

PCAN-PassThru API

Pass-Thru API and Connection of Pass-Thru Software to PEAK CAN Interfaces

User Manual



PassThru
SAE J2534

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1 Introduction

For the programming of control units (ECU), there are many applications from various manufacturers which are used in the development and diagnosis of vehicle electronics. The interface for the communication between these applications and the control units is defined by the international standard SAE J2534 (Pass-Thru). Thus, the hardware for the connection to the control unit can be selected regardless of its manufacturer.

PCAN-PassThru allows the use of SAE J2534-based applications with CAN adapters from PEAK-System. The functions defined by the standard are provided by Windows DLLs for 32 and 64-bit systems. These can also be used to develop own Pass-Thru applications. The API is thread-safe. It uses mutual exclusion mechanisms to allow several threads from one or several processes to call functions of the API in a safe way.

The communication via CAN and OBD-2 (ISO 15765-4) is based on the programming interfaces PCAN-Basic and PCAN-ISO-TP. PCAN-PassThru is supplied with each PC CAN interface from PEAK-System.


 **Note:** The SAE J2534 protocol is fully described in its norm. It is required for the development of your own Pass-Thru applications. This manual cannot supersede this API documentation.

1.1 Features

- Implementation of the international standard SAE J2534 (Pass-Thru)
- Implementation of the SAE J2534 extension GMW17753 from General Motors to support CAN FD
- Use of SAE J2534 applications with PC CAN interfaces from PEAK-System
- Windows DLLs for the development of your own SAE J2534 applications for 32 and 64 bit
- Thread-safe API
- Physical communication via CAN and OBD-2 (ISO 15765-4) using a CAN interface of the PCAN series
- Uses the PCAN-Basic programming interface to access the CAN hardware in the computer
- Uses the PCAN-ISO-TP programming interface (ISO 15765-2) for the transfer of data packages up to 4095 bytes via the CAN bus

1.2 System Requirements

- Windows 10, 8.1, 7 (32/64-bit)
- At least 2 GB RAM and 1.5 GHz CPU
- PC CAN interface from PEAK-System
- PCAN-Basic API
- PCAN-ISO-TP API

 **Note:** The required APIs PCAN-Basic and PCAN-ISO-TP are installed both with the PCAN-PassThru setup.

1.3 Scope of Supply

- └ PCAN-PassThru API installation including
 - Interface DLLs for Windows (32/64-bit)
 - Configuration software for Windows 10, 8.1, 7 (32/64-bit)
 - PCAN-Basic API
 - PCAN-ISO-TP API
- └ Documentation in PDF format

2 Installation

This chapter covers the setup of the PCAN-PassThru package under Windows and the use of its configuration software.

▶ Do the following to install the package:

1. Insert the supplied DVD into the appropriate drive of the computer.

Usually a navigation program appears a few moments later. If not, start the file `Intro.exe` from the root directory of the DVD.

2. In the main menu, select **Tools**, and then click on **Install**.

Besides the product DVD, the setup is also available as a download from the website www.peak-system.com. Double click the included file `PCAN-PassThru Setup.exe` to start the installation.

3. Confirm the message of the User Account Control.

The setup program for the package is started.

4. Follow the instructions of the program.

The setup will install the PCAN-PassThru interface DLLs for Windows 32- and 64-bit, the required APIs PCAN-Basic and PCAN-ISO-TP, and the configuration software PCAN-PassThru Configuration.

2.1 Hardware Interface Configuration

The CAN or OBD-II communication of PCAN-PassThru requires a CAN interface from PEAK-System which can be set up using the tool PCAN-PassThru Configuration. The desired PEAK CAN interface and its driver have to be successfully installed. A detailed description how to put your CAN interface into operation is included in the related documentation.

▶ Do the following to configure a PEAK CAN interface to be used by the PCAN-PassThru API:

1. Open the Windows Start menu or the Windows Start page and select **PCAN-PassThru Configuration**.

The dialog box for selecting the hardware and for setting the parameters appears.

