Application Note

REDFIT IDC SKEDD Connector

A new connection for debug and firmware-upload

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1 Connection of debugger and micro-controller

During development, the connection between the debugger and a micro-controller is important to upload firmware, validating codes or finding mistakes. Even during production of small and mid-size series this connection is used for uploading firmware after mounting. Commonly a box-header is mounted on the PCB to connect the debugger. But mostly this component is single used only and needs space, build height and money. Not only the cost of the part itself has to be considered, as there are purchasing- and production-processes generating costs as well. But an initial connection is necessary to bring the firmware to the micro-controller. For high volume production MCUs are programmed before mounting, but for small and midrange quantities it is not economic in terms of costs as well. Würth Elektronik now provides a solution perfect to use even for small series.

Figure 1: Würth Elektronik REDFIT IDC SKEDD Connector

2 Debugger connection without boxheader

Würth Elektroniks` new REDFIT IDC SKEDD connector is directly connected to the PCB by hand without the need of a counterpart. Means no extra costs for component, processing or purchasing. There´s even no space needed above the PCB, which benefits the housing designer. Nonetheless the connector provides secure connection without any additional tool. Thereby debugging of the firmware can be easily processed after production. Two differently sized plastic pegs protect the REDFIT IDC SKEDD against polarity reversal. This safety feature prevents damaging the debugger as well as the micro-controller. Another interesting feature: The plastic pegs are longer as the contacts. Therefore no shortcuts can occur by touching the board on wrong position or below mounting plate.

3 2-Wire Debugger

Most of the micro-controllers provide the possibility of a two wire debugging. For ARM MCUs it´s named Wire-Debug, for TI-MSP430 Spy-Bi-Wire but even other MCU showing this feature nowadays. Thereby only two pins of the MCU instead of five (JTAG) are used for debugging. Means three pins can be used for the application. A great benefit as mostly the micro-controller never have enough pins (by customer wish). Additionally the connector and PCB can be realized in a smaller form factor. Certainly two additional lines are needed for power supply, so it ends up with a 4-wire connection finally. The following graphics show the four lines in a schematic of TI-MSP430:

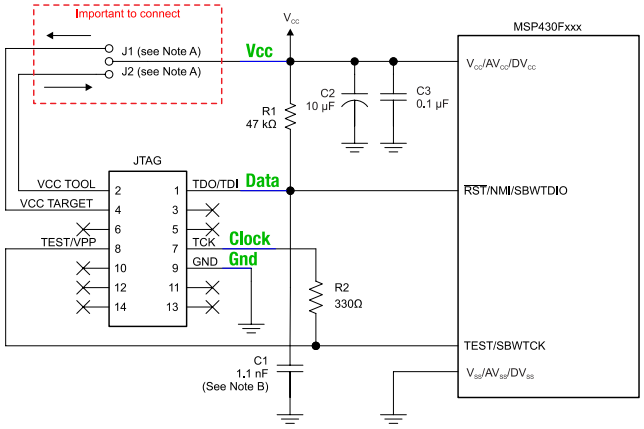

Figure 2: Debug-lines and power supply in TI-MSP430 schematic (Source: TI MSP430 – Hardware Tools User´s Guide Lit-No: SLAU278)

4 REDFIT IDC as 4-Pin Debug Plug

First tests performed with MPSP430G2553 show all advantages named above. The space needed for the connection could be integrated between the components:

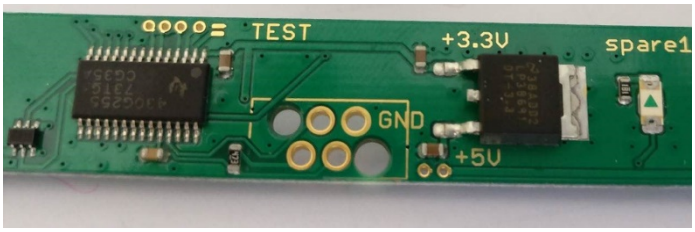

Figure 3: Layout and required space on the PCB

Used pinning:
1 = Vcc
2 = Clock
3 = Data (Reset)
4 = GND

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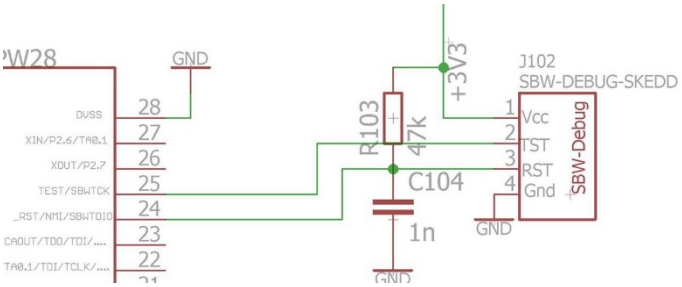

Figure 4: Pinning of REDFIT IDC SKEDD as debug-connector

Due to the used pinning the current carrying lines are maximum spread and enables a specific reset when shorting pin 3 and 4.

The REDFIT IDC SKEDD connects properly without any wiggling. A flexible 4-wire flat wire leads securely to the debugger:

Figure 5: REDFIT IDC SKEDD during debugging

5 Conclusion

The new WE REDFIT IDC SKEDD connector fits perfectly for debug connections. Both in design stage and for small and midsize volume production. It´s a secure, performed by hand connection without any need of a counterpart.

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