Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

KW01 Development Hardware

Reference Manual

Document Number: KW01DHRM
Rev. 1
1/2014

freescale semiconductor

How to Reach Us:

Home Page:
freescale.com

Web Support:
freescale.com/support

Document Number: KW01DHRM
Rev. 1
1/2014

Contents

About This Book

Chapter 1
Safety Information

Chapter 2
KW01 Development Platform Overview and Description

Chapter 3
KW01-MRB

Chapter 4
PCB Manufacturing Specifications

About This Book

This manual describes Freescale's KW01-MRB development platform hardware. The MKW01Z128CHN development platform is a highly-integrated, cost-effective, system-in-package (SIP), sub-1GHz wireless node solution with an FSK, GFSK, MSK, or OOK modulation-capable transceiver and low-power ARM Cortex M0+CPU microcontroller. The highly integrated RF transceiver operates over a wide frequency range including 315 MHz, 433 MHz, 470 MHz, 868 MHz, 915 MHz, 928 MHz, and 955 MHz in the license-free Industrial, Scientific and Medical (ISM) frequency bands.

Audience

This manual is intended for system designers.

Organization

This document is organized into the following chapters.

Chapter 1 Safety Information — Highlights some of the FCC requirements.

Chapter 2 MKW01 Development Platform Overview and Description — Provides an overview of the two boards that comprise the MKW01 development platform.

Chapter 3 Modular Reference Board — This chapter details the KW01-MRB evaluation board based on the Freescale MKW01Z128CHN device.

Chapter 4 PCB Manufacturing Specifications — This chapter provides the specifications used to manufacture the various KW01-MRB printed circuit boards (PCBs).

Revision History

The following table summarizes revisions to this document since the previous release (Rev 0.0).

Revision History

Location	Revision
Entire document	First public release

Definitions, Acronyms, and Abbreviations

The following list defines the acronyms and abbreviations used in this document.

ADC	Analog to Digital Converter
AES	Advanced Encryption Standard
CTS	Clear to Send
DAC	Digital to Analog Converter
I2C	Inter-Integrated Circuit is a multi-master serial computer bus
ISM	Industrial Scientific Medical 2.4 GHz radio frequency band
JTAG	Joint Test Action Group
LGA	Land Grid Array
MAC	Media Access Controller
MCU	Microcontroller Unit
PCB	Printed circuit board
PiP	Platform in Package
PWM	Pulse-width modulation
RCM	Remote Control Module
REM	Remote Extender Board
RTS	Request to Send
SMA Connector	SubMiniature version “A” connector
SPI	Serial Peripheral Interface
SSI	Synchronous Serial Interface
TACT Switch	A switch that provides a slight “snap” or “click” to the user to indicate function.
TELCO	Telephone Company
USB	Universal Serial Bus
VCP	Virtual Com Port

Chapter 1
Safety InformationRev. 1

1.1 Regulatory Approval For Canada (IC RSS 210)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

1.1.1 26 PART 5 – Appendix

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

1. l'appareil ne doit pas produire de brouillage, et
2. l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

1.2 Electrostatic Discharge Considerations

Although damage from electrostatic discharge (ESD) is much less common on these devices than on early CMOS circuits, normal handling precautions should be used to avoid exposure to static discharge. Qualification tests are performed to ensure that these devices can withstand exposure to reasonable levels of static without suffering any permanent damage.

All ESD testing is in conformity with the JESD22 Stress Test Qualification for Commercial Grade Integrated Circuits. During the device qualification ESD stresses were performed for the human body model (HBM), the machine model (MM) and the charge device model (CDM).

All latch-up test testing is in conformity with the JESD78 IC Latch-Up Test.

When operating or handling the development boards or components, Freescale strongly recommends using at least the grounding wrist straps plus any or all of the following ESD dissipation methods:

- Flexible fabric, solid fixed size, or disposable ESD wrist straps
- Static control workstations, static control monitors and table or floor static control systems
- Static control packaging and transportation materials and environmental systems

1.3 Disposal Instructions

This product may be subject to special disposal requirements. For product disposal instructions, refer to www.freescale.com/productdisposal.

Chapter 2
MKW01 Development Platform Overview and Description

2.1 Introduction

The MKW01development platform is an evaluation environment based on the Freescale MKW01Z128CHN device. The MKW01Z128CHN is a highly-integrated, cost-effective, system-in-package (SIP), sub-1GHz wireless node solution with an FSK, GFSK, MSK, or OOK modulation-capable transceiver and low-power ARM Cortex M0+CPU microcontroller. The highly integrated RF transceiver operates over a wide frequency range including 315 MHz, 433 MHz, 470 MHz, 868 MHz, 915 MHz, 928 MHz, and 955 MHz in the license-free Industrial, Scientific and Medical (ISM) frequency bands. This configuration allows users to minimize the use of external components.

The MKW01Z128CHN is targeted for the following low-power wireless applications:

- Automated Meter Reading
- Wireless Sensor Networks
- Home and Building Automation
- Wireless Alarm and Security Systems
- Industrial Monitoring and Control
- Wireless MBUS Standard (EN13757-4:2005)

Freescale supplements the MKW01Z128CHN with tools and software that include hardware evaluation and development boards, software development IDE and applications, drivers, custom PHY usable with Freescale's IEEE 802.15.4 compatible MAC, and an available wireless MBUS solution.

Features are listed in Section 2.2, "Features".

2.2 Features

The MKW01 development platform is built around the concept of having a single daughter card (KW01-MRB) that contains the MKW01Z128CHN IC and all necessary I/O connections for use as a self-contained module or for connection to an application motherboard like the TWR-RF board.

Figure 2-1 shows a photo of the KW01-MRB.

