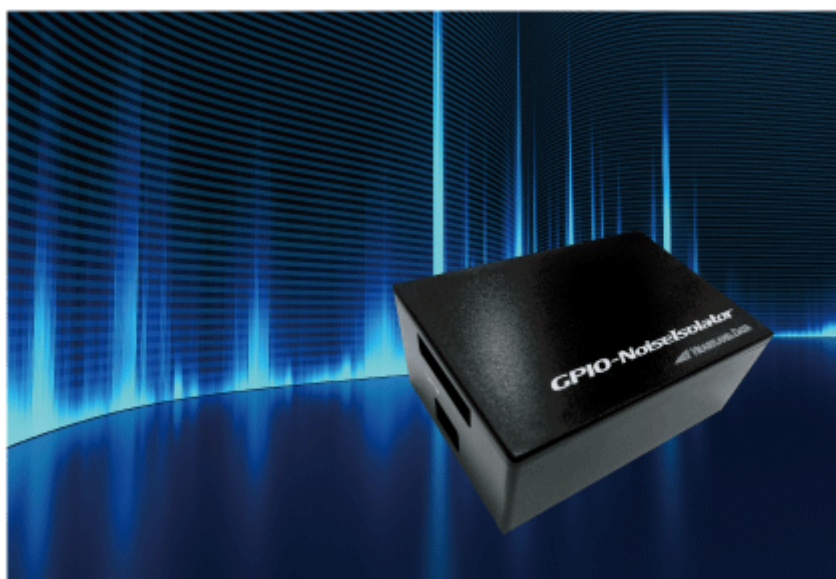


Ver.1.11

Dynamic Test
DT10

GPIO-NoiseIsolator

Manual



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About this manual

- This manual explains GPIO-Noiselsolator specification and usage.
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- The content and specification of this product are subject to change without prior notice.
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Product precautions

- To use this product safely, please read this manual before using.


Caution on installation

 <p>Caution</p>	Where the risk of static electricity is high, use the antistatic mat to protect DynamicTracer.
	Never install GPIO-Noiselsolator near any volatile substances or fire.
	Never install in any of the following places to protect GPIO-Noiselsolator against fire, electric shock, malfunction, and other troubles:
	<ul style="list-style-type: none"> A humid/dusty place A wet place A place exposed to direct sunlight A place subject to considerable fluctuations in temperature and humidity A place near HVAC equipment.

Cautions regarding power

 <p>Caution</p>	GPIO-Noiselsolator is electrical-supplied by HDMI cable.
	Never connect/disconnect the power plug while hands are wet to prevent the risk of electric shock.
	Obey the following rules when using an HDMI cable:
	<ul style="list-style-type: none"> Never modify the HDMI cable. Never expose the HDMI cable to strain. Never bend, twist and pull hard. Never place near heat equipment.
	Handle HDMI cable carefully to prevent fire:
	<ul style="list-style-type: none"> Never plug in a dusty HDMI cable. Plug in the HDMI cable firmly.
	Unplug HDMI cable while holding it firmly. Never unplug by pulling the HDMI cable to prevent the risk of fire and electric shock.

Cautions when using

 Caution	Never use if you notice any strange condition (smoke, strange smell, strange sound, etc...).
	Stop using GPIO-Noiselsolator if is contaminated with water or any foreign body.
	Do not decompose/custom GPIO-Noiselsolator.
	Connect GPIO-Noiselsolator to a PC by a cable connector ensuring the cable is in the correct direction.

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1. Product Outline

1.1. Features

GPIO-Noiselsolator is an interface unit to isolate the target device and DynamicTracer. It is for ConnctBoxC of DynamicTracer / DynamicTracer Storage.

< 3 fatures of GPIO-Noiselsolator >

•Prevent the incorrect data detection by the noise of target device.

Incorrect detection of trace data is happened because of the noise from the high voltage, high current and high-speed operation.

