



Highlights

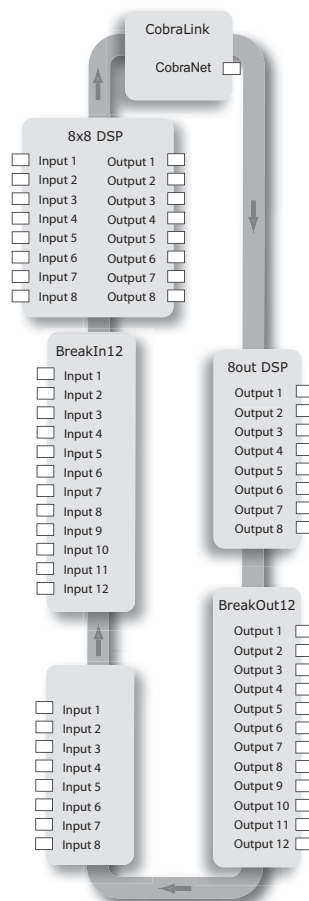
- **Modular, networkable, audio mixing / routing / processing solution for installed sound systems.**
- **CAD-style control software offers unlimited creative possibilities.**
- **Create a wide range of systems by linking any combination of the 4 DSP hardware devices, 2 I/O breakout devices, and a CobraNet interface unit.**
- **Superior audio fidelity delivered by meticulous hardware design and sophisticated signal processing algorithms.**
- **Powerful external control and monitoring features.**

Applications

- **Sports Complexes**
- **Worship Facilities**
- **Performing Arts Venues**
- **Airports**
- **Casinos**
- **Convention Facilities**
- **Cruise Ships**
- **Hotels**
- **Schools, Colleges**
- **Factories**
- **Residences**

The SymLink™ Ring

- **64-channel configurable bus.**
- **Digital audio *and* control data.**
- **Low latency, low emissions.**
- **Up to 16 devices per ring.**
- **Up to 10 meters, box to box.**



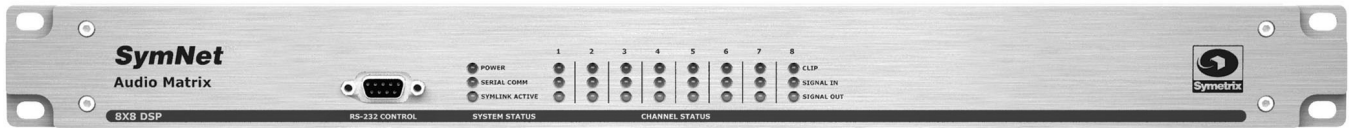
SymNet™ is setting the new standard in audio processing. This modular, networkable, signal processing solution is scalable to fit your exact specifications. DSP-based mixing, routing, and processing of audio ensures total creative freedom and flexibility.

The SymNet Audio Matrix is a general purpose signal processing and routing solution for applications ranging from simple mic mixing and EQ to highly sophisticated routing, specialized signal processing, paging, and loudspeaker management. Create a 24x8 mixer, an 8x32 distribution system, or a 64x64 matrix. Combine up to 16 rooms, each with its own automixer. The modular SymNet hardware expands to meet your needs. The limitations are few.

Seven different models of core audio hardware satisfy a variety of hookup requirements. Choose from DSP-based analog input/output formats, DSP-based digital input/output, analog input/output expanders, and a CobraNet breakout box to create a customized system. Up to 16 of these devices may be networked into a single SymNet 'ring,' maximizing the ultra low latency SymLink™ 64-channel audio bus. SymLink is a standard feature on all core hardware devices, requiring no additional interfacing hardware for basic operation.

SymLink audio buses are defined by the system designer using send and receive modules found in the SymNet Designer control software for Windows™. SymLink also transports control data, enabling the host computer to communicate with all networked units from a single location. Shielded CAT5 cable is used to interconnect all of the SymLink ports, completing the network.

The SymNet Designer™ application serves as the palette for your creativity. The tool box provides the colors. This CAD-style interface offers a complete collection of audio processing tools such as mixers, filters, dynamics, delays, and many more. The control category includes over fifty objects for programming logic, decision trees, and the control interface between SymNet and other hardware components in the system.



The SymNet system is comprised of 7 core rack mount hardware devices (the 8x8 DSP is shown above). The following table provides a comparison of device features:

	8x8 DSP	8in DSP	8out DSP	Break-In12	Break-Out12	Cobra-Link	DigIO 12x12 DSP
DSP processors	4	2	2	-	-	-	2
Analog audio inputs	8	8	-	12	-	-	-
Analog audio outputs	8	-	8	-	12	-	-
Digital audio inputs	-	-	-	-	-	up to 32	12 *
Digital audio outputs	-	-	-	-	-	up to 32	12 *
Analog/binary control inputs	8	8	8	-	-	-	-
Relay outputs	3	3	3	-	-	-	-
Binary outputs (o.c.)	6	6	6	-	-	-	-
RS-485	yes	yes	yes	-	-	yes	yes
RS-232	yes	yes	yes	yes	yes	yes	yes
Ethernet	-	-	-	-	-	yes	yes

* Direct connections to four channels - HomerLink™ BreakOut required for channels 5-12.

