
Ariel Dynamics, Inc.

EMG MODULE

Revision 1.0



Contents

ARIEL EMG PROGRAM	1
INTRODUCTION.....	1
WHAT'S NEW IN EMG 1.0.....	1
SYSTEM REQUIREMENTS.....	2
SCREEN LAYOUT.....	2
THE TOOL BAR.....	2
THE EMG WINDOW LAYOUT.....	2
THE STATUS BAR.....	2
TO START THE EMG PROGRAM.....	3
CREATING A NEW EMG FILE.....	3
PARTITION.....	4
GRAPH OPTIONS FOR EMG DATA FILE.....	5
EMG.....	5
AVG/RMS.....	7
INTEGRAL.....	8
POWER.....	10
SAVING AN EMG FILE.....	12
RESTORING PREVIOUSLY CREATED EMG FILE.....	13
EMG OPTIONS.....	13
CHANGING THE FONT.....	13
CHANGING EMG COLOR.....	13
EMG QUICK REFERENCE.....	13
EMG MENUS.....	15
FILE COMMAND MENU.....	15
EDIT COMMAND MENU.....	16
VIEW COMMAND MENU.....	17
GRAPH COMMAND MENU.....	17
EXPORT COMMAND MENU.....	17
WINDOW COMMAND MENU.....	18
OPTIONS COMMAND MENU.....	19
HELP COMMAND MENU.....	19

ARIEL EMG PROGRAM

INTRODUCTION

One of the most intriguing and challenging areas of study in biomechanics is probably the muscle itself. The electrical signal associated with the contraction of a muscle is called an electromyogram or, by its shorthand name, EMG. Electromyography is the study of muscle activity by measuring these electrical signals. Clinicians and researchers have applied the study of EMGs to the fields of neurology, surgical assessments, functional capacity evaluations, ergonomics and overuse injuries, and chronic pain evaluations, just to name a few.

In addition to the extensive EMG analysis options found in the Analog module of the **Ariel Performance Analysis System (APAS)**, the **Ariel EMG** program provides additional capabilities. The **ARIEL EMG** software is a Windows based program for calculating the integral and normalizing the EMG signal in both time and amplitude. An understanding of the electrophysiology and the technology of recording is recommended for optimal use of the EMG program.

Although a few of **EMG's** features appear complex, they are relatively easy to master once you understand the underlying concepts. This manual is arranged to teach you these concepts in a logical order by showing you, in step-by-step fashion, how to use the **EMG** program.

WHAT'S NEW IN EMG 1.0

A few of the new features you will see in EMG version 1.0

1. **EMG Signal Normalization.** EMG signals can be normalized in both Time and Amplitude.
2. **EMG Signal Integration.** EMG signals can be integrated using several parameters.

SYSTEM REQUIREMENTS

The following list provides the basic guidelines for the necessary components of the EMG program to provide the best possible performance. The software requires a minimum of Microsoft Windows 95/98 or later and APAS-2000 Revision 1.0 or later (with the EMG/Analog).

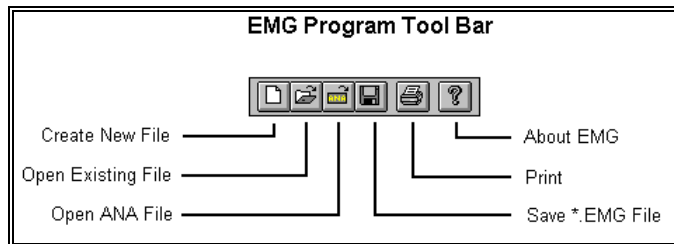
1. Ariel Performance Analysis System (APAS) software used to collect EMG data in *.ANA file formats.

SCREEN LAYOUT

Prior to performing the **EMG** analysis process, you should take the time to familiarize yourself with the format and contents of the various screens listed below:

THE TOOL BAR

You can activate many functions by selecting the icons located on the **EMG** program tool bar. The tool bar is located near the top of the window. Icons are pictorial representations of commands or functions. You can access the following commands by clicking the appropriate icon.