Isolation circuit enables getting the trace data stably. ◦

•Installation of the target devide and DynamicTracer will be easier and more flexible.

The installation place for the Dynamic Tracer is very improved because there is no limitation as a length of the 8 pin probe (25cm).

I/F cable can be extended by 5m, therefore, comfortable working space is available because there is no limitation of the place.

•Connection is more fuss-free to the target device

GPIO-Noiselsolator support flat cable connection other than clip connection of 8 pin probe which is stressful to attach.

It is easier to connect the target device because of the 10 pin connector that can be connected at one-touch.

1.2. Use image

•10 pin flat cable

Connect or disconnect are more easier than 8 pin probe when pin-header is mounted sutably to the target board.



•8 pin probe

Tuck by the clip of 8 pin probe in case some terminals and wires are available in the target board.



2. Hardware spec.

2.1. Appearance



2.2. Electric spec.

Name	Description	MIN	TYP	MAX	UNIT
VIH	High-level Input voltage (Hi-Threshold)	1.4	1.67		V
VIL	Low-level Input voltage (Lo-Threshold)		1.23	1.4	V
VDD	External Power Supply voltage	3.3		5	V
RIN	Input resistance		100		KΩ

*The power is supplied up to the voltage of input signal.

Please supply 3.3V to VDD pin of the GPIO-NoiseIsolator if the signal level is 1.8V - 3.3V.

2.3. Supported connection methods

GPIO NoiseIsolator supports the following connection methods:

- GPIO** : GPIO (4bit / 2bit) bus output method connection.
- SPI** : SPI output bus method connection.
- I2C** : I2C bus connection.

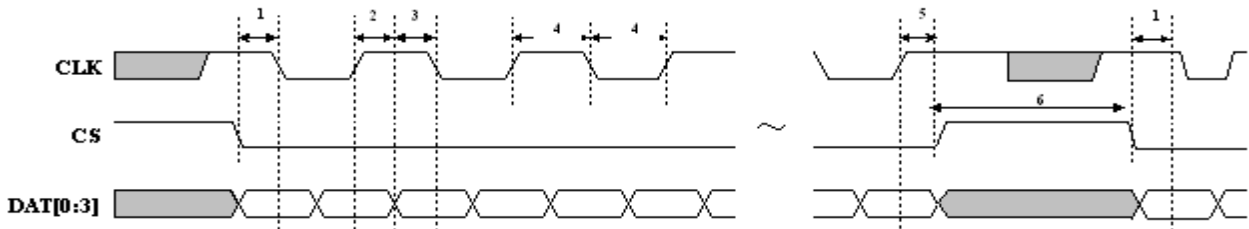


Caution

A Variable Write Point can NOT be used when connecting a GPIO-NoiseIsolator.

2.4. Timing chart

2.4.1. GPIO connection 4bit / 2bit



No.	Description	MIN.	MAX.	UNIT
1	CS (Low) - CLK timing	27		ns
2	Data hold timing	27		ns
3	Data setup timing	27		ns
4	CLK switch period	54		ns
5	CLK - CS (High) timing	40		ns
6	CS (High) period	27		ns

