

EVLA Front-End CDR

EVLA Front-Ends and the EVLA LO/IF System



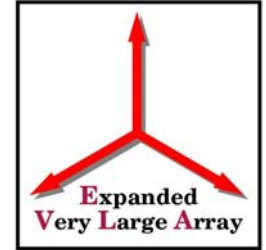
FE to LO/IF Overview



-
- Mapping of broadband IFs to digitizer bandwidths.
 - Signal flow from RF to baseband.
 - Gain Slope Equalization
 - Tuning capability



IF Mapping (T303 Operation)



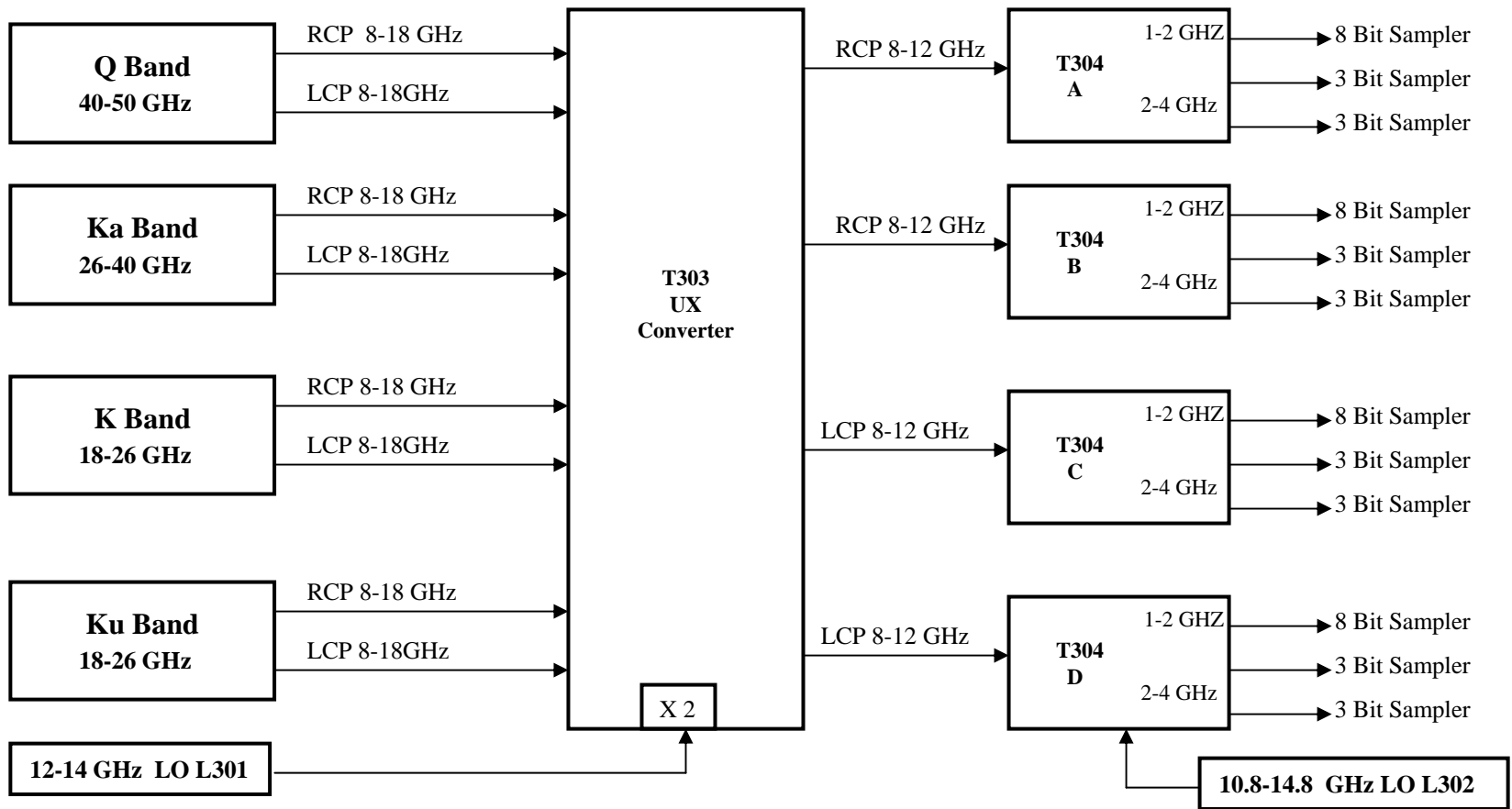
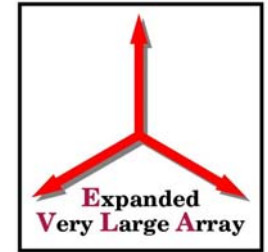
If the frequency range of the “wanted” input IF is not within the 8 to 12 GHz range, then the IF is down converted using the other first LO synthesizer.

