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DemoZ=-0987654321der

<https://youtu.be/eVU1GRY9JG0>

SETTINGS CURRENTLY (10 JAN 2016)

Serial:

/dev/ttyUSB0 9600 8N1 → from the circular mini-DIN connector labeled "RS232 TERM" on the AWCII card on the controller

- wiring closeup
<https://lh3.googleusercontent.com/-Ner9emP-G0c/VpFolzsnGcl/AAAAAABKUM/4D7MeqZoUtl/w470-h835-no/2016-01-09.jpg>
- laptop -> usb -> db9 -> mini-DIN -> rs232 term
<https://lh3.googleusercontent.com/-ZPQIFDI90Pg/VplFwo09pzi/AAAAAABKa4/w5TD30C1mmo/w1483-h834-no/2016-01-09.jpg>

AWCII DIP: Set to 4 ON, 3 OFF, 2 ON 1 ON

- <https://lh4.googleusercontent.com/-W73j8ex45WM/VplGW19vaqI/AAAAAABKbQ/ZC205cqPkuk/w469-h834-no/2016-01-09.jpg>
- <https://lh4.googleusercontent.com/-BCGvVA7dQoc/VplGXXhgRfI/AAAAAABKbM/lu9ICEHSEBA/w469-h834-no/2016-01-09.jpg>
 - as per CS7MBCONTROL.pdf
<https://drive.google.com/open?id=0B9r0HZeoMbmVJ3aEUwdmIPs1E>
 - pg 28, (3.2.11) CPU #1,
 - this sets to "no auto boot, user interface via serial port"

documents

- <https://wiki.london.hackspace.org.uk/view/Equipment/Staubli>
- http://www1.adept.com/main/KE/DATA/Archived/FALL_97/ENGLISH/UTLPRG.PDF
- <https://drive.google.com/folderview?id=0B9r0HZeoMbmVUZQdlpTS3o1cDg&usp=sharing>

Quickstart

controller picture:

<https://lh3.googleusercontent.com/-2dkhfESvnig/VpG0UQhTRNI/AAAAAABKYM/-f8kXFcBehg/w1483-h834-no/2016-01-09.jpg>

startup logs:

<https://drive.google.com/open?id=0B9r0HZeoMbmgaUFWd1dNNk5POEU>

- Plug in 360V to wall
- Turn big white switch clockwise (breaker for 360V)
- white and red lights should be on
 - Load from local disk (B or D) or network disk (X) [default is D]?
- **#press enter, or "D" and then enter**
 - *calibration : WARNING Low battery* #these errors seem to be fine
 - *calibration : channel not enabled* # these errors seem to be fine
 - Axis: 1
 - POSITION RECOVERY

 - Are all axes on their scribe marks ? (Yes/No/Quit)?
 - # at this point, make sure indentations lined up on all axes, either use teaching pendant or manually move:
<https://lh3.googleusercontent.com/-UZ0uohYujYQ/VpIKKy7KiI/AAAAAABKbk/EUyIVACwx4U/w1483-h834-no/2016-01-09.jpg>
- **Y**
 - *Illegal digital signal* #this error seems fine
 - Program task 5 stopped at auto_init, step 38 10-Jan-2016 08:03:45
 - **. #we are now at the prompt! . indicates the prompt**
- enable power #audible click as brakes release
- green button flashing → depress it
- disable dry.run
- do ready
- do speed 10 always
- do move 1,10,10
- **ALWAYS END WITH DO READY to return to scribe marks**
- turn white switch counterclockwise to cut power

Moving Staubli Manually

- turn on power on controller with big white knob
- switch knob on robot arm to axis you want to move
- <https://lh5.googleusercontent.com/-fsEv2KltHYI/VpBvzLrnQil/AAAAAABKPG/rFBdj70cAJE/w1483-h834-no/2016-01-08.jpg>
- hold down black button, move axis manually (beware axis 2 like to drop down toward you) #this will automatically disable power on the terminal
- return knob to zero when done!! or else red indicator will remain lit and will give estop error