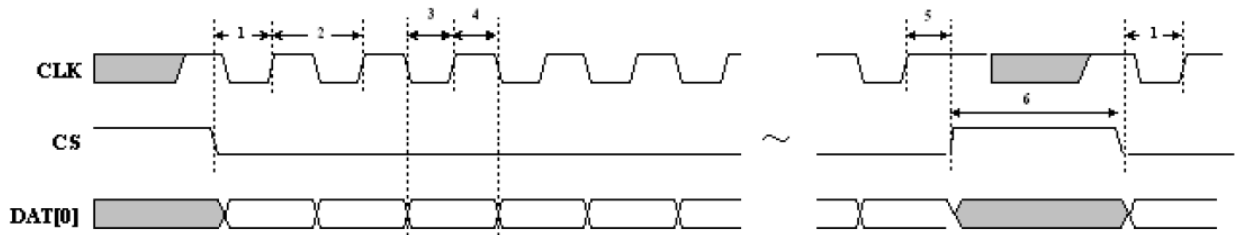
- Data is transferred as 4bit parallel and output as MSB First in order of the following items:
- Latch timing is the edge of CLK rising and falling.
 1. Argument of `_TP_BusOut () dat` (16bit)
 2. Argument of `_TP_BusOut () addr` (0 - 24bit)
 - * In the case of 4bit, the number of "addr" bit varies (0 / 4 / 8 / 12 / 16 / 20 / 24) and high-order bits less than 24bit are treated as "0".
 - * In the case of 2bit, the number of "addr" bit varies (0 / 2 / 4 / 6 / 8 / 10 / 12 / 14 / 16 / 18 / 20 / 22 / 24) and high-order bits less than 24bit are treated as "0".



Caution

**CS must be set "high", except when outputting the Test Point.
Never set it to "low" when the Test Point output stops.**

2.4.2. SPI connection



No.	Description	MIN.	MAX.	UNIT
1	CS (Low) - CLK timing	27		ns
2	CLK period	54		ns
3	CLK low period (setup time)	27		ns
4	CLK high period (hold time)	27		ns
5	CLK - CS (high) timing	40		ns
6	CS (high) period	27		ns

- Data is transferred as 1bit parallel and output as MSB First in order of the following items:
- Latch timing is the rising edge of CLK.
 1. Argument of `_TP_BusOut () dat` (16bit)
 2. Argument of `_TP_BusOut () addr` (0 - 24bit)

* The number of "addr" bit varies (0/4/8/12/16/20/24) and high-order bits less than 24bit are treated as "0".

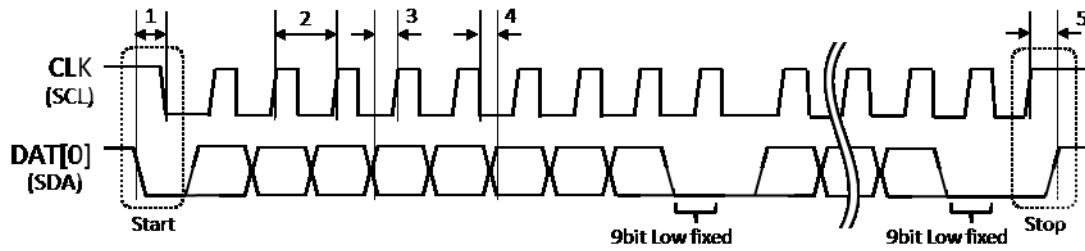


Caution

CS must be set "high", except when outputting the Test Point.

Never set it to "low" when the Test Point output stops.

2.4.3. I2C connection



No.	Description	MIN.	MAX.	UNIT
1	Start condition (SDA flank down to SCL flank up)	20		ns
2	CLK switch period	40		ns
3	Data(SDA) setup timing	20		ns
4	Data(SDA) hold timing	20		ns
5	Stop Condition (SCL flank down to SDA flank up)	20		ns

- Data is transferred as 1bit parallel and output as MSB First in order of the following items:
 - For 9th bit, output Low.
 - Latch timing is the rising edge of CLK.
 1. Argument of `_TP_BusOut () dat` (2byte)
 2. Argument of `_TP_BusOut () addr` (1 - 3 byte)
- * The number of "addr" bit varies and high-order bits less than 3 bytes are treated as "0"



Caution

Please ensure to output Low for 9th bit of data.

ConnectBoxC does NOT output ACK signal though using I2C bus format.

Therefore, please use the port that push-pull output setting is available, not open-drain-output by pull-up resistance.

Please prepare the I2C bus (general port) for the output of trace data of DT10.

