

**SUNRISE TELECOM**

... a step ahead



**SunSet<sup>®</sup> OCx**

**Powerful Transmission Testing & Protocol Analysis of  
SONET and T-carrier Access Networks**



# SunSet

## **A single solution for protocol analysis and physical layer troubleshooting– The SunSet OCx**

As telecommunications networks expand to higher bandwidths and wider arrays of services, it becomes more and more difficult to properly install, maintain, and troubleshoot them. A typical technician may be responsible for turning up and integrating many different services, requiring a host of skills, training, and equipment.

In addition, the modern access network combines many independent physical and protocol layers. A single voice or data connection may span the networks of several different companies including Regional Bell Operating Companies (RBOCs), Incumbent and Competitive Local Exchange Carriers (ILECs and CLECs), and other private and public networks.

### **The Challenge– comprehensive access network testing**

The SunSet OCx is the latest generation of access network test sets from Sunrise Telecom, the industry leader in design and manufacture of handheld telecommunications service verification equipment. It offers DS0 to OC-48 testing, along with all the service verification tools you need, including ATM, GR-303, Voice, and ISDN PRI. Technicians can increase efficiency, consolidate training, and save time and money by testing all these rates and services with a single handheld unit. Among handheld test sets, only the SunSet OCx has the feature set to ensure quality connections across the entire Access Network.

# OCx



OC-48 to DS0

## A complete kit of powerful protocol analysis tools— in one handheld unit

Incorporating the most popular and powerful features for testing T-carrier (T1 and T3) and Synchronous Optical NETWORKS (SONET), the SunSet OCx is also a full-featured protocol analyzer. The SunSet OCx analyzes Internet Protocol (IP), Asynchronous Transfer Mode (ATM), Primary Rate Integrated Services Digital Network (ISDN PRI), Bellcore GR-303-CORE, Frame Relay, and Signaling System 7 (SS7), as well as traditional voice frequency (VF) and trunk conditioning functions.

The SunSet OCx is battery powered and field upgradeable. Its light weight, durability, long battery life, and low cost make it the ideal tool for field technicians in the Access Network. The comprehensive measurements and advanced features are also well-suited for central office and laboratory environments.

### Power to grow

The SunSet OCx has the flexibility to grow as your network grows. If you only require DS3 and DS1 testing today, you can add SONET testing later with an easy software upgrade. Add features like ATM and GR-303 when you need them. Maintenance software upgrades and enhancements are available at no cost throughout the 3-year warranty period.

### Dual-Color LEDs

Check your circuit's operation at a glance, making testing as simple as "green is good; red is bad." Signal status is displayed simultaneously for all rates.

### Optical Test Ports

The SunSet OCx can be configured for SC or FC optical connectors, 1310 or 1550 nm, or dual wavelengths.

### Straightforward Results

There is no need to decipher or search through results. The SunSet OCx provides all results in an intuitive, convenient manner.

### Handset Jack

A convenient connector allows you to plug in a handset, enabling simultaneous communication over two DS1 drops or two PRI voice calls. The handset is also useful for noisy, central office environments.

### Easy to use

The OCx has a high-contrast color, backlit display and well-organized measurement screens that allow for quick access to all test results. The dual-state LEDs give unambiguous alarm and error information. The measurement screens collect all the important data at a glance; the dynamic summary screen provides an up-to-the-moment summary of all errors and alarms. Intuitive menus and function keys allow technicians to configure the test set quickly. The AUTO key simplifies test setup.





**Serial Port**

Print your results or store them on your PC for later review.

**DS1 Test Ports**

Dual DS1 Tx/Rx ports provide connections for full duplex T1 monitoring and drop/insert testing.

**Built-in Speaker**

Listen to speech over DS0 and PRI, or listen to DS0 tones using the convenient, hands-free speaker.

**STS-1/DS3 Test Ports**

Test and monitor STS-1 and DS3 circuits.

**ERR INJ Key**

Inject errors at DS1, DS3, or SONET rates to verify connectivity and response from network elements or to stress-test the network.

**STATUS Key**

Up-to-the-second status and event summary.

**AUTO Key**

The AUTO key eases test configuration, letting you test more quickly, efficiently, and accurately.

**Built-in Microphone**

Talk over DS0 or PRI using the convenient, hands-free microphone.

**Basic Testing Features**

- BERT up to 2.5 Gbps
- Bidirectional DS1 drop/insert
- Loopback and span control
- VF/DS0 and fractional T1
- Full complement of test patterns
- Error injection & alarm generation
- 16 MB data storage

**Advanced Testing Tools**

- Mux/Demux Testing & Emulation
- Pulse Mask Analysis
- SONET Overhead Control
- DS3 FEAC & C-bit Monitoring
- DS1 Data Link
- Remote Control

