



LAND



SEA



AIR

SKY15-P20A

15" RUGGED SMART DISPLAY WITH 20
PROGRAMMABLE FUNCTION KEYS



USER MANUAL

_WINDOWS

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

- All rights reserved. No part of this publication may be reproduced in any form or by any means, without prior written permission from the publisher.
- All trademarks are the properties of the respective owners.
- All product specifications are subject to change without prior notice

Revision History

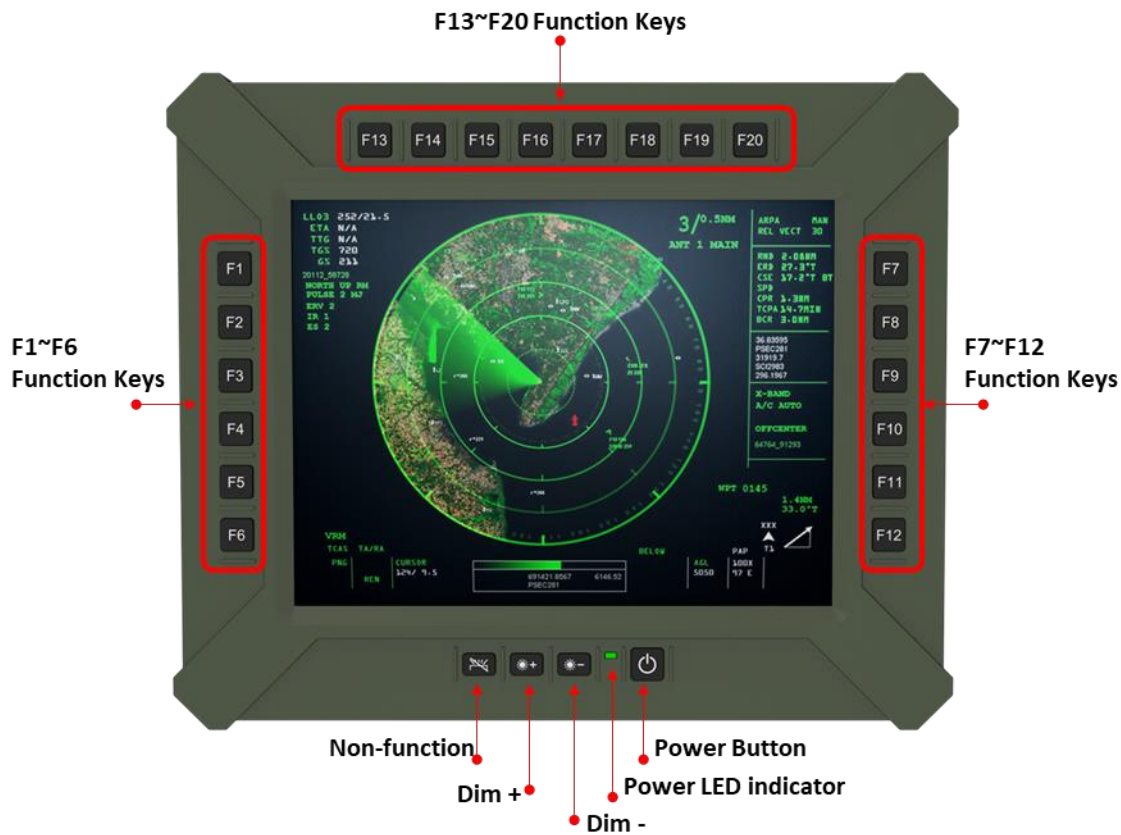
Revision	Date(YYYY/mm/dd)	Changes
V1.0	2025/03/27	Initial Release
V2.0	2025/05/06	Windows version
V2.1	2026/01/12	Update process

