PlaneWave - Tech Help - EFA

PlaneWave - EFA PC Port Protocol

EFA PC Port Protocol Overview

- Message Packet:
  - **SOM** Start Of Message byte must start every message packet. SOM = 59 = 0x3B
  - **NUM** Number of Bytes is calculated by: NUM = [(Packet Byte Count) - 3] (Note: The bytes SOM, NUM, and CHK are not counted in NUM)
  - **SRC** Source Address
  - **RCV** Receiver Address
  - **CMD** Command See below for a list.
  - **DA1** DATA1 Optional data byte, Some commands require data.
  - **DA2** DATA2 Optional data byte, Some commands require data.
  - **DA3** DATA3 Optional data byte, Some commands require data.
  - **CHK** Checksum The last byte of the message packet is a Checksum. It is calculated by summing the bytes of the packet, excluding the SOM and CHK, and taking the Least Significat Byte of the two's complement. Examples are below.
- When data bytes combine to represent an integer, the MOST-SIGNIFICANT data byte is sent first.
- All messages require the Receiver to respond. If the no data response is necessary, the Receiver will responsd by sending a meesage with the CMD it received. NOTE: THE EFA RESPONDS TO ANY MESSAGE RECIEVED, EVEN INVALID COMMANDS!
- Port Settings:
  - Baud Rate: 19200
  - Parity: None
  - Data bits: 8
  - Stop bits: 1
  - RTS/CTS Flow Control
    - PC waits for the CTS to be clear
    - PC enables the RTS

- PC sends message packet
- PC clears the RTS

Focuser

- Scale Factor: (115134.42 Encoder Counts) = (1 mm Focuser Travel)
- Nominal Focuser Travel: 33 mm = 3799422 Encoder Counts
- Focuser Encoder = 0 when racked completely in

Standard Addresses

	Device	**Decimal**	**Hex**
PC	Computer	32	0x20
HC	Hand Control	14	0x0D
FOC	Focuser	18	0x12
FAN	Fan Controller	19	0x13
TEMP	Temperature Sensor	18	0x12

Commands

Command	Description	CMD (Hex)	Send Data	Response Data	Send Sample (Hex)	Respond Sample (Hex)
MTR_GET_POS	Get position	0x01		3 bytes (encoder position)	3B 03 20 12 01 CA	3B 06 12 20 01 00 00 00 C7 Encoder Position = 0
MTR_GOTO_POS2	GOTO position	0x17	3 bytes (encoder position)	1 byte (1=OK)	Goto Position = 0x140000 = 1310720	
MTR_OFFSET_CNT	Set current focuser encoder position. Often used to set focuser encoder to Zero.	0x04	3 bytes (encoder position)	1 byte (1=OK)	3B 06 20 12 04 14 00 00 B0 Set Encoder Position = 0x140000 = 1310720	3B 04 12 20 04 01 C5
MTR_GOTO_OVER	Determine if the motor is moving during a GOTO?	0x13		1 byte (255=YES, 0=NO)	3B 03 20 12 13 B8	3B 04 12 20 13 FF B8 Goto is Over
MTR_SLEWLIMITMAX	Set the Maximum Slew Limit.	0x1B	3 bytes	1 byte (1=OK)	3B 06 20 12 1B 3B 82 60 90 Set Min Slew Limit =	3B 04 12 20 1B 01 AE

					0x3B8260 = 3900000	
MTR_SLEWLIMITGETMAX	Returns the Maximum Slew Limit in encoder ticks	0x1D		3 bytes (encoder position)	3B 03 20 12 1D AE	3B 06 12 20 1D 3A 4F A5 7D Maximum Slew Limit = 0x3A4FA5 = 3821477
MTR_PMSLEW_RATE	Move the motor positive. Motor will stop when the Max Slew Limit is reached.	0x24	One byte for the speed (stop to fastest) = (0x00 to 0x09)	1 byte (1=OK)	3B 04 20 12 24 09 9D Go Positive Top Speed	3B 04 12 20 24 01 A5
MTR_NMSLEW_RATE	Move the motor negative. Motor will stop when the Min Slew Limit is reached.	0x25	One byte for the speed (stop to fastest) = (0x00 to 0x09)	1 byte (1=OK)	3B 04 20 12 25 09 9C Go Negative Top Speed	3B 04 12 20 25 01 A4
TEMP_GET	Get the temperature of one sensor	0x26	One byte address(Primary=0, Ambient=1, Secondary=2)	3 bytes (byte1=address, [byte2 & byte3] = Temperature...See Formula Below)	3B 04 20 12 26 01 A3 Request Temp for ambient	3B 05 12 20 26 5C 01 46 Temp=5C01 (see below for conversion to Celcius)
FANS_SET	Set the fans, on or off.	0x27	1 byte (1=ON, 0=OFF)	1 byte (1=OK)	3B 04 20 13 27 01 A1 Set FANS=ON	3B 04 13 20 27 01 A1

