

High Speed, High Density Modems

Highlights

- High-speed access for remote LAN, Internet, and modem pooling applications
- High density, rackmount packaging for installation in a wide variety of GDC shelves and enclosures
- Data speeds up to 33.6 Kbps with up to 128 Kbps throughput
- GDC's built-in Steadfast Password and Handshake Security features protect your critical applications
- Optional RADIUS feature provides authentication for dial-in users (co-located SCM card required).
- Optional AES Encryption feature encrypts data (async only) at both ends of the network
- Optional Secure Access Modem feature supports the Secure Access Controller system which sets up a secure tunnel for AES encrypted data to authenticated users.
- Intuitive SNMP management; Flash memory

Overview

GDC's SpectraComm Dual V.34 device provides two high performance V.34 modems with autodial and autoanswer for switched network operation. Ideal for modem pooling, remote LAN access, Internet access, and other applications, the unit transmits synchronous or asynchronous data at speeds up to 33.6 Kbps over dial-up or 2-wire private lines. The V.34 modulation and V.42/V.42bis error correction and compression achieve effective throughput of up to 64 Kbps in synchronous, and 128 Kbps in async applications.

Setting the Standard

The SpectraComm Dual V.34 supports V.34, V.32 bis, V.32, V.22 bis, V.22, V.21, Bell 212A and Bell 103 standards, providing for maximum connectivity and operational flexibility. The SpectraComm Dual V.34 provides V.34 and slower standard speeds through a powerful Digital Signal Processor-based (DSP) platform.

Using AutoRate Renegotiation, it dynamically adjusts operating rates to compensate for switched network line impairments, for superior performance, even over PSTN circuits that may vary in quality. You can use the public network to support high speed applications (e.g., remote LAN or Internet access) that in the past would have required more reliable, but often less economical, dedicated links.

Scalable and Flexible Connectivity

The SC Dual V.34 modem is a 7-inch by 9.5-inch (178 mm by 241 mm) printed circuit card that conforms to GDC's SpectraComm format (Figure 1). As part of the SpectraComm family of products, NEBS-compliant SC Dual V.34 installs in any GDC shelf or enclosure: the 2-slot SC2000 shelf or, for higher density applications, the 16-slot SC5000 shelf. For standalone, non-NEBS CPE applications, the modem installs just as easily in the single-slot SpectraComm AD or DC standalone enclosures. This "Spectra-Commonality" makes a manageable, scalable environment that accommodates your network's needs.

Figure 1: SPECTRACOMMONALITY:

Same Card - Many Installation Options

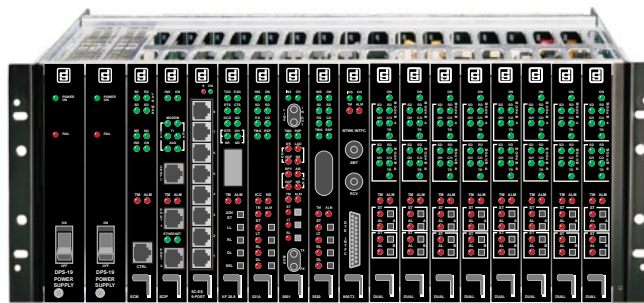


SC Dual V.34 in a SpectraComm Standalone Enclosure (1-Slot)

Two SC Dual V.34 modems in a SC 2000 Shelf (2-Slots)



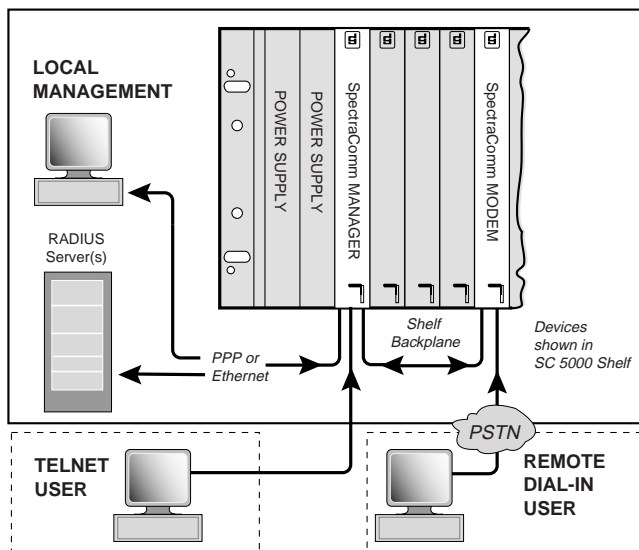
SC 5000 Shelf (16-Slots)



