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Preliminary

14. April. 2015

NWP-F1xx Bluetooth LE
Version: 1.00

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F1XX Bluetooth LE

2014.4.25	Preliminary version	JY LEE
2014.6.11	Add Offline Data Service Add Update Service Move characteristic related to offline of Write Pen to Offline Data Service UUID change according to Service list to create	JY LEE
2014.6.18	Change Update Service characteristic Add Update Message Sequence	JY LEE
2014.6.19	Add System Service Move characteristic related to system of Write pen service to System Service	JY LEE
2014.6.26	Change service including Transferable ID characteristic Add Request offline file list characteristic	JY LEE
2014.7.10	Change offline data transmission mode Add the first and the second offline service Change Service ID	JY LEE
2014.7.14	Change the structure of Transferable ID (0x2AB2)	JY LEE
2014.7.21	Change the structure of Pen up, Down (0x2AA2)	JY LEE
2014.7.31	Change the data type of Packet Index of Offline file Data (0x2ACA)(unsigned char -> unsigned short)	JY LEE
2014.8.21	Add ‘Send Pen State (0x2AB0), Set State (0x2AB1) ‘	JY LEE

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2014.8.27	Add protocol ‘Request delete offline files (0x2AC3) ‘ related to seal Add ‘Find My Pen (0x2AB3)’	JY LEE
2014.9.3	Due to need to check the possibility of data communication between app and pen > Add ‘Ready Exchange Data (0x2AB4)’	JY LEE
2014.9.4	Change 0x2AB4 and add 0x2AB5	JY LEE
2014.9.16	Add another System service ‘System 2 0x18F6 service’ Add 0x2AB7~0x2ABA related to password process	JY LEE

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Service

SpecificationName	AssignedNumber
Generic Access	0x1800
Device Information	0x180A
Battery Service	0x180F
Write Pen	0x18F1
Offline Data 1	0x18F2
Offline Data 2	0x18F3
Update	0x18F4
System 1	0x18F5
System 2	0x18F6

** Up to 7 characteristics can be added for one service

1.1. Role
App (Central) – Pen (Peripheral)

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2. Service Viewer

2.1. Generic Access

- Please refer to the linked web page

2.2. Device Information

- Please refer to the linked web page

~~2.3. Battery Service~~

~~- Please refer to the linked web page~~

2.4. Write Pen

2.4.1. Characteristics

① **Dot Info**

- Assigned Number : 0x2AA0
- Property: Notify
- Data total size : (8*N)+1 smaller than MTU Size.

- Data

Name	[Dot Info] Count	[Dot Info] (1)	[Dot Info] (2)	…	[Dot Info] (N)
Format	unsigned char				
Size (Byte)	1	8	8	…	8
Description	Count number(N) of [Dot Info] included	[Dot Info]	[Dot Info]		

[Dot Info]

Name	Time	X	Y	Float x	Float y	Force
Format	unsigned char	unsigned short	unsigned short	unsigned char	unsigned char	unsigned char
Size (Byte)	1	2	2	1	1	1
Description	Time difference from previous Dot info (Measuring time when taking image)	x coordinate	y coordinate	Precise x coordinate	Precise y coordinate	Pen pressure

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② Owner, Note, Page ID

- Assigned Number : 0x2AA1
- Property: Notify

- Data

Name	Owner ID	Note ID	Page ID
Format	unsigned long	unsigned long	unsigned long
Size (Byte)	4	4	4
Description	-	-	-

③ Pen Up, Down

- Assigned Number : 0x2AA2
- Property : Notify

- Data

Name	Time	Status	Pen Color
Format	unsigned long long	unsigned char	unsigned long
Size (Byte)	8	1	4
Description	millisecond tick from 1. Jan, 1970	Down : 0x00 (Writing start) Up : 0x01 (Writing stop)	Valid only when Pen Down - Type (MSB 1byte) 1: Pen Tip - Color (LSB 3 bytes) 24-16 bit : R 15-8 bit : G 7-0 bit : B

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2.5. Offline Data 1

2.5.1. Characteristics

① Request list of offline files

- Assigned Number : 0x2AC1
- Property : Write
- Request offline file list saved in a N2 pen

- data

Name	Status
Format	unsigned char
Size (Byte)	1
Description	0x00

② Send list of offline files

- Assigned Number : 0x2AC2
- Property : Notify
- Transmit offline file list saved in a N2 pen

- data

Name	Status	Section Owner ID	Note Count	Note ID [0]	…	Note ID [9]
Format	unsigned char	unsigned long	unsigned char	unsigned long		unsigned long
Size (Byte)	1	4	1	4		4
Description	0: next packet exists 1: last packet	31-24 bit : section ID 23-0 bit : owner ID	Count number(N) of note ID	note id		

③ Request delete offline files.

