FOR ENERGY EFFICIENT INNOVATIONS

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www.onsemi.cn

安森美 Ezairo 助听器平台

E7160SL芯片方案培训

Titan.tian@onsemi.com

安森美半导体Ezairo助听器平台培训内容：

Ezairo® 7160 SL 芯片

硬件包括：E7100 + RSL10 + 2Mb NVRAM + 无源器件

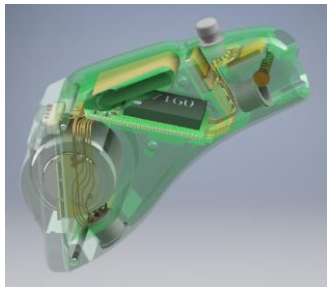
固件包括：一站式交钥匙方案，完整的助听器方案

验配包括：第三方的手机端APP；电脑端验配软件

开发板以及电脑端GUI软件

E7160SL EVB的硬件介绍

GUI电脑GUI软件Sound Designer的软件演示



Ezairo® 7160 SL 安森美样机及其演示

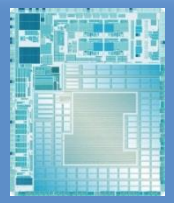
安森美出品的Ezairo 7160 SL 样机硬件模型

演示助听器功能，无线听音乐以及无线验配功能

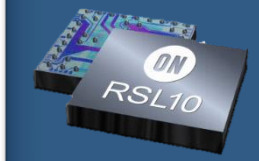
手机和电脑端的验配软件

Ezairo® 7160 SL 芯片

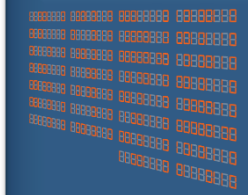
Ezairo® 7160 SL 芯片



Ezairo 7100
音频DSP

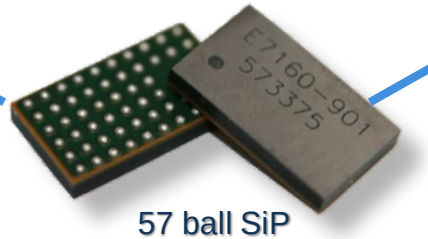


RSL10
最低功耗的
蓝牙5无线电
系统单芯片(SoC)



EA2M
2 Mb EEPROM

48 MHz 晶体
无源器件



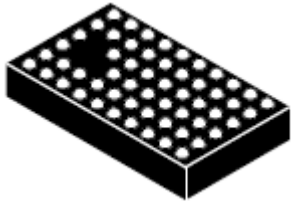
57 ball SiP
6.8 mm x 3.94 mm x 1.1mm

Ezairo® Pre Suite

支持我们首个
16通道
固件包

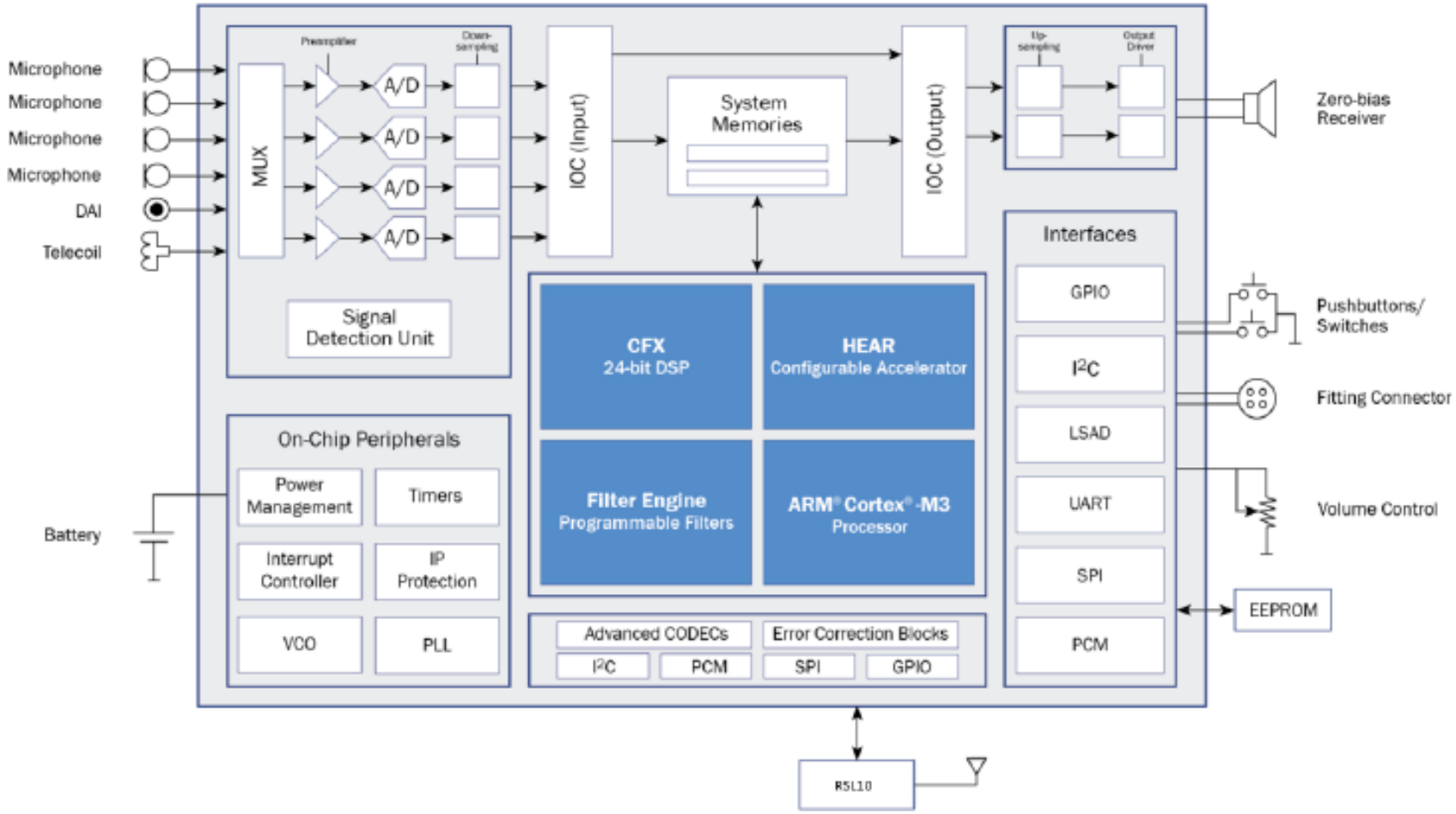
产品网页:
https://www.onsemi.cn/PowerSolutions/product.do?id=EZAIRO%207160%20SL

Ezairo® 7160 SL 芯片



E7160−0−102A57−AG

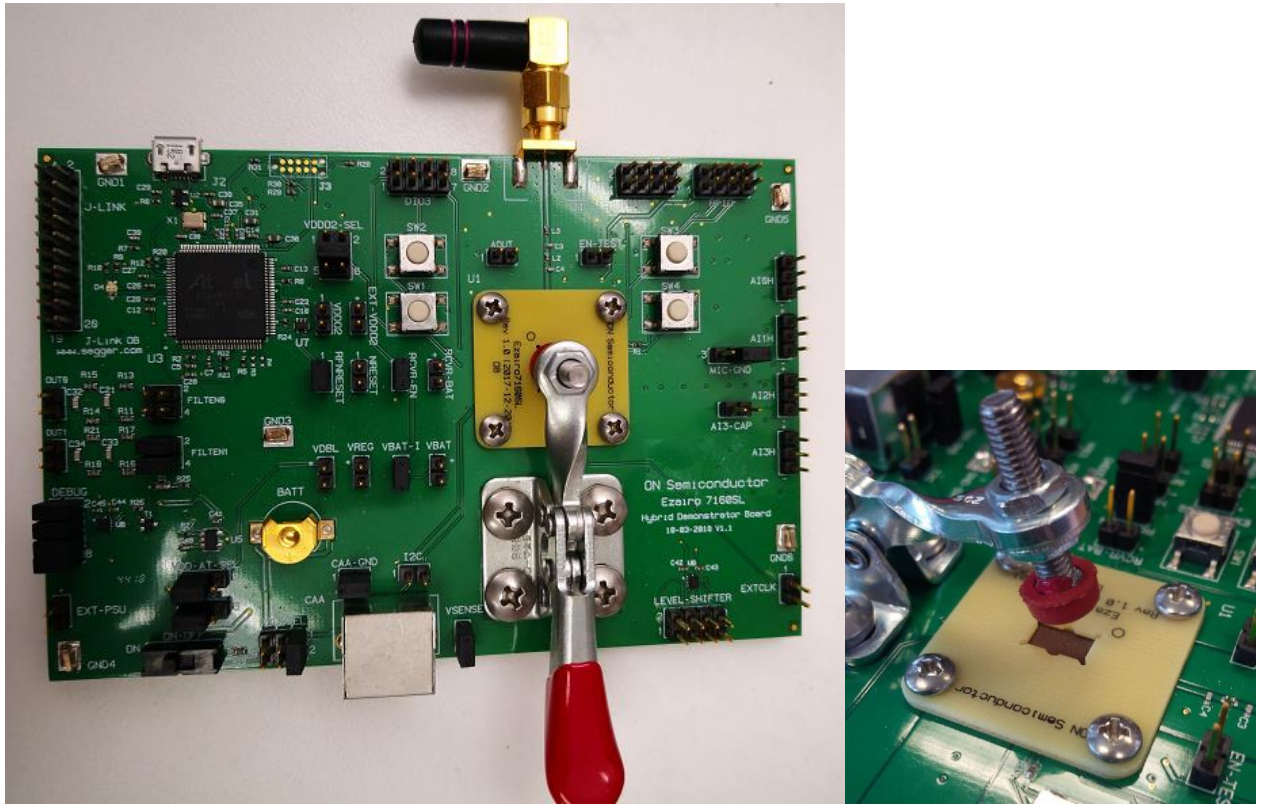
E7160−0P−102A57−AG
(MFi)



