D9800 Network Transport Receiver

Product Overview

The Cisco® D9800 Network Transport Receiver (Figure 1) is the most versatile receiver designed offering hardware configurability and over the air (OTA) licensing that allows content providers to customize the product to support the gamut of their applications. Designed to support high-efficiency video coding (HEVC) and ultrahigh-definition (UHD) delivery over satellite and IP terrestrial content distribution networks requiring Digital Video Broadcasting - Satellite (DVB-S), Digital Video Broadcasting - Satellite - Second Generation (DVB-S2), and IP reception capabilities, it future proofs the next network expansion. The D9800 chassis is available in a single stream variant for decoding to baseband digital or analog video and a multi-stream variant for bulk decryption and high density transcoding applications.

The single stream variant focuses on single service video decode applications. The integrated video decoder can decode an MPEG-2, advanced video coding (AVC), or HEVC video-encoded service and output the serial digital interface (SDI) or composite uncompressed video. The D9800 is capable of outputting simultaneous high-definition (HD) and down-converted standard definition (SD).

The multi-stream chassis is targeted towards applications that require decryption and/or transcoding on multiple video services within a transport stream or multiple transport streams. The optional satellite front end has four demodulators for sourcing content across transponders. The multi-stream chassis can decrypt up to 32 PowerVu services and transcode up to 16 services of AVC to MPEG-2 making it ideal for content providers carrying a high number of channels. The optional high density HEVC card adds the ability to transcode from an HEVC encoded source.

Figure 1. Cisco D9800 Network Transport Receiver

Digital Program Distribution

The Cisco D9800 Network Transport Receiver offers asynchronous serial interface (ASI) transport output and MPEGoIP output (HW option). These outputs provide a decrypted program for digital distribution when a codec or bitrate change is not needed. This capability provides the original compressed video programs on the outputs.

Digital Program Mapping

Digital program mapping allows programmers to “transparently” substitute programs at the uplink. It maintains predictable and compliant transport output during service replacement, network information table (NIT) retuning, and channel changes, including forced tuning. This feature remaps the packet identifier (PID) information from the primary service to an alternate service, allowing downstream devices to continue to operate without headend operator intervention. This helps ensure availability of alternate programming in the digital tier.

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Digital Advertisement Insertion

Digital program insertion (DPI) information is available along with the video and audio PIDs for external advertisement insertion in compressed digital format.

Digital Baseband Outputs

The single stream Cisco D9800 Network Transport Receiver is capable of decoding MPEG-2, AVC (if licensed), and HEVC (if licensed) compressed video content and outputting SDI baseband digital video. The decoder will decode any input resolution compliant with the codec standard that is licensed to decode. The SDI and composite outputs will automatically downscale based on the output resolution that the unit is licensed for up to 1080p60. Two SDI ports can be configured mirrored for redundancy or one native and one down-converted from the same input source

Digital Transport Stream Outputs

The multi-stream Cisco D9800 Network Transport Receiver is capable receiving up to 400 Mbps input aggregately and can transcode up to 16 video services. The aggregate output bit rate is 800 Mbps in order to accommodate more than one application per video service. For example, content providers can use the D9800 to decrypt 16 services and output the native and transcoded service for each of the input services on one aggregated TS output via MPEGoIP. The full functional multiplex allows for almost limitless applications of services on the digital transport outputs for ASI and MPEGoIP.

Common Features

- Four independent RF inputs with licensable independent tuner/demodulators
- Forward Error Correction (FEC) based on SMPTE 2022 for MPEGoIP input and output
- DVB-S quaternary phase shift keying (QPSK) demodulation
- Licensable DVB-S2 QPSK and eight-phase shift keying (8PSK)
- Cisco PowerVu® conditional access with Data Encryption Standard (DES) or DVB descrambling
- Optional DVB-CI support for CAM-based conditional access
- Aspect ratio conversion (4:3, 16:9, 14:9) with active format descriptor (AFD) control for SD programs
- AFD support for down-conversion of HD programs with aspect ratio conversion
- Fingerprint-triggered output to identify piracy sources
- Field-upgradeable software
- Simple Network Management Protocol (SNMP) for setup, control, and monitoring
- Front panel liquid crystal display (LCD) for control and monitoring
- Web browser interface for easy setup, control, and monitoring
- Digital program mapping providing uplink control for service replacements in blackout areas
- Cisco Live Event Controller support
- Satellite disaster recovery support with Cisco PowerVu Network Center uplink control (Release 12.5 or later)
- Onscreen display support on transcoded or baseband output

