C Programming with a RoboBuilder motion file

RoboBuilder 2008.04.25

● What is this document about?

This document explains how to create user's own firmware to control RBC controller by including a motion file in C programming instead of using RoboBuilder's standard firmware.

● Material included

(1) Example Motion File
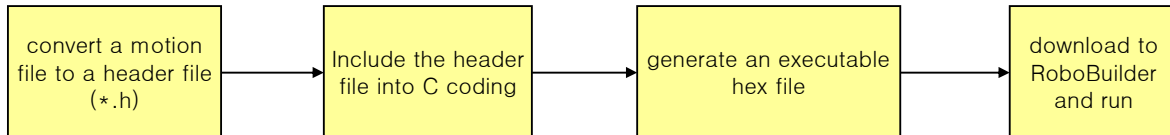① Project File : p_ex1.prj
② Motion File : m_ex1.rbm

(2) Example Source C Code(CodeVisionAVR 1.24.8d)
① Project File : cv_ex1.prj
② Unit File : main.c, comm.c, dio.c
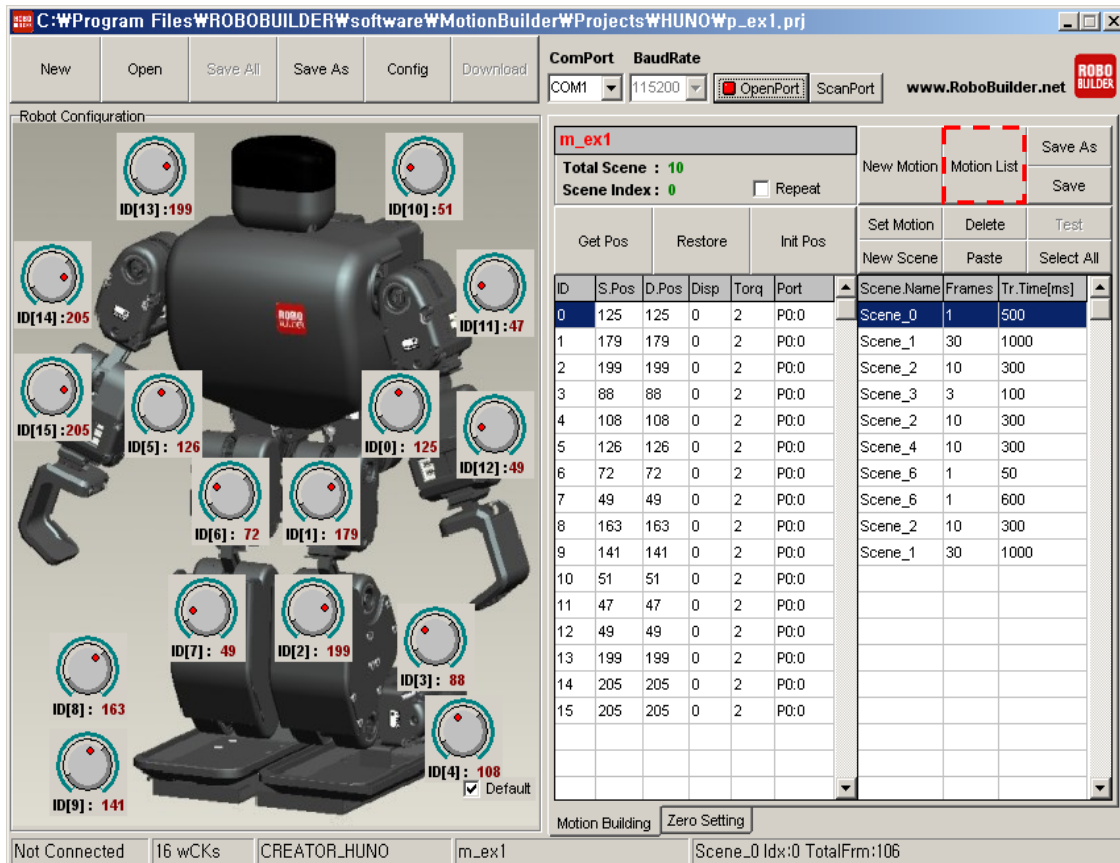③ Header File : main.h, comm.h, dio.h, macro.h, m_ex1.h

