



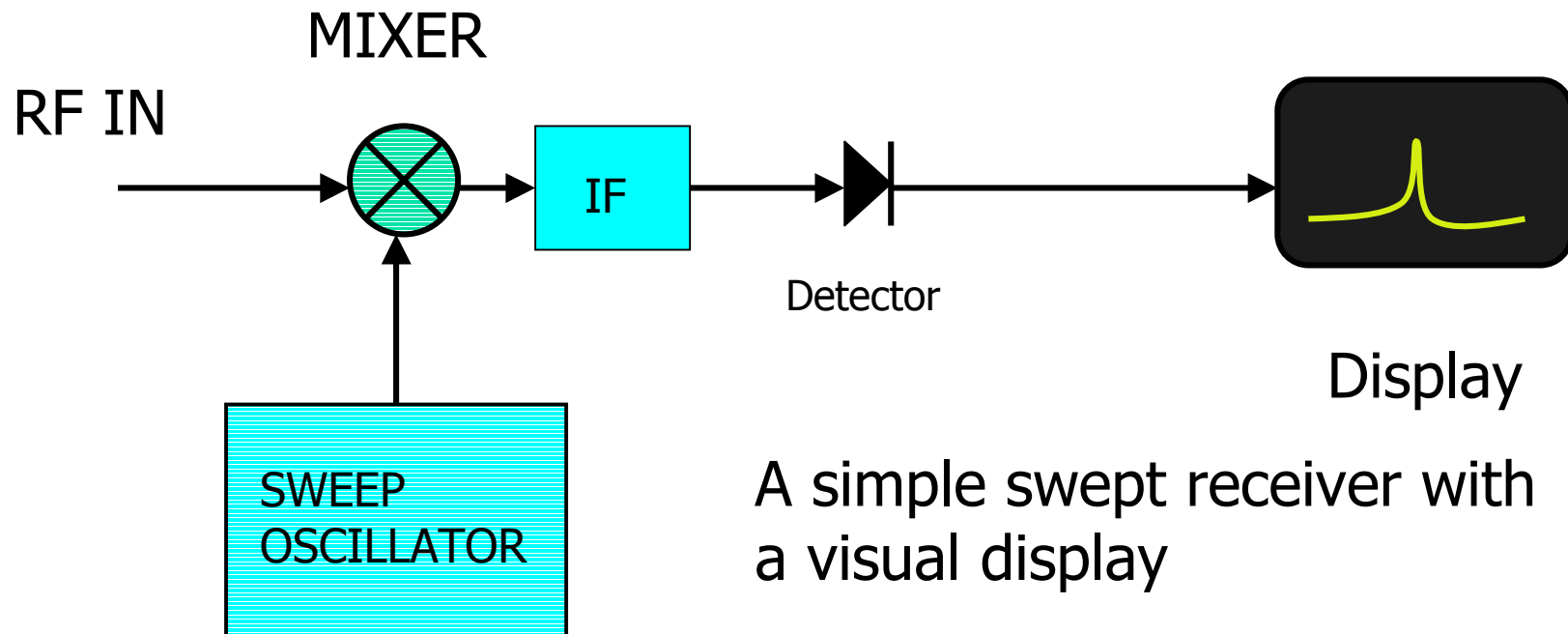
Spectrum Analyzers

Brian Yee

W6BY

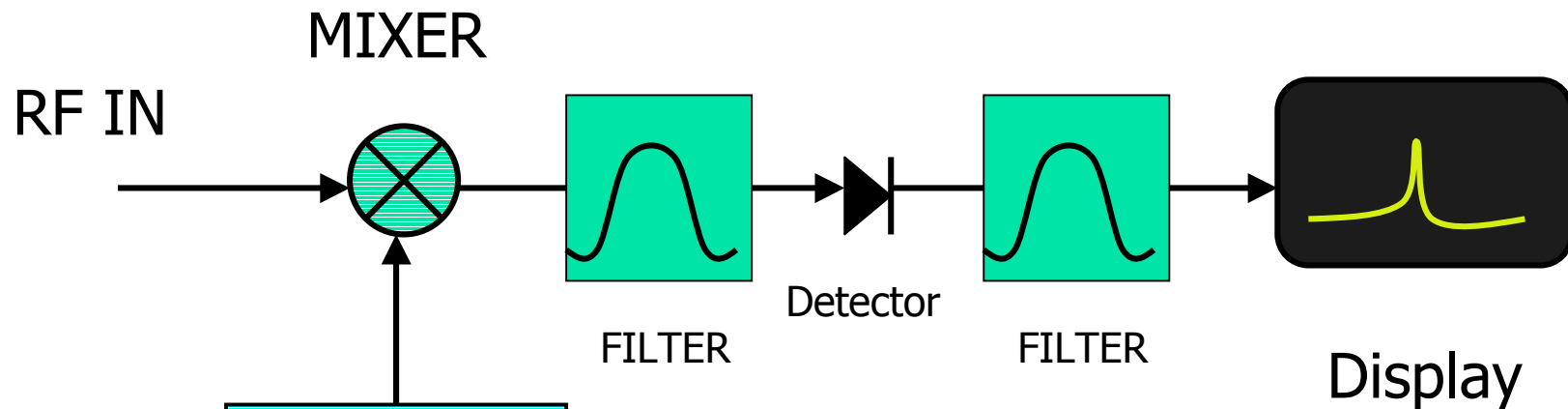
May 2, 2009

Basic Concepts – Key Components



