



Getting Started

Mpression MIPI LCD Card

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1. Read This First

1.1 Important Information

READ FIRST:

- **READ** this Reference Manual before using this product.
- **KEEP** the Reference Manual handy for future reference.
- **Do not attempt** to use the product until you fully understand its mechanism.

Purpose of the Product:

- The purpose of this product is to support the evaluation of MIPI D-PHY DSI interface LCD monitor on a system that uses an Altera FPGA. It provides support for system development in both software and hardware.

For Users of This Product:

- This product can only be used by operators who have carefully read the "Getting Started" and "Reference Manual" manuals and understand how to use it. Use of this product requires a basic knowledge of electric circuits, logic circuits, and FPGAs.

Precautions to be taken when using This Product:

- This product is to be used for evaluation of a program, and the evaluation stage. You cannot install this Board in your product and cannot use this Board for mass-production. When mass-producing a program you have finished developing, be sure to decide at your own responsibility whether it can be put to practical use by performing integration test, evaluation, or some other experiment.
- In no event shall Macnica Inc. be liable for any consequence arising from the use of this product.
- Macnica Inc. cannot anticipate every possible circumstance that might involve a potential hazard. The warnings in this reference manual and on the product are therefore not all-inclusive. The user is therefore responsible for the safe use of the product at the user's own responsibility.
- The operation of any specific USB memories or SD cards cannot be guaranteed.
- Connection with the apparatus of any specific LAN interfaces cannot be guaranteed.
- This product does not guarantee device functionality.
- Remodeling by the customer is not guaranteed.
- This product is a lead-free mounting product.
- Generally, the brand names carried in this reference manual each constitute a maker's trademark or registered trademark.

Improvement Policy:

- Macnica Inc. pursues a policy of continuous improvement in design, performance, and safety of the product. Macnica Inc. reserves the right to change, wholly or partially, specifications, design, reference manual, and other documentation at any time without notice.

Warranty:

- Macnica Inc. offers exchange of this product free of charge only in a set range of cases of initial trouble for this product, and within 30 days from when the customer received delivery of the Board.

Macnica Inc. cannot exchange products in cases where breakdown is caused for the following reasons:

- (1) Misuse, abuse of the product or use under abnormal conditions
- (2) Remodeling or repair
- (3) A fire, earthquake, fall or other accidents

Figures:

- Some figures in this reference manual may differ from your system as purchased.

1.2 Developer Information

The Developer of this product is:

Macnica Inc.

1-6-3 Shin-Yokohama, Kouhoku-ku, Yokohama, 222-8561 JAPAN

1.3 Inquires

In case you have any inquiries about the use this product, please contact your local Macnica company or make inquiries through the contact form in the following web site:

<http://www.m-pression.com/contact>




Macnica companies:

- | | | |
|------------------|-----------------------|---|
| • China & HK: | Cytech Technology | http://www.cytech.com/ |
| • ASEAN & India: | Cytech Global | http://www.cytechglobal.com/ |
| • Taiwan: | Galaxy Far East Corp. | http://www.gfec.com.tw/ |
| • North America: | Macnica Americas | http://www.macnica-na.com/ |
| • Brazil: | Macnica DHW | http://www.macnicadhw.com.br/en/ |
| • Japan: | Altima | http://www.altima.co.jp |
| | Elsena | http://www.elsena.co.jp |



2. For Ensuring Safe Use



Be sure to follow the instructions given in this Manual which are intended to prevent harm to the user and others as well as material damage.


2.1 Legend

 Danger	Indicates an imminent hazardous situation which if not avoided will result in death or serious injury.
 Warning	Indicates a potentially hazardous situation which if not avoided could result in death or serious injury.
 Caution	Indicates a potentially hazardous situation which if not avoided may result in minor or moderate injury or in property damage.

2.2 Cautions

 Danger	<p>If an AC adapter is required, make sure to use one that meets the specification described in this manual, or one that is included in the package.</p> <p>Using an AC adapter not meeting the specifications described in this Manual may cause the kit to emit heat, explode, or ignite.</p>
 Warning	<p>Do not apply strong impacts or blows to the kit.</p> <p>Doing so may cause the kit to emit heat, explode, or ignite, or the equipment in the kit to fail or malfunction. This may also cause fire.</p>
	<p>Do not put the main unit or the AC adapter in cooking appliances such as microwave ovens, or high-pressure containers.</p> <p>Doing so might cause the main unit or AC adapter to emit heat, explode, ignite, or emit smoke, or its parts to break or warp.</p>
	<p>Do not wrap the main unit that is in use with cloth or other materials that are likely to allow heat to build up inside the wrapping.</p> <p>This will cause heat to build up inside the wrapping which may cause the main unit to ignite or malfunction.</p>
	<p>When disposing of the main unit, do not dispose of it along with general household waste.</p> <p>Throwing the main unit into fire may cause it to explode. Dispose of the main unit following the laws, regulations, and ordinances governing waste disposal.</p>
	<p>Do not pull the power supply cable with excessive force or place heavy items on it.</p> <p>Do not damage, break, bundle, or tamper with the power supply cable.</p> <p>Damaged parts of the power supply cable might cause a short circuit resulting in fire or accidents involving electrical shock.</p>
	<p>Do not plug or unplug the power plug with wet or moist hands.</p> <p>This might cause injuries or equipment malfunctions or failures due to electrical shock.</p>

