



# SKY15-P20A

15" RUGGED SMART DISPLAY WITH 20  
PROGRAMMABLE FUNCTION KEYS



**USER MANUAL**

## Safety Information

### Electrical safety

- To prevent electrical shock hazard, disconnect the power cable from the electrical outlet before relocating the system.
- When adding or removing devices to or from the system, ensure that the power cables for the devices are unplugged before the signal cables are connected. If possible, disconnect all power cables from the existing system before you add a device.
- Before connecting or removing signal cables from the motherboard, ensure that all power cables are unplugged.
- Seek professional assistance before using an adapter or extension cord. These devices could interrupt the grounding circuit.
- Make sure that your power supply is set to the correct voltage in your area.
- If you are not sure about the voltage of the electrical outlet you are using, contact your local power company.
- If the power supply is broken, do not try to fix it by yourself. Contact a qualified service technician or your local distributor.

### Operation safety

- Before installing the motherboard and adding devices on it, carefully read all the manuals that came with the package.
- Before using the product, make sure all cables are correctly connected and the power cables are not damaged. If you detect any damage, contact your dealer immediately.
- To avoid short circuits, keep paper clips, screws, and staples away from connectors, slots, sockets and circuitry.
- Avoid dust, humidity, and temperature extremes. Do not place the product in any area where it may become wet.
- Place the product on a stable surface.
- If you encounter any technical problems with the product, contact your local distributor

### Statement

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- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

**Revision History**

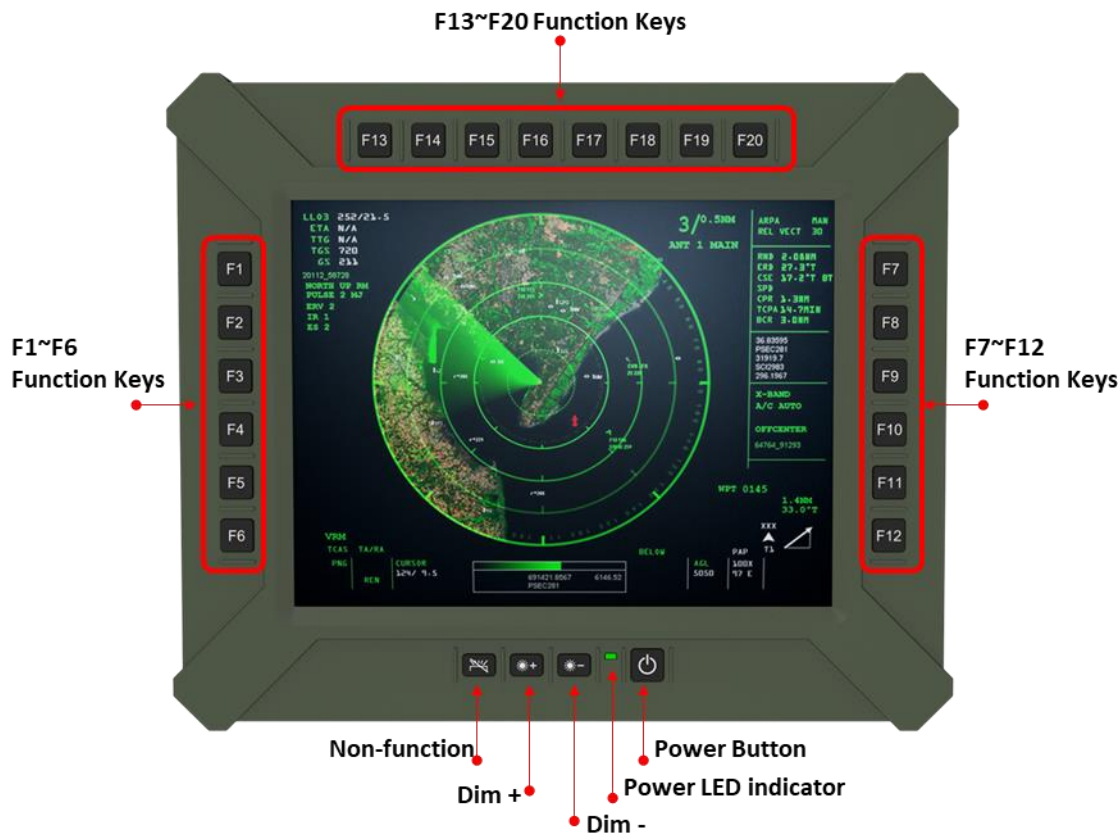
Revision	Date(YYYY/mm/dd)	Changes
V1.0	2025/03/27	Initial Release
V2.0	2025/5/06	Update to Linux version

