SKYETEK PROTOCOL V3

BASIC EXAMPLES

VERSION 101212

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1 About this Document

This document covers the range of commands used for generic tags including selecting, inventory, and reading, writing, and locking memory.

1.1 Required Reading

This document assumes you have read and are familiar with the SkyeProtocol V3 (STPV3) Guide located at http://www.skyetek.com/docs/commonblade/stpv3guide.pdf

1.2 Revision History

Revision Number	Submitted By	Date
101212	Ryan Smith	Initial Release

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2 Select Tag Command

2.1 Command Description

Selection operations apply to all tag types.

The Select Tag command returns the Unique ID or the EPC code of a tag in the field of the reader. The UID or EPC can later be used to address a specific tag when executing tag-specific commands. The reader has several modes for selecting tags:

Autodetect Mode: Reader automatically selects any recognized tag placed in the detection field.

Loop Mode: Reader detects tags in a continuous loop until loop mode is turned off or until another command stops the loop. This function works only when the Reader ID system parameter is set to FFFFFFFF.

Inventory Mode: Reader selects all tags in the detection field until a tag is placed in the field or until the inventory times out. This lets you read a "stack" of tags instead of reading and selecting each type of tag individually.

NOTE – The format of the Select Tag response is the same for Loop and Inventory Modes.

2.1.1 Using Auto Detect Functionality

- When you set the tag type to Auto-Detect, the reader determines the tag type of any tags in the field and includes this information in the response if any tags are successfully detected. There are several levels of Auto-Detect functionality:
- Auto-Detect – The reader scans for any tag type that it supports and reports back the UID (or EPC for UHF) and tag type of the first tag it detects.
- Air Interface Auto-Detect – The reader scans for the first tag with the specified air interface and reports back its UID (or EPC for UHF) and the tag type it detected. Tag types of different air interfaces are not reported.
- Manufacturer and Air Interface Specific Auto-Detect – The reader scans for the first tag with the specified manufacturer and air interface and reports back its UID (or EPC for UHF) and tag type. Tag types of different manufacturers with the same air interface are not reported.
- Tag Type Specific Select – The reader scans for the first tag of the specified tag type and report its UID (or EPC for UHF). The tag type is *not* reported, nor is any other tag types in the field.

2.2 Command Structure

2.2.1 Flags

This and all commands use the CRC flag for binary mode communication. In addition, this command allows the optional flags Loop, Inventory, RF, and TID.

Note – Other flags may be included for air interface specific tags.

2.2.2 Fields

This command requires the basic command request fields start, message length, flags, command, tag type, and CRC.

2.3 Example 1 – Selecting a tag using Auto-detect tag type

2.3.1 Request

Start	Message Length	Flags	Command	Tag Type	CRC
02	0008	0020	0101	0000	F81A

2.3.2 Response

Start	Message Length	Command Response	Tag Type	TID Length	TID	CRC
02	0010	0101	0111	0008	E00700001E40CEBC	9CDB

The response shown is for a Tag It HFI Tag as indicated by the tag type (0x0111). In addition to the tag type code the reader response will also include the TID of the tag in the reader's field.

2.4 Example 2 – Selecting a tag using tag type

This example illustrates selecting a tag using a known tag type.

2.4.1 Request

Start	Message Length	Flags	Command	Tag Type	CRC
02	0008	0020	0101	0210	DB2B

In this request the tag type field has been replaced with the tag type code (0x0210) corresponding to a SRIX4k tag. This will limit the readers to respond with the first TID of the tag type selected.

2.4.2 Response

Start	Message Length	Command Response	TID Length	TID	CRC
02	0010	0101	0008	D0020D051E10F2AE	A569

The reader responds with the TID of the first tag matching the requested tag type. Notice that when the tag type is not set to auto-detect the tag type is not returned by the reader.

2.5 Example 3 – Selecting a supported tag continuously (Loop Mode)

Loop mode sets up continuous monitoring for any tag type that enters the detection field. The first time you send this command, the reader responds that it is in loop mode. The reader then sends a response whenever a tag enters the field or whenever the current tag changes. Sending any command to the reader brings it out of loop mode.

