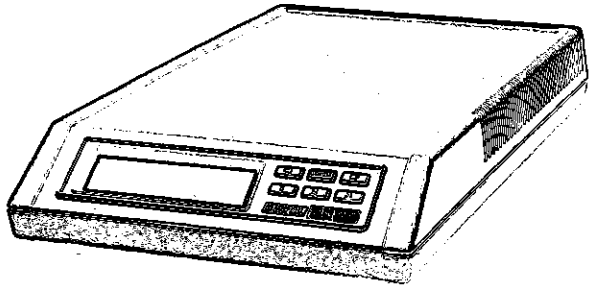


- **V.32bis/Bell 208 autodetect**
- **Network management with CMS®**
- **Full-duplex from 75 to 14,400 bps**
- **Auto/manual password security**
- **V.13 half-duplex emulation**
- **Supports DTE speeds up to 57,600 bps**
- **Dial or leased lines with Auto-Recovery**
- **Stores up to 50 phone numbers**
- **V.42/V.42bis and MNP® Class 1-5**
- **Remote unit control**
- **Residential/home user certification**

Full-Featured V.32bis Solution

The Racal-Datacom™ ALM 3223 is the first in a series of high-speed, slim-line V.32bis modems...the clear choice when it comes to performance, flexibility, and features. Its compliance with the V.32bis standard allows you to significantly reduce your line costs and response times. Which is why V.32bis-based modems are today's most popular choice for dial-up networks.

The ALM 3223 offers advanced network management and a security system that protects your network against unauthorized access with your choice of automatic, callback, or passthrough security modes.

The versatile ALM 3223 modem can operate over dial-up lines at speeds from 75 to 14,400 bits per second (bps) and over leased lines (2- or 4-wire) at speeds from 2400 to 14,400 bps. And the modem supports DTE speeds up to 57,600 bps — allowing superior throughput when combined with V.42bis or MNP Class 5 data compression. The ALM 3223 comes standard with automatic dialing and answering, automatic recovery from failed dial or leased lines, V.13 half-duplex emulation, and remote unit control. In addition, V.42 error correction ensures that your data arrives at its destination error-free.

Non-Interruptive Network Management

The state of the art Communications Management Series (CMS®) network management system lets you control, monitor, and report on over 32,000 modems — located anywhere in the world — from a single location. This multi-user, multi-tasking system provides real-time device monitoring, alarm gathering, advanced testing procedures, and statistical reports on network operation.

CMS network management features an icon-driven Microsoft Windows and X-Windows/Motif human interface along with multi-user functionality. Extensive automation provides auto-recovery of most managed devices and scripted execution of most functions. Activities can be scheduled by time of day or triggered by a specific event. CMS is compatible with networks using Ethernet or Token Ring, as well as computer environments using DOS, OS/2, and Unix.

Worldwide Compatibility

The ALM 3223 offers worldwide high-speed compatibility and coverage, based on its compliance with V.32bis and V.33 recommendations. In addition, its compliance with a wide array of lower speed standards lets your system migrate cost-effectively to the higher speeds.

The modem can operate in synchronous or asynchronous mode at line speeds from 600 to 14,400 bps. The following standards are supported:

- V.32bis at 14,400, 12,000, 9600, 7200, and 4800 bps
- V.32 at 9600 and 4800 bps
- Extended V.32 at 14,400 and 12,000 bps
- V.33 at 14,400 and 12,000 bps (leased lines only)
- V.23 at 1200/75 bps (async only)
- V.22bis at 2400 bps
- V.22 at 1200 and 600 bps
- V.21 at 0-300 bps (async only)
- Bell 208A/B at 4800 bps
- Bell 212A at 1200 bps
- Bell 103 at 0-300 bps (async only)

Trellis-Coded Modulation

When operating in V.32 mode, the ALM 3223 employs a trellis-coded modulation scheme with forward error detection and correction to provide reliable high-speed data transmission. The modem's sophisticated adaptive echo canceling technology effectively cancels both near- and far-end echoes...eliminating noise that can impair communication. In addition, the modem provides an automatic adaptive equalizer and four user-selectable compromise equalizers to help you maintain error-free communication through a wide variety of phone line impairments that can occur.

