**Features and Benefits**

- Single operational mode
- Preset EAW Greybox™ signal processing delivers EAW Focusing™ to optimize performance
- Comprehensive, intuitive front panel control makes computer control unnecessary for most adjustments
- 10 parametric EQs per input channel and per output channel
- EAWPilot™ software allows comprehensive computer control
- Filter parameters are compatible with EAW Resolution modeling and alignment software for optimized performance

**Description**

The UX3600 provides a complete suite of state-of-the-art digital signal processing tools. Advanced capabilities and features set the UX3600 apart from other processors in its class. This high end processor controls sound systems with a variety of output channels and also delivers optimized processing of specific EAW loudspeakers.

Built-in System functions include EQ filter, delay, gain, crossovers, and polarity. However, these functions are implemented using custom-designed algorithms to optimize their usefulness when applied to loudspeakers. For example, unlike many bell filter designs, the UX3600’s produce a flat frequency response when reciprocal cut and boost filters are overlaid. Also, to more accurately calculate signal delay distances, a temperature setting permits compensation for sound speed differences.

Loudspeaker preset processing is available for specific EAW loudspeakers and loudspeaker arrays. The UX3600 implement EAW’s innovative Greybox™ settings, including EAW Focusing™, as part of the preset processing to correct loudspeaker anomalies that cannot be corrected with conventional digital processing. Advanced limiting maintains sound quality while achieving maximum output levels based on amplifier outputs. An ambient humidity setting provides appropriate “air loss” equalization based on listening distances. While the output settings inGreyboxes are locked to deliver optimal loudspeaker performance, the user still retains control of input gain, EQ, signal delay, and polarity for the entire loudspeaker. This mode’s simplicity makes the UX3600 practical for entry level users and fast to operate for experienced users, providing a high degree of system consistency while retaining all necessary, user adjustable, alignment controls.

The UX3600 uses standard USB protocol and cabling for computer control using the custom EAWPilot software. Up to 50 user-defined presets can be save into device non-volatile memory. Two year warranty.

**Conclusion**

- Preset EAW Greybox™ signal processing delivers EAW Focusing™
- Comprehensive, intuitive front panel control makes computer control unnecessary for most adjustments
- 10 parametric EQs per input channel and per output channel
- EAWPilot™ software allows comprehensive computer control
- Filter parameters are compatible with EAW Resolution modeling and alignment software for optimized performance

---

### DIGITAL SIGNAL PROCESSOR, 3 INPUT X 6 OUTPUT

See NOTES TABULAR DATA for details

#### PERFORMANCE

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Range</td>
<td>15 Hz to 22 kHz, +/- 0.25 dB</td>
</tr>
<tr>
<td>THD + Noise</td>
<td>&lt;0.005%, 20 Hz to 20 kHz, +10 dBu</td>
</tr>
<tr>
<td>Channel Separation</td>
<td>80 dB, 20 Hz to 20 kHz</td>
</tr>
<tr>
<td>Dynamic Range</td>
<td>&gt;110 dB, A-weighted, analog in to analog out</td>
</tr>
</tbody>
</table>

#### INPUTS (3X)

<table>
<thead>
<tr>
<th>Type</th>
<th>Connector</th>
<th>Impedance</th>
<th>CMR</th>
<th>Crosstalk</th>
<th>Maximum Level</th>
<th>Absolute Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog Mode</td>
<td>Electronically balanced</td>
<td>3x XLR female</td>
<td>20k ohm (balanced), 10k ohm (unbalanced)</td>
<td>50 dB 30 Hz to 20 kHz</td>
<td>-110 dB, 1 kHz</td>
<td>24 dBu, 12.3 V</td>
</tr>
</tbody>
</table>

#### Analog to Digital Converters (3x)

| Resolution/Sampling | 24 bit, 48 kHz |

#### OUTPUTS (6X)

<table>
<thead>
<tr>
<th>Type</th>
<th>Connector</th>
<th>Impedance</th>
<th>Crosstalk</th>
<th>Maximum Level</th>
<th>Absolute Min</th>
</tr>
</thead>
<tbody>
<tr>
<td>Analog</td>
<td>Electronically balanced</td>
<td>6x XLR male</td>
<td>-50 ohm</td>
<td>-110 dB, 1 kHz</td>
<td>&gt;50 ohm/20nf</td>
</tr>
</tbody>
</table>

#### Digital to Analog Converters (6x)

| Resolution/Sampling | 24 bit, 48 kHz |

#### DIGITAL PROCESSING

<table>
<thead>
<tr>
<th>Processor</th>
<th>50 Mflop, 32 bit, 48kHz Sharl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latency</td>
<td>1.6 ms</td>
</tr>
</tbody>
</table>

#### COMMUNICATION

<table>
<thead>
<tr>
<th>Type</th>
<th>USB (1.1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Software</td>
<td>EAWPilot™</td>
</tr>
</tbody>
</table>

