General Description

The MAX7032 evaluation kit allows for a detailed evaluation of the MAX7032 ASK/FSK transceiver, capable of operating in the 300MHz to 450MHz frequency range. The device generates a typical output power of +10dBm into a 50Ω load and exhibits typical sensitivities of -114dBm for ASK and -110dBm for FSK data. The RF input uses a 50Ω matching network and an SMA connector for convenient connection to test equipment. The MAX7032 EV kit operates in conjunction with an external microcontroller (MCU) and graphical user interface (GUI) software running on a computer. The MAX7032 uses a SPI interface for internal register configuration.

The MAX7032 EV kit comes in two versions: a 315MHz version and a 433.92MHz version. The passive components are optimized for these frequencies. These components can easily be changed to work at RF frequencies from 300MHz to 450MHz.

For easy implementation into the customer's design, the MAX7032 EV kit also features a proven Printed Circuit Board (PCB) layout, which can be easily duplicated for quicker time-to-market. The PCB gerber files are available for download at **www.maximintegrated.com**.

Features

- Proven PC Board Layout
- Proven Components Parts List
- Multiple Test Points Provided on Board
- Available in 315MHz or 433.92MHz Optimized Versions
- Adjustable Frequency Range from 300MHz to 450MHz with Component Changes
- Windows 10-Compatible Software
- Fully Assembled and Tested
- Can Operate as a Stand-Alone Receiver with a User-Provided Connector and Antenna

***Ordering Information* appears at end of data sheet.**

319-100129; Rev 2; 1/21

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Quick Start

The MAX7032ASK/FSK transceiver communicates setup information through a 3-wire SPI port. With the MAX7032 evaluation board, this is done by connecting to the FTHR board microcontroller. The FTHR connects to the USB port of a computer and to the MAX7032EVKIT board through a header-pin connection. The MAX7032 EV kit can get its DC power from the computer through the USB port or it can be powered separately from a bench supply or battery by setting jumpers on the MAX7032 evaluation board.

Required Equipment

- MAX7032 EV kit board
- FTHR microcontroller board
- USB cable (enclosed with EV kit)
- Regulated power supply (not needed if EV kit is powered by the FTHR board)
- RF signal generator capable of delivering from -120dBm to 0dBm of output power at the operating frequency (Agilent E4420B or equivalent)
- Modulation of the RF generator in ASK or FSK mode (may be built-in)
- Optional ammeter for measuring supply current
- Dual-trace oscilloscope
- RF power meter (Agilent 436A or equivalent) or spectrum analyzer

Software and Drivers

The MAX7032 EV kit can be used in conjunction with the Arm® Cortex®-M4 processor with FPU microcontroller MAX32630FTHR application platform or "FTHR" board to provide power and control of the device through a software application or GUI. For this option, additional equipment is required.

When connected to the FTHR board, the MAX7032 EV kit uses the following drivers and software components. See *Appendix I* for additional information on this installation process.

- **ISM Radios GUI**

  The software, firmware, and drivers are available from the **Maxim website**. Log in to your MyMaxim account on the website, search for the MAX7032 IC or EV kit, click on **Design & Development**, and click on the appropriate software link. Finally, click the file link on the software landing page to download the ISM Radios GUI package.

- **mBed MAX32630FTHR and DAPLINK Interface System**

  The DAPLINK system should not be required unless a firmware update to the FTHR board has been released. The FTHR board included in the MAX7032 EV kit is preprogrammed for interfacing the GUI to the radio. The firmware programming process does not require additional software or drivers—it uses a simple USB drive, drag-and-drop file interface.

It is highly recommended that the target PC is connected to a local area network and has access to the Internet to allow for automatic download and updates of drivers. This process may take five minutes or more to complete.

Install the ISM Radios GUI Software

This process should take less than five minutes after downloading the software package. See *Appendix I* for detailed information on this installation process.

1) Download the ISM Radios GUI software.
2) Double-click the "ISMRadiosGUISetup.msi" setup file and follow the Setup Wizard prompts.
   a) Click **Next** in the ISM Radios GUI Setup Wizard window.
   b) It is recommended to use the default destination folder. Click **Next** to continue.
   c) Install the software by clicking the **Install** button.
   d) Click **Finish** when the ISM Radios GUI Setup Wizard installation process is complete.

Additional register and QuickStart files may be included in future GUI versions as the ISM Radios GUI is designed to support the ISM family of parts.

Update the MAX32630FTHR Board Driver on the Host PC

No changes are needed for the FTHR board when first receiving a MAX7032 EV kit—the FTHR board has been pre-loaded with the required firmware. Updates to the driver on the host PC may be necessary depending on the operating system and whether the PC has access to the internet when first connecting to the FTHR board. See *Appendix I* for detailed information on how to update the FTHR board firmware and the driver for the FTHR board/USB interface.

Connections and Setup

The MAX7032 EV kit board is fully assembled and tested. Follow the steps below to verify board operation:

1) Ensure jumpers are in the default position where JU5 has a jumper installed 1-2, and J1 has a jumper installed in 1-2, positions as noted in Table 1.

Table 1. MAX7032 EV Kit Installed Files and Folders

FILE NAME	DESCRIPTION
ISMRadiosGUISetup.msi	Application GUI
MaximStyle.dll	Supporting DLL file for software operation
MAX4147X_Registers.xml*	Register definition file for MAX4147X
MAX4146X_Registers.xml*	Register definition file for MAX4146X
MAX1471_Registers.xml*	Register definition file for MAX1471
MAX7032_Registers.xml	Register definition file for MAX7032
MAX4147X_QuickStart.xml*	Quick start configuration file for MAX4147X
MAX1471_QuickStart.xml*	Quick start configuration file for MAX1471
MAX7032_RXQuickStart.xml	Quick start configuration file for MAX7032 receive
MAX7032_TXQuickStart.xml	Quick start configuration file for MAX7032 transmit
Firmware	Folder for current FW at the time of the GUI download

**Not used in this evaluation, but provided with the common platform.*

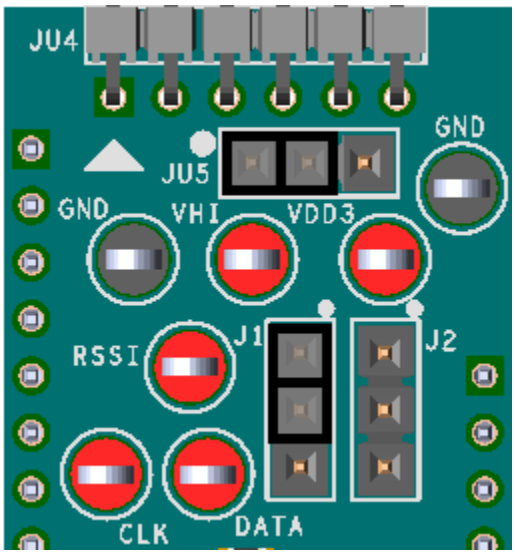


Figure 1. MAX7032 EV Kit Jumpers

2) Connect the MAX7032 EV kit to the FTHR board, making certain that the USB connector is oriented on the opposite side of the SMA connector, as shown in Figure 2.
3) Connect the FTHR board to the PC using a USB micro-B cable and observe a “heartbeat” on the FTHR board’s red LED (on the opposite side of the board from the USB connector).
4) Connect the SMA cable to the RFIN SMA. This is either the input for the signal to be received, or it is the output of the transmitter.
5) Start the ISM Radios GUI.
   a) A GUI splash screen is displayed, as shown in Figure 3.
   b) To disable future displays of the splash screen, select **Disable Splash**.

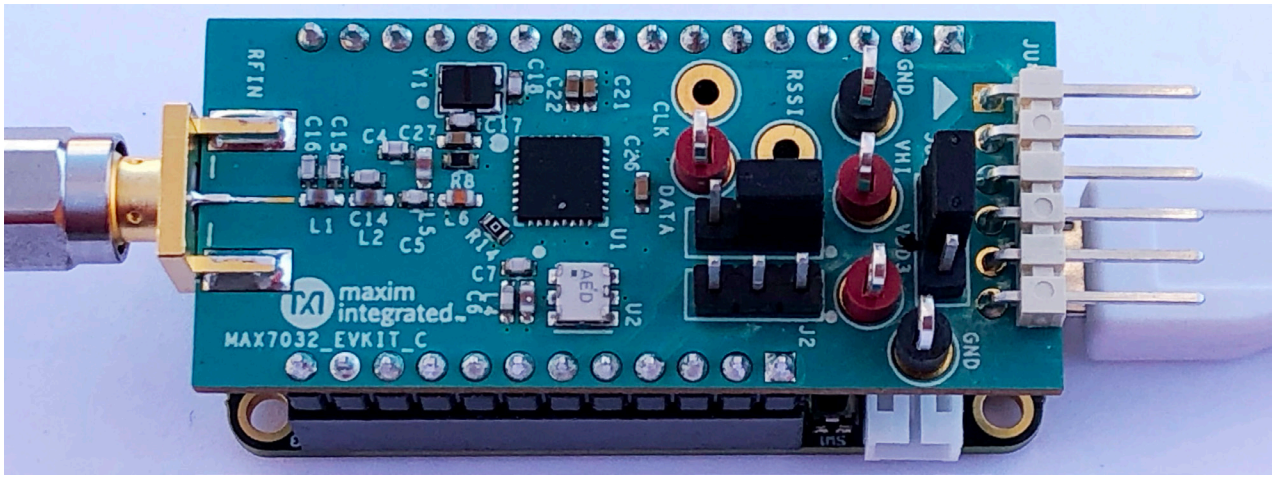


Figure 2. MAX7032 EV Kit to FTHR Board

Figure 3. ISM Radios GUI Splash Screen

6) The pop-up window (Figure 4) asks to select a device from the **Device** tab to get started; click **OK**.

7) Under the **Device** menu option pulldown, select MAX7032/31/30-TRx (Figure 5). The GUI tabs populate in the window, as shown in Figure 6.

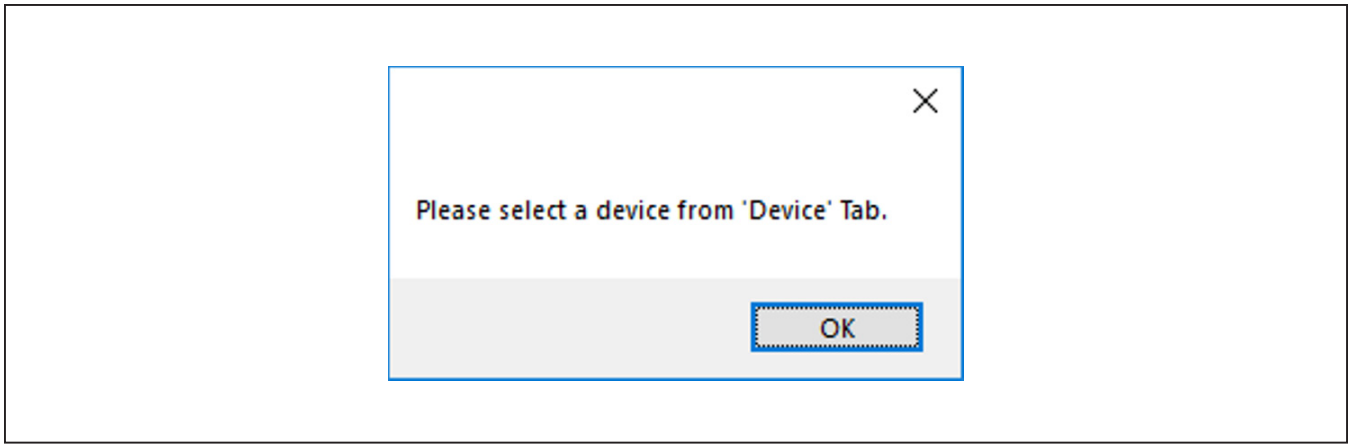


Figure 4. ISM Radios GUI Device Selection Reminder

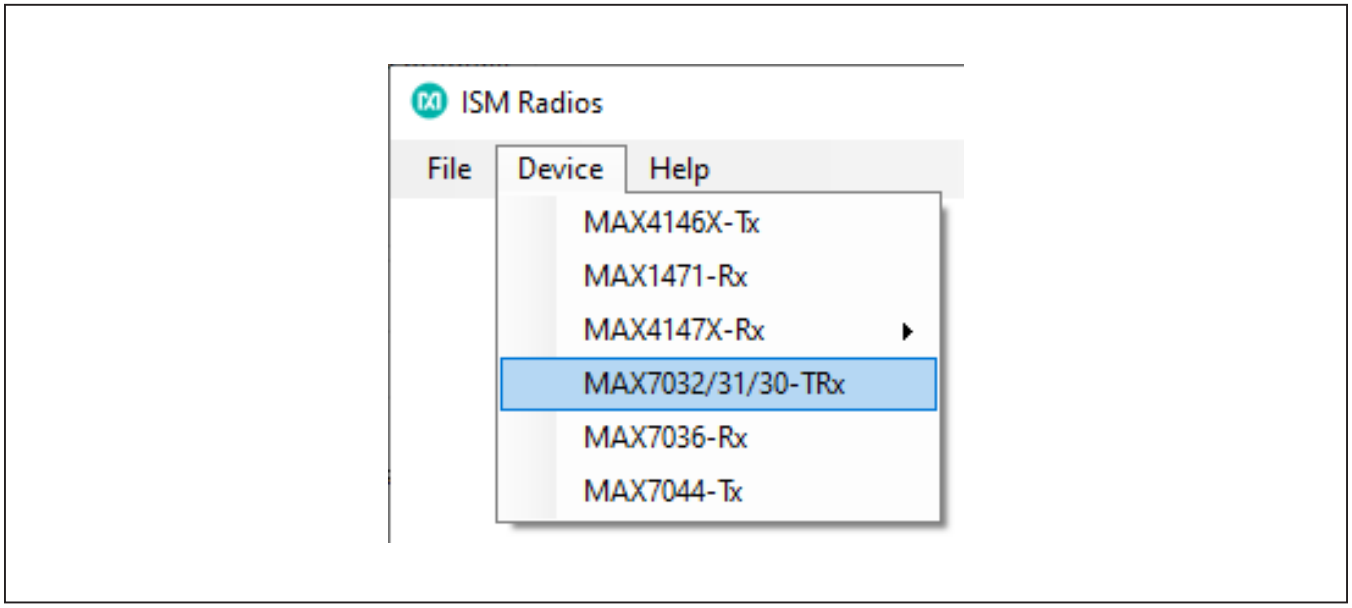


Figure 5. ISM Radios GUI Device Selection

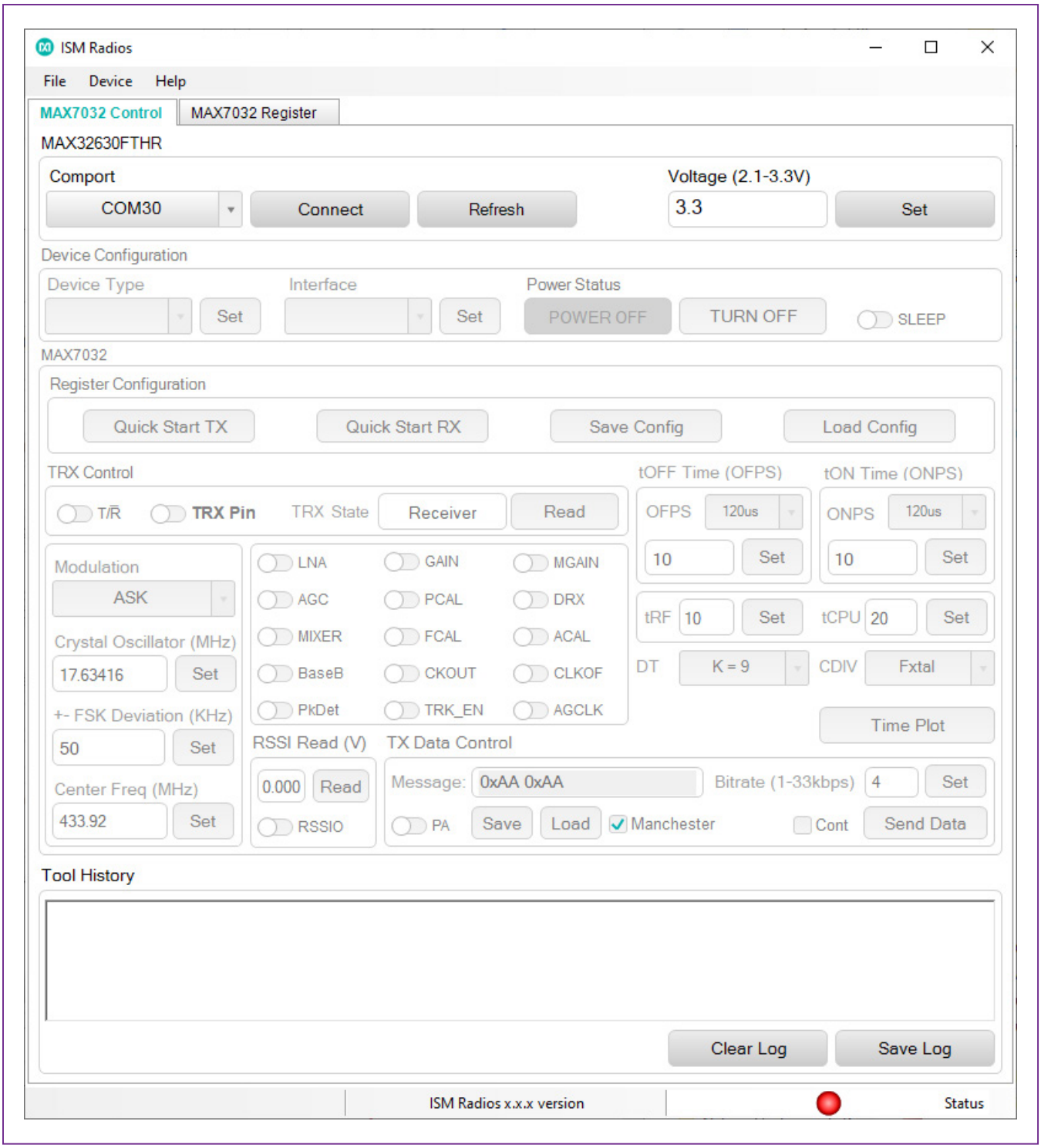


Figure 6. ISM Radios GUI Software Startup

8) If the EV kit was connected prior to starting the GUI, the expected COM port should be displayed. Select the appropriate COM port from the drop-down list (Figure 7) and click the **Connect** button. The **Connect** button changes to the **Disconnect** button. The COM port can be verified through the Windows device manager. The FTHR board may display under the COM ports as “Teensy USB Serial” or “Maxim USB-to-UART Adapter” and displays the associated port number.

