



TAIYO MUSEN

TD-238F ADF Beacon receiver with Automatic Direction Finder.

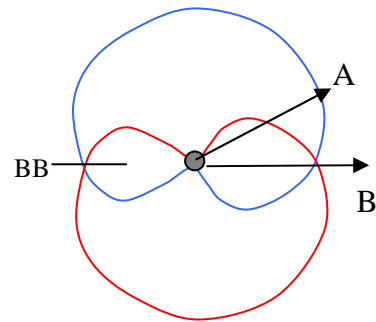
	Band	Range
Beacon	B	190- 420 kHz
Broadcast	BC	500-1400 kHz
Marine	M	1.4 -3.5 MHz
Crystal	X1	
Crystal	X2	

The unit uses a built-in battery of 8 “D” cells for a total supply voltage of 12Vdc.

A centre-tap on the battery is only used in ADF mode to make the ADF motor bidirectional.

The unit has BFO and (AGC operated) squelch. Both the frequency scale and the compass card can be illuminated.

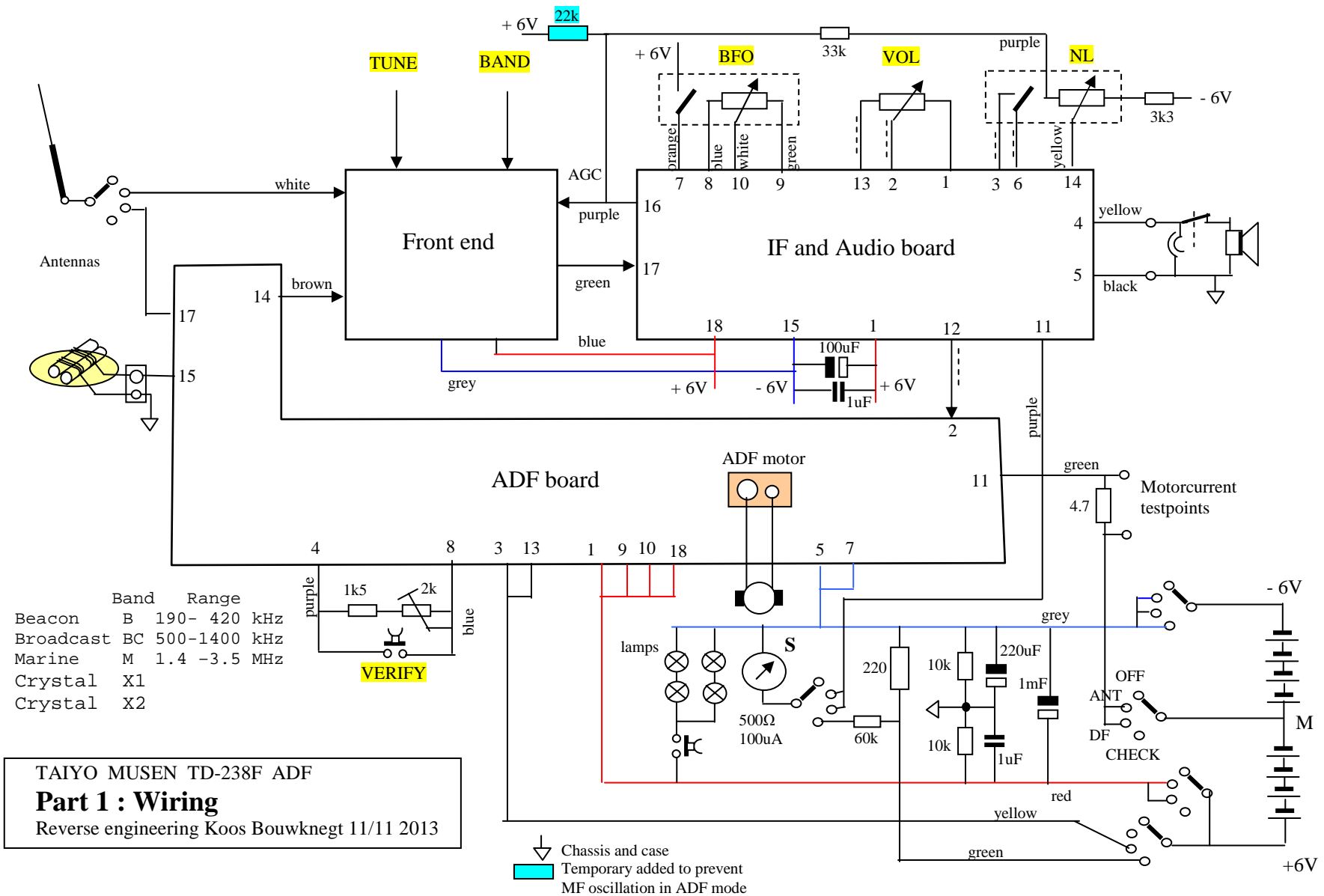
The sum of the signals from a ferrite rod loop antenna and a whip antenna gives a cardioid antenna diagram. Inverting the whip antenna signal inverts the cardioid. The automatic direction finder uses a 200Hz square-wave oscillator, which inverts the whip signal 200 times a second. The audio signal from the receiver is applied to a synchronous demodulator, which compares the signal strength in the time that the normal (red) cardioid diagram is used with the when the inverted (blue) diagram is used. If the red signal dominated, the loop antenna rotates clockwise. If the blue signal dominated, the antenna loop rotates counter clockwise until there is no difference anymore. This is a stable situation, and an arrow points to the signal source.

