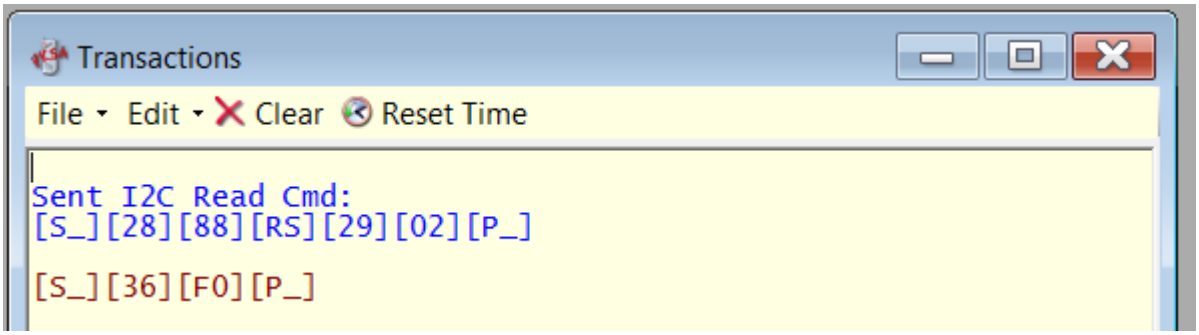
This document uses the PICKit Serial Analyzer and software to communicate to the MCP19111 via I2C Master Mode. The MCP19111 standard evaluation board is used and programmed via the GUI for PMBus communication.

Command: READ_VIN
Command Code: 0x88h

Use the Basic Operations window to send the READ_VIN command to the MCP19111 with an address of 0x28h. The Basic Operations window is found by clicking on the Basic Operation icon at the top of the PICkit Serial software. The information is entered as shown below.

The Device Address is 0x28h and Command is 0x88h. The byte count according to the GUI User's Guide for the data received is 2.

When the Execute button is pressed, the Transaction window shows what is sent to the MCP19111 (in BLUE) and what is received from it (in RED).



According to the GUI User's Guide, the data received back is in PMBus Linear Format. So the data is interpreted as follows.

F0 is the data MSB and 36 is the data LSB

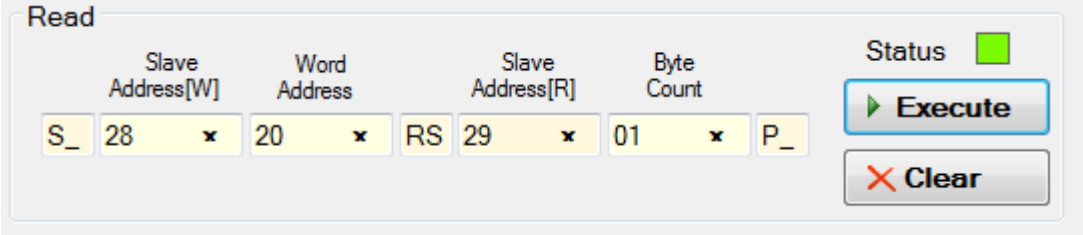
	MSB		LSB	
Raw Data (HEX)	F	0	3	6
Raw Data (BIN)	1111	0000	0011	0110
Linear Data Bit Separation	11110*	00000110110		
Decimal Version	-2	54		
Final Value	54*2^-2=13.5V			

* This is a 2's compliment number. If the MSB is '1', number is a negative number. To get the value, invert all bits then add '1'.
EXAMPLE: 11110 -> MSB=1 therefore number is negative, invert all bits -> 00001,
then add '1' -> 00010 =2. Therefore 11110 -> -2

For this READ_VIN example, the input voltage to the MCP19111 evaluation board was 13.3V

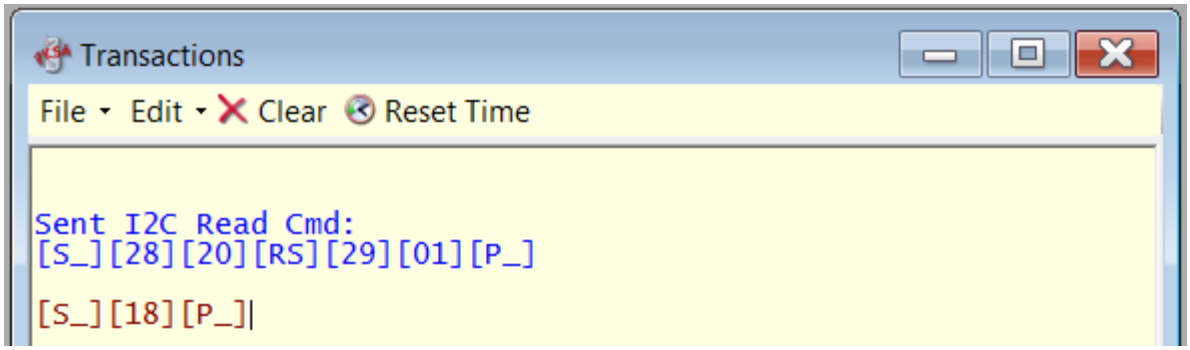
Command: **VOUT_MODE**
Command Code: **0x20h**

Using the PICkit Software Basic Operations window, the following was sent to the MCP19111.



