Honeywell

Honeywell Universal Modbus Interface Reference

Honeywell

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Notice

Honeywell Trademarks

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Contents

Getting Started

1

This reference describes how to set up, configure, and test Universal Modbus controller communications with the server. There is detailed information for defining the controller using Quick Builder.

Complete each step before commencing the next.

Steps for Connecting and Configuring an Universal Modbus Controller:

Steps:	Go to:
Connect and set up the Universal Modbus controller according to the controller's user manual's instructions	page 10
Use Quick Builder to define channels	page 18
Use Quick Builder to define controllers	page 24
Download channel and controller definitions to the server	
Enable channels and test communications	page 38
Troubleshooting communication errors	page 40
Define points with Quick Builder	page 28

The Control Products wizard makes it easier to configure a controller if you have only used its standard options. See "Control Products Wizard" on page 8.

Support and Documentation for Universal Modbus

About the Universal Modbus Interface

The Universal Modbus Interface enables the server to interface to any Control Products controller that implements the Honeywell Universal Modbus protocol. The Honeywell Universal Modbus protocol is the Honeywell implementation of the Modbus RTU Communications protocol for serial RS-485, RS-232 or Ethernet networks. Configuration information relating to specific controllers is supplied in separate user manuals (see "Other Documentation for Universal Modbus" on page 6).

This Interface is supported only by systems that are licensed for Universal Modbus.

To check your system licence:

1 In Station, select **Configure > Server Licence Details** from the Station menu.

2 Go the **Interfaces** page.

All licensed options for your system display. Ensure that "Universal Modbus" is listed.

Contact your local supplier for further licensing details.

Other Documentation for Universal Modbus

The following documents are available from Honeywell:

- *Modbus RTU Serial Communications User Manual* (Part number 51-52-25-66)
- *Overview and Planning Guide*
- *HC900 Modbus/TCP Communications User Manual* (Part number 51-52-25-111)

The controller communication and configuration user manuals are listed below.

Instrument Model	User Manual Part Number
RSX, VPR100, VRX100, UDC5300, VRX180	51-52-35-68
DR4300	51-52-25-71
DR4500	51-52-25-69
UDC 2300	51-52-25-75

Instrument Model	User Manual Part Number
UDC3300	51-52-25-70 51-52-25-38 UDC3000 A Modbus 485 RTU Communication Manual
DPR180 / DPR250	EN1I-6189 DPR180/DPR250 Communication Option Manual
UMC800	52-52-25-87 Modbus RTU Serial Communications User Manual
HC900	51-52-25-107 51-52-25-111 HC900 Hybrid Controller Ethernet Modbus/TCP Communications User Manual
TrendView - Minitrend, Multitrend, ez Trend	43-TV-25-08 Communications Manual
Ethernet Bridge Card (UMC900, VRX180 / DPR180 / DPR250	51-52-25-96 Ethernet Interface Manual

Control Products Wizard

The Control Products wizard makes it easy to configure a controller and its associated points. The wizard guides you through the standard configuration tasks, and can download the configuration details to the server. You can also use the wizard to modify the configuration details of an existing controller.

You can access the wizard either in Quick Builder, where the wizard adds the controller to the current project. To start the wizard from Quick Builder, select it from the **Tools** menu. To use the wizard in Quick Builder, select:

Tools > **Control Products Wizard**.

Note

HC900 is not supported by the Control Products Wizard.

Universal Modbus Controller Setup

2

This chapter describes how to set up an Universal Modbus controller.

The tasks for setting up a Universal Modbus controller are:

For:	Go to:
Connecting to the server	page 10
Setting Communications	page 16

Connecting your Controller

Many different types of controllers can be connected to the same Universal Modbus network. The only requirements are that every controller on the same network use the same connection type and baud rate, and that each controller use a unique device identification number.

Setting up Your Connections

Control Products controllers are designed to communicate using the Modbus TCP Ethernet, RS485 or the RS-232 specification. See the *User Manual* specific to your Control Products controller for information about cabling requirements.

Devices using RS-232 can be connected directly to a RS-232 port on the server, or to a terminal server.

Two methods are supported for connecting the server to an RS-485 network of Control Products controllers:

- Using an RS-232 to RS-485 converter (see “Using an RS-232/485 Converter” on page 11).
- Directly connecting the server to the RS-485 network via an add-in card (see “Using an RS-485 Adapter” on page 13).

You can also connect to Ethernet TCP/IP networks using Modbus/TCP protocol using two methods:

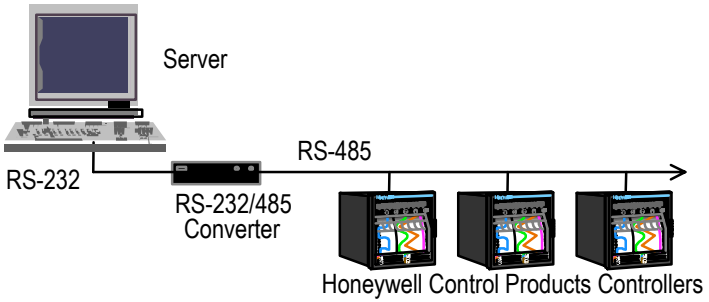
- Direct Ethernet connection (HC900, TrendView)
- Ethernet - Modbus bridge (internal option for UMC800, VRX180, DPR180 and DPR250)

Make sure that you read the *User Manual* specific to your Control Products controller before connecting your controllers to the network.

Using an RS-232/485 Converter

Honeywell recommends that you use the Black Box LD485-HS RS-232/485 Interface Converter, model number ME837A, or a Black Box IC109A-R2. These converters have been qualified by Honeywell. Use of another converter might produce unexpected results.

Figure 1 RS-232 to RS-485 Converter



Connect an RS-232 port on the server to the RS-232 port on the Black Box converter using a standard RS-232 straight through cable. Then connect the Black Box converter and the Control Products controllers to the RS-485 network as shown in “Black Box (2-wire) Connections” on page 11.

Black Box Connections

Figure 2 Black Box (2-wire) Connections

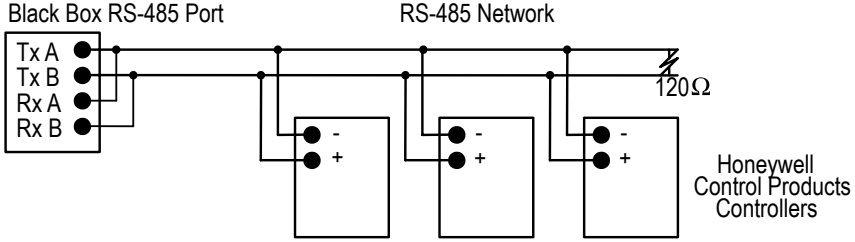
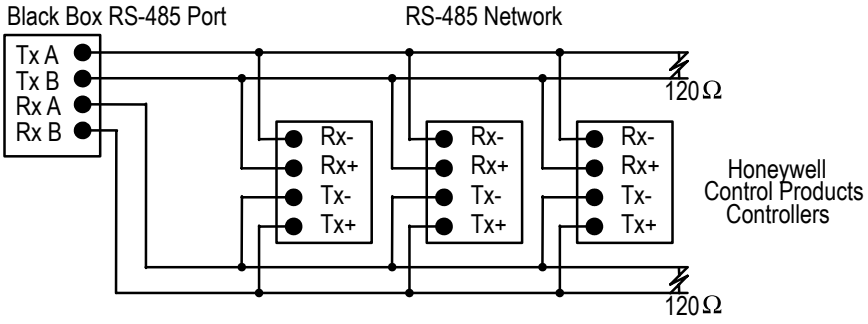


Figure 3 Black Box (4-wire) Connections



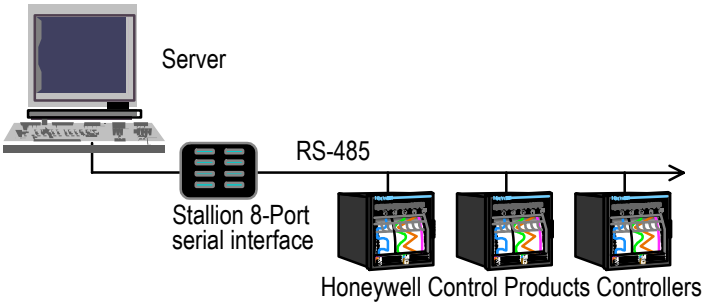
Ensure that the black box switches are configured with the following settings.

Switch	Setting	Description
XW1A	jumper in*	Configure RS-232 port as DCE.
XW1B	jumper out	Do not configure RS-232 port as DTE.
W8	B-C	2-wire (half-duplex) operation.
W9	C*	0 ms RTS/CTS delay.
W15	B-C	RS-485 transmitter enabled by data.
W5	A-B*	RTS/CTS normal.
W17	C	2 ms transmitter enabled time. This is good for 9600 Baud. Decrease for higher Baud rates. Increase for lower Baud rates. A - 30 ms B* - 7 ms C - 2 ms D - 0.7 ms E - 0.15 ms
W16	B*	0.1 ms delay before receiver enabled.
Term	ON	RS-485 receiver terminated.
Bias	OFF*	Line bias off.

Using an RS-485 Adapter

Honeywell recommends using the Stallion EasyConnection 8/32 ISA, 8/32 PCI, 8/64 ISA or 8/64 PCI adapters with the Stallion RS-232 to RS-485 8-port dual interface asynchronous module. Honeywell has qualified this adapter. Use of another adapter may produce unexpected results.

Figure 4 Stallion EasyConnection Adapter



Installing the Stallion EasyConnection Serial Adapter

Stallion EasyConnection serial adapters are suitable for connection to RS-232, RS-422 and RS-485 devices.

Install the adapter, port module, and driver in the server as described in the Stallion documentation.

Connect a port on the Stallion port module directly to the RS-485 network as shown in “Stallion RS-485 (2-wire) Connections” on page 13 and in “Stallion RS-485 (4-wire) Connections” on page 14. Next, connect your Control Products controllers to the RS-485 network.

Figure 5 Stallion RS-485 (2-wire) Connections

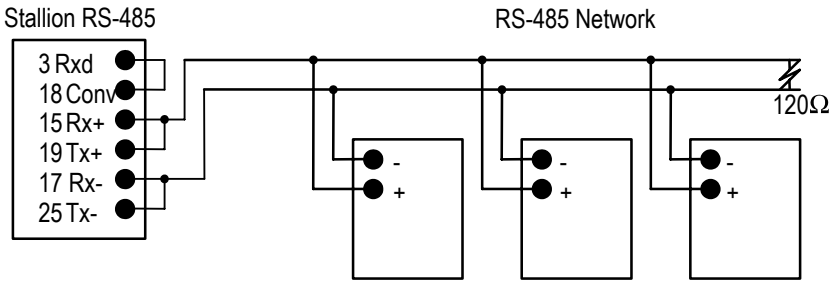
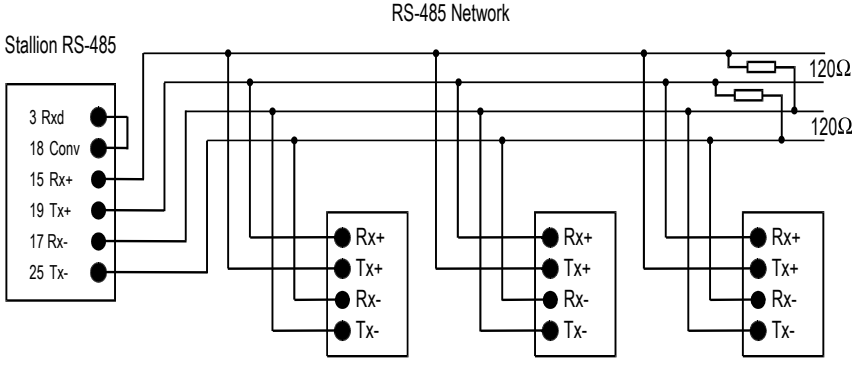


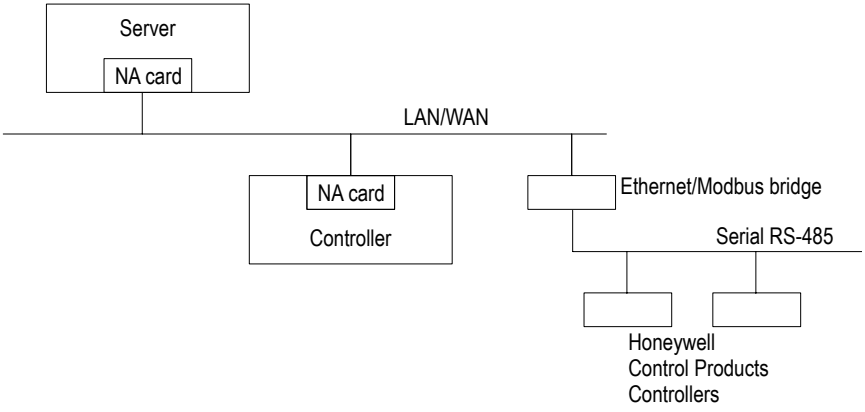
Figure 6 Stallion RS-485 (4-wire) Connections



Universal Modbus TCP Connection

To connect controllers to the server communicating using the UModbus TCP protocol, you are required to have network adapter (NA card) connected to an Ethernet network on both the server as well as the controller. An external TCP/IP bridge (Lantronix DR1-IAP) may also be used for RS-485 network connection to Ethernet.

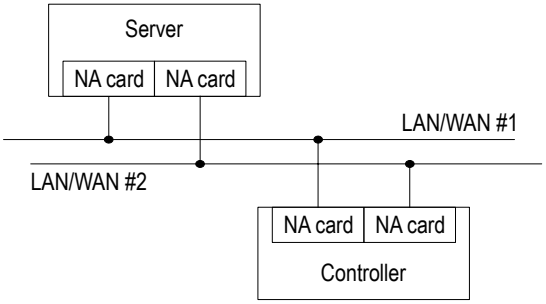
Figure 7 Non-redundant Universal Modbus TCP Network Architecture



Redundant Communication Architecture

If you require redundant communications, you must have two separate network adapters (NA card) on both the server and the controller which are connected to separate Ethernet subnets. This architecture is not presently supported in the controllers.

Figure 8 Redundant Universal Modbus TCP Network Architecture



Configuring Communication Parameters

RS485 Devices

Before using your Control Products controllers, ensure that all communication parameters are configured correctly for each controller. Configure each controller to use the following communication parameters.

Parameter	Value
Number of Start Bits	1
Number of Data Bits	8
Number of Parity Bits	0
Number of Stop Bits	1

Make sure that each controller on the RS-485 network is configured for the same Baud rate. When you are ready to configure the server, you will need to know what Baud rate each RS-485 network is using.

Every controller using the same connection to the server (RS-232 or RS-485) should have a unique Universal Modbus device identification number. Make a list showing what number has been associated with each of your controllers. You will need this information when using Quick Builder to configure the server to use your Control Products controllers.

TCP/IP Devices

Ensure every controller or TCP/IP bridge device on the Ethernet network has a unique IP address. Make a list showing what IP addresses have been associated with each controller or bridge device. You will need this information when using Quick Builder to configure the server to use your Control Products controllers.

Note that any serial Control Products controllers connected to a TCP bridge must also conform to communications parameters for RS485 devices. Each must also have a unique physical address on the RS-485 network.

Universal Modbus Controller Configuration and Addressing

3

This chapter describes how to configure a Universal Modbus controller for the system using Quick Builder. For each configuration procedure, there is detailed information covering all supported Universal Modbus devices.

The Quick Builder controller configuration tasks are described:

You can simplify configuration tasks by using the Control Products wizard. See “Control Products Wizard” on page 8.

Defining a Universal Modbus Channel

Build a channel for each RS-485, RS-232 or Ethernet TCP/IP physical connection from your server. Note that you can multi-drop several controllers on the one serial RS-485 channel, provided they all use the same Baud settings.

To define a channel using Quick Builder:

1 Click  to add a channel.

2 In the Add Items dialog box, select `Channel` as the item and `Universal Modbus` as the channel type.

3 Enter the channel details on the Main property page for the channel. For help with the channel definitions, see Universal Modbus Channel Main Properties.

