Datasheet

FORTEC Integrated

IF461-00

ZU-02-526

System Management Board

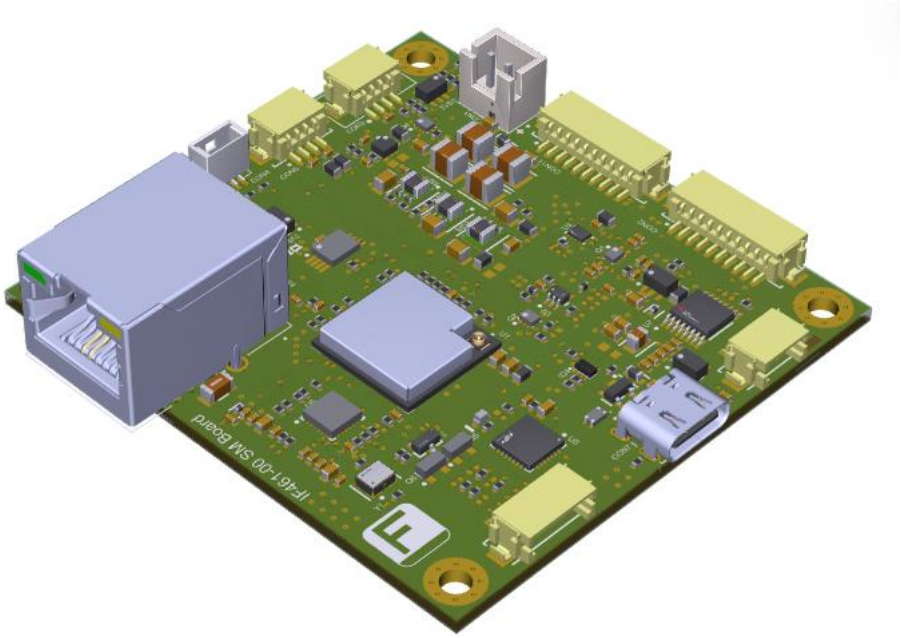

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Table of Contents

1 Revision History

Date	Rev. No.	Description	Page
19.08.2025	1.0	Initial version	All
24.11.2025	1.1	Adding CON11 as a second Backlight Connector	All

2 General Overview

The IF461-00 functions as a System Management Board which provides some interfaces suitable for industrial purposes.
With the user-friendly interface of the IF461-00, based on ESPRESSIF ESP32, easy to use applications are applicable.
This Board enables adaptive brightness control with environmental sensor monitoring and logging as well as easy interface via IoT applications.

3 Electrical Characteristics

All measurements are done at 25˚C ambient temperature.

Item	Symbol	Condition	MIN.	TYP.	MAX.	Unit	Note
Supply Voltage (V_{IN})	V_{IN}	All features Active	14	24	30	VDC	Under 14V, the 12V Fan Output is Disabled and other functions can operate till 7V
Current Consumption	I_{IN}	All features Active	81.5	48	39.4	mA	It includes 6W Fan Output.

3.1 Absolute Maximum Ratings

Permanent damage to the device may occur if maximum values are exceeded.

3.1.1 Electrical Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Supply Voltage (24V)	V_24_IN	-30	+30	VDC	
Continuous Input Current	I_{IN}	0	250	mA	

