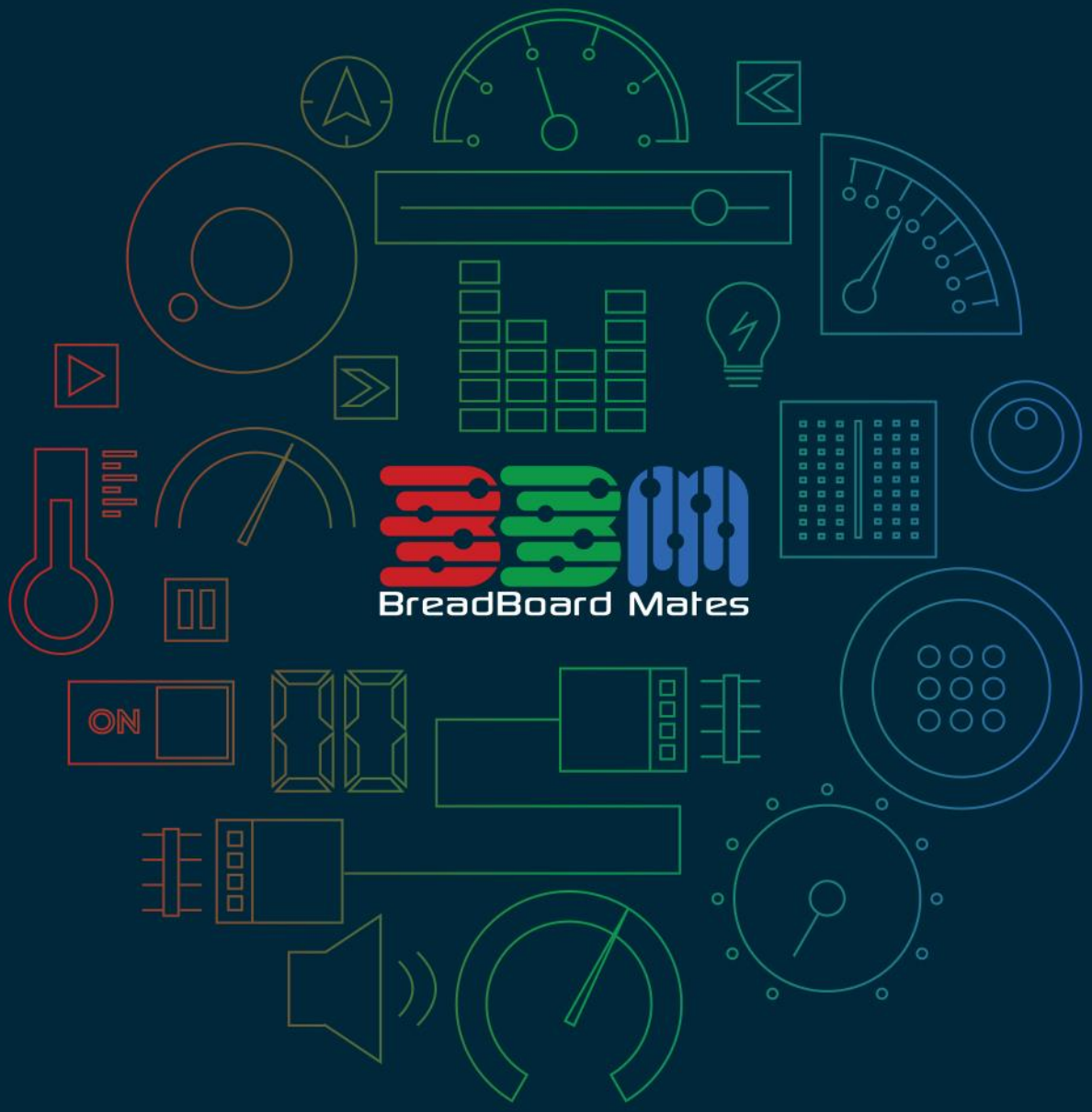


BBM Pi Adaptor
DATASHEET

Document Revision: 1.1
Document Date: 11/01/2022

Content subject to change at any time, please refer to www.breadboardmates.com for the latest revision.

