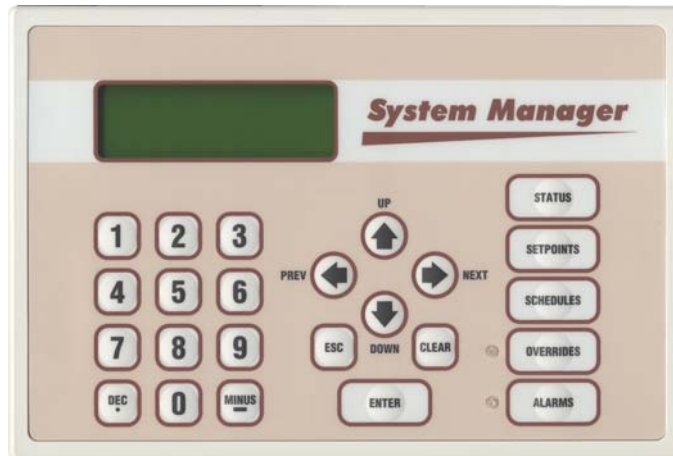


# Operator Interfaces Technical Guide

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**WattMaster**  
C O N T R O L S

## For MUA II D Controllers

( SS1013 or Y200405 MUA II D Controller Code )  
( Use SS1010 System Manager Code & SS1009 Service Tool Code )

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WattMaster Controls Inc.  
8500 NW River Park Drive · Parkville , MO 64152  
Toll Free Phone: 866-918-1100  
PH: (816) 505-1100 · FAX: (816) 505-1101 · E-mail: mail@wattmaster.com  
Visit our web site at [www.orioncontrols.com](http://www.orioncontrols.com)  
Form: OR-MUAIID-SMST-TGD-01C  
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## Introduction

### Modular Service Tool

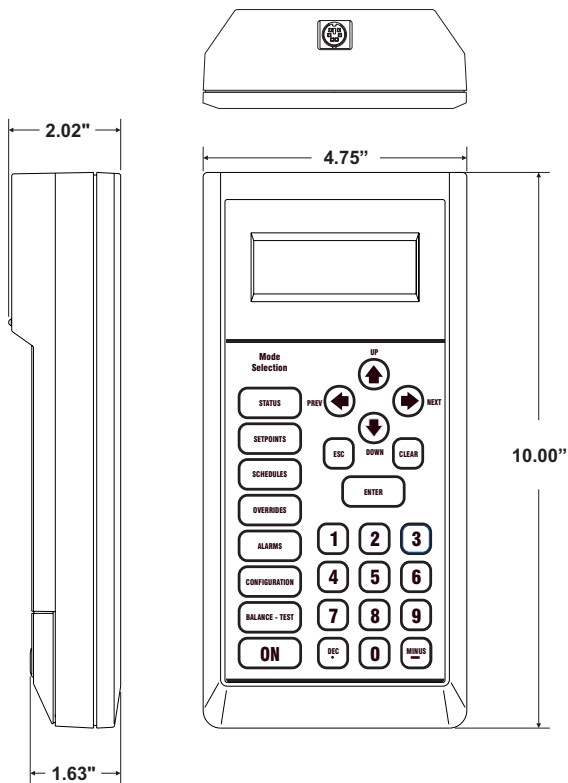


Figure 1: Modular Service Tool Dimensions

#### Description

The MUA II D Modular Service Tool is a system operator interface that provides a direct link to enable the system operator to view the status, configure and to adjust the setpoints of any controller on the control system communications loop. The Service Tool is housed in an attractive beige colored plastic enclosure. The display area is covered with a clear plastic bezel for protection of the display screen. The Service Tool has a four 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 Wendy's Modular Service Tool is supplied with (4) AA (1.5V) Volt alkaline batteries a wall mount DC power supply and a communication cable terminated with an 8 pin DIN connector for connection to the Service Tool. The cable allows the user to setup and program any MUA II D controller with a 8 pin DIN connector socket by simply plugging in the service tool to the socket on the controller.

The Service Tool is designed to be carried by the system installer or service technician. Its rugged plastic housing, provides superior protection for the electronic components housed inside. The MUA II D 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 System Manager

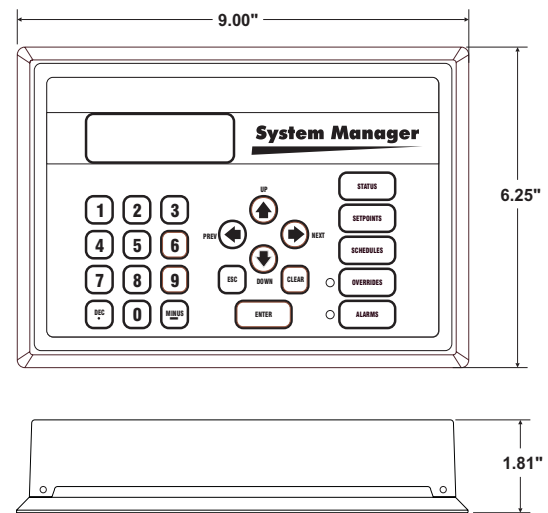


Figure 2: Modular System Manager Dimensions

#### Description

The MUA II D Modular System Manager provides a direct link to enable the system operator to view the status and to adjust the setpoints of any controller on the control system communications loop. The System Manager is designed to be used with the MUA II D controllers. The System Manager is housed in an attractive beige colored plastic enclosure. The System Manager is equipped with a four 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 LED's 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 System Manager from the 24 VAC power source and the HVAC unit controller communication wiring terminals.

The System Manager is designed for wall mounting. Mounting holes are provided to attach the 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 or superintendent's office or in an equipment room. The attractive enclosure is quite suitable for mounting in any location or with most decors.

## System Connections

### Modular Service Tool

Whether you have a Stand Alone, Interconnected or Networked Orion Controls System, the Modular Service Tool always connects to an HVAC unit 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 HVAC unit controller. If this is an Interconnected System, all controllers that are interconnected

with communications cable can be programmed from any HVAC unit controller on the loop. If this is a Networked System, all controllers on the entire Networked System can be programmed from one HVAC unit 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 3** for connection details.

