

PC - Instrument Direct Commands

1.0 General

In addition to data and status, today's instrumentation provides significantly more information over the RS-232 ports. The purpose of this command set is to allow a central processing computer or PC to retrieve and save this information. All instrumentation presents different status information. Each time the CPP polls an instrument, it also polls for relevant status. The CPP decodes the status information and appends appropriate status modifiers to the data byte, if needed. Some instruments must be polled several times to retrieve all relevant status information.

Each time the CPP polls an instrument it saves the status information in a register. The central processing unit can retrieve this status information and present the user with an indication of any detected problems.

2.0 Command Structure

The request command is presented below. This command instructs the CPP to return status information for the channel requested.

$D_C, III, V_1 V_2 V_3, N_1 N_2 N_3, (Field), CC < \text{crif} >$

Where $V_1 = D$

$V_2 = 0$

$V_3 = 1$

$N_1 N_2 N_3 = \text{CPP Ch \#}$

Field = blank, send ().

2.1 Response

The CPP returns a response as follows.

$D_R, III, D01, N_1 N_2 N_3, M_C, M_N, XX, (Field), CC < \text{crif} >$

Where: $N_1 N_2 N_3 = \text{channel \#}$

Field = (binary status code, in parentheses),

$M_C = \text{Two digit Manufacturers code}$

$M_N = \text{Two digit Model Number}$

XX = Information

= OK if all is proper

= NR if instrument is not responding

= NI if the channel requested is not connected serially to an instrument

= NS if instrument does not return status information

The binary status code will be contained in parentheses. Manufacturer codes and model number codes are provided in each detailed command/response section. If the XX is not OK, then the binary field is returned as ().

2.2 Not OK Response

D_R,III,D01,N₁N₂N₃,MC,MN,NR(),CC<crlf>

The MC and MN could actually be a manufacturers code, but the NR would indicate that it is not communicating properly with the CPP>.

3.0 Built In Test Feature

The CPP has a built in routine that allows the user to simulate status bits coming in from an analyzer for testing purposes. Over comm port #4 enter YY<cr>. The CPP responds with

YY Ch# Byte# 00000000<cr>.

This indicates the format of the input string to set up status bits. The spaces may or may not be included. The channel number and the byte number can be in the range of 1 – 8. The eight zeroes is the binary character to be written into the channel and byte selected. An example is given below.

YY 2 3 00110000<cr>

The CPP stores the 8 binary bits into channel #2, status byte #3. It also stores a three minute timeout, before the status will be flagged as missing because the instrument is not responding. To test, channel #2 in the CPP must be initialized as a polled instrument channel that returns status information.

After entering the string the CPP responds with the proper command to request the status information, given below. This is followed by the response to be expected from this command. The response will vary depending on the manufacturer initialized into the CPP channel.

>,010,D01,002,4A

D_R,III,D01,N₁N₂N₃,FE,01,OK,(000000000000000000000000),CC<crlf>

3.1 Forney Instruments

The Forney instruments return three, eight bit bytes as status information. In the set up presented above, the byte should be between 1 and 3. The routine will accept 1 – 8, but in the case of Forney instruments, the input byte will be stored in a non-used location, if the byte selected is greater than three. The binary data entered is the status data.

3.2 Thermo Instruments

The Thermo instruments return eight hexadecimal characters representing 32 binary bytes. These are stored by the CPP as they are received, as hexadecimal characters. Therefore, they can be bytes 1 – 8 in the input string. It should be noted that the binary data entered must be a hexadecimal character that represents the four bits associated

5.0 M&C Response

The response from the M&C PMA100 is presented below. The M&C status response from the instrument is either one or two hexadecimal characters. The CPP always returns two hexadecimal digits for the M&C status.

