

Nuvoton ICP Programming Tool 用户指南

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Table of Contents

1	概述6
1.1 1.2 1.3	简介6 支持的芯片
2	安装7
2.1 2.2 2.3	系统需求
3	ICP Programming Tool的操作模式及Nu-Link dongle10
3.1 3.2 3.3	Nuvoton ICP Programming Tool 模式10 Nu-Link dongle 操作模式10 Nu-Link dongle的LED指示灯及按键11
4	开始使用 ICP Programming Tool12
4.1 4.2 4.3 4.4 4.5 4.6 4.7	菜单栏
5	保护Binary code(在线模式) 20
5.1 5.2 5.3	Nu-Link 认证是什么
6	保护Binary code (离线模式) 26
7	Nu-Link 固件更新
8	支持 NUC505系列 31
8.1 8.2	主窗口31 MTP选项 (MTP Option)
9	Nuvoton 公告



10	版本历史
10	版本历史

3

ηυνοτοη

List of Figures

图 2-1 芯片选择及语言选择 ··		8
图 2-2 主窗口概要		9
图 3-1 离线烧写按钮		
图 4-1 ICP Programming T	ool用户界面······	12
图 4-2 菜单栏		12
图 4-3 连接之前的状态		13
图 4-4 USB Dongle 连接之后	5的状态	13
图 4-5 目标芯片连接之后的状	态	14
图 4-6 选择文件用于烧写		14
图 4-7 用户配置状态		14
图 4-8 用户配置的设置		15
图 4-9 用户配置的设置历史 ··		15
图 4-10 数据信息界面		16
图 4-11 离线Flash烧写信息…		16
图 4-12 编程区域选项及Star	t 按钮	17
图 4-13 编程区域选项		17
图 4-14 编程选项		
图 4-15 编程状态		19
图 5-1 Nu-Link 认证流程 …		21
图 5-2 连接 Nu-Link		22
图 5-3 创建Nu-Link认证文件		22
图 5-4 保存Nu-Link认证文件		22
图 5-5 导出项目		23
图 5-6 使能绑定Nu-Link设置		23
图 5-7 选择Nu-Link认证文件		23
图 5-8 设置最大烧写次数		24
图 5-9 保存 ICP Programmi	ing Tool 项目文件	24
Sep. 05, 2014	4	Rev. 1.22

图 7-1	固件更新选择对话框	7
图 7-2	固件更新对话框······28	3
图 7-3	重新连接 Nu-Link 来完成固件更新 ······29	Э
图 7-4	固件更新完成·······30	C
图 8-1	NUC505系列主窗口 ····································	1
图 8-2	NUC505 芯片信息及MTP状态 ····································	2
图 8-3	MTP选项 ·······33	3
图 9-1	Nu-Link 公告 ···································	4

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1 概述

1.1 简介

"ICP"缩写自In-Circuit Programming,它让用户不需要将已经安装的MCU从目标PCB取下就能够通过软件控制来更新MCU的程序存储。

Nuvoton ICP Programming Tool 支持"在线"及"离线"编程模式.

1.2 支持的芯片

"Ctrl + 点击"来打开芯片的支持列表: Link of supported devices.

用户请从 http://www.nuvoton.com获取每个芯片的规格书.

1.3 功能

- 在线烧写目标芯片
- 在线/离线编程模式
- 备份目标芯片的flash数据(如果目标芯片没有保护flash)
- 备份Nu-Link dongle 离线的flash数据(如果离线的数据没有被保护)
- 烧写软件序列号(SN)到目标芯片
- 限制最大的编程次数
- 数据加密适用于在线/离线烧写
- 批量模式适用于在线/离线烧写

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2 安装

2.1 系统需求

- 安装 Nuvoton ICP Programming Tool 系统的软硬件的需求如下:
- PC/AT 兼容机,Pentium或更高CPU
- XVGA(1024*768) 颜色显示器
- 至少 512M RAM
- 至少 20M 磁盘空间
- Windows 2000/XP/Vista/7

2.2 硬件安装

第1步:将Nuvoton ICP编程板连接到PC的USB.

第2步:将Nuvoton ICP编程板连接到目标开发板的ICE接口.

2.3 软件安装

请运行安装包来安装该软件.

图 2-1是ICP Programming Tool 启动时的选择窗口.

图 2-2是ICP Programming Tool的主窗口.