NOTE – Loop mode is designed for demonstrations and read range testing. Therefore, loop mode only works when the reader ID is set to the factory default of FFFFFFFF. In typical working applications, readers with unique reader IDs are grouped together on one port or host; they do not need to remain in loop mode, because the host system usually switches between different readers quickly and frequently.

NOTE – When using Loop mode, place only one tag at a time in the reader's detection field. Refer to the *SkyeTek Development Kit User Guide* for more information about using Loop mode to test read range and about anti-collision capabilities for multiple tags.

2.5.1 Request

Start	Message Length	Flags	Command	Tag Type	CRC
02	0008	0021	0101	0000	F35E

In this request the tag type is again set to auto-detect however now the loop mode flag is set.

2.5.2 Response

Start	Message Length	Command Response	CRC
02	0004	01C1	AD3C

The reader will first respond with the command response (0x01C1) indicating that the reader has entered loop mode. The reader will now continually read and report any tags that it detects in its field. The following table shows an example of what the reader's output might be while in loop mode.

Start	Message Length	Command Response	Tag Type	TID Length	TID	CRC
02	0010	0101	0111	0008	D0020D051E10F2AE	9CDB
02	0010	0101	0111	0008	D0020D051E10F2AE	9CDB
02	0010	0101	0111	0008	D0020D051E10F2AE	9CDB
...						
02	000F	0101	0211	0007	045B84E1C80280	A0E3
02	000F	0101	0211	0007	045B84E1C80280	A0E3
02	000F	0101	0211	0007	045B84E1C80280	A0E3

After you send another command the reader will send the following response indicating that loop mode has ended.

Start	Message Length	Command Response	CRC
02	0004	81C1	21F0

2.6 Example 4 - Selecting tags using inventory mode

Inventory mode permits reading of all tags in the detection field. This lets you read a "stack" of tags instead of having to read each type of tags individually. This mode gives you an easy way to test or demonstrate the reader's anti-collision capabilities.

2.6.1 Request

Start	Message Length	Flags	Command	Tag Type	CRC
02	0008	0022	0101	0000	EE92

In this request the inventory flag has been selected. This initiates the reader's anti-collision algorithm allowing the reader to detect and report multiple tags in the reader's field simultaneously.

2.6.2 Response

The following response table illustrates what the readers output might look like for 4 different tags placed in the readers field.

Start	Message Length	Command Response	Tag Type	TID Length	TID	CRC
02	000F	0101	0211	0007	045B84E1C80280	A0E3

02	0010	0101	0111	0008	E00700001E40CEBC	9CDB
02	0010	0101	0351	0008	D0020D051E10F2AE	F2B7
02	0010	0101	0212	0004	F26F07EC	4695
02	0004	810F				0E82

Notice at the end of the inventory after the reader has reported all available tags the reader sends the inventory complete response (0x810F).

2.7 Example 5 – Establishing a session (Selecting a tag using TID)

A session establishes communication between the reader and a specific tag. The RF flag must remain on after a session is established so that the reader and the tag can maintain the communication session.

2.7.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	CRC
02	000D	0060	0101	0212	0004	F26F07EC	8AB3

In this request the TID flag is set and so a TID is added to the request.

2.7.2 Response

Start	Message Length	Command Response	Data Length	Data	CRC
02	0007	0101	0001	01	037F

The TID was included in the request so the reader returns neither the tag type nor the TID. Instead it includes a data length and data fields. The data field returned by this command contains a session number which can be used to maintain communication with a single tag.

3 Read Tag Commands

3.1 Command Description

The Read Tag command reads data from the nonvolatile memory of a tag. You can read single or multiple memory blocks. The command as described in this application note assumes that the tag is generic and doesn't require authentication to read memory.

3.2 Command Structure

3.2.1 Flags

The read tag command requires the TID or sessions flag to be set.

