

# Application Note - Kwikset Home Connect™

Application #	Version	Author	Date	Product Line
KHC0112-1	1.3	Ron Darwish	08/27/2012	Kwikset Home Connect™

**Topic: Using the Leviton VRCOP Plug-In Serial Interface Module ASCII commands to control the Kwikset SmartCode® Z-Wave Deadbolt or Lever Locks.**

## Section 1) Introduction

This Application Note is intended to provide the user with the appropriate syntax structure of supported ASCII commands exclusive to the Leviton VRCOP Plug-In Serial Interface Module.

In this application the Leviton VRCOP Plug-In Serial Interface Module acts as an intermediate 2-way communication device taking ASCII commands and translating them into Z-Wave commands between related Controller(s) and the Kwikset SmartCode® Z-Wave Lock(s). This bridges the Kwikset SmartCode® Z-Wave Lock (connected on a Z-Wave network) to respond to ASCII commands issued thru a non-Z-Wave control system, via the Leviton VRCOP Plug-In Serial Interface Module.

The **Kwikset SmartCode® Z-Wave Lock with Home Connect™ Technology** is a Z-Wave enabled motor-driven deadbolt lock with true remote locking and unlocking capability.

The **Leviton VRCOP Serial Interface Module** is a plug-in Serial RS232 ASCII Interface Module, compatible with any Z-Wave enabled network and supports beaming. This device enables the integration of Kwikset SmartCode® Z-Wave door lock(s) into a non-Z-Wave Control Systems (CS<sub>N</sub>).

## Section 2) Supported Lock Functions

Below are the Kwikset SmartCode® Z-Wave Lock / Leviton VRCOP Plug-In Serial Interface Module functions covered in this Application Note:

Supported Lock Functions	Function Number: (Reference Section 8)
➤ Secure (Lock)	#1
➤ Unsecure (Un-Lock)	#2
➤ Report Lock Status (Locked or Un-Locked)	See "Command for Lock Status" under #1 or #2
➤ Set a custom User Code	#3
➤ Report a User Code	
➤ Battery Level Status	#4
➤ Set User Schedule (Day and Time)	#5
➤ Report User Schedule	
➤ Alarm Event Notifications	#6
➤ Set Association	#7
➤ Remove Association	#8

- #1) Secure Door Lock and Confirm Status
- #2) Unsecure Door Lock and Confirm Status
- #3) Set a User-Code and Get Confirmation of setup
- #4) Battery Level Status of Lock
- #5) Set a Week Day Time-Fence Schedule for a User and Confirm setup
- #6) Alarm Event Notifications and Event Classification
- #7) Add Leviton Serial Interface Module to the Lock Association Table
- #8) Remove a Node ID from the Lock Association Table

### Section 3) What You Need

1. Kwikset SmartCode® Z-Wave Deadbolt or Lever Lock(s) with Home Connect™ Technology.
2. Leviton VRC0P-1LW Vizia RF+® Plug-In Serial Interface Module (Note: Product label must have "+3" following the Vizia RF+® VRC0P designation).
3. Z-Wave compatible Control System (CS<sub>Z</sub>).
4. Any (non-Z-Wave) Control System (CS<sub>N</sub>) with an available RS232 serial port. This system will be controlling the Kwikset SmartCode® Z-Wave Deadbolt, or Lever Lock(s), by utilizing the Leviton VRCOP Plug-In Serial Interface Module.

### Section 4) Inclusion to Z-Wave Network

1. Include the Kwikset SmartCode® Z-Wave Deadbolt or Lever Lock(s) into your Z-Wave Control System (CS<sub>Z</sub>) network.

**Note:** Follow the setup instructions included with the Lock and your control system to include this device to your Z-Wave (CS<sub>Z</sub>) network

2. Include the Leviton VRCOP plug-In Serial Interface Module into the same Z-Wave (CS<sub>Z</sub>) mesh network that the Kwikset SmartCode® Z-Wave Deadbolt or Lever Lock is already connected to.

**Note:** Follow the setup instructions included with the Leviton Serial Interface Module and your control system to include this device to your Z-Wave (CS<sub>Z</sub>) network.