Table of content

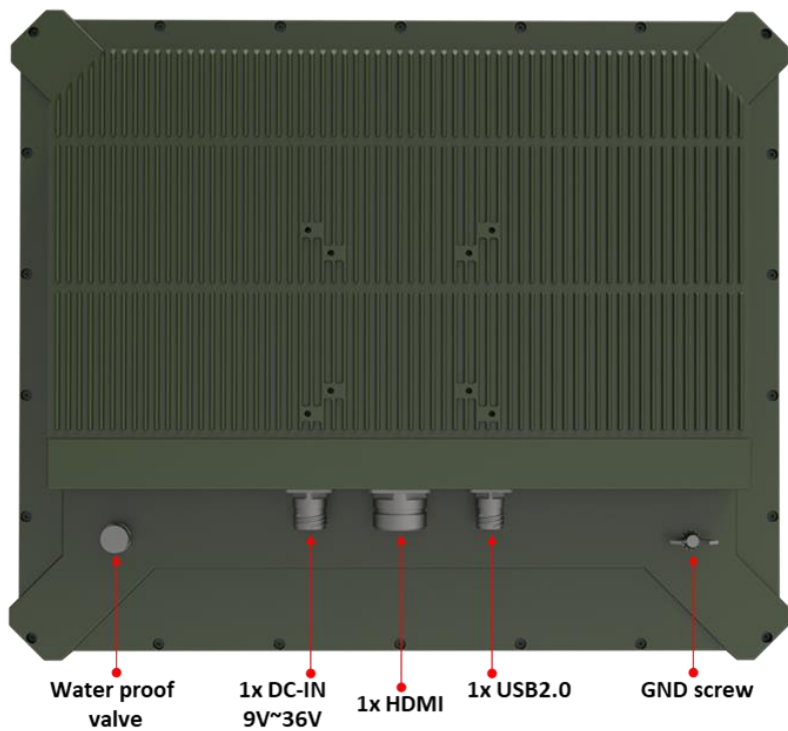
Chapter 1: Product Introduction	5
1.1 Front View	5
1.2 Rear View	5
1.3 ME Dimension	6
Chapter 2: Components	7
2.1 Location	7
2.2 Ruggedness	7
2.3 Power supply	7
2.4 Display Panel	7
2.4.1 Brightness	7
2.5 G.F.G screen	7
Chapter 3: Specification	8
3.1 15" TFT LCD Display	8
3.2 I/O Interface	10
3.2.1 (X1) 1x DC-IN	10
3.2.2 (X2) 1x HDMI 2.0	10
3.2.3 (X3) 1x USB2.0 connector	10
Chapter 4: Operation Introduction	11
4.1 F1~F20 Function Keys	11
4.2 Power Button	11
4.3 LED Indicators	11
4.4 Brightness Up or Down	11
4.5 Fn-key backlight on off	11
Chapter 5: Programable Function Key Setup	12
5.1 Software installation	12
5.1.1 install Arduino IDE	12
5.1.2 Install Teensy on Arduino IDE	12
5.1.3 install teensyduino 1.59 add-on	12
5.1.4 install Teensy loader application	13
5.2 Set up connection parameters	13
5.3 Adjust functional key value	13
5.4 Save, check and upload	14

