

Advanced · TV™ Series

Linear Encoding Xponents™

LEXCLASS™

Encoders



LEX2000™

Encoder Series



The Linear LEX2000 Series™ of ATSC Encoder / Mux combos – built to your exponential needs!

The Linear LEX2000™ generates an ASI or SMPTE-310 output from multiple audio, video and metadata sources. It sets a new standard for picture quality, functional integration and technology innovation for ATSC digital broadcast encoders and multiplexers. Its state-of-the-art parallel processing platform provides exceptional performance and cost, as well as the ability to add new features and functions as your needs evolve.

Innovative Video Encoding Technology

The Linear LEX2000 Series of scalable encoders are built to Linear client specifications by adaptiVideo™. The MPEG-2 encoder uses intelligent scene analysis, adaptive decision logic and non-linear quantization to achieve excellent quality video, even with multiple video programs and challenging bandwidth constraints. Its statistical multiplexer applies sophisticated multi-layer control algorithms to optimize encoding bit rates of multiple MPEG-2 data streams, ensuring high utilization of available bandwidth to provide great looking images on your highest priority channels.

Integrated Broadcast Control System

Beyond the primary mission of video encoding, audio encoding and building the ATSC multiplex, the Linear LEX2000 offers integrated add-on

functions, such as video format conversion, remote monitoring, and ASI re-multiplexing.

The highly integrated LEX2000 helps to shrink rack space usage and reduce power consumption, leading to lower operating costs and a better bottom line.

Gigabit Ethernet & Optical Network Interfaces

The Linear LEX2000 incorporates extensive networking connectivity with standard Gigabit Ethernet and optional optical media connections, supporting a variety of IP ingest and transmission applications.

Network-Enabled Performance Upgrades

Adding program capacity, installing new features, and updating the performance of the LEX2000 are simple. New firmware may be installed in the LEX2000 from an SD memory card, from its local network or directly from a web site, accessed through a secure internet connection.

Low Power Consumption & Maintenance Costs

The Linear LEX2000 uses a high reliability power supply with a single board computing platform that consumes less than 100W in operation. Network-based remote monitoring, diagnostics and management helps station engineers confidently manage multiple broadcast sites in different locations.

TECHNICAL SPECIFICATIONS

Multi-Channel MPEG-2 Encoder

The Linear LEX2000 provides ATSC-compliant ISO/IEC 13818-2 MPEG-2 (MP@ML, MP@HL) video encoding, supporting these video formats:

Video Format	Resolution H x V	Scan Style	Frames Per Sec
1080i	1920 x 1080	Interlaced	29.97
720p60	1280 x 720	Progressive	59.94
720p30	1280 x 720	Progressive	29.97
480p30	704 x 480	Progressive	29.97
480i	704 x 480	Interlaced	29.97

- ▲ Chroma Coding: 4:2:0
- ▲ Video Input Filter: Statistical non-linear filter with selectable sharpness response
- ▲ Aspect Ratios: 4:3, 16:9
- ▲ AFD pass-through supported for video programs received on HD-SDI and SD-SDI inputs.
- ▲ The LEX2000 supports a wide variety of video encoding configurations, including the example configurations listed below. Effective program capacity may be limited by video quality preferences and video program content characteristics.

Maximum Simultaneous Channels Supported			
1080i or 720p60	720p30	480i or 480p30	Total Channels
2	–	–	2
1	2	–	3
1	1	3	5
1	–	6	7
–	2	6	8
–	–	8	8

Multi-Stream Dolby® Audio Encoder

- ▲ Receive Audio via Embedded SDI, AES/PCM or Analog Audio with NTSC or with SDI video.
- ▲ Analog audio digitizer: 24 bits at 48kHz
- ▲ Audio Encoding Formats: Dolby Digital AC-3
- ▲ Audio Pass-Through Formats: Dolby 5.1, AC-3
- ▲ Encoding Capacity: 8 stereo (16 mono) programs

Statistical ATSC Multiplexer

Adaptive bandwidth allocation adjusts video encoder rate controls to optimize use of 19.4Mbit ASI stream.

- ▲ Select ATSC multiplex programs from audio and video streams, paired as received by encoder.
- ▲ Select additional audio programs from encoded or pass-through audio streams.
- ▲ Dual ASI / SMPTE-310 outputs with independently selectable protocol for each output.
- ▲ CEA-708 and EIA-608 caption support.

Dynamic PSIP

Dynamic PSIP supported through A/76 PMCP over IP, from PSIP generator or program control system.

Integrated EAS Cut-Over Switch

Maps primary program audio and video to secondary channels upon detection of EAS alert tones or receiving command from external EAS receiver. EAS alert command may be a dry contact closure or IP network.

LEX2000 System Management

- ▲ Embedded web pages allow interactive configuration of the Linear LEX2000 operational settings.
- ▲ DVI port (HDMI via adapter cable) for real time monitoring of active programs during operation.
- ▲ SNMP-enabled configuration supports distributed control and monitoring for enterprise installations.
- ▲ 10/100/1000 base-T Gigabit Ethernet IP port.
- ▲ Three SFP sockets for additional Gigabit Ethernet or optical ports. (SFP transceivers sold separately)
- ▲ Firmware updates and upgrades provided through a secure internet connection, local network connection, or on a physical memory card, which is inserted in the SD CARD socket on the rear panel.



OPTIONAL FEATURES

LINEAR LEX2000 Optional Features

Optional features provide unique functionality and unparalleled flexibility. Optional features are enabled by the license file and firmware installed in each LEX2000 unit. Factory options are installed on the LEX2000 before shipment. Field upgrades allow users to increase capacity or add new features to existing LEX2000 units already operating in the field. Most optional features only need a new license file and/or firmware, but some features may require factory installation of additional hardware.