SymNet hardware delivers audio fidelity that will please the most discerning ear. From high-headroom, low-noise audio I/O, to the 40-bit floating point processing algorithms, SymNet has been designed for superb sonic performance.

SHARC® Floating Point DSP

DSP units incorporate 66 MHz SHARC floating point processors. Each SHARC delivers 132 MFLOPS (million floating point instructions per second).

Studio Quality A/D and D/A Conversion

All SymNet hardware devices have been designed with studio quality 24-bit A/D and D/A converters.

Software Controlled I/O

Analog input and output trimming is done from the SymNet Designer control screen. There is never any need to go inside the box. All inputs are switchable between mic and line level; there are no optional input cards or outboard mic preamps.

External Control

SymNet hardware offers extensive remote control support including analog control inputs, relay outputs, open-collector outputs, RS-485 and RS-232. (see above table)

External Control Protocol

Almost every SymNet parameter is easily controlled from third party media controllers such as AMX and Crestron. Our clearly documented protocol is quickly implemented.

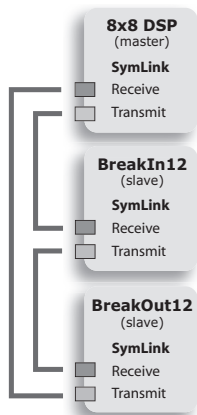
ARC (Adaptive Remote Control)

The ARC is a compact and affordable user panel that provides a wide range of remote control functions for SymNet systems. For instance, a combination audio source selector and zone volume control, a hotel room combining control, or a preset recall for EQ and delay presets in a house of worship, or all of the above. The ARC is completely programmable from within SymNet Designer to address almost any combination of parameters contained within a SymNet configuration.

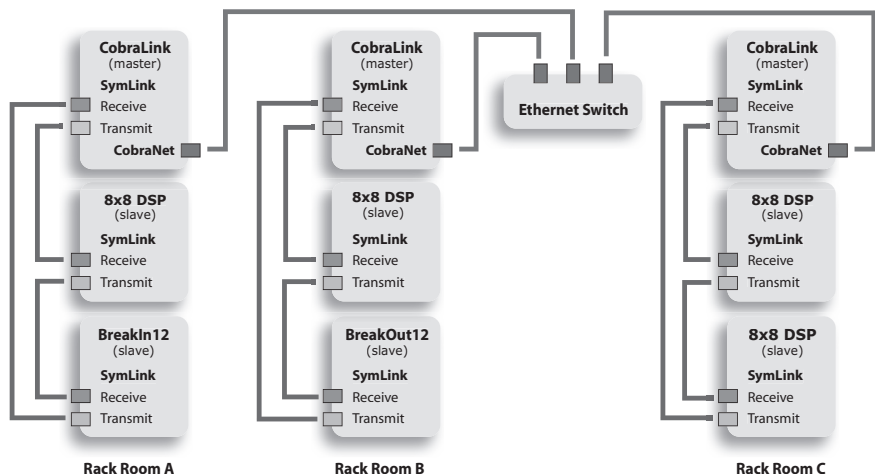


- Low cost.
- Programmable directly from within SymNet Designer.
- Uses standard RS-485 protocol.
- Locally powered (supply included) or remotely powered from any 6-15 volt DC supply or from the ARC-PS rack mount power supply.
- Bright, easy to see alphanumeric LED display.
- Mounts in a standard North American electrical box.

A small system. (single ring)



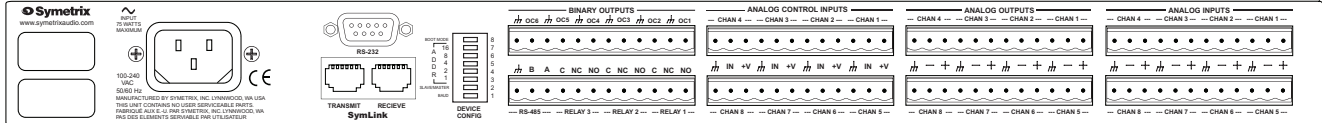
A large venue configuration. (3 rings connected via CobraNet)



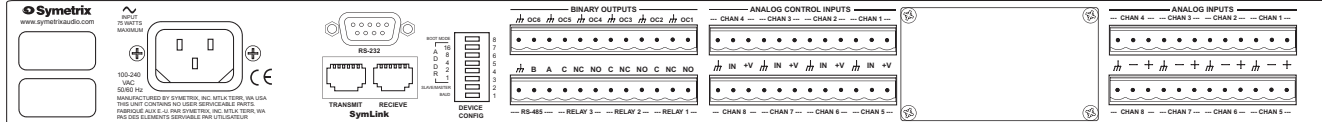
Control I/O is a SymNet system accessory which expands SymNet's control input and output capacity as well as providing a MIDI gateway to SymNet. Low cost generic MIDI controllers can be used for real time or programmed control of almost any SymNet parameter, examples being presets, EQ settings, audio source selection and volume.