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Single Stream Decoding Specific Features

- User-configurable redundant ASI, SDI, or HD-SDI outputs
- SDI, HD-SDI, or 3G-SDI video output with embedded audio
- 4:2:0 10-bit HEVC decoding up to UHD resolutions
- 4:2:0 AVC decoding up to 1080p60
- 4:2:0 MPEG-2 decoding up to 1080p60
- New H/W with up to 180 Mbps throughput/bandwidth
- MPEGoIP input with redundancy (1 MPTS or 1 SPTS)
- MPEGoIP output with redundancy (1 MPTS or 16 SPTS)
- Closed captioning support for EIA-608 and EIA-708
- MPEG and Dolby Digital audio decoding
- DVB or Imitext subtitling
- Four or eight audio outputs providing either two or four stereo pairs of balanced audio, each with the ability to use part of the output for applications such as second audio program (SAP), cue tones, and so on
- Uplink-addressable decoder output control, including vertical blanking interval (VBI) data, audio routing, DPI, and ASI output
- DVB-VBI and SCTE-127 support
- Dual-tone multi-frequency (DTMF) cue tone and cue trigger outputs for advertisement insertion
- HDMI monitoring port (controllable over PNC)

Multi Stream Specific Features

- Optional 8 or 16 channels of AVC to MPEG-2 transcoding
- HEVC to MPEG-2 transcoding supported in specific HW configurations
- 400 Mbps aggregate input and 800 Mbps aggregate output for using content sources for multiple purposes
- Decrypt up to 32 services of PVu content
- User defined TS multiplex on physical output ports (IP or ASI)
- MPEGoIP interface standard
- Select services across transponders with 4 tuner

Specifications

Table 1, Table 2, and Table 3 provide product specifications for the Cisco D9800 Network Transport Receiver.

Table 1. Common Product Specifications

Feature	Description
System	
Standards	MPEG-2 and DVB compatible EN 300 421, EN 300 468
Demodulation	DVB-S QPSK, DVB-S2 QPSK, and 8PSK

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Feature	Description
Tuner RF Inputs	
Number of RF inputs	4 (default 1 active at a time, or can be licensed as individual tuners)
Input level	–25 to –65 dBm per carrier
Frequency range	950 to 2150 MHz
Symbol rate range	• DVB-S: ◦ 1.0 to 60 MS/s • DVB-S2: ◦ 1.0 to 45 MS/s
Input return loss	≥ 18 dB (950–2150 MHz)
Port-to-port isolation	≥ 65 dB (70 dB typical) (950–2150 MHz)
Input impedance	75 ohm
ASI Input	
MPEG-2 transport input	EN50083-9, DVB-ASI coaxial, 188/204-byte packets
MPEGoIP Output (Single stream optional, Multi-stream standard)	
Physical	RJ-45
Ethernet	100BASE-T Ethernet and 1000BASE-T Ethernet
Output modes	UDP raw, RTP, FEC
FEC	FEC based on SMPTE 2022
Rates	Up to 200 Mbps
Ethernet Output for MPE Data	
Connector	RJ-45, 100/1000BaseT
Rates	Up to 10 Mbps
Conditional Access	
Cisco PowerVu conditional access	DES or DVB
DVB descrambling	BISS mode1/E
DVB-CI	
Interface	2 CI slots: EN 50221
CA method	Multicrypt, simulcrypt
Alarm Output	
Programmable relay output	Alarm or configurable to one of the 8 open collector outputs
Cue Tone Output	
Balanced audio output	–3.0 dBu ±3 dB, 600 ohms
Output impedance	< 50 ohms
Cue Trigger Outputs	
Number of outputs	8
Type	Open collector
Environmental Specifications	
Operating temperature	0–50°C (32–122°F)
Storage	–20–70°C (–4–158°F)
Chassis Mechanical Specifications	
Height	1.72 in. (4.37 cm) 1RU high, 19 in. EIA rack mountable
Width	17.35 in. (44.07 cm)
Depth	20.25 in. (51.44 cm)
Weight	15 lbs (6.8 kg) for single stream chassis, 22 lbs (10 kg) for multi-stream chassis (approx.).