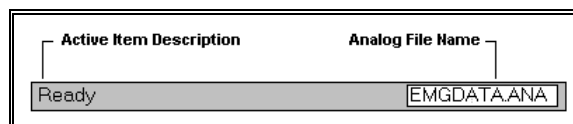


THE EMG WINDOW LAYOUT

When an EMG file is opened, additional windows will be displayed inside the main window. Multiple windows can be opened simultaneously. The **EMG Title** will be displayed at the top of each active Window.

THE STATUS BAR

The status bar provides information about the current EMG analog file. The status bar is located at the bottom of the EMG window.



The far left side of the status bar indicates the current status of the EMG file. This field will usually state **READY**. The far right side of the status bar displays the currently selected analog (*.ANA) file.

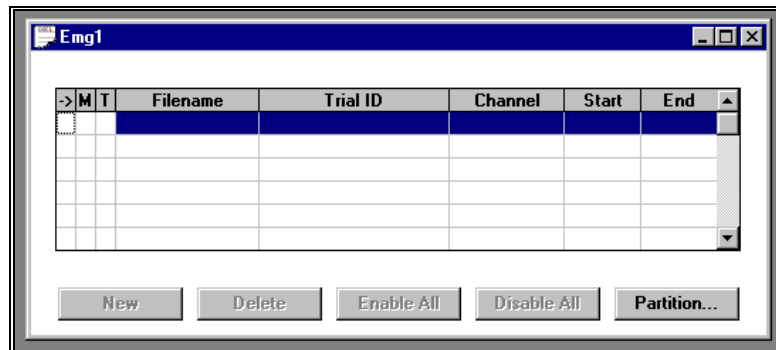
TO START THE EMG PROGRAM

1. Double-click the **EMG** icon located in the **APAS System** window group. The main EMG window will appear.

CREATING A NEW EMG FILE

The following steps are recommended for correct operation of the EMG program.

1. Choose the **NEW** command from the **FILE** menu. This will open a new *.EMG document with an empty list of EMG data sets. A grid with 8 columns appears to display the active sample list.



2. Select the **ANALOG** command from the **FILE** menu to specify an Analog (*.ANA) file for retrieving data sets. This selection can be changed at any time.
3. Click on the **NEW** button below the "grid" and select a Save Trial and Channel from the active Analog file. Select the **OK** button to enter the selected data set to the active data set display.
4. Repeat Step #3 to select all data sets of interest.
5. Mark individual entries as either active or inactive by clicking in the 1st column of the grid. Active channels will be graphed and displayed for analysis. If an entry is active, a "=>" will be displayed in the first column. If an entry is inactive, the first column will be blank. If the user selects FILE, SAVE AS and there are disabled channels, the program prompts the user whether or not to save disabled channels.

6. Mark an individual entry as the Maximum Voluntary Contraction (MVC) by clicking the 2nd column of the grid. The Maximum Voluntary Contraction channel is the channel where the subject has performed a maximum contraction. Marking a channel at the MVC is only required for normalizing using the MVC option.
7. Mark an individual entry as the Trigger channel by clicking the 3rd column of the grid. The Trigger channel is used in partitioning data. It typically is not an EMG channels but rather some other signal that helps one partition the EMG data. An example would be a switch opening/closing to define an activity of interest.

NEW - This button is selected to add a save trial from the currently active analog file.

DELETE - This button is selected to remove a save trial from the analysis table.

ENABLE ALL - This button is selected to ACTIVATE All the Save Trials in the analysis table.

DISABLE ALL - This button is selected to INACTIVATE All the Save Trials in the analysis table. Disabled channels will not be graphed.