Table of Contents

Document Revision History 3
Hardware Revision History 3
About Breadboard Mates 4
Product Description 5
Product Features 5
Hardware Detail 5
Hardware Interfaces 6
  System Pins 6
  HOST/PROG Switch 6
Connection to the Raspberry Pi 7
Connection of BBM Programmer 8
Hardware Drawing 9
Hardware Schematic 10
Legal Notice 11

Document Revision History

Revision Number	Date	Description
0.1	24/05/2021	Initial Draft
0.2	19/07/2021	Formatting Update
1.0	28/07/2021	Initial Public Release
1.1	11/01/2022	Added detail about Prog Header / connection to Prog

Hardware Revision History

Revision Number	Date	Description
1.0	25/02/2021	Initial Revision

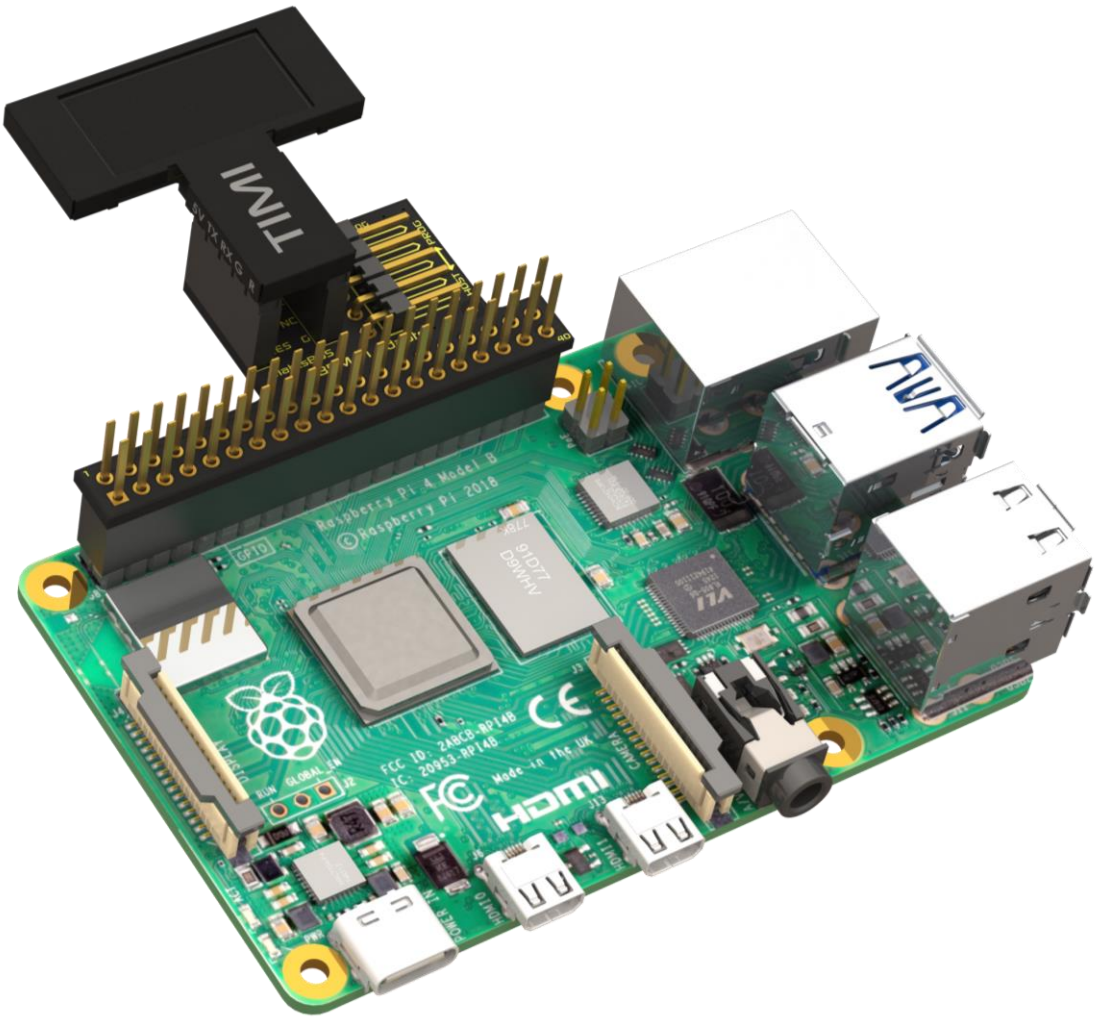
About Breadboard Mates

Breadboard Mates (aka BBM) is an Australian start-up company and was established in 2020 with the aim to bring breadboard friendly display products to the market, cutting down the time and components required to develop or experiment with electronics.

Hobbyist to Professional, BBM products can be utilised for development or education or anything in between. Development of projects / applications is made incredibly easy with the help of the revolutionary Mates Studio IDE.

The Mates Studio IDE is unlike any other, it offers 4 different programming methods with interchangeable pages and widgets, and helps speed up development for stand alone, host driven or PC tethered applications.

