STATE OF NEW HAMPSHIRE
BEFORE THE
PUBLIC UTILITIES COMMISSION

Petition for Investigation into the Regulatory Status of IP Enabled Voice Telecommunications Service	DT 09-044

TWC DIGITAL PHONE LLC RESPONSES TO FIRST SET OF NHTA DATA REQUESTS

TWC Digital Phone LLC ("TWCDP"), on behalf of itself and its affiliates, hereby submits its responses to the First Set of Data Requests by the New Hampshire Telephone Association ("NHTA") in the above-captioned proceeding. TWCDP incorporates by reference the General Objections and Specific Objections it submitted on November 2, 2009, pursuant to Admin. Rule Puc 203.09(g).

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-1 Witness: Julie Laine

REQUEST:

In its testimony at page 3, lines 8-19, TWCDP states that it offers an "interconnected VoIP service."

a. Please state whether this is a legal conclusion that TWCDP's Cable VoIP service conforms to the definition provided at 47 C.F.R. § 9.3.

b. If it is not a legal conclusion, please define "interconnected VoIP service" as it is used in TWCDP's testimony.

RESPONSE:

a. TWCDP's Cable VoIP Service is an "interconnected VoIP service" as that term has been defined by the Federal Communications Commission.

b. N/A.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-2 Witness: James Medica

REQUEST:

In its testimony at page 4, lines 12-14, TWCDP states that a 200 Kbps connection is required for obtaining a Voice connection.

a. Is additional bandwidth required for additional simultaneous voice connections?

b. If yes, how much bandwidth is required for the second connection?

c. What bandwidth is required for a single TW VoIP call?

d. Does the 200 Kbps also accommodate data and video?

e. Is there a minimum bandwidth dedicated to Cable VoIP service?

f. If so, how much bandwidth is dedicated?

RESPONSE:

a. Yes.

b. Approximately 100 kbps is required for each voice communication.

c. See response to 1-2(b) above.

d. A broadband connection of at least 200 kbps would accommodate broadband Internet access service as well as Cable VoIP service. As TWCDP described in response to Staff Data Request No. 1-19, video traffic is not routed through the broadband connection.

e. Yes.

f. TWCDP reserves a certain amount of bandwidth on each upstream transmission to the CMTS for usage by all eMTAs on that upstream path for voice. Each 100 kbps stream request by an eMTA for a call is allocated from that bandwidth. Currently, that amount is approximately 5 Mbps.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-3 Witness: Julie Laine

REQUEST:

Regarding the TWCDP testimony at page 4, lines 7-14, is the eMTA powered by the network or is it wholly dependent on power at the customer's premises? If more than one option exists, please provide a description of each option and its prevalence.

RESPONSE:

Like traditional cable modems, eMTAs are powered by electricity drawn from a standard power outlet at the customer's premises. In New Hampshire, for Business Class Phone customers and residential customers who also have alarm systems, TWCDP provides a battery back-up for the eMTA.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-4 Witness: James Medica

REQUEST:

In its testimony at page 4, lines 15-17, TWCDP states that the primary function of an eMTA is "to reformat the customer's outgoing voice communications from an analog signal to IP packets (or vice versa, for incoming voice communications)."

a. Please state the differences, if any, between such "reformatting" and a protocol conversion.

b. If this reformatting is the primary function, please list in detail and explain in detail each and every other function of the eMTA.

RESPONSE:

a. Please see TWCDP's specific objection to this data request.

b. The functions of the eMTA are described in TWCDP's response to Staff Data Request No. 1-5, and in the documents provided in response to NHTA Request No. 1-5 below.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-5 Witness: James Medica

REQUEST:

Please provide a representative sample of the specifications of eMTA devices utilized for New Hampshire residential customers and, if different, for business customers.

RESPONSE:

TWCDP previously asserted that information regarding the manufacturers and model numbers of the eMTAs used with its Cable VoIP service was proprietary and thus sought confidential treatment of that information. Upon further consideration, and without conceding the relevance of such information, TWCDP has decided to waive that claim of confidentiality for purposes of this discovery. Accordingly, attached at Exhibits A through G to these responses, TWCDP is providing representative specifications for eMTAs used with its Cable VoIP service.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-6 Witness: James Medica

REQUEST:

In its testimony at page 4, line 18 through page 5, line 2, TWCDP states that Cable VoIP customers use the last mile broadband facilities provided by TWCDP's locally franchised cable television operating affiliates.

a. What encoding protocol is used for the VoIP calls (i.e. G.711, G.728, G.729 or other)?

b. Can a TWCDP customer use an independent third party broadband connection to originate and terminate Cable VoIP calls?

RESPONSE:

a. G.711.

b. No, to the extent this data request seeks information regarding whether a TWCDP customer can use a physical broadband connection provided by an independent third party to originate and terminate Cable VoIP calls.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-7 Witness: James Medica

REQUEST:

In its testimony at page 7, lines 12-21, TWCDP refers to "additional calling features and capabilities that can be invoked sequentially or simultaneously to allow those customers to manage their personal communications dynamically."

a. Are these services provided via a web portal?

b. If not please explain how the features are delivered to the customer.

c. When will these features be available?

d. Please define the word "dynamically." Specifically, does this mean that the caller will be able to modify the parameters of [a] call while it is in progress?

e. If the caller will be able to modify the parameters of call while it is in progress, what parameters will be dynamically modifiable?

RESPONSE:

a. See response to NHTA Request 1-7(c) below.

b. See response to NHTA Request 1-7(c) below.

c. TWCDP Cable VoIP Service customers can direct that their incoming Caller ID information be routed through their television and set-top box using a remote control. TWCDP expects that the other calling features and capabilities discussed in its testimony will become available in the first quarter of 2010. The cited portion of TWCDP's direct testimony describes how customers will be able to access these features.

d. As used in TWCDP's testimony, the term "dynamically" has its ordinary meaning. The calling features and capabilities described in TWCDP's testimony, by their very nature, would not apply to a voice communication that is in progress.

e. N/A.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-8 Witness: James Medica

REQUEST:

In its testimony at page 9, lines 10-12, TWCDP states that "in contrast to traditional telephone service, TWCDP's interconnected VoIP service does not require the customer to maintain a dedicated communications channel during the course of a communications session." Please describe the actions that a traditional telephone service customer must undertake to "maintain" a dedicated communications channel during the course of a communications session, and contrast those actions with those of a TWCDP customer during the course of a TWCDP communications session.

RESPONSE:

The actions of a TWCDP customer in connection with a typical TWCDP communications session are described in TWCDP's response to Staff Request No. 1-13. With a traditional telephone service, when a customer lifts the receiver on his or her telephone, the customer opens a circuit, which, as TWCDP understands the technology, requires the telephone company to dedicate capacity for as long as the circuit remains open. In contrast, with TWCDP's Cable VoIP service, voice communications are packetized and transmitted through the broadband connection without any need for the service provider to "open" a dedicated communications path.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-9 Witness: James Medica

REQUEST:

In its testimony at page 9, lines 13-15, TWCDP states that "whereas a TWCDP customer can engage in simultaneous voice sessions over a single broadband connection as described above, in the traditional landline environment it would be necessary to dedicate capacity to maintain two open circuits at the same time."

a. Please state whether a second voice session over a broadband connection reduces the amount of available bandwidth in that broadband connection over and above the reduction attributable to a single voice session.

b. How does TWCDP provide multiple lines over one broadband facility, e.g. are there multiple connections at the eMTA, or are there other arrangements?

RESPONSE:

a. Where there are multiple connections at the eMTA, there is bandwidth reserved for each. Accordingly, a second voice session would not reduce the amount of available bandwidth for the first voice session.

b. TWCDP does not provide multiple "lines" over any broadband facility. The eMTA may have multiple connections that can support simultaneous voice sessions.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-10 Witness: James Medica

REQUEST:

In its testimony at page 11, lines 16-18, TWCDP states that the dial tone is generated by the eMTA.

a. When a customer picks up the phone, what is the technical interaction between the phone and the eMTA?

b. When the dial tone indicator is sent to the phone by the eMTA, does the CMTS or any other network element know that a customer is initiating a call?

RESPONSE:

a. The eMTA reacts to the standard RJ-11 electrical interfaces detecting the loop voltage closures signaling that the customer has gone off-hook, and sends a message to the call management server ("CMS," also sometimes known as a softswitch). The CMS instructs the device to play a dial tone and collect the dialed digits. The eMTA collects those digits, passes them back to the CMS, and the call proceeds. A technical description can be found in the publicly available "PacketCable Network-Based Call Signaling Protocol Specification, PKT-SP-EC-MGCP-C01-071129," which can be accessed at http://www.cablelabs.com/specifications/.

b. The CMTS does not "know" that a customer is initiating a voice communication. The CMS receives a MGCP-based "NOTIFY" message informing it that the eMTA has gone off-hook.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-11 Witness: Julie Laine

REQUEST:

Regarding TWCDP's testimony at page 12, line 1 through page 13, line 5;

a. Is it TWCDP's position that it is not required to comply with any state regulations that apply to CLECs?

b. Of the actions described in this portion of the testimony, please identify those that are required by law or regulation, and those which are undertaken voluntarily by TWCDP.

c. Of those that are voluntary, is it TWCDP's intention that this voluntary compliance will be permanent, regardless of the outcome of this proceeding?

