End-to-End Connectivity Over Private IP Networks

SpectraComm ADT Highlights

- Provides secure, high performance, low-cost transfer of async data between sites utilizing IP networks.

- Scalable, individually configurable ports in 16- or 32-port increments.

- Acts as a terminal server to connect local craft devices, allowing management from anywhere in the network.

- Provides alarm reporting via contact sensing, alarm traps and contact outputs between network locations.

- Supports LAN connection to 10/100Base-T Ethernet.

- Supports automated configuration of multiple SC-ADT devices via ASCII batch file upload/download.

- Low power consumption (6 watts maximum per slot).

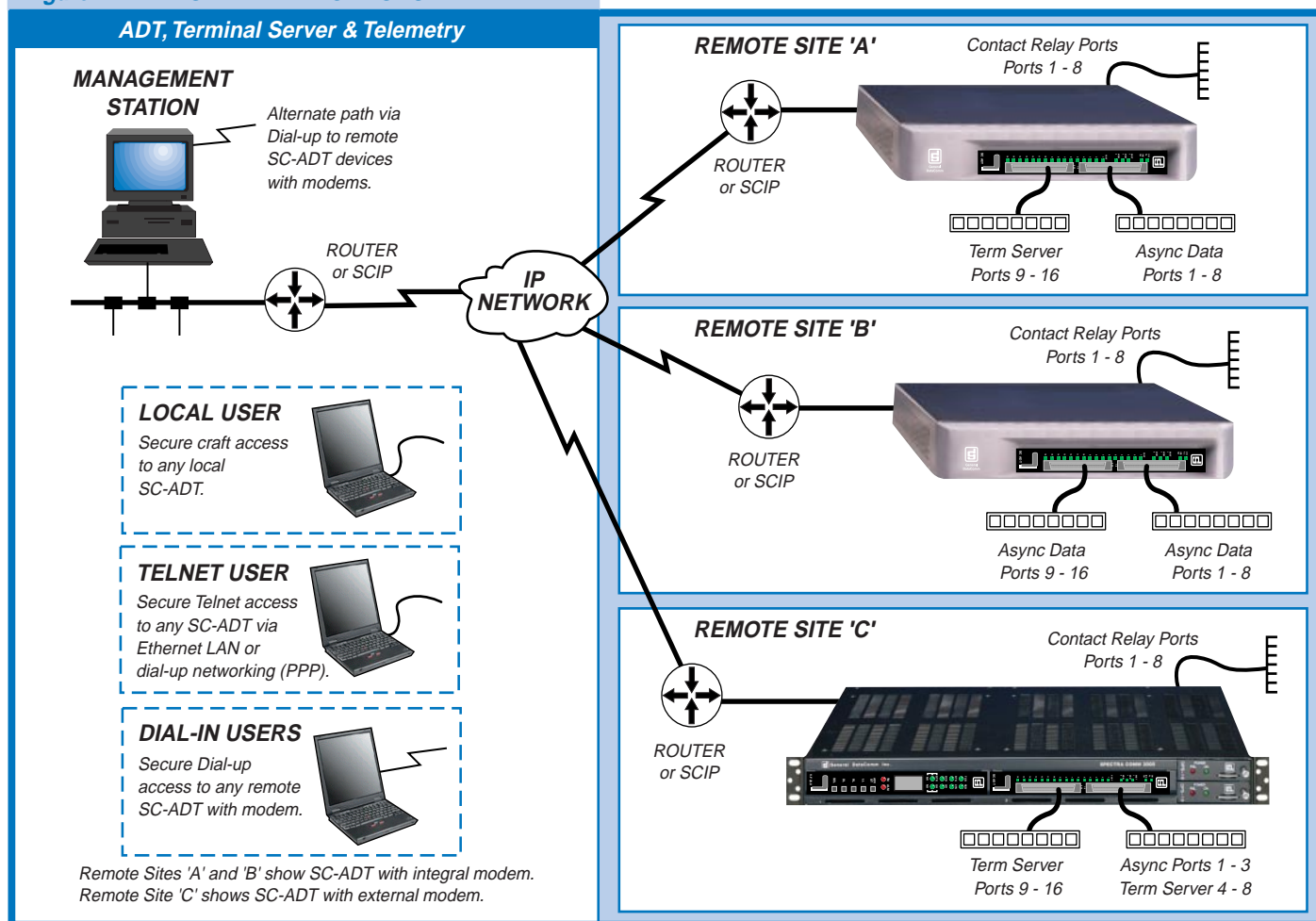- Designed for NEBS Level III Certification

Introduction

The SpectraComm Asynchronous Data Transfer device (SC-ADT) is designed primarily for high density applications where asynchronous data transfer over private IP networks is required. The NEBS-certified SC-ADT can be deployed anywhere in the network where asynchronous devices, craft port equipment or contact relays are located.

Figure 1 shows SC-ADT supporting multiple applications simultaneously:

- From the Management Station, all SC-ADT units are managed via Telnet, SNMP, and HTTP. Password-protected local and dial-in access is also supported.

- At SC-ADT sites, some async ports are configured as terminal server ports, some to exchange async data with other sites, some for external modem connections.

- The rear panel DB-25 connector provides contact ports for alarm transfer and traps.

Figure 1: END-TO-END APPLICATIONS

ADT, Terminal Server & Telemetry

MANAGEMENT STATION

Alternate path via Dial-up to remote SC-ADT devices with modems.

ROUTER or SCIP

IP NETWORK

LOCAL USER
Secure craft access to any local SC-ADT.

TELNET USER
Secure Telnet access to any SC-ADT via Ethernet LAN or dial-up networking (PPP).

DIAL-IN USERS
Secure Dial-up access to any remote SC-ADT with modem.

