

THE SYMETRIX 402 DUAL OUTPUT DELAY IS A 1-INPUT, 2-OUTPUT digital delay intended for acoustical alignment of distant speaker systems, video post production, and other applications requiring top-notch audio performance. In many sound systems, the 402 is necessary due to the delay caused by distance when multiple speakers are spread throughout a large room. In any multi-path situation, large or small, the different arrival times for sound arriving at the listener's ears via the main speakers and "fill" speakers can greatly reduce the audio quality of the program. The 402 allows you to delay the remote speakers to match the time it takes for the signal coming from the main speakers to reach the listener positioned near the remote speakers.

This way, the two signals (delayed remote speakers and non-delayed front speakers) arrive at the listener at the same time. This improves intelligibility and helps focus the listener's attention to where the sound is really coming from. The 402 may be used wherever quiet, distortion-free delay is needed: churches, auditoriums, theaters, concert halls, stadiums, and large meeting rooms.

In video post applications, use the 402 to keep your audio tracks "in-sync" with your video. Every time you pass your video signal through a frame synchronizer, digital effects generator, time base corrector, or other digital signal processor, the video is delayed one frame relative to the associated audio tracks. Use the 402 in "Frame" mode to correct this problem.

What sets the 402 apart from other delays is the meticulous attention paid to superb audio performance specs. A 64-times oversampling 20-bit A/D converter feeds the signal through a 20-bit digital delay line. The two delayed outputs return through 20-bit D/A converters for total system dynamic range exceeding 100 dB. To further optimize noise performance, the 402 provides a 12-segment input headroom meter which makes it extremely simple for the user to optimize input level settings. Simply put, the sound of the 402 is transparent enough for even the most demanding applications—better than CD quality to say the least.

Setting the delay times of the two outputs is a snap. The user first selects which output to adjust and then either increases or decreases the delay time with the push of a button. A bright seven-segment LED displays the delay time. Delay times are displayed in milliseconds, feet, or meters. If desired, the user may measure the distance from the front-of-house speakers to the placement of the remote speakers and simply enter the distance in feet or meters. The 402 figures the proper delay time accordingly.

There are no cryptic dip switches or multi-page displays to contend with. Installers can choose XLR (balanced), ¼" phone (unbalanced) connectors, or barrier terminal block (balanced) for the input and outputs. For security, a rear panel lockout switch disables the delay adjustment controls. An optional full-panel security cover is available as well.

The 402 is a reliable, easy to use, high performance digital delay, which comes with the Symetrix reputation for quality and support. •

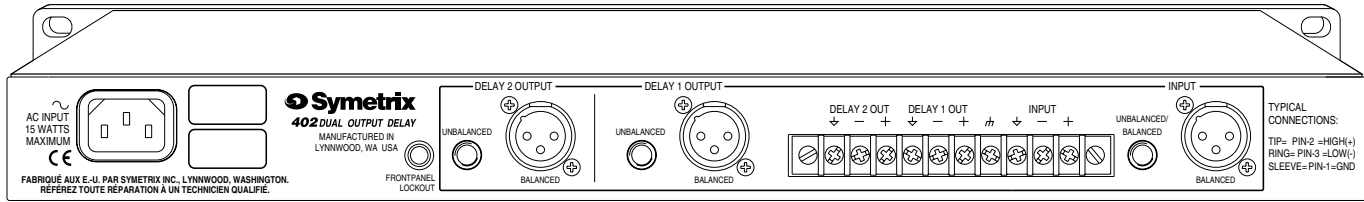
APPLICATIONS

- Touring Sound Systems
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- Auditoriums
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- Sports Arenas
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- Video Post Production
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- Churches
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FEATURES

- 20-bit A/D, 20-bit D/A's for >100 dB dynamic range
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- Two independently adjustable outputs
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- Simple, intuitive user interface
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- Delay settings stored in nonvolatile memory (no battery to replace)
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- Automatic hard wire bypass in case of power loss
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- Front panel lockout
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- Barrier terminal, XLR, and ¼" phone connectors
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SPECIFICATIONS

Specifications subject to change without notice.

