RACAL VADIC'S VI1222 1200 bps Full Duplex Modems
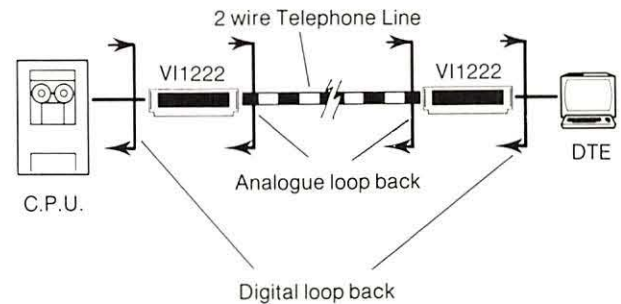
Operation

Modem VI1222 has a comprehensive range of diagnostic features for rapid pin-pointing of faults in point-to-point data links. Three test functions are easily selected by front panel push buttons. Analogue Loop (AL), and Digital Loop (DL) allow operators to loop back the line connection at the local modem and the DTE interface. The third test - Remote Loop (RL), loops data back from the remote modem without operator intervention.

When used in conjunction with the built-in test pattern generator and error detection circuitry selected by the front panel (ET) push button, or an external test set, it enables system faults to be isolated to the local modem, line or remote modem. Figure 2 shows how these tests are carried out.

Packaging

The Racal-Vadic VI1222 is combined on a dual printed circuit board assembly. All the controls and indicators are mounted on the edge of the card. This enables it to be housed in either a table top case measuring only 20 cm wide or, where space saving is a criterion, high density packaging is achieved with a new Racal-Vadic 19″ rack-mounting card
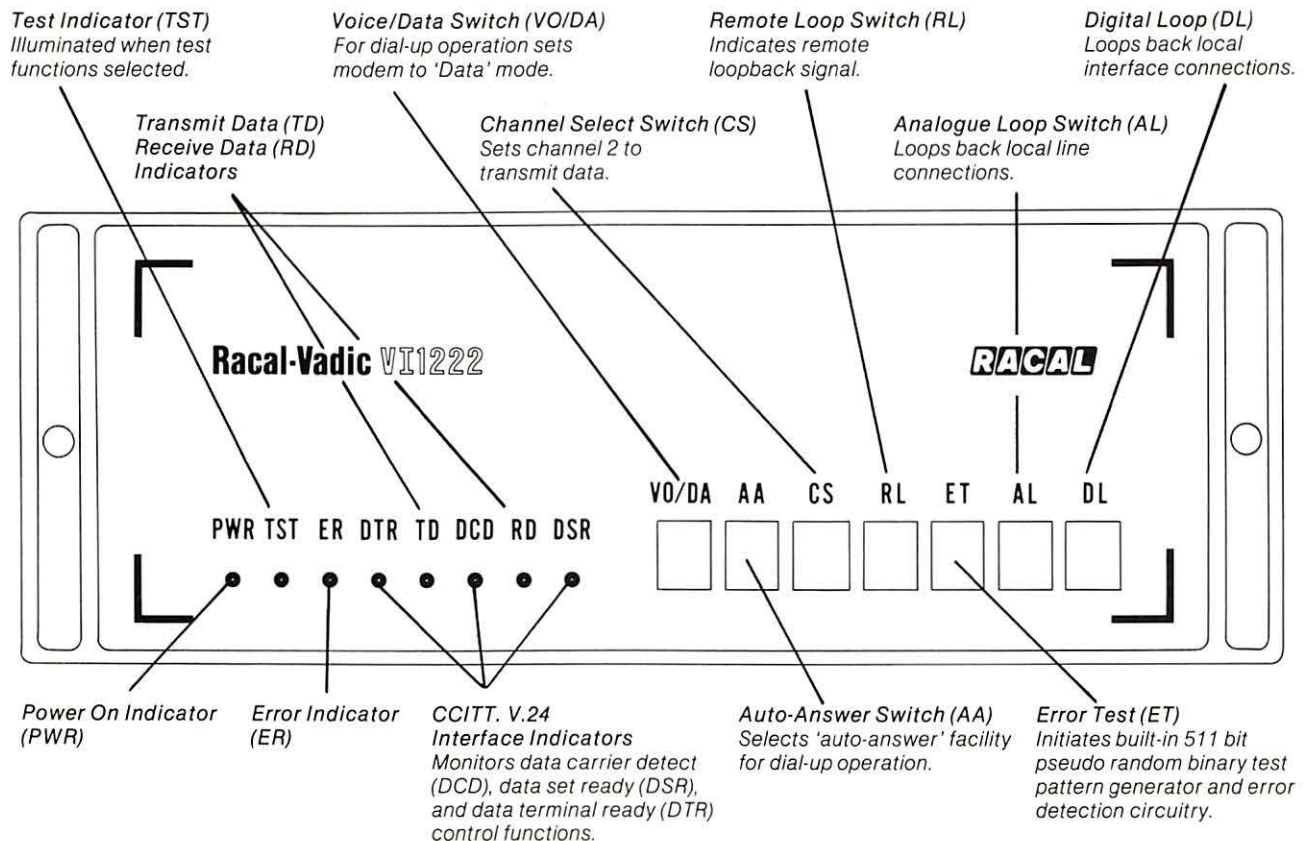
nest. This can accommodate up to 7 front loading modem cards with a front loading common power supply. An advantage is that the VI1222 can be intermixed with other Racal-Vadic modems in this new series. This adds even greater flexibility to Racal-Vadic's data communication capability.

