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CYCLONE Programmers User Manual



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| 1 | INTR | ODUCTION | 1 | | | | | |
|---|------|--|----|--|--|--|--|--|
| | 1.1 | Feature Overview/Comparison | 1 | | | | | |
| 2 | QUIC | K START GUIDE FOR SAP OPERATION | 2 | | | | | |
| 3 | CYCI | CYCLONE HARDWARE | | | | | | |
| | 3.1 | Touchscreen LCD | 5 | | | | | |
| | 3.2 | LED Indicators | 5 | | | | | |
| | 3.3 | Start Button | 5 | | | | | |
| | 3.4 | Access Panel | 5 | | | | | |
| | 3.5 | Cyclone System Power | 6 | | | | | |
| | 3.6 | RS232 Communication (Serial Port) | 6 | | | | | |
| | 3.7 | Ethernet Communication | 6 | | | | | |
| | 3.8 | USB Communications | 6 | | | | | |
| | 3.9 | Electromechanical Relays | 6 | | | | | |
| | 3.10 | Power Connectors | 7 | | | | | |
| | 3.11 | Reset Button | 7 | | | | | |
| | 3.12 | Optional Oscillator (MON08 Only) | 7 | | | | | |
| | 3.13 | Cyclone Time / Real Time Clock | 7 | | | | | |
| | 3.14 | Power Jumper Settings | 8 | | | | | |
| | 3.15 | Debug Connectors | 8 | | | | | |
| | 3.16 | Target Headers For Part# CYCLONE_ACP | 9 | | | | | |
| | 3.17 | Target Headers For Part# CYCLONE_UNIVERSAL | 12 | | | | | |
| | 3.18 | Ribbon Cable | 18 | | | | | |
| 4 | TARC | GET POWER MANAGEMENT | 19 | | | | | |
| | 4.1 | Cyclone Configuration | 19 | | | | | |
| | 4.2 | Cyclone Setup | 21 | | | | | |
| | 4.3 | Setup Reminders | 23 | | | | | |
| 5 | TOU | TOUCHSCREEN LCD MENU | | | | | | |
| | 5.1 | Home Screen | 24 | | | | | |
| | 5.2 | Main Menu | 25 | | | | | |
| 6 | STAN | STAND-ALONE PROGRAMMER CONFIGURATION | | | | | | |
| | 6.1 | Create A Stand-Alone Programming (SAP) Image | | | | | | |
| | 6.2 | Manage Multiple SAP Images | | | | | | |
| 7 | STAN | ND-ALONE PROGRAMMER MANUAL CONTROL | 41 | | | | | |
| | 7.1 | Operation Via Start Button | | | | | | |
| | 7.2 | Operation Via LCD Touchscreen Menu | 41 | | | | | |
| | 7.3 | Home Screen | | | | | | |
| | 7.4 | Status Window | | | | | | |
| 8 | STAN | ND-ALONE PROGRAMMER AUTOMATED CONTROL | 45 | | | | | |
| | 8.1 | Cyclone Automated Control Package - Overview | | | | | | |
| | | | | | | | | |

| | 8.2 | Cyclone Automated Control Package - Details | 45 |
|----|-------|---|----|
| 9 | ETHE | RNET CONFIGURATION | 47 |
| | 9.1 | Network Architectures | |
| | 9.2 | Network Parameters | |
| | 9.3 | Internet Protocol | |
| | 9.4 | Connecting The Cyclone Device | 48 |
| | 9.5 | Cyclone IP Setup Via LCD Menu | |
| | 9.6 | Cyclone IP Configuration Utility User Interface (ConfigureIP) | 50 |
| | 9.7 | Using Cyclone IP Configuration Utility To Configure The Cyclone | 53 |
| 10 | SERI | AL PORT CONFIGURATION | 55 |
| 11 | USB F | PORT CONFIGURATION | 56 |
| 12 | SAP_ | LAUNCH COMMAND-LINE UTILITY | 57 |
| | 12.1 | SAP_LAUNCH Introduction | 57 |
| | 12.2 | SAP_LAUNCH Startup | 57 |
| | 12.3 | SAP_LAUNCH Examples | 57 |
| | 12.4 | SAP_LAUNCH Sample Batch File | 58 |
| | 12.5 | SAP_LAUNCH DOS Error Returns | 58 |
| 13 | AUTC | MATIC SERIAL NUMBER MECHANISM | 60 |
| | 13.1 | Understanding Serialization | 60 |
| | 13.2 | Serialize Utility | 60 |
| | 13.3 | Serialize Utility Example | 62 |
| | 13.4 | Using Serial Number File | 63 |
| | 13.5 | Serial Number Handling | 63 |
| 14 | SAP (| CONVERTER UTILITY | 65 |
| 15 | TROL | IBLESHOOTING | 66 |
| 16 | ERRC | OR CODES | 67 |
| | 16.1 | Debug Mode Communication Related Errors | 67 |
| | 16.2 | SAP Image Handling Related Errors | 67 |
| | 16.3 | SAP Algorithm header Operation Handling Related Errors | 67 |
| | 16.4 | SAP Operation Related Errors | 68 |
| | 16.5 | SAP Blank Check Range and Module Related Errors | |
| | 16.6 | SAP Erase Range and Module Related Errors | 68 |
| | 16.7 | SAP Program Byte, Word, and Module Related Errors | 68 |
| | 16.8 | SAP Verify Checksum Related Errors | 69 |
| | 16.9 | SAP Verify Range and Module Related Errors | 69 |
| | 16.10 | SAP User Function Related Errors | 69 |
| | 16.11 | SAP Trim Related Errors | 69 |
| | 16.12 | Unrecoverable Fatal Errors | 69 |
| | 16.13 | Operation Security Related Errors | 70 |

| | 16.14 | External Memory-Related Errors | 70 |
|----|-------|---|----|
| | 16.15 | Serial Number Related Errors | 70 |
| | 16.16 | Download Count Related Errors | 71 |
| | 16.17 | System Hardware/Firmware/Logic Recoverable Errors | 71 |
| 17 | CYCL | ONE FEATURE OVERVIEW / COMPARISON | 72 |
| | | | |



INTRODUCTION

PEmicro's **CYCLONE** production programmers are powerful, fast, and feature rich in-circuit programming solutions. PEmicro offers two models which have the same feature set and only vary by the devices supported.

The CYCLONE_ACP supports a wide variety of ARM Cortex devices.

The CYCLONE_UNIVERSAL supports those ARM Cortex devices as well as the following NXP device families: Kinetis, LPC, S32, Qorivva (MPC5xxx), MPC5xx/8xx, DSC, S12Z, RS08, S08, HC08, HC(S)12(X), and Coldfire.



Figure 1-1: CYCLONE Supported Architectures

CYCLONE programmers are designed to withstand the demands of a production environment. They are Stand-Alone Programmers (SAP) that can be operated manually or used to host automated programming. In manual SAP mode the Cyclone is operated using the touchscreen LCD Menu and/or the Start button. Host-controlled SAP mode, for automated programming, is accomplished using either a command line utility, RS232 protocol, UDP protocol, or the Cyclone Automated Control DLL.

P&E also offers **CYCLONE FX** programmers which include enhanced speed, storage, security, and other features that make them an incredibly powerful and versatile solution. For more information, visit pemicro.com/cyclone.

1.1 Feature Overview/Comparison

See **CHAPTER 17 - CYCLONE FEATURE OVERVIEW / COMPARISON** for a **CYCLONE** feature overview and comparison with the **CYCLONE** programmers.



2

QUICK START GUIDE FOR SAP OPERATION

Stand-Alone Programming (SAP) is the most common use of the **CYCLONE**. This quick-start guide illustrates how easy it is to begin using the Cyclone for stand-alone programming.