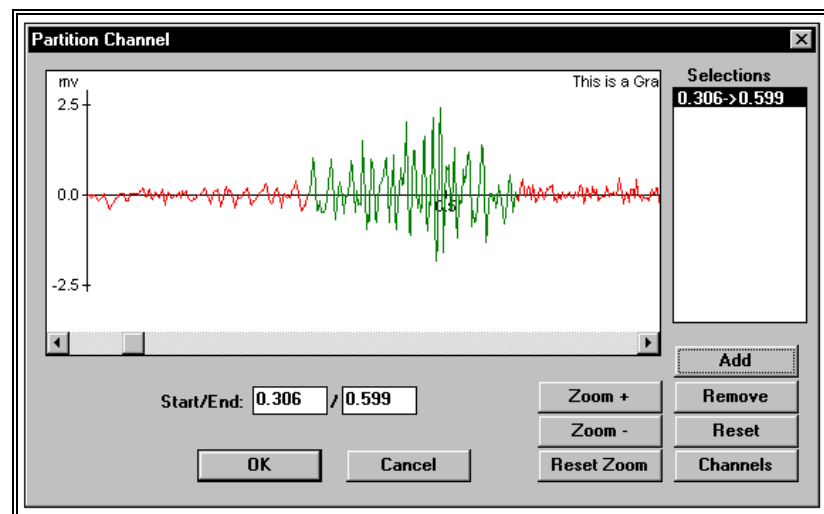
PARTITION - This button is selected to Partition the selected entries.

At this point, the program is ready to Graph the EMG data.

PARTITION

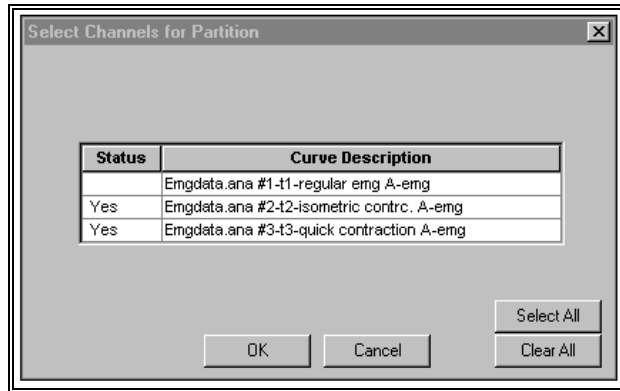
When sampling EMG activity, it is often useful to analyze specific intervals of the entire signal. The Partition option allows the user to partition an EMG signal into smaller intervals for analysis. Multiple curves can be simultaneously partitioned. The following steps are recommended for partitioning an EMG signal.

1. Select the PARTITION button to display the Partition Channel menu.



2. Select the CHANNELS button to specify which data channels are active during the partitioning. Individual channels are

selected by clicking in the Status column next to the desired channel. All channels can be activated by selecting the Select All button. All channels can be deactivated by selecting the Clear button. Select OK to proceed.



3. Select the desired partition by clicking the left mouse button and dragging the cursor to highlight the desired partition. The partition will be seen as an alternate color.
4. Select the Add button to enter the data in the partition list. Repeat step #3 for additional partitions.
5. Select OK to return to the data entry table. The partition information will be updated in the table.

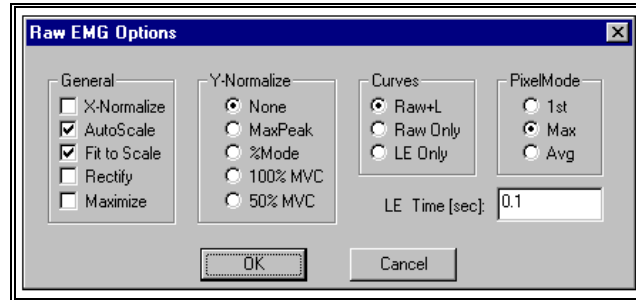
GRAPH OPTIONS FOR EMG DATA FILE

Once the desired trials have been entered into the table, activated and partitioned (if desired), the data can be graphed utilizing several analysis options.

1. Select the **GRAPH** menu to display the available graphing options for the EMG data.

EMG

The EMG command provides several options for graphing and analyzing the "raw" EMG signal. When this command is selected, the RAW EMG OPTIONS menu will be displayed.



GENERAL

X-Normalize - Selected to normalize all selected graphs to the same time scale (X-axis). All the active graphs will be normalized to the same time scale as the graph with the smallest time period.

AutoScale - Selected to display the entire graph(s) with maximum resolution. The size of the graph remains constant, regardless of the size of the display window.

