

Configuration File Structure in SPICE

Mark Lumsden
Created: 7/18/2006

The top-level configuration file for SPICE must be named “configure.ini” and should be located in:

- The same directory as the code repository if SPICE is run from code. For instance, if the code is contained in a directory named “spice_code_lv_801”, the configure.ini file should be at the same level as this directory (on my computer, the full path to the code directory is “c:\spice\spice_code_mv_801” and the top-level configuration file is “c:\spice\configure.ini”)
- The same directory as the spice executable (spice.exe) if running from a compiled executable. This is typically in “C:\Program Files\Spice”

NOTE: if SPICE cannot find this file, it will not operate correctly.

In the following sections, we will describe the internal path structure of SPICE in relation to the top-level configuration file described above. Many paths in SPICE are composite paths composed of several entries in the “configure.ini” file and debugging path issues is very difficult if you don’t understand how these paths are formed.

1. System Files:

```
[Help]
filename=spice.chm
[Version]
Value=1.1
[Virtual]
Value=true
[UserInterface]
VisToLoad=Instrument.lvlib:Triple_Axis_GUI.lvlib:MainTAS.vi, Instrument.lvlib:Triple_Axis_GUI.lvlib:Status2.vi
[WebServer]
LoadGWebServer=False
WebServerVI=common\\Launch_Spice\\StartGWebServer.vi
[Memory]
ConserveMemory=False
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\System_TAS
InstrumentPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
```

The diagram illustrates the construction of the system directory path. A blue arrow points from the `TopPath=C:\spice` line in the configuration file to the text `TopPath+SystemPath=System Directory`. Another blue arrow points from the `SystemPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\System_TAS` line to the same text. The text `TopPath+SystemPath=System Directory` is written in blue.

The first path of interest is the system directory. This path contains several directories and configuration files which are designed to be present for all installations of SPICE independent of the instrument type. The location of the system directory is a combination of the “TopPath” and the “SystemPath” as shown in the above figure. In the example shown above, the system directory would be “C:\spice\spice_code_lv_801\Support_Files\Configuration_Files\System_TAS”. NOTE the use of “\\” in the relative path specifiers – this is necessary for the LabVIEW Build Path tool to construct a proper path.

```
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\System_TAS
InstrumentPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
SysAliasFile=SysAlias.txt
InstAliasFile=InstAlias.txt
UserAliasFile=UserAlias.txt
SysCountfileDir=Countfiles
InstCountfileDir=Countfiles
UserCountfileDir=Countfiles
DataFileDir=Datafiles
VIBasePath=spice_code_lv_801
LogFile=LogFile.txt
CountLogFile=CountLog.txt
UBConfDir=UBConf
HistoryPath=history.txt
ExpConfFile=expconf.ini
HTMLLogs=html
Calibration=Calibration
Variables=Variables.txt
HelpConfig=helpconfig.ini
CommandsIni=commands.ini
CodeMax=common\\Utilities\\GUI_utilities\\codemax_call.vi
SystemConfigsDir=Configs
InstrumentConfigsDir=Configs
UserConfigsDir=Configs
```

Within this system directory, there are a number of files and directories which are highlighted in the figure to the left. These files are located in the system directory as specified above:

- System script, macro, countfile and configuration (used in some instruments to drive the instrument to a previously determined configuration) directories.
- System alias file, online help configuration, and variable configuration file (to specify which global variables will be accessible through the SPICE command line)

2. Dynamically loaded VIs:

SPICE makes extensive use of VIs called and loaded dynamically. This allows us to specify the graphical user interface (GUI) and the commands in the “configure.ini” file. This allows tailoring the installation of SPICE to a specific instrument type or even a specific instrument of the same type (for instance, a polarized versus non-polarized triple-axis spectrometer). To be able to call these VIs dynamically, we need to specify a top-level location for these files so that SPICE can form the full path. We do this with a combination of “TopPath” and “VIBasePath” as shown in the figure below.

```
[Help]
filename=spice.chm
[Version]
Value=1.1
[Virtual]
Value=true
[UserInterface]
VIsToLoad=Instrument.lvlib:Triple_Axis_GUI.lvlib:MainTAS.vi,Instrument.lvlib:Triple_Axis_GUI.lvlib:Status2.vi
[WebServer]
LoadGWebServer=False
WebServerVI=common\\Launch_Spice\\StartGWebServer.vi
[Memory]
ConserveMemory=False
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\System_TAS
InstrumentPath=spice_code_lv_801\\Support_Files\\Configuration_Files\\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\\Support_Files\\User\\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
SysAliasFile=SysAlias.txt
InstAliasFile=InstAlias.txt
UserAliasFile=UserAlias.txt
SysCountfileDir=Countfiles
InstCountfileDir=Countfiles
UserCountfileDir=Countfiles
DataFileDir=Datafiles
VIBasePath=spice_code_lv_801
LogFilePath=LogFile.txt
CountLogFile=CountLog.txt
UBConfDir=UBConf
HistoryPath=history.txt
ExpConfFile=expconf.ini
```

TopPath+VIBasePath=Dynamically called VI location

All dynamically loaded VIs are given a path which is relative to this combined path (“C:\spice\spice_code_lv_801” in the example above). There are two ways within SPICE to specify the VI path:

- A conventional relative path specifier (for example “common\\commands\\comment.vi”)
- A library path structure (for example, “Common.lvlib:Common_Commands.lvlib:comment.vi”)

The project libraries used in type 2 above are a new construct in LabVIEW 8. They offer some advantages over specifying a path explicitly and, consequently, *we recommend using these whenever possible*. That being said, both types will continue to be supported.