RESPONSE:

a. Because TWCDP is not classified as a CLEC in the state of New Hampshire, it is not subject to legal requirements that, by their terms, apply only to CLECs.

b. Information responsive to this request is provided in the cited portion of TWCDP's testimony. Generally speaking, the federal requirements described apply to TWCDP as a matter of law. Because TWCDP is not classified as a CLEC in the state of New Hampshire, it is not subject to legal requirements that, by their terms, apply only to CLECs.

c. TWCDP has no current intention to change its business practices with respect to the items described in the cited portion of its testimony.

Data Request Received: 10/23/09 Date of Response: 11/06/09
Request No. NHTA 1-12 Witness: Julie Laine

REQUEST:

Regarding the TWCDP testimony at page 12, line 12, does TWCDP calculate its USF contributions based on jurisdictional traffic studies, or does it use the FCC safe harbor percentage?

RESPONSE:

TWCDP currently calculates its USF contributions based on a traffic study, consistent with FCC rules.

Respectfully submitted,

TWC DIGITAL PHONE LLC

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Dated: November 6, 2009

Certificate of Service

I hereby certify that, on this 6th day of November, 2009, a copy of the foregoing TWC Digital Phone LLC Responses to First Set of NHTA Data Requests has been sent by electronic mail to persons listed on the Service List.

Brian Murray

TWCDP Responses to NHTA Set 1 -- Exhibit A

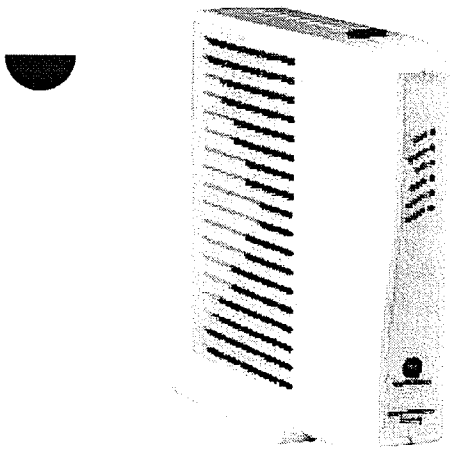
SURFboard® SBV4200 VoIP Cable Modem

MOTOROLA
intelligence everywhere™

The Motorola SURFboard SBV4200 VoIP Cable Modem is based on the SURFboard SB4200 Cable Modem and Motorola's proven cable modem experience. By utilizing industry-standard signaling protocols, the SBV4200 provides high speed Internet access and telephone service over cable lines directly to a consumer's home. Its advanced architecture allows for Internet connection speeds that are unsurpassed in the market place, making it capable of handling current and future DOCSIS functions.

The SBV4200 supports two telephone lines that are terminated in two RJ-11 connectors. In addition, the SBV4200 offers industry-leading connection speeds to the Internet via an integrated cable modem that connects to a computer through either a 10/100Base-T Ethernet connection or a USB data port. The SBV4200 is remotely upgradeable via SNMP and TFTP configuration and firmware downloads. As part of Motorola's broadband family of telephony products, it is capable of converging 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.



IP Telephony converges with cable data service in one, convenient package.

FEATURES INCLUDE:

- Supports all standard DOCSIS 1.1 cable modem features
- Two lines of telephone service (RJ-11 jacks)
- 10/100Base-T Ethernet (RJ-45) high speed data port
- USB port
- DC powering via wall transformer or Uninterruptible Power Supply (UPS)
- Compatible with PacketCable and ETSI standards
- SNMP and TFTP configuration and firmware downloads from headend
- Automatic fax/modem processing
- Standby function provides increased data security by disabling Ethernet and the USB ports
- Supports G.711 and low-rate vocoders
- Telco interface configures to meet multiple market standards
  - ETSI harmonized impedance
  - 600 Ω impedance
- Global safety approvals:
  - FCC
  - UL
  - CE
  - CB

GENERAL SPECIFICATIONS

Downstream

Demodulation:	64 or 256 QAM
Maximum Data Rate:*	38 Mbps
Bandwidth:	6 MHz
Symbol Rate:	64 QAM 5.069 Msym/s
Symbol Rate:	256 QAM 5.361 Msym/s
Operating Level Range:	-15 to +15 dBmV
Input Impedance:	75 Ω (nominal)
Frequency Range:	88 to 860 MHz

Upstream

Modulation:	16 QAM or QPSK
Maximum Data Rate:	10 Mbps
Bandwidth:	200 kHz, 400 kHz, 800 kHz,1.6 MHz, 3.2 MHz
Symbol Rates:	160, 320, 640, 1280 and 2560 ksym/s
Operating Level Range:	+8 to +55 dBmV (16QAM) +8 to +58 dBmV (QPSK)
Output Impedance:	75 Ω (nominal)
Frequency Range:	5 to 42 MHz (edge to edge)

General

Cable Interface:	F-Connector, female, 75 Ω
CPE Network Interface:	USB, Ethernet 10/100Base-T (auto sensing)
Data Protocol:	TCP/IP
Dimensions:	7.2" H x 2.0" W x 7.8" L
Input Power:	12 VDC

Environmental

Operating Temperature:	0° to 40° C
Storage Temperature:	-30° to 80° C
Operating Humidity:	5 to 95% R.H. (non-condensing)

Telephony

Line Type:	2 Wire
Hook State Signaling:	Loop start
Maximum Line Length (One-way):	500 feet (AWG 26/0.4 mm @ 65° C)
Off Hook Threshold (Line Seizure):	Rdc ≤ 1000 Ω
On Hook Threshold (Line Release):	Rdc ≥ 10000 Ω
Rdc DC Supervisory Range:	Rdc ≥ 450 Ω
DTMF Level Sensitivity Range:	0 And -20 dBm
Speech Coding:	64 kbps PCM, u-law or A-law companding, support for G.711 plus other low-rate CODECs
Line Termination:	Configurable based on market needs
Loss Plan:	Receive (D/A) 4 dB/transmit (A/D) 2 dB
Loss Plan Tolerance (One-way):	+/- 1 dB
60/50 Hz Loss (Referenced To Off Hook Loss At 1004 Hz):	> 20 dB
Ringing Wave Form:	Quasi-trapezoidal
Ringing Crest Factor:	1.2 ≤ CF ≤ 1.6
Ring Trip (Maximum):	200 mS with 300 Ω termination

CONVERGENT COMMUNICATIONS

The Motorola SURFboard SBV4200 VoIP Cable Modem is the intelligent way to communicate converging voice and data on one network.

- One bill for voice and data services creating new opportunities for bundled pricing
- Consolidation of operational support systems
- Improved bandwidth utilization
- One infrastructure for communications services
- Simultaneous usage of phone lines and high speed data services
- All CLASS services provided today by the phone company

* When compared to traditional 28.8k analog modems. Actual speeds will vary, and are often less than the maximum possible. Upload and download speeds are affected by several factors including, but not limited to: network traffic and services offered by your cable operator or broadband service provider, computer equipment, type of server, number of connections to server, and availability of Internet router(s).

MOTOROLA

Motorola, Inc
Broadband Communications Sector
101 Tournament Drive
Horsham, PA 19044
1.800.523.6678
www.motorola.com/broadband

5488 702 5K

TWCDP Responses to NHTA Set 1 -- Exhibit B

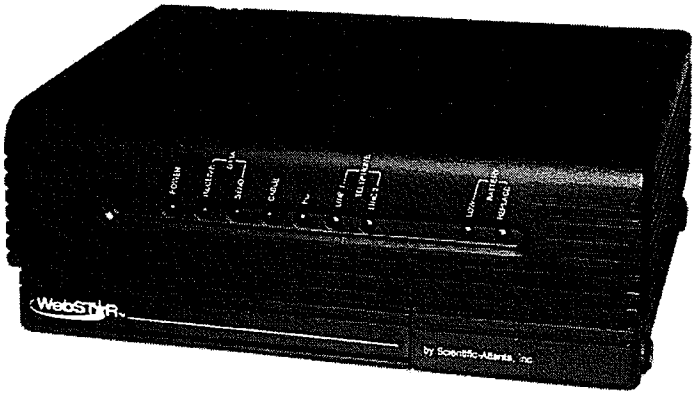
Subscriber Networks

Scientific Atlanta

WebSTAR™ DPX2203C™ Cable Modem with Embedded MTA

Description

The WebSTAR™ DPX2203C™ Cable Modem has an embedded media terminal adapter (EMTA) with two RJ-11 telephone ports for voice over IP (VoIP) services along with a 10/100BaseT Ethernet port and a USB 1.1 port for high-speed data connectivity.



The DPX2203C differs from the standard DPX2203 only in that the DPX2203C features an internal cartridge-style Li-Ion battery as opposed to an external add-on battery pack. The Li-Ion battery is used to provide backup power for operation in the event of an AC power failure.

The battery compartment is neatly concealed behind a "press-to-open" access door on the front panel. This user-friendly design allows the end user to easily replace the battery cartridge without the use of any tools.

The DPX2203 platform was the first EMTA in the industry to be awarded PacketCable™ 1.0 certification for DOCSIS® 2.0 networks. The DPX2203C is also designed to meet PacketCable 1.1 specifications.

The DPX2203C can be configured to support various combinations of codecs including G.711, industry-standard voice codecs, and T.38 fax relay.

Call signaling is compliant with Network Call Signaling (NCS) of the PacketCable specifications or the DPX2203C can be configured with optional SIP call signaling protocol.

WebWizard

To facilitate setup and troubleshooting, the DPX2203C includes WebWizard—a browser-based user interface. WebWizard eliminates the need to load setup software on the CPE. In addition, the nine LEDs on the front panel provide an informative and easy-to-understand display that indicates cable modem status and real-time data transmission activity.

