

Bit State Timing

Local application

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For digital data, one may want to generate an alarm only if a bit is in a given state for too long. Normally, this would be handled by the "tries needed" option supported by the alarm scanning logic. But that parameter is only a 4-bit number of 15 Hz cycles, so that it supports times of up to about one second. This note describes a new LA called BITT that can handle longer times.

The general idea is to use a local application called BITT, for Bit Timing, to measure how long a given Bit is in a given state, updating a dummy analog channel to reflect this time in cycles. One can then enable alarm scanning on this analog channel when the result time is too long.

Parameter layout

The parameter list for BITT is as follows:

<i>Field</i>		<i>Size</i>	<i>Meaning</i>
ENABLE	B	2	Usual local application enable Bit#
CYCLES	C	2	Target Chan# for cycle count of Bit matching given bit state
STATUS1	B	2	Status 1 Bit#, bit state in ms bit
STATUS2	B	2	Status 2 Bit#, bit state in ms bit
STATUS3	B	2	Status 3 Bit#, bit state in ms bit
STATUS4	B	2	Status 4 Bit#, bit state in ms bit

The CYCLES parameter is the first Chan# for the cycle count results. If there is more than 1 status Bit# specified in the next parameters, then those result channels simply follow sequentially. Although only 4 status bits are allowed, increasing this limit to 8 would be a trivial modification.

Each STATUS x Bit# parameter includes the selected bit state of interest in the most significant (sign) bit of the given Bit#. If one needs to measure the time that a given status bit is continuously zero, then this sign bit is 0; otherwise, the sign bit is 1.

As a specific example, chosen for use in node05E9, we have the following parameters:

<i>Parameter</i>		<i>Value</i>	<i>Meaning</i>
ENABLE	B	0x00C2	BITT ENABLE
CYCLES	C	0x0150	CHLRUS
STATUS1	B	0x0108	CHL RUN CH 140
STATUS2	B	0x8109	CHL RUN CH 141
STATUS3	B	0	
STATUS4	B	0	

Accordingly, the cycle count for Bit 0x0108 being continuously "0" is measured and placed into analog channel 0x0150. The cycle count for Bit 0x0109 being continuously "1" is measured and placed into analog channel 0x0151. To scale the result channels in units of seconds rather than cycles, use a full scale of 2184 rather than 32768. The maximum time is more than a half hour, no matter which full scale is used.