For the Ku-band front end, both of the first LO synthesizers are used to down convert the IFs to X-band.

Note: Any converted IF will be spectrally inverted from the non-converted IF.

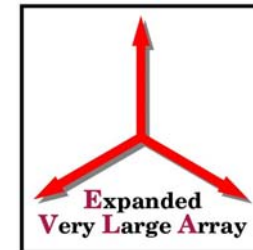


Q, Ka, K, Ku IF Paths

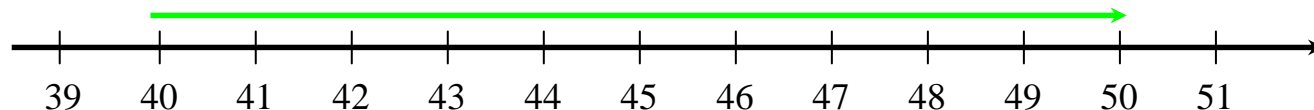




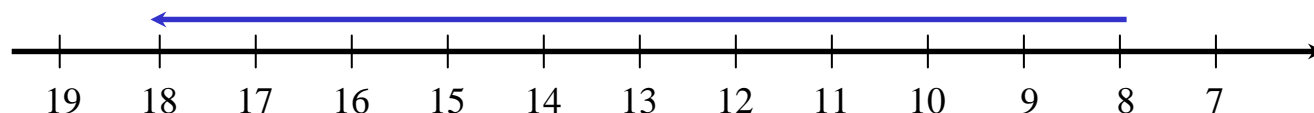
Q-Band Down-conversion



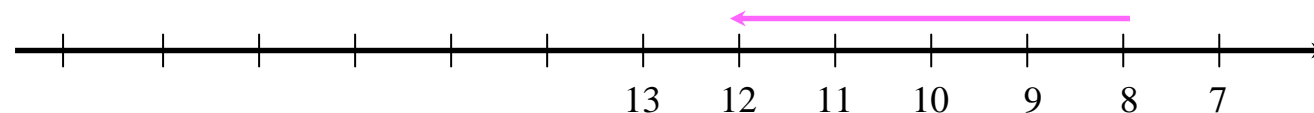
RF Input



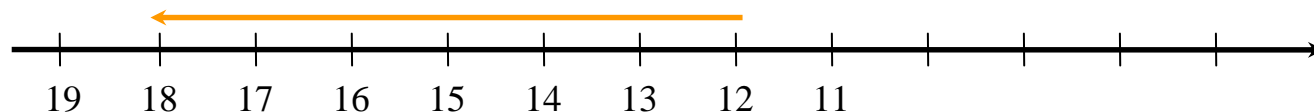
Rx IF Out
(LO = 58 GHz)



