LOKII-CE boards User Guide V1.0

PRODUCT SPECIFICATIONS

SMART_SHIELD	ARM9 Multimedia Processor 256MB internal flash 320x240 LCD display 720P Camera module 802.11 a/b/g 2.4GHz WIFI module Bleutooth 5.0 module USB port
SMART_POWER	DC input: 6-8.5V @5A power source Support up to 40W power for external components. (SMART_DEVICES)
SMART_IO Extender (Optional)	17 Digital Input/Output board
SMART_ARDUINO (Optional)	Arduino compatible board with BLE connectivity
SMART_RC (Optional)	A SMART_DEVICE board which can drive 4 RC servo motor

Remark: Depend on your board order configuration, either SMART_IO or SMART_Arduino is bundled in the box.

SUPPORT

For more information, please visit www.btobsteam.com to get the latest support or send us email: btobsteam@gmail.com

INTRODUCTION

LOKII-CE boards are three boards stacked together to provide functions for user programming through standard Arduino IDE or LOKII-CE graphical IDE environment.

SMART_SHIELD   SMART_POWER   SMART_ARDUINO

SMART_SHIELD , SMART_POWER,SMART_ARDUINO
(LOKII-CE board) can stacked together to provide Arduino
programming functions

SMART_ARDUINO

To start Arduino IDE programming,   user can connect the Arduino USB port to a Window / Mac computer and write programming through Arduino IDE with the LOKII Arduino library installed. Detail can be found in SMART_ARDUINO_installation.pdf

If you do not required to program in Arduino (C /C++ language), you can unplug this board before powering up the system.
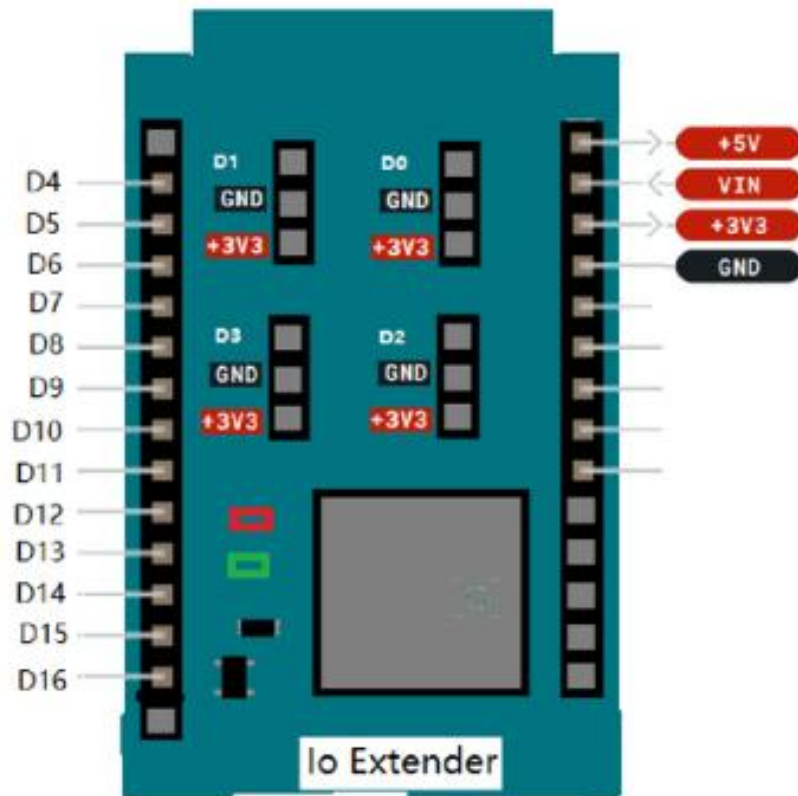
Arduino USB port