9) Confirm that the firmware status bar has changed from “ISM Radios x.x.x” to “ISM Radios 4.0.1” or later, the software LED is lit green, and the port status is noted as “**Connected**” (Figure 8).

10) Enter a supply level into the **Voltage** field and click the **Set** button (Figure 9).

11) Select the MAX7032 in the **Device Type** drop-down list and click the **Set** button (Figure 10).

12) Power on the device by clicking **TURN ON**, which updates the status (Figure 11).

Figure 7. COM Port

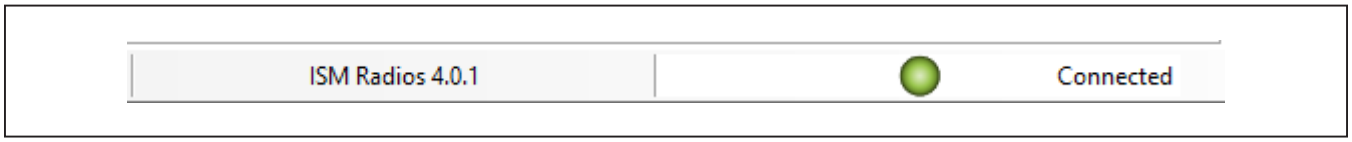


Figure 8. Connected, Indicators at Bottom of GUI

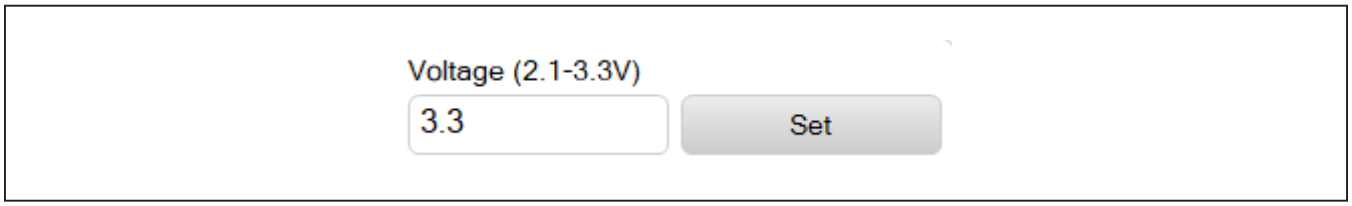


Figure 9. Supply Voltage Example

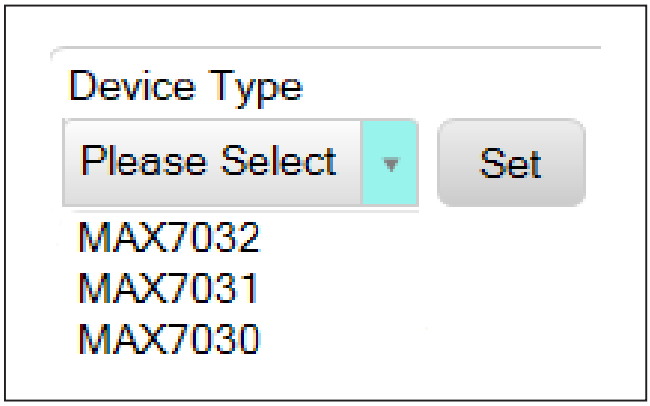


Figure 10. Part Selection

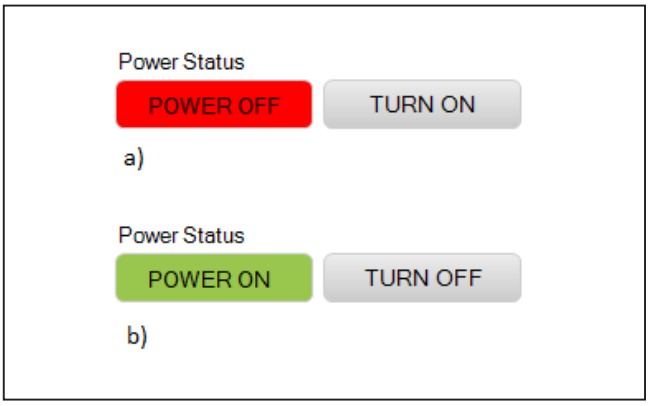


Figure 11. Power On (a) and Power Off (b) Status

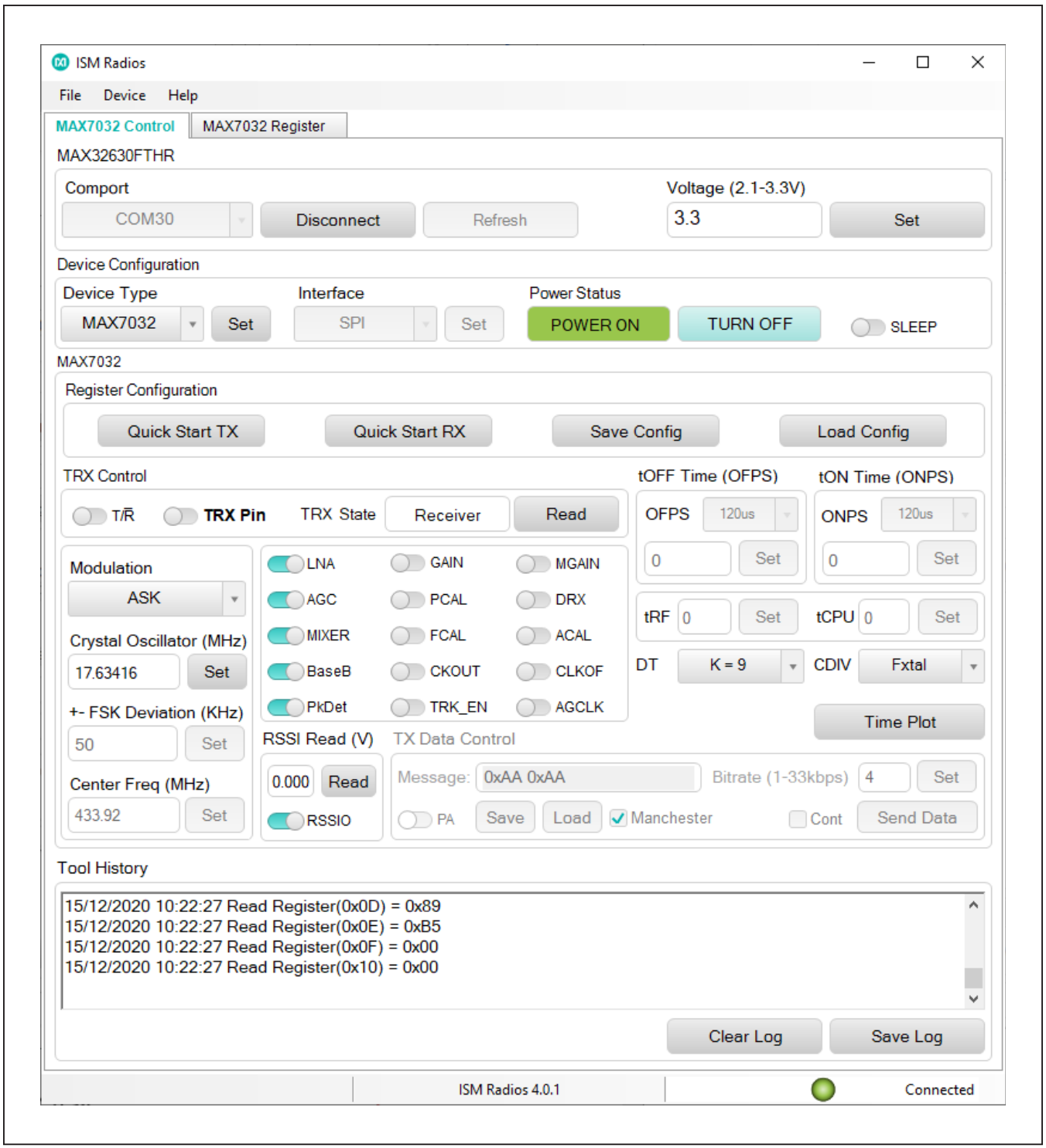


Figure 12. Connected and Power-On GUI State

Configure as Receiver with ASK Modulation – RX ASK

1) Configure the device, either through the Quick Start or the GUI configuration selections.
   a) Quick Start
      i) Click the **Quick Start RX** button (Figure 13) for an ASK receive configuration.
   b) GUI Drop-Down and Entry Selections (Figure 14)
      i) Enable the **T/$\overline{R}$** toggle switch to put the device in Receive mode.
      ii) Select **ASK** in the **Modulation** drop-down list.
      iii) Click **Set** for the Crystal Oscillator setting of "17.63416".
      iv) Ensure the following toggle switches are enabled (active): **LNA**, **AGC**, **MIXER**, **BaseB**, **PkDet**, **FCAL**, and **RSSIO**.
      v) Ensure all other toggle switches not listed are disabled.
      vi) Set DT to "K = 13" in the drop-down list.
2) Connect the DATA test point to an oscilloscope to see the output data stream or view through the **Time Plot** sampler (Figure 15). (See *Time Plot* in the *Detailed Description of Software* section.)

Figure 13. Quick Start TX and Quick Start RX Buttons

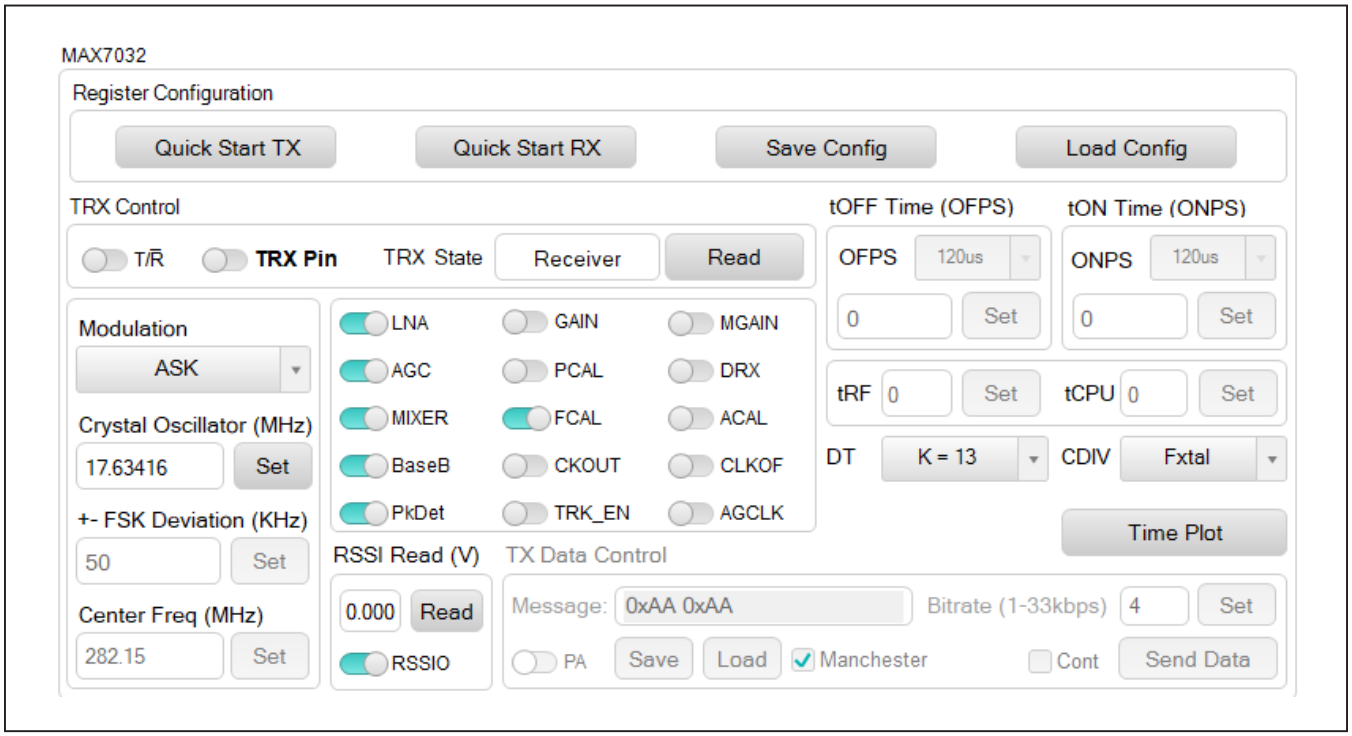


Figure 14. Device Settings for ASK Receiver

Configure as Receiver with FSK Modulation – RX FSK

1) Configure the device through GUI configuration selections.
   a) GUI Drop-Down and Entry Selections (Figure 14)
      i. Enable the **T/$\overline{R}$** toggle switch to put the device in Receive mode.
      ii. Select **FSK** in the **Modulation** in the drop-down list.
      iii. Click **Set** for the Crystal Oscillator setting of “17.63416”.
      iv. Ensure the following toggle switches are enabled (active): **LNA**, **AGC**, **MIXER**, **BaseB**, **PkDet**, **FCAL**, and **RSSIO**.
      v. Ensure all other toggle switches not listed are disabled.
      vi. Set **DT** to “K = 13” in the drop-down list.
2) Connect the DATA test point to an oscilloscope to see the output data stream or through the Time Plot sampler (Figure 15). (See *Time Plot* in the *Detailed Description of Software* section.)

Configure as Transmitter with ASK Modulation – TX ASK

1) Connect the RFIN to a spectrum analyzer.
   a) Center frequency at desired frequency, span of 200kHz, resolution bandwidth of 300Hz, video bandwidth to Auto or 10kHz.
2) Configure the device through GUI configuration selections.
   a) Quick Start
      i. Click the **Quick Start TX** button (Figure 13) for an ASK transmit configuration at 433.92MHz and oscillator of 17.63416MHz.
   b) GUI Drop-Down and Entry Selections (Figure 14)
      i. Disable the **T/$\overline{R}$** toggle switch to put the device in Transmit mode.
      ii. Select **ASK** in the **Modulation** in the drop-down list.
      iii. Click **Set** for the Crystal Oscillator setting of “17.63416”.
      iv. Click **Set** for the Center Frequency of ”433.92”.