3. Once above steps are completed make sure to write down the Z-Wave (CS<sub>Z</sub>) network assigned Node ID of the Lock(s) you want to control via the Leviton Serial Interface Module. You will need the node ID of each lock you want to issue commands to.
4. Verify that associations are set between the Lock(s) and the Leviton VRCOP Plug-In Serial Interface Module on your primary Z-Wave Control System (CS<sub>Z</sub>).

**Note:** Associations are needed to allow the Lock(s) to communicate through the Leviton Serial Interface Module.

### Section 5) RS232 Connectivity Settings

This Application Note is not intended for any person that is unfamiliar with using Terminal Emulation programs and/or ASCII RS232 programming.

NOTE: The following general information applies to the RS232 Interface:

If your PC does not have an RS232 port, you may use a "USB to RS232 Adapter", available for purchase at your preferred Home Automation Superstore.

When using a Terminal Emulation program, make sure to select settings that allow you to see the characters being typed as well as keeping the responses from overwriting the typed characters.

#### Serial Connection Settings

To configure your device to communicate with the interface module, use the following settings:

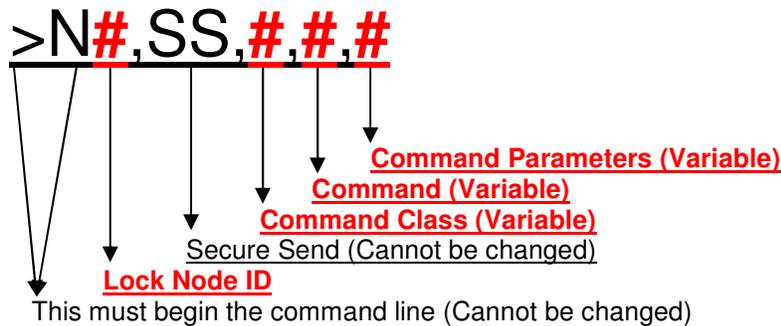
9600 BAUD  
8 DATA  
1 STOP  
NOPARITY

Message format:  
 Use uppercase letters  
 Message must start with: ">"  
 Input string is limited to 80 characters

## Section 6) Understanding the command line structure for the Kwikset SmartCode® Z-Wave Locks

The following is the Kwikset SmartCode® Z-Wave Lock serial ASCII operation command line structure understood by the Leviton VRCOP Plug-In Serial Interface Module:

RED indicate areas where user can enter custom numeric only data.



Note:

- Lock Node ID is obtained from the Z-Wave Control System (CS<sub>Z</sub>) network of the lock.
- Command Parameters length may vary as some commands have multiple segments.
- All letters must be in Uppercase (Caps On)
- All of the above segments must be separated with “,”

## Section 7) Leviton VRCOP plug-In Serial Interface Module command request responses

After receiving commands over the serial port, the Leviton serial interface module will check for any commands and then process them. If the sent command was correct and the device has enough resources to implement the command, the interface module responds with: “<E000” - Indicates No error message (Request Processed).

If any error has been detected or some of the resources requested are unavailable, the node responds with <Exxx, where xxx is the error number. Possible errors are listed below:

- 0 – No error
- 1 – Wrong start of the string symbol
- 2 – Input buffer overflow
- 3 – Cannot start RF transmission. All buffers are taken
- 4 – Cannot start RF transmission because previous one has not finished
- 5 – Unrecognized command
- 6 – Attempt to send the new buffer over RS232 before previous one had been processed
- 7 – The send Message does not have data fields specified
- 8 – Cannot stop SUC mode. Node is SUC
- 9 – EEPROM is busy, can't store group information
- 10 – No devices with specified properties have been found

“<X000” - Indicates No error message (Request Sent).

## Section 8) Kwikset SmartCode® Z-Wave Lock Serial ASCII Commands

The following are the Kwikset SmartCode® Z-Wave Lock serial ASCII operation commands understood by the Leviton VRCOP Plug-In Serial Interface Module:

### Function Number:

#### #1) Secure Door Lock and Confirm Status

Note1: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network of the lock you wish to control.