Features

- Combination cable modem with an media terminal adapter that provides two lines of voice services
- PacketCable 1.0 and DOCSIS 2.0 compliant, upgradeable by software download
- Supports NCS or SIP call signaling
- Versatile orientation: stands vertically or lies flat on the desk top, or mounts easily on the wall
- WebWizard graphical user interface for simple setup
- Bridged 10/100BaseT auto-sensing / auto-MDIX Ethernet port, and USB 1.1 data port
- 1200 mAh (3.5 hour) or 2200 mAh (6.4 Hour) battery cartridge[1]

[1] The listed battery backup time (3.5 or 6.4 hours) is the nominal initial time that the battery pack can provide standby power after loss of AC power and after fully charging the battery. Due to variations in individual units, the actual initial standby time can vary +/- 10%. Other factors can also influence battery standby power times such as CPE data activity, variations in DOCSIS traffic, telephone port activity, battery aging, and temperature.

WebSTAR DPX2203C
Cable Modem with Embedded MTA

Scientific Atlanta

Ordering Information

Contact your Sales Representative for product availability in your area.

Description	Part Number
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • No battery cartridge included, battery to be ordered and shipped separately • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4009682
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • No battery cartridge included, battery to be ordered and shipped separately • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver • *Road Runner configuration*	4009683
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • 1200 mAh Li-Ion battery cartridge • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4009618
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • 1200 mAh Li-Ion battery cartridge • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver • *Road Runner configuration*	4009423
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • 2200 mAh Li-Ion battery cartridge • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4009625
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC frequency plans. Includes: • H/W Rev 2.1 • 2200 mAh Li-Ion battery cartridge • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver • *Road Runner configuration*	4009684

WebSTAR DPX2203C
Cable Modem with Embedded MTA

Scientific Atlanta

Replacement Components	Part Number
120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply for North America	4004854
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 Euro plug power connector	4004855
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and BS-1363 style 3-pin power connector	4006872
100-240 VAC / 50-60 Hz, 15 VDC / 1A Universal power supply	4007274
100 VAC, 50-60 Hz, 15 VDC /1A Plug-in switching power supply	4006873
Replacement Li-Ion battery pack, 3 cell, 1200 mAh	4008307
Replacement Li-Ion battery pack, 3 cell, 2200 mAh	4008300
Ethernet cable	740580
USB cable	740579
CD-ROM with user's guide and USB drivers	749995

Power Cords for Universal Power Supplies	Part Number
Power cord, North America, NEMA 1-15 to C7 non-polarized	186750
Power cord, European, Euro plug CEE7/16 to C7	503414
Power cord, United Kingdom, BS1363 to C7	1002798
Power cord, Japan, NEMA 1-15 (Non-polarized) to C7	207586

Scientific Atlanta

Specifications and product availability are subject to change without notice.

Scientific-Atlanta, Inc.
1-800-722-2009 or 770-236-6900
www.scientificatlanta.com

Part Number 7006901 Rev A
May 2005

TWCDP Responses to NHTA Set 1 -- Exhibit C

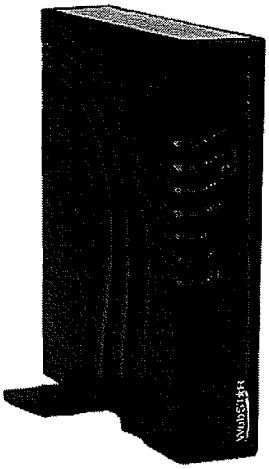
Subscriber Networks

Scientific Atlanta

WebSTAR™ DPX2203™ Cable Modem with Embedded MTA

Description

The WebSTAR™ DPX2203™ Cable Modem (DPX2203) features an embedded media terminal adapter (EMTA) with two RJ-11 telephone ports for voice services along with a 10/100BaseT Ethernet port and a USB 1.1 port for high-speed data connectivity.



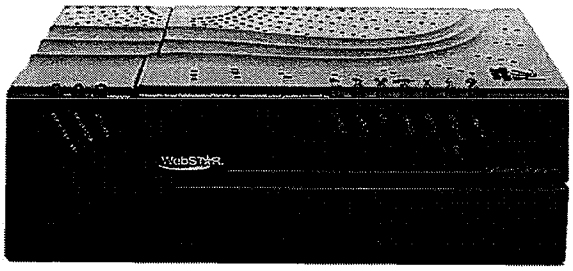
The DPX2203 is PacketCable 1.0 compliant and designed to be software upgradeable to meet PacketCable 1.1 specifications. The DPX2203 is the first EMTA in the industry to be awarded PacketCable 1.0 certification for DOCSIS® 2.0 networks.

The standard DPX2203 provides two voice codecs: G711 and G728. Call signaling is compliant with PacketCable's Network Call Signaling (NCS) specifications.

The housing of the DPX2203 incorporates a hide-away stabilizer bar for standing the unit on end. The stabilizer bar tucks neatly into the casing when the unit is set horizontally on a desktop or when wall-mounted.

WebWizard

To facilitate setup and troubleshooting, the DPX2203 includes WebWizard—a browser-based user interface. WebWizard also eliminates the need to load setup software on the CPE. In addition, the seven LEDs on the front panel provide an informative and easy-to-understand display that indicates cable modem status and real-time data transmission activity.



DPX2203 shown with optional battery pack

Battery Backup (optional)

The DPX2203 can be equipped with a factory installed rechargeable Li-Ion battery pack to provide up to 4, 8, 12, or 16 hours[1] of stand-by operation in the event of an AC power failure. The user friendly battery pack design allows the end user to replace the battery pack without the use of any tools.

The DPX2203 can also be used with a variety of third-party battery backup power supplies.

Features

- Combination cable modem with an EMTA that provides two lines of voice services
- PacketCable 1.0 and DOCSIS 2.0 compliant
- PacketCable 1.1 upgradeable by software download
- Compact design
- Versatile orientation: stands vertically or lies flat on the desk top, or mounts easily on the wall
- WebWizard graphical user interface for simple setup
- Bridged 10/100BaseT auto-sensing / auto-MDIX Ethernet port, and USB 1.1 data port
- 4, 8, 12, or, 16 hour battery backup options

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[1] The listed battery standby time (4, 8, 12, or 16 hours) is the nominal initial time that the battery pack can provide standby power after loss of AC power and after fully charging the battery. Due to variations in individual units the actual initial standby time can vary +/- 10%. Other factors can also influence battery standby power times including: CPE data activity, variations in DOCSIS traffic, telephone port activity, battery aging, temperature, and other factors.

WebSTAR DPX2203
Cable Modem with Embedded MTA

Scientific Atlanta

Specifications

VoIP	
Network Signaling Protocol	NCS (Network-Based Call Signaling)
Codecs	Standard: G.711 and G.728 Optional: G.711 and G729 Annex E, or G.711 and Broadcom's BroadVoice 16

RF Downstream	
Frequency Range	88 MHz to 860 MHz
Demodulation	64 QAM or 256 QAM
Maximum Data Rate	30 Mbps for 64 QAM and 43 Mbps for 256 QAM
Bandwidth	6 MHz
Operating Level Range	-15 dBmV to +15 dBmV
Input Impedance	75 ohms
RF Upstream	
Frequency Range	5 MHz to 42 MHz
Modulation	16 QAM QPSK 64 QAM 128 QAM TCM
Maximum Data Rate	10.2 Mbps for 16 QAM 5.12 Mbps for QPSK 30.0 Mbps for A-TDMA and SCDMA
Bandwidth	200 kHz to 6.4 MHz
Operating Level Range	+8 dBmV to +58 dBmV +8 to +55 dBmV (8QAM, 16QAM) +8 to +54 dBmV (32QAM, 64QAM)
Output Impedance	75 ohms

Electrical	
Input Voltage	15 VDC
Power Consumption (modem module)	6.6 Watts
Data Ports	One (1) RJ-45 Ethernet port, 10/100BaseT (auto-sensing with auto-MDIX) One (1) USB 1.1 Type 2
RF	One (1) Female "F" type
Telephone / Fax	Two (2) RJ-11

Mechanical (Module Only)	
Dimensions (W x D x H)	Not including "F" connector: 6.875 in. x 5.19 in. x 1.5 in. (17.5 cm x 13.2 cm x 3.8 cm)
	Including "F" connector: 6.875 in. x 5.75 in. x 1.5 in. (17.5 cm x 14.6 cm x 3.8 cm)
Weight (approximate)	12 oz (0.34 kg)
Operating Temperature	32°F to 104°F (0° to 40°C)
Operating Humidity	0-90% RH non-condensing
Storage Temperature	-4°F to 158°F (-20°C to 70°C)

WebSTAR DPX2203
Cable Modem with Embedded MTA

Scientific Atlanta

Mechanical (with Battery Pack)	
Dimensions (W x D x H)	Not including "F" connector: 8.75 in. x 5.19 in. x 2.71 in. (22.2 cm x 13.2 cm x 6.9 cm)
	Including "F" connector: 8.75 in. x 5.75 in. x 2.71 in. (22.2 cm x 14.6 cm x 6.9 cm)
Weight (approximate) 4 hour 8 hour 12 hour 16 hour	 1.7 lbs (0.77 kg) 2.1 lbs (0.95 kg) 2.5 lbs (1.13 kg) 2.9 lbs (1.32 kg)
Battery type and capacity 4 hour 8 hour 12 hour 16 hour	 Li-Ion, 3 cells, 2200 mAh Li-Ion, 6 cells, 4400 mAh Li-Ion, 9 cells, 6600 mAh Li-Ion, 12 cells, 8800 mAh
Operating Temperature	32°F to 104°F (0° to 40°C)
Operating Humidity	0-90% RH non-condensing
Storage Temperature	-4°F to 140°F (-20°C to 60°C)

Standards and Approvals	
Designed to comply with the following standards	PacketCable 1.0 DOCSIS 2.0
Other Approvals	WHQL
Regulatory Approvals	Certified as required per country where the DPX2203 will be used

Ordering Information

Contact your Sales Representative for product availability in your area.

