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NFC FRI SDK Start Guide

Rev. 1.0 — 31 October 2007

Application Note

Document information

Info	Content
Keywords	NFC, FRI
Abstract	Start Guide of NFC FRI SDK.

Revision history

Rev	Date	Description
1.0	2007 Oct 31	First Released Version – 1.0 Release 0

Contact information

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1. Introduction

1.1 Purpose

The purpose of this document is to describe the NFC-FRI SDK package for Windows.

1.2 Content of the package

In the NFC-FRI package, you will find the following content:

- Documents:
 - o .\Nfc\FRISDK_1.0_Release_Note (.pdf file)
 - o .\Nfc\FRISDK_1.0_User_Manual (.pdf file)
 - o .\Nfc\FRISDK_1.0_API_Reference (.chm file)
 - o .\Nfc\FRISDK_1.0_Int_Guidelines (.chm file)
 - o End User License Agreement (.pdf file)
 - o NFC-FRI-SDK Start Guide (this document .pdf file).

- Source and libraries:
 - o NFC FRI Library (.c .h .lib files)
 - o NFC scenarios (Application example) (.c files)

- MS Visual Studio 2003 project:
 - o .\Nfc\comps\phLibNfc\ex\vc7 (.sln .vcproj files)

- Drivers:
 - o .\PN531USBDriver\PN531 USB driver (.inf .sys files)

1.3 Limitation

This first version of NFC-FRI-SDK is limited to **PN53x NFC IC support**.
(PN532 & PN531 demo boards).

2. NFC-FRI Overview

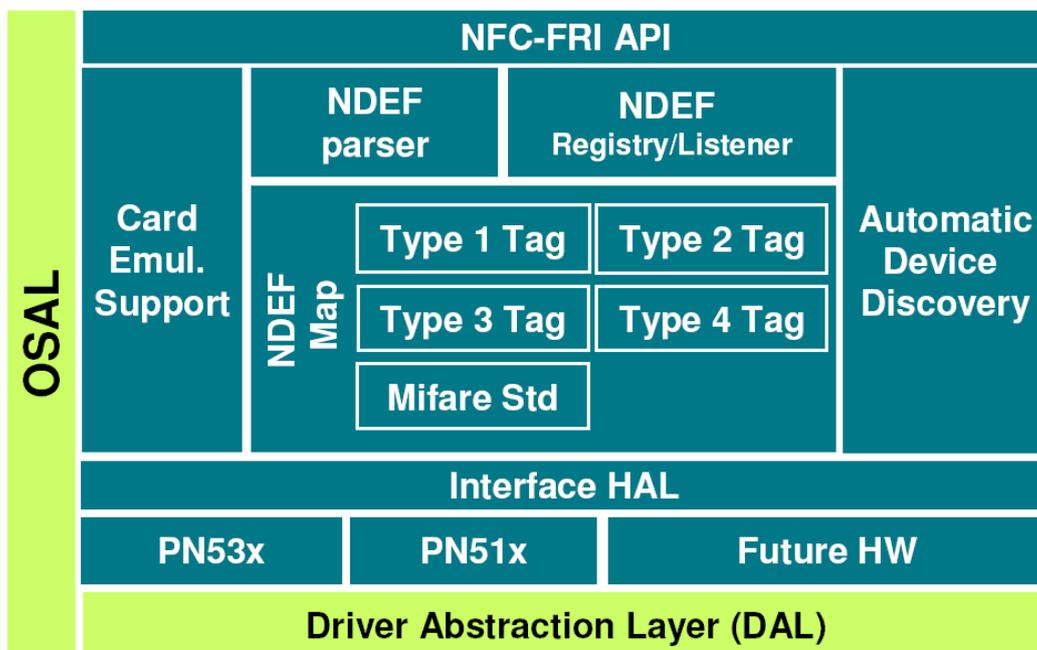
2.1 Features

The following features are supported:

- Automatic Device Discovery
- NDEF Parser
- NDEF registry/Listener
- NDEF Mapping
 - o Type 1 Tag
 - o Type 2 Tag
 - o Type 3 Tag
 - o Type 4 Tag
 - o Mifare Standard as NFC Forum Tag
- Card Emulation Support

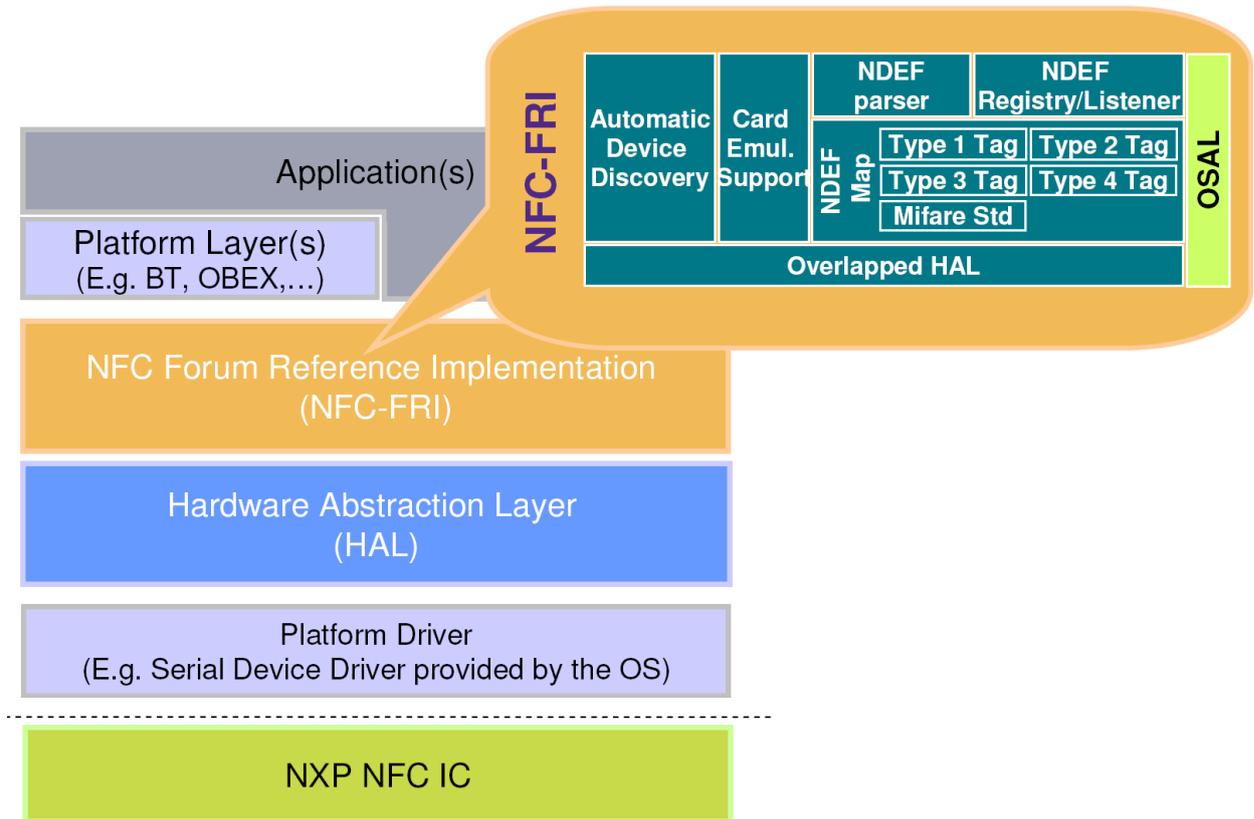
2.2 Architecture

The NFC-FRI Stack is organized as follow:



*Note: **OSAL** (Operating System Abstraction Layer) & **DAL** (Driver Abstraction Layer) modules are 'platform dependent' and need to be adapted for specific platform. The versions delivered in this SDK are **Windows_X86** compatible.*

Here is a general overview of NFC-FRI Stack integration in a system:



2.3 Useful links

For more information on NFC FORUM, you can consult the dedicated web site:

<http://www.nfc-forum.org/home>

3. Setup

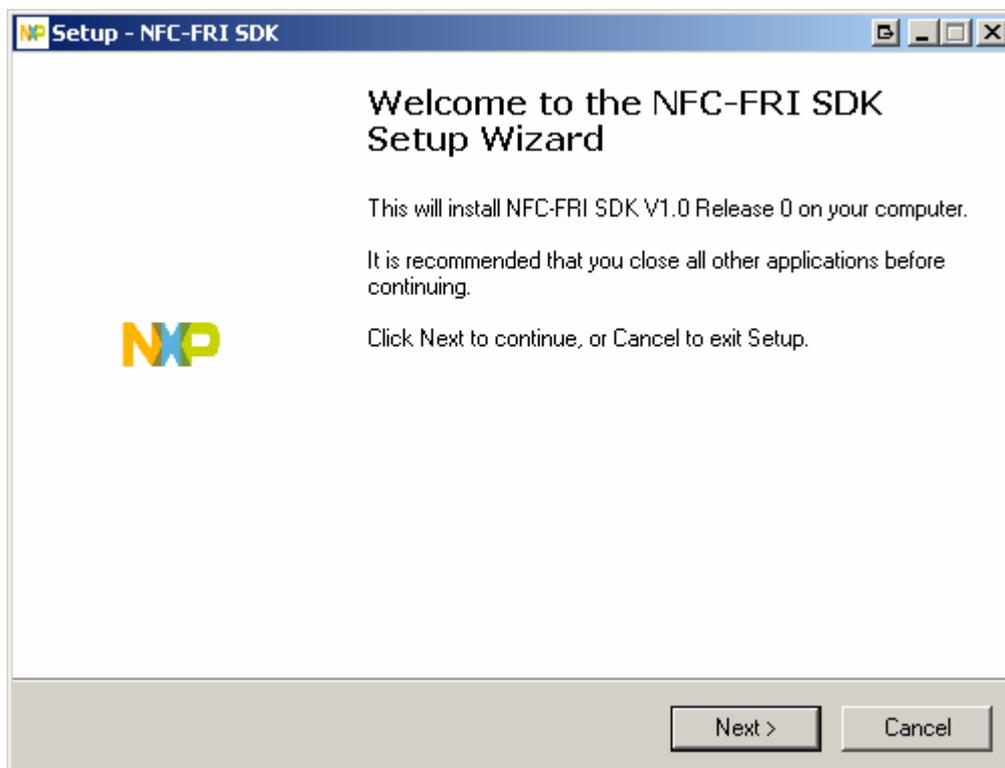
3.1 Pre-requisite

- Hardware:
 - o NFC **PN53x** demo board.
 - o SmartMX daughter board (optional)
 - o NDEF Tag(s) (optional).
 - o Mifare Ultra Light & Mifare Standard Cards.
 - o ISO14443-A Card (Optional).

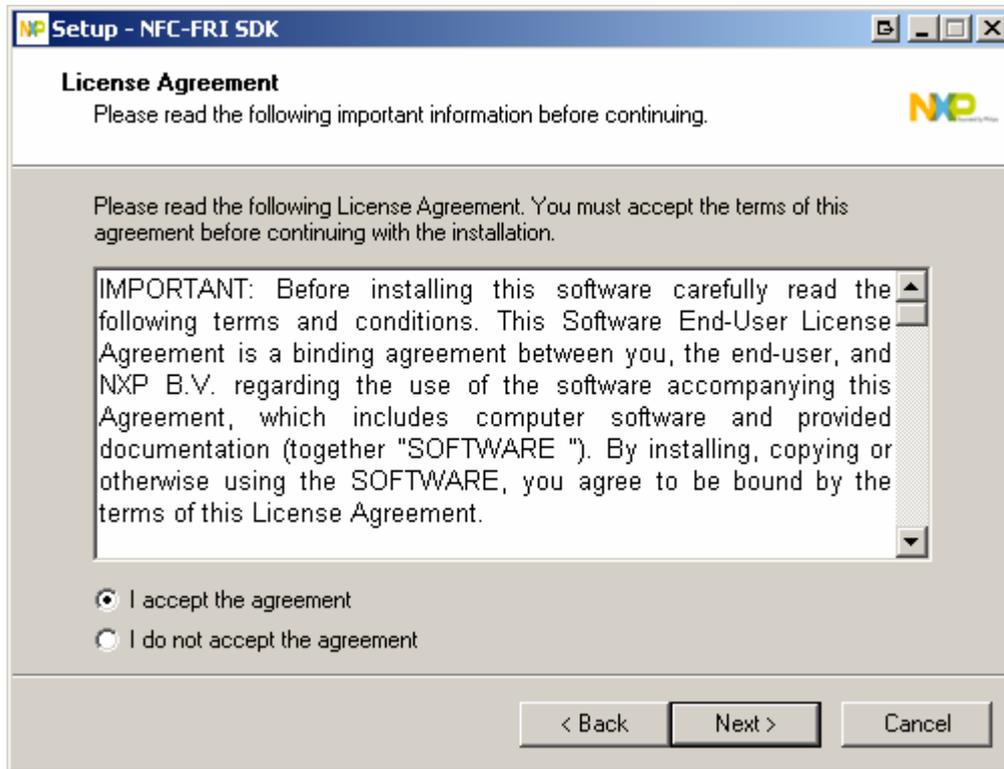
- Software:
 - o MS Visual Studio 2003 or newer.