● Caution

(1) This function is supported only with MotionBuilder version 1.10 beta or higher.
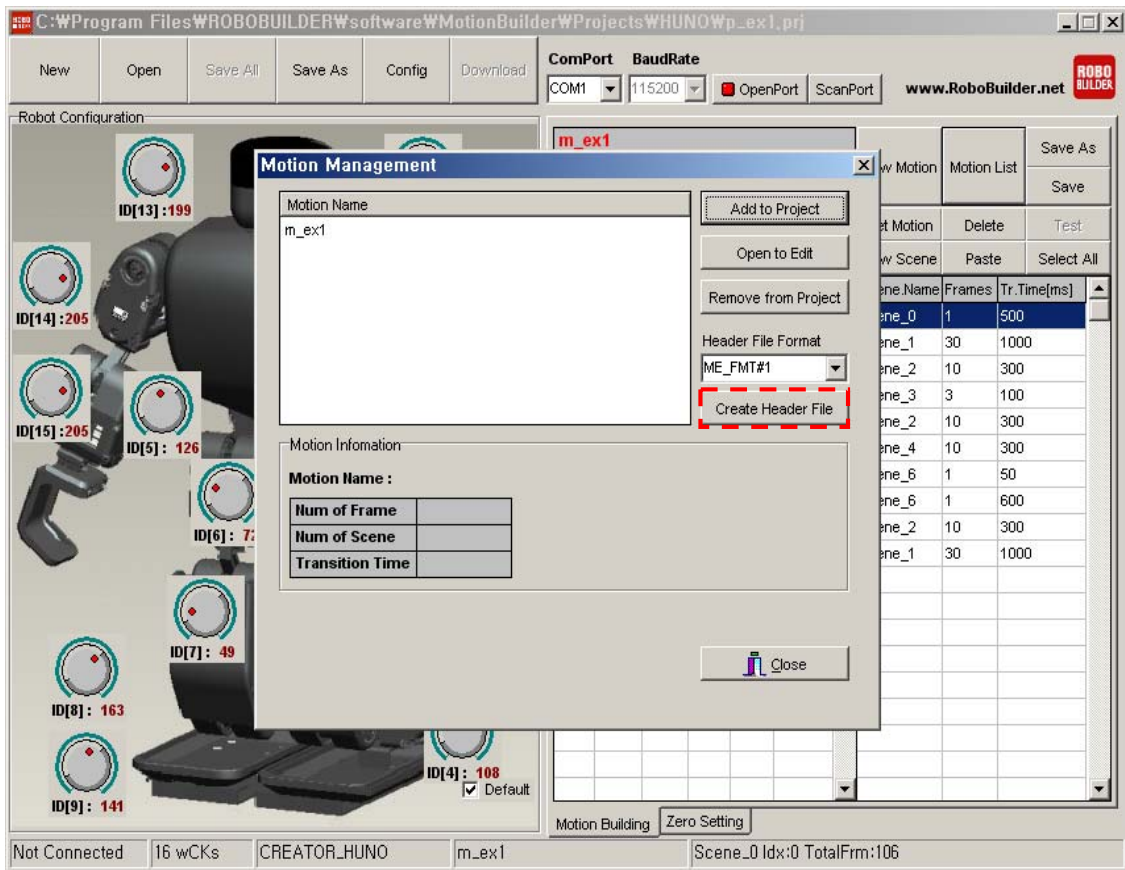(2) C code is based on CodeVisionAVR 1.24.8d

