, you can copy both the System
Software and the Asynchronous Communications Software onto the Winchester
disk. Thereafter, you can access the software from the Winchester disk
without inserting a diskette each time you use the software. Refer to Chapter
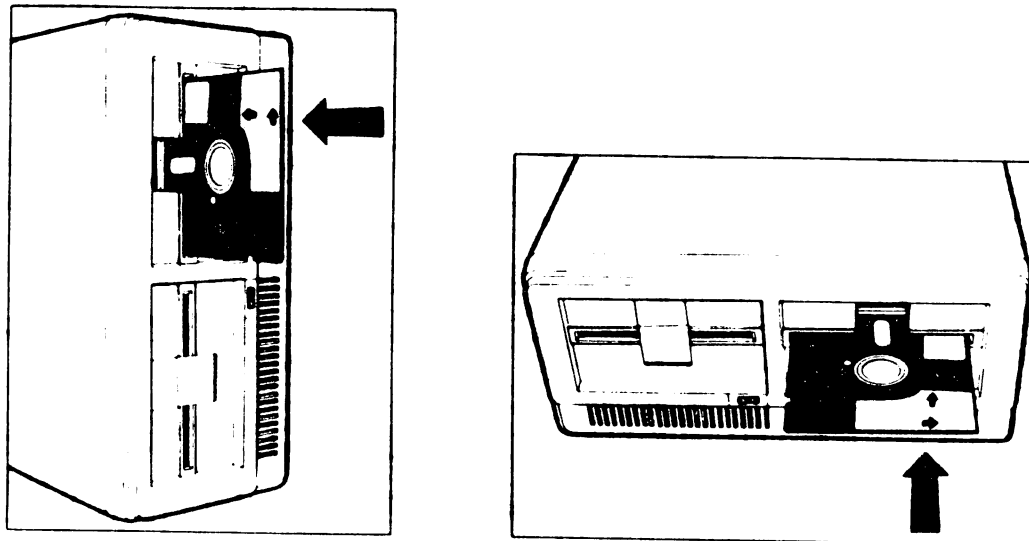10 of the The Wang Professional Computer Introductory Guide for details.



Figure 11-1   Inserting a Diskette

2.   Turn on the power. The power switch, which is located on the back
     panel of the electronics unit, turns on the power for all system
     components.

     At this point, the system performs the power-on diagnostics tests.
     After completion of the diagnostics tests, the system displays a
     series of Start-up screens. The Start-up screens display
     information such as the start-up drive location, the MS-DOS and BIOS
     version numbers, and the Copyright notice.

     If the start is successful, the system displays the Date and Time
     screen. If you choose to enter the date and time, press RETURN to
     move from item to item. After entering or not entering this
     optional information, press EXEC. The Main System Menu is
     displayed. Refer to Figure 11-2.

```
        mm/dd/yy            Wang Professional Computer        hh:mm:ss
                            M A I N   S Y S T E M   M E N U
                                    Release 1.0

        SELECT ONE


                                _ Applications
                                _ System Utilities
                                _ Program Development
                                ■ Communications
                                _ DOS Command Processor
                                _ Other


                                        SPACE BAR - Item select
                                        EXECUTE   - Proceed
```
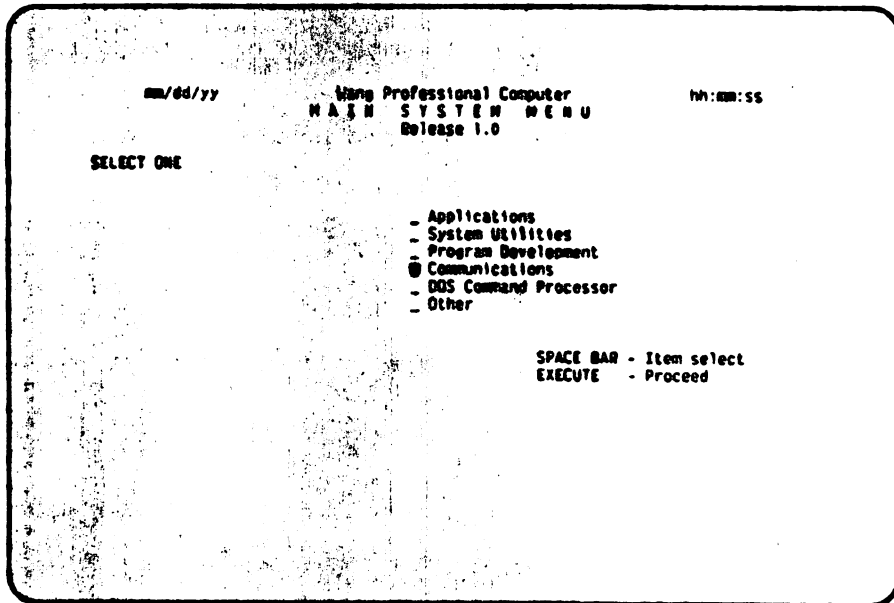
Figure 11-2   The Main System Menu


Refer to The Wang Professional Computer Introductory Guide for a detailed description of the start-up procedure, as well as for information about common problems and system diagnostics.


