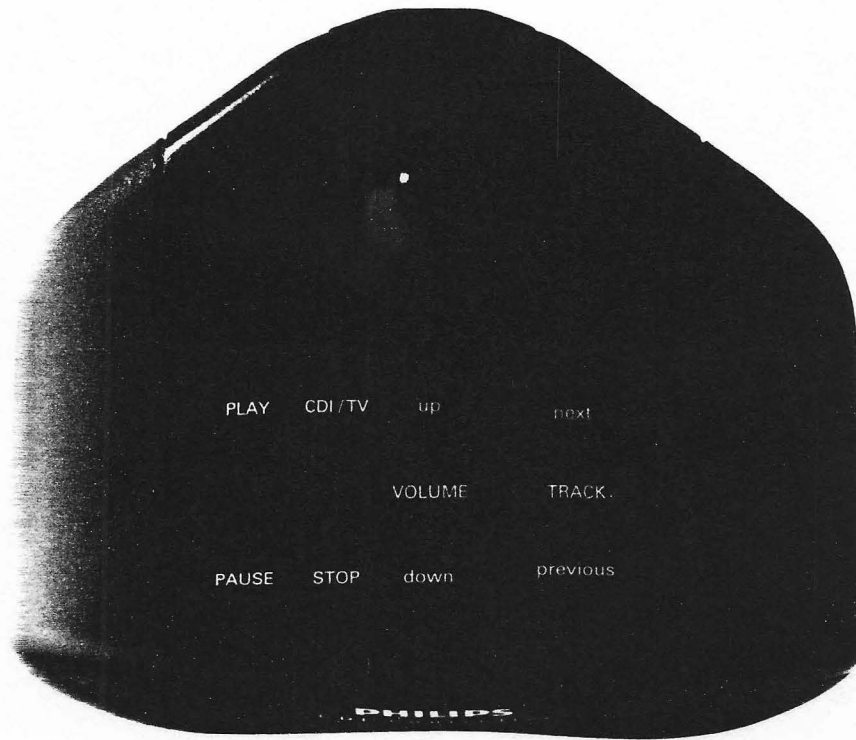


# TurboTrack Remote Control 1)



Based on Philips superior IR technology and the success of trackerball pointing devices for CD-I applications a totally new IR pointing device concept is developed.

- ◆ **Attractive and ergonomic design**
- ◆ **Sophisticated opto-mechanical trackerball device for easy operation**
- ◆ **Dynamic cursor control to cover a wide range of application requirements**
- ◆ **Reliable operation**
- ◆ **Recharger prepared**
- ◆ **Wireless**

This superior device will be included as standard controller with Philips home CD-I players introduced from early 1993 onwards. Next to that the TurboTrack IR controller will be made available as a product for separate sales.

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## Sophisticated IR Transmission Technology

The TurboTrack controller is a wireless pointing device using an Infrared transmission technology. To enable sophisticated pointing devices such as this TurboTrack controller a new transmission protocol is developed. This RC6 (mode 2) Infrared protocol, based on "leading edge" Philips technology, offers reliable operation for high specified pointing devices at distances up-to 10 meters.

All CDI220 and CDI360 player models and also the CDI605 development system are already prepared for the RC6 based pointing devices. These products are able to handle this new transmission protocol next to the old (dedicated for thumbstick devices) RC5 protocol. The system used by the remote control is detected automatically by the player, giving maximum flexibility in the transition period to all RC6.

This new protocol is future proof as it is specified to handle all types of pointing devices known to the CD-I system.

## Trackerball Technology

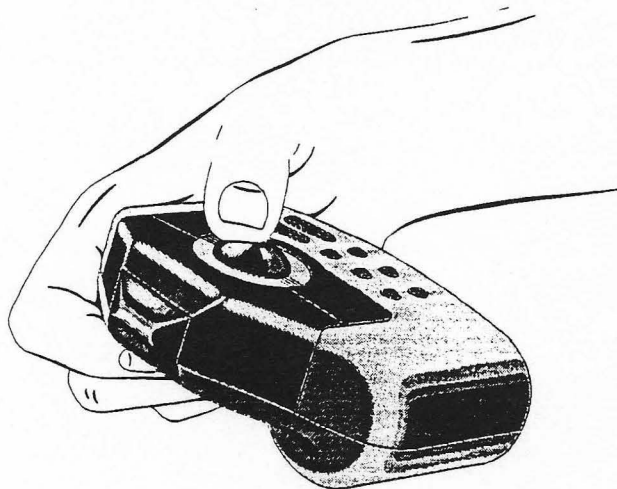
The famous Roller Controller and wired trackerball devices for CD-I applications showed their superior behaviour and proved that this technology is suitable for all types of users. People know intuitively how to use it and it gives them immediately the feel that they master the situation.

