ATLAS POLAR

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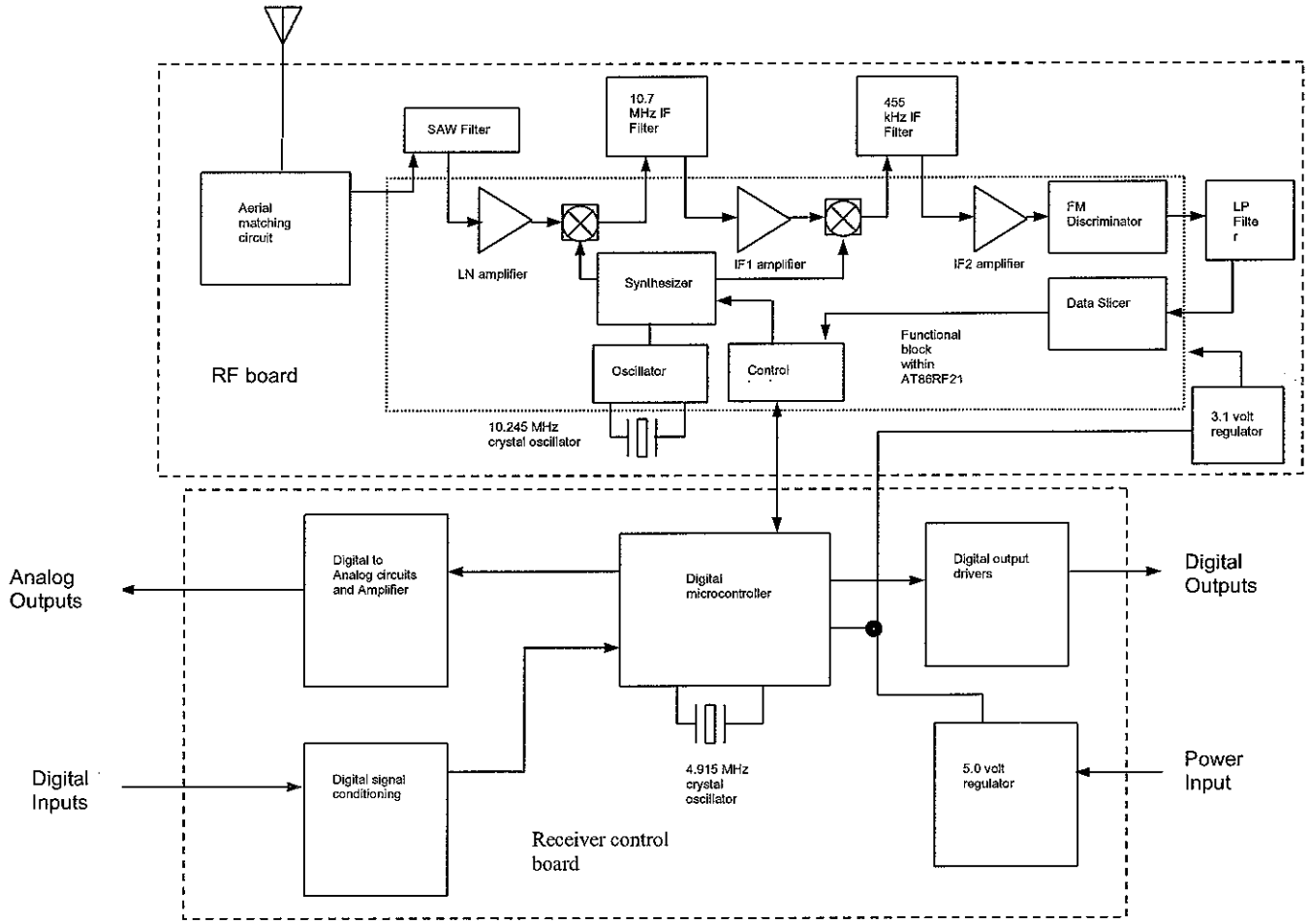
MODEL 9900R

900 MHz Receiver Block Diagram



Receiver Function:

The RF signal coming in from the antenna is filtered by a surface acoustic wave (SAW) filter. The SAW filter is tuned to the 902 to 928MHz band. The filtered signal is then amplified by a low noise amplifier to increase the receiver sensitivity and lower the overall noise figure of the receiver. The signal is next mixed with a synthesized local oscillator for the first frequency conversion. The synthesized frequency is set with parameter values selected by the microcontroller. The first IF frequency is 10.7 MHz.