<b>&gt;N#,SS,98,1,255</b>	<b>- Command to Lock</b>
<E000	- Request Processed
<N003:152,128,090,009,251,128,107,108,232,247	- Security nonce message*
<X000	- Request has been sent

<b>&gt;N#,SS,98,2</b>	<b>- Command for Lock Status</b>
<E000	- Request Processed
<N003:152,128,120,002,035,240,079,104,236,241	- Security nonce message*
<X000	- Request has been sent
<N005:152,064	- Security command class
<n003:000,098,003, <b>255</b> ,000,000,254,254	- Sample Lock Status Response

Lock Mode: 255 =Door Secure “Locked” \ 000 =Door Unsecured “Un-Locked”

This reports the responding Lock Node ID (Matching the command)

#### #2) Unsecure Door Lock and Confirm Status

Note1: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network of the lock you wish to control.

<b>&gt;N#,SS,98,1,0</b>	<b>- Command to Un-Lock</b>
<E000	- Request Processed
<N003:152,128,003,206,204,026,094,025,168,006	- Security nonce message*
<X000	- Request has been sent

<b>&gt;N#,SS,98,2</b>	<b>- Command for Lock Status</b>
<E000	- Request Processed
<N003:152,128,049,008,051,203,015,166,162,245	- Security nonce message*
<X000	- Request has been sent
<N005:152,064	- Security command class
<n003:000,098,003, <b>000</b> ,000,002,254,254	- Sample Lock Status Response

Lock Mode: 255 =Door Secure “Locked” \ 000 =Door Unsecured “Un-Locked”

This reports the responding Lock Node ID (Matching the command)

### #3) Set a User-Code and Get Confirmation of setup

Note1: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network of the lock you wish to control.

Note2: The uppercase “x” below is the Lock User-Code location you wish to set or get (i.e. enter 3 for user-code location 3. Lock supports 1-30).

Note3: The lowercase “xxx” below is the actual User-Code number you wish to set on the Lock (Four or eight digits, for eight digits you will need to extend the parameters to eight xxx segments). Use the following table for the corresponding digits:

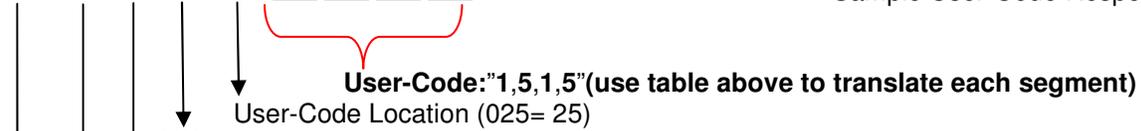
User-Code Conversion Table for Kwikset SmartCode™ Z-Wave Lock - Table 1										
For #	0	1	2	3	4	5	6	7	8	9
Enter “xxx”	048	049	050	051	052	053	054	055	056	057

>N#,SS,99,1,x,1,xxx,xxx,xxx,xxx - **Command Set User-Code**

<E000 - Request Processed  
 <N003:152,128,030,244,245,222,048,161,191,235 - Security nonce message\*  
 <X000 - Request has been sent

>N#,SS,99,2,x - **Command Get User-Code**

<E000 - Request Processed  
 <N003:152,128,015,187,241,081,186,070,034,019 - Security nonce message\*  
 <X000 - Request has been sent  
 <N003:152,064 - Security command class  
 <n003:000,099,003,025,049,053,049,053 - Sample User-Code Response



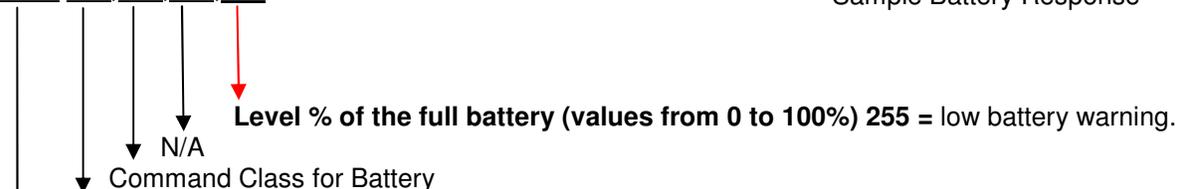
This reports the responding Lock Node ID (Matching the command)

### #4) Battery Level Status of Lock

Note1: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network of the lock you wish to control.

>N#,SS,128,2 - **Command for Battery Get**

<E000 - Request Processed  
 <N003:152,128,043,092,017,203,108,187,123,079 - Security nonce message\*  
 <X000 - Request has been sent  
 <N003:152,064 - Security command class  
 <n003:000,128,003,070 - Sample Battery Response



This reports the responding Lock Node ID (Matching the command)

**#5) Set a Week Day Time-Fence Schedule for a User and Confirm setup**

Note1: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CSz) network of the lock you wish to control.