IMPORTANT COMMANDS

("do" at beginning for interactive mode)

enable power #you should hear audible click as brakes release

disable dry.run

do speed 10 always #set speed to 10 always

do ready # points straight up

where # in ready position, shows X0 Y48.95mm Z665mm y0 p0 r0. J1-J6 are degrees of the joints

do drive axis#,degrees,speed (0-100)

do drive 1,10,10

do move trans(600,50,50,0,90,180) #X,Y,Z, end effector angles y,p,r. interpolates at will

do moves trans(600,50,50,0,90,180) #interpolates in straight line

kill

abort

IMPORTANT STATUS CHECK COMMANDS

- parameter
- parameter not.calibrated = -1 (sets the variable "not.calibrated", -1 to force recalibrate. 0 is calibrated)
- switch
- where #lists xyz values

EDIT CONFIGURATION

http://www1.adept.com/main/KE/DATA/Archived/FALL_97/ENGLISH/UTLPRG.PDF page 93

- load \utilspec
- execute 1 a.spec
-

*** ADEPT ROBOT SPECIFICATION PROGRAM ***

(Version 13.1C2)

Copyright (c) 1988-2000 by Adept Technology, Inc.

Servo code version: 13.1S.0 Servo rate: 1000 Hz

ROBOT 1: S60B_STD.SPC . D 242 552 00 A . 12/03/02 . V+13.1 N S2
Restricted access mode (formerly CONFIG_R)

- 0 => Exit to system monitor
- 1 => Enter password to increase access
- 2 => Perform hardware diagnostics
- 3 => Edit robot specifications
- 4 => Load robot specifications from a disk file
- 5 => Save robot specifications to a disk file
- 6 => Save ALL specifications to system disk
- 7 => Edit SPEC program preferences

http://www1.adept.com/main/KE/DATA/Archived/FALL_97/ENGLISH/UTLPRG.PDF page 26

- zero
- load \util\config_c
- execute a.config_c

*** ADEPT SYSTEM CONFIGURATION PROGRAM (Version 13.1C4) ***

Copyright (c) 1984-1999 by Adept Technology, Inc.

- 0 => EXIT to system monitor
- 1 => V+ Installation
- 2 => V+ System Configuration Data**
- 3 => Robots and Device Modules
- 4 => Controller NVRAM
- 5 => Scan the DeviceNet

Enter selection and press RETURN:

Directory Commands

```
ls
cd
fdirectory
```

MOTION finetuning

DISABLE SCALE.ACCEL

DEBUG

Estop? Check that:

- 1) controller estop not depressed
- 2) jiggle pendant bypass, or if pendant connected, make sure pendant estop not depressed
- 3) on base of robot arm, knob points to zero
- 4) after hitting estop, you need to run "enable power" and hit the green button again
- 5) still getting "*E-STOP from MCP enable switch"? pull out the wooden block on the pendant and put it back in again
- 6)

Switches? Don't seem to matter.

PROGRAM

EDIT square

(type in line by line)

E #to exit back to prompt

EXEC square

abort #if needed

kill #if needed

SQUARE (pen should touch paper when z = 50, so put a cardboard box under it)

SPEED 20 ALWAYS

READY

DRIVE 2,60,20

DRIVE 3,40,20

DRIVE 5,-10,20

ABOVE

MOVE TRANS(600,50,**50**,0,90,180)

MOVES TRANS(600,50,**0**,0,90,180) #move pen down

MOVES TRANS(**500**,50,0,0,90,180)

MOVES TRANS(500,**150**.0,0,0,90,180)

MOVES TRANS(**600**,150,0,0,90,180)

MOVES TRANS(600,**50**.0,0,0,90,180)

MOVE TRANS(600,50,**50**,0,90,180) #move pen up

TEACH PENDANT

should show "-" on LCD screen on bootup
jiggle up and down to make sure connected
<unfinished>

SERIAL gcode

only takes in a few gcode commands!

<https://github.com/MITERS/gdmux>

```
$ python sendvplus.py gcode.pg gcode
```

```
$ sudo minicom /dev/ttyUSB0
```

```
. exec gcode
```

```
$ gdmux -consolate 9600 -consoletty "/dev/ttyUSB0" -datarate 9600 -datatty "/dev/ttyUSB1"  
-http :5000
```

LONDON

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Misc. NOTES from london

- you can also probably use Kermit protocol to upload the V+ code over one of the data serial lines
- I am making the assumption that the data serial lines still work even if the local terminal serial line is disabled.
- You get the idea - always best to start from a configuration close to where you will work, with the elbow bent the right way, then ABOVE, then do your work
- maxing out the acceleration and deceleration parameters with something like ACCEL (1) 10000, 10000