

VCL-STM1-OE-MUX

With upto 16 E1 & 4 Ethernet / SDH Equipment

Introduction:

STM-1 (Optical / Electrical), E1 and Ethernet Multi-Service SDH Transmission Unit is a modular platform unit with two 155.52Mbps optical / electrical interfaces, which may be used in a point-to-point, chain or ring application to provide an ultra-compact, cost effective and flexible multi-service platform.



STM-1 (Optical/Electrical) Add-Drop Multiplexer

Interface card options include the 8xE1 interface card (120 Ohms [RJ-45] and 75 Ohms [BNC]), 4x100BaseT Ethernet interface card (1 VCG, 4 Ports 1 Channel), 4x100BaseT Ethernet interface card (4 VCG, 4 Ports 4 Channels) and Gigabit Ethernet interface card options along with Engineering Order Wire is available. The user removable / replaceable STM-1 Optical / Electrical interface option makes it easy to meet various and changing user requirements. STM-1, E1 and Ethernet over SDH Transmission Equipment provides full capability to cross-connect at VC-12 level between all tributaries.

The equipment can be used as Terminal Multiplexer (TM) or an Add-Drop-Multiplexer (ADM) to build a point-to-point, ring and chain (add-drop) transmission network.

Service interfaces

- 2 x STM-1 optical interfaces, MSA compliant SFP (pluggable) optical module (LC connector) based design, which supports onsite optical port replacement
- 2 x STM-1 electrical interfaces, SFP electrical module (Mini BNC connector) Optional
- Maximum 16 E1 interfaces compliant with ITU-T G.703 (8 E1 interfaces per card)
- 120 Ohms E1 and 75 Ohms E1 interfaces options available
- 4 x 10/100BaseT Ethernet (electric) interface
- 10/100BaseT (FE) Ethernet Interface Options
 - 4 Ports, 4 Channels (4 VCG), and
 - 4 Ports, 1 Channel (1 VCG)
- 1 x GigE (Gigabit) Ethernet interface Options
 - Optical GigE (Gigabit) Ethernet interface
 - Electrical 1000BaseT (Gigabit) Ethernet Interface

Features:

- 1U height, - 19 Inch standard rack-mountable Stand-alone chassis
- Provides complete diagnostics facilities to the user for monitoring optical ports and provide reading of optical transmit and receive power, laser temperature, bias current in voltage alarms etc.
- Performance Monitoring and Alarms - Error counts for B1, B2, B3
- Performance Analysis - Error Seconds (ES), Several Error Seconds (SES), Unavailable seconds (UAS), Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)
- Supports 1+1 Line Protection and Automatic Protection Switching (APS) with less than 50ms recovery
- Supports point-to-point, ring and chain topology (4 VCG card only)
- Local management and network-based management via a unified platform
- Supports Remote Power Down Detection and Auto Laser Shutdown
- Supports STM-1 and E1 loop-back for troubleshooting
- 850nm multi-Mode, 1310nm Single Mode and 1550nm Single Mode optical interface options offered
- Ethernet mapping adopts GFP/VC-12 virtual concatenated technology; according with MSTP criterion
- Provides Ethernet over SDH mapping through standard GFP and VC-12 virtual concatenation (VCAT)
- Ethernet bandwidth can be adjusted by the user between 2Mbps ~126 Mbps (VC-12 mapping)
- Supports MAC Address list filtration, learning and updating function
- Easy to operate.

Management and Maintenance interfaces

- 10/100BaseT Ethernet management interface
- RS232 serial management interface
- Remote (Telnet) management interface
- Windows XP based Graphical User Interface (GUI)
- Windows 7 based Graphical User Interface (GUI)
- SNMP V2 Monitoring
- Engineering Order Wire (EOW) interface (RJ-11)
- NMS (Network Management System) for monitoring multiple units from a single / central location.