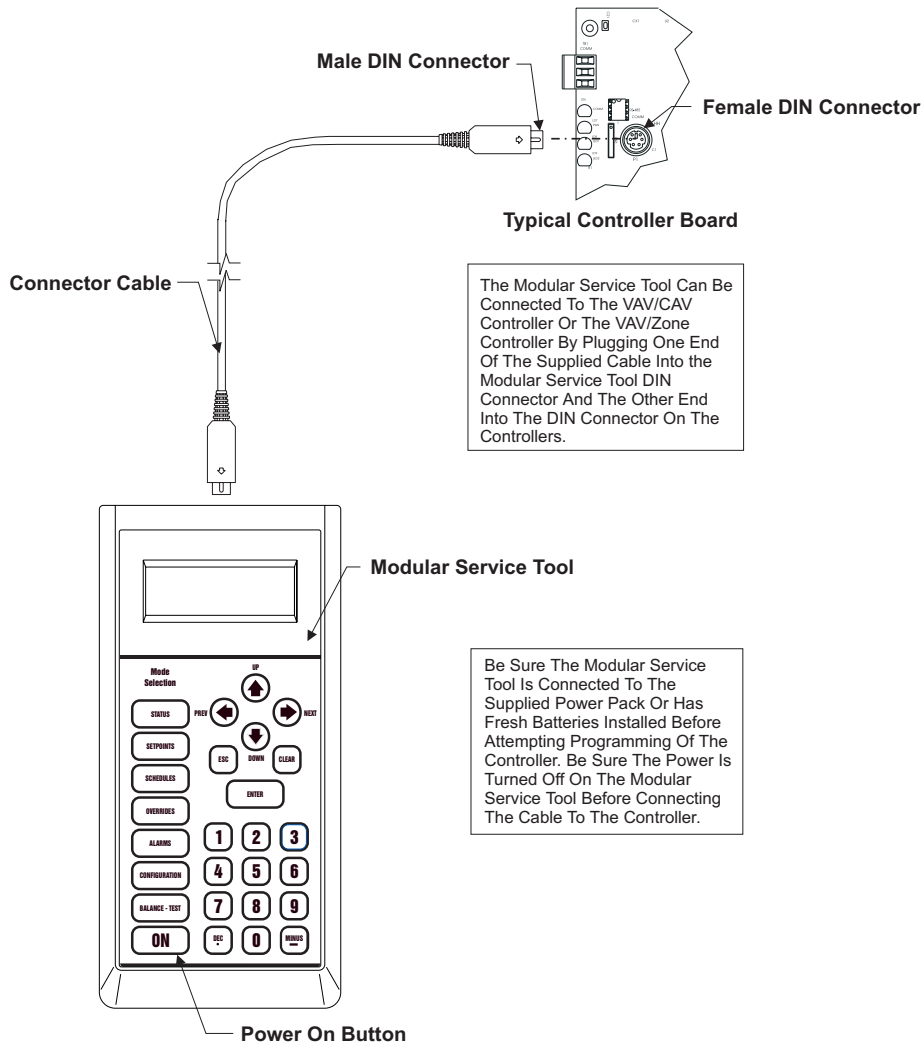


Figure 3: Modular Service Tool

## Modular System Manager

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 the Modular Polling device. By using these plug in connections wiring errors are virtually eliminated and system installation is fast and easy. See **Figure 4** for typical connection information. See **Figure 5** for typical Power/Comm board wiring and connection information.

When the System Manager is to be connected to a Stand Alone system, a 12 ft. 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** 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 cutoff 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.

