

Tutorial - Getting started with CAN

This document is a quick tutorial over:

1. How to get started with CAN in Atmel Studio 6.1.
2. How to use CANKing.
3. How to connect the EVK1100 board to the CAN bus
4. How to use the Scania dashboard.

How to get started with CAN in Atmel Studio 6.1

Step 1

Start with creating a new example project for the EVK1100 board. The example project that should be chosen is *Kit->ASF(3.11.0)->EVK1100->DIP204 Display Controller Example – EVK1100*. This is to ensure that the display work correctly. Due to a bug in ASF the display might not work if you create a new regular project.

Step 2

Download the files “can.h”, “can.c”, “regs2515.h” and “main.c” from the course KTH-Social page.

Step 3

Create a new folder in your project called “CAN” by right-clicking the “src” folder and choosing *Add->New folder*. Now right-click the CAN folder you just created and chose *Add->Existing Item*, navigate to where you downloaded the files from the home page. Chose to add “can.h”, “can.c” and “regs2515.h”. You also need to add the “CAN” folder to the compiler directories as described in “Note 2 in Tutorial2 – Creating your own program”.

Delete the “dip204_example.c” file in the “src”. Add the downloaded “main.c” to the project by right-clicking “src” folder and choosing *Add->Existing Item*. (Alternatively just replace the content of the “dip204_example.c” file with the content from the “main.c”.

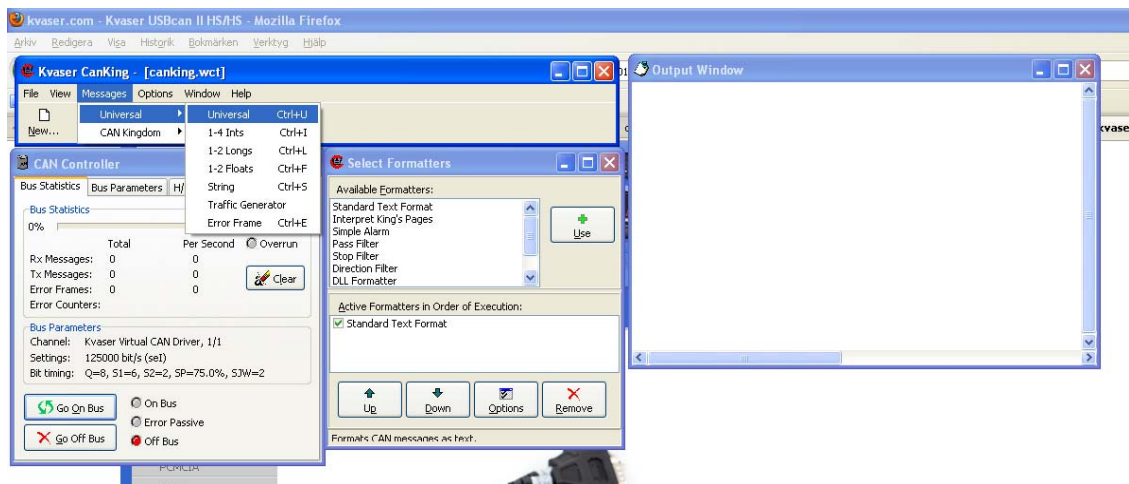
Because you started from an example project, all needed drivers should already be included in the ASF Wizard.

Step 4

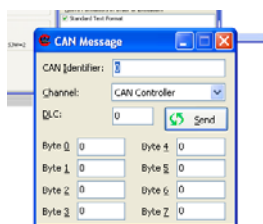
Connect a CANKing dongle directly to the MCP2515 board, you will need a female-female DSUB connector. This way you’re creating a small CAN bus between the MCP2515 and the CANKing. Run the program and verify that a CAN message is being sent every second. If not go through the tutorial again and make sure everything was done right before contacting an assistant. Try also to send a message with the CANKing and verify that the EVK1100 displays it on the display. See next chapter on how to use the CANKing software.

How to use CANKing

- Connect the CANKing to the PC using a USB cable.
- Start CANKing, click in “Ok, I know what I’m doing”, choose “template” and click “Ok”. Then choose CAN Kingdom Basic.
- In the CAN Controller window you need to set the *Bus Speed* in the menu *Bus Parameters*. It has to be the same for all the boards that you are using. Under *CAN Channel*, make sure that the Kvaser USBcan II 1/1 is chosen. Now click on the tab *Bus Statistics* and click on the button *Go On Bus*. A green LED will indicate the program is on the bus.
- You should now be able to send and receive messages.
- In the Output Window you can see if any message has been received.
- To send messages go to *Messages->Universal->Universal*.



