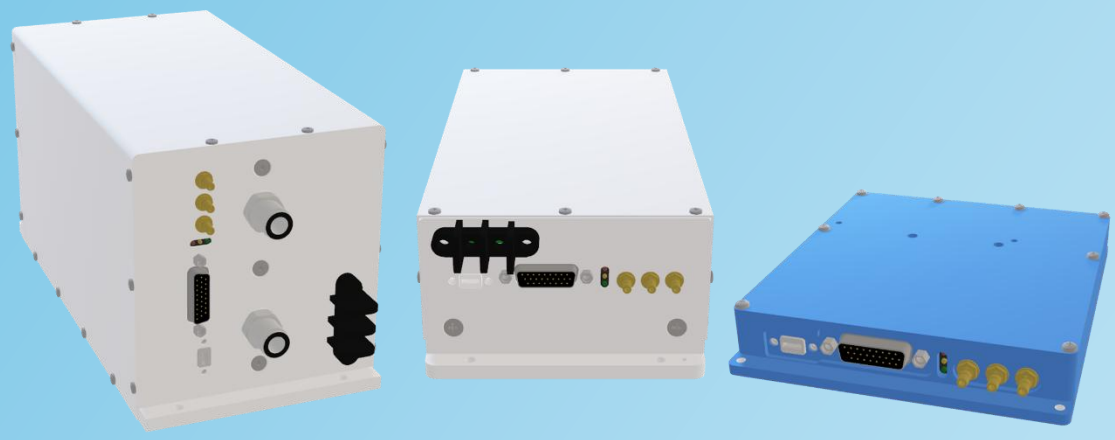
iVSA control Panel

User Manual



ISOMET

AN: 26140
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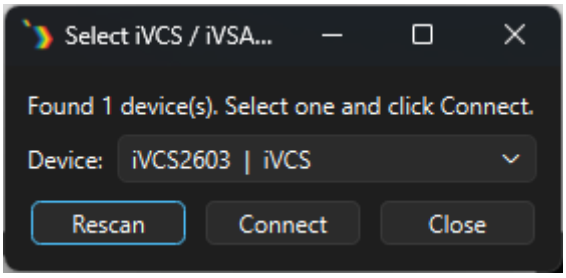
Revised:
Author: James Hughes

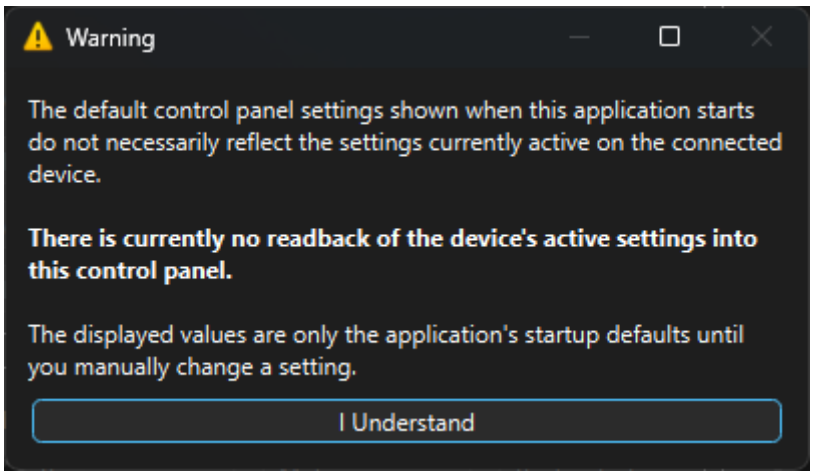
Contents

1. Device Connection



Upon loading the application, a device scan will be carried out, and the user is presented with a device selection dialogue. Scan results are filtered to only show iVCS/IVSA devices. The user can rescan, connect or close the application.

2. SDK Limitations

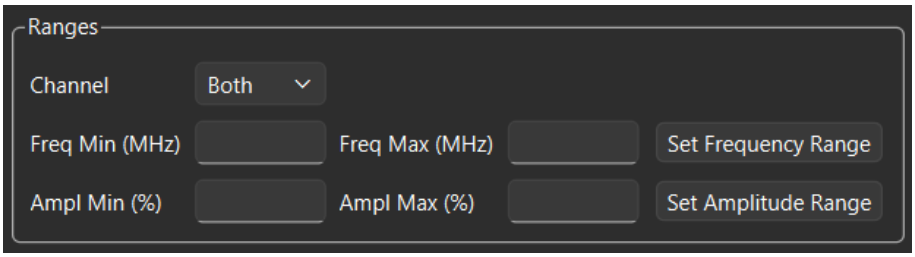


It's important to note that this application (and the Isomet SDK in general) has limited has limited functionality to reading back data/settings from the ims. Currently there is no way to readback the vco setings such as f_{min}, f_{max}, a_{min}, a_{max}, routing, DDS/ch power, etc...