Remote Sites 'A' and 'B' show SC-ADT with integral modem.
Remote Site 'C' shows SC-ADT with external modem.

REMOTE SITE 'A'
Contact Relay Ports Ports 1 - 8
ROUTER or SCIP
Term Server Ports 9 - 16
Async Data Ports 1 - 8

REMOTE SITE 'B'
Contact Relay Ports Ports 1 - 8
ROUTER or SCIP
Async Data Ports 9 - 16
Async Data Ports 1 - 8

REMOTE SITE 'C'
Contact Relay Ports Ports 1 - 8
ROUTER or SCIP
Term Server Ports 9 - 16
Async Ports 1 - 3
Term Server 4 - 8

SpectraComm ADT

16-Port and 32-Port Models

The SC-ADT device is available in two models, each conforming to GDC's 'telco-tough' SpectraComm format.

The SC-ADT 16-Port is a 7- by 9.5-inch card that occupies one slot in GDC's 2-slot SpectraComm 2000 shelf, the 10-slot MultiPak or the 16-slot SC 5000 shelf. For remote site or non-NEBS, stand-alone applications, the same SC-ADT 16-port card installs in the single-slot SpectraComm SC 1001 (AC) or SC 1002 (DC) enclosure.
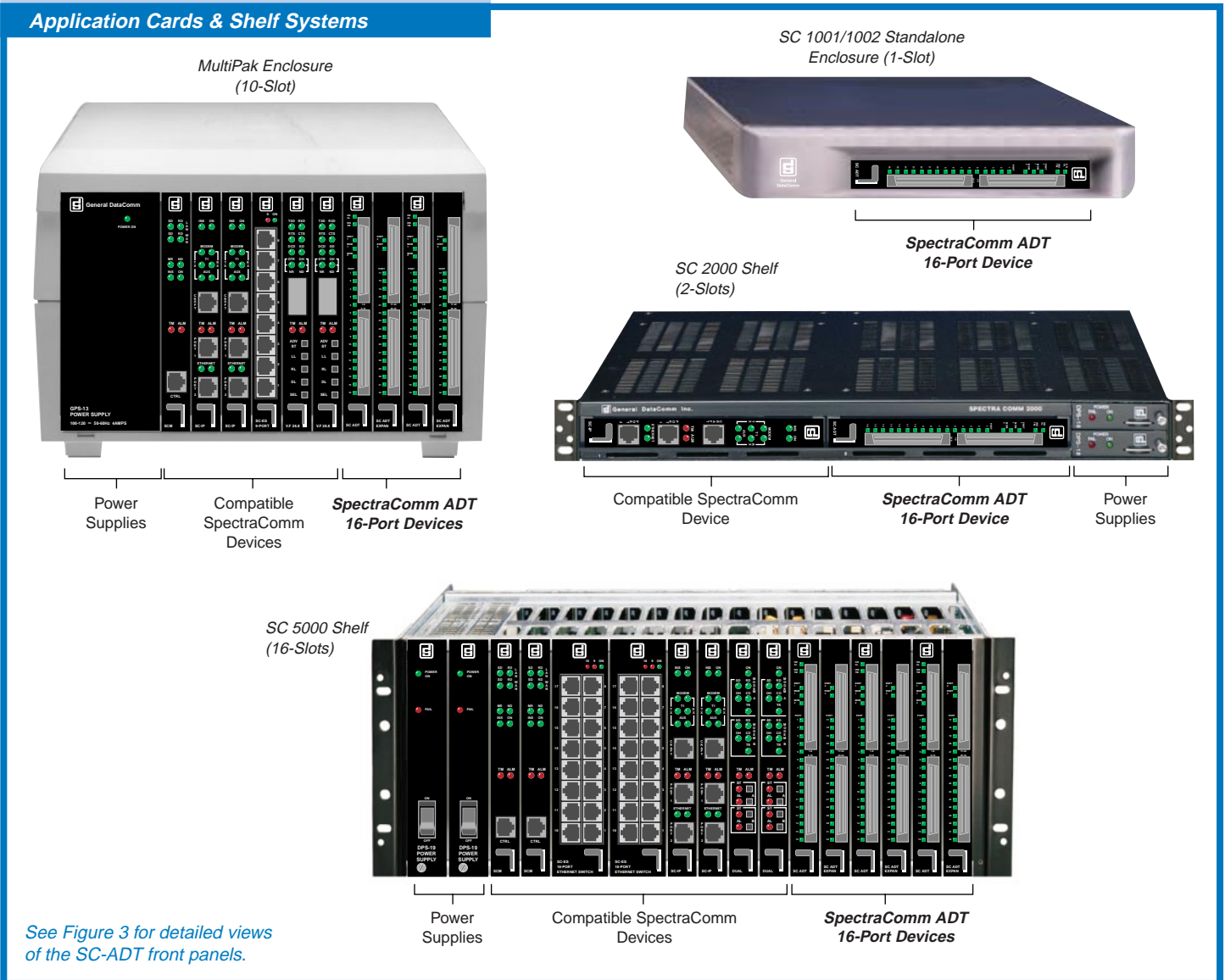
For higher density applications, the SC-ADT 32-Port is a 7- by 9.5-inch card that occupies two slots in the 10-slot Multi-Pak and the 16-slot SpectraComm 5000 shelf.

Scalable, Flexible SpectraCommonality

Any other SpectraComm device can be co-located in the shelf with SC-ADT cards, providing a unified, flexible, managed shelf environment that is scalable to your network requirements. Typical shelf configurations can include SC-ADT devices with SpectraComm IP cards (SCIP, SCIP-E1, SCIP-G.S), SpectraComm Ethernet Switch cards (SC-ES 9-Port or SC-ES 18-Port), as well as GDC SpectraComm modems, DSUs, LTUs and multiplexers.

