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2.1 Authors:

- Markus van Pinxteren
- Javier Lipiz
- Daniel Scheib

3 Abstract

The BLUEPIRAT data logger family gathers several meta information regarding the created trace files and the logger events which occurred while capturing trace data. This information is written to a data file called “reference database” (RDB).

The RDB can be used to get quick access to the logger’s content, without the need of reading each trace file.

With further development of the logger’s firmware, the RDB can be extended. In this case the version will be increased and there will be a matching specification document.

4 Details

4.1 Reference Database (RDB)

The reference database is a relational SQLITE database. It consists of four tables described in the following chapters.

Database system: sqlite3, V3.6.16-2.3

Filename: rdb.sqlite

RDB format version: 1.4.0

4.1.1 TraceBlockTbl

The RDB TraceBlockTbl holds information about the stored trace files. Each table row accords to one existing trace file on the loggers hard disk.

The yellow fields in the table are set from the database itself, when inserting a new row. Grey entries are currently not used.

Column	C++	SQL	Scope	Description
TraceEntryId	uint64	Primary key		Unique ID for each trace block
DataBaseEntryId	uint64	INTEGER		Unique ID for each database entry
LoggerModuleName	string	VARCHAR		Unique LoggerModulname. e.g ethernet, fpgaa,
FilePath	string	VARCHAR		Path of the trace block – relative to /var/opt/telemotive/data/
FileName	string	VARCHAR		The trace block's filename, including start and end time of contained data. The time stamps time zone depends on the file type: *.tmt -> UTC *.xtmt -> Local Time (see field TimeZone)
DataFileSize	uint64	INTEGER		File size in Byte
DataSize	uint64	INTEGER		Data size in Byte (may differ from DataFileSize for compressed trace blocks)
DataStartTimeUTC	uint64	INTEGER		Time stamp of the first included trace message in UTC (µsec since 01.01.1970)

DataEndTimeUTC	uint64	INTEGER		Time stamp of the last included trace message in UTC (µsec since 01.01.1970)
DataStartGPS	string	VARCHAR	currently not used	GPS position at DataStartTime
DataEndGPS	string	VARCHAR	currently not used	GPS position at DataEndTime
BlockNumber	uint64	INTEGER		Increasing block counter, starting at 1
TimeZone	string	VARCHAR		Timezone string in IEEE format.[1] Example: WEuropeStandard-Time-1DST-2,M3.5.0/2:0:0,M10.5.0/3:0:0.
CfgBackupFile	string	VARCHAR		Filename of the config backup that stores the logger configuration at the trace block's creation time stamp.
The following fields contain information whether data of the according BUS/interface type is included in the trace block. Channel indexes start at zero and are separated by ','. A channel index is always written with two characters (leading '0'). "n/a" stands for "not available" and means no data of this type included.				
CAN_CANextData	string	VARCHAR	00,01,02,03,04,05...	
MOST25Data	string	VARCHAR	Ctr, Async, Sync	
SerialData	string	VARCHAR	00,01,02,03,04,05...	
EthernetData	string	VARCHAR	00,01,02,03,04,05...	
FlexRayData	string	VARCHAR	00,01,02,03,04,05...	
LINData	string	VARCHAR	01,02,03,04,05...	
ApixData	string	VARCHAR	currently not used	currently not used
MOST150Data	string	VARCHAR	Ctr, MEP,MDP	
CameraData	string	VARCHAR	00,01,02,03,04…	Index corresponding to camera
AnalogData	string	VARCHAR	00,01,02,03,04,05…	
GpioData	string	VARCHAR	00,01,02,03,04,05…	
AudioData	string	VARCHAR	00	Audio channel of "Remote Control Voice"
CCPXCPData	string	VARCHAR	00,01,02,03	Index corresponds to configured ECUs
DiagData	string	VARCHAR	currently not used	currently not used
GPSData	string	VARCHAR	00	GPS Data

[1] http://pubs.opengroup.org/onlinepubs/9699919799/basedefs/V1_chap08.html

ECLData	string	VARCHAR	00	ECL Data
CLASSData	string	VARCHAR	currently not used	currently not used
ComplexFilterData	string	VARCHAR	<filter name>, …	Name corresponds to configured Complex Filter name
TTYData	string	VARCHAR	00, 01	TTY data, currently QXDM protocol(00) or AndroidGateway (01)
MIIData	string	VARCHAR	00, 01, 02, 03,…	MII data
Comment	string	VARCHAR		Comment data

Table 1: Reference Database TraceBlockTbl

4.1.1.1 TSL-Extension

RDBs of **unsorted** TSL datasets contain the trace blocks of all devices. To distinguish the file origin the column 'LoggerModuleName' is extended by the mainboard number of the originating device. The column format is as follows**:"<module name>|<mainboard number>"**.

