Cisco DCM Series D9901
Digital Content Manager – IP Video Gateway

Today's video contribution networks are evolving rapidly with the dual drivers of increased demand, for high-definition TV, and a need for reduced cost of ownership. The Cisco® DCM Series D9901 Digital Content Manager (DCM) IP Video Gateway is a compact 1 RU SDI Video Gateway platform capable of supporting the delivery at full quality, a high number of uncompressed video signals over cost-effective Ethernet links.

Figure 1.   Cisco DCM Series D9901 IP Video Gateway

The DCM Series D9901 IP Video Gateway provides IP-encapsulation of uncompressed SD and HD SDI video. At the transmitter site, the DCM Series D9901 IP Video Gateway enables SDI video to be carried over 1 GbE or 10 GbE and at the receiving site, the DCM Series D9901 IP Video Gateway converts the IP-encapsulated stream back to a baseband SDI video signal.

Due to its quality, flexibility, and very compact design, the DCM Series D9901 IP Video Gateway is adaptable for a wide range of applications, such as professional broadcast contribution, studio-to-studio media exchange, in-house signal distribution and routing, post-production, live event coverage, etc.

As IP is becoming more and more the transport network of choice, provisions are required to maximize quality of service. The DCM Series D9901 IP Video Gateway's extensive set of IP over GbE features including extensive protocol support allows for a seamless integration with these IP networks.

Physical Configuration

The DCM Series D9901 IP Video Gateway comes in a compact 1 RU chassis. The unit can be configured with up to two gateway cards, with each card having dual GbE ports and up to six SDI video ports.

The gateway cards can be individually configured with either electrical video interfaces or optical video interfaces, or a combination of both. With electrical interfaces, it can be equipped with either 6 electrical SDI inputs, or 6 electrical SDI outputs, or the combination of 3 SDI inputs and 3 SDI outputs. With optical interfaces, it can be equipped with either 6 optical ports, or a combination of 3 optical SDI ports and 3 electrical SDI ports (either 3 inputs or 3 outputs). The optical ports are based on unidirectional video SFPs. The user will define the port direction by plugging in either a receiver SDI SFP or a transmitter SDI SFP.

Each gateway card is equipped with a main and a backup Ethernet port. The ports are software switchable to function as either 1 GbE or 10 GbE. With 1 GbE, the ports can be equipped with SFP connectors giving each card a total throughput of 1 Gbps bidirectional. With 10 GbE, the ports can be equipped with SFP+ connectors, giving each card a total throughput of 10 Gbps.

Scalable platform

The DCM Series D9901 IP Video Gateway has been designed to provide processing of up to 12 video signals. However, the platform is scalable in hardware as well as in software. The chassis can be equipped with one card only, and a basic card always comes with one standard definition video stream enabled. In case the physical configuration is 3 inputs and 3 outputs, the operator can freely select either to transmit or receive a video stream over IP. The operator can choose to enable additional video signals to be processed over time as well as to high-definition video and 10 GbE via software licenses. The capital expenses can therefore be adapted to existing and future needs as more video streams are needed.

Redundancy and Reliability

The DCM Series D9901 IP Video Gateway has been designed to allow operators to configure highly-reliable networks. The DCM Series D9901 IP Video Gateway supports hot-swappable and redundant power supplies and hot-swappable cooling fans. In addition, each DCM Series D9901 IP Video Gateway card is also hot-swappable.

The DCM Series D9901 IP Video Gateway can be configured in a hot 1:1 configuration to support maximum uptime with minimum switchover interruption.

User Interface and Management

The DCM Series D9901 IP Video Gateway is controlled via an easy and intuitive GUI. To keep things simple, there is no software to load on the user's computer. The GUI of the DCM Series D9901 IP Video Gateway is a HTML-based user interface that can be opened using Microsoft Internet Explorer 6.0 and higher or Firefox 3.0. The GUI supports simple program provisioning through drag-and-drop functionality. The interface provides detailed information to the user, showing the DCM Series D9901 IP Video Gateway configuration, input and output bit rate monitoring, video stream alarms, and other information. For easy access to details, sorting of video service information can be performed on various criteria, including input and output ports, bit rates, and video service names.