Making Menu Selections


To make selections on the menus depicted in Figures 11-2 and 11-3, move the acceptance block (■) to the desired choice.  There are two methods of moving the acceptance block.  You can use the space bar and the Backspace key to move forward and backward through the list of options.  Alternatively, if you want to move immediately to a particular option, press the letter key on the keyboard corresponding to the first letter of the desired option.  Thus, you can choose Communications on the Main System Menu either by pressing the space bar three times or by typing the letter C.

Once you have indicated your choice on a menu, you can do one of the following:  press EXEC to accept the indicated choice and proceed, or press CANCEL to abort the indicated choice and return to the previous menu. (Throughout this chapter, the word "select" refers to the 2-step process of indicating a choice and pressing EXEC to accept that choice and proceed.)

## 11.5 LOADING THE 2200 TERMINAL EMULATION SOFTWARE

Once the System Software is loaded, perform the following steps to load the 2200 Terminal Emulation software.

1.  Select Communications from the Main System Menu.  Refer to Figure 11-2.

    The Communications Menu (Select a Package - Release 1.0) is displayed.  Refer to Figure 11-3.  When this menu is displayed and the red light on Drive A is off, remove the System Software diskette.
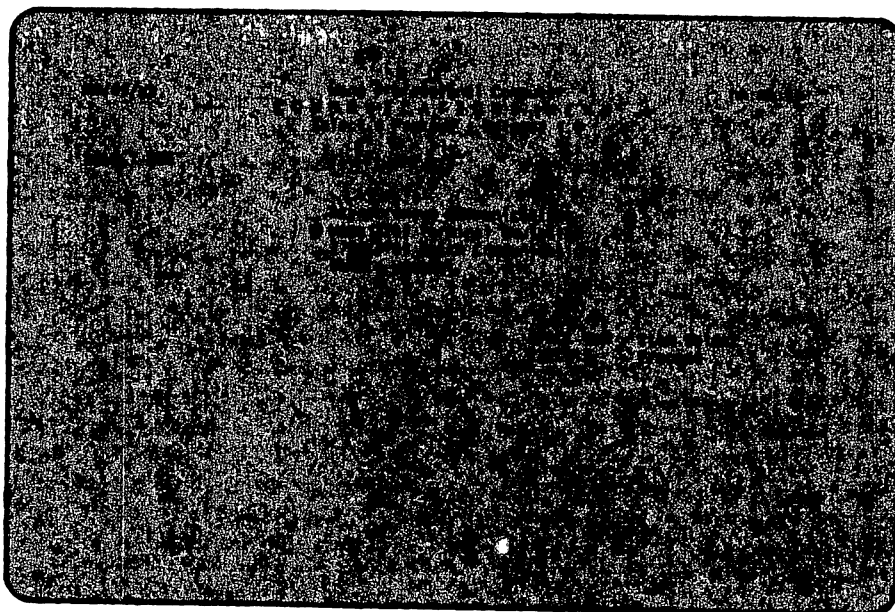


Figure 11-3   The Communications Menu

2.  Insert the Asynchronous Communications Software diskette into Drive A.

    Drive A is the start-up default diskette drive.  The system assumes that you will start from Drive A unless you change the default.

    As you insert the diskette into the drive, use the Insert and Up arrows on the orientation label to ensure that the position of the diskette is correct.  The Insert arrow should point into the drive, and the Up arrow should point toward the Wang logo on the front of the electronics unit.

    Figure 11-1 shows the correct orientation of the diskette for insertion into the diskette drive.  Slip the diskette completely into the diskette drive and close the door of the drive.

3.  Select Wang 2200 Terminal Emulation from the Communications Menu.

    The system attempts to load the emulation software (file name = EMUL2236.COM) into memory.  The system cannot load the 2200 Terminal Emulation software unless the Wang Monochrome Monitor is active.  If the monitor is not active, the system displays the following message:

        Wang Monochrome Monitor not active
        Press RETURN to exit

    If the monitor is active, the system displays the following prompt:

        BAUD RATE (1=9600, 2=4800, 3=2400, 4=1200, 5=600, 6=300)?

    The Wang PC is connected to a port on the terminal processor installed in the 2200 CPU.  The baud (transmission) rate that you select must equal the baud rate that is already set for the port.  Refer to your 2200 terminal manual for further information on setting baud rates.

    After you enter a response to the baud rate prompt, the system displays the 2200 terminal self-identification message at the top of the screen.  The self-identification message appears in following format:

        model      rev-#      baud-rate      char-format      char-set

    where:

        model       specifies the terminal model number.

        rev-#       specifies the revision number of the terminal
                    software, preceded by R.

        baud-rate   specifies the baud rate, followed by BPS (bits
                    per second).  The following are valid baud rates:
                    300, 600, 1200, 2400, 4800, and 9600.

        char-format specifies the communication character format.
                    The communication character format consists of
                    the number of data bits (7 or 8), followed by the
                    parity (E = even parity, 0 = odd parity, N = no
                    parity).

        char-set    specifies the version of the keyboard and
                    character set, enclosed in parentheses.

