


# PCAN-RS-232

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		Ersteller:	<a href="#">S. Schott</a>
		Version / Freigabe:	<a href="#">1.0 / 01.08.2009</a>

## 1.1 Description

This example code implements the CAN-to-serial-by-command application. PCAN-RS-232 is shipped with this firmware in flash memory.

First time use: When powering up the PCAN-RS-232 will blink 3 times red, meaning the serial interface is set to 57600 bit/s. CAN is configured to 125 kbit/s, all filters are inactive. When e.g. starting the popular CAN hacker shareware, one might immediately send and receive CAN messages. The PCAN-RS-232 device behaves widely as similar adapters from other (famous) brands...

**Author:**


StS

**Date:**

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## 1.2 Function Documentation

### 1.2.1 C[CR] Close the CAN channel.

#### Precondition:

This command is accepted only if the CAN channel is open.

#### Parameters:


**none**

#### Note:

example: C[CR]  
Close the channel, blinking stops, green LED is lit statically.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is not open  
CR (Ascii 13) for OK

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### 1.2.2 N[CR]

Get serial number of the PCAN-RS-232.

#### Precondition:

This command is always accepted.

#### Parameters:

**none**

#### Note:


example: N[CR]

Get serial number.

The serial number may be composed of both numerical and alphanumerical values. The serial number is also printed on the PCAN-RS-232 enclosure.

#### Returns:

N and a 4 bytes value for serial number plus CR (Ascii 13) for OK, e.g. NA123[CR]

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### 1.2.3 F[CR] Read Status Flags.

#### Precondition:

This command is accepted only if the CAN channel is open.

#### Parameters:

**none**


#### Note:

example: F[CR]  
Read Status Flags.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is not open  
An F with 2 bytes BCD hex value plus CR (Ascii 13) for OK, e.g. F01[CR]

- Bit 0 : CAN receive FIFO queue full
- Bit 1 : CAN transmit FIFO queue full
- Bit 2 : Error warning (EI), see SJA1000 datasheet
- Bit 3 : Data Overrun (DOI), see SJA1000 datasheet
- Bit 4 : Not used.
- Bit 5 : Error Passive (EPI), see SJA1000 datasheet
- Bit 6 : Arbitration Lost (ALI), see SJA1000 datasheet
- Bit 7 : Bus Error (BEI), see SJA1000 datasheet

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#### 1.2.4 V[CR]

Get version number of both PCAN-RS-232 hardware and software.

##### **Precondition:**

This command is always accepted.

##### **Parameters:**


**none**

##### **Note:**

example: V[CR]  
Get version numbers.

##### **Returns:**

V and a 2 bytes BCD value for hardware version and a 2 byte BCD value for software version plus CR (Ascii 13) for OK, e.g. V1013[CR]

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### 1.2.5 L[CR]

Open the CAN channel in listen only mode (receiving).

#### Precondition:

This command is accepted only if the CAN channel is closed and has been initialized with either the S or the s command.

#### Note:

It is not possible to send CAN frames (t, T, r & R)

#### Parameters:


**none**

#### Note:

example: L[CR]  
Open the channel, green LED starts blinking slowly 1Hz.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is either open or uninitialized  
CR (Ascii 13) for OK

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### 1.2.6 O[CR]

Open the CAN channel in normal mode (sending & receiving).

#### Precondition:

This command is accepted only if the CAN channel is closed and has already been initialized with either the S or the s command.

#### Parameters:

**none**


#### Note:

example: O[CR]  
 Open the channel, green LED starts blinking slowly 1Hz.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open or uninitialized  
 CR (Ascii 13) for OK



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### 1.2.7 [A\[CR\]](#)

Polls CAN Rx queue for incoming CAN frames (all pending frames)

#### Parameters:

**none**

#### Note:


example: [A\[CR\]](#)

Polls all CAN frames from the FIFO queue.

This command is not supported, use the new AUTO POLL/SEND feature instead.

#### Returns:

BELL (Ascii 7) for ERROR

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### 1.2.8 P[CR]

Polls CAN Rx queue for incoming CAN frames (single poll)

#### Parameters:

**none**

#### Note:

example: P[CR]

Poll one CAN frame from the FIFO queue.

This command is not supported, use the new AUTO POLL/SEND feature instead.