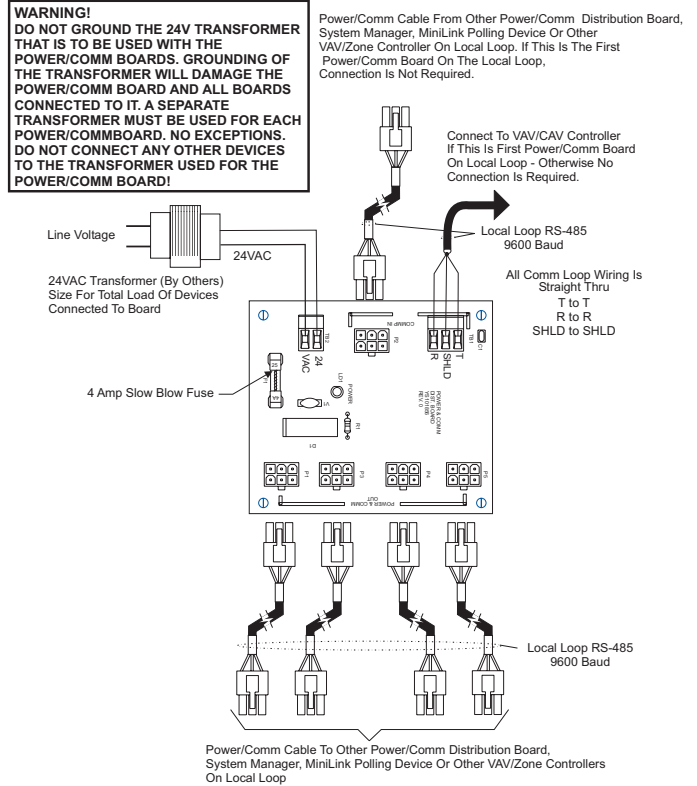


Figure 5: Typical Power/Comm Board Wiring

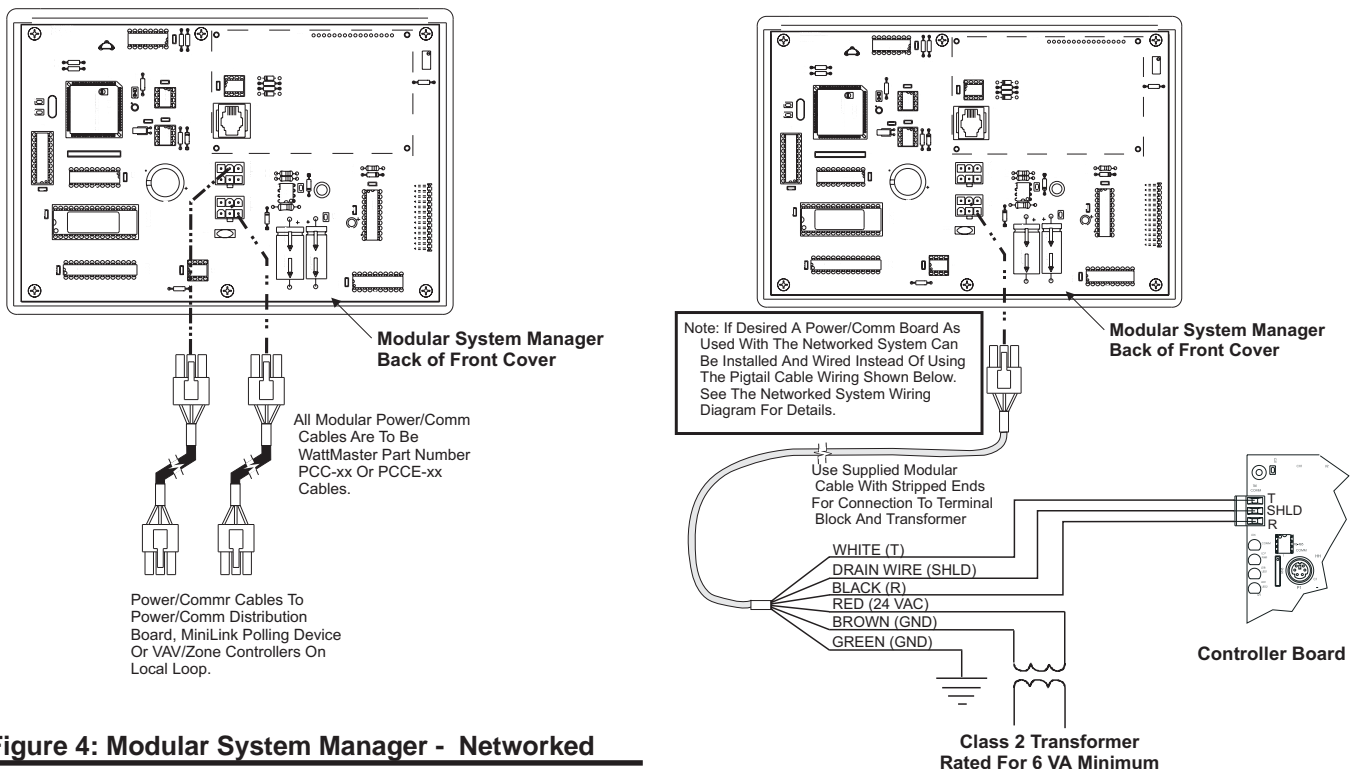


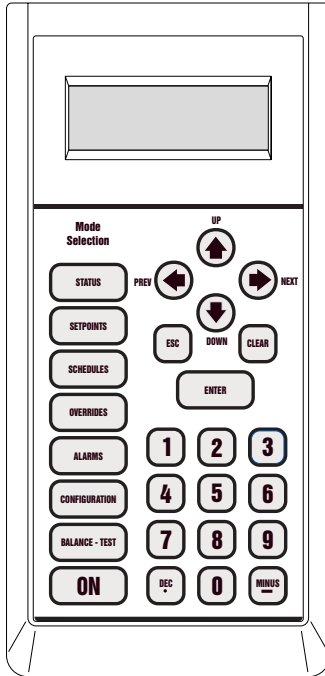
Figure 4: Modular System Manager - Networked

Figure 6: Modular System Manager - Stand Alone

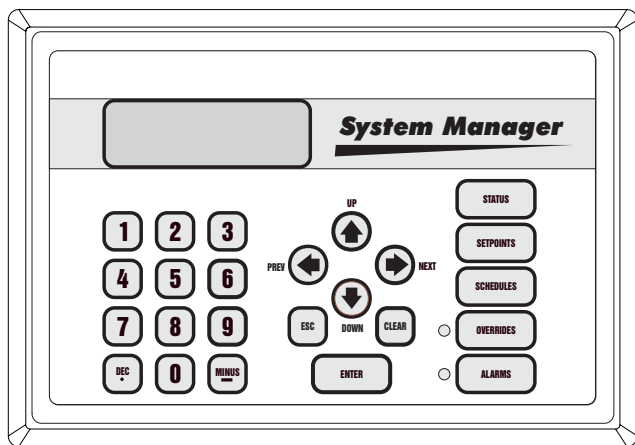
## General Programming Information

### Operator Interfaces Comparison

In order to configure and program the Orion System controllers you must have a central operators interface or a personal computer with the Prism computer front end software installed. Two different central operators interfaces are available for programming of the Orion Controls System. You may use either the *Modular Service Tool* and/or the *Modular System Manager* to access the *status* and *setpoints* of any controller on your communications loop.



Modular Service Tool



Modular System Manager

The Modular Service Tool or the System Manager allow the user to view any temperature or output condition 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

The System Manager display screens and the Modular Service Tool display screens are very similar. For most setpoints and modes the only difference between using the Service Tool and the System Manager is a few differences in the function of the keypads. The Modular Service Tool has 2 extra function keys (“Configuration” and “Balance-Test”) that are not available on the System Manager. Where a difference in the keypad input or the screens displayed exists between the two operators interfaces, both screens or keypads will be shown. See the chart below for a list of the keypad descriptions and functions.

Keypad Description	Key Function	
	System Manager	Modular Service Tool
<b>ESC</b>	Used to exit from screens or from data entry. Use this screen to return to the main menu from any screen in the system	Same function as System Manager but also turns off the power to the Service Tool when on the main menu screen
<b>ENTER</b>	This key is used to close a data entry field and advance to the next item or screen	Same function as System Manager
<b>Clear</b>	If a data entry mistake is made, press this key to clear the data entry field and start over	Same function as System Manager
<b>Minus</b>	If the a setpoint with a negative value is required, press this key for the minus sign	Same function as System Manager
<b>DEC</b>	Press this key when entering data that requires a decimal point	Same function as System Manager
← →	Steps the user to the next controller on the loop on interconnected or networked systems	Same function as System Manager
↑ ↓	Steps the user backward or forward through the screens	Same function as System Manager

## Modular System Manager

### System Manager Initialization Screens

When the System Manager is powered up, the first screen displays the current version of the software installed in your System Manager and whether your system is configured for Network or Stand-Alone operation. The System Manager will try to detect the type of installation you have by scanning the communications loop. See the screens below. If it is configured for Stand-Alone operation, only the HVAC unit controller that the System Manger is connected to is available for programming. On a Networked System, all controllers on the communications loop are available for programming by entering their loop address (ID). If an Interconnected System is connected to the System Manager all controllers that are connected to the communication loop are available for programming.

```

Initializing
System Manager vX.XX
Wattmaster Controls
Network Mode
    
```

```

System Manager vX.XX
Monday Operations
09/09/99 04:26 PM
Outdoor Air 87°F
    
```

The screen above will appear a few seconds later. If this is a Stand Alone system, the outdoor air temperature will not be shown on the display. If you believe your system is incorrectly configured, please follow the instructions that follow. If your system is configured correctly proceed to the Menu Screens section of this manual.