Fit to Scale - Selected to display the entire graph regardless of the size of the window. If the window size is adjusted, the graph will also adjust to fit the new size of the window.

Rectify - Selected to perform a full-wave rectification on the "raw" EMG signal.

Maximize - Selected to enlarge the window to the maximum size.

Y-NORMALIZE

None - Selected to display the graph(s) without Y-Normalization being performed.

MaxPeak - Selected to normalize all the curves so that all curves will have a peak value for the envelope equal to the curve that un-normalized had the largest envelope value.

%Mode - Selected to scale each curve so that the peak value for the envelope curve is 100%.

100% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 100% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 100% normalization has been selected, then other channels would be normalized so that their peaks would be 4.0 mv.

50% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 50% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 50% normalization has been selected, then other channels would be normalized so that their peaks would be 2.0 mv.

CURVES

Raw + LE - Selected to graphically display the Raw data curve as well as the computed Linear Envelope (LE) curve.

Raw Only - Selected to graphically display only the Raw data curve.

LE Only - Selected to graphically display only the computed Linear Envelope curve.

PIXEL MODE

Due to the high sampling rate of EMG signals, one pixel often corresponds to many A/D samples. The number of data points is divided by the available pixels to determine the number of data points represented by each pixel. Each "set" of pixels can be represented in various ways.

1st - Selected to use the First data point of each group to represent the entire group.

Max - Selected to use the Maximum data point of each group to represent the entire group.

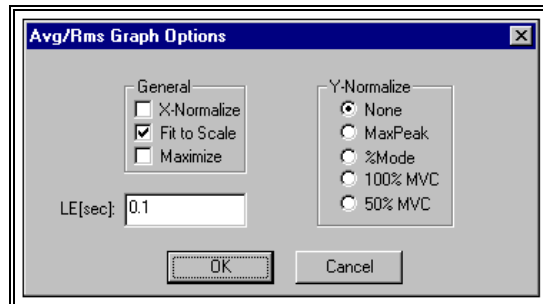
Avg - Selected to use the computed Average of all the data point of each group to represent the entire group.

LE TIME (sec)

This field is used to enter the time interval for the Linear Envelope (LE). The LE is used to remove rapid signal fluctuations by averaging over an interval that is longer than the duration of individual "spikes" or fluctuations. It is similar in nature to a low-pass analog filter. The longer the time constant, the lower the cutoff frequency of this filter. Some experimentation may be necessary, however, a default value of 0.1 seconds will be displayed.

AVG/RMS

The AVG/RMS command provides several options for graphing and analyzing the Average EMG signal. When this command is selected, the AVG/RMS GRAPH OPTIONS menu will be displayed.



GENERAL

X-Normalize - Selected to normalize all selected graphs to the same time scale (X-axis). All the active graphs will be normalized to the same time scale as the graph with the smallest time period.

Fit to Scale - Selected to display the entire graph regardless of the size of the window. If the window size is adjusted, the graph will also adjust to fit the new size of the window.

Maximize - Selected to enlarge the window to the maximum size.

Y-NORMALIZE

None - Selected to display the graph(s) without Y-Normalization being performed.

MaxPeak - Selected to normalize all the curves so that all curves will have a peak value for the envelope equal to the curve that un-normalized had the largest envelope value.

%Mode - Selected to scale each curve so that the peak value for the envelope curve is 100%.

100% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 100% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 100% normalization has been selected, then other channels would be normalized so that their peaks would be 4.0 mv.

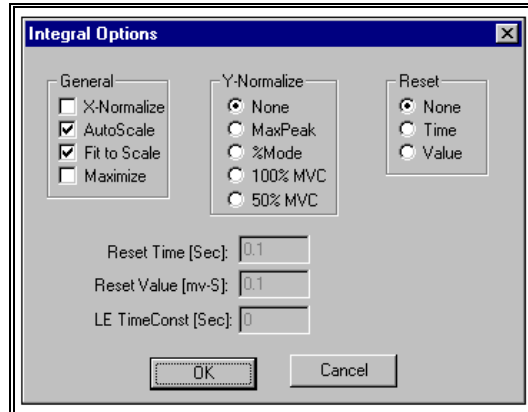
50% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 50% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 50% normalization has been selected, then other channels would be normalized so that their peaks would be 2.0 mv.