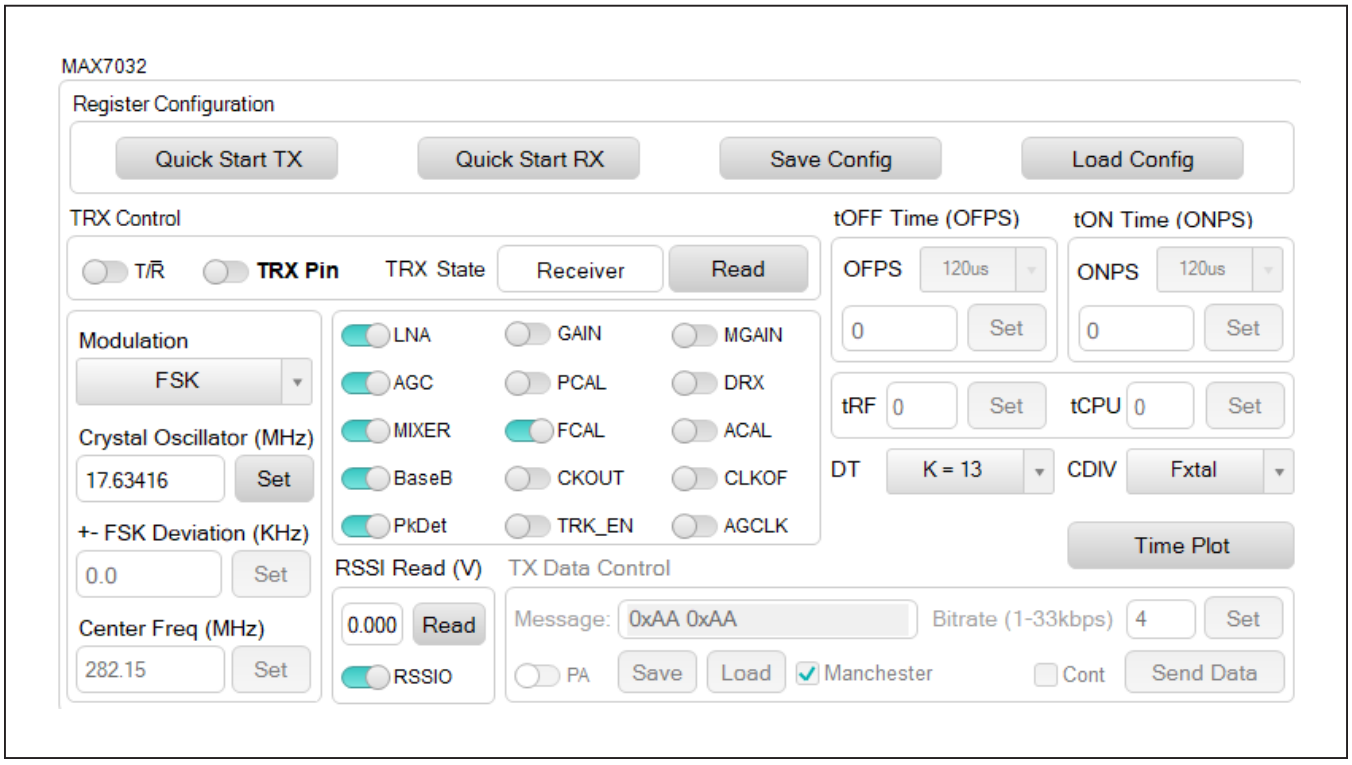


Figure 15. Device Settings for FSK Receiver

v. The following toggle switches can be enabled (active): **LNA**, **AGC**, **MIXER**, **BaseB**, **PkDet**, and **RSSIO**.
vi. Ensure the other toggle switches not listed are currently disabled.
vii. Set **DT** to "K = 13" in the drop-down list.

3) If set up through the quick start, go to step 5.

4) If manually set up, enable the **PA** toggle switch to start the transmitter. Set the **Message** box in the **TX Data Control** block to 0xAA. Click on the **Cont** checkbox for continuous data transmission. With "4" as the default setting in the **Bitrate** field, click **Set**. Then click on **Send Data** button.

5) Evaluate the device performance on the spectrum analyzer.
a) If using the default Manchester 0xAA pattern, the expected output power will be around +6dBm.
b) If attempting to see higher output power, the message can be changed to 0xFF 0xFF and the **Manchester** selection can be unchecked (so that NRZ data is transmitted), and the expected output power will then be around +12dBm.

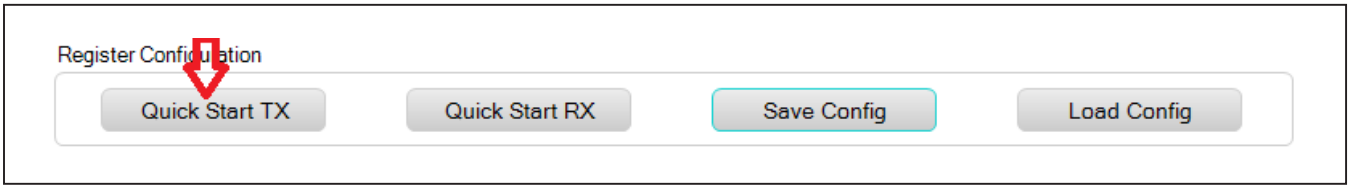


Figure 16. Quick Start TX Button

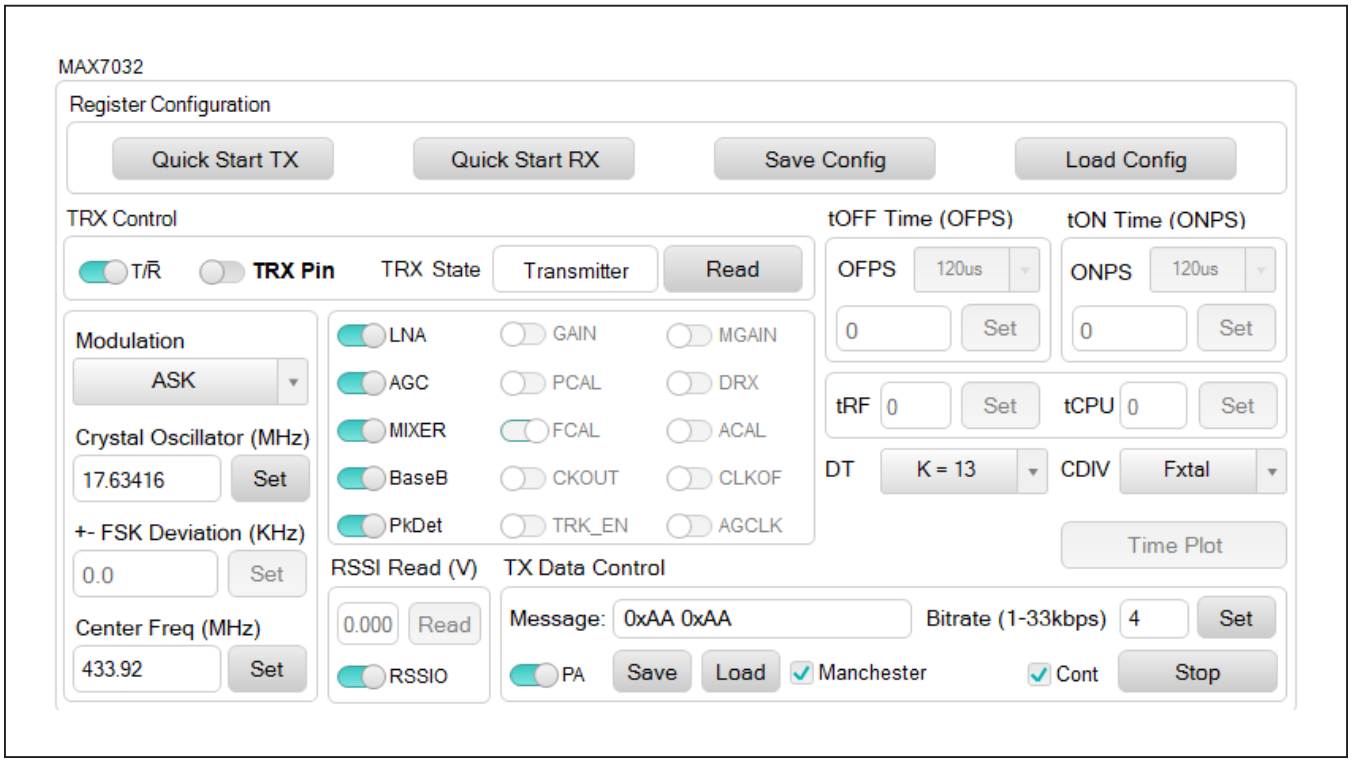


Figure 17. Device Settings for ASK Transmitter

Configure as Transmitter with FSK Modulation – TX FSK

1) Connect the RFIN to a spectrum analyzer.
   a) Center frequency at desired frequency, span of 200kHz, resolution bandwidth of 300Hz, video bandwidth to auto or 10kHz.
2) Configure the device through GUI configuration selections.
   a) GUI Drop-Down and Entry Selections (Figure 14)
      i. Disable the **T/$\overline{R}$** toggle switch to put the device in Transmit mode.
      ii. Select **FSK** in the **Modulation** in the drop-down list.
         a. A popup reminder will warn to set the FSK Frequency Deviation.
      iii. Click **Set** for the Crystal Oscillator setting of "17.63416".
      iv. Click **Set** for the Center Frequency of "433.92".
      v. Set the **Frequency Deviation** to "50" and click **Set**.
      vi. The following toggle switches can be enabled (active): **LNA**, **AGC**, **MIXER**, **BaseB**, **PkDet**, and **RSSIO**.
      vii. Ensure the other toggle switches not listed are currently disabled.
      viii. Set **DT** to "K = 13" in the drop-down list.
3) If set up through the quick start, go to step 5.
4) If manually set up, enable the **PA** toggle switch to start the transmitter. Set the **Message** box in the **TX Data Control** block to 0xAA. Click on the **Cont** checkbox for continuous data transmission. With "4" as the default setting in the **Bitrate** field, click **Set**. Then click on **Send Data** button.
5) Evaluate the device performance on the spectrum analyzer.
   a) If using the default **Manchester** 0xAA pattern, the expected output power will be around +6dBm.
   b) If attempting to see higher output power, the message can be changed to 0xF 0xFF and the **Manchester** selection can be unchecked (so that NRZ data is transmitted), and the expected output power will then be around +12dBm.

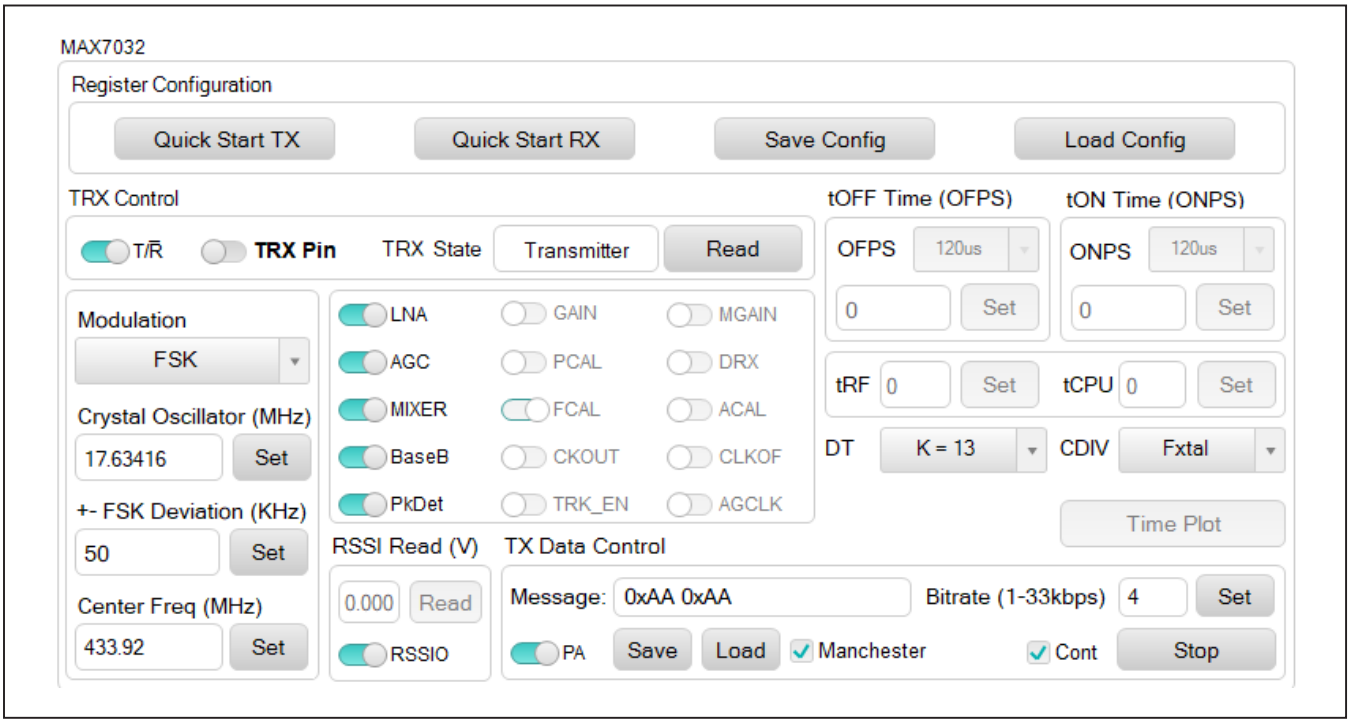


Figure 18. Device Settings for FSK Transmitter

Detailed Description of Hardware

Layout Issues

A properly designed PCB is essential for any RF/microwave circuit. Keep high-frequency input and output lines as short as possible to minimize losses and radiation. At high frequencies, trace lengths that are on the order of λ/10 or longer can act as antennas.

Both parasitic inductance and capacitance are influential on circuit layouts and are best avoided by using short trace lengths. Generally, a 10-mil wide PCB trace, 0.0625in above a ground plane, with FR4 dielectric has about 19nH/in of inductance and about 1pF/in of capacitance. In the LNA output/mixer input tank circuit, the proximity to the MAX7032 IC has a strong influence on the effective component values.

To reduce the parasitic inductance, use a solid ground or power plane below the signal traces. Also, use low-inductance connections to ground on all GND pins, and place decoupling capacitors close to all VDD connections.

Table 2. Jumper Function Table

JUMPER	STATE	FUNCTION
JU1	1-2*	3.3V Operation
JU1	2-3	5V Operation
JU2	1-2	Device enabled
JU2	2-3	Device asleep
J2	NC*	Enable controlled by FTHR
JU5	1-2 *	FTHR powered
JU5	2-3	PMOD powered
JU5	NC	External power supply

**Default setting*

Power Supply

The MAX7032 can operate from 3.3V or 5V supplies. For 3.3V operation, connect jumper J1 from 1-2 with JU5 jumper at 1-2. Or, if providing the supply externally, leave JU5 open and connect 3.3V on VDD3 test point with J1 from 1-2. For 5V operation, connect jumper J1 from 2-3 with JU5 left open. Or, if providing supply externally, leave JU5 open and connect 4.5V - 5.5V on VHI test points.

Test Points and I/O Connections

Additional test points and I/O connectors are provided to monitor the various baseband signals and for external connections. See Table 3 and Table 4 for a description.

Table 3. Test Points

TEST POINT	DESCRIPTION
DATA	DATA pin
RSSI	RSSI pin
CLK	CLKOUT pin
VDD3	DVDD, AVDD, PAVDD pins
VHI	HVIN pin
GND	GND

Table 4. I/O Connectors

SIGNAL	DESCRIPTION
RFIN	RF input/output
H1/H2	FTHR connections
JU4	Optional PMOD connector

Detailed Description of Software

The MAX7032 EV kit controller GUI software is designed to control the MAX7032 EV kit board and the MAX32630FTHR board. The software includes USB controls, which provide SPI and power to the MAX7032 through the FTHR board interface.

Comport

The **Comport** section provides a drop-down list of serial communication ports available for connection to a MAX7032 EV kit through a FTHR board. When the GUI is run after connecting the EV kit hardware, the drop-down list should default to the proper COM port. If the hardware is connected to the computer after the GUI is started, click on the **Refresh** button to scan for compatible ports. Once the appropriate COM port is selected in the drop-down list, click on the **Connect** button (See Figure 19). After properly connecting to the COM port with the FTHR board, the GUI displays the revision of FTHR board firmware detected displays a Green "LED" and displays "Connected" in the status bar along the bottom of the GUI window (See Figure 20).

Voltage (2.1V to 3.3V)

The **Voltage** section provides a user-adjustable power supply from the FTHR board MAX14690N power management IC (PMIC) to the MAX7032 EV kit and can be used as the primary VDD supply. The PMIC L3OUT can be set to voltages between 2.1V to 3.3V, and it applies to the level of the logic interface lines as well as the device supply. To program the supply voltage, enter a valid level in the **Voltage** field and click the **Set** button. The default value of the L3OUT voltage is 3.3V. When using the FTHR board interface to supply the MAX7032 EV kit with power, make sure to connect the JU5 jumper between pins 1-2.

An alternate option with the MAX7032EVKIT hardware is to provide 5V to the MAX7032 HVIN pin. To use the 5V supply from the FTHR board, connect the J1 jumper between 2-3 before the FTHR USB connection, instead of the default connection of HVIN to DVDD on the MAX7032 EV kit (J1 jumper at 1-2).

Device Configuration

The **Device Type** section must be set by the user to properly choose which transceiver is attached to the FTHR board. This selection configures the GUI software to default the interface through the SPI pins when the MAX7032 is selected. The **Power Status** allows enabling or disabling the device through the **ENABLE** pin on the MAX7032. Click the **TURN ON** to enable the device. To disable the device, click the **TURN OFF** button, as shown in Figure 21.

There is also a register control that can put the MAX7032 into a sleep mode through the Control Register at address 0x01. To activate this control, click the **SLEEP** toggle switch, as shown in Figure 22 in the **Device Configuration** section. This will put the device into a deep sleep mode, regardless of the **ENABLE** pin.

MAX7032

The MAX7032 section allows GUI configuration of the device through multiple toggle switches, buttons, and text box entries. These controls can be seen in Figure 23.

