

HY-TTC 30 Family

Quick Start Guide

C Programming



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Revision Chart

A revision is a new edition of the document and affects all sections of this document.

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1.0.0	22.03.2014	JOH	Creation
1.1.0	26.03.2014	JOH	Work in of review findings
1.1.1	09.07.2014	MLM	Added section "Build modification"

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1 Overview

The purpose of this document is to give a short overview of how to setup HY-TTC 30 Starter Kit for C programming.

2 Information and latest version of software

Get the latest version of the Quick Start Guide and information about new product features, improvements and bug fixes from our Service Area at <http://www.ttcontrol.com/service-area/>.

3 Starter Kit

HY-TTC 30 Starter Kit for C programming consists of following components:

- HY-TTC 30
- Connector Interface Board
- 1-1 cabling harness
- PCAN USB Adapter
- Serial to USB Adapter and DSUB-9 cable
- USB Stick with Documentation and Software
- Case



Figure 1: HY-TTC 30 Starter Kit

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4 Connections

4.1 HY-TTC 30 Module Cabling Harness

Connect HY-TTC 30 to the connector interface board with the provided 1-1 cabling harness.

4.2 HY-TTC 30 Module CAN Connection

- Connect pin D2 and C2 (CAN termination high line) to activate 120 Ohm termination resistance.
- Connect pin B2 and A2 (CAN termination low line) to activate 120 Ohm termination resistance.
- Make sure that no jumper is connected to the node ID section.
- Connect PEAK PCAN USB adapter to the CAN DSUB 9 connector of connector interface board.

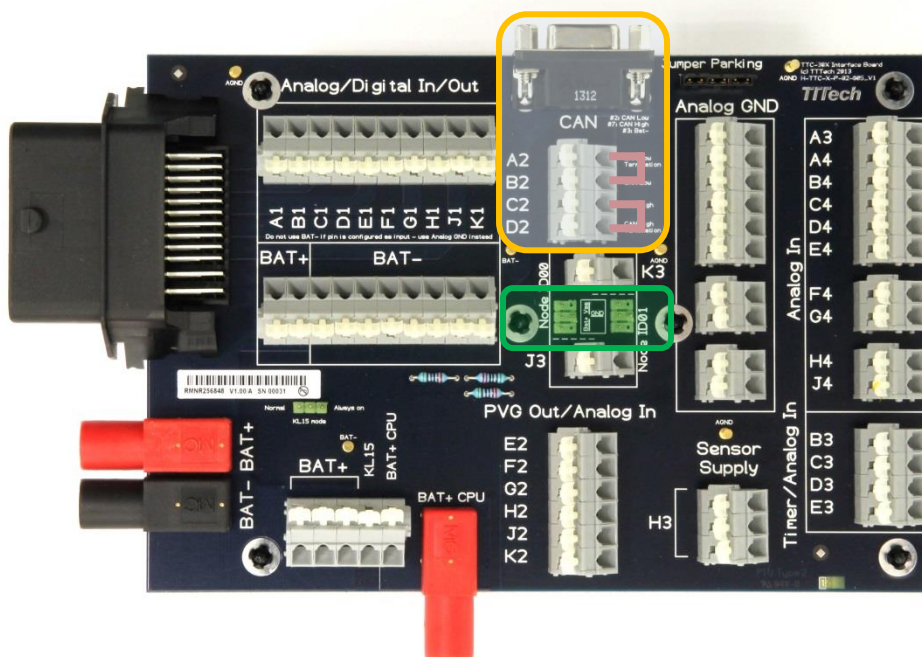


Figure 2: Connector Interface Board – CAN Setup

4.3 HY-TTC 30 Module Power Supply

- Connect 0 V to the black banana jack labelled BAT- of connector interface board.
- Connect 8-32 V to the red banana jacks of connector interface board.
- Put jumper KL15 mode to “Always on” to activate K15.