#### Returns:

BELL (Ascii 7) for ERROR

### 1.2.9 Mxxxxxxx[CR] Sets Acceptance Code Register (ACn Register of SJA1000).

The setting is saved in EEPROM and remembered on next startup.

#### Precondition:

This command is accepted only if CAN channel is initialized but closed.

#### Parameters:

**xxxxxxx** Acceptance Code in hex with LSB first, AC0, AC1, AC2 & AC3. For more info, see NXP SJA1000 datasheet.

#### Note:


example: M00000000[CR]

Set Acceptance Code to 0x00000000. This is default when power on with Autostart=0, i.e. all frames will come through.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open

CR (Ascii 13) for OK

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#### 1.2.10 mxxxxxxx[CR]

Sets Acceptance Mask Register (AMn Register of SJA1000).

The setting is saved in EEPROM and remembered on next startup.

#### Precondition:

This command is accepted only if CAN channel is initialized but closed.

The Acceptance Code Register and the Acceptance Mask Register work together and they can filter out 2 groups of messages. For more detailed info, see NXP SJA1000 datasheet. In 11bit IDs it is possible to filter out a single ID this way, but in 29bit IDs it is only possible to filter out a group of IDs. The example below will set a filter to only receive all 11bit IDs from 0x300 to 0x3FF. M00006000[CR] -> AC0=0x00, AC1=0x00, AC2=0x60 & AC3=0x00 m00001FF0[CR] -> AM0=0x00, AM1=0x00, AM2=0x1F & AM3=0xF0 The first command tells the filter 2 to match 2 bits and if they are not set (in this case it corresponds to 0x3nn, the 3). The second command tells the nn to be don't care, so it could be from 0 to FF, though not so easy to read, since they are not placed nice in a row in memory. Filter 1 is turned off (uses AM0, AM1 & half lower AM3). The last byte in the mask could also be 0xE0 instead of 0xF0, then we filter out the RTR bit as well and you wont accept RTR frames.

#### Parameters:

**xxxxxxx** Acceptance Mask in hex with LSB first, AM0, AM1, AM2 & AM3. For more detailed info, see NXP SJA1000 datasheet.

#### Note:

example: mFFFFFFFF[CR]  
Set Acceptance Mask to 0xFFFFFFFF. This is default when power on with Autostart=0, i.e. all frames will come through.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open  
CR (Ascii 13) for OK

### 1.2.11 Xn[CR]

Sets Auto Poll/Send ON/OFF for received frames.

#### Precondition:

This command is accepted only if the CAN channel is closed.

The value will be saved in EEPROM and remembered next time the PCAN-RS-232 is powered up. It is set to OFF by default, to be compatible with old programs written for PCAN-RS-232. Setting it to ON will disable the P and A commands and change the reply back from using the t and T command (see these commands for more information on the reply). It is strongly recommended to set this feature and upgrade from the old polling mechanism. Doing so will save bandwidth and increases number of CAN frames that can be sent to the PCAN-RS-232. With this feature set, CAN frames will be sent out on the RS232 as soon as the CAN channel is opened.

#### Parameters:

**n=0** turn off Auto Poll/Send feature

**n=1** turn on Auto Poll/Send feature

#### Note:

example 1: X0[CR]

Turn OFF the Auto Poll/Send feature


example 2: X1[CR]

Turn ON the Auto Poll/Send feature.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open

CR (Ascii 13) for OK

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### 1.2.12 Qn[CR]

Auto Startup feature (from power on).

#### Precondition:

This command is accepted only if the CAN channel is open.

Use this function when you have set up CAN speed and filters and you want the PCAN-RS-232 to boot up with these settings automatically on every power on. Perfect for logging etc. or when no master is available to set up the PCAN-RS-232. Note: Auto Send is only possible (see X command), so CAN frames are sent out automatically on RS232 when received on CAN side. No polling is allowed.

