

NETROPY[®] 40G

HARDWARE GUIDE



Netropy® 40G Hardware Guide

Hardware Revision: S1

Documentation Version: 3

Printed August 2017

Apposite® Technologies LLC

17835 Ventura Blvd., Suite 211

Los Angeles, CA 91316 USA

1.310.477.9955

info@apposite-tech.com

www.apposite-tech.com

Copyright ©2005-2017 Apposite Technologies LLC. All rights reserved. Apposite, Linktropy, and Netropy are registered trademarks of Apposite Technologies LLC. The Apposite logo and "WAN Emulation Made Easy" are trademarks of Apposite Technologies LLC.

Part No. DOC-HG-40G-S13

CONTENTS

| | |
|--|----|
| 1 Overview..... | 3 |
| 2 Included Items..... | 4 |
| 3 Front and Rear Panels..... | 5 |
| 3.1 Front Panel..... | 5 |
| 3.2 Rear Panel..... | 6 |
| 4 Capacity Limitations..... | 7 |
| 5 Slide Rail Installation..... | 9 |
| 6 QSFP Interfaces..... | 12 |
| 7 Console Interface..... | 13 |
| 8 Apposite Support..... | 14 |
| Appendix A: Specifications..... | 15 |
| Appendix B: Regulatory..... | 16 |
| Federal Communications Commission Notice..... | 16 |
| Canadian Notice / Avis Canadien..... | 16 |
| CE Certification..... | 16 |
| Appendix C: Apposite End User License Agreement..... | 17 |

1 OVERVIEW

This *Netropy 40G Hardware Guide* describes the physical hardware of the Netropy 40G Network Emulator. The companion *User's Guide* describes the installation, configuration, and operation of the Netropy network emulation functionality. A separate *Quick Start Guide* provides a walk-through for first time configuration.



The Netropy 40G contains no user serviceable parts. Opening the chassis voids the warranty. If you believe your unit is not functioning properly, see Section 8 for information on obtaining support.

This guide is for the Netropy 40G hardware revision –S1.

2 INCLUDED ITEMS

The Netropy 40G shipping carton contains the following items:

- ▶ Netropy 40G hardware unit
- ▶ Slide rail kit and rack ear brackets
- ▶ Netropy 40G Quick Start Guide
- ▶ AC power cord (U.S.) quantity 2
- ▶ RS-232 DB9 serial cable

3 FRONT AND REAR PANELS

3.1 Front Panel



The front panel of the Netropy 40G contains:

Power LED: Lit green when the unit is powered on.

Power Button: Press the power button on the front panel to turn the device on or off.

3.2 Rear Panel



The rear panel of the Netropy 40G contains (from left to right):

Redundant Power Input: Dual IEC C14 sockets for redundant power input. U.S. and Canadian customers should use the supplied power cords to connect both sockets to a power outlet. International customers may need to substitute a local power cord with a standard IEC C13 plug. The Netropy 40G handles AC power input from 100 to 240 V. If power is supplied to only one of the power inputs or if one of the power supplies fails, the system will sound an alarm.

CONSOLE: Console interface using RS-232 with a DB9 connector. See Section 7 for a pin-out of the console interface.

MGMT: Gigabit Ethernet interface with a standard RJ45 connector for management of the unit over the network.

PORTS 1 – 2: Two 40 GbE QSFP interfaces. See Section 6 for details. The top LED on each port glows green when link is established. The amber LED below blinks to indicate activity.



Please ensure the space around the fan outlets on the back panel and the air intakes on the side panels remains unblocked to provide adequate airflow and prevent overheating.

4 CAPACITY LIMITATIONS

The Netropy 40G can forward up to 40 Gbps of packets in each direction for an aggregate capacity of 80 Gbps.

Each port can forward packets at a rate of 16 million packets per second (with 64 byte packets) and an aggregate limit of 32 million pps (with 64 byte packets).

These limits apply regardless of whether emulation is on or off. These limits may be reduced depending on the classification methods used.

The maximum one-way latency that the Netropy 40G supports depends on data throughput and packet size. The chart below summarizes a few typical examples for traffic in one direction. To calculate the maximum latency in each direction for traffic in both directions at the listed rate, divide these maximum one-way latencies values in half. The listed values are based on actual data throughput, not path bandwidth settings. Users who need to emulate latencies close to these limits are advised to contact ApPOSITE to discuss their specific requirements. Maximum latencies of over 20 seconds are not specifically listed, but are not limited to 20 seconds and may be much larger than 20 seconds.

