Zilog Education Solutions

Zilog Educational Platform

User Manual

UM025504-0316

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Revision History

Each instance in the Revision History table below reflects a change to this document from its previous version.

Date	Revision Level	Description	Page No
Mar 2016	04	Updated content with iPhone App information; added the iOS iPhone ZEDUcation App Mode section; added links in Related Documentaion section.	27, 42
Aug 2014	03	Updated Ordering Information table to include a product page link to the Zilog Store.	41
Apr 2013	02	Modified language in Ordering Information section for clarity.	41
Apr 2013	01	Original issue.	All

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Introduction

The Zilog Educational Platform is designed to offer a comprehensive educational advantage to students who are pursuing a degree in the electronics and computer sciences. The Zilog Educational Platform Kit includes all of the necessary components and software to allow students to design with freedom. This document, has been created to be a companion document to the Zilog Educational Shields User Manual (UM0256). Also available for this Platform is a third party book, *Programming the Zilog ZNEO Microcontroller by Example* by Dan Eisenreich (see Related Documentation on page 42).

The Zilog Educational Platform is an electronics development system for learning and teaching at the university level, yet can also serve the needs of students at the high school level. The core of the Platform is Zilog's Z16F2810 MCU, a 16-bit Flash chip based on Zilog's ZNEO CPU.

The Platform's robust educational capabilities allow students to learn about microcontroller architecture, language programming, wireless communication, analog-to-digital conversion, sensing technologies and security encryption methods; students can also experiment with creating industrial lighting and motor control applications. The Platform can also be configured as a data acquisition and remote control system. The platform ships with two features – a command shell that allows control of the Platform without the need for additional programming and a Test Shield that is used to verify that all the available GPIO pins are working properly. An assortment of additional interesting application shields is also available; please visit zilog.com for more information.

Note: At power-on, the Zilog Educational Platform starts in active Bluetooth iPhone Search mode; the platform is looking for an iPhone running the ZEDUcation App. Any iPhone enabled with Bluetooth LE and running the App will be able to connect to the Platform (a Bluetooth LE Shield is required for this operation). However, if you do not want to connect to an iPhone, simply press Ctrl+D to enter the native Shell Mode.

The Educational Platform's design layout allows students to use it with intuitive ease, thereby saving time, energy and money. The Platform is complete in all aspects of its functionality. Attention has been given to many of the Platform's details, such as its integrated audio buzzer and a jumper that, when removed, can disable the backlight display from the LCD panel when power savings are important. The Platform's battery power source allows for mobile capability when considering projects in the field.

Note: Operation of the Zilog Educational Platform assumes a functional knowledge of basic computer principles on the part of the student.

Kit Contents

The Zilog Educational Platform is available as a stand-alone product and as a kit that provides all of the hardware necessary to begin learning as soon as you open the box.

- Educational Platform Board
- System ZED Test Shield
- USB Smart Cable for debugging purposes
- USB (A to Mini-B) cable
- Wall power adapter
- 9V battery
- Flash drive

Figure 1 shows the contents of the Zilog Educational Platform Kit.

Figure 1. The Zilog Educational Platform Kit

Figure 2 shows the Educational Platform with a ZPAN (Bluetooth LE) test shield affixed to it.

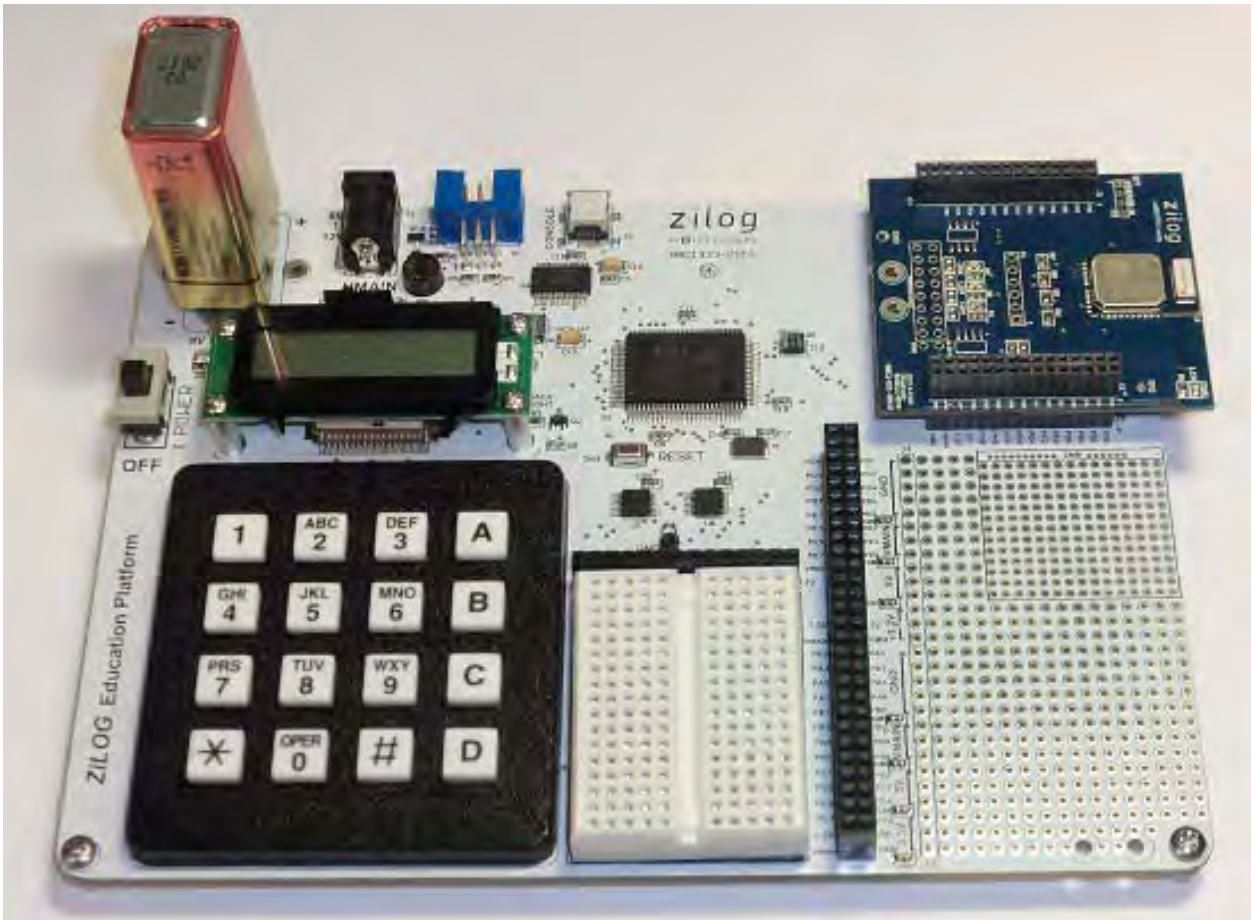


Figure 2. Educational Platform with ZPAN (Bluetooth LE) Shield Attached

Required Software

In addition to the hardware in your Kit, freely available software is required to properly conduct experiments and debug operations with the Zilog Educational Platform. All of the software items listed below are available for free online, as noted.

- ZDSII Integrated Development Environment for the ZNEO CPU (available as a free download from the Zilog Store)
- USB Smart Cable driver (available as a free download from the Zilog Store)
- Terminal emulation program such as HyperTerminal or Tera Term

- FTDI USB (console) driver

Note: Tera Term is used in this document, and it can be downloaded for free from http://log-mett.com/index.php?/download/tera-term-474-freeware.html. Zilog does not provide technical support for Tera Term or any terminal emulator program.

If you have not previously used an FTDI virtual COM port, you will be prompted for the FTDI USB driver when you connect the PC to Console Connector J5 on the Educational Platform. This driver can be downloaded from the FTDI website at http://www.ftdi-chip.com/Drivers/VCP.htm.

Optional Software

The following free software is available for download from Apple iTunes. For more information, refer to iOS iPhone ZEDUcation App Mode

- iOS iPhone App (ZEDUcation)

Educational Platform Features

The Zilog Educational Platform hardware is configured to offer versatility of function for enabling the speedy development of experiments. Its integrated command shell and stackable shields give the Zilog Educational Platform a depth of purpose not common in the field, yet make learning more economical for students.

The Zilog Educational Platform's key features include:

- Input via a 16-key pad and/or a PC console application
- Output through a 16x2 LCD and/or standard PC monitor
- Dual-format breadboards, both standard and solderless
- Dual main power options: 6V–12V wall outlet or 9V battery for mobile operation
- Three voltages available to the breadboard when the Platform is powered with the included 9V wall outlet:
  - V_{MAIN}
  - 3.3V
  - 5V with a maximum current of 2.0 amps
- 47 GPIO lines
- Stackable application shield modules

- Preprogrammed command shell
- I/O signal access connector
- Buzzer
- Compatibility with iPhone App

Figure 3 shows the Zilog Educational Platform with its System ZED Test Shield plugged in. This Test Shield is used to test all available GPIO pins for proper operation.

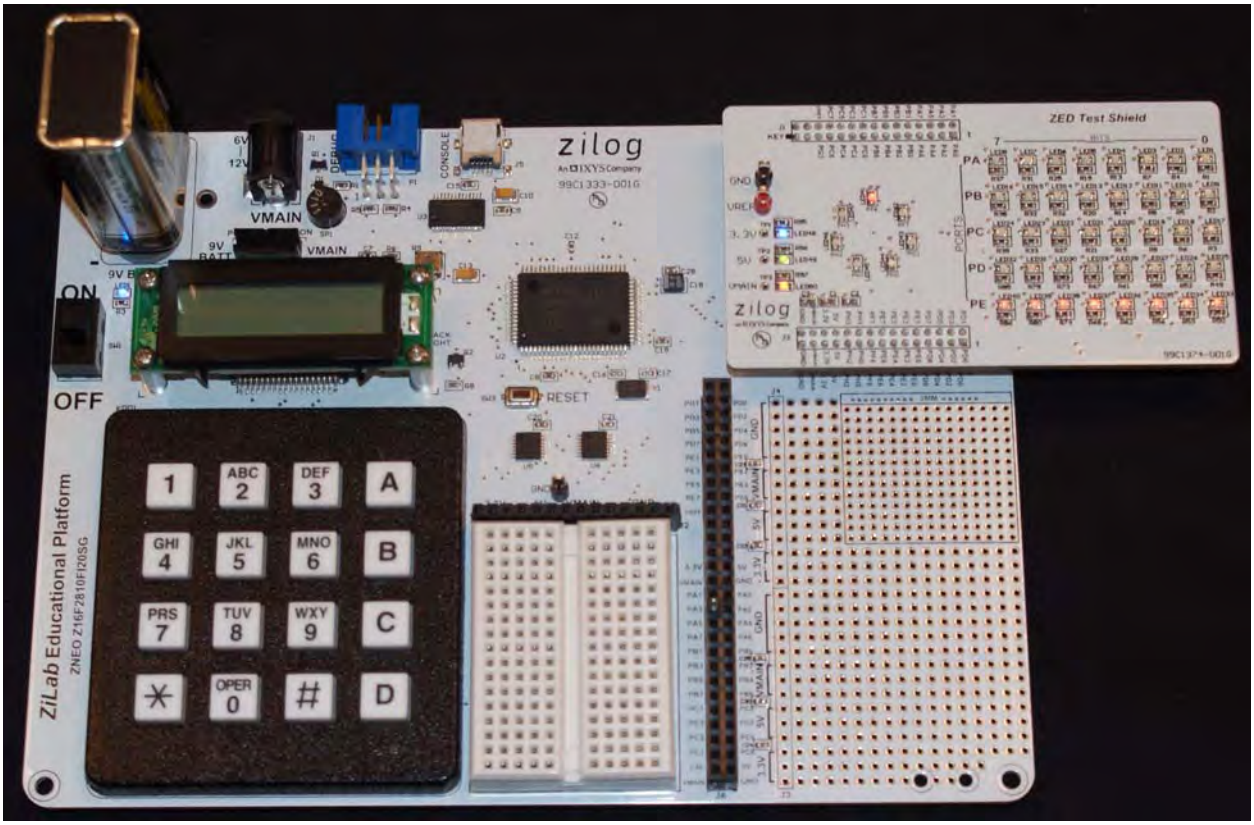


Figure 3. The Zilog Educational Platform with Test Shield

Figure 4 shows the arrangement of these features on the Platform.

