

## Fast, Switched, Scalable Ethernet Connectivity to Remote LANs

### SC Ethernet Switch Highlights

- NEBS-compliant ethernet switching for applications where high-quality, high-reliability, security and low-cost are needed.
- Scalable 10/100Mbps connectivity in 9- or 18-port increments, using the existing infrastructure.
- Ideal for remote LAN access applications when used with its companion product, the SpectraComm IP static router, or any other bridge/router device.
- Flexible and secure management options.

### Introduction

The SpectraComm Ethernet Switch provides fast ethernet connectivity for internal networks, allowing a Carrier to efficiently and securely manage LAN-attached equipment.

As part of the GDC SpectraComm family of products, SpectraComm Ethernet Switches offer the high reliability and NEBS safety required in Carrier environments. SC-ES can be deployed as a replacement to legacy hubs or in new installations where fast ethernet switching is desired.

### Network Performance

SpectraComm ethernet switches (SC-ES) are a cost-effective means of dramatically increasing network performance. SC-ES reduces collisions and eases congestion problems on existing shared-hub networks. Unnecessary network traffic is eliminated as SC-ES delivers dedicated bandwidth for each of the ports.

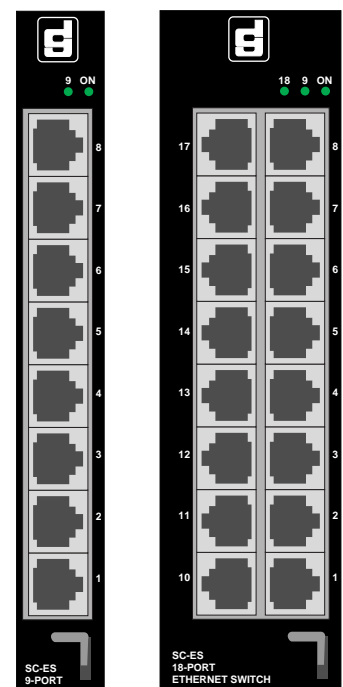
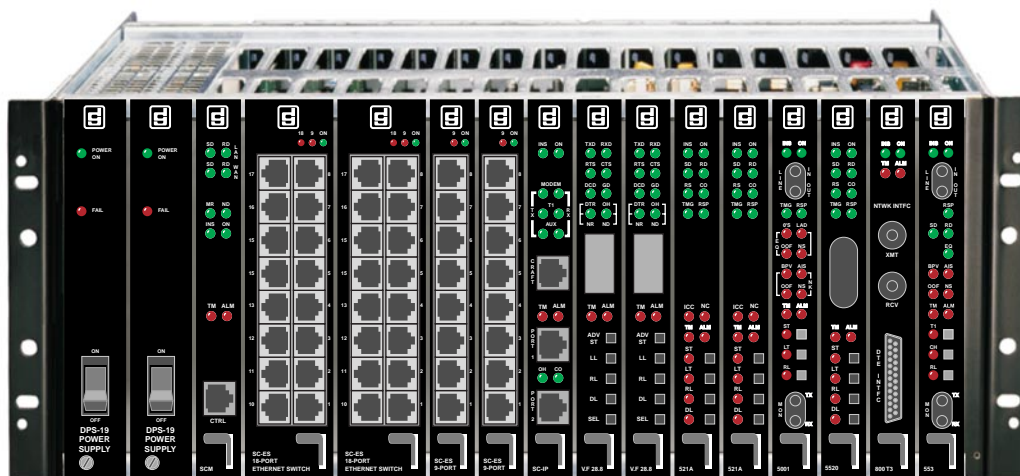
### 9-Port and 18-Port Models

SC-ES 9-Port is a single-width, 7-inch by 9.5-inch SpectraComm card with nine RJ45 ports. SC-ES -18 Port is a double-width, 7-inch by 9.5-inch SpectraComm card with 18 ports. SC-ES can operate as a standalone switch or, for greater port density, can employ one or two ports as a logical uplink to another switch/hub device.

