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iCLASS® Reader Operation Modes

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Introduction

iCLASS readers and modules operate in one of the following modes.

- Local Mode
- Remote Mode

Local mode

The reader/module polls for a transponder approximately every 100 milliseconds. During transponder polling, the reader/module attempts to perform anti-collision across a number of configurable RF protocols, including ISO15693, ISO14443A, and ISO14443B. When an iCLASS credential is in the field, the reader (default configuration) attempts to authenticate with the HID Access Control Application. The Access Control Application is contained on programmed iCLASS credentials – see [iCLASS Card Programming](#). The card format is then output to all available interface lines excluding host-slave communication lines (see [iCLASS Reader and Module Communications](#)).

Polling using numerous RF protocols allows the module to communicate with non-iCLASS credentials as well. When non-iCLASS cards are found, the reader couples with the credential and outputs numerous other data formats (including MIFARE CSN and FIPS-201 low and medium assurance outputs). See [iCLASS Reader Configurations](#).

Remote mode

The reader/module only executes commands from the host controller via bi-directional communication lines. This allows the host to create customer applications, writing and reading data to the card, using the reader/module as a coupler.

Additionally, the reader can operate in a dual mode (Local and Remote), where the reader/module operates in Local mode until a card read and data is passed to the host. After the host receives the card data, the host sends a command to the reader/module. When the host sends a card specific serial command to the reader (resulting in an RF transmission), the command places the reader into Remote mode. In Remote mode, the Local mode (HID Access Control Application) is temporarily disabled and the reader operates passing data between the reader and the card.

For those applications storing data on iCLASS cards, Dual mode operation is often a desirable operating mode because:

1. The host does not have to expend processing time to poll for a card.
2. Local mode is the easiest way to obtain the access card data, which is commonly by applications in the field.

The remainder of this document discusses operation of Dual mode readers and modules.



Dual Mode Operations

Operating properly in Dual mode means the reader switches back to Local mode after completing Remote mode operations. For the reader to switch automatically back to Local mode, performing the last serial command (card specific) invokes a timer. The timer reaches a specified value, enabling the HID Access Control Application. Shown in Table 1 EEPROM Product Versions, are the timeout values for different reader firmware versions and associated reader types.

Table 1 EEPROM Product Versions

EE Prom Product Version	iCLASS Readers and Modules	Remote Mode Timeout Value
iCL02	RW300, RW400, RWK400, OEM50 REV A	500ms
iCL5	RW300, RW400, RWK400, OEM50 REV A –G2.0	~20sec
BiR01	RWKL550, RWKLB575 REV A	~25sec
UiR02	OEM150 REV A/B, RW100, RW150, RW300, RW400, RWK400 REV B	~30sec

The timeout values indicate that if starting reader transactions in Local mode (HID Access Control Application,) a subsequent transaction cannot occur for approximately 15 seconds (max). Commands manually reset the reader into Local mode before achieving these timeout values.

Commands

Two commands allow a host to place the reader into Local mode, **Reset_RF** and **Control_Mode**.

Reset_RF The Reset_RF command resets the RF field and places the reader into Local mode. This command will work on all of the firmware versions listed in Table 1 EEPROM Product Versions *except* iCL5. When using iCL5 firmware, this command will reset the RF field, but Local mode polling will not occur until the 15sec timeout has elapsed.

Control_Mode The Control_Mode command reboots any BiR01 or UiR02 reader. The reboot causes the reader LED to flash and the sounder to play boot-up tune. After rebooting, the reader will begin operating in Local mode. This command will not work on iCL02 or iCL5 readers.

Anti-Passback

After sending a Control_Mode command, any card in the field automatically causes a card read once the reader is back in Local mode. Anti-passback configuration does not affect this behavior.

After sending a Reset_RF command to a UiR02 reader, the reader performs a card read again. When sending a Reset_RF command to an iCL02 or BiR01 reader, if reading the same card that was previously read (and the card did not leave the RF field for the anti-passback duration,) a card read will not occur.



Double-Reads

For double-read behaviors, the following are suggestions for host handling.

- Do not send a reset command until continued polling for a card returns a card not found. Once the card has left the field, send the reset command.
- Ignore any subsequent reads of the same card number (if a double-read occurs)

The following section describes how to disable user feedback when a card is reads a second time.

Other Behavior

When in Local mode (default) a reader beeps and the LED flashes when reading a card. If desiring Dual mode, use a configuration card to disable this functionality. An operator must control the LED and sounder once the Remote commands have completed.

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