- A brief history of some spectrum analyzer developments can be found at:
http://www.hpmemory.org/wb_pages/wall_b_page_04.htm

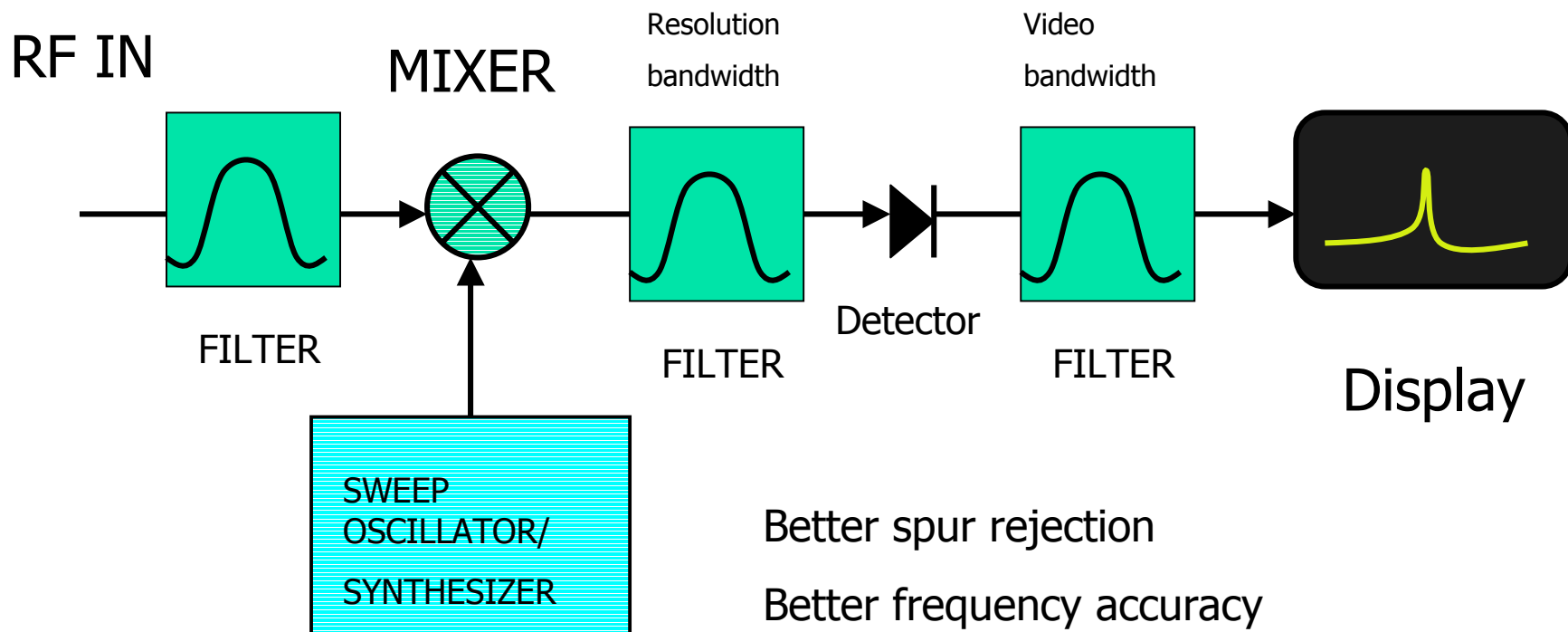
Some Refinements...



