HardDiskTemp

Step-by-step operating description

General flow of installation, startup, disk selection, temperature reading, tray indication, update and uninstall

The purpose of this document is to describe step by step how HardDiskTemp works from installation to everyday use, without linking the description to a specific version number.

The application mainly works as a tray utility: it monitors the temperature of the selected disk, shows the indication in the notification-area icon and gives the user options to change disk, use automatic selection, update and exit.

1. Operating overview

Phase	What happens
1	The user installs the application and the required auxiliary files in the installation folder.
2	Shortcuts, an uninstall entry and a startup mechanism are created with the correct permissions where required.
3	The application starts as a tray application and shows an icon in the notification area.
4	The suitable disk is detected automatically, usually the system disk, unless the user has selected another one.
5	The application reads temperature through smartctl and, where needed, uses fallback from Windows storage information.
6	The temperature is shown in the tray icon and tooltip; if no available value exists, N/A is shown.
7	From the menu, the user can select a disk, return to Auto system disk, view About, run Check for Updates or close the application.
8	Uninstall removes the application, shortcuts, scheduled task or launch references and the related registry entries.

2. Installation and initial preparation

Step	Description
2.1	The user runs the application setup.
2.2	The setup checks or requests the required installation permissions.
2.3	The application installation folder is created or updated.
2.4	The main executable, smartctl.exe, icons, helper executables and install/uninstall scripts are copied.
2.5	Old references or old versions are cleaned where required, without affecting disk-reading logic.
2.6	Start Menu/Desktop shortcuts and Windows Apps/Programs entries are created.

2.7	A scheduled task or startup mechanism is created or updated for proper relaunch with the required permissions.
2.8	When completed, the application can start immediately or from the shortcut/ Start Menu.

3. Startup and tray presence

Step	Description
3.1	The user opens HardDiskTemp or the application starts automatically through the defined mechanism.
3.2	A single-instance check is performed so that multiple copies of the application do not open.
3.3	If the application requires elevated execution and an installed scheduled task exists, it is relaunched through it.
3.4	The tray context is loaded and the notification-area icon is created.
3.5	A timer for periodic temperature refresh is initialized.
3.6	A heartbeat/log is written so that there is a technical view of startup and status.

4. Disk selection

The application works either with automatic disk selection or with manual selection by the user. The manual selection is saved so it can be used again on the next startups.

State	Description
Auto system disk	The application tries to find the Windows system disk and give it priority as the main monitored disk.
Selected tray disk	The user selects a specific disk from the selection window. The choice is saved in settings or in a selection file.
Loss of selected disk	If the selected disk is disconnected or is no longer recognized, the application can return to a safe automatic selection.
Selection refresh	The disk selection window can refresh or auto-refresh so that newly connected or available disks are shown.

5. Disk scan and recognition

Source / method	Role
smartctl	Used to read disk identity, SMART data and disk temperature.
NVMe candidates	Appropriate smartctl arguments are tested for NVMe devices and Windows NVMe aliases.
SATA/SCSI/USB bridges	The application tests suitable reading variants where the disk appears through a bridge or a different bus.
Windows WMI/CIM	Used to correlate the disk with drive letter, model, serial, index and bus type.

Windows Storage temperature fallback	Used when smartctl does not provide a direct temperature but Windows has an available temperature value.
USB flash filtering	Simple USB flash devices or devices without real temperature are not shown as normal monitored disks, but only as USB devices without temperature.

6. Temperature reading

Step	Description
6.1	The application takes the active monitored disk: the user-selected disk or the automatically selected system disk.
6.2	It creates a series of smartctl argument candidates according to the type and identity of the disk.
6.3	It runs smartctl with a timeout so the application does not hang if a device or enclosure does not respond.
6.4	It analyzes the output for known temperature fields, such as Temperature, Temperature Sensor or Current Drive Temperature.
6.5	If no temperature is found from smartctl, it tries Windows storage temperature fallback where such a value is available.
6.6	If no reliable temperature exists, the indication becomes N/A instead of showing a false value.