Rear Panels

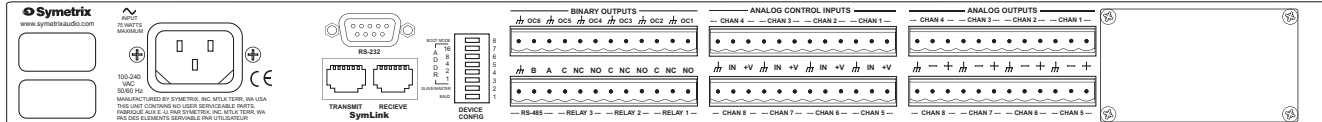
8x8 DSP



8in DSP



8out DSP



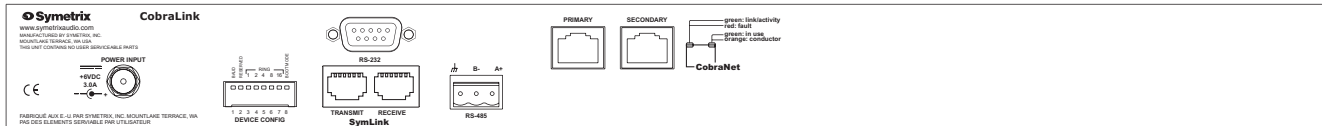
BreakIn12



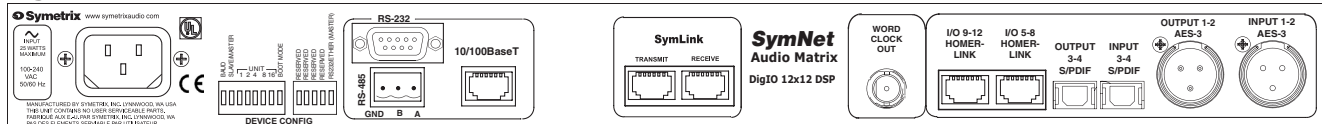
BreakOut12



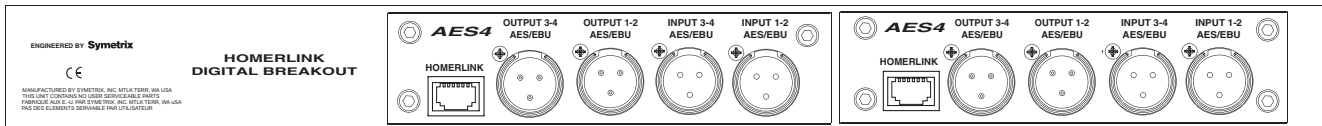
CobraLink



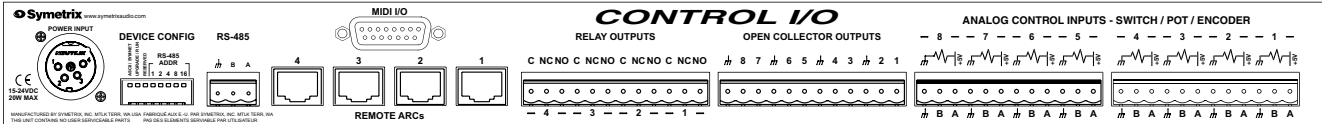
DigIO 12x12 DSP



HomerLink



Control I/O

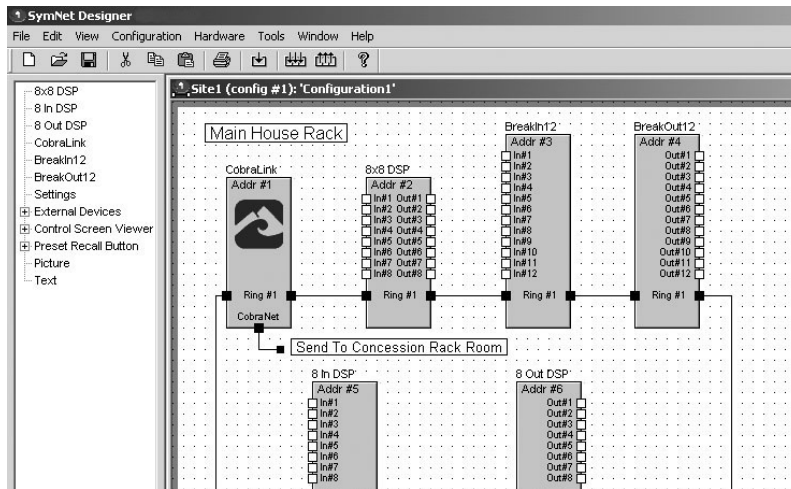


HomerLink BreakOut is an accessory used with the **DigIO 12x12 DSP**. A HomerLink port transmits and receives four channels of 48kHz, 24-bit digital audio, plus control data, over standard CAT5 cable at distances up to 100 meters. HomerLink converts these signals to industry standard AES-3 and/or optical S/PDIF (TOSLINK) digital audio formats supporting up to eight channels of input and output in a 1U chassis. This,

of course, is in addition to the direct connections to 2 channels of AES and 2 channels of S/PDIF found on the DigIO 12x12 DSP unit itself.

Modular packaging supports 5 possible configurations:

8in/8out AES-3	8in/8out optical S/PDIF
4in/4out AES-3	4in/4out optical S/PDIF
4in/4out AES-3 + 4in/4out optical S/PDIF	



SymNet Designer™ is the Windows software used to create designs (routings and DSP settings) that are then downloaded and stored in non-volatile memory in the SymNet hardware devices. SymNet Designer uses CAD technology allowing the user to construct digital audio processes much like electrical engineers design hardware. The combination of 'drag and drop' software with modular hardware offers the greatest degree of flexibility and creativity when executing everything from the simplest to the most complex design concepts.

Design Files are quickly downloaded to the target hardware with a single button press. Once this is done, parameter changes (volume, muting/unmuting, EQ, etc.) can be made in real time from SymNet Designer and/or from external control devices using an easy to understand external control protocol. Once the site design has been downloaded into non-volatile hardware memory the PC may be disconnected, if so desired.

