A tour of the SCALEMASTER functions and features

A presentation of the SCALEMASTER 5.X Piano Scaling Software.

This Presentation will introduce program operational screens, features and options.

Functions

- View Tension, Inharmonicity, Volume, and other graphs
- Print out of Winding Specification sheets and complete scale data
- Calculates effects of changing wound string wrapping materials
- Allows evaluation at any pitch standard
- Provides manufacturability checks to match selected string winding vendor

There are even more functions to discus latter in the presentation.

Viewing the tension, inharmonicity and volume curves allows you to see where the problems are and then see the improvement results of you scale alterations

The winding specifications may be printed AT TENSION or AT REST. Some winding vendors prefer using the AT TENSION specifications that account for elongation (string stretch as opposed to tuning stretch) while winding. You need the AT REST version to do the quality assurance acceptance measurements before stringing.

So many of the old pianos were scaled using steel wrap that today will need to be replaced with copper.

The difference in density of the two materials usually requires changes in wrap diameters to compensate for the change in volume.

An older instrument originally scaled at A435 may need to be evaluated at A440 to control tension limits. Volume and inharmonicity are also affected by target pitch.

Not all string winding vendors use the same set of steel and copper wire sizes. You will need to know how close your selected winder can come to you improved "ideal" specifications before you submit the order. SCALEMASTER will present the difference so

Features

- Allows user defined color combinations for graphs and forms
- Imports and exports data in Comma Separated Values format for interface to spread sheets or other programs
- Customized Wire size tables to be compatible with your selected string winding vendor.

Features are user selectable aspects of the program that make it easier of nicer for the user and assist in some of the calculations.

There will be examples of color selections and wire size table editing.

Other features include graphing with lines or dots, type of octaves to use when producing the recommended tuning charts, pitch standard, automatic recalculation options and a few other items.

Variability

- Inputs and output formats may be in:
  - Inch Decimal (1.25)
  - Inch Fractional (1 ¼)
  - Metric (27mm)

Internally everything is in inch decimal format, but the displays and print outs may be in any of the 3 formats as needed by you or your vendor.

The 25cent tour

This tour will walk through a typical edit session to introduce the
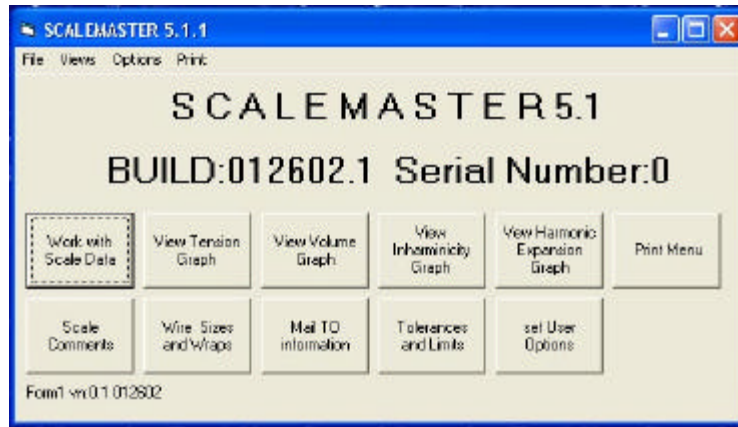SCALEMASTER tool from launch.

LAUNCHING THE PROGRAM
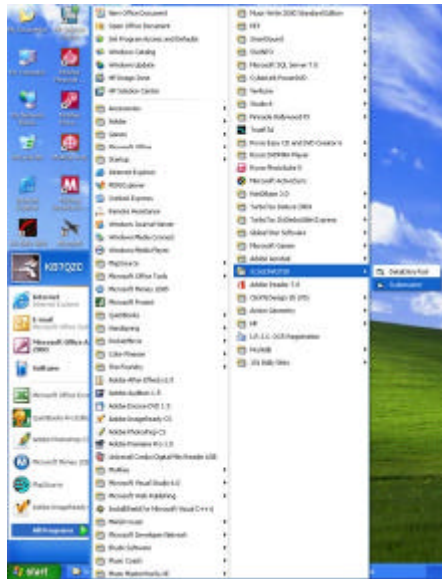
SCALEMASTER launches as many Windows applications.

Start -> All Programs -> SCALEMASTER -> Scalemaster

An icon may be added to the desk top during installation as well.

SCALEMASTER5 is designed to work best in Windows XP, but may be run on earlier versions back to Windows 98.

Main Control Screen

There is a mix of screen captures from several release versions of SCALEMASTER.x used in the presentation. The older version images are used where there is no significant change.

Your copy of SCALEMASTER will be customized to include you business name as well as serial number. Both pieces of information are needed for free program support.

There is a lot to this page! Some features and functions are available only through this page. They will be noted as the presentation progresses.

