Development of a Satellite TV receiver for fibre optic distribution system

Graham Leach
Riverbeck Ltd, UK.
13th June 2016
What’s the problem?

• You’ve won a contract to provide satellite TV reception to every room of a large block of flats

• How do you wire up the building?
Legacy install

Coax cabling can not carry satellite TV bandwidth. Need one cable per satellite band to switch matrix

Significant loss and frequency tilt in long cable runs

Gain stages needed to maintain C/N
The untidy install looks like this...
Proposed Solution

Frequency stack all satellite TV bands on low loss fibre optic.

System pioneered by Global Invacom.

Passive split optical signal. Fibre optic immune to electrical interference.

Frequency destack device powered by set top box

Frequency bands must appear to STB as if directly connected to LNB
Architecture

- Homodyne down conversion
- Wideband continuous time filter to clean spectrum
- Homodyne up conversion and output buffer

Isolation > 70dB at 2.15GHz
Chip Floorplan

FC-QFN12

QFN40 with 12 downbonds
Oscillator / PLL

- Fractional N charge pump based phased lock loop RX LO 1.45GHz – 4.925GHz
  TX LO 1.45GHz – 1.625GHz
Gain / Filter stages

- Gain disturbed in multiple stages. 15dB - >45dB
- Channel Filter. 3\textsuperscript{rd} order Butterworth. Fc 500 MHz – 720 MHz
Up integration of circuits

• At project start first generation product already in market

• Riverbeck contracted to integrate RF / analogue functionality to
  • Reduce cost
  • Protect IP
  • Reduce form factor
  • Lower power consumption
A successful up integration project