For using SMART_ARDUINO for programming, please follow SMART_ARDUINO SETUP GUIDE (V1.0)
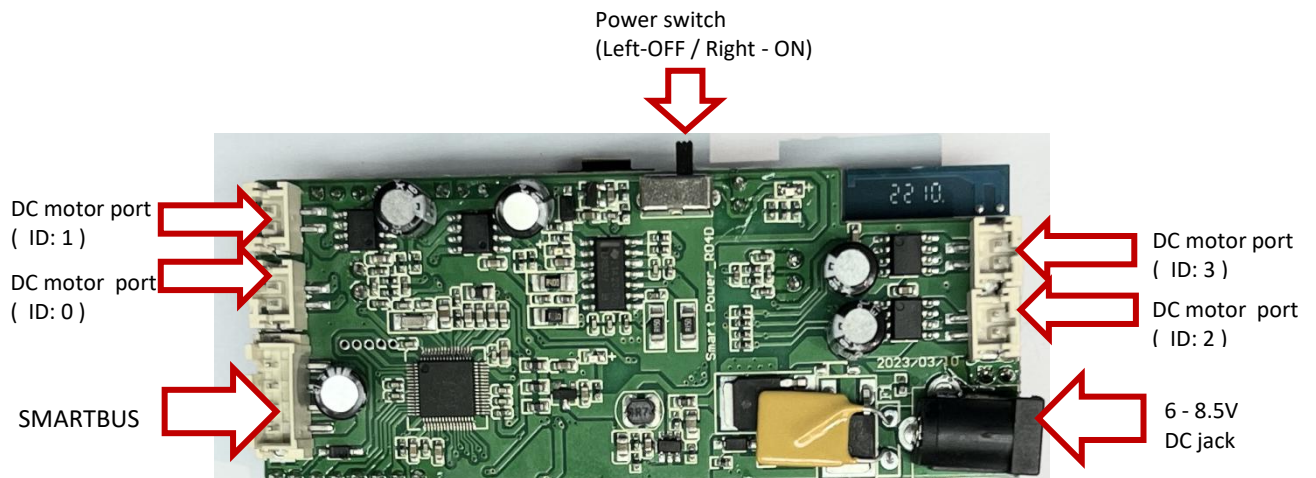
SMART_IO Extender

SMART_IO provides 17 digital I/O ports for external sensors or output in 3.3 V. This board can be replaced with SMART_ARDUINO to allow user to program in Blockly environment to control digital I/Os.
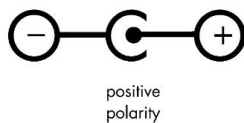
SMART_POWER

This board provide external power source and source direction detection for the LOKII-CE board. You can plug in a 6V - 8.5V DC voltage to provide up to 40W power to drive external components. For example, a list of SMART DEVICES connected through SMARTBUS and 4 x DC motor connected to the DC motor port The default SMART_IDs for these DC port are   **0,1,2,3** and cannot be changed in the program.

