AR-alpha
Digi-receiver
The Digital Processing Radio
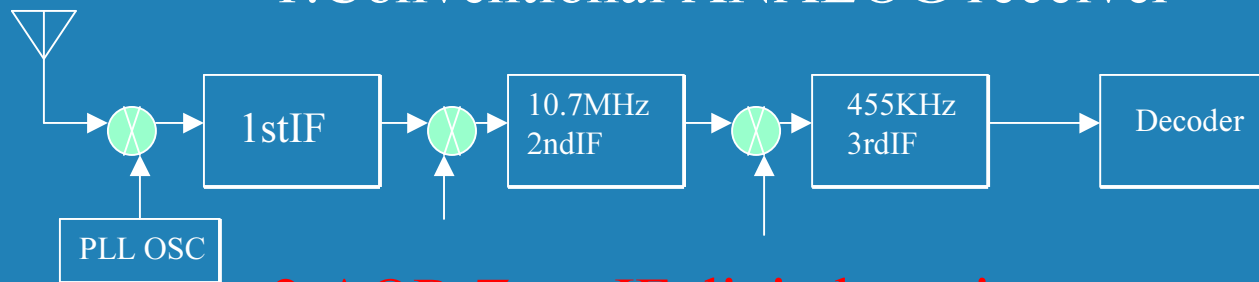
1. Zero-IF and DDS local generator
2. Video Decoder & Display (FM/AM)
3. Wide Band I/Q digital output
4. Fast FFT Spectrum display
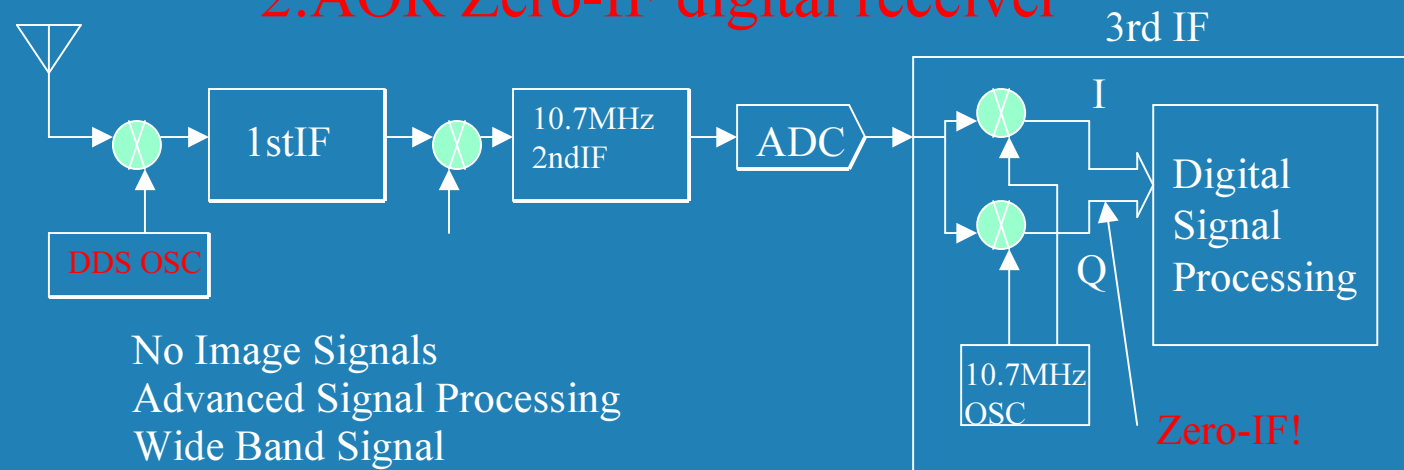5. All mode (P-25 optional)
6. Special Digital Functions

Zero-IF and DDS local generator

1:Conventional ANALOG receiver

	1stIF		10.7MHz 2ndIF		455KHz 3rdIF	Decoder

PLL OSC

2:AOR Zero-IF digital receiver

3rd IF

	1stIF		10.7MHz 2ndIF	ADC	

I

Digital Signal Processing

Q

DDS OSC

10.7MHz OSC

Zero-IF!

