Datenblatt
Trackball für den Fronteinbau
TCL50F1

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Bezeichnung	TCL50F1
Ausführung	Frontpaneleinbau
Tastenanzahl	2
Schalttechnologie	Kurzhubtasten
Cursorsteuerung	Kunststofftrackball
Technologie	mechanisch
Balldurchmesser	50,8 mm
Ballmaterial	Epoxydharz transluzent hinterleuchtet
Front	Designfolie
Schutzgrad	IP65 statisch
Betriebstemperatur	-10°C ... +60°C
Abmessungen	100 x 116 x 39 mm
Schnittstelle	PS2/USB
Zusatzfunktion	Hintergrundbeleuchtung
Zertifizierung	CE
Artikelnummer	TKH-TB50-F1-BACKL-MODUL
Einsatzbereich	Industrie, Gerätebau, Design

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50 MM "CHAMELEON" BACKLIT TRACKBALL
Backlighting in up to 7 different colours, IP65 sealed

CHAMELEON

TCL50F1

TCS50F4

IP65   50mm   RGB

These "Chameleon" backlit trackballs feature 7-colour illumination of the total ball surface and the mouse button legends. Up to seven different colours can be selected by internal settings on the trackball or by remote dynamic selection via an output connector. For both selection methods, internal or remote, the illumination intensity can be dimmed. The total panel mount unit is sealed to IP65 static and comes with a silicon sponge to seal the carrier plate into the users' cabinet or console. The output is combo PS/2 & USB with auto-recognition and in both cases the current for the illumination is drained from the mouse ports.

Two basic versions are available :
Black overlay version - Type TCL50F1
With aluminium carrier plate, two short travel switches and dark coloured polyester overlay. Tactile, short travel switches

Stainless steel version - Type TCS50F4
With stainless steel carrier plate and two long travel stainless steel switches. Tactile switches

GENERAL TECHNICAL SPECIFICATIONS

Sealing	: IP65 static
Ball diameter	: 50,8 mm (2'')
Ball material	: epoxy resin, translucent
Dimensions	: 100 x 116 x 40 mm
Weight	: 0,6 kg
Lifetime	: >= 2 million ball revolutions
Tracking force	: nom. 50 grams
Output	: PS/2 & USB Combo
Cable	: 1 shielded, straight 1,6 m long
Operating temperature range	: -10°C to +60°C
Storage temperature range	: -25°C to +80°C

Switches	TCL50F1	TCS50F4
Travel	: 0,3 mm	3,0 mm
Operating force	: 2,55 N	0,6 N
Mechanical life	: 1 million oper.	10 million oper.

CE
Compliant to EMC Directive 89/336/EEC for Electromagnetic Compatibility. Low Voltage Directive 73/23/EEC not applicable for our trackballs.

Main features :
- full backlighting of ball and switches in up to 7 different colours
- colours selectable internally (fixed) or remote (dynamic)
- illumination intensity can be dimmed internally or remotely
- illumination power directly from mouse port, no extra power supply
- proven industrial grade 50mm large trackball

CONNECTIVITY

These combo PS/2 & USB trackball units have a 1,6 meter long shielded straight cable ended by a USB type A plug.
An adaptor to PS/2 is added. No special device driver is needed, use standard available drivers of your operating system.

Due to the increasing differences of the PS/2 mouse port specifications of the various PC manufacturers, we do recommend that this unit should be tested on the final PC configuration and operating system prior to installing it in series.
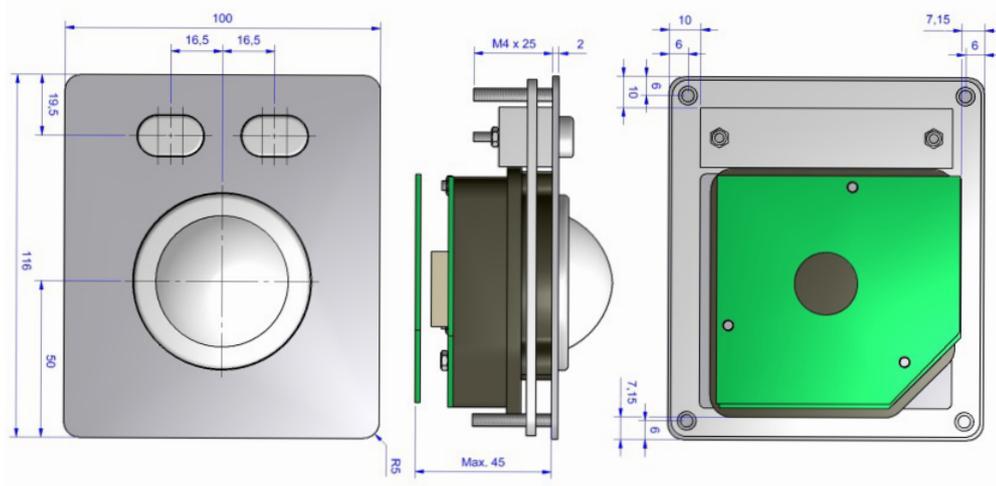
ORDER INFO

TCL50F1	Polyester carrier
TCS50F4	Stainless steel carrier

Combo PS/2 & USB output
Standard factory setting : **blue baclit.**

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DIMENSIONAL DRAWING   TCS50F4   (TCL50F1 has the same outside dimensions and mounting stud details)

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1. Electrical Specification

Protocol	PS/2, USB (auto-select)
Supply voltage	4.40V to 5.25V D.C.
Supply current	See Table 2

Table 1: Basic Electrical Specification

Typical Supply Current						
Colour Configuration				LED Intensity		
Red Channel	Green Channel	Blue Channel	Resultant Colour	Low	Medium	High
Off	Off	Off	Off	28mA		
Off	Off	On	Blue	31mA	38mA	53mA
Off	On	Off	Green	31mA	39mA	54mA
Off	On	On	Cyan	34mA	48mA	75mA
On	Off	Off	Red	35mA	48mA	80mA
On	Off	On	Magenta	37mA	57mA	99mA
On	On	Off	Yellow	36mA	57mA	99mA
On	On	On	White	40mA	65mA	116mA[3]

Table 2: Details of current consumption against device configuration.

