

# Optical Voice Processor (STM-1)

**D**itech Communications Corporation introduces the highest speed, highest capacity echo cancellation system available – the Optical Voice Processor™. Featuring an SDH STM-1 interface, the Optical Voice Processor provides echo cancellation and voice enhancement for 22,600 voice channels in a single 2,3 meter bay.

To eliminate downtime, the Optical Voice Processor's multiplexer/controller and echo cancellation resource cards are fully redundant (1:1 and 1:3 respectively) and hot swappable. Automatic protection switching allows carriers to provide uninterrupted service to their customers.

Next generation networks require voice enhancers with extended tail capabilities. The Optical Voice Processor automatically locates and eliminates echoes in connections up to 128 ms in length while providing real time Reflectometry™ tail delay data, Echo Return Loss (ERL), talker power, and canceller status on a per DS0 basis.

The Optical Voice Processor supports the following advanced features: IP addressing, native LAN 10/100 baseT access, optical and electrical signal interface options, and the full range of Voice Quality of Service (VQoS™) features that include Advanced Noise Reduction (ANR™), Acoustic Echo Control (AEC™), and network level controls. These features are standard, and require no add-on cards.

Provisioning of the Optical Voice Processor is accomplished through either serial ports or remotely through a LAN using NetConsul™, Ditech's user-friendly element management system. NetConsul enables service providers to manage and monitor world wide network deployments of Ditech echo cancellers.

The Optical Voice Processor is the latest in a line of Ditech echo cancellation products that leading carriers have come to rely on as the "Gold Standard" in voice quality. Ditech products combine technical leadership with industry leading service and support to provide telecommunication carriers with world class solutions that meet business and end-user needs.



- ▶ 12 STM-1s/22.680 DS0s per 2,3m bay
- ▶ One to three STM-1 (155.52 Mbps) systems per shelf
- ▶ Optical and electrical interfaces
- ▶ 1.890 to 5.670 DS0s per shelf
- ▶ Four shelves per ETSI compliant rack
- ▶ Up to 22.680 DS0s per rack
- ▶ Standard 128 ms tail delay
- ▶ Power consumption per DS0: 69 mW
- ▶ Floor Space Efficiency: 135.000 DS0/m<sup>2</sup>
- ▶ Voice Quality of Service (VQoS) standard features (no additional hardware required)
  - Adaptive Noise Reduction (ANR)
  - Acoustic Echo Control (AEC)
  - Adaptive Listener Enhancement (ALE)
  - Automatic Level Control (ALC)
  - High Level Compensation (HLC)
  - Fixed Gain/Attenuation
- ▶ Full redundancy (Controller 1:1; ECR 1:3)
- ▶ Provisioning interfaces: LA(10/100baseT) and local serial (V.24)
- ▶ ITU G.168-2000 Compliant

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Last Revised 10/01 Specifications may change without notice. Reference Ditech's Web site for current information. ([www.ditechcom.com](http://www.ditechcom.com))

## GENERAL

**ERLE (Echo Return Loss Enhancement)**  
>35 dB (with 6dB ERL) at -10 dBm0 input  
Infinite with NLP enabled

**ERL (Echo Return Loss)**  
Selectable Threshold Level: 0, 3, 6 dB

**Comfort Noise**  
Per DSO

**Convergence Time**  
<50 ms for 30 dB or better (ERL + ERLE)

**Tail Circuit Delay**  
Auto Tail to 128 ms  
Selectable: 24, 32, 48, 64, 80, 96, 112, 128 ms

**Tone Disablers**  
ITU-T G.164, G.165, G.168-2000

**Re-Enable Modes**  
On Hook, Low Energy

**Automatic Level Control**  
ITU-T G.169

**Signaling Protocols**  
CAS, CCS, ITU-T #5, 6, 7, R1 + R2

## VOICE QUALITY OF SERVICE

Adaptive Noise Reduction (ANR)  
Acoustic Echo Control (AEC)  
Automatic Level Control (ALC) G.169  
Adaptive Listener Enhancement (ALE)  
High Level Compensation (HLC)  
Fixed Gain/Attenuation