If you do not required to drive external devices or sound direction, you can unplug this board before powering up the system.
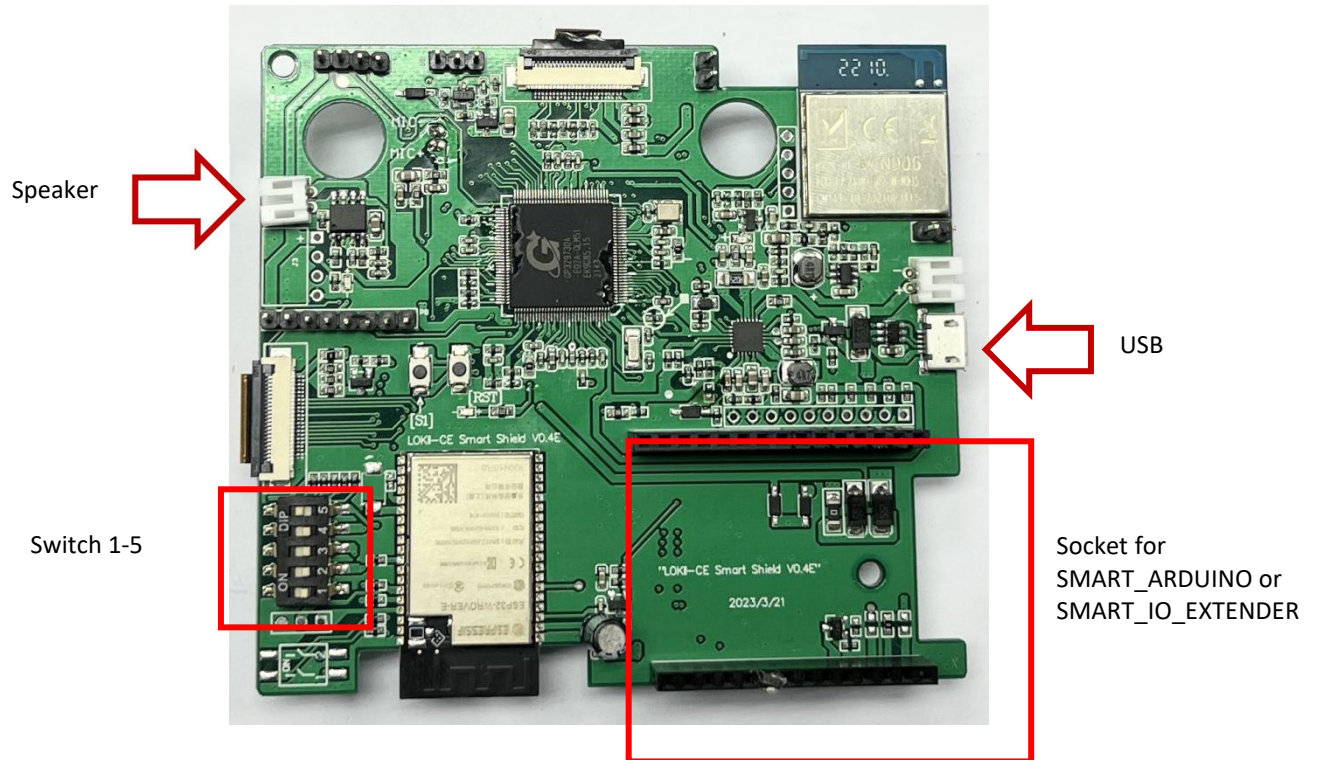
Power switch
(Left-OFF / Right - ON)

DC motor port
(ID: 1)

DC motor port
(ID: 0)

SMARTBUS

DC motor port
(ID: 3)

DC motor port
(ID: 2)

6 - 8.5V
DC jack

SMART_POWER should be plugged with external DC supply with this jack polarity.

positive
polarity

SMART_SHIELD

This board allows SMART_POWER and SMART_ARDUINO stacked together to provide LOKII-CE AI functions. In addition, it has an internal storage (~170MB) to store multi-media files (mp3, wav, avi) for playback and configure the WIFI functions.

To power up the SMART_SHIELD, you can supply 5V DC power using USB port.

Speaker

USB

Switch 1-5

Socket for
SMART_ARDUINO or
SMART_IO_EXTENDER

Switches 1 -5 controls LOKII-CE board boot up behaviors. When LOKII-CE boards is power up, it will check the switch conditions to kick start one of the following mode.

Switch 1 ON	LOKII-CE board enter USB mass storage mode when connect with a PC through USB cable. This allow user to change the wifi setting or copy file from mass storage.
Switch 2 ON	LOKII-CE enter SMART_ARDUINO board control mode. (This mode works if SMART_ARDUINIO is inserted before power up)
Switch 3 ON	Run Blockly script 1 once
Switch 4 ON	Run Blockly script 2 once
Switch 5 ON	Run Blockly script 3 once

Speaker port supports common 8 Ω speaker.