LE TIME (sec)

This field is used to enter the time interval for the Linear Envelope (LE). The LE is used to remove rapid signal fluctuations by averaging over an interval that is longer than the duration of individual "spikes" or fluctuations. It is similar in nature to a low-pass analog filter. The longer the time constant, the lower the cutoff frequency of this filter. Some experimentation may be necessary, however, a default value of 0.1 seconds will be displayed.

INTEGRAL

The INTEGRAL command is selected to perform one of several types of integration on the EMG signal. These integration options produce data curves representing the integrl or area under the input curve in different formats. When this command is selected, the INTEGRAL OPTIONS menu will be displayed.



GENERAL

X-Normalize - Selected to normalize all selected graphs to the same time scale (X-axis). All the active graphs will be normalized to the same time scale as the graph with the smallest time period.

AutoScale - Selected to display the entire graph(s) with maximum resolution. The size of the graph remains constant, regardless of the size of the display window.

Fit to Scale - Selected to display the entire graph regardless of the size of the window. If the window size is adjusted, the graph will also adjust to fit the new size of the window.

Maximize - Selected to enlarge the window to the maximum size.

Y-NORMALIZE

None - Selected to display the graph(s) without Y-Normalization being performed.

MaxPeak - Selected to normalize all the curves so that all curves will have a peak value for the envelope equal to the curve that un-normalized had the largest envelope value.

%Mode - Selected to scale each curve so that the peak value for the envelope curve is 100%.

100% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 100% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 100% normalization has been selected, then other channels would be normalized so that their peaks would be 4.0 mv.

50% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 50% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 50% normalization has been selected, then other channels would be normalized so that their peaks would be 2.0 mv.

RESET

Select one of the following Reset options for integrating the signal.

None - Selected to perform a summing integral or an integral with "No-reset." The curve value represents the cumulative integral of the input channel and thus is a monotonically increasing curve.

Time - Selected to perform a constant frequency resetting integral. The integral curve is cumulative for a specified "Time" interval, then is reset to zero and begins accumulating again. This produces a series of peaks at a constant interval whose amplitude indicates the level of activity of the EMG signal.

Value - Selected to perform a constant amplitude resetting integral. The integral curve is cumulative until a specified "Value" is reached, then is reset to zero and begins accumulating again. This produces a series of peaks at a constant amplitude whose frequency indicates the level of activity of the EMG signal.

RESET TIME (sec)

This field is used to enter the time interval for the Time Reset option.

RESET VALUE (mv-sec)

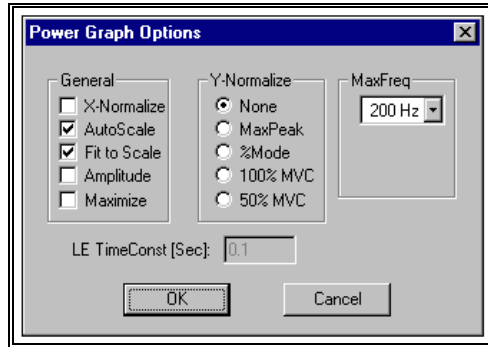
This field is used to enter the value for the Value Reset option.

LE TIME (sec)

This field is used to enter the time interval for the Linear Envelope (LE). The LE is used to remove rapid signal fluctuations by averaging over an interval that is longer than the duration of individual "spikes" or fluctuations. It is similar in nature to a low-pass analog filter. The longer the time constant, the lower the cutoff frequency of this filter. Some experimentation may be necessary, however, a default value of 0.1 seconds will be displayed.

POWER

The POWER command is selected to perform a power spectrum analysis of the EMG data signal. This analysis produces a graph of power as a function of frequency based on a Fourier decomposition of the analog signal. Power is defined as the sum of the squares of the Fourier coefficients. Since the EMG signal consists of many component frequencies, this type of analysis provides an indication of the dominant frequencies and their relative amplitudes within the composite signal. When this command is selected, the POWER GRAPH OPTIONS menu will be displayed.