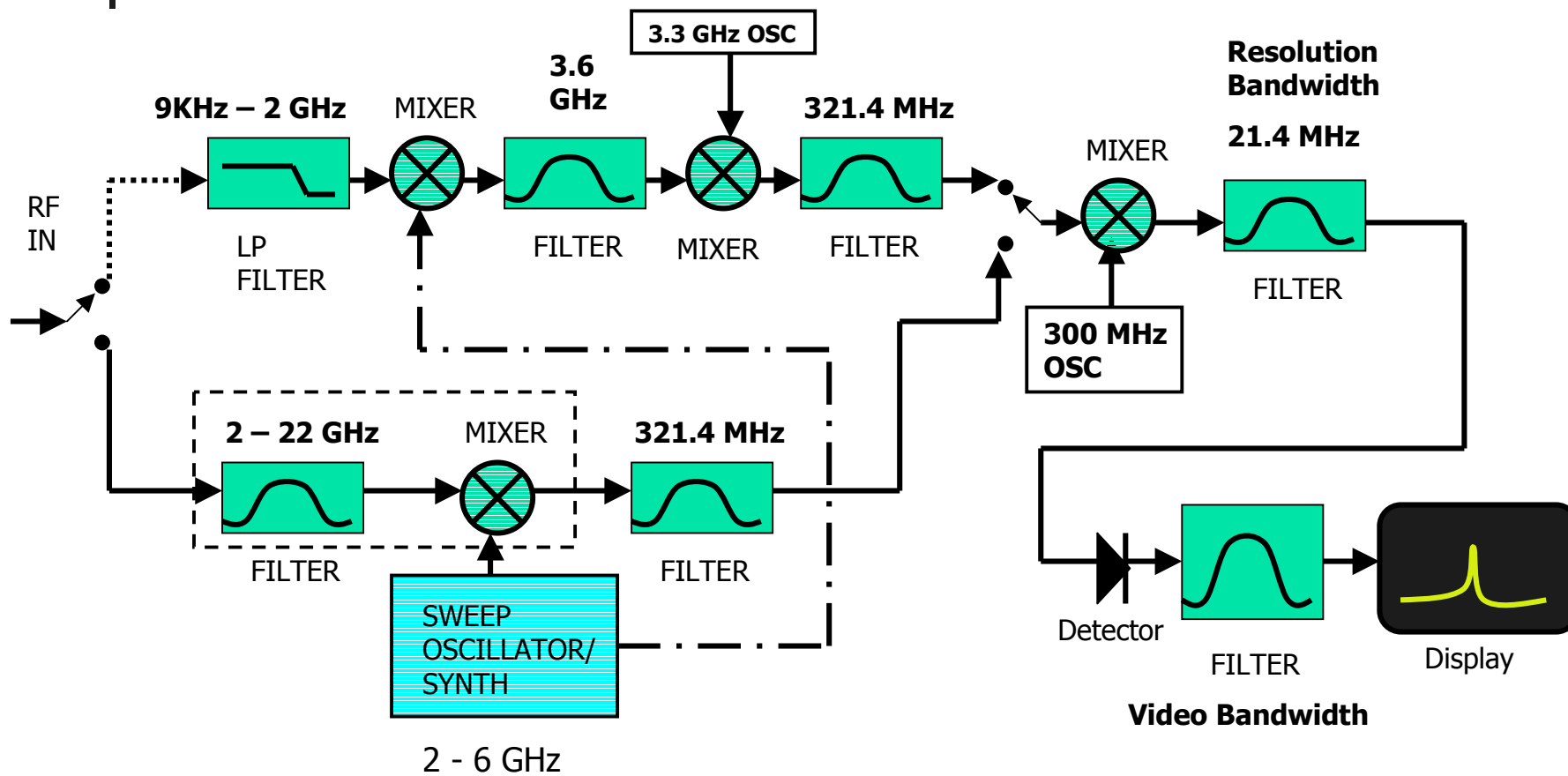
Problems with this approach:

- Limited frequency range
- Can't look at low frequencies
- Spurious signals show up
- Narrow sweeps difficult

More Refinements



High-end approach





Recent advances

- Smaller units with more capability
- DSP (can we use an ADR for this?)
- Demodulation of various communications formats



Applications

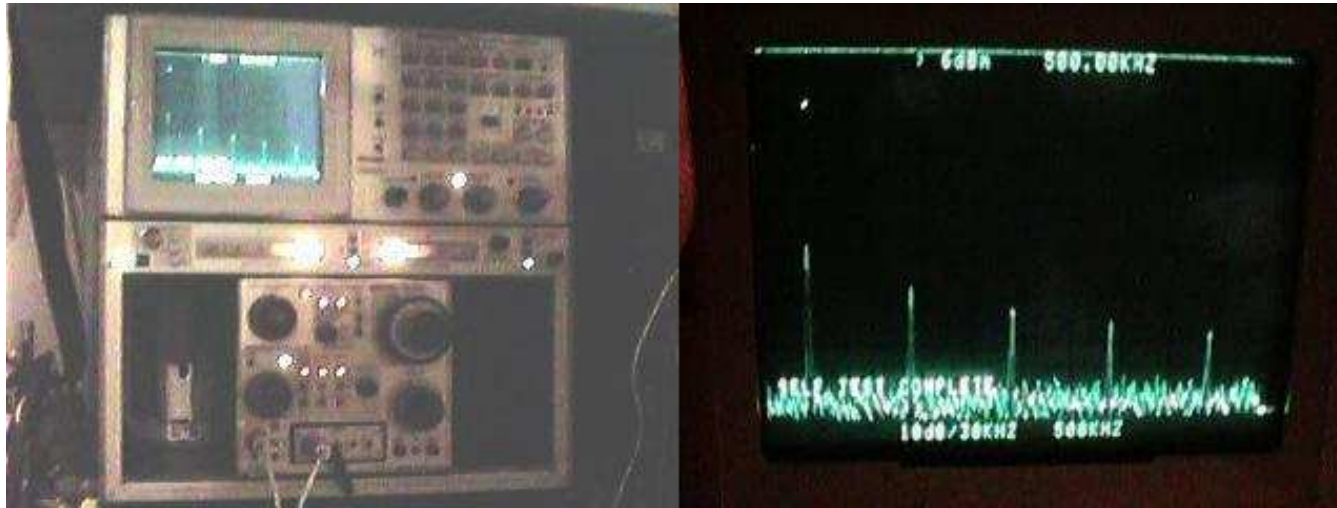
- Checking the power of amplifiers (with the proper pad)
- Checking for harmonics
- Phase noise measurement
- Modulation measurement
- Channel power measurement

Tektronix 7Lxx, 1Lx Plug-ins

In the beginning...



