

Ethernet

BLF Logging Format

Specification

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Status	Completed
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Document Management

Revision list

Version	Date	Editor	Section	Changes, comments
1.0	2016-06-22	Jr	All	Moved from CAN_and_General_BLF_Format to own document Added hardware channel Added extended Ethernet logging events
1.1	2016-07-04	Ft	All	Editorial changes
1.2	2016-07-25	Jr	All	Fixed description of hardware channel
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1 Disclaimer

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2 Overview

The document specifies the format of Ethernet events in the CANoe/CANalyzer BLF logging. The described structures can be used to read and write BLF logging files using the binlog.dll, which can be found in the CANoe/CANalyzer User Data folder:

<UserDataFolder>\Programming\BLF_Logging

3 Format Description

3.1 VBLEthernetFrame

Description: Ethernet frame.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_FRAME

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mSourceAddress[6]	BYTE	Ethernet (MAC) address of source computer (network byte order).
mChannel	WORD	The channel of the frame.
mDestinationAddress[6]	BYTE	Ethernet (MAC) address of target computer (network byte order).
mDir	WORD	Direction flag: 0 = Rx, 1 = Tx, 2 = TxRq
mType	WORD	Ethernet Type Field which indicates the protocol for Ethernet payload data See protocol specifications for valid values.
mTPID	WORD	TPID when VLAN tag valid, zero when no VLAN. See Ethernet standard specification.

Parameter	Type	Description
mTCI	WORD	TCI when VLAN tag valid, zero when no VLAN. See Ethernet standard specification.
mPayloadLength	WORD	Length of Ethernet payload data in bytes. Max. 1582 Byte (without Ethernet header)
mPayload	BYTE*	Ethernet payload data (without Ethernet header)

Note: The size of a `VBLEthernetFrame` object depends on the length of the payload data. To set the size correctly you have to add the payload data length to the object size:

```
VBLEthernetFrame ethFrame;

ethFrame.mHeader.mBase.mObjectSize = sizeof(VBLEthernetFrame) +
ethFrame.mPayloadLength;
```

The following piece of code shows how to save an Ethernet packet to a BLF file.

```
HANDLE hFile;
// open / create the BLF file
// ...
VBLEthernetFrame packet
BYTE      payload[1500];
DWORD     payloadLength = 0;
// source Mac 00:01:02:03:04:05; target Mac 06:07:08:09:0A:0B
BYTE      sourceMacId[6] = { 0x00, 0x01, 0x02, 0x03, 0x04, 0x05 };
BYTE      targetMacId[6] = { 0x06, 0x07, 0x08, 0x09, 0x0A, 0x0B };
// fill payload, payload length
// ...
packet.mChannel      = 1;
packet.mDir          = 0;
packet.mType         = 0x0800;
packet.mTPID         = 0;
packet.mTCI          = 0;
packet.mPayloadLength = payloadLength;
packet.mPayload       = payload;
memcpy( &packet.mSourceAddress, sourceMacId, sizeof(sourceMacId) );
memcpy( &packet.mDestinationAddress, targetMacId, sizeof(targetMacId) );

packet.mHeader.mObjectTimeStamp = 0;
packet.mHeader.mBase.mObjectSize = sizeof(VBLEthernetFrame) +
packet.mPayloadLength;

::BLWriteObject( hFile, &packet.mHeader.mBase );
```

The following piece of code shows how to read in Ethernet packets:

```
HANDLE hFile;
// open the BLF file
// ...
VBLObjectHeaderBase base;
VBLEthernetFrame packet;

while( BLPeekObject( hFile, &base ) )
{
    switch( base.mObjectType )
    {
        case BL_OBJ_TYPE_ETHERNET_FRAME:
            packet.mHeader.mBase = base;
            BLReadObject( hFile, &packet.mHeader.mBase );
            // process Ethernet packet
            // ...
            BLFreeObject( hFile, &packet.mHeader.mBase );
    }
}
```

```

        break;
    default:
        BLSkipObject( hFile, &base);
        break;
    }
}

```

3.2 VBLEthernetStatus

Description: Ethernet status event.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_STATUS