    The following example shows a self-identification message:

        WANGPC  R01  9600BPS  8+0  (USA)

4. Press 2ND HELP. The Wang PC displays the 2200 power-on message on the screen. The power-on message appears in the following format:

    READY (BASIC-2) PARTITION xx
    :_

where:

    xx specifies the partition number, such that $1 \leq xx \leq 16$.

When this message is displayed, the Wang PC is functioning as a terminal on the 2200 system.

By using the 2200 BASIC-2 language and system utilities, the Wang PC can now access all 2200 system devices, run existing data processing applications, and create new programs. However, Wang PC peripherals (e.g., disk drives) and other Wang PC features are unavailable, since the 2200 system is in control during the emulation.

## 11.6 KEYBOARD DIFFERENCES

The keyboard layouts on the Professional Computer and a 2200 terminal are not the same. Therefore, special keystroke sequences have been defined within the emulator to implement the necessary 2200 functions. Table 11-1 lists the 2200 keys that do not exist on the Wang PC keyboard and describes the equivalent key or combination of keys to use.

On some 2200 terminals (e.g., the Model 2236DE), you use the Special Function keys for editing operations. When using the 2200 Terminal Emulation software, you can use the Special Function (SF) keys on the Wang PC keyboard for editing. The SF key numbers on the Wang PC keyboard correspond to 2200 SF key numbers. However, the position of the keys is different than on a 2200 terminal (i.e., the position of the SF key is shifted one position to the left). Therefore, it is recommended that you use the cursor control keys ( ⟵ , ⟶ , ↓ , and ↑ ) and the special operation keys (INSERT and DELETE) for editing operations. Refer to the The Wang Professional Computer Introductory Guide for details.

Table 11-1   Wang PC Access to 2200 Terminal Keyboard Functions

| 2200 Terminal Function | Wang PC Emulator Access |
|---|---|
| RESET | 2ND + HELP |
| HALT | 2ND + STOP |
| CONTINUE | 2ND + GOTO |
| CLEAR | 2ND + ERASE |
| LOAD | SHIFT EXEC |
| RUN | EXEC |
| RECALL | 2ND + SEARCH |
| S.F. '0 | SHIFT HELP |

**APPENDIX B**
**CONNECTOR PIN ASSIGNMENTS**

Information in this section is provided for readers responsible for interfacing non-Wang equipment to a Wang system via the RS-232-C asynchronous serial port.

The Wang PC communication port conforms to the nationally recognized EIA RS-232-C and the internationally recognized CCITT V.24 standards for voltage levels and pin connections. The signal polarity and the voltage of driven and detected signals are as follows:

| Logic Level | Applied Voltage | Detected Voltage |
|---|---|---|
| 0 or ON (Spacing) | +8 vdc | +5 to +15 vdc |
| 1 or OFF (Marking) | -8 vdc | -5 to -15 vdc |

The pin assignments are listed in Table B-1 with both the EIA and the CCITT designations given for the circuit associated with each pin. Also, the signal descriptions and sources are included in the table.

## WANG PROFESSIONAL COMPUTER AND MODEM INTERACTION

The Wang PC communication hardware senses the value of the following modem signals:

- Received Data on Pin 3
- Clear to Send (CTS) on Pin 5
- Data Set Ready (DSR) on Pin 6
- Data Carrier Detect (DCD),
   also known as Received Line Signal Detector (RLSD),
   sometimes abbreviated CXR, on Pin 8

The Wang PC sets the level of the following modem signals:

- Data Terminal Ready (DTR) on Pin 20
- Request to Send (RTS) on Pin 4
- Transmitted Data on Pin 2

The Wang PC also uses Pin 7 as the Signal Ground and Common Return.

## Table B-1  Connector Pin Assignments

| Pin | EIA | CCITT | Signal Description | Source |
|-----|-----|-------|--------------------|--------|
| 2 | BA | 103 | Transmitted Data | Wang PC |
| 3 | BB | 104 | Received Data | Modem |
| 4 | CA | 105 | Request to Send | Wang PC |
| 5 | CB | 106 | Clear to Send | Modem |
| 6 | CC | 107 | Data Set Ready | Modem |
| 7 | AB | 102 | Signal Ground and Common Return | Not Applicable |
| 8 | CF | 109 | Data Carrier Detect (or Received Line Signal Detector or CXR) | Modem |
| 20 | CD | 108.2 | Data Terminal Ready | Wang PC |

NOTE:
The signals on the following pins are not utilized by the Wang PC:  pins 1, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 24, and 25.


The ONLINE/OFFLINE status message on the Interactive Session Screen reflects only the presence or absence of the DSR signal on pin 6.  However, other signals are necessary to enable the Wang PC to communicate. Specifically, the signal on pin 5 (CTS) must be active to enable the Wang PC to send data.  The signal on pin 6 (DSR) must be active to enable the Wang PC to send or receive data.  The signal on pin 8 (CXR) must be active to enable the Wang PC to receive data.

Disconnect 8 & 9