

Multi-Rate DDS CSU/DSU

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October 2002



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Revision C, October 2002

Trademarks

Verilink is a registered trademark Verilink Corporation.

Any named products herein are trademarks of their respective companies.

FCC Requirements

This equipment (Multi-Rate DDS CSU/DSU) has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user is required to correct the interference at his own expense. This device must also accept any interference received, including interference that may cause undesired operation.



For use only with a certified Class 2 power supply. See Power Source in Specifications on page 3.



Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This equipment complies with Part 15 of the FCC Rules. On the rear or bottom of the unit is a label that contains the FCC registration number and other information. If requested, provide this information to the telephone company. Operation is subject to the following two conditions:

- ◆ This device may not cause harmful interference.
- ◆ This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. The user will be required to correct the interference at his own expense.

Notice to Users of DDS service: The following instructions are provided to ensure compliance with FCC Rules, Part 68:

- 1 All direct connections to DDS lines must be made using standard plugs and jacks. An FCC-compliant telephone cord and modular plug is provided with the equipment. This equipment is designed to be connected to the telephone network or premises wiring using a compatible modular jack which is Part 68 compliant.

- 2 Before connecting the unit, inform the local telephone company of the following information:

Port ID	REN/SOC	kbps	FIC	USOC
2.4	6.0 N	2.4	04DU5-24	RJ-48S jack
4.8		4.8	04DU5-48	
9.6		9.6	04DU5-96	
38.4		38.4	04DU5-38	
56		56	04DU5-56	
64		64	04DU5-64	

- 3 If the unit appears to be malfunctioning, disconnect it from the telephone lines until it is determined whether the source of trouble is the equipment or the telephone line. If the equipment needs repair, do not reconnect it until repaired.
- 4 The unit has been designed to prevent harm to the DDS network. If the telephone company finds that the equipment is exceeding tolerable parameters, it can temporarily disconnect service. In this case, the telephone company will provide notice, if possible.
- 5 Under FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of warranty status.
- 6 If the telephone company alters its equipment in a manner that affects the use of this device, it must give warning so that you have the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.
- 7 If the equipment malfunctions, all repairs should be performed by our company or an authorized agent. It is the responsibility of users requiring service to report the need for service to our company or to one of our authorized agents.

Canadian Emissions Requirements

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

Le présent appareil numérique n'émet pas de bruits radioélectriques dépassant les limites applicables aux appareils numériques (de la class A) prescrites dans le Règlement sur le brouillage radioélectrique édicté par le ministère des Communications du Canada.

Notice: The Industry Canada label identifies certified equipment. This certification means that the equipment meets certain telecommunications network protective, operational and safety requirements. The Industry Canada does not guarantee the equipment will operate to the user's satisfaction.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. In some cases, the company's inside wiring associated with a single line individual service may be extended by means of a certified connector assembly (telephone extension cord). The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be made by an authorized Canadian maintenance facility designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Caution: Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Warranty

Verilink's product warranty is provided at the end of this document.

Returning Products

Verilink's policy for product returns is covered in the warranty statement that appears at the rear of this document.

Customer Service

Verilink offers the following services:

- ◆ System Engineers at regional sales offices for network design and planning assistance (800) 837-4546
- ◆ Technical Assistance Center for free 24×7 telephone support during installation, maintenance, and troubleshooting at (800) 285-2755 and support@verilink.com
- ◆ Return Materials Authorization (RMA) (800) 926-0085, ext. 2282
- ◆ Maintenance contracts and leasing plans (800) 837-4546, ext. 206
- ◆ Technical Training on network concepts and Verilink products at (800) 837-4546, ext. 346 and training@verilink.com
- ◆ Web site at www.verilink.com
- ◆ FAX-On-Demand at (800) 957-5465

Safety Precautions

When handling this equipment, follow these basic safety precautions to reduce the risk of electric shock and injury:

- ◆ Follow all warnings and instructions marked on the product and in the manual.
- ◆ Unplug the hardware from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a slightly damp cloth for cleaning.
- ◆ Do not place this product on an unstable cart, stand, or table. It may fall, causing serious damage to the product.
- ◆ This product should be operated only from the type of power source indicated on the marking label and manual. If you are unsure of the type of power supply you are using, consult your dealer or local power company.
- ◆ Do not allow anything to rest on the power cord. Do not locate this product where the cord interferes with the free movement of people.
- ◆ Do not overload wall outlets and extension cords, as this can result in fire or electric shock.
- ◆ Never push objects of any kind into the unit. They may touch dangerous voltage points or short out parts that could result in fire or electric shock. Never spill liquid of any kind on this equipment.
- ◆ Unplug the equipment from the wall outlet and refer servicing to qualified service personnel under the following conditions:
 - ◇ When the power supply cord or plug is damaged or frayed.
 - ◇ If liquid has been spilled into the product.
 - ◇ If the product has been exposed to rain or water.
 - ◇ If the product has been dropped or if the housing has been damaged.

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ABOUT THIS MANUAL

What is a Reference Manual?

This is a reference manual. It provides information about unit installation, configuration, testing and troubleshooting on a function-by-function basis. It is not a user's guide containing step-by-step procedures. This manual contains specific information about a command, menu field, port, etc. Unless otherwise noted, the information in this manual applies only to the Verilink Multi-Rate DDS CSU/DSU (also referred to as the unit.)




Where to go for Information

The chapters and appendices in this manual are arranged for quick reference. It is not necessary to read previous chapters to understand the subsequent chapters.

- 1 General - This chapter introduces the unit, lists the features, and provides specifications.
- 2 Installation and Configuration - This chapter describes unit installation, port and power connections, and switch settings.
- 3 Testing - This chapter describes the indicators, test switch, and loopbacks.

Conventions

The following table lists the conventions used throughout this manual.

Convention	Description
	<i>Notices</i> call attention to important features or instructions.
	<i>Cautions</i> alert you to personal safety risk, system damage, or data loss.
	<i>Warnings</i> alert you to the risk of severe personal injury.
<i>italics</i>	Italics denote <i>new terms</i> or <i>emphasis</i> .
<u>underline</u>	Default settings are underlined.

1

GENERAL

Introduction

The Multi-Rate DDS CSU/DSU is a cost-effective DDS CSU/DSU that allows connecting your computer or other data terminal equipment directly to the digital network without any network access device. The unit transfers data at up to 64 kbps in point-to-point or multipoint applications. It also accepts line rates ranging from 2.4 to 64 kbps and performs asynchronous-to-synchronous conversions.

The Multi-Rate DDS CSU/DSU is powered by an external wall mount power supply. Easy configuration and setup is done using DIP switches. The Multi-Rate DDS CSU/DSU can intelligently respond to V.54 loopbacks initiated from the central office or other equipment.

Features

- ◆ Network connection is RJ-48S
- ◆ Equipment interface is RS-232 presented on a DB-25 connector
- ◆ DDS service termination
- ◆ Subrate capability from 2.4 to 64 kbps
- ◆ Asynchronous-to-synchronous conversion capability
- ◆ V.54 loopback response
- ◆ LED indicators
- ◆ 115 VAC external power supply
- ◆ Space-saving design can be desktop or wall mounted
- ◆ Standard 5-year warranty

Specifications

Network Interface	Line Rate:	2.4, 4.8, 9.6, 19.2, 28, 38.4, 56, and 64 kbps
	Line Code:	AMI
	Line Impedance:	Balanced 135 Ω
	Input Signal:	+1 to -40 dB (ALBO)
	Output Signal:	3.0 V ($\pm 15\%$) base-peak into 135 Ω 1.5 V ($\pm 15\%$) at the 9.6 kbps line rate
	Line Protection:	1000 V lightning, input/output