An IF receiver mixes the 10.7 MHz signal with a precision 10.245 MHz crystal oscillator to produce the second IF at 455 kHz. This IF signal is filtered, amplified. The signal is then discriminated about 455kHz to produce an analog signal and filtered again. A bit splicer is incorporated to provide the digital signal for the digital micro controller.

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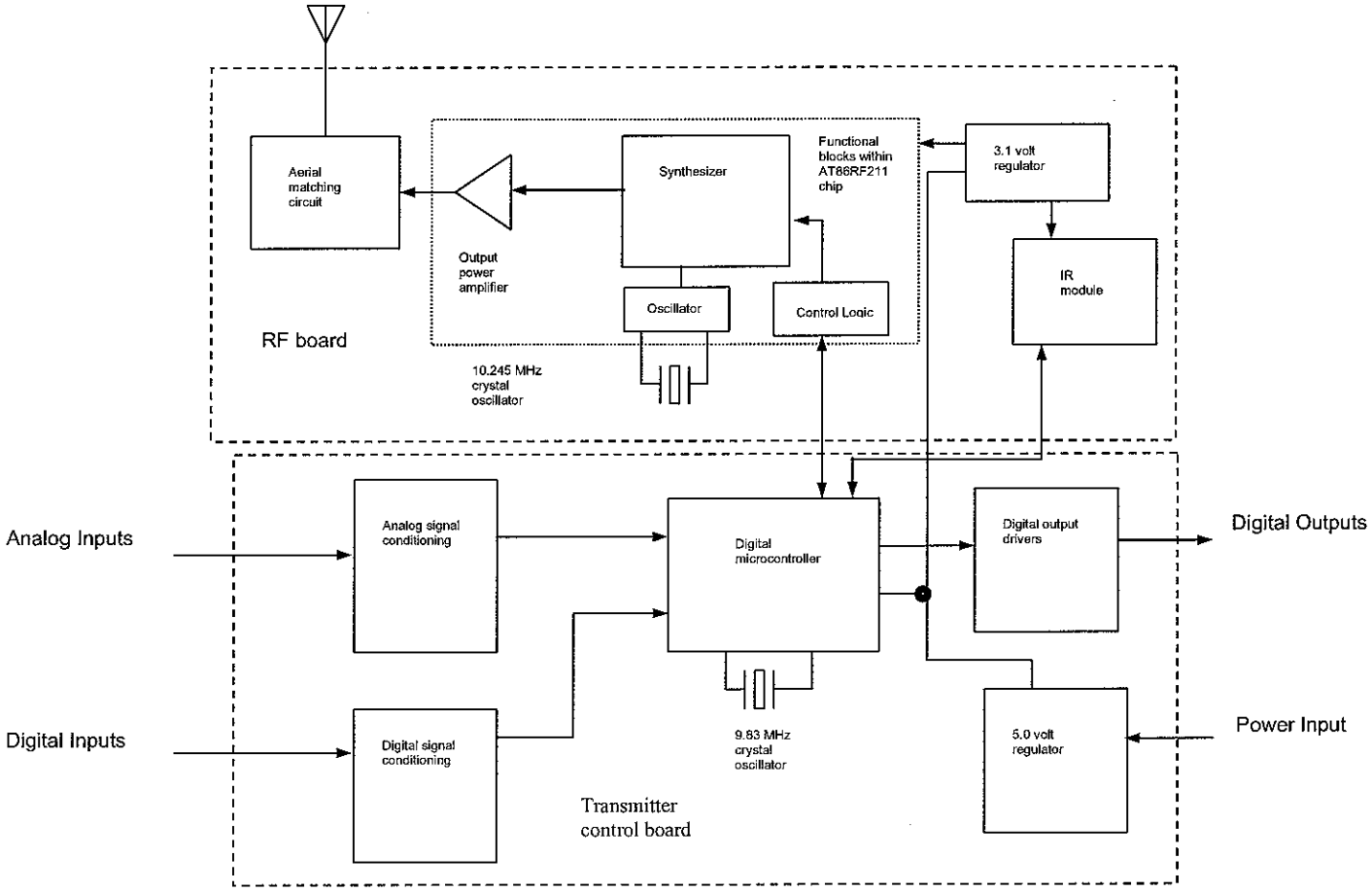
900 MHz Transmitter Block Diagram



