

GADD System Configuration Instructions

For GADD to run you need to put several configuration items in a folder called Setup in the GADD folder in your system's programs folder (in Windows XP that's C:\Program Files\GADD). The installation does not do this for you, and you must have administrator privileges to create that folder.

In Setup you must put the following files:

- GADD_config.ini
- GADD_defaults.ini
- a_pe_wave_file.txt

All of these are text files and can be written with, for instance, Notepad. You should avoid Microsoft Word or other bloated, formatting-heavy text editors. The first two must have exactly those names, the third can have any name, it is referred to in GADD_defaults.ini file, which will be clearer in a few paragraphs. The easiest way to start is to go to the Download page at multispectroscopy.com, download the zipped Setup folder, unzip it, and put it in the GADD folder after you install GADD. Then you can freely edit those files for your system working from the existing examples. Within the files, capitalization doesn't matter, I'm using it in this document for clarity.

GADD_config

GADD_config contains descriptions of the equipment the GADD program will have access to and some information about that equipment. The purpose of this configuration file is to tell GADD what equipment is available, where to send it's commands, and where to go to get measured information. At the beginning of each script file you need to use the SET command to specify which equipment from the list given in this file that particular script will use. That is described in the scripting tutorial. Please look at the example files to see the basic structure. In this file you will specify:

exactly one: GPIBDEVICE

and between 0 and 10 of each:

ACDEVICE, DMM, PAMETER, DCSOURCE, SWEEPDEVICE, SWITCH, AMPLIFIER

and between 0 and 10:

HEATER or OVEN

The GPIBDEVICE should be either NI or PROLOGIX depending on which USB-IEEE488 converter you have.

The SWITCH can be either an NI USB 600x type or the HP3488 switch mainframe. If you are using an NI device it should be the named using NI's Measurement and Automation Explorer. The name should start with NI6008 or NI6009, for instance NI6008_MYLAB. The entry in GADD_config should then look like:

```
SWITCH NI6008_MYLAB USB
```

For the HP3488 at gpib address (for instance) 16 it should look like:

```
SWITCH HP3488 GPIB 16
```

If you don't have a switchdevice you can simply not include this line or write

```
SWITCH none
```

The AMP specifies the kind of amplifier you are using. It can be NONE, EXTERNAL-something, or GADD. If EXTERNAL the name can have a suffix, such as EXTERNAL_KEPCO or EXTERNAL_TREK and should be followed by the gain of that amplifier. Examples:

```
AMP EXTERNAL 100  
AMP EXTERNAL_THELITTLEONE 10  
AMP GADD
```

The format for each of the:

ACDEVICE, DMM, PAMETER, DCSOURCE, SWEEPDEVICE

is the same. It looks like:

```
devicetype name gpibaddress
```

The gpibaddress is the address (0-31) which is set on the device and which keeps the various devices from crosstalking on the GPIB. You have to consult the manual on each device for setting it. When the AC device is GADD (combination of gadd hardware and SYS830 lockin) you should use the name GADD_SOMETHING and the address of the lockin. You must use NI's MAX program to set the name of the 6009 interface built into the gadd hardware to match the name in the config file. The name used should start with GADD.

For instance a line would look like:

```
ACDEVICE HP4284 18  
ACDEVICE GADD_1 5  
ACDEVICE GADD 8
```

You should have one line for each of the various devices connected to your system. The DCSOURCE line will duplicate the entry for an LCR meter, lock-in, or pA-meter since those devices can be used as dc sources. As of this writing:

The available ACDEVICES are: HP4284, HP4192, SRS830, GADD

The available PAMETER's are: HP4140

The available DMM's are: HP3478, FLUKE8840 (others can be set to emulate these)

The available SWEEPDEVICESs are: HP4194

The DCSOURCE can also specify the gadd hardware (when only used for pe or preisach measurements) in which case it should follow the rules given above for ac devices but no address is used.

The configuration for an OVEN or HEATER (the terms are synonyms in this system) is similar but includes more information. The exact line depends on whether your oven is connected by GPIB or USB. If GPIB the line is:

```
OVEN name gpibaddress GPIB low_limit high_limit resolution
```

if USB the line is:

OVEN name deviceaddress USB comport low_limit high_limit resolution

where:

low_limit is the lowest temperature the oven should be used

high_limit is the highest temperature the oven should be used

resolution is the resolution of the temperature controller, usually 0.1 or 1.0

gpibaddress is the same as above

deviceaddress is the address of the individual controller, usually 0-31, set on the controller itself

comport is the number of the comport which your computer assigned to the USB communication link.

That number can be seen using the Device Manager, my ListInterfaces program, or in the pop-up error message box which appears if you try to use an incorrect comport address.

The supported ovens are:

DD9010, DD9015, LOVE, H1000, TP3000, STC200, LAKESHORE330, LAKESHORE331

It is possible to use more than one Love controller (with different addresses) by giving each one a different name beginning with LOVE, for instance LOVE_1, LOVE2, or LOVE_HIGHTEMP.

GADD_defaults

The defaults file specifies the, well, default values for many of the system operating values. Each line is the name of a setting then its value. The short forms are given in parentheses. The variables that can be set are:

AC	ac signal level
DC	dc level
PEAK	peak value of the pe voltage
FREQ	frequency
TAU	lock-in time constant
SETTLING	number of time constants to wait before a lock-in measurement is taken
MINWAIT	minimum amount of time (sec) to wait before any lock-in measurement
RANGESETTLING	number of time constants to allow the lock-in to settle while autoranging
TEMPTOL	allowable range for temperature settling
TEMPHOLD	amount of time to wait within TEMPTOL band for temperature settling
TEMPOVERRUN	number of degrees over a temperature sweep's stop temp to be used to maintain the desired rate up to the stop temp
RESERVE	lock-in dynamic reserve (1=low, 2=normal, 3=high)
INTEGRATION	LCR meter integration time (1=low, 2=normal, 3=high)
MAXHOLD	the maximum amount of time GADD should wait for the temperature to settle
SWEEPWAIT	the maximum amount of time GADD should wait for a sweep device to do a sweep
OVENTRIES	the maximum number of attempts GADD should make to set the oven temperature
LCRMETERTRIES	the maximum number of attempts GADD should make to read the LCR meter
PAMETERTRIES	the maximum number of attempts GADD should make to read the pA meter
PELOOPDELAY	the delay between pe points
PEDELAY	the delay between pe loops
COUPLING	lock-in ac coupling (0) dc coupling (1)
MODE	
HARMONIC	lock-in harmonic to be measured

PERANGE range of GADD hardware
PEWAVE the name of the file containing the shape of the applied pe waveform

pe wave file

This is a text file which should contain just a list of numbers between -1 and +1, typically starting and ending with 0.0, which gives the shape of the pe waveform. The number of points in the pe measurement is determined by the number of lines in this file, 256 is common. GADD will scale and offset these numbers to produce the peak and dc specified during the experiment.