Quick Start Guide
DigIO 12x12 DSP

SymNet ™
Audio Matrix

To download the latest version of SymNet Designer, the Windows application that controls all SymNet hardware, go to: www.symetrixaudio.com

What Ships in the Box

☑ A DigIO hardware device.

☑ SymNet Designer CD-ROM (Windows).

☑ A SymLink patch cable.

☑ A ferrite clamp.

☑ A detachable power cord.

☑ This Quick Start Guide.

☑ An RJ-45 Incompatibility Warning sheet.

What You Need to Provide

☑ A Windows PC with 300MHz or higher Pentium and:

- WIN 98SE, ME, 2000 or XP.
- 10-15 MB free storage space.
- 1024x768 graphics capability
- 16-bit or higher colors
- CD-ROM drive or Internet connection.
- 64MB RAM (WIN 98SE/ME), 128MB RAM (WIN 2000/XP).

☑ An available serial port capable of operating at 57.6 or 115.2 kilobaud.

☑ A straight-through RS-232 cable to connect the serial port of your PC to the DigIO's rear RS-232 port. The DigIO's RS-232 input is a female DB-9 connector.

Getting Help

SymNet Designer, the Windows application that controls all SymNet hardware, includes a help module which acts as a complete user's guide for both hardware (including the DigIO) and software. A printable copy is also available at www.symetrixaudio.com.

If you have questions beyond the scope of the help module, contact our Customer Support Group in the following ways:

Tel   (425) 778-7728
           8:00 am to 4:30 pm
           Monday through Friday,
           Pacific Time

Email   tech@symetrixaudio.com

Web   www.symetrixaudio.com

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.
This Class A Digital apparatus meets all requirements of the Canadian Interference-Causing Equipment Regulations
Cet appariel numerique de la classe A respecte toutes les Exigences du Reglement sur le materiel brouilleur du Canada.

Important Safety Instructions.

1. Read these instructions.

2. Keep these instructions.

3. Heed all warnings.

4. Follow all instructions.

5. Do not use this apparatus near water.

6. Clean only with dry cloth.

7. Do not block any ventilation openings. Install only in accordance with the manufacturer's instructions.

8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.

9. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.

10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the apparatus.

11. Only use attachments/accessories specified by the manufacturer.

12. Use only with the cart, stand, tripod, bracket, or table specified by the manufacturer, or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus combination to avoid injury from tip-over.

13. Unplug this apparatus during lightning storms or when unused for long periods of time.

14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug cord is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN

WARNING: TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE

AVIS: RISQUE DE CHOC ELECTRIQUE NE PAS OUVRIR

SEE OWNERS MANUAL. VOIR CAHIER D'INSTRUCTIONS. No user serviceable parts inside. Refer servicing to qualified service personnel. Il ne se trouve a l'interieur aucune piece pourvant entre reparee l'usager. S'adresser a un reparateur compétent.

The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user of the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons. The exclamation point within an equilateral triangle is intended to alert the user of the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product (i.e. this Quick Start Guide).

CAUTION   To prevent electric shock, do not use the polarized plug supplied with the unit with any extension cord, receptacle, or other outlet unless the prongs can be fully inserted.

WARNING To reduce the risk of fire or electric shock, do not expose this apparatus to rain or moisture. Apparatus shall not be exposed to dripping or splashing and no objects filled with liquids, such as vases, shall be placed on the apparatus.

Power Source. SymNet DigIO hardware uses a switching power supply that automatically adjusts to the applied voltage. Ensure that your AC mains voltage is somewhere between 100-240 VAC, 50-60 Hz. Use only the power cord and connector specified for the product and your operating locale. A protective ground connection, by way of the grounding conductor in the power cord, is essential for safe operation. The appliance coupler shall remain readily accessible and operable once the unit is installed.

User Serviceable Parts. There are no user serviceable parts inside the SymNet DigIO. In case of failure, customers inside the U.S. should refer all servicing to the Symetrix factory. Customers outside the U.S. should refer all servicing to an authorized SymNet distributor. Distributor contact information is available online at www.symetrixaudio.com.

