PHENIX

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Revised BBC LL1 algorithm

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1. New BBC Block Diagram on p. 2 has these advantages:

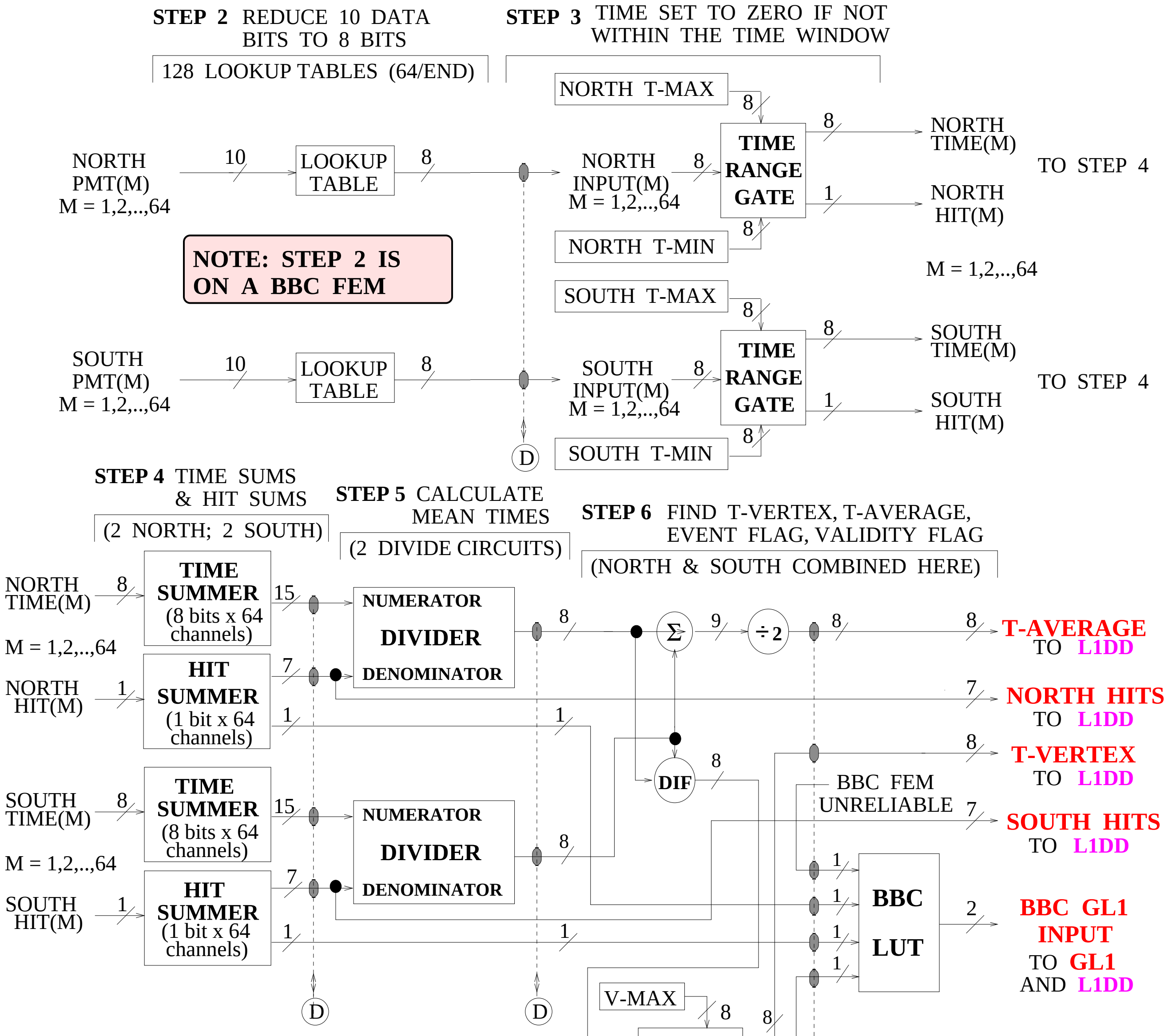
- **Mean-Time algorithm:** Toru and his group had shown (DC meeting in Aug 1997) that the mean-time algorithm was better than the channel-with-the-most-hits algorithm. (For reference, the previous block diagram, dated July 10, 1997, which had the channel-with-the-most-hits is shown on page 3.)
- **Less data for L1DD:** Without the histograms constructed for the channel-with-the-most-hits algorithm, there are no histogram data to send to the L1DD. The number of 16-bit words to the L1DD is 3 instead of 68 as in the previous version - the 3 words are sent to the L1DD from the BBC-2 board, and the two BBC-1 boards have no data to send to the L1DD.
- **Lower cost:** The mean-time algorithm can be built with just 2 BBC-1 boards, whereas the other algorithm would have required 4 BBC-1 boards.

2. 8 bits instead of 7 from the BBC FEMs has the obvious advantage of either twice the dynamic range or a lsb (least significant bit) of 50 ps rather than 100ps, the choice being which 8 bits of the 12-bit FADC on the BBC FEM is selected by the LUT on the BBC FEM.

3. New Hit data for L2: The new algorithm calculates two 7-bit words - **North Hits** and **South Hits** - that provide a BBC multiplicity for use in higher level triggers. (This multiplicity saturates at about 64 (all PMTs hit) in Au-Au collisions for impact parameters below about 7 fm, but provides selectivity for impact parameters between 7 and 14 fm.)

