User Manual
LTC-Family

LTC-Family:

LTC-1141

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Table of Contents

This release of the user manual contains preliminary information and is not yet complete.

1 LTC Hardware Overview

The LTC family controllers are laser diode drivers with an integrated TEC controller (based on TEC-1091).

The core of the LTC controllers consists of a system on chip featuring high performance processing capabilities in combination with fast ADC, DAC and memory. This allows fast modulation, sampling as well as onboard data processing.

Object (laser diode, sensor etc.) cooling is managed by the onboard TEC controller featuring high temperature stability and high measurement precision.
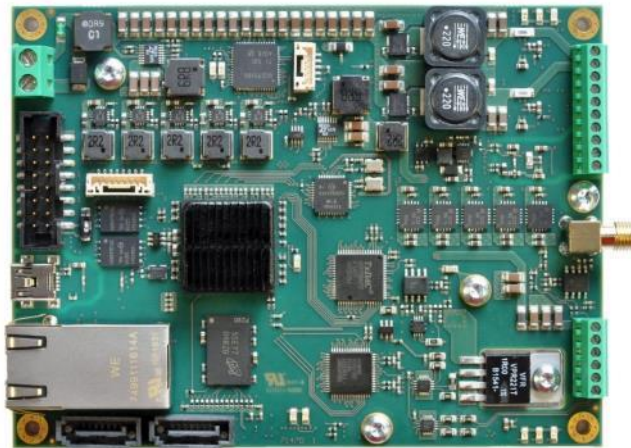
1.1 LED Status
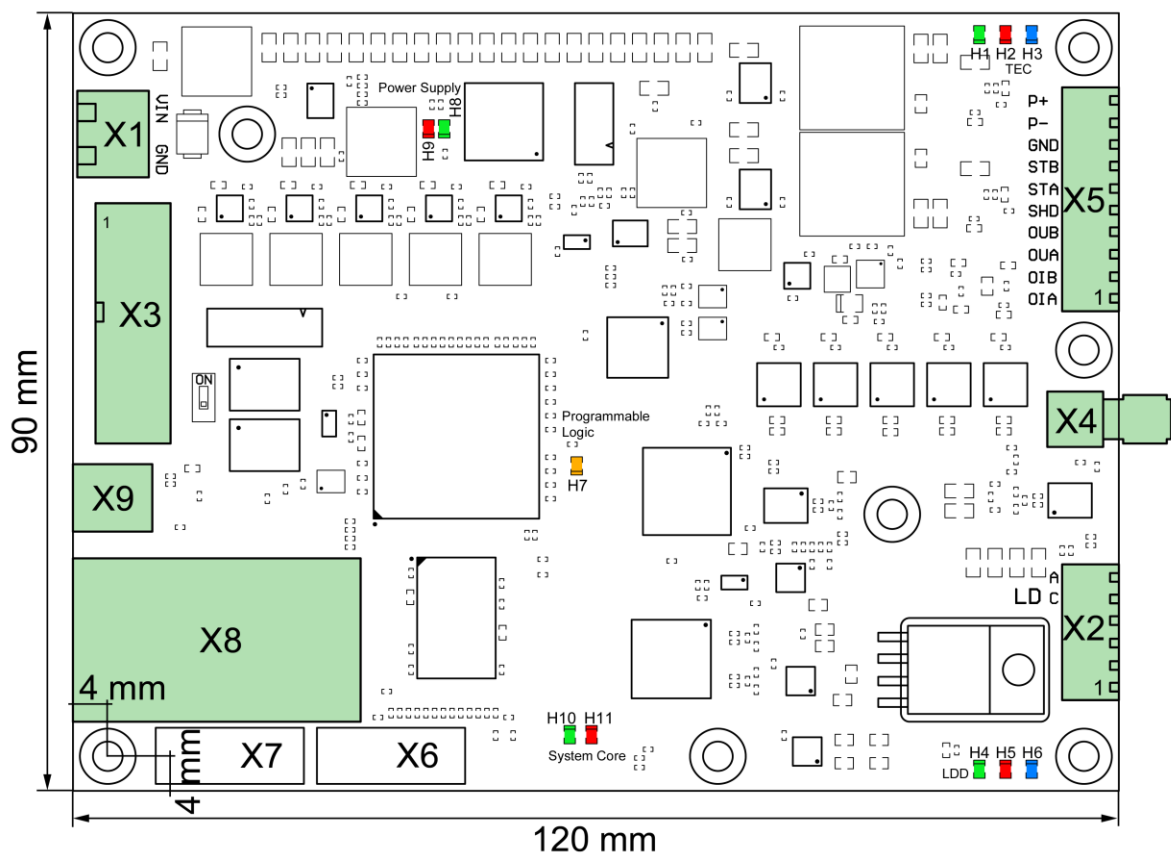
1.1.1 Power

