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OMNIKEY 5x27 CK

Custom Human Interface Device Protocol

APPLICATION NOTE

DOC-00069, A.0

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Trademarks

Version History

Date	Author	Description	Document Version
03282013	G. Phillips	Initial Release	A.0

Contents

Introduction

This document describes the custom Human Interface Device (HID) protocol introduced in the OMNIKEY® 5x27 CK reader firmware Service Pack 2 release . The HID protocol provides simplified IN reports and a back channel.

Simplified IN reports provide easier processing of keyboard wedge data. A back channel (through the control endpoint) allows reader configuration using the HID protocol.

Requirements

Requirements include the following.

- Computer with an internet browser (for example, Mozilla Firefox®, Internet Explorer® 8, Safari®)
- OMNIKEY 5x27 CK reader running Service Pack 2 firmware

  Note: Verify your firmware version using the *AN0407, OMNIKEY 5x27 CK Firmware Upgrade Application Note*.

1 Switching to Custom HID Mode

The default configuration for the OMNIKEY 5x27 CK is **CCID** mode. Before using the Custom HID Mode, enable the Keyboard Wedge mode and set the output type to **Custom Report**.

The following steps enable Keyboard Wedge mode and Custom Reports.

1. Open a web browser and navigate to the OMNIKEY 5x27 CK web server address (http://192.168.63.99 by default).
2. Click the **Keyboard Wedge** tab
3. Click the **General Config** tab.
4. Check the **Keyboard Wedge Enable** flag and select **Custom Report** for the output type (see Figure 1-1).