The maximum emulation bandwidth may be limited below the hardware capacity by the device's license key. See the *Netropy User's Guide* for more details on the license key.

| Aggregate Throughput | Frame Size (Non-Jumbo Packets) | | |
|----------------------|--------------------------------|-----------|------------|
| | 100 bytes | 500 bytes | 1518 bytes |
| 1 Gbps | >20 sec | >20 sec | >20 sec |
| 10 Gbps | 3.9 sec | 19.7 sec | >20 sec |
| 40 Gbps | ** | 5.1 sec | 15.1 sec |

** Not supported by maximum packet rate

Table 1: Maximum Round-Trip Latency for Standard Sized Packets

| | Frame Size (Jumbo Frames) | |
|----------------------|---------------------------|------------|
| Aggregate Throughput | 1520 bytes | 9220 bytes |
| 1 Gbps | >20 sec | >20 sec |
| 10 Gbps | 5.3 sec | >20 sec |
| 40 Gbps | 1.3 sec | 8.1 sec |

Table 2: Maximum Round-Trip Latency for Jumbo Frames

5 SLIDE RAIL INSTALLATION

1. PREPARATION

SLIDE RAIL COMPONENTS:

- a. 6mm Screws
- b. 6mm Flat Head Screws
- c. 1.2mm Flat Head Screws and Conical Washers
- d. Inner Fixed Chassis Rail (x2 pre-installed)
- e. Additional Chassis Rails with Locking Tab (x2)
- f. Outer Rail, Short Bracket (x2)
- g. Outer Rail, Long Bracket (x2)
- h. Short Brackets (x4)

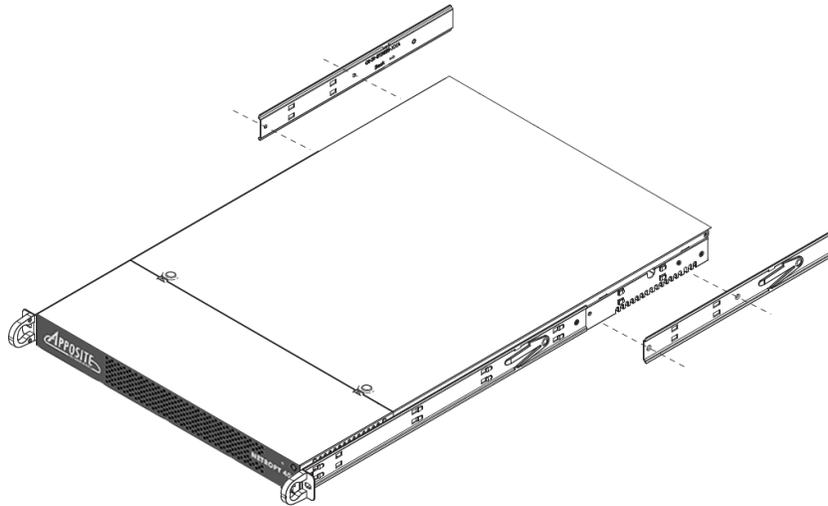
- i. Note: For the installations described below, not all of the supplied components will be needed. Rack screws and cage nuts used to secure the ears to the rack are not included.

TOOLS REQUIRED:

- j. Phillips Screwdriver

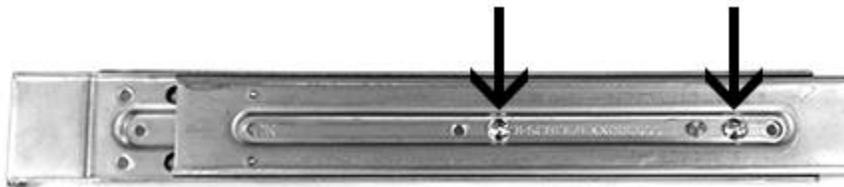
2. Attach Additional Chassis Rails (Optional)

- a. For longer racks, attach an Additional Chassis Rail (E) to the left and right side of the unit using Flat Head Screws (B). For racks shorter than 31", the Additional Chassis Rails if attached will extend out the back of the rack.