### Secure and Managed

SC-ES switches can be monitored and managed using standard protocols, including Telnet, SNMP, and HTTP (web). Local management via a craft interface is also provided. Management access to the unit is multi-level, password-protected with the additional support of inactivity timers. For additional security during periods of heightened alert, SNMP and web access may be disabled.

Ethernet Switching in a SpectraComm System



SC-ES 9-Port SC-ES 18-Port



## SC-ES APPLICATIONS

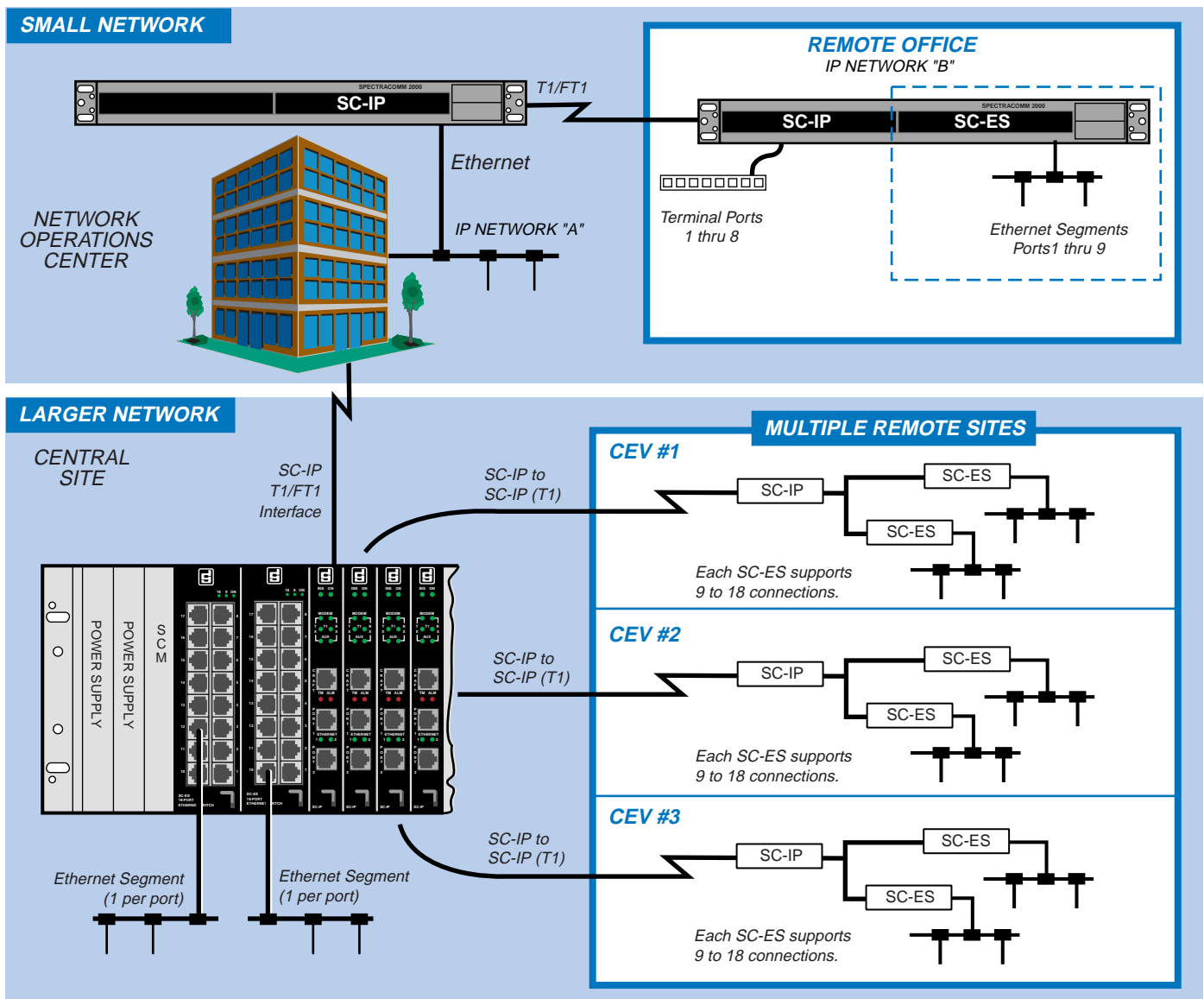
The primary SC-ES application is to provide low-cost, fast ethernet switch connectivity to the Carrier's internal LAN network. The NEBS-compliant SC-ES can be deployed anywhere within a Carrier's network: in the central office, in the remote office or in CEV/Hut environments.