Nuvoton NuMicro ICP Pr	ogramming Tool 1.24
	Select Language: English Select Target Chip: NUC100 series Quit Continue >>
A AV	Support Forum http://www.nuvoton-m0.com

图 2-1 芯片选择及语言选择

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Connect or disconnect target chip				
Nuvoton NuMicro ICP Pro	gramming Tool 1.24 - NUC	100 series		
Project Chips Tool Lan	guage			
nuvoTor				
Status				
Disconnect Chip Conr	ected with Nu-Link (ID: 00000	⁰⁰⁰⁾ ← Device sta	te	
Part No. NUC100	/E3DN LDROM:4K, APRON UID/UCID:	1:128K, Data:0K, RAM:16K	Chip information	
Load File				
LDROM File Name	C:\LDROM.hex			
	File not load.		K	 File information
APROM File Name	C:\APROM.hex			
	File not load.			
Data Flash File Name	C:\Data.hex			
	File not load.			Select data tab
Config Bits Se	t configuration bit			
Setting Config	0: 0xFFFFFFFF Config 1:	0xFFFFEEFF - Select -	•	Configuration bit
File Data	On-board Flash	Offline Flas < On-board	Config >	on target chip
LDROM APROM Data FI	ash LDROM APROM Da	ta Flash LDROM A < Offline Co	r UxrFFFFFFF	
00000000: 88 OC 00 00000010: 00 00 00	20 D9 00 00 00 DD 00 00 00 00 00 00 00 00	00 00 DF 00 00 < Update H	listory >	Configuration bit
00000020: 00 00 00 00 00 00 00 00 00 00 00 00 0	00 00 00 00 00 00 00 00 00 00 00 00 00 E3 00	00 00 E1 00 00 0xFFFFFFF	F OxFFFFFFFFF	in offline program data
00000040: E7 00 00 00000050: E7 00 00	00 E7 00 00 00 E7 00 00 E7 00 00 00 E7 00	00 00 E7 00 00 00 00 00 E7 00 00 00	32 bits	— Data display area
00000060: E7 00 00 00000070: 59 08 00	00 E7 00 00 00 E7 00 00 E7 00 00 00 E7 00	00 00 E7 00 00 00 00 00 E7 00 00 00		Data display alea
00000080: E7 00 00 00000090: E7 00 00	00 E7 00 00 00 E7 00 00 E7 00 00 00 E7 00	00 00 E7 00 00 00 00 00 51 08 00 00	Save As	
000000A0: E7 00 00 000000B0: E7 00 00	00 E7 00 00 00 E7 00 00 E7 00 00 00 E7 00	00 00 E7 00 00 00 00 00 E7 00 00 00	- Refresh	
Programming	58 N7 48 85 46 00 FO	4C FF 00 48 00 47		
LDROM VAPRO	M 📃 Data Flash	Config Options	Start	——— Start programming
-	7			
Target	program block	Action select	Build: 6211r	—— Application version
		国。	т .	1

图 2-2 主窗口概要

3 ICP Programming Tool的操作模式及Nu-Link dongle

该章节将描述ICP Programming Tool的操作模式及Nu-Link dongle.

3.1 Nuvoton ICP Programming Tool 模式

ICP tool 支持 "在线"及"离线" 编程模式.

3.1.1 在线模式

如果图 4-14的"离线编程模式"没有被选中,ICP Programming Tool 将于在线模式下编程.

点击图 2-2的"Start"按钮立即开始烧写目标芯片.目标芯片必须连接到Nu-Link.

3.1.2 离线模式

如果图 4-14的"离线模式"被选中, ICP Programming Tool 将于离线模式下编程. 点击"Start"按钮将会首先保存文件数据到Nu-Link,不管目标芯片是否连接到Nu-Link.

接下来,用户能够单独使用该dongle来烧写目标芯片,通过按下Nu-Link的按键(图 3-1红 色部分)来触发,不需要使用PC及ICP Programming Tool.



图 3-1 离线烧写按钮

3.2 Nu-Link dongle 操作模式

Nu-Link dongle 也有两种模式, ICE模式及离线下载模式.ICE模式是Nu-Link的默认模式.

按下按键(图 3-1红色部分)将使得Nu-Link切换到离线下载模式且立即开始下载离线数据到目标芯片.

3.2.1 ICE模式

Nuvoton ICP Programming Tool AP于ICE模式下仅能够连接到Nu-Link.

3.2.2 离线下载模式

在离线下载模式, Nu-Link dongle尝试烧写目标芯片.在烧写完成后, Nu-Link将立即切换到ICE模式.

该操作不需要PC及Nuvoton ICP Programming Tool AP.请留意通过章节3.1.2离线模式 编程来保存文件数据到Nu-Link.

