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1. PURPOSE / SCOPE

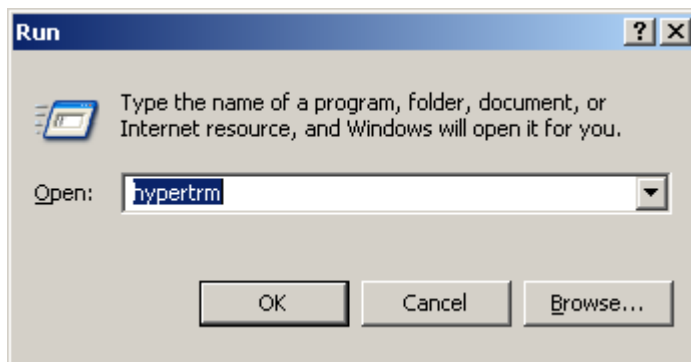
This document provides instructions on how to communicate with the PCX-7450 using Hyper Terminal.

2. REQUIRED EQUIPMENT

1. PCX-7450
2. PCX-7450 load strip-line cable
3. 9-pin d-sub Female-female straight through serial cable
4. User-supplied diode load
5. User-supplied PC running Windows 95 or later with available serial port

3. PROCEDURE

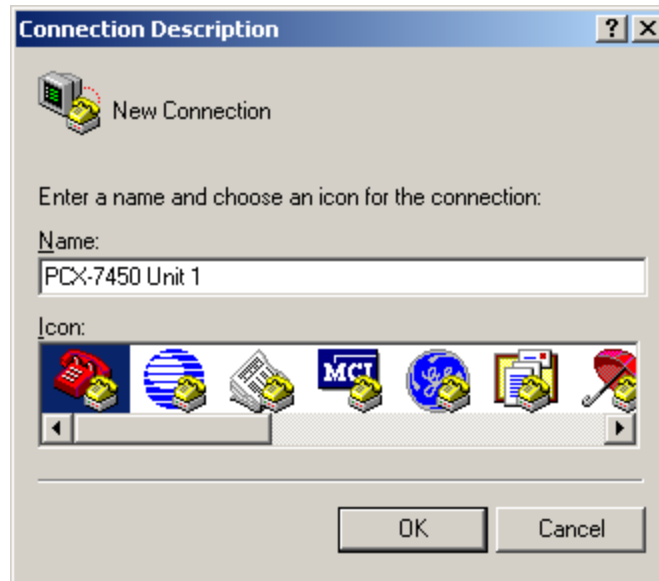
1. Hook up serial cable to J1 on rear panel of PCX-7450.
2. Start up HyperTerminal by going to Start / Run and typing in “hypertrm”:



3. Click “Cancel” when asked make HyperTerminal your default telnet client.
4. Click “Cancel” when asked for location information.
5. Click “Yes” when asked if you’re sure you want to cancel
6. Click “Okay” when told that you need to enter location information before placing a call.

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7. In the dialog box below, enter a descriptive name for this connection, such as “PCX-7450 Unit 1”



8. Click “OK” on the Connection Description dialog box
9. Click “Cancel” on the Location Information dialog box
10. Click “Yes Already!” on the “Are you sure you want to cancel?” dialog box
11. Click “OK” on the location information dialog box.

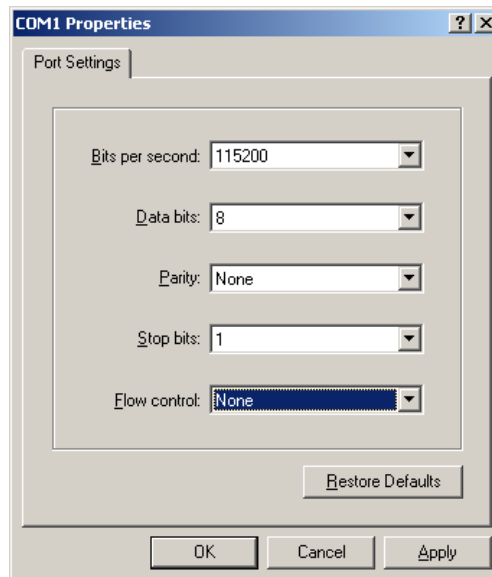
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12. From the drop down box pictured below, select the COM port that the PCX-7450 is connected to:



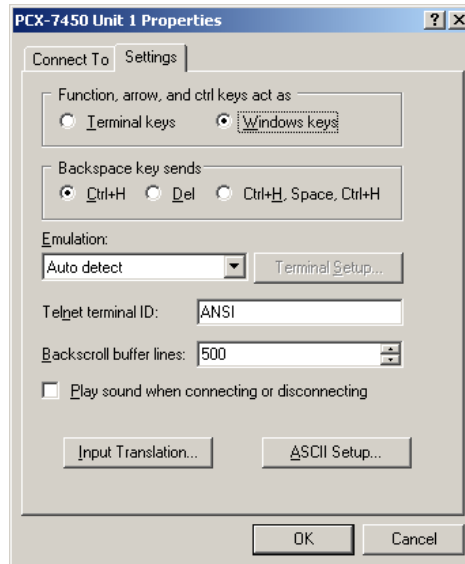
13. Click "OK"

14. Fill in the dialog box below as shown:

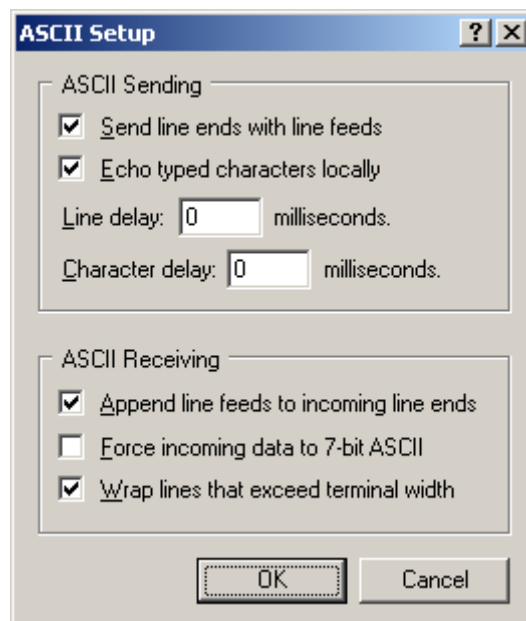


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- 15. Click “OK”
- 16. Select *File/Properties*
- 17. Set the following dialog as shown:

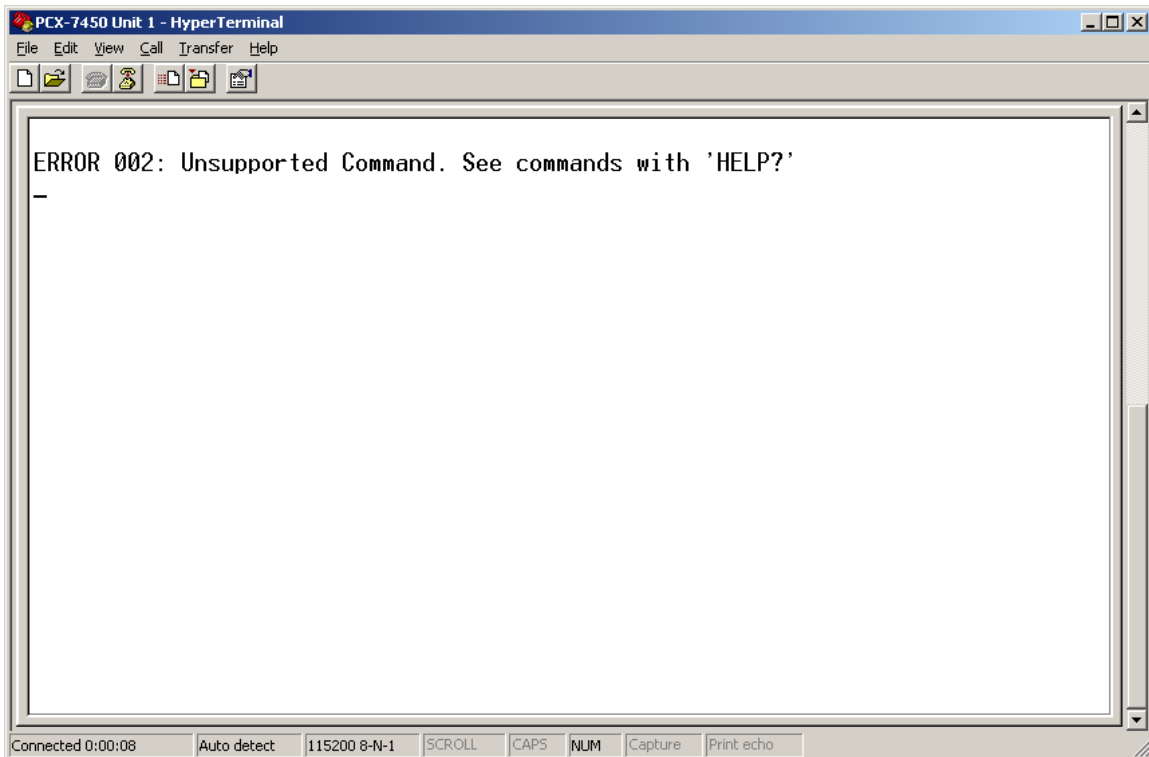


- 18. Click “ASCII Setup”
- 19. Set the following dialog as shown:



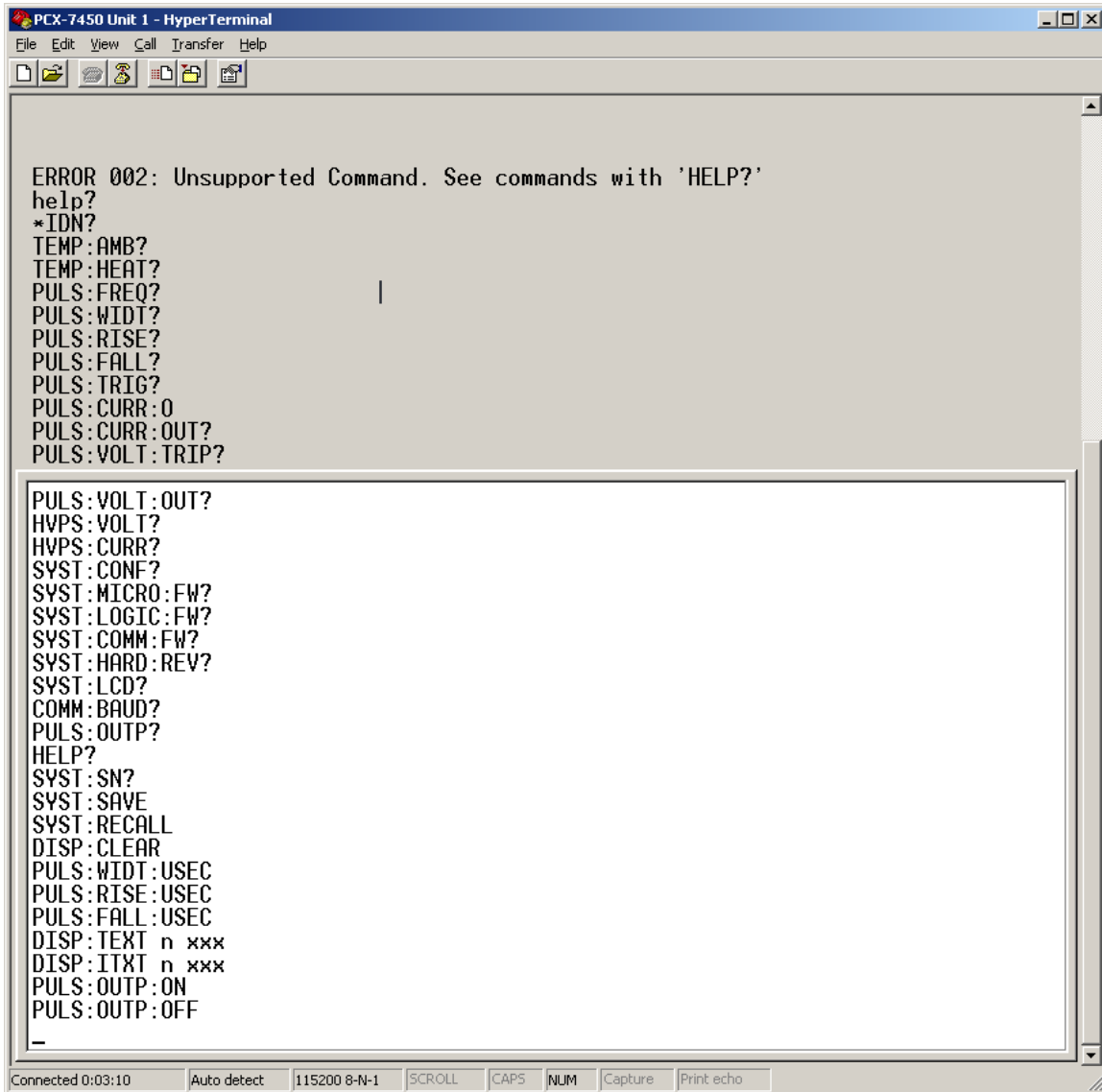
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20. Click “OK” on the ASCII Setup dialog box
21. Click “OK” on the “<Connection name you entered> Properties” dialog box.
22. Click *File/Save As* to save the connection & avoid steps 1 through 22 in the future.
23. Hit <Enter> to clear the buffer. You should see something like this:



24. Type “HELP?<CR>” at the cursor. <CR> is short for the “Enter” key (Carriage Return on old typewriters). This gives you a listing of all the commands available on the PCX-7450.

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4. COMMAND REFERENCE

4.1. *IDN

4.1.1. Description

*IDN is short for Identity. This allows the user program to determine what is connected to the serial port.

4.1.2. Example:

```
*IDN?
```

```
Directed Energy, PCX-7450, 150 Amp Pulsed Current Source
```

4.2. TEMP:AMB?

4.2.1. Description

This command returns the ambient temperature in degrees Celsius as read by an on-board thermistor & look-up table.

4.2.2. Example

```
TEMP:AMB?  
24.0 °C
```

Note: The degree symbol displays a shaded box in Hyperterminal because of the Terminal font. The character code for this symbol is decimal 248.

4.3. TEMP:HEAT?

4.3.1. Description

Returns the temperature of the heatsink in degrees Celsius as read by an on-board thermistor & look-up table.

4.3.2. Example

```
TEMP:HEAT?  
25.0 °C
```

4.4. PULS:FREQ?

4.4.1. Description

Returns the frequency of the pulse output if running in internal triggering mode

4.4.2. Example

```
PULS:FREQ?  
10.00 Hz
```

4.5. PULS:WIDT?

4.5.1. Description

Returns the width of the pulse from the beginning of rise to the end of fall

4.5.2. Example

```
PULS:WIDT?  
4975.0 uSec
```

4.6. PULS:RISE?

4.6.1. Description

Returns the rise time of the pulse from the beginning of rise to the end of rise

4.6.2. Example

```
PULS:RISE?  
1000.0 uSec
```

4.7. PULS:FALL?

4.7.1. Description

Returns the fall time of the pulse from the beginning of fall to the end of fall

4.7.2. Example

```
PULS:FALL?  
1000.0 uSec
```

4.8. PULS:TRIG?

4.8.1. Description

Returns if the unit is in internal or external trigger mode

4.8.2. Example

```
PULS:TRIG?  
Internal
```

```
PULS:TRIG?  
Ext 50 Ohm
```

```
PULS:TRIG?  
Ext 1k Ohm
```

Note: As of micro firmware revision 1.04A, the pulse trigger is not able to be changed remotely. A workaround would be to use the front panel to set the trigger configuration to the desired setting, then save that configuration to a user slot. This user configuration can then be recalled remotely.

4.9. PULS:CURR:OC?

4.9.1. Description

Returns the current threshold at which the unit will discontinue pulse operation

4.9.2. Example

```
PULS:CURR:OC?  
80.0 Amps
```

4.10. PULS:CURR:OUT?

4.10.1. Description

Returns the current level which the load will be driven to within the compliance voltage limit.

4.10.2. Example

```
PULS:CURR:OUT?  
75.0 Amps
```

4.11. PULS:VOLT:TRIP?

4.11.1. Description

Returns the load voltage threshold at which the unit will discontinue pulse operation

4.11.2. Example

```
PULS:VOLT:TRIP?  
75.0 Volts
```

4.12. PULS:VOLT:OUT?

4.12.1. Description

Returns the load compliance voltage set point. **CAUTION:** Set this value as low as possible for the given load. The excess voltage gets burned up in the switches, which can catastrophically damage the unit.

4.12.2. Example

```
PULS:VOLT:OUT?  
80.0 Volts
```

4.13. HVPS:VOLT?

4.13.1. Description

This command returns the voltage reading of the high voltage power supply capacitor bank. The firmware adds an offset voltage to the load compliance voltage to arrive at this value to compensate for capacitive voltage droop, maintaining the desired current throughout the pulse waveform.