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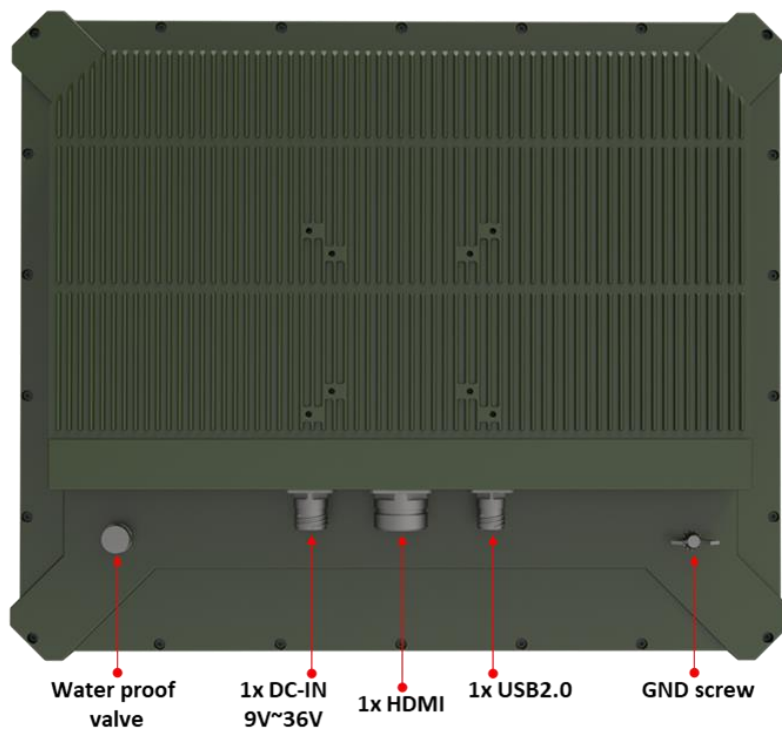
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Chapter 1: Product Introduction