Figure 19. COM Port Assignment

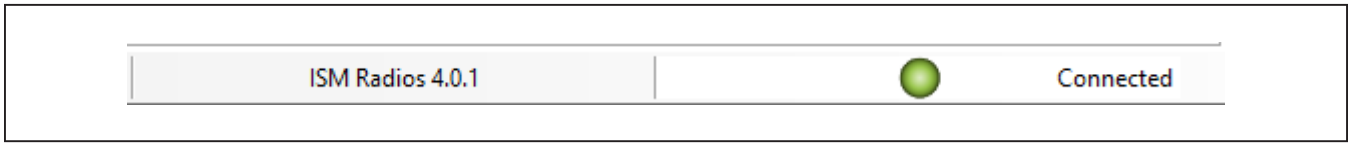


Figure 20. FTHR Status

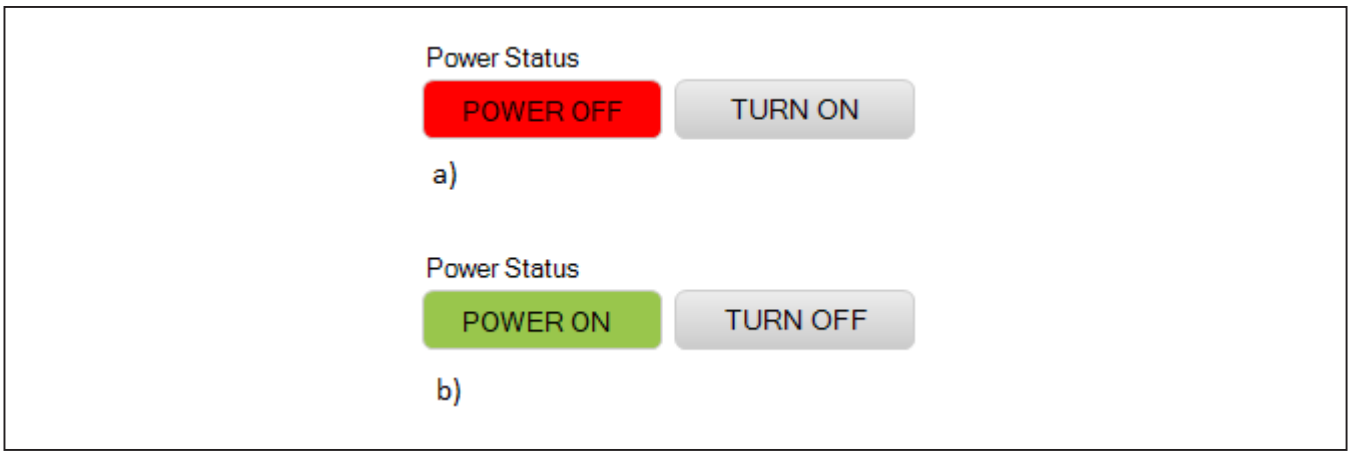


Figure 21. Power States to Power On (a) and Power Off (b)

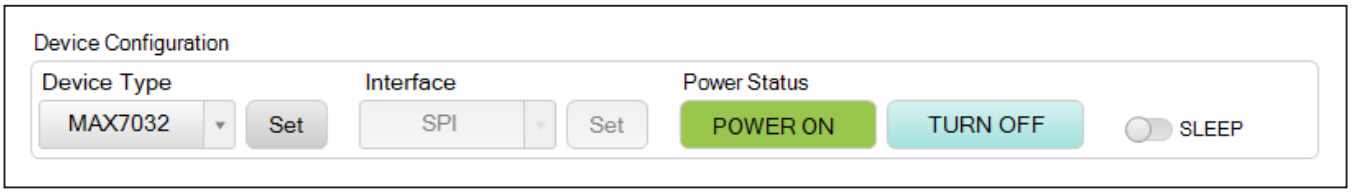


Figure 22. Device Configuration

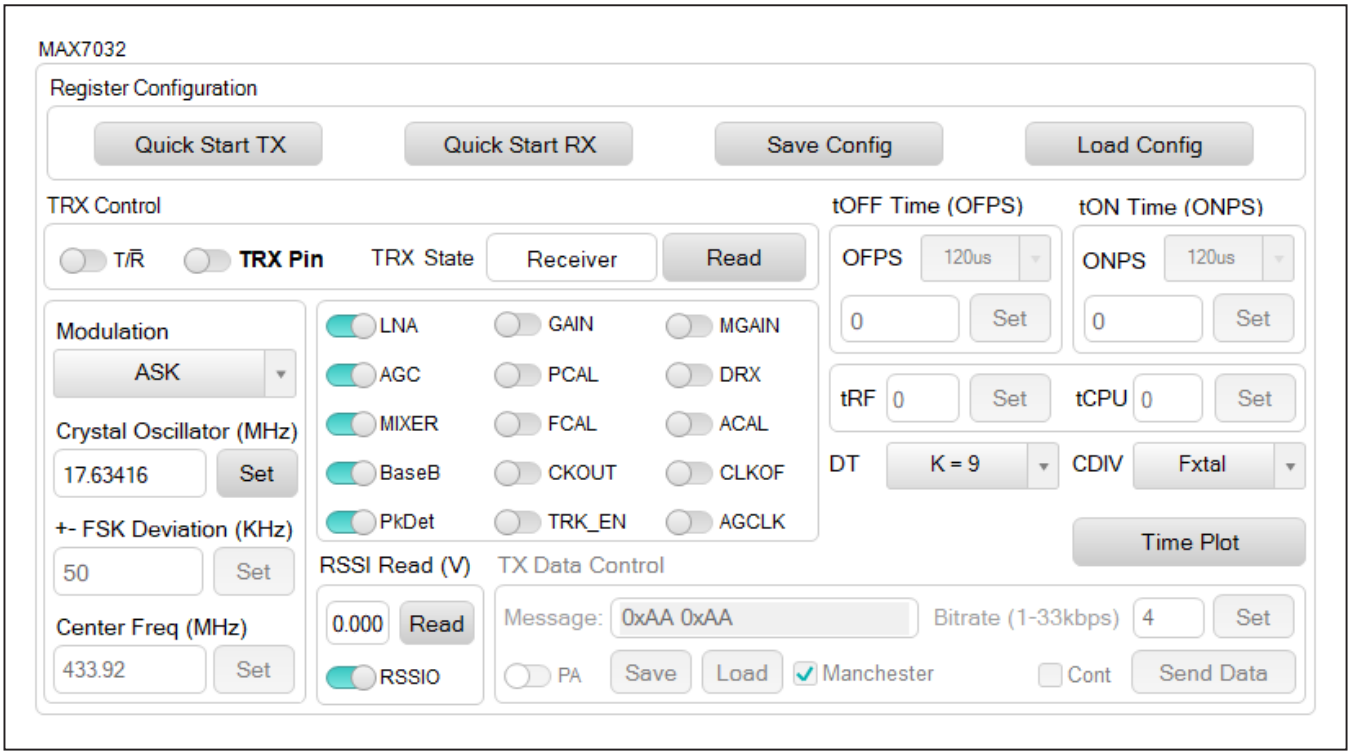


Figure 23. MAX7032 Control Section

Register Configuration

The GUI allows simple configuration options for easy bring-up. These options can be seen in Figure 24.

There is a **Quick Start TX** function that loads the programming of the MAX7032 to support an ASK transmit function. This assumes the default populated crystal oscillator of 17.63416MHz, Center Frequency of 433.92MHz, and a Manchester encoded data message of 0xAA to be sent continuously to the DATA pin of the MAX7032. The **PA** control bit will be enabled with this configuration and will result in an active signal output. This setup will result in a modulated ASK output at approximately +6dBm in output power.

There is also a **Quick Start RX** function that will load the programming for an ASK receive function. This configuration will place the device into an active receive state. Provided a modulated ASK signal on the RFIN SMA pin, the received signal will be output on the DATA pin and can be viewed on an oscilloscope or using the **Time Plot** button as described in the *Time Plot* section.

To capture the current configuration of the MAX7032 registers, click the **Save Config**. The results of the current settings will be captured into an XML file that can be used later to duplicate the device setup.

Similarly, there is a **Load Config** button that loads an XML file into the registers of the MAX7032.

TRX Control

The **TRX Control** section, as shown in Figure 25, allows the control and status of the current transmit or receive state. This state can be controlled through the **T/$\overline{R}$** pin or the Configuration 0 Register control at address 0x02. If the register control is set to enable the transmit mode, the pin control associated with **TRX Pin** toggle switch will not have any impact. The **Read** button provides the current **TRX State** status to indicate the transmit or receive state.

Modulation, Frequencies, Pin Control, and Timers

The **Modulation** is controlled with a simple pulldown to select either ASK or FSK modulation of the signal. When changing to FSK modulation, a warning pop-up window might appear to enter a **Frequency Deviation** value.

The oscillator frequency should be set to the board crystal value by entering the value and clicking the **Set** button, as shown in Figure 26. The default value is 17.63416MHz for the 433.92MHz operating frequency.

For the transmit function, the other frequencies of the system must be entered to ensure the system is programmed as expected. The Center Frequency should be programmed to the desired output. If the modulation is set to FSK, the programmed frequencies are calculated given the Center Frequency and FSK Deviation set.

Many of the registers within the MAX7032 can be controlled via toggle switches, as shown in Figure 27. See the device data sheet for the individual definition of each bit.

There is a section of settings that control the timers in the MAX7032. Some of these are only applicable when in the DRX receiver mode. These timers will be greyed out unless the **DRX** bit is enabled.

Figure 24. Register Configuration Section

Figure 25. TRX Control

Time Plot

The **Time Plot** button, shown in Figure 28, opens up a window, which allows the user to visually see the DATA pin displayed in a plot. This plot works best at around the 10kbps rate and lower for proper oversampling of the received signal. The **StartRF** button should be clicked to begin the display, as shown in Figure 29. After it is running, the **StopRF** can be clicked to stop the sampling. Clicking the **Clear Plot** button clears the current display. To zoom in or out of the display samples, use the mouse scroll.

RSSI Read

With the **RSSIO** enabled, the level of the RSSI pin, as sampled by the FTHR board, can be read by clicking the **Read** button in the **RSSI Read** section, as seen in Figure 30.

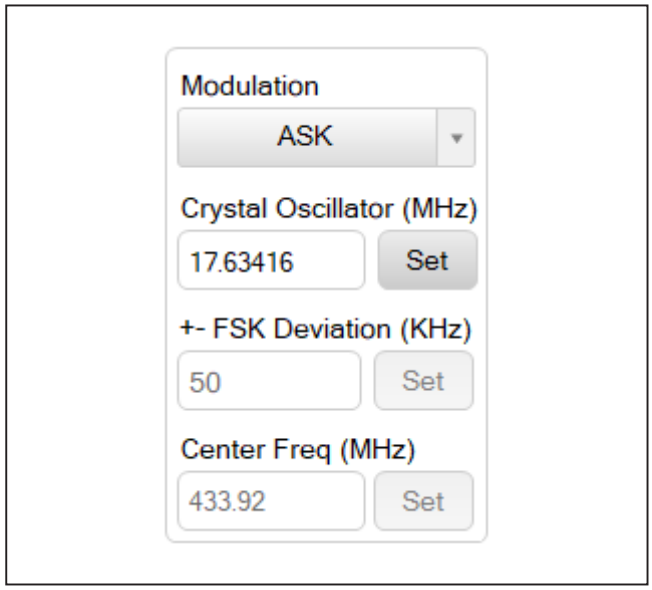


Figure 26. Setting of Modulation and Frequencies

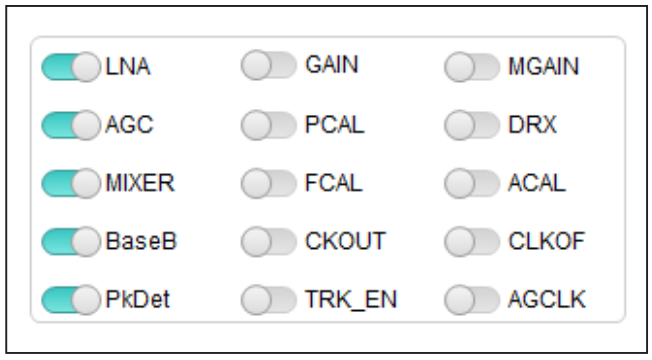


Figure 27. Register Bit Controls

Figure 28. Time Plot Button

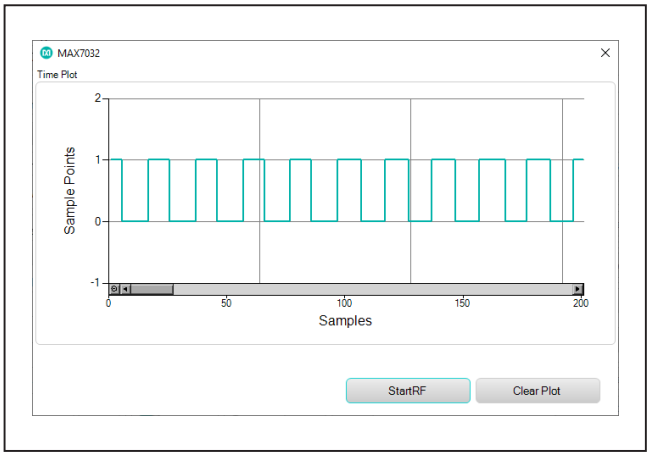


Figure 29. Time Plot Window

Figure 30. RSSI Read

TX Data Control

The **PA** bit in the Power-Configuration Register within the MAX7032 enables the output when in transmit mode. Click the **PA** toggle switch to enable or disable this signal.

When the MAX7032 is programmed as a transmitter, the message can be sent from the FTHR board. The **TX Data Control** section, as shown in Figure 31, allows the user to manage the data pattern. The message that is to be sent to the MAX7032 DATA pin is defined by the **Message:** entry, with "0xAA 0xAA" being the default data stream. A pattern can be loaded into this field by clicking the **Load** button and selecting the desired file to load. The pattern defined within the **Message** field can also be saved to a file using the **Save** button. This message can be encoded as Manchester or NRZ data. Manchester is the default selection with the **Manchester** checked, and NRZ is selected when the **Manchester** is unchecked. The data rate of this bitstream is defined by populating the **Bitrate (1-33kbps)** field, followed by clicking the **Set** button. To enable a continuous and repeating pattern to the MAX7032, click the **Cont** checkbox. When the message bitrate and selection of continuous or single have been made, the **Send Data** is clicked to start the stream of data to the DATA pin of the MAX7032.

As shown in Figure 32, a Manchester 2kbps signal could look like a 2kHz square wave to represent all 1's (or all 0's if shifted in phase) in Manchester-encoded data. And an NRZ 4kbps signal could look like a 2kHz square wave to represent alternating 0's and 1's.

