

TOUCH PANEL INTERFACE BOARD

Delivery Specification

Model Name: AHL-71N-BL2

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Precautions

1. Avoid using this panel for applications that may affect people's lives, such as medical equipment, space equipment, aircraft, submarine repeater and other equipment for which extremely high reliability is required.

2. If you are planning to use this panel for control or security system in transport equipment (train, automobile and vessel or the like), always contact our sales service center in advance.
The quality level of this product is limited to general applications. (Computer, OA equipment, FA equipment, communication equipment, measuring equipment, AV equipment, etc.)

3. Do not ever remodel or recompose our products. It may cause problems and breakdown.

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Date of Revision	Indication for Revision	Revised Contents	Remarks	Checked by

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1 Outline

The AHL-71N-BL2 is a product with lead-free. Therefore this will be suitable for a customer think about an environmental consideration. The AHL-71N-BL2 is a substitute for the AHL-71-BL without quite losing a function.

The AHL-71N-BL2 is an interface board used to detect the resistive membrane-type analog touch panel pushing pressure position. Even if an unstable data (voltage value) generated when the touch panel was lightly depressed and noise arising due to operating environment are inputted to the AHL-71N-BL2, internal filtering (touch panel controller:AHL-71N) is carried out; it is, therefore, possible to detect the pushing pressure position with high precision.

The communication system contains serial (start-stop) . Where the serial interface is used, direct connection to the COM port of a personal computer or the like is possible by connecting the EIA-232D (RS-232C) transceiver.

Also available is the device driver for mouse emulation. By using this unit, the touch panel can be used in place of the mouse.

- For Windows XP/2000/Me : TPDD
- For Windows NT4.0 : U-TP

Contact our sales section if you use another operation system.

2 Features

2.1 Power supply

- Supply Voltage: 5V±10%
- Supply current: 20mA (max.)

2.2 Temperature condition

- Operating ambient temperature : 0 to 70
- Storage temperature : -10 to 85

2.3 Electrostatic dielectric strength

- 25 kV (150 pF, 150Ω)

* Equipment used: ESD-300 (SANKI DENSHI KOGYO)

* The test method should be in accordance with the GUNZE LIMITED specifications.

2.4 Electrical resolution

- 10 bits (1,024 x 1,024)

NOTE) This numerical value is the electrical resolution of AHL-71N-BL2. The electrical resolution in the touch panel key area is lower than this numerical value, which differs among the touch panels.

2.5 Output system

- Serial (Start-stop)

2.6 Output rate

- 87 cps (Serial interface)

NOTE) Under the following communication conditions:

Communication speed :	9,600 bps
Parity :	None
Data length :	8 bits
Stop bit length :	1 bit

2.7 Response speed

- 14ms.

2.8 Environmental adaptation

- Complies with the RoHS directive.

3 Connection

EX1, EX3: Touch panel connection

EX1: Type No.: SLP8R-5 (FCI Japan)

EX2: Type No.: IMSA-9616S-08A-GF1 (IRISO)

Connect the GUNZE 8wire analog touch panel to EX1 with terminal pitch 1.25 mm or to EX3 with terminal pitch 1mm.

Pin No.	Terminal Function	Pin No.	Terminal Function
1	yL	5	xR
2	yLref	6	xL
3	yUref	7	xLref
4	yU	8	xRref

EX2: Power supply, EIA-232E (RS-232C) Interface

Type No.: DF13-10P-1.25H (HIROSE ELECTRIC)

(Applicable socket: DF 13-10S-1.25C (HIROSE ELECTRIC))

Pin No.	Terminal Function	Pin No.	Terminal Function
1	5V	6	GND
2	5V	7	CTS
3	GND	8	RTS
4	GND	9	RxD
5	GND	10	TxD

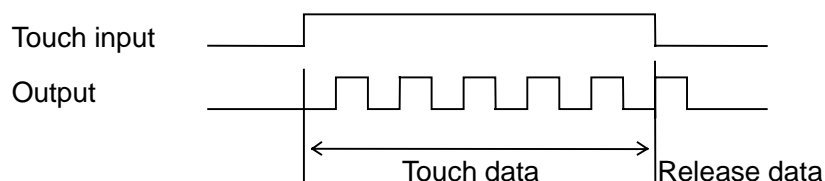
4 Setting

The cut land method is used for JP1 and JP2 . According to your operating environment, short the pattern by soldering or absorb the solder to make it open.