## REFLECTOMETRY

**ERL, ERLE, Max Delay, Send and Receive Levels**  
Actual measurements per DSO

**Alarm Monitoring**  
Local, distant, AIS, multiframe, distant multiframe

## SYNCHRONIZATION

**Output Synchronization**  
BITS1, BITS2, tail, long haul, internal

## NETWORK INTERFACE

**Line Rate**  
STM-1 at 155.52 Mbps

**Framing Format**  
Per ITU-T G.704 WITH CRC-4

**Line Encoding**  
CEPT 2.048 Mb/s, HDB3 per ITU-T G.703, G.704

**PCM Encoding**  
A-law per ITU-T G.711

**Jitter Tolerance**  
GR.253

**Electrical Interface**  
Unbalanced 75 ohm BNC on backplane and front ETSI panel

**Optical Interface**  
STM-1 optical fiber (1310 nm)

**Alarms & E2A Post Interface**  
Dry contacts

**Maximum Cable Length**  
200 m (655 ft) 75Ω coaxial

## TERMINAL CONTROL

**Serial Interface**  
One CRAFT V.24 port per SCC card

**Data Transfer**  
Selectable up to 19.2 baud

**Audible Alarm Cutoff (ACO) Switch and LED Indicator**

**SCC Front Panel LED Indicators**  
Tail Status, Long Haul Status, Active Status, ACO

**ECR Front Panel LED Indicators**  
Active Status, Alarm

**LAN 10/100baseT**  
Ports for each STM-1 on backplane

**Local Provisioning**  
On-board

**Remote Element Management**  
NetConsul™: Multit Site, EMS  
TCP/IP Address Per STM-1 System: 3 per shelf

## FRONT PANEL CONTROL

Push button for alarm cutoff (ACO)

## ELECTRICAL

**Input Voltage**  
-36 VDC to -60 VDC (all calculations based on -48 VDC)  
Dual fused power inputs

**Input Current (includes fans)**  
One STM-1 System: 3.3 A  
Two STM-1 Systems: 5.8 A  
Three STM-1 Systems: 8.2 A

**Power Consumption (includes fans)**  
One STM-1 System: 159 W maximum, 84 mW/DSO actual  
Two STM-1 Systems: 279 W maximum, 74 mW/DSO actual  
Three STM-1 Systems: 394 W maximum, 69 mW/DSO actual  
Fusing: GMT "grasshopper" fuses

**Heat Output**  
1 Watt Hour = 3.413 BTU

## REDUNDANCY

**Power**  
Fused A & B power

**Redundancy Per Telcordia**  
GR-253-CORE, G.841  
**System Control Cards (SCC)**  
1:1

**Echo Cancellation Resource (ECR) Card**  
1:3

**Fans**  
Fans alarmed. No one fan is critical.  
Metallic bypass at STM-1 electrical level.  
Hot swappable, auto switching to standby cards for both SCC and ECR-21.

## PHYSICAL ATTRIBUTES

**Dimensions (H x W x D)**  
475 x 440 x 350 (mm) with ETSI interface panel  
Fits standard 19" ANSI racks  
Extensions for 21" ETSI racks  
Boxed Shipping Size: 622 x 539 x 642 (mm)

**Weight**  
Empty Shelf: 18,6 kg (40,7 lbs)  
Three STM-1 Systems (fully loaded): 64,7 kg (29,4 lbs)  
Shelf with One STM-1 System: 22,2 kg (48,8 lbs)  
ECR-21 Card: 0,6 kg (1,3 lbs)  
STM-1 Controller Card: 0,6 kg (1,3 lbs)  
Shelf Shipping Weight (boxed): 27,7 kg (61 lbs)

**Capacity**  
Total: 12 ECR-21 cards + 6 SCC cards  
One to three STM-1 systems per shelf (1.890 DSO – 5.670 DSO/shelf)  
Four Optical Voice Processors per std rack (up to 12 STM-1s or 22.680 DSOs)

**Floor Space Efficiency**  
147.272 DSO/m<sup>2</sup>/rack  
For a 19" (551 mm total width) zone 4 rack with cable ducts

## REGULATORY COMPLIANCE

Safety compliant with UL 60950, CAN/CSA-C22.2 No. 60950-00, EN 60950, and IEC 950; EMI/EMC compliant to FCC Part 15 Class A, EN 55022, and GR-1089-CORE; designed for NEBS Level 3 Compliance

## ENVIRONMENTAL

**Temperature**  
Operating: 5° to 40°C  
Short Term: -5° to 50°C

**Relative Humidity**  
Operating: 85% maximum non-condensing

**Operating Altitude**  
4700 m (15000 ft)

**MTBF Per Telcordia SR-332 Issue 1 May 2001**  
ECR-21 (Echo Cancellation Resource card): 11.7 years at 40°C  
SCC (System Controller Card): 36.1 years  
Shelf Back Plane: 36.3 years

## ORDERING INFORMATION

**Single STM-1 System:** 000-0281-00  
**Single STM-1 System + Shelf:** 000-0282-00  
**Three STM-1 Systems + Shelf:** 000-0283-00

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The Gold Standard in Voice Quality