

Reliable E1 Connectivity for Remote Network Management

Highlights

- Low-cost, reliable routing or LAN-extension
- Supports scalable high performance LAN via 10/100BASE-T Ethernet
- Compatible with existing UAS 600, 700 and 7000 Series devices.
- PTT-tough, compliant packaging

Introduction

As PTTs introduce IP equipment to their networks, GDC's SpectraComm IP device (SC-IP) offers two independent modes of operation that provide access solutions for LAN-attached IP devices and legacy (Craft Port) devices. SC-IP connectivity can be conducted over the Carrier's E1/FE1 networks, as well as over a dial-up PSTN.

- In router mode, SC-IP provides management access by extending the PTT's internal network to remote locations where separate IP networks are required.
- In LAN-X mode, SC-IP can be deployed as a LAN-extension device for those remote locations where a single 'flat' IP network is required.

Connectivity via IP Routing

Figure 1 demonstrates how the SpectraComm IP uses static routing to forward IP data between serial WAN ports and an Ethernet (LAN) switch and connects to the craft ports of up to eight co-located devices. Dial-in users may be authorized for read or read-write access to remote devices over the private switched telephone network.

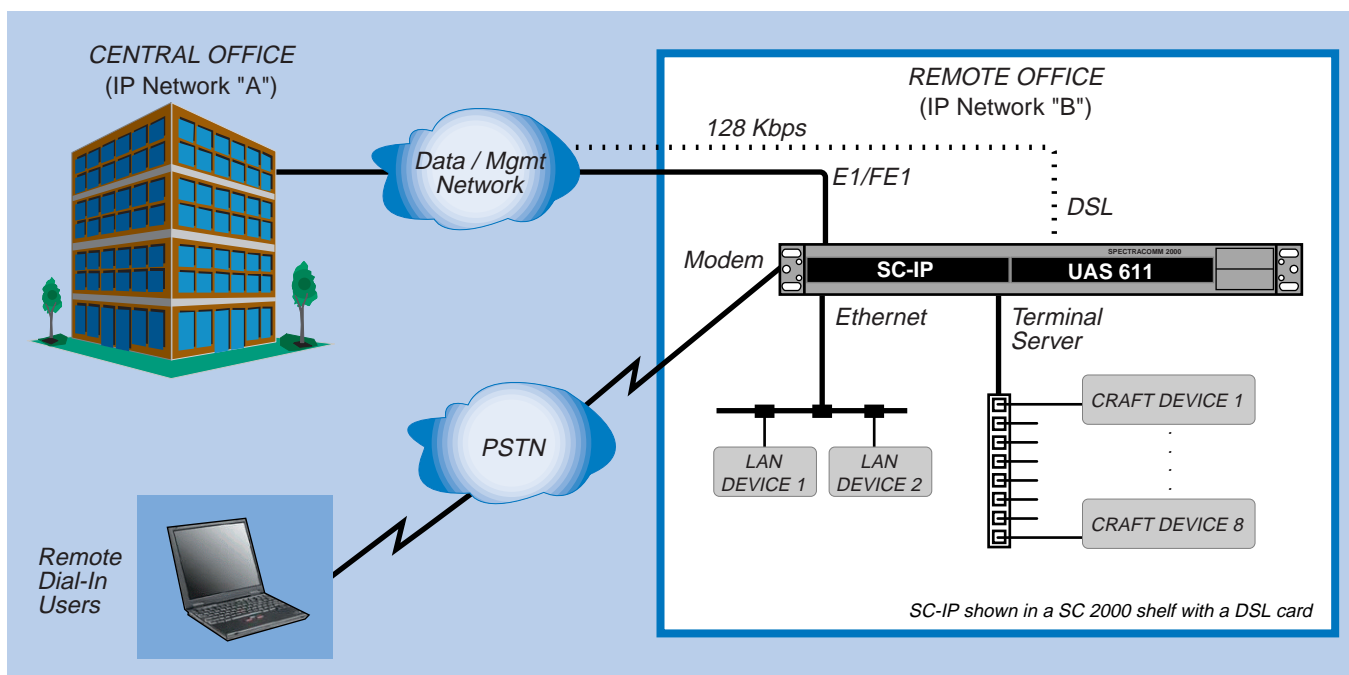
Connectivity via LAN-Extension

Figure 2: When placed in LAN-extension mode, the SC-IP extends the Carrier's local area networks. Deployed in pairs, SC-IP cards are connected to their separate LANs via the Ethernet interface and are connected to each other 'back-to-back' via the E1 or WAN. GDC's LAN-extension (LAN-X) is used as the link layer WAN protocol.

Switched Ethernet Applications

When additional Ethernet connectivity is required, SC-IP will integrate with SpectraComm Ethernet Switch (SC-ES) cards, offering scalable IP connectivity in 9 or 18 port increments.

Figure 1: Typical Deployment of SC-IP E1 Router





SpectraComm IP-E1

SC-IP E1 ROUTER APPLICATIONS

Figure 1 shows an application of the SC-IP in static router mode, which provides “Telco-tough” IP connectivity to the PTT’s internal network and between managed sites.

SC-IP can be located anywhere within the PTT’s network; for example SC-IP can be located within the Central Office’s environment as part of the inside plant, or located in a remote office or CEV-Hut environment as part of the outside plant.

With SC-IP routers deployed in all remote offices, virtually all remote devices can be connected back to the Central Office through their ethernet LAN ports or their craft ports. In addition, the SC-IP’s exclusive use of static routes provides reduced IP traffic in the Carrier’s network.

