# SPY-BI-TAG: MSP430 SPY-BI-WIRE Adaptor for TC2030-MCP

Allows Tag-Connect TC2030-MCP cables to be used with TI's FET430 for MSP430.

The "SPY-BI-TAG" SPY-BI-WIRE adaptor board allows use of our Tag-Connect TC2030-MCP series Plug-of-Nails™ cables with later versions of TI's MSP430 MCU's that support the SPY-BI-WIRE (2-Wire) JTAG interface and allow a tiny Tag-Connect footprint (as small as 0.02 sq. inch) to be used instead of the traditional 14-pin JTAG header.
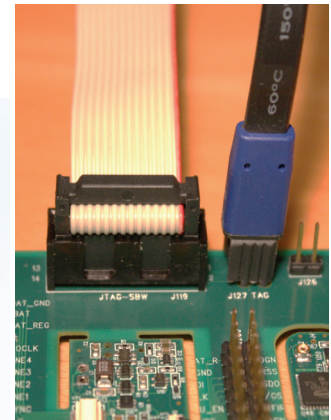

Left: SPY-BI-TAG boards. Right: TI MSP-FETU430 shown with SPY-BI-TAG adapter board and TC2030-MCP cable – also works with TC2030-MCP-NL "No Legs" cable. When your board real-estate is at a premium, Tag-Connect is the way to go!

Compare the board space for the old-style 14-pin ribbon against the self-retaining TC2030-MCP (legged version)

(TC2030 Cable, TI FET and Target Board shown for illustrational use only and are not included)

Tag-Connect - Save Cost and Space on Every Board!
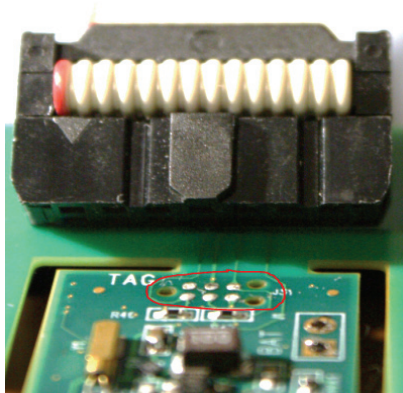
Even smaller yet, the TC2030-MCP-NL footprint (circled in red) is shown against the 14-pin ribbon!
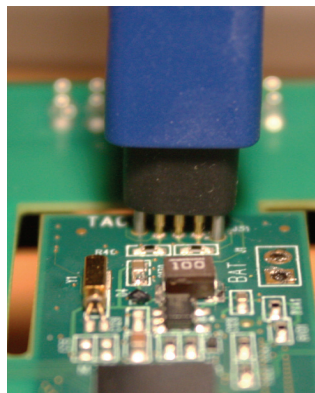
TC2030-MCP-NL shown held in place by the TC2030-CLIP board (not visible)

TC2030-CLIP board side-on.

Application Notes (also see www.Tag-Connect.com)

