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], [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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