Equil
Developer Guide
for iOS

PNF R&D S/W

2015. 05

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- Hardware Structure
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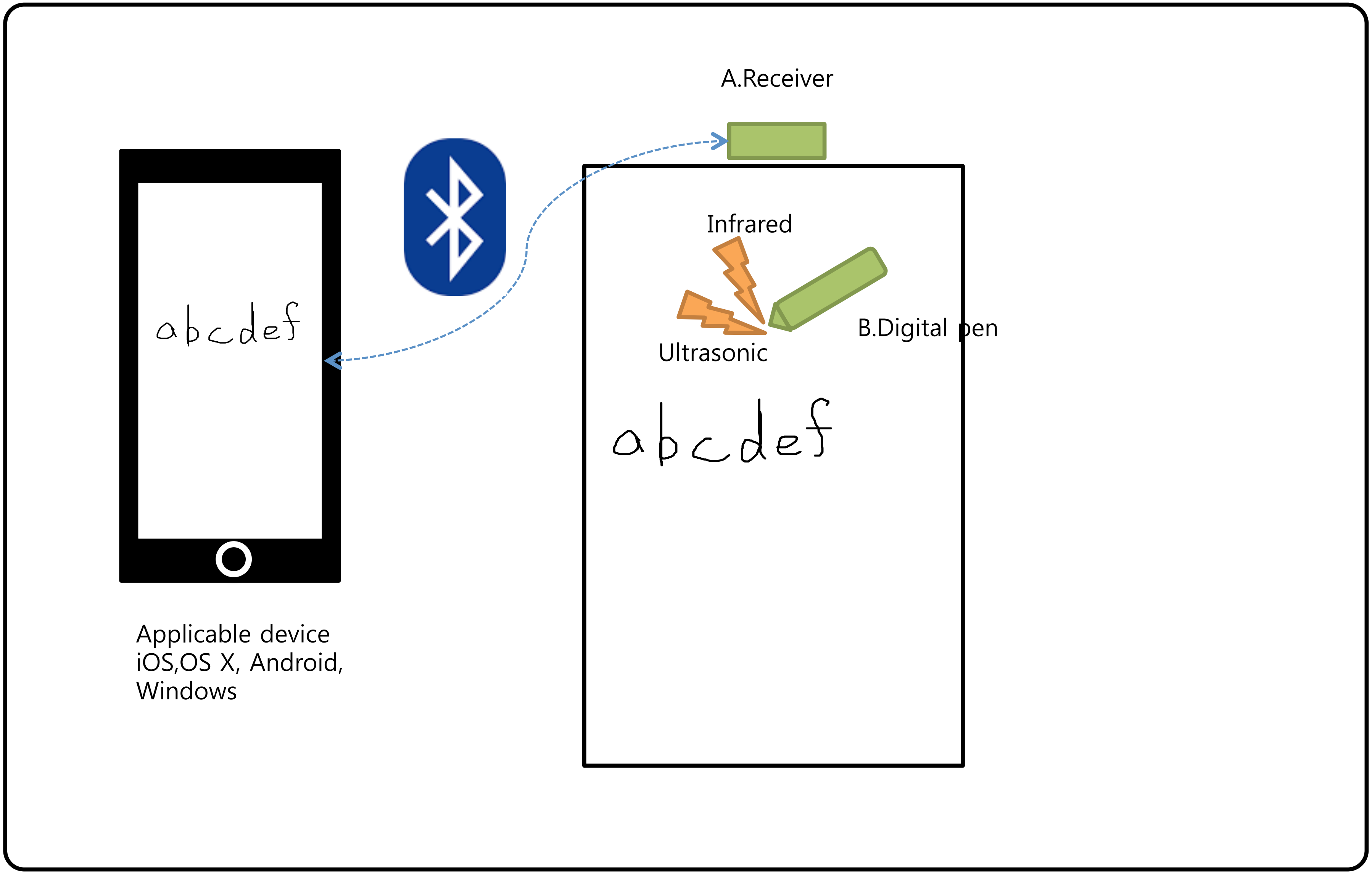
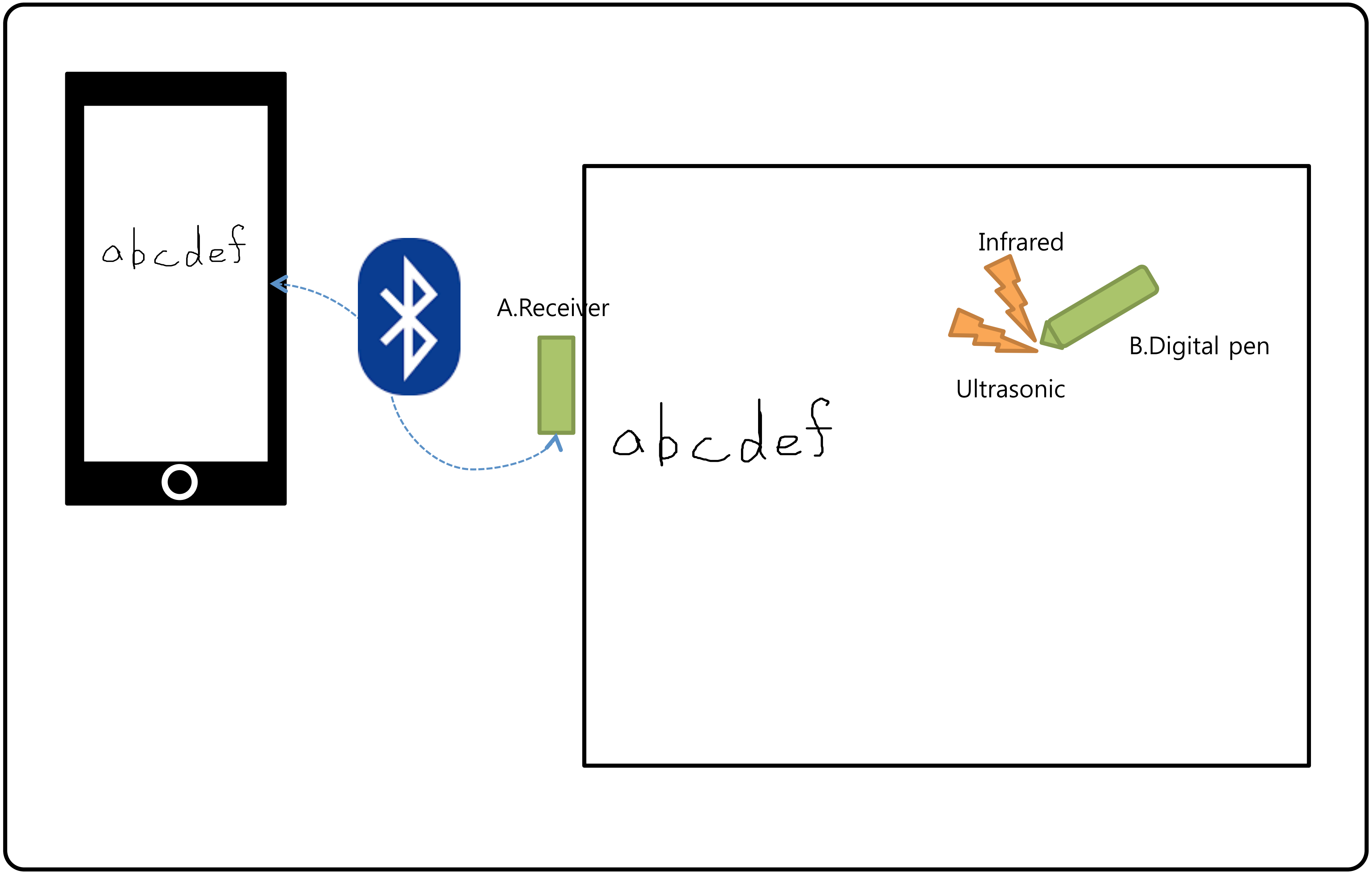
Concept > PNF Hardwares