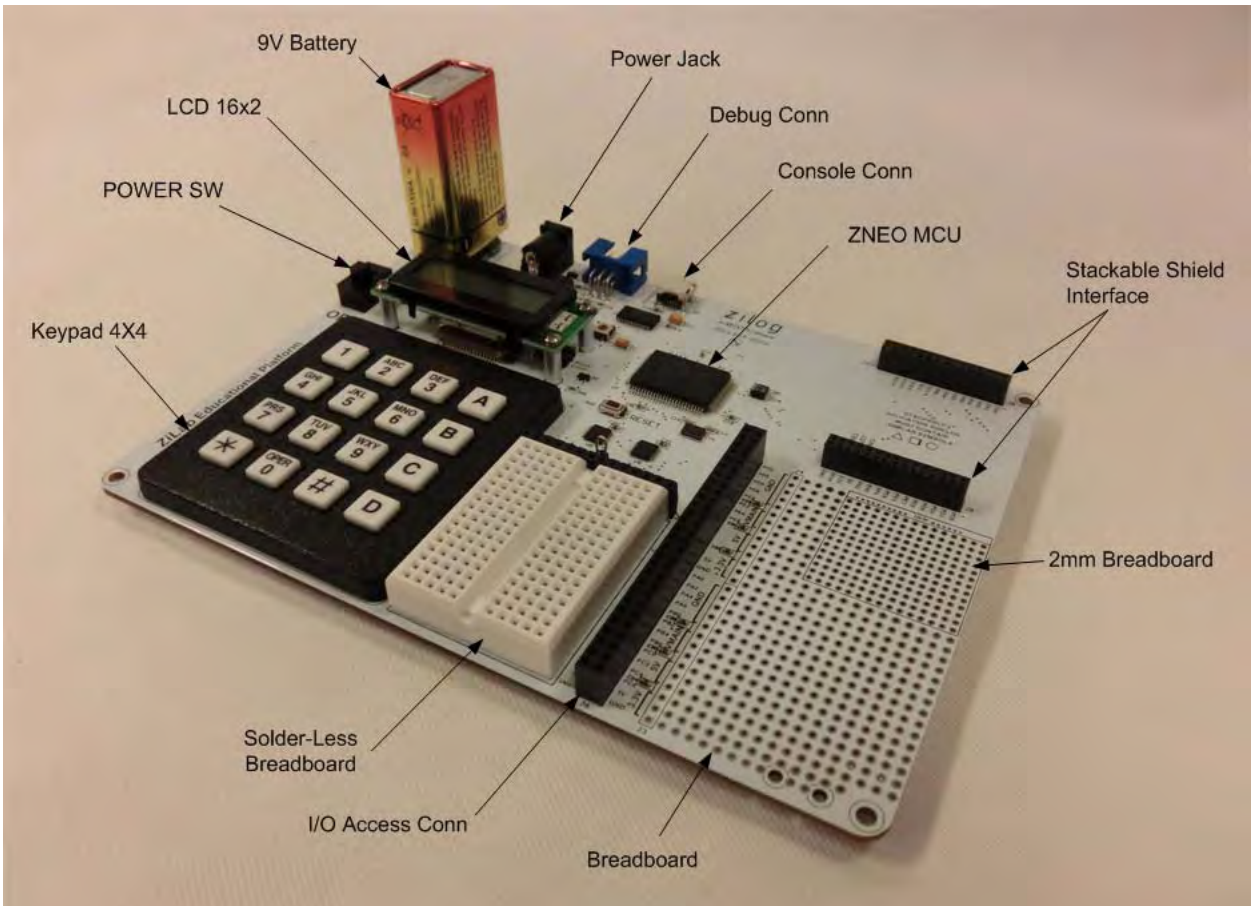


Figure 4. Elements of the Zilog Educational Platform

Setup and Operation

This section describes how to set up the Zilog Educational Platform and operate it in Serial Mode. Before proceeding, it is important that you observe standard antistatic precautions when removing the contents of the Kit from the box it is contained in. Do not apply power to the Zilog Educational Platform until you have established all hardware connections.

Caution: When unpacking and working with the Zilog Educational Platform and its application shields, always use a grounding strap to prevent damage resulting from electrostatic discharge (ESD).

Setup

Observe the following procedure to establish the Platform's hardware connections in Serial Mode.

Note: Three additional operating modes are described in this document. To learn more about these three modes, refer to the Modes of Operation section on page 20.

1. Locate the Test Shield. With the Power Switch on the Platform set to OFF, insert the Test Shield into interface connectors J8 and J9. Align the *Key* locations on both the Base and Shield boards.

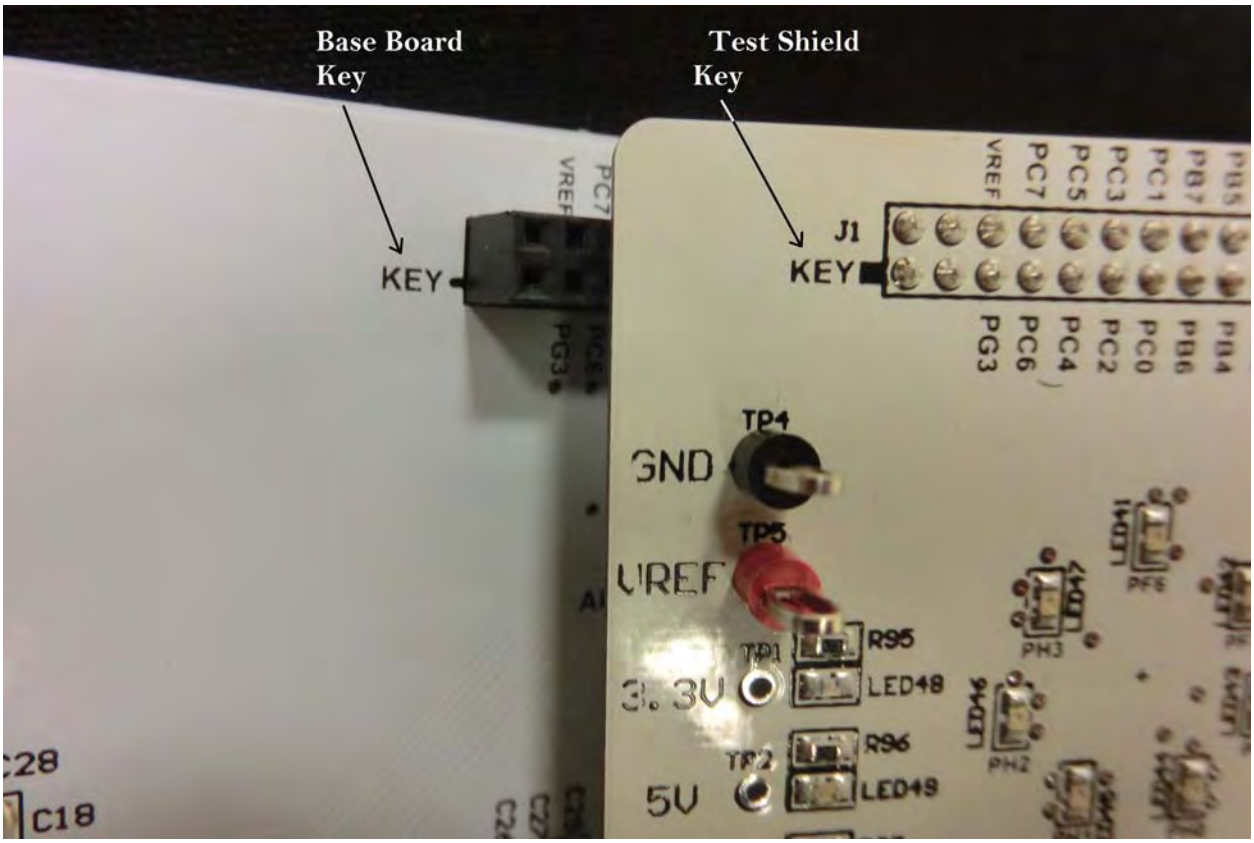


Figure 5. Key Alignment Base to Shield

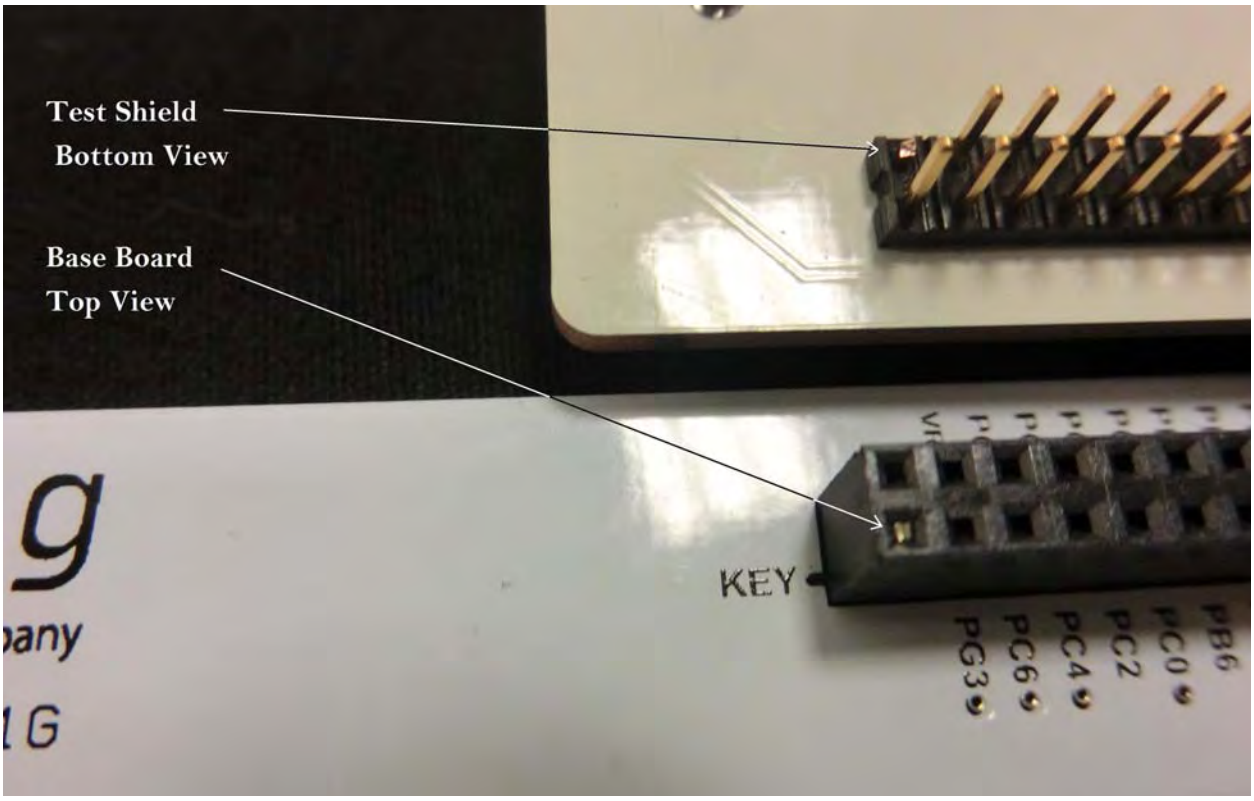


Figure 6. Key Pins Trim Plug

2. Connect the USB (A to Mini-B) cable to your PC and to the J5 console connector on the Platform.

Note: If the Windows OS displays a *Driver Not Found* message, you must install a USB driver. A standard USB driver is resident on the Flash drive that you received with your Kit, but a driver can also be downloaded from the FTDI website at http://www.ftdichip.com/Drivers/VCP.htm