Loading and Saving files
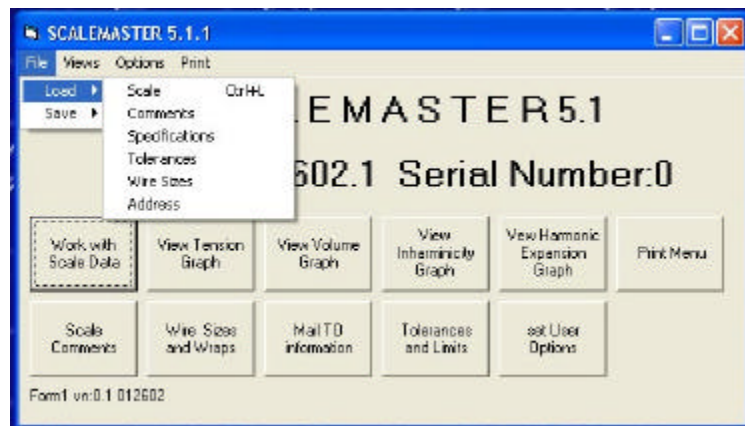
File loading and saving is also available on the Data page (Working with Scale Data) and all the load and save screens are very similar
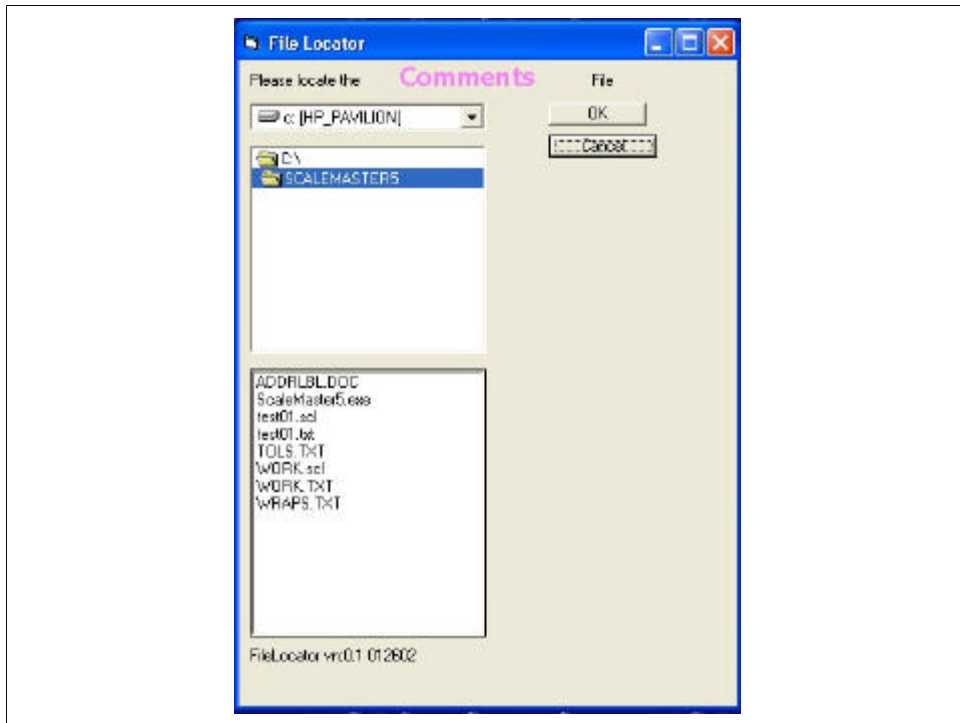
The Filer Locator screen is common to any of the file loads (open) and will tell you which file its looking for (comments, in this example).

The drop down list box at the top selects the drive. The next box down selects by click and double click the directory and the last box selects the file to load.

The Main Form Views menu has the common views of Tension, Volume, Inharmonicity and Expansion available from the Data page (working with scale data button). It also has a choice to open the scale data page and three 'sanity" checks on the input data.

The speaking length (F7) should show curves that are technically a combination of the curves of the bridges and the vbar (cappo d'astro or agrafffs) curve line. The graphic should smoothly look like the bridges, if not… check the measurements!

Same for the wrap size graph, smooth (ideal) or stair step changes are expected. Something out of place warrants verification.

The tail length graph should look similar to the visual line of the hitch pins in the bass.
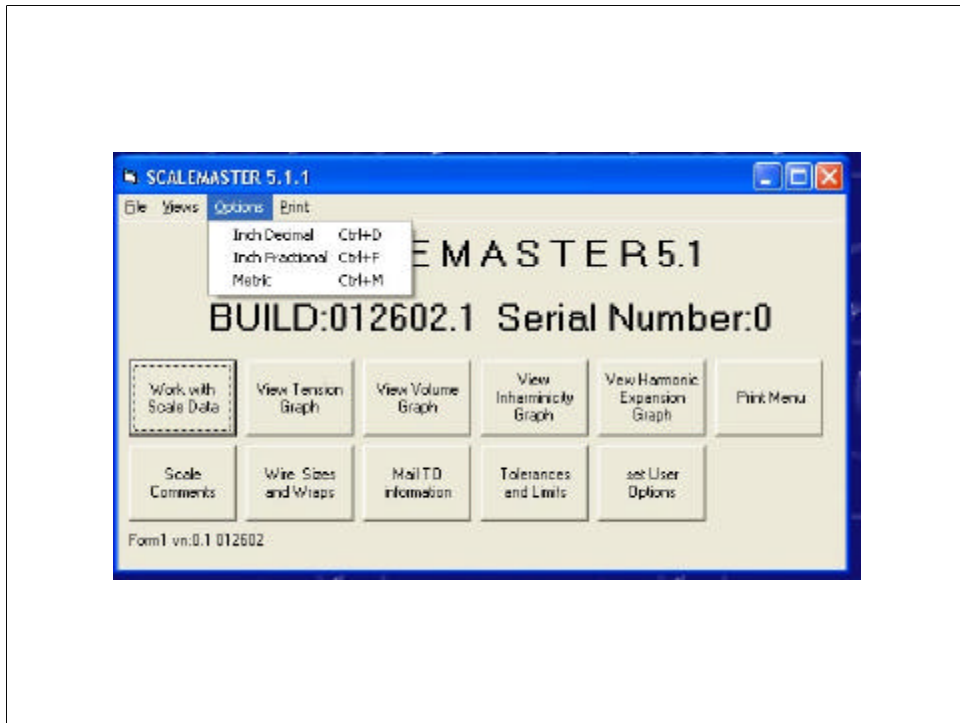
Here is one place to set the Unit Of Measurement option

The print menu opens the same print window as the Print Menu buttion

Help (added since this version's screen capture) is a pretty typical help menu with the About, Help File, and User Manual Links.

SCALEDATA PAGE

The Scale Data page is the heart of the tool set.

The file, print, view and option menus are very similar to the ones on the main screen and most of the menu items are available by button or check box on the form.

The tree sections are file information and record (note) navigation.

The middle section is the "captured" or physically measured parameters about the string.

The bottom section is all calculated data. These are the resultant parameters calculated from the middle data that is input.

Jumping between this and the Tension, Volume and Inharmonicity graphs is where the alterations to a scale is explored.

For example, maybe you see a significant jump in volume going from the last double wound single unison bass string to the first 2 string unison single wound note. You might experiment with changing the wrap diameter of both notes to reduce the difference and smooth out the curve while ensuring the tension and inharmonicity don't get whacko or the breakpoint % is still low enough (specific scale evaluation topics are under separate presentations)

SCALE DATA NEW SCALE DATA ENTRY

The color scheme in the newest version of this page is a simple inverse of forground and background colors. Thank goodness! This original color scheme is UGLY!

