

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 1 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 1 von 7 |

1. General

This programming adapter can be used to program the serial flash memories on the HPSDR boards and other Altera based CPLD and FPGA systems.

The connection to the Computer is established with a 1:1 parallel port cable which has a male connector on both ends.

For programming you need the programming tool from Altera which is included in the complete programming package „Quartus II Web Edition“. It can be downloaded after registration from the Altera sites.

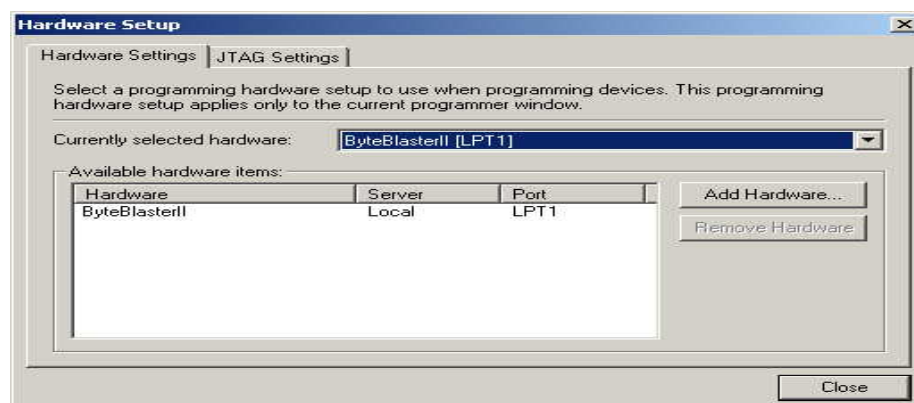
https://www.altera.com/support/software/download/altera_design/quartus_we/dnl-quartus_we.jsp

If you do not intend to read or change codes in the software, you can decide to use the stand alone programming tool which you can download from

https://www.altera.com/support/software/download/programming/quartus2/dnl-quartus2_programmer.jsp

2. Configuration of the Programming Tool

The programming adapter is based on Alteras Byteblaster II, so you have to select “Byteblaster II” for your hardware in the hardware setup.



More detailed help can be downloaded from:

http://www.altera.com/literature/ug/ug_bbii.pdf

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 4 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 2 von 7 |

3. Correction of erroneous pcb layout

You can find hints what is wrong and how to correct it in the schematic.

4. Stückliste

| Reference Designator | Wert | Bauform |
|---------------------------|----------------------------------|---------------------------|
| R1, R15 | 1K0 | SMD 0805 |
| R2 | 10K0 | SMD 0805 |
| R3,R4 / R5,R6 | 47R | SMD 0805 |
| R7-R11 | 330R | SMD 0805 |
| R12 | darf nicht bestückt werden | |
| R13 | 10K0 | SMD 0805 |
| R14 | 6K8 | SMD 0805 |
| V1 | BC817 | SMD SOT23 |
| D1-D4 | BAT54C | SMD SOT23 |
| D5 | BAT54C | SMD SOT23 |
| U1,U2 | 74LVC125 | SMD SO14 |
| U3 | LT1720CS8 | SMD SO8 |
| C1,C6 | n.b. / do not solder | SMD Tantal A |
| C2,C3 | 10µF/6.3V Keramik X5R | SMD 0805 |
| C4,C5 | 100nF/63V Keramik X7R | SMD 0805 |
| J1 | DSUB Buchse 25-polig | mit Lötkelch |
| PCB | | |
| Flat Ribbon Cable 10 pole | 30 cm | |
| Flat Ribbon Connector | PFL10 | |
| | | |
| X1-X10 | Solderpads for Flat Ribbon Cable | Flachbandkabel X1=Pin1... |