3. Installing the Unit into a Four Post Rack

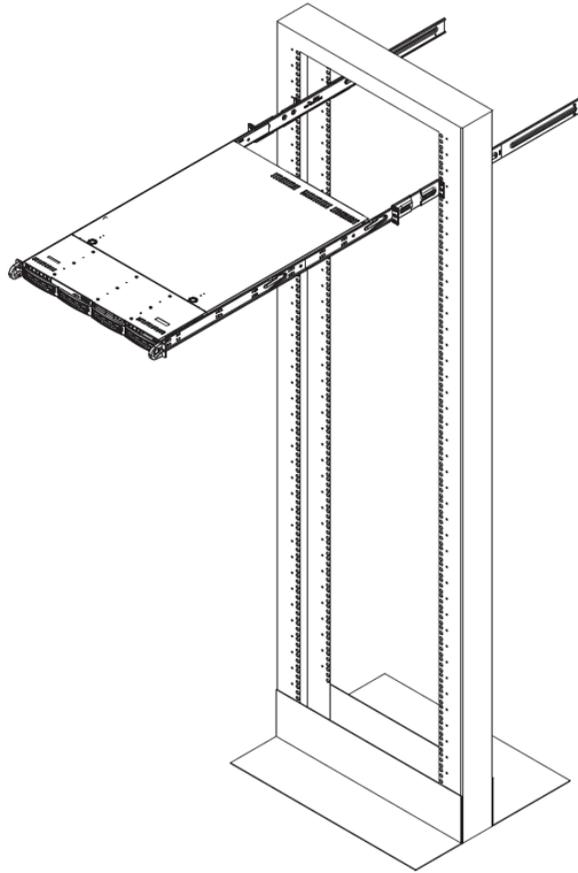
- a. Place the Short Outer Rail Bracket (F) onto the Long Outer Rail Bracket (G). Adjust the length of the rails to fit the size of your rack.
- b. Secure the Outer Rails to your rack using 3 screws in the back and 2 screws in the front (leaving the middle screw hole open.)
- c. Lock the outer rail from sliding using screws (A) in the two threaded holes on each rail as shown.



- d. Carefully slide the inner rails of the chassis into the Outer Rails installed on the rack until they lock into place.
- e. If desired, lock the unit in place with a screw through the front ears.

4. Installing the Unit into a Two Post Rack

- a. Attach a Short Bracket (H) to the middle of both Long Outer Rail Brackets (G) using 2 screws (A) on each.
- b. Secure the middle of the Outer Rail to your rack.
- c. Carefully slide the Inner Rails of the chassis all the way into the Outer Rails attached to the rack. Lock the unit in place with a screw through the front ears.

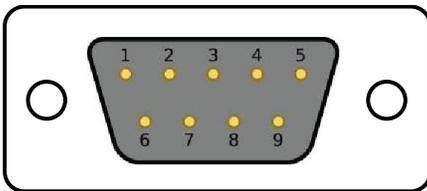


6 QSFP INTERFACES

The Netropy 40G has two QSFP 40 Gbps interfaces. The interfaces accept any standard 40 Gbps QSFP transceivers available from a variety of vendors or from Apposite. Through the use of a QSFP-to-SFP+ adapter (separately available from Apposite), the interfaces can also accept standard fiber and copper 10 Gbps SFP+ transceivers and 1 Gbps SFP transceivers. The interfaces will auto-negotiate to 1G/10G/40G.

7 CONSOLE INTERFACE

Console access to the Netropy 40G is through the RS-232 interface on the rear panel labeled "CONSOLE." A DB9 cable is included with the unit to connect the device to a standard PC serial port. The pin-out for the DB9 connector is shown below:



| Pin | Definition | Pin | Definition |
|-----|------------|-----|------------|
| 1 | DCD | 6 | DSR |
| 2 | RxD | 7 | RTS |
| 3 | TxD | 8 | CTS |
| 4 | DTR | 9 | RI |
| 5 | GND | | |

To connect to the console, use a terminal or a computer running terminal emulation software such as HyperTerminal or PuTTY, and set the following parameters:

- 9600 baud
- 8 data bits
- No parity
- 1 stop bit
- Disable flow control

8 APPOSITE SUPPORT

Netropy units with a product license receive support and maintenance for the term of the license, including hardware warranty, firmware updates, and customer support. The license expiration date for limited term product licenses is shown in the Netropy GUI on the Administration window License Key tab.

For units with an unlimited term license (purchased prior to August 2017), one year of maintenance is included with purchase, after which a yearly maintenance renewal is required for ongoing support. License and maintenance renewals are available from Apposite or your Netropy reseller.

