e-Gizmo

Serial I/O

Communications Manual

Rev 1r0

Initial Release

July 31,2006

This document is for advance users who may want to write their applications in other programming language or platform, such as C language, or PLC hardware.This document describes only the functions of each command. Detailed hardware and software description, features and applicable limitations, are covered in the main product documentation.

Communications parameter
Baud rate: 9600 or 28800 baud
Data length : 8 bits
Stop bits: 2
Parity :none
Handshake : none

Communications Format (to I/O module)

[STX] + [ID] + [COMMAND] +[[DATA] + [PortNo]] +[CHKSUM] + [ETX]

STX :	1 character = 02h , signifies start of new transmission
ID :	1 character, specify the device ID the master controller wants to talk to. = 10h for the I/O module
COMMAND:	1 character, command to execute. See the Command sub section of this manual for a complete list and descriptions of available commands.
DATA:	Variable length. Some commands do not require this field.
PortNo:	1 character, Port to read or write to. Some commands do not require this field.
CHKSUM:	2 characters = STX + ID + COMMAND + DATA, modulo 8 sum of transmitted data, starting from STX, up to the last DATA byte. Transmitted in Hex Ascii string format.
ETX:	1 character = 03h, signifies end of transmission

All characters must be transmitted in ASCII format.
DATA is always send in Hex Ascii Format
PortNo is always send in Decimal Ascii Format

Example: To transmit ON a port command:

[STX]+[ID]+"1" +"18"+ [CHKSUM] + [ETX]

This command will switch ON port 18

The hex number equivalent of this ascii string is

Ascii		**Hex**
[STX]	=	02h
[ID]	=	10h
"1"	=	31h
"1"	=	31h
"8"	=	38h

Checksum is then computed as 02h+10h+31h+31h+38h = ACh

[CHKSUM]	=	"AC"
[ETX]	=	02h

In Visual Basic, you will transmit this string as
chr(&H02)+chr(&H10)+"18AC"+chr(&H02)

COMMAND Descriptions

1. '1' – Turn On an output

Format:
[STX] + [ID] + "**1"**+ [Port No] + [CHKSUM] + [ETX]

Where:
Port No = 2 characters, Port Number to turn ON
Valid Port No: 00 to 27

Example:
[STX]+[ID]+"1" +"15"+ "A9" + [ETX]

will switch ON port 15.

Controller Response:
The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

2. '0' – Turn OFF an output

Format:

[STX] + [ID] + "**0"**+ [Port No] + [CHKSUM] + [ETX]

Where:

Port No = 2 characters, Port Number to turn ON
Valid Port No: 00 to 27

Example:

[STX]+[ID]+"0" +"23"+ "A7" + [ETX]

will switch OFF port 23.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

3. 'B' – Byte (8-bit) write to port, write to 8 outputs at the same time

Format:

[STX] + [ID] + "**B"**+ [DATA]+ [Group] + [CHKSUM] + [ETX]

Where:

DATA = 2 characters, 8 bit data in Hex Ascii format
Group = 1 character, group of Ports to write.
Valid Group No: 0 to 9
Group 0-3: Physical port groups
Group 0 : P00 to P07
Group 1 : P08 to P15
Group 2 : P16 to P23
Group 3: P24 to P27
Group 4-6: Group 0 to 3 logic 0 to 1 capture memory
Group 7-9: Group 0 to 3 logic 1 to 0 capture memory

Example:

[STX]+[ID]+"B" +"55"+ "2"+"F0" + [ETX]

55 (hex) translates to 01010101 in binary. The above example will turn ON P16,P18,P20,P22 and turn OFF P17,P19,P21,P23. The Byte Write command B provides a fast and efficient way of manipulating outputs.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

4. 'R' – Byte (8-bit) read from port, read a group of 8 inputs at the same time

Format:

[STX] + [ID] + "**R"**+ "00"+ [Group] + [CHKSUM] + [ETX]

Where:

Group = 1 character, Group of Ports to read.
Valid Group No: 0 to 9
Group 0-3: Physical port groups
Group 0 : P00 to P07
Group 1 : P08 to P15
Group 2 : P16 to P23
Group 3: P24 to P27
Group 4-6: Group 0 to 3 logic 0 to 1 capture memory
Group 7-9: Group 0 to 3 logic 1 to 0 capture memory

Example:

[STX]+[ID]+"R" +"00"+ "0"+"F0" + [ETX]

Reads the state of P00 to P07 at the same time, returning an 8 bit state pattern arranged such that P00 corresponds to the least significant bit (LSB), and P07 corresponds to the MSB.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + “R”+ [DATA]+ [CHKSUM]+ [ETX]

where [ID] = 10h : controller ID
“R” : Echoed command
[DATA] : 2 characters Hex Ascii of port bit pattern

5. ‘r’ – Read a port state

Format:
[STX] + [ID] + “**r”**+ [PortNo] + [CHKSUM] + [ETX]

Where:
Where:
Port No = 2 characters, Port Number to turn ON
Valid Port No: 00 to 27

Example:
[STX]+[ID]+”r” + “08”+“EC” + [ETX]

Read the state of P08

Controller Response:
The controller acknowledge command by responding with a string-

[STX] + [ID] + “r”+ [STATE]+ [CHKSUM]+ [ETX]

where [ID] = 10h : controller ID
“r” : Echoed command
[STATE] : 1 character Ascii Status, “1”-ON “0” - OFF

