

Balancing

- ***There are no set in stone rules for balancing***
- Guidelines
 - Balance after configuring
 - Minimize the number of times you balance
 - Only re-balance when $T_{src}+T_{sys}$ changes by a factor of 2 or more
 - Do not balance between sig/ref pairs (e.g. on/off)
 - Do not balance between calibration source and target source
 - If spectrometer reports $> 2\text{db}$ errors consider balancing
 - Avoid balancing during maps

Dynamic Ranges

- Spectrometer/Spigot
 - Factor of 4 which is 6 dB
 - Linear over much larger range but 3 level sampling noise becomes an issue
- Spectral Processor
 - Factor of about 15 which is 12 dB
 - Has 32 level sampling
- DCR
 - Factor of 50 (0.1 to 5.0 Volts) which is 27 dB

Balancing Within Astrid

- Balance()
 - Can specify device(s) to balance
 - Can specify target levels
- Examples
 - Balance("RcvrPF_1")
 - Balance("IFRack")
 - Balance("SpectralProcessor", {"target_level": -6})

Spectral Processor Balancing

- Default balance level is -11 dB
- Optimum range is actually -6 dB

Spectrometer Balancing

- Spectrometer is balanced to mid-point of allowable range (+/- 3 dB)
- Strong source can change $T_{\text{sys}} > 2\text{-}3$ dB
- BalanceOnOff(location, offset, beamName)
 - Balance off source (location+offset)
 - Move on source (location)
 - See how attenuation has changed
 - Remove attenuation from IF Rack

Additional Astrid Functions

- `ChangeAttenuation(devicename, attnchange)`
 - `devicename` = 'IFRack', 'ConverterRack', etc.
 - `attnchange` is the amount of attenuation change desired
 - Will change all attenuators in the device by the same amount