#### AC MAINS (nominal)

<table>
<thead>
<tr>
<th>Connector</th>
<th>IEC C14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maximum Input Range</td>
<td>100V to 240V  50Hz to 60Hz</td>
</tr>
<tr>
<td>Load</td>
<td>&lt;50VA</td>
</tr>
<tr>
<td>Temperature Range</td>
<td>32° F to 104° F / 0° C to 40° C</td>
</tr>
</tbody>
</table>

### ORDERING DATA

<table>
<thead>
<tr>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>EAW UX3600 Signal Processor</td>
<td>2039199</td>
</tr>
</tbody>
</table>

### Supplied Accessories

| AC Mains Cable | 120V (6 ft) and 220V (1 m) |
| USB Cable      | 6 ft / 1.8 m |

## EAW Specifications


**Compliance**

- N484
- PS E
- CE
- UL US
- LISTED AUDIO/VIDEO APPARATUS 3MUP

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EAW products are continually improved. All specifications are therefore subject to change without notice.
PERFORMANCE DATA
See NOTES GRAPHIC DATA for details

CHANNEL FUNCTIONS (Ch A to Ch C and Ch 1 to Ch 6)
See NOTES TABULAR DATA for details

EQ FILTERS (10 filters for each input and output channel)

<table>
<thead>
<tr>
<th>Type</th>
<th>Symmetrical boost / cut</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency</td>
<td>20 Hz to 20 kHz, 1/24 octave steps</td>
</tr>
<tr>
<td>Gain</td>
<td>+/-15 dB, 0.1 dB steps</td>
</tr>
<tr>
<td>Bandwidth</td>
<td>0.2 to 2 octave, 0.1 octave steps</td>
</tr>
<tr>
<td>Q</td>
<td>0.25 to 64, 0.1 octave step</td>
</tr>
<tr>
<td>Low / High Shelf</td>
<td>Slope: 6 dB / 12 dB</td>
</tr>
<tr>
<td>Frequency</td>
<td>20 Hz to 20 kHz, 1/24 octave steps</td>
</tr>
<tr>
<td>Low / High Pass</td>
<td>Slope: 6 dB / 12 dB per octave</td>
</tr>
</tbody>
</table>

Bypass
- Bypass Filter: For each individual filter
- Bypass EQ: For all EQ filters

CROSSOVER (each output channel)

Low Pass / High Pass
- Butterworth, Bessel: 6 dB to 48 dB per octave, 6 dB steps
- Linkwitz-Reilly: 12 dB to 48 dB per octave, 12 dB steps
- Frequency: 20 Hz to 20 kHz, 1/24 octave steps
- Bypass: For each individual low and high pass filter

OTHER CHANNEL FUNCTIONS

Input Delay: 0.00 to 1200 ms, 20.83 us steps
Output Delay: 0.00 ms to 1200 ms, 20.83 us steps
- Gain: +/-15 dB
- Polarity: Normal/Inverted
- Mute: Mute/Unmuted
- Source Select: In A to In C
- 2x Analog (two signals are summed)
- Out 1 to Out 6
- In A to In C

Limiter (Out 1 to Out 6)
- Threshold: -40 dBu to 20 dBu in 0.1 dB steps
- Ratio: 1:1 to 20:1 and Inf:1, integer steps
- Attack: 40 us to 1 ms, 10 us steps / 1 ms to 40 ms, 1 ms steps
- Release: 10 ms to 3 s, 10 ms steps
- Knee: Hard/Soft
- Bypass: Each output limiter

CONTROLS AND INDICATORS

FRONT PANEL

Meters
- Input (3x): 4 segment LED, Clip = 0 dBFS = full scale on ADC
- Output (6x): 2 segment LED, Clip = 0 dBFS = full scale on DAC
- 2 segment LED, LIM = Limiter threshold

Buttons
- Inputs A to C: Selects input channel for editing
- Output 1 to 6: Selects output channel for editing
- Input Mutes (3x): Mutes the output of the input channel
- Output Mutes (6x): Mutes the output of the output channel
- EQ: Equalization
- DELAY: Signal Delay
- LEVEL: Level and Polarity

MENU
- Channel setup
- Crossover (X-Over)
- Limiter (Comp / Lim Setup)
- User Programs (Program)
- Global Functions (Utilities)

Other
- Data Entry Encoder: 4 up/down/left/right buttons navigate system menu
- Display: Backlit LCD 122 pixel x 32 pixel graphic
- USB Port: Connector type B

REAR PANEL
- Power Switch: Turns AC mains on and off

GLOBAL FUNCTIONS

Units
- Imperial/metric

Temperature
- 32 F to 114 F / 0 C to 40 C degrees, 1 F degree steps
- (used to convert delay time to distance)

Humidity
- 10% to 100% relative, 1% steps (functions only in loudspeaker optimization for the air loss pre-emphasis filter)
- LCD Contrast: 0 to 10 (relative scale)
- Front Panel Lock: Password protects all functions except Mute buttons
- Input Configuration: Analog
- Programs: 50 memories for user configuration
- Memory Recall: <1 s, all parameters
UX3600 Design Challenges: The goal for UX3600 digital signal processor was to provide a comprehensive set of digital processing tools in a 3 input by 6 output processor. In addition, the processor’s hardware had to be able to implement EAW Focusing™ in order to provide preset, factory-optimized processing for specific EAW loudspeakers. This would include those intended for standalone use and those normally used in arrays. The preset processing allows unused input and output channels to have standard processing for other uses.

