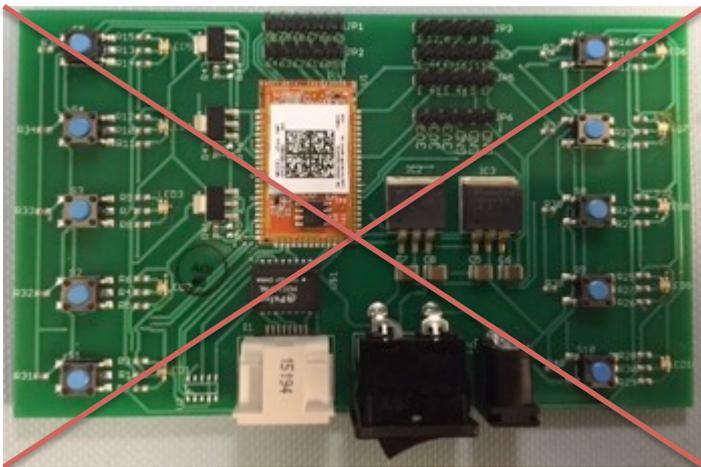


# SM Buttons

## Driver Development Note

### Driver Development Module (DDM) is Obsolete

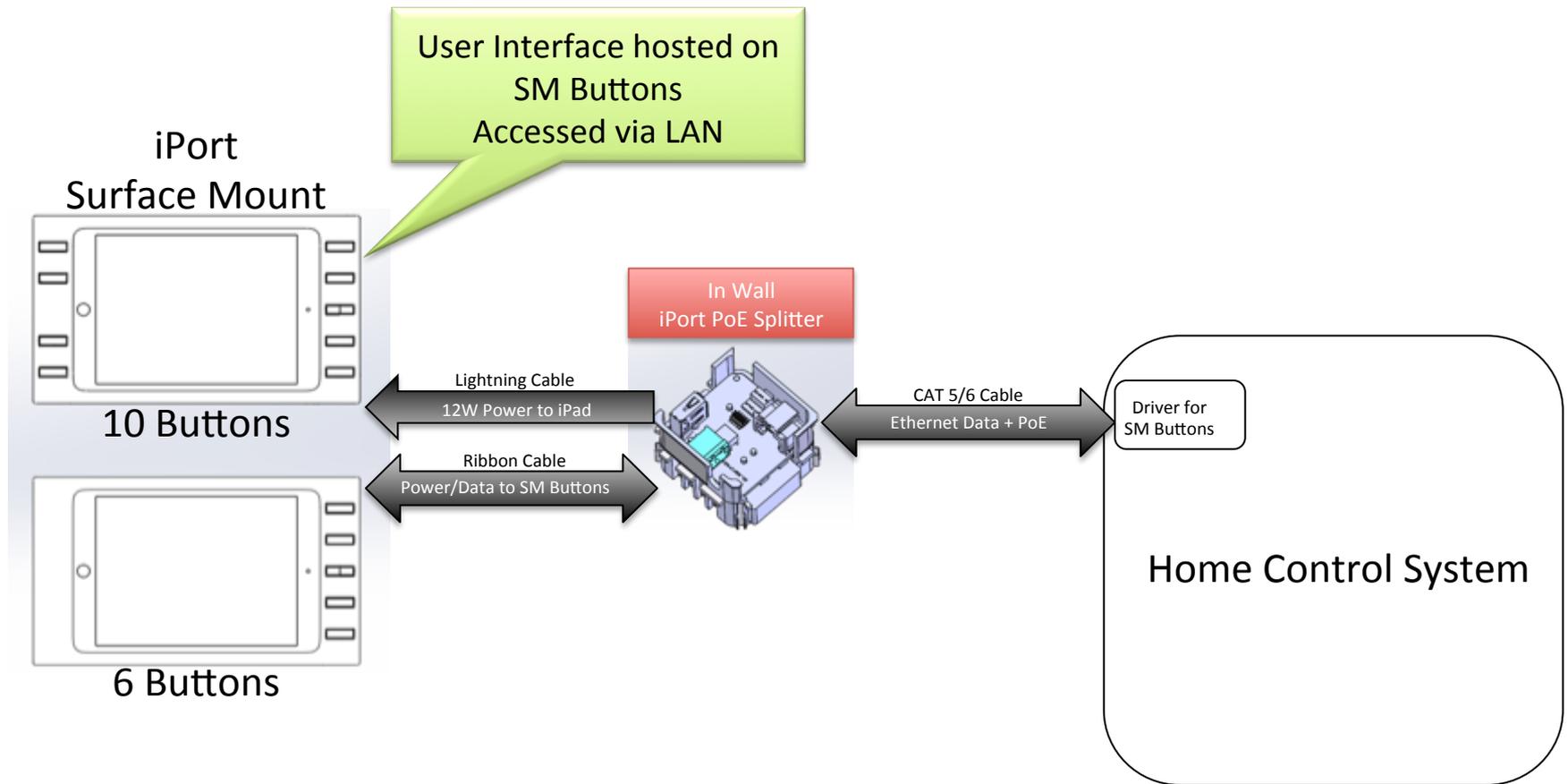
- iPort previously distributed limited quantities of a 10 button driver development module (DDM) PCBA.
- This DDM hardware uses different hardware LEDs than the near production versions provided in April 2016. The latest firmware (Version 6 or later) will therefore not work with the DDM properly when controlling the LEDs.
- Control companies developing drivers should no longer use the DDM and should instead use the latest hardware and firmware in the SM Buttons hardware provided in April 2016 or later.
- Please check any control system drivers developed with the DDM using the latest provided April 2016 or later SM Buttons hardware to verify proper functionality.



Please do not use the DDM to develop drivers anymore.

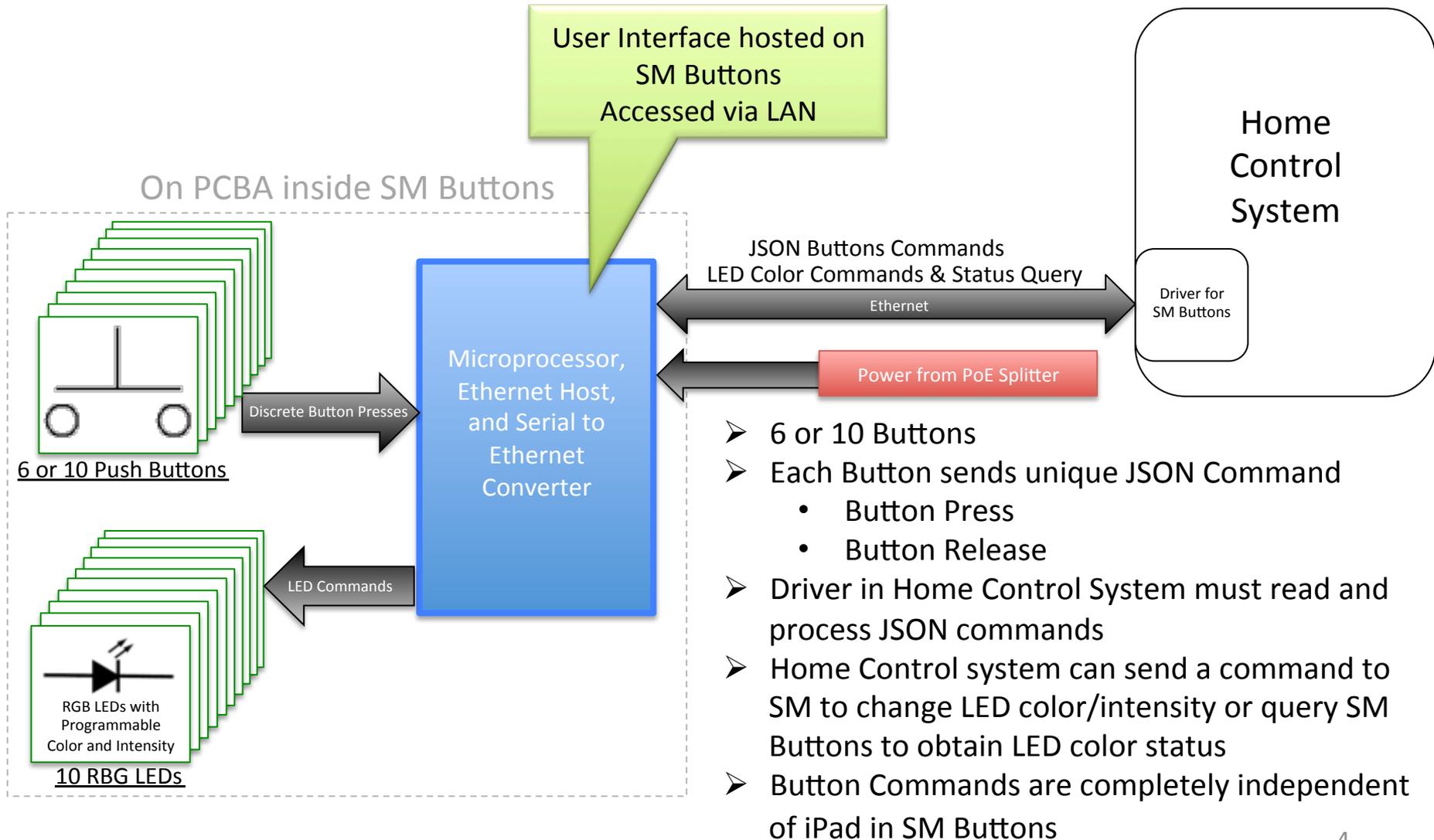
Only use SM Buttons hardware provided in April 2016 or later to develop drivers for SM Buttons.