FANS_GET	Get the fans state, on or off.	0x28		1 byte (0=ON, 3=OFF)	3B 03 20 13 28 A2	3B 04 13 20 28 00 A1 FANS=ON
MTR_GET_CALIBRATION_STATE	Determine if the focuser as been calibrated. Useful for Handcontrol and PWI Focus software.	0x30	1 byte (0x40)	1 byte (0=NO, 1=YES)	3B 04 20 12 30 40 5A	3B 04 12 20 30 01 99 Motor = calibrated.
MTR_SET_CALIBRATION_STATE	Set the calibration state for the focuser. Useful for Handcontrol and PWI Focus software.	0x31	2 bytes (Calibrated = 40 01) and (Not = 40 0)	1 byte (1=OK)	3B 05 20 12 31 40 01 57 Set calibration = true	3B 04 12 20 31 01 98
MTR_GET_STOP_DETECT	Determine if Motor will stop when the focuser hits a physical hardstop.	0xEE		1 byte (1=YES, 0=NO)	3B 03 20 12 EE DD	3B 04 12 20 EE 01 DB Stop Detect = enabled
MTR_STOP_DETECT	Set the controller to stop when focuser hits a physical hardstop.	0xEF	1 byte (1=YES, 0=NO)		3B 04 20 12 EF 01 DA Set Stop Detect = enabled	3B 03 12 20 EF DC
MTR_GET_APPROACH_DIRECTION	Get the approach of motor during a	0xFC		1 byte (0=negative, 1=positive=default)	3B 03 20 12 FC CF	3B 04 12 20 FC 00 CE Motor is set

	goto					to approach from positive, this is default.
MTR_APPROACH_DIRECTION	Get the approach of motor during a goto	0xFD	1 byte (0=negative, 1=positive=default)	1 byte (1=OK)	3B 04 20 12 FD 00 CD Set APPROACH = positive, this is default.	3B 04 12 20 FD 01 CC
GET_VERSION	Get Firmware Version	0xFE		2 bytes (byte1=Major, second byte2=minor)	3B 03 20 12 FE CD	3B 05 12 20 FE 01 05 C5 Version = 1.5

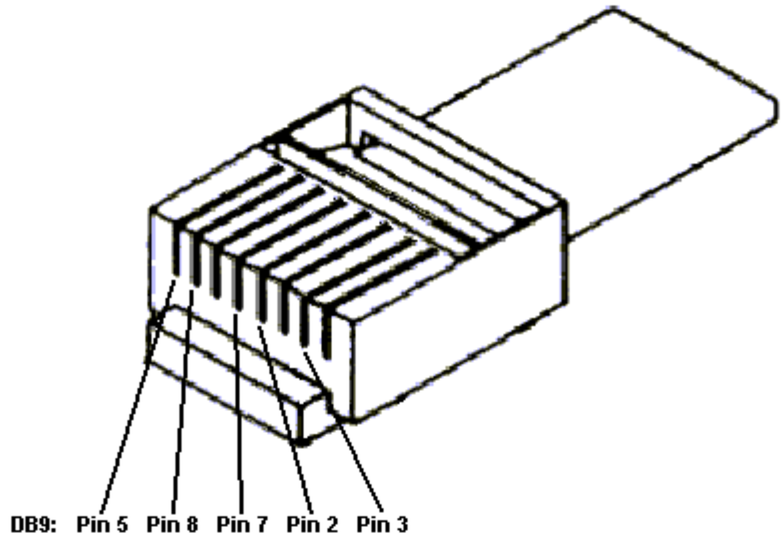
Convert Temperature to Celcius

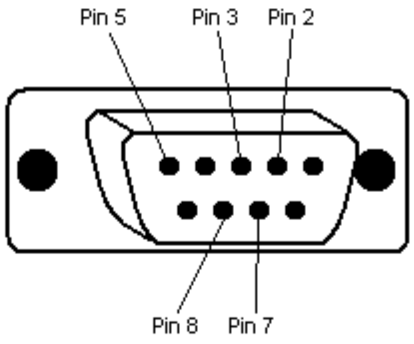
- The response request for temperature is 3 bytes
- byte1=address, byte2 & byte3 are used to calcuate the temperature
- If there is no sensor for the address requested, the response bytes are 0x7F7F
- (Primary=0, Ambient=1, Secondary=2)

Conversion of the two received bytes to Celcius

```
int rawTemp = byte2*256 + byte3
bool tempIsNeg = false
if(rawTemp > 32768)
{
  tempIsNeg = true
  rawTemp = 65536 - rawTemp
}
int intPart = RawTemp / 16
int fractionDigit = (RawTemp - intPart) * 625 / 1000
float celciusTemp = intPart + fractionDigit / 10
if(tempIsNeg) celciusTemp = -celciusTemp
```

PC Port Cable - RJ45 and DB9





- 2 Receive Data
- 3 Transmit Data
- 5 Signal Ground
- 7 Request To Send
- 8 Clear To Send