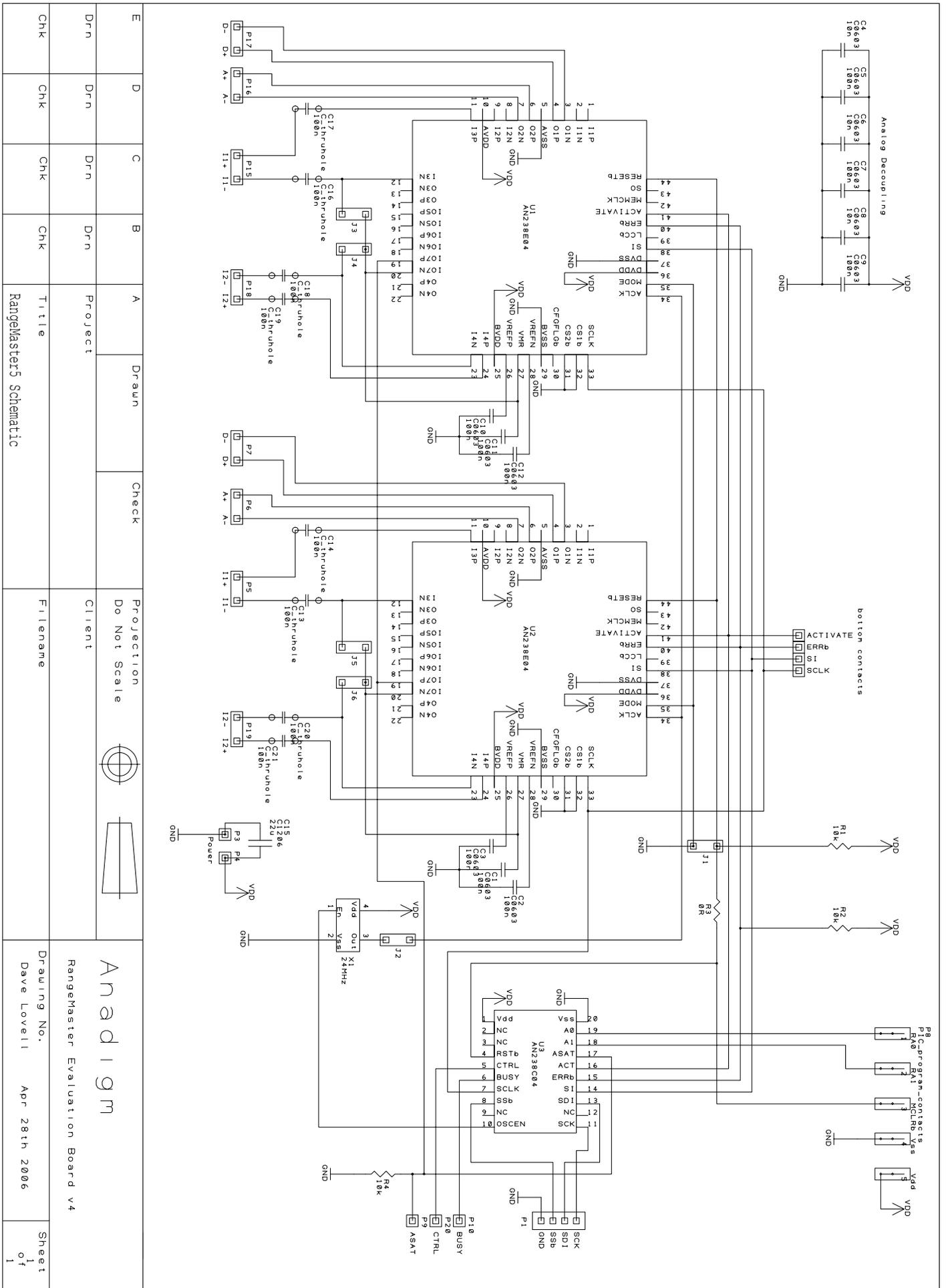


# RangeMaster5 Evaluation board – Quick start Guide



# RangeMaster5 Evaluation Board Quick Start User Guide

**PLEASE read this entire minimal document before starting. It may save you a lot of time.**

Connecting the RangeMaster5 board into an existing RFID reader - to replace the sub-carrier filters, see figure1 below.

The connections can be made by directly soldering wires to the RangeMaster5 board or by first adding single in line 1mm header pins (2.54mm spacing).