Description	Part Number
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4003254
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4006117
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC systems. Includes: • Retail package • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4006695
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 4 hour battery backup for NTSC systems. Includes: • 120VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4005849

WebSTAR DPX2203
Cable Modem with Embedded MTA

Scientific Atlanta

Ordering Information (continued)

Description	Part Number
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 4 hour battery backup for NTSC systems. Includes: • 120VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4006351
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 8 hour battery backup for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4005851
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 8 hour battery backup for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4006352
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 12 hour battery backup for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4004538
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 16 hour battery backup for NTSC systems. Includes: • 120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4006834
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for Europe. Includes: • 230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 style 2-pin power connector • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4003256
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 4 hour battery backup for Europe. Includes: • 230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 style 2-pin power connector • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4005850
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 8 hour battery backup for Europe. Includes: • 230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 style 2-pin power connector • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4005852
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem with factory installed 12 hour battery backup for Europe. Includes: • 230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 style 2-pin power connector • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4005848

WebSTAR DPX2203
Cable Modem with Embedded MTA

Scientific Atlanta

Ordering Information (continued)

Replacement Components	Part Number
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for the UK. Includes: • 230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and BS-1363 style 3-pin power connector • Ethernet and USB cables • CD-ROM containing user's guide and USB driver	4003255
2-Line, VoIP, DOCSIS, WebSTAR Cable Modem for NTSC (Japan). Includes: • 100 VAC, 50-60 Hz, 15 VDC /1A Plug-in switching power supply • Ethernet cable only • Japanese language user's guide	4003257

Replacement Components	Part Number
120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply for North America	4004854
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 style 2-pin power connector for continental Europe	4004855
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and BS-1363 style 3-pin power connector	4006872
100 VAC, 50-60 Hz, 15 VDC /1A Plug-in switching power supply	4006873
Replacement Li-Ion battery pack, 3 cell, 4 hour	4005800
Replacement Li-Ion battery pack, 6 cell, 8 hour	4005801
Replacement Li-Ion battery pack, 9 cell, 12 hour	4005802
Replacement Li-Ion battery pack, 12 cell, 16 hour	4006836
Ethernet cable	740580
USB cable	740579
CD-ROM with user's guide and USB drivers	749995

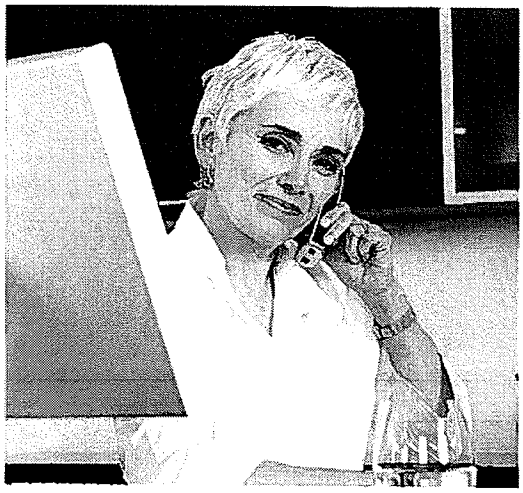
Scientific Atlanta

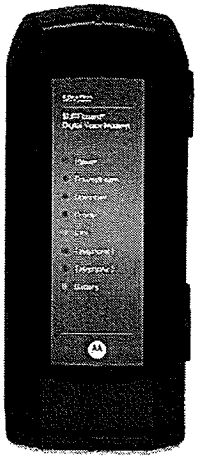
Specifications and product availability are subject to change without notice.

Scientific-Atlanta, Inc.
1-800-722-2009 or 770-236-6900
www.scientificatlanta.com

Part Number 7002076 Rev C
March 2004

TWCDP Responses to NHTA Set 1 -- Exhibit D





SURFboard® SBV5222

Digital Voice Modem with Integrated Battery Backup

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

Highlights

Plug-and-play installation

Front-panel, easy-to-read LEDs for power, data activity, voice, and battery status

Intuitive, built-in Web-based diagnostics for quick and easy troubleshooting

Up to two lines of full-featured telephone service

High-speed 10/100 Ethernet (RJ-45) data access

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

Automatic fax modem processing

SNMP and TFTP support for remote configuration and monitoring

DOCSIS® 2.0- and PacketCable™ 1.5-certified
Interoperable with DOCSIS 1.0 and 1.1 and PacketCable 1.0; compatible with PacketCable 2.0

Fast, Convenient, Reliable

The next-generation Motorola SURFboard SBV5222 Digital Voice Modem with 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 both 10/100 Ethernet and USB network connectivity and two RJ-11 connectors, the SBV5222 is an intelligent, flexible, and convenient way to converge voice and data on one network. The SBV5222's integrated 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 SBV5222 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 SBV5222 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.

More Highlights

Two integrated slots for field-replaceable Lithium-ion batteries, which can provide backup power during a power outage
Two-cell 2.2 Ah 8.4 V and three-cell 2.2 Ah 12.6 V batteries available

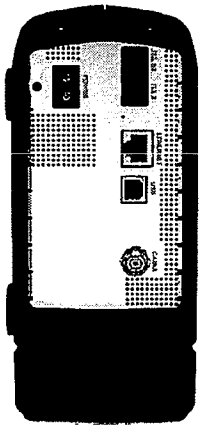
Network Call Signaling (NCS) and Session Initiation Protocol (SIP) support
Field-upgradeable software

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 Ω

Support for G.711, G.729, and other low-rate vocoders

Support for up to 16 Service IDs (SIDs) allows for future enhanced features



GENERAL SPECIFICATIONS

Cable Interface	F-connector, female, 75 Ω
Network Interface	USB, 10/100 Ethernet
Data Protocol	TCP/IP
Dimensions	20.14 cm H x 17.32 cm D x 6.89 cm W (7.93 in x 6.82 in x 3.5 in)

POWER

Power Input	3 W (nominal)
North America	105 to 125 VAC, 60 Hz
Elsewhere	100 to 240 VAC, 50 to 60 Hz

ENVIRONMENT

Operating Temperature	0 °C to 50 °C (32 °F to 122 °F)
Storage Temperature	–30 °C to 80 °C (–22 °F to 176 °F)
Operating Humidity	0 to 95% R.H. (non-condensing)

DOWNSTREAM

Modulation	64 or 256 QAM
Max. Data Rate*	38 Mbps (256 QAM at 5.361 Msym/s)
Bandwidth	6 MHz
Symbol Rates	64 QAM 5.069 Msym/s, 256 QAM 5.361 Msym/s
Operating Level Range	–15 to 15 dBmV
Frequency Range	88 to 860 MHz
Input Impedance	75 Ω (nominal)

UPSTREAM

Modulation	8***, 16, 32***, 64***, 128*** QAM or QPSK
Max. Channel Rate**	30 Mbps
Bandwidth	200 kHz, 400 kHz, 800 kHz, 1.6 MHz, 3.2 MHz, 6.4*** MHz
Symbol Rates	160, 320, 640, 1280, 2560, and 5120*** ksym/s
Operating Level Range	
A-TDMA	8 to 54 dBmV (32 QAM, 64 QAM), 8 to 55 dBmV (8 QAM, 16 QAM) 8 to 58 dBmV (QPSK)
S-CDMA	8 to 53 dBmV (all modulations)
Output Impedance	75 Ω (nominal)
Frequency Range	5 to 42 MHz (edge to edge)

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 other low-rate vocoders
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	Quasi-trapezoidal
Ringing Crest Factor	1.2<CF<1.6
Ring Trip (maximum)	200 mS with 300 W termination

All features, functionality, and other product specifications are subject to change without notice or obligation

*When comparing download speeds with a traditional 28.8k analog modem. Actual speeds will vary, and are often less than the maximum possible. Upload and download speeds are affected by several factors including, but not limited to, network traffic and services offered by your cable operator or broadband service provider, computer equipment, type of service, number of connections to server, and availability of Internet router(s).

**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 Cable Modem Termination System (CMTS). 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. Your service provider, not Motorola, is responsible for the provision of Voice-over-IP (VoIP) telephony services through this equipment. Motorola shall not be liable for, and expressly disclaims, any direct or indirect liabilities, damages, losses, claims, demands, actions, causes of action, risks, or harms arising from or related to the services provided through this equipment.