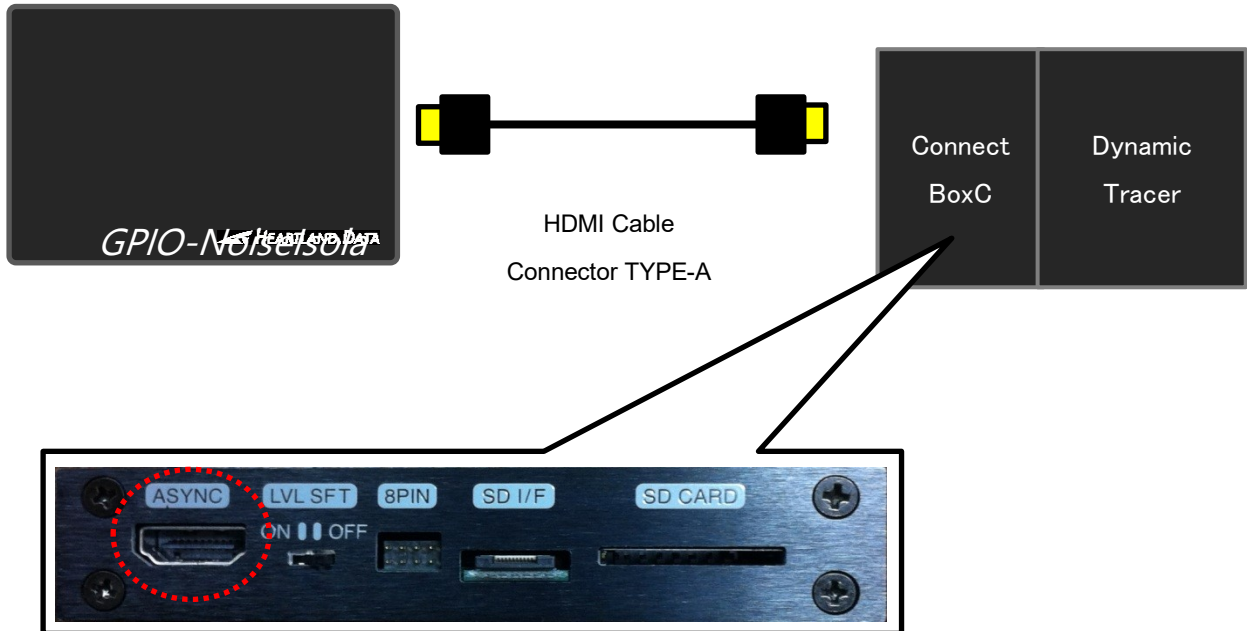
Do NOT connect other devices in the I2C bus connecting DynamicTracer (ConnectBoxC) because slave address is not output.

Similarly, I2C bus using for communication to other devices can NOT use for the output the trace data of DT10.

3. Setting

3.1. Connection to HDMI cable

Connect to HDMI cable in [ASYNC] port of ConnectBoxC.



4. Connection to The Target Device

4.1. The power supply from the target device

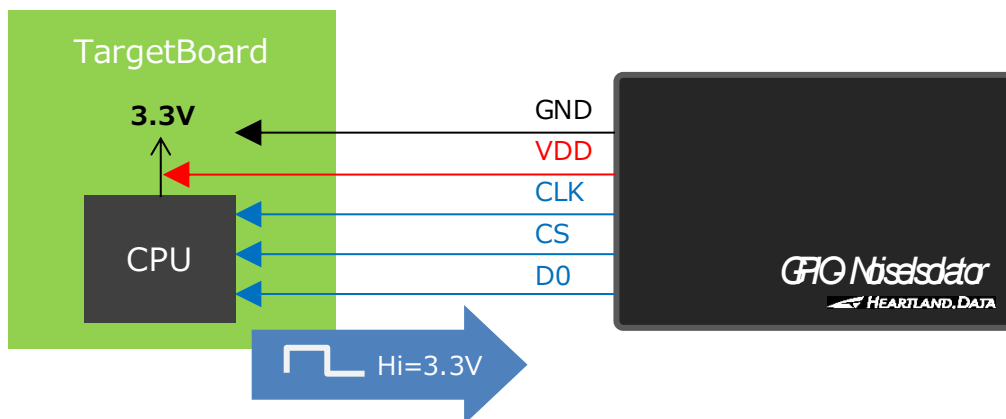
Connection of the VDD line of GPIO-Noiselsolator and the power line of the target device is needed apart from the signal line when connecting GPIO-Noiselsolator and the target device.