To make this technology available for handheld devices a new small sized trackerball device has been developed for this product using a 22 mm ball. The precision opto-mechanical rotary encoder gives a 200dpi resolution.

With its 100 Km of ball rotation capability the TurboTrack controller ensures reliable operation.

## Ergonomics

The shape, lay-out, natural way of holding were subject of careful ergonomic studies to ensure that it can be used left-handed or right-handed, with big or small hands.



As result of ergonomical studies on trackerball devices for handheld purposes, we designed a fully symmetrical unit for one hand operation as well as for two hand operation. The large action buttons are placed in such a way that they can be operated with either hand. Also the weight distribution is made fully symmetrical on purpose

## Direction Sensitivity

Wireless infrared transmission normally needs a line of sight between transmitter and receiver. It is understandable that the TurboTrack controller is pointed towards the TV screen where the visual feedback is given. This is not always the right direction for the receiver in the CD-I player. Various technologies are used to eliminate practical problems related to this.

The natural way of holding a handheld pointing device is slightly up. The optimal infrared transmission angle is reached in that position.

The TurboTrack controller is equipped with a double set of IR transmitters each sending its signal in a different direction.

The TurboTrack controller reaches a transmission range of far over 10 meters. This looks extremely big for CD-I use, but a side effect of long range capabilities is reflection via the walls so that a line of sight is easily established.

#### Dynamic Behaviour

The TurboTrack controller is equipped with a sophisticated microcontroller operating at a speed of 6Mhz. This ensures the capabilities of the electronics to follow the high rolling speed of the ball and to send out this information to have direct cursor action on the screen.

Next to this basic functionality, an algorithm is implemented to adapt the cursor movement behaviour to the user input. This dynamic behaviour gives the user optimal control over the cursor. Fast cursor movement on the screen when the ball is moved fast. One third of a ball rotation is more than sufficient to get the cursor moving from left side of the screen completely to the right side of the screen. Accurate positioning intuitive results in a slow rotation of the ball. In this mode the ball reacts extremely accurate. Each individual screen pixel dot can be pointed at easily.

#### Auto-Sleep mode

Optical trackerball technology in battery powered devices requires special technologies to avoid high battery power consumption for the continuous check if the ball is rolled.

For this reason an auto-sleep mode is implemented. This mode is entered automatically if the device is not used for approx 2 minutes. The function is also activated if a button is being pressed

continuously e.g caused by sitting on your remote control.

In this mode the device practically does not consume any battery power, but rolling the ball does not result in any cursor movement.

To awake the controller simply press a button. As a confirmation to the user of getting awake the cursor is instructed to make a movement on the screen and returns to the original position.

To allow the user to only awake the controller it waits 0.5 seconds before it will execute the command related to the button depressed for waking up. This is sufficient time to resume the wanted operation.

The text AUTOSLEEP is clearly mentioned on the product to inform the user continuously about the presence of this feature.

On one set (4 pcs) of alkaline batteries the unit can be used for 20 hours continuously, which represents 6 month of normal use.

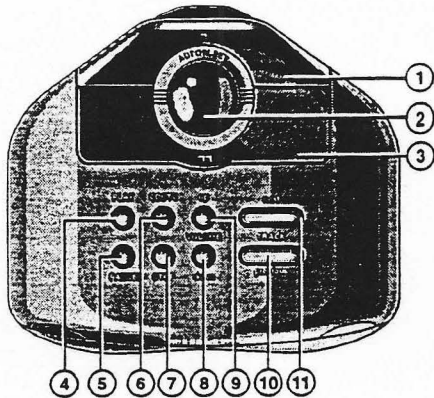
#### Recharging Functions.

The TurboTrack is designed to operate on normal batteries as well as on a set of rechargeable batteries. These batteries can be recharged outside the unit with any standard recharger.

The unit is prepared for a battery recharging without taking the rechargeable batteries out of the product. This will require a special recharger.