Timing mode

- Synchronization with STM-1 line timing
- Synchronization with timing from any of the E1 interfaces (1-16 E1 tributary interfaces)
- External timing source option - 120 Ohms 2Mbps (External Bits Clock)
- External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
- Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
- The timing source can be auto-switched according to default or operator programmed settings

Ethernet Standards Conformity

- Generic Framing Procedure GFP-F compliant with ITU-T G.7041
- VCAT compliant with ITU-T G.707 and LCAS compliant with ITU-T G.7042
- Ethernet flow control on WAN port and LAN port.
- Large buffer size upto 410,000 bytes
- Maximum Frame length (MTU size):1552 bytes with Gigabit Ethernet Card
- Maximum Frame length (MTU size):1536 bytes with 4 port 1 channel (1 VCG) Ethernet Card
- Maximum Frame length (MTU size): 2036 bytes with 4 port 4 channel (4 VCG) Ethernet Card Electrical Gigabit compliant with 802.3ab
- Optical Gigabit compliant with 802.3z
- Auto MID/MID-X for Ethernet Interfaces
- Support 802.1Q based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)
- Support Port based VLAN tagging (4 ports 1 channel (1 VCG) Ethernet Card only)

Performance Analysis

- All Received Packets
- All Transmitted Packets
- Received Dropped Packets

Power Supply Options

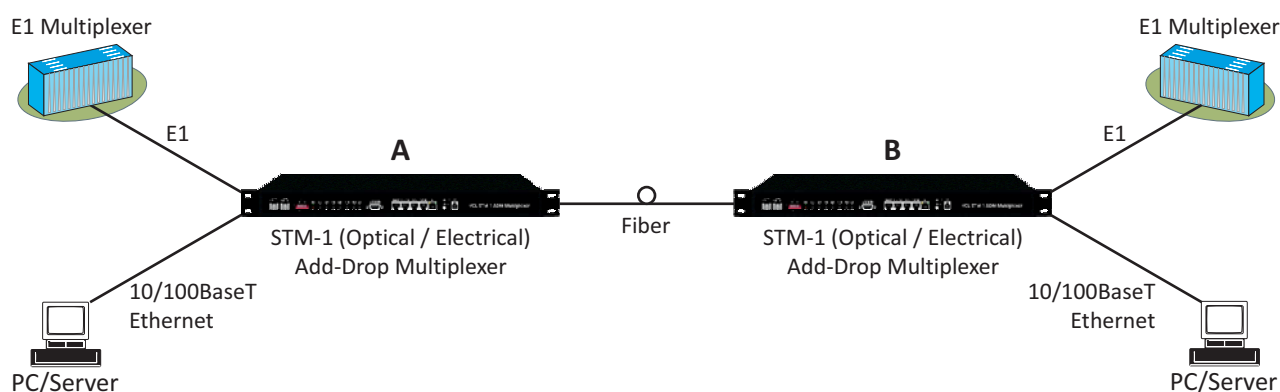
- Redundant power supply card options AC+DC, DC+DC and AC+AC
- 110V AC - 240V AC (50/60 Hz) power options available
- -48V DC power option available
- -24V DC power option available
- Power consumption less than 17W.

Alarm and Indicator Monitoring

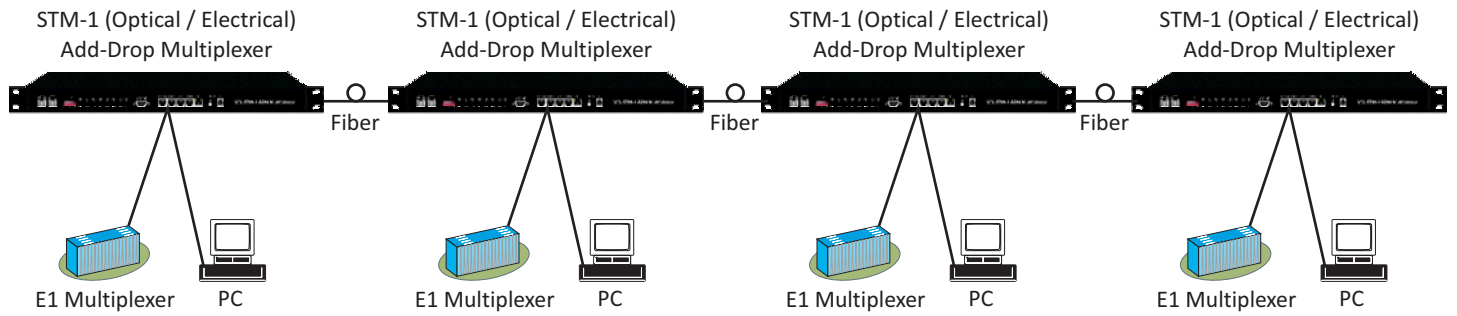
- Power Indicator
- Current Status (integrity and activity) Indicator
- Urgent Alarm Indicator
- Minor Alarm Indicator
- Optical Signal Loss Alarm Indicator
- Remote Device Power-down Indicator
- Ethernet Card Status Indicator
- General Alarm Indicator for Ethernet Card (including Link-down of Ethernet Port)
- Auto Laser Shutdown (ALS) Indicator
- Engineering Order-Wire (EOW) Indicator
- Ethernet Link Indicator
- Ethernet Speed Indicator
- E1 Card Status Indicator
- Dry contact via 9-pin, D-type male connector
- Buzzer Alarm
- SNMP Diagnostic and Monitoring.