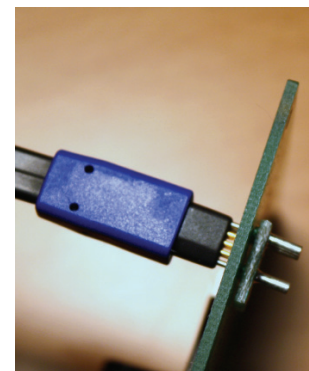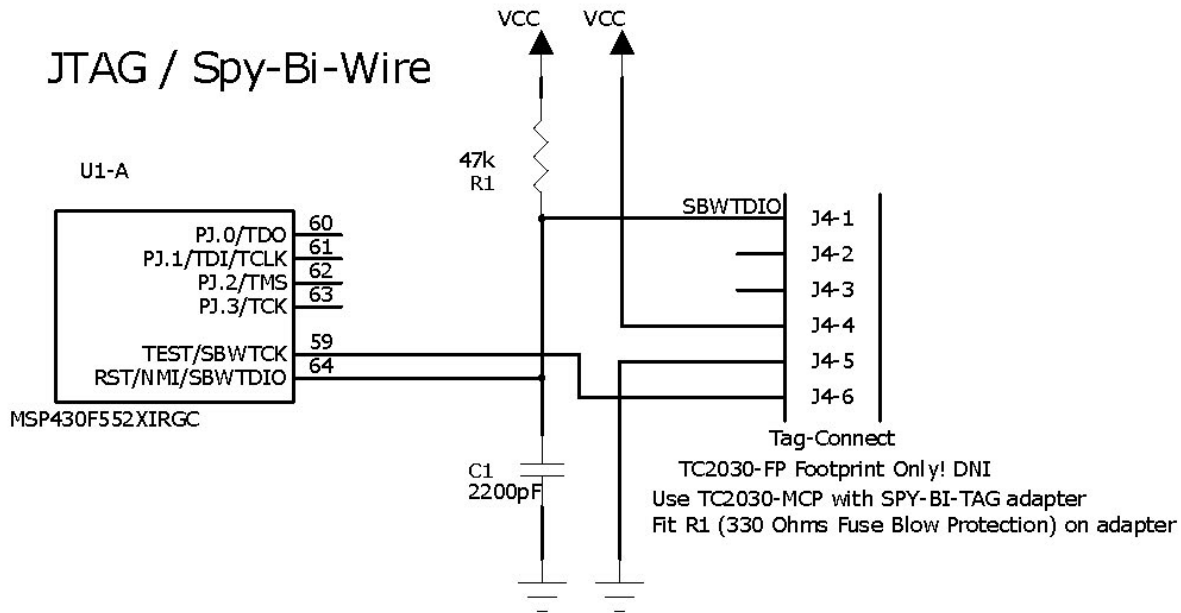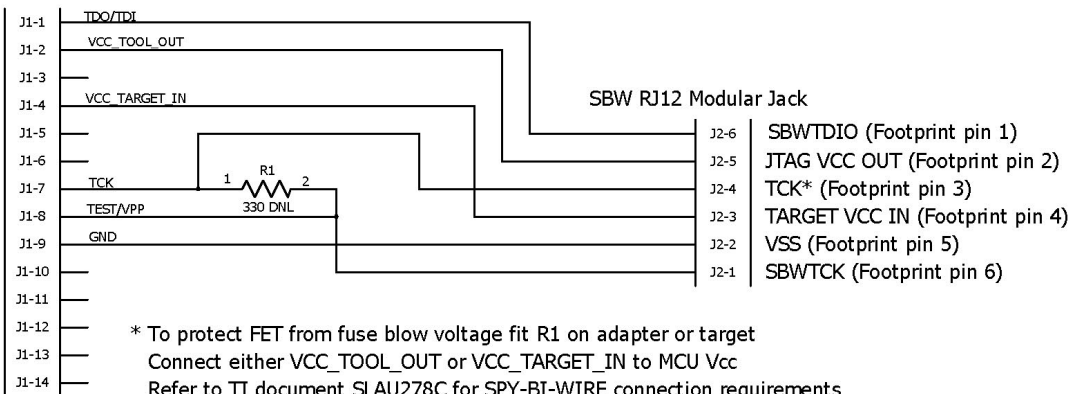IMPORTANT NOTE FOR USE OF FUSE-BLOW: A 330 Ohm Fuse Blow Protect Resistor must in place either on your PCB (between footprint pin 3 TCK and pin 6 TEST/SBWTCK) or alternately may be soldered in place on the SPY-BI-TAG PCB (solder an an 0805 330 Ohm resistor in the R1 location). See Figure 2-2 of TI's MSP430 Hardware Tools User's Guide (SLAU278C) for SPY-BI-WIRE connection details. The R1 330 Ohm resistor is not fitted in the shipping configuration of the SPY-BI-TAG adaptor.

MAXIMUM CABLE LENGTH: TI specifies a cable length of no more than 8 inches (20 cm). TC2030-MCP cables are available in 6" (TC2030-MCP and TC2030-MCP-NL) and 10" (TC2030-MCP-10 and TC2030-MCP-NL-10) lengths. We've tested extensively and experienced no problems using our 10" cables (we put the Tag-Connect footprint right at the MSP430) but you may wish to use only our 6" cables.

Suggested MSP430 Hookup

```
              VCC    VCC

JTAG / Spy-Bi-Wire

                      47k
    U1-A              R1
                                  SBWTDIO    J4-1
         PJ.0/TDO  60                        J4-2
    PJ.1/TDI/TCLK  61                        J4-3
        PJ.2/TMS  62                         J4-4
        PJ.3/TCK  63
                                             J4-5
     TEST/SBWTCK  59                         J4-6
 RST/NMI/SBWTDIO  64
                                         Tag-Connect
 MSP430F552XIRGC                         TC2030-FP Footprint Only! DNI
                  C1                     Use TC2030-MCP with SPY-BI-TAG adapter
                  2200pF                 Fit R1 (330 Ohms Fuse Blow Protection) on adapter
```

SPY-BI-TAG Schematic

```
J1-1    TDO/TDI
J1-2    VCC_TOOL_OUT
J1-3
J1-4    VCC_TARGET_IN
J1-5                          SBW RJ12 Modular Jack
J1-6                                        J2-6   SBWTDIO (Footprint pin 1)
J1-7    TCK      1  R1  2                    J2-5   JTAG VCC OUT (Footprint pin 2)
J1-8    TEST/VPP    330 DNL                  J2-4   TCK* (Footprint pin 3)
J1-9    GND                                  J2-3   TARGET VCC IN (Footprint pin 4)
J1-10                                        J2-2   VSS (Footprint pin 5)
J1-11                                        J2-1   SBWTCK (Footprint pin 6)
J1-12
J1-13
J1-14
```

* To protect FET from fuse blow voltage fit R1 on adapter or target
  Connect either VCC_TOOL_OUT or VCC_TARGET_IN to MCU Vcc
  Refer to TI document SLAU278C for SPY-BI-WIRE connection requirements
  NOTE J2 has inverted pin numbering to the TC2030 footprint because
  there is a 1-6, 2-5, 3-4 pin swap in the TC2030-MCP cables.

TC2030-MCP Footprint Pinout

Pin 1: SBWTDIO
Pin 2: JTAG Vcc OUT
Pin 3: TCK*
Pin 4: Target Vcc IN
Pin 5: Vss
Pin 6: SBWTCK

* Fit R1 Fuse Blow Protect to SPY-BI-TAG adaptor or include on target board

Footprints, Decals, Technical Support:

For access to technical support, product information and datasheets please visit our website: **www.Tag-Connect.com**