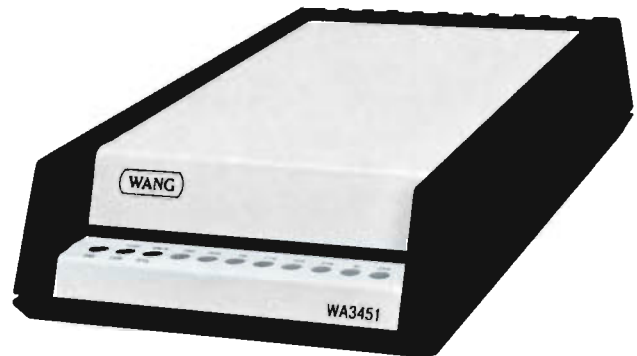


# Wang WA3451 Asynchronous/Synchronous Modem

## Data Sheet

- Supports asynchronous or synchronous data communications
- Compatible with Bell Type 212A and 103J modems, and Racal-Vadic 3400 Series modems
- FCC registered for direct connection to switched telephone lines—no DAA needed
- Supports remote Wang 2200 Series 2236DE Interactive Terminals
- Supports low-speed file and document interchange between Wang systems (2200, VS, OIS, and WPS)
- Operates at 300 and 1200 bits per second



The Wang WA3451 Asynchronous/Synchronous Modem is a full-duplex modem that supports asynchronous or synchronous data communications. The modem operates over switched telephone lines at either 1200 or 300 bits per second (bps). WA3451 modems support a variety of data communications applications for users of Wang 2200 Series systems, Word Processing Systems (WPS), Office Information Systems (OIS), and VS systems. (Refer to the table summarizing Wang products supporting WA3451 modems.)

### ASYNCHRONOUS COMMUNICATIONS

In asynchronous mode, the WA3451 modem is compatible with Wang 2200 Series 2236DE Interactive Terminals and is the recommended modem for dial-up remote connection of these terminals to 2200LVP or MVP computers. The WA3451 is also recommended for use with the Wang 2200 Remote Control and Maintenance (RCM) software, which accesses a remote 2200 Series system by emulating a 2236DE terminal.

The WA3451 modem can also be used with Wang asynchronous emulation software, including the 2200 Teletype® and 2741 emulations, the VS Teletypewriter (TTY) emulation, and the OIS or WPS Teletype and 2741 emulations.

A unique feature of the WA3451 modem is its capability to perform asynchronous operations in both 2200 remote terminal mode (11 bits per character) and 212A mode (10 bits per character). This capability requires no internal option changes.

### SYNCHRONOUS COMMUNICATIONS

In synchronous mode, a WA3451 modem can be used with Wang synchronous emulation software for data communications between a Wang system and a host or terminal supporting the IBM 2780, 3780, 3741, or 3275 binary synchronous protocol. The modems can also be used

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### Wang Products Supporting WA3451 Modems

Wang System	Hardware	Software
VS	22V06 or 22V26 communications IOP	TCCOPY (2780/3780 emulation) VSCOPY (VS-to-VS file transfer) VS Teletypewriter (TTY) emulation MAILWAY software (MPVS-3, MCVS-3, or MMDC-2)
OIS	TC-5536 or TC-AWS workstation (or other model with comparable TC capabilities) TC-B communications controller	2780/3780 Batch Communications and Document Transmission software Teletype and 2741 Asynchronous Communications software MAILWAY software (MPOIS-3, MOIS-3, MOIS-2, or MOIS-1)
WPS	TC-5536 or TC-AWS workstation (or other model with comparable TC capabilities) TC-BWP or TC-3 communications controller	2780/3780 Batch Communications and Document Transmission software Teletype and 2741 Asynchronous Communications software MAILWAY software (MPWPS-3, MPWPS-2, MPWPS-1, MPSYS-3, MPSYS-2, or MPSYS-1)
2200	2236DE Interactive Terminal (for remote terminal connection) 2228B, 2228C, Option 28B, or Option 28C communications controller 2227B or Option 27B communications controller 2228D Data Communications Controller	Remote Control and Maintenance system software Binary Synchronous 1 (BSC 1) emulation software Asynchronous 1 emulation software 3275 BSC emulation software Enhanced 2780/3780 emulation software MAILWAY software (MP2200-3)

with Wang communications software for data file and document transfer between Wang 2200 Series systems, Office Information Systems, Word Processing Systems, and VS systems. The WA3451 modem is unlikely to support operations where Wang 3270-type emulation software is utilized, because most 3270 host systems do not support dial-up connection. The WA3451 modem cannot be used to connect a 2246R remote terminal to a Wang VS system.