Video Formatter (VF Option)

The Video Formatter converts the format of one video program from one supported video format to any other supported format. The user selects the input and output video formats on the LEX2000 configuration web pages. The Video Formatter may be used to upscale SD video to an HD format or to downscale 1080i video to 720p format.

ASI / SMPTE-310 Re-Multiplexer (RX Option)

The ASI Remux combines local program content, received by LEX2000 through its SDI or NTSC inputs, with programs received on an incoming ASI (or SMPTE-310) stream to create a new ASI (or SMPTE-310) output stream. The ASI Remux may be used to receive an ASI stream from a satellite feed, insert local programming and reassign the PIDs to correctly identify the local broadcast entity.

Second ATSC Multiplexer (2X Option)

The Second ATSC Mux allows LEX2000 customers to generate two independent ASI (or SMPTE-310) output streams. The program content and PID values for each ASI stream are defined independently through the internal configuration web pages. The Second ATSC Mux may be used to provide unique ASI feeds to different destinations, such as a broadcast transmitter and a monitor feed or an IP feed to a cable head end.

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Remote Monitor and Diagnostics (MD Option)

The Remote Monitor and Diagnostics function provides a digital dashboard of current system operations, allowing station engineers to track encoder operations 24/7 from any location with internet access. The Remote Monitor issues alert messages upon detection of specific events, as selected using the internal configuration web pages.

Remote Monitor – Digital Dashboard

- ▲ Thumbnail images for all active programs
- ▲ Audio activity indicators for all active programs
- ▲ Mux bit-rate indicators for all active programs
- ▲ Time since last EPG update / PSIP download
- ▲ System operating temperature

Remote Monitor – Event Detection and Alerts

- ▲ Loss of signal on audio, video or ASI input
- ▲ Data stream errors on audio, video or ASI input
- ▲ Dark screen video detection for each program with selectable time-out
- ▲ High temperature and thermal shut-down warnings
- ▲ Consolidated alarms from local network devices
- ▲ Equipment self-test failure warning
- ▲ Alert messages may be sent by email or text message if the encoder is connected to the Internet.

Remote Diagnostics

- ▲ Initiate built-in self test
- ▲ Switch to stored test pattern pre or post encoder.
- ▲ Capture a segment of the ASI output stream, an ASI input stream, or one of the audio or video input streams to a removable SD memory card.
- ▲ Stream capture may be initiated by user command or triggered by detection of a specific event, as selected using the internal configuration web pages.
- ▲ Transmit captured data streams to a remote engineer, either to a local area network or via the Internet. If a network connection is not available, then the SD memory card may be removed and shipped to a station engineer or customer service engineer for examination of the captured streams.



LINEAR LEX2000™ MULTI-CHANNEL ATSC ENCODER / MUX

TECHNICAL DETAILS



Inputs & Outputs

- ▲ 2 HD-SDI Digital Video Inputs
- ▲ 6 SD-SDI Digital Video Inputs
- ▲ 6 NTSC analog Video Inputs
- ▲ 8 Analog Audio Inputs
- ▲ 4 AES/PCM Digital Audio Inputs
- ▲ 2 Sense Inputs for External Dry Contact Closure
- ▲ 2 Dry Contact Closure Outputs
- ▲ 1 Gigabit Ethernet Network Interface
- ▲ 3 SFP Network Interface Sockets
- ▲ 2 ASI / SMPTE-310 Outputs
- ▲ 1 ASI / SMPTE-310 Input
- ▲ 1 SD Card Socket
- ▲ 1 DVI / HDMI Monitor Port

Essentials

- ▲ Power Source: 110-240VAC, 50-60Hz Nominal
- ▲ Power Consumption: 50W - 80W Typical, 100W Max
- ▲ Storage Temperature: -40 C (-40 F) – 70 C (158 F)
- ▲ Operating Temperature: 0 C (32 F) – 50 C (122 F)
- ▲ Operating Humidity: < 95% non-condensing
- ▲ Cooling: integrated fans, air flows front to rear
- ▲ Electromagnetic Compliance: FCC Class A
- ▲ Safety Compliance: UL 1950 / CSA 22.2 No. 950
- ▲ Dimensions: 2RU - 19 x 3.5 x 16 Inches
- ▲ Weight: 17 lb

ORDERING INFORMATION

MODEL NUMBER	PROGRAMS	FACTORY OPTIONS
LEX2200	2-SD	LEX OPT-GN PSIP Ingest Function LEX OPT-RX ASI Remux LEX OPT-2X 2 nd ASI Remux LEX OPT-VF Video Formatter LEX OPT-MD Remote Mon & Diagnostics
LEX2210	1-HDSD, 1-SD	
LEX2220	2-HDSD	
LEX2400	4-SD	FIELD UPGRADES
LEX2410	1-HDSD, 3-SD	
LEX2420	2-HDSD, 2-SD	
LEX2600	6-SD	LEX UPG-HD Add 1 HD Channel
LEX2610	1-HDSD, 5-SD	LEX UPG-SD Add 1 SD Channel
LEX2620	2-HDSD, 4-SD	LEX UPG-SH 1 SD Channel to HD
LEX2800	8-SD	LEX UPG-RX Add ASI Remux
LEX2810	1-HDSD, 7-SD	LEX UPG-2X Add 2 nd ASI Remux
LEX2820	2-HDSD, 6-SD	LEX UPG-VF Add Video Formatter
		LEX UPG-MD Add Remote Mon & Diagnostics



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