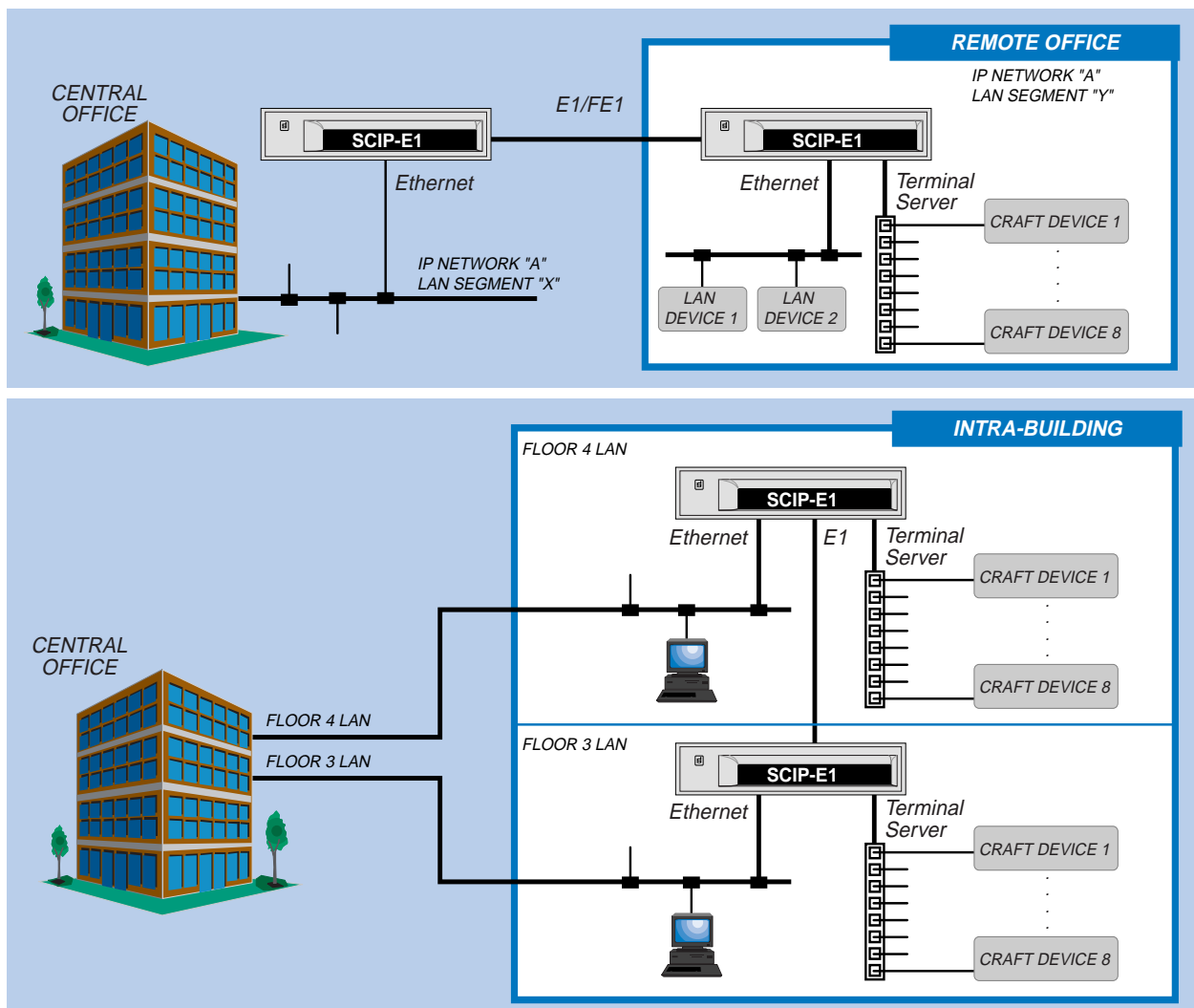
SC-IP E1 LAN-X APPLICATIONS

Figure 2 shows SC-IP in LAN-X mode of operation where a Central Office can extend its LAN via one or more pairs of SC-IPs connected ‘back-to-back’ over the E1 line. This configuration reliably extends the PTT’s network; any remote device can be accessed from the Central Office via the SC-IP. The PTT’s LAN can be extended within a building (i.e., between floors) or, more typically, across a WAN connection.

SC-IP can be located anywhere within the PTT’s network; for example SC-IP can be located within the Central Office’s environment as part of the inside plant, or located in a remote office or CEV-Hut environment as part of the outside plant.

SC-IP in LAN-X mode is ideal for flat IP networks and realizes savings by eliminating routers in the network topology.

Figure 2: SC-IP E1 in LAN-extension Mode





SpectraComm IP-E1

ADDITIONAL FEATURES

- Employs GDC's 'Smart CLI', an interactive command line interface, and the intuitive web (HTTP) interface.
- Remote access to eight craft devices and two LAN switching devices.
- Provides Telnet 'cut-thru' to terminal server ports.
- Access to E1/FE1 network via an integral E1 CSU/DSU with long-haul and short-haul capability.
- Frame Relay or PPP for link layer encapsulation of IP traffic
- Efficient configuration of multiple SC-IPs via ASCII batch file upload/download
- High performance 'run from ram' architecture includes Running, Primary and Standby versions of software.
- Software can be upgraded via TFTP.
- With a future upgrade, SCIP supports:
 - an internal or external V.34 modem.
 - DSL network access via synchronous DTE interface to an external DSL modem.
 - secure SC-IP configuration via dial-up connectivity.

PTT Safe - Telco Tough

Designed for reliable and secure deployment anywhere in the PTT network, the SC-IP installs easily in the high density 16-slot SC 5000 shelf or the 2-slot SC 2000 shelf. For stand-alone applications, SC-IP installs just as easily in the single-slot SC 1001 (AC) or SC 1002 (DC) enclosure.

