# Getting Started Guide

IAR KickStart Kit™ for NXP Semiconductors' LPC1788

This guide briefly describes how to get started using IAR Embedded Workbench® with IAR J-Link (Lite) debug probe for ARM® to run an example application on the LPC1788-SK target system.

For more detailed information, see the *IAR Embedded Workbench® IDE User Guide* and the C-SPY Debugging Guide, which can be found on the Help menu in the IAR Embedded Workbench IDE.

Features of the LPC1788-SK evaluation board

- LPC1788 device with ARM Cortex-M3 core
- LCD 3.5" 320x200 24bit color TFT with backlight and touch screen
- 3D accelerometer with 11 bit accuracy
- 64MB SDRAM
- USB connectors
    - OTG
    - Host
- Several methods of powering the board
    - JTAG, trace or external power
- IrDA transceiver
- 100 Mbit Ethernet
- CAN driver and connector
- RS232 with ICSP control
- SD/MMC card connector
- JTAG/SWD connectors
    - 20 pin 0.1" (JTAG1)
    - 10 pin 0.05" (JTAG2)
- TRACE connector 20 pin 0.05"
- 2 user buttons and reset button
- Trim pot
- EXT and UEXT connector
- Audio input/output
- RoHS compliant
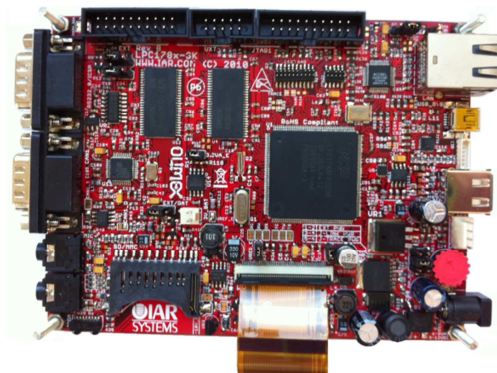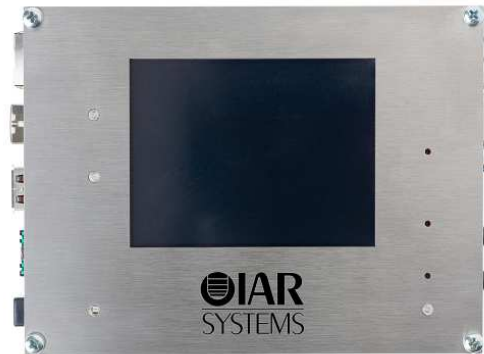
Install IAR Embedded Workbench for ARM

1 Insert the IAR KickStart Kit DVD. The DVD contains all the software you need to get your development project up and running.

2 First choose which board you are working with, and then move on to the **INSTALL SOFTWARE** page.

3 Select the IAR Embedded Workbench for ARM installation. This will lead you first to the registration procedure, and after that the software installer procedure.
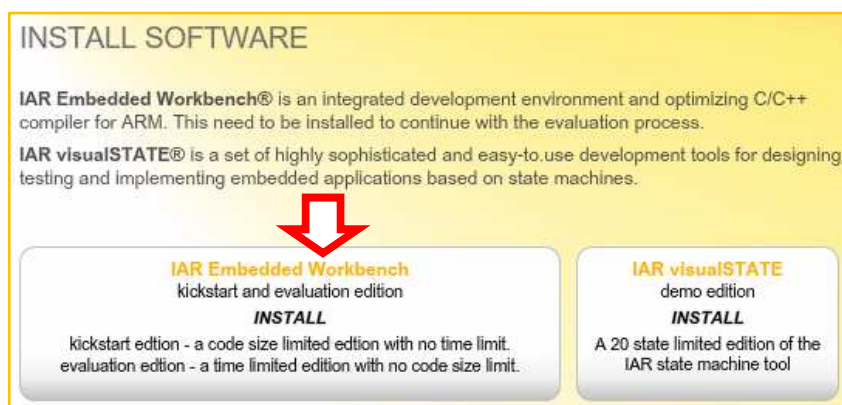
4 You will be able to choose between a code-limited and time-limited edition. We recommend the kickstart edition which has no time limit for the IAR KickStart kits. The example applications later used are created within the code size limit. After the registration, the license number will be sent to you via e-mail within a few minutes.

