Preliminary Design Review

EVLA

1st and 2nd Local Oscillators

Specifications – 1st LO

- 12-20 GHz
  - F_O = (n*512 MHz +/- FTS) where 23<=n<=40
  - Tuning Span F_o +/- TBD
- Phase Noise
  - -90 dBc @ 10 kHz @ 20 GHz (x fs)
  - -107 dBc @ 100kHz @ 20 GHz (x fs)
- Output Power
  - +14 dBm +/- 0.5 db

1st LO YIG

- Electromagnetically Tuned YIG oscillator by Micro-Lambda
- Integrated Drivers
- Requires +15 VDC @ 700mA and +24 VDC @ 50 mA

- 1.75” Cylinder

Specifications - 2nd LO

- 10.8 – 14.8 GHz
  - F_o = n*128 +/- FTS where 84<=n<=116
  - Tuning Span: F_o +/- TBD (almost continuous)
- Phase Noise
  - -90 dBc @ 10 kHz @ 14.8 GHz
  - -105 dBc @ 100 kHz @ 14.8 GHz
- Output Power
  - +14 dBm +/- 0.5 dB

2nd LO YIG

- Permanent Magnet YIG Oscillator by Micro-Lambda
- Integrated Drivers
- Requires +/- 12 VDC @ 365 & 165 mA and +15 VDC @ 50 mA
- ~ 7.2 Watts

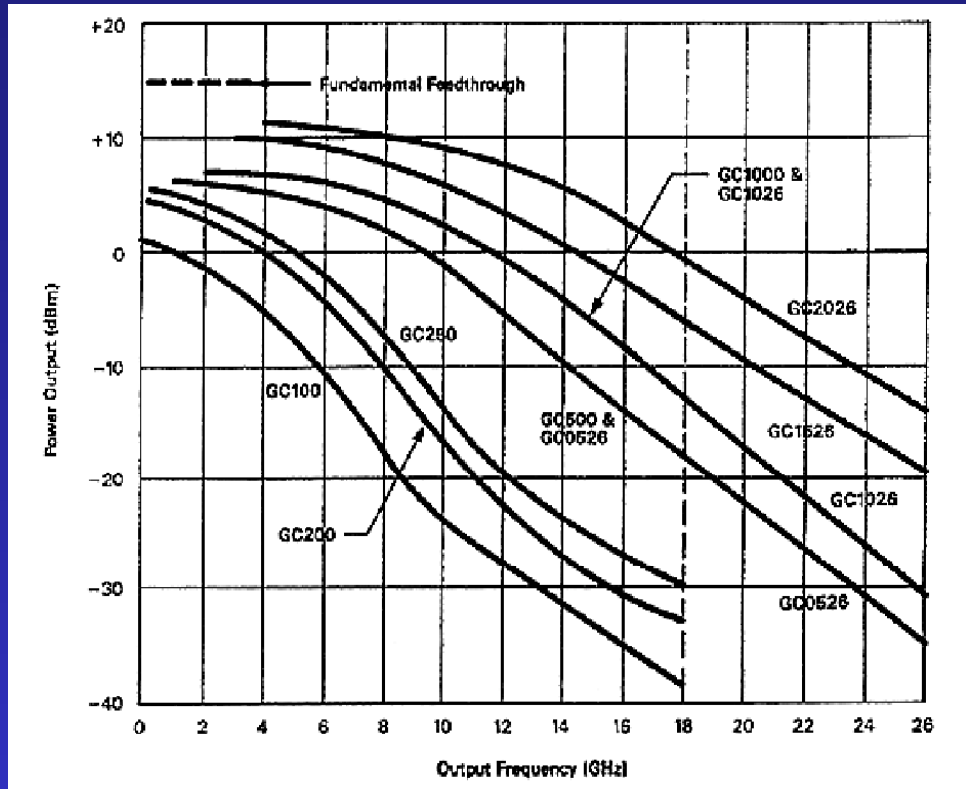
1” Cube

General Functional Description

- Power on reset – report back “OK”
- MIB Frequency command
- Coarse tune loop (prescaler + MIB)
- AGC DAC set to cal data
- Loop Closes, Lock to comb +/- FTS
- Output tracks FTS
- Only monitor data reported back, FTS operates “autonomously” reducing M/C load & RFI

Reference

- Herotek Comb Generator
  - 128 or 512 MHz @ 0 dBm input
  - Integrated driver amplifier, +15 VDC @ 200mA
  - "Like" GC526, GC100
- Equalizer (Custom Matched)
- Band Pass Filter
- Splitter (2 or 4-way)



Block Diagram

- YIG
- Isolator
- Prescaler Coupler
- AGC Amplifier
- Output Coupler
- Output Splitter
- Mixer L port
- Mixer R Port
  - Comb Generator
  - Equalizer
  - BPF
  - Splitter (2 or 4 Way)

