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SOME COMMENTS ON CAMAC, IEEE488 and PC

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1. General

Three commonly used devices can be linked together so that a simple data acquisition system can be configured. An IEEE 488 to IBM PC, manufactured by Tecmar Corp., was used in this test. Two CAMAC to 488 interfaces were tested; they are Kinectic system 3988 and LRS 8901. Both have their drawbacks. The just-announced CAMAC to 488 by Standard Engineer (CC488) was not tested. According to the manufacturer it has a 500 KB/sec transfer rate and does full CAMAC functions. I will try to buy one to evaluate when it is available.

2. TECMAR IBM PC to 488 interface

This interface was on loan from the Control Group. According to the experts, the National Instrument product is better. After a few days of testing, I found the interface quite awkward to use. I agree with the experts; the advantage is in the driver. The Tecmar card IEEE 488 drives are a combination of Basic and a machine language program. There are two versions of the Tecmar software. Version 1.1 comes with machine language subroutine packages. It can be compiled with the Basic program. I have not tried the Fortran version. The compiled Basic program seems to be pretty fast. Unfortunately, the subroutine package (ASM488) does not contain all the standard IEEE 488 functions and it also does not support the DMA. The release 4.1 using subroutine package (call sublib) is also written in Basic but I was not able to compile it.

One general comment about doing debugging in Basic and then running the compiled program: it really speeds up the process of program developing. This is especially true when the hardware and software specs are not very well specified. In new equipment and devices, there is a lot to learn before a final configuration can be settled. On the other hand, the software developed in Basic is much harder to incorporate in the future program. A Fortran program can be easily lifted to be used later, provided it is written in the format of subroutines.

3. Kinetic 3988 CAMAC to 488 interface

This interface was built with the 8085 as the protocol processor for 488 and CAMAC. It works well with the TECMAR card. Because it uses the 8085 as the processor, the speed is less than desired. I tried it with the DMA mode and found that the transfer rate is less than 2 KB/sec. The module contains 255 words of 24 bits memory. When it is in the DMA mode, the CAMAC speed is about 150 micro sec/24 bits. The combined maximum speed is about 500 24 bits-words/sec with some software overhead. In this situation, the compiled Basic will not be too helpful.

4. LRS 8901 CAMAC to 488 interface

This module is built with discrete components. It can only do a very simple CAMAC read and write. It is very awkward to use. It does, however, contain one feature that can read the LRS CAMAC module very fast. The speed is 20 KB/sec when used with the program read. I have not as yet developed the DMA driver for this module. The normal DMA routine will not work with this module. The latest LRS MOD may take care of this, but it remains to be tested.

5. Conclusion

For the moment, the present hardware is not very suitable for general usage. The Control Group does not have one National Instrument PC to 488 interface to spare. I will try to obtain one when it becomes available. I will also buy a CC488 (the Standard Engineer's 488 CAMAC crate controller) to test its performance. It will take two months to obtain the CC488 module. If speed is not important, and you need a system to test your CAMAC device with your IBM PC, then you should choose the Kinectic 3988 as the CAMAC to 488 interface.