Figure 2 shows SC-ADT devices installed in GDC's flexible and scalable SpectraComm shelf and enclosure platforms, along with other compatible product cards.

Figure 2: SPECTRA-COMMONALITY:
Application Cards & Shelf Systems

MultiPak Enclosure (10-Slot)

Power Supplies | Compatible SpectraComm Devices | *SpectraComm ADT 16-Port Devices*

SC 1001/1002 Standalone Enclosure (1-Slot)

SpectraComm ADT 16-Port Device

SC 2000 Shelf (2-Slots)

Compatible SpectraComm Device | *SpectraComm ADT 16-Port Device* | Power Supplies

SC 5000 Shelf (16-Slots)

Power Supplies | Compatible SpectraComm Devices | *SpectraComm ADT 16-Port Devices*

See Figure 3 for detailed views of the SC-ADT front panels.

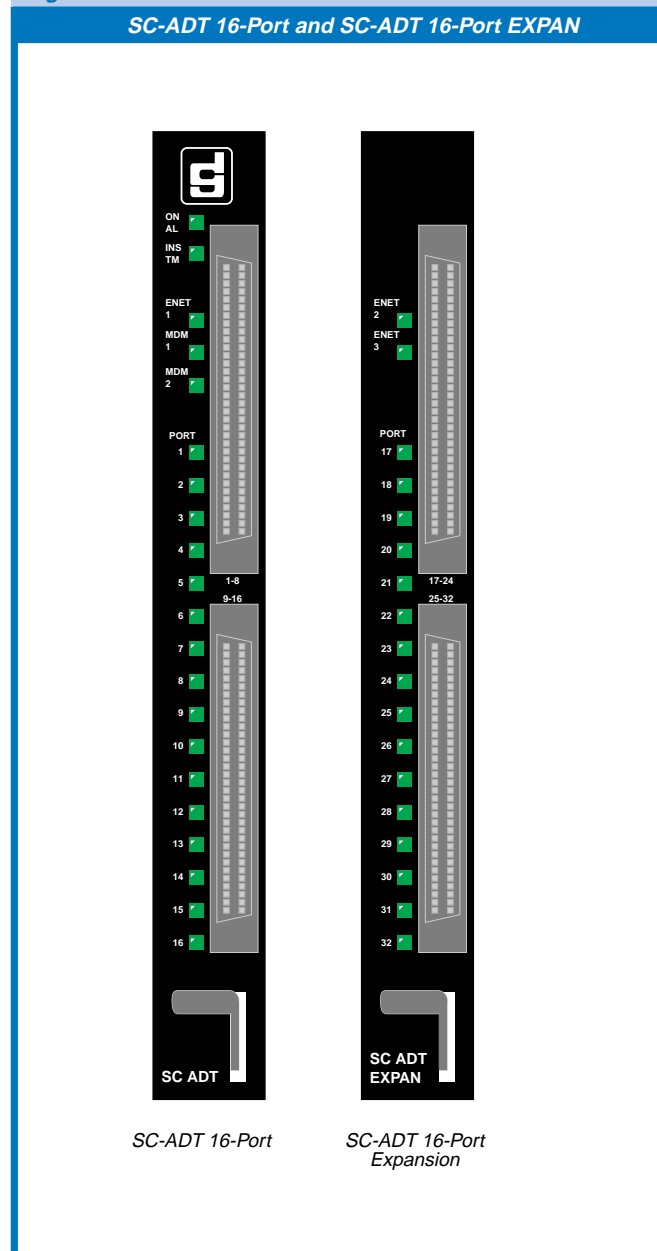# SpectraComm ADT

ADDITIONAL FEATURES

- EIA lead status for each port.

- Disconnect/connect controls for each port.

- Diagnostics: async loopbacks, ping and statistics.

- Employs GDC's 'Smart CLI', an interactive command line interface, and the web-based CLI interface.

- Ethernet auto-negotiates for 10 or 100 Mbps port speed, full- or half-duplex modes and enabled/disabled flow control.

- Ethernet auto-senses (HP MID/X) for straight-thru or crossover cable connections.

- Efficient configuration of multiple SC-ADT devices via ASCII batch file upload/download.

- Responds to SNMP polling and discovery

- High performance 'run from ram' architecture includes Running, Primary and Standby versions of software.

- Provides a console port for local management.

- Supports remote management using standards-based IP protocols including Telnet, TFTP, and HTTP (Web).

- Supports discovery, statistics, and alarm traps using standards-based SNMP.

- Provides support for two connections to external/integral modems for dial-in access.

- Supports multi-level password protection for added security.

- Supports TACACS+ authentication for secure, centralized username and password administration.

- Software upgradable via TFTP, allowing quick bug fixes and feature enhancements over time.

Highest Design Standards

All of General DataComm's family of NEBS-certified products meet the stringent safety, environmental, shock and vibration standards that meet or exceed the Network Equipment Building System standards (NEBS).

Both models of the SpectraComm ADT device are designed for NEBS Level III compliance and intended for installation in GDC's 'telco-tough' SpectraComm shelves and enclosures.

Figure 3: FRONT PANEL VIEWS

SC-ADT 16-Port and SC-ADT 16-Port EXPAN

SC-ADT 16-Port

SC-ADT 16-Port Expansion

TERMINAL SERVER APPLICATIONS

SpectraComm ADT front panel connectors can be configured as terminal server ports for the management of remote equipment through their craft ports. Each port is a standard EIA-232 async interface. In terminal server applications, the equipment can be managed from anywhere in the customer's network, with a SC-ADT device only required at craft equipment sites.

Users can access any of the craft devices at each port using the local console port or by telnet access. Users may also gain access remotely via modem dial-in, or by the ethernet LAN.