 Warning (Continued from previous page)	<p>Plug the power plug securely into the outlet.</p> <p>If the power plug is not securely plugged into the outlet, it may cause accidents involving electrical shock or fire due to heat emitted.</p>
	<p>Do not connect many electrical cords to a single socket or connect an AC adapter to an outlet that is not rated for the specified voltage.</p> <p>Doing so may cause the equipment to malfunction or fail, or lead to accidents involving electrical shock or fire due to heat emitted.</p>
	<p>Periodically remove any dust accumulated on the power plug and around the outlet (socket).</p> <p>Do not use a power plug with dust accumulated on it because doing so will lead to insulation failure due to moisture which may lead to fire.</p> <p>Remove any dust on the power plug and around the outlet with dried cloth.</p>
	<p>Do not place any containers such as cups or vases filled with water or other liquid on this Board.</p> <p>If this Board is exposed to water or other liquids it may cause the Board to malfunction or lead to accidents involving electrical shock. If you spilled water or other liquid on this Board, immediately stop using the Board, turn off the power, and unplug the power plug. If you have any requests for repairs or technical consultation, please contact the local Macnica company or Mpression inquiry URL.</p>
	<p>Keep this board and accessories out of reach of children. Failure to do so may lead to injuries.</p>
 Caution	<p>Do not place the kit on unstable places such as shaky stands or tilted locations. Doing so may cause injuries or cause this Board to malfunction if the Board should fall.</p>
	<p>Do not attempt to use or leave the kit in places subject to strong direct sunlight or other places subject to high temperatures such as in cars in hot weather. Doing so might cause the kit to emit heat, break, ignite, run out of control, warp, or malfunction.</p> <p>Also, some parts of the equipment might emit heat causing burn injuries.</p>
	<p>Do not use the kit in places subject to extremely high or low temperatures or severe temperature changes.</p> <p>Doing so may cause the kit to fail or to malfunction.</p> <p>Always be sure to use the kit within a temperature range of 5°C to 35°C and a humidity range of 0% to 85%.</p>
	<p>Unplug the power supply cable when carrying out maintenance of devices in which the main unit is embedded.</p> <p>Failure to do so may lead to accidents involving electrical shock.</p>
	<p>Do not place this Board in locations where excessive force is applied to the Board.</p> <p>Doing so may cause the PC board to warp, leading to breakage of the PC board, missing parts or malfunctioning parts.</p>
	<p>When using the kit together with expansion boards or other peripheral devices, be sure to carefully read each of their manuals and to use them correctly.</p> <p>Developer does not guarantee the operation of specific expansion boards or peripheral devices when used in conjunction with this Board unless they are specifically mentioned in this Manual or their successful operation with this Board has been confirmed in separate documents.</p>

 <p>Caution (Continued from previous page)</p>	<p>Be sure to turn off the power switch when moving this Board to connect to other devices. Failure to do so may cause this Board to fail or lead to accidents involving electrical shock.</p>
	<p>Do not clean this Board by using a rag containing chemicals such as benzine or thinner. Failure to do so will likely to cause this Board to deteriorate. When using a chemical cloth be sure to comply with any directions or warnings.</p>
	<p>Do not immediately turn on the power if you find that water or moisture had condensed onto the main unit after removing the board from the package. Condensation might occur on this Board when taking it out of the box, if the board is cool yet the room temperature is warm.</p> <p>Do not apply power to the Board while water or moisture has condensed on it because the moisture may cause the Board to break or may shorten the service life of the parts.</p> <p>When you first take this Board out of the box be sure to leave it at room temperature for a while before using it. If condensation or moisture has occurred on this Board, first wait for the moisture to fully evaporate before installing or connecting the Board to other devices.</p>
	<p>Do not disassemble, dismantle, modify, alter, or recycle parts unless they are clearly described as customizable in this Manual.</p> <p>Although this kit is customizable, if parts not specified in this Manual as customizable are modified in any way, then the overall product operation cannot be guaranteed.</p> <p>Please contact the local Macnica company or Mpression inquiry URL beforehand if you wish to customize or modify any parts that are not described in this Manual as customizable.</p>

3. Preparations

3.1 About This Manual

By following the procedure described in this Getting Started guide, you can download the reference design to the FPGA and check the operation of this card.

With this reference design, the image from an external video device or a host PC is rotated 90° and displayed on the LCD monitor.