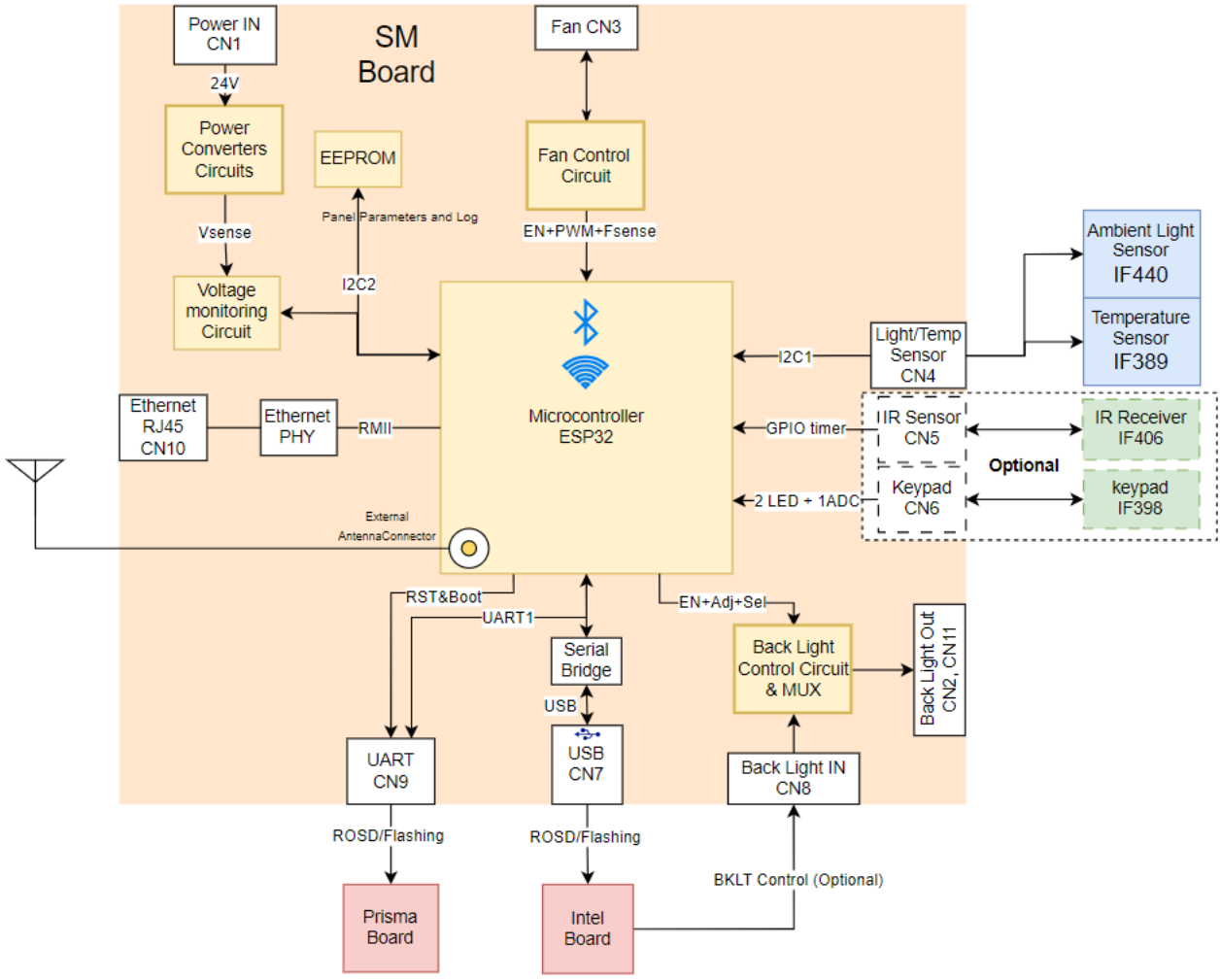
4 Environmental Absolute Maximum Ratings

Item	Symbol	Min.	Max.	Unit	Note
Storage Temperature	T_{st}	-35	+85	°C	
Operating Temperature	T_{op}	-20	+80	°C	

5 Interface Specifications

5.1 Block Diagram

The next figure shows the interfaces and internal required components in the IF461-00.



Block diagram of IF461-00

5.2 Electrical Interfaces

The IF461-00 provides the following interfaces:

- 1x 24VDC power input for the internal power supply (V_24_IN)
- 1x 12VDC power output for powering the cooling fan (V_12_OUT_Fan)
- 2x Identical Backlight Interfaces 5V/3.3V configurable level and PWM/Analog configurable control method.
- IR Receiver Interface
- Keypad Interface
- USB ROSD Interface
- I2C Interface (Ambient Light, Temperature Sensor)
- External UART
- Ethernet RMII 10/100
- 1 x I-PEX Inc., MHF® III antenna plug for 2.4 GHz Wi-Fi+ Bluetooth® + Bluetooth LE module

5.2.1 Board-ID

- The Board-ID is stored on the board memory (External EEPROM, flash memory of MCU) and can be read by Host USB connection or via MQTT.
- This ID is used to identify each board in case of using multiple boards in the same network.

