

Ethernet Receive Timing

Diagnostic table

Fri, Feb 6, 1998

In the IRMs, the timing of ethernet frame reception is the subject of this note. Since a circular ring of receive buffers is passed to the controller chip, it is important that the chip never overrun the number of buffers in the ring. This number is currently 85, so it's unlikely; nevertheless, it is good to check it.

The idea is to measure the elapsed time between successive ethernet receive interrupts and record them in a table. Also, check how many frames were processed during one ethernet receive interrupt. The routine in the `ETHERNET` source module called `ENETRX` processes frame reception. The changes to support this diagnostic table are in this routine.

The diagnostic table is called `ERXTIME` and is located at address `00006400-000064FF`. Its structure is as follows:

<i>Field</i>	<i>Size</i>	<i>Meaning</i>
<code>eRxIn</code>	2	Offset to next entry in table
<code>eRxMax</code>	2	Maximum #frames processed in one call to <code>ENETRX</code> .
<code>eRxTMO</code>	1	Date (Mo) of last update of <code>eRxMax</code>
<code>eRxTOD</code>	4	Date (DaHrMnSc) of last update of <code>eRxMax</code>
<code>eRxTim</code>	1016	Room for 254 longword entries

Each longword entry holds the number of frames processed during that interrupt in the upper 8 bits. The elapsed time between consecutive frame receive interrupts (in microseconds) occupies the remaining 24 bits.

A new local application called `RXTH` histograms this data. It watches the activity of the `eRxIn` field and histograms all 24-bit elapsed time values it finds. Its parameters are the bin size (in microseconds) used for histogramming, the address of the memory used for building the histogram, and the available size of that memory. The histogram bins are 2-byte integer counts. The last bin is used as an overflow bin.

Preliminary results show it is very unlikely to process more than 3 frames in one interrupt. It is almost always the case that only one frame is processed per interrupt. With `RXTH` running in `node0562`, normally used for TFTP booting IRMs, it seems that 512-byte blocks are transferred every 4 ms, with the 162Bug client.