Breadboard Mates is constantly working on new product ideas, so keep a watch on the breadboardmates.com website for new product releases.



Product Description

BBM-Pi-Adaptor (ref. Pi Adaptor) is a Raspberry Pi adaptor, designed to provide a standard Raspberry Pi with a MatesBUS interface, to connect products such as the TIMI-96 directly to the Raspberry Pi bus.

The Pi Adaptor also features a 5-pin programming header, to program the connected device directly through the Pi Adaptor using the BBM Programmer, and a selection switch (on the back – accessible from the side) to switch between device programming mode or connection of the device to the Pi.

Product Features

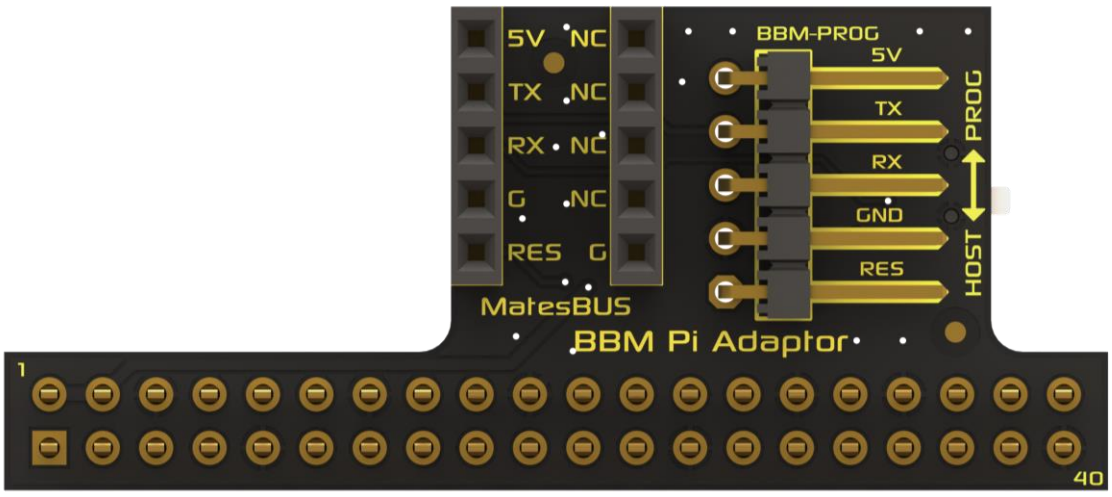
The Pi Adaptor connects to the Raspberry Pi's 40 pin interface, breaking out selected pins for use with the MatesBUS. It also features a selector switch, which interrupts the Raspberry Pi's TX signal, to direct the MatesBUS RX signal to the programming header instead. This allows the Pi Adaptor to be left connected to the Raspberry Pi when the connected device (such as the TIMI-96) is required to be programmed.

The only interface to the MatesBUS is a 3.3V level Asynchronous Serial UART and is used to communicate between the Raspberry Pi and the connected device on the MatesBUS.

Hardware Detail

The Pi Adaptor utilises the BBM MatesBus, which is a unique interface pinout designed to be simple and easy to use.

