



# **RC-3100C & RC-3000U**

## **Resistive USB and RS-232**

### **Touch Controller**

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## Chapter 1. Product Overview

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### 1.1 INTRODUCTION

*RISIN Technology Incorporation (RISINTECH) provides cutting-edge touch total solutions to customers. Our solution is including chips, module boards to be fit in the needs for various system design and platforms.*

*Our touch controllers can be used in various computer products such as desktops, laptop computers, Point of Sales (POS) automatic machines, PDAs, digital cameras, and GPS devices. To satisfy these demands, we provide flexible firmware and driver supports on operating systems such as Windows 8/7/Vista/XP/2000/98/95, WinCE 5/6, DOS, MacOS and most Linux distributions like Ubuntu, Fedora, RedHat , Debian and so on.*

*RISINTECH also provides customized design service for special application fields, such as embedded system integration and multi-monitor applications.*

### 1.2 PRODUCT DESCRIPTION

*The RISINTECH RC-3100C and RC-3000U resistive touch controller board*

#### 1.2. 1 Part Number

- RC-3100C: 4/5-wire analog resistive USB & RS-232 touch controller board
- RC-3000U: 4/5-wire analog resistive USB touch controller board

#### 1.2. 2 Features

Supply voltage requirement	Supply voltage: 5V +/- 5%
Host interface	<ul style="list-style-type: none"><li>- Automatically detects communication type</li><li>- USB (2.0 compliant)</li><li>- RS-232 (9600 BAUD)</li></ul>
Protocol	<ul style="list-style-type: none"><li>- USB: Full Speed, HID Compliant at 12Mhz/sec, Support</li></ul>

	suspend and remote wakeup - RS-232: 9600 bps, 8 data bits, none parity, 1 stop bit
USB Plug & Play	- USB mouse (HID-MOUSE) or - Single-touch Win7 digitizer (HID-DIGITIZER)
Sensor support	- 4-wire - 5-wire - Touch screen resistance – max. 2K ohm contact resistance
Resolution	- 10-bit measurement(1024 x 1024) - 12-bit reporting(4096 x 4096) of processed touch coordinates
Report Rate	USB: max. 200 points/sec RS-232: max. 150 points/sec
Touch Operation Mode	- Drawing mode: position and linearity verification - Button mode: Mouse left /right button emulation - Sound Notification: enable/disable beep or audio sound for Touch down/Touch up - COM port support: COM1~255 for Windows and Linux, COM1 ~ 8 for DOS
Response Time	Max. 15ms
Chip Package	28 pin MLP
Calibration	- Support 4 / 9 / 25-point calibration - Support edge-compensation
Power consumption	- Normal mode and touch inactive : less than 22 mA - Normal mode and touch active: max 30mA (4-Wire touch panel, Rx-x: 800ohm, Ry-y:250ohm) - USB suspend mode: less than 650uA - Power down mode for RS-232 : 80uA
Permanent data storage	calibration data and system parameters stored on local Flash memory. No need external EEPROM, real SoC

	<i>solution</i>
<i>Operating Temperature</i>	<i>-20°C to 85°C</i>
<i>Storage Temperature</i>	<i>-65°C to 150°C</i>
<i>Humidity</i>	<ul style="list-style-type: none"> <li>- <i>Operating: 10% to 90% RH, non-condensing</i></li> <li>- <i>Storage: 10% to 90% RH, non-condensing</i></li> </ul>
<i>ESD</i>	<i>Contact discharge 6kV, air discharge 8kV</i>