**Protocol Analysis/Emulation**

- ATM/IP
- VF Dialing
- ISDN PRI
- GR-303
- SS7
- Frame Relay

## Advanced SONET transmission testing & analysis—in a handheld

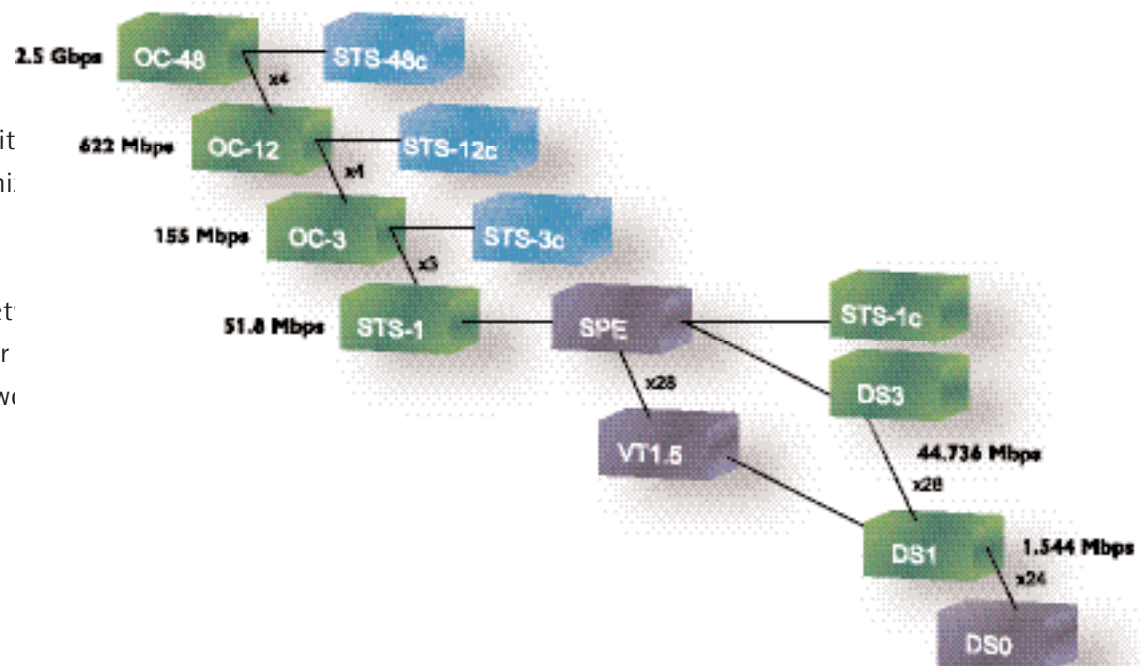
Don't let its size fool you—the SunSet OCx offers extensive features for SONET testing and analysis. With the SunSet OCx, operators can access the SONET network at the optical or electrical interface, including STS/OC-1, OC-3/3c, OC-12/12c, and OC-48/48c. It supports mapping for DS3, DS3/DS1 and VT1.5. Comprehensive SONET errors and alarms are conveniently sorted by near-end and far-end, section, line, and path, complying to Bellcore GR-253. Tests range from simple verification of power level & frequency for efficient field installation and maintenance, to advanced features like overhead control/decode and multiplex testing.

### SONET for the field

Lightweight, handheld, and ruggedized, the SunSet OCx is uniquely suited for field applications. The OCx gives you long battery life and a color display that is easily readable under all lighting conditions, indoor and outdoor. The OCx has the power and features you would expect from a benchtop box in a platform you can take anywhere.

Applications for the field technician:

- Verify network continuity
- Easily detect SONET errors and alarms with LEDs and well-organized results screens
- Monitor pointer movement in the net or adjust the pointer values to stress network elements





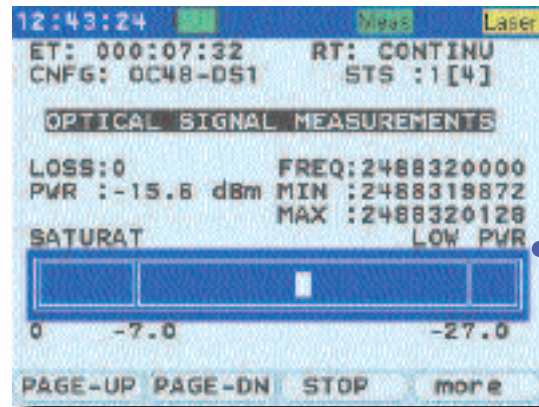
### APS Timing

Automatic Protection Switching is an important, mission-critical function of SONET. The SunSet OCx allows you to qualify this vital system by measuring the time it takes for a working circuit to switch to the protection circuit. The user can select the desired switch and gate times and the OCx will give a clear pass/fail indication along with the time measurement.

#### Sensors and Switching Criteria:

- Line and Path AIS
- Line Parity Errors (B2)
- DS3 Errors

The SunSet OCx also measures the duration of service disruptions & loss of pattern with millisecond resolution.



Field operators can quickly verify signal level with an easy to read power measurement.

### SONET Overhead Control

Nearly five percent of the SONET frame is dedicated to overhead. This overhead includes important network properties such as parity (B1, B2, B3, and VTBP-2), protection switching (K1, K2), pointers (H1-H2), network status (S1, G1, V5), and defects (AIS, RDI, REI, etc.).

The SunSet OCx gives you easy access to the entire section, line, path, and virtual tributary path overhead, displaying the hex values and their decodes. The OCx also provides control of transmitted overhead bytes, pointer values, and pointer movement.

#### SONET Overhead Highlights

- Decode/encode of overhead bytes
- Display & modify traces (J0, J1, J2) as text characters
- Data Communications Channel (D1-D3, D4-D12)
- VT1.5 overhead control (V1-V5, J2, etc.)

