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Find the *NASA VME BED* at our website: *Click HERE*

VMEBUS-BASED NASCOM BLOCK ERROR DETECTOR

THE PURPOSE of the VMEbus Block Error Detector (VME BED) is to monitor data quality of 4,800-bit Nascom blocks on a RS-422-A communications line. Each VME BED can simultaneously monitor (in parallel) either simplex side (send/receive) of a Nascom communication line. Simplex side selection (send/receive) and normal/reversed timing selection are done by the user.

Upon reception of a Nascom block on the monitored communications line, the block sync light-emitting diode (LED) will briefly illuminate and the block count will increment. If the received Nascom block has an incorrect 22-bit cyclic redundancy check (CRC), the CRC error LED will briefly illuminate and the block error count will increment. The VME BED can count up to 99999 detected Nascom blocks and up to 99999 detected Nascom blocks with CRC errors. Each counter has an overflow indication. Previous designs used off-the-shelf transistor-to-transistor logic microcircuits requiring about 40 microcircuits per BED board. The 10:1 attenuated patch panel added additional cost to the troubleshooting procedure and added another piece of equipment which could fail during troubleshooting. Another limitation was the inability to count the number of Nascom blocks detected and a limited number (999) of blocks detected with CRC errors. In contrast, the VME BED design is based on one programmable logic device. A few additional integrated circuits are used for the Nascom line interface and the front panel display interface.

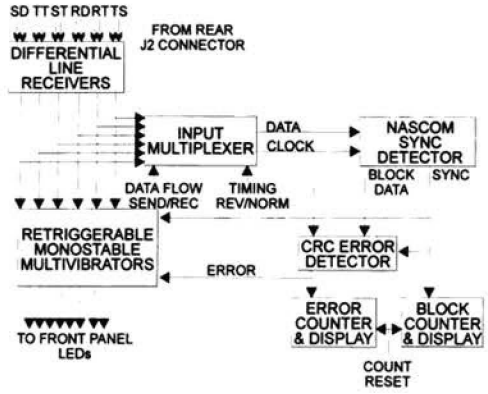
The VME BED is capable of monitoring either data flow of a full-duplex Nascom communications line. The VME BED is a standard 6U, 160-mm single-slot VMEbus card for mounting in any standard VME chassis. The front panel display (shown in the first figure) contains the operating controls, LED indicators, switches, block count display, block error count display, ejector handles, and mounting screws necessary to the operation and testing of each full-duplex port.

The selection of the data signals upon which to perform error detection is controlled at the front panel display. This block counter function and the block error detection function are performed by the following sequence of events:

- The standard 24-bit Nascom block synchronization pattern, 627627 hexadecimal (h), is detected;



VME BED.



Block diagram of VME BED circuit.

- The block sync LED is briefly illuminated and the block count is incremented;
- The CRC calculation is performed on the data field by the CRC generation circuitry. The P1 and P2 flag bits are not included;
- After the block CRC is encoded, a bit-by-bit comparison is performed on the CRC value located in the last 22 bits of the Nascom block;
- Finally, if the comparison fails, the block error count is incremented, and the block CRC LED is briefly illuminated.

The circuitry that performs the CRC calculation is summarized in the block diagram in the second figure.

The VME BED can be used to monitor data quality and connectivity of Nascom line switching systems. It can also be used to monitor data quality (as a control) for equipment that can send and/or receive Nascom blocks. This controlled monitoring has proven extremely useful in operational and testing scenarios.

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Sponsor: Office of Space Communications

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