Object Library

S300 Hardware Module Object

S300 HARDWARE MODULE OBJECT

INTRODUCTION

The S300 Hardware Module object combines all S300 hardware module-wide settings and diagnostic information. Each separate piece of hardware other than the supervisory controller on the S300 bus is represented by one S300 Hardware Module object.
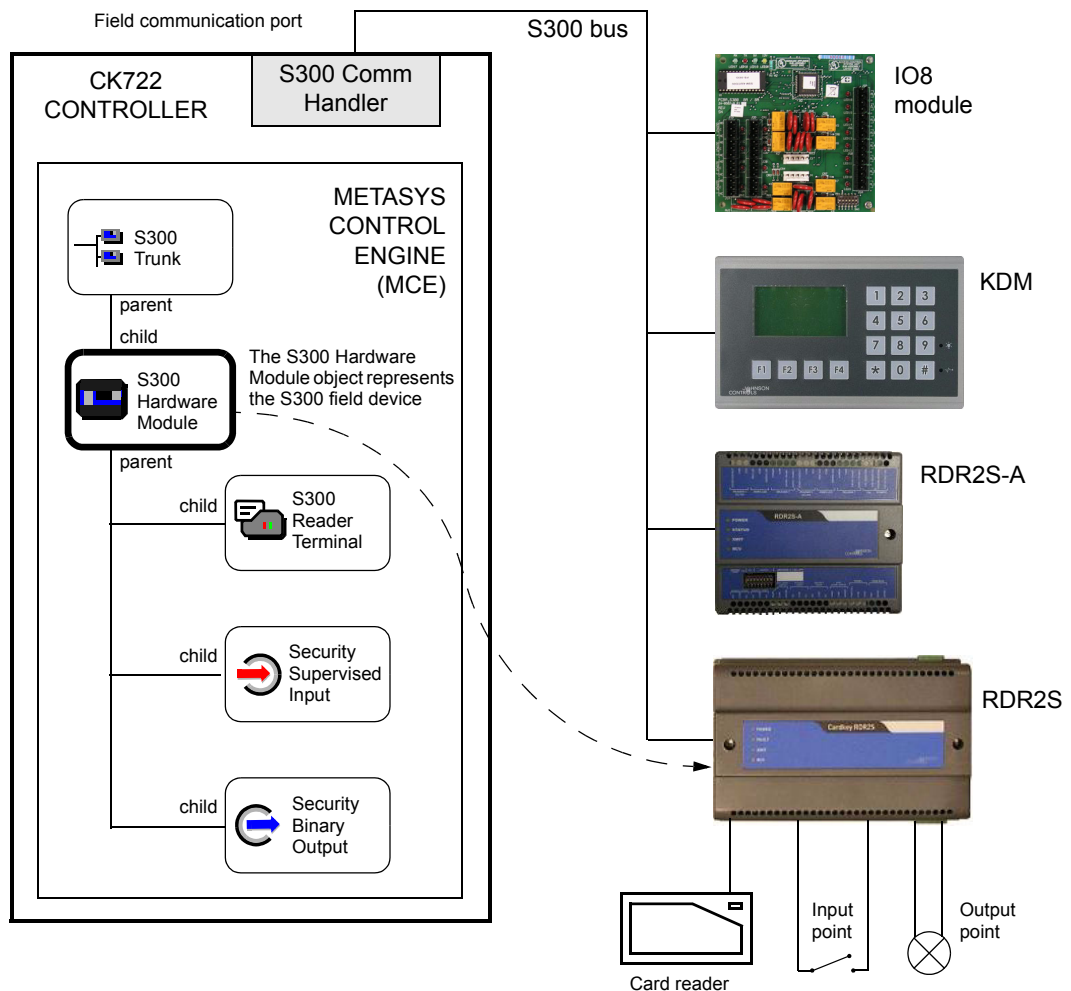

Figure 1: S300 Hardware Module Object

There are three types of objects directly involved in S300 integration:

- Integration type object: S300 Trunk

- Field device type object: S300 Hardware Module

- Field point type objects: S300 Reader Terminal, Keypad/Display, Security Binary Output, and Security Supervised Input

ATTRIBUTES

This section describes visible attributes specific to the S300 Hardware Module object. This object also contains:

- Attributes common to all objects in the P2000 Security Management System. For details, see the *General Object Information* document.