7. Tray display

Item	Description
Tray icon	The icon is updated according to the current temperature or the N/A state.
Tooltip	Shows the disk name/label, temperature and version/build where provided.
Menu	Right-click opens the options menu: Select tray disk, Auto select system disk, Help/About, Check for Updates and Exit.
Recreate tray icon	If Windows loses the tray icon or the UI state changes, the application can recreate it.
Heartbeat	The application writes a periodic heartbeat to show that it is alive and to help diagnosis.
The tray icon changes color by temperature: blue <50°C, green 50–64°C, orange 65–74°C and red ≥75°C.	

8. Disk selection window

Step	Description
8.1	The user selects Select tray disk... from the tray menu.
8.2	A window opens and scans the available disks.
8.3	The list shows information such as drive letter, disk model, type, temperature and available recognition quality.

8.4	The application tries to hide or downgrade useless/generic USB flash entries without temperature.
8.5	The user selects a disk and presses Use selected.
8.6	The selection is saved and the tray starts monitoring the new disk.
8.7	With Auto system disk, the manual selection is cleared and automatic operation returns.

9. N/A state and safe behavior

The application must not invent a temperature. If the reading is not reliable, it prefers the N/A indication.

Case	Behavior
smartctl does not respond	The application keeps a timeout, records an error and does not freeze permanently.
No temperature in output	Fallback is tried; otherwise N/A is shown.
USB flash without sensor	It is not treated as a disk with real temperature.
USB SSD/NVMe enclosure with temperature	It can appear as a candidate disk if there is a reliable indication.
Selected disk disconnected	The application can return to automatic selection or show N/A until an available disk exists.

10. Update check

Step	Description
10.1	The user selects Check for Updates from the Help menu.
10.2	The application checks the available version from the defined update source.
10.3	It compares the installed build with the newest available build.
10.4	If there is no newer version, it shows that the application is up to date.
10.5	If there is a newer version, it asks the user whether to download and run the update installer.
10.6	The download starts as an app-update flow and the new setup starts in a controlled way.

11. About / application information

Item	Description
About window	Shows application information, version/build and identity/logo details.
About helper	The window can open from a separate helper executable so the main tray application remains clean.

Resources	Application icons/images are used for visual identity.

12. Uninstall

Step	Description
12.1	The user starts uninstall from Windows Apps/Programs, Start Menu or uninstall shortcut.
12.2	The uninstaller requests permissions where required.
12.3	It closes HardDiskTemp if it is running.
12.4	It removes scheduled task/launch references, shortcuts, App Paths and uninstall registry entries.
12.5	It removes the installed application files from the installation folder.
12.6	It completes cleanly without affecting disks, user data or system settings outside its own entries.

13. Complete step-by-step flow from startup to temperature indication

#	Flow
1	HardDiskTemp starts.
2	It confirms single instance and suitable permissions.
3	It creates the tray icon and menu.
4	It loads the saved disk selection or switches to Auto system disk.
5	It detects disks with smartctl and Windows information.
6	It tests suitable smartctl arguments for the active disk.
7	It reads temperature from SMART output or Windows fallback.
8	It updates the tray icon and tooltip.
9	It repeats the reading periodically.
10	If the disk is lost or has no temperature, it shows N/A or returns to a safe selection.
11	The user can change disk, run update check, view About or close the application.

14. Central idea

HardDiskTemp works as a small continuous-monitoring tool: it stays in the tray, selects or accepts the disk the user wants, reads the temperature through safe attempts and shows a simple indication without loading the system with an unnecessary window.

The basic principle is indication reliability: when a real temperature exists it is displayed numerically, while when reliable information does not exist, N/A is displayed instead of a misleading value.

HardDiskTemp - Installation requirements / Troubleshootin

- Requirements: Windows 10/11 64-bit.
- No extra runtime, SDK, WPT, xperf/WPA, compiler, or internet download is required for the final user setup.
- The official installer contains the required HardDiskTemp application files.

Note: If the setup does not start on a damaged Windows installation, repair Windows/.NET Framework using Microsoft tools and run the setup again.

This note is for rare damaged Windows installations only. Normal Windows 10/11 systems need no additional prerequi