CAN Hardware for physical CAN Bus Connection

USB Port Connection to PC
Sub-D 9 connection to CAN Bus

HW Features :

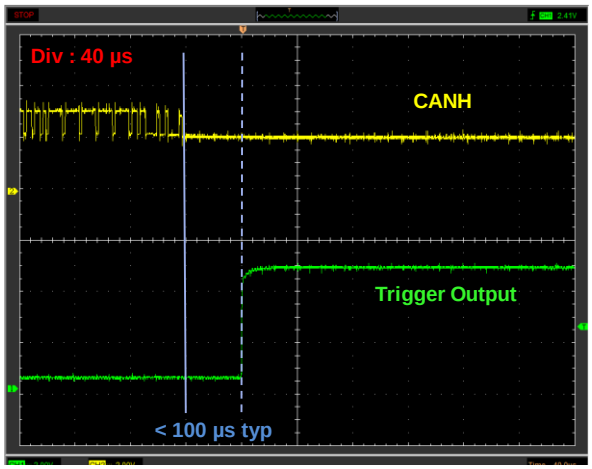
- ➔ **1 x High Speed CAN Bus up to 1 Mbit/s**
- ➔ **4 x digital Signal Output / Trigger Output**

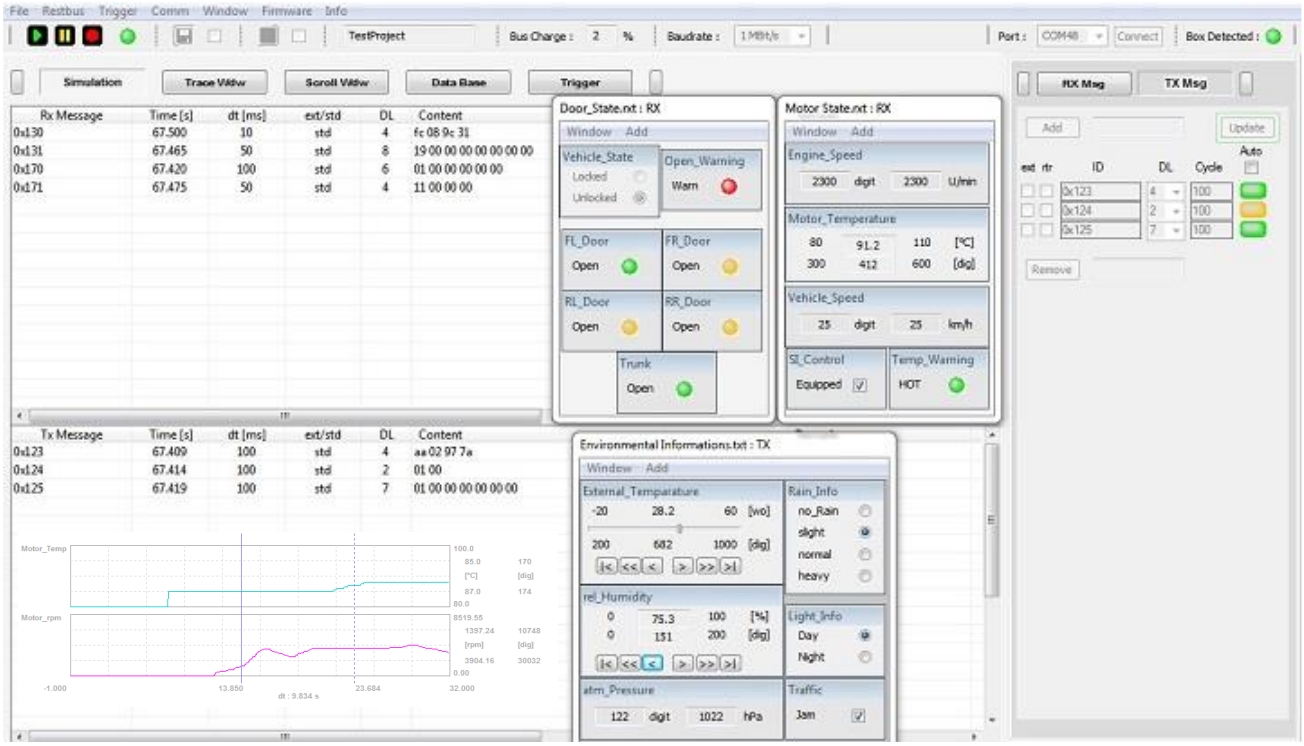
- ➔ **easy synchronization between CAN Messages and physical HW Outputs**

SW Features :

- ➔ *Can Bus Analyzing* **Tool**
- ➔ *Can Restbus Simulation* **Tool**
- ➔ *Scope Functionality* **: monitor up to 8 Can Signals**
- ➔ *RX/TX Automation* **in dll Mode combined with any C-Compiler supporting regular dll's**
- ➔ *HW/SW synchronization* **in dll Mode**
- ➔ **HW/SW synchronization by** *pre-defined TX Sequences*
- ➔ *Can Database* **Support**
- ➔ **4 x SW configurable** *Trigger on CAN message* **contents**

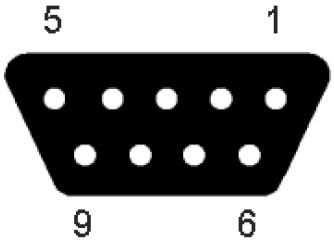
- ✓ **including PC SW Pre-Release Version without restrictions and with upgrade privilege for future SW releases**
- ✓ **possibility to add or integrate customer needs within very short time**
- ✓ **user manual available for download :** *http://www.jwe-electronics.com/*
- ✓ **compatible with Windows XP / Vista / 7 / 8**