Ezairo 7160 SL Hybrid System Diagram

E7160SL开发板

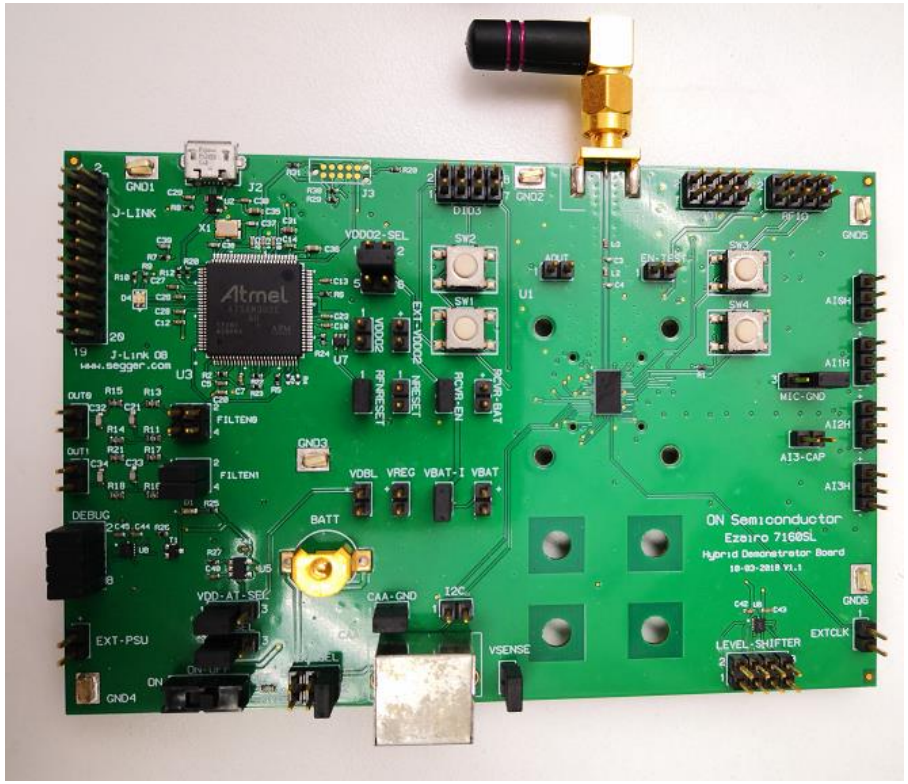
E7160SL开发板以及电脑端GUI软件



E7160SL-001GEVB

Ezairo ® 7160 SL Hybrid Demonstrator Board

Socketed version

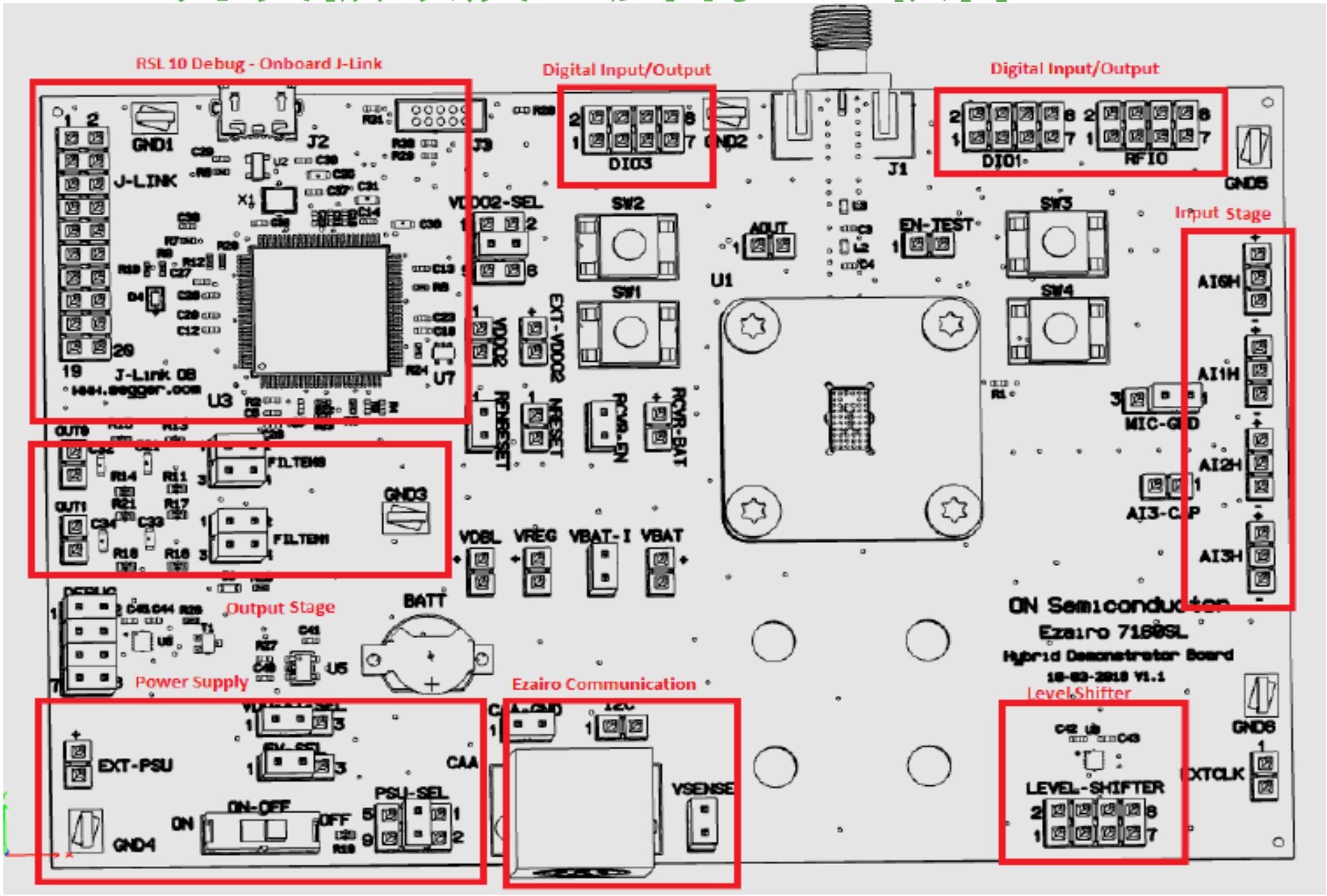


E7160SL-002GEVB

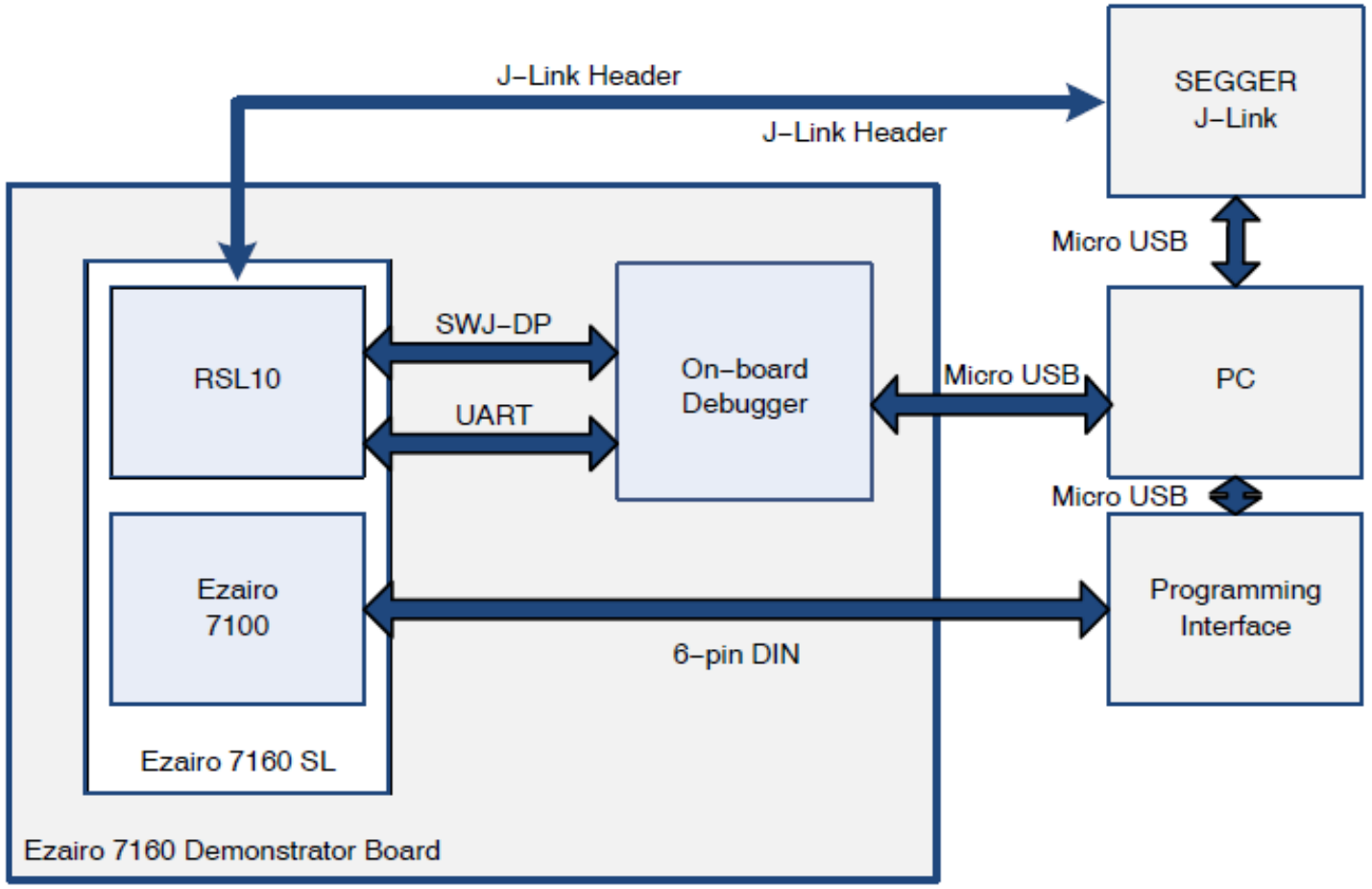
Ezairo ® 7160 SL Hybrid Demonstrator Board

Reflowed version

E7160SL开发板以及电脑端GUI软件



E7160SL开发板以及电脑端GUI软件



E7160SL开发板仿真、调试连接示意图

E7100的编程，依然通过I2C接口，编程器可以选择DSP3，CAA，Promira，Hipro2。

RSL10的编程，依然通过JTAG/SWD接口，编程器使用的是J-Link

E7160SL板载仿真器包含了J-Link，而且包含了UART-USB转换的接口，方便连接PC。

Ezairo® 7160 SL 安森美样机
以及硬件设计要点

Ezairo® 7160 SL 安森美样机

将演示:
- 符合小外形
- 天线性能
- Pre Suite 固件特性

提供器件:
- PCB 电路图
- PCB CAD 文件
- 物料单(BOM)
- RF 测量报告
- 必须从供应商购买RIC壳

免责声明:
- 仅用作演示
- 不用于生产

初步BOM

硅:
1 x Ezairo 7160SL 混合模块
含: E7100 DSP, RSL10 无线电, 2Mb EE, x-tal 和无源器件

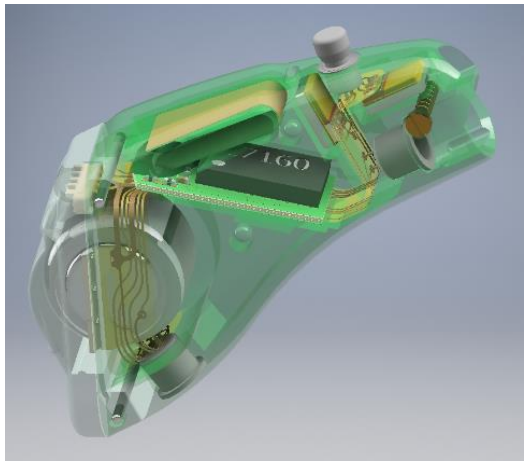
换能器:
2 x 麦克风
1 x 接收器

接口, MMI:
1 x 柔性PCB
1 x PWR strip 连接器
1 x RCVR 链路连接器
1 x CS45 编程接孔
1 x 按钮

电源及滤波:
1 x 电池ZnAir, Type 13
1 x C (47uF – 0603)

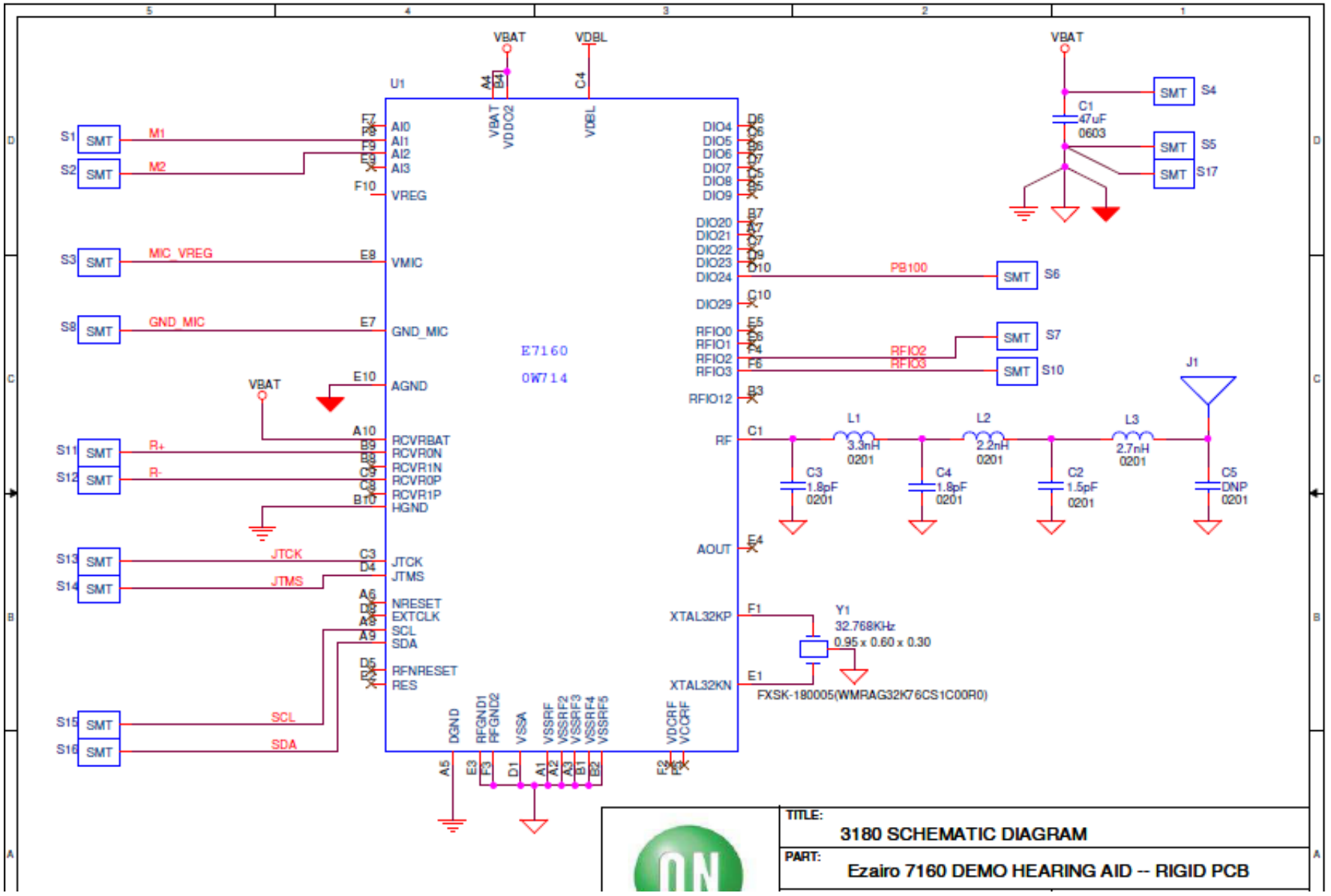
天线子系统:
1 x 印在柔性PCB上的天线
2 x L (0.9nH – 0201)
1 x L (2.3mH – 0201)
2 x C (2pF – 0201)
1 x C (2.4pF – 0201)
1 x C (1.1pF – 0201)

振荡器:
1 x 32.768 kHz
(0.95x0.60x0.30mm) – 可选



Ezairo® 7160 SL 硬件设计要点

安森美E7160SL样机
的完整原理图，
可以在官网直接申请下载
如右图：



Ezairo® 7160 SL 硬件设计要点

1，E7160SL Pre Suit固件中RSL10采用的是LDO模式，所以RFVCC与RFVDD之间不需要添加电感。

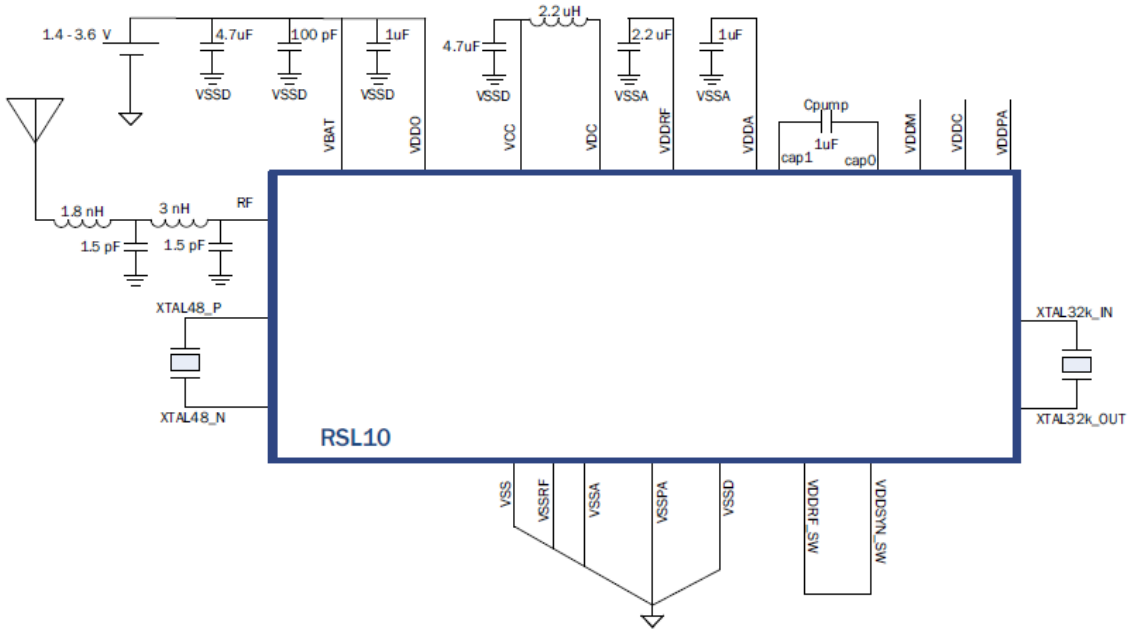
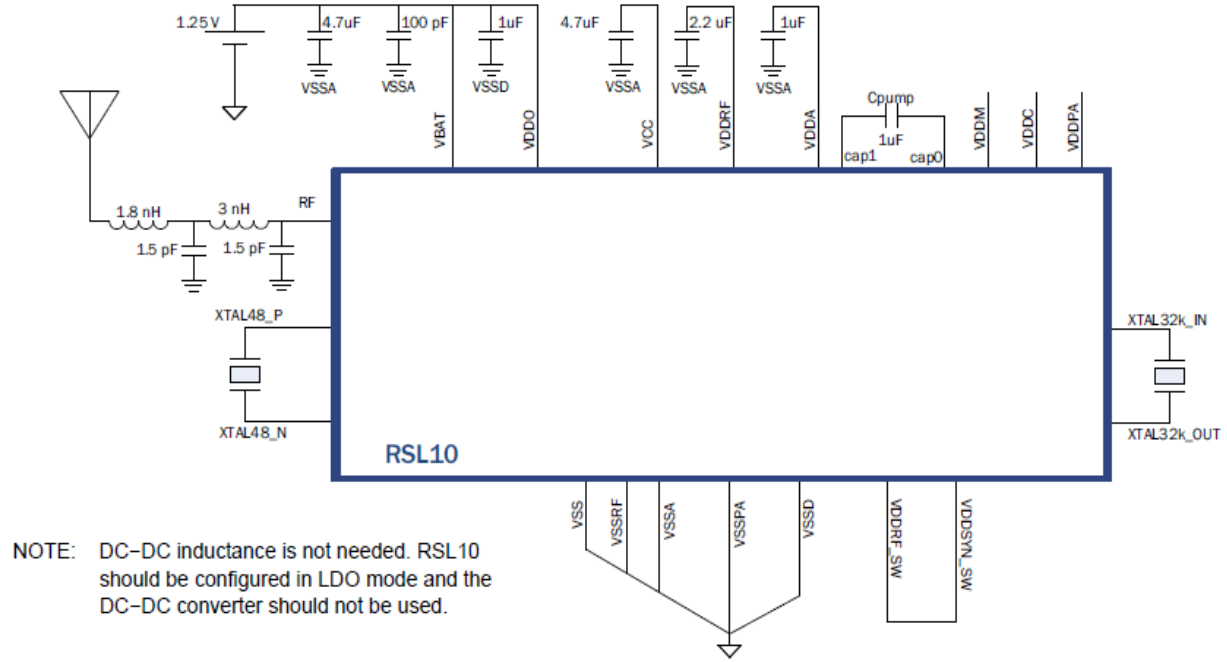


Figure 2. RSL10 Application Diagram in Buck Mode

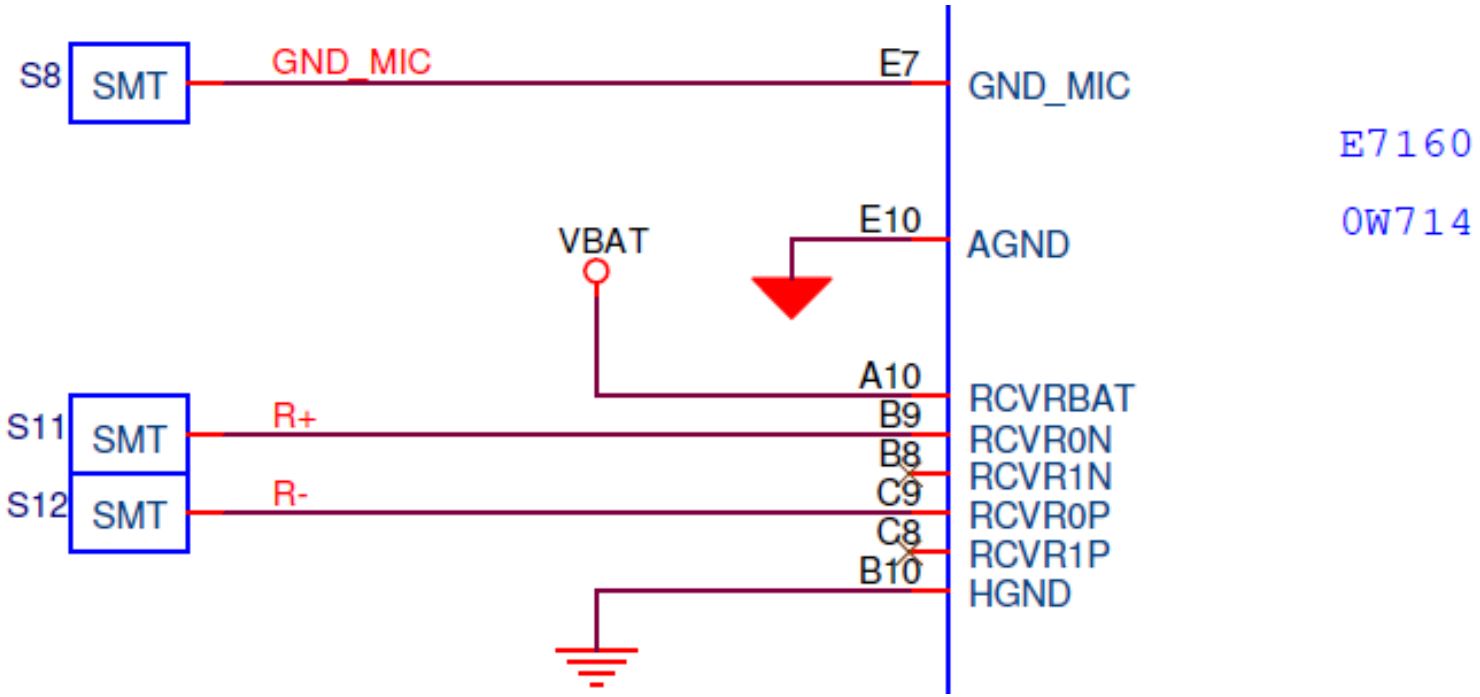


NOTE: DC–DC inductance is not needed. RSL10 should be configured in LDO mode and the DC–DC converter should not be used.

