DTP3 Software Development Environment Guide

DAINCUBE Corp. ARM Cortex-M4 STM32F429IGT6

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Preface

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DAINCUBE Corp. Web: www.daincube.com E - MAIL: support@daincube.com

Safety precautions

Be sure to observe all of the following safety precautions.

Strict observance of these warning and caution indications are a MUST for preventing accidents, which could result in bodily injury and substantial property damage. Make sure you fully understand all definitions of these terms and related symbols given below, before you proceed to the manual.

Symbols

The following symbols may be used in this specification:

Warning : Warnings indicate conditions that, if not observed, can cause personal injury.



Caution : Cautions warn the user about how to prevent damage to hardware or loss of data.

Note : Notes call attention to important information that should be observed.

REVISON HISTORY

Revision	Data	Comment
Version 1.0	2014.10.13	Initial Version
Version 2.0	2015.08.06	Board revision
Version 2.1	2016.05.10	Update version of True STUDIO
Version 2.2	2017.03.16	Manual revision, Update version of True Studio

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1. Introduction

This document is for applying of DTP3(Daincube Teach Pendant Cortex_M4) to software development. Daincube corporation provides DTP3_DEVKIT for software engineer.

DTP3 Platform and Specification OS is Window7_32bit, development tool is Atollic's software TrueSTUDIO and debugging and Hex file download by ST-Link/V2 JTAG.

DTP3 development environment consist of 5 steps.

Summary of DTP3 development environment

- A. TrueSTUDIO Lite version Install.
- B. The ST-Link/V2 configuring the development environment.
- C. HOST PC and DTP3 connection (ST-Link/V2 JTAG).
- D. How sample program debugging in HOST PC.
- E. Make sample project.

* This document was proceeded in HOST PC Windows7_32bit environment.

1.1. DTP3 Package List

DTP3 Package List

Item	Photo	Options	Quantity
Item DTP3		Options Basic Configuration System Cable: 1.5m *Options System Cable: 1.5 ~ 5m	Quantity 1
Junction Box		*Options	1
ST-Link/V2	The second secon	*Options	1
Development CD	DTTP Development Kr. Torr Development Torr Development Torr Development Torr Development	*Options	1

1.2. DTP3 Connecting



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2. TrueSTUDIO Install

2.1. TrueSTUDIO Download

Download TrueSTUDIO tool.

Link to : https://atollic.com/

Development



© Evaluate Pro





HOME TRUESTUDIO BUY/PRICING FORUM RESOURCES PARTNERS ABOUT US **Q**

Download	Home / Resources / Download	
Select your operating system		Target support
	Auril - 14 - 00	Evaluate Pro
Windows	Apple Mac OS Coming 2017	😭 Buy / Get quote
Linux installers	-	
Atollic provides a single installer for all TrueSTUDIO editions, one for	or each operating system.	



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Filename	Version	Size	Revision h
Atollic_TrueSTUDIO_for_ARM_windows_x86_v7.1.1_20170310-1837.exe	7.1.1	784 MB	readme.txt
Atollic_TrueSTUDIO_for_ARM_windows_x86_v7.1.0_20170201-1344.exe	7.1.0	783 MB	readme.txt
Atollic_TrueSTUDIO_for_ARM_windows_x86_v7.0.1_20161216-1540.exe	7.0.1	762 MB	readme.txt

% This document was proceeded in TrueSTUDIO 7.1.1 Lite Version environment.

2.2. True STUDIO Install

Click download install file.



Select language and click "OK" button.



Click "Next" button.



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Agree with all license and click "I Accept" button.

Check on "ST-Link GDB" and click "Next" button.



Atollic TrueSTUDIO(R) Setup	×
Choose Install Location Choose the folder in which to install Atollic TrueSTUDIO?for ARM.	6
Setup will install Atollic TrueSTUDIO?for ARM in the following folder. To install in a differer folder, click Browse and select another folder. Click Next to continue.	nt
Destination Folder	
C:\Program Files (x86)\Atollic\TrueSTUDIO for ARM 7.1.1	
Space required: 3.3GB Space available: 1558.5GB	
< Back Next > Can	icel

Check on Destination Folder and click "Next" button.

Install finish, click "Finish" button.

Atollic TrueSTUDIO(R) Setup	
Installation Complete Setup was completed successfully.	a
Completed	
Show details	
	< Back Next > Cancel



If you appear ST-Link/V2 driver install program, You will start install.



< 뒤로(B)

다음(N) >

취소



3. ST-Link/V2 Development environment

Setting to ST-Link/V2.



< Purchase basic configuration items ST-Link/V2 >



< Daincube corporation items. >

DTP3 development environment items need 4 items and ST-Link/V2 JTAG connection method is below picture.