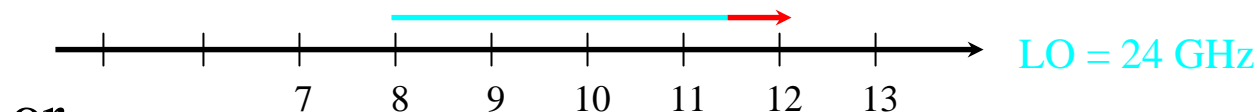
T303 UX Conv.
Through Path



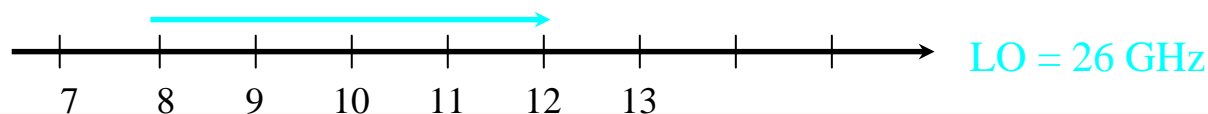
T303 UX Conv.
23-29GHz LO



Down-Converter
'B' Input

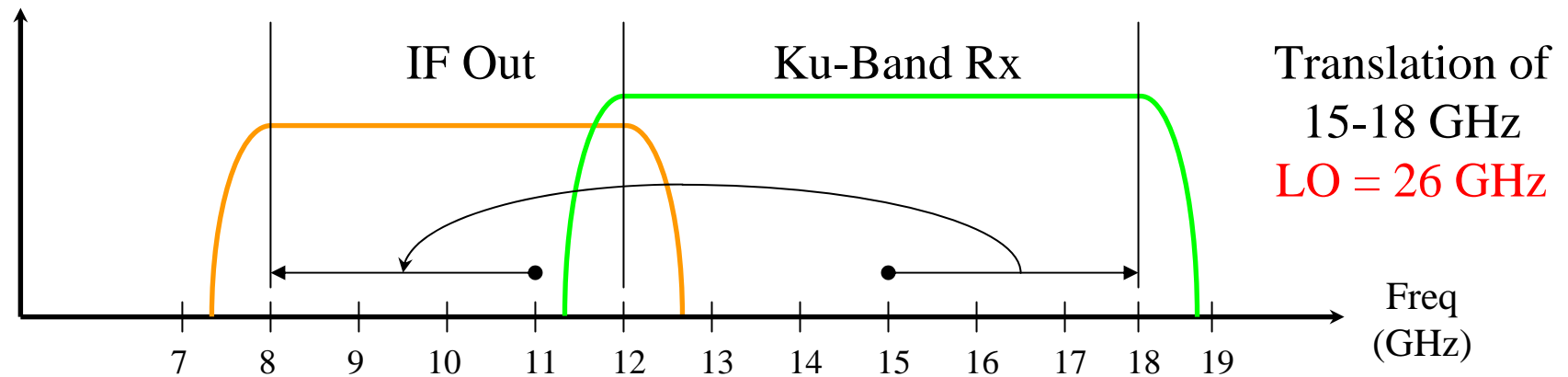
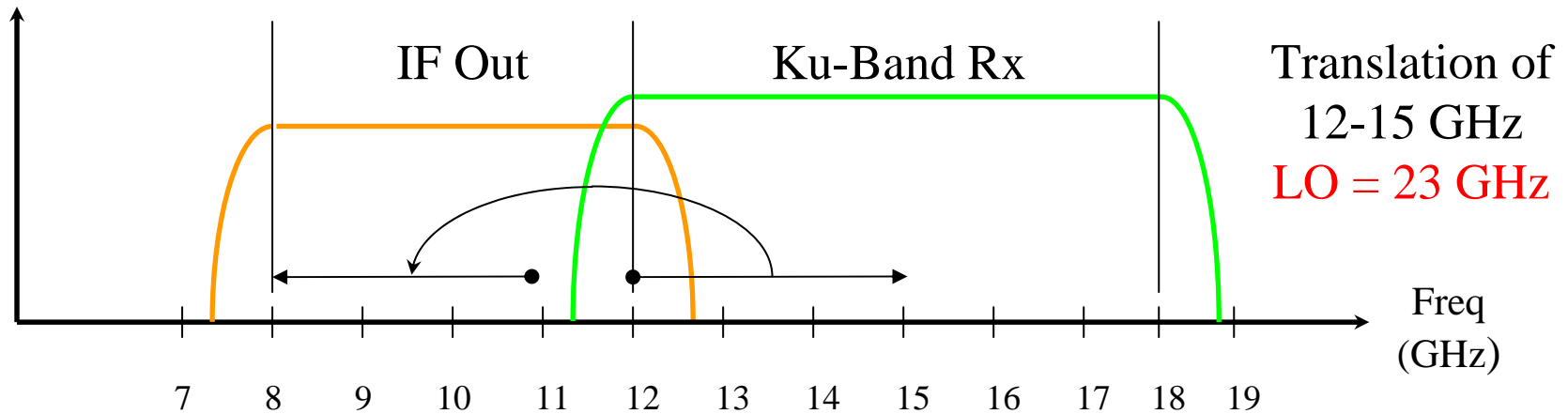
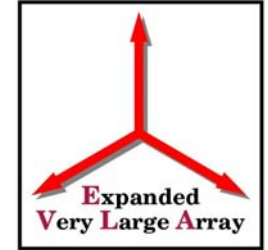