Power Supplies SCM Compatible SpectraComm Cards SC Dual V.34 Modem Cards

Features & Benefits

- Integral synchronous/asynchronous operation: Synchronous DTE rates to 33.6 kbps, Asynchronous DTE rates to 128 kbps.
- 2-wire, full-duplex, switched network operation using permissive transmit level.
- 2-wire private line operation, with selectable transit level.
- Automatic VF line rate determination in V.34 and V.32 bis modes, with fallforward/fallback.
- V.42/MNP error control.
- V.42 bis/MNP-5 asynchronous data compression.
- Supports MNP-10 for cellular phones.
- Synchronous data compression (supports rates up to 128 kbps).
- EIA/TIA-602 AT Command Set support.
- V.25 bis compatible command protocol support.
- Remote Configuration to change a user's configuration profile of a remote modem.
- Front panel with push-button testing and 17 status indicators
- Flash memory for downloading modem firmware.
- Permanent storage of modem configuration profiles in non-volatile memory.
- External, Internal, or Receiver Recovered transmit timing.
- Maximum line rate selection.
- Asynchronous character lengths of 8, 9, 10, and 11 bits.
- Intelligent Serial Terminal Dialer via the DTE interface, using the AT command set.
- Stores up to ten telephone numbers for easy dialing.
- Pulse or tone dialing.
- Automatic answer.
- Analog Loopback with or without Self-Test features.
- Digital Loopback and Remote Digital Loopback.
- End-to-End Self-Test (511 or in FSK ALT pattern).
- Supports FAX Class 1 operation.
- When factory-optional for RADIUS, the modem provides remote authentication for dial-in users.
- When factory-optional for AES encryption, the modem encrypts/decrypts Transmit and Receive data (async only) at both ends of the network
- When factory optional as a Secure Access modem, employs public and private keys generated by authentication servers to allow secure, out-of-band management access to remote users via secure tunnels.



Flexible Management

The SC Dual V.34 modem can be managed using a co-located SpectraComm Manager card (SCM) that serves as the SNMP agent. The modem can also be monitored and configured locally via the AT command or the ITU-T V.25 bis command set, or remotely through an off-site Dual V.34 modem and DTE.

AT commands can be sent to the modem locally DTE using either the AT command or the ITU-T V.25 bis command set, or remotely through an off-site Dual V.34 modem and DTE.

The modem includes front panel controls for testing. The software of the Dual V.34 Modem includes Simple Network Management Protocol (SNMP) Management Information Base (MIB) files that enable control by an SNMP network controller. A SpectraComm Manager (SCM) card is required to access the MIBs.



Built-in Security Features

SpectraComm V.34 modems supply a variety of built-in security features for dial-in users. With the built-in SteadFast Handshake Security enabled in SC V.34 modems at both the originating and answering sites. As part of its handshake, the answering GDC modem sends the originating GDC modem a cell password that must have been previously stored in both modems. GDC's SteadFast Handshake Security is hacker-proof and will not permit unknown modems to communicate (*Figure 2*).

With the built-in SteadFast On-line Password security, the SC V.34 modem is configured with stored cell passwords (*Figure 2*) to respond to dial-in users as follows:

- With Callback Security, after accepting the online password, the modem disconnects and calls back the originating modem.
- With Roving Callback, after accepting the online password, the V.34 modem prompts the caller for a callback phone number.
- With Cell Callback, after accepting the online password, the modem prompts the caller for a memory cell number, disconnects the call and then places a return call using the phone number stored in that cell.

Optional Authentication & Encryption

GDC modems can employ RADIUS (Remote Authentication for Dial-In Users) to authenticate users from a secure and centralized database of RADIUS usernames, passwords and challenges. RADIUS Authentication will accept, challenge and reject dial-in users via secure RADIUS servers. The RADIUS Accounting feature offers call tracking and billing information.

With the AES Encryption option, the modem encrypts async data sent across the communications facility via a dialup or leased line connection. Two GDC modems optioned for data encryption are required at either end of the link. The modems perform all data encrypt/decrypt functions without burdening customers' applications, and without the need of purchasing additional hardware. User-selectable encryption modes and key sizes are supported.

