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 Restrictions

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**1 About this Support Note**

In the table below you will find the icon conventions used throughout the Support Note.

Symbol	Utilization
	This icon indicates notes and tips that facilitate your work.
	This icon warns of dangers that could lead to damage.
	This icon indicates examples.

**2 Overview**

In most cases, diagnostic frames using the ISO Transport Protocol (ISO-TP) shall be padded in order to have a constant 8 bytes long data field, independently of the actual data amount that is transported.

This Support Note explains how to process if your project CANoe /CANalyzer Setup doesn't provide the required padding. It also explains how to automatically control the proper frame padding using the Trace Window.

**3 Set frame padding**

There are two possibilities to set up the padding of the diagnostic frames:

- Set the padding of the frames sent by the Diagnostics Console (tester) of the corresponding ECU

- Set the padding of the frames sent by a CAPL routine (tester or ECU). This possibility does only exist for CANoe.

We can send you on demand an example making usage of both possibilities.

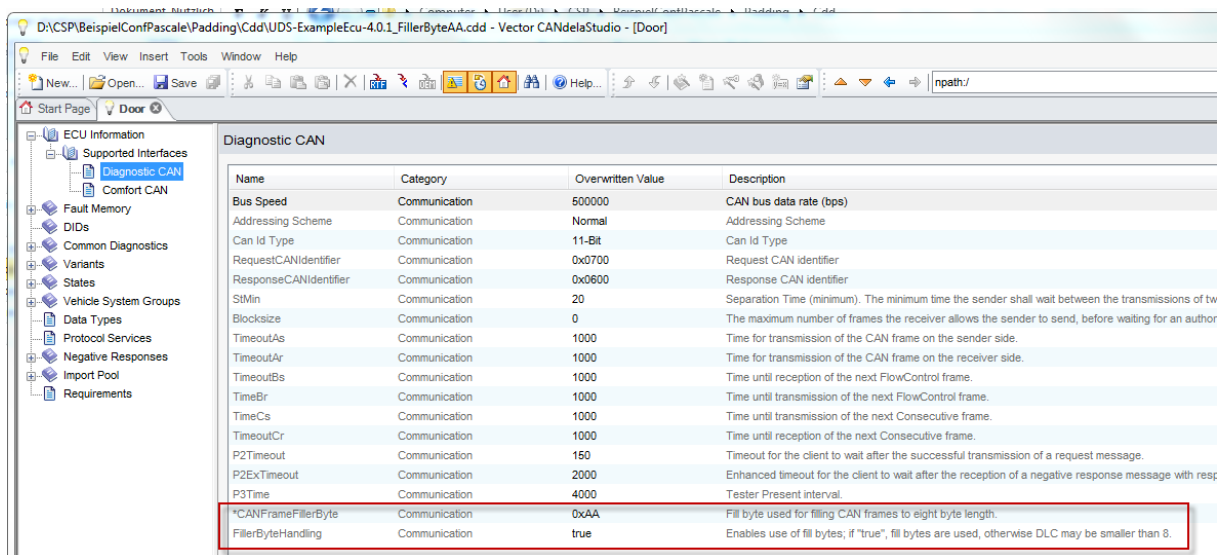
### 3.1 Set padding using a CDD

#### 3.1.1 For CAN

To obtain the padding of all CAN diagnostic frames that are sent by CANoe/CANalyzer Diagnostics Console modify the CDD file of the concerned ECU using CANdelaStudio. In the ECU Information / Supported Interface / Diagnostic CAN section of the communication parameters (see figure below), the two following parameters shall be present.



Note: The name “Diagnostic CAN” is project specific and can be different in your case.



If they are not present, please add them.



Note: you require for this operation the CANdelaStudio Admin Edition.

If the parameters are present, the CANdelaStudio Standard Edition is sufficient to set the parameters to the necessary values.

- `FillerByteHandling` from type ENUM:
  - “True” the frames will be padded to a DLC of 8.
  - “False” no padding.
- `CANFrameFillerByte` from type unsigned: provides the byte value which is used to pad the frames.

