SECTION 1: GENERAL INSTRUCTIONS

"Where To Find" Features

The following is a list of commonly used WCC III features and the screens you should access to use them.

FEATURES	SCREEN
Alarms	
"E-mail-Out-On-Alarm" Call "All" or "Either" E-mail Address Input E-mail Address	 System Parameters
Clear (Acknowledge) Alarms	Alarm Summary
Set Alarm Limits Analog Inputs Run Time Global Analog Values Global Binary Values	 Analog Input Screen Trend Logs Global Analog Global Binary
View Alarms All Alarms Global Alarms	 Alarm Summary Global Summary
Demand Limiting	Shed/Restore
Monitor Analog Inputs (Temperature/Pressure etc.) Find Highest or Lowest Building Temp Find Average Building Temp Present Value Trend Logs	 Global Analog-Sort Global Analog-Avg Analog Input Summary Analog Trend
Monitor Binary Inputs (air flow switch etc.) Present Value Trend Log.	 Logic Switches Change of State
Password Entry Assign Operator Access Codes "Sign-On" "Sign-Off".	 Sys Par/Oper Codes System Parameters Secure Screen
Schedules Change Schedules Permanently. Holiday Schedules	 Week Schedules Holiday & Week Sch
Setpoints Change Setpoints - Satellite Change Setpoints - TUC	 Control Outputs SCUSCR
Sequence Satellites After a Power Outage	Satellite Summary
Time and Date Modifications	System Parameters

WCC III Routine Maintenance

The following maintenance items should be performed on a regular basis:

Service Item	As Req'd	Every Wk	Every Mo	Every 3 Mo	Every 6 Mo	Every 12 Mo
Blow out keyboard	X					X
Blow out MCD assy	X				X	
Check all external cable connections	X					X
Test/Verify U.P.S. operation					X	
Clean display screen	X		X			
Dim display screen	*X					
Clean floppy drive	X				X	
Test floppy drive					X	
Test MCD memory					X	
Test display monitor					X	
Test modem (system's ability to e-mail-out-on-alarm)	X			X		
Delete "back-up" (*.bak) files	X					X
Make "back-up" copies of program	X		X			
Check disks for available space to prevent overfilling the disk	X			X		
Check loop connection on rear of MCD					X	

Service Item	As Req'd	Every Wk	Every Mo	Every 3 Mo	Every 6 Mo	Every 12 Mo
Save satellite data to disk	X		X			
Test satellites' local-set capability						X
Test satellites' battery (or capacitor)						X
Check/Reset trend logs	X		X			
View/Clear all alarms	X	X				
Cycle power to MCD to verify correct system re-start after a power outage				X		

* Set the screen's intensity to the lowest setting when the system is not being used.

WCC III Installation Software CD Information

There are three available CD-ROMs available from WattMaster Controls, Inc. - either from the factory or downloadable from the wcc-controls.com website. They are as follows:

WattMaster Part # DM1WC011-01X*

This is the contractor installation CD for the main WCC III System. This CD installs the following programs: WCC3.EXE, SCUSCR.EXE, WCCUTILITY.EXE, TENANTOVERRIDE.EXE, TENANTREPORT.EXE, WCC3TRENDLOG.EXE, WCC3DOWNLOAD.EXE, WCC3GUEST.EXE

WattMaster Part # DM1WC012-01X*

This is the end-user installation CD for "View Only" versions of the WCC III system. This CD only installs the following programs: WCC3GUEST.EXE and SCUSCRLtd.EXE

WattMaster Part # DM1WC013-01X*

This is the end-user installation CD for the Tenant Override program. This CD only installs the following programs: TENANTOVERRIDE.EXE

* = Where "X" is the software version A to Z.

WCC III Software Version List

The WCC III software is updated periodically to include more features. The two files that change as the WCC III system is upgraded are the WCC III file and the BACKTASK file. When a WCC III file is installed in a system, the BACKTASK file may need to be changed also. The Backtask software is located in the MCD.

NOTE: You can see the present WCC III and BACKTASK version used by the system by looking at the lower left hand corner of the *Main Menu Screen.*

Recommended Data Entry Procedure

When setting up an WCC III system, the screens can be programmed in any order. However, you may find it easier to follow this sequence:

