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Sony SIRC Protocol

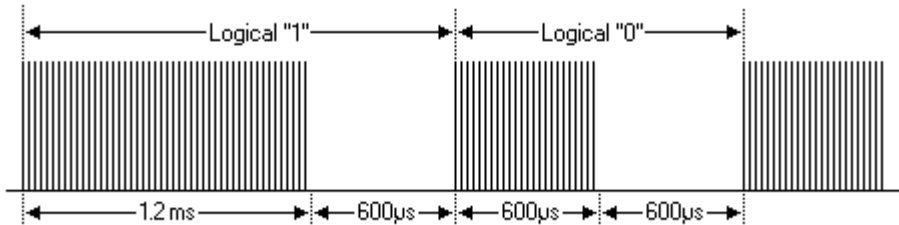
I've collected and combined some information found on the internet about the Sony SIRC protocol. I must admit that I have never worked with this particular protocol, so I could not verify that all information is valid for all situations.
It appears that 3 versions of the protocol exist: 12-bit (described on this page), 15-bit and 20-bit versions. I can only assume that the 15-bit and 20-bit versions differ in the number of transmitted bits per command sequence.

Please note that a lot of confusing documentation about the SIRC protocol exists on the internet. At first I contributed to the confusion by assuming the correctness of the source documents I found myself, until someone with some SIRC experience informed me about my errors. I double checked his story with a universal remote control and a digital storage oscilloscope, and found that the bit and word order I documented were indeed wrong.
The protocol information on this page is according to my own measurements and should be correct now.

Features

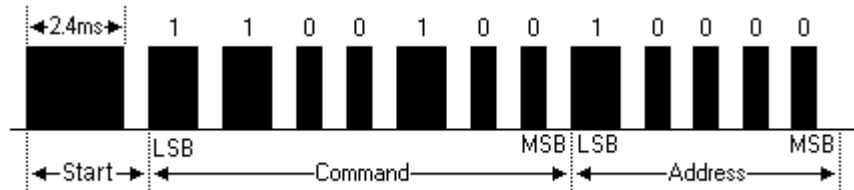
- 12-bit, 15-bit and 20-bit versions of the protocol exist (12-bit described here)
- 5-bit address and 7-bit command length (12-bit protocol)
- Pulse width modulation
- Carrier frequency of 40kHz
- Bit time of 1.2ms or 0.6ms

Modulation



The SIRC protocol uses a pulse width encoding of the bits. The pulse representing a logical "1" is a 1.2ms long burst of the 40kHz carrier, while the burst width for a logical "0" is 0.6ms long. All bursts are separated by a 0.6ms long space interval. The recommended carrier duty-cycle is 1/4 or 1/3.

Protocol



The picture above shows a typical pulse train of the SIRC protocol. With this protocol the LSB is transmitted first. The start burst is always 2.4ms wide, followed by a standard space of 0.6ms. Apart from signalling the start of a SIRC message this start burst is also used to adjust the gain of the IR receiver. Then the 7-bit Command is transmitted, followed by the 5-bit Device address. In this case Address 1 and Command 19 is transmitted.

Commands are repeated every 45ms(measured from start to start) for as long as the key on the remote control is held down.

Example Commands

The table below lists some messages sent by Sony remote controls in the 12-bit protocol. This list is by no means meant to be complete, as the assignment of functions is probably quite dynamic.

Address	Device
1	TV
2	VCR 1
3	VCR 2
6	Laser Disc Unit
12	Surround Sound
16	Cassette deck / Tuner
17	CD Player
18	Equalizer

Command	Function
0	Digit key 1
1	Digit key 2
2	Digit key 3
3	Digit key 4
4	Digit key 5
5	Digit key 6
6	Digit key 7
7	Digit key 8
8	Digit key 9
9	Digit key 0
16	Channel +
17	Channel -
18	Volume +
19	Volume -
20	Mute
21	Power
22	Reset
23	Audio Mode
24	Contrast +
25	Contrast -
26	Colour +
27	Colour -
30	Brightness +
31	Brightness -
38	Balance Left
39	Balance Right
47	Standby