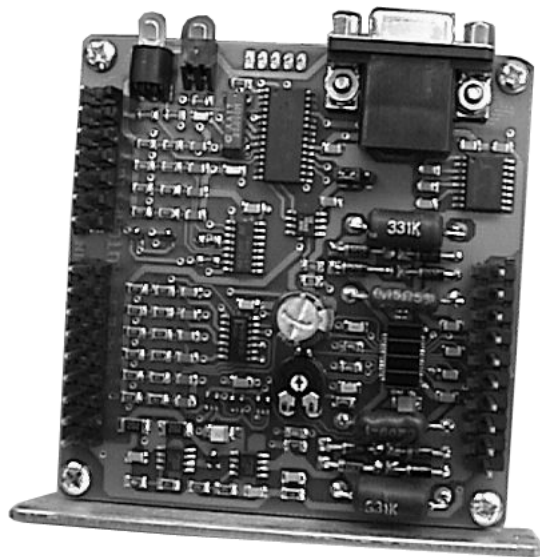


MBC25P11

Programmable Pulse Generator/Driver

User's Guide



ANAHEIM AUTOMATION

910 East Orangefair Lane, Anaheim, CA 92801
e-mail: info@anaheimautomation.com

(714) 992-6990 fax: (714) 992-0471
website: www.anaheimautomation.com

Table of Contents

Features	3
Introduction	3
Motion Profiles and Running the Pulse Generator	3
Operation with Ramp Down Option	4
Operation without Ramp Down Option	4
Operation with Soft and Hard Limits	4
LEDs	5
Baud Rates	5
Inputs and Outputs	5
Connector Descriptions	6
Ordering Information	7
Specifications	7
Dimensions and Jumper/Potentiometer Locations	8
Wiring Diagrams	8
Jumper Functions	9
Microstep Modes	9
Setting the Output Current	9
Reducing Output Current	9
Determining Output Current	10
Step Motor Configurations	10
Connecting the Step Motor	11
Circuit Protection	11
Functions	12
SMPG10WIN Software	13
Installation	13
Getting Started	13
“The Unit is Connected” / “The Unit is NOT Connected”	14
File Menu	14
Setup Menu	14
Toolbar	14
Program Window	15
Direct Talk Mode	16
COM Port Settings	16
Unit Selection	16
Instructions	16
Troubleshooting	20
Error Codes	21
ASCII Table for Direct Mode	21
Torque Speed Curves	22
Copyright	22

Features

- **Output Current of 2.5A Peak**
- **200 to 1600 Steps/Revolution (1, 2, 4 and 8 Selectable Step Operation)**
- **Drives Two Motors In Series**
- **On-Board Programmable Pulse Generator**
- **Pulses From 77Hz to 15kHz**
- **Directional Soft and Hard Limit Switch Inputs**
- **Clock Output for Daisy Chaining**
- **Busy Output**
- **Motor On/Off Input and Automatic Current Reduction**
- **Short Circuit Protection**

Introduction

The MBC25P11 is an economical single axis step motor driver integrated with a programmable pulse generator. The MBC25P11 microstep driver/pulse generator has an output current capability of 0.5A minimum to 2.5A maximum (peak rating). The MBC25P11 driver operates with a DC voltage of 12VDC to 35VDC. The MBC25P11's internal PG (pulse generator) has four different programmable motion profiles. The MBC25P11 also has directional soft and hard limit switch inputs, a busy output and a clock output that can be used for daisy chaining drivers together. The MBC25P11 driver features direction control and motor current On/Off capabilities. The "Reduce Current Enabled" feature automatically reduces motor current to 70% of the set value. The driver has built in features to indicate power on (green LED), running (yellow LED) and error conditions (red LED). The MBC25P11 has various step resolutions that can be implemented. These divisions range from 200 steps/rev to 1600 steps/rev. The bipolar drive configuration handles 4, 6, and 8 lead step motors and is also equipped with short circuit, over temperature and crossover current protection. The MBC25P11 communicates via RS232 communication. The easy to use Windows software, SMPG10WIN, is used to directly set up to four different motion profiles.

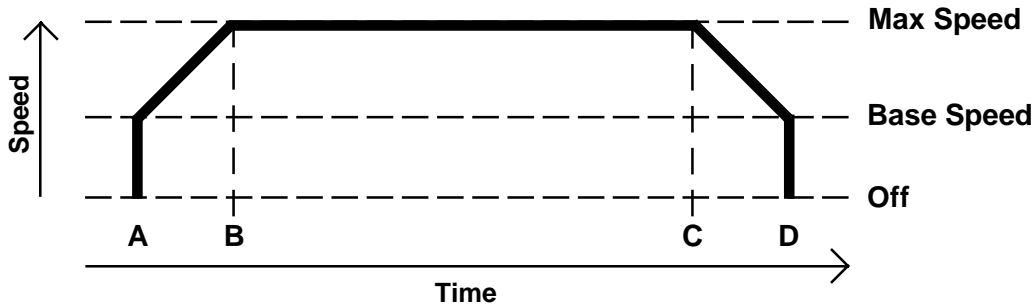
Motion Profiles and Running the Pulse Generator

The programmable pulse generator has the ability to store up to four different motion profiles. The profiles include a base speed (starting speed), a maximum speeds (running speed) and acceleration/deceleration. The base speed has a range of 77-3500 Hz, the maximum speed has a range of 77 Hz-15 kHz, and the acceleration/deceleration has a range of 1-255. A separate command is used to control the ramp down profile. The ramp down profile lets the user have the option to either ramp down to base speed and stop (soft stop), or to hard stop once the Run input is released. The deceleration option is the same for all four motion profiles.

