CAN FD is 10* Faster

With CAN 2.0A/B maximum data rates were limited to about 320 Kbits/sec (after allowances for the protocol overhead). The latest standard CAN FD is able to achieve over 3.7Mbits/sec. The FD protocol is fully compatible with the 2.0A/B and allows interworking of mixed systems (where all controllers are FD but some modules may be 2.0) so provides a good upgrade path allowing people to use the many CAN 2.0 modules available but, where higher rates/larger volumes of data are involved, new modules can be designed to satisfy the requirement.

Peak are among the manufacturers who have responded to the call with new USB single and dual FD interfaces conforming to the FD specification with only a slight cost increase to give future proofing.

How Does It Do It?

It is really quite clever – following the message number field in the CAN protocol one of the previously unused bits in the control field is used to signal that the transaction is a Fast Data (FD) transaction. Once detected any FD enabled interface or module, when addressed, will operate at a higher clock rate (typically 10Mz rather than 2.0's 1MHz). The remainder of the control field and the data field of the message is then sent/read at this higher rate. In addition the designers have changed the possible length of the data field from 2.0's limit of 0-8 bytes to FD's alternative of 0-8 or 12, 16, 20, 24, 32, 48 or 64 bytes.

The details of the CRC check have also been changed to cope with the longer packet lengths. During the trial stage of the design of FD an error bit situation was encountered that the CRC algorithm could not flag. The algorithm was changed and all new FD interfaces implementing this change (known as bit stuffing) and are then described as ISO-CAN FD compliant. Peaks interfaces can be switched between the original FD and ISO-CAN FD in order to allow early adopter systems to be used with them.

Peaks CAN FD Interfaces

Two versions are available

PCAN-USB FD a single channel interface
PCAN-USB Pro FD this has two CAN FD channels plus two Lin channels all of which are isolated from one another and can operate simultaneously.

These all have the following functions for their CAN channels.

- Adapter for High-speed USB 2.0 (compatible to USB 1.1 and USB 3.0)

- Complies with CAN specifications 2.0A/B and FD

- CAN bit rates from 40 kbit/s up to 1 Mbit/s

- CAN FD bit rates for the data field (64 bytes max.) from 40 kbit/s up to 12 Mbit/s

- CAN FD support for ISO and Non-ISO standard is switchable

- Time stamp resolution 1 µs

- CAN bus connection via D-Sub, 9-pin (in accordance with CiA®102)

- FPGA implementation of the CAN FD controller

- NXP TJA1044GT CAN transceiver

- Galvanic isolation up to 500 V

- CAN termination may be activated via a solder jumper

- It provides data on bus load, error frames and overload frames on the bus

- It can induce errors for incoming and outgoing CAN messages

- 5-Volt supply to the CAN connection can be connected to the D-Sub 9 connector through a solder jumper, e.g. for an external bus converter

- Interface power is supplied via the USB connection

- Extended operating temperature range from -40 to 85ºC (-40 to 185ºF)

PCAN View has been upgraded to support the larger data packets displaying them in decimal or in ASCII formats as well as Hex. In addition the enhanced timing, bus load and error handling provided by the PCAN FD FPGA are supported along with listen only mode.

Complex Modules – Simple Answers

Some of our modules have been released with windows based configuration programs. These allow the user to rapidly set up the most common modes of operation. But our users are ingenious and inventive and Sods Law says we cannot guess all their requirements. So now many of Peaks' modules include an ARM CPU and are provided with a Yagarto GNU compiler/GDB debugger and flash programmer plus a set of examples of how to drive the I/O of interest. In this way the purchasing engineer can make the module perform exactly the functions he needs. This gives us a solution that allows a much wider distribution of intelligence down near the sensor.

Indeed such is the flexability provided that some of these modules could be used as data loggers or as controllers for simple CAN systems.

Modules where programmability is now supported are:-
  Two port Routers
  Four port Router Pro with data logging to SD cards
  Plus the two following modules

PCAN-RS-232

Not an interface that will run CAN from a 232 port. But instead a solution to the problem that many sensors in the field have a 232 port used for setting the scale or reporting the value which needs now to be connected to CAN. Peaks solution is a module with a CAN port and an ARM single chip micro with a 232 port. As there will be a multitude of possible formatted messages the user is provided with a GCC C compiler and a GDB debugging environment plus example code to act as a template. In this way the module may be customised to the application.

PCAN-GPS

With a satellite receiver, a magnetic field sensor, an accelerometer, a gyroscope and a micro SD card this module can be of use in many different applications requiring positional data. It includes a single chip ARM processor, development software and example programs. This allows the user to configure the message structure and reporting that they require.

These modules and the CAN FD interface are now available for next day shipping from our web shop www.computer-solutions.co.uk