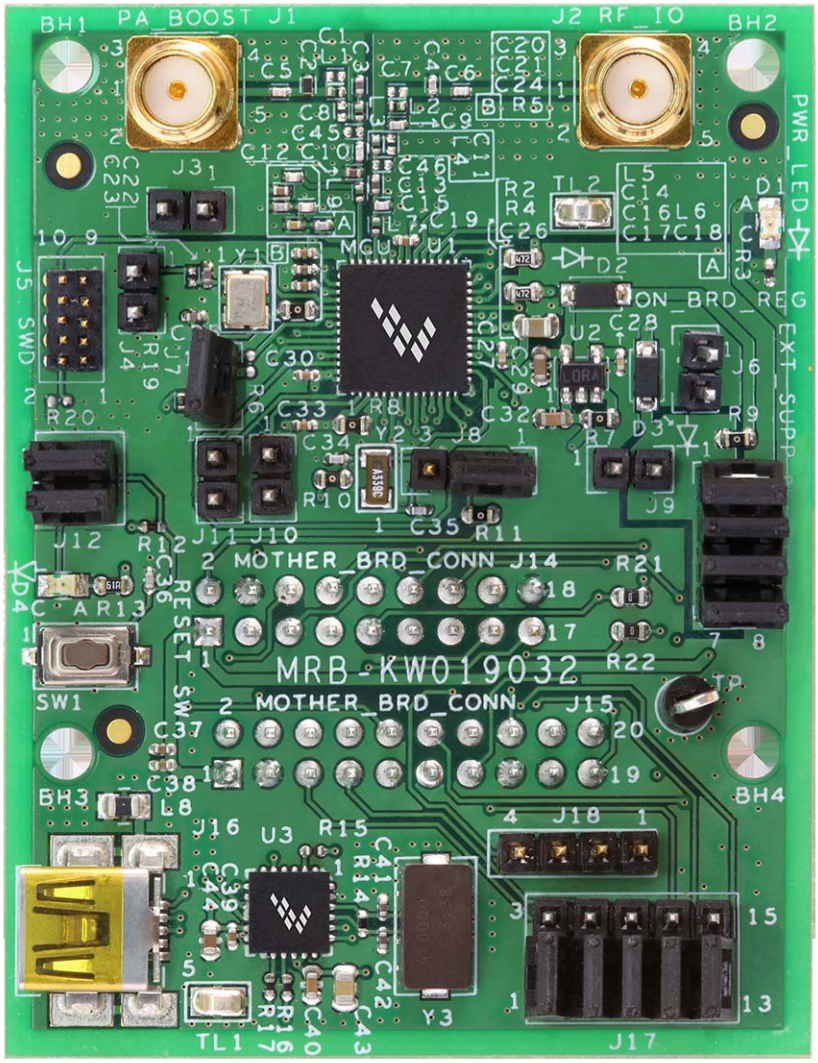

Figure 2-1. KW01-MRB

Features of the MKW01Z128CHN development platform include:

- Based on Freescale's low-cost MKW01Z128CHN sub-1GHz wireless node solution with an FSK, GFSK, MSK, or OOK modulation-capable transceiver and low-power ARM Cortex M0+CPU microcontroller, and a functional set of MCU peripherals into a 60-pin LGA package
- Reference design area with small footprint, low cost RF node
  - — Power Amplifier Output
  - — Unbalanced input/output port
  - — Flexible RF-Front End for different bands operation
  - — Programmable output power from -18 dBm to +17 dBm in 1dB steps
  - — High Sensitivity: down to -120dBm at 1.2kbps
- 30 or 32 MHz reference oscillator depending on regional configuration
- SWD MCU debug port

- Optional secondary 32.768 kHz crystal for accurate low power RTC timing
- Master reset switch
- Full power regulation and management
- KW01-MRB board provides
  - Required circuitry for MKW01Z128CHN - crystals and RF circuitry including SMA connectors for Power Amplifier Output and Input/Output RF port
  - Local power supply regulation
  - Access to all GPIO
  - Standalone or daughter card use modes
  - SWD connector
  - Onboard UART communication via mini-USB connector.
  - Two boards allow board-to-board packet communications.

2.2.1 TWR-RF Module

The KW01-MRB can run in the Freescale Tower System using the RF-Tower module (TWR-RF). Features of the TWR-RF module include:

- Standard sockets 100 mils J5 and J4 (2 x 9 and 2 x 10) to connect either a 1323x Modular Reference Board (1323x-MRB), a 12311 Modular Reference Board (12311-MRB) or a KW01 Modular Reference Board (KW01-MRB)
- Standard header 100 mils J1 (2 x 20) to enable signalling path to TWR primary and secondary connectors.
- Standard header 100 mils J6 (3 x 12) to enable signalling to on board HW and USB interface or to TWR system Hardware
- On-board regulator to provide external supply
- Four (4) user-controllable LEDs
- Four (4) user push-button switches
- Mini-USB Type mini-B connector

Figure 2-2 shows a simplified block diagram of the Freescale Tower RF system.