There are "two ways" to get the pulse generator to run. The first way is to directly control it from the computer with software. Once the motion profiles have been set, the pulse generator is ready to run. From the software, the user can select which profile to run and then hit the run button. There are then several different ways to stop motion. To ramp down to base speed and continue to run at base speed, a soft limit command needs to be sent. This is done by either hitting the soft limit button or a physical limit switch trigger of the soft+ or soft- depending on direction. To stop all motion, a hard limit command needs to be sent. This is done by either hitting the hard limit button or a physical limit switch trigger of the hard+ or hard- depending on direction. The second way to make the pulse generator run is to activate the Run input. When this input is activated, it looks to see what speed profile input is set. If no speed profile is set then the default is Profile 1. To stop motion, release the Run input. When this input is released, the deceleration option will then either ramp down to base speed and stop or just hard stop. If a soft+ or soft limit switch is activated when the Run input is active, the pulse generator will ramp down to base speed and keep running. If a hard+ or hard- limit switch is activated when the Run input is active, the motor will stop immediately.

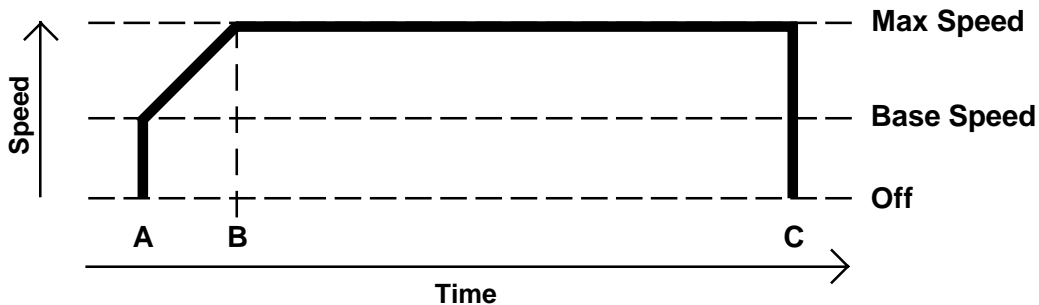
Operation with Ramp Down Option

- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is inactivated; Motor ramps down.
- D) Pulses automatically stop when base speed is reached.



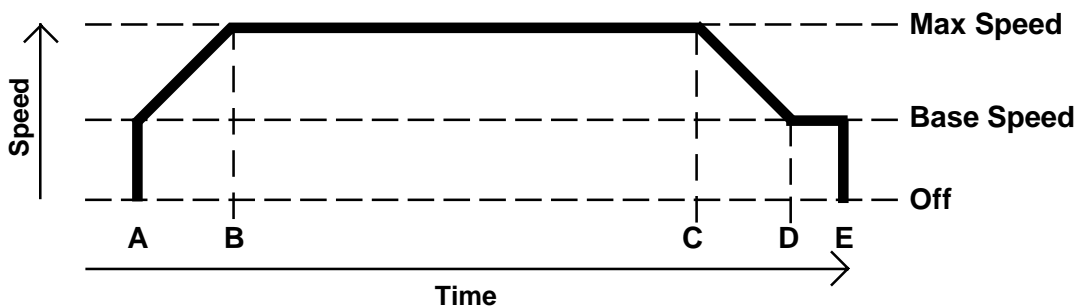
Operation without Ramp Down Option

- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is inactivated; Motor stops immediately.



Operation with Soft and Hard Limits

- A) Run is activated; Starts at base speed and immediately ramps up to max speed.
- B) Run is still active; Max speed is reached (keeps running at max speed).
- C) Run is still active; Soft limit is hit; Motor ramps down to base speed and keeps running.
- D) Run is still active; Base speed is reached (keeps running at base speed).
- E) Run is inactivated or Hard limit is hit; Motor stops immediately.



LEDs

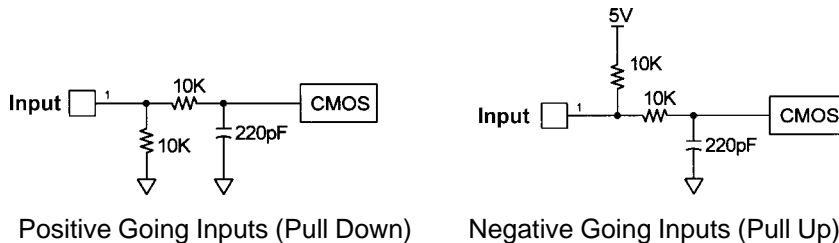
When powered and operated properly, the status LED will be green. When an error occurs, the LED will change to RED and an error code will be generated in the error code register. To read and clear the error with the software, click on the “Verify Parameters” button located in the “Motion Tab”. To read and clear the error while in “Direct Mode” use the “!” command. Once the error has been read and cleared, the LED will return to green and the error code register will be cleared. Refer to the table in section 5 for a list of the error codes. When the pulse generator is running the yellow LED will be on. Refer to the dimension drawing for location of the LEDs. For more detail on “Direct Mode” refer to the Direct Talk Mode section of user’s guide.

Baud Rates

A term used frequently in serial data communications. A “baud” is defined as the reciprocal of the shortest pulse duration in a data word signal, including start, stop, and parity bits. This is often taken to mean the same as “bits per second”, a term that expresses only the number of “data” bits per second. Very often, the parity bit is included as an information or data bit. The MBCPG211 only accepts a baud rate of 9600.

Inputs and Outputs

Inputs: All inputs (except limit inputs) are either pulled up to 5VDC or pulled down to 0VDC based on JP1. For pullups place JP1 in position 1-2, for pulldowns place JP1 in position 2-3. A logic “0” activates inputs that are pulled up, while a logic “1” activates an input that is pulled down. An unconnected input will always remain inactive. (Refer to Dimensions and Jumper/Potentiometer Locations drawing for JP1)



Direction: When this input is not active, the motor will be moving in the clockwise or “+” direction. When this input is active, the motor will move in the counterclockwise or “-” direction. This input can be overridden by sending a + or - command to the pulse generator. When two motors are used, the second motor will move in the opposite direction by default.