SMART-RC (SMART_DEVICE board)
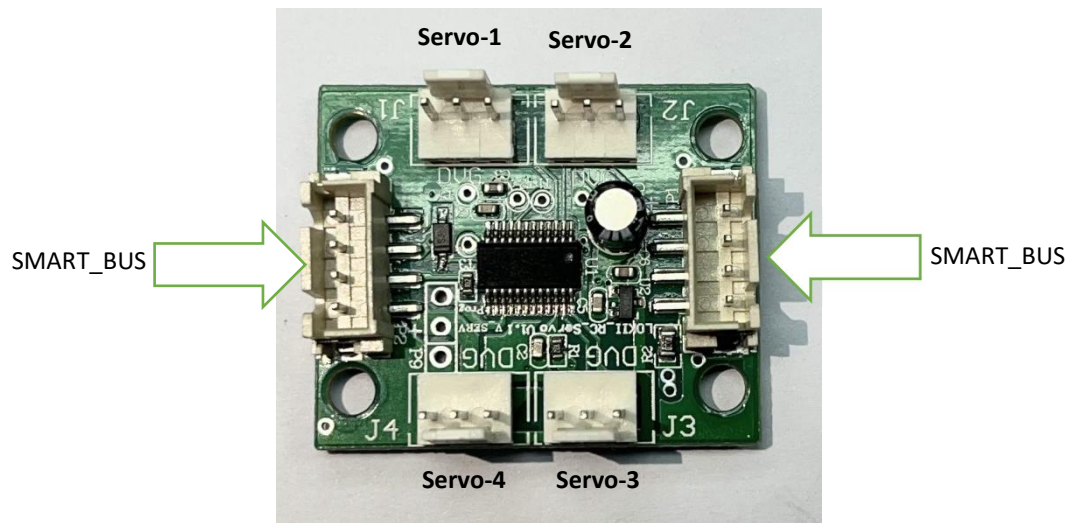
RC_Servo board can control up to 4 RC servo motor. The default SMART_IDs for these RC port are 8,9,10,11. The initial SMART_ID (id =8) can be configured in program. The servo motor should connect according to the port pin marking (DVG)
(D = Data pin, V = Vin , G = Ground)

Some popular Servo motors supported are:

- SG90
- MG996R
- MG90S
- MG995

Programming Configuration Guide

Here is the summary for the board configuration based on the function requirements and programming method.

Function Scope	Arduino Programming	LOKII-CE Graphical IDE
LOKII-CE AI functions: ● Image processing ● Sound processing ● Multimedia ● SMART_IOTs ● Cloud AI functions	SMART_SHIELD + SMART_ARDUINO (USB power)	SMART_SHIELD + SMART_IO Extender (USB power)
LOKII-CE Smart Device Control LOKII-CE Sound direction detection	SMART_SHIELD + SMART_ARDUINO + SMART_POWER (DC jack power)	SMART_SHIELD + SMART_POWER (DC jack power)

First time setup

LOKII-CE boards support two WIFI configuration method:

- Soft-AP mode
- Station mode

Soft-AP mode

When there is no "wifi.txt" file configured inside SMART_SHIELD USB mass storage and power up the board, LOKII_CE boards will enter Soft-AP mode. In this mode, LOKII-CE boards will emulate as a Soft-AP router (No internet connection) and user can connect this WIFI access point by joining the network name called: "**LOKII_XXXXXX**" and typing default password: "**12345678**". After joining the network, user can use a computer device (Window/Mac/iPhone/Android) to enter "192.168.4.1" in an internet browser and enter LOKII-CE Graphical IDE.

Station mode

User can configure SMART_SHILED to join the same 2.4GHz WIFI router. (Not 5GHz WIFI network) In this case, user can keep the internet connection when using a computer to enter LOKII-CE Graphical IDE.