5.2.2 Temperature Sensor Interface ZU-02-389

The temperature measurements are relying on the interface board IF389, and it is used for adjusting the intensity of the back light based on a pre-defined temperature range.
. Fitting cable to CON4: KA-30-323

5.2.3 Ambient Light Sensor Interface IF440 (ZU-02-509)

An Ambient light sensor is used to measure the ambient light intensity and give feedback to the microcontroller to adjust the intensity of the back light.

5.2.4 Fan Interface

The IF461-00 provides 12V 0.5A supply for the fan, PWM for speed control and receives feedback readings from the tachometer.

5.2.5 Back Light Interface

- The IF461-00 does not provide powering the panel backlight and panel power should be fed externally.
- The IF461-00 supports interfacing with Backlight control via Backlight enable signal, PWM Control or Analog control with 5V or 3.3V Logic Levels.
- The Backlight Control based on Ambient light and temperature reading can be enabled or disabled and select a specific brightness value.
- IF461-00 supports controlling two panels backlight.
- IF461-00 supports buffering the backlight control signal coming from external controller via CON8 to be fed to two panels via CON2, CON11

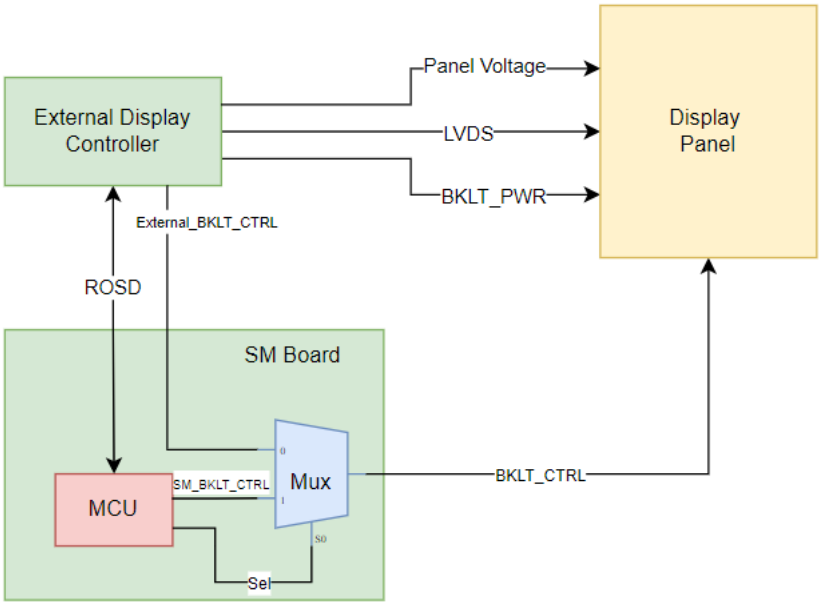


Figure 1: Backlight MUX Concept of IF461-00

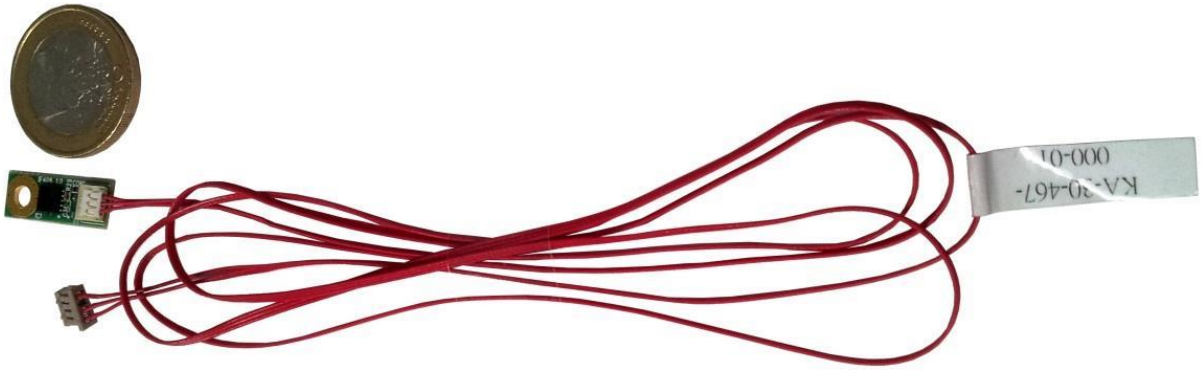
Note: these options are selectable via the firmware parameters that are configured during production for each panel configuration file.

