

## 1. Outline

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FRONTBOX2 makes ANALOGDISCOVERY2 the same easiness as a general measuring instrument.

FRONTBOX2 is used with ANALOGDISCOVERY2.

ANALOGDISCOVERY2 and The PC environment for ANALOGDISCOVERY2 is necessary for the use of FRONTBOX2.

Because FRONTBOX2 is a kit, the assembly work is necessary.

ANALOGDISCOVERY2 is not included in FRONTBOX2.

## 2. Unpacking.

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Please confirm the following items are included in the package.

PCB parts

FRONTBOX2 PCB parts list				
Part number	Kind	Value	Supplier	Quantity
	PCB	FB-2 Rev. 1.0	Softone	1
R1,R2,R3,R4	Resistor	300 ohm 1% 1/4W	Koa	4
C1,C2,C3,C4	Capacitor	0.01uF 630V	Panasonic	4
VR01,VR02	Potentiometer PCB, Vertical	1K ohm PTV09A-4025F-B102	Bourns	2
BNC01,BNC02 BNC03,BNC04 BNC05,BNC06 BNC07,BNC08	BNC Terminal PCB, Female With nut			8
SW1,SW2,SW3 SW4,SW5,SW6	Toggle switch DPDT 6P	2MD1-T1-B4- M2-QE-1	Cosland	6
CONN1	Rectangular connector Header, Male 30pin (15pinX2)	302-S301	On Shore Technology	1
CONN2	Rectangular connector right angle Socket, Female 30pin (15pinX2)	PPPC152LJBN-RC	Sullins Connector Solutions	1

## Chassis parts

FRONTBOX2 Chassis parts list			
Parts name	Value	Supplier	Quantity
Chassis upper part	FB-2 Rev. 1.0	softone	1
Chassis lower part	FB-2 Rev. 1.0	softone	1
Knob 13mm	ABS-603(YELLOW)	Yung	2
Felt foot			4
Metal spacer M3 8mm			4
Black truss screw M3 6mm			8
Set screw M3 6mm			4
Tooth lock washer M3			2

## Manual

### 3. Tool and material necessary for assembly

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The following items are necessary for the assembly of FRONTBOX2.

1. Driver set for ISO screw
2. Box wrench set or long-nose plier
3. Soldering iron
4. String solder

## 4. Assembly of the printed circuit board (PCB)

It solders sequentially from small short parts with the PCB.

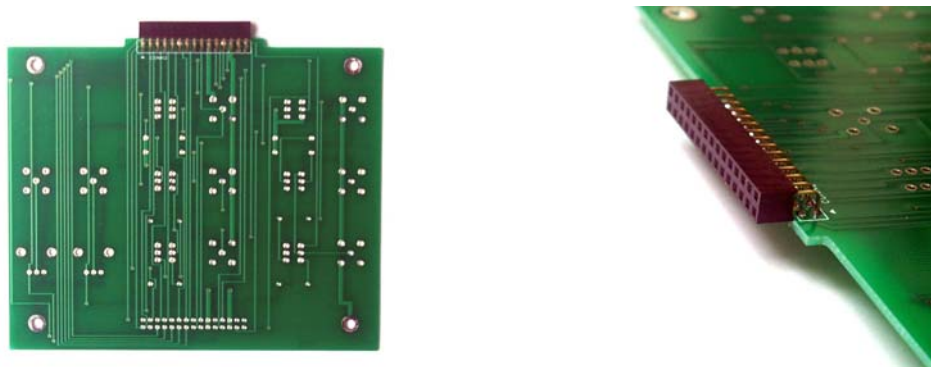
### 4.1 Soldering of resistor, capacitor, and connector

CONN2 (Rectangular connector right angle Socket Female) is soldered with the **back side** of the PCB.

Only CONN2 is arranged on the **back side** of the PCB. Please note it.

First of all, only one pin is soldered. The socket part is horizontally adjusted with the PCB while melting solder.

After it horizontally adjusts it, the pin of the remainder is soldered.



