

Cyclone LC & Cyclone FX Programmers Getting Started Guide v.1.01

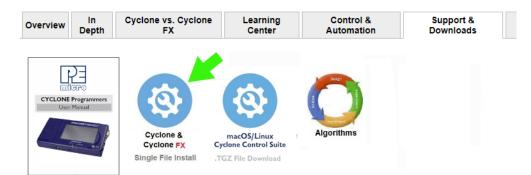
This guide will allow the user to program their device with a Cyclone programmer, using a simple programming image, by completing the following steps.

- Installing the Cyclone software
- Setting up the Cyclone hardware
- · Creating a stand-alone programming image
- Launching Cyclone programming

This guide is intended as a supplement to the Cyclone's User Manual, which contains in-depth information about the topics covered here and much more.

1 Installing The Cyclone Software

First, the Cyclone software should be installed on the user's PC. It can be downloaded from the Support & Downloads tab on the pemicro.com product page for Cyclone LC or Cyclone FX, or directly from https://www.pemicro.com/downloads/download_file.cfm?download_id=481.



Once the software is downloaded, the user should install it on their PC. If Cyclone software is already installed on the PC, it is recommended that the old installation be removed before the user installs the latest software.

Note: The User Manuals for Cyclone LC or Cyclone FX programmers, which contain more detailed information about the topics covered here, are installed along with the Cyclone software. They can also be downloaded from the Support & Downloads tab.

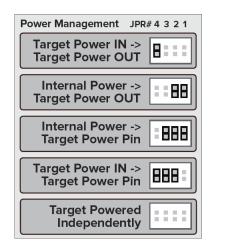
2 Setting Up The Cyclone Hardware

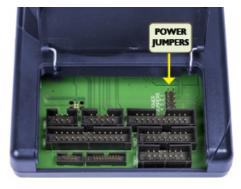
Step 1. Configure Cyclone power settings

The Cyclone has several different power configurations. The label on the bottom of the Cyclone indicates the appropriate Jumper settings for each. The user should install the Jumpers as indicated for their desired power configuration.

The Jumpers are located underneath the Cyclone's access panel. They are labeled "Power Jumpers." and numbered from 1-4. The part# Cyclone-ARM-Univ is shown in the example below; the jumper location will be similar for all Cyclone models.







If power is provided via the Cyclone, the user may need to configure the programming image accordingly. Image creation and configuration is discussed in **Section 3 - Creating A Stand-Alone Programming Image**.

For more information on the various power configurations, the user should refer to their Cyclone's User Manual. There is a also a blog post that covers this topic at: http://www.pemicro.com/blog/ index.cfm?post_id=121

Step 2. Connect Cyclone to a PC (for programming image setup)

The Cyclone programmer should be connected to the PC via USB, Serial, or Ethernet. Cables for each of these options are included with the Cyclone.

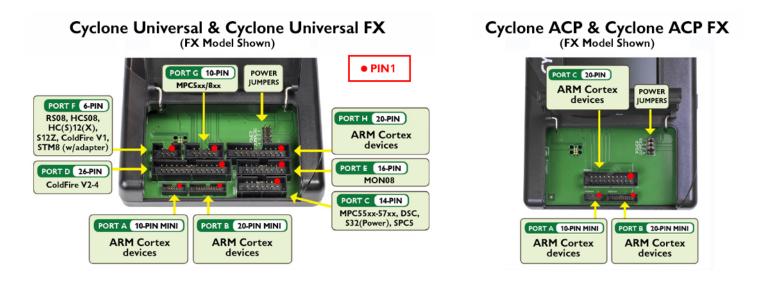
Note: An Ethernet connection requires IP setup on the Cyclone unit; please refer to the Cyclone's User Manual for more information.



Step 3. Connect Cyclone to target

A ribbon cable should be connected from the appropriate Cyclone header (located under the Cyclone's access panel) to the header for your target device. Ribbon cables are provided with the Cyclone.





Step 4. Plug in power to the Cyclone

The provided power supply should be plugged into the System Power jack of the Cyclone programmer. Other power connections should be made according to the power configuration selected in Step 1.



On power-up the user may need to agree to a firmware update on the Cyclone unit.

3 Creating A Stand-Alone Programming Image

A stand-alone programming (SAP) image is the result of pre-processing the programming algorithms, data to be programmed, programming options, and scripted programming commands. These are combined into a single encrypted file. This SAP image can then be loaded onto the Cyclone and used to program, without need for the Cyclone to be connected to a PC.

