AR-ALPHA

Multi-mode
Communications receiver

10kHz-3.5GHz
Software defined receiver

Zero-IF
DDS local generator
1GHz FFT Spectrum

1MHz I/Q output
60ch/sec scan
PAL/NTSC/SECAM reception

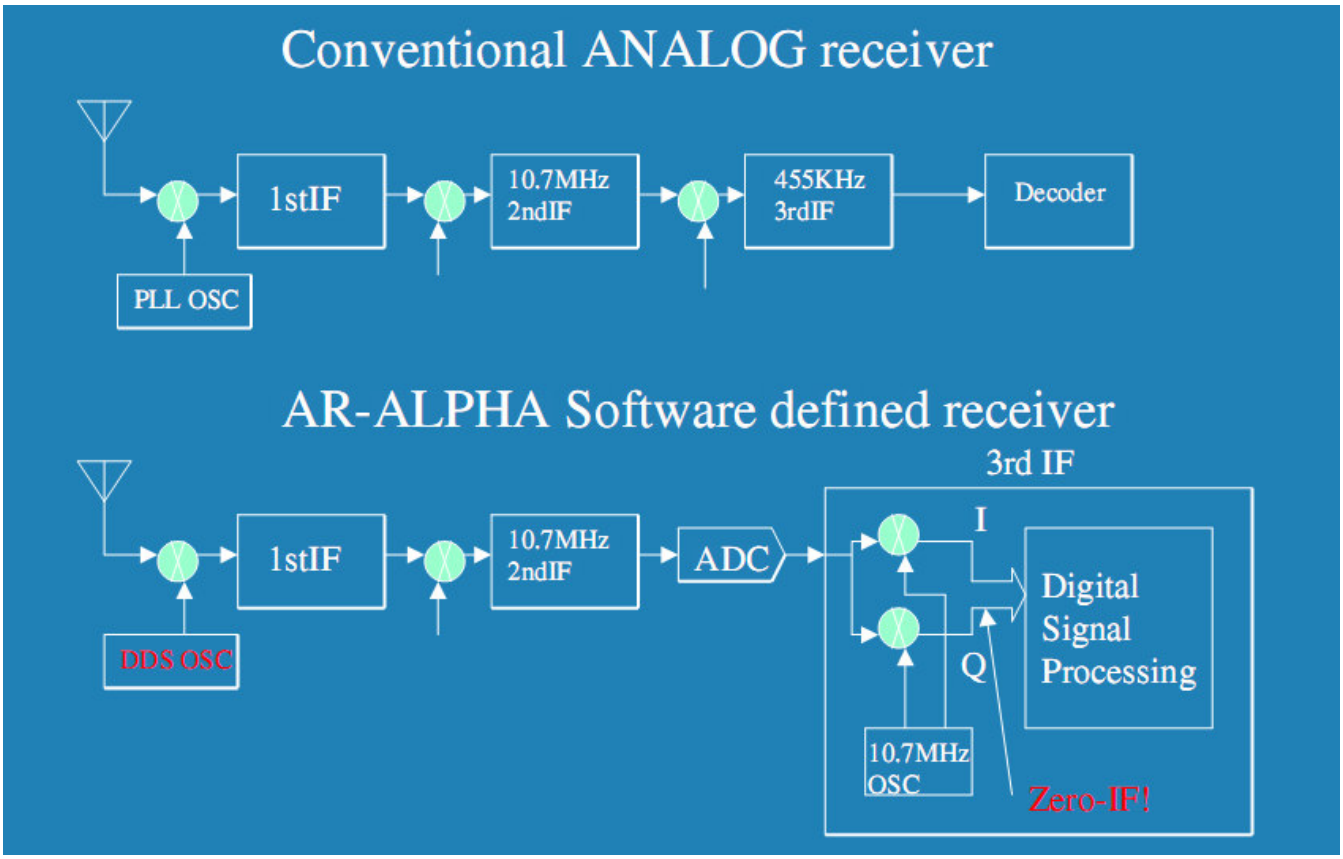
APCO 25
19” rack mount

This guide is a temporary version and all content is subject to change without prior notice.