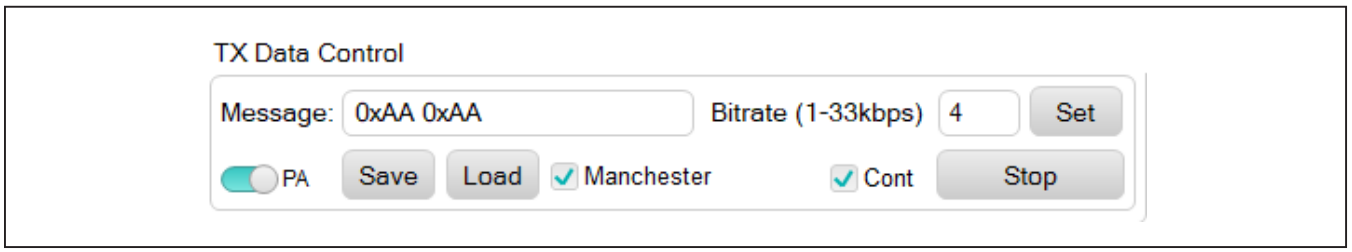


Figure 31. TX Data Control

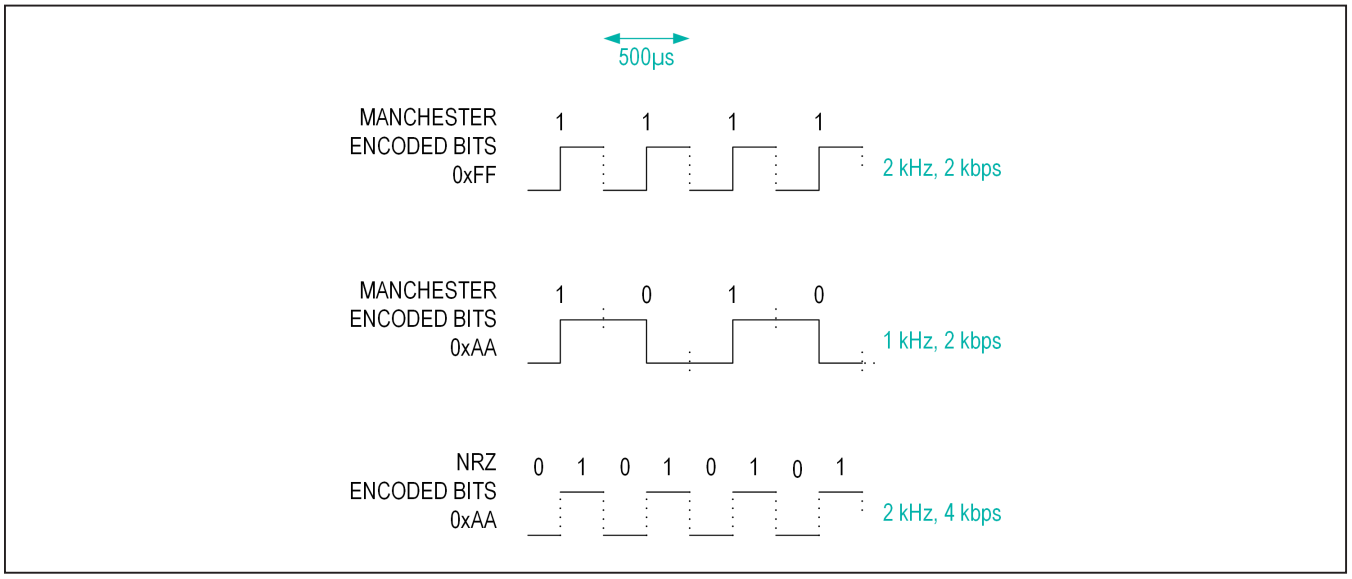


Figure 32. Manchester and NRZ Messages

Ordering Information

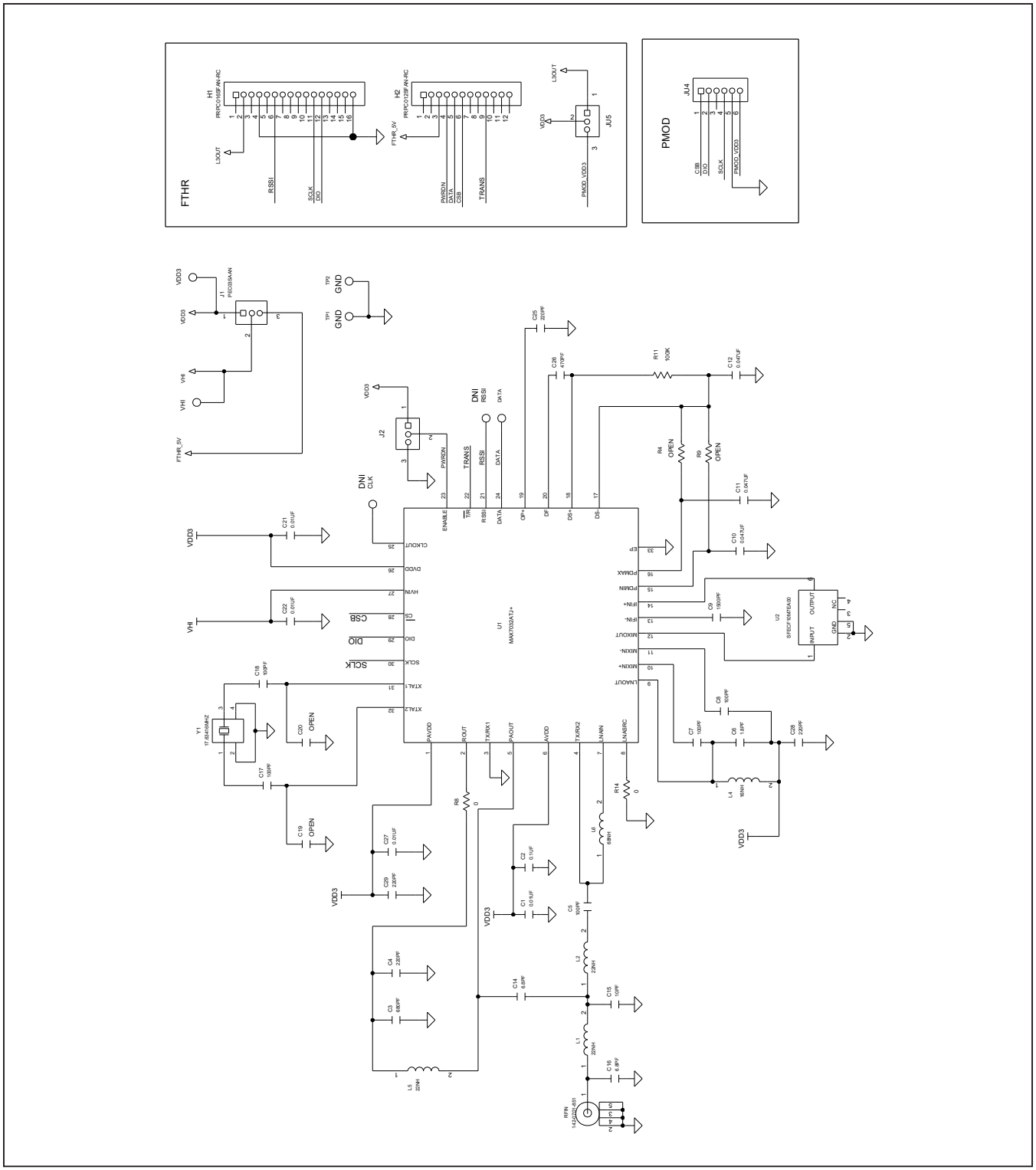
PART	TEMP. RANGE	IC PACKAGE
MAX7032EVKIT-315	-40ºC to +85ºC	32-TQFN
MAX7032EVKIT-433	-40ºC to +85ºC	32-TQFN

MAX7032 EV Kit Bill of Materials

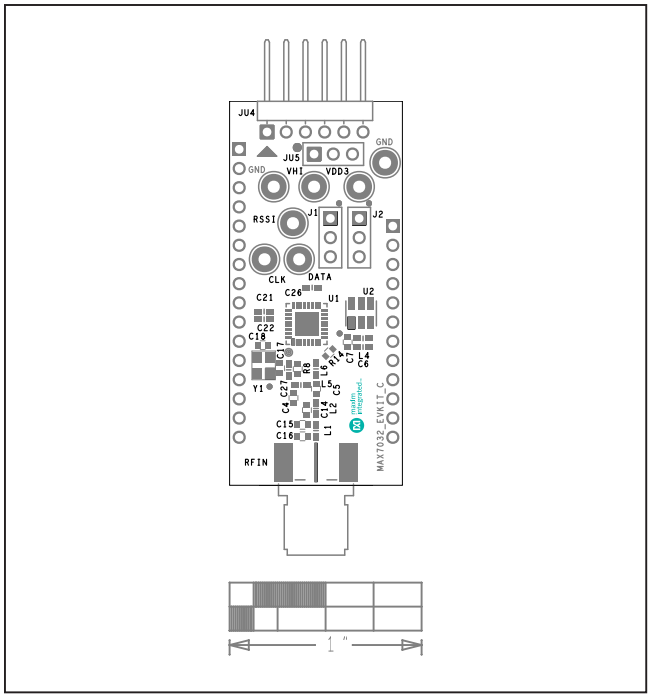
PART	QTY	DESCRIPTION
C1, C21, C22, C27	4	0.01UF 10% 200V X7R CER CAP (0603) KEMET: C0603C103K2RAC
C2	1	0.1UF 10% 100V X7R CER CAP (0603) YAGEO: CC0603KRX7R0BB104
C3	1	680PF 1% 50V C0G CER CAP (0603) KEMET: C0603C681F5GAC
C4, C25, C28, C29	4	220PF 5% 50V C0G CER CAP (0603) MURATA: GRM1885C1H221JA01
C5, C7, C8, C17, C18	5	100PF 5% 50V C0G CER CAP (0603) KEMET: C0603C101J5GAC
C6	1	1.8PF ±0.25pF 50V C0G CER CAP (0603) AVX: 06035A1R8CAT2A
C9	1	1500PF 10% 50V C0G CER CAP (0603) VENKEL LTD.: C0603C0G500-152KNP
C10-C12	3	0.047UF 10% 50V X7R CER CAP (0603) KEMET: C0603C473K5RAC
C14, C16	2	6.8PF ±0.25pF 50V C0G CER CAP (0603) MURATA: GRM39C0G6R8C050
C15	1	10PF 5% 50V C0G CER CAP (0603) KEMET: C0603C100J5GAC
C26	1	470PF 10% 50V C0G CER CAP (0603) KEMET: C0603C471K5RAC
DATA, VDD3, VHI	3	TEST POINT RED KEYSTONE: 5010
TP1, TP2	2	TEST POINT BLACK KEYSTONE: 5011

PART	QTY	DESCRIPTION
H1	1	16-PIN CONNECTOR SULLINS ELECTRONICS CORP: PRPC016SFAN-RC
H2	1	12-PIN CONNECTOR SULLINS ELECTRONICS CORP: PRPC012SFAN-RC
J1, J2, JU5	3	3-PIN CONNECTOR SULLINS ELECTRONICS CORP: PEC03SAAN
JU4	1	6-PIN CONNECTOR SAMTEC: TSW-106-25-T-S-RA
RFIN	1	2-PIN CONNECTOR, END LAUNCH JOHNSON COMPONENTS: 142-0701-851
L1, L2, L5	3	22NH 5% (0603) COILCRAFT: 0603CS-22NXJL
L4	1	16NH 5% (0603) COILCRAFT: 0603CS-16NXJL
L6	1	68NH 5% (0603) COILCRAFT: 0603CS-68NXJL
R8	1	0 ohm RESISTOR 5% (0603) SAMSUNG ELECTRONICS: RC1608J000CS
R11	1	100K ohm RESISTOR 5% (0603) PANASONIC: ERJ-3GEYJ104
R14	1	0 ohm RESISTOR 1% (0603) YAGEO: RC0603FR-070RL
U1	1	IC MAXIM: MAX7032ATJ+
U2	1	BANDPASS 10.7MHz FILTER; 3dB BW=330kHz MURATA: SFECF10M7EA00
Y1	1	CRYSTAL 17.63416MHz ±80PPM NDK: EXS00A-CG07843
	1	PCB MAXIM: MAX7032

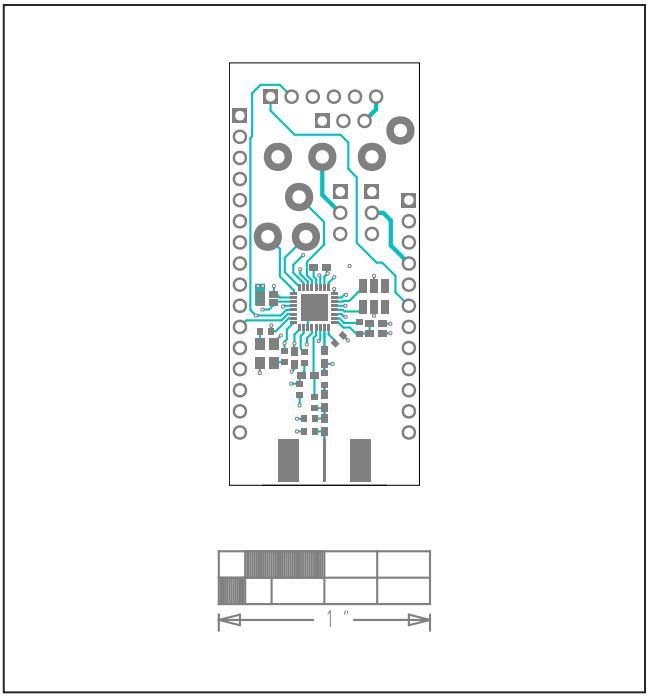
MAX7032 EV Kit Schematic



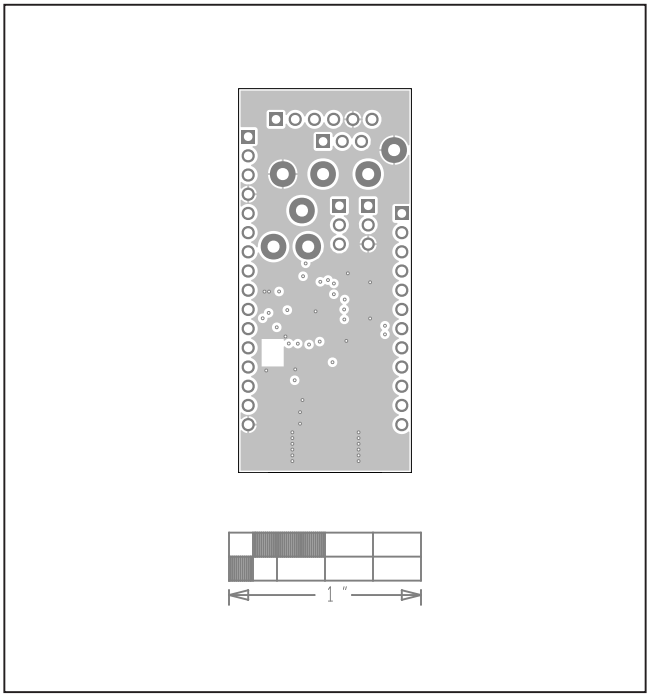
MAX7032 EV Kit PCB Layout Diagrams



MAX7032 EV Kit Board Layout—Top Silkscreen

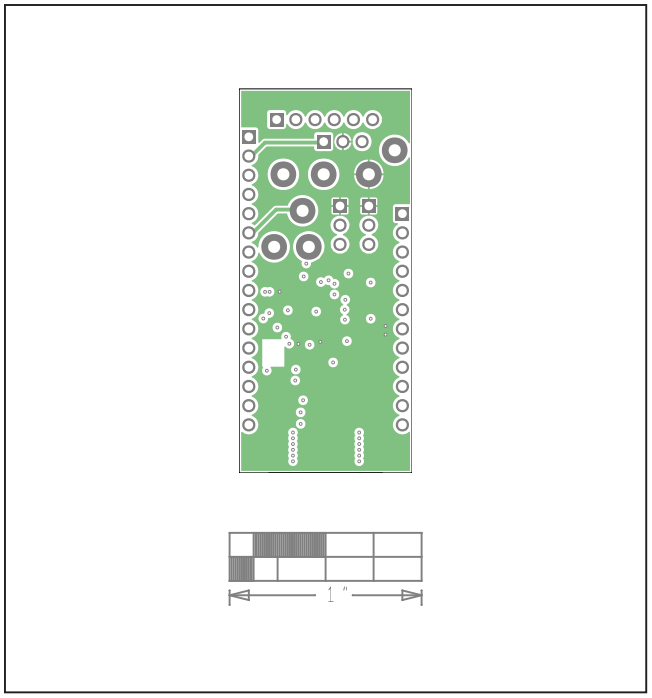


MAX7032 EV Kit Board Layout—Top

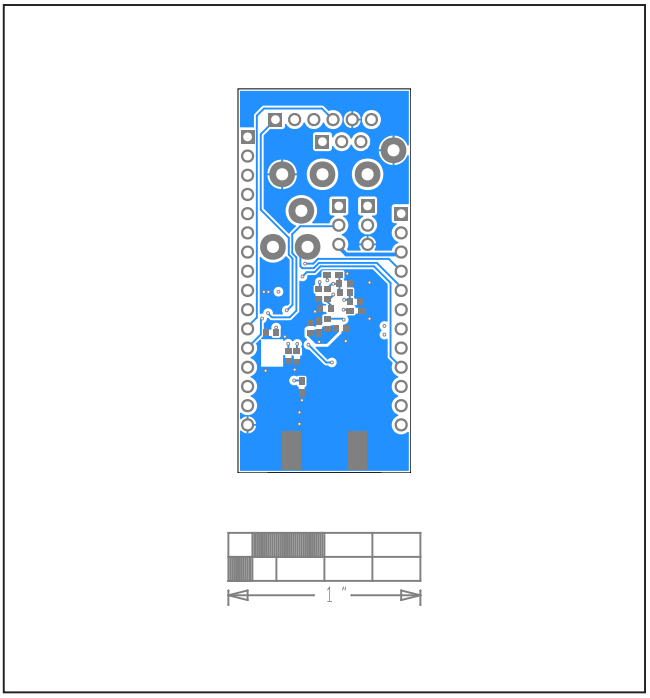


MAX7032 EV Kit Board Layout—Internal2

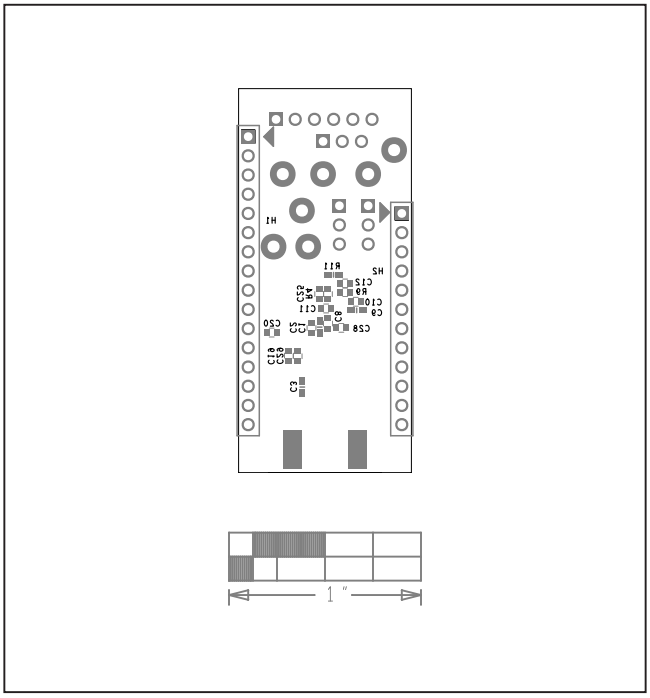
MAX7032 EV Kit PCB Layout Diagrams (continued)



