

Features Of LCD Front Panel

1.0 General

Although a notebook is the desired form of interfacing with the CPP, the CPP does support an LCD display and an optical switch, which allows the user a great degree of interfacing to the CPP. The interfacing is primarily for requesting data presentations, inputting normal system operating parameters, such as zero/span values, starting and stopping calibration cycles, and setting and resetting the digital I/O bits, which allows the integrity of the system operation to be verified. The CPP will also present bar and trending charts for selected data. The features available from the front panel include;

- Displaying A/D voltages,
- Starting/stopping sequencers (calibrations),
- Setting/resetting digital output bits,
- Displaying calibration results,
- Inputting zero/span expected values,
- Displaying recently collected data,
- Setting time and date,
- Setting comm port Baud rates,
- Putting up bar displays,
- Putting up trend displays.

The LCD is a 16 row by 40 column display measuring 2½" x 4¼ (65 x 120mm).

1.1 Communications Bar

The top line of the display is reserved and used to show activity on the communications ports. From the left hand edge of the LCD, comm ports 1 through 4 are presented and then comm ports 3-01 through 3-08. Given the number of spaces in the Comm Bar, comm ports 3-01 through 3-08 are numbered 1 through 8, but they start about 1/3 across the Comm Bar. Activity is presented as 4rt, where the comm port is number 4 and it is both receiving and transmitting. If it was just transmitting it would display as 4 t.

The top line of the LCD is also used to apprise the user of some potential problem that the CPP has detected. Under such conditions, the CPP displays ERL if the far right hand corner of the top line. Any detected condition can be determined by calling up and displaying the error log. This can be done from the LCD on the front panel or from comm ports 1 or 4. The ERL condition is cleared by clearing the error log.

1.2 Time Bar

The bottom line of the LCD display is used to continuously display the time, Julian date and the calendar date.

1.3 Authorization Code or Password

The CPP front panel supports a numbered password feature designated as an authorization code. If a code is set up then the user must enter the code before any active commands can be invoked from the front panel. Viewing data, calibration results and other system settings can still be accomplished, however, the display format can not be changed nor can commands be sent to the CPP. The authorization code feature is covered in section 2.12, System Configuration.

The code is useful to stop well meaning, but errant fingers from upsetting the monitoring configuration, as well as malicious fingers.

1.4 Power Up checks

At power up, the CPP conducts a series of internal checks. This is displayed on the LCD and all front panel controls are disabled until the power up checks are completed.

1.5 Backlight

The on/off control of the backlight can also be set up by the user. The system default is for the backlight to automatically turn off after two hours of non front panel activity. The backlight has a half life intensity of 10,000 hours. Although noticeable in a side by side comparison, a backlight operating at ½ intensity is very useable and does not present an objectionable presentation. The operating lifetime of the backlight can be extended by allowing it to automatically turn off during times of non activity. In conditions where the backlight needs to be on at all times, the user can select this operating option in the System Configuration.

2.0 Menus

All display presentations have an Exit option which returns the unit to the Main Menu. Turn the optical switch until this selection is highlighted. Press the rotary switch to activate the built in pushbutton and return to the Main Menu. Following power up the CPP presents the Main Menu as given below.

Main Menu

A/D Readings	Start/Stop Seq
Channel Vals	Digital I/O
Cal Values	Zero/Span Vals
Display Avgs	Set Time/Date
System Logs	Serial Ports
Reserved	System Config
Bar Charts	System Review
Trend Chart	Special Menus

The first line (A/D Readings) will be highlighted (enclosed in a box). Turn the rotary switch clockwise to move the box down the menu and counterclockwise to move the box up the menu. Pressing the pushbutton selects the highlighted menu item. From the Main Menu, this normally opens a subsequent menu for selecting a particular operation. In some cases, such as the bar & trend presentations, the last configuration set up is presented with a selectable icon for making changes. In some cases, such as the last data values, no further action is required as all values are brought up and displayed. The sub menus for each major category are presented below.

2.1 A/D Readings

Depressing the pushbutton with this category highlighted results in the CPP presenting the instantaneous reading from the analog to digital converter for the first four channels.