Examples of dynamically loaded VI path specifiers are shown in the following figures:

1. User interface specification

```
[Help]
filename=spice.chm
[Version]
Value=1.1
[Virtual]
Value=true
[UserInterface]
VisToLoad=Instrument.lvlib:Triple_Axis_GUI.lvlib:MainTAS.vi,Instrument.lvlib:Triple_Axis_GUI.lvlib:Status2.vi
[WebServer]
LoadWebServer=False
WebServerVI=common\\Launch_Spice\\StartGWebServer.vi
...
```

2. Commands specification

```
[Commands]
alias=Common.lvlib:Common_Commands.lvlib:alias.vi
scan=Common.lvlib:Common_Commands.lvlib:scan.vi
drive=Common.lvlib:Common_Commands.lvlib:drive.vi
wait=Common.lvlib:Common_Commands.lvlib:wait.vi
preset=Common.lvlib:Common_Commands.lvlib:preset.vi
title=Common.lvlib:Common_Commands.lvlib:exptitle.vi
count=Common.lvlib:Common_Commands.lvlib:count.vi
ef=Instrument.lvlib:Triple_Axis_Commands.lvlib:ef.vi
ei=Instrument.lvlib:Triple_Axis_Commands.lvlib:ei.vi
run=Common.lvlib:Common_Commands.lvlib:run.vi
exec=Common.lvlib:Common_Commands.lvlib:exec.vi
lattice=Instrument.lvlib:Triple_Axis_Commands.lvlib:lattice.vi
comment=Common.lvlib:Common_Commands.lvlib:comment.vi
scanon=Common.lvlib:Common_Commands.lvlib:scanon.vi
scanoff=Common.lvlib:Common_Commands.lvlib:scanoff.vi
stepbegin=Common.lvlib:Common_Commands.lvlib:stepbegin.vi
stepend=Common.lvlib:Common_Commands.lvlib:stepend.vi
counthead=Common.lvlib:Common_Commands.lvlib:counthead.vi
defxy=Common.lvlib:Common_Commands.lvlib:defxy.vi
plusminus=Instrument.lvlib:Triple_Axis_Commands.lvlib:plusminus.vi
spv=Instrument.lvlib:Triple_Axis_Commands.lvlib:spv.vi
peak1=Instrument.lvlib:Triple_Axis_Commands.lvlib:peak1.vi
peak2=Instrument.lvlib:Triple_Axis_Commands.lvlib:peak2.vi
addpeak=Instrument.lvlib:Triple_Axis_Commands.lvlib:addpeak.vi
ubcalc=Instrument.lvlib:Triple_Axis_Commands.lvlib:ubcalc.vi
calc=Common.lvlib:Common_Commands.lvlib:calc.vi
hold=Common.lvlib:Common_Commands.lvlib:hold.vi
hide=Common.lvlib:Common_Commands.lvlib:hide.vi
showdest=Common.lvlib:Common_Commands.lvlib:showdest.vi
begin=Instrument.lvlib:Triple_Axis_Commands.lvlib:begin.vi
```

3. Device driver VI specification

```
[m2]
alias=m2
class=motor
type=monochromator
enable=true
vi=Devices.lvlib:virtual_motor_controller.lvlib:virtual_motor_channel.vi
controller=virtual_8-axis_motor_controller_1
description=Monochromator Scattering angle.
axis=0
user_lower_limit=-80.000000
user_upper_limit=57.000000
motor_units=deg
motor_jog_stepsize=0.01
motor_show_hide=TRUE
motor_hold_position=0
motor_speed=fast
motor_zero=0.120505
motor_tolerance=0.005000
motor_hold_status=FALSE
motor_backlash_type=0
motor_backlash=0.05
upper_limit_offset=0.1
lower_limit_offset=0.1
fast_speed=8.0
slow_speed=0.5
current_position=-41.047052
```

NOTE: for the library specifiers to work, the top-level library must be in the location of the VI base path directory. If you examine the code base, you will notice that there are several libraries at this level and all VIs have a library path relative to one of these libraries. To see the library path, open the VI and look at the path specified in the window bar.

