PANASSONIC
HVAC IR PROTOCOL

Reverse engineering based specification
V0.1

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Table des matières

1 STRUCTURE

1.1 GENERAL OVERVIEW

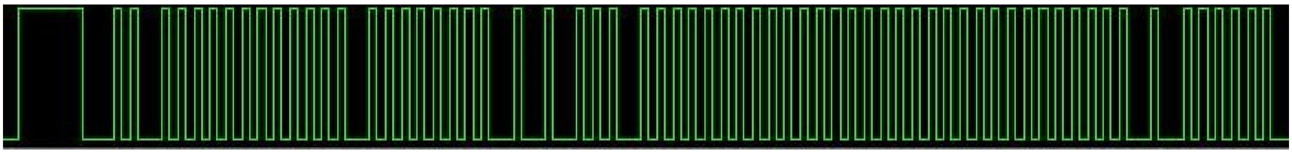
The Panassonic HVAC Infrared protocol is composed of two consecutive frames. The first one remains the same whatever the comman sent to the AC module. Note that the overall information (temperature, fan, swing...) at each command sending.

As other AC protocol, the structure of the transmitted bit request the following elements (decode through analysIR www.analysir.com):

Header	3500
HeaderSpace	1750
Mark	435
Space0	435
Space1	1300
Modulation	38000
Delta	200
Bits	216

1.2 FIRST FRAME

As briefly explain earlier, the first frame of the protocol is independent of the command that needs to be sent. This is an 8 bytes frame which value is **0x4004072000000060**.



1.3 SECOND FRAME STRUCTURE

The second frame is a 19 bytes frame where the command is encoded. Notice that to be able to understand the frame content, it has first to be transformed. A switch is required bytes per bytes, the 4 significant bits becoming the less significant ones.

__Temperature__.

The temperature is encoded on the bye #7. Only 4 bits are used to specify an allowed value from 16°C to 30°C. In decimal, the value 0 represents then 16°C when 30° will be set by using the value 14.

Note that those for bits are no consecutive ones within the bytes #7.

Bytes #7							
[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
Temp[3]	1	0	0	0	Temp[0]	Temp[1]	Temp[2]

Swing and fan.
Swing and Fan are set by the same bytes that is the #9 bytes.

Bytes #9							
[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
FAN[3]	FAN[2]	FAN[1]	FAN[0]	SWING[3]	SWING[2]	SWING[1]	SWING[0]

SWING	
1111	AUTO
1010	P1 (Horizontal)
0010	P2
1100	P3
0100	P4
1000	P5 (Ground)

FAN	
0101	AUTO
1110	F1 (Slowest)
0110	F2
1010	F3
0010	F4
1100	F5 (Fastest)

Profile.
The Panassonic HVAC allows 3 profiles: Normal, boost and quiet. The choice of the profile to be used is set through the byte #14.

Bytes #14							
[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
PRO[7]	PRO[6]	PRO[5]	PRO[4]	PRO[3]	PRO[2]	PRO[1]	PRO[0]

PROFILE	
10000000	NORMAL
10001000	BOOST
11000000	QUIET

Mode and switch ON/OFF

The byte #6 is the one that is used to both setup the mode of the HVAC and to switch it ON or OFF. Note that there is no difference between the switch ON and the switch OFF command. It means then that you have to know if the HVAC is working or note to know what would be the result of the SWITCH ON/OFF command.

Bytes #6							
[7]	[6]	[5]	[4]	[3]	[2]	[1]	[0]
MODE[3]	MODE[2]	MODE[1]	MODE[0]	SWITCH	0	0	1

If bit #3 is set to 0, the command is set to the HVAC but it will not affect whether it is in use or not. For example, in case the HVAC is not running, the command is received by the module but it remains OFF.

MODE	
0110	FAN
0100	DRY
1100	COOL
0010	HEAT
0000	AUTO

Time and ON/OFF programming.

At this stage those elements have not been decoded yet.

CRC.

Bytes #19 is a CRC of frame 2. It allows the HVAC to know whether the command sent is valid or not. CRC is the checksum of the previous 18 bytes modulo 256.

Other frame 2 bytes.

Other bytes did not varied during the reverse engineering phase. We can consider at this stage that they do not need to be changed and can remain at the same value all time.

For easier frame programming, we can derived any command (which is sent through frame #2) from this one (which is not witching on or of the HVAC):

4004072000103C01850000700708008000600E

When this frame is post processed has described earlier, bytes value are the following ones.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
04	40	70	02	00	**01**	**C3**	10	**58**	00	00	07	70	**80**	00	08	00	06	**E0**

2 Usage Arduino functions

2.1 TBD