


# MBHP\_Genesis\_LS

This is the schematic for the breakaway MBHP\_Genesis\_LS board included with the MBQG\_FP front panel board. This should be sufficient for anyone to build a copy of this circuit on prototype board. 

## Explanation

When using the MBHP\_Genesis module with a MCU supplied at less than 5V, especially when using several modules in parallel, a buffer circuit will be required between the MCU and the modules. This is a very simple circuit that consists of two 20-pin 74HCT series ICs and two power supply bypass capacitors, and can easily be built on prototyping board.

For buffering the data lines, a bidirectional buffer must be used; a common one is 74HCT245. Connect the eight lines from the MCU board to data pins B; connect the eight lines from the MBHP\_Genesis board to data pins A; connect the /OE pin to the buffered /CS line (on the MBHP\_Genesis side of the buffer); connect the DIR pin to the buffered /RD line (same thing); and connect a 0.1uF capacitor across the supply rails of the buffer chip.

For buffering the address lines, which are unidirectional from MCU to MBHP\_Genesis, use a 74HCT541, with its two /OE pins always active (grounded). Alternatively you can use another 74HCT245, with /OE permanently active (grounded) and DIR set appropriately to always send the signals from the MCU to the MBHP\_Genesis board. Again, bypass the supply rails with a capacitor.

Both buffers must be powered from +5V, not +3.3V or whatever the MCU uses. In addition, the MCU must be tolerant of 5V signals being applied to its I/O pins (the CORE\_STM32F4 module is tolerant)-otherwise it will damage the MCU!

## Parts List

| Qty | Ref. Deg.         | Part Name                   | Mouser Part Number   | Description / Notes  |
|-----|-------------------|-----------------------------|----------------------|--|
| 1   | U101              | 74HCT245                    | 595-SN74HCT245N      | Bidirectional buffer chip  |
| 1   | U102              | 74HCT541                    | 595-SN74HCT541N      | Buffer chip  |
| 2   | [U101],<br>[U102] | 20-pin 0.3" DIP socket      | 571-1-2199298-6      | Socket for chips   |
| 2   | J101, J102        | 10×2 pin header, 0.1" pitch | 649-68691-420HLF     | Connectors to core and MBHP_Genesis module   |
| 1   | J103              | 2×1 pin header, 0.1" pitch  | 571-826936-2         | Connector for +5V power from core  |
| 2   | C101, C102        | 0.1 uF                      | 21RZ310-RC           | Power supply filtering capacitors for chips (place one next to each chip's +5V connection) |
| 1   | C103              | 10 uF                       | 140-REA100M1HBK0511P | Power supply filtering capacitor for board   |

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