

VXIbus

APPLICATION BULLETIN

USING THE VXI-5500 TO INTERFACE MSEU MODULES TO THE VXIbus (An application example)

SUMMARY

VXI Prototyping Modules are used as a quick way to interface all types of circuits to the VXIbus. ICS's Model VXI-5500 Prototyping Module contains a message-based interface and a large grid area for the user's prototype circuits. This application note describes how ICS's VXI-5500 Prototyping Module was used to interface two Miniature Speech Enhancement Units (MSEU) to the VXIbus.

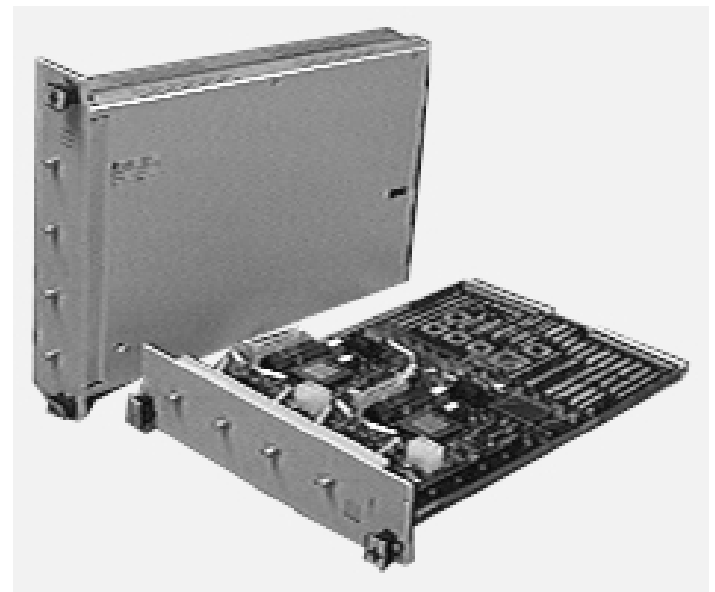
INITIAL CONDITION

In the customer's existing system, the MSEU modules were mounted on a tray with an external power supply. The MSEU modules are open PC board assemblies that measure 5.5 inches by 4 inches with components that are 1.2 inch high. Each module has a 9-pin connector for an RS-232 interface, a 26-pin ribbon connector for the GPIB interface and two SMA coaxial connectors for the audio input and output signals. The modules can be controlled either from the serial or GPIB ports.

The tray assembly with the MSEU modules was installed in a rack along with assorted other instruments. Audio connections were made directly to the modules. The MSEU modules were controlled via a GPIB bus connected to the computer. The customer wanted to replace this awkwardly packaged test system with a compact VXIbus system and asked ICS to interface the MSEU modules to the VXIbus.

HARDWARE MODIFICATIONS

Because the MSEU modules have a maximum component height of 1.2 inches, the decision was made to use a double wide VXI prototyping module and to mount the MSEU modules on the circuit side of the PC board as shown



Modified VXI-5500D Prototyping Module showing two MSEU Modules mounted on the circuit side of the VXI-5500D

in the above photo. The circuit side of a VXI-5500D has 1.3 inches of free space between the PCB and the inside of the VXI shield to accommodate wire wrap socket tails. Two of the MSEU modules easily fitted on the prototyping grid area of the VXI-5500 as shown in Figure 1. Holes were drilled through the VXI-5500's PCB in the grid area to mount the MSEU modules. Each hole was checked to verify that it was clean and it did not short the floating power planes in the grid

HARDWARE cont'd

area to each other or to the ground plane. (The power planes were saved for later use with the interface ICs that were added later.) Standoffs and plastic screws were used to mount the MSEU modules to the PCB.

Four 'D' holes were punched in the front panel for SMA bulkhead connectors. Short SMA to SMA coaxial cables were used to extend the audio input and output connectors to the front panel. The front panel was painted and silk-screened to identify the audio connectors and their functions. The finished panel is shown in the front photo.