For VDD line, please connect the target device and the power line depending on the Hi voltage of output voltage of the target device

- Hi voltage of the target output signal : 1.8V - 3.3V -> VDD=3.3V
- Hi voltage of the target output signal : 3.3V -5V -> VDD=5V

Please refer to the [\[4.2 Connection by 8 pin probe\]](#) or [\[4.3 Connection by 10 pin flat cable\]](#) for more details about the pin assign of VDD or signal line.

ex) SPI



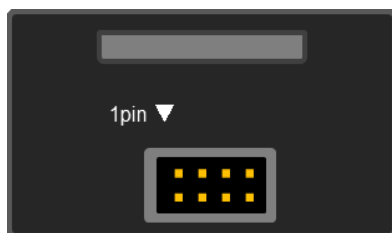
4.2. Connection by 8 pin probe

This chapter explains the connection by the 8 pin probe.



4.2.1. Pin design of the header

The left-upper side of the pin header of GPIO-Noiselsolator is for the 1 pin of 8 pin probe.



▼ Pin-header of GPIO-NoiseIsolator

	GPIO4bit	GPIO2bit	SPI	I2C
1	GND	GND	GND	GND
2	CLK	CLK	CLK	CLK
3	CS	CS	CS	Unused
4	VDD	VDD	VDD	VDD
5	D0	D0	D0	D0
6	D1	D1	Unused	Unused
7	D2	Unused	Unused	Unused
8	D3	Unused	Unused	Unused

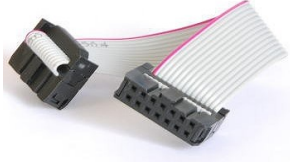
*For VDD line, please connect the target device and the power line depending on the Hi voltage of output voltage of the target device

- Hi voltage of the target output signal : 1.8V - 3.3V -> VDD=3.3V
- Hi voltage of the target output signal : 3.3V -5V -> VDD=5V

4.3. Connection by 10 pin flat cable

This chapter explains the connection by the 10 pin flat cable.

It is easier to connect to the target board by mounting the pin-header suitable for the 10 pin flat cable on the target board.

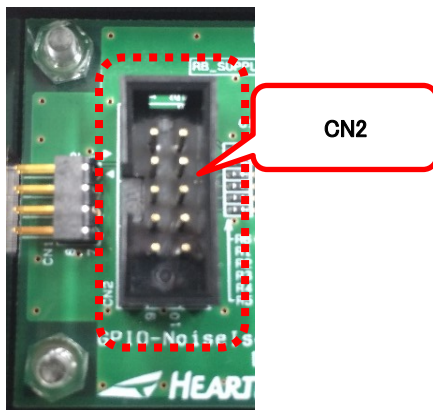


10pin flat cable Manufacturer : Linkman Type: 216310P3

Remove the lid of the main body case of GPIO-Noiselsolator. Put your finger to the gap like the figure below, and then open.



After the removing the cover, put the connector of the flat cable to the pin-header [CN2].

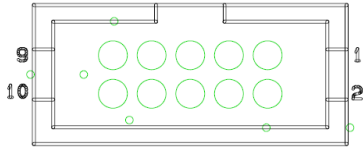


Attach the cover and use it.