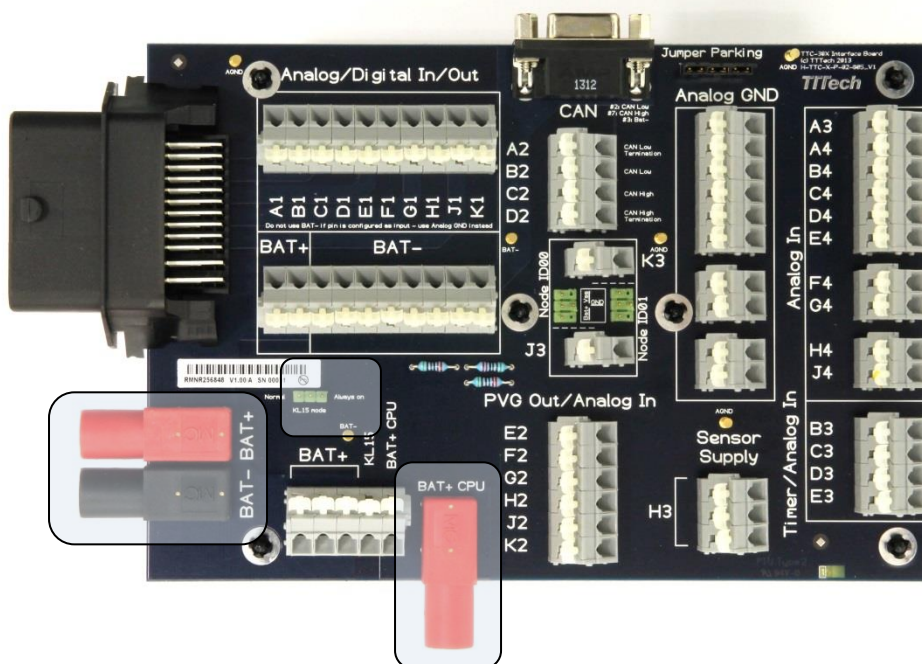


Figure 3: Connector Interface Board – Power Supply Setup

5 C Programming Tools

This chapter gives a step by step guide on how to install software tools needed for C programming:

- Compiler (TASKING VX-toolset for C166 v3.0r3)
- TTC Downloader
- Debugger (Trace32)

5.1 TASKING VX-toolset for C166 v3.0r3

5.1.1 Installation

HY-TTC 30 C application shall be compiled with TASKING VX-toolset for C166 v3.0r3. Please execute setup.exe and follow the instruction of the installation manager. On start please select "TASKING VX-toolset for C166 v3.0r3" and confirm with "Install". All further windows can be confirmed with "Next". If you are asked for installation of optional components (e. g. drivers for debugging) you should disable them and not install those options.



Figure 4: TASKING VX-toolset installation

5.1.2 Integrated Development Environment

TASKING VX-toolset comes with an integrated development environment based on Eclipse. When first starting the system you have to select the workspace and confirm it with OK.

Following steps are necessary to create a project based on TTControls' C template located on the USB Stick of the Starter Kit:

- In Tasking IDE click on "File – New" and select "C/C++" - "Makefile Project with Existing Code"

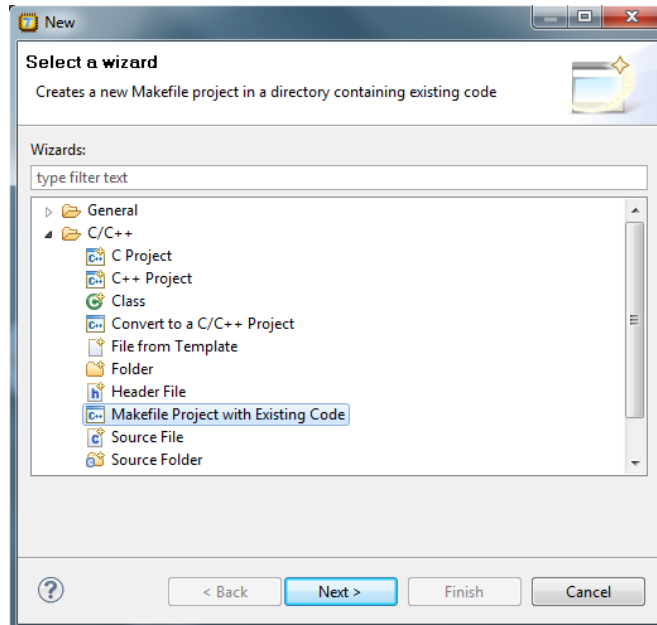


Figure 5: Makefile Project with Existing Code

- Specify a Project Name and browse to the directory of the template and confirm with „Finish“