A/D Readings

Ch #	Range	Reading
01	1 volt	0.500
02	5 volt	2.500
03	10 v	5.00
04	4-20mA	10.00

Exit

Turning the switch clockwise scrolls the channels presented in increasing A/D channel order. This may or may not correspond to channel numbers in the CPP depending on how the A/D Channels were assigned to CPP channels in the system initialization. Turning the switch counter clockwise scrolls the channels presented in decreasing order. Depressing the pushbutton returns to the Main Menu.

2.2 Channel Values

The channel values presentation is similar to the A/D Readings presented above except that data presented is organized by CPP channel number. The CPP also uses the initialized full scale and zero value to provide an instantaneous readout in the parameter units. Depressing the pushbutton results in the CPP asking the following question.

Channel Values

Engineering Units
Scientific Units
Return To MM

Selecting the engineering units presentation results in the CPP displaying the first four channels data and status as presented below.

Channel Values

Ch #	Name	Units	Reading	Status
01	SO2	ppm	125.5	C100
02	T-in	deg C	82.2	8000
03	T-out	deg C	68.7	8000
04	Flow	scf/m	105.0	8000

Exit

Turning the switch clockwise scrolls the channel selection in increasing numbers, and turning the switch counterclockwise scrolls the channel selection in decreasing numbers. Depressing the pushbutton returns to the Main Menu.

The CPP captures and stores 16 independent status conditions for each data point. Since a data point could have more than one status condition existing at any time, in this presentation the status word is presented in hexadecimal so that any condition can be determined. The meaning of the codes is presented in section 3 of the CPP manual, and repeated at the end of this Tech Note.

2.3 Calibration Results

The latest calibration results can be displayed on the front panel display. Selecting this option brings up the following sub menu, which presents the channels that have been set up as calibration channels.

Cal Results

Exit

Chan # 01 02 04 07

Turn the switch until the desired channel is highlighted and press the pushbutton. The CPP presents the calibration results as presented below. If no channels have been set up as calibration channels, the CPP will present such a message.

Cal Results

Exit

Chan # 01 02 04 07

01 SO2	B0	05-12-99		
	Start	Stop	Value	Exp Val
Z	08:00:00	08:15:00	1.2	0.0
S1	08:15:00	08:30:00	272.1	270.0

If the CPP is conducting more than one span, then the other span results would follow the S1 span presented above. The B0 will be highlighted. Turning the switch clockwise will result in the CPP going back and presenting the previous calibration results. The B0 will change to B1, B2, and so forth. The date indicates which days calibration results are being displayed. In a like manner, turning the switch counterclockwise presents more recent calibration results. Pressing the pushbutton returns to the channel selection mode, allowing other channels to be viewed.

When a channel is selected, the CPP searches the stored calibration table looking for the occurrence of a zero cycle. When one is found, the CPP presents all zero/spans that are stored for this channel. The date presented as the date of this calibration is the date associated with the start of the zero cycle. In some instances the span cycles are conducted first and then the zero cycle. The CPP will not present any results until the zero cycle is completed.

2.4 Display Averages

The averages formed by the CPP can be displayed on the front panel. Selecting this option brings up the sub menu presented below. From this menu the user can select either the preliminary, the interim, or the final averages for display.

Display Averages

Exit

Prelim

Interim

Final

Select the desired average to be displayed and press the pushbutton. The CPP brings up the last 4 values for the selected average for channels 1-4. Older averages can be viewed by turning the switch clockwise. Likewise, more recently formed averages can be viewed by turning the switch counterclockwise. This routine is exited by turning the switch counterclockwise with the pushbutton pushed until the Exit is highlighted and pressing the pushbutton.

The channels being displayed can be scrolled by holding down the pushbutton and turning the switch. Data is displayed as presented below.

Display Averages

Exit	Prelim	Interim	Final	
Chan	01	02	03	04
Time	SO2	NOx	O2	DegF
13:00	120.0	65.4	10.3	192.2
12:00	110.3	60.2	9.9	188.8
11:00	115.4	62.8	10.2	190.1
10:00	116.5	64.4	10.5	191.3

2.5 System Logs

Several logs providing information on system operation can be called up and reviewed on the front panel. Selecting this option brings up the following sub menu.

