BOSCH
Invented for life

VIP X1600 XF Modular High-performance Video Encoder

- **Up to 16 video input channels**
- **Modular and expandable with hot-swappable video modules**
- **Choice of modules, including high-performance H.264 encoders**
- **Direct or network-attached iSCSI RAID**
- **Intelligent video motion detection and camera tampering detection on encoder modules**
- **ONVIF conformant**

The Bosch VIP X1600 XF is a modular, high-performance CCTV video encoder system. Each VIP X1600 XF is a 4 x 4 unit that accommodates up to four hot-swappable modules, allowing modules to be added or exchanged at any time without interrupting transmission to the existing channels. Encoder modules, each with four analog audio/video inputs, can be mixed and matched within both base systems.

The VIP-X1600-XFB base system provides two 1 Gbps Ethernet ports on the front and an additional 1 Gbps Ethernet port on the rear. This provides a greater choice of network connectivity and allows for easier inside-rack cabling like, for example, direct connection to an iSCSI storage array. This base system also features a 1 Gbps small form-factor pluggable (SFP) slot on the front, for example, an optical transceiver to enable direct fiber connection to a remote network. For applications not benefiting from these advanced features the VIP-X1600-B base system is available that just provides two 1 Gbps Ethernet ports, one on the front and one on the rear.

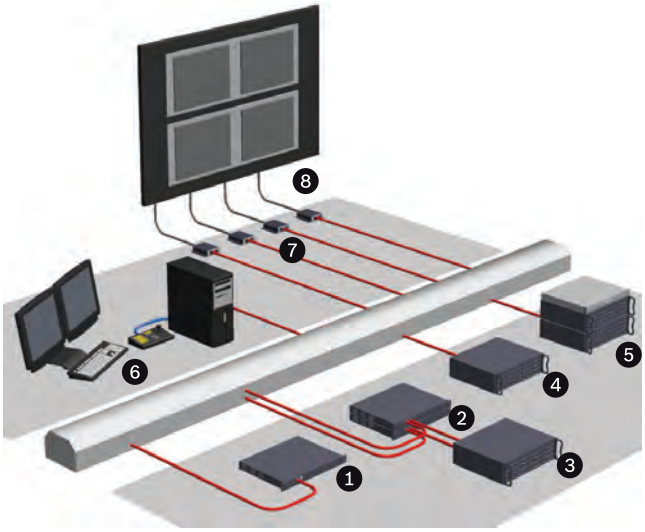
The VIP X1600 XF H.264 main profile encoder modules (VIP-X1600-XFM4A/XFM4B) deliver real-time H.264 compressed video over IP, providing two independent streams per camera with full frame rate at best quality for different purposes, like one stream for live viewing with lowest delay while the second stream is optimized for requiring only little recording space. In addition they are equipped with a hardware-accelerator for VCA functions, bringing “Intelligence-at-the-Edge” to the next level. A module version supporting Bilinx communication over coax cable is also available.

The VIP X1600 MPEG-4 encoder modules (VIPX1600M4S/M4SA) also support H.264 with the latest firmware, though with limited functionality.

View the video on a PC using Bosch’s comprehensive video management system, with or without Bosch’s IntuiKey keyboard. Alternatively, use a Web browser. These high-performance, multi-channel devices with iSCSI Recording-at-the-Edge, offer top-of-the-line Video-over-IP performance for CCTV today. Designed for reliability, the VIP X1600 XF features hot-swappable video modules, dual redundant power supply inputs, and redundant network ports.

The Bosch VideoSDK provides the means to integrate the VIP X1600 XF with other video management systems.

System Overview



1 VIP X1600 XF with 16 analog cameras, network-attached iSCSI storage, or streaming only
2 2 x VIP X1600 XF with 16 analog cameras
3 Direct-attached iSCSI RAID
4 Network-attached iSCSI RAID unit
5 NVR server with SCSI connection to very large RAID unit
6 Management station with IntuiKey
7 VIP XD decoders
8 Monitors

Functions

Flexibility

The VIP X1600 XF supports external storage, either directly attached to the unit (Recording-at-the-Edge), or across an IP network to a centralized network video recorder (NVR). For Recording-at-the-Edge, attach an iSCSI RAID directly to the VIP X1600 XF, making the system's recording performance wholly independent from the network's performance. The iSCSI RAID storage enables the VIP X1600 XF to act as a conventional DVR and stream high-performance live video across the network.