4 To complete the channel definition, click the Port tab and define either a serial, terminal server or a LANVendor port (for Ethernet Modbus/TCP). See “Universal Modbus Port Properties” on page 20.

Universal Modbus Channel Main Properties

Use the Main tab to enter the basic channel properties for a Universal Modbus channel.

Property	Description
Name	Type a unique name for the channel. A maximum of 10 alphanumeric characters can be used. (Double quotation marks and spaces are not allowed.)
Description	(Optional) Type a description of the channel. A maximum of 30 characters can be used, including spaces.

Property	Description
Marginal Alarm Limit	The communications alarm marginal limit at which the channel is declared to be marginal. When this limit is reached, a high priority alarm is generated. A channel barometer monitors the total number of requests and the number of times the controller did not respond or response was incorrect. The barometer increments by 2 or more, depending on the error and decrements for each good call. To calculate an acceptable limit, multiply the square root of the number of controllers on the channel by the average **Marginal Alarm Limit** defined for those controllers. (Normally, you specify the same value for all controllers on a channel). For example, if there are 9 controllers on the channel and their **Marginal Alarm Limit** is set to 25, the value would be [3 is square root] x 25 = 75.
Fail Alarm Limit	The communications alarm fail limit at which the channel is declared to have failed. When this barometer limit is reached, an urgent alarm is generated. Set this to double the value specified for the channel **Marginal Alarm Limit**.
Write Delay	If the channel is on a serial port, specify the minimum number of milliseconds that the server must wait before writing to any controller on the channel. See “Channel Write Delay Settings” on page 20.
Connect Timeout	Amount of time (in seconds) the server waits to connect to the controller before abandoning the connection. Type a new value in this field if you do not want the default, `10` seconds. Use the default value unless the communications line has a high error rate or unless you are using modems.
Read Timeout	Amount of time (in seconds) that the server waits for a reply from the controller. Type a new value in this field if you do not want the default, `2` seconds. Use the default value unless the communications line has a high error rate or unless you are using modems.
Item Type	Shows the type of item specified when this item was created.
Last Modified	Shows the date of the most recent modification to this channel’s property details.

Property	Description
Item Number	This field displays the unique item number currently assigned to this item by Quick Builder. You can change the item number displayed in this field if you need to match your current server database configuration. The item number must be between 1 and the maximum number of channels allowed for your system.

Channel Write Delay Settings

Serial devices using the RS-485 protocol require a minimum period during which no communications occur. Different devices have different requirements. You should configure the write delay to be the largest value required by any device on your RS-485 network. See the following table for requirements of individual devices.

Where a delay is specified in number of characters, convert the value to milliseconds using this formula:

```
Time(ms) = (1000 x Characters)/Baud Rate
```

Write delay should be rounded up to the nearest whole number.

For example, 3.5 Chars at 9600 Baud = (1000 x 3.5)/9600 = 3.6ms (round to 4ms)

RSX, VPR, UDC5300, UMC800	DPR100, DPR180, DPR250	DR4300	DR4500	UDC3300, UDC2300
3.5 Chars	3.5 Chars	V 4: 20 ms V 5 or greater: 3.5 Chars + 2ms	V 57 and 58: 20ms V 59 or greater: 3.5 Chars + 2 ms	20 ms

Universal Modbus Port Properties

The Port tab defines the communication-related properties for a channel. The **Port Type** for Universal Modbus can be:

- `Serial`. A serial communications interface, such as RS-485. See “Serial Port Properties” on page 21.
- `TerminalServer`. A communications link that enables controllers with a serial interface to be connected to a LAN. See “TerminalServer Port Properties” on page 22.
- `LANVendor`. A communications interface using TCP/IP to controllers connected to a LAN.

Serial Port Properties

Note

The Serial Port settings must match the settings on your communication devices.

Property	Description
Serial Port Name	The device name of the serial port.
Baud Rate	The number of data bits per second. The default is `9600`.
Number of Data Bits	The number of data bits used for transmission. The default is `8`.
Stop Bits	The number of stop bits used for transmission. The default is `1`.
Parity	The parity verification used on the port. The default is `NONE`.
Checksum	Select `None`.
XON/XOFF	The type of XON/XOFF software flow control used to stop a receiver from being overrun with messages from a sender. The types are: • `None` (default) • `Input` (use XON/XOFF to control the flow of data on the receive line) • `Output` (use XON/XOFF to control the flow of data on the transmit line)

Property	Description
Handshaking Options	**RS-232** • **Enable RTS/CTS flow control**. Select to stop a receiver from being overrun with messages from a sender by using RTS/CTS for flow control. • **Detect DCD**. Select if the Data Carrier Detect communication status line of the COM port requires monitoring (usually when using modem or microwave linking). When selected, the communications fails if the desired COM status line is not high—for example, on a dial-up link connection for a modem. • **Detect DSR**. Select if the Data Set Ready communication status line of the COM port requires monitoring (usually when using modem or microwave linking). When selected, the communications fails if the desired COM status is not achieved. **Note:** No options available for RS-422. **RS-485** • **Enable Stallion RS-485 Half Duplex**. Select for a Stallion EasyConnection. • **Echo (Required for RS-485 2-wire ports)**. Select so that the server expects the messages it sends to the port on the transmit line to be echoed back on the receive line. Select for a Stallion EasyConnection adapter. Do not select for a Black Box Converter.

TerminalServer Port Properties

Property	Description
Terminal Server TCP Host Name Terminal Server TCP Port No	The name and port number of terminal server to which the channel is connected. You can specify either a TCP host name or an IP address, but it must match the TCP host name used when you installed and internally configured the terminal server.
Idle Timeout	The time, in seconds, the channel waits for a successful connection to the server before closing the connection. A value of `0` indicates that the connection is never closed.
Checksum	Select `None`.

Redundant Port Properties

A communication port used as a redundant link has the same channel name but a requires a different port name to its twin. All other entries are identical to those of the primary port.

Defining a Universal Modbus Controller

You need to define a controller to describe each product on a channel.

To define a controller using Quick Builder:

1 Click  to add a controller.

2 In the Add Items dialog box, select `Controller` as the item and `Universal Modbus` as the controller type.

3 Enter the property definitions for the controller on the controller Main property page.

Universal Modbus Controller Main Properties

Use the Main tab to define the basic properties for a Universal Modbus controller.

Property	Description
Name	Type a unique name for the controller. A maximum of 10 alphanumeric characters can be used. (Double quotation marks and spaces are not allowed.) For LAN connected controllers, the name must not contain Underscore (_) characters. This name is used to look up the IP address in the Hosts file or DNS if you do not specify an **IP Address** property. In the case of communications redundancy when the IP Addresses are not defined in Quick Builder, the IP Address 1 and 2 must be specified in the server hosts file. The host name for IP Address 1 is then the Name property with an “A” appended to it and the host name for IP Address 2 is the Name property with a “B” appended to it.
Description	(Optional) Type a meaningful description for this controller. A maximum of 30 characters, including spaces, can be entered.
Channel Name	The name of the channel on which the controller communicates. In the list of channel names, click the name. You need to have defined the channel in order for it’s name to appear in the list.

Property	Description
Marginal Alarm Limit	The communications alarm marginal limit at which the controller is declared to be marginal. When this value is reached, a high priority alarm is generated. This limit applies to the controller barometer which monitors the total number of requests to the controller and the number of times the controller did not respond or response was incorrect. The barometer increments by 2 or more, depending on the error and decrements for each good call. Type a new value in this field if you do not want the default, `25`.
Fail Alarm Limit	The communications alarm fail limit at which the controller is declared to have failed. When this value is reached, an urgent alarm is generated. Set this to double the value specified for the controller **Marginal Alarm Limit**.
Device Type	Enter the acronym for the type of controller you are using. See “Available Device Types” on page 26.
Device Identifier	The Universal Modbus identification number assigned to your device.
Offset	Enter the lowest address within the range you intend to use. See “Using Offsets” on page 26. By default use `0`.
Item Type	Shows the type of item specified when this item was created.
Last Modified	Shows the date of the most recent modification to this channel’s property details.
Item Number	This field displays the unique item number currently assigned to this item by Quick Builder. You can change the item number displayed in this field if you need to match your current server database configuration. The number must be between 1 and the maximum number of controllers allowed for your system.
IP	If the channel **Port Type** is `LANVendor`, enter the controller’s IP address here. If the IP address is not specified, the controller name is used as the TCP host name. For more information see the Name property.

Available Device Types

Type Acronym	Controller Device
RSX	RSX Controller
VPR100	VPR100 Controller
VRX100	VRX100 Controller
VRX180	VRX180 Controller
UDC5300	Universal Digital Controller 5300
UDC2300	Universal Digital Controller 2300
UDC3300	Universal Digital Controller 3300
DR4300	DR4300 Circular Chart Recorder
DR4500	DR4500 Circular Chart Recorder
DPR180	Digital Process Recorder 180
DPR250	Digital Process Recorder 250
UMC800	UMC800 Controller
HC900	HC900 Controller
TV	TrendView Recorder

Using Offsets

The server can only access a maximum of 4096 records in a particular file. Therefore if the server needs to access records beyond that limit, you may need to define several “logical” controllers in Quick Builder for a device, each with an appropriate offset.

For Universal Modbus, use an offset to reference addresses outside the range 0x0000 and 0x1FFF. For example, if you have to refer to addresses between 0x0000 and 0x4000 within a device, you will need to create two controllers, one with an OFFSET=0 (the default) for all addresses up to 0x1FFF, and one with OFFSET=2000 for all addresses between 0x2000 and 0x3FFF.

HC900 and UMC800 Controller OFFSET Addresses

The Controller OFFSET address entry for the UMC800 and HC900 relative to parameter category is provided in the following table. For example, for an HC900, to access up to 24 control loops, all Variables, and up to 1000 Signal Tags would require setup of two virtual controllers with offset entries of 0 and 2000 respectively.

Parameter Category	OFFSET Address for Controller		
	UMC800	HC900	Point Addressing
Control Loops	0 (loops 1 to 16)	0 (loops 1 to 24)	Named (acronyms)
Control Loops (25 – 32)	Not applicable	6000	Modbus Hex codes
Variables (MATH_VAR)	0 (all Variables, 1-150)	0 (all Variables, 1-600)	Named (acronyms)
SP Programmers 1 to 4	0	0	Named (acronyms)
SP Programmers 5 to 8	Not applicable	Not supported	
Signal Tags (TAG)	2000 (Signal Tags 1–500)	2000 (Signal Tags 1–1000)	Named (acronyms)
Signal Tags 1001-2000	Not applicable	4000	Modbus Hex codes
SP Scheduler 1	2000	2000	Named (acronyms)
SP Scheduler 2	Not applicable	2000	Named (acronyms)
Sequencers 1 - 4	Not applicable	4000	Modbus Hex codes
Alternator, Stage, Ramp, HOA, Device Control	Not applicable	6000	Modbus Hex codes

Defining a Universal Modbus Address for a Point Parameter Value

Different addresses are available depending on the type of device to which you are connected. Addresses that are *read-only* can only be used as source addresses. Addresses that are *write-only* can only be used as destination addresses. Addresses that are available for both read and write operations can be used as both source and destination addresses.

Entering an Address

For source, and destination addresses the format for a Universal Modbus controller address is:

```
ControllerName Location
```

Part	Description
`ControllerName`	The name of the Universal Modbus controller.
`Location`	The location in the controller where the value is recorded. The syntax depends on the address type: • "Location Syntax for Named Addresses" on page 28 • "Location Syntax for Non-named Addresses" on page 32

If you would like help when defining an address, click ... next to **Address** to display Address Builder. For details, see the help.

Location Syntax for Named Addresses

Named addresses can be either:

- Non-numbered Address
- Numbered Address

Non-numbered Address

For addresses that occur in only one location, specify the name of a register within your controller simply using the syntax:

```
AddressName [Format]
```

Part	Description
AddressName	Matches an address from "Non-numbered Addresses" on page 99.
Format	(Optional) Specify only if the device does not use the default format for that address. Different addresses will have different default formats.

Numbered Address

For address types that occur multiple times within the device (for example, more than one analog input), use the syntax:

```
AddressName Number [SubAddressName][Format]
```

Part	Description
AddressName	Name of the address, for example, loop. See "Numbered Addresses" on page 51 for address names.
Number	The number of the address. See "Numbered Addresses" on page 51 for address numbers.
SubAddress Name	(Optional) Some types of numbered addresses can have sub-addresses. For example, every loop has a Process Variable (PV) and a Set Point (WSP). See "Device Information" on page 49.
Format	(Optional) Specify only if the device does not use the default format. See "Data Formats" on page 33.

Example

The following example addresses the Process Variable (PV) of the second loop:

```
LOOP 2 PV
```

Process variable for loop 1:

```
LOOP 1 PV
```

Typical Control loop parameter addressing (where *n* is the loop number):

Parameter	Source Address	Destination Address
Process Variable (PV)	LOOP *n* PV	Not configurable
Set Point (SP)	LOOP *n* WSP[1]	LOOP *n* WSP
Output (OP)	LOOP *n* OPWORK[2]	LOOP *n* OPWORK

Parameter	Source Address	Destination Address
MODE (MD)	LOOP *n* LOOPSTAT	LOOP *n* MODEIN
1. LSP1 or SP1 can be used if the parameter WSP is unavailable.		
2. OP can be used if the parameter OPWORK is unavailable.		

Loop Tuning constants (possible AUX parameters for a loop point):

Parameter	Source Address	Destination Address
Gain	LOOP *n* GAIN1	LOOP *n* GAIN1
Reset	LOOP *n* RESET1	LOOP *n* RESET1
Rate	LOOP *n* RATE1	LOOP *n* RATE1

Digital Output values (used on a status point):

Parameter	Source Address	Destination Address
PV	DO *n*	Not configurable
OP	DO *n*	DO *n* [1]
1. Note that not all devices support writing to digital output addresses. See “Digital Output Control Strategies” on page 31.		

Digit Input values (used on a status point):

Parameter	Source Address	Destination Address
PV	DI *n*	Not configurable

Signal Tag and Variable Named Address Support for the HC900 and UMC800

Signal Tags (read only) with TAG as the named parameter and Variables (read/write) with MATH_VAR as the named parameter may be assigned to analog (floating point) or digital status points. The Variable and Signal Tag list (Tag Information) should be printed out from the controller configuration to obtain the sequential number listing and the data type (Analog or Digital) so that the proper point assignment may be made.

“Analog” Signal Tag Example:

Parameter	Source Address	Destination Address
PV	TAG n	Not Configurable

"Digital" Signal Tag Example:

Parameter	Source Address	Destination Address
PV	TAG n	Not Configurable

"Digital" Variable Example:

Parameter	Source Address	Destination Address
PV	MATH_VAR n	Not Configurable
OP	MATH_VAR n	MATH_VAR n

"Analog" Variable Example:

Parameter	Source Address	Destination Address
PV	MATH_VAR n	Not Configurable
SP	MATH_VAR n	MATH_VAR n

Digital Output Control Strategies

Some controllers support the use of digital outputs as destination addresses; however, this functionality may have unintended consequences.

Digital outputs are typically controlled by the controller itself. If you use a digital output in a destination address, the server value will always override the value the controller expects to use. Once the output has been "forced" by the server, control cannot be returned to the controller. (that is, the server value will always have precedence).

Because of this potential problem, the use of the digital output as a destination address has been disabled for the UMC800. Instead if you have a control strategy as shown in "Digital Output Control Strategy - Example 1" on page 31, rather than use "Digital Output" as the destination of a server point parameter, use the strategy shown in the "Digital Output Control Strategy - Example 2" on page 32. This strategy uses two server destination addresses, "Force Value" and "Force Enabled". "Force Enabled" enables you to switch between the local value, "Calculated Value", and the server value, "Force Value".

