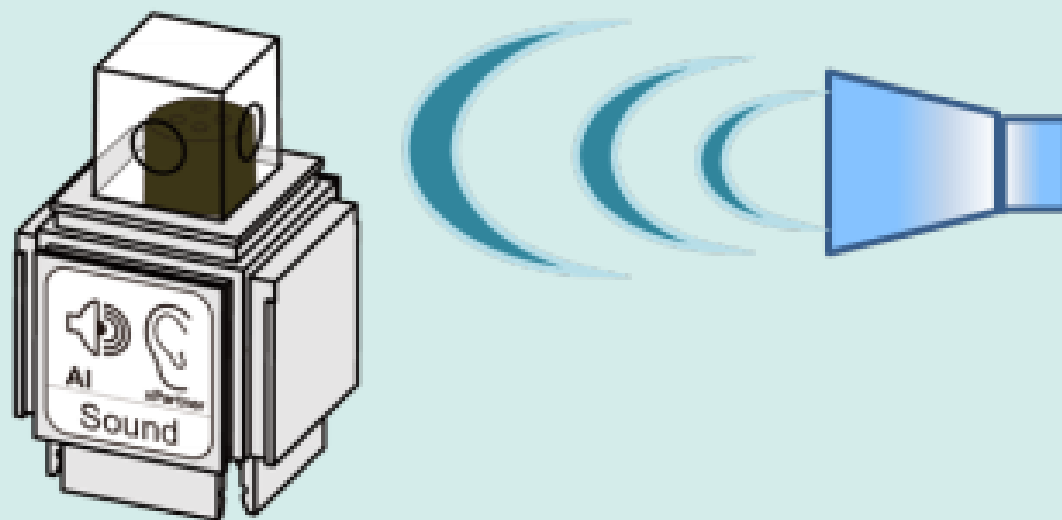


教育机器人教师培训

第4课：能听到声音的机器人



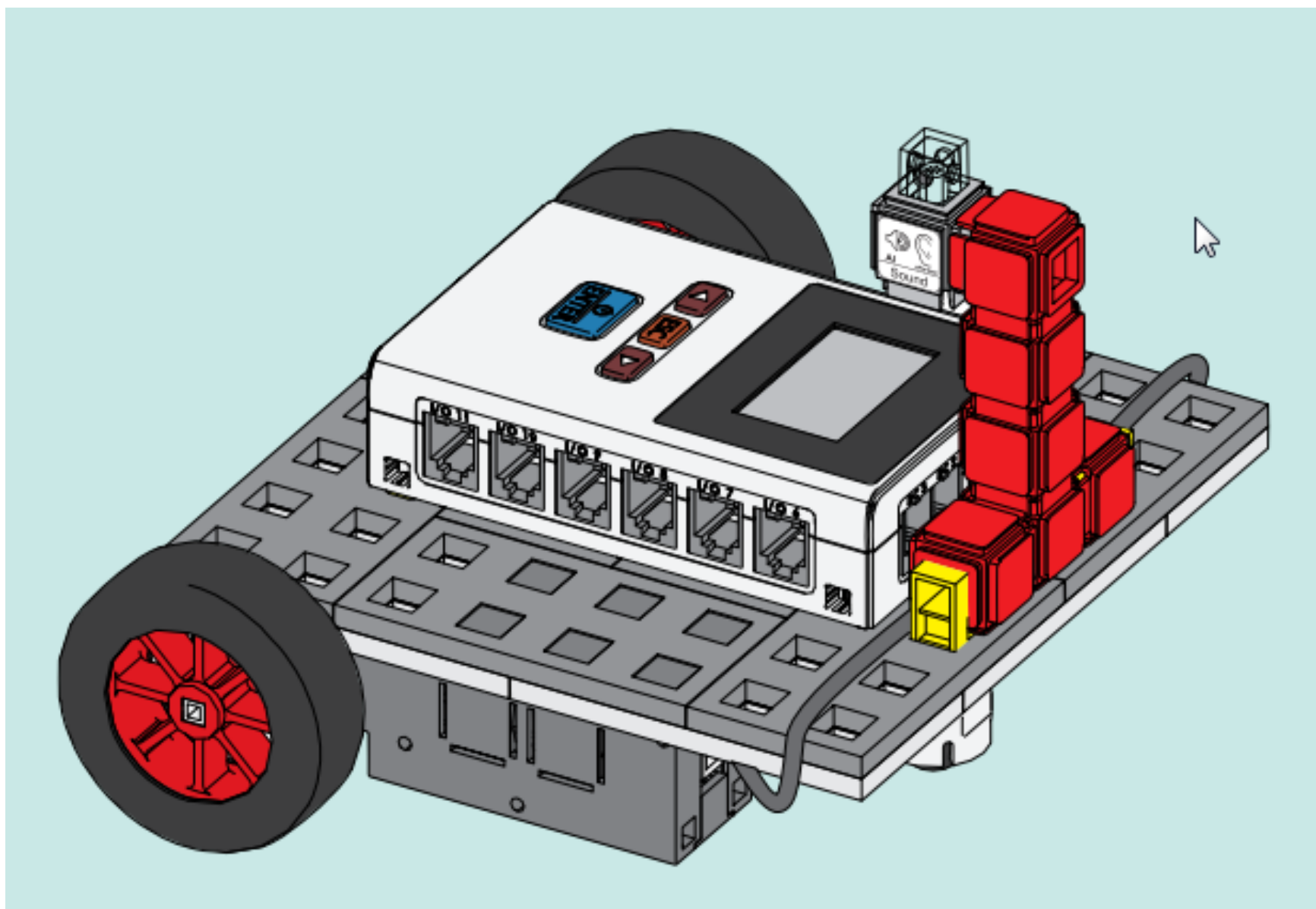
1、声音传感器原理



声音传感器就像人类的耳朵，它可以听到外界的声音，虽然它不能“听明白”你在讲什么，但是它能够辨别出声音的强弱。

声音传感器的作用相当于一个对声音敏感的话筒(麦克风)。该传感器能显示声音强度大小，声波使话筒内的驻极体薄膜振动，导致电容的变化，而产生与之对应变化的微小电压，这一电压随后被转化成 0-5V 的电压，经过 A/D 转换被数据采集器接受，并传送给控制器。

声音启动机器人



声音启动机器人

The screenshot displays a software development interface for a robot. The main window is titled "VJC_4.2_CH_Build:20150104 Ccon102 [4 声音启动.flw] 主程序窗口". The menu bar includes "文件(F)", "编辑(E)", "视图(V)", "工具(T)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations and execution. The main workspace is divided into three sections:

- Left Panel (Control Module Library):** Contains icons for "多次循环" (Multiple Cycles), "永远循环" (Forever Loop), "条件循环" (Conditional Loop), "条件判断" (Conditional Judgment), and "中断" (Interrupt). A "break" button is also visible.
- Center Panel (Flowchart):** Shows a sequence of blocks: a yellow "主程序" (Main Program) block, a brown "声音11" (Sound 11) input block, a red diamond-shaped "条件循环" (Conditional Loop) block with "是" (Yes) and "否" (No) labels, and another brown "声音11" (Sound 11) input block. A red box highlights the conditional loop and the second sound block, indicating a loop structure.
- Right Panel (Code Editor):** Displays the following C code:

```
#include "ASEIO.h"

int voi_1=0;

void main()
{
    voi_1 = AI(11);
    while(voi_1 < 1500)
    {
        voi_1 = AI(11);
    }
}
```

The status bar at the bottom left shows "就绪" (Ready).

