

Summary of MROD-X Temperature Tests

Description

In the temperature tests the MROD-X modules are placed stand-alone in a climate-controlled oven, and are powered from the outside. The onboard SHARC DSPs are connected to an In-Circuit Emulator (also on the outside) and PC, enabling controlled software execution on all DSPs simultaneously. The GOL input links were interconnected by loopback fibers from MRODIN to MRODIN, so that sender and receiver were in different clock domains. The next page shows some pictures of the setup.

Test software that generates CSM-like input data on the GOL outputs was running on the MRODIN DSPs and software that spied on the event data and performed a full check on the data in real-time, was running on the MRODOUT DSP. During the temperature cycles, the full hardware chain from MROD-X GOL input up to, but not including, the SLINK output was thus continuously active (in this case: 8 GOL inputs and onboard RocketIO links) generating and processing event data. The event rate achieved was about 1 to 1.5 kHz.

In some of the tests the SLINK output was also utilized for relatively brief periods (about 10 to 15 min), in a number of the tests described in the next sections. The data was received on a FILAR module in a PC, stored on disk and checked for errors offline.

The MRODOUT DSP read out the FPGA temperature at regular intervals during the tests. This temperature is shown in the graphs, next to the test descriptions on the next pages.

No problems have been observed in any of the tests performed.

