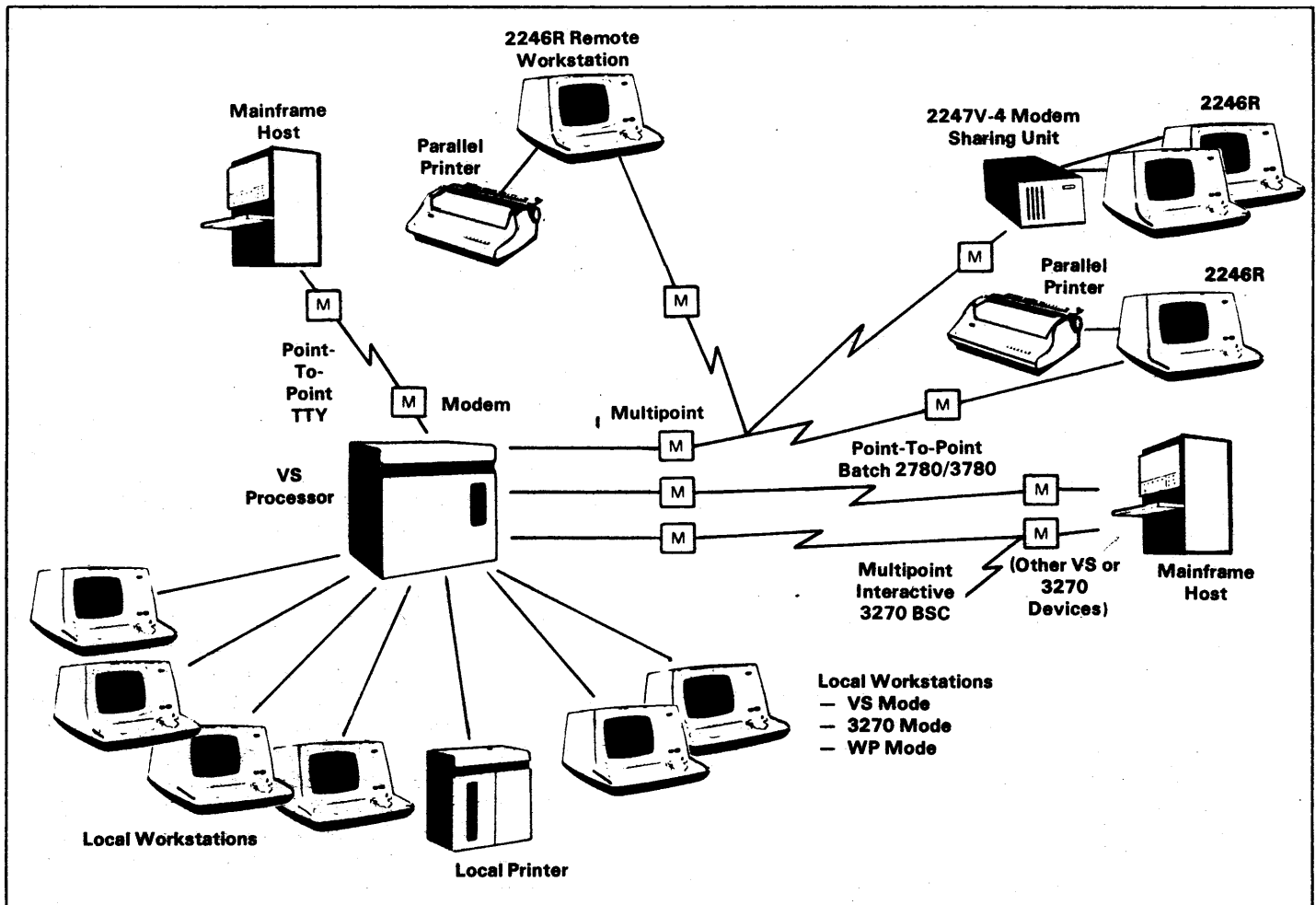


Wang Computer Systems



Data Communications



Wang VS Computer Systems can be configured with various data communications capabilities, including:

- VS Remote Workstations and Printers
- 2780/3780 Emulation (TCCOPY)
- VS-to-VS File Transfer (VSCOPY)
- 3270 Emulation
- Teletypewriter Emulation (TTY)

These capabilities are available with optional VS hardware and software. Each one, if not included when a VS computer is initially ordered, can be added to the system when data communications needs expand.