● Work Flow

(1) convert a motion file to a header file(*.h)
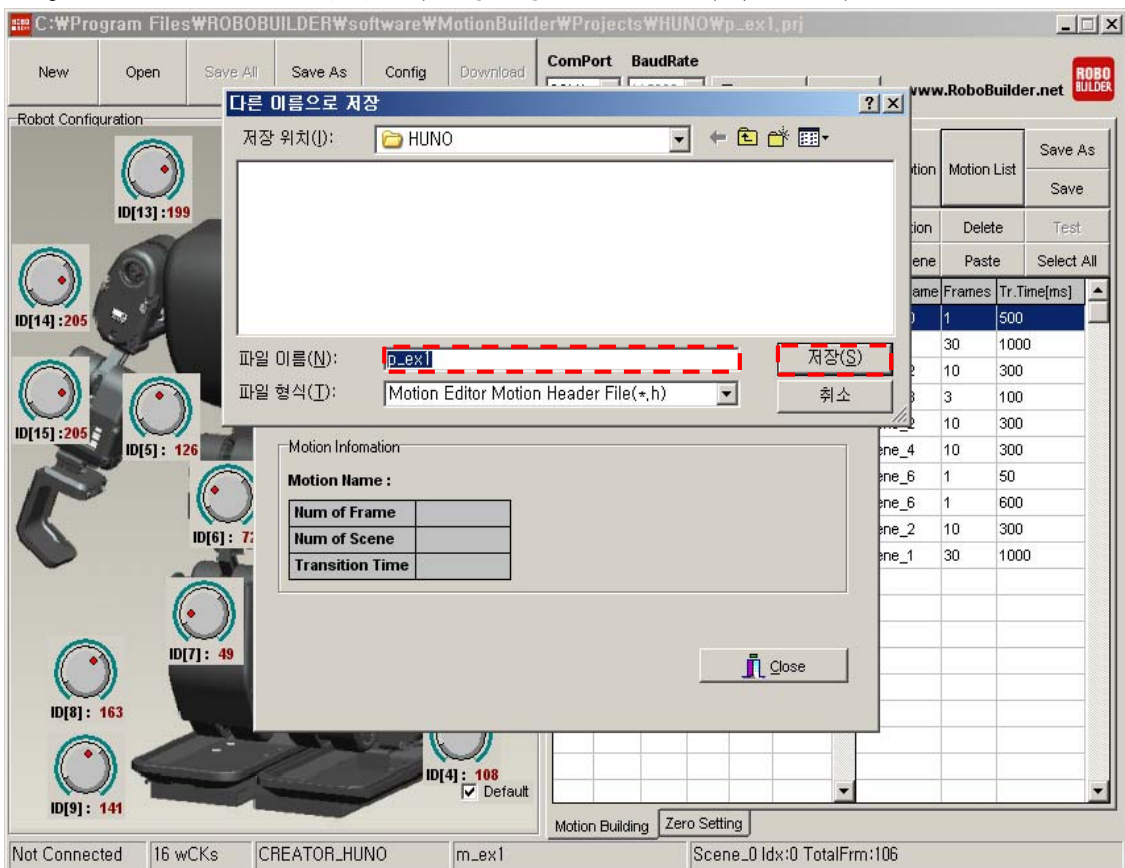
① Open MotionBuilder(version 1.10 beta or higher.

② Click [Open] button to open [p_ex1.prj] file in [motion_exam] folder.

③ Click [Motion List] button.

④ Set the "Header File Format" as "ME_FMT#1"(default) and push the [Create Header File] button.

⑤ Assign a name for the header file(∗.h) and push [Save] button. For example, a name "p_ex1.h" was used in this example.

⑥ A pop-up window appears and ask if you want to read the generated header file. Choose as you wish.

⑦ Header file generation is completed.

(2) include the header file(∗.h) into C coding

① Move the generated file "p_ex1.h" into the folder "cv_exam/src". A file with identical name will be overwritten.