- Internal attributes, which are invisible to the user and cannot be modified directly, but may be referred to throughout this document.

Table 1: S300 Hardware Module Object Attributes

Attribute Name	Attribute Number	Data Type	Notes	Initial Value	Values/Options /Range
Acked Transitions	0	BACnetEvent TransitionBits	-	-	Refer to *BACnet Standard 12.19.19*
Checksum Errors	1148	Unsigned32	-	-	-
Clear Statistics	2427	Boolean	W	-	-
Date	548	Date	-	-	-
Event Enable	35	BACnetEvent TransitionBits	-	1,1,1	Refer to *BACnet Standard 12.19.18*
Event State	36	Enumeration	F	-	0 = Normal 1 = Fault 2 = Off-Normal
Event Time Stamps	130	BACnetARRAY[3] of BACnetTimeStamp	-	-	Refer to *BACnet Standard 12.19.21*
Fault Cause	2896	Enumeration	F	-	0 = None 1 = Type Mismatch 2 = Address Conflict 3 = Invalid Module Number
Firmware Model	3745	Unsigned8	-	-	-
Firmware Revision	3746	Enumeration	-	-	A - Z
Firmware Subrevision	3747	Unsigned8	-	-	-
Firmware Upgrade File	3776	String	W	-	-

Table 1: S300 Hardware Module Object Attributes

Attribute Name	Attribute Number	Data Type	Notes	Initial Value	Values/Options /Range
Firmware Upgrade Status	3777	Enumeration	F	-	0 = Not Initialized 1 = Upgrading 2 = Success 3 = Failed: Module Offline 4 = Failed: Upgrading Not Supported 5 = Failed: Upgrade File Not Found 6 = Failed: Upgrade File Invalid
Hardware Module Number	3711	Unsigned8	WCA	-	-
Hardware Module Type	3710	Enumeration	WCA	-	0 = Generic 1 = RDR2S 2 = RDR2 3 = IO8 4 = SIO8 5 = SI8 6 = I16 7 = KDM 8 = RDR2S-A 9 = RDR8S
Latch Statistics	2426	Boolean	W	-	-
Message Receives	1143	Unsigned32	-	-	-
Message Transmits	1142	Unsigned32	-	-	-
Notification Class	17	Unsigned32	WCA	1	Refer to *BACnet Standard 12.19.15*
Notify Priority	3644	Unsigned8	WCA	-	-
Notify Type	72	Enumeration	WCA	-	Refer to *BACnet Standard 12.19.20*
Offlines	3744	Unsigned32	-	-	-
Present Value	85	Enumeration	F	-	0 = Not Initialized 1 = Operational 2 = Offline 3 = Fault 4 = Upgrading
Priority	86	Unsigned8	WCA	1	1 - 4
Reset Date	1141	Date	-	-	-
Reset Time	1140	Time	-	-	-
Time	547	Time	-	-	-
Timeouts	3743	Unsigned32	-	-	-
Trunk Number	549	Unsigned8	-	-	Value is computed from parent object

Table 1: S300 Hardware Module Object Attributes

Attribute Name	Attribute Number	Data Type	Notes	Initial Value	Values/Options /Range

A - Archive, C - Configurable, F - PMI (Person/Machine Interface) refreshing, W - Writable, Z - Priority allowed on write

Acked Transitions – Refer to *BACnet Standard 135-2001 12.19.19*.

Checksum Errors – Indicates how many messages were corrupted by a checksum error by this hardware module.

Clear Statistics – Resets the hardware module statistics when written to "True."

Date – Indicates the local date when the hardware module statistics were last updated.

Event Enable – Refer to *BACnet Standard 135-2001 12.19.18*.

Event State – Indicates the event related status of the S300 Hardware Module object, which is determined as follows:

- Off-Normal - The *Present Value* attribute is set to "Offline" or "Upgrading" or the last To-Offnormal notification has not yet been acknowledged.

- Fault - The *Present Value* attribute is set to "Fault" or the last To-Fault notification has not yet been acknowledged.

