

Model D9155 Originator™ Encoder

Description

Scientific-Atlanta's three-rack-unit-high Originator™ Encoder is a flexible, MPEG-2/DVB/ATSC compact transmission system, featuring advanced signal processing for unsurpassed video quality in 4:2:0 and 4:2:2 transmission profiles. This package allows video content to be delivered together with a larger number of audio services all within the same package.



The Originator Encoder is part of the PowerVu product family. It is designed for direct connection to a satellite modulator, D9140 Advanced Multiplexer, D9150 Originator Encoder with an ASI input module, cable modulator or telecom network adapter unit for standalone operation. Based on the modular PowerVu chassis architecture, it provides a flexible platform for single-channel video transmission together with up to 16 monaural channels. Alternatively it may be configured as an audio-only encoder with up to 20 monaural channels.

This encoder is configured using an RS-232 terminal, or using SNMP via an Ethernet interface (MIB available upon request).

For secure operation, the Originator Encoder can be equipped with a scrambling card. CES1000 software provides PowerVu® conditional access with an on-board database of up to 1000 receivers.

Features

- Advanced spatial-temporal filtering for unsurpassed video quality
- Switchable 4:2:0 or 4:2:2 chroma encoding
- Small profile - 3U high to fit cramped environments
- Stand-alone single channel operation without a multiplexer or external control computer
- Remote control via RS-232 terminal or SNMP host
- Fully user-configurable, with 16 preset configurations including ISOG Mode
- Optional DVB or DES scrambling
- Optional PowerVu conditional access, with 1000 receiver database
- BISS compatible fixed key encryption
- Produces MPEG and DVB or ATSC SI/PSI tables
- DVB-ASI output for flexibility - for operation with a wide range of modulators, multiplexers and telecom network adapters
- Automatic control of PowerVu Digital Video (QPSK) modulator via Ethernet
- Switchable analog or digital input interfaces
- NTSC/PAL/PAL-M/PAL-N operation
- Optional MPEG or Dolby Digital® (AC-3™) audio encoding
- Internal video and audio test signals



Applications

The Originator Encoder is fully interoperable with all PowerVu and PowerVu *Plus* receivers, as well as other manufacturers' DVB-S receivers, when operated in the clear

This version of the PowerVu Originator Encoder makes it the ideal solution for content transmission with large quantity of audio channels in the following applications:

DSNG Uplink

The Originator Encoder is a low profile unit with ruggedized packaging to suit transport case or vehicle mounted DSNG (Digital Satellite News Gathering) operation. It requires a minimum of external hardware to set up and meets vibration MIL standard 810E for mobile applications. Multiple video formats can be configured to get on the air quickly.

OB Uplink or Fixed Contribution Uplink

Superb video quality for program origination in 4:2:0 or 4:2:2, with up to eight independent audio feeds.

Telecom Network Operation

Program contribution and distribution over terrestrial telecommunications networks is simplified by the use of the DVB-ASI standard transport stream interface. Conserves transmission room rack space and minimizes bandwidth required on the network while delivering superb video and audio. A remote control interface supports control and monitoring by external NMS.

Cable Headend Local Encoding

Excellent performance at low bit rates plus a low profile chassis allow digital cable operators to add more local content on the digital tiers especially with more audio services for a given video program or compress more audio programs within a single 3RU package.

Card Descriptions

Model D9796 Video Input Card

The Video Input card accepts either analog composite or serial digital video conforming to ITU-R-656 bit-serial interface and ANSI/SMPTE 259M-C standards.

The Video Input card has an on-board synchronizer with a built-in three-line adaptive comb decoder. The card processes video with 10-bit resolution producing the highest quality video available. The card also provides anti-aliasing low-pass (brick wall) filtering giving the user the flexibility to change bandwidths for optimum picture quality. Supported VBI data formats include NABTS, WST, Inverted WST (cue tones), AMOL I and II (Nielsen),

VITC, Gemstar, WINK and EIA 608. Any data extracted is reinserted correctly into the video frame.

