ATDH2200E Programming Kit

User Guide

Section 1 Stand-alone Device Programming Using Atmel's ATDH2200E Configurator Programming System

For example schematics reference:

- The "FPGA Configuration EEPROM Memory" datasheets for AT17C/LVXXX(A) device(s).
- The "AT17A Series Conversions from Altera FPGA Serial Configuration Memories" application note for using Atmel Configurators in place of Altera devices (EPCXXXX).

Section 2 In-System Programming (ISP) Using Atmel's ATDH2200E Configurator Programming System

For example schematics reference:

- The "Programming Specification for Atmel's FPGA Configuration EEPROMs" application note for AT17C/LVXXX(A) device(s).
- The "In-System Programming Cascaded Configurators" application note for cascaded Configurators.
- The "AT17A Series Conversions from Altera FPGA Serial Configuration Memories" application note for using Atmel Configurators in place of Altera devices (EPCXXXX).

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Section 1

Stand-alone Device Programming Using Atmel's ATDH2200E Configurator Programming System

1.1 Hardware Setup

1.1.1 Hardware Requirements

- ATDH2200 Programming Board
- 25-pin Parallel Cable
- 9V DC Power Supply
- FPGA Configurators – AT17C/LVXXX(A)
- PC with Standard Configuration Parallel Port(1)
- Socket Adapters
  - **ATDH2220** for 20-pin **PLCC** Devices (Excluding 2M-bit Devices)
  - **ATDH2221** for 20-pin **SOIC** Devices
  - **ATDH2222** for all 20-pin **PLCC** Devices (Including 2M-bit Devices)

1.1.2 Hardware Connections

1. Connect the **25-pin parallel cable** from the PC's parallel port to connector P1 on the ATDH2200 programming board.(1)
2. Connect the power supply from an AC wall outlet to the **9V DC** connector.
3. Set jumper **JP2 to PROGRAM** unless otherwise specified for a specific procedure.
4. Set jumper **JP3 to 5.0V** if using an AT17CXXX(A) device or **3.3V** if using an AT17LVXXX(A) device.
5. Insert AT17C/LVXXX(A) device directly in the socket marked 17CXXX (U3) or via a socket adapter inserted into U3. Make sure the adapter is correctly placed into the socket marked 17CXXX (U3) and set the jumper(s) on the socket adapter, if any, as appropriate.
6. Set **S1** to the "**ON**" position to apply power to the board. Make sure the **LED** (D2) **illuminates**.

Note: ***1.*** LPT1 is the default port. LPT2 or LPT3, if available, can be selected from the COM Port options list in CPS.

1.2 Software Setup

1.2.1 Software Requirements

- CPS (Configurator Programming System)
- Windows® 95/Windows 98/Windows NT®

1.2.2 Install and/or Launch CPS

To install CPS under Windows 95/98:

1. Exit all open applications and insert the "AT17 Configurator Programming System" installation disk in the appropriate drive
2. Click the Start button and select Run
3. Type your disk drive letter followed by :\CPSInstall.exe (e.g., A:\CPSInstall.exe)
4. Follow the on-screen prompts to complete the installation

To install CPS under Windows NT:

1. The installation procedure is same as Windows 95/98, but the installation must be done by the System Administrator

1.3 Using a Configurator with Atmel FPGA(s)

Perform hardware and software setup as described in paragraphs 1.1 and 1.2.

1.3.1 Program the Contents of a .BST File to the AT17C/LVXXX Device(s)

1. Procedure → Select "/P: Partition, program and verify from an Atmel file".
2. Input File → **<design>.bst**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
5. Press "Start Procedure"(1)

1.3.2 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

1.3.3 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

1.3.4 Verify the Device Reset Polarity

1. Procedure → Select "/X: Verify device reset polarity".
2. Options → Default or previous settings are given. You may need to modify the following:
   – Reset Polarity → Select the reset polarity.
3. Set **JP2** to the **READ** position on the ATDH2200 board.
4. Press "Start Procedure"(1)
5. Set **JP2** back to the **PROGRAM** position on the ATDH2200 board.

Note: ***1.*** If CPS is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration.

1.4 Using a Configurator with Xilinx FPGA(s)

Perform hardware and software setup as described in paragraphs 1.1 and 1.2.