## Comprehensive T-Carrier Testing

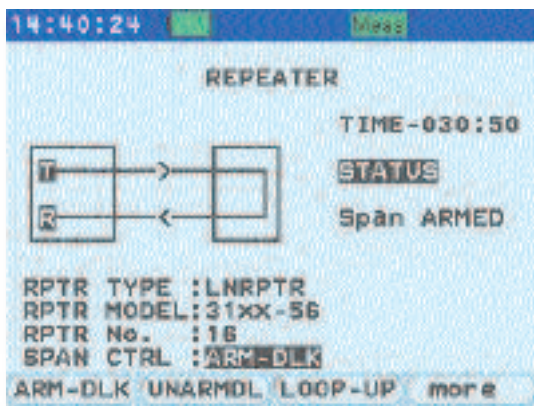
Just because the SunSet OCx is designed for high speed optical rates and data-centric protocols like ATM does not mean that you need to sacrifice the traditional T-carrier applications. In fact, the SunSet OCx offers all the transmission testing applications for T1 and T3 circuits.

### Loopback Control

Loopback testing is a vital tool for circuit turn-up and troubleshooting. The SunSet OCx provides a variety of options for looping DS1 and DS3 circuits, allowing technicians to isolate a fault quickly from a single location, saving time and truck rolls.

- In-band and data link codes
- Addressable repeaters (Westell/Teltrend)
- HDSL loopbacks
- DS3 and DS3/DS1 FEAC codes
- Easy-to-read diagrams

The OCx can also emulate CSU or NIU equipment and respond to loopback commands.

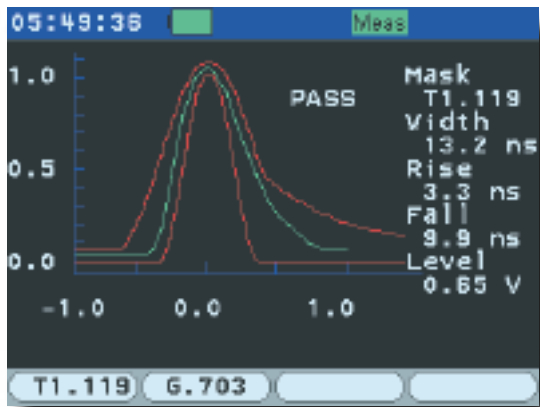


### DS1 Testing Features

The SunSet OCx comes standard with a variety of easy-to-use tools for testing DS1 networks.

- View Received Data shows all 24 timeslots over 20 DS1 frames—ideal for seeing in-band alarms and messages, identifying an ISDN D-Channel, or looking at simple test patterns.
- Quicktest I/II allows a technician to program a variety of test patterns for a set duration. At the end of the test, the OCx provides the test results for each pattern as well as a clear pass/fail indication. Quicktests can also automatically loop up and loop down the circuit.
- Bridge Tap Detect uses specialized test patterns to determine if bridge taps are on the line.
- Propagation Delay provides the roundtrip delay of a test pattern through the DS1 network.





## Pulse Mask Analysis

The pulse mask feature gives you a quick and powerful tool to analyze and qualify a DS1 or DS3 circuit. Physical layer problems become readily apparent, making for quick fault diagnosis.

The SunSet OCx measures the shape and key parameters of the pulse, displaying the pulse on the screen. The OCx then compares the shape to predefined templates based on governing standards and provides an easy-to-interpret pass/fail test.