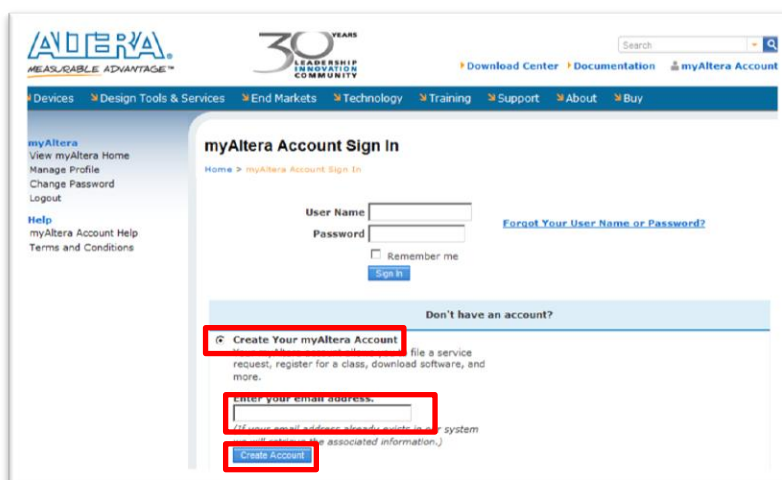
3.2 Preparations

Before using this Board, download the software described below, which is required for FPGA development. To download Altera software, you must create a myAltera account beforehand. Complete registration of your myAltera account before you begin downloading the software.

A. How to Create a MyAltera Account

Open the following URL and enter the required information to create a MyAltera account.

- URL for MyAltera account registration
<https://www.altera.com/myaltera/mal-signin.jsp>
- If you are creating a myAltera account for the first time, check **Create Your myAltera Account** on the lower part of the page, enter your email address below the message **Enter your email address**, and then click **Create Account**.



B. Quartus® II Web Edition

Quartus II Web Edition is a license-free software program provided by Altera. Some limitations apply to the functions compared to the Subscription Edition. Quartus II Web Edition can be

downloaded from the Quartus II Web Edition Software page. See the following page for details on the difference between the Web and Subscription Editions of Quartus II.

- Quartus II Web Edition Software page
<http://dl.altera.com/?edition=web>
- Comparison between Subscription Edition and Web Edition of Quartus II
http://www.altera.com/literature/po/ss_quartussevswe.pdf

C. Installing the USB-Blaster™ Driver

USB-Blaster (sold separately) is required for writing the FPGA programming file to the FPGA/configuration ROM of this Board. To install the USB-Blaster driver, download it from the Altera Programming Cable Driver Information page.

- Altera Programming Cable Driver Information page
<http://www.altera.com/download/drivers/dri-index.html>

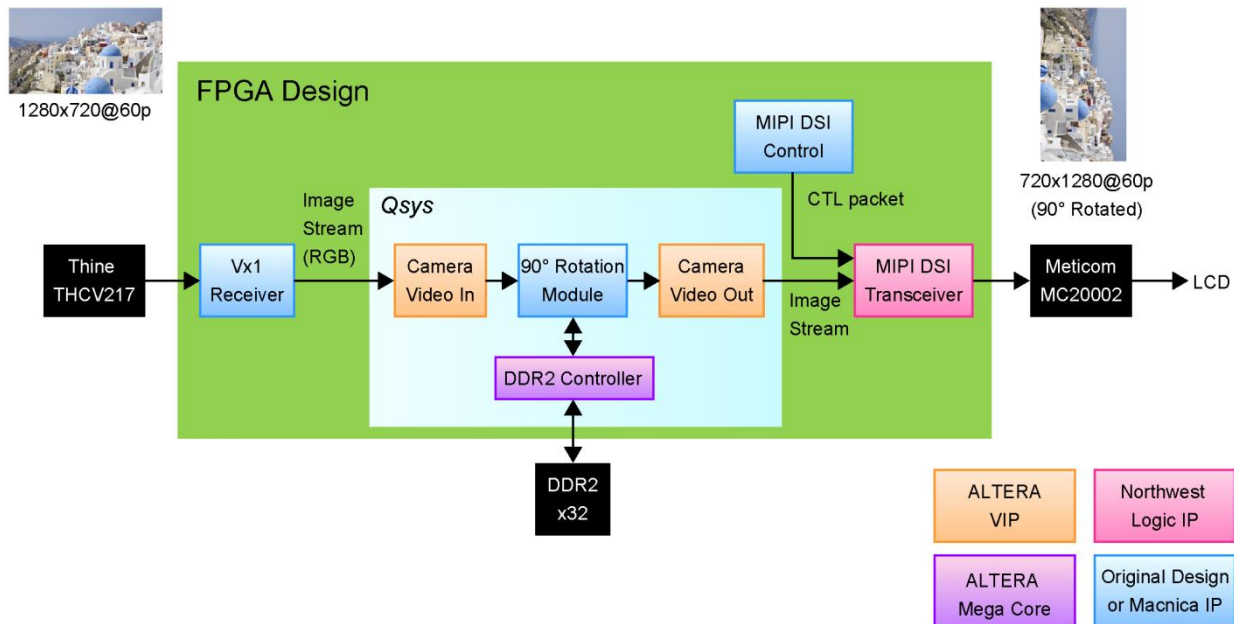
3.3 Prerequisites

- This Card
- Hydra/Nitro Board
- Video source (which can output a 720p DVI signal)
- DVI cable
- Host PC
- USB-Blaster

4. Setting Up the Board and Executing the Design

4.1 Block Diagram

Figure 1 shows the block diagram of the reference design.



4.2 Default Settings of the DIP Switches

The default settings of the DIP switches on this card are shown below.

