Quick Start User Manual: TEMfilter

1.0 Getting Ready:

The software product you purchased is located inside a ZIP file that you can open, by following these steps:

1. Double-click on the ZIP file you purchased. This action starts the ZIP Wizard application, which contains the software product.
2. The ZIP Wizard automatically opens the software product you purchased and stores it inside your computer.
3. Once the software product is unzipped, right-click on the application's *filename* and single-click: "Extract". This action will extract all files located inside the software product and store them inside your computer:
    a. *TEMfilter.exe*: The executable software product.
    b. *TEMfilter.DEF*: Default Data File read by *TEMfilter.exe*
    c. *Quick Start User Manual*: This User Manual.
    d. *License*: License Agreement for the software product.
4. NOTE: All files unzipped inside your computer must be located in the same file folder, since several Data Files are read by the executable software product.
5. Open the License Agreement so you know the terms & conditions for using the software product. Return the software product for a full refund if you do not agree with those terms & conditions, as stated in the License Agreement.
6. Open the Default Data File: *TEMfilter.DEF* using Notepad and read the description contained inside.

Once the above software files are extracted and stored inside your computer, just double-click on the executable file to start using the product.

2.0 How I Works:

Software product: *TEMfilter.exe* performs a Frequency Analysis of multi-section Bandpass Filters and/or multi-section Bandstop Filters constructed in a non-dispersive transmission-line medium. That is: Bandpass & Bandstop Filters propagating in a TEM-mode. This software product uses pure mathematics for Bandpass Filters & for Bandstop Filters, without regard to the construction method, so it allows the User to explore RF/microwave performance limits of practical Bandpass/Bandstop Filters, like: Combline Bandpass Filters, Interdigital Bandpass Filters, etc. . . . . when constructed in a non-dispersive transmission-line medium.

The executable file: *TEMfilter.exe* reads the Default Data File: *TEMfilter.DEF* each time you start the program. As such, you can change Data Entries inside *TEMfilter.DEF* to suite your most common multi-section Bandpass & Bandstop Filter designs, using the guidelines written in *TEMfilter.DEF*.

When you start using the software product, you are asked to enter key design parameters for your Bandpass or Bandstop Filter. If you press <ENTER> on your computer's keyboard, the software product uses the Data Entry from your Default Data File: *TEMfilter.DEF* for that design parameter. As such, you can change any/all Data Entries in *TEMfilter.DEF* to suite your most common Bandpass or Bandstop Filter designs, without having to enter those values when asked

by the executable file: *TEMfilter.exe*. Just press <ENTER> on your computer's keyboard and your Default Data values are used for that Data entry by the software product.

Figure 2-1 shows the baseline data entries for Default Data file: TEMfilter.DEF.

Certain design parameters have a "default answer", shown as an asterisk (*), which enables you to press <ENTER> on your keyboard, if that "default answer" (= *) is your selection.

Lastly, all Data entries (including Default Data entries) are included in the Output Data format so you know the basis for the Frequency Analysis of your multi-section Bandpass or Bandstop Filter.

Most data entries are straight-forward and easy to understand for those skill-at-the-art of RF/microwave design…….and those not-so-skilled. So, let us know where improvements are needed as you operate the software product.

3.0 Screen Shots: Input Data

Screen-shots for User Input Data entry are shown in Figure 3-1 and Figure 3-2 for a Frequency Analysis of a multi-section Bandpass Filters and for a multi-section Bandstop Filter, respectively.

4.0 Screen Shots: Output Data

Screen-shots of Output Data calculated by the software product are shown in Figures 4-1 and in Figure 4-2 for Frequency Analysis of a multi-section Bandpass Filter and for a multi-section Bandstop Filter, respectively.

The Output Data from the software product can be stored in a User-defined filename:

A. Enter a *filename*.**xls** for storage in a spreadsheet.
B. Enter *filename*.**doc** for Output Data storage in a word processor.
C. Enter *filename*.**txt** for Output Data storage as a text file.

The Output Data files can be used for presentations to your Customers, e-mails to your colleagues, and for graphical plots of your Output Data.

5.0 Reserved for later use

6.0 Software Bugs

Every effort has been applied to minimize "software bugs" inside the software product. Yet, we invite all Users to notify us if you find one. Many thanks!

Inside the software product, you will find "User-friendly Error Traps", which identify errors in your Data Entry. The software product notifies you when an error is detected and asks for a different Data Entry, so the software product performs within the proper technical bounds for the technology.

7.0 Customer Satisfaction:

Many thanks for purchasing our RF/microwave CAE software product. We hope you find the product useful in your high frequency designs, both in Synthesis of your designs and in Analysis of your designs. Please let us know where our software product can be improved, and what your needs are for another software product you could use. . . . .. perhaps we can develop that software product for you.

Our best regards. . . . . .

AtlantaRF

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TEMfilter.DEF contains all Default Data values read by Program; TEMfilter.exe
   1.0              :IBPBS = 1.0 for Bandpass;= 2.0 for Bandstop;= 3.0 for Both
 1000.0             :Fo       = Filter's Center Frequency……...MHz
  200.0             :BW       = Filter's Passband Bandwidth……..MHz
   0.05             :RIPPLE= Passband Amplitude Ripple.....dB
  800.0             :F1       = Out-of-band Skirt Freq where A1 is needed….MHz
   40.0             :A1       = Minimum Attenuation needed at Skirt Freq…..dB
    9.0             :N        = Number of Sections/Poles in the Filter
  500.0             :Qu       = Unloaded Q of the Filter
  700.0             :Fstart   = Analysis Start Frequency.....MHz
 1300.0             :Fstop    = Analysis Stop  Frequency.....MHz
   50.0             :Fstep    = Analysis Step  Frequency……...MHz
TEMfilter.DAT       :FN       = Default filename for your Output Data Storage
                    |
                    |____ The first 20 characters are read by TEMfilter.exe

Default Data File: TEMfilter.DEF is read by RF/microwave software product:
TEMfilter.exe when you start the program. As such, the executable file
(TEMfilter.exe) and this Default Data File (TEMfilter.DEF) must be located
in the same Folder or Subfolder in your computer.

The executable program (TEMfilter.exe) reads the first 20 characters in each
line from TEMfilter.DEF, so keep those first 20 characters for data, and do
not shorten any line in this Default Data File: TEMfilter.DEF.

The User is invited to change any/all data values in TEMfilter.DEF to data
values that you commonly use for your RF/microwave designs of TEM-mode
Bandpass & Bandstop Filters, so you do not have to enter data values when
prompted by TEMfilter.exe (just press ENTER on your computer's keyboard and
 your Default Data values will be assigned to that data entry).

Thank you for choosing Atlanta RF for your RF/microwave CAE software products.
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Figure 2-1: Baseline data entries (and Instructions) in **Default Data file**: TEMfilter.DEF

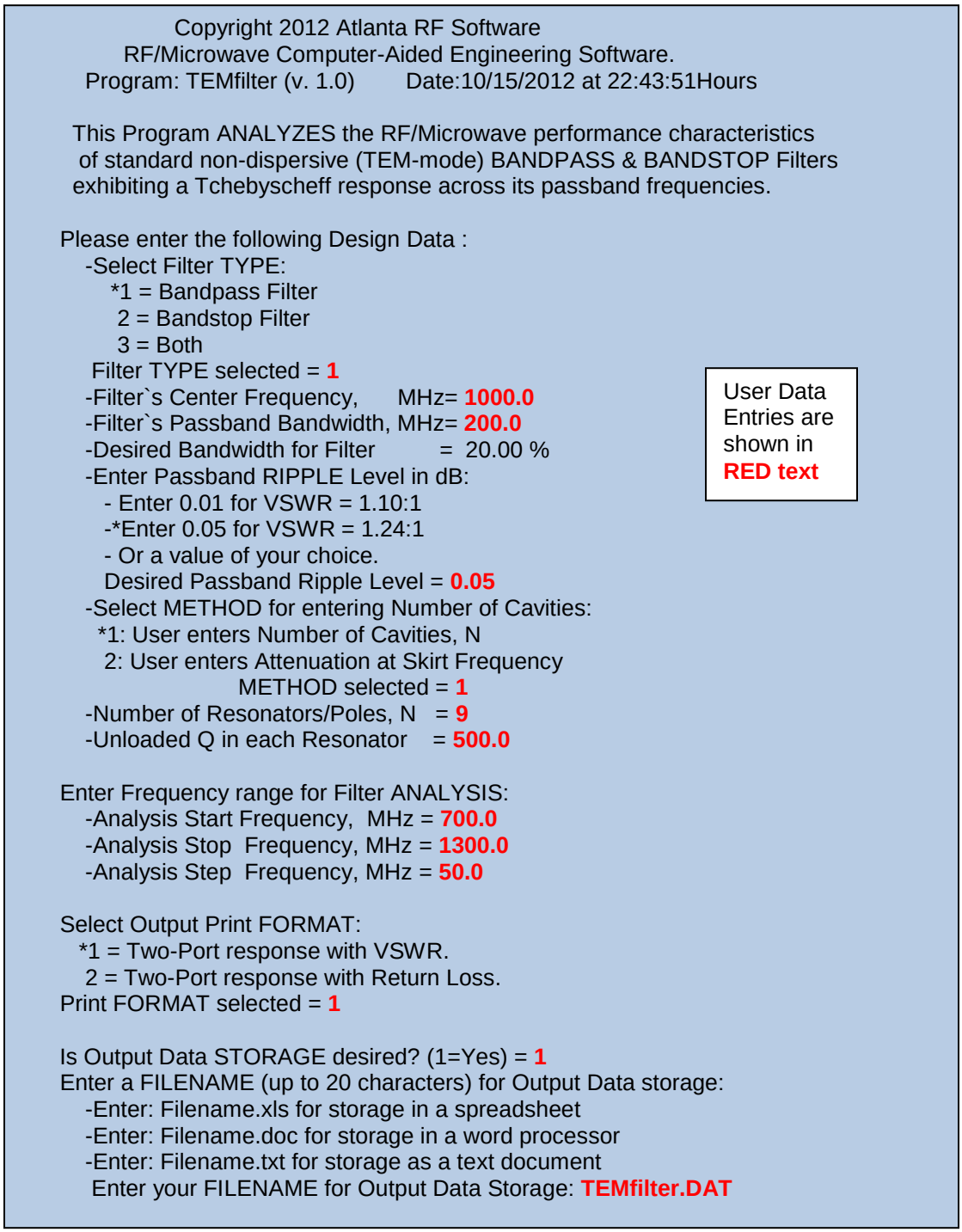

Figure 3-1: Typical Input Data entry for a **Bandpass Filter's Frequency Analysis** in TEMfilter.exe

RF/Microwave Computer-Aided Engineering Software.
Program: TEMfilter (v. 1.0) Date:10/16/2012 at 16: 3:37Hours

This Program ANALYZES the RF/Microwave performance characteristics of standard non-dispersive (TEM-mode) BANDPASS & BANDSTOP Filters exhibiting a Tchebyscheff response across its passband frequencies.

Please enter the following Design Data :
-Select Filter TYPE:
*1 = Bandpass Filter
2 = Bandstop Filter
3 = Both
Filter TYPE selected = **2**
-Filter`s Center Frequency, MHz= **1000.0**
-Filter`s Passband Bandwidth, MHz= **200.0**
-Desired Bandwidth for Filter = 20.00 %
-Enter Passband RIPPLE Level in dB:
- Enter 0.01 for VSWR = 1.10:1
-*Enter 0.05 for VSWR = 1.24:1
- Or a value of your choice.
Desired Passband Ripple Level = **0.05**
-Select METHOD for entering Number of Cavities:
*1: User enters Number of Cavities, N
2: User enters Attenuation at Skirt Frequency
METHOD selected = **1**
-Number of Resonators/Poles, N = **9**
-Unloaded Q in each Resonator = **500.0**

Enter Frequency range for Filter ANALYSIS:
-Analysis Start Frequency, MHz = **700.0**
-Analysis Stop Frequency, MHz = **1300.0**
-Analysis Step Frequency, MHz = **50.0**

Select Output Print FORMAT:
*1 = Two-Port response with VSWR.
2 = Two-Port response with Return Loss.
Print FORMAT selected = **1**

Is Output Data STORAGE desired? (1=Yes) = **1**
Enter a FILENAME (up to 20 characters) for Output Data storage:
-Enter: Filename.xls for storage in a spreadsheet
-Enter: Filename.doc for storage in a word processor
-Enter: Filename.txt for storage as a text document
Enter your FILENAME for Output Data Storage: **TEMfilter.DAT**

User Data Entries are shown in **RED text**

Figure 3-2: Typical Input Data entry for a **Bandstop Filter's Frequency Analysis** in TEMfilter.exe

TEMfilter (v. 1.0) Date:10/15/2012 at 22:43:51Hours

RF/Microwave Computer-Aided Engineering Design Data for
Multi-Section Filters Exhibiting a Tchebyscheff Response.