# iPort Surface Mount Buttons System Overview



Note: Button Commands are completely independent of the iPad in SM Buttons

# iPort Surface Mount Buttons System Block Diagram



# Surface Mount Buttons

## 10 Buttons Locations



Button 7  
LED 7

Button 1  
LED 1

Note Blank  
Space

Note  
Up/Down

Button 10  
LED 10

Button 6  
LED 6

# SM Buttons Setup Photograph

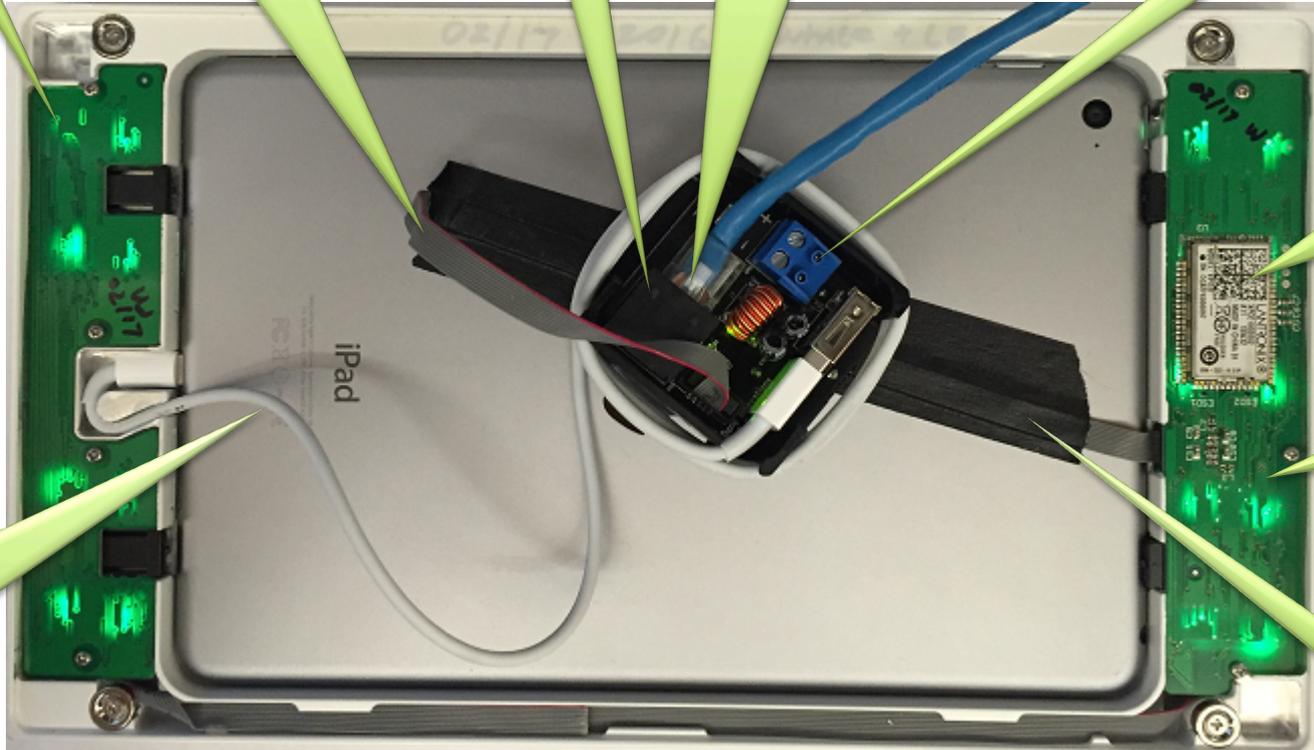
4 Buttons  
PCBA

iPort PoE  
Splitter

Power and Data  
Ribbon Cable

Connect Ethernet  
with PoE

Auxiliary  
18-24V Input



SM Buttons  
Microprocessor

6 Buttons  
PCBA

Optional  
Black Tape

Apple  
Lightning Cable  
(Provided with iPad)  
to Power iPad  
via USB

# Overview

## SM Buttons



- Button Commands are completely independent of iPad in SM Buttons
- It is not therefore necessary to include the iPad in the SM Buttons, however the iPad could replace the PC in some of the next steps.

# SM Buttons

## Driver Development Setup Instructions

- Connect a wireless router, PoE injector, PoE splitter, and the SM Buttons as below.
- Power both the wireless router and the PoE injector.
- Connect a laptop to the wireless router using Network Settings

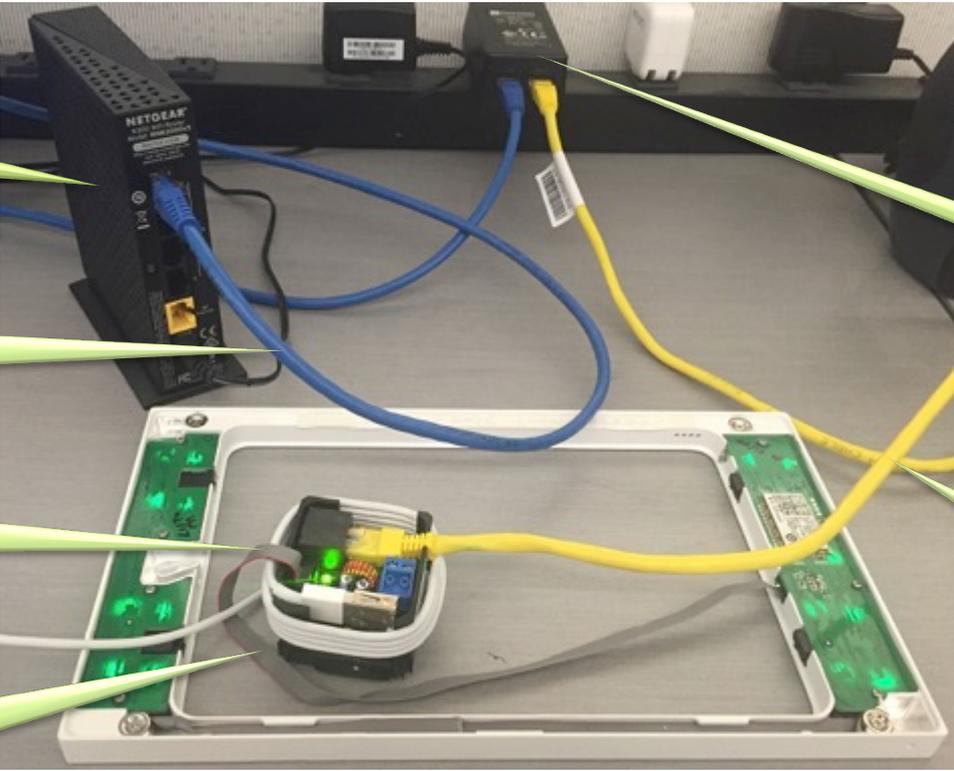


LAN Router

Ethernet Data

PoE Splitter

Ribbon Cable Connecting PoE Splitter and SM Buttons



PoE Injector (or PoE Switch)