MAX7032 EV Kit Board Layout—Internal3



MAX7032 EV Kit Board Layout—Bottom



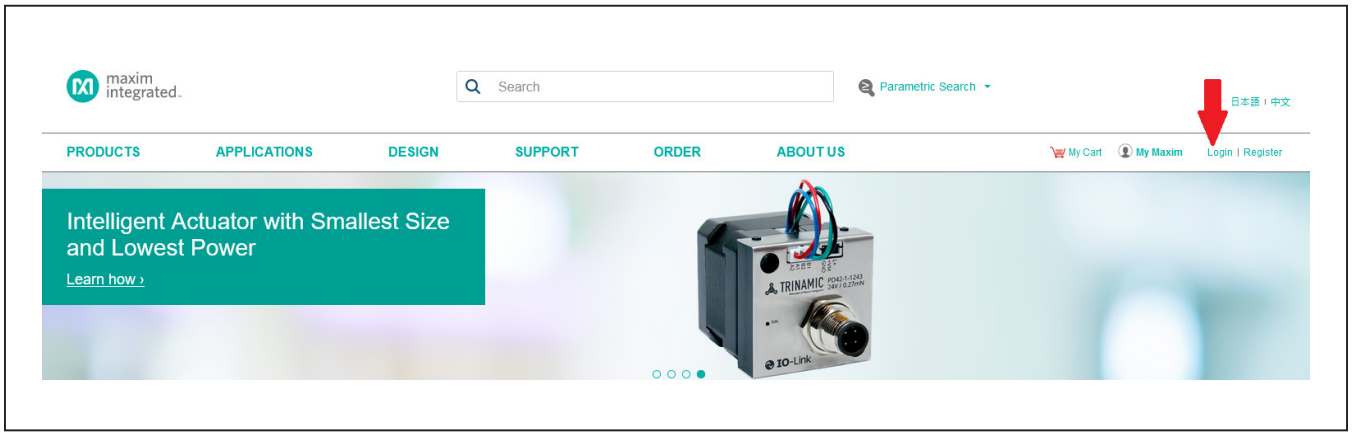
MAX7032 EV Kit Board Layout—Bottom Silkscreen

Appendix I – Detailed Software, Firmware, and Driver Installation Procedures

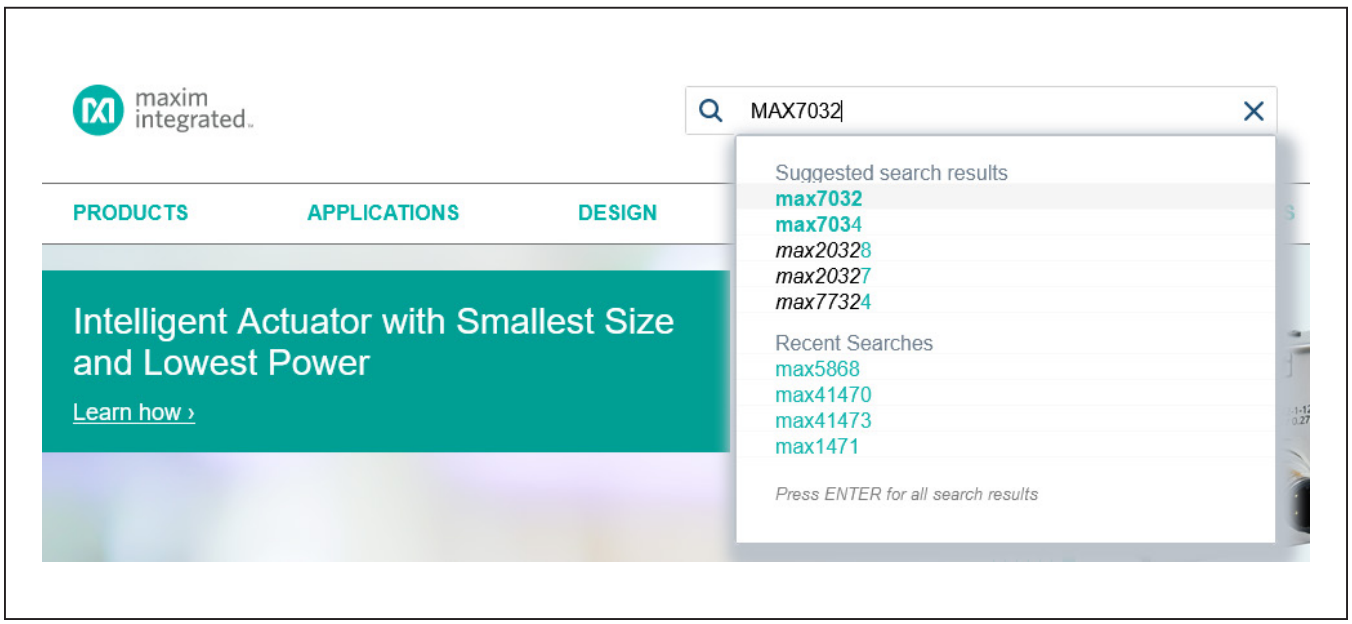
Download the ISM Radios GUI

This software and firmware are available from the **Maxim website**.

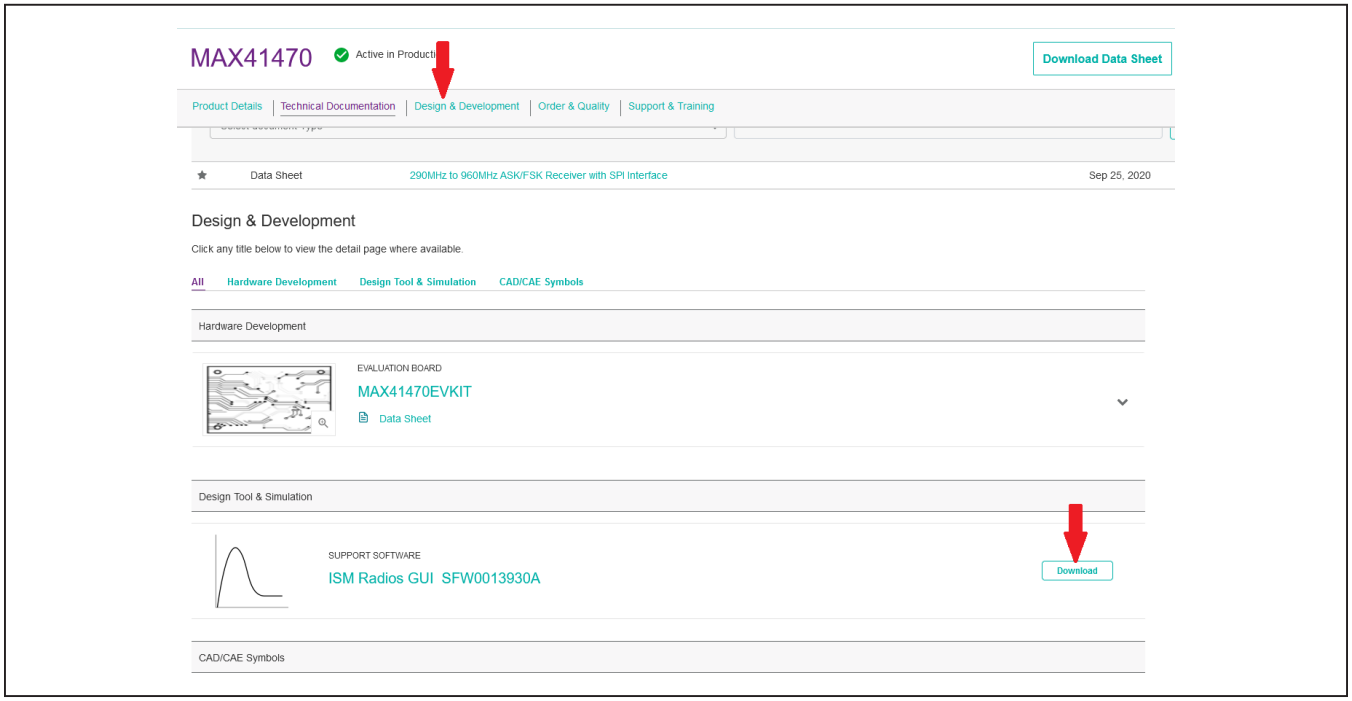
1) Log in to your MyMaxim account on the website.



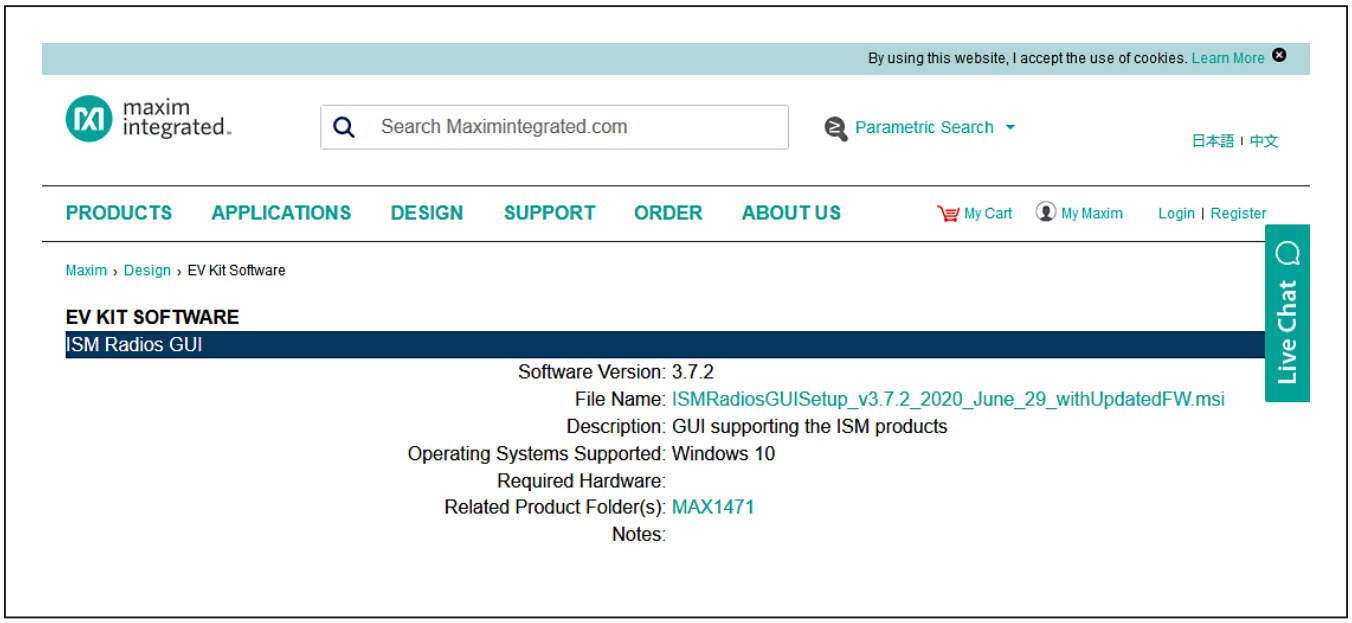
2) Click on the magnifying glass and search for the **MAX7032**.



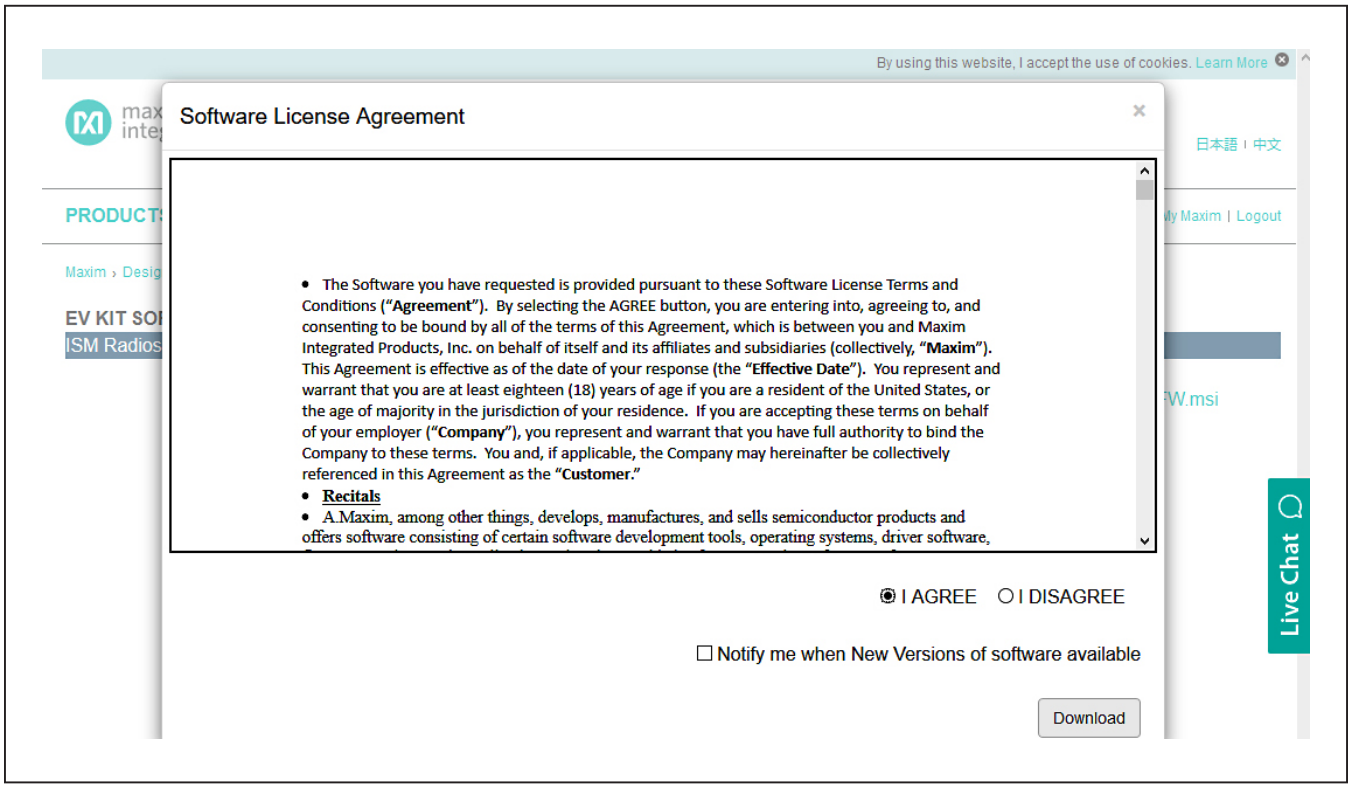
3) Click on the **DESIGN RESOURCES** tab on the appropriate product web page and click on the software link.



4) Click the file link on the software landing page to download the ISM Radios GUI msi.



5) Review the Maxim Software License Agreement (SLA), and accept the terms by selecting **I AGREE** and clicking the **Download** button.



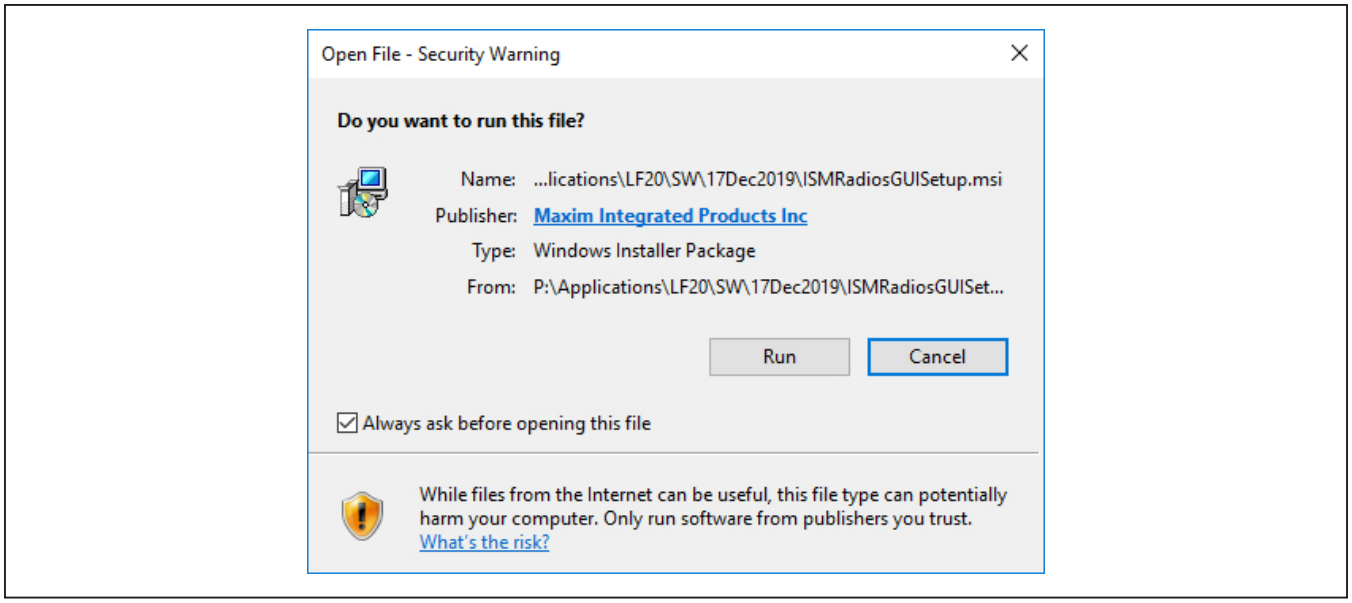
6) Save the EV kit software package to your desktop or other accessible location for later install.