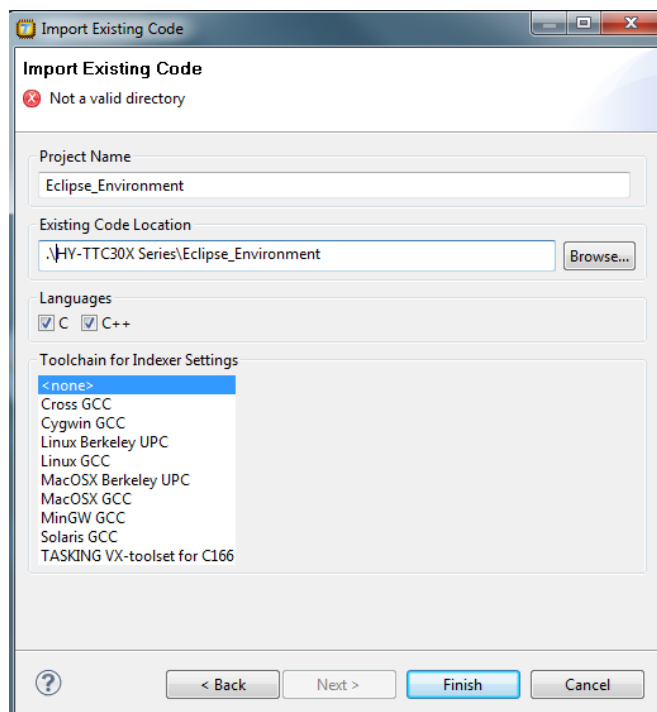


Figure 6: Selecting Location of Code

- The template project in TASKING should look like the following screenshot

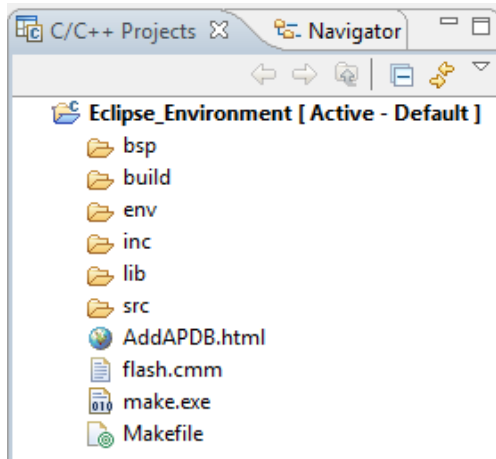


Figure 7: File structure of template

- Right click on “Eclipse_Environment” and click on “Build Project” to test compiler and linker. If compilation and linking is successful following or similar output shall be visible in window “Console”

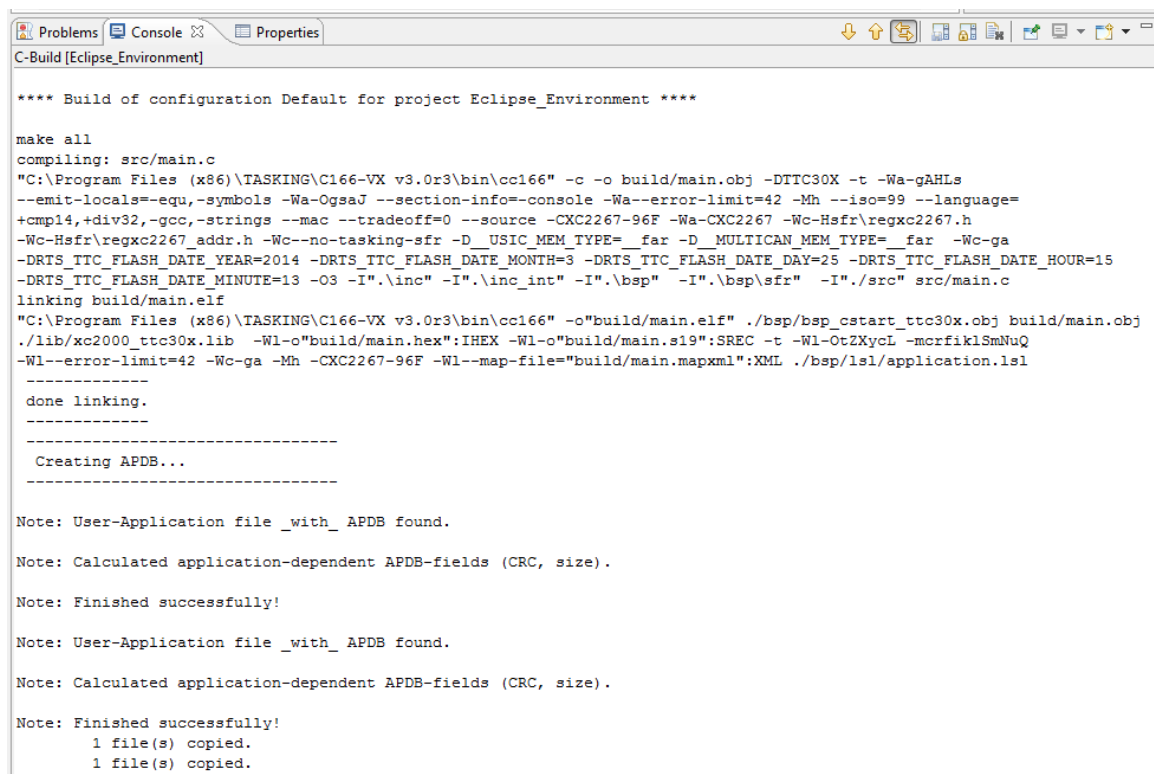


Figure 8: Console Output during Compilation

- The generated hex file is copied to folder /build

5.1.3 Build modification

The Makefile of the template uses the HY-TTC 30H as default target. This has the effect that for the build process the library file 'xc2000_ttc30h.lib' is selected. In order to build the project for the HY-TTC 30SH (safety variant, library file 'xc2000_ttc30sh.lib') it is either necessary to adapt the Makefile or to instruct Eclipse to specify the target upon building the project.

