GENERAL DATACOMM

SpectraComm 553 CSU/DSU

CSU/DSU Functionality over T1/FT1 Networks

INTRODUCTION

The SpectraComm 553 Data Service Unit (SC 553 DSU) is a highly efficient means of transmitting and receiving digital data. It provides interface between customer equipment and a T1 or Fractional T1 (FT1) digital carrier facility provided by a Telco or other carrier. The SC 553 DSU performs both Data Service Unit (DSU) and Channel Service Unit (CSU) functions.

The SC 553 DSU is intended principally for space efficient, high density central site installations. As a DSU it converts one channel of customer data to bipolar format for transmission over the T1 network. As a CSU it is responsible for network interfacing and protection.

Theory of Operation

The SC 553 DSU is software controllable for configuration, diagnostic testing, and alarm management via Simple Network Management Protocol (SNMP) control or terminal interface control. Both types of control can be extended from a master DSU installed at a central site to its dedicated remote DSU. A co-located SpectraComm Manager card (SCM) is required with the DSU at the central site to provide communication and interface functions.

Scalable, Flexible Connectivity

The SC 553 DSU is a 7-inch by 9.5-inch (178 mm by 241 mm) printed circuit card that conforms to GDC's SpectraComm format. As part of the SpectraComm family of products, NEBS-compliant SC553 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 SC553 installs just as easily in the single-slot SpectraComm AC or DC standalone enclosures. Any SpectraComm device can be co-located in the shelf with the SC553, comprising a unified, flexible, managed shelf environment that is scalable to the Carrier's network requirements. This "SpectraCommonality" means reduced sparing requirements and more flexible inventories *(Figure 1)*.

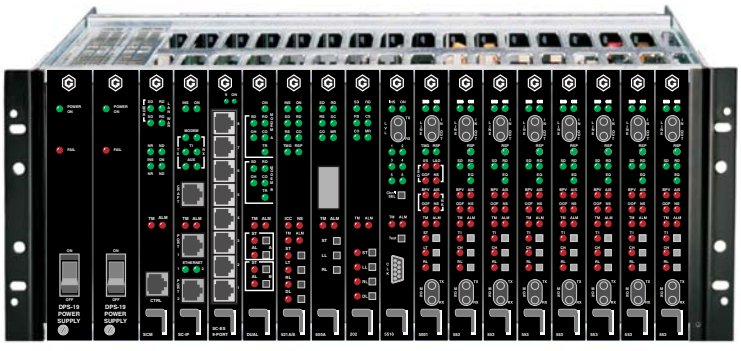
The SC 553 supports RS-449/EIA-530 and ITU V.35 interfaces. The SC 553 also supports a cascade port that can be selected for either DS1 or DSX-1 operation. The Cascade Interface card can be used to support drop/insert capabilities for the DSU or to enable the unit to operate as a channel service unit (CSU) interfacing a DSX-1 signal from the customer site onto the T1 network *(Figure 2)*.

FIGURE 1: SC 553 in SC Housings

SC 553 in SC Standalone Enclosure (1-Slot)

SC 553 and SCM in SC 2000 Shelf (2-Slots)

SC 5000 Shelf (16-Slots)



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FEATURES & BENEFITS

- Supports full T1 or Fractional T1 operation with operating speeds, assigned in multiples of 56 kbps or 64 kbps, from 56 kbps to 1.536 Mbps (24 DS0s at 64 kbps each).
- Supports selectable Extended Superframe Format (ESF) and D4 Superframe Formats at the network interface and the optional cascade port.
- Provides configurable Auto Framing options at the network interface and the optional cascade port to adapt the DSU automatically to ESF or D4 format
- Supports unframed operation, running at 1.544 Mbps.
- Supports Simple Network Management Protocol (SNMP) network management for software control of configuration, alarm reporting, and diagnostic testing.
- Communicates with SNMP controller through a shelf-resident SpectraComm Manager (SCM) card for comprehensive, non intrusive network management.
- Provides terminal interface functions that are accessible, when installed in SpectraComm shelf through the shelf-resident SCM card using either a VT100-compatible ASCII terminal or a computer running the Telnet protocol.
- Supports direct-connect terminal interface for a VT100-compatible ASCII terminal when installed in an SC 2000 enclosure.
- Provides selectable transmit timing: Receive, Internal, Cascade, External (DTE), or Station Clock.
- Provides DTE interface that conforms to ITU-T V.35; supports EIA-530 interface when equipped with optional plug-in card.
- Supports optional T1 Cascade Port interface, configurable for DSX-1 or DS1 operation. With cascade installed:
    - channelized DS0 bundle from DTE port can be directed either to network interface or to Cascade Port.
    - can function as CSU with all network interface DS0s connected to Cascade Port.
    - supports automatic fault recovery application in which cascaded DSUs are installed in a ring arrangement.
- Can be housed in a variety of AC-or DC-powered SpectraComm shelf/enclosures *(Figure 1)*.