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Feature	Description
Power	
Voltage range	100V to 240 VAC
Line frequency	50/60 Hz
Power consumption	70W typical for single stream chassis, 82W typical for multi-stream chassis (without LNB)
LNB power on satellite input	+13V or +18V at 400 mA maximum

Table 2. Single stream and decoder specific product specifications

Feature	Description
Analog SD Video Output	
Number of channels	1
Video decompression type	MPEG-2 4:2:0 and MPEG-4 AVC 4:2:0
Video standard	NTSC and PAL B/G/I/D/M/N
Maximum video resolution	720x480 and 576 video output
Analog Audio Output	
Number of channels	2 stereo pairs or 4 mono channels and 5.1 channel down-mix 4 stereo pairs or 8 mono channels (with license)
Audio decompression	MPEG, Dolby Digital (AC-3), HE-AAC, and Dolby Digital Plus
Output level	Balanced output is adjustable at the front panel by ±6.0 dB (ref. 100 kilo ohms) and is factory calibrated to +18 dBu (at full scale). Recommended 600 ohm operation adjustment range is –6 dB to +4dB. +17 dBu (ref. 600 ohms) at full scale
Frequency response	±0.5 dB, 20 Hz to 20 kHz (ref. 100 kilohms)
Total harmonic distortion	< 0.3% at 1 kHz (ref. 100 kilohms)
Dynamic range	85 dB (CCIR average response meter [ARM] weighting)
Crosstalk	–110 dB at 1 kHz (typical)
Digital SDI-HD Video Output (Optional)	
Number of channels	1
User-selectable output ports	2 (mirrored or optional simultaneous SD/HD output)
Output type	BNC
Output format	3G-SDI, SMPTE-424M (license option) HD-SDI, SMPTE-292M (license option) SDI, SMPTE-259M
Embedded audio	2 audio programs (license option for 4), PCM or pass-through 2 digital audio outputs (license option for 4) (1 stereo channel each) BNC, AES-3id (HW limited to 2), SMPTE 276M
Aspect Ratio	
Display aspect ratios	4:3, 16:9
Aspect ratio conversions for down-conversion	4:3: 16:9 letterbox, 14:9 letterbox, center cutout 16:9: center cutout
Aspect ratio conversions for SD programs	4:3: 16:9 letterbox, 14:9 letterbox, center cutout, none 16:9: Scale to 16:9

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Feature	Description
VBI	
NTSC	• Lines 10 to 22, fields 1 and 2 • Line 21 closed captions • NABTS • AMOL I and II (Neilsen) • VITC • WSS
PAL	• Lines 7 to 22, fields 1 and 2 • WST • WSS • VPS • VITC

Table 3. Multi Stream and Transcoder Specific Product Specifications

Feature	Description
HD Video Output	
Compression format	MPEG-2
Vertical resolutions	Same as input
Horizontal resolutions	1080i:1920, 1080i:1440, 720p:1280, 720p:960
Output bitrate	10 Mbps to 25 Mbps
SD Video Output	
Compression format	MPEG-2
Vertical resolutions	Same as input
Horizontal resolutions	720/704/544/528
Output bitrate	2 Mbps to 15 Mbps
SD output aspect ratios	4:3, 16:9
Aspect ratio conversions	Auto, auto AFD, 16:9 letterbox, 4:3 pillar box, 14:9, 4:3 center cut, 16:9 scale
Decryption and transcoding	
Transcode density	Up to 16 AVC or up to 8 HEVC
Decrypt density	Up to 32 services of PVu
Bit Rates	Up to 400 Mbps aggregate input and 800 Mbps aggregate output (individual physical input limitations and decrypt limitations apply

Figure 2 shows the rear view of the Cisco D9800 Network Transport Receiver single stream configuration and multi-stream.