The MatesBus is made up of 2 rows of 5 pins, 0.1" (2.54mm) pitch, spaced 0.3" (7.62mm) apart, ideal for direct plug into a breadboard, or compatible adaptor or development board.



Hardware Interfaces

The Pi Adaptor connects to the Raspberry Pi's 40 pin interface and utilises the Serial UART of the Raspberry Pi to connect the MatesBUS headers.

System Pins

+5V (Device Supply Voltage)
Display supply voltage pin. This pin supplies the MatesBUS with 5VDC from the Raspberry Pi.

GND (Module Ground)
Device ground pin.

TX (Serial UART Transmit - MatesBUS)
TX of the MatesBUS connects to RX of the Raspberry Pi, this is the 3.3V Asynchronous Serial UART Transmit for communications between the device connected to the MatesBUS headers and the Raspberry Pi.

RX (Serial UART Receive - MatesBUS)
RX of the MatesBUS connects to TX of the Raspberry Pi, this is the 3.3V Asynchronous Serial UART Receive for communications between the device connected to the MatesBUS headers and the Raspberry Pi.

RESET (MatesBUS Reset)
This pin is primarily connected to the BBM-Prog header, for programming the connected MatesBUS device, such as the TIMI-96. Is it also connected to the Raspberry Pi via a 680ohm resistor to Pin7 (GPIO_4), making it possible for the Raspberry Pi to initiate a reset of the MatesBUS device, as required.

NC (Not connected)
These pins are not connected or used on the MatesBUS by the Raspberry Pi.

HOST/PROG Switch

The HOST/PROG selection switch is used to switch the RX signal which comes from the MatesBUS, between the Raspberry Pi's TX, and the BBM-PROG headers TX. This allows the User to select if the MatesBUS device is being programmed by the BBM-PROG header, or if its connected to the Raspberry Pi, making it possible to program the device such as the TIMI-96 without having to unplug it from the MatesBUS and the Pi Adaptor.

When you want communications to be between the Raspberry Pi and the MatesBUS device (such as the TIMI-96), the switch should be on **HOST**.

When you want the communications to be between the BBM-PROG header and the MatesBUS device, the switch should be on **PROG**.