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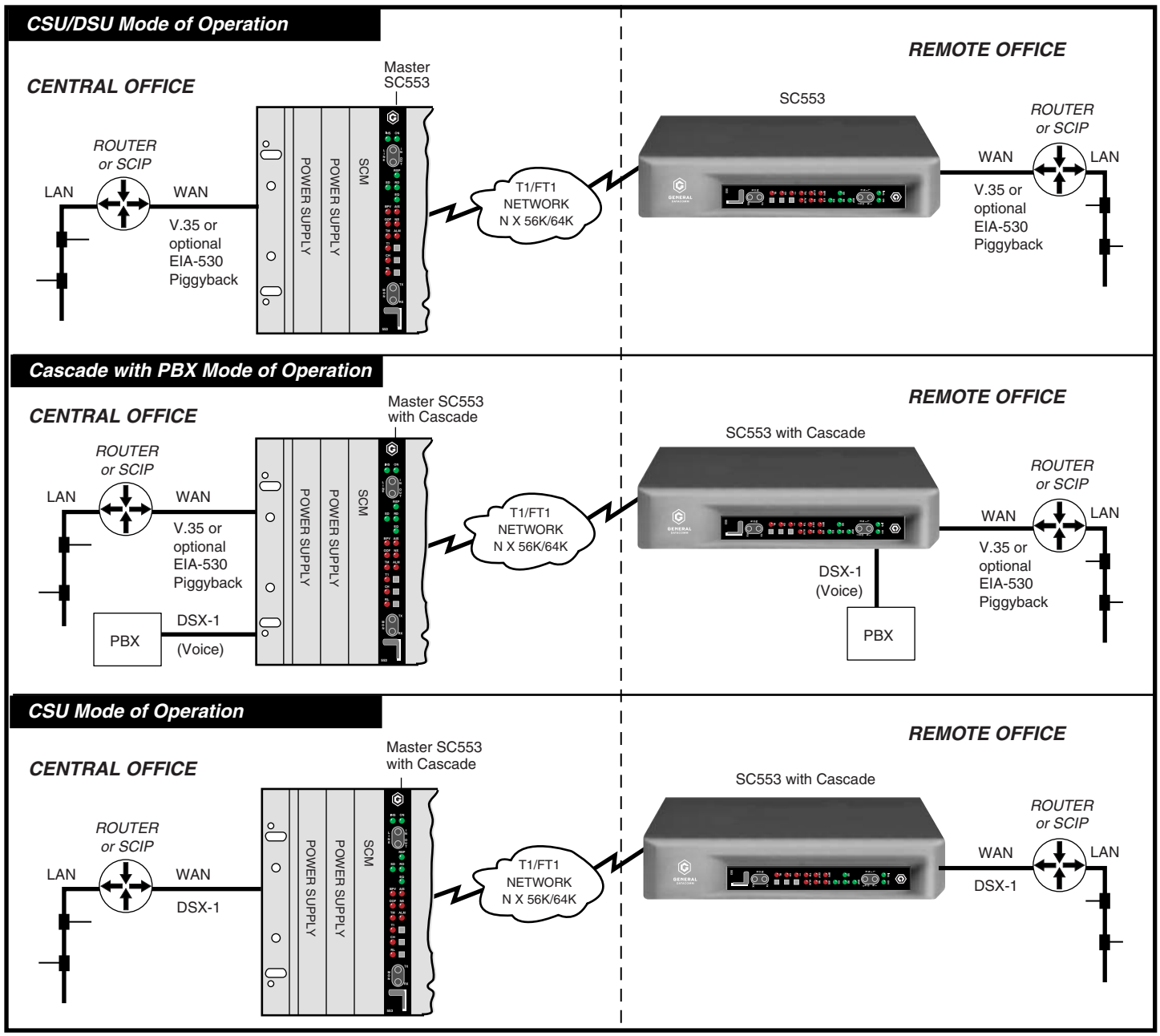
SC 553 APPLICATIONS

Figure 2 shows the SC553 deployed in three modes of operation, with a master SC553 and SpectraComm Manager (SCM) co-located at the central offices, and a standalone SC 553 located at the remote offices. The SCM provides communication and interface functions and serves as the SNMP agent for a broader range network-wide management capabilities. Terminal interface control is supported to one master DSU and its remote at a time.

The SC553 provides an IUT-T V.35 interface. Optional plug-in cards mounted on the SC 553 base card support additional interfaces: the 530 interface plug-in supports the EIA-530 DTE interface; the Cascade plug-in supports a cascade port that can be selected for either DS1 or DSX-1 operation. The Cascade plug-in can support drop/insert capabilities for the DSU, or can enable the unit to operate as a channel service unit (CSU) interfacing a DSX-1 signal from the customer site onto the T1 network.