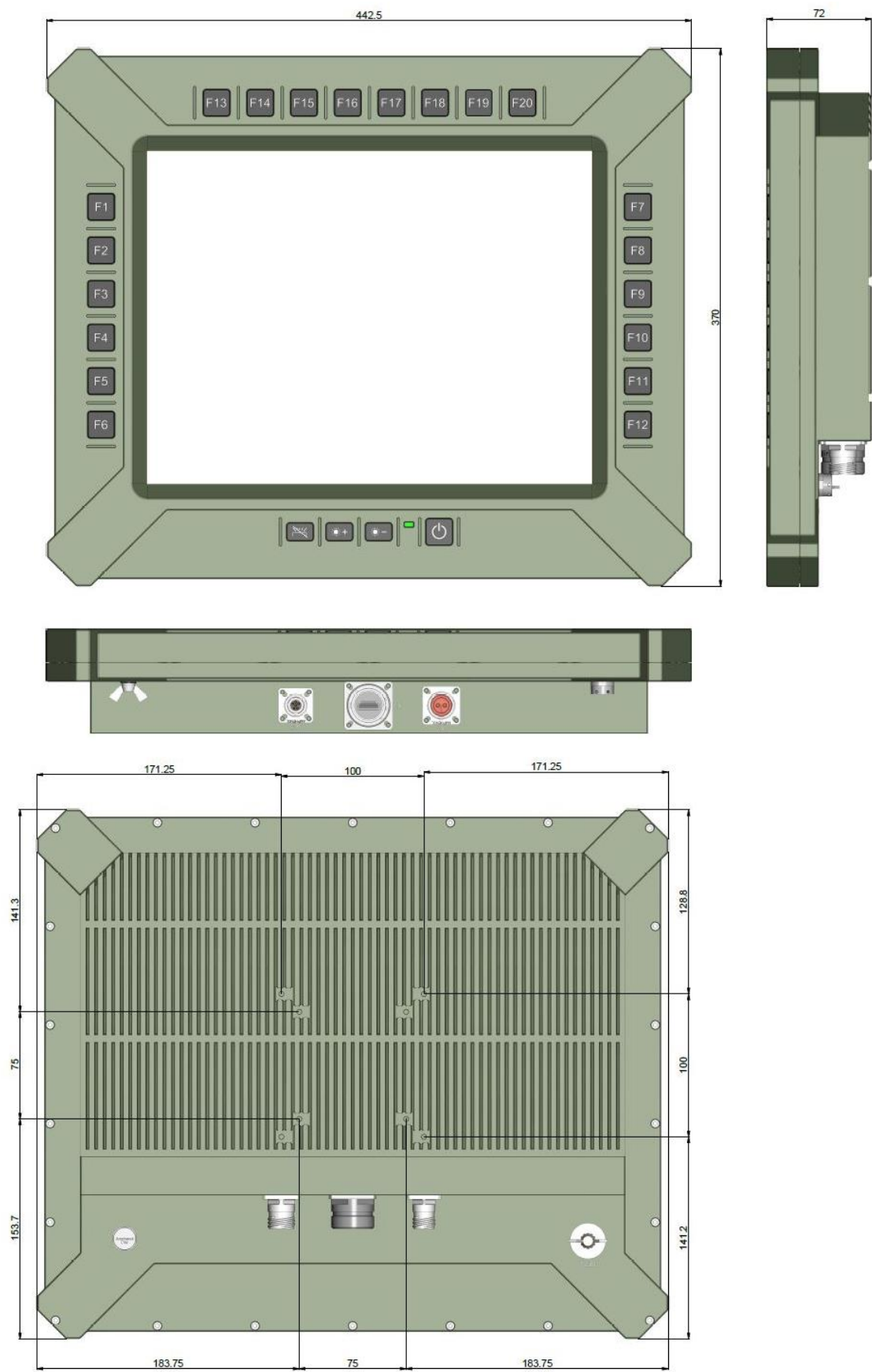
1.1 FRONT VIEW



1.2 REAR VIEW



1.3 ME DIMENSION





## Chapter 2: Components

### 2.1 LOCATION

A clean and moisture free environment is preferred. Make room for air circulation. Avoid areas with:

- Sudden or extreme changes in temperature.
- Extreme heat.
- Strong electromagnetic fields.
- Dust or high humidity.

If it is necessary to work in a hostile environment, please regularly maintain your display by cleaning dust, water, etc. to keep it in optimal condition.

### 2.2 RUGGEDNESS

The display is designed with rugged features such as vibration, shock, dust and rain/water protection. However, it is still necessary to provide appropriate protection while operating in harsh environments. NEVER immerse the unit in water. Doing so may cause permanent damage. All connectors will corrode if exposed to water or moisture. Corrosion is accelerated if the system's power is ON. Please take proper water-resistant measures for cable connections.

The DC jack and cables are sealed and may be operated with water splashing while attached. All port covers should be in place when no cable is attached.

### 2.3 POWER SUPPLY

The display can be powered via DC-IN (18~36V). Optional: MIL-STD-461, MIL-STD-1275

### 2.4 DISPLAY PANEL

The panel of the CLOUD15 series is a 4:3, 1024 x 768 XGA panel with typical 1000 cd/m<sup>2</sup> brightness, a contrast of 2000:1 and a LED backlight.

#### 2.4.1 BRIGHTNESS

The brightness of the display can be changed by simply pressing the brightness up/down keys in normal operational mode.

### 2.5 G.F.G SCREEN

CLOUD15 series is equipped with a 15" G.F.G screen. The screen can be connected and used with an external LCD panel via the HDMI (by cable kit) interface. It is designed to meet requirement and environmental specifications dictated by the nature of military systems.

## 15 "TFT LCD Display screen

<b>Resolution</b>	1024x768 XGA	<b>Brightness</b>	1000 Nits
<b>Aspect Ratio</b>	4:3	<b>Contrast Ratio</b>	4000
<b>Touch Panel</b>	Glass-Film-Glass panel		

## Chapter 3: Specification

### 3.1 15" TFT LCD DISPLAY

Resolution	1024x768	Brightness	Up to 1000 Nits
Aspect Ratio	4:3	Contrast Ratio	4000:1
Touch Panel	Glass-Film-Glass panel (Options: 5-Wire resistor touch)		