To adapt the Makefile the following steps are necessary:

1. Open the 'Makefile' in your text-editor of choice or in Eclipse
2. Search for an assignment to "TARGET" (by default "TARGET = TTC30H")
3. Replace "TTC30H" with "TTC30SH"
4. Save the file, Right click on "Eclipse_Environment" and click on "Clean Project"
5. Re-build the project (Right click on "Eclipse_Environment" and click on "Build Project")



As an alternative to the above steps it is also possible to specify the target in the properties of the Eclipse Project. The following steps are just one possibility to configure your Project:

1. Right click on the project and click on "Properties"
2. Select "C/C++ Build" and open the tab "Behaviour"
3. Check that the checkbox "Build (Incremental build)" is enabled, the text field next to it should read "all"
4. Replace the content of the text field "all" with your target of choice: "TARGET = TTC30H" for the HY-TTC 30H or "TARGET = TTC30SH" for the HY-TTC 30SH.
5. Click on "Apply"
6. Right click on "Eclipse_Environment" and click on "Clean Project"
7. Re-build the project (Right click on "Eclipse_Environment" and click on "Build Project")

5.2 TTC Downloader

HY-TTC 30 can be flashed by using TTC Downloader. The latest TTC Downloader is available on TTControl Service Area at <http://www.ttcontrol.com/service-area/> or on the USB Stick provided with the Starter Kit.

Following steps are necessary to flash a hex File with TTC Downloader. For details please refer to Section Help (F1) within TTC Downloader:

8. Connect PEAK PCAN USB adapter adapter to the USB port of the PC.
9. Connect PEAK PCAN USB adapter to the CAN DSUB 9 connector of connector interface board.
10. Start TTC Downloader.
11. Configure the correct CAN Baud rate (Default: 500 kBit/s).
12. Click the "Connect" button or press [F2].
13. While the tool sends "Connect" messages (which is indicated by a progress bar), perform a power cycle of HY-TTC 30.
14. If HY-TTC 30 has been found by TTC Downloader:
 - Select the application hex file you want to download (located e. g. in build\ folder of your project folder) by clicking the "Open"  icon next to the text field of "Application Download".
 - Activate "Select for Download" checkbox and click "Download"  button to start the download.
 - After successful download, perform a power cycle HY-TTC 30, close TTC Downloader and verify if your application is running.
15. If HY-TTC 30 has not been found by TTC Downloader, please check
 - the cabling harness (chapter 4),
 - communication settings (Baud rate, Node ID, ...),
 - power cycle and
 - the correct function of your PEAK PCAN USB adapter.

5.3 Trace32

5.3.1 Overview

The Lauterbach product TRACE32-ICD supports a wide range of on-chip debug interfaces. The hardware for the debugger is universal and allows interfacing different target processors by simply changing the debug cable and the software.

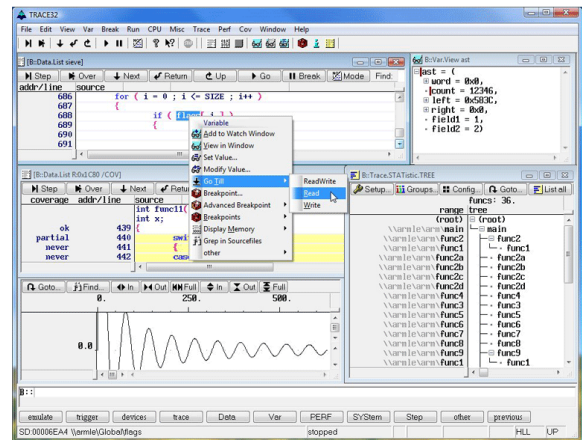


Figure 9: Lauterbach Base Station and Trace32 Software

5.3.2 Installation

Installation is started automatically or can be launched by executing setup.bat of installation DVD.

- After confirming licensing agreements and selecting “New Installation” (in case of first time installation), select button “ICD In-Circuit-Debugger ...”