Pinout SubD 9 female Connector

home



1 : (Trigger) Output 2
2 : HS CANL
3 : GND
4 : n.c.
5 : (Trigger) Output 3
6 : (Trigger) Output 1
7 : HS CANH
8 : n.c.
9 : (Trigger) Output 4

Hardware Series Overview

Series	High Speed CAN	LIN	Single Wire CAN	HW Output	Availability
CLDT 1xx4	1	x	x	4	✓
CLDT x1x4	x	1	x	4	Q2 / 2015
CLDT xx14	x	x	1	4	✓

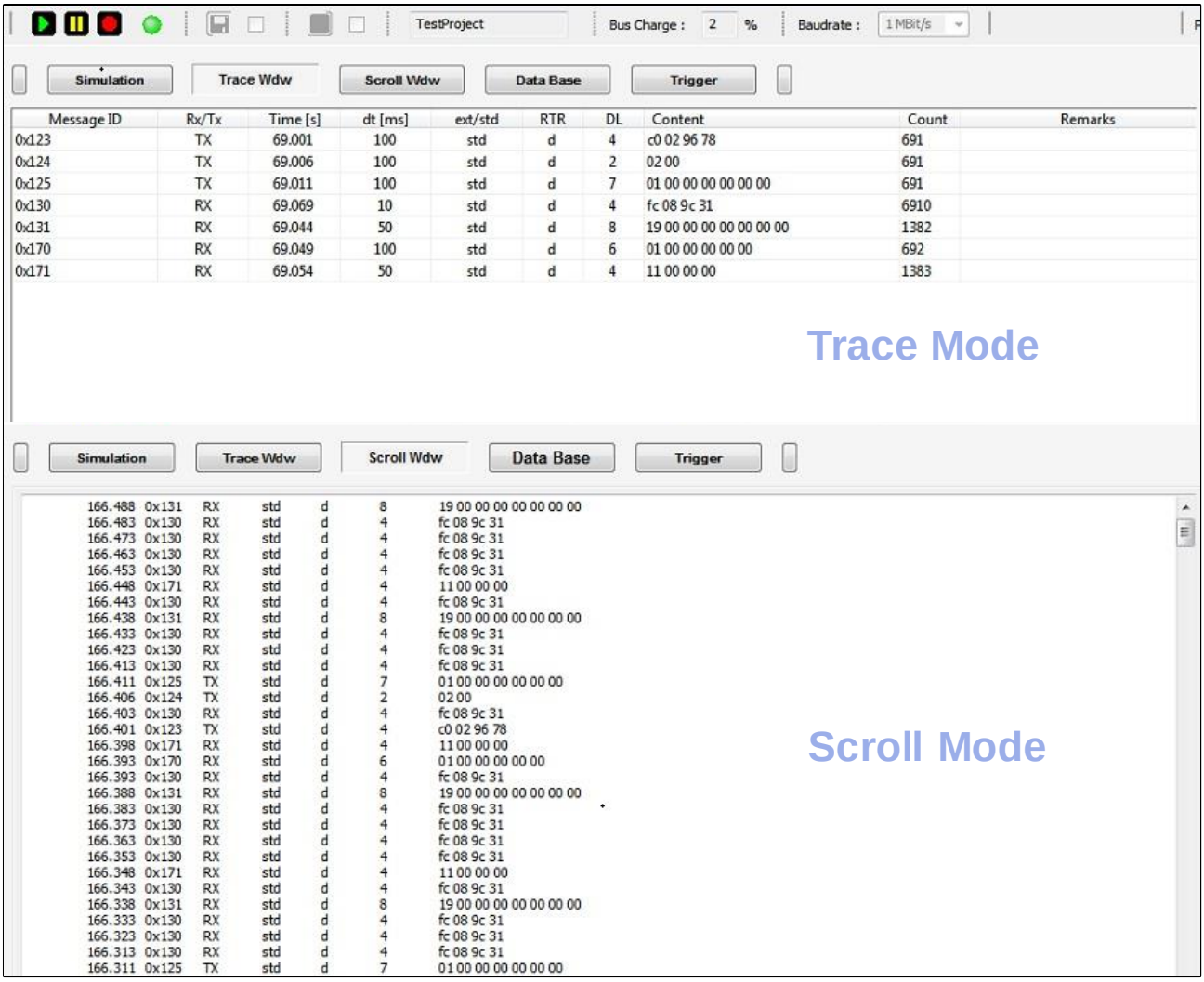
Technical Specification :

SubD 9 female Connector & USB Connector		min	typ	max
Supply Voltage	by PC USB Port		+5V	
Supply current				200 mA
Output 1 … 4	Input Capacitor		< 10 nF	
	Output High Level		> 4 V	
	Output High Resistance		1 kΩ	
	High Level Output Current			5 mA
	Output Low Level	0.3V	0.6V	1 V
	Input Low Level Current			4 mA
GND line fuse				200 mA

Can Bus Analyzing Tool

home

- **Show complete CAN Bus traffic in real time**
- **Display bus traffic in Trace Mode**
- **Display bus traffic in Scroll Mode**
- **Save bus traffic data in text file**