Figure 9 Digital Output Control Strategy - Example 1

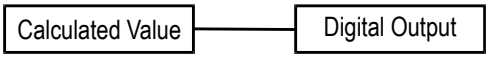
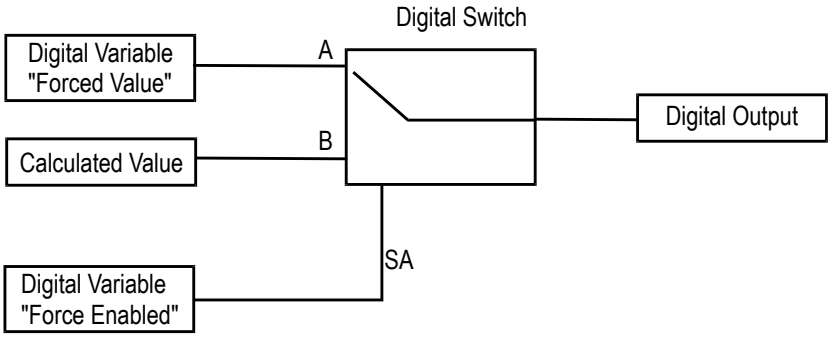


Figure 10 Digital Output Control Strategy - Example 2



Location Syntax for Non-named Addresses

Addresses without names can be addressed directly using the format:

`n:0xA [Format]`

Part	Description
n	Table number. See “Table Types” on page 32 for table descriptions and their number.
A	Address within the table.
Format	(Optional) Only used for Input and Holding register tables (3 and 4). If a format is not specified, the format defaults to IEEEFP. See “Data Formats” on page 33 for more information.

Table Types

Table Description	Table Number	Point Type	Address Type
Digital Output (also known as Coil)[1]	0	Status	Source/Destination[2]
Digital Input	1	Status	Source
Input Registers	3	Status/Analog/Accumulator	Source
Holding Registers	4	Status/Analog/Accumulator	Source/Destination
1. See “UMC800 Problems” on page 41 and “HC900 Problems” on page 43.			
2. See “Digital Output Control Strategies” on page 31.			

Data Formats

The data format tells the server how to interpret the register value. The possible formats are:

Data Format	Description	Point Type
`IEEEFP`	32-bit IEEE floating point value. (Big Endian)	Status/Analog/Accumulator
n	Bit field. *n* represents the starting bit (0 to 15). This cannot be used with a named address.	Status
`MODE`	Informs the server that the address is a mode parameter.	Status/Analog/Accumulator
`UINT2`	Unscaled 16-bit integer.	Status/Analog/Accumulator

Non-named Address Examples (for HC900):

Parameter	Point Type	Address Type	Point Table/Address/ Format	Controller OFFSET Address
Signal Tag 1001	Analog	Source	4:0x42CD IEEEFP	4000
Loop 25 PV	Analog	Source	4:0x7840 IEEEFP	6000
Loop 25 A/M Stat	Status	Source/ Destination	4:0x78FA 0 (Bit 0 of 16-bit register)	6000
*Analog In, Slot 2, Channel 2, of Rack 2	Analog	Source	3:0x112 IEEEFP	0
*Digital In, Slot 8, Channel 3, of Rack 1	Status	Source	1:0x72	0
Step Number of Sequencer 1	Analog	Source	4:0x5AA9 UINT2 (16-bit Integer)	4000
* All I/O beyond Rack 1 in an HC900 must be addressed using hex addressing while all I/O in Rack 1 can be accessed using DI, DO, and AI named addresses, for example, D1 9, AI 18.				

Named Register Addresses

See “Device Information” on page 49 for addresses relevant to your device.

Troubleshooting Point Configuration

Errors when point building

84E0h

Invalid address for this type of controller specified.

8426h

Invalid data format for this type of controller specified.

Error when scanning

(Errors appear in log)

0106h

A request to the controller timed out. This could be caused by a communication setup problems (for example, wrong address or Baud rate).

A channel write delay value being too low could also cause this problem. See “Channel Write Delay Settings” on page 20. Try increasing the value to solve the problem.

8102h

An invalid address has been reported by the controller. This could be caused by the wrong address, the wrong data type, or the wrong controller type.

Optimizing Scanning Performance

The maximum amount of data that can be acquired from an controller is influenced by the rate of sending scan packets to the controller. An understanding of the Universal Modbus scan packets will help you configure points so that optimal data acquisition performance can be achieved by maximizing the amount of data acquired with each scan packet.

The scan packets that have been built can be listed by using the list scan utility, **lisscn**. Listing scan packets helps verify the scanning strategy. See the *Configuration Guide* for usage of **lisscn**.

Server and Station Tasks for Universal Modbus

4

This chapter describes tasks for the Universal Modbus controller that you perform either on the server or from any Station.

For:	Go to:
Testing communications with the server	page 38
Troubleshooting	page 40

Testing Communications with the Server

Use the test utility **umbtst** to test the communications.

Before using the utility, make sure that:

- You have set up your Control Products controllers according to their user manuals.
- All cables are connected.
- You have configured your channels in Quick Builder without error and downloaded all configuration information to the server without error.
- The server need not be running while using the utility as long as the database service is running. If making a connection through a terminal server, the server daemon service should also be running.
- The server is not communicating with your devices. The **umbtst** utility might interfere with communications.

  To stop the server, type the command at the command prompt:

  hscserver /load

  Answer **y** to every prompt. This unloads the server, but leaves the database in memory.

To use the test utility, start a command prompt window and type: **umbtst**.

When prompted for the channel number, type **chn01** for channel 1 and so on.

For help using this utility, type **?**.

To check if your devices are present, use the **find a,b** command. This command locates all Universal Modbus devices on the channel with IDs between a and b. For example:

```
C:\>umbtst
Enter LRN or device name of channel
chn01
Enter command:
find 1,4
FIND device with id   1 to   4, at 28-May-98  14:06:52

Device   1 ?
Device   2 ?
Device   3 ? ...responding
Device   4 ?
Enter command:
```

```
q
```

If you do not know the device name of your channel, select **View > System Status > Channels** from the **Station** menu. To the left of the channel name is the channel number. The device name of the channel will be the letters “chn” followed by the two-digit channel number. For example, your Universal Modbus channel “COM3” might be channel number 1. Its device name will be “chn01”.

Troubleshooting Universal Modbus Configuration Errors

Common Problems

Error message/problem	Explanation/solution
You see the error in the server log file: `Error code 0106 (Device Timeout)`	The server has not received a response from the controller.
You see the error in the server log file: `Error code 8102 (MODBUS error 2 - illegal data address)`	You either specified an illegal address, or an illegal number of addresses.
You see the error in the Station Message Zone when you try to change the OP parameter: `CONTROL - Illegal mode for control of parameter`	The point is in AUTO mode, or its equivalents (AUTO-LSP, CASC, AUTO-RSP). You must change the mode of the point to MAN or its equivalents (MAN-LSP, MAN-RSP).
You see the error in the Quick Builder output file: `Address is outside hardware cross reference table`	You have upgraded your database from a previous server version and the there is not enough room to store the controller addresses. To rectify the problem, follow these steps: 1. Make a backup of `\server\data`. 2. At the command prompt, type: **`sysbld -preserve -full`**. 3. Answer **`Y`** to the first two queries. 4. When presented with the ability to change all sorts of database values, press <Enter> until you see the following message: `There are 8192 addresses per rtu. Enter required number of addresses` 5. Change the number of addresses per rtu (controller) to `32766`. 6. Keep pressing <Enter> until the **sysbld** command terminates.

Error message/problem	Explanation/solution
The address LOOP *n* SP doesn't download.	The SP parameter is not a valid named address because there are a number of set point types available, and a simple SP is ambiguous. WSP stands for working set point and SP1 stands for set point 1. In most cases, WSP works best.

Problems with Specific Controller Models

UDC3300 Problems

Error message/problem	Explanation/solution
• You attempt to change a Setpoint in Station and the value changes on the Station display but not on the controller faceplate. • You attempt to change a Setpoint in Station and the value on the Station display changes to a different value and the controller's faceplate doesn't change.	The communications link between the controller and server can become overwhelmed. The solution is to increase the **COM** > **Tx Delay** on the controller faceplate.

UMC800 Problems

Error message/problem	Explanation/solution
• You know that you should use the address `LOOP n parametername` but you don't know what value to use for *n*. • You want to access the process variable of the only PID loop you have configured. You used the number *n* which appears on the top right-hand corner of the PID block (`LOOP n PV`), but the values shown by the server don't seem to match those values in your controller.	The number shown on the top right-hand side of the PID block does NOT correspond with the loop number. You can find out the appropriate number by selecting **File** > **Print** > **Block Parameters** in the Honeywell Control Builder configuration utility. One of the properties printed out is **Modbus ® loop number**. Use this number for your loops.

Error message/problem	Explanation/solution
The address `PID n PV` doesn't download.	The PID part of the address is not valid and doesn't appear in the Universal Modbus driver documentation. You cannot use the names of control blocks within Control Builder as Universal Modbus addresses. You can only use the addresses listed in the Universal Modbus documentation.
You know that you should use the address `AI n` but you don't know what value to use for *n*.	The analog input number is calculated using the formula: `n = (m-1) * 4 + c`. *n* = the analog input number. *m* = the module/slot number. The UMC800 has 16 slots, numbered 1 to 16. *c* = the channel number (of the analog input). The analog input devices have up to four channels, numbered 1 to 4.
You know that you should use the address `DI n` or `DO n` but you don't know what value to use for *n*.	The digital input number is calculated using the formula: `n = (m-1) * 16 + c`. *n* = the digital input or output number. *m* = the module/slot number. The UMC800 has 16 slots, numbered 1 to 16. *c* = the channel number (of the digital input or output). The digital I/O devices have up to 16 channels, numbered 1 to 16.
You want to write to a digital output.	Honeywell recommends against writing to a digital output because this forces the output to a particular state, which cannot be overridden using the UMC800 internal logic. (Since this practice is inherently dangerous, it is not supported.) You can create a safer implementation using digital variables and some UMC800 logic blocks.
You see the error: `***** PNTBLD ERROR ***** illegal MODICON plc address` in the Quick Builder output when trying to download a signal tag as a source address (such as `TAG 2`) to the server.	You might be trying to download to a controller whose OFFSET address is not 0x2000. Please read the Universal Modbus documentation about address ranges and OFFSET.

Error message/problem	Explanation/solution

You see the error:
`***** PNTBLD ERROR *****`
`illegal MODICON plc address`
in the Quick Builder output when trying to download a signal tag, such as `TAG 2,` as a destination address to the server.
	Signal tags are read-only parameters, so cannot be used as destination addresses. Please read the Universal Modbus documentation about read-only and write-only addresses.

You don't know what number to use for the signal tag using named address TAG or variable using named address MATH_VAR.	1. Start the configuration utility Honeywell Control Builder configuration utility. 2. Select **File** > **Print**. 3. Select **Tag Properties** then click **OK**. 4. Your printout should show, amongst other items, your signal tags. To the right of the words "Signal Tag" or "Variable" you should see a number. This is the tag number you should use in the address `TAG` *`n`* or MATH_VAR *`n`*.

HC900 Problems

Error message/problem	Explanation/solution
You know you should use the address LOOP *n parametername* but you don't know what value to use for *n*. You want to access the process variable of the only control loop that you have configured. You used the number *n* which appears on the upper-right hand corner of the PID block (LOOP n PV), but the values shown by the server don't seem to match those values in your controller.	The block execution order number shown on the upper right-hand side of the block does NOT correspond with the loop number. The loop number corresponds with order of entry of the PID loop blocks only. You can find the appropriate number by selecting **File** > **Print Report Preview**, then select **FBD's** icon and **Block Modbus Parameters** in the Hybrid Control (HC) Designer configuration. The Loop Blocks are listed by number. Use this number for your loops. **Loop numbers 1 – 24 are supported using Named addressing**. Loops 25-32 require Non-named addressing using hex addresses for the parameters.
For loops 25 – 32, you know that this requires Non-named addressing using hex parameter addresses but there is no mode support for Auto-Manual and Remote-Local SP in combination from the standard station point displays.	This is true. For loops 1- 24, using named addresses, the mode is handled as 2 bits and Station selections are available for AUTO-LOC, AUTO-REM, MAN-LOC, and MAN-REM. However, for loops 25 – 32 with hex addressing only one bit may be addressed for Mode – Auto/Manual or Remote/Local. See Non-named Address examples for HC900.

Error message/problem	Explanation/solution
For analog inputs in the first rack, you know that you should use the address AI *n* but you don't know what value to use for *n*.	For the first rack only, the analog input number is calculated using the formula: *n* = (*m*-1) * 8 + *c*. *n* = the analog input number *m* = the module/slot number. The HC900 has up to 12 slots depending on rack size, numbered 1 to 12. *c* = the channel number (of the analog input). The analog input cards have 8 channels, numbered 1 to 8. The 2nd AI channel for slot/module 2 in Rack 1 is AI 10.
I don't know to access analog inputs beyond the first rack.	If you have provided a Signal Tag for the Analog Input block output, use this tag number and TAG as the address name, for example, TAG 45 for a controller with an OFFSET address of 2000. Otherwise, you must use Non-Named hexadecimal addressing for a controller with an offset of 0. The address ranges for the racks are as follows: Rack 1: 0 - FF Rack 2: 100-1FF Rack 3: 200 – 2FF Rack 4: 300 – 3FF Rack 5: 400 – 4FF Zero-based addressing is used and two contiguous registers comprise the floating point data. Table 3 (Modbus Function Code 4) is used for access. The first analog channel for slot/module 1 in Rack 2 is: 3:x100 IEEEFP, channel 2 is 3:x102 IEEEFP, channel 8 is 3:x10E IEEEFP. There are 8 inputs per slot/module.

Error message/problem	Explanation/solution
For analog inputs in the first rack, you know that you should use the address DI *n* or DO *n* but you don't know what value to use for *n*.	For the first rack only, the digital or output number is calculated using the formula: *n* = (*m*-1) * 16 + *c*. *n* = the analog input number *m* = the module/slot number. The HC900 has up to 12 slots depending on rack size, numbered 1 to 12. *c* = the channel number (of the digital input or output). The digital I/O cards have 8 or 16 channels, numbered 1 to 8 or 1 to 16. An allocation of 16 I/O is made for each slot/module regardless of type. The 2nd DI channel for slot/module 3 in Rack 1 is DI 34.
I don't know to access digital I/O beyond the first rack.	If you have provided a Signal Tag for the Digital Input or Output block output, use this tag number and TAG as the address name, for example, TAG 56 for a controller with an OFFSET address of 2000. Otherwise, you must use Non-Named hexadecimal addressing for a controller with an offset of 0. The address ranges for the racks are as follows: Rack 1: 0 - FF Rack 2: 100-1FF Rack 3: 200 – 2FF Rack 4: 300 – 3FF Rack 5: 400 – 4FF Zero-based addressing is used and two contiguous registers comprise the floating point data. Table 1 is used for access to digital inputs and Table 0 is used for digital outputs. The 3rd digital input channel for slot/module 6 in Rack 2 is 1:x152, the 4th digital input on the same module is 1:x153. The 5th digital output for slot/module 8 in Rack 3 is 0:x274. There are 8 inputs per slot/module. An allocation of 16 I/O is made for each slot/module regardless of type.

Error message/problem	Explanation/solution
You want to write to a digital output.	Honeywell recommends against writing to a digital output since this forces cannot be returned to normal via Modbus communications. Use the HC Designer tool concurrently for force actions where force removal is supported. You may also use digital Variables and logic blocks in the controller configuration to implement the force more safely via Station.
You see the error: `****** PNTBLD ERROR*******` illegal MODICON plc address in the Quick Builder output when trying to download a signal tag as a source address (such as TAG 2) to the server.	You might be trying to download to a controller whose OFFSET address is not 2000. Please read the Universal Modbus documentation about offset ranges and OFFSET.
You see the error: `****** PNTBLD ERROR*******` illegal MODICON plc address in the Quick Builder output when trying to download a signal tag such as TAG 2 as a destination address to the server.	Signal tags are read-only parameters, so cannot be used as destination addresses. You will need to use Variables in your HC900 configuration instead for writes. Please read the Universal Modbus documentation about read-only and write-only addresses.
You don't know what number to use for accessing an HC900 Signal Tag or a Variable.	Start the Hybrid Control (HC) Designer configuration tool. Select **File** > **Print Report Preview** Select **FBD's** icon in the dialog box. Select **Tag Information** from the pull-down menu This listing shows the Variables and Signal Tags used in the configuration listed by tag name and in number sequence. Use the number in the # column as your reference for use in the address TAG *n* (for Signal Tags) or MATH_VAR *n* for Variables. You may print out this list for reference by selecting the Print button from Print Preview.

