Davis CAN-capable devices transmit using the CAN extended data frame with 29-bit ID and, in some products, the CAN standard data frame with 11-bit ID.. There may be up to 8 bytes of data in a frame. The first byte received in a frame is considered byte-0 and the last byte received is considered byte-7. Data is encoded as Big Endian.

The most significant 13 bits in the 29-bit ID (3 bits if the 11-bid ID is selected in an 11-bit capable device) may be configured in the device's setup screens. The default value is hexadecimal 0x04. This allows the CAN priority of the device to be changed if the receiving device is also advised of the address change.

The 16 least-significant bits identify the type of data in the 8-byte data stream. The following table details the available data frames from Davis devices along with their default CAN ID numbers. If the device is capable of 11-bit ID frame, the 11-bit address is shown in parentheses.

CAN ID	Rate (Hz)	Position	Channel	Units	Conversion
VPS					
0x0040000	N/A	0-1	et60	1/100 S	y=x/100
(0x400)		2-3	et330	1/100 S	y=x/100
		4-5	et660	1/100 S	y=x/100
		6-7	et1320	1/100 S	y=x/100
0x0040001	N/A	0-1	mph60	mph	y=x
(0x401)		2-3	mph330	mph	y=x
		4-5	mph660	mph	y=x
		6-7	mph1320	mph	y=x
0x0040002	N/A	0-1	max mph 660	mph	y=x
(0x402)		2-3	max mph 1320	mph	y=x
0x0040003	100	0	VPS Status Flags	N/A	
(0x403)		1-2	Pitch	1/10 degree	y=x/10
		3-4	Forward Acceleration	1/1000 G	y=x/1000
		5	Retard Percentage	0.39% (0-255)	y=x/2.55
		6	SmartDrop Level	cylinders	y=x
0x0040007	100	0-1	Selectable		
(0x407)		2-3	Selectable		
		4-5	Selectable		
		6-7	Selectable		
PFEFI					
0x0040020	100	0	PFEFI Status Flags	N/A	
		1	Retard	degrees	y=x
		2	SmartDrop Level	cylinders	y=x
		3-4	Driveshaft RPM	rpm	y=x
		5	Analog Input	1/10 Volt	y=x/10
DIC					
0x0040030	N/A	0	DIC Status Flags	N/A	
		1	Reserved	N/A	
		2	Retard	degrees	y=x

		3	SmartDrop	cylinders	y=x
		4-5	Engine RPM	rpm	y=x
		6	Analog In 1	1/10 Volt	y=x/10
		7	Analog In 2	1/10 Volt	y=x/10
SmartRelay4					
0x00400040	50	0-1	SmartRelay Status Flags	N/A	
		2	Channel-1 Duty	percent	y=x
		3	Channel-2 Duty	percent	y=x
		4	Channel-3 Duty	percent	y=x
		5	Channel-4 Duty	percent	y=x
0x00400041	50	0-1	SmartRelay Status Flags	N/A	
		2	Channel-1 Event		
		3	Channel-2 Event		
		4	Channel-3 Event		
		5	Channel-4 Event		

Bytes described above as Status Flags are comprised of single-bit indicators of various conditions. The bit indicators are detailed in the table below.

Bit Number:	7	6	5	4	3	2	1	0
VPS Status Flags				TC Active	Run Stopped	Run Active	Armed	Transbrake
PFEFI Status Flags				TC Active	Run Stopped	Run Active	Armed	Transbrake
DIC Status Flags				TC Active	Run Stopped	Run Active	Armed	Transbrake
SmartRelay Status (0)				TC Active	Run Stopped	Run Active	Armed	Transbrake
SmartRelay Status (1)					Ch-4 On	Ch-3 On	Ch-2 On	Ch-1 On

The CAN IDs shown above are the default for all devices. For any device, the most-significant 13-bits of the CAN ID can be changed to any value from 0x0000 to 0x1FFF. This allows the CAN IDs to be moved as needed to avoid conflicts with other devices transmitting on the CAN bus. It also allows the CAN priority of the frames from a device to be changed. Lowering the value of the CAN ID will give the CAN frame a higher priority relative to other frames being transmitted. For example, consider the VPS frame shown above at address 0x00040005. In the VPS configuration screens, the base CAN ID can be changed from 4 to any value 0x0000 to 0x1FFF. If you change the base ID to 0x0DA0, the resulting frame ID will be 0x0DA00005.

Example of CAN frame for ID 0x00040003 (VPS Standard Frame)

Here's an example of the CAN frame for VPS standard data at CAN ID 0x00040003. The data being transmitted is as follows:

Status Flags:	0x06	VPS Armed, Run in progress
Pitch Angle:	0xFFFD	Pitch at -0.3 degree
Forward Acceleration:	0x03E8	Acceleration at 1.000G
Timing Control	0x0C	Timing at 5% retard
SmartDrop Control	0x01	SmartDrop level-1

	CAN ID	BYTE 0	BYTE 1	BYTE 2	BYTE 3	BYTE 4	BYTE 5	BYTE 6
Data		Status	Pitch		Forward Acc		Timing	SD
Hex	0x00040003	0x06	0xFF	0xFD	0x03	0xE8	0x0C	0x01
Binary	00000000001000000000000000011	00000110	11111111	11111101	00000011	11101000	00001100	00000001

VPS Custom Frame

The VPS is capable of a custom CAN frame for the purpose of reporting to the variety of g and control devices in the drag racing world. The least significant bits of the custom frame CAN address is always 0x7. The custom frame uses the same 11-bit or 29-base address set globally in the CAN Settings screen.

The custom frame offers four 16-bit signed data selections. Each of these selections can be configured for any of the positional data channels the VPS produces: forward acceleration, lateral acceleration, vertical acceleration, pitch angle, roll angle, yaw angle, timing and SmartDrop.

For illustration, here's a look at essentially the same data in the Standard Frame, but configured as a Custom Frame. Notable differences are the omission of the Status byte (it is only available in the standard frame) and the formatting of Timing and SmartDrop data as 16-bit signed (because that's the only format available in the custom frame). Also the Timing data range is 0-100% in the Custom Frame, but in the Standard Frame it uses a range of 0-255 to accommodate the binary math in our ignition controller.

Pitch Angle:	0xFFFD	Pitch at -0.3 degree
Forward Acceleration:	0x03E8	Acceleration at 1.000G
Timing Control	0x0005	Timing at 5% retard
SmartDrop Control	0x0001	SmartDrop level-1

	CAN ID	BYTE 0	BYTE 1	BYTE 2	BYTE 3	BYTE 4	BYTE 5	BYTE 6	BYTE 7
Data		Pitch		Forward Acc		Timing		SmartDrop	
Hex	0x00040007	0xFF	0xFD	0x03	0xE8	0x00	0x05	0x00	0x01

Snapshot of Data with VPS custom frame (id 40007 and Profiler EFI (id 40020) module on the bus.