Differences Between SilverNugget™ and SilverDust™

The SilverDust uses a more advanced Digital Signal Processor (DSP) for its computing engine, which allows QuickSilver to add more features. Every effort was made to make the SilverDust backwards compatible with the SilverNugget. QuickSilver also wanted to make improvements on the SilverNugget design and in some cases were limited by the previous generation DSP's specifications.

This technical document highlights the differences. For more details on the individual products, please see their datasheets and the SilverLode Command Reference.

The following is a list of differences between the SilverNugget and SilverDust.

DB15HD Connector

The pinout between these two products is the same except for the RS485 communication lines. The RS485 A&B lines are switched on the SilverDust. The RS232 signals are the same in both products.

Driver

At the time this document was written, only the SilverDust D2 was available which has a continuous per phase rating of 3.5A (see SilverDust datasheet). This is the same as the SilverNugget N2, both of which are designed to servo 17 and 23 frame step motors. For 34 frame motors, the SilverNugget N3 is the only option at this point.

Digital Inputs/Outputs

Background: Today's DSP technologies are moving toward smaller sizes and faster performance. As a result, lower operating voltages are necessary to reduce the power consumption of the system and generate less heat to compensate for the smaller size DSPs.

The SilverDust's DSP is based on a 3.3V design as opposed to the SilverNugget's DSP with is based on a 5.0V design. As stated earlier, every effort was made to make the SilverDust backward compatible, so that the SilverDust can accept a 0-5 Volt inputs, however due to limitation of the DSP, the output is only 0 – 3.3 Volts.

NOTE: The use of 5V pullups on outputs is not recommended as they will most likely override the output capability of the SilverDust.

Data Input Range

	SilverNugget	SilverDust
Input Range	0 to 5.0V	0 to 3.3V
Valid HIGH	2V – 5V	2V – 5V
Valid LOW	0 – 0.8V	0 – 0.8V

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Data Output Range

	SilverNugget	SilverDust
Output Range	0 to 5.0V	0 to 3.3V

Pull-Up Resistance

Input	SilverNugget	SilverDust
1	4.7K	~200K
2	4.7K	~200K
3	4.7K	~200K
4	~200K	~200K
5	~200K	~200K
6	~200K	~200K
7	~200K	~200K

Sourcing Limits

Output	SilverNugget	SilverDust
1	5mA	4mA
2	5mA	2mA
3	5mA	2mA
4	5mA	4mA
5	5mA	4mA
6	5mA	8mA
7	5mA	4mA

Analog Inputs

	SilverNugget	SilverDust
Range	0 to 5.0V	0 to 3.3V
Number of Bits	10	10
Resolution	4.88mV	3.22mV
Data range when read into a register	0-32767	0-32767

Temperature

For those users who read the raw temperature register (reg 214), use the following information to scale to degrees C in the SilverDust:

Temp (C) = (raw temp - 4960) / (99.29)
Temperature Sensor Limit is 105C

Encoder Support

SilverDust rev 02-10+ supports standard, single index pulse encoders as well as QCI's special 49 index encoder. The SilverNugget requires separate firmware for the 49 index encoders.

The M-Grade SilverDust does not support an encoder output feature.

Command Differences

Select External Encoder (SEE)

SilverDust does not support as many options as the SilverNugget. For the SilverDust the following parameter limitations apply:

Index Source
value=0 only
I/O #6

Encoder Style
value = 0 or 3 only
A/B Quadrature on I/O 4&5 or
Step & Dir on I/O 2&3

Disable Encoder Monitor (DEM)
Modulo Clear (MDC) (DEM)

For the SilverDust, these commands are accepted but do nothing.

Enable Encoder Monitor (EEM)
Modulo Set (MDS)
Modulo Trigger (MDT)

These commands do not exist for the SilverDust.

Select Encoder Filter (SEF)

SEF does not exist in SilverDust rev 01-10 code, but was put back for rev 02-10.

For rev 02-10+ code, Filter Enable:
0 = 150ns filter
1 = 300ns filter

Protocol (PRO)

For SilverDust rev 02-10+, supports all three of QCI's protocols (8 Bit ASCII, 9 Bit Binary, Modbus®) with same firmware.

ACK Delay (ADL)

For SilverDust rev 02-10+, a negative Delay Count is interpreted as the number of 30uSec ticks to delay. Positive Delay Count is still interpreted as the number of 120uSec ticks to delay. For the SilverNugget, a negative delay count is only allowed if the Modbus® firmware is being used.