

# Student Response System IR remote

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## eInstruction CPS-IR

8-button infrared remotes with unique serial numbers.

### 1. Framing

scope measurements, in microseconds:

- start: 976
- pause: 524
- pulse: 160
- zero: 472
- one: 952

Circuit has a 455 kHz oscillator. 2.20 us period.

- LED ON time is 3 clocks.
- LED OFF time is 9 clocks.
- Period tick is 12 clocks / 26.37 us / 37.917 kHz.
- start burst is 38 pulses. 1002.2 us or ON-ON of 995.6 us.
- short burst is 7 LED pulses. 184us period, but ON-ON width is 178 us.
- zero gap is 476 us from start of last to start of next LED pulse. 18 ticks, so gap is 17 ticks.
- one gap is 950 us from start of last to start of next LED pulse. 36 ticks, gap is 35 ticks.

### 2. Sample decodes

#### 2.1. Serial 10679c

**prefix** 0001 0000 0110 0111 1001 1100  
0x10679c



- A      0110 0011 0x10679c**63**
- B      0111 0010 0x10679c**72**
- C      1010 1111 0x10679c**af**
- D      1110 1011 0x10679c**eb**
- E      1011 1110 0x10679c**be**
- F      1111 1010 0x10679c**fa**
- G      1001 1100 0x10679c**9c**
- H      1101 1000 0x10679c**d8**

## 2.2. Serial 1051b5

**prefix** 0001 0000 0101 0001 1011 0101 0x1051b5

- A      1000 0011 0x1051b**583**
- B      1001 0010 0x1051b**592**
- C      0100 1111 0x1051b**54f**
- D      0000 1011 0x1051b**50b**
- E      0101 1110 0x1051b**55e**
- F      0001 1010 0x1051b**51a**
- G      0111 1100 0x1051b**57c**
- H      0011 1000 0x1051b**538**

## 3. Encoding scheme

Bits are in time-order. Leftmost bit is the first received from the packet.

iiii iiii iiii iiii iiii iiii xxxx kkkk (32 bits)

**octets**

id[2], id[1], id[0], b

**b octet**

xxxx kkkk

upper 4-bits of last byte have unknown meaning.

**keymap** 0x0f & key

- 0x03 → A
- 0x02 → B
- 0x0f → C
- 0x0b → D
- 0x0e → E
- 0x0a → F or \*
- 0x0c → G or <
- 0x08 → H or >

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