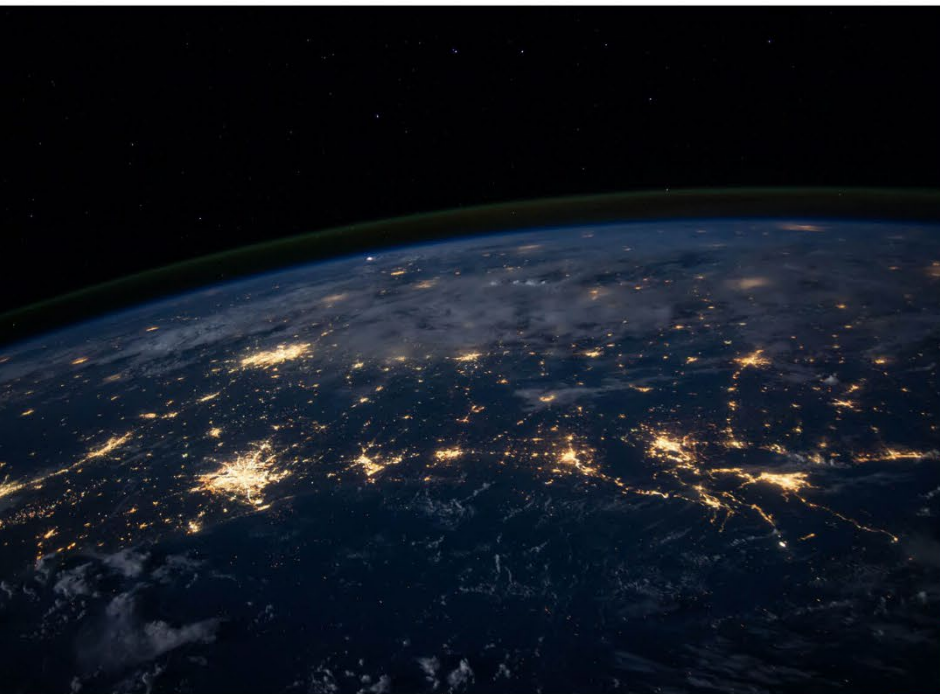


Ubiik SECS Interface Reference

V. 2.0



Authors

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Revision History

Date	Version	Comment	Author
2020.02	1.0	Draft of interface document	CY
2020.03.09	1.1	<ol style="list-style-type: none"> 1. Add data type in the data element of each message 2. Add the message S2F31 ~ S2F38 to support dynamically configure the event report 3. Add the message S1F13 to support querying the tag information 4. Add new host command of TagUpdate to update the tag display 	CY
2020.03.24	1.2	<ol style="list-style-type: none"> 1. To get the the tag information, the message S2F41 is used to send the host command of "TagInfoAcquire"; once the tag information is acquired, a report of event with the associated data ID will be sent if the event is linked to a report and the event report is enabled. 2. Extend the max region to 12 	CY
2020.07.02	1.3	<ol style="list-style-type: none"> 1. Fix the data structure of SVID 2 & 3; the data structure of those Status Variables should be a list of tag information, instead of the information of one single tag 	CY
2020/07/27	1.4	<ol style="list-style-type: none"> 1. XCoord / YCoord changed to 2 bytes unsigned 2. Barcode width changed to 2 bytes unsigned 3. Add CEID for "Base Station is connected" 4. Add support for ASCII for font name 	Fabien Petitgrand
2020/09/15	1.5	<ol style="list-style-type: none"> 1. Add refresh time to TagStatus 2. Change RSSI from I1 to I2 3. Change updateStatus from B to I1 	Fabien Petitgrand
2021/02/17	1.6	<ol style="list-style-type: none"> 1. Add DeviceName host command 2. Remove unused region commands 	Fabien Petitgrand
2021/09/14	1.7	<ol style="list-style-type: none"> 1. Update TagImage to reflect current implementation 	Fabien Petitgrand
2021/10/4	2.0	<ol style="list-style-type: none"> 1. Added version column to this revision history table and generated stable release version. 	Siraj Sabihuddin, Yiyun Huang

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Part I - Summary of Supported Messages