On/Off: When this input is not active, the motor will be enabled or energized. When this input is active, the motor will be disabled or de-energized.

Run: When this input is not active, the pulse generator is stopped and will not output any pulses. When this input is active the pulse generator will output pulses starting at the base speed rate and will ramp up and output pulses at the max speed rate. When this input is released, the pulse generator will ramp down to base speed and stop or hard stop depending on the deceleration option.

Speeds: These inputs are used to select one of the four profiles when the run input is activated. To use profile 2, then activate Speeds 2, to use profile 3, then activate Speeds 3, and to activate profile 4, then activate Speeds 4. Activate only one of these three inputs at once. If none of the inputs are active, then profile 1 will be used. (Refer to both the Motion Tab and Wiring Diagrams for illustrations)

Soft Limits: These two inputs are active low and are controlled by the direction of the pulse generator. When the pulse generator is running in the positive direction only soft+ will work. When the pulse generator is running in the negative direction then only soft- will work. When pulled low the pulse generator will ramp down to base speed and continue running until a hard limit is reached or the run input is released.

Hard Limits: These two inputs are active low and are controlled by the direction of the pulse generator. When the pulse generator is running in the positive direction only hard+ will work. When the pulse generator is running in the negative direction then only hard- will work. When pulled low the pulse generator will stop all pulses to the motor. To reverse off of a Hard Limit, release the Run input, change directions, and activate the Run input again to move in the opposite direction.

External Clock Output: The external clock is the output of the internal pulse generator that can be used to daisy chain other step motor drivers together. This is an open collector output that is capable of sinking 10mA.

Busy Output: This is an open collector output that is capable of sinking 10mA. It is current sinking when the pulse generator is operating (sending pulses), and open when the pulse generator is not sending pulses.

Connector Descriptions

Connector P2:	
Pin #	Description
1	Power Supply Ground (0VDC)
2	Power Supply Input (12VDC - 35VDC)
3	Motor On/Off
4	Direction In
5	Speeds 4
6	Speeds 3
7	Speeds 2
8	Run
9	Ground (0VDC)

Connector P3:	
Pin #	Description
1	Clock Output
2	Busy Output
3	Hard-
4	Hard+
5	Soft-
6	Soft+
7	Ground (0VDC)

Connector P5: (One Motor)	
Pin #	Description
1	Motor 1, Phase 1
2	No Connect
3	No Connect
4	Motor 1, Phase 4
5	Motor Ground
6	No Connect
7	Motor 1, Phase 3
8	No Connect
9	Motor 1, Phase 2
10	No Connect

Connector P5: (Two Motors)	
Pin #	Description
1	Motor 1, Phase 1
2	Motor 1, Phase 3
3	Motor 1, Phase 2
4	Motor 1, Phase 4
5	Motor 1 Ground
6	Motor 2, Phase 1
7	Motor 2, Phase 3
8	Motor 2, Phase 2
9	Motor 2, Phase 4
10	Motor 2 Ground

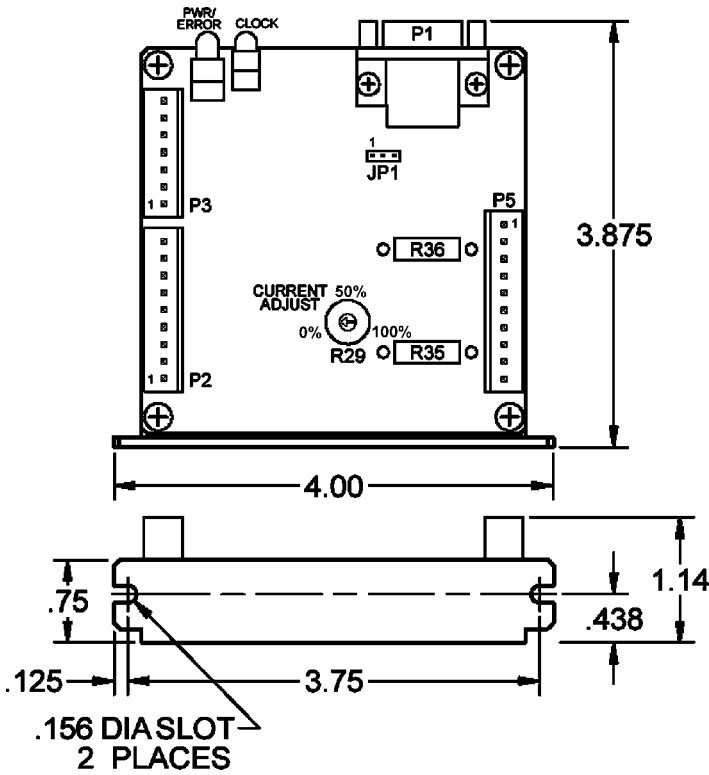
Ordering Information

Part Number	Description
MBC25P11	2.5A Microstep Driver with integrated Programmable Pulse Generator
PSAM24V2.7A	Power supply for MBC25P11 (24V@2.7A)
CON-6404287	Optional 7 pin connector, 0.156" IDC (AMP part no. 640428-7)
CON-6404289	Optional 9 pin connector, 0.156" IDC (AMP part no. 640428-9)
CON-16404280	Optional 10 pin connector, 0.156" IDC (AMP part no. 1-640428-0)
AA9MFC-6	6 foot serial communication cable, Male to Female