or



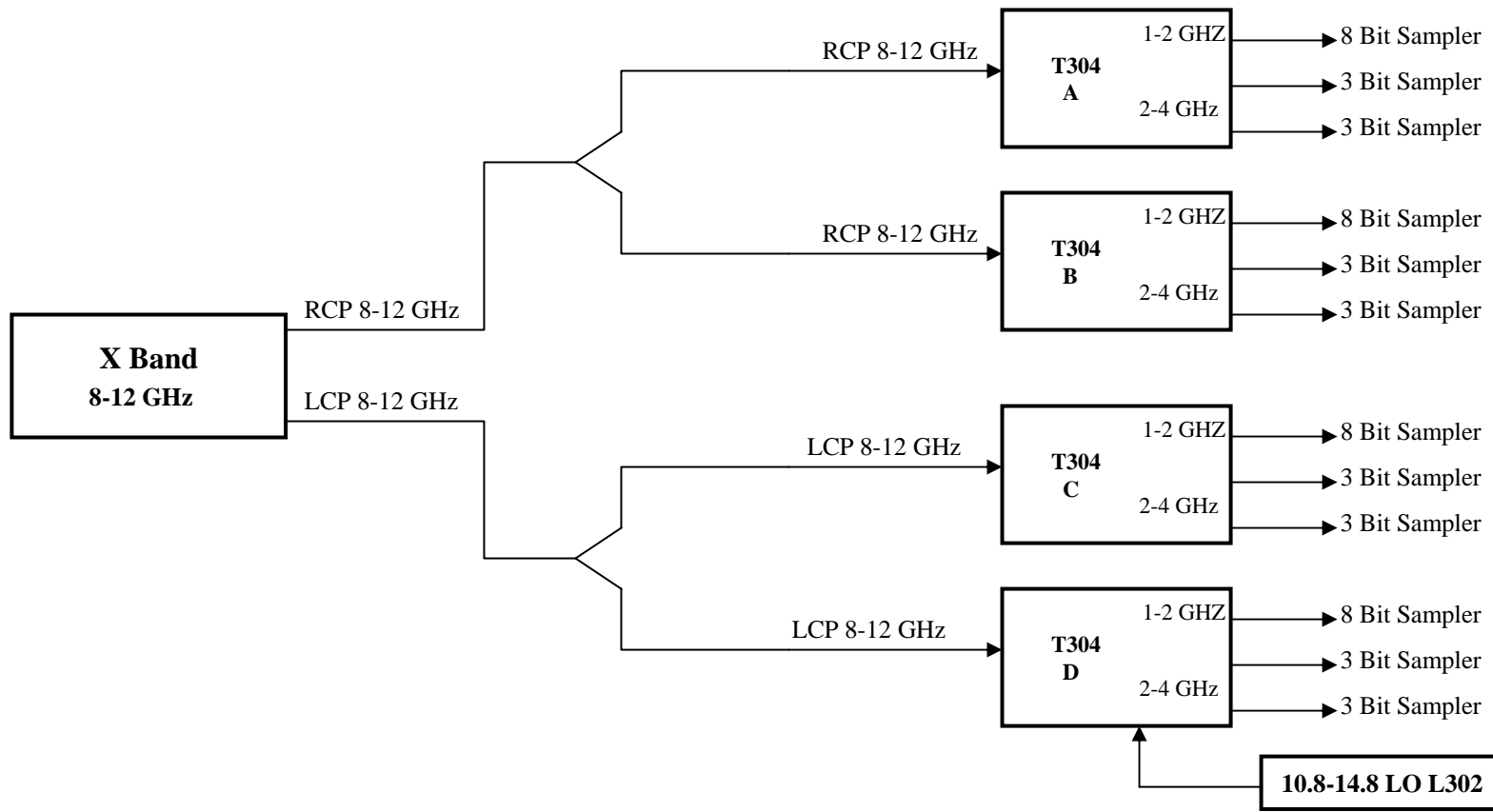
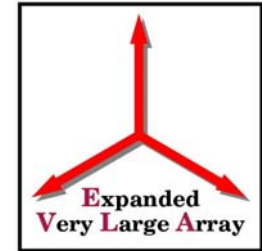


