



# SURFboard® SBV6220

## DOCSIS® 3.0 Digital Voice Modem with Integrated Battery Backup

IP telephony converges with Ultra-Broadband cable data service in one convenient package.

### HIGHLIGHTS

- Compatible with Windows®, Macintosh®, and UNIX® computers
- Enhanced network management
- 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
- Battery Option for Digital Voice service back up in the event of primary power failure
- Support for CLASS services (caller ID, call waiting, three-way calling, etc.)

The Motorola SURFboard Digital Voice Modem (SBV6220) is DOCSIS 3.0 and PacketCable 1.5 Certified and PacketCable 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 well over 100 Mbps in each direction without upgrading their HFC plant, in addition to offering a two-line VoIP service. The SBV6220 uses a field-replaceable battery to provide VoIP subscribers with primary line reliability. The SBV6220 supports all DOCSIS 3.0 features, including channel bonding, IPv6, and Advanced Encryption Services.

### HIGH VALUE AND INCREASED DATA RATES

Motorola's easy-to-use SBV6220 SURFboard DOCSIS 3.0 Cable Modem unlocks the potential of offering innovative high-bandwidth data and multimedia services to customers.

Utilizing the power of DOCSIS 3.0, the SBV6220 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 well over 100 Mbps in each direction. The SBV6220'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

Designed for Service Assurance, the SBV6220 is compatible with Motorola's NBBS Device Management Platform and with Motorola's eCare for remote access customer component troubleshooting and configuration, eliminating unnecessary truck rolls.

### ECONOMIC AND FLEXIBLE

The Motorola SBV6220 SURFboard DOCSIS 3.0 Cable Modem provides operators with an economic option for providing Ultra-Broadband services, with 4X the current maximum user data throughput approximating 160 Mbps in DOCSIS mode and 195 Mbps in Euro-DOCSIS mode\*, without the need for hybrid fiber coax (HFC) plant upgrade. Maximizing an operator's current infrastructure investment, the SBV6220 can be deployed without service interruption.

Backwards compatible to DOCSIS 1.0, 1.1 and 2.0, the SBV6220 also supports both IPv4 and IPv6, Advanced Encryption Services, and all other DOCSIS 3.0 standards.

## DATA SHEET

SBV6220 SURFboard DOCSIS Digital Voice Modem

### HIGHLIGHTS, CONT.

- Automatic fax modem processing
- Certified PacketCable 1.5; Ready for PacketCable 2.0
- Network Call Signaling (NCS) and Session Initiation Protocol (SIP) support Field-upgradeable software
- Support for GR909 test suite allows remotely diagnosing and troubleshooting wiring problems at the customer premises
- Configurable to meet multiple telco market standards ETSI harmonized impedance, 600  $\Omega$
- Support for G.711, G.729, and other low-rate vocoders
- Support for Wide-band Audio
- Support for up to 16 Service IDs (SIDs) allows for future enhanced features

As part of Motorola BroadScape™ DOCSIS 3.0 Ultra-Broadband family of products, the SBV6220 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 SBV6220 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 SBV6220 Digital Voice Modem with field-replaceable Lithium-ion battery backup uses industry-standard signaling protocols to provide high-speed Internet access and up to two lines of primary line 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 SBV6220 is an intelligent, flexible, and convenient way to converge voice and data on one network. The SBV6220's integrated field-replaceable Lithium-ion battery backup minimizes the likelihood that a consumer will lose telephone service during a power outage.

### A SINGLE SOLUTION FOR INTELLIGENT CONVERGENCE

The SBV6220 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 SBV6220 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 SBV6220 is the ideal competitive solution for the high-end residential user, the small home office owner, and the medium to large business enterprise.



## DATA SHEET

SBV6220 SURFboard DOCSIS Digital Voice Modem

# Specifications

### GENERAL

Cable Interface	75 $\Omega$ 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 $\Omega$
Line Mating	Line 1 = Line 1, or Lines 1 and 2, Line 2 = Line 2
Dimensions	9.2 in x 1.5 in x 6.1 in (23.36 cm x 3.81 cm x 15.49 cm)
Input Power	100 to 125 VAC, 60 Hz

### 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)
Storage Temperature with Battery Installed	14 °F to 140 °F (-10 °C to +60 °C)
Recommended Battery Storage at 25 °C for optimal storage life	
Operating Humidity	5 to 95% R.H. (non-condensing)

### BATTERY

Type	Replaceable, Lithium Ion, Single piece construction
Options	2-Cell, 4-Cell

### 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, $\mu$ -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	$\pm$ 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



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## 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
Bandwidth	DOCSIS ≤ 24 MHz
Symbol Rate	DOCSIS: 64 QAM 5.057 Msym/s; 256 QAM 5.361 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)

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
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	5 – 42 MHz (edge to edge)
Optional DOCSIS	5 – 65 MHz



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