PEAK CAN TRC File Format

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Contents

Version 1.0

Used by: PCAN-Explorer 3.0, PCAN-Trace 1.0.

Example

```
;##############################################################################
;    C:\TraceFile.trc
;
;     CAN activities recorded by PCAN Explorer
;     Start time: 11.09.2002 16:00:20.682
;     PCAN-Net: PCI1
;
;     Columns description:
;     ~~~~~~~~~~~~~~~~~~~~~~
;     +-current number in actual sample
;     |         +time offset of message (ms)
;     |         |              +ID of message (hex)
;     |         |              |       +data length code
;     |         |              |       |    +data bytes (hex) ...
;     |         |              |       |    |
;----+-   ---+---  ----+---   +  -+ -- -- ...
     1)     1841     0001   8   00 00 00 00 00 00 00 00
     2)     1842     0008   4   ERROR 00 19 08 08
     3)     1843  FFFFFFFF   4   00 00 00 04 -- -- -- --   BUSLIGHT
     4)     1844     0100   3   RTR
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN.

Columns

1) Index of recorded message.

2) Time offset since start of the trace, in milliseconds.

3) CAN-ID (Hex):

   - 4 digits for 11-bit CAN-IDs (0000-07FF).

   - 8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF).

   - Special case: 'FFFFFFFF' for Error Warnings. See **Error Warnings** on page 4.

4) Data Length Code (0-8).

5) Data Bytes (0-8):

   - For Data Frames: Data bytes in hexadecimal notation.

   - For Remote Requests: 'RTR'.

- For Error Warnings: 2-byte or 4-byte Error Warning Code in Motorola format. Unused bytes filled with '--'. Optional: Short names of the Error Warning flags at the end of the line, ignored while loading Trace file. See **Error Warnings**.

- For Error Frames: 'ERROR' followed by 4 data bytes of Error Frame message. See **Error Frames**.

Error Warnings

Error Warnings consist of a bit combination of error flags. The 32-bit Error Warning code is contained in the first 4 data bytes in Motorola format (most significant byte first).

The following table lists the Error Warning flags that can be recorded in a Trace file:

Code	Short Name	Description
0x00000002	OVERRUN	The CAN controller receives so many messages that not all of the triggered hardware interrupts can be processed CAN controller was read too late.
0x00000004	BUSLIGHT	Bus error: an error counter reached the 'light' limit (more than 0 error points).
0x00000008	BUSHEAVY	Bus error: an error counter reached the 'heavy' limit (at least 96 error points).
0x00000010	BUSOFF	Bus error: the CAN controller is in Bus-off state because a serious and continuous error exists on the bus (255 error points have been exceeded).

Error Frames

All relevant information of Error Frames is contained in the CAN ID and 4 data bytes.

ID: Type of Error Frame

1 = Bit Error
2 = Form Error
4 = Stuff Error
8 = Other Error

Data Byte 0: Direction

0 = Error occurred while sending
1 = Error occurred while receiving.

Data Byte 1: Current Position in Bit Stream

2 = ID.28 to ID.21
3 = Start of frame
4 = Bit SRTR
5 = BIT IDE
6 = ID.20 to ID.18
7 = ID.17 to ID.13
8 = CRC Sequence
9 = Reserved Bit 0
10 = Data field
11 = Data Length Code

12 = Bit RTR
13 = Reserved Bit 1
14 = ID.4 to ID.0
15 = ID.12 to ID.5
17 = Active Error Flag
18 = Intermission
19 = Tolerate dominant Bits
23 = Error Delimiter
24 = CRC Delimiter
25 = Acknowledge Slot
26 = End of Frame
27 = Acknowledge Limiter
28 = Overload Flag.

Data Byte 2: RX Error Counter

Current Value of the Receive Error counter.

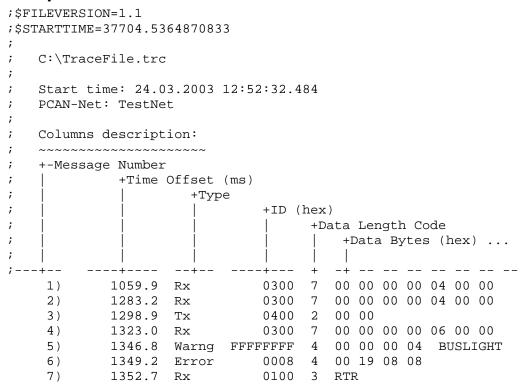### Data Byte 3: TX Error Counter

Current Value of the Transmit Error counter.

Version 1.1

Used by: PCAN-Explorer 3.0.2, PCAN-Explorer 4, PCAN-Trace 1.5, PCAN-View 3.

Example