Notice that only one byte needs to be returned. This can be found in the GUI User's guide.

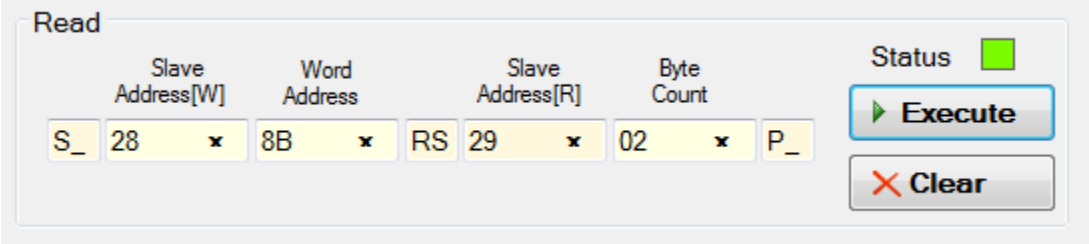
The Transactions window shows what was sent and what was received.



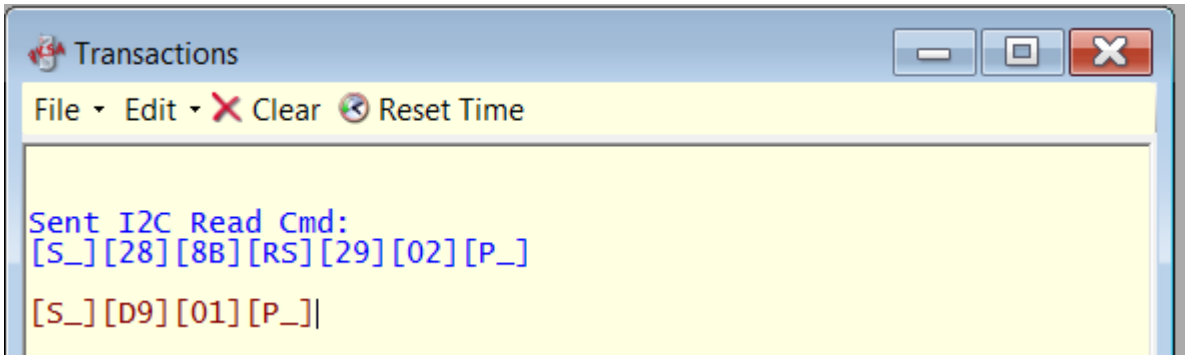
According to the PMBus specification, the returned value is 8 bits. Therefore 0x18h becomes 00011000b.
The first three bits indicate the Mode and the final five bits indicate the Parameter.
Mode = 000 -> Linear format
Parameter = 11000 -> 5 bit 2's compliment exponent for the mantissa delivered as the data bytes for an output voltage related command.
Therefore the exponent for output voltage related commands is -8.

Command: **READ_VOUT**
Command Code: **0x8Bh**

Using the PICkit Software Basic Operations window, the following was sent to the MCP19111.



The Transactions window shows what was sent and what was received.



The previous VOUT_MODE command told us the data is in Linear format with a mantissa exponent of -8.
Therefore the received data is interpreted as follows.
MSB=01, LSB=D9
01D9h = 473d
According to the PMBus specification for reading Vout, the equation is:
Vout=V*2^N
Vout=473*2^-8
Vout=1.848V
The output voltage measured with a multi-meter was 1.88V.

Command: **VOUT_COMMAND**
Command Code: **0x15h**

This PMBus command changes the output voltage of the POL and it can be implemented two different ways. This command needs to be WRITTEN to the MCP19111 and it must contain a PEC(CRC-8) number so the command structure is different.

The structure of the sent command is:

Start, write, # of bytes, addr, command, data lsb, data msb, PEC, stop

The *# of bytes* does not need to be sent when using the Basic Operations Window. See Script Builder for the implementation of the number of bytes sent.

According to the PMBus specification, the VOUT_COMMAND changes the output voltage defined by the following equation.

Voltage = V*2^N

For example, to set the output voltage to 2.0V, the data sent to the MCP19111 is:

V = Voltage/2^N
V=2.0/2^-8
V=512d ->0x0200h

To calculate the PEC, use the Java applet found on the SMBus website at:

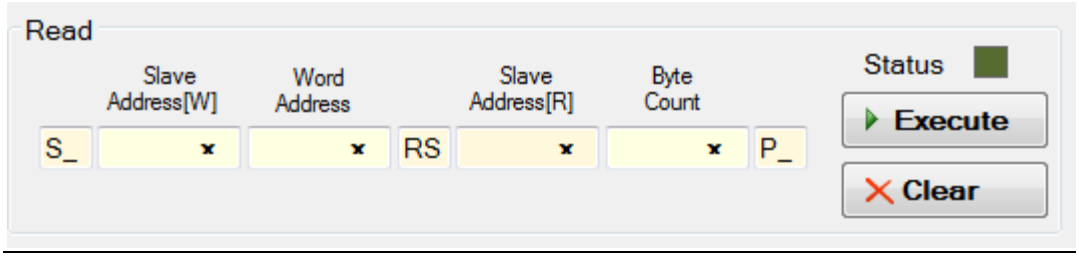
http://smbus.org/faq/crc8Applet.htm

The PEC uses all the data sent to the MCP19111, so for this example the PEC would use:

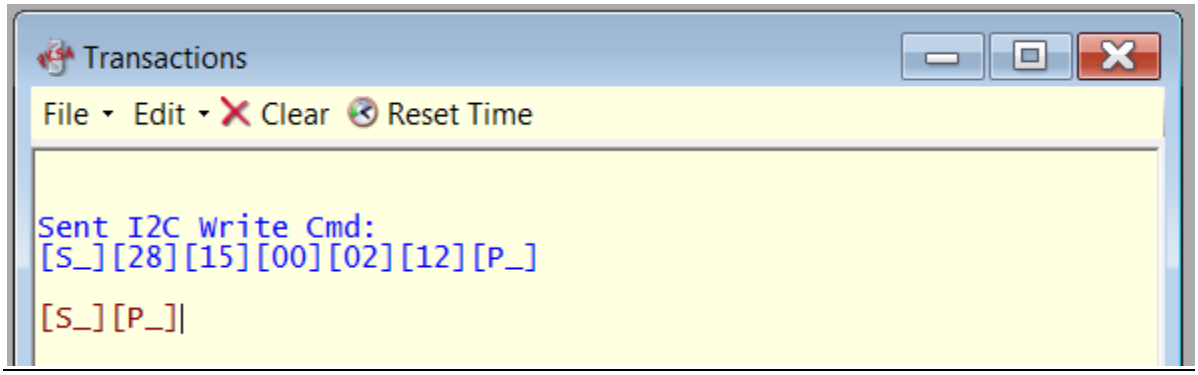
28150002 -> 0x12h ->PEC value

#1 Basic Operation Window

Using the PICkit Software Basic Operations window, the following was sent to the MCP19111.



The Transactions window shows what was sent and what was received.



No data is received since we are WRITING to the MCP19111.

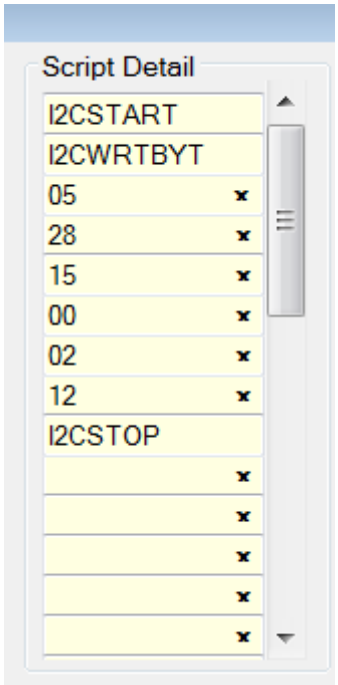
This changed the output voltage of the POL system to 2.0V

#2 Script Builder Window

The PICkit Serial Software Script Builder could also be used to WRITE the VOUT_COMMAND to the MCP19111. The Script Builder is found under the Communications>Script icon.

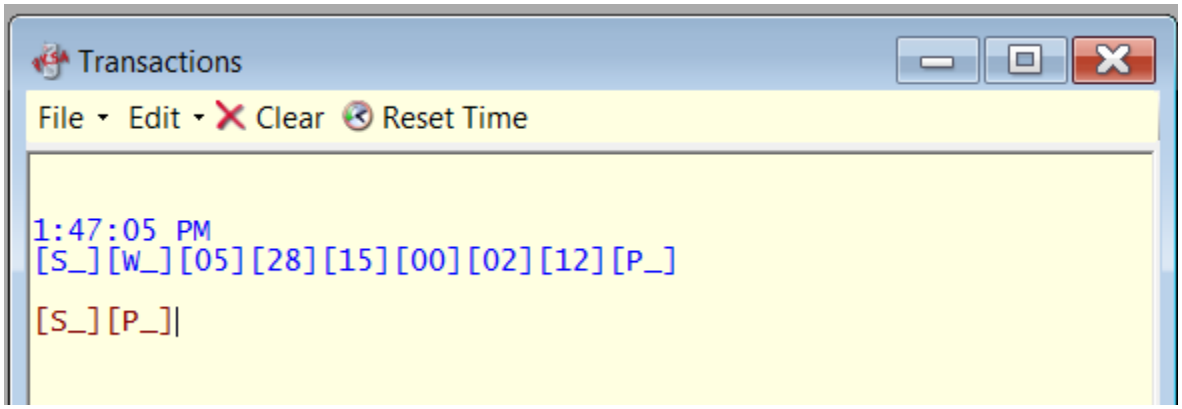
When using the Script Builder, the number of bytes being sent needs to be included.

Using the PICkit Script Builder, the following was sent to the MCP19111.



Refer to the PICkit Serial Analyzer User's Guide for information on using the Script Builder for I2C.

The Transactions window shows what was sent and what was received.



This changed the output voltage of the POL to 2.0V.