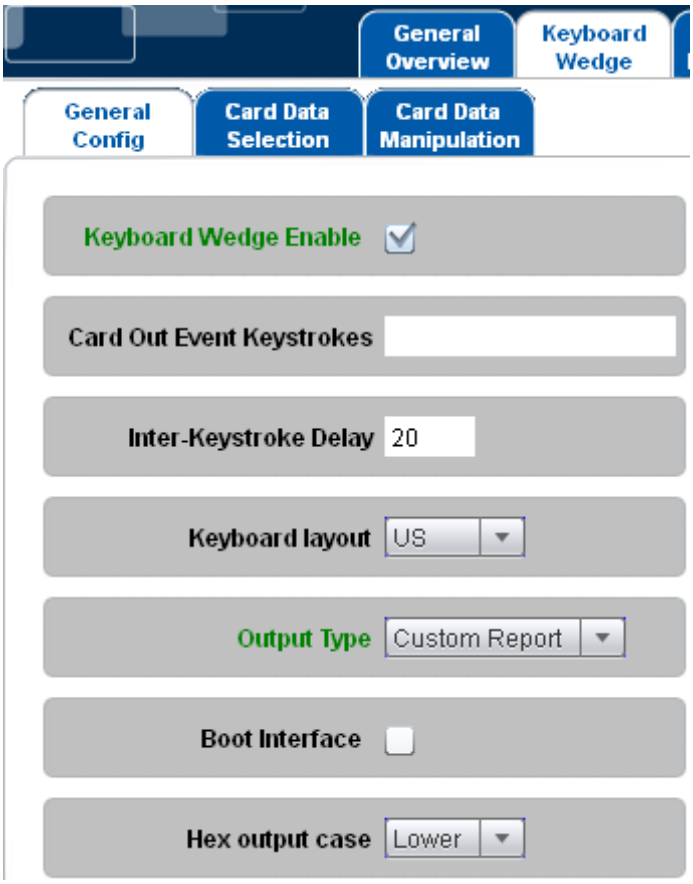

Figure 1-1 Switching to HID Custom Report Mode

5. Go to the **System Config** tab and click **Apply Changes**
6. Click **Reboot System** (see Figure 1-2).

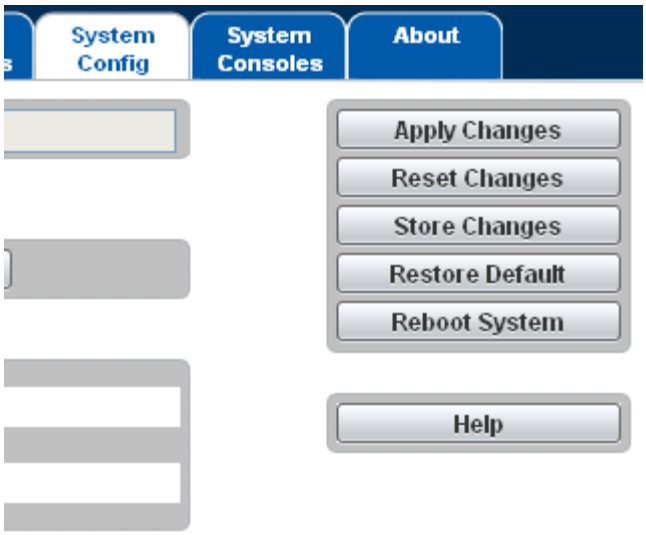

Figure 1-2 Apply changes and reboot

7. Wait while the reader reboots. When the reader restarts, Custom HID mode is configuration is complete.

2 Output Configuration

Output configuration for Custom HID Mode is identical to that for Keyboard Wedge mode.

Set the Keyboard Wedge configuration items such as card type, fields to display, pre-strokes and post-strokes…etc. Therefore, generated is the desired output when presenting a card to the reader. For details about using these configuration options, see the *5127-902 Keyboard Wedge User Guide*.

Set the configuration items in three different ways.

- **Webserver.** To set the configuration using the webserver, see the *5127-902 Keyboard Wedge User Guide*.
- **CCID.** To set the configuration through CCID, see the *5127-903 OMNIKEY 5x27 CK Software Developer Guide*.
- **Custom HID Protocol Back Channel.** Using the back channel for setting the configuration is described later in this document.

3 Custom HID Protocol Output Format

All output packets for the custom HID Protocol have the following format.

Byte	Length	Value
0	1 byte	Output type
1	1 byte	Data length
2	1 byte	Version of packet (0x01)
3 - 39	37 bytes	Output Data

Figure 3-1 Custom HID output format

3.1 Output Type

The Output Type field determines whether the packet contains Keyboard Wedge information or is the response to a command sent through the Keyboard Wedge back channel. The following codes are applicable.

Output Type	Value
Keyboard Wedge Report	0x01
HID Back Channel Reply that ends with this report	0x02
HID Back Channel Reply with more data to follow	0x82

Figure 3-2 Custom HID Report Types

3.2 Data Length

The data length specifies the amount of data contained within the output data.

3.3 Version

The version is for future compatibility and is currently always set to 0x01.

3.4 Output Data

The Output Data contains either the Keyboard Wedge output or the reply to the HID Back Channel Message. For Keyboard Wedge replies, the data is identical to the output in normal Keyboard Wedge mode. The difference is keystrokes are replaced with the ASCII values of the characters produced by those keystrokes. If this is a Back Channel reply, the data is raw binary data containing the reply to the APDU sent to the reader using the back channel.

In either mode, if the data length is not enough to fill the packet, the data is padded with zeroes until the full packet length is reached. If the data is too large for one packet, it is sent in multiple packets.

4 Custom HID Back Channel Protocol

This provides a way of configuring the reader using HID Protocol by wrapping PC/SC APDU's and sending them to the reader through a SET_REPORT command in the USB Control pipe.

The APDU reply from the reader returns through the interrupt IN pipe.

See the *5127-904 OMNIKEY 5x27 Software Developer Guide* for a list of APDU's for configuring the reader.

The following describes the Back Channel SET_REPORT command format.

Description		Value
wValue		0x0300 (feature report type with no report ID)
wIndex		0 (Interface 0 is the keyboard wedge interface)
Data:	1st Byte	Command Code
	2nd Byte	Command Version Number (0x01)
	3rd Byte	Length of data in report
	Up to 61 bytes	APDU data
	Remaining Bytes	If the packet is less than 64 bytes then the pad the report with zeroes to a total length of 64 bytes

Figure 4-1 Custom HID Back Channel Command Format

The following values describe the Command Code.

Command Code	Value
APDU Data	0x6B
APDU Data with more to follow	0xEB
Cancel APDU	0x72

Figure 4-1 Back Channel command codes

APDU Data. The **APDU data** indicates an APDU ending with the current report. The APDU will be processed once this report has been received

APDU Data with more to follow. The message **APDU Data with more to follow** indicates another APDU report will be sent after the present one. Therefore, APDU is not processed until more data has been received. This allows sending APDU's longer than 61 bytes.

Cancel APDU. Discard any previously sent APDU data that has not processed.