Note: You are welcomed to try both the kickstart and the evaluation edition. Note that you only need to install the software once, but register for both kickstart and evaluation. You will then get two license numbers and you can easily switch between using the **License manager** within the IAR Embedded Workbench IDE.

5 Once you have registered it is time to start installing the software. It can take several minutes for the installation files to unpack. Click on the installer button, and follow the instructions on the screen.

We recommend that you use the default directories on your installation.

Activate your IAR Embedded Workbench for ARM license

1 The first time you start IAR Embedded Workbench for ARM you will need to activate your license(s). Once you start the application you will go straight into **Information Center**. **Information Center** is the starting point where you can find everything from technical documentation to example applications.

2 The first time you start using the IDE, the **License Wizard** window with the request to activate your license appears. Fill in the license number you previously received via e-mail, and click **Next**.
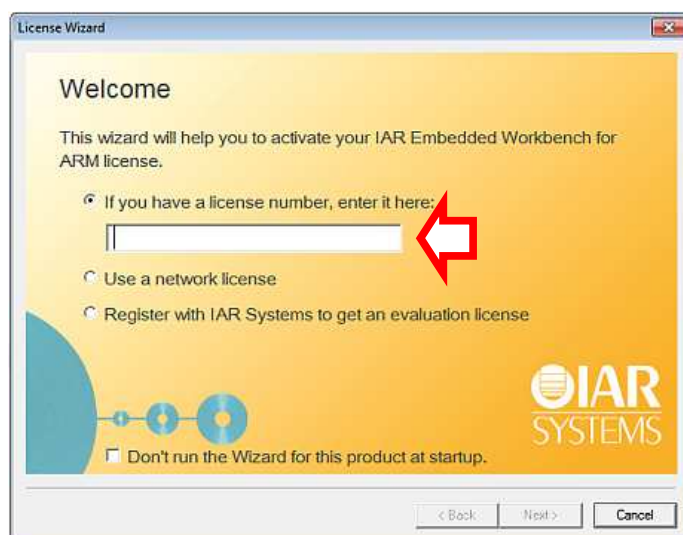
3 If you want to switch between license numbers (for instance KickStart and evaluation license), you can do this from the **License Manager** from inside the IDE. For further information, see the *IAR Embedded Workbench, Licensing Guide*, available from the **User Guide** section of **Information Center**.

Install IAR J-Link (Lite) debug probe for ARM

Before you start IAR Embedded Workbench, IAR J-Link debug probe for ARM (hereafter called IAR J-Link) must be installed.

1 Connect your computer and J-Link using the USB cable. Do not connect the IAR J-Link debug probe to the evaluation board yet.

   The green LED on the front panel of the IAR J-Link will blink for a few moments while Windows searches for a USB driver.

2 If this is the first time that you are using IAR J-Link, Windows will start the installation wizard. Choose **Install from a specific location**. If the installation wizard does not start automatically – see note below.

3 When asked to locate the USB drivers, click the browse button and navigate to the `\Program Files\IAR Systems\Embedded Workbench x.x\arm\drivers\JLink\` directory.

4 Click **Finish**. IAR J-Link now installed and the LED is shining with a steady light.

   Note: If installation wizard does not start automatically, or you get a message that the driver has not been installed properly: Navigate to `\Program Files\IAR Systems\Embedded Workbench x.x\arm\drivers\Jlink\` and start the `InstDrivers` application. This will install the driver and the green light should shine steadily.

Set up the evaluation board

After you have installed the software and IAR J-Link debug probe, you should set up the evaluation board according these instructions:

1 Set these jumpers:

Jumper(s)	Description
PWR_SEL	Pin 3-4 closed - power from J-Link
ISP_E	Unfilled
RST_E	Unfilled

Table 1: Jumper settings for the example project

2 It is time now to plug the IAR J-Link (Lite) debug probe into the JTAG connector on the evaluation board.

The **PWR** LED on the evaluation board light up.