Industry-Standard AT Command and V.25bis-Compatible Autodialing

When the AT-compatible autodialer is selected, the ALM 3223 emulates a Hayes modem, allowing it to interface with computers running communications software based on the AT command set. When set for V.25bis autodialing, the modem uses serial automatic calling to establish dial line connections in both synchronous and asynchronous applications.

Auto-Recovery for Dial and Leased Lines

The ALM 3223 provides an Auto-Recovery feature that operates in both dial and leased line applications. In dial line applications, if the line is disconnected unintentionally, the modem automatically redials the call to restore communication. This feature emulates the reliability of a leased line connection. In leased line applications, if the line deteriorates excessively, the modem automatically places a dial line call to restore communication. It then periodically monitors the condition of the leased lines and automatically switches communication back when they are restored.

V.54 Diagnostics

A full set of ITU-T V.54 diagnostic tests enables you to quickly isolate the source of network faults. Available tests include Analog Loopback, Digital Loopback, Remote Digital Loopback, self-tests, and VF level measurements. The modem also contains an X-Y eye pattern generator that lets you visually monitor the received analog signal on a standard oscilloscope.

V.42 Error Correction

The ALM 3223 uses the V.42-specified methods of error-correction (LAP-M and MNP Classes 2-4) to ensure virtually error-free data transmission. This feature enables the modem to detect errors in the received data, and automatically request retransmission until the data is received correctly. During the initial handshake, the calling and answering modems automatically negotiate the highest common level of error correction.

V.42bis and MNP Class 5 Data Compression

For maximum data throughput on an asynchronous transmission link, the ALM 3223 offers both V.42bis and MNP Class 5 data compression. The V.42bis method provides up to 4 to 1 compression, while MNP Class 5 provides up to 2 to 1 compression. With data compression, your DTEs can transmit at their maximum speeds, allowing you to significantly reduce your line costs. The type of data compression used depends on the error correction level negotiated — V.42bis is used with LAP-M; MNP Class 5 is used with MNP Classes 2-4.

Supports DTE Speeds to 57,600 bps

The ALM 3223 can communicate with the DTEs at speeds from 75 bps to 57,600 bps. This allows you to achieve maximum data throughput when using the modem's data compression feature.

V.13 Half-Duplex Emulation

The ALM 3223 can be configured for ITU-T V.13 half-duplex emulation in both point-to-point and multidrop networks. This feature allows 14,400 bps transmission in a half-duplex point-to-point network without having to reprogram the network. This feature is also designed for applications that require control of a remote Data Carrier Detect (DCD) signal by the local Request-to-Send (RTS) signal (such as dial backup of multidrop networks).

Automatic and Manual Password Security

It's a fact. High tech thievery happens frequently. Hackers break into networks and steal or corrupt valuable data. The losses can be devastating. Today, it's essential that you have control over network access. The ALM 3223 offers both automatic and manual modes of password security to prevent unauthorized user access.

With automatic password security, each time the modem receives a call, it performs a security handshake with the calling modem. Users do not have to enter a password since both modems have been configured to use the same password in the security handshake.

During this handshake, the calling modem sends its password through the auxiliary channel to the answering modem. The answering modem permits the connection only if the password it receives matches its own password. Because the password is included in the handshake, the user doesn't have to perform any additional steps when placing the call.

You can use automatic password security in both synchronous and asynchronous applications. It works only between the ALM 3223 and other Racal-Datacom modems that support this feature.

