**Pan & Tilt System Communication Protocol**

# Introduction

The Pan & Tilt (PT) system communication protocol describes the command structure in order to communicate with a system that contains an internal controller inside it.

This protocol is a collection of functions that allow you to implement motion control applications over the PT system.

# Messages

## Get messages

### In Get messages only the axis needs to be specified, there is no data in the sending packet.

### Name: SLN\_MerRegister

|  |  |
| --- | --- |
| Name | SLN\_MerRegister |
| OpCode | 0x0101 |
| Return value | Unsigned short (16 bit). |
| Description | Motion Error Register. |

Remark:

### Name: SLN\_DerRegister

|  |  |
| --- | --- |
| Name | SLN\_DerRegister |
| OpCode | 0x0102 |
| Return value | Unsigned short (16 bit). |
| Description | Detailed Motion Error Register. |

Remark:

### Name: SLN\_SrhRegister

|  |  |
| --- | --- |
| Name | SLN\_SrhRegister |
| OpCode | 0x0103 |
| Return value | Unsigned short (16 bit). |
| Description | Motion Status Register High. |

Remark:

### Name: SLN\_SrlRegister

|  |  |
| --- | --- |
| Name | SLN\_SrlRegister |
| OpCode | 0x0104 |
| Return value | Unsigned short (16 bit). |
| Description | Motion Status Register Low. |

Remark:

### Name: SLN\_GetMotorCurrent

|  |  |
| --- | --- |
| Name | SLN\_GetMotorCurrent |
| OpCode | 0x0130 |
| Return value | Integer (16 bit). |
| Description | Get the actual motor current. |

### Name: SLN\_GetMotorVoltage

|  |  |
| --- | --- |
| Name | SLN\_GetMotorVoltage |
| OpCode | 0x0131 |
| Return value | Integer (16 bit). |
| Description | Get the actual motor voltage. |

### Name: SLN\_GetMotorPosition

|  |  |
| --- | --- |
| Name | SLN\_GetMotorPosition |
| OpCode | 0x0140 |
| Return value | Floating point (32-bit). |
| Description | Get the actual motor position. |

### Name: SLN\_GetMotorSpeed

|  |  |
| --- | --- |
| Name | SLN\_GetMotorVoltage |
| OpCode | 0x0141 |
| Return value | Fixed point (32-bit). |
| Description | Get the actual motor voltage. |

Remark: The fixed number is given as integer part and fraction part. First 2 bytes represent

the integer part and the last 2 bytes the fraction part. The integer part is signed 16-bit integer and the fraction part is unsigned 16-bit integer.

### Name: SLN\_GetMaxCurrent

|  |  |
| --- | --- |
| Name | SLN\_GetMaxCurrent |
| OpCode | 0x011A |
| Return value | Integer (32 bit). (Current unit is Ampere) |
| Description | Getting the maximum allowed current in the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_GetTimeMaxCurrent.

### Name: SLN\_GetMaxCurrentTime

|  |  |
| --- | --- |
| Name | SLN\_GetMaxCurrentTime |
| OpCode | 0x011C |
| Return value | Unsigned integer (32 bit). (Time units in seconds) |
| Description | Getting the maximum allowed time for the maximum current. |

### Name: SLN\_GetMaxSpeed

|  |  |
| --- | --- |
| Name | SLN\_GetMaxSpeed |
| OpCode | 0x011E |
| Return value | Integer (32 bit). |
| Description | Getting the maximum allowed speed for the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_GetMaxSpeedTime.

### Name: SLN\_GetMaxSpeedTime

|  |  |
| --- | --- |
| Name | SLN\_GetMaxSpeedTime |
| OpCode | 0x0120 |
| Return value | Unsigned integer (32 bit). (Time units in seconds) |
| Description | Getting the maximum allowed time for the maximum speed for the motor. |

### Name: SLN\_GetMaxPosition

|  |  |
| --- | --- |
| Name | SLN\_GetMaxPosition |
| OpCode | 0x0122 |
| Return value | Unsigned integer (32 bit). |
| Description | Setting the maximum allowed Position for the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_GetMaxPositionTime.