Mechanical	Mounting:	desktop or wallmount
	Dimensions:	1.25" H, 3.50" W, 5.75" D
	Weight:	1 pound

Power Source External: Input: 115 VAC
Output: 9 VAC, 750 mA

Industry Standards FCC Compliance: Part 15 Class A Subpart B, Part 68
U.S. Safety: UL 1950
Canadian Safety: CSA C22.2 No. 950-95
Industry Canada: CS-03, Issue 8
Bellcore GR-1089-CORE

Environmental Operating Temp: 0° to 50°C (32° to 122°F)
Storage Temp: -20° to 70°C (-4° to 158°F)
Humidity: 95% max (non-condensing)

2


INSTALLATION AND CONFIGURATION


Introduction

This chapter contains information and instructions required to prepare the Verilink Multi-Rate DDSCSU/DSU for use. Included are initial inspection procedures, mounting instructions, configuration guidelines, connection and powering information.

Safety Summary

This manual contains information and warnings that must be followed to ensure safe operation and retain the equipment in a safe condition.

 *This WARNING sign denotes a potential hazard to the operator. It calls attention to a procedure or practice that, if not correctly performed or adhered to, could result in injury or loss of life. Do not proceed beyond a WARNING sign until the indicated conditions are fully understood and met.*

 *Caution: Units are susceptible to damage caused by static electricity. Use ESD (electrostatic discharge) precautionary measures, such as wearing electrostatic grounding straps.*

Unpacking and Inspection

This unit is carefully packaged to prevent damage in shipment. Upon receipt, inspect the shipping container for damage. If the shipping container or cushioning material is damaged, notify the carrier immediately and make a notation on the delivery receipt that the container was damaged (if possible, obtain the signature and name of the person making delivery). Retain the packaging material until verifying the contents of the shipment are complete and the unit has been checked both mechanically and electrically.

If the contents of the shipment are incomplete or, if there is mechanical damage or defect, notify Verilink. If the shipping container is also damaged, or the cushioning material shows signs of stress, notify the carrier of the damage as well as Verilink. Keep the shipping materials for the carrier's inspection. Verilink will arrange for repair or replacement without waiting for claim settlement.

Supplied Materials

The Multi-Rate DDS CSU/DSU is shipped from the factory with the following standard equipment.

- ◆ external AC power supply
- ◆ reference manual
- ◆ adhesive strip
- ◆ phone cable

Wallmount Installation

Using Adhesive Strips

- 1 Select a place close to a 115 VAC outlet with clearance for the signal and power cables. The indicators and switches should be easily accessible.
- 2 Verify the mounting surface is clean.
- 3 Cut the adhesive strip to the desired length and affix the backing of one piece to the underside of the unit.
- 4 Attach the other adhesive strip to the piece on the underside of the unit.
- 5 Remove the backing to expose the sticky surface.
- 6 Press the underside of the unit firmly against the selected place.

Using Screws

- 1 Select a place close to a 115 VAC outlet with clearance for the signal and power cables. The indicators and switches should be easily accessible.
- 2 Vertically place two #6 screws 3-13/32 inches apart at the selected place. Leave the screws out about an eighth of an inch.
- 3 Place the upright unit over the screws until the holes engage and slide the unit down until it locks.

Connections

The Multi-Rate DDS CSU/DSU has three interface connectors: an RJ-48C DDS network connector, a 3-pin power connector, and an RS-232 connector.

DDS Network Connection

The network DDS facility interface is a standard RJ-48C (8-pin) modular jack with the following pinout.

Table 2-1 DDS Network Connection

Pin	Assignment
1	Network Transmit Out
2	Network Transmit Out
3-6	Not Used
7	Network Data In
8	Network Data In

RS-232 Port Connection The RS-232 connector is a standard DB-25 female, configured as a DCE port.

