

常问问题 • 3 月/2013 年

WinAC S20 (Simulink to ODK) 向导使用入门

WinAC , S20, Matlab/Simulink,风能

http://support.automation.siemens.com/CN/view/109094704

目录

1	WinAC S2	0 向导概述	3
2	WinAC S2	0 向导安装	4
	2.1	软件要求	4
	2.2	安装顺序	4
3	WinAC S2	0 向导的使用	5
	3.1	风机建模及仿真	5
	3.2	代码转换步骤	6
	3. 2. 1	采用 Matlab 中的 Real-Time Workshop(RTW)生成 C/C++代码	7
	3.2.2	采用Simulink to ODK wizard(S20 wizard)生成dll(或	
		rtdll)及SCL源代码	9
	3.2.3	Step7 V5.5 中调用生成的功能块	12
	3.2.4	将生成的 DLL 拷贝到目标 PC 的 C:\下	13
	3.2.5	Step7 V11 代码转换及调用	13

1

WinAC S20 向导概述

Mathworks 公司的产品 MATLAB/Simulink 是一款提供建模与仿真功能的软件。 Simulink 图形化的编辑器可以用来创建实际的工艺过程及解决方案,譬如,可以 应用到控制工程领域。Real-Time Workshop Embedded Coder (RTWEC) 插 件能够将 Simulink 子系统直接编译为 C/C++代码。借助于 WinAC ODK,这些 C/C++代码可以在 Windows 或者 WinAC RTX 实时环境下处理执行。

WinACS2O(Simulink to ODK)向导使得 Simulink 子系统在 Step7 中的集成变 得更加方便快捷。

WinAC S2O 向导自动创建用于在 Step7 项目中集成所需要的所有的功能块及文件。通过 WinAC S2O 向导,通过 RTWEC 创建的 C/C++代码可以创建成 SCL 源代码以及 DLL 或 RTDLL 文件。Step7 V5.X 或 TIA portal Step7 V11 可以将创建的 SCL 源代码很容易的集成到 Step7 程序中去,同时也可以将 DLL 或 RTDLL 文件方便的装载到 WinAC RTX 所在的 PC 系统中去,最终实现 C/C++ 代码在 WinAC RTX 系统中的集成。

本文将以风能 Demo 控制系统在 Step 7 中的集成为例介绍 WinAC S2O 的使用, 图 1 简单描述了代码转换及集成过程。



图 1 使用 S20 向导实现风能 Demo 控制系统在 Step 7 中的集成

2 WinAC S20 向导安装

2.1 软件要求

WinAC S2O 向导安装之前,需要安装如下软件:

- Microsoft Visual Studio 2008 Professional
- STEP V5.5 与 S7-SCL V5.3
- 或 STEP 7 V11 Professional with Service Pack 2
- WinAC ODK V4.2
- 2.2 安装顺序

需要按照如下顺序安装:

- Microsoft Visual Studio 2008 Professional
- STEP V5.5 与 S7-SCL V5.3
- 或 STEP 7 V11 Professional with Service Pack 2
- ODK4.2;
- S2O

提示!
 0DK4.2 不支持 Win7,而 S20 需要 0DK4.2 的支持,所以 S20 也只能在 Windows Xp 环境
 下应用,不支持 Win7;另外经测试 S20 不支持 VS2005。

3 WinAC S20 向导的使用

3.1 风机建模及仿真

首先将风机全部或部分对象或功能建模并仿真,如图2所示。



图 2 风机建模及仿真

关于 Matlab/Simulink 的建模及仿真本文不展开介绍,具体操作可参考 Mathworks 公司的相关技术资料。

西门子提供了基于 WinAC 及 MicroBox427C 的软硬件平台,用于实现风能算法的集成,实现风机主控、变桨、偏航控制以及系统的状态监控。

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图 3 基于 WinAC 及 MicroBox427C 实现风能算法的集成

3.2 代码转换步骤

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基于 Matlab/Simulink 对风机的仿真,使用 S2O 向导实现风能算法在 Step7 中的 集成主要通过如图 4 所示的三个步骤:

- 采用 Matlab 中的 Real-Time Workshop (RTW) 生成 C/C++代码;
- 采用 Simulink to ODK wizard (S2O wizard) 生成 dll (或 rtdll)及 SCL 源代
- Step7 中调用生成的功能块及 DLL 文件。



图 4 使用 S20 向导实现风能算法在 Step 7 中集成过程

下面以风机 Demo 主控系统的代码转换为例详细介绍 S2O 的使用。

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序号	操作	图例
1.	设置 Matlab/Simulink 中 Real- Time Workshop(RTW)的代码编 译环境	Centered by length of the sector Sector Sector Sector
		- TextBench

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2.	选择编译子系统命令	Open Build.
3.	选择参数	Link: Wind_Turbins/Main Controller/Wind In A Build code for Subsystem: Turbine State Machine Pick turbins/Main Controller/Wind In Pick turbable parameters Pick turbable parameters Variable Name Class StorageClass WYT_Params Struct Input Blocks using selected variable Block Parent Block Parent Select turbable parameters and click Build Cancel Untrace_table Select turbable parameters and click Build Cepright 2000 MatWide, Inc. G