Input/Output

Inputs	One, 4700 Ohms, Balanced Bridging, XLR-female, TRS and screw terminals
Outputs	Two, 100-Ohms source impedance, Balanced XLR-male, TRS and screw terminals
Maximum Input Level	+20 dBu
Maximum Output Level	+22 dBu into an open-circuit balanced load +20 dBm into 600 Ohm balanced loads

Performance Data

Frequency Response	12 Hz to 20 kHz ± 1.5 dB
THD+Noise	<0.015% @ 1 kHz, 1V RMS
Maximum Delay Time	885 milliseconds, 999 feet, 304 meters
Headroom Display	12-LED bar graph, 8 green LED's @ 6 dB/step 3 yellow LED's @ 1 dB/step 1 red LED @ true clipping
Dynamic Range	>104 dB. This represents the difference between the largest and smallest signals that will pass through the 402. Measured using 8192 point FFT with Blackman-Harris windowing function.
Signal to Noise	93 dBfs measured with RMS voltmeter using 20 kHz "Brickwall" filter
Sample Rate	48 kHz
Converter Type	Sigma-Delta
Conversion Method	20-bit linear, 64X oversampling times 2
Parameter Storage	EEPROM nonvolatile memory Backup battery NOT required. Guaranteed for 10,000 parameter changes over 6 years at 4 delay changes/day, every day.

Security

Recessed rear panel lockout switch disables delay increment switches.
Optional security cover (SC-1).

Physical

Size (hwd)	1.72 x 19 x 5.25 inches, 4.37 x 48.26 x 13.335 centimeters
Weight	7.5 lbs, 3.4 kg (shipping wt.), 6 lbs, 2.7 kg (net)

Electrical

Power Requirements	117V nominal, 105 to 125V AC, 50 to 60 Hz, 12.5 watts 230V nominal, 205 to 253V AC, 50 Hz, 12.5 watts
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402 ARCHITECTS AND ENGINEERS SPECIFICATIONS

The Digital Delay (DDL) shall be a single input, dual output model that delays its input signal by a precise period before delivering the delayed signal to its output. There shall be two independent delays provided, each sharing a common input, and a common chassis. All signal processing shall occur within the digital domain. Delays utilizing bucket brigade delays, or other analog means shall not be acceptable within the letter of this specification. The DDL shall occupy one rack space (1U).

The DDL shall be capable of delaying an audio signal by up to 885 ms. The delay time shall be adjustable in one millisecond, one foot, or one meter increments. The

delay time shall be displayed in milliseconds, feet, or meters and shall be selectable from the front panel at any time during operation. Each channel's delay time shall be stored in nonvolatile memory. Provision shall be made to disable the front-panel delay-time adjustment.

The DDL shall indicate its peak input signal level via a multistep LED ladder having the following indication points: -48, -42, -36, -30, -24, 18, -12, -6, -3, -2, -1, and clip.

The frequency response shall be 12 to 20000 Hz ± 1.5 dB. The dynamic range shall be 104 dB minimum. The dynamic range shall be defined as the difference between the largest output signal possible and the smallest output signal possible. The total harmonic distortion shall be no more than 0.015%, measured at 1 kHz, 1V RMS.

The inputs shall be active balanced bridging designs terminated with 3-pin XLR (AES/IEC standard wiring), 1/4" TRS female, and screw terminals. The input circuitry shall incorporate RFI filters. The outputs shall be active balanced designs having equal source impedances and terminated with 3-pin XLR (AES/IEC standard wiring), and screw terminals. A separate 1/4" TRS jack shall provide an unbalanced output.

The DDL shall accept input signals ranging from -10 to +4 dBu. The balanced inputs shall accommodate +20 dBu signals without distortion, and the balanced outputs shall be capable of delivering +22 dBu into an open-circuit balanced load, and +20 dBm into 600-Ohm balanced loads without distortion. The output level of each output shall be adjustable over the range of -10 to +4 dBu.

When the unit is inoperative (either by loss of power, or via the BYPASS switch), the inputs and outputs shall be wired together. There shall be no transients transmitted to the output terminals during either turn-on, turn-off, or bypass operation.

The Digital Delay (DDL) shall be capable of operating by means of its own built-in power supply connected to 117V nominal AC (105 to 130V) 50/60 Hz (230V nominal AC, 207 to 253V AC, 50 Hz where applicable). Power consumption shall be 12.5 watts. The DDL shall be listed by Underwriters Laboratories Inc. (UL) or other equivalent nationally recognized safety testing agency.

The unit shall be a Symetrix Incorporated model 402 Dual Output Delay.

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