Network Application

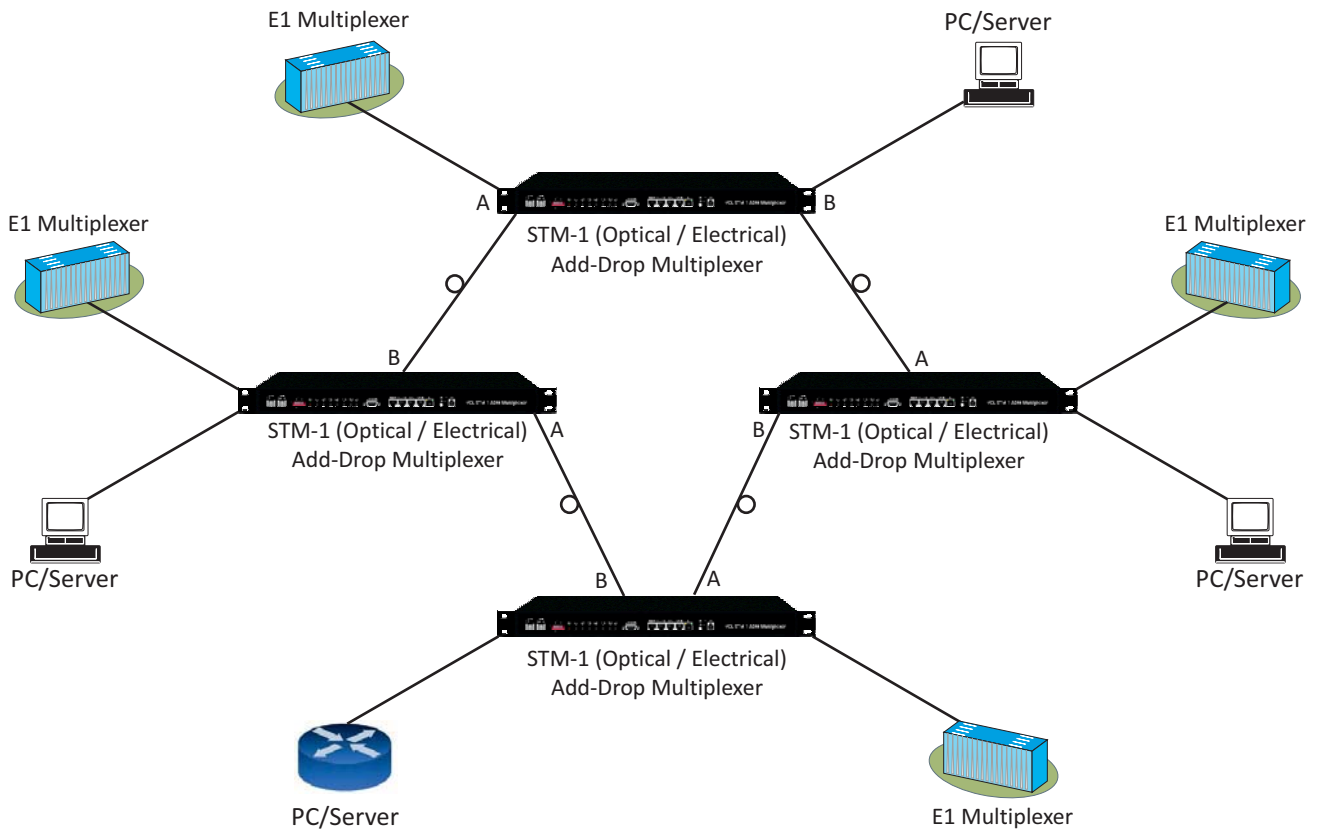
Point to point network application diagram



