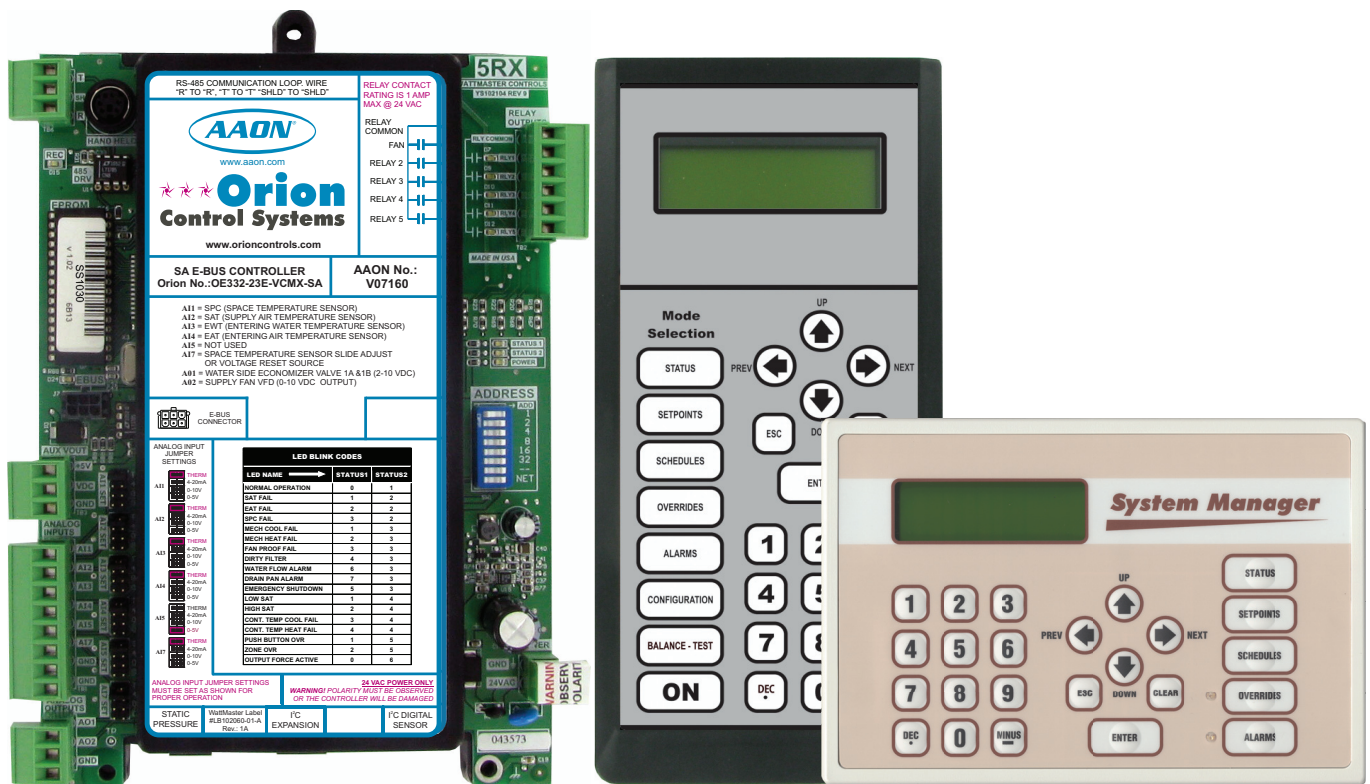




Factory Packaged Controls

SA E-BUS Controller Operator Interface SD Technical Guide

SA E-BUS Controller Code: Y200921
VAV/Zone Controller Code: SS1001, SS1005, SS1025
Requires Modular Service Tool SD Code: SS1063
Requires Modular System Manager SD Code: SS1068



IMPORTANT NOTICE

This technical guide provides instructions for using the Modular Service Tool SD and the Modular System Manager SD with the SA E-BUS & VAV/Zone Controllers only. If you are using a different controller, you can download the applicable SD Technical Guide listed below from our website—orioncontrols.com. The technical guides can also be printed from the SD card.

VCM-X & VCM-X E-BUS Controller - AA-VCMXRNEOISD-TGD

RNE Controller - AA-VCMXRNEOISD-TGD

VCB-X Controller - AA-VCBXOISD-TGD

VCM Controller - AA-VCMOISD-TGD

VAV/CAV and MUA II Controllers - AA-VAVCAVMUAIIOISD-TGD

SD CARD UPDATING INSTRUCTIONS

The Modular Service Tool and Modular System Manager are equipped with an SD memory card. This SD card can be removed and easily updated through a computer by downloading updates, as they become available, from our website to your computer.

In order to perform any updates, your computer needs an SD card drive or you will need to purchase an SD card adapter.

Download instructions are found in Appendix B on page 65 of this manual.



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Modular Service Tool

Modular Service Tool

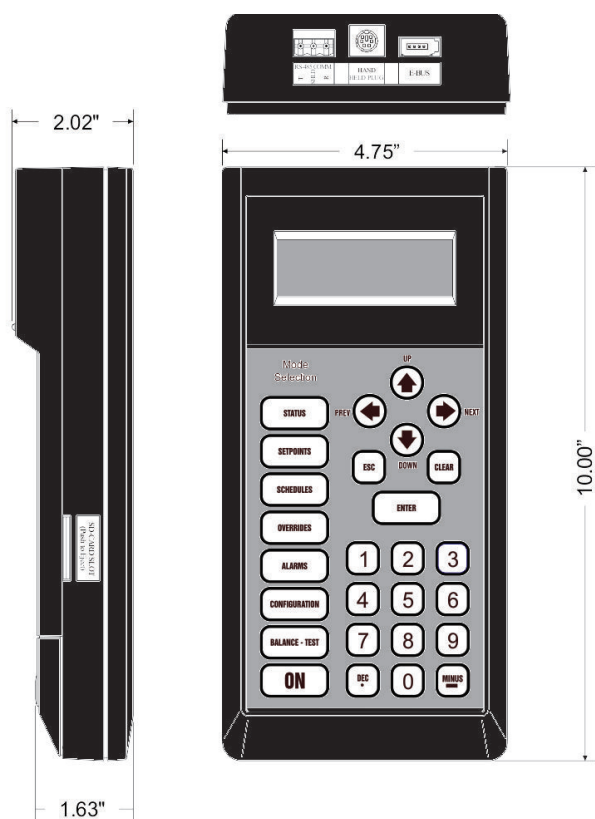


Figure 1: Modular Service Tool Dimensions

Description

The OE391-12 Modular Service Tool is a system operator interface that provides a direct link in viewing the status, configuring, and adjusting the setpoints of the SA E-BUS, VAV/CAV, MUA II, VCM, VCM-X, VCM-X E-BUS, RNE, VCB-X, VCC-X or VAV/Zone Controller on the control system communications loop. However, this manual only applies to SA E-BUS and VAV/Zone Controllers. See note in the inside front cover for the list of manuals that pertain to other controllers.

The Modular Service Tool is housed in an attractive black plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Modular Service Tool has a 4-line-by-20-character display panel with adjustable contrast control and a 27-key membrane keypad for data selection and entry. All keypad operations are simple and straight forward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The Modular Service Tool is supplied with a programmable 4 Gigabyte SD memory card, with (4) AA 1.5 V batteries, a wall mount a DC power supply, a mini-Din communication cable, and an E-BUS communication cable. The mini-Din cable allows you to connect the Modular Service Tool to any Orion controller which has a mini-Din connector socket for programming, monitoring, and troubleshooting purposes.

The Modular Service Tool is also equipped with an EBC E-BUS port and an RS-485 three conductor terminal block port. The E-BUS port and included E-BUS cable are used for updating E-BUS Module software (described in Appendix C). The RS-485 port is used for hard-wiring to older controllers that do not have a mini-DIN connector socket.

The Modular Service Tool is designed to be hand-carried. Its rugged plastic housing provides superior protection for the electronic components housed inside. The Modular Service Tool is a top-quality service tool that will stand up to the demands of the typical job site environment for many years.

Modular Service Tool

Whether you have a Stand Alone, Interconnected, or Networked Orion Controls System, the Modular Service Tool always connects to the controller via a prefabricated cable that is supplied with the service tool. The Modular Service Tool cable is terminated on both ends with a mini-DIN connector. Attach one end to the Modular Service Tool and the other end to the mini-DIN connector on the controller. If this is an Interconnected System, all controllers that are interconnected with communications cable can be programmed from any controller on the loop. If this is a Networked System, all controllers on the entire Networked System can be programmed from one controller.

Be sure that the Modular Service Tool has fresh batteries installed or that it is connected to a power source using the supplied power pack before attempting any programming of the controller. See **Figure 2** for connection details.

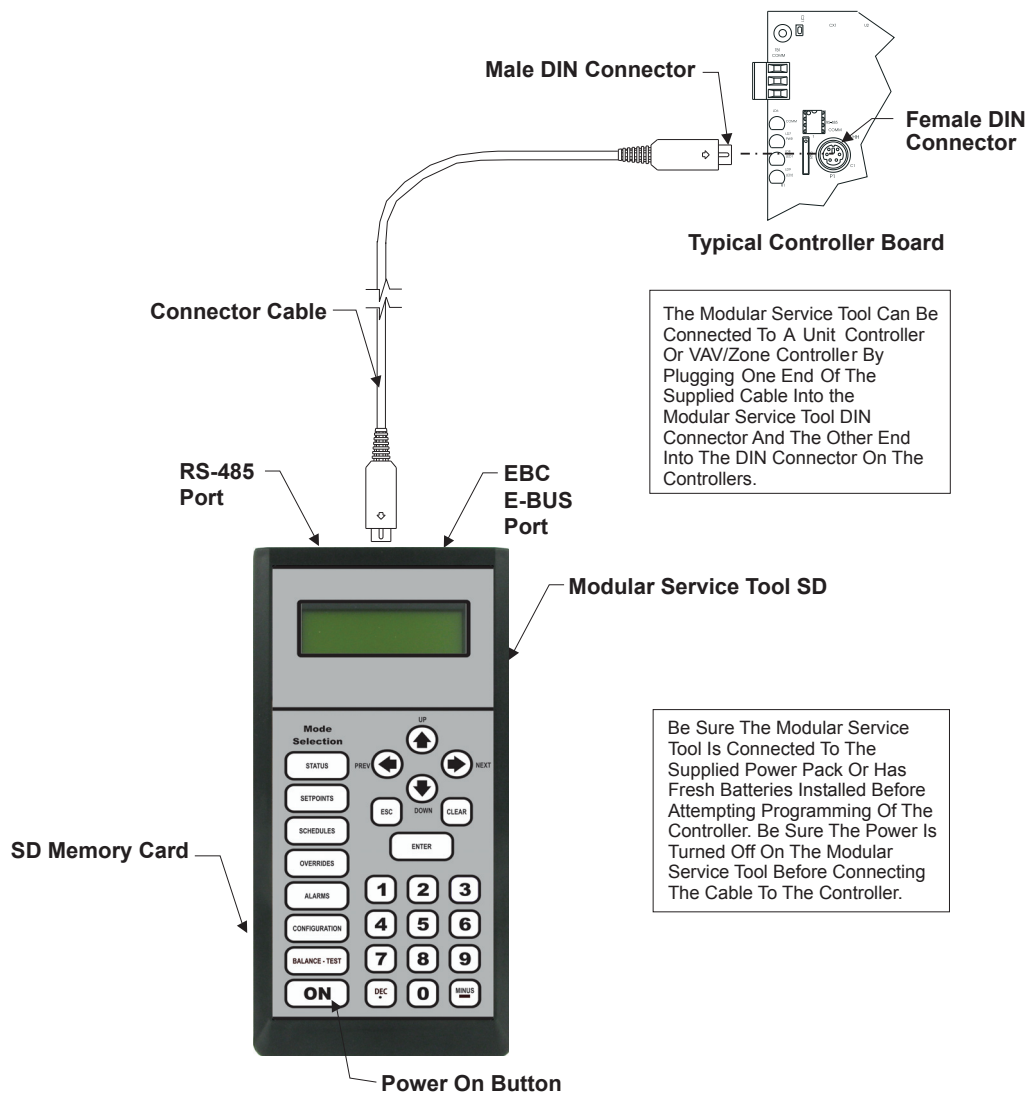


Figure 2: Modular Service Tool SD

Modular System Manager SD

Modular System Manager SD

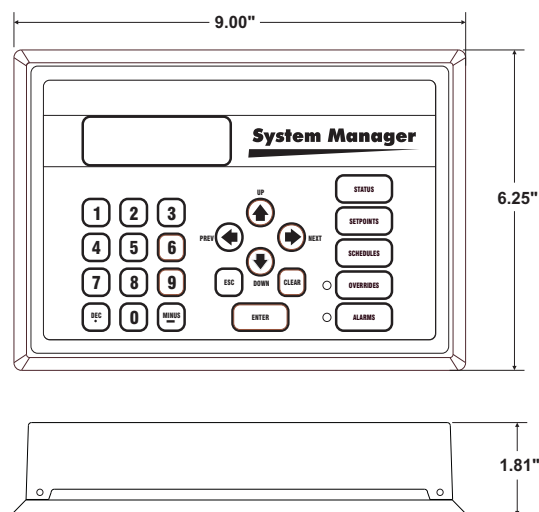


Figure 3: Modular System Manager SD Dimensions

The OE392-12 Modular System Manager SD provides a direct link to enable you to view the status and adjust the setpoints of the VCM-X, VCM-X E-BUS, VCB-X, RNE, SA E-BUS, VCM, VAV/CAV, MUA II or VAV/Zone Controller on the control system communications loop. The System Manager SD is housed in a beige-colored plastic enclosure. The System Manager has a programmable 4 Gigabyte SD card and is equipped with a 4-line-by-20-character backlit display panel and a 24-key membrane keypad for data selection and entry. All keypad operations are simple and straight forward, utilizing non-cryptic plain English language messages. Menu-driven programming allows for easy setup and operation without the need for specialized training. The System Manager also has 2 integral LEDs for user notification of system alarm conditions and override initiations. Protection from unauthorized users is provided by the System Manager's integral multi-level passcode authorization programming.

On a Networked System, the Modular System Manager is connected to the communications and power loop of the system via modular cables that simply plug into the System Manager board and the Power/Comm Distribution Board. This virtually eliminates wiring errors and makes installation fast and easy. When it is to be connected to a Stand-Alone system, a cable with modular connectors on one end and stripped wire ends on the other end is provided to facilitate connecting communications and power to the Modular System Manager from the 24 VAC power source and the HVAC unit controller communication wiring terminals.

The Modular System Manager is designed for wall mounting. Mounting holes are provided to attach the Modular System Manager to a standard handy box. It is recommended that the System Manager be mounted at approximately eye level to allow for ease of programming and reading of the display. The System Manager is typically mounted in the building manager's or superintendent's office or in an equipment room. The attractive enclosure is quite suitable for mounting in any location.

Modular System Manager SD Network Connection

Network Connection

As previously described, when you are connecting the Modular System Manager to a Networked System, the Modular System Manager is connected to the communications and power loop of the system via modular cables. These cables simply plug into the System Manager board and to any device with modular connectors on any local loop on the system. Devices with modular connectors include the Power/Comm Distribution Board, VAV/Zone controller, and MiniLink Polling Device. By using these plug-in connections, wiring errors are virtually eliminated and system installation is fast and easy. See **Figure 4** below for typical connection information. See **Figure 5 on page 8** for typical Power/Comm board wiring and connection information.

When the System Manager is to be connected to a Stand Alone system, a 12-foot cable with modular connectors on one end and stripped wire ends on the other end is provided for this purpose. This is used to facilitate connecting communications and power wiring to the Modular System Manager from a 24 VAC power source and to the HVAC unit controller communication wiring terminals. See **Figure 6 on page 9** for wiring details. If the supplied cable wire is not long enough for your installation, a standard modular cable of the correct length can be purchased through WattMaster and one of the modular connectors can be cut off to allow for the transformer and communication terminal wiring connections. It is recommended that you do not splice the communications wire if at all possible. The transformer should be rated at 6 VA minimum power output.

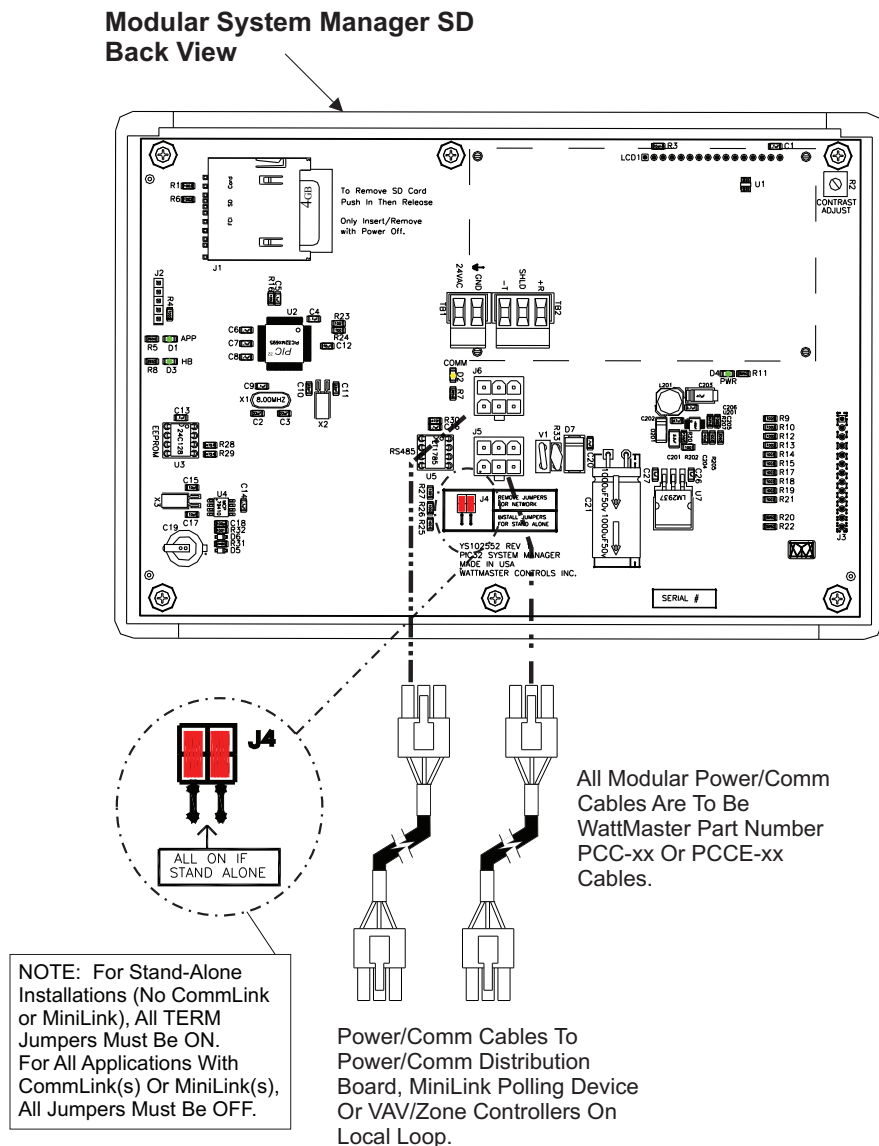


Figure 4: Modular System Manager SD - Network

SYSTEM CONNECTIONS

Power/Comm Board Wiring

WARNING!

DO NOT GROUND THE 24V TRANSFORMER THAT IS TO BE USED WITH THE POWER/COMM BOARDS. GROUNDING OF THE TRANSFORMER WILL DAMAGE THE POWER/COMM BOARD AND ALL BOARDS CONNECTED TO IT. A SEPARATE TRANSFORMER MUST BE USED FOR EACH POWER/COMM BOARD. NO EXCEPTIONS. DO NOT CONNECT ANY OTHER DEVICES TO THE TRANSFORMER USED FOR THE POWER/COMM BOARD!

A Power/Comm Cable Can Be Used To Connect With The MiniLink PD Instead Of Using 2 Conductor Twisted Pair With Shield Cable. You Can Also Use A Power/Comm Cable To Connect With Another Power/Comm Board, A System Manager Or A VAV/Zone Controller.

If Desired, Instead Of Using A Power/Comm Cable, You Can Use 2 Conductor Twisted Pair With Shield Cable To Connect To The Power/Comm Board From The Unit Controller, MiniLink PD, Or Another Power/Comm Board.

