2200 Keyboard -Trackerball Supplement
Application / Engineering Manual



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1. Overview of Range

The Storm Trackball range (as fitted to the Storm 2200 keyboard) comprises a number of rugged Trackballs utilising 38mm (1.5") balls. The units are designed for public access applications and are available with either a black phenolic resin ball or a specially treated steel ball. Both types are available with either

- *auto-configuring PS2/USB output (standard product),* ***or***
- *Microsoft compatible serial (RS232) output (to special order only).*

Each unit has a self-adjusting seal around the ball which affords the unit an IP65 rating whilst ensuring that the ball tracks smoothly and accurately under all operating conditions.

All units are further protected by a stainless steel 'anti-vandal' plate which transmits shock loads (for example, due to abuse) directly to the stainless steel keyboard fascia, thus preventing damage to the trackball assembly.

2. Configuration settings

There are no user-selectable configuration settings on the Trackball units.

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3. Specifications.

Mechanical

Ball dimensions	38.1mm ±0.05mm	
Tracking force	50g nominal- any direction (tangential to ball)	
Ball speed	250 rpm maximum	
Seal material	PTFE with low friction fill	
Ball material	Phenolic resin or Surface-treated steel	
Body material	Polymer	Flammability UL94 - V-0
Bezel material	Stainless steel	
Shaft material	Stainless steel	
Anti-vandal plate material	Stainless steel	

Electrical

Supply voltage	5.0V dc ±10%
Resolution	150 pulses/ball revolution
	600 counts/ball revolution
Switch debounce	30ms rising and falling
Supply current (protocol)	15mA maximum
Supply current (USB Suspend Mode)	450µA maximum
Button pullup resistors	7kΩ nominal
Minimum output high voltage Data, Clk	4.5V
Maximum output low voltage Data, Clk	0.8V

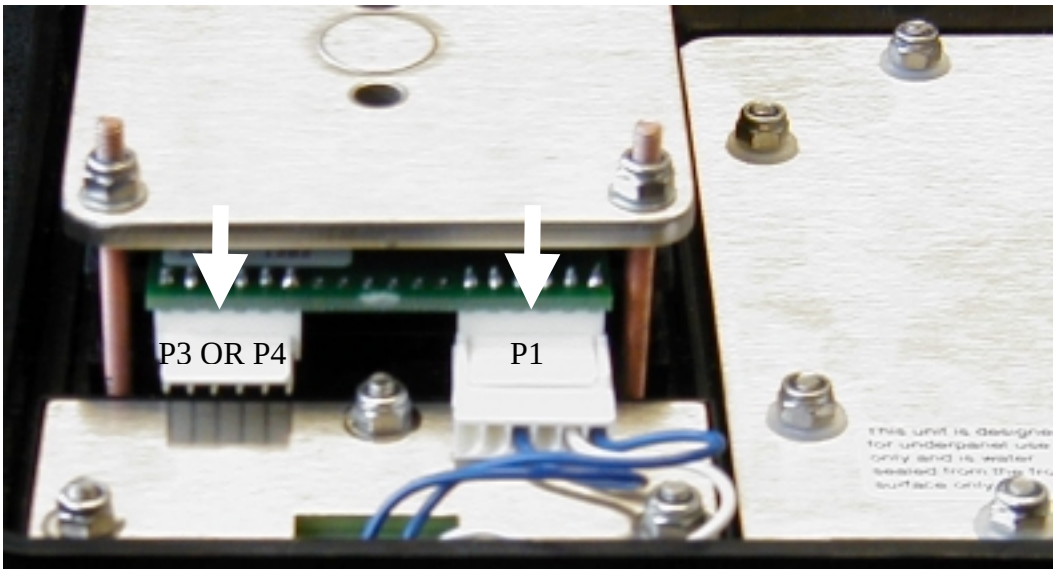
Environmental

Storage temperature	-25°C to +85°C
Operating temperature	0°C to +70°C
Humidity	95% rh, non-condensing, maximum
Static ball load	1000N maximum
Sealing	IP65 (static), IP54 (rotating)
Shock ball load	10J maximum
Lifetime	10 million ball revolutions minimum

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4. Connection Formats

All units are fitted with two Molex 5046 headers to allow connection to the associated buttons and also to the host computer. Cables are normally ordered separately to allow the user choice of interface. (See Section 7 for ordering details). Note that earlier models can be factory configured with both buttons as left click. In later versions this feature is user selectable with a jumper between the two Molex headers.



- *P1 is the input connector for the buttons (6-way) and is always fitted.*
- *P3 is the output connector for USB and PS/2 protocols (6-way).*
- *P4 is the RS232 output connection for Microsoft serial protocol (6-way).*

Either P3 or P4 are fitted, never both.

Table 1 shows the connector pin-out details:

Pin	P1 Function	P3 Function	P4 Function
1	0V	D-/ DATA	Tx
2	Button 1(L)	D+/ CLK	Rx
3	0V	TEST	RTS
4	Button3 (R)	+5V	+5V
5	0V	0V	0V
6	Button 2(M)	N.C.	DTR

Table 1: Connector details

Please note that the TEST input is reserved for factory test only. On no account should a connection be made to this terminal.

