

DART User Manual – Zips Racing

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The DART (or Data Acquisition and Racing Telemetry System) is Zips Racing's custom data acquisition system and vehicle dashboard. This user manual details the operation and maintenance of the DART.

General Tips

- To prevent the DART from running out of storage, it is recommended that **all data logs are deleted before a testing day begins**.
- To prevent multiple logging sessions taken in the same testing day from being confused with one another, it is recommended that **no data logs are deleted during a test day**.
- To prevent important data logs from being deleted, it is recommended that data logs are **retrieved as soon as possible after a testing day ends**.
- To prevent local data logs from being overwritten, it is recommended that data logs are **copied into OneDrive immediately after being copied locally**. If this is not possible, the directory should be renamed to something unique (**especially if the DART's data logs have been deleted**).
- To make future data analysis easier, it is recommended that **all notes taken during a test day have the current session number written down with them**. This number is reported on any of the DART's driving pages.

Data Logging Basics

All data logs the DART generates are divided into “sessions”. Each session begins when the DART powers on and ends when it powers off. During this time, every single CAN message received by the device is written into the log. If the data log exceeds a certain size, it will be “split” into multiple smaller files. A single logging session may generate over 10 split files. Split files are stored chronologically; split 0 is always the first, followed by split 1, and so on. There should be no discontinuity between the data in split files.

Digitally, each logging session is stored in a unique directory (session_0, session_1, etc.). Inside of this directory are each of the log’s split files. When powered online, the DART will determine the current session number based on the highest existing session number. For instance, if the device has a session called session_11, the DART will choose session_12 as the next session number. If no logging sessions are present on the device, the DART will start from session_0.

Retrieving Data Logs

To retrieve one or more data logs from the DART, the `dart-cli` application (downloaded from the ZRE-CAN-Tools project, <https://github.com/ZipsRacingElectric/ZRE-CAN-Tools>) may be used.

In order to communicate with the DART, your PC must be connected to the DART's ethernet connector. Locate the correct cable and connect your PC before starting the `dart-cli`. Your PC may take a minute to recognize the DART. If the `dart-cli` says it failed to connect to the DART, close the application and try again.



Left: The DART's ethernet connector. Typically installed on the dashboard of the vehicle.

Right: An Ethernet-to-ASL cable. The right side connects to the vehicle, the left to your PC.

After connecting successfully, the dart-cli should give the below output.

```
[cole@arch zre_cantools]$ dart-cli
Testing Connection... (Ctrl+C to Cancel)
Connected.

Enter an option:
l - List all remote log files
c - Copy all logs locally
x - Delete all remote log files
s - Open an interactive SSH connection to the DART
j - Print the DART's system journal
t - Test connection to the DART
q - Quit
```

Listing Data Logs

To get a list of all the data logs on the device, or to check the amount of remaining storage, the “l” option can be used.

```
Enter an option:
l - List all remote log files
c - Copy all logs locally
x - Delete all remote log files
s - Open an interactive SSH connection to the DART
j - Print the DART's system journal
t - Test connection to the DART
q - Quit
l

Remote Logs:
session_0
session_1

Filesystem      1K-blocks    Used   Available  Use% Mounted on
/dev/mmcblk0p2     3382356  1152728   2037488  37% /
```

The “Remote Logs” section lists all logs present on the device, including the log that is currently being written to.

Underneath, the “Filesystem” section lists the total size of the system’s storage, the amount of used storage, and the amount of available storage. Note these quantities are all in terms of 1024 byte blocks.

The “Use%” column indicates the percentage of the storage being used. Note that this quantity refers to the amount of space being used by both data logs and the operating system itself.

Copying Data Logs

To retrieve data logs, the “c” option can be used. This command will copy all of the DART’s data logs into a local directory.

```
Enter an option:  
l - List all remote log files  
c - Copy all logs locally  
x - Delete all remote log files  
s - Open an interactive SSH connection to the DART  
j - Print the DART's system journal  
t - Test connection to the DART  
q - Quit  
c  
  
Copying Logs to '/home/cole/zre//dart_2026.02.17' ...  
split_0.mf4  
split_0.mf4  
  
Done.
```

The destination directory is located in the user's Documents directory, in a directory based on the current date. For example:

```
%USER_PROFILE%\\Documents\\ZRE\\dart_2026.02.17\\
```

It is important to note that if data logs are copied multiple times in the same day, the destination directory will be the same and the newer data logs will overwrite the older data logs. For this reason, it is recommended that data logs are not deleted in the middle of a testing day.

Deleting Data Logs

To prevent the DART from running out of storage, data logs must be deleted periodically. To do this, the “x” option can be used.

```
Enter an option:  
l - List all remote log files  
c - Copy all logs locally  
x - Delete all remote log files  
s - Open an interactive SSH connection to the DART  
j - Print the DART's system journal  
t - Test connection to the DART  
q - Quit  
x  
Are you sure? [y/n]: y  
Deleting Logs...  
Done.
```

When entered, the CLI will ask you to confirm whether you would like to delete all the data logs. This operation cannot be undone, so exercise caution. Enter “y” to confirm the operation. Once this is done, all the previous logs (including the log currently being written into) will be deleted. The DART will reset and begin logging at session_0 again.