#### 3.1.2 For LIN

According to LIN 2.1 Specification, all unused bytes shall be padded to 0xFF. Therefore CANoe/CANalyzer from CANoe 8.5 SP5 on automatically pad the requests that are sent by the Diagnostics Console.

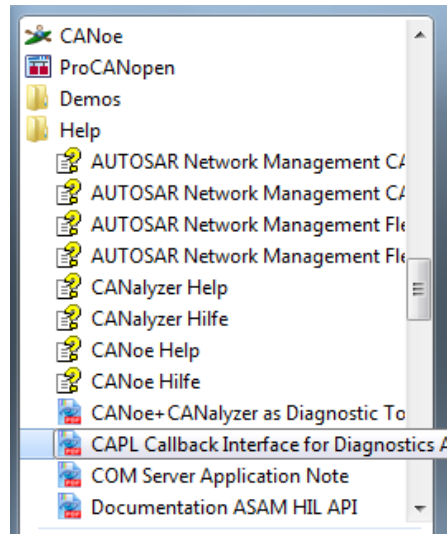
### 3.2 Set padding using CAPL (CANoe only)

If you are using CAPL nodes to implement a tester or simulate a diagnostic ECU, you can make use of some available CANoe TP (Transport Protocol) functions to force the padding of your Diagnostic frames.

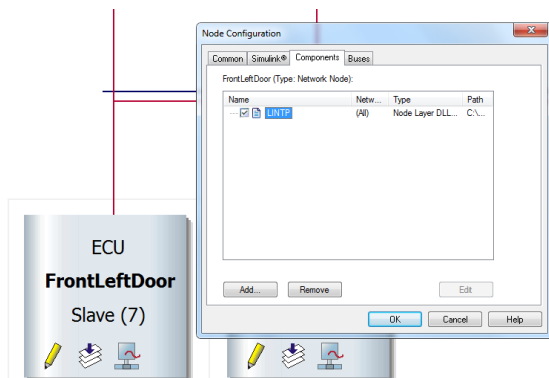
These functions must be integrated as a CCI (CAPL Callback Interface) which gives the CAPL user the possibility to adapt the PDUs that are exchanged between Diagnostics Layer and Transport Layers before they are sent on CAN.



Note: You can find more information on CCI in the corresponding Application Note that you can find for instance in the Windows Start Menu like shown in the picture below.



Note: Each concerned CAPL nodes shall be configured using the TP dll as component. For that use in Measurement Setup the mouse positioned on the node and press on the right mouse button. Add CANoe TP dll (see 3.2.1 or 3.2.1) as Component like indicated below.



#### 3.2.1 For CAN

The following two CAPL functions pad the desired CAN frames with a constant value.

```
CanTpGetPadding
CanTpSetPadding
```

