Realtime CAN Sniffer using the VW SocketCAN Interface

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Abstract

A tool for reading out information of a Realtimesystems is nowadays absolutly necsessary for a secure an quick development Process. If on is able to browse Infomation in a quick and efficent manner, then one would be able to find failures quickly. Irregular answers of the System could be observed and seen in the context with other elements of the Embedded Software. A usual used debugger is not able to transfer the Data amount about longer times of observation. A faster transfer rate is neccessary. Also interesting in this Point is a independent realtime clock. Modern Trace-Debuggers are able to do this job almost. But they are expencive and closed source. But using the CAN Bus for debugging purposes is much more flexible. It can be used with every Microcontroller, which got a CAN Bus interface. With this approach it is possible to Observe the System or the interplay of the Systems. Values of the Programm running on the DUT can be sent out and displayed by a special Software on a PC. This all in very close time. One can observe the System in real world an also in its inner values. An other approach can be time measurements. There are a few Sniffers on the market out there. Very expencive and most (because closed source) time not applicable.

1 QCANObserver

The QCANObserver connects through the SocketCAN interface to a CAN intface in a PC. There is a flexible integration for new drivers also. There are two implementations in the subfolders of the source. One for peak-systems PCAN Interface-Dongles and one for the SocketCAN. Windows implementation is already made but at the moment not compilabel. Dynamic linkable libraries are used. So at the moment there is only a linux Version.

For compilation see the corresponding manual (pdf) on the homepage. Installing the driver, testing it, installing the dependencies of QCANObserver and compiling itself are the neccessary steps. There can be problems with other versions of the libraries (Qt, qwt) which only can be solved in the source of the programm. There can be problems with the linkerflags/include paths/lib paths/ for (Qt, qwt, math) which can be solved in the QtCreator project file. Look at the flags for your linux distro and at the examples in the .pro file. You could send those changes to my mail adress. I take them into the respository. It would be fine if the development of the programm would go on.

QCANObserver is made to help at complicated development processes. It was tested in the development for a positioning controller. It was neccesary to read out the step response of the mechanical system. The software on the embedded device measured the system. Speed and possition against voltage. This data was send over the CAN bus out on a certain ID. In the configuration of QCANObserver (xml database) the Values(Items) can be defined. (Position and dataype, interpretation etc...) The visual interface of QCANObserver displays in three possible views. On the mainwindow is a list where all messages are added with ID, data, timestamp(from interface or from linux itself (rt or not)). In the graphic windows one can add Items (defined in the xml database) to the view. The value is displayd as graph. In the Observerwindow too, but as list.

At the moment there are some examples on those xml databases. Follow the description on the hompage for definition. There are some undocumented features for floating point variables. Look in the source files under processdatabase.cpp. All datahandling for those Items is done with float at the moment. So if you define a integer in you database it is handled by floats in the programm. So you loose resolution on big values. Future development could lead to doubles. Or the Item data handling must be rewritten for the handling. Unsigned values should be also implemented. Look at the sourcefiles with signal in its name.

But already QCANObserver is a very powerful solution. Once running - very useful. You can send questions, ideas and bugs to me: “florian - hillen at web dot de“. I try to respond. http://qcanobserver.sourceforge.net/
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