No Image Signals
Advanced Signal Processing
Wide Band Signal
Supper Fast scan by DDS

Video Decoder

10.7MHz-IF

ADC → Filter → ⊗ (upper) and ⊗ (lower) → Filter →

10.7MHz OSC

Audio Trap Filter → AM Video Demod → AGC

NTSC(4.5MHz) Only

FM Video Demod → Audio Trap Filter → AGC

⊗ → Filter → Audio Processing

-2.65MHz OSC
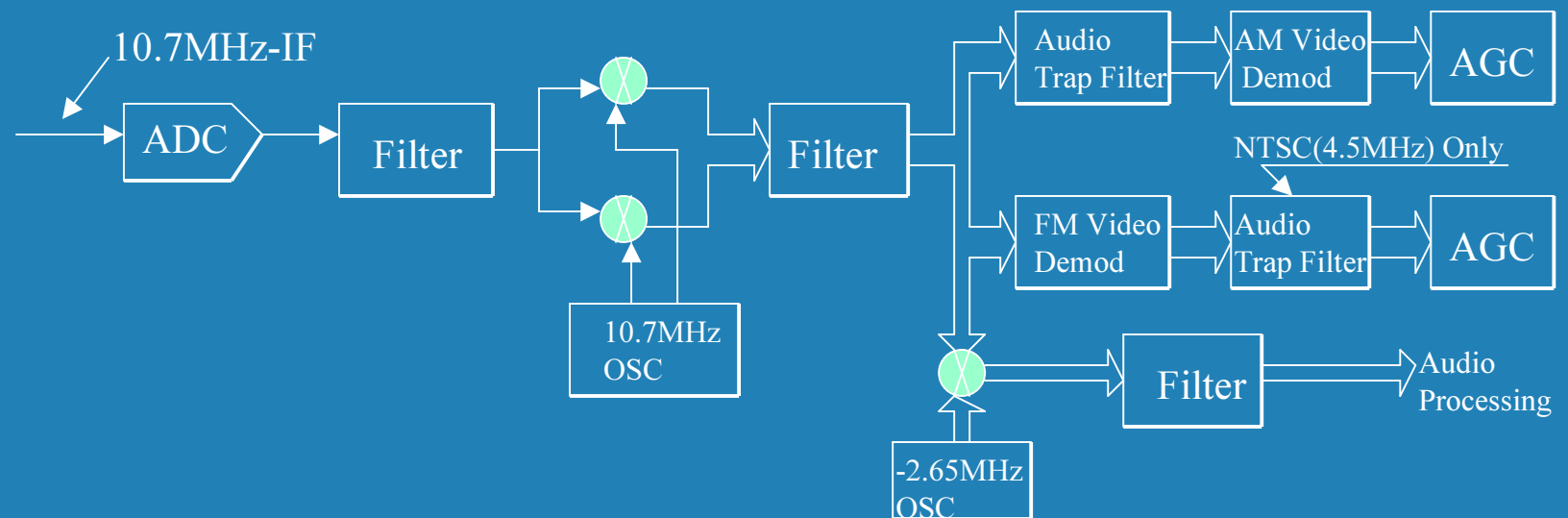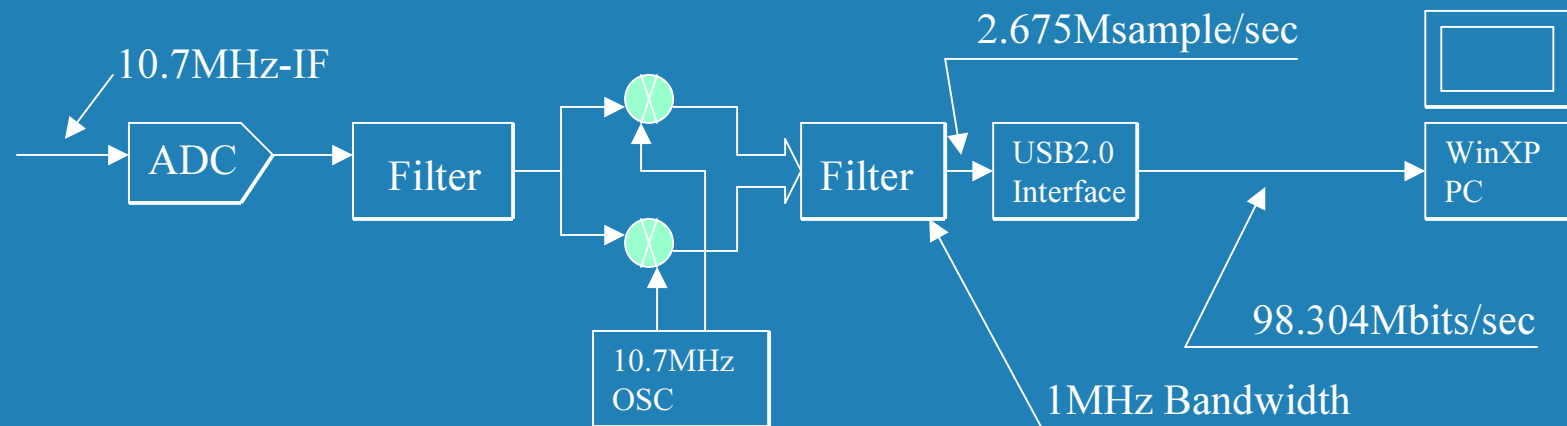
Decode NTSC, PAL, SECAM, PAL-M Broadcasting Analogue Video