JP1:	Baud rate setting Open → 9600 bps (Factory preset before shipment) Short → 19200 bps
JP2:	Stop mode setting Open → Unavailable (Factory preset before shipment) Short → Available

5 Output mode

The output mode is the continuous mode. The positional data is continuously outputted while the touch panel is being touched. When your finger or pen was released from the touch panel, only one data in the release position is outputted. When it is not touched, no data is outputted.



6 Serial Interface

6.1 Outline

Using start-stop serial, touch position data and command communication can be carried out.

By connecting EIA-232D (RS-323C) transceiver, direct connection to the COM port of a personal computer, etc. is possible. Also available is the device driver for mouse emulation. By using this unit, the touch panel can be used in place of the mouse.

- For Windows XP/2000/Me :TPDD
- For Windows NT4.0 :U-TP

Contact our sales section if you use another operation system.

6.2 Communication format

- Communication speed : 9600/19200 bps
- Data length : 8 bits
- Parity : None
- Stop bit : 1 bit

NOTE) The underline is the default setting.

6.3 Text format

- According to 8-bit ASCII format, one data is transmitted at 11 or 12 bytes.

HEADER ('T'/'R')	X Coordinate (4 bytes)	',' (2Ch)	Y Coordinate (4 bytes)	CR (0Dh)	LF (0Ah)*
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* Where "CR" + "LF" was set as a delimiter:

NOTE) The delimiter default is only "CR".

* Example in Continuous Mode:

```

T0273 , 0581 <--      When the touch panel was depressed
T0273 , 0582
T0272 , 0581
.
.
.
.
.
.
T0273 , 0582
R0273 , 0581 <--      The touch panel was released.
    
```

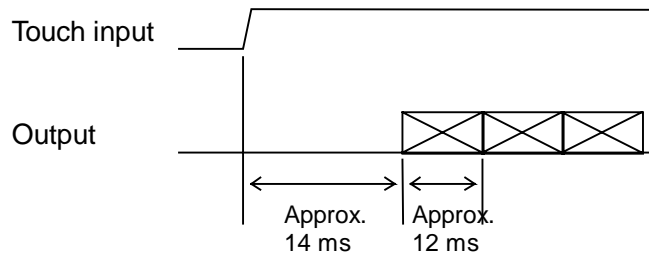
* The data while the touch panel is being depressed is transmitted with "T" prefixed as a header, and when the touch panel was released, only one data is transmitted with "R" prefixed as a header.

* The data is the numeral of 0 to 1,023 (decimal) for both X and Y.

* Where the AHL-71N-BL2 and touch panel were connected as specified, the touch panel left lower part becomes the origin.

NOTE) Even when the touch panel left lower part is depressed, the data of (0, 0) is not outputted. Also, even the touch panel right upper part is depressed, the data of (1023, 1023) is not outputted. Actually, 0 to 1023 inside data are outputted. (Example: 20 to 1000)

6.4 Response speed



NOTE) The communication conditions are as follows for the data.

Communication speed	:	9,600 bps
Parity	:	None
Data length	:	8 bits
Stop bit	:	1 bit

6.5 Output rate

- Approx. 87 cps (cps: Co-ordinate Per Second)

NOTE) The communication conditions are as follows for the data.