Error message/problem	Explanation/solution
You want to know which HC900 Signal Tags or Variables are digital in nature so that they can be applied to Status points.	You can apply Signal Tags (read only) and Variables (read/write) to digital Status points if they are digital data types. See above for information related to viewing/printing the Tag Information Report. The Data Type column lists whether the parameter is Digital or Analog. If digital, you may apply to Status points. The UMB driver does the floating point conversion to integer translation to read or write an ON (1) or OFF (0) condition.
You want to know how to input a set point programmer point to use the standard screens in Station for viewing an HC900 set point programmer table and the profile pre-plot.	Consult the HC900 SPP & Recipe Support Users Guide. Support is for programmers 1-4 only. There is no UMB driver support for programmers 5-8.

Device Information

5

This chapter lists numbered and non-numbered addresses, their parameter details and the devices which are supported.

This following devices are supported by the Universal Modbus controller:

- RSX
- VPR100
- VRX100
- VRX180
- UDC5300
- DR4300
- DR4500
- DPR180
- DPR250
- UDC2300
- UDC3300
- UMC800
- HC900
- TrendView

For numbered address details about:

For details about:	Go to:
Alarm Set Point Value Group	page 64
Alarm Set Point Value Group	page 65
Alarm Status	page 67
Alarm Status Analog	page 68
Alarm Status Channel	page 69

For details about:	Go to:
Alarm Status Com	page 70
Alarm Status Digital	page 68
Alarm Status Event	page 69
Alarm Status Math	page 70
Analog Input	page 60
Communication or Constant Value Group	page 62
Digital Input Table	page 71
Digital Input Table	page 71
Digital Output Table	page 72
Digital Output Table	page 73
Math, Variable or Calculated Value Group	page 63
Math or Calculated Value Status	page 65
PID Loop	page 51
Set Point Scheduler #1 Segment	page 92
Set Point Scheduler #2 Segment	page 95
Set Point Scheduler Values	page 88
Set Point Programmer	page 73
Set Point Programmer #1 Profile Segment	page 79
Set Point Programmer #2 Profile Segment	page 81
Set Point Programmer #3 Profile Segment	page 84
Set Point Programmer #4 Profile Segment	page 86
Set Point Program Additional Values	page 78
Tagged Signal	page 61
Totalizer Value Group	page 64
Totalizer Value Status	page 66

For information about non-numbered addresses, see “Non-numbered Addresses” on page 99.

Devices

Baud Rates Supported

The following table lists the devices and their supported baud rates.

Note

Baud rates are not applicable to HC900 or TrendView devices. These devices use Ethernet connections.

	Baud Rate Supported							
Device	**300**	**600**	**1200**	**2400**	**4800**	**9600**	**19200**	**38400**
RSX	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VPR100	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VRX100	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
VRX180	Yes	Yes	Yes	Yes	Yes	Yes	Yes	v
UDC5300	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DR4300	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DR4500			Yes	Yes	Yes	Yes	Yes	
DPR180	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
DPR250	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
UDC2300	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
UDC3300	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
UMC800	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Numbered Addresses

PID Loop

The following table lists the devices which support PID Loops and their formats.

Device	Supported Address Format	Range
RSX	LOOP [n] [param]	[n] = 1 to 2
VPR100	LOOP [n] [param]	[n] = 1 to 4

Device	Supported Address Format	Range
VRX100	LOOP [n] [param]	[n] = 1 to 2
VRX180	LOOP [n] [param]	[n] = 1 to 8
UDC5300	LOOP [n] [param]	[n] = 1 to 2
DR4300	LOOP [n] [param]	[n] = 1 to 1
DR4500	LOOP [n] [param]	[n] = 1 to 2
UDC2300	LOOP [n] [param]	[n] = 1 to 1
UDC3300	LOOP [n] [param]	[n] = 1 to 2
UMC800	LOOP [n] [param]	[n] = 1 to 16
HC900	LOOP [n] [param]	[n] = 1 to 24

The following table lists the details of the PID Loop parameters.

Param	Address Line	Param Format	Access	Devices
Process Variable	LOOP [n] PV[1]	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Output	LOOP [n] OP	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Input #1	LOOP [n] INP1	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Gain #1 (Prop Band #1 if active)	LOOP [n] GAIN1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Prop Band #1	LOOP [n] PROP1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
DIR	LOOP [n] DIR	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Reset #1	LOOP [n] RESET1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate #1	LOOP [n] RATE1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
PV Low Range	LOOP [n] PVLOW	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
PV High Range	LOOP [n] PVHIGH	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Alarm #1 SP #1	LOOP [n] AL1SP1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Alarm #1 SP #2	LOOP [n] AL1SP2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Gain #2 (Prop Band #2 if active)	LOOP [n] GAIN2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Prop Band #2	LOOP [n] PROP2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
DB	LOOP [n] DB	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Reset #2	LOOP [n] RESET2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate #2	LOOP [n] RATE2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point #1	LOOP [n] SP1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Local Set Point #1	LOOP [n] LSP1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Local Set Point #2	LOOP [n] LSP2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Alarm #2 SP #1	LOOP [n] AL2SP1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Alarm #2 SP #2	LOOP [n] AL2SP2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
SP Low Limit	LOOP [n] SPLOW	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
SP High Limit	LOOP [n] SPHIGH	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Output Low Limit	LOOP [n] OPLOW	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
OP High Limit	LOOP [n] OPHIGH	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Output Working Value	LOOP [n] OPWORK	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
RATIO	LOOP [n] RATIO	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
BIAS	LOOP [n] BIAS	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Deviation	LOOP [n] DEV	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Auto / Manual	LOOP [n] AMSTAT	Discrete (bits). [Status Point Only]	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Writable Controller Mode	LOOP [n] MODEIN	Control Mode - Auto / Man State (bit 0) and LSP / RSP State (bit 2).	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Remote / Local Set Point State	LOOP [n] RSP_STATE	Discrete (bits). [Status Point Only] Bit 0, 0 = LSP, 1 = RSP	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Tune Set State	LOOP [n] TUNE_SET_STATE	Discrete (bits). [Status Point Only]	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Read-only mode for the PID Loop	LOOP [n] LOOPSTAT	Mode Status - Bit 0 = Auto / Man State. Bit 2 = LSP / RSP State.	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Read-only AUTO / MAN Mode	LOOP [n] STATUS_MODE	Discrete (bits). [Status Point Only] Bit 0, 0 = Man, 1 = Auto	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Currently Selected Set Point	LOOP [n] STATUS_SP	Discrete (bits). [Status Point Only]	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Currently Selected Local or Remote Set Point	LOOP [n] STATUS_RSP	Discrete (bits). [Status Point Only]	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Currently Selected Tune Set	LOOP [n] STATUS_TUNE	Discrete (bits). [Status Point Only] Bit 0, 0 = Tune Set 1, 1 = Tune Set 2	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Remote Set Point (RSP)	LOOP [n] RSP	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point #2	LOOP [n] SP2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Working Set Point (WSP)	LOOP [n] SPWORK	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Remote Set Point (RSP)	LOOP [n] RSP	Floating Point	RO	DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point #2	LOOP [n] SP2	Floating Point	RO	DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Working Set Point (WSP)	LOOP [n] SPWORK	Floating Point	RO	DR4300, DR4500, UDC2300, UDC3300
Working Set Point (SPWORK)	LOOP [n] WSP	Floating Point	RO	DR4300, DR4500
Working Set Point (SPWORK)	LOOP [n] WSP	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, UDC2300, UDC3300, UMC800, HC900
Process Variable Override Value	LOOP [n] PVOVR	Floating Point	RW	UDC2300, UDC3300
Set Point Override Value	LOOP [n] SPOVR	Floating Point	RW	UDC2300, UDC3300
Output Override Value	LOOP [n] OPOVR	Floating Point	RW	UDC2300, UDC3300
Set Point State	LOOP [n] SP_STATE	Discrete (bits). [Status Point Only]	RW	UDC2300, UDC3300

Param	Address Line	Param Format	Access	Devices
Set Point State	LOOP [n] SP_STATE	Discrete (bits). [Status Point Only] Bit 0, 0 = SP1, 1 = SP2	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UMC800, HC900
Input #2	LOOP [n] INP2	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300
Cycle Time #1	LOOP [n] CYCLE1	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300
Cycle Time #2	LOOP [n] CYCLE2	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300
Local Set Point #3	LOOP [n] LSP3	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300
Temperature in carbon potential loop	LOOP [n] TEMP	Floating Point	RO	UMC800, HC900
Cycle Time #1	LOOP [n] CYCLE1	Floating Point	RO	UMC800, HC900
Cycle Time #2	LOOP [n] CYCLE2	Floating Point	RO	UMC800, HC900
Manual Reset	LOOP [n] MAN_RESET	Floating Point	RW	UMC800, HC900
Feed Forward Gain	LOOP [n] FF_GAIN	Floating Point	RW	UMC800, HC900
Local Percent Carbon Monoxide	LOOP [n] PCTCO	Floating Point	RW	UMC800, HC900
Furnace Factor	LOOP [n] FFCTR	Floating Point	RW	UMC800, HC900
Percent Hydrogen	LOOP [n] H2	Floating Point	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
On/Off Output Hysteresis	LOOP [n] OUT_HYST	Floating Point	RW	UMC800, HC900
Carbon Potential Dewpoint	LOOP [n] CPD	Floating Point	RW	UMC800, HC900
Three Position Step Motor Time	LOOP [n] MOTOR	Floating Point	RW	UMC800, HC900
Fuzzy State	LOOP [n] FUZZY_STATE	Discrete (bits). [Status Point Only] Bit 0, 0 = Disable, 1 = Enable	RW	UMC800, HC900
Demand Tune Request	LOOP [n] TUNE_REQ	Discrete (bits). [Status Point Only] Bit 0, 0 = Off, 1 = On	RW	UMC800, HC900
Anti-soot set point limit enable	LOOP [n] ANTI_SOOT	Discrete (bits). [Status Point Only] Bit 0, 0 = Off, 1 = On	RW	UMC800, HC900
IMAN Active / Inactive	LOOP [n] STATUS_IMAN	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Active / Inactive LO	LOOP [n] STATUS_LO	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
1. The default Parameter if only “LOOP [n]” is entered.				

Analog Input

The following table lists the devices which support Analog Inputs and their formats.

Device	Supported Address Format	Range
RSX	AI [n] [param]	[n] = 1 to 6
VPR100	AI [n] [param]	[n] = 1 to 12

Device	Supported Address Format	Range
VRX100	AI [n] [param]	[n] = 1 to 12
VRX180	AI [n] [param]	[n] = 1 to 48
UDC5300	AI [n] [param]	[n] = 1 to 3
DR4300	AI [n] [param]	[n] = 1 to 1
DR4500	AI [n] [param]	[n] = 1 to 4
DPR180	AI [n] [param]	[n] = 1 to 24
DPR250	AI [n] [param]	[n] = 1 to 64
UDC2300	AI [n] [param]	[n] = 1 to 2
UDC3300	AI [n] [param]	[n] = 1 to 3
UMC800	AI [n] [param]	[n] = 1 to 64
HC900	AI [n] [param]	[n] = 1 to 64*
TrendView	AI [n] [param]	[n] = 1 to 32
* In 1st rack, first 8 slots.		

The following table lists the details of the Analog Input parameters.

Param	Address Line	Param Format	Access	Devices
Analog Input Value	AI [n] VALUE[1]	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, DPR180, DPR250, UDC2300, UDC3300, UMC800, HC900, TV
1. The default Parameter if only “AI [n]” is entered.				

Tagged Signal

The following table lists the devices which support Tagged Signal and their formats.

Device	Supported Address Format	Range
UMC800	TAG [n] [param]	[n] = 1 to 500
HC900	TAG [n] [param]	[n] = 1 to 1000

The following table lists the details of the Tagged Signal parameters.

Param	Address Line	Param Format	Access	Devices
Tagged Signal Value	TAG [n] VALUE[1]	Floating Point	RO	UMC800, HC900
1. The default Parameter if only "TAG [n]" is entered.				

Communication or Constant Value Group

The following table lists the devices which support the Communication or Constant Value group and their formats.

Device	Supported Address Format	Range
RSX	CN [n] [param]	[n] = 1 to 10
VPR100	CN [n] [param]	[n] = 1 to 16
VRX100	CN [n] [param]	[n] = 1 to 16
VRX180	CN [n] [param]	[n] = 1 to 32
UDC5300	CN [n] [param]	[n] = 1 to 9
DPR180	CN [n] [param]	[n] = 1 to 24
DPR250	CN [n] [param]	[n] = 1 to 32
TrendView	CN [n] [param]	[n] = 1 to 32

The following table lists the details of the Communication or Constant Value Group parameters.

Param	Address Line	Param Format	Access	Devices
Communication Value	CN [n] VALUE[1]	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DPR180, DPR250, TV[2]
1. The default Parameter if only "CN [n]" is entered. 2. TrendView communication values are written via this parameter, read via Math/Calculated values parameter (the "pen" value).				

Math, Variable or Calculated Value Group

The following table lists the devices which support the Math or Calculated Value group and their formats.

Device	Supported Address Format	Range
RSX	MATH_VAR [n] [param]	[n] = 1 to 24
VPR100	MATH_VAR [n] [param]	[n] = 1 to 32
VRX100	MATH_VAR [n] [param]	[n] = 1 to 32
VRX180	MATH_VAR [n] [param]	[n] = 1 to 64
UDC5300	MATH_VAR [n] [param]	[n] = 1 to 16
DR4500	MATH_VAR [n] [param]	[n] = 1 to 1
DPR180	MATH_VAR [n] [param]	[n] = 1 to 24
DPR250	MATH_VAR [n] [param]	[n] = 1 to 32
UDC3300	MATH_VAR [n] [param]	[n] = 1 to 2
UMC800	MATH_VAR [n] [param]	[n] = 1 to 150
HC900	MATH_VAR [n] [param]	[n] = 1 to 600
TrendView	MATH_VAR [n] [param]	[n] = 1 to 64

The following table lists the details of the Math or Calculated Value Group parameters.

Param	Address Line	Param Format	Access	Devices
Math or Calculated Value	MATH_VAR [n] VALUE[1]	Floating Point	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4500, DPR180, DPR250, UDC3300, TV[2]
Math or Calculated Value	MATH_VAR [n] VALUE[1]	Floating Point	RW	UMC800[3], HC900[3]

1. The default Parameter if only “MATH_VAR [n]” is entered.
2. Applies to TrendView “pen” values.
3. Applies to UMC800, HC900 “variable” values.

Totalizer Value Group

The following table lists the devices which support the Totalizer Value group and their formats.

Device	Supported Address Format	Range
RSX	TOTALIZER [n] [param]	[n] = 1 to 6
VPR100	TOTALIZER [n] [param]	[n] = 1 to 3
VRX100	TOTALIZER [n] [param]	[n] = 1 to 12
VRX180	TOTALIZER [n] [param]	[n] = 1 to 48
DR4300	TOTALIZER [n] [param]	[n] = 1 to 1
DR4500	TOTALIZER [n] [param]	[n] = 1 to 4
UDC3300	TOTALIZER [n] [param]	[n] = 1 to 1
TrendView	TOTALIZER [n] [param]	[n] = 1 to 64

The following table lists the details of the Totalizer Value Group parameters.

Param	Address Line	Param Format	Access	Devices
Totalizer Value	TOTALIZER [n] VALUE[1]	Floating Point	RO	RSX, VPR100, VRX100, VRX180
Totalizer Value	TOTALIZER [n] VALUE[1]	Floating Point	RW	DR4300, DR4500, UDC3300
1. The default Parameter if only “TOTALIZER [n]” is entered.				

Alarm Set Point Value Group

The following table lists the devices which support the Alarm Set Point Value group and their formats.