3. Connect the 9V power adapter to the J1 jack or insert the 9V battery; set the Power Selection switch accordingly.

Serial Mode Operation

The Platform is connected by USB cable from a PC to console connector J5 on the Platform. It is primarily controlled by means of its preprogrammed command shell, which can be accessed through a terminal emulation program. Any emulator, such as Tera Term or HyperTerminal, can be used to access the shell. COM port settings will be the same for all emulators.

Note: Tera Term is used in this document, and it can be downloaded for free from http://log-mett.com/index.php?/download/tera-term-474-freeware.html. Zilog does not provide technical support for Tera Term or any terminal emulator program.

Observe the following procedure to establish the port connections in Serial Mode.

1. Launch Tera Term and select the serial COM port assigned to the Platform from the **Port:** drop-down menu, as indicated in Figure 7. COM Port number will vary.

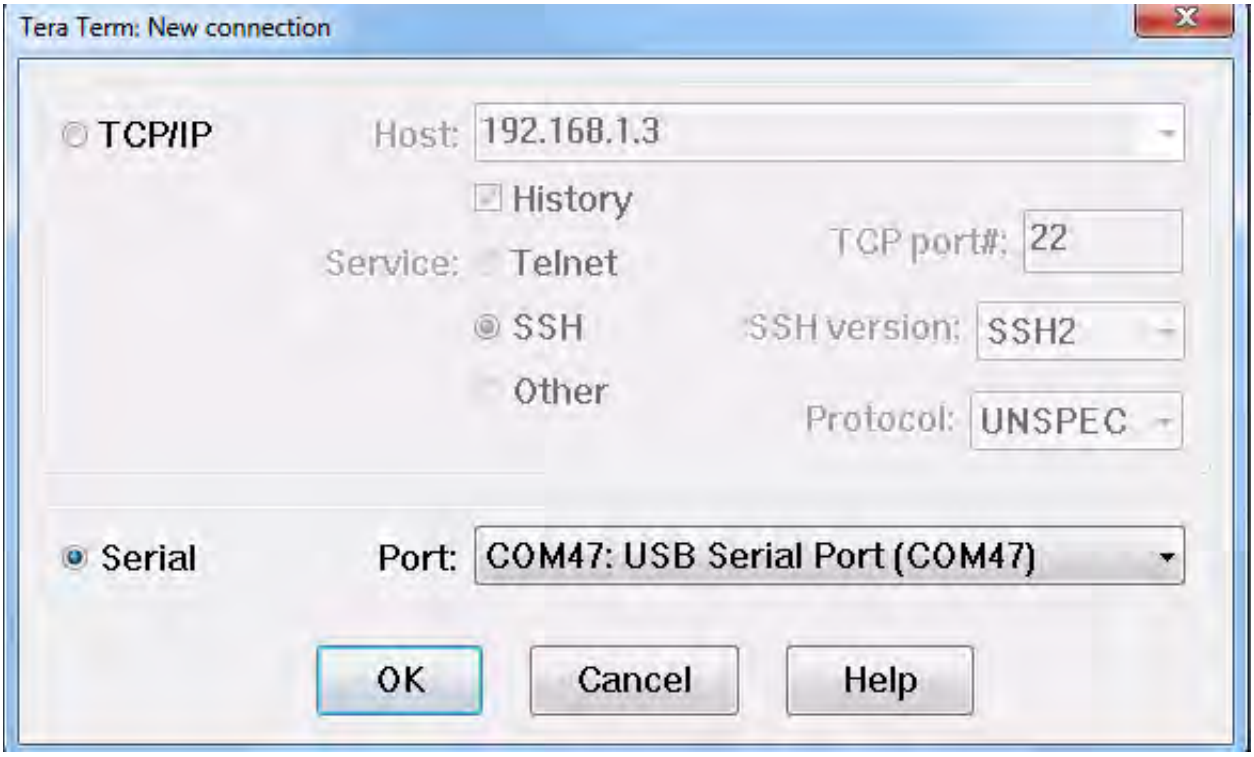


Figure 7. Selecting the Serial Port in Tera Term's New Connection Dialog

Note: To determine which port is assigned to the Platform, first plug in, then unplug the USB cable from connector J5 (Console) on the Educational Platform. The assigned port will appear, then disappear, in the Tera Term window. As an alternative, port assignment can also be monitored using the Windows OS Device Manager Port viewer. In the Figure 7 example, COM47 has been assigned.

2. Click **OK**. The initial Tera Term dialog appears, as shown in Figure 8.

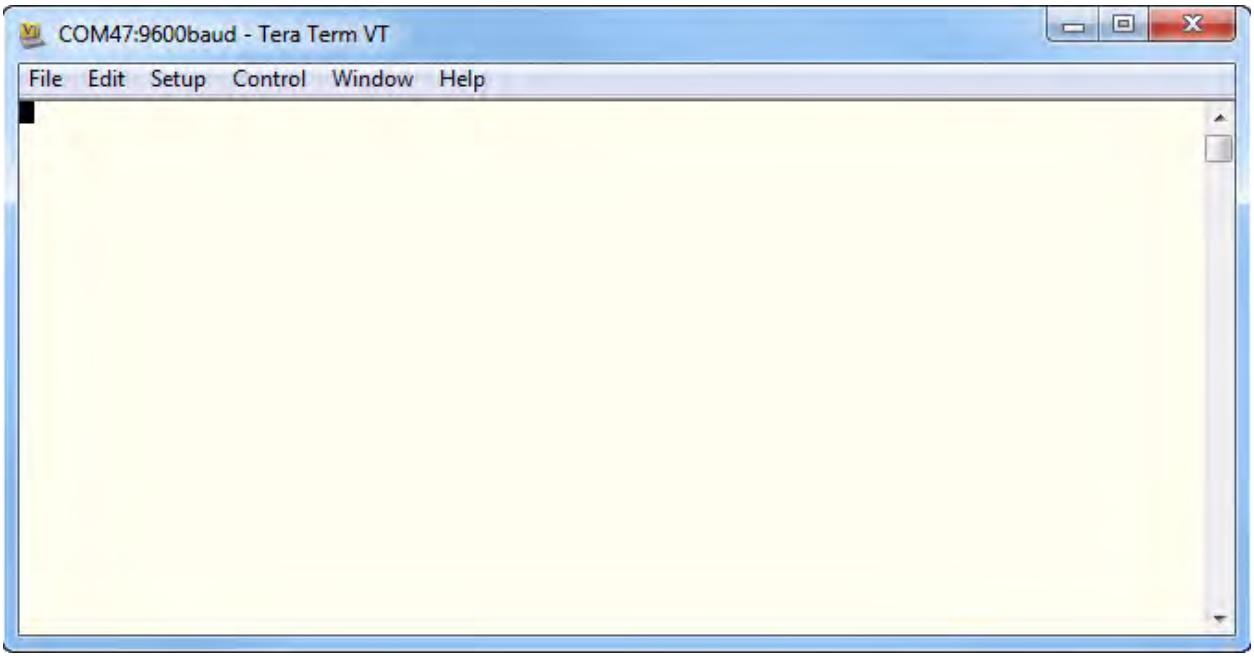


Figure 8. Tera Term Initial Dialog

3. Click **Setup**. The Baud Rate Setting dialog will appear, as shown in Figure 9.

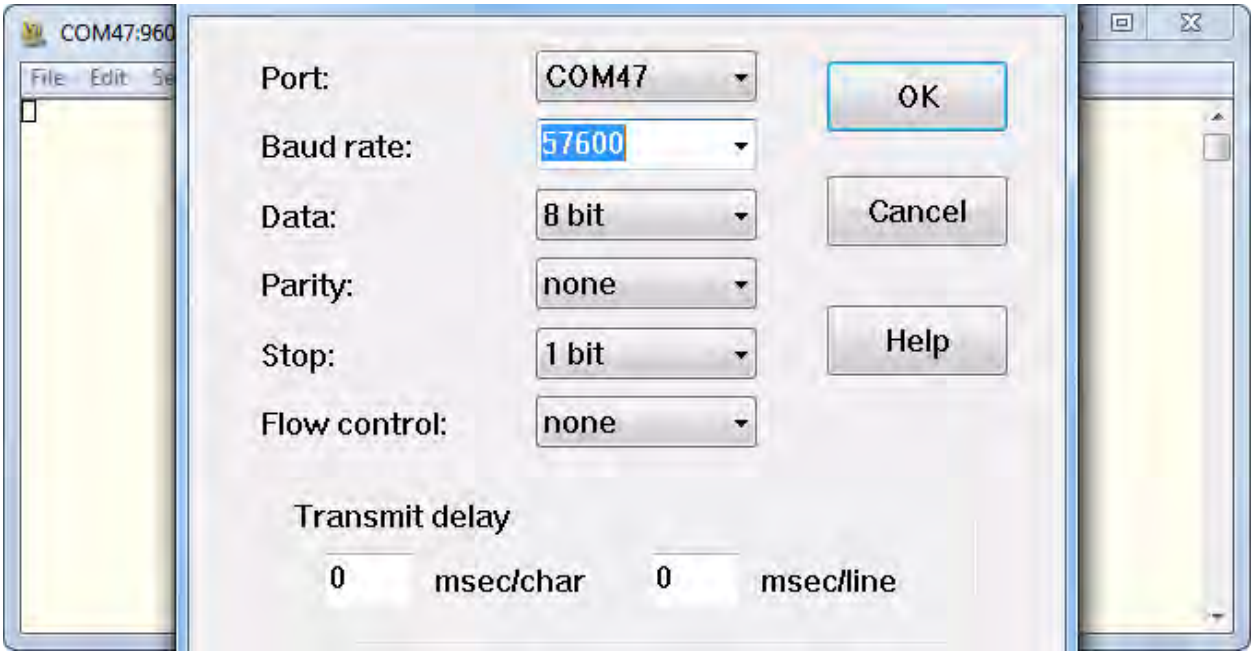


Figure 9. Baud Rate Setting

4. Enter `57600` in the **Baud rate:** field, and allow the other settings to remain at their defaults. Click **OK**.
5. Press the Platform's RESET switch, indicated in Figure 10.