You are encouraged to read this manual in its entirety for a complete description of all features specific to your Cyclone, many of which are beyond the scope of this quick-start guide.

Step 1. Install Software

The first step is to install the accompanying software. This will install all of the applications and drivers that can be used to configure/control the **CYCLONE**.

Once the installation is complete and the PC has been rebooted you may begin to configure the Cyclone for SAP operation.

Step 2. Hardware Setup

a. Configure the target power management scheme

Power management is configured by setting jumpers that are revealed by opening the access panel on the Cyclone's left side. The corresponding settings are conveniently illustrated on the rear label of Cyclone. No jumpers are installed by default. You may wish to refer to **Section 3.22 - Target Power Management**.

b. Connect the Cyclone to your PC

Select the appropriate communications interface (Serial, USB or Ethernet) and connect the Cyclone to your PC. If you wish to use the Ethernet port you will need to configure the corresponding network settings before use, either through the touchscreen LCD menu or via the software utility *ConfigureIP*. The Ethernet port will not function properly until this configuration is complete. You may wish to refer to **CHAPTER 9 - ETHERNET CONFIGURATION**.

c. Power up the Cyclone.

Step 3. Create a SAP Image

A SAP image, or Stand-Alone Programming image, is a self-sufficient data object containing the Cyclone and target hardware setup information, programming algorithm, programming sequence, and target data. The Cyclone uses these images to perform SAP operations on target devices. Follow these steps to create a SAP image:

a. Run the Cyclone Image Creation Utility

This utility is a GUI designed to help users create architecture/manufacturer-specific SAP images. To run this utility:

From the "Start" menu of your PC, navigate to "All Programs -> PEMicro. From there, select "P&E Cyclone Universal Programmer" or "P&E Cyclone for ARM devices" depending on which specific PEmicro part# you are using, then select -> *P&E Cyclone Universal* (or *P&E Cyclone for ARM devices*) *Image Creation Utility*. The utility is shown in **Figure 2-1**. Continue with the steps below to create an image.



| Specify Target Architecture: | Qorivva | - | | | | | |
|---|--|---|----------------------------|----------------|---------------|-------------------|-------|
| Programming Sequence | <i></i> | | | | | | |
| CM ;Choose Algorithm SS ;Specify Object Code | CM C:\p SS C:\V | progNNT_FREESCALE_HC GENS19\s19.ASM\PPC\MF | PC_QORIVVA\ PC5674F.s19 | Freescale_MPC5 | 674F_1x32x102 | 24k.pcp | |
| EN ;Erase if not Blank EM ;Erase Module | EN ;Era | se if not Blank gram Module | | | | | |
| BM ;Blank Check Module PM ;Program Module | | fy Checksum | | | | | |
| PR ;Program Range VM Verifu Module | | | | | | | |
| VR :Verify Range | - 4 | | | | | - | |
| VC , Veniy Checksum | | 1 | 1 | 1 | 1 | | |
| Ignore Address Range C | heck Show S19 CRC | Launch Script Wizard | Clear Scrip | t Move up | Move down | Remove Fron | n Lis |
| Communication Settings | | | | Debug Port Pi | n Settings | | |
| Debug Shift Speed: 3 - 9 | Shift Frequency = 4.55 | MHz | - | Pin 1 ==> | | GND <== F GND | 'in 2 |
| Security Settings | | | | | | GND | |
| Device supports uncens | soring. C 64-bit • 256-bit 0 | 1234567-89ABCDEF-12345 | Browse | | | N/C TMS | |
| Target Power & Voltage Set | ttings | | | | VDD • • (| GND | |
| 🗌 Use Cyclone Relays | | | | Pin13 ==> | RDY# 🔷 💊 🗸 | JCOMP <== F | in14 |
| | | | | | | | |
| Reset Signal Settings | | | | | | | |
| After Reset, delay | 0 ms before contactin | ng target and enter programm | ning mode. | | | | |
| Drive RESET signal LO | W before and after SAP | operations. | | | | | |
| | | | 10 | | | | |
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| mage Description: 12/15/ | 2016 3:04:41 PM | | | | | | |
| | | | | | | | |
| FX Special Features | | | | | Stor | re Image to Cycl | one |
| FX Special Features | Maximum Harana har | dates : 12/18/2016 | to 12/19/2 | | | | |
| FX Special Features | it Image Usage between | | er of failures all | lowed: | 0 | | |
| FX Special Features mage Restrictions : 🖵 Limi 🖵 Nurr | it Image Usage between nber of programs allower | ± 0 🗆 Numb | | | | tara Imaga ta Di | sk |
| FX Special Features mage Restrictions : 		Limi | it Image Usage between nber of programs allowed | t: 0 🗆 Numb | | Br | owse SI | tore image to Dis | |
| FX Special Features mage Restrictions : 		Limil | it Image Usage between nber of programs allower | ± 0 🗆 Numb | | Br | owse S | tore image to bi | |
| FX Special Features | it Image Usage between | ± 0 | | Br | owse | tore image to bit | _ |
| FX Special Features | it Image Usage between | ±O Numb | | Br | | | |

Figure 2-1: Cyclone Image Creation Utility (Qorivva Selected)

- b. In the Cyclone Image Creation Utility, select your CPU manufacturer and architecture from their respective drop-down lists.
- c. Click the "Launch Script Wizard" button. Follow the pop-up screens to specify a programming algorithm and target object file. The programming algorithm, target object file, and default programming sequence will then show up in the programming sequence listbox.
- d. Specify the auxiliary setup and hardware setup, such as Communication Mode, Communication Rate, Target Power, and Voltage Settings.
- e. Type an Image Description for your SAP image. The default description is a time stamp.
- f. Click the "Store Image to Cyclone" button.
- g. Choose the communication interface, select the Cyclone to which the image will be saved, and then click the "Store Image to Cyclone" button. A backend image configuration utility will pop up and store the image information on the Cyclone. Your SAP image has now been created.

Step 4. Execute SAP Image

The SAP image stored on your Cyclone can now be programmed to the target with one button press. Once your target is connected to the Cyclone, press the "Start" button of the Cyclone unit and wait for programming operations to finish. During this process, the LCD screen will show the status of operations. Note that the menu option described in **Section 5.2.3.5.3 - Set Progress**



Details will allow you to set the Cyclone to display either more or less detailed information about the programming process during programming. Eventually the "Success" or "Error" LED will illuminate, and the LCD screen will display the results.

Note: If programming is unsuccessful when using this quick start setup, the user may instead wish to use the included PROG software for their device. The PROG software allows the user to manually walk through the programming procedure step by step, which may help determine which part of setup or programming function is causing difficulty.



3

CYCLONE HARDWARE

The following is an overview of the features and interfaces of the **CYCLONE** programmers. Many of these interfaces are labeled on the underside of the plastic case.



Figure 3-1: CYCLONE Top View

3.1 Touchscreen LCD

The LCD Touchscreen displays information about the Cyclone's configuration and the programming process, and also allows the user to navigate the Cyclone's menus. The location of the Touchscreen LCD is shown in **Figure 3-1**.

3.2 LED Indicators

The LED indicators for Error or Success will illuminate depending on the results of the programming process and provide a clear visual indication of the results. The location of the LED Indicators is shown in **Figure 3-1**.

3.3 Start Button

The Start Button can be used to begin the programming process manually, provided that the Cyclone is properly configured. The location of the Start Button is shown in **Figure 3-1**.

3.4 Access Panel

The Access Panel can easily be opened to allow the user to connect/disconnect ribbon cables from the headers, or to configure the Cyclone's Power Jumpers to select one of the available Power Management setups. The location of the Access Panel is shown in **Figure 3-1**; a layout of the headers and jumpers beneath the Access Panel is shown in **Figure 3-4**.