3.2 NFC-FRI Installation

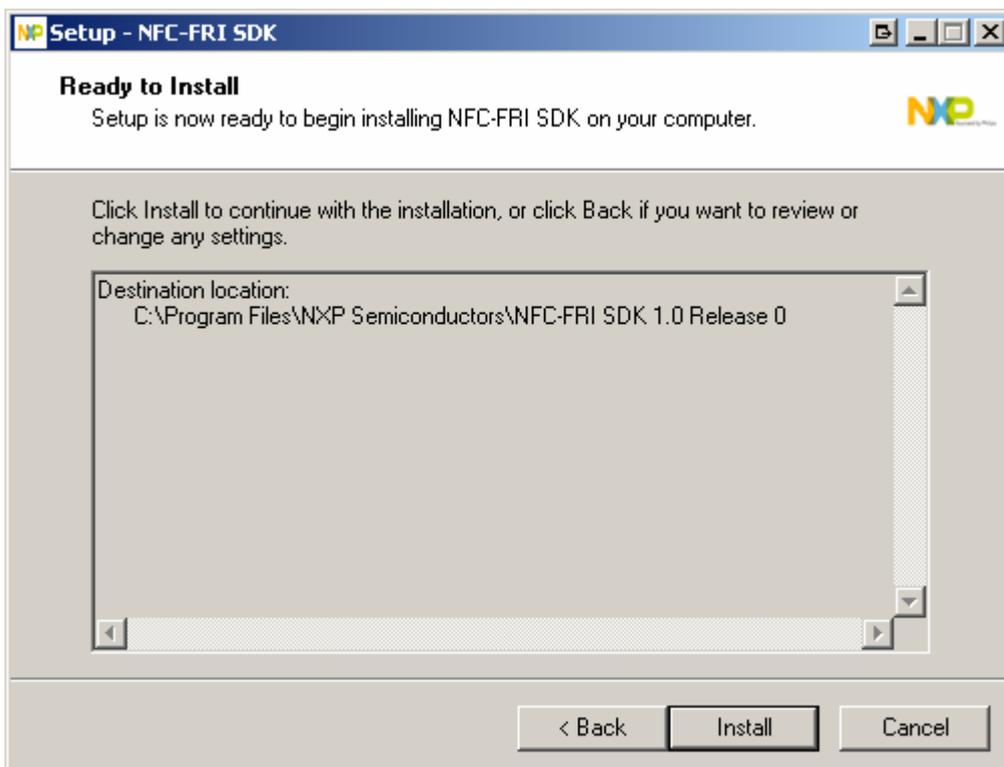
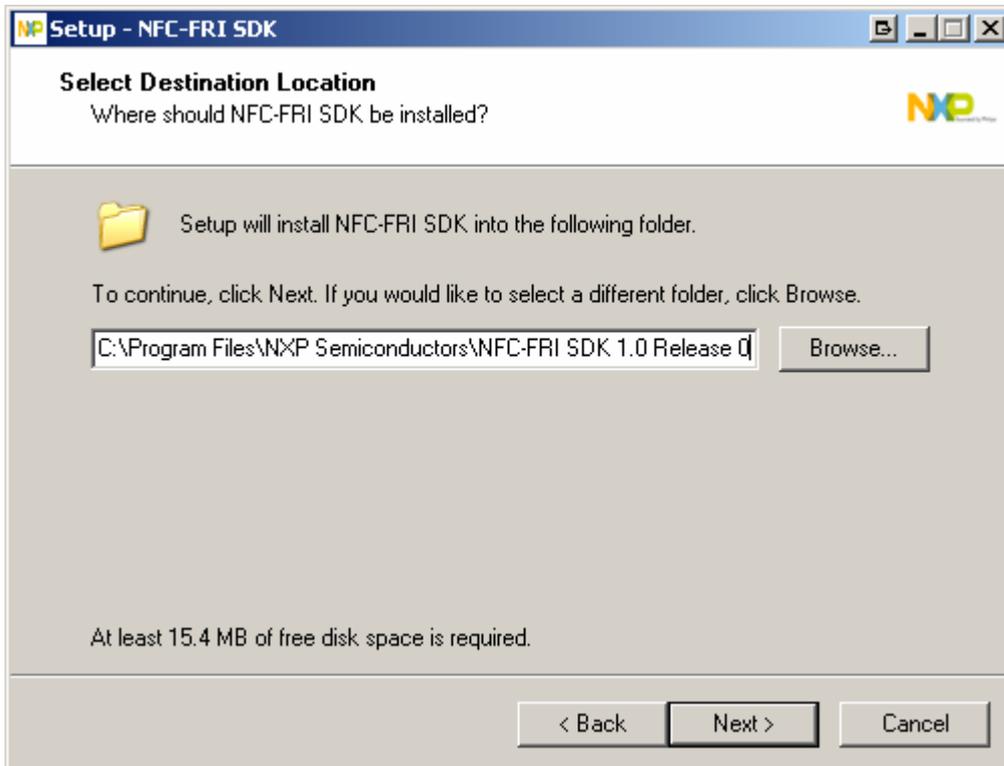
Launch the **NFC-FRI SDK V1.0 Release 0.exe** file to install the application.

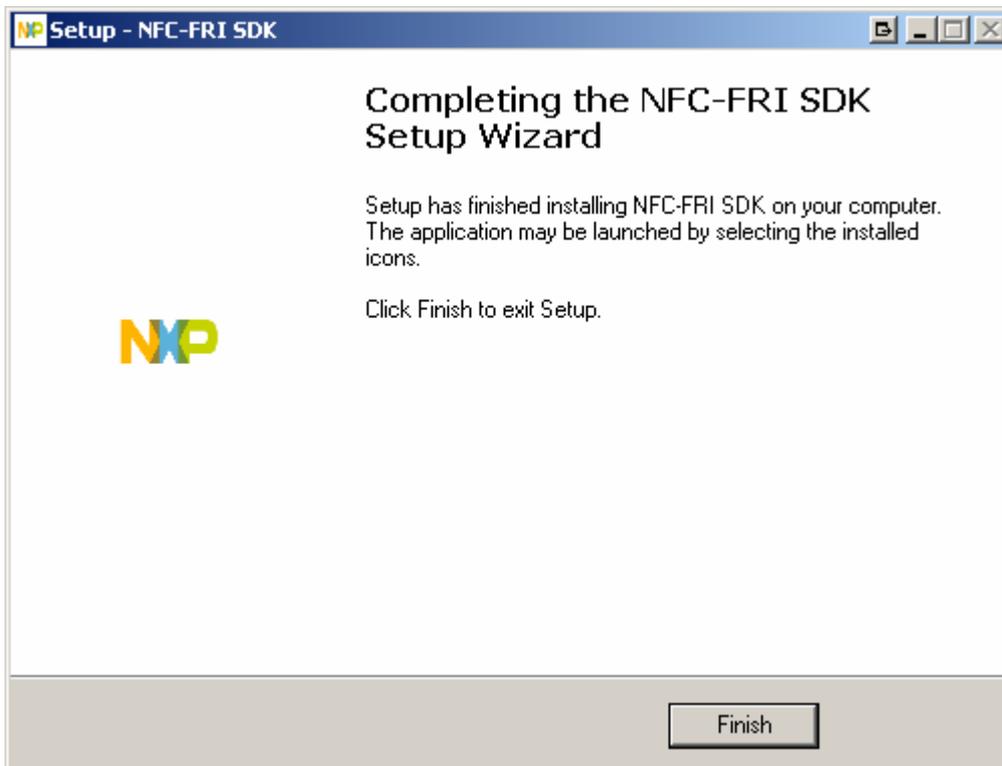
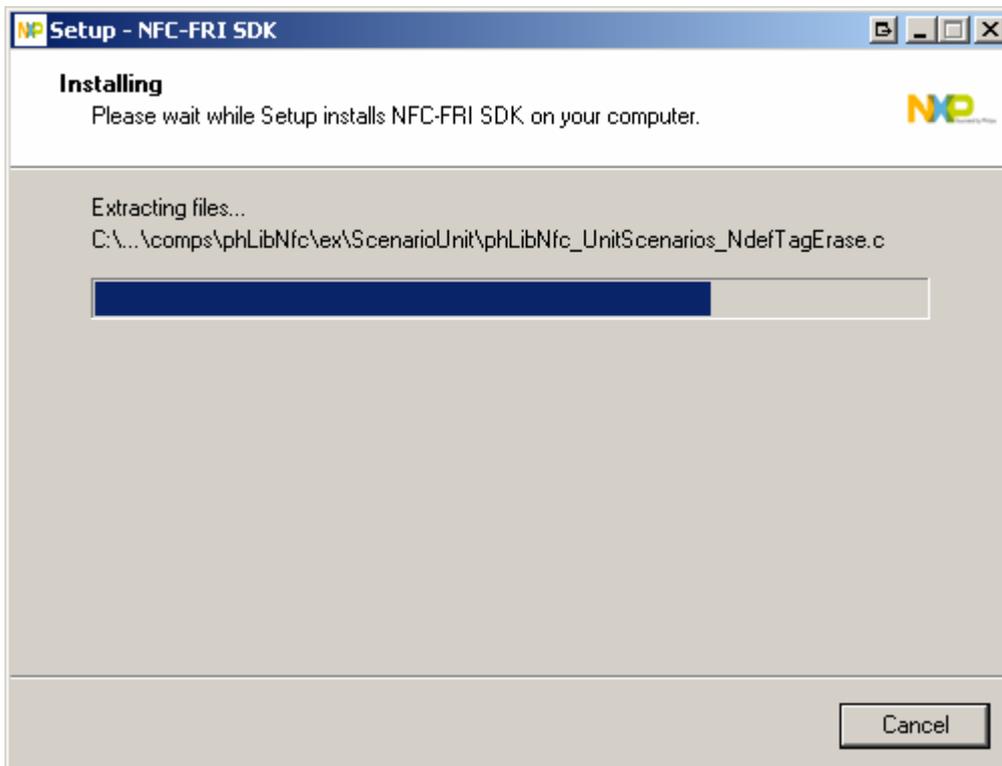