A **Site** is a specific signal routing scheme connecting together various DSP modules and external control devices - analogous to using an analog mixing console patchbay to connect the core mixer to external signal processing devices.

A **Site File Archive** is stored in a protected memory cache within the hardware devices themselves. When changes to the site are required it is not necessary to have the original site file on your PC. All you need is a copy of the version of SymNet Designer under which the site file was created. (All versions are available for a quick and free download from our website at www.symmetrixaudio.com.) When you need to make site adjustments or routing changes, a simple upload procedure 'unzips' the site file to your PC.

Text format **Reports** can be viewed or printed for the entire design. Reports may be customized to selectively include ARC

Programming, Assigned Controls, CobraNet Bundles, Control Screens, Events, Graphics, Modules, Module Settings, Notes, Output Switches, Super-modules, SymLink Buses, Units, and Wire Connections.

The **Event Scheduler** may be used to initiate preset changes and/or trigger contact closures using the internal real-time clock. Any given event may be initiated from a weekly or annual calendar. Automatic adjustment of daylight savings time (DST) is supported.

Presets are snapshots of DSP module settings. Beginning with version 4.0 of SymNet Designer up to 1000 presets may be stored and recalled from SymNet Designer or external controllers.

Control Screens are easy-to-use custom screens that include designer selected controls and indicators (faders, select buttons, meters, etc.), used to save time during system setup and live operation.

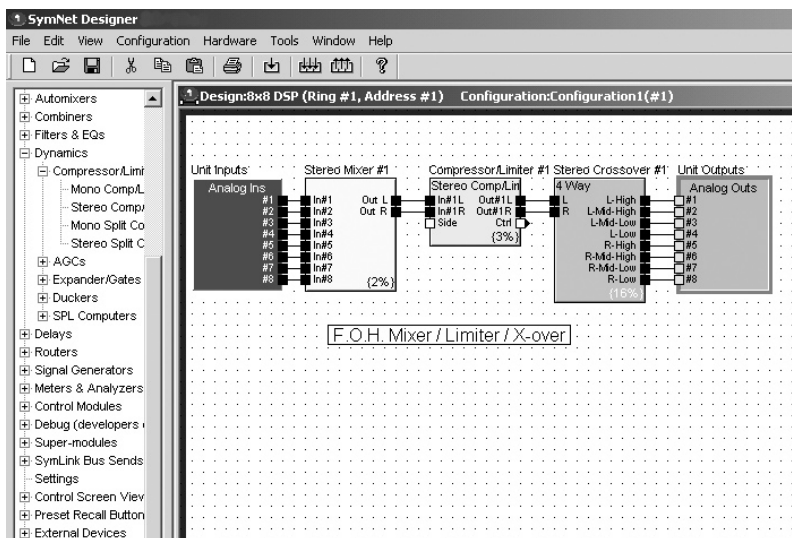
Control screens can also be used as an advanced security feature allowing end user access to selected controls while preventing unauthorized tampering.