- Assigned Number : 0x2AC3
- Property : Write
- Request a N2 pen to delete offline file

- data

Name	Section Owner ID	Note ID
Format	unsigned long	unsigned long long
Size (Byte)	4	8
Description	31-24 bit : section ID 23-0 bit : owner ID	Not used

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2.6. Offline Data 2

2.6.1. Characteristics

① Request Offline File

- Assigned Number : 0x2AC7
- Property : Write
- Up to 10 note ids can be transmitted. When above 10 note ids, error exception occurs.
- Transmit repeatedly when IDs to request are above 10.

- data

Name	Section Owner ID	Note Count	Note ID [0]	…	Note ID [9]
Format	unsigned long	unsigned char	unsigned long		unsigned long
Size (Byte)	4	1	4		4
Description	31-24 bit : section ID 23-0 bit : owner ID	Count number of note ID(N)	note id		

② Offline file list info

- Assigned Number : 0x2AC8
- Property : Notify
- Transmit number and total size of file list to be transmitted

- data

Name	File Count	File Size
Format	unsigned long	unsigned long
Size (Byte)	4	4
Description	Count number of offline files to be transmitted	Total size of offline files to be transmitted

③ Offline file Info

- Assigned Number : 0x2AC9
- Property : Notify

- Data

Name	File Type	File Size	Packet Count	Packet Size	Packet Slice Count	Packet Slice Size
Format	unsigned char	unsigned long	unsigned short	unsigned short	unsigned short	unsigned short
Size (Byte)	1	4	2	2	2	2
Description	0 : 1 : Zip	File size	-	-	Number of slice per packet	Slice size divided by packet (divide packet into pieces according to the transmission size of LE) Size of data with index excluded

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- If a file size is 4096 KB and a Packet Size is 1KB, Packet Count will be 4096.
- Receive a response to a packet, after transmitting the packet which is divided into pieces .
- A case that packet size cannot be divisible by packet slice size exists. Packet should be generated according to packet size like file size.

④ Offline file Data

- Assigned Number : 0x2ACA
- Property : Notify

- Data

Name	Packet Index	Packet Slice Index	Data
Format	unsigned short	unsigned char	unsigned char []
Size (Byte)	2	1	N
Description	Packet Number	Packet Slice Number	Packet slice size data of Offline file Info

⑤ Offline file Response

- Assigned Number : 0x2ACB
- Property : Write

- Data

Name	type	Packet Index
Format	unsigned char	unsigned char
Size (Byte)	1	1
Description	1: header 2: data	Packet Index

⑥ Send Offline File Status

- Assigned Number : 0x2ACC
- Property : Notify
- Notify offline file status when transmission is completed

- data

Name	Status
Format	unsigned char
Size (Byte)	1
Description	0 : Transmission failure 1: Transmission completion