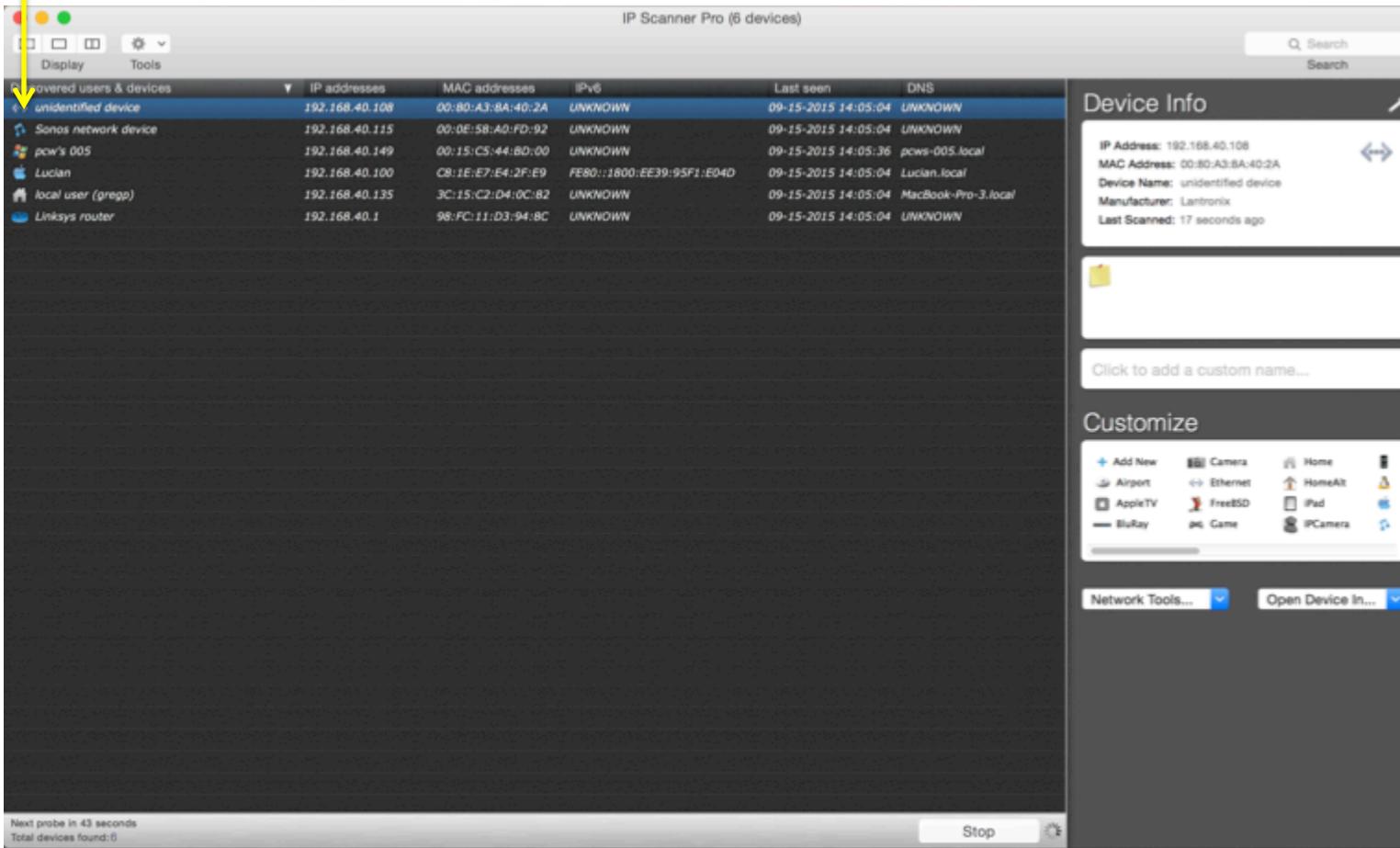
Data and Power

# SM Buttons

## User Instructions

Find IP Address of SM Buttons on LAN using Fing or other Network Scanner software

- Note: Unit will default to Dynamic IP address
- Unit will appear as “iPort” or “unidentified device” on your Network



The screenshot displays the IP Scanner Pro interface with the following data:

Discovered users & devices	IP addresses	MAC addresses	IPv6	Last seen	DNS
← unidentified device	192.168.40.108	00:80:A3:8A:40:2A	UNKNOWN	09-15-2015 14:05:04	UNKNOWN
Sonos network device	192.168.40.115	00:0E:58:A0:FD:92	UNKNOWN	09-15-2015 14:05:04	UNKNOWN
pcw's 005	192.168.40.149	00:15:CS:44:BD:00	UNKNOWN	09-15-2015 14:05:36	pcw's-005.local
Lucian	192.168.40.100	C8:1E:E7:E4:2F:E9	FE80::1800:EE39:95F1:E04D	09-15-2015 14:05:04	Lucian.local
local user (gregg)	192.168.40.135	3C:15:C2:D4:0C:82	UNKNOWN	09-15-2015 14:05:04	MacBook-Pro-3.local
Linksys router	192.168.40.1	98:FC:11:D3:94:BC	UNKNOWN	09-15-2015 14:05:04	UNKNOWN

The 'Device Info' sidebar for the selected device shows:

- IP Address: 192.168.40.108
- MAC Address: 00:80:A3:8A:40:2A
- Device Name: unidentified device
- Manufacturer: Lantroxix
- Last Scanned: 17 seconds ago

At the bottom of the window, it indicates: Next probe in 43 seconds, Total devices found: 6, and a Stop button.

# SM Buttons

## User Instructions

Enter SM Buttons' IP Address into a web browser connected to the same network as SM Buttons Use Configuration Utility to:

- Add Custom Name to SM Buttons Device
- Change Button Color or Brightness
- Static or Dynamic IP
- Blink LEDs of SM Buttons
- Restore Device
- Email Configuration Settings

192.168.2.4

iPort | Configuration Utility  
Version: 6

Device Name: SurfaceMount

Blink LEDs Restore Device

IP Address

Mode  
 Static  Automatic (Dynamic)

Backlight

Color  
 White  Blue  Green  Red

Brightness  
0 25 50 75 100%

Custom  R G B  
255 255 255

Save Reset Form

Caution: Remember to SAVE settings before exiting.

Email Configuration Notify Me of Software Updates

Note:  
Accessing the Configuration Utility is not necessary for functionality. The SM Buttons will function out of the box. The factory defaults are White LED and Dynamic IP.

Remember to Press  
"Save" after adjusting  
settings

# SM Buttons

## User Instructions

### Factory Reset:

To Reset SM Buttons (6 or 10 Buttons Models) to Factory Default Settings, **Press and hold buttons 1,2,5, & 6 for nine seconds with power connected.**



# SM Buttons

## Driver Development Instructions

Establish connection between Control System (with Driver) and SM Buttons

- SM Buttons is the TCP Server
- Control System is the TCP Client
- Connection is made via Raw TCP connection
- Port for SM Buttons is 10001

# SM Buttons

## Driver Development Instructions

### JSON command formats

JSON report: Report fields (all quoted strings) examples:

#### Connection report follows:

```
{
  "deviceid":"SurfaceMount",
  "model":"iPortSM6B",
  "macaddr":"0080A38A4002",
  "version":"V6",
  "uptime":"10893",
  "keys":[
    {"label":"key 1","state":"0"},
    {"label":"key 2","state":"0"},
    {"label":"key 3","state":"0"},
    {"label":"key 4","state":"0"},
    {"label":"key 5","state":"0"},
    {"label":"key 6","state":"0"}
  ]
}
```

#### Event Report follows:

```
{
  "deviceid":"SurfaceMount", - up to 16 character field for a specific Device ID
  "model":"iPortSM6B", - up to 10 character field for a Model Type
  "macaddr":"0080A38A4002", - 12 character field for the MAC address
  "version":"V6", - Variable length field for the firmware version
  "uptime":"21301", - up to 10 character field for unit uptime in milliseconds (32 bit value in decimal)
  "eventtime":"21301", - up to 5 character field for event timestamp in milliseconds (16 bit value in decimal)
  "events":[
    {"label":"key 3", - key name = Button Number (1-10)
      "state":"1"} - key state (0 = Button Release, 1 = Button Press)
  ]
}
```

- There are NO carriage returns or line feeds inside the {} – there are included here only for readability.
- The entire JSON report is surrounded with {}. And the TCP report transaction will end with a trailing "\r\n".
- The 'connection' report will not contain the events[] array and the 'event' reports will not contain the keys[] array.
- Each name:value pair is separated with comma.

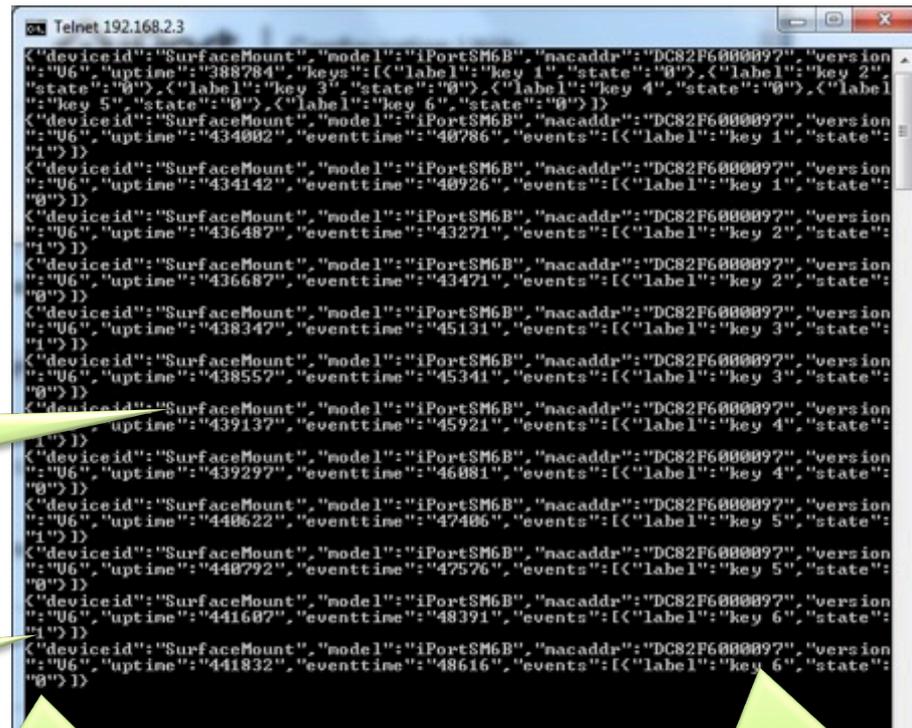
See next page for example output.