声音启动机器人

VJC_4.2_CH_Build:20150104 Ccon102 [4 声音启动.flw] 主程序窗口

文件(F) 编辑(E) 视图(V) 工具(T) 窗口(W) 帮助(H)

主程序名字 shyqd

执行器模块库
传感器模块库
控制模块库
程序模块库

任务 新建子程序
子程序返回 结束模块
code
自定义

```
graph TD; Start([主程序]) --> Sound11_1[/声音11/]; Sound11_1 --> Loop{条件循环}; Loop -- 否 --> MotorTurn[马达03转]; Loop -- 是 --> Sound11_2[/声音11/]; Sound11_2 --> MotorTurn; MotorTurn --> Delay[延时等待]; Delay --> MotorStop[马达03停]; MotorStop --> End([结束]);
```

```
#include "ASEIO.h"

int voi_1=0;

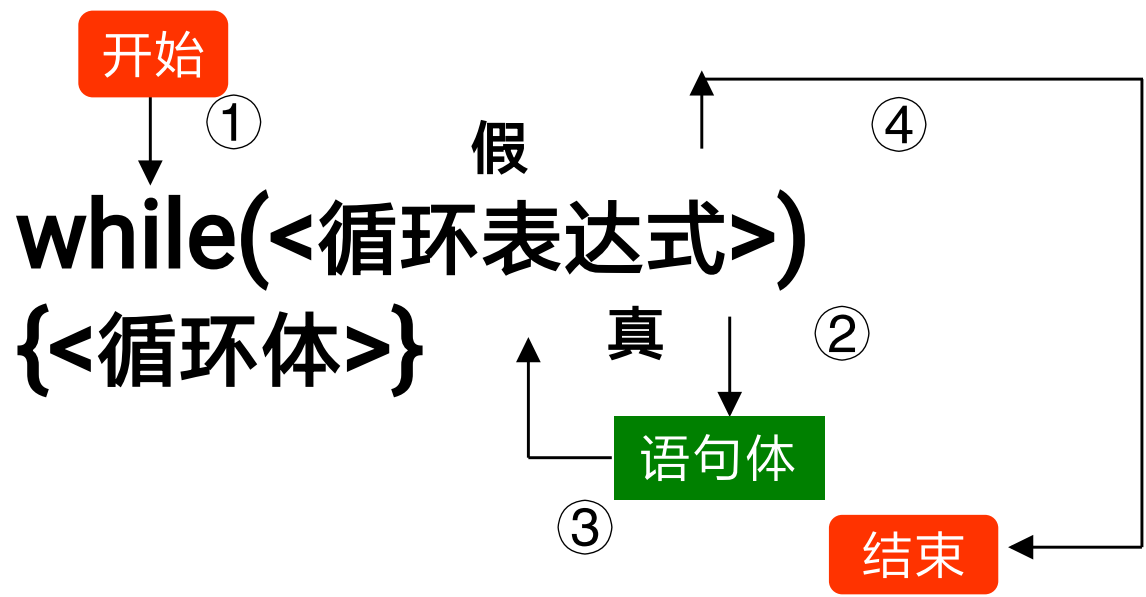
void main()
{
    voi_1 = AI(11);
    while(voi_1 < 1500)
    {
        voi_1 = AI(11);
    }

    SetMotoCL(0,50);
    SetMotoCL(3,50);
    wait( 0.500000 );
    SetMoto(0,0);
    SetMoto(3,0);
}
```

