# Knowledge Base

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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.

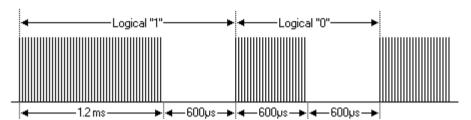
Please note that a lot of confusing documentation about the SIRC protocol exists on the internet. At first I contributed to the confusion by assuming the correctness of the source documents I found myself, until someone with some SIRC experience informed me about my errors. I double checked his story 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

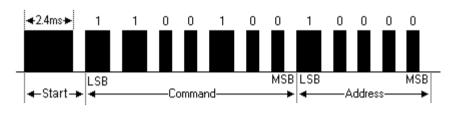
- 12-bit, 15-bit and 20-bit versions of the protocol exist (12-bit described here)
- 5-bit address and 7-bit command length (12-bit protocol)
- Pulse width modulation
- Carrier frequency of 40kHz
- Bit time of 1.2ms or 0.6ms

## 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.

**Function**Digit key 1

Command

# **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             |

|    | 2 1810 110 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       |

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