GENERAL LIFT
LOS ANGELES

K2001i card – Kuper Protocol

The serial output of this box mimics the protocol defined by Kuper Controls, the serial port output of Kuper K2001 card. .

Kuper Serial Information
From Kuper K2001 card:
The serial stream always starts with an upper case alpha character.

‘S’ when the move is not rolling.
‘P’ if the move is pre-rolling.
‘R’ during a move record and/or playback, or whenever the move frame number is advancing on the Kuper screen.

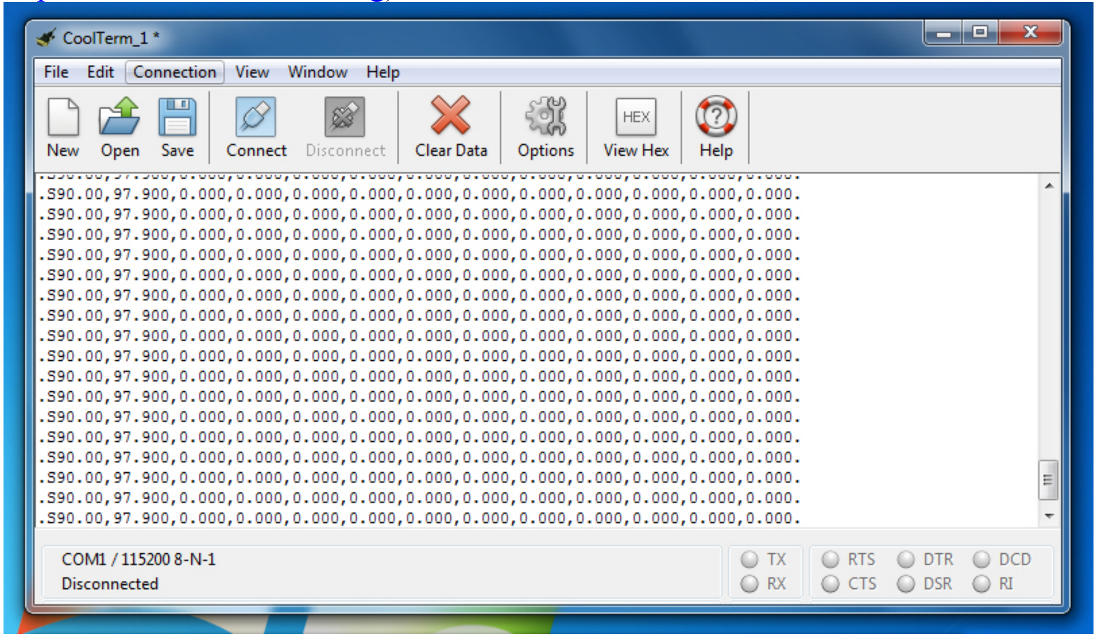
For ‘S’ and ‘R’, the data string consists of:
<decimal_move_frame>,<axis_position>,< axis_position>,…for up to 12 axes.

The positions are as calibrated by the operator in the Kuper software.
The frame number has two decimal places; axis positions have three decimal places.

All lines are terminated with hex character 0x0d, followed by hex character 0.

The move frame is specified as a decimal. Where n = a number.
n.5 = 180 degrees, the position of the axes halfway through the exposure.
n.0 = shutter closed.
The alpha character is essentially a sync character, sent exactly 1 data frame before the data is valid. For Kuper Data/Visual of 4, the data from frame 0.5 is sent at frame 0.25.

HyperTerminal, the communication program in MS Windows, or Coolterm (Http:// http://freeware.the-meiers.org) There are different for Mac,Windwos and Linux. Pretty handy.