System Logs

Exit
Pwr fail
Comm Err
A/D Err
Alarm
Clr Err
RamPack

Selecting the power fail option brings up the power fail log. The type of log entry is identified by a two character code, where OL = Off Line, PF = Power Fail, TC = Time Change, BO = Brown Out, and DS = Time Set To DSM Time.

Selecting the Comm Err log presents any errors that were detected on comm ports used to collect serial data from instruments. To provide a compact presentation, the errors are presented as hyphenated and abbreviated mnemonics. The definitions are Cp (Comm Port), No-R (No Response), R-Err (Response Error), Un-R (Unknown Response), M-Er (Model Number Error), and C-Er (Comm Port Error). A comm port error is an improper set up condition detected by the CPP. To aid in detection, any non zero indication is flagged with an asterisk.

This screen also presents a completed poll indication. This should always be zero. A non zero means that the CPP could not poll all of the instruments connected in a one minute time frame. Rearranging comm port assignments will normally correct this problem.

The Ext I/O status indicates that an error was detected when transferring data to an external I/O device. Since there are independent units communicating over a serial line, there could occasionally be an error, but it should be very infrequent. An incrementing error condition means that something is wrong and needs to be corrected.

The A/D No Response provides an indication that the A/D subsections are communicating with the CPP. These should be zero. Each A/D subsection contains four analog input channels. Error indications are as follows;

01 - 04 = A/D subsection

0₁0₂-0₃0₄

0₁ = Type of error

4 = Could not find A/D subsection

2 = Subsection did not return all data

0₂ = Not used

0₃0₄ = counter for above errors. Counts up to 19 then holds.

The Alarm log brings up any channels that are in an alarm condition.

The Clr Err clears the error log registers.

Selecting the RamPack option brings up information regarding the RamPack. The CPP checks and reports the status of the RamPack.

System Logs

Back RamPack

RamPack 2Mb

Battery Good

Err 0000

WADR 00 00 00 00 LADR 00 00 00 00

If a RamPack is not installed, the CPP will present such a message. If the RamPack internal battery is weak or bad, the CPP will present such information. If any errors were detected while writing to the RamPack, the Err counter would not be zero. If a RamPack that has been formatted as a configuration RamPack is installed, the CPP will detect and report this condition. The CPP will not record data on a configuration RamPack. Any error indications are cleared with the Clr Err command. The bottom line is RamPack internal address registers, and are of importance only to H2NS personnel.

The Err 0₁0₂0₃0₄ indicates the following;

0₁ = A write error was detected

0₂ = The RamPack is unformatted

0₃ = Write address bad

0₄ = Last address bad

2.7 Bar Charts

Selecting the Bar Charts icon brings up the Bar Chart #1. The CPP supports two independent bar charts. These are set up in the System Configuration section. The bar charts can be presented without entering the password.

Bar Charts

Bar Chrt#1	Bar Chrt#2
01P Chan#1	Four Bar Charts Presented In This Area
03I SO2RL	
04F SO2-3H	
05F TEMP	

Use the switch to select the desired bar chart presentation. Each bar chart can have four channels presented, with the input to each channel presentation being the instantaneous, preliminary, interim, or final average data points. The channels in a bar chart can be different or the same channel with different averaging intervals.

Four bar charts are presented in the space above. To the left of the screen, the 01P indicates CPP channel number 01, and the bar chart is presenting the preliminary average. The following terms are used; P - preliminary, A - instantaneous, I - interim, and F - final. The actual value is also printed to the right of the display. This routine is exited by pressing the pushbutton.

2.9 Sequencers

The sequencers can be started and stopped from the front panel. Making this selection brings up a subsequent menu that allows any sequence to be selected. This presentation also displays any sequencer label that has been entered. The Exit will be highlighted which if selected returns to the Main Menu.

Sequencers

Seq #	Label
Exit	
01	SO2 Calibration
02	NOx Calibration
03	Blowback-6,12,18,24 hrs
04	None

Turning the switch clockwise displays higher numbered sequencers. Turning the switch counterclockwise moves the numbers in the smaller direction. Depressing the pushbutton selects a particular sequence and the next menu is brought up.

