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TECH TALK

A journal of bus architecture tips & techniques

Modifications Making VMEbus & VME64X Compatible (Part 3 of 4)

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Engineers should be aware of potential problems when combining VME64X and VMEbus hardware. These were pointed out in article 1 and article 2 of this series. With hardware modifications or funding to purchase a new enclosure, the issues can be solved. Since a VME64X system is designed to accept a VMEbus board, modifications to a VMEbus board going into a VME64X system should not be necessary. However, the opposite is not true. Inserting VME64X boards into a legacy VMEbus enclosure will require modifications to the boards or enclosure. Here are the options:

Option 1: Modify the VME64X board
VME64X boards built to be compatible with VMEbus systems are on the market. Check with the manufacturer of the VME64X board to see if it can be modified to be VMEbus compatible. Make sure the board can be purchased with older VMEbus handles. The J0 connector must be removed and all rear I/O confined to the VMEbus user-defined pins. It's okay to have the 160-pin connectors on J1 and J2 as long as the signals defined for VME64X (the outer rows) are disabled. Look for boards that require only +5V, -12, and +12V inputs. VMEbus systems do not provide 3.3V. The power supply in the VMEbus enclosure can, of course, be replaced with one that has a 3.3V output. Try to select boards with front panel I/O. There won't be a rear I/O card cage, so a rear transition module may not fit or may be difficult to secure or you could be stuck building wiring I/O from P2.

An example of a new PowerPC single board computer compatible with both VME64X and VMEbus systems is the VM27 (add link to data sheet here) built by SBS Technologies. It does not require 3.3V input nor have a J0 connector.

Option 2: Upgrade the VMEbus enclosure
I don't know anyone who has actually reworked a VMEbus enclosure to make it fully VME64X compatible. Most projects avoid this option because it can be expensive and exhaustive. Once you consider the effort, you will probably favor modifying the boards (option above) or purchasing a new VME64X enclosure (option below). Manufacturers will be reluctant to retrofit an enclosure. They prefer selling new systems, not upgrading older ones.

If the choice made is to upgrade a VMEbus enclosure to VME64X, several replacement parts are needed: rails or handles, backplane, power supply, and power supply wiring harness. I've greatly simplified the steps:

- Replace the top and bottom rails. First, find out if the manufacturers of the VME64X boards can remove the IEEE 1101.10 handles and install older VMEbus ones. If so, then skip this tedious step. If not, purchase IEEE 1101.10 (Elma PN 66-677-23) rails to accommodate the VME64X handles. Removing the older rails can be a chore as most of the enclosure may end up needing disassembly. Certainly, the top, bottom, and side plates, plus several extrusions, will have to be removed. The card guides are sometimes attached to these rails; if, so, remove them too. Reassemble the enclosure with IEEE 1101.10 rails and snap in the card guides.

- Replace the backplane. Remove the VMEbus backplane, power supply, and wiring. Install the VME64X backplane. Hopefully both have the same number of slots. If the VME64X backplane is larger, remember to purchase and install additional card guides. The new backplane should fit into the existing backplane extrusion mounted in the enclosure. Align the backplane with a couple of boards; then tighten.

- Replace the power supply. Remove the power supply with the old wiring harness and install the newer one. Chances are the mounting pattern will not be the same for both supplies. A new mounting provision may be necessary. The power supply manufacturer will likely provide a wiring harness attached to the supply. Wire the backplane, AC switch, and fans.

- What about rear I/O? There won't be a rear I/O card cage, per IEEE 1101.11, in a VMEbus enclosure. Are rear transition modules necessary? If so, will they fit and secure into the rear of the VMEbus

chassis? Only the VMEbus user-defined pins on P2 will be available.

Option 3: Replace the VMEbus enclosure with VME64X
Buying a new VME64X enclosure to replace the older VME enclosure is the simplest choice if your project has the budget. I'll admit that I suggest this option first to customers who face this dilemma. Hopefully, if you're ever caught with a handful of VME64X boards and a legacy VMEbus system, your project will have funds to replace the older enclosure.

Elma Electronics is a leading manufacturer of Eurocard and IEEE 1101.10 parts, backplanes, and systems. They have the parts needed to replace or retrofit your VMEbus enclosure. Contact your local Sierra Sales engineer to help you choose the right option.

The final article (part 4) will conclude this series with a cost and performance comparison between VMEbus and VME64X. Stay tuned.

Back to TECH TALK

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