



Intelligent Display Module with 3.5" Landscape Display

Ordering Information

Product No.	Description
MDL-IDM-L35	Stellaris® Intelligent Display Module with 3.5" Landscape Display for Single-Unit Packaging
MDL-IDM-L35-B	Stellaris® Intelligent Display Module with 3.5" Landscape Display for Volume Packaging
RDK-IDM-L35	Stellaris® Intelligent Display Module with 3.5" Landscape Display Reference Design Kit (includes MDL-IDM-L35 board)



Figure 1. Intelligent Display Module with 3.5" Landscape Display RDK

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General Description

The Luminary Micro 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 Luminary Micro's comprehensive 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.

See the *RDK-IDM-L35 Quickstart Guide* and *RDK-IDM-L35 User's Manual* for complete technical details on using and customizing the Intelligent Display Module.



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:

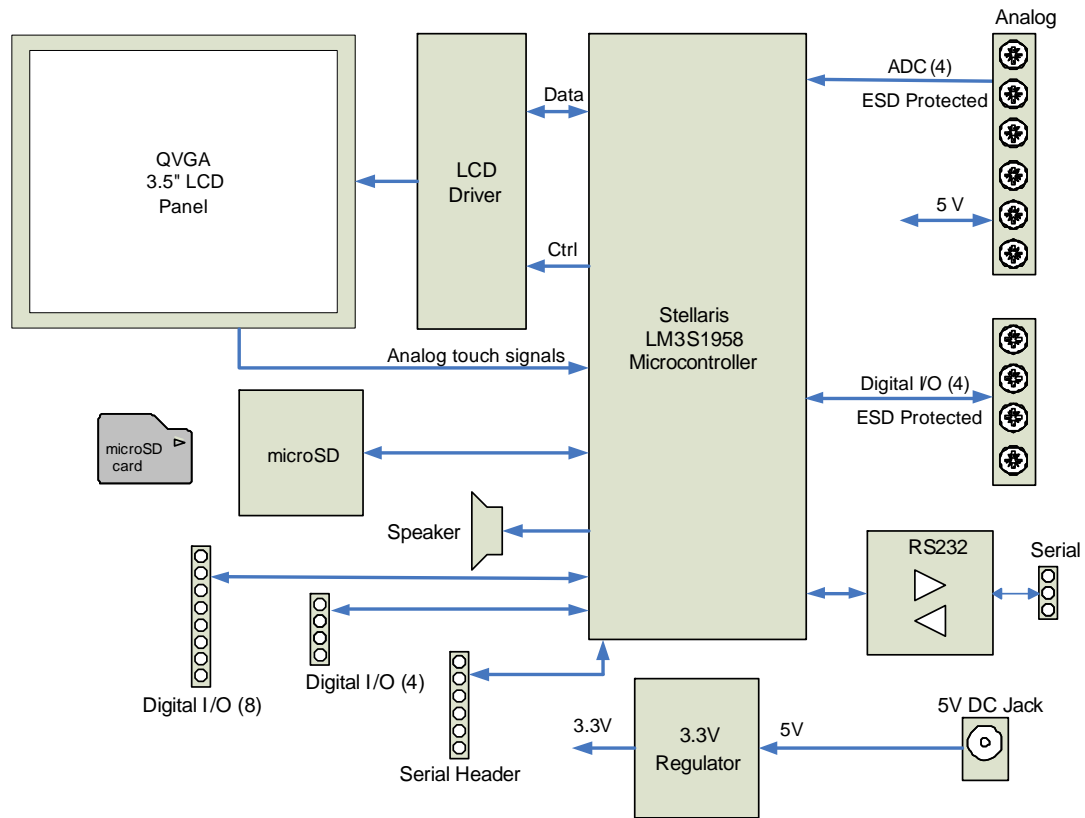
- LCD display
 - 3.5" QVGA 320 x 240 pixels
 - 16-bit color
 - White LED backlight
 - 4-wire resistive touch panel
- Serial communications
 - UART serial port with RS232 signal levels
 - UART serial port with TTL signal levels
 - Default 115.2k,8,n,1 operation
- Stellaris® microcontroller
 - 32-bit ARM® 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