### Name: SLN\_GetMaxPositionTime

|  |  |
| --- | --- |
| Name | SLN\_GetMaxPositionTime |
| OpCode | 0x0124 |
| Return value | Unsigned integer (32 bit). (Time units in seconds) |
| Description | Getting the maximum allowed Position for the motor. |

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## Set messages

All Set messages require specifying the motor axis number.

Tilt is axis No. 1, Pan is axis No. 2.

### Name: SLN\_SetAcceleration

|  |  |
| --- | --- |
| Name | SLN\_ SetAcceleration |
| OpCode | 0x0150 |
| Data unit | Internal Units (in floating point format) |
| Description | Set the motor acceleration in IU. |

### Name: SLN\_SetSpeed

|  |  |
| --- | --- |
| Name | SLN\_ SetSpeed |
| OpCode | 0x0151 |
| Data unit | Internal Units (in floating point format) |
| Description | Set the motor speed in IU. |

Remark: After sending Acceleration and Speed, the value remains in the system. Another command is needed only if the value needs to be changed.

Acceleration and Speed needs to be followed by an Update command.

### Name: SLN\_SendPosition

|  |  |
| --- | --- |
| Name | SLN\_SendPosition |
| OpCode | 0x0152 |
| Data unit | Internal Units (in integer format only) |
| Description | Sending command for the motor to move. |

Remark: Like Acceleration and Speed, Position command needs to be followed by an Update command.

### Name: SLN\_SetActualPosition

|  |  |
| --- | --- |
| Name | SLN\_ SetActualPosition |
| OpCode | 0x0153 |
| Data unit | Internal Units (in integer format only) |
| Description | Tell the motor its current position |

Remark: The SetActualPosition will place the value in the motor driver memory. This will affect the value received by GetMotorPosition and relative position commands.

### Name: SLN\_SetMaxCurrent

|  |  |
| --- | --- |
| Name | SLN\_SetMaxCurrent |
| OpCode | 0x011B |
| Data unit | Unsigned short (16 bit). (Current unit is Ampere) |
| Description | Setting the maximum allowed current in the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_SetTimeMaxCurrent.

### Name: SLN\_SetMaxCurrentTime

|  |  |
| --- | --- |
| Name | SLN\_SetMaxCurrentTime |
| OpCode | 0x011D |
| Data unit | Unsigned short (16 bit). (Time units in seconds) |
| Description | Setting the maximum allowed time for the maximum current. |

### Name: SLN\_SetMaxSpeed

|  |  |
| --- | --- |
| Name | SLN\_SetMaxSpeed |
| OpCode | 0x011F |
| Data unit | Unsigned short (16 bit). |
| Description | Setting the maximum allowed speed for the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_SetMaxSpeedTime.

### Name: SLN\_SetMaxSpeedTime

|  |  |
| --- | --- |
| Name | SLN\_SetMaxSpeedTime |
| OpCode | 0x0121 |
| Data unit | Unsigned short (16 bit). (Time units in seconds) |
| Description | Setting the maximum allowed time for the maximum speed for the motor. |

### Name: SLN\_SetMaxPosition

|  |  |
| --- | --- |
| Name | SLN\_SetMaxPosition |
| OpCode | 0x0123 |
| Data unit | Unsigned short (16 bit). |
| Description | Setting the maximum allowed Position for the motor. |

Remark: The motor driver will not exceed this value for longer than the time specified in SLN\_SetMaxPositionTime.

### Name: SLN\_SetMaxPositionTime

|  |  |
| --- | --- |
| Name | SLN\_SetMaxPositionTime |
| OpCode | 0x0125 |
| Data unit | Unsigned short (16 bit). (Time units in seconds) |
| Description | Setting the maximum allowed Position for the motor. |

### Name: SLN\_SaveData

|  |  |
| --- | --- |
| Name | SLN\_SaveData |
| OpCode | 0x0155 |
| Data unit | Null |
| Description | Saving All current motor values to the driver’s memory. |

Remark: Data will be stored only after SaveData command. If SaveData has not been sent, after power down the motor will be loaded with the previous information.