Communication speed	:	9,600 bps
Parity	:	None
Data length	:	8 bits
Stop bit	:	1 bit

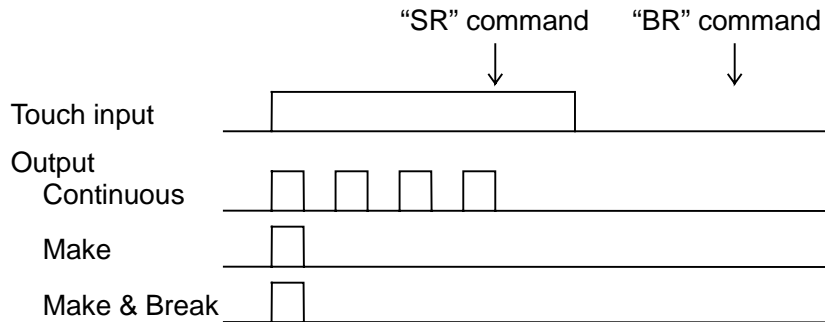
6.6 Command System

Command	Operation
RE	Resets the AHL-71N-BL2. However, if this command is received during data transmission, the data being transmitted may be in disorder.
DI	Diagnosis of the AHL-71N-BL2. In the normal condition, "Pass ____" is returned. * "_" means the space.
SR	Transmission stop. The command is accepted, however. During data transmission, the transmission is stopped from the next data.
BR	Transmission re-start
VE	Returns software version "Vn.nn_". Ex. "V1.00 " * "_" means the space.
LF	The data delimiter should be "CR(0Dh)" + "LF (0Ah).
CR	The data delimiter should be "CR (0Dh)".
XL	Returns the reference data on the X-coordinate low voltage side. Ex. "0012" The reference data refers to the data in the touch panel electrode part.
XH	Returns the reference data on X-coordinate high-voltage side.
YL	Returns the reference data on Y-coordinate low-voltage side.
YH	Returns the reference data on Y-coordinate high-voltage side.

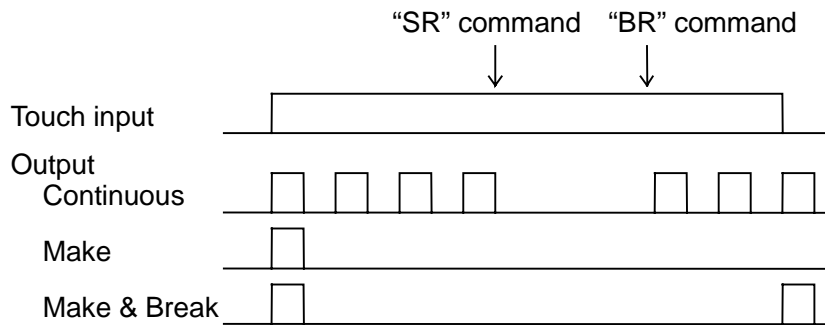
- NOTES) 1) Transmit the command in the ASCII format.
 2) When transmitting the command, send "CR" (0Dh) lastly (as a delimiter).
 3) Any letter, capital or small, is effective for the command.
 4) The command is executed immediately upon receipt thereof. The command is accepted even when the AHL-71N-BL2 is being transmitted, and for the command with response data, such as "DI" and "VE" commands, the response data is outputted in the course of position data, and then, the position data is outputted again.
 5) For the response data to the command, normally, transmit "CR" (0Dh) lastly (as a delimiter).
 6) Where the command could not be received normally or the command that is not present in the list was sent, it is disregarded. (No data is outputted.)
 7) When the setting is changed by "SR" and "LF" command, the changed setting is cancelled if the AHL-71N-BL2 is reset.
 8) The interval between commands should be 15 ms or more.