The VIP X1600 XF supports the Bosch Video Recording Manager VRM, Bosch's flexible and scalable recording management software. It allows a flexible assignment of recording space on camera level including load balancing and decent redundancy features. Bosch VRM is available as stand-alone system or embedded into the Bosch Video Management System.

Dual Streaming

The VIP X1600 XF encoder modules use Dual Streaming to generate two independent IP video streams per channel if sufficient computational power is available. This allows viewing and recording at two different quality levels to save disk space and bandwidth. On alarm, they can send an e-mail with JPEG images attached.

Dual Recording

You can record the streams independently on different media. Thus video can be recorded centrally on iSCSI drives managed by VRM Video Recording Manager and redundantly on the local media. If necessary, for example in case of a network failure VRM can fill up the gap in the central recording (ANR, Automatic Network Replenishment).

Recording Profiles

The encoder modules feature a highly flexible recording scheduler, providing up to ten programmable recording profiles and allowing individually assigned camera profiles. With these profiles, you can accelerate the frame rate as well as increase the resolution on alarm, saving recording space during non-alarm periods.

Access Security

The VIP X1600 XF modules offer various security levels for accessing the network, the unit, and the data channels. As well as password protection with upt to three levels, they support 802.1x authentication using a RADIUS server for identification. You can secure Web browser access by HTTPS using a SSL certificate that is stored in the unit. For total data protection, each communication channel—video, audio, or serial I/O—can be independently AES encrypted with 128-bit keys, once the Encryption Site License has been applied.

Intelligence

With built-in video content analysis, VIP X1600 XF encoder modules reinforce the Intelligence-at-the-Edge concept where edge devices become increasingly intelligent. The VIP X1600 XF encoder module comes with built-in MOTION+ video motion detection. This motion detection algorithm is based on pixel change and includes object size filtering capabilities and sophisticated tamper detection capabilities.

Bosch offers more advanced video content analysis (VCA) applications with its Intelligent Video Analysis (IVA). A licensable option, it bases the IVA algorithm on digital imaging technology that uses multi-level image analysis of pixel, texture, and motion (trajectory) changes.

Viewing

View the VIP X1600 XF encoder module video on a PC using a Web browser, in the Bosch Video Management System, or integrate it into another video management system. By routing the IP video to a high-performance VIP XD or a VIDOS Monitor Wall, you can present the video with ultimate clarity.

The VIP X1600 XF is also used with VASA—Bosch's hybrid IP integration software—offering Allegiant IntuiKey users the ability to view an Allegiant camera or one from an IP-based system.

Easy Upgrade

Remotely upgrade the VIP X1600 XF modules whenever new firmware becomes available. This ensures up-to-date products, thus protecting investment with little effort.

VIP X1600 M4S/M4SA and Firmware 4.0

Firmware 4.0 enables the Bosch MPEG-4 encoder modules (VIPX1600M4S/M4SA) to use H.264 Baseline Profile to encode the video signal. This allows reducing the required bit rate for a given quality setting, or increasing the quality when keeping the bit rate setting.

ONVIF conformance

Firmware 4.10 introduces conformance to the ONVIF (Open Network Video Interface Forum) specification guaranteeing interoperability between network video products regardless of manufacturer. ONVIF conformant devices are able to exchange live video, audio, metadata and control information and ensure that they are automatically discovered and connected to network applications such as video management systems.

Certifications and Approvals

Approvals

Region	Certification	
Europe	CE	VIP X1600 Bases
		VIP X1600 XFM4
		VIP X1600 XFMD
		VIPX1600M4S
		VIP X1600 Power Supply
USA	UL	VIP X1600 Bases
		VIP X1600 Modules
		VCS UL online certifications directory (link)
China	CCC	VIP X1600 Power Supply

Safety

Region	Number
	IEC 60950

System

Region	Number
	IEC 62676-2
	EN50132-5-2

Electromagnetic Compatibility

Region	Number
EU	EN55103-1 Video and audio equipment
	EN55103-2
	EN50130-4 Alarm systems
	EN50132-5
	EN50121-4
	EN55022 ITE
	EN55024 ITE
	EN61000-3-2
	EN61000-3-3
	EN61000-6-2
	EN61000-6-4
US	FCC 47 CFR Chapter 1 Part 15
AU	AS/NZS 3548
JP	VCCI-3/2008.04 Class B