### Name: SLN\_Update

|  |  |
| --- | --- |
| Name | SLN\_Update |
| OpCode | 0x0156 |
| Data unit | Null |
| Description | Update the current command set. |

Remark: Acceleration, Speed and Position commands require Update to be executed.

### Name: SLN\_SetPositionRelative

|  |  |
| --- | --- |
| Name | SLN\_SetPositionRelative |
| OpCode | 0x0137 |
| Data unit | Null |
| Description | Setting the position commands to be relative. |

Remark: In Relative Mode, the position commands will be added to the current position.

### Name: SLN\_SetPositionAbsolute

|  |  |
| --- | --- |
| Name | SLN\_SetPositionAbsolute |
| OpCode | 0x0139 |
| Data unit | Null |
| Description | Setting the position commands to be absolute. |

Remark: In Relative Mode, the position commands will take the motor to the absolute value compared the position indicated by the command SLN\_ActualPosition.

### Name: SLN\_SetSpeedMode

|  |  |
| --- | --- |
| Name | SLN\_SetSpeedMode |
| OpCode | 0x0143 |
| Data unit | Null |
| Description | Setting motor to take speed commands. |

Remark: In Speed mode, the motor will rotate in a constant speed after receiving a SetSpeed command. The motor will keep on rotating in this speed until it receives different speed (can be zero speed to stop the motor) or until a SetPositionMode is received.

### Name: SLN\_SetPositionMode

|  |  |
| --- | --- |
| Name | SLN\_SetPositionMode |
| OpCode | 0x0145 |
| Data unit | Null |
| Description | Setting motor to take position commands. |

Remark: In position mode, in order to get the motor to rotate, a SendPosition command needs to be sent followed by an Update command.

### Name: SLN\_AxisOn

|  |  |
| --- | --- |
| Name | SLN\_SetAxisOn |
| OpCode | 0x0147 |
| Data unit | Null |
| Description | Turn the motor motion on. |

Remark: Only when the motor is in AxisOn it can accept commands.

### Name: SLN\_AxisOff

|  |  |
| --- | --- |
| Name | SLN\_SetAxisOff |
| OpCode | 0x0149 |
| Data unit | Null |
| Description | Turn the motor motion off. |

Remark: In AxisOff the motor cannot accept motion commands.

### Name: SLN\_AxisReset

|  |  |
| --- | --- |
| Name | SLN\_SetAxisReset |
| OpCode | 0x0160 |
| Data unit | Null |
| Description | Reset the current axis. |

Remark: Reset the Axis and restore previous configurations.

### Name: SLN\_Reboot

|  |  |
| --- | --- |
| Name | SLN\_SetReboot |
| OpCode | 0x0199 |
| Data unit | Null |
| Description | Reboot the internal managing controller. |

### Name: SLN\_Shutdown

|  |  |
| --- | --- |
| Name | SLN\_SetReboot |
| OpCode | 0x019A |
| Data unit | Null |
| Description | Shutting down the internal managing controller. |

### Name: SLN\_StabilizationOn

|  |  |
| --- | --- |
| Name | SLN\_StabilizationOn |
| OpCode | 0x019B |
| Data unit | Null |
| Description | Turn on stabilization algorithms. |

Remark: When the stabilization is turned on, the system will remain in the current position it is in when the command is sent.

### Name: SLN\_StabilizationOff

|  |  |
| --- | --- |
| Name | SLN\_StabilizationOff |
| OpCode | 0x019C |
| Data unit | Null |
| Description | Turn off stabilization algorithms. |

Remark: When the stabilization is turned on, the system will remain in the current position it shows when the command is sent.

## GPS messages

These messages retrieve data from the GPS unit.