Local analogue and local and remote digital loop back. Fig. 2

Controls and Indicators

All controls and indicators (light emitting diode type) are conveniently mounted on the front panel of the modem and are protected from inadvertent operation by a molded plastic bezel.

Test Indicator (TST)
Illuminated when test functions selected.

Voice/Data Switch (VO/DA)
For dial-up operation sets modem to 'Data' mode.

Remote Loop Switch (RL)
Indicates remote loopback signal.

Digital Loop (DL)
Loops back local interface connections.

Transmit Data (TD) Receive Data (RD) Indicators

Channel Select Switch (CS)
Sets channel 2 to transmit data.

Analogue Loop Switch (AL)
Loops back local line connections.

Racal-Vadic VI1222

RACAL

PWR TST ER DTR TD DCD RD DSR

VO/DA AA CS RL ET AL DL

Power On Indicator (PWR)

Error Indicator (ER)

CCITT. V.24 Interface Indicators
Monitors data carrier detect (DCD), data set ready (DSR), and data terminal ready (DTR) control functions.

Auto-Answer Switch (AA)
Selects 'auto-answer' facility for dial-up operation.

Error Test (ET)
Initiates built-in 511 bit pseudo random binary test pattern generator and error detection circuitry.

Major Benefits

- Conforms to all 3 alternatives of CCITT recommendation V.22

- Asynchronous Operation of 0 to 300 bps, 600 bps, and 1200 bps

- Synchronous Operation of 600 and 1200 bps

- Split Speed Operation

- Automatic Character Length Recognition

- Automatic Configuration Mode (No-option, option)

- Overspeed Recognition

- Full duplex operation over 2-wire "dial-up" or leased telephone circuits

- Low cost compact construction, table top and high density rack mounting versions

- CCITT recommendation V.22 alternatives A, B, and C

  Alternative A offers full duplex synchronous transmission at 600 bps and 1200 bps. Only useful in a limited number of specialized applications

  Alternative B adds full duplex asynchronous capability but limited to 600 bps and 1200 bps

  Alternative C adds another dimension. Alternatives A and B plus 0 to 300 bps full duplex operation. The advantages of alternative C are many

- Single modem will operate with any terminal at all standard asynchronous speeds

- Single modem will operate on all front ends with automatic speed recognition eliminating the need for split rotors

- Split speed operation for terminals and systems operating in an asymetrical mode such as "Viewdata" systems

- Overspeed operation for use with devices such as statistical multiplexors

- Automatic Character Length recognition which eliminates user confusion and potential service problems

- Automatic Configuration Mode (No-option option)