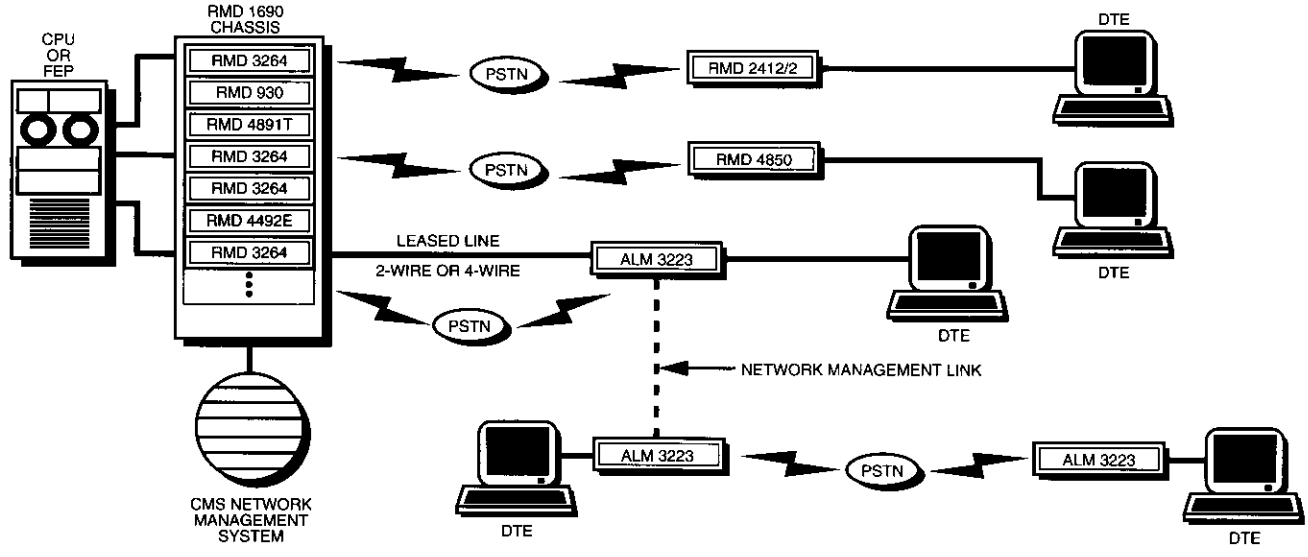
With manual password security, remote users attempting to connect to the ALM 3223 are required to enter a password. Incoming calls are accepted only if the user enters a valid password. This feature is compatible with any type of modem (V.32, V.22bis, Bell 212). Manual-response password protect is available in AT command mode only.

Bell 208B Auto Detect

This feature allows the ALM 3223 modem to automatically detect, during the handshake, whether the calling modem is V.32/V.32bis or Bell 208B. The modems connect appropriately after the answering modem determines the type of calling modem. Bell 208B modems use a 2-wire, half-duplex technique providing synchronous data transfer at 4800 bps. V.32/V.32bis modems use a 2-wire, full-duplex modulation with V.13 half-duplex simulation. This feature allows the host CPU or front end to be configured for half-duplex synchronous operation.

FCC Class B Certification

Due to the proliferation of personal computers, more employees are using their houses as their offices. Therefore, it is becoming more and more necessary that the data communications product be certified to legally work in a residence in addition to a business. Because the ALM 3223 has both A and B certifications, you can use it in either urban or suburban environments.