For this reason it is important to note that the software does not reflect the current state of the connected device at startup. Instead, the settings have been set to reasonable defaults but they to not take affect until they are changed change or asserted with their respective set control.

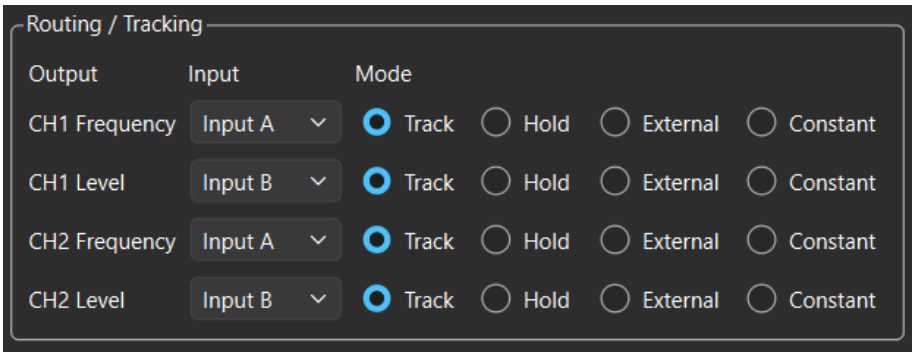
3. Control Tab

3.1. Ranges



The ranges tab allows the user to set the minimum and maximum values for the analogue inputs. These setting can be set per channel or to both channels using the channel selection box. Once entered the values are not communicated to the device until the set button is triggered.

3.2. Routing / Tracking



The ‘Routing / Tracking’ section allows the user to set the control source for the frequency and amplitude of each RF output. There are 2 main options:

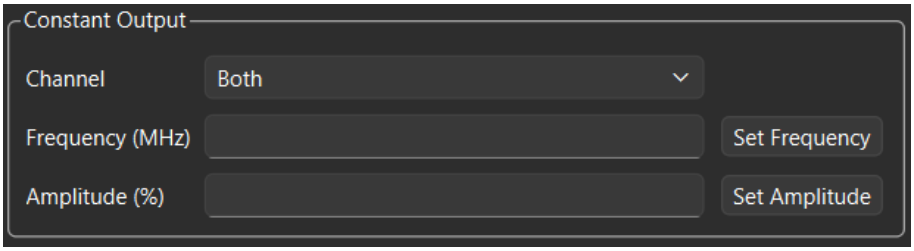
- Analogue input
  The analogue inputs A and B can be routed to control any of the four controls in any combination. There are 3 modes relating to the analogue input method:
  - Track – This means that the output value is exactly tracked to the input analogue value.
  - Hold – This means that the output value is exactly tracked to the input analogue value until it is stationary (minimal net change) at which point the output is not updated until the change exceeds the threshold.
  - External – This means that external control ## will be used to place a hold on the output signal instead of analysing rate of change
- Constant
  The constant mode dictates that the value set in the constant tab (see section 3.4) are to be used.

Users can define any combination of these settings they desire.

3.3. RF Mute Control

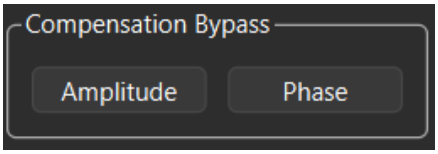
The RF Mute controls allow the user to determine, per channel, whether the output should be Run, be muted, or for these states to be triggered by a digital pin ## externally.