Running example applications

When you have installed and set up all the software and hardware, you can try out one of the example applications provided with the IAR Embedded Workbench kickstart edition for ARM.

To take full advantage of the example application, you must have some working knowledge of the IAR Embedded Workbench IDE. For a quick introduction, see the tutorials in the *IAR Embedded Workbench® IDE User Guide for ARM*, available as a PDF from the **IAR Information Center for ARM.**

The example described here is LCD which shows the IAR, NXP and Olimex logo on the LCD and the cursor moves when the board position is changed.

1 From the **Start** menu, start the IAR Embedded Workbench IDE by choosing **All Programs>IAR Systems>IAR Embedded Workbench for ARM x.xx Kickstart>IAR Embedded Workbench**. You will get straight into the **IAR Information Center for ARM**.
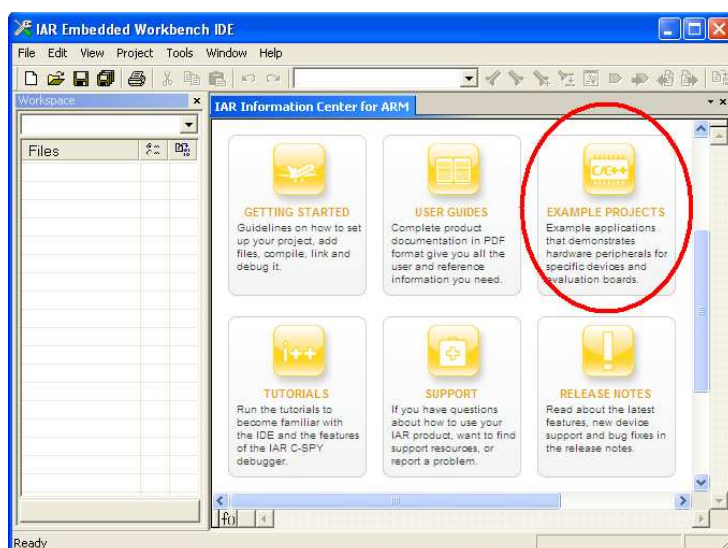
2 Click **EXAMPLE PROJECTS**.

Figure 1 - IAR Information Center for ARM

3 Select the chip manufacturer **NXP**.

4 Select the device family **LPC17xx** and the **IAR LPC-1788-SK** evaluation board.

5 Open project `LCD`.

6 Choose a destination folder to save a copy of this project for testing, so that the original project will not be updated for any changes you made during testing.

7 Follow the instructions in the `Example description` to configure the board.

Make sure that the compilation target, at the top of the workspace window is set, or changed to `Flash Debug`.
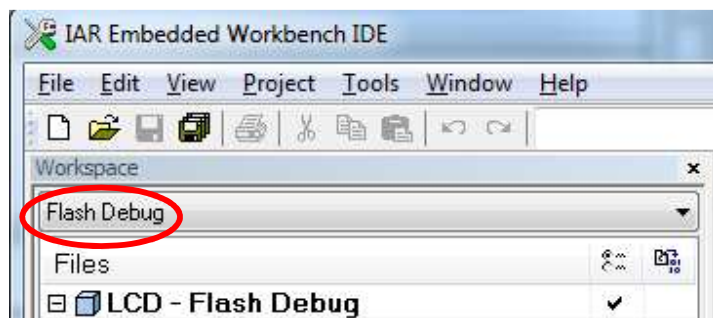

Figure 2 - Choose the application target

8 Choose **Project>Make** or click the **Make** button on the toolbar. The project should compile with no errors or warnings.

9 Choose **Project>Download and Debug** or click the **Download and Debug** button on the toolbar. This will cause your program to be downloaded to the evaluation board.

The file `main.c` is now displayed in the editor window and the application is stopped at the start.

10 Click **Debug>Go** or click the **Go** button on the toolbar to start the application.

On the touch screen LCD on the evaluaton board you will see a cursor is moving as the board position is changed.