### SYSTEM SPEC

Function key	Programmable Function Keys (F1~F20)
DC-IN	9V ~ 36V DC-IN, 28Vdc Optional:12V~40V DC-IN (150W max) MIL-STD-461, MIL-STD-1275,

### CONNECTORS

Rear I/O Port	1x Water Proof valve
	[X1] 1x DC-IN MIL-38999
	[X2] 1x HDMI with MIL-38999
	[X3] 1x USB2.0 with MIL-38999
	1x GND screw

### APPLICATIONS

Applications

PHYSICAL			
Dimension	442.5 x 72 x 370mm (17.42" x 2.84" x 14.57")		
Weight	12.0kg(26.43lbs)	Finish	Anodic aluminum oxide
Chassis	Aluminum Alloy, Corrosion Resistant.	Ingress Protection	IP65 Dust /water Proof

### MIL COMPLIANCE

#### MIL-STD-810 (OPERATION TEST)

Low Temp.	Method 502.5 Procedure 2	Exposure(24h x 3 cycle) at -10°C min.
High Temp.	Method 501.5 Procedure 2	60°C for 2 hrs after temperature stabilization.
Humidity	Method 507.5 Procedure 2	RH -95%. Test cycles: ten 24-hrs , functional test after 5th and 10th cycles
Vibration	Method 514.6 Category 20	10 - 500Hz 1.04Grms Test duration: 1 hr x 3 axis (total 3 hrs)
Shock	Method 516.6 Procedure 1	10G, 11mSec, 3 per axis

#### MIL-STD-810 (NON-OPERATING TESTS)

Low Temp.	Method 502.5	Exposure(24h x 7 cycle) at -20°C min.
High Temp.	Method 501.5 Procedure 1	71°C for 2 hrs after temperature stabilization.
Vibration	Method 514.6 Category 24	200 to 2000Hz Test duration: 1hr per axis; rms = 2.24 gs



Shock	Method 516.6 Procedure 1	20G, 11mSec, 3 per axis
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**MIL-STD-461**

CE102

RE102-4	(1.5 MHz) -30 MHz - 5 GHz
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RS103	1.5MHz -5GHz, 50V/m equal for all frequencies EN 61000-4-2: Air discharge: 8 kV,
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**ENVIRONMENTAL QUALIFICATIONS**

Regulatory	CE, FCC, Compliance
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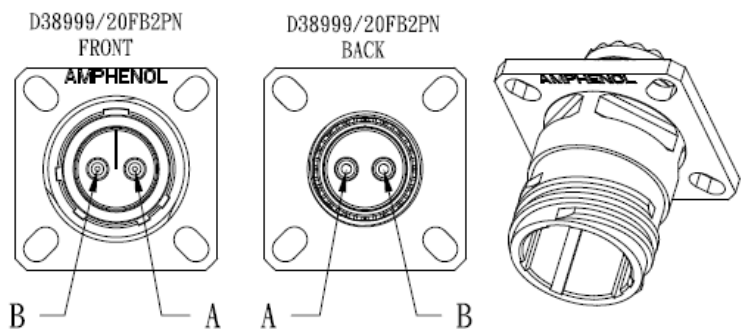
Operation Temp.	-20~+60 °C
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Storage Temp.	-40~+85 °C
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Green Product	RoHS, WEEE compliance
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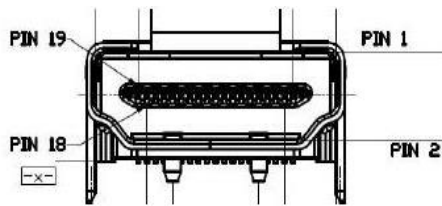
3.2 I/O INTERFACE