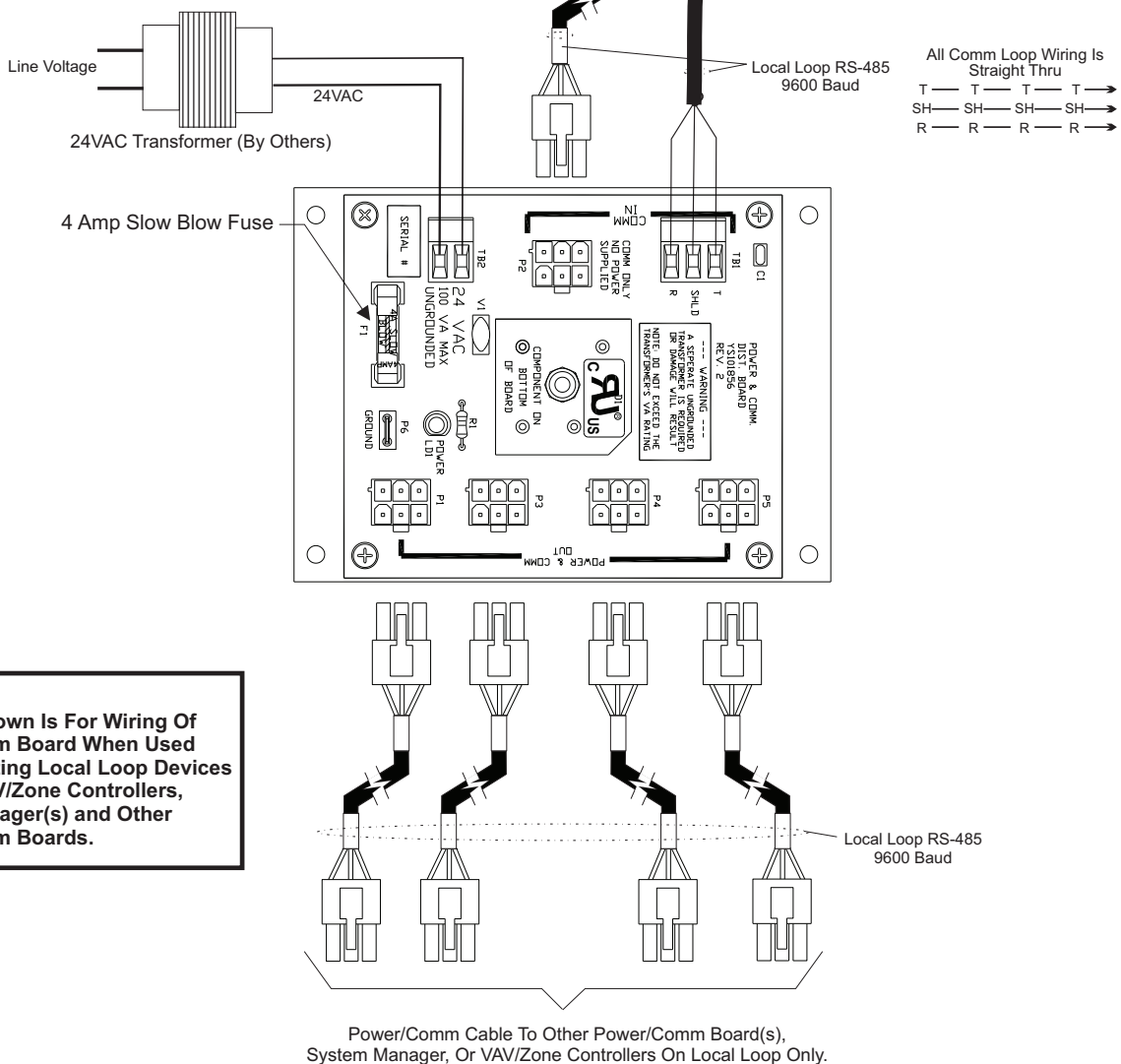


Figure 5: Typical Power/Comm Board Wiring

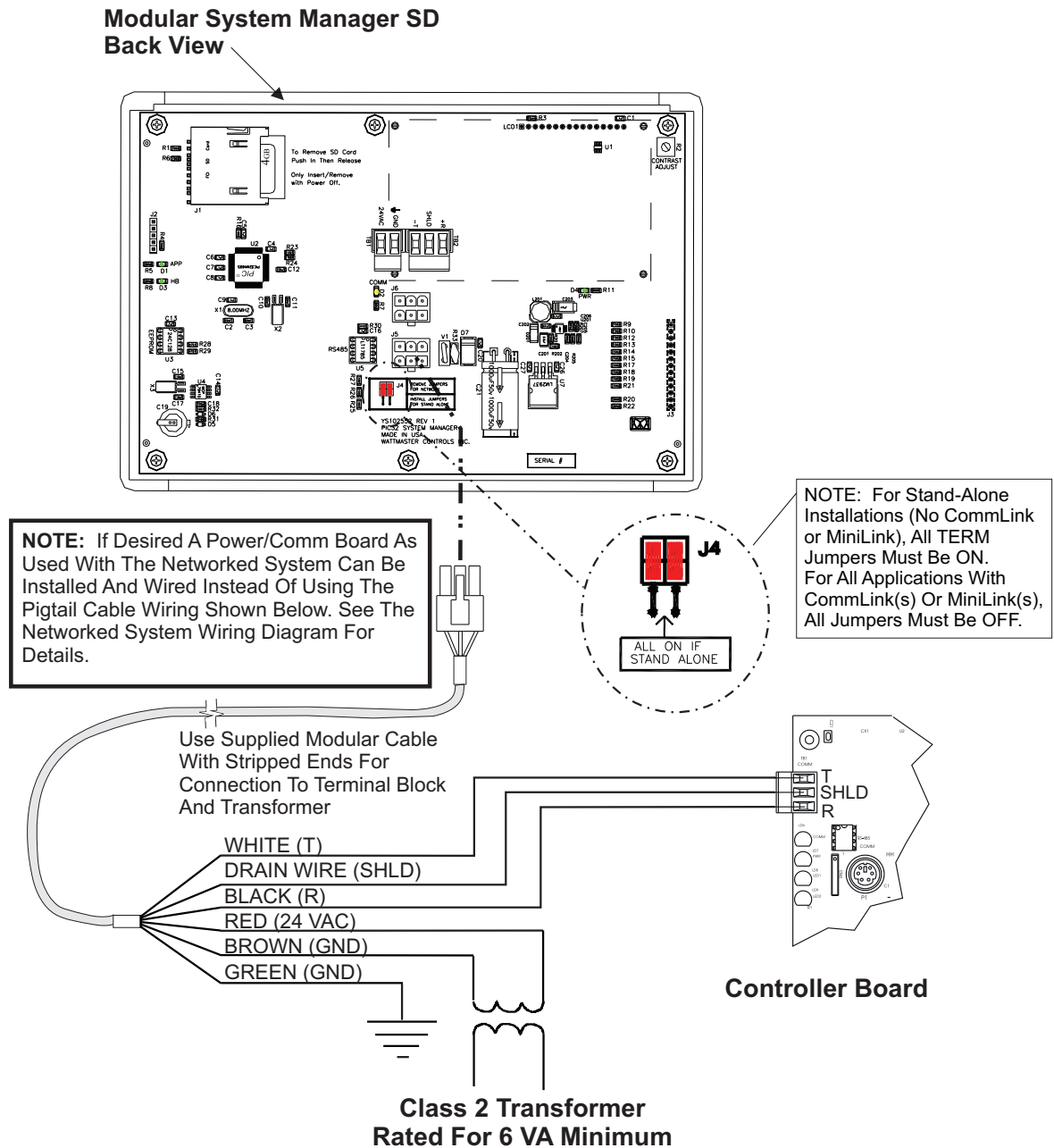


Figure 6: Modular System Manager SD - Stand Alone

Modular Service Tool Keys

Operator Interfaces

In order to configure and program the Orion System controllers, you must have an Operator's Interface or a personal computer with the Prism II computer front-end software installed. Three different Operator Interfaces are available for programming of the SA Controls System—the Modular Service Tool SD, the Modular System Manager, and/or the System Manager TS II. These devices allow you to access the status and setpoints of the controllers on your communications loop. This manual describes the Modular Service Tool SD. If using the Modular System Manager or System Manager TS II, please see the *SA Operator Interfaces Technical Guide* or the *System Manager TS II Technical Guide*. If using Prism II, please see the *Prism II Technical Guide*.

The Modular Service Tool allows you to view any input or output status and change any setpoint to fine-tune the operations of the total system. All keypad operations are simple and straightforward, utilizing non-cryptic plain English messages.

Display Screens & Data Entry Keys

See the chart below for a list of the keypad descriptions and functions.

Keypad Description	Key Function
NEXT	Use this key to access the Setup Screens.
ESC	Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system.
ENTER	Use this key to enter a new value.
Clear	If a data entry mistake is made, press this key to clear the data entry field and start over. This key also turns off the power to the Service Tool when on the Main Screen
Minus	If a setpoint with a negative value is required, press this key for the minus sign.
DEC	Press this key when entering data that requires a decimal point.
← →	Use these keys to change values in the Configuration Screens as prompted.
↑ ↓	Use these keys to step backward or forward through the screens.

Table 1: Keypad Descriptions

Mode Selection Buttons

The Modular Service Tool is provided with "Mode Selection Buttons." These buttons give you instant access to the specific mode desired without having to scroll through several menu screens to get there.

Button Description	Mode Selection Buttons
STATUS	Pressing this button takes you directly to the controller "Status" screens.
SETPOINTS	Pressing this button takes you directly to the controller "Setpoints" screens.
SCHEDULES	Pressing this button takes you directly to the controller "Schedules" screens.
OVERRIDES	Pressing this button takes you directly to the controller "Overrides" screen. See the "Override Button" section on page 13 for a description of this function. See Note 1 below.
ALARMS	Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on page 13 for a description of this function.
CONFIGURATION	Pressing this button takes you directly to the controller "Configuration" screens.
BALANCE-TEST	Pressing this button takes you directly to the controller "Balance-Test" screens.
Notes: (1) The Modular Service Tool will only search the Overrides one loop at a time. You must enter the Loop number and the MiniLink PD unit ID (60).	

Table 2: Button Descriptions

Initialization & Setting the Time & Date

Modular Service Tool Initialization

Modular Service Tool Initialization Screen and Setup Screens

After connecting the Service Tool to the controller with the supplied cable, press **<ON>**. The *Initialization Screen* will appear followed by the *Setup Screens* as shown below. If there is no SD card installed, the second screen will display, "No SD Card Connected! Powering Down!"

```

      Initializing
    Service Tool vX.XX
  WattMaster Controls
  
```

```

    1) Set Time & Date
    2) Communications
  NEXT) More Options
  ESC) Exit Menu
  
```

```

    3) Energy Saving
    4) Update Software
  NEXT) More Options
  ESC) Exit Menu
  
```

NOTE: Once you press **<ESC>** while at the *Setup Screens* shown above, you can access them again by pressing **<NEXT>** or cycling power.

Setting The Time & Date

The Modular Service Tool is equipped with a real time clock chip allowing it to maintain the correct time. Once you have programmed the correct time and date, the information is broadcast globally to all controllers on the entire system.

NOTE: If you are in a time zone that has daylight savings, you will need to manually adjust the time twice a year.

Programming the Time

From the *Setup Screen* shown below, press **<1>** on your keypad to access the *Set Time & Date Screens*. (You may have to press **<NEXT>** to access this screen).

```

    1) Set Time & Date
    2) Communications
  NEXT) More Options
  ESC) Exit Menu
  
```

Although the times are displayed on the *Main Screen* in a standard 12-hour format, you must program them using the 24-hour military format. If you configured the SA E-BUS Controller to use its own Internal Schedules, the Occupied/Unoccupied modes are calculated on the basis of the current real time clock reading.

The two screens that follow will appear. To scroll through the fields, press **<↓>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```

      Program Time/Date
    Day   (Sunday=0):  X
  Enter Hr. (0-23): XX
  Enter Minutes   : XX
  
```

Day - Enter the Day of the Week (0 to 6)
Sunday = 0

Hours (Hr) - Enter Hours in 24-Hour Military Format
(1700 = 5:00 PM)

Minutes - Enter the Minutes
(0 to 59)

Programming the Date

To scroll through the fields, press **<↓>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```

      Program Time/Date
    Month   (1-12):  XX
    Day     (1-31):  XX
    Year    (00-99):  XX
  
```

Month - Enter the Month (1 to 12)

Day - Enter the Day of the Month (1 to 31)

Year - Enter the current Year with two digits (00 to 99)

When you have finished programming the time and date, press **<ESC>** to return to the *Setup Screen* shown below.

```

    1) Set Time & Date
    2) Communications
  NEXT) More Options
  ESC) Exit Menu
  
```

Setting the Operating Mode and Energy Saving Timer

Setting the Operating Mode

The Operating Mode is displayed on the last line of the *Main Screen* as shown below. By factory default setting for the Service Tool is configured **LS (Low Speed) Stand Alone Mode**. **LS Stand Alone Mode** is the correct configuration for the SA E-BUS Controller when in Stand Alone Mode.

```
Service Tool SD vX.XX
01/16/15 02:21 PM
LS Stand Alone
No Communication
```

If you are using this Service Tool on a communications loop and have an installed MiniLink PD or CommLink, you will need to change the setting to **LS (Low Speed) Network Mode**.

If your display indicates a different mode than the one you need, *press* **<2>** at the *Setup Screen* shown below. You may have to *press* **<NEXT>** to access this screen.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

The *Communications Screen* will appear as shown below.

```
Stand Alone Mode
Lo Speed Connection
Use Left/Right Arrow
To Change Selections
```

Press **<←>** or **<→>** to select the proper mode of operation.

When you have made your selection, *press* **<ENTER>**. The following screen will appear.

```
You Have Changed The
System Mode
Press Any Key To
Continue
```

Press any key to continue. The *Setup Screen* will appear as shown below:

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Setting the Energy Saving Timer

The Modular Service Tool has a built-in timer that can be programmed to shut the Service Tool off after a specified period of time if no buttons are pressed. This is a very useful feature if you are powering the Service Tool from the internal batteries.

To set the Energy Saving Timer, *press* **<NEXT>** at the first *Setup Screen* and **<3>** at the second *Setup Screen* shown below. (You may have to *press* **<NEXT>** to access these screens).

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
3) Energy Saving
4) Update Software
NEXT) More Options
ESC) Exit Menu
```

The *Energy Saving Screen* will appear as shown below:

```
Energy Saving
Automatic Power Down
Minutes: xx
Press ESC to Exit
```

Enter the number of minutes you want the Service Tool to stay active before it automatically powers down and *press* **<ENTER>**. To cancel the automatic power down, *enter* **<99>** and *press* **<ENTER>**. After you have entered a number between 1 and 99 minutes, *press* **<ESC>** to exit the screen.

The *Setup Screen* will appear again as shown below:

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Modular Service Tool Alarm Search

NOTE: When you *press* the **<ALARMS>** button on the Modular Service Tool, it will search only the unit ID that you have entered; therefore, you must search each unit individually to access all alarms for that controller.

To search for alarms, *press* **<ALARMS>** while on any screen but the *Main Screen*. The *Unit Selection Screen* will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller the Service Tool is connected to and *press* **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then *press* **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

One of the following screens will appear:

SA V.XXX
NO ALARMS

SA V.XXX
ALARMS PRESENT
SCROLL DOWN TO VIEW

Press **<↓>** to scroll through all the alarms for the controller that the Modular Service Tool is connected to.

To clear any alarms that are found, you must fix the problem indicated in the alarm. Once the problem is fixed, the alarm will clear from the screen the next time the unit is polled.

Modular Service Tool Override Search

When a space sensor with override option is used with any VAV/Zone or SA E-BUS Controller, the Modular Service Tool can determine and report any controllers that are currently operating in an override condition on a specific Loop by entering a Loop ID number and then doing a search.

NOTE: When you *press* the **<OVERRIDES>** button on the Modular Service Tool, it will search only the Loop number that you enter; therefore, you must search each loop individually to access all overrides.

To access the *Overrides Screen*, *press* **<OVERRIDES>** from the Modular Service Tool’s keypad. A screen will appear asking you to enter the unit ID.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID for the MiniLink PD (MLPD) of the loop you wish to search. and *press* **<ENTER>**. The MLPD is always address 60 on each loop. So the unit ID of any particular MLPD would be the loop number followed by 60. In the example above, Loop 1, address 60 has been entered. Once communication is established, “No Communication” will be replaced with “Press Down.” Then *press* **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

If communications are successful, one of the following screens will appear:

SA V.XXX
NO OVERRIDES

SA V.XXX
OVERRIDES PRESENT
SCROLL DOWN TO VIEW

After the Service Tool completes its search, it will post a message to tell you if there are overrides present. If there are overrides, *press* **<↓>** and all units on the loop will be listed showing ‘Override: Yes or No’

Press **<OVERRIDES>** again to access overrides on a different loop. Enter the Unit ID of the MLPD of that loop.

Schedules and Holidays

Scheduling

You can access the Unit Controller Scheduling Screens by pressing **<SCHEDULES>**. The *Unit Selection Screen* will be displayed.

```
Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication
```

Enter the Unit ID of the controller the Service Tool is connected to and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

Press the **<↓>** button and then press **<ENTER>** to access the scheduling function you wish to view.

```
SA Schedule Menu
Schedule Override
Week Schedules
Holidays
```

Week Schedules

Event #1

```
SA Schd
Sunday Event #1
Start Time..: XXXX
Stop Time...: XXXX
```

Event #2

```
SA Schd
Sunday Event #2
Start Time..: XXXX
Stop Time...: XXXX
```

If you are using the internal scheduling capability of the SA Controller, set the schedule hours and holiday periods from the menu shown above. You can also force the unit to operate continuously in occupied or unoccupied mode by selecting the Schedule Override menu item and entering the desired command.

If you are using an external contact closure to signal the occupied mode, you must access the *Week Schedule Screens* and set all start and stop times to zero to prevent the internal schedule from turning the equipment on when you don't want it to operate.

The screens will step through the *Start Time* and then the *Stop Time* for each day of the week. You can quit at any point in the process by pressing **<ESC>**. There are two Start/Stop events available per day, so the screen will show which event is being programmed. If you need only one event, keep Event #2's times set at ZERO.

All times are in 24-hour military format, so 5:00 PM would be entered as 1700.

If both the Start and Stop Times are ZERO, the schedule is in a continuous OFF mode. (Use for Remote Signal Contact.)

If both the Start and Stop Times are 2359, the schedule is in a continuous ON mode.

NOTE: The second line displays which day of the week is currently being programmed. The day of the week automatically increments as you exit the Event #2 screen for the day and continue to the next day's Event #1 screen.

CAUTION: The controller ships with all schedules set to zero so that the controller will not attempt to heat or cool before you have configured the system.

Holiday Start/Stop Day Selection

```
SA Hldy
Holiday # 1
Start Mon/Day.: XXXX
[ July 4th = 704 ]
```

```
SA Hldy
Holiday # 1
Stop Mon/Day.: XXXX
[ July 5th = 705 ]
```

The screens will step through the fourteen possible holidays, one period at a time. Line 2 shows which holiday is currently being programmed. Since a holiday period can encompass more than one day, you need to program the day the holiday starts and the day the holiday ends. If your holiday only lasts one day, simply set both the Start Day and the Stop Day to the same value. Remember to combine the *month and day* into a single four-digit value.

EXAMPLE: 704 = July 4th (NOTE: Leading zero not required)
1225 = December 25th

Holiday Scheduling and Schedule Override

Holiday Start/Stop Times

```
SA Hldy
Holiday Schedule
Start Event #1: XXXX
Stop  Event #1: XXXX
```

```
SA Hldy
Holiday Schedule
Start Event #2: XXXX
Stop  Event #2: XXXX
```

The fourteen holidays all use the same Start and Stop times which you program on this screen and the next. You must enter the time in 24-hour military format, the same as a regular week schedule.

Normally, the holidays will operate in an unoccupied mode or a reduced schedule mode. There are two start/stop events available on holidays to match the standard schedule number of events.

Schedule Override

```
SA Ovrd
Schedule Override
Enter Override...: X
[0=Auto 1=ON 2=OFF]
```

If you want to force the unit to operate in a continuous Occupied or Unoccupied mode, select this menu item to activate the desired method. If a Schedule Override is active, all other methods of schedule control are ignored (Push-Button, Internal, and Remote).

As you can see on the last line of the display, enter **<1>** to run continuously in the *Occupied Mode* or **<2>** to run continuously in the *Unoccupied Mode*. To restore normal schedule operations, enter **<0>**.

This override remains in effect until canceled and does not time-out like the Output Overrides do after 10 minutes of no communications.

NOTE: Do not use the Force OFF mode in place of setting all the week schedules to ZERO if you are using a Remote Signal for your scheduling since the Override has priority over the Remote Signal.

System Manager SD Keys and Buttons

Operator Interfaces

In order to configure and program the Orion System controllers, you must have an Operator's Interface or a personal computer with the Prism 2 computer front-end software installed. Three different Operator Interfaces are available for programming of the Orion Controls System—the Modular Service Tool SD, the Modular System Manager SD, and/or the System Manager TS II. These devices allow you to access the status and setpoints of the controllers on your communications loop. This manual describes the Modular System Manager SD. If using the Modular Service Tool SD, please see the *Modular Service Tool SD Quick Start Guide*. If using the System Manager TS II, please see the *System Manager TS II Technical Guide*. If using Prism 2, please see the *Prism 2 Technical Guide*.

The Modular System Manager SD allows you to view any input or output status and change any setpoint to fine-tune the operations of the total system. All keypad operations are simple and straightforward, utilizing non-cryptic plain English messages.

Display Screens & Data Entry Keys

See the chart below for a list of the keypad descriptions and functions.

Keypad Description	Key Function
	Modular System Manager SD
ESC	Use this key to exit from screens or from data entry or to return to the Main Screen from any screen in the system.
ENTER	Use this key to enter a new value.
Clear	If a data entry mistake is made, press this key to clear the data entry field and start over.
Minus	If a setpoint with a negative value is required, press this key for the minus sign.
DEC	Press this key when entering data that requires a decimal point.
← →	Use these keys to change values in the Configuration Screens as prompted.
↑ ↓	Use these keys to step backward or forward through the screens.

Table 3: Keypad Descriptions

Mode Selection Buttons

The Modular System Manager is provided with "Mode Selection Buttons." These buttons give you instant access to the specific mode desired without having to scroll through several menu screens to get there.

Button Description	Modular System Manager SD
STATUS	Pressing this button takes you directly to the controller "Status" screens.
SETPOINTS	Pressing this button takes you directly to the controller "Setpoints" screens and "Configuration" menu.
SCHEDULES	Pressing this button takes you directly to the controller "Schedules" screens.
OVERRIDES	Pressing this button takes you directly to the controller "Overrides" screen. See the "Override Button" section on page 21 for a description of this function. See Notes 1 & 2 below.
ALARMS	Pressing this button takes you directly to the controller "Alarms" screen. See the "Alarms Button" section on page 21 for a description of this function. See Notes 1 & 2 below.

Notes:

(1) This button only functions when the system is configured for "Network Mode" or "Multiple MGRS Mode." It will not function in "Stand Alone Mode."

(2) The "Search for Units" function must be performed on the System Manager upon initial system setup before this function will be available. See the "Network Mode & Multiple Managers Loop Search" on **page 20** of this manual for complete instructions on performing a loop search.

Table 4: Button Descriptions

Initialization & Setting the Time & Date

System Manager SD Initialization

System Manager SD Initialization Screen and Setup Screens

After connecting the System Manager to the controller with the supplied cable, press **<ON>**. The *Initialization Screen* will appear followed by the *Setup Screens* as shown below. If there is no SD card installed, the second screen will display, "No SD Card Connected! Powering Down!"

NOTE: After exiting these screens, you can access them again by pressing **<ESC>** and then **<↔>** or by cycling power.