Model	Devices	Connection	Writing	Image
Equil Smart Pen	iPhone,iPod,iPad, Mac,Windows,Android	Wireless(BlueTooth)	On the paper Or desk	
Equil Smart Marker	iPhone,iPod,iPad, Mac,Windows,Android	Wireless(BlueTooth), USB(Windows, OSX)	On the whiteboard	

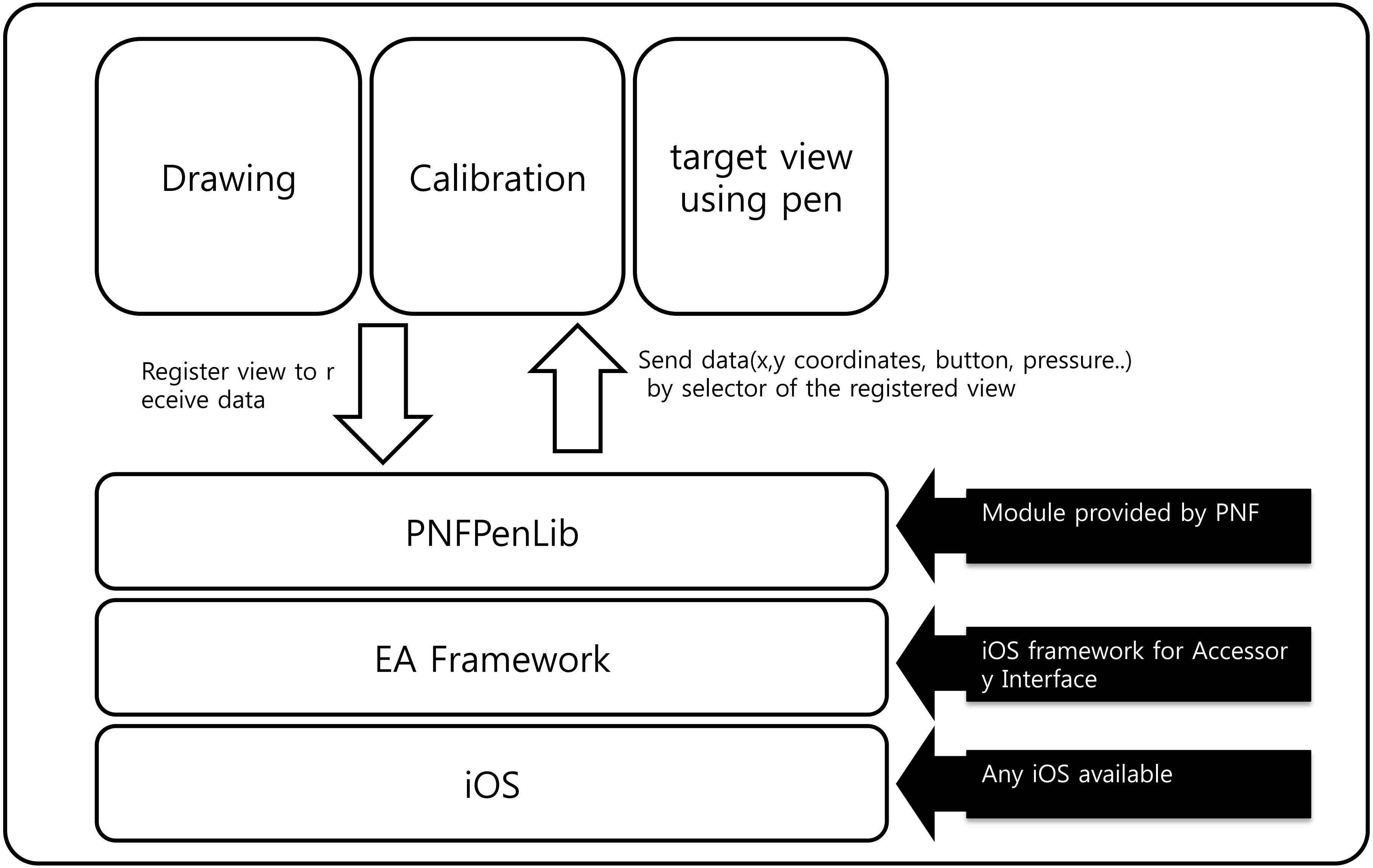
Concept > Hardware Structure (Equil Smart Pen)



Concept > Hardware Structure (Equil Smart Marker)



Concept > Software Structure



Drawing

Calibration

target view using pen

Register view to r eceive data

Send data(x,y coordinates, button, pressure..) by selector of the registered view