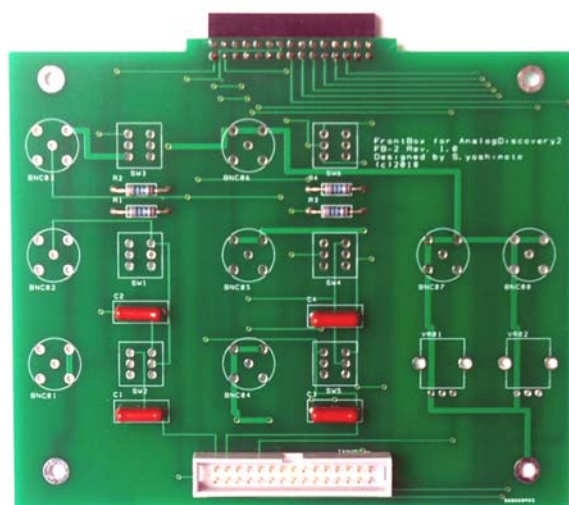
Other parts are arranged in front side of the PCB.

300 ohm resistor of R1, R2, R3, and R4 is soldered.

0.01uF 630V capacitor of C1, C2, C3, and C4 is soldered.

CONN1 (Rectangular connector Header Male) is soldered while matching a triangular mark (1pin mark).

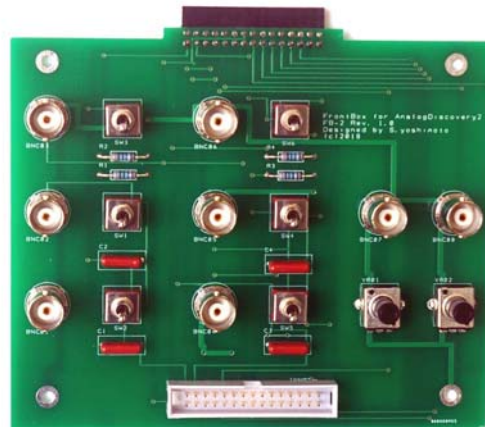
When a triangular mark is not found, CONN1 is soldered with the direction where the incision part of the header frame becomes an internal side of the PCB.



## 4.2 Soldering of switch, potentiometer, and BNC connector

The switch, potentiometer, and BNC connector are soldered with the PCB in vertical and the sticking state. If it is not vertical, it is not suitable for the hole position of the chassis.

First of all, only one point of centers of parts is soldered. The parts is adjusted in vertical and the sticking state while melting solder. After the adjustment, the pin of the remainder is soldered.



## 5. Assembly of chassis

### 5.1 Installation of the PCB on the chassis upper part

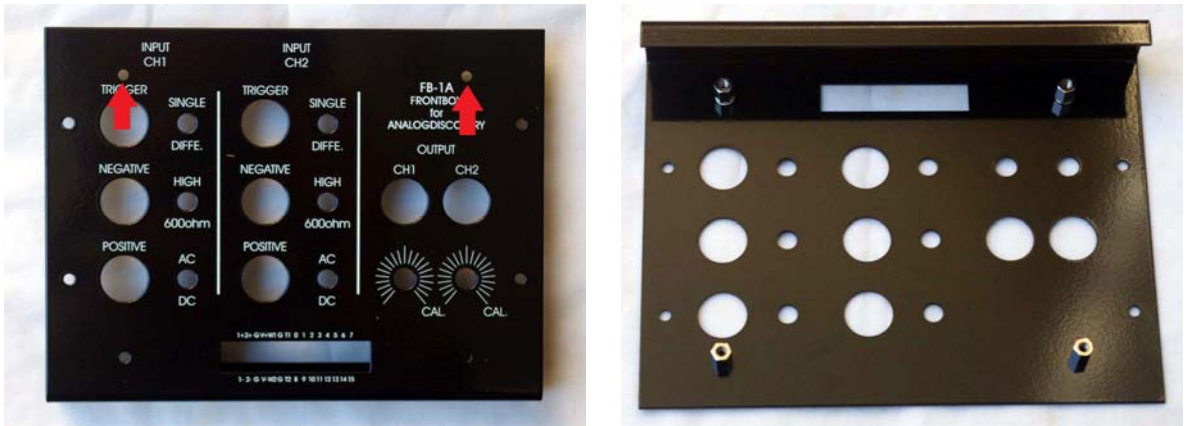
4 of 8mm length metallic spacer for the PCB fixation are installed in the chassis upper part.