GENERAL

X-Normalize - Selected to normalize all selected graphs to the same time scale (X-axis). All the active graphs will be normalized to the same time scale as the graph with the smallest time period.

AutoScale - Selected to display the entire graph(s) with maximum resolution. The size of the graph remains constant, regardless of the size of the display window.

Fit to Scale - Selected to display the entire graph regardless of the size of the window. If the window size is adjusted, the graph will also adjust to fit the new size of the window.

Amplitude - Selected to perform an Amplitude analysis on the active channels. This analysis produces a graph of Amplitude as a function of frequency.

Maximize - Selected to enlarge the window to the maximum size.

Y-NORMALIZE

None - Selected to display the graph(s) without Y-Normalization being performed.

MaxPeak - Selected to normalize all the curves so that all curves will have a peak value for the envelope equal to the curve that un-normalized had the largest envelope value.

%Mode - Selected to scale each curve so that the peak value for the envelope curve is 100%.

100% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 100% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 100% normalization has been selected, then other channels would be normalized so that their peaks would be 4.0 mv.

50% MVC - Selected to perform the Linear Envelope of this data and normalize the other active channels to the MVC channel. It is often desired to normalize to 50% of this "maximum" contraction value. For example, if the MVC channel has a peak value (LE) of 4.0mv and 50% normalization has been selected, then other channels would be normalized so that their peaks would be 2.0 mv.

MAX FREQ

Select the Maximum Frequency for the computation of the power spectrum. Only the power component frequencies below the maximum frequency will be reported. This allows the user to scale the power spectrum to the frequency band most applicable to the signal being studied.

The largest value for the maximum frequency that can be detected in a power spectrum analysis is the Nyquist or "folding frequency" which is one-half the frequency of data measurement. Be aware that if there are frequencies in the input signal above the folding frequency, aliasing (high frequency signals "appearing" as low frequency signals) may occur. To properly interpret a power spectrum measurement on an analog signal, one must know the true range of frequencies in the data.

LE TIME (sec)

This field is used to enter the time interval for the Linear Envelope (LE). The LE is used to remove rapid signal fluctuations by averaging over an interval that is longer than the duration of individual "spikes" or fluctuations. It is similar in nature to a low-pass analog filter. The longer the time constant, the lower the cutoff frequency of this filter. Some experimentation may be necessary, however, a default value of 0.1 seconds will be displayed.

SAVING AN EMG FILE

Once the EMG analysis file has been created, the entire file can be saved as a project (*.EMG file) for later use. The SAVE/SAVE AS commands can be used to save all the information that is used to create the analysis. This includes, MVC channel, Trigger channel, partitioning information as well as the associated analog and files. There are two options for saving the EMG file:

1. Choose the **SAVE** command from the **FILE** menu. This command will Save the current information using a sequentially numbered default file name (Emg1.emg, Emg2.emg etc.) and Save it to the current drive and directory. The *.EMG extension will be added automatically.

OR...

2. Select the **SAVE AS** commands from the **FILE** menu. The Save As dialog box will appear showing the current file name, directory, drive and file type. At this point, you can enter the desired name for the EMG file. Please note that the file must have the EMG extension.

RESTORING PREVIOUSLY CREATED EMG FILE

EMG files can be created and saved to retain the necessary information for displaying the EMG analysis. Files can then be Restored at a later time for comparison and/or analysis. There are two methods to Restore a previously created EMG file:

1. Choose the **OPEN** command from the **File** menu. The **OPEN File** Dialog box will appear. Select the desired drive, directory and *.EMG file and click the **OK** button.

OR...

2. Select the File Open icon from the EMG Tool Bar. The **OPEN File** Dialog box will appear. Select the desired drive, directory and *.EMG file and click the **OK** button.

EMG OPTIONS

CHANGING THE FONT

The FONT parameters can be changed by the following process:

1. Select the **FONT** command from the **OPTIONS** menu. You will be presented with a Font menu of the available options. The options include Font, Font Style, Size, Effects and Script. Select the desired options with the left mouse button. Press the OK button to save the selected choice. Select the CANCEL button to abort this menu without saving the changes.