6. ‘c’ – Configure or define Input and Output port

Format:
[STX] + [ID] + “**c”**+ [DATA]+ [Group] + [CHKSUM] + [ETX]

Where:
DATA = 2 characters, 8 bit data in Hex Ascii format
Group = 1 character, group of Ports to write.
Valid Group No: 0 to 2
Group 0-3: Physical port groups
Group 0 : P00 to P07
Group 1 : P08 to P15

Group 2 : P16 to P23
Group 3: Invalid – Fixed input group

Note: LSB of the DATA pattern corresponds to the lowest numbered port of the Group. “1” defines the corresponding port as input, “0” defines the corresponding port as output. Read the main product documentation to learn more and know the restrictions of each Group.

Example:
[STX]+[ID]+”c” +”F0”+ “2”+“19” + [ETX]

F0 (hex) is 11110000 in binary. The above example
will configure P16-P19 as outputs, and P20-P23 as inputs.

Note on CHKSUM – the actual checksum is 119h. The most significant digit ‘1’ is outside of 8 bit range and is simply discarded.

Controller Response:
The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

7. ‘C’ – Read counter registers

Format:
[STX] + [ID] + “**C”**+ [PortNo] + [CHKSUM] + [ETX]

Where:
Where:
Port No = 2 characters, Port (Counter)Number to read
Valid Port No: 25, 26, 27, 99

Example:
[STX]+[ID]+”C” + “99”+“EF” + [ETX]

Read the content of Incremental Encoder Counter 99

Controller Response:
The controller acknowledge command by responding with a string-

[STX] + [ID] + “C”+ [DATA]+ [CHKSUM]+ [ETX]

where [ID] = 10h : controller ID
"C" : Echoed command
[DATA] : 4 characters in Hex Ascii Format

8. 'Z' – Clear counter registers

Format:

[STX] + [ID] + "**Z"**+ [PortNo] + [CHKSUM] + [ETX]

Where:

Where:
Port No = 2 characters, Port (Counter) to clear
Valid Port No: 25, 26, 27, 99

Example:

[STX]+[ID]+"Z" + "25"+"D3" + [ETX]

Clear Counter register 25

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

9. 'P' – Pulse Generator : Start Pulse Generator

Format:

[STX] + [ID] + "**P"**+ [CHKSUM] + [ETX]

Example:

[STX]+[ID]+"P" + "62" + [ETX]

This command will start the pulse generator.

Note: The Pulse Rate and Number of Steps must be set before sending this command. See command list 11 and 12 of this manual.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

10. 'p' – Pulse Generator : Stop Pulse Generator

Format:

[STX] + [ID] + "**p"**+ [CHKSUM] + [ETX]

Example:

[STX]+[ID]+"p" + "82" + [ETX]

This command will immediately stop the pulse generator.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

11. ‘F’ – Pulse Generator : Set Pulse Rate (Pulse Frequency)

Format:

[STX] + [ID] + “**F”**+ [DATA1] + [DATA2]+[CHKSUM] + [ETX]

Where:

Where:

[DATA1] = 2 Hex Ascii characters, sets the fist divider value
valid values = 0 to 63 decimal. 0 = divide by 64

[DATA2} = 2 Hex Ascii characters, sets the Fine Rate

Frequency is computed as follows:

Frequency = 691200 / (DATA1 * DATA2)

This gives us a theoretical range of 42Hz to 691.2 KHz. In practice, the maximum pulse frequency must be limited to 10 KHz to allow the controller do other tasks.

Example:

[STX]+[ID]+”F” + “25” + “C0”+“32” + [ETX]

Coarse Frequency is set to 25h (37 decimal) and Fine frequency set to C0h (192)

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

12. ‘S’ – Pulse Generator : Set No of Steps(Pulse Frequency)

The pulse generator will automatically stop after the specified steps.

Format:

[STX] + [ID] + “**S”**+ [DATA] +[CHKSUM] + [ETX]

Where:

Where:
[DATA] = 4 Hex Ascii characters, Number of steps/pulses

Example:
[STX]+[ID]+"S" + "1000"+"26" + [ETX]

Instructs the pulse generator to stop after 1000h (4096) pulses

Note: [DATA] = "0000" - continuous pulse until stopped by 'p' command.

Controller Response:
The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

13. 'H' – Communication Baud Rate : Set to 28.8 kbps

Format:
[STX] + [ID] + "**H"**+ [CHKSUM] + [ETX]

Example:
[STX]+[ID]+"H" + "5A" + [ETX]

This command will set the communication speed to 28.8kbps

Controller Response:
None

14. 'L' – Communication Baud Rate : Set to 9600bps

Format:
[STX] + [ID] + "**L"**+ [CHKSUM] + [ETX]

Example:
[STX]+[ID]+"L" + "5E" + [ETX]

This command will set the communication speed to default value of 9600 bps.

Controller Response:
None

15. 'T' – Test Link

Format:

[STX] + [ID] + "**T"**+ [CHKSUM] + [ETX]

Example:

[STX]+[ID]+"T" + "66" + [ETX]

This command is used mainly to test the communication link.

Controller Response:

The controller acknowledge command by responding with a string-

[STX] + [ID] + ETX

where [ID] = 10h : controller ID

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