

Model HR-16P **16-Channel Programmable Serial Device**



Senses transitions on 16 discrete inputs and issues user programmed serial strings

UMA1112 Rev C

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This equipment generates, uses, and can radiate radio frequency energy and if not installed and used properly, that is, in strict accordance with the manufacturer's instructions, may cause interference to radio communication. It has been designed to comply with the limits for a Class A computing device in accordance with the specifications in Subpart B of Part 15 of FCC rules, which are intended to provide reasonable protection against such interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at their own expense will be required to take whatever measures may be necessary to correct the interference.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.




**RoHS
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1.0 General

Thank you for purchasing the Hall Research HR-16P. The HR-16P is a programmable RS-232 serial device designed to control any device with a serial port based on sensing level changes (open-to-close and close-to-open, or digital high to low and vice versa).

The HR-16P has 16 discrete inputs that sense a DC voltage level or contact closure (see figure below for input terminal configuration). It detects both “low-to-high” and “high-to-low” transitions of these discrete inputs and issues corresponding commands out the serial port of the HR-16P to the serial device (typically a video projector but not limited to that).

The commands can be any ASCII (or non-ASCII) data with programmable delays embedded in the string. The commands can also be a complex multi-part string, such as having commands with delays and then more commands.

Hall Research provides a powerful Windows® based application that is used to create the data files and for uploading them to the HR-16P, via a supplied serial cable. The latest version of this file is available for free download from Hall Research website. www.hallresearch.com

The unit is supplied with a 5v DC power adapter and a serial cable (null-modem or crossover cable for programming the unit). The inputs are on screw terminals with headers that can be unplugged for easy assembly.

A typical application would be to send commands to turn a projector on and off or select different inputs.



Figure 1 – Model HR-16P Front and Rear

2.0 Features

- ✓ Compact, Reliable, and Economical
- ✓ 33 user-programmable Command Strings (2 per each input and one for startup)
- ✓ Allows multiple instances of user-defined delays within each string
- ✓ Intuitive Operation
- ✓ Front panel LED status indicator
- ✓ Compact, Rugged, Reliable, and Economical
- ✓ Made in USA

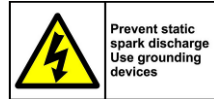
3.0 Precautions



This device is shipped with a 5v DC regulated power supply that has a 2.1mm plug (center positive). Use of higher voltage supplies will cause damage to the unit.



This device is sensitive to Electrostatic Discharge (ESD). Prior to touching the unit (especially the connectors), touch a grounded object, and make sure the devices that will be plugged in to the HR-16P are properly grounded.



4.0 Operation

The HR-16P is designed to send a string of commands to a serial device (e.g. a projector) via the serial interface, when the discrete input transitions from one state to another.

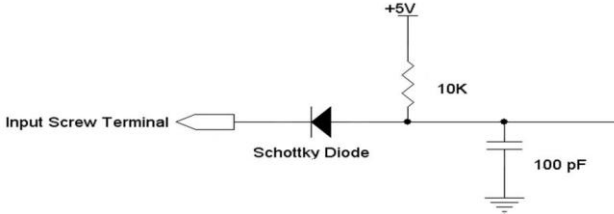


Figure 2 – Input circuit for each of the 16 Discrete inputs

Hi input = Open or Voltage above 1v

Lo input = Short to ground or Voltage below 0.3v

*** Input Voltage Range = 0v to +30 v ***

4.1 Mode Switch

In the **Run** position, the HR-16P will communicate with the serial device using an appropriate cable (target cable not included).

In the **Program** position, the user can upload strings to the HR-16P. This will consist of the Rising edge and the Falling edge strings.

These strings are limited to 250 characters in length each. The strings are constructed using the HR-16P Programmer Windows™ software available from our website.

The user will then be able to upload the file to the HR-16

4.2 Front Panel Status Indicator

The front panel has a convenient LED that is used to indicate power on state (steady on) or blinking (when commands are being sent to target)



Figure 3 – Model HR-16P Front and Rear

6 Windows® GUI Programming Software

Go to: <http://www.hallresearch.com>

Select the HR-16P product from the list and download the software from the page displayed..

