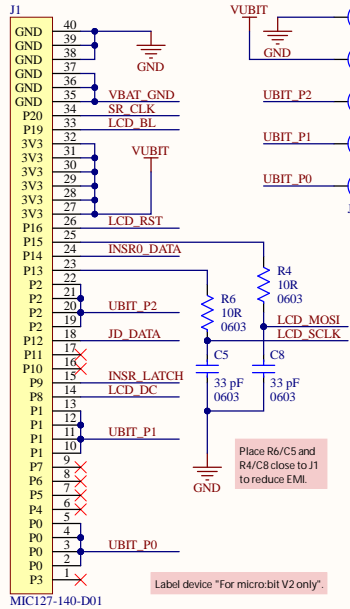


micro:bit connections

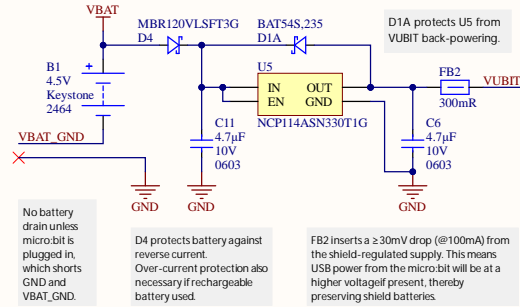
190 mA max current draw from micro:bit V2.

Exposing the 5 micro:bit edge connector "rings" means users can use them to extend the functionality of their games.



On-shield battery supply

Shield display needs 3.3V to operate reliably. If the micro:bit is USB-powered, 3.3V from the edge connector is used. Otherwise, 3x on-board AA cells provide 3.3V for the shield via U5. If the micro:bit is battery powered and the 3x on-shield AA cells provide less than 3.0V, shield operation is unreliable.



Hardware configuration

| HW_CFG0 | | | Display rotation |
|---------|---|---|----------------------|
| 0 | 0 | 0 | Rotated 180 degrees. |
| 1 | 0 | 0 | Not rotated. |

| HW_CFG3 | HW_CFG2 | HW_CFG1 | Hardware configuration |
|---------|---------|---------|--|
| 0 | 0 | 0 | Reserved, do not use. |
| 0 | 0 | 1 | ST7735 (CFG1=0x603 or =0x12c2d). |
| 0 | 1 | 0 | ILI9163C with BGR color order (CFG1=0xe14ff). |
| 0 | 1 | 1 | ST7735 inverted color palette (CFG1 as above, CFG0 = 0x1??????). |
| 1 | 0 | 0 | Future configuration. |
| 1 | 0 | 1 | Future configuration. |
| 1 | 1 | 0 | Future configuration. |
| 1 | 1 | 1 | Reserved, do not use. |

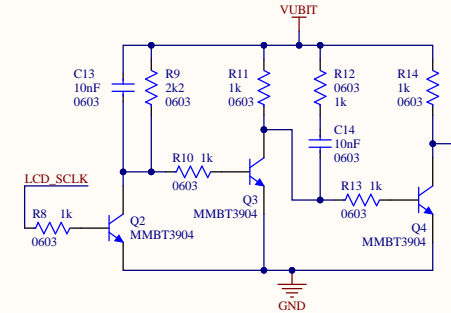
Inputs E-H of U2 (HW_CFG0 - HW_CFG3) are read at power-on to specify Arcade shield hardware configuration. Connect according to these tables.

This reference design uses un-rotated JD-T18003 display with ST7735 controller so HW_CFG0/1 = 1 and HW_CFG2/3 = 0.

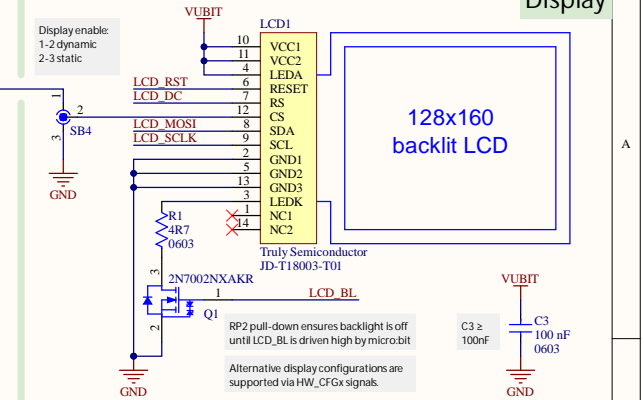
If you would like to propose a new configuration please email: arcade@hwdw@microsoft.com.

Dynamic display enable generator

Kitronik Ltd found that an ESD event can cause the display to freeze if CS is permanently held low, but that the display recovers if CS is periodically taken high. This circuit kindly contributed by Kitronik generates the display CS signal dynamically based on the SPI clock - it briefly disables communications with the display at the end of each frame of SPI data. Please consider the use of an approach like this to increase robustness of operation.



Display



Jaccadac interface

Optionally include 1 or more Jaccadac connectors. Power delivery optional.

