MS Series Master Development System

Software Documentation

Introduction

This software is designed to provide a complete understanding of how MS Series encoders and decoders work together, as well as to describe how they can be used in a system. There are two modes of operation: Software Operation Mode and Development System Operation Mode. Software Operation is the default mode when the program is started and requires no additional equipment. Development System Operation Mode is accessed through the "View Options" label at the top of the main "Linx Encoder / Decoder Demonstration Software" window and requires the MDEV-LICAL-MS Development System to be plugged into a USB port on the PC. Help can be found by clicking the "Help" label at the top of the main window or the "Help" button at the bottom of the "View Options" form.

Getting Started

When the program starts, the Software Operation Mode is initialized and ready to use. Both encoders and decoders have default baud rates, addresses, and Control Permissions. Each data line is set to control its own function. Press a button on the simulated handheld transmitter and watch the event execute that corresponds to the matching receiver data line.

Each encoder and decoder combination has two essential variables that must match for successful communication. First is the baud rate. Each encoder and decoder has an option to select one of four baud rates for data transfer. This option is found in the "View Options" form. Second is the assigned address. This address is set to a default value at the factory and is the same for all encoders and decoders. The encoders are placed in the simulated handheld transmitter and the decoders are placed in the receiving device. The address is represented by the background color of the transmitter and receiver, so units with matching addresses will have matching colors. The address and Control Permissions are created by the encoder in the transmitter, and learned by the decoder in the receiver. Detailed instructions will be given later in this document.

Software Operation Mode

The Software Operation Mode is used to simulate operation of the encoders and decoders without any hardware present. It simulates two handheld transmitters as well as two receiving devices. Any combination of these units is allowed, and can be set in the "View Options" form. Help can be accessed by clicking on the "Help" label at the top of the window.

Figure 1: The Encoder / Decoder Demonstration Software Window in Software Operation Mode

The simulation starts with a default address setup so that the units will work with each other. To change the address value of one of the encoders, press and hold down the "Create Addr." button of the desired handheld transmitter. The length of time the button is held determines the duration of the randomizing routine. This allows for a unique address to be created, which is represented by the background color of the unit. Once the button is released, the "Mode Ind." LED at the top-left corner of the transmitter will begin flashing. This indicates that the encoder's Control Permissions need to be set by pressing on each of the desired data line buttons. When done, press the "Create Addr." button again to save Control Permissions. If the internal timer times out before this button is pressed, all of the currently activated data line buttons will be saved and available for use. Unselected buttons will be grayed out, indicating that they are not accessible.
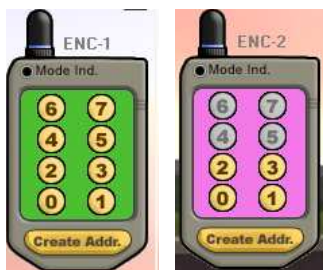

Figure 2: The Transmitters After Programming

Once the encoder's address has been set, the decoder must then learn the encoder's address. To do this, press the "Learn" button. The "Mode Ind." LED at the top-left corner of the receiver unit will begin flashing. Press any of the enabled data line buttons on the desired transmitter. To simulate a learned address, the receiver background color will change to match the corresponding transmitter background color. Press the "Learn" button again to exit Learn Mode and the units are now synchronized and ready to use.

Figure 3: The Encoder / Decoder Demonstration Software Window in Software Operation Mode After Programming

Once the encoder and decoder are synchronized, any of the enabled data lines on the encoder can be pressed to operate the corresponding function of that data line on the decoder. These functions can be changed in the "View Options" form. The data line's LED on the receiver will change from red to green and the corresponding function, which is labeled next to the LED, will operate. For example, if data line "1" is set to operate "Porch Lights," and data line button "0" is pressed on the transmitter, the LED next to data line "1" will turn green and the house's porch lights will turn on. The User ID will also be displayed to the right of the receiver's antenna, showing which encoder has been used to activate the data line.

Figure 4: Activating a Data Line

To erase all users from the decoder's memory, press and hold down the "Learn" button for 10 seconds. The decoder's background color will return to black to indicate that all users have been erased. The default address will also be erased so the units will need to be re-synchronized despite the black background. To return to the original settings, the program may be shut down and re-started, though it should be noted that the actual encoders can not be returned to the default address once a new address has been created. A new address gets saved over the previous address so the old address cannot be retrieved.

Once comfortable with the operation to this point, open the "View Options" form and change some of the available settings to simulate all of the options available to the MS Series encoders and decoders. Remember to match baud rates for each encoder / decoder pair or they can't communicate.

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Development System Operation Mode

This mode is only available if the decoder board in the MDEV-LICAL-MS kit is plugged into the PC's USB port. The only available options for this mode are the settings for the data line functions. These options can be accessed by clicking the "View Options" label at the top of the main program window. All other options, such as "Power Down Enabled" and "Latch Mode Enabled", will need to be set on the decoder's development board. The encoder and decoder must be synchronized on the development boards as well. This is done the same way as the Software Operation Mode simulated, by creating a new address and Control Permissions, and the decoder learning them. The MS Series Master Development System User's Guide explains how to set up the boards in detail.

NOTE: Only 2,400 baud can be used in this mode. Check the baud select switches on the boards to make sure they are set to 2,400bps.

If LEDs on the evaluation board turn on, then the LEDs in the program should also turn on and activate the corresponding data line function. If you get a warning message when trying to use the Development System Operation Mode, then the PC doesn't recognize the decoder development board. If this happens, unplug the USB cable and then plug it back in again. If it still will not function, check to make sure the correct drivers for this device are installed. The drivers are on the software CD included with the development system and can be downloaded from the Support section of the Linx website at www.linxtechnologies.com. If problems persist, contact Linx Technologies for support at +1 800 736 6677 or techsupport@linxtechnologies.com.