Transmitter Functional Description

The synthesizer is a high-speed, high-resolution multi-loop synthesizer. All circuitry is on-chip with the exception of the PLL loop filter. The phase comparison is made using charge pump topology.
The microcontroller on the digital transmitter board transfers register values to the control logic portion of the AT68RF211 chip. These values set the synthesizer to output frequencies of the carrier frequency plus the deviation for a digital "High" input, and carrier minus deviation for a digital "Low" input.

Digital data from the digital micro controller is therefore frequency modulated at the transmitter using frequency shift keying. A buffer amplifier is used to isolate the VCO of the synthesizer from the antenna, and increases the output power of the transmitter. The buffer output is connected to a low pass filter used to suppress harmonic emissions. The filter output is connected to the antenna.

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Frequency Hopping Description

The Transmitter operates on a fixed time state machine format. Once initialization is complete, the micro controller collects input data, processes the values, and then transmits out the data. This process is repeated every 0.015 seconds.
The data is transmitted as digital logic RS232 standard operating at 9600 baud. This gives a byte size of ~ 1m sec. The transmission packet size is 11 bytes for a transmission size of ~11 m sec. After the packet is sent, there is another 1 m sec. of continuous high output transmitted to indicate to the receiver an "End of Packet".
Once the end of packet is sent, the transmitter's power amplifier is turned off, and the carrier frequency is changed to the next random carrier frequency. At 15 m sec. The power amplifier is again turned on and the transmission of the next packet begins.

The transmitter and receiver use 50 equally spaced frequencies (see table). Each transmitter/receiver pair also has a stored unique random stepping sequence for going through the 50 channels. The random stepping sequence uses each channel only 1 time in the 50-channel sequence, and once each channel is used, the sequence is repeated.

When transmitting on a particular carrier frequency, there is a deviation frequency added for incoming data "High" levels, and deviation frequency subtracted from the carrier for "Low" incoming data.

	Frequency	TX channel "High"	TX channel "Low"
1	902.805	902.83	902.78
2	903.255	903.28	903.23
3	903.705	903.73	903.68
4	904.155	904.18	904.13
5	904.605	904.63	904.58
6	905.055	905.08	905.03
7	905.505	905.53	905.48
8	905.955	905.98	905.93
9	906.405	906.43	906.38
10	906.855	906.88	906.83
11	907.305	907.33	907.28
12	907.755	907.78	907.73
13	908.205	908.23	908.18
14	908.655	908.68	908.63
15	909.105	909.13	909.08
16	909.555	909.58	909.53
17	910.005	910.03	909.98
18	910.455	910.48	910.43
19	910.905	910.93	910.88
20	911.355	911.38	911.33
21	911.805	911.83	911.78
22	912.255	912.28	912.23
23	912.705	912.73	912.68

Freq. Deviation	0.025
Freq. Separation	0.45

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24	913.155	913.18	913.13
25	913.605	913.63	913.58
26	914.055	914.08	914.03
27	914.505	914.53	914.48
28	914.955	914.98	914.93
29	915.405	915.43	915.38
30	915.855	915.88	915.83
31	916.305	916.33	916.28
32	916.755	916.78	916.73
33	917.205	917.23	917.18
34	917.655	917.68	917.63
35	918.105	918.13	918.08
36	918.555	918.58	918.53
37	919.005	919.03	918.98
38	919.455	919.48	919.43
39	919.905	919.93	919.88
40	920.355	920.38	920.33
41	920.805	920.83	920.78
42	921.255	921.28	921.23
43	921.705	921.73	921.68
44	922.155	922.18	922.13
45	922.605	922.63	922.58
46	923.055	923.08	923.03
47	923.505	923.53	923.48
48	923.955	923.98	923.93
49	924.405	924.43	924.38
50	924.855	924.88	924.83