PNFPenLib

EA Framework

iOS

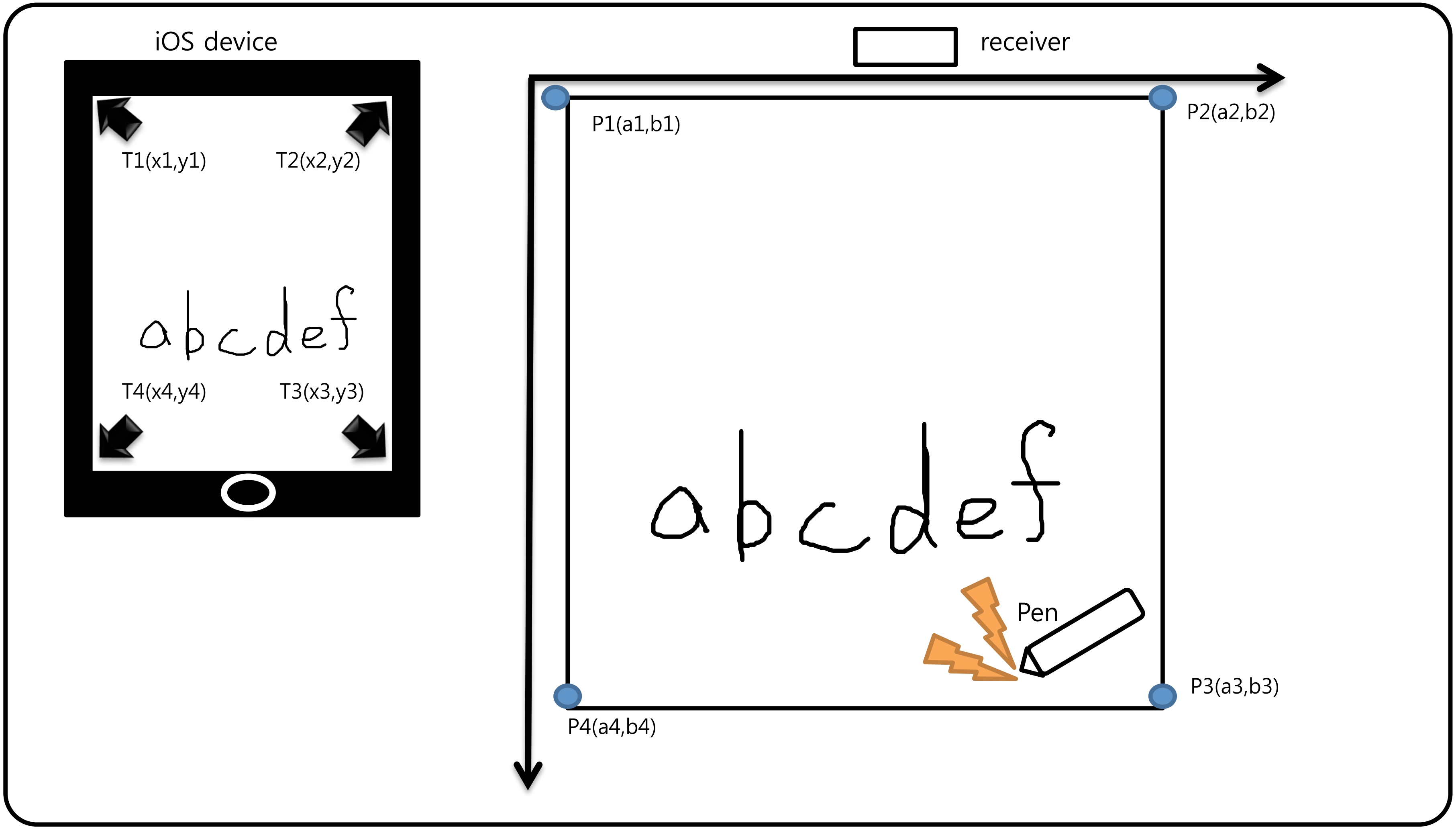
Module provided by PNF

iOS framework for Accessor y Interface

Any iOS available

Concept > Background knowledge > Calibration (equil)

Calibration is Mapping the points of paper P1~P4 to
coordinates T1~T4 of screen in order to have the image on the screen look the same as the image on the paper.
In case of Equil, assuming that receiver is parallel with paper, just clicking two points(P1,P3) is enough.



Concept > Background knowledge > External Accessory Framework

- Refer to Developer.apple.com

https://developer.apple.com/library/ios/#featuredarticles/ExternalAccessoryPT/Introduction/Introduction.html

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Development > Project setting

- Add PNFModule folder of the sample soures into your project
- Add an item as “supported external accessory” in your project-Info.plist
- Insert “com.penandfree.uartpen” as the value of the item
- Add External Accessory framework into your project

Development > Components of Test Sample (PenTest)

※ $(SrcHome) : [unZipped folder]/

Folder		File	Description
$(SrcHome)/PenTest/	./	main.m	
		PenTest-Info.plist	
		PenTest-Prefix.pch	
		AppDelegate.h .m	
		ViewController.h .m .xib	Main controller
	DrawView/	DrawView.h .m	Drawing lines according to the coordinate from pen.
		DrawViewController.h .m .xib	
$(SrcHome)/Common/	Calibration/	Calib9ViewController.h .m .xib	9 point calibration view(smartpen)
		CalibViewController.h .m .xib	2,3 points calibration view(Equil)
		EquilCalibrationViewController,h .m .xib	2 points calibration view(Equil, Equil Smartmarker)
	Common/	Toast+UIView.h .m	Shows error information about Pen.
		Common.h	Default Calibration value
	PNFModule/	libPNFPenLib.a	Standard library
		PNFDefine.h	Constants
		PNFPenLib.h	Interfaces
	PNFStrokePoint/	PNFStrokePoint.h .m	Objects for drawings
	Resource/		
	TimeTestView/	TimeTestViewController.h .m .xib	Class checking pen alive time

● PNFPenController Class

Inherits from	NSObject
Declared in	PNFPenController.h

➢ Overview

PNFPenController is the class of PNFPenLib Library to manage the information of device , make calibrated coordinates and tranfer it to the other classes.

➢ Members

ptRaw			
Type	CGPoint	Property	readonly
Description	Coordinates before calibrating		
Range	0 ~ 6500		
Device	Equil Smart Pen / Marker		
Usage			

ptConv			
Type	CGPoint	Property	readonly
Description	Calibrated coordinates		
Range	According to the target view size		
Device	Equil Smart Pen / Marker		
Usage			

PenStatus			
Type	int	Property	readonly
Description	Where pentip is pressed or not		
Range	PEN_DOWN : Pentip down PEN_MOVE : Move with Pentip down PEN_UP :Pentip up PEN_HOVER : Move with Pentip up * **Equil Smart Pen only** PEN_HOVER_DOWN : Pen button down PEN_HOVER_MOVE : Move with Pen button down (defined in PNFDefine.h)		
Device	Equil Smart Pen / Marker		
Usage			

<table>
<tr><th colspan="4">StationPosition</th></tr>
<tr><td>Type</td><td>int</td><td>Property</td><td>readonly</td></tr>
<tr><td>Description</td><td colspan="3">Current position of Equil Smart Marker station.</td></tr>
<tr><td>Range</td><td colspan="3">UIInterfaceOrientationPortraitUpsideDown
UIInerfaceOrientationLandscapeLeft
UIInteraceOrientationLandscapeRight
UIInterfaceOrientationPortrait
(defined in UIApplication.h)</td></tr>
<tr><td>Device</td><td colspan="3">Equil Smart Marker</td></tr>
<tr><td>Usage</td><td colspan="3"><pre>
[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(DICallBack:) name:PNF_MSG object:nil];

....
....
-(void) DICallBack:(NSNotification *)call {
    if ([szS isEqualToString:@"CHANGE_DEVECE_POSITION_FIRST"]) {
        NSString* position = @"Left";
        if (m_PenController.StationPosition == UIInterfaceOrientationLandscapeLeft)
            position = @"Left";
        else if (m_PenController.StationPosition == UIInterfaceOrientationLandscapeRight)
            position = @"Left";
        else if (m_PenController.StationPosition == UIInterfaceOrientationPortrait)
            position = @"Top";
        else if (m_PenController.StationPosition == UIDeviceOrientationPortraitUpsideDown)
            position = @"Bottom";
        NSLog(@"%@ %@", szS, position);
       }
}
</pre></td></tr>
</table>

Temperature			
Type	int	Property	readonly
Description	Temperature		
Range	0~60 (Celsius)		
Device	Equil Smart Pen / Marker		
Usage	[txtTemerature setText::[NSString stringWithFormat:@”%d”,m_PenController.Temperature]];		

bConnected			
Type	BOOL	Property	readonly
Description	Whether receiver is connected or not		
Range	Yes / No		
Device	Equil Smart Pen / Marker		

Usage	if(m_PenController.bConnected)
	{
	//// if receiver is connected
	}
	else
	{
	// if receiver is not connected
	}		

Development > Reference

bStopped			
Type	BOOL	Property	readonly
Description	Whether Pause is set or not If it is set, Pen data is not transferred to target view.		
Range	Yes / No		
Device	Equil Smart Pen / Marker		

Usage	[m_PenController stopPen]; // set pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display YES
	
	[m_PenController restartPen]; // release pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display NO		

bExistCalibrationInfo			
Type	BOOL	Property	readonly
Description	Where calibration data file exists or not		
Range	Yes / No		
Device	Equil Smart Pen / Marker		

Usage	if(m_PenController. bExistCalibrationInfo)
	{
	////
	}
	else
	{
	    //
	}		

pressure			
Type	Int	Property	readonly
Description	Pressure value of Equil.		
Range	0 ~ 700		
Device	Equil Smart Pen		
Usage	int pressureValue = [m_PenController pressure];		

Development > Reference

modelCode		
Description	Connected device	
Out	Int	2 : Equil Smart Pen 3 : Equil Smart Pen2 4 : Equil Smart Marker
Input	N/A	
Device	Equil Smart Pen / Marker	

Usage	if (![penController existCalibrationInfo]) {
	[self addDebugText:@"calibration data not exist"];
	if (penController.modelCode == 2) {
	[self addDebugText:@“equil pen"];
	}
	else if (penController.modelCode == 3) {
	[self addDebugText:@“equil2"];
	}
	else if (penController.modelCode == 4) {
	[self addDebugText:@“equil smartmarker"];
	}	