```
INITIALIZING
System Manager SD
vX.XX
WattMaster Controls
```

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
3) Change Passcodes
4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

```
5) Alarm Search

NEXT) More Options
ESC) Exit Menu
```

Setting The Time & Date

The System Manager SD is equipped with a real time clock chip allowing it to maintain the correct time. Once you have programmed the correct time and date, the information is broadcast globally to all controllers on the entire system.

NOTE: A Level 1 or Level 2 User can set the time and date.

NOTE: If you are in a time zone that has daylight savings, you will need to manually adjust the time twice a year.

Programming the Time

From the *Setup Screen* shown below, press **<1>** on your keypad to access the *Set Time & Date Screens*.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Although the times are displayed on the *Main Screen* in a standard 12-hour format, you must program them using the 24-hour military format. If you configured the Unit Controller to use its own Internal Schedules, the Occupied/Unoccupied modes are calculated on the basis of the current real time clock reading.

The two screens that follow will appear. To scroll through the fields, press **<↓>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
Program Time/Date
Day (Sunday=0): X
Enter Hr. (0-23): XX
Enter Minutes : XX
```

Day - Enter the Day of the Week (0 to 6)
Sunday = 0

Hours (Hr) - Enter the Hour (0-23) in
24-Hour Military Format
(13 = 1:00 PM)

Minutes - Enter the Minutes
(0 to 59)

Programming the Date

To scroll through the fields, press **<↓>** or **<ENTER>**. In order to save a new value, you must press **<ENTER>**.

```
Program Time/Date
Month (1-12): XX
Day (1-31): XX
Year (0-99): XX
```

Month - Enter the Month (1 to 12)

Day - Enter the Day of the Month (1 to 31)

Year - Enter the current Year (0 to 99)

When you have finished programming the time and date, press **<ESC>** to return to the *Setup Screen*.

Setting the Operating Mode

Setting the Operating Mode

The Operating Mode is displayed on the last line of the *Main Screen* as shown below. The factory default setting for the System Manager is **LS (Low Speed) Stand Alone Mode**.

```
System Manager SD
01/16/15 02:21 PM
LS Stand Alone
No Communication
```

The System Manager must be configured for the correct mode of operation for your system. There are 5 modes of operation available for the Orion System—**LS (Low Speed) Stand-Alone**, **HS (High Speed) Stand-Alone**, **LS (Low Speed) Network**, **HS (High Speed) Network**, and **LS (Low Speed) & HS (High Speed) Multiple MGRS**.

If you are using this System Manager on a communications loop that doesn't have a MiniLink PD or CommLink connected to it and you have a single System Manager on your system, then you need to operate in **LS (Low Speed) Stand-Alone Mode**. If you are using a VCB-X Controller or GPC-XP Controller that is set for high speed, and you don't have a MiniLink PD or CommLink connected to the loop, then you will need to change the setting to **HS (High Speed) Stand Alone Mode**.

If you are using the System Manager on a communications loop and have an installed MiniLink PD or CommLink, you will need to change the setting to **LS (Low Speed) Network Mode**. If you are using a VCB-X Controller or GPC-XP Controller that is set for high speed, and are using a MiniLink PD or CommLink, then you will need to change the setting to **HS (High Speed) Network Mode**.

If you are using this System Manager on a communications loop, have a MiniLink PD or CommLink installed, and have multiple System Managers, then you need to operate in **Multiple MGRS Mode**.

If your display indicates a different mode than the one you need, press **<2>** at the *Setup Screen* shown below. You will have to cycle power to get to this screen or by pressing **<ESC>** and **<PREV>**.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

The *Passcode Clearance Screen* will appear as shown below.

```
THIS ACTION REQUIRES
A SPECIAL HIGH LEVEL
PASSCODE CLEARANCE
Enter: XXXXXXXX
```

Enter the seven digit passcode **<2337377>** to access the next screen.

You will then see the screen below displayed.

```
Stand Alone Mode
Lo Speed Connection
Use Left/Right Arrow
To Change Selections
```

Press **<←>** or **<→>** if you need to change the mode of operation to **LS (Low Speed) Stand-Alone**, **HS (High Speed) Stand-Alone**, **LS (Low Speed) Network**, **HS (High Speed) Network**, **LS (Low Speed) Multiple Manager** or **HS (High Speed) Multiple Manager** and then press **<ENTER>** to save your selection. If you are not using Multiple Manager Mode, press **<ESC>** at the screen below and continue scrolling right and left.

```
Multiple Manager
Unit Address: 0

Press ESC to Exit
```

For **Multiple MGRS Mode**, enter the address at which you want this particular System Manager to be set.

When multiple System Managers are used on a local loop, each must be set with a unique address different from any other device on that loop. You must perform this same operation again for each System Manager installed. If you want one of these System Managers to be able to indicate alarms and overrides for the entire system, you must *select* either **LS** or **HS Network Mode** on that particular System Manager.

Once you have the correct number per the display above displayed, press **<ENTER>**. The following screen will appear telling you that you have changed the system mode:

```
You Have Changed The
System Manager Mode
Press Any Key To
Continue
```

Press any key on the keyboard to exit this screen.

Changing Passcodes

System Manager Passcodes

Changing the mode of operation, updating software, changing schedules, and changing setpoints and configurations require passcode clearance. The screen below will appear if this action requires passcode clearance.

```
THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX
```

The System Manager has three levels of user access. All users can view Status Screens. Level 1 users are limited to changing the Time and Date and Operating Schedules. Level 2 users have complete system access. Any status or setpoint field can be read or reset from the System Manager.

These two levels of passcodes are programmable by any Level 2 user. The default Level 1 passcode is "1111" and the default Level 2 passcode is "2222."

If you wish to change either Level 1 or Level 2 passcodes, please see the instructions that follow.

From the *Main Status Screen*, press **<ESC>** and then press **<PREV>**. The following screen will appear:

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Press **<→>** for the Next Menu. The following screen will be displayed:

```
3) Change Passcodes
4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

Press **<3>** for Change Passcodes. The following screen will be displayed:

```
THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX
```

Passcodes can only be changed by a Level 2 user. *Enter* the passcode and *press* **<ENTER>**. The following screen will appear:

```
Enter New Passcode
Level 1.....: XXXX
Level 2.....: XXXX
[Must Be 4 Digits]
```

This screen allows you to enter new Level 1 and/or Level 2 passcodes. Passcodes must always be four digits in length, so the usable range of numbers is 1000 to 9999.

CAUTION: If you change the Level 2 passcode and cannot remember what it is, you will be locked out of your system!

Loop Search and System Alarm Search

Network Mode & Multiple Managers Loop Search

When the System Manager is configured for Network Mode, a loop search must initially be performed for the System Manager to recognize alarms or overrides. Also, when you have a system that has multiple System Managers and you have one of the System Managers set to (63) Network Mode for alarm and override indication, you must also perform a loop search for that System Manager. This allows the System Manager to be aware of all alarms and overrides for all local loops on the entire system.

To access the *Loop Search Screen*, from the *Setup Screen Screen*, press **<ESC>** and then press **<PREV>**.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Press **<↔>** for Next Menu. The following screen will be displayed:

```
3) Change Passcodes
4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

Press **<4>** for Loop Search. The following screen will be displayed:

```
Loop Search
Current Loop = XX
Loops Found = XX
Searching
```

The System Manager will now proceed to search all loops to find the MiniLink PDs that are connected to the system. The screen will display the current loop being searched and the number of loops currently found.

Once the search is completed, the following screen will be displayed:

```
Loop Search
Finished
Loops Found = XX
Press ESC to Exit
```

The screen will display the number of loops found on your system. The information will be saved into the System Manager's memory. No further loop searches will be required unless you add an additional MiniLink PD to the Network System.

System Alarm Search

The System Manager can be used to search for all active alarms on the system. You must configure the MiniLink PD to allow for "Alarm Polling" for each controller you want polled for alarms. See the MiniLink PD programming section on **page 75** of this manual for setting information.

This option will alert you of the number of alarms present on individual units, but will not tell you what type of alarm are present. You will have to perform an individual unit alarm search for detailed alarm information.

To access the *Alarm Search Screen*, from the *Setup Screen Screen*, press **<ESC>** and then press **<PREV>**.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

Press **<↔>** for Next Menu. The following screen will be displayed:

```
3) Change Passcodes
4) Loop Search
NEXT) More Options
ESC) Exit Menu
```

Press **<↔>** for Next Menu. The following screen will be displayed:

```
5) Alarm Search
NEXT) More Options
ESC) Exit Menu
```

Press **<5>** for Alarm Search. The entire system is searched from this point. The following screen will be displayed:

```
Alarm Screen

SEARCHING!
```

Once the Alarm Search is complete, one of the following screens will display:

```
Alarm Screen

XX ALARMS ON UNIT XX
```

Unit Alarm Search and Override Search

Alarm Screen

NO ALARMS DETECTED

To check controllers individually for alarms, use the **<ALARMS>** button on the Main Display.

Unit Alarm Search

The System Manager can be used to search for all active alarms one controller at a time.

Press **<ALARMS>**. The *Unit Selection Screen* below will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller you wish to search and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will appear. The System Manager will search for any active alarms on the unit and one of the following screens will appear:

CONTROLLER V.XXX

NO ALARMS

CONTROLLER V.XXX

ALARMS PRESENT
SCROLL DOWN TO VIEW

Press **<↓>** to scroll through all the alarms for the controller that the Modular Service Tool is connected to.

To clear any alarms that are found, you must fix the problem indicated in the alarm. Once the problem is fixed, the alarm will clear from the screen the next time the unit is polled.

System Manager Override Search

NOTE: In order for the Override Search to work, a Loop Search must be performed first. See **page 20** for details.

When a space sensor with override option is used with any VAV/Zone Controller or Unit Controller, the System Manager can determine and report any controllers that are currently operating in an override condition. This function requires that a MiniLink PD is installed on each loop where the controllers may be located. The MiniLink PD must be configured to allow for "Alarm Polling" for each controller that Override Polling Enabled is desired for this function to work. See the MiniLink PD programming section on **page 75** of this manual for setting information.

To access the *Space Sensor Overrides Screen*, press **<OVERRIDES>**. The following screen will appear.

Overrides Screen

SEARCHING!

After the System Manager completes its search, it will list the first unit on the system that is currently in the override mode. Press the **<↓>** button to scroll through all units that are in the Override Mode.

Overrides Screen

Loop = 1 Unit = 59
OVERRIDE FOUND

Schedules and Holidays

Scheduling

You can access the Controller Scheduling Screens by pressing **<SCHEDULES>**. The screen below will appear because Scheduling requires passcode clearance. A Level 1 or 2 passcode can change schedules.

```
THIS ACTION REQUIRES  
PASSCODE CLEARANCE  
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address  
Then Press Enter  
Selected Unit#: XXXX  
No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The *Unit Schedule Menu* will be displayed.

```
Schedule Menu  
Schedule Override  
Week Schedules  
Holiday Schedules
```

Press the **<↓>** button until the cursor is on the desired option and then press **<ENTER>**.

Week Schedules

From the *Unit Schedule Menu*, select Week Schedules. The following two screens will appear in order:

Event #1

```
Schd  
Sunday      Event #1  
Start Time..: XXXX  
Stop Time...: XXXX
```

Event #2

```
Schd  
Sunday      Event #2  
Start Time..: XXXX  
Stop Time...: XXXX
```

If you are using the internal scheduling capability of the Controller, set the schedule hours and holiday periods from the menu shown above. You can also force the unit to operate continuously in occupied or unoccupied mode by selecting the Schedule Override menu item and entering the desired command.

If you are using an external contact closure to signal the occupied mode, you must access the *Week Schedule Screens* and set all start and stop times to zero to prevent the internal schedule from turning the equipment on when you don't want it to operate.

The screens will step through the **Start Time** and then the **Stop Time** for each day of the week. You can quit at any point in the process by pressing **<ESC>**. There are two Start/Stop events available per day, so the screen will show which event is being programmed. If you need only one event, keep Event #2's times set at ZERO.

All times are in 24-hour military format, so 5:00 PM would be entered as 1700.

If both the Start and Stop Times are ZERO, the schedule is in a continuous OFF mode. (**Use for Remote Signal Contact.**)

If both the Start and Stop Times are 2359, the schedule is in a continuous ON mode.

NOTE: The second line displays which day of the week is currently being programmed. The day of the week automatically increments as you exit the Event #2 screen for the day and continue to the next day's Event #1 screen.

CAUTION: The controller ships with all schedules set to zero so that the controller will not attempt to heat or cool before you have configured the system.

Holiday Scheduling and Schedule Override

Holiday Start/Stop Day Selection

From the *Unit Schedule Menu*, select Holiday Schedules. The following four screens will appear in order:

```

      Hldy
    Holiday #  1
  Start Mon/Day.: XXXX
    [ July 4th = 704 ]
  
```

```

      Hldy
    Holiday #  1
  Stop Mon/Day.: XXXX
    [ July 5th = 705 ]
  
```

The screens will step through the fourteen possible holidays, one period at a time. Line 2 shows which holiday is currently being programmed. Since a holiday period can encompass more than one day, you need to program the day the holiday starts and the day the holiday ends. If your holiday only lasts one day, simply set both the Start Day and the Stop Day to the same value. Remember to combine the *month and day* into a single four-digit value.

EXAMPLE: 704 = July 4th
 (**NOTE:** Leading zero not required)
 1225 = December 25th

Holiday Start/Stop Times

```

      Hldy
    Holiday Schedule
  Start Event #1: XXXX
  Stop  Event #1: XXXX
  
```

```

      Hldy
    Holiday Schedule
  Start Event #2: XXXX
  Stop  Event #2: XXXX
  
```

The fourteen holidays all use the same Start and Stop times which you program on this screen and the next. You must enter the time in 24-hour military format, the same as a regular week schedule.

Normally, the holidays will operate in an unoccupied mode or a reduced schedule mode. There are two start/stop events available on holidays to match the standard schedule number of events.

Schedule Override

From the *Unit Schedule Menu*, select Schedule Override. The following screen will appear:

```

      Ovr
    Schedule Override
  Enter Override...: X
    [0=Auto 1=ON  2=OFF]
  
```

If you want to force the unit to operate in a continuous Occupied or Unoccupied mode, select this menu item to activate the desired method. If a Schedule Override is active, all other methods of schedule control are ignored (Push-Button, Internal, and Remote).

As you can see on the last line of the display, *enter <1>* to run continuously in the *Occupied Mode* or *<2>* to run continuously in the *Unoccupied Mode*. To restore normal schedule operations, *enter <0>*.

This override remains in effect until canceled and does not time-out like the Output Overrides do after 10 minutes of no communications.

NOTE: Do not use the Force OFF mode in place of setting all the week schedules to ZERO if you are using a Remote Signal for your scheduling since the Override has priority over the Remote Signal.

SA E-BUS Controller Configuration Screen Index

SA E-BUS Configuration Screen Index

The available Configuration Screens for the SA E-BUS Controller are listed on the next few pages by sequential screen number. When each SA E-BUS Controller is configured for the first time, it is best to start with screen #1 and proceed to each screen in numerical order until you have viewed all available Configuration Screens. This ensures that you have seen all the available SA E-BUS Controller configuration possibilities and have the opportunity to change or accept the defaults for each screen.

Once the unit is configured and you decide to change one of the screen options, it is helpful to know what screen number contains the configuration you wish to change. With this in mind, the following is a list of all the SA E-BUS Controller Configuration Screens in numerical order with a brief listing of the configuration feature available on each screen.

Screen #1	Duct Static Pressure Control	Screen #19	Chilled Water Output Signal
Screen #2	Supply Fan Cycle Mode	Screen #20	Digital Compressor Signal
Screen #3	HVAC Mode Enable	Screen #21	Modulating Cooling Reverse Acting
Screen #4	HVAC Reset Source	Screen #22	Modulating Cool Proportional Window
Screen #5	Reset Interval Rate	Screen #23	Water Cooled Condenser or WSHP Module Installed
Screen #6	Dehumidification Control	Screen #24	Head Pressure Module Installed
Screen #7	Dehumidification Priority	Screen #25	Mult Digital Comp Installed
Screen #8	Dehumidification Unoccupied	Screen #26	Heat Pump Control
Screen #9	Entering Air Humidity Sensor	Screen #27	Reversing Valve Active For Heat/Cool
Screen #10	Indoor Air Humidity Sensor	Screen #28	Emergency Shutdown Input
Screen #11	Heat During Dehumidify	Screen #29	Broadcast Supply Temperature
Screen #12	Water Side Economizer Control	Screen #30	Broadcast Status Fan & Heat
Screen #13	Water Side is Variable	Screen #31	Broadcast Internal Time Clock
Screen #14	Proof of Flow Input	Screen #32	Broadcast Internal Schedule
Screen #15	Modulating Cooling/Heating	Screen #33	Broadcast VAV Boxes Force to Max
Screen #16	Modulating Heat Output Signal	Screen #34	Broadcast VAV Boxes Force to Fixed
Screen #17	Modulating Heat Reverse Acting	Screen #35	1 HVAC Unit w/Boxes on Multiple Loops
Screen #18	Modulating Heat Proportional Window	Screen #36	Unit Uses R410A Refrigerant
		Screens #37-40	Cooling & Heating Staging Delays
		Screens #41-60	Relay Configuration Screens

SA E-BUS Controller Configuration Screens**Configuration Screens**

In order to correctly set up the SA E-BUS Controller, you must first configure several parameters in regard to the type of HVAC unit and system you have installed. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

Modular Service Tool Instructions

No matter what screen or menu you're in, press **<CONFIGURATION>**. The *Unit Selection Screen* will appear, shown below, requesting that you enter the unit ID number.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the correct unit ID number of the SA Controller you want to configure and then press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**. You will then see *Unit Configuration Screen #1*. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

Change Setpoints
Configure Unit
Save/Copy/Restore

Scroll down to the 'Configure Unit' option and press **<ENTER>**. This will take you to the first Configuration Screen shown below.

Configuration Screen #1 - Duct Static Pressure Control

SA Unit Cnfg ID 102
Duct Static Pressure
Control: YES
Use < Or > To Change

Select NO if the HVAC unit has a Supply Fan that delivers a Constant Volume of air. Select YES if the HVAC unit has a Supply Fan that delivers a Variable Volume of Air using a VFD or a Bypass Damper. Default is YES.

Configuration Screen #2 - Supply Fan Cycle

SA Unit Cnfg ID 102
Supply Fan Cycle
Mode: NO
Use < Or > To Change

Select YES if you want the HVAC unit's Supply Fan to run during Heating, Cooling, or Dehumidification Modes. Select NO if you want the HVAC unit's Supply Fan to run continuously while in the Occupied Mode, regardless of the Heating, Cooling, or Dehumidification Modes. Default is NO.

SA E-BUS CONFIGURATION

SA E-BUS Controller Configuration Screens

Configuration Screen #3 - HVAC Mode Enable

SA Unit Cnfg ID 102
HVAC Mode Enable
Supply Air
Use < Or > To Change

Select the Temperature Sensor that will determine the Heating, Cooling, or Vent Mode of operation. The selections are:

- **Supply Air**
This is typical for VAV applications. Occupied Cooling with Morning Warm-up.
- **Entering Air**
This is for 100% Outdoor Air (MUA) units. Dehumidification utilizes a Dewpoint Calculation if equipped with an Entering Air Humidity Sensor.
- **Space Temperature**
This is for any unit that conditions a space and is not 100% Outdoor air. Occupied/Unoccupied Heating, Cooling, and Vent Modes of operation.

Configuration Screen #4 - HVAC Reset Source

SA Unit Cnfg ID 102
HVAC Reset Source
No Reset
Use < Or > To Change

The Supply Air Heating and Cooling Temperature Setpoints can be re-set using various input sources. Default is No Reset. Select the desired Reset Source for Supply Air Temperature Reset. If you select No Reset, then neither the Supply Air Setpoint nor the Supply Fan VFD Reset will occur. The selections are:

- **No Reset**
- **Fan VFD Percentage**
- **Entering Air**
- **Space Temperature**
- **Remote Reset Signal**

Configuration Screen #5 - Reset Interval Rate

SA Unit Cnfg ID 102
Reset Interval
Rate...: 20 s
[1-255 Seconds]

If you selected Space Temperature Reset in Screen #4, enter a value in seconds between 1-255. This value determines how fast the Supply Air Temperature Setpoint is adjusted as the Reset Source changes. Default is 20 seconds.

Configuration Screen #6 - Dehumidification Control

SA Unit Cnfg ID 102
Dehumidification
Control: NO
Use < Or > To Change

Select YES if your system requires Dehumidification Control. Default is NO.

Configuration Screen #7 - Dehumidification Priority

SA Unit Cnfg ID 102
Dehumidification
Priority: NO
Use < Or > To Change

Select YES if Dehumidification is a Priority during the Occupied Mode. Priority means that the Cooling stages will activate based on Coil Temperature and Reheat will be used regardless of Heating, Cooling, or Vent Modes of Operation. Default is NO.

Configuration Screen #8 - Dehumidification Unoccupied

SA Unit Cnfg ID 102
Dehumidification
Unoccupied: NO
Use < Or > To Change

Select YES if Dehumidification is required during the Unoccupied mode. Unoccupied Dehumidification is activated based on Indoor Air Humidity only. Default is NO.

Configuration Screen #9 - Entering Air Humidity Sensor

SA Unit Cnfg ID 102
Entering Humidity
Sensor: NO
Use < Or > To Change

Select YES if the HVAC unit is equipped with an Entering Air Humidity Sensor. Default is NO.

SA E-BUS Controller Configuration Screens**Configuration Screen #10 - Indoor Air Humidity Sensor**