Figure 3-2: CYCLONE Right Side View

3.5 Cyclone System Power

The **CYCLONE** programmer requires a regulated 6V DC Center Positive power supply with 2.5/ 5.5mm female plug. Cyclones derive power from the Power Jack located on the right end of the unit. The location of Cyclone System Power is shown in **Figure 3-2**.

3.6 RS232 Communication (Serial Port)

The **CYCLONE** provides a DB9 Female connector to communicate with a host computer through the RS232 communication (115200 Baud, 8 Data bits, No parity, 1 Stop bit). The location of the Serial Port is shown in **Figure 3-2**.

3.7 Ethernet Communication

The **CYCLONE** provides a standard RJ45 socket to communicate with a host computer through the Ethernet Port (10/100 BaseT). The location of the Ethernet Port is shown in **Figure 3-2**.

3.8 USB Communications

The **CYCLONE** provides a USB connector for Universal Serial Bus communications between the Cyclone and the host computer. The **CYCLONE** is a USB 2.0 **Full-Speed** compliant device. The location of the USB Port is shown in **Figure 3-2**.

3.9 Electromechanical Relays

Inside the **CYCLONE** programmer, two electromechanical relays are used to cycle target power. The specifications of the relays are as following:

Maximum switched power:30W or 125 VAMaximum switched current:1AMaximum switched voltage:150VDC or 300VACUL Rating:1A at 30 VDC1A at 125 VAC

PEmicro only recommends switching DC voltages up to 24 Volts.





Figure 3-3: CYCLONE Front Side View

3.10 Power Connectors

The **CYCLONE** programmers provide a Target Power Supply Input Jack and a Target Power Supply Output Jack with 2.5/5.5 mm Pin Diameter. The power jacks are connected or disconnected by two electromechanical relays. When connected, the Center Pin of the Target Power Supply Input Jack is connected to the Center Pin of the Target Power Supply Output Jack. When disconnected, both terminals of the Target Power Supply Output Jack are connected to GND via a 1W, 100 Ohm resistor. The location of Target Power In is shown in **Figure 3-3**, and the location of Target Power Out is shown in **Figure 3-3**.

3.11 Reset Button

The Reset Button performs a hard reset of the Cyclone system. The location of the Reset Button is shown in **Figure 3-3**.



CYCLONE Rear Side View

3.12 Optional Oscillator (MON08 Only)

CYCLONE programmers with MON08 support (PEmicro Part# CYCLONE_UNIVERSAL only) provide a software configurable 9.8304MHz or 4.9152 MHz oscillator clock signal to Pin 13 of the MON08 Connector. The user may use this clock signal to overdrive the target RC or crystal circuitry. If this signal is not used, just leave Pin 13 of the target MON08 header unconnected.

Please note that if the target already uses an oscillator as its clock, the Cyclone will NOT be able to overdrive it. The clock should have sufficient drive to be used with a target system even if the target system has an RC circuit or crystal connected.

Note:

3.13 Cyclone Time / Real Time Clock

CYCLONE programmers are equipped with a Real Time Clock (RTC) module designed to keep



accurate timing even when the Cyclone is turned off.

The Date & Time are displayed on the home screen. Date/Time settings can be configured by navigating to the following menu using the touchscreen display:

Main Menu / Configure Cyclone Settings / Configure Time Settings

For more information on the available configuration options, see Section 5.2.3.3 - Configure Time Settings (Cyclone Time / Real Time Clock).

3.14 Power Jumper Settings

The Power Jumpers must be set differently for various power management options that the **CYCLONE** offers. If the target is being powered independently of the **CYCLONE**, all pins in the Power Jumpers header must instead be left unpopulated. To reveal the Power Jumpers header, lift the access panel on the left end of the **CYCLONE**. The location is indicated as Power Jumpers in **Figure 3-4**. Please see **Section 3.22 - Target Power Management** for the correct jumper settings for the Cyclone's power management options. A quick guide to these settings is also located on the underside label of the **CYCLONE**.

3.15 Debug Connectors

When purchasing a **CYCLONE** programmer, the user is able to choose between two part numbers, each corresponding to a different level of device support. See the sticker on the underside of the Cyclone to determine the PEmicro part# for your specific **CYCLONE** programmer.

PEmicro Part# CYCLONE_ACP supports ARM Cortex devices only, so this programmer provides one shrouded, un-keyed, 0.100-inch pitch dual row 0.025-inch square header, and two shrouded, keyed 0.050-inch pitch dual row mini headers.

PEmicro Part# CYCLONE_UNIVERSAL supports ARM Cortex devices and additionally supports target connections to many 8-/16-/32-bit NXP architectures, so this programmer provides six shrouded, un-keyed, 0.100-inch pitch dual row 0.025-inch square headers, and two shrouded, keyed 0.050-inch pitch dual row mini headers.

To reveal the headers and connect/disconnect ribbon cables, lift the access panel on the left end of the Cyclone. Each header is designated for one or more specific target architectures, as indicated in **Figure 3-4**.



Figure 3-4: Target Headers & Power Jumpers (CYCLONE_UNIVERSAL vs.CYCLONE_ACP)

Mechanical drawings are shown below whose dimensions are representative of the pin size and spacing of these headers.

Note: The number of pins depicted in the mechanical drawings may differ from the Cyclone headers; the drawings are provided simply to demonstrate pin size and spacing.











3.16 Target Headers For Part# CYCLONE_ACP

PEmicro Part# CYCLONE_ACP features 3 ports labeled A-C.

3.16.1 PORT A: 10-Pin Keyed Mini Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a keyed 10-pin 0.050-inch pitch double row connector for ARM targets. The location of the this header is indicated as PORT A in **Figure 3-4**. The 10-pin keyed mini connector pin definitions for JTAG mode are as follows:

10-Pin Keyed Mini Connector JTAG Mode Pin Assignments

| PIN 1 - | TVCC | TMS | - PIN 2 |
|---------|------|-------|----------|
| PIN 3 - | GND | ТСК | - PIN 4 |
| PIN 5 - | GND | TDO | - PIN 6 |
| PIN 7 - | NC | TDI | - PIN 8 |
| PIN 9 - | NC | RESET | - PIN 10 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

10-Pin Keyed Mini Connector SWD Mode Pin Assignments

PIN 1 - TVCC TMS/SWDIO - PIN 2



| PIN 3 - | GND | TCK/SWCLK | - PIN | 4 |
|---------|-----|-----------|-------|----|
| PIN 5 - | GND | NC | - PIN | 6 |
| PIN 7 - | NC | NC | - PIN | 8 |
| PIN 9 - | NC | RESET | - PIN | 10 |

