ViBE CP3000

CONTRIBUTION ENCODERS

The industry's best value for high-end Digital Satellite News Gathering (DSNG) and live sports broadcasting applications, the Harmonic ViBE® CP3000 (formerly Ellipse® 3000) family of contribution encoders combines superior video quality, the highest level of function integration, and ease of use in an economical, compact package.

The innovative ViBE CP3000 product family includes the first DSNG encoder with an integrated broadcast satellite modulator that supports the DVB-S2X and DVB-CID standards, as well as broadcast-quality video contribution over the Internet. The encoders leverage Harmonic's industry-leading compression expertise and a flexible system architecture for all mission-critical contribution applications. Multi-format, multi-codec versatility, low latency and optional integrated modulators make the ViBE compression platform ideal for both DSNG and fixed contribution. A compact footprint and plug-and-play deployment deliver the additional benefit of low cost of ownership.

ViBE CP3000 encoders support all SD and HD MPEG-2 and MPEG-4 AVC codecs at 4:2:0 or 4:2:2 chroma subsampling and 8 or 10 bits. Fully firmware upgradeable, the encoders offer a smooth and cost-effective migration path from MPEG-2 SD 4:2:0 8-bit to AVC HD 4:2:2 10-bit compression schemes, making them among the most versatile contribution encoders available. 3G SDI input enables encoding of HD content at resolutions up to 1080p60.

At just 1 RU, compact and rugged ViBE CP3000 encoders are a perfect fit for DSNG vehicles, teleports and flyaway packages operating on the C, Ku or Ka bands. Four models are available, assuring the deployment of systems precisely tailored to a user's application:

Fixed Contribution Over IP or Telco Networks

- **CP3100 –** Features simultaneous IP and DVB-ASI outputs
- **CP3102 –** Features simultaneous IP and DVB-ASI outputs, 3G SDI input, and optional dual power supplies

DSNG

- **CP3200 –** Features simultaneous IP and DVB-ASI outputs, an integrated DVB-S/S2/DSNG broadcast satellite modulator with simultaneous DVB-ASI and L-band or IF output
- **CP3202 –** Features 3G SDI input, simultaneous IP and DVB-ASI outputs, an integrated broadcast satellite modulator with DVB-S/S2/S2X and DVB-CID support on top of NIT-CID, IF and L-band interfaces on the same board, simultaneous L-band, IF and DVB-ASI output, and optional dual power supplies

HIGHLIGHTS

- MPEG-2 and MPEG-4 AVC SD/HD 4:2:0/4:2:2 8/10-bit encoding
- Broad SD/HD format support, up to 1080p60
- Audio encoding of up to eight stereo or 16 mono channels
- Optional integrated broadcast satellite modulator supporting DVB-S/S2/S2X and DVB-CID on top of NIT-CID; roll-off factor up to 5%
- Broadcast-quality video contribution over the Internet
- Simultaneous RF, IP and DVB-ASI outputs
- IF and RF interfaces on the same chassis
- Choice of single or dual power supplies
- Ultra-low delay mode
- User-friendly front-panel controls or web-based management
- BISS scrambling
- 1:1 stand-alone redundancy
- Fast boot time
- Pay-as-you-grow scalability

Business Benefits

Pristine Video Quality
The ability to encode 1080p60 content in AVC 4:2:2 10-bit enables the transmission of exceptionally vivid video, augmenting your ability to offer customers the highest video quality available.

"Pay-As-You-Grow" Scalability
License-based pricing assures that customers pay only for the features they need. Video codecs and formats are easily added in ViBE CP3000 encoders via firmware upgrade, enabling a scalable migration path that provides operational flexibility and business continuity and extends the system's value.

Low CAPEX and OPEX
The integrated modulator in the CP3200 and CP3202 eliminates the need to purchase costly external stand-alone devices for satellite uplink. Second-generation DVB-S2X support on the CP3202 offers improved performance for DSNG and contribution applications, and enables efficient migration to emerging technologies such as HEVC and Ultra HD. As such, the CP3202 encoder helps assure that your investment will pay off well into the future. The small system footprint and low power consumption inherent to all ViBE CP3000 encoders further ensures exceptional ROI.

Integrated Redundant Path Support
Simultaneous L-band, IF and DVB-ASI outputs on ViBE CP3000 encoders provide alternate distribution channels in the event of link failure.

Contribution Over the Internet
With support for broadcast-quality video contribution over unmanaged networks, ViBE CP3000 dramatically alters the economics of gathering and distributing news and sports content from locations with Internet access.