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3.2.2 采用 Simulink to ODK wizard (S20 wizard) 生成 dll (或 rtdll)及 SCL 源代码

序号	操作	图示
1.	新建 Step7 项目	StMATIC Manager - [wind_turbin - C:\Program Files\Sitemens\Step7\s7proj\wind_tur] File Edit Insert PLC Vew Options Window Help Site # 10 # 10 # 10 # 10 # 10 # 10 # 10 # 1
2.	打开 WinAC ODK Library	SIMATIC Manager - [WinAC ODK Library C:\Program Files\SIEMENS\Step7\S7Proj\OdkLib] File Edit Insert PLC View Options Window Help Image: State PLC Image: State

3.		SIMATIC Manager - [wind_turbin C:\Program Files\Siemens\Step7\s7proj\wind_tur]
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	SFB65003 拷贝到新建的 Step7	□ 🔁 wind_turbin 🕢 🕞 OB1 📁 SF865001 💭 SF865002 🚌 SF865003
	项目中去	S/ Program[1]
		Blocks
		220 Wind C 520 Witzerd
		WinAC Simulink to ODK Wizard
		Version 1.0.19.1
	打开 WinAC S2O 向导	
		Copyright 2011 Siemens AG. All rights reserved.
		Candel
4.		WinAC S20 Wizard
		Select source project Select the source code destination path and the integration in a STEP 7 / 00K project
		Select the C/C++ source:
		Select the ODK Project - destination folder:
		Generate SCL Block: ODK project type:
		 STEP 7 V5.x Windows DLL (DLL)
		C STEP 7 V11 C Real-Time DLL (RTDLL)
	选择 C/C++代码所在的存储位置	
		<back next=""> Cancel</back>
		Open 2
		Select source project
		Select the source code, decimation path and the integration in a STEP 7/ CDK project. 2 Vig Recent Turbore Curve
		Select the CIC++ source
		Select the CDIX Project - destination folder:
		Generate SDL Block: ODIX project type: My Computer
		C STEP 7VSx C Windows DLL DLL) My Lework File name Tudine D Open
		Place Res of type: CCC+ source (* c, *cop)
		ZBAS Mars Court
		<u></u>





3.2.3 Step7 V5.5 中调用生成的功能块

序号	操作	图示
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1.	打开目标项目,可以看到 FB1 已 包含在项目中	● The Life Street R.C He ● The Life Street R.C He □ @ B [*] mill stre	Lurbin - Cl. Program Protoco: Window Union Concerning and Concerning Union Concerning and Concerning Stresson Stresson Stresson Stresson Stresson	Files Semens Step 7 i s7pm Help Spitolic rane Tutine, MarChi CREA, COM DEC.COM ASTIN_COM	of, wind_tur] File:) Created in language SCL STL STL STL STL STL	文 왕왕 종 등 다 가 Seenflewokne, 「Jpe 30 Optice 33 Gruces - System - System - System	Version (Hear tion Block 0.1 Block 0.0 unotion block 1.0 unotion block 1.0 unotion block 1.0	e) Name (Header) Orea, com Exec_com Astru_com	Unirked 	Author N Author N SEMENS - SIEMENS - SIMATIC -
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3.2.4 将生成的 DLL 拷贝到目标 PC 的 C:\下

3.2.5 Step7 V11 代码转换及调用

序号	操作	图示
1.	选择 SCL 代码的应用环境- Step7 V11	Select source project Select the source code, destination path and the integration in a STEP 7 / 0DK project. Select the C/C++ source: \[Madministrator\Desktop\Wrind_Turbine_Model\Turbine_ert_rtw\Turbine.cpp] Select the 0DK Project - destination folder: [Iministrator\Desktop\Wrind_Turbine_Model\Turbine_ert_rtw\Turbine_S20[1] Generate SCL Block: 0DK project type: © STEP 7 V5.x © Windows DLL (DLL) © STEP 7 V11 © Real-Time DLL (RTDLL)
		<pre></pre>

2.		Select destination project Select a name for the SCL source.
	命名 SCL 源代码以及 FB 变量表 名称,之后点击 Finish 按钮	Name for new SCL source: Turbine Symbolic name for Function Block: Turbine (optional)
		Kack Finish Cancel
	完成 SCL 及 DLL 文件的创建	WinAC 520 Wizard Overview The following SCL source has been created successfully: Turbine.scl The following DLL file has been created successfully: C_ODK.dll Destination path: Compilation report
		New parameterization
3.	Step7 V11 中选择" Add new external file"并选择创建的 SCL 文件	Internation wind Landa The state wind Landa Internation wind Landa

<u> </u>		1
4.		
4.	将导入的 SCL 代码通过 " Generate Blocks" 转换成 FB 块	Wind_turbin Wind_turbin Wind_turbin Wind_turbin Devices & networks PoSystem_1 [SIMAIIC PC station] Device configuration WonA [RTX [CPU] WinA [RTX [RTX [RTX [RTX [RTX [RTX [RTX [RTX
5.	在项目中调用生成的 FB 块	Print preview Alt+Enter Properties Alt+Enter Cenerate blocks Inteface Int