Caution:
Using different voltage than the rated voltage for the selected panel could damage the Display

5.2.6 IR Receiver Interface ZU-02-406 and IR Remote Control RC-10-007

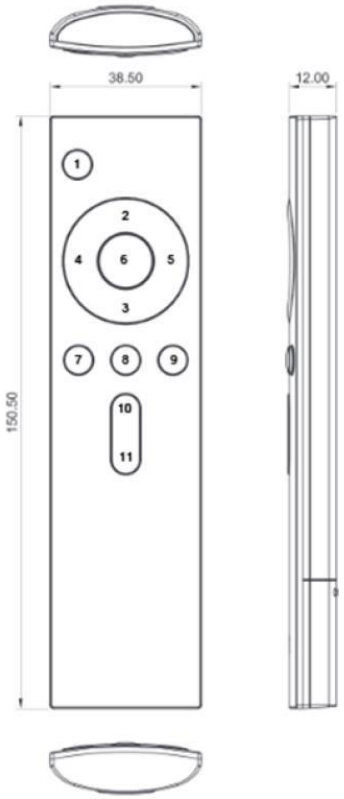
The IF461-00 supports controls accessibility via IR Remote.

IR sensor and IR remote control devices are provided by FORTEC Integrated.
Fitting cable to CON5: KA-30-467.



Position	Code	Function
1	0x01	Power
2	0x0D	Key Up
3	0x11	Key Down
4	0x0E	Key Left / decrease Brightness
5	0x10	Key Right / increase Brightness
6	0x0F	Key Enter
7	0x27	Menu
8	0x13	Exit
9	0x05	Mute
10	0x04	Volume +
11	0x03	Volume -

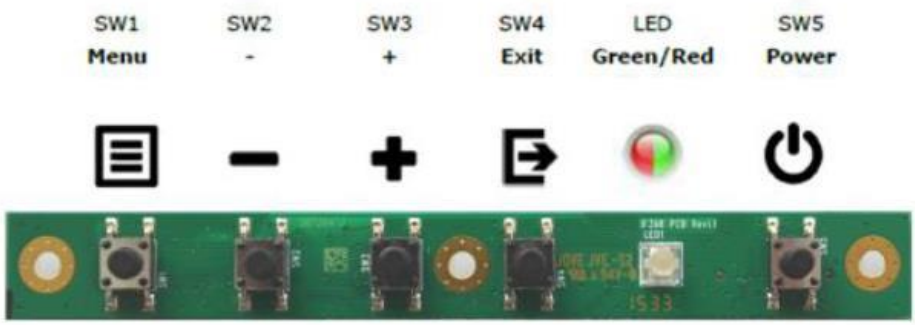
RC-10-007 Button Position



RC-10-007 Picture

5.2.7 Keypad Interface ZU-02-398

An OSD keypad can be used to control brightness, volume and power on/off. Fitting cables to CON6: KA-30-394 (80cm) or KA-30-613 (45cm)



5.2.8 USB ROSD Interface

- IF461-00 can interface with any external processor board via USB 2.0 Communication with the ROSD protocol.
- USB ROSD is the same UART ROSD, but it is converted via serial bridge to USB2.0 to be compatible with more boards.
- ROSD protocol aims to handle the operations between the IF461-00 specification and the Processor Board to handle data reporting and to receive commands.