3.4. Constant output



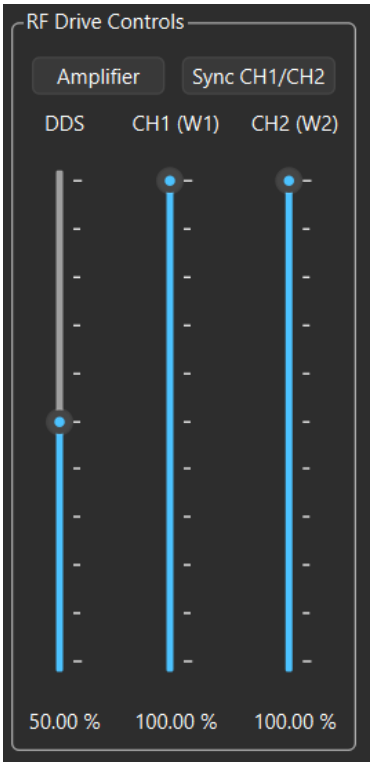
The Constants Tab determines that constant value to be stored for frequency and amplitude per channel. Once entered the set frequency/amplitude buttons will push the change and set the mode control (see section 3.2) to Constant for the value selected.

3.5. Compensation Bypass



The compensation bypass controls allow the user to bypass the loaded amplitude and phase look up tables meaning that there is no compensation in the control chain.

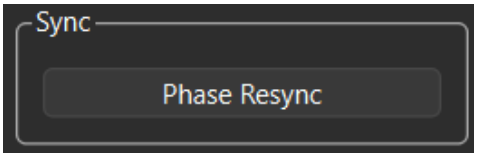
3.6. RF Drive Controls



The RF Drive Controls allow the user to set the values for the DDS and ch1+2 powers as well as the state of the software amplifier gate (if it is required, see Appendix I)

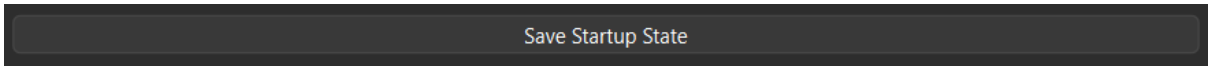
Caution: take care when adjusting the values of the power wipers. Do not exceed the maximum allowable power for AO devices. See Appendix I for the functions of each power slider.

3.7. Sync



The sync section provides the option to resync the phase offset between the two RF outputs. This may be necessary when using the application as when updating some controls phase sync can be lost. Phase compensation is not affected by this control.

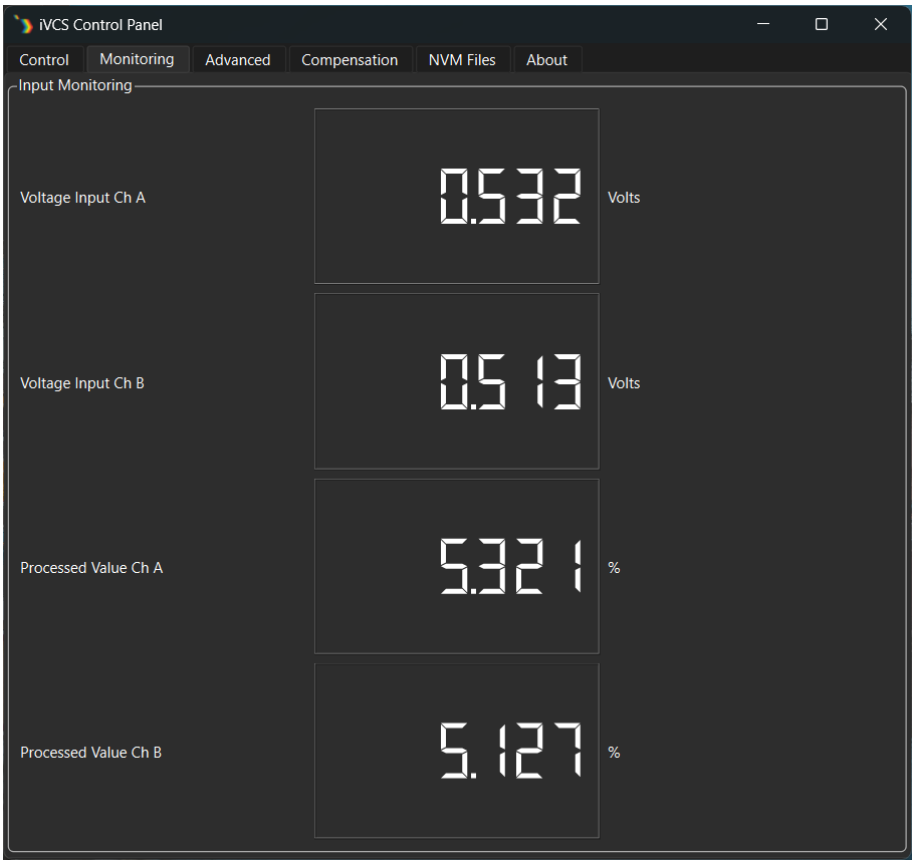
3.8. Save Startup State



The application allows the option to save the configured setting as the default startup state. This will store the state of all of the controls in the control tab (and those in the advanced tab) as the default state in NVM.