The Cyclone Image Creation Utility, shown below, allows the user to configure and save SAP images. A simple programming image can be created in 6 steps:

- Step 1. Run Cyclone Image Creation Utility
- Step 2. Select Device Manufacturer & Device
- Step 3. Set Up Programming Sequence
- Step 4. Add Basic Programming Commands
- Step 5. Configure Additional Settings
- Step 6. Save SAP Image To Cyclone



Cyclone Image Creation	reality version risoloolo	-					
			T				
Specify CPU Manufacturer:	ARM Based (All Manufac	sturers) 💌]				
Device Selection				_			
Architecture: ARM	Vendor: NXP		Family: K		1		
Device: K64FN1M0M12		•	Select	New Device	Adva	inced	
Programming Sequence							
CM ;Choose Algorithm SS ;Specify Object Code EN ;Erase if not Blank EM ;Erase Module BM ;Blank Check Module PB ;Program Bytes PW ;Program Words PM ;Program Module PR ;Program Range PT ;Program Trim	≡ SS C:\prod EN ;Erase if PM ;Program	ucts\devops\te not Blank			RM\NXP\K6x\f nwaretest\sreco		n1mOm12_1x32x256 DM12.s19
			1				,
Ignore Address Range C	heck Show S19 CRC	Launch Scrip	t Wizard	Clear Script	Move up	Move down	Remove From Lis
Communication Settings					Debug Port Pin	Settings	
Mode: SWD ▼ Target Power & Voltage Set ✓ Provision Target Power Target Voltage: 3.3 ▼ Del Reset Signal Settings After Reset, delay Drive RESET signal LOV Trim Control: Default 32768 Use custom trim reference	✓ Power off target aft lay after Power Off (ms) 24 0 ms before contacting ta w before and after SAP ope 00 .00; Valid range 31250.00 to 100	50 Delay after I arget and enter p rations.	Power On (programmin	ms) 250	pins) and 20-Pin Please refer to u 20-pin debug he	i debug heade iser manual for sader.	SWCLK NC RESET# NC NC NC NC NC <== Pin20 cing 10-Pin (first 10 r. 2.54mm spacing
Image Description: 7/PARA	M3				Cyclone Max rei (Install jumper of		WD ADAPTEN
ProCryption Security Licens							
Image Encryption: No Ima						_	Save Image To:
Image Restrictions : C Limit		es : 5/10/200	19 b	5/16/202	20		Cyclone Only
	nber of programs allowed:			of failures allo		0	Cyclone & Disk
FX Exclusive Settings							Disk C 1
🔲 Use Barcode File :					Bro	wse	Disk Only

The following instructions walk the user through each of these steps:

Step 1. Run Cyclone Image Creation Utility

CreateImage.exe is in the "ImageCreation" folder, in the location where the Cyclone software was installed. For an in-depth description of the Cyclone Image Creation Utility please refer to the User Manual for your Cyclone programmer.

Step 2. Select Device Manufacturer and Device

Specify CPU Manufacturer and Select New Device are used to choose the manufacturer of the target device, and then the specific device or architecture.



Cyclone Image Creation	Utility Version 7.26.00.00			
File Options Help				
Specify CPU Manufacturer: Device Selection Architecture: ARM Device:	ARM Based (All Manufacturers) ARM Based (All Manufacturers) NXP STMicroelectronics	•	Family: Select New Device Advanced	

Step 3. Programming Sequence Setup

The user should double-click on CM in the Programming Sequence window to choose the appropriate Algorithm for the target device. They can navigate to the algorithm using the dialog provided.

e Options I Specify Target Ar	Help chitecture: ARM o	devices	•				
Device Selection Architecture: AR		/endor: NXP	Family: K	΄ λ υ			
	V512M10			New Device	Advanced		
, Programming Seq							
CM ;Choose Algo SS ;Specify Obje	orithm	amming Algorith	m to I Icel			×	
	Look in:			• +	€ 💣 III -		L .
	œ.	Name	*	Dat	te modified	Туре	
Ignore Addr Communication Iode:	Recent Places	freescale_k	40dn512m10_1x32x128/	c_pflash.arp 3/1	6/2016 12:26 P№	1 ARP File	ve From L
arget Power & Use Cyclon Reset Signal S	Computer Computer Network						
After Reset		•	III			•	
Drive RESE		File name:	*K40DN512M10*.ARF	-	•	Open	
		Files of type:	ARM devices Algortihr	n File (* ARP)	•	Cancel	

Based on the algorithm that was selected, additional commands will be made available in the box of programming commands on the left.

The user should then double-click on the SS command to specify the Object Code.