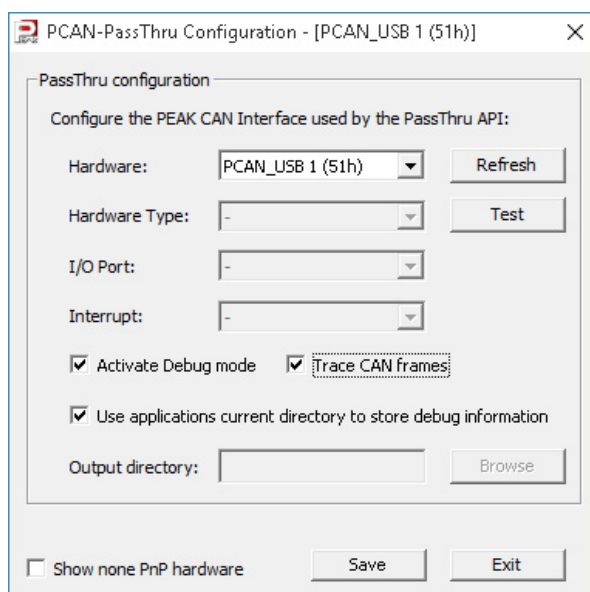


Figure 1: PCAN-PassThru Configuration (PnP hardware selected)

2. If you like to use none PnP hardware like the PCAN-ISA, PCAN-PC/104, or PCAN-Dongle activate the **Show none PnP hardware** checkbox at the bottom on the left.
3. **Hardware:** Select the interface to be used by the PassThru API from the list. If this is a PnP hardware, the next 3 parameters are skipped.
Note: If the adapter was connected to the computer after the tool was started, you can update the list with the button **Refresh** button.
4. **Hardware Type:** Select the type of your adapter.
5. **I/O Port and Interrupt:** Each CAN channel of none-PnP interfaces is set up with an interrupt (IRQ) and an I/O port before the hardware is installed in the computer. Select these parameters from the following drop-down lists.
The entered parameters can be checked with the **Test** button on the top right.
6. Finally, save the configuration with **Save** or close the tool with **Exit**.

2.1.1 Additional Options

The PCAN-PassThru Configuration tool offers additional options for debugging and logging.


Activate Debug mode: Activate this checkbox to enable logging and the trace option. With this, all function calls with their parameters are saved to a csv file. The parameters are: timestamp of the function call, function name, return value, parameters, and error message.

The log file is named with the pattern:

```
PCAN_log_[Year][Month][Day][Hours][Minutes][Seconds]_[Counter].csv
```

Trace CAN frames: This option is available if **Activate Debug mode** is checked. With this enabled, the CAN traffic is traced to the configured directory. The trace file format PCAN-Trace 1.1 by PEAK-System is used. If the file reaches a size of 10 MB a new one is created. File naming follows the pattern:

```
[Year][Month][Day][Hours][Minutes][Seconds]_[Used_CAN-Channel]_[Counter].trc
```

 **Note:** Both, creating log and trace files is done until the capacity of the hard drive is reached.

Output Directory: If **Use applications current directory to store debug information** is disabled, the directory for saving log and trace files can be chosen via **Browse**.

3 Programming Interface

3.1 Implementation

3.1.1 PasThru Functions

The following functions are available:

- └ **PassThruOpen:** establishes a connection and initializes the Pass-Thru device.
- └ **PassThruClose:** closes the connection to the Pass-Thru device.
- └ **PassThruConnect:** establishes a logical connection with a protocol channel on the specified SAE J2534 device.
- └ **PassThruDisconnect:** terminates a logical connection with a protocol channel.
- └ **PassThruReadMsgs:** reads messages and indications from the receive buffer.
- └ **PassThruWriteMsgs:** sends messages.
- └ **PassThruStartPeriodicMsg:** queues the specified message for transmission, and repeats at the specified interval.
- └ **PassThruStopPeriodicMsg:** stops the specified periodic message.
- └ **PassThruStartMsgFilter:** starts filtering of incoming messages.
- └ **PassThruStopMsgFilter:** removes the specified filter.
- └ **PassThruSetProgrammingVoltage:** Sets a single programming voltage on a single specific pin. This function is not supported.
- └ **PassThruReadVersion:** returns the version strings associated with the DLL.
- └ **PassThruIoctl:** read/write configuration parameters. Only the following IOCTL ID values are supported:
 - **GET_CONFIG:** read configuration parameters. Only the following parameter details are supported:
 - **DATA_RATE:** get the bit rate value (in bps).
 - **LOOPBACK:** states whether Tx messages are echoed (1) or not (0).
 - **BIT_SAMPLE_POINT:** bit sample point as a percentage of the bit time.
 - **SYNC_JUMP_WIDTH:** synchronization jump width (undefined unit, value from BRCAN).
Note: Use a pointer to an `SCONFIG_LIST` structure for the `InputPtr` parameter.
 - **SET_CONFIG:** write configuration parameters. Only the following parameter details are supported:
 - **DATA_RATE:** set the bit rate value (in bps). This will call a disconnection and a connection of the channel.
 - **LOOPBACK:** states whether Tx messages are echoed (1) or not (0).
Note: Use a pointer to an `SCONFIG_LIST` structure for the `InputPtr` parameter.
 - **CLEAR_TX_BUFFER:** Tx AND Rx buffer will be cleared.
 - **CLEAR_RX_BUFFER:** Tx AND Rx buffer will be cleared.
 - **CLEAR_PERIODIC_MSGS:** clears periodic messages.
 - **CLEAR_MSGS_FILTERS:** clears filter messages.