A multipoint leased communications line and/or a point-to-point leased or switched (dial-up) network may be connected to the VS computer, via a suitable modem (not available from Wang Laboratories) and a Model 22V06 Communications Input/Output Processor (IOP) housed within the VS. The 22V06 IOP is available from Wang in three models to support one, two, or three communications lines (ports).

With appropriate software resident in the VS, the multipoint IOP models can support the same type of data communications on each of their lines, or a mix of types among lines on the same IOP, one type at a time per line. This ability enables a 3-port IOP, for example, to run



remote workstations and MSUs on each of its lines at the same time; or to run three 3270 emulation programs at the same time, one on each line; or a 2780/3780 emulation on one line concurrently with remote workstations on the second line and 3270 emulation on the third line. Any combination of VS-supported communications types is possible on a 22V06 IOP, and if IOP slots are available, other 22V06 IOPs can be added to the VS computer to accommodate all desired data communications capabilities.

VS REMOTE WORKSTATIONS AND PRINTERS

Remote workstation/printer support on VS systems is a synchronous communications-based capability enabling physically remote devices to access a VS computer and appear functionally equivalent to locally attached devices. (A remote workstation, however, cannot act as a VS system operator's console, nor can it support VS 3270 emulation or WP capability.) The Model 2246R Remote Workstation has a built-in communications controller, with a connector for attachment of a modem (not available from Wang Laboratories), and a built-in printer controller with a connector for attachment of an optional parallel printer up to 50 feet from the workstation.

This workstation can function as a self-contained communications device at a remote site where only one workstation and possibly a printer are needed. With the Model 2247V-4 Modem Sharing Unit (MSU), as many as four 2246R workstations (with optional printers) can share a single modem and communications line (the maximum distance from the MSU to each workstation is 2000 feet).

The number of communications lines needed to support remote devices depends on the desired distribution of those devices. For example, a point-to-point leased line can support a site which needs either a single remote workstation (and perhaps a printer) or an MSU with as many as four remote workstations, each with an optional printer. (Although a point-to-point switched line can also support several remote sites, those sites cannot have concurrent access to the VS computer.) A multipoint leased line can support several remote workstations and MSU sites concurrently. When remote devices are configured, the total number of *local and remote* workstations must not exceed 32 for the VS or VS-50 processors, or 128 for the VS-100 processor. (See the Requirements Table.)

2780/3780 EMULATION (TCCOPY)

For IBM 2780/3780 emulation, the Wang synchronous communications-based program called TCCOPY is available on VS systems. TCCOPY supports point-to-point, half-duplex, batch communications over leased or switched (dial-up) networks at speeds up to 9600 bps. Card reader input and punch output functions are emulated as VS disk files. Features supported include:

- Terminal or Host mode operation
- File or library transmission
- Multirecord blocking
- Cyclic redundancy checking
- Automatic extended retransmission
- Wait for acknowledgment (WACK)
- EBCDIC-coded transmission
- Transparent transmission
- Space compression (3780 only)

With this software, a 22V06 IOP, and a suitable modem, a VS computer can communicate with other computers, minicomputers, intelligent terminals, and remote batch terminals which support the IBM 2780 or 3780 protocols. (Every Wang Word Processing System, Office Information System, 2200 Series Computer System, and VS Computer System has optional 2780/3780 emulation capability.)

