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Datasheet

BT85x Series Development Kits

Applicable to the following Laird part numbers:
DVK-BT850-SA
DVK-BT850-ST

Version 1.0

REVISION HISTORY

Version	Date	Notes	Contributor	Approver
1.0	12 Jan 2018	Initial Release	Jacky Kuo Raj Khatri	Jonathan Kaye

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1 Overview

Laird's BT850 development kit (DVK-BT850-Sx) provides a platform for rapid prototyping of BT850-Sx series modules. The development board provides simple, easy-to-use access to the various hardware interfaces and configuration options for the module. The DVK is the perfect platform to provide for early development testing of the BT850-Sx series features and functionality, prior to designing the module onto a host PCB.

This datasheet is for the development board PCB which is DVK-BT850 1.0 on PCB.

2 Introduction

The Laird DVK-BT850-Sx is designed to support the rapid development of applications and evaluation for the specific Laird Bluetooth module part number BT850-SA or -ST. In-depth documentation for this product is available from the BT850 series product pages: http://www.lairdtech.com/Products/BT850

2.1. Package Contents

Each DVK-BT850-Sx includes the following items:

Development motherboard	The motherboard has the BT850-Sx module already soldered onto it and all available hardware interfaces are exposed.
USB cable – USB A type male to Micro-USB type	The USB cable can be used to power, control, and configure the BT850-Sx.
Stand-off	Screw nuts x 4 pcs; Stand-off x 4 pcs
Insert card	Provides links to additional information including BT850-Sx datasheet, utilities, schematics, and application notes.
External antenna	Only supplied with DVK-BT850-ST. Antenna supplied is Laird part # 0600-00040.

2.2. DVK-BT850-Sx – Main Development Board

The development board allows the Laird Bluetooth module to be connected to a PC. The development board provides USB interface linking to PCB and the BT850-Sx host interface. Any Windows PC (Windows 7. or later) auto-installs the generic Microsoft Bluetooth driver. Getting to Know the Development Board

Figure 1: Main DVK-BT850-Sx Board

3 Power Supply

Table 1: Input voltage

	Minimum	Typical	Maximum
Input Voltage	4.5V	5V	5.5V

Power supply options for powering development board:

- USB
- External DC supply

The DVK-BT850-Sx includes a USB cable to provide power to the development board. This should be plugged into a PC USB port, a USB hub, or a main adaptor with a USB output. If a hub is used, it should be a powered USB hub to ensure sufficient current is available at the port. The BT850-Sx module can be driven by the available current at a USB port.

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The low noise LDO (U4) on the DVK-BT850-Sx provides the 3.3V to support the entire board's operating voltage.

4 Interface Specification

4.1. GPIOs (PIN HEADER – J2)

There are three GPIO signals (GPIO [5;6;7]) presented on pin header J2. These can be used for an LED indicator or Cypress GCI (Global Coexistence Interface). The following (Table 2) shows the default settings by firmware.

Table 2: Default setting by firmware

GPIO	Function
GPIO_5	LED indications
GPIO_6	Cypress GCI; BT_SECI_IN (same as *WLAN_Activity*)
GPIO_7	Cypress GCI; BT_SECI_OUT (same as *BT_Activity*)

Note: All GPIOs functions are configured by firmware and any changes from the defaults would require a new firmware load.

The pin descriptions of J2 are shown in Table 3.

Table 3: J2 pin descriptions

J2	Description	Direction
Pin-2	GPIO[5]	O
Pin-3	GPIO[7]	O
Pin-4	GPIO[6]	I

There are four LED indicators on the DVK-BT850-Sx as shown in Table 4.

Table 4: LED indicators

LED	Description	Function
LED1	Connected to the BT_SECI_I	Cypress GCI indication
LED2	Connected to the BT_SECI_OUT	Cypress GCI indication
LED3	Connected to the output of the U4 (LDO)	3.3V power supply rail indication
LED4	Connected to GPIO_5	For BT850-Sx of status indications including inquiry, connected, and data traffic. BR/EDR Modes: ▪ When ininquiry mode, the LED is flashing with one-second periods. ▪ When the BT connection is created, the LED is solid light state . ▪ When the BT has data traffic, the LED is flashing with 250 ms periods LE Mode: ▪ When in inquiry mode, the LED is flashing with one-second periods. ▪ When the BT connection is created, the LED is solid light state. ▪ When the BT has data traffic, the LED is flashing with 250 ms periods