Note2: The uppercase “x” below is the Lock User-Code location (i.e. enter 3 for User 3. Lock supports 1-30).

Note3: For the lowercase “sid,wd” use the below conversion table:

Week Day Time-Fence Schedule Conversion - Table 2							
Week Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Enter “sid”	1	2	3	4	7	6	7
Enter “wd”	0	1	2	3	4	5	6

Note4: For the lowercase “bhh,bmm,shh,smm” use the below parameters (24 hour format):

bhh = Start Hour

Enter a value from 0 to 23 representing the starting hour of the time fence.

bmm = Start Minute

Enter a value from 0 to 59 representing the starting minute of the time fence.

shh = Stop Hour

Enter a value from 0 to 23 representing the stop hour of the time fence.

smm = Stop Minute

Enter a value from 0 to 59 representing the stop minute of the time fence

- a) The start time of the time-fence must occur prior to the stop time.
- b) For days you want to allow 24hour access: Use 0:0 to 24:59 (24 hour format) to enable access.
- c) For days you do not want to allow the user access: Do not set a schedule command for that day.

Note5: Setting any one week day schedule automatically disables access for non-scheduled days. So remember to set week day scheduling for each day of the week, based on access needs.

>**N#,SS,78,3,1,x,sid,wd,bhh,bmm,shh,smm**

- **Command Set Schedule**

<E000

- Request Processed

<N003:152,128,070,118,127,079,100,102,238,106

- Security nonce message\*

<X000

- Request has been sent

>**N#,SS,78,4,x,sid**

- **Command Get Schedule**

<E000

- Request Processed

<N003:152,128,163,068,137,122,241,121,054,066

- Security nonce message\*

<X000

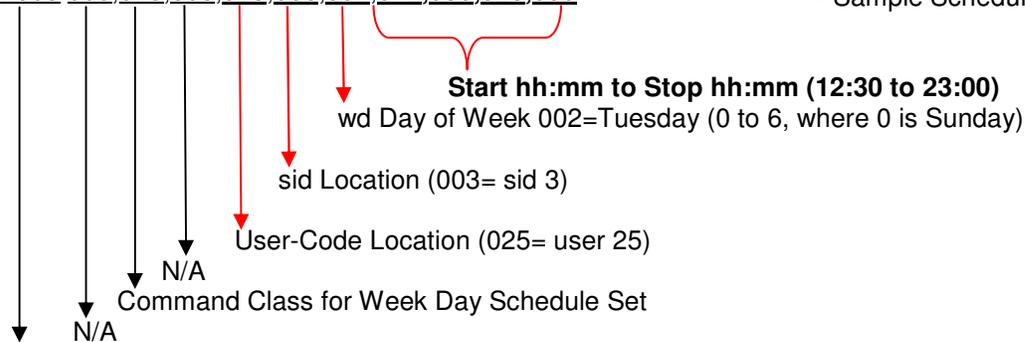
- Request has been sent

<N003:152,064

- Security command class

<n003:000,078,005,**025,003,002,012,030,023,000**

- Sample Schedule Response



This reports the responding Lock Node ID (Matching the command)

**#6) Alarm Event Notifications and Event Classification**

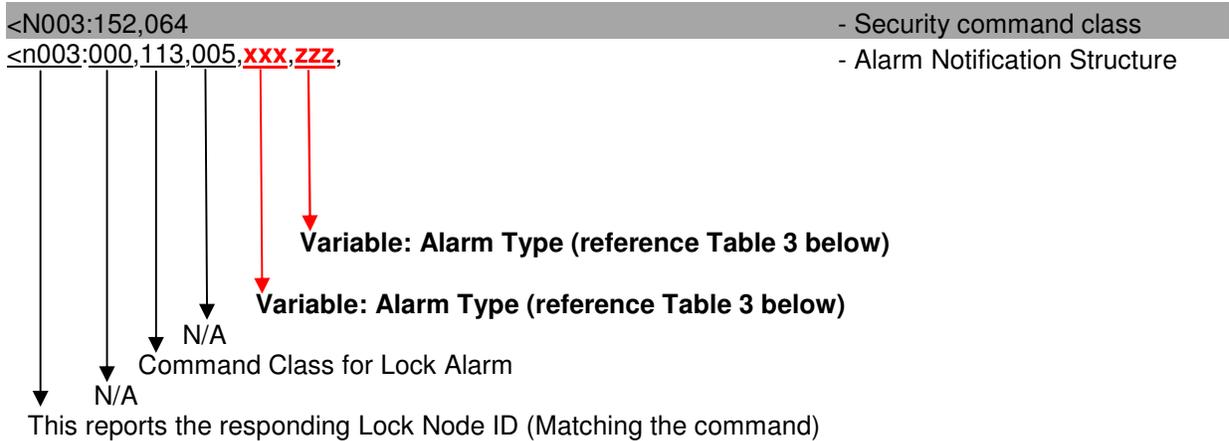
Note1: With the correct association configured the lock is able to securely transmit unsolicited Alarm Event Notifications to the Leviton VRCOP Plug-In Serial Interface Module.