### Name: SLN\_GetClock

|  |  |
| --- | --- |
| Name | SLN\_GetClock |
| OpCode | 0x0501 |
| Return value | Integer (32-bit) |
| Description | Get the current time given by the GPS module. |

Remark: Time format is: HH.MM.SS but without the leading zero. For example if the time is 08:17:32 it will return 81732.

### Name: SLN\_GetHeading

|  |  |
| --- | --- |
| Name | SLN\_GetHeading |
| OpCode | 0x0502 |
| Return value | Floating point. |
| Description | Get the current heading given by the GPS module. |

Remark: The given value is in degrees.

### Name: SLN\_GetLatitude

|  |  |
| --- | --- |
| Name | SLN\_GetLatitude |
| OpCode | 0x0503 |
| Return value | Floating point. |
| Description | Get the current latitude given by the GPS module. |

Remark: The given value is the earth latitude line of the current place of the system.

The integer part of the number is the degrees of the latitude and the fraction part is the minutes of the latitude. The value is positive for the upper side of the latitude lines (North) and negative for the bottom side (South).

### Name: SLN\_GetLongitude

|  |  |
| --- | --- |
| Name | SLN\_GetLongitude |
| OpCode | 0x0504 |
| Return value | Floating point. |
| Description | Get the current longitude given by the GPS module. |

Remark: The given value is the earth longitude line of the current place of the system.

The integer part of the number is the degrees of the longitude and the fraction part is the minutes of the longitude. The value is positive for the East side of the latitude lines and negative for the West side.

### Name: SLN\_GetAltitude

|  |  |
| --- | --- |
| Name | SLN\_GetAltitude |
| OpCode | 0x0505 |
| Return value | Floating point. |
| Description | Get the current altitude given by the GPS module. |

Remark: The given value is the height of the system above sea level in Meters.

### Name: SLN\_GetSatellites

|  |  |
| --- | --- |
| Name | SLN\_GetSatellites |
| OpCode | 0x0506 |
| Return value | Unsigned integer |
| Description | Get the number of satellites connected to the GPS module. |

## IMU messages

These messages retrieve data from the IMU unit.

### Name: SLN\_IsReadyImu

|  |  |
| --- | --- |
| Name | SLN\_IsReadyImu |
| OpCode | 0x0601 |
| Return value | Floating point (32-bit) |
| Description | Check if the IMU is on and ready to be read. |

Remark: The value returned by this command is in a floating point format. The value can be either 0 when the IMU is NOT ready, or 1 when it is ON and ready.

### Name: SLN\_GetRoll

|  |  |
| --- | --- |
| Name | SLN\_GetRoll |
| OpCode | 0x0602 |
| Return value | Floating point (32-bit) |
| Description | Get the current Roll Value read by the IMU. |

### Name: SLN\_GetPitch

|  |  |
| --- | --- |
| Name | SLN\_GetPitch |
| OpCode | 0x0603 |
| Return value | Floating point (32-bit) |
| Description | Get the current Pitch Value read by the IMU. |

### Name: SLN\_GetYaw

|  |  |
| --- | --- |
| Name | SLN\_GetYaw |
| OpCode | 0x0604 |
| Return value | Floating point (32-bit) |
| Description | Get the current Yaw Value read by the IMU. |

### Name: SLN\_GetGyroX

|  |  |
| --- | --- |
| Name | SLN\_GetGyroX |
| OpCode | 0x0605 |
| Return value | Floating point (32-bit) |
| Description | Get the current x-axis Gyro Value read by the IMU. |

### Name: SLN\_GetGyroY

|  |  |
| --- | --- |
| Name | SLN\_GetGyroY |
| OpCode | 0x0606 |
| Return value | Floating point (32-bit) |
| Description | Get the current y-axis Gyro Value read by the IMU. |

### Name: SLN\_GetGyroZ

|  |  |
| --- | --- |
| Name | SLN\_GetGyroZ |
| OpCode | 0x0607 |
| Return value | Floating point (32-bit) |
| Description | Get the current z-axis Gyro Value read by the IMU. |