### Configuring The System Manager For Network Or Stand-Alone Operation

The System Manager can operate as a Stand Alone interface with the HVAC unit controller and does not require any other communications devices to read or reset any available values. To verify if it is currently configured for Stand Alone operation, cycle power to the System Manager and monitor the LCD initialization screen. If it is configured for Stand Alone you will see the words "**Stand Alone Mode**" on the bottom line of the display. If you are using this System Manager on a communications loop and have installed a MiniLink or CommLink II communications interface, then you need to operate in Network Mode and the bottom line should display the words "**Network Mode**".

If your display indicates a different mode than the one you need, press the "Enter" key and the following screen will appear.

```

1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
    
```

Press the "2" key on the keypad to enter the communications screen.

```

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

Enter the seven digit passcode "**2337377**" to access the next screen. These seven digits spell the word "ADDRESS" on your telephone keypad if you forget what they are. Once on the screen shown below, use the keypad to enter the correct mode for your installation. The screen will now show "Stand Alone System" or "Multiple MGRS" or "Network System" depending on what you selected.

```

0) Stand Alone
1-60) Multiple MGRS
63) Network System
Enter Mode Of Op:.xx
    
```

Once you have the correct mode displayed, press the **ENTER** key. The following screen will appear to telling you that you have changed the system mode. Press any key on the keyboard to exit this screen.

```

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

## Modular Service Tool

The Modular Service Tool is very similar to the System Manager in its operations as stated previously. Two exceptions to this are that the Service Tool unlike the System Manager does not check the system to determine whether it should be in Network or Stand Alone Mode and it does not have any passcoding capability.

After connecting the Service Tool to the controller with the supplied cable, press the "On" key. The following screen will appear.

```

Service Tool vX.XX
Monday Operations
09/09/02 04:26 PM
Stand Alone Mode
    
```

## General Programming Information

### Configuring The Modular Service Tool For Network Or Stand-Alone Operation

As with the System Manager described previously, you must determine if the mode displayed is correct for your system. If it is configured for Stand Alone you will see the words "**Stand Alone Mode**" on the bottom line of the display. This is the factory default setting. If you are using this tool on a system or controller that does not have a CommLink or MiniLink installed, then this is the correct setting and you can proceed to desired screen by pressing the menu key or any function key. If you are using this Service Tool on a communications loop with and have installed a MiniLink or CommLink II communications interface, then you need to operate in network mode and the bottom line should display the words "**Network Mode**".

If your display indicates a different mode than the one you need, press the "Enter" key and the following screen will appear.

```
1) Set Time & Date
2) Communications
3) Energy Saving
ESC) Exit Menu
```

Press the "2" key on the keypad to enter the communications screen.

```
0) Stand Alone
1) Network System

Enter Mode Of Op: .xx
```

As the screen indicates, press "0" or "1" keys to select the proper mode of operation. When you are finished press "Enter" to move back to the main menu screen.

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

### 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 access this setting from the main status screen press "Enter".

```
1) Set Time & Date
2) Communications
3) Energy Saving
ESC) Exit Menu
```

When this screen appears press the "3" key to access the Energy Saving screen. The following screen will appear.

```
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. To cancel the automatic power down enter "99". After you have entered this number between 1 and 99 minutes, press "ESC" to exit as the screen instructs you.

### Unit Selection

With both the Modular Service Tool and the Modular System Manager You must enter the ID (Address) of the controller you wish to program

```
Unit Selection
Enter Unit ID#
Selected ID#: xxxx
```

With the main menu screen displayed, press the function key associated with the operation (setpoints, configuration, etc.) you want to perform. The screen shown above will appear asking you to enter a unit I.D.# (controller address). Put in the ID# of the controller you wish to communicate with then press the "ENTER" key.

If this is Network System (the system has a CommLink), the Unit ID is actually two separate numbers, combined into one value. The first part of the number contains the Loop Address at which the controller is located. The second part of the number contains the actual controller address. See Examples #1 & #2 below.

If this is a Stand Alone System (system without a CommLink) this will be a number between 1 and 59. It is recommended the address be set to 1. See example #3 below.

#### EXAMPLE #1

You would like to view the 3rd controller on the 5th loop. Enter "503" as the Unit ID.

## EXAMPLE #2

You would like to view the 12th controller on the 24th loop. Enter "2412" as the Unit ID

## EXAMPLE #3

You would like to view the only controller on the loop. Enter 1 as the Unit ID. No loop number is required since there is only one loop.

Hit the "Enter" key after entering the unit ID. If you are using the Modular Service Tool you will be taken directly to the first screen for the operation you are trying to program.

From the main status screen press "Enter", The following screen will appear.

```
1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
```

Press ">", to proceed to the next menu and the following screen will appear.

## System Manager Passcodes

Anytime you enter a unit ID with the Modular System Manager you will be asked for a passcode. Passcodes are not required to view Status Screens. The screen below will appear if this action requires passcode clearance.

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

The System Manager has two levels of user access. Level 1 users are limited to viewing or 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.

```
1) Change Passcodes
2) Loop Search
<-) Prev. Menu
ESC) Exit Menu
```

Press the "1" key on the keypad to enter the Change Passcode screen.

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

Enter the default Level 2 passcode "2222" to access the next screen. You must use the Level 2 passcode to change passcodes. Level 1 passcodes will not allow changing passcodes!

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

This screen allows you to enter new Level 1 or Level 2 passcodes. The actual digits in your passcodes are never displayed. An "X" is used as a place holder for each digit entered. 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!

## General Programming Information

### Scheduling

The MUA II D controller scheduling screens are accessed by pressing the "Schedule" button on either the System Manager or the Modular Service Tool. Press the number button for the scheduling function you wish to view.