Main specifications:

- **Zero-IF and DDS local generator**
- **10kHz-3.5GHz (with or without gaps, depending on country regulation)**
- **FFT Spectrum Display up to 1GHz bandwidth**
- **Wide Band I/Q digital output through continuous isochronous USB 2.0 Interface (1MHz BW, Mantissa 4-bit, Index 13-bit for wide dynamic range, 98.304M-bit/sec. transfer rate)**
- **Multi mode receive : WFM (in stereo, selectable de-emphasis), NFM, AM (Synchronous AM, diversity synchronous AM), ISB, RZSSB, USB, LSB, CW, P25, TV (FM, AM, NTSC/PAL/ SECAM/ PAL-M)**
- **Multiple IF filters: 200Hz, 500Hz, 1kHz, 3kHz, 6kHz, 15kHz, 30kHz, 100kHz, 200kHz, 300kHz**
- **Versatile digital processing: Digital noise filter, auto notch filter, noise blanker, IF shift, AFC, variable CW pitch, voice descrambler, voice squelch, CTCSS, DCS**
- **6.4” color TFT display**
- **19” rack mount**

Differences between a typical analog receiver and a “software defined” receiver



Advantages of a “software defined” receiver vs. an analog receiver

*Heterodyne images are greatly reduced thanks to ZERO IF.

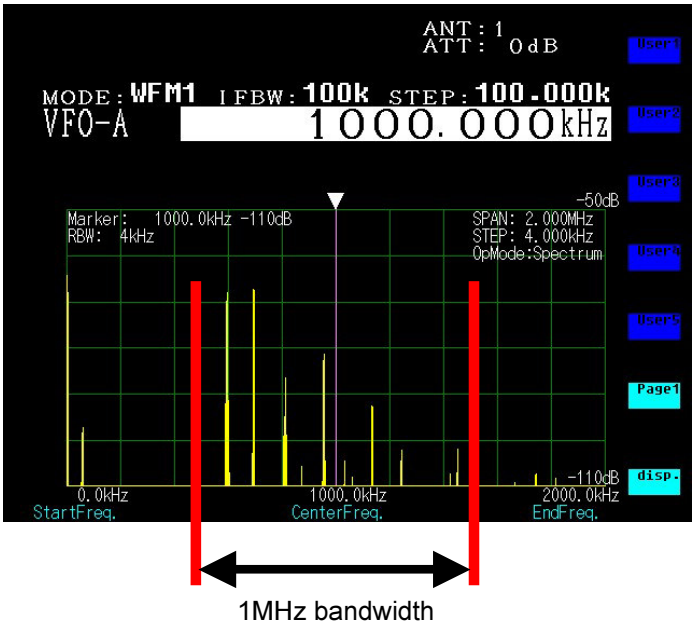
* ZERO IF allows to produce a high-spec & large bandwidth IQ data stream.

*DDS local oscillator allows a very high scanning speed.

*As new modulation standards are invented, software receiver systems can often be upgraded by new firmware routines, instead of replacing expensive hardware.

*More functions for lower cost.

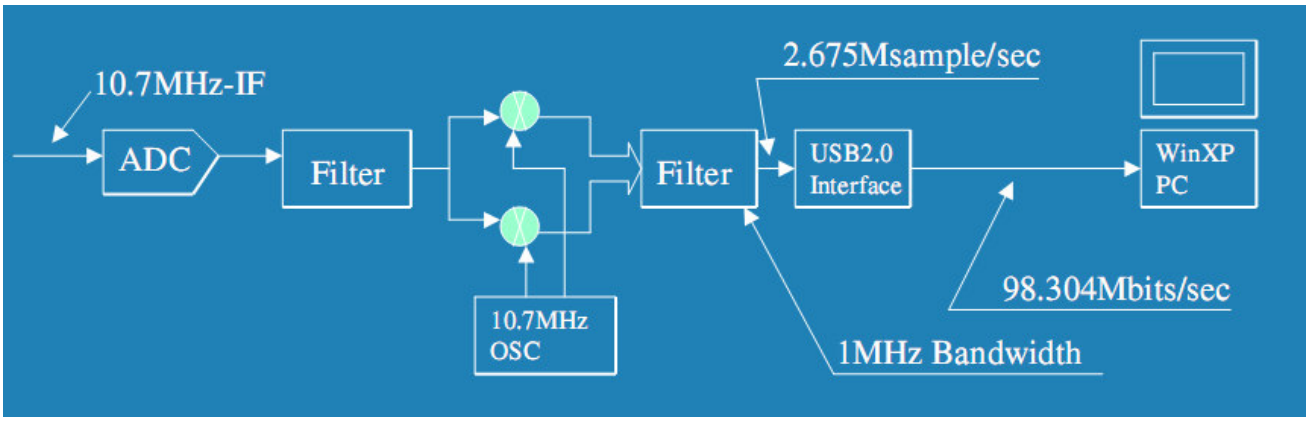
What is Wide Band I/Q Digital data?:



*It's the pure and original data of a 1MHz wide reception, over any length of time.