Figure 3. RSL10 Application Diagram in LDO Mode

Ezairo® 7160 SL 硬件设计要点

2，E7160SL Pre Suit固件中，Speaker输出是固定的RCVR0N, RCVR0P。而并没有使能RCVR1N, RCVR1P。

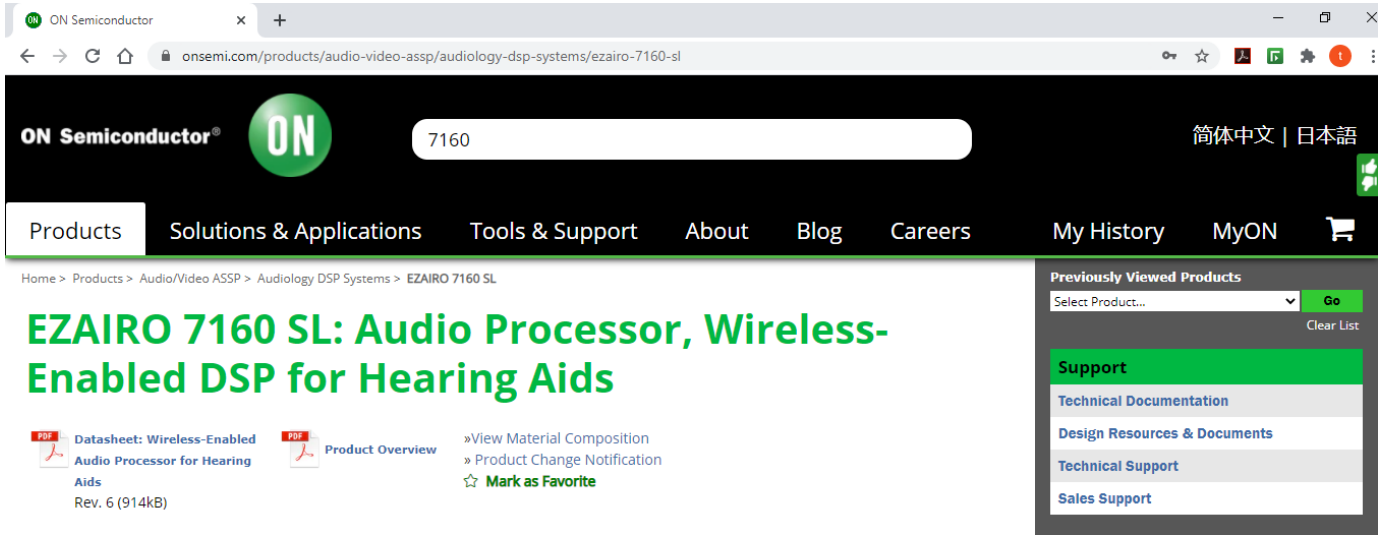


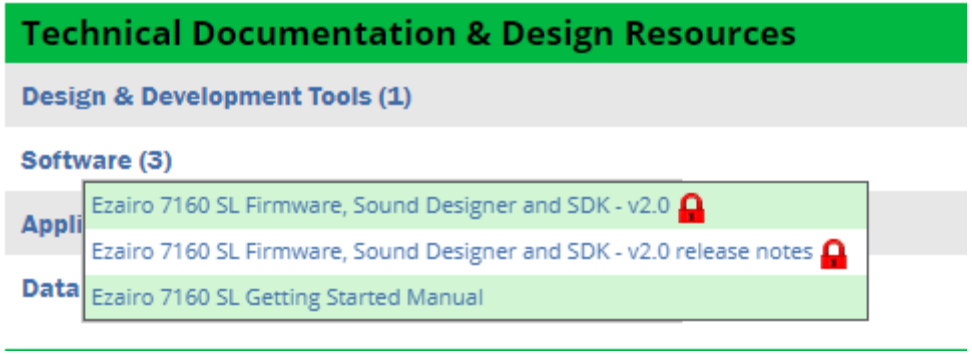
E7160SL软件资料申请

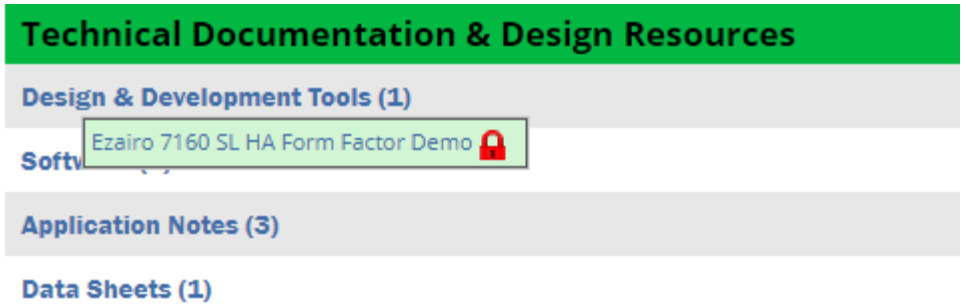
E7160SL软件资料申请

1， NDA is must option
2，注册MyON账号
3，登录ON官网到7160芯片主页
4，在Software里面申请：

- Sound Designer工具
- Sound Designer SDK包
- E7160样机设计资料





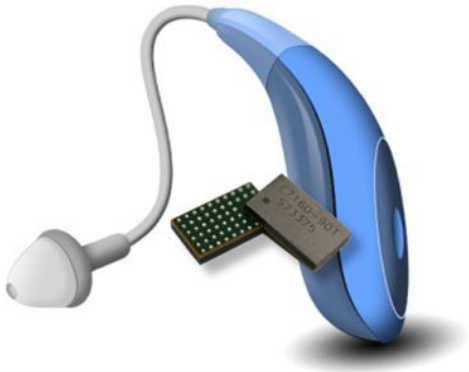


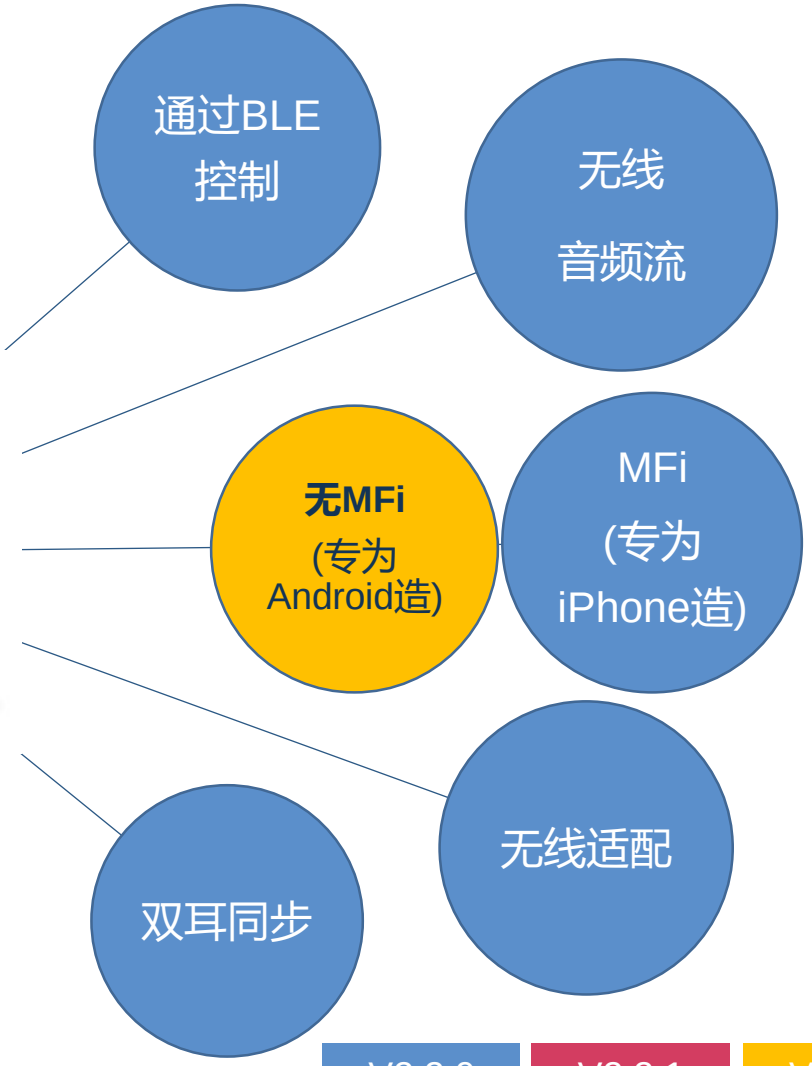
E7160SL Firmware 配套电脑端软件
Sound Designer

Ezairo 7160 SL Pre Suite 固件包 – V2

高性能无线助听器

- 24 kHz 采样率 (12 kHz 带宽)
- 16通道 WDRC， 提供通道内AGCo/Limiter
- 宽带 AGCo/Limiter
- 48波段图形均衡器(EQ)
- 自适应反馈消除
- 降噪
- 自适应方向性麦克风
- 电传线圈和直接音频输入
- EC 具备音乐检测
- 8 个存储
- 数据记录
- 自动接收器检测
- 固件更新
- 针对耳鸣的声音发生器
- 自动适配
- 租赁(订阅) 模型
- Pediatrics的电源指示灯



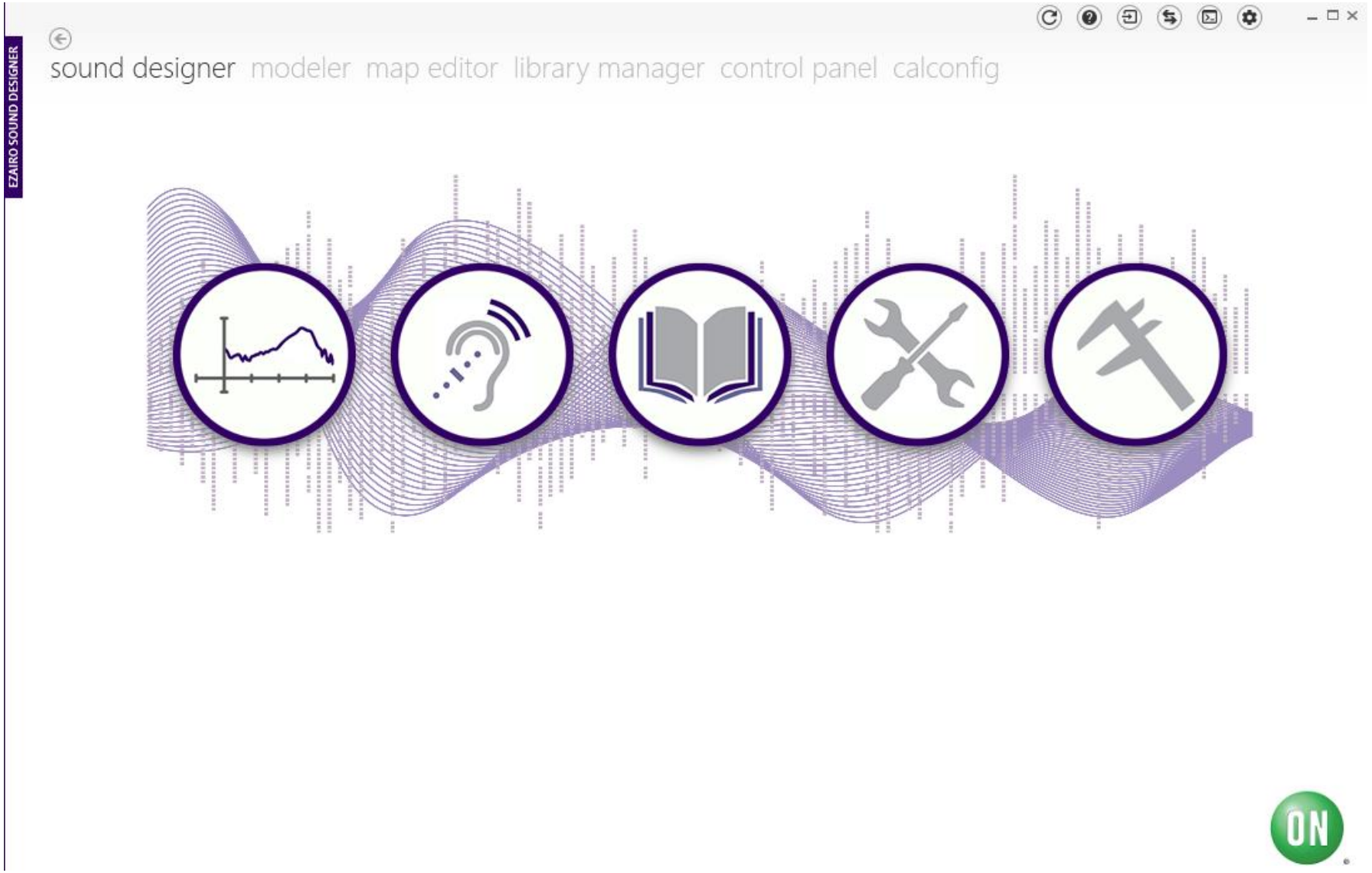


V2.2.0 V2.2.1 V2.2.2

E7160SL开发板以及电脑端GUI软件

电脑端Sound Designer软件介绍，
主要包括5个部分：

1， Modeler
2，Map Editor
3， Library
4，Control Panel
5， Calconfig



E7160SL开发板以及电脑端GUI软件

Modeler

sound designer modeler map editor library manager control panel calconfig

TRANSDUCER MODELING

Sound Designer软件之Modeler介绍

Create a new .tdr file for the Front Microphone

Create a new .tdr file for the Rear Microphone

Create a new .tdr file for the Receiver

Import a legacy .mlr file and convert to .tdr

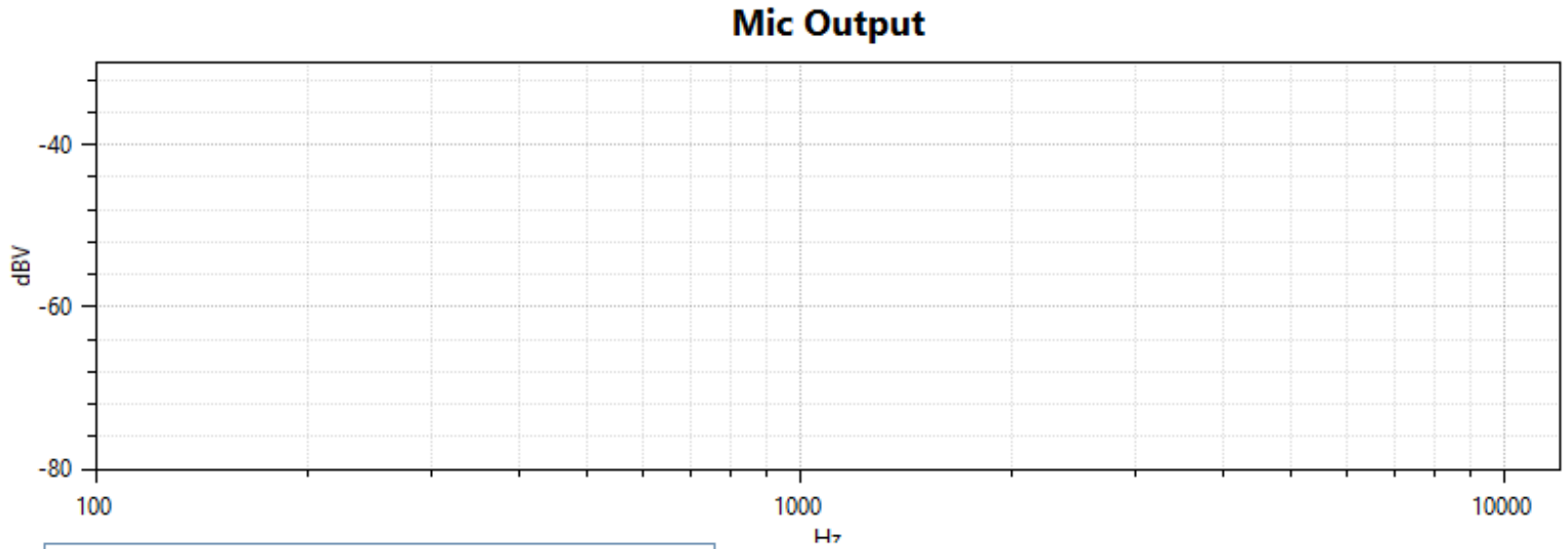
Import a .csv file and convert to .tdr

Double click to open a file from the workspace:

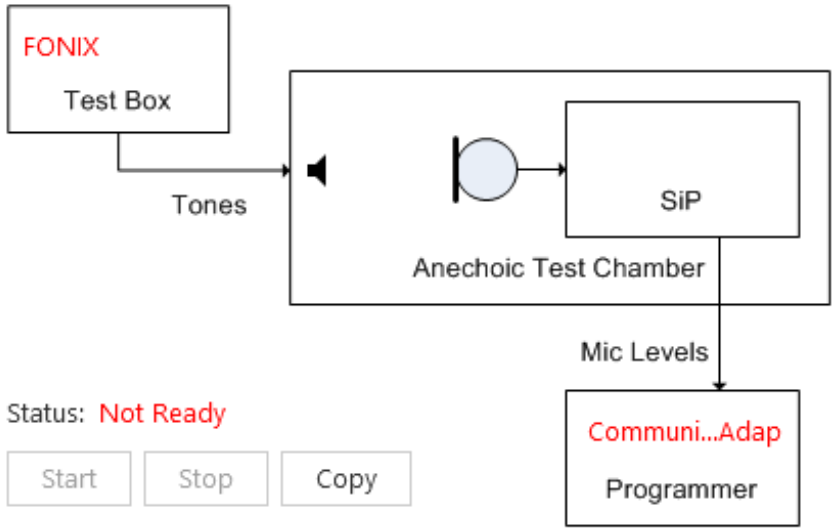
- Microphones
  - em4346cx.tdr
  - flat_mic.tdr
- Receivers
  - ed3146_10mm.tdr
  - flat_rec.tdr

E7160SL开发板以及电脑端GUI软件

Create a NEW .tdr file for Microphone

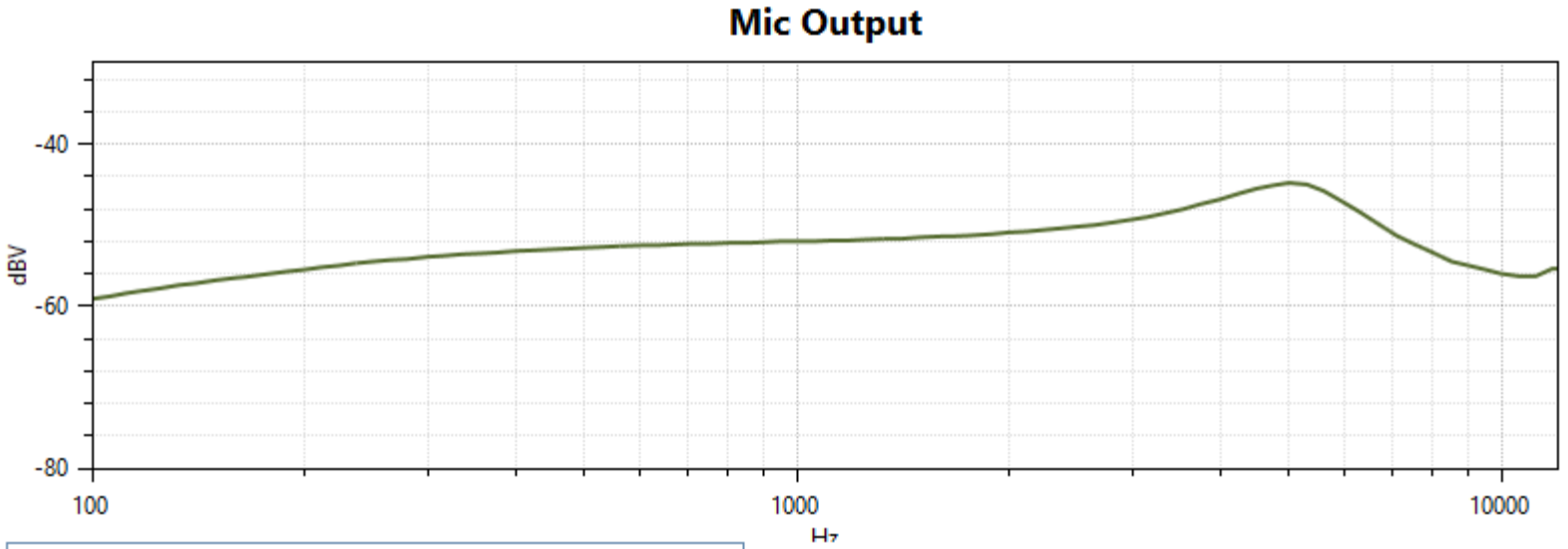


Frequency (Hz)	Sensitivity (dBV/dBSPL)	Output (dBV @ 74dB)

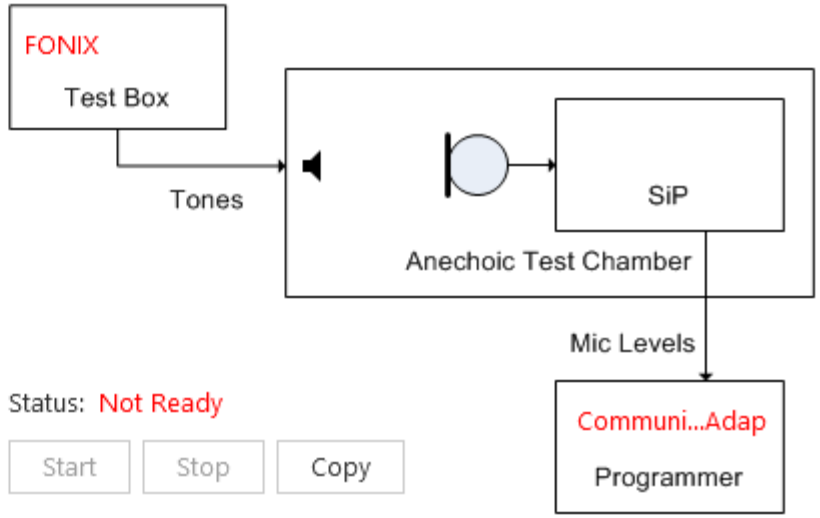


E7160SL开发板以及电脑端GUI软件

Microphone .tdr file for Example

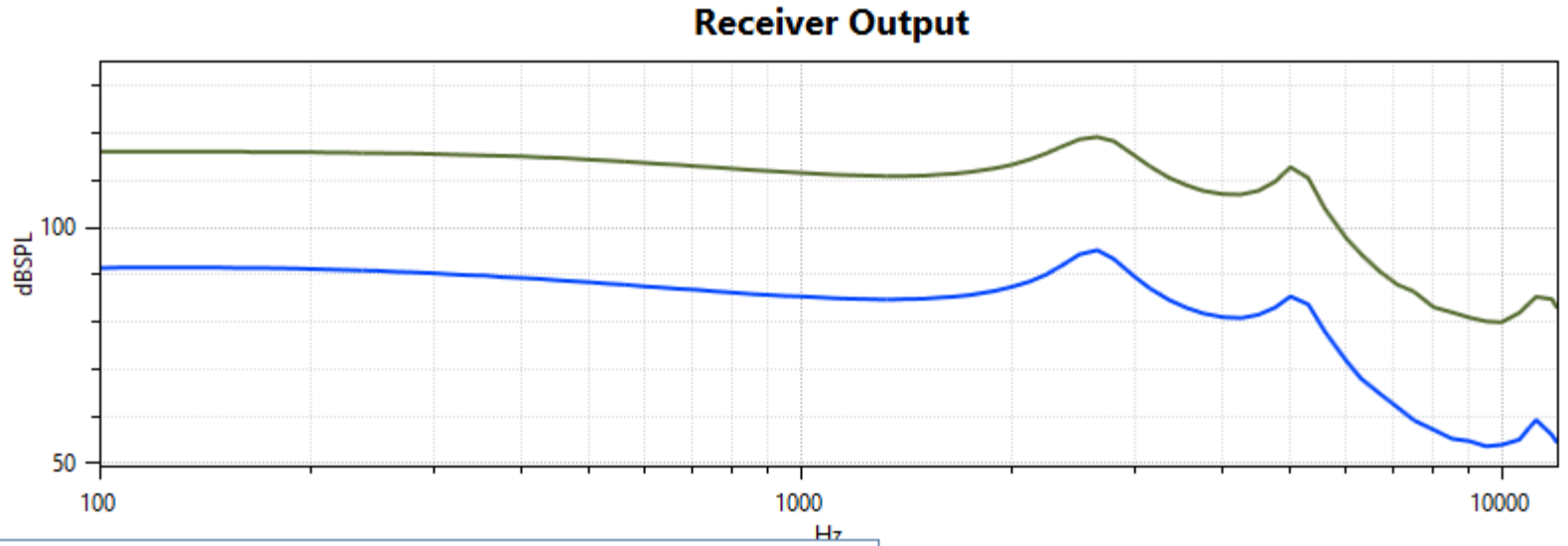


Frequency (Hz)	Sensitivity (dBV/dBSPL)	Output (dBV @ 74dB)
800	-126.2	-52.2
850	-126.2	-52.2
900	-126.1	-52.1
950	-126	-52
1000	-126	-52
1060	-126	-52
1120	-125.9	-51.9
1180	-125.9	-51.9
1250	-125.8	-51.8
1330	-125.7	-51.7
1400	-125.7	-51.7

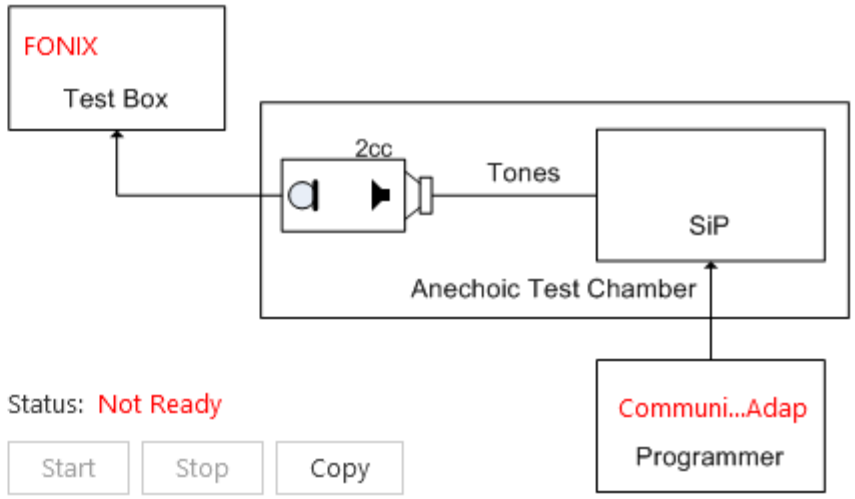


E7160SL开发板以及电脑端GUI软件

Receiver .tdr file for Example



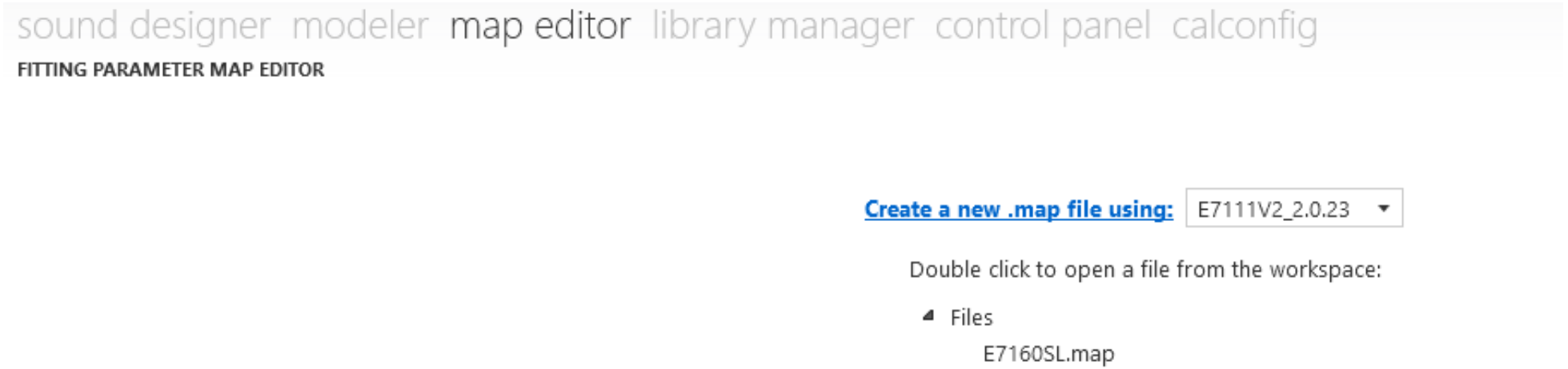
Frequency (Hz)	Sensitivity (dBSPL/dBV)	Rec. Output (dBSPL @ -30 dBV)	Saturation (dBSPL)
33.5	117.3	87.3	114.8
35.5	117.7	87.7	114.9
37.5	118	88	115
40	118.4	88.4	115.1
42.5	118.8	88.8	115.3
45	119.2	89.2	115.4
47.5	119.5	89.5	115.5
50	119.8	89.8	115.6
53	120	90	115.6
56	120.2	90.2	115.7
60	120.4	90.4	115.8



