



# YKUSH XS Yepkit USB Switchable Hub XS

Product Manual

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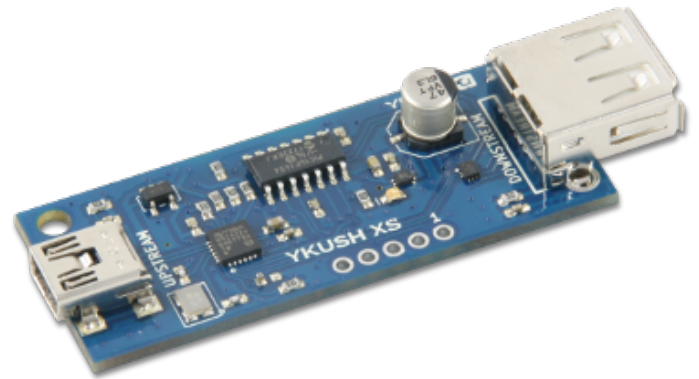
# PRODUCT OVERVIEW

## CONTROL YOUR USB DEVICES

### Yepkit USB Switchable Hub XS

Being able to connect/disconnect USB devices without having to physically plug/unplug is quite helpful for recurrent processes. Below are some example of use cases where this capability is quite advantageous:

- Data backup systems using USB HDDs
- Data access control by emulating the physical plug/unplug by connecting/disconnecting the USB device (Both power and data lines) containing or relaying the data
- Power saving schemes for solutions with USB powered systems or devices



The control is achieved by sending ON/OFF commands to the on-board microcontroller, visible to the host system as a HID USB device. The commands are based in a very simple protocol detailed in Control Protocol section of this manual.

#### Key Features:

- Single USB 2.0 High Speed downstream port
- USB bus powered
- Full downstream port switching (both VBUS power and data lines)
- ICSP programming interface for loading new firmwares
- Reduced footprint

#### Key Benefits:

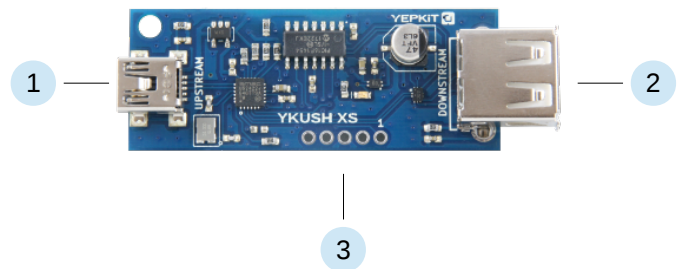
- Full control over your USB device ON/OFF
- Remote switching of USB devices
- Bus powered for ease of use
- High flexibility of use and integration brought by a user application layer control software
- Open source control software allowing customization
- Reduced footprint for space constrained applications
- Lower cost than other YKUSH boards for applications that do not require more than one downstream port

# CONNECTING AND SETTING-UP

## CONNECTING AND SETUP

### YKUSH XS board terminals

- 1 Upstream Port (connect to the host)
- 2 Downstream Port (connect to the device)
- 3 ICSP Programming interface



The hardware setup for using YKUSH XS is quite simple, it's connected exactly as any other USB Hub, just connect the upstream port to the host system (eg., a PC USB port).

At this point YKUSH XS is a working high-speed (single port) USB Hub to which USB devices can be connected.

To use the control functionality a software component must be installed in the host system (or custom developed by the user).

This software component in the host system implements the communication protocol with the YKUSH XS in-board microcontroller that controls the downstream port.

The control application is provided as Open Source software and can be downloaded from the YKUSH XS product page at [www.yepkit.com](http://www.yepkit.com).

The software provided sends commands from the host system to YKUSH to perform the following actions:

- Switch ON (bring UP) the downstream port
- Switch OFF (bring DOWN) the downstream port
- Get downstream port status
- List the serial numbers of the YKUSH XS boards connected

To make these commands available in the host system follow the instructions in the setup guide by following the link for your system in the product page.

# USING IT

## USING YOUR YKUSH XS

Now that everything is set-up you can start using the full capabilities of YKUSH XS. If you are using our software, the commands have the following structure and options.

### The command structure

```
ykushcmd ykushxs -s serial_number option
```

*option:*

- u Turns the port up
- d Turns the port down
- g Gets the port status
- l List the serial number of the connected boards

The `<-s serial_number>` parameter is optional and only relevant when more than one YKUSH XS board is connected to the same host.