| Elle Options Help Specify Target Architecture: ARM devices Device: FAchecture: Architecture: KL2S:128M4 Select New Device Advanced Programming Sequence: CM: CVFEMenrologicone:::::::::::::::::::::::::::::::::::: | Cyclone Image Creation | Utility Version 5.77.10.00 | | | | |
|---|---|---|---------------------|------------------|------------------------|--------------------------------|
| Specify Target Auchitecture: ARM devices Device: Selection Architecture: ARM Vendor: NXP Family: KL2x Device: KL2x2120M4 Programming Sequence Advanced Programming Sequence Advanced M: Choce Notes B: Size Module B: Biark Check Module Mode: Store Blank Mode: Store Strings Mode: Store NC GND 0 NC Mode: Store Image Description: Priout in for 1.22mm (minit spacing 10-Pin (first 10 pin) and | Eile Options Help | | | | | |
| Device Selection Architecture: ARM Vendor: NXP Family: KL2x Device: KL2X:128M4 Select New Device Advanced Programming Sequence: CM: Choce Adgorithm Select New Device Advanced SS: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code SS: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code SS: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code Image: Specify Dipet Code SS: Specify Dipet Code Image: Dipet Code Image: Specify Dipet Code Image: Dipet Code | Specify Target Architecture: | ARM devices | • | | | |
| Debug Solution: Advanced Programming Sequence Select New Device Advanced Programming Sequence Monocold Setting Select New Device Advanced Programming Sequence Image Device Advanced Programming Sequence Device: KL2S2128M4 Image Device Advanced Programming Sequence Image Device Advanced Program Trim Image Device Image Device Advanced Program Nodue Image Device State Industry Image Device Advanced Image Device Image Device Image Device Advanced Image Device Image Device Image Device Image Device Advanced Image Device Image Device Image Device Image Device Advanced Image Device Image Device Image Device Image Device Image Device Store Image Device Advanced Image Device Image Device Image Device Image Device Image Device Store Image Device Advanced Image Device Image Device Image Device Image Device Image Device Image Device Image Devi | Device Selection | | | | | |
| Device: KLZSZ128M4 Select New Device Advanced Programming Sequence CM CADCA Agaztam Select New Device Advanced DM Social Sequence CM CADCA Agaztam Select New Device Addvanced DM Social Sequence CM CADCA Agaztam Select New Device Addvanced DM Social Sections Immodel Immodel Immodel Immodel BM Blank Check Module Immodel Immodel Immodel Immodel Immodel Program Bytes Program Model Immodel Immodel Immodel Immodel Immodel Program Range Program Model Immodel < | Architecture: ABM | Vendor NXP | Family | KI 2x | | |
| Detect: NL2s2_L28M4 Cell Advanced Programming Sequence Community Sequence Respective Direct Code Respective Direct | | | - Gila | ot New Device | Advanced | 1 |
| Programming Sequence OM Chock Approximation Sequence ACM Chock Ap | Device. [KL252128M4 | | ✓ Jeie | CITAGON DEVICE | | |
| CM. Choose Algorithm CM CoNCENTRATE OF CONCENTRATION OF CONCE | Programming Sequence | | | | | |
| BM. Blank Check Moddle mmm BM. Blank Check Moddle mmm BM. Blank Check Moddle mmm PP. Frogram Bytes mmm Program Bytes mmm Program Nockle Strong Strong Communication Settings mode Mode: SWD Debug Shit Speed: Debug Shit Speed: Diver Rest Debug Shit Speed: Diver Rest Signal Settings mice strong settings Pint Seed, delay: 0 ms before contacting target and enter programming mode. Pint Reset, delay: 0 ms before contacting target and enter programming mode. Pint Reset, delay: 0 ms before contacting target and enter programming mode. Pint Reset, delay: 0 ms before contacting target and enter programming mode. Pint Reset, delay: 0 ms before contacting target and enter programming mode. Pint Reset, delay: 0 ms before contacting target and enter programming mode. Pint See: User I signal LDW before and after SAP operations: Pint See: Get to user manual for 254mm spacing 20pin debug header. | CM ;Choose Algorithm SS ;Specify Object Code EN ;Erase if not Blank | CM C.\PEMicro\ | cyclone_universal\ | supportFiles_A | RM\NXP\KL2x\freesca | le_kl25z128m4_1x32x32k_pfla |
| PB Program Bytes PW Program Module PM Program Range SWD Debug Shift Speed: Diver Range Settings Prover Stores Prover Stores NC WO Mode Prover Stores NC GND © NC GND © NC GND © NC GND © NC GND © NC GND © NC Prover St | EM ;Erase Module BM ;Blank Check Module | = | | | | |
| PM # Program Module PF. Program Trim I Ignore Address Range Check. Show S13 CRC Launch Script Wizard Communication Settings Mode: SWD Debug Shitt Speed: 0.5 shill Frequency WO Debug Shitt Speed: Use SwD Debug Shitt Speed: | PB ;Program Bytes PW ;Program Words | | | | | |
| PH Program Tim + Immediate Program Tim + If prove Address Range Check. Show S19 CRC Launch Script Wizard Clear Script Move up Move down Remove From List Communication Settings Debug Port Pin Settings Pin 1 => TVCC Is IS SWD10 (== Pin 2) GMO Debug Shift Speed. Immediate Stript Pin 1 => TVCC Is IS SWD10 (== Pin 2) GMO N 0 Immediation Settings Immediate Stript Immediate Stript Pin 1 => TVCC Is IS SWD10 (== Pin 2) GMO N 0 Immediate Stript Immediate Stript Immediate Stript Immediate Stript Immediate Stript Target Power & Votage Settings Immediate Stript Immediate Stript Immediate Stript Immediate Stript Immediate Stript Time Control Default 32768.00, Valid range 31250.00 to 39062.50 Immediate Stript Immediate Stript Pin 2 Store Image Io Cyclone Image Description: Immage Description: Immage Description: Store Image Io Cyclone Store Image Io Cyclone | PM Program Module | | | | | |
| I Ignore Address Range Check Show S19 CRC Launch Script Wizard Clear Script Move up Move down Remove From List Communication Settings | PR ;Program Range PT ;Program Trim | | | | | F |
| Communication Settings Debug Shift Speed: 0Shift Frequency=10.0 MHB Mode: SWD Debug Shift Speed: 0Shift Frequency=10.0 MHB Target Power & Voltage Settings Pin 1 ==> TVCC © SWD10 < <= Pin 2 | Ignore Address Range Ch | neck Show S19 CRC Lau | ın ch Script Wizard | Clear Scrip | t Move up Mov | e down Remove From List |
| Contraction Debug Shitt Speed: 0 • Sixth Frequency = 10.0 MHz Wode: SWD > SWDLX JTAG Find = SWDLX SWDLX JTAG SWDLX SWDLX GND 0 · SXULX SWDLX SWDLX Taget Power & Voltage Settings NC • NC Use Cyclone Relays Store NC Store SEST # After Reset, delay 0 ms before contacting target and enter programming mode. Pin1 9 =>> GND • NC <== Pin20 | Communication Settings | | | | - Dahua Port Pin Satti | |
| JTAG GND ○ SWCLK GND ○ SWCLK GND ○ NC Target Power & Voltage Settings NC ○ NC □ Use Cyclone Relays GND ○ NC Reset Signal Settings NC ○ NC □ After Reset, delay 0 ms before contacting target and enter programming mode. □ Drive RESET signal LOW before and after SAP operations. Pin19 ==> □ Drive RESET signal LOW before and after SAP operations. Pin20 Pin debug header. □ Drive RESET signal LOW before and after SAP operations. Pin20 Pin debug header. □ Drive RESET signal LOW before and after SAP operations. Pin20 Pin debug header. □ Bise custom tim reference frequency : 32768.00 □ Use Custom tim reference frequency : 32768.00 □ Bise custom tim reference frequency : 32768.00 □ Image Description: Explanation of SATION Social Features Image Restrictions : Limit Image Usage between dates : 5/31/2016 Image Restrictions : Limit Image Usage between dates : 5/31/2016 | Mode: SWD - Debuc | g Shift Speed: 0 - Shift Frequen | ncy = 10.0 MHz | • | Pin 1 ==> TVC | :C □ ♦ SW/DI0 <== Pin 2 |