Ku-Band Down-Conversion



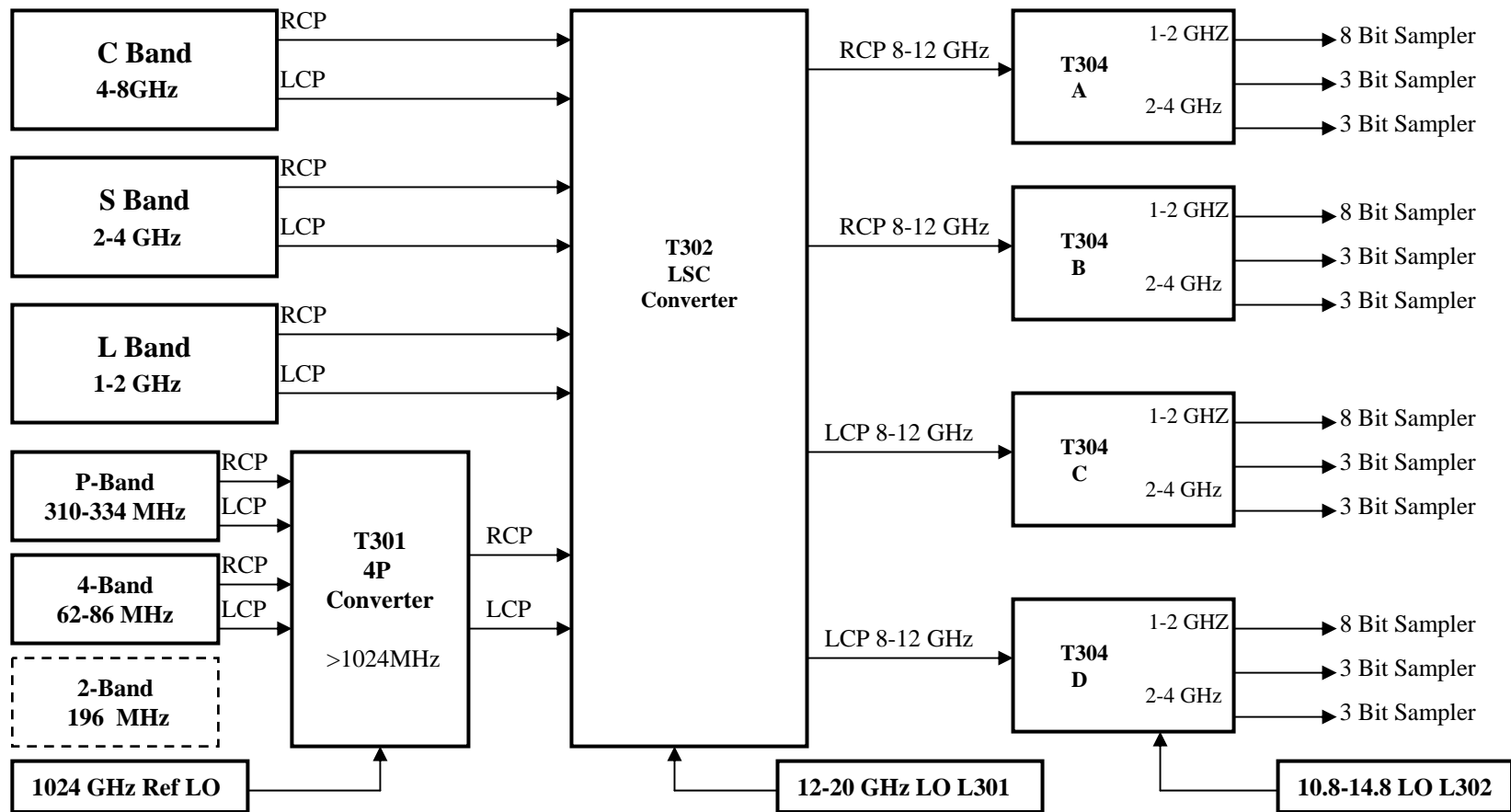
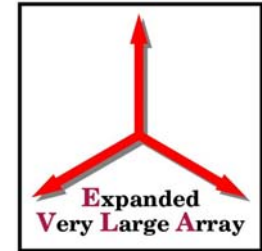


