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Advance Resistor Value Calculator with MATLAB

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Abstract: This paper about the information on creating a MATLAB application with resistor value calculation program. In this application Graphical User Interface (GUI) for ease to use. It notes the use of color code technique to manually calculate value of resistors. This resistor color code calculator will help to determine the value of axial resistors marked with color bands. It can be used for 3 and 4 band resistors. We can select the colors of the corresponding bands by clicking on them in the table. The resistor will visually show band color choices and display the value of the resistor.

Keywords: MATLAB 2013, Graphical user interface design environment (GUIDE), Color Band

I. Introduction

The resistor is a passive electrical component to create resistance in the flow of electric current. A few examples for applications include delimit electric current, voltage division, and fix time constants. Practically all leaded resistors with a power rating up to one watt are marked with color bands. Together they specify the resistance value, the tolerance and sometimes the reliability. The resistance color code calculator will help to determine the value of resistors marked with color bands. It can be used for 4 band resistors. So we can select the color of the corresponding bands by clicking on them in the table. The resistor will visually show band color choices and display the value of the resistor.

II. Color code

The color code is given by several bands. Together they specify the resistance value, the tolerance. The number of bands varies from three to six. As a minimum, two bands indicate the resistance value and one band serves as multiplier.

Color	Signficant figures			Multiply	Tolerance (%)	Temp. Coeff. (ppm/K)	Fail Rate (%)
black	0	0	0	x 1		250 (U)	
brown	1	1	1	x 10	1 (F)	100 (S)	1
red	2	2	2	x 100	2 (G)	50 (R)	0.1
orange	3	3	3	x 1K		15 (P)	0.01
yellow	4	4	4	x 10K		25 (Q)	0.001
green	5	5	5	x 100K	0.5 (D)	20 (Z)	
blue	6	6	6	x 1M	0.25 (C)	10 (Z)	
violet	7	7	7	x 10M	0.1 (B)	5 (M)	
grey	8	8	8	x 100M	0.05 (A)	1(K)	
white	9	9	9	x 1G			
gold			3th digit only for 5 and 6 bands	x 0.1	5 (J)		
silver				x 0.01	10 (K)		
none					20 (M)		

Table1. Resistance color-code chart with tolerance, temperature coefficient and failure rate.

A. Resistor 4-Band

Figure1. 4-Band resistor
1. Green color –Significant value
2 .Blue color –Significant value

3. Red color- Multiplying factor
4. Yellow color -Tolerance

III. Graphical user interface Design Environments (GUIDE):

GUIDE stores GUIs in two files:
.fig file - contains a complete description of the GUI figure.
.m file - contains the code that controls the GUI

A. Coding file (.m file):

.m file - contains the code in MATLAB 2013 that controls the GUI. In this file we can program the callbacks in this file using the M-file Editor.