Sequencers

01 SO2 Calibration
Back
Start Seq
Stop Seq
Single Pass

Selecting the Back option returns to the previous menu. If a sequence is active, *i.e.*, it is actively controlling the digital I/O bits, then the CPP will not accept a command to start the sequence or to start a single pass. It will provide a message that the sequence is active. If a sequence has external enabling criteria set up, then the external setting must meet the set up criteria or the CPP will not start the sequence. It will provide a message that the sequence is disabled. If a command is issued to a sequence that has not been initialized then the CPP ignores the command and provides a message.

Starting a sequence results in the sequence starting at the present time, and transfers the rep rate into the counter. From this time forward, sequences set up as automatically starting run from the entered rep rate. Should a power fail or time change occur, the system uses the entered start time and the restart criteria to restart the sequence. If the sequence is not set up as an automatic start sequence, then after all T times have been completed, the sequence will not restart, unless the conditions initiating a manual start are met.

Stopping a sequence results in the sequence being stopped at the present time. If the sequence is set up to automatically start, the sequence will restart at the entered start time. A sequence set up to manually start will restart when starting conditions are met.

A single pass starts a single pass through all T times. The original rep rate in the counter is not changed. Therefore this sequence continues to cycle at the rep rate related to the entered start time.

The CPP responds to all commands with a message in the following format.

Sequencers

```
Seq#            Label
01            SO2 Calibration
Back
I/O Now
Seq # 01-Started
  1                            24
In  00000000 00000000 00000000
In  00000000 00000000
Out 10000000 00000000 00000000
Out 00000000 00000000
```

Although shown above, the I/O settings are not presented until they are requested with the I/O Now selection.

2.10 Digital I/O

The Digital I/O selection allows the existing setting of the digital input bits and the digital output bits. The labels assigned to these bits can also be reviewed. Making this selection brings up the following sub menu.

Digital I/O

Exit
I/O Now
Set I/O
Labels

Selecting the I/O Now displays the instantaneous settings of the digital input and output bits as presented below.

Digital I/O

Exit
I/O Now
Set I/O
Labels
1 24
In 00000000 00000000 00000000
In 00000000 00000000
Out 00000001 00000000 00000000
Out 00000000 00000000

Selecting the Labels options displays the labels that have been assigned to the digital I/O bits. Each I/O bit can have a 20 character label. For ease in reviewing on the LCD, these labels are limited to 16 characters on the front panel display. An example is presented below. The first two digits are the bit #, and the next two numbers are the digital input and digital output settings, respectively.

Digital I/O

Bit-IO	Input	Output
01-00	Flow Status	* Blow Back
02-01	Stack Temp	* SO2 Zero
03-00		* SO2 Span
04-00	O2 Limit	*

Turning the switch clockwise presents increasing numbers and turning the switch counter clockwise presents decreasing numbers. Pressing the pushbutton returns to the previous menu.

The user can also set and reset the digital I/O bits from this sub menu. Select the Set I/O option. The CPP presents the following screen.

Digital I/O

```
Back Set I/O
      1                24
In   00000000 00000000 00000000
In   00000000 00000000
Out  00000000 00000000 00000000
Out  00000000 00000000
```

Out 12 SO2 Zero

Turn the switch until the In or Out that has the desired bit is highlighted with a blinking cursor. Press the pushbutton. The cursor will move to the first bit, reduce in size and blink. Turn the switch until the cursor is under the desired bit. Pressing the pushbutton will toggle the bit setting. Both input and output bits settings can be forced to a true state by the user. They can not be forced into a permanent off state. Set bits will remain in the set state until reset by the user. If a password is set into the front panel controls, this feature can not be entered without entering the password. The bit patterns presented in the screen are not the actual input/output settings. They are the operator settings registers which are "or'ed" into the I/O registers.

The CPP displays the bit number the cursor is on and any label assigned to this bit in the lower part of the display. This routine is exited by turning the switch counterclockwise until the cursor is blinking under the I or the O and depressing the pushbutton. The cursor is made larger to acknowledge the switch.

2.11 Zero/Span Values

Zero and span expected values can be viewed and entered from the front panel. Selecting this option brings up the following menu.