The RS-232 pin assignments are shown in Table 2-2. Only circuits serviced by the unit are listed. All unbalanced bipolar inputs and outputs meet RS-232C physical and electrical specifications. The asynchronous mode is ITU V.22 compliant.

Power Plug the connector from the power supply into the unit. Plug the transformer into an appropriate outlet. This applies power to the unit.

Table 2-2 Equipment Connection

Circuit	RS-232	Signal Function (Note: All other pins are open.)	DCE
101	1	Frame Ground - This circuit is used to terminate shields.	Gnd
102	7	Signal Ground - This circuit is used as the return reference for unbalanced signals.	Gnd
103	2	Transmit Data - This input is used for synchronous TD from the DTE. It is transmitted on the DDS side.	In
104	3	Receive Data - This output is the data decoded from the incoming DDS receive data.	Out
105	4	Request To Send - This input is a control line from the DTE indicating data is to be transmitted. When RTS is On (space), the data transmitter, the zero suppression circuitry, and the CTS are enabled. When RTS is Off, the transmitter sends idle code and the CTS is forced Off.	In
106	5	Clear To Send - This output is a DCE response, indicating that either RTS is On or S1-7, position B, is forcing CTS On. When S1-6 is in position B, RTS and DCD must be On for CTS to be On.	Out
107	6	Data Set Ready - This output is On when the unit is powered.	Out
109	8	Data Carrier Detect (DCD) - This output is On when the correct data or zero suppression code is being received and DSR is On. It is Off when either DSR is Off, the DDS receiver has lost sufficient signal to operate for at least one second, or the receiver has received OOS, OOF, idle, or loop codes for about 20 U.I.	Out
114	15	Transmit Clock - This output is supplied by the DCE as an external DTE timing source. It is generated from the internal data clock or the far end transmit data.	Out
115	17	Receive Clock - This clock output is the timing for the RD and is always used to time the receive data. This clock is always derived from the DDS receive data.	Out

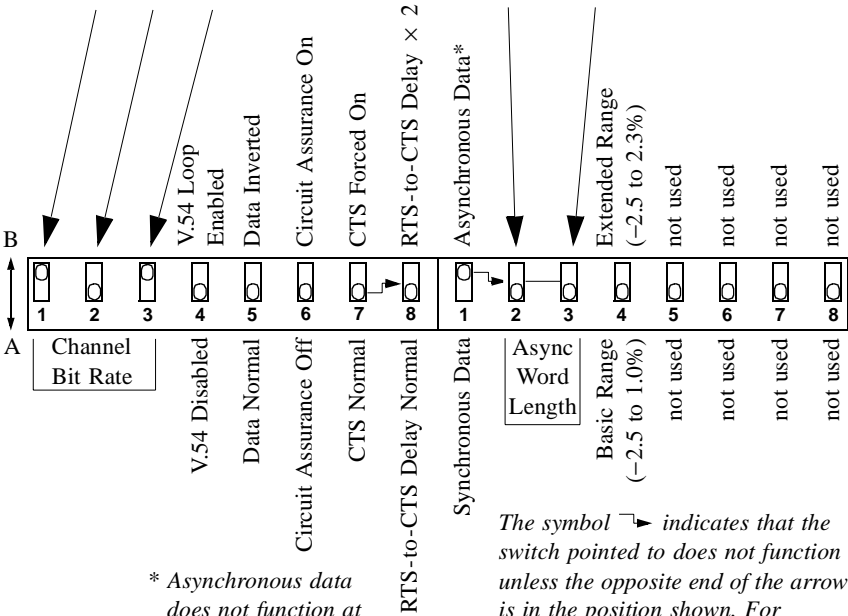
Configuration

This section describes the configuration of the Multi-Rate DDS CSU/DSU. This unit is configured using DIP switches shown in Figure 2-1.

On power up, the unit configures to the hardware settings of option switches SW1 and SW2. Changes to these settings take effect after resetting the unit by removing and then reapplying power. The unit then cycles through its LEDs and reads the new configuration.