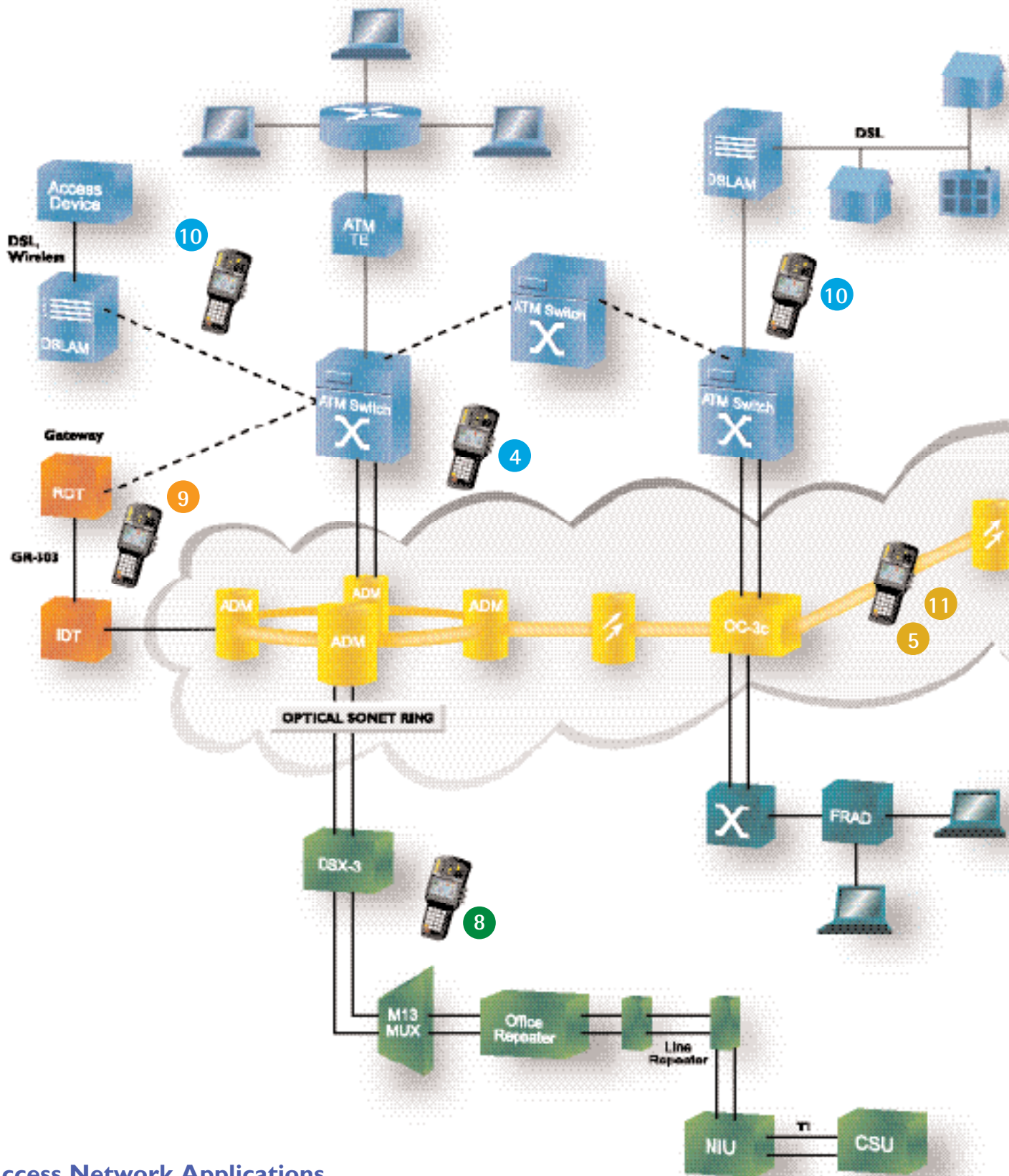
## DS1 Data Link

Monitoring the DS1 Data Link is an excellent way to discover errors which otherwise could not be detected at your monitoring point. Decodes of bit messages provide valuable information such as alarms and protection switching. Performance reports provide a comprehensive snapshot of the health of the circuit.

The SunSet OCx monitors and decodes both bit and performance report messages. The OCx also transmits bit codes selected by the user or performance reports compiled from its own measurement results.

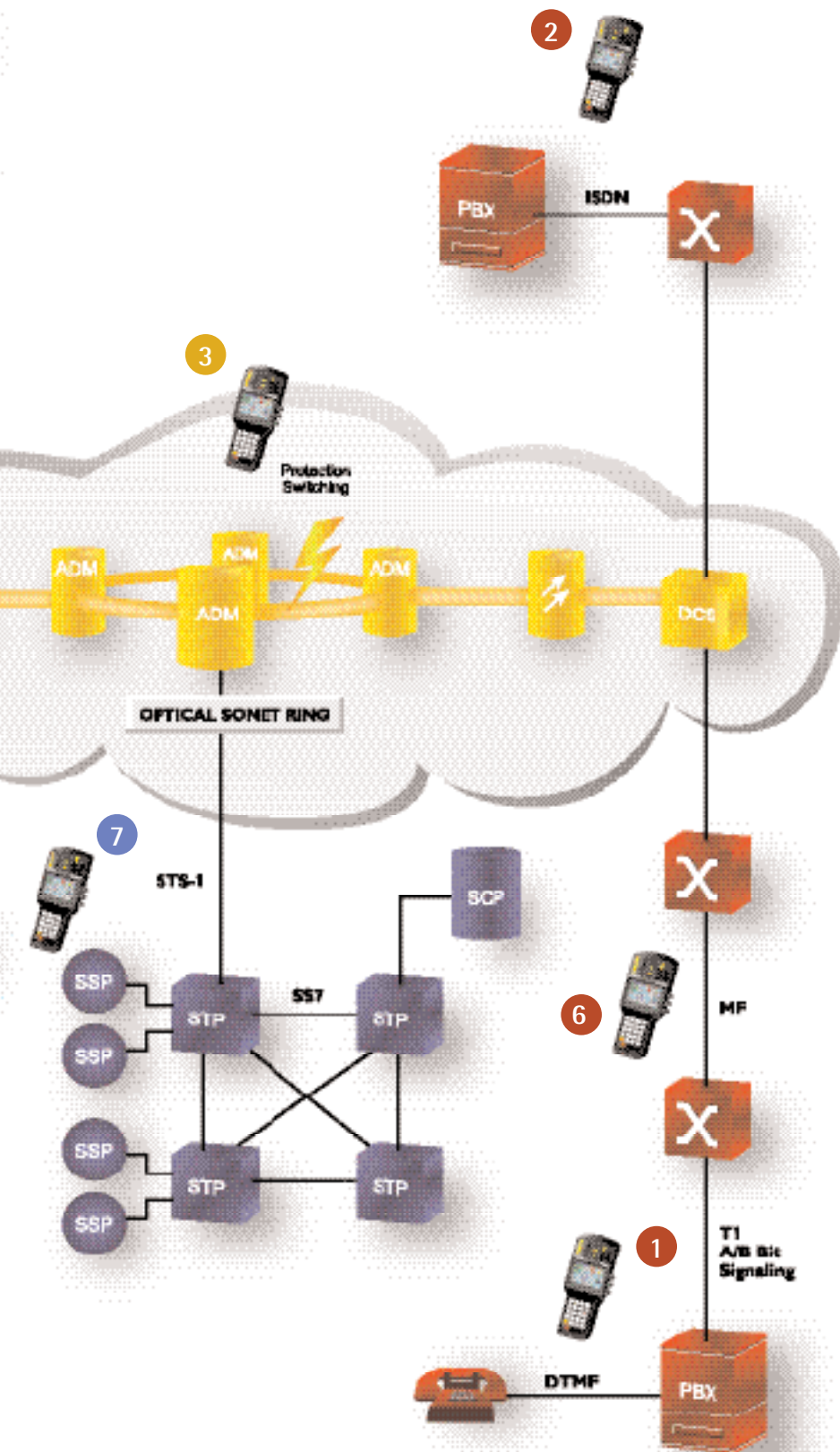
## DS3 FEAC

Monitor and transmit messages carried by the Far End Alarm and Control Channel used in C-bit framing to provide circuit status and loopback control.