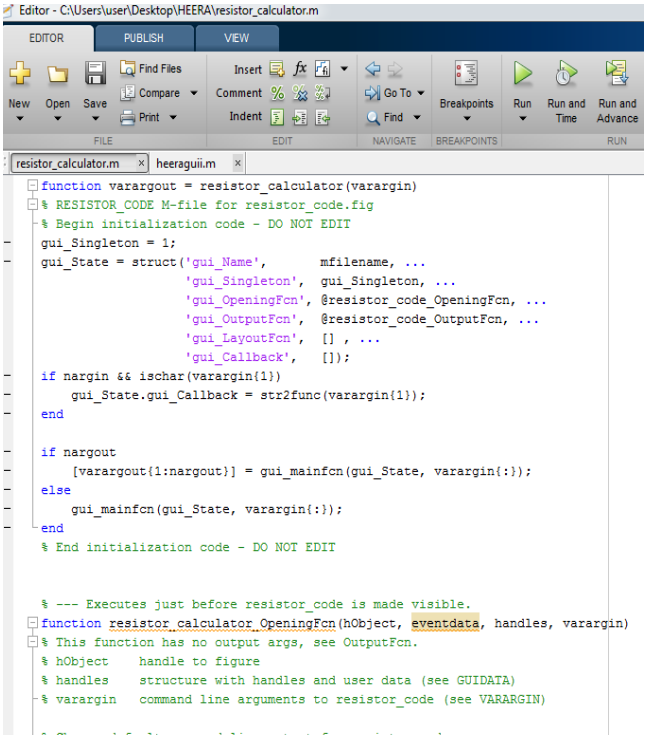

Figure2. M file

B. Figure window (.fig file):

.fig file - contains a complete description of the GUI figure Layout and the components of the GUI .In this file changes can be done using Layout Editor.
Typical stages of creating a GUI are:

a. Designing the GUI using select button, edit button, axis, pop-up menu, channel box etc.

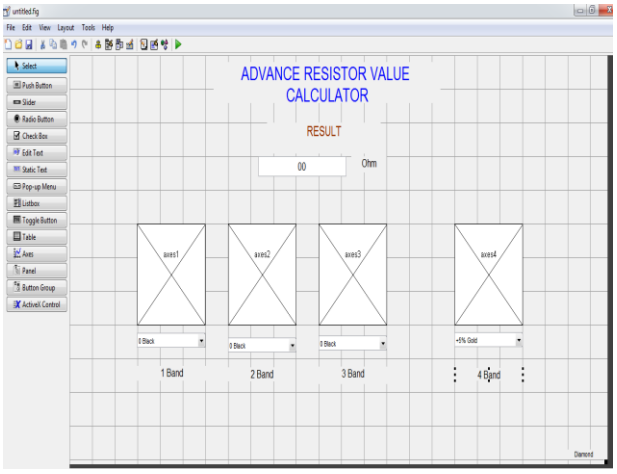

Figure3. Fig file

b. Laying out the GUI
– Using the Layout Editor
c. Programming the GUI
– Writing callbacks in the M-file Editor
d. Finally, Saving and Running the GUI

IV. Calculation

For figure window 4 band resistor:

1. Green colour for significant value
2. Orange colour for significant value
3. Orange colour for multiplying factor
4. Gold colour for tolerance

So resistor value = 5(Green) 3(Orange)*1000(orange)
=53000 with a 5% tolerance
=53K Ohm

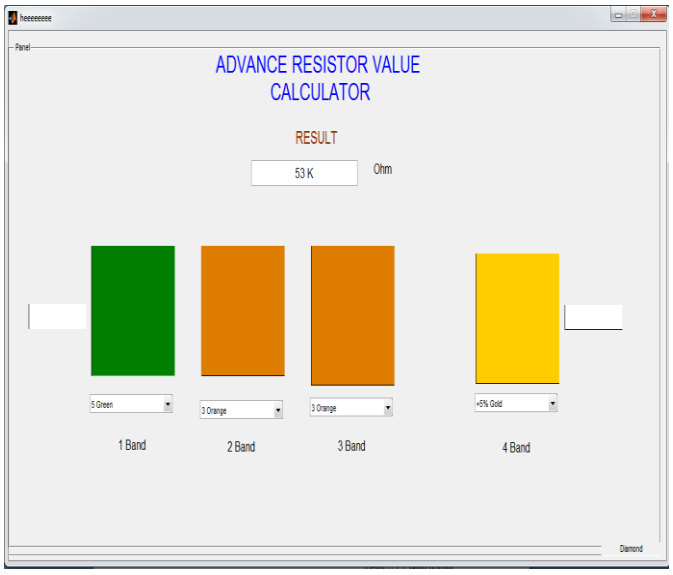

Figure4. Figure-window (Resistance value calculator)

V. Conclusion:

This resistor color code calculator will help to determine the value of resistors marked with color bands. It can be used for 4 band resistor. We can select the colors of the corresponding bands by clicking on them in the table. The resistor will visually show band color choices and display the value of the resistor.

VI. Future scope:

In future, this application will be use for measure resistor value, tolerance, and temperature coefficient and failure rate for 6 band color code resistor**.**

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