LF125KHz TPMS Transmitter Module

Application Module for the Freescale REIMS System

Hardware User Guide

Reference Documentation:

1) Freescale example LF125KHz TPMS Transmitter application software example and documentation.

2) Freescale REIMS TPMS application reference manuals for detailed system operation.

3) Freescale MC33690 and M9S08GT60 device user guides.

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Cautionary Notes:

1) Electrostatic Discharge (ESD) prevention measures should be applied whenever handling this product. ESD damage is not a warranty repair item.

2) Axiom Manufacturing reserves the right to make changes without further notice to any products to improve reliability, function or design. Axiom Manufacturing does not assume any liability arising out of the application or use of any product or circuit described herein; neither does it convey any license under patent rights or the rights of others.

3) EMC Information on the LF125KHz TPMS Transmitter Module:

   a) This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
      1) This device may not cause harmful interference, and
      2) This device must accept any interference received, including interference that may cause undesired operation.

      TX FCC ID# TFY0423

   b) Changes or modifications to this unit not expressly approved by Axiom Manufacturing, could void the user's authority to operate this equipment under FCC or other regulatory agency rules.

   c) This product is designed and intended for use as an application development or evaluation platform in an educational or professional laboratory. This product is not intended for application or installation in end user equipment or systems.

   d) In a domestic environment this product may cause radio interference in which case the user may be required to take adequate prevention measures.

   e) RF Exposure – This device exceeds the FCC requirements for RF exposure when the antenna used for this transmitter has a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

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Terminology

Signal names in this document that are followed by an asterisk (*) denote an active-low signal.

Module Features

The LF125KHz TPMS Transmitter Module is a demonstration, evaluation, or application development platform for the Freescale MC33690 device or as an application module for the TPMS REIMS evaluation system. Module operation is controlled by dedicated firmware contained in the M9S08GT60 microcontroller flash memory. The module provides the MC33690 LF125Khz transmitter under the control of the GT60 microcontroller. The installed application provides an address transmission to an associated REIMS TPMS module. The REIMS module will provide the sensor reading data in response. Sensor data is transmitted on a different frequency to the TPMS system host controller.

The Module does not provide any external connections except for the BDM connector. BDM connection will provide a method to load application firmware into the GT60 controller. A HCS08 BDM cable with 3.3V I/O may be applied, see the BDM Development Port section for more details.

Application support features of the module include:

- ON / OFF Switch
- Push Switches SW1 and SW2
- Select Switch SW3, 6 position DIP switch.
- Indicators L1 and L2
- 9V replaceable battery
- BDM Port provided to load application firmware

Specifications:

Size:	2.1W, 3.7L, 1.5H (with battery) inches
Battery:	9VDC Transistor Type
Switches:	4, ON/OFF, 2x User Push, User Address (6 position)
Indicators:	2, Green and Red
Ports:	BDM, J4 Serial not provided.

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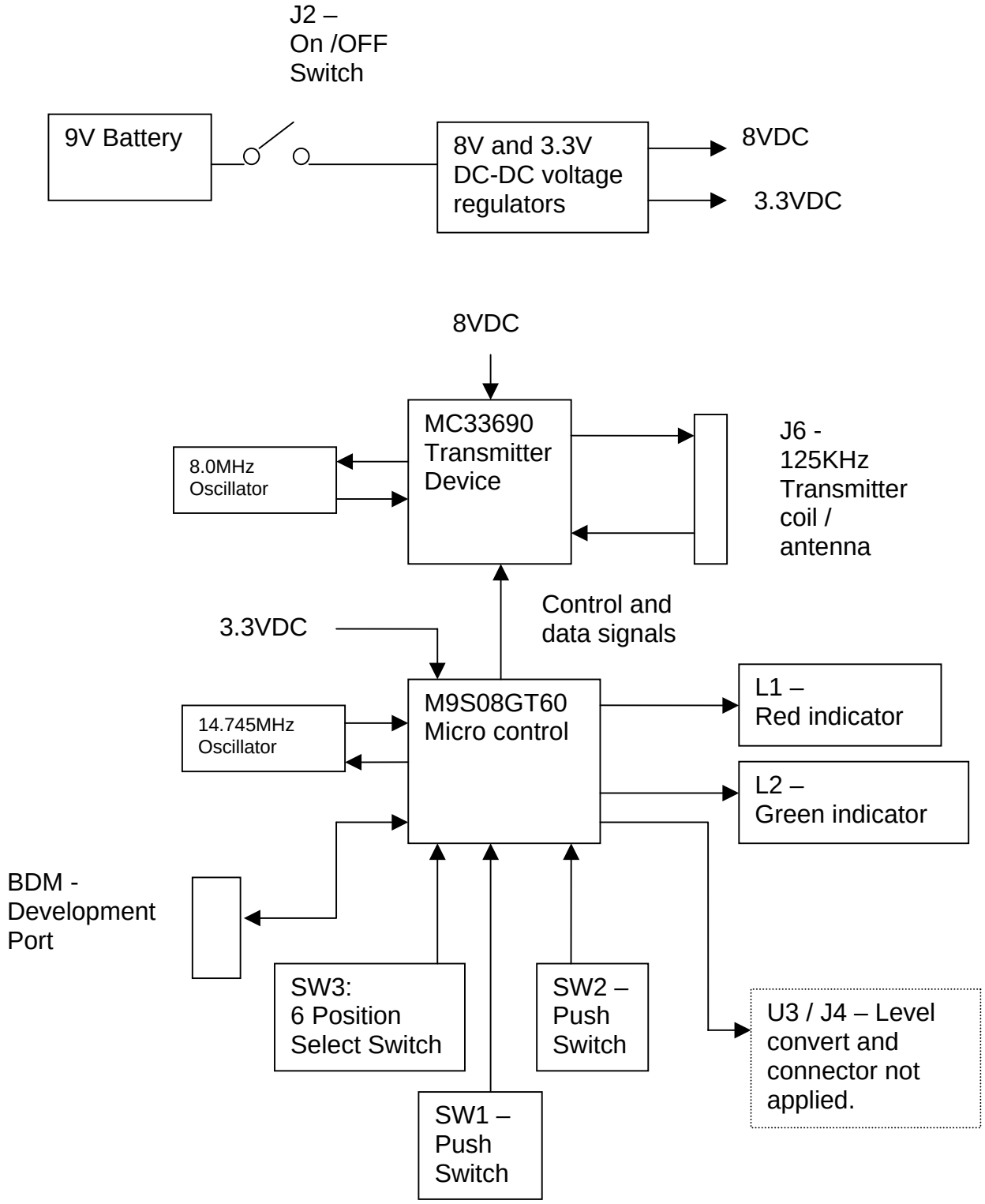
LF125 Transmitter Module Block Diagram