I.1 supported messages initiated by the host

Message received by the equipment	Response Message
SxF0	-
S1F1	S1F2
S1F3	S1F4
S1F13	S1F14
S2F33	S2F34
S2F35	S2F36
S2F37	S2F38
S2F41	S2F42

I.2 supported messages initiated by the equipment

Message initiated by the equipment	Expect response Message
S1F1	S1F2
S1F13	S1F14
S6F11	S6F12
S9F1	-
S9F3	-
S9F5	-
S9F7	-

Part II - details of supported messages

II.1 S1

II.1.1 S1F1 Are You There Request (R)

Establishes if the equipment is on-line.

Structure:

Header only

II.1.2 S1F2 On Line Data (D)

Data signifying that the equipment is alive.

Structure:

L,2

1. <MDLN> (ASCII)
2. <SOFTREV> (ASCII)

Exception:

The host sends a zero-length list to the equipment.

II.1.3 S1F3 Selected Equipment Status Request (SSR)

A request to the equipment to report selected values of its status. The SVID numbers are listed in the VID table in the Appendix B.

Structure:

L,n

1. <SVID 1> (2 byte unsigned)
- ..
- n. <SVID n>

Exception: A zero-length list means report all SVIDs.

II.1.4 S1F4 Selected Equipment Status Data (SSD)

The equipment reports the value of each SVID requested in the order requested.

Structure:

L,n

1. <SV 1> (variable data types, see the Appendix for details)
- ..
- n. <SV n>

Exceptions: A zero-length list item for SV_i means that SVID_i does not exist.

II.1.5 S1F13 Establish Communications Request (CR)

The purpose of this message is to provide a formal means of initializing communications at a logical application level both on power-up and following a break in communications. It should be the following any period where host and Equipment SECS applications are unable to communicate. An attempt to send an Establish Communications Request (S1F13) should be repeated at programmable intervals until an Establish Communications Acknowledge(S1F14) is received within the transaction timeout period with an acknowledgement code accepting the establishment.

Structure:

- For the equipment:

L,2

1. <MDLN> (ASCII)
2. <SOFTREV> (ASCII)

- For the host
Header only

II.1.6 S1F14 Establish Communications Request Acknowledge (CRA)

Accept or deny Establish Communications Request (S1F13). MDLN and SOFTREV are on-line data and are valid only if COMMACK = 0.

Structure:

- For the equipment

L,2

1. <COMMACK> (1 byte binary)

2. L,2

1. <MDLN> (ASCII)

2. <SOFTREV> (ASCII)

- For the host

L,2

1. <COMMACK> (1 byte binary)

2. L,0

II.2 S2

II.2.1 S2F33 Define Report (DR)

The purpose of this message is for the host to define a group of reports for the equipment. Only the type of S6F11 report is supported.

Structure:

L,2

1. <DATAID> (2 byte unsigned)

2. L,a *number of reports

1. L,2 *report 1

1. <RPTID 1> (2 byte unsigned)

2. L,b *number of VIDs in the report

1. <VID 1> (2 byte unsigned)

..

b.<VID b>

..

a. L,2 *report a

1. <RPTID a>

2. L,c *number of VIDs in the report

1. <VID 1>

..

c. <VID c>

Exceptions:

1. A list of zero-length following <DATAID> deletes all report definitions and associated links.
2. A list of zero-length following <RPTID> deletes report type RPTID. All CEID links to this RPTID are also deleted.

II.2.2 S2F34 Define Report Acknowledge (DRA)

Acknowledge or error If an error condition is detected the entire message is rejected (i.e., partial changes are not allowed).

Structure:

<DRACK> (1 byte binary)

where DRACK:

- 0 - ok
- 1 - out of space
- 2 - invalid format
- 3 - 1 or more RPTID already defined
- 4 - 1 or more invalid VID

II.2.3 S2F35 Link Event Report (LER)

The purpose of this message is for the host to link n reports to an event (CEID). These linked event reports will default to 'disabled' upon linking. That is, the occurrence of an event would not cause the report to be sent until enabled. See S2F37 for enabling reports.