Flexible and Scalable Connectivity

Any UAS system device can be co-located in the shelf with SC-IP cards, providing a unified, flexible, managed shelf environment that is scalable to the PTT's network requirements. Typical shelf configurations can include SC-IP with SpectraComm Ethernet Switch cards (SC-ES 9-Port or SC-ES 18-Port), the SpectraComm Manager Card, the UAS 600, 700 and 7000 Series devices, as well as GDC modems and line termination units (LTUs).

SpectraComm Ethernet Switch Cards

The SC-ES cards can connect several 10/100B-T Ethernet devices on the same network segment at maximum speed and improved LAN performance. In a shelf at a remote site, the SC-ES 9-port or SC-ES 18-port card connects to one of SC-IP's two ethernet ports. This configuration extends the Carrier's management network to reach remote devices attached to a scalable ethernet LAN.

Remote Authentication for Dial-In Users

With a future upgrade, RADIUS can be enabled in the SC-IP integral modem or an external modem in order to open a client service session for RADIUS security. With this capability, only authorized dial-in users will be granted access to remote devices connected to the SC-IP in the PTT's network.

Security

SC-IP access is protected by several security measures: provides multi-level password authentication; can disable TFTP, HTTP or SNMP services when desirable; can enable RADIUS security (optional software) for dial-in users.

Connectivity Requirements:	SC-IP Solutions Extend the Reach
Local legacy devices and two local LANs	The terminal server connects to up to eight legacy device craft ports; the Ethernet interface connects to two hosts, hubs or switches, reaching devices attached to associated LANs.
Remote legacy devices via E1/FE1	The E1/FE1 interface connects to SC-IP at the remote site, reaching up to eight remote legacy devices.
Remote legacy devices via DSL networks	Synchronous DTE interface to a UAS611 NTU (at 128 kbps) connects to SC-IP at a remote site, reaching up to 8 remote legacy devices.
LAN-attached devices at remote sites on the same IP network (i.e., a flat IP network)	SC-IP LAN-extension reaches any LAN or craft-attached device at remote sites.
LAN-attached devices at remote sites on separate IP networks	SC-IP static routing reaches LAN or craft devices at remote sites; static routes required.
Local or remote switched Ethernet devices	SC-IP and SC-ES cards provides switched connectivity to remote sites: SC-ES 900 (9 ports) or SC-ES 1800 (18 ports).
Secure access for dial-up users	Password-protected access to SC-IP via its V.34 modem. Password-protected access to SC-IP via its asynchronous AUX interface to an external modem. Integrates with optional RADIUS Security via the SC-IP's integral modem or via the SCM and a SC V.34 modem.



SpectraComm IP-E1

SC-IP MANAGEMENT INTERFACES

SC-IP 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-IP in the network from a terminal or Telnet connection or through any popular web browser.

Secure Access and Protection

Management access at CLI and web interfaces is protected by several SC-IP 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

Figure 3 illustrates centralized management of a system of SC-IPs in the Carrier's network. From this central site, the user can access SC-IPs via the preferred CLI interface: Terminal Telnet CLI, or web browser. The number of concurrent management sessions is determined by your workstation resources.

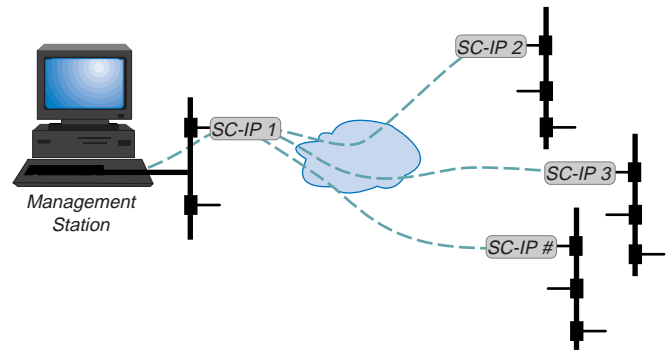
SMART CLI Features

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-IP upgrades via TFTP downloads of software versions and configuration data.
- Command entry from a Telnet or terminal connection;

Web-Based Management

SC-IP's integral HTTP server provides password-protected access to easy-to-use webscreens. Authorized users can monitor or change SC-IP configuration and operation parameters in a streamlined logical graphical user interface using any popular web browser.