*AR-ALPHA streams this data to the PC for further processing.

*Almost 100Mbits/sec of digital data.



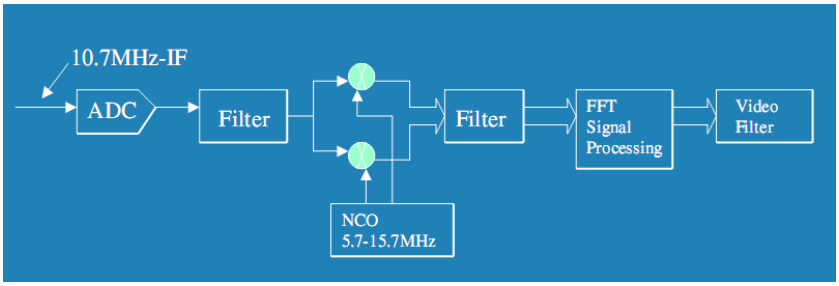
What can I do with I/Q Digital data?:

*Store the streamed data in a single file on a PC hard drive with the AOR USB driver.

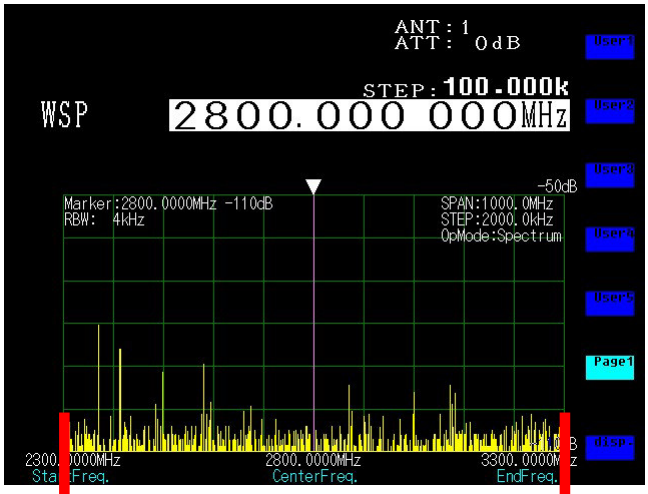
*"Re-receive" any frequency within this 1MHz range as in real time conditions, without loss of quality and reception accuracy. The stored audio & data being pure and unprocessed, it is possible to apply any kind of filtering and decoding as in real reception situation.

*Burst signals can be searched for, re-received and processed as many times as wanted.

What is FFT and why using FFT?



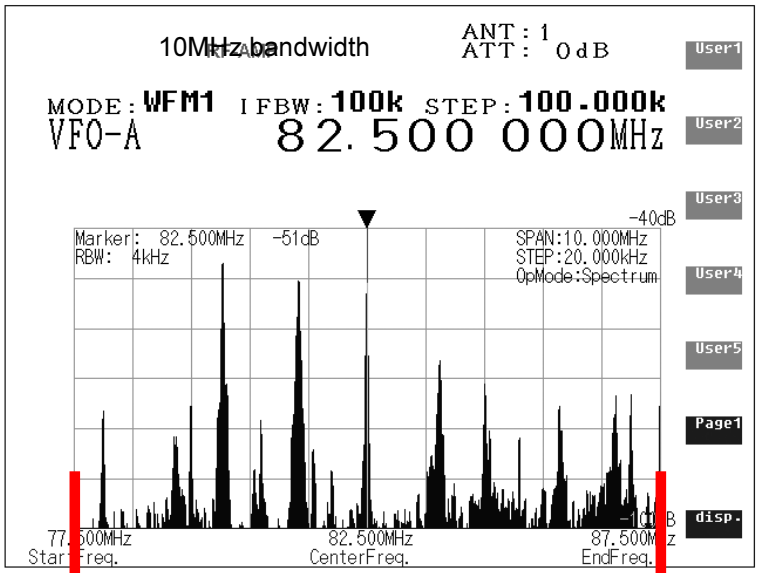
FFT stands for FAST FOURIER TRANSFORM, a mathematical analysis of non-periodic signals. It's an equation to calculate the frequency, amplitude and phase of each sine wave needed to make up any given signal.



(3.3-2.3GHz)=1Ghz RBW on display!

High resolution bandwidth

•Wide span up to 1GHz
(no audio over 10MHz span)



10MHz bandwidth

High speed

•Refreshed 10 times/sec
(for 10MHz span at 500Hz RBW)

X10times/sec

Advantages of AR-ALPHA over competing product:

VS.