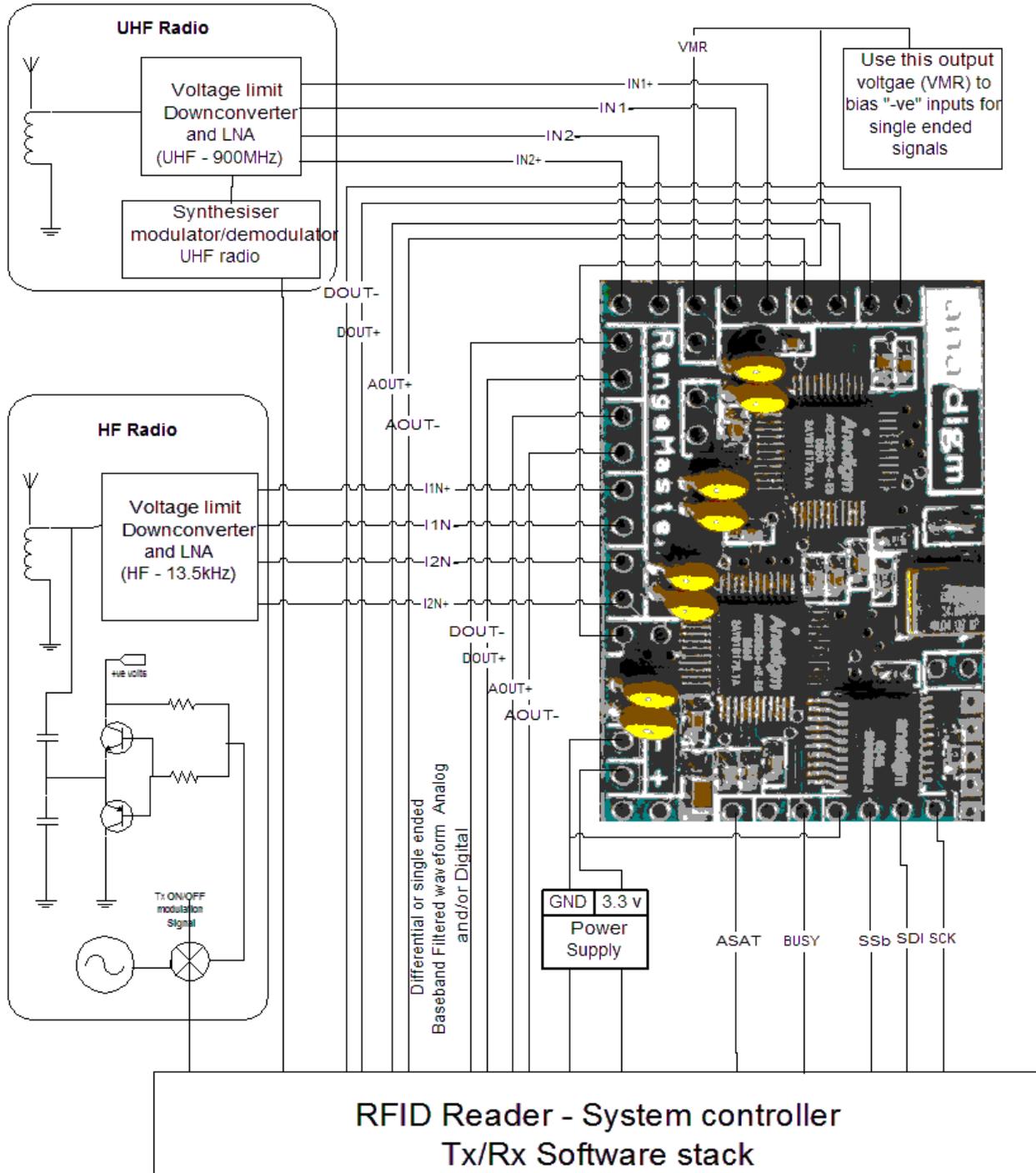


Figure 1.

## RangeMaster5 Evaluation board – Quick start Guide

### Quick start instructions:

- The initial state of the digital inputs should be described in the following table. Initial State refers to the electrical signal present on these connection points immediately after connecting the 3.3volt power source.