```
SA Unit Cnfg ID 102
Indoor Humidity
Sensor: NO
Use < Or > To Change
```

Select YES if the HVAC unit is equipped with an Indoor Air Humidity Sensor. Default is NO.

Configuration Screen #11 - Heat During Dehumidify

```
SA Unit Cnfg ID 102
Heat During
Dehumidify: NO
Use < Or > To Change
```

Select YES if your application needs to use unit heat during Dehumidification to supplement Reheat. If Reheat is not available, this selection will allow unit heat to operate in place of Reheat. Default is NO.

Configuration Screen #12 - Water Side Economizer Control

```
SA Unit Cnfg ID 102
Water Side Economizer
Control: NO
Use < Or > To Change
```

Select YES if the SA E-BUS Controller is controlling the Water Side Economizer. Default is NO.

Configuration Screen #13 - Water Side is Variable

```
SA Unit Cnfg ID 102
Water Side is
Variable: NO
Use < Or > To Change
```

Select YES if the Water Side Economizer has Variable Flow. Select NO for Constant Flow. Default is NO.

Configuration Screen #14 - Proof of Flow Input

```
SA Unit Cnfg ID 102
Proof Of Flow
Input: NO
Use < Or > To Change
```

Select YES if the unit is equipped with a Proof of Flow Switch and it is connected to the SA Controller. If selected as YES and the Proof of Flow Switch is open, only the Supply Fan Relay will be active. If any other relays such as Heating Stages or Cooling Stages are active, they will be deactivated when the Proof of Flow Switch input is lost. Default is NO.

Configuration Screen #15 - Modulating Cooling/Heating

```
SA Unit Cnfg ID 102
Mod Cooling: NO
Mod Heating: NO
Use < Or > To Change
```

Select YES if the HVAC unit is controlling Modulating Heating or Modulating Cooling or both. If your HVAC unit is going to use a Modulating Chilled Water Valve or is equipped with a Digital Compressor, you must select YES for Modulating Cooling. If your HVAC is using a Modulating Hot Water Valve, Modulating Steam Valve, or a SCR Controlled Electric Heater, you must select YES for Modulating Heating. Defaults are NO.

Configuration Screen #16 - Modulating Heating Output Signal

```
SA Unit Cnfg ID 102
Mod Heating
Output Signal.: 0-10V
Use < Or > To Change
```

Select a 0-10 VDC signal or 2-10 VDC signal to a Modulating Heat Source such as a Hot Water Valve or SCR Electric Heater. Default is 0-10 VDC.

Configuration Screen #17 - Modulating Heating Reverse Acting

```
SA Unit Cnfg ID 102
Mod Heating
Rev Acting: NO
Use < Or > To Change
```

Select YES if the Modulating Heat Source requires 0 VDC to open and 10 VDC to close. Default is NO.

SA E-BUS CONFIGURATION

SA E-BUS Controller Configuration Screens

Configuration Screen #18 - Modulating Heating Proportional Window

SA Unit Cnfg ID 102
Mod Heating
Prop. Window.: 10°F
Time Period...: 5 s

The Modulating Heating Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Setpoint. The larger the Modulating Heating Proportional Window, the smaller the signal adjustment per Time Period will be for each °F the supply air is from the Active Supply Air Temperature Setpoint. The Time Period is the delay before another signal increase or decrease can be made and is user-adjustable. Short Time Periods may cause hunting of the Modulating Signal. Defaults are 10°F and 5 seconds.

Configuration Screen #22 - Modulating Cooling Proportional Window

SA Unit Cnfg ID 102
Mod Cooling
Prop. Window.: 10°F
Time Period...: 30 s

The Modulating Cooling Proportional Window is the control range of the Modulating Signal above and below the Active Supply Air Setpoint. The larger the Modulating Cooling Proportional Window, the smaller the signal adjustment per Time Period will be for each °F the supply air is from the Active Supply Air Temperature Setpoint. The Time Period is the delay before another signal increase or decrease can be made and is user-adjustable. Short Time Periods may cause hunting of the Modulating Signal. Defaults are 10°F and 30 seconds.

Configuration Screen #19 - Chilled Water Output Signal

SA Unit Cnfg ID 102
Chilled Water
Output Signal: 0-10V
Use < Or > To Change

Select a 0-10 VDC signal or a 2-10 VDC signal to a Chilled Water Valve for Modulating Cooling Stage 1. If using a Digital Compressor, select YES on the next screen. Default is 0-10 VDC.

Configuration Screen #23 - Water Cooled Condenser or WSHP Module Installed

SA Unit Cnfg ID 102
Water Cooled
Condenser: NO
Use < Or > To Change

Select YES if your unit has a Water Cooled Condenser or if you have a Water Source Heat Pump (WSHP) Module installed. Default is NO.

Configuration Screen #20 - Digital Compressor Signal

SA Unit Cnfg ID 102
Digital Compressor
Signal 1-5V : NO
Use < Or > To Change

Select YES if the HVAC unit is equipped with a Digital Compressor for Modulating Cooling Stage 1 or 2. Default is NO.

Configuration Screen #24 - Head Pressure Control

SA Unit Cnfg ID 102
Head Pressure
Control: NO
Use < Or > To Change

Select YES if you have a Head Pressure Module installed. Default is NO.

Configuration Screen #21 - Modulating Cooling Reverse Acting

SA Unit Cnfg ID 102
Mod Cooling
Rev Acting: NO
Use < Or > To Change

Select YES if the Modulating Cooling Source requires 0 VDC to open and 10 VDC to close. You cannot use a Reverse Acting Signal if a Digital Compressor is being used. Default is NO.

Configuration Screen #25 - Multiple Digital Compressors Installed

SA Unit Cnfg ID 102
Mult Digital Comp
Installed: NO
Use < Or > To Change

Select YES if you have a multiple Digital Scroll Compressors installed. Default is NO.

SA E-BUS Controller Configuration Screens**Configuration Screen #26 - Heat Pump Control**

SA Unit Cnfg ID 102
Heat Pump
Control: NO
Use < Or > To Change

Select YES if the HVAC unit is a Heat Pump. Default is NO.

Configuration Screen #27 - Reversing Valve Active During Heat/Cool

SA Unit Cnfg ID 102
Rev. Valve Active
For: Cool
Use < Or > To Change

Select Heat if your Heat Pump unit activates its Reversing Valve during Heating operation. Select Cool if your Heat Pump unit activates its Reversing Valve during Cooling operation. Default is Heat.

Configuration Screen #28 - Emergency Shutdown Input

SA Unit Cnfg ID 102
Emergency Shutdown
Input: NO
Use < Or > To Change

Select YES if a Smoke Detector/Firestat or other Emergency Shutdown input is connected to the binary input. If the Emergency Shutdown input is active, the Supply Fan, Heating and Cooling Relay Outputs will be disabled. Default is NO.

Configuration Screen #29 - Broadcast Supply Temperature

SA Unit Cnfg ID 102
Broadcast Supply
Temperature: YES
Use < Or > To Change

This broadcast sends the SA Controller's Supply Air Temperature to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Select YES to Broadcast the Supply Air Temperature. Default is NO.

Configuration Screen #30 - Broadcast Status Fan & Heat

SA Unit Cnfg ID 102
Broadcast Status
Fan & Heat: NO
Use < Or > To Change

This broadcast sends the SA Controller's Supply Fan and Heating Status to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate. Select YES to Broadcast the Fan & Heat Status. Default is NO.

Configuration Screen #31 - Broadcast Internal Time Clock

SA Unit Cnfg ID 102
Broadcast Internal
Time Clock: NO
Use < Or > To Change

This broadcast sends the time from the SA Controller's Internal Time Clock to all controllers on its local loop. This broadcast needs to be configured on a VAV or Zoning System using the SA Controller with Orion VAV/Zone Controllers. A network communications device is required in order for this feature to operate, but can also be used to synchronize all controllers on the local loop. Select YES to Broadcast the Internal Time Clock. Default is NO.

Configuration Screen #32 - Broadcast Internal Schedule

SA Unit Cnfg ID 102
Broadcast Internal
Schedule: NO
Use < Or > To Change

This is always required when you have VAV/Zone Controllers connected to this SA Controller. This will broadcast the Occupied and Unoccupied Condition of the SA Controller to all VAV/Zone controllers on the local loop. Select YES to Broadcast the Internal Schedule. Default is NO.

SA E-BUS CONFIGURATION

SA E-BUS Controller Configuration Screens

Configuration Screen #33 - Broadcast VAV Boxes Force to Max

SA Unit Cnfg ID 102
Broadcast VAV Boxes
Force To Max: YES
Use < Or > To Change

This broadcast is to ensure the VAV/Zone Controllers will drive their dampers to the Max Airflow Damper Position during Morning Warm-up. This is important to allow the proper amount of airflow for Heating in the HVAC unit. Select YES to Broadcast VAV Boxes Force to Max. Default is YES.

Configuration Screen #34 - Broadcast VAV Boxes Force to Fixed

SA Unit Cnfg ID 102
Broadcast VAV Boxes
Force To Fixed: NO
Use < Or > To Change

Select YES to have all VAV/Zone controllers connected to this SA Controller forced to their “Fixed Airflow” Position during the Morning Warm-up Mode of operation. See the VAV/Zone controller Setpoint Screens for setting of the “Fixed Airflow” position. Default is NO.

Configuration Screen #35 - 1 HVAC Unit with Boxes on Multiple Loops

SA Unit Cnfg ID 102
1 HVAC Unit w/ Boxes
On Multi. Loops: NO
Use < Or > To Change

Select YES to have all broadcasts that have been configured on Configuration Screens 29 through 34 sent to all local loops on the entire system, not just the local loop the SA Controller is on. This is normally only required if you have a large HVAC unit that requires more than the 58 VAV/Zone Controllers normally allowed on the local loop. This allows other VAV/Zone Controllers connected on additional local loops to receive the required broadcasts. This only is allowed when you have a single SA Controller with VAV/Zone Controllers on multiple loops. Other SA Controllers or add-on devices may be connected but no other SA Controllers with VAV/Zone Controllers can be connected on the system. Default is NO.

Configuration Screen #36 - Uses R410A Refrigerant

SA Unit Cnfg ID 102
Unit Uses R410A
Refrigerant: YES
Use < Or > To Change

Select YES if your HVAC unit uses R410A Refrigerant. Default is YES.

SA E-BUS Controller Configuration Screens

Configuration Screens #37-40 - Cooling & Heating Stage Delays

SA Unit Cnfg ID 102
Cooling Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

SA Unit Cnfg ID 102
Cooling Stage Delays
Min Run Time: 5 Min
Min Off Time: 3 Min

SA Unit Cnfg ID 102
Heating Stage Delays
Staging Up...: 3 Min
Staging Down : 1 Min

SA Unit Cnfg ID 102
Heating Stage Delays
Min Run Time: 2 Min
Min Off Time: 1 Min

Both the Heating Stages and the DX Cooling Stages utilize **Staging Up** and **Down** Delay Periods between stages and **Minimum Run** Times and **Off** Times.

Both modes have their own set of Staging and Run Delay Times. The Heating Timer Screens look exactly the same as the Cooling Timer Screens except they reference the Heating settings instead of the Cooling settings.

See the *Sequence of Operation Manual* for information on how these Delays and Run Times are used.

Description	Minimum	Default	Maximum
Cooling Stage Up	3 Min	3 Min	15 Min
Cooling Stage Down	1 Min	1 Min	15 Min
Cooling Min Run Time	5 Min	5 Min	15 Min
Cooling Min Off Time	3 Min	3 Min	15 Min
Heating Stage Up	3 Min	3 Min	15 Min
Heating Stage Down	1 Min	1 Min	15 Min
Heating Min Run Time	2 Min	2 Min	15 Min
Heating Min Off Time	1 Min	1 Min	15 Min

Configuration Screens #41-60 - Relay Configuration Screens

SA Unit Cnfg ID 102
Relay Configurations
Rly xx: Not Used
Use < Or > To Change

Relay #1 is not configurable as it is reserved for the Supply Air Fan. Relays #2-#21 are configurable for the following options:

- Not Used
- Heat Stage
- Cool Stage
- Warmup Mode
- Rev Valve
- HGR
- Pre-Heater
- Alarm
- Override
- Occupied
- WS Economizer

Relays #2 through #21 can be individually configured. By using the 4 relay outputs available on the SA Controller, the 4 relays on the SA Expansion Module, and the 12 relays on the 12 Relay Expansion Module, you have the ability to configure up to a combined total of 20 Heating Stages, Cooling Stages, and the rest of the options listed above. Only the Heating and Cooling relays can be configured with multiple outputs. If any other option is selected more than once, it will simply activate redundant relays, but no multiple staging will occur. Default is "Not Used."

SA E-BUS Controller Setpoint Screens

Setpoint Screen Index

The available Setpoint Screens for the SA E-BUS Controller are listed on the next few pages by sequential screen number. When each SA E-BUS Controller is configured for the first time, it is best to start with screen #1 and proceed to each Setpoint Screen in numerical order until you have viewed all available Setpoint Screens. This ensures that you have seen all of the available SA E-BUS Controller Setpoint possibilities and have the opportunity to change or accept the defaults for each screen. Once the unit Setpoints are configured and you decide to change one of the screen options, it is helpful to know what screen number contains the configuration you wish to change. With this in mind, the following is a list of all the SA Controller Setpoint Screens in numerical order with a brief listing of the Setpoint feature available on each screen:

Setpoint Screen #1	HVAC Mode Setpoints
Setpoint Screen #2	HVAC Mode Select Deadband
Setpoint Screen #3	Unoccupied Setbacks
Setpoint Screen #4	SAT Cooling Setpoints
Setpoint Screen #5	Cool Reset Source Setpoints
Setpoint Screen #6	SAT Heating Setpoints
Setpoint Screen #7	Heat Reset Source Setpoints
Setpoint Screen #8	Stage Control Window
Setpoint Screen #9	Entering Air Lockouts
Setpoint Screen #10	Heat Pump Compressor Lockout
Setpoint Screen #11	Cutoff Temperatures Lo SAT & Hi SAT
Setpoint Screen #12	Minimum Supply Fan VFD Speed For Heating
Setpoint Screen #13	Morning Warm-up Target Temp & Max Length
Setpoint Screen #14	Dehumidification Indoor RH & Entering Air Dewpoint
Setpoint Screen #15	Dehumidification Coil Temperature
Setpoint Screen #16	Cooling Head Pressure Setpoint
Setpoint Screen #17	Reheat Head Pressure Setpoint

Setpoint Screen #18	Head Pressure Output Minimum Position Setpoint
Setpoint Screen #19	Water Side Economizer Setpoints
Setpoint Screen #20	Static Setpoint, Deadband, and Control Rate
Setpoint Screen #21	Fan Starting Delay Timer
Setpoint Screen #22	Mechanical Heat Cool Failures Occur After No Change For
Setpoint Screen #23	Preheat/Low Ambient Temperature
Setpoint Screen #24	HVAC Schedule
Setpoint Screen #25	Push-Button Override Duration
Setpoint Screen #26	HVAC Mode Sensor Slide Offset
Setpoint Screen #27	Heat Pump Auxiliary Heating Delay
Setpoint Screen #28	Heat Pump Defrost Temp and Defrost Timer
Setpoint Screen #29	Adaptive Defrost Adjustment
Setpoint Screen #30	Internal Schedule Optimal Start Soak Multiplier
Setpoint Screen #31	Trend Log Interval
Setpoint Screen #32	Sensor Calibration For SPC & SAT
Setpoint Screen #33	Sensor Calibration For EAT & EWT
Setpoint Screen #34	Sensor Calibration For Coil

SA E-BUS Controller Setpoint Screens

Setpoints - General Procedures

Modular Service Tool Instructions

From any menu screen, press **<SETPOINTS>**. The *Unit Selection Screen*, shown below, will appear requesting that you enter the unit ID number.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the correct unit ID number of the Unit Controller you want to change Setpoints for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**. You will then see Setpoint Screen #1. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

Change Setpoints
Configure Unit
Save/Copy/Restore

Scroll to the 'Change Setpoints' option and press **<ENTER>**. This will take you to the first Setpoints Screen shown below.

Setpoint Screen #1 - HVAC Mode Setpoints

SA Unit Spts ID 102
HVAC Mode Setpoints
Cooling.....: 75°F
Heating.....: 70°F

These Setpoints are used to determine the Heating, Cooling, or Vent Modes of operation in reference to the HVAC Mode Enable Sensor. If the Supply Air Sensor is configured to be the HVAC Mode Enable, these Setpoints are used in conjunction with the Unoccupied Setbacks if equipped with a Space Temperature Sensor.

Description	Minimum	Default	Maximum
HVAC Mode Setpoints Cooling	0°F	75°F	99°F
HVAC Mode Setpoints Heating	0°F	70°F	99°F

Setpoint Screen #2 - HVAC Mode Select Deadband

SA Unit Spts ID 102
HVAC Mode Select
Deadband.....: 1.0°F

This Setpoint is added to and subtracted from the HVAC Mode Setpoints. It provides you with flexibility on when the Heating and Cooling Modes should be active above or below the HVAC Mode Setpoints.

Description	Minimum	Default	Maximum
HVAC Mode Select Deadband	0°F	1°F	10°F

SA E-BUS SETPOINTS

SA E-BUS Controller Setpoint Screens

Setpoint Screen #3 - Unoccupied Setbacks

```
SA Unit Spts ID 102
Unoccupied Setbacks
Cooling.....: 30°F
Heating.....: 30°F
```

During the Unoccupied Mode of Operation, these Setpoints spread the HVAC Mode Setpoints out by a user-adjustable amount. Use only positive numbers for these Setpoints. If you do not want Cooling or Heating to operate during the Unoccupied Mode, use the default setting of 30°F for these setpoints.

Description	Minimum	Default	Maximum
Unoccupied Setbacks Cooling	0°F	30°F	30°F
Unoccupied Setbacks Heating	0°F	30°F	30°F

Setpoint Screen #4 - SAT Cooling Setpoints