Rate (kbps)	SW 1-1	SW 1-2	SW 1-3	RTS-to-CTS Delay (ms)
2.4	B	B	B	8.0
4.8	A	B	B	4.0
9.6	B	A	B	2.0
19.2	A	A	B	1.0
28.0	B	B	A	0.8
38.4	A	B	A	0.5
56.0	B	A	A	0.4
64.0	A	A	A	0.3

Bits	SW2-2	SW2-3
8	A	B
9	B	B
10	A	A
11	B	A



* Asynchronous data does not function at 28, 56, and 64 kbps.

The symbol \curvearrowright indicates that the switch pointed to does not function unless the opposite end of the arrow is in the position shown. For example, SW1-8 functions only when SW1-7 is in the A position.

Figure 2-1 Multi-Rate DDS CSU/DSU Configuration

SW1 and SW2 are two 8-position DIP switches located on the side of the unit. These switches provide the following configuration parameters.

Network Bit Rate Select	Positions SW1-1, SW1-2, and SW1-3 are used to set the network bit rate. Refer to the table shown in the upper left of Figure 2-1 to determine the switch settings for a particular bit rate. RTS-to-CTS delays double when position SW1-8 is in the B position.
V.54 Loop Operation	Position SW1-4 is used to enable or disable V.54 loop operation. A - Disabled B - Enabled
Data Polarity	SW1-5 is used to determine whether data bits are inverted. In the A position, marks equal pulses. In the B position, spaces equal pulses. Receipt of OOF, OOS, idle, or loop codes forces the DSU data to all marks (A position) or spaces (B position). A - Normal B - Inverted
Circuit Assurance	When SW1-6 is in position B, the status of CF (receive line signal detector) and CA (request to send) controls the output CB (clear to send). If either CA or CF is Off, CB is Off. If CA and CF are On, CB is On. A - Off B - On
CTS Control	When SW1-7 is in position B, CTS is forced On regardless of the RTS input status. In the A position, the delays are determined by SW1-8. A - CTS normal B - CTS forced On
RTS-to-CTS Delay	When SW1-8 is in the A position, the RTS-to-CTS delay is as shown in the table shown in the upper left of Figure 2-1. In the B position, the delays double. A - The normal Delay B - Twice the normal delay
Synchronous/Asynchronous Data	When SW2-1 is in the A position, the unit operates in Synchronous mode. This switch must be in position B for switches SW2-2 and SW2-3 to function. When in position B, the unit operates in Asynchronous mode. In Asynchronous mode, data functions at 2.4, 4.8, 9.6, 19.2, and 38.4 kbps. A - Synchronous B - Asynchronous

Asynchronous Word Length Switches SW2-2 and SW2-3 are set to match the number of bits that make in each word of the asynchronous data. Refer to the table shown in the upper right of Figure 2-1.

Signalling Rate Range Switch SW2-4 is set to match the ranges provided by the service provider.

A - Basic (-2.5 to 1.0%) B - Basic (-2.5 to 2.3%)

Not Used Switches S2-5, S2-6, S2-7, and S2-8 are not used.

3

TESTING

Introduction

This chapter describes the diagnostic and test features of the Verilink Multi-Rate DDS CSU/DSU. The unit is controlled manually using DIP switches (the DIP switches are discussed on page 8). The indicators are described below.

Indicators

The unit indicators show major alarm conditions, power, and loop status.

Network This three-color indicator shows the receiver's operating status. Green indicates a signal at the receiver (either customer data or zero suppression). Amber indicates signal is present, but received data is idle or out of service. Red indicates an insufficient signal for the receiver to operate properly.

Tx Data This three-color indicator shows the status of the transmitted data. Green indicates marks. Red indicates spaces. Amber indicates alternate marks and spaces.

Rx Data This three-color indicator shows the status of the received data. Green indicates marks. Red indicates spaces. Amber indicates alternate marks and spaces.