CHANGING EMG COLOR

The EMG color scheme can be changed by the following process:

1. Select the **COLOR** command from the **OPTIONS** menu. Select the desired color using the mouse.

EMG QUICK REFERENCE

CREATING A NEW EMG PROJECT

1. Select **FILE, NEW** (or the New Document icon in the Tool Bar) to Open a new *.EMG document.
2. Select **FILE, ANALOG** to open the desired EMG analog file.

3. Click on the **NEW** button below the "grid" and select a Save Trial and Channel from the active Analog file. Select the **OK** button to enter the selected data set to the active data set display.
4. Repeat Step #3 to select all data sets of interest.
5. Mark individual entries as either active or inactive by clicking the cursor in the 1st column of the grid. Active channels will be graphed and displayed for analysis.
6. Mark an individual entry as the Maximum Voluntary Contraction (MVC) by clicking the 2nd column of the grid.
7. Mark an individual entry as the Trigger channel by clicking the 3rd column of the grid.
8. You are now ready to Graph, Export or Save the EMG project.

GRAPHING EMG DATA

1. Select GRAPH, and the desired Graph type. Available choices are **EMG**, **AVG/RMS**, **INTEGRAL** and **POWER**.
2. Specify the desired Graph options and select **OK** to display the graphed data.
3. Repeat Step#1 for desired additional graphs.

EXPORTING EMG DATA

Data can be exported to a Worksheet file as well as to an ARIEL format Analog file.

WORKSHEET

1. Select **EXPORT, WORKSHEET, NEW** to create a new worksheet file. Select **EXPORT, WORKSHEET, OPEN** to append to an existing worksheet file.
2. Select **EXPORT, WORKSHEET, SAVE** to save the desired data to the active worksheet.
3. Enter the desired Export Information and select **OK** to proceed.
4. Select **EXPORT, WORKSHEET, CLOSE** to close the active worksheet

ANALOG

1. Select **EXPORT, ANALOG, NEW** to create a new .ANA file. Select **EXPORT, ANALOG, OPEN** to append to an existing Analog (.ANA) file.
2. Select **EXPORT, ANALOG, SAVE** to save the desired data to the active Analog file.
3. Enter the desired Trial ID Caption and select **OK** to proceed.
4. Select **EXPORT, ANALOG, CLOSE** to close the active Analog file.

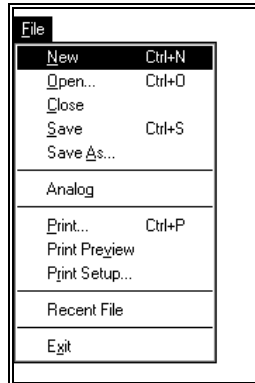
SAVING AN EMG PROJECT

1. Select **FILE, SAVE AS** to save the EMG project.
2. Select **FILE, EXIT** to exit the EMG program.

EMG MENUS

Listed below are the various menus for the EMG program. Select the desired menu to see a description of the available commands for each menu.

FILE COMMAND MENU



New

Selected to open a new *.EMG file for creating an EMG project.

Open

Select the OPEN command to open an existing *.EMG file. . When this option is selected, the Open File dialog box will appear.

Close

Select the CLOSE command to close the currently open file.

Save

Select the SAVE command to SAVE the current *.EMG project file. When this option is selected, the Save File dialog box will appear.

Save As

Selected to SAVE the current file AS another name.

Analog

Selected to open a previously created ANA format ANALOG file to be used for the EMG analysis.

Print Preview

Selected to check or examine the positioning on one or more pages. When you give the Print Preview command, a new window will be open showing the document position as it would appear on paper. To close the Print Preview window, select the Cancel button to go to the previous mode.

Print

Select the Print command to send the current file to a printer.

Print Setup

Selected to adjust the printer settings prior to issuing the PRINT command.

Recent File

Selected to open one of the most RECENT FILES that were used. Files are selected the highlighted file name.

Exit

Selected to EXIT the EMG program and return to the APAS group in Microsoft Windows program manager.

