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## **SAMPLE INFRARED CODE FORMATS**

**Formats described in this document:**

**Sony**  
**Matsushita**  
**NEC**  
**RC5**

## Protocol

This section covers some of the most common transmission signal's format.

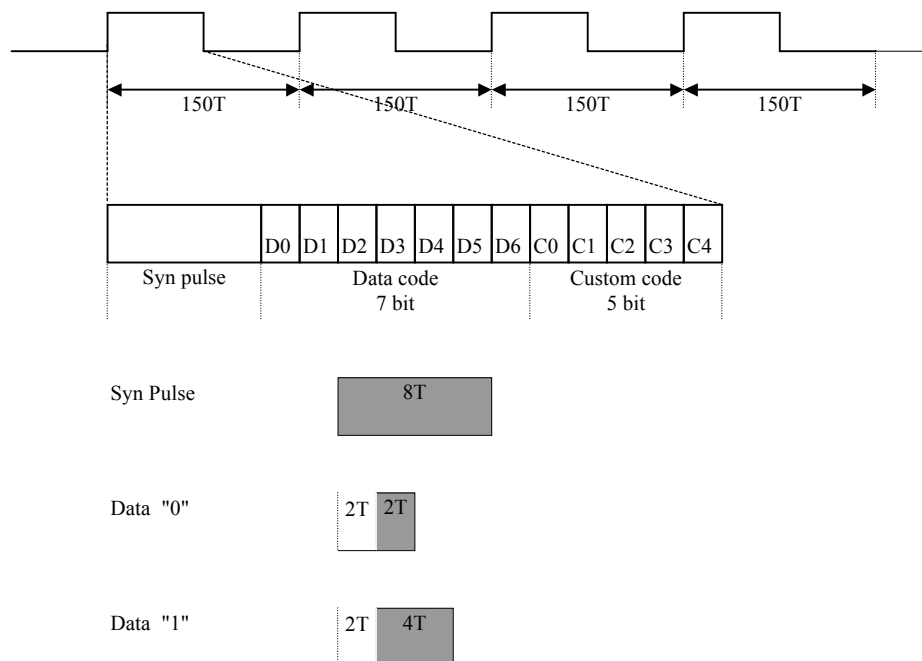
### 1. Sony

The modulated carrier is usually derived from 480kHz and is 1/12 of the frequency with 1/3 duty cycle.

When data are transmitted repeatedly, the frame cycle is 45ms or 150 period.

A frame consists of a syn pulse, a seven-bit data code and a five-bit custom code.

The timing definitions of the output code waveform are shown below.



Data Item	Time (sec.)	Time (no. of period)
Syn pulse	2.4ms	8T
Data off time	0.61ms	2T
Data on time (0)	0.59ms	2T
Data on time (1)	1.19ms	4T
Data period (0)	1.2ms	4T
Data period (1)	1.8ms	6T
Frame output cycle	45ms	150T