Zero/Span Values

Exit

Ch # 01 02 05

The CPP presents the channel numbers of the channels that have been initialized as calibration channels. If no channels have been set up as calibration channels, the CPP puts up such a message in place of the channel numbers. The only option enabled in this scenario is to exit back to the Main Menu. If channel numbers are presented, they can be selected by turning the switch. The CPP will display the channels name and the zero and span values settings as the switch is turned. Press the pushbutton when the desired channel is highlighted to change the channels settings.

Zero/Span Values

Exit

Ch # 01 02

SO2

Zero 0.000E+0

Span1 1.200E+2

Span 2 2.550E+2

The Zero value will be highlighted. Turning the rotary switch moves the highlighted value up and down. If a value is to be changed, depress the pushbutton when the desired value is highlighted. The CPP will open another window to the right of the selected value with the selected value being displayed, +1.200E+2 R. The Cursor will be blinking under the R. Turn the switch to move the cursor to the desired number or sign. Press the pushbutton to select this number. Turning the switch sequences the number 0 - 9. Press the pushbutton when the desired value is displayed. After the desired value has been entered, move the cursor to the R and press the pushbutton. The entered value will be moved into the value setting.

If a password has been set up, the values can not be changed without entering the password. This routine is exited by turning the switch counter clockwise until the Exit is highlighted and pressing the pushbutton.

2.12 Set Time & Date

The time and date of the CPP can be set from the front panel. Selecting this option brings up the following menu.

Set Time & Date

Exit
Time 00:00:00 Set
Date Jan-01-2000 Set

To set the time or date turn the switch until either Time or Date is highlighted. Press the pushbutton. If time is being set, the cursor starts blinking under the hours of the time. To set the hours, press the pushbutton. The cursor changes sizes. Turn the switch until the desired hour is being displayed and press the pushbutton. The cursor changes sizes again. Continue this process for the minutes and the seconds. After the time has been set turn the switch clockwise until the cursor is blinking under the Set. Press the pushbutton. The cursor reduces in size. Press the pushbutton again and the cursor disappears. This stores the setting to update the CPP clock upon exiting the routine. The Time is highlighted. Use the rotary switch and pushbutton to exit or to set the date.

If the time or date settings are not set in by moving the cursor under the Set and pressing the pushbutton, the setting will not be transferred into the CPP. Turning the switch counterclockwise until the cursor disappears does not store the settings to update the CPP clock. If a password has been set up, the password must be entered before the time or date can be changed.

2.13 Serial Ports

This option allows the user to review the serial port baud rates and assignments. Selecting this option brings up the following information.

Serial Ports

Station Name 010 V15
Comm #1 9600 01,H,h
Comm #4 9600
Broadcast Inputs - C2 19.2K CLI

Ch#	Comm	Baud	Manu	Model
01	3-01	9600	API	100C

03	3-02	9600	TEC	42C
04	3-03	9600	MLB	9832
06	3-04	4800	CSI	???

More>

The top line gives the CPP assigned station name, the station numerical ID, and the installed program version. The second line provides information for comm port #1. In the example the Baud rate is 9600, and the DSM emulation ID is 01. The capital H is the ID that is used in conjunction with the DSM emulation that allows direct communications with the instrumentation. The little h is the ID that invokes a quiet or computer transfer of data. This data is transferred as a comma delimited ASCII file.

The next line indicates the Baud rate of comm port #4. This is followed by a listing of any instrumentation connected that operates in the broadcast mode. This is normally meteorological sensors.

The bottom portion is used to provide information on any channels collecting data from instruments via their serial ports. Four are displayed at a time. If more than four are connected then the More> prompt is presented. Use the rotary switch to scroll to other channels. This routine is exited by pressing the pushbutton.

2.14 System Configuration

Selecting this option allows the user to set up various operating parameters of the LCD display. The CPP brings up the following sub menu.

System Config

- Exit
- Password
- Screens
- Bar Charts
- Trends
- Help

2.14.1 Password

The following discussions use the term password, although it really references a hexadecimal pass code. The front panel uses numbers 0 - 9, and letters A - F. The CPP supports three levels of password regarding changing system operating parameters from the front panel controls. If a password has not been set up, making this selection brings up a sub menu for setting up the three levels of password. If a password has been set up, then the CPP requests the password which must be properly entered before further access is granted.