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SymNet ™
Audio Matrix

Introduction

The Symetrix SymNet Audio Matrix is a Modular, networkable, audio mixing / routing / processing solution for installed sound systems. Modular and scalable, the SymNet consists of several different hardware modules, which connect to give you a flexible routing and signal processing solution tailored to your needs. Setup is fast and simple using CAD-style control software, SymNet Designer, which runs on a PC connected to the SymNet hardware. SymNet hardware modules are digitally interconnected via SymLink, our low-latency 64-channel digital audio and control bus.

Overview

The DigIO 12x12 DSP is a 1 rack space SymNet hardware device which provides the system with twelve (12) digital audio inputs and outputs in the form of two (2) AES-3 XLR connectors, two (2) optical S/PDIF (TOSLINK) connectors and two (2) HomerLink ports (each of which provides four bi-directional channels of AES-3 format audio over standard CAT-5 which can be broken out to AES-3 XLR connectors or optical S/PDIF connectors via the HomerLink BreakOut boxes). The DigIO is one of the core DSP hardware devices in the SymNet family. It features two (2) 66 MHz SHARC™ processors which manipulate audio with 40-bit floating-point precision with the full suite of DSP processes found in the SymNet Designer application. The DigIO requires SymNet Designer 4.0 or later.

Mechanical Data

Item	Discussion	Remarks
Space Required	1U (WDH: 48.3 cm x 26.7 cm x 4.37 cm / 19 in x 10.5 in x 1.72 in). Depth does not include connector allowance.	Allow at least 1 inch additional clearance for rear panel connections. Additional depth may be required depending upon your specific wiring and connections.
Electrical	100-240 VAC, 50-60 Hz, 25 Watts maximum.	No line voltage switching required.
Ventilation	Maximum recommended ambient operating temperature is 30 C / 86 F.	
Weight	3.27 kg / 7.22 lbs.	

Performance Data

Nominal Sample Rate	48 kHz	**Note:** The DigIO will sample rate convert all inputs within the range of 30-100 kHz to the SymNet nominal system rate of 48 kHz. Sample rate conversion should only be defeated if the source devices are referencing the DigIO's sample clock by way of the WORD CLOCK OUT.
Digital Input Sync Range	30-100 kHz (with Sample Rate Conversion) 48 kHz, +/- 100 ppm and +/- 90 degrees (without Sample Rate Conversion, source phase-locked to DigIO Word Clock output)	
Digital Output Sample Rate	48 kHz +/- 25 ppm	
Sync Output Rate	48 kHz +/- 25 ppm (Word Clock)	
Frequency Response	20 Hz - 20 kHz @ > 44.1 kHz (with Sample Rate Conversion) 20 Hz - 24 kHz @ 48 kHz (without Sample Rate Conversion)	
Input and Output Impedance	110 Ohms, +/- 10% (AES)	
THD + N	N/A (with Sample Rate Conversion) < 0.0003% @ 1 kHz, -1dBfs (with Sample Rate Conversion)	
Dynamic Range	> 120 dB, unweighted (with Sample Rate Conversion) > 144 dB, unweighted (without Sample Rate Conversion)	

Front Panel
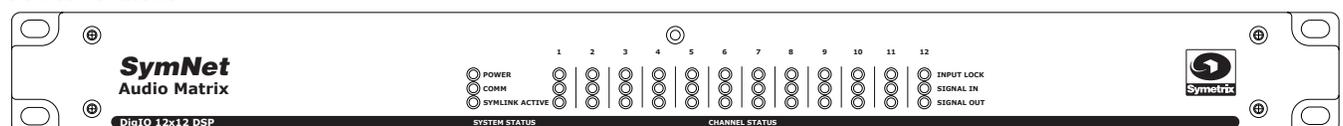
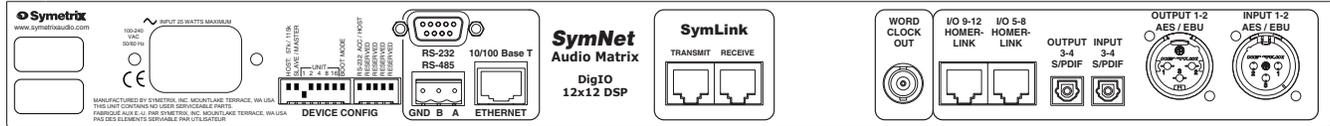| Item	Description	What It Does
POWER	Red LED	Indicates that the unit is powered on.
COMM	Yellow LED	Indicates active communications.
SYMLINK ACTIVE	Green LED	Indicates SymLink bus connection.
INPUT LOCK	Green LEDs	Indicates the presence of a valid digital input source on digital inputs (1-12).
SIGNAL IN	Yellow LEDs	Indicates the presence of audio on digital inputs (1-12).
SIGNAL OUT	Green LEDs	Indicates the presence of audio on digital outputs (1-12).