11 To stop C-SPY, choose Debug>Break or click the Break button on the debug bar.

12 To exit C-SPY, choose **Debug>Stop Debugging** or click the **Stop Debugging** button on the toolbar.

You can now try other example projects included, click **Help>Information Center** to bring up the **IAR Information Center** again. Remember to read the project descriptions in each project.

If the code size of some examples exceeds the 32K limit, please download and test on the 30-day evaluation edition (**http://www.iar.com/downloads**).

Evaluation board overview

Jumper descriptions
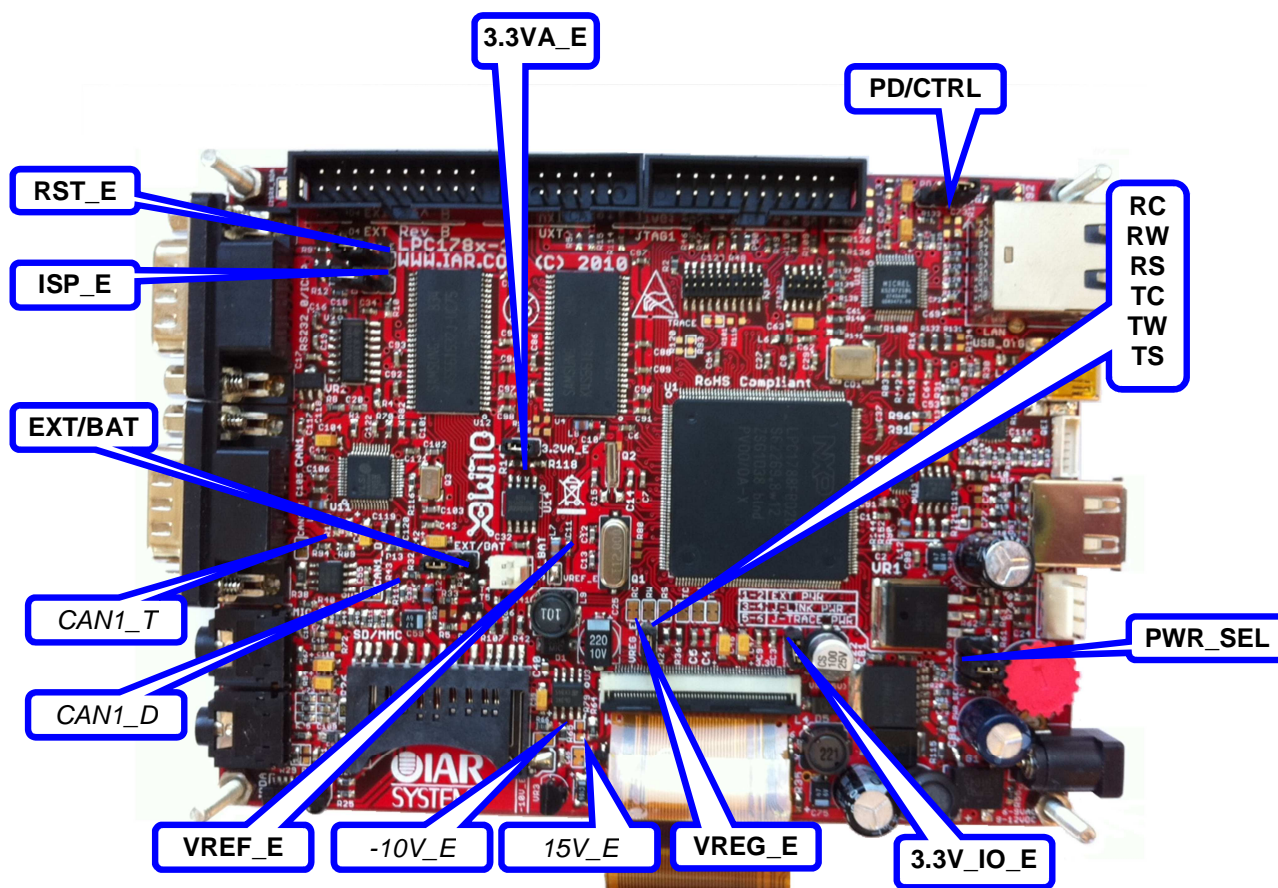
Figure 3 - LPC1788-SK jumper settings