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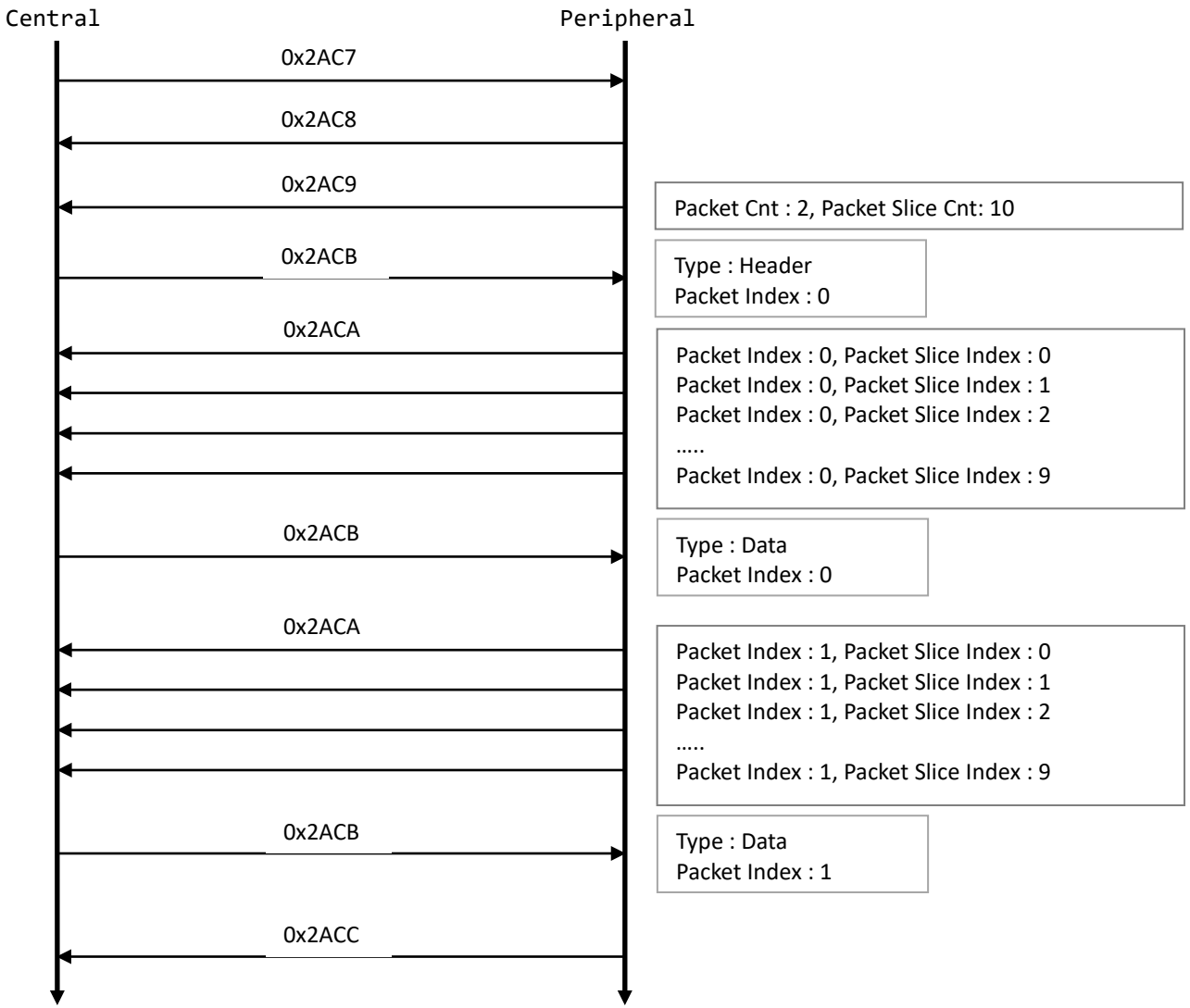
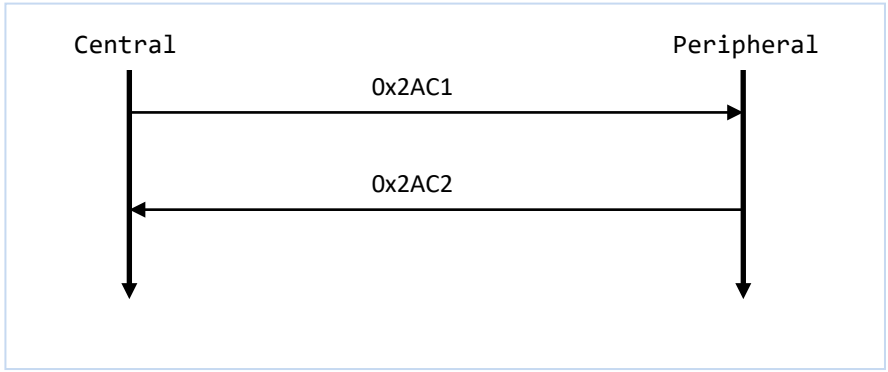
1.1.2. Message sequence chart

① Request offline data



② **Request offline data list**



1.2. Update

1.2.1. Characteristics

① **Send File Info**

- Assigned Number : 0x2AD1
- Property : Write
- Apply after checking packet size to be transmitted.

- data

Name	File Path	File Size	Packet Count	Packet Size
Format	unsigned char []	unsigned long	unsigned short	unsigned short
Size (Byte)	52	4	2	2
Description	File path which starts from '\ ' Max 52 bytes ex) \Update.zip	File size (byte)	Number of packets	Packet size (LE is maximum x bytes)

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② Request File

- Assigned Number : 0x2AD2
- Property : Notify
- Notify about the position of file to receive

- data

Name	Index
Format	unsigned short
Size (Byte)	2
Description	Packet Number (0~)

③ Send File

- Assigned Number : 0x2AD3
- Property : Write
- Transmit the corresponding data to the index of file requested.