Chain network application diagram



Ring network application diagram



Technical Specifications

Network Topology and Interfaces

Network topology	Point to point network, Ring and Chain
Service interfaces	STM-1 SDH single optical or double optical ports (1+1 protection) supported - 8/16 E1 Interfaces - 1 VCG, 4 VCG or GigE Ethernet Interfaces

STM-1 Electrical Interface

Data Rate	155.52 Mbps
Standard	ITU-T G.703 Compliant
Line Code	CMI
Physical Connector	Mini BNC
Automatic 1+1 line Protection	Less than 50 ms switching / recovery

STM-1 Optical Interface

Data Rate	155.52 Mbps
Standard	ITU-T G.957 compliant
Bit rate	155.520Mbps
Coding	NRZ
Connector	LC
Light source	Class 1 Laser
Wave length	850nm/1310nm/1550nm (optional) - 1310nm Std.
Transmit power	S 1.1, L 1.1, L 1.2 (-11 dBm to -2.5 dBm - as may be ordered)
Receive sensitivity	S 1.1, L 1.1, L 1.2 (-28 dBm to -34 dBm - as may be ordered)
Automatic 1+1 Line Protection	Less than 50 ms switching / recovery
Automatic Laser Shut Down Option	User selectable options

Technical Specifications

STM-1 Monitoring and Performance Analysis

Performance Monitoring and Alarms	Error counts for B1, B2, B3
Performance Analysis	Error Seconds (ES), Several Error Seconds (SES), Unavailable Seconds (UAS), Higher Order Virtual Container - Remote Error Indication (HOVC-REI), Higher Order Virtual Container - Pointer Justification Event (HOVC-PJE)

1 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channel	1
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1536 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical

802.1Q MAC packet transparent transmission supported
Ethernet data rate can be adjusted from 2M to 100M

4 VCG - Ethernet Interface Specification: 10/100BaseT (Electrical)

Number of Interfaces	4
Number of VCG/Channels	4
Interface Types	10/100BaseT
Ethernet Mode	Half/Full
MDI/MDI-X Support	Yes
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	2036 bytes
Transmission Bit Rate	10/100 Mbps
Connectors	RJ-45 Electrical

802.1Q MAC packet transparent transmission supported
Ethernet data rate can be adjusted from 2M to 126M

Optical Interfaces

Type	Wavelength (nm)	Mean launched power (dBm)	Receiver sensitivity (dBm)	Receiver overload (dBm)	Connector	Configuration
Double fibers, Two Direction	1310	-8 ~ -12	-36	-3	LC	Standard (S1.1)
	1310	0 ~ -5	-36	-3	LC	Optional (L1.1)
Single fiber, One Direction	1310/1550	-8 ~ -14	-30	-3	LC	Optional
	1310/1550	0 ~ -5	-30	-3	LC	Optional

GigE - Ethernet Interface Specification

Number of Interfaces	2 Electrical (Comply with IEEE 802.3ab) 1 Optical - Optional (Comply with IEEE 802.3z)
Interface Types	10/100/1000BaseT or 1000Base-FX (LC)
MDI/MDI-X Support	Yes (Electrical port)
VCAT Compliance	ITU-T G.707
LCAS Compliance	ITU-T G.7042
GFP-F	ITU-T G.7041
Frame Size	1552 bytes
Transmission Bit Rate	10/100/1000 Mbps
Connectors	RJ-45 Electrical / LC - Optical

802.1Q MAC packet transparent transmission supported
Ethernet data rate can be adjusted from 2M to 126M