```
;$FILEVERSION=1.1
;$STARTTIME=37704.5364870833
;
;   C:\TraceFile.trc
;
;   Start time: 24.03.2003 12:52:32.484
;   PCAN-Net: TestNet
;
;   Columns description:
;   ~~~~~~~~~~~~~~~~~~~~~
;   +-Message Number
;   |         +Time Offset (ms)
;   |         |         +Type
;   |         |         |        +ID (hex)
;   |         |         |        |       +Data Length Code
;   |         |         |        |       |   +Data Bytes (hex) ...
;   |         |         |        |       |   |
;---+--   ----+----   --+--   ----+---   +   -+ -- -- -- -- -- -- --
     1)     1059.9   Rx        0300   7   00 00 00 00 04 00 00
     2)     1283.2   Rx        0300   7   00 00 00 00 04 00 00
     3)     1298.9   Tx        0400   2   00 00
     4)     1323.0   Rx        0300   7   00 00 00 00 06 00 00
     5)     1346.8   Warng  FFFFFFFF   4   00 00 00 04   BUSLIGHT
     6)     1349.2   Error     0008   4   00 19 08 08
     7)     1352.7   Rx        0100   3   RTR
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file, except $-keywords.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN.

Changes compared to Version 1.0

1) $FILEVERSION keyword to store the version of the file format:

    Format: *Major.Minor*

    Value: 1.1

2) $STARTTIME keyword to store the absolute start time of the trace file:

    Format: Floating point, decimal separator is a point.

    Value: Integral part = Number of days that have passed since 30. December 1899.

                      Fractional Part = Fraction of a 24-hour day that has elapsed, resolution is 1 millisecond.

3) 'Type' column.

Columns

1) Index of recorded message.

2) Time offset since start of the trace. Resolution: 1/10 milliseconds.
   Milliseconds before the decimal separator, 1/10 milliseconds (1 digit) after the decimal separator.

3) Type of message:

Type	Description
Rx	Message was received.
Tx	Message was transmitted.
Warng	Error Warning. See **Error Warnings** under **Version 1.0** on page 4.
Error	Error Frame. See **Error Frames** under **Version 1.0** on page 4.

4) CAN-ID (Hex):

   - 4 digits for 11-bit CAN-IDs (0000-07FF).
   - 8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF).
   - Special case: 'FFFFFFFF' for Error Warnings.

5) Data Length Code (0-8).

6) Data Bytes (0-8):

   - For Data Frames: Data bytes in hexadecimal notation.

   - For Remote Requests: 'RTR'.

   - For Error Warnings: 4-byte Error Warning code in Motorola format. Optional: Short names of the Error Warning flags at the end of the line, ignored while loading Trace file.

   - For Error Frames: 'ERROR' followed by 4 data bytes of Error Frame data.

Version 1.2

Used by: PCAN-Explorer 5.0 Beta 1.