The intent of the color change is to make the user aware that they are in data input vs data edit mode.

In the input mode values "stick" from the present note to the next note displayed.

This allows the user to only input the parameters that have changed (usually length, wrap and tails. Parameters like core size, unison, class, vbar and bridge change less frequently.
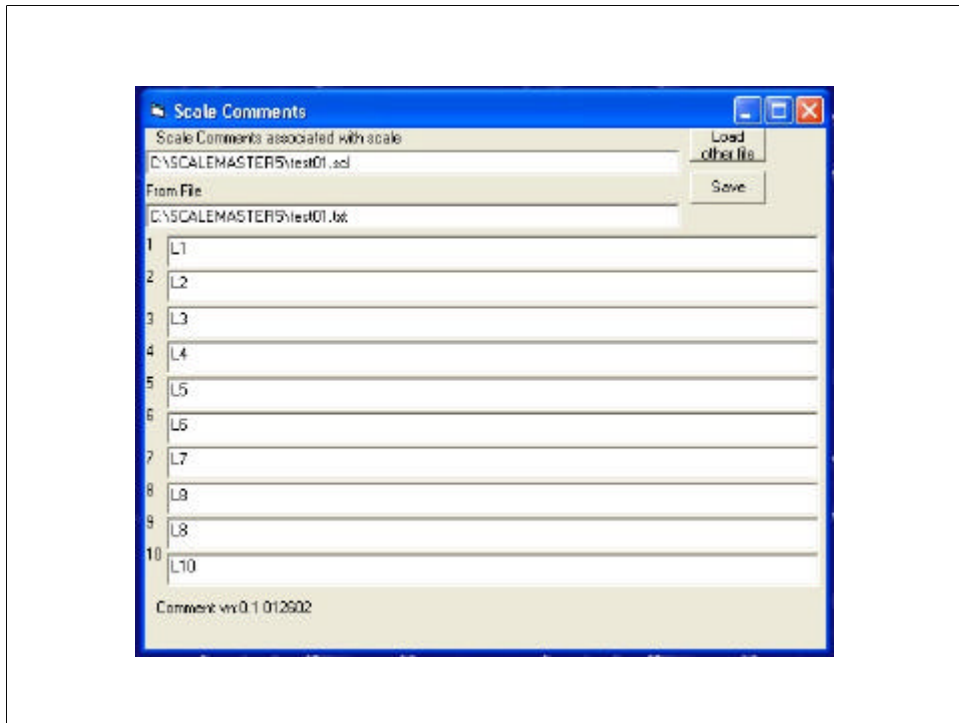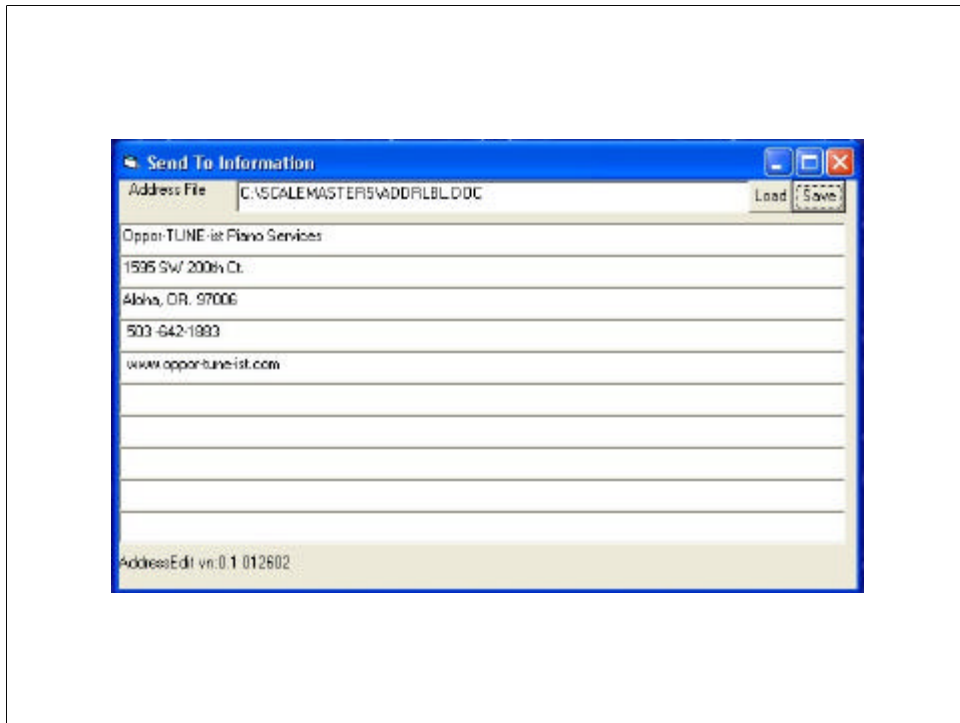
An example Scale Comments page.

Scale comments are opened from the main page or the data page.

Up to ten 80 character lines are provided.

Some comments might be:

1. Note 59 left Tied.

2. Hitch pin .173 diameter

3. Use .5" step on all double wrap strings

Each line is uniquely edited, but it IS a simple text file that can also be edited in NOTEPAD.

The Address file is accessible from the main page and data page.

This is a pretty important page to modify! If left unmodified your vendor will send the completed strings to me!