Super-modules allow complex multi-processor DSP module designs to be created, labeled and represented as a single module on screen. Super-modules can be placed repeatedly in one or more designs and password protected to allow distribution without revealing design details.

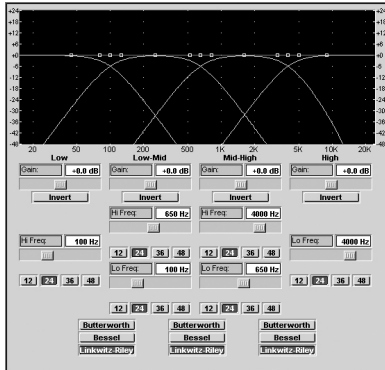
Super-module Control Screens can be associated with specific super-modules allowing the designer to organize and control which super-module parameters are user accessible and which are not.

Control of almost every SymNet parameter, including preset changes, is possible using any of four means as configured from SymNet Designer:

- 1) **Analog Control Inputs** on the back of 8x8 DSP, 8in DSP, and 8out DSP hardware devices. These ports may be interfaced to analog control voltages, binary contact closures, or analog potentiometers.
- 2) Rear panel **RS-232** ports on the SymNet ring master units are intended to connect to third party media control units such as those from Crestron and AMX.
- 3) RS-485 ports on SymNet ring master units are intended to connect to the SymNet ARC (Adaptive Remote Control) and/or the Control I/O, our system control input and output expander unit. Both devices are directly programmable from within SymNet Designer.
- 4) Internal 'control signals' generated from within any SymNet DSP unit can affect any controllable SymNet parameter.



SymNet **DSP Modules** have been designed with an emphasis on creating familiar, intuitive graphic interfaces to facilitate quick and easy setup. Most modules function in both mono and stereo.



Mixers are found in mono, stereo, and LCR configurations. Each channel features a volume fader, plus mute and solo buttons. Clip and signal present LEDs are available for each channel. Stereo and LCR mixers are equipped with pan controls.

Standard and automixer **Combiners** link from 2 up to 16 rooms with the push of a button.

Gain sharing master and slave **Automixers** in 4, 8 or 16 input modules can be linked for very high input channel count applications.

Inline **Mute/Solo/Gains** are provided in groups of up to 16.

Matrixes include cross-point with submix and master output volume controls in sizes from 8x4 to 64x12 which may be connected in combination for even larger matrixes.

Input Selectors allow simple switching between different audio sources. All changes are de-zipped for perfectly smooth transitions.

Three different **Delay** ranges are available. The longest provides up to two seconds of delay time. Single sample precision is supported on the shortest delay modules for driver alignment applications.

The delay modules make use of SymNet's 80 seconds of dedicated SDRAM delay memory and thereby consume an absolute minimum of DSP resources.

Mono and stereo **Parametric EQ** modules have up to 8 bands. Each band features frequency, gain, and Q (bandwidth) controls. A graph of the overall frequency response for all bands gives a visual representation of the EQ's function.

Filters include high and low pass, high and low shelving and a programmable class of filters selectable between Butterworth, Bessel, and Linkwitz-Riley with slopes from 6 to 48dB per octave.

Crossovers include 2, 3, and 4-way, mono or stereo, with slopes from 6 to 48dB per octave and selectable Butterworth, Bessel, and Linkwitz-Riley transfer functions. There is also a mono-summing subwoofer module.

Mono and stereo **Compressors** use sophisticated processing algorithms to deliver ultra fast attack times without sounding 'clicky'. Split band compressors allow independent compression of high and low frequency bands.

Sophisticated **AGC** (automatic gain control) provides smooth, even audio levels. The designer sets his target output level and ratio and the AGC does the rest. Both fast and slow settings are provided to optimize the dynamic characteristics for speech or music.

Gates have adjustable threshold, depth, attack, hold, and release times. Digital switching technology ensures extremely fast

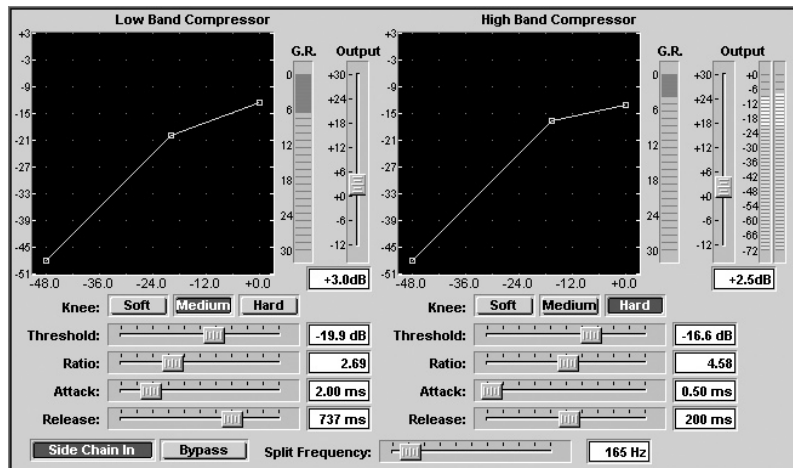
The **Oscilloscope** shows 1, 2, or 4 signals in the same window. It can be used to check for distortion, or to view the actual waveforms at any point. Single capture or continuous triggering are supported.