# SM Buttons

## Driver Development Instructions

View Button Press commands transmitted by each button press onto the Local Area Network via WireShark or other IP software

### JSON Commands Example Output



```
Telnet 192.168.2.3
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "388784", "keys": [{"label": "key 1", "state": "0"}, {"label": "key 2", "state": "0"}, {"label": "key 3", "state": "0"}, {"label": "key 4", "state": "0"}, {"label": "key 5", "state": "0"}, {"label": "key 6", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "434002", "eventtime": "40786", "events": [{"label": "key 1", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "434142", "eventtime": "40926", "events": [{"label": "key 1", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "436487", "eventtime": "43271", "events": [{"label": "key 2", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "436687", "eventtime": "43471", "events": [{"label": "key 2", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "438347", "eventtime": "45131", "events": [{"label": "key 3", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "438557", "eventtime": "45341", "events": [{"label": "key 3", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "439137", "eventtime": "45921", "events": [{"label": "key 4", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "439297", "eventtime": "46081", "events": [{"label": "key 4", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "440622", "eventtime": "47406", "events": [{"label": "key 5", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "440792", "eventtime": "47576", "events": [{"label": "key 5", "state": "0"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "441607", "eventtime": "48391", "events": [{"label": "key 6", "state": "1"}]}
{"deviceid": "SurfaceMount", "model": "iPortSM6.B", "nacaddr": "DC82F6000097", "version": "U6", "uptime": "441832", "eventtime": "48616", "events": [{"label": "key 6", "state": "0"}]}
```

“SixteenCharacter”  
= Custom Name  
Input by Installer

“1” = Button Press

“0” = Button Release

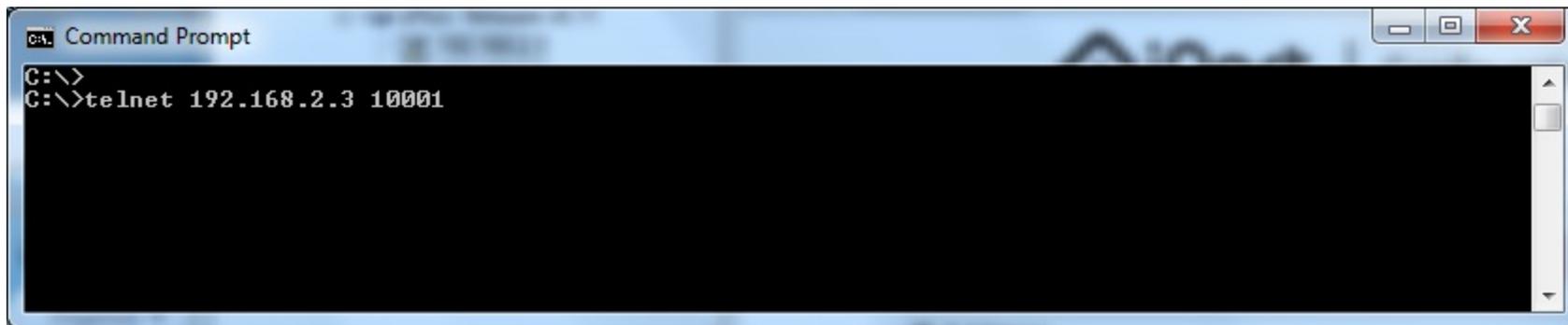
“key 6” = Button 6

# SM Buttons

## Driver Development Instructions

From a windows computer, you can telnet to the SM Buttons connected to the same network. This will allow you to see all button commands coming from the SM Buttons.

Start Menu->Run: telnet <IP address of xPico> 10001  
and press Enter



```
Command Prompt
C:\>
C:\>telnet 192.168.2.3 10001
```

Button Commands sent from SM Buttons will output on screen:



```
Telnet 192.168.2.3
{"deviceid":"SurfaceMount","model":"iPortSM6B","macaddr":"DC82F6000097","version":"U6","uptime":"1628810","keys":[{"label":"key 1","state":"0"}, {"label":"key 2","state":"0"}, {"label":"key 3","state":"0"}, {"label":"key 4","state":"0"}, {"label":"key 5","state":"0"}, {"label":"key 6","state":"0"}]}
```

# SM Buttons

## Driver Development Instructions

### Sending Commands from a Control System to SM Buttons

The LEDs color can be controlled by sending a command with an RGB or HEX color code to the SM Buttons from a control system or any computer.

note: (<cr> = press Enter)

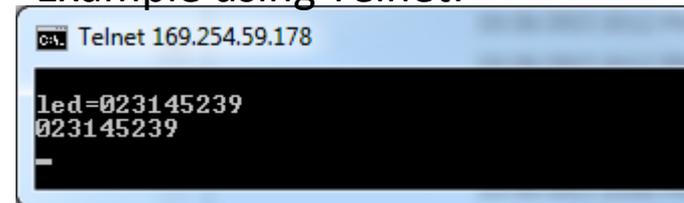
To set LEDs colors to RGB Code: Red 23, Green 145 and Blue 239,  
Send the follow command to the SM Buttons:

```
<cr>led=023145239<cr>
```

which sends the following HEX bytes:

```
0D 6C 65 64 3D 30 32 33 31 34 35 32 33 39 0D
```

### Example using Telnet:



```
C:\> Telnet 169.254.59.178  
led=023145239  
023145239  
-
```

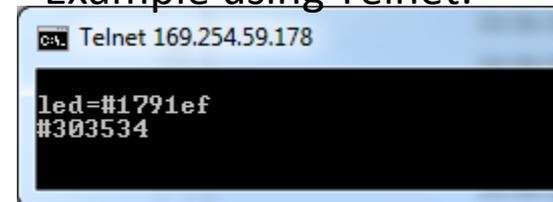
To set LEDs colors to Red 23, Green 145 and Blue to 239 in HEX mode,  
Send the follow command to the SM Buttons:

```
<cr>led=#1791EF<cr>
```

which sends the following HEX bytes:

```
0D 6C 65 64 3D 23 31 37 39 31 45 46 0D
```

### Example using Telnet:



```
C:\> Telnet 169.254.59.178  
led=#1791ef  
#303534
```

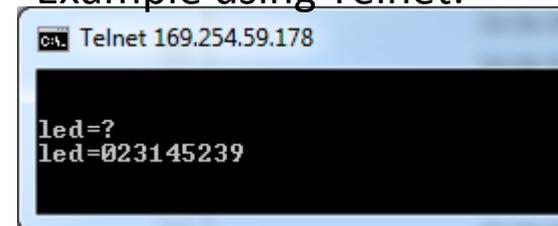
To query the SM Buttons at anytime to get the current led RGB setting,  
Send the follow command to the SM Buttons:

```
<cr>led=?<cr>
```

which sends the following HEX bytes:

```
0D 6C 65 64 3D 3F 0D
```

### Example using Telnet:



```
C:\> Telnet 169.254.59.178  
led=?  
led=023145239
```

# SM Buttons

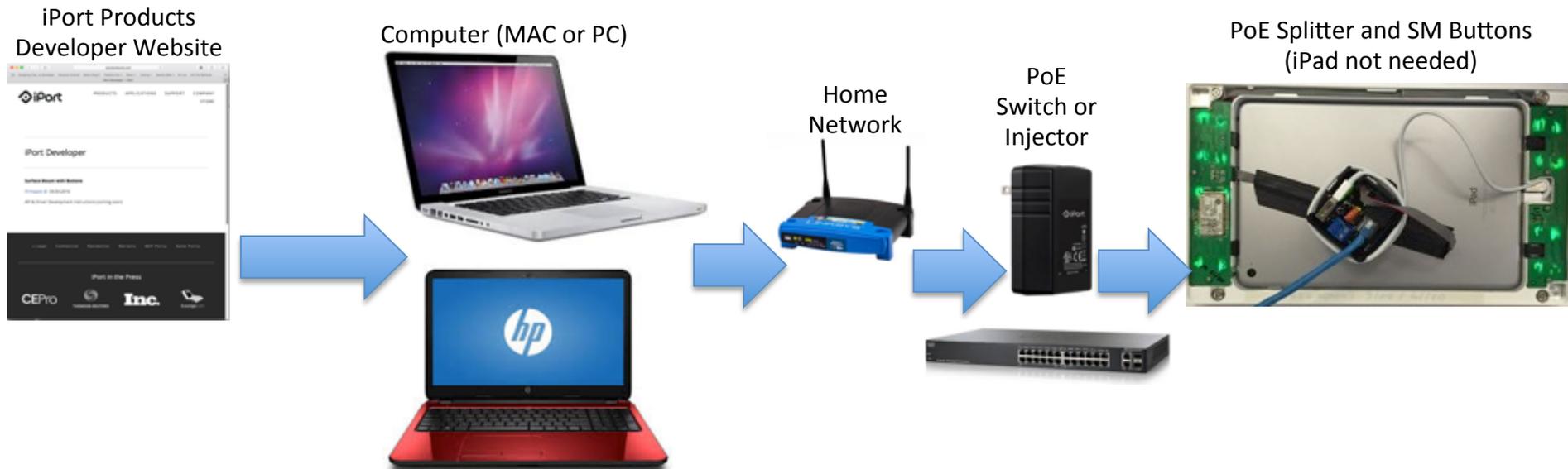
## Driver Development Instructions

### Loss of Connection + Reboot

- When the SM Buttons settings are saved by pressing the “Save” Button in the Configuration Utility or if power to the unit is turned off and the turned back on, the SM Buttons microprocessor reboots automatically in about 3-5 seconds.
- This reboot will cause a break in the network TCP connection between the control system and the SM Buttons.
- The control system driver design must account for this reboot situation. The control system must regularly check if there is communication between SM Buttons and controller. We recommend the control system checks at least every minute.
- If there is no TCP connection, the control system must re-establish communication must with the SM Buttons.
- Other than monitoring normal network connection activity, another way the control system can confirm the TCP connection is by using the commands described in earlier slides where the control system sends a query to the SM Buttons, `<cr>led=?  
<cr>` in ASCII code. SM Buttons will send back the ASCII code of the value of the LED color.

