COMARK Communications

HITACHI
Inspire the Next

LEX-2000

MPEG-2 Digital TV Encoder / Multiplexer

The LEX-2000 is a powerful yet low cost MPEG-2 encoder / multiplexer, that can be configured with all the functions necessary to get any station on the air with a DTV signal.

Hitachi-COMARK provides high performance and award winning television trans-mitters that are backed by more than 40 years of leadership in both inductive output tube (IOT) and solid-state broadcast technologies.

The LEX-2000 MPEG-2 digital TV encoder / multiplexer from Hitachi-COMARK was developed primarily for the LPTV market. It uses a compact 2RU dedicated hardware platform and provides all the necessary functions to allow a broadcaster to get on the air with an ATSC compliant, multi-program signal. The LEX-2000 can encode up to 8 programs in in a combi-nation of either SD or HD formats. In addition to program encoding, the product also multiplexes the program content with both static and dynamic PSIP data.

Flexibility by Design

The LEX-2000 unit is integrated and very flexible. It can be configured to accommodate many different encoding needs. Standard encoder configurations include 4xSD, 1HD + 3xSD, 6xSD or 8xSD programs. CMX units may be upgraded with a license file to add channels or optional features as the station's needs grow or change.

Powerful Encoding

The LEX-2000 incorporates powerful video processing. The unit has the ability to receive digital and/ or analog video and encode into ATSC compliant SD and/or HD streams. The video encoder supports multiple frame rates, GOP sizes, and aspect ratio controls, allowing the broadcaster to setup the encoder to match the program content and viewer preferences. The built-in statistical multiplexer adjusts the effective bit rate of each video encoder channel to optimize output bandwidth utilization.

Transport Stream Multiplexer

The LEX-2000 includes a built-in multiplexer to create the final output 19.39 Mbps transport stream for OTA broadcast or 38.8 Mbps transport stream for cable broadcast.

PSIP Management

The LEX-2000 supports multiple methods of receiving program guide and dynamic PSIP data including a manual low-cost PSIP solution for small broadcasters as well as more comprehensive, automated solutions for larger broadcast enterprises. The unit supports reception of external dynamic PSIP data from most of the popular third party PSIP generators through the built-in IP data input. Optionally, the LEX-2000 supports automatic guide data ingest from sources such as TMS, BIM or on-site traffic systems using the PMCP XML file format.

KEY FEATURES

- VBR encoding for up to 8 video and stereo audio programs
- Supports SD/HD MPEG-2 MP@ML or MP@HL (4:2:0) video encoding
- Compact 2RU platform operates in stand-alone mode
- Built-in video smoothing and noise filter, selectable per program stream
- Dynamic PSIP support in accordance with ATSC A/65 standard
- Built-in TS multiplexer with dual mirrored ASI / SMPTE-310 outputs
- Optional ASI input; used to mux satellite content with local programs
- Optional direct PSIP interface with popular traffic system software or program guide services.
- CEA-608 and CEA-708 Closed Caption extraction, with optional translation from 608 to 708
- Integrated EAS cut-over switch
- Rear panel dry loop control and monitor connections
- DVI monitor output for at-a-glance status of the encoded video programs

The **CMX-EPG** software, provided free of charge with the LEX-2000, allows the LPTV operator to build a customized program guide using a simple spread-sheet, imported into the unit typically on a weekly basis.

Closed Captioning

The LEX-2000 supports ATSC mandatory closed captioning. If the source video input contains CEA-608 closed captions (CDP's, ANC, or Line 21), the unit extracts the data and inserts it into the output video stream. CEA-708 captions are passed from the input video into the transport multiplex and placed in proper location for 708 captions.

The optional 67 closed caption translator receives 608 captions from the video input signal and creates full 708 captions based on the 608 caption content. 708 caption colors, fonts and presentation modes are selectable for each channel.

DVI Confidence Monitoring

The rear panel of the LEX-2000 has a DVI connection that can be connected directly to a PC monitor or with a DVI-to-HDMI converter to an appropriate television monitor.

The monitoring port provides at-a-glance status of each of the video encoded programs (thumbnail) as well as the operational status information for each service in the multiplex.