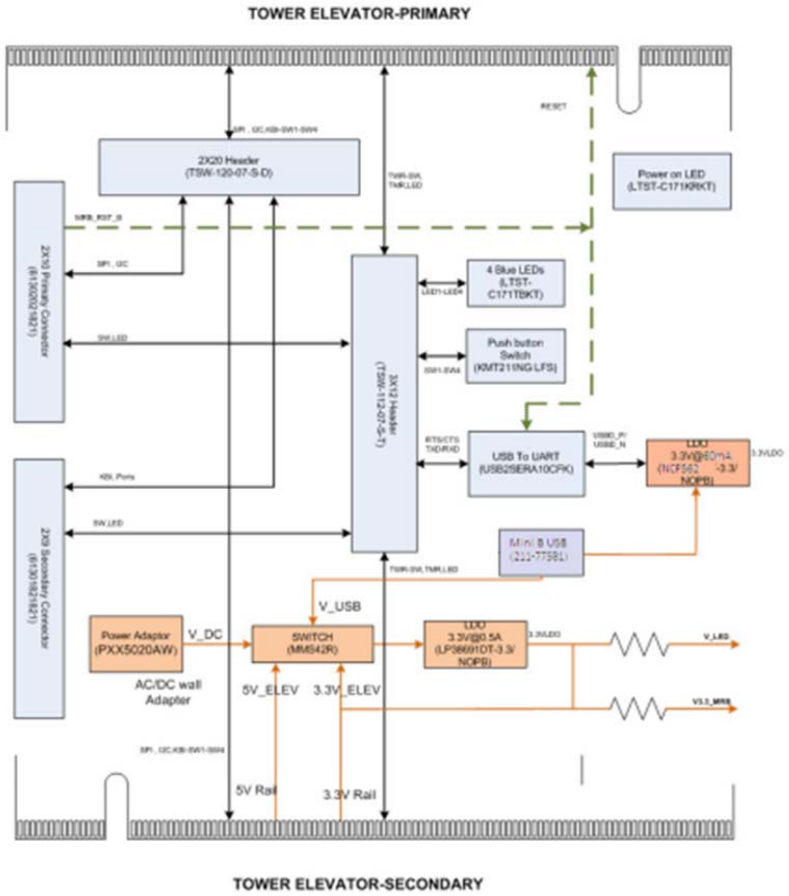

Figure 2-2. Simplified TWR-RF Block Diagram

See the TWR-RF Reference Manual for more information about the RF-Tower module.

2.3 Driver Considerations

When users first connect a KW01-MRB to a PC, they may be prompted to install drivers. If the drivers do not automatically load, they can be found here if they have been previously installed:

```
C:\Program Files\Freescale\Drivers
```

If they haven't been downloaded previously, download the appropriate drivers and follow the instructions to complete driver installation from:

www.freescale.com

Follow the instructions as they appear on the screen to complete driver installation.

Be aware of the following:

- The boards use the FSL USB2SER USB to UART bridge converter.
- Download the appropriate driver and follow the instructions to complete driver installation from www.freescale.com

Chapter 3
KW01-MRB

3.1 KW01-MRB Overview

The KW01-MRB is an evaluation board based on the Freescale MKW01Z128CHN device. The KW01-MRB provides a platform to evaluate the MKW01Z128CHN device, develop software and applications. The core device is accompanied by the 32 MHz reference oscillator crystal, RF circuitry including SMA for antenna connection and/or instrumentation, and supporting circuitry.

This basic board is intended as the core module for MKW01Z128CHN evaluation and application development and can be used in the following modes:

- Simple standalone evaluation platform
- Daughtercard to other Development Platform boards (TWR-RF, 1323x-RCM or 1323x-REM)
- Daughtercard to an application specific motherboard.

3.1.1 Features

The KW01-MRB provides the following features:

- Small form factor (2.6 x 2 inches)
- 4-Layer, 0.034 inch thick FR4 board
- MKW01Z128CHN reference design area
  - LGA footprint and power supply bypass
  - 30 or 32 MHz reference oscillator crystal depending on regional configuration
  - RF components and layout
- Low cost RF node
  - Dual Output RF Path. Transmit/Receive (RFIO) and single Power Amplifier Transmitter (PA Boost) Output
  - Differential input/output port (typically used with a balun)
  - Programmable output power from -18 dBm to +17 dBm typical
  - High sensitivity of -120 dBm at 1.2 KBPS
  - SMA output connector for Transmit/Receive Output
  - SMA output connector for Power Amplifier
- Two connectors provided daughter card mounting
  - 20-Pin primary connector
  - 18-Pin secondary connector

  - Provide main supply voltage to board
  - Provide access to all MKW01Z128CHN GPIO pins
- Flexible board power supply
  - Onboard 3.3 V LDO series regulator
  - Regulator bypass jumper option
  - Separate external voltage source option
  - Power-on green LED
  - Jumpers allow various block current measurements
- 10-Pin SWD MCU debug port
- MKW01Z128CHN reset switch

3.1.2 Form Factor

Figure 3-1 shows the KW01-MRB connector and header locations.