SC-ES allows the segmenting of attached LAN devices to improve network performance and provides a 100Mbps full- or half-duplex channel for servers. It allows a network to be mixed (10 and 100Mbps) for optimal price/performance ratio, and is ideal for relieving bandwidth bottlenecks and providing faster response times. Using ethernet switch technology, SC-ES supports cabling distances of up to 100 meters by eliminating the propagation delays normally found with hubs/repeaters.

## Extending Small and Large Networks

The SC-ES may be deployed to extend the Carrier's management in a small or large network. In a small network application, the SC-ES is installed at the remote site with one of the Ethernet ports connected to any router or bridge at that site. The remaining SC-ES ports may be used to connect as many as 17 LAN devices at that site.

In larger network applications, a Carrier can manage equipment using SC-ES at a Central Office location which has multiple remote sites (CEVs). Similarly, multiple COs can also deploy the SC-ES. In such large Carrier networks, SC-ES provides LAN connectivity from the Network Operations Center (NOC) to a Central site and all the way out to multiple remote sites. Router/bridge functions can be provided by customer equipment or by the SpectraComm IP, a companion product to the SC-ES.





# SpectraComm ES

## ADDITIONAL FEATURES

- Employs GDC's 'Smart CLI', an interactive command line interface, and the web-based CLI interface.
- Allows direct switch-to-switch connection via the Auto-Sense feature which detects and corrects for crossover cables.
- Auto-Negotiates for 10 or 100 Mbps port speed, full- or half-duplex modes and enabled/disabled flow control.
- Auto-Learns network addresses for up to two thousand Unicast MAC addresses and builds connections between network elements.
- Efficient configuration of multiple SC-ES devices via ASCII batch file upload/download.
- Responds to HPOV polling and Auto Discovery
- High performance 'run from ram' architecture includes Running, Primary and Standby versions of software.
- Software can be upgraded via standard TFTP.
- With a future upgrade, SCES will support:
  - Spanning Tree for network redundancy.
  - QoS Configuration for prioritization of traffic.
  - Port-based VLANs for port partitioning.
  - Configuration via an intuitive web (HTTP) interface.

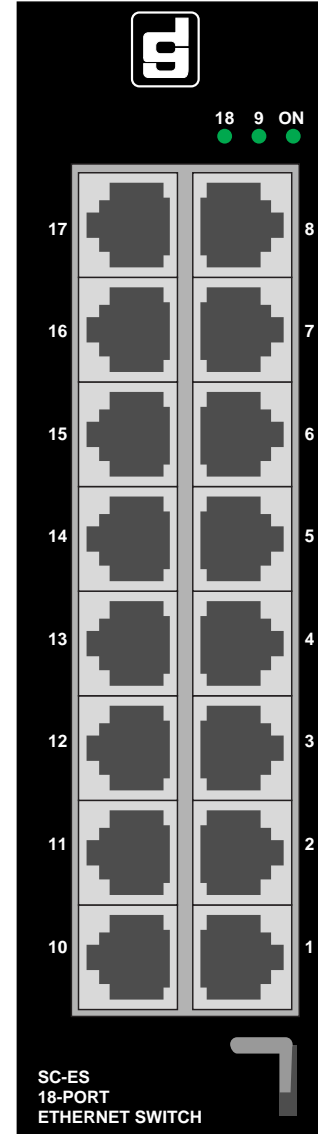
## NEBS-Compliant - Telco Tough

The rigorous Network Equipment Building System standards (NEBS), is a requirement for Central Office equipment located in U.S. public switched network centers, and is a universal measure of network product excellence for Carriers. General DataComm's family of NEBS-compliant products meet the stringent safety, environmental, shock and vibration standards that meet or exceed the "Telco Tough" criteria.