Each SC-ADT device can be connected to up to 32 ports of local asynchronous customer equipment. To support more async ports, simply add more SC-ADT units to the ethernet segment at each site as required.

Ease of Use

Users can Telnet directly to an async port, or can access any terminal port from a convenient port menu by selecting its description field or port number.

The SC-ADT allows dial-users to access one terminal server port after another without having to disconnect and redial the modem connection.

IP or Dial-in Access

Figure 4 shows craft devices at the SC-ADT site being accessed by users at remote sites over the IP Network, by local users over the Ethernet connection, and by users at remote sites via the modem connections.

IP Network Access

SC-ADT is attached to a local router or a SCIP over 10/100Base-T Ethernet. Users can launch a telnet session to a terminal port, thus connecting to the craft device at that port. Several users may connect to several terminal server ports simultaneously as long as they are connecting to different ports.
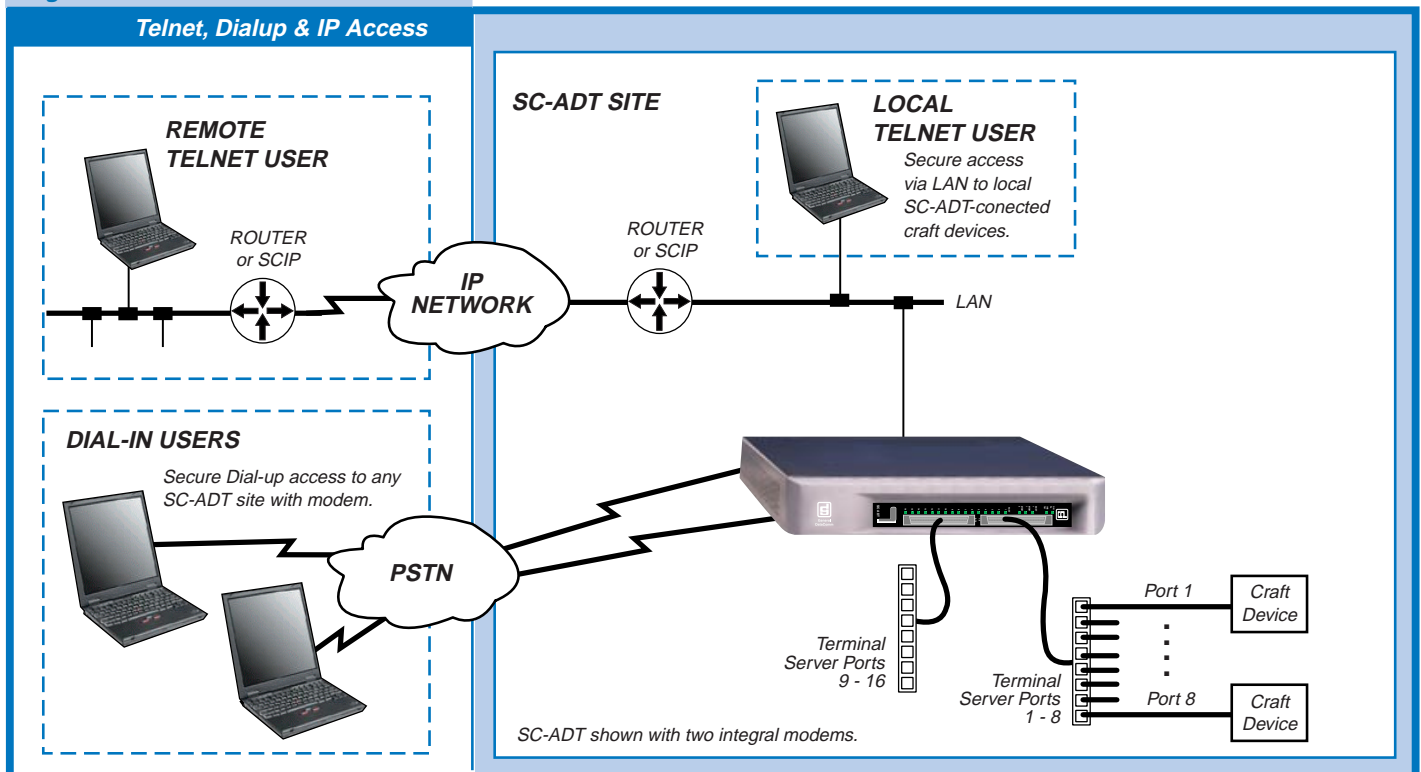
Modem Access

SC-ADT supports two external modem connections for dial-in access over the PSTN. SC-ADT also supports two integral modems, when so equipped. The external modem connections use two of the thirty-two available async ports. The integral modem connections are separate.

Users dial-in and connect to SC-ADT in Terminal Emulation mode using applications like HyperTerminal or in Dial-up Networking mode for standard IP access.

Two dial-in users may connect to any two separate terminal ports simultaneously. If there is a LAN connection at the SC-ADT site, several more users may Telnet simultaneously over the LAN to additional craft devices.

Figure 4: TERMINAL SERVER

Telnet, Dialup & IP Access

REMOTE TELNET USER

ROUTER or SCIP

IP NETWORK

SC-ADT SITE

ROUTER or SCIP

LOCAL TELNET USER

Secure access via LAN to local SC-ADT-conected craft devices.

LAN

DIAL-IN USERS

Secure Dial-up access to any SC-ADT site with modem.

PSTN

Terminal Server Ports 9 - 16

Terminal Server Ports 1 - 8

Port 1

Craft Device

Port 8

Craft Device

SC-ADT shown with two integral modems.