The Button inputs are pulled high within the unit to the 5V power supply via approximately 7kΩ. Both rising and falling edges of this signal are debounced for 30ms.

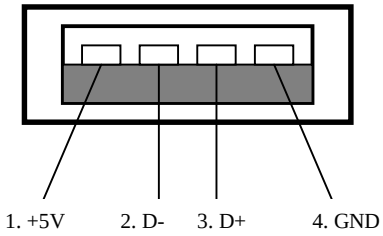
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Since Trackballs are classified as Human Input Devices (HID) by the USB organisation, they implement the low-speed USB specification. Therefore it is not necessary to shield the cable carrying the D+ and D- signals, although it is highly recomended that you do so. In addition, it is recommended that the systems integrator follows USB guidelines on wire gauge and twisted pairs.

In serial (RS232) modes, both RTS and DTR must be connected for the unit to operate correctly when no 5V supply is present. It is not sufficient to just connect RTS, unless the external 5V supply is present.

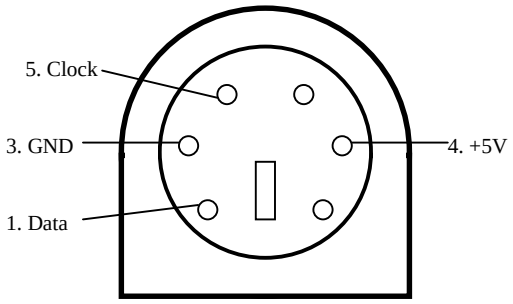
The following diagrams show the connection details for the corresponding connectors to the computer :

USB



4-pin type- A plug, viewed looking into pins.

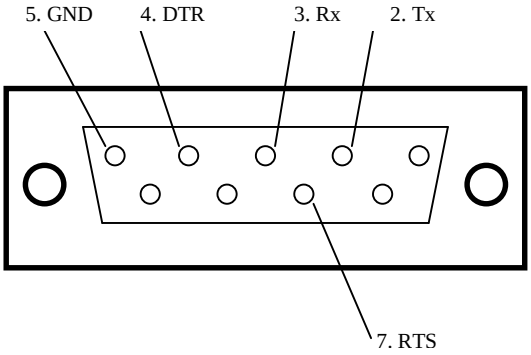
PS/2



6-pin plug, viewed looking into pins.

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RS232 (COM PORT)



9-pin sub-D socket, viewed looking into pins.
Pins with no legend are not connected.

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5. Frequently Asked Questions

Q. How are the various protocols selected on multi-protocol Trackballs?

A. *The unit automatically selects either USB or PS/2 protocols on power-up without setting any DIP switches.*

Q. My Trackball wasn't supplied with a driver disk. Is this correct?

A. *Yes, our products are designed to work with resident drivers and do not require any further software to be loaded.*

Q. I have connected my Trackball to a USB port but it does not function. Why is this?

A. *Ensure you do not have either Windows 3.1 / 95 or Windows NT operating systems- none of which support USB even if your computer has the necessary sockets.*

If you have Windows 3.1 / 95 installed, consider an upgrade to Windows 98. If you have Windows NT4 installed, consider upgrading to Windows 2000.

Q. Is any maintenance or adjustment required through the life of the product?

A. *No, other than periodic cleaning with a clean, lint-free cloth, no maintenance is required. The electronics are calibrated for life facture and require no maintenance.*

Q. What happens if liquid is dragged around the ball in usage ?

A. *The rear of the trackball incorporates a collar so that in the event of this happening any liquid is channeled away from the trackball electronics.*

Q. I have purchased a standard unit and am installing it in a kiosk where the right button function must not be accessible to the user. How can I disable the right button ?

A. *Remove the connection going to Pin 4 on connector P1.*

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6. Servicing

No routine servicing is necessary to the trackball product. The seal around the ball offers a high level of protection to the internal mechanism and circuitry, making routine cleaning unnecessary.

In high-use applications the user may occasionally notice a slightly 'lumpy' feel to the ball. This is invariably a small build-up of debris between the shafts and ball and may be removed by gently pushing against the ball whilst rotating it. This has the effect of crushing the debris and moving it off the run-line between the ball and shafts. The unit will then behave normally.

If the trackball requires cleaning in-situ, this can be carried out using a clean, lint-free cloth. Do not use solvents, abrasives or other cleaning agents.

If the trackball has to be replaced, follow the following procedure :

1/ Remove both cable connections.

2/ Undo 4 M3 nuts and washers from the back of the trackerball unit.

3/ Remove the anti-vandal plate.

4/ Lift the entire trackerball unit and sealing gasket off the back of the keyboard.

5/ Fit new sealing gasket and trackerball unit.

6/ Refit nuts, torque to 50Ncm.

7. Spares Ordering

The following parts are available to order from your Storm distributor

Description	*Order Code*
Cable 2.5m PS2	*2200-00200[x]*
Cable 2.5m USB	*2200-00300[x]*
Trackerball Unit PS2/USB Black Phenolic Ball	*2210-00020[x]*
Trackerball Unit PS2/USB Stainless Steel Ball	*2210-00030[x]*

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