## Access Network Applications

The SunSet OCx can go anywhere your network takes you.



- 1 Place/receive calls through a PBX or switch. Monitor live calls, voice, signaling, winks, digits, and call states.
- 2 Install and troubleshoot ISDN PRI circuits by placing, receiving, or monitoring calls.
- 3 Test automatic protection switch timing.
- 4 Monitor VCCs, ATM QoS, OAM and BERT.
- 5 Establish & analyze SONET link to Network Elements. Loopback and BERT T1 channels. Place calls on T1 channels.
- 6 Monitor MF signaling on inter-office trunks.
- 7 Perform inexpensive first-pass analysis on SS7 signaling problems.
- 8 Bring T3 or T3/T1 circuits into service. Loopback T1 devices.
- 9 Troubleshoot GR-303 links. Bidirectionally monitor TMC/CSC and EOC channels, identify signaling problems, and monitor alarm information.
- 10 Ping the PC or ISP. Perform a Point-to-Point test on an ATM/VPI/VCI.
- 11 Troubleshoot new optical circuit turn-ups.

## ATM Features

The SunSet OCx is the single testing solution for both the physical layer and the ATM layer. With one test set, a single technician can verify network performance with and without ATM traffic. All applicable network rates from T1 to OC-48c are available in one chassis, eliminating the need for multiple ATM test sets. The full-featured ATM testing capabilities of the SunSet OCx provide the power and flexibility to install and troubleshoot an ATM network from the ground up. The OCx can test and monitor transmission between separate network elements (NNI) or between the network and edge devices. Here it can verify network provisioning; perform stress tests; conduct BER testing; and monitor responses to alarms, errors, and OAM cells. The SunSet OCx allows you to non-intrusively monitor traffic across the network, gathering statistics on congestion, bandwidth, idle cells, OAM cells, and errors.

Any SONET or T-carrier network provisioned for ATM traffic needs to be qualified for ATM. If you lease your network to service providers using ATM, you need a tool to test, verify, and troubleshoot the network and the traffic it is carrying. Conversely, if you are responsible for the ATM traffic, you must verify that the network is error-free and functioning properly, especially when you do not own the network. When traffic is disrupted, you cannot waste valuable time and money on finger pointing.

### Traffic Generation

- Generate multiple independent VCCs. With the SunSet OCx, you can program up to eight independent VCCs, each with their own traffic pattern and payload, up to 100% of your ATM network capacity. The OCx supports 0.191 test cells or user cells with pseudo-random or 16-bit patterns.
- Insert Errors and OAM Cells. Inject bit errors, HEC errors, or OAM Fault Management cells into your generated traffic.

### Traffic Supervision

- VCC Scan. View the traffic moving across the network including the cell header and bandwidth. Filter on VPI or select one or more VCCs for more detailed traffic statistics.
- BERT and Quality of Service (QoS). The SunSet OCx supports QoS measurements, such as cell delay variation, cell loss ratio, and bit error rate testing.
- Capture and store cells. Save, view, decode, and analyze user and OAM cells. Decode the ATM header and OAM function fields.

#	GFC	VPI	VCI	PTI	CLP
1	0000	000	00032	000	0
2	0000	000	00000	000	1
3	0000	008	00035	000	0
4	0000	008	00035	000	1
5	0000	000	00032	010	0
6	0001	015	00128	000	0
7	0000	015	00128	000	0
8	0000	000	00064	000	0
9	0000	000	00068	000	0

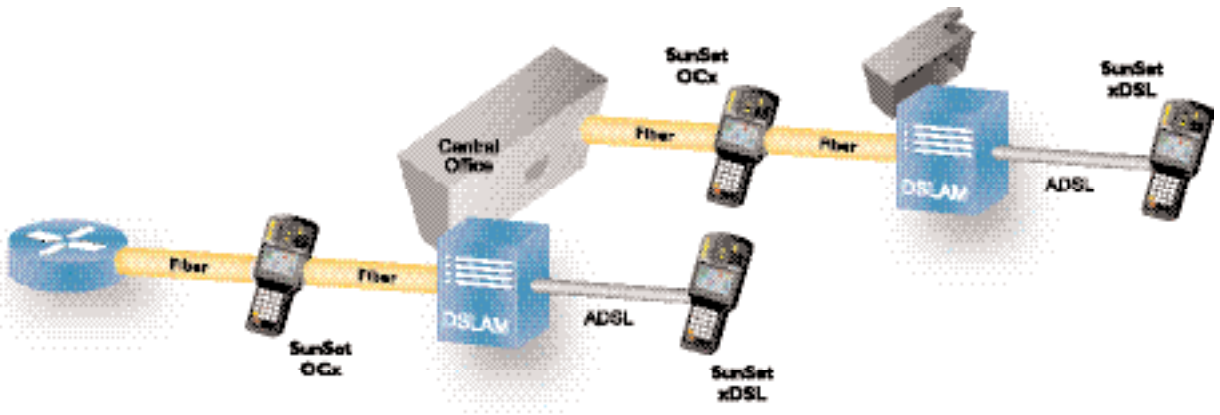
### DSL Testing Highlights

- Automatic detection of SunSet xDSL
- Independent upstream and downstream rates
- Bit error rate and throughput testing
- ATM over SONET and T-Carrier out of the DSLAM

## DSL Testing

As DSL becomes widely deployed, DSLAM (Digital Subscriber Loop ATM Multiplexer) installation verification is becoming more critical in ensuring proper functionality. However, when the full backbone is not operational, only limited testing can be achieved. To solve this problem, Sunrise Telecom has developed an innovative test solution for DSLAM turn-up verification.