FIGURE 2: SC 553 Applications



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PHYSICAL SPECIFICATIONS

Single-slot Blade

Width: 178 mm (7.0 in)
Depth: 241 mm (9.5 in)
Height (SC 553 card only): 21 mm (0.81 in)
Height (SC 553 with 530 card): 45 mm (1.75 in)

Weight (SC 553 card only): 0.28 kg (10 oz)
Shipping Weight (SC 553 only): 0.74 kg (1 lb 10 oz

ENVIRONMENTAL SPECIFICATIONS

Non-Operating

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

Operating

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 ft to 10,000 ft)

ELECTRICAL SPECIFICATIONS

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

Power Dissipation: 6 Watts per slot maximum

COMPLIANCE & COMPATABILITY

Safety: UL Approved

NEBS Level III Certified

EMI: FCC Part 15 Class A Approved

Telco: FCC Part 68 Approved

Quality Assurance: ISO 9001:2000 Certified

OPERATIONAL SPECIFICATIONS

Communications

Data rates: N x 64 kbps or N x 56 kbps (N = 1 to 24); maximum aggregate (payload) rate of 1,536,000 bps

Communication line: T1 digital carrier (non-loaded, staggered-twist ABAM, PIC, or pulp-insulated exchange-type cable, 19 to 26 gauge)

Line impedance: 100 Ohm

Physical Interfaces

Network and Cascade port physical interface: RJ48C modular jack

DTE interface: DB25 (25-pin female subminiature-D connector

Network & Cascade Transmitter Specifications

Frequency: 1,544,000 bps ± 75 bps

Pulse amplitude with surge protection current: 2.40 to 3.60 V at 60deg F (may vary over a cycle of 60 Hz)

Unbalance in height of adjacent negative and positive pulses: 200 mV (maximum)

Width of output pulse (half amplitude): 324 nsec ± 45 nsec

Unbalance in width of positive and negative pulses: 20 nsec (max)

Time between two consecutive pulses of opposite polarity: 648 nsec ± 15 nsec (measured at half amplitude point of leading edges)

Maximum rise or falling time: 100 nsec

Overshoot at trailing edge of pulse: 10% to 30% of pulse amplitude

Line Build-Out: 0, 7.5, or 15 dB (selectable or automatic) at 772 kHz

Timing source: Internal clock, external clock, slave (received timing loopback)

Network & Cascade Receiver Specifications

Operating range: 0 to -32 dB of cable loss at 772 kHz

Input impedance: 100 3/4

Jitter tolerance: Conforms to specifications defined in AT&T PUB 62411, December 1988

Longitudinal balance: 35 dB from 50 to 1500 kHz

Transmitter Pre-equalization: 0 to 655 feet of line length

Transmitter Impedance: 100 3/4

Receiver Impedance: 100 3/4

Channel port (customer equip) interface:

Standard: ITU-T V.35-compatible synchronous serial data port

Optional: EIA-530 compatible synchronous serial data port

T1/FT1 Compatibility

Data encoding: AMI with no bipolar violations, and B8ZS

Clear Channel Capability: B8ZS

Network interface: 1.544 Mbps channelized DS1 in consecutive or alternate DS0s (complies with AT&T 54019A specifications for FT1 transmission)

Consecutive zeros enforcement: 15 or 39 maximum

Average pulse density enforcement: Minimum one ‘one’ per 8 bits, or 24 ‘ones’ per 192 bits

Keep Alive signal: Type 1 (consecutive, framed ones filling the unused bandwidth)

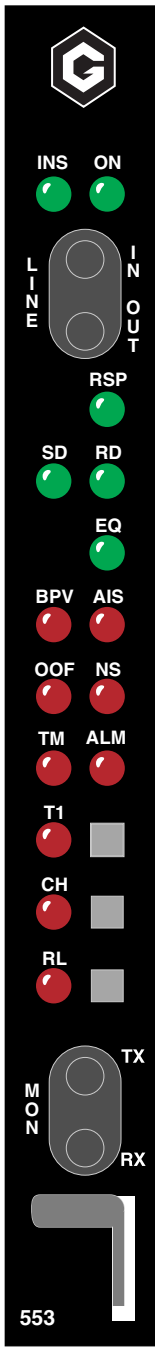
Framing format: D4 Superframe Format, AT&T 54016 Extended Super-frame Format (ESF), and ANSI T1.403 ESF, with automatic format option

Diagnostics

DS1 Line Loop with Self-Test; DS1 Local Test with Self-Test; DS1 Network Interface Loopback with Self- Test; DS1 Remote Test with Self-Test; DS1 Self-Test; DS1 Test Loop with Self-Test; DS0 Circuit Delay Measurement Test; DS0 Remote Test, with Self-Test; DS0 Self-Test; Channel Digital Loop; Channel Remote Digital Loop with Self-Test; Channel Self-Test; Front panel test jacks for DS1 access.

Alarms and Status Conditions

Out of Frame (OOF), Alarm Indication Signal (AIS or Blue alarm), Loss of Signal (LOS), Red alarm, and Yellow alarm



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