Block Diagram

- Mixer I port
- Band Pass Filter (128 MHz)
- IF Amplification
- Band Pass Filter
- Divider
  - Lock Detector
  - Phase Detector
- Phase Detector
- Loop Filter
- FM Coil Driver
- (Loop Closed)

Design Considerations

- MIB handles most functions
- Onboard SRAM holds cal data, etc.
- No Mechanical Adjustments
- SPI bus devices – DAC's, ADC's and digital potentiometers
- Design in flexibility in prototype – "EVB"

RFI Considerations

- Comb line filtered at source
- Continuous wire mesh gaskets
- Front panel ??
- Prescaler
- Non – RF connectors minimally sized

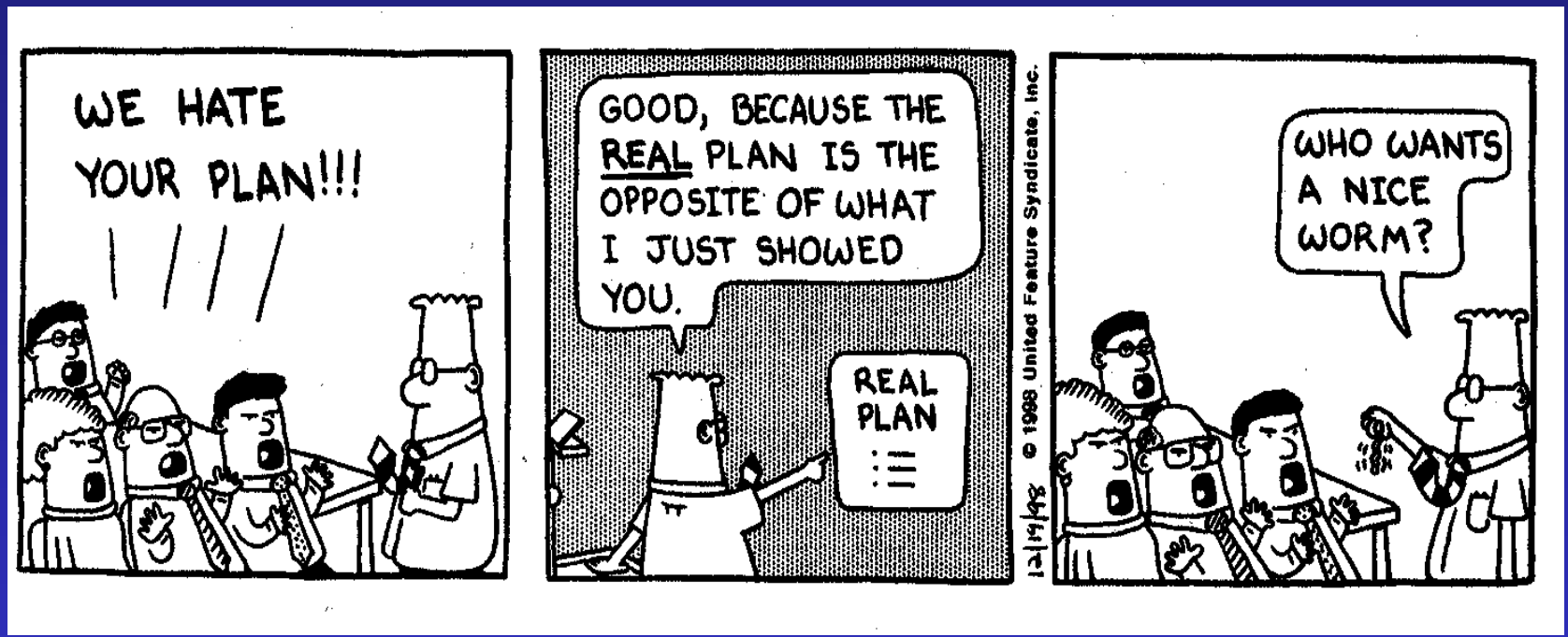
Monitor and Control Points

- Monitor
  - O/P Power
  - FTS Power
  - Lock
  - YIG Heater I
  - PLL V and I
  - Frequency (1 MHz)
  - Temperature
- Control
  - YIG Main Tune
  - AGC
  - Reset
  - FTS Parameters
  - Various Calibration capabilities (NO MECHANICAL!)

Front Panel

- Lock indicator (not uP dependant)
- Frequency
- FTS Sample
- Reference / Clock Sample
- FM coil Voltage / (selectable)

Questions


WE HATE YOUR PLAN!!!
GOOD, BECAUSE THE REAL PLAN IS THE OPPOSITE OF WHAT I JUST SHOWED YOU.
REAL PLAN
12/19/98 © 1998 United Feature Syndicate, Inc.
WHO WANTS A NICE WORM?