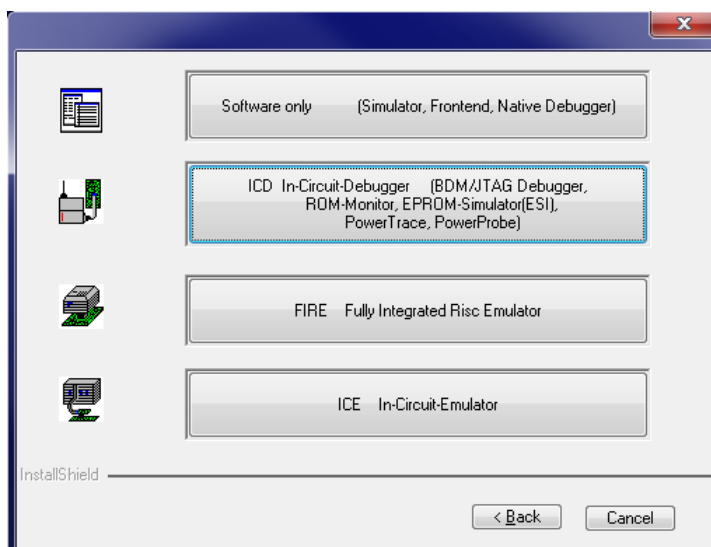


Figure 10: Installation of ICD In-Circuit-Debugger

- Specify the host interface type of your Lauterbach device, e. g. USB Interface

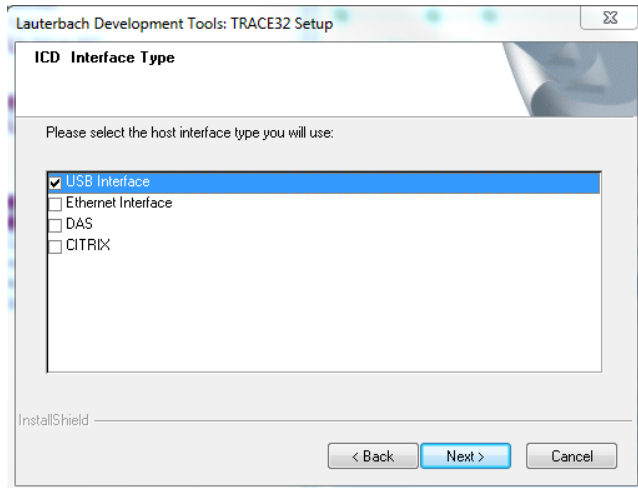


Figure 11: ICD Interface Type

- Select "License Key not necessary"

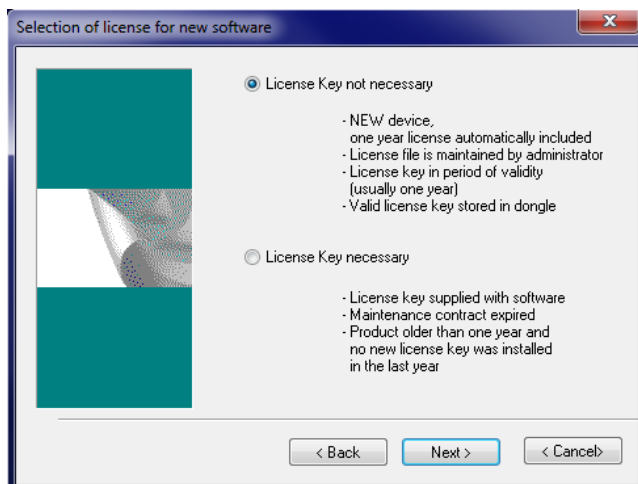


Figure 12: License Key Window

- After confirmation, select your operating system (default: PC Windows 95/98/NT/2000...)

- After confirmation, select the CPU type you want to install (ICD C166 for HY-TTC 30)

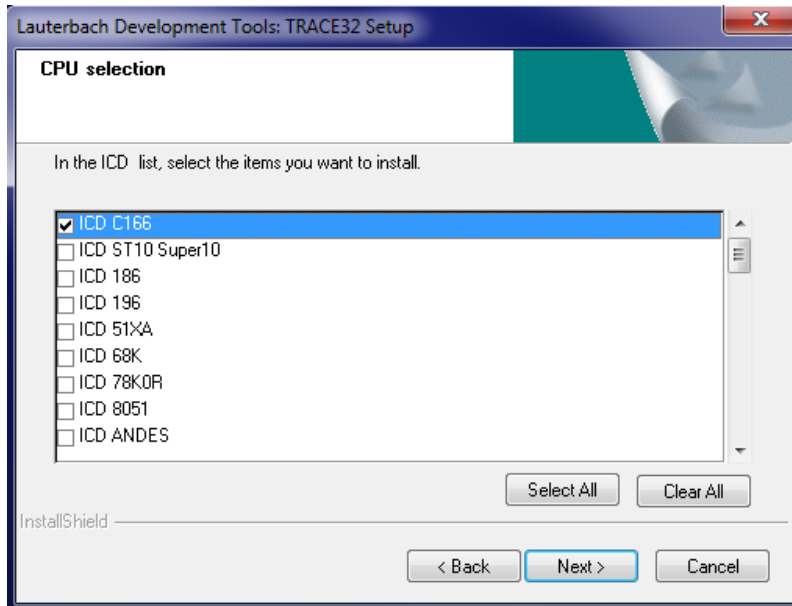


Figure 13: CPU Type

- After confirmation, confirm the following dialogs with “Yes”, “Next” or “OK”.
- When asked for integration of Trace32 with other products, select “No Integration” and confirm with “Next”