Where  $T=0.3\text{ms}$

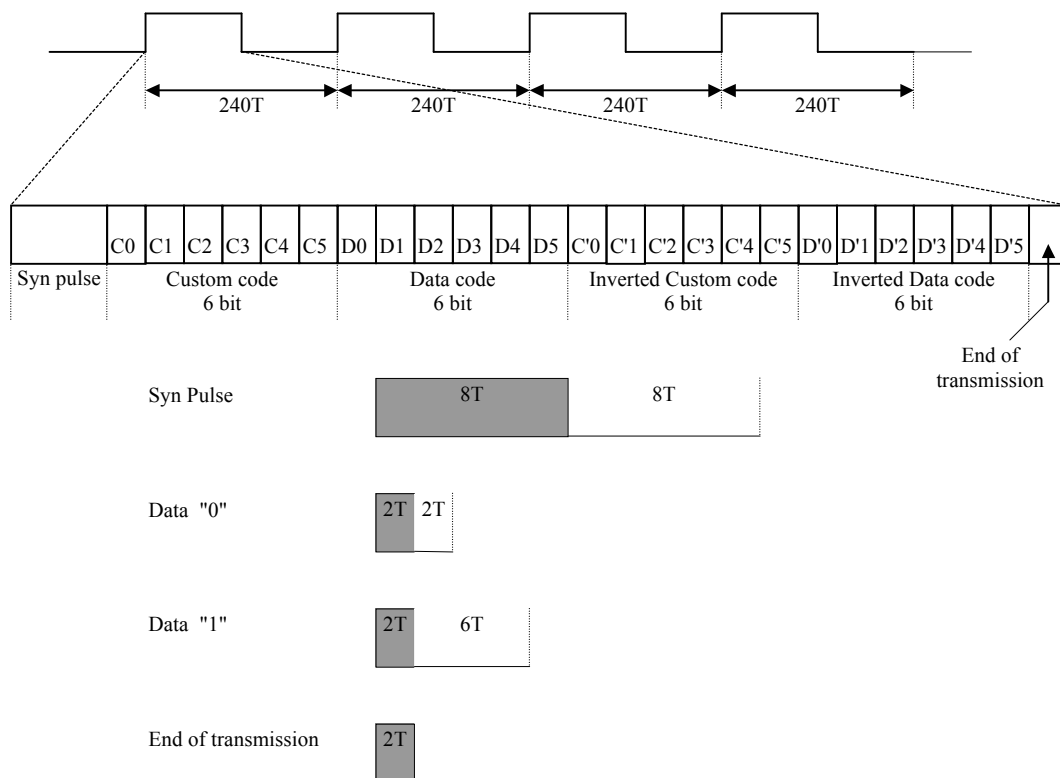
## 2. Matsushita

The modulated carrier is usually derived from 440kHz and is 1/12 of the frequency with 1/2 duty cycle.

When data are transmitted repeatedly, the frame cycle is 104.7ms or 240 period.

A frame consists of a syn pulse, a six-bit custom code, six-bit data code, a six-bit inverted custom code and a six-bit inverted data code.

The timing definitions of the output code waveform are shown below.



Data Item	Time (sec.)	Time (no. of period)
Syn pulse on time	3.49ms	8T
Syn pulse off time	3.49ms	8T
Data on time (0)	0.86ms	2T
Data off time (0)	0.88ms	2T
Data on time (1)	0.86ms	2T
Data off time (1)	2.63ms	6T
Data period (0)	1.74ms	4T
Data period (1)	3.49ms	8T
Frame output cycle	104.7ms	240T