Structure:

```
L,2
  1. <DATAID> (2 byte unsigned)
  2. L,a *number of events
      1. L,2 *event 1
          1. <CEID 1> (2 byte unsigned)
          2. L,b *number of RPTIDs in the report
              1. <RPTID 1> (2 byte unsigned)
              ..
              b.<RPTID b>
          ..
      ..
```

a. L,2		*event a
1. <CEID a>		
2. L,c		*number of RPTIDs in the report
1. <RPTID 1>		
..		
c. <RPTID c>		

Exception:

1. A list of zero length following DATAID deletes all links to all events.
2. A list of zero length following CEID deletes all report links to that event.

II.2.4 S2F36 Link Event Report Acknowledge (LERA)

Acknowledge or error If an error condition is detected the entire message is rejected (i.e., partial changes are not allowed).

Structure:

<LRACK> (1 byte binary)

where LRACK:

- 0 - ok
- 1 - out of space
- 2 - invalid format
- 3 - 1 or more CEID links already defined
- 4 - 1 or more CEID invalid
- 5 - 1 or more RPTID invalid

II.2.5 S2F37 Enable/Disable Event Report (EDER)

The purpose of this message is for the host to enable or disable reporting for a group of events (CEIDs).

Structure:

- L,2
 - 1. <CEED> (1 byte Boolean) *1: enable / 0: disable
 - 2. L,n *number of CEIDs
 - 1. <CEID 1> (2 bytes unsigned)
 - ..
 - n. <CEID n>

Exception: A list of zero length following <CEED> means all CEIDs.

II.2.6 S2F38 Enable/Disable Event Report Acknowledge (EERA)

Acknowledge or error If an error condition is detected the entire message is rejected, i.e., partial changes are not allowed.

Structure:

- <ERACK> (1 byte binary)

where ERACK:

0 - ok

1 - denied

II.2.7 S2F41 Host Command Send (HCS)

The Host requests the Equipment perform the specified remote command with the associated parameters. See [Appendix C](#) for the details about the remote command.

Structure:

- L,2
 - 1. <RCMD> (ASCII) *see [Appendix C](#)
 - 2. L,n # of parameters
 - 1. L,2
 - 1. <CPNAME 1> (ASCII) *parameter 1 name
 - 2. <CPVAL 1> (1 byte unsigned/ASCII) *parameter 1 value
 - ..

n. L,2

1. <CPNAME n> *parameter n name
2. <CPVAL n> *parameter n value

II.2.8 S2F42 Host Command Acknowledge (HCA)

Acknowledge Host command or error. If command is not accepted due to one or more invalid parameters (i.e., HCACK=3), then a list of invalid parameters will be returned containing the parameter name and reason for being invalid.

Structure:

L,2

1. <HCACK> (1 byte binary)
2. L,n # of parameters
 1. L,2
 1. <CPNAME1> (ASCII) *parameter 1 name
 2. <CPACK 1> (1 byte binary) *parameter 1 reason
 - ..
 - n. L,2
 1. <CPNAME n> *parameter n name
 2. <CPACK n> *parameter n reason

where HCACK:

- 0 - ok, completed
- 1 - invalid command
- 2 - cannot do now
- 3 - parameter error
- 4 - initiated for asynchronous completion
- 5 - rejected, already in desired condition

and CPACK:

- 1 - unknown CPNAME
- 2 - illegal value for CPVAL
- 3 - illegal format for CPVAL

Exception:

If there are no invalid parameters, then a list of zero length will be sent for item 2.

II.3 S6

II.3.1 S6F11 Event Report Send (ERS)

This message is for the equipment to send to the host a group of reports to the host upon the occurrence of an event (CEID).

Structure:

```
L,3
  1.<DATAID>                (2 byte unsigned)
  2.<CEID>                   (2 byte unsigned)
  3.L,a
    1. L,2
      1. <RPTID1>            (2 byte unsigned)
      2. L,b
        1.<V1>               (variable data type, see Appendix for
        details)
        ..
        b.<Vb>
      ..
    a. L,2
      1. <RPTIDa>
      2. L,c
        1. <V1>
        ..
        c.<Vc>
```

II.3.2 S6F12 Event Report Acknowledge (ERA)

Acknowledge or error

Structure:

```
<ACKC6>                (1 byte binary)
```

where ACK6:

0: accepted,

otherwise, error / not accepted

II.4 S9

II.4.1 S9F1 Unrecognized Device ID (UDN)

The device ID in the message block header did not correspond to any known device ID in the node detecting the error.