TCCOPY's Terminal mode allows VS disk-resident data files to be transmitted to a host system. Although VS data files may have variable-length records, TCCOPY automatically reformats the records to conform to the 80-column card image format of the IBM 2780 and 3780 protocols (the records stored on disk are not altered). VS data file records exceeding the 80-byte limit are divided into multiple 80-byte records, and are padded with blanks if necessary to achieve the fixed length.

TCCOPY's Host mode allows the VS to send print and punch files to a remote 2780 or 3780 terminal without loss of data integrity. If the user selects single-record blocking, the software formats print files into 132-byte records, and punch files into 80-byte records for transmission. As a special option, VS disk files are transmitted record by record as they are stored on disk, with a maximum length of 256 bytes per record-block, to another Wang computer emulating a 2780 or 3780 terminal; disk file records exceeding this length are reformatted into blocks of 256 bytes or less before transmission.

The user can optionally select multirecord blocking when transmitting card image files in Terminal mode, or print or punch files in Host mode, to increase data throughput when communicating with a system that supports this feature. The blocksize (which includes both transmission control and data characters) is 400 characters for the 2780 protocol and 512 characters for the 3780.

During data reception in Terminal or Host mode, data normally routed to a 2780 or 3780 printer is sent to either an online VS printer or the VS print spooler, depending on the operator's choice at TCCOPY initialization time. Data normally routed to a 2780 or 3780 card punch is stored on disk. Optionally, both print and punch data can be directed to the printer (or spooler), or to a disk file.

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Space compression is a feature automatically implemented when using the 3780 protocol, and is appropriate for improving throughput when also supported by the remote site. With space compression, the transmitting system represents each group of repetitious 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.

Since the VS normally stores its files as ASCII-coded data, and the 2780/3780-emulated transmission code is EBCDIC, a user would ordinarily select Translation in Non-Transparent Text mode when sending/receiving a file or library. Alternatively, No Translation (transmit data as it appears in the VS file, receive and store data as it appears on the line) in Transparent Text mode can be selected. (ASCII and Six-Bit Transcode are not supported as transmission codes; indexed files are transmitted sequentially; file names and characteristics are not maintained.)

The 2780/3780 software supports "auto dial" by utilizing the RS-366/CCITT V.11 automatic calling unit (ACU) interface in the 22V06 IOP. If a compatible ACU is connected to this interface, the VS has the capability to automatically dial other systems or terminals — a useful feature for VS computers that regularly communicate with many systems via a switched network. (See the Requirements Table.)

VS-TO-VS FILE TRANSFER (VSCOPY)

For transfer of files and libraries between VS computer systems in point-to-point leased- or switched-line networks at speeds up to 9600 bps, the Wang synchronous communications-based program called VSCOPY is another capability supported on VS systems. This software uses the VS's native ASCII code (with no translation) for all communications, and has many of the features found in TCCOPY's 2780/3780 emulation, including cyclic redundancy checking, automatic extended retransmission, autodialing, and WACK. VSCOPY maintains all file structures and characteristics, so that all files sent/received retain their original formats. (See the Requirements Table.)

3270 EMULATION

With the Wang 3270 communications software, a VS computer can emulate an IBM 3270 Information Display System and communicate with any host computer that supports the following devices on multipoint leased lines in half-duplex mode configurations using EBCDIC transmission code.

- A 3271 Control Unit, Model 2
 - This BSC remote cluster controller, which supports a 1920-character buffer and the EBCDIC character set, is emulated by a VS-resident Master Control Program and special microcode loaded into a data link processor on the 22V06 IOP.

- Attached 3277 Display Stations, Model 2 (with typewriter keyboard option)
 - These display stations, with 24 lines by 80 characters per line (1920 characters), are emulated by local VS workstations (except the Model 2246P); the workstations may be logically attached to (or detached from) the VS Master Control Program via a VS-resident attachment task.
- Attached 3288 Printers, Model 2 (with Vertical Forms Control option)
 - The 22V06 IOP's data link processor and VS-resident Master Control Program provide functionally-compatible emulation of these 1920-character-buffer printers. Received print data is routed either to an online VS printer or to a 3288 "virtual printer" where the data is converted to VS print format and sent optionally to the VS print spooler or to a specified print file on disk.