NEW BBC LL1 (MEAN-TIME ALGORITHM)

(30-NOV-1998)

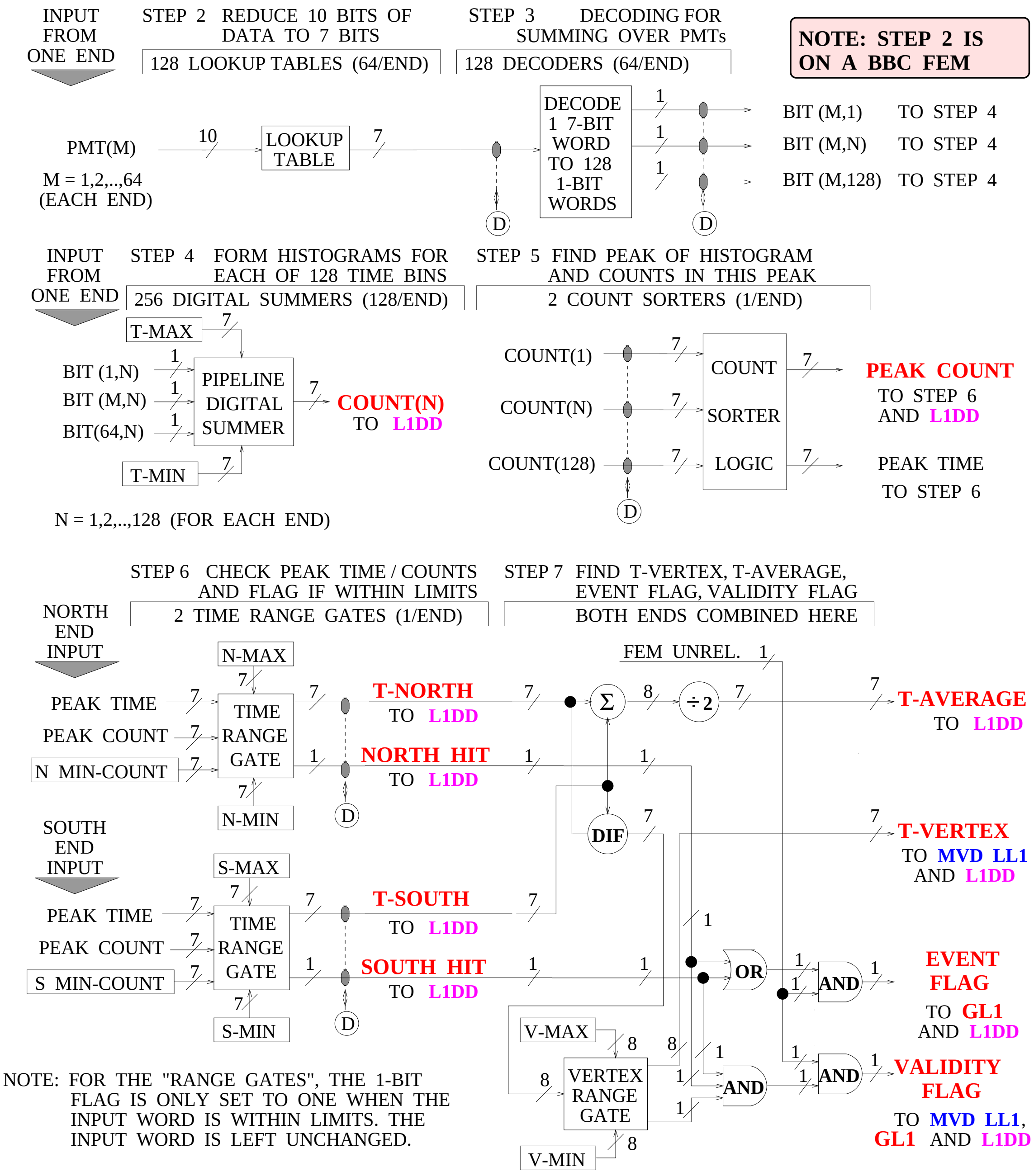


NOTE: FOR THE "RANGE GATES", THE 1-BIT FLAG IS ONLY SET TO ONE WHEN THE INPUT WORD IS WITHIN LIMITS. THE INPUT WORD IS RESET TO ZERO IF IT IS OUTSIDE THE RANGE GATE.

SYMBOLS AND (D) INDICATE LOCATIONS OF I/O USED FOR DIAGNOSTICS (TEST PATTERNS, ETC.)
THE BBC **MODE ENABLE** AND THE 8 BBC LL1 **MODE BITS** ("FEM UNRELIABLE" IS ONE) GO TO **L1DD,**
THE STEP-3 INPUT DATA FROM THE BBC FEMS COMES ON 24 FIBER-OPTIC CABLES.

OLD BBC LL1 (CHANNEL-WITH-THE-MOST-HITS ALGORITHM)

(10-JUL-1997)



SYMBOLS ⬮ AND (D) INDICATE LOCATIONS OF I/O USED FOR DIAGNOSTICS (TEST PATTERNS, ETC.)

THE BBC **MODE ENABLE** AND THE 8 BBC LL1 **MODE BITS** ("FEM UNRELIABLE" IS ONE) GO TO **L1DD,** AS DO THE BRD-1 **STATUS BITS.** THE 9 MODE BITS COME FROM BBC'S TIMING MODULE ON A COPPER CABLE. THE STEP-3 INPUT DATA FROM THE BBC FEMS COMES ON 24 FIBER-OPTIC CABLES.