Wide Range FM Video Decoder (no audio)

Wide Band I/Q Digital Output

10.7MHz-IF

ADC → Filter → ⊗ ⊗ → Filter → USB2.0 Interface → WinXP PC

10.7MHz OSC
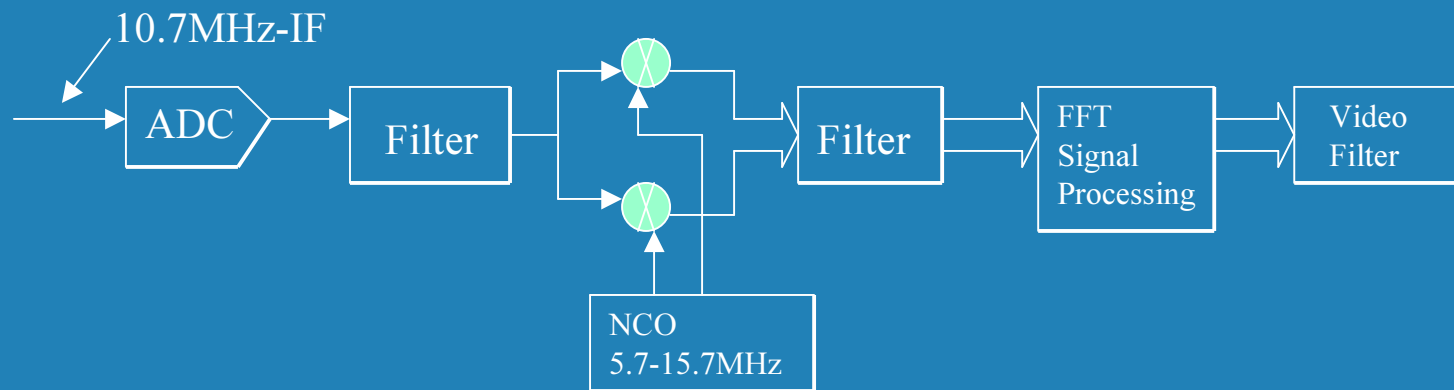
2.675Msample/sec

98.304Mbits/sec

1MHz Bandwidth

Continues Isochronus USB2.0 Standard Interface

Store the streamed data on a PC HDD with the AOR USB driver

Easy to make your own application software based on the sample software.

Wide Dynamic Range (No AGC processed) floating point data format
Exponent : 4bits Mantissa:13bits (I/Q)

Fast FFT Spectrum Display

10.7MHz-IF

```
         ┌─────┐      ┌────────┐    ⊗         ┌────────┐    ┌──────────┐    ┌────────┐
──────→  │ ADC │ ───→ │ Filter │ ───┤         │ Filter │ ──→│   FFT    │ ──→│  Video │
         └─────┘      └────────┘    │    ⊗    │        │    │  Signal  │    │  Filter│
                                    └────────→└────────┘    │Processing│    └────────┘
                                                            └──────────┘
                              ┌──────────────┐
                              │ NCO          │
                              │ 5.7-15.7MHz  │
                              └──────────────┘
```