Example

```
;$FILEVERSION=1.2
;$STARTTIME=39878.6772258947;
;   C:\TraceFile.trc
;
;   Start time: 06.03.2009 16:15:12.317.3
;   Connection: TestNet
;
;   Columns description:
;   ~~~~~~~~~~~~~~~~~~~~~
;   +-Message Number
;   |           +Time Offset (ms)
;   |           |            +Bus
;   |           |            |    +Type
;   |           |            |    |         +ID (hex)
;   |           |            |    |         |    +Data Length Code
;   |           |            |    |         |    |   +Data Bytes (hex) ...
;   |           |            |    |         |    |   |
;---+--    ----+------   +  --+--  ----+---  +  -+ -- -- -- -- -- -- --
      1)    1059.900   1  Rx        0300   7   00 00 00 00 04 00 00
      2)    1283.231   1  Rx        0300   7   00 00 00 00 04 00 00
      3)    1298.945   1  Tx        0400   2   00 00
      4)    1323.201   1  Rx        0300   7   00 00 00 00 06 00 00
      5)    1346.834   1  Warng FFFFFFFF   4   00 00 00 04   BUSLIGHT
      6)    1349.222   1  Error     0008   4   00 19 08 08
      7)    1352.743   1  Rx        0100   3   RTR
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file, except $-keywords.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN.

Changes compared to Version 1.1

1) Time offset has resolution 1 microsecond.

2) 'Bus' column.

Columns

1) Index of recorded message.

2) Time offset since start of the trace. Resolution: 1 microsecond.
   Milliseconds before the decimal separator, microseconds (3 digits) after the decimal separator.
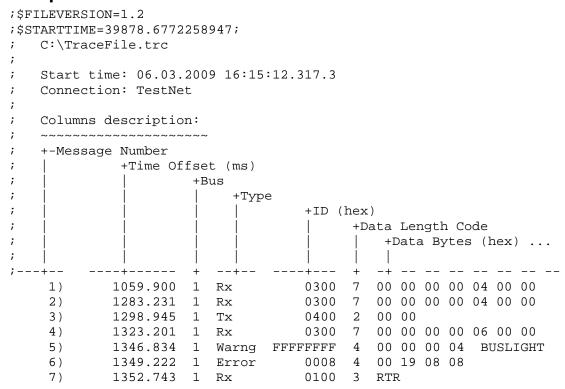
3) Bus (1-16).

4) Type of message:

Type	Description
Rx	Message was received.
Tx	Message was transmitted.
Warng	Error Warning. See **Error Warnings** under **Version 1.0** on page 4
Error	Error Frame. See **Error Frames** under **Version 1.0** on page 4.

5) CAN-ID (Hex):
4 digits for 11-bit CAN-IDs (0000-07FF).
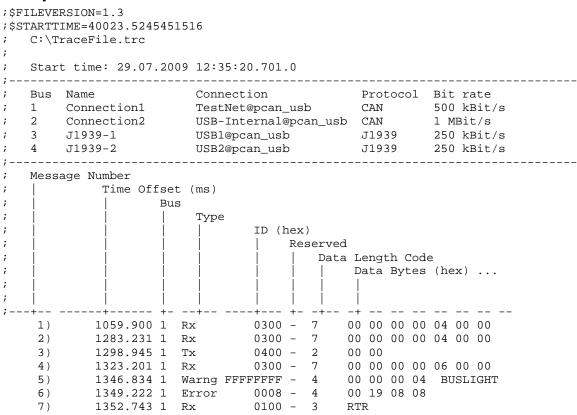8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF).
Special case: 'FFFFFFFF' for Error Warnings.

6) Data Length Code (0-8).

7) Data Bytes (0-8):

- For Data Frames: Data bytes in hexadecimal notation.

- For Remote Requests: 'RTR'.

- For Error Warnings: 4-byte Error Warning code in Motorola format. Optional: Short Names of the Error Warning flags at the end of the line, ignored while loading Trace file.

- For Error Frames: 'ERROR' followed by 4 data bytes of Error Frame data.

Version 1.3

Used by: PCAN-Explorer 5.

Example