4.1 Assebmly Variants

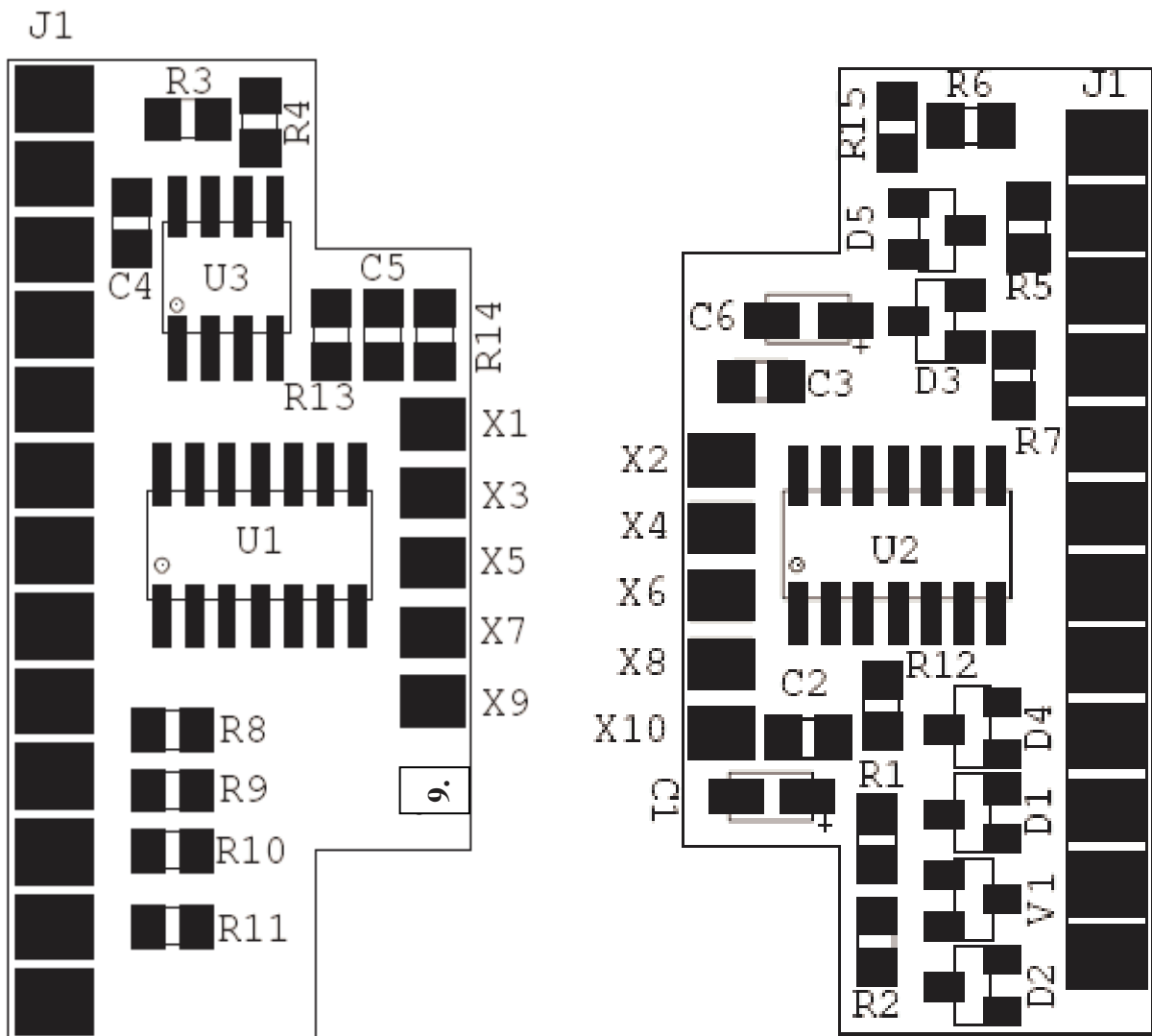
Mercury-EU and the HPSDR boards are running with an I/O Voltage of 3.3V.

The yellow marked components are only provided for I/O voltages < 2.2V and are not assembled on this board.

Should you intend to use the programming adapter for I/O voltages < 2.2V you have to assemble the yellow marked components i.e. R3 and R4 **and to remove** R5 and R6. If all are assembled you will risk to damage the adapter and/or the unit to be programmed.

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 4 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 3 von 7 |

5. Top and Bottom Assembly



X1-X10 are solderpads for wires 1-10 of a flat ribbon cable. Wire no.1 is coloured.