< HOST PC & DTP3 Connection >

4. DTP3_API Project

4.1. DTP3_API Project Build

Daincube corporation provides DTP3_API Project and Debugging at TrueSTUDIO.

Execute TrueSTUDIO and select workspace.

Eclipse Launcher	
Select a directory as workspace Atollic TrueSTUDIO for ARM uses the workspace directory to store its preferences a	and development artifacts.
Workspace: C:#Users#Yangjae#Atollic#TrueSTUDIO#ARM_workspace_7.1	▼ Browse
Use this as the default and do not ask again	
Recent Workspaces	
	OK Cancel

TrueSTUDIO Main screen.

ARM_workspace_7.1 - C/C++ - Atollic	TrueSTUDIO for ARM												- 0 -X
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		Description	Resource	Path	Location	Type			_				
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							•						

Click "Project Explorer" click right mouse button and click "Import" button.

🎦 Project Explorer 🕱 📄 🗢 🗖 🗖

	New	•
è	Import	
è	Export	
	Refresh	F5

Select "Existing Projects into Workspace" and click "Next" button.

Create new projects from an arc	chive file or directory.	Ľ
Select an import wizard:		
type filter text		
 ∠ General Archive File ∠ Existing Projects int ⊂ File System □ Preferences □ Projects from Folde ∠ C/C++ ∠ CVS ∠ Example projects ∠ Git ∠ Install ∠ Nu/Debug ∠ SVN ∠ Tasks ∠ Team 	o Workspace r or Archive	E

DAINCUBE Corp.

Click "**Browse**" button.

UN DI UNSC	button.			
Import				%
import Projects Select a directory to sear	ch for existing Eclipse	projects.		
 Select root directory: Select archive file: 			•	Browse
Projects:				
				Select All
				Deselect All
				Refresh
Options Search for nested pro Copy projects into w Hide projects that all	ojects orkspace eady exist in the work	space		
Working sets			_	
Add project to work	ing sets			New
Working sets:			· · · · · · · · · · · · · · · · · · ·	Select
?	< Back Next	>	Finish	Cancel

Select project path and click " $\mathbf{O}\mathbf{K}$ " button.

(DTP3_DEVKITW02_DTP3_SWW02_ExampleWDTP3_APIWCompanyWAtollicWProjects)

L 1	DTP3_API	^
4	Company	
	Atollic	-
	Projects	
	🖻 🍌 .metadata	E
	DTP3_API_V0.1	
	.settings	
	🖻 퉲 Debug	
	🖻 퉬 Libraries	
	3 src	

Check for "Copy projects into workspace" and click "Finish" button.

Import		
Import Projects Select a directory to sear	ch for existing Eclipse projects.	
 Select root directory: Select archive file: Projects: 	C:\Users\Yangjae\Desktop\02_DTP3_DE +	Browse Browse
♥ DTP3_API_V0.2 (C:#Users#Yangjae#Desktop#02_DTP3_DEVKIT	Select All Deselect All Refresh
Options Search for nested pre Copy projects into w Hide projects that all	ojects orkspace ready exist in the workspace	
Working sets	cing sets	New Select
?	< Back Next > Finish	Cancel

Then added project.



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4.2. Sample Project Debugging

If your DTP3_API Project rebuild success, connect DTP3 and HOST PC with ST-Link/V2. Connection method refer to 1.2 DTP3 Connecting.

Click "Run -> Debug Configurations" .

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<u>File E</u> dit <u>S</u> ource Refac <u>t</u> or View <u>N</u> avigate Se <u>a</u> rch <u>P</u> roject	<u>R</u> un	<u>W</u> indow <u>H</u> elp		
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DTP3_API_V0.2	检	Debug	F11	
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Elbranes B src		Run Configurations		
> 🔁 Debug		Debug History	+	
stm32f4_flash.ld		Debug As		
		Debug Configurations		
	0	Toggle Breakpoint	Ctrl+Shift+B	
	0	Toggle Line Breakpoint		
	0	Toggle Method Breakpoint		
	65	Toggle Watchpoint		
	æ	Skip All Breakpoints	Ctrl+Alt+B	
	X	Remove All Breakpoints		
		Breakpoint Types	•	
	Q	External Tools	+	

	ln	"Debugger	->	Interface"	,	check	"SWD"	and click	"Debug"
--	----	-----------	----	------------	---	-------	-------	-----------	---------

 Debug Configurations Create, manage, and run confi 	gurations	
Image: Second State St	Name: DTP3_API_V0.2 Debug Main Startup Scripts Source Debug probe ST-LINK GDB Connection Settings Autostart local GDB server Host name or IP address Connect to remote GDB server Port number GDB Server Command Line Options Interface SWD JTAG Serial Wire Viewer (SWV) Enable Clock Settings Core Clock: 8.0 MHz SWO Clock: 1000 KHz Port number: 61235 Wait for sync packet Misc Verify flash download Log to file: C:#Users#Yangjae#Atollic#TrueSTUDIO#A	Common
Filter matched 7 of 7 items		Revert Apply
?		Debug Close

After checking the following debug messages are in progress.