Development > Reference

MCU1Version			
Type	int	Property	readonly
Description	Version of MCU 1 of receiver and pen 0: 2: the latest F/W version including Pen Alive		
Range	0 , 2		
Device	Equil Smart Pen / Marker		
Usage			

MCU2Version			
Type	Int	Property	readonly
Description	Version of MCU 2 of receiver and pen 0: 2: the latest F/W version including Pen Alive		
Range	0 , 2		
Device	Equil Smart Pen / Marker		
Usage			

Development > Reference

HWVersion			
Type	Int	Property	readonly
Description	Version of Hardware of receiver and pen 0: 2: the latest F/W version including Pen Alive		
Range	0 , 2		
Device	Equil Smart Pen / Marker		
Usage			

penAliveSec			
Type	Int	Property	readonly
Description	- Remaining time before going to sleep mode (sec) - It is applied only when MCU1Version, MCU2Version, HWVersion All are 2		
Range	0 ~ 600		
Device	Equil Smart Pen		
Usage			

Development > Reference

AudioMode			
Type	Int	Property	readonly
Description	Audio Mode of Smart Marker		

Range	YES = beep only
	NO = beep + voice		

Device	Equil Smart Marker		
Usage			

Volume			
Type	Int	Property	readonly
Description	Audio volume of Smart Marker		
Range	0 ~ 255 0 = loud 255 = slient		
Device	Equil Smart Marker		
Usage			

Development > Reference

battery_station			
Type	Int	Property	readonly
Description	Battery status of sensor		
Range	0 ~ 100		
Device	Equil Smart Pen / Marker		
Usage			

battery_pen			
Type	Int	Property	readonly
Description	Battery status of pen		
Range	• Smart Marker 0 = High Else = Low • Smart Pen 0 ~ 100		
Device	Equil Smart Pen / Marker		
Usage			

Development > Reference

➢ Methods

startPen		
Description	Start to communicate with device	
out	int	0 : success PNF_E_NOT_CONNECTED : device is not connected PNF_E_INVALID_PROTOCOL: device is invalid PNF_E_FAIL_LISTENING: receiving error (should reconnect the device) (Define in PNFDefine.h)
input	N/A	
Device	Equil Smart Pen / Marker	

Usage	-(void) viewDidLoad
	{
	.....
	m_PenController = [[PNFPenController alloc] init];
	[m_PenController startPen];
	......
	}	

stopPen		
Description	Stop receiving data temporarily Pen data is not transferred to target view.	
out	Void	
input	N/A	
Device	Equil Smart Pen / Marker	

Usage	[m_PenController stopPen]; // set pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display YES
	
	[m_PenController restartPen]; // release pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display NO	

restartPen		
Description	Restart to receive pen data which is stopped by stopPen again	
out	Void	
input	N/A	
Device	Equil Smart Pen / Marker	

Usage	[m_PenController stopPen]; // set pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display YES
	
	[m_PenController restartPen]; // release pause
	NSLog(@”%@”, m_PenController.bStopped ? @”YES”,@”NO”);
	/// display NO	

Development > Reference

disConnectPen		
Description	Disconnect device	
out	Void	
input	N/A	
Device	Equil Smart Pen / Marker	
Usage	[m_PenController disConnectPen];	

Development > Reference

setRetObj		
Description	Set an object to receive the pen data The object should have “-(void) PenHandler:(id) sender{}”	
Out	Void	
input	NSObject*	Object pointer to receive the pen data
Device	Equil Smart Pen / Marker	

Usage	-(void) viewDidLoad
	{
	.....
	m_PenController = [[PNFPenController alloc] init];
	[m_PenController startPen];
	[m_PenController setRetObj:self];
	......
	}	

getRetObj		
Description	Return registered object to receive pen data	
Out	NSObject*	
Input	Void	
Device	Equil Smart Pen / Marker	
Usage	[penController getRetObj];	

Development > Reference

setRetObjForEnv		
Description	Set an object to receive the pen data for environment The object should have “-(void) PenHandlerEnv:(NSArray*)info {}”	
out	Void	
input	NSObject*	Object pointer to receive the pen data for environment
Device	Equil Smart Pen / Marker	

Usage	-(void) viewDidLoad
	{
	    …..
	     m_PenController = [[PNFPenController alloc] init];
	
	    [m_PenController startPen];
	
	    [m_PenController setRetObj:self];
	
	    [m_PenController setRetObjForEnv:self];
	    ……
	
	}
	-(void) PenHandlerEnv:(NSArray*)info {
	    // info count = 2
	    // ir = Infrared Gap
	    // us = Sensor distance
	    unsigned short ir = [[info objectAtIndex:0] unsignedShortValue];
	    unsigned short us = [[info objectAtIndex:1] unsignedShortValue];
	}	

setCalibrationData		
Description	Set data for calibration	
out	Void	
input	CGRect	square which consists of calibrated coordinates
	Float	Margin between displayed point and edge of screen
	CGPoint[]	Original points
Device	Equil Smart Pen / Marker	

Usage	// CGPoint m_CaResultPoint[4]; // lollol→ 4 points
	CGPoint m_CaResultPoint[9]; // SmartPen → 9 points
	
	....
	
	[m_PenController setCalibrationData:[m_calView bounds]
	        GuideMargin:0
	        CalibPoint:m_CalResultPoint]];	

Development > Reference

<table>
<tr><th colspan="3">setProjectiveLevel</th></tr>
<tr><td>Description</td><td colspan="2">Set calibration points</td></tr>
<tr><td>out</td><td>Void</td><td></td></tr>
<tr><td>input</td><td>Int</td><td></td></tr>
<tr><td>Device</td><td colspan="2">Equil Smart Pen / Marker</td></tr>
<tr><td>Usage</td><td colspan="2"><pre>
-(void) viewDidLoad
{
    .....
     m_PenController = [[PNFPenController alloc] init];
    [m_PenController FixStationPosition:DIRECTION_TOP];

    [m_PenController setProjectiveLevel:9];   // smartPen
   /// [m_PenController setProjectiveLevel:4]; Equil, lollol
    [m_PenController startPen];

    [m_PenController setRetObj:self];
    ......

}
</pre></td></tr>
</table>

Development > Reference

getProjectiveLevel		
Description	Get calibration points	
out	int	
input		
Device	Equil Smart Pen / Marker	
Usage	Int projectlevel = [m_Pencontroller getProjectiveLevel];	

Development > Reference

changeAudioMode		
Description	Change Audio mode of Smart Marker	
Out	Void	
Input	BOOL	Yes:/No
Device	Equil Smart Marker	
Usage	[penController changeAudioMode:YES]; -> Change to beep only [penController changeAudioMode:NO]; -> change to beep and voice	

changeVolume		
Description	Change audio volume	
Out	Void	
Input	int	0 ~ 255
Device	Equil Smart Marker	
Usage	[penController changeVolume:0]; -> max [penController changeVolume:255]; -> min	

ReadQ		
Description	Read one data from read Queue	
Out	NSDictionary	
Input	Void	
Device	Equil Smart Pen / Marker	

Usage	NSDictionary* dic = [penController ReadQ];
	CGPoint ptRaw = [[dic objectForKey:@"ptRaw"] CGPointValue];
	CGPoint ptConv = [[dic objectForKey:@"ptConv"] CGPointValue];
	int PenStatus =[[dic objectForKey:@"PenStatus"] intValue];
	int Temperature = [[dic objectForKey:@"Temperature"] intValue];
	int modelCode = [[dic objectForKey:@"modelCode"] intValue];
	int SMPenFlag = [[dic objectForKey:@"SMPenFlag"] intValue];
	int SMPenState = [[dic objectForKey:@"SMPenState"] intValue];
	int pressure = [[dic objectForKey:@"pressure"] intValue];	