Chapter 1: Product Introduction

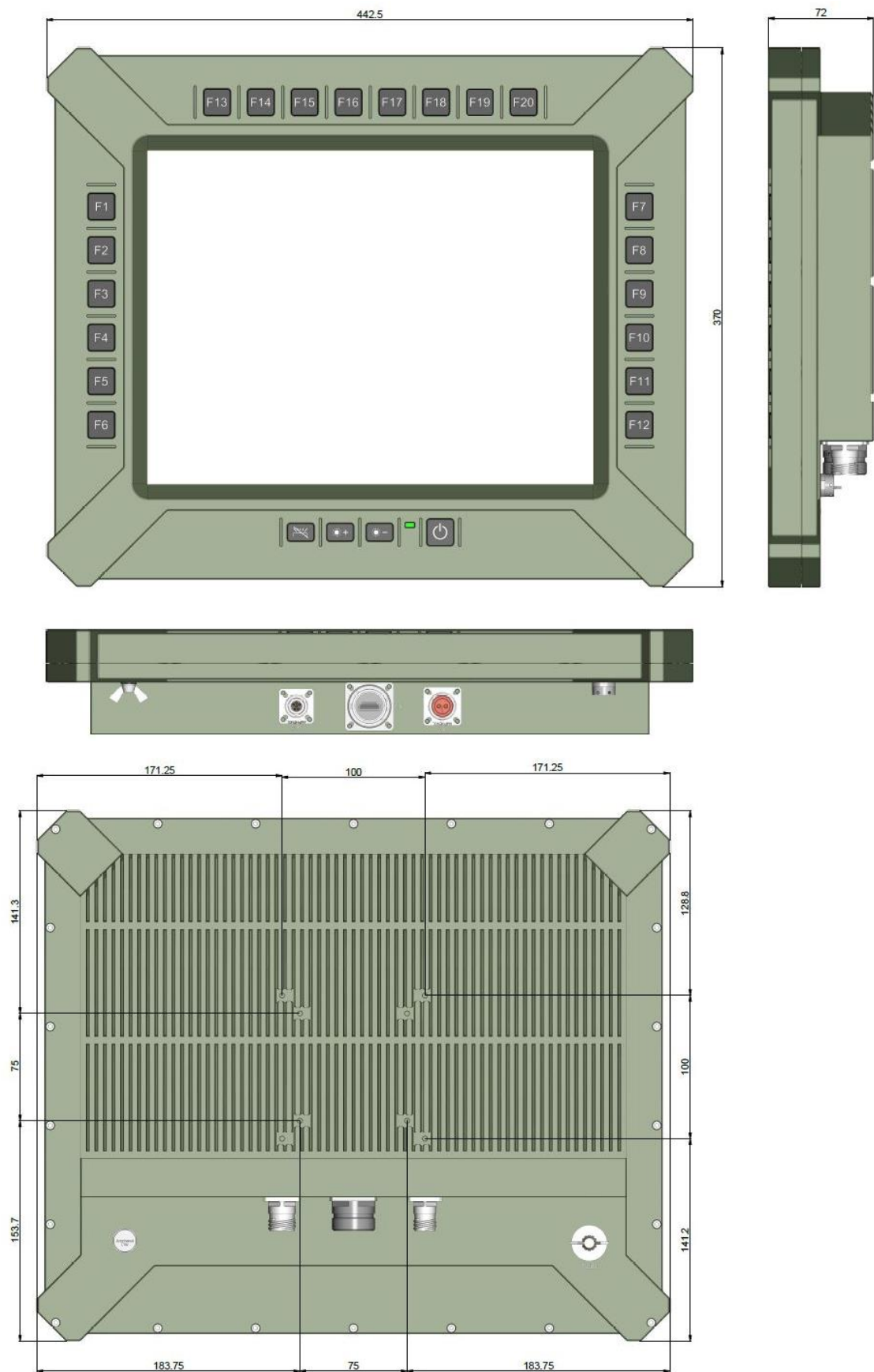
1.1 FRONT VIEW



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 SKY15 series is a 4:3, 1024 x 768 XGA panel with typical 1000 cd/m² 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

Resolution	1024x768 XGA	Brightness	1000 Nits
Aspect Ratio	4:3	Contrast Ratio	4000
Touch Panel	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
-------	--------------------------	-------------------------

MIL-STD-461

CE102

RE102-4	(1.5 MHz) -30 MHz - 5 GHz
---------	---------------------------

RS103	1.5MHz -5GHz, 50V/m equal for all frequencies EN 61000-4-2: Air discharge: 8 kV,
-------	---