EDIT COMMAND MENU



Undo

Select the UNDO command to retrieve edited data. The UNDO command reflects the last change you made, such as Undo Delete or Undo Insert.

Cut

Select the CUT command to remove the selected item and temporarily copy it to the Windows Clipboard. The items are placed in the clipboard so that it can be Pasted into another area of the same application or into another Windows application. To avoid losing this item, you should Paste it before performing any additional editing.

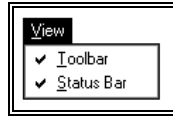
Copy

Select the COPY command to make a COPY of the selected item and temporarily copy it to the Windows Clipboard. The items are placed in the clipboard so that it can be Pasted into another area of the same application or into another Windows application. To avoid losing this item, you should Paste it before performing any additional editing.

Paste

Select the PASTE command to insert a copy of the item currently in the Windows clipboard. This item could have been cut or copied from almost any Windows application.

VIEW COMMAND MENU



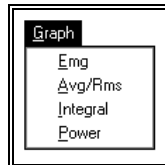
Toolbar

Selected to display or remove the EMG Toolbar located at the top of the view window. This command acts like a toggle switch. The check mark next to the Toolbar command indicates that the Toolbar will be visible. Selecting this option again, will remove the check mark and remove the Toolbar from view.

Status Bar

Selected to display or remove the EMG Status Bar located at the bottom of the view window. This command acts like a toggle switch. The check mark next to the Status Bar command indicates that the Status Bar will be visible. Selecting this option again, will remove the check mark and remove the Status Bar from view.

GRAPH COMMAND MENU



EMG

Selected to display information pertaining to the “raw” EMG signal. When this option is selected, an additional menu will be presented that allows changing the display parameters.

Avg/RMS

Selected to display the combined Average and RMS curves calculated from the “raw” EMG signal. When this option is selected, an additional menu will be presented that allows changing the display parameters.

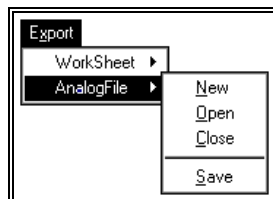
Integral

Selected to display the Integral curves calculated from the “raw” EMG signal. When this option is selected, an additional menu will be presented that allows changing the display parameters.

Power

Selected to display the Power spectrum curves calculated from the “raw” EMG signal. When this option is selected, an additional menu will be presented that allows changing the display parameters.

EXPORT COMMAND MENU



Worksheet

Selected to activate the worksheet option for data export. This option allows EMG data to be exported to a worksheet for further data processing.

Analog File

Selected to activate the Analog File option for data export. This option allows processed EMG data to be exported to the *.ANA format file and saved as a new data file.

New

Selected to create a New worksheet/analog file for data export. When this command is selected, a menu will be presented to specify the drive, folder and file name for the worksheet/analog file.

Open

Selected to Open a worksheet/analog file for data export. When this command is selected, a menu will be presented to specify the drive, folder and file name for the worksheet/analog file.

Close

Selected to close the currently open worksheet/analog file.

Save

Selected to SAVE the selected date to the specified worksheet/analog file.

WINDOW COMMAND MENU



Cascade

Selected to arrange all programs that are window sized in an overlapping CASCADE. This will not arrange a program that has been minimized to an icon.

Tile

Selected to re-size the program windows to fit side-by-side on the screen. Since Windows will include all programs that are window-sized in the tile setup, it is best to minimize all programs that are not currently being used so it will not take up space on the screen.

Arrange Icons

Selected to automatically ARRANGE ICONS in a straight row. The user has no control over where the icons are placed.

OPTIONS COMMAND MENU



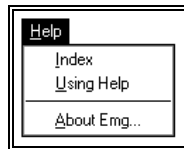
Fonts

Selected to set the Font, style, size and effects for the displayed graphics.

Colors

Selected to adjust the colors of the displayed graphs.

HELP COMMAND MENU



Index

Selected to provide an INDEX of Help related topics.

Using Help

Selected to provide instructions on using the Help Windows.

About EMG

Provides information about the EMG program