End-to-End Contribution Solution
ViBE CP3000 encoders are the perfect complement to Harmonic's ProView™ 7100 and 8100 integrated receiver-decoders. Compress AVC HD 4:2:2 10-bit video with the ViBE CP3000, then use the ProView 7100 for decompression at the same sampling and bitrate, and the result is a contribution workflow with nearly lossless video quality.

Content Protection
ViBE CP3000 encoders help prevent signal interception with industry-standard BISS (Basic Interoperability Scrambling System) mode 1 and BISS-E encryption. With support for the new Carrier ID system (DVB-CID), currently in development by the satellite Interference Reduction Group (sIRG), the CP3202 also makes it easier to identify interfering carriers and respond to a radio frequency interference (RFI) event, resulting in improved quality of service (QoS) and reduced operating costs.

Technical Benefits

Video Encoding
Utilizing the industry's most advanced silicon and ASIC compression technologies, ViBE CP3000 encoders offer superior-quality compression at data rates up to 100 Mbps.

Audio Encoding
ViBE CP3000 encoders support four AES/EBU embedded stereo pairs, two analog stereo pairs or four mono channels as standard. The addition of an optional audio expansion module increases support to eight digital or analog stereo pairs, or 16 mono channels. A range of sampling rates, an internal sample rate convertor (SRC) and an advanced coding scheme ensure reliable and high-quality audio encoding.

Low Delay
Low latency on ViBE CP3000 encoders helps eliminate awkward pauses during handoffs between field and studio talent, and is available for all encoding modes.

Ease of Use
Controlled by a front-panel operating menu or web GUI, the simple ViBE CP3000 menu structure is specifically tailored for contribution applications, with frequently used, operation-critical controls available via hot keys.

Plug and Play
Fast boot times prepare ViBE CP3000 encoders for action right out of the box, and configuration presets allow multiple user settings to be saved and quickly recalled, increasing the ability to get on air fast. Switching between 4:2:2 low-delay and 4:2:0 modes, for instance, is easily accomplished on the GUI, eliminating the need to manually change settings for different production setups.

Resilience Against Packet Loss
In video-over-IP applications, ViBE CP3000 encoders employ the SMPTE 2022 protocol to minimize packet loss by inserting forward error correction (FEC) packets in the transport stream. These packets are used by the reception device to detect lost packets and automatically recover from losses when they occur.

Efficient Multicast of Multiple Services
ViBE CP3000 encoders support the creation of multiple single-program transport streams, which can be multicast to 16 different ports or IP addresses. A separate PSI is generated for each SPTS. Users may choose optional BISS scrambling with a separate scrambling key for each SPTS.

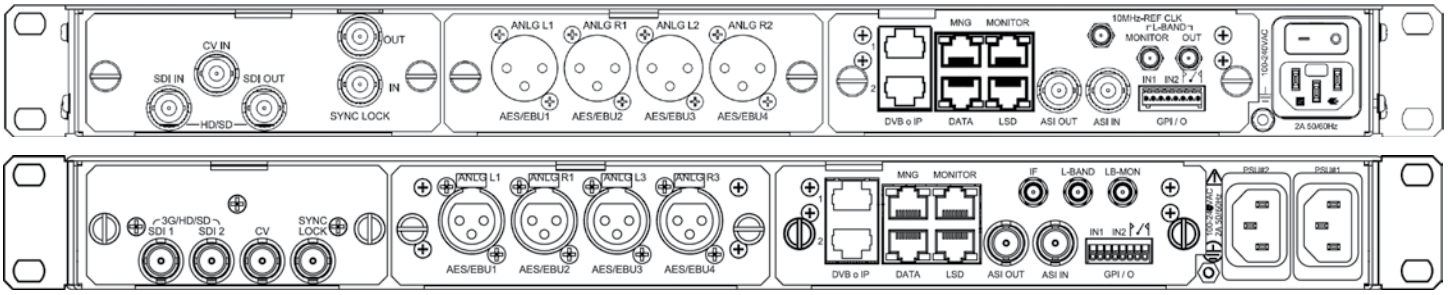
High-Speed Data Transmission Over Satellite
The CP3200 encoder supports data transmission up to 20 Mbps via ETSI EN301 192 DVB MPE encoding, which enables IP packet transmission via satellite using an MPEG-2 transport stream.

Modulated Outputs
The on-board modulator on the CP3200 offers DVB-S/S2/DSNG transmission modes; the CP3202 supports DVB-S2X as well. Both the CP3200 and CP3202 offer QPSK, 8PSK and 16APSK modulation. The CP3200 supports IF or L-band outputs, whereas the CP3202 supports IF and L-band outputs on the same board. The modulation output can directly feed the up-converter, providing a very compact uplink package. Standard and extended roll-off factors of 15%, 10% and 5% enable highly efficient utilization of transponder bandwidth.

