

MPLAB® SNAP AVR UPDI/PDI/TPI Interface Modification

Symptom: Programming and debugging fails with AVR microcontroller devices that use the UPDI/PDI/TPI interfaces. MPLAB SNAP, Assembly #02-10381-R1 requires an external pull-up resistor for AVR microcontroller devices that use these interfaces.

Problem: AVR microcontroller devices that use the UPDI/PDI/TPI interfaces require the idle state of inactivity to be at a logic high level. Internally, the AVR devices have a weak (50-100K) pull-up resistor that attempts to keep the line high. An external and stronger pull-up resistor may be enough to mitigate this issue and bring voltages to acceptable VDD levels. In some cases, this may not be enough and the pull-down resistor that is part of the ICSP protocol can be removed for these AVR microcontroller applications.

Solution: If most of the applications are AVR-centric, consider removing the R48 resistor as shown below. This completely isolates any loading on the programming data line. Additionally, a pull-up resistor to VDD in the range of 1K to 10K should be used for robustness. Pin 4 of J4 is the TPGD data line used for ICSP interfaces and it also doubles as the DAT signal for UPDI/PDI and TPI interfaces. The pull-up resistor can be mounted directly from TVDD (J4-2) to TPGD/DAT (J4-4). Alternatively, the resistor can be mounted on the application side of the circuit for convenience.

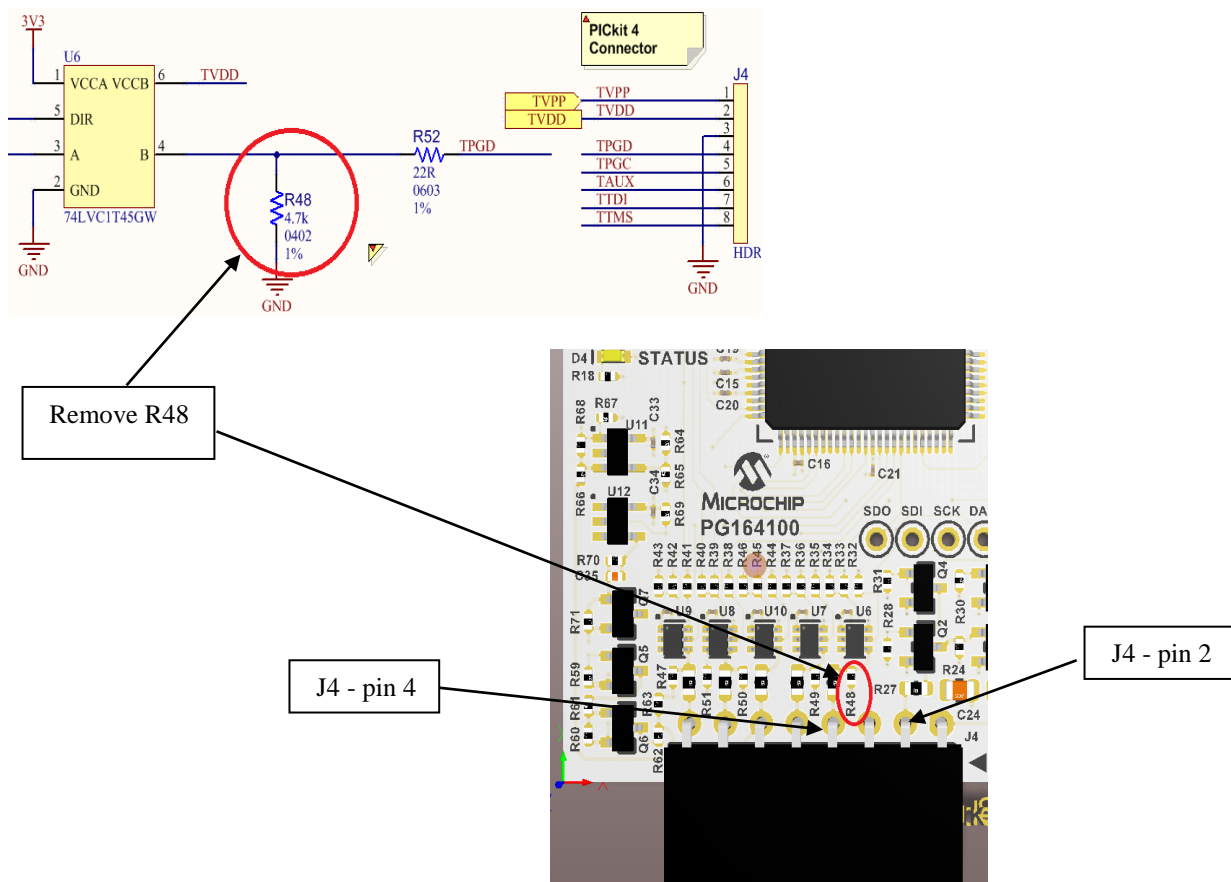


Figure 1