Structure: header only

II.4.2 S9F3 Unrecognized Stream Type (USN)

The equipment does not recognize the stream type in the message block header.

Structure: header only

II.4.3 S9F5 Unrecognized Function Type (UFN)

This message indicates that the function in the message ID is not recognized by the receiver.

Structure: header only

II.4.4 S9F7 Illegal Data (IDN)

This message indicates that the stream and function were recognized, but the associated data format could not be interpreted.

Structure: header only

Appendix A - Event IDs

<CEID>	Event description
31	Tag is connected
32	Tag is disconnected
33	Tag battery level is low
34	Base Station is disconnected
35	Tag update status
36	Tag information is acquired
37	Base Station is connected

Appendix B - Variable IDs

<VID>	Description	Name	Unit	Format
1	UUID list of tags	UUID_List	N/A	<pre><L[n] <A "UUID 1"> ... <A "UUID n"> >.</pre>
2	Status of tag update	TagUpdateSts	N/A	<pre><L[n] <L[3] <A "UUID 1"> <I2 "status"> *0: OK / Not-0: error <B "reason"> <A "refreshTime"> > ... <L[3] <A "UUID n"> <I2 "status"> <B "reason"> <A "refreshTime"> > >.</pre>
3	tag information	TagInfo	N/A	<pre><L[n] < L[6] <A "UUID 1"> <B "status"> *0: absent / 1:present <A "last connected time"> <A "last updated time"> <I2 "last UL RSSI"> <U1 "battery capacity percentage"> *only if available > ... < L[6] <A "UUID n"> <B "status"> *0: absent / 1:present <A "last connected time"> <A "last updated time"> <I2 "last UL RSSI"> <U1 "battery capacity percentage"> > >.</pre>

Appendix C - examples of configuring event report

S2F33_DefineReports: S2F33

```
<L[2]
  <U2 1>                                *DataID 1
  <L[3]
    <L[2]
      <U2 1>                                *RPTID 1
      <L[1]
        <U2 1>                                *VID 1
      >
    >
  <L[2]
    <U2 2>                                *RPTID 2
    <L[1]
      <U2 2>                                *VID 2
    >
  >
  <L[2]
    <U2 3>                                *RPTID 3
    <L[1]
      <U2 3>                                *VID 3
    >
  >
>
```

S2F35_LinkEventReport: S2F35

```
<L[2]
  <U2 1>                                *DataID 1
  <L[6]
    <L[2]
      <U2 31>                            *CEID 31
      <L[1]
        <U2 1>                                *RPTID 1
      >
    >
  <L[2]
```

```

    <U2 32>          *CEID 32
    <L[1]
      <U2 1>          *RPTID 1
    >
  >
  <L[2]
    <U2 33>          *CEID 33
    <L[1]
      <U2 1>          *RPTID 1
    >
  >
  <L[2]
    <U2 34>          *CEID 34
    <L[1]
      <U2 1>          *RPTID 1
    >
  >
  <L[2]
    <U2 35>          *CEID 35
    <L[1]
      <U2 2>          *RPTID 2
    >
  >
  <L[2]
    <U2 36>          *CEID 36
    <L[1]
      <U2 3>          *RPTID 3
    >
  >
  >
>.
```

S2F37_EnableAllEventReports: S2F37

```

<L[2]
  <BOOLEAN 1>      *enable
  <L[0]>
>.
```