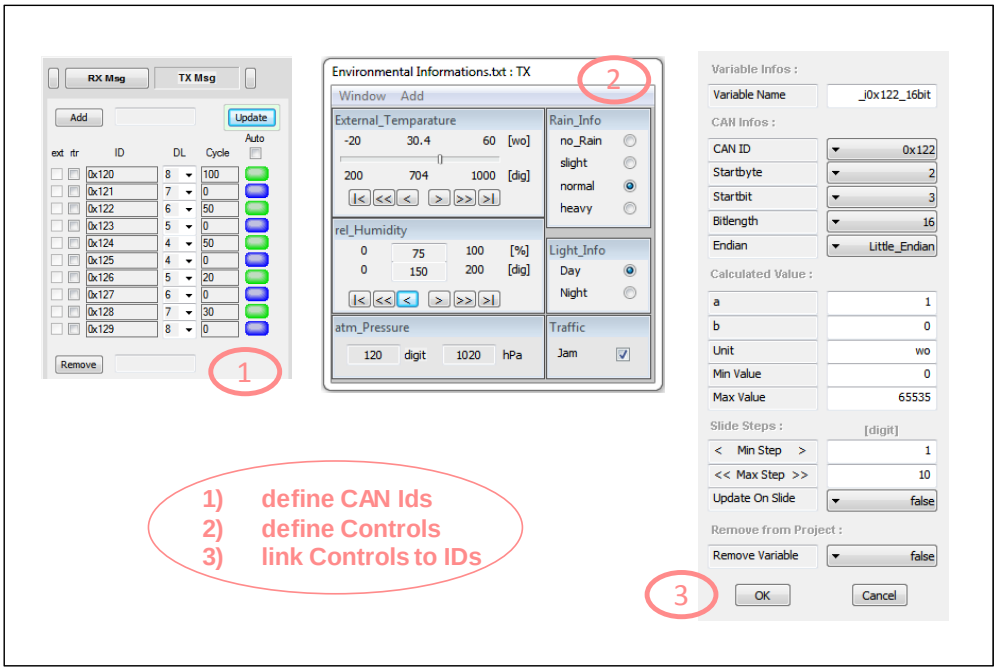
Message ID	Rx/Tx	Time [s]	dt [ms]	ext/std	RTR	DL	Content	Count	Remarks
0x123	TX	69.001	100	std	d	4	c0 02 96 78	691	
0x124	TX	69.006	100	std	d	2	02 00	691	
0x125	TX	69.011	100	std	d	7	01 00 00 00 00 00 00	691	
0x130	RX	69.069	10	std	d	4	fc 08 9c 31	6910	
0x131	RX	69.044	50	std	d	8	19 00 00 00 00 00 00 00	1382	
0x170	RX	69.049	100	std	d	6	01 00 00 00 00 00	692	
0x171	RX	69.054	50	std	d	4	11 00 00 00	1383	

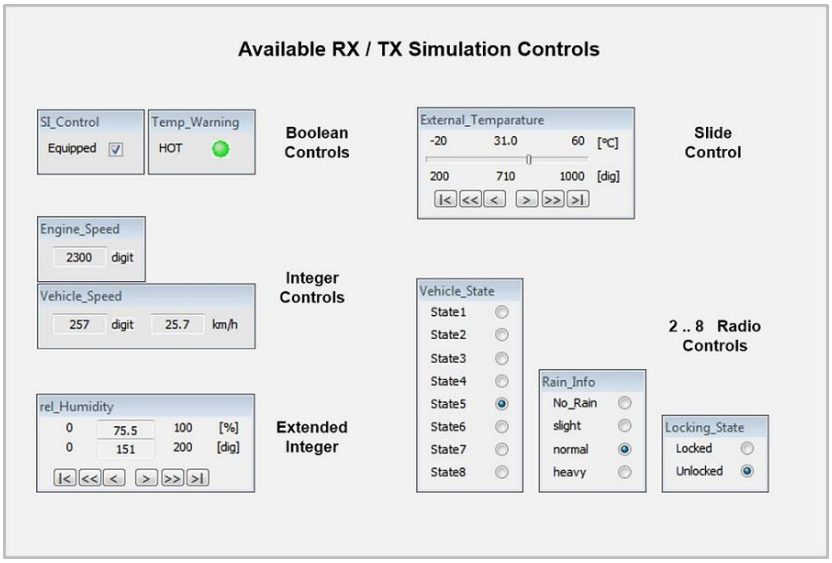
166.488	0x131	RX	std	d	8	19 00 00 00 00 00 00 00
166.483	0x130	RX	std	d	4	fc 08 9c 31
166.473	0x130	RX	std	d	4	fc 08 9c 31
166.463	0x130	RX	std	d	4	fc 08 9c 31
166.453	0x130	RX	std	d	4	fc 08 9c 31
166.448	0x171	RX	std	d	4	11 00 00 00
166.443	0x130	RX	std	d	4	fc 08 9c 31
166.438	0x131	RX	std	d	8	19 00 00 00 00 00 00 00
166.433	0x130	RX	std	d	4	fc 08 9c 31
166.423	0x130	RX	std	d	4	fc 08 9c 31
166.413	0x130	RX	std	d	4	fc 08 9c 31
166.411	0x125	TX	std	d	7	01 00 00 00 00 00 00
166.406	0x124	TX	std	d	2	02 00
166.403	0x130	RX	std	d	4	fc 08 9c 31
166.401	0x123	TX	std	d	4	c0 02 96 78
166.398	0x171	RX	std	d	4	11 00 00 00
166.393	0x170	RX	std	d	6	01 00 00 00 00 00
166.393	0x130	RX	std	d	4	fc 08 9c 31
166.388	0x131	RX	std	d	8	19 00 00 00 00 00 00 00
166.383	0x130	RX	std	d	4	fc 08 9c 31
166.373	0x130	RX	std	d	4	fc 08 9c 31
166.363	0x130	RX	std	d	4	fc 08 9c 31
166.353	0x130	RX	std	d	4	fc 08 9c 31
166.348	0x171	RX	std	d	4	11 00 00 00
166.343	0x130	RX	std	d	4	fc 08 9c 31
166.338	0x131	RX	std	d	8	19 00 00 00 00 00 00 00
166.333	0x130	RX	std	d	4	fc 08 9c 31
166.323	0x130	RX	std	d	4	fc 08 9c 31
166.313	0x130	RX	std	d	4	fc 08 9c 31
166.311	0x125	TX	std	d	7	01 00 00 00 00 00 00