Specifications

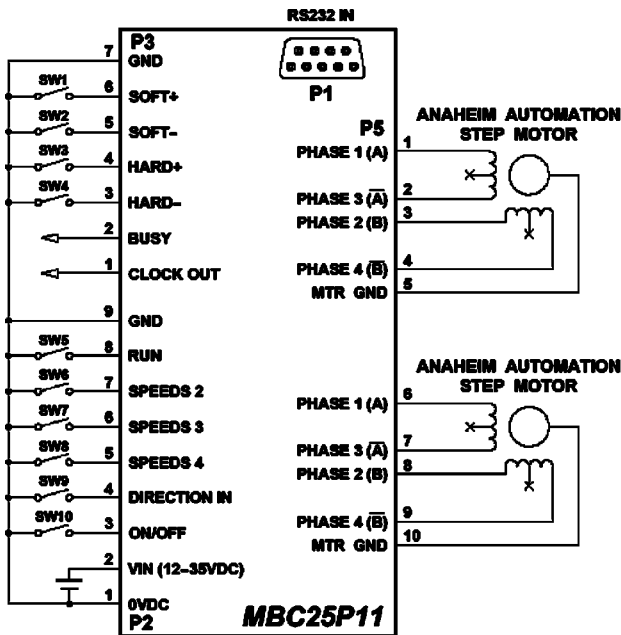
Voltage Requirements	12-35VDC	
Run Input (P2, Pin 8)	Stop	Inactive
	Run	Active
Direction Input (P2, Pin 4)	CW	Inactive
	CWW	Active
On/Off Input (P2, Pin 3)	On	Inactive
	Off	Active
Busy Output (P3, Pin2)	Open Drain type Output, 75mA Sink, 40VDC Stand Off	
Clock Output (P3, Pin1)	Open Drain type Output, 75mA Sink, 40VDC Stand Off	
Clock Out Frequency (P3, Pin 1)	Min	77Hz
	Max	15kHz
Output Current: $T_A = 25^\circ\text{C}$	Min	0.5A peak
	Max	2.5A peak
Driver Chopping Frequency	25kHz - 30kHz	
Operating Temperature	0 - 70°C	
LEDs	Green	Power On
	Red	Programming Error
	Yellow	Clocks being received above 10Hz
Com Port Settings	9600,N,8,1	

Dimensions and Jumper/Potentiometer Locations

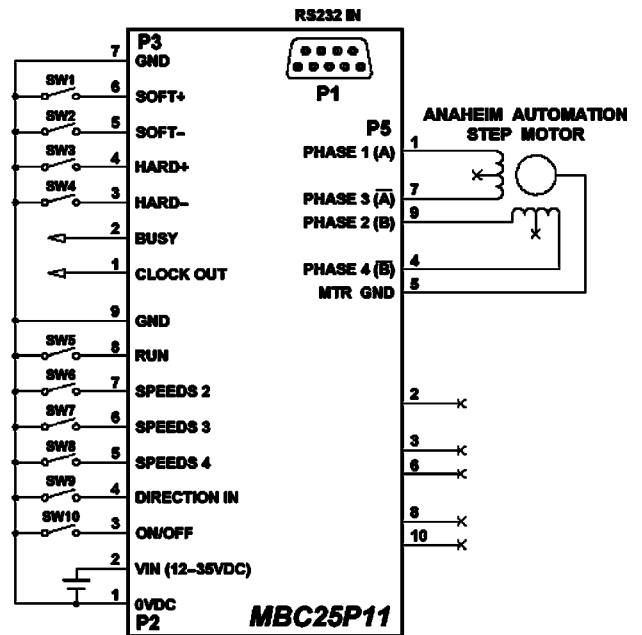


Wiring Diagrams

Two Motors



One Motor



Jumper Functions

Jumper #	1-2	2-3
JP1	Negative Going Inputs	Positive Going Inputs

Microstep Modes

The microstepping modes are set by using the software when the profiles are being setup. The ranges of microstepping are 200, 400, 800, and 1600 steps per revolution in a 200 step/revolution step motor. To set the divisor just select the divisor wanted (1,2,4, or 8). (Refer to Motion Tab Sheet)

Setting the Output Current

The output current on the MBC25P11 is set by the on-board potentiometer R29 (Refer to Dimensions/Jumper and Potentiometer Locations). This current adjust potentiometer determines the per phase peak output current of the driver. This relationship between the output current and the potentiometer setting is as follows:

Potentiometer Settings

Peak Current	Potentiometer Setting
0.5A	0%
0.7A	10%
0.9A	20%
1.1A	30%
1.3A	40%
1.5A	50%
1.7A	60%
1.9A	70%
2.1A	80%
2.3A	90%
2.5A	100%

Reducing Output Current

Reducing the output current is accomplished automatically depending on the current reduction setting in the SMPG10WIN software. The amount of current per phase in the reduction mode is approximately 70% of the set current. When the current reduction circuit is activated, the current reduction resistor is paralleled with the current adjustment potentiometer. This lowers the total resistance value, and thus lowers the per phase output current. This is done when the pulse generator is not running. (Refer to Motion Tab Sheet)

Determining Output Current

The output current used for the motor when microstepping is determined differently from that of a full/half step unipolar driver. In the MBC25P11, a sine/cosine output function is used in rotating the motor. The output current for a given motor is determined by the motor's current rating and the wiring configuration of the motor. There is a current adjustment potentiometer used to set the output current of the MBC25P11. This sets the peak output current of the sine/cosine waves. The specified motor current (which is the unipolar value) is multiplied by a factor of 1.0, 1.4, or 2.0 depending on the motor configuration (series, half-coil, or parallel).

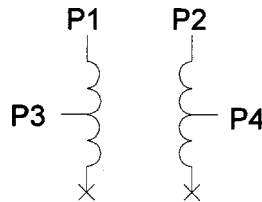
Step Motor Configurations

Step motors can be configured as 4, 6, or 8 leads. Each configuration requires different currents. Refer to the lead configurations and the procedures to determine their output current.