  A standard V.22 modem can be configurated using a wide range of options. Both the customer and the serviceman are required to have a significant knowledge of both ends of the system to insure proper operation

  The VI1222, utilizing alternative C eliminates most of the above problems with a "No-option, option" which satisfies most user applications

  The utilization of this option forces the setting of several switches regardless of their actual position. In the No-option mode the following functions are set:

  a. Abort Timer - enabled

  b. Loss of Carrier Disconnect - enabled

  c. Circuit 108/2 enabled

  d. Asynchronous Mode

  e. 1200 bps and 0 to 300 bps operation

  f. Normal data range

  g. Originate and answer modes

  h. Answer tone enabled

  i. Alternative C mode V

  j. 9 or 10 bit characters, automatically selected

Technical Specifications

Configurations: V.22, alternatives A, B, or C strap selectable

Operating Modes:
Mode i:	1200 bps, synchronous
Mode ii:	1200 bps, asynchronous
Mode iii:	600 bps, synchronous
Mode iv:	600 bps, asynchronous
Mode v:	1200 bps, asynchronous, 0-300 bps, asynchronous

Alternative Modes:
- A: modes i, iii
- B: modes i, ii, iii, iv
- C: modes i, ii, iii, iv, v

Transmission Characteristics

Data: Binary, serial, synchronous or 8, 9, 10 or 11 bit characters asynchronous

Data Rate: 1200, 600, Or 0-300 bps depending on options and mode selected

Mode: Full or Half Duplex

Line Interface: Switched (dial-up) Network or 2 wire leased line. 4 wire leased line available with external adapter

Modulation: Differential Phase Shift Keying (DPSK)

Transmitter:

Frequency: Low Channel, 1200 HZ ± 0.12 HZ
High Channel, 2400 HZ ± 0.24 HZ

Level: 0 to −15 dBm ± 1 dB, switch selected in 1 dB steps

Answer Back Tone: 2100 HZ ± 15 HZ

Guard Tone: 1800 HZ or 550 HZ strap selectable

Receiver:

Frequency: Low Channel, 1200 HZ ± 0.12 HZ
High Channel, 2400 HZ ± 0.24 HZ

Carrier Detect Threshold: OFF to ON − 42 dBm
ON to OFF − 49 dBm

Carrier Detect Timing: OFF to ON − 105 to 205 msec
ON to OFF − 10 to 24 msec

Dynamic Range: 35 dB

Hysterists: >2.0dB, no equalizer
>0.5dB, with amplitude equalizer

Line Connection Options

1. Switched Network, two-wire line.
2. Leased Line, two-wire.
3. Switched Network through Automatic Calling Unit.
4. Leased Line, four-wire, through External Adapter.

Switched Network Connect Modes

Manual Originate
Manual Answer
Automatic Originate, with external ACU
Automatic Answer

Disconnects:
DTR 108/2 Off
Abort Timer (switch selectable)
Loss of Carrier Disconnect (switch selectable)

Test Facilities:
Local Loopback, Analog (CCITT loop 3)
Local Loopback, Digital (CCITT loop 2, local)
Initiate Remote Digital Loopback (CCITT loop 2, remote)
Respond to Digital Loop Command (switch selectable)
Error Test

Front Panel:
Controls
VO/DA - Voice/Data Select
AA - Manual/Automatic Mode Select
CS - Channel Select
RL - Initiate Remote Test
ET - Error Test
AL - Local Analog Loopback
DL - Local Digital Loopback

Front Panel:
Displays
PWR - Power
TST - Test Mode
ER - Error
DTR - Data Terminal Ready (108/2)
TD - Transmit Data
DCD - Received Line Signal Detector
RD - Receive Data
DSR - Data Set Ready (107)

Power Requirements:
Voltage
24Vrms with center-tap
18Vrms with center-tap

Power:
10 watts maximum

Operating Environment:
Altitude	0 to 3000 meters (0 to 10,000 ft.)
Temperature	
Operating	0 to 50 degrees centigrade
Storage	−20 to +70 degrees centigrade
Humidity	90% non-condensing

No-Option Option:
This is a fixed mode in which the modem defaults to to these conditions.