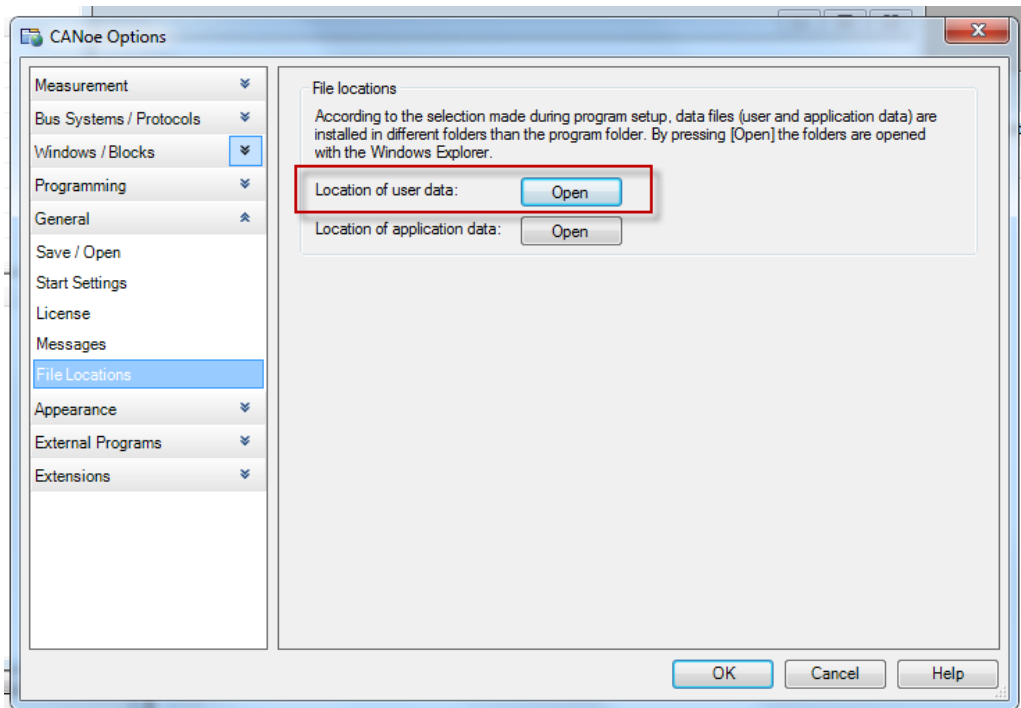


Note: Both functions are part of the OSEK\_TP.DLL which implements ISO-TP and are available for CANoe versions 7.0 or higher.

Please first copy the corresponding CCI Header File to the same directory as your CAPL module:

- for CANoe up to version 8.2: `CCI_Implementation.cin`, stored in the `Demo_CAN_CN\Diagnostics\UDSSim\Nodes` in the "Location of user data". The directory "Location of user data" is installation dependent and can be found like shown in the picture below.

- from CANoe version 8.5 on: `CCI_CanTP.cin` that can be found in the `Reusable\CAPL_Includes\Diagnostics` subdirectory of the CANoe user data directory.



Then include the following code in your CAPL module for CANoe:

- Up to CANoe version 8.2:

```

includes
{
  #include "DownloadSim.cin"
  #include "CCI_Implementation.cin"
}

variables
{
  const cIsTester = 0; // set to 0 in ECU simulation
  -----//
  char gECU[10] = "UDSSim";
}
    
```

- For CANoe version 8.5 on:

```

includes
{
#include "CCI_CanTP.cin"
}

variables
{
const cIsTester = 1;
char gECU[30] = "XXXXX_DW10FU_X250_Euro6";
}

```

Then set the required padding value, for instance:

```

canTpSetPadding(gHandle,0x11); // used to force padding value to 0x11
write("Return Value: %d", DiagSendRequest( request));

```



Note: The padding settings will then be used in all diagnostic parts of CANoe: trace window, diagnostics console window and fault memory window.

### 3.2.2 For LIN

Please first copy the following corresponding CCI Header File to the same directory as your CAPL module:

- for CANoe up to version 8.2: Please contact [support@vector.com](mailto:support@vector.com) for more details.
- from CANoe version 8.5 on: `CCI_LINTP.cin` that can be found in the `Reusable\CAPL_Includes\Diagnostics` subdirectory of the CANoe user data directory.

Then include the following code in your CAPL module for CANoe:

- For CANoe version 8.5 on:

```

2 includes
3 {
4     #include "CCI_LINTP.cin"
5 }
6
7 variables
8 {
9     char gECU[ 10] = "ECU"; // Provide a name to identify this node
10    const cIsTester = 1;    // Set to 1 in master as tester,
11                            // then ALSO set the table indices (see below)!
12
13 }