6.7 Output pattern when the transmission stop "SR" and transmission restart "BR" commands are received.

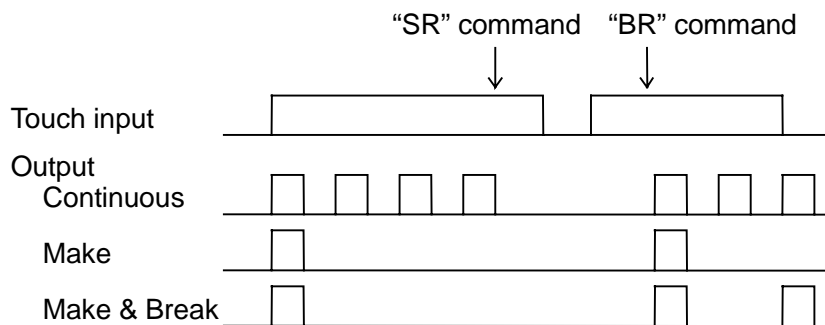
<Pattern 1>



<Pattern 2>



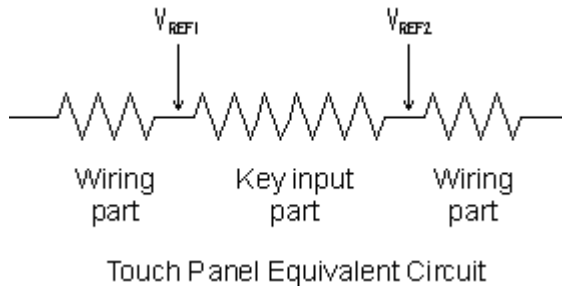
<Pattern 3>



* Each pulse of output is one-point data.

7 Calibration

7.1 Auto calibration



Since the touch panel forms the equivalent circuit as shown in the figure above, if direct current voltage is applied to both ends of the touch panel, some dc voltage will be applied to the key input part, and the remaining one will be applied to the wiring part. Consequently, if the resistance value of only key input part and only wiring part changes, the voltage applied thereto also changes. In other words, if the resistance value in each part of the touch panel changes, the output voltage when the same point on the touch panel was depressed differs, thereby giving rise to a phenomenon of positional deviation.

On the other hand, in combinations of (AHL-71N-BL2) + (8-wire touch panel), the AHL-71N checks double-end voltage (reference voltage: V_{REF1} , V_{REF2}) in the key input part of the touch panel in order to make internal correction so that the data on the low voltage side becomes zero and the high-voltage side data becomes "1023" or "4095" which is referred to as auto calibration; therefore, there is virtually no positional deviation caused by changes in resistance value in each part of the touch panel.

The reference voltage is saved inside the AHL-71N-BL2.

The AHL-71N checks the reference voltage when; 1. the power is turned ON; and 2. the unit is reset.

- * Normally, the touch panel reference data does not change significantly as shown in the example above. Accordingly, the reference data is not rewritten substantially, either.
- * In our touch panel, the resistance value in each part is hard to change, but it may vary, depending on operating conditions (environment) or when it has been used over a long period of time.

7.2 User calibration

In the touch panel module in which the touch panel and display were laminated, the touch panel pressing position and display position must be aligned with each other. This is called "user calibration".

This user calibration should be carried out when the touch panel module is used for the first time, and the touch panel pressing position and display position shifted, for example.

NOTE) There is no correlation between the touch panel pressing position and display position with the touch panel module assembled. It is, therefore, necessary to always carry out user calibration the first time the touch panel module is used. Even when the touch panel module is of the same configuration, the position data in the same point of the touch panel differs among the modules for reasons of dispersion in touch panel resistance value, etc. Also, there is a need to carry out user calibration for each module even if the touch panel module is of the same configuration since there is an error in touch panel and display lamination as well, for example.

As one example of user calibration method, a description is given of the method used by pressing 2 points on the touch panel.

* Position data of touch panel at point A: (X_A, Y_A)

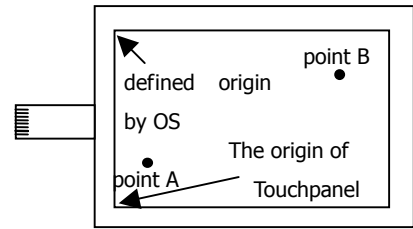
* Position data of touch panel at point B: (X_B, Y_B)

However, $X_A < X_B$ and $Y_A < Y_B$.

* Dot position on the display at point A: (DX_A, DY_A)

* Dot position on the display at point B: (DX_B, DY_B)

However, $DX_A < DX_B$ and $DY_A > DY_B$.



The number of dots (DX1) per data in the X direction is:

$$DX1 = (DX_B - DX_A) / (X_B - X_A) \text{-----A)}$$

The number of dots (DY1) per data in the Y direction is:

$$DY1 = (DY_A - DY_B) / (Y_B - Y_A) \text{-----B)}$$

Therefore, the relationship between the optional positions (X_D, Y_D) on the touch panel and dot positions

(DX_D, DY_D) on the display is:

$$DX_D = DX_A + DX1 \times (X_D - X_A) \text{-----C)}$$

$$DY_D = DY_A - DY1 \times (Y_D - Y_A) \text{-----D)}$$

Attention! Screen the left top usually becomes the origin by the OS such as Windows, but touch panel defines the left bottom as the origin. Therefore calculation type of DY_D is different from DX_D .