```
;$FILEVERSION=1.3
;$STARTTIME=40023.5245451516
;   C:\TraceFile.trc
;
;   Start time: 29.07.2009 12:35:20.701.0
;-------------------------------------------------------------------------------
;   Bus  Name            Connection            Protocol  Bit rate
;   1    Connection1     TestNet@pcan_usb      CAN       500 kBit/s
;   2    Connection2     USB-Internal@pcan_usb CAN       1 MBit/s
;   3    J1939-1         USB1@pcan_usb         J1939     250 kBit/s
;   4    J1939-2         USB2@pcan_usb         J1939     250 kBit/s
;-------------------------------------------------------------------------------
;   Message Number
;   |         Time Offset (ms)
;   |         |         Bus
;   |         |         |   Type
;   |         |         |   |      ID (hex)
;   |         |         |   |       |    Reserved
;   |         |         |   |       |    |   Data Length Code
;   |         |         |   |       |    |   |   Data Bytes (hex) ...
;   |         |         |   |       |    |   |   |
;   |         |         |   |       |    |   |   |
;---+-- ------+------ +- --+-- ----+--- +- -+-- -+ -- -- -- -- -- -- --
    1)     1059.900 1 Rx       0300 -  7     00 00 00 00 04 00 00
    2)     1283.231 1 Rx       0300 -  7     00 00 00 00 04 00 00
    3)     1298.945 1 Tx       0400 -  2     00 00
    4)     1323.201 1 Rx       0300 -  7     00 00 00 00 06 00 00
    5)     1346.834 1 Warng FFFFFFFF -  4     00 00 00 04   BUSLIGHT
    6)     1349.222 1 Error    0008 -  4     00 19 08 08
    7)     1352.743 1 Rx       0100 -  3     RTR
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file, except $-keywords.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN, J1939.

Changes compared to Version 1.2

1) 'Reserved' column.

2) J1939 support.

3) Header section contains a table of connections/busses.

Columns

1) Index of recorded message.

2) Time offset since start of the trace. Resolution: 1 microsecond.
   Milliseconds before the decimal separator, microseconds (3 digits) behind the decimal separator.

3) Bus (1-16).

4) Type of message:

Type	Description
Rx	Message was received.
Tx	Message was transmitted
Warng	Error Warning. See **Error Warnings** under **Version 1.0** on page 4.
Error	Error Frame. See **Error Frames** under **Version 1.0** on page 4.

5) CAN-ID (Hex):
   4 digits for 11-bit CAN-IDs (0000-07FF).
   8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF).
   Special case: 'FFFFFFFF' for Error Warnings.

6) Only used for J1939 protocol. Contains '-' for CAN busses. For J1939 protocol, contains destination address of a Transport Protocol PDU2 Large Message.

7) Data Length Code (0-1785).

8) Data Bytes (0-1785):

   - For Data Frames: Data bytes in hexadecimal notation.

   - For Remote Requests: 'RTR'.

   - For Error Warnings: 4-byte Error Warning code in Motorola format. Optional: Short Names of the Error Warning flags at the end of the line, ignored while loading Trace file.

   - For Error Frames: 'ERROR' followed by 4 data bytes of Error Frame data.

Version 2.0

Used by: PCAN-View 4.