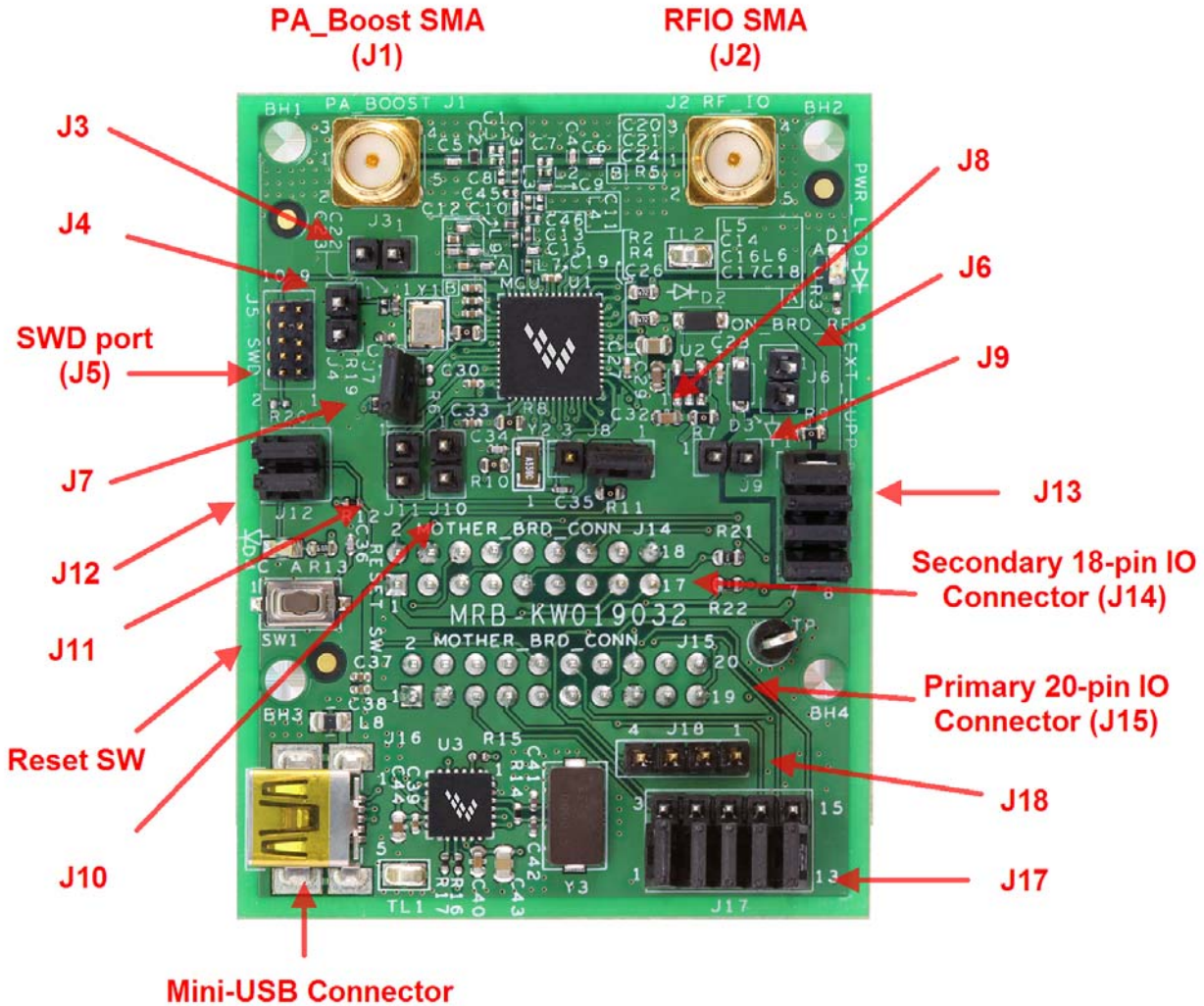

Figure 3-1. KW01-MRB

Figure 3-2 shows a footprint of the KW01-MRB with the location of the IO Headers J2 and J3. Users can create a motherboard to mount the KW01-MRB and headers J2 and J3 are used for that connection.

- Both headers have standard 0.10in / 2.54 mm pin spacing
- J2 is 20-pin and J3 is 18-pin
- Both are pin headers mounted on the bottom side of the KW01-MRB and are intended to plug into matching receptacles on the motherboard.

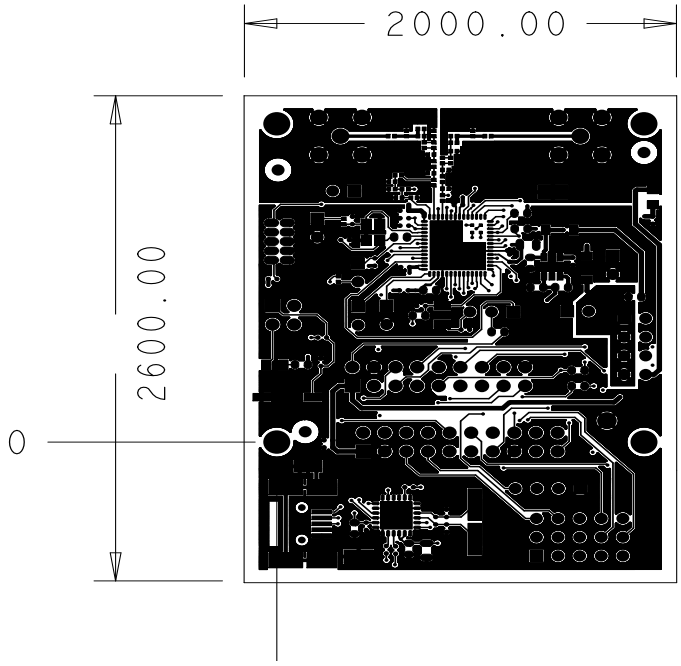

Figure 3-2. KW01-MRB Top Side (Component Side) Footprint

3.1.3 Board Level Specifications

Table 3-1. KW01-MRB Specifications

Parameter	Min	Typ	Max	Units	Notes/Conditions
General					
Size (PCB: X, Y)			66 x 51 2.60 x 2.01	mm inches	
Layer build (PCB)		0.8 0.031		mm inches	4-Layer
Dielectric material (PCB)					FR4
Power					
Voltage supply (DC)	3.5	5	16	V	Full module, into 3.3 V regulator, U2. Take care to not exceed power dissipation of U2.

Table 3-1. KW01-MRB Specifications (continued)

Parameter	Min	Typ	Max	Units	Notes/Conditions
Current consumption (All numbers typical)		31		mA	XCVR Standby (MCU running)
		45		mA	Receive
		80		mA	TX, +13 dBm via RFIO
		110		mA	TX, +17 dBm via PA_Boost
Temperature					
Operating temperature (see note)	-40	+25	+70	°C	• Operating temperature is limited to +70°C due to switches. Basic circuit is good for a maximum temperature of +85°C.
Storage temperature	-30	+25	+70	°C	
RF Receiver					
FSK Sensitivity		-105 to -120		dBm	
OOK Sensitivity		-112		dBm	
Adjacent channel Rejection (Offset = +/- 25 kHz or 50 kHz)		-42		dB	
2nd order Intercept point		+75		dBm	
3rd order Intercept point		+20		dBm	
RSSI dynamic range	-115		0		
RF Transmitter					
RF Power Output (RFIO pin)	-18		+13	dBm	Programmable in 1dB steps
RF Power Output (PA_Boost pin)		+17		dBm	
Adjacent channel Power (25KHz offset)			-37	dBm	
Safety					
UL					MRB is approved accordingly to the IEC 60950-1 and EN 60950-1, First Edition standards
Environment					
RoHS					MRB complies with the EU Directive 2002/95/EC of 27 January 2003
WEEE					MRB complies with the EU Directive 2002/95/EC of 27 January 2003

3.2 Functional Description

The KW01-MRB is built around Freescale's MKW01Z128CHN 56-pin LGA platform. Figure 3-2 shows a simple block diagram. This board is intended as a simple evaluation platform and as a building block for

application development. The 4-layer board provides the MKW01Z128CHN with its required RF circuitry, 32 MHz reference oscillator crystal, and power supply bypassing. The layout for this base level functionality can be used as a reference layout by the user target board.