- GET_DEVICE_INFO: acquires the general capabilities of the device.
- GET_PROTOCOL_INFO: acquires the protocol specific capabilities of the devices.

3.1.2 Passthru Message Structure

The ISO-TP message has the following structure:

```
typedef struct {
    unsigned long ProtocolID;
    unsigned long RxStatus;
    unsigned long TxFlags;
    unsigned long Timestamp;
    unsigned long DataSize;
    unsigned long ExtraDataIndex;
    unsigned char Data[4128];
} PASSTHRU_MSG;
```

Data fields:

- └ **ProtocolID:** supported protocols are CAN (0x05) or ISO-15765 (0x06).
- └ **RxStatus:** only available when receiving a message. Supported flags are:
 - CAN_29BIT_ID: the value of the bit #8 states if the message is standard (11bit, value = 0) or extended (29bit, value = 1).
 - TX_MSG_TYPE: the value of the bit #0 states if the message is a transmit loopback (value = 1) or not (value = 0).
- └ **TxFlags:** transmit message flags. Supported flags are:
 - CAN_29BIT_ID: the value of the bit #8 states if the message is standard (11bit, value = 0) or extended (29bit, value = 1).
- └ **Timestamp:** timestamp in microseconds.
- └ **DataSize:** data size in bytes (including the 4 CAN ID bytes).
- └ **ExtraDataIndex:** when no extra data, the value should be equal to DataSize.
- └ **Data:** array of data bytes.

3.1.3 PassthruIoctl

The following structures are used with the PassThruIoctl and the ioctl ID values GET_CONFIG and SET_CONFIG.

```
// parameter for PassThruIoctl (used with GET_CONFIG/SET_CONFIG Ioctl IDs)
typedef struct {
    unsigned long Parameter;    // name of the parameter
    unsigned long Value;       // value of the parameter
} SCONFIG;

// list of parameters for PassThruIoctl (used with GET_CONFIG/SET_CONFIG Ioctl IDs)
typedef struct {
    unsigned long NumOfParams; // number of SCONFIG elements
    SCONFIG* ConfigPtr;        // array of SCONFIG
} SCONFIG_LIST;
```

The following structures are used with the PassThruIoctl and the ioctl ID values GET_DEVICE_INFO and GET_PROTOCOL_INFO.

```
// parameter for PassThruIoctl (used with GET_DEVICE_INFO/GET_PROTOCOL_INFO Ioctl
IDs)
typedef struct {
    unsigned long Parameter;    // name of the parameter
    unsigned long Value;       // value of the parameter
    unsigned long Supported;    // support for parameter
} SPARAM;

// list of parameters for PassThruIoctl (used with
GET_DEVICE_INFO/GET_PROTOCOL_INFO Ioctl IDs)
typedef struct {
    unsigned long NumOfParams;  // number of SCONFIG elements
    SPARAM* ParamPtr;          // array of SPARAM
} SPARAM_LIST;
```

3.2 Function Examples

The following example is divided in several steps demonstrating the supported PassThru functions.

