

HiTechnic Servo Controller Specification

HiTechnic First Servo Controller for LEGO NXT

1. Summary

This specification defines a servo controller for use with the LEGO NXT Mindstorms system. The servo controller will provide six channels each of which can support an FTC servo. The servos will be driven by standard PWM signals.

Power will be supplied from an external 9v – 15v battery via a screw terminal block.

2. Technical Description

2.1. Operation

The servo controller firmware will support the LEGO company's sensor memory model.

| Address | Type | Contents |
|----------|-------|-----------------------|
| 00 – 07H | chars | Sensor version number |
| 08 – 0FH | chars | Manufacturer |
| 10 – 17H | chars | Sensor type |
| 18 – 3DH | bytes | Not used |
| 3E, 3FH | chars | Reserved |
| 40H | byte | Status |
| 41H | byte | Step time |
| 42H | byte | Servo 1 position |
| 43H | byte | Servo 2 position |
| 44H | byte | Servo 3 position |
| 45H | byte | Servo 4 position |
| 46H | byte | Servo 5 position |
| 47H | byte | Servo 6 position |
| 48H | byte | PWM enable |

The *Sensor version number* field will report a revision number in the format “Vn.m” where *n* is the major version number and *m* is the revision level. Revision numbers will typically reflect the firmware level. The version number will be used to indicate the hardware level.

The *Manufacturer* field will contain “HiTechnic”.

The *Sensor type* field will contain “ServoCon”.

The *Status* field returns 1 if there are still servos changing position, else it will return 0.

The *Step time* field sets the step time for the servo channel which has the furthest to move. Other servo channels which are not at their designated positions yet will run at a slower rate to ensure they reach their destination positions at the same time. This value

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may range from 1 – 15. If the field is set to 0, no timing is applied, ie; the servos move at their maximum rate.

The *Servo 1/2/3/4/5/6 position* fields will accept a value between 0 – 255 to set the PWM output from 0.75 – 2.25mS. Note that some servos may hit their internal mechanical limits at each end of this range causing them to consume excessive current.

The *PWM enable* field is used to control the PWM output. If it is set to zero (00H), it will enable the PWM outputs, causing the servos to be active, and start a ten second timeout running. If it is set to 255 (0FFH), it will disable the PWM outputs, causing the servos to be inactive. If no I2C communication is received during the ten second timeout period, the *PWM enable* field will automatically revert to 255 (0FFH), disabling the servos. If the *PWM enable* field is set to 170 (0AAH), it will enable the PWM outputs, causing the servos to be active, and disable the ten second timeout. The *PWM enable* field is set to 255 (0FFH) during power up and after the timeout has elapsed.

3. Appendix 1

3.1. Electrical Connections

Servo + Motor Controller Daisy Chain