For integrated network monitoring and control, the DCM Series D9901 IP Video Gateway is integrated with ROSA® Network Management and Control (NMC) system. All functionality available via the HTML interface is available with the ROSA control system.

Features

Interfaces

- Up to 12 video interface ports (6 video ports per gateway card)
  - Each card can have a combination of 3 inputs and 3 outputs or 6 inputs or 6 outputs
  - The video interfaces can be either electrical (BNC) or optical (video SFP), or combined in sections of 3 electrical and 3 optical
- Flexible video signal monitoring
  - Each card has a dedicated electrical monitor output, which can mirror any of the 6 video ports selected by the user
  - Any video output port can also be configured as a monitor of another active video output port or input port
- Each gateway card is equipped with dual Ethernet ports capable of either 1 GbE (connectors: SFP) or 10 GbE (connectors: SFP+)
  - Unicast and multicast support
  - Protocols supported: 802.3, Ethernet, RTP, UDP, IP, ARP, ICMP, IGMPv2 / v3, VLAN
  - Quality of Service: Diffserv/TOS 802.1p

Video signals & formats

- Standard definition 625i25 and 525i29.97
- High-definition 720p50, 720p59.94, 1080i25, 1080i29.97
- Adaptive clock recovery – no need for external reference
- Built-in SDI signal generators assist in easy set-up of the gateway during installation without the need for a dedicated signal generator

Redundancy

- 1:1 Redundant configuration supported
- 1:1 GbE port backup supported
- Dual Streaming mode (IP Port mirroring)
- Video input ports can act as backup inputs for each other

System

- User hot swappable power supplies, fans and gateway cards
- Redundant load sharing power supplies, supports both AC and DC power supplies
- Configuration settings stored on Compact Flash card (transferable to cold standby unit)
- Configurations can also be copied through the user interface from either one chassis to another or from one Gateway card to another

Management

- SNMP traps
- ROSA management
- Easy control using web browser
- Ethernet interface for communication with management system and web browser
- IPsec

Anticipated Future Software Features

- 3G HD Video – 1080p50, 1080p60
- Gen-lock to external reference with adjustable phase
- FEC & Hitless switchover
- ASI transparent transport

Anticipated Future Factory Options

- JPEG2K compression engine

Anticipated software and hardware features/releases described herein are in varying stages of development and are subject to change at the sole discretion of Cisco without liability to Cisco. Contact Cisco for estimated commercial availability.

Product Specifications

Table 1. Product Specifications

Specification	Value
Video Interfaces	
Number of video ports per card	Up to 6 ports In addition: • Loop-through output: can monitor any active input or output video stream • Reference input: common to all the video outputs on one gateway card (see Note 1) Note: Any output port can also be configured as a monitor of another active video output port or input port.
Hardware configuration of ports	Electrical: one of the following per gateway card • 3 inputs + 3 outputs • 6 inputs • 6 outputs Optical: one of the following per gateway card • 6 optical video SFP cages • 3 optical video SFP cages + 3 electrical inputs • 3 optical video SFP cages + 3 electrical outputs
Connector type 　Video ports 　Reference input 　Loop-through output	 Electrical: BNC (in groups of 3) Optical: video SFP (for use with video SFP compliant to SMPTE 297) BNC (internally terminated) BNC
Impedance	75 Ω
Video formats 　Video ports and loop-through output	 Standard: SD-SDI • 625i25, 525i29.97 (SMPTE259-C, Type B) • Transparency of SDTI @ 270 Mbit/s (SMPTE305) Option: HD-SDI • 720p59.94, 720p50 (SMPTE 292 - SMPTE 274 System 2 & 3, Type B) • 1080i29.97, 1080i25 (SMPTE 292 - SMPTE 274 System 5 & 6, Type B)
Return loss 　Video ports and loop-through output	 SD: > 15 dB, 5 MHz – 270 MHz HD: > 15 dB, 5 MHz – 1.485 GHz
Cable length 　Video input ports	 SD: > 350 m (using RG59/U) HD: > 200 m (using RG6/U)
Video resolution	10 bit