Ethernet port (1 VCG/4 VCG/GigE) Performance Analysis

- All Received Packets
- All Transmitted Packets
- Received Dropped Packets

E1 Port (TU 12) Performance Analysis

- Error Bits (EB)
- Error Seconds (ES)
- Several Error Seconds (SES),
- Unavailable seconds (UAS)
- Remote Error Indication (REI)
- Code Violation (CV)

Clock Synchronization Options

- Synchronization with STM-1 line timing
- Synchronization with timing from any of the E1 interfaces (1-16 E1 tributary interfaces)
- External timing source option - 120 Ohms 2MBps (External Bits Clock) - Factory Configurable
- External timing source - 120 Ohms 2MHz (External TTL Clock) - Factory Configurable
- Internal Clock - ITU-T G.813 internal oscillator (Stratum 3)
- The timing source can be auto-switched according to Default or operator programmed settings.

Technical Specifications

E1 Interface Specification - 120 Ohms

Number of E1s (Max) per system	16 E1 Interfaces
Number of E1s per E1 service card	8 E1 per card
E1 Interface option	8 E1 / 16 E1 (Optional)
Line Rate per E1	(2.048 Mbps \pm 50 bps)
Line Code	HDB3
Framing Structure	As per ITU (CCITT) G.704
Framing Options	Un-Framed/PCM 30/PCM 31
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	120 Ohms balanced
Nominal Pulse Width	244ns
Pulse Shape	As per ITU-T G.703
Connector	RJ-45 (F)

E1 Interface Specification - 75 Ohms

Number of E1s (Max) per system	16 E1 Interfaces
Number of E1s per E1 service card	8 E1 per card
E1 Interface option	8 E1 / 16 E1 (Optional)
Line Rate per E1	(2.048 Mbps \pm 50 bps)
Line Code	HDB3
Framing Structure	As per ITU (CCITT) G.704
Framing Options	Un-Framed/PCM 30/PCM 31
Electrical	As per ITU-T G.703
Jitter	As per ITU-T G.823
Impedance	75 Ohms unbalanced
Nominal Pulse Width	244ns
Pulse Shape	As per ITU-T G.703
Connector	BNC

Engineering Order Wire (EOW)

Engineering Order Wire (EOW)	RJ-11 connector
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NMS

- Graphical User Interface (GUI) Windows XP / Windows Vista / Windows 7 compatible
- SNMP V2 based NMS
- Supports In-band Management

Power Supply Options

DC Mains Input	- 48V DC (range -18V DC to -72V DC)
AC Main Input	100V AC to 240V AC, 50 / 60 Hz
Power Protection	1+0 (AC, DC), 1+1 (AC+AC, AC+DC, DC+DC)
Power Consumption	< 17 Watts
Input Connector	3 PIN Socket for AC 3 PIN Connector for DC
Redundancy	Supports AC/DC (Hot Swappable - Power Supply)

Operating Conditions

Ambient temperature	-10°C ~ +60°C
Relative humidity	<90% (Non condensing)

Mechanical Specifications

Rack Mounting	Standard 19 Inch. DIN Rack
Height	44 mm.
Depth	256 mm.
Width	440 mm.
Weight	3.75 kg

Ordering Information

Core Unit without E1 and PSUs

Part	VCL-STM-1-ADM
Description	VCL-STM-1 ADM Multiplexer STM-1 (1+1) SDH Add-Drop Multiplexer 19-inch 1U High Rack Mount version Supports: - 2 x STM-1 Ports (1+1) [SFP based-without SFPs] - 1 x System Core Cables, Installation accessories, Documentation, System User Manual/ Disk etc (Set) - OAM: EOW, SNMP, EMS, NMS

E1 (Any One) Options:

Part	Description
08E1-120	1 x VCL-EMOD 0167, 08E1-120, 8E1 Card [120 Ohms DB37 (M)]
08E1-075	1 x VCL-EMOD 0166, 08E1-075, 8E1 Card [120 Ohms DB37 (M)]
16E1-120	2 x VCL-EMOD 0167, 08E1-120, 16E1 Card [120 Ohms DB37 (M)]
16E1-075	2 x VCL-EMOD 0166, 08E1-075, 16E1 Card [120 Ohms DB37 (M)]