Appendix D - Remote Commands

<RCMD>	Description	<CPNAME>	Format	Value range
TagRefresh	Refresh tag by specifying: <ul style="list-style-type: none"> - Tag UUEID - Template index 	UUEID	32 bytes ASCII	
		Templdx	1 byte Unsigned	
TagImage	Write tag background image by specifying: <ul style="list-style-type: none"> - Tag UUEID - Background image index - Image type - Image content, or image filename 	UUEID	32 bytes ASCII	
		ImageIndex	1 byte Unsigned	
		Type	ASCII (optional)	"NMP" "GIF" Auto-detect if not specified
		Filename*	ASCII (optional)	Filename of the image file stored locally on the Controller's machine *: Filename and Content are mutually exclusive. Exactly 1 is required.
		Content*	ASCII (base64) or Binary	Image file content (base64 representation or raw binary) *: Filename and Content are mutually exclusive. Exactly 1 is required.
TagUpdate	Update the tag with the content to be displayed using the specific template The parameters of Content1 ~ Content8 are optional;	UUEID	32 bytes ASCII	
		Templdx	1 byte Unsigned	
		Content1	ASCII	Optional field If present, the region should be updated with the

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	those mean the content to be updated and displayed in the region 1 ~ 12. For example, if the parameter Content1 is present, it means the region 1 will be updated with the content in Content1.			content
		Content2	ASCII	Same as above
		Content3	ASCII	Same as above
		Content4	ASCII	Same as above
		Content5	ASCII	Same as above
		Content6	ASCII	Same as above
		Content7	ASCII	Same as above
		Content8	ASCII	Same as above
		Content9	ASCII	Same as above
		Content10	ASCII	Same as above
		Content11	ASCII	Same as above
		Content12	ASCII	Same as above
TagInfoAcquire	Acquire tag information Note: When the command is received, reports of event <36> with the associated data ID <3> will be sent if the event is linked to a report and the event report is enabled	UUEID	32 bytes ASCII	
DeviceName		DeviceType	1 byte Unsigned	1: End Device (default) 2: Base Station 3: Base Station Controller
		UUEID	32 bytes ASCII	
		Name	ASCII	Not present or empty to remove the name

Appendix E - Message Examples

E.1 update tag display

S2F41_RCMD(TagUpdate): S2F41

```
<L[2]
  <A "TagUpdate">   *RCMD: "TagUpdate"
  <L[3]
    <L[2]
      <A "UUEID">
      <A "000EA29E40AE193E6875F67C1AF7D61C">
    >
    <L[2]
      <A "Templdx">
      <U1 1>           *template 1 is used
    >
    <L[2]
      <A "Content1">
      <A "Hello World"> *change the content of region 1
    >
  >
>.
```

E.2 notifying tag being connected

S6F3_ReportTagConnected: S6F11

```
<L[3]
  <U2 1>
  <U2 31>           *CEID of tag connected
  <L[2]
    <U2 1>           *RPTID
    <L[1]
      <A "000EA29E40AE193E6875F67C1AF7D61C">
    >
  >
>.
```

E.4 Refresh tag with template

S2F41_RCMD(TagRefresh): S2F41

```
<L[2]
  <A "TagRefresh"> *RCMD: "TagRefresh"
  <L[2]
    <L[2]
      <A "UUEID">
      <A "000EA29E40AE193E6875F67C1AF7D61C">
    >
  <L[2]
    <A "Templdx">
    <U1 3> *template index 3
  >
>
>.
```

E.5 Write tag template image

S2F41_RCMD(TagImage): S2F41

<L[4]

<A TagImage> *RCMD: TagImage

<L[3]

<L[2]

<A "UUEID">

<A "000EA29E40AE193E6875F67C1AF7D61C">

>

<L[2]

<A "ImageIndex">

<U1 3> *template index 3

>

<L[2]

<A "Type">

<A "BMP">

>

<L[2]