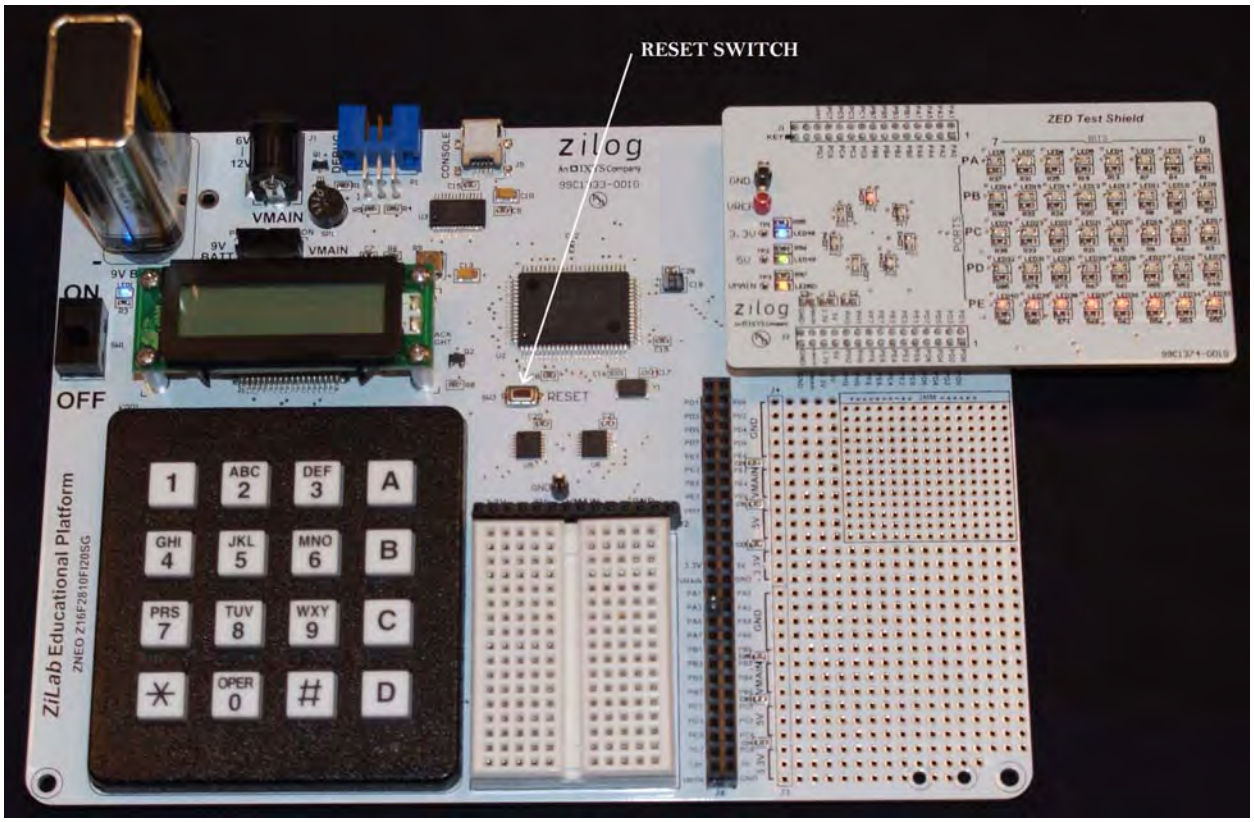


Figure 10. The Location of the Educational Platform RESET Switch

6. As a result, the Shell Prompt dialog will appear, as shown in Figure 11.

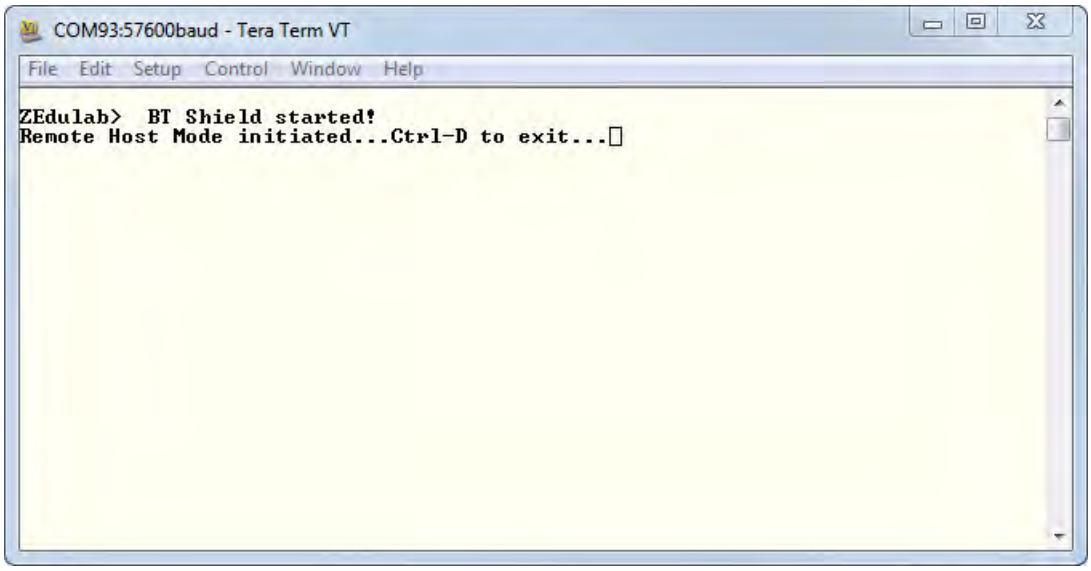


Figure 11. Shell Prompt

7. Press Ctrl+D to exit Bluetooth iOS connection search mode.
8. At the `ZEdulab` prompt**,** enter a question mark (“?”) and press the Enter key to display a list of basic Shell commands, as shown in Figure 12.

Note: To continue working in iOS mode and to connect with an iPhone using the ZEDUcation App, see iOS iPhone ZEDUcation App Mode on page 27. Otherwise, continue reading the Shell commands.

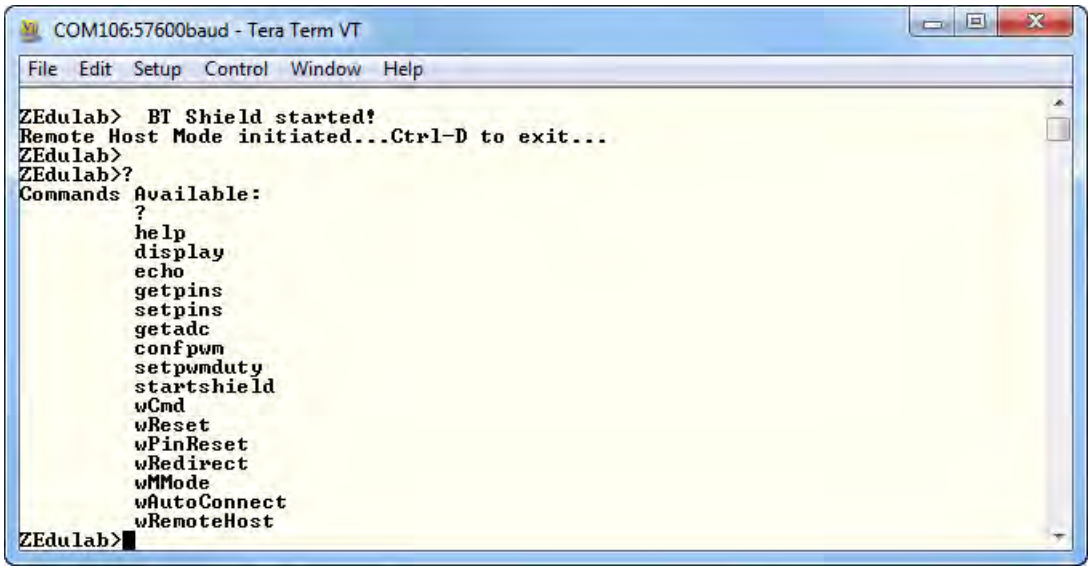


Figure 12. Shell Command List

Shell Commands

Table 1 lists the ten standard Shell commands for controlling the Zilog Educational Platform. These commands are described in greater detail in the Mini-Z Shell and Flash Loader Reference Manual (RM0061).

Note: The Command List shown in Table 1 is current as of the time of release of this user manual; future revisions may include additional commands.

Table 1. Shell Commands

Command	Description
?	Lists all available commands.
Help	Lists all available commands.
Display	Displays a string on the LCD panel. Turns off any monitoring, displays the first parameter on line 1, and displays the second parameter on line 2.
Echo	Turns Echo Keystrokes to the console ON or OFF. Syntax: echo on|off
Getpins	Sets the pin(s) to INPUT and retrieves the pin values for a specified port. Syntax: getpins PX HexNumber, in which HexNumber is the value specifying the pins to get; defaults to ALL.
Setpins	Sets the pin(s) to OUPUT and sets the pin values for a specified port. Syntax: setpins PX HexNumber ON|OFF, in which HexNumber is the value specifying the pins to set.
Getadc	Sets the port to alternative function, then reads the ADC value from the requested ADC 0–11. Syntax: getadc xx, in which xx is an ADC number from 0 to 11.
Confpwm	Configures the PWM cycle period from 1–20 kHz. The absence of a parameter will result in a display of the current setting. Syntax: confpwm 2
Setpwmduty	Configures the PWM channel's duty cycle, from 1 to 100. The absence of a duty parameter will result in a display of the current selected PWM setting. Syntax: setpwmduty xx [DD], in which xx is the PWM number from 1 to 6, and DD is the duty cycle, from 0 to 100.
Startshield	Starts a shield that is plugged into the Platform. Use the List parameter to view the list of shields. Syntax: startshield xxxx, in which xxxx is the shield name, or list to view all available shields.
wCmd	Allows you to directly interface with the Bluetooth module using AT commands. Press Ctrl-D to exit.
wReset	Resets the Bluetooth module using AT commands.

Table 1. Shell Commands

Command	Description
WPinReset	Resets the Bluetooth module using pin signals.
wRedirect	Routes all incoming packets to the console and console out to the WLAN module. Press Ctrl-D to exit.
wMMode	Allows you to set the Master Mode (Hardware). ON is Master, OFF is Slave (requires the wReset command to be executed to take effect).
wAutoConnect	
wRemoteHost	

Example 1. To view a command's parameters, enter the command, followed by the ? character, as shown in the following example:

```
Setpins ?
```

The console will display the following response:

```
Sets the pin(s) to output and sets the pin(s) values for a
specified port.
Syntax: setpins PX HexNumber ON|OFF (Hex number is the value
specifying the pins to set)
Example: setpins PA FF on : Will set all pins of Port A to 1s
```

Example 2. To view a list of application shields integrated into the root shell, enter the following command:

```
startshield list
```

The console will display the following response:

```
WLAN
BT
WoS
RF
```

Note: The Educational Platform ships with a System Test LED shield that will show if all of the available I/O outputs are in working order by turning each line's LED ON.

Testing Shell Commands

To test a shell command, observe the following procedure.