Ordering Information

Ethernet (Any One) Options:

Part	Description
0169E	4 x Ethernet Port [100Mbps, Electrical RJ45 (F), 1VCG (1 Channel) + VLAN]
0212E	4 x Ethernet Port [100Mbps, Electrical RJ45 (F), 4VCG (4 Channel)]
0264E	4 x Ethernet Port [100Mbps, Electrical RJ45 (F), 4VCG (4 Channel) +VLAN]
0223OE	Gigabit Ethernet Port (4VCG, 4 Channel, 100M bandwidth) - 2 x Electrical Ethernet Port [RJ45 (F)] OR - 1 x Optical Ethernet Port [SFP based - without SFP]

STM-1 SFP Options: (Maximum Two SFPs Per Core Unit)

Part	Description
VCL-EMOD 0193	155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, S-1.1, Duplex LC, 1310nm, 15Km, SMF
VCL-EMOD 0194	155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, L-1.1, Duplex LC, 1310nm, 40Km, SMF
VCL-EMOD 0217	155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, Fast Ethernet, L-1.2, Duplex LC, 1550nm, 80Km, SMF
VCL-EMOD 0156	155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, LR-2/LR-3, Fast Ethernet, L-1.2, Duplex LC, 1550nm, 120Km, SMF
VCL-EMOD 0243	155Mbps SFP Transceiver, SDH/STM-1, SONET/OC-3, L-1.2, Duplex LC, 1550nm, 150Km, SMF
VCL-EMOD 0195	155Mbps SFP Copper Transceiver, STM-1e (ES1) [Electrical], 75Ω DIN 1.0/2.3 female coaxial, MSA, Grounds Isolated, RoHS

Gigabit SFP Options: (Maximum One SFPs Per Optical Ethernet Card)

Part	Description
VCL-EMOD 0231	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 15Km, SMF, +3.3V
VCL-EMOD 0255	1.25Gbps SFP Transceiver Duplex LC, 1310nm, 40Km, SMF, +3.3V
VCL-EMOD 0256	1.25Gbps SFP Transceiver Duplex LC, 1550nm, 80Km, SMF, +3.3V

Power Supply (Any One) Options:

Part	Description
AC220	1 x 100-240V AC Power Supply Input
DC048	1 x (-) 48V DC Power Supply Input
ACDC	1 x 100-240V AC Power Supply Input 1 x (-) 48V DC Power Supply Input
AC220R	2 x 100-240V AC Power Supply Input [Redundant]
DC048R	2 x (-) 48V DC Power Supply Input [Redundant]

Cables and Accessories Options (As per Site Requirement):

Part	Description
VCL-HRNS 1246	8E1 75 Ohm Connectorized Cable [DB37F-16BNCF]
VCL-HRNS 1255	8E1 120 Ohm Connectorized Cable [DB37F-8RJ45F]
VCL-HRNS 1229	Optical Patch Cord Connectorized Cable [2LC-2LC, 3m, SM]
VCL-HRNS 1238	Optical Patch Cord Connectorized Cable [2LC-2LC, 10m, SM]
VCL-HRNS 1242	Optical Patch Cord Connectorized Cable [LC-FC, 10m, SM]
VCL-HRNS 1243	Optical Patch Cord Connectorized Cable [2LC-2FC, 10m, SM]
VCL-HRNS 1239	Optical Patch Cord Connectorized Cable [LC-SC, 10m, SM]
VCL-HRNS 1258	Optical Patch Cord Connectorized Cable [2LC-2SC, 10m, SM]
VCL-ECON 1216	Mini-BNC-to-Big-BNC Connectorized Cable [3m]
VCL-ECON 1172	Connector (Attenuator LC-LC (10 db.))
VCL-ECON 1173	Connector (Attenuator LC-LC (20 db.))
VCL-ECON 1186	Connector (Attenuator FC-FC (10 db.))
VCL-ECON 1187	Connector (Attenuator FC-FC (20 db.))
VCL-ECON 1197	Connector (Attenuator SC-SC (10 db.))
VCL-ECON 1198	Connector (Attenuator SC-SC (20 db.))



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