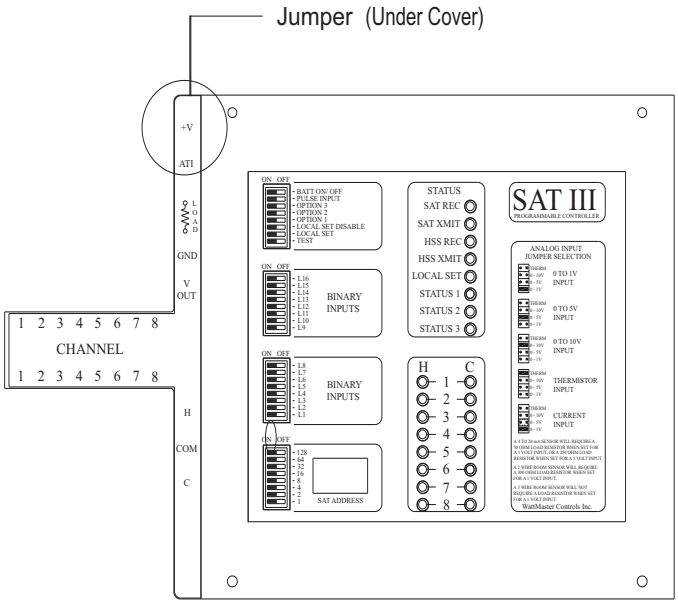
1. Make Back-Up Copies of the Program/Data Files.
2. System Parameter Screen
3. Satellite Summary Screen
4. On/Off Units Messages Screen / Alarm Message Screen —Enter the On/Off messages, units of measure messages, and alarm messages, and then print a copy of the messages. Keep a copy of these messages handy while entering data on the remaining screens.
5. Week Schedule Screens
6. Holiday Screen
7. Analog Input Screens
8. Logic Switch Screens
9. Control Output Screens
10. TUC Screens
11. Analog Output Screens
12. Analog Global Screens
13. Binary Global Screens
14. Optimal Start Screens
15. Shed/Restore Screens
16. Duty Cycle Screens
17. Proportional Reset Screens
18. Energy Consumption Screens
19. Trend Log Screens
20. Save Satellite Data to Disk
21. Make Back-Up Copies of the Program/Data Files.

Analog Inputs

An analog input is a numerical value (signal) sent from the SAT III controller to allow monitoring of space temperatures, duct pressures etc. The SAT III controller can accept 8 analog inputs which are named, A1-A8. (NOTE: A1-A8 may be either analog or binary inputs.) On certain screens (such as *Global Analog Screens*), you must indicate the satellite controller number along with the channel on the satellite controller. For example, 12A2 means satellite controller #12 analog input number 2.

The analog inputs are usually wired to the "+V" and "ATI" (Actual Temperature In) terminals on the SAT III controller (three wire sensors are wired to the "GND" terminal also.) The "+V" terminal on channels 1-7 are a 12 VDC power source. The "+V" terminal on channel 8 provides either 12 VDC or 24 VDC depending on the position of the jumper under the cover near channel 8. To get 12 VDC from the "+V" terminal on channel 8, the jumper must connect the 12 volt and center terminals. To get 24 VDC, the jumper must connect the 24 volt and center terminals.

A thermistor and 20 mA sensor can be used on the SAT III controller. You choose the type of sensor to be used by selecting the appropriate jumper (located under the SAT III cover). The choices are Thermistor, 0-10 V, 0-5 V, 0-1 V and Jumper A1 used J01, A2 used J02 and so on up to A8 uses J08.