In additional to the base MKW01Z128CHN functionality, the KW01-MRB provides features to assist in debug, reset button, simple power manager, and expansion connectors for the GPIO. In the following sections, refer to:

- Figure 3-1 for location of connectors and features
- Figure 3-3 for the functional blocks
- Figure 3-9 for the board schematic

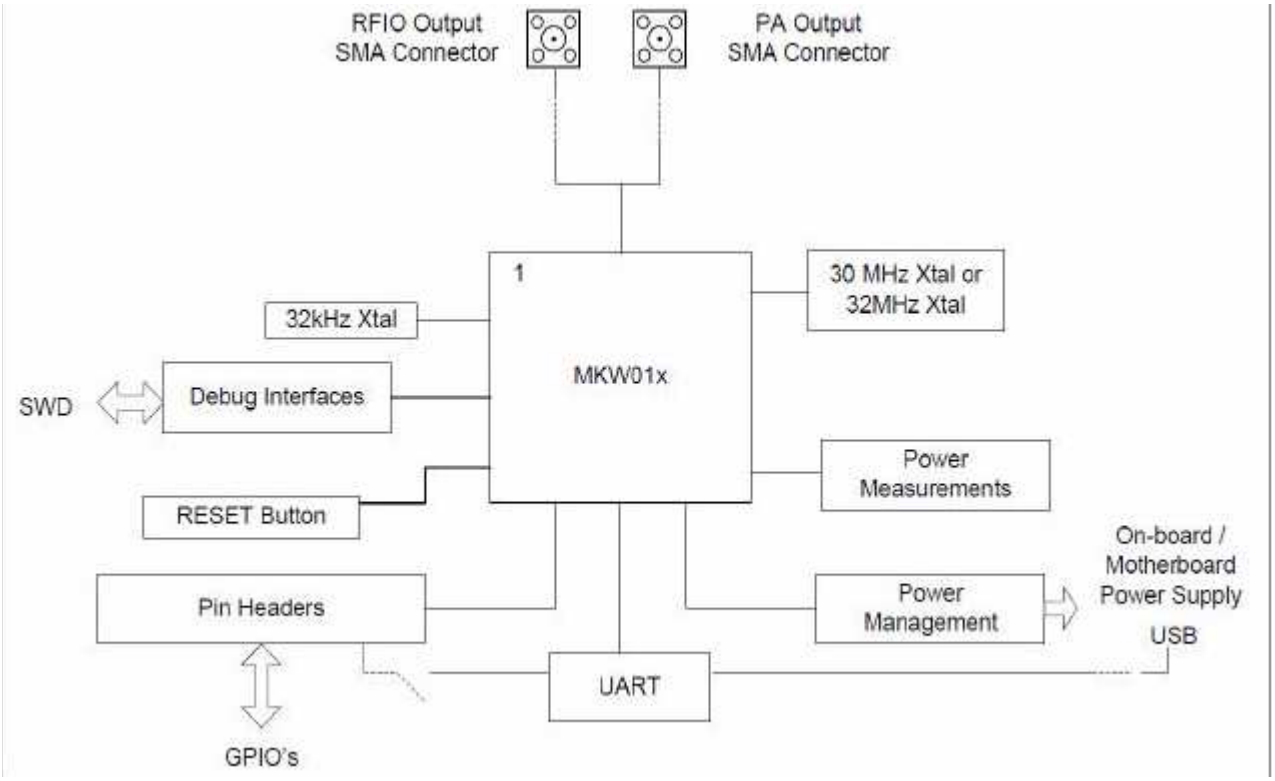

Figure 3-3. KW01-MRB Block Diagram

3.2.1 RF Performance and Considerations

The MKW01Z128CHN transceiver is a single-chip integrated circuit ideally suited for today's high performance ISM band RF applications. It is intended for use as a high-performance, low-cost FSK and OOK RF transceiver for robust, frequency agile, half-duplex bi-directional RF links. The MKW01Z128CHN is intended for applications over a wide frequency range, including the 433 MHz and 868 MHz European and the 902–928 MHz North American ISM bands.

- Output power –18 to +17 dBm, depending on output and setting

The KW01-MRB uses a flexible RF path topology that make it suitable for working in different frequency bands by replacing a minimum number of components while providing good RF performance. The tables

in Section 3.4.1, “Bill of Materials” show the different BOM according to different frequency bands of operation.

NOTE

See the MKW01Z128CHN Data Sheet and Reference Manual for more RF design information.

