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CONTROLLING GPIB DEVICES OVER A SERIAL LINK
or the differences between the 4894A and the 4895

INTRODUCTION

This application note shows how the 4894A and the 4895 can be used to control GPIB devices over a serial link and the differences between the two devices when used as GPIB bus controllers.

SERIAL TO GPIB CONNECTION

Figure 1 shows the basic serial-to-GPIB bus connection. The system is controlled by a computer as represented by the PC symbol on the left of the figure. The 4894A or 4895 in the center of the figure performs the serial-to-GPIB conversion. The figure on the right represents a GPIB controlled device or instrument. This application note deals with how the 4894A and the 4895 control the GPIB device.

4894A

The 4894A is a GPIB-to-Serial Interface with two operating modes. In the G-mode, it operates as a GPIB device and accepts commands and data at its GPIB interface. It transparently converts GPIB messages to serial messages and serial responses back to GPIB messages.

In the S-mode, the 4894A operates as a Serial-to-GPIB bus controller for one device. The 4894A can address a device to talk or listen to transfer data to or from the device. Serial messages are transparently sent to the GPIB device and GPIB responses are transparently converted into serial messages. At power turn-on time, the 4894A pulses the IFC line and sends the device a device clear command.

The 4894A can be set to swap addresses when it senses a linefeed (<nl>), carriage return or when it has not received anything on the serial link for 300 ms. The time swap settings not recommended it you are running the 4894A from a terminal emulation program. The 4894A uses its address setting as the device's GPIB address so they both have to be set to the same GPIB address.

4894A COMMAND SEQUENCE

The user sends the GPIB device a command by outputting the device command as a serial message. e.g.

F1R2T1 <nl> 'serial setup command message

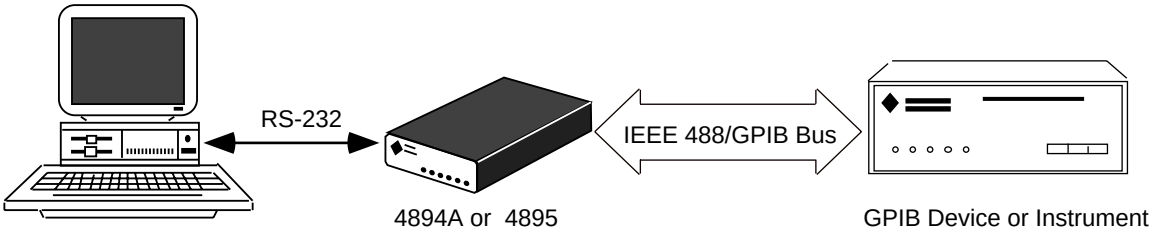

Figure 1 Serially controlling a GPIB Device

The 4894A detects the linefeed character, <nl>, addresses the GPIB device as a listener and outputs the serial message. Underlined characters are GPIB commands e.g.

LISTEN 04 F1R2T1 <nl> '4894A output

The 4894A then addresses the device as a talker and reads any response data. e.g. reading a DVM's readings.

TALK 04	'4894A output
1.23E-3<nl>	'DVM readings
1.67E-3<nl>	'DVM readings
..	
1.23E-3<nl>	'DVM readings

The 4894A convert a the GPIB messages into the serial format and sends them to the computer. e.g.

1.23E-3<nl> 1.67E-3<nl> .... 1.23E-3<nl>

4895

The 4895 is a Serial-to-GPIB Controller with two operating modes. In the G-mode, it operates as a GPIB device and accepts commands and data at its GPIB interface. It transparently converts GPIB messages to serial messages and serial responses back to GPIB messages.

In the S-mode, the 4894A operates as a full featured Serial-to-GPIB bus controller and drives up to fourteen devices. The 4895 executes all GPIB commands with the exception of Pass Control. Serial messages from the computer include the 4895 command, the device address and any data or device specific commands to be sent to the device. The 4895 interprets its command to determine which GPIB commands should be sent to the device(s) that it is controlling.

4895 COMMAND SEQUENCE

Because the 4895 does not perform any automatic power-on commands, the user should send the 4895 the Abort command followed by the Device Clear command if the instrument needs it. e.g.

ABORT <nl>	'serial output
IFC	'4895 pulses the IFC line
DevClr 04 <nl>	'serial output
UNLISTEN LISTEN 4 SDC	'device clear to device 4

The user sends the GPIB device a command by combining the 4895 Output command, the device address and the device specific message in one string. e.g. the setup command becomes:

OUTPUT 04; F1R2T1 <nl> 'serial output setup command to device 4

The 4895 detects the linefeed character, <nl>, and parses the command. It then puts out the following commands on the GPIB bus:

UNLISTEN LISTEN 4 F1R2T1 <nl> '4895 output to device 4

To read data, the user sends the Enter command to the 4895. e.g.

ENTER 04 <nl> 'serial enter command to the 4895

The 4895 then queries the GPIB device and sends the response string to the computer. e.g.

UNLISTEN TALK 4	'4895 commands to the device
1.23E-3<nl>	'DVM readings

The 4895 converts the GPIB response into the serial format and sends it to the computer. e.g.

1.23E-3<nl> 'serial message to the computer

SUMMARY

This application note has shown how the 4894A and 4895 miniboxes operate as serial-to-GPIB controllers. For simple devices or applications, the user can get away using the 4894A to control a GPIB device. The 4895 is recommended for remote applications because it can be remotely reset and in applications where more than one device needs to be controlled because of its multiple command and device capability.