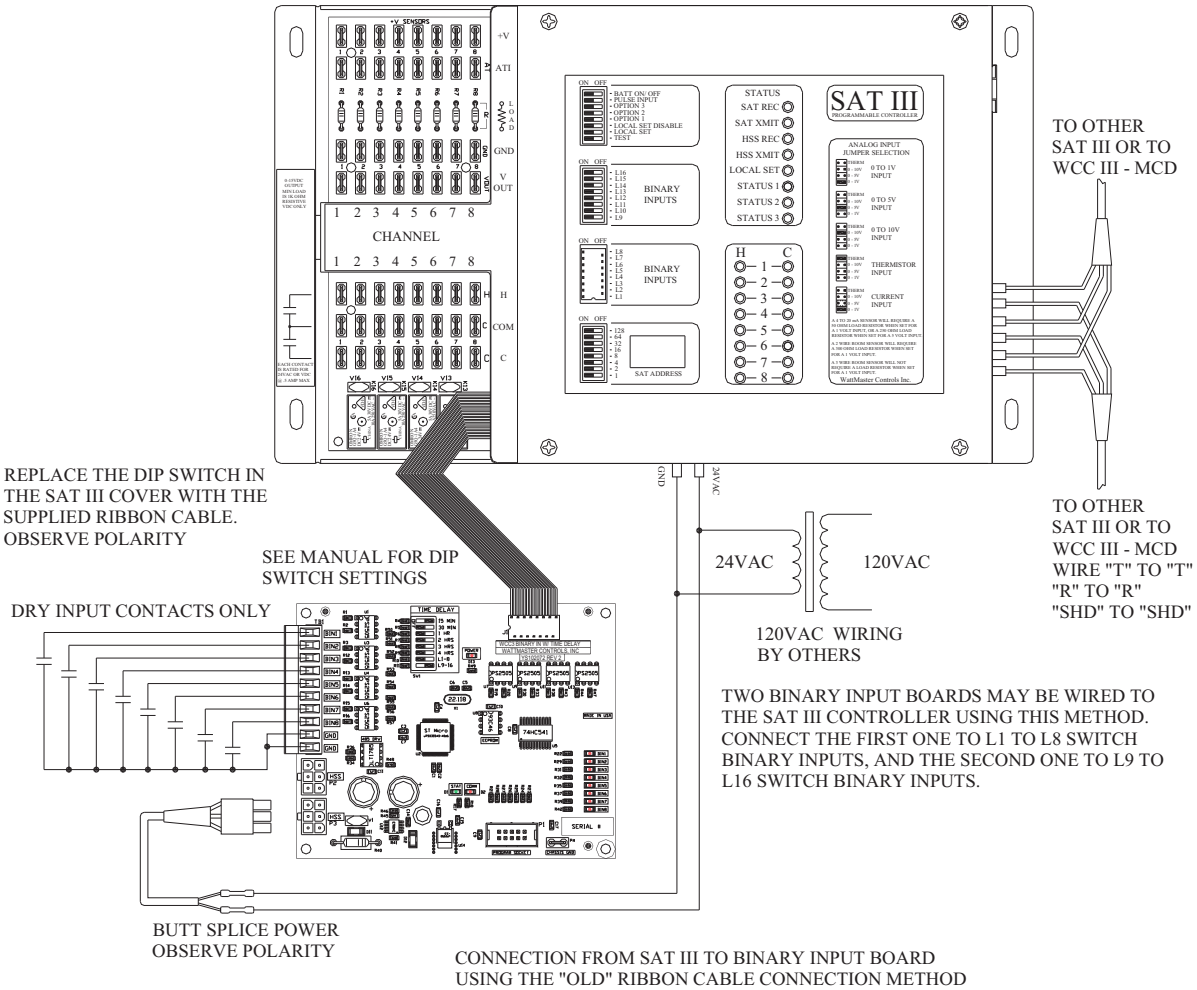


Binary Inputs

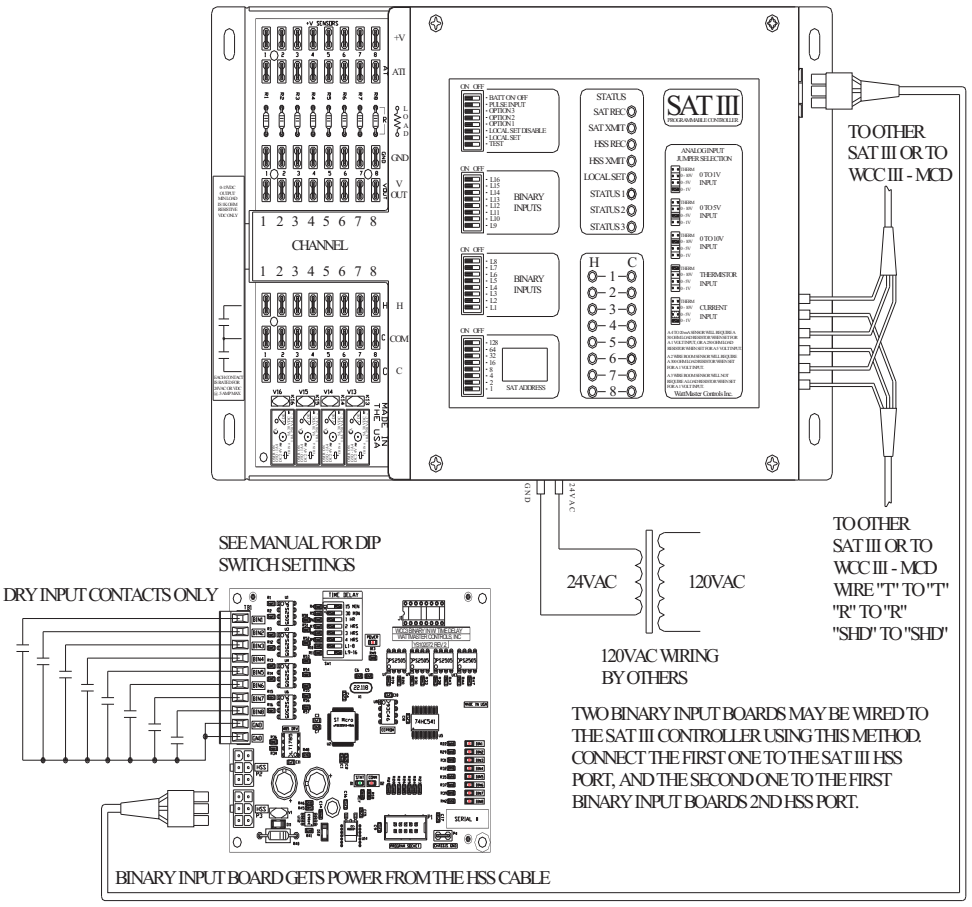
A binary input is an On/Off (dry contact closure) signal sent to the SAT III controller to allow monitoring of air flow switches, switch settings, etc. The SAT III controller comes standard with 16 small switches on its front panel labeled, L1-L16 which are in effect manually controlled binary inputs. The WCC III monitors the On/Off status of these switches and can control and/or alarm based on the position of these switches. The binary input board(s) allow the manual dip switches to be replaced with a terminal strip which accepts wiring from remote mounted binary input devices.

The SAT III controller has two sets of 8 small switches on its front cover labeled L1-L16. Switches L1-L8 are housed together in one module, and switches L9-L16 are housed together in another module. One module of switches is removed for each binary input board and replaced with a ribbon cable which connects the binary input board to the SAT III controller. The binary devices to be monitored are then wired to the terminal strip of the binary input board. The binary input board requires a 24 VAC power supply.