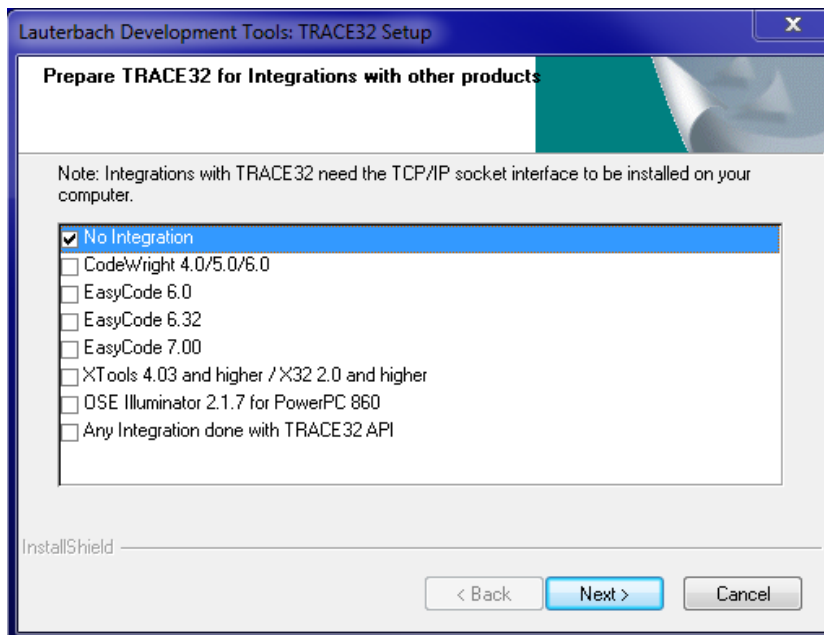


Figure 14: Tool Integration

- Confirm the following dialogs with next.

- Select “Register later” when asked for registration

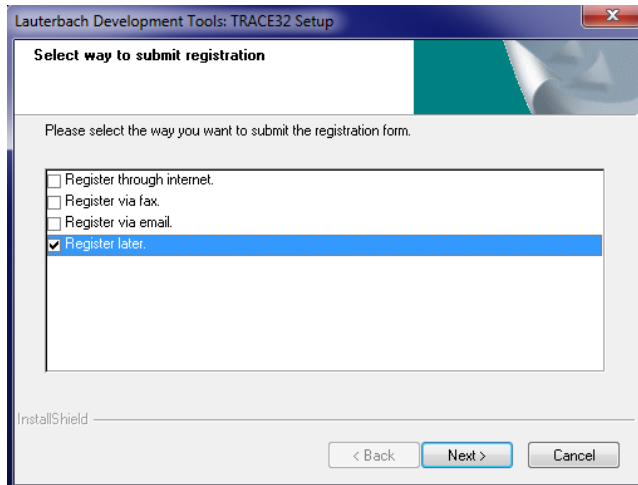


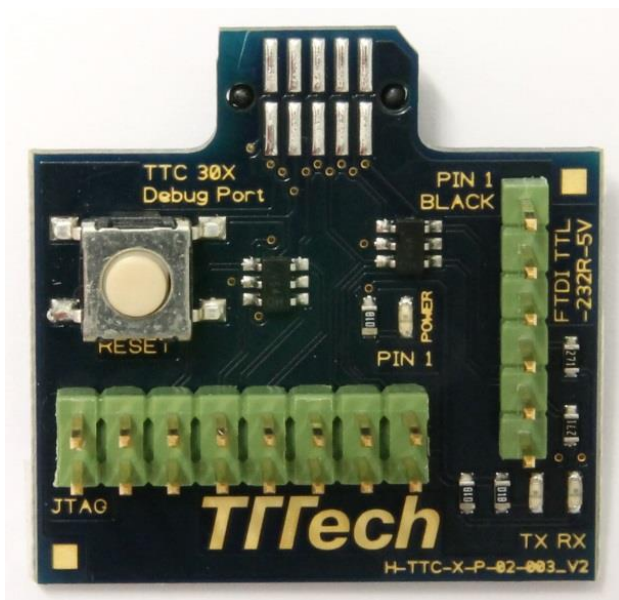
Figure 15: Registration

5.3.3 Usage

5.3.3.1 Hardware

HY-TTC 30 Starter Kit comes with a:

- JTAG Adapter Board and JTAG cabling harness



top view



bottom view

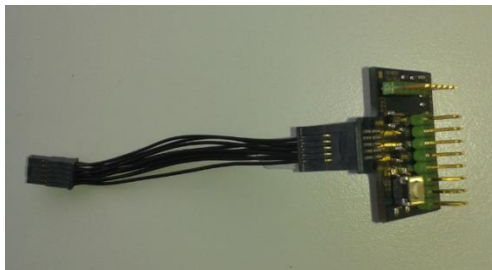


Figure 16: JTAG Adapter Board and Cabling

- Open housing for enabling connection with JTAG interface



Figure 17: HY-TTC 30 with JTAG connector

Following components from Lauterbach are required:

- Lauterbach Base Station, e. g. Power Debug Interface / USB 2 LA-7708
- Lauterbach Debug Cable: OCDS-C166S-V2 LA-7759 for XC2267

Please refer to following picture to understand how to connect HY-TTC 30 with Lauterbach debugger.