Although the extension for the file is .DOC it is the same as a text file (.txt) and can be edited in NOTEPAD
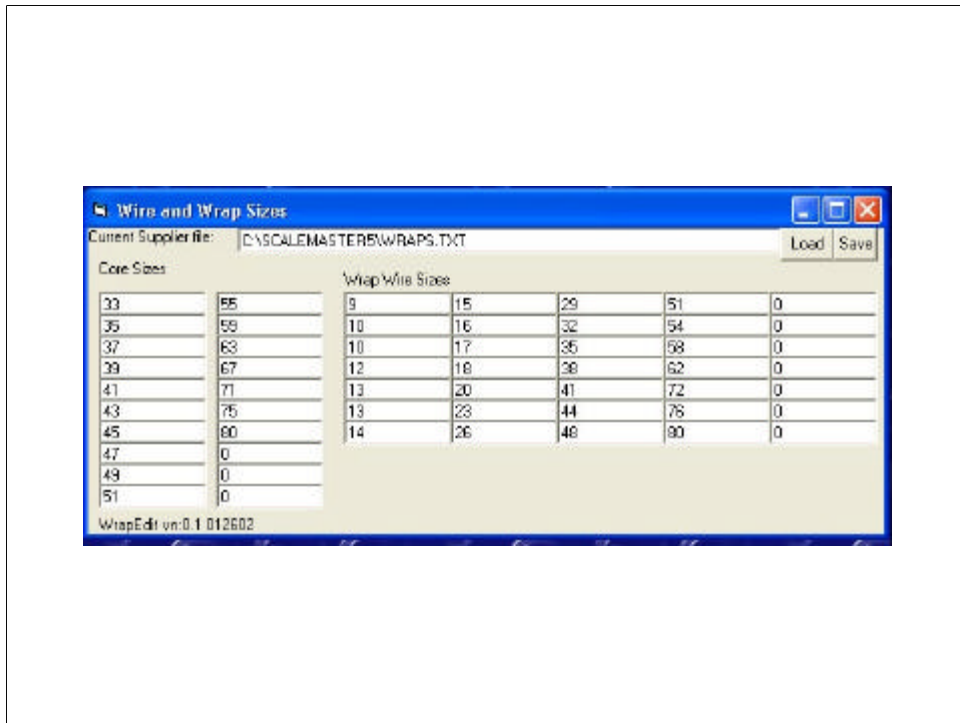
Editing from with in the program is recommended for this file even though iis a text file and can be edited with NOTEPAD because the number of slots in both the core and wrap wire size sections is critical to the program's data load routines.

But, you can see that you may get a list of wire sizes from your favorite vendor and edit the list.

The default file loaded at program launch is WRAPS.TXT. The program comes with sets of sizes from Schaffs, JD Grandts, and Issacs.

The file is important to verify that the supplier you choose can most closely match the ideal string specs you've determined using SCALEMASTER.
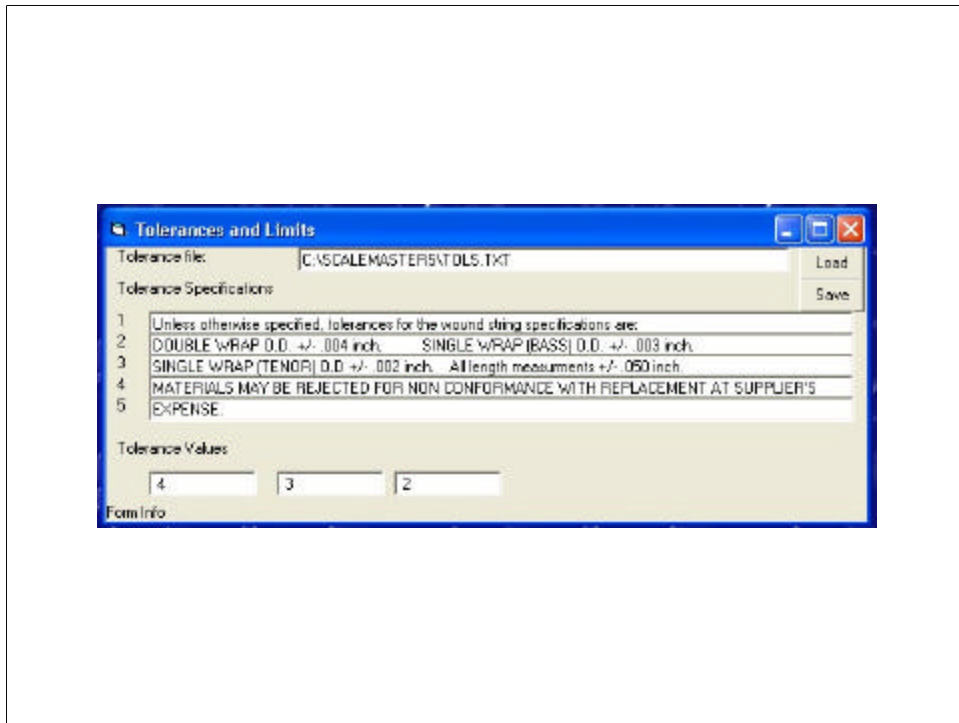
These are the default tolerances recommended. Most of the winders have no problem staying within these specs.

Tolerance Specification is needed to ensure quality as Quality in American Manufacturing is defined as "to specification within agreed tolerance."
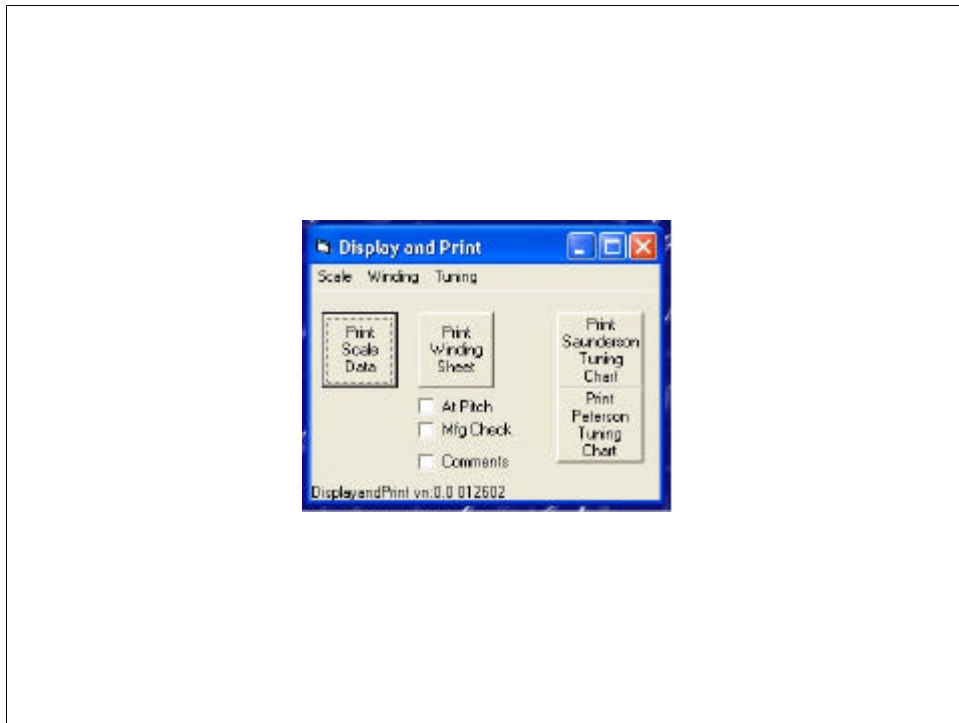
The examples of the print outs will follow the discussion of the print and display control page.