### Direct Control Buttons

The standard model has the following direct control buttons next to the trackerball and the 2 action buttons:

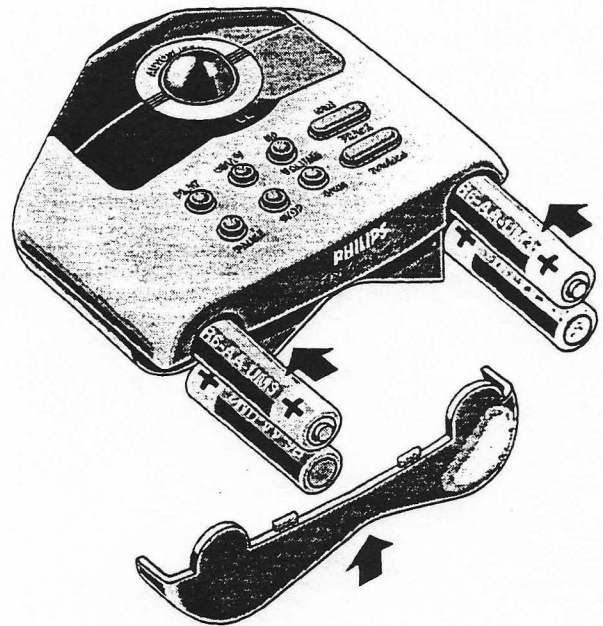


- 4 Play key
- 5 Pause key
- 6 TV/CD-I key (or mute depending on version)
- 7 Stop key
- 8 Volume up
- 9 Volume down
- 10 Previous track
- 11 Next track

There are models planned without direct control keys and/or with additional control keys

### Battery Replacement

The TurboTrack controller operates on a set of 4 standard green batteries which are easy replaceable by the user



### Maintenance

For the situation that the trackerball operation is not smooth due to collecting dust and other particles together with body secretion (e.g. sweat) the user has the possibility to take out the ball and clean it

### Safety

The TurboTrack controller meets all safety and environmental requirements.

Although the product is not designed for children use, it will fulfil all the safety requirements applicable for toys.

## Comparison with the Thumbstick Control

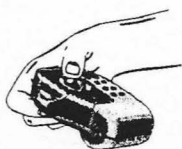
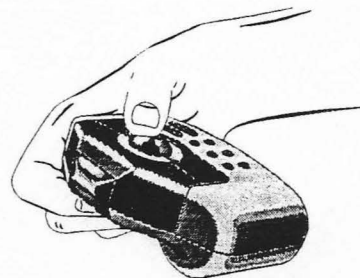
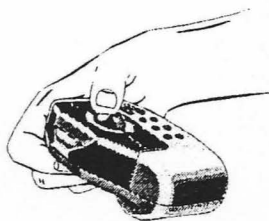
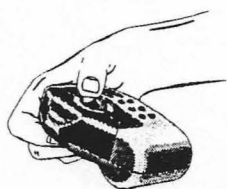
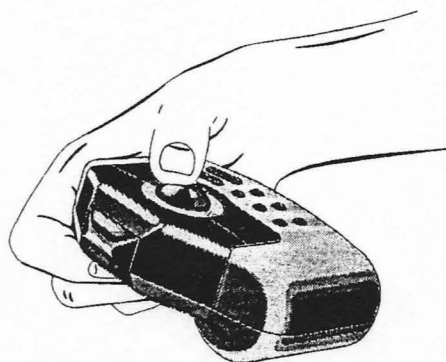
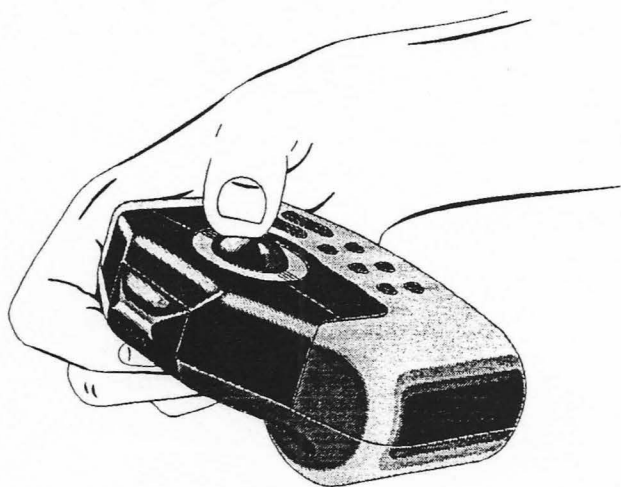
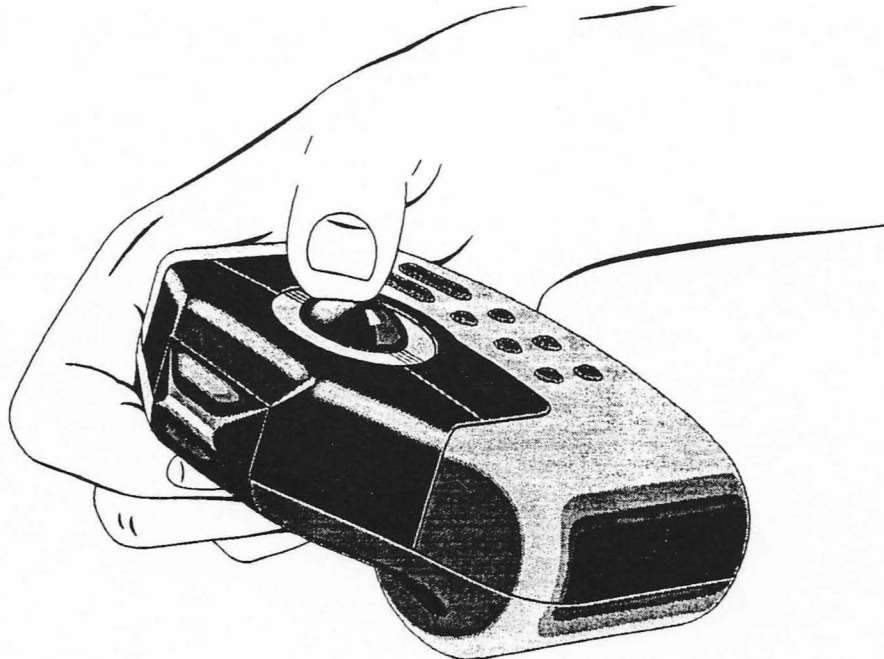
### Positive for the new TurboTrack controller