Figure 18: Lauterbach connection to HY-TTC 30X

- Connect the System cable to the PCB.

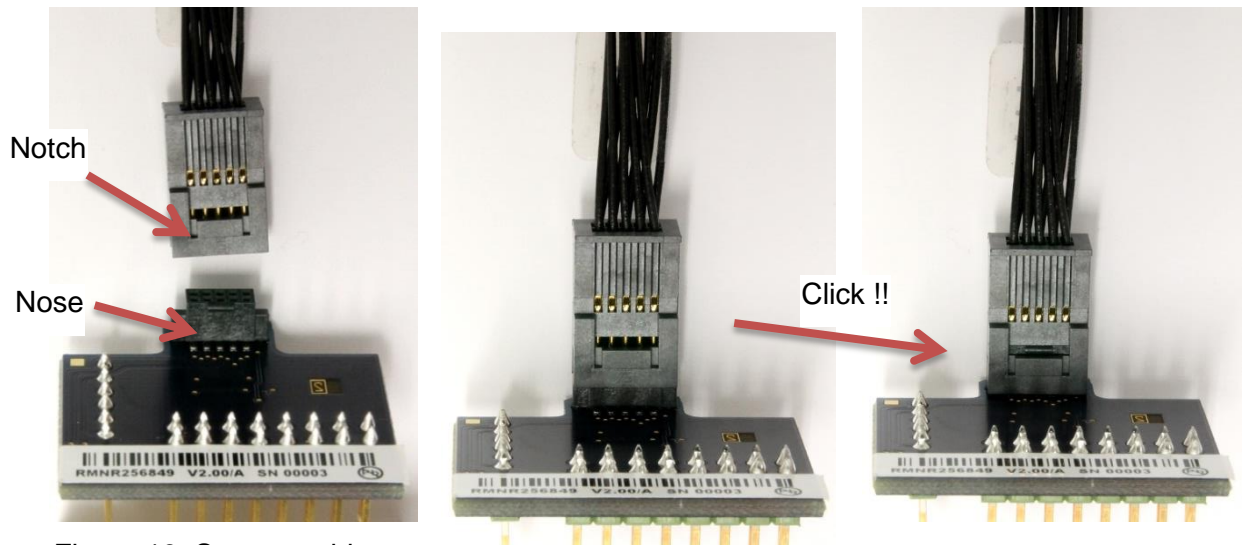


Figure 19: System cable

- Please make sure that Pin 1 of Lauterbach debugger connector is connected with Pin 1 of JTAG Adapter board.

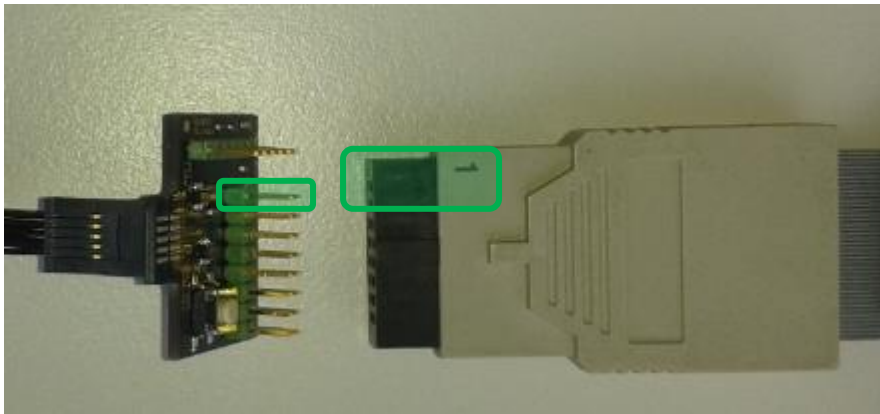


Figure 20: Connecting JTAG Adapter Board with Lauterbach connector

- Connect the System cable of the HY-TTC 30 Debug Adapter to the HY-TTC 30 Debug port.