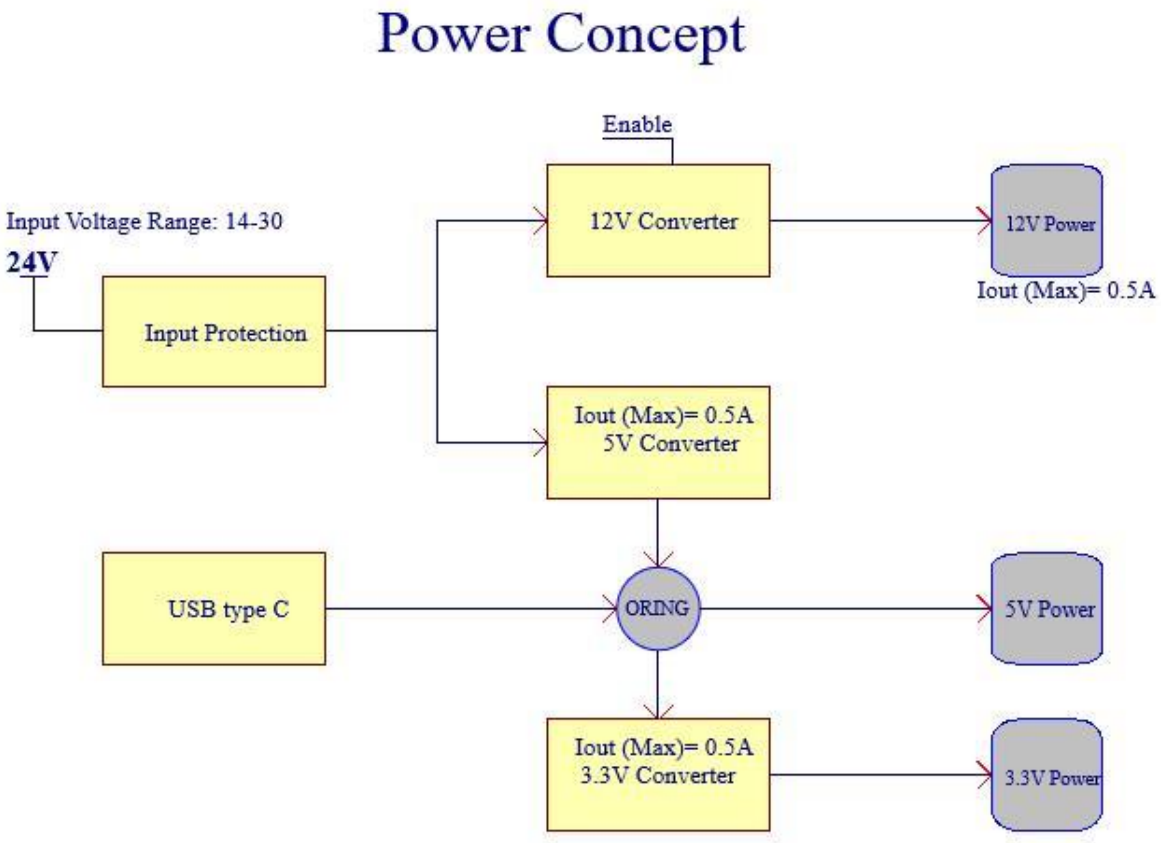
5.2.9 UART ROSD Interface

- The IF461-00 is still supporting the old UART ROSD to be backward compatible with older display solutions like the Prisma Media ECO-II
- Note: In case of using UART ROSD the USB ROSD will be suspended

5.3 Power Specifications

5.3.1 Power Concept

The next figure shows a possible power supply architecture for the board.



Power Concept of IF461-00

5.3.2 Power Consumption

Voltage	24V Main Source	12V (Fan)	5V	3.3V	Total Power Consumption From 24V	Condition
Current	90mA (Total)	80mA	161.8mA	191.7mA	2.16W	All features Active, 24V is supplied

- In case of using 24V as main source the total consumption is 2.16W including 0.96W for fan consumption.
- In case of using 5V USB as main source the total consumption is 0.81W and fan power is disabled