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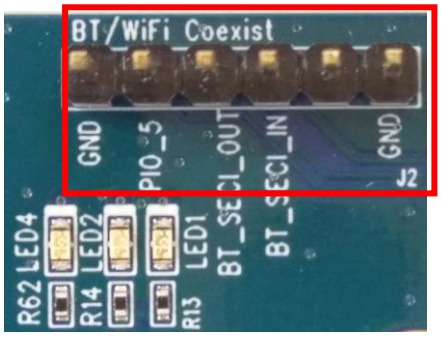

Figure 2: Pin headers - J2

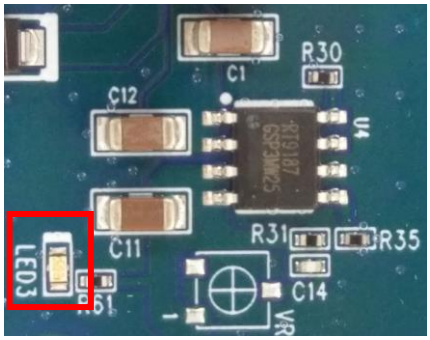

Figure 3: LED3

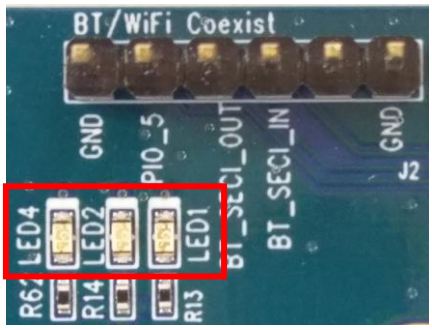

Figure 4: LED1, LED2, LED4

. PLEASE NOTE – The LED4 status configuration is controlled by firmware, any changes from the above default, please contact Laird.

4.2. PCM/I²S Interface (Pin Header – J1)

The DVK-BT850-Sx has a 4-wire digital audio port capable of operating in PCM or I²S mode; it isa dedicated audio interface and cannot be used as general purpose GPIOs.

The pin descriptions of J1 in PCM/I²S are shown in Table 5.

Table 5: J1 Descriptions for PCM/I2S Interface

J11	Description (PCM/I²S/SPI)	Direction
Pin-1	GND	
Pin-2	PCM_SYNC/I²S_WS	I/O
Pin-3	PCM_CLK/I²S_CLK	I/O
Pin-4	PCM_IN/I²S_DI	Input
Pin-5	PCM_OUT/I²S_OUT	Output
Pin-6	GND	

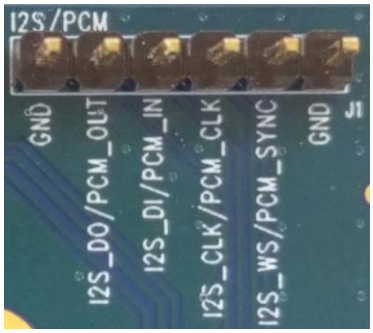

Figure 5: Pin Headers - J11 for PCM/I2S Interface

4.3. DC Power Supply

- **USB Connector –** The development kit provides a USB Type micro-USB connector (USB1) which allows connection to any USB host device. The connector optionally supplies power to the DVK-BT850-Sx when SW2 is set to the USB position.
- **DC JACK –** The development kit provided a DC JACK (CN1) for DC power supply input with an LDO (U4) to converting input voltage to 3.3V. The operation voltage range of the LDO is from 2.5V to 5.5V (1) and the current consumption is 1A maximum. When using the DC JACK for supply voltage to the DVK-BT850, the SW2 need to set to the DC JACK position.

(1) The DVK-BT850-Sx that it just supported +5V input only.

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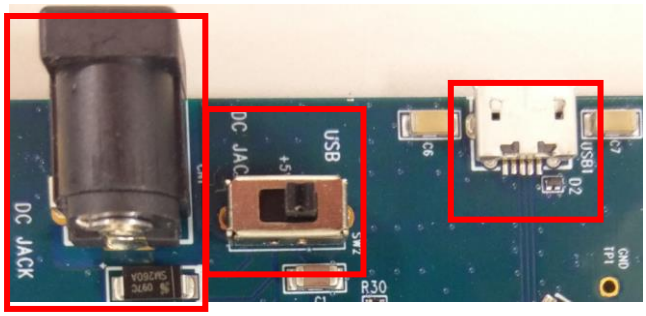

Figure 6: Micro-USB Connector (USB1), SW2, and DC JACK (CN1)

4.4. Push Button

SW4 (push button TACT switch) provides a reset signal to reset the BT850-Sx module (**Error! Reference source not found.**).

