

MAX14745 Evaluation Kit

Evaluates: MAX14745

General Description

The MAX14745 evaluation kit (EV kit) is a fully assembled and tested circuit for evaluating the MAX14745 wearable charge-management solution with I²C capability for low-power wearable application. The device includes a linear battery charger, smart power selector, two ultra-low quiescent current buck regulators, and three low-dropout (LDO) linear regulators.

Refer to the MAX14745 IC data sheet for detailed information regarding the operation and features of the devices.

Features

- RoHS Compliant
- Proven PCB Layout
- Full Assembled and Tested
- I²C Serial Interface

Quick Start

Required Equipment

- Adjustable Power Supply with 0-5V Capability
- Digital Multimeter (DMM)
- I²C Controller Device
- GPIO Controller Device
- Cables with Grabber Connections

Optional Equipment

- Second Power Supply for LDOs

Procedure

The EV kit is fully assembled and tested. Follow the steps below to verify basic board operation:

Caution: Do not turn on the power supply and external devices until all connections are completed.

- 1) Connect PFN1 (J2 pin 11) to the GPIO controller output. Alternatively, PFN1 can be connected to a 3V IO supply through a 10k pullup resistor. This procedure assumes that a GPIO controller is used.

- 2) Connect the I²C controller device to GND, SDA (J1 pin 6) and SCL (J1 pin 7).
- 3) Set the power supply voltage to 3.7V and turn off the supply.
- 4) Connect the positive terminal of the 3.7V power supply to BAT (J1 pin 4) and the negative terminal to GND (J3 pin 1).
- 5) Turn on the 3.7V power supply.
- 6) Turn on the GPIO controller device and I²C controller device.
- 7) Set GPIO controller to output logic-high to PFN1 to power on the MAX14745.
- 8) Measure the voltage on SYS (J1 pin 3) and confirm that it equals the battery voltage.
- 9) To enable Buck1 output, use the I²C controller to set Buck1En[1:0] to "01" by writing value "0xE9" to register 0x0D. Measure B1OUT (J2 pin 6) and confirm that it equals 1.2V.
- 10) To enable Buck2 output, Use the I²C controller to set Buck2En[1:0] to "01" by writing value "0xE9" to register 0x0F. Measure B2OUT (J2 pin 5) and confirm that it equals 1.8V.
- 11) **Optional:** To test any one of the LDOs, set the second power supply voltage to the desired LDO input voltage. Turn it off and then connect the positive terminal to the LDO input and the negative terminal to GND. Turn it on. To enable the LDO output, use the I²C controller to write value "0xE2" to the register LDO1Cfg, LDO2Cfg, or LDO3Cfg corresponding to the LDO under test. Measure the voltage of the LDO output and confirm that it matches the default setting: 0.8V (LDO1), 0.9V (LDO2), and 0.9V (LDO3).
- 12) The EV Kit is ready for additional evaluation.

Detailed Description of Hardware

The MAX14745 evaluation kit (EV Kit) evaluates the MAX14745 wearable charge-management solution.

See [Table 1](#) thru [Table 3](#) for pin descriptions of the three connectors (J1–J3).

Ordering Information appears at end of data sheet.

Table 1. Connector J1

| PIN | MAX14745 | DESCRIPTION |
|-----|----------|---|
| 1 | GND | Ground |
| 2 | MON | Voltage Monitor Output |
| 3 | N.C. | Not Connected |
| 4 | INT | Open-drain Active-low Interrupt Output |
| 5 | RST | Power-On Reset Output. |
| 6 | SDA | I ² C Serial Data Input / Output |
| 7 | SCL | I ² C Serial Clock Input |
| 8 | MPC1 | Multipurpose Configuration Input 1 |
| 9 | MPC0 | Multipurpose Configuration Input 0 |
| 10 | PFN2 | Power Function Control Input / Output |
| 11 | PFN1 | Power Function Control Input |
| 12 | GND | Ground |

Table 2. Connector J2

| PIN | SIGNAL | DESCRIPTION |
|-----|--------|-------------------------|
| 1 | L3IN | LDO3 Input |
| 2 | L3OUT | LDO3 Output |
| 3 | L2OUT | LDO2 Output |
| 4 | L1OUT | LDO1 Output |
| 5 | B2OUT | Buck Regulator 2 Output |
| 6 | B1OUT | Buck Regulator 1 Output |
| 7 | L2IN | LDO2 Input |
| 8 | L1IN | LDO1 Input |