Explanation is given below of the above calibration method.

- 1) Press 2 points on the display to obtain the data of X_A, Y_A, X_B & Y_B . Save these data in the host computer.
- 2) From eq. A) and eq. B) above, find $DX1$ and $DY1$. Save this data and DX_A & DY_A as well in the host computer.

This completes the user calibration. During normal operation, find the touch positions DX_D, DY_D on the display unit from these data and position data X_D, Y_D when the touch panel was depressed, using eq. C) and eq. D) above. This calculation should be made each time the touch panel position data is inputted.

Thus, the touch positions DX_D, DY_D on the display are found according to the touch panel position data X_D, Y_D .

7.3 Stop mode

The Stop Mode is a low power consumption mode that AHL-71N which is mounted on AHL-71N-BL2 is providing. When in the Stop Mode , the programs stops temporary and ensures the system lower power consumption.

i. When to become the Stop Mode?

In the condition the JP2 is shorted, when the touch panel is not pushed for more than 30 seconds, and also, command is not fed either at serial transmission.

ii. How to alter the Stop Mode?

- 1) Reset AHL-71N-BL2.
- 2) Touch the touch panel

iii. How to avoid the Stop Mode?

- 1) Opening the JP2 can avoid the Stop Mode absolutely/
- 2) Send a command once in 29 seconds period.

*If command is sent, it will not go to the Stop Mode for 30 seconds.

7.4 Mouse emulation

The device driver for mouse emulation is available. By using this unit, the touch panel can be used in place of the mouse.

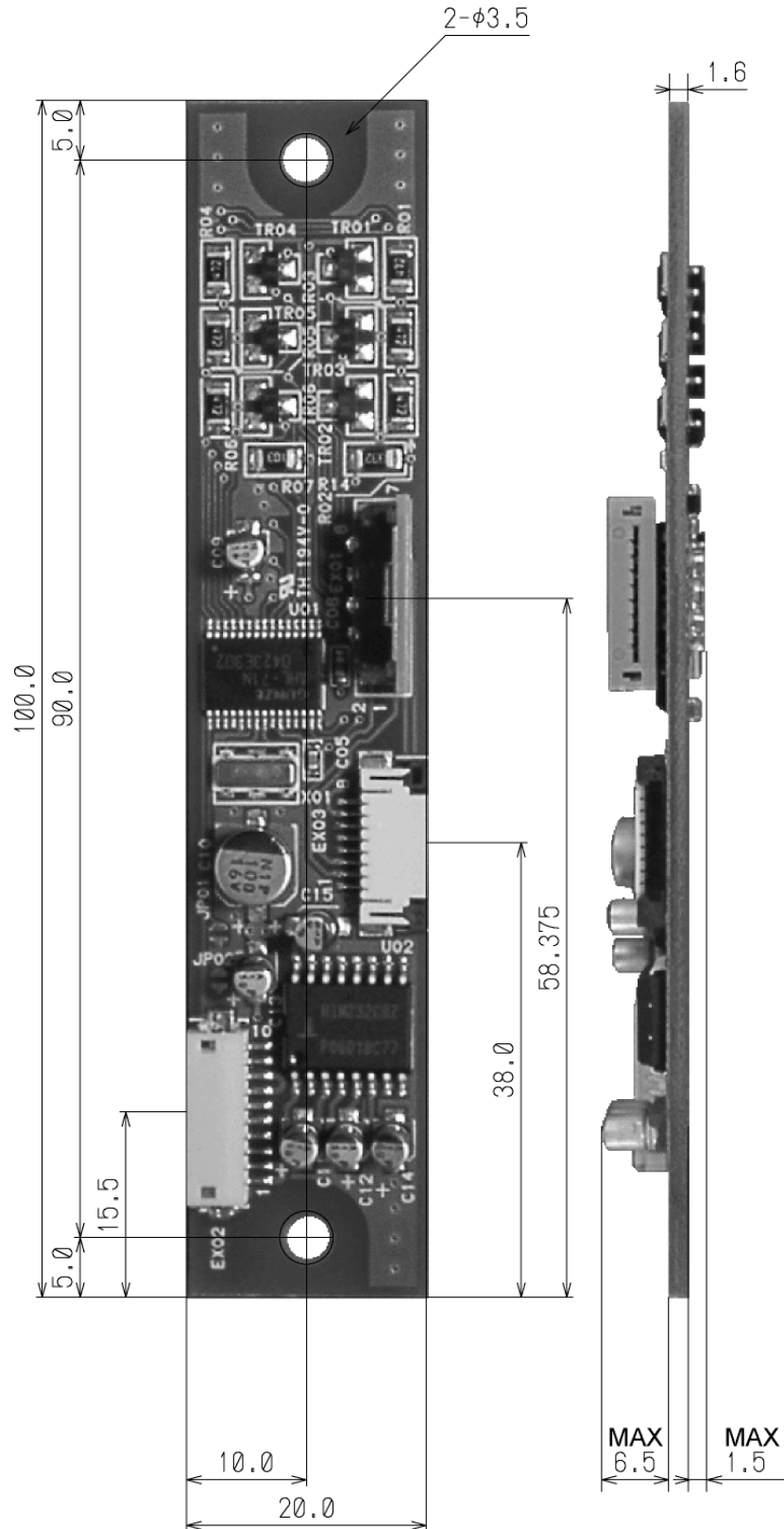
- For Windows XP/2000/Me :TPDD
- For Windows NT4.0 :U-TP