| SWD GRD © NC N0 © 0 NC NC ⊕ NC GRD © 0 NC GRD © NC GRD © NC GRD © NC GRD © 0 NC GRD © NC GRD © NC GRD © NC Finds is for 1.27mm (mini) spacing 10-Pn (first 10 pins) and 20-Pn debug header. Use custom tim reference frequency : 32768.00 Hz Pinod tis for 1.27mm (mini) spacing 10-Pn (first 10 pins) and 20-Pn debug header. Use custom tim reference frequency : 32768.00 Hz Pinod tis for 1.27mm (mini) spacing 20 Pin debug header. <t< td=""><td>JTAG</td><td>a second a s</td><td></td><td></td><td>GN</td><td>id 🔹 🗢 Swiclk</td></t<> | JTAG | a second a s | | | GN | id 🔹 🗢 Swiclk |
| Target Power & Voltage Settings GND ● ● RESET# I' Use Cyclone Relays GND ● ● NC GND ● ● NC GND ● ● NC Firstell startes GND ● ● NC Use custom tim reference frequency : 32768.00 Hz Drine betweet menual for 2 54mm spacing 20 pin debug header. Picout is for 1.27mm (min) spacing 10-Pin (first 10 pins) and 20-Pin debug header. Cyclone Max requires 17AG/SWD ADAPTER I'mage Description: GND ● Extended PX Special Features Store Image to Cyclone Image Restrictions : Limit Image Us | SWD | | | | GN | |
| Target Power & Voltage Settings INC ● ● NC □ Use Cyclone Relays INC ● ● NC Reset Signal Settings INC ● ● NC □ After Reset, delay Ins before contacting target and enter programming mode. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive RESET signal LOW before and after SAP operations. □ Drive Rest Sation Structure Requeses □ Drive Rest Sation Structure Requeses □ Drive Rest Sation Structure Rest Sation Sati | | | | | GN | IL O O NL |
| ☐ Use Cyclone Relays NC 0 NC Git Use Cyclone Relays Git 0 0 NC Reset Signal Settings Image Reset Signal LOW before and after SAP operations. Third Reset, delay 0 ms before contacting target and enter programming mode. Third Reset, delay 0 ms before contacting target and enter programming mode. Third Reset, delay 0 ms before contacting target and enter programming mode. Third Control: Default 32768.00. Valid range 31250.00 to 33062.50 Priout is for 1.27mm (mini) spacing 10-Pm (first 10 pins) and 20-Pin debug header. Place relief to user manual for Z-SAmm spacing 20pin debug header. Use custom tim reference frequency: 32768.00 Hz Place relie to user manual for Z-SAmm spacing Use for the target targ | Target Power & Voltage Sett | inns | | | N N | |
| GBNO ● NC GBNO ● NC GBNO ● NC Pint9 ==> Pint9 ==> GBNO ● NC Pint9 ==> Pint9 ==> Pint9 ==> GBNO ● NC Pint9 ==> Pint9 ==> Pint9 ==> GBNO ● NC Pint9 ==> Pint9 ==> Pint9 ==> Pint19 ==> | Use Cyclone Relays | | | | h | IC 🔹 🔹 NC |
| GND ◇ ◇ NC Reset Signal Settings Cher Reset, delay 0 ms before contacting target and enter programming mode. Drive RESET signal LOW before and after SAP operations. Trim Control Default 32768.00. Valid range 31250.00 to 39062.50 Hz Use custom trim reference frequency: 32768.00 Hz Image Description: FX Special Features Image Restrictions : Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | | | | | GN | D 🔹 🔍 NC |
| Reset Signal Settings ms before contacting target and enter programming mode. Drive RESET signal LOW before and after SAP operations. Prout is for 1.27mm (min) spacing 10.Pin (first 10 pin) and 20.Pin debug header. Tim Control: Default 32768.00: Valid range 31250.00 to 39062.50 Prout is for 1.27mm (min) spacing 10.Pin (first 10 pin) and 20.Pin debug header. Use outcom tim reference frequency: 32768.00 Hz Please refer to user manual for 2.54mm spacing 20pin debug header. Use outcom tim reference frequency: 32768.00 Hz Please refer to user manual for 2.54mm spacing 20pin debug header. Use outcom tim reference frequency: 32768.00 Hz Please refer to user manual for 2.54mm spacing 20pin debug header. Use outcom tim reference frequency: 32768.00 Hz Please refer to user manual for 2.54mm spacing 20pin debug header. (Install imper on SWD) Image Description: FX Special Features Store Image to Cyclone Image Restrictions : Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | | | | | Bin19> GN | D O O NC / Pin20 |
| After Reset. delay 0 ms before contacting target and enter programming mode. Drive RESET signal LOW before and after SAP operations. Trim Control: Default 32768.00. Valid range 31250.00 to 39062.50 Use custom tim reference frequency: 32768.00 Hz Use custom tim reference frequency: 32768.00 Hz Image Description: EX Special Features Image Restrictions: Limit Image Usage between dates: 5/31/2016 to 5/1/2017 | Reset Signal Settings | | | | Timo un | |
| Drive RESET signal LOW before and after SAP operations. Tim Control. Default 32768.00, Valid range 31250.00 to 33062.50 Jims) and 20-Pin debug header. Please refer to user menual for 2.54mm spacing Use custom tim reference frequency : 32768.00 Hz Mage Description: FX Special Features Image Restrictions : Limit Image Usage between dates : 5/31/2016 to 6/ 1/2017 | 🔲 After Reset, delay 🗌 | 0 ms before contacting target | and enter programm | ning mode. | | |
| Trim Control: Default 32768.00; Valid range 31250.00 to 39062.50 Privat is for 1.27mm (min) spacing 10.Pin (first 10 privat) and 20-Pin debug header. If Use custom trim reference frequency: 32768.00 Hz Image Description: | 🔲 🔲 Drive RESET signal LOV | V before and after SAP operation | ns. | | | som a same and |
| Image Description: | Trim Control: Default 227691 | 00: Valid range 21250 00 to 290 | 62.50 | | Pinout is for 1.27mm (| mini) spacing 10-Pin (first 10 |
| 20 pin debug header. 20 pin debug header. Cyclone Max requires JTAG/SWD ADAPTER Image Description: FX Special Features Image Restrictions : T Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | Use custom trim reference | e frequency : | 32768.00 | H2 | Please refer to user m | ay rieduel. |
| Cyclone Max requires JTAG/SWD ADAPTER [Install jumper on SWD]. Image Description: FX Special Features Image Restrictions : T Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | | | 1 02100.00 | | 20-pin debug header. | and a ror 2.54mm spacing |
| Insge Description: FX Special Features Image Restrictions : T Limit Image Usage between dates : 5/31/2016 to 6/ 1/2017 | | | | | Cyclone Max requires | JTAG/SWD ADAPTER |
| Image Description: FX Special Features Image Restrictions: Limit Image Usage between dates: 5/31/2016 to 6/1/2017 | | | | | (Install jumper on SW | UJ. |
| FX Special Features FX Special Features Image Restrictions : [] Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | Image Description: | | | | | |
| Image Restrictions : | mage Description. | | | | | - Mi |
| Image Restrictions : T Limit Image Usage between dates : 5/31/2016 to 6/1/2017 | FX Special Features | | | | | 1 |
| Image Restrictions: Limit Image Usage between dates: 5/31/2016 to 6/1/2017 | a san a sa | | | 1 | | Store Image to Cyclone |
| | Image Restrictions : 🔽 Limit | Image Usage between dates : | 5/31/2016 | to 6/ 1/20 | 017 | |
| Number of programs allowed: 0 I Number of failures allowed: 0 Store Image to Disk | 🕅 Num | ber of programs allowed: | 0 🗆 Numb | er of failures a | llowed: 0 | Store Image to Disk |
| | | | | | | |
| | | | | | | |

