Intelligent Display Module with 3.5" Landscape Display

Ordering Information

<table>
<thead>
<tr>
<th>Product No.</th>
<th>Description</th>
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<tbody>
<tr>
<td>MDL-IDM-L35</td>
<td>Stellaris® Intelligent Display Module with 3.5&quot; Landscape Display for Single-Unit Packaging</td>
</tr>
<tr>
<td>MDL-IDM-L35-B</td>
<td>Stellaris® Intelligent Display Module with 3.5&quot; Landscape Display for Volume Packaging</td>
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<tr>
<td>RDK-IDM-L35</td>
<td>Stellaris® Intelligent Display Module with 3.5&quot; Landscape Display Reference Design Kit (includes MDL-IDM-L35 board)</td>
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Figure 1. Intelligent Display Module with 3.5" Landscape Display

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General Description

The Stellaris® Intelligent Display Module with 3.5" Landscape Display (MDL-IDM-L35-L35) offer a complete graphical touch-screen user interface solution for control, automation, and instrumentation applications. The compact design is based on a Stellaris® LM3S1958 microcontroller; a highly integrated controller incorporating a 32-bit ARM® Cortex™-M3 core.

Development of software for the IDM module is simplified by using the comprehensive Stellaris graphics library and ARM development tools from our tools partners. First-time users should purchase the RDK-IDM-L35 Reference Design Kit which includes the touch panel module, a documentation CD, and cables.

Feature Summary
Highlighted capabilities of the MDL-IDM-L35 include:

- Bright QVGA LCD Display with touch
- Serial connectivity
- Easy to customize – full source code and design files included
- Flexible power supply options
- Compact size simplifies system integration

Features
The MDL-IDM-L35 provides the following features:

- LCD display
  - 3.5” QVGA 320 x 240 pixels
  - 16-bit color
  - White LED backlight
  - 4-wire resistive touch panel
- Serial communications
  - UART serial port with RS232 signal levels
  - UART serial port with TTL signal levels
  - Default 115.2k,8,n,1 operation
- Stellaris® microcontroller
  - 32-bit ARM® Cortex™-M3
  - 50 MHz operation
- Memory
  - 256 KB main flash memory
  - 64 KB SRAM
  - 168 KB image RAM
  - microSD slot (typically 1 GB storage)
- Power-supply options
  - 5 V DC jack
  - 5 V Terminal block
  - 5 V Serial header
- Peripherals
  - Four analog measurement inputs
  - 16 digital I/O lines
  - Magnetic buzzer, PWM controlled
- Software
  - Example applications included
  - Supports development tools from Keil, IAR, Code Sourcery, and Code Red Technologies
  - Stellaris® Graphics Library
Module Block Diagram
Figure 2 shows the block diagram for the MDL-IDM-L35.

Figure 2. Block Diagram

Operational Specifications
Table 1 shows the operating parameters for the MDL-IDM-L35.

Table 1. Operating Specifications

<table>
<thead>
<tr>
<th>Parameter Name</th>
<th>Min</th>
<th>Nom</th>
<th>Max</th>
<th>Unit</th>
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<tr>
<td><strong>Power Supply Connection Options</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DC Jack J7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terminal Block J1</td>
<td>4.5</td>
<td>5</td>
<td>5.5</td>
<td>V DC</td>
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<tr>
<td>Serial Header J8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Required Supply Current</td>
<td>–</td>
<td>–</td>
<td>300</td>
<td>mA</td>
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<tr>
<td><strong>Environment</strong></td>
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<tr>
<td>Operating Temperature Range</td>
<td>-20</td>
<td>–</td>
<td>+50</td>
<td>°C</td>
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<tr>
<td>Storage Temperature Range</td>
<td>-30</td>
<td>–</td>
<td>+70</td>
<td>°C</td>
</tr>
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</table>
Power

The IDM-L35 requires 5 V DC for operation, which can be applied to one of the three power supply board connectors (see page 3). The RDK includes a USB serial cable that provides power via the serial header connector. In all cases, the power supply must be regulated within the electrical limits listed in Table 1.

Wiring

Figure 3 shows all possible electrical connections, including RS232, analog inputs, and digital I/O. The actual functionality of the peripheral connections is determined by the application software.
Software Development

The MDL-IDM-L35 ships with a factory-programmed example application. This application must be replaced with a program specific to the end product. Development requires the use of a compiler capable of generating code for an ARM® Cortex™-M3 processor. Visit www.luminarymicro.com to download evaluation versions of suitable development tools.

The Stellaris Graphics Library accelerates software development by providing a range of display-related extensions to the standard StellarisWare™ Software. The Graphics Library includes widgets, low-level drawing primitives, and display drivers.

Graphics Library widgets encapsulate the ability to render a GUI element, detect if a touchscreen press occurred within its bounds, and react to presses. Widgets may be used in a hierarchical manner to provide groups of associated widgets, such as radio buttons. Examples of widgets include check boxes, buttons, sliders, and images.

Drawing primitives are elementary geometric items. The Graphics Library includes primitives such as lines, circles, filled circles, rectangles, and fonts. A selection of pre-built fonts is included and additional user fonts may be added to the library.

The display driver provides low-level code for initializing the display controller and a method for setting pixels. Graphics Library includes a display driver optimized for the RDK-IDM-L35 LCD panel and therefore, users do not need low-level knowledge of LCD-driver operation.

Programming the MDL-IDM-L35

Once an application has been compiled and linked to a binary file, it can be loaded into the MDL-IDM-L35 by two different methods:

- Over the RS232 serial port using the Stellaris serial boot loader
- Using the JTAG or SWD port and an In-circuit Debug Interface (ICDI)

Both methods are supported by the LMFlash utility included on the software and documentation CD and available from the www.luminarymicro.com web site.

The RDK-IDM-L35 includes an adapter to convert the fine-pitch, 10-way debug header to the common 20-pin ARM debug header.

Figure 4. Fine-Pitch Debug Header Pin Assignments

Reference Design Kit Contents

The RDK-IDM-L35 RDK includes the following:

- MDL-IDM-L35 Intelligent QVGA Touch Panel with Ethernet
- USB to TTL serial USB cable
- Debug adapter
  - Fine pitch to 0.1” standard header
- Documentation and source code CD

Mechanical Installation

The MDL-IDM-L35 mounts to a front panel mounting using four screws and appropriate stand-offs.
Figure 5. MDL-IDM-L35 Module Dimensions

Additional Information
The following documents are available for download at www.luminarymicro.com:

- Stellaris® Intelligent Display Module with 3.5" Landscape Display Reference Design Kit User’s Manual, document order number RDK-IDM-L35
- Stellaris Peripheral Driver Library User’s Guide, document order number SW-DRL-UG
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