WA3451 modems are compatible with the MAILWAY™ Electronic Mail and Message System (Level I, II, or III). However, the WA3451 modem is not compatible with Bell automatic calling units. To use WA3451 modems with MAILWAY Level II or III for automatic dial-up operations, a MAILWAY System's distribution center can be configured with a Bell 212A modem (or equivalent) and a Bell 801 Automatic Calling Unit (or equivalent). A WA3451 modem, operating in 212A mode, can then be used at any of the MAILWAY System's distribution points.

## OPERATING FEATURES

The WA3451 modem incorporates a powerful set of self-diagnostic features, including Idle Test, Analog Loopback, Remote and Local Digital Loopback, and Self Test. For user convenience, the WA3451 front panel includes switches for Answer mode (used for manual answer operations), High-/Low-Speed mode, and On-Line/Off-Line mode (manual connect/disconnect). In addition, there are eight LED displays to signal line connection and indicate line conditions. The rear panel includes a switch for normal or self test operations and a switch for Analog Loopback/Digital Loopback.

## COMPATIBILITY

The WA3451 modem is FCC registered for direct connection to a switched telephone line, so a Data Access Arrangement (DAA) is not needed. For communications to occur, modems at both ends of the communications link must be compatible with each other. The Wang WA3451 modem is compatible with Racal-Vadic's VA3400 Series modems and with the

Bell Type 212A and 103J modems. The WA3451 modem does not support leased line operations.

## COMMUNICATIONS CAPABILITIES

For manual originate and manual answer operations, the WA3451 modem is used with an attached telephone. The modem can be used to manually originate communications with three different types of modem: another WA3451 (or compatible modem from another manufacturer), a Bell Type 212A, or a Bell Type 103J. For manual originate operation, simply dial the telephone number of the remote modem. When the remote modem responds with an answer tone, switch the WA3451 modem to On-Line mode and begin transmission. To initiate manual answer operations, answer the telephone, switch the modem to On-Line mode, and activate the Answer mode switch on the modem.

The WA3451 should be set in High-Speed mode (1200 bps) for communication with WA3451 or 212A modems; the Low-Speed mode (300 bps) is used for communication with 103J modems. In the High-Speed mode, the WA3451 automatically identifies the type of modem called (WA3451 or 212A), thereby reducing communications connection problems.

The WA3451 modem can also be used with an attached telephone in configurations requiring manual originate, manual answer, and automatic answer capabilities. For automatic answer operations, the modem automatically selects the proper speed and responds to a compatible modem (Wang WA3451, Racal-Vadic 3400 Series, Bell 212A, or Bell 103J).

In a configuration requiring only automatic answer operations, the modem can be used without an attached telephone (originate operations would not be possible). In such a case, however, a spare telephone should be available for line testing.

## ORDERING INFORMATION

The WA3451 modem is manufactured for Wang Laboratories, Inc., by Racal-Vadic, Inc., and is registered as a permissive device for direct connection to the switched public telephone network. The RJ11C voice jack is recommended for connection to equipment registered

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for permissive connection, and is required for WA3451 installation behind a Private Branch Exchange (PBX) or switchboard. A WA3451 modem can also be connected to a programmable device, such as the RJ41S data jack or the RJ45S data jack.

A telephone suitable for use with the WA3451 modem is available from public telephone companies or from modem vendors. One of the following telephones can be ordered from a public telephone company.

- A standard telephone, to be connected to the WA3451 modem and an RJ11C voice jack by means of the T-connector provided with the modem. (Note that a standard telephone provides no indication of line connection, because the handset is placed on-hook during data transfer. Therefore, it is possible that the line could inadvertently remain connected, and unnecessary line charges could be incurred.)
- An exclusion-key telephone (RTC503—rotary dial or RTC2503—tone dial), to be connected to the WA3451 modem and either an RJ41S or RJ45S data jack. (Note that an exclusion-key telephone provides a visual indication of line use, because the handset is placed off-hook during data transfer. Thus, an exclusion-key telephone can reduce the possibility of unnecessary line charges.)

To use an exclusion-key telephone with a WA3451 modem, order the telephone with the following options.

- For manual originate and manual answer operations, specify:

Telephone set controls the line  
Aural monitoring not provided  
Switch hook indicator only.