The odd wires are soldered to the odd pads on one side of the pcb and the even wires are soldered to the even pads on the other side of the board.

On the other end of the cable you have to press the flat ribbon connector. Wire no. 1 (coloured) has to be next to the end of the connector which is marked with a triangle

The pcb is fitting into the housing of the DB9 connector.

6. Schematics

Umbauanleitung des fehlerhaften Schaltungsteils:

1. Möglichkeit:

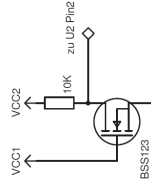
-- R12 wird bestückt, U2, Pin2 mit GND verbinden.

Vorteil: sehr einfach umsetzbar.

Nachteil: FPGA-Applikation startet erst bei abgezogenem Programmierstecker.

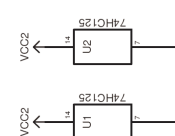
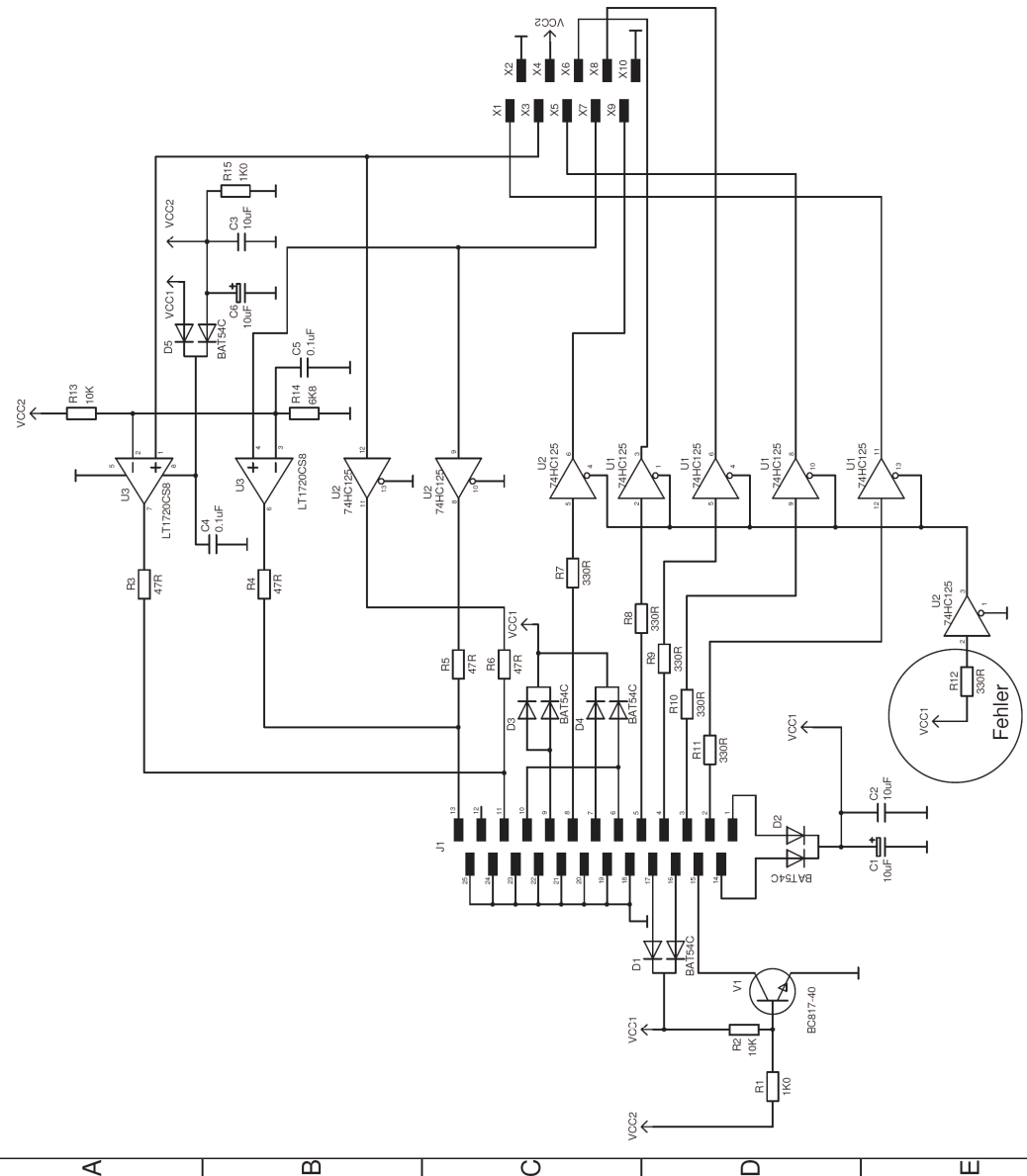
2. Möglichkeit