Parameter Name	Min	Nom	Max	Unit
Power Supply Connection Options				
DC Jack J7	4.5	5	5.5	V DC
Terminal Block J1				
Serial Header J8				
Required Supply Current	-	-	300	mA
Environment				
Operating Temperature Range	-20	-	+50	°C
Storage Temperature Range	-30	-	+70	°C
Display				
Brightness	210	220	-	Cd/m ²
View Angle (V)	-10	-	+35	deg
View Angle (H)	-45	-	+45	deg
Contrast Ratio	340	400	-	-
Peripherals				
Analog Input Range	0	-	3	V
Analog Inputs – Electrical Limits	-0.3	-	3.3	V
Digital Inputs - Low level (VIL)	-0.3	-	0.8	V
Digital Inputs - High level (VIH)	2.0	-	5.0	V
Digital Outputs - Low level (VOL)	-	-	0.4	V
Digital Outputs - High level (VOH)	2.4	-	-	V
RS232				
Data Rate	-	-	120	Kbps
Transmitter Voltage Swing	±5.0	±5.4	-	Vdc
Input Threshold Low	0.6	1.2	-	-
Input Threshold High	-	1.5	2.4	-

Power

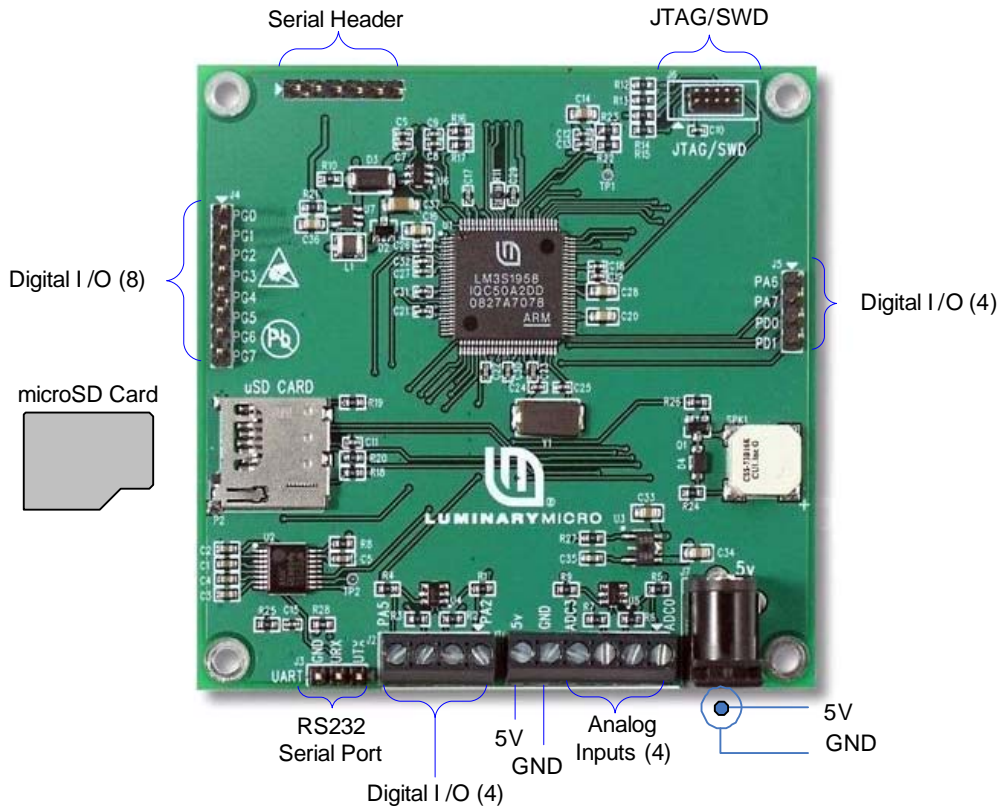
The IDM-L35 requires 5V DC for operation, which can be applied to one of the three power supply board connectors (see Table 1). The RDK includes a USB serial cable that provides power via the serial header connector. In all cases, the power supply must be regulated within the electrical limits listed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

Figure 3. Connection Diagram



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 Luminary Micro 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.

Refer to the Luminary Micro *Stellaris® Graphics Library User's Guide* for full details.

Programming the MDL-IDM-L35

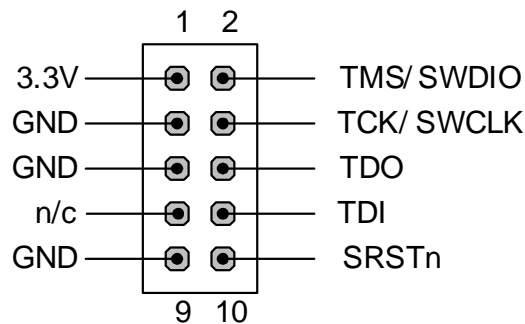
Once an application has been compiled and linked to a binary file, it can be loaded into the MDL-IDM-L35 by two different methods:

- Over the RS232 serial port using the Luminary Micro's 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 Luminary Micro web site at www.luminarymicro.com.

