# Info about MiscEl

The program contains a lot of pages with different electronic calculations. Each page contain one or more different calculations.
The program is free to download and use, but the program is timelocked. A new version will have to be downloaded after about 1/2 year
For download: See bottom of page
For good ideas and bug reports please write a message to author

## Last updates:

- Page Capacitor design added to MiscEl
- Page Periodic table added to MiscEl
- Integer math, added: Real to Mult/Div with x/2^wordsize
- Improved precision and range on atmosphere values in weather and air
- I have moved to Delphi2007 and Windows Vista (MiscEl will also work on Win2000 and WinXP)
- Updated Two port with T and PI circuits and added a help page for it
- Added a summary of all circuits in MiscEl: Circuits
- Improved save formats in Curve fit
- Added more help pages and cross linking between pages
- Added a CRC calculations page to this site
- Added a MPU support page to this site
- Added a Hints and tricks page to this site
- Added Air coil, analyze and design of air core inductors

## Information

| | |
|---|---|
| Circuits | A summary of all circuits in MiscEl and what calculations are supported for the circuit |
| MPU support | Where can MiscEl help when working with microprocessors |
| CRC calculations | With code to do CRC calculations |
| Hints and tricks | Some hints and tricks for using MiscEl |

## Functions

See tricks page for some hints on how to use MiscEl

- System
  Prefered components Select component values used in all designs and step size for ctrl-n and ctrl-m
  Hotkeys               Define hotkeys for opening pages
- Miscellaneous
  Geometry        Handles: Circles, part of circles, triangles, squares, rectangles, trapezoid
  Sound          Sound speed and perceived sound levels
  Weather and air %RH, dewpoint, air pressure and other weater related calculations
  Periodic table  A periodic table with all elements, it has search functions and a few data for each element
  Photo lens      Some lens calculations
  Photo light     Some light calculations
- Calculations
  Calculator       Can do all the usual stuff, including mathematic.
  TinyCalc         Can do the same as the entry line in **Calculator**, but is very small when pulled out.
  Curve fit        Fits a curve to a collection of data points
  Ohms law         Ohms law, impendace of capacitor and inductors, complex power
  Ohms law 3 phase Ohms law with complex power for 3 phase systems
  dB               Decibel and neper, both power and voltage including volt/watt for a reference level
  Charge curve     Capacitor/inductor charge/discharge with resistive, current and power loads (not all combinations supported)
  Waveforms        Calculates RMS, mean, PEEK, DC, FFT for different waveforms.
- Mechanical
  Wires            Calculates resistance and power loss in wires, can also do conversion between USA and european units.
  Cable calculations    Calculate frequence response of a cable
  Fan cooling      Calculates how big a fan to get rid of some power.
  Heatsink         Calculates junction temperature for specifed power level and heatsink
  Printed circuit board Calculate microstrip, stripline, track resistance and current
  Cable calculations    Simulate cables at low (audio) frequences
- Components
  Capacitor design       Calculate capacitance of different geometries
  Color codes            Convert between color codes and numeric values for many types of components.

| [Thermo sensors](#) | Calculates for PT100, NTC and all types of thermocouples |
| [Air coil](#) | Analyze or design an air core inductor |
| [Leds](#) | Color/wavelength of leds and design of circuits to drive leds from DC or AC. |
| [Components type numbers](#) | Tries to decode component codes |
| [Power MOS](#) | Turn on/off time and power loss estimation |

- MPU

| [MPU Timers](#) | Calculates divide factors for up to five software timers |
| [Integer math](#) | Converts real numbers to fractions, calculates primes and other integer stuff |
| [Serial communication](#) | Timing and curves, usefull when programming software uart's and IR rx/tx. |
| [CRC and checksum](#) | Calculate crc, checksum and modulus for datablocks, can also analyze a datablock for what checksum/crc was used |

- Simple Circuit

| [Fo](#) | Calculates Fo for RC, RL, RLC circuits |
| [Series/parallel](#) | Calculate/design series/parallel connection of resistors, capacitors and inductors |
| [Charge time](#) | Charge/discharge time for simple circuits (including 555). |
| Voltage divider | Design/analyze voltage dividers, can include component tolerance and load. |
| [Two port](#) | Conversion between different types of two ports. |

- Circuit

| [1. order filters](#) | Analyze and design 32 different filter configurations |
| [Attenuator network](#) | Design different kind of attenuators |
| [Power Supply](#) | Analyze and design power supplies with 78xx and LM317 style regulators |