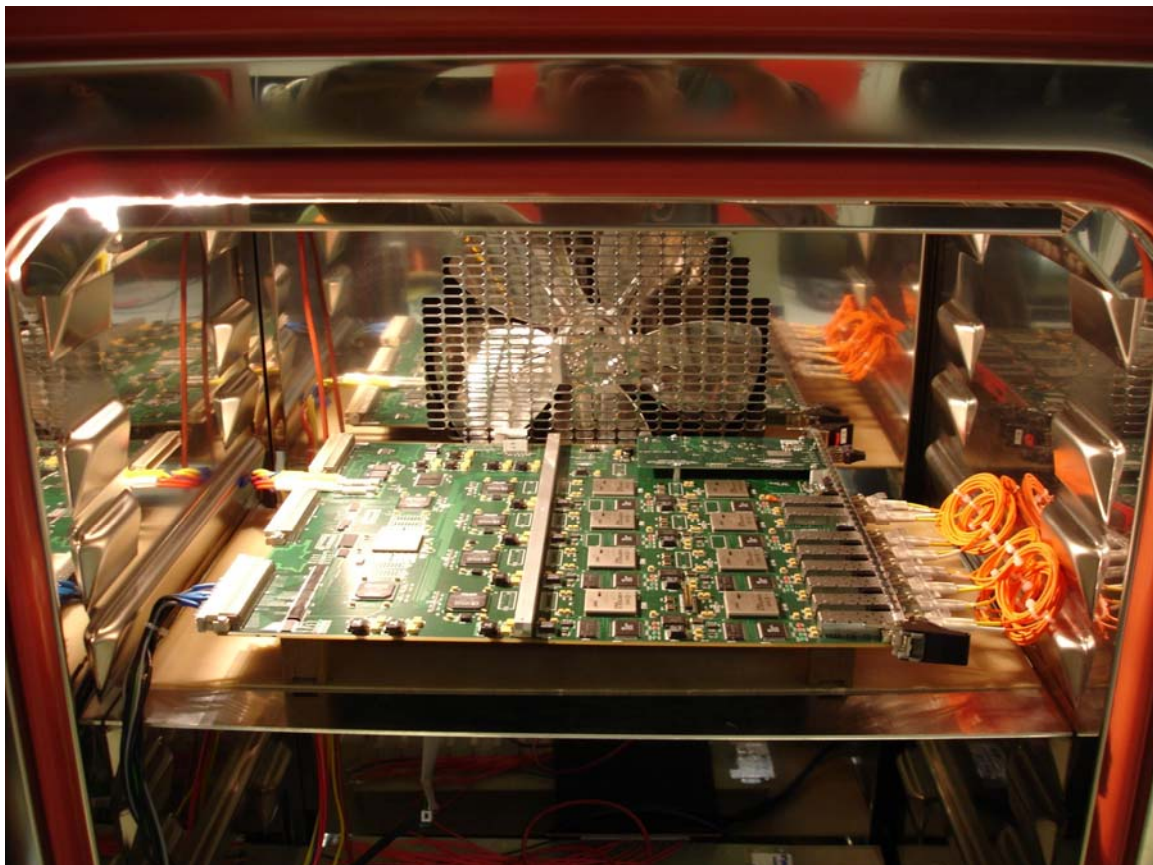
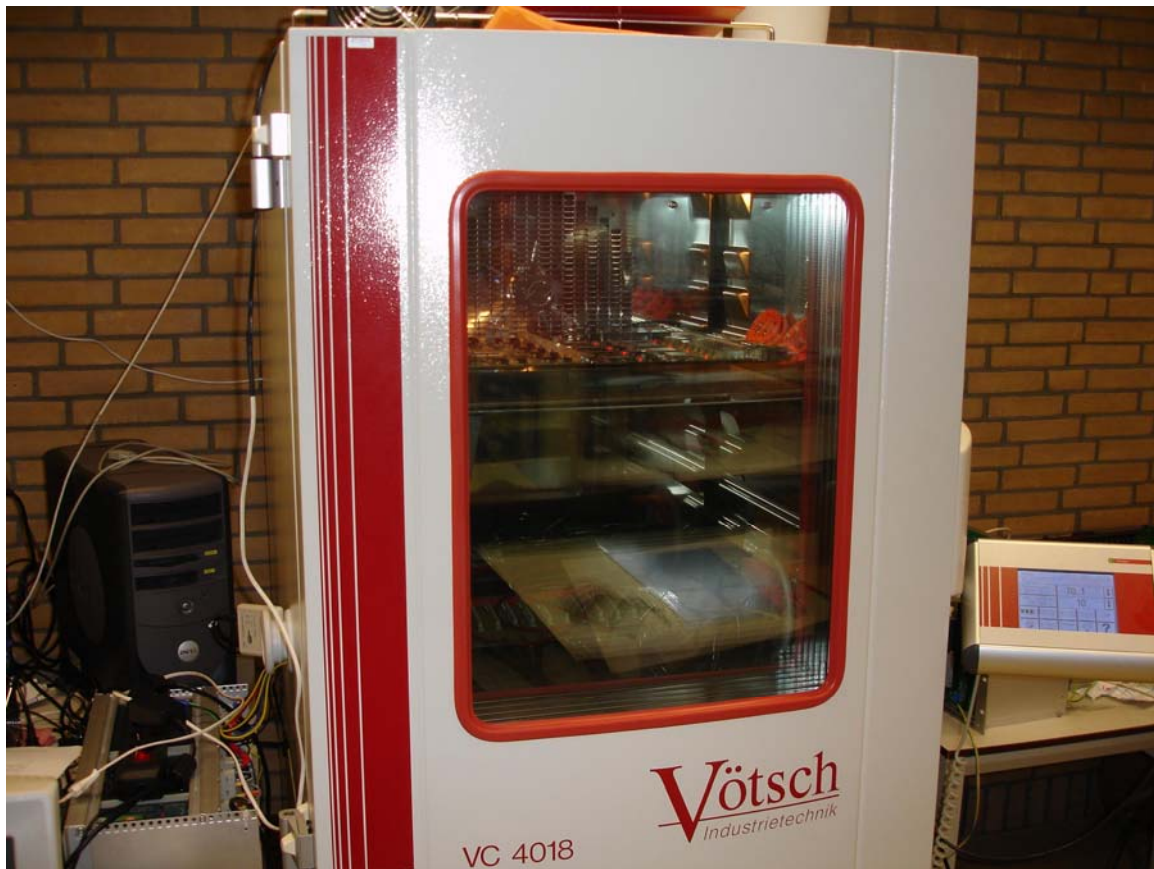
SHARC Link Tests

A number of the SHARC links (dedicated communication links between the SHARC DSPs) were tested while the MROD-X module was at a temperature of 0 and 70 C, respectively.

A link test consists of sending blocks of data across and checking at the other side for errors. Links were tested in both directions (not simultaneously).