```
1)Schedule Overrides
2)Week Schedules
3)Holidays
ESC) Exit Menu
```

### Week Schedules

#### Event #1

```
MUA II Sched ID 59
Sunday Event #1
Start Time : xxxx
Stop Time : xxxx
```

#### Event #2

```
MUA II Sched ID 59
Sunday Event #2
Start Time : xxxx
Stop Time : xxxx
```

If you are using the internal scheduling capability of the VAV/CAV 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 bringing 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 the "Escape" key. 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, leave Event #2 times to 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. This automatically increments as you finish the Event #2 screen and continue to the next days 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 the user has configured his system.

### Holiday Start/Stop Day Selection

```
MUA II Hldy ID 59
Holiday # 1
Start Mon/Day: xxxx
[ July 4th = 704 ]
```

```
MUA II Hldy ID 59
Holiday # 1
Stop Mon/Day: xxxx
[ July 4th = 704 ]
```

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 4<sup>th</sup> (Note : Leading zero not required)  
1225 = December 25<sup>th</sup>

### Holiday Start/Stop Times

```
MUA II Hldy ID 59
Holiday Schedule
Start Event #1: xxxx
Stop Event #1: xxxx
```

```
MUA II Hldy ID 59
Holiday Schedule
Start Event #2: xxxx
Stop Event #2: xxxx
```

The fourteen *holidays* all use the same *Start and Stop times* which are entered on this screen and then next. It is entered 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.

For the Service Tool, from the main screen press “**Enter**” and the following screen will appear.

## Schedule Override

```
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 or Remote)

As you can see on the last line of the display you enter a ‘1’ to run continuously in the *Occupied Mode* or a ‘2’ to run continuously in the *Unoccupied Mode*.

To restore normal schedule operations, make sure a ‘0’ is entered here. This override remains in effect until canceled by the user 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.

---

## Setting Time & Date

Both the Modular Service Tool and Modular System Manager are equipped with a real time clock chip allowing it to maintain the correct time. Once the correct time and date are entered, the information is broadcast globally to all controllers on the entire system. The System Manager will also broadcast this information once every day at midnight to synchronize all the controllers on the system.

From the main System Manager screen press “**Enter**” and the following screen will appear.

```
1) Set Time & Date
2) Communications
->) Next Menu
ESC) Exit Menu
```

Press 1 to enter the Set Time and Date Menu.

```
1) Set Time & Date
2) Communications
3) Energy Saving
ESC) Exit Menu
```

Press 1 to enter the Set Time and Date Menu.

## Programming Times

Although the times are displayed on the Main Screen in a standard 12-hour format, they are programmed using the 24-hour military format. If the VAV/CAV controller was configured to use its own Internal Schedules, the Occupied/Unoccupied modes are calculated on the basis of the current real time clock reading.

```
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 Date

```
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)

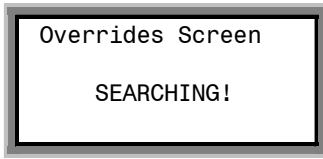
## Space Sensor Overrides

When a space sensor with override option is used the System Manager or Modular Service Tool can determine and report any units which are currently operating in an override condition. This function requires that a polling device is installed on the loop where the controllers are located.

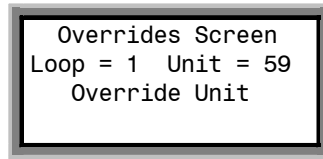
To access the Space Sensor Overrides screen, press the “Override” button located on the System Manager or Modular Service Tool. A screen will appear asking you to enter a unit ID. Enter an ID for any active

## General Programming Information

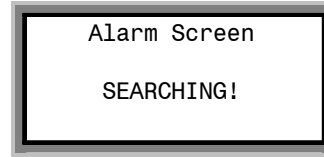
controller on the system and press "Enter". The following screen will appear.



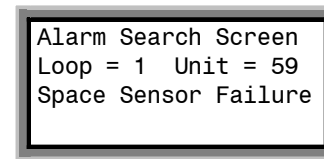
After the System Manager or Modular Service Tool completes its search, it will list the first unit on the system that is currently in the override mode. Press the previous or next button to scroll through all units that are in the Override Mode.



The following screen will appear. The operators interface will search for any active alarms on the entire system.

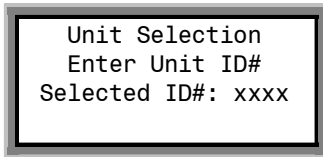


After the System Manager or Modular Service Tool completes its search, it will list the first unit on the system that currently has an active alarm. Press "Enter" to scroll through all the alarms on that particular unit. To move to the next unit or back to the previous unit use the "Prev" or "Next" arrows to move between units with alarms.



## Alarm Search

The System Manager or the Modular Service Tool can be used to search for all active alarms on the system. From either of the operators interfaces press the "Alarm" key. The Unit Selection screen below will be displayed. Enter the Unit ID of any unit on the system and press "Enter".



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.

## Programming The MUA II D Controller

### Configuration

In order to correctly setup the MUA II D 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.

#### System Manager Instructions

From any menu screen press the “Setpoint” key. The unit selection screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the MUA II D controller you want to configure and hit the “Enter” key. You will see the screen shown below.

```
1)Change Setpoint
2)Configure Unit
3)Damper Force
ESC) Exit Menu
```

Press “2” on the keypad to enter Configuration Screen #1.

#### Modular Service Tool Instructions

From any menu screen press the “Configuration” key. The unit selection screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the MUA II D controller you want to configure and hit the “Enter” key. You will then see unit configuration screen #1.

#### Configuration Screen #1

```
MUA II Cnfg IDxxxx
Proof Of Flow Switch
Installed: NO
(0=No 1=Yes)
```

If you need proof of airflow before allowing any heating or cooling stages to operate, install a differential pressure switch with a contact closure that is connected to analog input #7 and select this option. If this option is not selected, the air handler assumes there is adequate airflow anytime the fan is running and ignores this signal defaulting input #7 to space humidity.