In addition to emulating a 3271 cluster controller with attached 3277 display stations and 3288 printers (up to 32 devices per cluster), the Wang 3270 emulation software provides a "virtual terminal" capability that allows a user-written COBOL application program, running concurrently with the emulator, to logically attach itself to the emulator as a 3277 display station and pass buffered data from a virtual screen image between the VS's Master Control Program and the host. Thus, an application program can effectively access the emulator and appear to the host as virtually another attached 3277 display station. This feature enables distributing COBOL applications by allowing them to fetch additional data from the host's data base in situations where the information cannot be located at the VS site.

Local VS workstations in 3270 mode, or user-written COBOL programs, can perform inquiry, interactive transaction processing, or data entry operations — the primary functions of 3270 Information Display Systems. The VS 3270 emulation software supports formatted or unformatted screen images sent from a host. Screen formatting, field protection, and field validation are under the control of the host-supplied attribute byte for each field displayed on a screen: information handling occurs on a field-by-field basis according to attribute byte characteristics. Features of the VS 3270 emulation software include command chaining, cyclic redundancy checking, and automatic retransmission. (See the Requirements Table.)

TELETYPEWRITER EMULATION (TTY)

The Wang VS program called TTY emulates a standard asynchronous interactive teletypewriter, and has the ability to communicate in half- or full-duplex mode, over point-to-point switched (dial-up) or leased lines, with a host computer system that supports asynchronous data communications using ASCII line code.



TTY allows keyboard entry and transmission of text from either a remote or a local VS workstation, and reception of text to the workstation screen. VS disk files can be transmitted at any time, and received screen text can be simultaneously routed to a disk file and/or printer file. Optionally, a log file containing all text received, all text transmitted from the keyboard, and the names of all disk files transmitted can be maintained on disk.

TTY can execute interactively as a foreground task from a VS workstation, or as a background task under the control of a VS procedure. (When running TTY in foreground from a workstation, the user can select or deselect any combination of receive and transmit functions at any time. When running TTY in background via a procedure, however, only transmit functions are available.)

Communications options such as the number of data bits per character (5, 6, 7, or 8, excluding parity bit), parity (odd, even, or none), baud rate (50-9600 bps), and STOP bit duration (1, 1.5, or 2 data bit intervals) are all easily user-selectable, in foreground or background, for each TTY session. "Echo-host" (the immediate transmission back to the host of all characters received), as well as "Wait For Host Response Before Sending Next Record" for all file transmissions, can be specified on a session-by-session basis. Automatic calling unit capability is also supported. (See the Requirements Table.)

Standard Warranty Applies

Data Communications Capabilities Requirements Table

Capability Requirement	Remote Workstation	TCCOPY	VSCOPY	3270 Emulation	TTY
22V06-1, -2, or -3 Communications IOP*	•	•	•	•	•
Point-to-point leased or switched (dial-up) line or network	•	•	•		•
Multipoint leased line	•			•	
A modem**, compatible with the modem connected to the: 22V06 IOP in VS Remote Host Remote Terminal Remote VS	•	• •	•	•	•

* Each IOP port has two connectors:
An RS-232-C/CCITT V.24 connector for cabling a modem up to 50 feet from the VS.

An RS-366/CCITT V.11 connector for automatic calling unit attachment.

** Any RS-232-C/CCITT V.24-compatible synchronous modem supplying clocking signals up to 9600 bps (except for TTY, which requires an asynchronous modem). Modems are not available from Wang Laboratories.

Wang Laboratories reserves the right to change specifications without prior notice.

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