D_R,III,D01,N₁N₂N₃,MC,01,OK,(H₁H₂),CC<crLf>

Where:

M&C code	= MC	
PMA100-O2 Code	= 01	CPP Status Flag
H ₁ H ₂	= 00	No errors
	= 01	Heating I
	= 02	Man/Ext L
	= 08	Calib Data I
	= 09	System Fault I
	= 10	Parameter I
	= 11	O2 Calib I
	= 13	No Flow I
	= 14	Concentra I
	= 15	External I
	= 16	Measuring Range I
	= 17	Pressure Sensor I
	= 18	Out Of Meas Range I
	= 19	Voltage Failure I

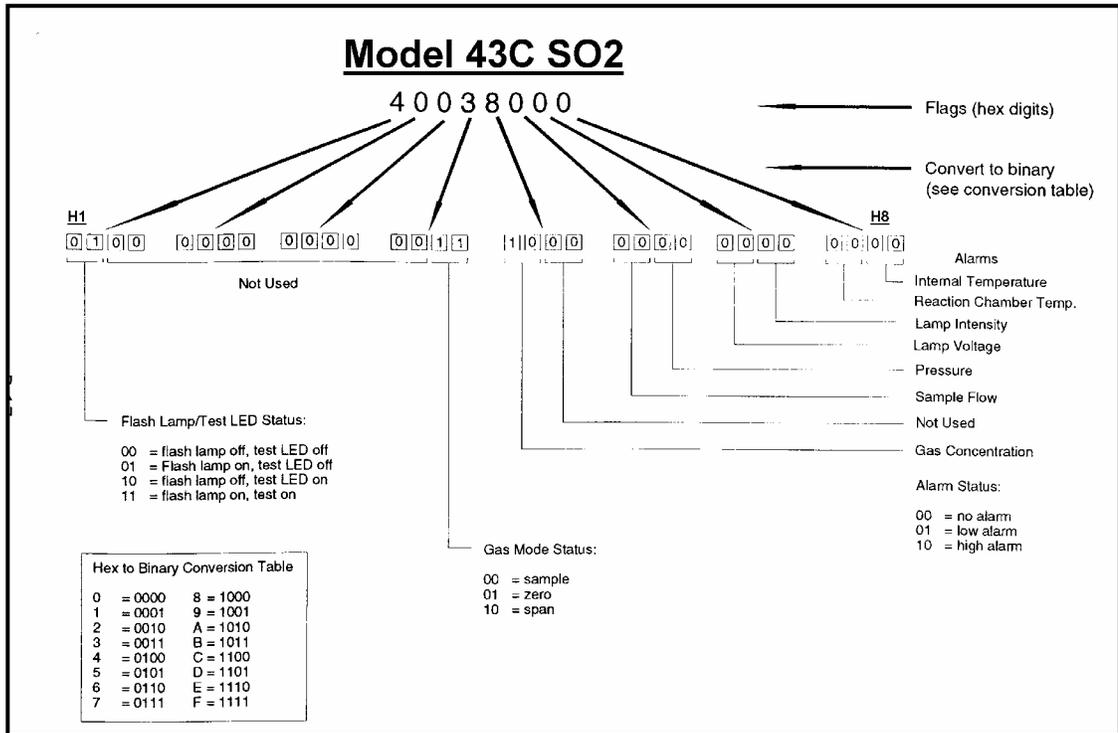
6.0 Thermoelectron Response

The Teco response is as follows. The Teco response is 8 hexadecimal characters representing 32 bits. The bit definitions change depending on the instrument type.

D_R,III,D01,N₁N₂N₃,TI,01,OK,(H₁H₂H₃H₄H₅H₆H₇H₈),CC<crLf>

Where;

Teco Manu code	= TI
43C SO ₂	= 01
42C NO _x	= 02
42C NO ₂	= 03
42C NO	= 04
48C CO	= 05
49C O ₃	= 06