Restbus Simulation Tool

home

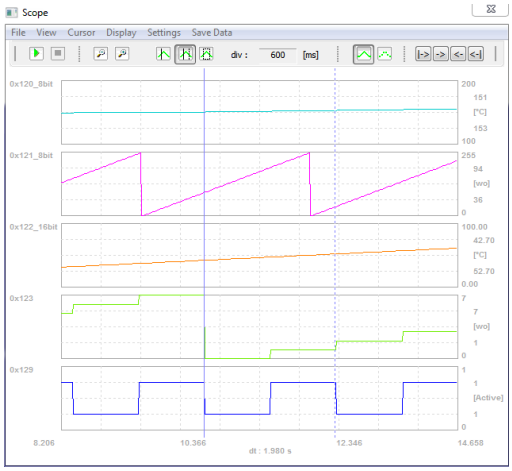
- ➔ **Define up to 25 Rx & Tx Message Ids**
- ➔ **Add Rx & Tx Simulation Windows**
- ➔ **Add Rx / Tx Controls to Simulation windows**
- ➔ **Link Rx / Tx Controls to the Rx / Tx Messages with Controls Properties**
- ➔ **Choose Baudrate & start Restbus Simulation**
  - → **manually set TX Values in real time**
  - → **manually control 4 x digital HW Output in real time**
  - → **check RX Simulation Values in real time**