Location	Function	Default setting
SW3	THCV217 Setting	DEMUX=ON, MODE=ON, RF=OFF, BET=ON, PRE=ON, COL=ON
SW4	TFP401A Setting	STAG=OFF, DFO=ON, OCK_INV=OFF, ST=ON

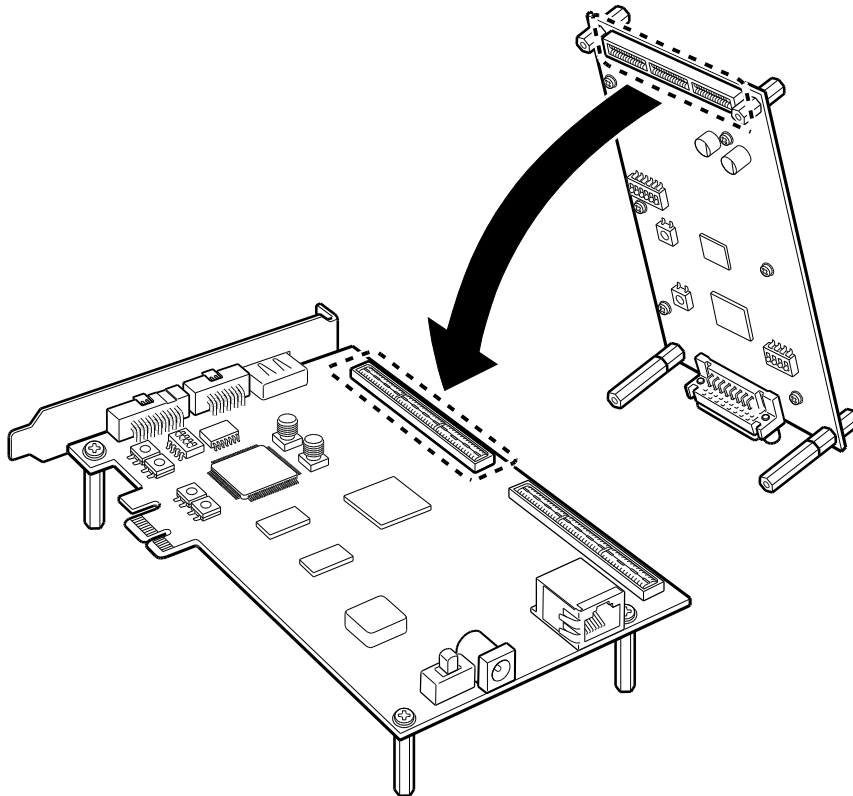
4.3 Connection and Operation

The following procedure assumes that you have prepared the required development tool:

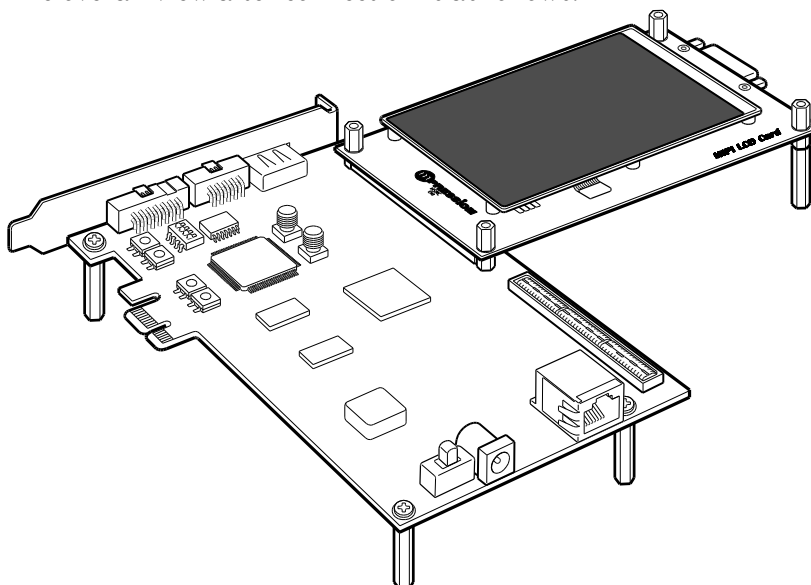
- ALTERA Quartus II
This tool can be downloaded from the URL below.
ALTERA Quartus II Web Edition software:
<https://www.altera.com/download/software/quartus-ii-we/>

The Hydra board is used as an example of FPGA board to which this Card is connected.

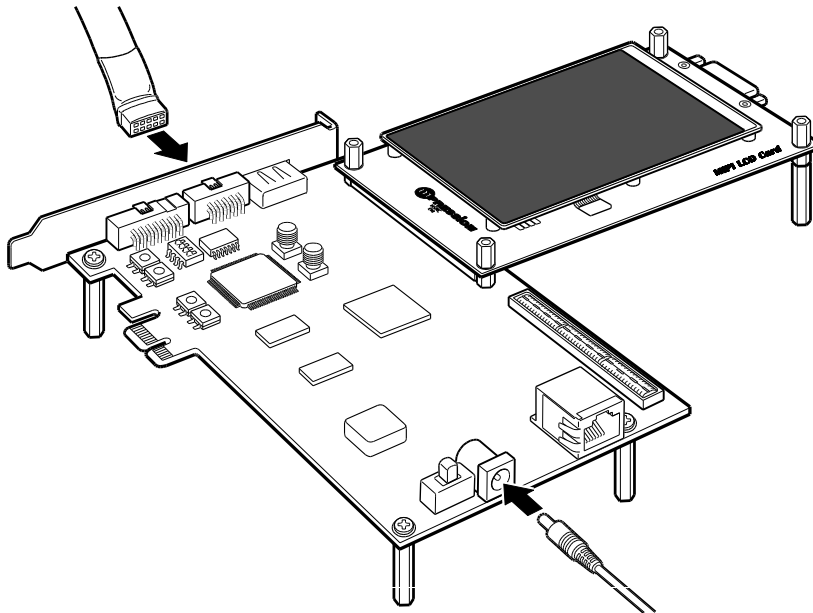
- 1) Connect this Card to the HSMC port of the Cyclone V board.
When connecting to the Nitro board, connect it to the HSMC port A.