- Here you can send messages with different Id, length and data content.



How to connect the EVK1100 board to the CAN bus

In the labs, there are three parallel CAN busses installed on the walls. A red, a yellow and a green bus that can be seen in Figure 2. At each end of every CAN bus there is one 120 ohm resistor connected, (see Figure 1). This is because that the CAN bus needs to be terminated.

120 Ω

120 Ω

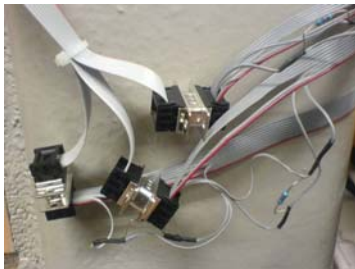
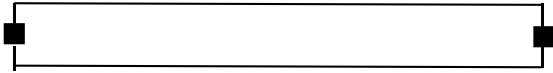


Figure 1: CAN bus termination resistors

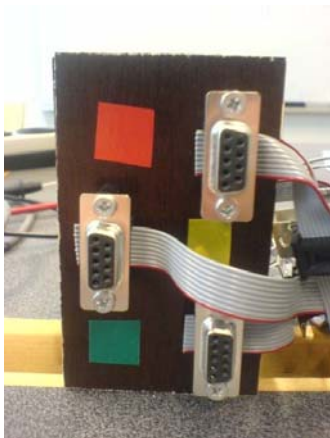


Figure 2: CAN bus sockets

If you are using the MCP2515 board there are a 120 Ω resistor integrated on the board that can be used when you want to directly send messages to CANking, without using the CAN busses on the wall. To use this resistor use the jumper shown in Figure 3.



Figure 3: MCP2515

How to use the Scania dashboard

One fun way of testing CAN is to try to control the Scania dashboard in the lab (see Figure 4). The Scania dashboard datasheet can be found on the homepage, and shows the different Id:s, which byte that should be set and the data range. The Scania dashboard is connected to the yellow bus (middle) and uses 250 kbps bus speed.

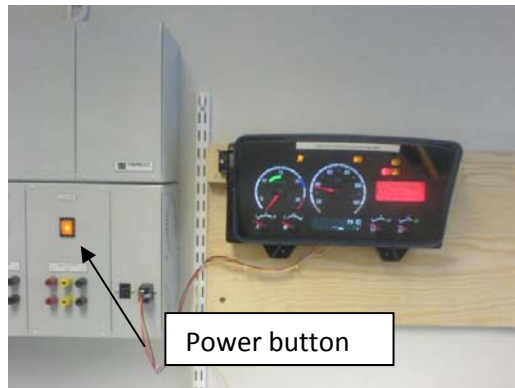
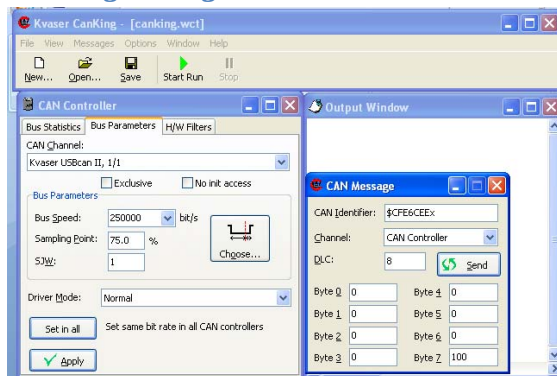


Figure 4: Scania dashboard

CANKing settings:



Make sure that you put an “x” after the Identifier in the CAN Identifier field, since the Scania dashboard uses Extended Id.

MCP2515 example:

For example the Velocity indicator can be controlled by sending one message to the right identifier (0X0CFE6CEE). The 7th byte is set to 50 and the velocity indicator should now show 50 km/h.

```
msg[0]=0;
msg[1]=0;
msg[2]=0;
msg[3]=0;
msg[4]=0;
msg[5]=0;
msg[6]=0;
msg[7]=50;
```

```
// Channel, Identifier (max 0x1fffffff (29 bits)), Message, Number of bytes, R or 0 (Remote
//frame or no remote frame).
CANSendMsg( 0, 0x0cfe6cee, msg, 8, 0 );
delay_ms(1000);
dip204_clear_display();
```

If you want to control the other instruments this can be done in the same way.