Insert the 6mm black truss screw into the two holes indicated by the arrows in the figure below. Attach the 8 mm length metal spacer from the back side across the M3 tooth lock washer.

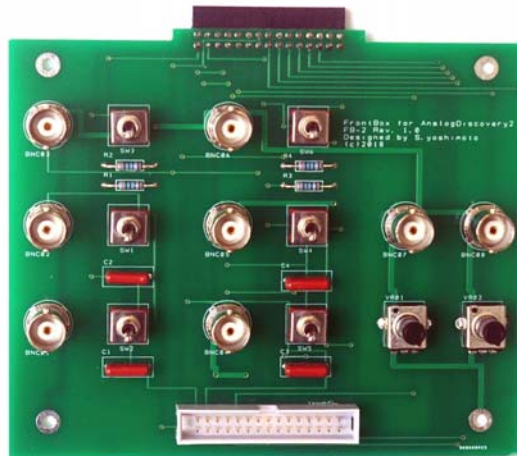
Please be sure to pinch the M3 tooth lock washer to ground the chassis and the circuit. It is these two places to install the M3 tooth lock washer.



Insert the 6mm black truss screw into the two holes indicated by the arrows in the figure below. Attach the 8 mm length metal spacer from the back side.



The lever of all switches is arranged to near side position.



The PCB is built in from the back side according to the hole of the chassis.  
 The PCB is fixed with 4 of 6mm lengths set screw.  
 The knob is installed in the potentiometer.

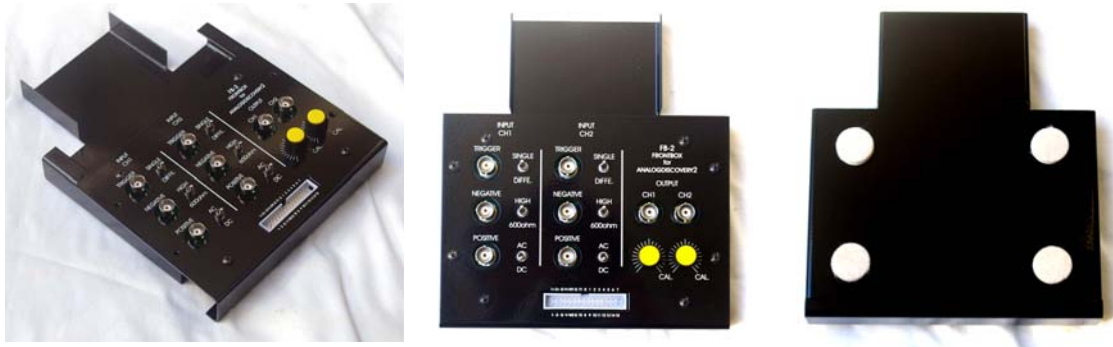


## 5.2 Installation of the chassis lower part

The chassis upper part that installs the PCB is combined with the chassis lower part.

The upper part and the lower part are fixed with 4 of 6mm lengths black truss screws.

4 of felt feet are bonded to the back of the lower part.



## 6. Installation of ANALOGDISCOVERY2

ANALOGDISCOVERY2 is inserted in the socket behind FRONTBOX2.



## 7. Function

Input function

BNC input terminal

FRONTBOX2 provides with the BNC terminal for a positive phase, a negative phase, and a trigger input for two channels.

The differential input of ANALOGDISCOVERY2 enables the measurement of the balance output of the audiovisual equipments.

#### AC/DC switch

At the AC position, only the AC signal that excludes the overlay of direct current can be measured.