4.13.2. Example

```
HVPS:VOLT?  
90.0 Volts
```

4.14. HVPS:CURR?

4.14.1. Description

Returns an average reading of the high voltage power supply current

4.14.2. Example

```
HVPS:CURR?  
0.00 Amps
```

4.15. SYST:CONF?

4.15.1. Description

Returns a 0-6 or "None" representing the slot that the current configuration resides in

4.15.2. Example

```
SYST:CONF?  
None
```

4.16. SYST:MICRO:FW?

4.16.1. Description

Returns the microcontroller firmware version

4.16.2. Example

```
SYST:MICRO:FW?  
1.04A
```

4.17. SYST:LOGIC:FW?

4.17.1. Description

Returns the FPGA firmware version

4.17.2. Example

```
SYST:LOGIC:FW?  
1.02A
```

4.18. SYST:COMM:FW?

4.18.1. Description

Returns the version of communications protocol the system is running. Should match this document's revision.

4.18.2. Example

```
SYST:COMM:FW?  
1.00A
```

4.19. SYST:HARD:REV?

4.19.1. Description

Returns the hardware revision of the product. Currently returns a <CR>

4.19.2. Example

```
SYST:HARD:REV?
```

4.20. SYST:LCD?

4.20.1. Description

This command is not implemented.

COMM:BAUD?

4.20.2. Description

Returns the baud rate that the unit is currently running at

4.20.3. Example

```
COMM:BAUD?  
115200
```

4.21. PULS:OUTP?

4.21.1. Description

Returns if pulses are enabled or not

4.21.2. Example

```
PULS:OUTP?  
Off
```

4.22. HELP?

4.22.1. Description

Returns a list of supported commands

4.22.2. Example

```
HELP?  
*IDN?  
TEMP:AMB?  
TEMP:HEAT?  
PULS:FREQ?  
PULS:WIDT?  
PULS:RISE?  
PULS:FALL?  
PULS:TRIG?  
PULS:CURR:OC?  
PULS:CURR:OUT?  
PULS:VOLT:TRIP?  
PULS:VOLT:OUT?  
HVPS:VOLT?  
HVPS:CURR?  
SYST:CONF?  
SYST:MICRO:FW?  
SYST:LOGIC:FW?  
SYST:COMM:FW?  
SYST:HARD:REV?  
SYST:LCD?  
COMM:BAUD?
```

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PULS:OUTP?
HELP?
SYST:SN?
SYST:SAVE
SYST:RECALL
DISP:CLEAR
PULS:WIDT:USEC
PULS:RISE:USEC
PULS:FALL:USEC
DISP:TEXT n xxx
DISP:ITXT n xxx
PULS:OUTP:ON
PULS:OUTP:OFF

4.23. SYST:SN?

4.23.1. Description

Returns the system serial number

4.23.2. Example

SYST:SN?
987-654

4.24. SYST:SAVE:<0>

4.24.1. Description

Commands the unit to save the current configuration of the product to the location specified. This command returns the string passed as a command once the command has processed.

4.24.2. Arguments

0,1,2,3,4,5, or 6

4.24.3. Example

SYST:SAVE:1
SYST:SAVE:1

4.25. SYST:RECALL:<0>

4.25.1. Description

Commands the unit to load configurations settings from the location specified. This command returns the string passed as a command once the command has processed.

4.25.2. Arguments

0,1,2,3,4,5,6

4.25.3. Example

```
SYST:RECALL:1  
SYST:RECALL:1
```

4.26. DISP:CLEAR

4.26.1. Description

Clears the display, setting all pixels to white. This command returns the string passed as a command once the command has processed.

4.26.2. Example

```
DISP:CLEAR  
DISP:CLEAR
```

4.27. PULS:WIDT:USEC:<decimal number less than 11 digits >

4.27.1. Description

Commands the unit to set the pulse width. This command returns the string passed as a command once the command has processed.

4.27.2. Arguments

0-4975 representing pulse width in microseconds from the beginning of the pulse to the end of rise.

4.27.3. Example

Sets the pulse width to 100 microseconds:

```
PULS:WIDT:USEC:100  
PULS:WIDT:USEC:100
```

4.28. PULS:RISE:USEC:< decimal number less than 11 digits>

4.28.1. Description

Commands the unit to set the pulse rise time. This command returns the string passed as a command once the command has processed.

