# Product Requirement Specification 994-0118-004
# MBScope, Analyzer Data (ANL) File Format V6.1 Rev D

| | | Date MMMM DD,YYYY |
|---|---|---|
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REVISION HISTORY

| Rev | ECO | Description | Date MMMM DD,YYYY | Edited By | Checked By |
|---|---|---|---|---|---|
| A | N/A | Release to baseline (V5 format) | 2011/09/23 | SPT | MMZ |
| B | N/A | Added the MAT data file format | 2011/09/23 | SPT | MMZ |
| C | E12-0198 | Changes are highlighted in blue. (V6.0)<br>- Describe analyzer parameters available only for ERSP300<br>- V6.0 format | 2012/06/07 | MMZ | SPT |
| D | E14-0019 | Changes are highlighted in blue. (V6.1)<br>- Updated section names, parameter names, option formats, valid options and option examples in the header section changed to V6.1<br>- Updated header example<br>- Removed Matlab file (.mat) description | 2014/24/01 | MMZ | SPT |

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# 2 ANALYZER DATA FILE FORMAT

## 2.1 ASD File Format

The analyzer data shall be stored to a text file with a ANL extension. This file is divided into header and data sections.

### 2.1.1 Header Section

The header section is in the form of an INI file (see SKF document 994-0118-003) with the following sections, parameters and values. The data interpretation format and an example of a typical value, is also provided for each parameter.

| Section | Parameter | Description | Format | Valid Options | Example | Controller Types |
|---|---|---|---|---|---|---|
| [File Info] | Version | Analyzer file version | float | 4.0, 5.0, 6.0 | 6.0 | All |
| | Type | Always set to "Analyzer" | string | Analyzer | Analyzer | All |
| | Architecture | System architecture | string | “G3”, “G4”, “EA300”, “ERSP300” | “ERSP300” | All |
| [Analyzer Info] | Creation Date (PC) | File creation date (local system time) | time | | 2008/10/15 17:15:35.001 | All |
| | ~~Architecture~~ | ~~System architecture~~ | ~~string~~ | ~~“G3”, “G4”, “EA300”, “ERSP300”~~ | ~~“ERSP300”~~ | ~~All~~ |
| | Magnitude | Magnitude of injected sinusoidal signal. | float | Float or “N/A” for ERSP300 | N/A | G3/G4 and EA300 |
| | Data Size | Represents the number of points in each transfer function, depending on the discretization frequency. | uint | | 1726 | All |
| | Sweep Type | Specify the way in which the frequency sweep is discretized. Only Linear for ERSP300 | string | "Linear" or "Logarithmic" | Linear | All |
| | Sweep Domain | Domain in which the transfer function is computed | string | "Time" or "Frequency" or “N/A” for ERSP300 | N/A | G3/G4 and EA300 |
| | WindowSize | Size of the FFT Window | uint | Uint or “N/A” for ERSP300 | N/A | G3/G4 and EA300 |
| | Injection Channel | Channel in which the signal is injected | string | "V13", "W13", "V24", "W24", "V57", "W57", "Z12" or N/A for ERSP300 | N/A | G3/G4 and EA300 |
| | NumStages | Number of stages in which the frequency is swept. N=1 for ERSP300 | uint | Uint or “N/A” for ERSP300 | N/A | All |
| [MainInjectionParams] | ~~Main~~ Axis Selection | A list of channels in which main injection signal is injected | strings | “None” or "V13", "W13", "V24", "W24", "V57", "W57", "Z12" | V13, | ERSP300 |
| | Injection Point | The point of injection in the control loop for the main and complementary injection signal | string | “Position” or “Force” | Position | ERSP300 |
| | Scan Type | Type of injection scanning applied for the transfer function computation | string | “Sweep” or “Chirp” | Sweep | ERSP300 |
| | Signal Shape | Shape of the injected signal | string | “Sine”, “Triangular” or “Square” | Triangular | ERSP300 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Amplitude | 0-peak amplitude of the injected signal. A negative value allows starting the injection with negative instead of positive values. The % is relative to the injection point FSV. | float | 0.00 - 100.00 | 60.00 | ERSP300 |
| | Offset | Offset applied to the injected signal. The % is relative to the injection point FSV. | float | 0.00 – 100.00 | 0.00 | ERSP300 |
| | SweepRepetitions | Whole scan repetitions | Int | 1 – 256 | 2 | ERSP300 |
| [ComplementaryInjectionParams] | ~~Compl~~ Axis Selection | A list of channels in which complementary signals are injected | string | "None" or "V13", "W13", "V24", "W24", "V57", "W57", "Z12" | "None" | ERSP300 |
| | Mode | Complementary injection mode: either the Offset is injected or the signal delayed by Angle. | string | "Synchronous" or "Offset" | Synchronous | ERSP300 |
| | Rotation | A rotation speed can be simulated at the DSP acquisition (will be controlled and monitored). The speed value is the current fundamental frequency of the injected signal. | bool | "True" or "False" | True | ERSP300 |
| | Angle | Only applicable for Synchronous mode. Oriented angle from the main axis to the complementary axis. The sign is given by the rotation sense. For example if V is the main, W is the complement, and the rotation is from V to W, then Angle=+90° | int | -90, 0 or 90 | 90 | ERSP300 |
| [FFTParams] | FrequencyStepMode | Makes FrequencyStep to be either automatically computed regarding FrequencyResolution, or manually assigned. | string | "Auto" or "Manual" | Manual | ERSP300 |
| | FrequencyResolutionMode | Size for FFTSize request, frequency for FrequencyResolution request, automatic for FrequencyStep request | string | "Size", "Freq", or "Auto" | Freq | ERSP300 |
| | WindowFilterType | Window to be applied to the time sequence before FFT computation. | string | "Rectangular", "Hann", "Hamming", or "Gaussian" | Hamming | ERSP300 |
| | Averaging | Consecutive FFT to be averaged along the frequencies. Only applicable present if Scan=sweep. | uint | 1 – 256 | 1 | ERSP300 |
| [TFParams] | SinalType | Specifies the type of signal used for the transfer function computation | string | "Random" or "Harmonic" | Random | ERSP300 |
| | InjectionCorrection | Specifies the algorithm to be used in the transfer function computation. | string | "Mean", "Max" or "Adapted" | Max | ERSP300 |
| | OverFrequency | Factor by which the frequency resolution is artificially increased. | uint | 1 – 256 | 1 | ERSP300 |
| [Stage N]<br>N=1 for ERSP300 | FFTSize | FFT number of points | int | 256 – 32768 | 1024 | ERSP300 |
| | FrequencyResolution | Frequency resolution linked to the FFTSize | float | ~~0.00 – 7000.00~~ | 13.671875 | ERSP300 |
| | FrequencyStep | Frequency step of the injected signal | float | ~~0.00 – 7000.00~~ | 13.671875 | ERSP300 |
| | Start Frequency | Start frequency for the sweep stage 'N' | float | | 0.5 | All |
| | End Frequency | End frequency for the sweep stage 'N' | float | | 1725 | All |