- data

Name	Index	Data
Format	unsigned short	unsigned char []
Size (Byte)	2	N
Description	Packet Number	Data for packet size of update Info

④ Status

- Assigned Number : 0x2AD4
- Property : Notify
- Notify about the end or error of file transmission

- data

Name	Index
Format	unsigned short
Size (Byte)	2
Description	Error type 0 : file transmission failure 1: file transmission success 2: transmitting file(multiple transmission is impossible) 3: short of remained memory space

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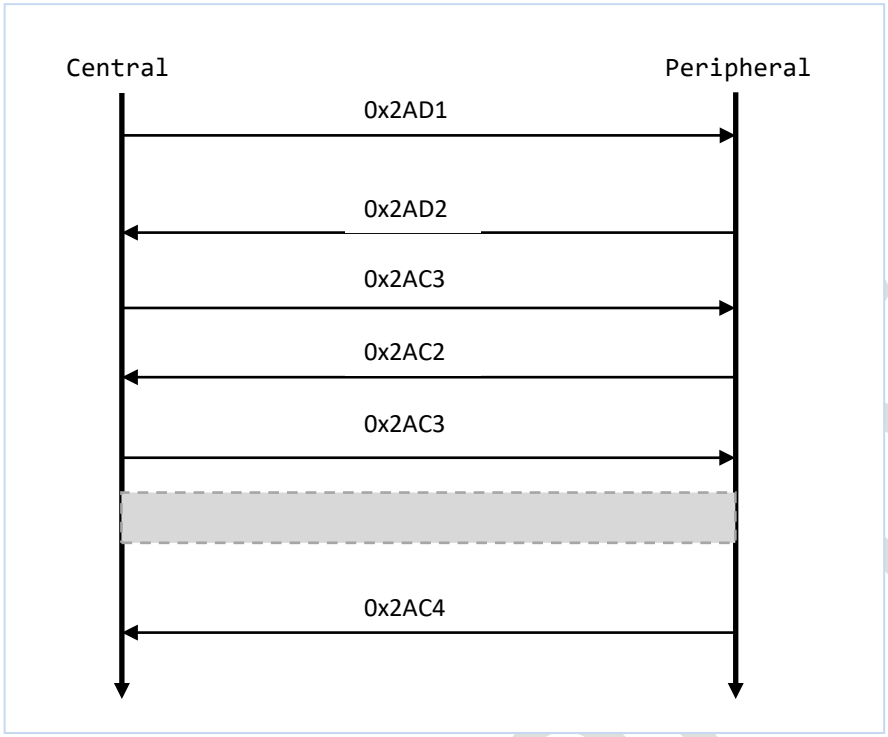
1.2.2. Message sequence chart

① Update



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1.3. System 1

1.3.1. Characteristics

① Send Pen State

- Assigned Number : 0x2AB0
- Property : Notify
- Transmit if a pen is connected
- Transmit if the one of the pen setting values is changed
- Fixed size, only 40 bytes are always used.

- Data

Name	Protocol Version	Status	Time Zone	Time Tick	Force Max	Battery	Used Memory	Pen Tip Color	Auto Power On/Off
Format	unsigned char	unsigned char	signed long	unsigned long long	unsigned char	unsigned char	unsigned char	unsigned long	unsigned char
Size (Byte)	1	1	4	8	1	1	1	4	1
Description	Protocol version	Pen status	The corresponding GMT offset (millisecond) to Time Zone ex) Seoul (KST) : 9 hours (Time gap) * 3600(sec) * 1000(ms) Apply DST (Daylight Saving Time) according to local region	Millisecond tick from 1.Jan.1970	Maximum pen pressure	% value (100~0 %)	% value	Pen tip color (dot color) 24-16 bit : R 15-8 bit : G 7-0 bit : B	Whether Pen Tip Power function is on or off 1: On 2: Off

Acceleration Sensor On/Off	Hover Mode	Beep	Auto Power Off Time	Pen Pressure	Reserved
unsigned char	unsigned char	unsigned char	unsigned short	unsigned short	unsigned char []
1	1	1	2	2	11
Whether 3 DOF acceleration sensor is on or off 1: On 2: Off	Whether hovering mode is on or off 1: On 2: Off	Whether beep is on or off 1: On 2: Off	Waiting time for automatic power off Unit (Minute)	Pen pressure strength Range : 0~ 4 steps	Reserved

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② Set State

- Assigned Number : 0x2AB1
- Property : Write
- Set pen status
- Fixed size, only 40 bytes are always used.