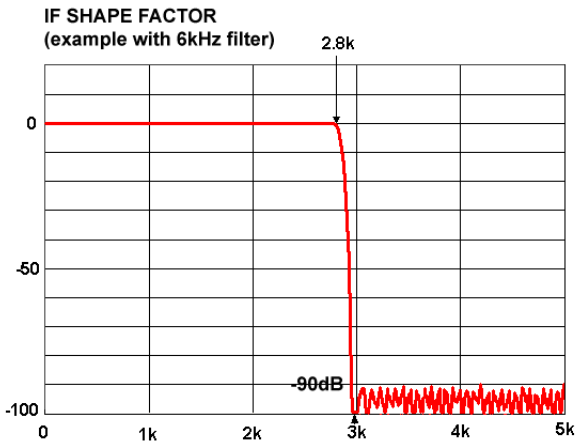
•**Mostly SOFTWARE defined**
•**2nd and 3rd IF are digital**

*Less heterodyne images
*Higher scanning speed
*Longer lifetime through firmware upgrades to future new transmission standards.
*-90dB IF shape factor

•**Mostly analog processed**
•**Only 3rd IF stage processed in Digital**:

*Unavoidable heterodyne images
*Scan speed limited to 50ch/sec.
*Expensive hardware upgrades

*-60dB IF shape factor



•**Wide Band 1MHz IQ DIGITAL output**

•**None**

Target customers:

Government: Intelligence Agencies
Coastal & Port Authorities
Border Patrol and Border Guard Authorities
Search & Rescue Agencies
Police
Airport Authorities
Flight safety organizations
Frequency Management organizations
Interference Suppression and Monitoring agencies

Laboratories: Scientific Research and Academic Laboratories
Propagation Analysis

Military: Army, Navy, Air Force & Marines Coast Guards
(ex: Unattended IQ recordings on dangerous sites, data can be picked up at a later time)

Telecom: Telecommunications Corporations, Quality of Service Departments

Newsrooms

Technical specifications:

AR-ALPHA SPECIFICATIONS			
Configuration	Triple conversion superheterodyne		
Frequency coverage	10 KHz - 3.5 GHz		
Reception modes	AM, WAM, NAM, SAM, SAL, SAH, NFM, SFM, WFM, FMST, USB, LSB, CW, ISB, SBD, RZ-SSB		
Sensitivity	Mode	IF Bandwidth	Input sensitivity
	CW	200, 500Hz	-120dBm
	AM	6,15,30kHz	-110dBm
	LSB	3,6,15kHz	-120dBm
	USB	3,6,15kHz	-120dBm
	2-ISB	6,15,30kHz	-120dBm
	FM	6,15,30kHz	-120dBm
IF frequencies	1st IF : 755 MHz/265MHz		
	2nd IF : 10.7MHz		
Tuning steps	1Hz to 999.999kHz (1Hz incremental)		
Selectivity			
Spurious Sensitivity			
Adjacent Selectivity			
Dynamic Range			
Unwanted Spurious emission	<-100dB (internal signal), <-80dB (external signal)		
IP3			
Frequency stability	+/- 0.1ppm (-10 ~ 55C)		
Distortion			
Audio output	Internal speaker: 0.6W / 8 Ohm, output for speaker: 2W / 8 Ohm		

Power requirements	13.8V DC, 2A
Antenna impedance	50 Ohm unbalanced N-TYPE & SO239
IF output	none
External frequency standard input:	10MHz / 50 Ohm, 0dBm
Control interface	RS-232C & USB 2.0
Operating temperature	-10 to 55 degrees Celcius
Dimensions	290(W) x 145(H) x 420(D) mm including projections
Weight	Approx. 7.7Kg
Nominal filter bandwidths	0.2kHz, 0.5kHz, 1kHz, 3kHz, 6kHz, 15kHz, 30kHz, 100kHz & 200kHz, 300 kHz.
Memory channels	2000 (40 banks)
Search banks	40
Scan/Search Rate	60 steps per second
PASS frequencies	2000
Select scan channels	100
Priority channels	1
LCD display	6.4" color TFT display
Display spectrum	+/-125kHz to 10MHz, 20, 50, 100, 1000MHz (no audio from 20MHz)
IQ OUT by USB	2x20 bit, floating point, 1MHz bandwidth
Extended demodulation	NTSC, PAL, SECAM TV (AM up to 1GHz, FM over 1GHz)
	DCS (digital code squelch)
	CTCSS (digital tone squelch)
	DTMF (dual tone multi frequency)
	ATIS (automatic terminal information service)
	APCO 25 decoding

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