# Some screen dumps from MiscEl
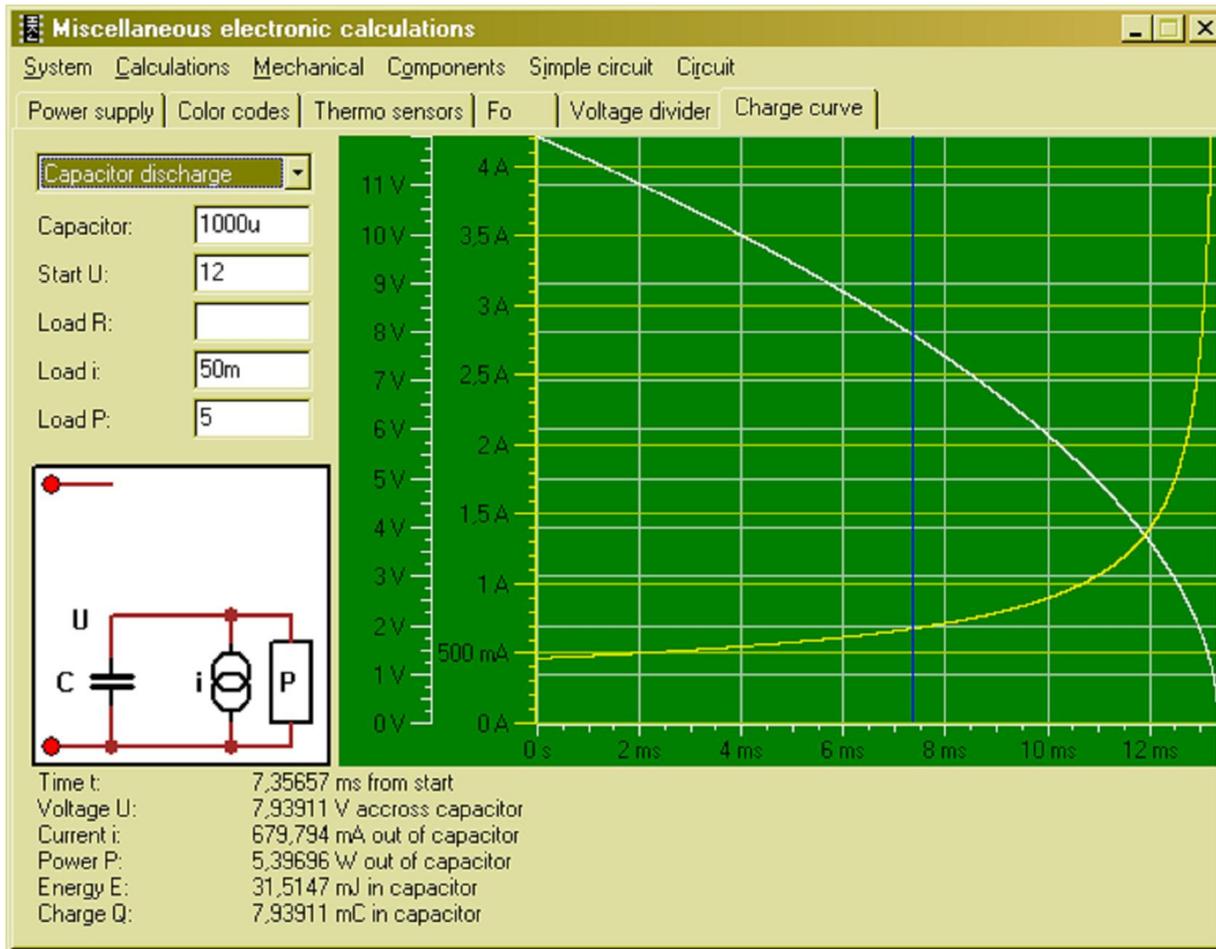
## Miscellaneous electronic calculations

System   Calculations   Mechanical   Components   Simple circuit   Circuit

Power supply | Color codes | Thermo sensors | Fo | Voltage divider | Charge curve |

Circuit type:   [(RL)C, parallel]



Analyze | Design |          ☐ Impedance curve

Fo:   [1000]        Q:   [10]

Resistor:   [30]

Capacitor:   [    ]

Inductor:   [    ]

Frequence:   [3k]        Voltage:   [    ]

                         Current:   [    ]

C (E6):          470 nF
L (E6):          47 mH

Fo               1.066 KHz @ phase=0
Q                10.4934
Impedance at Fo   3.33333 Kohm