**There is a command class limitation that allows only 1-association with 1-node ID. This means that each Lock can only send unsolicited Alarm Event Notifications to one Node ID. Ensure that the Lock is only associated with the Leviton VRCOP Plug-In Serial Interface Module.**

Note2: Verify that associations are set on your primary Z-Wave Control System (CS<sub>Z</sub>) between the Lock(s) and the Leviton VRCOP Plug-In Serial Interface Module.

Note3: Refer to “Function Number 7” below if you are unable to set associations using your Z-Wave Control System (CS<sub>Z</sub>).

Below is the report structure of the unsolicited Alarm Event Notifications received by the Leviton VRCOP Plug-In Serial Interface Module:



Alarm Event Classification - <b>Table 3</b>		
Alarm Type “xxx”	Alarm Level “zzz”	Notification Event
021	001	Lock Secured using Keyed cylinder or inside thumb-turn
022	001	Lock Un-Secured using Keyed cylinder or inside thumb-turn
026	001	Lock Auto Secured – Bolt Jammed (Not fully extended)
027	001	Lock Auto Secured – Successful (Fully extended)
017	001	Lock Secured at Keypad – Bolt Jammed (Not fully extended)
018	000 or User-ID#*	Lock Secured at Keypad – Successful (Fully extended)
019	User-ID#*	Lock Un-Secured by User (User-ID) at Keypad
023	001	Lock Secured by Controller – Bolt Jammed (Not fully extended)
024	001	Lock Secured by Controller – Successful (Fully extended)
025	001	Lock Un-Secured by Controller – Successful (Fully retracted)
112	User-ID#*	New User Code (User-ID#) added to the lock
032	001	All User Codes deleted from lock
161	001	Failed User Code attempt at Keypad
162	User-ID#*	Attempted access by user (User-ID#) outside of scheduled
167	001	Low battery level
168	001	Critical battery level
169	001	Battery level too low to operate lock

\*User-ID# values: 001 to 030

**#7) Add Leviton VRCOP Plug-In Serial Interface Module to the Lock Association Table**

Note1: Use the following command if you are not able to add the Leviton Serial Interface Module Node ID to your lock association table using your Z-Wave Control System (CS<sub>z</sub>).

Note2: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network of the lock you wish to control.

Note3: The “x” sign below indicates where you need to enter the Leviton VRCOP Plug-In Serial Interface Module Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) network.

> <b>N#,SS,133,1,1,x</b>	- <b>Command Add Association</b>
<E000	- Request Processed
<N003:152,133,030,244,245,222,048,161,191,235	- Security nonce message*
<X000	- Request has been sent

**#8) Remove a Node ID from the Lock Association Table**

Note1: Use the following command to if you are not able to remove a Node ID from your lock association table using your Z-Wave Control System (CS<sub>z</sub>).

Note2: The “#” sign below indicates where you need to enter the Lock Node ID obtained from the Z-Wave Control System (CS<sub>z</sub>) of the lock you wish to control.

Note3: The “x” sign below indicates where you need to enter the Node ID to be removed.

> <b>N#,SS,133,4,1,x</b>	- <b>Command Remove Association</b>
<E000	- Request Processed
<N003:152,133,030,244,245,222,048,161,191,235	- Security nonce message*
<X000	- Request has been sent

\* Note: The Security nonce message is variable response used once in Security Message Encapsulation and should be ignored.

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