The SAT III can also accept two HSS Binary Input Boards.



CONNECTION FROM SAT III TO BINARY INPUT BOARD USING THE "OLD" RIBBON CABLE CONNECTION METHOD



HSS CABLE - ORDER STANDARD LENGTHS OF 1 FOOT, 1½ FEET, 3 FEET, 25 FEET, 40 FEET, 80 FEET

CONNECTION FROM SAT III TO BINARY INPUT BOARD
USING THE "NEW" HSS CABLE CONNECTION METHOD

Analog Outputs

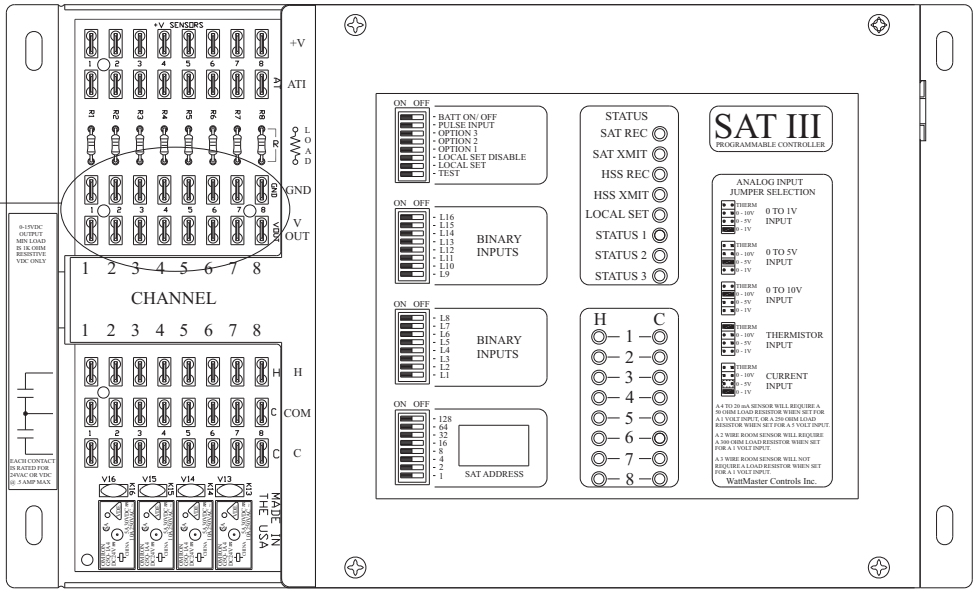
An analog output is a variable DC voltage signal sent from the satellite controller used for proportional control of devices with modulating actuators. The analog outputs are wired to the “V-Out” and “Gnd” terminals on the SAT III controller and are named P1-P8. The P stands for Proportional Output.

The SAT III controller has the capability of providing 8 analog output signals which have a maximum range of 0-15 VDC.

Each analog output has a limit of 15 mA. The total current output of all 8 analog outputs must be kept under 115 mA.

The SAT III controller comes standard with 8 analog outputs.