**For specified frequence**
Impedance         129.334 ohm  89.717 °
Serial circuit to give same impedance at frequence
Resistance        638.632 mohm
Capacitance       410.196 nF
Parallel circuit to give same impedance at frequence
Resistance        26.1923 Kohm
Capacitance       410.186 nF

**Components**
C impedance       112.876 ohm  90 °

L impedance       885.929 ohm  90 °

## Miscellaneous electronic calculations

System   Calculations   Mechanical   Components   Simple circuit   Circuit

Power supply | Color codes | Thermo sensors | Fo | Voltage divider | Charge curve |

Kind:   NTC user with divider

Temperature | Value

Temperature:   40

B(eta)   Tempco   Measurements

R (25 ºC):   10000     Tol (%):   1
Beta:   3988      Tol (%):   1

The temperature range of the Beta specifies where the calculations are valid

Divider input voltage:   5

Divider resistor:   10k

Curve
Min temp:   0
Max temp:   50

Vdiv
Rdiv
NTC
GND
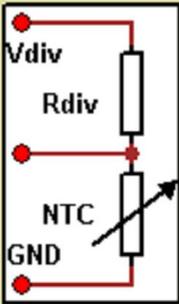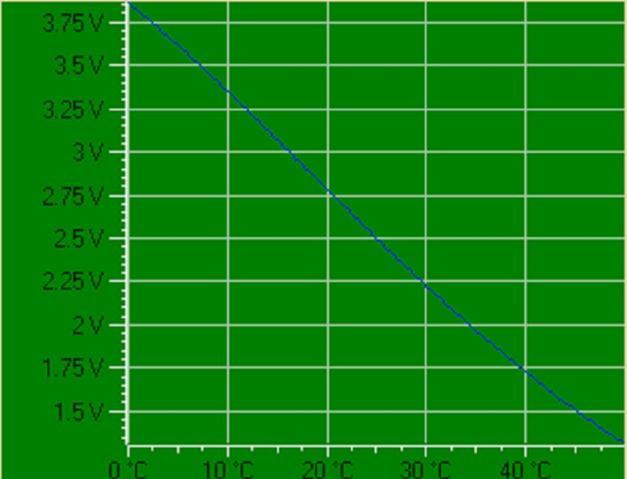
**Voltage:**          **1.72543 V at 40 °C**
Power in sensor:      565.005 µW
Delta:                -45.955 mV/°
                      -0.02 °C/V
Tolerance:            1.70688 V ... 1.74396 V
                      39.6 °C ... 40.4 °C
Tolerance is only valid inside Beta temperature limits

Temperature range:   -60 °C ... 300 °C
Voltage range:       8.14809 mV ... 4.97599 V

**These calculations are only valid for standard NTC**

## Miscellaneous electronic calculations

System  Calculations  Mechanical  Components  Simple circuit  Circuit

| Power supply | Color codes | Thermo sensors | Fo | Voltage divider | Charge curve |



Analyze  Analyze PS  Design

Vin: `10`

Vout: `3`

Divider current: `4m`

R tolerance (%): `1`

☑ Use 3 resistors

| | Min. | Max. |
| --- | --- | --- |
| Load current: | `1u` | `100u` |
| Load resistor | | |

**R1 (E12):**     **1.8 Kohm**
**R2 (E12):**     **820 ohm**
**R3 (E12):**     **18 Kohm**
Divider current:     3.88889 mA

Unloaded Zin:     2.58427 Kohm
Output impedance:     546.262 ohm
**Unloaded Vout:**     **3.03479 V**

Vout range:     2.93827 V ... 3.07668 V
    -2.06 % ... 2.56 % (Base: 3 V)
Iin range:     3.83155 mA ... 3.939 mA
    -1.47 % ... 1.29 % (Base: 3.88889 mA)

Min. power in load:     2.99213 µW
Max. power in load:     302.24 µW

Max. power in R1:     302.24 µW   (R1=1.782 Kohm)
Max. power in R2:     302.24 µW   (R2=811.8 ohm)
Max. power in R3:     302.24 µW   (R3=17.82 Kohm)

Sensity of r1 on Vout: -70.1 %
Sensity of r2 on Vout: 66.4 %
Sensity of r3 on Vout: 3.01 %