```
SA Unit Spts ID 102
SAT Cooling Spts
Cooling..: 55°F
Rst Limit: 55°F
```

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Cooling Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. Reset is always upward from the SAT setpoint to the Reset Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Cooling Supply Air Temperature Setpoint will automatically be reset warmer or colder within this range as the Reset Source (next screen) moves within its range.

Description	Minimum	Default	Maximum
SAT Cooling Setpoint	30°F	55°F	80°F
Cooling Reset Limit	40°F	55°F	200°F

Setpoint Screen #5 - Cool Reset Source

```
SA Unit Spts ID 102
Cool Rst Source Spts
EntHi: 75 SAT: 55°
EntLo: 75 RST: 55°
```

If no Reset Source has been configured in Configuration Screen #4, then this screen will read Cool Rst Not Config and will not be used. If a Reset Source has been configured in Configuration Screen #4, then the names of the values on the left side of this screen will correspond to the Reset Source that was configured. This screen will then allow you to input the upper and lower limits for the range of values of the Reset Source on the left side of the screen and will show the corresponding Cooling Supply Air SAT and Rst Limit values that were entered on the previous screen. Single Zone VAV Reset of the Supply Fan VFD is addressed in the last paragraph.

Please note that the SAT and Rst Limit values on the right side of this screen cannot be changed on this screen; they are simply displayed from what was entered on the Setpoint Screen #4. For each line, the value on the left corresponds to the value on the right. So, if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or above the SpcHi Temperature Setpoint, the Supply Air Cooling Setpoint will be reset to its lowest value, the SAT Setpoint. If the Space Temperature is at or below the SpcLo Setpoint, the Supply Air Cooling Setpoint will be reset to its highest value, the Cooling Rst Limit. Then, as the Space Temperature moves from its low value to its high value, the Supply Air Cooling Setpoint will be proportionally reset from its high value to its low value.

Depending on whether reset has been configured or not, the options for the names of the values on the left side of the screen are SpcHi, SpcLo, EntHi, EntLo, VLT, VFD, NoRST.

In the examples that follow, the desired Space Temperature in Cooling Mode is 75°F:

Space Temperature Cool Reset:

Space Temperature (SPC Hi) = 75°F SAT Setpoint (SAT) = 55°F
Space Temperature (SPC Lo) = 74°F SAT Setpoint (Rst) = 65°F

VFD Percentage Cool Reset:

VFD Percentage (VFD) = 70% SAT Setpoint (SAT) = 55°F
VFD Percentage (VFD) = 30% SAT Setpoint (Rst) = 65°F

Input Voltage Cool Reset:

Input Voltage (VLT) = 0 Volts SAT Setpoint (SAT) = 55°F
Input Voltage (VLT) = 10 Volts SAT Setpoint (Rst) = 65°F

In the Cooling Mode in a Single Zone VAV application, the Supply Fan VFD speed will proportionally modulate as the Space Temperature rises within the range set on this screen. Upon entering the Cooling Mode, the fan will start at 30% and modulate up to 100% as the Space Temperature rises from the SpcLo Setpoint to the SpcHi Setpoint. The SpcLo Setpoint should be the same as the Space Cooling Setpoint (Mode Enable Setpoint) from Setpoint Screen #1. The SAT and RST Setpoints on the right side of the screen are not used.

SA E-BUS Controller Setpoint Screens

Setpoint Screen #6 - SAT Heating Setpoints

If no Reset Source has been configured in Configuration Screen #4, then this setpoint will be the Supply Air Temperature Heating Setpoint. Line 4 will be blank. If a Reset Source has been configured in Configuration Screen #4, then Line 4 will read Rst Limit. Reset is always upward from the SAT setpoint to the Reset Limit setpoint. So, the SAT will be the lowest temperature the Supply Air Setpoint can be reset to and Reset Limit will be the highest temperature the Supply Air Setpoint can be reset to. The Heating Supply Air Temperature Setpoint will automatically be reset warmer or colder within this range as the Reset Source (next screen) moves within its range.

```
SA Unit Spts ID 102
SAT Heating Spts
Heating...: 120°F
Rst Limit: 120°F
```

Description	Minimum	Default	Maximum
SAT Heating Spt	30°F	120°F	200°F
Reset Limit Spt	40°F	120°F	200°F

Setpoint Screen #7 - Heat Reset Source

```
SA Unit Spts ID 102
Heat Rst Source Spts
EntHi: 70 SAT: 120°
EntLo: 70 RST: 120°
```

If no Reset Source has been configured in Configuration Screen #4, then this screen will read Heat Rst Not Config and will not be used. If a Reset Source has been configured in Configuration Screen #6, then the names of the values on the left side of this screen will correspond to the Reset Source that was configured. This screen will then allow you to input the upper and lower limits for the range of values of the Reset Source on the left side of the screen and will show the corresponding Heating Supply Air SAT and Rst Limit values that you entered on the previous screen. Single Zone VAV Reset of the Supply Fan VFD is addressed in the last paragraph.

Please note that the SAT and Rst Limit values on the right side of this screen cannot be changed on this screen; they are simply displayed from what was entered on the Setpoint Screen #6. For each line, the value on the left corresponds to the value on the right. So if the Space Temperature Sensor has been configured as the Reset Source, then when the Space Temperature is at or above the SpcHi Temperature Setpoint, the Supply Air Heating Setpoint will be reset to its lowest value, the SAT Setpoint. If the Space Temperature is at or below the SpcLo Setpoint, the Supply Air Heating Setpoint will be reset to its highest value, the Heating Rst Limit. Then, as the Space Temperature moves from its low value to its high value, the Supply Air Heating Setpoint will be proportionally reset from its high value to its low value.

Depending on whether reset has been configured or not, the options for the names of the values on the left side of the screen are SpcHi, SpcLo, EntHi, EntLo, VLT, VFD, NoRST.

In the examples that follow, the desired Space Temperature in Heating Mode is 71°F:

Space Temperature Heat Reset:

Space Temperature (SPC Hi) = 71°F SAT Setpoint (SAT) = 90°F
Space Temperature (SPC Lo) = 70°F SAT Setpoint (Rst) = 120°F

VFD Percentage Heat Reset:

VFD Percentage (VFD) = 30% SAT Setpoint (SAT) = 90°F
VFD Percentage (VFD) = 70% SAT Setpoint (Rst) = 120°F

Input Voltage Heat Reset:

Input Voltage (VLT) = 0 Volts SAT Setpoint (SAT) = 90°F
Input Voltage (VLT) = 10 Volts SAT Setpoint (Rst) = 120°F

In the Heating Mode in a Single Zone VAV application, the Supply Fan VFD speed will proportionally modulate as the Space Temperature falls within the range set on this screen. Upon entering the Heating Mode, the fan will start at 50% and modulate up to 100% as the Space Temperature falls from the SpcHi Setpoint to the SpcLo Setpoint. The SpcHi Setpoint should be the same as the Space Heating Setpoint (Mode Enable Setpoint) from Setpoint Screen #1. The SAT and RST Setpoints on the right side of the screen are not used.

Setpoint Screen #8 - Stage Control Window

```
SA Unit Spts ID 102
Stage Control Window
Cooling.....: 5°F
Heating.....: 5°F
```

When the SA Controller is in Cooling Mode, if the Supply Air Temperature drops below the Active Supply Air Temperature Setpoint minus the Cooling Stage Control Window value, a Cooling Stage will be deactivated after its Minimum Run Time. In the Heating Mode, if the Supply Air Temperature rises above the Active Supply Air Temperature Setpoint plus the Heating Stage Control Window value, a Heating stage will be deactivated after its Minimum Run Time. This staging window is also used for the coil temperature during Dehumidification Mode.

Description	Minimum	Default	Maximum
Stage Control Window Cooling	1°F	5°F	20°F
Stage Control Window Heating	1°F	5°F	20°F

Setpoint Screen #9 - Entering Air Lockouts

```
SA Unit Spts ID 102
Entering Air Lockouts
Cooling.....: 50°F
Heating.....: 70°F
```

The SA Controller will Lockout Mechanical Heating or Cooling when the Entering Air Temperature is above or below these Setpoints.

Description	Minimum	Default	Maximum
EA Lockouts Cooling	0°F	50°F	100°F
EA Lockouts Heating	35°F	70°F	150°F

SA E-BUS SETPOINTS

SA E-BUS Controller Setpoint Screens

Setpoint Screen #10 - Heat Pump Compressor Lockout

```
SA Unit Spts ID 102
Heat Pump Compressor
Lockout.....: 36°F
```

The SA Controller will Lockout the Heat Pump Compressor when the Outdoor Air Temperature is below this Setpoint.

Description	Minimum	Default	Maximum
Heat Pump Compressor Lockout	0°F	36°F	100°F

Setpoint Screen #11 - Cutoff Temperature

```
SA Unit Spts ID 102
CutOff Temperatures
Lo SAT.....: 40°F
Hi SAT.....: 170°F
```

The SA Controller will temporarily disable Heating or Cooling if while in Heating or Cooling Mode the Supply Air Temperature rises above the Hi SAT Cutoff Temperature Setpoint or falls below the Lo SAT Cutoff Temperature Setpoint. See the *SA Controller Technical Guide* for detailed information on the Lo and Hi Supply Air Temperature Cutoff sequence of operation.

Description	Minimum	Default	Maximum
Lo SAT Cutoff	0°F	40°F	250°F
Hi SAT Cutoff	0°F	170°F	250°F

Setpoint Screen #12 - Minimum Supply Fan VFD Speed For Heating

```
SA Unit Spts ID 102
Minimum Supply
Fan VFD Speed
For Heating..: 30%
```

If the Supply Fan VFD Signal falls below the Minimum Supply Fan VFD Speed For Heating Setpoint, Heating will be disabled.

Description	Minimum	Default	Maximum
Min Supply Fan VFD Speed For Heating	0%	30%	100%

Setpoint Screen #13 - Morning Warm Up Temp

```
SA Unit Spts ID 102
Morning WarmUp
Target Temp: 72°F
Max Length.: 60 Min
```

When the SA Controller is configured for VAV operation and the controller enters the Occupied Mode, the controller looks at the Entering Air Temperature to determine if the unit should initiate Morning Warm-up Mode. If the Entering Air Temperature is below the Morning Warm-up Target Temperature and the Max Length is greater than "0," the controller will initiate Heating. This is considered Morning Warm-up and will run until the Entering Air Temperature rises above the Morning Warm-up Target Temperature or until the Max Length Setpoint time expires.

Description	Minimum	Default	Maximum
Morning Warm Up Target Temp	50°F	72°F	90°F
Morning Warm Up Max Length	0 Min	60 Min	240 Min

Setpoint Screen #14 - Dehumidification Indoor RH & Entering Air Dewpoint

```
SA Unit Spts ID 102
Dehumidification Spt
Indoor RH....: 50%
Entering Dp...: 55°F
```

On VAV configured units that are not using 100% Outdoor Air, when the Indoor Relative Humidity percentage rises above the Indoor RH Setpoint, the unit will start operating in Dehumidification Mode.

If an Indoor Humidity Sensor is installed, the unit will reset the Coil Suction Temperature Setpoint as needed to maintain this Indoor RH Setpoint. This includes VAV, CAV, and MUA applications.

On MUA configured units that are using 100% Outdoor Air, when the Outdoor Air Dewpoint Temperature rises above the OA Dewpoint Setpoint, the unit will start operating in Dehumidification Mode.

Description	Minimum	Default	Maximum
Dehumidification Setpoint Indoor RH	1%	50%	100%
Dehumidification Setpoint OA Dewpoint	35°F	55°F	80°F

SA E-BUS Controller Setpoint Screens

Setpoint Screen #15 - Dehumidification Coil Temperature

SA Unit Spts ID 102
Dehumidification
Coil Temperature
Setpoint.....: 45°F

During the Dehumidification Mode, the SA Controller uses the calculated Coil Temperature to activate DX Cooling based on this Dehumidification Coil Temperature Setpoint. The controller uses a Suction Pressure Transducer to read Suction Pressure (the Saturation Vapor Pressure of the Refrigerant) and converts this Suction Pressure reading to a Coil Temperature value. This calculation is based on using R410A refrigerant only and will not work with any other refrigerant. This setpoint determines the number of compressor stages that need to be activated to maintain the Dehumidification Coil Temperature Setpoint.

Description	Minimum	Default	Maximum
Dehumidification Coil Temperature Setpoint	35°F	45°F	70°F

Setpoint Screen #16 - Cooling Head Pressure Setpoint

SA Unit Spts ID 102
Cooling
Head Pressure
Setpoint: 275PSI

If you are using the Head Pressure Module, this is the Cooling Setpoint for control of the condenser fan speed. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. See the *Two Condenser Head Pressure Module Technical Guide* for detailed information.

Description	Minimum	Default	Maximum
Cooling Head Pressure Setpoint	250 PSI	291 PSI	400 PSI

Setpoint Screen #17 - Reheat Head Pressure Setpoint

SA Unit Spts ID 102
Reheat
Head Pressure
Setpoint: 375PSI

If you are using the Head Pressure Module, this is the Reheat Setpoint for control of the condenser fan speed during dehumidification. This is based on the highest head pressure reading of up to 4 Head Pressure Sensors. See the *Two Condenser Head Pressure Module Technical Guide* for detailed information.

Description	Minimum	Default	Maximum
Reheat Head Pressure Setpoint	250 PSI	395 PSI	400 PSI

Setpoint Screen #18 - Head Pressure Output Minimum Position Setpoint

SA Unit Spts ID 102
Head Pressure
Output Min Position
Setpoint: 35%

This is the minimum position the Condenser Water Valve or the Condenser Fan will be allowed to modulate down to when the compressors are active. This will ensure adequate water flow or airflow during compressor cooling operation. For a Water Cooled Condenser, a proper setting will prevent the Water Flow Switch from opening which would create a proof of water flow Failure.

Description	Minimum	Default	Maximum
Head Pressure Output Minimum Position Setpoint	0%	35%	100%

Setpoint Screen #19 - Water Side Economizer Setpoints

SA Unit Spts ID 102
Water Side Econo
Delta Spt: 10°F
Deadband: 2°F

If an Entering Air Humidity Sensor is not connected to the SA Controller and the Entering Air Temperature falls below the Delta Setpoint, the Economizer can be used for Free Cooling. If an Entering Air Humidity Sensor is connected to the SA Controller, then a Wetbulb Temperature will be calculated and used instead of the Entering Air Drybulb Temperature to determine when Free Cooling can be used.

Description	Minimum	Default	Maximum
WS Econo Delta Setpoint	3°F	10°F	20°F
WS Econo Deadband	2°F	2°F	10°F

SA E-BUS SETPOINTS

SA E-BUS Controller Setpoint Screens

Setpoint Screen #20 - Static Setpoint, Deadband & Control Rate

```
SA Unit Spts ID 102
Static Spt...: 0.50"
Deadband.....: 0.10"
Control Rate.: 10 s
```

For VAV units, a Supply Fan VFD or Bypass Damper Actuator is used to maintain the Duct Static Pressure Setpoint. The Static Pressure Output Signal varies to control the Static Pressure Setpoint. If the Duct Static Pressure is above the Static Setpoint plus the Deadband, the Static Pressure Output Signal will be reduced at every Control Rate interval. If the Static Pressure is below the Static Setpoint minus the Deadband, the Output signal will be increased at every Control Rate interval.

The Duct Static Pressure Control Output Signal is a non-configurable Direct Acting Signal (0-10 VDC). This can be used to directly connect to a Supply Fan VFD without any modifications.

When you are using a Bypass Damper Actuator to control the Duct Static Pressure, you must set up the Bypass Damper Actuator or the Bypass Damper so that it is Reverse Acting in operation. The Output Signal increases (closes Bypass Damper) if the Duct Static Pressure is below the Duct Static Pressure Setpoint by the Deadband amount and the Output Signal decreases (opens Bypass Damper) if the Static Pressure is above the Setpoint by the Deadband amount.

Description	Minimum	Default	Maximum
Static Spt	0.10" WG	0.50" WG	3.0" WG
Deadband	0.10" WG	0.10" WG	1.0" WG
Control Rate	1 Sec	10 Sec	30 Sec

Setpoint Screen #21 - Supply Fan Starting Delay Timer

```
SA Unit Spts ID 102
Fan Starting Delay
Timer...: 255 s
```

This is the Supply Fan Starting Delay Timer initiated whenever the SA Controller initiates Supply Fan operation. This is useful when you are using multiple HVAC units and want to be sure that all the units do not start at exactly the same time when the Occupied schedule occurs. Each SA Controller should be set with staggered Fan Starting Delay Timer Setpoint values. When the 255 Second default setpoint is used, it multiplies each SA Controller's address by 5 and uses this value in seconds as the Fan Starting Delay Time. This provides a staggered start for each SA Controller on the system without having to individually set each SA Controller for its own time delay.

Description	Minimum	Default	Maximum
Fan Start Delay Timer	0 Sec	255 Sec	255 Sec

Setpoint Screen #22 - Mechanical Heat/Cool Failure Time Period

```
SA Unit Spts ID 102
Mechanical Heat/Cool
Failures Occur After
No Change For 15 Min
```

When Heating or Cooling Mode is initiated and staging is activated, if the Supply Air Temperature does not rise or fall 5°F within the Mechanical Heat/Cool Failures Occur After No Change For Setpoint time period, a Mechanical Heating or Cooling failure alarm will be generated. The Alarm is for Status Reporting only. The HVAC unit will continue to run.

Description	Minimum	Default	Maximum
Mechanical Heat/Cool Failures Occur After No Change For	0 Min	15 Min	255 Min

Setpoint Screen #23 - Preheat/Low Ambient Temperature

```
SA Unit Spts ID 102
Preheat/Low
Ambient Temperature
Setpoint: 0°F
```

For cold climates where freezing temperatures may be experienced, a Pre-Heater relay output can be activated based on the Outdoor Air Temperature to prevent freezing of Water Coils. One of the SA Relay Outputs must be configured for the Pre-Heater control. When configured, if the Entering Air Temperature falls below the Low EAT Ambient Protection Temperature Setpoint and the HVAC unit is in Occupied Mode, the Pre-Heater relay will activate.

Description	Minimum	Default	Maximum
Preheat/Low Ambient Temperature	0°F	0°F	100°F

SA E-BUS Controller Setpoint Screens

Setpoint Screen #24 - HVAC Schedule

```
SA Unit Spts ID 102
HVAC Schedule...: 0
[ 0 = Internal   ]
[ 1-5 = External ]
```

The SA Controller has an Internal Scheduler. If you want the SA Controller to use its own Internal Schedule to schedule the HVAC unit, *enter <0>* for Internal. To use the External Schedule option, you must have a GPC Plus controller installed and operating on your system. To use one of the (5) External Schedules available on the GPC Plus controller, enter the number of the GPC Plus Schedule (1 through 5) you wish to use.

Description	Minimum	Default	Maximum
HVAC Schedule	0	0	5

Setpoint Screen #25 - Push-Button Override Duration

```
SA Unit Spts ID 102
Push-Button Override
Duration....: 2.0 Hr
```

If the SA Controller has a Space Temperature Sensor installed and it has the Override Button option, the HVAC unit will initiate Occupied Mode any time the Override Button is pressed and held for less than 3 seconds. The Push-Button Override Duration Setpoint allows you to adjust the amount of time the Override will remain in effect when the Override Button is pressed. To cancel the Override before the Override Duration time period expires, press the Override Button for 5 to 10 seconds.

Description	Minimum	Default	Maximum
Push-Button Override Duration	0.0 Hr	2.0 Hr	8.0 Hr

Setpoint Screen #26 - HVAC Mode Sensor Slide Offset

```
SA Unit Spts ID 102
HVAC Mode Sensor
Slide Offset: 0°F
```

If the SA Controller has a Space Temperature Sensor with the Slide Adjust option installed, the HVAC Mode Enable Heating and Cooling Setpoints can be offset by the HVAC Mode Sensor Slide Offset Setpoint value. When the Slide Adjust bar is in the middle, no offset will occur. If the Slide Adjust bar is moved all the way to the top of the Sensor, the Heating and Cooling Setpoints will be raised by the Setpoint value you have entered. If the Slide Adjust bar is moved all the way down to the bottom of the Sensor, the Heating and Cooling Setpoints will be lowered by the Setpoint value you have entered.

Description	Minimum	Default	Maximum
HVAC Mode Sensor Slide Offset	0°F	0°F	10°F

Setpoint Screen #27 - Heat Pump Auxiliary Heating Delay

```
SA Unit Spts ID 102
Heat Pump
Auxiliary Heating
Delay: 3 Min
```

If the SA Controller is configured to operate as a Heat Pump, the Heat Pump Auxiliary Heating Delay Setpoint can be configured to provide a time delay period before Auxiliary Heating Stages can be activated once activation of the Compressor Heating Stages have been initiated.

Description	Minimum	Default	Maximum
Heat Pump Auxiliary Heating Delay	0 Min	3 Min	30 Min

SA E-BUS SETPOINTS

SA E-BUS Controller Setpoint Screens

Setpoint Screen #28 - Heat Pump Defrost Setpoints

