

# Longword Counters

*Local application*

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Wed, Aug 11, 2010

A VME board containing up to 16 counters has data that must be read as 32-bit longwords. In the present use, the counter values are expected to be under 15 bits in size. A new local application `LCNT` provides the needed support for access to these counters.

The parameter layout is as follows:

<i>Param</i>		<i>Size</i>	<i>Meaning</i>
<code>ENABLE</code>	B	2	Usual LA enable Bit#
<code>CYCLES</code>	B	2	Optional enable for current cycle Bit#
<code>BASEADDR</code>		4	Base address of first 4-byte counter data
<code>TARGET</code>	C	2	Target analog Chan# for first counter value
<code>NCHANS</code>		2	#channels in range 1-16

The optional `CYCLES` Bit# can be used to enable accessing the counters on only certain cycles, as specified by a status Bit# and matching bit state (in the sign bit position). For example, to specify that access to the counters only be done on cycles for which status Bit `0x00B5 = 1`, then use the parameter value `0x80B5`. Using `0x0000` enables access on every cycle.

The `BASEADDR` specifies the first register address, with any additional registers assumed to follow in sequence. The board in question is installed for a base address of `0x40F0080`, which provides for accessing the current values of the counter upon each access. The program computes differences of these counter readings between successive accesses. When the LA is first enabled, the counter readings are ignored the very first time they are read, since their history is unknown.

The `TARGET` parameter is the first analog channel whose reading is set for the counter specified by the given `BASEADDR`. Additional channels are assumed to follow in sequence.

The operation of the program is as simple as possible. If the `CYCLE` status Bit value matches the matching bit state, or if the `CYCLE` parameter is zero, the longword counter values are read from the hardware, starting at `BASEADDR`, and the previous readings are subtracted from them. Each difference is checked for being in the range  $\pm 32767$  and clamped if necessary. These 16-bit values are copied into the reading fields of the sequence of channels beginning at the `TARGET` channel.

If access to the specified hardware address results in a bus error, such cases are counted, with the date/time captured for the last such bus error occurrence, if any.