

# Project All Digital Amateur Transceiver, ADAT

Technical Specifications, version P1.3, 12.05.2007

## Technical Specifications of ADR-200A (preliminary)

### Receiver

Frequency Range (without options)	10kHz ... 30MHz 1MHz ... 30MHz	Input RX-ANT Inputs ANT1, ANT2
Resolution of Tuning Knob	± 1Hz	
Frequency chngement per resolution	500Hz ... 100kHz	degressive at < 1Turn/s progressive at > 3Turns/s
Preamplifier	0, +5, +10dB	
Attenuator	0, 5, 10, 15, 20, 25dB	
Max. Input Power ( $U_e$ an 50Ω)	- 5dBm +20dBm	Att = 0dB, Preamp = 0dB Att = 25dB
Sensitivity (MDS) CW ( $f = 1.8 \dots 30\text{MHz}$ ) ( $B = 500\text{Hz}$ )	< -137dBm (0.03μV) < -127dBm (0.1μV)	S/N = 0dB, Preamp = 10dB S/N = 10dB, Preamp = 10dB
Sensitivity SSB ( $f = 1.8 \dots 30\text{MHz}$ ) ( $B = 2400\text{Hz}$ )	< -120dBm (0.22μV) < -110dBm (0.7μV)	S/N = 0dB, Preamp = 0dB S/N = 10dB, Preamp = 0dB
Sensitivity AM ( $f = 0.1 \dots 30\text{MHz}$ ) Preamp = 0dB	< -105dBm (1.2μV)	$B = 5\text{kHz}$ , $f_{\text{mod}} = 1\text{kHz}$ , $m = 50\%$ S/N = 10dB
Noise Figure	< 10dB	Preamp = 10dB
Intermodulation 3 <sup>th</sup> Order (IP3) <sup>1)</sup>	> 23dBm	2 x -20dBm, $\Delta f = 5\text{kHz}$ , $B = 500\text{Hz}$
IM3-free Dynamic Range <sup>1)</sup>	> 100dB	Preamp = 0dB
Intermodulation 2 <sup>th</sup> Order (IP2)	> 60dBm	2 x -20dBm, $f_1 = 6\text{MHz}$ , $f_2 = 9\text{MHz}$
IM2-free Dynamic Range	> 93dB	Preamp = 0dB
Spurious Receptions	< - 107dBm	
Blocking Dynamic Range (Preamp = 0dB)	> 112dB	$B = 2400\text{Hz}$ , $\Delta f = 5\text{kHz}$
Selectivity:		
- CW-Filter	50Hz ... 2kHz	in 13 Steps
- SSB-Filter	500Hz ... 3kHz	in 11 Steps
- AM-Filter	3.5kHz ... 9kHz	in 6 Steps
- FM-Filter	3.5kHz ... 25kHz	in 13 Steps
S-Meter Tolerance	± 1.5dB	-123 ... -13dBm (S1 bis S9 <sup>+60dB</sup> )
Sideband Noise of NCO	< -140dBm/Hz	5kHz spaced from $f_e$
AGC-Threshold	-40 ... -116dBm	in Steps of 2dB selectable
AGC-Time Constants	1ms ... 100ms 10ms ... 500ms 10ms ... 10s	Attack Hold Decay
AF- Frequency Response at SSB $B = 2400\text{Hz}$ , Equalizer: off	± 1dB	$f_{\text{NF}} = 300\text{Hz} \dots 2700\text{Hz}$
AF-Equalizer (in Steps of 3dB)	± 18dB	$f = 300\text{Hz}$ , 1kHz, 3kHz
Signal delay (Ant. Input to AF-Output.)	typ. 20ms	

<sup>1)</sup> The two tone measurement procedure is generally not applicable for AD converters, as the IP3 of an AD converter decreases proportionally to the input signals. On the other hand, due to dithering, the IM-free dynamic range is in practical operation substantially higher than at the laboratory two tone measurement.

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## Frequency Reference

Internal Reference-Oscillator	TCXO, 10MHz	
Stability at 10...30°C ambient temp.	± 0.1ppm	after 30min.
Aging	max. 1ppm /Year	
Electronic Tuning Range	± 4ppm	by SW with external Reference
External Reference, Type A	1 ... 15MHz	
External Reference, Type B	60kHz, 75kHz, 77.5kHz	MSF, HBG, DCF77
External Reference, Type C	1pps, 1000pps	external GPS signal required
Signal Amplitude of ext. Reference	min 100mV <sub>RMS</sub>	

## Transmitter

Frequency Range	1.8 ... 29.7MHz	all Amateur Bands
Power Output Range (in 12 Steps)	0.1W ... 50W	CW-Power oder PEP
Harmonics	< -60dBc	
Non-Harmonic Spurious Emmissions	< -70dBc	outside of $f_c \pm 200\text{kHz}$
Intermodulation 3. ... 9. Order	< - 45dBc	two tone, 50W PEP
Drain-Efficiency	70%	at Pout = 50W
AF-Frequency Range at SSB	200Hz ... 2.7kHz	
Rejection of unwanted Sideband	> 80dB	
Tx-Equalizer (Steps of 3dB)	± 18dB	f = 300Hz, 1kHz, 3kHz
Enhancement of medium Voice Power	0 ... 8dB	
Power Leveling	automatic	according to the selected power
Inband IM-Distortions	< -40dB	
Tolerance of Power-Meter	± 3%	numeric and bar display
Power Range of VSWR Meter	0.1 ... 50W	min. Resolution: 1:1.03

## General Data

AC Supply	90 ... 253V <sub>AC</sub> 50...60Hz	
Power Consumption	20W (Rx), 100W (Tx)	
Dimensions (B x H x T)	260 x 103 x 260mm	
Weight	tbd	
Temperature Range	+5°C ... +45°C	fully functional