Both models of the SpectraComm Ethernet Switch are designed for NEBS Level III compliance and intended for installation in GDC's 16-slot SpectraComm/UAS shelves. The SC-ES 9-Port device can also be installed in the 2-slot SpectraComm 2000 shelf for applications at remote office sites. Stand-alone, non-NEBS applications can utilize the single-slot SpectraComm 1001 enclosure.

## Flexible and Scalable Connectivity

Any SpectraComm device, from SC202 to SC800 T3, can be co-located in the shelf with SC-ES cards, providing a unified, flexible, managed shelf environment that is scalable to the Carrier's network requirements. Typical shelf configurations can combine the SpectraComm Ethernet Switch cards with the SpectraComm IP cards, SC521A DSUs, as well as GDC modems and LTUs.





# SpectraComm ES

## SC-ES MANAGEMENT INTERFACES

SC-ES configuration is managed through SMART CLI, an interactive command line interface. Using CLI an authorized user can monitor or configure any SC-ES in the network from a terminal or Telnet connection or through any popular web browser. Using the SC-ES embedded SNMP agent, authorized users have access to the unit via any standard SNMP controller.

### Secure Access and Protection

Management access is protected by several robust security features:

- User- and Supervisor-level password protection authorizes every access attempt.
- Inactivity logoff prevents hacks through 'left on' equipment
- Enable/Disable of SNMP, HTTP, and TFTP services deters hacking through these protocols.

### Centralized and Versatile Options

The illustration (right) demonstrates centralized management of a system of SC-ES units in the Carrier's network. From this central site, the user can access SC-ES units via the desired interface: Terminal or Telnet CLI, Web-based or SNMP (not shown.) The number of concurrent management sessions is determined your workstation resources.

### SMART CLI Features

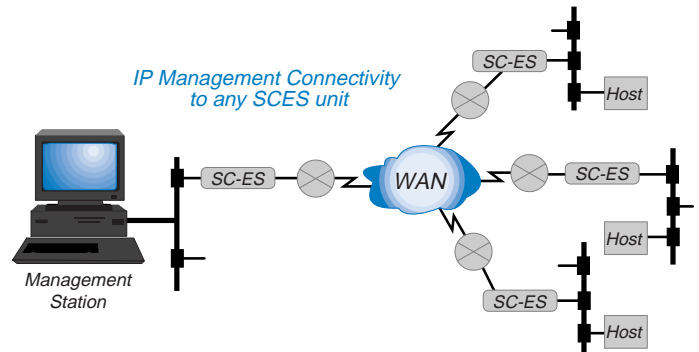
General DataComm's SMART CLI has a look and feel that will be familiar to most field personnel, with the benefit of several enhancements over most standard CLIs, such as:

- 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.
- SC-ES upgrades via TFTP downloads of software versions and configuration data.
- Command entry from a Telnet or terminal connection; Command entry at the web-based CLI webscreen.

### Web-Based Management

The SC-ES integral HTTP server provides password-protected access to configuration webscreens using any popular web browser.

## Centralized and Versatile Management



### Sample CLI Screen

```

SC-ES% configure
Type "configure ?" for a list of subcommands
SC-IP% configure ?
Help for "configure"
-----
inactivity      Configure inactivity time; requires 1 parameter(s)
ip-route       Configure ip static route table
mgt            Configure LAN extension or routing mode
ports          Configure port parameters
prompt         Configure custom prompt; requires 1 parameter(s)
snmp           Configure SNMP Server parameters
switch        Configure thernet switch parameters

SC-IP% configure _