3.3 Nu-Link dongle的LED指示灯及按键

● 启动

■ 所有指示灯 (ICE_Red, ISP_Organe,Red,Green) 闪烁

- ICE 模式
 - ICE_Red 亮
 - ISP_Organe-闪烁,如果先前的"离线下载模式"操作失败,否则灭.
 - Red 亮,如果出现错误
 - Green 亮,如果Nu-Link是激活的
 - Keypad(图 3-1红色部分) 按下后切换到"离线下载模式"
- ●3.2.2 离线下载模式
 - ICE_Red 灭
 - ISP_Organe 亮
 - Red 灭
 - Green 闪烁,如果flash数据正在下载
 - Keypad (图 3-1红色部分) 没有定义.
 - 如果"Green" 正在闪烁且 "ISP_橙色灯是亮的",表明这正在下载flash数据.其他任 何形式的指示灯闪烁都表明发生了一个错误.

4 开始使用 ICP Programming Tool

在这个章节,我们介绍ICP Programming Tool的基本操作,且我们分组地解释这些简介,请参考下述图表的群组信息.

		Connect or disconnect target chip	
Section1	. [🔗 Nuvoton NuMicro ICP Programming Tool 1.24 - NUC100 series	
Menu bar		Project Chips Tool Language	
		Πυνοτοη	
Section?		Status	
Connect stat	us	Disconnect Chip Connected with Nu-Link (ID: 00000000) Chip Connected with Nu-Link (ID: 00000000)	
		Part No. NUC100VE3DN LDRUM:4K, APRUM:128K, Data:UK, HAM:16K Chip information	
		Load File	
Section3		LDROM File Name: C:\LDROM.hex	
Load file	5	File not load.	File information
		APROM File Name: C:\APROM.hex	
		File not load.	
		Data Flash File Name: C:\Data.hex	
		File not load.	Select data tab
Section4		Setting Config 0: 0xFFFFFFF Config 1: 0xFFFFFFFF Select	Configuration bit
Config Bits	~	- Select -	on target chip
		File Data Orfboard Coning >	
Section 5			Configuration bit
File Data	\neg	00000010: 00 00 00 00 00 00 00 00 00 00 00 00 0	in offline program data
		00000040: E7 00 00 00 E7 00 00 0E7 00 00 E7 00 00 00 E7 00 00 00 00 00 00 00 00 00 00 00 00 00	Data display area
		00000060: E7 00 00 00 E7 00 00 00 E7 00 00 00 E7 00 00 00 00000070: 59 08 00 00 E7 00 00 00 E7 00 00 00 E7 00 00 00	Data display area
		00000090: E7 00 00 00 E7 00 00 00 E7 00 00 00 51 08 00 00 00000090: E7 00 00 00 E7 00 00 00 E7 00 00 00 51 08 00 00 000000000: E7 00 00 00 E7 00 00 00 E7 00 00 00 51 08 00 00	
		000000080: E7 00 00 00 E7 00 00 00 E7 00 00 00 E7 00 00 00 - Refresh	
Section6	5	Programming	
Program opt	ions	LDROM VAPROM Data Flash V Config	Start programming
Section7		Target program black 0time -last	Application version
Program Stat	tus	rarger program block Action select	

图 4-1 ICP Programming Tool用户界面

4.1 菜单栏

菜单栏它长的样子:



- 项目
 - 导入及导出*.icp项目文件.它不仅能够保存及加载你的设置,而且也能够通过导出 一个认证来保护二进制代码.
- 芯片
 - 对不同的芯片切换主对话框.
- 工具
 - 擦除离线数据
 - ◆ 擦除保存于NuLink dongle的离线数据.
 - 创建Nu-Link认证文件
 - ◆ 为了保证ICP Programming Tool在线模式的安全,创建认证文件来加密保存 于.icp项目文件中的程序数据,且将这个.icp项目文件绑定到某一个Nu-Link dongle.请检查章节 "保护保护Binary code(在线模式)" 来获取更多的细节.
- 语言
 - 在"英语","简体中文"及"繁体中文"之间切换.

4.2 连接状态

● 连接之前

一旦用户点击"Connect"按钮, Nuvoton ICP Programming Tool 将尝试着连接目标芯片.

Connect	Disconnected		
Part No.			

图 4-3 连接之前的状态

● USB dongle 连接成功之后

Nuvoton ICP Programming Tool 显示 "ICE Connected".

Status	
Stop check	Nu-Link connected (ID: 778876f9)
Part No.	

图 4-4 USB Dongle 连接之后的状态

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● 目标芯片成功连接之后

Nuvoton ICP Programming Tool 显示芯片信息.