3.2.1 (X1) 1x DC-IN



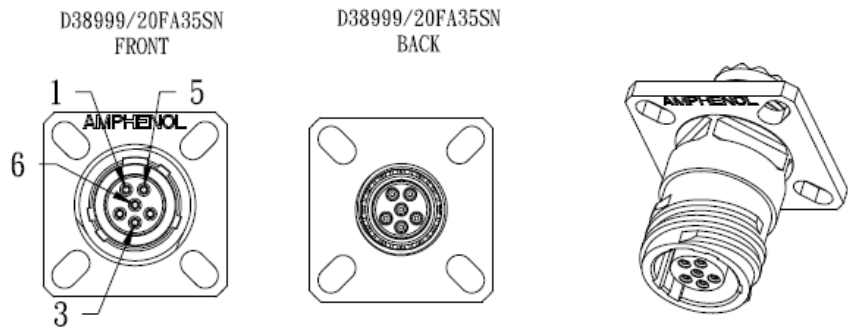
D38999/20FB2PN DC-IN	
A	Vin+
B	Vin-

3.2.2 (X2) 1x HDMI 2.0



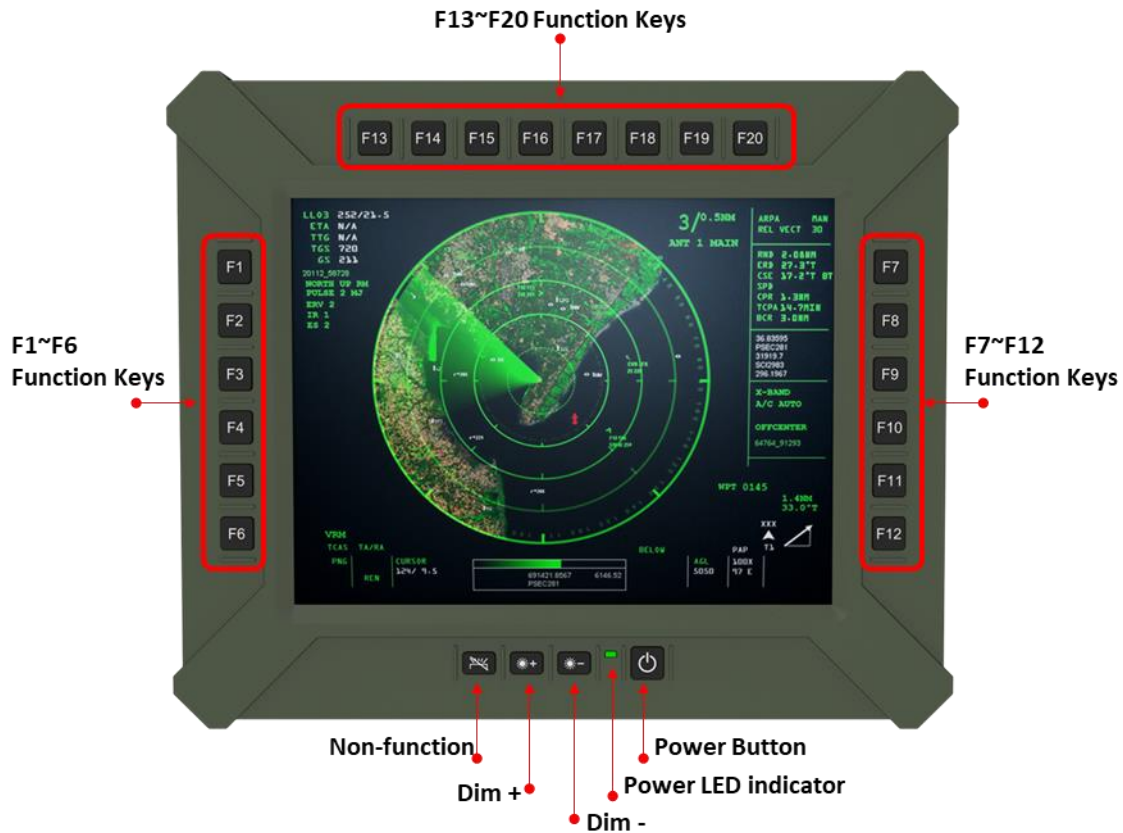
Pin #	Signal	Pin #	Signal
1	HDMI_TX2_P	2	GND
3	HDMI_TX2_N	4	HDMI_TX1_P
5	GND	6	HDMI_TX1_N
7	HDMI_TX0_P	8	GND
9	HDMI_TX0_N	10	HDMI_CLK_P
11	GND	12	HDMI_CLK_N
13	CEC	14	NC
15	HDMI_SCL	16	HDMI_SDA
17	GND	18	+5 V Power
19	Hot Plug Detect	20	GND
21	GND	22	GND
23	GND		

3.2.3 (X3) 1x USB2.0 CONNECTOR



D38999/20FA35SN USB2.0	
1	VCC
2	D-
3	D+
4	GND
5	N. C.
6	N. C.