Abort Timer Enabled
Loss of Carrier Disconnect Enabled
Circuit 108/2 Enabled
Asynchronous Mode
Automatic Character Selection, 9 or 10 bits
Answer Tone Enabled
Automatic Answer, Manual Originate, Manual Answer
Normal Data Range
1200 bps and 0-300 bps Operation

NOTE: Automatic character length detection is possible in Alternative C, mode V.

Size and Weight:

	Table Top (1½ units)	Card Nest (5 units)
Height:	70 mm (¾ in.)	222.0 mm (8¾ in.)
Width:	203.0 mm (8 in.)	483.0 mm (19 in.)
Depth:	343.0 mm (13½ in.)	368.0 mm (14½ in.)
Weight:	2.26 kg (5lb)	11.5 kg (27 lb)

Applications & Diagnostics

Modem VI1222 is one of a new generation of medium speed modems from Racal-Vadic. It is microprocessor controlled, offering superior performance at synchronous or asynchronous data speeds up to 1200 bit/s and operating in full duplex mode over two wire dial-up (PSTN) or leased lines. This is achieved using di-bit phase shift keying (DPSK) techniques in compliance with CCITT V22 recommendations.

Modem VI1222 is contained on a dual printed circuit card assembly with edge mounted controls and indicators enabling the modem to be packaged either in an attractive, extremely compact, but rugged table top case — 4.45 cm in height and 20 cm wide or in a standard 19 inch rack mounting card nest, housing up to 7 modems with a common front loading power supply.

Built in as a standard feature is an "auto-answer" capability which enables a "called" modem on a dial-up circuit to connect itself automatically to line on receipt of a ringing signal from the "calling" modem site — no manual intervention is required.

The same exacting standards of design, manufacture and quality assurance that have earned Racal-Vadic a worldwide reputation for the quality and reliability of its range of low & medium speed data communications equipment, are applied to the production of the Modem VI1222. High reliability, compact design and low power consumption is achieved with the aid of the latest microcircuit technology including LSI (large scale integration) techniques and microprocessor control.

Applications

The VI1222 offers two wire, full duplex operation to meet the requirements of PTT's (postal, telegraph and telephone authorities) and end users. It is suitable for direct connection to the switched network and provides both manual and automatic answer facilities over point-to-point and multidrop networks.

Another application of the VI1222 is that illustrated below in Figure 1, where four low speed asynchronous CPU ports are combined and extended to a remote location using time division multiplexers. The remote multiplexer's low speed channels are further extended by VI1222 modems to distant terminals.

Modem VI1222 operates synchronously or asynchronously at speeds up to 1200 bit/s over 2 wire dial-up (PSTN) or leased telephone circuits.

Dial-Up

Using the PSTN (Public Switched Telephone Network) an Operator wishing to establish a data link, simply dials the modem at the remote site. The call is answered either manually by an operator using the remote telephone handset or automatically by the remote modem with a built-in "auto-answer" facility. In the case of manual answering the "calling" operator agrees with the "called" operator which channel (CS) Channel 1 or Channel 2 is to be used for transmission and which for reception of data. Both modems are then set to the data mode using the VOICE/DATA (VO/DA) button on the front panel.

Communication can then commence. With "auto-answer" selected the remote modem automatically selects Channel 1 to receive data and Channel 2 to transmit. It then connects itself to the telephone line and finally transmits an appropriate signal to the "calling" operator to signify that it is ready to commence communication. The "calling" operator then sets the local modem to the data mode using the VOICE/DATA (VO/DA) switch on the modem.