Status		
Disconnect	Chip Connected with Nu-Link (ID: 00000000)	
Part No.	NUC100VE3DN LDR0M:4K, APR0M:128K, Data:0K, RAM:16K UID/UCID:	

图 4-5 目标芯片连接之后的状态

加载文件(Load file) 4.3

● 选择文件用于烧写

选择文件用于烧写,文件的大小及校验信息将显示.

Load File		
LDROM	File Name:	C:\Flash\ldrom.bin
		size: 4096 Bytes, checksum: 5000
APROM	File Name:	C:\Flash\aprom0.bin
		size: 4096 Bytes, checksum: a000
Data Flash	File Name:	C:\Flash\file.bin
		size: 4096 Bytes, checksum: 8000

图 4-6 选择文件用于烧写

● 支持的文件格式:

bin 或 Intel hex 文件格式. Intel hex 格式支持Intel 8, 16及32.

配置位(Configuration bits) 4.4

该组用于配置位的设置.

Config Bits				
Setting	Config 0:	0xFFFFFFFD	· Select ·	-
			-	
		図 1-7 田白配罟状太	t.	

如果点击"Setting"按钮,下述的对话框将弹出.

Clock Source Options	
External Crystal Clock (4~2	4MHz)
Internal RC 22MHz Oscillat	or Clock
Brown-out Voltage Options	
● 4.5V ○ 3.8V	○ 2.7V ○ 2.2V
Brown-Out Detector	🔲 Brown-out Reset
Boot select	
© LDROM	APROM
🔲 Data Flash	C Security Lock
Data Flash Base Address:	0x FFFFFFF
Config Value	
Config 0: 0xFFFFFFF	Config 1: 0xFFFFFFFF

图 4-8 用户配置的设置

- 配置选择列表
 - "On-board Config" 显示的配置位是来自读取目标芯片;
 - "Offline Config"显示的配置位是来自读取Nu-Link先前用于离线烧写保存的;
 - "Update History" 显示的配置位是由该软件填充的.

	- Select - 🗸 👻
	- Select -
2	< On-board Config >
~ _	0xFFFFFFFF 0xFFFFFFFF
¢,	< Offline Config >
	0x0000000 0x00000000
	< Update History >
2 1	0xFFFFFFFF 0xFFFFFFFF
i.	

图 4-9 用户配置的设置历史

4.5 回放数据(dump data)

一旦刷新,它将会显示三个部分的flash数据信息,它们分别是是"File Data", "On-board Flash", "Offline Flash".

File Data						0	n-bo	ard I	Flash	(08	fine	Flas	h				
LDROM	APR	OM	Da	ka F	lash	LD	RON	4	APR	ОМ	Da	ta Fl	ash	LD	ROM	A	PROM	Data	Flash	h	nío
000000000000000000000000000000000000000	0::00::	10 00 00 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	02 00 00 00 00 00 00 00 00 00 00 00 00 0	00 00 00 00 00 00 00 00 00 00 00 00 00	20 00 00 00 00 00 00 00 00 00	DS 000 FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	00 00 00 00 00 00 00 00 00 00 00 00 00	000000000000000000000000000000000000000	000000000000000000000000000000000000000	FOOBFFFFFFFF	00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00	F709FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00	00 00 00 00 00 00 00 00 00 00 00 00 00	á	000	8 bi 16 t 32 t	ts bits bits
0000008	:0:	FF	00	00	00	FF	00	00	00	FF	00	00	00	FF	00	00	00			Re	fresh

图 4-10 数据信息界面

- File data
 - 这是在"加载文件"组中所加载的文件内容.
- On-board Flash
 - 这是烧写到目标芯内置的flash数据.
- Offline Flash
 - 这是位于Nu-Link dongle的SPI flash的离线数据.
 - 信息表格将显示在线及离线模式的下载信息.



图 4-11 离线Flash烧写信息

Programming	APROM	📝 Data Flash	<table-cell> Config</table-cell>	<u>Options</u>	Start			
	图	4-12 编程区域	选项及Start按领	迅				
● 目标编程区域								
用户能够单独	地烧写APR	OM, Data Flas	h, LDROM .					
在线模式, 你只	只需要如图图	3 4-13 设置目标	编程区域.					
离线模式,除了 时它将会擦除	目标编程区 整个目标芯	域,你也需要使 片.	能图 4-14 的"特	F定编程区域	", 否则当离	线下载		
Progr	amming							
	LDROM	🔽 APROM	📃 Data Flas	sh 🔽	Config			