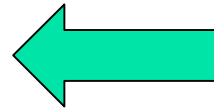
Tek 7Lxx Series



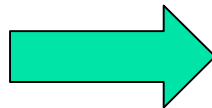
Tektronix 49x Series – 22 GHz



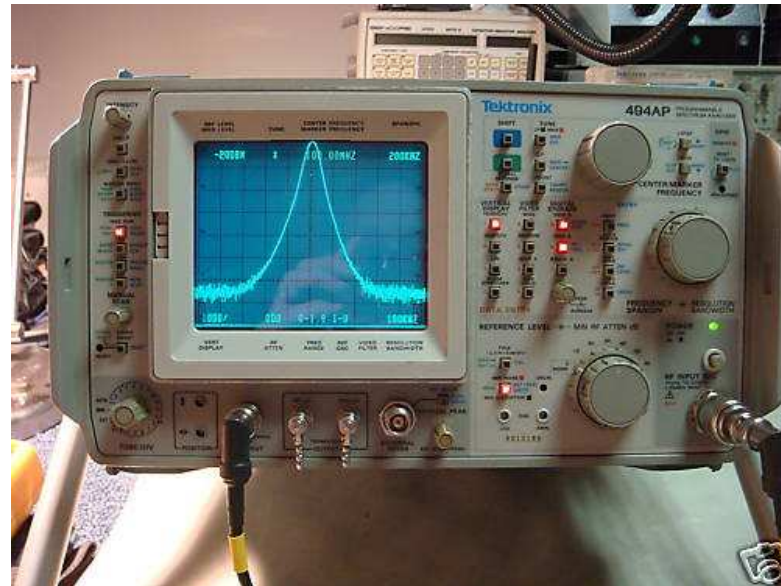
492 popular, lots available, mm-wave mixers available, digital/analog display



494AP top of the line



Some limited-frequency range units (496, 492P's)



Tektronix 27xx Series – 1.8 GHz



Primarily made for field use, service shops and CATV servicing



Tektronix 275x Series – 22+ GHz



Rack mount
variation of
494AP, some
models mm-wave
capable

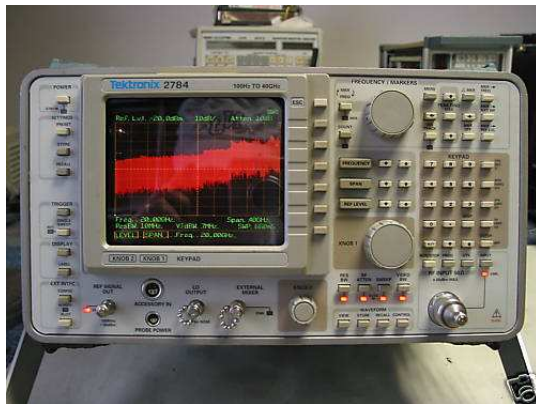


Tektronix 279x – 26 GHz

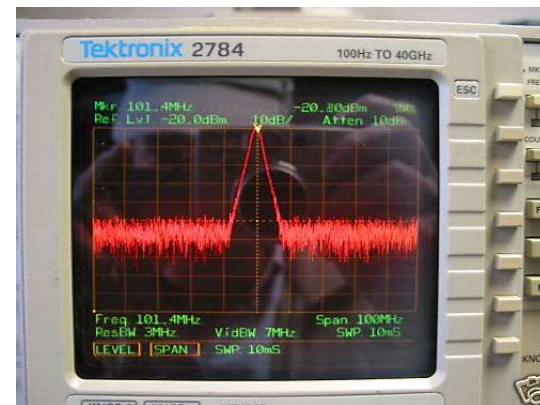


Nice...

Tektronix 2782/4 – 40 GHz



Even
nicer...



- CRT has color LCD shutter
- 2782 has 33 GHz range, 2784 has 40 GHz range
- MM-wave operation possible with internal duplexer
- Expensive

HP 851A



Display unit shown,
RF unit goes on the
bottom.