TYPICAL ALM 3223 NETWORK MANAGEMENT APPLICATION

Technical Specifications

	Modem	
Line Requirements	Operates full duplex over 2-wire dial lines, or over 2- or 4-wire unconditioned leased lines	
Line Speeds	Synchronous	14,400, 12,000, 9600, 4800, 2400, 1200, and 600 bps
	Asynchronous	14,400, 12,000, 9600, 7200, 4800, 2400, 1200, 300, and 1200/75 bps; 9, 10, or 11 bit word
DTE Speeds	Selectable from 75 to 57,600 bps	
Modulation Technique	Quadrature Amplitude Modulation (QAM) at 14,400, 12,000, 9600, 7200, and 4800 bps (trellis coded at 14,400 and 12,000 bps; trellis coded or non-coded at 9600 and 7200 bps)	
	QAM at 2400 bps; bandsplit, full duplex	
	DPSK at 1200 bps; bandsplit, full duplex	
	FSK at 1200/75 and 300 bps; bandsplit, full duplex	
Standards Supported	V.54, V.42bis, V.42, V.32bis, V.32, V.28, V.25bis, V.25, V.24, V.23, V.22bis, V.22, V.21, V.14, V.13, Bell 208 A/B, Bell 212A, Bell 103, MNP classes 1-5, ATPlus command set	
Dial Channel Separation	Echo cancellation in V.32/V.32bis modes; half-duplex in Bell 208B mode; bandsplit in all other modes	
Digital Interface	EIA RS-232E, ITU-T V.24/V.28	
Dial Line Interface	Dial-up RJ-45 or RJ-11 modular connector with A/A1 and MI/MIC control	
Leased Line Interface	RJ-45 (JM8) type modular connector	
Transmit Level	Permissive: -10 dBm; Programmable: 0 to -12 dBm; Leased line: 0-15 dBm	
	Dial-Up Line	**Leased Line**
Carrier Detect Threshold	-51, -41, and -34 dBm, selectable	-26, -33, and -43 dBm, selectable
Power Requirements	Domestic Model	108 to 132 VAC, 60 Hz ±10%
	International Model	178 to 264 VAC, 50 Hz ±5%
Operating Temperature	32° to 122° F (0° to 50° C) ambient	
Storage Temperature	-4° to 158° F (-20° to 70° C)	
Relative Humidity	5 to 95%, noncondensing	
Physical Specifications	Height	1.5" (3.81 cm)
	Width	5.75" (14.6 cm)
	Depth	10.25" (26.04 cm)
	Weight	1.5 lbs (0.69 kg)
Compliance/Approvals	U.S./Canada	FCC Parts 15B and 68, CSA, CDOC, UL approved
	International	Germany, U.K., Netherlands, Denmark, Sweden, Latin America, Spain, Belgium, New Zealand, Taiwan, France, and various Asian territories

Our policy of continuous development may cause the information and specifications contained herein to change without notice.

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Racal-Datacom™

USA/Canada	305-846-1601 or 1-800-RACAL-55	France	33-14933-5800
		Italy	39-331-426111
United Kingdom	256-763911	Hong Kong	852-815-8633
Germany	49-6102-2020	Singapore	65-779-2200
Netherlands	31-15-698282	New Zealand	649-520-4309
Belgium	32-2725-3450	Australia	612-963-7000

Racal-Datacom has achieved international certification for quality through ISO 9002 registration.

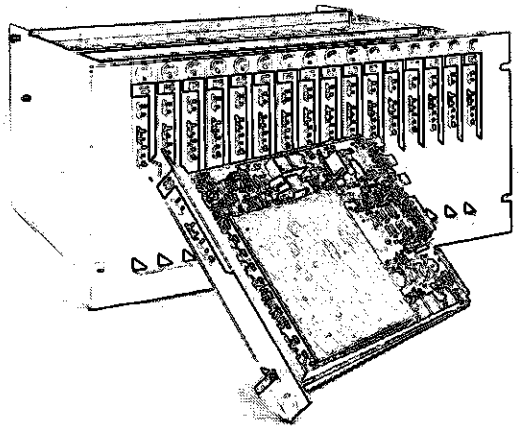
Certification number FM26783

RACAL

3C1215 8/94 – 9803

ALM 3223 CS and ALM 1623

V.32bis Modem Card and Card Nest



- **Full-duplex from 75 to 14,400 bps**
- **Supports DTE speeds up to 57,600 bps**
- **CMS® network management support**
- **Dial or leased lines with Auto-Recovery**
- **V.42/V.42bis and MNP Class 1-5**
- **Auto/manual password security**
- **V.13 half-duplex emulation**
- **16 modems per ALM 1623 chassis**
- **5 chassis daisy-chained in one 6-foot rack**
- **Various power options**

Full-Featured V.32bis System Solution

The ALM 3223 Central Site (CS) joins the series of Racal-Datacom high-speed V.32bis modems...the clear choice when it comes to performance, flexibility, and features. Its compliance with the V.32bis standard allows you to significantly reduce your line costs and response times. Which is why V.32bis-based modems are today's most popular choice for dial-up networks.