3. Instrument Files:

The device driver specifications for SPICE are contained in the instrument directory. The instrument directory path is formed from the combination of the “TopPath” and “InstrumentPath” as shown in the figure below.

```
[Help]
filename=spice.chm
[Version]
Value=1.1
[Virtual]
Value=true
[UserInterface]
VisToLoad=Instrument.lvlib:Triple_Axis_GUI.lvlib:MainTAS.vi,Instrument.lvlib:Triple_Axis_GUI.lvlib:Status2.vi
[WebServer]
LoadGWebServer=False
WebServerVI=common\Launch_Spice\StartGWebServer.vi
[Memory]
ConserveMemory=False
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\Support_Files\Configuration_Files\System_TAS
InstrumentPath=spice_code_lv_801\Support_Files\Configuration_Files\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
```

TopPath+InstrumentPath=Instrument Directory

The configuration files for various device types are contained in this instrument directory and the names of these configuration files are specified in the “configure.ini” file as shown below.

```
[Instrument]
InstrumentName=VSANS
ComputerName=localhost
InterfaceConfig=interfaces.config
ControllerConfig=controllers.config
CounterConfig=counters.config
MotorConfig=motors.config
PseudoMotorConfig=pseudo_motors.config
AuxiliaryConfig=auxiliary.config
ParameterConfig=parameters.config
```

In addition to the configuration file names, the “InstrumentName” is specified here. This name can be changed to the instrument of interest.

In addition to the device driver configuration files, there are a number of additional files and directories which are specified as relative to the instrument directory:

- Instrument specific script, macro, and configuration directories.
- An instrument configuration file (to specify some instrument specific details), instrument alias file, and a commands configuration file (to specify options for certain commands)

```
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\Support_Files\Configuration_Files\System_TAS
InstrumentPath=spice_code_lv_801\Support_Files\Configuration_Files\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
SysAliasFile=SysAlias.txt
InstAliasFile=InstAlias.txt
UserAliasFile=UserAlias.txt
SysCountfileDir=Countfiles
InstCountfileDir=Countfiles
UserCountfileDir=Countfiles
DataFileDir=Datafiles
VIBasePath=spice_code_lv_801
LogFileDir=LogFiles
CountlogfileDir=CountLog.txt
UBConfDir=UBConf
HistoryPath=history.txt
ExpConfFile=expconf.ini
HTMLLogs=html
Calibration=Calibration
Variables=Variables.txt
HelpConfig=helpconfig.ini
CommandsIni=commands.ini
CodeMax=common\Utilities\GUI_utilities\codemax_call.vi
SystemConfigsDir=Configs
InstrumentConfigsDir=Configs
UserConfigsDir=Configs
```

4. User Files:

The final essential file structure in SPICE is the user files structure. This one is of particular importance as it is the only directory structure exposed to the users. The user directory is specified in “configure.ini” as “UserDir”. NOTE: this directory is NOT relative to “TopPath”. This is done intentionally to prevent users from having to navigate a complicated directory structure (normally, we set this to “C:\User” as opposed to the complicated path shown in the figure below).

```
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\Support_Files\Configuration_Files\System_TAS
InstrumentPath=spice_code_lv_801\Support_Files\Configuration_Files\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
SysAliasFile=SysAlias.txt
```

UserDir

UserDir+UserPath=User experiment directory

The files of interest for a particular experiment are contained in the experiment directory which is a combination of “UserDir” and “UserPath” as shown above. This only needs to be manually set once during initial installation. Changes in experiment number (using the “begin” command) will automatically modify this entry and create all necessary files and directories.

```
[Paths]
TopPath=C:\spice
BufferPath=Buffer.txt
ScriptBufferPath=ScriptB.txt
SystemPath=spice_code_lv_801\Support_Files\Configuration_Files\System_TAS
InstrumentPath=spice_code_lv_801\Support_Files\Configuration_Files\Virtual_TAS
InstrumentConfFile=instrument.ini
UserDir=C:\spice\spice_code_lv_801\Support_Files\User\User_TAS
UserPath=expl
SysScriptDir=Scripts
InstScriptDir=Scripts
UserScriptDir=Scripts
SysMacroDir=Macros
InstMacroDir=Macros
UserMacroDir=Macros
SysAliasFile=SysAlias.txt
InstAliasFile=InstAlias.txt
UserAliasFile=UserAlias.txt
SysCountfileDir=Countfiles
InstCountfileDir=Countfiles
UserCountfileDir=Countfiles
DataFileDir=Datafiles
ViBasePath=spice_code_lv_801
LogFileDir=LogFiles
CountlogfileDir=CountLog.txt
UBConfDir=UBConf
HistoryPath=history.txt
ExpConfFile=expconf.ini
HTMLLogs=html
Calibration=Calibration
Variables=Variables.txt
HelpConfig=helpconfig.ini
CommandsIni=commands.ini
CodeMax=common\Utilities\GUI_utilities\codemax_call.vi
SystemConfigsDir=Configs
InstrumentConfigsDir=Configs
UserConfigsDir=Configs
2d_PSD_Dir=2D_PSD_Files
```

Within the user experiment directory, there are a number of files and directories:

Experiment script, macro, countfile, datafile, UB matrix configuration, calibration, instrument configuration directories

Experiment specific aliases, experiment configuration file, command history, and experiment logfile.

NOTE: this makes up a large portion of the [Paths] section of the “configure.ini” file.