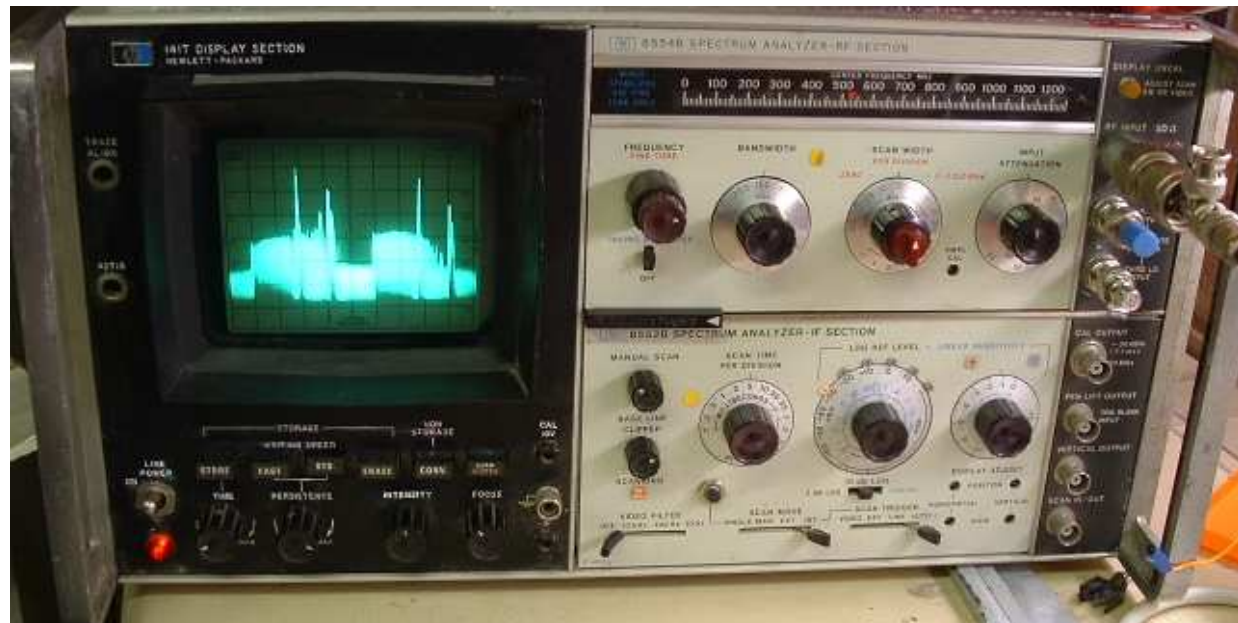
Very basic
functionality, but
more than 1L20

HP 141T – 18 GHz

Nice unit, lots available

3 types of plug-ins up to 18 GHz

Uses storage tube



HP 8565A – 22+ GHz



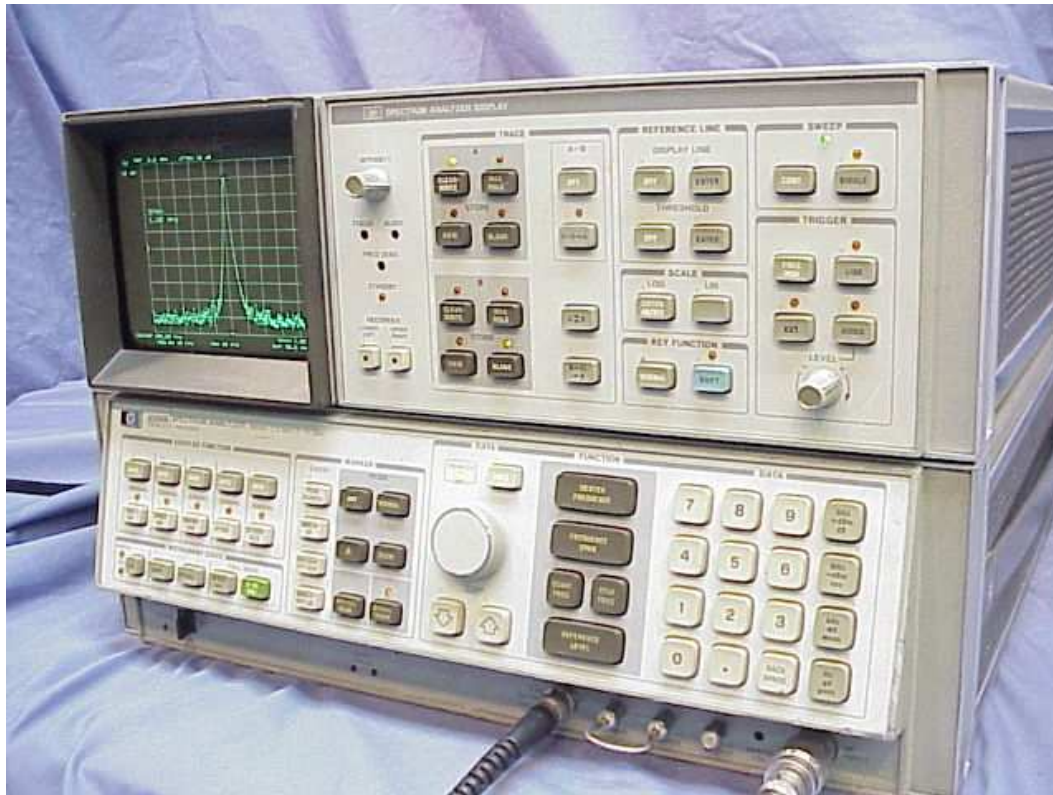
- Many available
- Storage display with digital readouts
- Can use external mixers