The ALM 3223 CS offers advanced network management and a security system that protects your network against unauthorized access with your choice of automatic, call-back, or passthrough security modes.

The versatile ALM 3223 CS modem can operate over dial-up lines at speeds from 75 to 14,400 bits per second (bps) and over leased lines (2- or 4-wire) at speeds from 2400 to 14,400 bps. It supports DTE speeds up to 57,600 bps — allowing superior throughput when combined with V.42bis or MNP Class 5 data compression. The ALM 3223 CS comes standard with automatic dialing and answering, automatic recovery from failed dial or leased lines, V.13 half-duplex emulation, and remote unit control. Combine these features with V.42 error correction so your data arrives at its destination error-free and V.42bis or MNP 5 data compression for the superior throughput you need for your data communications.

Space-Saving High-Density Design

Designed for central-site locations, the space-saving ALM 3223 CS allows you to install up to 16 modems in one ALM 1623 High-Density Card Nest. Each modem can be controlled independently using a VT terminal or the Communications Management Series (CMS®) system. Eight LEDs give you constant status information.

You can daisy-chain up to five card nests in one 6-foot rack. This allows you to configure up to 80 central site modems through the card nest control port.

Superior Network Management

The state-of-the-art CMS network management system lets you control, monitor, and report on over 32,000 modems — located anywhere in the world — from a single location. This multi-user, multi-tasking system provides real-time device monitoring, alarm gathering, advanced testing procedures, and statistical reports on network operation.

Because it is multi-tasking, multiple users can perform different jobs at the same time. For example, while one user configures a remote ALM 3223 without disrupting data transmission, another user can transparently monitor chassis status from another console.

Trellis-Coded Modulation

When operating in V.32bis mode, the ALM 3223 CS employs a trellis-coded modulation scheme with forward error detection and correction to provide reliable high-speed data transmission. The modem's sophisticated adaptive echo canceling technology effectively cancels both near- and far-end echoes...eliminating noise that can impair communication. In addition, the modem provides an automatic adaptive equalizer and four user-selectable compromise equalizers to help you maintain error-free communication through a wide variety of phone line impairments that can occur.

Multistandard & Worldwide Compatibility

The ALM 3223 CS offers worldwide high-speed compatibility and coverage, based on its compliance with V.32bis and V.33 recommendations. In addition, its compliance with a wide array of lower speed standards lets your system migrate cost-effectively to the higher speeds.

The modem can operate in synchronous or asynchronous mode at line speeds from 600 to 14,400 bps. The following standards are supported:

- V.32bis at 14,400, 12,000, 9600, 7200, and 4800 bps
- V.32 at 9600 and 4800 bps
- Extended V.32 at 14,400 and 12,000 bps
- V.33 at 14,400 and 12,000 bps (leased lines only)
- V.23 at 1200/75 bps (async only)
- V.22bis at 2400 bps
- V.22 at 1200 and 600 bps
- V.21 at 0-300 bps (async only)
- Bell 212A at 1200 bps
- Bell 103 at 0-300 bps (async only)

V.42 Error Correction

The ALM 3223 CS uses the V.42-specified methods of error-correction (LAP-M and MNP Classes 2-4) to ensure virtually error-free data transmission. This feature enables the modem to detect errors in the received data, and automatically request retransmission until the data is received correctly. During the initial handshake, the calling and answering modems automatically negotiate the highest common level of error correction.

V.42bis and MNP Class 5 Data Compression

For maximum data throughput on an asynchronous transmission link, the ALM 3223 CS offers both V.42bis and MNP Class 5 data compression. The V.42bis method provides up to 4 to 1 compression, while MNP Class 5 provides up to 2 to 1 compression. With data compression, your DTEs can transmit at their maximum speeds, allowing you to significantly reduce your line costs. The type of data compression used depends on the error correction level negotiated — V.42bis is used with LAP-M; MNP Class 5 is used with MNP Classes 2-4.