Operational Description

The LF125KHz Transmitter Module is a basic demonstration platform for the MC33690 device controlled by a M9S08GT60 controller. Module configuration is set for 125KHz transmit frequency only. Typical application provides for the transmission of address data from the Select Switch (Sw3) to a remote REIMS module set to the same address, and upon reception the REIMS module will report sensor data to a system host receiver. The transmissions are sent at 9600 baud in ASK modulation with Manchester data encoding.

Module power is derived from the on-board 9V battery with ON/OFF switch. When ON/OFF switch is ON, battery voltage is applied to the module on-board voltage regulators to provide 3.3V and 8VDC. Low voltage operation will reduce effective range.

The GT60 controller accepts user input from the module switches and determines operation under application software control. Default application will provide a user push switch to enable a transmission. The GT60 will read the Select Switch data, format the data, send the data to the MC33690 transmitter, and indicate transmission with an indicator.

Agency approved operation of the transmitter applies maximum transmit power setting of 8V peak to peak. The module 125KHz transmit coil (J6) should be at least 6 inches from the receiver. Overdriving the remote receiver detector is possible if the distance is too short.

The REIMS TPMS demonstration software and application documentation package provides all necessary functions, operations, and controls to operate the module correctly. Preset software definitions and C language function calls provide an easy method to modify or adjust operation for particular applications.

User Switches

ON / OFF Switch

The ON /OFF switch applies power from the installed battery to the module when in the ON position. Always place the switch in the OFF position when the module is not in use.

SW1 and SW2 Push Switches

Push switches provide user application controls. The default application applies SW2 as the SEND switch. SW1 or 2 depressed will apply a logic low or 0 to the GT60 input port. SW1 is applied to GT60 I/O port IRQ and SW2 is applied to port PTA3.

SW3 Select Switch (Address)

The Select Switch provides application input to determine which REIMS module to send data to. All six positions provide a binary number when input by the GT60 controller. An ON position provides a binary 1 value and an OFF position provides a binary 0 value. The switch setting will indicate the binary number or address of the REIMS module expected to receive the data. Select Switch is applied to GT60 I/O ports PTB0 – PTB5.

User Indicators

LED1 (RED) and LED2 (GREEN) are provided for user application indication. Default operation provides LED2 (GREEN) as a transmit indicator. The LED indicators are active when the GT60 I/O port is low or logic 0. LED1 is connected to GT60 I/O port PTC4 and LED2 is connected to PTC5.

BDM Connector – Development Access Port

BDM provides a development connection to the GT60 controller. A standard 6 pin BDM cable may be applied to load firmware into the GT60. The BDM connection should not be applied during transmitter operation.

Battery

The battery is a 9V transistor type and may be replaced. If the module does not operate, the battery voltage should be measured with a suitable voltmeter and replaced if the voltage is at or below 8VDC.

Refer to the referenced internet web sights for additional applications information.