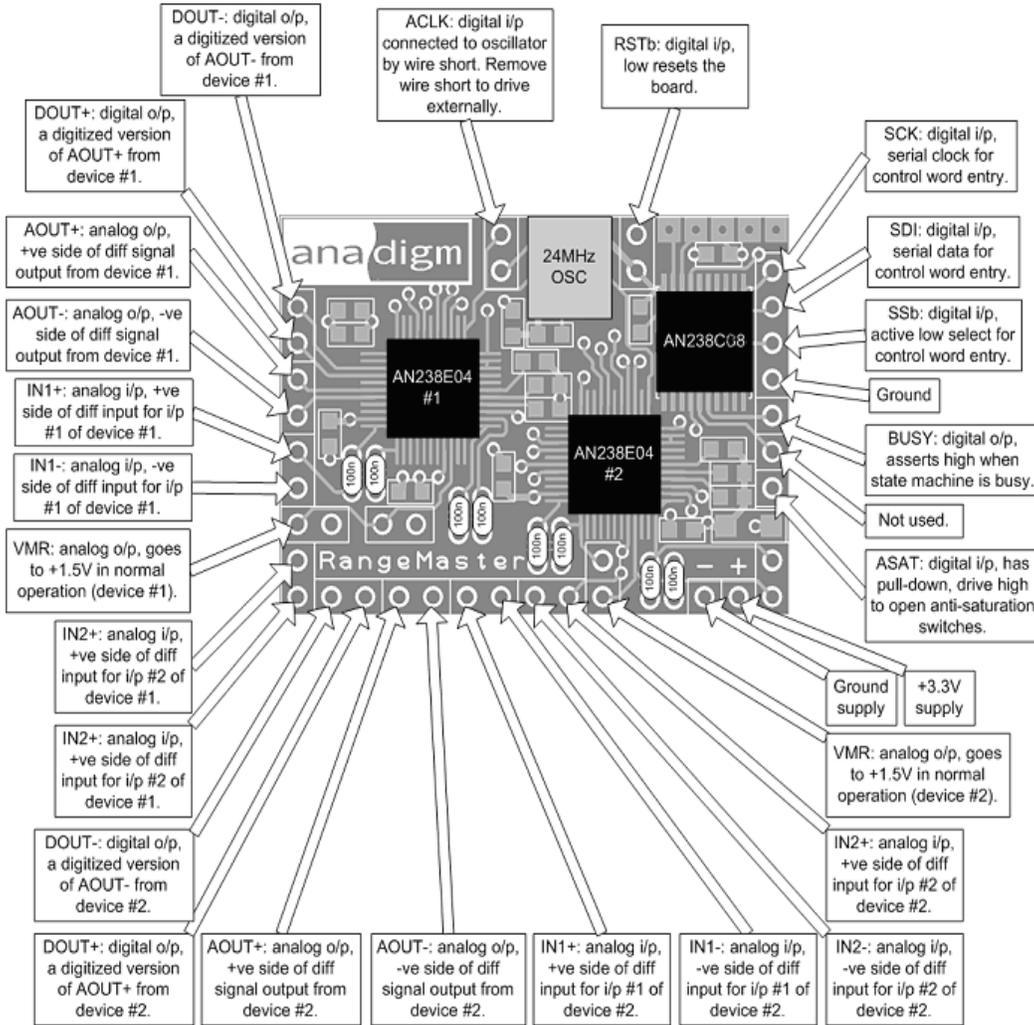
In/Output	Initial state	Comments
EXEC	low	This pin has a 10K pull-down resistor.
SCK	low	This pin has no pull-down and must be driven low.
SDI	high or low	This pin has no pull-up or pull-down so should be driven, but which state is not important.
SSb	high	This pin has no pull-up and must be driven high.
RSTb	high	This pin has a 10K pull-up resistor. To Reset the board momentarily pull RSTb low, Minimum low time = 10 msec
BUSY	low	This pin is an output, At start-up will drive high whilst the board is configuring; start-up configuration time is approx 36msec. When configuration has completed this pin pulls low. When a re-configuration word is received this pin will drive high until configuration is complete