When AC is selected, it is measured through the capacitor of 0.01 $\mu$ F/630V.

#### HIGHT/600ohms switch

The input impedance is switched to low impedance of 300 ohms for high impedance of 1M ohms for each single phase.

It becomes 600 ohms load between positive and negative phase when 600 ohms position is selected, and is suitable for the measurement of the audiovisual equipments with the balance output.

#### SINGLE/DIFFE switch

The single input measurement or the differential input measurement is selected.

At the SINGLE position, only the positive phase input is measured, and the negative phase input of ANALOGDISCOVERY2 is connected with the ground.

When the balance output of the audiovisual equipments is measured, the DIFFE position is selected.

#### Output function

##### BNC output terminal

Two channel BNC output terminals for the arbitrary wave generator of ANALOGDISCOVERY2.

##### Potentiometer for output voltage adjustment

FRONTBOX2 provides with the 1K ohm potentiometer that adjusts the output voltage.

The screen of ANALOGDISCOVERY2 also has the adjusting function of the output voltage.

However, if the voltage is decreased on the screen of ANALOGDISCOVERY2, the number of bits of DA conversions that generate the waves is decreased. It causes an high distortion rate and a low accuracy of waves.

##### In the measurement of the audiovisual equipments

The output voltage of ANALOGDISCOVERY2 is fixed to a high, and A high accurate and low distortion rate signal is obtained by adjusting the output voltage with the potentiometer.

Extension connector

FRONTBOX2 has the extension connector similar to the I/O connector of ANALOGDISCOVERY2.

The same usage as ANALOGDISCOVERY2 is possible according to the extension connector.

## 8. Usage restrictions of 10:1(X10) probe

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There is a restriction in the waveform observation that uses 10:1(X10) probe in the oscilloscope application.

There is no restriction in the waveform observation that uses 1:1(X1) probe.

In general, when 10:1(X10) probe is used, 1KHz square wave is observed and the probe is adjusted.

When ANALOGDISCOVERY2+FRONTBOX2 is combined, the shape of waves cannot be adjusted enough by the probe.

It causes from parting of the resonator in the root of the probe and the measurement point because the input signal line is extended by FRONTBOX2. The insufficiency of the adjustment is different according to the probe.

### HP10041A Probe

Good waveform can be observed.

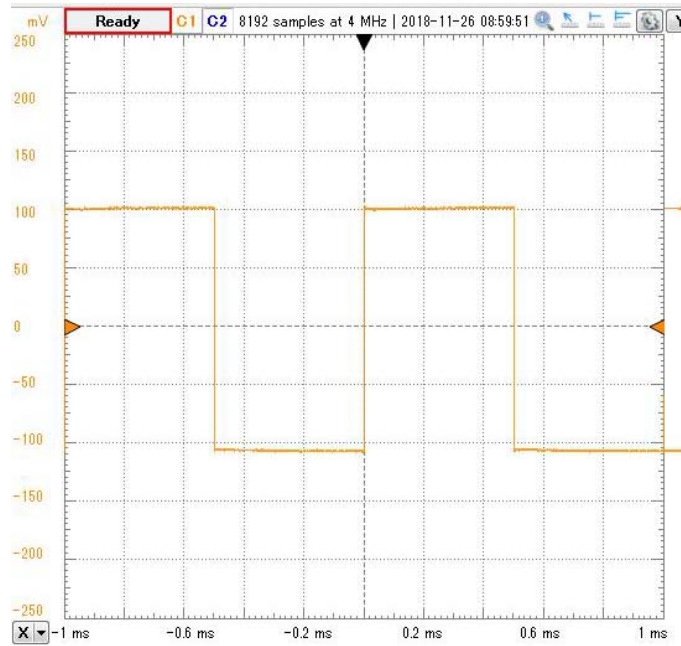




### TEXAS60 Probe

This probe can switch X10 and X1.

The corner inclines at X10. Good waveform can be observed.