1. Insert the LED Test shield into place and use the `setpins` command to test PA thru PE and seven individual ports, as follows:

   ```
   Setpins PA FF ON
   ```

   As a result, all pins on Port A are turned ON.

   ```
   Setpins PA 55 ON
   ```

   The command above turns on all alternating bits, as diagrammed below.

   ```
   Weight      8 4 2 1 8 4 2 1      →      8 4 2 1 8 4 2 1
   Bit         7 6 5 4 3 2 1 0      →      7 6 5 4 3 2 1 0
   PA = 0x55   0 1 0 1 0 1 0 1   PA = 0xFF   1 1 1 1 1 1 1 1
   ```

Note: On Port A, bits 4 and 5 can be controlled only when the UART is not in use; otherwise, these pins are used as the Tx and Rx signals.

2. Repeat Step 1 for ports PB, PC, PD and PE. All LEDs should illuminate.
3. Issue a `setpins Px FF OFF` command to turn all LEDs off.
4. The remaining seven I/O pins can be tested individually. For example, use the following command to turn Port H, bit 1 on:

   ```
   setpins PH 01 ON
   ```

The Zilog Educational Platform as a Development Board

The Zilog Educational Platform facilitates the development of many applications by providing a full complement of features for building and testing many advanced concepts.

Modes of Operation

The Platform features the following four modes of operation; these modes, ranging from simple to advanced, are described in the following pages.

- Serial Interface Mode
- Program/Debug Mode
- Independent Mode
- iOS App Mode

Note: Refer to the Application Shields User Manual (UM0256) for operation and program flashing instructions specific to these three modes.

Serial Interface Mode

For students just learning about the Zilog Educational Platform, Zilog recommends Serial Interface Mode as the best operating mode to begin with. In Serial Interface Mode, a USB/serial cable is used to connect the Educational Platform to a PC. The Platform is managed through a preprogrammed command shell and a terminal emulator. The source code for the command shell is provided on the USB Flash drive that is shipped with the Zilog Educational Platform Kit.

A procedure for running the Educational Platform in Serial Mode is described in the Serial Mode Operation section on page 11. This procedure shows how to acquire and set up a console application and how to begin and perform basic operations with the command shell and the Test Shield.

Program/Debug Mode

The Zilog Developer Studio Integrated Development Environment (ZDSII IDE) for the ZNEO CPU is the software environment that is used to program, flash, debug and control

the Educational Platform. In Program/Debug Mode, ZDSII replaces the preprogrammed command shell that is used in Serial Mode.

The following procedure describes how to get ZDSII – ZNEO up and running.

Caution: Do not apply power to the Zilog Educational Platform until you have established all hardware connections.

1. Download the latest version of the ZDSII – ZNEO software from the **Free Software** category of the Zilog Store and follow the prompts to install it on your development PC. A ZDSII – ZNEO icon will appear on your desktop.
2. Locate the USB Smart Debug Cable that shipped with your Kit. Insert the cable's USB A connector into a USB port on the PC, and insert the 6-pin connector on the other end of the cable to the Base Board P1 (Console) connector.

Note: The A to Mini-B USB cable is not required for this function.

3. After the USB Smart Debug Cable is connected, apply power to the Platform and double-click the ZDSII – ZNEO icon to launch the ZDSII Development Environment.
4. In ZDSII, navigate via the **File** menu to the **Samples** folder on your Kit's USB drive, and open a project file labelled `LightMeUp.zdsproj`.
5. If your system does not recognize the USB Smart Cable, you will be prompted for the location of the USB Smart Cable driver. If your system does recognize the USB Smart Cable, proceed to Step 6.

Note: The USB Smart Cable driver can be found in the Drivers folder of the USB Flash Drive that shipped with your Kit. It is also located in the ZDSII – ZNEO directory that you just installed on your PC, and it can also be found in the RD0005-SC01.zip file, which is available free for download from the Zilog website.

6. From the **Project** menu in ZDSII, select **Settings** to open the Project Settings dialog. From the **Configuration:** drop-down menu located at the top of this dialog, select **Debug**, as shown in Figure 13.

Figure 13. Selecting the Debug Tool from the ZDSII Taskbar

7. In the Debug Tool pane at the bottom of the Project Settings dialog, select **USBSmart-Cable** from the **Current:** drop-down menu (if it is not already selected); see Figure 14.

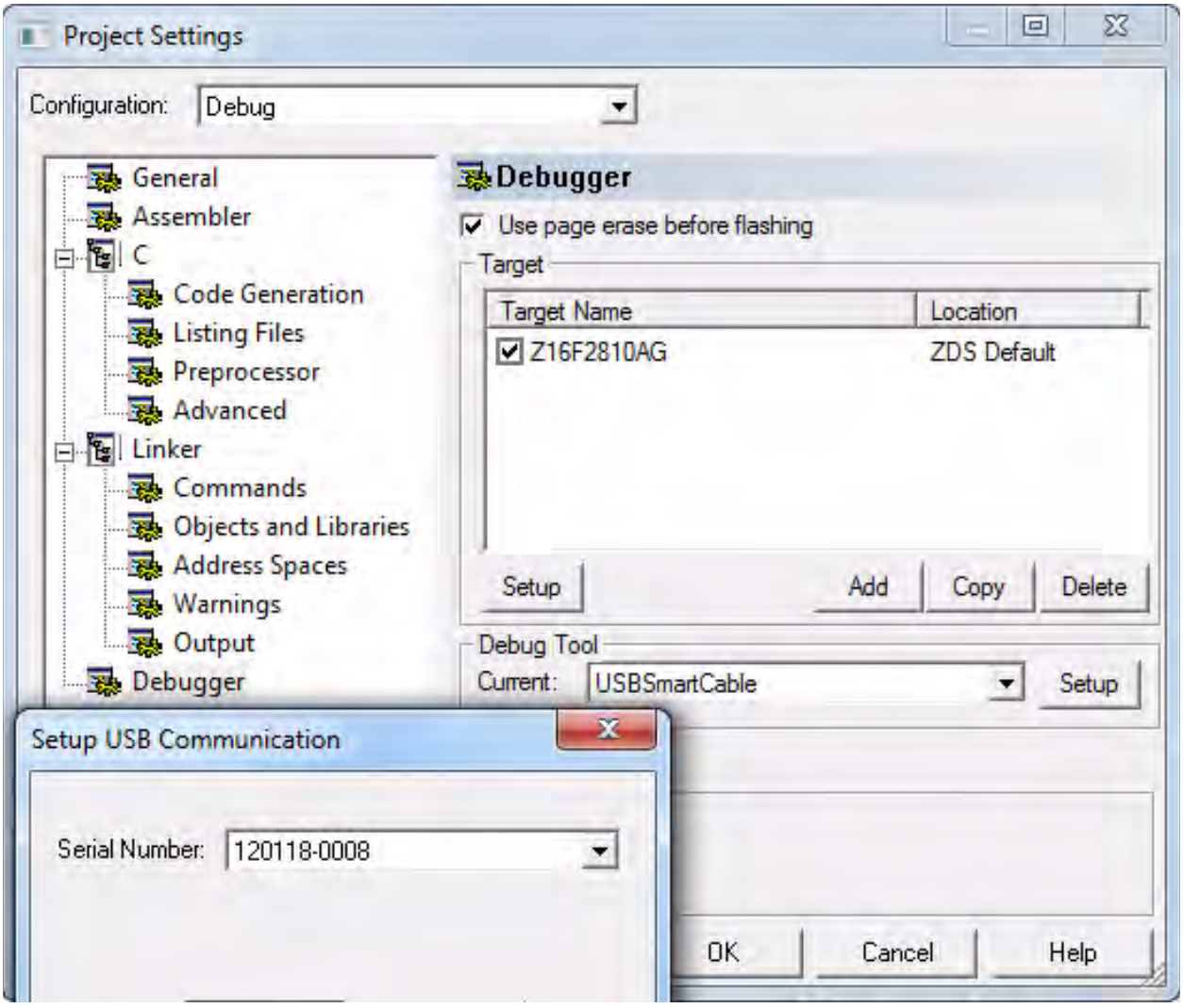


Figure 14. USB Smart Cable Serial Number Register

8. Click the **Setup** button in this Debug Tool pane to prompt ZDSII to recognize the serial number of your USB Smart Cable (seen in the Setup USB Communication dialog in Figure 14).
9. Click **OK** to exit the Project Settings dialog.
10. Locate the USB Flash drive that shipped with your Kit and insert it into a USB port on your PC.
11. From the **File** menu in ZDSII, select **Open Project...** to open the Open Project dialog. In this dialog, browse to the **C_Projects** folder on the USB Flash drive, and open the `LightMeUp.c` project file.
12. With the `LightMeUp.c` project displayed on your PC's monitor, compile it by clicking **Build** in the ZDSII taskbar.
13. From the selection of commands listed in the **Build** drop-down menu, select **Rebuild All**. The compile process that ensues will create several files that will be placed in the Debug folder, which is located in the Project directory. One of these files will display a `.hex` extension; this file will be used to burn the program into Flash memory in a procedure that will follow later.
14. When the rebuild is complete, a `Build Complete` message will appear in the Message Window at the bottom of the ZDSII screen; see Figure 15.

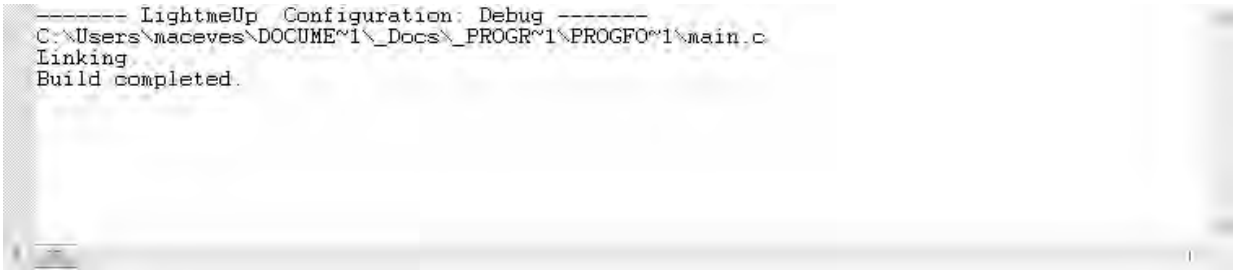


Figure 15. Build Completed Message

15. In the ZDSII taskbar, click **Debug** to open the Debug Command Window.
16. In the Debug Command Window, select **Connect to Target**, and observe the progress of the debug operation in the progress window. When the debug is complete, a `Successfully initialized target` message will appear, as shown in Figure 16.

Figure 16. Connected Successfully Screen

Note: If you are unable to establish a successful connection, return to Step 5.

17. Click **Debug** on the taskbar a second time, and select **Download Code** from the drop-down menu. If ZDSII prompts you to rebuild the project, click **Yes**. When the debug operation is complete, you should see a `Load successful` message in the progress window.