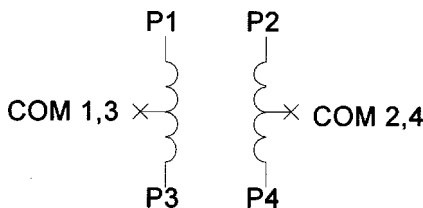
WARNING! Step motors will run hot even when configured correctly. Damage may occur to the motor if a higher than specified current is used. Most specified motor currents are maximum values. Care should be taken to not exceed these ratings.

6 Lead Motors

When configuring a 6 lead motor in a **half-coil configuration** (connected from one end of the coil to the center tap), multiply the specified per phase (or unipolar) current rating by 1.4 to determine the current setting potentiometer value. This configuration will provide more torque at higher speeds when compared to the series configuration.

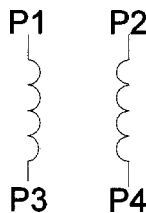


When configuring the motor in a **series configuration** (connected from end to end with the center tap floating) use the specified per phase (or unipolar) current rating to determine the current setting potentiometer value.



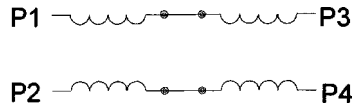
4 Lead Motors

Multiply the specified **series** motor current by 1.4 to determine the current adjustment potentiometer value. 4 lead motors are usually rated with their appropriate series current, as opposed to the *Phase Current*, which is the rating for 6 and 8 lead motors.

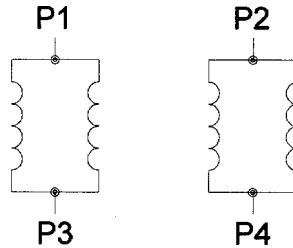


8 Lead Motors

Series Connection: When configuring the motor windings in series, use the per phase (or unipolar) current rating to determine the current setting potentiometer value.



Parallel Connection: When configuring the motor windings in parallel, multiply the per phase (or unipolar) current rating by 2.0 to determine the current setting potentiometer value.



Note: After the current has been determined, according to the motor connections above, use the potentiometer setting table to choose the proper setting for the current setting potentiometer.

Connecting the Step Motor

The MBC25P11 is designed to accept either one or two motors. For wiring of the motor refer to the pages containing the connector descriptions and hookup diagrams.

Note: The physical direction of the motor with respect to the direction input will depend on the connection of the motor windings. To reverse the direction of the motor with respect to the direction input, switch the wires on phase 1 and phase 3. With the operation of 2 motors, they will run in the opposite direction when wired the same.

WARNING: Do not connect or disconnect motor wires while power is applied!

Circuit Protection

This driver is equipped with short circuit, over temperature and cross over current protection.

Note: When drive experiences a fault condition, it will cease to function. Power down, inspect wiring, motors, etc. and allow for a 30 second pause to resume functioning. If driver is too hot, additional ventilation and airflow should be added to prevent temperature to exceed recommended temperature limit.

Functions

Hard Limit Switches: When a hard limit switch is encountered, the pulses will stop. Hard limits are intended as an emergency stop for your system.

Soft Limit Switches: These switches cause the pulse generator to ramp down to the base speed before encountering a hard limit switch.

Profile Inputs: These inputs are used to select the specified speed profile. These inputs are used in conjunction with the Run input. If no profile inputs are selected then profile 1 will be used. Only 1 input should be activated at a time.

Speed Profiles: The pulse generator will accept up to four different speed profiles. Each profile has its own programmable Accel/Decel, Base speed, and Max speed. These values are stored in EEPROM for standalone use and must be programmed before the pulse generator can run.

Run: Triggering this input will cause the pulse generator to start. The pulse generator will use the given speed profile and start at base speed and ramp up to max speed. The motor will run at max speed until a soft limit, hard limit, or the stop run is released. If the pulse generator is running at max speed when the stop/run input is released then it will either stop hard or ramp down to base and stop depending on the setting of the ramp down profile.

Ramp Down Option: When this option is off the pulse generator will stop hard when the Run input is released. If this option is on, then the pulse generator will ramp down to base speed and stop when the Run input is released.

Acceleration/Deceleration: The acceleration and deceleration are by default the same value. This function controls the time that the motor will take to move from base speed to max speed. The higher the value, the slower the motor will accelerate. The same principle applies for the deceleration which is controlling the time it takes to go from maximum speed to base speed. The higher the value, the slower the pulses will decelerate. The different accel/decel profiles are stored in EEPROM for standalone use. (Range: 1 to 255)

Base Speed: The base speed is the speed at which motion starts and stops. It is entered directly as the number of steps per second. This speed must always be less than the max speed. The different base profiles are stored in EEPROM for standalone use. (Range: 77 to 3500)

Max Speed: The max speed is the top speed the user wants the pulses to run at. This speed must always be equal or greater than the base speed. It is entered directly as the number of steps/second. The different max profiles are stored in EEPROM for standalone use. (Range: 77 to 15000)

Direction Input: If this input is open then the unit will be running in the clockwise direction. If this input is active then the unit will be running in the counterclockwise direction. This pin can be overridden by the programmable software direction. It will activate the direction output when the pin is changed.

Busy Output: This output will be pulled low when the pulse generator is operating. It is an open drain output so when the pulse generator is not running the pin is open.