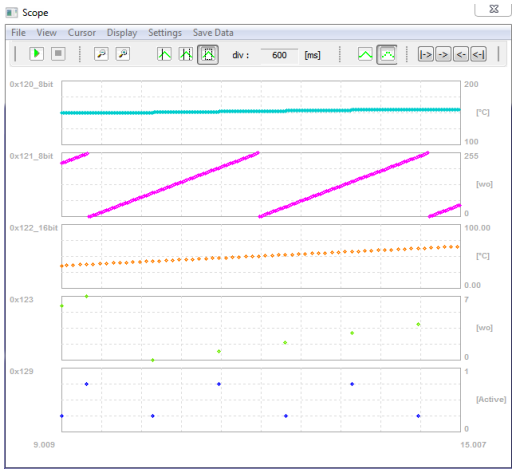


Scope Functionality

home

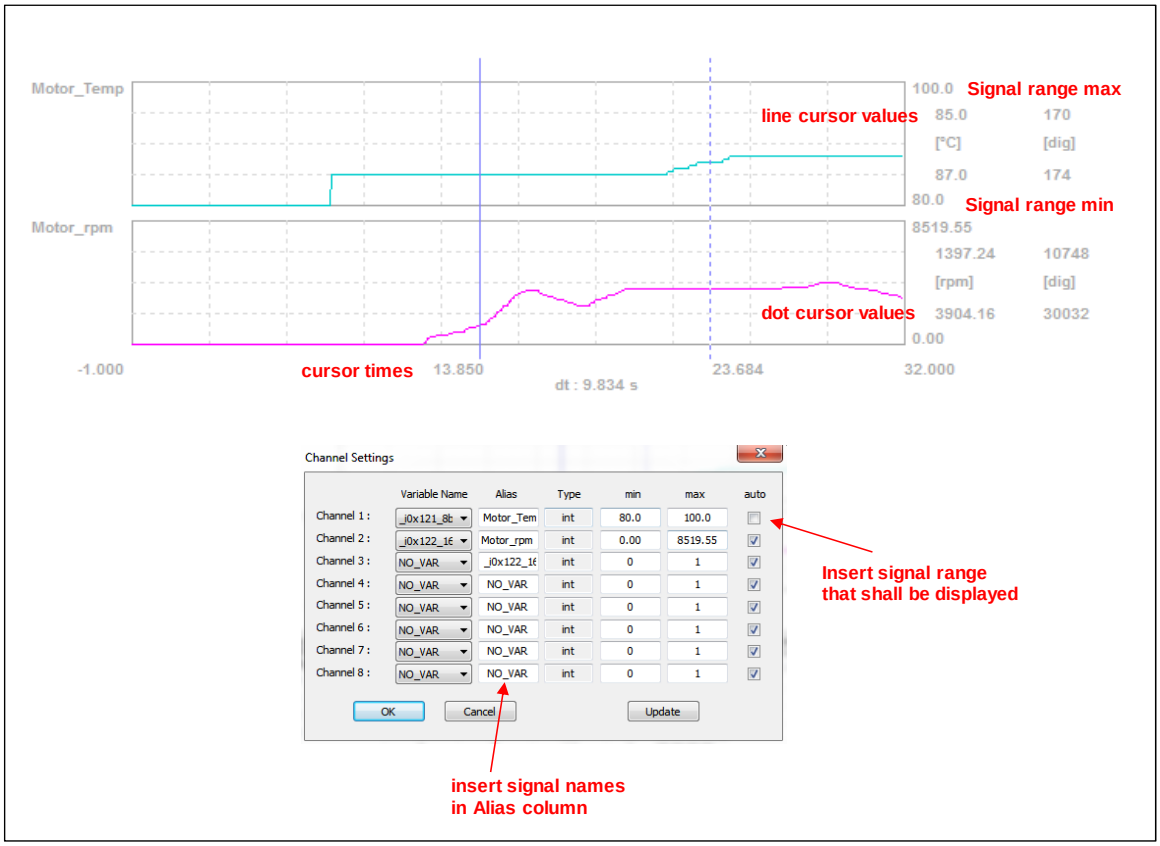


Line Mode



Dot Mode

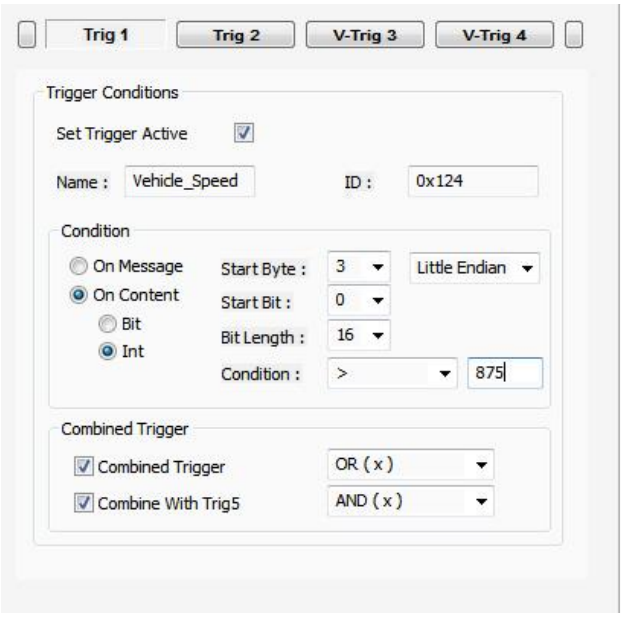
- **Monitor up to 8 CAN Signals in real time**
- **Maximum resolution of 1ms with a memory capacity of 50s**
- **2 displaying modes : Line Mode & Dot Mode**
- **Various measuring, zooming and storing possibilities**
- **Save signal curves to clipboard or to text file**

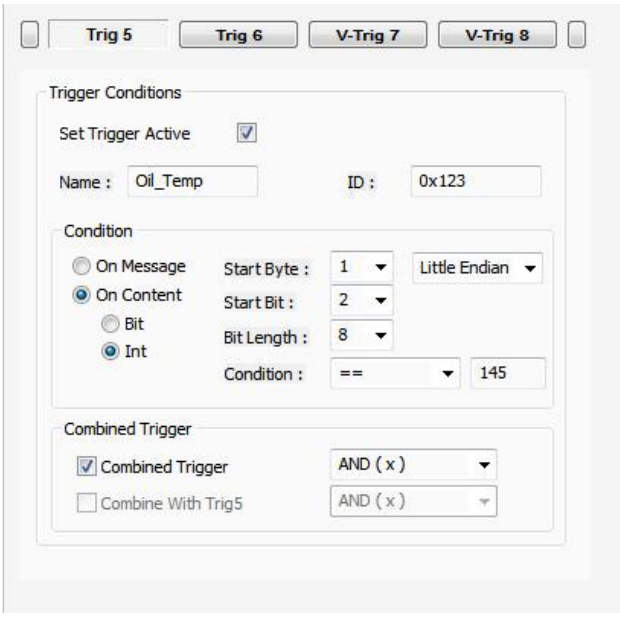


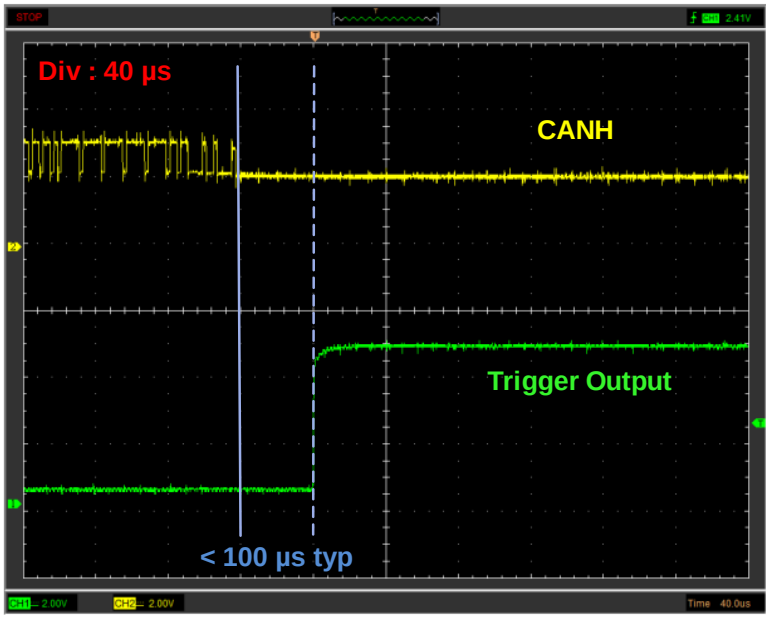
4 x physical HW Trigger Outputs

home

- **create up to 8 different trigger events**
- **high flexibility by combining trigger events**
- **4 x physical trigger output, 4 x virtual trigger (to create combined trigger events)**
- **Trigger reaction time < 100 µs typ.**
- **Output rising / falling time < 50 µs typ.**

