

## Introduction

Holzworth Instrumentation allows customer access to instrument DLLs for use with alternate interface and control programs. The HolzworthHS1001A.dll allows direct access to the HS1001A through any software that can call a standard C DLL. Both integer and string commands are available.

This Application Note provides specific examples for controlling the HS1001 with Matlab™.



## HolzworthHS1001A.dll Commands

```
int openDevice(const char *serialnum)
int RFPowerOn(const char *serialnum)
int RFPowerOff(const char *serialnum)
int ModEnableNo(const char *serialnum)
int ModEnableFM(const char *serialnum)
int ModEnableAM(const char *serialnum)
int ModEnablePM(const char *serialnum)
int ModEnablePulse(const char *serialnum)
int ModEnableSweep(const char *serialnum)
int setPower(const char *serialnum, short powernum)
int setPowerS(const char *serialnum, const char *powerstr)
int setPhase(const char *serialnum, short phasenum)
int setPhaseS(const char *serialnum, const char *phasestr)
int setFrequency(const char *serialnum, INT64 frequencynum)
int setFrequencyS(const char *serialnum, const char *frequencystr)
int setFrequencyDwell(const char *serialnum, unsigned short dwellnum)
int setFrequencyDwellS(const char *serialnum, const char *dwellstr)
int setFrequencyPoints(const char *serialnum, unsigned short pointsnum)
int setFrequencyPointsS(const char *serialnum, const char *pointsstr)
```

## Accessing DLLs in Matlab™

The commands used in Matlab™ to access DLLs are as follows:

- **Loadlibrary** Loads a dll
- **Unloadlibrary** Unloads a dll
- **Libisloaded** Checks to see if a library is loaded
- **Calllib** Calls a loaded dll function

To open the HolzworthHS1001A.dll, the following code sequence is used:

```
if libisloaded('HS1001A')==1,
    disp(' HS1001A Library is Loaded');
end

if libisloaded('HS1001A ')==0,
    disp('Loading Library...');

    loadlibrary HolzworthHS1001A.dll HolzworthHS1001A.h alias HS1001A

    n = calllib('HS1001A ', 'openDevice','015');
        if n == 0, disp('Error Opening HS1001A'); end
        if n == 1, disp('HS1001A is open'); end
end
```

### SUMMARY

The “*libisloaded*” command checks to verify if the library has already been loaded. Therefore, this section of code can always be put in front of other commands rather than having to include separate scripts.

The “*loadlibrary*” command loads a DLL and the associated header. This command and header must be in the Matlab™ working directory or in a path that will Matlab™ recognize. Note that the name of the DLL can be aliased. In the above code, it has been aliased to “*HS1001A*”.

The “*calllib*” function calls out a function that is listed in the header and contained within the DLL.

The “*opendevic*” function is used here to open communications with the HS1001A. Note that the serial number of the device must be used to call the device and it is sent as a string. We use serial number 015 in the above example. While using the “*openDevice*” function, a 1 is returned if successful, a 0 if unsuccessful.

**Example: Setting a Frequency using a string**

The setFrequency command does not work in Matlab™ as this alternate program does not support 64bit integers. Therefore, the “setFrequencyS” (S for string) is used instead.

To set the Frequency to 86.75MHz the value must be in mHz, decimals are not allowed.

```
86.75MHz => 8675000000
```

```
n = calllib('HS1001A ', 'setFrequencyS', '8675000000');  
    if n == 0, disp('Error Setting Frequency'); end  
    if n == 1, disp('New Frequency Set'); end
```

To convert from an integer to a string use:

```
>> int2str(86.75e9) // MHz is e6 – convert to mHz by multiplying again by 1000  
ans =              // int2str converts an integer to string  
86750000000  
>>
```

For further details, refer to Holzworth Application Notes:

<b>AN102-1.0</b>	<b>Functions of the HolzworthHS1001A.dll</b>
<b>AN103-1.0</b>	<b>Using the HolzworthHS1001A.dll with Matlab™</b>

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