The channel indices in the "…Data"-columns are the original indices without TSL cascading offset and without possibly configured channel mapping.

For **sorted** datasets the channel indices already include the TSL cascading offsets and/or possibly configured channel mapping indices.

4.1.2 EventTbl

The RDB EventTbl holds information about the logger events occurred while processing.

Column	C++	SQL		Description
EventEntryId	uint64	Primary Key		Unique ID for each event entry. Starts with 1.
DataBaseEntryId	uint64	INTEGER		Unique ID for each Database entry. Starts with 1.
Type	string	VAR-CHAR	*STARTUP*, *SHUTDOWN*, *MARKER*, *MARKER_CLEAR*, *INFO*, *DATA_DELETED*, *TIME_SET*, *NEW_TIME*, *SUDDEN_DEATH*, *TSL_SLAVE_OFFSET*, *TSL_SLAVE_TO_MAS-TER*, *CONFIG*, *WAKEUP*, *START_TESTDRIVE*, *STOP_TESTDRIVE*, *TESTDRIVE_INFO*	See description below
EventTimeUTC	uint64	INTEGER		The event's time stamp in UTC (µsec since 01.01.1970)
EventTimeZone	string	VAR-CHAR		Timezone string in IEEE format.[2] Example: WEuropeStandardTime-1DST-2,M3.5.0/2:0:0,M10.5.0/3:0:0.
GPSPos	string	VAR-CHAR	currently not used	GPS position at EventTimeUTC
TypeIndex	uint16	INTEGER		Continuing counter separately for each type, starting at 1.

[2] http://pubs.opengroup.org/onlinepubs/9699919799/basedefs/V1_chap08.html

Comment (e.g. for Info-Events)	string	VAR-CHAR		Comment

Table 2: Reference Database EventTbl

Event-Type description:

STARTUP: Set on logger startup

SHUTDOWN: Set on logger shutdown

MARKER: Set with the trigger button on the logger's front panel or from a configured trigger condition.

MARKER_CLEAR: The marker counter has been reset to 1.

INFO: Set from a configured trigger condition. The info string is written to the Comment field.

DATA_DELETED: Set when all trace data of the logger was deleted via client/library

TIME_SET: Set when time is set via client/library. The event's time stamp is captured before changing time.

NEW_TIME: Set after time was set with client/library. The event's time stamp is captured after changing time.

SUDDEN_DEATH: Set on sudden power down, when logger was not able to finalize all open trace files and processes.

TSL_SLAVE_OFFSET: Slave is synchronized with master.

TSL_SLAVE_TO_MASTER: Slave is not synchronized with master.

CONFIG: Configuration has been updated.

WAKEUP: Wake-up source in 'Comment' column.

START_TESTDRIVE: Start an easy track test drive.

STOP_TESTDRIVE: Stop an easy track test drive.

TESTDRIVE_INFO: Information about a test drive like test name, vin, map version, re-producibility.

4.1.3 TraceSummaryTbl

The RDB TraceSummaryTbl holds meta information about the logger cycles (sections). Each table row accords to one section from startup till shutdown and stores information about the section's size and captured data.