To configure Station mode, user turn on SMART_SHIELD Switch-1 for "USB mode ", and then connect the USB cable to a Window computer, SMART_SHIELD will emulate a USB mass storage device.
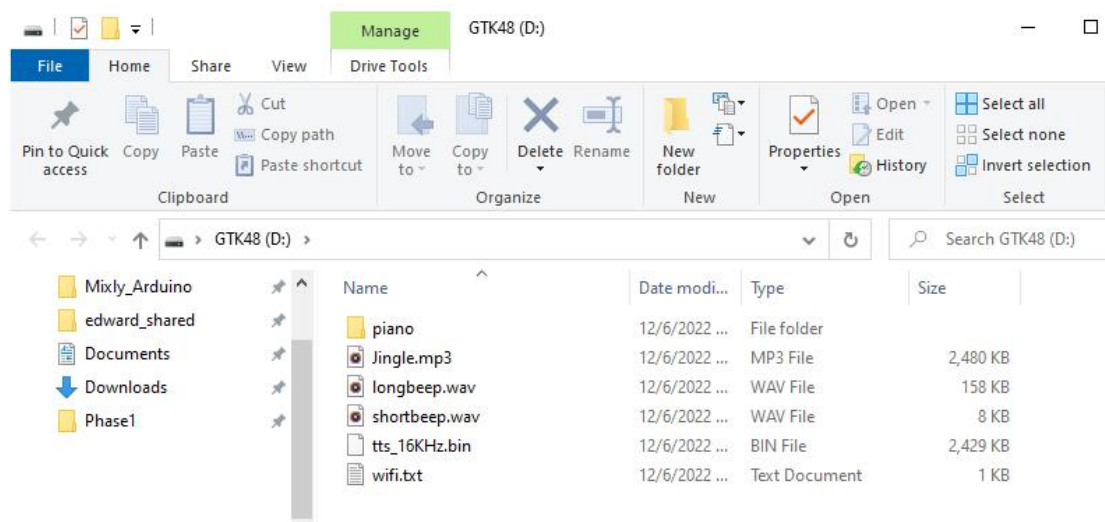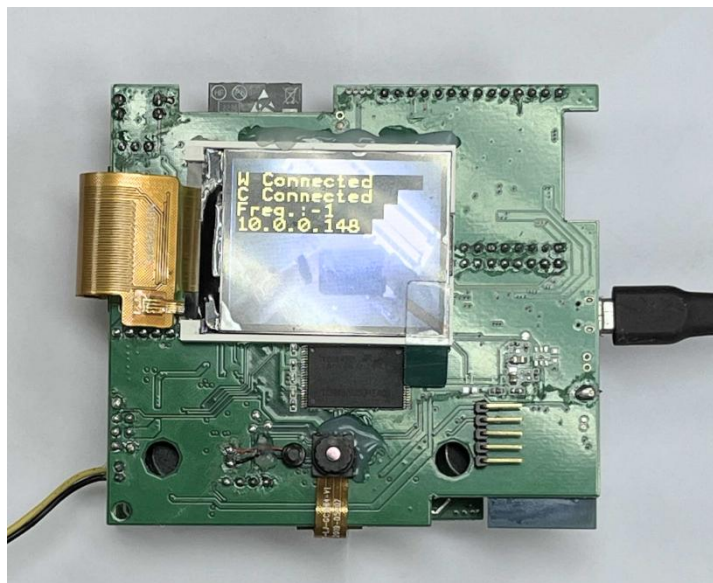
Under the USB mass storage drive, create a "wifi.txt" file by notepad and enter the WIFI SSID and password of the network router with following format (Make sure these keywords are in lower case) :

ssid=XXXXXXX
password=XXXXXXX
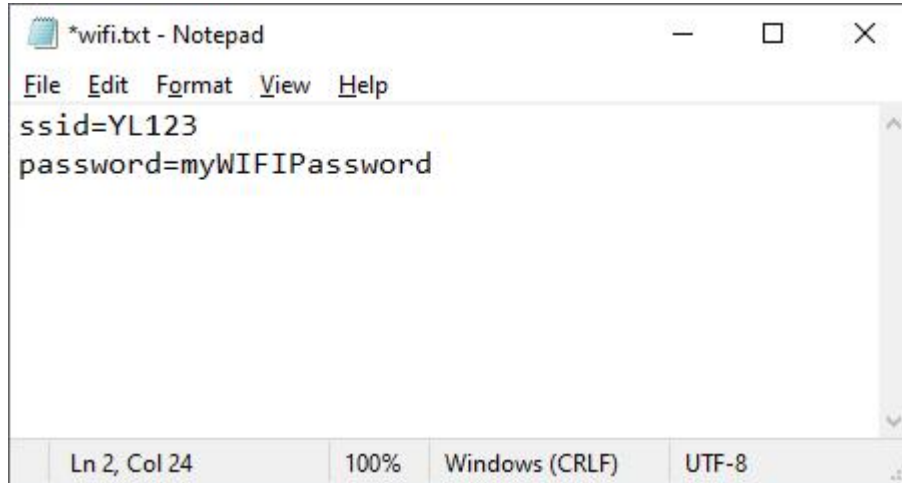
After reset the boards power (Unplug and plug in the USB power cable), LOKII-CE should show the connected IP address.