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.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.S90.00,97.900,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
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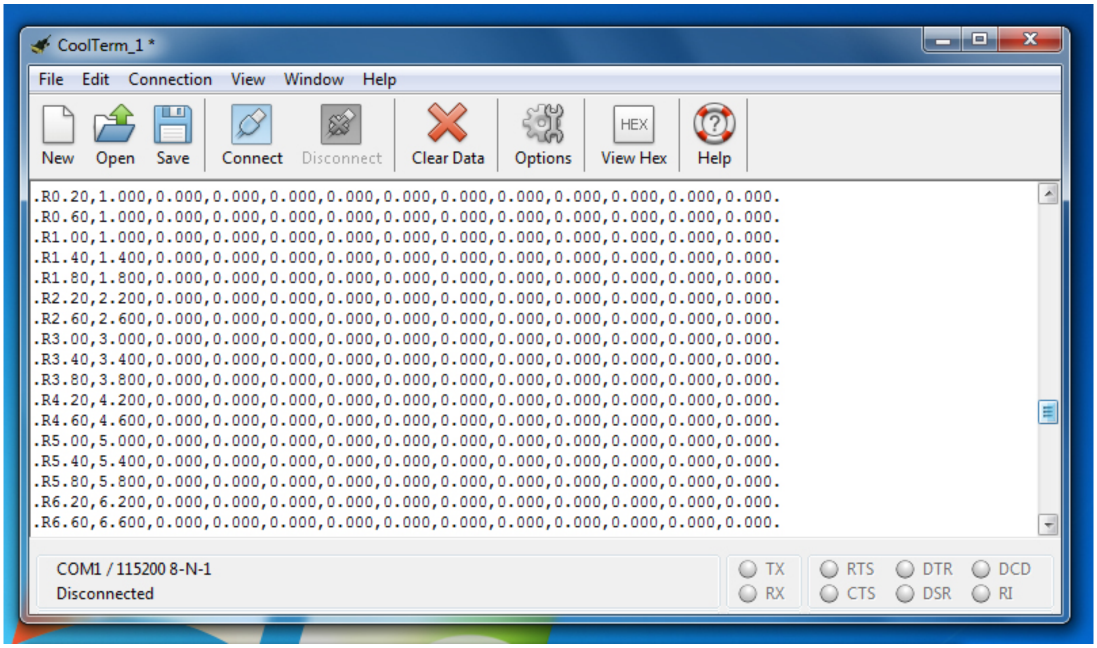
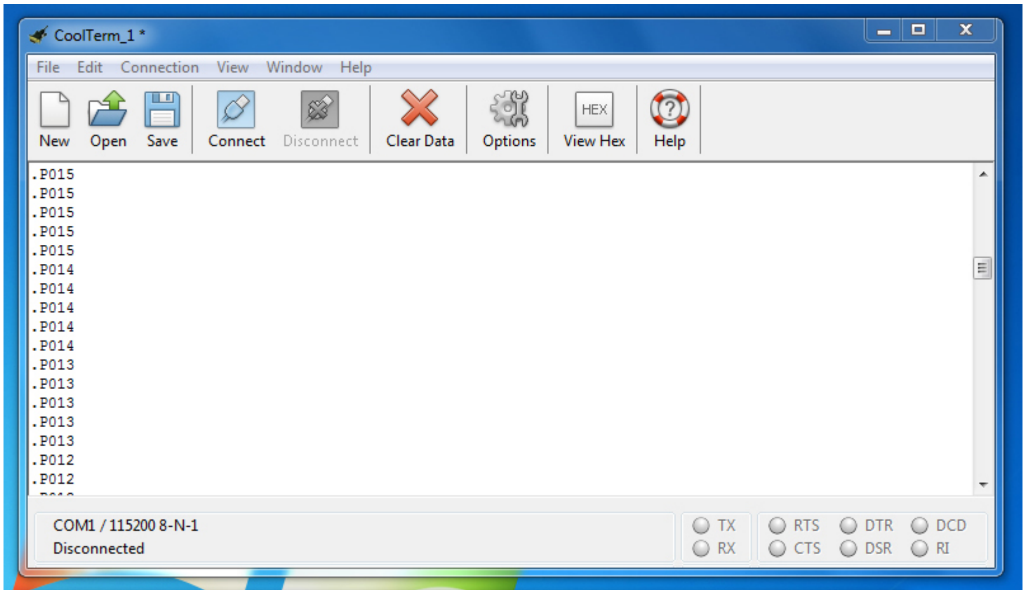
COM1 / 115200 8-N-1
Disconnected



```
.R0.20,1.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R0.60,1.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R1.00,1.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R1.40,1.400,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R1.80,1.800,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R2.20,2.200,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R2.60,2.600,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R3.00,3.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R3.40,3.400,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R3.80,3.800,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R4.20,4.200,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R4.60,4.600,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R5.00,5.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R5.40,5.400,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R5.80,5.800,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R6.20,6.200,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
.R6.60,6.600,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000,0.000.
```