Installation/Configuration Notes

H.264 Encoder Modules (VIP-X1600-XFM4A/XFM4B)

All H.264 encoder modules have four camera inputs that support Dual Streaming. They provide dedicated hardware for encoding and VCA and thus are not limited in frame rate and resolution settings, nor in Dual Streaming:

	Stream 1	Stream 2
4CIF/D1	30 ips	30 ips
CIF	30 ips	30 ips

MPEG-4 Encoder Modules (VIPX1600M4S/M4SA)

All MPEG-4 encoder modules have four camera inputs that support Dual Streaming if sufficient computational power is available. They can also be operated in 2-channel mode if higher performance per camera input is required.

The MPEG-4 encoder modules deliver MPEG-4 video over IP at a full frame rate of 25 (PAL) or 30 (NTSC) images per second with up to 4CIF resolution on every channel, when one or two inputs are used. If four inputs are used, the maximum frame rate is 12.5/15 images per second at 4CIF resolution and no Dual Streaming is possible.

Because H.264 Baseline Profile does not support field encoding, interlaced video is not possible, thus resolution is limited to a maximum of 2CIF. H.264 encoding requires the double performance in respect to MPEG-4. Frame rate values must therefore be divided by two.

The maximum frame rates listed in the tables below depend on the resolution, picture content and movement, and the number of inputs used.

MPEG-4	4 inputs	2 inputs	1 input
4CIF	12.5/15 ips	25/30 ips	25/30 ips
2/3 D1	25/30 ips	25/30 ips	25/30 ips
2CIF	25/30 ips	25/30 ips	25/30 ips

ips = frame rate in images per second

H.264	4 inputs	2 inputs	1 input
2CIF	12.5/15 ips	25/30 ips	25/30 ips

ips = frame rate in images per second

Front View Base Systems

VIP-X1600-XFB

1 2 x redundant 10/100/1000 Base-T Gigabit Ethernet
2 1 x SFP slot for additional Gigabit Ethernet interface e.g. via Fiber
3 5 x status LEDs

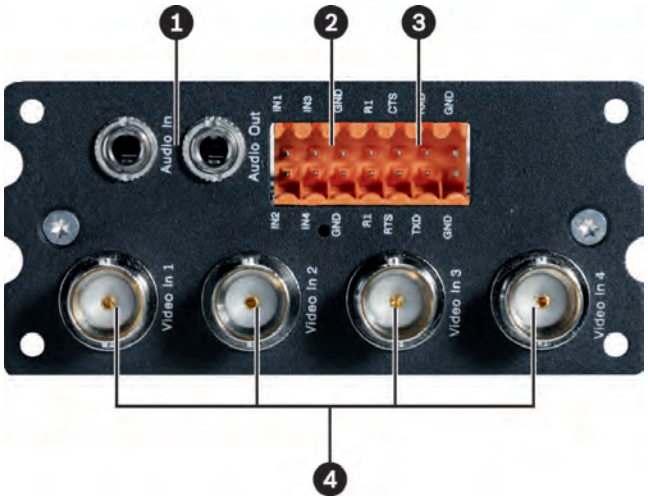
VIP-X1600-B

1 1 x 10/100/1000 Base-T Gigabit Ethernet (redundancy achieved by combining with rear side Ethernet interface)
2 These interfaces are not available for VIP-X1600-B
3 5 x status LEDs

Rear View Base Systems

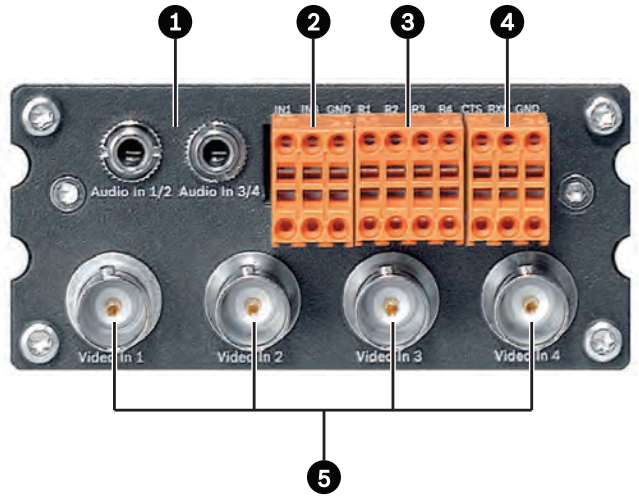
4 4 x module slot
5 1 x 10/100/1000 Base-T Gigabit Ethernet (redundancy achieved by combining with front side Ethernet interface)
6 2 x power supply input (redundant use possible)