- Data

Name	Time Zone	Time Tick	External set Color	Auto Power On/Off	Acceleration Sensor On/Off	Hover Mode On/Off
Format	signed long	unsigned char	unsigned long	unsigned long long	unsigned char	unsigned char
Size (Byte)	4	8	4	1	1	1
Description	The corresponding GMT offset (millisecond) to Time Zone ex) Seoul (KST) : 9 hours (Time gap) * 3600(sec) * 1000(ms) Apply DST (Daylight Saving Time) according to local region 0xFFFFFFFF : ignore	Millisecond tick from 1.Jan.1970 0: ignore	LED Type and Color set externally - Type (MSB 1 byte) 1: Pen Tip - Color (LSB 3 bytes) 24-16 bit : R 15-8 bit : G 7-0 bit : B 0 : ignore	Set whether or not Pen Tip Power On/Off function will be turned on 0: ignore 1: On 2: Off	Set whether or not 3 DOF acceleration sensor will be turned on 0: ignore 1: On 2: Off	Set hovering mode 0: ignore 1: On 2: Off

Beep On/Off	Auto Power On Time	Pen Pressure	Reserved
unsigned char	unsigned short	unsigned short	unsigned char []
1	2	2	16
Set beep on/off 0: ignore 1: On 2: Off	Set waiting time for automatic power off when no external input 0 : ignore 1~ : unit (minute)	Set pen pressure strength 0xFFFF : ignore Range :	

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③ Transferable ID

- Assigned Number : 0x2AB2
- Property : Write
- Request valid ID, different valid ID according to type
- Fixed size

- data

Name	Type	Count	Param[0]	Param [1]	…	Param [9]
Format	unsigned char	unsigned char	unsigned long	unsigned long		unsigned long
Size (Byte)	1	1	4	4		4
Description	1: note id 2: section owner id 3: all	ID number to request (Max 10) Type 1: note id count number Type2 : section owner id count number	Type1: corresponding OwnerSection Id to Note ID List in Param0 Type2: the first OwnerSection ID OwnerSection ID 31-24 bit : section ID 23-0 bit : owner ID	Type1: the first Note ID Type2: the second OwnerSection ID		

④ Find My Pen

- Assigned Number : 0x2AB3
- Property : Write
- Notify about a pen connected

- data

Name	Reserved
Format	unsigned char
Size (Byte)	1
Description	

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⑤ Data/Response Ready Exchange Data

- Assigned Number : 0x2AB4
- Property : Write
- Respond to a pen if the app is ready for data communication after it receives the request, 0x2AB5, from the pen.
- Notify a pen if the app is closed with a pen powered on.

- data

Name	Ready
Format	unsigned char
Size (Byte)	1
Description	1 : App On 0 : App Off

⑥ Request Ready Exchange Data

- Assigned Number : 0x2AB5
- Property : Notify
- Notify the app if a pen is connected to BT.

- data

Name	Ready
Format	unsigned char
Size (Byte)	1
Description	1 : Pen On 0 : Pen Off

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1.4. System 2

1.4.1. Characteristics

① Password request

- Assigned Number : 0x2AB7
- Property : Notify
- Request password

- data

Name	Retry Count	Reset Count
Format	unsigned char	unsigned char
Size (Byte)	1	1
Description	Start from 0	Reset(delete) pen data if Retry Count is the same as Reset Count

② Respond to password request

- Assigned Number : 0x2AB8
- Property : Write

- data

Name	Password
Format	unsigned char []
Size (Byte)	16
Description	

③ Password change request

- Assigned Number : 0x2AB9
- Property : Write
- Notify the app if a pen is connected to BT.
- data

Name	Previous Password	New Password
Format	unsigned char []	unsigned char []
Size (Byte)	16	16
Description	Previous password	Password to change

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④ Respond to password change request

- Assigned Number : 0x2ABA
- Property : Notify
- Notify the app if a pen is connected to BT

- data

Name	State
Format	unsigned char
Size (Byte)	1
Description	0x00 : success 0x01 : different from current password 0x02 : wrong password format

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