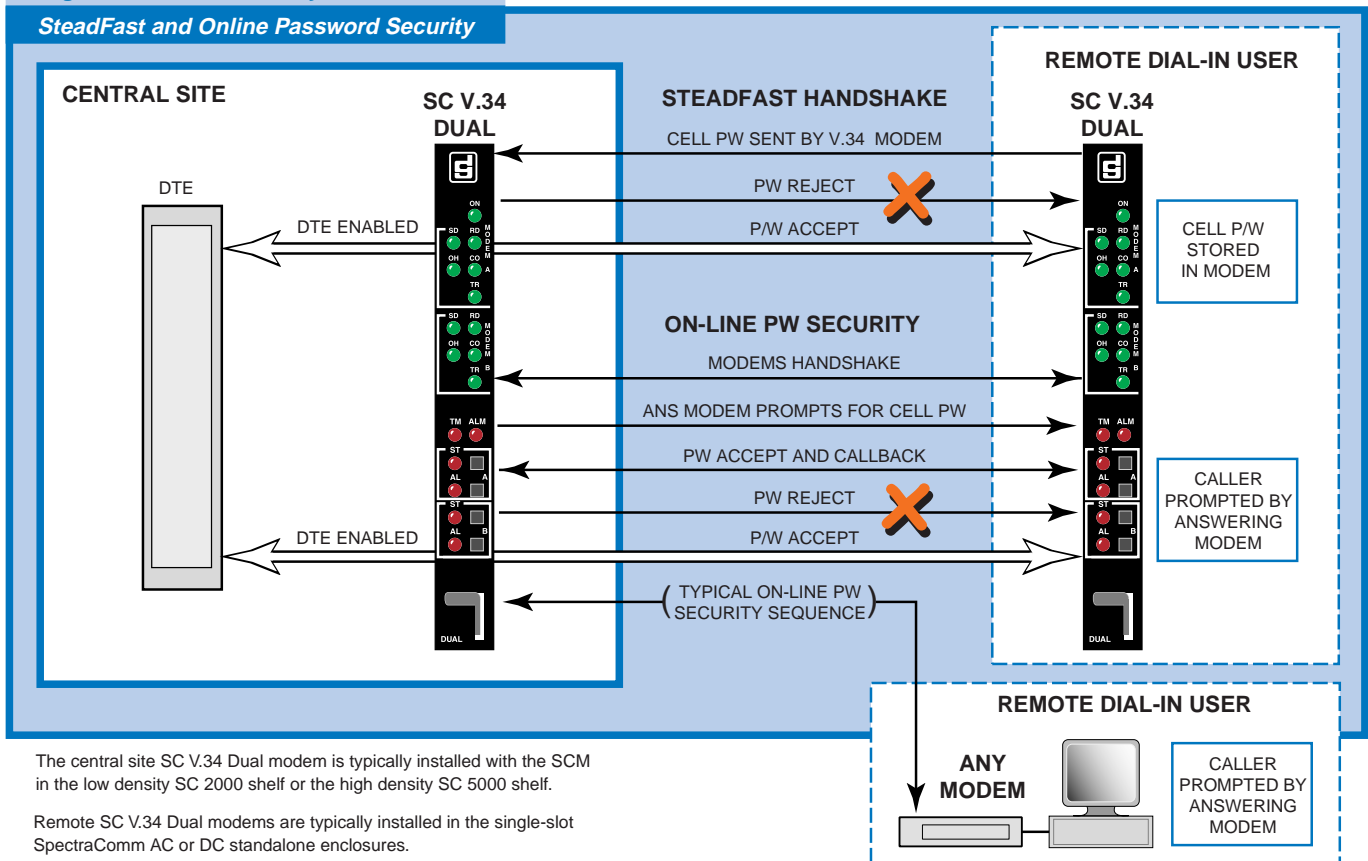
Triple Protection

In capable modems, AT commands can be used to combine security features:

- AES Encryption or RADIUS or SteadFast Security only
- Steadfast Security and AES Encryption
- Steadfast Security, AES Encryption and RADIUS.

Figure 2: Built-in Security Features

SteadFast and Online Password Security



The central site SC V.34 Dual modem is typically installed with the SCM in the low density SC 2000 shelf or the high density SC 5000 shelf.

Remote SC V.34 Dual modems are typically installed in the single-slot SpectraComm AC or DC standalone enclosures.