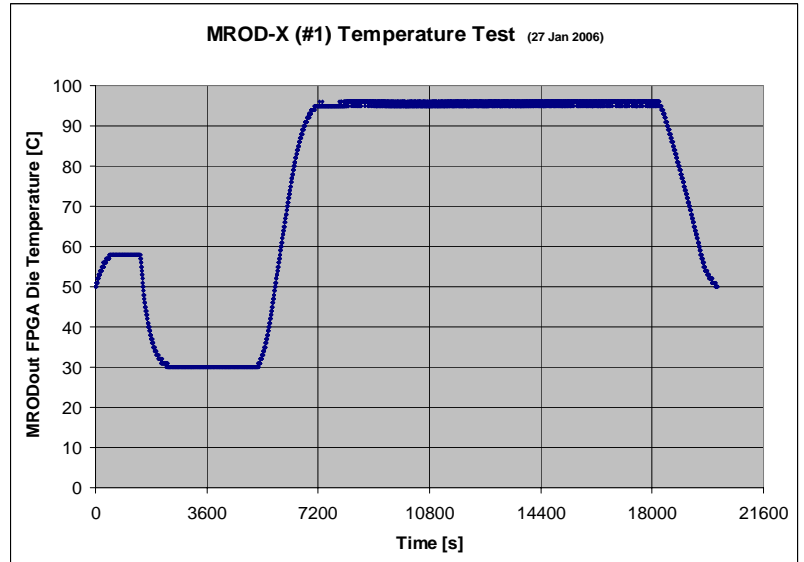
Links tested were (5 out of 7 links used in a 6-channel MROD-X, or 6 out of 9 links used in an 8-channel MROD-X, with MROD-X without SHARC B):

- MRODOUT – MRODIN: A1 to C4, A2 to D4, A3 to E4, A4 to F4.
- MRODIN – MRODIN: C0 to D5 (*not used normally*), D0 to E5, E0 to C5.

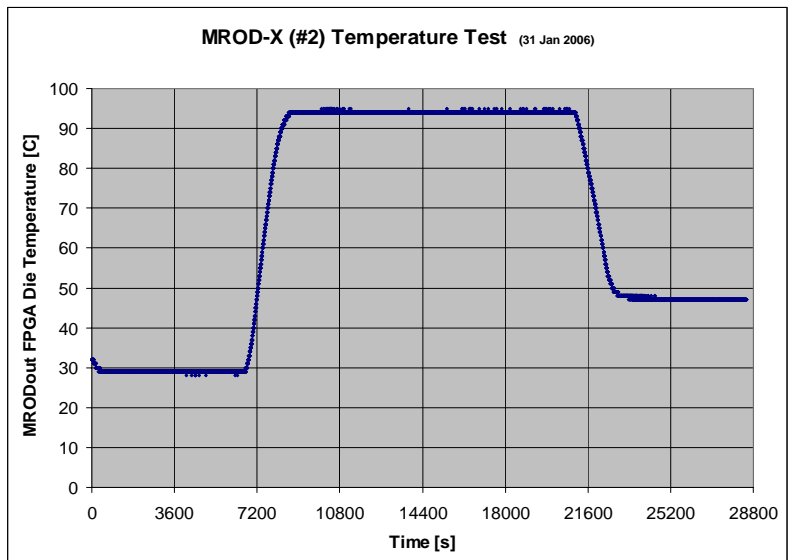


Full Board Tests

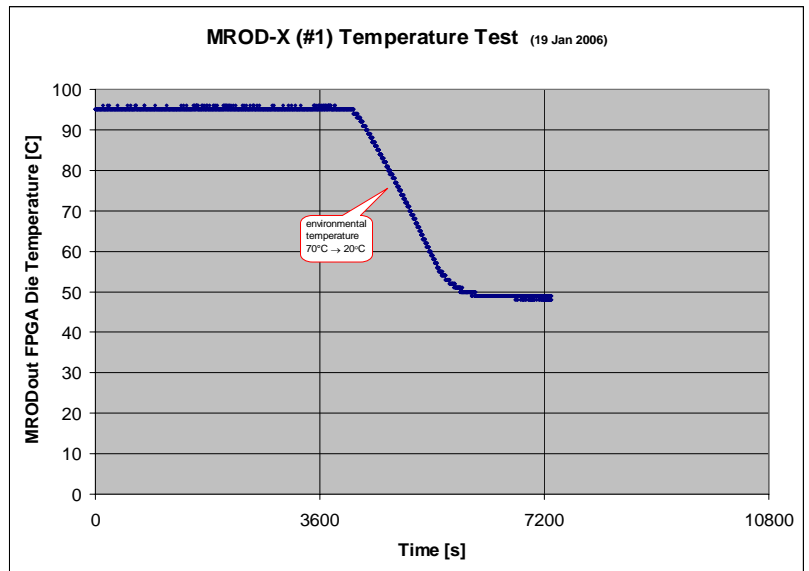
Module	S/N 1
Date	27 Jan 2006
Parameters	MRODIN: 50 MHz MRODOUT: 50 MHz, GOL: 25 MHz RocketIO: 100 MHz
Temp cycle	30 → 0 → 70 → 20 °C
Duration	5½ hours
Comments	no SLINK output