Development > Reference

RemoveQ		
Description	Delete one data from read Queue	
Out	Void	
Input	Void	
Device	Equil Smart Pen / Marker	
Usage	[penController removeQ];	

ClearQ		
Description	Clear all data from read Queue	
Out	Void	
Input	Void	
Device	Equil Smart Pen / Marker	
Usage	[penController ClearQ];	

<table>
<tr><th colspan="3">StartReadQ</th></tr>
<tr><td>Description</td><td colspan="2">Read Pen mode through Read Queue</td></tr>
<tr><td>Out</td><td>Void</td><td></td></tr>
<tr><td>Input</td><td>Void</td><td></td></tr>
<tr><td>Device</td><td colspan="2">Equil Smart Pen / Marker</td></tr>
<tr><td>Usage</td><td colspan="2"><pre>
[penController StartReadQ];
.....
-(void) runReadThread {
    @autoreleasepool {
        while (1) {
            if (readThreadStop) {
                break;
            }

            if ([[UIApplication sharedApplication] isIgnoringInteractionEvents]) {
                [NSThread sleepForTimeInterval:0.02];
                continue;
            }

            NSDictionary* dic = [self.penController ReadQ];
            if(dic) {
                [self performSelectorOnMainThread:@selector(PenHandlerWithDictionary:) withObject:dic waitUntilDone:YES];
                [self.penController RemoveQ];
            }
            else {
                [NSThread sleepForTimeInterval:0.02];
            }
        } // while (1) {
    }
}
</pre></td></tr>
</table>

EndReadQ		
Description	Read Pen mode through Notification	
Out	Void	
Input	Void	
Device	Equil Smart Pen / Marker	

Usage	[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(PenHandlerWithMsg:) name:@"PNF_PEN_READ_DATA" object:nil];
	……
	-(void) PenHandlerWithMsg:(NSNotification*) note {
	    NSDictionary* dic = [note object];
	    if ([self.penController getRetObj] != self)
	        return;
	    [self PenHandlerWithDictionary:dic];
	}
	-(void) PenHandlerWithDictionary:(NSDictionary*) dic {
	    int PenStatus = [[dic objectForKey:@"PenStatus"] intValue];
	    CGPoint ptRaw = [[dic objectForKey:@"ptRaw"] CGPointValue];
	    CGPoint ptConv = [[dic objectForKey:@"ptConv"] CGPointValue];
	    int Temperature = [[dic objectForKey:@"Temperature"] intValue];
	    int modelCode = [[dic objectForKey:@"modelCode"] intValue];
	    int SMPenFlag = [[dic objectForKey:@"SMPenFlag"] intValue];
	    int SMPenState = [[dic objectForKey:@"SMPenState"] intValue];
	    int press = [[dic objectForKey:@"pressure"] intValue];
	    [self PenHandlerWithArgs:ptRaw
	                  ptConv:ptConv
	               PenStatus:PenStatus
	             Temperature:Temperature
	               ModelCode:modelCode
	               SMPenFlag:SMPenFlag
	              SMPenState:SMPenState
	                Pressure:press];
	}	

<table>
<tr><th colspan="3">InitPenUp</th></tr>
<tr><td>Description</td><td colspan="2">Enforce Pen-up and initialize library coordinates if there is no pen-up after a certain seconds while drawing.</td></tr>
<tr><td>Out</td><td>Void</td><td></td></tr>
<tr><td>Input</td><td>Void</td><td></td></tr>
<tr><td>Device</td><td colspan="2">Equil Smart Marker</td></tr>
<tr><td>Usage</td><td colspan="2"><pre>
-(void) eraseUpTimerCallBack:(NSTimer*)t {
    [self stopEraseUpTimer];
    [m_PenController initPenUp];
    [drawView DoMouseUp:di_old_point pressure:100];
}
</pre></td></tr>
</table>

Development > Guide > Connect and Initialize

Overview

Create and initialize object PNFPenController

Example

1. Create PNFPenController object

   ```
   m_PenController = [[PNFPenController alloc] init];
   ```

2. Appoint the calibration points

   ```
   [m_PenController setProjectiveLevel:4];    // Equil: 4 points
   ```

3. Start to communicate with device

   ```
   [m_PenController startPen];
   ```

4. Set object to receive data

   ```
   [m_PenController setRetObj:self];
   ```

example source: ViewController.h ViewController.m

Development > Guide > Device recognize

Overview

To recognize which device is connected.
After the device is connected and model code is sent after 1 sec.

Example

```
-(void) checkPenConnect {
.... // After the device is connected
                      if (penController.bConnected) {
        m_penConntectedStatus = YES;
        [NSTimer scheduledTimerWithTimeInterval:1.5f
                                          target:self
                                        selector:@selector(lazyCheckCalibration)
                                        userInfo:nil
                                         repeats:NO];
                     }
    .....
}
-(void) lazyCheckCalibration {
    if (![penController existCalibrationInfo]) {
        [self addDebugText:@"calibration data not exist"];
        if (penController.modelCode == 0) {
            [self addDebugText:@"smart pen"];
            if (IS_IPAD)
                [penController setProjectiveLevel:9];
            else
                [self addDebugText:@"The iPhone does not support smart pen."];
        }
...
}
```

example source: ViewController.h ViewController.m

Development > Guide > Receive data from library

Overview

Internally PNFPenController is supposed to call selector named as “PenHandler” of object set by “setRetObj” whenever the pen moves.

Example

```
-(void) PenHandler:(id)sender {
    // deprecated
}
-(void) ReadThreadStart { // if [penController StartReadQ];
    [self addDebugText:@"ReadThreadStart"];
    if (readThread == nil) {
        readThread = [[NSThread alloc] initWithTarget:self
                                             selector:@selector(runReadThread) object:self];
        readThreadStop=NO;
        readThreadPause=NO;
        [readThread start];

    }
    if (self.penController) {
        [self.penController StartReadQ];
    }
}
-(void) PenHandlerWithMsg:(NSNotification*) note {// if [penController EndReadQ];
    NSDictionary* dic = [note object];
    if ([self.penController getRetObj] != self)
        return;
    [self PenHandlerWithDictionary:dic];
}
```

example source: ViewController.h ViewController.m

Development > Guide > Receive data from library

➢ Example

```
-(void) runReadThread {// if [penController StartReadQ];
    @autoreleasepool {
        while (1) {
            if (readThreadStop) {
                break;
            }

            if ([[UIApplication sharedApplication] isIgnoringInteractionEvents]) {
                [NSThread sleepForTimeInterval:0.02];
                continue;
            }

            NSDictionary* dic = [self.penController ReadQ];
            if(dic) {
                [self performSelectorOnMainThread:@selector(PenHandlerWithDictionary:) withObject:dic waitUntilDone:YES];
                [self.penController RemoveQ];
            }
            else {
                [NSThread sleepForTimeInterval:0.02];
            }
        } // while (1) {
    }
}
-(void) ReadThreadOff {// if [penController StartReadQ];
    [self addDebugText:@"ReadThreadOff"];
    readThreadStop = YES;
    [NSThread sleepForTimeInterval:0.2];
    if (readThread) {
        [readThread cancel];
        [readThread release];
        readThread = nil;
    }
    if (self.penController) {
        [self.penController EndReadQ];
    }
}
```

