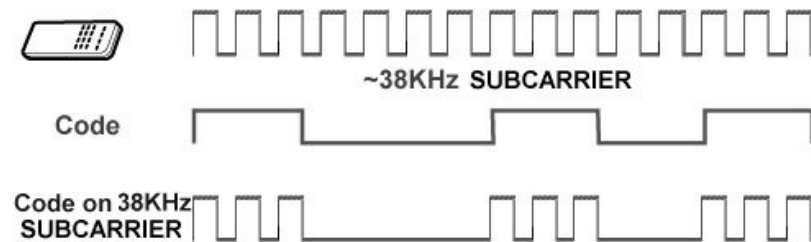


# Airwell air conditioner remote IR protocol

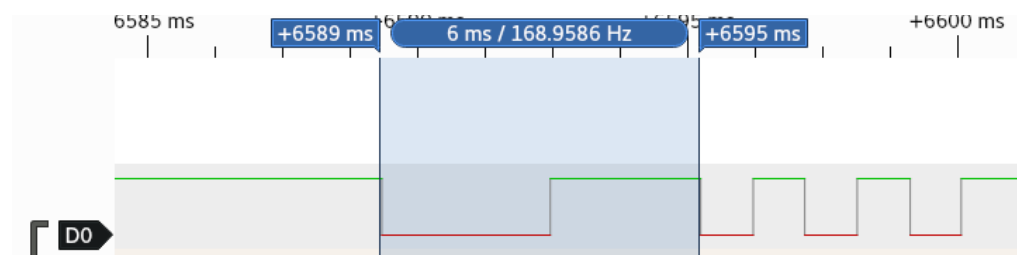
## Physical layer

- IR
- Data is ASK modulated onto a 38KHz square wave
  - Duty cycle of the carrier should be 30% - 50%

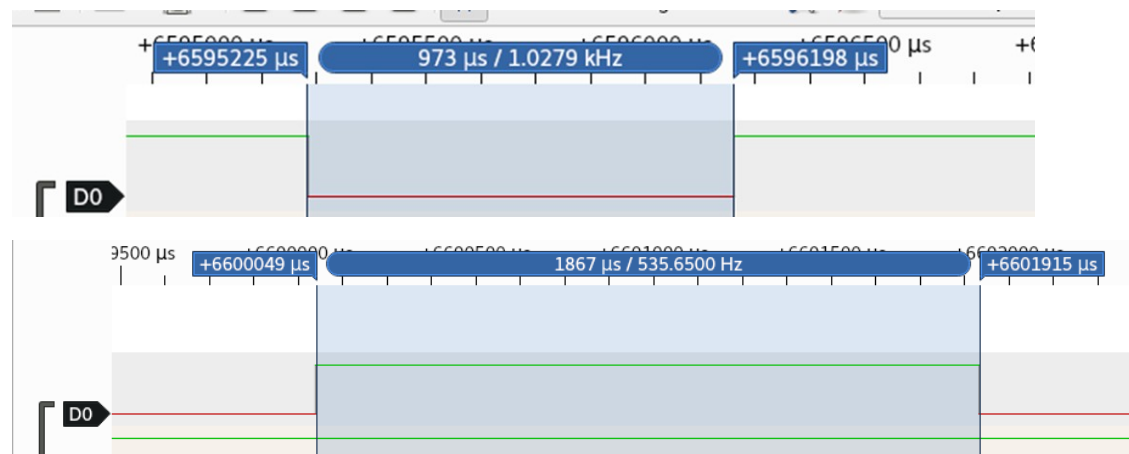


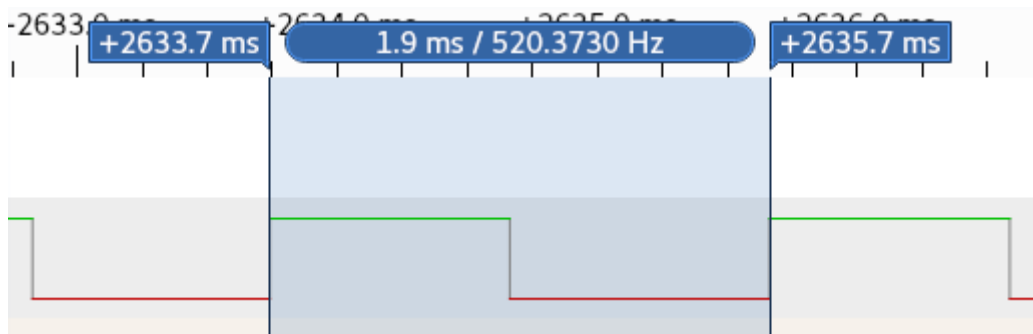
## Protocol

- There is a preamble used to mark start/end of frames
  - The preamble is a low pulse for ~3ms and a high pulse for ~2.9ms, totalling 6ms



- Data is Manchester encoded
  - Logic 0 = Low-High transition
  - Logic 1 = High-Low transition
- Manchester data is clocked at ~520Hz





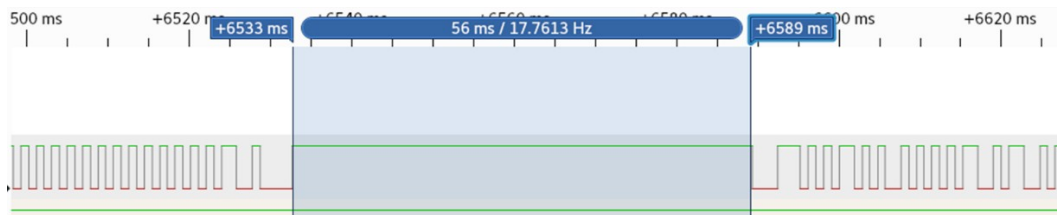
- There are 3 repeats of the data frame, each surrounded by a preamble, as follows:

preamble	data	preamble	data	preamble	data	preamble
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- The data is 34bits

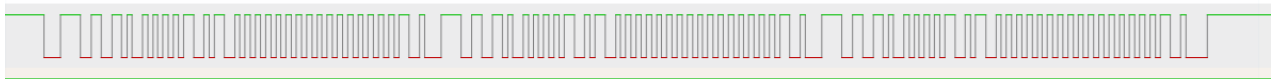
bit	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
function	F	Mode			Fan	0	0	0	Temperature								0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0

- Main data bits
  - Bit 0: function
    - 1 = power
    - 0 = settings (same for mode, fan and temperature buttons)
  - Bits 1-3: mode
    - 010 = heat
    - 001 = cool
    - 011 = recycle
    - 101 = fan
    - 100 = water drop (fan is always 00)
  - Bits 4-5: fan
    - 11 = auto
    - 10 = hi
    - 01 = med
    - 00 = low
  - Bits 9-16: temperature
- Other Bits:
  - Bits 6-8: possibly for the IFEEL function, this is unconfirmed and kept reserved
  - Bits 17-34: reserved, all set to zero, except for bit 33 which is 1.



- There is a minimum of 56ms between consecutive messages

As an example, the following sets the unit to Cool, Auto fan, 24°C and powers it on



### Temperature encoding

- Temperature is between 16°C and 30°C, inclusive.
- Encoded temperature is transmitted most significant bit first
- Temperature is mapped using a linear function, the result in hexadecimal

$$f(x) = 4x - 60$$

Actual	Encoded	Encoded (Hex)
16	4	04
17	8	08
18	12	0C
19	16	10
20	20	14
21	24	18
22	28	1C
23	32	20
24	36	24
25	40	28
26	44	2C
27	48	30
28	52	34
29	56	38
30	60	3C