### **1.2. 3 Software and driver support**

<i>Calibration</i>	<i>4 /9/25 points calibration</i>
<i>OS support</i>	<ul style="list-style-type: none"> <li>- <i>MS-DOS 6.22</i></li> <li>- <i>Microsoft Windows Series...</i></li> <li>- <i>Windows CE 4.0/4.2/5.0/6.0,..</i></li> <li>- <i>Linux OS...</i></li> <li>- <i>Android 4.0/4.1/4.2...</i></li> </ul>
<i>Languages</i>	<i>Utility support multiple languages</i> <i>( English, Traditional Chinese, Simplified Chinese, Arabic, French, German, Greek, Hungarian, Korean, Portuguese, Russia, Spanish, Thai, Turkic)</i>
<i>Sound</i>	<i>Support audio sound and beep sound</i>
<i>Software Utility</i>	<ul style="list-style-type: none"> <li>- <i>controller setting utility</i></li> <li>- <i>drawing test</i></li> <li>- <i>auto pin definition detect</i></li> </ul>
<i>Display support</i>	<ul style="list-style-type: none"> <li>- <i>Support display rotation</i></li> <li>- <i>Support multiple monitors</i></li> <li>- <i>Support split monitor</i></li> </ul>
<i>Right click support</i>	<ul style="list-style-type: none"> <li>- <i>Auto right click</i></li> <li>- <i>manual right click</i></li> </ul>

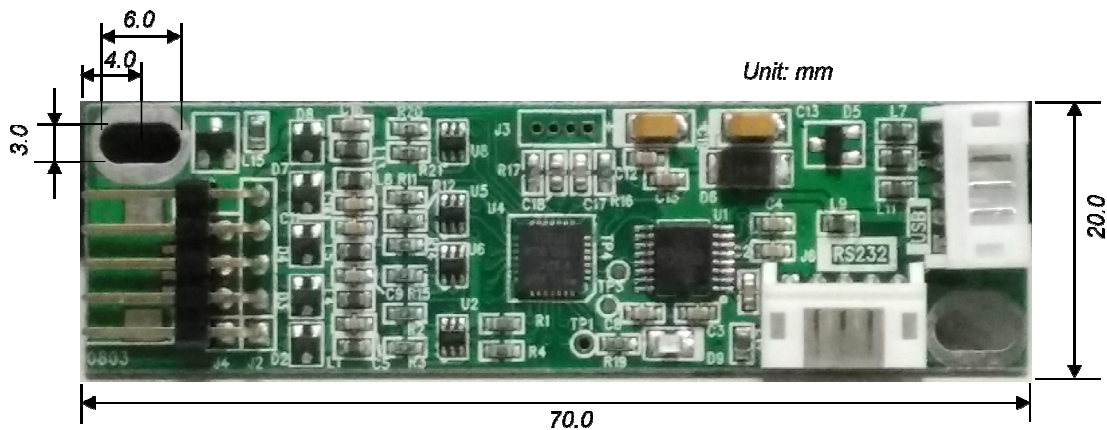
## Chapter 2. Mechanical

### 2.1 CONSTRUCTION

- Two-layers surface-mount PCB design

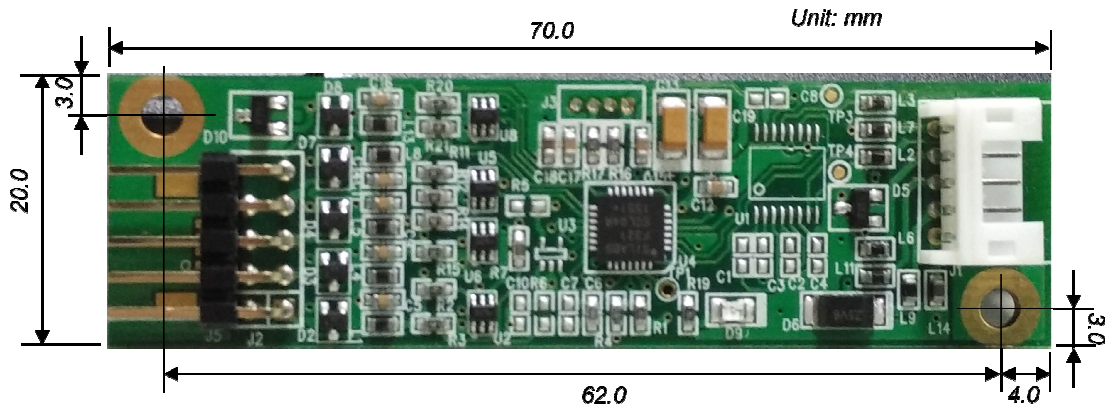
### 2.2 MECHANICAL DRAWING

#### 2.2.1 RC-3100C



- Total Width: 20.0 mm
- Total Length: 70.0 mm (include connector)
- Total height: 8.5mm (include Through Hole Lead Trim Length)
- All mounting holes are plated through for chassis ground connection.