You must accept the License Agreement to install this SDK. The license terms will be available in the **EndUserLicenseAgreement** file after the SDK setup.



You can choose a different folder to install this SDK. The default folder will be:
C:\Program Files\NXP Semiconductors\NFC-FRI SDK 1.0 Release 0





Setup is finished. You can access to documents and MS Project via the **Start->Program->NXP Semiconductors->NFC-FRI-SDK_1.0 Release 0** or directly from the installation folder.

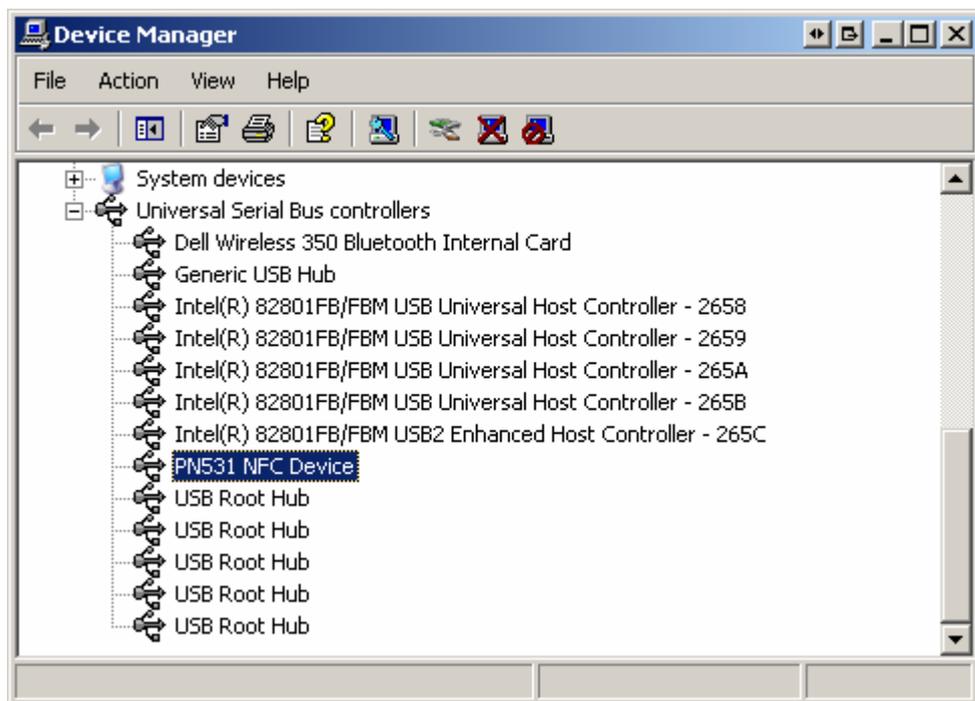
3.3 PN531 USB Driver

In case you are using a PN531 v4.2 USB demo board for the first time, you will need to install the USB driver once you connect the demo board.

Select **PN531_USB.inf** file when windows requests for the driver installation file. This new driver has passed USB certification.

The PN531 USB Driver is available in **C:\Program Files\NXP Semiconductors\NFC-FRI SDK 1.0 Release 0\PN531USBDriver** folder.

After driver setup, you can check that the driver is correctly installed in the following windows: **/Control Panel/System/Hardware/Device Manager**



4. How to use NFC-FRI-SDK?

4.1 NFC-FRI API Documents

Useful documents for NFC-FRI-SDK use.

4.1.1 NFC-FRI Release Note

This documentation is the delivery form of the NFC Forum Reference Implementation Software Development Kit (SDK). It describes the full content of the SDK: Documents, Source code, Binaries/Object Code.

4.1.2 NFC-FRI User Manual

This documentation describes in detail the NFC-FRI-SDK in term of architecture, functionalities, etc ...

It also describes the MS Project Example project (Unit & Extended Scenarios).

4.1.3 NFC-FRI API Reference

This documentation describes the different component of the NFC-FRI API.

To start browsing this documentation you have to open the **.chm** file available as a shortcut in: **Start->Program->NXP Semiconductors->NFC-FRI-SDK 1.0 Release 0->FRISDK_1.0_API_Reference** or in the installation folder.

4.1.4 NFC-FRI Integration Guidelines

This documentation intends to describe how to integrate NFC-FRI SDK onto any platform. The integration process consists in compiling all platform dependent and integration sources by linking with NFC libraries.

To start browsing this documentation you have to open the **.chm** file available as a shortcut in: **Start->Program->NXP Semiconductors->NFC-FRI-SDK 1.0 Release 0->FRISDK_1.0_Int_Guidelines** or in the installation folder.