3.2.1 Opening a PassThru Device

With this step the default PassThru device is opened. Furthermore checking for an error is shown.

```
#define PASSTHRU_NB_MSG    10

TPTRresult result;
ULONG deviceId;

result = PassThruOpen(NULL, &deviceId);
if (result != STATUS_NOERROR)
{
    char errText[BUFSIZ];
    memset(errText, 0, sizeof(BUFSIZ));

    if (STATUS_NOERROR != PassThruGetLastError(errText))
        fprintf(stderr, "Failed to get LastError.\n");
    else
        fprintf(stderr, errText);
}
```

To connect to a specific device, the “pName” parameter must be formatted like such:

- └ J2534-2:PEAK {PCANHandle}
- └ Where {PCANHandle} is one of the following PCAN Device Channel Handle:

Value	Description	Value	Description
0x41	PCAN-PCI interface, channel 1	0x50A	PCAN-USB interface, channel 10
0x42	PCAN-PCI interface, channel 2	0x50B	PCAN-USB interface, channel 11
0x43	PCAN-PCI interface, channel 3	0x50C	PCAN-USB interface, channel 12
0x44	PCAN-PCI interface, channel 4	0x50D	PCAN-USB interface, channel 13
0x45	PCAN-PCI interface, channel 5	0x50E	PCAN-USB interface, channel 14
0x46	PCAN-PCI interface, channel 6	0x50F	PCAN-USB interface, channel 15
0x47	PCAN-PCI interface, channel 7	0x510	PCAN-USB interface, channel 16
0x48	PCAN-PCI interface, channel 8	0x61	PCAN-PC Card interface, channel 1

Value	Description	Value	Description
0x409	PCAN-PCI interface, channel 9	0x62	PCAN-PC Card interface, channel 2
0x40A	PCAN-PCI interface, channel 10	0x801	PCAN-LAN interface, channel 1
0x40B	PCAN-PCI interface, channel 11	0x802	PCAN-LAN interface, channel 2
0x40C	PCAN-PCI interface, channel 12	0x803	PCAN-LAN interface, channel 3
0x40D	PCAN-PCI interface, channel 13	0x804	PCAN-LAN interface, channel 4
0x40E	PCAN-PCI interface, channel 14	0x805	PCAN-LAN interface, channel 5
0x40F	PCAN-PCI interface, channel 15	0x806	PCAN-LAN interface, channel 6
0x410	PCAN-PCI interface, channel 16	0x807	PCAN-LAN interface, channel 7
0x51	PCAN-USB interface, channel 1	0x808	PCAN-LAN interface, channel 8
0x52	PCAN-USB interface, channel 2	0x809	PCAN-LAN interface, channel 9
0x53	PCAN-USB interface, channel 3	0x80A	PCAN-LAN interface, channel 10
0x54	PCAN-USB interface, channel 4	0x80B	PCAN-LAN interface, channel 11
0x55	PCAN-USB interface, channel 5	0x80C	PCAN-LAN interface, channel 12
0x56	PCAN-USB interface, channel 6	0x80D	PCAN-LAN interface, channel 13
0x57	PCAN-USB interface, channel 7	0x80E	PCAN-LAN interface, channel 14
0x58	PCAN-USB interface, channel 8	0x80F	PCAN-LAN interface, channel 15
0x509	PCAN-USB interface, channel 9	0x810	PCAN-LAN interface, channel 16

With this step, the 3rd PEAK device connected on USB is opened.

```
#define PASSTHRU_NB_MSG      10

TPTRResult result;
ULONG deviceId;

result = PassThruOpen("J2534-2:PEAK 0x53", &deviceId);
if (result != STATUS_NOERROR)
{
    [...]
}
```

3.2.2 Connecting to CAN

This step shows how to connect to a raw CAN channel.

```
ULONG channelId;

result = PassThruConnect(deviceId, CAN, 0, BAUDRATE_250K, &channelId);

if (result != STATUS_NOERROR) { /* TODO ... */ }
```