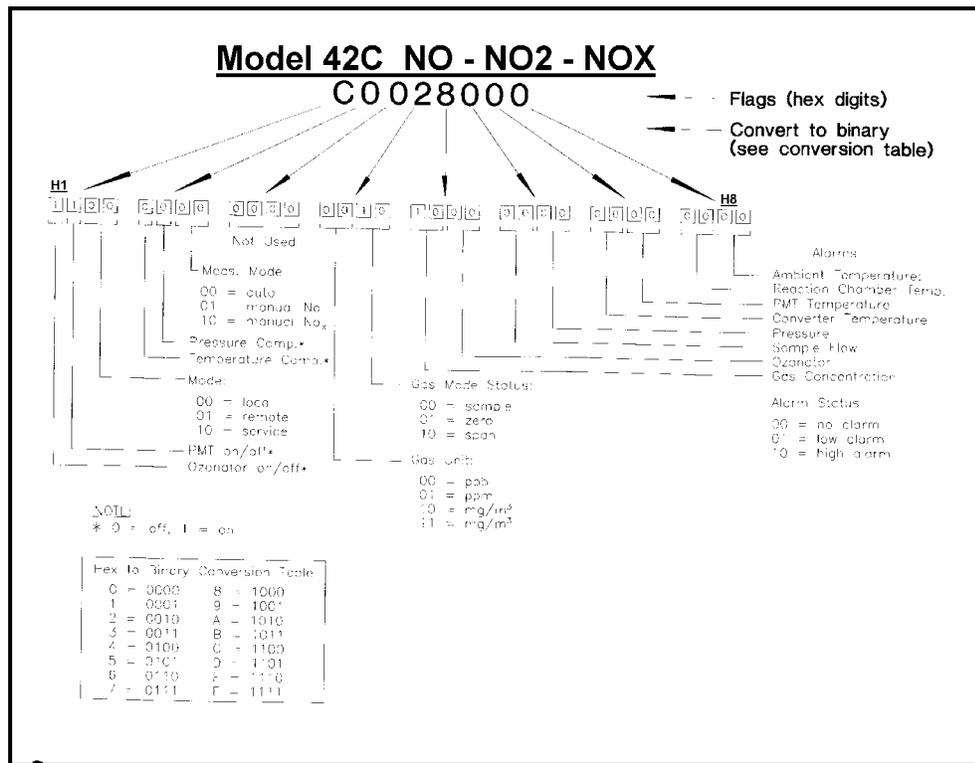


Data retrieved from the Model 43C is flagged with an I modifier under the following conditions.

- H1 not equal to 40H
- Any bit set in H6, H7, H8

Data is flagged with a C modifier if byte H4 so indicates. Instrument status has priority over calibration status.

Data is flagged with a high (A) or low alarm (a) if bits in byte H5 so indicate.



Data retrieved from the Model 42C is flagged with an I modifier under the following conditions.

H1 – PMT Off, or Ozonator Off

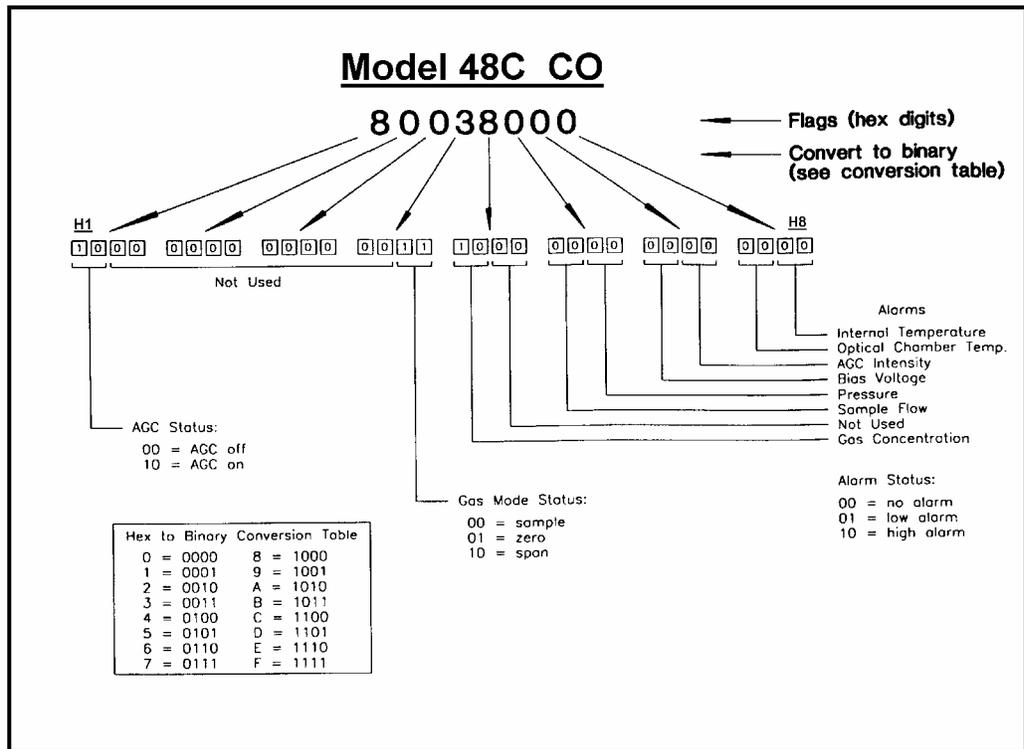
H2 – Pressure, or Temperature bits not equal to zero

Any bit set in H6, H7, H8

Data is flagged with a C modifier if byte H4 so indicates. Instrument status has priority over calibration status.