1.4.1 Program the Contents of a .MCS File to the AT17C/LVXXX Device(s)

1. Procedure → Select "/E: Convert, partition, program and verify from a Xilinx file".
2. Input File → **<design>.mcs**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
5. Press "Start Procedure"(1)

1.4.2 Convert a .MCS File

1. Procedure → Select "/H: Convert a Xilinx file".
2. Input File → **<design>.mcs**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Press "Start Procedure"

1.4.3 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

1.4.4 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

Note: ***1.*** If CPS is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration

1.4.5 Verify the Device Reset Polarity

1. Procedure → Select "/X: Verify device reset polarity".
2. Options → Default or previous settings are given. You may need to modify the following:
   – Reset Polarity → Select the reset polarity.
3. Set **JP2** to the **READ** position on the ATDH2200 board.
4. Press "Start Procedure"(1)
5. Set **JP2** back to the **PROGRAM** position on the ATDH2200 board.

Note: ***1.*** If CPS is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration

1.5 Using a Configurator with Altera FPGA(s)

Perform hardware and software setup as described in paragraphs 1.1 and 1.2.

1.5.1 Program the Contents of a .POF/.RBF/.HEX File to the AT17C/LVXXX(A) Device(s)

1. Procedure → Select "/A: Convert, partition, program and verify from an Altera file".
2. Input File → **<design>.<pof | rbf | hex>**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
5. Press "Start Procedure"(1)

1.5.2 Convert and Partition a .POF/.RBF/.HEX File

1. Procedure → Select "/B: Convert and partition an Altera file".
2. Input File → **<design>.<pof | rbf | hex>**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
5. Press "Start Procedure"

1.5.3 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

1.5.4 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

Note: ***1.*** If CPS is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration

1.5.5 Verify the Device Reset Polarity

1. Procedure → Select "/X: Verify device reset polarity".
2. Options → Default or previous settings are given. You may need to modify the following:
   – Reset Polarity → Select the reset polarity.
3. Set **JP2** to the **READ** position on the ATDH2200 board.
4. Press "Start Procedure"(1)
5. Set **JP2** back to the **PROGRAM** position on the ATDH2200 board.

1.5.6 Enable the Clock Output on the AT17C/LV512A/010A /020A Configurator

1. Procedure → Select "/M: Enable AT17C512A/010A/020A Internal Clock".
2. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
3. Press "Start Procedure"(1)

1.5.7 Disable the Clock Output on the AT17C/LV512A/010A /020A Configurator

1. Procedure → Select "/M: Disable AT17C512A/010A/020A Internal Clock".
2. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – A2 Bit Level → Select "Low". (Not applicable to 2M-bit devices)
3. Press "Start Procedure"(1)

Note: ***1.*** If CPS is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration

Section 2

In-System Programming (ISP) Using Atmel's ATDH2200E Configurator Programming System

2.1 Hardware Setup

2.1.1 Hardware Requirements

- ATDH2200 Programming Board
- 25-pin Parallel Cable
- 10-pin Ribbon Cable
- PC with Standard Configuration Parallel Port(1)
- FPGA Configurators – AT17C/LVXXX(A)

2.1.2 Hardware Connections

1. Connect the **25-pin parallel cable** from the PC's parallel port to connector P1 on the ATDH2200 programming board.(1)
2. Connect the 10-pin ribbon cable from the **ATDH2200's** in-system programming **Header U7** to the **Target System's** matching in-system programming **Header**.
3. Set jumper **JP2** to **PROGRAM**.
4. Remove jumper **JP3**.
5. Insert AT17C/LVXXX(A) Configurator in the socket of the Target System.
6. Apply power to the Target System.

Note: ***1.*** LPT1 is the default port. LPT2 or LPT3, if available, can be selected from the COM Port options list in CPS.