Model D9790 MPEG-2 Video Encoder Card

The Video Encoder card compresses the digitized video signal received from the input processor. Video is compressed using the latest generation MPEG technology and state-of-the-art adaptive field/frame encoding algorithms. In addition, this card performs spatial-temporal filtering to obtain the best-encoded picture quality for any of the operating bit rates. Compressed video is then packetized into a transport stream and sent to the control card. This card supports both variable bit rate (VBR) and constant bit rate (CBR) video encoding in both 4:2:0 and 4:2:2 MPEG-2 profiles at main level.

Model D9792 Dolby Digital (AC-3) Audio Encoder Card

The Audio Encoder card accepts four mono input channels, which can be configured as two stereo pairs in either analog, AES/EBU digital format or an AES/EBU digital audio signal embedded in a serial D1 stream. Up to two cards are supported (per encoder) with video encoding simultaneously, allowing up to eight audio channels. Inputs are processed using Dolby Digital (AC-3) audio compression prior to packetization and transfer of the data to the clock and multiplexer card. In addition, this card can accept pre-encoded Dolby Digital audio inputs for surround sound (5.1) applications. A wide range of audio bit rates are also supported. MPEG and Dolby Digital audio cards can be installed in the chassis at the same time.

Model D9793 MPEG Audio Encoder Card

The Audio Encoder card accepts four mono input channels, which can be configured as two stereo pairs in either analog, AES/EBU digital format, or an AES/EBU digital audio signal embedded in a serial D1 stream. Up to two cards are supported (per encoder) with video encoding simultaneously, allowing up to eight audio channels. Inputs are processed using MPEG audio compression prior to packetization and transfer of the data to the clock and multiplexer card. A wide range of audio bit rates are also supported. MPEG and Dolby Digital audio cards can be installed in the chassis at the same time.

Model D9741 Clock and Multiplexing Card

The Clock and Multiplexing card provides an Ethernet connection allowing communication with the PowerVu Digital Video Modulator and or an external network management system. Form C contact closure alarms are provided to indicate major, minor and power faults. Diagnostic and status information from all cards is reported via the control card back using the RS-232 and a dumb terminal interface or using the Ethernet interface and an external network computer in stand-alone and networked applications.

This card provides three identical DVB-ASI output connectors that can be connected directly into both a primary and secondary PowerVu Modulator, BitMizer™ Multiplexer and/or to the DVB-ASI input of a monitoring device such as an MPEG decoder or transport stream analyzer.

Model D9753 Control Card

The Control card provides the configuration and monitoring functions for all cards within the encoder chassis.

Model D9754 Control and Conditional Access Card

The Control and Conditional Access card provides the configuration and control function for all other cards within the encoder chassis. Additionally, this card is coupled with either the D9747 or D9748 scrambling cards to provide complete PowerVu encryption and scrambling (DES, DVB or DVB-based fixed key BISS) of audio, video and data services. This level of encryption allows unique access levels for each decoder.

Model D9747 and D9748 Scrambler Cards

The Scrambler cards are auxiliary cards that provide the capability of scrambling services using either the DES (Model D9747) or DVB (Model D9748) scrambling algorithm.

Specifications

Video and Audio Inputs

Selectable video and audio inputs allows operation with analog or digital source equipment. The Digital Audio mode is switchable between AES/EBU and D1.

Composite Video Input

Video Level: 1V p-p $\pm 0.3V$ p-p
Bandwidth (at 720 horizontal resolution):
Up to 4.2 MHz (NTSC)
Up to 5.5 MHz (PAL)
Impedance: 75 Ω unbalanced
Return Loss: >25 dB
Connector: BNC

Serial Digital (D1) Video Input

Interface: SMPTE 259M (270 Mb/s)
Format: ITU-R-601
Impedance: 75 Ω unbalanced
Connector: BNC

Audio Inputs

Analog Audio Input

Audio Level: 0 dB full scale, variable from -7 dBu to 24 dBu
Typically users set the 0 dBFS level 10 to 18 dB below +24 dBu
Maximum Input: +24 dBu
Level Adjust: ± 15 dB