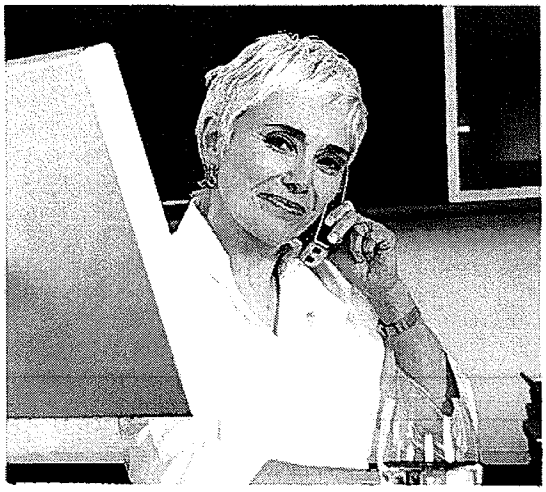
Important: Be aware that you will not be able to make any calls using this VoIP device if your broadband connection is not functioning properly. Battery back-up times may vary based on many factors, including the battery age, charging state, storing conditions, and operating temperature, as well as by factors such as data activity and length of active telephone calls.

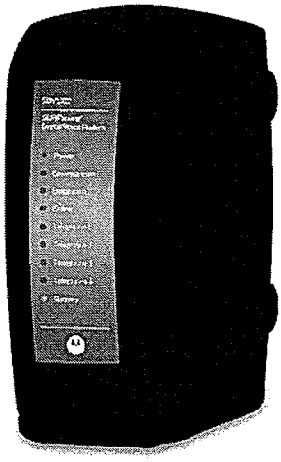
MOTOROLA

Motorola, Inc. 101 Tournament Drive, Horsham, Pennsylvania 19044 U.S.A. www.motorola.com

543284-001-b 5816 - 1007 - OK

TWCDP Responses to NHTA Set 1 -- Exhibit E





SURFboard® SBV5322

4-Line Digital Voice Modem

IP telephony converges with high-speed cable data service in one convenient package for small- to medium-sized commercial customers.

Highlights

Plug-and-play installation

Web-based diagnostics for quick and easy troubleshooting

Up to four lines of full-featured telephone service

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

High-speed 10/100 Ethernet (RJ-45) data access

Automatic fax modem processing
Includes support for T.38 protocol

DOCSIS® 2.0- and PacketCable™ 1.5-certified
Interoperable with DOCSIS 1.0 and 1.1 and PacketCable 1.0, compatible with PacketCable 2.0

Intelligent Convergence

As part of Motorola's broadband family of telephony products, the SURFboard SBV5322 4-Line Digital Voice Modem intelligently converges voice and data on one network, in one unit. The SBV5322 allows MSOs to offer a competitive package of services to small home office and small- to medium-sized business customers who are currently passed by the HFC plant but are supported by an incumbent local exchange carrier (ILEC), providing them with:

- 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 phone company, including caller ID, call waiting, and call forwarding

Convenient And Reliable

The SBV5322 offers up to four lines of primary Voice-over-IP (VoIP) telephone service, as well as high-speed data access through a 10/100 Ethernet port. The integrated Lithium-ion battery provides back-up power, minimizing the likelihood that a consumer will lose telephone service during a power outage.

The SBV5322 4-Line Digital Voice Modem is simple to set up and easy to use—just plug it in and go.

More Highlights

Two integrated slots for field-replaceable Lithium-ion batteries, which can provide backup power during a power outage
Two-cell 2.2 Ahr 8.4 V and three-cell 2.2 Ahr 12.6 V batteries available

Support for Network Call Signaling (NCS) and Session Initiation Protocol (SIP)
Field-upgradeable software

Remotely configurable and monitorable using SNMP and TFTP

Telco interfaces configurable to meet multiple market standards
ETSI harmonized impedance, 600 Ω

Support for G.711, G.720, and low-rate vocoders

Support for up to 16 Service IDs (SIDs) allows for future enhanced features

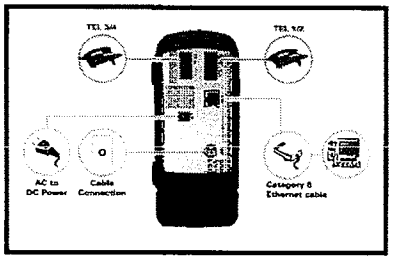
Support for GR909 test suite
Allows remotely diagnosing and troubleshooting wiring problems at the customer premises

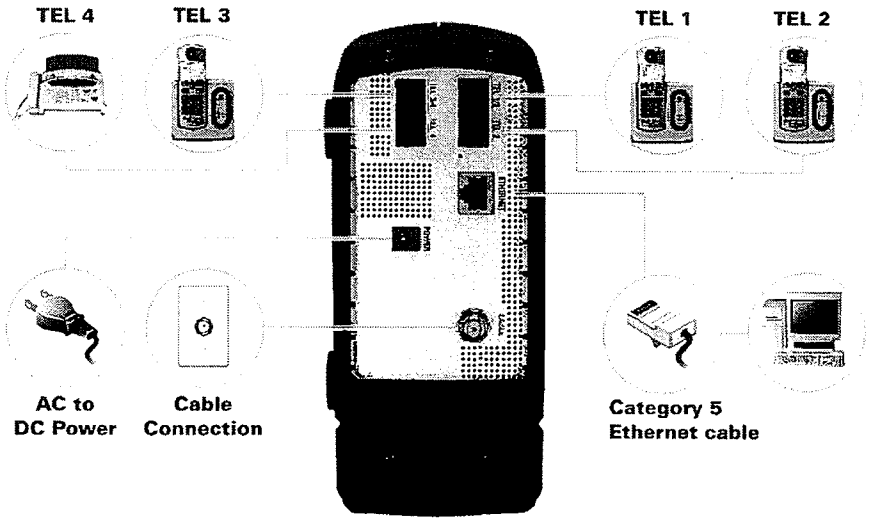
The Features Customers Want

Motorola's SURFboard SBV5322 4-Line Digital Voice Modem offers the features small-office/home-office (SOHO) and small-business customers want:

- Ease of use and simple set-up
- Front-panel, easy-to-read operational status LEDs for power, data activity, and voice status
- Intuitive, built-in Web-based diagnostics for quick and easy troubleshooting
- Up to four lines of full-featured telephone service with support for CLASS services such as caller ID, call waiting, and three-way calling
- Reliable back-up power during power outages from integrated, field-replaceable Lithium-ion batteries
- RJ-14 ports 1 and 3 support lines 1 and 2, 3 and 4 respectively, simplifying wiring (see diagram for illustration)

SBV5322 Installation Diagram





SURFboard SBV5222
4-Line Digital Voice Modem

GENERAL SPECIFICATIONS

Cable Interface	F-connector, female, 75 Ω
Network Interface	10/100 Ethernet
Data Protocol	TCP/IP
Dimensions	20.14 cm H x 17.32 cm D x 6.89 cm W (7.93 in x 6.82 in x 3.5 in)

POWER

Power	4 W (nominal)
Input	
North America	105 to 125 VAC, 60 Hz
Elsewhere	100 to 240 VAC, 50 to 60 Hz

ENVIRONMENT

Operating Temperature	0 °C to 50 °C (32 °F to 122 °F)
Storage Temperature	–30 °C to 80 °C (–22 °F to 176 °F)
Operating Humidity	0 to 95% R.H. (non-condensing)

DOWNSTREAM

Modulation	64 or 256 QAM
Max. Data Rate*	38 Mbps (256 QAM at 5.361 Msym/s)
Bandwidth	6 MHz
Symbol Rates	64 QAM 5.069 Msym/s, 256 QAM 5.361 Msym/s
Operating Level Range	–15 to 15 dBmV
Frequency Range	88 to 860 MHz
Input Impedance	75 Ω (nominal)

UPSTREAM

Modulation	8***, 16, 32***, 64***, 128*** QAM or QPSK
Max. Channel Rate**	30 Mbps
Bandwidth	200 kHz, 400 kHz, 800 kHz, 1.6 MHz, 3.2 MHz, 6.4*** MHz
Symbol Rates	160, 320, 640, 1280, 2560, and 5120*** ksym/s
Operating Level Range	
A-TDMA	8 to 54 dBmV (32 QAM, 64 QAM), 8 to 55 dBmV (8 QAM, 16 QAM) 8 to 58 dBmV (QPSK)
S-CDMA	8 to 53 dBmV (all modulations)
Output Impedance	75 Ω (nominal)
Frequency Range	5 to 42 MHz (edge to edge)

TELEPHONY

Line Type	2-wire
Hook State Signalin	Loop start and ground 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 other low-rate vocoders
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	Quasi-trapezoidal and sinusoidal
Ringing Crest Factor	1.2<CF<1.6
Ring Trip (maximum)	200 mS with 300 W termination

All features, functionality, and other product specifications are subject to change without notice or obligation.

*When comparing download speeds with a traditional 28.8k analog modem. Actual speeds will vary, and are often less than the maximum possible. Upload and download speeds are affected by several factors including, but not limited to, network traffic and services offered by your cable operator or broadband service provider, computer equipment, type of service, number of connections to server, and availability of Internet router(s).

**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 Cable Modem Termination System (CMTS). 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. Your service provider, not Motorola, is responsible for the provision of Voice-over-IP (VoIP) telephony services through this equipment. Motorola shall not be liable for, and expressly disclaims, any direct or indirect liabilities, damages, losses, claims, demands, actions, causes of action, risks, or harms arising from or related to the services provided through this equipment.

Important: Be aware that you will not be able to make any calls using this VoIP device if your broadband connection is not functioning properly. Battery back-up times may vary based on many factors, including the battery age, charging state, storing conditions, and operating temperature, as well as by factors such as data activity and length of active telephone calls.