Device	Supported Address Format	Range
RSX	ALMSP [n] [param]	[n] = 1 to 12
VPR100	ALMSP [n] [param]	[n] = 1 to 16
VRX100	ALMSP [n] [param]	[n] = 1 to 16
VRX180	ALMSP [n] [param]	[n] = 1 to 96
UDC5300	ALMSP [n] [param]	[n] = 1 to 4
DPR180	ALMSP [n] [param]	[n] = 1 to 48
DPR250	ALMSP [n] [param]	[n] = 1 to 64

The following table lists the details of the Alarm Set Point Value Group parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Set Point Value	ALMSP [n] VALUE[1]	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DPR180, DPR250
1. The default Parameter if only "ALMSP [n]" is entered.				

Alarm Set Point Value Group

The following table lists the devices which support the Alarm Set Point Value group and their formats.

Device	Supported Address Format	Range
DR4300	ALMSP [n] [param]	[n] = 1 to 2
DR4500	ALMSP [n] [param]	[n] = 1 to 6
UDC2300	ALMSP [n] [param]	[n] = 1 to 2
UDC3300	ALMSP [n] [param]	[n] = 1 to 2

The following table lists the details of the Alarm Set Point Value Group parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Set Point #1	ALMSP [n] SP1[1]	Floating Point	RW	DR4300, DR4500, UDC2300, UDC3300
Alarm Set Point #2	ALMSP [n] SP2[1]	Floating Point	RW	DR4300, DR4500, UDC2300, UDC3300
1. The default Parameter if only "ALMSP [n]" is entered.				

Math or Calculated Value Status

The following table lists the devices which support the Math or Calculated Value Status and their formats.

Device	Supported Address Format	Range
RSX	MATH_STATUS [n] [param]	[n] = 1 to 24
VPR100	MATH_STATUS [n] [param]	[n] = 1 to 32

Device	Supported Address Format	Range
VRX100	MATH_STATUS [n] [param]	[n] = 1 to 32
VRX180	MATH_STATUS [n] [param]	[n] = 1 to 64
UDC5300	MATH_STATUS [n] [param]	[n] = 1 to 16
DR4500	MATH_STATUS [n] [param]	[n] = 1 to 1
DPR180	MATH_STATUS [n] [param]	[n] = 1 to 24
DPR250	MATH_STATUS [n] [param]	[n] = 1 to 32
UDC3300	MATH_STATUS [n] [param]	[n] = 1 to 2

The following table lists the details of the Math or Calculated Value Status parameters.

Param	Address Line	Param Format	Access	Devices
Math or Calculated Value Status	MATH_STATUS [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4500, DPR180, DPR250, UDC3300
1. The default Parameter if only “MATH_STATUS [n]” is entered.				

Totalizer Value Status

The following table lists the devices which support the Totalizer Value Status and their formats.

Device	Supported Address Format	Range
RSX	TOTALIZER_STATUS [n] [param]	[n] = 1 to 6
VPR100	TOTALIZER_STATUS [n] [param]	[n] = 1 to 3
VRX100	TOTALIZER_STATUS [n] [param]	[n] = 1 to 12
VRX180	TOTALIZER_STATUS [n] [param]	[n] = 1 to 48
DR4300	TOTALIZER_STATUS [n] [param]	[n] = 1 to 1
DR4500	TOTALIZER_STATUS [n] [param]	[n] = 1 to 4
UDC3300	TOTALIZER_STATUS [n] [param]	[n] = 1 to 1

The following table lists the details of the Totalizer Value Status parameters.

Param	Address Line	Param Format	Access	Devices
Totalizer Status	TOTALIZER_STATUS [n] STATUS[1]	Discrete (bits). [Status Point Only] 0 = Totalizer Off 1 = Totalizer On	RO	RSX, VPR100, VRX100, VRX180, DR4300, DR4500, UDC3300
1. The default Parameter if only "TOTALIZER_STATUS [n]" is entered.				

Alarm Status

The following table lists the devices which support the Alarm Status and their formats.

Device	Supported Address Format	Range
RSX	ALMSTAT [n] [param]	[n] = 1 to 12
VPR100	ALMSTAT [n] [param]	[n] = 1 to 16
VRX100	ALMSTAT [n] [param]	[n] = 1 to 16
VRX180	ALMSTAT [n] [param]	[n] = 1 to 96
UDC5300	ALMSTAT [n] [param]	[n] = 1 to 4
DR4300	ALMSTAT [n] [param]	[n] = 1 to 2
DR4500	ALMSTAT [n] [param]	[n] = 1 to 6
UDC2300	ALMSTAT [n] [param]	[n] = 1 to 2
UDC3300	ALMSTAT [n] [param]	[n] = 1 to 2
UMC800	ALMSTAT [n] [param]	[n] = 1 to 120
HC900	ALMSTAT [n] [param]	[n] = 1 to 120

The following table lists the details of the Alarm Status parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
1. The default Parameter if only “ALMSTAT [n]” is entered.				

Alarm Status Analog

The following table lists the devices which support the Alarm Status Analog and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_ANALOG [n] [param]	[n] = 1 to 24
DPR250	ALMSTAT_ANALOG [n] [param]	[n] = 1 to 64

The following table lists the details of the Alarm Status Analog parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_ANALOG [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only “ALMSTAT_ANALOG [n]” is entered.				

Alarm Status Digital

The following table lists the devices which support the Alarm Status Digital and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_DIGITAL [n] [param]	[n] = 1 to 36
DPR250	ALMSTAT_DIGITAL [n] [param]	[n] = 1 to 48

The following table lists the details of the Alarm Status Digital parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_DIGITAL [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only “ALMSTAT_DIGITAL [n]” is entered.				

Alarm Status Event

The following table lists the devices which support the Math or Calculated Value Status and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_EVENT [n] [param]	[n] = 1 to 6
DPR250	ALMSTAT_EVENT [n] [param]	[n] = 1 to 6

The following table lists the details of the Alarm Status Event parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_EVENT [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only "ALMSTAT_EVENT [n]" is entered.				

Alarm Status Channel

The following table lists the devices which support the Alarm Status Channel and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_CHANNEL [n] [param]	[n] = 1 to 24
DPR250	ALMSTAT_CHANNEL [n] [param]	[n] = 1 to 64

The following table lists the details of the Alarm Status Channel parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_CHANNEL [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only "ALMSTAT_CHANNEL [n]" is entered.				

Alarm Status Com

The following table lists the devices which support the Alarm Status Com and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_COM [n] [param]	[n] = 1 to 24
DPR250	ALMSTAT_COM [n] [param]	[n] = 1 to 32

The following table lists the details of the Alarm Status Com parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_COM [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only “ALMSTAT_COM [n]” is entered.				

Alarm Status Math

The following table lists the devices which support the Alarm Status Math and their formats.

Device	Supported Address Format	Range
DPR180	ALMSTAT_MATH [n] [param]	[n] = 1 to 24
DPR250	ALMSTAT_MATH [n] [param]	[n] = 1 to 32

The following table lists the details of the Alarm Status Math parameters.

Param	Address Line	Param Format	Access	Devices
Alarm Status	ALMSTAT_MATH [n] STATUS[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only “ALMSTAT_MATH [n]” is entered.				

Digital Input Table

The following table lists the devices which support the Digital Input Table and their formats.

Device	Supported Address Format	Range
RSX	DI [n] [param]	[n] = 1 to 6
VPR100	DI [n] [param]	[n] = 1 to 24
VRX100	DI [n] [param]	[n] = 1 to 24
VRX180	DI [n] [param]	[n] = 1 to 36
UDC5300	DI [n] [param]	[n] = 1 to 3
DR4300	DI [n] [param]	[n] = 1 to 2
DR4500	DI [n] [param]	[n] = 1 to 2
UDC3300	DI [n] [param]	[n] = 1 to 2
UMC800	DI [n] [param]	[n] = 1 to 256
HC900	DI [n] [param]	[n] = 1 to 256
TrendView	DI [n] [param]	[n] = 1 to 32

The following table lists the details of the Digital Input Table parameters.

Param	Address Line	Param Format	Access	Devices
Digital Input Value	DI [n] VALUE[1]	Discrete (bits). [Status Point Only]	RO	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC3300, UMC800, HC900[2], TV

1. The default Parameter if only "DI [n]" is entered.
2. Applies to Rack 1 only, allocation is 16 inputs (bits) per slot, 12 slots maximum.

Digital Input Table

The following table lists the devices which support the Digital Input Table and their formats.

Device	Supported Address Format	Range
DPR180	DI [n] [param]	[n] = 1 to 36
DPR250	DI [n] [param]	[n] = 1 to 48

The following table lists the details of the Digital Input Table parameters.

Param	Address Line	Param Format	Access	Devices
Digital Input Value	DI [n] VALUE[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only "DI [n]" is entered.				

Digital Output Table

The following table lists the devices which support the Digital Output Table and their formats.

Device	Supported Address Format	Range
RSX	DO [n] [param]	[n] = 1 to 6
VPR100	DO [n] [param]	[n] = 1 to 24
VRX100	DO [n] [param]	[n] = 1 to 24
VRX180	DO [n] [param]	[n] = 1 to 36
UDC5300	DO [n] [param]	[n] = 1 to 4
DR4300	DO [n] [param]	[n] = 1 to 2
DR4500	DO [n] [param]	[n] = 1 to 6
UDC2300	DO [n] [param]	[n] = 1 to 3
UDC3300	DO [n] [param]	[n] = 1 to 3
UMC800	DO [n] [param]	[n] = 1 to 256
HC900	DO [n] [param]	[n] = 1 to 256
TrendView	DO [n] [param]	[n] = 1 to 32

The following table lists the details of the Digital Output Table parameters.

Param	Address Line	Param Format	Access	Devices
Digital Output Value	DO [n] VALUE[1]	Discrete (bits). [Status Point Only]	RW	RSX, VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500
Digital Output Value	DO [n] VALUE[1]	Discrete (bits). [Status Point Only]	RO	UDC2300, UDC3300, UMC800, HC900[2], TV

Param	Address Line	Param Format	Access	Devices
1. The default Parameter if only “DO [n]” is entered. 2. Applies to Rack 1 only, allocation is 16 outputs (bits), 12 slots maximum.				

Digital Output Table

The following table lists the devices which support the Digital Output Table and their formats.

Device	Supported Address Format	Range
DPR180	DO [n] [param]	[n] = 1 to 36
DPR250	DO [n] [param]	[n] = 1 to 48

The following table lists the details of the Digital Output Table parameters.

Param	Address Line	Param Format	Access	Devices
Digital Output Value	DO [n] VALUE[1]	Discrete (bits). [Status Point Only]	RO	DPR180, DPR250
1. The default Parameter if only “DO [n]” is entered.				

Set Point Programmer

The following table lists the devices which support the set point programmer and their formats.

Device	Supported Address Format	Range
VPR100	SPP [n] [param]	[n] = 1 to 4
VRX100	SPP [n] [param]	[n] = 1 to 1
VRX180	SPP [n] [param]	[n] = 1 to 4
UDC5300	SPP [n] [param]	[n] = 1 to 1
DR4300	SPP [n] [param]	[n] = 1 to 1
DR4500	SPP [n] [param]	[n] = 1 to 2
UDC2300	SPP [n] [param]	[n] = 1 to 1
UDC3300	SPP [n] [param]	[n] = 1 to 1
UMC800	SPP [n] [param]	[n] = 1 to 4

Device	Supported Address Format	Range
HC900	SPP [n] [param]	[n] = 1 to 4

The following table lists the details of the set point program parameters.

Param	Address Line	Param Format	Access	Devices
Set Point Programmer Output	SPP [n] OUT[1]	Floating Point	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Segment Time Remaining	SPP [n] SEG_TIME_REM	Floating Point	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Start	SPP [n] START	UINT2	WO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Hold	SPP [n] HOLD	UINT2	WO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Advance	SPP [n] ADV	UINT2	WO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Reset	SPP [n] RESET	UINT2	WO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Status - Ready	SPP [n] STATUS_READY	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - Run	SPP [n] STATUS_RUN	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Set Point Programmer Status - Hold	SPP [n] STATUS_HOLD	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - End	SPP [n] STATUS_END	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - Time Units in Seconds	SPP [n] STATUS_TIME_UNIT_S	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - Time Units in Minutes	SPP [n] STATUS_TIME_UNIT_M	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - Time Units in Hours	SPP [n] STATUS_TIME_UNIT_H	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Elapsed Time	SPP [n] EL_TIME	Floating Point	RO	VPR100, VRX100, VRX180, UDC5300, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Status - Ramp Rate	SPP [n] STATUS_RAMP_RATE	Discrete (bits). [Status Point Only]	RO	DR4300, DR4500, UDC2300, UDC3300
Set Point Programmer Status - Ramp Units	SPP [n] STATUS_RAMP_UNITS	Discrete (bits). [Status Point Only]	RO	DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Set Point Programmer Current Segment Number	SPP [n] SEG_NO	Floating Point	RO	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300

Param	Address Line	Param Format	Access	Devices
Set Point Programmer Current Segment Number	SPP [n] SEG_NO	Floating Point	RW	UMC800, HC900
Set Point Programmer Status - Type of Hold	SPP [n] STATUS_HOLD_TYPE	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Set Point Programmer Status - Current Segment is a ramp	SPP [n] STATUS_RAMP	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Set Point Programmer Active Time	SPP [n] ACT_TIME	Floating Point	RO	VPR100, VRX100, VRX180, UDC5300
Set Point Programmer Segment Event #1	SPP [n] EV01	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #2	SPP [n] EV02	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #3	SPP [n] EV03	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #4	SPP [n] EV04	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #5	SPP [n] EV05	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #6	SPP [n] EV06	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Set Point Programmer Segment Event #7	SPP [n] EV07	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #8	SPP [n] EV08	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #9	SPP [n] EV09	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #10	SPP [n] EV10	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #11	SPP [n] EV11	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #12	SPP [n] EV12	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #13	SPP [n] EV13	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #14	SPP [n] EV14	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #15	SPP [n] EV15	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
Set Point Programmer Segment Event #16	SPP [n] EV16	Discrete (bits). [Status Point Only]	RO	VPR100, VRX100, VRX180, UDC5300, UMC800, HC900
1. The default Parameter if only “SPP [n]” is entered.				

Set Point Program Additional Values

The following table lists the devices which support the Set Point Program Additional Values and their formats.

Device	Supported Address Format	Range
UMC800, HC900	SPP_ADD [n] [param]	[n] = 1 to 4

The following table lists the details of the Set Point Program Additional Values parameters.

Param	Address Line	Param Format	Access	Devices
Current Program Number	SPP_ADD [n] PROG_NO[1]	Floating Point	RW	UMC800, HC900
Program Save Request	SPP_ADD [n] PROG_SAVE	Floating Point	RW	UMC800, HC900
Auxiliary Output	SPP_ADD [n] AUX_OUT	Floating Point	RO	UMC800, HC900
Guaranteed Soak Low	SPP_ADD [n] SOAK_LOW	Floating Point	RW	UMC800, HC900
Guaranteed Soak High	SPP_ADD [n] SOAK_HIGH	Floating Point	RW	UMC800, HC900
Restart Ramp Rate	SPP_ADD [n] RESTART_RAMP	Floating Point	RW	UMC800, HC900
Display High Range Limit	SPP_ADD [n] DISPLAY_HIGH	Floating Point	RW	UMC800, HC900
Display Low Range Limit	SPP_ADD [n] DISPLAY_LOW	Floating Point	RW	UMC800, HC900
Jog Segment	SPP_ADD [n] JOG_SEG	Floating Point	RW	UMC800, HC900
Loop Start	SPP_ADD [n] LOOP_START	Floating Point	RW	UMC800, HC900
Loop End	SPP_ADD [n] LOOP_END	Floating Point	RW	UMC800, HC900
Repeats	SPP_ADD [n] REPEATS	Floating Point	RW	UMC800, HC900
Time Units	SPP_ADD [n] UNITS_TIME	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Ramp Units	SPP_ADD [n] UNITS_RAMP	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Guaranteed Soak Type	SPP_ADD [n] SOAK_TYPE	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
1. The default Parameter if only "SPP_ADD [n]" is entered.				

Set Point Programmer #1 Profile Segment

The following table lists the devices which support the Set Point Program #1 Profile Segment and their formats.