2 zusätzliche Bauteile



Vorteil: FPGA-Applikation startet sofort nach Programmierung.

Nachteil: im Vergleich zu Variante1 komplizierter



| | | | | | | | | | | | | | | | | | | | | | |
|-------------------|--------|-------|-------|------|-------|--------|-------|-------|------|--|--------|-------|-------|------|-------|--------|-------|-------|------|-------|--|
| Datum | Änd.Nr | Datum | gepr. | Name | gepr. | Änd.Nr | Datum | gepr. | Name | gepr. | Änd.Nr | Datum | gepr. | Name | gepr. | Änd.Nr | Datum | gepr. | Name | gepr. | |
| gez: | | | | | | | | | | | | | | | | | | | | | |
| gepr: | | | | | | | | | | | | | | | | | | | | | |
| freig: | | | | | | | | | | | | | | | | | | | | | |
| Nur mit CAD ndern | | | | | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | NT-Electronics | | | | | | | | | | | |
| | | | | | | | | | | BEZEICHNUNG: Mercury FPGA/Flash Programmieradapter | | | | | | | | | | | |
| | | | | | | | | | | Maststab Lp-Nr. | | | | | | | | | | | |
| | | | | | | | | | | Blatt: 1 / 1 | | | | | | | | | | | |
| | | | | | | | | | | SB-Nr. | | | | | | | | | | | |

Dieses Dokument ist ausschließlich unser Eigentum. Ohne unsere Zustimmung darf es weder vervielfältigt noch Dritten zugänglich gemacht werden. Wir behalten uns die Rechte vor, auch für den Fall der Freilegung nach Gebrauchsmusterprüfung.

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 4 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 5 von 7 |