example source: ViewController.h ViewController.m

Development > Guide > Receive data from library

➢ Example

```
-(void) PenHandlerWithDictionary:(NSDictionary*) dic {
    int PenStatus  = [[dic objectForKey:@"PenStatus"] intValue];
    CGPoint ptRaw = [[dic objectForKey:@"ptRaw"] CGPointValue];
    CGPoint ptConv = [[dic objectForKey:@"ptConv"] CGPointValue];
    int Temperature = [[dic objectForKey:@"Temperature"] intValue];
    int modelCode = [[dic objectForKey:@"modelCode"] intValue];
    int SMPenFlag = [[dic objectForKey:@"SMPenFlag"] intValue];
    int SMPenState = [[dic objectForKey:@"SMPenState"] intValue];
    int press = [[dic objectForKey:@"pressure"] intValue];
    [self PenHandlerWithArgs:ptRaw
                      ptConv:ptConv
                   PenStatus:PenStatus
                 Temperature:Temperature
                   ModelCode:modelCode
                   SMPenFlag:SMPenFlag
                  SMPenState:SMPenState
                    Pressure:press];
}
-(void) PenHandlerWithArgs:(CGPoint) Arg_ptRaw ptConv:(CGPoint) Arg_ptConv PenStatus:(int) Arg_PenStatus
               Temperature:(int) Arg_Temperature ModelCode:(int) Arg_modelCode
                SMPenFlag :(int) Arg_SMPenFlag SMPenState:(int) Arg_SMPenState
                  Pressure:(int) Arg_pressure {
           CGPoint ptDrawing;
            switch (Arg_PenStatus) {
                   case PEN_DOWN:
                       break;
                   case PEN_MOVE:
                       break;
                   case PEN_UP:
                       break;
                     case PEN_HOVER:
                       break;
                   default:
                       break;
               }
           }
           ptDrawing = m_PenController.ptConv ;
}
```

example source: ViewController.h ViewController.m

Development > Guide > Receive message from library

Overview

Information of device status is sent by notification named as “PNF_LOG_MSG”.

Example

1. Add Notification

```
 [[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(FreeLogMsg:) name:@“PNF_LOG_MSG" object:nil];
```

1. Handler for Message

```
-(void) FreeLogMsg:(NSNotification *) note
{
        NSString * szS = (NSString *) [note object];
    if ([szS isEqualToString :@"FAIL_LISTENING"] ) {
     }
    else if ([szS isEqualToString:@"CONNECTED"]) {
     }
    else if ([szS isEqualToString:@"INVALID_PROTOCOL"]) {
        return;
    }
    else if ([szS isEqualToString:@"SESSION_CLOSED"]) {
    }
    else if ([szS isEqualToString:@"PEN_RMD_ERROR"]) {

    }
    else if ([szS isEqualToString:@"FIRST_DATA_RECV"]) {
    }
    else if ([szS isEqualToString:@"DOUBLE_CLICK"]) {}
    else if ([szS isEqualToString:@"CLICK"]) {}
    else if ([szS isEqualToString:@"Gesture Circle Clockwise"]) {}
    else if ([szS isEqualToString:@"Gesture Circle CounterClockwise"]) {}
}
```

Log String Message	Description
CONNECTED	Device is connected
NOT_CONNECTED	Device is disconnected
FAIL_LISTENING	Fail to receive. Need to reconnect.
INVALID_PROTOCOL	Invalid hardware
SESSION_CLOSED	Session is disconnected
FIRST_DATA_RECV	First data is received after connecting
PEN_RMD_ERROR	Abnormal drawing data
* Equil Smart Pen only	
DOUBLE_CLICK	Equil pen button double click
CLICK	Equil pen button click
Gesture Circle Clockwise	Equil pen circle clockwise gesture
Gesture Circle CounterClockwise	Equil pen circle counter clockwise gesture

example source : ViewController.h ViewController.m

Development > Guide > Receive message from library

Overview

Information of device status is sent by notification named as “PNF_MSG”.

Example

1. Add Notification

```
[[NSNotificationCenter defaultCenter] addObserver:self selector:@selector(PenCallBackFunc:) name:@“PNF_MSG" object:nil];
```

1. Handler for Message

```
-(void) PenCallBackFunc:(NSNotification *)call {
    NSString * szS = (NSString *) [call object];
    if([szS isEqualToString:@"BATTERY_INFO"]) {
        battery[0] = self.penController.battery_station;
        battery[1] = self.penController.battery_pen;
        [mTableView reloadData];
    }
    else if([szS isEqualToString:@"NEW_PAGE"] || [szS isEqualToString:@"DUPLICATE_PAGE"]) {
        [self addDebugText:szS];
    }
    else if ([szS isEqualToString:@"CHANGE_DEVECE_POSITION"] ||
             [szS isEqualToString:@"CHANGE_DEVECE_POSITION_FIRST"]) {
        self.position = @"Left";
        if (self.penController.StationPosition == UIInterfaceOrientationLandscapeLeft)
            self.position = @"Left";
        else if (self.penController.StationPosition == UIInterfaceOrientationLandscapeRight)
            self.position = @"Left";
        else if (self.penController.StationPosition == UIInterfaceOrientationPortrait)
            self.position = @"Top";
        else if (self.penController.StationPosition == UIDeviceOrientationPortraitUpsideDown)
            self.position = @"Bottom";
        [mTableView reloadData];
    }
}
```

Log String Message	Description
BATTERY_INFO	Battery information
NEW_PAGE	Button smart marker
DUPLICATE_PAGE	Long press button smart marker
CHANGE_DEVECE_POSITION	Change device position
CHANGE_DEVECE_POSITION_FIRST	Change device position first

example source : ViewController.h ViewController.m

Development > Guide > Calibration

➢ Overview

Pen coordinates is converted to screen coordinates by projective matrix which is set in the calibration view.

➢ Example

1. create calibration controller

```
CalibViewController* cVController =      [[[CalibViewController alloc] init] autorelease];
```

2. connect Pen controller and calibration controller

```
[cVController SetPenController:m_PenController];
```

3. set calibration controller as target view

```
[m_PenController setRetObj:cVController];
```

4. show calibration view

```
[self presentModalViewController:cVController animated:YES];
```

example source : CalibViewController.h CalibViewController.m

Development > Guide > Calibration

➢ Overview

Calibration data is saved automatically by this library.
App need not save the data.

➢ Example

5. Save calibration data

```
      /// after click the last calibration point
      [m_PenController SetClibrationData:[m_calView bounds] GuideMargin:CAL_POINT_MARGIN_X
                                                          CalibPoint:m_CalResultPoint];♪
```

example source : CalibViewController.h CalibViewController.m

Development > Guide >Receive pen alive time data from library

➢ Overview

Pen goes to sleep mode, when pentip is not clicked and pen button is not pressed for 10 minutes. To wake up pen, user must press pen button. In this case, apps need to show the message which inform users to press the pen button.