Device	Supported Address Format	Range
VPR100	SPP1_SEG [n] [param]	[n] = 1 to 63
VRX100	SPP1_SEG [n] [param]	[n] = 1 to 63
VRX180	SPP1_SEG [n] [param]	[n] = 1 to 63
UDC5300	SPP1_SEG [n] [param]	[n] = 1 to 63
DR4300	SPP1_SEG [n] [param]	[n] = 1 to 24
DR4500	SPP1_SEG [n] [param]	[n] = 1 to 12
UDC2300	SPP1_SEG [n] [param]	[n] = 1 to 12
UDC3300	SPP1_SEG [n] [param]	[n] = 1 to 12
UMC800	SPP1_SEG [n] [param]	[n] = 1 to 50
HC900	SPP1_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Set Point Program #1 Profile Segment parameters.

Param	Address Line	Param Format	Access	Devices
Ramp/Soak Segment	SPP1_SEG [n] SEG_TYPE 0 = Soak segment 1 = Ramp segment	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #1	SPP1_SEG [n] EV01	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #2	SPP1_SEG [n] EV02	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #3	SPP1_SEG [n] EV03	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #4	SPP1_SEG [n] EV04	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #5	SPP1_SEG [n] EV05	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #6	SPP1_SEG [n] EV06	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #7	SPP1_SEG [n] EV07	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #8	SPP1_SEG [n] EV08	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #9	SPP1_SEG [n] EV09	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #10	SPP1_SEG [n] EV10	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #11	SPP1_SEG [n] EV11	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #12	SPP1_SEG [n] EV12	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #13	SPP1_SEG [n] EV13	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #14	SPP1_SEG [n] EV14	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #15	SPP1_SEG [n] EV15	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #16	SPP1_SEG [n] EV16	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Value for Auxiliary Output	SPP1_SEG [n] AUX_OUT	Floating Point	RW	UMC800, HC900
Time	SPP1_SEG [n] TIME[1]	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate	SPP1_SEG [n] RATE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Ramp or Soak Value	SPP1_SEG [n] SEG_VALUE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

1. The default Parameter if only “SPP1_SEG [n]” is entered.

Set Point Programmer #2 Profile Segment

The following table lists the devices which support the Set Point Program #2 Profile Segment and their formats.

Device	Supported Address Format	Range
VPR100	SPP2_SEG [n] [param]	[n] = 1 to 63
VRX100	SPP2_SEG [n] [param]	[n] = 1 to 63
VRX180	SPP2_SEG [n] [param]	[n] = 1 to 63

Device	Supported Address Format	Range
UDC5300	SPP2_SEG [n] [param]	[n] = 1 to 63
DR4300	SPP2_SEG [n] [param]	[n] = 1 to 24
DR4500	SPP2_SEG [n] [param]	[n] = 1 to 12
UDC2300	SPP2_SEG [n] [param]	[n] = 1 to 12
UDC3300	SPP2_SEG [n] [param]	[n] = 1 to 12
UMC800, HC900	SPP2_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Set Point Program #2 Profile Segment parameters.

Param	Address Line	Param Format	Access	Devices
Ramp/Soak Segment	SPP2_SEG [n] SEG_TYPE 0 = Soak segment 1 = Ramp segment	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #1	SPP2_SEG [n] EV01	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #2	SPP2_SEG [n] EV02	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #3	SPP2_SEG [n] EV03	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #4	SPP2_SEG [n] EV04	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #5	SPP2_SEG [n] EV05	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #6	SPP2_SEG [n] EV06	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #7	SPP2_SEG [n] EV07	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #8	SPP2_SEG [n] EV08	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #9	SPP2_SEG [n] EV09	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #10	SPP2_SEG [n] EV10	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #11	SPP2_SEG [n] EV11	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #12	SPP2_SEG [n] EV12	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #13	SPP2_SEG [n] EV13	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #14	SPP2_SEG [n] EV14	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #15	SPP2_SEG [n] EV15	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #16	SPP2_SEG [n] EV16	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Value for Auxiliary Output	SPP2_SEG [n] AUX_OUT	Floating Point	RW	UMC800, HC900
Time	SPP2_SEG [n] TIME[1]	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate	SPP2_SEG [n] RATE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Ramp or Soak Value	SPP2_SEG [n] SEG_VALUE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
1. The default Parameter if only “SPP2_SEG [n]” is entered.				

Set Point Programmer #3 Profile Segment

The following table lists the devices which support the Set Point Programmer #3 Profile Segment and their formats.

Device	Supported Address Format	Range
VPR100	SPP3_SEG [n] [param]	[n] = 1 to 63
VRX100	SPP3_SEG [n] [param]	[n] = 1 to 63
VRX180	SPP3_SEG [n] [param]	[n] = 1 to 63
UDC5300	SPP3_SEG [n] [param]	[n] = 1 to 63
DR4300	SPP3_SEG [n] [param]	[n] = 1 to 24
DR4500	SPP3_SEG [n] [param]	[n] = 1 to 12
UDC2300	SPP3_SEG [n] [param]	[n] = 1 to 12
UDC3300	SPP3_SEG [n] [param]	[n] = 1 to 12
UMC800, HC900	SPP3_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Set Point Program #3 Profile Segment parameters.

Param	Address Line	Param Format	Access	Devices
Ramp/Soak Segment	SPP3_SEG [n] SEG_TYPE 0 = Soak Segment 1 = Ramp Segment	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #1	SPP3_SEG [n] EV01	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #2	SPP3_SEG [n] EV02	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #3	SPP3_SEG [n] EV03	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #4	SPP3_SEG [n] EV04	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #5	SPP3_SEG [n] EV05	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #6	SPP3_SEG [n] EV06	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #7	SPP3_SEG [n] EV07	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #8	SPP3_SEG [n] EV08	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #9	SPP3_SEG [n] EV09	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #10	SPP3_SEG [n] EV10	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #11	SPP3_SEG [n] EV11	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #12	SPP3_SEG [n] EV12	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #13	SPP3_SEG [n] EV13	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #14	SPP3_SEG [n] EV14	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #15	SPP3_SEG [n] EV15	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #16	SPP3_SEG [n] EV16	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Value for Auxiliary Output	SPP3_SEG [n] AUX_OUT	Floating Point	RW	UMC800, HC900
Time	SPP3_SEG [n] TIME[1]	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate	SPP3_SEG [n] RATE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Ramp or Soak Value	SPP3_SEG [n] SEG_VALUE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
1. The default Parameter if only “SPP3_SEG [n]” is entered.				

Set Point Programmer #4 Profile Segment

The following table lists the devices which support the Set Point Programmer #4 Profile Segment and their formats.

Device	Supported Address Format	Range
VPR100	SPP4_SEG [n] [param]	[n] = 1 to 63
VRX100	SPP4_SEG [n] [param]	[n] = 1 to 63
VRX180	SPP4_SEG [n] [param]	[n] = 1 to 63
UDC5300	SPP4_SEG [n] [param]	[n] = 1 to 63
DR4300	SPP4_SEG [n] [param]	[n] = 1 to 24
DR4500	SPP4_SEG [n] [param]	[n] = 1 to 12
UDC2300	SPP4_SEG [n] [param]	[n] = 1 to 12
UDC3300	SPP4_SEG [n] [param]	[n] = 1 to 12
UMC800, HC900	SPP4_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Set Point Program #4 Profile Segment parameters.

Param	Address Line	Param Format	Access	Devices
Ramp/Soak Segment	SPP4_SEG [n] SEG_TYPE 0 = Soak Segment 1 = Ramp Segment	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #1	SPP4_SEG [n] EV01	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #2	SPP4_SEG [n] EV02	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #3	SPP4_SEG [n] EV03	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #4	SPP4_SEG [n] EV04	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #5	SPP4_SEG [n] EV05	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #6	SPP4_SEG [n] EV06	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #7	SPP4_SEG [n] EV07	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #8	SPP4_SEG [n] EV08	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #9	SPP4_SEG [n] EV09	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #10	SPP4_SEG [n] EV10	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #11	SPP4_SEG [n] EV11	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #12	SPP4_SEG [n] EV12	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #13	SPP4_SEG [n] EV13	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #14	SPP4_SEG [n] EV14	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #15	SPP4_SEG [n] EV15	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #16	SPP4_SEG [n] EV16	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Value for Auxiliary Output	SPP4_SEG [n] AUX_OUT	Floating Point	RW	UMC800, HC900
Time	SPP4_SEG [n] TIME[1]	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Rate	SPP4_SEG [n] RATE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
Ramp or Soak Value	SPP4_SEG [n] SEG_VALUE	Floating Point	RW	VPR100, VRX100, VRX180, UDC5300, DR4300, DR4500, UDC2300, UDC3300, UMC800, HC900
1. The default Parameter if only “SPP4_SEG [n]” is entered.				

Set Point Scheduler Values

The following table lists the devices which support the Set Point Scheduler Values and their formats.

Device	Supported Address Format	Range
UMC800	SCHED [n] [param]	[n] = 1 to 1

Device	Supported Address Format	Range
HC900	SCHED [n] [param]	[n] = 1 to 2

The following table lists the details of the Scheduler Values parameters.

Param	Address Line	Param Format	Access	Devices
Output #1	SCHED [n] OUTPUT1[1]	Floating Point	RO	UMC800, HC900
Output #1	SCHED [n] OUTPUT2	Floating Point	RO	UMC800, HC900
Output #1	SCHED [n] OUTPUT3	Floating Point	RO	UMC800, HC900
Output #4	SCHED [n] OUTPUT4	Floating Point	RO	UMC800, HC900
Output #5	SCHED [n] OUTPUT5	Floating Point	RO	UMC800, HC900
Output #6	SCHED [n] OUTPUT6	Floating Point	RO	UMC800, HC900
Output #7	SCHED [n] OUTPUT7	Floating Point	RO	UMC800, HC900
Output #8	SCHED [n] OUTPUT8	Floating Point	RO	UMC800, HC900
Auxiliary Output #1	SCHED [n] AUX_OUT1	Floating Point	RO	UMC800, HC900
Auxiliary Output #2	SCHED [n] AUX_OUT2	Floating Point	RO	UMC800, HC900
Auxiliary Output #3	SCHED [n] AUX_OUT3	Floating Point	RO	UMC800, HC900
Auxiliary Output #4	SCHED [n] AUX_OUT4	Floating Point	RO	UMC800, HC900
Auxiliary Output #5	SCHED [n] AUX_OUT5	Floating Point	RO	UMC800, HC900
Auxiliary Output #6	SCHED [n] AUX_OUT6	Floating Point	RO	UMC800, HC900
Auxiliary Output #7	SCHED [n] AUX_OUT7	Floating Point	RO	UMC800, HC900
Auxiliary Output #8	SCHED [n] AUX_OUT8	Floating Point	RO	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Current Program Number	SCHED [n] PROG_NO	Floating Point	RW	UMC800, HC900
Current Segment Number	SCHED [n] SEG_NO	Floating Point	RW	UMC800, HC900
Program Elapsed Time	SCHED [n] EL_TIME	Floating Point	RO	UMC800, HC900
Segment Time Remaining	SCHED [n] TIME_REMAIN	Floating Point	RO	UMC800, HC900
Schedule Save Request	SCHED [n] SCHED_SAVE	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #1	SCHED [n] SOAK_LIMIT_1	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #2	SCHED [n] SOAK_LIMIT_2	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #3	SCHED [n] SOAK_LIMIT_3	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #4	SCHED [n] SOAK_LIMIT_4	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #5	SCHED [n] SOAK_LIMIT_5	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #6	SCHED [n] SOAK_LIMIT_6	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #7	SCHED [n] SOAK_LIMIT_7	Floating Point	RW	UMC800, HC900
Guaranteed Soak Limit #8	SCHED [n] SOAK_LIMIT_8	Floating Point	RW	UMC800, HC900
Jog Segment	SCHED [n] JOG_SEG	Floating Point	RW	UMC800, HC900
Event #1	SCHED [n] EVENT_01	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #2	SCHED [n] EVENT_02	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #3	SCHED [n] EVENT_03	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #4	SCHED [n] EVENT_04	Discrete (bits). [Status Point Only]	RO	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #5	SCHED [n] EVENT_05	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #6	SCHED [n] EVENT_06	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #7	SCHED [n] EVENT_07	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #8	SCHED [n] EVENT_08	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #9	SCHED [n] EVENT_09	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #10	SCHED [n] EVENT_10	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #11	SCHED [n] EVENT_11	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #12	SCHED [n] EVENT_12	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #13	SCHED [n] EVENT_13	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #14	SCHED [n] EVENT_14	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #15	SCHED [n] EVENT_15	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Event #16	SCHED [n] EVENT_16	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Status	SCHED [n] STATUS	Discrete (bits). [Status Point Only]	RO	UMC800, HC900
Start Schedule	SCHED [n] START	UINT2	WO	UMC800, HC900
Hold Schedule	SCHED [n] HOLD	UINT2	WO	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Advance Schedule	SCHED [n] ADVANCE	UINT2	WO	UMC800, HC900
Reset Schedule	SCHED [n] RESET	UINT2	WO	UMC800, HC900
Time Units	SCHED [n] UNITS_TIME	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
1. The default Parameter if only “SCHED [n]” is entered.				

Set Point Scheduler #1 Segment

The following table lists the devices which support the Scheduler #1 Segment and their formats.

Device	Supported Address Format	Range
UMC800, HC900	SCHED1_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Scheduler #1 Segment parameters.

Param	Address Line	Param Format	Access	Devices
Soak Type #1	SCHED1_SEG [n] GUAR1[1]	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #2	SCHED1_SEG [n] GUAR2	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #3	SCHED1_SEG [n] GUAR3	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #4	SCHED1_SEG [n] GUAR4	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #5	SCHED1_SEG [n] GUAR5	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #6	SCHED1_SEG [n] GUAR6	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Soak Type #7	SCHED1_SEG [n] GUAR7	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Soak Type #8	SCHED1_SEG [n] GUAR8	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #1	SCHED1_SEG [n] EVENT_01	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #2	SCHED1_SEG [n] EVENT_02	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #3	SCHED1_SEG [n] EVENT_03	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #4	SCHED1_SEG [n] EVENT_04	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #5	SCHED1_SEG [n] EVENT_05	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #6	SCHED1_SEG [n] EVENT_06	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #7	SCHED1_SEG [n] EVENT_07	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #8	SCHED1_SEG [n] EVENT_08	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #9	SCHED1_SEG [n] EVENT_09	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #10	SCHED1_SEG [n] EVENT_10	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #11	SCHED1_SEG [n] EVENT_11	Discrete (bits). [Status Point Only]	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Event #12	SCHED1_SEG [n] EVENT_12	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #13	SCHED1_SEG [n] EVENT_13	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #14	SCHED1_SEG [n] EVENT_14	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #15	SCHED1_SEG [n] EVENT_15	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Event #16	SCHED1_SEG [n] EVENT_16	Discrete (bits). [Status Point Only]	RW	UMC800, HC900
Time	SCHED1_SEG [n] TIME Parameter Format:	Floating Point	RW	UMC800, HC900
Output #1	SCHED1_SEG [n] OUTPUT1	Floating Point	RW	UMC800, HC900
Output #2	SCHED1_SEG [n] OUTPUT2	Floating Point	RW	UMC800, HC900
Output #3	SCHED1_SEG [n] OUTPUT3	Floating Point	RW	UMC800, HC900
Output #4	SCHED1_SEG [n] OUTPUT4	Floating Point	RW	UMC800, HC900
Output #5	SCHED1_SEG [n] OUTPUT5	Floating Point	RW	UMC800, HC900
Output #6	SCHED1_SEG [n] OUTPUT6	Floating Point	RW	UMC800, HC900
Output #7	SCHED1_SEG [n] OUTPUT7	Floating Point	RW	UMC800, HC900
Output #8	SCHED1_SEG [n] OUTPUT8	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #1	SCHED1_SEG [n] AUX_SOAK_1	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #2	SCHED1_SEG [n] AUX_SOAK_2	Floating Point	RW	UMC800, HC900

Param	Address Line	Param Format	Access	Devices
Soak Value for Auxiliary Output #3	SCHED1_SEG [n] AUX_SOAK_3	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #4	SCHED1_SEG [n] AUX_SOAK_4	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #5	SCHED1_SEG [n] AUX_SOAK_5	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #6	SCHED1_SEG [n] AUX_SOAK_6	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #7	SCHED1_SEG [n] AUX_SOAK_7	Floating Point	RW	UMC800, HC900
Soak Value for Auxiliary Output #8	SCHED1_SEG [n] AUX_SOAK_8	Floating Point	RW	UMC800, HC900
Number of Times to Recycle	SCHED1_SEG [n] RECYCLE	Floating Point	RW	UMC800, HC900
Recycle Segment	SCHED1_SEG [n] RECYCLE_SEG	Floating Point	RW	UMC800, HC900
1. The default Parameter if only “SCHED1_SEG [n]” is entered.				