- 2) The overall view after connection is as follows.



- 3) Connect the power cord provided with the Cyclone V board and a USB-Blaster cable to the Cyclone V board.

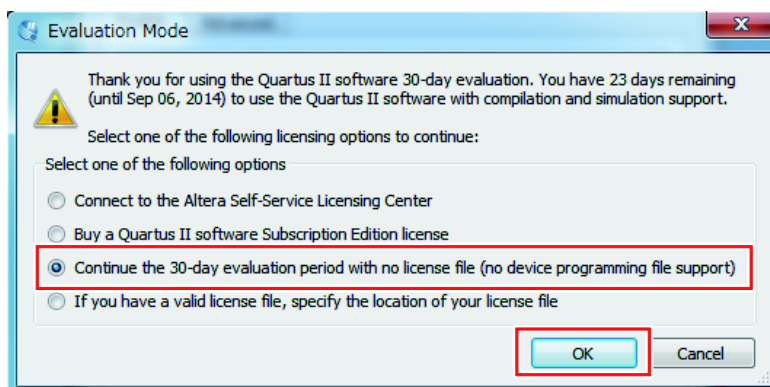


- 4) Turn on the power of the Cyclone V board.

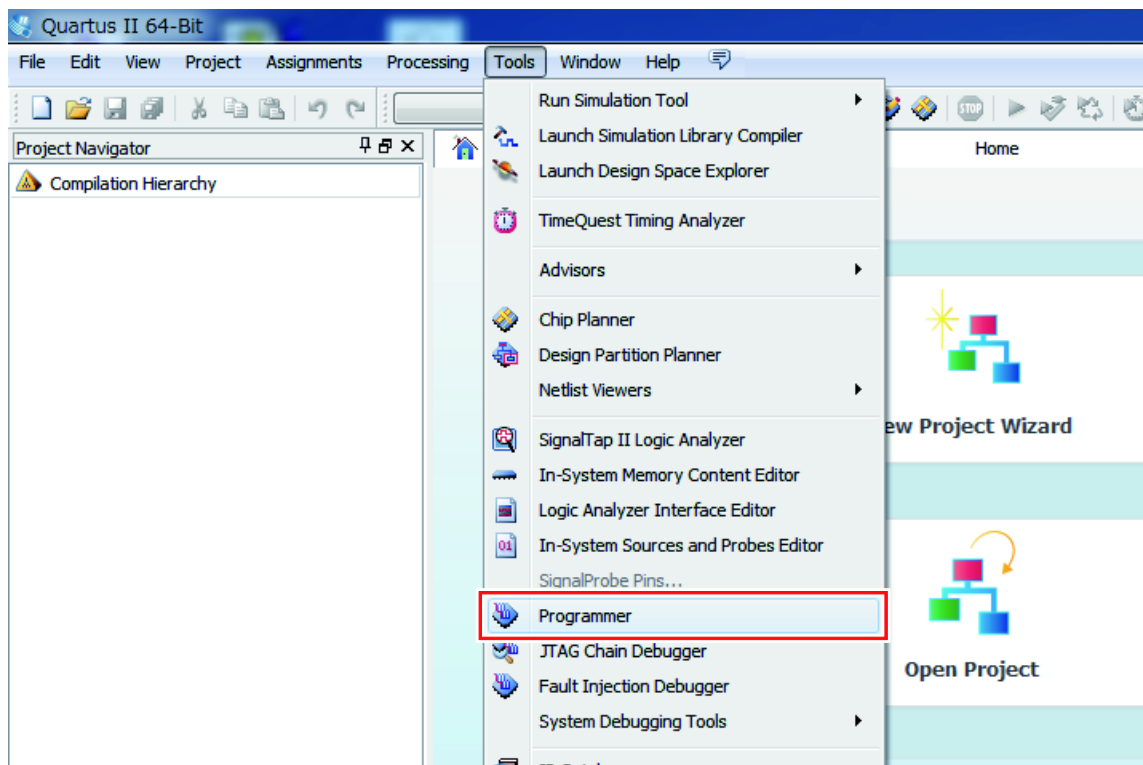
How to download the .sof file to the Cyclone V board is explained below. (See steps 5 through 13 below.)

- 5) Start Quartus II.