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:

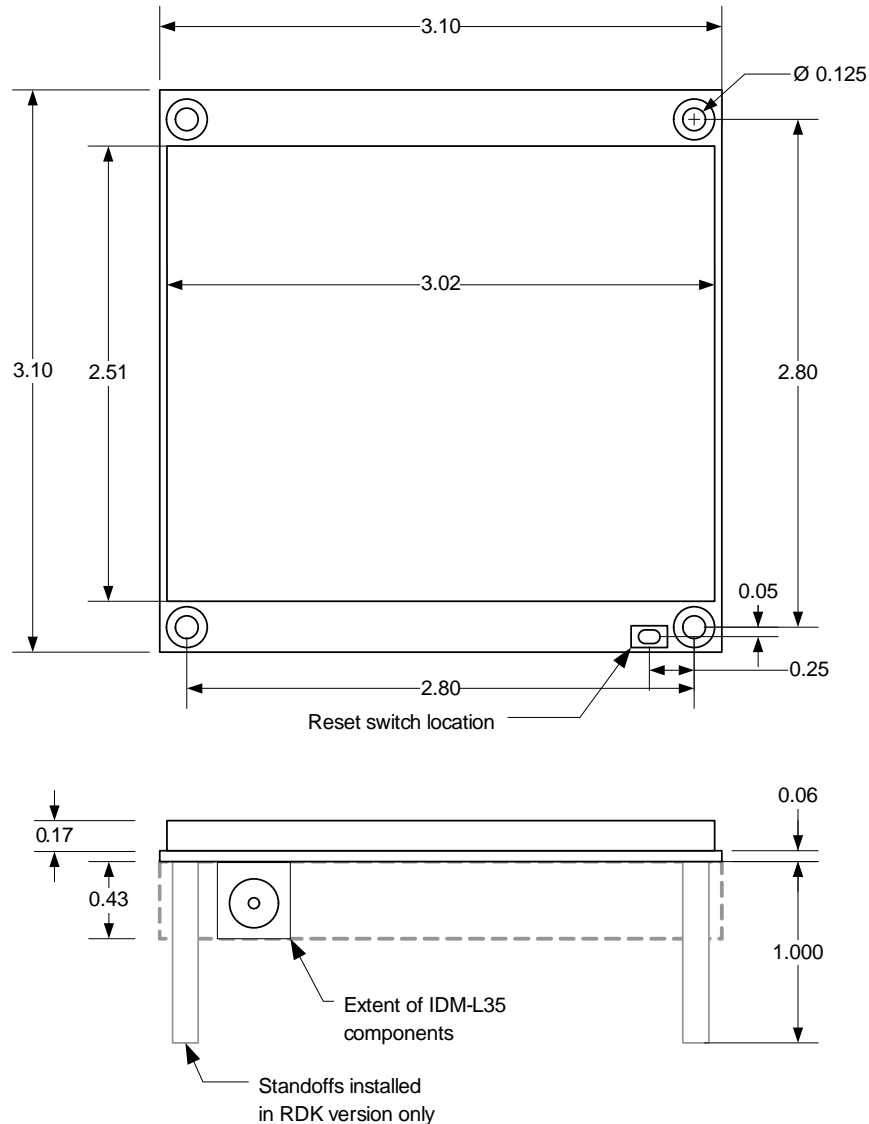
- MDL-IDM-L35 Intelligent QVGA Touch Panel with Ethernet
- USB to TTL serial USB cable
- Debug adapter
 - Fine pitch to 0.1" standard header
- Documentation and source code CD



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
- *Stellaris® Graphics Library User's Guide*, document order number SW-GRL-UG
- *RDK-IDM-L35 Firmware Development Package User's Guide*, document order number SW-RDK-IDM-L35



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Company Information

Luminary Micro, Inc. designs, markets, and sells ARM Cortex-M3-based microcontrollers (MCUs). Austin, Texas-based Luminary Micro is the lead partner for the Cortex-M3 processor, delivering the world's first silicon implementation of the Cortex-M3 processor. Luminary Micro's introduction of the Stellaris® family of products provides 32-bit performance for the same price as current 8- and 16-bit microcontroller designs. With entry-level pricing at \$1.00 for an ARM technology-based MCU, Luminary Micro's Stellaris product line allows for standardization that eliminates future architectural upgrades or software tool changes.