V-OUT CONNECTIONS



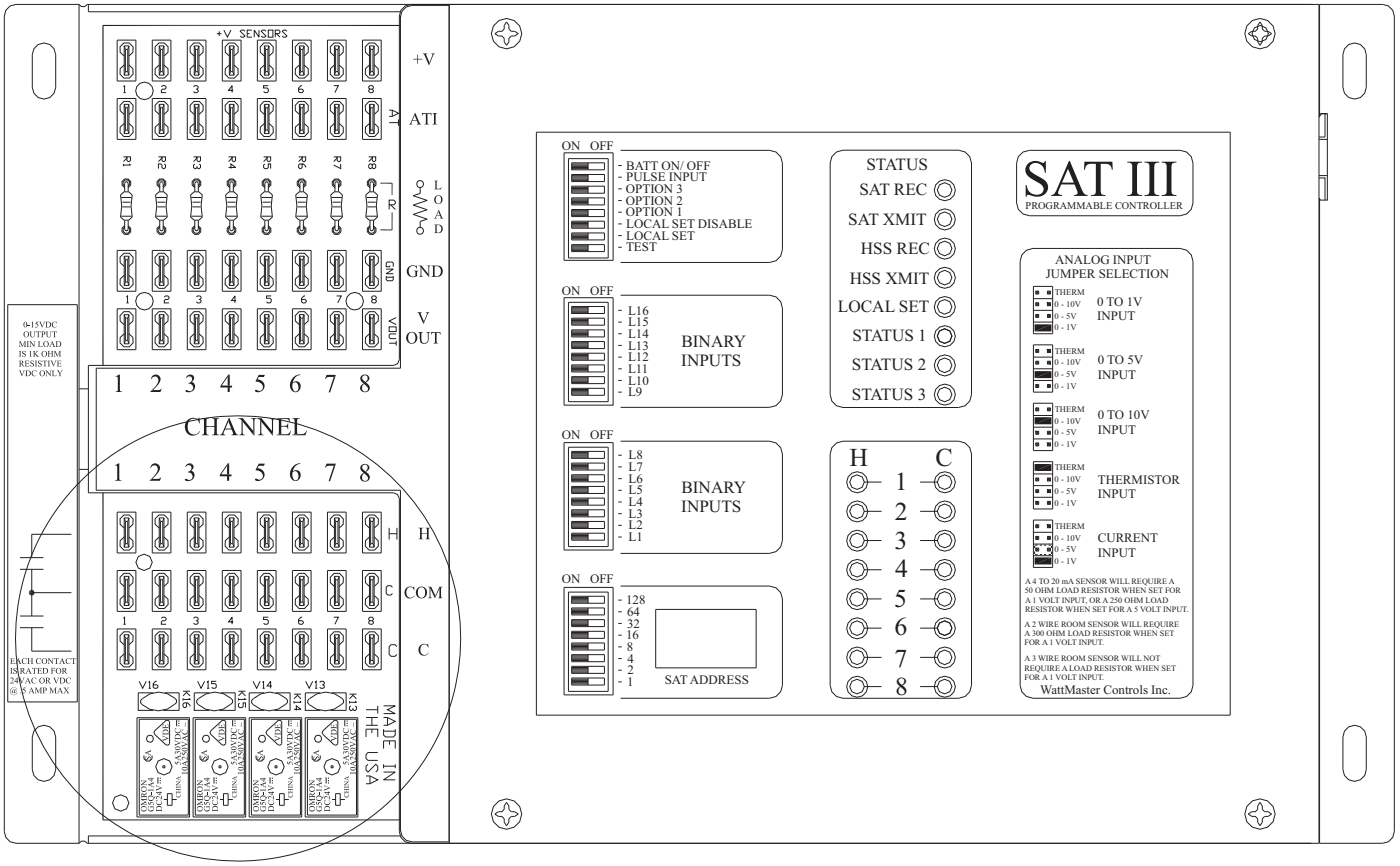
Binary Outputs

A binary output on the SAT III controller is the electronic equivalent of a relay contact which is used to complete a circuit to activate on/off devices such as relays, 2-position valves, etc. The binary output contacts can be used to complete a 24 v DC voltage circuit and 24 volt AC circuit at 0.5 amp maximum load. The binary output terminals are labeled H, COM, and C.

The SAT III controller is capable of providing 16 binary (on/off) outputs.

The terminals for the binary outputs are found at the lower left hand corner of the SAT III controller. The “COM” to “H” contacts are referred to as K1h-K8h. The “COM” to “C” contacts are referred to as K1c-K8c.

The SAT III can also accept up to three WCC III V-Out Relay Boards.



Point Addresses

A Point Address uniquely identifies a point within the WCC III system. All point addresses have an associated “analog” or “binary” value. The term “analog” simply means a value which is represented by a number (such as room temperature, duct static pressure, etc.). The term “binary” means the value is represented by one of two conditions, ON or OFF. An input is a signal sent to the WCC III system, and an output is sent from the WCC III system. Therefore, room temperature is an analog input, fan status is a binary input, and controlling a fan relay is a binary output.

In addition to the inputs and outputs that are wired to the SAT III controllers, there are several software point addresses within the system. For example, the WCC III system has 128 week schedules. This means that separate day/night schedules can be assigned to 128 different areas of the building.

For example, assume that you have three different areas in a building that have different schedules as shown in the following table.

	Area	Occupied Time
Week Schedule #1	1st Floor West	8:00 am - 5:00 pm, M-F
Week Schedule #2	1st Floor East	7:00 am - 7:00 pm, M-F
Week Schedule #3	2nd Floor	9:00 am - 4:00 pm, M-Th

Week Schedule #1 is named W1, and the value of W1 will be On between 8:00 am and 5:00 pm, Monday through Friday, etc.

The Name column in the table that follows is the name that you should use when specifying a point address to the system. The “n” is where a “point number” for the point address is to be entered.

Table of Point Addresses

Name	Description	Value
Cn	Comparator (See analog input screen binary setpoint)	On/Off
An	Analog Inputs	Analog
Pn	Analog Outputs	Analog
KnH	Control Outputs (H Contacts)	On/Off
KnC	Control Outputs (C Contacts)	On/Off
RnA	Data Registers (a)	Analog
RnB	Data Registers (b)	Analog
TnR	Trend Logging Run Time	Analog
TnC	Trend Logging Change of State	None
TnA	Trend Logging Analog Trend	None
TnP	Trend Logging Analog Peak	None
Ln	Logical Input	On/Off
Wn	Week Schedules	On/Off
Sn	Optimal Starts	On/Off
GBn	Binary Globals	On/Off
GAn	Analog Globals	Analog
On	Binary Output	On/Off

Constant Point Addresses

The following list shows several point addresses within the system that are always available for use on many of the data input screens.

Name	Description	Associated Data Type
0	Logical Zero	Always Off
1	Logical One	Always On
////	Logical Null	Ignored
. . . .	Logical Off	Always Off/Not Used

NOTE: When a point option is not required, replace the default value (/ / / /) with either a zero (0) or dot (. . . .) to force the system to realize that the option is always OFF. If the slashes are not replaced, the system will ignore that input and the system can, in rare cases, see the slashes as being ON.