图 4-13 编程区域选项

● 编程选项

V Erase	A
🔽 Program	
Verify	· ·
Write Software Serial N	umber
Offline Programming Ma	ode
Software Serial Number (SN	1
Increase SN from	, _{Ox} 18000000
Write Address in Flash	0x 00100010
Repeat Password	
Enter Password	•••••
✓ Limit The Number of Of	fline Programming
	100
Max Number	
Max Number	Test before use!)
Max Number Auto-programming Program Specific Area	Test before use!)
Max Number Auto-programming Program Specific Area	Test before use!)
Max Number Auto-programming Program Specific Area Nu-Link Pro ID Voltage Power control is used on Nu power is not detected.	Test before use!) u-Link-Pro, and is valid only if target

图 4-14 编程选项

- 它包括擦除(erase),编程写入(program),编程校验(verify),离线模式设置选项 (offline programming mode),可由用户选中.
- 用户能够使能"Write Software Serials Number",分配"SN起始值"及"SN保存的目标flash地址".
- 用户能够指定离线模式的密码及因安全问题来限制最大的编程次数.



4.7 编程状态(Programming status)

Nuvoton ICP Programming Tool AP包括进度条编程状态.当编程完成后,弹出一个对话 框来显示成功信息或其他错误信息.

Program 46%

图 4-15 编程状态

5 保护Binary code(在线模式)

这个章节的主题是关于ICP Programming Tool在线模式下的代码保护.

在数据传送,代码是在在线编程模式加密的(指以下图表):



5.1 Nu-Link 认证简介

为了防止工厂获得开发者的代码且发布给其他人,开发者能够绑定他的bin文件到某一个 Nu-Link dongle.

Nu-Link dongle的拥有者 (在这个实例,它是由大规模生产的工厂所拥有) 应该创建认证 文件并且发送给开发者,开发者能够使用该文件加密bin文件且绑定到该Nu-Link dongle.

Nu-Link的认证功能:

- 必须使用该创建了认证文件的Nu-Link来烧写目标芯片:
 - 如果有人获得你的 *.icp 项目文件,没有那个已经生成认证的Nu-Link dongle他不能够烧写目标芯片.
- 导出的*.icp 项目文件的内容是加密的.
- 加密的项目能够以预先定义的最大次数来烧写目标芯片.
 没有开发者的许可,Nu-Link 拥有者不能够无限制地大规模量产.

5.2 使用Nu-Link认证的流程

步骤 1: 工厂创建Nu-Link的认证文件并把它发送给开发者.

步骤 2: 开发者使用该认证文件来加密bin文件并且导出一个 *.icp 项目文件,接着发送该 *.icp文件到工厂.

步骤 3: 当已经生成认证的Nu-Link成功地解密且烧写ICP项目到目标芯片后,会自动更新它的认证信息(例如,增加烧写次数).

提示:只有该已经生成认证的Nu-Link 能够解密这个ICP项目.所以工厂能够打开该项目 且烧写目标芯片的固件.



图 5-1 Nu-Link 认证流程

5.3 操作步骤

这个章节解释Nu-Link认证的操作步骤.

5.3.1 创建Nu-Link认证文件(工厂端的操作)

步骤 1: 连接Nu-Link

Nuvoton NuMicro ICP Programming Tool 1.26 - M051 series	×
Project Chips Tool Language	
ΠυνοΤοη	
Series	
Connected	
Connect	
Part No.	

图 5-2 连接 Nu-Link

步骤 2: 创建认证文件



图 5-3 创建Nu-Link认证文件

步骤 3: 保存认证文件(*.ict)

Save As	August Research Transfer	×
🖉 🖓 🗖 Deskto	op 🕨 👻 🛃 Search Desktop	Q
Organize 🔻 Ne	w folder	≝= - (2)
 Favorites Desktop Downloads Recent Places 	Libraries System Folder MU30 CHLin55	* III
4 🛜 Libraries	E System Folder	
 Documents Music 	Computer System Folder	
 Pictures Videos 	Network System Folder	
4 🛤 Computer	- Claire	-
File name:	Nu-Link.ict	•
Save as type:	Nu-Link certificate file (*.ict)	•
Hide Folders	Save	Cancel

图 5-4 保存Nu-Link认证文件

5.3.2 绑定认证文件及二进制程序文件来加密项目 (开发者端的操作)

步骤 1: 导出项目
Nuvoton NuMicro ICP Programming Tool 1.26 - M051 series
Project Chips Iool Language
Import DO
Export
Stop about Nu-Link-Pro connected (ID: 7788c400)
图 5-5 导出项目
步骤 2:使能设置
Export Option
\frown
Bind to one Nu-Link and limit the maximum programming number
Target Nucl ink's Certification file Help
L: \Users\UHLIN35\Desktop\Nu-Link.ict Browser
Max number
5
3