Noise Generators output pink and white noise.

Tone Generators offer 4 different waveforms: sine, square, triangle, or sawtooth. Sine waves have programmable sweep.

SymLink Bus Send/Receive Modules support up to 64 channels of busing used as audio gateways between the hardware devices on a SymNet ring.

Control Modules include over 50 modules for the design of very adaptable and intelligent control systems to control both audio DSP processes and binary control



attack times without clicks. Use of hysteresis and hold time control eliminates 'chatter'.

Expanders have ratio controls ranging from 1:1 to 20:1. The expander allows either subtle increase in dynamic range or noise gate style operation. A soft knee assures a smooth transition from expansion. Threshold, ratio, attack, and release parameters are provided.

Duckers provide page-over-music control and support the creation of simple or multi tiered priority override systems. Mono and stereo duckers automatically reduce the program level based on a side-chain input. The amount of "ducking" plus the dynamic characteristics (attack, hold, release) of the ducking are fully adjustable.

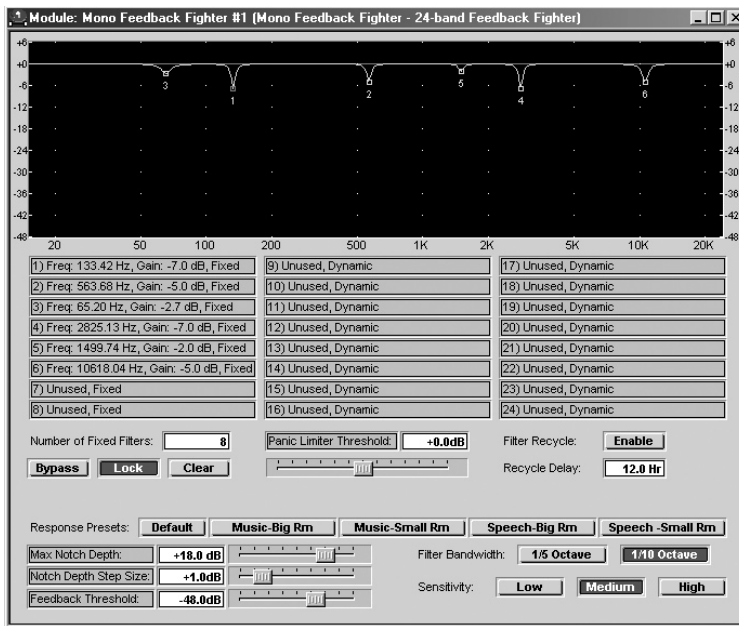
Real time peak responding **Meters** are provided on every input and output. Additional meters may be placed on any signal in the design. A unique feature is the 'Selected Wire' meter. Clicking on any wire displays the signal present on that wire.

outputs. Complex decision making logic, sequenced events, and many custom functions can be implemented with these modules.

VCA and **Switch** modules enable volume control and audio 'patching' by internal and external control sources.

Gap sensing mono and stereo **SPL Computer** modules control system gain in response to changes in ambient noise level.

Output Selectors and **Output Distributors** facilitate easy assignment and routing of mono or stereo input signals to multiple outputs.



The **Feedback Fighter** modules automatically detect and suppress audio feedback with minimal impact on audio quality. The module is able to discriminate between feedback and desired audio. When the presence of feedback is detected, a notch filter is added at the frequency of feedback to attenuate it. When first added, the notch attenuates only slightly. If the feedback remains, the notch is deepened as required to eliminate the feedback. A variety of user parameters are available to fine-tune its operation and sensitivity to feedback.

Filters can be selected as either fixed or dynamic. A fixed filter, once deployed, will remain fixed in frequency. A dynamic filter may be re-used at a different frequency

if all filters are used up. In addition, filters can be locked after ring out to prevent them from changing during a performance. The filter settings can also be copied to a dedicated notch filter module which requires significantly less DSP processing power.

The filter recycle feature allows filters which haven't been adjusted recently to be slowly released. In this way, filters which may have only been needed temporarily can be removed.