COM1 / 115200 8-N-1
Disconnected

During a move pre-roll, a 'P' is sent, followed by a non-decimal countdown to zero.
The next data packet after "P000" will be the first frame in the move.
Axis position data is not sent during a pre-roll, since the phase relationship between the data and when it is sent may be adjusted during the pre-roll, which could lead to some data being stepped on.



```
.P015
.P015
.P015
.P015
.P015
.P014
.P014
.P014
.P014
.P014
.P013
.P013
.P013
.P013
.P013
.P012
.P012
```

COM1 / 115200 8-N-1
Disconnected

These serial commands may be sent to the Serial Box.

Command Example	Function	Description
G	Go	Start frame numbers rolling
S	Stop	Stop frame numbers rolling
R	Reset	Reset frame count to zero
Z	Zero Encoders	Set all encoder positions to zero
E	Enable Encoders	Enable serial output for all encoders (default on power up)
D	Disable Encoders	Disable serial output for all encoders (serial stream stops)
P,3,-2300	Set Position	Set encoder 3 to position –2300 (encoder numbers go from 1 through 8)
O,3,1700	Set Home Position	Set encoder 3's home position to +1700 (encoder 3 will be reset to this position the next time the home switch is tripped)
H,3,1	Enable Home Switch	Enable home switch for encoder 3
H,3,0	Disable Home Switch	Disable home switch for encoder 3 (default on power-up)

Notes: The commands 'P', 'O' and 'H' all need a terminating character after the whole command is set. Any character will do EXCEPT a comma.

All commands must be upper case.

The commands 'P', 'O' and 'H' all take some time to calculate in the serial box.
There is a 48 character serial input buffer in the box, but if too many of these commands are sent at one time, the buffer might overflow and commands would get lost.
A suggestion is to send about 48 characters maximum at a time, then wait a few milliseconds before sending the next set of commands.

Setup command string examples.

Command String	Description
H,1,1	Enable home switches for encoder 1
H,3,1	Enable home switches for encoder 3
O,1,1010101	Channel 1 will home to position 1010101
O,3,3030303	Channel 3 will home to position 3030303
P,1,111	t new position for encoder 1
P,2,222	Set new position for encoder 2
P,3,333	Set new position for encoder 3

*Always send positions last after reset.