The default values stored on the device at the time of shipping will be logged on the device test data sheet.

4. Monitoring Tab



The monitoring tab allows a real-time readout of the values being read by the analogue inputs.

5. Advanced Tab

The advanced tab allows more detailed control of the input filtering and scaling of the analogue ADCs.

We do not recommend changing these settings for regular use.

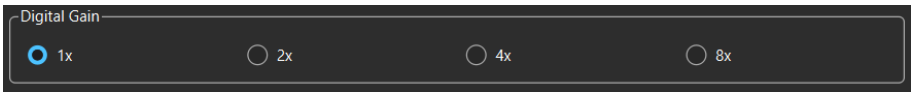
5.1. Filters

- CIC Length (1–10) sets the length of the CIC (Cascaded Integrator-Comb) filter. Higher values increase smoothing of the ADC input but also slow the response to changing input signals.
- IIR Cutoff (kHz) sets the cutoff frequency of the IIR (Infinite Impulse Response) filter. Lower cutoff values provide stronger smoothing, while higher values allow faster signal changes to pass through.

- Stages (1–8) sets the number of IIR filter stages. Higher stage counts increase the filtering effect.

The user can enable and disable these filters as desired.

5.2. Digital Gain



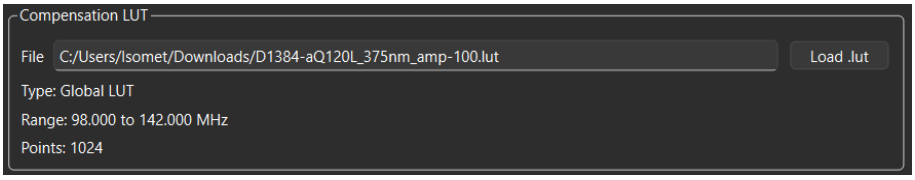
The digital gain control allows the user to scale the input for best usage of the ADCs input range. By default the scaling is one to one for a 0-10v signal and the digital gain allows the device to be controlled by a smaller voltage range but maintain the input resolution.

6. Compensation Tab

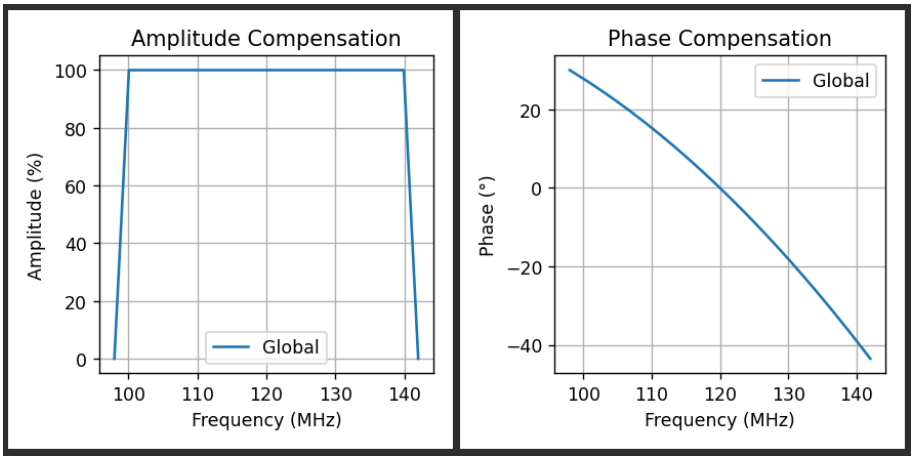
The iVSA/iVCS voltage-controlled synthesisers allow users to setup amplitude and phase lookup tables that compensate for non-linearities in both the AO and RF drive components and allows the user to set the crucial phase offsets required for beam steered application.

More details of lut generation are available on our website. (Compensation LUT and Scan Uniformity Guide.pdf)

6.1. Loading a .lut file



To Load a .lut file the user must select the ‘load lut’ button. This will open a file explorer window allowing the user to select a .lut file to load. Once loaded the compensation details will be shown in the ‘compensation LUT’ section. The values in the lut file will be graphed and displayed.