AT Commands and V.25bis-Compatible Autodialing

When the AT command-compatible autodialer is selected, the ALM 3223 CS emulates a Hayes® modem, allowing it to interface with computers running communications software based on the industry standard "AT" command set. When set for V.25bis autodialing, the modem uses serial automatic calling to establish dial line connections in both synchronous and asynchronous applications.

Auto-Recovery for Dial and Leased Lines

The ALM 3223 CS provides an Auto-Recovery feature that operates in both dial and leased line applications. In dial line applications, if the line is disconnected unintentionally, the modem automatically redials the call to restore communication. This feature emulates the reliability of a leased line connection. In leased line applications, if the line deteriorates excessively, the modem automatically places a dial line call to restore communication. It then monitors the condition of the leased lines and automatically switches communication back when they are restored.

V.54 Diagnostics

A full set of V.54 diagnostic tests enables you to quickly isolate the source of network faults. Available tests include Analog Loopback, Digital Loopback, Remote Digital Loopback, self-tests, and VF level measurements. The modems also contain an X-Y eye pattern generator that lets you visually monitor the received analog signal on a standard oscilloscope.

V.13 Half-Duplex Emulation

The ALM 3223 CS can be configured for ITU-T V.13 half-duplex emulation in point-to-point networks. This feature allows 14,400 bps transmission in a half-duplex point-to-point network without having to reprogram the network. This feature is also designed for applications that require control of a remote Data Carrier Detect (DCD) signal by the local Request-to-Send (RTS) signal (such as dial backup of multidrop networks).

Various Power Options

There are three power options available with the ALM 1623 card nest. The AC power unit provides either 115 or 230 Volts AC. The -48 VDC power unit is a proprietary DC-to-DC converter that works on the switched node principle.

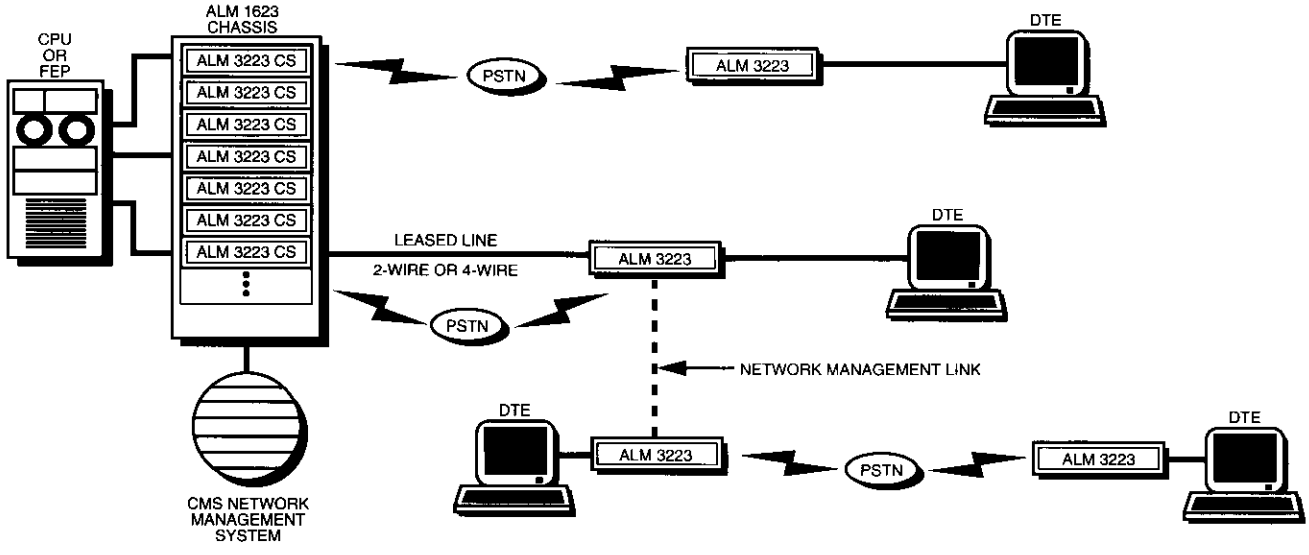
Automatic and Manual Password Security

It's a fact. High-tech thievery happens frequently. Hackers break into networks and steal or corrupt valuable data. The losses can be devastating. Today, it's essential that you have control over network access. The ALM 3223 CS offers both automatic and manual modes of password security to prevent unauthorized user access.