Optional Secure Access Control

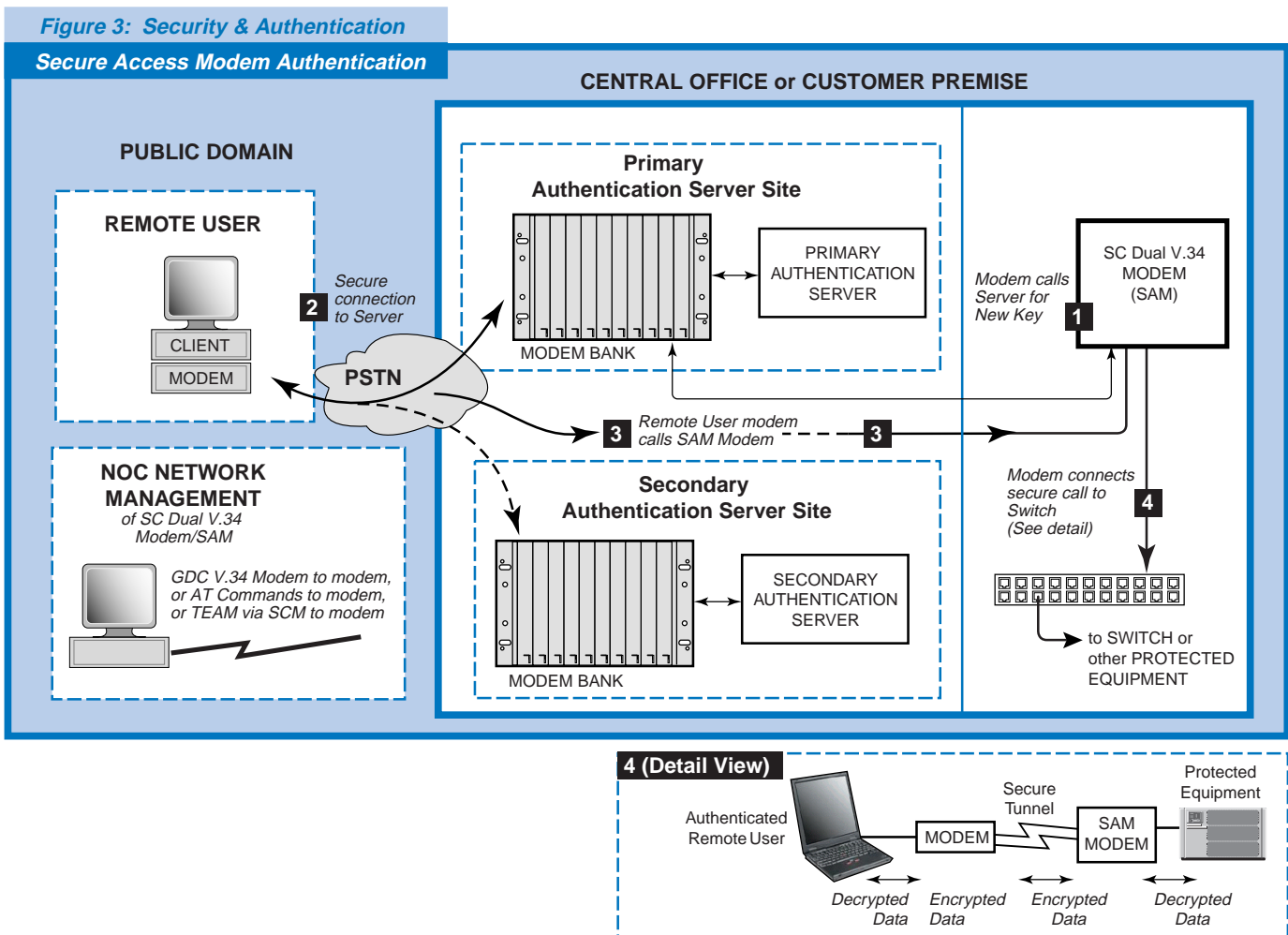
The Secure Access Controller (SAC) system consists of secure servers and a factory--optioned GDC V.34 modem that authenticate remote users attempting to access protected network equipment, such as switches, routers, multiplexers, etc. The Authentication Server generates the private key exchanged by the modem and server, and the public key exchanged by the modem and remote user's client software. Each connection sets up a secure tunnel that passes AES-encrypted data to the authorized user. When a user terminates a management session, the Secure Access Modem requests a connection to the Authentication Server to obtain another new private key, thus preventing further access from the previous remote user or intruders.

The Secure Access Modem is user-configured via extended AT commands typed at one of its management interfaces (Telnet via the SCM, the SCM craft port, or a terminal connected to the modem's DTE connector).

Figure 3 demonstrates a typical network configuration and the authentication sequence that occurs when a remote user attempts a management connection to protected network equipment.