H8 green steady	Power supply OK
H9 red steady	Power supply failure
H8 green & H9 red steady	System on chip running & at least one power supply rail not ready

1.1.2 System Core

H7 orange steady	Programmable logic starting up
H10 green steady	Initializing
H10 green fast blinking	Run
H11 red steady	Error
H11 red & H10 green steady	Other states: - Firmware update - Restart

1.1.3 TEC

H1 green steady	Initializing
H1 green slowly blinking	Ready
H1 green fast blinking	Run
H1 green & H2 red slowly alternating	System not OK
H1 green & H2 red steady	Restart
H2 red steady	Error
H3 blue slowly blinking	TEC temperature control off (output can be enabled)
H3 blue fast blinking	TEC temperature not stable
H3 blue steady	TEC temperature stable

1.1.4 LDD

H4 green steady	Initializing
H4 green slowly blinking	Ready
H4 green fast blinking	Run
H4 green & H5 red slowly alternating	System not OK
H4 green & H5 red steady	Restart
H5 red steady	Error
H6 blue steady	Laser Diode Driver run

1.2 Mounting

The LTC controller has to be mounted to a heatsink using four M3 screws, to prevent overheating of the system.

2 Software

The LTC-114x configuration software allows the setup and monitoring of the controller in a graphical way.

2.1 Requirements

2.1.1 Operating System

The compatibility of the LTC configuration software has been tested with Microsoft Windows 7, 8 and 10.

2.2 Installation

- ✓ Connect the LTC controller using a USB cable with a mini USB-B connector
- ✓ Download the **LTC-Family Software Package (.msi)**.
- ✓ Execute the MSI-file and follow the instructions

Two new icons appear on your desktop: "LTC-114x Configuration Software vX.XX" and "LTC Software vX.XX Additionals" with further information

The "… Additionals" folder also contains the firmware upgrade file for the LDD Controller itself and some other useful files..

Info: The MSI setup procedure will also provide you the USB driver and Microsoft.NET files if you do not have the necessary versions already installed

- ✓ Open the Configuration Software

The Configuration Software displays: "Not connected" because the LTC is not powered by the external power supply

2.3 Access Over Ethernet

As an alternative to USB, the controller can be connected using an Ethernet connection.

- ✓ Ask your network administrator for the network configuration
- ✓ Connect the controller using the USB connection
- ✓ Configure the IP settings in the communication subsystem (DHCP or static IP address)
- ✓ Remove the USB connection and connect the controller to your LAN using an Ethernet cable
- ✓ Open the menu *Tools > Connection Criteria Manager*
- ✓ Select the option *Use Ethernet (TCP) Connection* and enter the IP address of the controller
- ✓ Click *Try to connect to a device with these criteria* to establish a connection

Now you are able to connect to the controller using the LTC configuration software or connect to the IP address in your web browser to open the status page.

2.4 Software Description

The LTC configuration software design corresponds to the hardware layout of the controller. Each subsystem is divided in a block. Status information is directly displayed in the main window.

