MT103KSK Four Microphone, Beamforming, & Echo Canceling Kiosk Kit

The MT103KSK is a DSP based, four microphone, beamforming, stereo, and echo canceling daughter board ideal for Kiosk solutions.

Features

- The MT103KSK is a four microphone, beamforming, single output, stereo, 8KHz Noise Canceling/Echo Canceling solution
- The MT103KSK utilizes two, two-split Phoenix Audio microphones and your own loudspeaker. It provides both analog and digital outputs
- The 4 microphones are connected through a 0.1" pitch header. User can design the board to mount on its motherboard with mating connector, or connect to the MT103KSK through wires
- Controllable input level and phantom power supply via free downloadable utility
- Analog output through a 0.1" pitch header. User can design the board to mount on its motherboard with mating connector, or connect to the MT103-KSK through wires
- Digital output through USB connection
- Phoenix's proprietary echo canceling, beamforming, noise canceling, and AGC algorithms with no gating, to prevent the loss of critical information

Specifications

- 16KHz sampling frequency; 100Hz-8KHz bandwidth
- Two levels of Echo Canceling aggressiveness and three levels of Echo Canceling speed
- Controllable tail length – up to 200 ms.
- Three levels of noise reduction: 8dB (Low), 14dB (Medium), and 20 dB (High), selectable through the free control software
- Residual noise suppressed to the environment noise level to prevent pumping noise

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- Eight preset color filters for both the output and the speaker signal
- Low latency (10msec)
- The 4 microphone inputs are connected to pins 1, 2, 3, & 4 of J1. The following microphone settings are available using the setup software:
    - Mic level (140mV peak-to-peak)
    - Line level (2V peak-to-peak)
    - Add 6dB boost
    - Optional 2.8V power supply (phantom) , via 1 KOhm resistor

*Units are preset to Mic level without 6dB boost; Phantom On

Note: User has the option to use a single microphone connected to either pin 1, 2, 3, or 4 of J1. However, it is recommended that the provided microphones are used and that all four are connected to maximize beamforming and audio clarity.

- Far-End Inputs connected to USB and J1 pin 6. The input setting is Line level (2V peak-to-peak)

Notes:

1) **Far-End Input will be received through the USB channel only.**

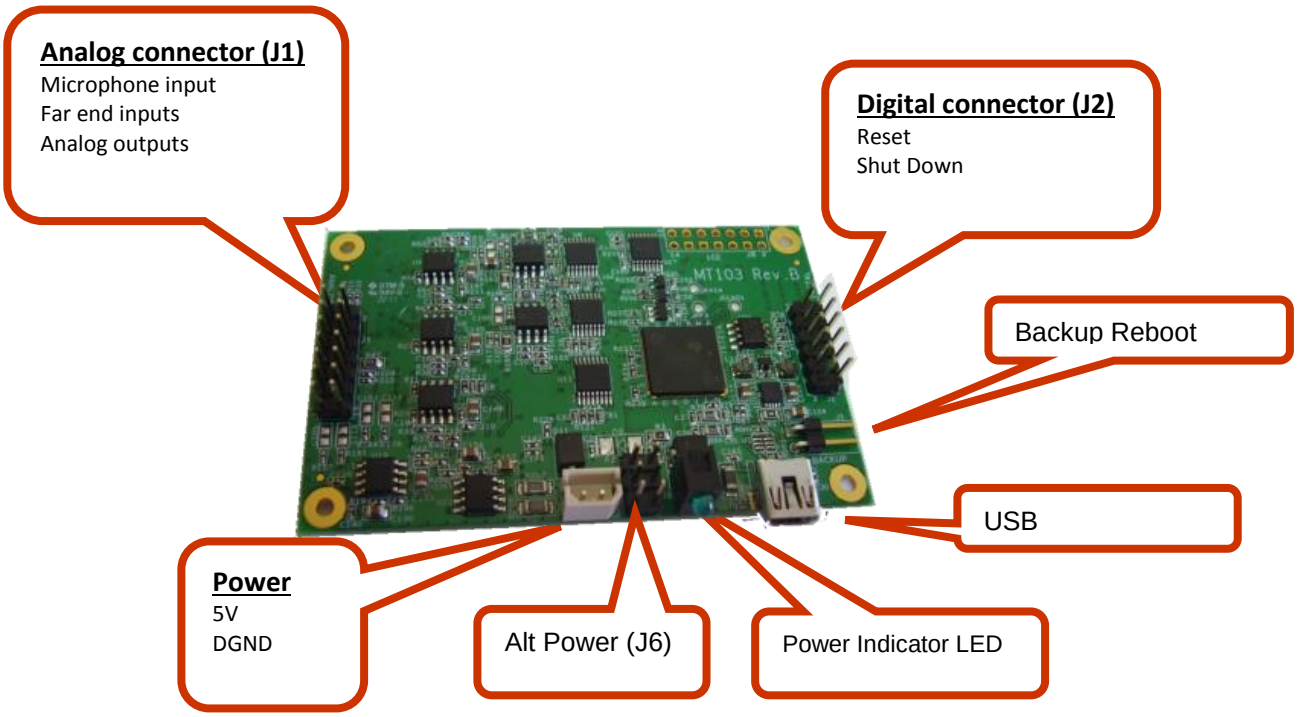
- System Output connected to the pin12 of J1 and USB. The following output settings are available using the setup software:
    - Line level: 2V peak-to-peak
    - Mic level: 200mV peak-to-peak