The SunSet OCx works hand-in-hand with the SunSet xDSL to perform dual-ended, asymmetric ADSL qualification. These tests not only allow you to verify installation, but also the qualification of the Optical Carrier and the DSL copper pair simultaneously. This help qualify DLC (Digital Loop Carrier) Systems and verify proper provisioning of the remote DSLAM.



## ATM IP Testing

The predominant application for ATM networks, especially for DSL services, is the Internet. Testing the IP layer is critical for qualifying an ATM connection. Though it only takes a few minutes, the IP PING test can qualify not only the ATM network, but reach through Ethernet, Packet over SONET, and other IP-centric networks.

### ATM/IP Testing Highlights

- RFC 1483 Bridged and Routed, PPPoA, and PPPoE
- Static and dynamic addresses
- PING generation and automated PING response

```

20:49:00 [Meas]
ST:20:48:28 ET:000:00:34
LOCAL IP:001.002.003.004
DEST IP:100.101.102.103
PING : PASS

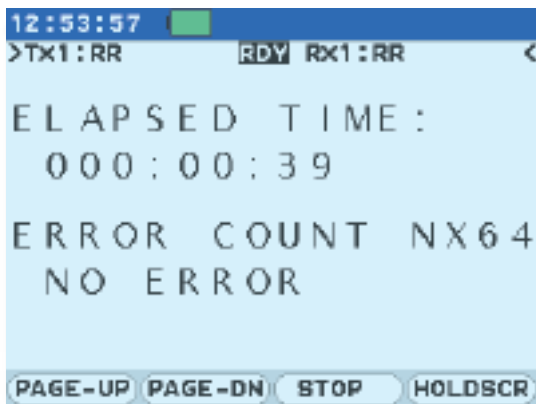
Pings : 123 Round Trip (ms)
Sent : 122
State : SENDING Crnt: 78
Recv'd : 120 Avg: 81
Unreac : 0 Max: 115
Missing: 2 Min: 73

[ECHO] [SUMMARY] [STOP]
    
```

## Powerful signaling and protocol analysis in your hand

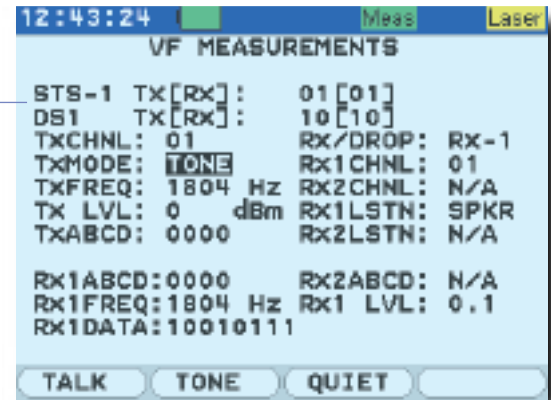
### VF/DS0 Testing

The SunSet OCx contains complete diagnostic tools necessary to install and troubleshoot voice circuits. Full duplex drop and insert testing allows the user to place a call on one channel while the T1 remains in service. Verify and monitor service, signaling, digits, and noise level. You can also check the voice path with the integrated microphone and speaker or handset. Full physical layer results allow transmission verification while measuring signal levels and error or alarm conditions.



### ISDN PRI Highlights

- TE/NT Emulation
- National ISDN, AT&T, and Nortel DMS
- 23B+D, 47B+D, or 46B+2D testing
- Talk/listen for voice calls: Standard, 3.1k
- BERT data calls: 56k, 64k, Nx64k
- Backup D-channel test for NFAS circuits
- D-channel monitor with full decode
- Trace filtering and storage



### VF/DS0 Highlights

- Full duplex drop and insert testing
- Talk/listen or send/receive test tones
- E&M, loop-start and ground-start with FXO/FXS
- Dialing: DTMF, MF, pulse
- Digit capture and analysis
- Scan mode for receiving calls or digits
- Noise Measurements: S/N, 3k-flat, C-message, C-notch
- Monitor calls: voice, signaling sequences with timestamps

### ISDN PRI

PRI trouble can be caused by a variety of sources such as physical layer errors, timing, switch translations, and protocol problems. A PRI test set that combines full-featured T1 and PRI testing lets you identify trouble the first time to avoid costly revisits. The SunSet OCx's ISDN Primary Rate option rivals protocol analyzers and equipment dedicated solely to PRI testing. You can use the OCx to install new PRI circuits or PBX equipment by placing/receiving voice and data calls. Talk/listen and BERT testing verify the B-channel connection. In-service monitoring can troubleshoot problems with a full D-channel decode, message filters, and storage.