# Updating Firmware of SM Buttons Overview

1. Download Firmware from iPort Website
2. Connect to Computer to home network (Can be VPN)
3. Transfer two SM Buttons firmware files with ending “xxx.rom” and “yyy.cob” to SM Buttons microprocessor



# Updating Firmware of SM Buttons

## Four Ways to Update Firmware

Windows	Mac
1. Command prompt using tftp	3. Command prompt using tftp
2. Lantronix Device Installer	4. Pumpkin

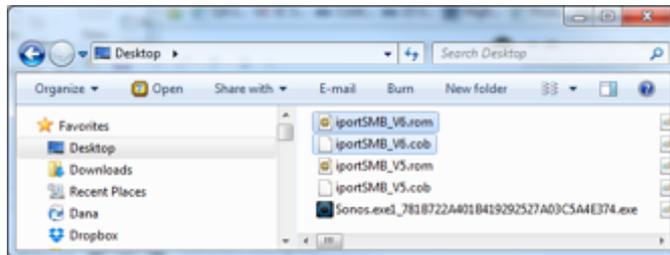
Note: Only need to update firmware when new firmware has been issued by iPort

# Updating Firmware of SM Buttons

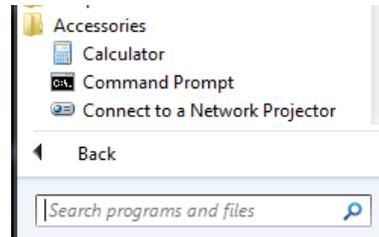
## Windows

### 1. Command prompt using tftp

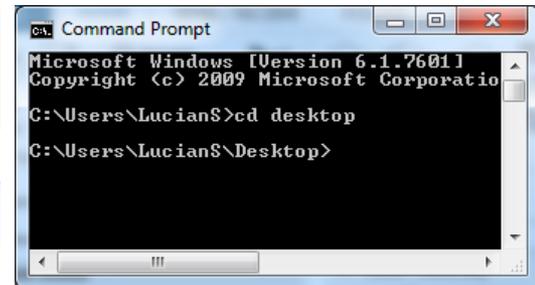
Copy filename.cob and filename.rom onto your desktop.



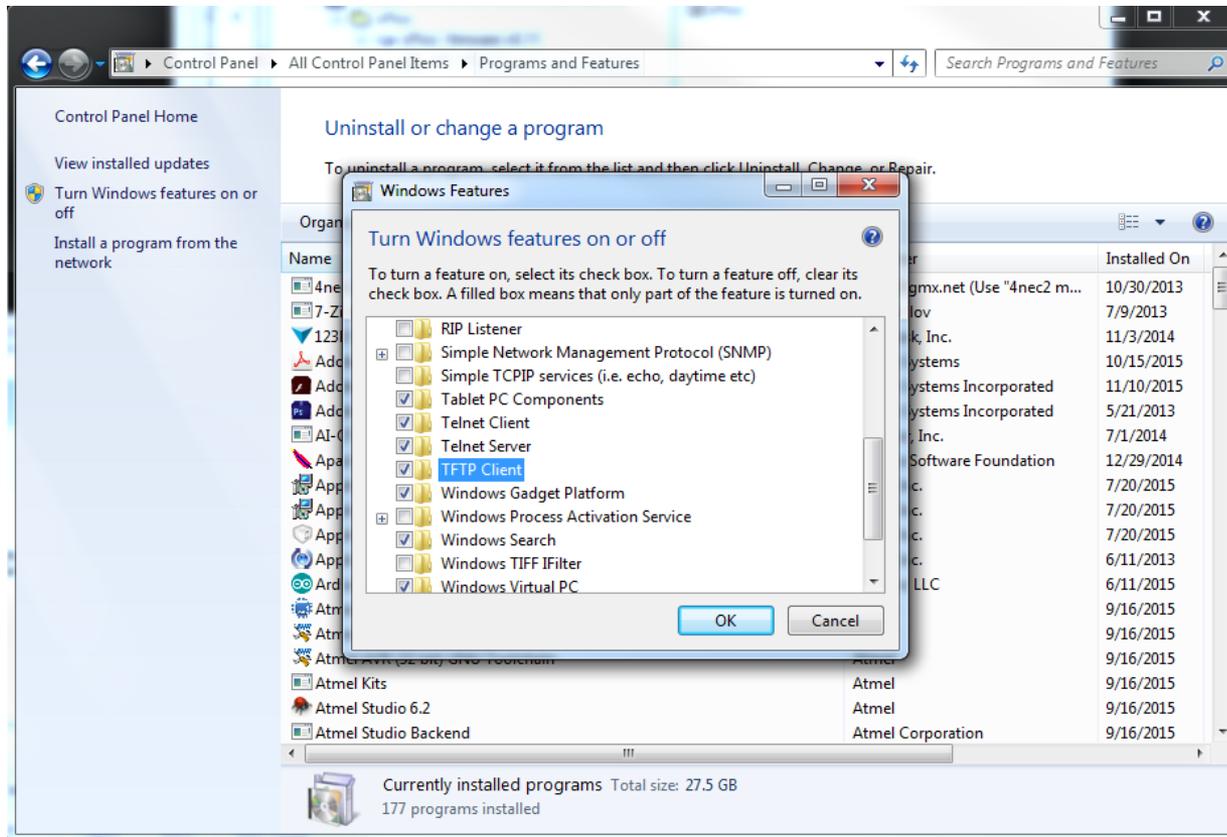
Select Command Prompt from Accessories



Change directories to get to the Desktop

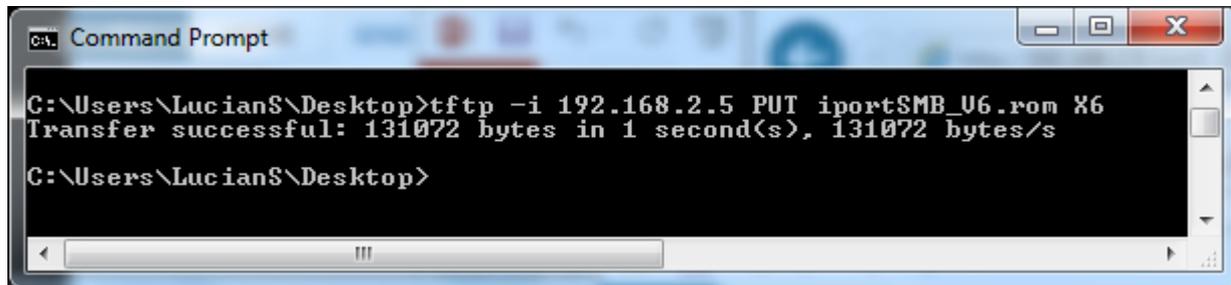


Remember to Turn on TFTP and Telnet by checking the boxes in the Control Panel Programs and Features as showed below:



Type: `tftp -i <IP Address of SM Buttons> put filename.rom X6`

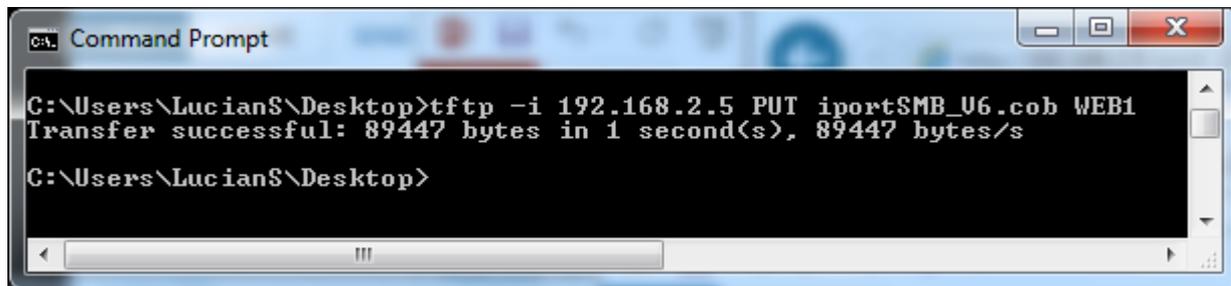
Example below:



```
Command Prompt
C:\Users\LucianS\Desktop>tftp -i 192.168.2.5 PUT iportSMB_U6.rom X6
Transfer successful: 131072 bytes in 1 second(s), 131072 bytes/s
C:\Users\LucianS\Desktop>
```

Type: `tftp -i <IP Address of SM Buttons> put filename.cob WEB1`

Example below:



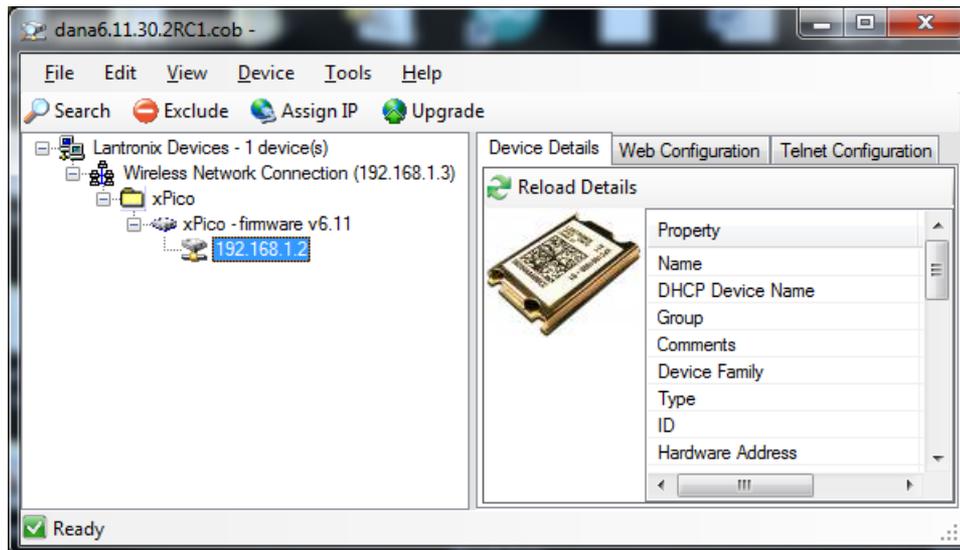
```
Command Prompt
C:\Users\LucianS\Desktop>tftp -i 192.168.2.5 PUT iportSMB_U6.cob WEB1
Transfer successful: 89447 bytes in 1 second(s), 89447 bytes/s
C:\Users\LucianS\Desktop>
```