Sample Rates: 32K, 44.1K, 48K samples/second
Frequency Range: 20 Hz to 20 kHz ± 0.25 dB
A/V Delay Adj.: ± 255 ms relative to video
Impedance: >10K Ω , all levels reference to 600 Ω source

Connector: mini XLR (female pin, male shell), provided with each card

Digital Audio Input

Serial Interface: AES/EBU format

Sample Rates: 32K, 44.1K, 48K samples/ second, 16-bit linear or 48K samples/second, 20-bit linear

Connector: Mini XLR (female pin, male shell), provided with each card

Embedded Audio on D1 Video Input

Interface: SMPTE 259M (270 Mb/s), AES/EBU (as above)

Format: ITU-R-601

VBI Data Processing (Standard Feature)

Rates up to 6.9375 Mb/s instantaneous, sampled from selected video input

Active Lines:

NTSC: lines 10 to 22, fields 1 & 2

PAL: lines 7 to 22, fields 1 & 2

Standards: NABTS, WST, Inverted WST, AMOL I and II (Nielsen), VITC, Gemstar, WINK and EIA 608

Video and Audio Processing

Video

Quantization: 10-bit processing
Format: MPEG-2 adaptive field/frame encoding (MPEG-2 MP@ML, MPEG-2 4:2:2P@ML)

Bit Rates: Up to 15 Mb/s (4:2:0)

Up to 50 Mb/s (4:2:2)

H Resolutions: 700, 704, 544, 480 and 352

V Resolutions: 576 and 480

Audio

Format: MPEG-1 layer 2 or Dolby Digital (AC-3)

Bit Rates: MPEG-1: 32K to 384 kb/s

Dolby Digital AC-3: 64K to 640 kb/s

Transport

Multiplexed MPEG-2 transport packets, with individual audio and video Packetized Elementary Streams (PES). The output includes MPEG or DVB system information.

Format: DVB-ASI

Connector: BNC (75Ω)

Number of Outputs: 3

Monitor and Control

Ethernet

Connector: RJ 45 (10Base-T)

Protocol: SNMP v2c (MIB available upon request)

RS-232

Connector: DB9

Alarms Contacts

Type: Form C contacts

Connector: Spring terminal block

Alarms: Minor Alarm, Major Alarm, and Power Fault

Contacts: 2 sets (NC, Common, NO)

Video monitoring is optionally provided on some Models.

Environmental

Operating Temperature: 0°C to 40°C

(32°F to 104°F)

Storage Temperature: -20°C to 60°C

(-4°F to 140°F)

Relative Humidity: 0% to 95% non-condensing

Physical Dimensions: 5.25 in. H x 19.0 in. W x

25 in. D (13.3 cm H x 48.3 cm W x 63.5 cm D)

3U high, 19 in. rack mountable

Power Requirements

Voltage Range: 100V to 240V ac ±10% nominal

Line Frequency: 47 Hz to 63 Hz

Power Consumption: 485W max.

Optional redundant power supplies

Options

Scrambling and Conditional Access

Scrambling Algorithm

DVB or DES scrambling (card option)

BISS fixed key encryption

CES1000 Conditional Access Software

Programs: Up to 16

Tiers: 16

Database: 1000 receiver capacity

System: PowerVu and PowerVu lite

Ordering Information and Standard Configuration

The PowerVu Originator Encoder chassis assembly contains the following cards as a standard configuration except for the cards noted as optional. In addition, it is equipped with redundant power supplies.