X-Band Down-Conversion





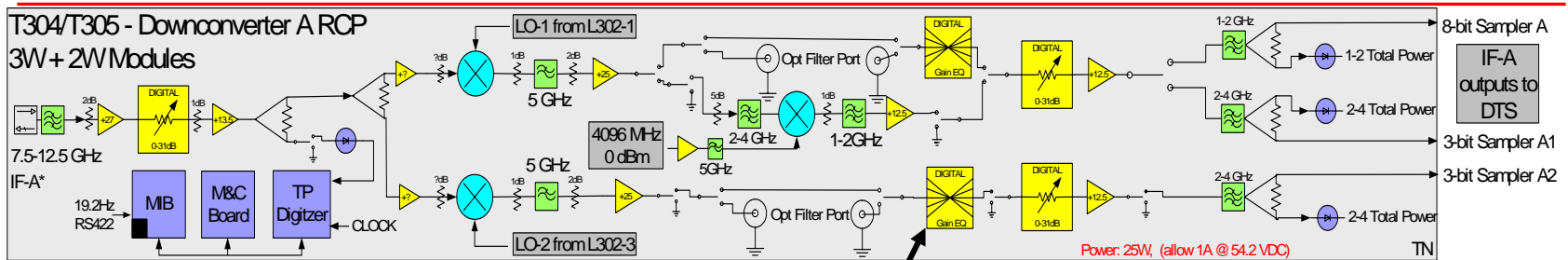
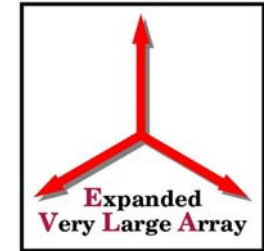
2, 4, P, L, S, C Band Up-Conversion





T304/305

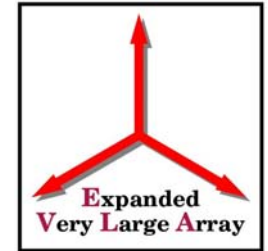
Gain Slope Equalization



- The gain slope equalizers incorporated into this module, will be able to correct for passband slopes encountered in the front ends, downconverters, cables, etc.
- The amount of correction to be applied, will be determined by using the autocorrelation spectrum of the Widar correlator.
- There are 16 settings from a +15dB slope to a -15dB slope in 2dB steps.
- Analog equalization scheme used in order to accommodate the 3 bit digitizers.



EVLA Tuning

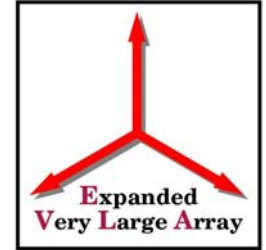


EVLA LO Frequency Tuning Capability

LO Module	Tuning Range (MHz)	Step Size
L301	11904 - 20096	256 MHz (coarse tune)
L302	10800 - 14860	Sub-milliHz (Fine tuning, Fringe rotation, Doppler tracking, Φ Switching)



Summary



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- Discussed the philosophy and method of mapping the broadband IF to the digitizers.
 - Illustrated the overall IF signal flow.
 - Discussed the signal conditioning capability of the T304/305 downconverters.
 - Touched on the LO tuning capability.