MOTOROLA

Motorola, Inc. 101 Tournament Drive, Horsham, Pennsylvania 19044 U.S.A. www.motorola.com

543283-001-a 5796 - 0807 - OK

TWCDP Responses to NHTA Set 1 -- Exhibit F

Touchstone®
Multi-Line Telephony Modems TM508A and TM512A

ARRIS

Application

ARRIS is pleased to introduce the Touchstone TM508A and TM512A Multi-line Embedded Media Terminal Adaptors. Designed to support small businesses and multiple dwelling unit (MDU) applications, these products combine 8 (Touchstone TM508A) or 12 (Touchstone TM512A) subscriber line interfaces with one 100BaseT Ethernet port and a high performance DOCSIS 2.0 cable modem in a rack or wall mountable chassis.

Touchstone Multi-line Telephony Modems TM508A and TM512A Offer World Class Features to Deliver the Highest Quality Voice Service

The Touchstone TM512A/TM508A continues ARRIS cable telephony leadership by incorporating the widely deployed Touchstone Telephony Modem TM502 telephone interfaces and call features. Each line interface provides a 48VDC nominal battery feed with 5 REN per line ringing capacity. Configuration options for loop current, loop voltage management, and ringing waveform are available for each line interface.

Enhanced telephony features include auto-adapting FSK/CAS tone levels, dynamic jitter buffers, and G.168 compliant echo cancellation. Advanced signal processing methods provide RFC 2833 compliant DTMF relay, T.38 Fax transmission, three-way calling, call waiting, and caller ID. All these features make the multi-line E-MTA well suited for the demanding needs of small businesses and MDUs.

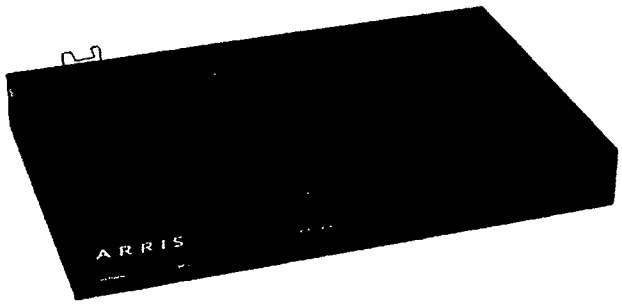
Extensive System Management capability to service the unique needs of small business and MDU markets

Network Operations Center (NOC) support for toll grade small business and multi-line dwelling voice service requires advanced provisioning, performance monitoring, and diagnostics capabilities. The Touchstone TM508A and TM512A address these needs by supporting secure SNMP and a comprehensive suite of IETF, PacketCable™, DOCSIS®, and ARRIS proprietary MIBs.

Provisioned SNMP traps and event reports assure proactive management of the Touchstone TM508A and TM512A operation. Access to text readable provisioning settings, system logs, and diagnostics tools are available through remote Telnet, password protected Command Line Interface (CLI) via Ethernet port, or local device web pages.

PacketCable & Session Initiation Protocol Support

The TM508A and TM512A presently implement PacketCable 1.0 NCS signaling. Future firmware releases will support remote upgrades to comply with SIP and PacketCable 1.5.



- **DOCSIS 1.1 / 2.0 Based**
- **PacketCable 1.0 Compliant**
- **Toll Quality Voice Supplies A Superior Subscriber Experience**
- **Same World-Class Features Available On The Market Leading Touchstone Residential Products**
- **Flexible Provisioning For The Small Business And MDU Market**
- **Extended Temperature Range For Utility Closet Applications**
- **Small One Rack Unit (1RU) Enclosure That Can Be Rack Or Wall Mounted**
- **Over 16 Hours Of Idle Battery Back And Up To 8 Hours Of Battery Back Up With All 12 Lines Off Hook (Via External LPSU) With Telemetry**
- **Future SIP, and PacketCable 1.5 Remote Firmware Upgrade**

Touchstone®
Multi-Line Telephony Modems TM508A and TM512A

ARRIS

Specifications

Physical:	Operating Temperature °F (°C)	32 to 122 (0 to 50)
	Operating Relative Humidity(Min.-Max.)	5-90% (Non condensing)
	Storage Temperature °F (°C)	-40 to 158 (-40 to 70)
	Color	Dark gray
	Dimensions (H x W x D) in.	1.7 x 9.6 x 15.2
	mm	(43 x 244 x 385): - excluding F-connector
	Weight lbs (kg)	~ 6.2 lbs (~2.8kg)
	Diagnostic LEDs	Power, DS, US, Online, Link, Telephone 1-12 (1-8 for TM508)
Interfaces:	RF Interface	External 'F' type connector
	Data Interfaces	10/100 Base-T Ethernet RJ-45
	Telephony Interface	1 RJ-21 supporting 12 Tip/Ring pairs (8 for TM508)
	Input Power (nominal)	100-240 Vac, 60 Hz
	Battery Pack Up Input Power (nominal)	48 VDC
	Average Power Consumption (maximum)	33 Watts
	LPSU Telemetry Interface	AC Power Fail, Replace Battery, Battery Missing, Battery Low
Telephony:	Supervisory Voltage	48 V dc nominal
	Maximum Loop Length to CPE	1500 ft (457M) of 26 AWG (0.4 mm) wire
	Ringing Load Capacity	5 REN MAX / Line 24 REN total / unit
	Provisionable High Loop Current Mode	YES
	Telcordia™ GR 1089 (Lightning and Power Surge) Tested	YES
RF Downstream:	Frequency Range (MHz)	88 - 860
	Modulation (QAM)	64 or 256
	Data Rate (Mbps) (Max.)	30 or 42
	RF Input Sensitivity Level (dBmV)	-15 to 15
	Bandwidth	6 MHz
RF Upstream:	Frequency Range (MHz)	5-42
	Modulation	QPSK, 8 QAM, 16 QAM, 32 QAM, 64 QAM & 128 QAM (S-CDMA only)
	Data Rate (Mbps) (Max.)	up to 30.72
	RF Output Level (dBmV)	
	A-TDMA:	+8 to 54 dBmV (32 QAM, 64 QAM)
		+8 to 55dBmV (8 QAM, 16 QAM)
		+8 to 58 dBmV (QPSK)
	S-CDMA:	+8 to +53 dBmV (all modulations)
	Automatic Level Adjust	Yes
	Gain Control Range (dB)	50
	Frequency Stability (kHz)	±5
	Output Impedance (Ohms)	75
Standards:	Codec: G.711, 64 kbps, μ and A-law encoded speech	
	Enhanced codec firmware support planned (G.726, G.728, G.729, BV16, iBLC)	
	DOCSIS 2.0	
	PacketCable 1.0	
	UL® 60950	
	FCC Part 15 Subpart B Class B	
	CE (IEC 60950) is supported	

Ordering Information

Touchstone Telephony Modem TM512A/NA
NCS, DOCSIS 2.0,
110VAC / 60 Hz Power Input,
N. American Power cord 718059

Touchstone Telephony Modem TM512A/CL
NCS, DOCSIS 2.0
220VAC / 50 Hz Power Input,
Chilean Power cord 718060

Touchstone Telephony Modem TM508A/NA,
NCS, DOCSIS 2.0
110VAC / 60 Hz Power Input
North American Power cord 718108

Touchstone Telephony Modem TM508A/CL
NCS, DOCSIS 2.0\
220VAC / 60 Hz Power Input
Chilean Power cord 718107

Telco Interface Kit
for the TM508 and TM512 multiline EMTA
Kit includes 66 Telco Punch Block,
24 Bridging Clips, Punch Block Cover,
and 10 foot RJ21 cable 719321

Local Power Supply Unit (LPSU) Kit
for TM508 and TM512.
Includes LPSU and LPSU Telemetry Cable 718115K

5 June 2006

TWCDP Responses to NHTA Set 1 -- Exhibit G

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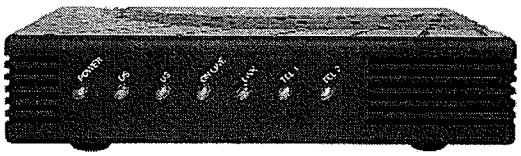
Subscriber Networks

Model DPC2203™ Cable Modem with Embedded MTA

Description



The DPC2203™ Cable Modem (DPC2203) is a high-speed cable modem with an embedded media terminal adapter (EMTA). The DPC2203 features two RJ-11 telephone ports for Voice over Internet Protocol (VoIP) service along with a 10/100BaseT Ethernet port and a USB 1.1 port for high-speed data connectivity.

The DPC2203 is designed to meet PacketCable™ 1.5, PacketCable 1.0, and DOCSIS® 2.0 specifications as well as being backward compatible with DOCSIS 1.1 and DOCSIS 1.0 networks. The DPC2203 uses advanced line-interface technology to provide multi-country, toll-quality, telephone service using existing in-home wiring. The DPC2203 supports full 5 REN phone loading on each phone line (10 REN total).

The DPC2203 fully supports the CODECs specified in PacketCable 1.5. Additional CODECs are available through a software upgrade that includes a high fidelity CODEC option for toll-quality plus service. Standard VoIP call signaling is compliant with PacketCable's (MGCP/NCS) specifications. Software upgrades are available to support Session Initiation Protocol (SIP) call signaling.