Push Button	Label on DVK-BT850 PCB	Description
SW4	Reset	Reset the BT850-Sx module

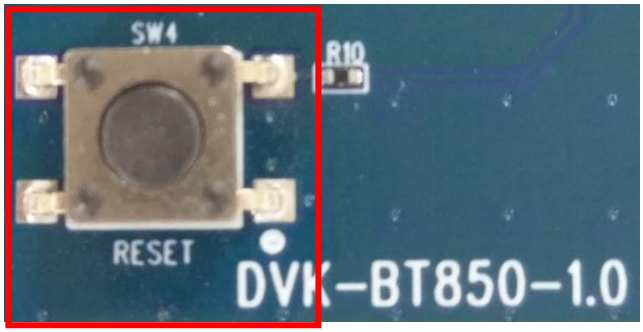

Figure 7: SW4

5 Other Features

5.1. Current Consumption Measurement

A removable jumper (J3) is provided to break the power supply line directly to the module (if SB1 is cut), allowing you to measure current consumption. For normal operation, J3 must be fitted. **Error! Reference source not found.** shows the locations of SB1 and J3.

Note: This measures the current consumption of the BT850-Sx series module ONLY.

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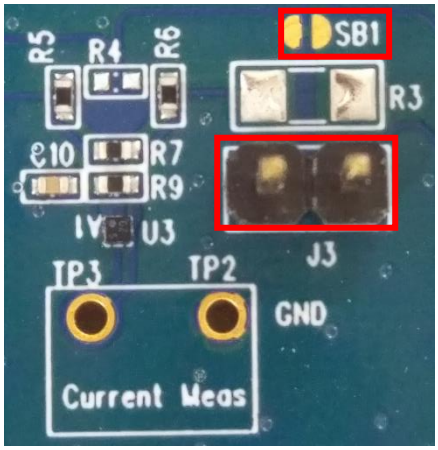

Figure 8: Current measurement circuit

To prepare the board for current measurement, **cut the shorting of the solder bridge SB1.** After this modification, there are two primary ways to measure the current consumption:

- **Using Ammeter –** Connect an ampere meter between the two pins of connector J3. This directly monitors the current.
- **Using Oscilloscope (Note below) –** Mount a resistor on the footprint R3. The resistor should not be larger than 10 Ohm. Connect an oscilloscope or similar with two probes on the pin on the J3 connector and measure the voltage drop. The voltage drop is proportional with current consumption. If a one-Ohm resistor is chosen,
  1 mV equals 1 mA.

There is also a third way to measure current:

- **Using Current Shunt Monitor –** The current drawn by the BT850-Sx module can be monitored using the Current Shunt Monitor (CSM), INA216 (U3). The gain of INA216 is 200 V/V for lowest possible drop voltage.

Note:	The Current Shunt Monitor method allows the dynamic current consumption waveforms on oscilloscope as the BT850-Sx radio operates. This can provide insight into power optimization.

Current consumed by the BT850-Sx series module is measured as a voltage (that is proportional to the current) using the CSM by connecting measuring voltmeter or oscilloscope to TP3 Connect measuring voltmeter or oscilloscope GND to TP2.

I(mA) = Vmeas_TP3(mV) /51

CAUTION:	To avoid permanent damage to the IC U3 (the current shunt monitor), do not short the TP3 output to GND.

6 Additional Documentation

Laird offers a variety of documentation and ancillary information to support our customers through the initial evaluation process and ultimately into mass production. Additional documentation can be found at the BT850 product page under the documentation tab. It includes:

- BT850 – Class 1 BT4.2 Dual Mode HCI module – Product brief
- BT850 Datasheet - Hardware Integration Guide

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- BT850 UART HCI Bluetooth Module for Linux – User's Manual – Using the BT850 with the BlueZ Linux BCCMD tool

For any additional questions or queries or to receive local technical support for the DVK-BT850-Sx or BT850-Sxmodule, please visit our support site at https://laird-ews-support.desk.com/.

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Факс: 8 (812) 320-03-32
Электронная почта: ocean@oceanchips.ru
Web: http://oceanchips.ru/
Адрес: 198099, г. Санкт-Петербург, ул. Калинина, д. 2, корп. 4, лит. А