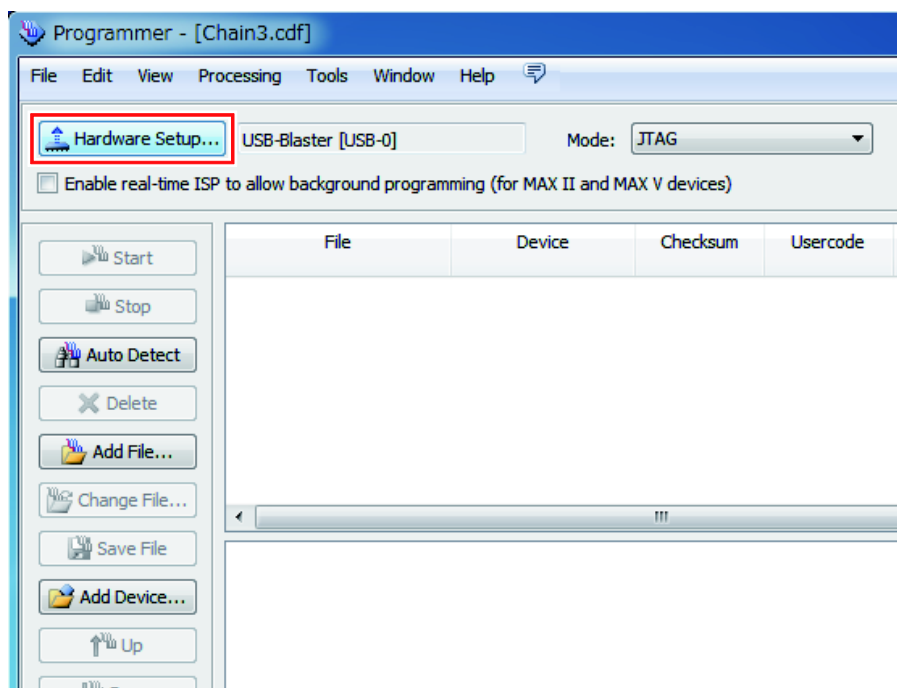
If you do not have a license of Quartus II and a popup is displayed, check "Continue the 30-day evaluation period with no license file (no device programming file support)" and click [OK].



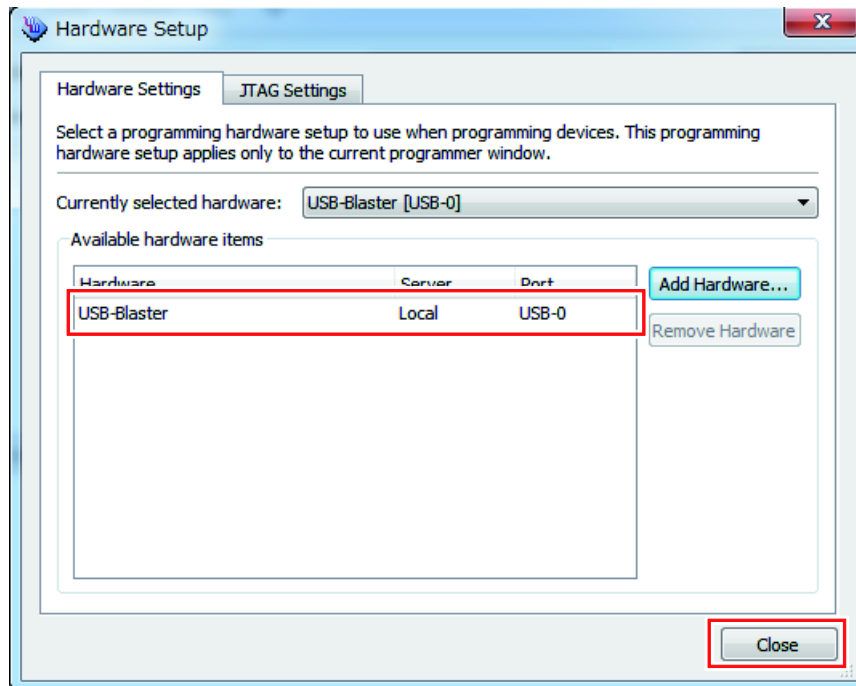
- 6) When the Quartus II window opens, click [Programmer] in the [Tools] menu.



- 7) Click [Hardware Setup] on the Programmer window.
*If the [Hardware Setup] configuration is not required, proceed to step 9.

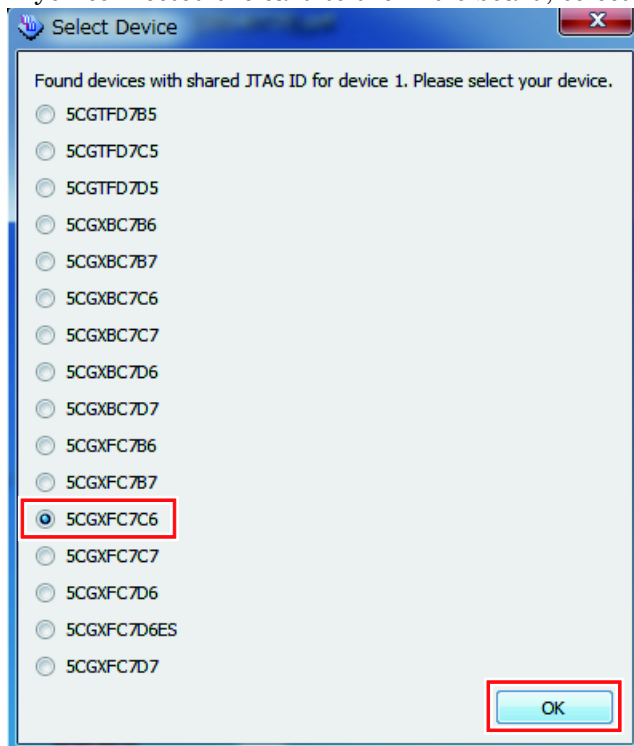


- 8) Double-click [USB-Blaster] in "Available hardware items", and then click [Close] to close the window.