```
SA Unit Spts ID 102
Heat Pump Defrost
Defrost Tmp: 30°F
Defrost Tmr: 30 Min
```

The Defrost Temperature Setpoint is the Coil Suction Temperature at which the unit will go into Defrost Mode during Heat Pump Heating operation. This unit will operate in the Defrost Mode for 10 minutes or until the Head Pressure reaches 450 PSIG. The Defrost Timer determines the length of time between Defrost Modes. The length of the Defrost Timer can be automatically be adjusted by the Adaptive Defrost Adjustment described in Setpoint Screen #29. This Defrost Mode is only available if using the SA Controller and a Head Pressure Module. A Suction Pressure Transducer is also required. This screen does not appear if using the SA Controller and a WSHP Protection Module in a Water Source Heat Pump application.

Description	Minimum	Default	Maximum
Heat Pump Defrost Temp	0°F	30°F	50°F
Heat Pump Defrost Timer	10 Min	30 Min	90 Min

Setpoint Screen #29 - Adaptive Defrost Adj. Setpoint

```
SA Unit Spts ID 102
Adaptive Defrost
Adj. Setpoint: 0 MIN
```

Enter a value greater than zero to enable the Adaptive Defrost Adjustment of the Heat Pump Defrost Timer (Screen #28). This adjustment value will be subtracted from the Heat Pump Defrost Timer if the Defrost Mode lasts the entire 10 minutes. A proportion of this adjustment value will be added to the Heat Pump Defrost Timer if the Defrost Mode only lasts between 8 minutes and 0 minutes. This screen only applies if using the SA Controller and a Head Pressure Module. This screen does not appear if using the SA Controller and a WSHP Protection Module in a Water Source Heat Pump application.

Description	Minimum	Default	Maximum
Adaptive Defrost Adj.	0 Min	0 Min	30 Min

Setpoint Screen #30 - Internal Schedule Optimal Start Soak Multiplier

```
SA Unit Spts ID 102
Internal Schedule
Optimal Start Soak
Multiplier: 0.0
```

The Internal Schedule Optimal Start Soak Multiplier Setpoint is a multiplier that if set to a number greater than 0 will be used as a multiplier for calculating the Optimal Start Time for the HVAC unit. This multiplier is only applied if the unit has been off for more than 24 hours. See the *SA Controller Technical Guide* for more detailed information regarding the Optimal Start. This multiplier is only applied if you are using the SA Internal Schedule.

Description	Minimum	Default	Maximum
Internal Schedule Optimal Start Soak Multiplier	0.0	0.0	5.0

Setpoint Screen #31 - Trend Log Interval

```
SA Unit Spts ID 102
Trend Log
Interval: 15 MIN
```

An internal Trend Log is constantly updated at a rate equal to this value.

Description	Minimum	Default	Maximum
Trend Log Interval	1 Min	15 Min	120 Min

Setpoint Screen #32 - Sensor Calibration for SPC & SAT

```
SA Unit Spts ID 102
Sensor Calibration
SPC: XX.X° 0.00°
SAT: XX.X° 0.00°
```

If the Space or Supply Air Temperature Sensors are reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature. Enter a positive Sensor Calibration value to raise the Space Temperature and/or Supply Air Temperature Sensor reading and a negative value to lower the Sensor reading.

Description	Minimum	Default	Maximum
Sensor Calibration SPC	-100.0°F	0.0°F	+100.0°F
Sensor Calibration SAT	-100.0°F	0.0°F	+100.0°F

SA E-BUS Controller Setpoint Screens

Setpoint Screen #33 - Sensor Calibration for EAT & EWT

SA Unit Spts ID 102

Sensor Calibration

EAT: XX.X° 0.00°

EWT: XX.X° 0.00°

If the Entering Air or Entering Water Temperature Sensors are reading incorrectly, you can use this option to enter an offset temperature to adjust the Sensor's Temperature. Enter a positive Sensor Calibration value to raise the Entering Air or Entering Water Temperature Sensor reading and a negative value to lower the Sensor reading.

Description	Minimum	Default	Maximum
Sensor Calibration EAT	-100.0°F	0.0°F	+100.0°F
Sensor Calibration EWT	-100.0°F	0.0°F	+100.0°F

Setpoint Screen #34 - Sensor Calibration for COIL

SA Unit Spts ID 102

Sensor Calibration

COIL: XX.X° 0.00°

If the Coil Temperature reading is too high, enter a negative calibration offset to decrease the reading. If it is too low, enter a positive value to increase the reading.

Description	Minimum	Default	Maximum
Sensor Calibration COIL	-30.0°F	0.0°F	+30.0°F

SA E-BUS Controller Status Screens

Status Screens - General Procedures

From any menu screen, press **<STATUS>**. The *Unit Selection Screen*, shown below, will appear requesting that you enter the unit ID number.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the correct unit ID number of the Controller you want to view and press **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then press **<↓>**. You will then see Setpoint Screen #1. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

Status Screen Index

The available Status Screens for the SA E-BUS Controller are listed on the next few pages by sequential screen number. The following is a list of all the SA E-BUS Controller Status Screens in numerical order with a brief listing of the Status features available on each screen:

Screen #1	Mode
Screen #2	Cooling, Heating & Economizer Enabled/Disabled
Screen #3	Mode Enable Temperature & Mode Cooling and Heating Setpoints
Screen #4	Supply Air Temperature & Active Setpoint
Screen #5	Current Space Temperature & Slide Adjust
Screen #6	Current Entering Air Temperature & Entering Air Relative Humidity
Screen #7	Current Entering Air Dewpoint & Dewpoint Setpoint

Screen #8	Current Indoor RH & Indoor RH Setpoint
Screen #9	Current Coil A1 & B1 Temperature & Setpoint
Screen #10	Current Coil A2 & B2 Temperature &
Screen #11	Current Static Pressure and Static Pressure Output Signal Percentage
Screen #12	Water Side Economizer Valve Position and Current Water Temperature
Screen #13	Water Side Economizer Bypass Valve Positions
Screen #14	Current MODGAS Heating Output Signal Percentage and Current MHGRV Reheat Valve Output Signal Percentage
Screen #15	Current Modulating Cooling Stage 1 & 2 Output Signal Percentage
Screen #16	Current Modulating Heating Output Signal Percentage
Screen #17	Current Head Pressure Setpoint
Screen #18	Current Leaving Water Temperature
Screen #19	Current Head Pressure and Condenser Valve Signal for Condenser #1
Screen #20	Current Head Pressure and Condenser Valve Signal for Condenser #2
Screens #21-27	Current Supply Fan Status of Relays #1-7
Screens #28-41	Alarm Status Screens

SA E-BUS Controller Status Screens

Status

The SA E-BUS Controller Status Screens are accessed by *pressing* the **<STATUS>** button on the Modular Service Tool or Modular System Manager. *Enter* the correct unit ID number of the Unit Controller you want to configure and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<↓>**. You will then see *Status Screen #1*. *Press* **<↓>** to scroll through the screens.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

Status Screen 1 - Mode

```
SA Unit v2.20 ID 102
Occupied Mode
Vent Mode
02/15/10 05:00 PM
```

Line 2 Displays one of the following:

Unoccupied Mode	Remote FRC Occupied
Occupied Mode	Override Mode
Holiday Mode	Zone Demand!
Forced Schedule Mode	OUTPUT FORCE MODE!
SUPPLY AIR CUTOFF!	PURGE MODE

Line 3 Displays one of the following:

Off Mode	Dehumid. Mode	Defrost Mode
Vent Mode	Cool Dehumid. Mode	
Cool Mode	Heat Dehumid. Mode	
Heat Mode	Warm Up Mode	

Line 4 Displays one of the following:

MM/DD/YY HH:MM XX (XX = AM or PM)
 Fan Starting Delay and then time will display
 xx Min Left in W-Up (Number of Minutes Left in Warm-Up Mode)

Status Screen 2 - Cooling, Heating, Economizer

```
SA Unit v2.20 ID 102
Cooling Enabled
Heating Enabled
Economizer Disabled
```

Line 2 Displays one of the following:

Cooling Enabled
 Cooling Disabled

Line 3 Displays one of the following:

Heating Enabled
 Heating Disabled

Line 4 Displays one of the following:

Economizer Enabled
 Economizer Disabled

Status Screen 3 - Mode Enable Temperature & Mode Cooling and Heating Setpoints

```
SA Unit v2.20 ID 102
Enable Tmp.: XX.X°F
Cooling Spt: XX.X°F
Heating Spt: XX.X°F
```

Line 2 Mode Enable Temperature

Can be the Supply Air Temperature, Entering Air Temperature, or Space Temperature, depending on which one has been configured as the Mode Enable Sensor.

Line 3 Cooling Mode Setpoint

Based on the current Occupied/Unoccupied Mode of operation.

Line 4 Heating Mode Setpoint

Based on the current Occupied/Unoccupied Mode of operation.

Status Screen 4 - Supply Air Temperature & Setpoint

```
SA Unit v2.20 ID 102
Supply Air.: XX.X°F
Supply Spt.: XX.X°F
```

Line 2 Current Supply Air Temperature

The Supply Air Temperature is always required. If a Supply Air Temperature Sensor is not installed, the SA Controller will not operate correctly and will display 0°F.

Line 3 Current Active Supply Air Setpoint

This is the Supply Air Setpoint for the mode that the unit is currently operating in. If the Supply Air Reset is configured, this is the calculated setpoint based on the current Reset Source conditions.

SA E-BUS STATUS

SA E-BUS Controller Status Screens

Status Screen 5 - Space Temp & Slide Adjust

```
SA Unit v2.20 ID 102
Space Tmp.:    XX.X°F
Slide Adj.:    XX.X°F
```

Line 2 Space Temperature

If you are using a Space Temperature Sensor, this line will display the current Space Temperature during the Occupied or Unoccupied Mode.

Line 3 Slide Adjust

This is the current value of the Space Temperature offset based on the position of the slide adjust switch on the Space Sensor.

Status Screen 6 - Entering Air Temperature & Entering Air Relative Humidity

```
SA Unit v2.20 ID 102
Entering Tmp:   XX.X°F
Entering RH.:   XX.X%
```

Line 2 Current Entering Air Temperature

If an Entering Air Temperature Sensor has been installed and configured on the unit or if an Entering Air Broadcast has been configured on another SA Controller on the system, the Entering Air Temperature will appear on this line. If not, this line will display a temperature that is half way between the Cooling and Heating Lockout Setpoints.

Line 3 Current Entering Air Relative Humidity

If an Entering Air Humidity Sensor has been installed and configured on the SA Controller, the Entering Air Relative Humidity Percentage will appear on this line. If not, this line will display 0%.

Status Screen 7 - Entering Air Dewpoint & Dewpoint Setpoint

```
SA Unit v2.20 ID 102
Entering Dp :   XX.X°F
Dewpoint Spt:  XX.X°F
```

Line 2 Current Calculated Entering Air Dewpoint Temperature

If both an Entering Air Humidity Sensor and an Entering Air Temperature Sensor have been installed and configured on the unit, the calculated Entering Air Dewpoint Temperature will appear on this line. If not, this screen displays 0°F.

Line 3 Current Entering Air Dewpoint Setpoint

The user-adjustable Entering Air Dewpoint Temperature Setpoint will appear on this line.

Status Screen 8 - Indoor RH & Indoor RH Setpoint

```
SA Unit v2.20 ID 102
Indoor RH....:  XXX%
Indoor RH Spt:  XXX%
```

Line 2 Current Indoor Relative Humidity Percentage

If an Indoor Humidity Sensor has been installed and configured on the unit, the current Indoor Air Relative Humidity Percentage will appear on this line. If an Indoor Humidity Sensor is not installed, this line will display 0%.

Line 3 Current Indoor Relative Humidity Setpoint Percentage

This is the adjustable Indoor Air Relative Humidity Setpoint Percentage that has been set by the user.

SA E-BUS Controller Status Screens

Status Screen 9 - Coil Temp & Setpoint

```
SA Unit v2.20 ID 102
Coil A1 Tmp : XX.X°F
Coil B1 Tmp : XX.X°F
Coil Tmp Spt: XX.X°F
```

Line 2 Coil A1 Temperature

If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.

Line 3 Coil B1 Temperature

If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.

Line 4 Coil Temperature Setpoint

During dehumidification, the Coil Suction Temperature Setpoint is automatically reset based on the current space humidity conditions. This is the current calculated Coil Temperature Setpoint based on that reset.

Status Screen 10 - Coil A2 & B2 Temp

```
SA Unit v2.20 ID 102
Coil A2 Tmp : XX.X°F
Coil B2 Tmp : XX.X°F
```

Note: This screen only applies if you have a WSHP Protection Module connected to the SA Controller.

Line 2 Coil A2 Temperature

If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.

Line 3 Coil B2 Temperature

If a Suction Pressure Transducer has been installed and configured on the unit, the calculated Evaporator Coil Temperature will appear on this line. If not, this line will display 0°F.

Status Screen 11 - Static Pressure & Output %

```
SA Unit v2.20 ID 102
Static Pr...: X.XX"
Press Output: XXX%
[Optional Output]
```

Line 2 Current Static Pressure

Requires the installation and wiring of a Duct Static Pressure Sensor. If you do not have a Duct Static Pressure Sensor correctly installed and wired to the controller, this line will display "0.0".

Line 3 Current Static Pressure Output Signal Percentage

Indicates the output signal percentage being supplied to the VFD Controller or Bypass Damper Actuator when you have configured one of these options for your HVAC unit.

If you have not configured Duct Static Pressure Control, this line will display [No Press Out Conf].

Line 4 Indicates That This is An Optional Output

This output may or may not have live data to display.

Status Screen 12 - Water Side Economizer Valve Position & Water Temperature

```
SA Unit v2.20 ID 102
Water Side Econo
Valve Pos.: XXX %
Water Temp.: XX.X°F
```

Line 2 Water Side Economizer

This screen pertains to the Water Side Economizer.

Line 3 Valve Position

The Water Side Economizer Valve position will display on this line.

Line 4 Water Temperature

You must install and configure a Entering Water Temperature Sensor to display the current Water Temperature.

SA E-BUS Controller Status Screens

Status Screen 13 - Water Side Economizer Bypass Valve Positions

```
SA Unit v2.20 ID 102
Water Side Econo
Byps Vlv A:    XXX %
Byps Vlv B:    XXX %
```

Line 2 Water Side Economizer

This screen pertains to the Water Side Economizer.

Line 3 Bypass Valve A Position

The Water Side Economizer's Bypass Valve A position will display on this line.

Line 4 Bypass Valve B Position

The Water Side Economizer's Bypass Valve B position will display on this line.

Status Screen 14 - MHGRV Output %

```
SA Unit v2.20 ID 102
MODGAS Pos...: XXX%
MHGRV Pos...:  XXX%
[Optional Equipment]
```

Line 2 Current MODGAS Heating Output Signal

Indicates the percentage of the output signal being supplied to the MODGAS controller when you have one connected to your HVAC unit. If you do not have a MODGAS controller connected to your SA Controller, this screen will indicate [MODGAS NOT CONNECTED].

Line 3 Current MHGRV Reheat Valve Output Signal Percentage

Indicates the percentage of the output signal being supplied to the MHGRV controller when you have one connected to your SA Controller. If you do not have a MHGRV controller connected to your SA Controller, this screen will indicate [MHGRV NOT CONNECTED].

Line 4 Optional Equipment

Indicates that these outputs are optional and therefore may or may not have live data to display.

Status Screen 15 - Mod Cooling %

```
SA Unit v2.20 ID 102
Mod Cooling 1:  XXX%
Mod Cooling 2:  XXX%
[ Optional Outputs ]
```

Line 2 Current Modulating Cooling Stage 1 Output Signal Percentage

Indicates the percentage of the output signal being supplied to a Modulating Cooling device when you have configured this option for your HVAC unit. This can either be Chilled Water or Digital Compressor. If Reverse Acting operation is configured, this percentage will be Reversed. See the following examples for clarification:

Standard Operation:

0-10 VDC 0% = 0 VDC 100% = 10 VDC

2-10 VDC 0% = 2 VDC 100% = 10 VDC

1.5-5.0 VDC 0% = 1.5 VDC 100% = 5.0 VDC

Reverse Acting Operation:

0-10 VDC 0% = 10 VDC 100% = 0 VDC

2-10 VDC 0% = 10 VDC 100% = 2 VDC

If you do not have a Modulating Cooling device configured, this screen will indicate [No Mod Cool 1 Config].

Line 3 Current Modulating Cooling Stage 2 Output Signal Percentage

Indicates the percentage of the output signal being supplied to a Modulating Cooling device when you have configured this option for your HVAC unit. This can only be Digital Scroll Compressor. See the following examples for clarification:

Standard Operation:

1.5-5.0 VDC 0% = 1.5 VDC 100% = 5.0 VDC

If you do not have a Modulating Cooling device connected to your HVAC unit and configured, this screen will indicate [No Mod Cool 2 Config].

Line 4 Indicates That These Are Optional Outputs

These outputs may or may not have live data to display.

SA E-BUS Controller Status Screens

Status Screen 16 - Mod Heating %

```
SA Unit v2.20 ID 102
Mod Heating:   XXX%
[ Optional Outputs ]
```

Line 2 Current Modulating Heating Output Signal Percentage

Indicates the percentage of the output signal being supplied to a Modulating Heating device when you have configured this option for your HVAC unit. If Reverse Acting operation is configured, this percentage will be Reversed. See the following examples for clarification:

Standard Operation:

0-10 VDC 0% = 0 VDC 100% = 10 VDC

2-10 VDC 0% = 2 VDC 100% = 10 VDC

Reverse Acting Operation:

0-10 VDC 0% = 10 VDC 100% = 0 VDC

2-10 VDC 0% = 10 VDC 100% = 2 VDC

If you do not have a Modulating Heating device configured, this screen will indicate [No Mod Heat 1 Config].

Line 4 Indicates That These Are Optional Outputs

These outputs may or may not have live data to display.

Status Screen 17 - Head Pressure Setpoint

```
SA Unit v2.20 ID 102
Current
Head Pr Spt: 0 PSI
```

Line 2-3 Current Head Pressure Cooling or Reheat Setpoint

If you are using a Two Condenser Head Pressure Module attached to the unit, the Head Pressure Cooling or Reheat Setpoint will display, depending on what mode the Module is in. This status value will show 0 if not in the Cooling or Dehumidification Mode.

Status Screen 18 - Leaving Water Temp

```
SA Unit v2.20 ID 102
Leaving Water Temp
Temp A:  XX.X°F
Temp B:  XX.X°F
```

Line 2 Leaving Water Temperature

If this is a Water Source Heat Pump Unit with a Water Source Heat Pump Protection Module, the Leaving Water Temperature will display, depending on what mode the Module is in. This status value will show 0 if not in the Cooling or Dehumidification Mode.

Line 3 Temperature A

This is the temperature of the water leaving the Water Side Economizer A.

Line 4 Temperature B

This is the temperature of the water leaving the Water Side Economizer B.

Status Screen 19 - Condenser #1

```
SA Unit v2.20 ID 102
Condenser #1
Head Pr.....: 0PSI
Cond Valve:     0%
```

Line 2 Condenser #1

If you are using the Two Condenser Head Pressure Module attached to the unit, this line displays Condenser #1.

Line 3 Head Pressure

This line indicates the highest of the first two current Head Pressure readings on the Two Condenser Head Pressure Module.

Line 4 Condenser Valve

This line displays the position of the associated Condenser Valve (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.

SA E-BUS Controller Status Screens

Status Screen 20 - Condenser #2

```
SA Unit v2.20 ID 102
Condenser #2
Head Pr.....: 0PSI
Cond Valve:      0%
```

Line 2 Condenser #2

If you are using the Two Condenser Head Pressure Module attached to the unit, this line displays Condenser #2.

Line 3 Head Pressure

This line indicates the highest of the second two current Head Pressure readings on the Two Condenser Head Pressure Module.

Line 4 Condenser Valve

This line displays the position of the associated Condenser Valve (0-100%) that is currently necessary to maintain the Head Pressure Setpoint.

Status Screens 21-27 - Fan Relay

```
SA Unit v2.20 ID 102
Fan Relay: OFF
Cool Stage 1: OFF
Heat Stage 1: OFF
```

Line 2 Current Supply Fan Relay Status

The letters FRC will appear before the colon if this Relay is in a Force Mode. On screens 21 to 27, this line will indicate the relays use and the ON/OFF condition for that relay. Possible options are as follows:

Not Used	Pre-Heater
Heat Stage	Alarm Relay
Cool Stage	Override
Warmup Mode	Occupied
Rev Valve	WS Economizer
Gas Re-Heat (HGR Relay)	

Line 3 Current relay status and description of what it is configured for

The letters FRC will indicate the relay is forced to its current condition.

Line 4 Current relay status and description of what it is configured for

The letters FRC will indicate the relay is forced to its current condition.

Status Screens 28-41 - Alarm Conditions

```
SA Unit v2.20 ID 102

NO ALARMS!
```

```
SA UNIT v2.20 ID 102

ALARMS PRESENT
SCROLL DOWN TO VIEW
```

Line 2 Blank

Line 3 NO ALARMS! OR ALARMS PRESENT

If alarms are present, the screens that follow will display one or more of the following:

NO SUPPLY AIR TEMP
NO ENTERING AIR TEMP
SPACE SENSOR FAILURE
MECH COOLING FAILURE
MECH HEATING FAILURE
FAN PROVING ALARM
DIRTY FILTER ALARM
EMERGENCY SHUTDOWN
NO WATER FLOW ALARM
DRAIN OVERFLOW ALARM
LO SUPPLY AIR ALARM
HI SUPPLY AIR ALARM
LOW CONTROL TEMP
HIGH CONTROL TEMP
MODULE ALARM

Press <↓> to scroll through all active alarms.

For Alarm Definitions, see the *SA Controller Technical Guide* or the *SA E-BUS Controller Technical Guide*.

VAV Zone Configuration

In order to correctly set up the VAV/Zone controller, you must first configure several parameters in regard to the type of system and operating parameters for the VAV/Zone controller you have installed. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

Modular Service Tool Instructions

From any *Menu Screen*, press the **<CONFIGURATION>** button. The *Unit Selection Screen*, shown below, will appear requesting that you enter the unit ID number.