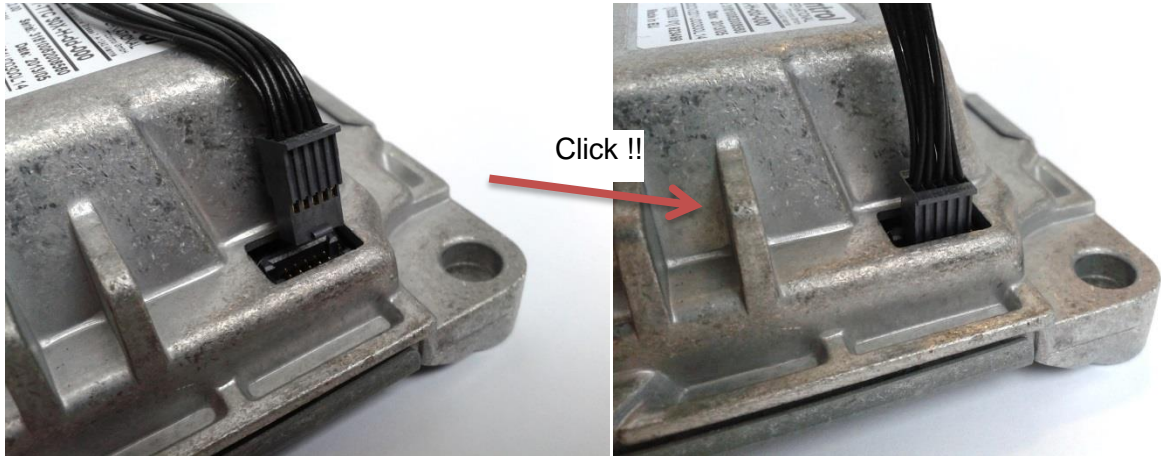


Figure 21: System cable connection

5.3.3.2 Software

- Connect Lauterbach Base Station and Debug cable to PC and power supply and install necessary drivers.
- Perform connection as described in chapter 4 and chapter 5.3.3.1
- Perform power cycle
- Start the Lauterbach debugger software via Start - Trace32 ICD 80C166 USB.
- HY-TTC 30 template comes with a predefined *.cmm script. Start the script by clicking on File – Run Batch file ... A Popup will ask if the application shall be flashed or if only the symbols for debugging shall be loaded. If Yes will be selected, the flashing procedure will start and alert you when finished.

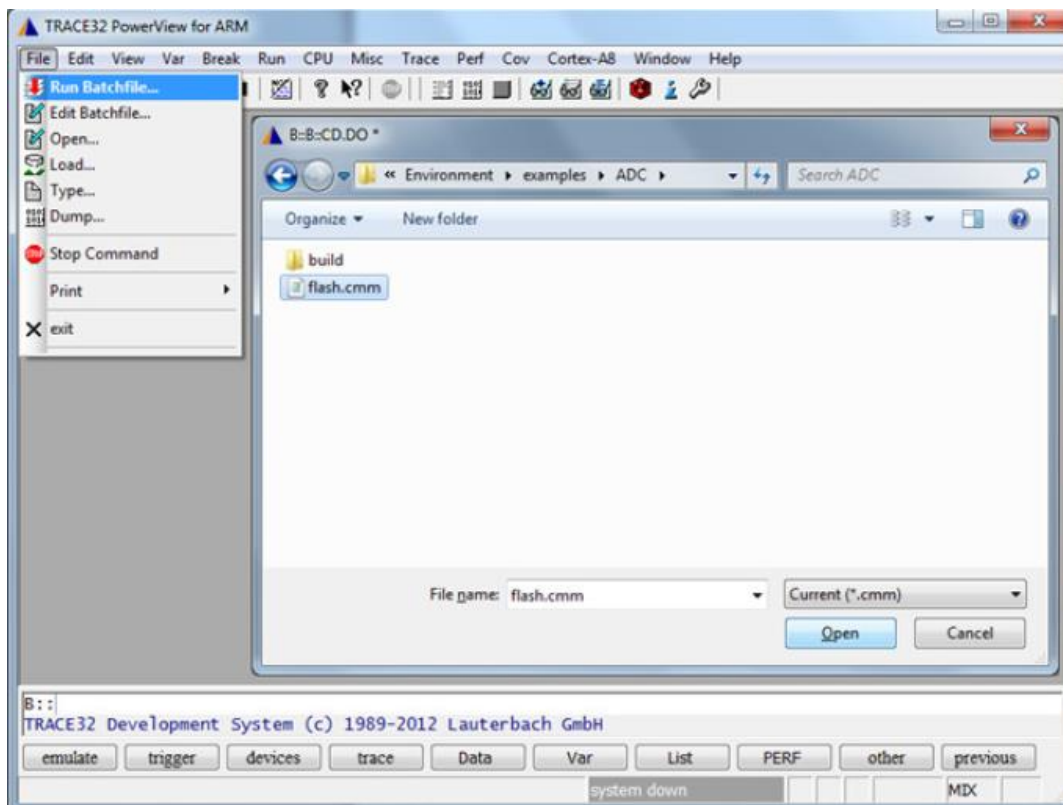


Figure 22: Trace32 and cmm Batch file

6 Abbreviation and Glossary

Acronym / Term	Meaning
ECU	Electronic Control Unit
CAN	Controller Area Network