Two options are provided for **DSP Optimization**. They determine how the software attempts to arrange DSP processes on the DSP chips to either maximize the amount of DSP processing available or to

minimize the audio delay through the unit. When 'Minimize Routing Delays' is selected, you can additionally choose to enable **Delay Compensation** to time align the outputs on each individual unit.

SymNet Designer enables the system architect to implement several levels of security:

Hardware Security prevents unauthorized computer control of SymNet hardware via serial or Ethernet ports. Access is regulated using a hardware based password entry system. Four security levels can be defined which enable or disable access to critical hardware functionality such as upload, download, and parameter control.

Site File Security (new in version 4.0) protects designs from unauthorized use and can be customized for individual users. An unlimited number of users can be defined and managed. Each user is assigned a security access level and password and can be presented with a specific control screen when he opens and logs into a site file. Access to any control screen can be regulated by defining the required security access levels independently for the features of viewing, using, or changing the control screen. The site file can even be programmed to automatically connect to the hardware for particular users.

Super-module Security provides access to the design of a super-module can be separately password protected. This password protection follows a super-module design through any site file on any computer or SymNet hardware. This allows super-module designers to protect their work while at the same time enabling distribution to multiple users.

Specifications

Common System Wide Specifications

RS-232 host serial I/O	115.2 kbaud or 57.6 kbaud, 8-bit, no parity	Maximum devices per SymLink ring	16
RS-485 serial I/O	38.4 kbaud, 8-bit, no parity	Maximum SymLink rings	31
Sample rate	48 kHz	Maximum stored presets	1000
SymLink cable	Shielded CAT5, maximum device to device length = 10 meters		
HomerLink cable	Unshielded CAT5, maximum length = 100 meters		

	8x8 DSP	8in DSP	8out DSP	BreakIn12	BreakOut12	DigIO12x12DSP
General Specifications						
Processors	4 x Analog Devices SHARC 21065L @ 66 MHz	2 x Analog Devices SHARC 21065L @ 66 MHz	2 x Analog Devices SHARC 21065L @ 66 MHz	-	-	2 x Analog Devices SHARC 21065L @ 66 MHz
Raw processing capacity	264 MIPS, 528 MFLOPS sustained	132 MIPS, 264 MFLOPS sustained	132 MIPS, 264 MFLOPS sustained	-	-	132 MIPS, 264 MFLOPS sustained
Analog control inputs	0-10 volts, DC.	0-10 volts, DC.	0-10 volts, DC.	-	-	-
Recommended external control potentiometer	10k Ohm, linear	10k Ohm, linear	10k Ohm, linear	-	-	-

Specifications

	8x8 DSP	8in DSP	8out DSP	BreakIn12	BreakOut12	Dig IO 12x12 DSP
Physical						
Size (width x depth x height)	48.3 x 21.6 x 4.37cm (19.0 x 8.5 x 1.72 inches)	48.3 x 21.6 x 4.37cm (19.0 x 8.5 x 1.72 inches)	48.3 x 21.6 x 4.37cm (19.0 x 8.5 x 1.72 inches)	48.3 x 26.7 x 4.37cm (19.0 x 10.5 x 1.72 inches)	48.3 x 26.7 x 4.37cm (19.0 x 10.5 x 1.72 inches)	48.3 x 26.7 x 4.37cm (19.0 x 10.5 x 1.72 inches)
Shipping Weight	6 kg (12 lbs)	6 kg (12 lbs)	6 kg (12 lbs)	6 kg (12 lbs)	6 kg (12 lbs)	6 kg (12 lbs)
Electrical						
Power Requirements	100 to 120 VAC, 50-60 Hz, 75W <i>or</i> 200 to 240 VAC, 50-60 Hz, 75W.	100 to 120 VAC, 50-60 Hz, 75W <i>or</i> 200 to 240 VAC, 50-60 Hz, 75W.	100 to 120 VAC, 50-60 Hz, 75W <i>or</i> 200 to 240 VAC, 50-60 Hz, 75W.	100 to 120 VAC, 50-60 Hz, 75W <i>or</i> 200 to 240 VAC, 50-60 Hz, 75W.	100 to 120 VAC, 50-60 Hz, 75W <i>or</i> 200 to 240 VAC, 50-60 Hz, 75W.	100 to 240 VAC, 50-60 Hz, 25W.
Audio						
Converter Types	24-bit Sigma Delta	24-bit Sigma Delta	24-bit Sigma Delta	24-bit Sigma Delta	24-bit Sigma Delta	-
Frequency Response	+/- .25dB, 20-20kHz	+/- .25dB, 20-20kHz	+/- .25dB, 20-20kHz	+/- .5dB, 20-20kHz	+/- .5dB, 20-20kHz	20-20kHz
A/D dynamic range, A-weight	>113dB	>113dB	-	>111dB	-	-
D/A dynamic range, A-weight	>114dB	-	>114dB	-	>110dB	-
Input to output dynamic range	-	-	-	-	-	144dB (SRC disabled), >120dB (SRC enabled)
Total THD+Noise @1kHz, -1dBFS	<0.005%	<0.003%	<0.003%	<0.003%	<0.0025%	N/A (SRC disabled), <0.0003% (SRC enabled)
Delay memory	80 seconds	40 seconds	40 seconds	-	-	40 seconds
Input impedance, bal.	6.67k Ohms	6.67k Ohms	--	6.67k Ohms	-	(AES) 110 Ohms
Output impedance, bal.	204 Ohms	-	204 Ohms	-	204 Ohms	(AES) 110 Ohms
Maximum input level	+24dBu	+24dBu	-	+22dBu	-	0dBfs (24-bit)
Maximum output level	+24dBu, 100k Ohms	-	+24dBu, 100k Ohms	-	+24dBu, 100k Ohms	0dBfs (24-bit)
Maximum output level	+21dBu, 600 Ohms	-	+21dBu, 600 Ohms	-	+21dBu, 600 Ohms	-
Mic pre-amp EIN (equivalent input noise), 22-22kHz, A-weighted	-129dBu, typical	-129dBu, typical	-	-128dBu, typical	-	-
Phantom power (per input)	+48v, 10ma	+48v, 10ma	-	+48v, 10ma	-	-
Input CMR, 60 Hz	>70dB	>70dB	-	>70dB	-	-
Channel separation, 1kHz	>100dB, in thru out	>102dB	>105dB	>110dB	>112dB	-