```
Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication
```

Enter the correct unit ID number of the VAV/Zone controller you want to configure, and press **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then press **<↓>**. You will then see *Unit Configuration Screen #1*. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then press **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll down to the ‘Configure Unit’ option and press **<ENTER>**. This will take you to the first Configuration Screen shown below.

Configuration Screen #1 - Box Configuration

```
XX Box Cnfg IDXXXX
Box Configuration
COOLING ONLY BOX
Use < Or > To Change
```

This Box Control Code will operate in one of four possible modes. The box designation will display on the top line of all screens. Select one of the following options:

- 0 = COOLING ONLY BOX (will display as CO Box)
- 1 = H/C CHANGEOVER BOX (will display as HC Box)
- 2 = SERIES FAN BOX (will display as SF Box)
- 3 = PARALLEL FAN BOX (will display as PF Box)

Configuration Screen #2 - Damper Operation

```
XX Box Cnfg IDXXXX
Damper Operating
Mode: DIRECT ACTING
Use < Or > To Change
```

Select Direct Acting or Reverse Acting. If the damper opens in a *clockwise* direction, it is DIRECT ACTING. If the damper opens in a *counter-clockwise* direction, it is REVERSE ACTING.

CAUTION: If you change this setting, you **MUST** cycle power to the controller to allow it to re-calibrate the damper feedback positions for its new direction of control!

VAV/ZONE CONTROLLER PROGRAMMING

VAV/Zone Configuration Screens

Configuration Screen #3 - Voting Zone

```
XX Box Cnfg  IDXXXX
Is This Box a
Voting Zone.: YES
Use < Or > To Change
```

If this is a Zoned System, select YES so that the box can be included as a voting zone.

Configuration Screen #4 - Pressure Independent Airflow Constant

```
XX Box Cnfg  IDXXXX
Pr Independent Boxes
Airflow @ 1" WG
Constant.: 1200 CFM
```

If this is a Pressure Independent Box, you must enter this airflow constant so that the CFM readings can be correctly calculated. This airflow constant is provided by the box manufacturer and depends on the diameter of the duct.

Configuration Screen #5 - Expansion Relays Heating Stages

```
XX Box Cnfg  IDXXXX
Expansion Relays
[Optional]
Steps of Reheat.: 2
```

If you require the VAV/Zone Controller to control reheat for the zone it is installed in, you must include a relay expansion board and then configure the number of heating stages (1, 2, or 3) that it will be controlling whenever there is a heating demand in the space. Enter <0> if you don't require this option.

Configuration Screen #6 - Proportional Heating Signal

```
XX Box Cnfg  IDXXXX
Proportional Heating
Signal.: 0 - 10 VDC
Use < Or > To Change
```

Select 0-10 VDC or 2-10 VDC as the range of the proportional heat output.

Configuration Screen #7 - Box Heat Allow

```
XX Box Cnfg  IDXXXX
Allow Box Heat With
HVAC Heat....: NO
Use < Or > To Change
```

Select YES to allow the Heating Relay's Controlling Box Heat to remain on even when the HVAC unit is in Supply Air Heating Mode. This is used as a method to provide supplemental heat if for some reason the HVAC heat cannot satisfy the heating demand.

Configuration Screen #8 - Main Fan Status

```
XX Box Cnfg  IDXXXX
This Unit Needs Main
Fan Status...: NO
Use < Or > To Change
```

This setting only applies to the unoccupied mode of operation. Select YES to activate the heating stages only when the main fan is operating on non-fan terminal units. For series fan terminal units, if this setting is set to YES, the series box fan will only run when the main HVAC unit fan is running or when a space heating demand is made. For series fan terminal units, if this setting is set to NO, the series box fan will only run when a space heating demand is made. This setting has no effect on the parallel flow fan terminal unit.

Configuration Screen #9 - Push-Button Override

```
XX Box Cnfg  IDXXXX
Push-Button Override
Group ID #: 1
```

During Unoccupied Mode, all zones with a corresponding Group ID # will resume Occupied operation whenever any of the zones in that group has its push-button depressed to initiate an override condition. This allows you to group zones in various areas of the building. For example, individual tenants with several offices could restore occupied mode for just their zones and not affect other zones in the building.

The default group ID number for all VAV/Zone Controllers is set at the factory to 1. If you don't want a specific zone(s) to be part of that group, you must give each one a distinct Group ID number between 2 and 16. Setting a zone's Group ID number to 0 will disable the Space Sensor Override Button function.

If you don't want a specific zone to be a part of any group, enter <0> for its Group ID #.

Configuration Screen #10 - Dump Zone

```
XX Box Cnfg IDXXXX
Is This A Dump Zone
(No Actuator): NO
Use < Or > To Change
```

A “Dump Zone” is used when you want to control a duct heater or baseboard heater independently. A VAV/Zone Controller board with a relay expansion board is used for this purpose. No damper or actuator is used. If you need to control an auxiliary heater, select YES; otherwise, be sure it is set to NO.

Configuration Screen #11 - HVAC Unit is on Separate Loop

```
XX Box Cnfg IDXXXX
HVAC Unit is on
Separate Loop: NO
Use < Or > To Change
```

If this system has 1 HVAC unit controlling boxes on multiple loops and the HVAC unit is on a different loop than this box, select YES; otherwise, be sure it is set to NO.

VAV/ZONE CONTROLLER PROGRAMMING

VAV/Zone Controller Setpoint Screens

VAV/Zone Controller Setpoints

Modular Service Tool Instructions

From any menu screen, press **<SETPOINTS>**. The *Unit Selection Screen*, shown below, will appear requesting that you enter the unit ID number.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the correct unit ID number of the Controller you want to change Setpoints for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**. You will then see Setpoint Screen #1. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

Change Setpoints
Configure Unit
Save/Copy/Restore

Scroll to the 'Change Setpoints' option and press **<ENTER>**. This will take you to the first Setpoints Screen shown below.

Setpoint Screen #1 - Occupied Setpoints

XX Box Spts IDXXXX
Occupied Setpoints
Cooling.....: XX°F
Heating.....: XX°F

Enter the **Occupied Cooling Setpoint** as the maximum temperature you would like the zone to reach before modulating the damper open to bring in more cold air to cool the space. Enter the **Occupied Heating Setpoint** as the minimum temperature you would like the zone to reach before activating the Reheat Stages on the optional Expansion Relay board. If this is a Cooling Only box that doesn't contain reheat, this setpoint will be ignored.

Description	Minimum	Default	Maximum
Cooling Setpoint	50°F	74°F	90°F
Heating Setpoint	50°F	70°F	90°F

Setpoint Screen #2 - Unoccupied Setbacks

XX Box Spts IDXXXX
Unoccupied Setbacks
Cooling SetUp: XX°F
Heating SetBk: XX°F

During unoccupied hours, the Occupied Cooling Setpoint is adjusted up by the amount entered for the Cooling SetUp. The Occupied Heating Setpoint is adjusted down by the amount entered for the Heating SetBk.

Description	Minimum	Default	Maximum
Cooling SetUp	0°F	+10°F	+30°F
Heating SetBk	0°F	-10°F	-30°F

Setpoint Screen #3 - AHU Heat Call Space Temp

```
XX Box Spts IDXXXX
AHU Heat Call
Space Temp...: XX°F
```

This setpoint allows you to set a Space Temperature that will cause the VAV/Zone Controller to send a call for heat to the HVAC unit. This only occurs in the Unoccupied Mode.

Description	Minimum	Default	Maximum
AHU Heat Call Space Temp	50°F	70°F	90°F

Setpoint Screen #4 - Damper Airflow Integral

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Integral [Ki]...: XXX
```

The VAV/Zone Controller normally opens its damper based on a Proportional Error from Setpoint. That means if the zone temperature is 4°F from setpoint, the damper would be 100% open, or it would be modulating to provide the Maximum CFM on Pressure Independent boxes. If the error is less than 4°F, the damper may stagnate at that position and never satisfy the zone. If you add **Integral** into the damper calculation process, this will cause the damper or airflow calculations to continue to increase as long as the zone temperature is still above the setpoint. That means it can provide 100% or Maximum CFM before the 4°F error is achieved, bringing the zone under control faster than it normally would. Start with a small (5 or 10) value, if you use this, and monitor the effect it has. If you enter too large a value, you can create “hunting” situations that can cause the damper actuator to prematurely wear out.

Description	Minimum	Default	Maximum
Integral	0	0	100

Setpoint Screen #5 - Damper Airflow Integral

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Integral [Ki]...: XXX
```

The VAV/Zone Controller normally opens its damper based on a Proportional Error from Setpoint. That means if the zone temperature is 4°F from setpoint, the damper would be 100% open, or it would be modulating to provide the Maximum CFM on Pressure Independent boxes. If the error is less than 4°F, the damper may stagnate at that position and never satisfy the zone. If you add **Integral** into the damper calculation process, this will cause the damper or airflow calculations to continue to increase as long as the zone temperature is still above the setpoint.

That means it can provide 100% or Maximum CFM before the 4°F error is achieved, bringing the zone under control faster than it normally would. Start with a small (5 or 10) value, if you use this, and monitor the effect it has. If you enter too large a value, you can create “hunting” situations that can cause the damper actuator to prematurely wear out.

Description	Minimum	Default	Maximum
Integral	0	0	100

Setpoint Screen #6 - Damper Airflow Max & Vent Min

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Maximum...: XXX %
Vent Min...: XXX %
```

The VAV/Zone Controller will not allow the damper or airflow calculation to exceed the Maximum setpoint while it is allowing the damper to modulate. During Vent mode when there is no heating or cooling demand, the damper or airflow will maintain at least the Vent Min amount of airflow into the zone for ventilation.

Description	Minimum	Default	Maximum
Maximum	0% or 0 CFM	100% or 1000 CFM	100% or 30000 CFM
Vent Min	0% or 0 CFM	25% or 250 CFM	100% or 30000 CFM

Setpoint Screen #7 - Damper Airflow Cool/Heat Minimum

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Cool Min...: XXX %
Heat Min...: XXX %
```

During Supply Air Cooling Mode, if the space being served by this damper is satisfied and has no cooling demand, the damper will close to this Cool Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional cooling. During Supply Air Heating Mode, if the space being served by this damper is satisfied and has no heating demand, the damper will close to this Heat Min setting. This provides a minimum amount of airflow into the space for ventilation, even if the space does not require additional heating.

Description	Minimum	Default	Maximum
Cool Min	0% or 0 CFM	10% or 1000 CFM	100% or 30000 CFM
Heat Min	0% or 0 CFM	10% or 100 CFM	100% or 30000 CFM

VAV/ZONE CONTROLLER PROGRAMMING

VAV/Zone Controller Setpoint Screens

Setpoint Screen #8 - Damper Airflow Night Min and Fan On Min

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Night Min.:      XXX %
Fan On Min.:     XXX %
```

The Night Min position is the position the damper will move to when the system is in Pushbutton Override Mode and this particular damper is not part of that Override Group. When not in Pushbutton Override, pressure independent boxes will only go to the Night Min CFM setpoint position if it is set to 0. Pressure dependent boxes will always stay at the Night Min position. This Night Min position only affects non fan powered boxes. The Fan On Min is the minimum damper or airflow setting used to activate the parallel fan if installed. Pressure Independent = CFM. Pressure Dependent = %.

Description	Minimum	Default	Maximum
Night Min	0% or 0 CFM	0% or 0 CFM	100% or 9999 CFM
Fan On Min	0% or 0 CFM	25% or 250 CFM	100% or 9999 CFM

Setpoint Screen #9 - Damper Airflow Reheat Min

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Reheat Min.:    XXX %
```

The Reheat Min is the damper or airflow setting used during the Space Reheat Mode of operation.

Description	Minimum	Default	Maximum
Reheat Min	0% or 0 CFM	0% or 0 CFM	100% or 30000 CFM

Setpoint Screen #10 - Damper Airflow Fixed Position

```
XX Box Spts IDXXXX
Damper/Airflow Spt
Fixed Pos:      XXX %
```

Many times while troubleshooting a system, it is useful to have the zone damper set to a specific damper position or airflow setting. This setpoint can be used to determine where the damper/airflow will remain when the VAV/Zone Controller receives a *Force to Fixed Position* command.

Description	Minimum	Default	Maximum
Fixed Pos	0% or 0 CFM	0% or 0 CFM	100% or 9999 CFM

Setpoint Screen #11 - SAT HVAC Mode Deadband

```
XX Box Spts IDXXXX
SAT HVAC Mode
Deadband.:    XX°F
```

If the supply air temperature is above the space temperature by this amount, the VAV/Zone controller enters the Supply Air Heating Mode. It will remain in the Supply Air Heating Mode until the supply air drops to 2°F above the space temperature. At that point the unit enters the Supply Air Vent Mode and remains there until the supply air drops this deadband below the space temperature. At that point the VAV/Zone Controller enters the Supply Air Cooling Mode and will remain there until the supply air temperature rises to 2°F below the space temperature.

Description	Minimum	Default	Maximum
SAT HVAC Mode Deadband	0°F	10°F	20°F

Setpoint Screen #12 - Zone Alarm Offsets

```
XX Box Spts IDXXXX
Zone Alarm Offsets
Hi Zone.....:  XX°F
Lo Zone.....:  XX°F
```

The VAV/Zone Controller can be setup to generate an alarm anytime the box goes into the Occupied Mode and the Zone Temperature exceeds the user-defined alarm limits for a user-defined period of time. A *High Temperature Alarm Setpoint* is created by adding the **Hi Zone Alarm** offset to the current *Cooling Setpoint*. The *Low Temperature Alarm Setpoint* is created by adding the **Lo Zone Alarm** offset to the current *Heating Setpoint*. If the zone temperature exceeds either of these limits for a period defined by the **Alarm Delay** setpoint, the controller can generate an alarm callout if all the optional hardware components required for this to occur are installed.

Description	Minimum	Default	Maximum
Hi Zone Alarm	+1°F	+30°F	+50°F
Lo Zone Alarm	-1°F	-30°F	-50°F

VAV/ZONE CONTROLLER PROGRAMMING

VAV/Zone Controller Setpoint Screens

Setpoint Screen #13 - Zone Alarm Delay

XX Box Spts IDXXXX
Zone Alarm Delay
Must Be Out Of
Limits For.: XXX Min

As mentioned above, if you configure the controller to generate zone temperature alarms, this is the amount of time after the box goes into the Occupied Mode that the temperature must be outside the alarm limits before an alarm is generated.

Description	Minimum	Default	Maximum
Out of Limits	1 Min	30 Min	300 Min

Setpoint Screen #14 - Day/Night Schedule

XX Box Spts IDXXXX
Day/Night Schedule
Control #: X
0=AHU 1-5=Scheduler

This screen allows you to set the VAV/Zone controller to operate on a remote schedule instead of the schedule that is contained in the SA Controller. Enter <0> to operate on the AHU schedule. Enter <1-5> to use an external schedule. A GPC Plus is required for schedules 1-5.

Description	Minimum	Default	Maximum
Schedule Control Number	0	0	1 to 5

Setpoint Screen #15 - Maximum Slide Offset

XX Box Spts IDXXXX
Maximum Slide Offset
Effect on Spt.: X°F

If the Flush Mount Wall Sensor has the optional Setpoint Slide Adjust, this is the maximum amount you can adjust the heating and cooling setpoints up or down as the slide is moved from the center position to its full up or down position.

Description	Minimum	Default	Maximum
Effect on SP	0°F	0°F	6°F

Setpoint Screen #16 - Push-Button Override Duration

XX Box Spts IDXXXX
Push-Button Override
Duration : X.X Hr

If the Flush Mount Wall Sensor has the optional Push-Button Override, this is the amount of the VAV/Zone Controller will resume using its Occupied Setpoints during unoccupied mode. This will generate a call for the Air Handler to start its fan and provide heating or cooling, depending on how you configure the Air Handler.

Description	Minimum	Default	Maximum
Duration	0.0 Hr	0.0 Hr	8.0 Hr

Setpoint Screen #17 - Maximum EMS Offset

XX Box Spts IDXXXX
Maximum EMS Setpoint
Offset...: XX°F

If the Energy Management System (EMS) is activated, the heat and cool setpoints can be spread apart by this amount.

Description	Minimum	Default	Maximum
Maximum EMS Setpoint Offset	0°F	0°F	30°F

Setpoint Screen #18 - Sensor Calibration for Space Temp and Supply Air Temp

Sensor Calibration
SPC: XXX.X° XXX.X°
SAT: XXX.X° XXX.X°
[SAT Only if Sensor]

The Thermistor Type III sensor readings can be calibrated. Enter a Positive value to increase a reading and a Negative value to decrease a reading.

Note: The Supply Air Temperature calibration offset only operates on the reading when the VAV/Zone Controller has its own Supply Air Temperature sensor installed on the AUX2 input. If the supply temperature is received from a global broadcast, you will need to go to the air handler to calibrate the temperature reading.

Description	Minimum	Default	Maximum
SPC (Space Temp)	-100°F	0°F	+100°F
SAT (Supply Air)	-100°F	0°F	+100°F

VAV/ZONE CONTROLLER STATUS

VAV/Zone Controller Status Screens

VAV/Zone Controller Status

Status Screen #1 - Mode of Operation

```
XX Box v4.01 IDXXXX
Occupied Mode
Vent Mode
Belongs to Group # 1
```

- Line 2** Unoccupied Mode
Occupied Mode
Override Mode
Override Pending*
Damper Calibration
Group Override
- Line 3** OFF Mode
Vent Mode
Cooling Mode
Heating Mode
Sensor Fail Mode**
- Line 4** Belongs to Group # xx
No Group Affiliation

* Not displayed when using a Digital Room Sensor.

** Displays for either a temperature sensor failure or an airflow sensor failure.

Status Screen #2 - Zone Temperature and Cooling/Heating Setpoints

```
XX Box v4.01 IDXXXX
Zone Temp.: XX.X°F
Cooling Spt: XX.X°F
Heating Spt: XX.X°F
```

- Line 2** Current Zone Temperature
- Line 3** Currently active Cooling Setpoint based on the current Occupied / Unoccupied mode of operation.
- Line 4** Currently active Heating Setpoint based on the current Occupied / Unoccupied mode of operation.

Status Screen #3 - Slide Offset & H/C Demand

```
XX Box v4.01 IDXXXX
Slide Offset: XX°F
H/C Demand.: XX.X°F
```

- Line 2** If the optional Setpoint Slide Adjust is installed on the Flush Mount Wall Sensor, this line will display the current amount the **Slide Offset** is affecting the Heating and Cooling Setpoints.
- Line 3** Current **Heating or Cooling Demand** in the Zone based on the current Heating and Cooling Setpoints when compared to the current Zone Temperature.
- Line 4** Blank

Status Screen #4 - Supply Air Temperature & Box Air Temperature

```
XX Box v4.01 IDXXXX
Supply Air: XX.X°F
Box Air.: XX.X°F
```

- Line 2** **Current Supply Air Temperature** received via broadcast from the DX Air Handler or from the Box Controller's own installed Box Air Temperature Sensor connected to the AUX input of the VAV/Zone controller board.
- Line 3** **Current Box Air Temperature**
If you have configured the SA Controller to broadcast the Supply Air Temperature to the VAV/Zone controller and don't have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Supply Air Temperature the same as line 2.

If you have a Box Air Temperature Sensor attached to the AUX input on the VAV/Zone controller board, this line will display the Box Air Temperature at the location where the Box Air Temperature Sensor is installed.
- Line 4** Blank

Status Screen #5 - Zone Damper Position, Airflow, and Desired CFM

```

XX Box v4.01 IDXXXX
Damper FRC:   XXX %
Airflow      : XXXX CFM
Desired      : XXXX CFM

```

- Line 2** Current Zone Damper Position
If you entered a FORCE command, the letters FRC will appear. If this is normal damper operation, the FRC will not be displayed.
- Line 3** If this is a Pressure Independent box, the current Airflow will be displayed. If not, this line will display the desired damper position.
- Line 4** If this is a Pressure Independent box, this line will display the Desired CFM the box would like to provide to the zone. If not, this line will display [Controls to +/- 3%] to indicate how accurately the damper will maintain the desired position.

Status Screen #6 - Fan Status & Reheat Stages

```

XX Box v1.04 IDXXXX
Fan Status       : OFF
Heating Relay#1 : OFF
Heating Relay#2 : OFF

```

- Line 2** If this is a Fan Powered box, this line will display the Fan On/Off Status. On non-fan powered boxes, this line will display [Exp Relay 1 Not Used].
- Line 3** If your VAV/Zone Controller has been configured to control reheat stages, this line reflects the On/Off Status of the first stage of Reheat. If you have 3 stages of reheat, this line will display the total number of active heating stages.

Examples:

“1 Reheat Stages On” or

“2 Reheat Stages On” or

“3 Reheat Stages On”

If proportional heating is used (you have no relays configured for heat), this line will display “Heating Signal: xxx %”.

- Line 4** If your VAV/Zone Controller has been configured to control reheat stages, this line reflects the On/Off Status of the second stage of Reheat. If you have 3 stages of reheat as explained on line 2, this line will be blank.

Status Screen #7 - Alarm Status

```

XX Box v1.04 IDXXXX

```

NO ALARMS!