Authentication Sequence

1. The Secure Access Modem obtains a new private key from the Authentication Server via a secure tunnel at every powerup, reset, key timeout, or session end.
2. Remote users make a connection to the Authentication Server through the PSTN via a modem. The remote user employs client software to request a connection to the Secure Access Modem. This involves contacting the Authentication Server to check the user's ID and password, and then initiating a client software connection with the requested Secure Access Modem. Once the remote user is authenticated as a trusted user, the Authentication Server transfers the necessary connection data and a public key to the client software and disconnects from the user.
3. The client software then calls the Secure Access modem and performs a public key exchange over a secure tunnel via the PSTN.
4. The authorized user is allowed encrypted and authenticated management access to the appropriate protected network equipment using AES data encryption.



SC Dual V.34 Physical Specifications

Single-slot Blade

Width: 178 mm (7.0 in)
 Height: 21 mm (0.81 in)
 Depth 241 mm (9.5 in)
 Weight: 0.28 kg (10 oz)

Environmental Specifications

Non-Operating Specifications

Temperature: -40 to 85 degrees C (-40 to 185 degrees F)
 Relative Humidity: 5% to 95%
 Altitude: 0 to 12,191 m (40,000 ft)

Operating Specifications

Temperature: 0 to 50 degrees C (32 to 122 degrees F)
 (Derate by 1 deg C/1000 ft above sea level)
 Relative Humidity: 5% - 95% non-condensing
 Altitude: 0 to 3,047 m (0 to 10,000 ft)

Electrical Characteristics

Power (AC or DC), voltage, frequency, and fusing determined by your SpectraComm shelf or enclosure.

Power Dissipation: 6 Watts per slot maximum

Compliance & Compatibility

Safety: UL Approved
 NEBS Level III Certified
 EMI: FCC Part 15, Subpart J (Class A) Approved
 Telco: FCC Part 68 Approved
 Quality Assurance: ISO 9001:2000 Certified

Security and Authentication Features

Built-in SteadFast Handshake Security
 Built-in Online Password Security
 Optional RADIUS Authentication and Accounting
 Optional AES Encryption Security
 Optional Secure Access Modem (SAM) Authentication

Note:
 Several combinations of security and authentication features can be configured simultaneously in the modem.



Operational Specifications

Modulations/Data Modes

V.34 - Up to 33.6 Kbps with fallback speeds
 V.32 bis, V.32, V.22 bis, V.22, V.21, Bell 212A/103
 Factory option available for Point-of-Sale (POS) fast handshake

Operation

Async only data rates:
 300 bps (ITU-T V.21 or Bell 212)
 Async Character codes:
 8, 9, 10, or 11-bit characters, V.14 compliant
 Operating Mode:
 Switched network or 2-wire private line
 Operating Format: Synchronous or Asynchronous
 Equalization: Automatic, Adaptive
 Character Detect Acquisition:
 Assured with a receive level at or above -43 dBm;
 Leased line level: -33 dBm (or per country requirement), 2-wire
 Carrier Detect Release:
 Assured with a receive level at or below -48 dBm;
 Leased line level: -38 dBm (or per country requirement), 2-wire
 Error Correction: ITU-T V.42 and MNP-4 or MNP-10 for cellular operation
 Data Compression:
 Async: ITU-T V.42 bis and MNP-5 giving a throughput up to 128 Kbps
 Sync: Synchronous data compression (proprietary throughput up to 64 Kbps)
 Configuration and Control:
 Extended AT command set; V.25 bis;
 Telnet; Front panel initiated test modes
 Download Flash Memory
 Test Mode: V.54 Compliant Analog Loop, Remote Digital Loop, Digital Loop, and Self Test
 Remote Configuration:
 AT commands; Telnet through the SCM
 Flow Control: XON/XOFF, RTS/CTS, External EIA/TIA-232-E signaling using CTS
 Call Monitoring: AT, V.25 bis, Indicator LEDs
 RTS/CTS Delay:
 10 to 250 ms in 10 ms steps; V.13 compliant
 Line Interface:
 RJ45 switched network, RJ45 private line
 Front Panel LEDs:
 Power On, Send Data, Receive Data, Off Hook, Carrier On, Terminal Ready, Test, Alarm
 Front Panel Switches: Self Test; Analog Loopback
 Output Level: Permissive (-9dBm or per country requirement); Adjustable (0 to -15dBm)
 DTE Interface: EIA/TIA-232-E/ITU-T V.24/V.28/ISO 2110