## Chapter 4: Operation Introduction



### 4.1 F1~F20 FUNCTION KEYS

Programming function keys could be customized depend on customer's requirement.

### 4.2 POWER BUTTON

Turn the LCD Panel power on by pressing the power button. Turn the display Off by pressing the power button again.

### 4.3 LED INDICATORS

Green: When Power is "ON".

### 4.4 BRIGHTNESS UP OR DOWN

Dim+:LCD backlight increase

Dim-:LCD backlight decrease

### 4.5 FN-KEY BACKLIGHT ON OFF

Non function Key.

## Chapter 5: Programmable Function Key Setup

### 5.1 SOFTWARE INSTALLATION

The overall installation could refer to following link

[https://www.pjrc.com/teensy/td\\_download.html](https://www.pjrc.com/teensy/td_download.html)

#### 5.1.1 INSTALL ARDUINO IDE 1.8.19 (ARM 64 BIT)

Download path <https://www.arduino.cc/en/software>

Go to "Arduino IDE 1.8.19", download Linux ARM 64 bit version (filename shall be arduino-1.8.19-linuxaarch64.tar.xz)

```
tar xvf arduino-1.8.19-linuxaarch64.tar.xz
```

```
cd arduino-1.8.19
```

```
sudo ./install.sh
```

#### 5.1.2 DOWNLOAD LINUX UDEV RULES

Download path <https://www.pjrc.com/teensy/00-teensy.rules>

Right click on the download path, select "Save Link As..."

```
sudo cp 00-teensy.rules /etc/udev/rules.d/
```

#### 5.1.3 INSTALL TEENSYDUINO 1.59 ADD-ON INTO ARDUINO-1.8.19 FOLDER

Download path [https://www.pjrc.com/teensy/td\\_159/TeensyduinoInstall.linuxaarch64](https://www.pjrc.com/teensy/td_159/TeensyduinoInstall.linuxaarch64)

```
chmod 755 TeensyduinoInstall.linuxaarch64
```

```
./TeensyduinoInstall.linuxaarch64
```

By clicking "Next" to finish installation. The installation folder shall be under "arduino-1.8.19" folder where you just extracted the Arduino IDE file earlier

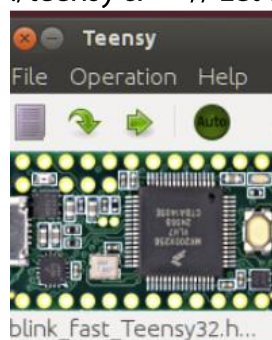
#### 5.1.4 INSTALL TEENSY LOADER APPLICATION

Download path [https://www.pjrc.com/teensy/loader\\_linux.html](https://www.pjrc.com/teensy/loader_linux.html)

select "Download Teensy Program (Jetson, R-Pi 64 bit)"

```
tar -xvf teensy_linuxarm64.tar.gz
```

```
./teensy & // Let the Teensy Loader run in the background
```



## 5.2 SET UP CONNECTION PARAMETERS



open arduino IDE application

The Tools -> Board -> Teensyduino menu, select "Teensy 4.1"

The Tools -> USB Type menu, select "Serial + Keyboard + Mouse + Joystick"

## 5.3 ADJUST FUNCTIONAL KEY VALUE

You can open the example file by using menu File -> Open.. , and select example "NV300\_Teensy\_4.1\_Buttons.ino"



There are already 20 predefined function keys F1 to F20 in the file , you can program these keys as your need

Use Keyboard.press(key) and Keyboard.release(key) to send individual key press and release events. The "key" is a key code represents the character on the keyboard. Please refer to following link for the definition of Key Code

[https://www.pjrc.com/teensy/td\\_keyboard.html](https://www.pjrc.com/teensy/td_keyboard.html)

- Keyboard.press(KEY\_A); represents key "A" has been press down
- Keyboard.release(KEY\_A); represents key "A" has been release off
- Keyboard.println("F1 press") will print string "F1 press" for debugging usage. Normally you shall not use it
- words after "/\*" can be represented as inline comments

## 5.4 SAVE, CHECK AND UPLOAD

- click File -> Save menu to save the configuration
- click  will verify if there is any wrong configuration
- click  will upload your latest configuration to the CLOUD15-P20-F2A2. During uploading, you should see a progress bar on the Teensy Loader window

Now you can test new settings as you defined earlier