Information about subsystems and their configuration can be accessed by clicking on the corresponding field of each subsystem.
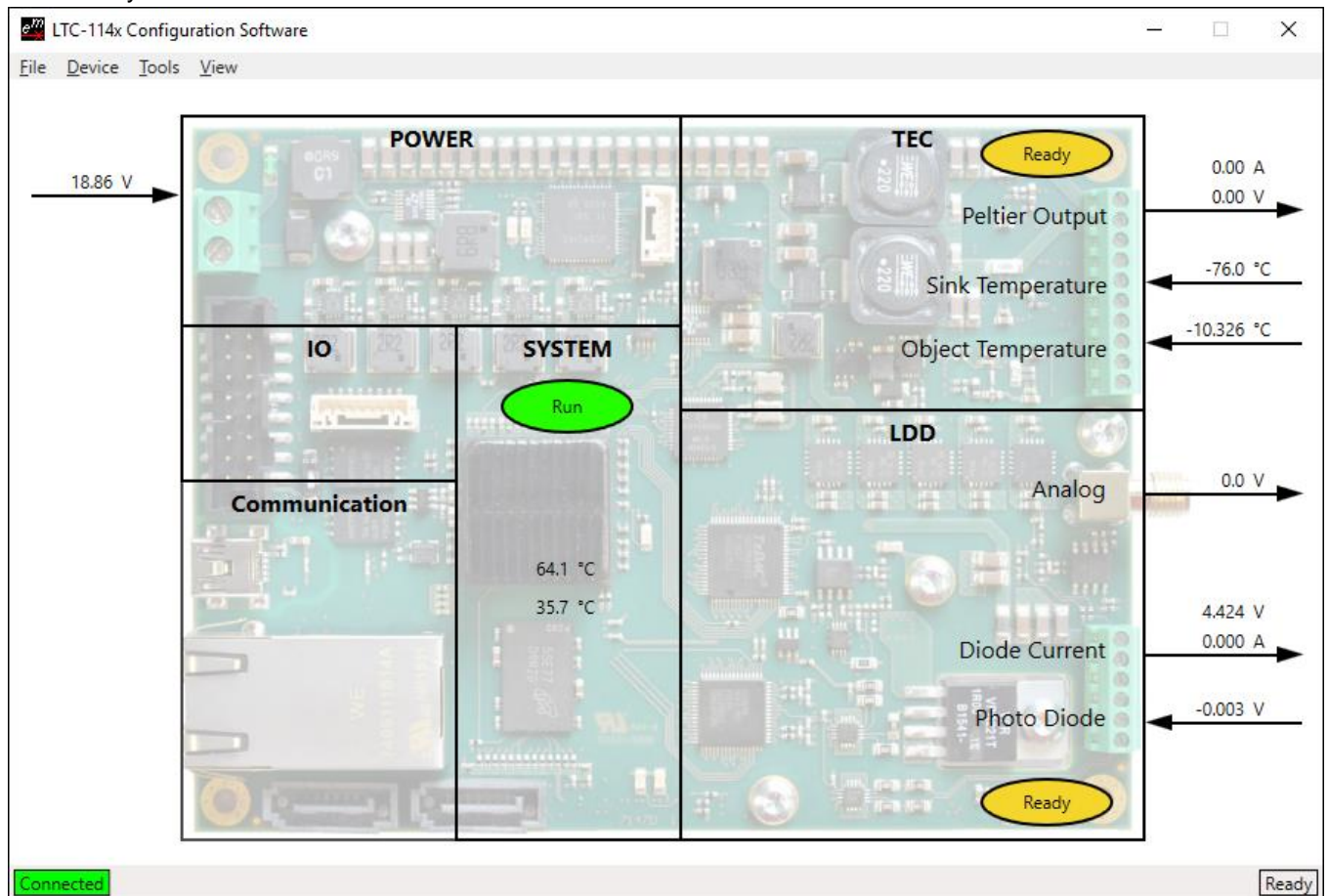
The digital storage oscilloscope (DSO) can be accessed in tphe LDD subsystem by pressing the *graph* button.
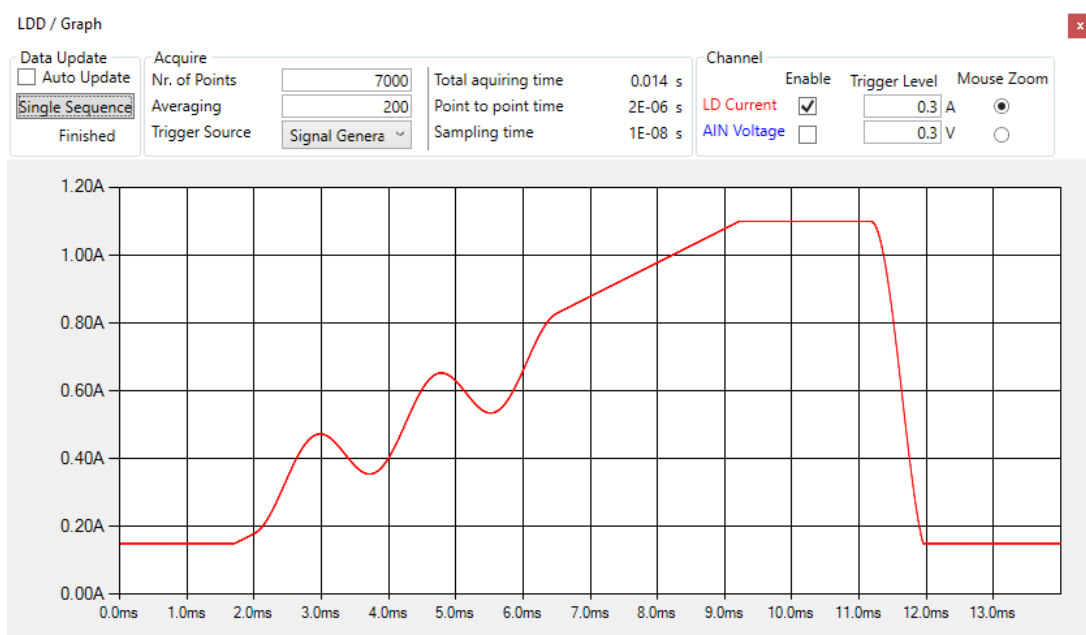
2.4.1 Changing Parameters