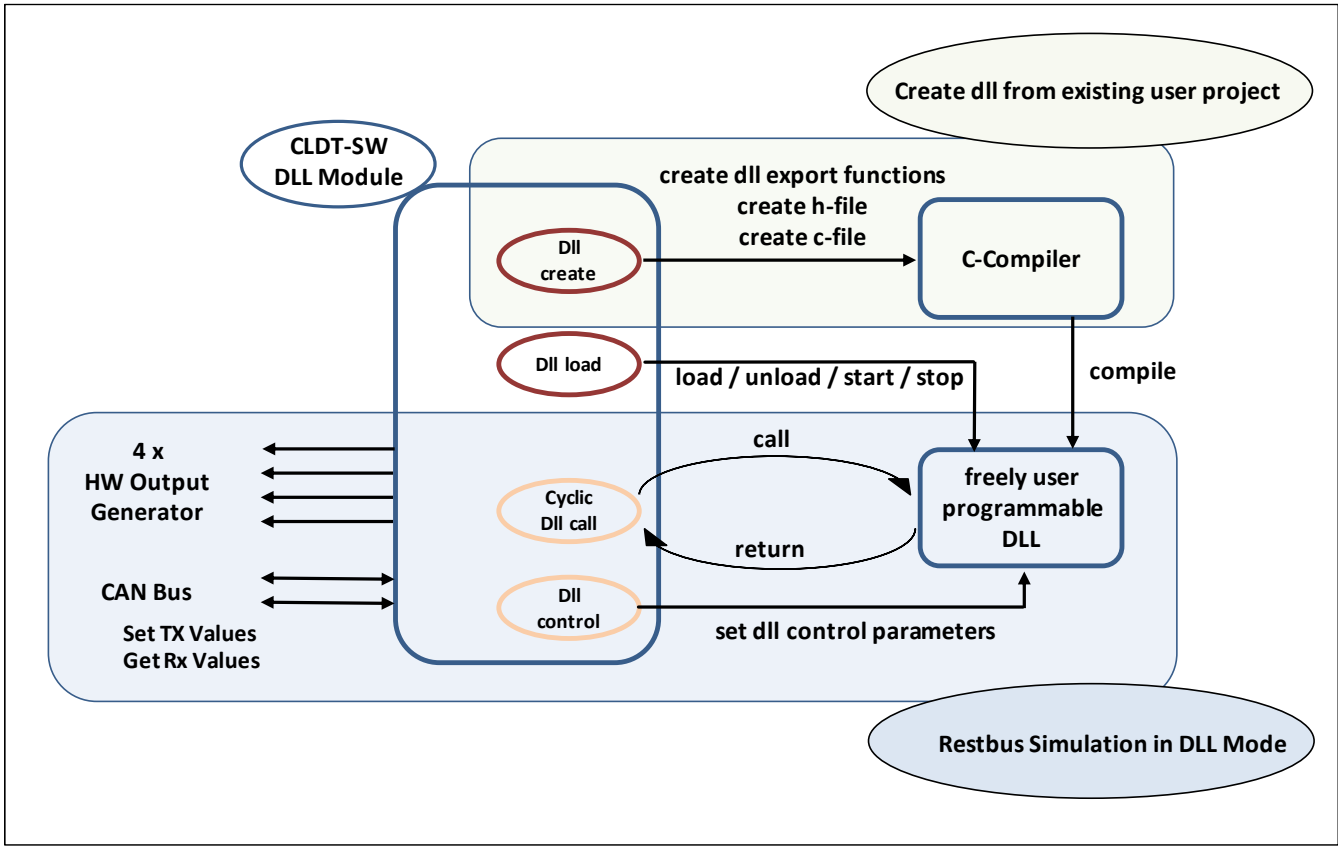






RX / TX Automation in dll Mode

home



- In CLDT SW create a Restbus Simulation Project and define CAN RX & TX Signals
- Auto-create a dll project for a C-Compiler (e.g. LCC- or Micropsoft VC++ Compiler) with CLDT SW
- Write the user specific functional logic in C or C++ → pre-defined C-functions
  - → control TX CAN Bus Values / Messages
  - → read RX CAN Bus Values / Messages
  - → control 4 x physical HW Output & thereby synchronize HW with RX or TX CAN Bus Data
- Compile dll with C-Compiler
- Load dll with the CLDT SW
- Start Restbus Simulation in dll Mode
- See next page for a simple example, compiled with LCC-Win32 Compiler