6.1 How to Create Command Strings

After installation, run the application and select the COM port you will use to connect the HR-16P to the PC. Typically this is something like COM1

To build your command strings in the HR-16P Programmer, follow the instructions below:

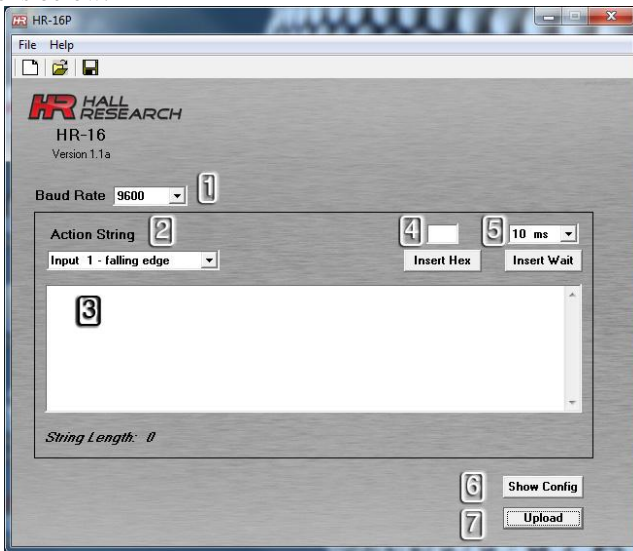


Figure 4 – Define String Screen

1. Select the target baud rate (from 1200 to 57600 bps)
2. Select the trigger action for the command. You have 16 inputs and 2 commands for each: when the input goes from low to high (rising edge), and when it goes from high to low (falling edge). The list also has a Startup Command used for initialization of the target when it powers up.

If a command is blank(not defined), then when that trigger event happens, the unit does nothing. So if you are using momentary push button switches

(as opposed to toggle switches), and you want a single RS-232 Command to be issued, simply define it for the rising edge .

3. Here is where you type your command string in ASCII. You can use backspace to erase characters if you wish. You can also hit enter to insert a Carriage Return (Hex 0D) in to the string.

4. If your target expects control characters that you cannot directly type from your keyboard, you can type the hex value (from 0 to FF) here and click on insert. You can do this anywhere in the string as you are typing.

5. You can insert pauses or wait-times anywhere in the string. This dropdown gives you choices of: 10 msec, 50 msec, 250msec, 1sec, 5sec, 30sec, 1min, 5min, and 10 min. For example to get 1minute and 30 second wait, insert 1 min and 30 sec!

6. To get an easy to read sheet with all the items which you have created, click this button. It will open a new window with the unit's entire configuration including all the strings. You can cut and paste from this window to any other application if you wish.

7. Connect the PC to the HR-16P with the cable provided and place the HR-16P mode switch in PGM (program) position and click upload. Upload time can be as short as a few seconds to a couple of minutes, depending on how much data has to be uploaded.

After uploading remember to move the switch on the HR-16P back to RUN position.

8. If you decide to define a Start up string, then you should use the field that appears to its right (as shown here) to instruct the unit as to when to send it out. The choices are upon power up, or when CTS line (asserted by the target) goes high.

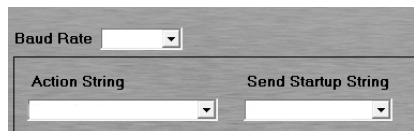


Figure 5 – Startup String

Most devices will likely assert their CTS line on their RS-232 port after they are powered up. If

this is the case with your target device, then you can select to issue your start-up string on CTS. If you are not sure the target is ready to listen to command when its CTS is asserted, then begin your command with a wait of appropriate length.

On the other hand, if your device does not assert the CTS line, then you can issue the startup command on HR-16P's own power up. This will

work if the HR-16P is powered up together with or after the target. You may wish to also include a wait at the start to give target time to boot up.

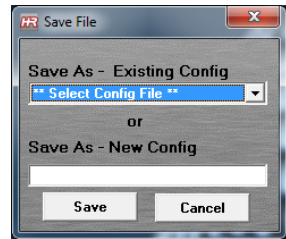
Notes

There are a few restrictions when building your string:

- The Backspace key is the only way to correct or delete characters in your string and you can only Backspace from the end of the string.
- The Windows “Paste” function has been disabled so you may not “Paste” into the Serial String window.
- You may only insert characters at the end of the string. The maximum length of each string is 250 characters.
- A “Wait Time” will occupy 3 characters in the string.
- Any ASCII character input from the keyboard will increment the string length by 1.
- All Hexadecimal bytes will increment the string length by 1.

6.2 Saving and Recalling your Configuration

The GUI software has convenient save and recall functions. When you choose to save your configuration, you get a choice to write over an existing configuration, or to create a new configuration.





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