```

and set the Index of LIN schedule table to the correct value, for instance:

```

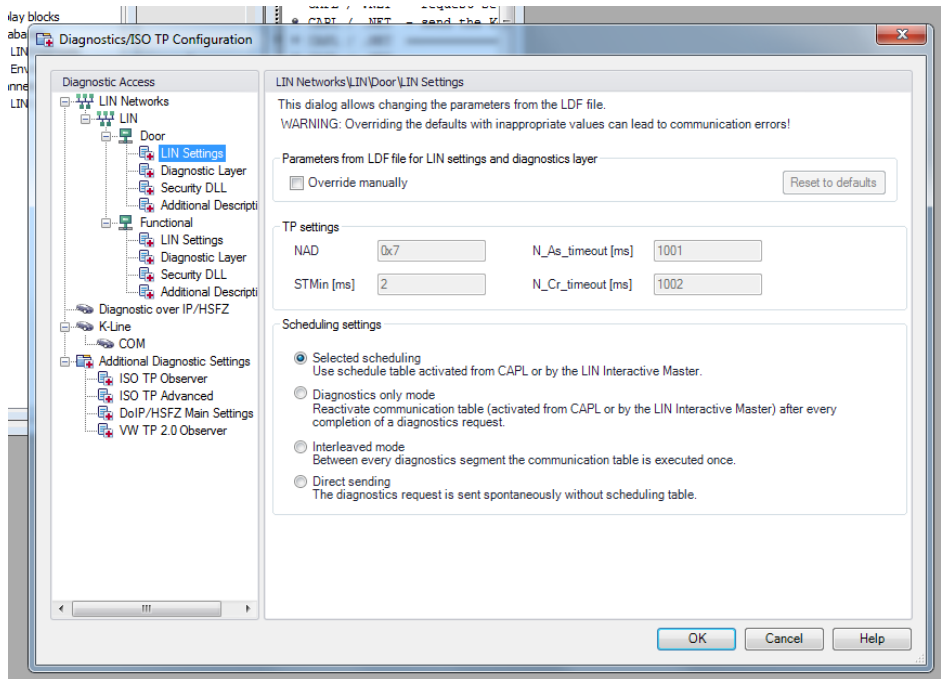
CCILIN_GetTableIndices( long& masterRequestTableIndex, long& slaveResponseTableIndex)
{
// In a tester (=LIN master), change these values to the actual table indices!
// In an ECU simulation (=LIN slave), these values will be ignored.
masterRequestTableIndex = 0;
slaveResponseTableIndex = 1;
}

```



Note: the padding value of all Diagnostics Frames sent using CAPL is then automatically set to 0xFF.

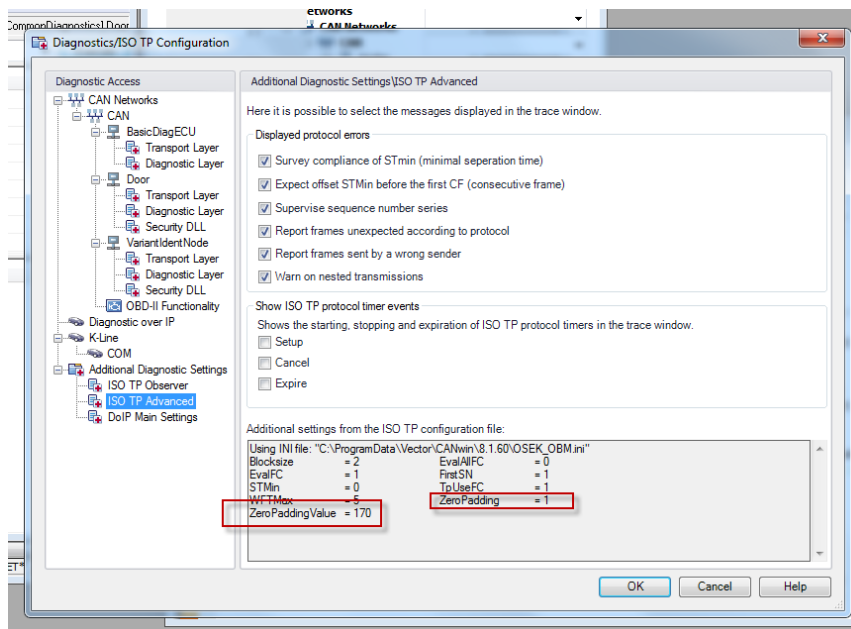
Make sure that the following LIN setting has been made in Diagnostics/ISO TP Configuration:



## 4 Check frame padding

To observe the content of a padding field, the following CANoe settings are necessary:

- ZeroPadding = 1
- ZeroPaddingValue = set value



This can be done like shown in the picture below in the CANoe `osek_obm.ini` file that is to be found in the “Location of application data”.