ENVIRONMENTAL QUALIFICATIONS

Regulatory	CE, FCC, Compliance
------------	---------------------

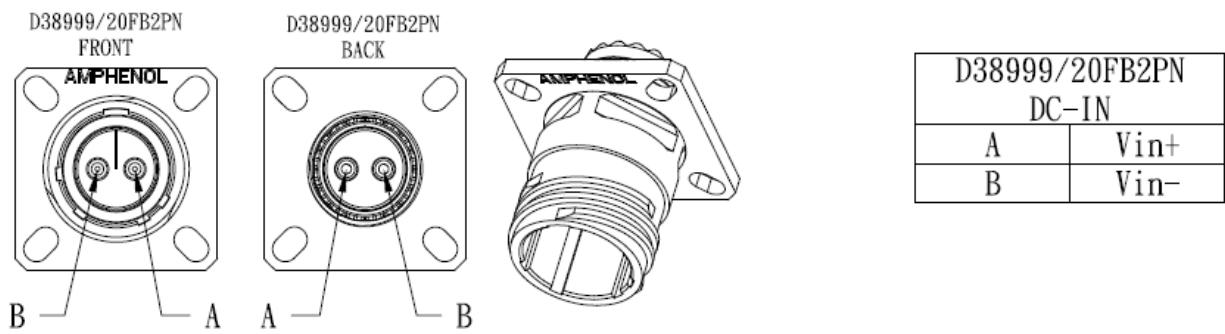
Operation Temp.	-20~+60 °C
-----------------	------------

Storage Temp.	-40~+85 °C
---------------	------------

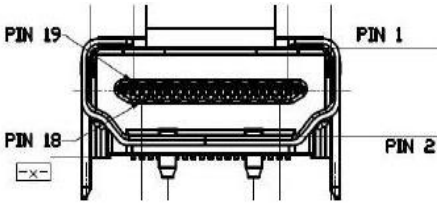
Green Product	RoHS, WEEE compliance
---------------	-----------------------