Slot No.	Front Cards	Rear Cards
1	Option or D9747 or D9748 Scrambling ¹ or Blank Panel	D9796 Video Input ² or D9792 Audio Encoder ³ or D9793 Audio Encoder ³
2	D9753 Control or D9754 Control and Conditional Access ¹	D9741 Clock and Multiplexing
3	Blank Panel	Option or D9792 Audio Encoder ³ or D9793 Audio Encoder ³ or Blank Panel
4	Blank Panel	Option or D9792 Audio Encoder ³ or D9793 Audio Encoder ³ or Blank Panel
5	Option or D9790 Video Encoder ² or Blank Panel	Option or D9792 Audio Encoder ³ or D9793 Audio Encoder ³ or Blank Panel
6	Blank Panel	Option or D9792 Audio Encoder ³ or D9793 Audio Encoder ³ or Blank Panel

List of Encoder Cards

Model No. and Description	Part No.
D9741 Clock and Multiplexing	767-001
D9754 Control and Conditional Access	767-002
D9796 Video Input	767-003
D9790 MPEG-2 Video Encoder	767-004
D9793 MPEG Audio Encoder	767-005
D9747 DES Scrambler	767-007
Blank Panel	767-009
D9753 Control	767-015
D9748 DVB Scrambler	767-016
D9792 Dolby Digital (AC-3) Audio Encoder	767-017

Preconfigured Encoders

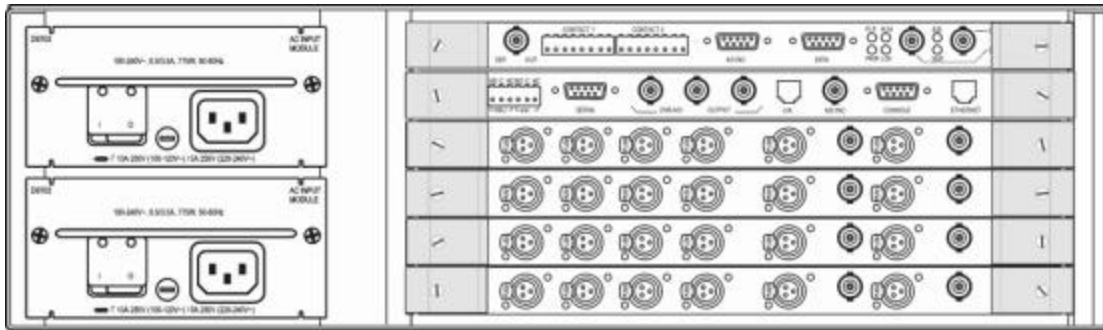
Part No.	Video	No. of MPEG Audio Cards	No. of Dolby Digital Audio Cards
803-409	Yes	4 ⁴	-
803-411	Yes	-	4 ⁴
803-414	No	5 ⁴	-
803-415	No	-	5 ⁴

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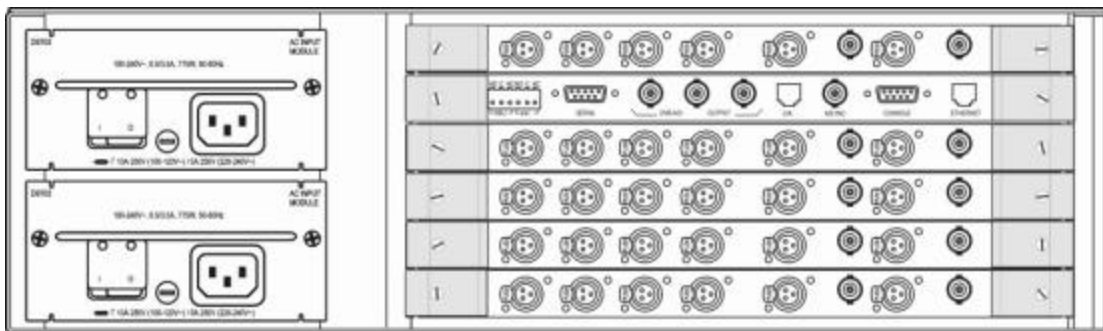
NOTES:

1. Scrambling card may be ordered with DES or DVB scrambling. Addition of scrambling card requires use of Control and Conditional Access card.
2. Video Encoder card requires that encoder also be fitted with the Video Input card.
3. Audio cards may not be mixed in audio-only applications.
4. Each audio card can encode up to two stereo pairs.

Typical Originator Encoder Rear Panel Configurations



Chassis Rear View, Video and Audio Configuration



Chassis Rear View, Audio-only Configuration



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Part Number 42D497 Rev. D
03/03