Packet structure[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=2)]

The HART Packet has the following structure:

|  |  |  |
| --- | --- | --- |
| **Field Name** | **Length (in bytes)** | **Purpose** |
| Preamble | 5–20 | Synchronization and Carrier Detect |
| Start byte | 1 | Specifies Master Number |
| Address | 1-5 | Specifies slave, Specifies Master and Indicates Burst Mode |
| Expansion | 0-3 | This field is 0–3 bytes long and its length is indicated in the Delimiter |
| Command | 1 | Numerical Value for the command to be executed |
| Number of data bytes | 1 | Indicates the size of the Data Field |
| Data | 0–255 | Data associated with the command. BACK and ACK must contain at least two data bytes. |
| Checksum | 1 | XOR of all bytes from Start Byte to Last Byte of Data |

**Preamble**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=3)]

Currently all the newer devices implement five byte preamble, since anything greater reduces the communication speed. However, masters are responsible for backwards support. Master communication to a new device starts with the maximum preamble length (20 bytes) and is later reduced once the preamble size for the current device is determined.

**Start delimiter**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=4)]

This byte contains the Master number and specifies the communication packet is starting.

**Address**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=5)]

Specifies the destination address as implemented in one of the HART schemes. The original addressing scheme used only four bits to specify the device address, which limited the number of devices to 16 including the master.

The newer scheme utilizes 38 bits to specify the device address. This address is requested from the device using either Command 0, or Command 11.

**Command**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=6)]

This is a one byte numerical value representing which command is to be executed. Command 0 and Command 11 are used to request the device number.

**Number of data bytes**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=7)]

Specifies the number of communication data bytes to follow.

**Status**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=8)]

The status field is absent for the master and is two bytes for the slave. This field is used by the slave to inform the master whether it completed the task and what its current health status is.

**Data**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=9)]

Data contained in this field depends on the command to be executed.

**Checksum**[[edit](https://en.wikipedia.org/w/index.php?title=Highway_Addressable_Remote_Transducer_Protocol&action=edit&section=10)]

[Checksum](https://en.wikipedia.org/wiki/Checksum) is composed of an XOR of all the bytes starting from the start byte and ending with the last byte of the data field, including those bytes.