## Miscellaneous electronic calculations

System  Calculations  Mechanical  Components  Simple circuit  Circuit

Charge time

Circuit type:  555 oscillator
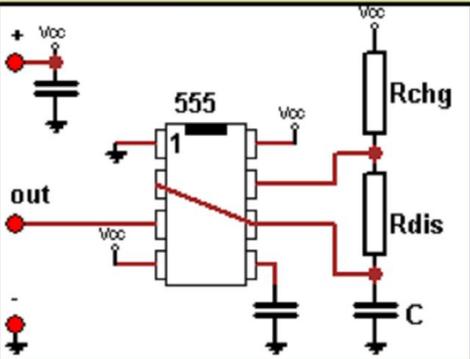


Analyze  Design

| | Charge | Discharge |
|---|---|---|
| Uchg: | 10 | |
| Time: | 10u | 5u |
| C: | 1n | ☐ Oscilloscope |

**Rchg (E12):**        **8.2 Kohm**
**Rdis (E12):**        **6.8 Kohm**

**Charge from 3.33333 V to 6.66667 V**
Time:              **10.3972 µs**
Deviation:          397.208 ns   (3.97 %)
Charge added:       3.33333 nC
Max. current:       444.444 µA
Min. current:       222.222 µA
Tau (R*C):          15 µs

**Dischar from 6.66667 V to 3.33333 V**
Time:              **4.7134 µs**
Deviation:          -286.599 ns   (-5.73 %)
Charge removed:     -3.33333 nC
Max. current:       -2.1999 mA
Min. current:       -1.70971 mA
Tau (R*C):          6.8 µs

**Total**
Time:              **15.1106 µs**
Deviation:          110.609 ns   (0.74 %)
**Frequence:**        **66.1787 KHz**
Duty cycle:         68.8 % charge time
                    31.2 % discharge time

## Miscellaneous electronic calculations

System   Calculations   Mechanical   Components   Simple circuit   Circuit

**Charge time**   **Leds**

Circuit:   R+C+Bridge (AC)

Very high efficiency AC circuit, works well with high voltages
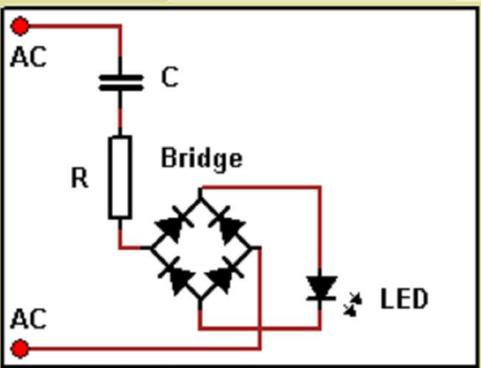
| | |
|---|---|
| **Resistor (E12):** | **820 ohm** |
| **Capacitor (E6):** | **150 nF / >343 V** |

**LED**

| | |
|---|---|
| Current (rms): | 10.3478 mA |
| Peek (each cycle): | 14.6511 mA |
| Power (rms): | 19.5332 mW |
| **Peek (one time):** | **754.944 mA** |
| Peek falloff (10 µs): | 695.995 mA |
| Peek falloff (100 µs): | 334.834 mA |

**Resistor (R)**

| | |
|---|---|
| Voltage (rms): | 8.48521 V |
| Current (rms): | 10.3478 mA |
| Power (rms): | 87.8034 mW |

**Capacitor (C)**

| | |
|---|---|
| Voltage (rms): | 219.46 V |
| Current (rms): | 10.3478 mA |

**Bridge rectifier**

Assumed 1.2 V drop and Ron=3 ohm

Analyze   Design   Config    ☐ Oscilloscope

| | | |
|---|---|---|
| Input voltage: | 220 | Freq: |
| LED voltage drop: | | Typical 2 Volt |
| Led current: | | Typical 10 mA |
| Peek current: | 0.8 | 0.1 ... 1 A |

## Installing

The program will automatic install first time it is run, this can be disabled by putting "noinstall" on the command line.

## A few notes about the program

- Right click to get a menu (Works on most pages).
- If no other unit is specified then input fields are for basic SI values (meter, ohms, volts, etc.)

- It is possible to use SI-prefix after numbers, i.e. "10k" is a legal value
  Be carefull with "10m" and "10M" the first is 0.01, the second is 10000000
- All input fields can do calculations.
- Red fields means error in input.
- Pages can be dragged outside main program, making it possible to view more pages simultaneous.
- Use Ctrl-N and Ctrl-M to step values.
- Remember to use "System, Prefered components" to set standard values (and step sizes).

## Command line options for MiscEl

- -last Do not restore open pages from last run
- "pagename" Open this page, spelling must be with correct case. This option can be used multiple times
- noinstall Do not try to install MiscEl, just run the program from the current location
- -key{keyname} execute the hotkey definition for specified key i.e. "-keyF10" will execute the definition for F10

# Download MiscEl

MiscEl
File size is about 1300K