Pretty straight forward thoug.

The Scale data is a long form with all of the information (captured and calculated) for each note. I use this print out to know guage changes when I'm putting on the plain wire.

Winding sheet, either at pitch or not (pre-tension). The Mfg Check will include inside and outside wrap diameters (underwrap and overwrap). Comments may be added or not depending on if you wish your vendor to see them.

The 2 types of tuning charts are the Saunderson (NOTE, PARTIAL, TUNE, OFFSET) or the Peterson (NOTE, OCTAVE, OFFSET). The Saunderson type of chart can be used with the RCT and the Veritune systems as well as the Accutuner.

ALTHOUGH…. The charts are a calculated result based on the calculated inharmonicity, I've never used them for a fine tuning.
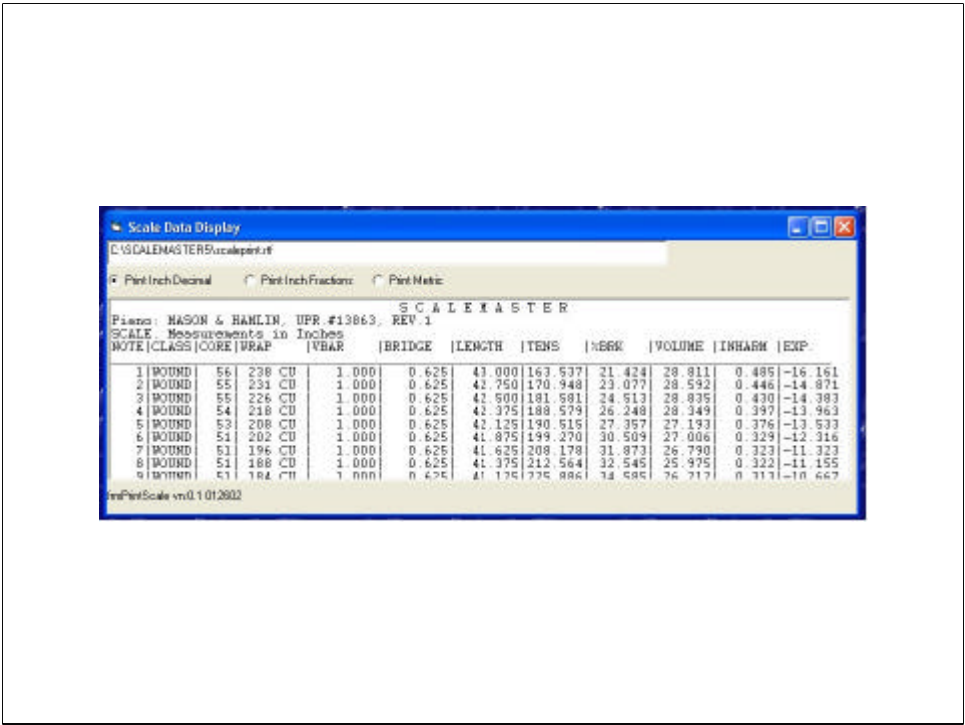
The print window display is CLUMSY and will be redesigned in a future release. You can scroll through the data and you do get the whole page when it prints.

This example is the scale data in inch decimal. Conversion to inch fraction or meteric can be done on this form before sending to the printer (a button added after the pictured release)
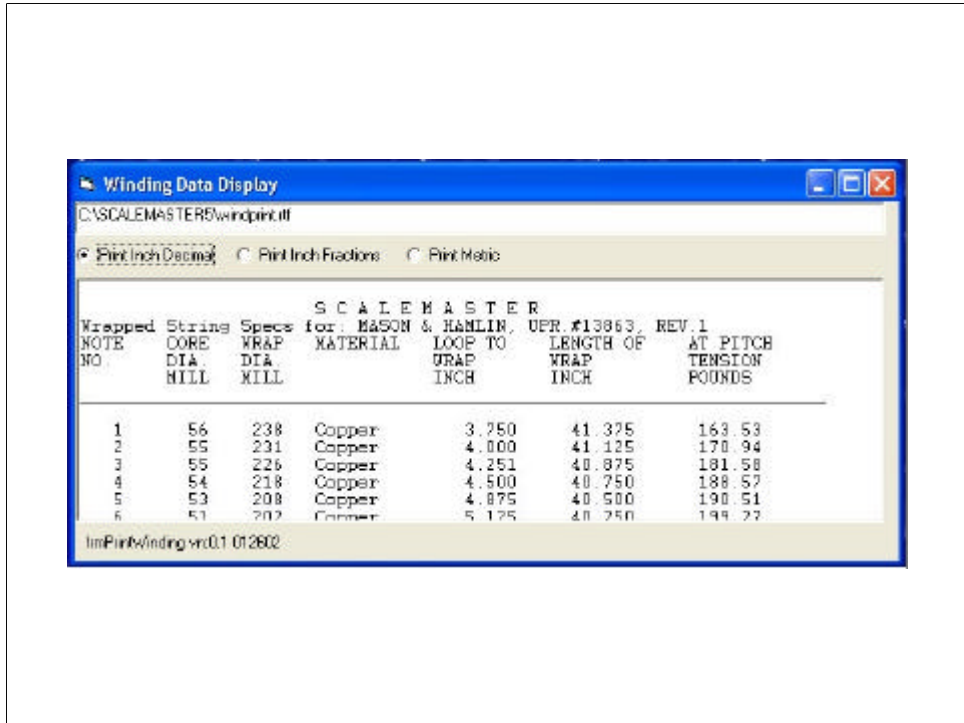
Example of print display winding specifications at pre-tension (no elongation)
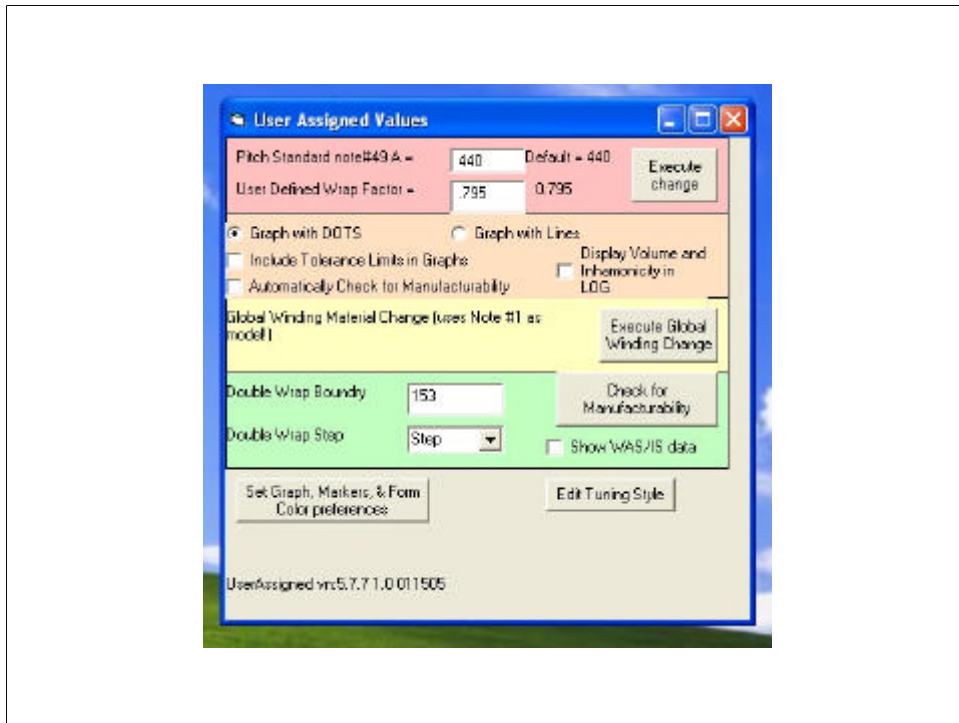
Ah, FEATURES abound on this page!