- Normal - All other conditions.

Event Time Stamps – Refer to *BACnet Standard 135-2001 12.19.21*.

Fault Cause – Indicates the reason why the hardware module is in the fault state. If multiple reasons apply, the state with the higher enumeration value is shown. The options are:

- None - There is no fault detected.

- Type Mismatch - The S300 hardware module's type is different than the one stated in the *Hardware Module Type* attribute.

- Address Conflict - The S300 hardware module uses at least one hardware module address that is already used by another S300 hardware module on the same S300 trunk.

- Invalid Module Number - The value specified in the *Hardware Module Number* attribute is not compatible with the value specified in the *Hardware Module Type* attribute.

Firmware Model – Indicates the hardware module's firmware model number.

Firmware Revision – Indicates the hardware module's firmware revision letter.

Firmware Subrevision – Indicates the hardware module's firmware sub-revision number.

Firmware Upgrade File – Specifies the firmware upgrade file that will be downloaded immediately after this attribute is written to. The result of the firmware upgrade can be obtained in the *Firmware Upgrade Status* attribute.

Firmware Upgrade Status – Indicates the status of the hardware module's last firmware upgrade.

Hardware Module Number – Specifies a logical hardware module number of the S300 hardware module. The valid range is based on the value of the *Hardware Module Type* attribute. The options are:

- Generic - the logical hardware module number plus 128 is its MAC address.

- RDR2, SIO8, SI8 - Value of DIP switches 1 through 3 (from least to most significant). Valid range is 0 to 7.

- IO8, I16 - Value of DIP switches 1 through 4 (from least to most significant). Valid range is 0 to 15.

- RDR2S - Value of DIP switches 1 through 5 (from least to most significant). Valid range is 0 to 31.

- RDR2S-A - Value of DIP switches 4 through 8 (from least to most significant). Valid range is 0 to 31.

- RDR8S - Value of DIP switches 1 through 5 (from least to most significant). Valid range is 0 to 31.

- KDM - The hardware module number is programmed through the keypad. Valid range is 0 to 63.

Hardware Module Type – Specifies the S300 hardware module's type. The options are:

- Generic - Currently not supported.

- RDR2 - The S300 hardware module is either an RDR2 of any revision or an STI-MUX. If connected to an RDR2S, and the advantages of an RDR2S are to be exploited, it is necessary to update its firmware to Revision Q, and set this attribute to RDR2S.

- IO8 - The S300 hardware module is an IO8 of any revision.

- SIO8 - The S300 hardware module is either an SIO8 of any revision, or an SIO8 emulation of an RDR2S of Revision P or lower. To fully use the capabilities of the RDR2S, it is necessary to update its firmware to Revision Q, and set this attribute to RDR2S.

- SI8 - The S300 hardware module is an SI8 of any revision.

- I16 - The S300 hardware module is an I16 of any revision.

- RDR2S - The S300 hardware module is an RDR2S of Revision Q or higher.

- KDM - The S300 hardware module is a Keypad/Display module.

- RDR2S-A - The S300 hardware module is an RDR2S-A.

- RDR8S - The S300 hardware module is an RDR8S.

Latch Statistics – Updates the hardware module statistics when written to "True."

Message Receives – Indicates how many incoming messages were successfully received by this hardware module.

Message Transmits – Indicates how many outgoing messages were successfully sent out to this hardware module.

Notification Class – Specifies which Security Notification Class object should be used by the S300 Hardware Module object to send its notifications.

Notify Priority – Specifies the priority parameter of all notifications generated by the S300 Hardware Module object.

Notify Type – Specifies the Notify Type of the S300 Hardware Module object.

Offlines – Indicates how many times this hardware module transitioned from the online into the offline state.

Present Value – Indicates the principal condition that the reader is in. The options are:

- Not Initialized - The S300 hardware module's condition is not yet determined. This state is used only as the initial state.

- Operational - The S300 hardware module is up and running.

- Offline - The S300 hardware module is offline to the controller that this object resides on.

- Fault - The S300 hardware module is online, but indicates an error.

- Upgrading - The S300 hardware module is receiving its firmware.