#### Parameters:

- n=0** Turn OFF the Auto Startup feature
- n=1** Turn ON the Auto Startup feature in normal mode.
- n=2** Turn ON the Auto Startup feature in listen only mode

#### Note:

The value is saved in EEPROM and is set each time the PCAN-RS-232 is powered up.  
example 1: Q0[CR]  
Turns OFF the Auto Startup feature. On next power up, the PCAN-RS-232 works normally, waiting for commands for setup etc.  
example 2: Q1[CR]  
Turn ON the Auto Startup feature in normal mode. Filters etc. are saved and used on next power up.  
example 3: Q2[CR]  
Turn ON the Auto Startup feature in listen only mode. Filters etc. are saved and used on next power up. This disables t, T, r and R commands!

#### Returns:

BELL (Ascii 7) for ERROR  
CR (Ascii 13) for OK

### 1.2.13 sxxyy[CR]

Setup with BTR0/BTR1 CAN bit-rates where xx and yy is a hex value.

#### Precondition:

This command is accepted only if the CAN channel is closed.

#### Parameters:

**xx** BTR0 value in hex

**yy** BTR1 value in hex

#### Note:

example: s031C[CR]

Setup CAN with BTR0=0x03 & BTR1=0x1C which equals to 125 kbit/s.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open

CR (Ascii 13) for OK

#### 1.2.14 Sn[CR]

Setup with standard CAN bitrates where n is 0-8.

##### Precondition:

This command is accepted only if the CAN channel is closed.

##### Parameters:

**bitrate** selector n (where n is 0-8)

- n=0 : 10 kbit/s
- n=1 : 20 kbit/s
- n=2 : 50 kbit/s
- n=3 : 100 kbit/s
- n=4 : 125 kbit/s
- n=5 : 250 kbit/s
- n=6 : 500 kbit/s
- n=7 : 800 kbit/s
- n=8 : 1 Mbit/s

##### Note:

example: S4[CR]  
Setup CAN to 125 kbit/s.

##### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open  
CR (Ascii 13) for OK



### 1.2.15 Wn[CR] Filter mode setting.

#### Precondition:

This command is accepted only if CAN channel is initialized but closed.

The setting is saved in EEPROM and since remembered on next startup.

#### Parameters:

**n=0** set dual filter mode


**n=1** set single filter mode

#### Note:

example 1: W0[CR]  
Set dual filter mode  
example 2: W1[CR]  
Set single filter mode

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open  
CR (Ascii 13) for OK

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### 1.2.16 Zn[CR]

Sets Time Stamp ON/OFF for received frames only.

#### Precondition:

This command is accepted only if the CAN channel is closed.

This command is set to OFF by default (to be compatible with older programs written for PCAN-RS-232). Setting it to ON will add 4 bytes sent out from PCAN-RS-232 when the Auto Poll/Send feature is enabled. With Timestamp ON, each message gets a time in milliseconds when it was received at the PCAN-RS-232, this can be used for realtime applications for e.g. knowing time inbetween messages etc. Using this feature will decrease bandwidth on the PCAN-RS-232, since it adds 4 bytes to each message being sent. If the timestamp is OFF, the incoming frames looks like this: t10021133[CR] (a standard frame with ID=0x100 & 2 bytes) If the timestamp is ON, the incoming frames looks like this: t100211334D67[CR] (a standard frame with ID=0x100 & 2 bytes) Note the last 4 bytes 0x4D67, which is a timestamp for this specific message in milliseconds (and of course in hex). The timer in the PCAN-RS-232 starts at zero 0x0000 and goes up to 0xEA5F before it loops around to 0x0000. This corresponds to 60,000mS (i.e. 1 minute, which will be more than enough in most systems).

#### Parameters:

**n=0** Turn OFF the timestamp feature

**n=1** Turn ON the timestamp feature

#### Note:

The value is saved in EEPROM and is set each time the PCAN-RS-232 is powered up.

example 1: Z0[CR]

Turn OFF the Time Stamp feature.


example 2: Z1[CR]

Turn ON the Time Stamp feature.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open

CR (Ascii 13) for OK

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### 1.2.17 Un[CR]

Setup UART with standard bitrates where n is 0-6.

#### Precondition:

This command is accepted only if the CAN channel is closed.