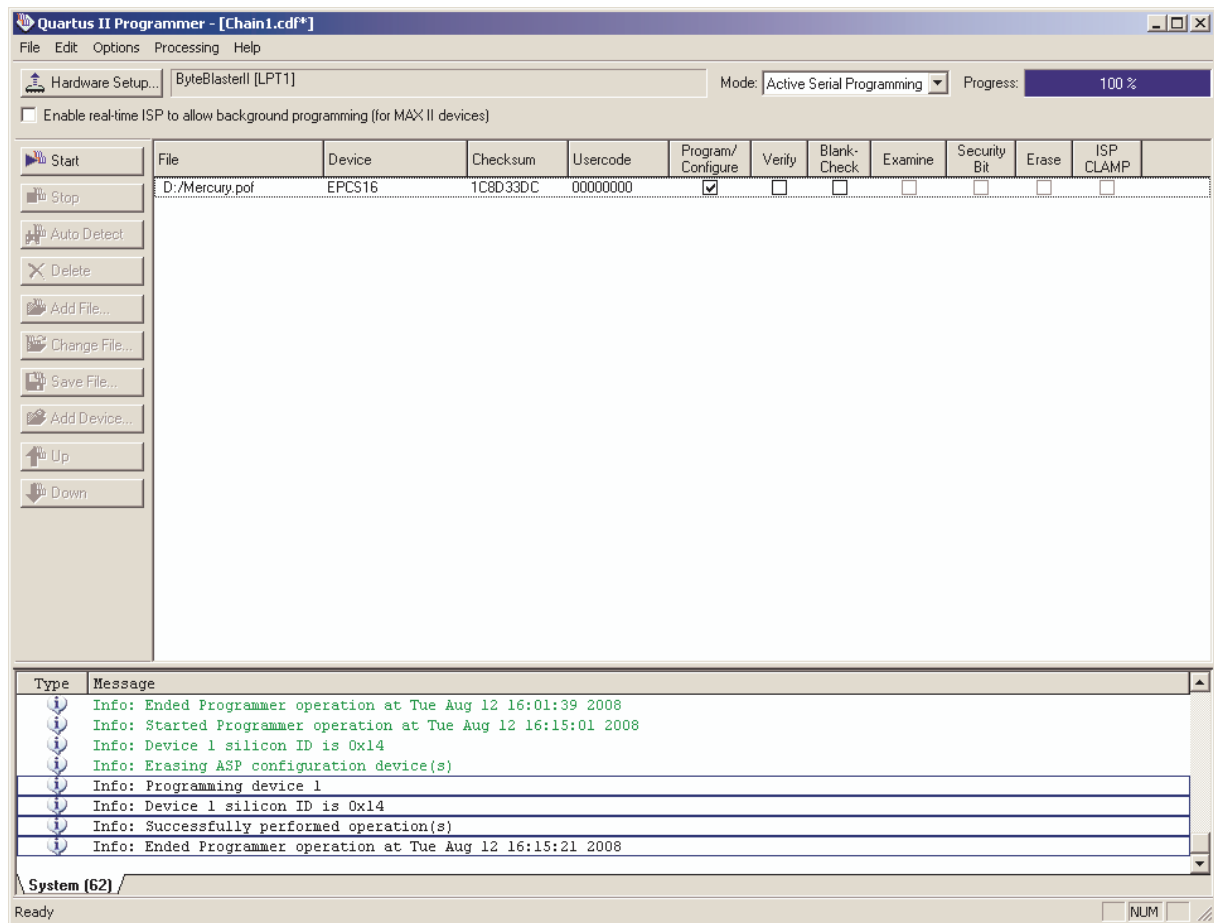
7. Programming Mercury-EU

- Disconnect PS from Mercury-EU.
- Connect DB25 receptacle of the programming adapter by means of a parallel (printer) cable to the pc parallel port. Plug the flat ribbon cable connector to J7 on Mercury-EU. This is the middle of 3 adjacent 10 pin connectors. When using non keyed connectors on other boards you must ensure to have pin1 on the correct side.

Jumpers on Mercury-EU have to be configured for „Active Serial“. This is not mandatory for programming but for starting the program.

- Switch on the psu for Mercury-EU resp. Atlas.
- Start the software tool Quartus II-Programmer.
- Select Quartus II Programmer **Mode** „Active Serial“ auswählen.
- Select „Hardware Setup“ and choose „Byteblaster II (LPT1)“ wählen.
- Select „Add File“ and choose the .pof file which contains the program.
- With Mercury-EU you should first programm **pulse_state.pof**. This is a testprogramm that lights the debug leds in sequence and isr running in a loop.
- When your selected file is shown in the list check the box **Program/Configure** and click on the button START.

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 4 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 6 von 7 |



All results in the bottom window are in green colour when everything working fine.

Info: Started Programmer operation at Tue Aug 12 16:15:01 2008

Info: Device 1 silicon ID is 0x14

Info: Erasing ASP configuration device(s)

Info: Programming device 1

Info: Device 1 silicon ID is 0x14

Info: Successfully performed operation(s)

Info: Ended Programmer operation at Tue Aug 12 16:15:21 2008

Errormessages are in red colour:

Error: JTAG Server can't access selected programming hardware

Error: Operation failed

Reason: Cable from pc to programming adapter is not plugged.

| | | |
|-----------------------|--|-------------------------------|
| NT-Electronics | Manual | Version: 4 04.09.08 |
| | Serial Flash Programming Adapter for Altera CPLD and FPGA | Seite 7 von 7 |

Error: Can't recognize silicon ID for device 1

Error: Operation failed

Reason: Flat ribbon connector is not plugged or the unit to be programmed has no power. (The programming adapter gets its power from the unit to be programmed)

When you have jumpered „Active Serial Mode“ the program starts immediately if you have modified the adapter pcb according to the comments in the schematics.

If not you have first to remove the connector of the programming adapter from the header on your board.