3.2.3 Writing Messages

```
PASSTHRU_MSG pMsg[PASSTHRU_NB_MSG];
ULONG pNumMsgs;
ULONG i, j;

// initialization
memset(pMsg, 0, sizeof(PASSTHRU_MSG) * PASSTHRU_NB_MSG);
pNumMsgs = PASSTHRU_NB_MSG;
for (i = 0; i < pNumMsgs; i++)
{
    // Initializes each message.
    j = 0;
    pMsg[i].ProtocolID = CAN;
```

```

// Sets a length.
pMsg[i].DataSize = min(4+i, 4+8);

// Sets CAN ID.
pMsg[i].Data[j++] = 0x00;
pMsg[i].Data[j++] = 0x00;
pMsg[i].Data[j++] = 0x00;
pMsg[i].Data[j++] = (unsigned char) (0xA0 + i);

// Sets CAN Data.
for (; j < pMsg[i].DataSize; j++)
    pMsg[i].Data[j] = (unsigned char) (0xB0 + j);
}

// Writes the messages.
result = PassThruWriteMsgs(channelId, pMsg, &pNumMsgs, 0);
if (result != STATUS_NOERROR) { /* TODO ... */ }

```

3.2.4 Setting a Filter Message

```

PASSTHRU_MSG pMsgMask, pMsgPattern;
ULONG filterId;

// initialization
memset(&pMsgMask, 0, sizeof(PASSTHRU_MSG));
memset(&pMsgPattern, 0, sizeof(PASSTHRU_MSG));

// Filters on a 11-bit CAN ID.
pMsgMask.ProtocolID = pMsgPattern.ProtocolID = CAN;
pMsgMask.DataSize = pMsgPattern.DataSize = 4;

// Filters on an ID anything like 0x????0140.
pMsgMask.Data[2] = 0xFF;
pMsgMask.Data[3] = 0xFF;
pMsgPattern.Data[2] = 0x01;
pMsgPattern.Data[3] = 0x40;

// Sets a filter message.
result = PassThruStartMsgFilter(channelId, PASS_FILTER, &pMsgMask, &pMsgPattern,
NULL, &filterId);
if (result != STATUS_NOERROR) { /* TODO ... */ }

```

3.2.5 Reading Messages

```

// initialization
memset(pMsg, 0, sizeof(PASSTHRU_MSG) * PASSTHRU_NB_MSG);
pNumMsgs = PASSTHRU_NB_MSG;

// Reads the messages.
result = PassThruReadMsgs(channelId, pMsg, &pNumMsgs, 0);
if (result == STATUS_NOERROR)
    { /* Process messages... */ }
else if (result == ERR_BUFFER_EMPTY)
    { printf("No message received"); }
else { /* TODO ... */ }

```

3.2.6 Tx Loopback Configuration

This step demonstrates how to set and get a Tx loopback configuration.

```

SCONFIG_LIST configList;
SCONFIG configs[10];
unsigned long nbParams;

// Prepares a parameter Tx loopback to enabled.
nbParams = 0;
configs[nbParams].Parameter = LOOPBACK;
configs[nbParams++].Value = 1;
configList.NumOfParams = nbParams;
configList.ConfigPtr = configs;

// Sets a configuration.
result = PassThruIoctl(channelId, SET_CONFIG, &configList, NULL);
if (result != STATUS_NOERROR) { /* TODO ... */ }

// Reads the configuration.
configs[0].Value = 0;
result = PassThruIoctl(channelId, GET_CONFIG, &configList, NULL);
if (result != STATUS_NOERROR) { /* TODO ... */ }

```

3.2.7 Periodic Messages

The step covers the setup of periodic messages.

```

PASSTHRU_MSG msg;
ULONG msgID;
ULONG timeInterval;

// Sets up a periodic message.
memset(&msg, 0, sizeof(PASSTHRU_MSG));
msg.ProtocolID = CAN;
msg.DataSize = 7+4;

// Sets a CAN ID
j = 0;
msg.Data[j++] = 0x00;
msg.Data[j++] = 0x00;
msg.Data[j++] = 0x00;
msg.Data[j++] = (unsigned char) (0xC1);

// Sets a CAN Data
for (; j < msg.DataSize; j++)
    msg.Data[j] = (unsigned char) (0xB0 + j);

timeInterval = 100;
result = PassThruStartPeriodicMsg(channelId, &msg, &msgID, timeInterval);
if (result != STATUS_NOERROR) { /* TODO ... */ }

```

3.2.8 Disconnect from the channel

```

// Disconnect from the channel.
result = PassThruDisconnect(channelId);
if (result != STATUS_NOERROR) { /* TODO ... */ }

```

3.2.9 Close the device

```
// Closes the device.  
result = PassThruClose(deviceId);  
if (result != STATUS_NOERROR) { /* TODO ... */ }
```

3.3 Technical Notes

3.3.1 Rx/Tx Queues

There is no receive queue or transmit queue:

- When PassThruReadMsgs is called, the messages are directly read from PCAN-Basic via a loop.
- When PassThruWriteMsgs is called, the messages are directly written via PCAN-Basic.