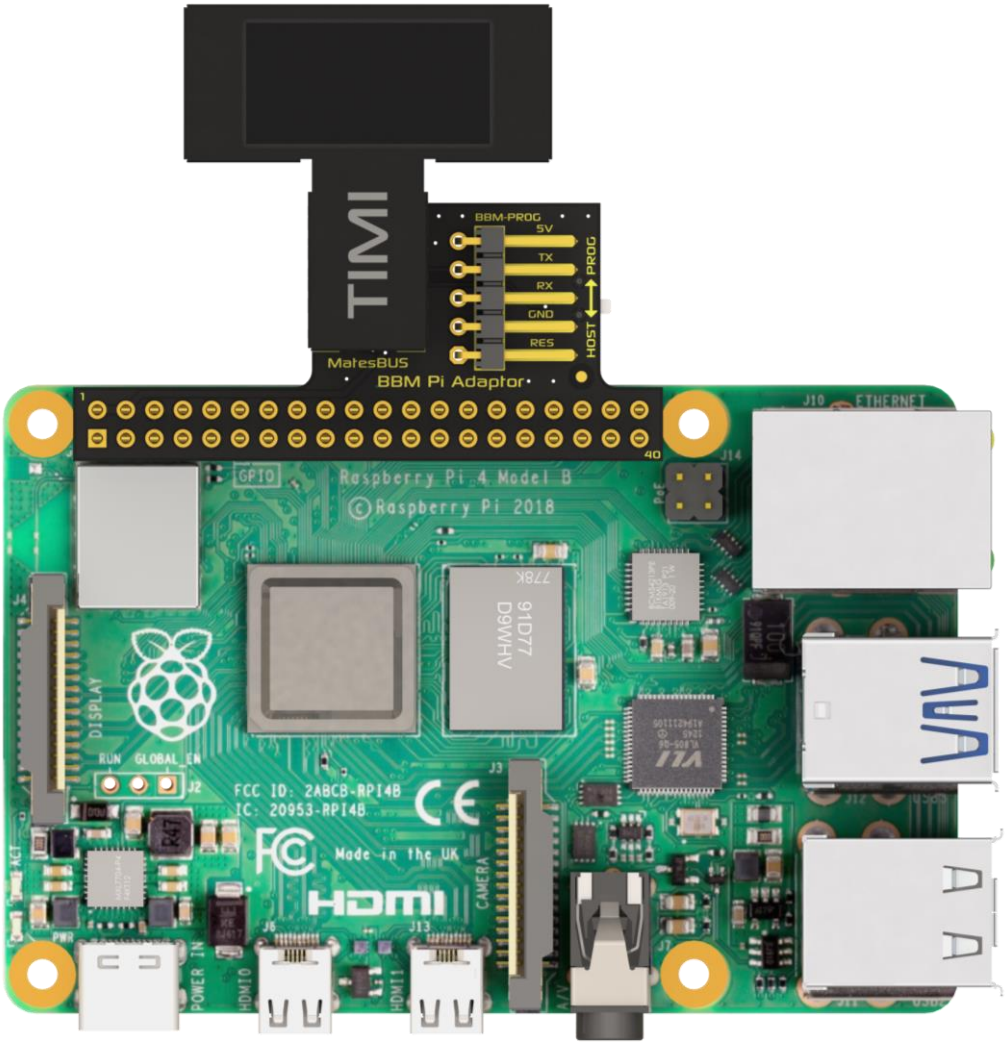
Connection to the Raspberry Pi

The Pi Adaptor connects to the Raspberry Pi directly to its 40-pin interface.

The Pi Adaptor's Female header connects to the Raspberry Pi's male pins, and the body of the Pi Adaptor sticks outside of the Raspberry Pi. The writing on the silkscreen of the PCB of the Pi Adaptor should be oriented in the same way as the writing on the Raspberry Pi itself.

The MatesBUS device, such as a TIMI-96, then connects to the Pi Adaptor, matching the pinout naming on both devices.

To illustrate, here is a Raspberry Pi 4, with the Pi Adaptor, and a TIMI-96 all connected.