Figure 3-7: Communications Mode Selection

3.16.2 PORT B: 20-Pin Keyed Mini Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a keyed 20-pin 0.050-inch pitch double row connector for ARM targets. The location of the this header is indicated as PORT B in **Figure 3-4**. The 20-pin keyed mini connector pin definitions for JTAG mode are as follows:

20-Pin Keyed Mini Connector JTAG Mode Pin Assignments

| PIN 1 - | TVCC | TMS | - PIN 2 |
|----------|------|-------|----------|
| PIN 3 - | GND | ТСК | - PIN 4 |
| PIN 5 - | GND | TDO | - PIN 6 |
| PIN 7 - | NC | TDI | - PIN 8 |
| PIN 9 - | NC | RESET | - PIN 10 |
| PIN 11 - | NC | NC | - PIN 12 |
| PIN 13 - | NC | NC | - PIN 14 |
| PIN 15 - | GND | NC | - PIN 16 |
| PIN 17 - | GND | NC | - PIN 18 |
| PIN 19 - | GND | NC | - PIN 20 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

20-Pin Keyed Mini Connector SWD Mode Pin Assignments



| PIN 1 - | тисс | TMS/SWDIO | - PIN 2 |
|----------|------|-----------|----------|
| PIN 3 - | GND | TCK/SWCLK | - PIN 4 |
| PIN 5 - | GND | NC | - PIN 6 |
| PIN 7 - | NC | NC | - PIN 8 |
| PIN 9 - | NC | RESET | - PIN 10 |
| PIN 11 - | NC | NC | - PIN 12 |
| PIN 13 - | NC | NC | - PIN 14 |
| PIN 15 - | GND | NC | - PIN 16 |
| PIN 17 - | GND | NC | - PIN 18 |
| PIN 19 - | GND | NC | - PIN 20 |

| PR Program Range PT Program Trim | int Move down Berrove From List |
|---|---------------------------------|
| | |
| Communication Settings | Debug Port Pin Settings |
| Mode: SWD V Debug Shift Speed: 0 · Shift Frequency = 10.0 MHz V | Pin 1 ==> TVCC • |
| JTAG | GND 🔹 🔶 SWCLK |
| SWD | GND 🔷 🔷 NC |
| | NC 🔷 🔷 NC |
| | GND 🔷 🗢 RESET# |
| Target Power & Voltage Settings | NC 🔷 🔷 NC |
| Use Cyclone Relays | NC 🔷 🔷 NC |
| | GND 🔷 🔷 NC |
| | GND 🔷 🔷 NC |
| D (0) 10 m | Pin19 ==> GND |

Figure 3-8: Communications Mode Selection

3.16.3 PORT C: 20-Pin Debug Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a 20-pin 0.100-inch pitch double row connector for ARM targets. The location of the this header is indicated as **PORT H** in **Figure 3-4**. The 20-pin standard connector pin definitions for JTAG mode are as follows:

20-Pin Standard Connector JTAG Mode Pin Assignments

| PIN 1 - | TVCC | NC | - PIN 2 |
|----------|------------|-----|----------|
| PIN 3 - | TRST or NC | GND | - PIN 4 |
| PIN 5 - | TDI | GND | - PIN 6 |
| PIN 7 - | TMS | GND | - PIN 8 |
| PIN 9 - | тск | GND | - PIN 10 |
| PIN 11 - | NC | GND | - PIN 12 |
| PIN 13 - | TDO | GND | - PIN 14 |
| PIN 15 - | RESET | GND | - PIN 16 |
| PIN 17 - | NC | GND | - PIN 18 |
| PIN 19 - | NC | GND | - PIN 20 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

20-Pin Standard Connector SWD Mode Pin Assignments

| PIN 1 - | TVCC | NC | - PIN 2 |
|----------|------------|-----|----------|
| PIN 3 - | TRST or NC | GND | - PIN 4 |
| PIN 5 - | NC | GND | - PIN 6 |
| PIN 7 - | TMS/SWDIO | GND | - PIN 8 |
| PIN 9 - | TCK/SWCLK | GND | - PIN 10 |
| PIN 11 - | NC | GND | - PIN 12 |
| PIN 13 - | NC | GND | - PIN 14 |
| PIN 15 - | RESET | GND | - PIN 16 |
| PIN 17 - | NC | GND | - PIN 18 |
| PIN 19 - | NC | GND | - PIN 20 |



| PR Program Rodue PR Program Range PI Program Trim Image: State of the sta | Script Move up Move down Remove From List |
|--|---|
| Communication Settings | Debug Port Pin Settings |
| Mode: SWD Debug Shift Speed: 0 - Shift Frequency = 10.0 MHz | Pin 1 ==> TVCC • |
| | GND |
| SWD | GND ♦ ♦ NC |
| | NC NC |
| | GND ♦ ♦ RESET# |
| Target Power & Voltage Settings | NC NC |
| Use Cyclone Belays | NC NC |
| | GND 🔷 🔷 NC |
| | GND 🔷 🔷 NC |
| | Pin19 ==> GND ◆ ◆ NC <== Pin20 |

Figure 3-9: Communications Mode Selection

3.17 Target Headers For Part# CYCLONE_UNIVERSAL

PEmicro Part# CYCLONE_UNIVERSAL features 6 ports labeled A-H.

3.17.1 PORT A: 10-Pin Keyed Mini Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a keyed 10-pin 0.050-inch pitch double row connector for ARM targets. The location of the this header is indicated as PORT A in **Figure 3-4**. The 10-pin keyed mini connector pin definitions for JTAG mode are as follows:

10-Pin Keyed Mini Connector JTAG Mode Pin Assignments

| PIN 1 - | TVCC | TMS | - PIN 2 |
|---------|------|-------|----------|
| PIN 3 - | GND | ТСК | - PIN 4 |
| PIN 5 - | GND | TDO | - PIN 6 |
| PIN 7 - | NC | TDI | - PIN 8 |
| PIN 9 - | NC | RESET | - PIN 10 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

10-Pin Keyed Mini Connector SWD Mode Pin Assignments

| PIN 1 - | TVCC | TMS/SWDIO | - PIN | 2 |
|---------|------|-----------|-------|----|
| PIN 3 - | GND | TCK/SWCLK | - PIN | 4 |
| PIN 5 - | GND | NC | - PIN | 6 |
| PIN 7 - | NC | NC | - PIN | 8 |
| PIN 9 - | NC | RESET | - PIN | 10 |

SWD Mode is selected from the "Communication Mode" drop-down box in the Cyclone Image Creation Utility:



| le <u>O</u> ptions <u>H</u> elp | |
|---|---|
| Specify Target Architecture: ABM devices | |
| Denies Calendaria | |
| Architecture APM Vender NYP Eamily KI 2e | |
| | 1 |
| Device: KL25Z128M4 | e Advanced |
| Programming Sequence | |
| SS Specify Dibject Code RE Erase in on Blank. EM. Erase Module BM. Blank, Check Module PB. Program Blates PM. Program Module PM. Program Module PI. Program Imm - Ignore Address Range Check. Show S19 CRC Launch Script Wizard Clear Scri Launch Script Wizard Clear Script Vizard Script Script Vizard Script Script Vizard Script Vizard Script Script Vizard Script Script Vizard Script Scri | pt │ Move up │ Move down │ Remove From List |
| | |
| Target Power & Voltage Settings | GND ◇ ◇ SWELK GND ◇ ◇ NC NC ◇ ◇ NC GND ◇ ○ NC GND ◇ ○ NC NC ◇ ○ NC GND ◇ ○ NC |
| Reset Signal Settings | FINTS ==> GND V VIC (== FIN20 |
| After Reset, delay 0 ms before contacting target and enter programming mode. | |
| Drive RESET signal LOW before and after SAP operations. | |
| | Pinout is for 1.27mm (mini) spacing 10-Pin (first 10 |
| Trim Control: Default 32/68.00; Valid range 31250.00 to 39062.50 | pins) and 20-Pin debug header. |
| | 20-pin debug header. |
| | Cyclone Max requires JTAG/SWD ADAPTER |
| | function bounded out o we off |
| mage Description: | |
| EX Special Features | |
| | Store Imper to Custome |
| made Bestrictions: Limit Image Lisage between dates: 5/31/2010 be CU1/20 | 017 |
| 10 6/1/2 | |
| Number of programs allowed: O Vumber of failures a | allowed: 0 Store Image to Disk |