Terminal / Telnet CLI Interface Option

```

SC-IP% configure
Type "configure ?" for a list of subcommands
SC-IP% configure ?
Help for "configure"
accounts      Configure usernames and passwords; clear login statistics
frame-relay   Configure frame relay parameters
inactivity    Configure inactivity time; requires 1 parameter(s)
interfaces    Configure interface parameters
ip-route      Configure ip static route table
lanx-router   Configure LAN extension or routing mode
modem         Configure modem parameters
prompt        Configure custom prompt: requires 1 parameter(s)
snmp          Configure SNMP Server parameters
e1            Configure E1 parameters
term-serv     Configure terminal server parameters
SC-IP% configure _

```

Web-based Interface Option

SpectraComm IP

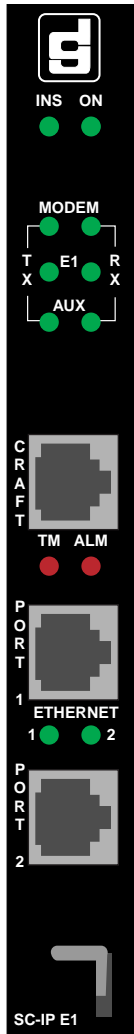
YOUR SYSTEM NAME (172.16.5.127)

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-IP

Figure 3: SC-IP Management Interface Options



SpectraComm IP-E1



Physical & Electrical Specifications

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)

Environmental Specifications

Non-Operating Temperature:
-40 to 70 degrees C (-40 to 158 degrees F)
Non-Operating Relative Humidity: 5% to 95%
Non-operating Altitude: Up to 12,191 m (40,000 ft)
Operating Temperature:
0 to 50 degrees C (32 to 122 degrees F)
Operating Relative Humidity: 5% - 90% non-condensing
Operating Altitude: -60 to 4,0000 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 or enclosure.
Power Dissipation: 6 Watts maximum, each

Compliance & Compatibility

Safety:

TUV (*pending*)
CE Mark (*Pending*)
UL, CUL (*Pending*)

SC-IP Card:

CTR-12; CTR-13 (*Pending*)
EN 55022 Class A approval (*Pending*)
EN 60950 (*Pending*)

Operational Specifications

Modes of Operation

Router Mode:
Static routing between any two SC-IP interfaces.
(IP version 4)
LAN-X Mode:
SC-IP to SC-IP over WAN (E1) interface.
(Proprietary WAN protocol)

Physical Interfaces

Front Panel Craft Port: V.24/V.28, TIA/EIA-232
Front Panel Ethernet Ports (2):
RFC 1213; MIB for Network Management of TCP/IP-based Internets; RFC 1398; Ethernet MIB; ANSI/IEEE 802.3; ANSI/IEEE 802.1d; Full duplex Ethernet
Terminal Server Ports:
V.24/V.28, TIA/EIA-232 for connection to up to eight devices.
AUX Port:
V.24/V.28, TIA/EIA-232 for asynchronous operation up to 115.2 kbps
V.24/V.28, TIA/EIA-232 for synchronous operation up to 128 kbps
E1 Interface:
2048 Kbps per G.703 and G.704
Frame Relay DTE interface (UNI-U)
PPP interface (RFC 1661)

Integral Modem port:
PPP or UART mode

SC-IP CSU/DSU Operation

Data Rate: N x 56/64 Kbps, where N = 1 - 32 DS0s
Data Encoding: HDB3
Framing: E1 Framed G.704 (with or without CRC4)
LMI: Q.933 Annex A, T1.67 Annex D, Consortium LMI

Integral Modem Operation

ITU-T V.34
V.42 LAPM and MNP 2-4 error correction
V.42 bis and MNP 5 data compression

SC-IP Management Interface 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.