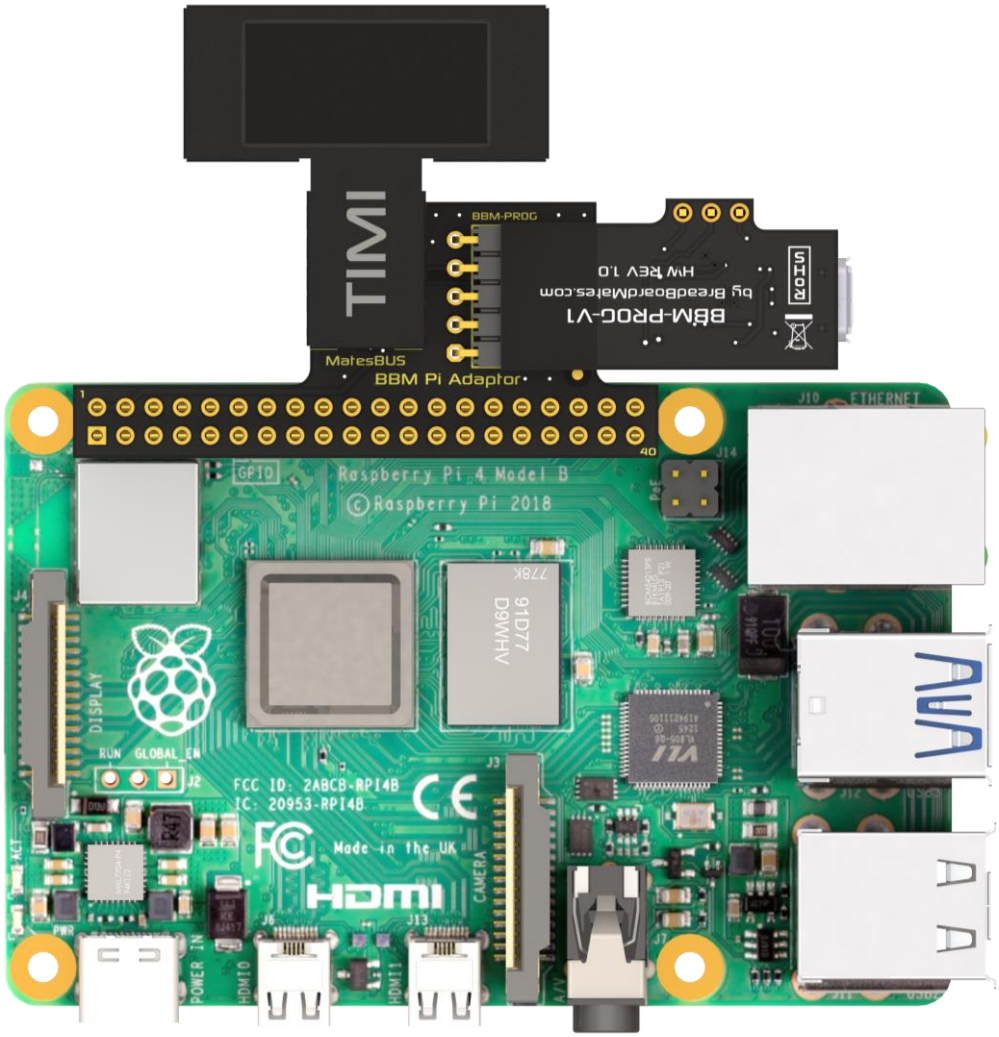


Connection of BBM Programmer

The Pi Adaptor has a 5-way male pin header on it, designed to connect directly to the BBM Programmer, allowing the connected BBM Device (such as