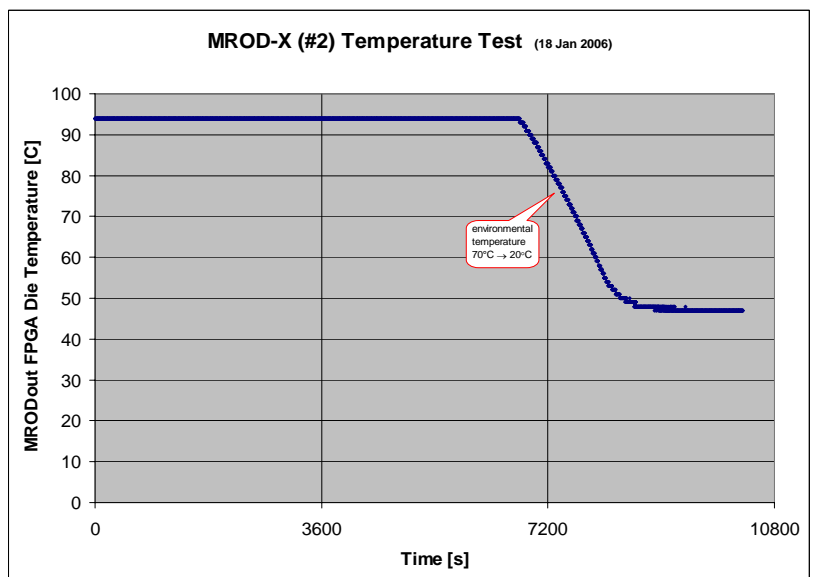
Module	S/N 2
Date	31 Jan 2006
Parameters	MRODIN: 50 MHz MRODOUT: 50 MHz, GOL: Chan 1AB, 2AB 50MHz Chan 3AB, 4AB 40MHz RocketIO: 100 MHz
Temp cycle	0 → 70 → 20 °C
Duration	8 hours
Comments	no SLINK output



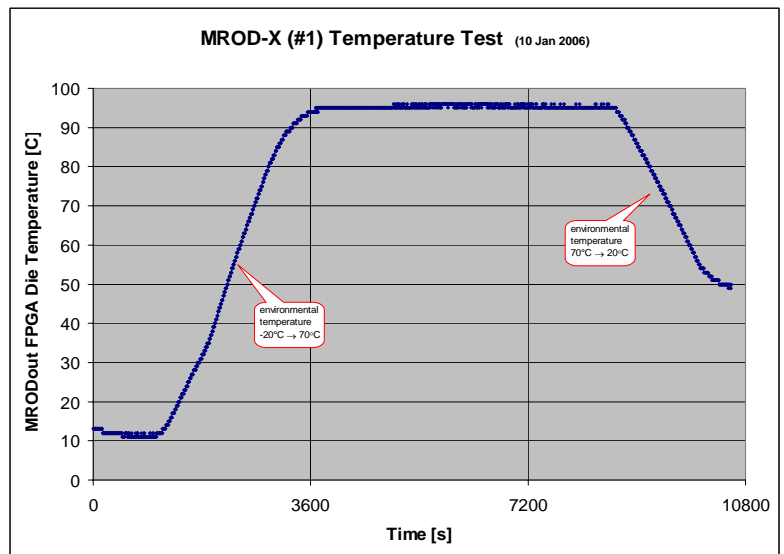
Module	S/N 1
Date	19 Jan 2006
Parameters	MRODIN: 50 MHz MRODOUT: 50 MHz, GOL: 25 MHz RocketIO: 100 MHz
Temp cycle	70 → 20 °C
Duration	2 hours
Comments	tested with SLINK output for brief periods (2 GB data per test)



Module	S/N 2
Date	18 Jan 2006
Parameters	MRODIN: 50 MHz MRODOUT: 50 MHz, GOL: Chan 1AB, 2AB 50MHz Chan 3AB, 4AB 40MHz RocketIO: 100 MHz
Temp cycle	70 → 20 °C
Duration	3 hours
Comments	tested with SLINK output for brief periods (2 GB data per test)



Module	S/N 1
Date	10 Jan 2006
Parameters	MRODIN: 40 MHz MRODOUT: 50 MHz, GOL: 25 MHz RocketIO: 100 MHz
Temp cycle	-20 → 0 → 70 → 20 °C
Duration	3 hours
Comments	no SLINK output



Module	S/N 2
Date	6 Jan 2006
Parameters	MRODIN: 40 MHz MRODOUT: 50 MHz, GOL: 25 MHz RocketIO: 100 MHz
Temp cycle	-15 → 0 → 70 → 20 °C
Duration	5 hours
Comments	no SLINK output