With automatic password security, each time the modem receives a call, it performs a security handshake with the calling modem. During this handshake, the calling modem sends its preprogrammed password through an auxiliary channel to the answering modem. The answering modem permits the connection only if the password it receives matches its own preprogrammed password.

Because the password is included in the handshake, the user doesn't have to perform any additional steps when placing the call. You can use automatic password security in both synchronous and asynchronous applications.

With manual password security, remote users attempting to connect to the ALM 3223 CS are required to enter a password. Incoming calls are accepted only if the password is valid. This feature is compatible with any type of modem (V.32, V.22bis, Bell 212, etc.). Manual-response password protection is available in AT command mode only.



NETWORK MANAGEMENT APPLICATION - THE CMS SYSTEM CONTROLS ALL CENTRAL ALM 3223 CS AND REMOTE ALM 3223 MODEMS IN THE NETWORK

ALM 3223 CS and ALM 1623

V.32bis Modem Card and Card Nest

Technical Specifications

Line Requirements	Operates full duplex over 2-wire dial lines or full-duplex over 2-wire or 4-wire unconditioned leased lines	
Line Speeds	Synchronous	14,400, 12,000, 9600, 7200, 4800, 2400, and 1200 bps
	Asynchronous	14,400, 12,000, 9600, 7200, 4800, 2400, 1200, 300, and 1200/75 bps; 9, 10, or 11 bit code
DTE Speeds	Selectable from 75 to 57,600 bps	
Modulation Technique	Quadrature Amplitude Modulation (QAM) at 14,400, 12,000, 9600, 7200 and 4800 bps (trellis coded at 14,400 and 12,000 bps; trellis coded or non-coded at 9600 and 7200 bps; and non-coded at 4800 bps). QAM at 2400 bps; bandsplit, full duplex.	
	DPSK at 1200 bps; bandsplit, full duplex	
	FSK at 1200/75 and 300 bps; bandsplit, full duplex	
Standards Supported	V.32bis, V.32, V.23, V.22bis, V.22, V.21, Bell 212, and Bell 103 (Bell 208 - Future)	
Network Management Support	Line speeds of 9600 bps and above	
Channel Separation	Echo cancellation in V.32/V.32bis	
Digital Interface	EIA RS-232E, ITU-T V.24/V.28	
Dial Line Interface	Dial-up RJ-45 or RJ-11 modular connector with A/A1 and MI/MIC Control	
Leased Line Interface	RJ-45 modular connector	
Transmit Level	Permissive: -10 dBm; Programmable: 0 to -12 dBm; Leased line: 0-15 dBm	
	Dial-Up Line	**Leased Line**
Carrier Detect Threshold	-51, -41, -and -34 dBm, selectable	-26, -33, and -43 dBm, selectable
	ALM 1623 Card Nest	**ALM 3223 CS**
Power Requirements	Domestic: 104 to 132 VAC, 60 Hz ±5% International: 178 to 264 VAC, 50 Hz ±5%	108 to 132 VAC, 60 Hz ±10% 178 to 264 VAC, 50 Hz ±5%
Operating Temperature	32° to 122° F (0° to 40° C) ambient	
Storage Temperature	-4° to 158° F (-20° to 70° C)	
Relative Humidity	5 to 95%, non-condensing	
Physical Specifications	Height	1.5" (3.81 cm)
	Width	5.75" (14.6 cm)
	Depth	10.25" (26.04 cm)
	Weight	1.5 lbs (0.69 kg)
Compliance/Approvals	FCC Parts 15A and 68, CSA, CDOC, UL, and BABT approved	

Our policy of continuous development may cause the information and specifications contained herein to change without notice.

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Germany	49-6102-2020	Singapore	65-779-2200
Netherlands	31-15-698282	New Zealand	649-520-4309
Belgium	32-2725-3450	Australia	612-963-7000

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