```

XX Box v.104 IDXXXX

```

ALARMS PRESENT
SCROLL DOWN TO VIEW

- Line 2** Blank
- Line 3** NO ALARMS! OR ALARMS PRESENT

If there are one or more alarms active, the possible messages are shown below:

SPACE SENSOR FAILURE

CFM SENSOR FAILURE

DAMPER OPENING ALARM

DAMPER CLOSING ALARM

HI SPACE TEMP ALARM

LO SPACE TEMP ALARM

DPR FEEDBACK FAILURE

Press <↓> to scroll through all active alarms.

For Alarm Definitions, see the *SA E-BUS Controller Technical Guide*.

VAV/Zone Damper Force Modes

Damper Force Modes

Damper Force Modes are available for testing or balancing the system. These Force Modes can be accessed and programmed from either the System Manager or Modular Service Tool.

Modular Service Tool Instructions

When using the Modular Service Tool, simply *press* the **<BALANCE - TEST>** key. You will then see the *Unit ID Screen*. Enter the unit ID of the controller you wish to access and *press* **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then *press* **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Damper Force
Para Blocks
Load / Save / Copy
```

With the cursor on Damper Force, *press* **<ENTER>** to access the *Damper Force Mode Screen*.

Dampers Force Mode Screen

If the unit ID you entered is for an SA E-BUS Controller that has VAV/Zone Controllers connected to its communication loop, the Damper Force Mode will act as a “Global” Damper Force Mode. That is, all VAV/Zone Controllers on that SA E-BUS Controller’s communication loop will be forced to the same Damper Force Mode setting. If the unit ID you entered is for a VAV/Zone Controller, the Damper Force Mode setting will only apply to that VAV/Zone Controller.

```
Damper Force
Enter Force Mode: 0
0=Auto 1=Open 2=Clsd
3=Max 4=Min 5=Fixed
```

Set the appropriate Damper Force Mode by entering numbers 0 through 5. Following is a list of the force modes and their meaning:

- | | |
|----------|---|
| 0 = Auto | This is the default setpoint. With this setting, the damper will operate normally and modulate according to the controller setpoints. |
| 1 = Open | This setting will force the dampers to their fully-open position. |

- | | |
|-----------|---|
| 2 = Clsd | This setting will force the damper to its fully-closed position. |
| 3 = Max | This setting will force the damper to its Maximum Position Setpoint. See <i>VAV/Zone Controller Setpoint Screen #5</i> on page 53 for complete setpoint information. |
| 4 = Min | This setting will force the damper to its Minimum Position Setpoint. See <i>VAV/Zone Controller Setpoint Screen #5</i> on page 53 for complete setpoint information. |
| 5 = Fixed | This setting will force the damper to a fixed position based on the Fixed Position Setpoint. See <i>VAV/Zone Controller Setpoint Screen #8</i> on page 54 for complete setpoint information. |

CAUTION: The Damper Force Modes should only be used by qualified service personnel. Serious damage to the ductwork could result if the dampers are all forced closed and the HVAC unit fan is operating.

MINILINK PD CONFIGURATION

MiniLink PD Configuration Screens

MiniLink PD Configuration

In order to correctly setup the MiniLink PD, you must first configure several parameters in regard to the type of system and operating parameters for the system it is installed on. Most of these values and operating parameters are only set once at the initial system setup and are never changed.

Modular Service Tool Instructions

From any *Menu Screen*, press the **<Configuration>** button. The *Unit Selection Screen* will appear requesting that you enter the unit ID number.

```
Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication
```

All MiniLink PDs are set at address 60. Enter the correct unit loop number for the loop the MiniLink Polling Device is connected to (for Loop 1 you would enter **<160>**) and press **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then press **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

If communications are successful, you will see the screen shown below. Press **<ENTER>** to save entered data and press **<↓>** to scroll through the screens.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

```
THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX
```

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

```
Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication
```

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, “No Communication” will be replaced with “Press Down.” Then press **<↓>**.

NOTE: If “No Communication” remains, it indicates a communication failure to the controller.

The following screen will be displayed:

```
Change Setpoints
Configure Unit
Save/Copy/Restore
```

Scroll to the ‘Change Setpoints’ option and press **<ENTER>**. This will take you to the first Setpoints Screen shown below.

Configuration Screen #1 - System Type

```
Polling Unit Config
System Type
Selection: X
Use < Or > To Change
```

Select Zoning or VAV. This screen allows you to select whether you want the system to behave as a VAV system or a Zoning System. If you select VAV, this will allow tenant logging for your VAV system.

Configuration Screen #2 - Last Polled Zone

```
Polling Unit Config
Last Polled Zone
Address: XX
[Enter Last Zone]
```

This zone is the last zone on the local loop of your zoning system that is to be included in zone voting.

Configuration Screen #3 - Mode Changeover Time

```
Polling Unit Config
Mode Changeover Time
Minutes: XX
[Enter Period Time]
```

This is the amount of time that you want to allow between changeover from heating to cooling modes.

MINILINK PD STATUS

MiniLink PD Configuration & Status Screens

Configuration Screen #4 - Optimal Start Target Zone

```
Polling Unit Config
Optimal Start
Target Zone.: XXX
[Enter Target Zone]
```

This is the unit ID of the Zone that you want to be satisfied by the normally scheduled start time. If you enter “-1” into this box, it will average all zones instead of picking a specific zone. If you do not require Optimal Start, enter “0”.

Configuration Screen #5 - Maverick Testing

```
Polling Unit Config
Maverick Testing
Disabled: YES
Use < Or > To Change
```

Select YES or NO. Disabling the Maverick Testing allows known troubled zone(s) to continue voting without causing a Maverick alarm. In other words, all zones are included in the voting regardless of whether they are more than four degrees from setpoint.

Configuration Screens #6-65 - Alarm Polling

```
Polling Unit Config
Enable Alarm Polling
Unit XX : YES
Use < Or > To Change
```

Select YES or NO. Enabling Alarm Polling allows any alarm from the loop to be polled. You must set this for each controller on the loop.

MiniLink PD Status

Status Screen #1 - Schedule Mode, System Status, and Minutes Left

```
Polling Device
System Occupied
Venting Mode
XXX Min Left in Mode
```

Line 2 Current Schedule Mode
Can be System Occupied or System Unoccupied.

Line 3 Currently System Status
Can be Vent Mode, Cooling Mode, or Heat Mode.

Line 4 Minutes Left In Mode
The number of minutes left in the current mode of operation before it can switch modes. This value is user-adjustable. See Configuration Screen #3.

Status Screen #2 - Mode Priority, Cool Total, and Heat Total

```
Polling Device
No Mode Priority
Cool Total.: XX.X°F
Heat Total.: XX.X°F
```

Line 2 Mode Priority
Can be Heat Priority or Cool Priority. This is based on the voting zones and their demand.

Line 3 Cool Total
Total cooling temperature demand from all zones.

Line 4 Heat Total
Total heating temperature demand from all zones.

Outputs Force

Outputs Force settings are available for testing or troubleshooting the system. These Force settings can only be accessed and programmed from the Modular Service Tool. The System Manager does not allow for programming of this function.

CAUTION: The Outputs Force settings should only be applied by qualified service personnel. Serious damage to the HVAC unit could result from improper use of these Outputs Force settings.

To access the Outputs Force settings, simply *press* the **<BALANCE - TEST>** button on the Modular Service Tool. You will then see the *Unit ID Screen*.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the unit ID of the SA Controller you wish to access and *press* **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then *press* **<↓>**. You will then see the screen shown below. *Press* **<ENTER>** to save entered data and *press* **<↓>** to scroll through the screens.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

NOTE: The Outputs Force settings are only available for the SA E-BUS Controller. They are not supported for the VAV/Zone Controllers or other Add-on controllers.

Outputs Force
Para Blocks
Save / Load / Copy

Place the cursor on Outputs Force and *press* **<ENTER>** to access the *Outputs Force Screen*.

Supply Fan Override
Auto

Use < Or > To Change

The first *Outputs Force Screen* allows the AHU fan relay to be set for Auto, Force On, or Force Off. The default setting is Auto. After you complete all troubleshooting or testing procedures, all relays should be changed back to this setting. The Force On setting will force the relay to the ON (energized) position. The Force Off selection will force the relay to the OFF (de-energized) position.

The next screen displays the Relay Overrides for Relay 2. After *pressing* **<ENTER>** to save any changes, *press* **<↓>** to have the next relay displayed. All 20 *Relay Override Screens* (including the AHU fan relay) are available by *pressing* **<↓>** after each setting is saved by *pressing* **<ENTER>**.

Relay Overrides
Relay 2 Override
Auto
Use < Or > To Change

After the screen for relay 21 is displayed, the first *Analog Output Override Screen* will be displayed.

Analog Output 1 Screen

Economizer Overrides
Analog Output #1
Override Volts: -1.0
[-1.0=Auto]

The default setting for normal operation is -1.0 volts. Voltages between 0 to 10.0 can be set for any of the Analog Output Overrides. *Press* **<ENTER>** after making a setting change and then *press* **<↓>** and the next *Analog Output Override Screen* will be displayed.

Analog Output 2 Screen

Supply VFD Override
Analog Output #2
Override Volts: -1.0
[-1.0=Auto]

Analog Output 3 Screen

Exhaust VFD Override
Analog Output #3
Override Volts: -1.0
[-1.0=Auto]

Analog Output 4 Screen

Mod Heating Override
Analog Output #4
Override Volts: -1.0
[-1.0=Auto]

Analog Output 5 Screen

Mod Cooling Override
Analog Output #5
Override Volts: -1.0
[-1.0=Auto]

Analog Output 6 Screen

RA Damper Override
Analog Output #6
Override Volts: -1.0
[-1.0=Auto]

Analog Output 7 Screen

RA Bypass Override
Analog Output #7
Override Volts: -1.0
[-1.0=Auto]

Modular Service Tool Instructions

From any menu screen, press **<BALANCE-TEST>**. The *Unit Selection Screen* will appear requesting that you enter the unit ID number.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the network unit ID for the controller you want to save the setpoints from. Example, '102' for Loop 1 / Unit 2. Then press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." After a brief pause, press **<↓>** to get to the *Balance - Test Screen* shown below.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

Outputs Force
Para Blocks
Save / Copy / Restore

Scroll down to the 'Save/Copy/Restore' option and press **<ENTER>**. This will take you to the Save Setpoints screen.

System Manager SD Instructions

From any Main screen, press **<SETPOINTS>**. The screen below will appear because this option requires passcode clearance. Only a Level 2 passcode can change setpoints.

THIS ACTION REQUIRES
PASSCODE CLEARANCE
Enter Passcode: XXXX

If the correct passcode was entered, the *Unit Selection Screen* will be displayed.

Enter Unit Address
Then Press Enter
Selected Unit#: XXXX
No Communication

Enter the Unit ID of the controller you wish to change schedules for and press **<ENTER>**. Once communication is established, "No Communication" will be replaced with "Press Down." Then press **<↓>**.

NOTE: If "No Communication" remains, it indicates a communication failure to the controller.

The following screen will be displayed:

Change Setpoints
Configure Unit
Save / Copy / Restore

Scroll down to the 'Save/Copy/Restore' option and press **<ENTER>**. This will take you to the Save Setpoints screen.

Save Setpoints - Network Mode

From the *Save Setpoints Screen* shown below:

Save Setpoints
Press Enter To Save

Press **<ENTER>** and a setpoint file will be saved to the SD card. You will receive a message that the save was successful. This file is specific to this controller on this loop.

APPENDIX A - SAVE, LOAD, COPY SETPOINTS

Copying & Restoring Previously Saved Setpoints

Copy Setpoints - Network Mode

To copy a saved setpoints file to other controllers on the network do the following:

From the *Save Setpoints Screen* shown below:

```
Save Setpoints
Press Enter To Save
```

Press **<↓>** once to access the *Copy Setpoints Screen* shown below.

```
Copy Setpoints
From Loop  1
From Unit  2
Press Enter to Copy
```

In the 'From Loop' field, enter the Loop of the controller you want to copy the setpoints from. In this example it is '1'. Then press **<ENTER>**.

In the 'From Unit' field, enter the Unit ID of the controller you want to copy the setpoints from. In this example it is '2'. Then press **<ENTER>**.

Now your cursor will be on the last line, and you can press **<ENTER>** once more to copy the setpoint file from unit 102 to unit 103.

You will receive a confirmation that the copy was successful.

Save & Copy Setpoints - Stand-Alone Mode

The instructions for Stand-Alone Mode are exactly the same as Network Mode, except that there is no need to enter a Loop number in the Unit ID number field and in the *Copy Setpoints Screen*, enter a zero in the 'From Loop' field.

Restore Setpoints - Network or Stand-Alone Mode

The Restore Setpoints feature is used to reload a saved setpoints file from one controller back to itself. This could be useful if setpoints or configurations were changed and need to be reset.

You can perform this function on a networked system; however, the Modular Service Tool needs to be directly connected to the controller you wish to restore previously saved setpoints to.

From the *Save Setpoints Screen* shown below:

```
Save Setpoints
Press Enter To Save
```

Press **<↓>** four times to access the *Restore Setpoints Screen* shown below.

```
Restore Setpoints
Press Enter to Load
```

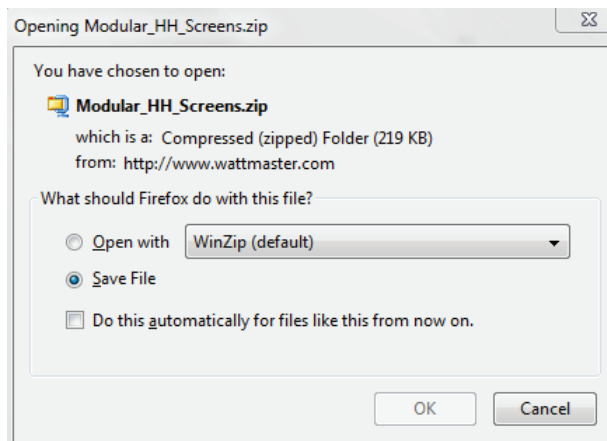
Press **<ENTER>**. This will reload the setpoints from the saved file. You will receive confirmation that the setpoints were loaded successfully.

Updating Your SD Memory Card

You may need to update your SD memory card from time to time, either for a new release or to add data for another Controller.

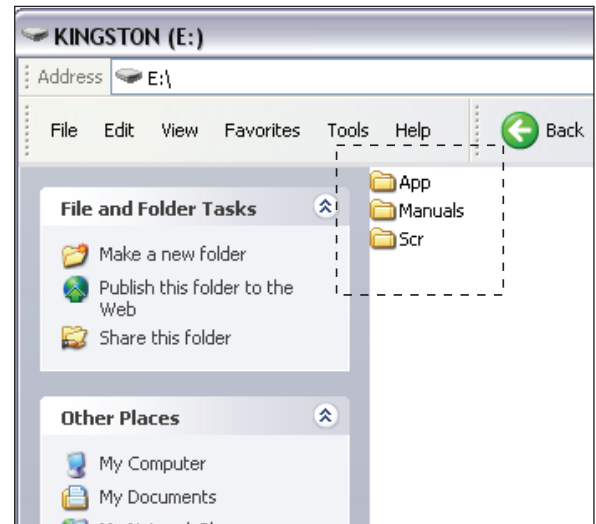
Follow the instructions below to download the update file from our tech support webpage:

1. Insert the SD memory card in your computer's SD drive and open the drive's window.
2. Open your browser and type in the address:
<http://wattmaster.com/techsupport>.
3. On the Tech Support webpage, locate the file Modular_HH_Screens.zip and *double-click* on it.
4. Click **<Save File>** when asked to save or open the file and then *click <OK>*. This option will save the file to the "Downloads" folder on your PC.



5. Open the "Downloads" folder in Windows Explorer. You will find a folder labeled, "Modular_HH_Screens.zip." *Right-click* on this folder and choose "Extract All" from the options list. **NOTE:** Any compression software can be used to extract the zip folder's contents, for example, Winzip.

6. Once you unzip the file, you will see a window similar to the one below.



7. Press **<CTRL> <A>** to highlight the folders in the window—App, Manuals & Scr. Press **<CTRL> <C>** to copy the folders.
8. Paste the files into the SD memory card drive's window by *pressing <CTRL> <V>*.
9. Remove the SD Memory Card from your computer and reinsert it in the Modular Hand Held Service Tool or Modular System Manager.

Updating Controller & E-BUS Module Software

Updating Software Using the Modular Service Tool SD

To update the software for various WattMaster controllers and E-BUS modules, follow these simple steps.

1. Update your SD memory card with the new software file for the controller or module you need to update. Follow the steps on **page 65** for Updating the SD memory card.
2. Connect the Modular Service Tool to the device you wish to update using the mini DIN communication cable or EBC E-BUS cable provided.
3. Power up the controller or E-BUS module you wish to update.
4. Apply power to the Modular Service Tool SD and press the **<ON>** button.
5. After initialization of the Modular Service Tool SD, press **<NEXT>** at the first Setup Screen and **<4>** at the second Setup Screen shown below.

```
1) Set Time & Date
2) Communications
NEXT) More Options
ESC) Exit Menu
```

```
3) Energy Saving
4) Update Software
NEXT) More Options
ESC) Exit Menu
```

6. The *Update Software Screen* will appear as shown below:

```
Select Communication
1) WattMaster Comm
2) E-BUS Module
ESC) Exit Menu
```

7. Follow the instructions for WattMaster Controllers or E-BUS Modules.

WattMaster Controllers

1. Press **<1>** to update a WattMaster Controller. The following screen will appear:

```
Enter Board Address
0
Esc) Exit Menu
```

2. Enter the address of the controller you are updating and then press **<ENTER>**.
3. The *Software Version Screen* will appear as shown below. Enter **<0>** for the latest software version or enter the number of an older version given to you by Technical Support. Then press **<ENTER>**.

```
Software Version
Enter 0 for Latest
0
Esc) Exit Menu
```

4. The screen will display the following messages:
"Resetting Unit"
"Load Sys Info"
5. If communications are successful, the screen will display, the name of the HEX file on the top line, "Flash Memory Erased" on the second line, and the progress percentage on the third line.

NOTE: If communications are not successful, the screen will display, "Press Any Key to Continue. Cannot Load Sys Info." Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, "Finish Download."

E-BUS Modules

1. Press **<2>** to update an E-BUS Module.
The following screen will appear:

```
Enter Board Address
      0
Esc) Exit Menu
```

2. Enter the address of the E-BUS module you are updating and then press **<ENTER>**. The following is the list of Module addresses:

WSHP-X - address 17
MHGRV-X - address 132
MODGAS-X - address 138

3. The *Software Version Screen* will appear as shown below. Enter **<0>** for the latest software version or enter the number of an older version if given to you by Technical Support. Then press **<ENTER>**.

```
Software Version
Enter 0 for Latest
      0
Esc) Exit Menu
```

4. The screen will display the following messages:
“Resetting Unit”
“Load Sys Info”

5. If communications are successful, the screen will display, the name of the HEX file on the top line, “Flash Memory Erased” on the second line, and the progress percentage on the third line.

NOTE: If communications are not successful, the screen will display, “Press Any Key to Continue. Cannot Load Sys Info.” Make sure you have the right address and the right software version on your SD card. If these two items are correct and you still experience a problem, contact Technical Support.

6. When updating is complete, the screen will display, “Finish Download.”

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