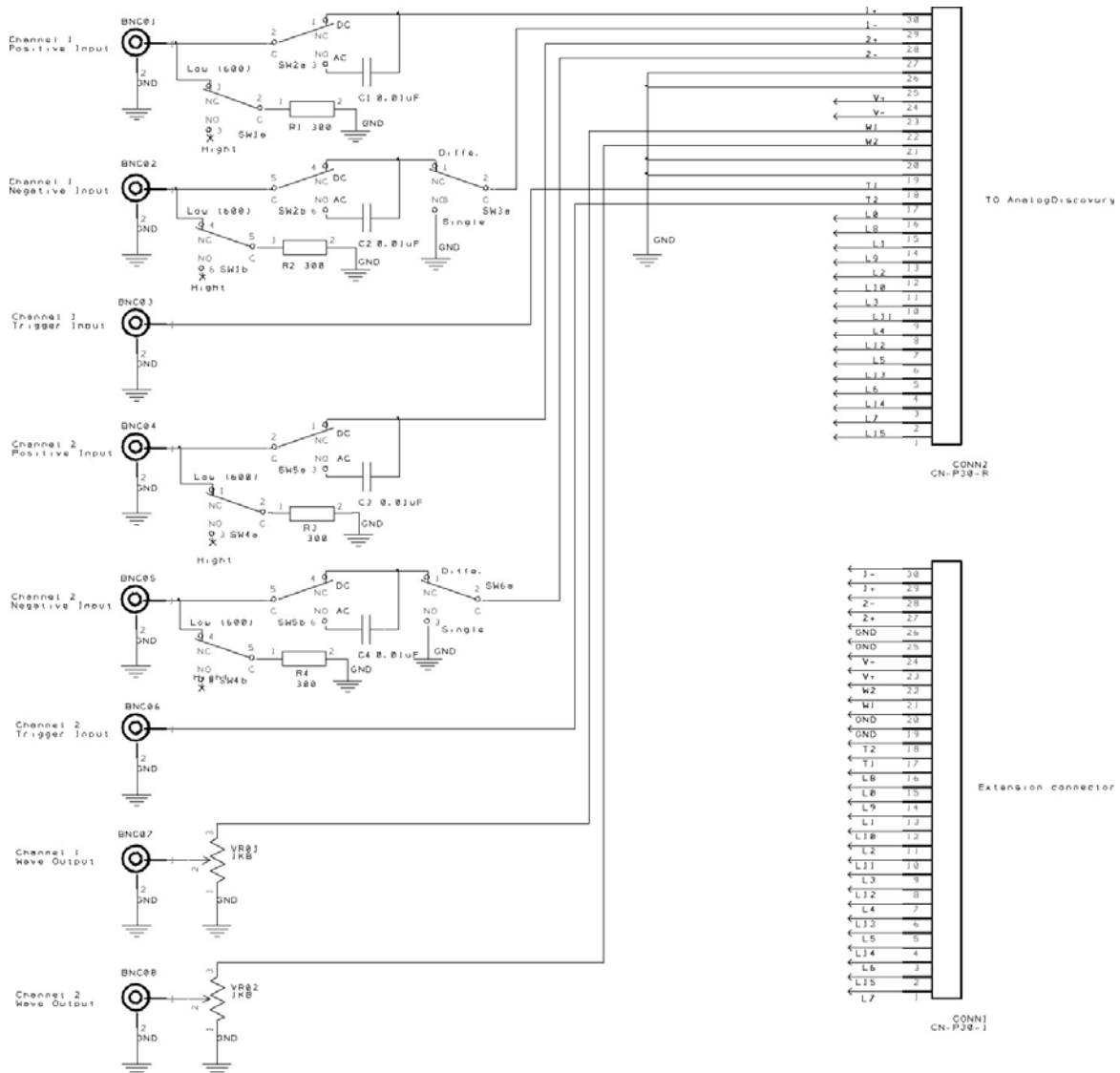


### YOKOGAWA 700996 Probe

The corner inclines greatly.



## 9. Schematic diagram



## 10. Contact

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