Emergency Alert System

The LEX-2000 provides a video cut-over switch for EAS applications. EAS can be triggered by a contact closure or audio tones. EAS audio tones and EAS program sources may be provided on different signal inputs than the main audio and video program inputs. The broadcaster can select which of their broadcast services are switched over to the EAS programming when activated.

AFD Management

The LEX-2000 manages the Active Format Description (AFD). AFD values received with the input video are passed to the output. For input video that does not have AFD data, the LEX-2000 allows the broadcaster to define a default aspect ratio independently for each of the SD and HD video formats so that the proper AFD value may be inserted into the encoded video stream of the output multiplex.

Optional ASI Input for IRD Feeds

The LEX-2000 can be optionally equipped with an ASI input for pre-compressed programs from a satellite IRD or similar device. The LEX-2000 has the ability to re-multiplex program streams from the ASI input into the unit's final transport stream output, creating a mix of national content with locally encoded programs.

Streaming IP Output

The LEX-2000 can be equipped with the TG option for streaming IP output and SMPTE-2022 FEC. This feature enables the CMX unit to transmit the final ATSC multiplex as a User Datagram Protocol (UDP) or Real Time Protocol (RTP) data stream over Ethernet with the data rate selectable from 10 to 80 Mbit/sec.

SMPTE-2022 FEC is included to protect against packet loss in unmanaged IP networks. The TG option also enables the ASI input to be converted to an IP output, allowing the CMX unit to loop through Neilson units and generate a final IP output to a Studio to Transmitter Link (STL).

SPECIFICATIONS

Inputs:
- 2 x HD-SDI inputs, BNC
- 6 x SD-SDI inputs, BNC
- 6 x NTSC analog inputs, BNC
- 8 x stereo analog audio inputs
- 4 x AES/PCM digital audio inputs
- 1 x ASI transport stream input, BNC

Video:
- 1920x1080_60i, 1280x720_60p, 1280x720_30p, 704x480_30p, 704 x 480_60i resolutions
- MPEG-2 MP@ML, MP@HL
- 4:2:0 chroma format
- VBR selectable bit rate
- AFD pass through on SDI inputs
- AFD insertion on all video channels
- Video smoothing filter and video noise filter; selectable on a per program basis

Audio:
- Dolby® Digital encoding
- 24 bit resolution
- Dolby® Digital 5.1, pass through

Multiplexing & Output:
- 2 x ASI / SMPTE-310 outputs, mirrored, BNC
- 19.39 Mbps output (ATSC-OTA),
- 38.8 Mbps max (Cable),
- 80 Mbps with IP Output

Monitor/Control:
- 2 x contact closure input for EAS
- 2 x contact closure outputs for alarms / power monitors
- Front panel LED status indicators
- Web management via Ethernet
- DVI monitor port for at-a-glance status of the encoded programs
- 3 x SFP network interfaces

Environmental & Mechanical:
- 0° to 50° C Temp range
- -40° to 70° C Temp range (storage)
- Ambient air cooled chassis, fans flow front to back
- < 95% non-condensing humidity
- 19" W x 3.5" H x 18" D
- 110 ~ 240 VAC, 50/60 Hz
- 50W typical (90W max) power
- 10 lbs / 4.5 kg net weight

Recommended Video Encoder Configurations			
1080i or 720p60	720p30	480i or 480p30	Total Programs
2	–	–	2
1	1	1	3
1	–	3	4
–	2	3	5
–	–	6 – 8	6 – 8

ORDERING INFORMATION

Please contact your authorized Hitachi-Comark representative.
US Sales 1-800-288-8364 or 413-998-1100
Hitachi Kokusai Electric Comark LLC
104 Feeding Hills Road
Southwick, MA 01077

Base Product Offerings*:
LEX-2210 → 1xHD/SD, 1xSD Enc/Mux
LEX-2220 → 2 x HD Enc/Mux
LEX-2410 → 1xHD/SD, 3xSD Enc/Mux
LEX-2600 → 6 x SD Enc/Mux
LEX-2800 → 8 x SD Enc/Mux

Available Factory Installed Options:
LEX-OPT-GN → PSIP Guide Ingest
LEX-OPT-67 → CC 608 to 708
LEX-OPT-TG → IP Output GigE + FEC
LEX-OPT-RX → ATSC ASI Remux
*other configurations available, consult factory