H.264 Encoder Module Close-up

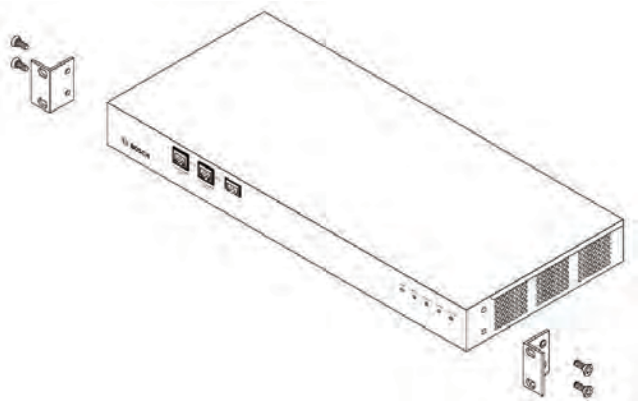


1 Line-level audio input/output jacks
2 4 x alarm in and 1 x relay out
3 COM port (RS-232/485)
4 4 x video input

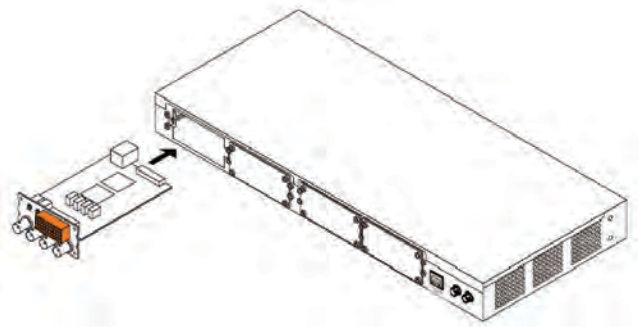
MPEG-4 Encoder Module Close-up



1 Line-level stereo audio jack per 2 channels (video/audio module only)
2 4 x alarm in
3 4 x relay out
4 COM port (RS-232/485)
5 4 x video input



VIP X1600 XF rack mounting accessories



VIP X1600 XF module assembly

Parts Included

VIP X1600 XF Base Systems

Quantity	Component
1	VIP-X1600-XFB base system or VIP-X1600-B base system
1	Mounting kit for 19” rack
1	Quick Installation Guide
1	CD-ROM with software and documentation

Modules and power supply are not included, order separately.

VIP X1600 XF Modules

Quantity	Component
1	VIPX1600M4S 4-channel video module, or VIPX1600M4SA 4-channel video/audio module, or VIP-X1600-XFM4A/B 4-channel H.264 encoder module
1	Quick Installation Guide

VIP X1600 XF Stand-alone Power Supply

Quantity	Component
1	VIP-X1600-PS stand-alone power supply (EU/US, UK, and AUS versions available)
1	Power cord (EU/US one each)

Technical Specifications

Base Systems

Power supply	
Electrical	
• Input	100 to 240 VAC, 47 to 63 Hz, 1.6 A
• Output	12 VDC, 5 A max
Mechanical	
• Dimensions (H x W x D)	35 x 118 x 52 mm (without cable outlet) (1.4 x 4.7 x 2.1 in)
• Weight	Approx. 0.4 kg (0.8 lb)
• Connectors	IEC 320, Switchcraft 760
Environmental	
• Operating temperature	0 °C to +50 °C (+32 °F to +122 °F)
• Storage temperature	-40 °C to +85 °C (-40 °F to +185 °F)
• Relative humidity	10 to 95%, non-condensing