Example

```
;$FILEVERSION=2.0
;$STARTTIME=42209.4075997106
;$COLUMNS=N,O,T,I,d,l,D
;
;   C:\TraceFile.trc
;   Start time: 24.07.2015 09:46:56.615.0
;   Generated by PCAN-View v4.0.29.426
;-------------------------------------------------------------------------------
;   Connection                 Bit rate
;   PCANLight_USB_16@pcan_usb  Nominal 1 MBit/s, Data 2 Mbit/s
;-------------------------------------------------------------------------------
;   Message   Time    Type ID      Rx/Tx
;   Number    Offset  |    [hex]   |  Data Length
;   |         [ms]    |    |       |  |  Data [hex] ...
;   |         |       |    |       |  |  |
;---+-- ------+------ +- --+----- +- +- +- -- -- -- -- -- -- --
        1    1059.900 DT      0300 Rx  7  00 00 00 00 04 00 00
        2    1283.231 DT      0300 Rx  7  00 00 00 00 04 00 00
        3    1298.945 DT      0400 Tx  2  00 00
        4    1323.201 DT      0300 Rx  7  00 00 00 00 06 00 00
        5    1334.416 FD      0500 Tx 12  01 02 03 04 05 06 07 08 09 0A 0B 0C
        6    1334.522 ER           Rx     04 00 02 00 00
        7    1334.531 ST           Rx     00 00 00 08
        8    1334.643 EC           Rx     02 02
        9    1335.156 DT 18EFC034 Tx  8  01 02 03 04 05 06 07 08
       10    1336.543 RR      0100 Rx  3
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file, except $-keywords.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN, CAN FD.

Changes compared to Version 1.3

1) New $COLUMNS keyword. See **Columns**.

2) CAN FD support.

3) Separate Type and Direction (Rx/Tx) columns.

Columns

The columns contained in the trace file are specified in the $COLUMNS parameter in the header section. Each column is identified by an alphabetic, case-sensitive character, separated by commas. The column order cannot be changed, but some columns are optional.

The mandatory column order is as follows, optional columns are enclosed in square brackets:

[N],O,T,I,d,l/L,D

The following columns are possible (in alphabetical order):

Identifier	Description
d	Direction. Indicates whether the message was received ('Rx') or transmitted ('Tx').
D	Data. 0-64 data bytes in hexadecimal notation. • For Data Frames (message types DT, FD, FB, FE, BI, see 'T' column): Data bytes of message, if Data Length is > 0. • Empty for Remote Request frames (message type RR). • For Hardware Status changes (message type ST): 4-byte status code in Motorola format. See **Hardware Status** on page 14. • For Error Frames (message type ER): 5 bytes of Error Frame data, see **Error Frames** on page 14. • For Error Counter changes (message type EC): 2 bytes of Error Counter data. The first byte contains the RX Error counter, the second byte the TX Error counter. See **Error Counter Change** on page 15.
I (upper-case 'i')	CAN-ID (Hex): • 4 digits for 11-bit CAN-IDs (0000-07FF). • 8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF). • This column is empty for the message types EC, ER, ST, see 'T' column.
l (lower-case 'L')	Data Length (0-64). This is the actual number of data bytes, not the Data Length Code (0..15). Optional. If omitted, the Data Length Code column ('L') must be included. This column is empty for the message types EC, ER, ST, see 'T' column.