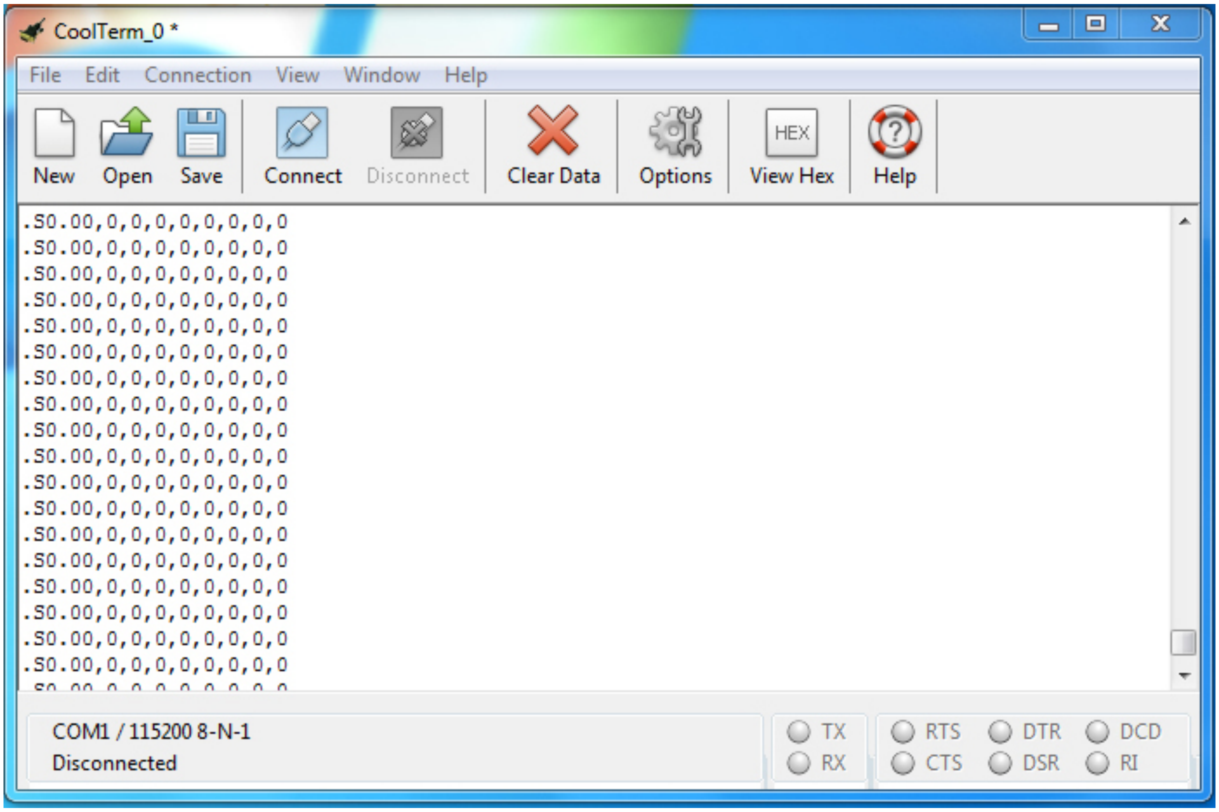
Serial Box Serial Communication Protocol

The serial stream always starts with an upper case alpha character:
‘S’ when the move is not rolling
‘R’ during a move record and/or playback, or whenever the move frame number is advancing.

For ‘S’ and ‘R’, the data string consists of:
<decimal_move_frame>,<axis_position>,< axis_position>,…for up to 8 axes.
New SB3 version box will be total 10 axes.
The frame number has two decimal places, axis positions are signed integers, 1 count = 1 encoder line.

All lines are terminated with hex character 0x0d, followed by hex character 0.

The move frame is specified as a decimal. Where n = a number.
n.5 = 180 degrees, the position of the axes halfway through the exposure.
n.0 = shutter closed.



```
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
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.S0.00,0,0,0,0,0,0,0,0
.S0.00,0,0,0,0,0,0,0,0
```
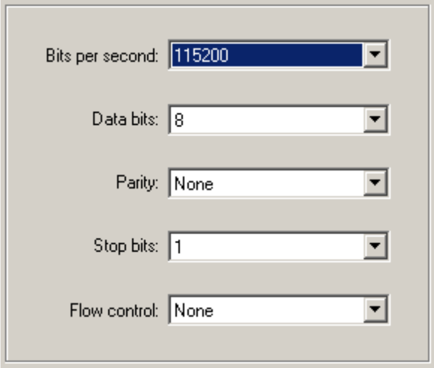

COM1 / 115200 8-N-1
Disconnected

Serial port options:

- Baoud rate: 115200
- Data bit: 8
- Parity: 0
- Stop Bits: 1
- Flow Control: none

HyperTerminal, the communication program in Windows, can be used to view the string.



Bits per second: 115200
Data bits: 8
Parity: None
Stop bits: 1
Flow control: None