

White Paper

Clock Signal Quality of SPI and SD-Cards on miriac® MPX-LS10xx Modules:

miriac MPX-LS1043A

miriac MPX-LS1046A

miriac MPX-LS1088A

This White Paper is intended for Engineers designing a main board for one of the above mentioned CPU-Modules.

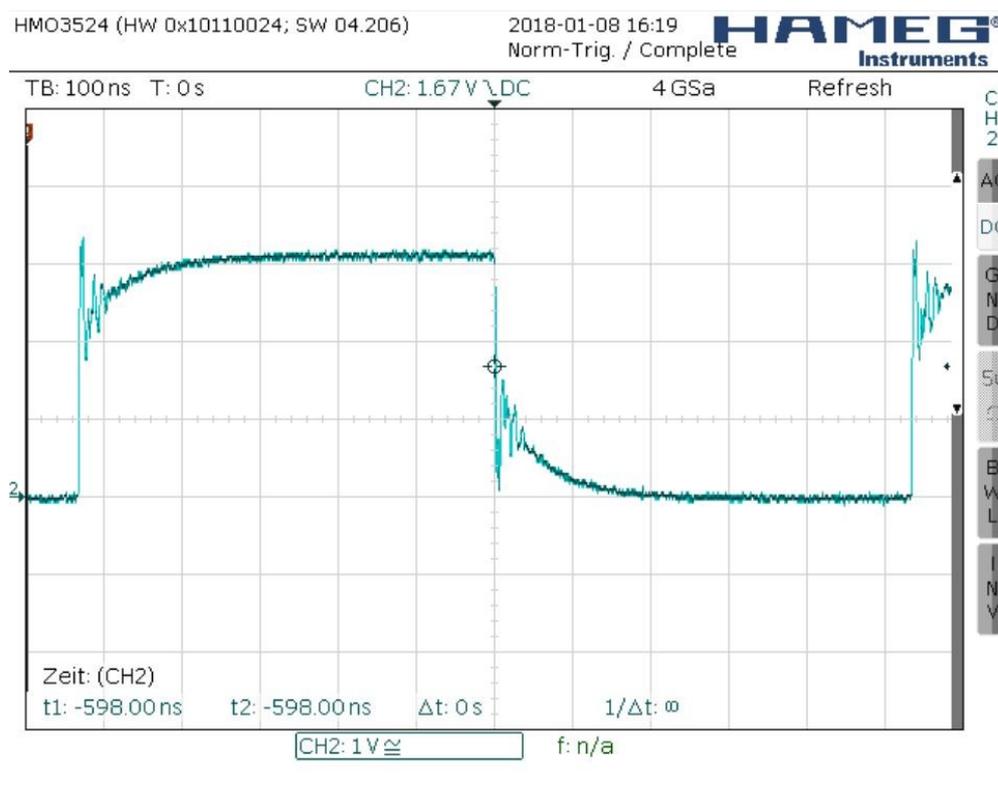
It provides a guideline for SPI and SD-Card clock signal handling.

CPU-modules of the miriac MPX-LS10xx product line are equipped with a level shifter for SPI / SDC signals. This device shifts the 1.8V I/O voltage of the CPU to 3.3V for standard SDC / SPI device operation.

The level-shifter used on the modules drives quite rampant edges, so care must be taken on your baseboard design.

On few designs SPI-CLK (Connector Pin 137 = B69) and SDC-CLK (Connector Pin199=B100) appeared to show unlovely transient response which might cause problems on the receiving device.

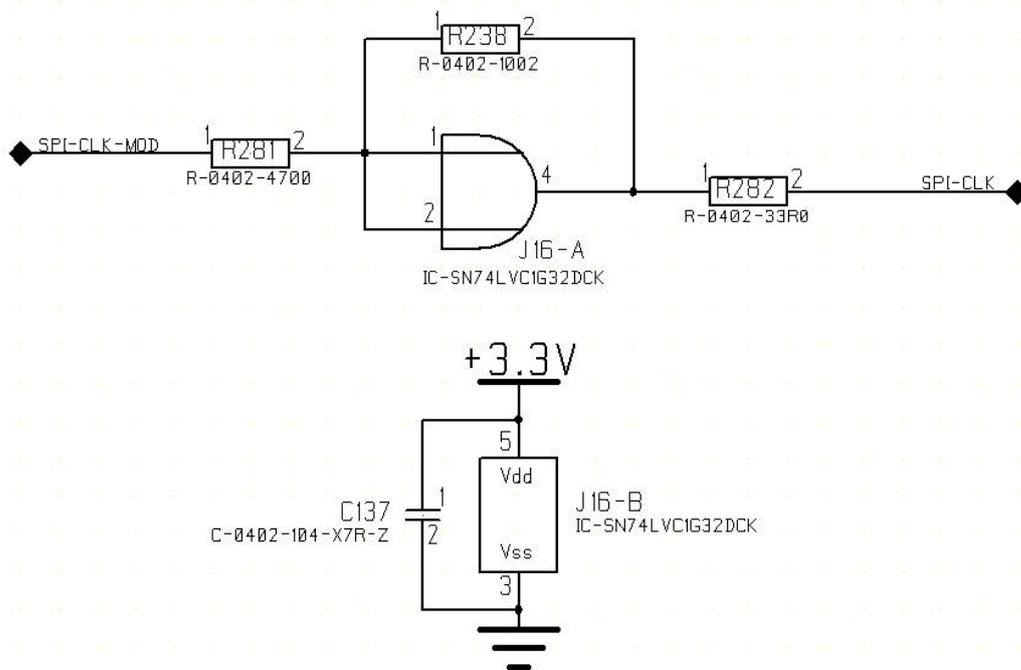
Sample oscillograph curve with poor transient response measured on SPI-device:



Please note that the observed behaviour is very dependent on the total system design. Input capacitance of the receiving device, layout etc. have a significant impact on the resulting signal quality.

On your design please direct your special attention to these two signals. To be on the safe side, we propose to use a Schmitt-Trigger or RC-filter for Those two Clock-signals.

Sample circuitry with Schmitt-Trigger for SPI-Clock:



Please note that the resistor values given are guiding values only and may vary depending on your design.

In case you have further questions please contact your sales representative.

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