LOKII-CE Graphical IDE (Blockly)

When LOKII-CE boards (without SMART_ARDUINO) power up and display the IP address, user can enter the IP address in the internet browser to start the Blockly programming. LOKII-CE Graphical IDE supports browser running on iPad / Android pad / Mac/ Linux/ Window platform.
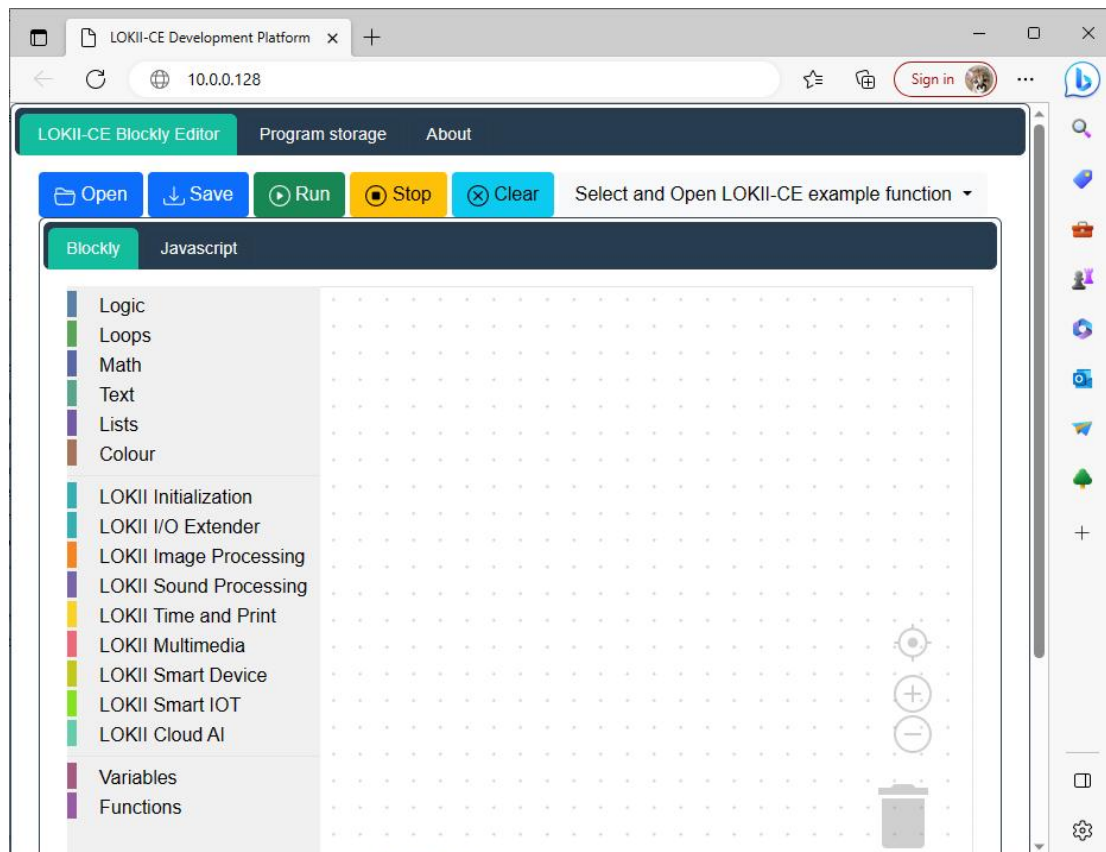
Under LOKII-CE Blockly Editor, user can either:

- Select   a sample program from the a list of demos
- Click "Open Program" to load program from PC.
- Click "Run Program" to download and run the program in LOKII-CE boards
- Click "Save Program" to save the current program into PC
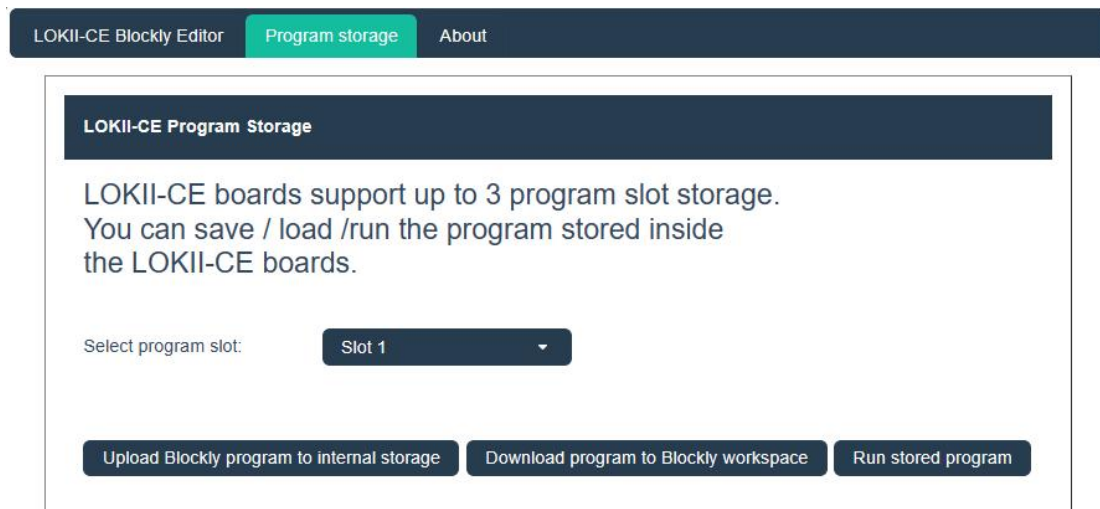
All the LOKII-CE functions can be dragged and dropped into the workspace to program logic flows:
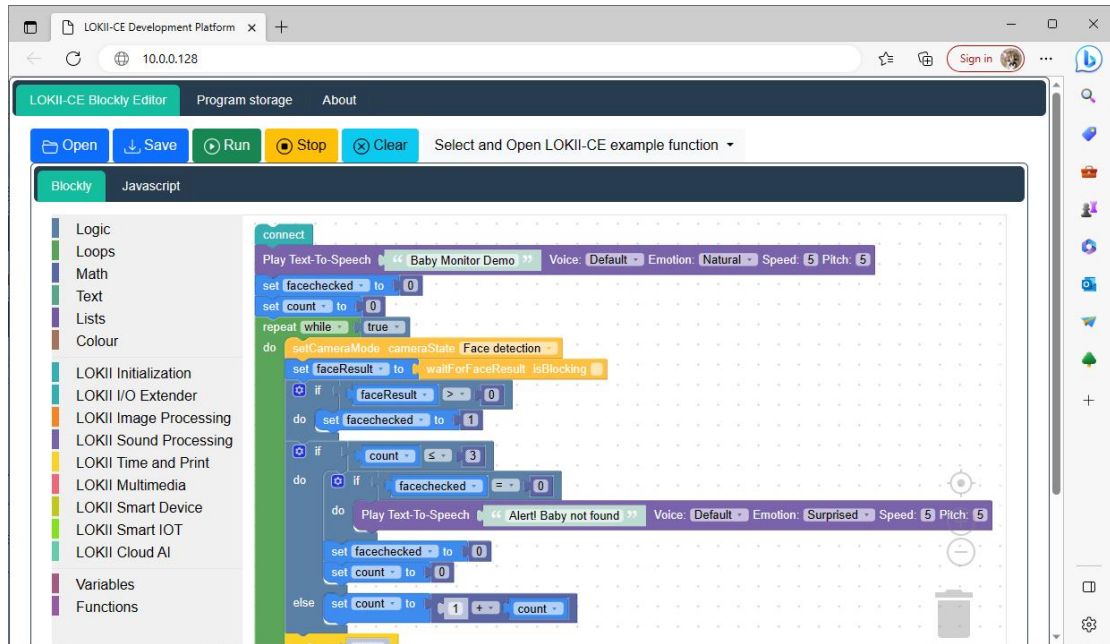
LOKII-CE Program Storage

 LOKII-CE boards support 3 Blockly scripts storage.
Once user create the program in LOKII-CE Blockly Editor, user can select 1 of 3 memory slots to save /load the program from LOKII-CE boards.

The saved program can be run once automatically when LOKII-CE boards power up. For example,
If SMART_SHIELD switch 3 is ON, LOKII-CE run slot 1 program during power up.
If SMART_SHIELD switch 5 is ON, LOKII-CE run slot 3 program during power up.

LOKII-CE About page

User can click "About" to check the LOKII-CE serial number, firmware version and undergo firmware update here.