HP 8569A/B – 22+ GHz

- Very popular, lots available
- Can use external mixers
- Digital storage display, GPIB



HP 8568A/B, 8566A/B, 8567A – 22 GHz+



- An industry standard
- One of the best displays
- Lots available
- Serviceable
- Can use external mixers, auto signal ID

HP 859x Series



- Low-end portable
- Subject to drift
- Intended for field service market
- Lots available

HP 856x Series



- Synthesized
- Available in several frequency ranges
- Some can use external mixers
- Expensive

Many of the features of the 8566 series and more crammed into a portable unit



IFR



- 1 GHz unit
- Lots available



Advantest 326x



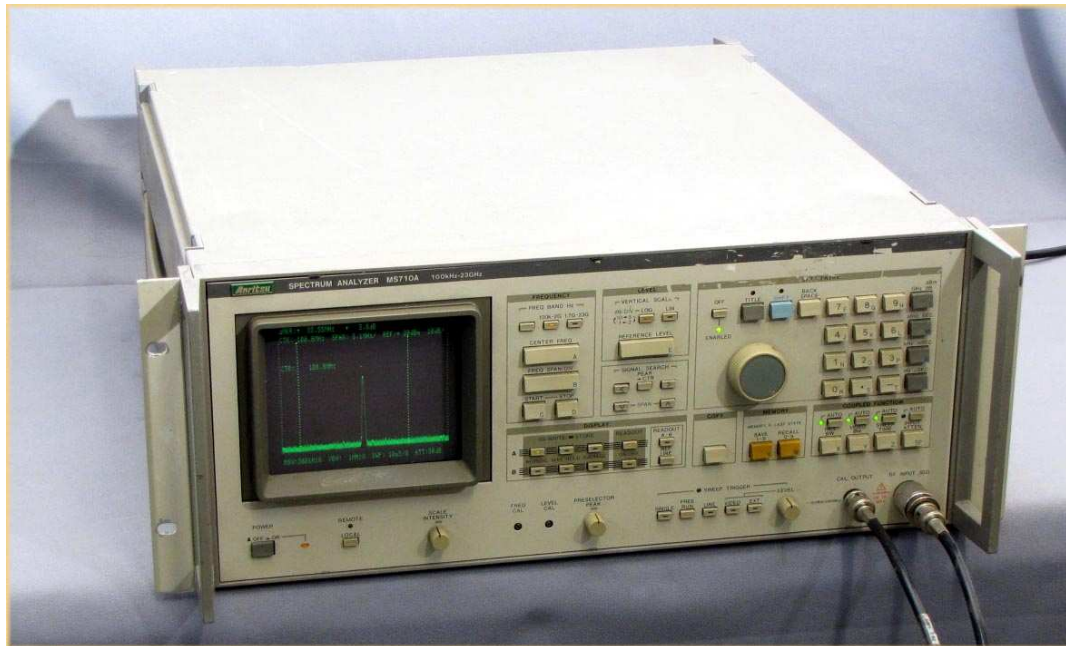
Nice units, lots of features,
hard to get service info

Advantest U36xx Series



Microwave units to 26+ GHz

Anritsu MS710A/B/C/D



D model can accept either Tek or HP mixers

Anritsu MSxx Series





Others

Marconi

Instek

AIL/Eaton

Systron Donner

Rohde and Schwarz - expensive

Various Chinese makes

... manuals or parts?...