Parameter values can be directly changed by clicking on the text field. An orange indicator is displayed, when a parameter is not yet stored and active on the controller. Parameters have to be written to the controller by pressing the enter key. This also applies for selecting options.
By clicking on the orange circle next to the text field, the value can be reset.

2.4.2 Resetting Subsystems

A subsystem can be reset by clicking on the oval status indicator.

2.4.3 Firmware Update

By performing the following steps, the firmware of the controller can be updated to the newest version which can be found in the software package.
- ✓ Export the configuration of the controller by clicking *File > Export Config*
- ✓ Open the menu *Device > Firmware Update*
- ✓ Load the *.mefw file and start the update
- ✓ Reset the device
- ✓ Import the saved configuration by clicking *File > Import Config*

2.4.4 Custom Lock Configuration

Individual parameter values can be locked so that an end user cannot vary these parameters. The Custom Lock Settings can be saved using a password. To lock parameters, perform the following steps:
- ✓ Open the Custom Lock Configuration by clicking *Tools > Custom Lock Configuration*
- ✓ Open the subsystems in which the parameters to lock are located
- ✓ Move the cursor to the desired parameter and set the *Lock this setting* flag in the tooltip pop-up window
- ✓ To Lock the Firmware Updater open the menu *Device > Firmware Update*
- ✓ To Lock the TEC Auto Tuning open the Auto Tuning window
- ✓ Click *Collect new settings*
- ✓ Set a password and click *Save and apply*
- ✓ For changing the Custom Lock Configuration click *Tools > Custom Lock Configuration* and type the password

Hint: This feature is only implemented in the Configuration Software Application. It is still possible to modify a locked parameter by using a self-made application.

3 Functional Description

3.1 Laser Diode Driver

The characteristics of the laser diode and the laser diode driver have to be set in the LDD subsystem.

- ✓ Refer to the datasheet of your laser diode to find the parameters forward voltage (V_F) and differential resistance of the laser diode. Add all other resistive components to this value. (E.g. cable resistance) If no value is specified in the datasheet, use 0.1 Ω
- ✓ Use the *Driver Characteristics* to limit the output of the driver

3.1.1 Current Modulation

There are two possibilities for the laser diode current modulation as an alternative to the constant current. Either the internal signal generator can be used or a lookup table can be loaded. The *Current Source Selector* in the LDD subsystem defines the source for the modulation.

3.1.1.1 Signal Generator

The signal generator can be accessed in the LDD subsystem. Possible waveforms are:

- Sine
- Rectangular
- Ramp

The amplitude and offset of the current as well as the frequency of the generator can be chosen.

3.1.1.2 Lookup Table

The lookup table has to be defined in an Excel-file (*.xlsx). An example is provided in the *LTC Controller Software vX.XX Additionals.*.

The lookup table defines the amplitude of the current per sampling point. A maximum of 8192 points can be defined.

3.2 TEC Controller

Please refer to the TEC-Family User Manual for information about the TEC controller functionality.

4 Support

Please contact Meerstetter Engineering in case of questions.

http://meerstetter.ch/customer-center/support