3.2 I/O INTERFACE

3.2.1 (X1) 1x DC-IN



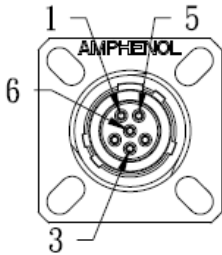
3.2.2 (X2) 1x HDMI 2.0



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		

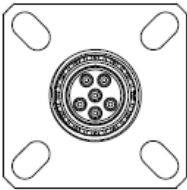
3.2.3 (X3) 1x USB2.0 CONNECTOR

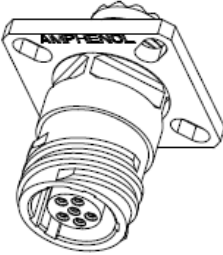
D38999/20FA35SN
FRONT



1 5 6 3

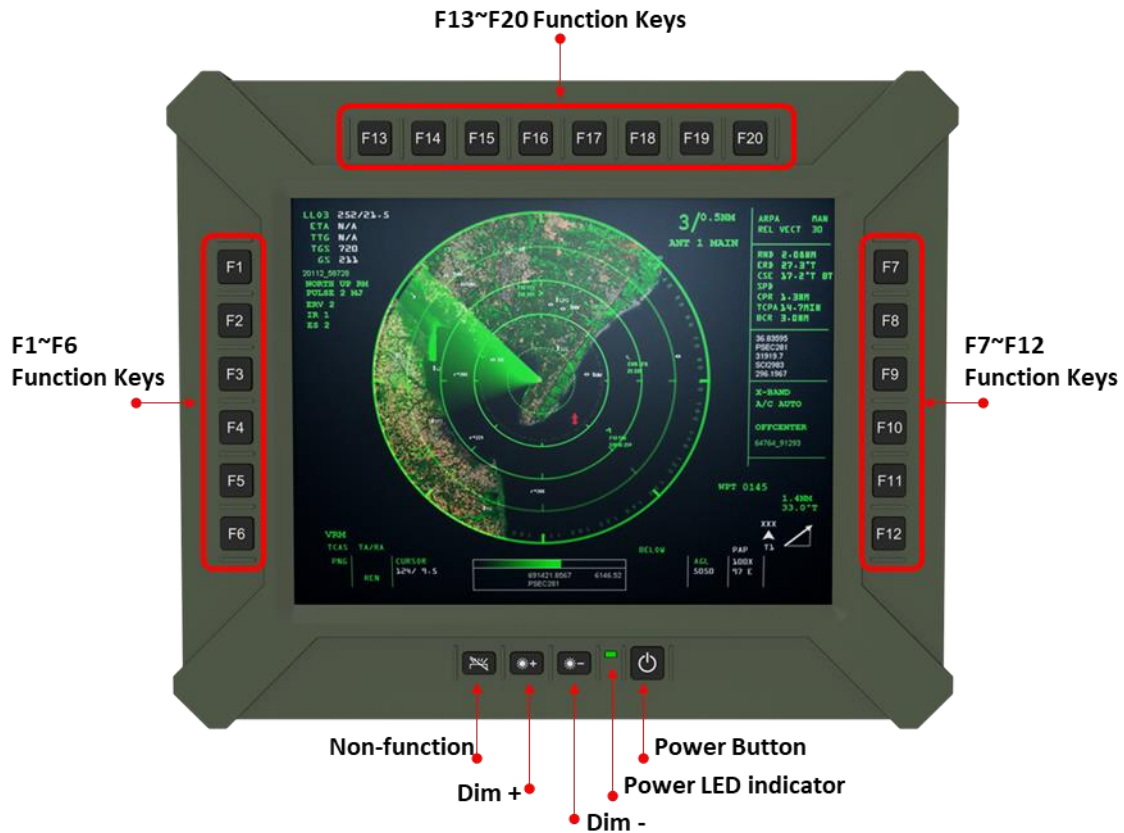
D38999/20FA35SN
BACK





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: Programable Function Key Setup

5.1 SOFTWARE INSTALLATION

The overall installation could refer to following link

https://www.pjrc.com/teensy/td_download.html

5.1.1 INSTALL ARDUINO IDE

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

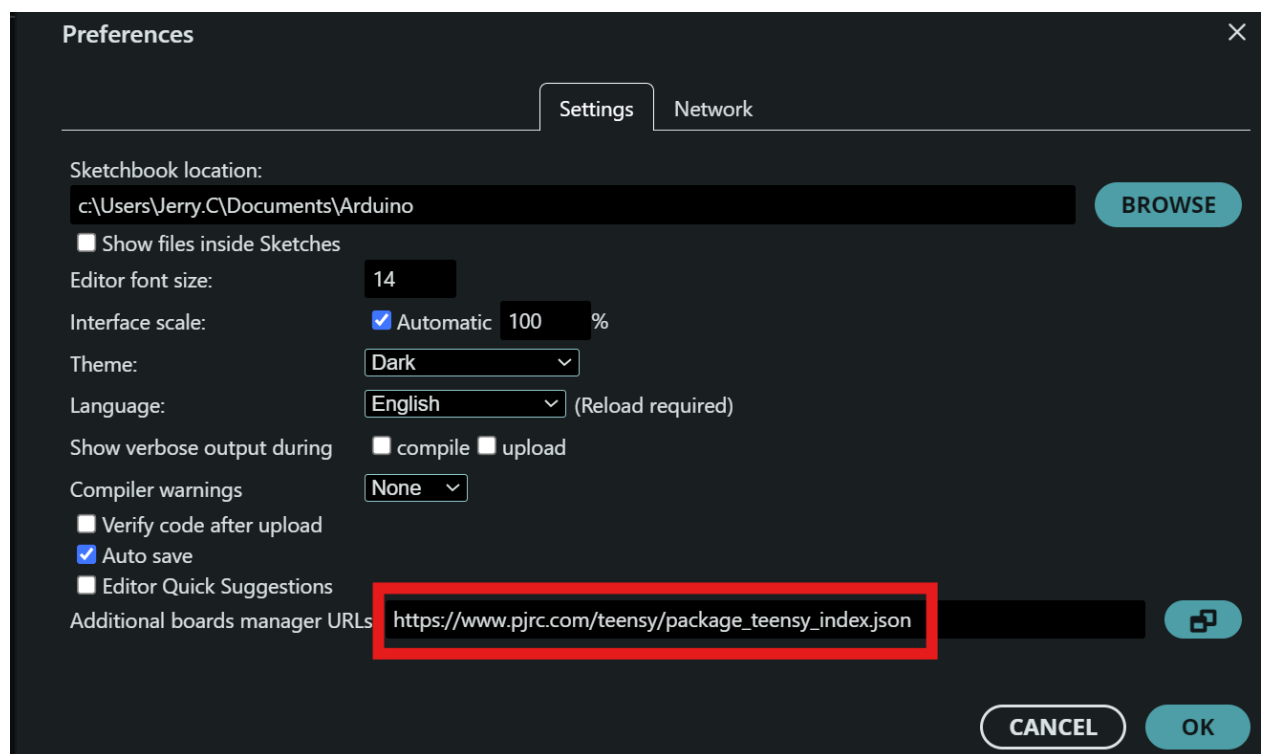
Go to Session "Arduino IDE 2.3.7" , select version "Windows Win 10 or newer(64 bit) and click "DOWNLOAD" button. (filename shall be arduino-ide_2.3.7_Windows_64bit.exe)

Run the installer and follow install steps.