Loop Test This indicator show the loop status of the unit. Amber indicates the unit is in loop mode. When the indicator is Off, the unit is not in loopback.

Loopbacks

This section describes loops that can be initiated on the Multi-Rate DDS CSU/DSU.

Channel Loop This loop (shown in Figure 3-1) is activated by the reversal of the simplex, 20 mA sealing current. This is a unidirectional loop that ignores the DSU transmit data and retransmits the received DDS data. Receive data is unaffected and circuit CF is forced Off.

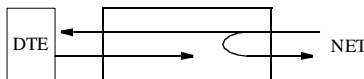


Figure 3-1 Channel Loop (Mandatory Loop)

Data Set Loop (Non-latching) This loop (shown in Figure 3-2) is activated by the receipt of at least four consecutive loop commands and remains looped as long as each third pattern byte is the loop command. It returns to normal operation after at least four pattern bytes that are not the loop command. This is a unidirectional loop that retransmits the DSU received data on the DSU transmit data. Receive data is unaffected and circuit CF is Off.

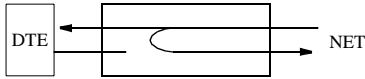


Figure 3-2 Remote Channel Loop (V.54) and Data Set Loop

V.54 Channel Loop This loop is activated by the receipt of the V.54 loop command. This loop is unidirectional and returns the DSU receive data to the DSU transmit data, and subsequently the DDS transmit data. Receive data is unaffected.