Figure 2. Cisco D9800 Network Transport Receiver

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Ordering Information

Table 4. Ordering Information

Cisco D9800 Single Stream Base HW Chassis	Part Number
1RU D9800 Base Chassis with ASI Input/Output	D9800-SS-BASIC
1RU D9800 Base Chassis with ASI and MPEGOIP Input/Output	D9800-SS-MPEGOIP
Cisco D9800 Single Stream Base Decoder Options	**Part Number**
D9800 Analog Video and Audio Output Decoder	D9800-ANALOG
D9800 Digital Video and Audio Output Decoder	D9800-3G-SDI
Cisco D9800 Common Hardware Options	**Part Number**
Four Port Satellite Input Card	D9800-SAT-GEN1
DVB Common Interface Module for 2 CAMs	D9800-DVB-CI
Cisco D9800 Single Stream Software License Options	**Part Number**
AVC Video Decoding License	L-D9800-DEC-AVC
HEVC Video Decoding License (must have L-D9800-AVC)	L-D9800-DEC-HEVC
Standard HD (up to 720p, 1080i) Output License (must have D9800-3G-SDI HW)	L-D9800-VR-HD
Advanced HD (up to 1080p) Output License (must have D9800-3G-SDI HW and L-D9800-VR-HD)	L-D9800-VR-3G
Enable 3rd and 4th Audio License (must have D9800-3G-SDI HW)	L-D9800-AUD-ADV
Cisco D9800 Common Software License Options	**Part Number**
Upgrade to DVB-S2 Demodulation License (must have D9800-SAT-GEN1 HW)	L-D9800-SAT-S2
Add an extra Tuner/Demodulator License (must have D9800-SAT-GEN1 HW)	L-D9800-SAT-DEMOD
Cisco D9800 Multi-Stream Base HW Chassis	**Part Number**
1RU D9800 Base Chassis with ASI and MPEGOIP Input/Output	D9800-MS-MPEGOIP
Cisco D9800 Multi-Stream Transcoder HW Options	**Part Number**
AVC to MPEG-2 8 Channel Transcode Card	D9800-TXB
HEVC Decoder Front End Card (for HEVC input transcoding)	D9800-HEVC-DEC
Cisco D9800 Multi-Stream Software License Options	**Part Number**
Add an SD Output Transcoding Channel to a D9800-TXB	L-D9800-SD-TX
Add an HD Output Transcoding Channel to a D9800-TXB	L-D9800-HD-TX
Upgrade an SD to an HD Transcoding Channel to a D9800-TXB	L-D9800-HD-UPGR-TX
PVu Bulk Decryption License (When Decryption Channels Exceed Transcoding Channels)	L-D9800-PVU-DCRYPT

Table 5. Ordering Information: Country-Specific Power Cords

Power Cord Description	Part Number
North American Power Cord (US, IEC, 10AMP, 2.5m)	CAB-PWR-DMN-US
Japan Power Cord	CAB-PWR-DMN-JPN
China Power Cord (IEC)	CAB-PWR-DMN-CHN
Australia Power Cord	CAB-PWR-DMN-AUS
Italy Power Cord	CAB-PWR-DMN-IT
European Power Cord (EU)	CAB-PWR-DMN-EU
Brazil Power Cord	CAB-PWR-DMN-BRA
India Power Cord	CAB-PWR-DMN-IND
Argentina Power Cord	CAB-PWR-DMN-ARG
UK Power Cord (IEC, 10AMP, 2.5m)	CAB-PWR-DMN-UK

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