1

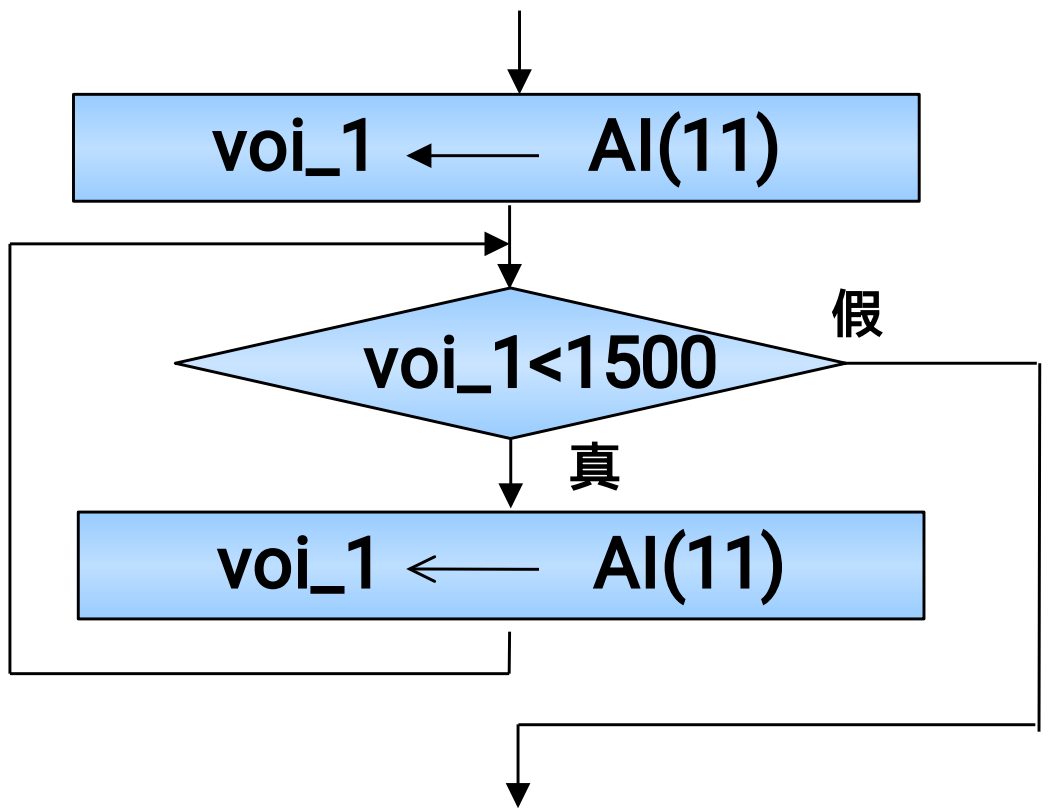
```
#include "ASEIO.h"int //编译预处理命令
voi_1=0; //声音变量1的初值为0
void main() //主函数
{
    voi_1 = AI(11); //将11#端口读取的数据存到voi_1中
    while(voi_1 < 1500) //当voi_1<1500时执行循环,否则退出循环
    {
        voi_1 = AI(11); //将11#端口读取的数据存到voi_1中
    }
    SetMotoCL(0,50);
    SetMotoCL(3,50);
    wait( 0.500000 );
    SetMoto(0,0);
    SetMoto(3,0);
}
```

关系运算符	名称	关系表达式
==	等于	x==y
!=	不等于	x!=y
>	大于	x>y
<	小于	x<y
>=	大于等于	x>=y
<=	小于等于	x<=y



```

void main()
{
    voi_1 = AI(11);
    while(voi_1 <1500)
    {
        voi_1 = AI(11);
    }
}
  