Set Point Scheduler #2 Segment

The following table lists the devices which support the Scheduler #2 Segment and their formats.

Device	Supported Address Format	Range
HC900	SCHED2_SEG [n] [param]	[n] = 1 to 50

The following table lists the details of the Scheduler #2 Segment parameters.

Param	Address Line	Param Format	Access	Devices
Soak Type #1	SCHED2_SEG [n] GUAR1[1]	Discrete (bits). [Status Point Only]	RW	HC900

Param	Address Line	Param Format	Access	Devices
Soak Type #2	SCHED2_SEG [n] GUAR2	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #3	SCHED2_SEG [n] GUAR3	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #4	SCHED2_SEG [n] GUAR4	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #5	SCHED2_SEG [n] GUAR5	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #6	SCHED2_SEG [n] GUAR6	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #7	SCHED2_SEG [n] GUAR7	Discrete (bits). [Status Point Only]	RW	HC900
Soak Type #8	SCHED2_SEG [n] GUAR8	Discrete (bits). [Status Point Only]	RW	HC900
Event #1	SCHED2_SEG [n] EVENT_01	Discrete (bits). [Status Point Only]	RW	HC900
Event #2	SCHED2_SEG [n] EVENT_02	Discrete (bits). [Status Point Only]	RW	HC900
Event #3	SCHED2_SEG [n] EVENT_03	Discrete (bits). [Status Point Only]	RW	HC900
Event #4	SCHED2_SEG [n] EVENT_04	Discrete (bits). [Status Point Only]	RW	HC900
Event #5	SCHED2_SEG [n] EVENT_05	Discrete (bits). [Status Point Only]	RW	HC900
Event #6	SCHED2_SEG [n] EVENT_06	Discrete (bits). [Status Point Only]	RW	HC900

Param	Address Line	Param Format	Access	Devices
Event #7	SCHED2_SEG [n] EVENT_07	Discrete (bits). [Status Point Only]	RW	HC900
Event #8	SCHED2_SEG [n] EVENT_08	Discrete (bits). [Status Point Only]	RW	HC900
Event #9	SCHED2_SEG [n] EVENT_09	Discrete (bits). [Status Point Only]	RW	HC900
Event #10	SCHED2_SEG [n] EVENT_10	Discrete (bits). [Status Point Only]	RW	HC900
Event #11	SCHED2_SEG [n] EVENT_11	Discrete (bits). [Status Point Only]	RW	HC900
Event #12	SCHED2_SEG [n] EVENT_12	Discrete (bits). [Status Point Only]	RW	HC900
Event #13	SCHED2_SEG [n] EVENT_13	Discrete (bits). [Status Point Only]	RW	HC900
Event #14	SCHED2_SEG [n] EVENT_14	Discrete (bits). [Status Point Only]	RW	HC900
Event #15	SCHED2_SEG [n] EVENT_15	Discrete (bits). [Status Point Only]	RW	HC900
Event #16	SCHED2_SEG [n] EVENT_16	Discrete (bits). [Status Point Only]	RW	HC900
Time	SCHED2_SEG [n] TIME	Floating Point	RW	HC900
Output #1	SCHED2_SEG [n] OUTPUT1	Floating Point	RW	HC900
Output #2	SCHED2_SEG [n] OUTPUT2	Floating Point	RW	HC900
Output #3	SCHED2_SEG [n] OUTPUT3	Floating Point	RW	HC900
Output #4	SCHED2_SEG [n] OUTPUT4	Floating Point	RW	HC900

Param	Address Line	Param Format	Access	Devices
Output #5	SCHED2_SEG [n] OUTPUT5	Floating Point	RW	HC900
Output #6	SCHED2_SEG [n] OUTPUT6	Floating Point	RW	HC900
Output #7	SCHED2_SEG [n] OUTPUT7	Floating Point	RW	HC900
Output #8	SCHED2_SEG [n] OUTPUT8	Floating Point	RW	HC900
Soak Value for Auxiliary Output #1	SCHED2_SEG [n] AUX_SOAK_1	Floating Point	RW	HC900
Soak Value for Auxiliary Output #2	SCHED2_SEG [n] AUX_SOAK_2	Floating Point	RW	HC900
Soak Value for Auxiliary Output #3	SCHED2_SEG [n] AUX_SOAK_3	Floating Point	RW	HC900
Soak Value for Auxiliary Output #4	SCHED2_SEG [n] AUX_SOAK_4	Floating Point	RW	HC900
Soak Value for Auxiliary Output #5	SCHED2_SEG [n] AUX_SOAK_5	Floating Point	RW	HC900
Soak Value for Auxiliary Output #6	SCHED2_SEG [n] AUX_SOAK_6	Floating Point	RW	HC900
Soak Value for Auxiliary Output #7	SCHED2_SEG [n] AUX_SOAK_7	Floating Point	RW	HC900
Soak Value for Auxiliary Output #8	SCHED2_SEG [n] AUX_SOAK_8	Floating Point	RW	HC900
Number of Times to Recycle	SCHED2_SEG [n] RECYCLE	Floating Point	RW	HC900
Recycle Segment	SCHED2_SEG [n] RECYCLE_SEG	Floating Point	RW	HC900
1. The default Parameter if only “SCHED2_SEG [n]” is entered.				

Non-numbered Addresses

The following table lists the details of the Non-numbered Address parameters.

Param	Address Line	Param Format	Access	Devices
Relay #1	RELAY1	Discrete (bits). [Status Point Only]	RO	DR4300
Relay #2	RELAY2	Discrete (bits). [Status Point Only]	RO	DR4300
Alarm Relay #1	ALMRLY1	Discrete (bits). [Status Point Only]	RO	DR4500
Alarm Relay #2	ALMRLY2	Discrete (bits). [Status Point Only]	RO	DR4500
Control Relay #1	CR1	Discrete (bits). [Status Point Only]	RO	DR4500
Control Relay #2	CR2	Discrete (bits). [Status Point Only]	RO	DR4500
Control Relay #3	CR3	Discrete (bits). [Status Point Only]	RO	DR4500
Control Relay #4	CR4	Discrete (bits). [Status Point Only]	RO	DR4500
Control Relay	CR	Discrete (bits). [Status Point Only]	RO	UDC2300, UDC3300
Alarm Relay #2	ALMRLY2	Discrete (bits). [Status Point Only]	RO	UDC2300, UDC3300
Alarm Relay #1	ALMRLY1	Discrete (bits). [Status Point Only]	RO	UDC2300, UDC3300
INSTMODE	INSTMODE	Floating Point	RW	RSX, VPR100, VRX100, VRX180, UDC5300, UMC800, HC900

Param	Address Line	Param Format	Access	Devices
CONFIG_CLEAR	CONFIG_CLEAR	Floating Point	WO	RSX, VPR100, VRX100, VRX180, UDC5300, HC900
LOAD_RECIPE	LOAD_RECIPE	Floating Point	WO	UMC800
CHART_SPEED	CHART_SPEED	Floating Point	RO	DR4300, DR4500
Pen #1 High Value	PEN1HI	Floating Point	RO	DR4300, DR4500
Pen #1 Low Value	PEN1LO	Floating Point	RO	DR4300, DR4500
Number of Chart Divisions	CHART_DIVS	Floating Point	RO	DR4500
CHART_STATUS	CHART_STATUS	Floating Point	RO	DR4500
Pen #1 Status	PEN1STAT	Floating Point	RO	DR4500
Pen #2 Status	PEN2STAT	Floating Point	RO	DR4500
Pen #2 High Value	PEN2HI	Floating Point	RO	DR4500
Pen #2 Low Value	PEN2LO	Floating Point	RO	DR4500
Pen #3 Status	PEN3STAT	Floating Point	RO	DR4500
Pen #3 High Value	PEN3HI	Floating Point	RO	DR4500
Pen #3 Low Value	PEN3LO	Floating Point	RO	DR4500
Pen #4 Status	PEN4STAT	Floating Point	RO	DR4500
Pen #4 High Value	PEN4_HIGH	Floating Point	RO	DR4500
Pen #4 Low Value	PEN4_LOW	Floating Point	RO	DR4500

HC900 and UMC800 SPP and Recipe Support

6

Overview

The HC900 and UMC800 SPP & Recipe Support is an application that enables you to configure and control Set Point (SP) programmers and variables in one or more HC900 and/or UMC800 controllers through Station. The application allows operators to easily configure set point profiles and Variable-based recipes offline, before downloading to a specific controller. Also supported is the monitoring and configuration of running set point programs. The HC900/UMC800 application provides an easy alternative to configuring, monitoring, and loading SP programs and recipes from the controller operator interface.

In particular, the HC900/UMC800 SPP and Recipe Support includes:

- Configuration and maintenance of recipe definitions using Variables in Station.
- Downloading recipes to HC900 and UMC800 controllers.
- Configuration and maintenance of SP profiles through Station displays.
- Configuration and maintenance of combined recipe definitions in Station. A combined recipe includes a recipe with a defined list of Variables and/or up to two SP profiles.
- Download a combined recipe to a compatible HC900 or UMC800 controller. (In an HC900 controller, profiles may only be sent to the first four programmers.)
- Upload and download of SP profiles between the server database and HC900/UMC800 SP programmers. (In an HC900 controller, profiles can be sent to the first four programmers only.)
- View and modify online the first four HC900/UMC800 SP programmers in a controller (configuration and “current state”).

Planning

This section describes the planning and design-related issues concerned with configuring HC900 and UMC800 SPP and Recipe Support. After reading this section, you will be able to plan for the configuration process.

Resource Requirements

This section details the requirements and restrictions for the HC900/UMC800 application.

Set Point Profile and Recipe Slots

The server database allows you to configure and store up to 1000 SP profiles. These profiles can be downloaded to HC900 and UMC800 SP programmers in the same manner as profiles stored locally in the controller.

The system overwrites Profiles 1 to 4 in the HC900's and the UMC800's own pool of stored profiles. Apart from these four profiles, it is possible, although strongly not recommended, to use the remaining profile slots internal to the controller in parallel with the 1000 server database profiles.

The server database also allows you to configure and store up to 1000 recipes. These recipes can then be downloaded to HC900 and UMC800 controllers in the same manner as recipes stored locally in the controller.

The system overwrites Recipe 1 in the HC900's and the UMC800's own pool of stored recipes. Apart from this recipe, it is possible, although strongly not recommended, to use the remaining recipe slots in parallel with the 1000 server database recipes.

Set Point Program History

The history of a SP program can be viewed on a standard trend and compared to its ideal pre-plotted profile. To collect history, a point needs to be built for each programmer in an HC900 and a UMC800 controller. These points are used to monitor the primary and auxiliary PV outputs of the processes driven by the programmers, collecting the values and storing them in history.

Note that only the first four programmers in an HC900 can be monitored. This means that a maximum of four points, one for each programmer, are required for each HC900 and UMC800 controller in the system.

Display Locking

For safety reasons and data integrity, recipes and SP programmers can only be configured and maintained by one user at a time. Any users who try to access these displays while they are in use are locked out. A message indicating the lockout is displayed, indicating the Station number that is currently using the display. These displays remain locked until the Station either exits the displays or is disconnected.

Migration/Conversion Requirements

The 1000 SP profiles and recipes stored in the server database supersede the HC900's and the UMC800's own set of stored profiles and recipes. This section details how to migrate the existing profiles and recipes into the server database from a controller.

Set Point Profiles

To migrate existing profiles from a controller, a utility transfers the stored profiles to a block within the server database of 1000 profiles.

The utility is named umc800export, and may be run from the command line:

To migrate profiles:

1. From a command line enter

   `C:> umc800export`

   The UMC800 Profile Export Utility starts
2. Enter a valid controller number.
3. Enter the starting profile number.
4. Enter `y` to proceed.

   For example:

```
**** UMC800 Profile Export Utility ****
Enter valid controller number: 1
Enter profile number to start from (1 to 931): 1
All profiles in Controller 1 will exported to profiles 1
to 70
Do you want to proceed (Y/N) ? y
Profile 70 of 70
Exported all profiles
C:>
```

Recipes

No utility exists to transfer existing recipes from an HC900 or a UMC800 controller to the server database of 1000 recipes. Recipes need to be re-created manually in Station.

Configuration

In this section, you will learn how to configure HC900 and UMC800 recipes, SP profiles, and combined recipes. Configuration requirements for setting up the set point programmer monitoring displays are also presented.

Prerequisites

Before configuring the HC900/UMC800 SPP and Recipe Support, ensure that you have:

- Access to the MNGR operator account in Station.
- Fast and Extended history.
- SPP function blocks configured in each HC900 or UMC800 controller. You will need one block for each SP programmer (see *UMC800 Control Builder User's Guide* or HC900's HC Designer User's Guide or Help files for information on function blocks).

Considerations

Each recipe, SP profile, and combined recipe stored in the server database must have a unique name (respectively).

SP profiles must have zero length/rate segments only at the end of the profile.

Configuring a Recipe

A recipe is a collection of 50 Variable signal tags and their values or states. Each Variable is either a digital or analog element in a control configuration, acting as an input to any connected function blocks. When a recipe is loaded, the values or states of the signal tags in the recipe replace the values of those signals in the controller's configuration.

Up to 1000 recipes can be created and maintained using the Station HC900 and UMC800 Recipe Configuration displays.

To configure a recipe:

1. In Station select **Configure > Applications > HC900/UMC800 > Recipes (Variables Only)**. The Recipe Selection display opens.
2. Click the recipe that you want to configure or modify, or click a blank slot to create a new recipe.
3. Click on the recipe name to load its configuration.

When the Recipe Configuration display opens, the server attempts to read a list of all variables from the currently selected “Compatible” controller. If the controller is not a valid HC900 or UMC800 controller or the upload fails, an alarm is raised.

The variable list does not overwrite any of the variables configured in the current recipe, nor do variables in the recipe need to be members of the list. Instead, the list is used to provide default selections in the “Variable” boxes to help when configuring a recipe.

By changing the controller selection from the “Compatible controller” dropdown list, the server attempts to read a new list of all variables from the controller. If the controller is not a valid HC900 or UMC800 controller or the upload fails, an alarm is raised.

Note

Only the first 188 variables configured on an HC900 are used to populate the variable combobox. While additional variables are not visible in the combobox, they can still be added to a recipe.

Download to Controller

Allows the user to download the current recipe to an HC900 or a UMC800 controller. A recipe can be downloaded to any controller, not just the “Compatible controller”. See the section “Downloading a Recipe” on page 113 for information on downloading a recipe.

See the section “Configuring a Combined Recipe” on page 108 for information on configuring a recipe for use in a combined recipe.

Configuring a SP Profile

A SP profile is a time-based program typically used as the set point of a control loop. Each program may be from 2 to 50 segments in length, where each segment of the program may be a ramp or soak except the last segment that must be a soak.

In addition to the main output value, a second analog value is available for each step of the program. This output is a fixed soak value, which may be used as an input to another function or to provide a set point for a secondary control loop in the process such as pressure or % carbon.

A set point guarantee function is provided that holds the program if a process variable exceeds a predefined deviation from the set point. The set point guarantee can be selected to be active for the entire program, for soaks only, or for user specified segments.

Up to 1000 profiles can be created and maintained using the Station HC900 and UMC800 Profile Configuration displays.

To configure a SP profile, perform the following steps:

1 In Station select **Configure > Applications > HC900/UMC800 > Set Point Programs > Profile Setup**. The Profile Selection display opens.