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Rear Panel

Item	Description	What It Does
POWER INPUT	IEC 3 prong jack	Accepts power from detachable IEC power cable (100-240 VAC, 50-60 Hz, 25 Watts max).
DEVICE CONFIG	8 + 5 DIP switch blocks	Configures the DigIO's device address (1-16) and the DigIO's Master/Slave status as well as the RS-232 host communications baud rate and RS-232 port purpose (Accessory/Host). Device addressing is done in a binary fashion. (See **Device Address Quick Reference**).
RS-232	Female DB9	Serial communications interface with SymNet Designer on the host PC or a 3rd party accessory controller. (Mode is determined by the "RS-232: ACC / HOST" mode switch.)
RS-485	Euroblock	Connects to a Control I/O, ARC-PS, ARC or other Symetrix SymNet family RS-485 controller, wired in parallel (A to A, B to B and GND to GND) using shielded twisted pair.
10/100 Base T	RJ-45	Used for Ethernet control (only when the DigIO is a Ring #1, Address #1 device).
SYMLINK TRANSMIT/RECEIVE	2 x RJ-45	Connects the DigIO to the SymLink ring network providing an ultra-fast 64-channel audio/data backbone. TRANSMIT connects to the next unit in the ring, RECEIVE connects to the previous unit in the ring.
WORD CLOCK OUT	Female BNC	Provides a SymNet system sample clock reference of 48 kHz.
I/O 5-12 HOMERLINK	2 x RJ-45	Transmits 4 AES-3 mono channels and receives 4 AES-3 mono channels over standard CAT-5. Connects to a HomerLink BreakOut.
IN/OUT 3-4 S/PDIF	TOSLINK	Digital inputs and outputs 3-4 in S/PDIF optical format on TOSLINK connectors.
IN/OUT 1-2 AES/EBU	XLR	Digital inputs and outputs 1-2 in AES-3 format on XLR connectors.