Table 3. Connector J3

| PIN | SIGNAL | DESCRIPTION |
|-----|--------|---|
| 1 | GND | Ground |
| 2 | CHRGIN | Charger Input |
| 3 | SYS | System Load Connection |
| 4 | BAT | Battery |
| 5 | THM | Battery Temperature Thermistor Connection |
| 6 | CAP | Bypass for Internal LDO |
| 7 | SET | External Resistor Connection for Configuring Battery Charge Current |
| 8 | LED | LED Current Sink Input |
| 9 | N.C. | Not Connected |
| 10 | N.C. | Not Connected |
| 11 | N.C. | Not Connected |
| 12 | GND | Ground |

Component Suppliers

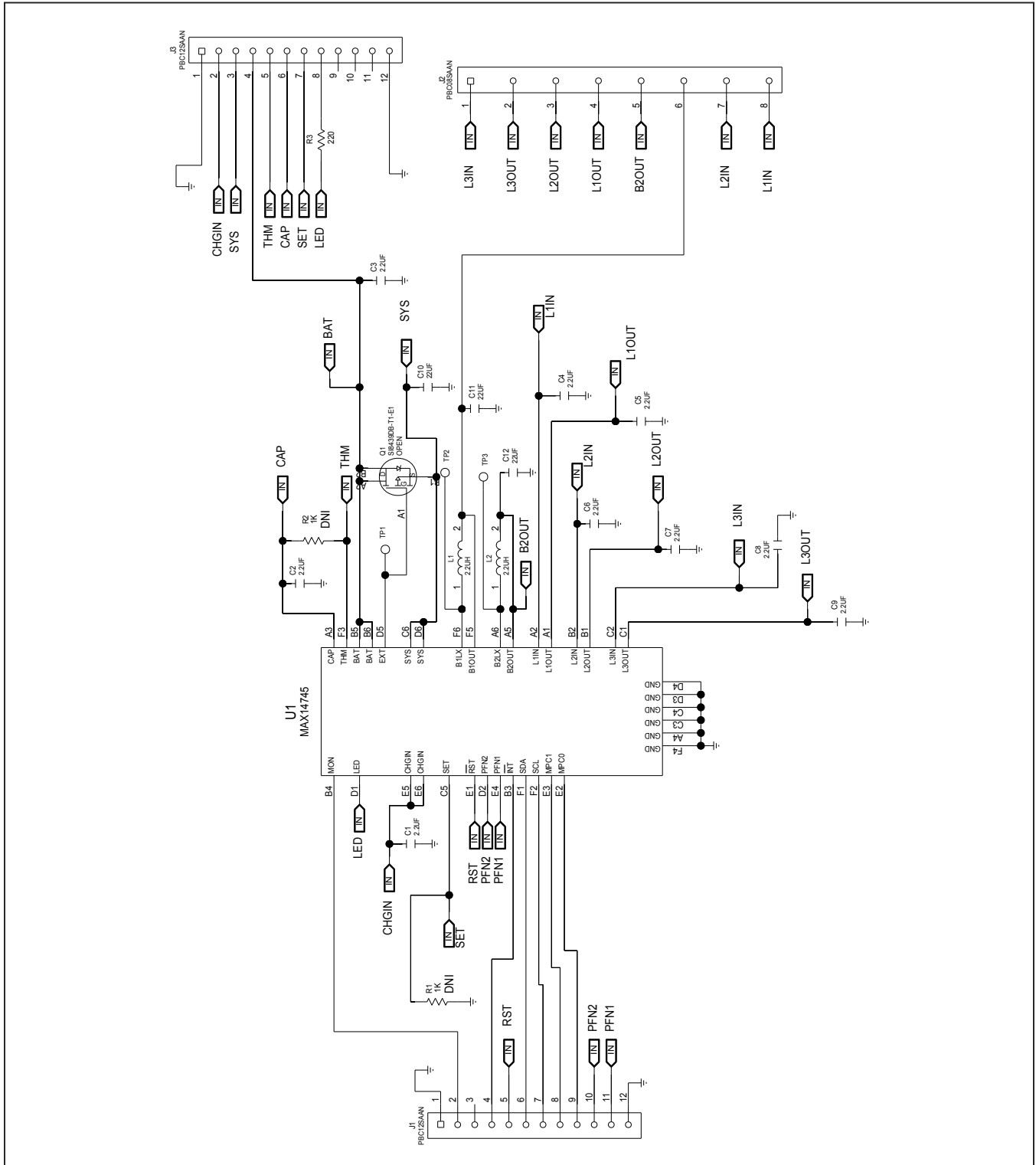
| SUPPLIER | WEBSITE |
|-----------------|--|
| Murata Americas | www.murata.com |
| TDK Corp | www.component.tdk.com |

Note: Indicate that you are using the MAX14745 when contacting these component suppliers.