*Units are preset to Line level

Note: Output will be transmitted through the USB and pin 12 of J1 and USB.

- Speakers – (Far-end out signal) is connected to pin 11 and pin 13 of J1. The output setting is Line level: 2V peak-to-peak

How to Connect:



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Analog Connector (J1) Pin Definition

Pin	Name	Function	Level	Rating
1	IN1	Mic 1 In	Mic/Line	Mic = 140/280 mV ptp Phantom 1K 2.8V Line = 2/4V ptp Input Impedance 24K AC Coupled Max Rating 4Vptp
2	IN2	Mic 2 In	Mic/Line	
3	IN3	Mic 3in	Mic/Line	Mic = 140 mV ptp Phantom 1K 2.8V Line = 2 V ptp Input Impedance 24K AC Coupled Max Rating 4Vptp
4	IN4	Mic 4 in	Mic/Line	
5	IN5	NA		Max Rating 4Vptp
6	IN6	Far-End In		Line = 2V ptp
7	3.3V		OUT	
8	AGND		AGND	Input Amp Ground
9	AD0	10 bit A/D converter	AD0	Input level 0V-3V Maximum Rating 4.5V
10	AGND		AGND	Output Amp Ground
11	OUT1	SPKL (FarEnd out)	line	Line = 2V ptp
12	OUT3	System Out	Line	Line = 2V ptp
13	OUT2	SPKR (FarEnd out)	Line	Line = 2V ptp
14	OUT4	N/A	N/A	N/A

GND connection recommendation

Improper GND connection can generate unwanted ground noise. In most cases we recommend that you connect both analog grounds (pin 8 and 10) to your motherboard's power supply ground – and short the two as close as possible to the source (motherboard).

Digital Connector (J2) Pin Definition

Pin	I/O	Function	Notes	Nominal Rating	Max Rating
1	I	N/A	Pulled Up – 100K	VIn Low<0.8V Vin High>2V	0V – 4.5V
2	I	N/A	Pulled Up – 100K		
3	I	N/A	Pulled Up – 100K		
4	I	N/A	Pulled Up – 100K		
5	I	N/A	Pulled Up – 100K		
6	O	SDA(I^2C)	Pulled Up – 5K	VIn Low<1.0V Vin High>2.3V	0V – 4.5V
7	I/O	SCL(I^2C)	Pulled Up – 5K	VIn Low<1.0V Vin High>2.3V	
8	I	Shut Down	Active High, Pulled Down	VIn Low<0.7V Vin High>2.0V	0V – 5.0V
9	O	N/A		Vout Low <0.4 Vout High >2.5	I Out Max 4mA
10	O	N/A			
11	O	N/A			
12	I	Reset	Active Low, Pulled up 100K	VIn Low<0.7V Vin High>2.0V	

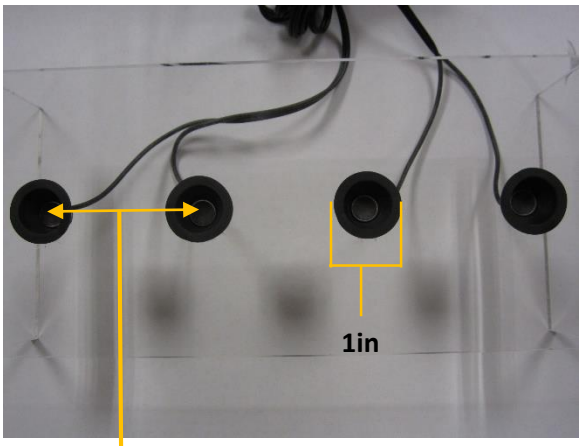
Alternative Power Connector (J6) Pin Definition