System Connection

The DigIO connects to the rest of the SymNet system by SymLink. SymLink is a ring network, unlike Ethernet which uses a hub and spoke topology making a single connection to each device from a hub. Each SymNet hardware device on a SymLink ring has two connections: TRANSMIT and RECEIVE. The TRANSMIT connects to the next device's RECEIVE and the RECEIVE connects to the previous device's TRANSMIT to make a complete ring. When the ring is complete and all connections and device addresses are valid, the SYMLINK ACTIVE LEDs on the fronts of <u>all</u> units will be lit solid green. If any unit's SYMLINK ACTIVE LED is flashing or unlit, it means that the unit is not receiving a valid SymLink connection from the upstream unit. Check the connection and cabling,
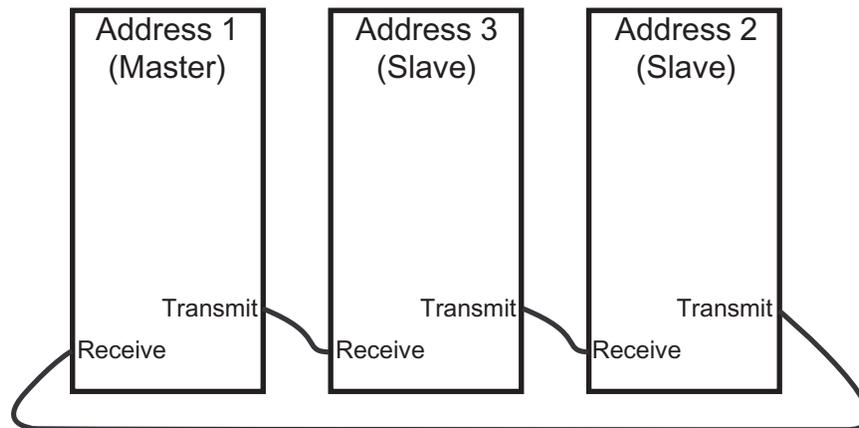
Note: Shielded CAT-5 cables are recommended for SymLink connections and length must be limited to 10 meters each. One shielded SymLink patch cable is included with each hardware device featuring SymLink connections.
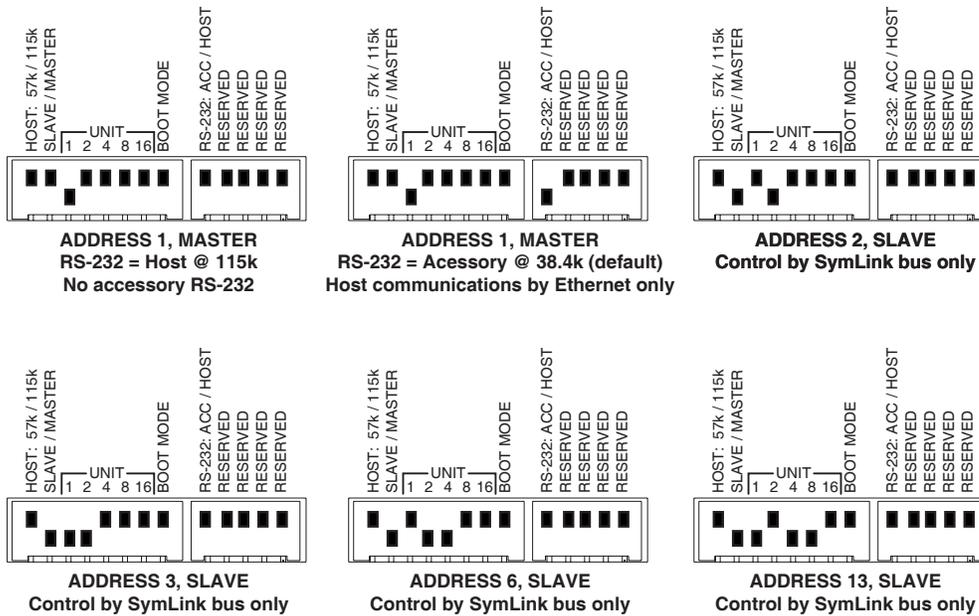
⚠️ **Warning!** The RJ-45 connectors labeled "SYMLINK" should ONLY be connected to other RJ-45 connectors labeled "SYMLINK". NEVER connect "SYMLINK" connectors to any other RJ-45 connectors.

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Device Addressing, Host Communications   **4/7**

Device Addressing

Every SymNet hardware device must be uniquely identified within its ring. A device address of 1 through 16 is available. Address 1 is considered the master unit, all others are slaves. If a device is assigned an address of 1, its DIP switch #2 "SLAVE / MASTER" must be in the "MASTER" position. If a device is assigned an address other than 1 (2-16), its DIP switch #2 must be in the "SLAVE" position. The device addresses of the physical hardware in your system must match the devices as configured in your SymNet Designer Site File. You may use the pictorial diagrams below to quickly set up and understand the device address DIP switches on the DigIO.

DigIO DIP Switch Settings

NOTE: For the sake of space, a small variety of configurations are shown.
A total of 16 devices per ring are possible. Or, in a multi-ring system,
one CobraLink and 15 other devices per ring.

ADDRESS 1, MASTER
RS-232 = Host @ 115k
No accessory RS-232

ADDRESS 1, MASTER
RS-232 = Acessory @ 38.4k (default)
Host communications by Ethernet only

ADDRESS 2, SLAVE
Control by SymLink bus only

ADDRESS 3, SLAVE
Control by SymLink bus only

ADDRESS 6, SLAVE
Control by SymLink bus only

ADDRESS 13, SLAVE
Control by SymLink bus only

Note: Any time the DIP switches are changed, the unit(s) must be power cycled for the changes to take effect.

Host Communications

The host PC (running SymNet Designer) can communicate directly with the DigIO as a stand alone or ring master unit (Ring #1, Address #1) in one of two ways: RS-232 or Ethernet. Otherwise, the host PC communicates with the DigIO indirectly via the SymLink bus like any other slave hardware device.