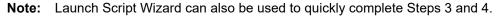
Cyclone Image	Creation Utility \	/ersion 7.26.00.0	0				. 0 X
File Options H	Help						
Specify Target Arc	chitecture: ARM o	devices	-]			
- Device Selection							
Architecture: ARM	4 V	endor: NXP		Family: K4x			
Device: K40DN	V512M10		•	Select New Device	Advanced		
Programming Segu	uence						
CM ;Choose Algo SS ;Specify Object EN ;Erase if not E EM ;Erase Modul BM ;Blank Che	orithm <u>ct Code</u> Blank		icro\cyclone\s	upportfiles\supportFiles_,	ARM\NXP\K4x\freescak	e_k40dn512m	10_1×32×128k
PB ;Program B PW ;Program V PM ;Program M PR ;Program R	Look in:	_	EX	•	← 🗈 💣 💷 -		
PT ;Program T	(Here)	Name	~		Date modified	Туре	Þ
🗌 Ignore Addre	Recent Places	testk40x_2	00k.ELF		1/25/2012 4:35 PM	ELF File	e From List
Communication	Necenii Fiaces	testk40x_2	00k.s19		10/4/2011 6:30 PM	S19 File	
Mode: SWD							<== Pin 2
	Desktop						
	Libraries						
Target Power &							
	Computer						
D 101 10							<== Pin20
Reset Signal Se	Network						
After Reset,		•		III		+	
Drive RESE		Dia anna a	testk40x 2			Open	h (first 10
Trim Control: D∈ □ Use custom		File name:					
Use custom		Files of type:	All Debug/	Object Files	•	Cancel	pacing
C	_	_	_		Cyclone Max requires J		APTER
					(Install jumper on SWD)		

Step 4. Adding Basic Programming Commands

The user should then add other basic programming commands, using the list of commands on the left side of the Programming Sequence area. The arrow and buttons allow the user to add, remove, and re-sequence the commands, in the box on the right. As an example, some basic commands might be

- Erase
- Program
- Verify

CM :Choose Algorithm SS :Specify Object Code EN :Erase if not Blank EM :Erase Module BM :Plank Check Module PB :Program Bytes PW :Program Words PM :Program Module PR :Program Range PT :Program Trim		==>	CM_C:\PEMicro\voyclone\supportFiles\supportFiles_ARM\NXPVK4x\freescale_k40dn512m10_1x32x128 SS_F:\Test_Automation\S19\ARMCORTEX\testk40x_200k.s19 EN_Erase if not Blank PM_Program Module VC_Venty Checksum
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Step 5. Other Settings

The user should then specify any other settings that the SAP image should contain in order to program correctly, such as

- Communication SWD vs JTAG
- Shift frequency
- Target Power and Voltage Settings

These settings can be made using the corresponding areas of the Cyclone Image Creation Utility.

Communication Settings Mode: SWD Shift Frequency in MHz: 556 MHz	Debug Port Pin Settings Pin 1 ==> TVCC □ ♦ SWDI0 <== Pin 2
Mode: SWD Shift Frequency in MHz: 5.56 MHz	GND ♦ ♦ SWCLK
	GND ♦ ♦ NC
	NC 🔷 🔷 NC
	GND ♦ ♦ RESET#
Target Power & Voltage Settings	NC ◇ ◇ NC NC ◇ ◇ NC
Use Cyclone Relays	
	GND NC
□ Reset Signal Settings	Pin19 ==> GND
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	Pinout is for 1.27mm (mini) spacing 10-Pin (first 10 pins) and 20-Pin debug header.
Use custom trim reference frequency : 32768.00 Hz	Please refer to user manual for 2.54mm spacing 20-pin debug header.
	Cyclone Max requires JTAG/SWD ADAPTER (Install jumper on SWD).
Image Description: 4/16/2019 3:13:01 PM	

Step 6. Save SAP image to Cyclone

The user should then save the SAP image onto the Cyclone by clicking the button to save to "Cyclone Only" or "Cyclone & Disk." The image will be automatically selected as the current SAP image on the Cyclone.

Save Image To:
Cyclone Only
Cyclone & Disk
Disk Only

3.1 Advanced Features

Cyclone programmers can take advantage of several advanced features that are beyond the scope of this Getting Started guide, such as RSA/AES encrypted programming images, programming count/date restrictions on images, external storage on SD cards, and use of a barcode scanner to launch programming. For information on these topics, please refer to the User Manual for your model of Cyclone programmer. Cyclone FX programmers include all of these features as standard, and Cyclone LC programmer users can purchase ProCryption Security features separately.

4 Launching Cyclone Programming

There are three ways to launch programming.

1. Cyclone Start Button Press - The user simply presses the Start button located on top of the



Cyclone programmer.



- 2. Cyclone Control Console (command-line utility) The user writes a script that specifies parameters and initiates programming using the command line. More information is available in the Cyclone's User manual or at: http://www.pemicro.com/blog/index.cfm?post_id=142
- SDK The SDK is a software library that is used in conjunction with the user's own code. The user writes a customer application that uses this library of functions to launch programming. More information is available in the Cyclone's User Manual, or at: http://www.pemicro.com/blog/ index.cfm?post_id=139

The "Success" or "Error" LED will illuminate to let the user know the result of programming.

Note: If programming is unsuccessful when using this quick start procedure, the user may instead wish to use the included PROG software for their target 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.