```

### Sample Web Screens

**SpectraComm ES**

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

**SpectraComm ES**

**Statistics for Port 1**

RX Octets:	3936583	TX Octets:	147368
RX Undersize Packets:	0	TX Dropped Packets:	0
RX Pause Packets:	0	TX Broadcast Packets:	44
RX 64 Octet Packets:	49518	TX Multicast Packets:	0
RX 65-127 Octet Packets:	5997	TX Unicast Packets:	1844
RX 128-255 Octet Packets:	647	TX Collisions:	0
RX 256-511 Octet Packets:	459	TX Single Collisions:	0
RX 512-1023 Octet Packets:	0	TX Multiple Collisions:	0
RX 1024-1522 Octet Packets:	1	TX Deferred Transmit:	0
RX Oversize Packets:	0	TX Late Collisions:	0
RX Jabbers:	0	TX Excessive Collisions:	0
RX Alignment Errors:	0	TX Frame In Disc:	0
RX FCS Errors:	0	TX Pause Packets:	0
RX Good Octets:	3936583		
RX Dropped Packets:	0	Admin State:	On
RX Unicast Packets:	2387	Link Status:	Up
RX Multicast Packets:	5521	Auto Negotiate:	Enabled
RX Broadcast Packets:	48714	Flow Control:	Disabled
RX SA Changes:	51438	Port Speed:	100
RX Fragments:	0	Duplex Status:	Full
RX Excess Size Disc:	0	MDIX Status:	MDIX
RX Symbol Error:	0	Channel Polarity:	Normal



## Physical & Electrical Specifications

### SC-ES 9-Port Dimensions

Width: 178 mm (7.0 in.)  
Height: 21 mm (0.81 in.)  
Depth: 241 mm (9.5 in.)  
Weight: 0.28 kg (10 oz.)  
Shipping weight: 0.74 kg (1 lb 10 oz)

### SC-ES 18-Port Dimensions

Width: 178 mm (7.0 in.)  
Height: 42 mm (1.62 in.)  
Depth: 241 mm (9.5 in.)  
Weight: 0.33 kg (12 oz.)  
Shipping weight: 0.78 kg (1 lb 12 oz)

### 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 Specifications

### 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.

9-Port Power Dissipation: 6 Watts maximum  
18-Port Power Dissipation: 9 Watts maximum

## 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

Immunity:  
IEC-61000-4-2 ESD, IEC-6100-4-5 Surge

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

## Operational Specifications

### Modes of Operation

As a Standalone Switch providing 9 or 18 port-connectivity.

For greater port density requirements, one or two ports can be used as logical uplinks to another switch/hub device.

### Physical Interfaces

Rear Panel Craft Port:  
TIA/EIA-232

Front Panel Ethernet Ports (8 or 16 ports):  
RFC1213 MIB-2; RFC1643 Ethernet-like MIB; RFC 1493 Bridge MIB  
IEEE 802.3, 802.3U, 802.3x providing compatibility with all industry standard Ethernet and fast Ethernet devices.

Rear Shelf Slot Ethernet Ports (1 or 2 ports):  
Can be used as logical uplinks;  
Same specifications as for Front Panel ports.

### Statistics

RX and TX Octets  
RX and TX Pause Packets  
RX and TX Dropped Packets  
RX and TX Unicast Packets  
RX and TX Multicast Packets  
RX and TX Broadcast Packets  
RX Undersize/Oversize Packets  
RX Jabbers  
RX Alignment Errors  
RX FCS Errors  
RX SA Changes  
RX Fragments  
RX Excess Size Disc  
RX Symbol Error  
TX Collisions  
TX Deferred Transmit  
TX Frame In Disc

### Management Options

Command line interface via VT-100 compatible terminal

Command line interface via Telnet and web-interface

HTTP interface via embedded web-server agent using PC browser (HTML and JAVA 1.1 supported)

SNMP support for standard statistics.

## Security

Username and Password access

Multi-level Permissions: User (Read-only), Supervisor (Read-Write) or Administrator (Read-Write and special functions)

Individual disabling of HTTP, SNMP and/or TFTP access

HTTP, Telnet and TFTP timeouts