Pin	Function	Notes	Nominal Rating	Max Rating
1	Power GND			
2	Vout	Connected to pin 4	4.75V-5.25V; 100 mAmp	0-7V
3	Vout Via 4.7Ohm			
4	Vout	Connected to pin 2	4.75V-5.25V 100 mAmp	0-7V
5	NC			
6	NC			

Note: Pins 2 or 4 can be used as VIN to power the MT103, but the supply must be through a Diode (0.5A)

Microphone Specifications & Set up

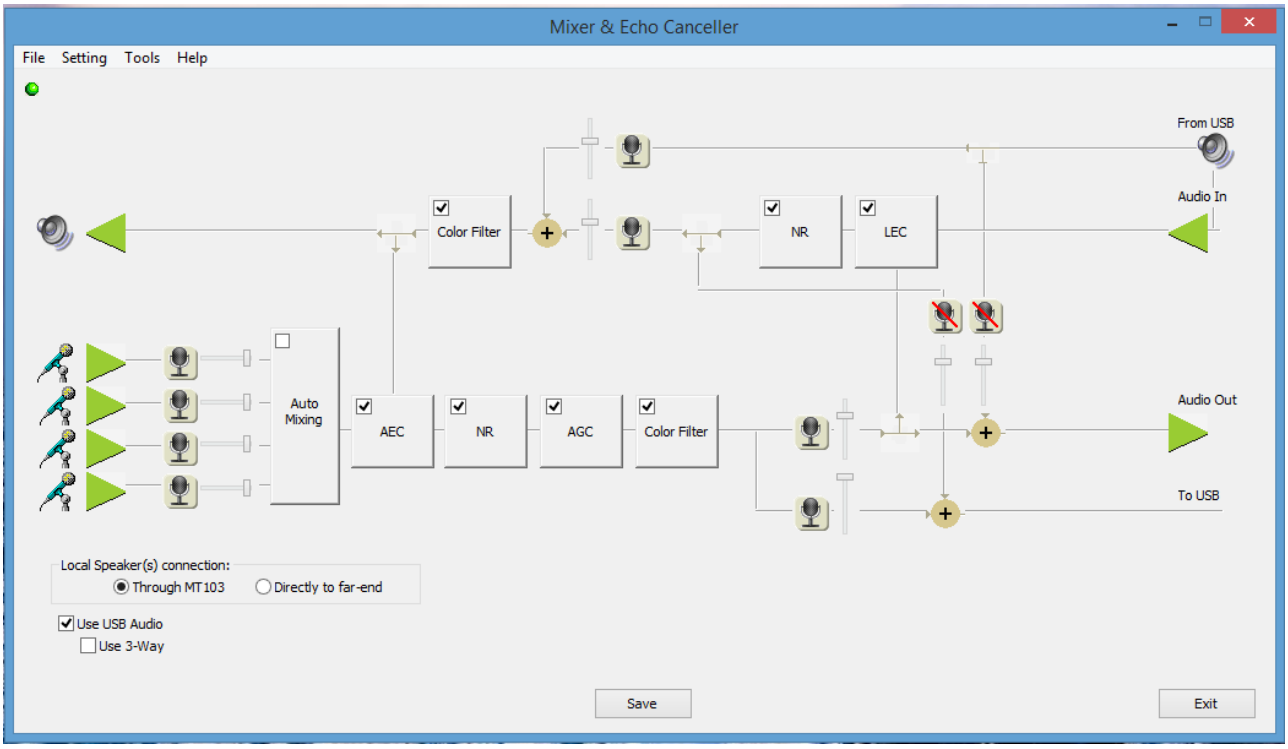
It is recommended that the four microphones delivered by Phoenix Audio are used in the setup for maximum quality. The following is a guideline for placement and set up of the microphones to ensure the highest quality audio possible. The microphones come with 3.5mm jacks and requires dismantling and consequential soldering/wiring to the pins. (*It is advised that only trained engineers tend to such a task in order to ensure the quality of the final product)