# Updating Firmware of SM Buttons

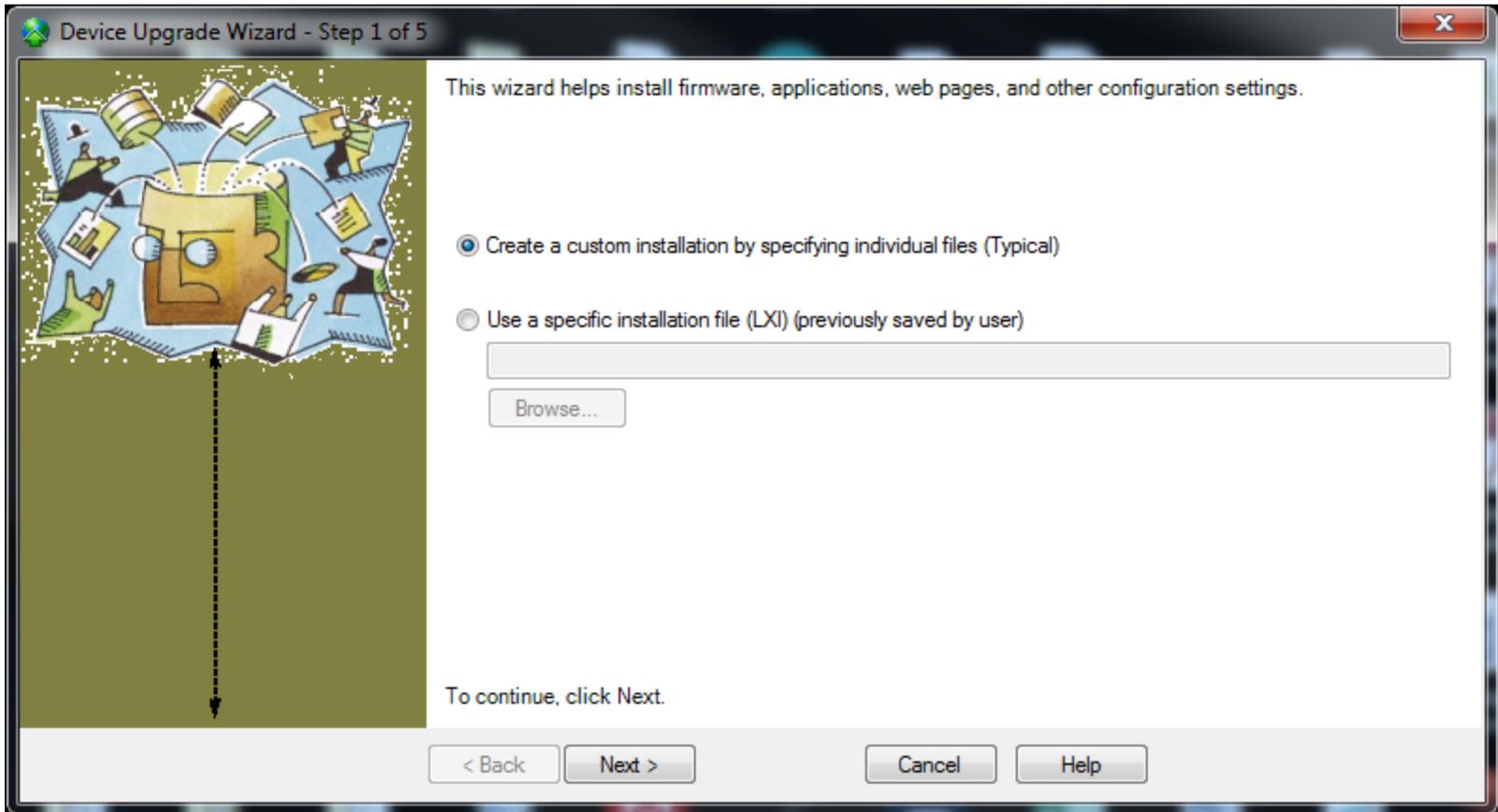
## Windows

### 2. Lantronix Device Installer

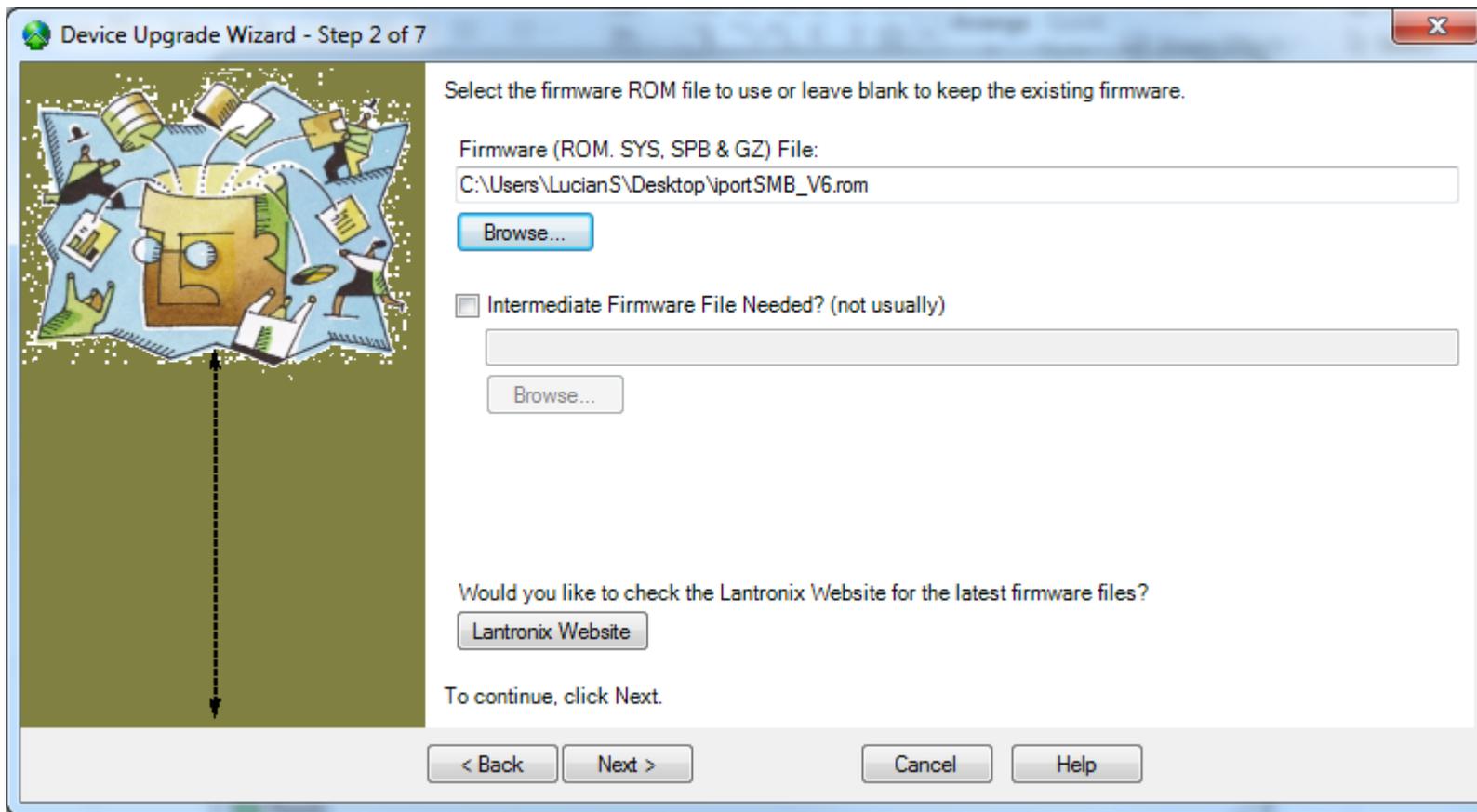
Launch Lantronix Device Installer, click search, expand all the way to xPico IP address.