5.1.2 INSTALL TEENSY ON ARDUINO IDE

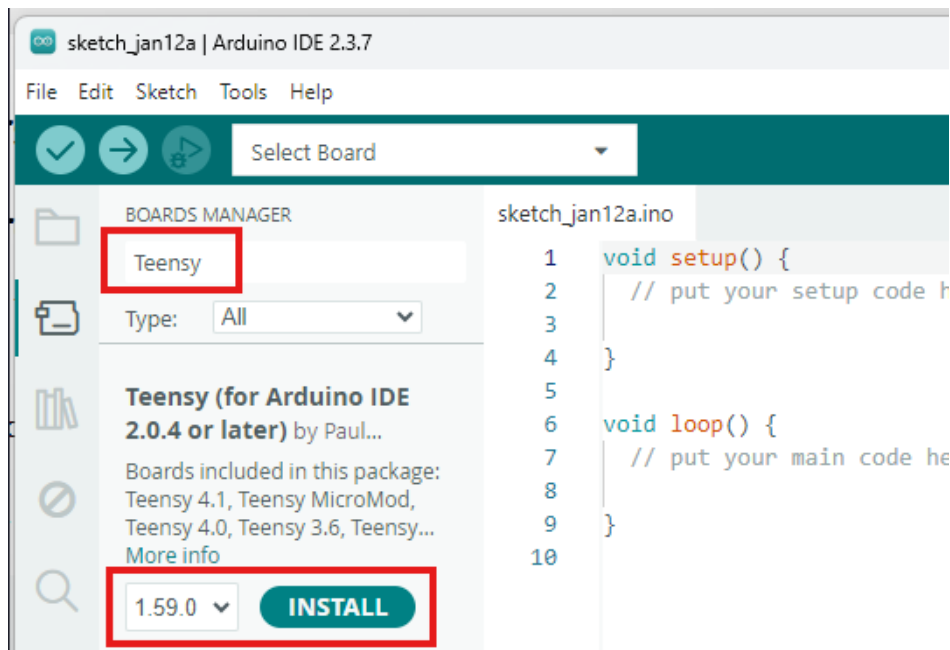
To install Teensy on Arduino IDE 2.x, click File > Preferences. You may need to scroll down to even if no scrollbar appears. In "Additional boards manager URLs", copy this link and click "OK"

https://www.pjrc.com/teensy/package_teensy_index.json



5.1.3 INSTALL TEENSYDUINO 1.59 ADD-ON

In the main Arduino window, open Boards Manager by clicking the left-side board icon, search for "teensy", and click "Install".



If you are facing "Error: 4 DEADLINE_EXCEEDED"

1. Close Arduino IDE
2. Open the file at the following path in any text editor:
C:\Users\<username>\.arduino\IDE\arduino-cli.yaml
(where <username> is your Windows username)
3. Add the following content to the arduino-cli.yaml file (or replace the existing content if equivalent content is already present in the file):

```
network:
  connection_timeout: 600s
```

4. Save the file.
5. Start Arduino IDE.

5.1.4 INSTALL TEENSY LOADER APPLICATION

Download path <https://www.pjrc.com/teensy/loader.html>

Click "Teensy Loader Program" and install it

5.2 SET UP CONNECTION PARAMETERS



open arduino IDE application

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

The Tools -> Port -> Select the correct COM port SKY15-P20A is connected

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

- 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 SKY15-P20A. During uploading, you should see a progress bar on the Teensy Loader window



Now you can test new settings as you defined earlier