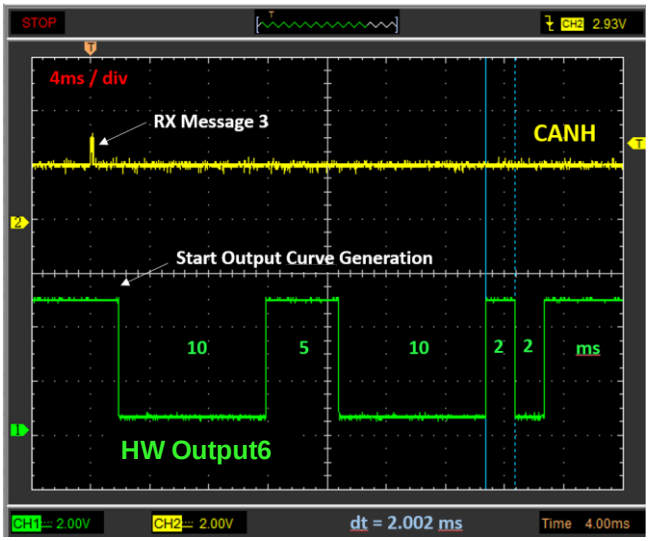
RX / TX Automation in dll Mode : Example

home

Compiled with LCC-Win32 Compiler

```
//  ____________________________________________________
//  RX TX Automation

void vRxTxLogic(i64DeltaT)                          // timer resolution : ns
{
    //  ___________
    //  count Timers

    _i64TimerOp6   += i64DeltaT;                    // Timer for Output 6 curve generation
    _i64Timer10ms  += i64DeltaT;                    // Timer 10ms tasks
    _i64Timer100ms += i64DeltaT;                    // Timer 100ms tasks

    //  ___________________________________
    //  generate digital Output 6 curve             // physical HW Output 4 is logical Output 6

    if (_bRxMsg3 == TRUE)
    {
        _i64TimerOp6 = 0;                           // start curve generation each time
    }                                               // when RX msg 3 has been received

    int iTimer100ns = _i64TimerOp6 / 100000;        // --> resolution :  ms/10

    if (iTimer100ns >= 0)       {   _bOp6 = LOW;    }   // 0ms   ... 10ms
    if (iTimer100ns >= 100)     {   _bOp6 = HIGH;   }   // 10ms  ... 15ms
    if (iTimer100ns >= 150)     {   _bOp6 = LOW;    }   // 15ms  ... 25ms
    if (iTimer100ns >= 250)     {   _bOp6 = HIGH;   }   // 25ms  ... 27ms
    if (iTimer100ns >= 270)     {   _bOp6 = LOW;    }   // 27ms  ... 29ms
    if (iTimer100ns >= 290)     {   _bOp6 = HIGH;   }   // 29ms  ...

    //  ____________
    //  time management

    if (_i64Timer10ms > _10MS)
    {
        _i64Timer10ms -= _10MS;
        vTask10ms();
    }

    if (_i64Timer100ms > _100MS)
    {
```