Notes:
1. Typical current measured with no external backlight PCB attached to CN4. When external backlight PCB is used, current consumption will depend on LED configuration.
2. All supply currents measured in USB mode with V_{BUS} = 5.05V.
3. Configuring the device for maximum intensity white will exceed USB descriptor for current consumption (100mA).

2. Connection Details
Connections on CN1and CN2 are as per the standard P50 protocol and switch connections. Please refer to the standard P50 datasheet (DS50023) for protocol and switch connection details.

2.1 Backlight Control Connector: CN3
Description: 8 way, 2mm pitch, right-angled connector
Manufacturer: JST (or equivalent)
Part No: S8B-PH-SM3-TB
Mating connector: PH, CR or KR types

Pin Number	Function
1	Do not connect
2	0V
3	Blue Control[4,5,6]
4	Green Control[4,5,6]
5	Red Control[4,5,6]
6	POT+
7	POT-W/V_{CTRL}[7,8]
8	POT-

Table 3: Control Connections

Notes:
4. If external colour control is required, switches 4, 5 and 6 on SW2 must be set to the OFF position. See section 3.1 for details.
5. Colour control connections are not PWM or SSDM compatible. These connections can only be switched up to 50Hz.
6. Colour control lines can be connected to a TTL/CMOS compatible driver, open-collector/open-drain driver or external switches to 0V. Pins are pulled to 5V by 5kΩ resistor. Colours enabled by a logic low signal.
7. If external intensity control is required, switch 7 on SW2 must be set to the ON position.
8. Option for 10k potentiometer connection or external analogue voltage (V_{CTRL}) in order to control intensity. V_{CTRL} can be 1.6-3.3V with respec to 0V pin.

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2.2 LED Output Connector: CN4
This connection allows for external LEDs to be attached and controlled by the on-board LED controller. The LEDs must be of common anode type. No resistors are provided for current limiting on the cathode channels, these must accompany the external LEDs.

Description: 4 way, 2mm pitch, right-angled connector
Manufacturer: JST (or equivalent)
Part No: S4B-PH-SM3-TB
Mating connector: PH, CR or KR types

Pin Number	Function
1	Common Anode Voltage (+5V)
2	Red Cathode
3	Green Cathode
4	Blue Cathode

Table 4: LED output connections

3. DIP Switch Functions
Please note that there are two DIP switch packs on the device. SW1 controls trackball functionality as described in the standard P50 datasheet (DS50023), SW2 configures settings for the backlight feature. DIP switch packs can be identified using the silkscreen overlay on the PCB.

DIP Switch	Function	Off	On
1	Intensity LOW[9]	-	Low LED intensity
2	Intensity MEDIUM[9]	-	Medium LED intensity
3	Intensity HIGH[9]	-	High LED intensity
4	Red Control[10]	Colour Control See Table 6	
5	Green Control[10]		
6	Blue Control[10]		
7	External Intensity Selection[10]	LED intensity selected from switches 1, 2 & 3	LED intensity controlled by external analogue input on POT-W/V_{CTRL} pin.
8	Demo Feature	Disabled	Enabled

Table 5 DIP switch functions on SW2

Notes:
9. Only one intensity switch should be enabled at a time. If several switches are ON, the highest intensity will take effect.
10. These switches have alternate functions when Demo Feature is enabled on switch 8. See section 3.2

3.1 Colour Control Functions.

Colour Control[11]			Colour
Red	Green	Blue	
Off	Off	Off	Off
On	Off	Off	Red
Off	On	Off	Green
On	On	Off	Yellow
Off	Off	On	Blue
On	Off	On	Magenta
Off	On	On	Cyan
On	On	On	White

Table 6 Colour Control Switch Function

Notes:
11. If external colour control is required; the red, green and blue control switches should be set to the OFF position. Colours can be enabled by applying a TTL/CMOS compatible logic low signal to the applicable colour control pins on CN3.

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3.2 Demo Feature
The demo feature allows the trackball to scroll through a sequence of colours by varying the individual LED channels. The feature includes the ability to configure the peak intensity and the scrolling speed, this is configurable only by using the SW2 DIP switch pack. The demo feature is enabled by setting switch 8 on SW2 to the ON position, when enabled the following DIP switch functions apply:-

DIP Switch	Function	Off	On
1	Intensity LOW[9]	-	Low Peak LED intensity
2	Intensity MEDIUM[9]	-	Medium Peak LED intensity
3	Intensity HIGH[9]	-	High Peak LED intensity
4	Speed 1[12]		
5	Speed 2[12]	Scrolling Speed Control See Table 8	
6	Speed 3[12]		
7	External Intensity Selection	Unavailable for this mode. Peak intensity must be set on switches 1, 2 & 3	
8	Demo Feature	Disabled	Enabled

Table 7: Alternate DIP switch functions on SW2 when demo feature is enabled.

Notes:
12. Only one scrolling speed switch should be ON at any one time. If several speed switches are ON, the highest speed switch will take effect.

Speed Control Settings	
Switch Configuration	Cycle Time
Speed switches OFF	7 seconds
Speed 1 ON	14 seconds
Speed 2 ON	28 seconds
Speed 3 ON	57 seconds

Table 8: Scrolling speed configurations for demo feature.

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