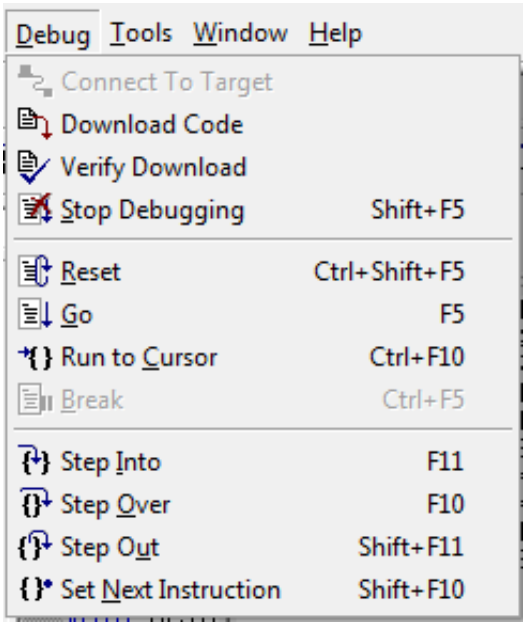


Figure 17. Select Download Code from the Debug Drop-Down Menu

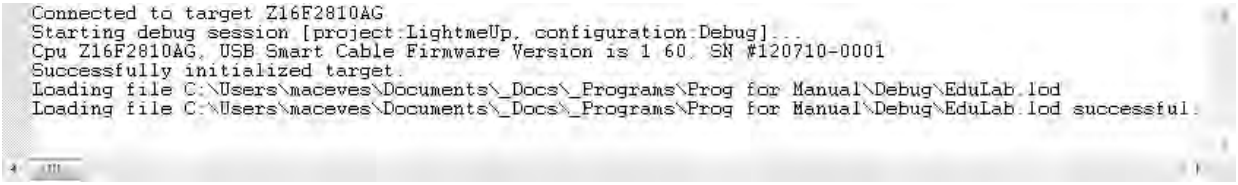


Figure 18. Load Successful Message

18. Click **Debug** on the taskbar a third time, then select **Go**. The `LightMeUp` project will run, and you should now see light patterns displayed on the Test Shield.

Flashing a Project to Memory

When flashing a program to memory, ZDS II must not be running in Debug Mode. To stop Debug Mode, click **Debug** on the taskbar and select **Stop Debugging**.

Observe the following procedure to flash the `LightMeUp` project to MCU memory.

1. Click **Tools** on the taskbar, and select **Flash Loader**. The Flash Loader Processor dialog appears, as shown in Figure 19.

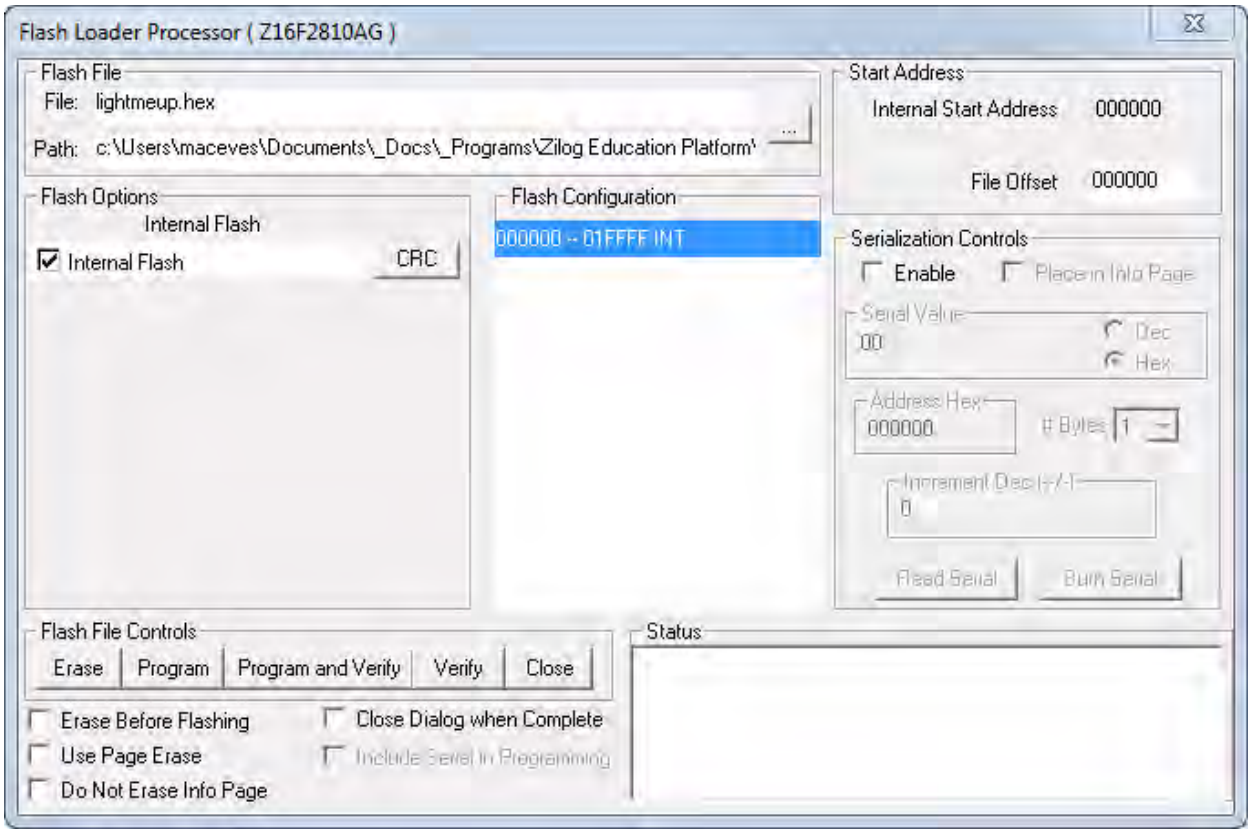


Figure 19. Flash Loader Screen

2. In this dialog, click the **...** icon in the Flash File pane to navigate to the `LightMeUp.hex` file, which is located in the Debug folder contained within the **LightMeUp** project directory. Once you have selected the file, allow all other options in this dialog to remain at their default settings.

Note: A different *.hex file name and path are used in this example.

3. In the Flash File Controls pane, click the **Erase** button to erase any possible preexisting code in memory.

4. Click the **Program and Verify** button. The programming and verifying process will take a few seconds to complete. When this process is complete, click the **Close** button.
5. Switch off the power to the Platform, and disconnect the USB Smart Cable.
6. Reapply power to the Platform, and press the Platform's RESET button to ensure that the `LightMeUp` project will run from the beginning of the program.

PC Independent/Mobile Mode

Operation in PC Independent/Mobile Mode requires the user to write an application. For the Platform to perform independently from a PC, it must first be flashed (i.e., preprogrammed) with a self-contained program that utilizes the keypad as its main source of input and control. This control can also be performed wirelessly by another Bluetooth-enabled device; e.g., an iPhone application that will issue commands to or request information from the Educational Platform.

PC Independent/Mobile Mode is dependent on a specific application designed for mobile use. For example, field measurements of differing environmental conditions could be gathered by Bluetooth-enabled sensors on a battery-powered Platform populated with a ZPAN (Bluetooth LE) shield.

iOS iPhone ZEDUcation App Mode

The ZEDUcation App illustrates the potential for using the ZNEO Z16F2810 16-bit Flash MCU with the latest technologies. This section describes the communication that takes place between an iPhone and the Educational Platform by sending and receiving data/commands to and from the iPhone. The data received by the Platform is in the form of Commands, and the data sent from the Platform is in the form of Data.

The following example shows the use of two of the available Educational Application Shields. The Bluetooth LE and World of Sensors shields are stacked together and then plugged into the Educational Platform shield interface. The software system is composed of the Shell firmware programmed into the ZNEO MCU and the ZEDUcation App installed on the iPhone. These two programs enable the iPhone to control the Platform and to read the data from seven sensors via the Bluetooth LE shield. The Bluetooth LE and World of Sensors Shield Stack are shown in Figure 20.

Note: The ZEDUcation App v1.0 is available free for download from Tunes at https://itunes.apple.com/us/app/zeducation/id970764547?mt=8.

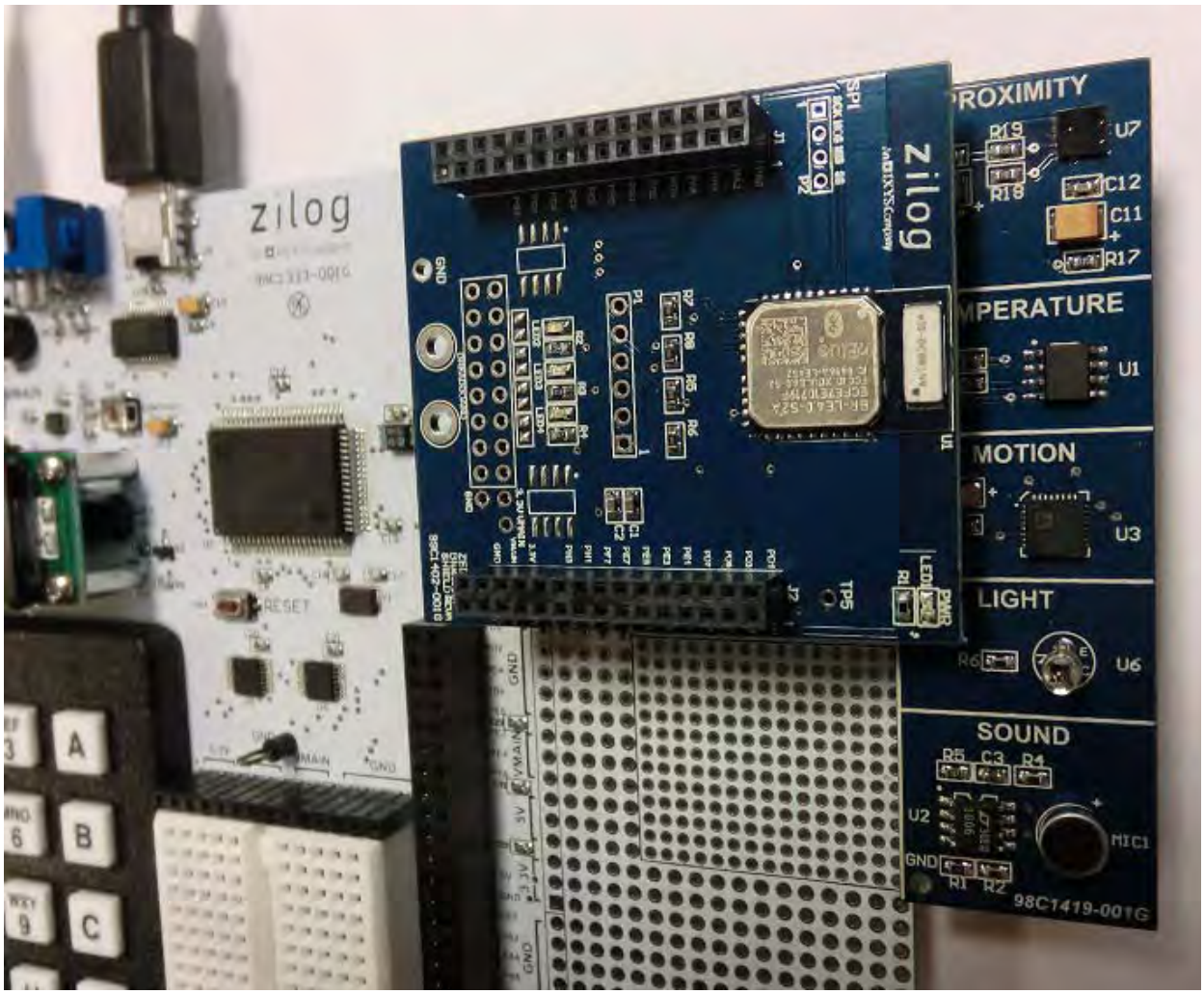


Figure 20. Bluetooth LE and World of Sensors Shield Stack

The ZEDUcation App initialization process is listed below.

