

# Important Television Engineering Formulas PDF



**Formulas  
Examples  
with Units**

## List of 17 Important Television Engineering Formulas

### 1) Fundamental Parameters Formulas

#### 1.1) Horizontal Frequency Formula

Formula

$$f_{hzi} = N_L \cdot FPS$$

Example with Units

$$48\text{Hz} = 2 \cdot 24$$

Evaluate Formula 

#### 1.2) One Horizontal Line Formula

Formula

$$L_{ht} = \frac{L_{oh}}{s}$$

Example with Units

$$8 = \frac{5}{0.625\text{ b/s}}$$

Evaluate Formula 

#### 1.3) One Horizontal Line Scan Formula

Formula

$$L_{hc} = \frac{HR}{2 \cdot BW}$$

Example

$$6.8008 = \frac{534}{2 \cdot 39.26}$$

Evaluate Formula 

#### 1.4) One Horizontal Line Tracing Formula

Formula

$$L_{ht} = \frac{L_{oh}}{s}$$

Example with Units

$$8 = \frac{5}{0.625\text{ b/s}}$$

Evaluate Formula 

#### 1.5) One Horizontal Time Formula

Formula

$$T_h = \frac{VRT}{L_h}$$

Example with Units

$$70\text{ms} = \frac{1400\text{ms}}{20}$$

Evaluate Formula 

#### 1.6) Video Bandwidth Formula

Formula

$$BW = \frac{HR}{2 \cdot L_{hc}}$$

Example

$$39.2647 = \frac{534}{2 \cdot 6.8}$$

Evaluate Formula 



## 1.7) Video Bandwidth Signal Formula

Formula

$$s = \frac{L_{oh}}{L_{ht}}$$

Example with Units

$$0.625 \text{ b/s} = \frac{5}{8}$$

Evaluate Formula 

## 2) Resolution Parameters Formulas

### 2.1) Aspect Ratio Formula

Formula

$$AR = \frac{w}{h}$$

Example with Units

$$1.7802 = \frac{160 \text{ cm}}{89.88 \text{ cm}}$$

Evaluate Formula 

### 2.2) Height of Rectangle Picture Frame Formula

Formula

$$h = \frac{w}{AR}$$

Example with Units

$$89.8876 \text{ cm} = \frac{160 \text{ cm}}{1.78}$$

Evaluate Formula 

### 2.3) Horizontal Resolution Formula

Formula

$$HR = BW \cdot (2 \cdot L_{hc})$$

Example

$$533.936 = 39.26 \cdot (2 \cdot 6.8)$$

Evaluate Formula 

### 2.4) Kell Factor or Resolution Factor Formula

Formula

$$KF = \frac{L_h}{N_L}$$

Example

$$10 = \frac{20}{2}$$

Evaluate Formula 

### 2.5) Number of Frames Per Sec Formula

Formula

$$FPS = \frac{f_{hzt}}{N_L}$$

Example with Units

$$24 = \frac{48 \text{ Hz}}{2}$$

Evaluate Formula 

### 2.6) Number of Horizontal Lines Lost during Vertical Retrace Formula

Formula

$$L_h = \frac{VRT}{T_h}$$

Example with Units

$$20 = \frac{1400 \text{ ms}}{70 \text{ ms}}$$

Evaluate Formula 



## 2.7) Number of Lines in Frame Formula

Formula

$$N_L = \frac{f_{hzt}}{FPS}$$

Example with Units

$$2 = \frac{48 \text{ Hz}}{24}$$

Evaluate Formula 

## 2.8) Vertical Resolution (VR) Formula

Formula

$$VR = N_L \cdot KF$$

Example

$$20.1 = 2 \cdot 10.05$$

Evaluate Formula 

## 2.9) Vertical Retrace Time Formula

Formula

$$VRT = L_h \cdot T_h$$

Example with Units

$$1400 \text{ ms} = 20 \cdot 70 \text{ ms}$$

Evaluate Formula 

## 2.10) Width of Rectangle Picture Formula

Formula

$$w = h \cdot AR$$

Example with Units

$$159.9864 \text{ cm} = 89.88 \text{ cm} \cdot 1.78$$





Evaluate Formula 



## Variables used in list of Television Engineering Formulas above

- **AR** Aspect Ratio
- **BW** Video Bandwidth
- **$f_{hzt}$**  Horizontal Frequency (*Hertz*)
- **FPS** Number of Frames per Second
- **h** Height of Rectangle Picture Frame (*Centimeter*)
- **HR** Horizontal Resolution
- **KF** Kell Factor
- **$L_h$**  Horizontal Lines Lost
- **$L_{hc}$**  One Horizontal Line Scan
- **$L_{ht}$**  One Horizontal Line Tracing
- **$L_{oh}$**  One Horizontal Line
- **$N_L$**  Number of Lines in Frame
- **s** Video Bandwidth Signal (*Bit Per Second*)
- **$T_h$**  One Horizontal Time (*Millisecond*)
- **VR** Vertical Resolution
- **VRT** Vertical Retrace Time (*Millisecond*)
- **w** Width of Rectangle Picture (*Centimeter*)

## Constants, Functions, Measurements used in list of Television Engineering Formulas above

- **Measurement: Length** in Centimeter (cm)  
*Length Unit Conversion* 
- **Measurement: Time** in Millisecond (ms)  
*Time Unit Conversion* 
- **Measurement: Frequency** in Hertz (Hz)  
*Frequency Unit Conversion* 
- **Measurement: Bandwidth** in Bit Per Second (b/s)  
*Bandwidth Unit Conversion* 



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