图 5-6 使能绑定Nu-Link设置

Cancel

Export

步骤 3: 选择Nu-Link认证文件路径

Expor	t Option	-	×
	Bind to one Nu-Link and limit the maximum p	programming number	
	Target Nu-Link's Certification file	Help	\frown
	C:\Users\CHLIN55\Desktop\Nu-Link.ict		Browser
	Max number		\smile
	5		
	C:\Users\CHLIN55\Desktop\Nu-Link.ict Max number 5	1 · 1) 1 · T · · · //	Browser

图 5-7 选择Nu-Link认证文件

步骤 4: 输入最大烧写次数且开始导出该项目

Export Option		-	×
I Bind to	one Nu-Link and limit the maximum	programming number	
Target	Nu-Link's Certification file	Help	
C:\Us	ers\CHLIN55\Desktop\Nu-Link.ict		Browser
Max n 5	umber		
	Export	Cancel	

图 5-8 设置最大烧写次数

步骤 5: 保存ICP项目文件(*.icp)

🥔 Save As		×
Deskto	p	٩
Organize 🔻 Nev	v folder	== ▼ (?)
☆ Favorites ■ Desktop ▶ Downloads ₩ Recent Places	E MU30 CHLin55 System Folder	E
Eibraries Documents Music	Computer System Folder	
Videos	Network System Folder	
🛤 Computer	🛫 📙 Claire	Ŧ
File <u>n</u> ame:	Test.icp	•
Save as <u>t</u> ype:	ICP project file (*.icp)	•
Hide Folders	Save	Cancel

图 5-9 保存 ICP Programming Tool 项目文件

提示:

项目一旦超过最大烧写次数,你需要创建一个新的Nu-Link 认证及新的最大烧写次数.

- 通过执行以上的步骤,另一个设置可以用来创建一个ICP项目文件:
 - 使用B.ict 来创建一个ICP项目文件并且设置最大烧写次数等于10.
 - 烧写5次之后, 使用B.ict来创建另一个ICP项目文件并且设置最大烧写次数等于3.
 - 但是使用第二个ICP 项目文件还是能烧写5次.
 - 当心第一次时设置的最大烧写次数并且最好是不同的认证应用于不同的 ICP 项 目.

提示:

当使用该认证来创建一个ICP项目文件,最大烧写次数是第一次设置时决定的。即使你多次地设置最大烧写次数,最大烧写次数还是第一次设置时的数字.

6 保护Binary code (离线模式)

这个章节的主题是关于ICP Programming Tool离线模式下的代码安全. 在数据传送,代码是在离线编程模式加密的(指以下图表):



如果代码安全是你关心的,建议设置位于图 4-14的 "密码用于离线数据",并且使能位于图 4-8"安全锁".

如果你想要限制 Nu-Link离线下载次数,请设置位于图 4-14的"限制离线烧写的次数".



7 Nu-Link 固件更新

下述提供的描述是关于固件更新:

步骤 1: 运行Nuvoton ICP Programming Tool. 点击 'Connect' 并开始连接到芯片.如果固件版本与驱动版本不匹配, 它将弹出固件更新窗口,如下:

Nuvoton Null	Alcro ICP Programming Tool 1.22 - Mini51 series		~
Project Chips	Tool Language		
nuvo	Τοη		
Status Stop check Part No.	Disconnected		
Load file			
LDROM	File name: C:\LDROM.hex		
	NuMicro ICP Programming Tool		
Data Flash	Application internal version is not matched! Current application has higher version 100003,	_	
- Configurations	while the Nu-Link firmware's version is 6008. The application may work abnormally.		
Setting	Before updating the Nu-Link firmware, please Remove any other devices connected on the Nu-Link!		•
File data	Do you want to update the Nu-Link firmware now?	th Info	
		8 bits	
	Yes No) 16 bits	
		🖌 32 bits	
		Refresh	
Program			_
LDROM	✓ APROM Data Flash ✓ Config Option	Start	
		Build: 100	003rc

图 7-1 固件更新选择对话框

步骤 2: 点击"Yes" 来更新固件,如下:

UVOTON

Nuvoton NuMicro ICP Programming Tool 1.21 - Mini51 series					
Project Chips	Tool Langu	age			
NUVO	TON				
Status					
Stop check	Disconnecte	ł			
Part No.					
Load file					
LDROM	File name:	C:\LDROM.hex			
		File not load.			
APROM	File name:	C:\APROM.hex			
(Index C		File wet les d			×
Cor File	e 29% IM Data Flash	LUHUM APHUM	Data Hash LDH	UM APHUM	Data Flash Info
					Ø 8 bits
					C 16 bits
					Refresh
Program					
LDROM	✓ APROM	🗌 Data Flash	🗸 Config	Option	Start
					Build: 5905rc
			レーエン・レイ	- LET	

图 7-2 固件更新对话框



更新完成,它需要重新连接nu-link 到 PC,如下:

	Γοη				
Stop check	Disconnecte	d			
Part No.					
Load file					
LDROM	File name:	C:\LDROM.hex			
		File not load.			
APROM	File name:	C:\APROM.hex			
		File wet level		~	D
Cor Opdate firm	remove any de	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ug in	
DPdate firm Please again!	remove any de	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ıgin	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	agin ata Hash Into	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ag in ata Flash Info	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	agin ata Hash Into	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ag in ata Flash Info	
Cor Please again!	remove any de M Data Hast	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ıg in sta Hash Into	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ag in ata Flash Into ● 8 bits ● 16 bits ● 32 bits Refresh	
Cor Please again!	remove any de M Data Flash	vice on the Nu-Link, and plug out the Nu-Link	from PC and plu	ıg in sta Flash Into	

图 7-3 重新连接 Nu-Link 来完成固件更新

Nuvoton ICP Programmer User Manual

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Nuvoton NuMicro ICP Progra	mming Tool 1.21 - Mini51 series	
Project Chips Tool Langua	ge	
NUVOTON		
Status Stop check Disconnected Part No.		
Load file		
LDROM File name:	C:\LDROM.hex	
	File not load.	
APROM File name:	C:\APROM.hex	
	File wet lesse	
Update firmware		
Update 100% Cor File LDRUM APRUM Data Flash	NuMicro ICP Programming T	RUM Data Flash Info
Program	🗌 Data Flash 🛛 🖉 Config	Option Start
		Build: 5905rc

图 7-4 固件更新完成

8 支持 NUC505系列

8.1 主窗口

Nuvoton NuMicro ICP Programming Tool 1.26 - NUC505 series	3
Project Chips Tool Language	
Shine	
Chin Connected with Nuclink (ID: 7700(05h)	
	t - Chin Information
Part No. NUC505 RAM:128K, SPI Flash:2M, MTP Program Count: 4/15	A : Chip information
Load File	
Code File Name: C:\Code.bin	
size: 66.0K Butes, checksum: 4905	B : Load Download File for Code Area
Bead Size: 67620 Butes	D . Load Bowmoad I lie for Gode / lied
Data File Name: C:\Data.bin	
size: 12.4K Bytes, checksum: 3e72	
Base Address: 0x 100000	C: Load Download File for Data Area
Read Size: 12720 Butes	
	1
Encrypt Code File Name: C:\Output.bin	D : Assign file path to save the encrypted
File Data On-board Flash Offline Flash	data of Code Area and Data Area
Fode área Data área Codo área Data área Codo área Data área Liste	
00000010: FF	
00000030: FF FF FF FF FF FF FF FF 15 02 00 00 17 02 00 00 00000030: FF FF FF FF FF FF FF 15 02 00 00 17 02 00 00 0000040: 00 19 01 19 02 00 00 00 00 00 00 00 00 00 00 00 00	
00000050: 00 00 00 00 00 00 00 00 00 00 00 00 0	
000000070: 29 DB 00 00 19 02 00 00 19 02 00 00 19 02 00 00 00000070: 4D 0F 00 00 19 02 00 00 00 00 00 00 00 00 00	
00000090: 10 00 00 00 00 00 00 19 02 00 00 19 02 00 00 00000090: 19 02 00 00 19 02 00 00 19 02 00 00 D3 06 00 00	
000000000: 19 02 00 00 7D ES 00 00 19 02 00 00 19 02 00 00 0000000B0: 19 02 00 00 1F 03 00 00 19 02 00 00 19 02 00 00 Refresh	
	■ E : Select Target block for program
	(Code Area, Data Area and MTP)
Code V Data MIP Program Uptions MIP Uptions	
Build: 6320	F : Option for MTP setting
	—
	L

检测到目标芯片之后, ICP Tool 将读取芯片信息 (包括料号,RAM大小, SPI Flash 大小及 MTP状态) 并且在主对话图 8-1框 A框图内显示这些信息. 如果MTP是锁住的, MTP状态 以红色显示 "MTP: Locked"及"MTP"的检查框也是禁止的.