Refreshed more than 10 times/sec for 10MHz span/500Hz RBW

Digital I/Q decoder --- NO Quadrature Error

Wide Range Display span up to 1GHz

Up to 10MHz span, with audio signal decoding

10MHz < Span < 1GHz, No audio

FFT Fast search function

All mode digital receiver(1)

1)Wide FM mode with Stereo sound (auto detected).
   +De-emphasys 50usec/75usec selectable
2)Narrow FM
   +TONE DCS squelch
   +Voice Inverter   4,500Hz+-2,000Hz
   +AFC
   +APCO P-25 digital decoder (option)

3)AM
   Envelope Detection(Normal AM decoder)
   Synchronous Detection
        a)DSB synchronous
        b)SSB(USB/LSB) selectable synchronous
        c)Side band diversity
   +AGC mode/Manual RF gain mode selectable

All mode digital receiver(2)

4) SSB

   USB/LSB selectable

   +AGC mode/Manual RF gain mode selectable

   +Sharp shape factor band pass filter

5) ISB

   Simultaneously decode LSB and USB (Stereo output)

   +AGC mode/Manual RF gain mode selectable

6) CW

   Narrow band IF filter 200Hz/500Hz

   CW stereo effect

      200Hz IF filter →(Right +100Hz/-50Hz,Left +50Hz/-100Hz)

   +Pitch frequency adjustable 600Hz+-300Hz
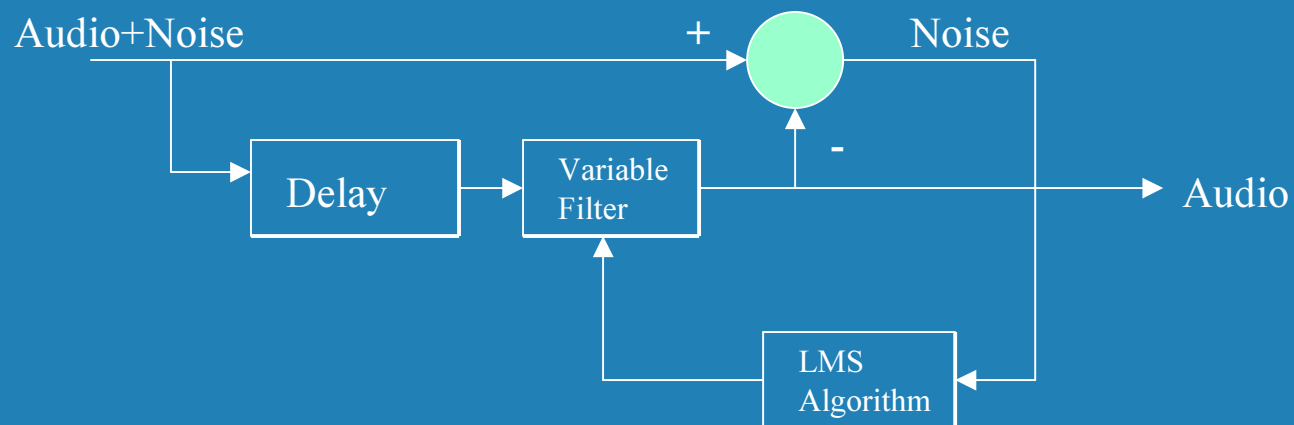
All mode digital receiver[3]

7) RZ-SSB

    Real Zero SSB decoder

      Decode AM signal by using FM decoder (NO AGC !)

    You can decide conventional AM signal by this mode.

Special Digital Functions[1]

1) Noise Blanker (AM, SSB, ISB, RZSSB)

2) Auto Notch Filter

3) Adaptive Digital Noise Filter

Audio+Noise   +   Noise

| Delay | → | Variable Filter | |

-

Audio

| LMS Algorithm |

Special Digital Functions [2]

4) IF shift   +-1,200Hz   (SSB, AM)

5) Voice Squelch
   By using FFT and LMS algorithm

6) Long Voice Memory
   for WFM   12min maximum
   for other mode 53min maximum

12sec Pre-recording

Start Cue   Stop Cue   Audio Stream

7) 6KHz IF(I/Q) analogue output for DRM PC receiver