Jumper(s)	Function	Position	Description
EXT/BAT pin 1-2	Select VBAT pin power source	**EXT Closed**	VBAT pin power is supplied by from PWR_JACK **(default)**
EXT/**BAT** pin 2-3		BAT Closed	VBAT pin power is supplied by from battery connector 3V_BAT
PWR_SEL pin 1-2	Power source select jumper		External power supply
PWR_SEL pin 3-4		**Closed**	Power from JTAG pin 19 (J-Link) +5VDC **(default)**
PWR_SEL pin 5-6			Power from TRACE pin 11&13 +5VDC
PD/CTRL Pin 1-2	LAN Power down/control jumper	PD Closed	PHY transceiver is placed in Power Down state
PD/**CTRL** Pin 2-3		**CTRL closed**	PD pin from PHY transceiver is connected to LPC1788 PHY_PD signal to control LAN Power down function
VREG_E	MCU VDD_REG power supply enable	**Closed**	3.3V is supplied to MCU VDD pin **(default)**
		Open	3.3V is not supplied to MCU VDD pin
VREF_E	MCU VREF enable	**Closed**	3.3V is supplied to MCU VREF pin **(default)**
		Open	3.3V is not supplied to MCU VREF pin
CAN1_D	*CAN1 disable SMD jumper*	*Closed*	*CAN1 driver is disabled*
		Open	*CAN1 driver is enabled (**default**)*
CAN1_T	*CAN1 terminator SMD jumper*	*Closed*	*120Ohm resistor is connected between CANH and CANL lines*
		Open	*120Ohm resistor is disconnected from CANH and CANL lines (**default**)*
ISP_E	BOOT enable jumper (used with RST_E)	Closed	Enable RS232 BOOT via RS232_0/ICSP connector. RST_E need to also be closed.
		Open	Disable RS232 BOOT via RS232_0/ICSP connector. RST_E need to also be open. **(default)**
RST_E	RST enable jumper (used with ISP_E)	Closed	Enable RS232 BOOT via RS232_0/ICSP connector. ISP_E need to also be closed.
		Open	Disable RS232 BOOT via RS232_0/ICSP connector. ISP_E need to also be open. **(default)**
3.3VA_E	3.3V analog power supply enable	**Closed**	3.3V is supplied to MCU VDDA pin **(default)**
		Open	3.3V is not supplied to MCU VDDA pin
3.3V_IO_E	3.3V digital power supply enable	**Closed**	3.3V is supplied to MCU VDD pins **(default)**
		Open	3.3V is not supplied to MCU VDD pins
-10V_E	*10V power source enable SMD jumper*	***Closed***	*10V is connected to LCD module (**default**)*
		Open	*10V is disconnected from LCD module*
15V_E	*15V power source enable SMD jumper*	***Closed***	*15V is connected to LCD module (**default**)*
		Open	*15V is disconnected from LCD module*

Table 2: Jumper settings

The jumper table below contains SMD jumpers which all are connected with I2S and LCD. If all are closed the I2S interface is shared with LCD low data bits. When I2S interface is to be used, you need to open these jumpers. Please note that by doing so you will lose lower 2 bits from LCD RED, LCD GREEN and LCD BLUE.