Click Device then Upgrade:

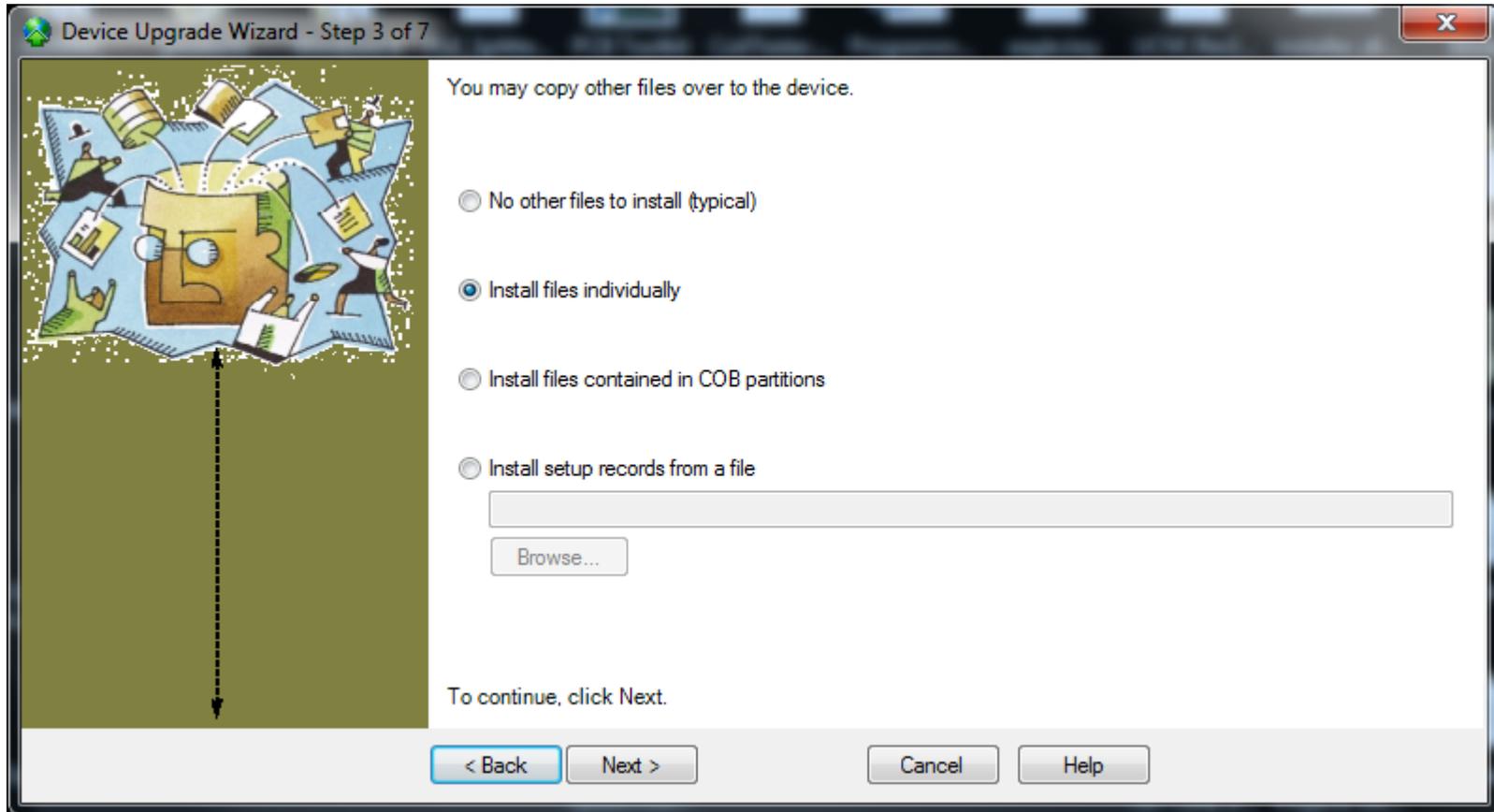


Select Create a custom ..... Then click Next, then Browse for the filename.rom file:



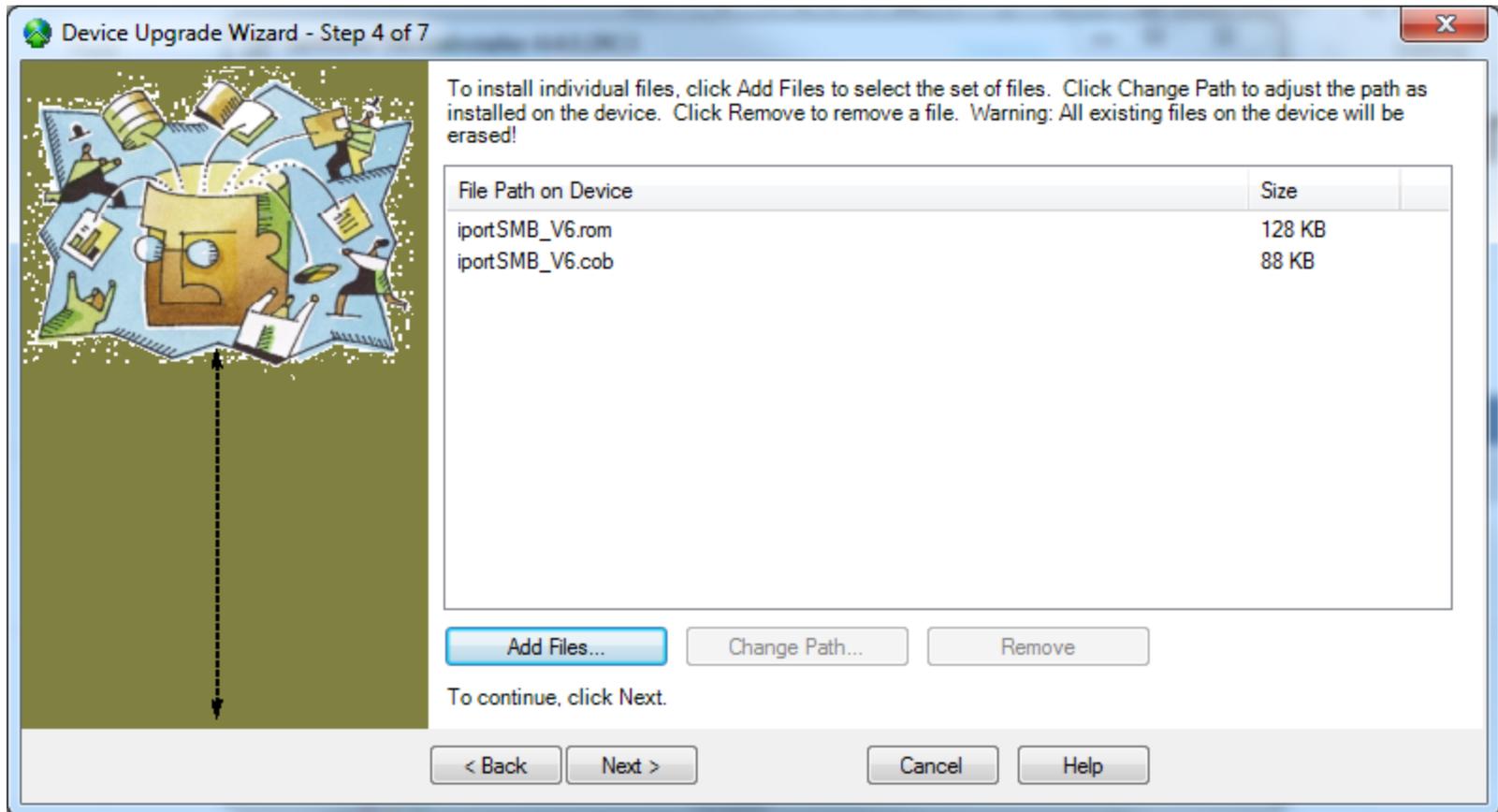
Click Next

## Select Install files individually



Click Next

Click Add Files... then choose the filename.rom file on your Desktop:



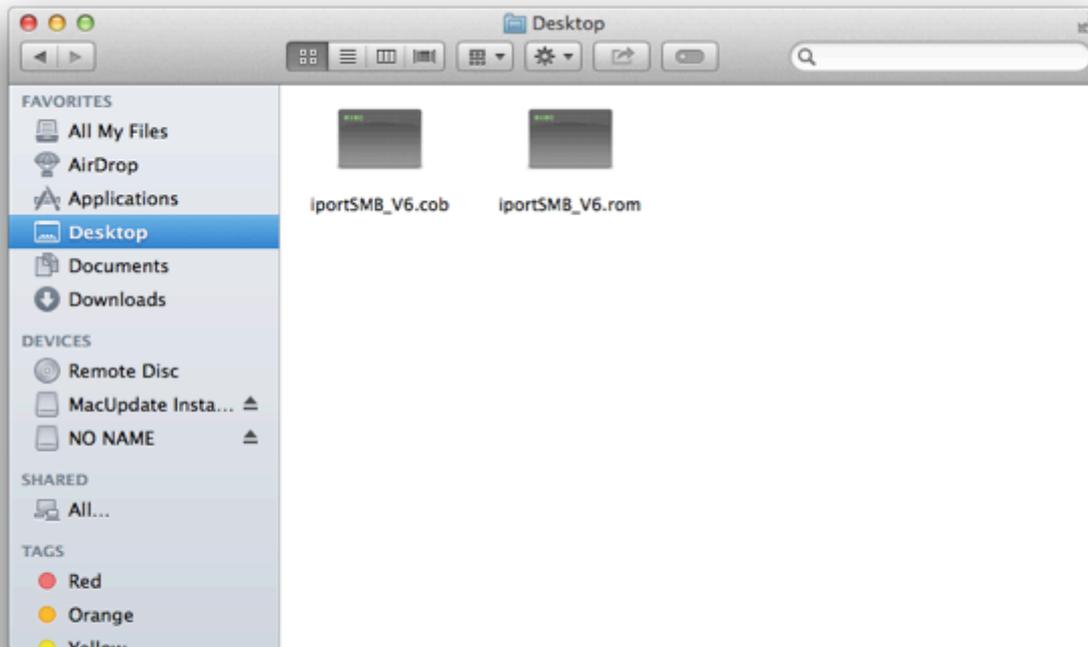
Click Next, Next, Next, wait for the files to upload then click Close. You're done.

