Logitec Group Infrared Transmission Protocol

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Date: 2016/10/26

Revision: V1

1. Logitec protocol is based on NEC protocol

The NEC IR transmission protocol uses pulse distance encoding of the message bits. Each pulse burst (mark – RC transmitter ON) is 562.5µs in length, at a carrier frequency of 38kHz (26.3µs). Logical bits are transmitted as follows:

- Logical '0' – a 562.5µs pulse burst followed by a 562.5µs space, with a total transmit time of 1.125ms
- Logical '1' – a 562.5µs pulse burst followed by a 1.6875ms space, with a total transmit time of 2.25ms

When transmitting or receiving remote control codes using the NEC IR transmission protocol, the WB_IRRC performs optimally when the carrier frequency (used for modulation/demodulation) is set to 38.222kHz.

When a key is pressed on the remote controller, the message transmitted consists of the following, in order:

- 9ms leading pulse burst (16 times the pulse burst length used for a logical data bit)
- a 4.5ms space
- the 8-bit address for the receiving device
- the 8-bit logical inverse of the address
- the 8-bit command
- the 8-bit logical inverse of the command
- a final 562.5µs pulse burst to signify the end of message transmission.

The four bytes of data bits are each sent least significant bit first. Figure 1 illustrates the format of an NEC IR transmission frame, for an address of 00h (00000000b) and a command of ADh (10101101b).

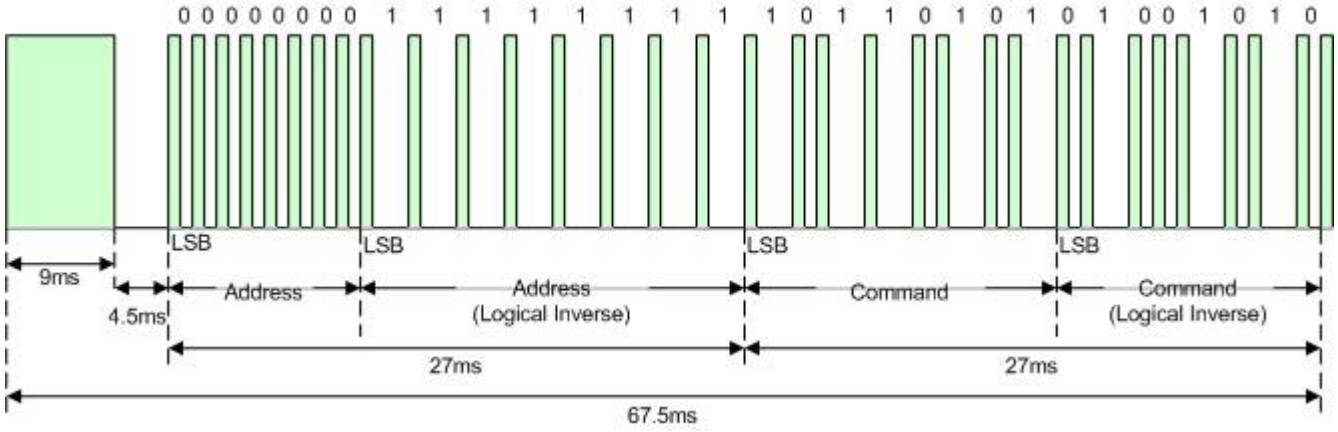

Figure 1. Example message frame using the NEC IR transmission protocol.

Notice from Figure 1 that it takes:

- 27ms to transmit both the 16 bits for the address (address + inverse) and the 16 bits for the command (command + inverse). This comes from each of the 16 bit blocks ultimately containing eight '0's and eight '1's - giving (8 * 1.125ms) + (8 * 2.25ms).
- 67.5ms to fully transmit the message frame (discounting the final 562.5µs pulse burst that signifies the end of message).

Repeat Codes

If the key on the remote controller is kept depressed, a repeat code will be issued, typically around 40ms after the pulse burst that signified the end of the message. A repeat code will continue to be sent out at 108ms intervals, until the key is finally released. The repeat code consists of the following, in order:

- a 9ms leading pulse burst
- a 2.25ms space
- a 562.5µs pulse burst to mark the end of the space (and hence end of the transmitted repeat code).

Figure 2 illustrates the transmission of two repeat codes after an initial message frame is sent.

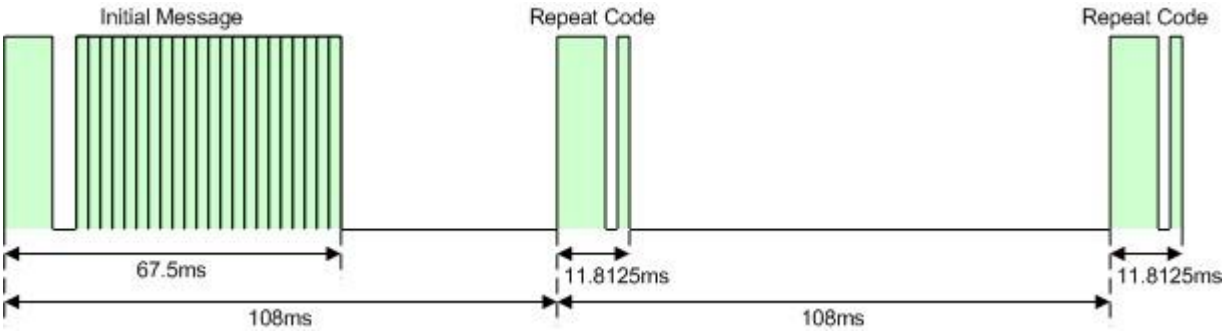

Figure 2. Example repeat codes sent for a key held down on the transmitting remote controller.

2. Logitec Group IR address and commands

Address and command values used by Logitech are listed in the table bellow.

Key		ADDRESS		/ADDRESS		DATA		/DATA	
		BIN	HEX	BIN	HEX	BIN	HEX	BIN	HEX
	Call answer	00000010	02	11111101	FD	11100110	E6	00011001	19
	Call end	00000010	02	11111101	FD	11110110	F6	00001001	09
	Volume down	00000010	02	11111101	FD	01101010	6A	10010101	95
	Volume Up	00000010	02	11111101	FD	10101010	AA	01010101	55
	Mute	00000010	02	11111101	FD	11101010	EA	00010101	15
	Camera Up	00000010	02	11111101	FD	10100110	A6	01011001	59
	Camera Down	00000010	02	11111101	FD	10110110	B6	01001001	49
	Camera Left	00000010	02	11111101	FD	10101110	AE	01010001	51
	Camera Right	00000010	02	11111101	FD	10111110	BE	01000001	41

Key		ADDRESS		/ADDRESS		DATA		/DATA	
		BIN	HEX	BIN	HEX	BIN	HEX	BIN	HEX
	Zoom in	00000010	02	11111101	FD	10100011	A3	01011100	5C
	Zoom out	00000010	02	11111101	FD	11100011	E3	00011100	1C
	Near/Far camera control	00000010	02	11111101	FD	11111010	FA	00000101	05
	Key1	00000010	02	11111101	FD	10101100	AC	01010011	53
	Key2	00000010	02	11111101	FD	01101100	6C	10010011	93
	Key3	00000010	02	11111101	FD	11101100	EC	00010011	13
	Key4	00000010	02	11111101	FD	01001100	4C	10110011	B3
	Key5	00000010	02	11111101	FD	00101100	2C	11010011	D3