- If indeed you chose to use your own microphones, ensure that they have boots, and are identical in all aspects.
- Place the microphones in the horizontal axis. (Do not place them vertically)
- The spacing between the microphones should be 2in for optimal performance. However, they could be placed 1-3in apart. (Do not place closer than 1in apart)
- Mount the microphone by drilling the holes onto the kiosk console or in a microphone box, and mount with the microphone boots. (*ensure that the microphone enclosure has ample space and that the microphones are facing the front of the kiosk, directly in front of where microphone input is received)
- A cloth, foam cover, or grill should be placed in front of the microphones to reduce wind distractions and increase pick up clarity

Modifying System Parameters Through the SDK

As mentioned in the Specification section, some of the MT103KSK parameters can be controlled, modified, and stored on the unit using a software setup utility which we refer to as the SDK.

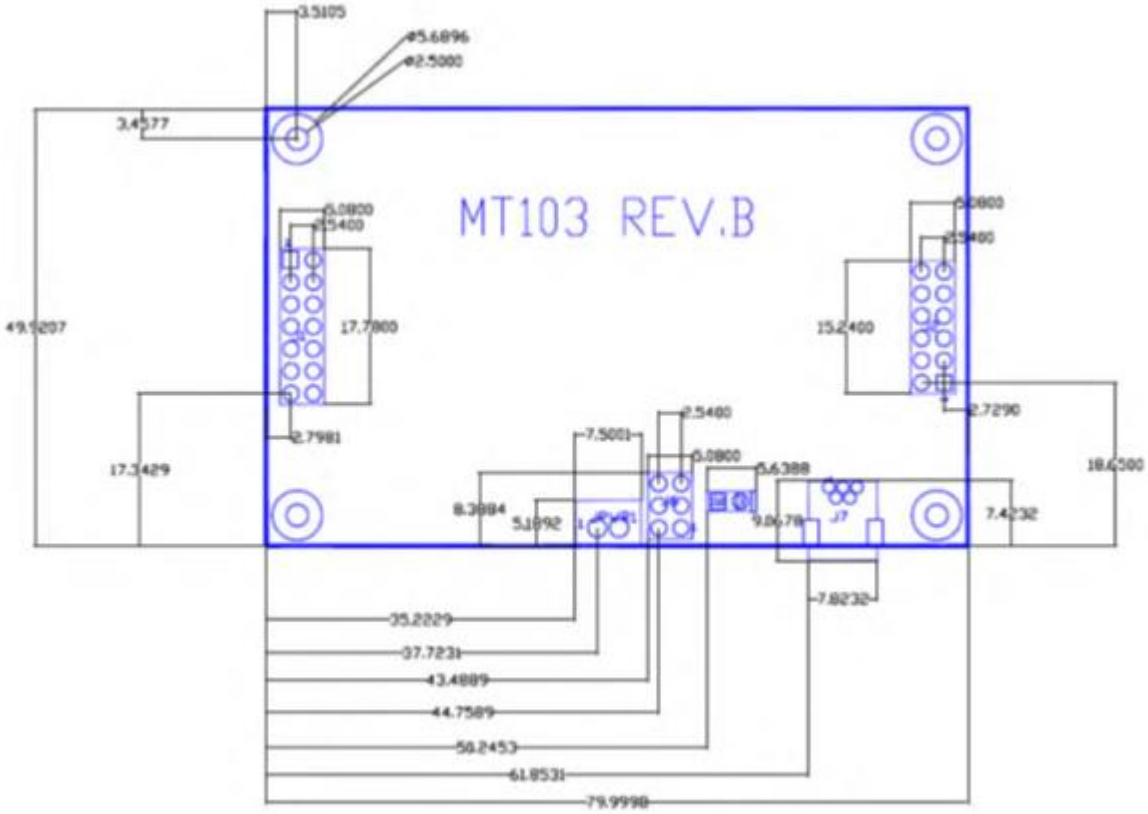


The SDK is a graphic software utility, available for Windows operating systems that can be downloaded for free from our website. The SDK communicates with the MT103KSK through a standard USB link.
Once the settings have been modified using the SDK, the user can save the new settings onto the device (by clicking Save). The parameters that can be modified with the SDK include:

- Input level (mic / line / 6dB boost)
- Phantom power supply (yes / no)
- Output level (mic / line).
- Muting of any mic or speaker

These parameters can be controlled by “double clicking” the specific icon (for example the input amplifier) or through the software’s menu.

MECHANICAL DRAWING IN DFX



For additional information please refer to our website at www.phnxaudio.com or contact us directly

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