Description continued next page

Features

- Designed to meet PacketCable 1.5, PacketCable 1.0, and DOCSIS 2.0 specifications
- Cable modem with an Embedded MTA that provides two lines of voice services
- Toll-quality, high-compression, and high-fidelity (exceeding toll quality) CODEC options
- IPSec and AES-128 encryption options
- Attractive compact design
- Versatile orientation—stands vertically, lies flat on the desktop, or mounts easily on the wall
- WebWizard graphical user interface for simple setup
- Bridged 10/100BaseT auto-sensing/auto-MDIX Ethernet port, and USB 1.1 data port
- Battery backup housing (optional models only) allows standby powering on loss of AC power
- 2200 mAh Li-Ion battery cartridge provides up to 8 hours of battery backup operation per cartridge[1]

[1] The listed battery backup time (8 hours) is the nominal initial time that the battery pack can provide standby power after loss of AC power and after fully charging the battery. Due to variations in individual units, the actual initial standby time can vary +/- 10%. Other factors can also influence battery standby power times such as CPE data activity, variations in DOCSIS traffic, telephone port activity, battery aging, and temperature.

Model DPC2203 Cable Modem with Embedded MTA

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Description, continued

WebWizard

To facilitate setup and troubleshooting, the DPC2203 includes WebWizard—a browser-based user interface. In addition, the LED status indicators on the front panel provide an informative and easy-to-understand display that indicates the cable modem status and real-time data transmission activity.

Battery Backup (Optional)

The DPC2203 can be ordered with or without the capability to provide battery backup powering. Units with battery backup capability are available in housings that have either one or two battery bays. Each bay holds a single, user replaceable, rechargeable Li-Ion battery cartridge that provides backup power in the event of an AC power failure.

Specifications

Voice Specifications	
Call Signaling Protocol	• MGCP/NCS including configurable IPSec encryption. • Configurable to support RFC2833 event signaling • Supports Bell103 detection: Improves alarm panel and Point of Sale (POS) interoperability by optimizing DSP for Bell103 protocol • Software upgradeable to support Session Initiation Protocol (SIP) • The following SIP standards are supported: – RFC 2617 HTTP Authentication: Basic and Digest Access Authentication – RFC 2976 The SIP INFO Method – RFC 3261 SIP: Session Initiation Protocol – RFC 3262 Reliability of Provisional Responses in Session Initiation Protocol (SIP) – RFC 3263 Session Initiation Protocol (SIP): Locating SIP Servers – RFC 3264 An Offer/Answer Model with Session Description Protocol (SDP) – RFC 3265 Session Initiation Protocol (SIP)-Specific Event Notification – RFC 3420 Internet Media Type message/sipfrag – RFC 3428 Session Initiation Protocol (SIP) Extension for Instant Messaging – RFC 3515 The Session Initiation Protocol (SIP) Refer Method – RFC 3842 A Message Summary and Message Waiting Indication Event Package for the Session Initiation Protocol (SIP) – RFC 3892 The Session Initiation Protocol (SIP) Referred-By Mechanism – RFC 3903 Session Initiation Protocol (SIP) Extension for Event State Publication – Draft-ietf-mmusic-sdp-new-24 SDP: Session Description Protocol (Replacement for RFC 2327) – Draft-ietf-sipping-cc-transfer-01 Session Initiation Protocol Call Control – Transfer – Draft-ietf-sip-session-timer-08 The SIP Session Timer – Draft-ietf-sipping-realtimefax-01 SIP Support for Real-time Fax: Call Flow Examples And Best Current Practices – Draft-ietf-mmusic-sdescription-09 Session Description Protocol Security Descriptions for Media Streams – Draft-ietf-sip-replaces-02 The Session Initiation Protocol (SIP) "Replaces" Header

Voice Specifications, continued

Provisioning Modes	• Full PacketCable secure provisioning • Kerberos support with NVRAM ticket caching • Configurable PacketCable-lite (MTA config file provisioning without security) • Configurable for non-PacketCable (MTA configuration using DOCSIS config file)
CODECS	Standard: G.711, T.38 Fax Relay, iLBC, and BV16 Software upgradeable to support other CODEC combinations including: • G.711 and G.728 • G.711 and G.729 • G.711 and G.729 a/e • G.711 and BV16 and BV32 (High fidelity – near CD quality) • G.711 and G.723 • G.711 and G.726
CODEC Packetization Intervals	10 mS, 20 mS, and 30 mS
CODEC Synchronization	CODEC synchronization to UGS time clock allows slip-free end-to-end sync to PSTN clock (minimizes frame slips that can cause Fax/Analog Modem call failures)
CODEC Encryption	Configurable to support AES-128 encryption or no encryption modes
Hearing Impaired Services Support	TDD support including detection of V.18 including Annex A
Fax and Analog Modem support	DSP based Modem/Fax Tone detection and support for Voice Band Data Mode with auto-CODEC negotiation and auto-control of echo canceller, jitter buffer, and voice activation detection (VAD)
Jitter Buffer Support	Adaptive dynamically controlled
Latency Control	Configurable min / max jitter buffer size
Audio Gain Levels	Independently Configurable transmit and receive audio gains
Silence Suppression	Configurable VAD with comfort noise generation
Packet Loss Concealment	ANSI T1.521-1999
Call Connection Quality Monitoring	RTCP, RFC1889, RFC1890, SNMP MIB for last call quality statistics
Dialing Modes	DTMF and configurable pulse dial support
DTMF Relay	RFC2833 including fast (40mS) DTMF Relay for alarm system signaling compatibility
Layer 2 Quality of Service	Full PacketCable secure DQOS with GateID including UGS and UGS/AD DQOS Lite support including UGS and UGS/AD
Layer 3 Quality of Service	Configurable DiffServe/TOS support for Signaling, RTP, and RTCP flows
Payload Header Suppression (PHS)	Supported for RTP and RTCP packet flows to reduce per-call network bandwidth. Advanced support for Dynamic Payload Header Suppression using Propane Technology.
Management	SNMPv3, SNMPv2, Telnet with configurable user ID and password, internal log, and external Syslog support
Echo Cancellation	G.168 with extended echo tail support

Voice Specifications, continued

Call Feature Support	• Caller ID • Call Waiting with Caller ID • Call Conferencing (3-way calls), • Configurable hook flash support • Distinctive Ringing (Configurable for up to 11 ring patterns per phone line) • Ring splash • Stutter dial tone • Off hook warning tone • Open Switch Interval support to enhance answering machine compatibility • Other call features available with compliant CMS or gateway
Telephone Ring Loading	Full 5 REN support on each phone line (10 REN total)
Ring Signal	Configurable balanced ring with configurable DC offset
Max Phone Line Distance	Supports up to 1000 ft of AWG26 wire (0.4mm) on each phone line. Supports operation with typical in-home telephone wiring
Country-Specific Telephone Parameters Supported	United States, Japan, United Kingdom, Germany, France, Belgium, Netherlands, Finland, Italy, Switzerland, Sweden, Denmark, Brazil, ETSI 101 909-18

High Speed Data	
Simultaneous Access	Bridged Ethernet and USB data ports
Cable Modem Access Protection	Software based standby feature disables bridging to the WAN when enabled
Max CPE	Configurable up to 64 CPE devices (1 USB and 63 Ethernet)

RF Downstream	
Frequency Range	88 MHz to 860 MHz
Demodulation	64 QAM or 256 QAM
Maximum Data Rate	30 Mbps for 64 QAM and 43 Mbps for 256 QAM
Bandwidth	6 MHz
Operating Level Range	-15 dBmV to +15 dBmV
Input Impedance	75 ohms

Specifications, continued

RF Upstream	
Frequency Range	5 MHz to 42 MHz 5 MHz to 55 MHz (Japan)
Modulation	QPSK 8 QAM 16 QAM 64 QAM 128 QAM TCM
Maximum Data Rate	5.12 Mbps for QPSK 10.2 Mbps for 16 QAM 30.0 Mbps for A-TDMA and SCDMA
Bandwidth	200 kHz to 6.4 MHz
Operating Level Range TDMA SCDMA	 +8 dBmV to +61 dBmV +8 dBmV to +61 dBmV
Output Impedance	75 ohms

Electrical Specifications	
Input Voltage Standard Housing Housings with battery	 12 VDC 15 VDC
Power Consumption (normal operation)	< 4 watts, on-hook
Data Ports	One (1) RJ-45 Ethernet port, 10/100BaseT (auto-sensing with auto-MDIX) One (1) USB 1.1 Type 2
RF	One (1) Female "F" type
Telephone / Fax	Two (2) RJ-11 supporting single-line and multi-line pinout

Model DPC2203 Cable Modem with Embedded MTA

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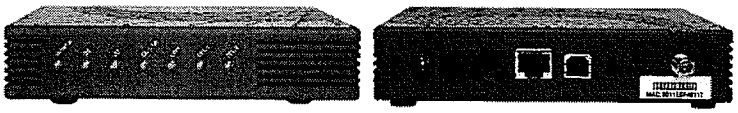
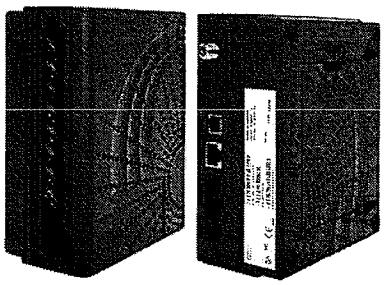
Specifications, continued