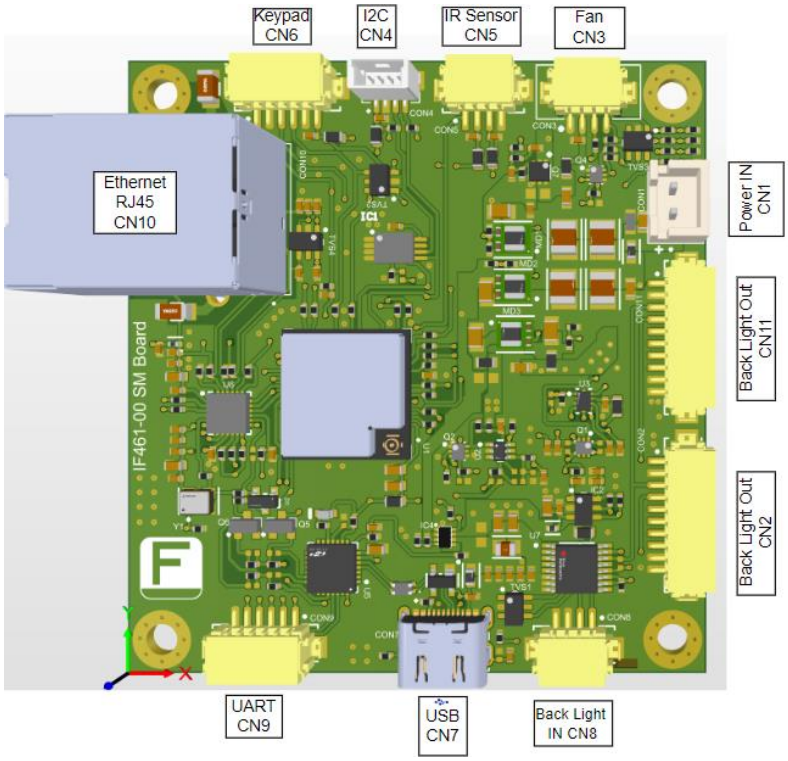
6 Mechanical Specifications

6.1 Connector Overview

The connectors' part numbers mentioned below are the currently in use in the PCB layout.

Table 1: Connector Overview

Connector	Description	No. of Pins	Type	Manufacturer
CON1	External Power Supply Input (Auxiliary)	2	B2B-XH-A(LF)(SN)	Molex
CON2	Back Light Output 1	10	DF13A-10P-1.25H	Molex
CON3	Fan Connector	4	DF13-4P-1.25H	Molex
CON4	Light/Temp Sensor Connector	4	501331-0407	Molex
CON5	IR Receiver Interface	4	DF13A-4P-1.25H	Molex
CON6	Keypad Interface	6	DF13A-6P-1.25H	Molex
CON7	ROSD USB	12	DX07S016JA1R1500	JAE Electronics
CON8	Backlight Input	4	DF13A-4P-1.25H	Molex
CON9	ROSD UART	6	DF13A-6P-1.25H	Molex
CON10	Ethernet RMII Connector	12	ARJM11D7-009-AB-EW2	Abracon
CON11	Back Light Output 2	10	DF13A-10P-1.25H	Molex



Board Connectors

6.2 Connectors of IF461-00

6.2.1 External Power Supply Connector – (CON1)

Connector CON1 for external power supply.

Pin	Signal	Description
2	GND	Ground
1	V_24V_IN	Positive Power Supply Input 24V

6.2.2 Backlight Output 1 Connector – (CON2)

Pin	Signal	Description
1	+V_BKLT	Backlight Positive Voltage Input
2	GND	Ground
3	BKLT_EN	Backlight Enable Input
4	BRT_ADJ	Backlight Adjust Input
5	NC	Not Connected
6	NC	Not Connected
7	+V_BKLT	Backlight Positive Voltage Input
8	+V_BKLT	Backlight Positive Voltage Input
9	GND	Ground
10	GND	Ground

6.2.3 Fan Connector – (CON3)

Pin	Signal	Description
1	GND	Ground
2	+12V_Fan	12VDC Power Output for the fan power
3	Fan_Sense	Sense pin from the fan tachometer
4	Fan_Control	PWM speed control output

6.2.4 Light/Temp Sensor Connector – (CON4)

Pin	Signal	Description
1	+3.3V	Positive 3.3 Volts Input
2	GND	Ground
3	MSCL1	Serial clock for I2C
4	MSDA1	Serial data for I2C

6.2.5 IR Receiver Connector – (CON5)

Pin	Signal	Description
1	IR_Signal	PWM IR Output Signal
2	+3.3V	Positive 3.3 Volts Input
3	+5V	Positive 5 Volts Input
4	GND	Ground

6.2.6 Keypad Connector – (CON6)

Pin	Signal	Description
1	+3.3V	Positive 3.3 Volts Input
2	GND	Ground
3	LBADC_IN1	Analog Keypad Output
4	GND	Ground
5	LED_RED	Digital Input for RED LED Activation (Power Mode Indicator)
6	LED_GREEN	Digital Input for GREEN LED Activation (Power Mode Indicator)
7	NC	Not Connected
8	+3.3V	Positive 3.3 Volts Input
9	+5V	Positive 5 Volts Input
10	GND	Ground