Parameter	Type	Description
mHeader	VBLObjectHeader	Common header type.
mChannel	WORD	The channel of the event.
mFlags	WORD	Valid fields: Bit 0 – Link Status Bit 1 – Bit rate Bit 2 – Ethernet Phy Bit 3 – Duplex Bit 4 – MDI Type Bit 5 – Connector Bit 6 – Clock Mode Bit 7 – Pairs Bit 8 – Hardware Channel
mLinkStatus	BYTE	0 – Unknown 1 – Link Down 2 – Link up 3 – Negotiate 4 – Link error
mEthernetPhy	BYTE	0 – Unknown 1 – IEEE 100BASE-TX, IEEE 1000BASE-T 2 – IEEE 100BASE-T1 (OABR ¹)
mDuplex	BYTE	0 – Unknown 1 – Half Duplex 2 – Full Duplex
mMdi	BYTE	0 – Unknown 1 – Direct 2 – Crossover
mConnector	BYTE	0 – Unknown 1 – RJ4 2 – D-Sub

¹ OABR = OPEN Alliance BroadR-Reach

Parameter	Type	Description
mClockMode	BYTE	0 – Unknown 1 – Master 2 – Slave
mPairs	BYTE	0 – Unknown 1 – one pair 2 – two pairs 3 – four pairs
mHardwareChannel	BYTE	Hardware channel (if network interface supports more than one hardware channel per application channel)
mBitrate	DWORD	Bitrate in [kbit/sec]

3.3 VBLEthernetStatistic

Description: Ethernet statistic event.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_STATISTIC

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mChannel	WORD	The channel of the event.
mRcvOk_HW	UINT64	Rx-frames detected by HW in epoch
mXmitOk_HW	UINT64	Tx-frames detected by HW in epoch
mRcvError_HW	UINT64	Rx-error frames detected by HW
mXmitError_HW	UINT64	Tx-error frames detected by HW
mRcvBytes_HW	UINT64	Rx-bytes detected by HW in epoch
mtXmitBytes_HW	UINT64	Tx-bytes detected by HW in epoch
mRcvNoBuffer_HW	UINT64	Rx-frames with lost/dropped data buffer in epoch
mSQI	short	Value for the Quality of the 100BASE-T1 (OABR) connection 0 – ErrorOccuring 1 – NoMargin 2 – Marginal 3 – Acceptable 4 – Good 5 – Excellent 6 – not available
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel)

3.4 VBLEthernetRxError

Description: Ethernet Rx/Tx error frame.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_RX_ERROR

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mStructLength	WORD	Length of this structure, without sizeof(VBObjectHeader) and without raw data length
mChannel	WORD	The channel of the frame.
mDir	WORD	Direction flag: 0 = Rx
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel) 0 = invalid
mFcs	DWORD	Ethernet frame checksum.
mFrameDataLength	WORD	Number of valid raw Ethernet data bytes, starting with Target MAC ID.
mError	DWORD	Error code: 1 - Data Length Error 2 - Invalid CRC 3 - Invalid Data received 4 - Collision detected
mFrameData	BYTE*	Raw Ethernet frame data.

3.5 VBLEthernetFrameEx

Description: Ethernet frame for Ethernet extended logging.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_FRAME_EX

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mStructLength	WORD	Length of this structure without VBObjectHeader and without frame data.
mFlags	WORD	Valid Fields: Bit 0 – reserved Bit 1 – mHardwareChannel valid Bit 2 – mFrameDuration valid Bit 3 – mFrameChecksum valid Bit 4 – mFrameHandle valid
mChannel	WORD	The channel of the frame.

Parameter	Type	Description
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel)
mFrameDuration	UINT64	Transmission duration in [ns]
mFrameChecksum	DWORD	Ethernet frame checksum
mDir	WORD	Direction flag: 0 = Rx, 1 = Tx, 2 = TxRq
mFrameLength	WORD	Length of Ethernet frame inclusive Ethernet header. Max. 1612 Byte
mFrameHandle	DWORD	Frame handle
mReserved	DWORD	Reserved
mFrameData	BYTE*	Ethernet data

Note: The size of a `VBLEthernetFrameEx` object depends on the length of the payload data. To set the size correctly you have to add the payload data length to the object size:

```
VBLEthernetFrameEx ethFrame;

ethFrame.mHeader.mBase.mObjectSize = sizeof(VBLEthernetFrameEx) +
ethFrame.mFrameLength;
```

3.6 VBLEthernetFrameForwarded

Description: Ethernet frame for Ethernet extended logging which was forwarded by the Ethernet hardware interface.