# Updating Firmware of SM Buttons

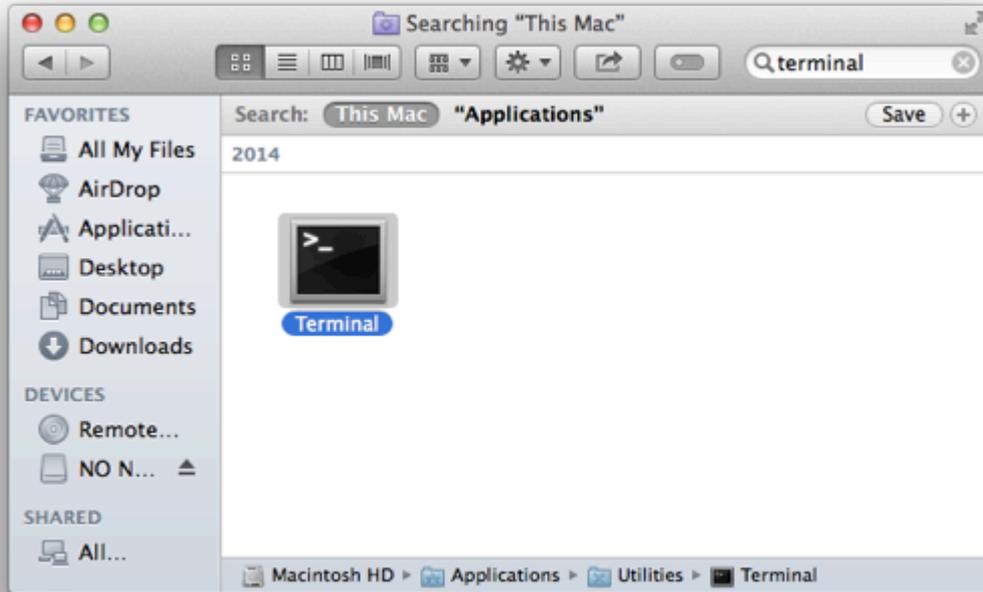
## Mac

### 3. Command prompt using tftp

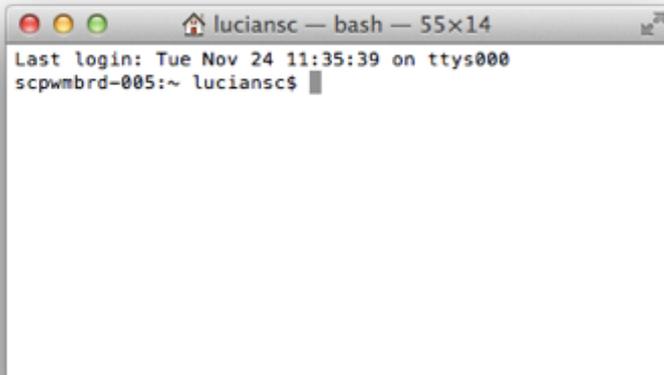
Copy filename.cob and filename.rom on your desktop.



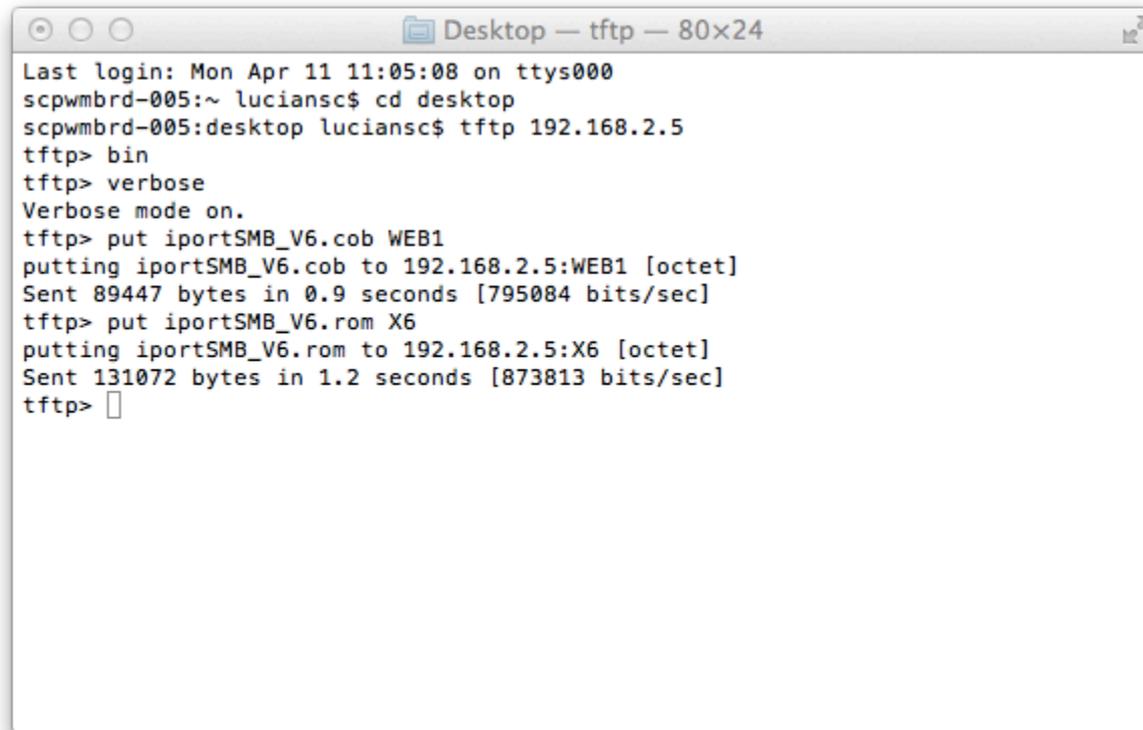
Click on Finder and type Terminal in the search box:



Click on Terminal to open it.



Change directory to desktop, activate TFTP to the SM Buttons' IP address and upload the files to the SM Buttons, following the example below.

A terminal window titled "Desktop — tftp — 80x24" showing a sequence of commands and their outputs. The user navigates to the desktop directory, starts a TFTP session to 192.168.2.5, sets verbose mode, and uploads two files: iportSMB\_V6.cob and iportSMB\_V6.rom.

```
Last login: Mon Apr 11 11:05:08 on ttys000
scpwmbird-005:~ luciansc$ cd desktop
scpwmbird-005:desktop luciansc$ tftp 192.168.2.5
tftp> bin
tftp> verbose
Verbose mode on.
tftp> put iportSMB_V6.cob WEB1
putting iportSMB_V6.cob to 192.168.2.5:WEB1 [octet]
Sent 89447 bytes in 0.9 seconds [795084 bits/sec]
tftp> put iportSMB_V6.rom X6
putting iportSMB_V6.rom to 192.168.2.5:X6 [octet]
Sent 131072 bytes in 1.2 seconds [873813 bits/sec]
tftp> █
```

# Updating Firmware of SM Buttons

## Mac

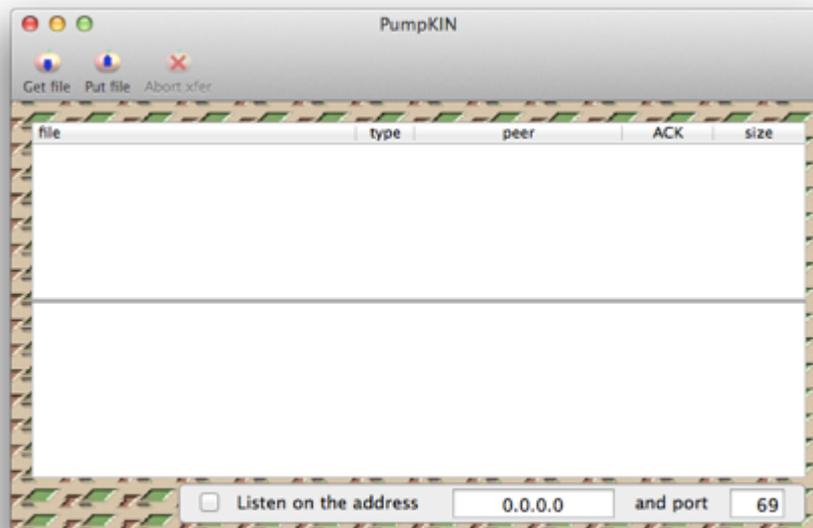
### 4. Pumpkin

Install PumpKIN tftp client from this site:

<http://www.macupdate.com/app/mac/46344/pumpkin>

Open PumpKIN despite the warning that this is an unauthorized app.

Click on Put file and fill in the information, like below



Put file to remote TFTP server

Local file:

Remote host:  port:  file:

Transfer type:

Block size:

Timeout:

PumpKIN

file	type	peer	ACK	size
------	------	------	-----	------

Connection timeout for 'X6'  
↑ Transfer of 'X6' finished.

Listen on the address  and port

Put file to remote TFTP server

Local file:

Remote host:  port:  file:

Transfer type:

Block size:

Timeout:

PumpKIN

file	type	peer	ACK	size
------	------	------	-----	------

Connection timeout for 'WEB1'  
↑ Transfer of 'WEB1' finished.

Listen on the address  and port

# Questions?

## Contact:

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949-226-5175

- Derick Dahl

[derickd@danainnovations.com](mailto:derickd@danainnovations.com)

949-226-5190