Here is where the pitch standard is set.

The user defined Wrap Factor (as a fraction of the specific gravity of copper, If you want to use some wrap material other than steel, copper, silver-Nickel, or alluminum… you'll need to do the research!)

Graph with dots or lines include tolerance limits (useful to know if a string is in but at the edge of wrap tolerance).

Display variations of volume and inharmonicity (log is the default)

GLOBAL winding material change. Oh yea, input the original scale using steel, then change the material on note 1 to copper and then hit the execute. Ever so much easier than note by note.

Double wrap boundary is a somewhat arbitrary value that determines the largest single wrap diameter desired.

Double wrap step standard selections of ½, ¾, 1 or 1 ½ inch distance from the start on the inner (under) wrap and the outter (over) wrap. This definitely affects inharmonicity.

Here is where you may select the graph and forms color scheme to suit you.

Tuning style: select the octave tuning (10:5, 6:3, 4:2, 2:1 etc) for each octave. Changes the calculation results of the tuning chart printouts.

Output Screens

- Graphics
  - Tension
  - Volume
  - Inharmonicity
  - Expansion
- Print outs
  - Winding data
 - Scale data
  - Tuning Charts

The next set of slides give examples of the outputs
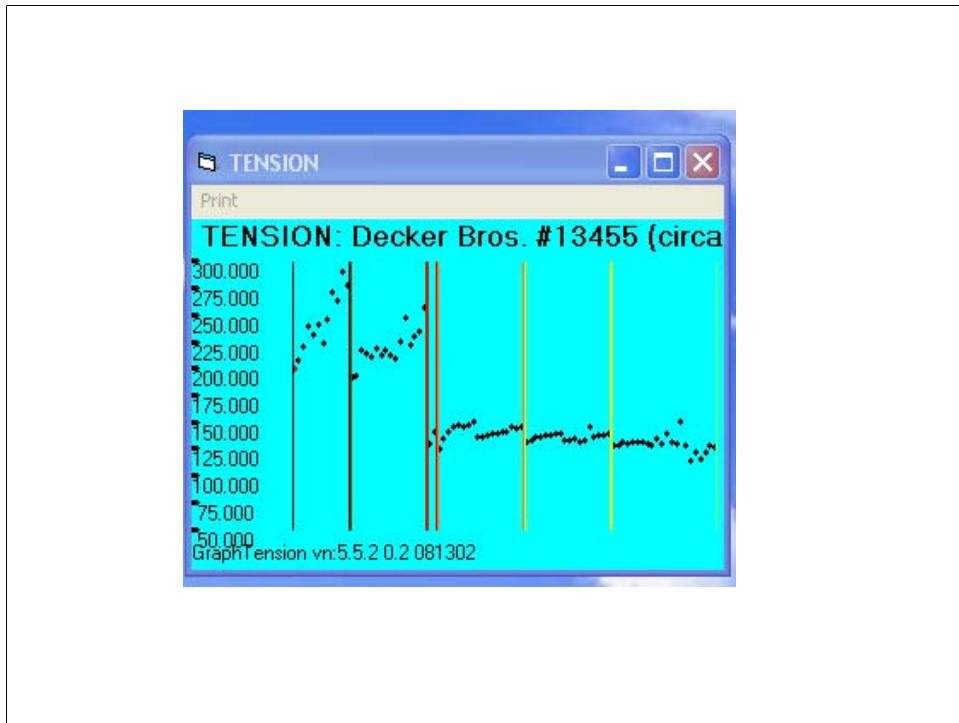
The vertical colored lines are section markers assigned on the Data page to easily track important change points Double wound – single wound, bass – tenor, strut positions

This presents a pretty interesting tension picture especially from bass to tenor.

