(/lbouchar)
Add unit vector sensor reading
(/docs/wiki/commit/49724d7740c3e7f96c925ead46b86724bad174bc)
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StandardUnits.md 3.2 KB

To enable interchangeability between multiple sensors, we standardize all units used in software.

Reading	Unit	Data Type	Fixed Point Representation (whole / fraction)
Temperature	kelvin	uint16_t	10/6
Current	Amps +/-	int32_t	15/16
Power	Watts	uint32_t	16/16
voltage	Volts	uint32_t	16/16
ADC output	Volts	int32_t	8/24
stored energy	Watt-hours	uint32_t	16/16
mag field	nT	int32_t	32/0
acceleration	G	int32_t	8/24
altitude	meters	uint32_t	32/0
angular rate	degrees per second	int32_t	12/20
latitude and longitude	degrees	int32_t	9/23
angle	degrees	uint16_t	9/7
	degrees	uint32_t	9/23
unit vector	N/A	int32_t	9/23

All sensors use the above standard units, but they have differing levels of precision. For future reference this documents the precision of various sensors we use.

= Driver Name =	= Range =	= Device Precision =	= Fixed Point Precision =	= Resulting Precision !** =	= Units =	= Data Type =	= Number / Decimal Format (Bits) !*** =	= Hardware Configuration =
=temp: tmp101 =	233-398 K	0.0625 C	1 / 64	0.0625 C	kelvin	uint16_t	10 / 6	

=temp: ad7517 =	233-398 K	0.25 C	1 / 64	0.25 C	kelvin	uint16_t	10 / 6	
=power: ina219 =								
= current=	4 A +-	100 uA	1 / 65536	100 uA	uA	int32_t	15 / 16	
= bus voltage=	0-16 V	4 mv	1 / 65536	4 mV	mV	uint32_t	16 / 16	
=power: ds2764 =								.01 ohm external shunt
= voltage=	4.997 V +	4.88 mV	1 / 65536	4.88 mV	mV	uint_32	16 / 16	
= current (Internal R)=	2.560 A +-	0.625 mA	1 / 65536	.625 mA	mA	int32_t	15 / 16	
= current (External R)=	3.2 A +-	15.625 uV	1 / 65536	15.625 uV	mA	int32_t	15 / 15	
=power: ds2782								0.015 ohm sense resistor
= voltage=	4.5 V +-	4.88 mV	1 / 65536	4.88 mV	V	uint16_t	16 / 16	
= temperature=	209-336.875 K	0.125 C	1 / 64	0.125 C	kelvin	uint32_t	10 / 6	
= current=	3.40 A +-	0.1044 mA	1 / 65536	0.1044 mA	A	int32_t	15 / 16	
= current accumulation=	0-27.308 A	0.4167 mA	1 / 65536	0.4167 mA	A	uint32_t	16 / 16	
=barometer: mpl115a2	50-150 kPa		1	1	kPa	uint16_t	16 / 0	Needs 3ms between readings.

!** equals the larger value between the provided device precision and the fixed point precision

!*** So 10 / 6 means top 10 bits indicate the whole number and the bottom 6 indicate the fractional part