The CPP puts up four zeroes with the cursor blinking under the first digit. Select this digit by pressing the pushbutton. The cursor changes. Use the switch to select the desired code and press the pushbutton. Repeat this procedure until all four codes have been entered, then select Code and press the pushbutton. If the correct code has been entered, access is granted, else the request is aborted.

System Config

Back
Honcho Level 2 Level 3

0000 Set

The Honcho password has the highest authority, and no other level can be set if the Honcho password is not set. Clearing the Honcho password clears levels 2 and 3 as well. The Honcho password has access to all front panel controls. Selecting the Honcho results in four zeroes being presented underneath the Honcho on the screen, with the cursor blinking under the first digit. This is shown above.

A password code of all zeroes is a null and disables the password feature. To change or set a code, turn the switch until the cursor is blinking on the desired digit and press the pushbutton. Turn the switch until the desired number or letter is being displayed, and press the pushbutton. Repeat for all digits. Zeroes are valid inputs, and unchanged zeroes are considered part of the password if any digit is set to non zero. After setting a Honcho password, passwords for levels 2 and 3 can be set. Setting a password for level 2 or level 3 brings up the following screen that allows features to be assigned to this level of password. Features not assigned to this level can not be accessed.

System Config

Back	Set Password	
Honcho	Level 2 0000 Set	Level 3
Seq	N	
Z/S	Y	
Time	N	
D/O	Y	

2.14.2 Screens

This selection allows the user to have a default screen, such as a trend chart instead of the Main Menu, to come up following a power fail. It also allows the user to have the CPP not turn off the backlight. Any special screens provided in this firmware version will also be included in the selection menu. Selecting the screens option brings up the following sub menu.

System Config

Back	Default Screens
Backlight	On/Off
Default Screen	None
Bar Chart	#1 #2
Trending	#1 #2

To control the operation of the backlight, turn the switch until the On/Off is highlighted. Pushing the pushbutton toggles this setting between On, and On/Off.

To select a default screen following a power up turn the switch until the desired screen is highlighted and press the pushbutton. The selection should appear in the Default Screen box. Pressing the pushbutton when only the Default Screen box is highlighted clears any default screen, and the Main Menu is presented following a power up.

2.14.3 Bar Charts

The CPP allows two bar charts to be defined and stored. Each bar chart can have up to four signals. The input to the signals can be the Instantaneous values, the preliminary values, the interim values or the final values. The inputs can be mixed on the same bar chart. For example, the preliminary value can be displayed on one channel and the three hour rolling average for the same signal presented on another channel.

System Config

Back Bar Chart #1 #2

Pos #	Input	Type	Name
Chan #1	02	P	SO2
Chan #2	03	F	SO2 RL
Chan #3	04	I	SO2 RL
Chan #4	11	A	Temp

The “Input” above is the CPP channel number. Under the type category, an A indicates an instantaneous input, a P a preliminary input, an I an interim input, and an F a final input.

Use the switch to select the desired Bar Chart number and press the pushbutton. The CPP will present any stored set up and the highlight the first Position #. Use the switch to select the desired input (Position #) and press the pushbutton to select. The CPP will also highlight the Input. Turning the switch allows the desired channel number to be selected. Press the pushbutton to select the displayed channel number. The CPP then highlights the Type. Use the switch the flip between the A, P, I, and F selections. Press the pushbutton to select the desired input type.

2.14.4 Trend Charts

The CPP allows two trending charts to be defined and stored for presentation. Each trend chart can have two input signals. The type data can also be selected, and is assigned to both channels. The set up screen is similar to that presented above for the bar charts.

2.15 System Review

This option allows the user to select a channel and review how it is set up. This is analogous to what is presented in the L keyin via comm port #4. Select the desired channel using the rotary switch. Press the pushbutton to view the displayed channel number. The cursor changes and the CPP displays the channels set up. To get back to the rotary switch, press the pushbutton. To exit this routine, select channel number 00 and press the pushbutton.

If this channel is collecting data from an instrument via a serial port, the CPP presents the following information.