It is but a part of the story as we need to look at the other graphs.
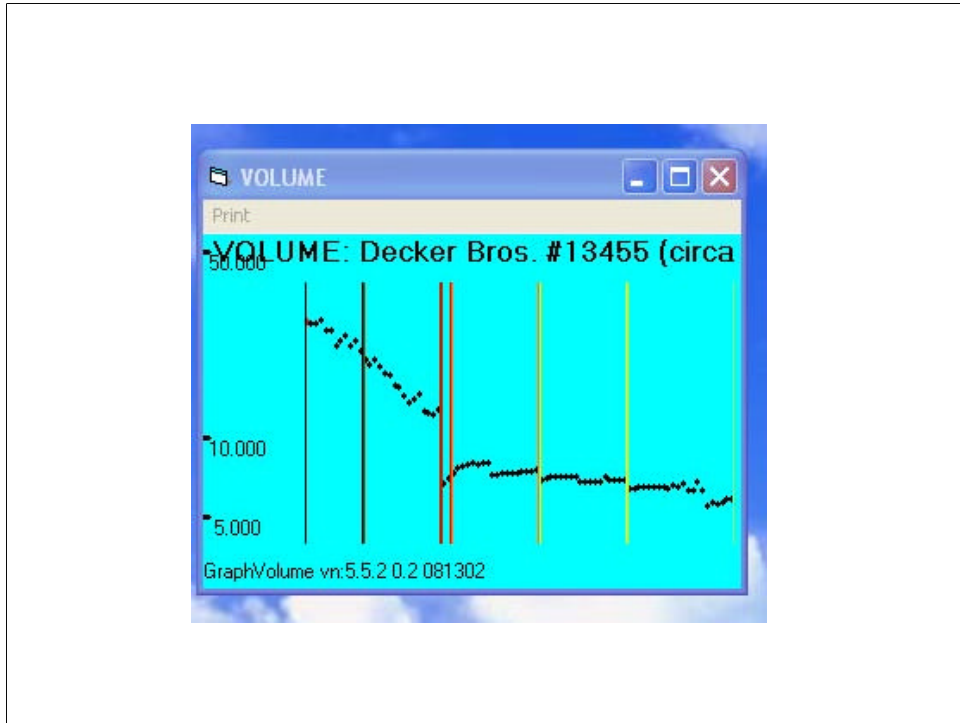
Look at the jump in volume from bass to tenor! Smoothing that out by up sizing the first few tenor guage sizes and reducing the wrap and core on the last of the bass looks to be in order. Then we can deal with the little inconsistancies.
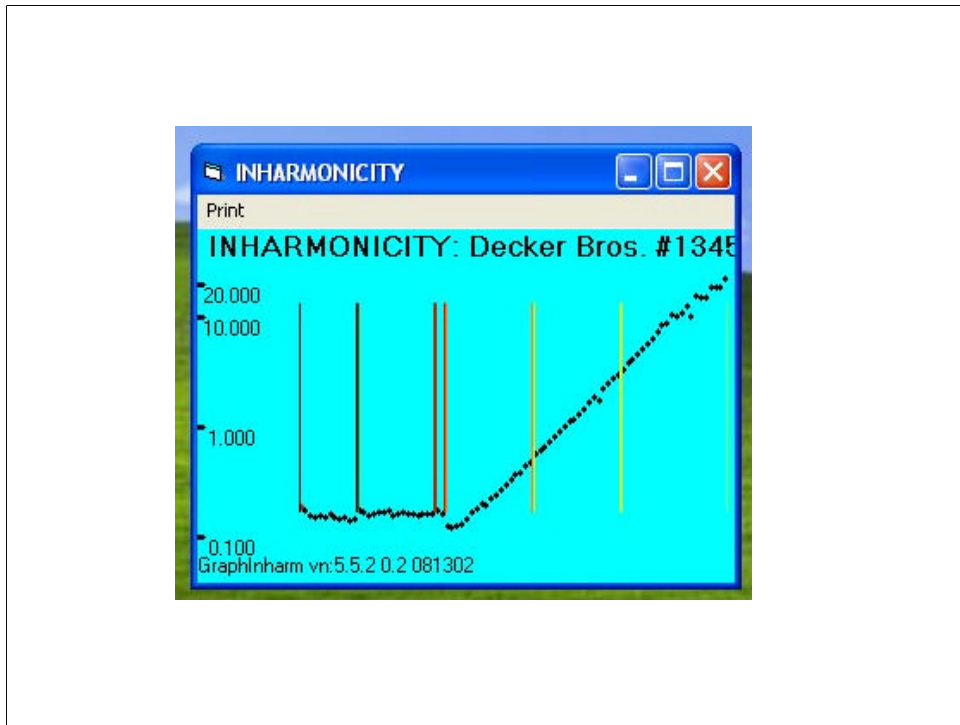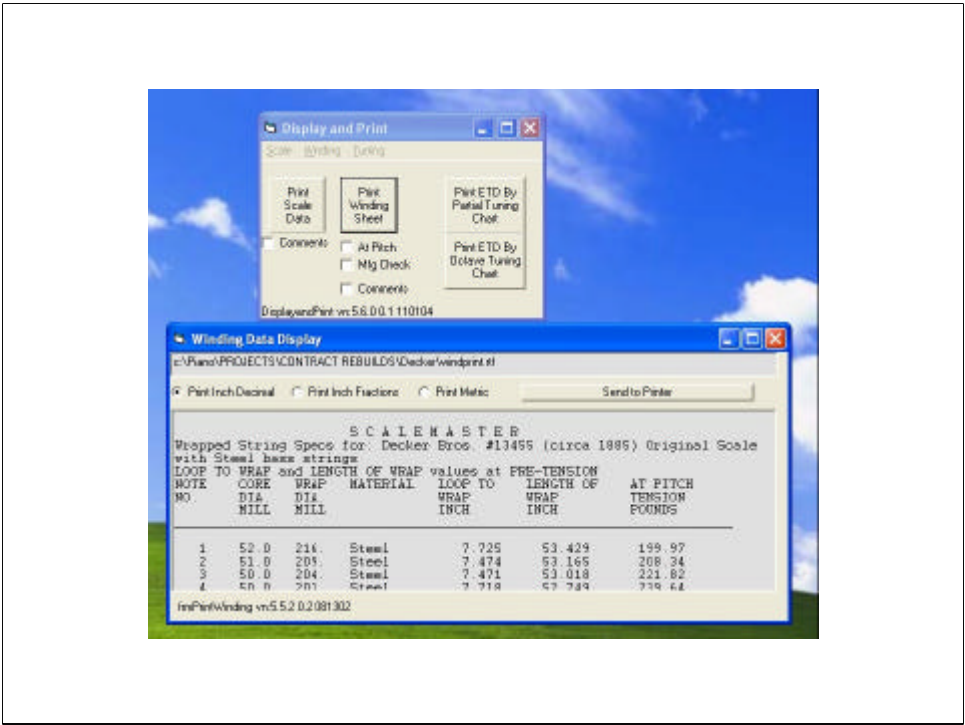
The inharmonicity curve doesn't look too bad, but I'll sacrifice a little here to get a better volume curve.