4.2 NFC-FRI Example Project

The Microsoft Project Examples files are located in: **.\Nfc\comps\phLibNfc\ex\vc7**

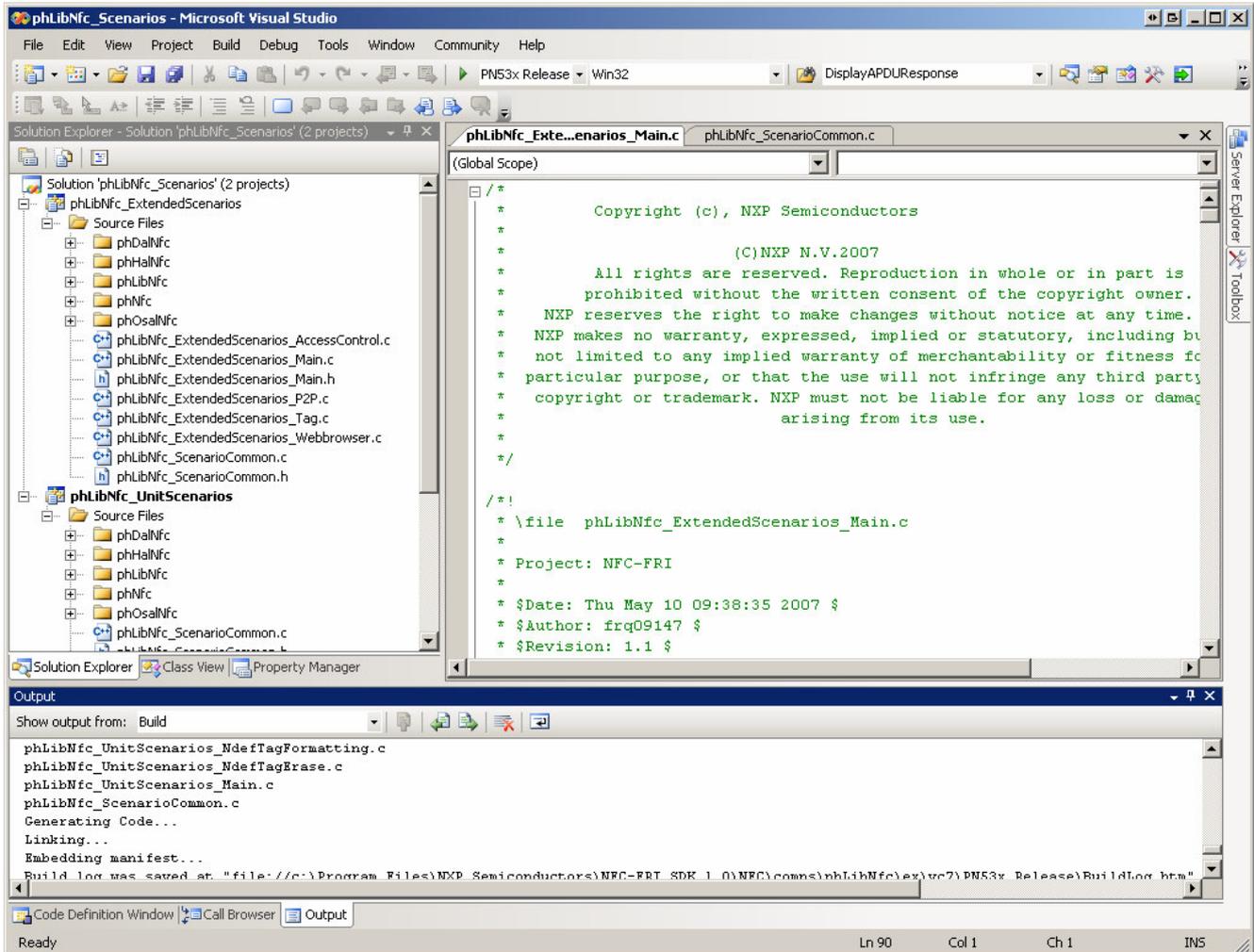
Launch the **.sln** file to open the MS Project environment. This file is available as a shortcut in: **Start->Program->NXP Semiconductors->NFC-FRI-SDK_1.0->phLibNfc_Scenarios** or in the installation folder.

2 projects are available:

- **phLibNfc_UnitScenarios** gives an example of NFC-FRI use in case of a single upper layer.
- **phLibNfc_ExtendedScenarios** gives an example of NFC-FRI use in case of several upper layers registered (Automatic Device Discovery).

For details about these 2 projects, refer to the **NFC-FRI User Manual**.

After launching the MS Project file, you will have access to the following window: (see screenshot).



Then you can choose to browse the source, build one project and run the example.

Note: Before running the example take care to have connected at least one PN53x demo board to the computer.

In the case of several demo boards connected, you will have to choose the device to use as follow:

```

C:\> c:\program files\nxp semiconductors\nfc-fri sdk 1.0\nfc\comps\phlibn...
Looking for local NFC Devices...
Number of boards detected : 2
Board Number = 1; Connection = \\.\PN531 NFC Device0
Board Number = 2; Connection = COM1:
Select the board <1 to 2 > : _
    
```

According to the project in use **phLibNfc_UnitScenarios** or **phLibNfc_ExtendedScenarios** you will have the following menu:

```

C:\> c:\program files\nxp semiconductors\nfc-fri sdk 1.0\nfc\comps\p...
Looking for local NFC Devices...
Number of boards detected : 2
Board Number = 1; Connection = \\.\PN531 NFC Device0
Board Number = 2; Connection = COM1:
Select the board <1 to 2 > : 1

?-----?
?<          UNIT SCENARIOS          >?
?-----?
?
? Select a scenario to run:
? p - Proprietary tag R/W
? f - Format tag as NDEF tag
? r - Ndef tag read
? w - Ndef tag write
? e - Ndef tag erase
? s - Secure card emulation
? i - Proprietary P2P Initiator
? t - Proprietary P2P Target
? x - Exit
?-----?
Your choice:
    
```

Or

```

C:\> c:\program files\nxp semiconductors\nfc-fri sdk 1.0\nfc\comps\p...
?-----?
?<          EXTENDED SCENARIOS          >?
?-----?
? Prerequisites :
? -> 1 NFC board with SMX
? -> 1 Pegoda with AccessControl app
? -> 1 NDEF Type tag
? -> 1 Non NDEF Type tag
?-----?
? Once discovery Manager is started
? v - Simulate Transaction Push
? p - before doing any P2P exchange
? x - Exit
?-----?
Press <enter> to start the Discovery Manager_
    
```