Leased Line

For use with "leased" telephone circuits a permanent connection is established and the AUTO/MANUAL data access is inoperative. Appropriate channel selection is achieved by either the front panel Channel Select button (CS) or by a selected DTE interface control signal.
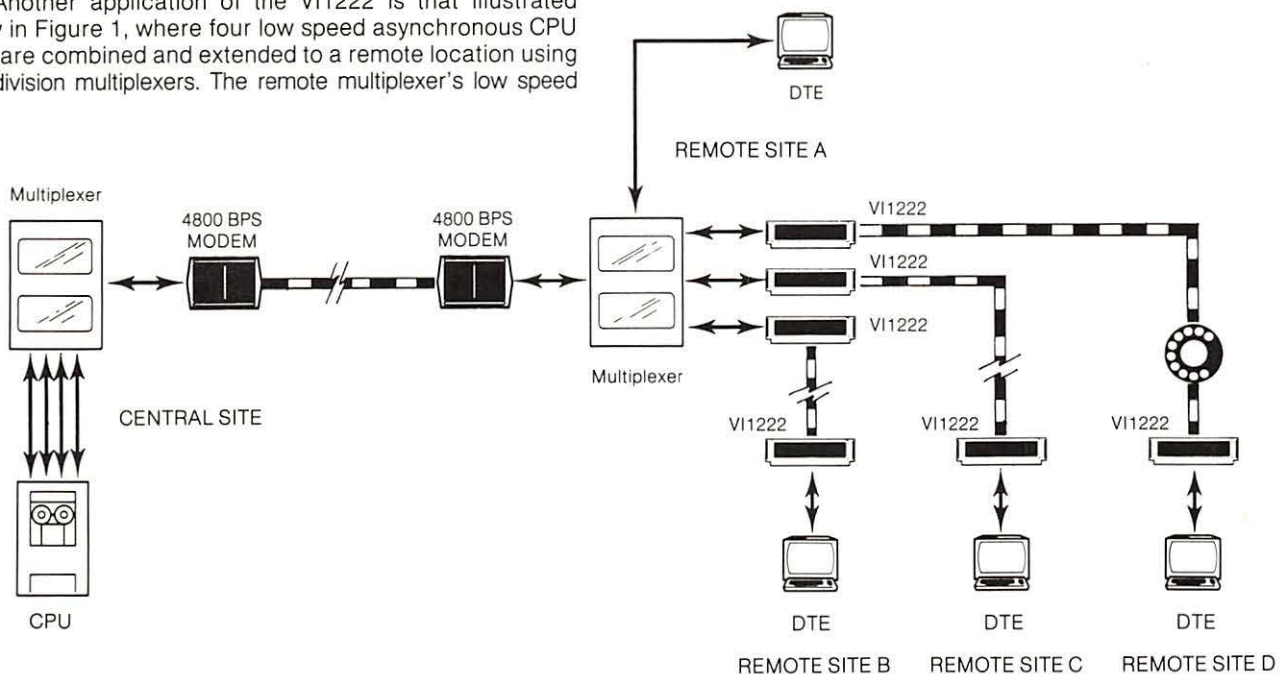
Ordering Information

Ordering Information

When ordering VI1222, it is necessary to specify:

Packaging required:
1. Table top
2. Card modem in new Racal-Vadic card nest 222 mm (8¾ in.) high, 25.4 mm (1 in.) pitch.

Note: Up to 7 card modems may be housed in a single card nest.

Operating voltage:
1. 230 volts
2. 115 volts

Input/Output Connections - V.24

Pin	CCITT No.	Function	Direction To
2	103	Transmit Data	DCE
3	104	Received Data	DTE
4	105	Request to Send	DCE
5	106	Ready for Sending (CTS)	DTE
6	107	Data Set Ready (DSR)	DTE
7	102	Signal Ground	---
8	109	Receive Line Signal Detect (DCD)	DTE
9	---	Positive Supply Voltage via Register	DTE
10	---	Negative Supply via Voltage via Register	DTE
11	126	Channel Select	DCE
15	114	Transmitter Clock	DTE
17	115	Receiver Clock	DTE
18	140	Remote Loopback	DCE
20	108	Data Terminal Ready (DTR)	DCE
21	141	Local Loopback	DCE
22	125	Calling Indicator	DTE
23	111	Data Rate Selector	DCE
24	113	External Transmit Clock	DCE
25	142	Test Indicator	DTE

Interface signal levels comply with recommendations CCITT V.28 and RS233C.

Note: Circuits 140 and 141 are mutually exclusive.