L-Band Monitoring
L-band monitoring output on CP3200 and CP3202 encoders provides real-time, on-the-spot monitoring of modulated information as it is transmitted. L-band and IF inputs in the same chassis, available on the CP3202 only, offers the additional benefits of lower CAPEX and increased workflow efficiency when moving from one deployment to the next.

Compact Footprint
ViBE CP3000 encoders occupy just 1 RU without the need for ventilation space above or below, saving real estate and reducing power consumption.

Reliability
ViBE CP3000 encoders are built rugged to assure high performance in most any production environment. 1:1 stand-alone redundancy assures the highest level of resiliency while simultaneously simplifying workflows, and for even greater peace of mind, optional dual power supplies are available on the CP3102 and CP3202.



*Back panel for the CP3200 (top) and 3202 contribution encoders**

harmonic

SPECIFICATIONS

VIDEO

Video Compression Bitrates	
MPEG-2 SD 4:2:0	0.3-15 Mbps
MPEG-2 SD 4:2:2[1]	1.5-50 Mbps
MPEG-2 HD 4:2:0[1]	3-80 Mbps
MPEG-2 HD 4:2:2[1]	3-100 Mbps
MPEG-4 AVC SD 4:2:0[1]	0.3-15 Mbps
MPEG-4 AVC SD 4:2:2 8/10-Bit[1]	1.5-50 Mbps
MPEG-4 AVC HD 4:2:0[1]	1-75 Mbps
MPEG-4 AVC HD 4:2:2 8/10-Bit[1]	3-100 Mbps
Profiles and Levels	MPEG-2 MP@ML MPEG-2 M@HL MPEG-4 AVC MP@L4.0 MPEG-4 AVC HP@L4.0 Hi422P@L4.1
Video Formats	PAL NTSC
Resolutions	
480 (NTSC)	Auto, 720x480, 704x480, 640x480, 544x480, 528x480, 480x480, 368x480, 352x480, 352x240
576 (PAL)	Auto, 720x576, 704x576, 640x576, 544x576, 528x576, 480x576, 368x576, 352x576, 352x288
720p	Auto, 1280x720, 960x720, 640x720
1080i	Auto, 1920x1080, 1440x1080, 1280x1080, 960x1080
MPEG-2, MPEG-4 Pre-Processing	Scene cut detection Analog/digital time base corrector (TBC) to handle raw VTR outputs Automatic frame resizing Motion compensated temporal filter Noise reduction filters Low pass filter
MPEG-4 AVC Video In-Loop Processing	Deblocking filter

AUDIO

Number of Channels	
Standard	Four AES/EBU stereo pairs, embedded; or two analog stereo pairs; or four mono channels
Optional (via two audio expansion modules)	Eight AES/EBU stereo pairs, embedded; or eight analog stereo pairs; or 16 mono channels
Audio Formats	
Standard	MPEG-1 Layer 2 Dolby® Digital (AC-3) 5.1 passthrough
Optional	AC-3 2.0[1] MPEG-2 AAC LC[1] MPEG-4 HE-AAC v1, v2[1] Linear audio passthrough[1] Dolby-E passthrough[1]
Operating Modes	Joint stereo, single channel, dual channel
Sampling Frequencies	32, 44.1, 48 kHz Integrated sample rate converter (SRC)

VIDEO AND AUDIO INPUT

Video	One HD/SD-SDI port (CP3100/CP3200) Two 3G/HD/SD-SDI ports (CP3102/CP3202) Composite (PAL/NTSC) Video loop-through (SDI only)
Audio	Four balanced XLR inputs Eight terminal block inputs (optional)[2]
Sync Lock	Black burst with loop-through capability
Data	Asynchronous RS-232 up to 115 Kbaud MPE (Multi-Protocol Encapsulation)[1] Up to 20 Mbps

VIDEO AND AUDIO OUTPUT

DVB-ASI	
Output Rate	350 Kbps-120 Mbps
Number of Connectors	Three for CP3100 and CP3102 One for CP3200 and CP3202
DVB Scrambling (optional)	BISS mode 1, BISS-E
IP Output	Dual GbE IP output, RJ-45, auto-negotiation Auto MDI/MDIX crossover UDP/RTP TOS, TTL configurable values SMPTE-2022 FEC (optional)[1] M-SPTS support (optional)[1] Special FEC and ARQ streaming for contribution over the Internet (optional)[1]
G.703 (optional for CP3100 and CP3102)[2]	
Connectivity	DS3
Number of Ports	Two
Output Data Rate	44.736 Mbps
Levels (Compliance)	ITU-T G.823/G.824 ANSI T1.102-1993
Interface	B3ZS