SMPG10WIN Software

The SMPG10WIN software is a handy utility that supports Anaheim Automation's programmable pulse generator. Connecting your PC to the MBC25P11, via a serial cable, the SMPG10WIN software can easily perform the following tasks:

- Exercise and monitor the MBC25P11
- Directly communicate with the MBC25P11

Installation

Software

- The SMPG10WIN is supplied on a CD, containing the setup program and the SMPG10WIN software
- SMPG10WIN is compatible with all versions of Windows including Windows 2000 and Windows XP

Windows 3.x Installation

- 1) Insert the CD into the drive
- 2) From the Program Manager select **File | Run**
- 3) Enter **D:\setup** and click **OK** - use the appropriate drive letter (i.e. **D** or **E**)

Windows 95/98/NT/ME/2000/XP Installation

Option 1

- 1) Insert the CD into the drive
- 2) On the Windows Taskbar select **Start | Run**
- 3) Enter **D:\setup** and click **OK** - use the appropriate drive letter (i.e. **D** or **E**)

Option 2

- 1) Open Windows Explorer
- 2) Open CD Drive Folder (D: or E:)
- 3) Double click the Setup Icon

Getting Started

- 1) Double click on the SMPG10WIN icon to run the SMPG10WIN software.
- 2) Apply power to the pulse generator unit.
- 3) Set the appropriate communication setting by selecting **Setup | Communication Setting** from the menu bar.
- 4) Establish communications with the pulse generator by clicking on the Connect Icon, or select **Setup | Connect**. If the unit is connected properly, the program will notify you when communications has been established.

“The Unit is Connected” / “The Unit is NOT Connected”

On the right of the Toolbar, the user will find the communication status of the pulse generator. If communications is not established, please refer to the troubleshooting section.



File Menu



Setup Menu



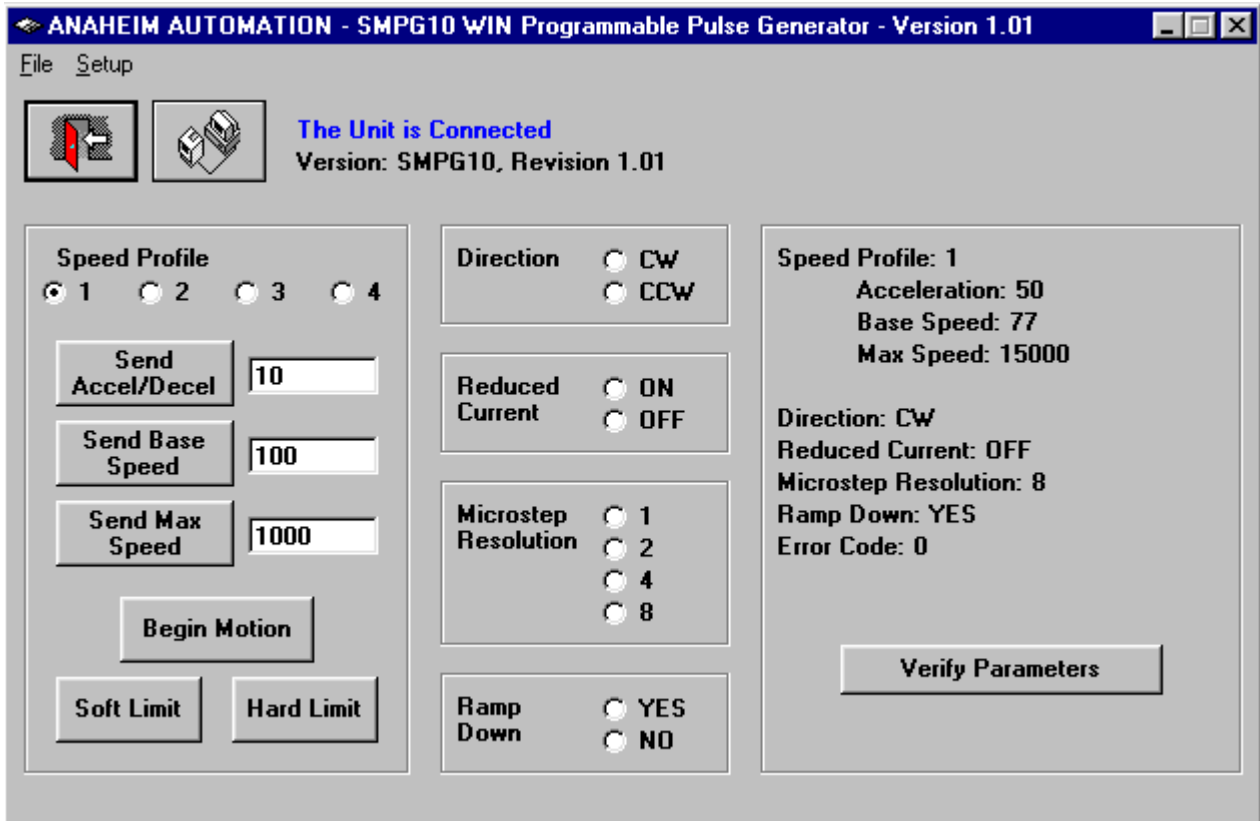
Exit	Exit the SMPG10WIN software
Connect	Establish communications with the controller.
Communication Settings...	COM port Selection (Ports 1, 2, 3 or 4)

Toolbar



Exit	Exit the SMPG10WIN software.
Connect	Establish communication with the controller.

Program Window



Speed Profile	Select speed profiles 1-4.
Send Accel/Decel	Send acceleration & deceleration parameter to the pulse generator. (1=fastest, 255=slowest)
Send Base Speed	Send base speed parameter to the pulse generator. (step/sec)
Send Max Speed	Send maximum speed parameter to the pulse generator. (step/sec)
Begin Motion	Motor will ramp up to maximum speed and keep moving until a limit switch is triggered.
Soft Limit	Motor will ramp down to base speed and continue running.
Hard Limit	Stop any motor motion.
Direction	Set direction to clockwise or counter-clockwise.
Reduced Current	Set reduced current on or off.
Microstep Resolution	Set microstep resolution to divide by 1, 2, 4, or 8.
Ramp Down	Set ramp down option to yes or no.
Verify Parameters	Updates and displays controllers parameters and resets the error codes.

Direct Talk Mode

Direct mode is used to directly control the motion for real time movements through serial communication. The pulse generator has 14 commands which are easy to remember for direct movement of a step motor.