Install the ISM Radios GUI

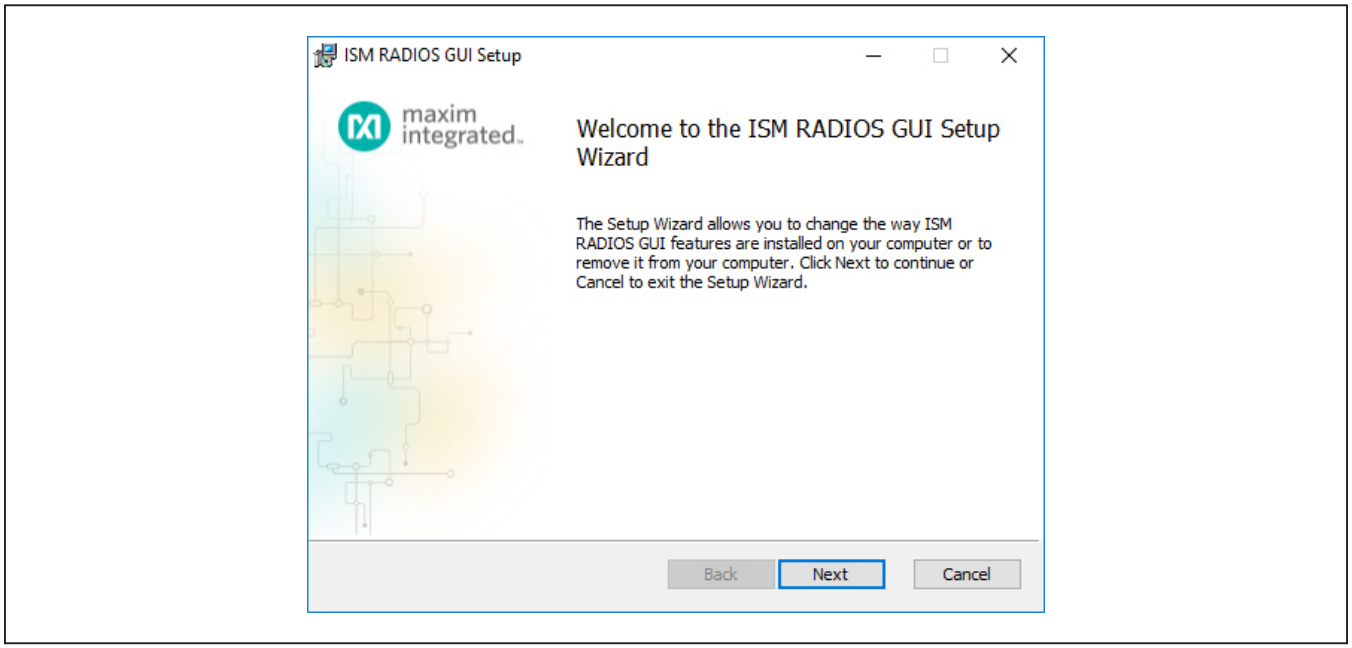
This software and firmware are available from the **Maxim website**. See the *Download the ISM Radios GUI* section for information on obtaining the latest firmware from Maxim.

This process should take less than 10 minutes after downloading the software, firmware, and driver package.

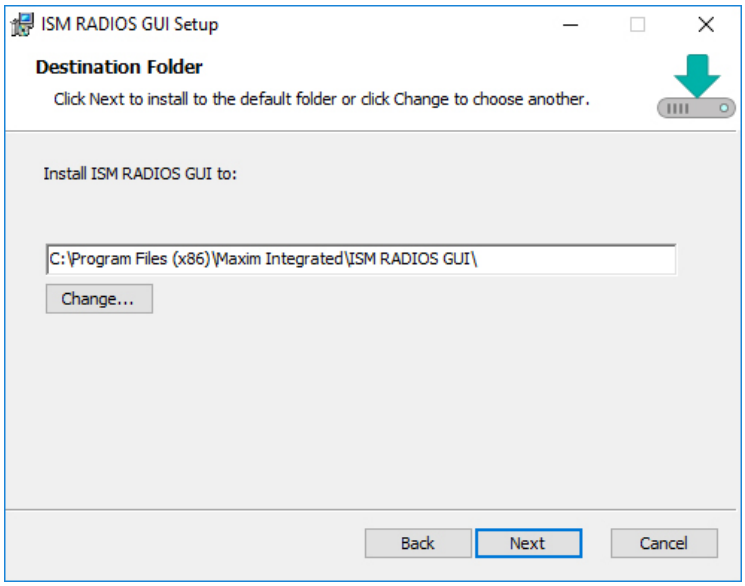
1) Double-click the ISMRadiosGUISetup.msi setup file and follow the Setup Wizard prompts.
   a) If a security warning appears, click **Run**.



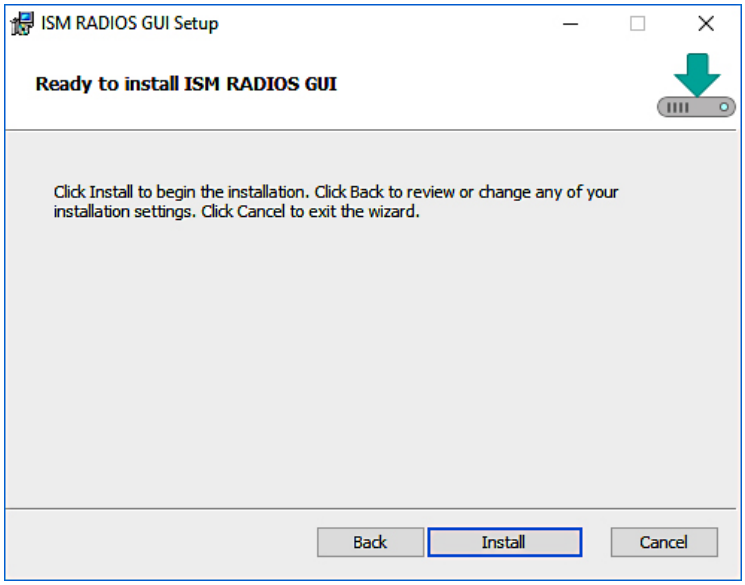
   b) In the **Welcome** window, click **Next**.



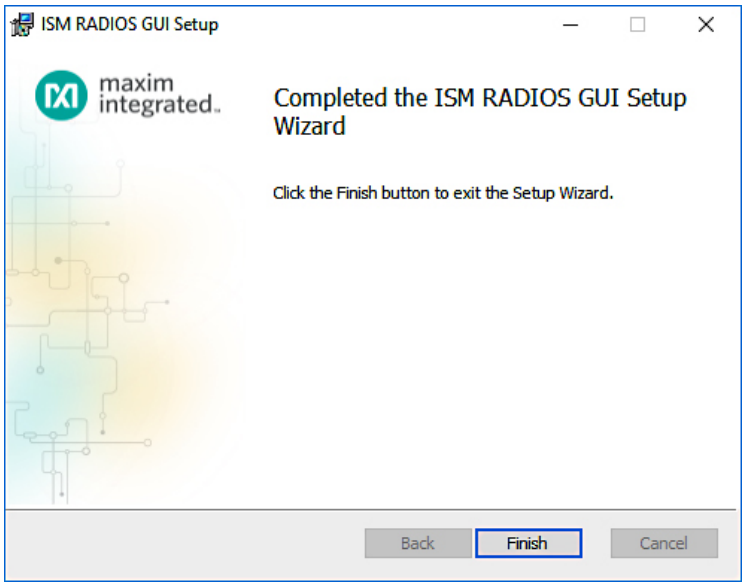
c) Use the default **Destination Folder**, and click **Next**.



d) Install the software by clicking **Install**.



e) Click **Finish** when the setup process is complete.

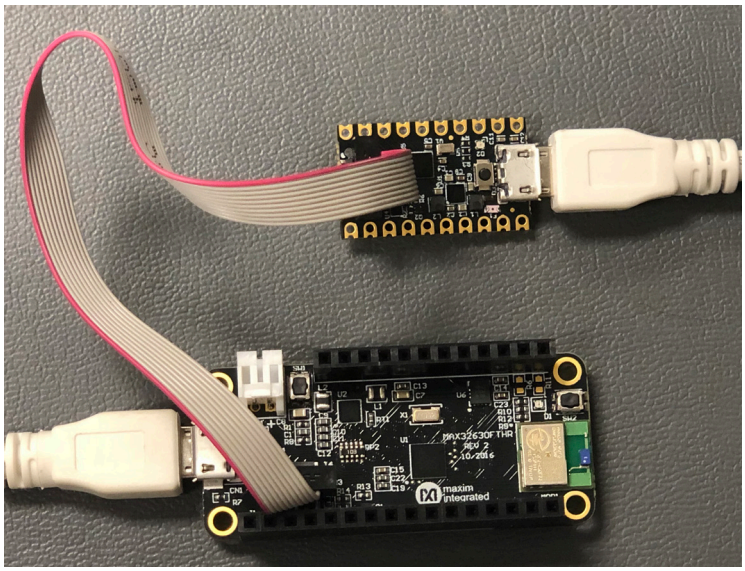


Program the MAX32630FTHR Board with the MAX7032 Firmware

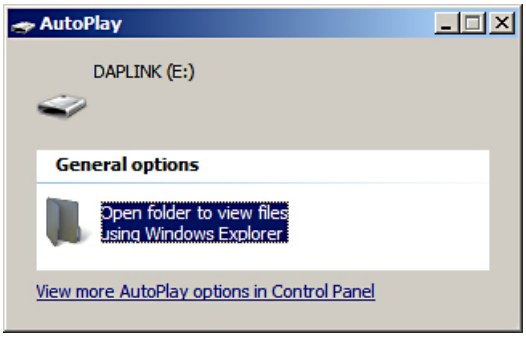
This software and firmware are available from the **Maxim website**. See the *Download the ISM Radios GUI* section for information on obtaining the latest firmware from Maxim.

1) Connect the MAX32630FTHR to the MAX32625PICO.

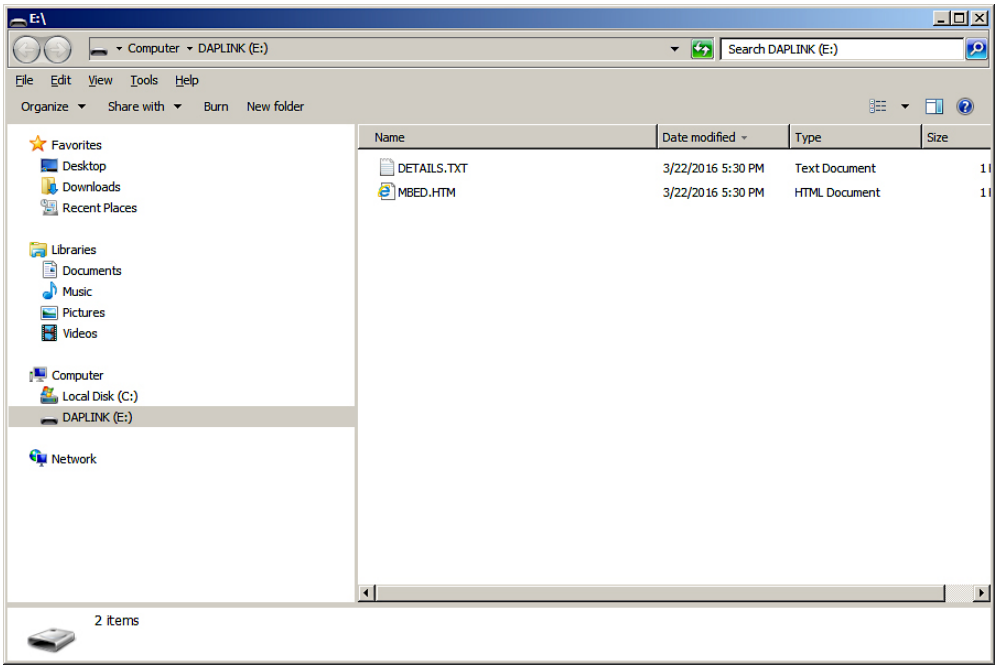
   a) Use the fine-pitch, 10-pin ribbon cable to connect the boards from the SWD (J3) header on the HDK to J4 on the MAX32630FTHR.



2) Connect the MAX32630FTHR to a power source.
   a) Use a USB Micro-B cable to connect the MAX32630FTHR board to a suitable power source (no USB connectivity is required). Alternatively, you can power the board from a charged battery as long as you remember to turn it on by pressing the power/reset button next to the battery connector. The board turns on automatically when powered from the USB supply.
   b) The status LED on the FTHR board should be lit a steady red.
3) Connect the MAX32625PICO to a PC.
   a) Use a USB Micro-B cable to connect the HDK to a PC (the white USB cable off the right side of the photo).



   b) The status LED on the DAPLINK board blinks red when connecting.
   c) After a few seconds of activity, the PC recognizes the DAPLINK as a standard USB drive.
4) Drag and drop, or save a the ism_radios_fw.bin program binary to the mbed or DAPLINK USB drive.



a) The FTHR board LED shuts off and the LED on the MAX32625PICO slowly flashes red as the FTHR board is being programmed.

b) Once the programming is complete, the DAPLINK USB drive disconnects from the PC and reconnects as a USB drive again.

c) If the programming was successful, the contents of the DAPLINK USB drive should include a DETAILS.TXT file. If an ERROR.TXT file exists on the drive, check that the FTHR board had power during the programming process and repeat steps 3 and 4.

5) To prepare the FTHR board for use, disconnect the DAPLINK board (ribbon cable) and press the **Reset** button on the FTHR board or disconnect the FTHR board from the USB power supply.

a) When the **Reset** button is pressed, the microcontroller restarts and the newly programmed application begins to run, or you can disconnect and reconnect the USB cable if using a PC for power.

The latest information and these firmware update instructions can be found on the **MAX32630FTHR board mBed web site** or by visiting the **mBed home page** and searching for “MAX32630FTHR”.

If you do not have an mbed account, choose **Sign up** and create your mbed account. Otherwise, log in with your normal username and password. This gives you access to the website, tools, libraries, and documentation.

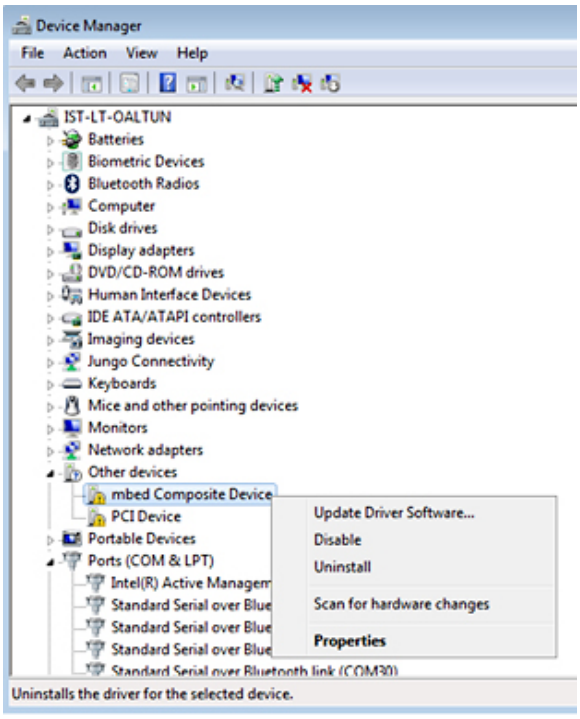
You must load the matching HDK image (**MAX32630FTHR DAPLINL image**) for the platform you are programming in order for drag-and-drop programming to work.

