The TinyML Kit

If you haven't already ordered your tinyML Kit, it is [available from Arduino for $49.99 at this link](). The kit is the easiest and most reliable way to obtain all of the parts necessary for this course. If you already have your kit or are planning on purchasing one then you can move onto the next reading.

That said, we understand that for some learners it may be beneficial, or even necessary, to obtain some or all of these parts via other means. As such, the remainder of this document details a bill of materials for the components you need to complete all of the planned exercises alongside potential vendors and functional alternatives. Note that availability may depend on your location and other shipping dynamics limitations.

tinyML Kit BOM

In the picture above you can see all of the components included in the purpose-designed kit that we have developed with Arduino. Fortunately, there aren't too many parts to begin with and most of them are generally accessible on a global scale, with the exception of Arduino's Tiny Machine Learning Shield, or PCB cradle (in the middle), for the Nano 33 BLE Sense AI-enabled microcontroller board (on the left) that serves to breakout the MCU's IO to connectors that permit easy, reliable connections with the camera module (on the right), as well as other sensing modules via connectors included preemptively for expansion to new areas of

application, calling upon the Grove system for nearly plug-and-play compatibility with a range of transducers, available from SeeedStudio.[1] Fortunately, while the shield can certainly make your life easier and lends a hand in creating reliable connections with off-board sensors / actuators, we can readily replace its function with other off the shelf components (e.g., a breadboard and some wires as listed below).

The table below is a list of parts that are comparable with suggested vendors alongside alternatives. To be clear, the edX course staff will only support the official kit we have developed in partnership with Arduino.

Description	Part Number	Vendors	Alternatives
Nano 33 BLE Sense *with headers* See note (1)	ABX00035	Arduino, Amazon, DigiKey, Newark, RS Components, Arrow, Mouser, Verical, Farnell, element14, Arrow (cn)	NA
USB microB cable, often to type A *or* C	Varied	DigiKey, Amazon, and many others	See note (2)
Breadboard	Varied	DigiKey, Amazon, and many others	See note (3)
Jumper wires 'Male to female'	Varied	DigiKey, Amazon, and many others	See note (4)
Camera sensor with breakout PCB	OV7675	RobotShop, Botland, Uctronics, and others	OV7670 See note (5)

Notes

1. Make sure that you select the variant of the Nano 33 BLE Sense *with headers*, which means that the board will arrive with 0.1" pitch pins pre-soldered, enabling you to quickly seat the microcontroller board into a breadboard without additional equipment.

2. The USB cable specification need only be *data carrying* **and** with connector type micro-B (plug) on one end — the other end will depend on the port available on your computer. Type A is the most common connector type, whereas modern laptops are increasingly featuring Type C connectors. Note that not all USB cables support data exchange and some are intended for power delivery only. Be sure to select a cable with a description that explicitly mentions data transfer, or equivalent.

    a. Type C cables tend to be more expensive than Type A, so it may be comparable or even cheaper to source a USB A to C adaptor, if your computer only features a Type C port. These adaptors are generally available.

[1] You'll want to check module voltage requirements and IO diagrams to verify Grove compatibility

b. For both cables and adaptors, as applicable (see 1a), think carefully about the necessary designation of plug vs. receptacle on each end. For cables, you'll likely want plugs on both ends. For a typical USB A to C adaptor, you'll find a Type A receptacle that gives way to a Type C plug, to be inserted into your PC.

3. Be sure that the breadboard you purchase is both *solderless* and equal to or greater in spatial dimensions than the standard 'half' size (5.5 x 8.5 cm), which we generally recommend for use in this context.

4. Here, 'jumper wires' refer to bundles of adjoined or individual lengths of wire that terminate in one of two possible forms: a 'male' pin (M) or a 'female' receptacle (F). To connect the camera module to our microcontroller board via the breadboard, you'll want to pick up about **25 or more** (individual wires) of the M-F variety. If you intend to go on to connect other off-board sensor modules, it may be helpful to have M-M jumpers on hand. Jumper wires can be purchased in various lengths. We suggest between 3 to 6 inches, here.

5. In searching for the OV7675 camera module, you may come across vendors selling the sensor itself, with only a ribbon cable breakout. Be sure to pick up a PCB breakout module that terminates in a 2x20 array of pins, like in the suggested link. If, for some reason, you can't obtain the OV7675 module, we have previously had success in using the related OV7670 module, but note, as above, that the edX course staff will only officially support the official kit we have developed in partnership with Arduino, including the requisite code for the OV7675 modules. Any adjustments to said code to call on the OV7670 module technically fall outside of the officially supported scope. With that said, we have noted in the course the required changes (fortunately there are very few) as we recognize that many students are finding it hard to source the OV7675.