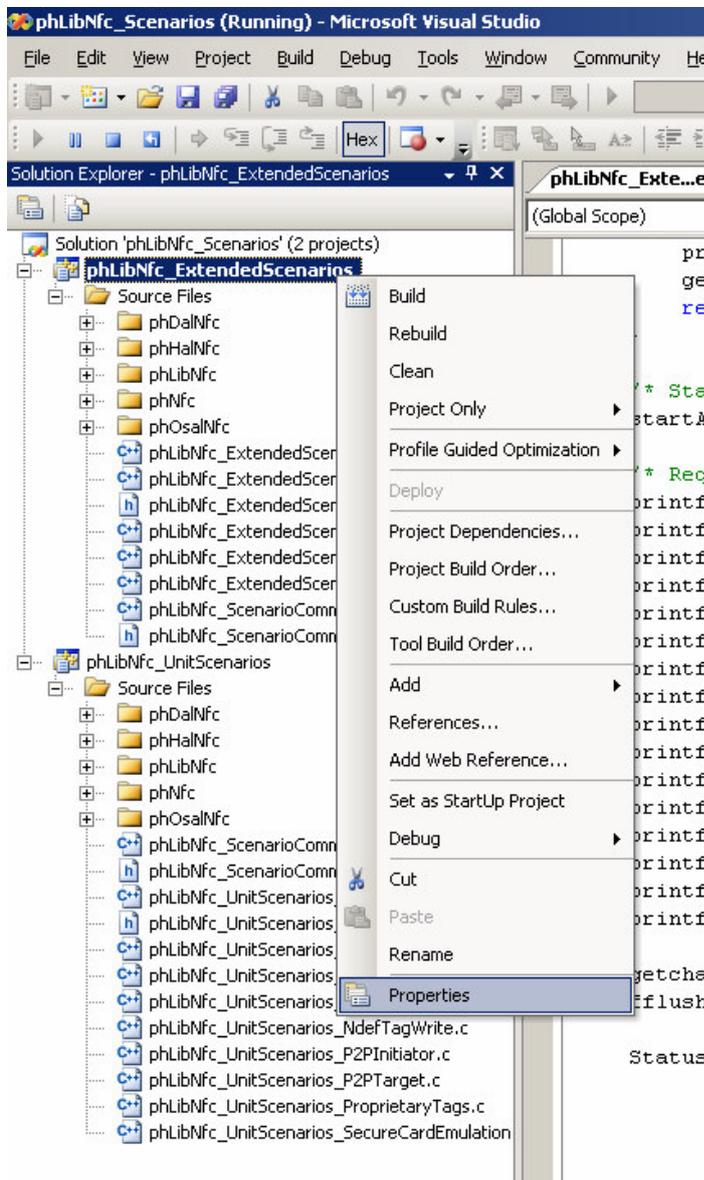
4.3 Debug & Trace

The MS Example project is configured in Release mode.

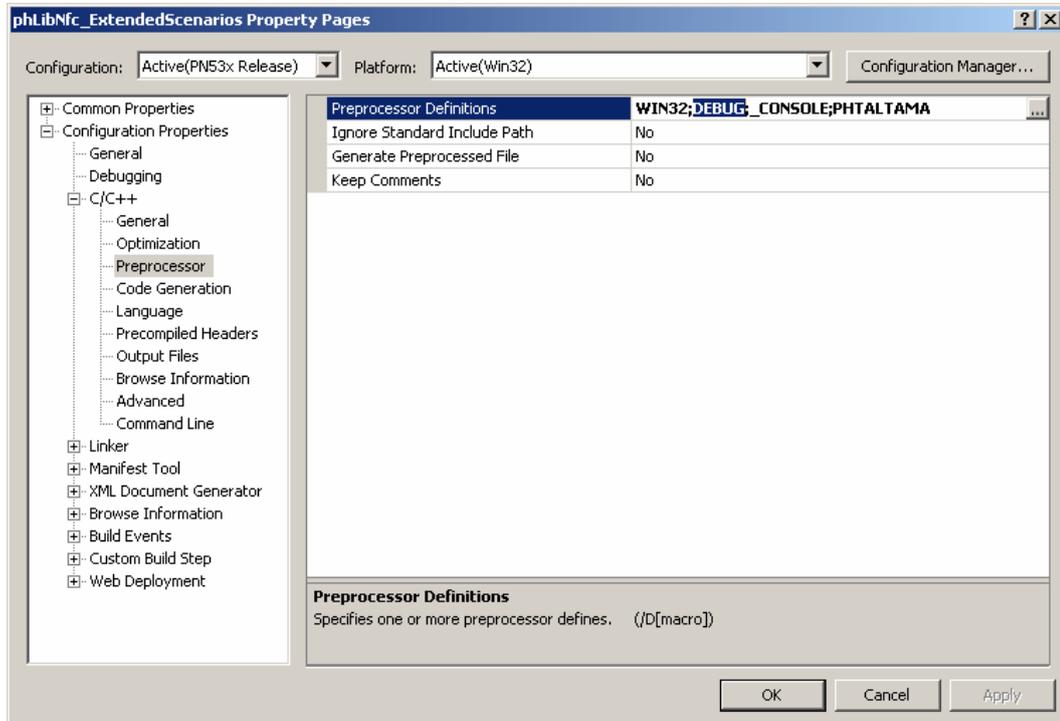
4.4 Switch in Debug Mode

To switch in Debug mode to be able to setup breakpoints and perform step by step debug, the following actions must be done:

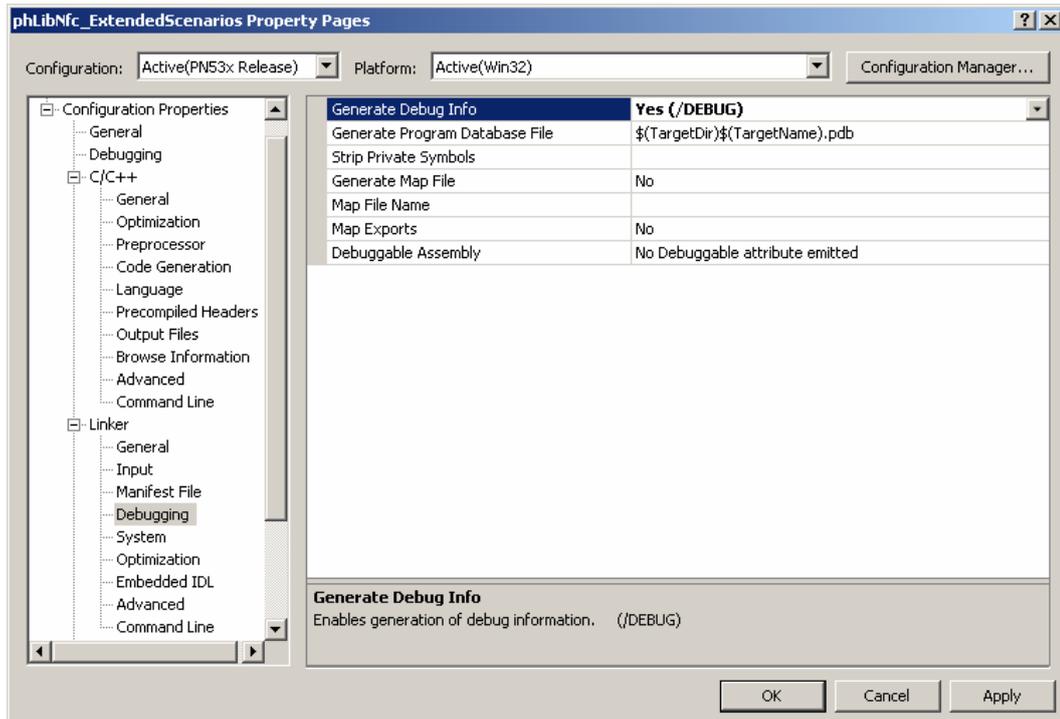
- Go into the project properties



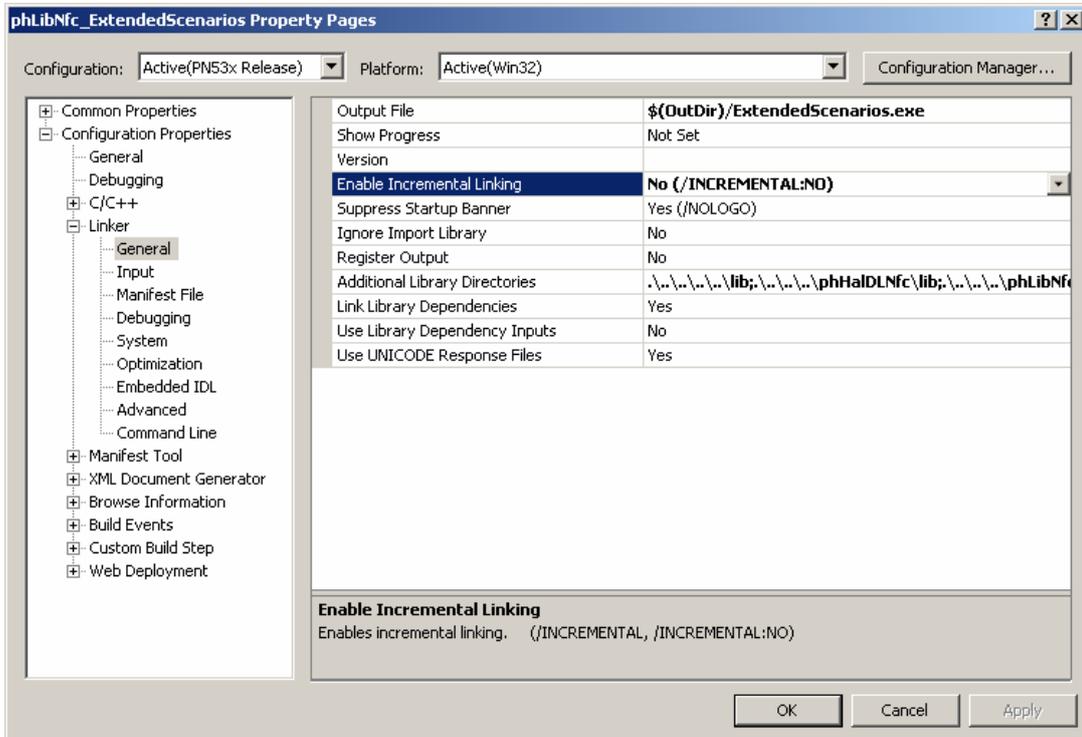
- Disable the NDEBUG preprocessing to enable the **DEBUG** preprocessing.



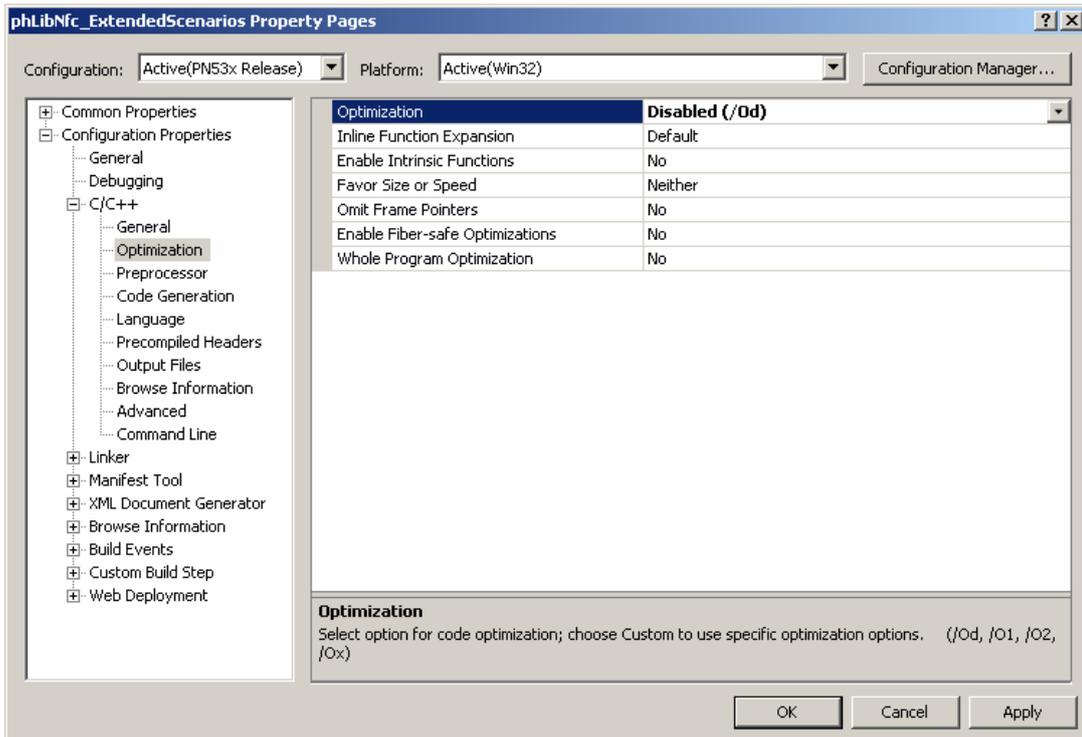
- Enable the **Debug Info**.



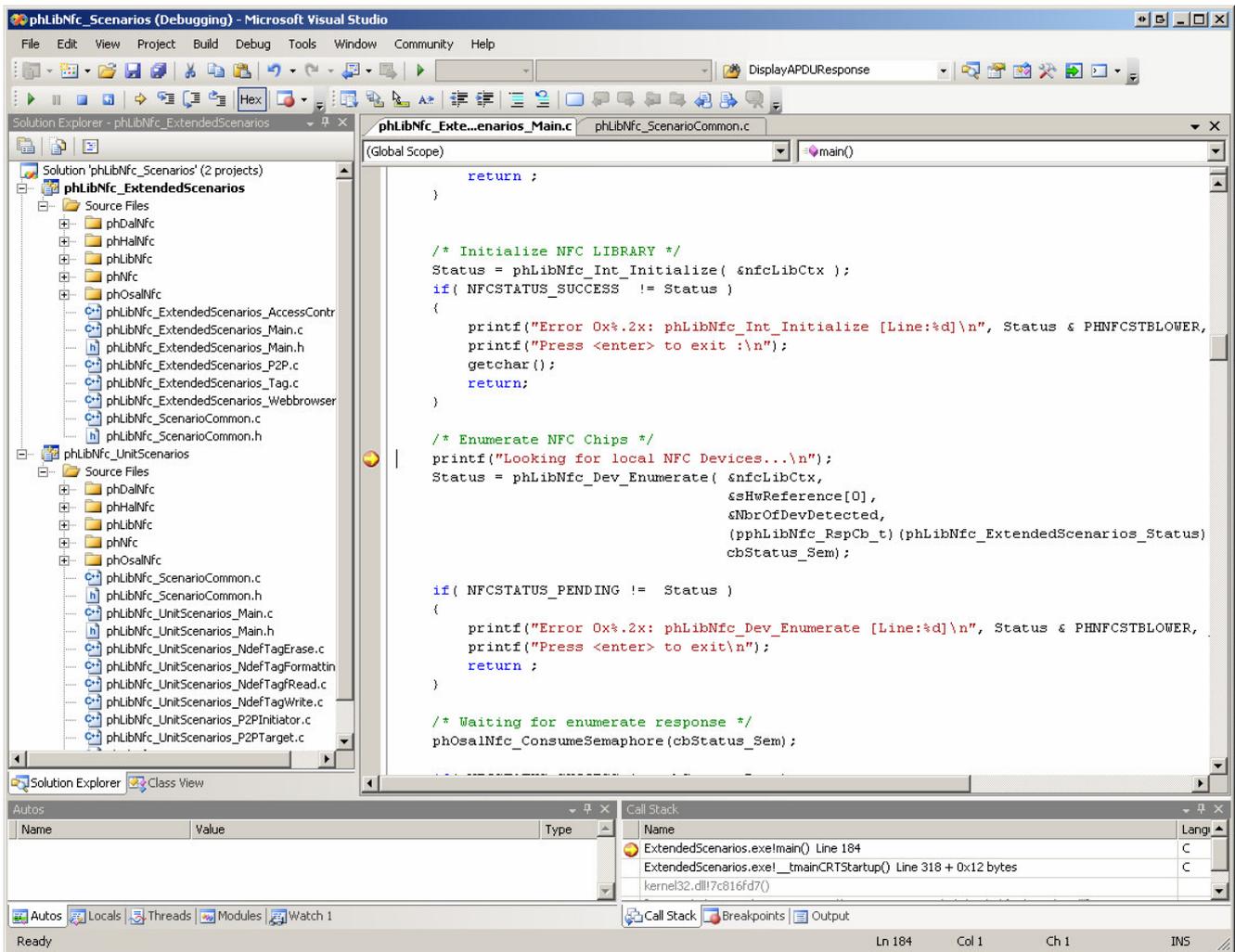
- Verify that the Incremental linking is disabled.