Mechanical Specifications	
Dimensions (W x D x H)	(Including "F" connector)
One Battery Housing	5.9 in. x 5.3 in. x 2.625 in. (15 cm x 13.5 cm x 6.5 cm)
Two Battery Housing	6.7 in. x 5.3 in. x 2.625 in. (17 cm x 13.5 cm x 6.5 cm)
Standard Housing	5.9 in. x 5.3 in. x 1.4 in. (15 cm x 13.5 cm x 3.5 cm)
Weight (approximate)	
One Battery Housing	12.6 oz (0.36 kg), no battery
Two Battery Housing	13.5 oz (0.38 kg), no battery
Standard Housing	10.16 oz (0.29 kg)
Battery	Li-Ion, 3 cell, cartridge style battery, 2200 mAh (approximate backup time 8.0 hours per cartridge)
Operating Temperature	32°F to 104°F (0° to 40°C)
Operating Humidity	0-90% RH non-condensing
Storage Temperature	-4°F to 140°F (-20°C to 60°C)

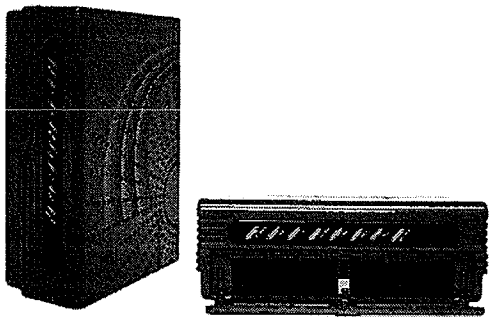
Models Available



Non-battery enclosure



"C" Enclosure
Support for one battery cartridge



"C2" Enclosure
Support for two battery cartridges

Standards and Approvals	
Designed to Comply with the Following Standards	PacketCable 1.5 PacketCable 1.0 DOCSIS 2.0
Other Approvals	WHQL
Regulatory Approvals	Certified as required per country where the DPC2203 will be used

Model DPC2203 Cable Modem with Embedded MTA

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Ordering Information

Contact your Sales Representative for product availability in your area.

Description **"C" Housing with one (1) battery bay**	**Part Number**
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Battery backup housing (1 battery bay, bottom loaded) • 120 VAC / 60 Hz, 15 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • No battery included (battery ordered separately) • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4016431
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Battery backup housing (1 battery bay, bottom loaded) • 120 VAC / 60 Hz, 15 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • No battery included (battery ordered separately) • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers *Time Warner/Bright House configuration*	4013087
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Battery backup housing (1 battery bay, bottom loaded) • 120 VAC / 60 Hz, 15 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4016432
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Battery backup housing (1 battery bay, bottom loaded) • 120 VAC / 60 Hz, 15 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers *Time Warner/Bright House configuration*	4013088

Ordering Information, continued

Description, continued "C" Housing with one (1) battery bay	Part Number
International Configuration – PAL/NTSC	
2-Line VoIP Cable Modem with EMTA for International markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 (PAL/NTSC) • Battery backup housing (1 battery bay, bottom loaded) • 100-240 VAC / 50-60 Hz, 12 VDC / 1A Class 2 In-line switching mode power supply • 2-conductor North American style power cord (NEMA 1-15 to C7 non-polarized) • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4013089
2-Line VoIP Cable Modem with EMTA for International markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 (PAL/NTSC) • Battery backup housing (1 battery bay, bottom loaded) • 100-240 VAC / 50-60 Hz, 12 VDC / 1A Class 2 In-line switching mode power supply • 2-conductor European style detachable power cord (CEE7/16 to C7) • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4013090
2-Line VoIP Cable Modem with EMTA for International markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 (PAL/NTSC) • Battery backup housing (1 battery bay, bottom loaded) • 230 VAC / 50 Hz, 15 VDC / 1A Class 2 in-line linear power supply for Europe attached power cord • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4013793
International Configuration – Japanese Diplexer (5 MHz to 55 MHz/88 MHz to 860 MHz)	
2-Line VoIP Cable Modem with EMTA for Japan. Includes: • PacketCable 1.0 / DOCSIS 2.0 (NTSC Japan and North America) • Battery backup housing (1 battery bay, bottom loaded) • 120-120 VAC / 50-60 Hz, 12 VDC / 1A Plug-in Class 2 linear switching power supply • One (1) 2200 mAh Li-Ion Battery • No USB 1.1 port • Ethernet cable • Paper Japanese user's guide	4016465

Ordering Information, continued

Description **"C2" Housing with two (2) battery bays**	Part Number
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Battery backup housing (2 battery bays, front loaded) • 120 VAC / 60 Hz, 15 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • One (1) 2200 mAh Li-Ion Battery • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4015069

Description **Housing with no battery backup capability**	Part Number
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Standard housing (no battery backup capability) • 120 VAC / 60 Hz, 12 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4011094
2-Line VoIP Cable Modem with EMTA for NTSC markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Standard housing (no battery backup capability) • 120 VAC / 60 Hz, 12 VDC / 1A Class 2 in-line linear power supply for North America with attached power cord • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers *Time Warner/Bright House configuration*	4016466
International Configuration – PAL/NTSC	
2-Line VoIP Cable Modem with EMTA for International markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Standard housing (no battery backup capability) • 100-240 VAC / 50-60 Hz, 12 VDC / 1A Class 2 In-line switching mode power supply • 2-conductor North American style detachable power cord (NEMA 1-15 to C7 non-polarized) • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4011102

Ordering Information, continued

Description, continued Housing with no battery backup capability	Part Number
2-Line VoIP Cable Modem with EMTA for International markets. Includes: • PacketCable 1.0 / DOCSIS 2.0 • Standard housing (no battery backup capability) • 100-240 VAC / 50-60 Hz, 12 VDC / 1A Class 2 In-line switching mode power supply • 2-conductor European style detachable power cord (CEE7/16 to C7) • Ethernet and USB cables • CD-ROM containing user's guide and USB drivers	4013091
International Configuration – Japanese Diplexer (5 MHz to 55 MHz/88 MHz to 860 MHz)	
• PacketCable 1.0 / DOCSIS 2.0 (NTSC Japan and North America) • Standard housing (no battery backup capability) • 120-120 VAC / 50-60 Hz, 12 VDC / 1A Plug-in Class 2 linear switching power supply • One (1) 2200 mAh Li-Ion Battery • No USB 1.1 port • Ethernet cable • Paper Japanese user's guide	4016464

Replacement Parts

AC Power Supplies	Part Number
Linear, Class 2, 15 VDC	
120 VAC / 60 Hz, 15 VDC / 1A In-line linear power supply for North America	4004854
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and CEE7/16 Euro plug power connector	4004855
230 VAC / 50 Hz, 15 VDC / 1A In-line linear power supply with attached cord and BS-1363 style 3-pin UK power connector	4006872
Switching Mode, Class 2, 15 VDC	
100-240 VAC / 50-60 Hz, 15 VDC / 1A Universal power supply	4007274
100-120 VAC / 50-60 Hz, 15 VDC / 1A Plug-in linear switching power supply for North America and Japan	4015454
230-240 VAC / 50-60 Hz, 15 VDC / 1A Plug-in linear switching power supply with Euro style connector	4015455
Linear, Class 2, 12 VDC	
120 VAC / 60 Hz, 12 VDC / 1A In-line linear power supply for North America	749826
230 VAC / 50 Hz, 12 VDC / 1A In-line linear power supply with attached cord and CEE7/16 Euro plug power connector	4002193
230 VAC / 50 Hz, 12 VDC / 1A In-line linear power supply with attached cord and BS-1363 style 3-pin power connector	4004768

Replacement Parts, continued

220 VAC / 60 Hz, 12 VDC / 1A In-line linear power supply with attached cord and power connector for Korea	4004222
220 VAC / 50 Hz, 12 VDC / 1A In-line linear power supply with attached cord and power connector for Argentina	4012871
230 VAC / 50 HZ, 12 VDC / 1A Plug-in linear power supply for Australia	4012872
230 VAC / 50 Hz, 12 VDC / 1A Plug-in linear power supply with CEE7/16 Euro plug power connector	4012345
Switching Mode, Class 2, 12 VDC	
100-240 VAC / 50-60 Hz, 12 VDC / 1A In-line universal switching mode power supply, Class II, C7 AC connector, 2 conductor (power cord not included, order power cord separately)	4009116
100 VAC, 50-60 Hz, 12 VDC /1A Plug-in switching mode power supply	4004856
100-120 VAC / 50-60 Hz, 12 VDC /1A Plug-in linear switching power supply North America and Japan	4015452
220 VAC / 50-60 Hz, 12 VDC /1A Plug-in linear switching power supply for Argentina	4015457
220 VAC / 50-60 Hz, 12 VDC /1A Plug-in linear switching power supply for Korea	4015458
230-240 VAC / 50-60 Hz, 12 VDC /1A Plug-in linear switching power supply with Euro style connector	4015453

Power Cords	**Part Number**
Class 2	
Power cord, 2 conductor, North America, NEMA 1-15 to C7, non-polarized	1002239
Power cord, 2 conductor, Japan, NEMA 1-15 to C7, non-polarized	207586
Power cord, 2 conductor, European, Euro plug CEE7/16 to C7	503414
Power cord, 2 conductor, United Kingdom, BS1363 to C7	1002798
Power cord, 2 conductor, Brazil Euro plug CEE7/16 to C7, INMETRO	4009115
Power cord, 2 conductor, Korea	4010439
Power cord, 2 conductor, Argentina	4012938

Battery Cartridge	**Part Number**
2200 mAh Li-Ion Battery Cartridge	4008300

Cables	**Part Number**
Ethernet cable	740580
USB cable	740579

User's Guide and USB Drivers	**Part Number**
CD-ROM with user's guide and USB drivers	4001911

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