If you believe your unit is not functioning properly and is under warranty, please upgrade to the latest firmware release. If the problem persists, please contact Apposite Support at:

support@apposite-tech.com
1.310.477.9955 ext. 2

When contacting Apposite Support, please include the following information:

- ▶ Netropy model
- ▶ Serial number
- ▶ Your e-mail address and phone number
- ▶ Installed firmware version
- ▶ A detailed description of the problem



Do not attempt to fix any hardware problem yourself. The Netropy 40G contains no user serviceable parts. Opening the chassis voids the warranty.

APPENDIX A: SPECIFICATIONS

| Capacity | | |
|----------------------------|-----------|--|
| Max. Emulation Rate | | 40 Gbps |
| Max. Throughput | | 80 Gbps aggregate |
| Max. Packet Rate | | 32 million packets per second aggregate (64 byte packets) 16 million packets per second in each direction (64 byte packets) |
| Max. Frame Size | | 9 KB |
| Interfaces | | |
| Network | | 2 x QSFP 40 GbE (1G/10G/40G auto-negotiate) |
| Management | | 1 x Gigabit Ethernet (10/100/1000baseT) |
| Console | | 1 x RS-232 DB9 |
| Environmental and Physical | | |
| AC Input Voltage | | Auto ranging 100 VAC to 240 VAC |
| AC Input Frequency | | 50 to 60 Hz |
| AC Input Current | | 1.6 A |
| Power Draw | | 190 Watts |
| Dimensions | Product | 28" D x 17" W x 1.75" H (1 RU) 72 cm D x 44 cm W x 4.4 cm H (1 RU) |
| | Shipping | 34" x 24" W x 8" 87 cm x 61 cm x 21 cm |
| Weight | Product | 25 lbs. (11 kg) |
| | Shipping | 36 lbs. (17 kg) |
| Temperature | Operating | 50° to 95°F (10° to 35°C) |
| | Storage | -40° to 158°F (-40° to 70°C) |
| Humidity | Operating | 20% to 95% (non-condensing) |
| | Storage | 5% to 95% (non-condensing) |
| Certifications | | FCC Class A, CE, RoHS |
| Warranty and Support | | |
| Hardware warranty | | included with product license |
| Support and Maintenance | | included with product license |

APPENDIX B: REGULATORY

Federal Communications Commission Notice

This equipment has been tested and verified 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 instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the user will be required to take whatever measures may be required to correct the interference at their own expense.

Canadian Notice / Avis Canadien

This Class A digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la classe A respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

CE Certification

The product described in this manual complies with all applicable European Union (CE) directives, including EU Directives on Radio Equipment and Telecommunications Terminal Equipment and Restriction of Hazardous Substances (RoHS).

APPENDIX C:

APPOSITE END USER LICENSE AGREEMENT

THIS END USER LICENSE AGREEMENT (“AGREEMENT”) IS A LEGAL AGREEMENT BETWEEN YOU AND APPOSITE TECHNOLOGIES LLC (“APPOSITE”). BY DOWNLOADING, INSTALLING, COPYING, ACCESSING OR USING THIS SOFTWARE, YOU AGREE TO THE TERMS OF THIS AGREEMENT. IF YOU ARE ACCEPTING THESE TERMS ON BEHALF OF ANOTHER PERSON OR COMPANY OR OTHER LEGAL ENTITY, YOU REPRESENT AND WARRANT THAT YOU HAVE FULL AUTHORITY TO BIND THAT PERSON, COMPANY OR LEGAL ENTITY TO THESE TERMS. IF YOU DO NOT AGREE TO THESE TERMS, ARE NOT AT LEAST 18 YEARS OF AGE, OR DO NOT HAVE AUTHORITY TO ENTER THIS AGREEMENT, DO NOT DOWNLOAD, INSTALL, COPY, ACCESS OR USE THIS SOFTWARE, AND PROMPTLY RETURN THIS SOFTWARE AND PROOF OF ENTITLEMENT TO THE PARTY FROM WHOM YOU ACQUIRED THEM.