Measured Result



→ Create Restbus Simulation project

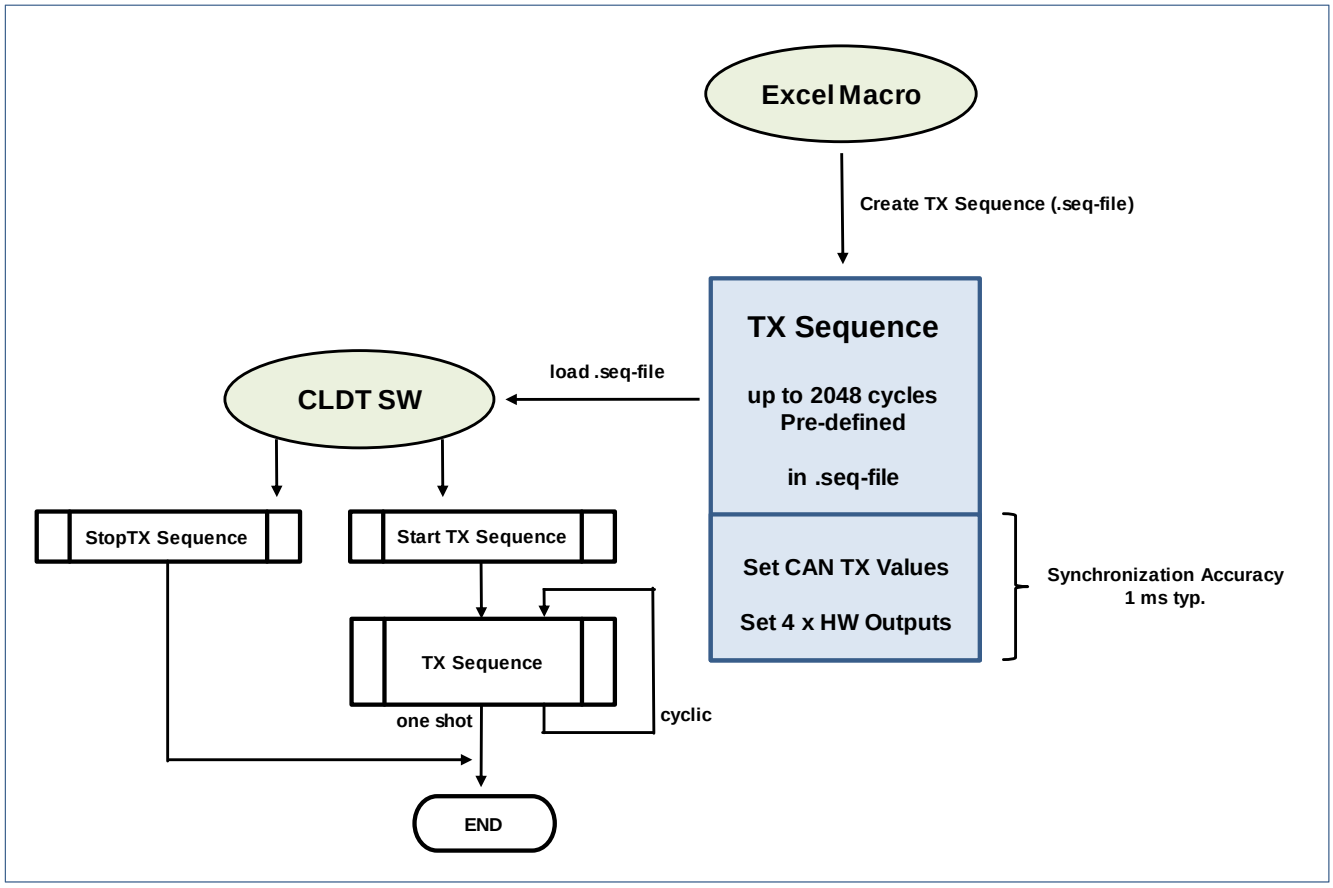
→ Create dll with C-Compiler

→ Load dll with CLDT SW

Pre-defined TX Sequences

home

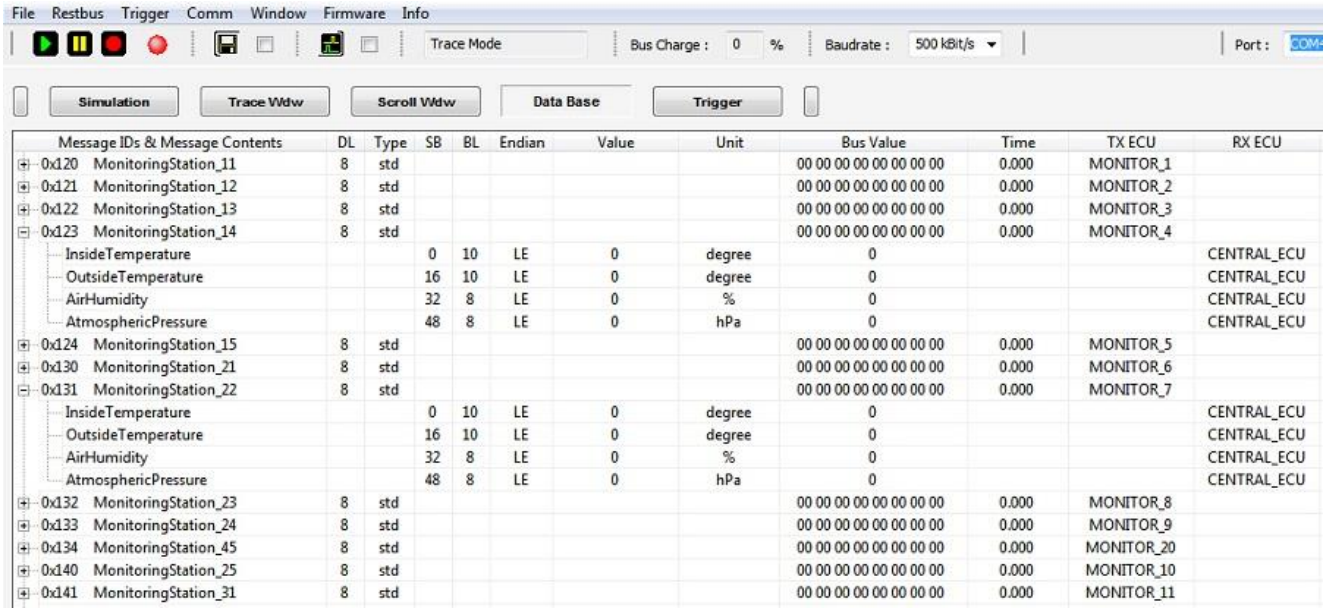
- **Pre-define a Tx Sequence with up to 2048 Tx Cycles**
- **Synchronize Tx Messages with 4 x physical digital Outputs**
- **Accuracy : 1ms typ.**
- **Apply Tx Sequence in cyclic or one shot mode**
- **Use Excel Macros to create Tx Sequence files .seq in correct format**



CAN Data Base Support

home

- **Analyze CAN Messages and CAN Signals in Can Data Base Mode**
- **Displaying Mode : Tree Mode**
- **.dbc file format supported**



Message IDs & Message Contents	DL	Type	SB	BL	Endian	Value	Unit	Bus Value	Time	TX ECU	RX ECU
0x120 MonitoringStation_11	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_1	
0x121 MonitoringStation_12	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_2	
0x122 MonitoringStation_13	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_3	
0x123 MonitoringStation_14	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_4	
InsideTemperature			0	10	LE	0	degree	0			CENTRAL_ECU
OutsideTemperature			16	10	LE	0	degree	0			CENTRAL_ECU
AirHumidity			32	8	LE	0	%	0			CENTRAL_ECU
AtmosphericPressure			48	8	LE	0	hPa	0			CENTRAL_ECU
0x124 MonitoringStation_15	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_5	
0x130 MonitoringStation_21	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_6	
0x131 MonitoringStation_22	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_7	
InsideTemperature			0	10	LE	0	degree	0			CENTRAL_ECU
OutsideTemperature			16	10	LE	0	degree	0			CENTRAL_ECU
AirHumidity			32	8	LE	0	%	0			CENTRAL_ECU
AtmosphericPressure			48	8	LE	0	hPa	0			CENTRAL_ECU
0x132 MonitoringStation_23	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_8	
0x133 MonitoringStation_24	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_9	
0x134 MonitoringStation_45	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_20	
0x140 MonitoringStation_25	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_10	
0x141 MonitoringStation_31	8	std						00 00 00 00 00 00 00 00	0.000	MONITOR_11	