Better volume curve means less voicing.
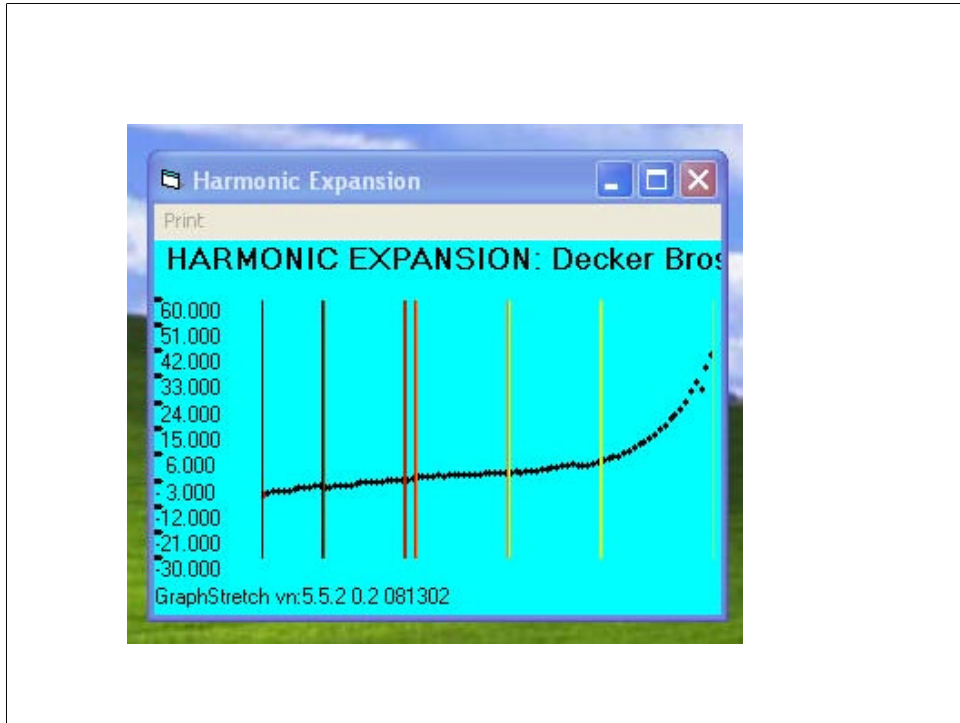
Expansion is a representation of the old "stretch" in a piano tuning an is a factor to watch but is ussally not my guiding light like volume might be.
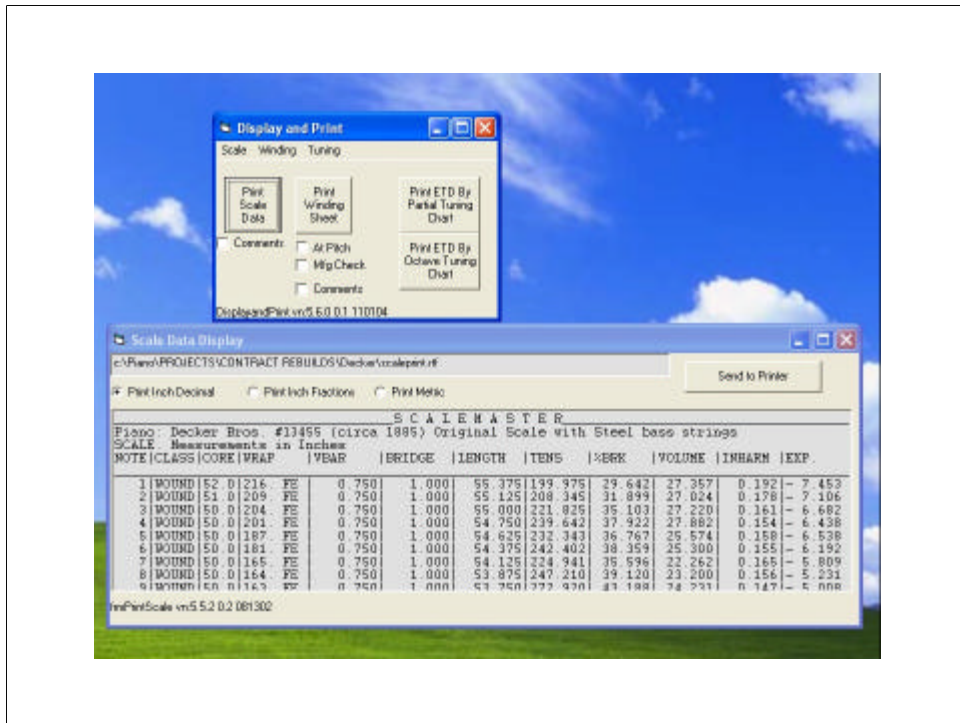
Scale data output display

Winding data display example

ETD (Saunderson style) tuning chart

Call 503 642 1883 or write opportuneist.pianoservice@verizon.net with questions.
Visit http://www.oppor-tune-ist.com/page/SCALEMASTER.html
for more information and purchase.

This small presentation cannot cover all of the aspects of the program. You may purchase the training video on VHS or DVD for $10 by sending email to opportuneist.pianoservice@verizon.net

You may submit a Purchase order for the software via http://www.oppor-tune-ist.com/page/SCALEMASTER.html . the software comes with the tutorial dvd.

Thank You.

Mark Gallant