Priority – Specifies the priority at which the module is polled. A value of 1 means that the module is polled in every loop, a value of 2 means that the module is polled only every 2nd loop, etc. Outgoing command messages are not subject to the polling priority.

Reset Date -Indicates the local date when the hardware module statistics were last reset.

Reset Time – Indicates the local time when the hardware module statistics were last reset.

Time – Indicates the local time when the hardware module statistics were last updated.

Timeouts – Indicates how many outgoing messages to this hardware module were not replied to.

Trunk Number – Indicates the trunk that this object belongs to. Because the S300 Hardware Module object is a child of a S300 Trunk object, this attribute is automatically filled out.

COMMANDS

This section describes commands that can be issued to this object from SCT.

Table 2: S300 Hardware Module Object Commands

Command Name	Description
Latch Statistics	Writes the *Latch Statistics* attribute to "True."
Clear Statistics	Writes the *Clear Statistics* attribute to "True."
Change Attribute	See the description below.

The `Change Attribute` is a generic command available for writing the attributes of an object. It is mainly used to change an attribute value from those features which work only with commands. For the sole purpose of giving a generic example, there is no command defined to change the *Notify Priority* attribute of an object. `Change Attribute` could, therefore, be used to change the *Notify Priority* attribute through an interlock or multiple command, both features which require commands to be entered. The `Change Attribute` command requires two parameters:

- Attribute - This parameter specifies which attribute of the object is to be written. Only writable attributes may be changed by this command.

- New value - This parameter specifies new value to be written and must be the same data type as the attribute. The only data types allowed in this command are those allowed as command parameters. A command priority can be specified if the attribute to be changed is a prioritized attribute.

VIEWS

This section illustrates how the System Configuration Tool displays properties of the S300 Hardware Module object. This screen also allows you to set the values of configurable attributes. For more information refer to the *System Configuration Tool (SCT)* manual.

Figure 2: Configuration View (for RDR2S-A)

DESCRIPTION OF OPERATION

The S300 Hardware Module Object must be a child of an S300 Trunk Object, from which it inherits the value of its *Trunk Number* attribute.

Child Object Mapping

The S300 Hardware Module Object represents a single piece of hardware that is connected to the S300 bus. The RDR2 hardware module allows different terminals that reside on it to be enabled.

The following table summarizes all child objects an S300 Hardware Module Object may have.

Table 3: Child Objects of the S300 Hardware Module Object

Hardware Module Type	Allowed *Point Address* values for all child objects:			
	S300 Reader Terminal Object	**Security Supervised Input Object**	**Security Binary Output Object**	**Keypad/ Display Object**
RDR2	1, 2	-	-	-
RDR2S (Rev Q or higher)	1, 2	1 through 6	1 through 10	-
SI8	-	1 through 8	-	-
SIO8	-	1 through 8	1 through 8	-
IO8 (S300 SI may only be 2-state)	-	1 through 8	1 through 8	-
I16 (S300 SI may only be 2-state)	-	1 through 16	-	-
KDM	-	-	-	1
RDR2S-A	1, 2	1 through 11	1 through 3, 5 through 8, 10	-
RDR8A	1 through 8	1 through 35	1 through 32	-

The *Connector* attributes of the S300 Reader Terminal, Security Supervised Input, and Security Binary Output objects show the actual silk screen labels of the selected hardware type, and the *Point Address* attributes are computed from that selection.

The *Point Address* attribute of each child object for an RDR2, SIO8, IO8, and I16 hardware module can easily be correlated to the labels printed on the hardware module's silk screen.

However, the S300 Reader Terminal, Security Supervised Input, and Security Binary Output objects use the following table to compute the *Point Address* attributes for an RDR2S:

Table 4: Point Address Attributes for RDR2S

Point Address Value of Child Object	S300 Reader Terminal Object	Security Supervised Input Object	Security Binary Output Object
1	DATA0 / DATA1 (top)	IN11	OUT11
2	DATA0 / DATA1 (bottom)	IN12	OUT12
3	-	IN21	OUT13
4	-	IN22	OUT01
5	-	IN01	NO / NC (top)