RS-232:

The DigIO has only one RS-232 port on the rear of the unit, a slight departure from the rest of the SymNet line. As a result, this rear panel RS-232 port sees double duty as both a host PC interface or a 3rd party RS-232 accessory controller interface, but not both simultaneously. The port's purpose is set by DIP switch #9 labeled "RS-232: ACC / HOST". When this switch is set to the "HOST" position, DIP switch #1 determines the baud rate of the RS-232 port (57.6 or 115.2 kilobaud) and this baud rate must match the baud rate chosen in SymNet Designer's Preferences dialog. When DIP switch #9 is set to the "ACC" position, the RS-232 port's baud rate defaults to 38.4k unless changed by the RS-232 Control Protocol or SymNet Designer's Upgrade Firmware dialog.

Ethernet:

The DigIO's 10/100 Base T Ethernet port is available for use regardless of DIP switch #9's position provided that the DigIO is the master unit in a single ring system (device address of Ring #1, Address #1). If for some reason, the DigIO can not be made the master unit in a single ring system, the host PC must connect via RS-232 to the master unit. In a multi-ring system, Ethernet interfacing is done through the CobraLink which also has an Ethernet interface (CobraNet) and must be the ring master.

Note: Ethernet communications settings (IP addresses and access codes) must first be set up from SymNet Designer via the RS-232 port interface. Please see the SymNet Designer online help for further information.

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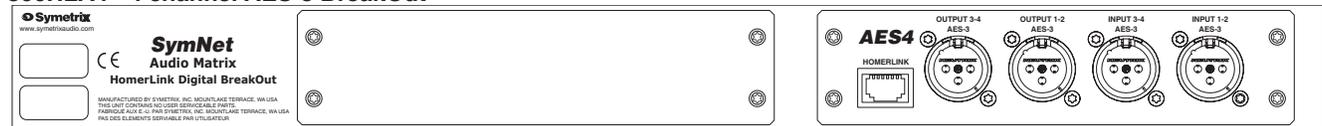
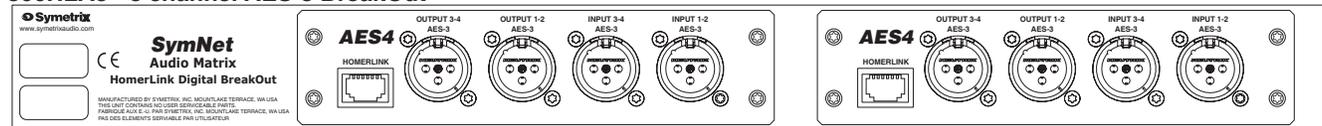## HomerLink, Interconnecting DigIO's with HomerLink   5/7

HomerLink

HomerLink is a data bus format designed by Symetrix which allows 4 mono bi-directional AES-3 digital audio channels to be transmitted between devices up to 100 meters apart over standard CAT-5 cable. The DigIO features two HomerLink ports which provide audio I/O channels 5-8 and 9-12. These two ports can be connected to one of two types of HomerLink BreakOut modules, the AES4 and TOS4. The AES4 provides AES-3 inputs and outputs on 2 pairs of XLR connectors. The TOS4 provides S/PDIF optical inputs and outputs on 2 pairs of TOSLINK connectors. Each HomerLink BreakOut module is a half rack device, and any combination can be fitted side-by-side in a one rack space chassis to provide all remaining DigIO audio I/O channels (5-12) in a single rack space breakout.

⚠️ **Warning!** The HomerLink RJ-45 connectors should ONLY be connected to other like HomerLink RJ-45 connectors. NEVER connect HomerLink connectors to any other RJ-45 connectors.
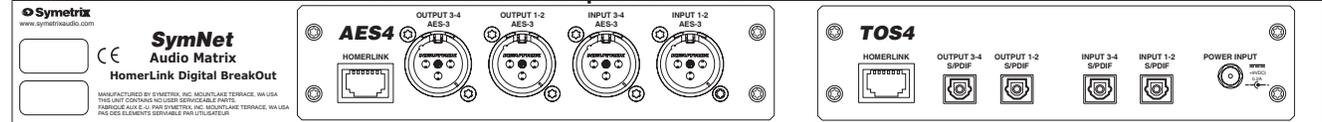
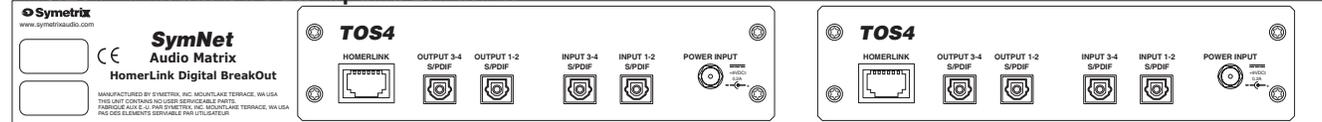### 800HLA4 - 4 channel AES-3 BreakOut

