BioloidCControl – User's Guide

Version 0.4 – November 2011

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BioloidCControl is an alternative firmware for the Robotis Bioloid Premium Kit humanoid type robots. Its aim is to replicate the functionality of the original Robotis firmware (which is not open source), giving the user more options in terms of behaviour control. It is based on:

1. Robotis Embedded C toolkit v1.01 (for serial and Dynamixel control)
2. Robotis sample task and motion files for humanoid Type A/B/C robots (for motion pages and walking code)
3. Pololu robotics library (for ADC and Buzzer functions)

The main control loop implements a finite state machine which can receive commands via the serial port. Commands can be issued using RoboPlus Terminal either using a Zig2Serial or the serial cable. A complete command reference is provided below.

Prerequisites

1. Robotis Bioloid Premium Kit with ZigBee modules (Zig2Serial for wireless control)
2. RoboPlus software (for Terminal and RoboPlus Motion)
3. AVR Studio 5 – can be downloaded from www.atmel.com
4. Perl if you want to use your own motion file

Getting Started

1. Unpack the zip file into a suitable directory
2. Create a motion.h file (the included file is for a Type A humanoid robot) using:
   ```
   Cygwin> perl translate_motion.pl bio_prm_humanoidtypeX_en.mtn
   (where X = a, b or c)
   ```
3. Import the project into AVR Studio 5
4. Open global.h and select the hardware configuration from the options provided
5. Open serial.h and select the serial interface (Zig2Serial or cable) that you will be using
6. Open BioiloidCControl.c and check the configuration options at the top for any adjustments you would like to make
7. Build the solution
8. Transfer the .hex file to the CM-510 controller using RoboPlus Terminal (you have to hold down Shift-# whilst pressing the Robot power button to start the bootloader)
9. Type 'go' in RoboPlus Terminal or cycle the power on the CM-510 once the download is complete
10. Wait for the PLAY LED to flash and then press the START button
11. Now you are ready to issue commands to control the robot

Command Reference

STOP	Execute the exit page(s) of the current motion being performed. This command does not disable torque.
Mxxx	Execute the motion page with the number xxx. This will execute the sequence if the page(s) have a Next Page entry.
SIT	Execute the Sit Down motion page and disable torque.
STND	Execute the Stand motion page.
BAL	Execute the balance page (*balancing using gyros not yet implemented*).
FGUP	Get up from slip forward (robot is face down)
BGUP	Get up from slip backward (robot is on its back)
WRDY	Execute the Walk Ready motion page
WFWD	Walk Forward
WBWD	Walk Backward
WLT	Walk Left Turn
WRT	Walk Right Turn
WLSD	Walk Left Side
WRSD	Walk Right Side
WFLT	Walk Forward Left Turn
WFRT	Walk Forward Right Turn
WFLS	Walk Forward Left Side
WFRS	Walk Forward Right Side
WBLT	Walk Backward Left Side
WBRT	Walk Backward Right Side
WAL	Walk Avoid Left
WAR	Walk Avoid Right
WBLT	Walk Backward Left Turn
WBRT	Walk Backward Right Turn