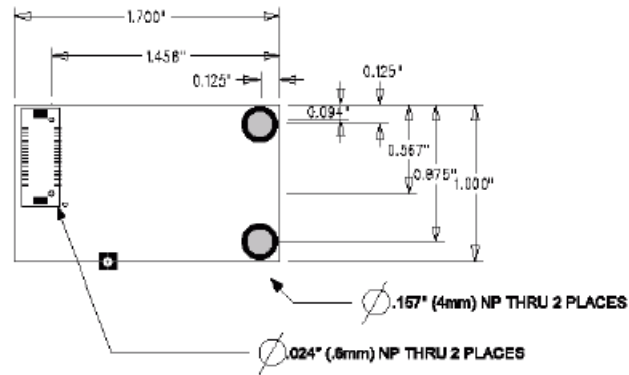## Interface Decal Dimensions

Components

Microcontroller (U2)

The 8-bit flash-based ATmega 128L/ATmega64L microcontroller contains software for the configuration and control of the RM2420, AMC and network functions, and the user-defined application software. The microcontroller utilizes a 32.768KHz crystal for MAC timing and power management, as well as external crystal operating at 8Hz. A variety of peripherals are routed to headers on the Developer Kit carrier board for application development. For detail information on the microcontroller, see www.atmel.com.

When configuring the Ember Studio Debug Reader, enter the following baud rate into the Debug Preference Window: 100,000. This rate is set by the microcontroller operating frequency.

Radio (U5)

The radio is an RM2420, a true single-chip 2.4GHz IEEE 802.15.4 – compliant and Zigbee-ready radio frequency transceiver designed for low-power and low-voltage wireless applications. It includes a digital direct sequence spread-spectrum (DSSS) baseband modem with an effective data rate of 250kbps.
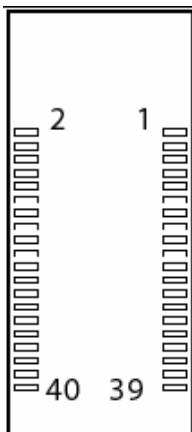
Channel Frequencies

These channels are equivalent to IEEE 802.15.4 channels 11 to 26.

RM2420 Channel Frequencies (GHz)

| Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2.405	6	2.435	12	2.465
1	2.410	7	2.440	13	2.470
2	2.415	8	2.445	14	2.475
3	2.420	9	2.450	15	2.480
4	2.425	10	2.455	—	—
5	2.430	11	2.460	—	—

Pin Layout

Pin	ATmega 128/64 Pin Name	Description
1	GND	Digital GND
2	GND	Digital GND
3	PD3 (TXD1/INT3)	EmberNet stack defaults to Alternate Function TX UART (TXD1)
4	nRESET	External reset, active low
5	PD2 (RXD1/INT2)	EmberNet stack defaults to Alternate Function RX UART

		(Rxd1)
6	PG1 (nRD)	General purpose I/O
7	+3.3V out	External power pin used to run custom external sensors and/or devices; 20mA max
8	+3.3V in	Input power from carrier boards
9	GND	Digital GND
10	GND	Digital GND
11	PD1 (SDA/INT1)	General purpose I/O; EmberNet defaults signal as an output connected to EM2 (button 1) on carrier board (with J11 installed)
12	PG0 (nWR)	General purpose I/O
13	PD0 (SDI/INT0)	General purpose I/O; EmberNet defaults signal as an output connected to EM1 (button 0) on carrier board (with J10 installed)
14	PC2	Dedicated connection to red LED (D55 on carrier board) for debugging purposes
15	PB7 (OC2/OC1C)	General purpose I/O
16	PC3	Dedicated connection to yellow LED (DS4 on carrier board) for debugging purposes
17	PB6	General purpose I/O
18	PC5	Dedicated connection to orange LED (DS2 on carrier board) for debugging purposes
19	NC	Dedicated for use with carrier board emulator/debug module
Pin	**ATmega 128/64 Pin Name**	**Description**
20	PC6	Dedicated connection to green LED (DS3 on carrier board) for debugging purposes
21	PB3	Master In/Slave Out SPI (used to configure the EM2420)
22	PG2	General purpose I/O
23	PB2 (MOSI)	Master Out/Slave In SPI (used to configure the RM2420)
24	AVCC	Analog voltage reference pin
25	PB1 (SCK)	SPI clock (used to configure the RM2420)
26	AGND	Analog ground pin (same as digital GND)
27	PC1	Dedicated signal for Temperature Enable (active high) for temperature sensor on carrier board
28	AREF	ADC voltage reference pin
29	NC	——
30	PF1 (ADC1)	EmberNet stack uses alternate function ACD1 to monitor external battery pack voltage
31	NC	——
32	PF2 (ADC2)	EmberNet stack uses alternate function ACD2 for temperature calibration
33	PE3 (OC3A/AIN1)	General purpose I/O
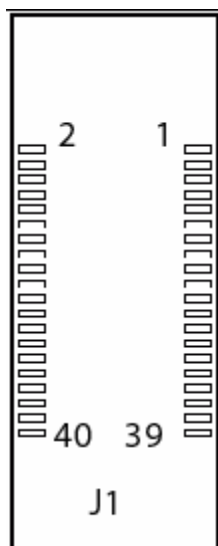
Viewed from bottom

34	PF4 (ADC4/TCK)	General purpose I/O; if JTAG is enabled, the EmberNet stack uses alternate function TCK for JTAG
35	PE2 (XCK0/AIN0)	General Purpose I/O
36	PF5 (ADC5/TMS)	General purpose I/O; if JTAG is enabled, the EmberNet stack uses alternate function TMS for JTAG
37	PE1 (TXD0/PDO)	EmberNet stack defaults to alternate function TX UART (TXD0)
38	PF6 (ADC6/TDO)	General purpose I/O; if JTAG is enabled, the EmberNet stack uses alternate function TDO for JTAG
39	PE0 (RXD0/PDI)	EmberNet stack defaults to alternate function RX UART (RXD0)
40	PF7 (ADC7/TDI)	General purpose I/O; if JTAG is enabled, the EmberNet stack uses alternate function TDI for JTAG