#### Parameters:

**UART** bitrate selector n (where n is 0-6)


- n=0 . Setup 230400 baud (not guaranteed to work)
- n=1 .. Setup 115200 baud
- n=2 ... Setup 57600 baud (default when delivered)
- n=3 .... Setup 38400 baud
- n=4 ..... Setup 19200 baud
- n=5 ..... Setup 9600 baud
- n=6 ..... Setup 2400 baud

#### Note:

The dots above indicate how many times the red LED blinks when the device is powered up. This is a simple way of showing which RS232 speed is currently configured. The value is saved in EEPROM and is set each time the PCAN-RS-232 is powered up.  
 example: U2[CR]  
 Setup UART to 57600 baud.

#### Returns:

BELL (Ascii 7) for ERROR when CAN channel is open  
 CR (Ascii 13) for OK

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### 1.2.18 Tiiiiiiiidd...[CR]

Transmit an extended (29bit) CAN frame.

#### Precondition:

This command is accepted only if the CAN channel is open in normal mode.

#### Parameters:

**iiiiiii** Identifier in hex (00000000-1FFFFFFF)

**l** Data length (0-8)

**dd** Byte value in hex (00-FF). Numbers of dd pairs must match data length, otherwise an error occurs.

#### Note:

example: T0000010021133[CR]

Sends a 29bit CAN frame with ID=0x100, 2 bytes with the value 0x11 and 0x33.

#### Returns:

If Auto Poll is disabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only

CR (Ascii 13) for OK

If Auto Poll is enabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only

z[CR] for OK

### 1.2.19 Riiiiiii[CR]

Transmit an extended RTR (29bit) CAN frame.

#### Precondition:

This command is accepted only if the CAN channel is open in normal mode.

#### Parameters:

iiiiiii Identifier in hex (00000000-1FFFFFFF)

i Data length (0-8)

#### Note:

example: R000001002[CR]

Sends a 29bit RTR CAN frame with ID=0x00000100 and DLC set to two (2 bytes).

#### Returns:

If Auto Poll is disabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only.

CR (Ascii 13) for OK

If Auto Poll is enabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only

z[CR] for OK

### 1.2.20 tiiidd...[CR]

Transmit a standard (11bit) CAN frame.

#### Precondition:

This command is accepted only if the CAN channel is open in normal mode.

#### Parameters:

**iii** Identifier in hex (000-7FF)

**l** Data length (0-8)

**dd** Byte value in hex (00-FF). Number of dd pairs must match data length, otherwise an error occurs.

#### Note:

example 1: t10021133[CR]

Sends an 11bit CAN frame with ID=0x100, 2 bytes with the value 0x11 and 0x33.

example 2: t0200[CR]

Sends an 11bit CAN frame with ID=0x20, 0 bytes.

#### Returns:

If Auto Poll is disabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only

CR (Ascii 13) for OK

If Auto Poll is enabled:

BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only

z[CR] for OK

### 1.2.21 r11l[CR]

Transmit a standard RTR (11bit) CAN frame.

#### Precondition:

This command is accepted only if the CAN channel is open in normal mode.

#### Parameters:

- i** Identifier in hex (000-7FF)
- l** Data length (0-8)

#### Note:

example: r1002[CR]  
Sends an 11bit RTR CAN frame with ID=0x100 and DLC set to two (2 bytes).

#### Returns:

If Auto Poll is disabled:  
 BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only  
 CR (Ascii 13) for OK  
 If Auto Poll is enabled:  
 BELL (Ascii 7) for ERROR when CAN channel is not open or Listen-Only  
 z[CR] for OK

### 1.2.22 en[CR]

Writes EepromData to EEPROM.

Don't write too often, intended for emergency cases only !!

Use this function when you have set up CAN speed and filters and you want the PCAN-RS-232 to boot up with these settings automatically on every power on. Perfect for logging etc. or when no master is available to set up the PCAN-RS-232. Note: Auto Send is only possible (see X command), so CAN frames are sent out automatically on PCAN-RS-232 when received on CAN side. No polling is allowed.

#### Parameters:

- ParamSetNo**
- n=0 Save current settings
  - n=1 Reset to factory defaults
  - n=2 Delete (=write 0xFF)

#### Note:

example 1: e0[CR]  
Saves all current settings to EEPROM.  
example 2: e1[CR]  
Write some useful defaults to EEPROM.  
example 3: e2[CR]  
Writes 0xFF (deletes EEPROM area)

#### Returns:

BELL (Ascii 7) for ERROR should never occur  
CR (Ascii 13) for OK