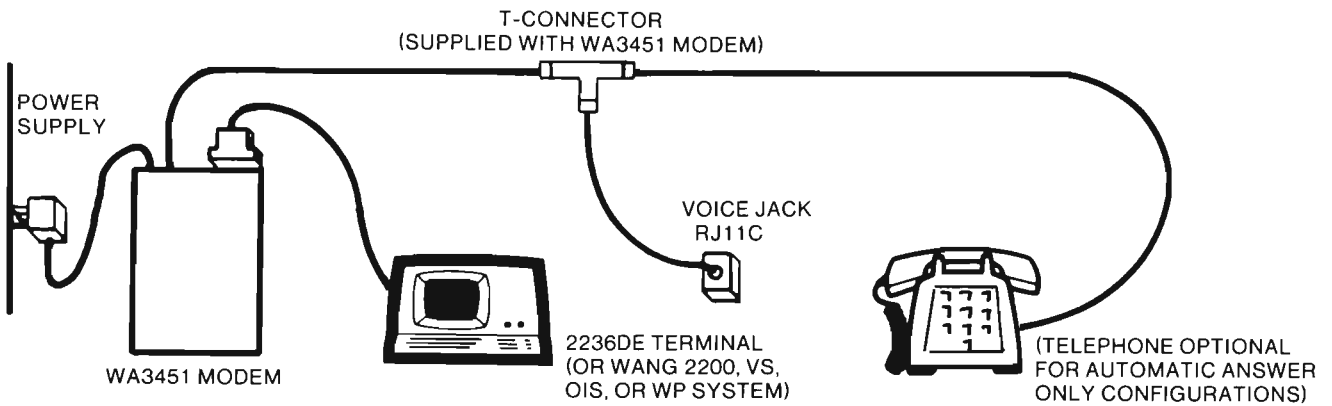
- For manual originate and manual answer operations, as well as automatic answer operations, specify:

Data set controls the line  
Aural monitoring not provided  
Switch hook indicator only.

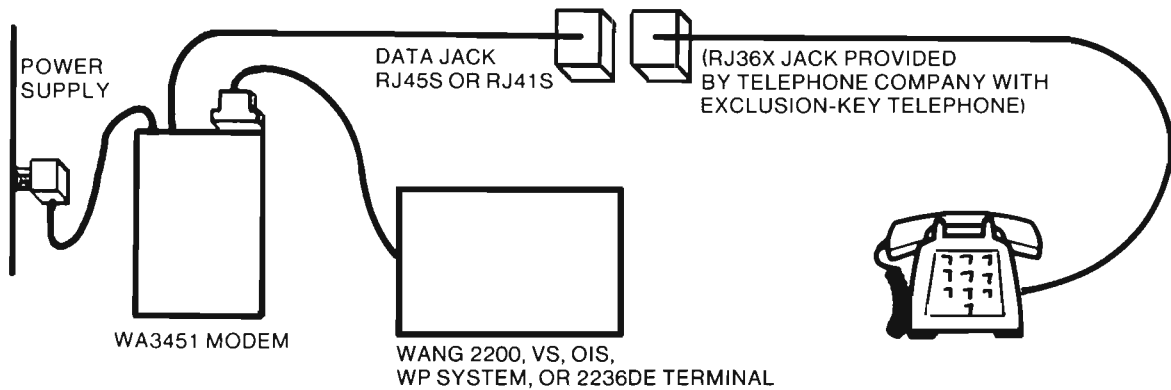
A Racal-Vadic VA871 Vadicphone, which also provides an exclusion key, can be used instead of a standard telephone or an exclusion-key telephone. A WA3451 modem can be connected to the switched public telephone network using a Vadicphone and one of the following: an RJ11C voice jack, an RJ41S data jack, or an RJ45S data jack. The Vadicphone is available for manual operations or automatic/manual operations in rotary and tone dialing versions.

To order the proper voice or data jack from a public telephone company, decide which type of telephone is to be used, and supply the following information.

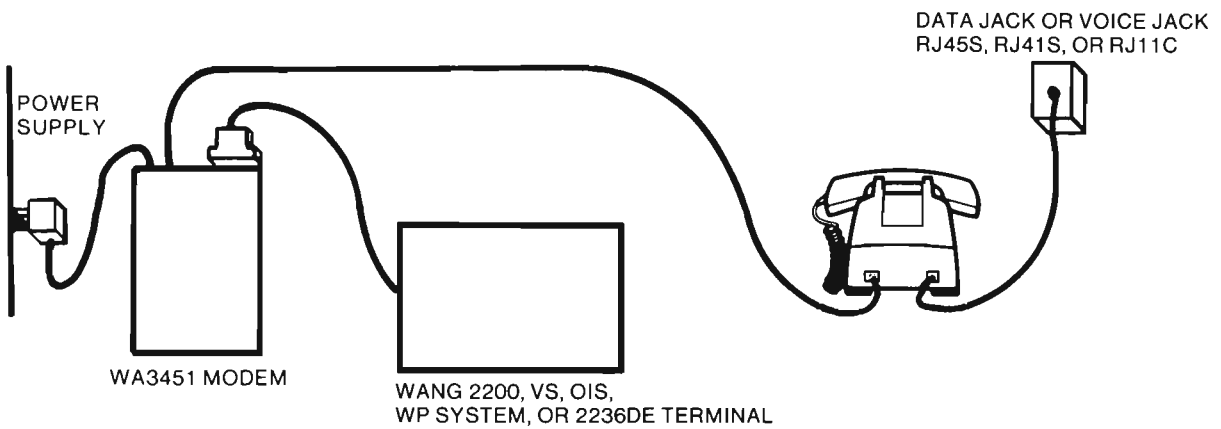
1. Type of device needed (voice or data jack), specified by Universal Service Ordering Code (USOC): for example, RJ11C voice jack
2. Manufacturer and model number of the modem to be connected: Racal-Vadic VA3451 modem (manufactured for Wang Laboratories, Inc., as Wang WA3451)
3. FCC registration number of the modem: AJ496M-67213-DM-N
4. Ringer Equivalence number of the modem: 0.9B