ELECTRICAL MODIFICATIONS

The VXI interface logic on the standard VXI-5500 Prototyping Module is a message based interface that is controlled by a Z180 microprocessor. The user's interface is 56 line, bi-directional digital interface that can be customized to match the prototype application. In this application, the MSEU modules could only be interfaced to by an RS-232 serial link or by a GPIB bus interface. Connecting the MSEUs to the VXI-5500 standard digital interface would involve adding a UART or GPIB interface to convert the digital signals to match the MSEU's interfaces. Because of the complexity of adding the interface ICs, the decision was made to use the two unused serial interfaces in the VXI-5500's Z180 microprocessor and add a pair of RS-232 transceivers to interface the Z180 serial signals to the MSEU modules.

Since the MSEU module's serial interface operates at a fixed 9600 baud rate, the Z180 had to be set to 9600 baud to match the MSEUs baud rate. The Z180's serial clock input is 32x or 64x the output baud rate. At 9,600 baud, the 64x setting required a 614.4 KHz clock input. An 9.8304 MHz oscillator and a divide-by-16 IC were placed on the VXI-5500's prototyping area to generate the 614.4 KHz clock. (This clock input is for the serial channels only and is not the microprocessor's clock) A quad RS-232 transceiver completed the logic needed to interface the VXI-5500 to the MSEU modules.

FIRMWARE CHANGES

Because the VXI-5500 does not have serial I/O capability as part of its standard firmware, additional routines were added to the VXI-5500's firmware to operate the Z180's serial

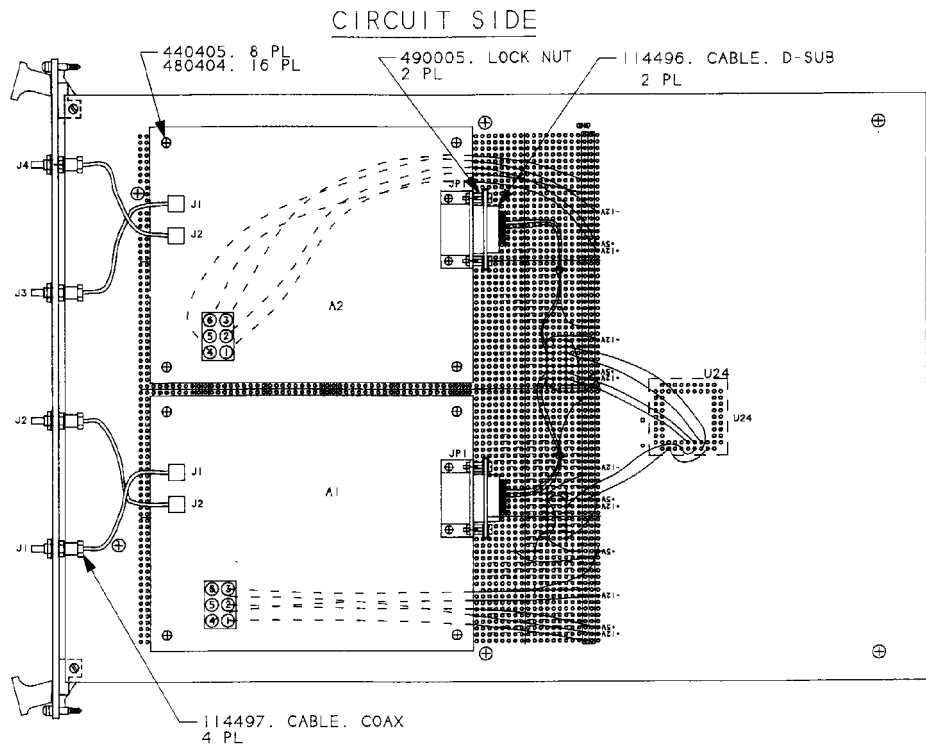


Figure 1 VXI-5500 Modification Drawing

ports. At power turn on, these ports are initialized to 9600 baud. At the same time, the MSEU modules output a startup status message that ends with the '<BSEU> =' prompt. The VXI-5500 was programmed to recognize this prompt as the end of the MSEU's output message. Two new commands, SEA and SEB, were added to the VXI-5500's parser so the user could sent commands to the modules and read back the modules' responses. The syntax for the new commands is:

SE channel# space <module string> <NL>

where: channel# is A or B.

NL is a line feed character and/or the end bit asserted during the last character.



An oscillator and two ICs were added on the prototyping grid as part of the modification.