3.2.2 Fields

The read tag command requires that a TID or session number be included depending which flag is set. In addition, this command requires a block address, tag type, and number of blocks to read.

3.3 Example 1 – Reading one block of data

3.3.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	Number Blocks	CRC
02	0015	0060	0102	0111	08	E00700001E40CEBC	0000	0001	11A8

This request instructs the reader to read one block of memory starting at address 0x0000.

3.3.2 Response

Start	Message Length	Response Code	Data Length	Data	CRC
02	000A	0102	0004	FFFFFFFF	8C8D

The reader's response includes the block data from the requested address.

Note – The SkyeTek Protocol V3 automatically handles the block size for the requested tag type.

3.4 Example 2 –Reading multiple blocks of data

3.4.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	Number Blocks	CRC
02	0015	0060	0102	0132	08	E0020472C4502CD6	0000	0003	DB78

This request instructs the reader to read three block of memory starting at address 0x0000.

3.4.2 Response

Start	Message Length	Response Code	Data Length	Data	CRC
02	0012	0102	000C	000000000000000000000000	0D67

The reader's response includes three blocks of data starting from the requested address.

4 Write Tag Command

4.1 Command Description

The Write Tag command writes data to the nonvolatile memory of a tag. If the lock flag is set, the block is locked (for supported tags).

4.2 Command Structure

4.2.1 Flags

This command requires the TID (unless RF flag is set and a session is started), Data, and CRC (if binary mode)

4.2.2 Fields

This command requires the tag type, TID, address, number of blocks, data length, and data fields as well as the usual message length, start, flags, and stop fields.

4.3 Example 1 – Writing one block of data

4.3.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	Number Blocks	Data Length	Data	CRC
02	001B	0860	0103	0111	08	E00700001E40CEBC	0000	0001	0004	11223344	0004

This request instructs the reader to write the data 0x11223344 to the address 0x0000.

4.3.2 Response

Start	Message Length	Command Response	CRC
02	0004	0103	4822

The reader echoes back the command message indicating a success.

4.4 Example 2 – Writing multiple blocks of data

4.4.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	Number Blocks	Data Length	Data	CRC
02	001B	0860	0103	0111	08	E00700001E40CEBC	0000	0002	0008	1122334455667788	5283

This request instructs the reader to write the data 0x1122334455667788 to the address 0x0000. This operation fills two blocks of data.

4.4.2 Response

Start	Message Length	Command Response	CRC
02	0004	0103	4822

The reader echoes back the command message indicating a success.

5 Lock Tag Commands

5.1 Command Description

Lock commands either get the lock status of a tag or lock a block on a tag.

5.2 Command Structure

5.2.1 Flags

This command requires the TID (unless RF flag is set and a session is started), Data, Lock, and CRC (if binary mode)

5.2.2 Fields

This command requires the same fields as the write tag command.

Note – If the lock flag is used the data field must be included however it is not written to the block before it is locked. The data is there for dummy purposes.

5.3 Example 1 – Locking one block of data

5.3.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	Number Blocks	Data Length	Data	CRC
02	001B	0864	0103	0121	08	E0020472C4502CD6	0000	0001	0004	XXXXXXXX	XXXX

This request instructs the reader to lock the block at address 0x0000. The data is marked as X's indicating a do not care. The CRC is not calculated for dummy data.

5.3.2 Response

Start	Message Length	Command Response	CRC
02	0004	0103	4822

The reader echoes back the command message indicating a success.

5.4 Example 2 – Getting the lock status of block of data

5.4.1 Request

Start	Message Length	Flags	Command	Tag Type	TID Length	TID	Address	CRC
02	0013	0060	0108	0131	08	E0020472C4502CD6	0000	DFCE

This request instructs the reader to get the lock status of the block at address 0x0000.

5.4.2 Response

Start	Message Length	Command Response	Data Length	Data	CRC
02	0007	0108	0001	00 (not locked) / 01 (locked)	EB95 / FA1C

The reader echoes back the command message indicating a success. In addition the data field will contain 0x00 if the block address is unlocked and 0x01 is the block is locked.