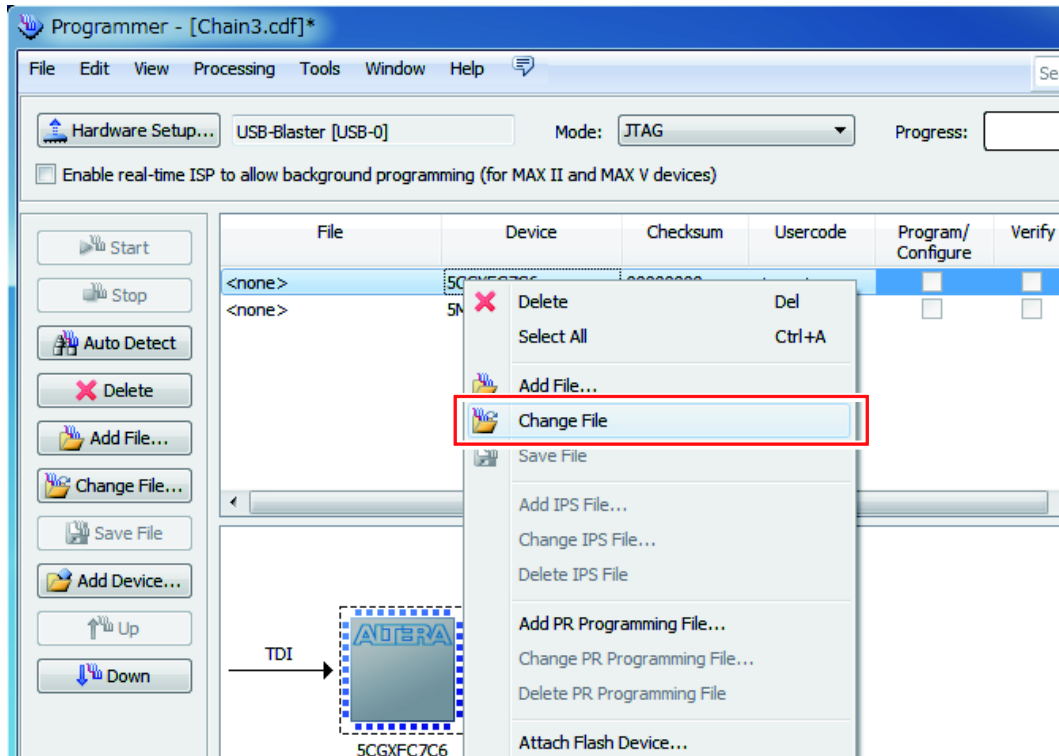


- 9) Click [Auto Detect]. When the "Select Device" window appears, select "5CGXFC7C6", and then click [OK].

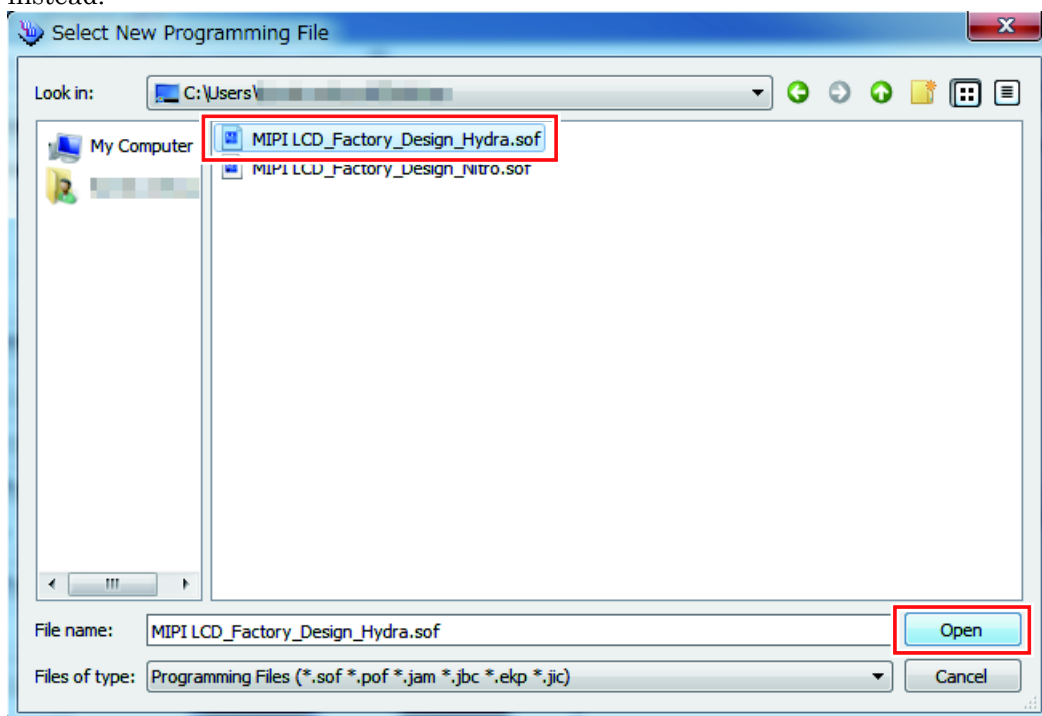
If you connected the card to the Nitro board, select "5CGXFC9E6" instead.