1. On power-up, the iOS iPhone App Mode is displayed. The initial prompt states:

   ```
   ZEdulab > BT Shield started!  Remote Host Mode initiated…Ctrl-D
   to exit
   ```

2. Continue in the Bluetooth LE communication Mode.
3. With the Educational Platform ON, start the ZEDUcation App on your iPhone. An image of Captain Zilog briefly appears on the screen, as shown in Figure 21, while the iPhone searches for the Zilog Educational Platform.

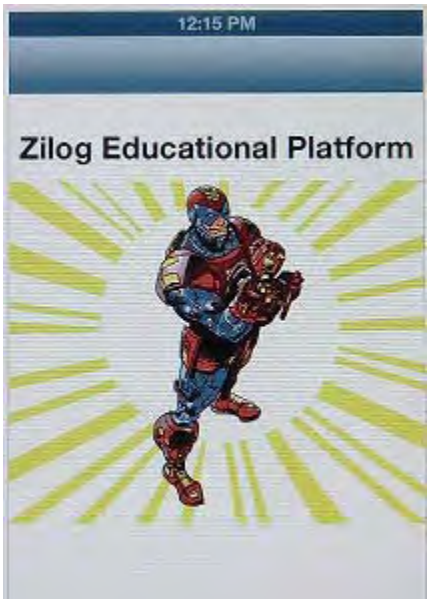


Figure 21. Captain Zilog

4. The **Select Device** screen appears, which displays all Bluetooth devices available, as shown in Figure 22.

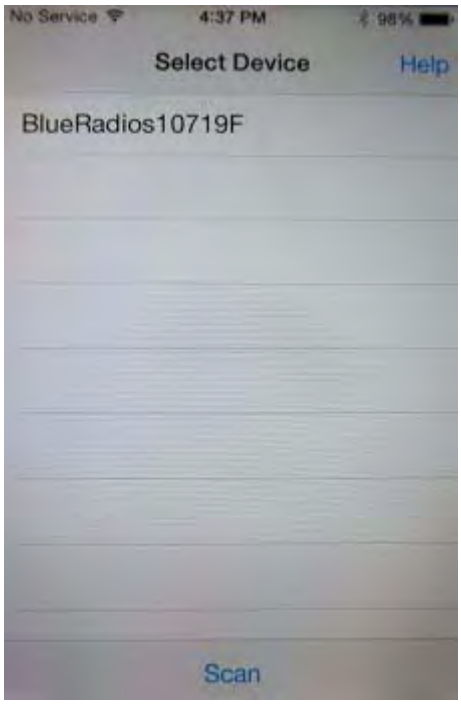


Figure 22. Select Device Screen

5. If no devices are displayed, tap the **Scan** command at the bottom of the screen. After the Radio ID is displayed, tap the ID and wait for a few seconds. The screen shown in Figure 23 is displayed.

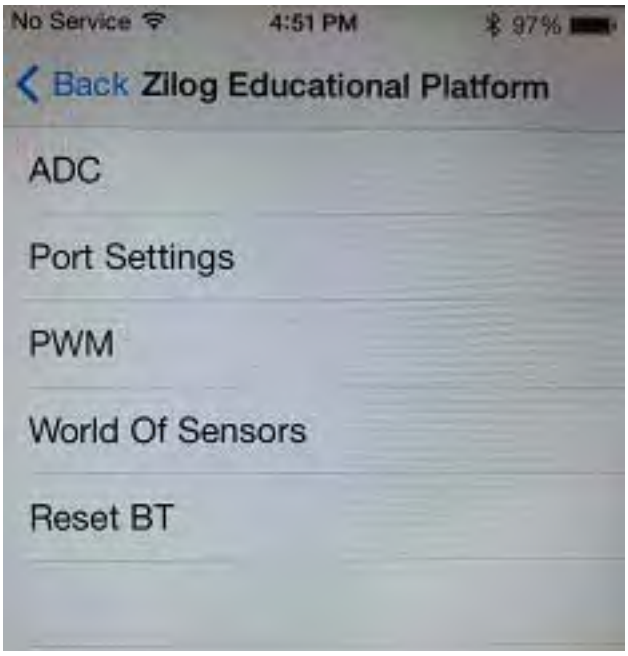


Figure 23. Zilog Educational Platform ZEDUcation App Command Options Screen

6. To perform a quick test, tap **Port Settings** to display the screen shown in Figure 24.

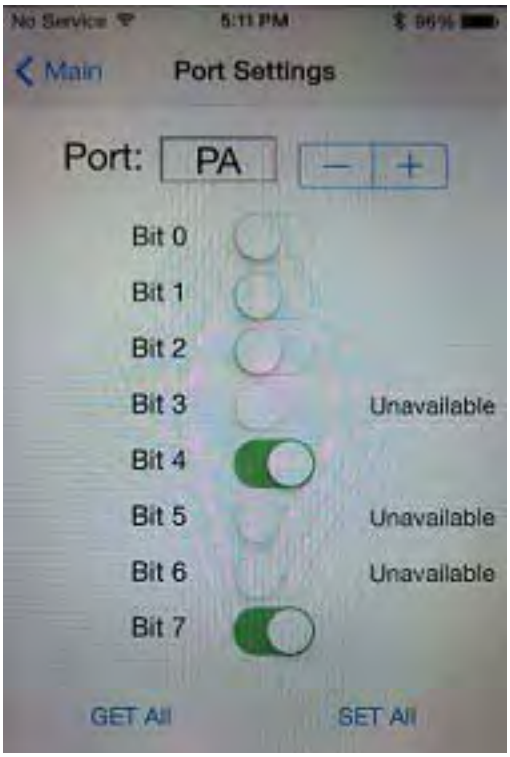


Figure 24. Port Settings Screen

7. On Port A, slide switches **Bit 0**, **Bit 1**, and **Bit 2** to the ON position. This results in three LEDs lighting up on the Bluetooth LE shield.
8. Turn the LEDs OFF by sliding the switches back to their original positions. This illustrates how to control the Educational Platform with an iPhone.

Note: At the bottom of the Port Settings screen, tap **GET All** to see a port's Bit Status. The **SET All** command is unavailable in this App version. In the next revision, tapping this command will set all Port Bits to 1.

9. Tap **Main** on the upper left corner of the screen to return to the previous screen, then tap **World of Sensors** to display the screen shown in Figure 25.

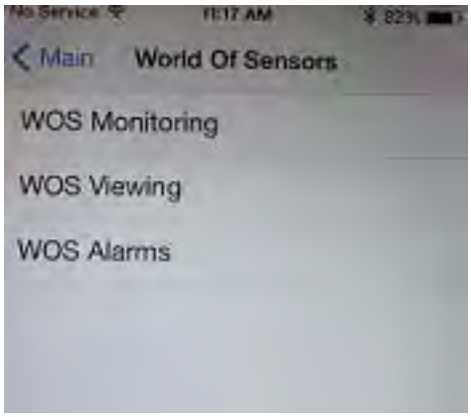


Figure 25. World of Sensors Screen

10. Tap **WOS Monitoring** to view the screen shown in Figure 26. Slide the **Humidity** switch to the ON position.

Figure 26. WOS Monitoring Screen

11. The environmental humidity reading can be viewed on the Educational Platform's LCD display, as shown in Figure 27. On the App screen, tap **Back** to return to the previous screen.

Figure 27. Educational Platform LCD Display

Alarm Setting

The following steps outline the procedure to set an alarm using the iOS App.

1. Select **WOS Alarms** to display the screen shown in Figure 28.

Figure 28. WOS Alarms Screen

2. Select the desired Alarm Source from the top center of the screen. For this example, select **Humidity**. The appropriate input fields are displayed, with the existing environmental humidity shown in the **Current Value** field.
3. To set an alarm, enter the desired value (in this example, 55%) in the **High Limit Alarm** field**.** When humidity reaches the defined value, the alarm will be triggered.
4. Slide the **Active** switch to the right to turn ON the alarm.

Note: To test the triggering of the alarm, increase the environmental humidity percentage. One way to quickly increase humidity is to get close to the World of Sensors shield and blow warm moist air over it so that it breaches the threshold and triggers the alarm. The alarm notification is shown in Figure 29.

Figure 29. Alarm Notification

Hardware

The shield interface provides two 30-pin indexed sockets that allow access to 48 general-purpose I/O lines. Each shield is stackable, though special attention to pin assignments is required to avoid signal conflict. Shield schematics contain a list of pins used to assist shield stacking configurations.

- Application Shield Interface
- Two parallel 30-pin connectors to accept stackable application shields
- One 56-pin connector to supply power and available signals to the breadboard area
- Smart USB/serial cable, used for programming and debugging, interfaces the PC-based ZDSII environment to the ZNEO-based Educational Platform
- Power selector switch between wall power and 9V battery
- Integrated buzzer generates audible signals

- LCD displays two 16-character lines and includes a backlight disable jumper
- Standard 2.1mm x 5.5mm wall outlet power jack
- Mini-USB connector
  - Connects the Educational Platform to the PC via a Serial/UART USB cable
  - Console software interface for the command shell

Firmware

The Zilog Educational Platform is preprogrammed with a command shell that allows control of the Platform out of the box; full C source code is provided.

Software

The Educational Platform requires two USB drivers for operation. These drivers, named Driver 1 and Driver 2, are described in this section.

Driver 1

Driver 1 is used to enable the USB Smart Cable connection to the PC and to the ZDSII development software; this driver is supplied by Zilog and can be found in the USB Flash drive that shipped with your Kit. Alternatively, it can be found in the folder containing the ZDSII software that you downloaded and installed on your computer; the default path to this driver is:

```
C:\Program Files(x86)\Zilog\ZDSII_ZNEO_<version>\device drivers\USB Smart Cable...
```

Driver 2

Driver 2 is used to enable the PC console serial connection used by the command shell. Like Driver 1, this driver can be found in the USB Flash drive that shipped with your Kit. Alternatively, it can be downloaded from the following path on the FTDI website: http://www.ftdichip.com/drivers/VCP.htm.

A terminal emulator program is also required to link the PC with the Educational Platform. As previously stated, Tera Term is used in this document, but any terminal emulation program can be used.

Note: Tera Term can be downloaded for free from http://logmett.com/index.php?/download/tera-term-474-freeware.html. Zilog does not provide technical support for Tera Term or any terminal emulator program.

Electrical Specifications

Table 2 describes the electrical characteristics of the Educational Platform and reflects all available data as a result of testing prior to qualification and characterization. As such, the data presented in this table is subject to change.

Table 2. Electrical Specifications for the Educational Platform

Parameter	Min	Max	Units	Notes
VIN Range	6	12	Volts	
Max voltage range on all other pins	–0.3	5.5	Volts	I/O pins and Reset; ADC pins are not 5V-tolerable.
Max current for I/O pin connection points	–25	25	Milliamps (mA)	
Max V_{IN} current	–	1	Amperes	
Ambient temperature	–40	105	°C	
Storage temperature	–65	150	°C	

Note: Stresses greater than those listed in Table 2 may cause permanent damage to the Zilog Educational Platform. These ratings are stress ratings only. Operation of the device at any condition outside those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for extended periods affects device reliability. For improved reliability, unused pins must be tied to one of the supply voltages (V_{DD} or V_{SS}).