Click "Start debug button."

Debug - DTP3_API_V0.1/src/main.c - Atollic TrueSTUDIO® for ARM®						
<u>File Edit View Run W</u> indow <u>H</u> elp						
	• 58 G>			Quick Access	8 6	C/C++ 🕸 Debug
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	(*
🖻 main.c 🛛			- 8	🗄 Outline 🖾		- 0
<pre>235 #Initiate Display.in 226 2379 [239 { 239 Display_Init(); 231 232 CreateWindow(); 233 244 245 while(1) { 256 GUI_Exec(); 257 } 258 } 259 #endif 300 // Ino Test 4</pre>				mair mair UAR UAR UAR UAR DIA Mair DIA Mair San San UAR Mair Mair UAR Mair UAR Mair UAR Mair Mair Mair Mair Mair Mair Mair Mair	$\begin{array}{c} \displaystyle \begin{array}{c} \displaystyle \begin{array}{c} \displaystyle \begin{array}{c} \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \right) I_{2} & \displaystyle \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \displaystyle \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array}{c} \displaystyle \displaystyle \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \end{array} \\ \displaystyle \begin{array} \\ \displaystyle \displaystyle \end{array} \\ \\ \\ \displaystyle \end{array} \\ \\ \displaystyle \end{array} \\ \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \end{array} \\ \\ \end{array} \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \\ \end{array} \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \\ \end{array} \\$	• • •
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۲	Overflow p	ackets: 0				
	Wr	ritable S	Smart Insert 290 : 1	1		

button.

5. Make the New Project

This method is making new project for DTP3 development in TrueSTUDIO.

```
Click "File -> New -> C Project" .
```



Define project name and select	"Embedded C Project"	and click	"Next"
--------------------------------	----------------------	-----------	--------

C Project	
C Project Create C project of selected type	
Project name: DTP3_API_V0.1 Use default location Location: C:#Users#Yangjae#Atollic#TrueSTUDIO#ARM_workspace_7	Browse
Project type: Toolchains:	
 ▲ ➢ Executable ● Empty Project ● CMSIS C/C++ Project ● PC C Project ● Embedded C Project ▷ Shared Library ▷ Static Library ▷ Makefile project 	
Show project types and toolchains only if they are supported on the	platform
? < Back Next > Finish	Cancel

Click "STMicrolelctronics", "MCUs", "STM32F42xx/43xx devices", and select "STM32F429IG" and click to "Next" button.

C Project				
rueSTUDIO® 히	나드웨어 구성			
하드웨어 설정 선택	택			E
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type filter text				
Device		7-6-		
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S	TM32F429IG	Atollic TrueSTUDIO prov		
S	TM32F429II	Atollic TrueSTUDIO prov		
S	TM32F429NE	Atollic TrueSTUDIO prov		
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C.	TM22EA20NI	Atollic TrueSTUDIO prov		
STM32F429IG: F	FLASH: 1024KB RAM: 192K	В		
부동 소수점	Hardware implementatio	n		•
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Sel	ect refer to below the picture and click	Next	button.			
a	C Project					
Т	rueSTUDIO® 소프트웨어 구성 ^{소프트웨어} 설정 선택				6	
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	🔲 tiny printf/sprintf/fprintf 사용(작은 코드 크기)					
	▼시스템 호출 파일 생성(입/출력 방향지정과 OS 통합 활성화)enable I/O n	edirection and	OS integration			

and aligk "Novt" butt

?

가변 힙 크기 (Default) ▼

☑ 사용되지 않은 코드 제거(데드 코드 제거) ☑ 사용되지 않은 데이터 제거(데드 데이터 제거) □ C++ 런타임 타입 정보(RTTI) 비활성화 □ C++ 익셉션 핸들링 비활성화

최적화

< Back

Next >

Finish Cancel

Select	"ST -Link "	and click	"Next"	button.				
a C Project								
TrueSTUDI (하드웨어 디	0® 디버거 구성 버그 설정 선택							a
디버그 프 디버그 프 ST-LINK	로브 선택 프로브 <mark>ST-LINK</mark>							
This supp	ports debugging with ST	-Link on STM32 boards.						
?					< Back	Next >	Finish	Cancel

Check on project configuration and click "Finish" button.