Data is flagged with a high (A) or low alarm (a) if bits in H5 so indicate.

Data is flagged with an L if H1 – mode is not equal to zero, or H2 – Measure mode not equal to zero.

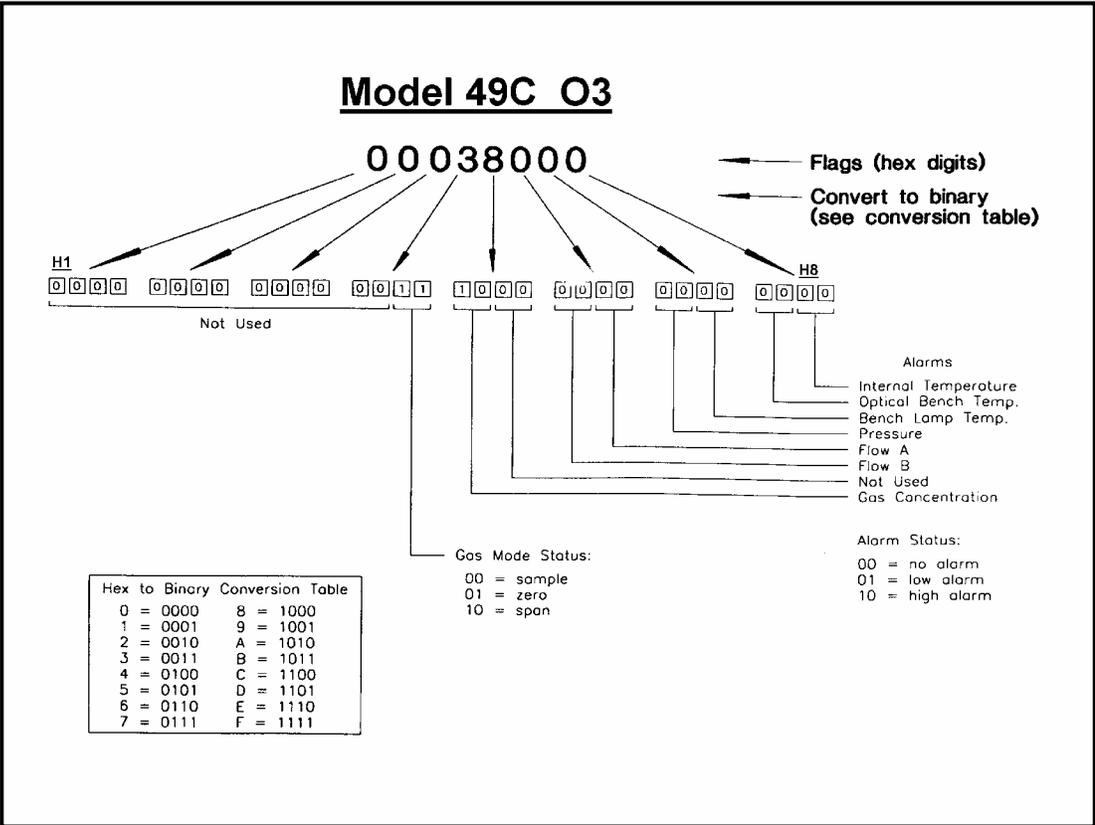


Data retrieved from the Model 48C is flagged with an I modifier under the following conditions.

Any bit set in H6, H7, H8

Data is flagged with a C modifier if byte H4 so indicates. Instrument status has priority over calibration status.

Data is flagged with a high (A) or low alarm (a) if bits in byte H5 so indicate.



Data retrieved from the Model 49C is flagged with an I modifier under the following conditions.

Any bit set in H6, H7, H8

Data is flagged with a C modifier if byte H4 so indicates. Instrument status has priority over calibration status.

Data is flagged with a high (A) or low alarm (a) if bits in byte H5 so indicate.