2.2 Software Setup

2.2.1 Software Requirements

- CPS (Configurator Programming System)
- Windows 95/Windows 98/Windows NT

2.2.2 Install and/or Launch CPS

To install CPS under Windows 95/98:

1. Exit all open applications and insert the "AT17 Configurator Programming System" installation disk in the appropriate drive
2. Click the Start button and select Run
3. Type your disk drive letter followed by :\CPSInstall.exe (e.g., A:\CPSInstall.exe)
4. Follow the on-screen prompts to complete the installation

To install CPS under Windows NT:

1. The installation procedure is same as Windows 95/98, but the installation must be done by the System Administrator

2.3 Using a Configurator with Atmel FPGA(s)

Perform hardware and software setup as described in paragraphs 2.1 and 2.2.

2.3.1 Program the Contents of a .BST File to the AT17C/LVXXX Device(s)

1. Procedure → Select "/P: Partition, program and verify from an Atmel file".
2. Input File → **<design>.bst**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select "Specify before each device". (Not applicable to 2M-bit devices)(2)
5. Press "Start Procedure"(1)

2.3.2 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

2.3.3 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT40K" or "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

Notes: ***1.*** If CPS utility is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration.

2. During programming, you will be asked to select the level that matches the level seen on the A2 input pin of each target device.

2.4 Using a Configurator with Xilinx FPGA(s)

Perform hardware and software setup as described in paragraphs 2.1 and 2.2.

2.4.1 Program the Contents of a .MCS File to the AT17C/LVXXX Devices

1. Procedure → Select "/E: Convert, partition, program and verify from a Xilinx file".
2. Input File → **<design>.mcs**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – A2 Bit Level → Select "Specify before each device". (Not applicable to 2M-bit devices)(2)
5. Press "Start Procedure"(1)

2.4.2 Convert a .MCS File

1. Procedure → Select "/H: Convert a Xilinx file".
2. Input File → **<design>.mcs**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Press "Start Procedure"

2.4.3 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

2.4.4 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

Notes: ***1.*** If CPS utility is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration.

2. During programming, you will be asked to select the level that matches the level seen on the A2 input pin of each target device.

2.5 Using a Configurator with Altera FPGA(s)

Perform hardware and software setup as described in paragraphs 2.1 and 2.2.

2.5.1 Program the Contents of a .POF/.RBF/.HEX File to the AT17C/LVXXX(A) Devices

1. Procedure → Select "/A: Convert, partition, program and verify from an Altera file".
2. Input File → **<design>.<pof | rbf | hex>**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – Reset Polarity → Select the reset polarity.
   – A2 Bit Level → Select "Specify before each device". (Not applicable to 2M-bit devices)(2)
5. Press "Start Procedure"(1)

2.5.2 Convert and Partition a .POF/.RBF/.HEX File

1. Procedure → Select "/B: Convert and partition an Altera file".
2. Input File → **<design>.<pof | rbf | hex>**
3. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
4. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
5. Press "Start Procedure"

2.5.3 Read the Contents of the Configurator to a .BST File

1. Procedure → Select "/R: Read data from device and save to an Atmel file".
2. Output File → Defaults to **<CPS_INSTALL_DIRECTORY>\out.bst** or the **most recently used output filename**.
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

Notes: ***1.*** If CPS utility is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration.

2. During programming, you will be asked to select the level that matches the level seen on the A2 input pin of each target device.

2.5.4 Verify the Device against a .BST File

1. Procedure → Select "/V: Verify device against an Atmel file".
2. Input File → **<design>.bst**
3. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – FPGA Family → Select "AT6K/Other".
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
4. Press "Start Procedure"(1)

2.5.5 Enable the Clock Output on the AT17C/LV512A/010A /020A Configurator

1. Procedure → Select "/M: Enable AT17C512A/010A/020A Internal Clock".
2. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
3. Press "Start Procedure"(1)

2.5.6 Disable the Clock Output on the AT17C/LV512A/010A /020A Configurator

1. Procedure → Select "/M: Disable AT17C512A/010A/020A Internal Clock".
2. Options → Default or previous settings are given. You may need to modify the following:
   – EEPROM Density → Select the device density.
   – A2 Bit Level → Select the level that matches the level seen on the A2 pin of the target device. (Not applicable to 2M-bit devices)
3. Press "Start Procedure"(1)

Note: ***1.*** If CPS utility is being launched for the first time on the computer, the clock calibration dialog will be displayed. Press "Yes" to proceed with clock calibration and select "High" for accurate calibration.

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