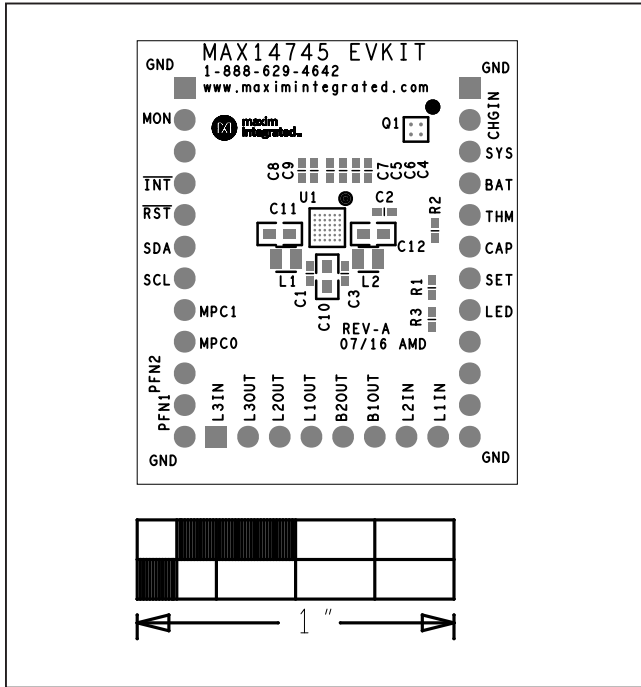
MAX14745 EV System Bill of Materials

| ITEM | REF_DES | DNI/DNP | QTY | MFG PART # | MANUFACTURER | VALUE | DESCRIPTION | COMMENTS |
|------|---------|---------|-----|---------------------|---------------------------|----------------|---|----------|
| 1 | C1-C9 | - | 9 | C1005X5R1V225M050BC | TDK | 2.2 μ F | CAPACITOR; SMT (0402); CERAMIC CHIP; 2.2 μ F; 35V; TOL = 20%; MODEL = C SERIES; TG = -55°C TO +85°C; TC = X5R | |
| 2 | C10-C12 | - | 3 | C1608X5R0J226M080AC | TDK | 22 μ F | CAPACITOR; SMT (0603); CERAMIC CHIP; 22 μ F; 6.3V; TOL = 20%; MODEL = C SERIES; TG = -55°C TO +85°C; TC = X5R | |
| 3 | J1, J3 | - | 2 | PBC12SAAN | SULLINS ELECTRONICS CORP. | PBC12SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 12PINS; -65°C TO +125°C | |
| 4 | J2 | - | 1 | PBC08SAAN | SULLINS ELECTRONICS CORP. | PBC08SAAN | CONNECTOR; MALE; THROUGH HOLE; BREAKAWAY; STRAIGHT; 8PINS; -65°C TO +125°C | |
| 5 | L1, L2 | - | 2 | DFE201610E-2R2M | TOKO | 2.2 μ H | INDUCTOR; SMT (2016); METAL ALLOY CHIP; 2.2 μ H; TOL= \pm 20%; 2.6A | |
| 6 | R3 | - | 1 | ERA-2AED221 | PANASONIC | 220 | RESISTOR; 0402; 220 Ω ; 0.5%; 25PPM; 0.063W; THIN FILM | |
| 7 | U1 | - | 1 | MAX14745 | MAXIM | MAX14745 | EVKIT PART-IC; PWRM; WEARABLE CHARGE MANAGEMENT SOLUTION; WLP36 | |
| 8 | Q1 | DNP | 0 | SI8439DB-T1-E1 | N/A | SI8439DB-T1-E1 | TRAN; P-CHANNEL 8V (D-S) MOSFET; PCH; SMT; PD-(2.7W); I(-9.2A); V(-8V) | OPEN |
| 9 | R1, R2 | DNP | 0 | RG1005P-102-D | SUSUMU CO LTD. | 1K | RESISTOR; 0402; 1K Ω ; 0.5%; 25PPM; 0.0625W; THIN FILM | |
| 10 | PCB | - | 1 | MAX | MAXIM | PCB | PCB Board:MAX14745 EVALUATION KIT | |