#### Configuration Screen #2

```
MUA II Cnfg IDxxxx
OA Humidity Sensor
Installed: NO
(0=No 1=Yes)
```

This configuration screen allows the user to indicate whether an Outside Air Humidity Sensor is to be installed and used to calculate dewpoint settings. If you either don't have an Outside Air Humidity Sensor installed or have one installed but wish to use only drybulb

temperatures for control of the HVAC unit, the setting should be set to 0=No. If you have an Outside Air Humidity Sensor installed and wish to use dewpoint calculations for unit control, select 1=Yes. If you have a sensor installed and do not select 1=Yes, the sensor readings will be ignored.

#### Configuration Screen #3

```
MUA II Cnfg IDxxxx
Heat In Dehumidify
Installed : Yes
(0=No 1=Yes)
```

If you need to allow heat during dehumidification, select this option. If this option is not selected, the controller assumes that only reheat will be allowed during dehumidification mode.

#### Configuration Screen #4

```
MUA II Cnfg IDxxxx
Is External Heat
Reverse Actn: Yes
Use Left/Right Arrow
```

If you need the modulation of the external heat to be reverse acting, select this option. If this option is not selected, the controller assumes the modulation will be direct acting.

#### Configuration Screen #5

```
MUA II Cnfg IDxxxx
If External Heat
Output Range.: 0
(0=2-10V 1=0-10V)
```

If you have an external heat device to be controlled by the MUA II D controller, you can select between the voltage ranges that will be used to control the device. The available options are 2-10 VDC and 0-10 VDC.

#### Configuration Screen #6

```
MUA II Cnfg IDxxxx
Broadcast Outside
Temperature:_NO
(0=No 1=Yes)
```

If you have other unit controllers on the system, you can elect to broadcast the Outside Air Temperature to these units by selecting 1=Yes on this screen. If you don't have other controllers or they have their own Outside Air Temperature Sensors, select 0=No on this screen.

## Programming The MUA II D Controller

### Configuration Screen #7

```
MUA II Cnfg IDxxxx
Broadcast Humidity
Reading :_NO
[0=No 1=Yes]
```

If you have other unit controllers on the system, you can elect to broadcast the Outside Humidity to these units by selecting 1=Yes on this screen. If you don't have other controllers or they have their own Outside Humidity Sensors, select 0=No on this screen.

### Configuration Screen #8- #27

```
MUA II Cnfg IDxxxx
Stage Configurations
Rly #xx: Not Used
Select Using '0' Key
```

The first relay on the controller is always reserved for the Supply Fan. The remaining four relays on the main board and the additional 16 relays on the expansion relay modules can be configured by pressing the left or right arrow key to change the relay to the desired configuration.

Possible Relay Descriptions:

- Not Used
- HeatStage
- CoolStage
- Gas Reheat
- External Heat

The MUA II D controller does not require whether you start configuring your heating or cooling stages first nor does it require that you utilize consecutive relays until all heating or cooling stages have been defined. This method allows the greatest flexibility in the field, but it requires close attention to the wiring of the heating and cooling stages to prevent incorrect and possibly harmful operation. The controller assumes that there will only be one relay configured for Hot Gas Reheat and one relay for External Heat Enable, although it doesn't prevent multiple relays from being selected.

## Setpoints

### System Manager Instructions

From any menu screen press the "Setpoint" key. The unit selection screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the MUA II D controller you want to change setpoints for and hit the "Enter" key. You will see the screen shown below.

```
1)Change Setpoint
2)Configure Unit
3)Damper Force
ESC) Exit Menu
```

Press "1" on the keypad to enter the first unit setpoint screen.

### Modular Service Tool Instructions

From any menu screen press the "Setpoint" key. The unit selection screen will appear requesting that you enter the unit ID number. Enter the correct unit ID number of the MUA II D controller you want to change setpoints and press the "Enter" key. You will then see setpoint screen #1.

### Setpoint Screen #1

```
MUA II Spts IDxxxx
Supply Air Temp
Setpoint.....: xxx°F
```

The **Supply Air Setpoint** is the desired temperature to be delivered by the MUA II D at any time during the occupied mode of operation

Description	Minimum	Default	Maximum
Supply Air Temp Setpoint	50° F	70° F	90° F

### Setpoint Screen #2

```
MUA II Spts IDxxxx
Staging Deadbands
Cooling.....: xxx°F
Heating.....: xxx°F
```

The **Cooling Deadband** added to the **Supply Air Setpoint** gives the **Cooling Mode Setpoint**. When the **Outside Air** Temperature rises above this setpoint, the MUA II D will go to Cooling Mode. The **Heating Deadband** subtracted to the **Supply Air Setpoint** gives the **Heating Mode Setpoint**. When the **Outside Air** Temperature drops below this setpoint, the MUA II D will go to Heating Mode.

Description	Minimum	Default	Maximum
Cooling Deadband	2° F	5° F	20° F
Heating Deadband	2° F	5° F	20° F

### Setpoint Screen #3

```
MUA II Spts IDxxxx
Unoccupied Deadbands
Cooling.....: xxx°F
Heating.....: xxx°F
```

The **Unoccupied Cooling Deadband** added to the **Supply Air Setpoint** gives the **Unoccupied Cooling Mode Setpoint**. When the **Space Air Temperature** rises above this setpoint, the MUA II D will go to **Unoccupied Cooling Mode**. The **Unoccupied Heating Deadband** subtracted

from the **Supply Air Setpoint** gives the **Unoccupied Heating Mode Setpoint**. When the **Space Air Temperature** drops below this setpoint, the MUA II D will go to **Unoccupied Heating Mode**.

If the default setpoint of 30° F is used it will cancel the corresponding unoccupied cooling or unoccupied heating mode.

Description	Minimum	Default	Maximum
Unoccupied Cooling Deadband	Cooling Deadband Setpoint	30° F	30° F
Unoccupied Heating Deadband	Heating Deadband Setpoint	30° F	30° F

## Setpoint Screen #4

```
MUA II Spts IDxxxx
Systems With Re-heat
Dewpoint Control
Setpoint...: xxx°F
```

The systems capable of dehumidification will enter this mode of operation when the **Outside Air Dewpoint** rises above the **Dewpoint Setpoint**.

Description	Minimum	Default	Maximum
Dewpoint Setpoint	40° F	55° F	80° F

## Setpoint Screen #5

```
MUA II Spts IDxxxx
Enthalpy Staging
Deadband....: xxxBTU
Hysterisis...: x.xBTU
```

The **Enthalpy Deadband** is the amount Enthalpy in the **Outside Air** needed to activate an extra stage of cooling. The **Enthalpy Hysterisis** is used to avoid unnecessary cycling of the cooling stages when the **Outside Enthalpy** is close to the setpoint.