1. DEFINITIONS.

- a. “Documentation” means published user manuals and other explanatory materials provided by Apposite relating to the Software or the Hardware.
- b. “Hardware” means the Apposite-branded hardware product on which the Software is designed to run.
- c. “Software” means the computer software (regardless of format or media in which distributed) designed to run on the Hardware.
- d. “Modifications” means any applicable upgrades, modified versions, updates, bug fixes, patches, or other modifications to the Software made generally available by Apposite to its customers.
- e. “Product” means the Apposite-branded product comprised of the Hardware, the Software, and the Documentation.
- f. “Legacy Product” means any Product purchased prior to August 1, 2017.
- g. “License Period” means for any Product that is not a Legacy Product, the license period identified on the relevant order form or receipt upon your purchase of the Product or the Software, including any purchased extension thereto.
- h. “Warranty Period” means (a) for any Legacy Product, the period during which you maintain a continuous, active subscription to Apposite maintenance services, or (b) for any Product that is not a Legacy Product, the License Period, unless such Product has a perpetual license, in which case the Warranty Period shall be five (5) years from the date of purchase of the Product from Apposite unless extended by purchase of maintenance services.

2. LICENSE GRANT. Conditioned upon compliance with the terms and conditions of this Agreement, Apposite hereby grants you the following licenses (collectively, the “License”):

- a. With respect to any Product that is not a Legacy Product, for the relevant License Period, a nonexclusive, nonsublicensable, nontransferable license to use the Software and Modifications solely as embedded in the Hardware, and to use the Documentation solely in conjunction with the Software, Modifications, and Hardware; and

- b. With respect to any Legacy Product, a perpetual, nonexclusive, nonsublicensable, nontransferable license to use the Software solely as embedded in the Hardware, and to use the Documentation solely in conjunction with such Software and Hardware, and to use any Modifications released by Apposite and installed on the Hardware during the Warranty Period.

This license is not a sale. The Software may contain open source or third-party software, subject to separate license terms. Acknowledgements, licensing terms and disclaimers for such materials are contained in the Documentation, and your use of such material is governed by their respective terms and not by the License.

3. **OWNERSHIP.** Apposite and its licensors retain ownership of all intellectual property rights in and to the Software and Documentation, including any copies, improvements, enhancements, derivative works and modifications thereof. The Software and Documentation are protected by United States and international copyright and other intellectual property laws and international trade provisions. Your rights to use the Software and Documentation are limited to those expressly granted by this Agreement. No other rights with respect to the Software or any related intellectual property rights are granted or implied.
4. **RESTRICTIONS.** Except as otherwise expressly provided under this Agreement, you shall not directly or authorize any third party to:
 - (i) copy the Software, except as necessary for archival or backup purposes only;
 - (ii) transfer, assign, sublicense, rent, lease, lend, or otherwise transfer your license rights to any other person or entity;
 - (iii) install or use the Software on any computing device other than the Hardware;
 - (iv) modify or adapt the Software or Documentation or create derivative works based upon the Software or Documentation;
 - (v) reverse engineer, disassemble, decompile, decrypt, or otherwise attempt to derive the source code of the Software, except to the extent otherwise expressly permitted under applicable law notwithstanding this restriction; or
 - (vi) remove, alter, cover or obfuscate any of the trademarks, trade names, logos, patent or copyright notices or markings, or add any other notices or markings to or on the Software, Documentation, or Hardware without the express written authorization of Apposite.
5. **SUPPORT.** Apposite shall have no obligation to support the Software except as provided in Apposite's Customer Support Terms and Conditions, which is incorporated by reference into this Agreement.
6. **LIMITED WARRANTY.** Apposite warrants that, for the duration of the Warranty Period, the Hardware will be free of any defects in materials and workmanship under normal use and the Software will perform substantially in accordance with the Documentation. This limited warranty extends only to the original user of the Product. This limited warranty is void if failure of the Hardware or Software to conform to the warranty has resulted from improper installation, testing, misuse, neglect, accident, fire or other hazard, a virus, or any breach of this Agreement. Apposite and its suppliers' entire liability and your sole and exclusive remedy shall be, at Apposite's sole discretion, to: (i) repair the Software or Hardware; (ii) provide replacement Hardware or Software; or (iii) refund the purchase price and terminate this Agreement. This limited warranty applies only if the Product is returned to Apposite, freight and insurance prepaid, in accordance with Apposite's Return Material Authorization (RMA) procedures. Any repaired or replaced Software or Hardware will be subject to this same limited warranty for the remainder of the original Warranty Period or thirty (30) days, whichever is greater. THE FOREGOING LIMITED WARRANTY IS IN LIEU OF ALL OTHER WARRANTIES OR CONDITIONS, EXPRESS OR IMPLIED, AND APPOSITE DISCLAIMS ANY AND ALL IMPLIED WARRANTIES OR CONDITIONS, INCLUDING, WITHOUT LIMITATION, ANY IMPLIED WARRANTY OF TITLE, NONINFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. THIS WARRANTY GIVES YOU SPECIFIC

LEGAL RIGHTS, AND YOU MAY ALSO HAVE OTHER RIGHTS WHICH VARY BY JURISDICTION.

