ABSTRACT

This guide is intended to provide users of the EVM430-FR6047 with a quick reference to the different hardware options available. This includes power, header configurations and pinouts, and communication interfaces.

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1 Power

The EVM430-FR6047 can be supplied power through USB or an external supply (for example, a battery or bench supply). Jumper and switch configurations must be set appropriately for power to be properly routed to the MSP430FR6047 device.[1]

1.1 USB Power

When using USB as the power source, set the POW_SEL switch to the middle position (ezFET) (see Figure 1).

![Figure 1. Power Selection](image1)

Set J1 and J3 as in Figure 2.

![Figure 2. USB Power Jumper Configuration](image2)

1.2 External Power

When using external power, the POW_SEL switch should be set to the top position (External) (see Figure 3). External supply voltage should be applied to the EXT_POW header shown below. For lowest power consumption, all jumpers on J2, J3, and J4 should be open. If not using a regulator (optional), operational supply voltage range is 1.8 V to 3.6 V. GND on J3 and communication jumpers on J4 are required if communicating through USB.
1.3 Using Voltage Regulators (optional)

Voltage regulators can be populated on the PCB if required. A switch mode regulator or LDO can be utilized. To use the TPS62740DSSR switch mode regulator, de-populate R19, and then populate U3 and surrounding components shown below. R41 to R48 should be set for the required output voltage. For more information, see the TPS62740 data sheet.[3]
To use the TPS78001DDCR LDO regulator, remove R19, and then populate U2 and surrounding components shown below. R20 and R21 should be set for required output voltage. This can be calculated using Equation 1. For more information, see the TPS78001 data sheet.[2]

\[ V = V_{fb} \times \left(1 + \frac{R1}{R2}\right) \]  

(1)
1.4 Measuring Current Consumption

Current consumption can be measured by removing the I_meas jumper and placing an ammeter across the header. When current measurements are not being performed, be sure this jumper is set.

Figure 8. Current Measurement Header
2 Header Connections

2.1 Transducer Headers

Two transducers can be connected to the board through J8. Additional ground connections are available on this header to accommodate transducers which use 3 pins (1 signal pin and 2 ground pins). The transducers signal pins should be connected to CH0 and CH1 and ground pin(s) to GND.

![Transducer Header](image)

Table 1. Transducer Connections

<table>
<thead>
<tr>
<th></th>
<th>GND</th>
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<tbody>
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<td>CH0</td>
<td>GND</td>
<td>GND</td>
<td>GND</td>
<td>CH1</td>
</tr>
</tbody>
</table>

2.2 USSXT_BOUT

When enabled in software, the buffered output clock of USSXT is available on J7. This allows for monitoring of the USSXT signal. Ground is also provided on J7.

![USSXT_BOUT Header](image)
2.3 BoosterPack™ Plug-in Module Connectors

J5 and J6 allow for connection to BoosterPack™ plug-in module or other devices which offer functionality such as wireless connectivity. To power a BoosterPack plug-in module from the main power supply, set jumpers on the RF_POW header (see Figure 11 and Table 2).

![Figure 11. BoosterPack Plug-in Module Headers](image)

Table 2. BoosterPack Plug-in Module Connections

<table>
<thead>
<tr>
<th>J5</th>
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<tr>
<td>VCC</td>
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<tr>
<td>RXD</td>
<td>N.C.</td>
</tr>
<tr>
<td>TXD</td>
<td>N.C.</td>
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<tr>
<td>CTS</td>
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<td>SPI_CLK</td>
<td>N.C.</td>
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<tr>
<td>RTS</td>
<td>N.C.</td>
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<td>SCL</td>
<td>N.C.</td>
</tr>
<tr>
<td>SDA</td>
<td>N.C.</td>
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</tbody>
</table>
2.4 JTAG

A standard MSP430™ 14 pin JTAG header is available for programming and debug. When using JTAG for programming, the POW_SEL switch should be set to the bottom position (JTAG) when power will be supplied through JTAG. If external power will be used, the switch should be set to the top position (External).

![JTAG Header](image)

**Figure 12. JTAG Header**

2.5 Communications

UART, I²C, and Spy-Bi-Wire interfaces are available.

JTAG TX and RX(UART) are available on J2. To use this interface with the on-board eZ-FET circuit, place jumpers on J2 TXD and RXD pins.

![JTAG UART Jumpers](image)

**Figure 13. JTAG UART Jumpers**

J2 also provides a connection for the Spy-Bi-Wire programming and debug interface. To use the on-board eZ-FET circuit, place jumpers on the J2 TEST and RST pins.

![Spy-Bi-Wire Jumpers](image)

**Figure 14. Spy-Bi-Wire Jumpers**

J4 provides a connection between the MSP430FR6047 and the high speed USB HID interface. To enable I²C, the J4 COMM_SDA, COMM_SCL, and COMM_IRQ jumpers should be populated. To enable UART on the USB HID interface, J4 TXD and RXD jumpers should be populated.
Figure 15. \textsuperscript{I}\textsubscript{C} Jumpers

Figure 16. USB HID UART Jumpers

Figure 17. LCD Contrast Control

3 LCD

The LCD contrast can be adjusted with the R11 potentiometer. Use a small flathead screwdriver to adjust the resistance of R11 and monitor the contrast on the display.

4 References

1. MSP430FR6047 Mixed-Signal Microcontroller
2. TPS780xx 150-mA Low-Dropout Regulator, Ultralow-Power, \textsubscript{I\textsubscript{Q}} 500 nA With Pin-Selectable, Dual-Level Output Voltage
3. TPS6274x 360nA \textsubscript{I\textsubscript{Q}} Step Down Converter For Low Power Applications
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<table>
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<th>Component Manufacturer</th>
<th>Component Part Number</th>
<th>SVHC Substance</th>
<th>SVHC CAS</th>
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<td>Murata</td>
<td>CSTCR4M00G15L99-R0</td>
<td>Lead Titanium Zirconium Oxide</td>
<td>12626-81-2</td>
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<tr>
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<tr>
<td>Abracon</td>
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<td>Diboron Trioxide</td>
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Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

Changes from June 2, 2017 to April 25, 2018

* Added Section 5, REACH Compliance ........................................................................................................... 10
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