Name	Description
Analog 0	Initiates a 0 (zero) value
TIME	Current Time (in HH:MM format)
TIMEB	Current Time (in minutes-since-midnight format)
NEWSEC	New Second
NEWMIN	New Minute
NEWHR	New Hour
NEWDAY	New Day
NEWMON	New Month

Time & TimeB

These logical addresses are the actual time on HH:MM (TIME) and minutes-since-midnight (TIMEB) formats. They are considered analog values and have value ranges of 0000 to 2359 (TIME), and 0000 to 1439 (TIMEB).

Typical application of these logical addresses includes use in the Dual Limit mode, allowing such modes of control as "On-Between-Times" and "Off-Between-Times."

NEWSET, NEWMIN, NEWHR, NEWDAY, & NEWMON

These logical addresses are considered binary values and are based on real-time. They have a pulse-type nature in that each of these addresses has a value of one (or ON) for one second after the occurrence of the specified event. After the one second ON period has elapsed, the value returns to zero (or OFF).

These addresses have several uses throughout the system. One example would be the generation of a variable duty cycle output. When used in conjunction with the separate "Minimum ON/OFF" timers, these addresses can achieve cycles of from one second to several days with a wide range of cycles.

Examples of "point addresses" within the system:

Name	Description
GA12	Global Analog #12
135A5	Satellite #135, Analog Input #5
A5	Analog Input #5, Current Satellite
W12	Week Schedule #12
S27	Optimal Start #27
C1	Setpoint Comparator on Analog Input #1
K1h	When K1h is ON, the relay within the satellite controller which connects the electrical path between the "H" and "COM" terminals on channel 1 of the satellite controller is closed. When K1h is OFF, the circuit is open.
14P3	Satellite #14, Analog Output #3.

Data Registers

The WCC III system has some capabilities built into the software that are very helpful, and you should be aware of them. There is a Data Register associated with each of the *H/C Control Output Screens*. A *H/C Control Output Screen* allows the user to tell the satellite controller when to open and close the binary output contacts. A *H/C Control Output Screen* can be a *Time Clock*, *EA Driver*, or *Dual Limit Mode Screen.*

Time Clock

When the H/C Control contact on the satellite controller is controlled by a *Time Clock Screen*, the contact opens and closes based on time only. For example, a *Time Clock Screen* can be used to run a water circulating pump from 8:00 am to 5:00 pm, Monday through Friday. Each Time Clock Screen has a Data Register associated with it.

The Data Register is an analog value which is the time in seconds since the satellite controller binary output contact closed. Assume the water circulating pump is controlled by satellite controller contact K1h. That is to say, the "COM" to "H" contact on channel 1 of the satellite controller closes to complete a 24 VAC signal to run the pump.

The Data Register for a *Time Clock Screen* is named RnA or RnB. R stands for data register, n refers to channel 1-8 of the satellite controller, A means the "COM" to "H" contact, and B means the "COM" to "C" contact. Therefore, the Data Register for contact K1h is R1A. As contact K1h closes, the Data Register for contact Klh (R1A) starts recording time in seconds. That is to say, the value of R1A is the time in seconds since contact K1h closed.

RnA = Time in seconds since COM to H contact closed (9999 sec max)
RnB = Time in seconds since COM to C contact closed (9999 sec max)

The Data Register for a *Time Clock Screen* might be used to start one piece of equipment after another has been started. For example, assume we want to start an air handler two minutes after the water circulating pump starts. The pump would be controlled by a *Time Clock Screen* as mentioned above. The air handler would be controlled using a *Dual Limit Screen*. The analog input value for the *Dual Limit Screen* would be R1A, which is time in seconds since the pump started. The *Dual Limit Screen* is set up to close the contact for the air handler when the value of R1A is between 120 seconds and infinity.

The data register will also record time in negative seconds. When the contact opens, the data register value will begin counting -1, -2, etc.

EA Driver

The EA Driver Mode is "3-point floating" control. For example, assume that the H/C control outputs on channel 2 of the satellite controller are used to control a VAV box using the EA Driver Mode. When the space needs heat, the "COM" to "H" contacts on the satellite controller will close to drive the damper in the VAV box to the closed position. When the space needs cooling, the "COM" to "C" contact on the satellite controller will close to open the damper in the VAV box.

There are two Data Registers associated with an *EA Driver Screen*. The value of the first Data Register is equal to the setpoint entered on the *EA Driver Screen* and is referred to as "RnA." The value of the second Data Register is equal to the difference between the setpoint and the actual temperature and is referred to as "RnB." "R" stands for data register, and "n" refers to channel 1-8 of the satellite controller.

RnA = Setpoint
RnB = Difference between Setpoint and Measured Value (error)

For example, assume that the setpoint for the room in question is 72 °F, and the actual temperature is 70 °F. The value of Data Register R2A (setpoint) is 72 °F, and the value of Data Register R2B (error) is -2 °F, since the actual space temperature is 2 °F below the setpoint.