Figure 3-10: Communications Mode Selection

3.17.2 PORT B: 20-Pin Keyed Mini Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a keyed 20-pin 0.050-inch pitch double row connector for ARM targets. The location of the this header is indicated as PORT B in **Figure 3-4**. The 20-pin keyed mini connector pin definitions for JTAG mode are as follows:

20-Pin Keyed Mini Connector JTAG Mode Pin Assignments

| TVCC | TMS | - PIN 2 | |
|------|---|---|--|
| GND | TCK | - PIN 4 | |
| GND | TDO | - PIN 6 | |
| NC | TDI | - PIN 8 | |
| NC | RESET | - PIN 10 |) |
| NC | NC | - PIN 12 |) |
| NC | NC | - PIN 14 | |
| GND | NC | - PIN 16 | ; |
| GND | NC | - PIN 18 | 5 |
| GND | NC | - PIN 20 |) |
| | TVCC GND GND NC NC NC GND GND GND | TVCCTMSGNDTCKGNDTDONCTDINCRESETNCNCGNDNCGNDNCGNDNCGNDNC | TVCC TMS - PIN 2 GND TCK - PIN 4 GND TDO - PIN 6 NC TDI - PIN 8 NC RESET - PIN 10 NC NC PIN 12 NC NC PIN 12 NC NC - PIN 14 GND NC - PIN 16 GND NC - PIN 18 GND NC - PIN 18 GND NC - PIN 18 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

20-Pin Keyed Mini Connector SWD Mode Pin Assignments

| <u> </u> |
|----------|
| 4 |
| 6 |
| 3 |
| 10 |
| 12 |
| 14 |
| |



| PIN 15 - GND | NC - PIN 16 |
|---------------------|-------------|
| PIN 17 - GND | NC - PIN 18 |
| PIN 19 - GND | NC - PIN 20 |

| PB Program Range PT Program Trim + | Þ |
|---|--|
| Ignore Address Range Check Show S19 CRC Launch Script Wizard Clear Script | Move up Move down Remove From List |
| Communication Settings | Debug Port Pin Settings |
| Mode: SWD Debug Shift Speed: 0 - Shift Frequency = 10.0 MHz JIAG SWD | Pin 1 ==> TVCC ● SWDI0 <== Pin 2 GND ● SWCLK GND ● SWCLK GND ● NC NC |
| ⊢ Target Power & Voltage Settings □ Use Cyclone Relays | GND ◇ ◇ RESET# NC ◇ ◇ NC NC ◇ ◇ NC GND ◇ ◇ NC GND ◇ ◇ NC |
| Diversion. | Pin19 ==> GND ♦ ♦ NC <== Pin20 |

Figure 3-11: Communications Mode Selection

3.17.3 PORT C: 14-Pin Debug Connector (Qorivva, SPC5, DSC, S32 (Power))

The Cyclone provides a standard 14-pin 0.100-inch pitch dual row 0.025-inch square header for Qorivva (MPC5xxx), DSC (MC56F8xxx), S32R, or STMicroelectronics' SPC5 targets. The location of the this header is indicated as PORT C in **Figure 3-4**.

Qorivva, SPC5, or S32 (Power) Pinout

| TDI | 1 | 2 | GND |
|-------|----|----|-------|
| TDO | 3 | 4 | GND |
| TCK | 5 | 6 | GND |
| NC | 7 | 8 | NC |
| RESET | 9 | 10 | TMS |
| VDDE7 | 11 | 12 | GND |
| RDY | 13 | 14 | JCOMP |

DSC Pinout

| TDI | 1 | 2 | GND |
|-------|----|----|--------|
| TDO | 3 | 4 | GND |
| TCK | 5 | 6 | GND |
| NC | 7 | 8 | NC/KEY |
| RESET | 9 | 10 | TMS |
| VDD | 11 | 12 | GND |
| NC | 13 | 14 | TRST |
| | | | |

3.17.3.1 BERG14-to-MICTOR38 Optional Connector

PEmicro offers a 14-pin BERG to 38-pin MICTOR adapter, sold separately, that may be used on Port C of the **CYCLONE**. The PEmicro part number is BERG14-TO-MICTOR38.





Figure 3-12: BERG14-TO-MICTOR38 Adapter (Sold Separately)

3.17.4 PORT D: 26-Pin Debug Connector (ColdFire V2/3/4)

The Cyclone provides a standard 26-pin 0.100-inch pitch dual row 0.025-inch square header for ColdFire MCF52xx/53xx/54xx family of microprocessors. This port connects to the target hardware using either the ColdFire extension cable for synchronous ColdFire targets such as MCF5272 & MCF5206E (PEmicro part# CABLE-CF-ADAPTER, sold separately), or a standard 26-pin ribbon cable for asynchronous ColdFire targets (included). Please refer to each processor's user manual to identify whether it is a synchronous or asynchronous interface. The location of the this header is indicated as PORT D in **Figure 3-4**.

ColdFire V2/3/4 Pinout

| N/C | 1 | 2 | BKPT |
|--------|----|----|--------|
| GND | 3 | 4 | DSCLK |
| GND | 5 | 6 | N/C |
| RESET | 7 | 8 | DSI |
| VCC | 9 | 10 | DSO |
| GND | 11 | 12 | PST3 |
| PST2 | 13 | 14 | PST1 |
| PST0 | 15 | 16 | DDATA3 |
| DDATA2 | 17 | 18 | DDATA1 |
| DDATA0 | 19 | 20 | GND |
| N/C | 21 | 22 | N/C |
| GND | 23 | 24 | CLK |
| VCC | 25 | 26 | TEA |

The ColdFire extension cables, one for Synchronous targets and one for Asynchronous targets, are pictured below:



Figure 3-13: ColdFire Extension Cable With Adapter (PEmicro part# CABLE_CF_ADAPTER, for





Figure 3-14: ColdFire Ribbon Cable (for asynchronous ColdFire targets, included with Cyclone)

3.17.5 PORT E: 16-Pin Debug Connector (MON08)

The Cyclone provides a 16-pin 0.100-inch pitch double row connector for MON08 targets. The location of the this header is indicated as PORT E in **Figure 3-4**. The MON08 header adopts the standard pin-out from MON08 debugging with some modifications. The general pin-out is as follows:

MON08 Signals

| | | - | |
|---------|------|------|---------|
| PIN 1 - | NC | GND | - PIN 2 |
| PIN 3 - | NC | RST | - PIN 4 |
| PIN 5 - | NC | IRQ | - PIN 6 |
| PIN 7 - | NC | MON4 | - PIN 8 |
| PIN 9 - | NC | MON5 | - PIN10 |
| PIN11 - | NC | MON6 | - PIN12 |
| PIN13 - | OSC | MON7 | - PIN14 |
| PIN15 - | Vout | MON8 | - PIN16 |
| | | | |

3.17.6 PORT F: 6-Pin Debug Connector (RS08, HCS08, HC(S)12(X), S12Z, ColdFire +/V1)

The Cyclone provides a standard 6-pin 0.100-inch pitch dual row 0.025-inch square header for ColdFire V1, S12Z, 68(S)12(X), 68HCS08, and RS08 targets. The location of the this header is indicated as PORT F in **Figure 3-4**. The header uses the NXP standard pin configuration, listed here for reference:

ColdFire V1, 68(S)12(X), 68HCS08, and RS08 Signals

| PIN 1 - BKGD | GND - PIN 2 |
|-------------------|---------------------|
| PIN 3 - NC | RESET - PIN 4 |
| PIN 5 - NC | TVCC - PIN 6 |

S12Z Signals

Note:* indicates optional signal

| PIN 1 - BKGD | GND - PIN 2 |
|----------------------|--------------------|
| PIN 3 - PDO * | RESET - PIN 4 |
| PIN 5 - PDOCLK* | TVCC - PIN 6 |

3.17.7 PORT G: 10-Pin Debug Connector (Power MPC5xx/8xx)

The Cyclone provides a standard 10-pin 0.100-inch pitch dual row 0.025-inch square header for



Power MPC5xx/8xx BDM targets. The location of the this header is indicated as PORT G in **Figure 3-4**.