COM Port Settings

Baud Rate: 9600
Parity: None
Data Bits: 8
Stop Bits: 1
Flow Control: Xon/Xoff

Unit Selection

In order to select a unit the @ command followed by 0 (address of the unit) must be sent.
NOTE: There should be no spaces between the @ and the 0.

How to select the unit:

@0 (Unit is selected)

How to get a response from the unit:

@0\$ (Carriage Return)

After the \$ command, the pulse generator will return a SMPG10 + the current version number.
Note: In direct talk mode each command is followed by a carriage return.

The unit communicates in half duplex mode, therefore proper setup of hyper terminal is necessary to view characters, if characters are to be echoed back to the screen.

Instructions

All instructions require that no spaces be sent between the command and the parameter followed by a carriage return. The commands are also case sensitive and are all sent as capitals.

Command Summary:

A - Acceleration/Deceleration	R - Microstep Resolution
B - Base Speed	S - Soft Limit
C - Current Reduction	V - Verify
D - Ramp Down	+ - Clockwise Direction
G - Go (Run)	- - Counterclockwise Direction
H - Hard Limit	\$ - Version Number Register
M - Max Speed	! - Error Codes Register

\$ - Version Number Register

Format: \$

Description: This command requests the pulse generator to return the version number.

! - Error Codes Register

Format: !

Description: This command requests the pulse generator to get the current error code and print it to the screen.

+/- - Direction

Format: + or -

Description: This command sets the direction output. A “+” sets the output to clockwise, and a “-” set the output to counterclockwise. This must be done when the pulses are not running. This value is saved in the EEPROM for standalone use.

A - Acceleration/Deceleration

Format: A#[value] - where # is the speed profile number 1 thru 4

Sample: A1_255 Accel of profile 1 equals 255

Description: This command sets the acceleration profile which can be an integer value between 1 and 255. The lower the value the faster the pulse acceleration, so a 1 is the fastest profile and 255 is the slowest. These values are saved in the EEPROM for standalone use.

Range: 1 - 255

B - Base Speed

Format: B#[value] - where # is the speed profile number 1 thru 4

Sample: B3_100 Base Speed of profile 3 equals 100

Description: This command sets the base (start) speed for motion. This value must be set before motion begins and be less than the maximum speed. The pulses will ramp down to this speed after a soft limit is triggered and run at this speed until a hard limit is triggered. These values are saved in the EEPROM for standalone use.

Range: 77 - 3500

C - Current Reduce Option

Format: C# - where # is 0 or 1

Description: This command enables the driver to reduce current after pulses are done being sent. A 1 will enable current reduction, and a 0 will disable current reduction. This value is saved in the EEPROM for standalone use.

D - Deceleration Option

Format: D# - where # is 0 or 1

Description: This command enables the pulse generator to ramp down to base speed before stopping when using the external Run/Stop input. A 1 will enable the pulses to ramp down to base speed and stop, and a 0 will disable ramp down causing the pulse generator to hard stop at maximum speed. This value is saved in the EEPROM for standalone use.

G - Go Slew (Run)

Format: G# - where # is the speed profile number 1 thru 4

Description: This command will send clocks out to the pulse generator. The only command that can stop the clocks is H (stop motion). The S(soft limit) command will make the pulses go from max speed to base speed. Motion can also be stopped by using the limit switch inputs. The ramp profile is specified by the B (base speed), M (max speed), and A (acceleration/deceleration) commands.

H - Hard Limit or Stop Motion

Format: H

Description: This command will stop all motion. It can only be used when pulses are running

M - Max Speed

Format: M#[value] - where # is the speed profile number 1 thru 4

Sample: M2_10000 Max Speed of profile 2 equals 10000

Description: This command sets the maximum (running) speed for motion. This value must be set before motion begins and be equal or greater than the base speed. The motor will run at this speed until a soft limit or a hard limit is triggered. These values are saved in the EEPROM for standalone use.

Range: 77 - 15000

R - Microstepping Resolution

Format: R# - where # is 1, 2, 4, or 8

Description: This command enables the user to select the desired resolution for the microstepping driver. Divisions for the driver are Full step (1), Half step (2), Quarter step (4), and Eighth step (8). This value is saved in the EEPROM for standalone use.

S - Soft Limit

Format: S

Description: This command will cause the pulse generator to ramp down to base speed and run until a hard limit is activated. It can only be used when pulses are running.

V - Verify

Description: This command can be used with most commands to verify the register contents. This is a read only command. Valid Commands are: A, B, C, D, M, R, and +.

Format: V[command]

This format is good for C, D, R, and +.

- C - If a 1 is sent back then the driver is in reduced current mode. If a 0 is sent back then the driver is not in reduced current mode.
- D - If a 1 is sent back then the pulse generator will ramp down to stop when the Run/Stop input is released. If a 0 is sent back then the pulse generator will stop hard when the Run/Stop input is released.
- R - If a 1 is sent back then the driver is in Full step mode. If a 2 is sent back then the driver is in Half step mode. If a 4 is sent back then the driver is in Quarter step mode. If an 8 is sent back then the driver is in Eighth step mode.
- + - If a 1 is sent back then the direction is clockwise. If a 0 is sent back then the direction is counterclockwise.

Sample: VD Verification of Direction is prompted.

Format: V[command]# - where # is the speed profile number 1 thru 4
This format is good for A, B, and M.

- A# - Verify Acceleration/Deceleration for given speed profile.
- B# - Verify Base speed for given speed profile.
- M# - Verify Max speed for given speed profile.

Sample: VB3 Verification of Base Speed in Profile 3 is prompted.

Troubleshooting

Problem:

Can not establish communications with the pulse generator.

