SURFboard® SBV6120E
Digital Voice Modem

Strengthen your broadband leadership — Count on Motorola's SURFboard DOCSIS® / EuroDOCSIS® 3.0 CPE to help you deliver innovative, ultra broadband IP voice and data services to your premium customers.

HIGHLIGHTS

- Compatible with Windows®, Macintosh®, and UNIX® computers

- Enhanced network management capabilities

- GigE (RJ-45) data port with Auto Negotiate and Auto MDIX

- Front Panel LEDs indicate status and simplify troubleshooting

- User-friendly online diagnostics

- Remotely configurable and monitorable using SNMP and TFTP

- 2 RJ-11 Telephony Ports

- Support for CLASS services (caller ID, call waiting, three-way calling, etc.)

The Motorola SURFboard Digital Voice Modem (SBV6120E) is DOCSIS® 3.0, EuroDOCSIS® 3.0, and EuroPacketCable™ 1.5 certified and PacketCable 1.5 and 2.0 ready. It introduces channel bonding capability, for up to four downstream channels and four upstream channels, to our Digital Voice Product Portfolio. This allows operators to offer their customers advanced multimedia services with data rates of up to 160 Mbps for a DOCSIS® 3.0 modem and over 200 Mbps for a EuroDOCSIS® 3.0 modem in each direction without upgrading their HFC plan, in addition to offering a two-line VoIP service. The SBV6120E operates in EuroDOCSIS mode, or DOCSIS mode, using the modem's WorldWide setting.

HIGH VALUE AND INCREASED DATA RATES
Motorola's SBV6120E unlocks the potential of delivering two lines of IP-based voice services and innovative, next-generation high-bandwidth demanding multimedia services to an operator's premium customers.

Utilizing the power of DOCSIS® 3.0, the SBV6120E enables channel bonding for up to four downstream channels and four upstream channels, which allows an operator to offer their customers advanced multimedia services with data rates of up to 160 Mbps in each direction. The SBV6120E's higher-speed services enable operators to:
- Protect their installed base of high-speed data customers
- Deliver high-bandwidth, multimedia services

- Offer Digital Voice Services bundled with high speed data service
- Deliver competitive, high-capacity commercial services to their business customers

SERVICE ASSURANCE AND RELIABILITY
Motorola's field-proven NBBS device management software platform provides the MSO with intelligent management and remote management features to improve accuracy, efficiency, and customer satisfaction. These value-adding features enable remote device administration for improved accuracy and reduced support costs. Motorola's NBBS platform is a scalable, carrier-grade software platform that enables cable operators to remotely access, configure, monitor, and troubleshoot their full portfolio of consumer devices, home networks, and services.

ECONOMIC AND FLEXIBLE
The Motorola SBV6120E SURFboard DOCSIS® 3.0 Cable Modem provides operators with a cost effective option for providing Ultra-Broadband services, with 4X the current maximum user data throughput peaking over 160 Mbps for a DOCSIS® 3.0 modem and over 200 Mbps for a EuroDOCSIS® 3.0 modem*, without the need for hybrid fiber coax (HFC) plant upgrade.

The SBV6120E supports all DOCSIS® 3.0 features, is backwards compatible to DOCSIS® 1.0, 1.1, and 2.0, and also supports IPv4, IPv6, and Advanced Encryption Services.

Motorola's Service Assured DOCSIS® 3.0 Solutions enable you to deliver increased bandwidth, enhance security, and cost-effectively deploy voice, data, and video services to your bandwidth-demanding consumers – all while maximizing current infrastructure investment and lowering capital spend.

As part of Motorola DOCSIS 3.0 Ultra-Broadband family of products, the SBV6120E includes an enhanced tuner that supports up to a 1 GHz downstream input, allowing operators to increase the frequency spectrum for deployment of new high-value services, such as bandwidth on-demand, commercial services, interactive gaming, and IPTV to their customers. The SBV6120E features a 10/100/1000Base-T Ethernet (RJ-45) port, as well as intuitive, easy-to-read front-panel operational status LEDs. Operators can optionally activate dual-colored LEDs for their customer to have visual verification of bonded channels and GigE link use.

FAST, CONVENIENT, RELIABLE
The SBV6120E Digital Voice Modem uses industry-standard signaling protocols to provide high-speed Internet access and up to two lines of voice-over-IP (VoIP) telephone service over cable's broadband connection to the home.

With 1Gig Ethernet data connectivity and two RJ-11 connectors, the SBV6120E is an intelligent, flexible, and convenient way to converge voice and data on one network.