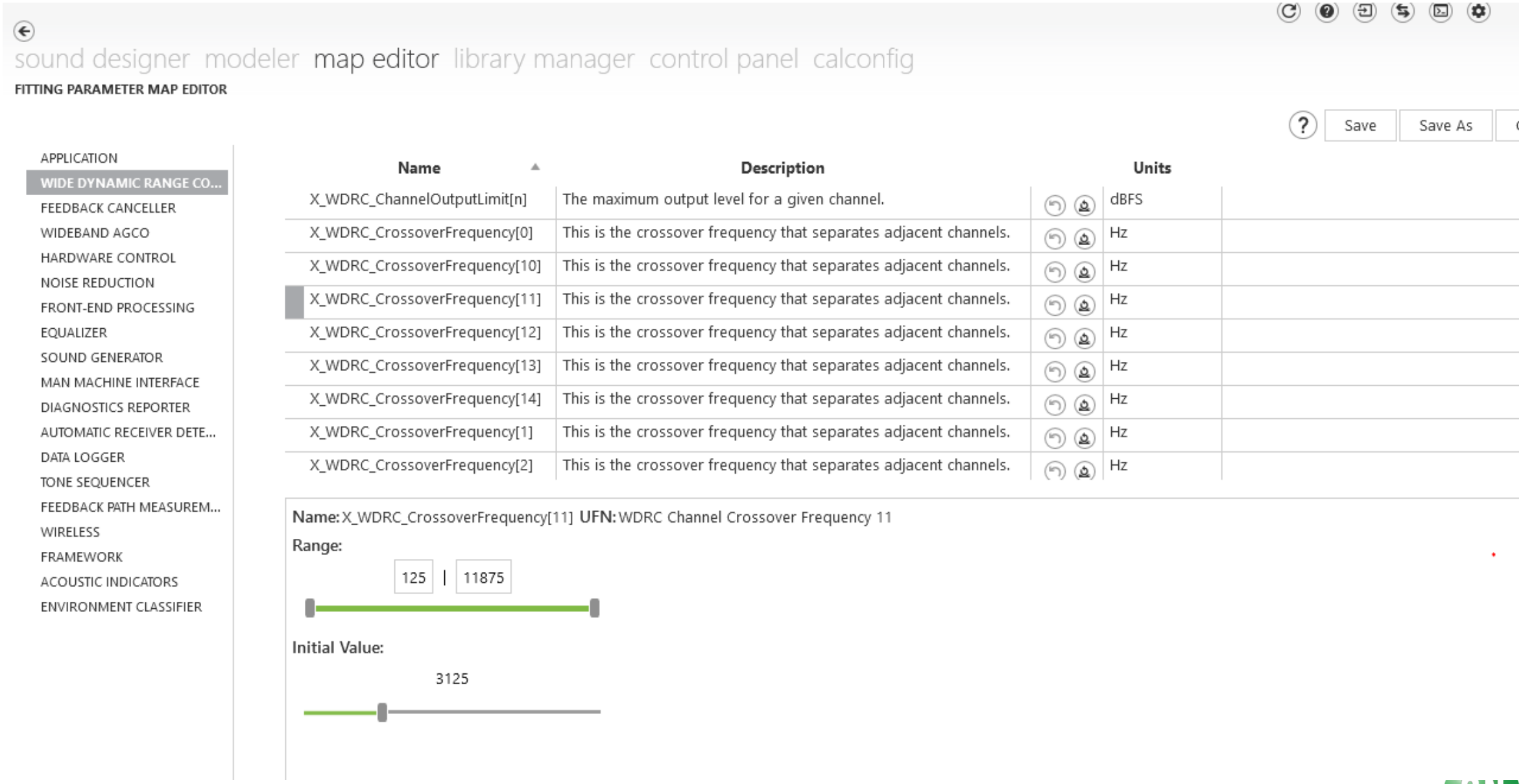
E7160SL开发板以及电脑端GUI软件

Map Editor

Sound Designer软件之
Map Editor介绍



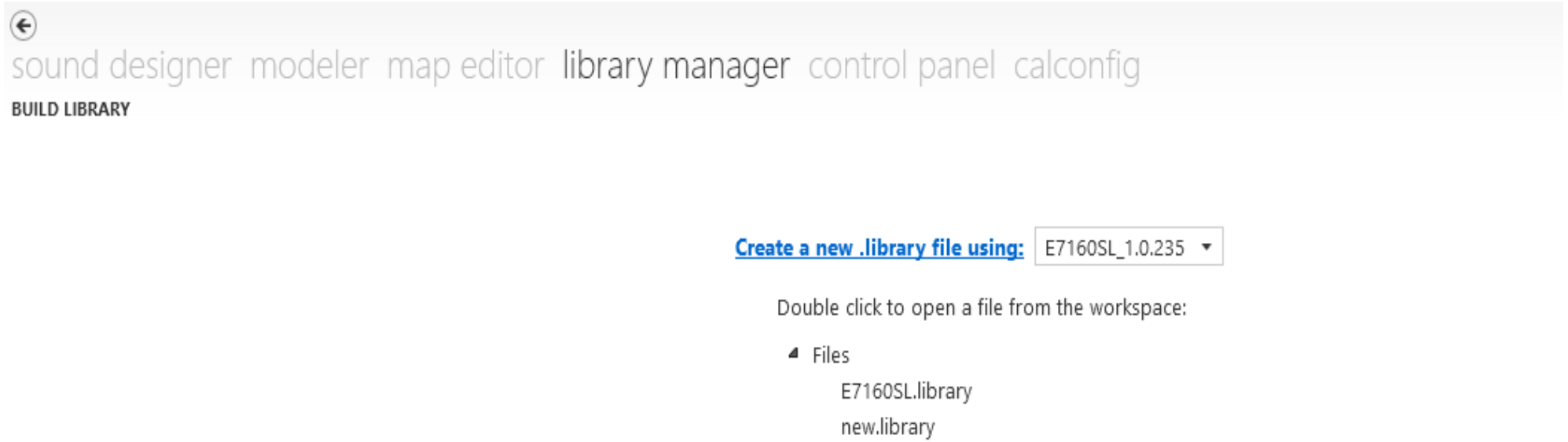
E7160SL开发板以及电脑端GUI软件



E7160SL开发板以及电脑端GUI软件

Library

Sound Designer
软件之Library介绍



E7160SL开发板以及电脑端GUI软件

Library

Sound Designer
软件之Library介绍

sound designer modeler map editor library manager control panel calconfig

BUILD LIBRARY

Platform: E7160SL_1.11.1428 Radio Fw: (App: 1.11.749 Bootloader: 1.0.179)

Library Name: E7160SL

Description: Ezairo 7160 SL Demo Library

Library ID: 1bf8

Library Key: Enable

Transducers

- Microphones
  - em4346cx.tdr
  - flat_mic.tdr
- Receivers
  - ed3146_10mm.tdr 5
  - flat_rec.tdr 5

Products

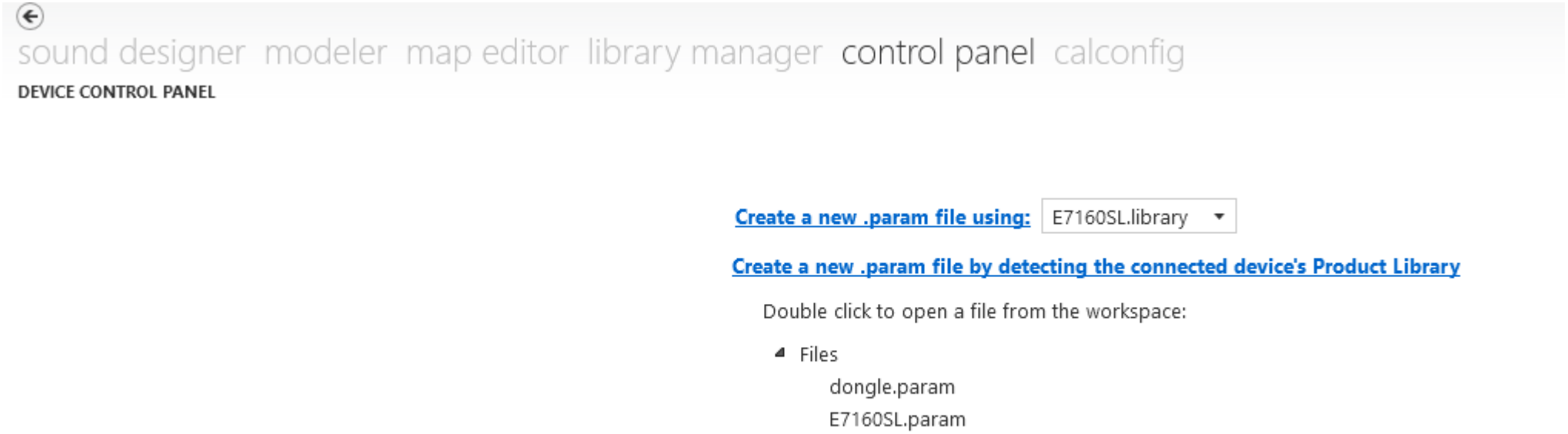
Add Product | Delete Product

	Name	Map	Microphone(s)	Receiver
✓	Ezairo 7160 SL 16 Chanr	E7160SL.map	em4346cx.tdr	ed3146_10mm