Possible Solutions:

- 1) Make sure the pulse generator has power. Is the Green LED on.
- 2) Check RS232 connections.
- 3) Check for loose cable connection either on the pulse generator or COM Port.
- 4) Was the software installed successfully?
- 5) Go to **Setup | Communication Settings** and verify COM port and baud rate settings.
- 6) Click on **Connect** icon to communicate with the pulse generator.
- 9) If problems still exist, contact Anaheim Automation Tech Support.

Problem:

There is no power to the pulse generator.

Possible Solutions:

- 1) Is the pulse generator connected to the appropriate power supply?
- 2) Check for any blown fuses in line with the pulse generator.
- 3) If problems still exist, contact Anaheim Automation at 714-992-6990.

Problem:

The pulse generator has a fault condition.

Possible Solutions:

- 1) To clear an error use either the SMCPGWIN software or the direct mode command.
- 2) The SMPG10WIN can clear an error in the motion tab section by clicking on the Verify Parameters button.
- 3) The direct mode command “!” can clear an error by prompting pulse generator to serially send the error code back to the user.

Example: @0! (carriage return)

Description: Address the unit by typing @ followed by a 0 (address number) an ! (Error Codes Register) and a carriage return.

Note: The error code is returned in binary coded decimal format. If two errors were received their binary values would be added together.

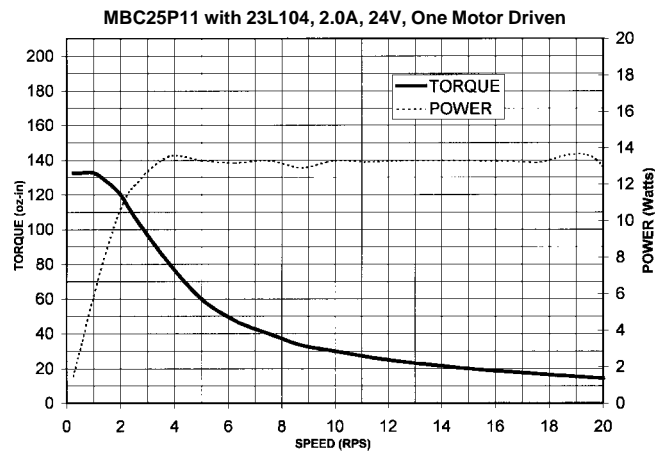
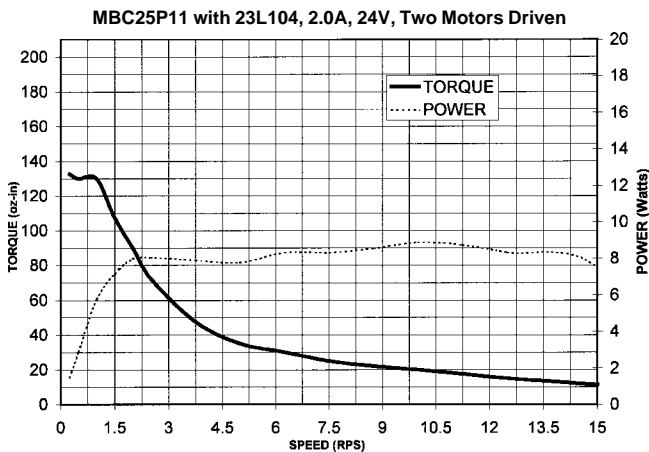
Error Codes

Error Code	Type	Description
1	Recieve Overflow Error	The serial communications had a recieving error. This is an internal error caused by the computer.
2	Range Error	There was an invalid number of characters sent to the pulse generator. Check to see if the parameters are invalid for the command that was sent.
4	Command Error	A bad command was sent to the pulse generator. Please check to see that the command being sent is valid, or that the pulse generator is not running.
8	Transmitt Error	To many parameters sent back to the PC. This is an internal error caused by the eeprom.
16	Motor Error	Motor speed profiles are set incorrectly. Please make sure that the base speed is less than the max speed and that the speeds are within their valid ranges.
32	Zero Parameters Error	There were no parameters sent to the pulse generator. A command was sent to the pulse generator that expected to see parameters after the command.

ASCII Table for Direct Mode

ASCII Symbol	Hex Value	ASCII Symbol	Hex Value
Carriage Return	0D	C	43
0	30	D	44
1	31	G	47
2	32	H	48
3	33	M	4D
4	34	R	52
5	35	S	53
6	36	V	56
7	37	!	21
8	38	\$	24
9	39	+	2B
A	41	-	2D
B	42	_	5F

Torque Speed Curves



Copyright

Copyright 2001 by Anaheim Automation. All rights reserved. No part of this publication may be reproduced, transmitted, transcribed, stored in a retrieval system, or translated into any language, in any form or by any means, electronic, mechanical, magnetic, optical, chemical, manual, or otherwise, without the prior written permission of Anaheim Automation, 910 East Orangefair Lane, CA, 92801. The only exception to this would be use of the program examples in this manual.

Disclaimer

Though every effort has been made to supply complete and accurate information in this manual, the contents are subject to change without notice or obligation to inform the buyer. In no event will Anaheim Automation be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation.

Limited Warranty

All Anaheim Automation products are warranted against defects in workmanship, materials and construction, when used under Normal Operating Conditions and when used in accordance with specifications. This warranty shall be in effect for a period of twelve months from the date of purchase or eighteen months from the date of manufacture, whichever comes first. Warranty provisions may be voided if the products are subjected to physical damage or abuse.

Anaheim Automation will repair or replace at its option, any of its products which have been found to be defective and are within the warranty period, provided that the item is shipped freight prepaid, with RMA (return material authorization), to Anaheim Automation's plant in Anaheim, California.

Trademarks

Control Link and Driver Pack are registered trademarks of Anaheim Automation.

IBM PC is a registered trademark of International Business Machines, Inc.

ANAHEIM AUTOMATION