Where T=0.436ms

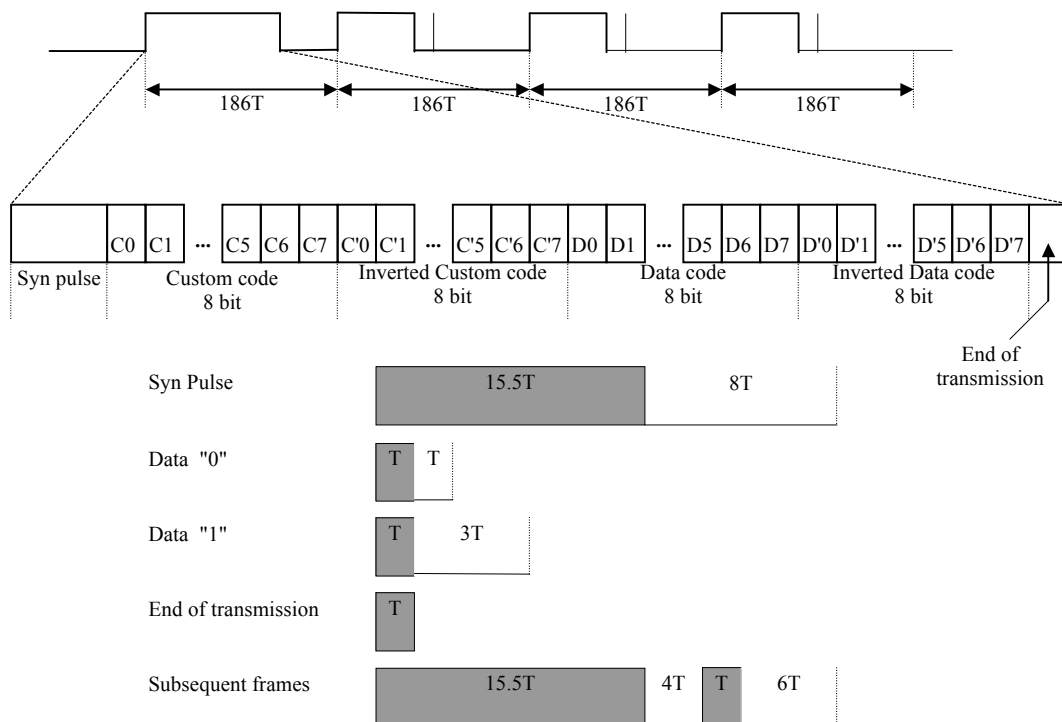
### 3. NEC

The modulated carrier is usually derived from 455kHz and is 1/12 of the frequency with 1/3 duty cycle.

When data are transmitted repeatedly, the frame cycle is 107.9ms or 186 period.

A frame consists of a syn pulse, an eight-bit custom code, an eight-bit inverted custom code, an eight-bit data code and an eight-bit inverted data code.

The timing definitions of the output code waveform are shown below.



Data Item	Time (sec.)	Time (no. of period)
Syn pulse on time	8.993ms	15.5T
Syn pulse off time	4.642ms	8T
Syn pulse off time (subsequent frame)	2.321ms	4T
Data on time (0)	0.561ms	T
Data off time (0)	0.598ms	T
Data on time (1)	0.561ms	T
Data off time (1)	1.7582.63ms	3T
Data period (0)	1.160ms	2T
Data period (1)	2.321ms	4T
Frame output cycle	107.9ms	186T

Where T=0.58ms

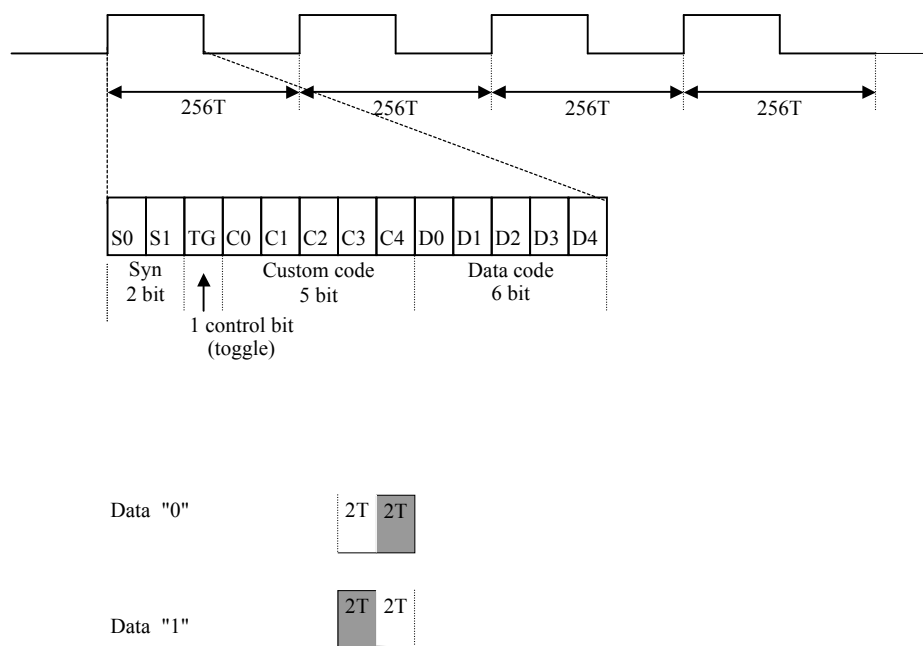
#### 4. RC5

The modulated carrier is usually derived from 432kHz and is 1/12 of the frequency with 1/3 duty cycle.

When data are transmitted repeatedly, the frame cycle is 113.7ms or 256 period.

A frame consists of a two-bit syn code, a one-bit control code, a five-bit system code, and a six-bit data code.

The timing definitions of the output code waveform are shown below.



Data Item	Time (sec.)	Time (no. of period)
Data off time	0.888ms	2T
Data on time	0.888ms	2T
Data period (0)	3.552ms	4T
Data period (1)	3.552ms	4T
Frame output cycle	113.7ms	256T

Where T=0.444ms