| Jumper(s)	Function	Position	Description
RC	I2S_RX_SCK	Closed	I2S_RX_SCK pin is connected to LCD0 pin (default)
		Open	I2S_RX_SCK pin is not connected to LCD0 pin
RW	I2S_RX_WS	Closed	I2S_RX_WS is connected to LCD1 pin (default)
		Open	I2S_RX_WS is not connected to LCD1 pin
RS	I2S_RX_SDA	Closed	I2S_RX_SDA is connected to LCD8 pin (default)
		Open	I2S_RX_SDA is not connected to LCD8 pin
TC	I2S_TX_SCK	Closed	I2S_TX_SCK is connected to LCD9 pin (default)
		Open	I2S_TX_SCK is not connected to LCD9 pin
TW	I2S_TX_WS	Closed	I2S_TX_WS is connected to LCD16 pin (default)
		Open	I2S_TX_WS is not connected to LCD16 pin
TS	I2S_TX_SDA	Closed	I2S_TX_SDA is connected to LCD17 pin (default)
		Open	I2S_TX_SDA is connected to LCD17 pin
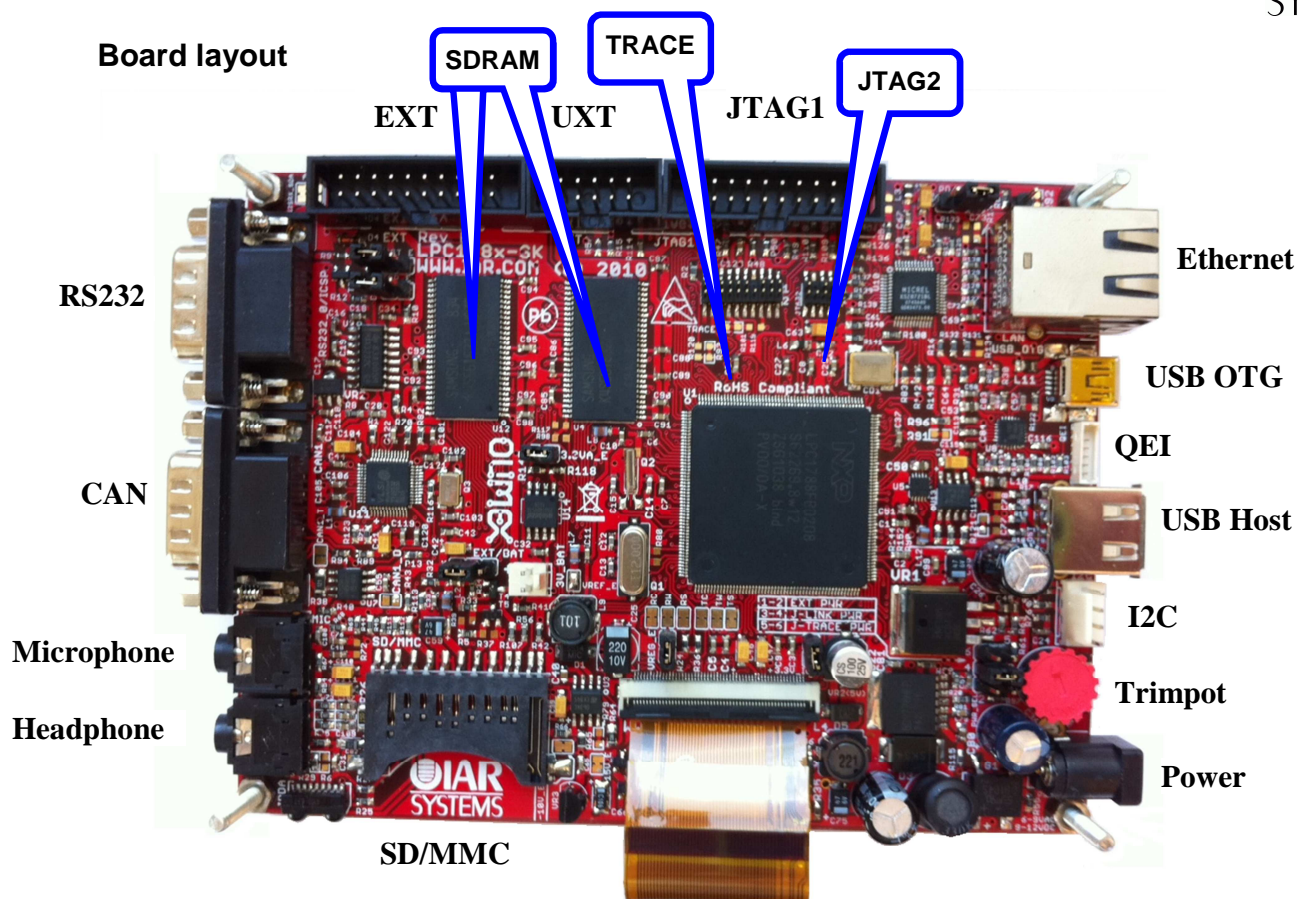
Board layout