Table 4: Point Address Attributes for RDR2S

Point Address Value of Child Object	S300 Reader Terminal Object	Security Supervised Input Object	Security Binary Output Object
6	-	IN02	OUT21
7	-	-	OUT22
8	-	-	OUT23
9	-	-	OUT02
10	-	-	NO / NC (bottom)

The S300 Reader Terminal, Security Supervised Input, and Security Binary Output objects use the following table to compute the *Point Address* attributes for an RDR2S-A:

Table 5: Point Address Attributes for RDR2S-A

Point Address Value of Child Object	S300 Reader Terminal Object	Security Supervised Input Object	Security Binary Output Object
1	Reader 1 Data 0 / Data 1	Reader 1 Door Contact	Reader 1 Red LED
2	Reader 2 Data 0 / Data 1	Reader 1 REX	Reader 1 Green LED
3	-	Reader 2 Door Contact	Reader 1 Shunt
4	-	Reader 2 REX	-
5	-	Reader 1 Spare	Reader 1 Strike
6	-	Reader 2 Spare	Reader 2 Red LED
7	-	Reader 1 Tamper	Reader 2 Green LED
8	-	Reader 2 Tamper	Reader 2 Shunt
9	-	Panel Tamper	-
10	-	Power Fail	Reader 2 Strike
11	-	Panel Battery Low	-

The S300 Reader Terminal, Security Supervised Input, and Security Binary Output objects use the following table to compute the *Point Address* attributes for an RDR8S:

Table 6: Point Address Attributes for RDR8S

Point Address Value of Child Object	S300 Reader Terminal Object	Security Supervised Input Object	Security Binary Output Object
1	Reader 1 Data 0 / Data 1	Reader 1 Door Contact	Reader 1 Red LED
2	Reader 2 Data 0 / Data 1	Reader 1 REX	Reader 1 Green LED
3	Reader 3 Data 0 / Data 1	Reader 1 Tamper	Reader 1 Strike
4	Reader 4 Data 0 / Data 1	Reader 1 Spare	Reader 1 Shunt
5	Reader 5 Data 0 / Data 1	Reader 2 Door Contact	Reader 2 Red LED
6	Reader 6 Data 0 / Data 1	Reader 2 REX	Reader 2 Green LED
7	Reader 7 Data 0 / Data 1	Reader 2 Tamper	Reader 2 Strike
8	Reader 8 Data 0 / Data 1	Reader 2 Spare	Reader 2 Shunt
9	-	Reader 3 Door Contact	Reader 3 Red LED
10	-	Reader 3 REX	Reader 3 Green LED
11	-	Reader 3 Tamper	Reader 3 Strike
12	-	Reader 3 Spare	Reader 3 Shunt
13	-	Reader 4 Door Contact	Reader 4 Red LED
14	-	Reader 4 REX	Reader 4 Green LED
15	-	Reader 4 Tamper	Reader 4 Strike
16	-	Reader 4 Spare	Reader 4 Shunt
17	-	Reader 5 Door Contact	Reader 5 Red LED
18	-	Reader 5 REX	Reader 5 Green LED
19	-	Reader 5 Tamper	Reader 5 Strike
20	-	Reader 5 Spare	Reader 5 Shunt
21	-	Reader 6 Door Contact	Reader 6 Red LED
22	-	Reader 6 REX	Reader 6 Green LED
23	-	Reader 6 Tamper	Reader 6 Strike
24	-	Reader 6 Spare	Reader 6 Shunt
25	-	Reader 7 Door Contact	Reader 7 Red LED
26	-	Reader 7 REX	Reader 7 Green LED
27	-	Reader 7 Tamper	Reader 7 Strike

Table 6: Point Address Attributes for RDR8S

Point Address Value of Child Object	S300 Reader Terminal Object	Security Supervised Input Object	Security Binary Output Object
28	-	Reader 7 Spare	Reader 7 Shunt
29	-	Reader 8 Door Contact	Reader 8 Red LED
30	-	Reader 8 REX	Reader 8 Green LED
31	-	Reader 8 Tamper	Reader 8 Strike
32	-	Reader 8 Spare	Reader 8 Shunt
33	-	Panel Tamper	-
34	-	Power Fail	-
35	-	Panel Battery Low	-