② Use CodeVisionAVR and read "cv_ex1.prj".
③ Edit "comm.c" so as to match the name as below.

```
#include "p_ex1.h"
```

```
#include "p_ex1.h"
```

④ Change the array names to match with the motion file in "SampleMotion1" function in "comm.c" (use capital letter only)
　　　　for example, if motion name is 'M_EX1',

```
gpT_Table       = M_EX1_Torque;
gpE_Table       = M_EX1_Port;
gpPg_Table      = M_EX1_RuntimePGain;
gpDg_Table      = M_EX1_RuntimeDGain;
gpIg_Table      = M_EX1_RuntimeIGain;
gpFN_Table      = M_EX1_Frames;
gpRT_Table      = M_EX1_TrTime;
gpPos_Table     = M_EX1_Position;
Motion.NumOfScene = M_EX1_NUM_OF_SCENES;
Motion.NumOfwCK   = M_EX1_NUM_OF_WCKS;
```

⑤ Header file registration completed.

(3) generate an executable hex file(*.hex)

① Use CodeVisionAVR and run "Project - Make" menu or push Shift+F9.

② executable hex file generation completed.

(4) download to RoboBuilder and run

① Connect RoboBuilder with PC and turn it on. (connect power supply too)

② Run the [RBC Upgrade Tool] and set Com port accordingly.

③ Set the 'Firmware File' to the "main.hex" file which was generated in "cv_exam/src" folder.
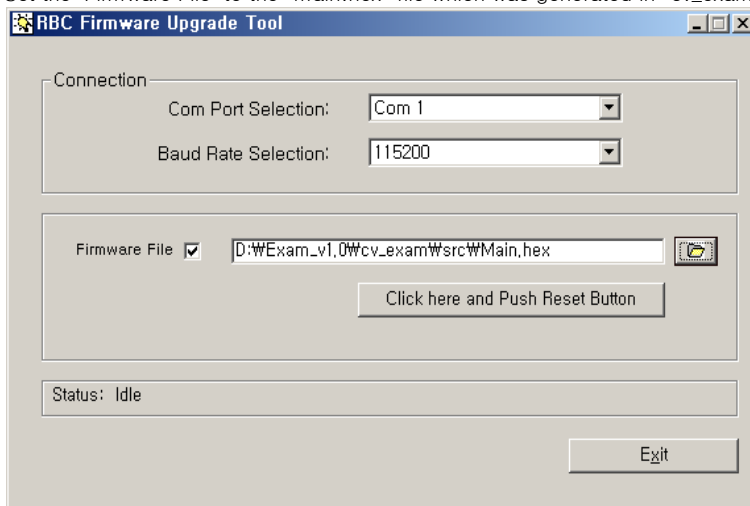
④ Push the 'Click here and Push Reset Button' button. Then RoboBuilder wait for you to push the reset button.

⑤ Push the Reset button(the hole between PF1 button and PF2 button to start the firmware upgrade.

⑥ When download completed the message of 'Flash File successfully downloaded.' appears.
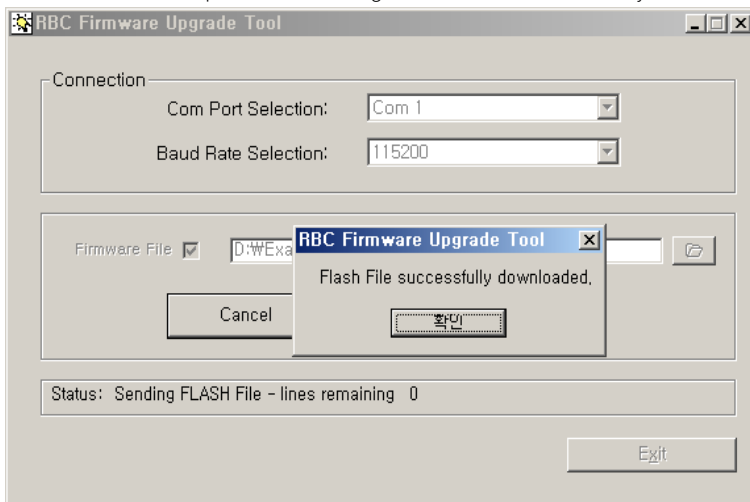
⑦ Disconnect RoboBuilder from PC and push PF1 button to run the motion.

⑧ All procedures completed.