Control I/O	
Analog or binary control inputs	x8
Open collector outputs	x8
Control relays	x4
RS-485	x1
MIDI in/out (via DB-15)	x1
ARC ports	x4
Physical	48.3 x 15.6 x 4.37cm (19.0 x 6.1 x 1.72 inches)
Power	External supply (included), 100 to 120 VAC, 50-60 Hz, 20W <i>or</i> 200 to 240 VAC, 20W.

CobraLink	
Maximum audio input channels	32
Maximum audio output channels	32
Dynamic range	120dB
RS-485	x1
Physical	48.3 x 21.6 x 4.37cm (19.0x 8.5 x 1.72 inches)
Power	External supply (included), 100 to 120 VAC, 50-60 Hz, 20W <i>or</i> 200 to 240 VAC, 50-60 Hz, 20W.

HomerLink BreakOut	
Physical	1U
Interconnect cable	CAT5
AES4 Module	
AES-3 inputs	x2
AES-3 outputs	x2
Power	none
TOS4 Module	
TOSLINK inputs	x2
TOSLINK outputs	x2
Power	External supply (included), 100 to 120 VAC, 50-60 Hz, <i>or</i> 220 to 240 VAC.

SymNet Boot Camp

Symetrix is highly committed to the development and support of our rapidly growing SymNet Audio Matrix product line. We invite qualified sound contractors and consultants to attend the SymNet Boot Camp held at our headquarters in Mountlake Terrace, WA (just outside of Seattle). These training sessions are conducted by veteran SymNet product specialist Michael Worona who has provided applications assistance and SymNet training to hundreds of contractors and consultants throughout the US, Canada, Europe and Asia.

During the two day session Michael will give you personal and in depth instruction providing a solid foundation for the installation of SymNet hardware and the use of the SymNet Designer Windows™ application.

To register please contact Michael Worona directly at (425) 778-7728 (extension 240) or mworona@symetrixaudio.com.

For More Information

If you're interested in learning more about the SymNet family of products then here are some suggestions:

- **Install SymNet Designer**

From our website (www.symetrixaudio.com) download the latest version of SymNet Designer to your PC. Install and launch the application and use the comprehensive online help module (F1) to answer your questions about SymNet hardware devices and the SymNet Designer Windows application itself.

- **Explore Our Website**

In the SymNet section of our site there are a number of helpful items you can browse or download. They include:

- Application Files
- Frequently Asked Questions
- A User Forum
- Links
- Print Format User Guides
- RS-232 Serial Control Protocol
- Technical Bulletins
- AutoCad Drawings
- Interactive Web Games (just kidding)

- **Call us**

(425) 778-7728
(8:00AM - 4:30PM, Pacific Time)

- **E-mail us**

sales@symetrixaudio.com

Service and Support

- **Call us**

(425) 778-7728
(8:00AM - 4:30PM, Pacific Time)

- **E-mail us**

tech@symetrixaudio.com

(Before calling or E-mailing you can help speed the support process by making note of your hardware serial numbers, the version of SymNet Designer you are using, and the firmware revisions you have downloaded to hardware.)

Engineered by Symetrix

Local Contact