TIMI-96) to be programmed without removing it from the Pi Adaptor or Pi itself.

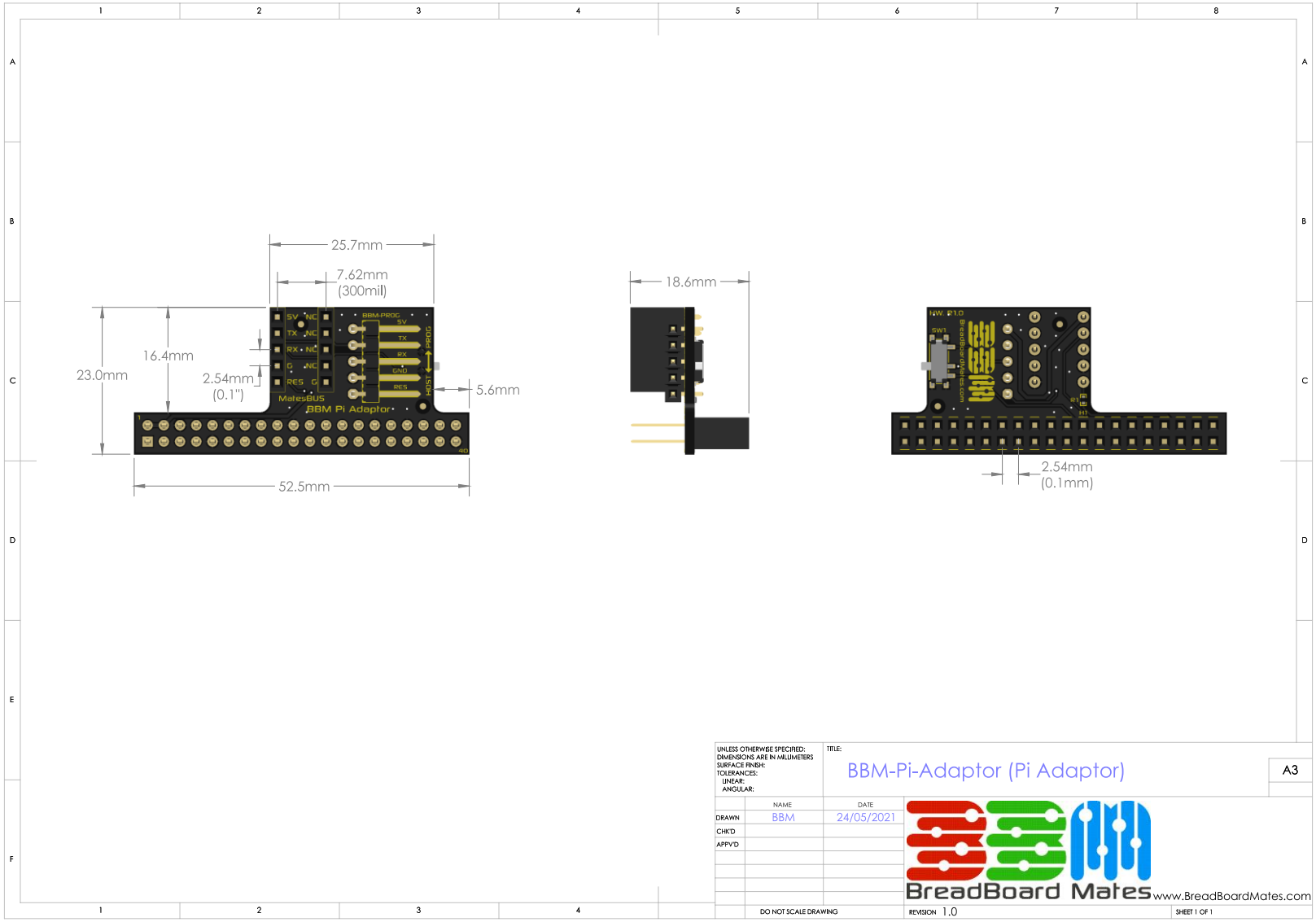
When used in conjunction with the Host/Prog switch mentioned previously, this is achieved easily.