<A "Content">

<A

```
"iVBORw0KGgoAAAANSUUEGAAALQAAAC0CAMAAAAKE/YAAAAAnFBMVEX///8Db3v
mTR+fyM04jZd6s7kVeYQOdYG+2t3t9fbh7u9TnaUhgluXxMn0+flEIJ3K4ePV5+lqqrGz1NeHu
8DN4uX//PtfpKt1sLfa6uzw9/f1u6m41tqpztLrc06MvcMth5Hse1nZrZf98OzWkXT40MT2wrL87ej
oXDH63dXqbEfpYjncZ0D1uKX62M795+HxnYTvjW/tf17xnIK2VjDjAAAFkUIEQVR4nO2aCXe
bOBRG5QUbg9mFAcETp2k6Zp25v//t+FJQHlExzhNk3bOd89pg7VePyQBwowBAAAAAAAA
AAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAAPA3cXVze3xvh0v5NJ1Ob99b4lLuGumb95a4IOP19
OH+vSUuZvP98b0VgMU2mxncVTczaTPrpE06XjXyq9LxvkkQ59S1WpplSbepVWw/34lI9Shfpe
9OeiWHic2iDE1eHC1NzjyTiR+nvQl+Swnfm4Ns0mW+s0rxtDvJuh3oRHxJtzmlVM78lBfzez1N
5vpL1ctuzl4m/yDJO90ArazTn3QU9JuaBG2hbdTrxHvayRpp6EQVxhZPeorUd4qX/RwZuY8Pn
VD/JOIPw9KT9kwXpZrJTSfPRtqqoqQLR1GKcrV1DnyVU1Djh9CEul1MRaDINyYkD21TnRqkM
jmUdiczK5qiE77tS2fOoJeSjvWnkEx9E4OZtktdeBEqK9V+j8k/ailfTZUI53Ywy4stFky6XTSlbYQ
XiZ9YZ1EwWkhmp9RcKx6VI3Lww8m1N9NoPvSooacB1EnTixvPq7FOaC5O7ftTkizmKqckqb
MhddK29UpWo48PFkoP2/okAL98DgsbWrMO6dTxNdExq5yUto7J73U7Z2QNqG2Az1euhor
HVa5or5AOjTY0psvjevXJtQ3VqDPSLumqXyc9lOfOgvYSOnl2rC0pGWor8SN5PTfNvF56YXV1
ijpqnVZGy3dR0tvPotRTWv0w8dx0j3OSm/X/SovlC51OTEbnzQ6rjcvkl6eky6p1KFQ+BcMj0W
HddYWU+NCjJR0t2mFrLgaektiaU6/ZLVY9XB3ObcyEuKtfadld5122JnpOlgbS7cyQXSbBg9
AUWov42SjvUNPC/du+y8gvR1OwGP7dr36tL1a0uLQP8Qh9+sUA9Jcy3tsgGej/ThYukdHWVD
PW1EoOXDy+Zrc/xlMyS9ojVL3nH4nUk1SjpprgvLXKdX46RDWtvmWeh5sW9CXQn1CQd6c
```


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```
lu3SUtPZ2zdBKrqbMTkVH361q3Nk5a3dMvLQlr0O0lRVxmvhx1BV1Y1HasoHfaWq/OSdeTfn
NjpJ8+bnAT6A+6xpX++PTJRT9s5P0HJHUKnruMp/3WjDR9BesBNDYNNhel3gOXkBaj+ME
8jotQi8A/kU7NOhv3L4pm3HRmO0m3iwbvDW+ko/l8bk03r/kc6WeM3KFsjXjEeLxusHeu7ijhT
hksdOGO7KwX4aywm1J9ZM0ht4slTYKesgnvdb+w30B/yfsrgPRbAem3AtJvBaTfir9SetbcjA3e
Nf/JhOaWGwAAAAB/AKs4FjtqXhzTe+Awj2N6+l+pV7E72n4lxX5AFcf6g9wgSHZxKlvqre1Q7
neEuo1tKP9RabN194vw1NITm37p0L5DHjkOyYv/wrIM6O1mll5x+o5D243eIWGeeM8xKwKnc
dzxpmC7/+MVjMVbVINJTru/Oz9kNe0WuUXAV/3eXyqtdnlK+cdVP0UQ0oHaZxHSoXoh40X
FVkgngqgorqmyv20tXbF2zMm+l3WgvpffWK91fli73YtfM53vqKpf3QdhKp7klTSUosSpjR0jPWt
MkdczNH0/ilLni20pn2T7bUQ9e6gxuLL9leie3ZYvco47i0hNnWkiXsSUdppW4Ma1Sxjmdgpn
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