EAW Focusing™: Using innovative analysis tools and methods developed by EAW, specific, long-standing, loudspeaker problems were isolated and analyzed as to their solutions using DSP. However, the desired complex filter responses required accuracies grossly lacking in conventional DSP filters based on the Bilinear Z-Transform (BZT). These filters sacrifice response accuracies in the upper audible octaves to avoid mathematical difficulties involving the Nyquist frequency. Using standard algorithms can result in filter response magnitude errors of over 15 dB, with equally flawed phase performance. Using FIR (Finite Impulse Response) filters would have resulted in latencies in excess of acceptability for real time use. EAW Focusing uses EAW-developed filter algorithms that avoid these issues while providing the exact, complex, filter responses required to correct the loudspeaker problems.

EAW Focusing is implemented in the UX3600 for many EAW loudspeaker models. Of particular note are EAW array loudspeakers. EAW Focusing not only optimizes the performance of the individual loudspeakers, but it also optimizes the integration of adjacent loudspeaker outputs and the off-axis performance of entire arrays.

**EAW Focusing Example:** Figure 1 shows the spectrogram of an ideal, point-source loudspeaker. Figures 2 and 3 show two different spectrograms of a 2-way loudspeaker optimized with conventional digital signal processing (DSP) and conventional measurements. In Figure 2 the time domain performance is emphasized. In Figure 3 the frequency domain performance is emphasized. In both cases there is significant energy to the right of the main energy spectrum compared to the ideal loudspeaker shown in Figure 1. These are all caused by inherent, mechanical properties of both the cone LF driver, the HF compression driver, and the HF horn itself. Although the frequency response (not shown) is nearly an ideal, flat line, these anomalies obviously exist in spite of the conventional processing. Because the usual measurements and corrective filtering lumped the undistorted signal and the anomalies together, the flat response is actually a combination of the energies from both. Anomalies like these are generally described as coloration and are responsible for why two, similar, flat-response loudspeakers can sound quite different.

In contrast, the result of applying EAW Focusing to this same loudspeaker is shown in Figure 4. The anomalies in both time and frequency are largely gone, making the spectrogram in Figure 4 look quite similar to that of the ideal loudspeaker in Figure 1. While the frequency response is also nearly an ideal, flat line, it is almost entirely a result of reproducing the energy from flat input signal.

**Summary:** EAW’s engineering efforts resulted in the UX3600 digital signal processor which provides complete user control as well as factory-optimized, Gunness Focusing settings for EAW standalone and arrayed loudspeakers. User-friendly, advanced, processing functions and plug-and-play audio/control networking facilitate its use for first-time DSP users, seasoned professional operators, system designers, and audio aficionados all over everywhere. In keeping with the performance of EAW loudspeakers, the UX3600’s sonic performance is superb.

**SPECTROGRAMS:** EAW's proprietary spectrograms show the spectrum or frequency content of sound (vertical axis) and its variation in time (horizontal axis), the colors representing intensity. The width of the data reflects the size of the sliding time window applied to the data, which increases in size with lower frequency. The “data” in the upper right is simply a limitation of the spectrograph's mathematics and has no relevance.

**NOTES**

**TABULAR DATA**
2. Measurements: Dual channel FFT; length: 32,768 samples; sample rate: 48 kHz; logarithmic sine wave sweep.
3. Measurement System Qualification (includes all uncertainties): Level: accuracy +/-0.05 dB 20 Hz to 20 kHz, precision +/-0.1 dB 20 Hz to 20 kHz, resolution 0.01 dB; Frequency: accuracy +/-1 %, precision +/-0.1 Hz, resolution the larger of 1.5 Hz or 1/48 octave; Time: accuracy +/-10.4 μs, precision +/-0.5 μs, resolution 10.4 μs.
4. Volts/Ampere: Measured rms value of the signal or as noted.
5. Performance: Input, DSP (Digital Signal Processing), outputs, and ac mains characteristics.
6. Functions: Operating controls, function parameters, and indicators.

**GRAPHIC DATA**
1. Graphs are plotted using raw data.
2. Frequency Response: Variation in output level with frequency for a constant input signal.
3. Phase Linearity: The difference in phase between the input signal and output, with signal processing latency removed.