Figure 4 - LPC1788-SK board layout

Mechanical dimensions
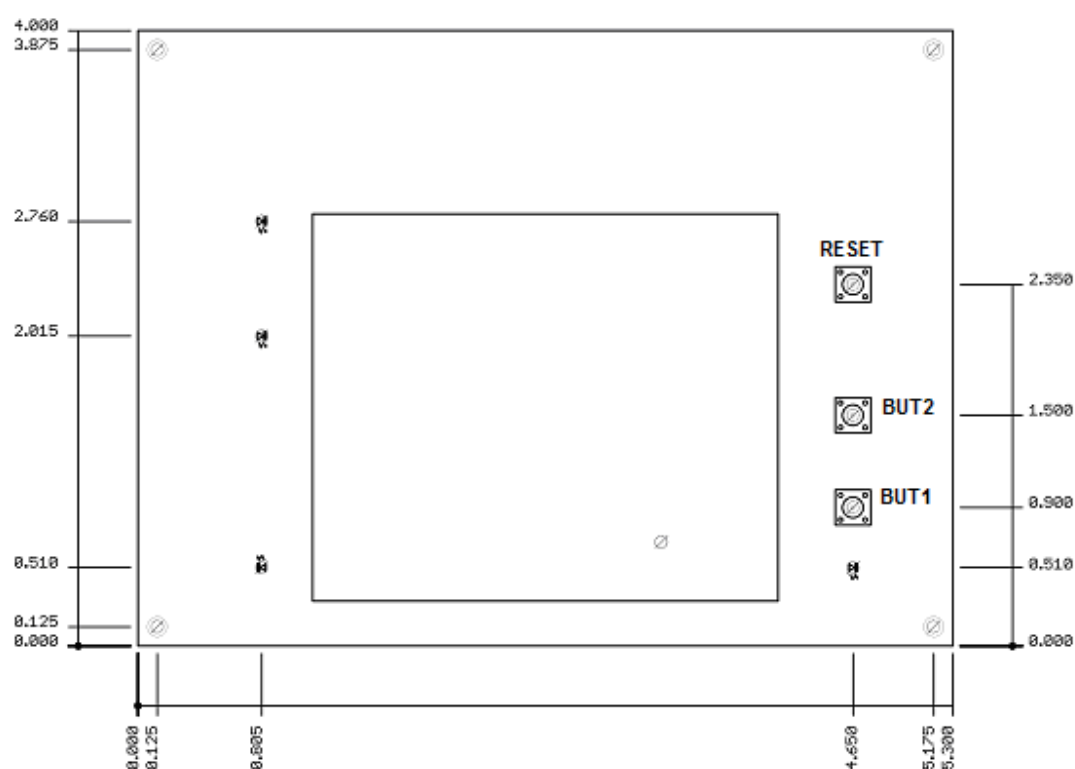
All measures are in inches.

General Troubleshooting
If you are unable to find the cause of a problem, try resetting the evaluation board by using the reset button on the board. Then restart the C-SPY Debugger in the IAR Embedded Workbench IDE. You can also try disconnecting and reconnecting the power to the evaluation board, pressing the reset button and then restarting C-SPY.

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- One installation CD or DVD - One LPC1788-STK evaluation board - One IAR J-Link (Lite) debug probe for ARM - One USB (mini) cable	IAR Systems, IAR Embedded Workbench, C-SPY, visualSTATE, IAR KickStart Kit, IAR and the IAR Systems logotype are trademarks or registered trademarks owned by IAR Systems AB. J-Link is a trademark licensed to IAR Systems AB. All other trademarks or registered trademarks mentioned in this document are the properties of their respective owners. © Copyright 2012 IAR Systems AB. Part number: GS-LPC1788-2. Second edition: November 2012.