### 2.2.2 RC-3000U



- Total Width: 20.0 mm
- Total Length: 70.0 mm (include connector)
- Total height: 8.5mm (include Through Hole Lead Trim Length)
- All mounting holes are plated through for chassis ground connection.

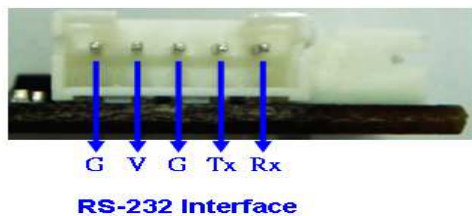
## Chapter 3. Connections

### 3.1 USB and RS-232 COMMUNICATION(RC-3100C)

The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

The USB and RS-232 I/O connector, J1/J6 is a 5-pins header(2.0mm pitch). Refer to the following figure for pin number locations.

Pin diagram for USB and RS-232 connector, J1/J6, as viewed from connector mating surfaces



Signal definition for RS-232 interface		
Signal Name	J6 pin	Signal Function
G	1	Cable shield ground
V	2	+5V power drain from host side.
G	3	Signal ground
TxD	4	Serial data from controller to host
RxD	5	Serial data from host to controller
Signal definition for USB interface		
Signal Name	J1 pin	Signal Function
G	1	Cable shield ground
V	2	+5V power drain from host USB port
G	3	Signal ground
D+	4	USB bus signal D+
D-	5	USB bus signal D-

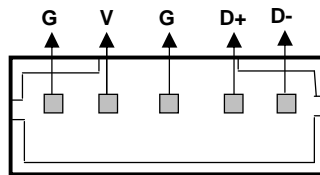


### 3.2 USB COMMUNICATION(RC-3000U)

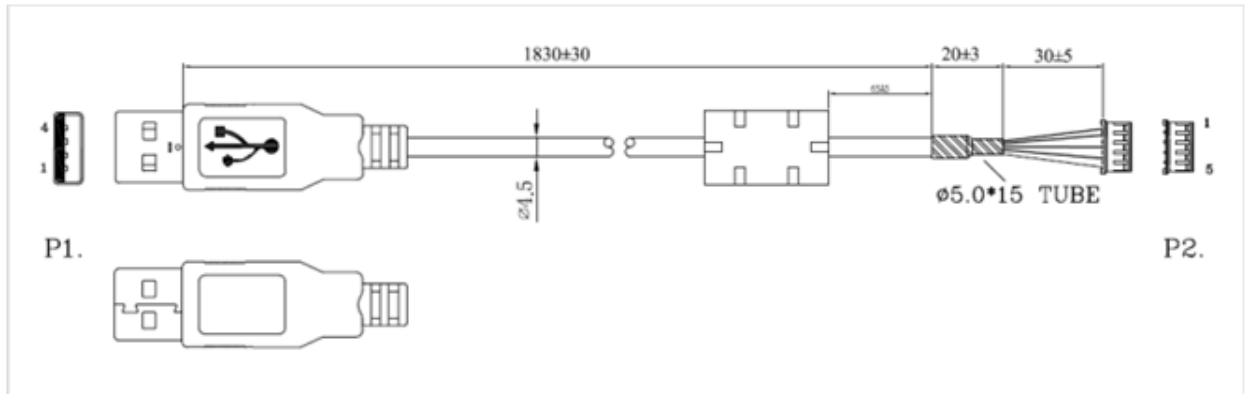
The connector configuration permits the controller to be placed in-line between the touch screen and serial I/O attachments

The USB I/O connector, J1, is a 5-pins header(2.0mm pitch). Refer to the following figure for pin number locations.