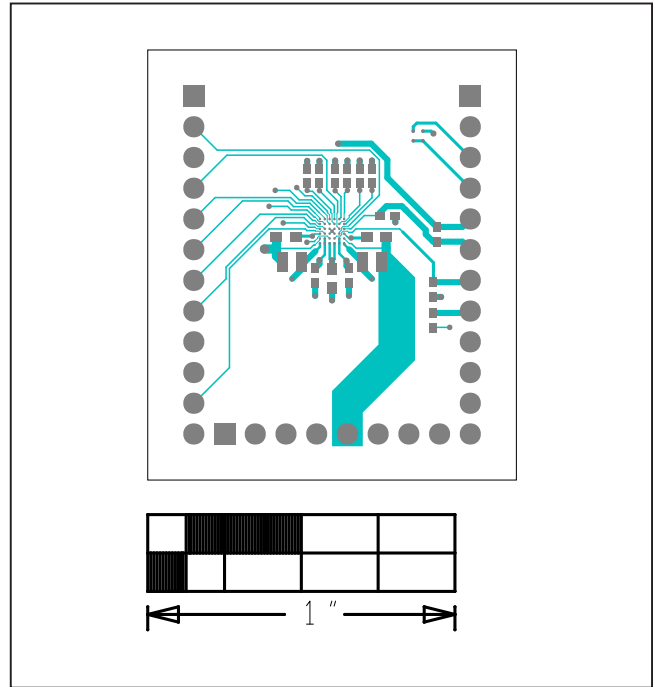
MAX14745 EV System Schematic



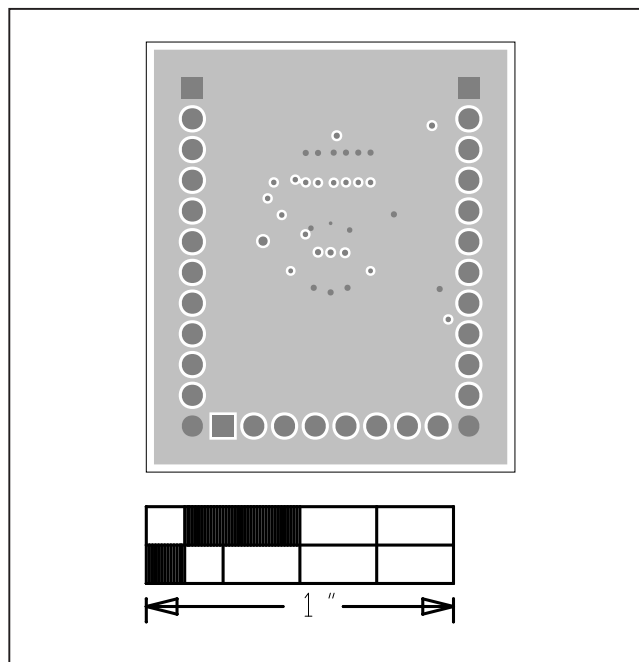
MAX14745 EV System PCB Layout



MAX14745 EV Kit—Top Silkscreen

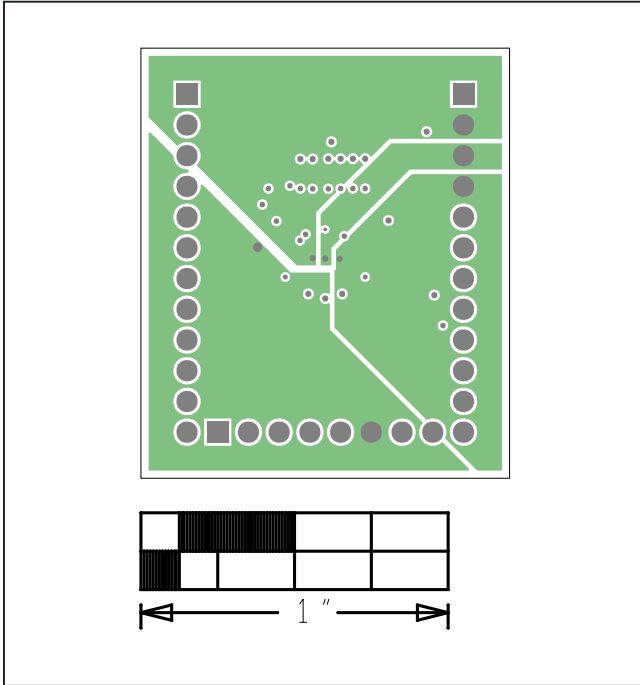


MAX14745 EV Kit—Top

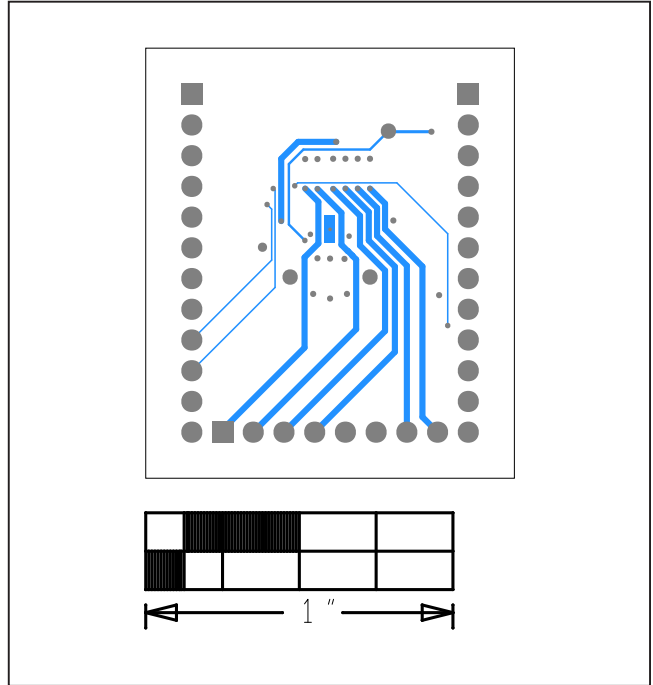


MAX14745 EV Kit—Layer 2

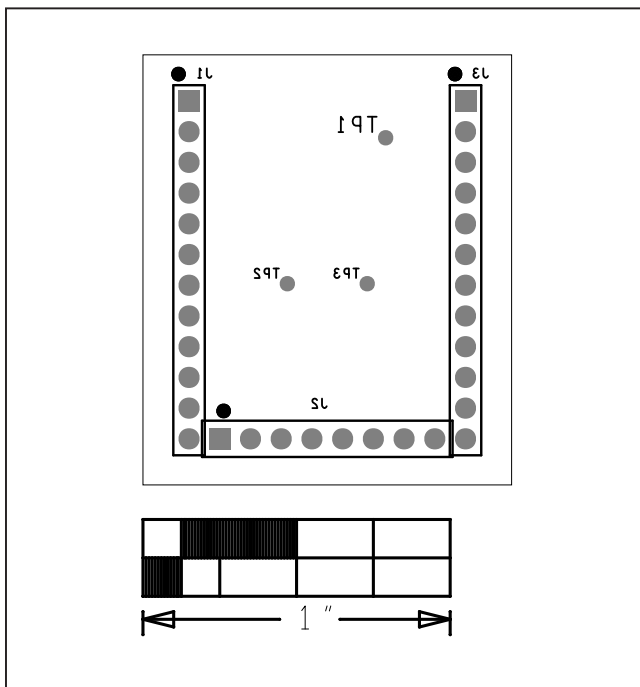
MAX14745 EV System PCB Layout (continued)



MAX14745 EV Kit—Layer 3



MAX14745 EV Kit—Bottom



MAX14745 EV Kit—Bottom Silkscreen

Ordering Information

| PART | TYPE |
|----------------|--------|
| MAX14745EVKIT# | EV Kit |

#Denotes RoHS compliant.

Revision History

| REVISION NUMBER | REVISION DATE | DESCRIPTION | PAGES CHANGED |
|-----------------|---------------|----------------------------------|---------------|
| 0 | 9/16 | Initial release | — |
| 1 | 2/19 | Added <i>Quick Start</i> section | 1 |

For pricing, delivery, and ordering information, please visit Maxim Integrated's online storefront at <https://www.maximintegrated.com/en/storefront/storefront.html>.

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