800HLA8 - 8 channel AES-3 BreakOut

800HLAT - 4 channel AES-3 and 4 channel S/PDIF Optical BreakOut

800HLT8 - 8 channel S/PDIF Optical BreakOut

800HLT4 - 4 channel S/PDIF Optical BreakOut

Interconnecting DigIO's with HomerLink

The DigIO's HomerLink connections can be used in scenarios where it is advantageous to share digital audio between two independent rings without CobraNet. Simply add a DigIO to each ring, and connect up to 8 audio channels in each direction via the two HomerLink connectors. A custom HomerLink Double-Crossover cable must be used. This cable swaps both RX pairs with both TX pairs (as opposed to normal Ethernet crossover cables, which only swap one RX/TX pair). Symetrix has available a six inch HomerLink Double Crossover Cable kit, part number 810HLXO which features a male RJ-45 on one end and a female RJ-45 on the other configured with the necessary double-crossover wiring. This adapter kit allows the use of standard CAT-5 cable of needed length to be used when connecting two DigIO's together via their HomerLink ports. (One crossover adapter needed per HomerLink port).

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Software Installation

The SymNet Designer software provides real-time control over multiple audio functions from a Windows 98/2000/XP PC environment.

Use one of the following procedures to install the SymNet Designer on your computer.

From the SymNet Designer CD-ROM:

1. The software should auto run after inserting the CD-ROM into your computer's CD-ROM drive.

2. If the software does not auto run, then Click on the Start button, Run D:\SETUP

    (If your CD-ROM drive isn't D:, then substitute its drive letter)

From the SymNet web site (http://www.symetrixaudio.com):

1. Download the SymNet Designer program file.

2. From the Start button, Run the file/program that you just downloaded to start the Setup program.

The software always starts up in offline mode. Regardless, you can explore the software, experiment to your heart's content, and perhaps even get useful work done. You can save any Sites that you create to a file that can be downloaded later into an operating SymNet system.

If there is a SymNet hardware unit connected, you can download to, and upload from the SymNet system. Once you have a unit connected, you can also work online in real time, which allows you to hear adjustments and settings as you make them.

Using SymNet Designer

Once the installation process is complete, you should have an icon on your desktop, and a program item in the Start menu. Click on the SymNet Designer icon and you're ready to begin.

SymNet Designer is mostly self explanatory. The Configuration Screen represents all SymNet hardware units in a system. Each unit can store up to 1000 presets. Using the tool kit (left-hand) window, you select the SymNet unit that you wish to configure and drag it to the configuration page. Double clicking on the unit opens it, and causes the tool kit to display all the different signal processors available. The tool kit window is context sensitive. It always displays the items that can be placed in the current window. You can use the Browser to navigate to all of the relevant windows opened.

Drag and drop signal processors into the configuration page. Connect them together by clicking on a connection point and moving the mouse in the direction you want the wire to run. Make corners by clicking at the corner and moving off in a new direction. Terminate a wire by clicking on the terminating connection point or by hitting the ESC key or right mouse button. Right click on an existing wire and choose "Start Wire" to make a tee connection.

Once you've completed your design, download it to the SymNet system. Double click on processors on the configuration page to see and change their settings.

Note: There are a lot of useful functions available in the mouse right-click. Explore! That's the ultra-condensed version. You'll find more complete information in SymNet Designer's online help.

Hardware Memory

SymNet saves its settings in internal flash memory, allowing it to recall settings through a power-down/up cycle. Unlike static RAM, the flash memory does not require batteries, and is designed to retain its memory for the life of the product.