### Some examples

Switch OFF/DOWN the downstream port.

```
ykushcmd ykushxs -d
```

Switch ON/UP the downstream port.

```
ykushcmd ykushxs -u
```

Get downstream port status.

```
ykushcmd ykushxs -g
```

List the serial number of the connected boards.

```
ykushcmd ykushxs -l
```

Switch OFF/DOWN the downstream port for the board with serial number YK00001.

```
ykushcmd ykushxs -s YK00001 -d
```

# CONTROL PROTOCOL

## UNDERSTANDING THE PROTOCOL

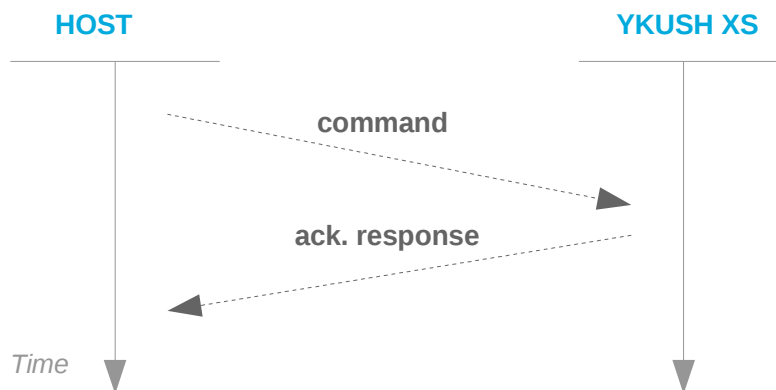
YKUSH XS board has an in-board microcontroller that handles the control communication with the host system and performs the switching of the downstream USB ports.

This in-board microcontroller is visible to the host system as an HID USB device with the following details:

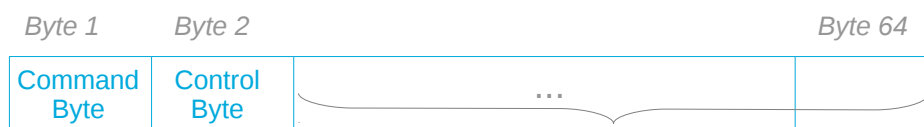
**Vendor ID (VID):** 0x04D8  
**Product ID (PID):** 0xF0CD

### The communication protocol

The communication protocol between the host system and YKUSH XS in-board microcontroller is a simple 64 byte packet (HID report) based command/acknowledge interaction.



Both the command and the acknowledge response (ack. response) are six bytes packet with the following format:



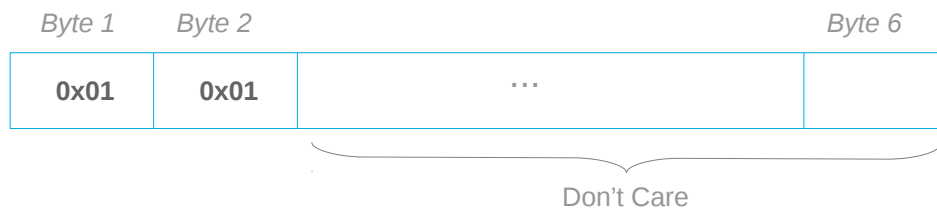
# CONTROL PROTOCOL

## The Command – From Host to YKUSH XS

As mentioned previously, the command sent from the host to the YKUSH XS microcontroller is transported in a six byte packet.

In this command packet, the **byte 1** carries the action code to be performed and the **byte 2** carries a control byte that is the repetition of the action code.

For example, the action code for powering down the Downstream Port 1 is 0x01. So the command packet sent by the host to YKUSH to switch off the Downstream Port 1 is the following:



All available action codes are listed in the table bellow.

Action	Byte 1	Byte 2
Power Down Downstream	0x01	0x01
Power Up Downstream Port	0x11	0x11
Get Downstream Port Status	0x21	0x21

## The Acknowledge Response – From YKUSH XS to Host

The acknowledge response message, sent from YKUSH XS to the host, is also a six byte packet with similar structure.

In this packet the **byte 1** carries the 0x01 code, which signals a successful reception and processing of the command sent. In the **byte 2** follows the received and executed action code.