FN-TEMP8 Data Format Specification

FN-STD-TEMP8 Rev. 2 2011-03

1. Purpose

FN-TEMP8 is the one-byte temperature representation used throughout the FNmega128 platform. It encodes an integer temperature in degrees Celsius using sign-magnitude form.

2. Bit Layout

- Bit 7 — sign (0 = positive, 1 = negative)
- Bits 6–0 — magnitude (absolute temperature, 0–127)

Representable range: –127 to +127 degrees Celsius.

3. Zero Handling

Two encodings map to zero. 0x00 is positive (canonical) zero; 0x80 is negative zero. Both decode to 0 °C. Encoders emit 0x00 for zero.

Encoding	Value
0x00	+0 °C (canonical)
0x80	–0 °C (normalized to 0)

4. Examples

Temperature (°C)	Binary	Hex
-30	10011110	9E
-24	10011000	98
-18	10010010	92
-12	10001100	8C
+0	00000000	00
+8	00001000	08
+24	00011000	18
+30	00011110	1E
+100	01100100	64
+125	01111101	7D
+127	01111111	7F

5. Conversion

```
encode(t):  if t &gt;= 0: byte = t &amp; 0x7F
            else:     byte = 0x80 | ((-t) &amp; 0x7F)

decode(b):  mag = b &amp; 0x7F
            value = -mag if (b &amp; 0x80) else mag
```

NOTE: The simulator recognizes valid FN-TEMP8 values across the entire representable range, including values outside the ranges offered by the ordinary configuration interface.

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