Network VIP-X1600-XFB	
Ethernet	Triple port (2 front, 1 rear) 10/100/1000 Base-T, auto sensing, half/full duplex, RJ45
SFP	1 Gbps SFP (small form-factor pluggable) slot at front
Protocols	RTP, Telnet, UDP, TCP, IP, HTTP, HTTPS, FTP, DHCP, IGMP V2/V3, ICMP, ARP, RTSP, SMTP, SNTP, SNMP (V1, MIB-II), 802.1x, RSTP

Network VIP-X1600-B	
Ethernet	Dual port (1 front, 1 rear) 10/100/1000 Base-T, auto sensing, half/full duplex, RJ45
Protocols	RTP, Telnet, UDP, TCP, IP, HTTP, HTTPS, FTP, DHCP, IGMP V2/V3, ICMP, ARP, RTSP, SMTP, SNTP, SNMP (V1, MIB-II), 802.1x, RSTP

Mechanical	
Dimensions (H x W x D)	44 x 440 x 210 mm (without brackets) (17.3 x 8.3 x 1.7 in)
Color	Charcoal
Weight	Approx. 4.0 kg (8.4 lb) with 4 modules

Environmental	
Operating temperature	0 °C to +50 °C (+32 °F to +122 °F)
Storage temperature	0 °C to +50 °C (+32 °F to +122 °F)
Relative humidity	0 to 95%, non-condensing
Thermal value	170 BTU/h max

H.264 Encoder Modules (VIP-X1600-XFM4A/XFM4B)

Input/output	
Video	4 x input
• connector	BNC
• impedance	75 ohm, switchable
• signal	Analog composite, 0.7 to 1.2 Vpp , NTSC or PAL
Audio	2 x mono line in, 1 x mono line out
• connector	2 x 3.5 mm stereo jack
• signal line in	9 kohm typical, 5.5 Vpp max
• signal line out	3.0 Vpp at 10 kohm/1.7 Vpp at 16 ohm typ.
Alarm	4 x input
• connector	Clamp (non-isolated closing contact)
• activation resistance	10 ohm max
Relay	1 x output
• connector	Clamp
• signal	30 Vpp (SELV), 0.2 A
COM port	Clamp, RS-232/422/485

Video	
Standards	H.264 MP, H.264 BP+ (ISO/IEC 14496-10) M-JPEG
Data rates	9.6 kbps to 6 Mbps per channel (MP)
	9.6 kbps to 2.5 Mbps per channel (BP+)
Resolution	Horizontal x vertical PAL/NTSC
• 4CIF/D1	704 x 576/480 (25/30 ips)
• 2CIF	704 x 288/240 (25/30 ips*)
• 2/3 D1	464 x 576/480 (25/30 ips*)
• 1/2 D1	352 x 576/480 (25/30 ips*)
• CIF	352 x 288/240 (25/30 ips)
• QCIF	176 x 144/120 (25/30 ips*)
GOP structure	I, IP, IPBB
Overall IP delay	120 ms
Dual streaming	Independently on all channels
Frame rate	1 to 50/60 (PAL/NTSC)

Audio	
Standard	G.711; 300 Hz to 3.4 kHz
Data rate	80 kbps at 8 kHz sampling rate (mono channel)

Network	
Protocols	RTP, Telnet, UDP, TCP, IP, HTTP, HTTPS, FTP, DHCP, IGMP V2/V3, ICMP, ARP, RTSP, SMTP, SNTP, SNMP, iSCSI, DynDNS, UPnP, 802.1x
Encryption	TLS 1.0, SSL, AES (licensed option)

Control	
Software update	Flash ROM, remote programmable
Configuration	Configuration Manager or Web browser

Environmental	
Operating temperature	0 °C to +40 °C (+32 °F to +104 °F)
	With only 2 modules installed: 0 °C to +50 °C (+32 °F to +122 °F)
Storage temperature	0 °C to +50 °C (+32 °F to +122 °F)
Relative humidity	0 to 95%, non-condensing

MPEG-4 Encoder Modules (VIPX1600M4S/M4SA)

Input/output	
Video	4 x input
• connector	BNC
• impedance	75 ohm, switchable
• signal	Analog composite, 0.7 to 1.2 Vpp , NTSC or PAL
Audio (audio version only)	4 x mono line in
• connector	2 x 3.5 mm stereo jack
• signal	9 kohm typical, 5.5 Vpp max