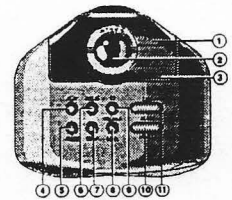
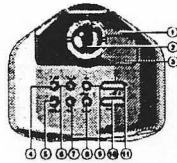
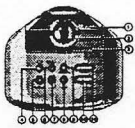
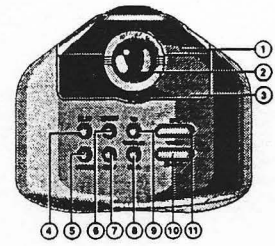
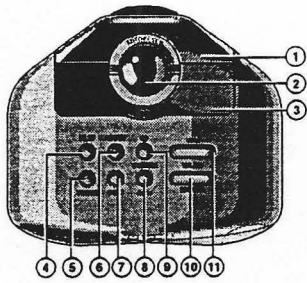
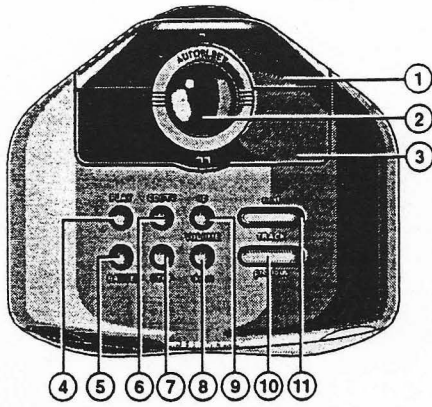
- ◆ more ergonomical design
- ◆ attractive appearance
- ◆ more effective operation
- ◆ no battery consumption if a button is accidentally depressed
- ◆ improved directional sensitivity behaviour
- ◆ Solid feeling and reliable operation

### Optional versions

- Same product for sales on CDI220, CDI360 and as replacement part
- For the installed base of CDI910, CDI205 and CD-I players from other manufacturers a package will be made available containing
  - ◆ TurboTrack remote control without direct control keys
  - ◆ IR receiver for RC6 to be connected to any input port.
- To offer this functionality on IBM-compatible PCs of all kinds of manufacturers a package will be made available containing
  - ◆ TurboTrack remote control without direct control keys
  - ◆ IR receiver for IBM compatible PC to be connected to the serial port.
  - ◆ Floppy disc with driver software.

1. The name TurboTrack is currently under examination by corp patents and trademarks





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