Pin diagram for USB connector, J1, as viewed from connector mating surfaces



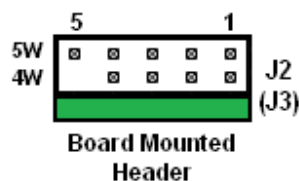
Signal definition for USB interface		
Signal Name	J1 pin	Signal Function
G	1	Cable shield ground
V	2	+5V power drain from host USB port
G	3	Signal ground
D+	4	USB bus signal D+
D-	5	USB bus signal D-



PIN ASSIGNMENT			
USB AM		HOUSING	
1 — RED	————	4	
2 — WHITE	XXXXXX	1	
3 — GREEN	XXXXXX	2	
4 — BLACK	————	3	
SHIELD	————	5	

### 3.2 SENSOR CONNECTION

The touch screen connector, J3, is a dual row by five-position header with 0.025-inch square pins spaced on 0.1 inch centers. 5W sensor must be connected to the upper row of the connector. 4W sensor must be connected to the low row of the connector. The pins are numbered as shown in the figure.



*The 5 Wire Touch screen connector, J3 upper row, and signal descriptions*

*\*Note : Pin 5,4,2,1 can be redefinition using **autodetect.exe** utility software*

Signal name	J3 pin	Signal function
LR(Y-)	5	Connect to touch screen Lower Right Conner of glass layer
LL(X-)	4	Connect to touch screen Lower Left Conner of glass layer
WIPPER	3	Connect to touch screen film layer
UR(Y+)	2	Connect to touch screen Upper Right Conner of glass layer
UL(X+)	1	Connect to touch screen Upper Left Conner of glass layer

*The 4 Wire Touch screen connector, J3 lower row, and signal descriptions*

*\*Note : Pin 4,3,2,1 can be redefinition using **autodetect.exe** utility software.*

Signal name	J3 pin	Signal function
None	5	Leave this pin not connect.
Y-	4	Connect to 4 Wire touch screen Y-
X-	3	Connect to 4 Wire touch screen X-
Y+	2	Connect to 4 Wire touch screen Y+
X+	1	Connect to 4 Wire touch screen X+

## Chapter 4. Data protocol

### 4.1 COMMUNICATION

The RC-3000U Touch Controller Board supports USB interface. The USB support HID-MOUSE and HID-DIGITIZER, the controller can be configured to power-up as either of this two type devices but the factory default is HID-MOUSE.

### 4.2 DATA FORMAT

The touch report data format for each communication protocol is defined below. The HID-MOUSE and HID-DIGITIZER are compatible with intrinsic drivers of Windows®

#### 4.2.1 USB Report Packet

Byte	Bit field (Bit7-Bit0)								Description
0	1	<u>D</u>	0	1	1	0	0	<u>R</u>	D = 1 when touched = 0 when no touch R = 1 when generate right click = 0 when no right click
1	X7	X6	X5	X4	X3	X2	X1	X0	X Axis Coordinate X range = 0 to 4095
2	0	0	0	0	X11	X10	X9	X8	
3	Y7	Y6	Y5	Y4	Y3	Y2	Y1	Y0	Y Axis Coordinate Y range = 0 to 4095
4	0	0	0	0	Y11	Y10	Y9	Y8	

Note:

1. Please execute calibration process at least once.
2. RCS1100 can emulate "Right" button click. To generate a "Right" button event just press the sensor statically on the same position for a short while.
3. Our USB controller support Microsoft standard HID mouse mode, generally you can plug and play the touch controller without installing extra driver on Windows.

#### 4.2.2 RS-232 Report Packet

Byte	Bit field (Bit7-Bit0)								Description
0	1	<u>D</u>	0	1	1	0	0	<u>R</u>	<i>D = 1 when touched</i> <i>= 0 when no touch</i> <i>R = 1 when generate right click</i> <i>= 0 when no right click</i>
1	0	X6	X5	X4	X3	X2	X1	X0	X Axis Coordinate X range = 0 to 4095
2	0	0	0	X11	X10	X9	X8	X7	
3	0	Y6	Y5	Y4	Y3	Y2	Y1	Y0	Y Axis Coordinate
4	0	0	0	Y11	Y10	Y9	Y8	Y7	Y range = 0 to 4095

*Note:*

1. Please execute calibration process at least once.
2. RCS1100 can emulate "Right" button click. To generate a "Right" button event just press the sensor statically on the same position for a short while.