Input/output	
Alarm	4 x input
• connector	Clamp (non-isolated closing contact)
• activation resistance	10 ohm max
Relay	4 x output
• connector	Clamp
• signal	30 Vpp (SELV), 2 A
COM port	Clamp, RS-232/422/485
Video	
Standards	H.264 Baseline Profile (ISO/IEC 14496-10) MPEG-4, M-JPEG
Data rates	9.6 kbps to 6 Mbps per channel
Resolution	Horizontal x vertical PAL/NTSC
• 4CIF/D1	704 x 576/480 (12.5/15 ips*)
• 2CIF	704 x 288/240 (25/30 ips*)
• 2/3 D1	464 x 576/480 (25/30 ips*)
• 1/2 D1	352 x 576/480 (25/30 ips*)
• CIF	352 x 288/240 (25/30 ips*)
• QCIF	176 x 144/120 (25/30 ips*)
	* Depending on picture content and movement
GOP structure	I, IP
Overall IP delay	120 ms
Frame rate	1 to 50/60 (PAL/NTSC)
Audio (audio version only)	
Standard	G.711; 300 Hz to 3.4 kHz
Data rate	80 kbps at 8 kHz sampling rate
Network	
Protocols	RTP, Telnet, UDP, TCP, IP, HTTP, HTTPS, FTP, DHCP, IGMP V2/V3, ICMP, ARP, RTSP, SMTP, SNTP, SNMP, iSCSI, DynDNS, UPnP, 802.1x
Encryption	TLS 1.0, SSL, AES (licensed option)
Control	
Software update	Flash ROM, remote programmable
Configuration	Configuration Manager or Web browser
Environmental	
Operating temperature	0 °C to +50 °C (+32 °F to +122 °F)
Storage temperature	0 °C to +50 °C (+32 °F to +122 °F)
Relative humidity	0 to 95%, non-condensing

Ordering Information

VIP-X1600-XFB VIP-X1600-XFB base system	**VIP-X1600-XFB**
VIP-X1600-B VIP-X1600-B base system	**VIP-X1600-B**
VIP-X1600-XFM4A VIP X1600 XF 4-channel H.264 video/audio module, serial I/O, 4 alarm in, 1 relay, dual mono audio in, mono audio out	**VIP-X1600-XFM4A**
VIP-X1600-XFM4B VIP X1600 XF 4-channel H.264 video/audio module with Bilinx-support, serial I/O, 4 alarm in, 1 relay, dual mono audio in, mono audio out	**VIP-X1600-XFM4B**
VIPX1600M4S VIP X1600 4-channel video module, serial I/O, 4 alarm in, 4 relays	**VIPX1600M4S**
VIPX1600M4SA VIP X1600 4-channel video/audio module, serial I/O, 4 alarm in, 4 relays, 4 audio in	**VIPX1600M4SA**
VIP-X1600S-V12 VIP-X1600-B base system preassembled with 3 x VIPX1600M4S encoder modules, providing 12 video channels	**VIP-X1600S-V12**
VIP-X1600S-V16 VIP-X1600-B base system preassembled with 4 x VIPX1600M4S encoder modules, providing 16 video channels	**VIP-X1600S-V16**
Accessories	
VIP-X1600-PS VIP X1600 stand-alone power supply for EU and US	**VIP-X1600-PS**
VIP-X1600-PSUK VIP X1600 stand-alone power supply for UK	**VIP-X1600-PSUK**
VIP-X1600-PSAU VIP X1600 stand-alone power supply for Australia	**VIP-X1600-PSAU**
DSA-N2B20-12AT iSCSI disk array, base unit with 12 x 1 TB SATA hard disk	**DSA-N2B20-12AT**
DSA-N2B40-12AT iSCSI disk array, base unit with 12 x 1 TB SATA hard disk	**DSA-N2B40-12AT**
Software Options	
MVC-FIVA4-ENC4 IVA 4.x VCA software license for quad channel encoder (e-license)	**MVC-FIVA4-ENC4**
MVC-FENC-AES BVIP AES 128 Bit Encryption BVIP AES 128-bit encryption site license. This license is required only once per installation. It enables encrypted communication between BVIP devices and management stations.	**MVC-FENC-AES**

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T4871475467 | Cur: en-US, V24, 30 Sep 2011