A SINGLE SOLUTION FOR INTELLIGENT CONVERGENCE
The SBV6120E enables:
- One infrastructure for communication services
- One bill for voice and data services
- Simultaneous use of phone lines and high-speed data services
- Support for a variety of CLASS features provided today by the telephone company, including caller ID, call waiting, and call forwarding

As part of Motorola's broadband family of telephony products, the SBV6120E combines voice and data on one network, in one product. By combining multiple services in one unit, consumers can enjoy an efficient solution that offers many advantages over competing technologies.

With Motorola's cable modems, high-speed Internet access has always been at your fingertips – always on and always connected. The SBV6120E is the ideal competitive solution for the high-end residential user, the small home office owner, and the medium to large business enterprise.

ECOMOTO™
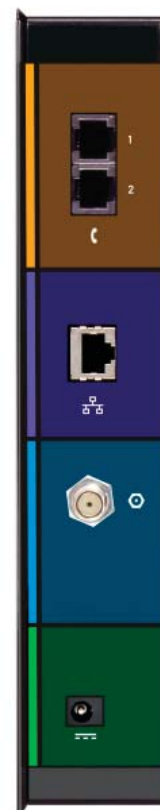
Motorola's SBV6120E SURFboard® Digital Voice Modems are helping service providers lower their carbon footprint by helping them lower energy consumption. Motorola has a global commitment to be part of the solution to climate change, working for years to continually improve the environmental profile of our products, operations and supply chain. We are in step with our customers and their increasing interest in partnering with a company that will help them reduce their environmental impact, while offering compelling products that will help them grow their eco-conscious customer base.

Motorola designed the next generation SURFboard portfolio of customer premises equipment (CPE) to minimize its impact on the environment. Motorola's CPE comply with international environmental and energy efficient standards. The portfolio uses ENERGY STAR qualified power supplies and its devices and power supplies are compliant with European Code of Conduct regulations. In addition, the devices and power supplies are lead-free and RoHS compliant. Finally, all new SBV6120E SURFboard Digital Voice Modems use environmentally friendly package designs. The SBV6120E digital voice modems are available in single bulk pack boxes – eliminating the use of suspension plastic and reducing box size – thereby reducing waste and transport costs. Motorola SBV6120E digital voice modem's packaging is 100% recyclable and is marked with standard recycling codes to make it easier for our customers to identify recycling opportunities.

Specifications

GENERAL

Cable Interface	75Ω F-connector
CPE Network Interface	10/100/1000Base-T Ethernet (RJ-45)
Telephony Interface	RJ-11 (x2)
Data Protocol	TCP/IP, UDP
Telephony Interfaces	ETSI harmonized impedance, 600 Ω
Line Mating	Line 1= 1, Line 2 = 2
Dimensions	7.3 in x 1.5 in x 6.1 in (18.68 cm x 3.81 cm x 15.49 cm)
Input Power	100 – 240 VAC, 60 Hz
Regulatory	UL listed (U.S. and Canada), CE, unit is RoHS compliant, ENERGY STAR V2 , COC V3, Compliant per the "Code of Conduct on Energy Consumption of Broadband Equipment", CMM

ENVIRONMENTAL

Operating Temperature	32 °F to 122 °F (0 °C to 50 °C)
Storage Temperature	–22 °F to 176 °F (–30 °C to 70 °C)
Operating Humidity	5 to 95% R.H. (non-condensing)

DATA COMPATIBILITY

PC	90496, Pentium, or later; Windows Vista™, 2000, or XP or Linux® with Ethernet connection (older versions of Windows, although not specifically supported, will work with this cable modem)
Macintosh	OS 10 or higher, Ethernet connection
UNIX	Ethernet connection
Home Networking	Ethernet router, or wireless access point with Ethernet connection

TELEPHONY

Line Type 2-wire	
Hook State Signaling Loop start	
Maximum Loop Length	1000 ft (AWG 26/0.4 mm @ 65 °C)
DTMF Level Sensitivity	
Range	0 to –20 dBm
Speech Coding 64 kbps PCM, µ-law or A-law companding; supports G.711 and low-rate vocoders; T.38 support	
Line Termination Configurable based on market needs	
Loss Plan Receive (D/A) 4 dB; transmit (A/D) 2 dB (configurable based on market needs)	
Loss Plan Tolerance ±1 dB (one-way)	
60/50 Hz Loss >20 dB (referenced to off-hook loss at 1004 Hz)	
Ringing Wave Form	
Sinusoidal Balanced Tracking mode 55 Vrms/48Vdc	
Trapezoidal Balanced Tracking mode 55 Vrms/48Vdc	
Sinusoidal Unbalanced Tracking 46 Vrms/70Vdc	
Sinusoidal Balanced Fixed mode 55Vrms/48Vdc	
Ringing Crest Factor 1.2<CF<1.6	
Ring Trip (maximum) 200 mS with 300 W termination	

Specifications (cont.)