L	Data Length Code (CAN: 0..8; CAN FD: 0..15). Optional. If omitted, the Data Length column ('l') must be included. This column is empty for the message types EC, ER, ST, see 'T' column.
N	Message number, index of recorded message. Optional.
O	Time offset since start of the trace. Resolution: 1 microsecond. Milliseconds before the decimal separator, microseconds (3 digits) after the decimal separator.
T	Type of message. See **Message Types**.

Message Types

The following table describes the message type identifiers that are allowed in the Message Type column:

Type	Description
DT	CAN 2.0A or 2.0B data frame.
FD	CAN FD data frame.

FB	CAN FD data frame with BRS bit set (Bit Rate Switch).
FE	CAN FD data frame with ESI bit set (Error State Indicator).
BI	CAN FD data frame with both BRS and ESI bits set.
RR	Remote Request Frame.
ST	Hardware Status change. See **Hardware Status**.
ER	Error Frame. See **Error Frames**.
EC	Error Counter change. See **Error Counter Change** on page 15.

Hardware Status

Hardware status values consist of a bit combination of status flags. The 32-bit hardware status code is contained in the first 4 data bytes in Motorola format (most significant byte first).

The following table lists the hardware status flags that can be recorded in a Trace file:

Code	Short Name	Description
0x00000000	OK	No error, or CAN controller error counter values lower than 96 error points.
0x00000002	OVERRUN	The CAN controller receives so many messages that not all of the triggered hardware interrupts can be processed CAN controller was read too late.
0x00000004	BUSWARNING	Bus error: an error counter reached the 'warning' limit (typically at least 96 error points).
0x00000008	BUSPASSIVE	Bus error: the CAN controller is in Error Passive state (at least 128 error points).
0x00000010	BUSOFF	Bus error: the CAN controller is in Bus-off state because a serious and continuous error exists on the bus (255 error points have been exceeded).

Error Frames

Error Frames have 5 data bytes that contain all relevant information.

Data Byte 0: Type of Error Frame

1 = Bit Error
2 = Form Error
4 = Stuff Error
8 = Other Error

Data Byte 1: Direction

0 = Error occurred while sending
1 = Error occurred while receiving.

Data Byte 2: Current Position in Bit Stream

2 = ID.28 to ID.21
3 = Start of frame
4 = Bit SRTR
5 = BIT IDE
6 = ID.20 to ID.18
7 = ID.17 to ID.13
8 = CRC Sequence
9 = Reserved Bit 0
10 = Data field
11 = Data Length Code
12 = Bit RTR
13 = Reserved Bit 1
14 = ID.4 to ID.0
15 = ID.12 to ID.5
17 = Active Error Flag
18 = Intermission
19 = Tolerate dominant Bits
23 = Error Delimiter
24 = CRC Delimiter
25 = Acknowledge Slot
26 = End of Frame
27 = Acknowledge Limiter
28 = Overload Flag.

Data Byte 3: RX Error Counter

Current value of the Receive Error counter.

Data Byte 4: TX Error Counter

Current value of the Transmit Error counter.

Error Counter Change

When an error counter value in the CAN controller has been decreased, an Error Counter Change event is triggered. Error Counter Change entries have 2 data bytes.

Data Byte 0: RX Error Counter

Current value of the Receive Error counter.

Data Byte 1: TX Error Counter

Current value of the Transmit Error counter.

Version 2.1

Used by: PCAN-Explorer 6.

Example