TRANSPORT MODE APPLICATIONS

The ADT application of the SC-ADT utilizes ethernet LAN facilities for end-to-end async data traffic between sites in the customer's IP network. In such applications, async data is received from customer equipment, encapsulated and transferred between sites.

Each SC-ADT front panel connector can interface with up to eight local asynchronous customer equipment ports. For higher density requirements, simply adding more SC-ADT devices will attach additional devices to the ethernet segment at each site in 16- or 32-port increments.

Individual async data ports are configurable for Baud, Data/Start/Stop Bits, Parity, and DTE/DCE type. The DTE/DCE type setting allow connections to either terminal (DTE) or modem (DCE) devices.

Theory of Operation

The SC-ADT encapsulates the async traffic into IP Packets and forwards the data over Ethernet to the local router/ bridge, or to a companion product, the SpectraComm IP device, for transfer over the IP network.

The async data at any local SC-ADT port can be forwarded to any async port at any remote SC-ADT location using a set of lookup tables maintained in each SC-ADT.

A SC-ADT device is required at both ends of a link to support the proprietary encapsulation scheme.

Figure 5 shows multiple sites with async equipment linked together over the customer's IP Network. Any DTE at any SC-ADT site can exchange async traffic with any other DTE.

Figure 5: ASYNCHRONOUS DATA TRANSFER

Async equipment at all SC-ADT sites can exchange data across the IP network.
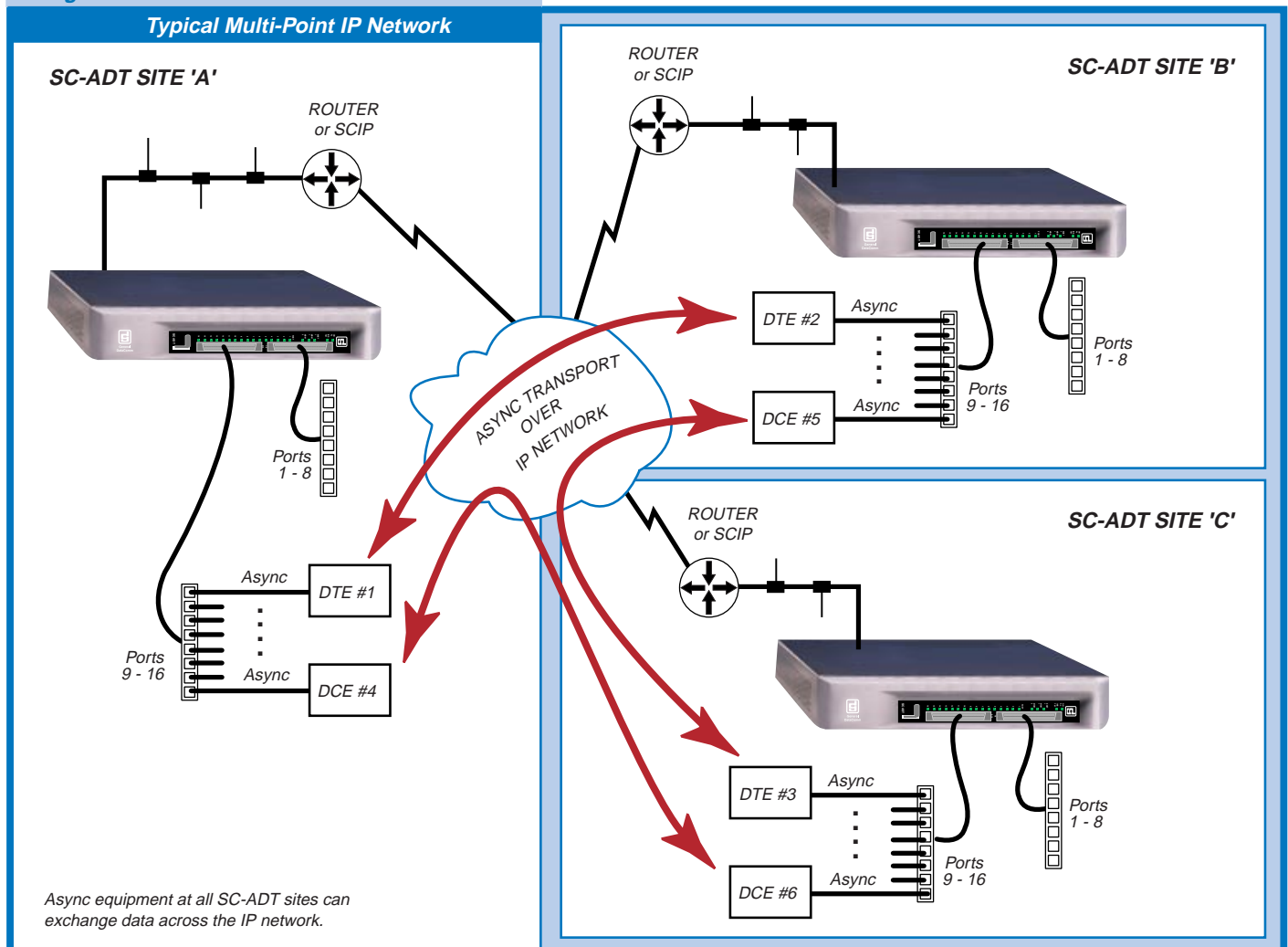
TELEMETRY APPLICATIONS

The SpectraComm ADT rear panel DB-25 connector can perform contact sensing and can be configured for alarm notification whenever a change in contact relays occur at customer network sites.

Each SC-ADT rear panel connector provides up to eight contact input ports for sensing activation of an open or closed contact; and up to two contact output ports to open or close a local contact relay. To support requirements for more contact ports, simply add more SC-ADT devices to accommodate each site requirements.