The BBM Programmer should be connected to the 5-way male pin header, upside down, as illustrated below. This allows the BBM Programmer to be directly connected.

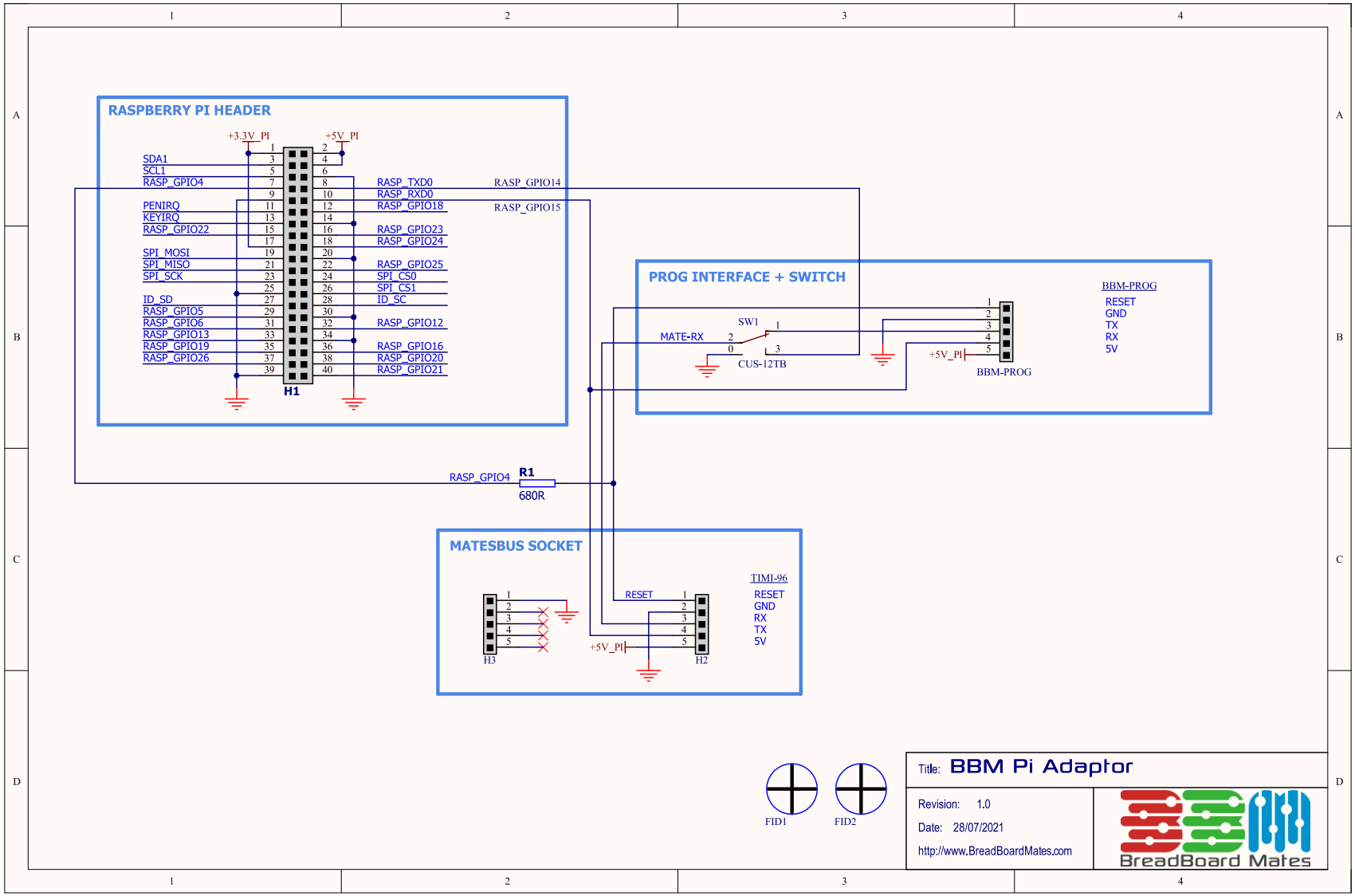


Be sure to read the Datasheet for the BBM Programmer for further details on the programmer hardware itself, available from the breadboardmates.com website.

Hardware Drawing



Hardware Schematic



Legal Notice

Proprietary Information

The information contained in this document is the property of 'Breadboard Mates' and may be the subject of patents pending or granted and must not be copied or disclosed without prior written permission.

Breadboard Mates endeavours to ensure that the information in this document is correct and fairly stated but does not accept liability for any error or omission. The development of Breadboard Mates products and services are continuous and published information may not be up to date. It is important to check the current position with Breadboard Mates. Breadboard Mates reserves the right to modify, update or makes changes to Specifications or written material without prior notice at any time.

All trademarks belong to their respective owners and are recognised and acknowledged.

Disclaimer of Warranties & Limitation of Liability

Breadboard Mates makes no warranty, either expressed or implied with respect to any product, and specifically disclaims all other warranties, including, without limitation, warranties for merchantability, non-infringement, and fitness for any particular purpose.

Information contained in this publication regarding device applications and the like is provided only for your convenience and may be superseded by updates. It is your responsibility to ensure that your application meets with your specifications.

Images and graphics used throughout this document are for illustrative purposes only. All images and graphics used are possible to be displayed on the Breadboard Mates range of products, however the quality may vary.

In no event shall Breadboard Mates be liable to the buyer or to any third party for any indirect, incidental, special, consequential, punitive, or exemplary damages (including without limitation lost profits, lost savings, or loss of business opportunity) arising out of or relating to any product or service provided or to be provided by Breadboard Mates, or the use or inability to use the same, even if Breadboard Mates has been advised of the possibility of such damages.

Breadboard Mates products are not fault tolerant nor designed, manufactured or intended for use or resale as on line control equipment in hazardous environments requiring fail – safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of the product could lead directly to death, personal injury or severe physical or environmental damage ('High Risk Activities'). Breadboard Mates and its suppliers specifically disclaim any expressed or implied warranty of fitness for High-Risk Activities.

Use of Breadboard Mates products and devices in 'High Risk Activities' and in any other application is entirely at the buyer's risk, and the buyer agrees to defend, indemnify, and hold harmless Breadboard Mates from any-and-all damages, claims, suits, or expenses resulting from such use. No licenses are conveyed, implicitly or otherwise, under any Breadboard Mates intellectual property rights.