System Review

Chan #01 VSCA 01,05,60

Name	Teco	ID-43
Units	43C	IMD - 00
Full Scale	3-01	
Zero	9600	
# Int avgs		
# Fin avgs		

The VSCA represent the following; V - validity, S - Sample delay, C - calibration, A - alarm. These characters are presented only for the functions that have been assigned to this channel. If there were no alarms set up for this channel, but the other functions applied, then VSC would be displayed. The 01, 05, 60 are, respectively, the preliminary average, the interim average, and the final average.

If the selected channel is getting data from the analog to digital converter, the CPP presents the following.

System Review

Chan #01 VSC 01,05,60

Name	A/D
Units	01
Full Scale	4-20ma
Zero	
# Int avgs	
# Fin avgs	

If the selected channel is a computed channel, then the CPP presents the following. The F=0 indicates the function code applied to the final computed number. Zero indicates that no other function applies. A one indicates that the square root of the final number should be taken and stored.

System Review

Chan #01 VSC 01,05,60 Computed
F=0

Name	[(ChA)(K1) op1 (ChB)(K2)]
Units	op2
Full Scale	[(ChC)(K3) op3 (ChD)(K4)]
Zero	
# Int avgs	
# Fin avgs	

If the selected channel is a rolling average channel, the CPP presents the following. In the example, the 04 is the input channel data, and this channel has been set up to form a 1 hour rolling average from the preliminary averages.

System Review

Chan #01 VSC 01,05,60 Rolling (Building)

Name	04
Units	1hr
Full Scale	P
Zero	
# Int avgs	
# Fin avgs	

If the selected channel has also been configured as a meteorological channel the CPP so indicates in the first line, as presented below.

System Review

Chan #01 01,05,60
Met HWD5V - 02
(HWS V - 01 - 01) other examples

The above would indicate that this channel is being treated as a 540 degree horizontal wind direction (HWD5) input, and a vector wind direction is being calculated using channel #02 as the associated wind speed. If a scalar wind direction was being calculated, the CPP would present HWD5S. If a 360 degree sensor is being used, the 5 becomes a 3. If the channel is conducting a sigma theta calculation, the mnemonic would be ST - 02, where the 02 indicates the channel being used as the horizontal wind direction channel. A sigma W would be presented as SW - 02.

The CPP supports a direct met interface which uses internal counters to determine the wind speed. If an internal counter is being used, then the second number is the number of the internal counter. If the internal counters are not being used, then nothing is printed.

3.0 Binary Status Indications

First Status Byte

Status Code Bit	Meaning
M	7 - 00 = Missing Bits 7 & 6 are decoded
G	6 - 10 = Good as given here
B	- 01 = Bad
o	- 11 = Other
R	5 - 1 = Instrument No response
L	4 - 0 = Instrument On Line, 1 = Off Line
P	3 - 1 = Instrument Parameter Alarm
A	2 - 1 = Data High Alarm
a	1 - 1 = Data Low Alarm
C	0 - 1 = In Cal, 0 = In Sample

Second Status Byte

F	7 - 1 = Power Fail
>	6 - 1 = Not All Samples , But More Than Required
<	5 - 1 = Not All Samples, And Less Than Required
M	4 - 1 = Math Error
D	3 - 1 = Downed By Operator
	2 = Encoded 0 = U - Nothing 4 = S - Smp Delay
	1 = " 1 = Z - In Initialization 5 = Undefined
	0 = " 2 = V - A/D Calibration 6 = Undefined
	3 = V - Validity 7 = Undefined

The first status byte contains status information that is normally provided by most instrumentation. The status conditions in byte number one can also be generated inside the CPP. For example, the high/low alarms may not be set up in the instrument, but are set up in the CPP. In this case these status bits would be provided by the CPP. Obviously both could be set up. If the status condition is set by one it will not be reset by the other.

Either an M, G, B, Or O is printed with each data point, and if any other status bits are set, then secondary flag indicator is also printed. In highest to lowest priority these are printed as; F, Y, Z, R, L, C, D, M, I, A, a, >, <.

Bits 2, 1, an 0 of the second status byte are available to be encoded to provide additional data status. If they are used they are defined in a special applications section. These bits are defined in the standard CPP in several categories.