E7160SL开发板以及电脑端GUI软件

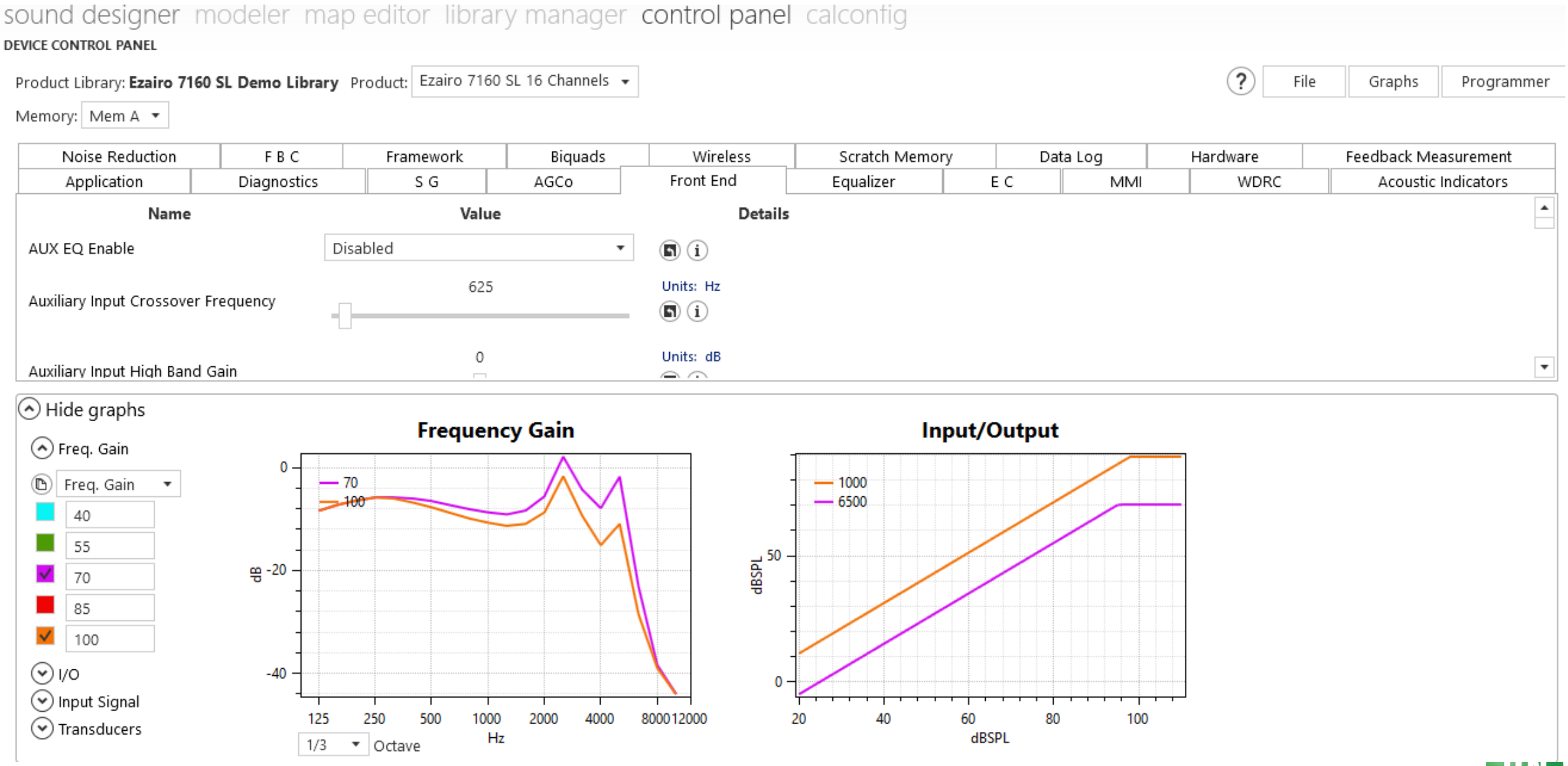
Control Panel

Sound Designer
软件之Control Panel
介绍



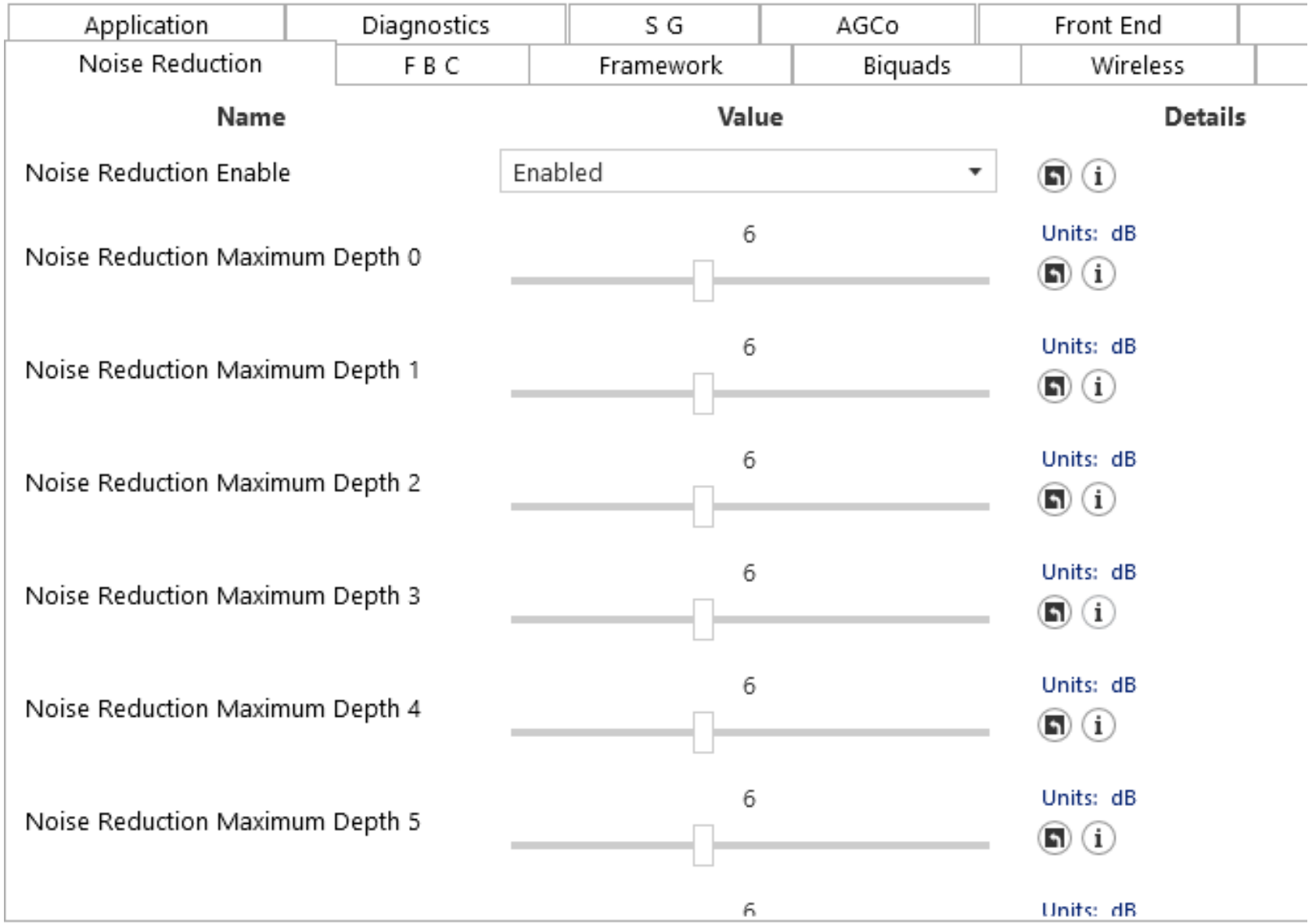
E7160SL开发板以及电脑端GUI软件

Control Panel



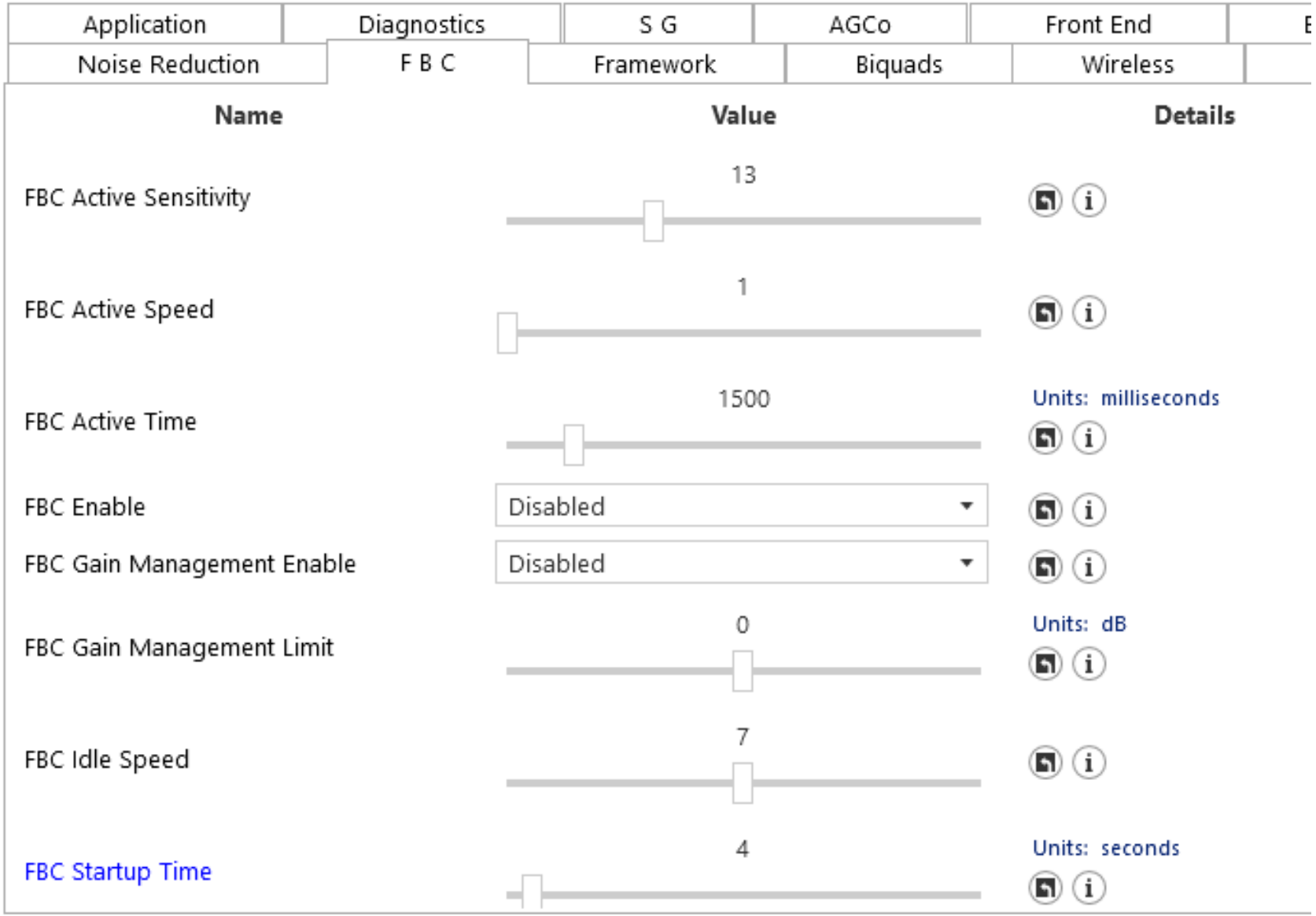
E7160SL开发板以及电脑端GUI软件

Control Panel--- Noise Reduction Option



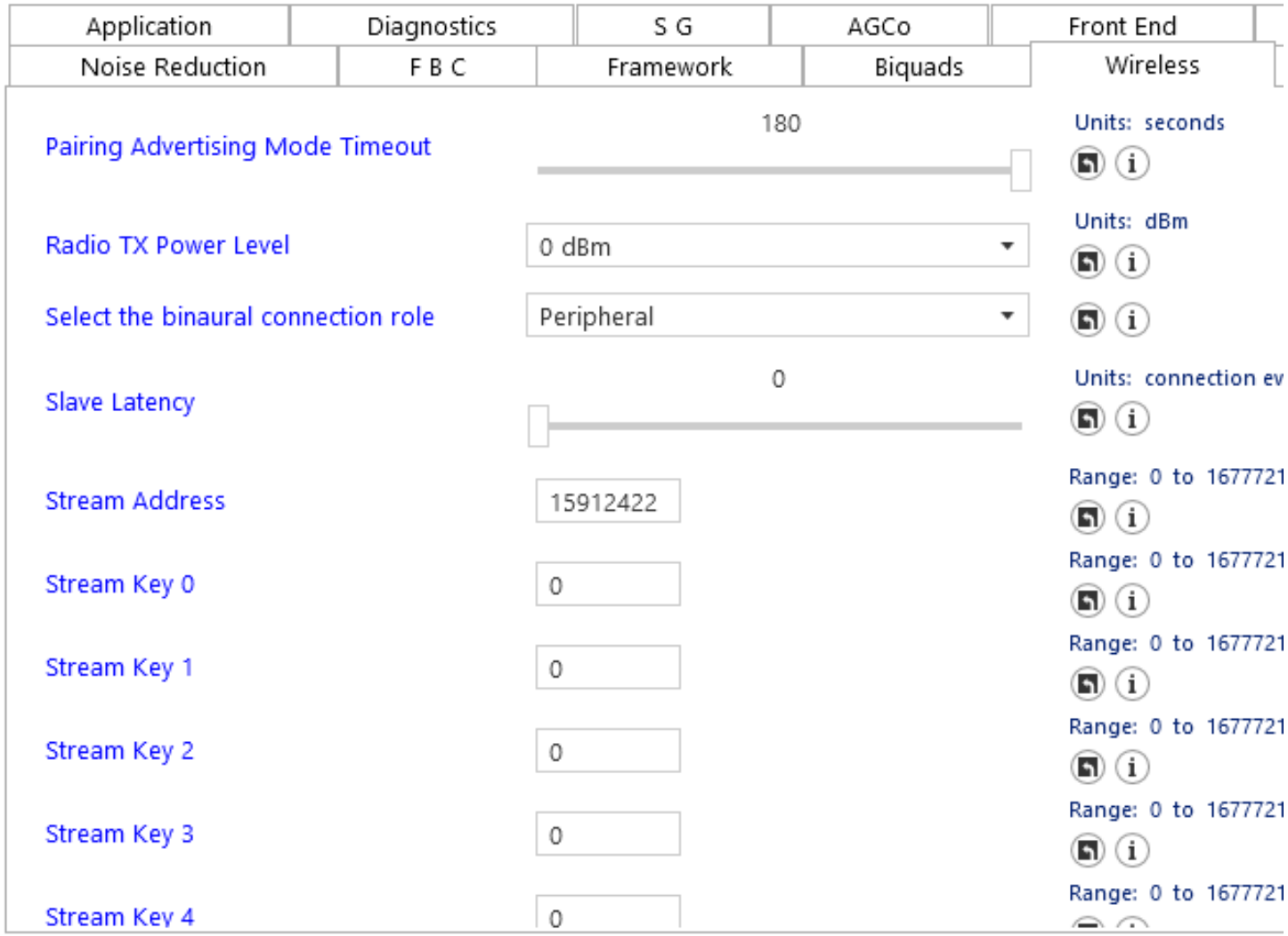
E7160SL开发板以及电脑端GUI软件

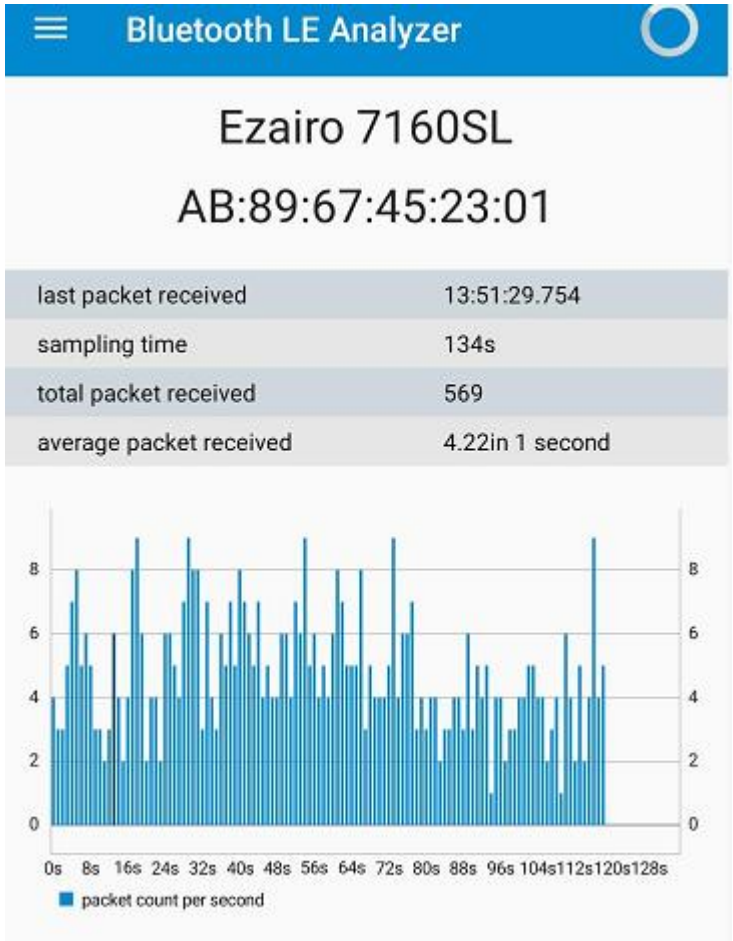
Control Panel--- FBC Option



E7160SL开发板以及电脑端GUI软件

Control Panel--- Wireless Option

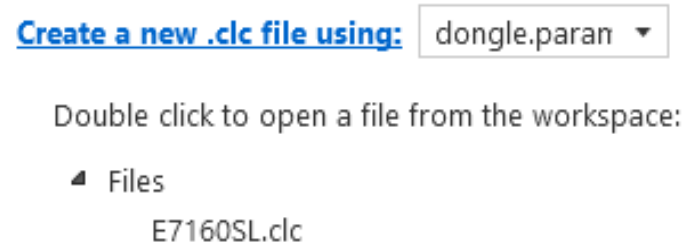




E7160SL开发板以及电脑端GUI软件

Calconfig

Sound Designer 软件之Calconfig 介绍



E7160SL开发板以及电脑端GUI软件

Calconfig

sound designer modeler map editor library manager control panel calconfig

CALIBRATION AND CONFIGURATION

? Edit Programmer Close

Verify the Calibration steps and click Start

Active	Step	Type	Result
☑	Front Microphone Calibration	Automatic	Pending
☐	Rear Microphone Calibration	Disabled	Skip
☑	Receiver Calibration	Automatic	Pending
☐	Telecoil Calibration	Disabled	Skip
☑	Configure Device		Pending
☑	Burn Scratch Memory		Pending
☑	Burn Voice Alerts		Pending