➢ Example

1. Set object to receive environment data

```
    -(void) viewDidLoad {
        .........
        penController = [[PNFPenController alloc] init];
        [penController setRetObjForEnv:self];
        isRecvEnvDataFirst = YES;
        isFirstPenSleepOldDevice = NO;
    }
```

2. Environment data handler implementation

```
    -(void) PenHandlerEnv:(NSArray*)info {
        if (penController.MCU1Version >= 2 && penController.MCU2Version >= 2 && penController.HWVersion >= 2) {
            if (penController.penAliveSec > 0) {
                [self closePenSleepView];
            }
        }
        if (isRecvEnvDataFirst) {
            isRecvEnvDataFirst = NO;
            [self penIdleTimerStop];
            penSleepCheckTimer = [[NSTimer scheduledTimerWithTimeInterval:5
                                                              target:self
                                                            selector:@selector(onTimerForPenAlive:)
                                                            userInfo:nil
                                                             repeats:YES] retain];
            savePenSleepRemainingTime = [[NSDate date] timeIntervalSince1970] + 600;
            savePenAliveSec = 600;
        }
    }
```

example source : ViewController.h .m

Development > Guide >Receive pen alive time data from library

➢ Example

```
 -(void) PenHandler:(id)sender {
        isRecvEnvDataFirst = YES;
        [self penIdleTimerStop];
        [self closePenSleepView];
        .........
}
-(void) onTimerForPenAlive:(NSTimer *)timer {
    long curTime = [[NSDate date] timeIntervalSince1970];
    if (penController.MCU1Version >= 2 && penController.MCU2Version >= 2 && penController.HWVersion >= 2) {
        if (penController.penAliveSec == 0) {
            [self showPenSleepView];
            [self penIdleTimerStop];
            return;
        }
        if (penController.penAliveSec != 0 && savePenAliveSec != penController.penAliveSec) {
            savePenAliveSec = penController.penAliveSec;
            savePenSleepRemainingTime = curTime + penController.penAliveSec;
        }
    }
    else {
        if (!isFirstPenSleepOldDevice) {
            isFirstPenSleepOldDevice = YES;
            savePenSleepRemainingTime = curTime - 10;
        }
    }
    if (savePenSleepRemainingTime < curTime) {
        [self showPenSleepView];
        [self penIdleTimerStop];
    }
}
```

example source : ViewController.h .m

Development > Guide >Receive pen alive time data from library

➢ Example

```
-(void) FreeLogMsg:(NSNotification *) note {
    NSString * szS = (NSString *) [note object];
    if ([szS isEqualToString:@"CONNECTED"]) {
        .........
        isFirstPenSleepOldDevice = NO;
    }
    else if ([szS isEqualToString:@"SESSION_CLOSED"]) {
        [self penIdleTimerStop];
        isFirstPenSleepOldDevice = NO;
        [self closePenSleepView];
    }
    else if ([szS isEqualToString:@"CLICK"] ||
             [szS isEqualToString:@"DOUBLE_CLICK"] ||
             [szS isEqualToString:@"Gesture Circle Clockwise"] ||
             [szS isEqualToString:@"Gesture Circle CounterClockwise"]) {
        [self penIdleTimerStop];
        [self closePenSleepView];
        return;
    }
    .........
}
-(void) penIdleTimerStop {
    // TODO:: timer release
}
-(void) closePenSleepView {
    // TODO:: pen sleep view release
}
-(void) showPenSleepView {
    // TODO:: pen sleep view show
}
```

example source : ViewController.h .m

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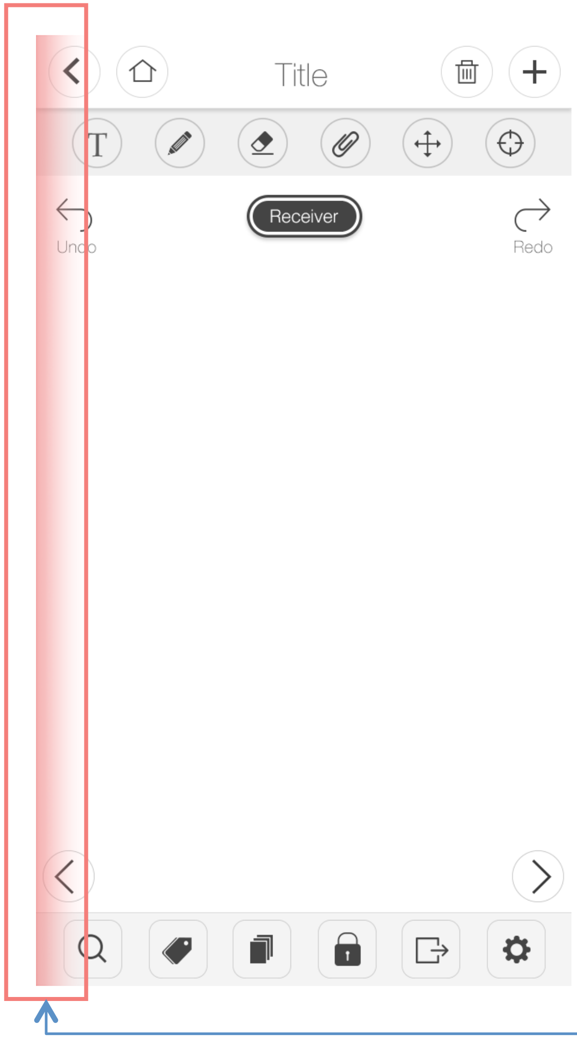
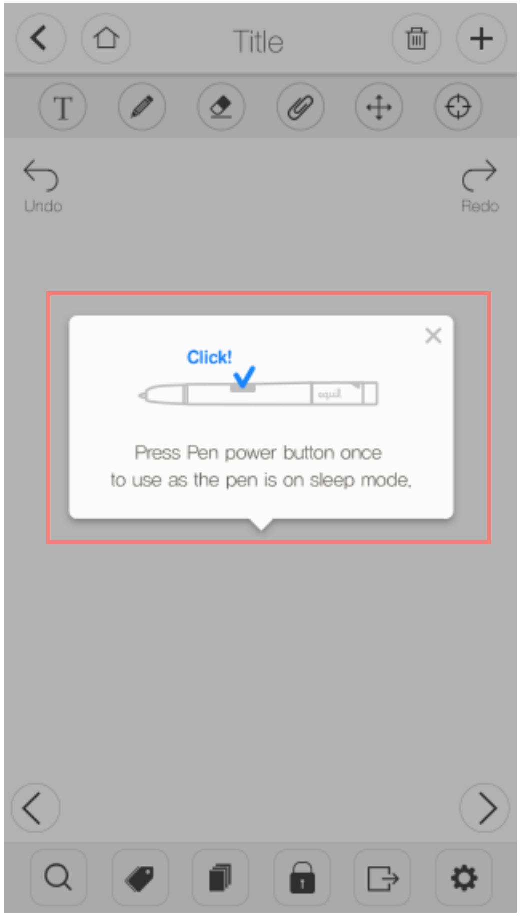
1. Screen Mode when it is out of the motion area



When the pen is out of range, it sh
ows in red color. The shape of color
 is changeable, it lets the users kno
w it is deviated

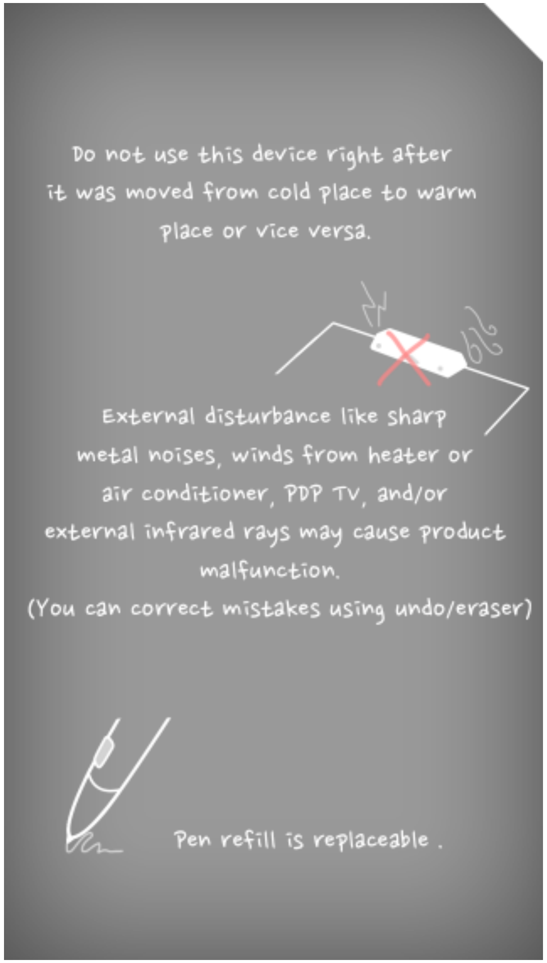
2. Show message when pen goes to sleep mode (Smart Pen only)



Press Pen power button once
to use as the pen is on sleep mode.