The Data Register could be used to turn on a second stage of heat whenever the space temperature falls 2 °F below setpoint. Assume that the second stage of heat is a heating coil which is energized when satellite controller contact K3h is closed. A *Dual Limit Screen* is used to control contact K3h. Data Register R2B is entered as the analog input value for the *Dual Limit Screen*. When the value of R2B is -2 or less (the space temperature is at least 2 °F below setpoint), contact K3h closes to turn on the second stage of heat.

Dual Limit

When the H/C control output contact on the satellite controller is controlled by a *Dual Limit Screen*, the contact opens and closes based on how the analog input value compares to a pair of setpoints. There is one Data Register for each contact on the satellite controller which is controlled by a *Dual Limit Screen*. The value of the Data Register is the difference between the setpoint and the actual temperature.

The Data Register for a *Dual Limit Screen* is named "RnA" or RnB." "R" stands for data register, "n" refers to channel 1-8 of the satellite controller, "A" means the "COM" to "H" contact, and "B" means the "COM" to "C" contact. Therefore, the Data Register for contact Klh is R1A.

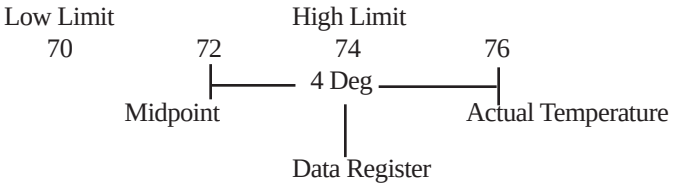
RnA = Difference between Setpoint and Measured Value (COM to H)

RnB = Difference between Setpoint and Measured Value (COM to C)

The *Dual Limit Screen* has two setpoints, the high limit and the low limit. Since the Data Register is the difference between the setpoint and the actual temperature, you have to "tell" the system what you are considering the setpoint to be. Therefore, the Data Register is measured from either the "Midpoint" or "Nearest Limit" of the setpoints, depending on how the *Dual Limit Screen* is set up.

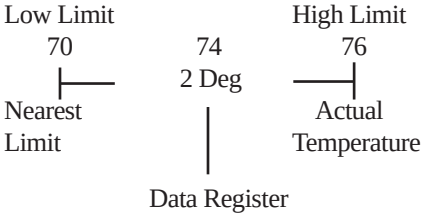
For example, assume that a *Dual Limit Screen* is used to control a heat pump compressor to have the compressor off if the space is between 70 and 74 °F. If the space temperature is below 70 °F, the compressor will be on for heating, and if the space temperature is above 74 °F, the compressor will be on for cooling. Assume the actual space temperature is 76 °F.

The Data Register can be measured from either the "Midpoint" or the "Nearest Limit." If the Data Register is measured from the "Midpoint," the value of the Data is 4 °F.



Difference between actual temperature and the "Midpoint" of the setpoints = 4 °F, and therefore, the value of the Data Register is 4 °F.

If the Data Register is measured from the nearest limit, the value of the Data Register is 2 °F.