Theory of Operation

SC-ADT detects when a contact changes from its normal state and, depending on its configuration, will send an alarm trap, transport the contact state, or perform both trap and transport actions. A 'clear' trap is sent when the contact returns to the normal state. SC-ADT devices are required at both sites to transport contacts, whereas a SC-ADT device is not required to receive traps. Any Management Station in the network can be a trap destination.

Configuration Options

Typical telemetry applications can include tracking temperature and entry to a remote location. The alarm notification is user-configured to one of three options:

SNMP Trap
After sensing a relay state change from the normal state (open or closed), an alarm trap is sent to a management station using an SNMP alarm trap.

Contact State Transport
After sensing a relay state change, a message is sent to a remote SC-ADT device to open or close a relay at that site.
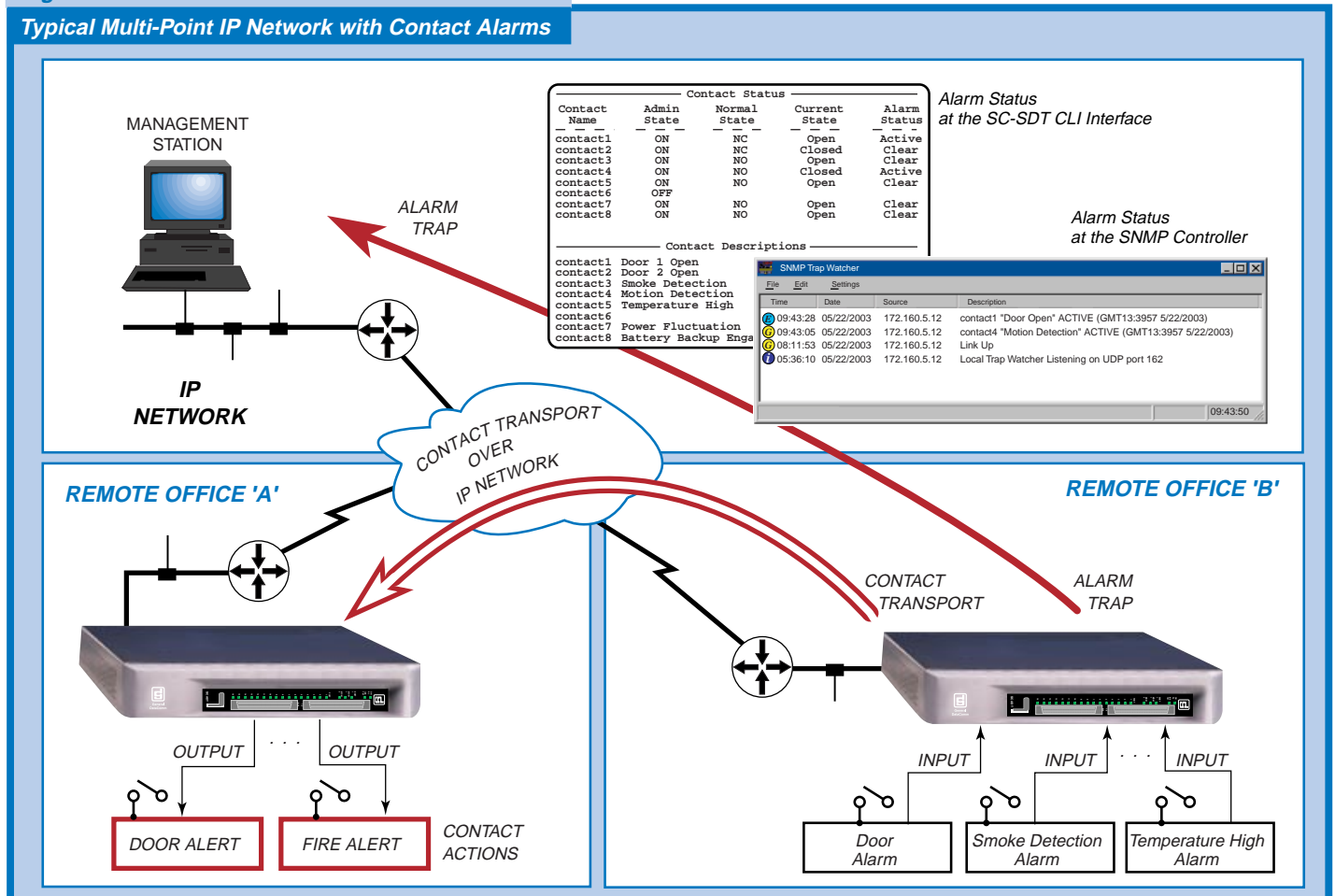
Trap and Transport
The alarm will be transported between sites and a Trap will be sent to a management station. The destinations for alarm transport and Trap are independent.

Figure 6 shows the SC-ADT in a typical telemetry application, with SNMP Traps sent to a Management Station and a Contact Transport message sent to another SC-ADT site.

Figure 6: TELEMETRY APPLICATIONS

Typical Multi-Point IP Network with Contact Alarms


```
----------------------- Contact Status -----------------------
Contact      Admin      Normal      Current      Alarm
Name         State      State       State        Status
contact1     ON         NC          Open         Active
contact2     ON         NC          Closed       Clear
contact3     ON         NO          Open         Clear
contact4     ON         NO          Closed       Active
contact5     ON         NO          Open         Clear
contact6     OFF
contact7     ON         NO          Open         Clear
contact8     ON         NO          Open         Clear
--------------------- Contact Descriptions ---------------------
contact1  Door 1 Open
contact2  Door 2 Open
contact3  Smoke Detection
contact4  Motion Detection
contact5  Temperature High
contact6
contact7  Power Fluctuation
contact8  Battery Backup Enga
```