2 Select the profile that you want to configure or modify, or click a blank slot to create a new profile.

3 Click the profile name to load its configuration.

The Profile Configuration display allows all the details of a SP profile to be edited from a single display. Changes made to configuration are applied immediately to the stored profile, but do not have any effect on profiles that are currently loaded into HC900 and UMC800 controllers.

Program Control

Values such as Restart Rate and Loop Segment control the dynamic execution of a program. These values can be shown or hidden using the Show/Hide button.

Clone a Profile

Allows the user to copy all the details of another of the 1000 stored profiles to the current profile slot. The “Name” field is not copied and made blank.

Upload from Controller

Allows the user to upload the profile currently loaded in an HC900 or UMC800 SP programmer into the profile slot currently being edited.

Download to Controller

Allows the user to download the current profile to an HC900 or UMC800 SP programmer. Note that this action causes the selected programmer to be cleared and reset before the profile is downloaded. Any pre-existing program is aborted and overwritten. See the section “Downloading a SP Profile” on page 114 for information on downloading a profile.

Configuring a Combined Recipe

A combined recipe is a combination of a recipe, up to two set point profiles and a list of “Compatible Destinations”.

Each combined recipe can be associated with a number of destinations, any one of which can be selected by the operator as a target for the combined recipe. Each destination includes an HC900 or UMC800 controller, a set point programmer for each profile in the combined recipe, and an optional ‘variable suffix’. This suffix is appended to every variable in the recipe component of a combined recipe, before it is sent to a controller. This allows the same recipe to be used for more than one set of variables in a single HC900 or UMC800 controller if the controller

is used to control multiple, similar processes. It is up to the user to configure the Variable tag names with the proper suffixes in the controller configuration so that the recipe with values for the Variables with these suffixes can be loaded from the server database. An error is posted if these Variable tag names are not found on download.

When a combined recipe is loaded to a controller, the SPP profiles are loaded into the specified programmers and the recipe is loaded to the controller's configuration.

Up to 1000 combined recipes can be created and maintained using the Station HC900/UMC800 Combined Recipe Configuration displays.

To configure a combined recipe, perform the following steps:

1. In Station select **Configure > Applications > HC900/UMC800 > Combined Recipes**. The Combined Recipe Selection display opens.
2. Select the combined recipe that you want to configure or modify, or click a blank slot to create a new combined recipe.
3. Click on its name to load the combined recipe.

The Combined Recipe Configuration display allows combined recipes to be configured and stored in the server database. Changes made to configuration are applied immediately to the stored combined recipe, but do not have any immediate effect on profiles or variable values currently loaded in HC900 or UMC800 controllers.

There are three optional components to a combined recipe. The first is a recipe selected from the 1000 recipes stored in the server database (see the section "Configuring a Recipe" on page 106 for information on recipes). The remaining components are up to two SP profiles, selected from the 1000 profiles stored in the server database (see the section "Configuring a SP Profile" on page 107 for information on SP profiles). A combined recipe may include any, some, or none, of these components.

Destination List

Each combined recipe may be configured with up to twenty "Compatible Destinations". This allows a single combined recipe to drive a number of processes in a given plant. For example, the same combined recipe may be used to operate three furnaces – where a different SP programmer in a controller, and a different set of variables, control each furnace. The recipe Variable suffix allows the same Combined Recipe to be directed to another set of Variables with the same function for a similar process in the controller.

Name

Each destination may be given a name to more easily identify the process it drives.

Controller

Each destination has a controller to which each component of the combined recipe is downloaded.

Prog A & B

These identify the SP programmers in the destination controller to which profiles A and B will be downloaded.

Var. Suffix

Identifies a short string that will be appended to every variable name in the recipe component of a combined recipe before it is downloaded. This allows the same recipe to be loaded to a number of subsets of variables within the same controller.

For example, assume the recipe contains the variables TEMP, VOLUME and PRESS. If destination “FURNACE1” has a variable suffix of “1” and destination “FURNACE2” has a variable suffix of “2”, then when the combined recipe is downloaded to “FURNACE2”, the variables updated will be TEMP2, VOLUME2 and PRESS2. If the destination had been “FURNACE1”, then TEMP1, VOLUME1 and PRESS1 would have been updated.

Download

See the section “Downloading a Combined Recipe” on page 114 for information on downloading a combined recipe.

Configuring SPP Monitoring

The user may view and control the current state of set point programs in the HC900 and UMC800 controllers from one of three monitoring displays. The SPP Summary displays allows the user to monitor the first four programmers in a given HC900 or UMC800 controller. This display provides information about the SP programmers, including their current state and segment number, the segment time remaining, and a history of the current program.

The SPP Program display allows the user to view the program configuration of a specific programmer. This display is very similar to the Profile Configuration display in that it shows a time-based program of 2 to 50 segments in length, where each segment of the program can be a ramp or soak except the last segment that must be a soak. The difference is that the SPP Program display reads and writes a set point program from a SP programmer, and does not store the program in the server database.

The SPP Trend display allows the user to view the history of a SP programmer and compare it to the ideal profile. To collect history, a point needs to be built for each SP programmer in a controller. These points are used to monitor the process PVs driven by the primary and auxiliary outputs of the programmers, collecting the values and storing them in history.

Building Points for SPP Monitoring

Quick Builder can be used to build the points for monitoring the SP programmers. The points must be of "Analog" type, and a unique point must be created for each programmer. The source addresses used to monitor SP Programmer 1 in an HC900 or UMC800 controller are described below.

Table 1 SP Programmer 1 Parameter Definition

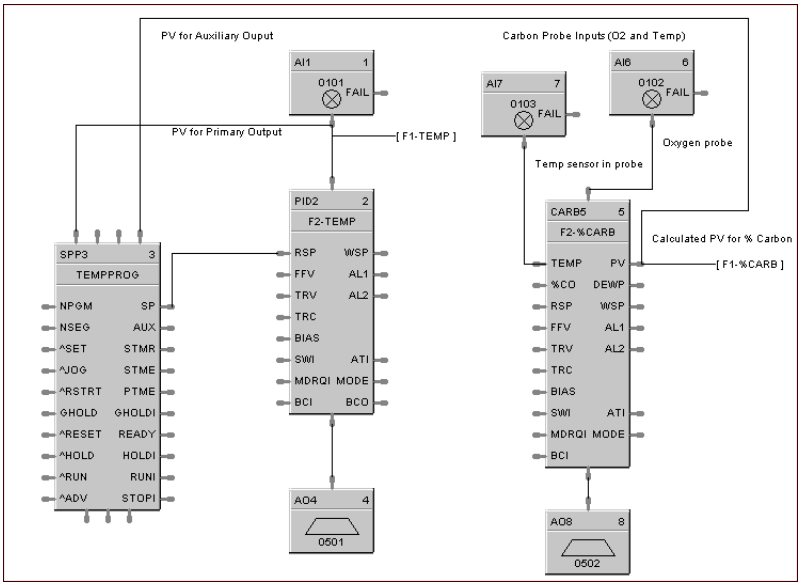
Parameter	Source Address
PV	Address the PV being driven by the output of SPP 1 in your process. See below for an example.
AL1	PV high value
AL2	PV low value
SP	SPP 1 OUT
A1	Address the PV being driven by the auxiliary output of SPP 1 in your process. See below for an example.
AL3	A1 high value
AL4	A1 low value
A2	SPP_ADD 1 AUX_OUT
A3	SPP 1 STATUS_HOLD
A4	SPP 1 STATUS_END

The point should also be configured with:

- Two second scan periods for each parameter.
- Disable Alarming set (that is, alarms are disabled).
- Fast, Normal, and Extended history collection for **each** parameter.
- PV range sufficient to cover the output of the programmer.

The following diagram illustrates a typical HC900/UMC800 configuration. In this example, when configuring a point in Station to track programmer block SPP3, you should configure the point's PV parameter to read the PV of loop PID2, and it's A1 parameter to read the calculated PV from CARB5.

Figure 11 Example SPP Implementation



To monitor the other SP programmers, create a new point for each programmer and replace the '1' in the Source Address with the given programmer number (valid 1 to 4). Each point must have a unique name. Repeat this process until you have created points for each programmer. When all points have been built, download them to the server database. See the *Server and Client Configuration Guide* for information on points.

To configure SPP monitoring:

1. Disable the HC900 HC900 & UMC800 channels.
2. Select **Configure > Applications > HC900/UMC800 > Programmer Operation**. The SPP Summary display opens.
3. For each HC900 and UMC800 controller, enter each point configured for this controller in the appropriate slot
4. Enable the channels.

   You can verify the SPP monitoring by checking that the primary and auxiliary SP follow that of the programmers (displayed on the controller faceplate).

Operation

This section describes how to use the HC900/UMC800 SPP & Recipe Support on a routine basis. Standard tasks include downloading recipes and SP profiles, and issuing commands to the SP programmers. After reading this section, you will be able to control HC900 and UMC800 controllers from Station.

Prerequisites

It is assumed that you have successfully completed the configuration procedure detailed in the previous section and that all prerequisites have been met.

Procedure

The HC900/UMC800 application allows you to easily perform routine control tasks from Station, including:

- Downloading recipes
- Downloading SP profiles
- Downloading combined recipes
- Controlling a SP programmer

Downloading a Recipe

Caution

When you download a recipe, you are in effect writing new values to the variables. Be aware that by changing the variable values, you can affect running programs if they use the variables as inputs.

To download a recipe:

1. In Station select **Configure > Applications > HC900/UMC800 > Recipes (Variables Only)**. The Recipe Selection display opens.
2. Click the recipe that you want to configure or modify, or click a blank slot to create a new recipe.
3. Click on the recipe name to load its configuration.
4. Click the **Download to Controller** button and select a controller destination. Note that a recipe can be downloaded to any controller, not just the “Compatible controller”.
5. Click **OK** to accept the current controller selection. A confirmation dialog box appears.

6 Click **Download** to accept the recipe destination or Cancel to remove the dialog box. The message “Downloading recipe…” appears.

If successful, the message “Recipe download complete.” appears. Otherwise “Recipe download failed.” is displayed and an alarm is raised. See the section “Troubleshooting” on page 117 for possible fail reasons.

Downloading a SP Profile

Caution

Downloading a profile will cause the selected programmer to be cleared and reset before the profile is downloaded. Any pre-existing program will be aborted and overwritten.

To download a SP profile:

1 In Station select **Configure > Applications > HC900/UMC800 > Set Point Programs > Profile Setup**. The Profile Selection display opens.

2 Click the profile that you want to configure or modify, or click a blank slot to create a new profile.

3 Click on the profile name to load its configuration.

4 Click the **Download to Controller** button and select a controller and programmer destination from the dialog box.

5 Click **OK** to accept the current controller and programmer selection. A confirmation dialog box appears.

6 Click **Download** to accept the profile destination or Cancel to remove the dialog box. The message “Downloading profile…” appears.

If successful, the message “Profile download complete.” appears. Otherwise “Profile download failed.” appears and an alarm is raised. See the section “Troubleshooting” on page 117 for possible fail reasons.

Downloading a Combined Recipe

Caution

If the download includes a recipe, then running programs can be affected by changing the variable values. If the download includes a profile, then the selected programmer(s) will be cleared and reset before the profile is downloaded. Any pre-existing program(s) will be aborted and overwritten.

To download a combined recipe:

1. In Station select **Configure > Applications > HC900/UMC800 > Combined Recipes**. The Combined Recipe Selection display opens.
2. Click the combined recipe that you want to configure or modify, or click a blank slot to create a new combined recipe.
3. Click on the combined recipe name to load its configuration.
4. Click the **Download** button to download the combined recipe. Select a controller destination and click on its "Download" button.A confirmation dialog box appears.
5. Click **OK** to accept the combined recipe destination or Cancel to remove the dialog box. The message "Downloading combined recipe…" appears.

   If successful, the message "Combined recipe download complete." appears. Otherwise "Combined recipe download failed." appears and an alarm is raised. See the section "Troubleshooting" on page 117 for possible fail reasons.

Controlling a SP Programmer

Considerations

- You can only change the present segment while the program is in operation. You must first place the programmer in the Hold state, then you may alter the Start Value/Soak Value or Rate/Soak Time. You must then select the Start action for the program to continue.
- Not all commands are valid in all programmer states. For example, 'Clear' is not valid when the programmer is in 'Run'. You must also go to the Hold state first before Advance or Reset. You can only start the program in the Ready state Commands can also be issued from the SPP Trend page.

To control a SP programmer:

1. In Station select **Configure > Applications > HC900/UMC800 > Programmer Operation**. The SPP Summary display opens
2. Select a controller in the combobox. The display updates with the current state of the SP programmers configured.
3. Select the programmer that you want to control. Click on programmer's number to load the SPP Program page with its configuration. This is as shown below.
4. Click **Command Programmer**. The Select Action dialog box appears. Select the required action and click **OK**.

5 A confirmation dialog box appears. Click Ok to accept the action or Cancel to remove the dialog box.

If the command is successful, the message “Command sent.” appears and the SP programmer status changes to reflect the command. Otherwise “Failed to send command.” appears. See the section “Troubleshooting” on page 117 for possible fail reasons.

While the program is running, the present segment number is highlighted and the segment and elapsed timers are active. When in Hold, the segment timer stops but the elapsed timer continues.

Click the Trend icon at the top right of the SPP Program display to access the SPP Trend display. If a profile has been downloaded to the programmer, a SP pre-plot for the Primary programmer output appears. The time of the program is spread over a single screen for this plot in hours or minutes, depending on the time units. Alternatively you can also select the Auxiliary output plot (if configured).

You can operate the programmer using the Command Programmer button as described for the SPP Program display. The status information includes the event LEDs that are red when the event is ON.

When the program is in Hold, the PV plotting stops. The PV continues plotting when the program is re-started.

Troubleshooting

This section describes cross-checks and remedies to perform if HC900/UMC800 SPP & Recipe Support does not respond as anticipated.

Behavior	Things to try or confirm
Cannot use Station to control an HC900 or UMC800. The commands appear to have no effect.	Ensure that the application has been installed correctly and that all prerequisites have been met. Make sure the UMC800SP.EXE task is running. Check that Station R1.1, Build 1358 or later is installed.
Display elements acting erratically	Check that Station R1.1, Build 1358 or later is installed.
Downloading/uploading a stored recipe or SP profile fails and causes an alarm to be raised in Station.	Ensure the selected controller is a valid HC900/UMC800 Check that the server can communicate with the controller, that is, the controller status is OK. If performing a download, ensure the target programmer has a SPP function block. Ensure the controller is in 'Run' mode (set on the controller hardware). Check the server log for error messages.
The "Clone a Profile" dialog box does not let me select the correct profile.	Check that each profile has a unique name. If this is not the case, then the dialog box will only select the first profile and clone this one.
Cannot enter a point name on the SPP Summary page.	Ensure that the HC900 and UMC800 channel(s) are out of service when entering the point names.
Downloading a program from the SPP Program page fails and causes an alarm to be raised in Station.	As per "Download profile" (above). The SP programmer must be in 'Ready' state to edit segments. Ensure all parameter have valid values for example, restart rate and jog segment not zero. Check the server log for error messages.
The command issued to a SPP programmer appears to have no effect.	Some actions require the SP programmer to be in a certain state, for example, 'Clear' is not valid when the programmer is in 'Run'.

Behavior	Things to try or confirm
The trend does not display the program history or the ideal profile.	Check that a point has been built and specified for the SP programmer. Ensure that HC900 and UMC800 channel(s) are enabled and the point has “Scanning and Control enabled” set. Ensure you are licensed for Fast and Extended history collection. Check that the point parameters have been configured properly and are collecting history. Make sure the point is not in alarm. The point range should be large enough to cover the output of the programmer.
The program history does not look like the ideal profile.	An ‘Advance’ command causes the programmer to advance to the next segment. This causes a ‘gap’ in the history values and results in the running program to be ‘distorted’.
The trend draws fewer segments than in the SP program.	The end of the program is taken as the first segment with a length/rate of zero Ensure that your program only contains these types of segments at the end of the program. To check this, you can upload the program in the SPP Program page. Check the server log for error messages.

Index

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