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Warranty and Service   7/7

The Symetrix Limited Warranty

Symetrix, Inc. expressly warrants that the product will be free from defects in material and workmanship for eighteen (18) months from the date the product is shipped from the factory. Symetrix's obligations under this warranty will be limited to repairing or replacing, at Symetrix's option, the part or parts of the product which prove defective in material or workmanship within eighteen (18) months from the date the product is shipped from the factory, provided that the Buyer gives Symetrix prompt notice of any defect or failure and satisfactory proof thereof. Products may be returned by Buyer only after a Return Authorization number (RA) has been obtained from Symetrix. Buyer will prepay all freight charges to return the product to the Symetrix factory. Symetrix reserves the right to inspect any products which may be the subject of any warranty claim before repair or replacement is carried out. Symetrix may, at its option, require proof of the original date of purchase (dated copy of original retail dealer's invoice). Final determination of warranty coverage lies solely with Symetrix. Products repaired under warranty will be returned freight prepaid via United Parcel Service by Symetrix, to any location within the Continental United States. Outside the Continental United States, products will be returned freight collect.

The foregoing warranties are in lieu of all other warranties, whether oral, written, express, implied or statutory. Symetrix, Inc. expressly disclaims any IMPLIED warranties, including fitness for a particular purpose or merchantability. Symetrix's warranty obligation and buyer's remedies hereunder are SOLELY and exclusively as stated herein.

This Symetrix SymNet product is designed and manufactured for use in professional and studio audio systems and is not intended for other usage. With respect to products purchased by consumers for personal, family, or household use, **Symetrix expressly disclaims all implied warranties, including but not limited to warranties of merchantability and fitness for a particular purpose.**

This limited warranty, with all terms, conditions and disclaimers set forth herein, shall extend to the original purchaser and anyone who purchases the product within the specified warranty period.

Symetrix does not authorize any third party, including any dealer or sales representative, to assume any liability or make any additional warranties or representation regarding this product information on behalf of Symetrix.

This limited warranty gives the buyer certain rights. You may have additional rights provided by applicable law.

Note: Some Symetrix SymNet products contain embedded software and may also be accompanied by control software intended to be run on a personal computer. Said software is specifically excluded from this warranty.

Limitation of Liability

The total liability of Symetrix on any claim, whether in contract, tort (including negligence) or otherwise arising out of, connected with, or resulting from the manufacture, sale, delivery, resale, repair, replacement or use of any product will not exceed the price allocatable to the product or any part thereof which gives rise to the claim. In no event will Symetrix be liable for any incidental or consequential damages including but not limited to damage for loss of revenue, cost of capital, claims of customers for service interruptions or failure to supply, and costs and expenses incurred in connection with labor, overhead, transportation, installation or removal of products, substitute facilities or supply houses.

Servicing the DigIO

If you have determined that your DigIO requires repair services and you live outside of the United States please contact your local SymNet dealer or distributor for instructions on how to obtain service. If you reside in the U.S. then proceed as follows.

Return authorization

At the Symetrix factory, Symetrix will perform in-warranty or out-of-warranty service on any product it has manufactured for a period of three (3) years from date of discontinued manufacture.

Before sending anything to Symetrix, please contact our Customer Service Department for a return authorization (RA) number. The telephone number is (425) 778-7728. Additionally support is available via E-mail through tech@symetrixaudio.com or via the web site http://www.symetrixaudio.com.

In-warranty repairs

To get your DigIO repaired under the terms of the warranty:
1. Call us for an RA number (have the serial number, shipping and contact information and description of the problem ready).
2. Pack the unit in its original packaging materials.
3. Include your name, address, daytime telephone number, and a brief statement of the problem.
4. Write the RA number on the **outside** of the box.
5. Ship the unit to Symetrix, freight prepaid. We do not accept freight collect shipments.

Just do these five things, and repairs made in-warranty will cost you only one way freight charges. We'll pay the return freight.

If you don't have the factory packaging materials, we recommend using an oversize box. Wrap the unit in a plastic bag, surround it with bubble-wrap, and place it in the box surrounded by Styrofoam peanuts. Be sure there is enough clearance in the box to protect the rack ears. We won't return the unit in anything but Symetrix packaging for which we will have to charge you. If the problem is due to operator misuse or error, you will have to pay for both parts and labor. In any event, if there are charges for the repair, you will pay for the return freight. All charges will be COD unless you have made other arrangements (prepaid, Visa or Mastercard).

Out-of-warranty repairs

If the warranty period has passed, you'll be billed for all necessary parts, labor, packaging materials, and freight charges. Please remember, you must call for an RA number before sending the unit to Symetrix.