Contact our sales section if you use another operation system.

7.5 Watchdog reset

AHL-71N-BL2 provides automatic reset function in the event software goes nowhere other than aimless running, of which cause may be like some environmental condition.

8 Outline Drawing



9 Operation Precautions

Refer to the following items.

9.1 Security

- (1) Hold the connector part of cable for plug-in and plug-out.
- (2) Do not approach any instruments or parts that could generate heat.
- (3) Please handle cables with special care.

9.2 Handling

- (1) Avoid remodeling or decomposing AHL-71N-BL2.
- (2) Take care not to drop it off or give any impact or shock to it. It could cause breakdown.
- (3) In handling AHL-71N-BL2, pay special attention to static electricity, and provide worker and work site grounding
- (4) Handle the equipment following the regulation in this specification such as described "operating power" and "operating temperature" or breakdown way happen.
- (5) Do not fix the controller when it is touched with something else. Give care to ventilation in point of the design.
- (6) Install AHL-71N-BL2 not to contact with anything. Give care to aeration and ventilation in point of design.
- (7) Avoid placing it next to the parts that may generate heat and provide coating on wiring. The above handling may cause breaking lines, short-circuit and fire.
- (8) Avoid locating cables next to the things may cause a bad influence to Power lines, Oscillators and Signals.

9.3 Environment

- (1) Avoid the direct rays of the sun in use.
- (2) Do not use in the oily smoke or powdered dust environment. It may cause a malfunction.
- (3) Use it in the environment that doesn't exceed Operational condition standard.
- (4) Do not use or store in conditions that has condensation.
- (5) Use or Store in the environment free from the corrosion gas and sorts.
- (6) Use in the places where have less vibrations and shocks.

10 Warranty Period and Warranty Range

10.1 Warranty period

The warranty period should be one (1) year after the date of delivery.

10.2 Warranty range

In the warranty period, if there arises failure or damage due to our nonconformity, our company is ready to repair or replace the defectives. However, in the following cases, the defectives are excluded from the warranty range.

- (a) Failure and damage caused by your mishandling, such as fall and shocks during transportation (movement) after delivery
- (b) Failure and damage caused by disasters and accidents
- (c) Repair & remodeling at other than our company
- (d) Failure and damage caused by handling that runs counter to the usage and precautions described in this specification

NOTE) Only the delivered product should be guaranteed, and any damage induced due to delivered product failure, repair and replacement on work site should be out of the warranty range.