Column	C++	SQL	Scope	Description
EntryId	uint64	Primary Key		Unique ID for each summary
DataBaseEntryId	uint64	INTEGER		Unique ID for each database entry
Valid	uint32	INTEGER		Indicates whether the summary is valid or not. 0 is invalid. > 0 is valid.
StartUpDbIdLink	uint64	INTEGER		Contains the DataBaseEntryId of the STARTUP event in the EventTbl that identifies the section that is represented by this trace summary.
AllDataFilesSize	uint64	INTEGER		Memory size of all trace blocks in this section in Bytes.
AllDataSize	uint64	INTEGER		Data size of all trace blocks in this section in Bytes. May differ from AllDataFileSize for sections that contain compressed trace files.
The following fields contain information whether data of the according BUS/interface type is included in the section. Channel indexes start at zero and are separated by ',’. A channel index is always written with two characters (leading '0'). "n/a" stands for "not available" and means no data of this type included.				
CAN_CANextData	string	VARCHAR	00,01,02,03,04,05...	
MOST25Data	string	VARCHAR	Ctr, Async, Sync	
SerialData	string	VARCHAR	00,01,02,03,04,05...	
EthernetData	string	VARCHAR	00,01,02,03,04,05...	
FlexRayData	string	VARCHAR	00,01,02,03,04,05...	
LINData	string	VARCHAR	01,02,03,04,05...	
ApixData	string	VARCHAR	currently not used	currently not used
MOST150Data	string	VARCHAR	Ctr, MEP,MDP	
CameraData	string	VARCHAR	00,01,02,03,04…	Index corresponding to camera
AnalogData	string	VARCHAR	00,01,02,03,04,05…	

GpioData	string	VARCHAR	00,01,02,03,04,05…	
AudioData	string	VARCHAR	00	Audio channel of “Remote Control Voice”
CCPXCPData	string	VARCHAR	00,01,02,03	Index corresponds to configured ECUs
DiagData	string	VARCHAR	00,01,02,03	Diagnostic data (UDS, KWP2000, ODB…) of different ECUs.
GPSData	string	VARCHAR	00,01,02,03	GPS Data
ECLData	string	VARCHAR	00	ECL Data
CLASSData	string	VARCHAR	currently not used	currently not used
ComplexFilterData	string	VARCHAR	<filter name>, …	Name corresponds to configured Complex Filter name
TTYData	string	VARCHAR	00	TTY data, currently QXDM protocol(00) or AndroidGateway (01)
MIIData	string	VARCHAR	00, 01, 02, 03,…	MII data

Table 3: Reference Database TraceSummaryTbl

4.1.4 VersionTbl

The RDB VersionTbl contains only one entry which includes the RDB version.

Column	C++	SQL	Scope	Description
VersionEntryId	uint64	Primary Key		Unique ID for each version
Component	string	VARCHAR		
Version	string	VARCHAR	X.X.X	Three-digit version number e.g. 1.2.0

Table 4: Reference Database VersionTbl

The VersionTbl contains currently only one entry which describes the RDB version.

VersionEntryId	Component	Version
1	FormatVersion	RDB Version

Table 5: Entries for Reference Database VersionTbl

4.1.5 TSLTbl

Reference Databases from offline data sets of TSL-Clusters contains the additional table TSLTbl. In this table information about all TSL participants is stored.

Column	C++	SQL	Scope	Description
Mainboardnumber	uint64	INTEGER		Mainboardnumber of device
Name	string	VARCHAR		Configured name of device
IP	string	VARCHAR		IP address of device
CANOffset	uint8_t	INTEGER		Start index of CAN channels of this device
SerialOffset	uint8_t	INTEGER		Start index of serial channels of this device
EthernetOffset	uint8_t	INTEGER		Start index of ethernet channels of this device

EthernetFPGAEOffset	uint8_t	INTEGER		Start index of CAN channels of this device
FlexRayOffset	uint8_t	INTEGER		Start index of ethernet channels > 100 of this device
LINOffset	uint8_t	INTEGER		Start index of LIN channels of this device
CameraOffset	uint8_t	INTEGER		Start index of camera channels of this device
AnalogOffset	uint8_t	INTEGER		Start index of analog channels of this device
GPIOOffset	uint8_t	INTEGER		Start index of GPIO channels of this device
CCPXCPOffset	uint8_t	INTEGER		Start index of CCP/XCP channels of this device
TTYOffset	uint8_t	INTEGER		Start index of TTY channels of this device

5 Contact

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MAGNA Telemotive GmbH

Office München
Frankfurter Ring 115a
80807 München / Germany

Tel.: +49 89 357186-0
Fax.: +49 89 357186-520
E-Mail: TMO.info@magna.com
Web: www.telemotive.de

Sales
Tel.: +49 89 357186-550
Fax.: +49 89 357186-520
E-Mail: TMO.Sales@magna.com

Support

Tel.: +49 89 357186-518

E-Mail: TMO.productsupport@magna.com

ServiceCenter: https://sc.telemotive.de/bluepirat