N * C C F * * C * * * * * *	🤹 🗠 🖓 🖓 🔸 🖓 🔶 🖉 🖉	2101-8-5	S C+		Q	UICK ACCESS	E E C/C++
Consider the planer SS → C → C → C → C → C → C → C → C → C	<pre>mainc 82 File : main.c Abstract : main function. Functions : main Environment : Atollic TrueSTUDIO(R) STNicroelectronics STN02F4xx Standard Peripherals Library Distribution: The file is distributed "as is", without any warranty Distribution: The file is distributed "as is", without any warranty Distribution: The file is distributed "as is", without any warranty Distribution: The file is distributed "as is", without any warranty Distribution: The file is distributed "as is", without any warranty Distribution: The file is distributed "as is", without any warranty Use function: The file is distributed "as is", without any warranty Wroking Command: am-atollic-eabi-gcc - cStdPeriph_Driver\src\stm32Kax_cryp_desc Ahways run in background Run in Background Cancel Details >> #*******************************</pre>					E O SS I T I A	1 □ □ □ ↓ √ • ₩ ▼
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C/C++ - DTP3_API_V0.1/src/main.c - Atollic TrueSTUDIC	0® for ARM®					
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	Description	Resource	Path	Location	Туре	
		w	ritable Smar	t Insert 27 : 1	i j	

This picture is ready to development DTP3.

If project makes success, Copy to DTP3 development library.

Library needed for development can be found at the following path within the SDK. Libraries and src folder are copy to new project folder.

$({\tt DTP3_DEVKITW02_DTP3_SWW02_Example{\tt WTrueSTUDIO{\tt WL}ibraries})$

(DTP3_DEVKITW02_DTP3_SWW02_ExampleWTrueSTUDIOWsrc)

If library copy success, right mouse click the "**Project** Explorer". Click Properties -> C/C++ General -> Paths and Symbols -> "**Add**". Then add library path refer to below picture.

Resource	Paths and Symbols	↓ ↓ ↓ .
Builders C/C++ Build C/C++ General Code Analysis Documentation	Configuration: Debug [Active]	age Configurations
File Types Formatter Indexer Language Mappings Paths and Symbols Preprocessor Include P. CMSIS-SVD Settings Project References Run/Debug Settings Testing	Languages GNU C S,S,JSM Include directories Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/CMSIS/Include Libraries/Common/STM32F4xx/Include Libraries/Common/STM32F4xx_USB_MSC_HOST Libraries/Common/FatFs Libraries/Common/FatFs Libraries/Common/FatFs/option Libraries/Common/TM_Lib Libraries/Common/STemWinLibrary522/inc Libraries/Common/Config Libraries/Common/Config Libraries/Common/Config	Add Edit Delete Export Move Up Move Down
	Using relative paths is ambiguous and not recommended. It can cause unexpected effects. Show built-in values Mark Institution Settings	
	Restore Def	aults Apply

- "Libraries/CommonWSTM32F4291-Discovery"
- "Libraries/Common/Font"
- "Libraries/Common/STM32F4xx_USB_MSC_HOST"
- "Libraries/Common/FatFs"
- "Libraries/Common/FatFs/drivers"
- "Libraries/Common/FatFs/option"
- "Libraries/Common/TM_Lib"
- "Libraries/Common/STemWinLibrary522/inc"
- "Libraries/Common/Config"
- "Libraries/Dain_Driver/inc"

Add GUI Library Path refer to below picture.

Properties for DTP3_API_V0.1	5 g. 20. abott-act - ante Sanction.	
	Paths and Symbols	
 Resource Builders C/C++ Build C/C++ General Code Analysis Documentation File Types 	Configuration: Debug [Active] Manage C Mana	Configurations
Formatter Indexer Paths and Symbols Preprocessor Include P. CMSIS-SVD Settings Project References Run/Debug Settings > Testing	Elbraries/Common/STemWinLibrary522/Lib	Add Edit Delete Export Move Up Move Down
	 Using relative paths is ambiguous and not recommended. It can cause unexpected effects. Show built-in values 	
<	Restore Defaults	Apply
?	OK	Cancel

"Libraries\Common\STemWinLibrary522\Lib"

	Paths and Symbols \Leftrightarrow \checkmark \Rightarrow	*
Resource		
Builders		
⊳ C/C++ Build	Configuration: Debug [Active]	ons
C/C++ General		
Code Analysis Documentation		
File Types	🕒 Includes # Symbols 🚔 Libraries 🖉 Library Paths 🗁 Source Location 📳 References	
Formatter	sTemWin522 CM4 GCCa	
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Language Mappings	Edit.	
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	 Using relative paths is ambiguous and not recommended. It can cause unexpected effects. 	
	Show built-in values	
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4 III		
	OK Canc	el

Add GUI Library file refer to below picture and click "OK" button.

":STemWin522_CM4_GCC.a"

6. FAQ.

DAINCUBE Corp.