Start Stop Clear Results

Test Box: FONIX

Programmer: Communi...Adap

Status: Not Ready

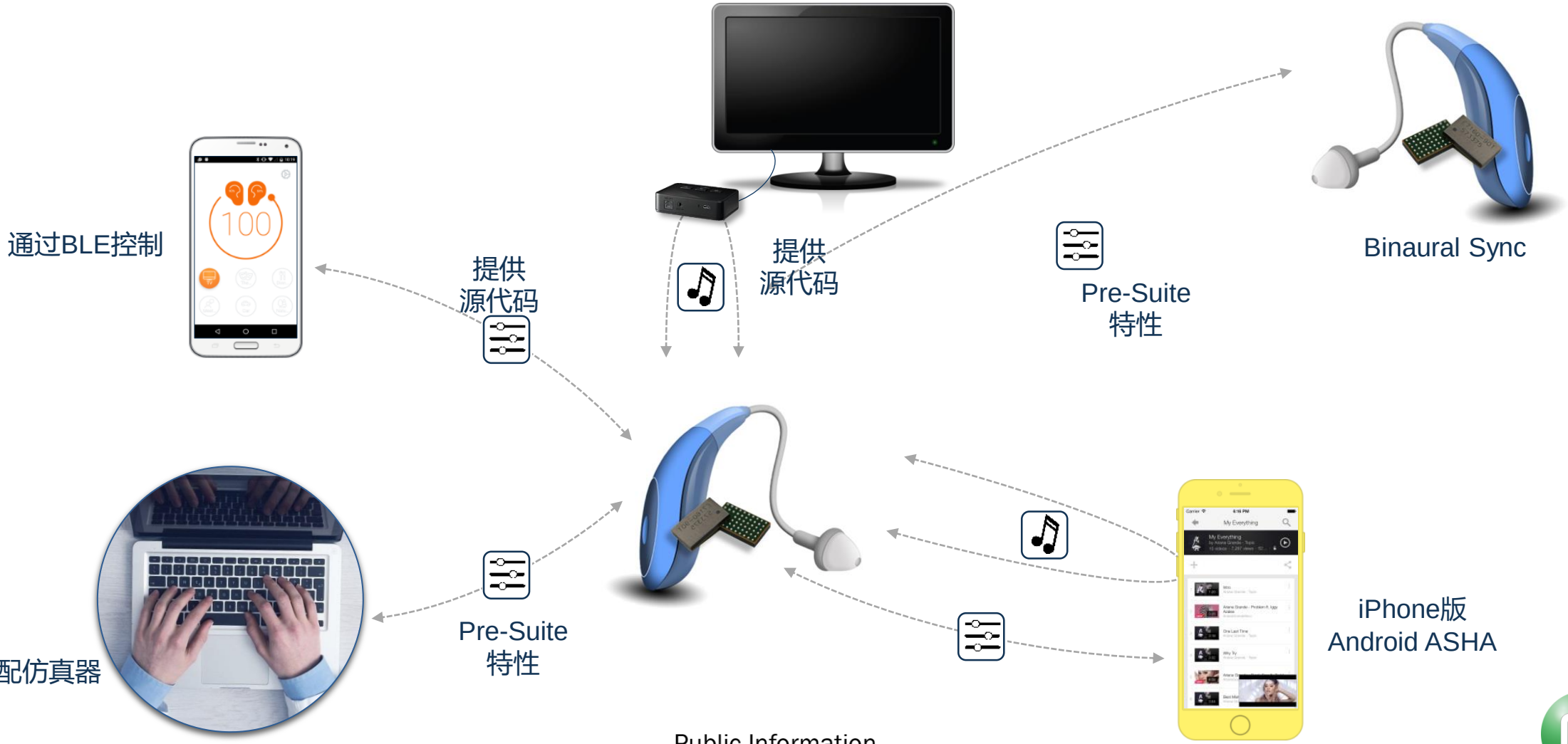
Ezairo® 7160 SL 安森美样机以及demo演示

Ezairo® 7160 SL 安森美样机演示

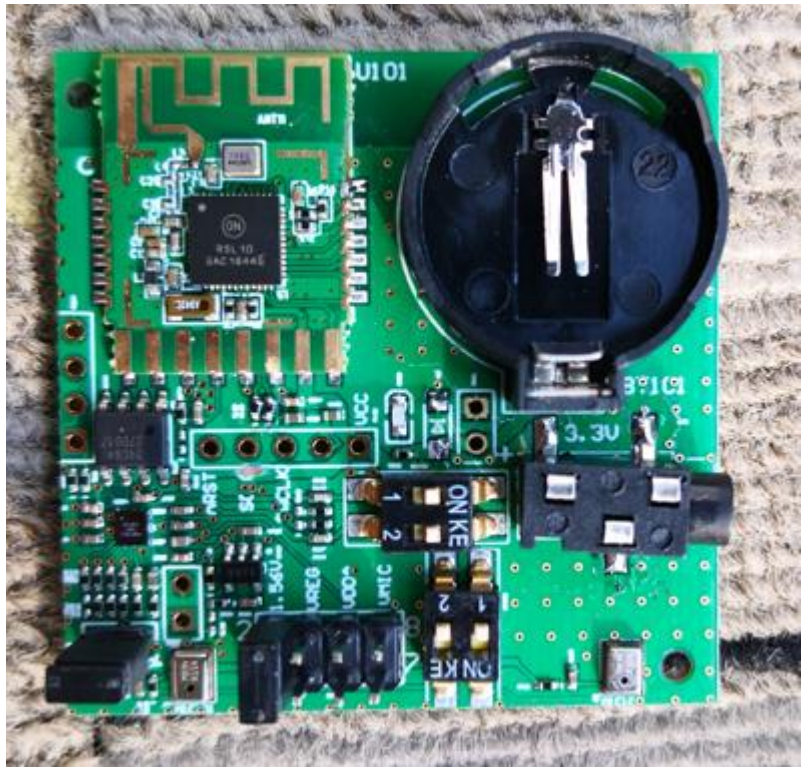
苹果手机音频传输

安卓手机音频传输

无线验配



TV Audio Streamer ----> Ezairo® 7160 SL



Streamer 方案采用安森美半导体的
RSL10 BLE 2.4GHz 无线电IC

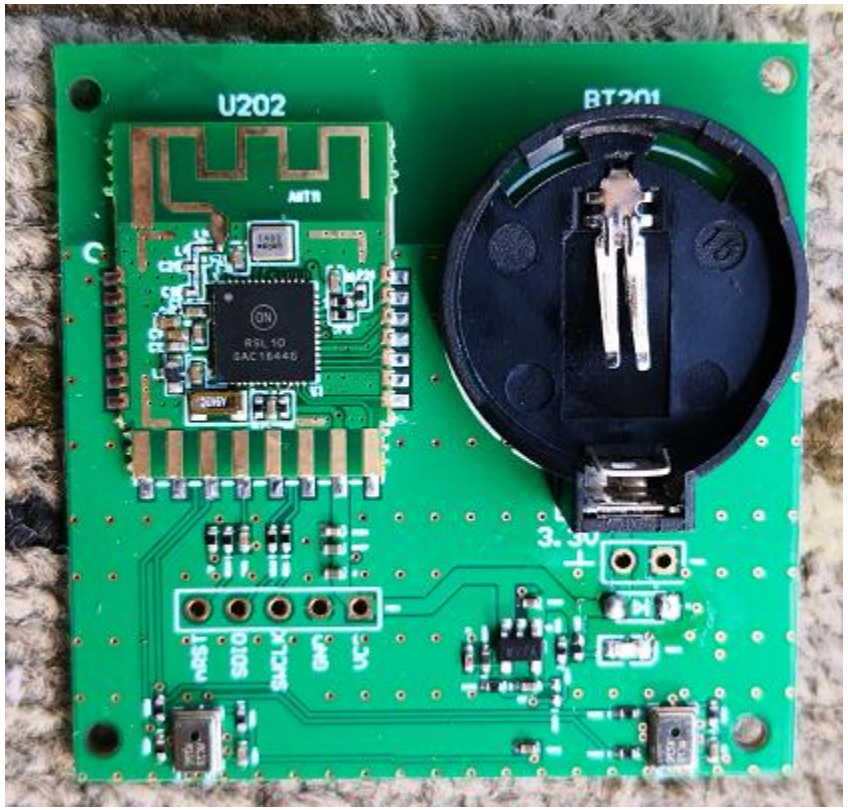
主要功能

- 支持3.5mm Line IN 模拟输入
- 支持模拟麦克风本地语音输入
- 发射功率最高+6dB，无线传输距离7-10米
- 支持降噪功能，拾音功能，去混响

关键性能指标

- 超低功耗BLE 5.0 RSL10
- TX (PHY)峰值电流 @ 0 dBm: 4.6 mA
- RX 灵敏度: -94 dBm
- 蓝牙5 认证，支持2 Mbps 数据链路

DMIC Audio Streamer ----> Ezairo® 7160 SL



Streamer 方案采用安森美半导体的
RSL10 BLE 2.4GHz 无线电IC

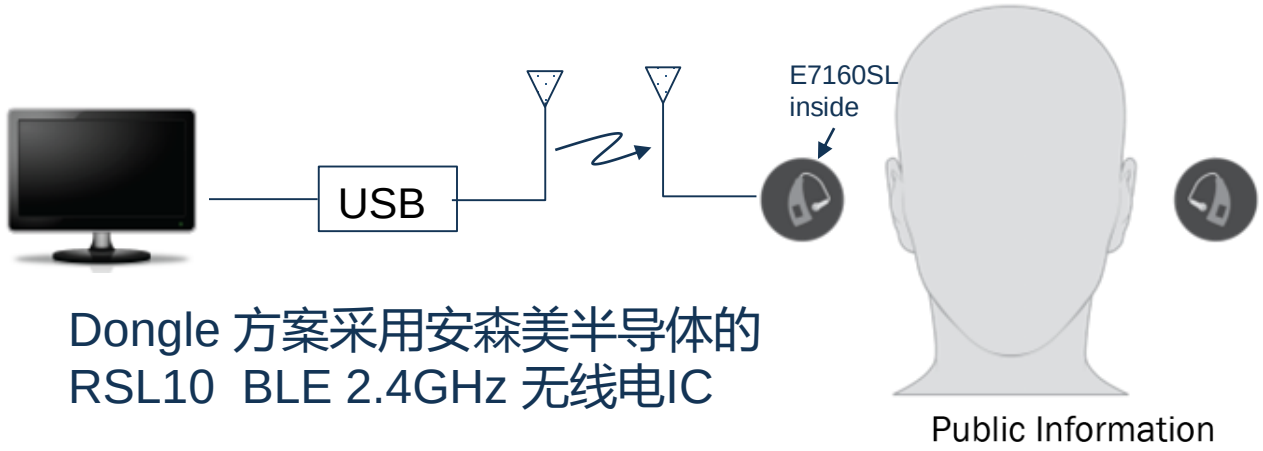
主要功能

- 支持本地数字麦克风输入
- 单SoC方案，超低功耗， 0 dBm, 12Khz Audio streaming 平均1.7mA电流
- 发射功率最高+6dB，无线传输距离7-10米

关键性能指标

- 超低功耗BLE 5.0 RSL10
- TX (PHY)峰值电流 @ 0 dBm: 4.6 mA
- RX 灵敏度: -94 dBm
- 蓝牙5 认证，支持2 Mbps 数据链路

USB Dongle Wireless Fitting ----> Ezairo® 7160 SL



Dongle 方案采用安森美半导体的
RSL10 BLE 2.4GHz 无线电IC

主要功能

- 支持无线Wireless Fitting功能
- Sound Designer内含驱动接口，方便易用
- 不需要任何电缆连接

关键性能指标

- 超低功耗BLE 5.0 RSL10
- TX (PHY)峰值电流 @ 0 dBm: 4.6 mA
- RX 灵敏度: -94 dBm
- 蓝牙5 认证，支持2 Mbps 数据链路

Ezairo® 7160 SL 安森美合作伙伴：谨颢 JH验配软件

http://www.jhearing.com/web/

瑾颢电子验配软件列表 更新至2020-10-11

预配置DSP SB3229， R3920/3910 验配软件

下载地址

Pre Suite Ezairo 7111-V.x 系列验配软件

下载地址

Pre Suite Ezairo 7160-V.x 系列验配软件

支持有线验配和无线验配 下载地址

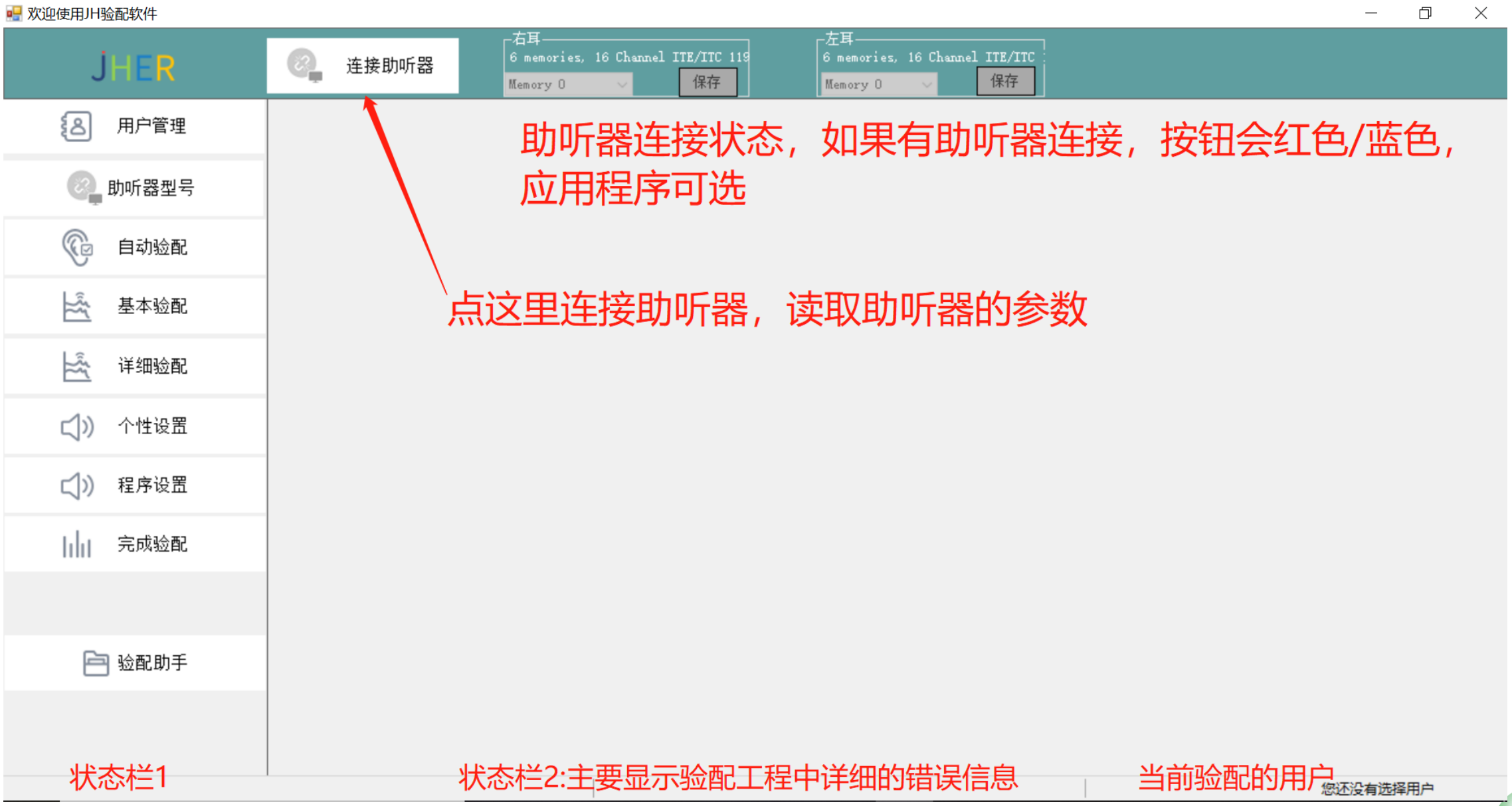
Pre Suite 无线助听器方案Ezairo 7160-V.x 系列验配软件

用户端软件 下载地址

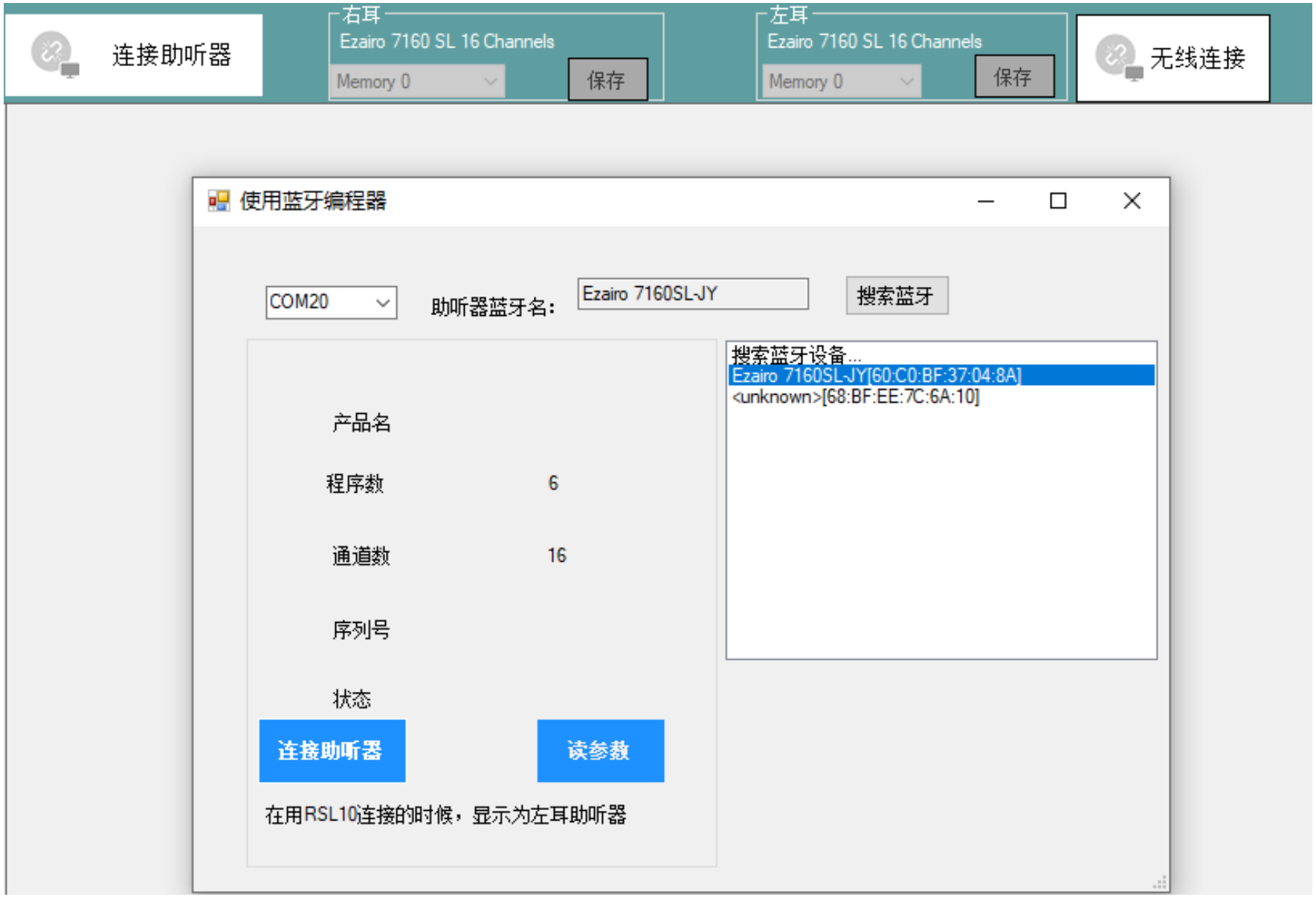
联系我们: http://www.jhearing.com

http://www.jhearing.com/jhear_files.htm

JH-FITTING PC端验配软件



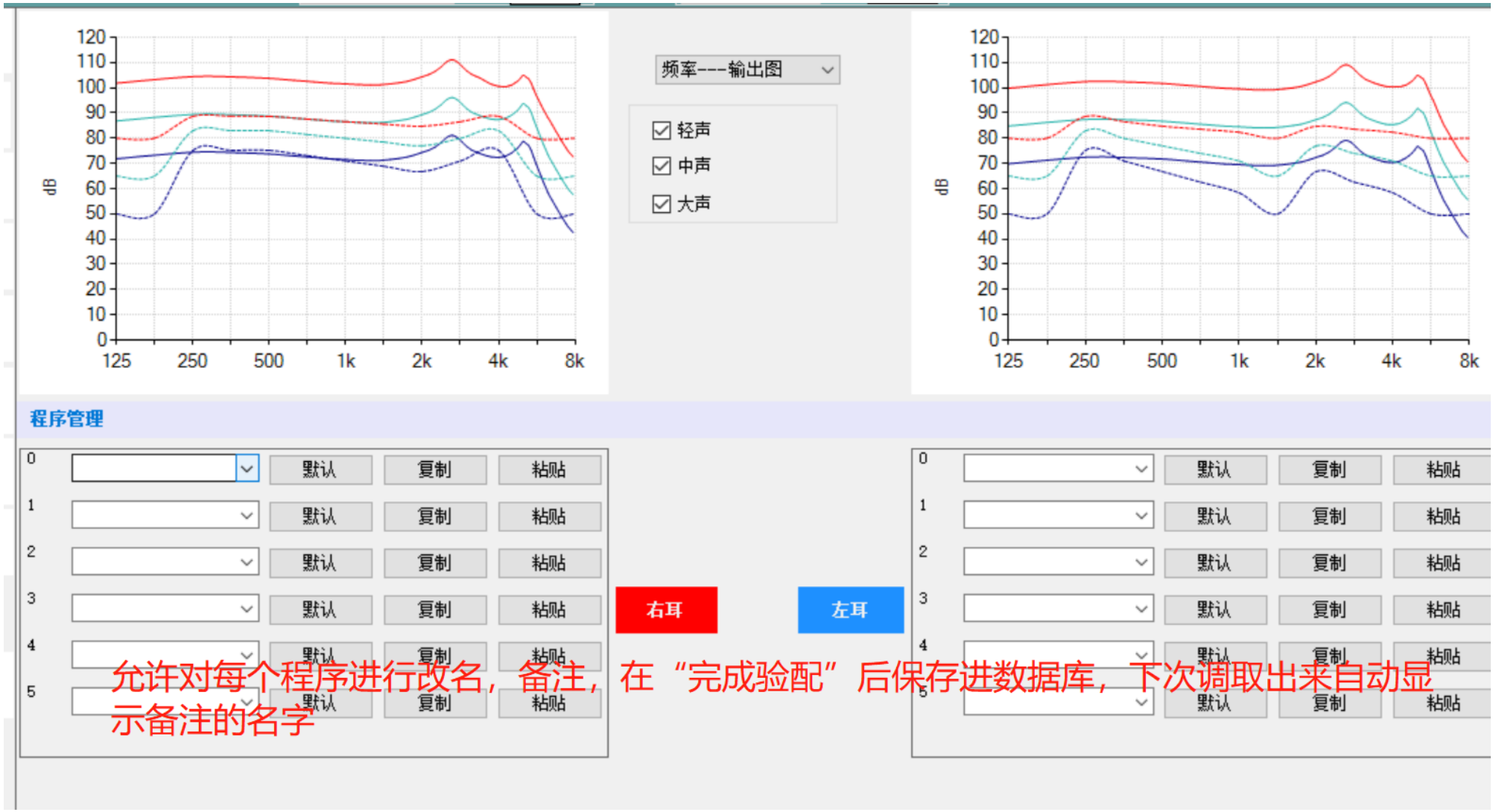
JH-FITTING PC端验配软件 --- RSL10 Dongle 无线验配