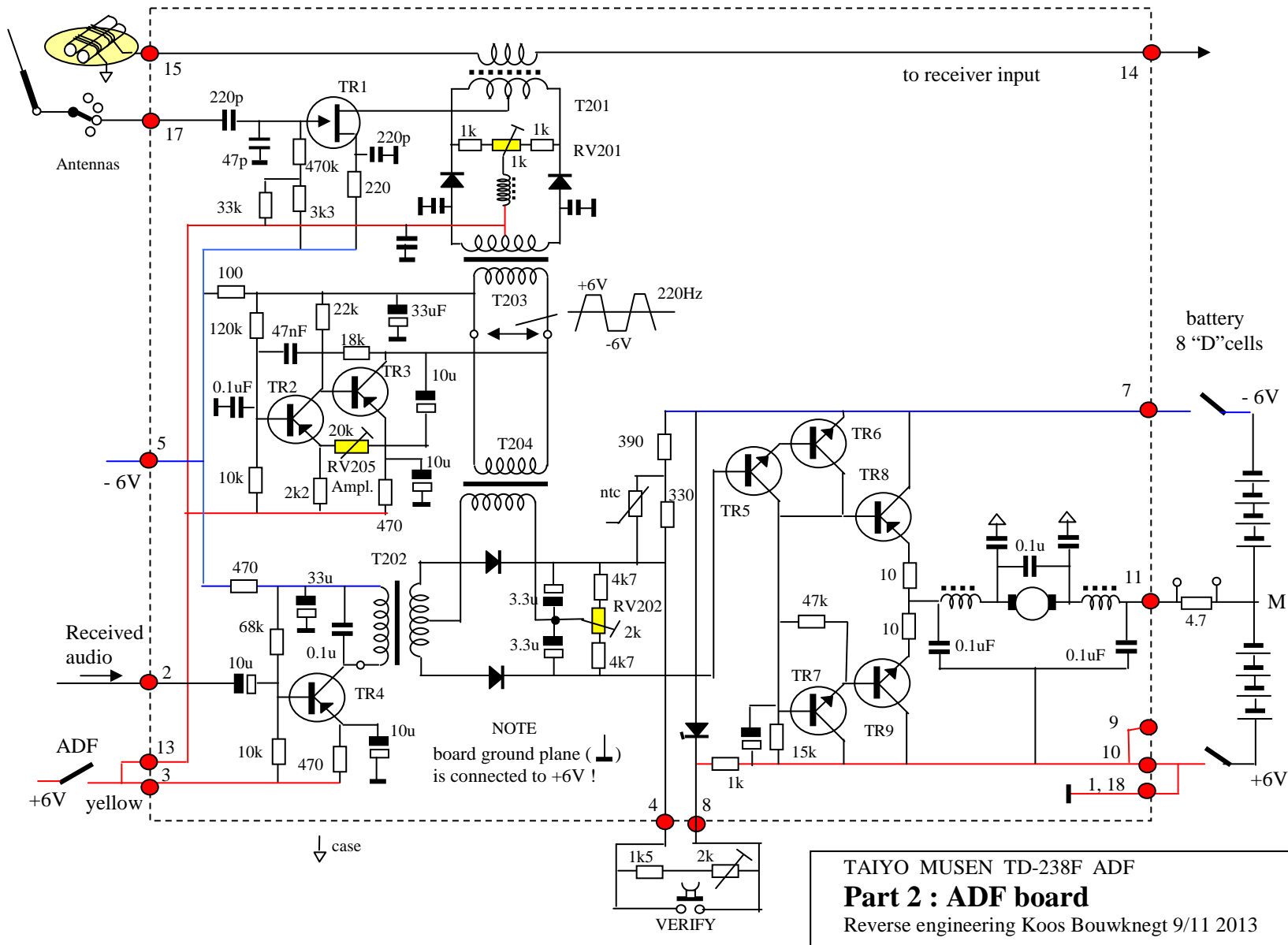


The antenna diagram is a cardioid. Continuous switching between the red and blue diagram produces a 200Hz square wave at the audio output of the receiver. For instance with a signal coming from the direction "A", the audio output is highest when the coax relay is in the "blue" position.

When the signal is strongest in the "blue" time, the antenna is rotated clockwise, if the signal is strongest in the "red" time, the complete antenna rotates counter clockwise. The smaller the difference, the slower the rotation until rotation stops in position B. Position BB also has equal strengths, but is not stable.

Now follow the circuit diagrams, except for the front end : (RF amplifier, mixer and oscillator).





TAIYO MUSEN TD-238F ADF
Part 2 : ADF board
 Reverse engineering Koos Bouwknegt 9/11 2013