4.28.2. Arguments

0 to 45% of pulse width, up to 1000 microseconds

4.28.3. Example

4.29. PULS:FALL:USEC:< decimal number less than 11 digits>

4.29.1. Description

Commands the unit to set the pulse fall time. This command returns the string passed as a command once the command has processed.

4.29.2. Arguments

0 to 45% of pulse width, up to 1000 microseconds

4.29.3. Example

Set the pulse fall time to 100 microseconds:

```
PULS:FALL:USEC:100  
PULS:FALL:USEC:100
```

4.30. DISP:TEXT:<0 TO 7>:<UPPER CASE TEXT, 16 POSITIONS>

4.30.1. Description

Displays text on the screen line. This command returns the string passed as a command once the command has processed.

4.30.2. Arguments

0-7 representing screen line
0-16 characters, only uppercase alphanumeric

4.30.3. Example

Display your favorite movie line on the first row:

```
DISP:TEXT:0:IM AFRAID, DAVE  
DISP:TEXT:0:IM AFRAID, DAVE
```

4.31. DISP:ITXT:<0 TO 7>:<UPPER CASE TEXT, 16 POSITIONS>

4.31.1. Description

Same as command 4.30 above, but displays highlighted / inverted text. This command returns the string passed as a command once the command has processed.

4.32. PULS:OUTP:ON

4.32.1. Description

Turns on pulse output based on present settings. This command returns the string passed as a command once the command has processed.

4.32.2. Example

```
PULS:OUTP:ON  
PULS:OUTP:ON
```

4.33. PULS:OUTP:OFF

4.33.1. Description

Turns off pulse output. This command returns the string passed as a command once the command has processed.

4.33.2. Example

```
PULS:OUTP:OFF  
PULS:OUTP:OFF
```

4.34. PULS:CURR:OC

4.34.1. Description

Sets the threshold at which an error will be generated. If the pulse current to the load surpasses this threshold, the machine will disable pulses. Sufficient headroom above the current set point must be determined by the end user based on load and cabling inductance which will vary between different implementations. This command returns the string passed as a command once the command has processed.

NOTE: This command does not work with COMM versions 1.00A and lower. Micro firmware version 1.05A includes COMM version 1.01A.

4.34.2. Arguments

200-1550 representing the current threshold **TIMES 10**. A value of 200 represents 20.0 Amps. 201 would be 20.1 Amps.

4.34.3. Example

Set current to 50.0 amps:

```
PULS:CURR:OC:500
```

```
PULS:CURR:OC:500
```

Read back the current set-point:

```
PULS:CURR:OC?
```

```
50.0 Amps
```

4.35. PULS:CURR:OUT

4.35.1. Description

Sets the output current that the load will be controlled to.

NOTE: This command does not work with COMM versions 1.00A and lower. Micro firmware version 1.05A includes COMM version 1.01A.

4.35.2. Arguments

200-1500 representing the load control current **TIMES 10**. A value of 200 represents 20.0 Amps, 201 represents 20.1 Amps.

4.35.3. Example

Set current to 150.0 amps:

```
PULS:CURR:OUT:1500
```

```
PULS:CURR:OUT:1500
```

Query current:

```
PULS:CURR:OUT?
```

```
150.0 Amps
```

4.36. PULS:TRIG:<INT,EXT: 50,EXT: 1000, or SS>

4.36.1. Description

Sets the trigger for the pulse output. This command returns the string passed as a command once the command has processed.

4.36.2. Arguments

- INT – Sets the trigger to the internal source
- 50 – Sets the trigger to 50 ohm external trigger
- 1000 – Sets the trigger to 1kohm external trigger
- SS – Single shot

4.36.3. Examples

Set the triggering to single shot:

```
PULS:TRIG:SS  
PULS:TRIG:SS
```

Set the triggering to external source with 1000 ohm internal impedance:

```
PULS:TRIG:EXT:1000  
PULS:TRIG:EXT:1000
```

Set the triggering to external source with 50 ohm internal impedance:

```
PULS:TRIG:EXT:50  
PULS:TRIG:EXT:50
```

Set the triggering to internal source:

```
PULS:TRIG:INT  
PULS:TRIG:INT
```