Alarm Status at the SC-SDT CLI Interface

Alarm Status at the SNMP Controller

SNMP Trap Watcher

File   Edit   Settings

Time	Date	Source	Description
09:43:28	05/22/2003	172.160.5.12	contact1 "Door Open" ACTIVE (GMT13:3957 5/22/2003)
09:43:05	05/22/2003	172.160.5.12	contact4 "Motion Detection" ACTIVE (GMT13:3957 5/22/2003)
08:11:53	05/22/2003	172.160.5.12	Link Up
05:36:10	05/22/2003	172.160.5.12	Local Trap Watcher Listening on UDP port 162

09:43:50

MANAGEMENT STATION

ALARM TRAP

IP NETWORK

CONTACT TRANSPORT OVER IP NETWORK

REMOTE OFFICE 'A'

REMOTE OFFICE 'B'

CONTACT TRANSPORT

ALARM TRAP

OUTPUT ... OUTPUT

INPUT   INPUT ... INPUT

DOOR ALERT   FIRE ALERT   CONTACT ACTIONS

Door Alarm   Smoke Detection Alarm   Temperature High Alarm

SC-ADT MANAGEMENT

SC-ADT configuration is managed through SMART CLI, an interactive command line interface, or through graphical user interface (GUI) web screens. Through these interfaces, an authorized user can monitor or configure any SC-ADT device in the network via a terminal or Telnet connection or through any popular web browser.

Secure Access and Protection

Management access to SC-ADT through CLI and web interfaces is protected by several security features:

- User- and Supervisor-level password protection authorizes every access attempt.

- Inactivity logoff prevents hacks through 'left on' equipment.

- Access control: Enable/Disable of SNMP, HTTP, and TFTP services deters hacking through these protocols.

- Enable/Disable management traffic by interface, for provider and customer management access schemes.

- TACACS+ protocol to offload user authentication to a central server, providing 'centralized' security.
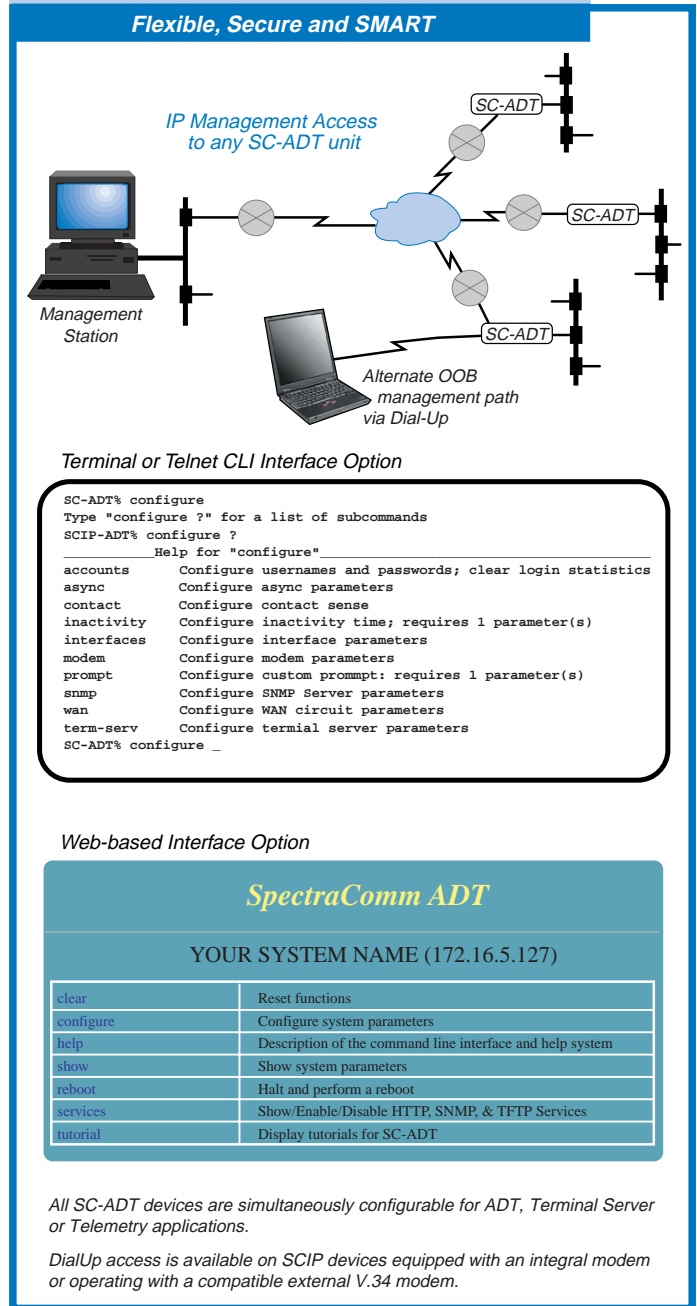
SMART CLI Features

General DataComm's SMART CLI has a look and feel that will be familiar to most field personnel, with the benefit of several enhancements over most standard CLIs, such as:

- Recognition and auto-expansion of abbreviated commands and sub-commands.

- Auto-prompts for required command arguments.

- General help at the command prompt.

- Context-sensitive help at the command string.

- Command line recall for easy re-entry or review of previous commands.

- Advanced utility for generating downloadable ASCII configuration files as batch scripts.

- Upgradable via TFTP downloads of SCIP software versions and configuration data.

- Command entry from a Telnet or terminal connection, or using a standard browser.

Web-Based Management

An integral HTTP server provides password-protected access to a web-based CLI interface. Authorized users can monitor or change SC-ADT configuration and operation parameters in a streamlined logical graphical user interface using any popular web browser.