INTEGRATED SATELLITE MODULATOR OUTPUT

Modulation Formats (CP3200)	
DVB-S	QPSK
DVB-S2	QPSK, 8PSK[1], 16APSK[1]
Carrier ID	NIT-CID
Symbol Rate	50 ksps-45 Msps[1]
Roll-Off	20%, 25%, 35%
Extensions Roll-Off	5%, 10%, 15%
Output	IF or L-band (selectable)
Modulation Formats (CP3202)	
DVB-S	QPSK
DVB-S2	QPSK, 8PSK, 16APSK[1], 32APSK[1]
DVB-S2X	QPSK[1], 8PSK[1], 16APSK[1], 32APSK[1], 64APSK[1]
Carrier ID	NIT-CID, DVB-CID[1]
Symbol Rate	50 ksps-72 Msps[1]
Roll-Off	20%, 25%, 35%
Extensions Roll-Off	5%, 10%, 15%
Output	IF and L-band (on the same board)
L-Band Output (CP3200)[3]	
Output Frequency	950-1750 MHz, 95 Hz steps
Output Impedance	50 Ω
Output Level/Output Power	-45 dBm, -7 dBm (0.5 dB step)
Spurious Level	-64 dBc @ -10 dBm
Selectable 10-MHz Reference Clock	In-band or external
L-Band Monitoring Output Power	-45 dBm
L-Band Monitoring Output Frequency	Transmit frequency
Features	Constant code rate modulation (CCM) 16 Kb and 64 Kb FEC block support Pilot mode External block up-converter (BUC) support DC Feed for BUC up to 24 VDC 400 mA

** CP3202 shown with optional dual power supplies.*

SPECIFICATIONS

INTEGRATED SATELLITE MODULATOR OUTPUT (CONT)

L-Band Output (CP3202)	
Output Frequency	950-2150 MHz, 10 Hz steps
Output Impedance	50 Ω
Output Level/Output Power	- 35 dBm to +5 dBm (0.1 dB step)
Spurious Level	< -67 dBc @ +5 dBm
Selectable 10-MHz Reference Clock	In band
Monitoring Output Power	-45 dBm (+/- 5 dB)
Monitoring Output Frequency	As current L-band transmit frequency
Features	CCM 16 Kb and 64 Kb FEC block support Pilot mode External block up-converter (BUC) support DC Feed for BUC up to 24 VDC 400 mA
IF Output (CP3200)[3]	
Output Frequency	50-180 MHz, 1 KHz steps
Output Impedance	50 Ω/75 Ω selectable
Output Level/Power:	- 35 dBm to +5 dBm (0.5 dB step)
Spurious Level	-64 dBc @ -10 dBm
Monitoring Output Power	-45 dBm
Monitoring Output Frequency	1080 MHz (fix frequency)
IF Output (CP3202)	
Output Frequency	50-180 MHz, 10 Hz steps
Output Impedance	50 Ω/75 Ω selectable
Output Level/Power:	- 35dBm to +5dBm (0.1 dB step)
Spurious Level	< -67 dBc @ +5 dBm
L-Band Monitoring Output Power	-45 dBm (+/- 5 dB)
L-Band Monitoring Output Frequency	1050 MHz or 1080 MHz (fix frequency)

SYSTEM MANAGEMENT

Remote	Web-based UI, SNMP
Local	Graphical front panel with quick access keys and alphanumeric keypad
Software Upgrades	Via FTP
Dry Contact Alarms (GPI)	One output for various status and faults
Presets	Up to 60 different configurations

POWER

Power Supplies	
CP3100/3200	Single
CP3102/3202	Single (standard), Dual (optional)[2]
Input Voltage Range	90-260 VAC
Consumption	Up to 88 W Up to 100 W (with DC power feed for BUC)

PHYSICAL

Dimensions (W x H x D)	17.1 in x 1.75 in x 19.1 in (1 RU) 43.9 cm x 4.4 cm x 54.6 cm
Weight	10 lbs/6 kg

ENVIRONMENTAL

Operating Temperature Range	+32º to +122º F 0º to +50º C
Storage Temperature Range	-4º to +158º F -20º to +70º C
Operating Humidity	85% non-condensing
Electromagnetic Compliance	FCC part 15 EN 55022, EN 55024
Safety	EN 60950 RoHS directive 2002/95/EC

Notes:

1. Licensed feature

2. Hardware option

3. Selective hardware

harmonicinc.com

PlanetComm

Planet Communications Asia PLC.

157 Soi Ramindra 34, Ramindra Rd., Tarang, Bangkhen, Bangkok 10230
Tel: +66 2 792 2400 I Fax: +66 2 792 2499, +66 2 943 5771 I E-mail: sales@planetcomm.com

PlanetComm: