

INSTRUCTIONS FOR USING CMX998 LOOP NOISE CALCULATOR

The program is run in **GNU Octave 5.1.0.0 or 5.2.0.0** (later versions may also work but they have not been tested) which can be downloaded for free from

<https://www.gnu.org/software/octave/download.html>

All files required to run the program are contained in the folder "CMX_998_Loop_Noise_Calculator". This folder must be saved to your computer.

How to use the program:

Open the application "GNU Octave-5.1.0.0 (GUI)" (or relevant downloaded version).

Set the current directory (on the toolbar in the top left of the screen) to the "CMX_998_Loop_Noise_Calculator" folder.

Type "CMX998_LNC" into the Command Window and then press enter.

You will then be prompted to choose a UI size: small or standard. The size of the small UI is 27.5 cm x 13 cm and the size of the standard UI is 33 cm x 15.5 cm. The default is standard size.

This will run the program and the UI will pop-up.

The UI has various parts with different functions.

NOTE: When the UI is dragged from a computer screen to a monitor screen and back it is possible that this will affect the UI dimensions. To return to the default UI the program must be opened from the GNU Octave command window again.

When the UI opens it will start by showing the "**Parameter Settings**" tab. This contains all of the input values required to run the program. A set of default values is initially displayed and these values can be changed by clicking on the relevant boxes and editing the values as required.

The "**Filter Choice**" box allows the user to select an Integrator or a Low-pass filter function. The default is a Low-pass filter function.

The "**Graphical Plots**" box allows the user to tick all of the options they would like to plot. Note that the "Cartesian Loop Noise" and the "Mask" are plotted on the same figure whereas the "Open Loop Gain" is plotted on a separate figure.

The "**Graph Frequency Limits**" box allows the user to choose the scale on the frequency axis.

The "**Main Input Values**" box allows the user to choose all of the Power Gain, Noise Figure, Output Power, Local Oscillator and Transfer Function values.

The "**Delay Settings**" box allows the user to choose the values which affect the delay of the feedback path signal.

The "**Mask Settings**" box allows the user to alter the Mask values. There are four preset masks within the program and there is also the option to create a custom mask with dBc/Hz or dBm/Hz

values. The user must click on the relevant setting and press the "Select" button. The values of that setting will then appear in the table and can be adjusted by clicking on the relevant boxes.

The "**Tick Components to Reset**" box allows the user to reset components to their default values. This is done by ticking the components the user wants to reset and then pressing the "Reset Selected Components" button. This will reset the selected components and untick the boxes.

The "**Resize Tables**" box allows the user to adjust the size of the text (in terms of the size measurement 'point') and the column widths (in terms of a scale factor) of the various tables on the UI. To do this, click on the "Resize Tables" box and a pop-out box appears. Adjust the relevant slider and press the corresponding button below, either "Resize Table Text" or "Rescale Column Width". This will adjust these settings in the UI and the value is updated in the "Resize Box". To return to the original values select the relevant button, either "Reset Table Text" or "Reset Column Width".

Click on the "**CMX998 Block Diagram**" tab to see a block diagram of the circuit board. The user can click on the component buttons to change their values. This will also update the relevant values in the "Parameter Settings" tab.

Click on the "**Transfer Function Diagram**" tab to see a diagram of the resistor-capacitor network around the Forward Amplifier. There are three buttons in this diagram that can be used to change the relevant time constants. This will also update the relevant values in the "Parameter Settings" tab.

Click on the "**Local Oscillator Graph**" tab to see a graph of the noise profile generated by the Local Oscillator. There are three buttons in this diagram that can be used to change the relevant input values. This will also update the relevant values in the "Parameter Settings" tab.

Click on the "**Run Calculator**" tab to plot the graphs the user has selected in the "Graphical Plots" box. The plots will be made in a pop-out figure. The plots will overlay so if the user wants a fresh figure the original figure must be closed and then a new figure will be created when the "Run Calculator" tab is next pressed.

Disclaimer: This calculator is a free tool provided by CML Microcircuits (UK) Limited; it is distributed in the hope that it will be useful, but without any warranty; without even the implied warranty of merchantability or fitness for a particular purpose.