## GR-303

The increased deployment of GR-303-based DLCs and access devices creates new provisioning challenges and troubleshooting problems. The SunSet OCx meets these new testing challenges for all aspects of GR-303 systems: monitoring the TMC/CSC control channel, viewing robbed ABCD signaling and dialed digits, listening to voice channels, and thoroughly testing the physical layer. The GR-303 option troubleshoots signaling problems between the switch and remote terminal. You can determine call status, monitor dropped calls, detect abnormal conditions, and identify when service was unavailable.

```
11:26:32
L2 01-11-16 12:59:34.011 0003
MSU - ISUP BSN:40 1 FBN:37 1
DPC:00-03-08 OPC:00-01-02
SI :5 SSF:08 SLS:004 CIC:004
MSG TYPE:01 - IAM
NOC INDI:00
FVD INDI:60 01
CLN PRY:00
USR SRVC:80 90 A2
CALLED No:03 90 11 11 31
CALLER No:03 13 12 11 31
PREV NEXT HEX L4DECO
```

## Signaling System 7

The SS7 option places powerful SS7 protocol analysis and monitoring in the hands of the field technician. Protocol decodes help technicians determine a preliminary diagnosis to SS7 network problems. Statistics screens show traffic utilization, frame types, and retransmission. Powerful filters aid in quick troubleshooting by focusing on a specific customer, message type, OPC/DPC, etc.

### GR-303 Highlights

- Bidirectional monitoring of TMC/CSC/EOC
- Full L3 decode of TMC/CSC messages including message type, customer, DS1#, DS0#, and cause values
- Full L7 decode of eoc channel including ROSE & CMIP protocols
- Quick summary of any abnormal or invalid conditions via a statistics screen which displays channel unavailability, protocol problems, or ring failure

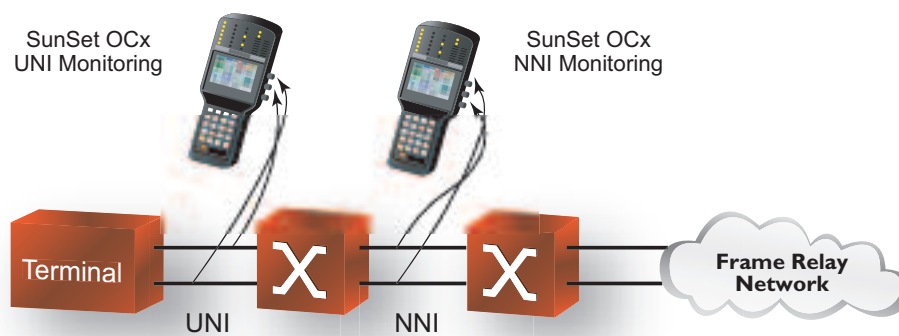
```
15:38:51
MESSAGE: -- BUFFER: 11
PAGE: 1/2
2001-10-18 15:33:35.082
LINE-1 RDT->IDT
LAYER-3 : SETUP
CALL REF NUMBER: 1369
CALL REF SUFFIX: 0
Non-ISDN
DS1 NUMBER: 13
DS0 NUMBER: 17
PREV NEXT PAGE RETURN
```

### SS7 Highlights

- Protocol analysis for SS7 TUP, ISUP, SCCP, SNM, & SNT messages
- TCAP filtering, capturing, & decoding of Transaction, Dialog, and Component Portions
- Capture layer 1 events (alarms)
- Capture and decode layer 2, 3, and 4 protocol messages

## Frame Relay features

The Frame Relay option adds powerful frame relay testing to the SunSet OCx's thorough physical layer testing, providing the perfect solution for installing and maintaining frame relay networks running over a T1 interface. Complete physical layer testing, along with frame level simulation and analysis, is essential, since frame relay lacks its own error checking capabilities. The SunSet OCx provides the fastest method for verifying performance and maintaining quality of service in frame relay networks.



- In-service monitoring: In-service monitoring provides vital statistics on frame relay performance: utilization percentage, throughput (max, min, avg), and frame size. It also gives essential troubleshooting results for congestion, aborted frames, short frames, discarded frames, and FCS (frame check sequence) errors.
- IP PING: The IP PING feature tests connectivity all the way to the user's IP LAN connection. Results include the number of errored or unreachable PINGs and the round trip return time.
- FOX Testing (Stress Testing): The SunSet OCx's load generation feature is capable of stress testing the network's various frame loads. This ability to generate traffic helps determine if the CIR (committed information rate) is achieved.

```
17:05:33 Meas
ST-16:02:18      ET-001:03:15
CIR-19.2      Kbps      LOAD-1 %
                FOX TEST
PVC STATUS      : READY
CURRENT Kbps    : 1920.0
FECH FRAMES     : 0
BECH FRAMES     : 0
DE FRAMES       : 0
BAD FRAMES      : 0
FCS ERROR       : 0
RSN ERROR       : 8
SSN ERROR       : 0
TX FRAMES       : 147524
RX FRAMES       : 147523
RESET PRINT FOXSTOP
```



## Other features

### Remote Control

You can control the SunSet OCx remotely from your Windows® PC over a dial-up, IP, or serial port connection. The remote control user interface duplicates the look and feel of the OCx, requiring no extra training.

VT100 terminals and terminal emulators can also control the OCx through a standard printer cable and null modem adapter. All test set LEDs and keys are represented.

### Auto Configuration

With a single button, the SunSet OCx will automatically configure itself to the circuit under test. The OCx will find the proper rate, mapping, framing, and test pattern based on the signal it receives.