3.3.2 Message Filtering

Although the PCAN-Basic API provides message filtering features, it was not used for the PCAN-PassThru API since the way you define a filter in this API differs a lot from the way used in PCAN-Basic. PCAN-PassThru uses a mask and a pattern for the CAN ID and the data. PCAN-Basic uses a range of CAN IDs instead.

3.3.3 Periodic Messages

Periodic messages are handled via a map for each channel. A unique thread periodically checks each channel every 1ms and transmits messages if needed.

4 License Information

The use of this software is subject to the terms of the End User License Agreement of PEAK-System Technik GmbH.

The APIs PCAN-PassThru, PCAN-Basic, and PCAN-ISO-TP are property of the PEAK-System Technik GmbH and may be used only in connection with a hardware component purchased from PEAK-System or one of its partners. If CAN hardware of third-party suppliers should be compatible to that of PEAK-System, then you are not allowed to use the mentioned APIs with those components.

If a third-party supplier develops software based on the mentioned APIs and problems occur during the use of this software, consult that third-party supplier.

Appendix A Supported Features from SAE J2534 and GM Extensions

A.1 SAE J2534-1 Revised DEC2004

A.1.1 Communication Protocols

The following figure lists the supported communication protocols:

Protocol	Supported?
CAN	Yes
ISO 15765-4	Yes
ISO 9141	No
ISO 14230-4 (KWP2000)	No
SAE J1850	No
SAE J2610	No

A.1.2 Other Features

The following figure lists unsupported features from the Pass-Thru System Requirements:

Feature	Supported?
PROGRAMMABLE POWER SUPPLY	Software pin assignment is not supported. Function <code>PassThruSetProgrammingVoltage</code> always returns <code>ERR_NOT_SUPPORTED</code> .

A.1.3 PASSTHRUIOCTL

The following figure lists the supported IOCTL IDs for the function `PassThruIOCTL`:

IOCTL ID	Supported?
GET_CONFIG	Yes
SET_CONFIG	Yes
READ_VBATT	No
FIVE_BAUD_INIT	No
FAST_INIT	No
CLEAR_TX_BUFFER	Yes
CLEAR_RX_BUFFER	Yes
CLEAR_PERIODIC_MSGS	Yes
CLEAR_MSG_FILTERS	Yes
CLEAR_FUNCT_MSG_LOOKUP_TABLE	No
ADD_TO_FUNCT_MSG_LOOKUP_TABLE	No
DELETE_FROM_FUNCT_MSG_LOOKUP_TABLE	No
READ_PROG_VOLTAGE	No

The following figure lists the supported parameters associated with the IOCTL IDs « GET_CONFIG » and « SET_CONFIG »:

Parameter	Supported ?
DATA_RATE	Yes
LOOPBACK	Yes

Parameter	Supported ?
NODE_ADDRESS	No
NETWORK_LINE	No
P1_MIN	No
P1_MAX	No
P2_MIN	No
P2_MAX	No
P3_MIN	No
P3_MAX	No
P4_MIN	No
P4_MAX	No
W0	No
W1	No
W2	No
W3	No
W4	No
W5	No
TIDLE	No
TINIL	No
TWUP	No
PARITY	No
BIT_SAMPLE_POINT	No
SYNC_WIDTH_JUMP	No
T1_MAX	No
T2_MAX	No
T3_MAX	No
T4_MAX	No
T5_MAX	No
ISO15765_BS	Yes
ISO15765_STMIN	Yes
BS_TX	Yes
STMIN_TX	Yes
DATA_BITS	No
FIVE_BAUD_MOD	No
ISO15765_WFT_MAX	Yes

A.2 SAE J2534-2 Revised OCT2010

The following figure lists the supported features from optional PassThru extension SAE J2534-2:

Feature	Supported?
Enabling SAE J2534-2 features and accessing multiple SAE J2534 devices	Yes
PIN SELECTION	No
ACCESS TO ADDITIONAL CHANNELS	No
Discovery Support & Discovery mechanism	Yes
MIXED FORMAT FRAMES ON A CAN NETWORK	Yes
Single Wire CAN	No
Analog Inputs	No
GM UART (SAE J2740)	No

Feature	Supported?
UART Echo Byte Protocol	No
Honda Protocol	No
Repeat Messaging	No
Extended Programming Voltage Support	No
J1939 Protocol	No
J1708 Protocol	No
Extended PassThru IOCTL for Device Configuration Parameters	Yes
TP2.0 Protocol	No
Fault-Tolerant CAN	No

A.3 SAE J2534-1 Revised OCT2015

The following figure lists the supported features included in PCAN-PassThru API. Please note that those features are intended only for forward compatibility the PassThruReadVersion still returns « 04.04 ».

Feature	Supported?
USE PASSTHROOPEN WITH A DEVICE NAME	YES. The <code>pName</code> argument in <code>PassThruOpen</code> function can start with <code>J2534-1:PEAK</code> or <code>J2534-2:PEAK</code> followed by the handle of the PEAK device that shall be opened (ex. 0x51).

A.4 GM Extension GMW177753 – CAN FD Support

The following table lists the supported features included in GMW177753.

Feature	Supported?
PIN SELECTION (CAN_FD_PS, ISO15765_FD_PS)	Only J1962_PINS with 0x60E
Protocols: CAN_FD_PS, ISO15765_FD_PS	Yes
Tx Flags: CAN_FD_BRS, CAN_FD_FORMAT	Yes
Rx Status: CAN_FD_BRS, CAN_FD_FORMAT, CAN_FD_ESI, ERROR_IND.	Yes
RX Status: RX_MSG_TRUNCATED	Yes
Mixed format with ISO15765_FD	Yes
Message Extension (DataSize > 4128)	Yes
Dynamic Flow CONTROL	No
IOCTL: CAN_FD_PHASE_RATE, CAN_FD_TC_DATA_LENGTH, CAN_FD_TYPE (ISO CAN FD)	Yes
IOCTL: CAN_FD_TYpE (BOSCH CAN FD)	No
IOCTL: CAN_FD_TERMINATION, N_CR_MAX	No

A.4.1 Supported Bit Rates

The following tables lists the valid bit rate combinations specified in GMW17753 and the corresponding register value sets.

Nominal Bit Rate	Data Bit Rate (bits per second)				
500 000	500 000	1 000 000	2 000 000	4 000 000	5 000 000 (Default)
250 000	250 000	500 000	1 000 000	2 000 000	2 500 000 (Default)
125 000	125 000	250 000	500 000	1 000 000	1 250 000 (Default)

Bit Rate Combination	Register Value Set								
	f_clock	nom. BRP	nom. TSEQ1	nom. TSEQ2	nom. SJW	data BRP	data TSEQ1	data TSEQ2	data SJW
500 kbit/s 500 kbit/s	80000000	10	12	3	1	4	29	10	1
500 kbit/s 1 Mbit/s	80000000	10	12	3	1	2	29	10	1
500 kbit/s 2 Mbit/s	80000000	2	63	16	16	2	15	4	4
500 kbit/s 4 Mbit/s	80000000	10	12	3	1	1	14	5	1
500 kbit/s 5 Mbit/s	80000000	1	127	32	32	1	11	4	4
250 kbit/s 250 kbit/s	80000000	2	139	20	1	8	29	10	1
250 kbit/s 500 kbit/s	80000000	2	139	20	1	4	29	10	1
250 kbit/s 1 Mbit/s	80000000	2	139	20	1	2	29	10	1
250 kbit/s 2 Mbit/s	80000000	2	139	20	1	1	29	10	1
250 kbit/s 2.5 Mbit/s	80000000	2	139	20	1	1	23	8	1
125 kbit/s 125 kbit/s	80000000	4	139	20	1	16	29	10	1
125 kbit/s 250 kbit/s	80000000	4	139	20	1	8	29	10	1
125 kbit/s 500 kbit/s	80000000	4	139	20	1	4	29	10	1
125 kbit/s 1 Mbit/s	80000000	4	139	20	1	2	29	10	1
125 kbit/s 1.25 Mbit/s	80000000	4	139	20	1	2	23	8	1