

PANASONIC HVAC IR PROTOCOL

Reverse engineering based specification
V0.2

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1 STRUCTURE

1.1 GENERAL OVERVIEW

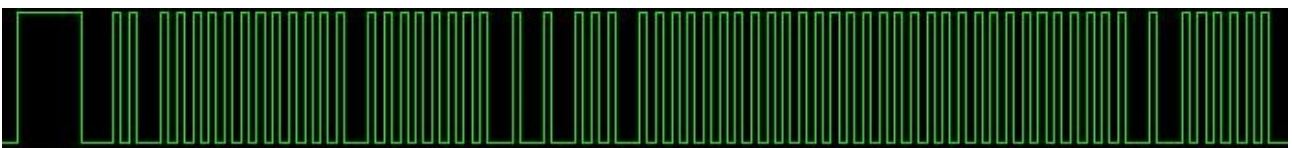
The Panasonic HVAC Infrared protocol is composed of two consecutive frames. The first one remains the same whatever the command sent to the AC module. Note that the overall information (temperature, fan, swing...) at each command sending.

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.

The frame have been then switched using the LSB8 fonction of AnalysIR.

Temperature.

The temperature is encoded on the byte #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.

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

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
0001	P1 (Horizontal)
0010	P2
0011	P3
0100	P4
0101	P5 (Ground)

FAN	
1010	AUTO
0011	F1 (Slowest)
0100	F2
0101	F3
0110	F4
0111	F5 (Fastest)

Profile.

The Panasonic 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	
00010000	NORMAL
00010001	BOOST
00110000	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 not 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]	1	0	0	SWITCH

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
0010	DRY
0011	COOL
0100	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 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):
0220E00400483C80AF00000EE01000010006BE

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
00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

2 USAGE ARDUINO FUNCTIONS

2.1 TBD