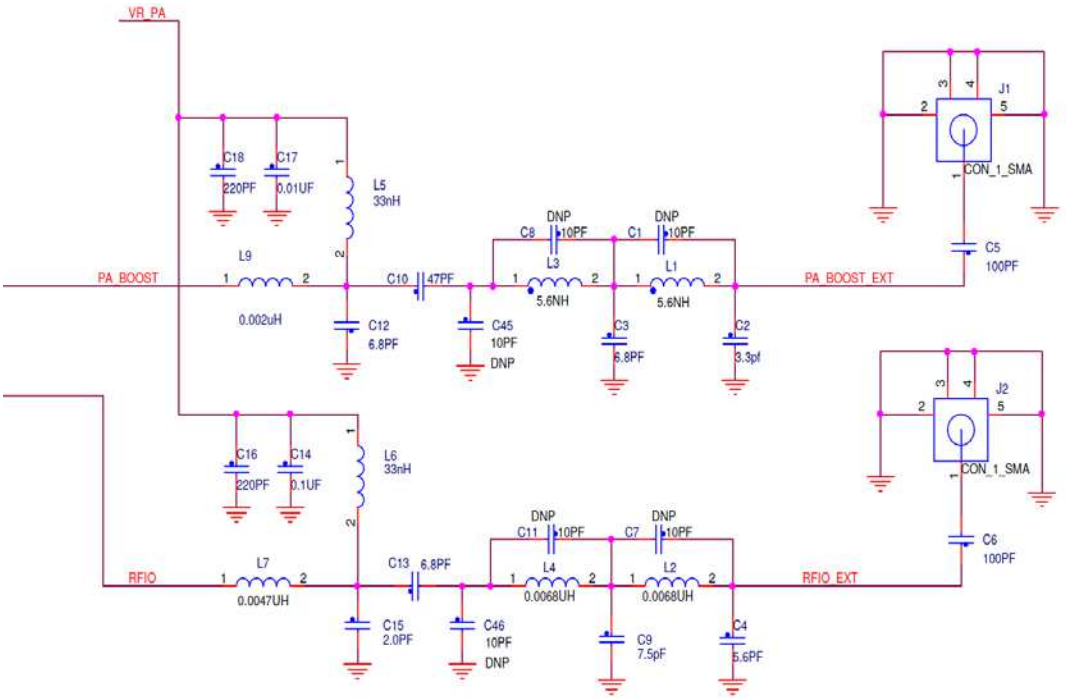

Figure 3-4. KW01-MRB RF Circuitry

3.2.2 Clocks

The MKW01Z128CHN provides for two clocks:

- 32 MHz Reference Oscillator — Figure 3-5 shows the external 32 MHz external crystal Y1. This mounted crystal must meet the MKW01Z128CHN specifications. (30 MHz in some board configurations)
  - — Capacitors C22 and C25 provide the bulk of the crystal load capacitance.
  - — Signal DIO5/CLKOUT can be used to supply an external clock to MCU die and to measure a the 32MHz oscillator frequency.
  - — The KW01-MRB has provision for injecting an external 32 MHz clock source as an alternative to use of the onboard crystal:
    - – The 0 Ohm jumper R5 should be removed to disconnect Y1.
    - – C23 must be mounted
    - – The external 32 MHz source is connected to 2-pin header J4.
- Optional 32.768 kHz Crystal Oscillator - Provision is also made for a secondary 32.768 kHz crystal Y2 (see Figure 3-6). This oscillator can be used for a low power accurate time base.

— The module comes provided with this Y2 crystal and its load capacitors C34 and C35.
— Load capacitors C34 and C35 provide the entire crystal load capacitance
— The 32 kHz oscillator components are supplied, but un-enabled. Zero-ohm resistors R10 and R11 enable use of IO signals PTA18 and PTA17 via the IO connector
— Use J8 to enable crystal signaling to MCU die from the DIO5 or from the 32kHz crystal.

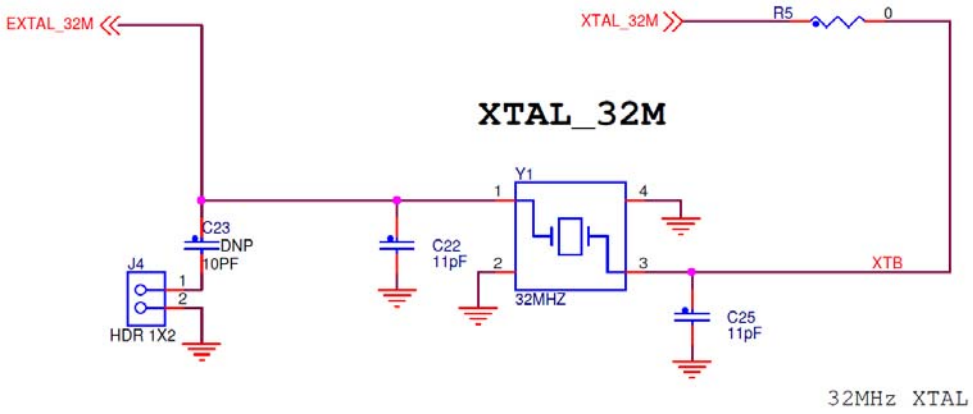

Figure 3-5. KW01-MRB 32 MHz Reference Oscillator Circuit

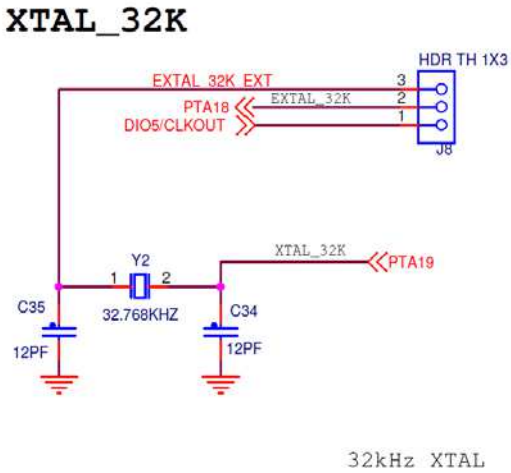

Figure 3-6. KW01-MRB 32.768 kHz Optional Oscillator Circuit

3.3 Reset and SWD Debug Port

The reset circuit and SWD port connector are shown in Figure 3-7. See Figure 3-1 for switch and header locations.

- Reset switch SW1 is active low and provides a hardware reset to the MKW01Z128CHN MCU die, which in turn, through a GPIO, can provide a RESET to the radio die by adding a jumper to J7. The Reset circuit also includes an LED for monitoring purposes.
- The 10-pin SWD 2x3 header J5 is provided to connect the MKW01 serial debug port to a standard Kinetis Series debug module.