Corresponding object type: `BL_OBJ_TYPE_ETHERNET_FRAME_FORWARDED`

Parameter	Type	Description
mHeader	VBLObjectHeader	Common header type.
mStructLength	WORD	Length of this structure without VBLObjectHeader and without frame data.
mFlags	WORD	Valid Fields: Bit 0 – reserved Bit 1 – mHardwareChannel valid Bit 2 – mFrameDuration valid Bit 3 – mFrameChecksum valid Bit 4 – mFrameHandle valid
mChannel	WORD	The channel of the frame.
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel)
mFrameDuration	UINT64	Transmission duration in [ns]

Parameter	Type	Description
mFrameChecksum	DWORD	Ethernet frame checksum
mDir	WORD	Direction flag: 0 = Rx, 1 = Tx, 2 = TxRq
mFrameLength	WORD	Length of Ethernet frame inclusive Ethernet header. Max. 1612 Byte
mFrameHandle	DWORD	Frame handle
mReserved	DWORD	Reserved
mFrameData	BYTE*	Ethernet data

Note: The size of a `VBLEthernetFrameForwarded` object depends on the length of the payload data. To set the size correctly you have to add the payload data length to the object size:

```
VBLEthernetFrameForwarded ethFrame;

ethFrame.mHeader.mBase.mObjectSize = sizeof(VBLEthernetFrameForwarded) +
ethFrame.mFrameLength;
```

3.7 VBLEthernetErrorEx

Description: Ethernet Rx/Tx error frame for extended logging.

Corresponding object type: `BL_OBJ_TYPE_ETHERNET_ERROR_EX`

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mStructLength	WORD	Length of this structure, without sizeof(VBObjectHeader) and without raw data length
mFlags	WORD	Valid Fields: Bit 0 – reserved Bit 1 – mHardwareChannel valid Bit 2 – mFrameDuration valid Bit 3 – mFrameChecksum valid Bit 4 – mFrameHandle valid
mChannel	WORD	The channel of the frame.
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel) 0 = invalid
mFrameDuration	UINT64	Transmission duration in [ns]
mFrameChecksum	DWORD	Ethernet frame checksum
mDir	WORD	Direction flag: 0 = Rx, 1 = Tx, 2 = TxRq

Parameter	Type	Description
mFrameLength	WORD	Number of valid raw Ethernet data bytes, starting with Target MAC ID.
mFrameHandle	DWORD	Frame handle
mError	DWORD	Error code: 1 - Data Length Error 2 - Invalid CRC 3 - Invalid Data received 4 - Collision detected
mFrameData	BYTE*	Raw Ethernet frame data. Max. 1612 Byte

3.8 VBLEthernetErrorForwarded

Description: Ethernet Rx/Tx error frame for extended logging which was forwarded by the Ethernet hardware interface.

Corresponding object type: BL_OBJ_TYPE_ETHERNET_ERROR_FORWARDED

Parameter	Type	Description
mHeader	VBObjectHeader	Common header type.
mStructLength	WORD	Length of this structure, without sizeof(VBObjectHeader) and without raw data length
mFlags	WORD	Valid Fields: Bit 0 – reserved Bit 1 – mHardwareChannel valid Bit 2 – mFrameDuration valid Bit 3 – mFrameChecksum valid Bit 4 – mFrameHandle valid
mChannel	WORD	The channel of the frame.
mHardwareChannel	WORD	Hardware channel (if network interface supports more than one hardware channel per application channel) 0 = invalid
mFrameDuration	UINT64	Transmission duration in [ns]
mFrameChecksum	DWORD	Ethernet frame checksum
mDir	WORD	Direction flag: 0 = Rx, 1 = Tx, 2 = TxRq
mFrameLength	WORD	Number of valid raw Ethernet data bytes, starting with Target MAC ID.
mFrameHandle	DWORD	Frame handle

Parameter	Type	Description
mError	DWORD	Error code: 1 - Data Length Error 2 - Invalid CRC 3 - Invalid Data received 4 - Collision detected
mFrameData	BYTE*	Raw Ethernet frame data. Max. 1612 Byte