Description	Minimum	Default	Maximum
Enthalpy Deadband	3 BTU	5 BTU	20 BTU
Enthalpy Hysterisis	0.5 BTU	1 BTU	2.5 BTU

## Setpoint Screen #6

```
MUA II Spts IDxxxx
Heat Delay During
Dehumidification
Will Occur...: xxxMin
```

If heating during dehumidification is configured, this is the amount of time the heating call will be delayed after the dehumidification is activated.

Description	Minimum	Default	Maximum
Heat Delay	0 Min	2 Min	10 Min

## Setpoint Screen #7

```
MUA II Spts IDxxxx
Alarm Limits
Hi SAT Limit.: xxx°F
Lo SAT Limit.: xxx°F
```

If the Supply Air Temperature ever rises above the **Hi SAT Limit** or drops below the **Lo SAT Limit** for a user defined period of time, an alarm is generated.

Description	Minimum	Default	Maximum
Hi SAT Limit	50° F	150° F	150° F
Lo SAT Limit	0° F	0° F	70° F

## Setpoint Screen #8

```
MUA II Spts IDxxxx
Supply Air Alarms If
Out Of Range For
xxx Minutes
```

This is the amount of time the Supply Air Temperature must be outside either the Hi or Lo SAT Limit setpoint before it generates an alarm.

Description	Minimum	Default	Maximum
Minutes	0 Min	30 Min	300 Min

## Programming The MUA II D Controller

### Setpoint Screen #9

```
MUA II Spts IDxxxx
Set Sat Temp Reset
SPC= xxx Spt= xxx
SPC= xxx Rst= xxx
```

A Type III Thermistor Sensor connected to AIN 1 can be used to reset the Supply Air Temperature. This screen allows the user to set the temperature that the reset will begin at and the new reset Supply Air Temperature range.

Description	Minimum	Default	Maximum
Minimum Range	40° F	0° F	100° F
Maximum Range	40° F	0° F	100° F
Reset	SAT Spt	SAT Spt	Spt + 50° F

### Setpoint Screen #10

```
MUA II Spts IDxxxx
Set Dewpoint Reset
HUM= xxx Spt= xxx
HUM= xxx Rst= xxx
```

An Indoor Humidity Sensor connected to AIN7 can be used to reset the Dewpoint Setpoint. This screen allows the user to set the relative humidity percentage that the reset will begin at, and the new reset Dewpoint Setpoint percentage range.

Description	Minimum	Default	Maximum
Minimum Range	0%	0%	100%
Maximum Range	0%	0%	100%
Reset	35° F	55° F	Dewpoint Spt

### Setpoint Screen #11-14

```
MUA II Spts IDxxxx
Cooling Stage Delays
Staging Up : xx Min
Staging Down: xx Min
```

```
MUA II Spts IDxxxx
Cooling Stage Delays
Min Run Time: xx Min
Min Off Time: xx Min
```

```
MUA II Spts IDxxxx
Heating Stage Delays
Staging Up : xx Min
Staging Down: xx Min
```

```
MUA II Spts IDxxxx
Heating Stage Delays
Min Run Time: xx Min
Min Off Time: xx 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 except they reference the Heating instead of Cooling.

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

### Setpoint Screen #15

```
MUA II Spts IDxxxx
External Mod Heat
DeadBand.....: xxx°F
```

The **External Heat Proportional deadband** is the range through which the external heating device will proportionally modulate.

Description	Minimum	Default	Maximum
Proportional Band	1° F	5° F	30° F

## Setpoint Screen #16

```
MUA II Spts IDxxxx
Push-Button Override
Duration      : x.x Hr
```

If the Space Temperature sensor contains the optional push-button override then this is the amount of time the unit will revert to occupied operation whenever the button is pressed during the unoccupied mode.

Description	Minimum	Default	Maximum
Duration	0.0 Hr	2.0 Hr	8.0 Hr

## Setpoint Screen #17

```
MUA II Spts IDxxxx
Maximum Slide Offset
Effect on Spt:  x°F
```

If Space Temperature is used as the controlling sensor for the HVAC unit and it is supplied with the optional Setpoint Slide Adjust, this is the maximum amount the user can adjust the heating and cooling set-points 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 Spt	0° F	0° F	10° F

## Setpoint Screen #18

```
MUA II Spts IDxxxx
AHU Scheduled By
Schedule Number: x
0=AHU 1-7=Scheduler
```

Normally, the MUA II D controller will use its own internal time clock and week schedules to set the occupied mode of operation. If you have several air handlers you can connect an external scheduling device to the communications loop and program the air handler for the desired schedule to follow. If the MUA II D controller is using its internal schedule, enter a '0' for the Schedule Number.

Description	Minimum	Default	Maximum
Schedule Number	0	0	7

## Setpoint Screen #19

```
MUA II Spts IDxxxx
Fan Time Delay
Before Activation
Can Occur...:XXX Sec
```

This is the time delay that occurs before the fan is activated when the unit switches into the occupied mode from unoccupied mode.

Description	Minimum	Default	Maximum
Fan Time Delay Before Activation Can Occur	1 Second	60 Second	180 Second

## Setpoint Screen #20

```
MUA II Spts IDxxxx
Sensor Calibration
SAT:  xx.x°  xx.x°
OAT:  xx.x°  xx.x°
```

The Thermistor Type III temperature sensors connected to the MUA II D controller can be calibrated using this screen. Enter a Positive value to increase a reading and a Negative value to decrease a reading.

Description	Minimum	Default	Maximum
Supply Sensor - SAT	-100.0° F	0.0° F	+100.0° F
Outdoor Sensor - OAT	-100.0° F	0.0° F	+100.0° F

## Setpoint Screen #21

```
MUA II Spts IDxxxx
Sensor Calibration
Reset Sensor
SPC:  xx.x°  xx.x°
```

If you are using a temperature sensor connected to analog input #1 on the MUA II D controller for resetting the Supply Air Temperature, the Thermistor Type III temperature sensor connected to the MUA II D controller can be calibrated using this screen. Enter a Positive value to increase a reading and a Negative value to decrease a reading.

Description	Minimum	Default	Maximum
Reset Sensor - RST	-100.0° F	0.0° F	+100.0° F

## Programming The MUA II D Controller

### Status

The MUA II D controller status screens are accessed by pressing the "Status" button on either the System Manager or the Modular Service Tool. Following are the available status screens and a description of their functions.

#### Status Screen 1