Figure 5: The Encoder / Decoder Demonstration Software Window in Development Kit Operation Mode

View Options

This window is used to make changes to the program operation. Once the changes are made, press the "OK" button to save changes. To cancel any unwanted changes, press the "Cancel" button. For help, press the "Help" button. The settings are divided into six areas: Operation Mode, Enable Enc/Dec's, Enc1, Enc2, Dec1 and Dec2.

Figure 6: The View Options Form

Operation Mode

This option is used to determine which mode of operation to enable. If the Software Operation Mode is selected, no additional hardware is needed. If the Development System Operation Mode is selected, then the MDEV-LICAL- MS kit should be connected to the PC with a USB cable. Once either of these is selected, the available options for each mode are enabled. All options are available for the Software Operation Mode, while only the data line options are available for the Development System Operation Mode. The rest of the options will need to be set on the Master Development System board.

Figure 7: The Operation Mode Area

Enable Enc / Dec's

This option allows the user to select which encoder / decoder combination to simulate. The checked selections will be enabled and visible in the main window.
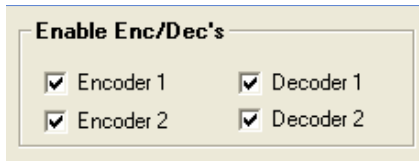

Figure 8: The Enable Enc / Dec's Area

Encoder 1 and Encoder 2

These options are used to simulate the power down and baud rate settings of the MS Series encoder. When placed into Power Down Mode, the encoder will toggle the TX_PDN line, which can be connected to the transmitter. This is simulated in the software by selecting the "Power Down Enabled" setting. The TX_PDN line will be low and keep the transmitter powered down until the user presses one of the data line buttons on the handheld transmitter. At this point, the TX_PDN line will go high and power-up the transmitter so that it may send the data generated by the encoder. The "ENC-1" label above the transmitter will be gray when the line is low and green when it is high. The "Select Baud Rate" setting includes values of 2,400, 9,600, 19,200, and 28,800bps. The encoder's baud rate must match the decoder's baud rate in order for operation to occur.
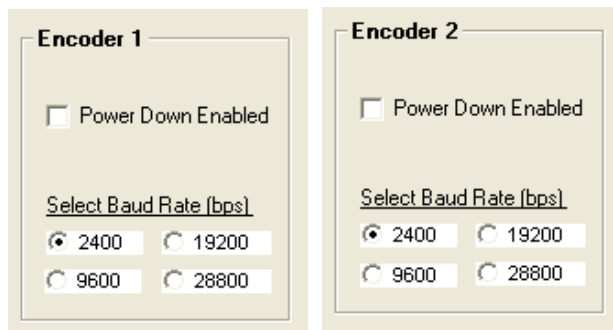

Figure 9: The Encoder 1 and Encoder 2 Areas

Decoder 1 and Decoder 2

These settings are used to simulate the Power Down Mode, Latch Mode, baud rate, and data line function settings available on the MS Series decoders. Power Down Mode is simulated when the "Power Down Enabled" option is selected, so that the RX_PDN line will be set high and low at a 1:10 ratio. This total time is determined by the baud rate selected, so the times will be shorter as the baud rate increases. This is simulated by the gray "DEC-1" label above the receiver changing to red when the RX_PDN line is low and to green when it's high. This feature reduces the average power consumption of the receiver by powering it on only 1/10 of the time, though it increases the response time of the decoder. When the "Latch Mode Enabled" option is chosen, Latch Mode is simulated and an accessed data line will be latched on until the same data line is accessed again, at which time it will turn off. To change the data line function settings, click on the dropdown box for that data line to view the available functions. If no function is desired, select the "No Connect" option. To set the baud rate of the decoder, select one of the available values. This baud rate selection must match the baud rate of the desired encoder in order for operation to occur.
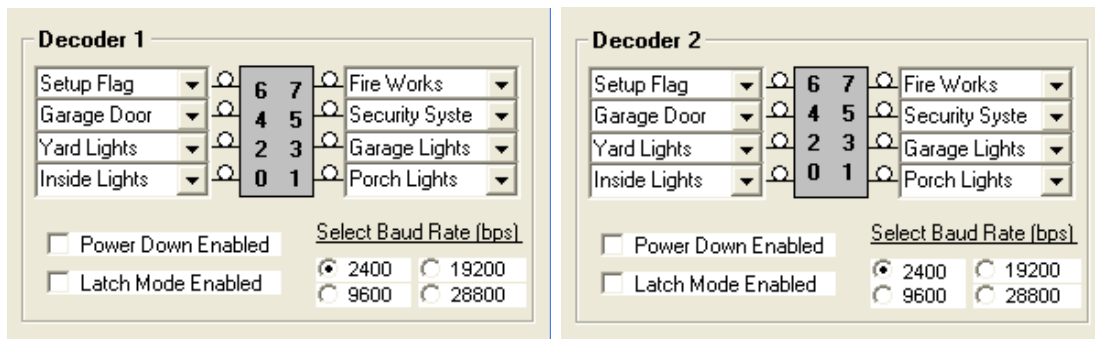

Figure 10: The Decoder 1 and Decoder 2 Areas

Six Simple Steps to Creating a New Address and Control Permissions

1. Hold the encoder's "Create Addr." button, then release it.

2. Press each data line button to be used while the encoder's "Mode Ind." LED flashes.

3. Press the "Create Addr." button again to exit Create Mode and save the Control Permissions.

4. Press the "Learn" button on the decoder.

5. Press one of the enabled data line buttons on the encoder while the decoder's "Mode Ind." LED flashes. Colors will match on units that are synchronized.

6. Press the "Learn" button again to exit Learn Mode and the units are ready.