```
;$FILEVERSION=2.1
;$STARTTIME=41766.4648963872
;$COLUMNS=N,O,T,B,I,d,R,L,D
;
;    C:\TraceFile.trc
;    Start time: 07.05.2015 11:09:27.047.8
;    Generated by PCAN-Explorer v6.0.0
;-------------------------------------------------------------------------------
;    Bus   Name            Connection              Protocol
;    1     Connection1     TestNet@pcan_usb        CAN
;-------------------------------------------------------------------------------
;    Message   Time     Type   ID     Rx/Tx
;    Number    Offset   |  Bus [hex]  |   Reserved
;    |         [ms]     |  |   |      |   |  Data Length Code
;    |         |        |  |   |      |   |   Data [hex] ...
;    |         |        |  |   |      |   |   |  |
;---+--  ------+------ +- +- --+----- +- +- +--- +- -- -- -- -- -- -- --
      1    1059.900 DT 1      0300 Rx -  7      00 00 00 00 04 00 00
      2    1283.231 DT 1      0300 Rx -  7      00 00 00 00 04 00 00
      3    1298.945 DT 1      0400 Tx -  2      00 00
      4    1323.201 DT 1      0300 Rx -  7      00 00 00 00 06 00 00
      5    1334.416 FD 1      0500 Tx -  9      01 02 03 04 05 06 07 08 09 0A 0B 0C
      6    1334.222 ER 1         - Rx -  5      04 00 02 00 00
      7    1334.224 EV 1   User-defined event for bus 1
      8    1334.225 EV -   User-defined event for all busses
      9    1334.231 ST 1         - Rx -  4      00 00 00 08
     10    1334.268 ER 1         - Rx -  5      04 00 02 08 00
     11    1334.643 EC 1         - Rx -  2      02 02
     12    1335.156 DT 1  18EFC034 Tx -  8      01 02 03 04 05 06 07 08
     13    1336.543 RR 1      0100 Rx -  3
```

General

Comment lines prefixed with a semicolon will be ignored while loading Trace file, except $-keywords.

Columns are separated with blanks.

One message/warning/error per line.

Lines are terminated with CR/LF.

Supported protocols: CAN, CAN FD, J1939.

Changes compared to Version 2.0

1) New optional Bus column 'B'.

2) New optional Reserved column 'R'.

3) J1939 support.

4) New EV message type.

5) Data Length/Data Length Code columns are not empty for message types ST, EC, ER.

Columns

The columns contained in the trace file are specified in the $COLUMNS parameter in the header section. Each column is identified by an alphabetic, case-sensitive character, separated by commas. The column order cannot be changed, but some columns are optional.

The mandatory column order is as follows, optional columns are enclosed in square brackets:

[N],O,T,[B],I,d,[R],l/L,D

The following columns are possible (in alphabetical order):

Identifier	Description
B	Bus (1-16).
	Optional. If Bus column is included, for events the Bus number can be specified as '-' if the event is not associated with a specific bus.
d	Direction.
	Indicates whether the message was received ('Rx') or transmitted ('Tx').
D	Data.
	0-1785 data bytes in hexadecimal notation.
	• For Data Frames (message types DT, FD, FB, FE, BI, see 'T' column): Data bytes of message, if Data Length is > 0.
	• Empty for Remote Request frames (message type RR).
	• For Hardware Status changes (message type ST): 4-byte status code in Motorola format. See **Hardware Status** under **Version 2.0** on page 14.
	• For Error Frames (message type ER): 5 bytes of Error Frame data, see **Error Frames** under **Version 2.0** on page 14.
	• For Error Counter changes (message type EC): 2 bytes of Error Counter data. The first byte contains the RX Error counter, the second byte the TX Error counter. See **Error Counter Change** under **Version 2.0** on page 15.
I (upper-case 'i')	CAN-ID (Hex):
	• 4 digits for 11-bit CAN-IDs (0000-07FF).
	• 8 digits for 29-bit CAN-IDs (00000000-1FFFFFFF).
	• Contains '-' for the message types EC, ER, ST, see 'T' column.
l (lower-case 'L')	Data Length (0-1785).
	This is the actual number of data bytes, not the Data Length Code.
	Optional. If omitted, the Data Length Code column ('L') must be included.
L	Data Length Code (CAN: 0..8; CAN FD: 0..15; J1939: 0..1785).
	Optional. If omitted, the Data Length column ('l') must be included.
N	Message number, index of recorded message. Optional.
O	Time offset since start of the trace.
	Resolution: 1 microsecond. Milliseconds before the decimal separator, microseconds (3 digits) after the decimal separator.

R	Reserved. Only used for J1939 protocol. Contains '-' for CAN busses. For J1939 protocol, contains destination address of a Transport Protocol PDU2 Large Message.
	Optional for files that contain only CAN or CAN FD frames.
T	Type of message. See **Message Types**.

Message Types

The following table describes the message type identifiers that are allowed in the Message Type column:

Type	Description
DT	CAN 2.0A, 2.0B, or J1939 data frame.
FD	CAN FD data frame.
FB	CAN FD data frame with BRS bit set (Bit Rate Switch).
FE	CAN FD data frame with ESI bit set (Error State Indicator).
BI	CAN FD data frame with both BRS and ESI bits set.
RR	Remote Request Frame.
ST	Hardware Status change. See **Hardware Status** under **Version 2.0** on page 14.
ER	Error Frame. See **Error Frames** under **Version 2.0** on page 14.
EC	Error Counter change. See **Error Counter Change** under **Version 2.0** on page 15.
EV	Event. User-defined text, begins directly after bus specifier.