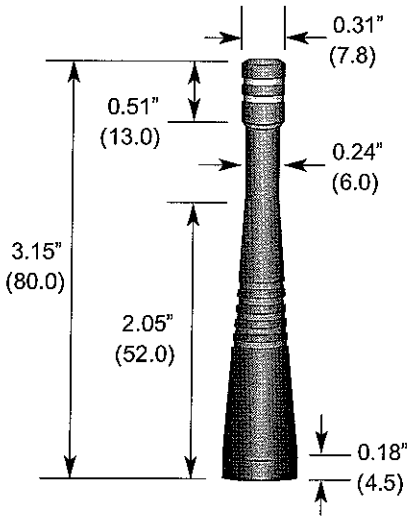
Note: All frequencies in MHz

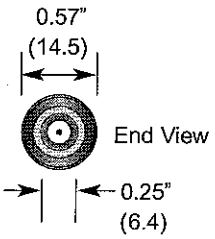
MODEL 9900R

ANTENNA FACTOR

ANT-916-CW-QW DATA SHEET

Product Dimensions





Description

CW Series 1/4-wave antennas deliver outstanding performance in a rugged and cosmetically attractive package. These antennas feature an SMA or FCC Part 15 compliant RP-SMA connector. This simplifies packaging and shipment, allowing for easy field replacement while complying with FCC requirements. A wide variety of matching connectors allows numerous mounting options. The CW Series comes standard in black, but custom colors are available with a 5,000 piece minimum order.

Features

- Low cost
- Outstanding VSWR
- Excellent performance
- Omni-directional pattern
- Flexible main shaft
- Fully weatherized & damage-resistant
- RP-SMA or SMA connector
- Available in black or custom colors
- Use with plastic* or metal enclosures

* Requires proximity ground plane

Electrical Specifications

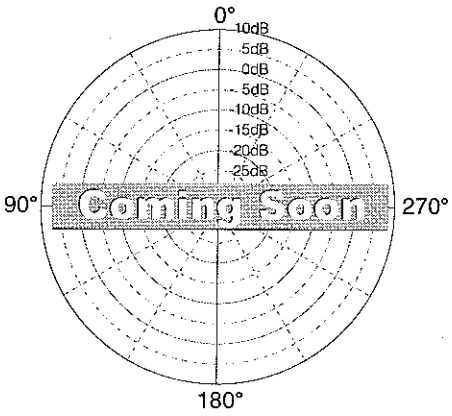
- Center Freq. 916MHz
- Bandwidth 100MHz
- Wavelength 1/4-wave
- VSWR <1.9 typ. at center
- Impedance 50 ohms
- Gain TBD
- Connector RP-SMA or SMA

Note: Electrical specifications and plots measured on 4"x 4" reference ground plane

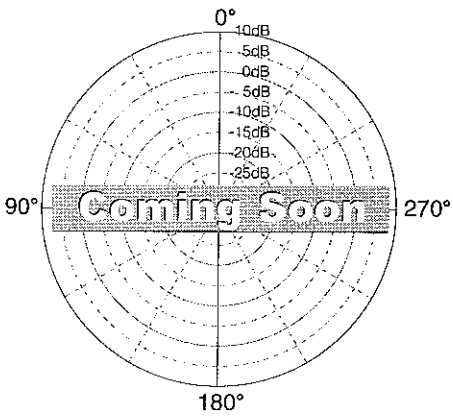
Ordering Information

- ANT-916-CW-QW (with RP-SMA connector)
- ANT-916-CW-QW-SMA (with SMA connector)

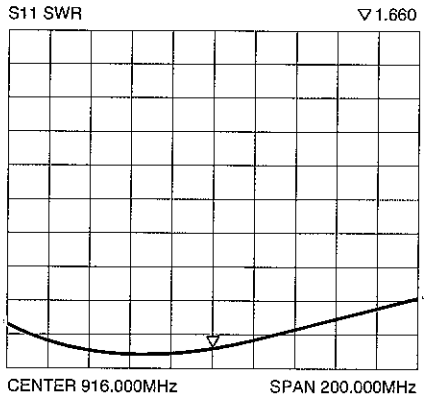
Plots



Azimuth



Elevation



Typical VSWR

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