ANALYSIS of the Theoretical Electrical Circuit for your
Filter results in the following frequency response:

Flow = 900.000 MHz Response = Bandpass
Fo = 1000.000 MHz # of Poles = 9
Fhigh= 1100.000 MHz Ripple (Am) = 0.050 dB
BW = 200.000 MHz Unloaded Q = 500.00

Bandpass Filter Response

Frequency (MHz)	Wavelength (Inches)	Loss (dB)	Time Delay (nsec)	Phase (deg)	VSWR	F/Fo
700.00	16.8612	-112.44	0.6086	770.28	999.000	0.7000
750.00	15.7371	-97.13	0.8509	761.37	999.000	0.7500
800.00	14.7536	-77.63	1.3871	746.75	999.000	0.8000
850.00	13.8857	-50.00	3.1976	716.46	999.000	0.8500
900.00	13.1143	-1.67	33.2215	513.67	1.240	0.9000
950.00	12.4241	-0.74	13.3304	212.90	1.240	0.9500
1000.00	11.8029	-0.63	11.4930	0.00	1.000	1.0000
1050.00	11.2408	-0.74	12.0593	-212.90	1.240	1.0500
1100.00	10.7299	-1.67	27.1539	-513.67	1.240	1.1000
1150.00	10.2633	-50.00	2.3554	-716.46	999.000	1.1500
1200.00	9.8357	-77.63	0.9172	-746.75	999.000	1.2000
1250.00	9.4423	-97.13	0.5024	-761.37	999.000	1.2500
1300.00	9.0791	-112.44	0.3186	-770.28	999.000	1.3000

Output data stored in User filename: TEMfilter.DAT

Figure 4-1: Typical Output Data for **Frequency Analysis of a Bandpass Filter** from TEMfilter.exe

TEMfilter (v. 1.0) Date:10/16/2012 at 16: 3:37Hours

RF/Microwave Computer-Aided Engineering Design Data for
Multi-Section Filters Exhibiting a Tchebyscheff Response.

ANALYSIS of the Theoretical Electrical Circuit for your
Filter results in the following frequency response:

Flow = 900.000 MHz Response = Bandstop
Fo = 1000.000 MHz # of Poles = 9
Fhigh= 1100.000 MHz Ripple (Am) = 0.050 dB
BW = 200.000 MHz Unloaded Q = 500.00

Bandstop Filter Response

Frequency (MHz)	Wavelength (Inches)	Loss (dB)	Time Delay (nsec)	Phase (deg)	VSWR	F/Fo
700.00	16.8612	-0.02	1.3354	-139.10	1.000	0.7000
750.00	15.7371	-0.03	1.9575	-168.21	1.000	0.7500
800.00	14.7536	-0.06	3.1618	-212.90	1.000	0.8000
850.00	13.8857	-0.15	6.3243	-293.16	1.006	0.8500
900.00	13.1143	-21.04	29.7342	-513.67	347.471	0.9000
950.00	12.4241	-20.10	4.3303	-746.75	347.451	0.9500
1000.00	11.8029	-72.87	3.1750	810.00	999.000	1.0000
1050.00	11.2408	-20.10	4.3303	746.75	347.431	1.0500
1100.00	10.7299	-21.04	29.7342	513.67	347.433	1.1000
1150.00	10.2633	-0.15	6.3243	293.16	1.006	1.1500
1200.00	9.8357	-0.06	3.1618	212.90	1.000	1.2000
1250.00	9.4423	-0.03	1.9575	168.21	1.000	1.2500
1300.00	9.0791	-0.02	1.3354	139.10	1.000	1.3000

Output data stored in User filename: TEMfilter.DAT

Figure 4-2: Typical Output Data for **Frequency Analysis of a Bandstop Filter** from TEMfilter.exe