

Manual For Practical Implementation

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1 Laboratory set-up

Figure 1 shows the block diagram that needs to be implemented in the laboratory when testing the localisation system. Figure 2 shows the block diagram implemented for testing the different receivers.

- Stripboard converts signal from jumper wires to SMA cables
- Switch modulates the keyed signal generated by the MCU
- The detectors can be replaced by notch filters
- The oscilloscope can be removed and the ADC input pins of the MCU used to sample the signal
- 7dB coupler was used

System was found to work best when the carrier frequency was in the range 13.8-13.6 MHz.

2 Transmitter

The functions are in the main.c file. Functions for the '1 out of 4' coding mode do not finish in a number (except EOF is 'EOF1'). Functions for the '1 out of 256' coding mode finish in 256, these are unreliable and need improvement.

You define the message to be transmitted in Hex using the 'message' function. This is then converted into binary and stored in the 'message_b' variable. The 'transmit_message' function then transmits the message according to the ISO 15693 standard.

3 Receivers

Receivers to be used alongside an amplitude modulation (AM) detector, alongside the name of the function in the code (apologies for the bad naming)

- Correlation Receiver: with filtering -i receive, without filtering -i receive_filtered

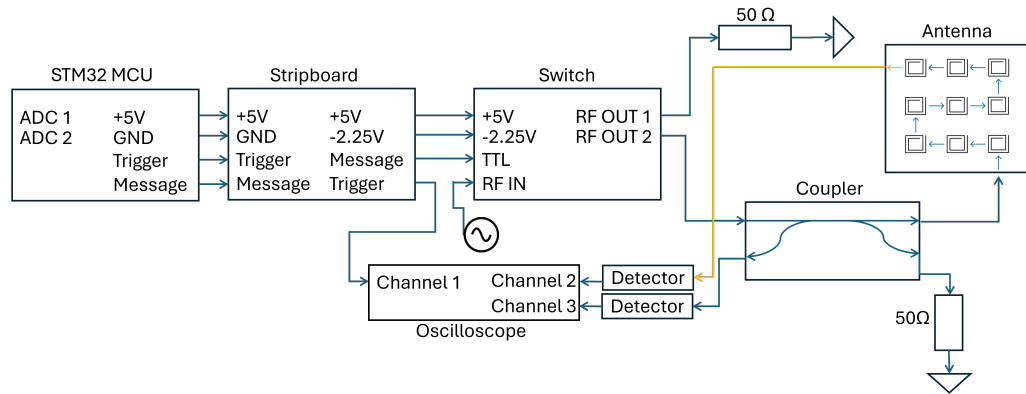


Figure 1: Block diagram for laboratory set up when testing localisation

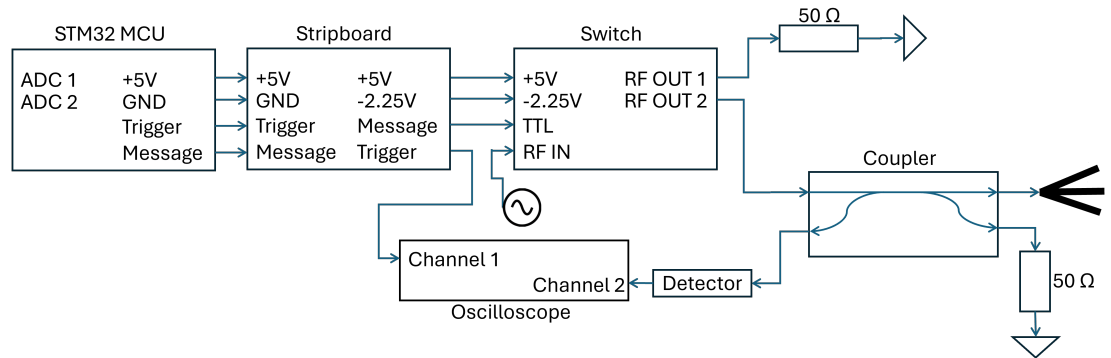


Figure 2: Block diagram for laboratory set up when testing receivers

- Threshold receiver: with filtering -i, *receive_threshold*, without filtering -i, *receive_threshold_df*

Receivers to be used with a notch filter instead of an AM detector, alongside the name of the function in the code (apologies for the bad naming)

- Correlation Receiver: *receive_correlation_filtered*
- Amplitude receiver (measure gradient): *receive_derivative*
- Amplitude receiver (measure difference between max and min samples in window): *receive_difference*

Each function begins by defining the variables, it then has the code to perform the demodulation. Some receivers contain the code to determine the location of the EOF, so activate this uncomment the code for a variable called 'threshold'. The functions end by determining the number of errors and displaying the errors and the decoded UID to the user. This is currently commented out for all functions.