- 7. LIMITATION OF LIABILITY.** REGARDLESS WHETHER ANY REMEDY SET FORTH HEREIN FAILS OF ITS ESSENTIAL PURPOSE, IN NO EVENT WILL APPOSITE OR ITS SUPPLIERS BE LIABLE FOR ANY DAMAGES, INCLUDING WITHOUT LIMITATION, ANY LOST PROFITS, BUSINESS INTERRUPTION, LOSS OF INFORMATION, OR OTHER INCIDENTAL OR CONSEQUENTIAL DAMAGES HOWEVER CAUSED AND REGARDLESS OF THE THEORY OF LIABILITY OR WHETHER ARISING OUT OF THE USE OF OR INABILITY TO USE THE PRODUCT AND EVEN IF APPOSITE OR ITS SUPPLIERS HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN NO EVENT SHALL APPOSITE OR ITS SUPPLIERS' LIABILITY, WHETHER IN CONTRACT, TORT (INCLUDING NEGLIGENCE), BREACH OF WARRANTY, OR OTHERWISE, EXCEED THE PRICE PAID FOR THE PRODUCT. SOME STATES DO NOT ALLOW THE LIMITATION OR EXCLUSION OF LIABILITY FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU. YOU HEREBY WAIVE CALIFORNIA CIVIL CODE SECTION 1542, WHICH SAYS "A GENERAL RELEASE DOES NOT EXTEND TO CLAIMS WHICH THE CREDITOR DOES NOT KNOW OR SUSPECT TO EXIST IN HIS FAVOR AT THE TIME OF EXECUTING THE RELEASE, WHICH, IF KNOWN BY HIM MUST HAVE MATERIALLY AFFECTED HIS SETTLEMENT WITH THE DEBTOR."
- 8. TERM AND TERMINATION.** This Agreement takes effect upon your use of the Software and remains effective until terminated. You may terminate it at any time by destroying all copies of the Software and Documentation in your possession. The licenses granted by Apposite herein will terminate immediately if you fail to comply with any term or condition of this Agreement. You agree on termination of the licenses to cease all use of the Software and Documentation. In addition, the provisions of the sections "U.S. Government Restricted Rights" and "Export" shall survive termination of this Agreement.
- 9. EXPORT.** The Product, including the underlying technology, is subject to U.S. export control laws, and may be subject to export or import regulations in other countries. You may not export or import the Product and the underlying technology, directly or indirectly, in violation of these laws. You agree to comply strictly with all such laws and regulations and acknowledge that you have the responsibility to obtain such licenses to export, re-export, or import as may be required.
- 10. U.S. GOVERNMENT RESTRICTED RIGHTS.** All Software and Documentation provided pursuant to this Agreement qualifies as "commercial computer software" and "commercial computer software documentation" pursuant to FAR 12.212 and DFAR 227.7202. The Software and Documentation are being licensed to U.S. Government end users only as commercial items and with only those rights as are granted to all other end users pursuant to the terms and conditions of this agreement.
- 11. GENERAL PROVISIONS.** This Agreement will be governed by and construed in accordance with the laws of the State of California without reference to its conflicts of law provisions. Any dispute arising out of or relating to this Agreement shall be subject to the exclusive jurisdiction and venue of the courts sitting in Los Angeles, California. This Agreement shall not be governed by either the Uniform Computer Information Transactions Act (UCITA) or the United Nations Convention on Contracts for the International Sale of Goods (CISG), the application of which is expressly excluded. If for any reason a court of competent jurisdiction finds any provision of this Agreement, or any portion thereof, to be unenforceable, the remainder of this Agreement shall continue in full force and effect. This Agreement constitutes the entire agreement between the parties with respect to the Product and supersedes all prior or contemporaneous understandings regarding such subject matter, whether written or oral, and supersedes any conflicting or additional terms contained in any purchase order or elsewhere, all of which terms are excluded. No amendment to or modification of this Agreement are binding unless in writing and signed by Apposite.

Apposite® Technologies LLC

17835 Ventura Blvd., Suite 211

Los Angeles, CA 91316 USA

1.310.477.9955

info@apposite-tech.com

www.apposite-tech.com