Board Driver

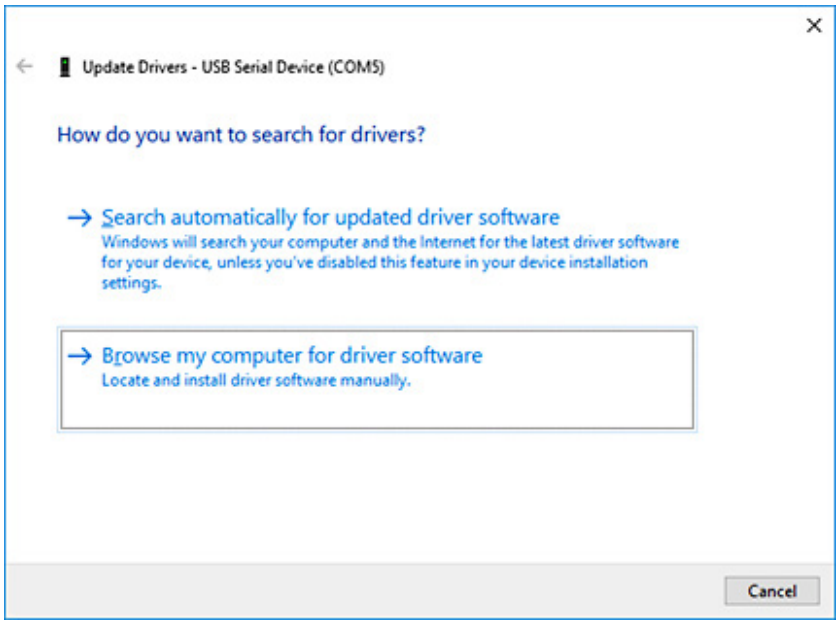
The required driver is available from the **Maxim website**. See the *Download the ISM Radios GUI* section in this documentationfor information on obtaining the latest driver from Maxim.

1) Connect the MAX32630FTHR to the PC’s USB port.

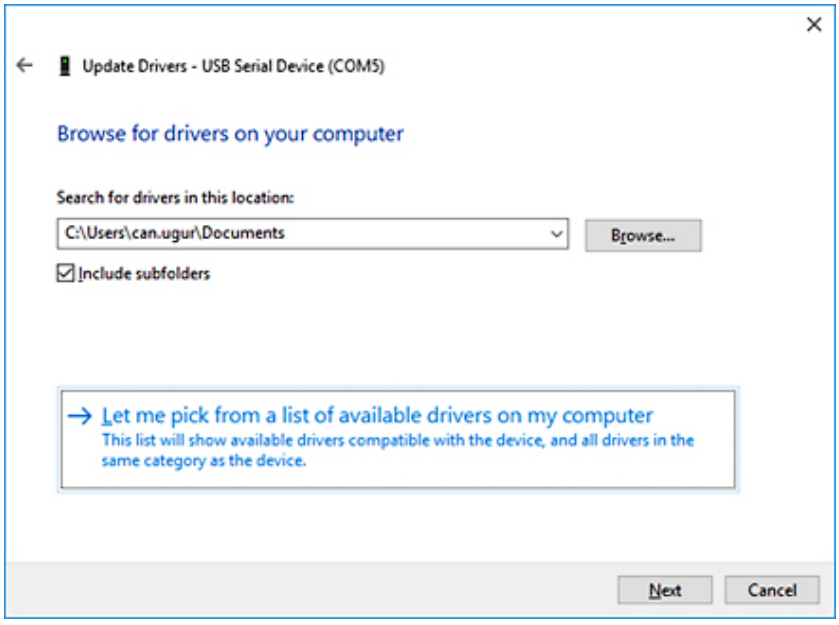
2) In **Device Manager**, right-click **Other devices** > **CDC Device** or **mbed Composite Device**.



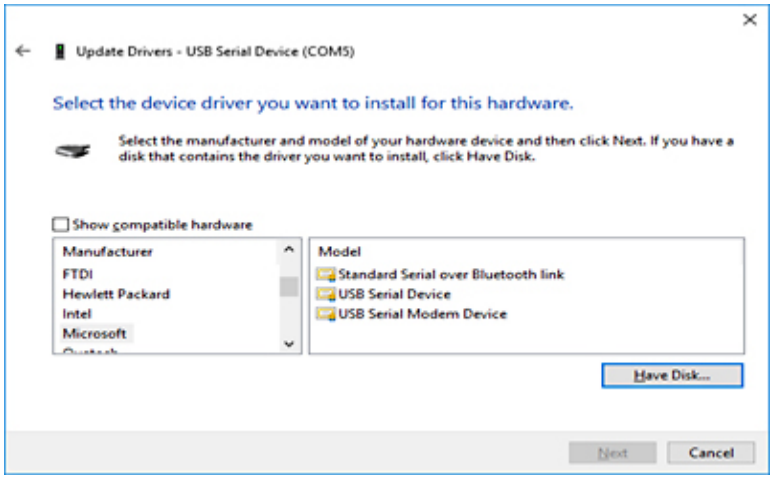
3) Click **Update Driver Software**, then select **Browse my computer for driver software.**



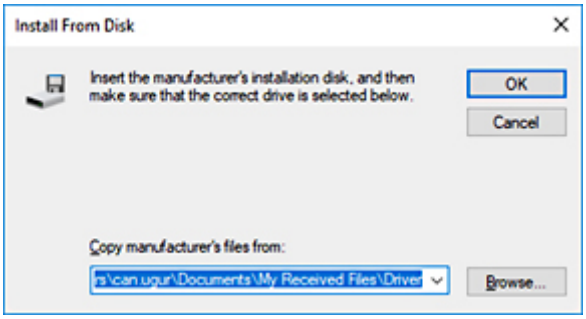
4) Select **Let me pick from a list of available drivers on my computer**, and click **Next**.



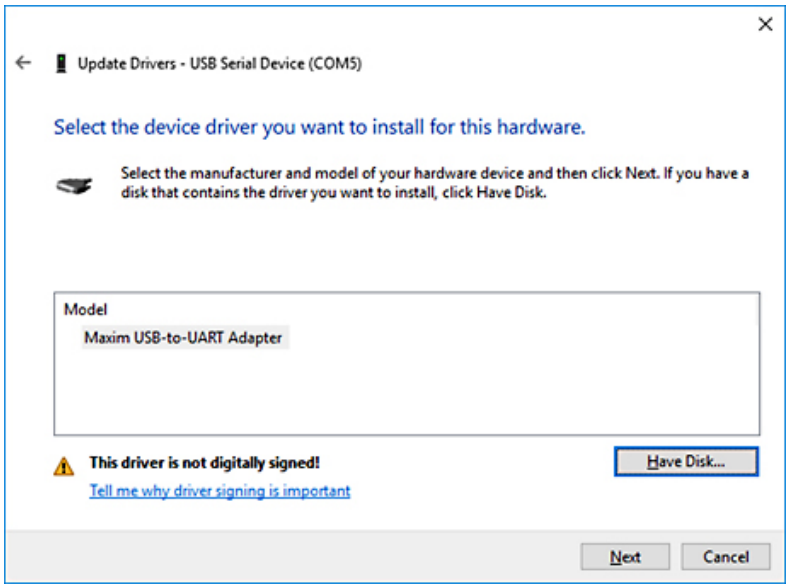
5) On a Windows 10 operating system, click the **Have Disk…** button.



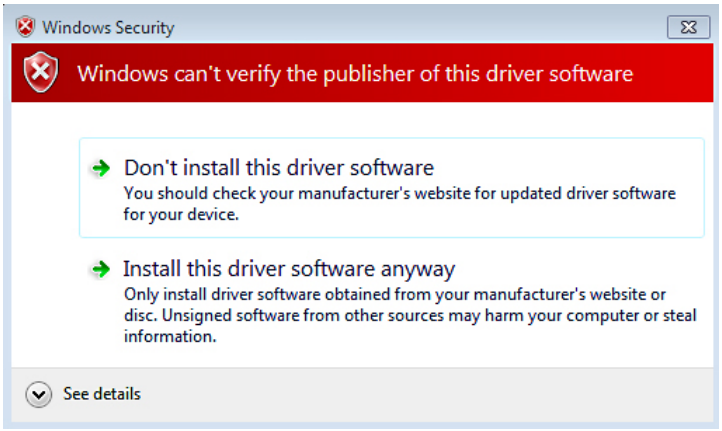
6) Browse to the path of the driver folder and click **OK**.



7) Select the device driver and click **Next**.



8) Ignore the warnings and click **Install this driver software anyway**.

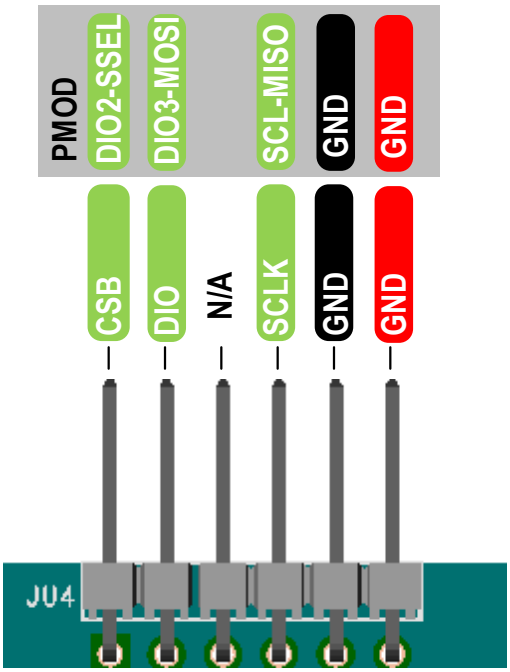


Appendix II – Hardware Modifications

PMOD Header Interface

The MAX7032 EV kit provides a PMOD-compatible header footprint, which provides yet another built-in interface to the transmitter. The JU4 connector can be populated with a 6-pin, 100mil, right-angle header such as a SAMTEC TSW-106-25-T-S-RA, allowing direct connections to the CSB, DIO, SCLK, ground, and VDD lines.

The PMOD interface can be used in combination with the Maxim MAX32600MBED kit and the MAXREFDES72# Arduino Uno R3-to-PMOD shield adaptor. When using the PMOD interface to supply the MAX7032 EV kit with power, be sure to connect the JU1 jumper between pins 2-3.

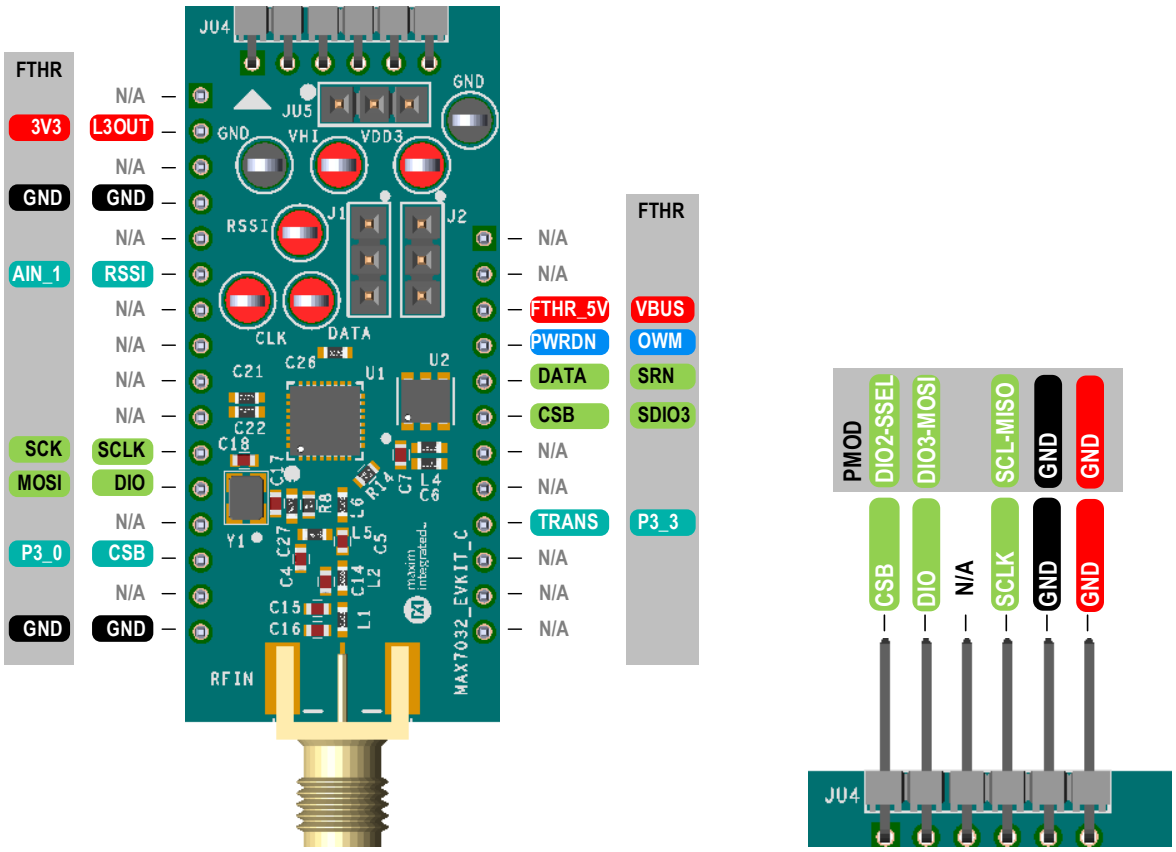


Appendix III – Pinout Sheets

MAX7032 EV Kit

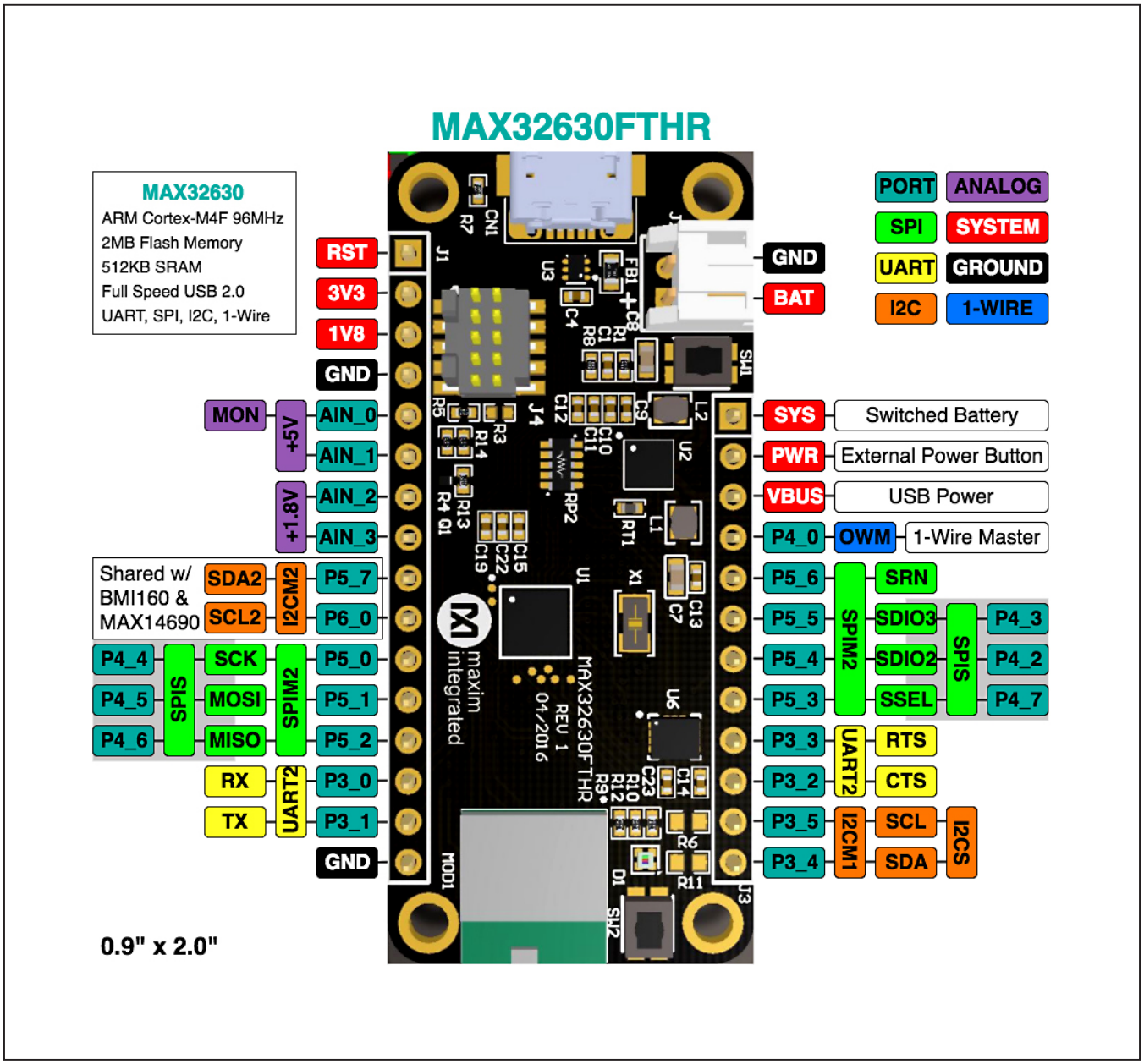
FTHR Board Connectors

Peripheral Module Connector



MAX32630FTHR

Arm Cortex-M4 processor with FPU microcontroller rapid development platform.



Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	1/18	Initial release	—
1	4/18	Updated Ordering Information table	11
2	1/21	Updated the EV kit throughout to match the new HW and SW, added Appendix I, Appendix II, and Appendix III	1–37

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