**CONFIGURATION FOR AUTOMATIC ANSWER, MANUAL ANSWER, AND MANUAL ORIGINATE WITH STANDARD TELEPHONE**



**CONFIGURATION FOR AUTOMATIC ANSWER, MANUAL ANSWER, AND MANUAL ORIGINATE WITH EXCLUSION-KEY TELEPHONE (RTC503/RTC2503)**



**CONFIGURATION FOR AUTOMATIC ANSWER, MANUAL ANSWER, AND MANUAL ORIGINATE WITH RACAL-VADIC VADICPHONE OR EQUIVALENT**

## SPECIFICATIONS

### Model Number

WA3451 Asynchronous/Synchronous Modem

### FCC Registration Number

AJ496M-67213-DM-N

### Interface

Analog (line): Conforms to FCC Rules, Part 68.

Digital: EIA RS-232-C compatible.

### Modulation

WA3451 or 212A mode: Quadrature AM (four-level PSK).

103J mode: Binary phase-coherent FSK.

### Line Discipline

WA3451 or 212A mode: Binary, serial, synchronous or asynchronous.

103J mode: Binary, serial, asynchronous.

### Asynchronous Character Length

WA3451 mode: 8, 9, 10, or 11 bits.

212A mode: 9 or 10 bits.

103J mode: Not applicable (independent of character length).

### Line Data Rates

WA3451 mode: 1200, 1205, or 1220 bps.

212A mode: 1200 bps  $\pm$  0.05%

103J mode: Equal to transmit data input.

### Transmit Level

-10 dBm per internal programming resistor

### Transmitter Carrier Frequencies

Mode	Answer	Originate
WA3451	1150 Hz $\pm$ 0.05%	2250 Hz $\pm$ 0.05%
212A	2400 Hz $\pm$ 0.05%	1200 Hz $\pm$ 0.05%
103J	2225 Hz $\pm$ 0.2% Mark 2025 Hz $\pm$ 0.2% Space	1270 Hz $\pm$ 0.2% Mark 1070 Hz $\pm$ 0.2% Space

### Receiver Sensitivity

WA3451 or 212A mode: -50 dBm when receiving with equalizer in; -45 dBm otherwise.

103J mode: Nominal -45 dBm.

### Receiver Dynamic Range

-15 dBm to carrier detect threshold, 4 dB hysteresis

### Data Rate To Terminal

WA3451 mode: Asynchronous—1205 or 1220 bps; synchronous—1200 bps.

212A mode: 1220 bps.

103J mode: As transmitted.

### Clear-To-Send Delay

(After carrier detect)

WA3451 mode: 50  $\pm$  10 msec.

212A mode: 774  $\pm$  27 msec.

103J mode: 265  $\pm$  60 msec.

### LED Displays

TXD (Transmit Data), RXD (Receive Data), CTS (Clear To Send), DSR (Data Set Ready), CXR (Carrier Detect), DTR (Data Terminal Ready), HS (High Speed), and RI (Ring Indicator)

### Diagnostics

Idle Test, Analog Loopback/Busy Out, Digital Loopback (remote or local), and Self Test

### Ringer Equivalence Number

0.9B

### Receiver Carrier Frequencies

Mode	Answer	Originate
WA3451	2250 Hz $\pm$ 7 Hz	1150 Hz $\pm$ 7 Hz
212A	1200 Hz $\pm$ 7 Hz	2400 Hz $\pm$ 7 Hz
103J	1270 Hz $\pm$ 0.2% Mark 1070 Hz $\pm$ 0.2% Space	2225 Hz $\pm$ 0.2% Mark 2025 Hz $\pm$ 0.2% Space

### Input Data Rates

Mode	Synchronous	Asynchronous
WA3451	1200 bps $\pm$ 0.05%	1180 to 1204 bps or 1196 to 1219 bps (also any standard data rate 300 bps or less)
212A	1200 bps $\pm$ 0.05%	1182 to 1212 bps
103J	Not applicable	0 to 300 bps

### Receiver Carrier Detect Timing

Mode	Off-On	On-Off
WA3451	30 msec	280 msec
212A	231 to 308 msec	280 msec
103J	100 to 200 msec	280 msec

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# WANG

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