```
MUA II vx.xx IDxxxx
OCCUPIED
Vent Mode
Normal Operation
```

**Line 2** Line displays one of the following:

Unoccupied Mode	Remote Occupied
Occupied Mode	Override Mode
Holiday Operations	FORCED OCCUPIED
FORCED UNOCCUPIED	FORCED OUTPUT
PUSH-BUTTON OVERRIDE	

**Line 3** Line displays one of the following:

Vent Mode	Cooling Mode
Heating Mode	Dehumidification

**Line 4** Line displays one of the following:

Normal Operation  
Fan Starting Delay

#### Status Screen 2

```
MUA II vx.xx IDxxxx
Supply Air: xxx.x°F
Supply..Spt: xxx.x°F
```

Line 2 - Current Supply Air Temperature

Line 3 - Current Supply Air Setpoint

Line 4 - Blank Line

#### Status Screen 3

```
MUA II vx.xx IDxxxx
Outdoor.Air: xxx.x°F
Cooling.Spt: xxx.x°F
Heating.Spt: xxx.x°F
```

Line 2 - Current Outdoor Air Temperature

Line 3 - Current Cooling Mode Setpoint.

Line 4 - Current Heating Mode Setpoint

#### Status Screen 4

```
MUA II vx.xx IDxxxx
Dewpoint...: xxx.x°F
Dewpnt..Spt: xxx.x°F
Outdoor.RH.: xxx.x%
```

Line 2 - Current Outside Air Dewpoint

Line 3 - Current Dewpoint Setpoint

Line 4 - Current Outside Humidity

#### Status Screen 5

```
MUA II vx.xx IDxxxx
Enthalpy...: xx.xBTU
Enthlpy Spt: xx.xBTU
Enthalpy Db: xx.xBTU
```

Line 2 - Current Air Enthalpy

Line 3 - Current Enthalpy Setpoint

Line 4 - Current Enthalpy Deadband

#### Status Screen 6

```
MUA II vx.xx IDxxxx
Space..Temp: xxx.x°F
Reset...Hum: xxx.x%
```

Line 2 - Current Reset Temperature reading

Line 3 - Current Reset Humidity reading

Line 4 - Blank Line

#### Status Screen 7

```
MUA II vx.xx IDxxxx
ModGas.Heat: xxx.x%
Mod..Reheat: xxx.x%
Extrnl Heat: xxx.x%
```

Line 2 - Current MODGAS II position

Line 3 - Current REHEAT II position

Line 4 - Current External Heat position

## Status Screen 8-27

```
MUA II vx.xx IDxxxx
Fan Relay : OFF
Cool Stage1 : OFF
Heat Stage1 : OFF
```

### Line 2 - Current Supply Fan Relay Status

The letters FRC will appear before the colon if this relay is in a force mode.

### Line 3 - Current Configurable Relay Status

Description of relay and what it is configured for and it's current status. The letters FRC will indicate the relay is forced to its current condition.

### Line 4 - Current Configurable Relay Status

Description of relay and what it is configured for and it's current status. The letters FRC will indicate the relay is forced to its current condition.

## Status Screen 28

```
MUA II vx.xx IDxxxx
NO ALARMS
```

### Line 2 - Blank Line.

Line 3 - **NO ALARMS** is displayed if none detected. If there are one or more alarms active, the possible messages are shown below:

**NO SUPPLY SENSOR**

**BAD OUTDOOR AIR TEMP**

**NO RELATIVE HUMIDITY**

**FAN PROVING ALARM!**

**LO SUPPLY AIR ALARM!**

**HI SUPPLY AIR ALARM!**

### Line 4 - Blank Line.

## Scheduling

The MUA II D controller scheduling screens are accessed by pressing the "Schedule" button on either the System Manager or the Modular Service Tool. Press the number button for the scheduling function you wish to view. All Scheduling, Holiday Functions, Schedule Overrides, Time & Date Functions and Alarm Search Functions are identical to these functions as detailed in the scheduling portion of this manual. See pages 10 through 11 of this manual for complete information in regards to programming these functions for the MUA II D controller.

```
1)Schedule Overrides
2)Week Schedules
3)Holidays
ESC) Exit Menu
```

## Programming The MUA II D Controller

### Outputs Force

Output 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 Output 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 Output Force settings simply press the "Balance-Test" key on the Modular Service Tool. You will then see the unit ID screen. Enter the unit ID of the MUA II D controller you wish to access and press "Enter". The Output Force settings are only available for the MUA II D controller.

```
Unit Does Not
Support The Function
Press Any Key To
Continue
```

If you entered the unit ID of a MUA II D controller the following screen will be displayed.

```
1)Outputs Force
2)Dampers Force
```

Press the "1" key to access the Outputs Force screen.

```
AHU Fan Override
Enter Override...: 0

[0=Auto 1=ON 2=OFF]
```

The first Outputs Force screen allows the AHU Fan Relay to be set for Auto, ON or OFF by entering a 0, 1 or 2 as desired. The default setting is 0=Auto. After completion of all troubleshooting or testing procedures all relays should be changed back to this setting. The 1=ON setting will force the relay to the ON (energized) position. The 2=OFF selection will force the relay to the OFF (de-energized) position.

The next screen displays the Relay Overrides for Relay 2. After pressing the "Enter" key the next relay will be displayed. All 20 Relay Override screens (including the AHU fan relay) are available by pressing the "Enter" key after each setting is made.

```
Relay Overrides
Relay 2 Override: 0

[0=Auto 1=ON 2=OFF]
```

After the screen for relay 20 is displayed, the first Analog Output Override screen will be displayed.

#### Analog Output 1 Screen

```
Mod External Heat
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 the Analog Output Override. Press "Enter" after making a setting change.

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**Notes:**

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**Notes:**

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WattMaster Controls Inc. • 8500 NW River Park Drive • Parkville, Mo. • 64152  
Phone (816) 505-1100    [www.orioncontrols.com](http://www.orioncontrols.com)    Fax (816) 505-1101