Figure 7: MANAGEMENT INTERFACE OPTIONS

Flexible, Secure and SMART

IP Management Access to any SC-ADT unit

Management Station

Alternate OOB management path via Dial-Up

Terminal or Telnet CLI Interface Option

```
SC-ADT% configure
Type "configure ?" for a list of subcommands
SCIP-ADT% configure ?
_____Help for "configure"_____
accounts      Configure usernames and passwords; clear login statistics
async         Configure async parameters
contact       Configure contact sense
inactivity    Configure inactivity time; requires 1 parameter(s)
interfaces    Configure interface parameters
modem         Configure modem parameters
prompt        Configure custom prommpt: requires 1 parameter(s)
snmp          Configure SNMP Server parameters
wan           Configure WAN circuit parameters
term-serv     Configure termial server parameters
SC-ADT% configure _
```

Web-based Interface Option

SpectraComm ADT

YOUR SYSTEM NAME (172.16.5.127)

clear	Reset functions
configure	Configure system parameters
help	Description of the command line interface and help system
show	Show system parameters
reboot	Halt and perform a reboot
services	Show/Enable/Disable HTTP, SNMP, & TFTP Services
tutorial	Display tutorials for SC-ADT

All SC-ADT devices are simultaneously configurable for ADT, Terminal Server or Telemetry applications.

DialUp access is available on SCIP devices equipped with an integral modem or operating with a compatible external V.34 modem.

Centralized and Versatile Options

Figure 7 shows management throughout the network from the central site. SC-ADT units can also be accessed via a craft connection from a VT100-compatible terminal, a Telnet connection, or a web browser. Authorized remote dial-in users can access SC-ADTs equipped with an internal or external modem.

SpectraComm ADT

Physical & Electrical Specifications
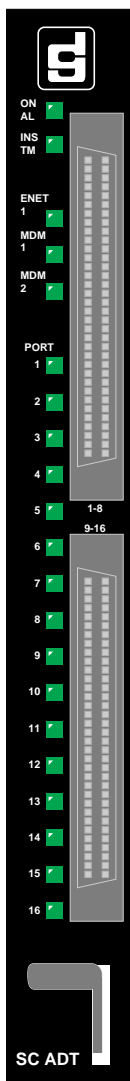
SpectraComm ADT 16-Port Dimensions
Width: 178 mm (7.0 in)
Height: 21 mm (0.81 in)

Weight: 0.28 kg (10 oz)
Shipping Weight: 0.74 kg (1 lb 10 oz)

SpectraComm ADT Dimensions
Width: 178 mm (7.0 in)
Height: 42 mm (1.62 in)

Weight: TBD
Shipping Weight: (TBD)

Environmental Specifications
Non-Operating
Temperature: -40 to 70 degrees C (-40 to 158 degrees F)
Relative Humidity: 5% to 95%
Altitude: up to 12,191 m (40,000 ft)

Operating
Temperature: 0 to 50 degrees C (32 to 122 degrees F)
Relative Humidity: 5% - 90% non-condensing
Altitude: -60 to 4,000 m (-197 to 13,123 ft)

Electrical Characteristics:
Power Requirements: AC or DC power, according to your SpectraComm shelf configuration.

Voltage/Frequency: 100 to 240 VAC or 24/48 VDC
Determined by your SpectraComm shelf.

Fusing: Determined by your SpectraComm shelf.

Power Dissipation: 6 Watts per slot maximum

Shown:
SC-ADT 16-Port Front Panel

Compliance & Compatibility

Safety: UL Listed, CUL Listed

NEBS Level III Compliance:
GR-1089-Core, GR-63-Core, GR-78-Core

Vibration: Compliant with GR-63-Core, Sect. 4.4.4 and Sect. 4.4.3

Shock: Compliant with GR-63-Core, Sect. 4.3 for Category 'A' and Category 'B' Containers.

EMI: FCC Part 15 Class A Approved

Telco: FCC Part 68 Approved

Quality Assurance: The MTBF reliability shall be greater than 150,000 hours per BELLCORE TR-232.

Management Options

Command line interface (CLI) via VT100-compatible terminal or Telnet.

HTTP interface via embedded web-server agent using PC browser. (Supports HTML)

SNMP support for discovery, statistics and alarm traps:
MIB for Network Management of TCP/IP-based
Internets MIB2 (RFC 1213); Ethernet MIB (RFC 1398).

Operational Specifications

Physical Interfaces
Craft Port: Standard asynchronous EIA-232 DCE (3-wire) interface at 9600,8,N, 1 for connection to standard VT100-compatible terminal, using rear panel DB-25 connector.

LAN Port (10/100B-T Ethernet) using rear panel RJ-connector.

Sixteen Async ports using two, front-panel 68-pin (D-type) connectors, or thirty-two Async ports using two additional front-panel 68-pin (D-type) connectors on dual-width panel.

Eight Contact Relay Input (2-wire) Interfaces and two Output (3-wire) Interfaces on rear DB-25 connector

Data Rates
Maximum: 32 ports at 57.6Kbps, or 16 ports at 115.2Kbps, etc.

Integral Modem Operation (Optional)
ITU-T V.34 with 9600 bps to 33.6 Kbps line speed

DTE speed up to 115.2 Kbps using:
- V.42 LAPM and MNP 2-3 error correction
- V.42 bis and MNP 5 data compression

Dial-up Access Modes, using:
- Terminal Emulation Mode, using a standard ASCII terminal or terminal emulation package like HyperTerminal.
- Dial-up Networking Mode, using standard Dial-up applications.

Diagnostics & Statistics
Generates/answers pings

Tests Contact States

Loopback on Async ports

Transmit and Receive packet counts on Ethernet interface.

Transmit and Receive byte counts on Ethernet interface.

Transmit and Receive character counts on Async ports.

Transmit and Receive byte counts on Management IP address (optional).

SCADT-DS03-072-EO