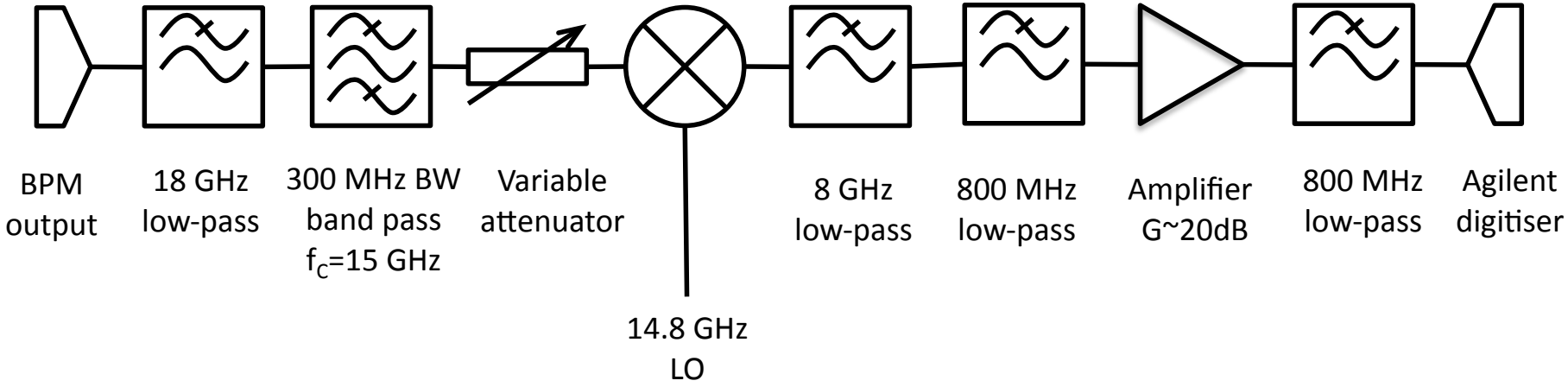
Current Design



- RF filter from RLC
- Variable attenuator from Hittite
- Mixer from Hittite
- High frequency low-pass filter at IF from RLC
- Low pass filters from Mini-Circuits
- Amplifier from Mini-Circuits/Hittite

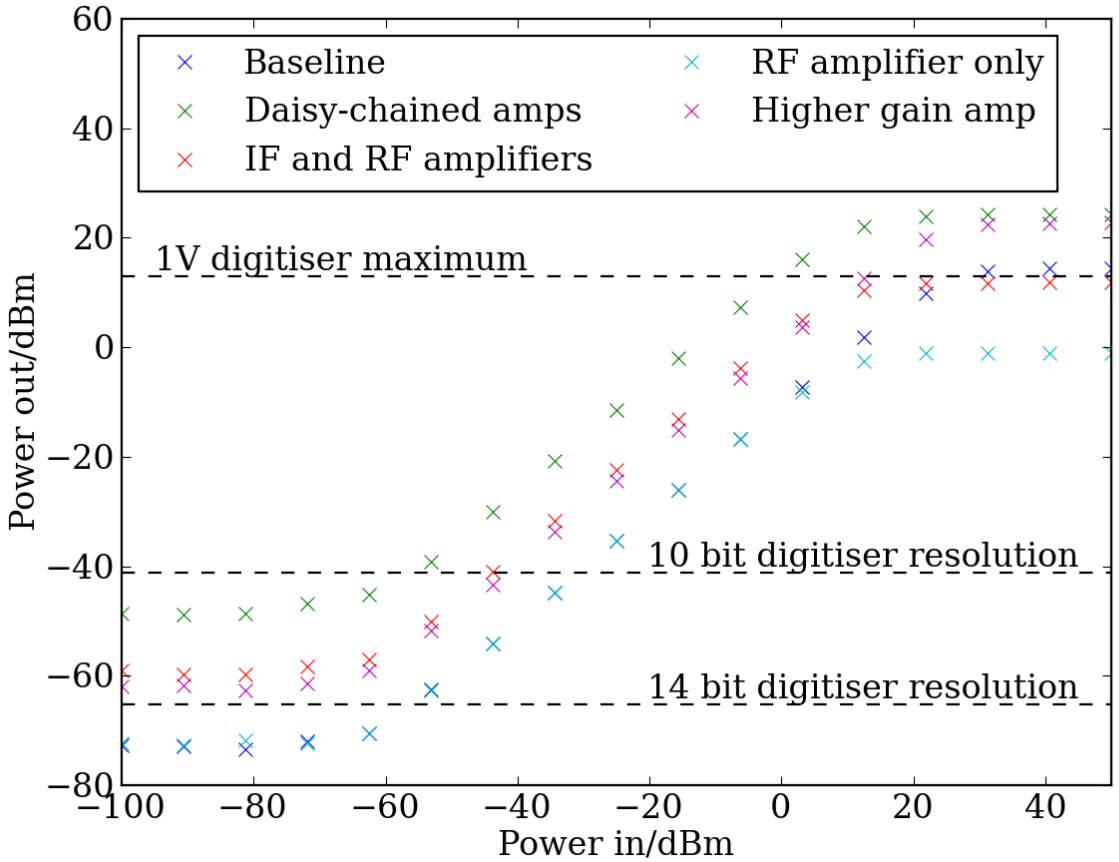
5 Schemes

Several possible schemes for amplification have been looked at, of which, I have chosen 5 to present here:

1. Baseline – 13 dB Mini-Circuits amplifier at IF
2. Daisy chained amplifiers – 2 of the amplifiers above at IF
3. IF and RF amplifiers – 13 dB amplifiers from Hittite/Mini-Circuits at both RF and IF
4. RF amplifier only – 13 dB Hittite amplifier at RF only
5. Higher gain amplifier – 24 dB Hittite amplifier at IF

5 Schemes

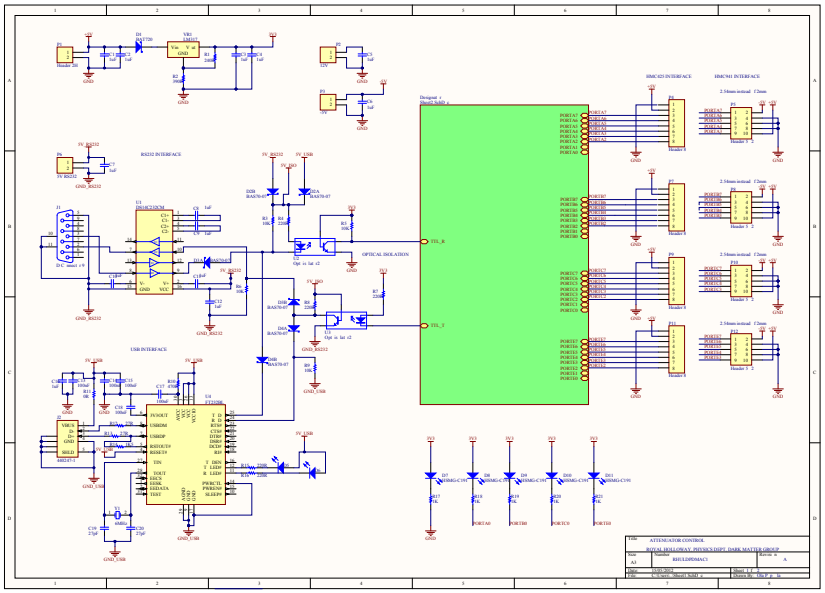
Scheme	Overall gain/dB	Noise floor/dBm	Resolution limit/m	1dB Compression/dBm	Maximum offset/m	Cost/€
Baseline	-2.6	-70	1.03E-08	14	1.63E-04	2,022.52
Daisy-chained amplifiers	10.4	-57	1.03E-08	27	1.63E-04	2,092.16
IF and RF amplifiers	10.4	-67	3.32E-09	14	3.65E-05	2,522.52
RF amplifier only	-2.2	-78	3.81E-09	1	3.65E-05	2,422.44
Higer gain amplifier	8.4	-58	1.22E-08	25	1.63E-04	2,140.88



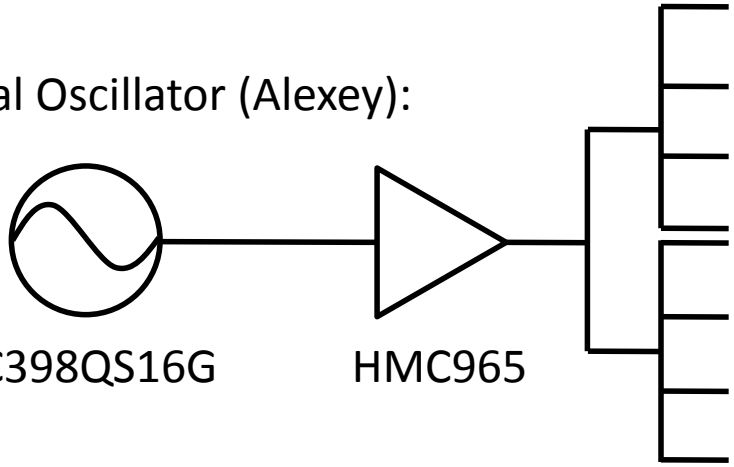
- Simulate power input from source
- Simple FFT analysis to calculate gain
- Electronics compression limited by mixer
- Amplifier in RF limits dynamic range
- High gain amplifier scheme preferred

Other Points

- Digitally controlled attenuator:
  - Hittite HMC941LP4E
  - Linux network server Lantronix XPort Pro – 'World's Smallest Linux Networking Server'
  - Amtel microcontroller



- Local Oscillator (Alexey):



- Range of bandwidths – at present, we should be able to resolve 150 MHz bunching pattern but we could go up to 500 MHz

- Many other practical considerations