- 10) Right-click the FPGA that has been recognized, and select "Change File".

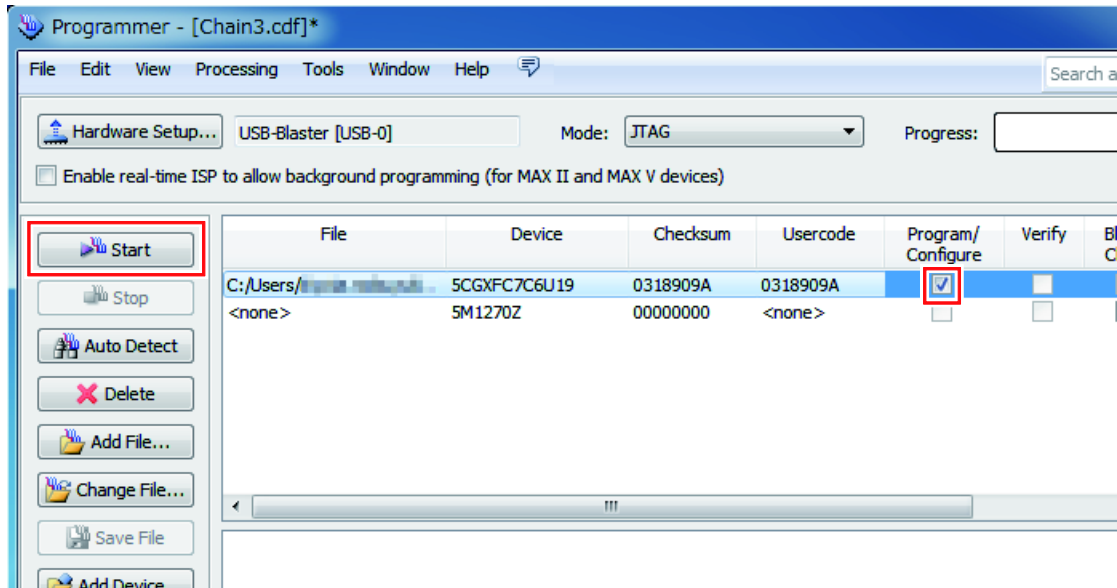


- 11) Select "MIPI_LCD_Factory_Design_Hydra.sof" in the file selection window and click [Open].
If you connected the card to the Nitro board, select "MIPI_LCD_Factory_Design_Nitro.sof" instead.



- 12) Check "Program/Configure" and click [Start].

The download of the .sof file to the Cyclone V FPGA board (Hydra or Nitro) starts.

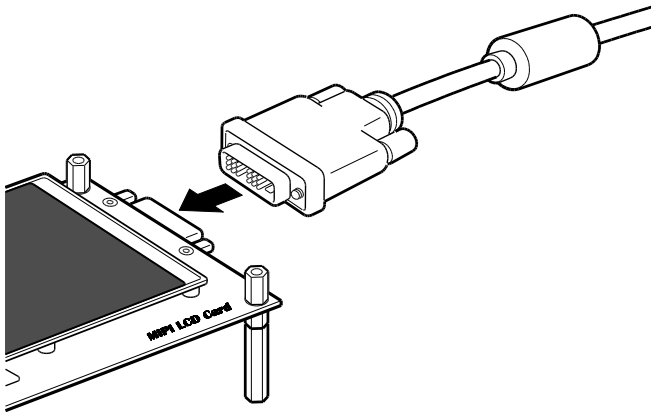


<Reference>

Program/Configure

Writes a programming file to the device.

- 13) Using a DVI cable, connect this Card as a duplicate or extended display of the host PC.



The following explains how to display images from the host PC on the LCD monitor of this Card, using Windows 7 as an example. (See steps 14 to 18 below.)

- 14) Right-click on the desktop of the host PC and select [Screen resolution].
- 15) If [Extend desktop to this display] is not selected for "Multiple displays", select it and click [Apply]. Click [Keep changes] on the confirmation dialog.
- 16) Select [ALT MIPI LCD] for "Display".
- 17) Select [1280 x 720] for "Resolution".
- 18) Click [OK]. Click [Keep changes] on the confirmation dialog.
The image from the host PC is displayed on the LCD monitor on this card.

5. Document Revision History

Date	Revision	Changes
September, 2014	1	<ul style="list-style-type: none">• Document created
		<ul style="list-style-type: none">•
		<ul style="list-style-type: none">•