```



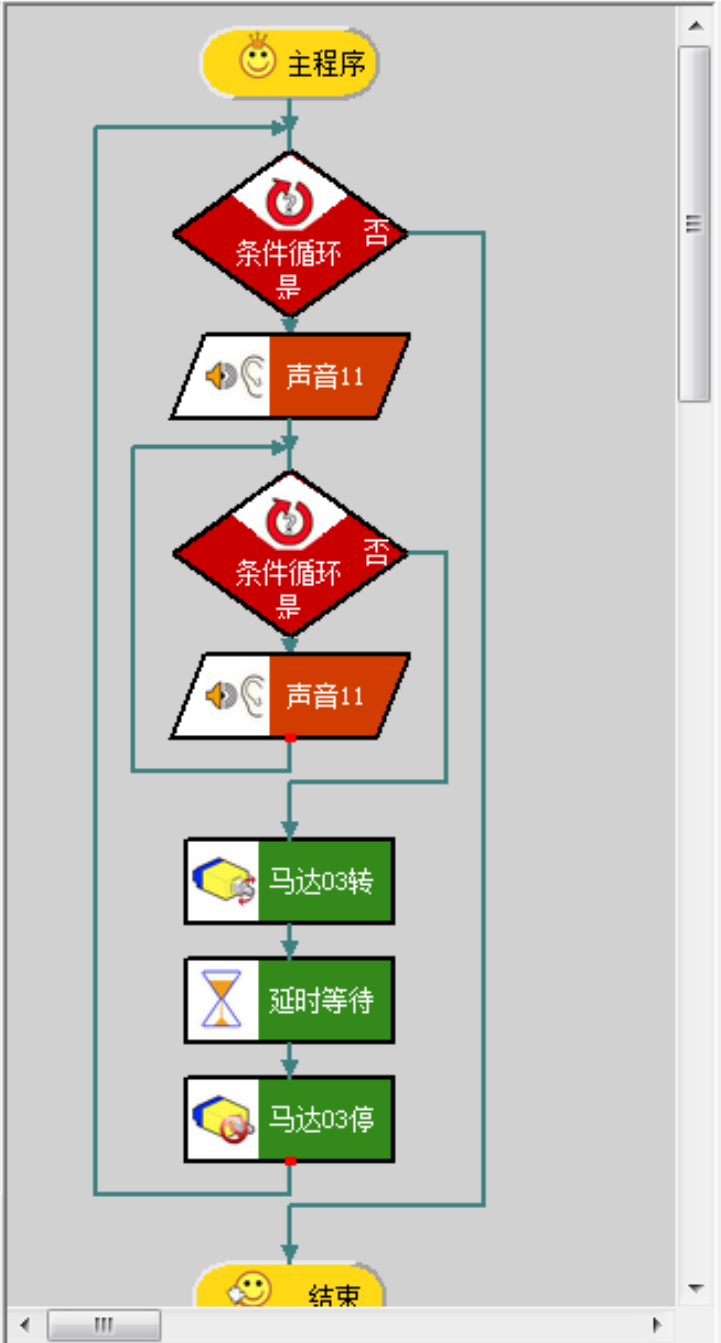
1

```
#include "ASEIO.h"
int gi_1=0;
int voi_1=0;
void main()
{
    while(gi_1 == 0)
    {
        voi_1 = AI(11);
        while(voi_1 < 1500)
        {
            voi_1 = AI(11);
        }
        SetMotoCL(0,50);
        SetMotoCL(3,50);
        wait( 0.500000 );
        SetMoto(0,0);
        SetMoto(3,0);
    }
}
```


执行器模块库
传感器模块库
控制模块库

- 多次循环
- 永远循环
- 条件循环
- 条件判断
- 中断

程序模块库



```
#include "ASEIO.h"

int gi_1=0;
int voi_1=0;

void main()
{
    while(gi_1 == 0)
    {
        voi_1 = AI(11);
        while(voi_1 < 1500)
        {
            voi_1 = AI(11);
        }
        SetMotoCL(0,50);
        SetMotoCL(3,50);
        wait( 0.500000 );
        SetMoto(0,0);
        SetMoto(3,0);
    }
}
```

机器人发声

The screenshot shows a software development environment window titled "VJC_4.2_CH_Build:20150104 Ccon102 [2017_04_06_09_12_22.flw] 主程序窗口". The menu bar includes "文件(F)", "编辑(E)", "视图(V)", "工具(T)", "窗口(W)", and "帮助(H)". The toolbar contains various icons for file operations and execution. The main workspace is divided into three sections:

- Left Panel (Module Library):** Lists "执行器模块库", "传感器模块库", "控制模块库", and "程序模块库". Under "程序模块库", there are icons for "任务", "新建子程序", "子程序返回", "结束模块", and "自定义".
- Center Panel (Flowchart):** A vertical flowchart starting with a yellow "主程序" block, followed by three green "发音 1", "发音 2", and "发音 3" blocks (each with a speaker icon), and ending with a yellow "结束" block.
- Right Panel (Code Editor):** Contains the following C code:

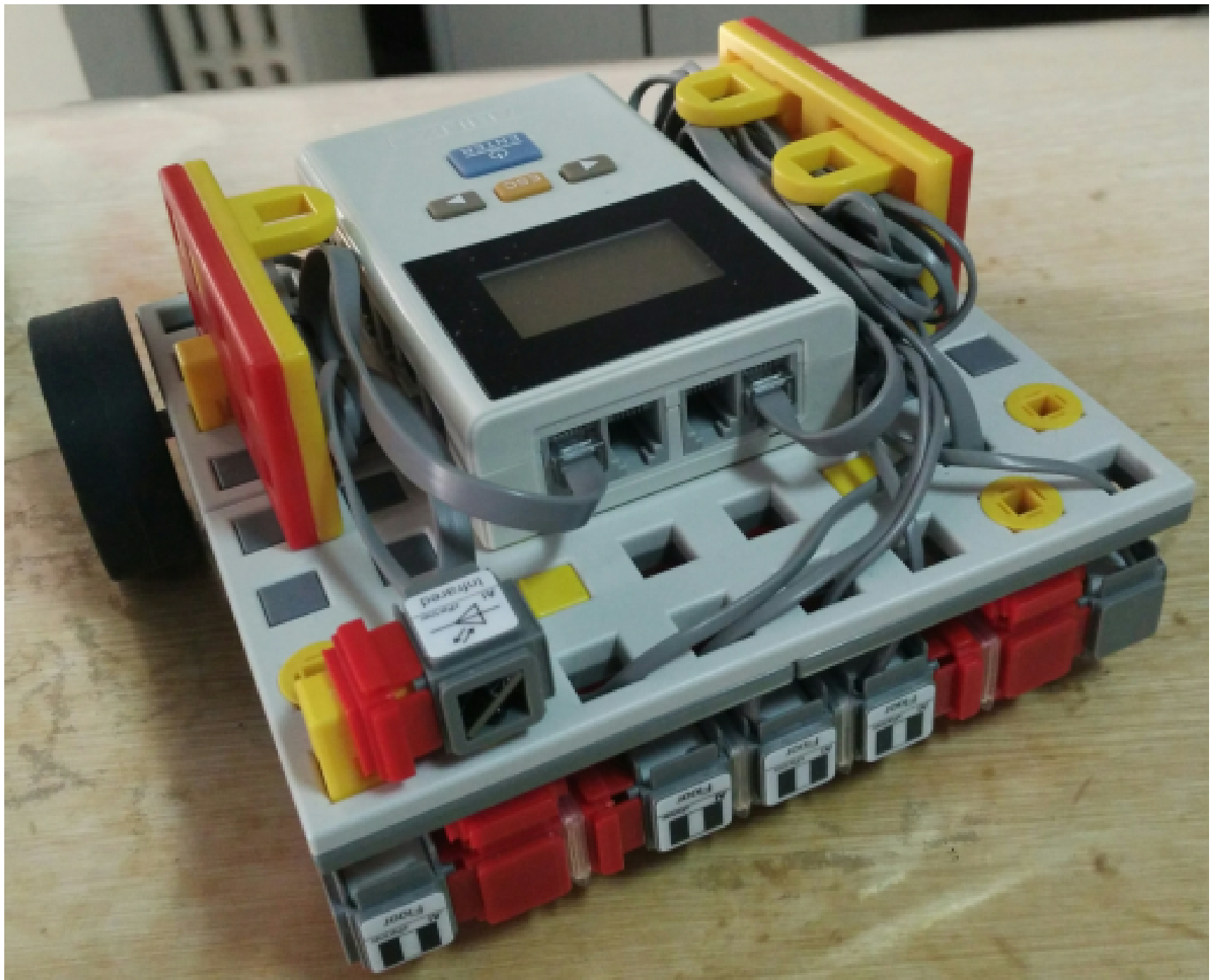
```
#include "ASEIO.h"

void main()
{
    BEEP(523.200012,0.250000);
    BEEP(587.299988,1.000000);
    BEEP(659.200012,1.000000);
}
```

The status bar at the bottom left displays "就绪".

编写、调试以下项目程序

1. 机器人闻声而停
2. 机器人听声而唱
3. 机器人声控灯
- 4.



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无穷魅力吧！