### Graphic Display

Navigating the SunSet OCx is straightforward with an icon-based main menu. The graph screen shows the test set configuration using familiar multiplexer icons, clearly showing the transmitted and measured signals.

### Status and Event Record

All important defects, errors, and alarms are constantly logged with a date and time stamp. The event log is always one button away for quick reference. Save the record to the storage card or print it out.

### Data Storage

The SunSet OCx comes standard with a data storage PC card with 32 Mb of memory – enough space to hold hundreds of protocol traces or thousands of test results. All the traces and results appear as text files organized into separate folders. Simply load the files into a spreadsheet for analysis or into a word processor to create reports.



## SunSet OCx Configuration

The SunSet OCx comes in a variety of configurations that you can customize to match your testing requirements. Whether you want full 2.5 gigabit SONET testing or basic T-carrier testing with a field upgrade to SONET, the OCx has a configuration for you.

Configurations	SSOCx-L* SSOCx-A	SSOCx-B	SSOCx-C	SSOCx-D	SSOCx-E
Dual DS1 1.5M	✓	✓	✓	✓	✓
Dual DS3 45M	✓	✓	✓	✓	✓
STS-1 52M		✓	✓	✓	✓
OC-1 52M		✓	✓	✓	
OC-3 155M			✓	✓	✓
OC-12 622M				✓	✓
OC-48 2.5G					✓
Dual Wavelength					✓
DS1/DS3 Pulse Mask	✓	✓	✓	✓	

\*SSOCx-L: Not Field Upgradeable to SONET

\*SSOCx-A: Field Upgradeable to SONET

SSOCx-C (OC-3) and SSOCx-D (OC-12) units are compatible with single mode and multimode fiber. 1310 nm optics are standard; 1310 nm long reach and 1550 nm long reach configurations are also available. SC connectors are standard on all units; FC connectors are available if specified at time of order.

SSOCx-E Optical Configurations	Rx		Tx		
	LR SM	IR MM	SR 1550	LR 1310	LR 1550
Standard	✓		✓		
SSOCx-LR-48	✓			✓	
SSOCx-1550-48	✓				✓
SSOCx-DW-48-1	✓		✓	✓	
SSOCx-DW-48-2	✓	✓	✓	✓	
SSOCx-DW-48-3	✓			✓	✓

SM: Single Mode  
MM: MultiMode

SR: Short Range  
LR: Long Range

IR: Intermediate Range

## Related products



The **SunSet 10G** is uniquely suited for the SONET and SDH field or laboratory engineer. It is lightweight and portable, so you can take it anywhere. But don't let this test set's small size fool you – the new SunSet 10G from Sunrise Telecom offers extensive features for SONET and SDH network testing and analysis, all in accordance with ANSI, Telcordia, and ITU-T standards.

- First true handheld test set at 10 Gbps
- Complete BERT & Performance Monitoring in compliance with ANSI, Telcordia, & ITU-T standards
- Overhead analysis
- Pointer stress testing
- Large, easy-to-see color display
- SONET and SDH in the same test set
- Economical for wide deployment
- Core Network payloads from STS-192c/STM-64c to STS-1/VC3 Bulk



For SDH and PDH networks, the **SunSet SDH** offers the same powerful overhead, protocol, and BERT features as the SunSet OCx. Other features include tributary scanning, orderwire, DCC BERT, and G.783 pointer test sequences for AU and TU pointers. SONET and T-Carrier circuits can also be tested.

- SDH Testing: STM-0e, STM-1e, STM-1o, STM-4o, OC-3o, OC-12o, STS-1e
- PDH Testing: 1.5M, 2M, 34M, 45M, 139M
- Error Performance Analysis: ITU-T G.821, G.826, M.2100, M.2101
- Service Verification and Analysis: ATM, GSM A-bis, VF, V5.x, TRAU, GPRS, SS7

**Sunrise Telecom is a global leader in providing service verification equipment for a growing variety of telecommunications environments and technologies.** We are constantly advancing industry standards in handheld telecom test equipment with leading edge innovations to our SunSet products: renowned easy-to-use graphical interface for viewing circuit status information, innovative software cartridges that instantly expand our already impressive feature set, and elegant internal design with state-of-the-art circuitry to enable next generation products.

Sunrise products have found broad acceptance in domestic and international markets, with a customer base that includes local exchange carriers, cellular exchange operators, private network operators, and telecom equipment manufacturers. Telephone companies on six continents have standardized on our products, which are distributed by a network of sales and service representatives in more than 70 countries.

Sunrise Telecom was incorporated on October 1, 1991 and became a public company July 2000, trading under the NASDAQ symbol SRTI.

## Service & Support

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Sunrise Telecom proudly gives its customers excellent service and support. Technical assistance is available from local representatives in over 70 countries, from factory experts, on the Internet, and via Sunrise's customer support line.

Contact Sunrise Telecom to find your local Sales Representative or Distributor and discover how the SunSet OCx can solve your testing needs.

### Specifications

Detailed specifications are available for the features listed in this document. Inquire with your local representative.

### Accessories

Several SunSet OCx accessories are available for specific testing requirements.

Ask your representative for ordering information and additional specifications.

### Order Direct

toll-free order hotline 1 888 242 7077 (US/Canada only)

fax hotline 1 408 360 1958

[order@sunrisetelecom.com](mailto:order@sunrisetelecom.com)

### Customer Support

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