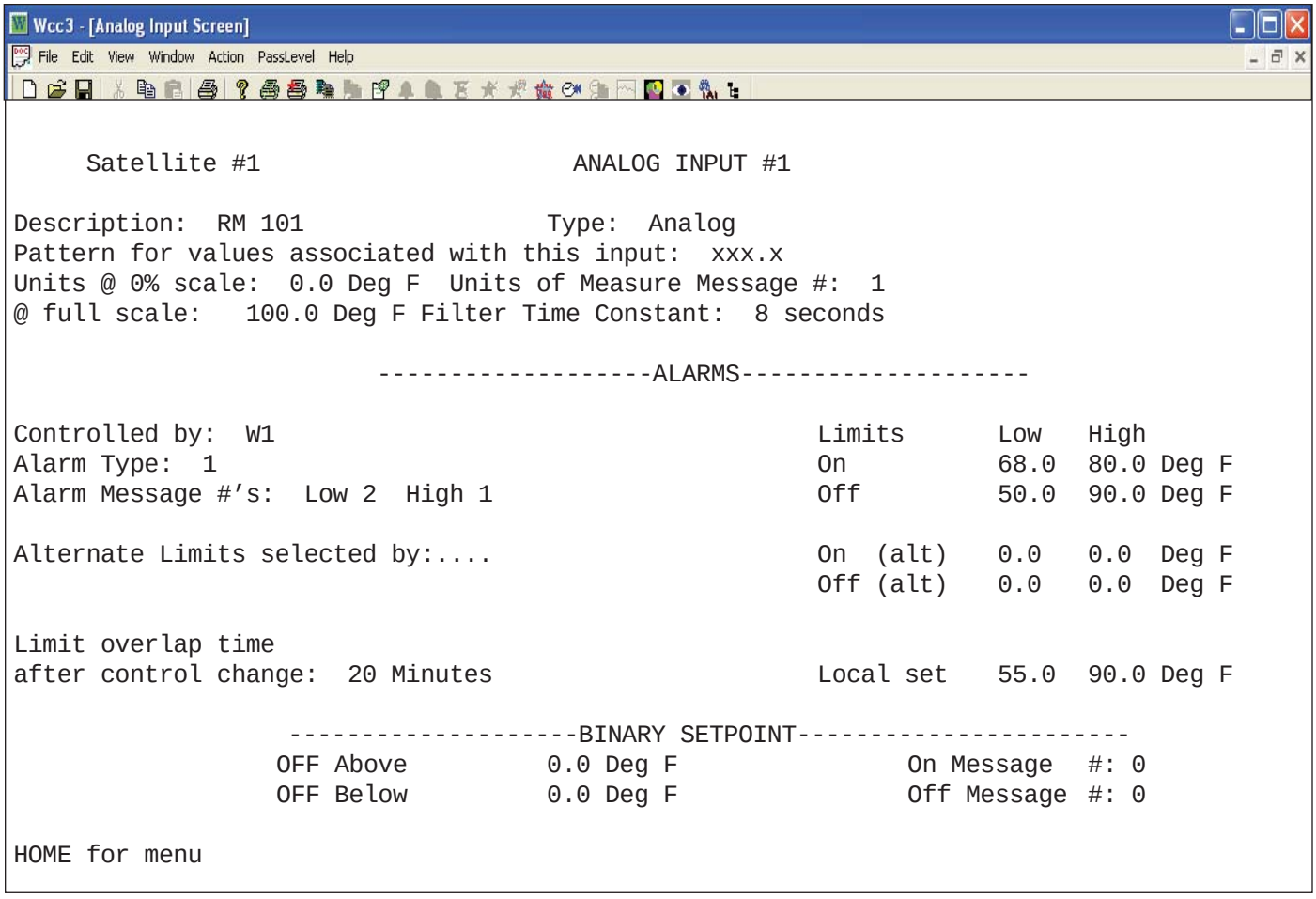
Alarm Call-Out

The WCC III will automatically e-mail a report of the alarms to an e-mail address. There are eight different alarm types or alarm priorities. The first five alarm types can "e-mail-out"; each of these five alarm types can e-mail 3 separate e-mail addresses.

Analog Alarm Limit

Each analog input can have a low and high limit assigned to it on the *Analog Input Screen*. If the value of the analog input falls below the low limit or rises above the high limit, the system automatically generates an alarm. For example, assume that the analog input in question is a room temperature sensor located in an office space. If the space temperature falls below 68 °F or rises above 80 °F during the occupied period, we want an alarm to call out. To set up the alarm limits, first sign on by accessing the *System Parameter Screen* and entering your password. An access level of 1 or greater is required to enter or change alarm limits. After you are signed on, return to the *Main Menu* and place the cursor over "ANALOG INPUT" and press <Enter>. An *Analog Input Screen* similar to what is shown below should come into view:

The alarm limits along with the alarm type and alarm message numbers are assigned on this screen (see the *Analog Input Screen* section of this guide on page 3-13 for more information). If the space temperature drifts out of the entered alarm limits, the system will automatically generate an alarm. For example, assume that the space temperature rises above the high limit value of 80 °F. Alarm message #1 (High Temperature) along with the time and date of the alarm and the high peak value of the room temperature will appear on *Analog Input Summary Screen* and the *Alarm Summary Screen*. Within one minute from the time the alarm appears on the screen, it will automatically be e-mailed if enabled. (To acknowledge alarms, select <Action> from the Top Menu Bar and then select <Acknowledge Alarm> or <Acknowledge All Alarm> described in the *Help Screen* (page 3-1), *Analog Input Summary Screen* (page 3-11), and *Alarm Summary Screen* (page 3-44) sections of this guide.



Run Time Alarm

The WCC III system also has the capability of alarming if the total ON time of a binary (on/off) value has exceeded the run time alarm limit. To assign a run time alarm limit, first sign on by accessing the *System Parameter Screen* and entering your password. An access level of 2 or greater is required to enter or change alarm limits. After you are signed on, return to the *Main Menu* and place the cursor over "TREND LOGS" and press <Enter>. The *Trend Log Summary Screen* should come into view. To access a *Run Time Trend Logging Screen*, use the arrow keys to place the cursor (>) by the desired run time point, and press <Enter>. The following screen should come into view:

In this example screen, we are recording the total "ON" time of contact Klc (COM to C contact closure) on satellite controller #1. When contact Klc is closed, or "ON", Fan #1 runs. Run time recorder #1 records total accumulated run time of the fan. Alarm message #7 (Grease Bearings) will automatically appear on the *Alarm Summary Screen* when the total accumulated run time of the fan exceeds 500 hours. Within one minute after the alarm appears on the screen, it will automatically e-mail if enabled. (See the *Alarm Summary Screen* section, page 3-44, for information about how to acknowledge a run time alarm, and see the *Run Time Trend Logging Screen* section, page 3-36, of this manual for information about how to reset the accumulated run time to zero.)

Satellite Fail Alarm

If the Master Communications Device loses communications with a satellite controller, a Satellite SOS Alarm will show which satellite is out of service and the time and date of the alarm.