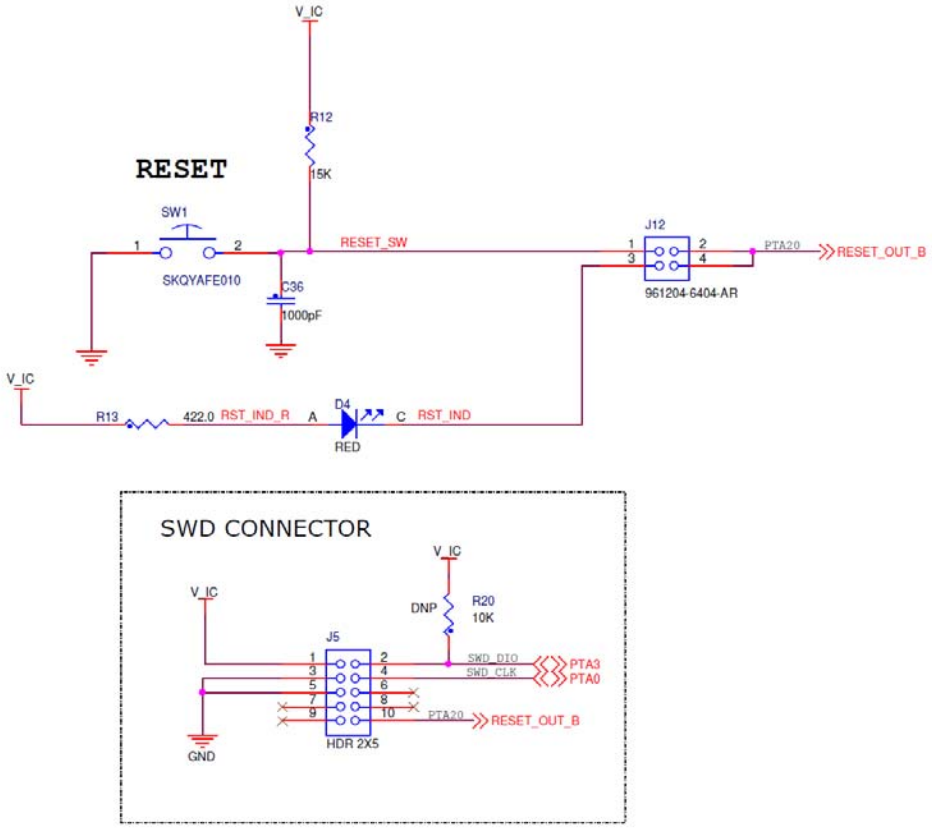

Figure 3-7. KW01-MRB Reset Switch and SWD Port

3.3.1 Power Management

The KW01-MRB power management circuit is shown in Figure 3-8.

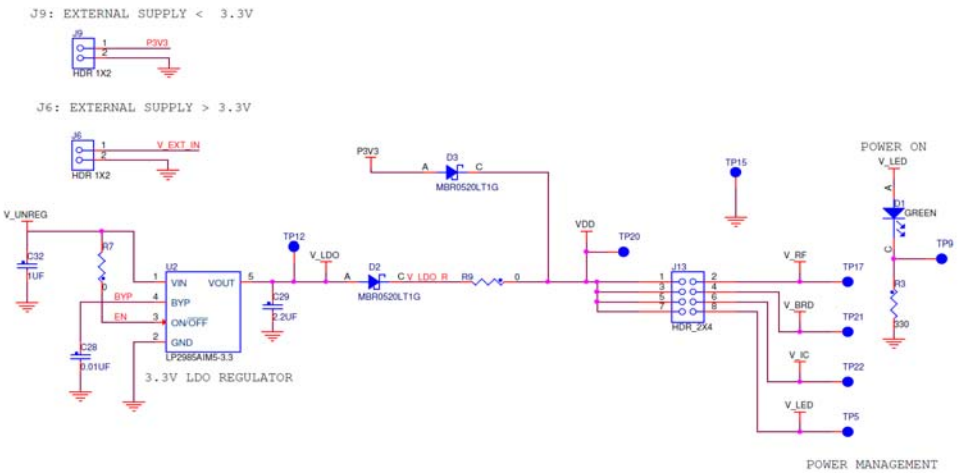

Figure 3-8. KW01-MRB Power Management Circuit

Power to the KW01-MRB can be configured in several ways and the circuit has the following features:

- Board can be supplied through the IO headers (V_BRD)
- Board can be supplied through the mini-USB connector (J16)
- Board can be supplied from an external DC supply (J6).
  - The external supply can be unregulated voltage and make use of the onboard 3.3 V LDO regulator.
- Board can be supplied from an external DC supply (J9).
  - The external supply voltage can be used directly without use of the LDO if its above 3.3Volts.
- 8-Pin 2x4 header J13 provides means to supply current to various board components and also measure current if desired
- Green LED D1 is available as a power indicator.

Table 3-2 shows the header configuration information for the various power supply modes.

NOTE

- The Freescale TWR-RF development boards can generate system powerand supply the voltage to the KW01-MRB through pin V_BRD on both J14 or J15.
- If an external supply is used via KW01-MRB header J5, current can flow to the TWR_RF.
- Only one supply at a time should be connected to the platform.
- In all modes, the IO voltage supply to peripherals on any board on the TWR platform must be the same voltage (V_BRD) as all other boards on the platform.

