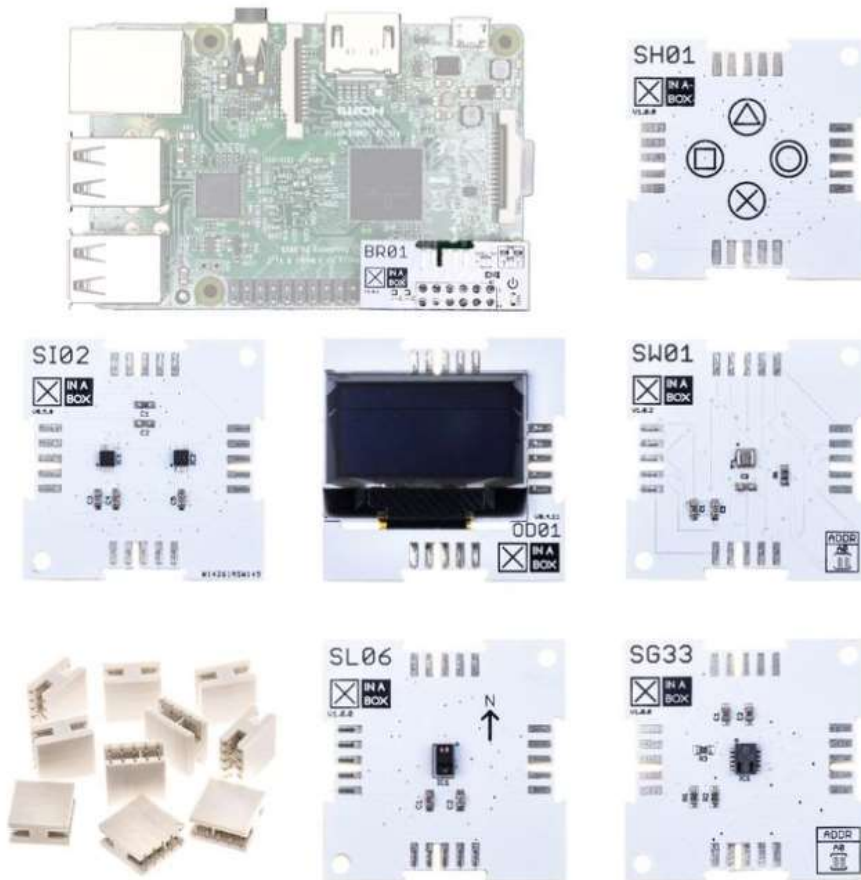## Part Number: XK03

Description: STEM Raspberry Pi Kit

This kit helps Raspberry Pi lovers build sophisticated electronic devices in minutes. With XinaBox's modular sensors for weather, hand gestures, proximity, acceleration/movement, volatile and organic gases, as well as capacitive touch, your Pi is transformed into an IoT hub, together with its own mini OLED display for local device monitoring. The kit includes our BR01 bridge giving your Pi access to our full eco-system of 60+ modular sensors, output, control, communication, and auxiliary xChips. Finally, we provide the right number of xBus and xPDI connectors for building and programming your xChips.
All of this is with no change to the way you code, no need to learn electronics, solder or breadboard. xChips are robust, so you can reuse and prototype countless devices.

Kit contents

1 x **BR01 - Raspberry Pi Bridge**
1 x **OD01 - OLED Display 128x64 (SSD1306)**
1 x **SG33 - VOC & eCO2 (CCS811)**
1 x **SH01 - Capacitive Touch (CAP1296)**
1 x **SI02 - IMU 6DoF (MAG3110 & MMA8653fc)**
1 x **SL06 - Gesture (APDS-9960)**
1 x **SW01 - Advanced Weather Sensor (BME280)**
1 x **XC10 - 10-Pack xBUS Connectors**
Please note that the Raspberry Pi is *not* included in the kit.

How it works
XinaBox BR01 is the hardware bridge that connects xChips with your Raspberry Pi
(abbreviated to RasPi or RPi). The bridge simply extends the I2C and UART bus,
and 3.3volt power to the xChips connected. xChips communicate using I2C, so you
need to activate that bus by running "Raspberry Pi Configuration" from the
"Preferences" menu. This is accessible from the default NOOBS/Raspbian menu or by
typing "sudo raspi-config" in the terminal. Once the bus is activated, you can type
"i2cdetect -y 1"to scan which xChips are connected. Please see here for more on
connecting your RasPi with XinaBox, libraries, and our simple Hackster project creating
a weather station with 5 lines of Python code.

Note for Raspberry Pi Zero users, you can use the BR03 Raspberry Pi Zero
Bridge instead of the BR01 Raspberry Pi Bridge.

There are many third-party I2C libraries available for the xChip range, either written
specifically for our products, or referencing the key component. Please see here for
a list of libraries for the XK03 components. You will find many libraries by searching
Github by either our product name (e.g. SW01), or the underlying component
(e.g. Bosch BME280).You can always find the component details on our website and
wiki, together with a link to the relevant datasheet, if you want to explore more
advanced specification and functionality. Most of our users code in Python on a Linux
based O/S, such as NOOBS/Raspbian. They can find a "pip install" to many of our
xChips by searching for the main chipset, as just described. Raspberry Pi also supports
many other user groups, such as NodeRed, Gobot and programming in Go, LabView,
Wolfram/Mathematica, and Microsoft C# and PowerBerry on the Windows 10 IoT
platform.

Some ideas to get you started
- Build a weather station in less than 5 minutes (see Raspberry Pi Weather Station to
get you started)

- first using only your RasPi, BR01, SW01 and a single XC10 connector. Adding
  an MD01 Spacer xChip allows you to move the sensor further away from the

RasPi CPU, and the heat that generates. The SW01 measures temperature, humidity and pressure, from which altitude, cloud base can also be estimated.

- next, you can add the OD01 mini-OLED display to show the Bosch sensor's output on the device
- and then the SH01 as a mini keyboard, and you have yourself a unit with input and output not exceeding the size of the RasPi. You could log temperature data to the cloud on the press of a button, or change the displayed data using the same mini-keyboard

- Add xChip SG33 to your weather station to get sophisticated air quality readings, which could be used to control ventilation, heating and emergency warnings.
- Revisit your childhood and play the classic Space Invaders game on your Pi mini OLED display, together with the mini keyboad
- Create an amazing Servo Controlled Time-Lapse Camera which records images on your untethered device for later retrieval - we've used this in amazing balloon missions!
- show live video from your Pi camera on our mini-OLED display - here's the project to follow
- Control apps on your Pi using hand gestures. The SL06 Gesture Sensorrecognises hand gestures including up/down and left/right swipes, as well as your hand's proximity, allowing you to create a control interface for your Pi software.
- Create an M&Ms sorter, add a SL06 Gesture sensor to identify M&M color, and the servo to steer M&Ms into colour coded piles
- Make a tracker with the SI02 to show how smooth your driving is! The mini OLED can also display live data on how much you accelerate, brake and take sharp turns
- Or make a mobile tracker to measure how much G-force and shocks you take on your bike at the weekend. How fast can you accelerate (or brake)?