Status Disconr Part N	nect o.	Chip Connec NUC505	ted with Nu	Link (ID: 7788f85b) 1:128K, SPI Flash:2N	1, MTP: Locked
	Program	nming Code	🔽 Data	MTP	

图 8-2 NUC505 芯片信息及MTP状态

由于读取SPI flash的所有内容是耗时的,我们提供局部读取开始于指定的基址(代码区固定为0)及图 8-1B与C框图的读取大小. "基址" ("Base Address")及"读取大小" ("Read Size")分别地显示不同的输入格式. "基址" ("Base Address")是十六进制,而"读取大小" ("Read Size")是十进制的.用户通过点击"Refresh"能够读取SPI Flash的任何位置.

如果MTP曾经被编程或 MTP被选中用于该程序,用户能够指定文件路径 (图 8-1框图D). 当编程写入结束, ICP tool 将代码区及数据区的加密数据合并到一个二进制(bin)文件且将 它保存到指定的路径.

开始编程目标板之前,用户能够选择目标区域用于编程 (图 8-1框图 E).

通过点击"MTP Options" (图 8-1框图 F), 用户能够打开MTP Options对话框及配置MTP相关的设置.

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8.2 MTP选项 (MTP Option)

MTP Option	x			
MTP Settings				
Vite MTP	Record MTP Settings	C : Option for the record of		
MTP KEY (Hex) 12345678 · 87654321	·	with related setting		
MTP Signature (Hex)				
Signature 20000400		A : M IP Write Settings		
Offset 000				
MTP Option (Hex) 00				
Lock MTP (Be careful! MTP cannot be program	nmed after lock	B : Option for MTP Lock operation		
~				

在"MTP Option"对话框,用户能够选中所想要的操作且将MTP密钥及签名填充:

- "Write MTP": 写64-位密钥, 32-位签名, 12-位偏移, 及1-字节选项 (十六进制输入格式).如果代码区的文件被加载, Tool 将搜索相应的32-位内容且根据"偏移"地址自动 地填充"签名".
- "Lock MTP": 锁MTP. 被锁之后MTP不能够被编程.
- "Record MTP Settings":如果该项被选中,按下"OK"后,MTP选项对话框的MTP设置包括MTP密钥及签名将被记录.当用户重新打开ICP Tool,先前的MTP设置将会被恢复.

图 8-3 MTP选项



9 Nuvoton 公告

当PC是联网的, NuLink驱动将自动地检查这是否有任何更新的驱动或者Nuvoton网站上的公告,当用户运行ICPTOOL它将进行检查. 用户也许看到下面的信息:

Nuvoton Announcement	×
The latest Nulink Keil driver version of Nulink is 6010, while the current driver version is 6008.	2
To get the new version, press Yes; if not, press No.	
Yes No	
Do not show this dialog again	
Nuvoton Technology to Bring Innovative Semiconductor Solutions a Design West 2013 in San Jose	it
Nuvoton Link1	
Nuvoton NuMicro Family 32-bit Cortex-M0 MCU Debuts a New Serie NUC200	es
Nuvoton Link2	

图 9-1 Nu-Link 公告

该上述的信息表明这有新版本的NuLink驱动更新在Nuvoton网站,点击 "Yes" 将从 Nuvoton网站下载该驱动,点击"No" 来关掉弹出的窗口.

提示:

即使用户安装最新的驱动,这个对话框也许还会弹出来,显示上图下方最新的" Nuvoton 新闻".如果用户不想这个对话框再次显示,请选中"Do not show this dialog again"并且点击"No"按钮.

10 版本历史

版本	时间	描述
V1.01.001	Jan. 28, 2010	初版.
V1.01.002	Feb. 24, 2010	增加离线模式.
V1.01.003	Jun. 04, 2010	变更按键及LED指示灯定义.
V1.02.001	Jun. 22, 2010	增加芯片选择及离线安全.
V1.03.001	Jul. 22, 2010	增加 M502x 系列芯片.
V1.17.001 Aug.03,2011	Aug 03 2011	增加 Mini51/Nano100 .
	Aug.03,2011	离线模式的更多功能.
V1.19.001	Aug.10,2012	增加 NUC200.
V/4.00.004	WI 01 2012	增加 NUC200及NUC123系列.
V1.20.001	Jul. 01,2013	固件更新及Nuvoton 公告.
V1.21.001	Feb. 10, 2014	变更文档格式.
V1.21.002	Aug. 08, 2014	增加安全章节及重新组织所有的文档.
V1.22.001	Sep. 05, 2014	变更文档及图表格式.



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