- Apply power to the board +3.3V. The RangeMaster5 board will immediately start to configure itself, after about 36ms this will be complete the board then puts itself into /Sleep standby mode. Do not enter a Control word during this initial 36msec configuration period. The BUSY output will drive high during this time.
- To wake the board from standby/sleep mode, input any 16 bit control word followed by the correct 16 bit control word. The contents of this first control word will be ignored they are used only to “wake-up” the board. A control word is entered using SCK, SDI and SSb, and must be entered as two separate bytes according to the timing diagram in figure 6, page 26 of the RangeMaster2 datasheet and on the next page. After the wake-up control word has been entered, a second new control word should not be entered for at least 30us after the end of the wake-up control word. Note that the BUSY signal will drive high during this period to indicate that the system is busy. When BUSY goes low, it is safe to enter another control word. Now the board is awake. To put the board into the desired configuration requires entering the appropriate control word, again entered as 2 bytes, conforming to the timings given in the datasheet. The RangeMaster5 control byte is detailed on page 25 of the RangeMaster5 datasheet and is below; the meaning of each bit in the control word is defined. Note that the time taken for the board to reconfigure itself after a new control word can be anything from 1 to 50msec, so the time between control words should be at least 50msec, unless the first control word is a wake-up in which case there should be a delay of just 30us before the next control word is entered. Note that the BUSY signal will drive high after each control word is entered to indicate that the system is busy. When BUSY goes low, it is safe to enter another control word. If the board is functioning correctly, then in normal operation the VMR pin should be at +1.5V. In standby mode this pin should be at 0V.
- The differential input signal should be connected to IN1+ and IN1- (or IN2+ and IN2-). The differential amplitude of this signal should not exceed +/-2.9V (minimum 5mV). The input connections are wired to the dpASP (AN231E04) device via a pair of 100nF capacitor (this provides a.c. coupling), but also adds a time constant, you may want to adjust the value of these capacitors for the higher frequency signals.
- If the input signal is single ended, connect it to IN1+ (or IN2+) and connect IN1- (or IN2-) to VMR by shorting the VMR hole to the hole above it (a jumper can be fitted if required). See figure2.
- The output will appear as a differential signal with +1.5V common mode voltage on AOUT+ and AOUT-. A digitized version of this signal will appear on DOUT+ and DOUT-.
- If a singled ended output signal is required connect to AOUT+ or DOUT+ and ignore the –ve output, the amplitude of the output signal will be half that of a differential output and will have a d.c.offset of +1.5volts. (fig3)
- The board can be put back into standby mode by entering a zero control word i.e. 0x0000. Note that any control word will wake the board from standby, so repeated inputting of a zero control word will cause the board to toggle in and out of standby.
- The board can be reset either by power cycling it or by pulsing RSTb low for a minimum of 10ms. There is a hole next to RSTb which is connected to ground. This allows a jumper to be fitted if required.

Note: Analog signal path within the AN238E04 has an additional start-up delay

When changing circuit parameters the Analog signal path will be reconfigured immediately after the BUSY line drives low. At start-up, following Reset and when changing circuits (e.g. from “wide” to “twin”, the Analog signal path within the AN238E04 device will be active 55msec after the State Machine (AN238C04) busy line drives low.

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**Figure 2. Pictorial Pin description**

## Hardware and Timings

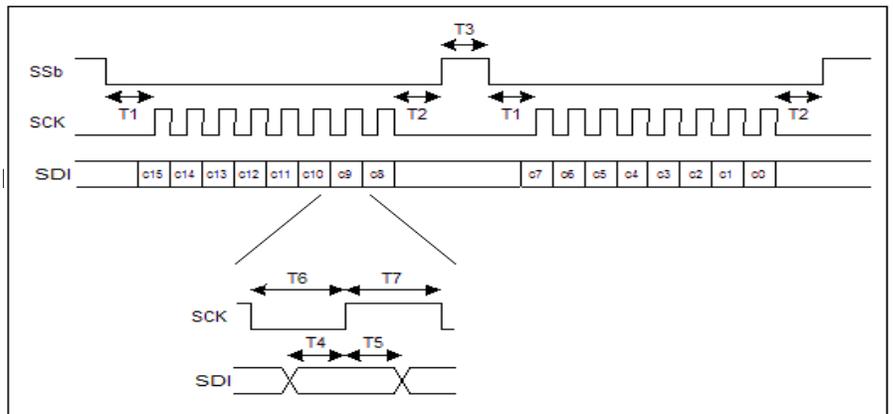
SPI like pin table/ interface.

Pin name	Pin type	Description
SSb	Input	Slave select
SCK	Input	Serial clock
SDI	Input	Serial data in

Note. This is the minimum high period for SSb between the 2 bytes of the control word. There is no maximum time for this. The interface will wait indefinitely for the second byte before the software can continue

This table and figure 3 show the timings specification

Symbol	Description	Min	units
T1	SSb falling to SCK rising	500	ns
T2	SSb rising after SCK falling	790	ns
T3	SSb high period <sup>Note</sup>	6.5	us
T4	SDI setup to SCK rising	100	ns
T5	SDI hold after SCK rising	100	ns
T6	SCK low period	520	ns
T7	SCK high period	520	ns



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