4.3.1. Connector spec. mounted on the target board

- Other manufacturer's one is available if it is suitable for the connector of flat cable.
- 10pin pin-header spec. : 10pin / 2.54 mm Pitch *Recommended Manufacturer : Linkman Type : 217010SE
- Please refer to [4.3.2 Pin design of pin-header] to the pin design. It is not necessary to design 9th pin and 10th pin because they are not used.



Pin design of the target board

4.3.2. Pin design of pin-header

▼ Pin-header of GPIO-NoiseIsolator

	GPIO4bit	GPIO2bit	SPI	I2C
1	GND	GND	GND	GND
2	VDD	VDD	VDD	VDD
3	CLK	CLK	CLK	CLK
4	CS	CS	CS	Unused
5	D0	D0	D0	D0
6	D1	D1	Unused	Unused
7	D2	Unused	Unused	Unused
8	D3	Unused	Unused	Unused
9	N.C	N.C	N.C	N.C
10	N.C	N.C	N.C	N.C

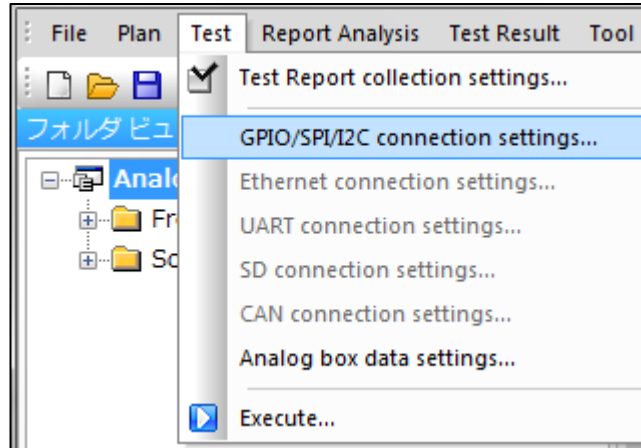
*For VDD line, please connect the target device and the power line depending on the Hi voltage of output voltage of the target device

- Hi voltage of the target output signal : 1.8V - 3.3V -> VDD=3.3V
- Hi voltage of the target output signal : 3.3V -5V -> VDD=5V

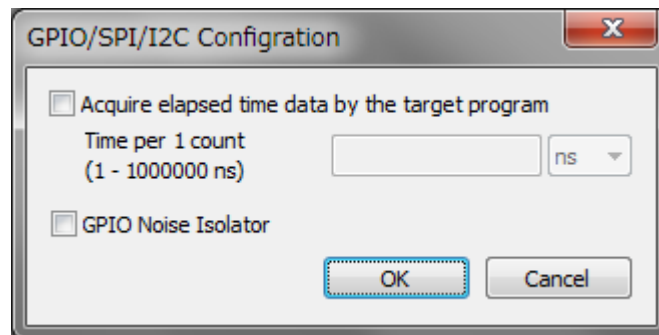
5. Application Setting

5.1. GPIO/SPI/I2C connection setting

1. Click the menu "GPIO/SPI/I2C connection settings..." from "Test"



2. Please check "GPIO Noise Isolator" and click OK.



3. After the setting and executing trace start, GPIO-NoiseIsolator connected to DynamicTracer (ConnectBoxC) is enabled and trace data can be collected.



Caution

Trace data can NOT be collected if the check box of the dialog box is off when the target device and GPIO-NoiseIsolator is connected.

6. Attentions

6.1. Combination use to Analog Box

For the trace data collecting through GPIO-Noiselsolator, there is 3.8us delay to input to DynamicTracer by the signal conversion process. Therefore, please consider that there is delay in "trace data collecting timing" for "collecting timing of the AnalogBox input signal".

6.2. Connection to the target board

Please connect the target device and GPIO-Noiselsolator when powering on DynamicTracer.

6.3. Installation of GPIO-Noiselsolator

It is recommended that GPIO-Noiselsolator is fixed by the taping etc. at or near the target device to decrease the load to the connection part to the target device.



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