- Verify that the C/C++ Optimization is disabled.



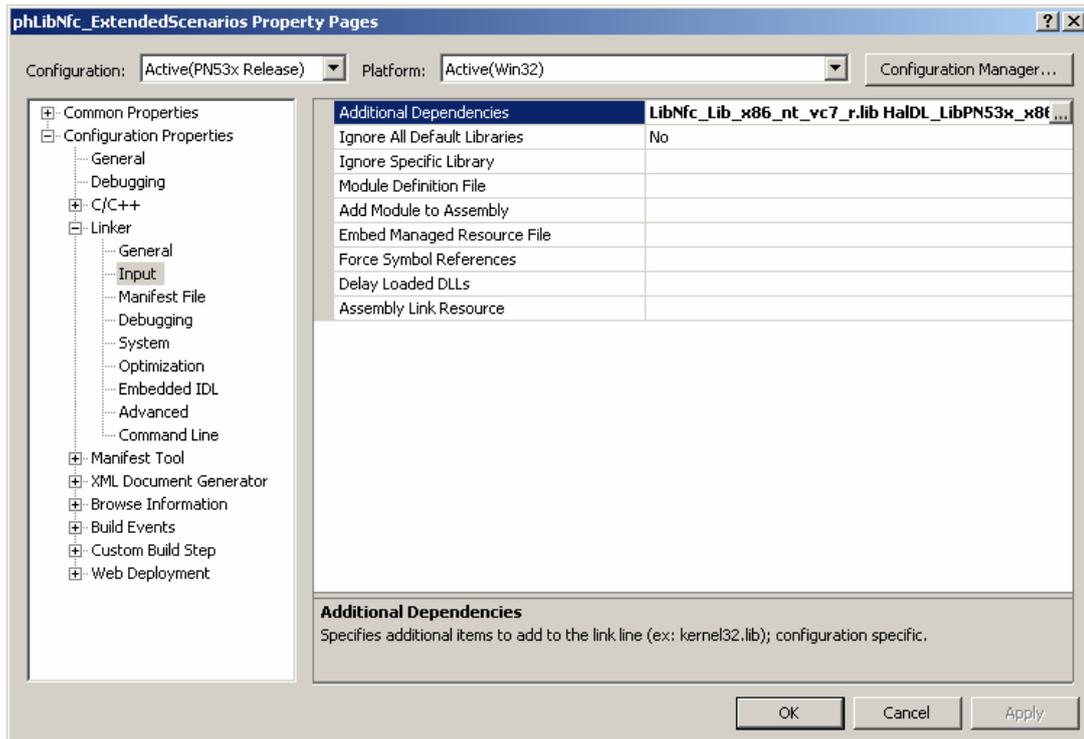
- Rebuild the MS Project. Then you are able to put breakpoints and do some step by step debug in the application.



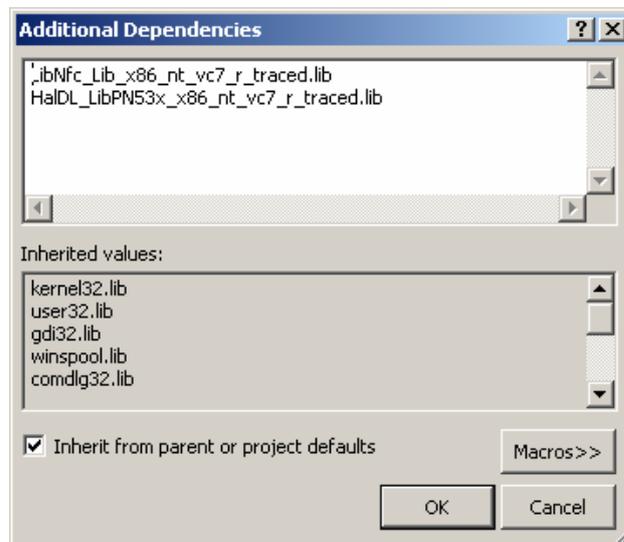
4.5 Switch in Trace Mode

To switch in Trace mode to be able to display traces from the NFC library, the following actions must be done:

- Use the NFC **'traced'** libraries when linking.



- Add the **_traced** extension to the libraries names.



- '_traced' libraries are available in the lib folder:

C:\Program Files\NXP Semiconductors\NFC-FRI SDK 1.0 Release 0\NFC\lib

- Rebuild the MS Project. Then you will be able to display additional information from the NFC-FRI stack use. See following example:

```

c:\program files\nxp semiconductors\nfc-fri sdk 1.0\nfc\comps\phlibnfc\ex\vc7\pn53x r...
LIBNFC: From Thread 0x8b8 , Message 0x0 received in state 2
Looking for local NFC Devices...
LIBNFC: From Thread 0x8b8 , Message 0x10 received in state 5
HALDL: From Thread 0xc8, Message 0x0 received
LIBNFC: From HAL-DL , Message 0x1 received in state 46
Number of boards detected : 2
Board Number = 1; Connection = \\.\PN531 NFC Device0
Board Number = 2; Connection = COM1:
Select the board (1 to 2 ) : 1
LIBNFC: From Thread 0x8b8 , Message 0x18 received in state 5
HALDL: From Thread 0xc8, Message 0x0 received
LIBNFC: From HAL-DL , Message 0x9 received in state 6
HALDL: From Thread 0xc8, Message 0x0 received
LIBNFC: From Thread 0xf78 , Message 0x68 received in state 8
LIBNFC: From HAL-DL , Message 0x59 received in state 8
LIBNFC: From Thread 0x260 , Message 0x130 received in state 9
LIBNFC: From Thread 0xb4c , Message 0xa8 received in state 9
LIBNFC: From Thread 0x748 , Message 0x130 received in state 9
LIBNFC: From Thread 0x748 , Message 0x130 received in state 9

?-----?
?-< EXTENDED SCENARIOS >-?
?-----?
? Prerequisites :
?   -> 1 NFC board with SMX
?   -> 1 Pegoda with AccessControl app
?   -> 1 NDEF Type tag
?   -> 1 Non NDEF Type tag
?-----?
? Once discovery Manager is started
?   v - Simulate Transaction Push
?   p - before doing any P2P exchange
?   x - Exit
?-----?
Press <enter> to start the Discovery Manager

```

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5.1 Definitions

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