3. Tutorial- related to Hardware

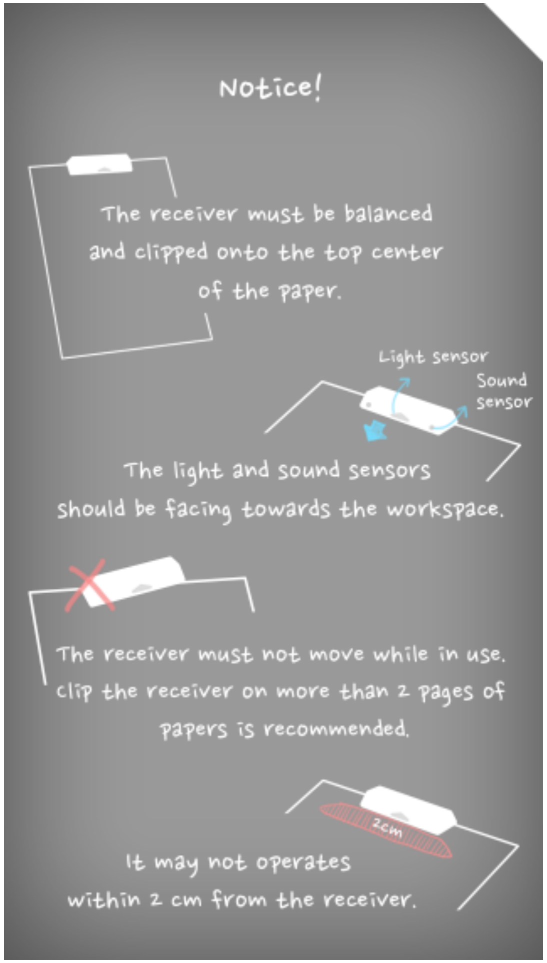
The information below must be included in the manual
We can provide source files as .psd format in 9 languages(English, Spanish, French, German, Italian, Japanese, Chinese–Simplified, Chinese-Traditional, Korean)
Please refer to Tutorial_source (Attachment)



Do not use this device right after it was moved from cold place to warm place or vice versa.

External disturbance like sharp metal noises, winds from heater or air conditioner, PDP TV, and/or external infrared rays may cause product malfunction.
(You can correct mistakes using undo/eraser)

Pen refill is replaceable .



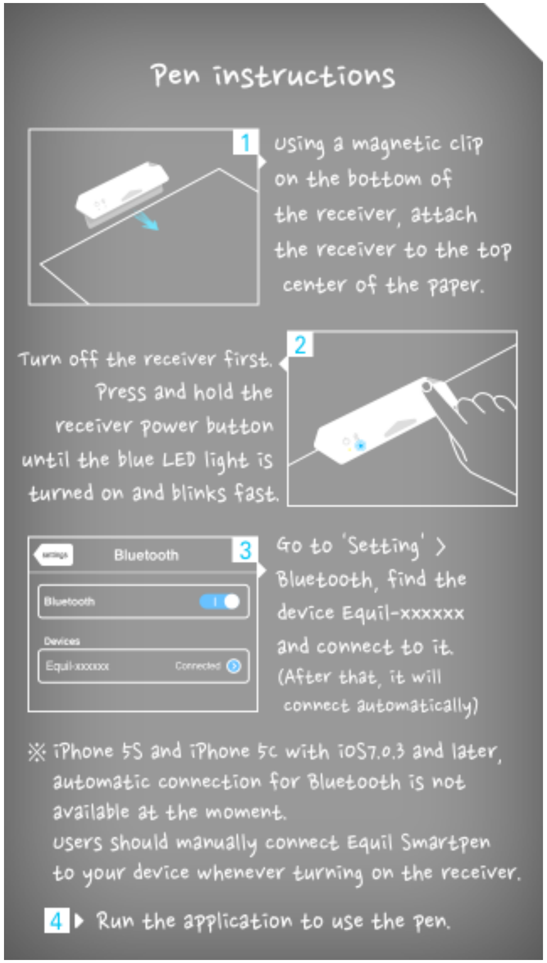
Notice!

The receiver must be balanced and clipped onto the top center of the paper.

The light and sound sensors should be facing towards the workspace.

The receiver must not move while in use. clip the receiver on more than 2 pages of papers is recommended.

It may not operates within 2 cm from the receiver.



Pen instructions

1 Using a magnetic clip on the bottom of the receiver, attach the receiver to the top center of the paper.

2 Turn off the receiver first. Press and hold the receiver power button until the blue LED light is turned on and blinks fast.

3 Go to 'Setting' > Bluetooth, find the device Equil-xxxxxx and connect to it. (After that, it will connect automatically)

※ iPhone 5S and iPhone 5c with iOS7.0.3 and later, automatic connection for Bluetooth is not available at the moment.
Users should manually connect Equil Smartpen to your device whenever turning on the receiver.

4 ▶ Run the application to use the pen.

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IV. Go to App Store

Go to App Store

➢ register to MFI

This is Apple certified accessory, we need to register all apps to use this device.

The below points are the information in order to register in Apple, so please fill it in English

Name of app as it will appear in App Store:
:
App version
:
Bundle Identifier
(The unique CFBundleIdentifier that specifies this application.)
:

Does your company own the brand name which will appear on this app?(Yes or No)
:
Is this a new or existing app on the App Store? (New or Existing)
:

Will this app be used independently of this accessory hardware? (Yes or No)
:

Please describe the iOS app for this accessory, including a general functional overview of the software and its key features
:

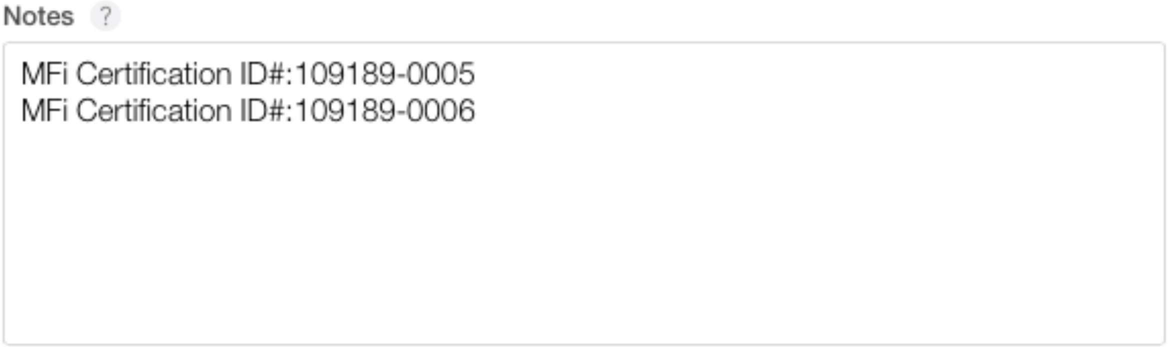
After done, please send it with your name and contact number to support@penandfree.com

Go to App Store

➢ register to App Store

When registering in App Store, record precisely to Mfi Certification ID#:109189-0006 at Review notes section
Equil Smartmarker is Mfi Certification ID#:109189-0006
Equil is Mfi Certification ID#:109189-0005
(Please refers to the example picture below)

➢ Example



MFi Certification ID#:109189-0005
MFi Certification ID#:109189-0006