IP Interfaces	
Number of ports per card	2 Ethernet ports, 1+1 (for redundancy)
Connector type (see Note 2)	Standard 1 GbE: • Optical or electrical Small Form Factor Pluggable (SFP) Optional 10 GbE: • Optical or electrical Small Form Factor Pluggable+ (SFP+)
Interface type	Standard 1 GbE: • 1 Gigabit Ethernet (GbE) according to IEEE 802.3ab (Electrical) or IEEE 802.3z (Optical) Optional 10 GbE: • 10 Gigabit Ethernet (GbE) according to IEEE 802.3ae
Protocols	IP/UDP/RTP, ARP, IGMPv2/v3, Diffserv/TOS 802.1p Support for IEEE 802.Q VLAN Tagging
Maximum throughput per gateway card	With 1 GbE interface: 1 Gbps input and 1 Gbps output per gateway card With 10 GbE interface: 10 Gbps input and output per gateway card
Processing	
Video encapsulation	According to RFC3497
Video output synchronization	Advanced Adaptive clock regeneration – no need for external reference
Programmable output control	Transition to a user-selectable monochrome color or 0 VDC in case of loss of RTP stream
Management and Monitoring	
Number of ports on chassis	2
Connector type	RJ-45
Interface type	10/100 & 10/100/1000 BT
Protocols	HTTP, SNMP, IIOP
User interface	Embedded HTML user interface
Environmental Specifications	
Operating temperature	0°C – +50°C / +32°F – +122°F
Storage temperature	-40°C – +70°C / -40°F – +158°F
Humidity	5% – 95% (non condensing)
Altitude	-200 – 10,000 feet (-61 – 3048 m)
Power Consumption	
Fully loaded	< 165 W
One card (chassis included)	< 100 W
Input Voltage	

AC input voltage
    Nominal
    Normal service voltage range
    Frequency
	
	100 – 240 VAC
	90 – 254 VAC
	47 – 63 Hz

DC input voltage
    Nominal
    Normal service voltage range
	
	-48 VDC
	-38 – -58 VDC

Chassis Mechanical Specifications	
Height	1 RU 1.74 in. / 44 mm
Width	19 in. / 483 mm
Depth	22.13 in. / 562 mm
Weight (fully loaded)	27.6 lbs / 12.5 kg
Cooling	Front to back, forced air: units are stackable

Note: 1. This is currently not active and will be supported in a future release

Note: 2. SFP or SFP+ module not included

Figure 2.   Cisco DCM Series D9901 IP Video Gateway Rear Panel with 2 AC power supplies, 2 gateway cards with SFP modules applied and electrical video interfaces
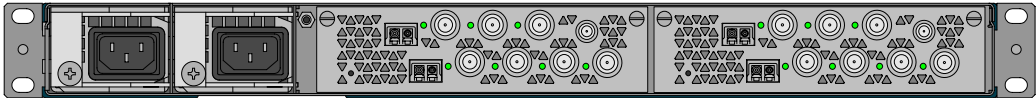
Table 2. Ordering Information Cisco DCM Series D9901 IP Video Gateway Components