Packaging

Figure 30 shows the overall dimensions of the Zilog Educational Platform.

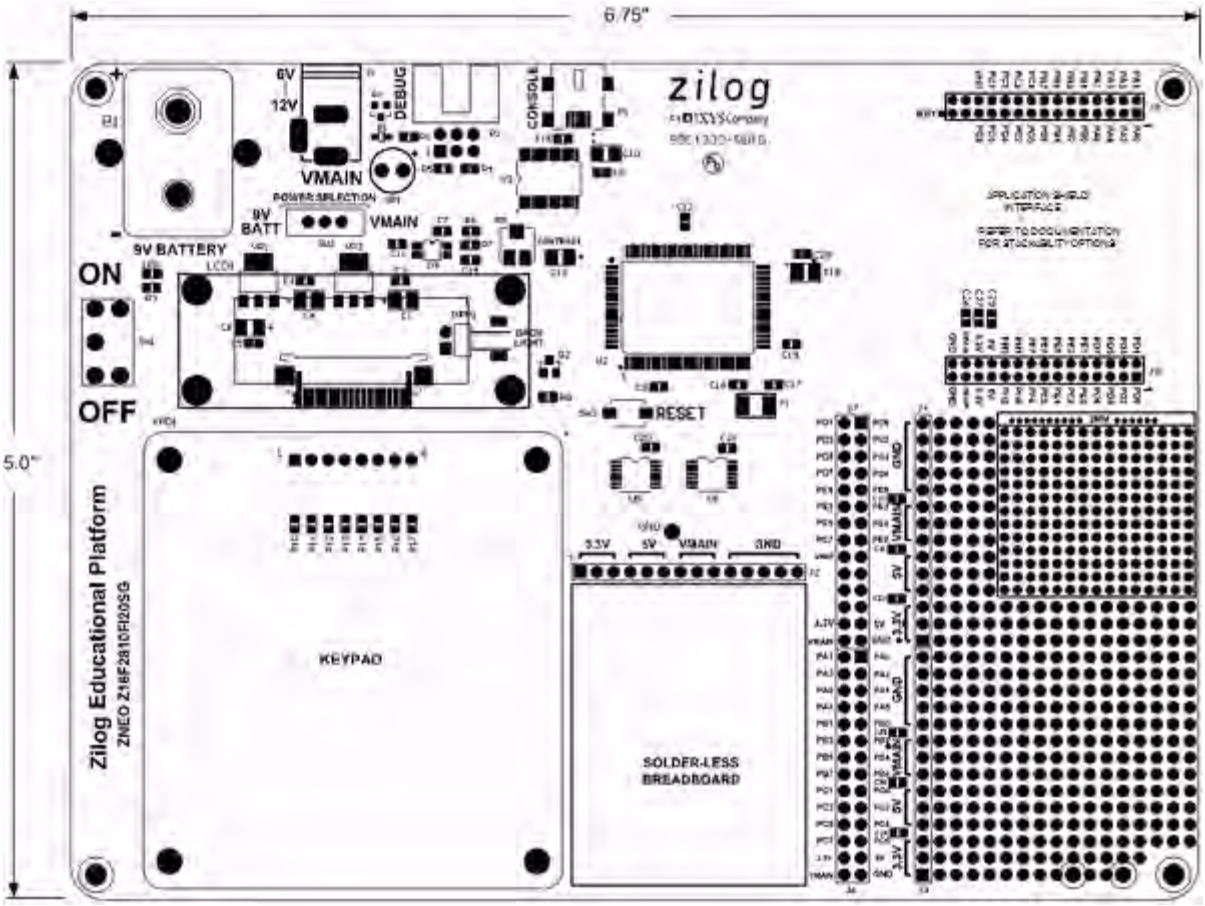
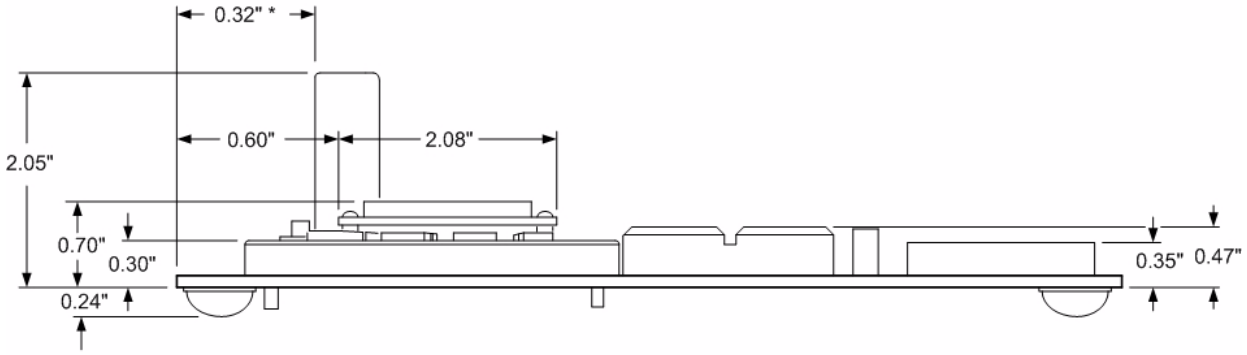


Figure 30. Educational Platform Dimensions

Mechanical Profile

Figure 31 shows a side view of the Zilog Educational Platform, with dimensional aspects.



* Note: Numerical dimensions are accurate to +/- 1/64"
Graphics may not be to scale due to perspective error,
use as reference only.

Figure 31. Educational Platform Side View

Ordering Information

The Zilog Educational Platform is available as a stand-alone product and as a kit. Each can be purchased from the Zilog Store – simply click the Store Product ID listed in Table 3.

Table 3. Zilog Educational Platform Ordering Information

Item	Zilog Part Number	Store Product ID
Zilog Educational Platform	EZEDU16F100MDSG	ED10001
Zilog Educational Platform Kit	EZEDU16F100KITG	ED10002

Related Documentation

The documents and reference links associated with the Zilog Educational Platform are listed in Table 4.

Table 4. Zilog Educational Platform Documentation

Document	Description
UM0255	This Zilog Educational Platform user manual
UM0256	Application Shield User Manual
PS0220	ZNEO Z16F Series Product Specification
UM0188	ZNEO CPU Core User Manual
UM0181	USB Smart Cable User Manual
https://itunes.apple.com/us/app/zeducation/id970764547?mt=8	ZEDUcation iPhone App
PDF Edition: https://www.smashwords.com/books/view/295146 Kindle Edition: http://www.amazon.com/Programming-Zilog-Microcontroller-Example-ebook/dp/B00CCS5IQO/	“Programming the Zilog ZNEO Microcontroller by Example”; textbook by Dan Eisenreich

Appendix A. Schematics

Figure 32 shows a schematic diagram of the Zilog Educational Platform.

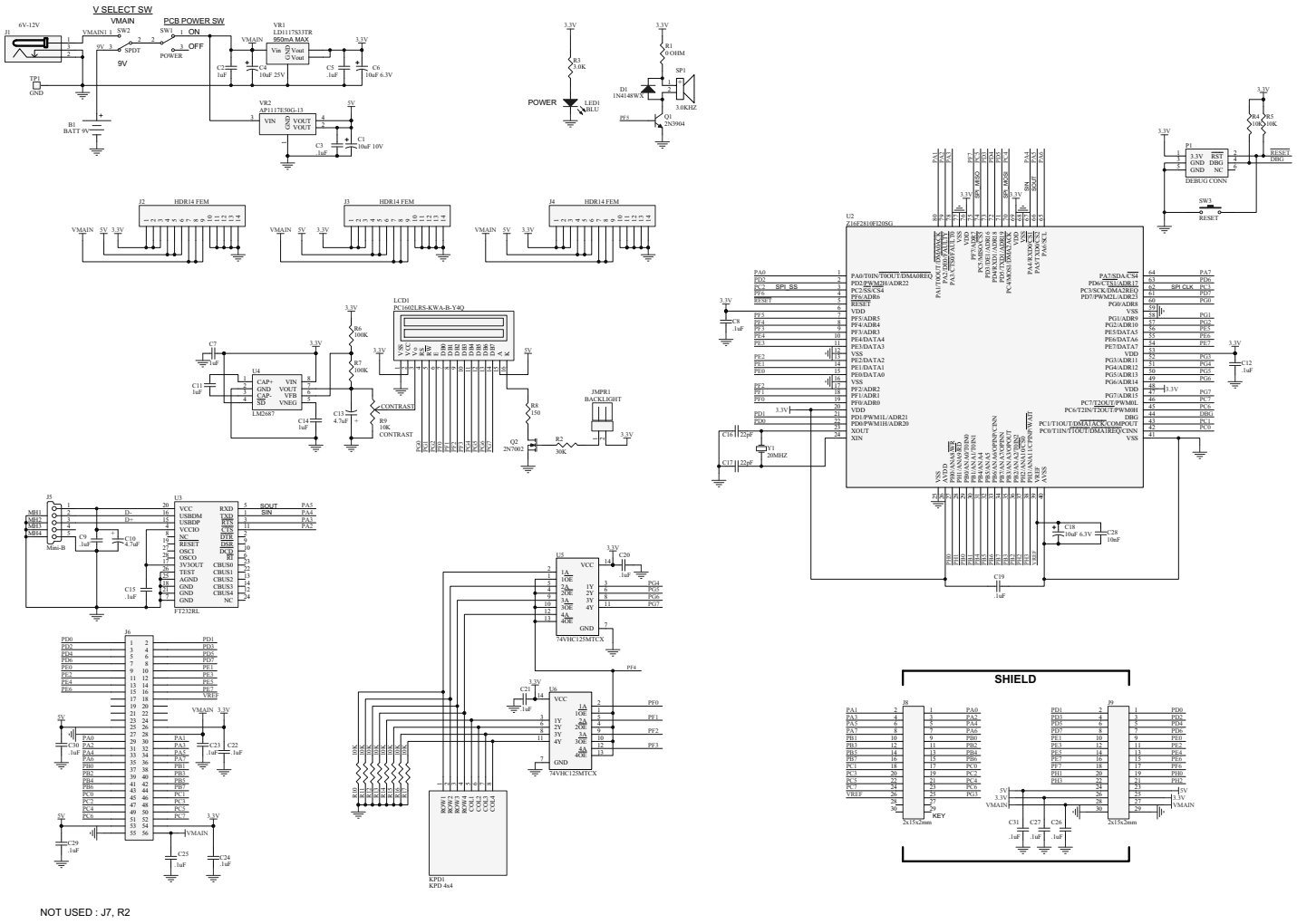


Figure 32. Schematic Diagram of the Zilog Educational Platform

Customer Support

To share comments, get your technical questions answered, or report issues you may be experiencing with our products, please visit Zilog's Technical Support page at http://support.zilog.com.

To learn more about this product, find additional documentation, or to discover other facets about Zilog product offerings, please visit the Zilog Knowledge Base or consider participating in the Zilog Forum.

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