6.2.7 ESP32 USB Connector – (CON7)

Pin	Signal	Description
1	VUSB	USB Positive Voltage
2	USB_DM	USB Data Minus (D-)
3	USB_DP	USB Data Plus (D+)
4	GND	Ground

6.2.8 Backlight Input Connector – (CON8)

Pin	Signal	Description
1	BKLT_EN_EXT	External Backlight Enable Signal
2	BKLT_ADJ_EXT	External Backlight Adjust Signal
3	GND	Ground
4	GND	Ground

5.2.9 ROSD UART Connector – (CON9)

Pin	Signal	Description
1	+3.3V	Positive 3.3 Volts Input
2	MCU_RST_N	MCU RESET
3	BOOT0/MAC_CLK	BOOT0 signal and Ethernet MAC Clock (MUXED)
4	MCU_TX0	UART0 MCU Transmitter
5	MCU_RX0	UART0 MCU Receiver
6	GND	Ground

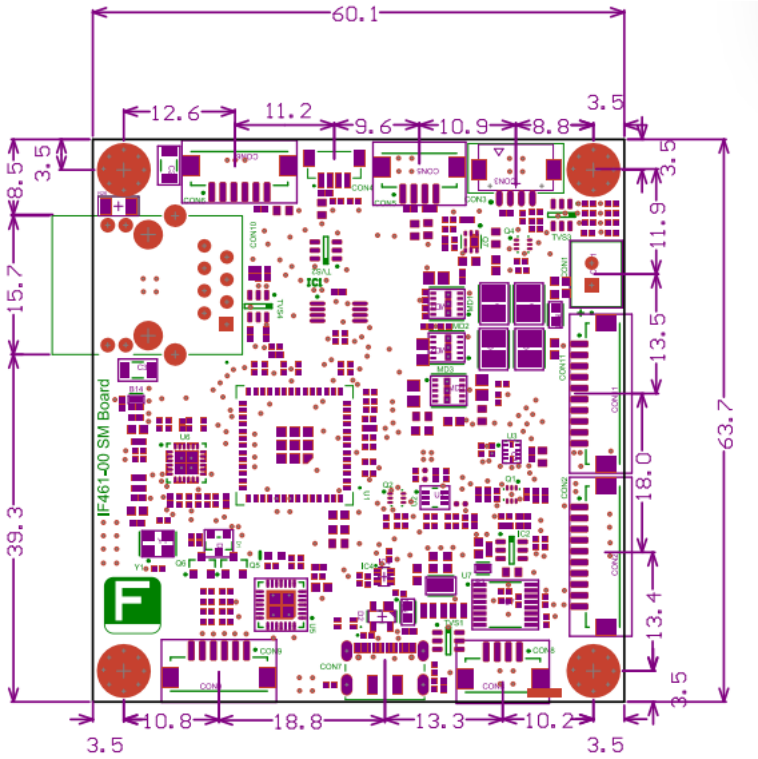
5.2.10 Ethernet Connector – (CON10)

Pin	Signal	Description
1	TD+	RMII Transmitter Positive Differential Pair
2	TD-	RMII Transmitter Negative Differential Pair
3	RD+	RMII Receiver Positive Differential Pair
4	CT1	Center Tap 1 for Transmitter
5	CT2	Center Tap 2 for Receiver
6	RD-	RMII Receiver Negative Differential Pair
7	NC	Not Connected
8	GND	Digital Ground
9	GLED+	Green LED Anode
10	GLED-	Green LED Cathode
11	YLED+	Yellow LED Anode
12	YLED-	Yellow LED Cathode

6.2.11 Backlight Output 2 Connector – (CON11)

Identical to CON2 just as duplicate incases of driving two backlight panels back-to-back.

6.3 Board Dimensions



Board Dimensions

		Min	Typ	Max
Width		60.1 mm	TBD mm	TBD mm
Length		63.7 mm	TBD mm	TBD mm
Height	**PCB**	1.5 mm	1.6 mm	1,76 mm
	Components on Top	-	15.0 mm	-
	Components on Bottom	-	2.5 mm	-

6.4 Cooling

IF461-00 operates without cooling in the whole specified temperature range.

6.5 Ordering Information

Part Number	Description
ZU-02-526	IF461-00 SM-Board

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