Cisco DCM Series D9901 IP Video Gateway Components	Part Number
DCM Series D9901 IP Video Gateway Preconfigured Unit	
DCM Series D9901 IP Video Gateway preconfigured unit (fully assembled and pre-enabled licenses)	D1xxxxxxxxxxxxxxxxx Call for Part Number
Hardware Upgrades (Boards delivered as separate kits)	
DCM SDI GWY – ELECTRICAL: 3 inputs & 3 outputs	4030219
DCM SDI GWY – ELECTRICAL: 6 inputs	4030220
DCM SDI GWY – ELECTRICAL: 6 outputs	4030221
DCM SDI GWY – OPTICAL: 6 ports	4030222
DCM SDI GWY – ELECTRICAL: 3 inputs & OPTICAL: 3 ports	4030223
DCM SDI GWY – ELECTRICAL: 3 outputs & OPTICAL: 3 ports	4030224
DCM blank plate for I/O slot	4008973
DCM blank plate for power supply	4010913
DCM Series D9901 front panel	4025755
Hardware Upgrades (Boards delivered as separate kits)	
AC power supply (AC power cord needs to be ordered separately)	4015490
DC power supply	4015491
License Upgrades (Upgrade delivered on a CD-ROM – Note 3)	

DCM license upgrade containing one or more of the following licenses:
- Single additional video stream option
  (1 license enables one additional video stream in a DCM Series D9901 IP Video Gateway
  chassis to be processed over IP, either from video input to RTP stream or from RTP stream
  to SDI output. The license is floating across the gateway cards in the chassis.)
	403409800001

- SDI GWY HD-SDI Option (for one gateway card)
  (1 license provides HD-SDI capability for one entire gateway card. The license is floating
  across the gateway cards in the DCM chassis)
	403409400001

- 10 GbE Option (for one gateway card)
  (1 license provides 10 GbE capability for one gateway card. The license is floating across the
  gateway cards in the DCM chassis)
	403410000001

AC Power Cords	
Argentina	207340
Australia	1000897
China	745415
Europe	3989835
Italy	3993130
Japan	3993133
UK	3989836
US	3989838

Note: 3. License Upgrade CD-ROMs are delivered as one separate CD-ROM per part number.

Table 3.   Ordering Information SFP Plug-ins (see Note 4)

Cisco DCM Series D9901 Components	Part Number
SFP Plug-ins – WDM types	
GbE SFP module 850 nm (LC, up to 500 m)	4002019
GbE SFP module 1310 nm (LC, up to 5 km)	4002020
GbE SFP module 1310 nm (LC, up to 40 km)	4003466
SFP Plug-ins – CWDM types	
GbE SFP module 1470 nm (LC, up to 40 km)	4002003
GbE SFP module 1490 nm (LC, up to 40 km)	4002004
GbE SFP module 1510 nm (LC, up to 40 km)	4002005
GbE SFP module 1530 nm (LC, up to 40 km)	4002006
GbE SFP module 1550 nm (LC, up to 40 km)	4002007
GbE SFP module 1570 nm (LC, up to 40 km)	4002008
GbE SFP module 1590 nm (LC, up to 40 km)	4002009
GbE SFP module 1610 nm (LC, up to 40 km)	4002010
GbE SFP module 1470 nm (LC, up to 70 km)	4002011
GbE SFP module 1490 nm (LC, up to 70 km)	4002012
GbE SFP module 1510 nm (LC, up to 70 km)	4002013
GbE SFP module 1530 nm (LC, up to 70 km)	4002014
GbE SFP module 1550 nm (LC, up to 70 km)	4002015
GbE SFP module 1570 nm (LC, up to 70 km)	4002016
GbE SFP module 1590 nm (LC, up to 70 km)	4002017
GbE SFP module 1610 nm (LC, up to 70 km)	4002018
SFP Plug-ins – 1000 BT copper	
GbE SFP module 1000 BT copper	4006222
Video SFP Plug-ins	
Video SFP 1310 nm – TX	1009647
Video SFP 1310 nm – RX	1009648

Note: 4. All Class 1 SFP plug-ins according to IEC 60825-1 (1997) Amendment 2 (2001)

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