Table 3-2. KW01-MRB Power Configurations

Mode	Voltage Range	External Source J6	Ext Mode Source J9	Current Enable J13	Description
Source V_BRD	2.7 - 3.6 V[1]	Not used	Not used	**Short Pins 3-4** - short other desired supplies	**Normal Operation** - The KW01-MRB main supply is supplied by an external board through the J15 and J14 Headers
Mini USB -Using LDO	5 V	Mini-USB J17 Short Pins 2-3	Not used	Short pins for all desired supplies	**External voltage w/regulation** - • Input range is set by the LDO regulator. • 3.3 V is supplied to KW01-MRB; do not use motherboard supply • J14 and J15 Headers supply voltage to V_BRD pins when J13, Pins 3-4 are shorted
External Source - Using LDO	3.5 - 16 V[2]	Connected - supplies DC Voltage J17 Short Pins 1-2	Not used	Short pins for all desired supplies	**External voltage w/regulation** - • Input range is set by the LDO regulator. • 3.3 V is supplied to KW01-MRB; do not use motherboard supply • J14 and J15 Headers supply voltage to V_BRD pins when J13, Pins 3-4 are shorted
External Source - Not Using LDO	2.7 - 3.6 V	Not used	Connected - supplies DC Voltage	Short pins for all desired supplies	**External voltage w/o regulation** - • Input range is set by the onboard circuitry • 2.7 - 3.3 V is supplied to KW01-MRB • J14 and J15 Headers supply voltage to V_BRD pins

1 The MKW01Z128CHN can run as low as 1.8 V

2 Take care to not exceed power dissipation of U2. Typically, at room temperature, this voltage should not exceed 7.5 V. At max temperature (70°C), it should not exceed 5.5 V during full power: +17 dBm, transmit, 8 V and 12 V, respectively, at +13 dBm, transmit.

Header J13 provides means to disable different sub-circuits or measure current and connections are described in Table 3-3. Current measurements can be made by inserting a current meter in place of a designated jumper.

Table 3-3. Power Distribution Header J13

Supply Designation	Header Pins	Description
V_RF	1 - 2	Supply voltage to MKW01Z128CHN -Radio die • Normally jumpered • Supplies only the MKW01Z128CHN Radio die Normally always same voltage as V_BRD
V_BRD	3 - 4	Supply voltage connected to IO Connectors J2 and J3 - • This supplies J2 and J3 if an external MRB supply is used • This voltage supplies the MRB if the motherboard is the main power • This connection is normally always jumpered
V_IC	5 - 6	Supply voltage to MKW01Z128CHN -MCU die • Normally jumpered • Supplies only the MKW01Z128CHN MCU die • Normally always same voltage as V_BRD
V_LED	7 - 8	Supply voltage to power indicator LED • Jumper to use indicator or IR blaster • Leave open for lowest power

3.3.2 IO Connectors J14 and J15

The two IO connectors J14 and J15 are standard 100 mil pin headers mounted on the back (non-component side) of the KW01-MRB.The primary header J15 is 20-pin and the secondary header J14 is 18-pin, and they are mounted physically in such a manner as to prevent reverse insertion of the KW01-MRB into a motherboard receptacle (see Figure 3-2). When the TWR-RF, 1323x-RCM or 1323x-REM or custom motherboard is plugged into these connectors, most GPIOs on the MKW01Z128CHN MCU can be accessed via the IO connectors.

- V_BRD is the connector supply voltage.
  - — Depending on power supply configuration, this voltage may supply the KW01-MRB from the motherboard or the KW01-MRB may supply this voltage to the motherboard. See Section 3.3.1, “Power Management”.
  - — Peripherals connecting to the MKW01Z128CHN IO and the MKW01Z128CHN supply should all use this same voltage.

NOTE

The TWR-RF, 1323x-RCM and 1323x-REM and KW01-MRB are supplied configured for the motherboard to supply main power.

- Some of the GPIO are shared with onboard devices. Check for the KW01-MRB schematic and Table 3-4 and Table 3-5 for any conflict.
- SWD port signals PTA3 and PTA4 are NOT connected to the IO headers to prevent possible interference with the debug port.

Table 3-4. 20 Pin Connector

Header Pin Number	MKW01Z128CHN Pin Name	Description
1	V_BRD	VDD supply to module
2	NC	
3	GND	Module ground
4	NC	
5	PTA1/RXD	UART RXD input to MCU
6	NC	
7	PTA2/TXD	UART TXD Output from MCU
8	NC	
9	PTB0	GPIO / Timer IO
10	PTA20/Reset	MCU Reset_out_b
11	PTC2/SDA	I2C Bus data signal (SDA)
12	PTB2	UART flow control RTS input into MCU (implemented in Freescale software)
13	PTC1/SCL	I2C Bus clock signal (SCL)
14	PTB17	UART flow control CTS output from MCU (implemented in Freescale software)
15	GND	Module ground
16	DIO5/CLKOUT	Reference Crystal Oscillator
17	PTA4	Port A Bit 4
18	PTD5	Port D Bit 5
19	PTD6	Port D Bit 6
20	PTD7	Port D Bit 7

Table 3-5. 18 Pin Connector

Header Pin Number	MKW01Z128CHN Pin Name	Description
1	V_BRD	VDD supply to module
2	PTA18/EXTAL_32K	Port A Bit 18- signal shared with 32.768 kHz oscillator
3	PTA19/XTAL_32K	Port A Bit 19- signal shared with 32.768 kHz oscillator
4	GND	Module Ground
5	DIO0	Transceiver GPIO Bit 0
6	DIO3	Transceiver GPIO Bit 3
7	PTE16	Port E Bit 16
8	PTB1	Port B Bit 1
9	PTC3	Port C Bit 3

Table 3-5. 18 Pin Connector

Header Pin Number	MKW01Z128CHN Pin Name	Description
10	PTE18	Port E Bit 18
11	PTE19	Port E Bit 19
12	PTE0	Port E Bit 0
13	PTC4	Port C Bit 4
14	PTE1	Port E Bit 1
15	PTE17	Port E Bit 17
16	PTD4	Port D Bit 4
17	DIO2	Transceiver GPIO Bit 2
18	GND	Module ground