| | | | | | | |
|---|---|---|---|---|---|---|
| | Revolutions per Convolution | Number of revolutions per convolution for stage 'N' | uint | Uint or "N/A" for ERSP300 | N/A | G3/G4 and EA300 |
| | Resolution | Frequency resolution for the TF FFT computation | float | Float or "N/A" for ERSP300 | N/A | G3/G4 and EA300 |
| | Step Size | Frequency step size for the sweep stage 'N' | float | Float or "N/A" for ERSP300 | N/A | G3/G4 and EA300 |

### 2.1.2 Data Section

The data section shall be in the form of a tab-delimited table. The start of the data section is denoted by the section tag [data] and is followed on the next line by the specific transfer function and by the column header with labels for frequency and the selected channels to save (magnitude, phase and coherence). Each proceeding line contains data related to the column headers defined in the table below. **If there is no data for a particular channel in a given frame, the cell will be left empty.**

| Section | Subsection | Items | Format | Example |
|---|---|---|---|---|
| [Data] | <transfer function name> | Transfer Function ID | string | ;OpenLoop transfer function section |
| | | Header (labels for the sampled frequency and channels) | string | ;Frequency V13_mag V13_phase |
| | | Data (data for the sampled frequency and channels) | float | 0.5 2.545454 11.526 |

### 2.1.3 Example

The following is an example of an ANL file, captured from an EA300 controller.

```
[File Info]
Version=6.0
Type=Analyzer
Architecture=ERSP300
[Analyzer Info]
Creation Date (PC)=2013/11/18 18:30:50.969
Magnitude=N/A
Data Size=1170
SweepType=Linear
SweepDomain=N/A
WindowSize=N/A
Injection Channel=N/A
NumStages=N/A
[MainInjectionParams]
Axis Selection=V13,
Injection Point=Force
Scan Type=Sweep
Signal Shape=Sine
Amplitude=2.00
Offset=0.00
SweepRepetitions=1
[ComplementaryInjectionParams]
Axis Selection=None
Mode=Synchronous
Rotation=False
Angle=90
[FFTParams]
FrequencyStepMode=Auto
FrequencyResolutionMode=Size
WindowFilterType=Rectangular
Averaging=1
```

```
[TFParams]
SignalType=Random
InjectionCorrection=Adapted
OverFrequency=1
[Stage 1]
FFTSize=8192
FrequencyResolution=1.708984375
FrequencyStep=1.708984375
Start Frequency=0
End Frequency=1999.51171875
Revolutions per Convolution=N/A
Resolution=N/A
Step Size=N/A

[data]
;OpenLoop transfer function section
;Frequency   V13_mag            W13_mag            V24_mag          W24_mag          V57_mag   W57_mag   Z12_mag   V13_phase          W13_phase          V24_phase          W24_phase          V57_phase
100          21.9999999999898   48.60049955102     11.0034478086312 94.5231608534318 0         0         0         179.999999999958   -69.1060108725551  9.57117028458554   108.763226795695   0
101          21.9999999999953   19.8524334358577   11.1997749850507 42.988004564042  0         0         0         179.999999999979   34.0405376419568   -1.61516826314839  -144.801093328467  0
102          22.0000000000017   12.7496307408006   10.687621606551  25.5998441693062 0         0         0         -179.999999999983  -65.8493212175272  4.98615963854475   106.057352034429   0
103          21.9999999999992   7.22800883516638   11.3777066564044 15.7469110799207 0         0         0         179.999999999989   -103.067520820924  5.48044876895326   56.7769537334734   0
104          21.9999999999767   41.3450150574279   16.5122629586202 43.4466154883249 0         0         0         179.999999999967   -71.6033604706103  3.22326767450834   92.2695598214278   0
105          21.9999999999873   70.0262655128519   11.6464941240736 137.300345935705 0         0         0         180                -99.4657013323801  10.3459568305972   76.6368758193198   0
106          21.9999999999935   8.32182987183319   11.7642000862226 22.3179372859366 0         0         0         -179.999999999997  65.6198133143015   -2.69089403880896  -119.297356764381  0
     ...

[data]
;Sensitivity transfer function section
;Frequency   V13_mag              W13_mag          V24_mag          W24_mag          V57_mag   W57_mag   Z12_mag   V13_phase          W13_phase          V24_phase          W24_phase          V57_phase
100          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
101          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
102          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
103          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
104          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
105          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
106          0                    0                0                0                0         0         0         0                  0                  0                  0                  0
     ...
```