The MT102 is a small DSP board that is available with the latest audio software applications from Phoenix Audio Technologies. The board can be delivered with Phoenix’s Acoustic Echo Canceller, Phoenix’s Noise Suppression (one or two channels), or other customized application that can be custom tailored from the portfolio of algorithms available by Phoenix Audio Technologies.

The board comes with a USB connector, and a 14 pin analog header. The user can use the analog header to power the board, provide the required input signals, and obtain the output signals. Four, out of the fourteen pins, can be assigned as I/O control pins that the user can utilize to either control software parameters or receive various indications from the DSP. Alternatively, the user can use the USB port to power the board, receive the far end signal, and transmit the output signal to a computer platform.

The design of the board implements Low Noise Design features enabling use with High-End audio applications. The board is the perfect solution for OEMs that want to utilize Phoenix’s technologies in their products. It is small, simple and easy to use, and runs on efficient power consumption.

**SMALL**
40 x 50 mm; 1.57” x 1.97”

**EASY**
Easy access 14 header for power supply, inputs, outputs and controls

**FLEXIBLE**
Available with Acoustic Echo Canceller
Single and Dual Channel Noise Suppression
Used as pure analog or a USB device
Single Channel advanced Noise Reduction Algorithms

**CONTROLLABLE**
Available I/O pins to control software parameters and / or return software indications
SPECIFICATIONS

Size
• 40mm x 50mm (1.57” x 1.97”)

Power
• 4.5V - 6V
• 50mA

Audio Inputs / Outputs
• 2 Analog inputs - available at Line level or Mic level
• 2 Analog outputs - available at Line level or Mic level
• Digital I/O through the USB port

Other Available I/O pins
• External Reset
• Four programmable I/O pins

Acoustic Echo Canceller

Features
• 100% Full Duplex Performance - No Attenuation
• Acoustic Echo Cancellation > 40dB
• High - end Performance: Conforms to ITU-T G.167
• Noise Cancellation > 10dB
• Residual Echo is suppressed to the enviroment noise level to prevent artificial ducking of signal
• Voice Level Equalization
• Fast convergence speed - 40 dB/sec
• convergence during full duplex (no recovery time after full duplex)
• Very low latency (10msec) 16KHz sampling rate
• Advanced AGC algorithm

Available control options
• Set NR level
• Control residual suppuration aggressiveness
• Control the level of the Voice Level Compensation
  Disable NR, VLC, AGC

Two Channel Noise Reduction

Features
• Process two independent channels
• Very low latency - 10 ms
• No Musical, no artifact
• Voice Level Compensation

Available control options
• Set the NR On/Off
• Set the NR level 12/20dB
### MT102 - Pin Definition

<table>
<thead>
<tr>
<th>PIN</th>
<th>Function</th>
<th>Direction</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Reset</td>
<td>In</td>
<td>Active Low</td>
</tr>
<tr>
<td>2</td>
<td>Output Flag</td>
<td>Out</td>
<td>Ready Flag</td>
</tr>
<tr>
<td>3</td>
<td>Not used</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Control Pin</td>
<td>In</td>
<td>Noise reduction - to disable connect V+</td>
</tr>
<tr>
<td>5</td>
<td>Control Pin</td>
<td>In</td>
<td>Acoustic Echo Cancellation - to disable connect V+</td>
</tr>
<tr>
<td>6</td>
<td>Control Pin</td>
<td>In</td>
<td>AGC - to disable connect to V+</td>
</tr>
<tr>
<td>7</td>
<td>5V Input</td>
<td>In</td>
<td>Supply</td>
</tr>
<tr>
<td>8</td>
<td>DGND</td>
<td></td>
<td>Supply GND</td>
</tr>
<tr>
<td>9</td>
<td>Ref Out</td>
<td>Out</td>
<td>Line level – max 2Vpp</td>
</tr>
<tr>
<td>10</td>
<td>3.3 OUT</td>
<td>Out</td>
<td>Via 1K ohm resistor</td>
</tr>
<tr>
<td>11</td>
<td>Audio In</td>
<td>In</td>
<td>Mic Level (0.15Vpp or Line level (max 2Vpp ))</td>
</tr>
<tr>
<td>12</td>
<td>Ref IN</td>
<td>In</td>
<td>Line level – max 2Vpp</td>
</tr>
<tr>
<td>13</td>
<td>Audio Out</td>
<td>Out</td>
<td>Line level - max 2Vpp</td>
</tr>
<tr>
<td>14</td>
<td>AGND</td>
<td></td>
<td>Signal GND</td>
</tr>
</tbody>
</table>

The actual functionality of pins 2, 4, 5, and 6 depends on the specific implementation and will change one customer to another.
MT102 – Typical Pin Assignment
for Acoustic Echo Canceling Implementation

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>7</td>
<td>5V Input</td>
<td>Supply</td>
</tr>
<tr>
<td>8</td>
<td>GND</td>
<td>Supply GND</td>
</tr>
<tr>
<td>9</td>
<td>Ref Out</td>
<td>Line level – max 2Vpp</td>
</tr>
<tr>
<td>11</td>
<td>Audio IN</td>
<td>Max Input 2Vpp</td>
</tr>
<tr>
<td></td>
<td>- Line In unit</td>
<td>Max Input 0.15Vpp</td>
</tr>
<tr>
<td>12</td>
<td>Ref IN (Fe)</td>
<td>Line level – max 2Vpp</td>
</tr>
<tr>
<td>13</td>
<td>Out</td>
<td>Line level – max 2Vpp</td>
</tr>
<tr>
<td>14</td>
<td>AGND</td>
<td>Signal GND</td>
</tr>
</tbody>
</table>

Audio IN definition (Line In or Mic In) varies from one implementation to another per the customer’s definition.

If communication is done using the digital (USB) port then pins 12 and 13 become redundant.
Typical Connections of the MT102 Using Analog I/O

Option 1: use far end signal for reference only

Option 2: far end signal is fed through the MT102
Typical Connections of the MT102 Using Digital I/O

Pin 12 must be connected to AGND

MT102

Pin12 Ref In
Pin9 Ref Out
USB
Audio In
Audio Out
Pin13 NC
Pin11
Pin14 AGND

Loudspeaker
mic

Recommended Power Connections

5V power supply
GND

Pin7

MT102
Pin8 DGND
Pin14 AGND

The ADNG and the DGND should be connected as near as possible to the power supply GND.
Phoenix MT102 Dimensions

Dimensions:

- 2.5 x 4
- 40
- 33
- 12.17
- 50
- 43
- 12.38
- 2.5

Notes:

- Less than 2mm height
- 0.1" pitch header

Components:

- CS
- PS