* Actual speeds will vary, and are often less than the maximum possible. Data transmission speed is approximate and depends on the configuration and capacity of your network, as well as the amount of traffic on the network

** Actual data throughput will be less due to physical layer overhead (error correction coding, burst preamble, and guard interval).

*** With A-TDMA- or S-CDMA-enabled CMTS.

For Cable Customers: Certain features may not be activated by your service provider, and/or their network settings may limit the feature's functionality. Additionally, certain features may require a subscription. Contact your service provider for details.

All features, functionality, and other product specifications are subject to change without notice or obligation. DOCSIS 3.0 modem capabilities are dependant on the services available through the CMTS. Please verify the DOCSIS 3.0 certification level of your CMTS to ensure that the desired features are supported.

DOWNSTREAM

Modulation	64 or 256 QAM	
Capture Bandwidth	100 MHz (edge to edge)	
Maximum Theoretical Data Rate**		
DOCSIS	171.537 Mbps (4 channels) / 42.884 (single channel) @ 256 QAM at 5.36 Msym/s	
EuroDOCSIS	222.464 Mbps (4 channels) / 55.616 (single channel) @ 256 QAM at 6.952 Msys/s	
Bandwidth	DOCSIS	≤ 24 MHz
	EuroDOCSIS	≤ 32 MHz
Symbol Rate	DOCSIS	64 QAM 5.057 Msym/s; 256 QAM 5.361 Msym/s
	EuroDOCSIS	64 QAM 6.952 Msym/s; 256 QAM 6.952 Msym/s
Operating Level Range	−15 to 15 dBmV	
Bonded Channel RF Level Tolerance	10dBmV	
Input Impedance	75 Ω (nominal)	
Frequency Range	108 to 1002 MHz (edge to edge)	
Network Management	SNMP v2 & v3	
Provisioning	Supports IP addressing using IPv4 and/or IPv6 (dual stack)	
Frequency Plan	EuroDOCSIS	Annex A
	DOCSIS	Annex B

UPSTREAM

Modulation	QPSK and 8, 16, 32, 64, 128 QAM	
Maximum Channel Rate**		
DOCSIS	131.072 Mbps (4 channels) / 32.768 Mbps (single channel): @ 128 QAM at 6.4 MHz	
EuroDOCSIS	131.072 Mbps (4 channels) /32.768 Mbps (single channel): @ 128 QAM at 6.4 MHz	
Channel Width	200 kHz, 400 kHz, 800 kHz, 1.6 MHz, 3.2 MHz, 6.4*** MHz	
Symbol Rates	160, 320, 640, 1280, 2560, 5120*** ksym/s	
Operating Level Range	Level range per channel (Multiple Transmit Channel mode disabled, or only Multiple Transmit Channel mode enabled with one channel in the TCS)	
	DOCSIS	Pmin to +57 dBmV (32 QAM, 64 QAM)
		Pmin to +58 dBmV (8 QAM, 16 QAM)
		Pmin to +61 dBmV (QPSK)
	S-CDMA	Pmin to +56 dBmV (all modulations), where:
		Pmin = +17 dBmV, 1280 kHz modulation rate
		Pmin = +20 dBmV, 2560 kHz modulation rate
		Pmin = +23 dBmV, 5120 kHz modulation rate
Level range per channel (two channels in the TCS)		
	TDMA	Pmin to +54 dBmV (32 QAM, 64 QAM)
		Pmin to +55 dBmV (8 QAM, 16 QAM)
		Pmin to +58 dBmV (QPSK)
	S-CDMA	Pmin to +53 dBmV (all modulations), where:
		Pmin = +17 dBmV, 1280 kHz modulation rate
		Pmin = +20 dBmV, 2560 kHz modulation rate
		Pmin = +23 dBmV, 5120 kHz modulation rate
Level range per channel (three or four channels in the TCS)		
	TDMA	Pmin to +51 dBmV (32 QAM, 64 QAM)
		Pmin to +52 dBmV (8 QAM, 16 QAM)
		Pmin to +55 dBmV (QPSK)
	S-CDMA	Pmin to +53 dBmV (all modulations), where:
		Pmin = +17 dBmV, 1280 kHz modulation rate
		Pmin = +20 dBmV, 2560 kHz modulation rate
		Pmin = +23 dBmV, 5120 kHz modulation rate
Output Impedance	75 Ω (nominal)	
Frequency Range	DOCSIS	5 – 42 MHz (edge to edge)
	EuroDOCSIS	5 – 65 MHz
	Optional DOCSIS	5 – 65 MHz

MOTOROLA

Motorola, Inc.   www.motorola.com