Power MPC5xx/8xx BDM Pinout

| N/C | 1 | 2 | SRESET# |
|---------|---|----|---------|
| GND | 3 | 4 | DSCLK |
| GND | 5 | 6 | N/C |
| HRESET# | 7 | 8 | DSDI |
| VDD | 9 | 10 | DSDO |

3.17.8 PORT H: 20-Pin Debug Connector (Kinetis, S32 (ARM), other PEmicro-Supported ARM devices)

The Cyclone provides a 20-pin 0.100-inch pitch double row connector for ARM targets. The location of the this header is indicated as **PORT H** in **Figure 3-4**. The 20-pin standard connector pin definitions for JTAG mode are as follows:

20-Pin Standard Connector JTAG Mode Pin Assignments

| PIN 1 - | TVCC | NC | - PIN 2 |
|----------|------------|-----|----------|
| PIN 3 - | TRST or NC | GND | - PIN 4 |
| PIN 5 - | TDI | GND | - PIN 6 |
| PIN 7 - | TMS | GND | - PIN 8 |
| PIN 9 - | ТСК | GND | - PIN 10 |
| PIN 11 - | NC | GND | - PIN 12 |
| PIN 13 - | TDO | GND | - PIN 14 |
| PIN 15 - | RESET | GND | - PIN 16 |
| PIN 17 - | NC | GND | - PIN 18 |
| PIN 19 - | NC | GND | - PIN 20 |

CYCLONE programmers also support SWD Mode. This replaces the JTAG connection with a clock and single bi-directional data pin.

20-Pin Standard Connector SWD Mode Pin Assignments

| PIN 1 - | TVCC | NC | - PIN 2 |
|----------|------------|-----|----------|
| PIN 3 - | TRST or NC | GND | - PIN 4 |
| PIN 5 - | NC | GND | - PIN 6 |
| PIN 7 - | TMS/SWDIO | GND | - PIN 8 |
| PIN 9 - | TCK/SWCLK | GND | - PIN 10 |
| PIN 11 - | NC | GND | - PIN 12 |
| PIN 13 - | NC | GND | - PIN 14 |
| PIN 15 - | RESET | GND | - PIN 16 |
| PIN 17 - | NC | GND | - PIN 18 |
| PIN 19 - | NC | GND | - PIN 20 |

SWD Mode is selected from the "Communication Mode" drop-down box in the Cyclone Image Creation Utility:

| PR Program Range PT Program Trim + | |
|---|---|
| Ignore Address Range Check Show S19 CRC Launch Script Wizard Clear Script | ript Move up Move down Remove From List |
| Communication Settings | Debug Port Pin Settings |
| Mode: SWD Debug Shift Speed: 0 - Shift Frequency = 10.0 MHz | Pin 1 ==> TVCC • |
| JTAG | GND 		 SWCLK |
| SWD | GND 🔷 🔷 NC |
| | NC 🔷 🔷 NC |
| | GND 🔷 🔷 RESET# |
| Target Power & Voltage Settings | NC NC NC |
| Use Cyclone Relays | NC 🔷 🔷 NC |
| | GND 🔷 🔷 NC |
| | GND 🔷 🔷 NC |
| - Devel Circuit Collins | Pin19 ==> GND |

Figure 3-15: Communications Mode Selection

CYCLONE programmers communicate with the target through ribbon cables. The ribbon cables for standard debug connectors have a 0.100-inch centerline dual row socket IDC assembly (not keyed). The ribbon cables for 10- and 20-pin mini debug connectors have a 0.050-inch centerline dual row socket IDC assembly (keyed). The ribbon cables are designed such that the Cyclone's Debug Connector has the same pinout as the Target Header, i.e., Pin 1 of the Cyclone's Debug Connector is connected to Pin 1 of the Target Header. As an example, **Figure 3-16** sketches the connection mechanism (looking down into the sockets) for a 14-pin ribbon cable. Ribbon cables for other supported architectures use a similar scheme, but may have more or fewer pins.







TARGET POWER MANAGEMENT

Different target devices may require different power schemes which depend on the design of the target board, target voltages, and even the device architecture. PEmicro has designed the **CYCLONE** to be capable of powering a target before, during, and after programming. Power can be sourced at many voltage levels from the Cyclone itself, or sourced by an external power supply and switched by the Cyclone.



External Power



The versatility of the Cyclone power scheme gives the user the utmost flexibility, and includes the following features:

- Provides power through a power jack or through the debug connector
- Provides internally generated voltage from 1.6v-5.5v at up to 500mA
- · Switches an external power supply voltage, up to 24V at 1amp
- · Selectively powers the target before, during, and after programming
- Powers down the target connections between programming operations
- · Uses power switching to aid entry into debug mode for certain targets
- Provides target voltage and current measurement capabilities

If target power is required, each target board may vary where the power is sourced from, externally or internally, and how it is channeled to the target: through the debug header or to a separate connector to the board. Power that is passed through and managed by the Cyclone goes through power relays so it can be power cycled. This is extremely useful because it also allows the power to be off during setup and automatically powered on by the Cyclone for programming. For some devices, the process of entering debug mode requires that the device be powered down and powered back up. Power can also be left in a desired power state, either on or off.

4.1 Cyclone Configuration

There are two different places Power Management is configured and they should be **matched**: first, by the **jumpers** on the **CYCLONE**, and second, in the **setup** of the programming image. The Cyclone jumpers are the most important because they are the physical connection to the target. The Cyclone has an easy access panel that reveals debug header connections for a variety of different architectures, and a 2x4 jumper block for configuring power management of the target. The specific location of the jumpers is indicated by the label POWER JUMPERS in **Figure 4-3**. This set of 4 jumpers can be used to set 5 different power management schemes for the target.



| 1 | Target is powered independently | POWER JUMPERS 4 3 2 1 |
|---|---|-----------------------------|
| 2 | Power provided externally (center +) and managed by Cyclone, power out to debug ribbon cable. | POWER JUMPERS 4 3 2 1 |
| 3 | Power provided externally (center +) and managed by Cyclone, power out to 2.5 mm output jack (center +) | POWER JUMPERS 4 3 2 1 |
| 4 | Power provided by Cyclone, power out to debug ribbon cable | POWER JUMPERS 4 3 2 1 |
| 5 | Power provided by Cyclone, power out to 2.5 mm output jack (center +) | POWER JUMPERS 4 3 2 1 |

Figure 4-2: Cyclone Power Schemes & Corresponding Jumper Settings

The bottom edge of the **CYCLONE** has a Power In jack for externally provided power, and the top edge of the Cyclone has Power Out jack, for when power schemes including these are used (see **Figure 4-3**). One of the provided ribbon cables is connected to the appropriate debug header based on the specific target architecture.





The power settings that are set by the jumpers are a physical connection and take precedence.