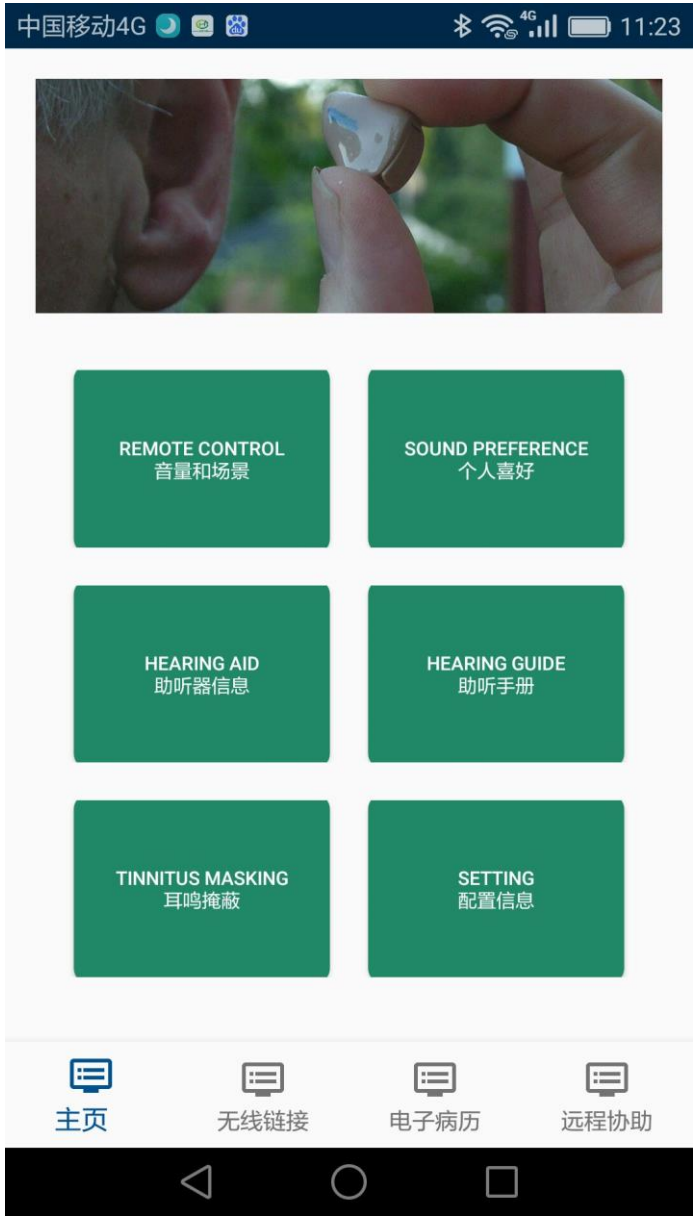
JH-FITTING PC端验配软件 --- RSL10 Dongle 无线验配

JH-FITTING PC端验配软件 --- RSL10 Dongle 无线验配

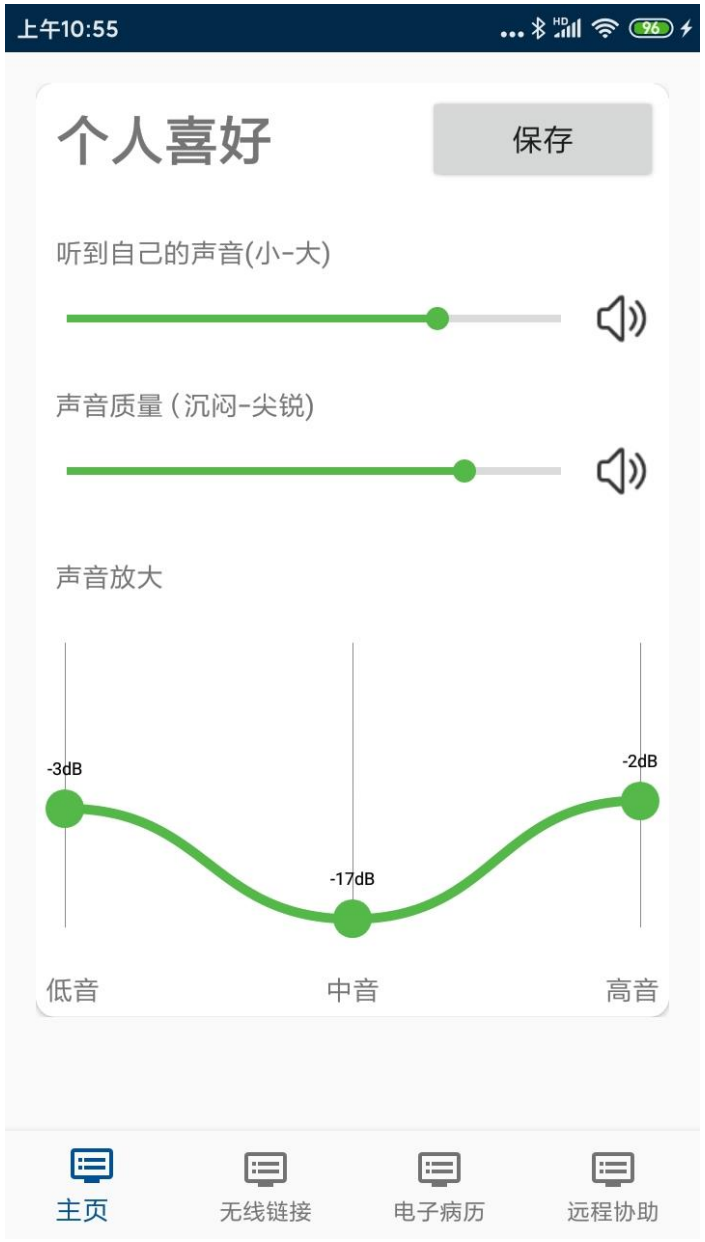
JH-FITTING PC端验配软件 --- RSL10 Dongle 无线验配

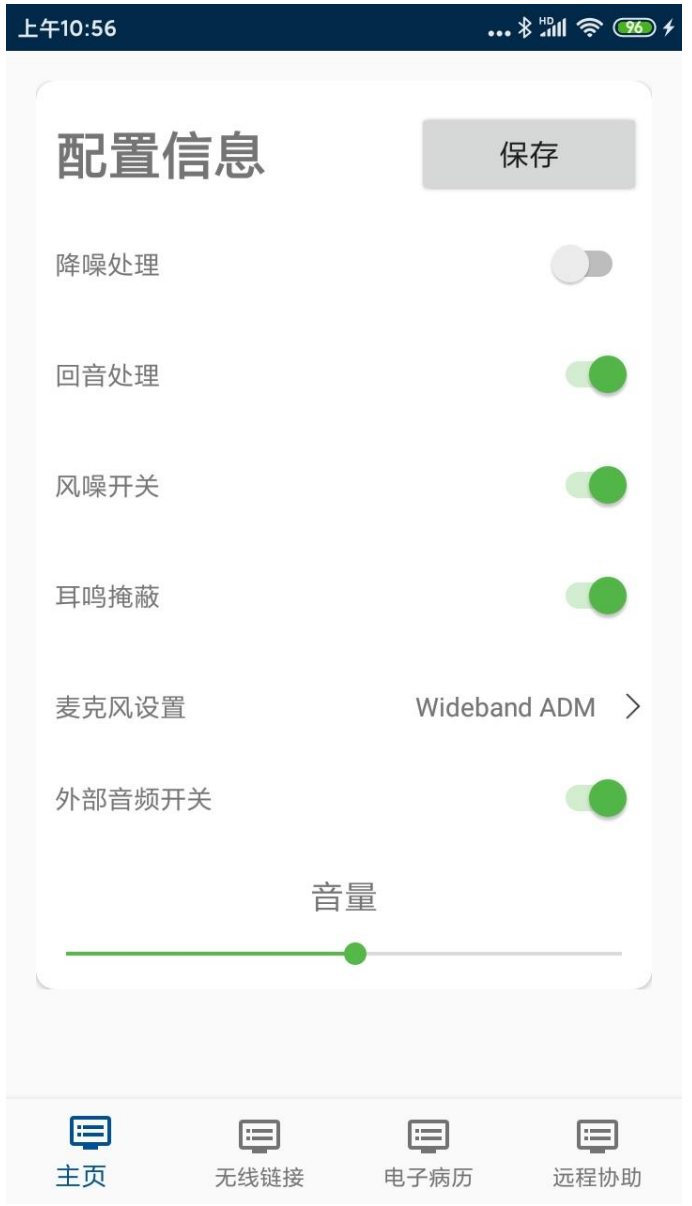


JH-7160 安卓端验配软件



JH-7160 安卓端验配软件

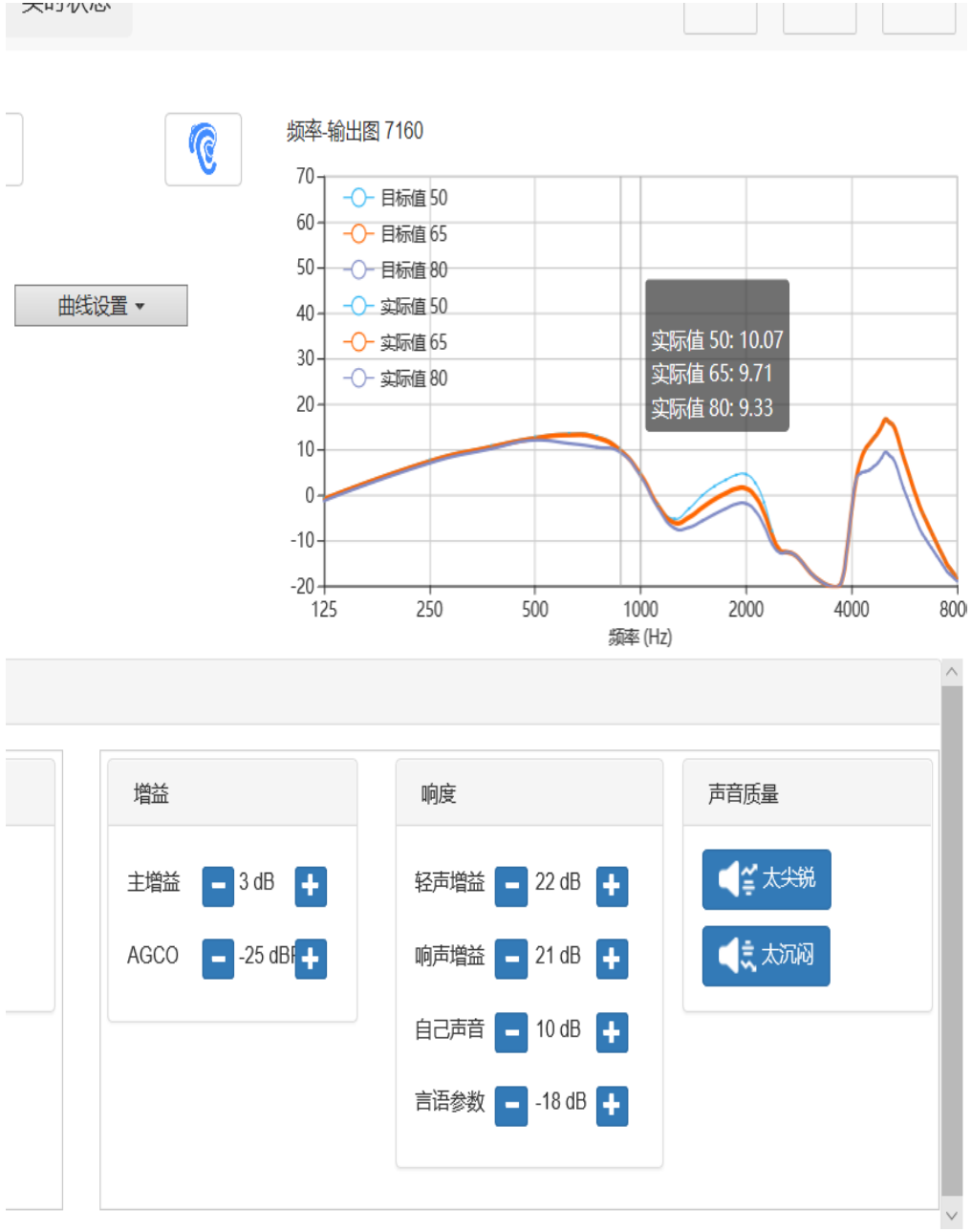




JH-7160 安卓端验配软件

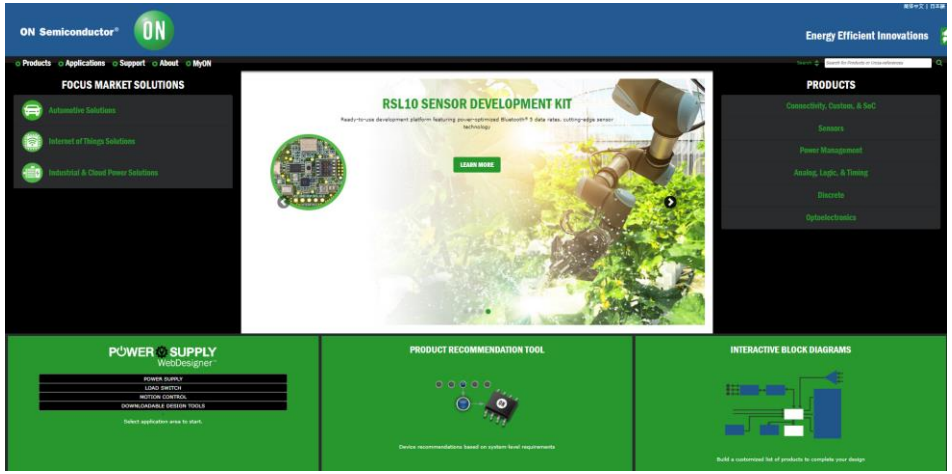
JH-7160 远程协助功能

1.听力师可在电脑/小程序上打开这个网址，对手机进行远程协助，进行助听器验配
2.基于阿里云基础架构，保证稳定运行
3.采用国际标准协议进行通讯，可接入第三方系统



更多信息

- 安森美半导体网站
  www.onsemi.cn



- 技术支持：

Titan.tian@onsemi.com

安森美半导体