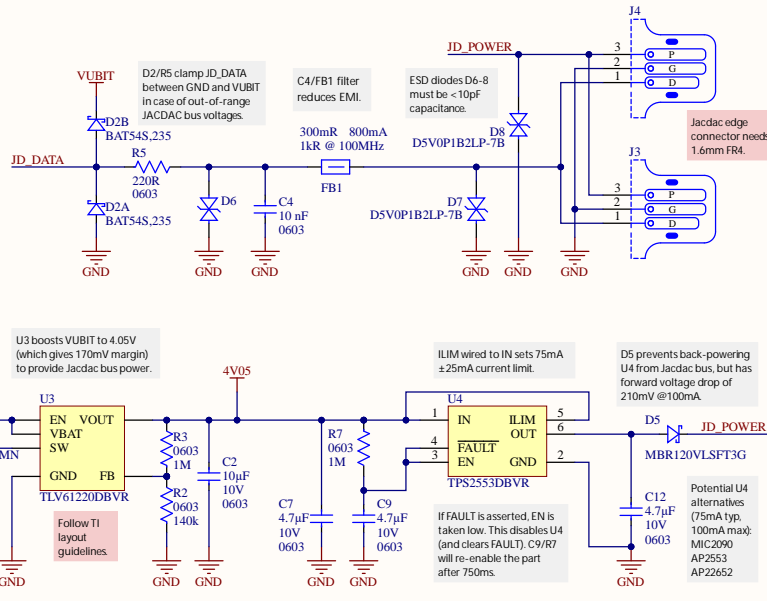
Jaccadac (<https://aka.ms/jaccadac>) is a "plug and play" protocol for connecting microcontrollers and peripherals. Its flexible topology, dynamic discovery and power delivery provide a great user experience for makers and students.

Jaccadac provides 1Mbps communications and power delivery. JD_DATA uses 3.3V logic, JD_POWER is nominally 5V.

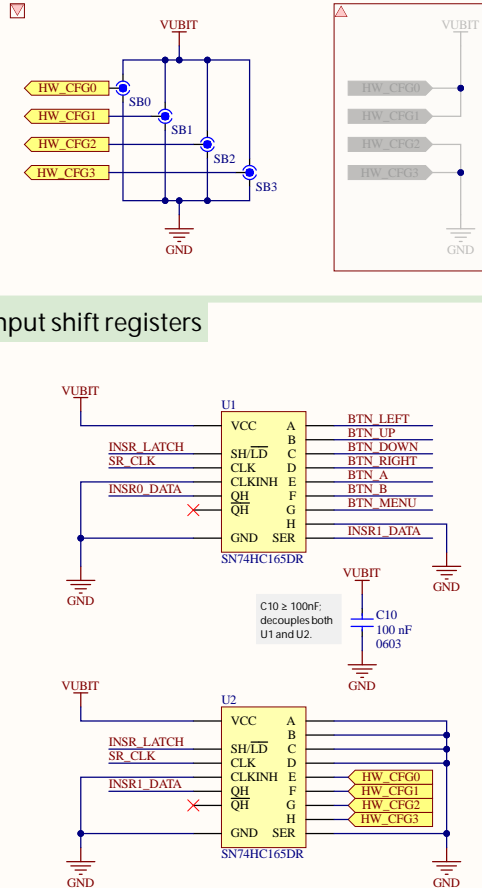
Jaccadac power delivery is optional. Spec requires current limiting with auto retry, and that nothing gets hot! This shield delivers 75mA typical, 100mA max.

A Jaccadac supply of up to 100mA must be $\geq 3.6V$ at the connector, i.e. U3 output $\geq 3.88V$. 100mA max requires 145mA from 3.3V VUBIT supply. LCD1 takes 45mA to give 190mA total.

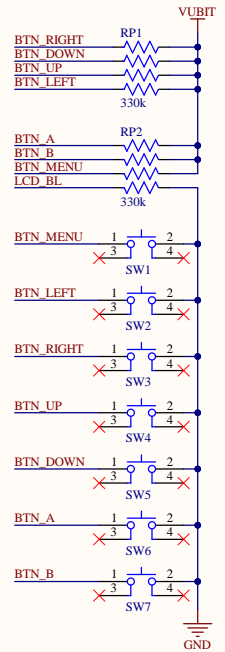
Check Jaccadac spec for voltages required at higher currents and MCU-based 'smart power providers'.



Input shift registers



Buttons



Key: Silkscreen & layout notes
Block name
Design notes

This information is provided "as-is". You bear the risk of using it. Some information relates to pre-released specification which may change without notice. Microsoft makes no warranties, express or implied, with respect to the information provided here.

When this PDF is viewed with Adobe Reader, clicking on components shows part numbers and other details.

Microsoft

PROJECT DESCRIPTION
Arcade shield reference design for the BBC micro:bit V2

SHEET DESCRIPTION
complete design