

# **J2E, LLC.**

## **Solenoid Driver Command Interface Specification**

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## 1. Introduction

The design establishes a serial connection via an Ethernet TCP/IP socket using the serial tunneling approach. The operation is Master/Slave; The Master initiates all messages. A slave only responds after receiving a message from the master (PC or equivalent).

## 2. Message Structure

The design uses the following message structure:

### **Source/Address/Length/Payload/Checksum/Terminator**

The following table summarizes the length and expected data for each of the fields identified above. Further explanation is given in sections 2.1 through 2.5.

| Function   | Number of Bytes | Valid Range                      |
|------------|-----------------|----------------------------------|
| Source     | 1               | B3h, (Master) or 88h (Slave)     |
| Address    | 1               | 0 – FFh*                         |
| Length     | 1               | 6 – 40 (total length of message) |
| Payload    | 1-33            | 0 – FFh, MSB first               |
| Checksum   | 1               | 0 – FFh                          |
| Terminator | 1               | CR, ODh                          |

\* *Default address = 1*

### 2.1. Source

This byte determines the source of the transmission and functions as a starting byte.

### 2.2. Address

The address is the specific slave device address, i.e., board address.

### 2.3. Payload

The payload is the combination of command and data if from the master. If a reply from a slave, the payload is a response byte and possible data. The structure of the payload is:

1<sup>st</sup> Byte Command/Response  
2<sup>nd</sup> to 33<sup>rd</sup> Byte

### 2.4. Checksum

The checksum is a 1-byte modulus-8 addition of all the bytes in the message except itself and the terminator.

### Checksum calculation sample code

```
For i=1 to Length-2
{
    Cksum=Cksum + serialstring(i)%FFh
}
```

The check sum is calculated from the first byte of the serial string until the check sum is reached. (The last two bytes of the serial string are not included.)

## **2.5. Serial Port Configuration**

N81 - No parity, 8 data bits, 1 stop bit.

Baud rate = 115,200

## **2.6. Ethernet Configuration**

Host IP Address: 169.254.210.189

Device IP Address: 169.254.202.181

Subnet Address: 255.255.0.0

Port: 10001

## **3. Commands**

The following summarizes the commands.

### **3.1. Solenoid Driver Control/Status**

This command provides the mechanism to enable/disable the solenoid drivers and returns the current state of the solenoids, UVtron Flame Detector and IR diode. This command can be issued at any time.

Command Format:

|    |     |    |    |        |        |    |
|----|-----|----|----|--------|--------|----|
| B3 | add | 07 | 10 | s(7:0) | chksum | 0D |
|----|-----|----|----|--------|--------|----|

Definition(s):

**s:** Solenoid driver enable byte. Each bit represents a specific solenoid. A '1' enables the solenoid driver and a '0' disables it.

Command Response:

|    |     |    |    |         |        |        |         |         |          |        |    |
|----|-----|----|----|---------|--------|--------|---------|---------|----------|--------|----|
| 88 | add | 0C | 10 | p(15:8) | p(7:0) | h(7:0) | ss(7:0) | sa(7:0) | reserved | chksum | 0D |
|----|-----|----|----|---------|--------|--------|---------|---------|----------|--------|----|

**p(15:8):** MSB of IR detector analog value. Bits 15 through 12 are unused and always set to '0';

**p(7:0):** LSB of IR detector analog value.

**h:** A byte which indicates UVTron state. A '1' on Bit 0 indicates a flame is detected, a '0' indicates no flame detected. Bits 7 through 1 are unused and always set to '0'.

**ss:** A byte which indicates the solenoid connection status. A returned value of 00h indicates that no solenoids are connected. A returned value of FFh indicates all solenoids are connected. The bits can be used as flags to indicate which solenoids are currently connected. Bit 0 corresponds to solenoid 1, Bit 1 corresponds to solenoid 2, etc. A '1' indicates a solenoid is connected, a '0' indicates no connection.

**sa:** A byte which indicates the status of the solenoid driver circuit. A returned value of 00h indicates that no solenoids are active. A returned value of FFh indicates all solenoids are active. The bits can be used as flags to indicate which solenoids are currently active. Bit 0 corresponds to solenoid 1, Bit 1 corresponds to solenoid 2, etc. A '1' indicates a solenoid is active, a '0' indicates a solenoid is inactive.

#### 4. Powerup Defaults

**The Solenoid Driver Board powers up as follows:**

**All registers cleared, all solenoid drivers off, heartbeat LED flashing.**