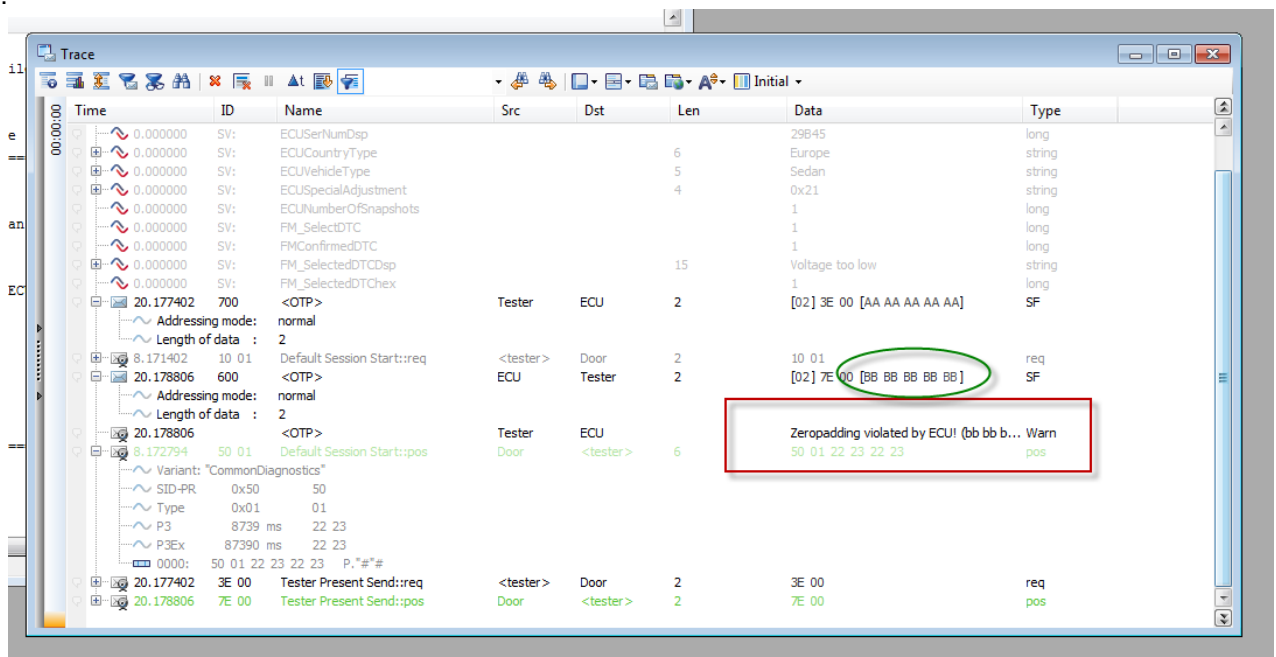


Note: see also  to find the actual location.

```

osek_obm.ini - Editor
Datei Bearbeiten Format Ansicht ?
[OSEK TP OBSERVER]
// Addressmode Normal=0/Extended=1
ADRMODE = 1
// Global Default values
TpBaseAddress=0x600
TpRxMask=0xff
// ZeroPadding on=1/off=0
ZeroPadding=1
ZeroPaddingValue=0xAA
// If FCs are not evaluated and FCs are used, this value is used.
Blocksize=5
// If EvalFC==0, then this value will be used
TpSTmin=20
// Report if more than this number of wait frames are generated.
// -1: ignore wait frames,
// 0: report all wait frames.
WFTMax=5
// First sequence number to expect.
FirstSN=1
// Level of verbosity, 0 = quiet, 10 = print all.
    
```

Padding failure will then be indicated after next measurement start like indicated in the following trace window:



## 5 Contacts

Please find the contacts of Vector Informatik GmbH and all subsidiaries worldwide via:

[http://www.vector.com/vi\\_addresses\\_en.html](http://www.vector.com/vi_addresses_en.html)