6.2. Storing compensation as device default

Once a compensation table has been loaded the user has 2 options:

- Download to device – this will simply load the lookup table to the device such that it takes immediate effect (if compensation is not bypassed). However, if the device is then power cycled the lookup table will return to its default and not the one previously loaded.
- Store to non-volatile memory – this operates in the same way as 'Download to device' with the exception that the table is stored into the devices non-volatile memory with a default flag and the name specified in the 'device storage' section.
  It is recommended that when storing a new default users ensure that there are no other default flags in the NVM tab (see section 7). The default lookup table loaded to the device is specified on the devices test data sheet. We recommend verifying that this default is correct for your AO application

7. Non-volatile Memory File Tab

The non-volatile memory tab allows users to manage the files stored in the devices NVM. Users are able to delete a specific or all files as well as asserting and removing default flags from entries.

It is recommended to refresh this table after storing a new compensation file. This window does not show any details relating to the VCO's startup settings.

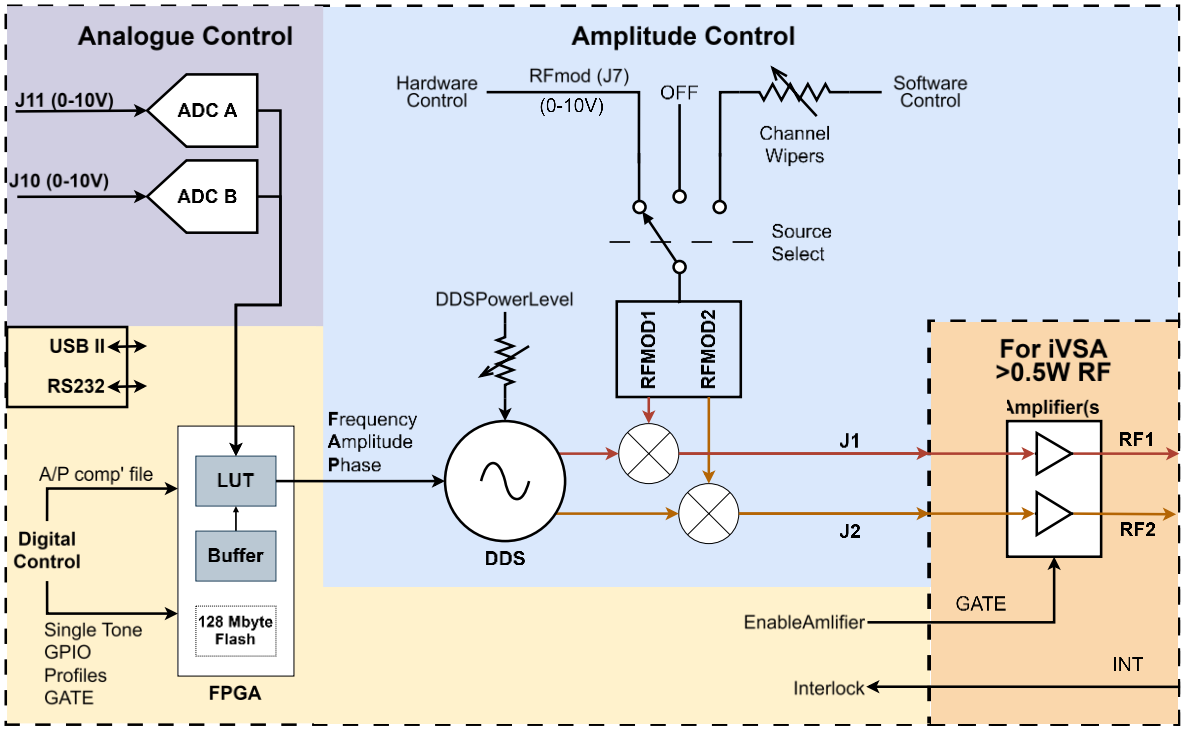
8. About Tab

The about tab gives all the details regarding the application build and the connected devices details.

It is often helpful to include these details when requesting support.

9. Appendices

Appendix I - iVCS/iVSA Conceptual Diagram



NOTE: For devices producing more than 0.5W of RF Power the devices interlock and requirements must be met for the device to output RF.

Appendix II - Application Version History

[1.0.2] - 2026-03-31

Fix

- Updated to store compensation table with correct flag in NVM

Added

- NVM file explorer tab

[1.0.1] - 2026-03-19

Change

- compensation tab layout improved

[1.0.0] - 2026-03-18

Added

- Initial release