Five-Year Hardware Limited Warranty

- I. **Limited Warranty.** Subject to the limitations and disclaimers set forth in this Hardware Limited Warranty, Verilink warrants to the original purchaser ("Buyer") that the Verilink equipment and component parts ("Goods") purchased by Buyer shall be free from defects in material and workmanship under normal use and service for a period of five years from the date of shipment of the Goods to Buyer ("Limited Warranty"). Verilink's sole obligation and Buyer's sole remedy under this Limited Warranty shall be to repair or replace any Verilink Goods that Verilink determines to be so defective. Any claim by Buyer under this Limited Warranty must be presented to Verilink in writing within five years and fifteen (15) days of the date of shipment of the Goods to Buyer, as evidenced by Verilink's packing slip or similar shipment documentation from a Verilink authorized reseller. Any replacement Goods may be new or reconditioned. Verilink reserves the right to substitute equivalent Goods for defective Goods, in its sole discretion. As long as Verilink either so repairs or replaces the Goods, this Limited Warranty will not be found to have failed its essential purpose. If the defect has been caused by accident, misuse or abnormal operating conditions (including lightning damage) occurring after delivery to Buyer, repairs and/or replacement will be made at Buyer's expense. In such event, an estimate of cost will be submitted to Buyer before repair work is started. The Limited Warranty will continue to apply to replaced or repaired Goods for whichever is longer: the 90-day period after the shipment of such Goods to Buyer or the remainder of the original Limited Warranty period.
- II. **EXCLUSION OF IMPLIED WARRANTIES OR OTHER REPRESENTATION.** THE GOODS ARE SOLD BY VERILINK "AS IS" WITHOUT ANY WARRANTY OR GUARANTEE OF ANY KIND OTHER THAN THE LIMITED WARRANTY SET FORTH ABOVE, WHICH IS MADE EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS, IMPLIED OR STATUTORY, AND VERILINK HEREBY DISCLAIMS ANY IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, NONINFRINGEMENT, AND ALL OTHER IMPLIED WARRANTIES ON THE PART OF VERILINK. VERILINK DOES NOT WARRANT THAT THE BUYER'S USE OF THE GOODS WILL BE UNINTERRUPTED, SECURE, OR ERROR-FREE. Buyer agrees that no oral or written representation, advice, advertisement or other statement by Verilink, its reseller, agent, employee, or representative constitutes any warranty, guarantee or modification of the foregoing disclaimer and Limited Warranty, and Buyer acknowledges that no person, including resellers, agents, employees, or representatives of Verilink, is authorized to assume for Verilink any other liability on its behalf except as set forth in this paragraph.
- III. **LIMITATION ON LIABILITY.** IN NO EVENT SHALL VERILINK, ITS OFFICERS, DIRECTORS, EMPLOYEES, OR SUPPLIERS BE LIABLE FOR SPECIAL, CONSEQUENTIAL, EXEMPLARY, INCIDENTAL, OR PUNITIVE DAMAGES (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF PROFITS, BUSINESS INTERRUPTION, DATA LOSS, DAMAGE TO EQUIPMENT, OR THE LIKE), REGARDLESS OF WHETHER THE CLAIM IS BASED ON BREACH OF WARRANTY, BREACH OF CONTRACT, STRICT LIABILITY, OR OTHER LEGAL THEORY, EVEN IF VERILINK OR ITS AGENT WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT WILL VERILINK'S LIABILITY TO BUYER OR ANY SUCCESSOR TO BUYER EXCEED THE PRICE PAID FOR THE APPLICABLE GOODS.
- IV. **LIMITED WARRANTY CONDITIONS.** The Limited Warranty shall be void (i) with respect to any Goods that have been repaired or altered outside Verilink's factory, unless Verilink specifically authorized such repairs or alterations; (ii) in the event parts not made or recommended by Verilink are used by Buyer in the Goods; or (iii) if the Goods are used by Buyer other than in the manner intended by Verilink or other than in conformance with operating instructions and specifications provided by Verilink.
- V. **MODIFICATIONS BY VERILINK.** Minor deviations from specifications that do not materially affect performance of the Goods covered hereby, as mutually agreed upon by Verilink and Buyer, shall not be deemed to constitute a breach of the Limited Warranty. Verilink also reserves the right to discontinue Goods and change specifications for Goods without notice, provided such changes do not adversely affect the performance of the Goods manufactured by Verilink or do not reduce performance below any applicable contract specifications between Verilink and the Buyer. Verilink also reserves the right to make product improvements without incurring any obligations or liability to make the same changes in Goods previously manufactured or purchased. Non-payment of any invoice rendered within the stated payment terms automatically suspends the application of, but not the running of, the Limited Warranty for the duration of the non-payment.
- VI. **AMENDMENT OF WARRANTY TERMS.** These terms and conditions of this Hardware Limited Warranty may be revised by Verilink from time to time in its sole discretion. The terms and conditions in effect at the time of purchase will apply to such Goods.
- VII. **RETURN OF GOODS.** If for any reason the Buyer must return a Verilink product, it must be returned to the factory, shipping prepaid, and packaged to the best commercial standard for electronic equipment. Verilink will pay shipping charges for delivery on return. The Buyer is responsible for mode and cost of shipment to Verilink. The Buyer must have a Return Material Authorization (RMA) number marked on the shipping package. Products sent to Verilink without RMA numbers will be returned to the sender, unopened, at the sender's expense. A product sent directly to Verilink for repair must first be assigned an RMA number. The Buyer may obtain an RMA number by calling the Verilink Customer Service Center at 1.800.926.0085, extension 2282 or 2322. When calling Verilink for an RMA, the Buyer should have the following information available:
 - Model number and serial number for each unit
 - Reason for return and symptoms of problem
 - Purchase order number to cover charges for out-of-warranty items
 - Name and phone number of person to contact if Verilink has questions about the unit(s).A return address will be provided at the time the RMA number is issued. The standard delivery method for return shipments is Standard Ground for domestic returns and International Economy for international returns (unless otherwise specified).
- VIII. **GOVERNING LAW.** This Agreement is governed by the laws of the State of Alabama, U.S.A., without reference to its conflicts of law provisions. The provisions of the UN Convention on Contracts for the International Sale of Goods shall not apply.