# TODO under construction!

## Buffer circuit

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!

Post on the forum or PM me if this is confusing and you want me to draw a schematic.

A MBHP_Genesis_LS board is included as a breakaway portion of the MBQG_FP front panel board, so anyone purchasing a front panel board gets the level shifter board for free. No other manufactured board will probably be produced for it.

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