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Support Materials for the Use of Pygraphic's <u>The Music</u>

<u>Writer</u> in the Beginning Music Theory Class at Sacramento

High School Visual and Performing Arts Center

An Action Research Project

Presented to Dr. Lois N. Harrison

University of the Pacific

In Partial Fulfillment of the Degree

Master of Arts in Teaching Music Education

by

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December, 1988

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Support Materials for the Use of Pygraphics' The Music
Writer in the Beginning Music Theory Class at Sacramento
High School Visual and Performing Arts Center

Introduction

This project grew out of my student-teaching experience
at Sacramento High School Visual and Performing Arts Center,
during the 1987-88 school year, when one of my primary
responsibilities was the beginning music theory class. I
introduced the class to the basic concepts of music theory,
and the supervising teacher, Mr. Ike Paggett, introduced the
students to the use of the computer as a tool for
composition.

The software chosen for use in the course is The Music
Writer, by Pygraphics. It is designed for professional use
as a music printing program, and has many advanced features
for data entry and transposition. The powerful features of
this program, and its current use in the professional music
field, led Mr. Paggett to choose it as a suitable vehicle
for the kind of preparatory experience that classes in the
Visual and Performing Arts Center require.

While discussing the difficulty of using professional
level productivity software in a high school music class
with Mr. Paggett, it became obvious that the support
materials necessary for successful integration of this
technology into the curriculum were not available. He and I

decided that part of my assignment would be to design those materials.

Statement of the Problem

The tutorial section that is included in the manual of Pygraphics' The Music Writer software is inappropriate for use in a beginning high school music theory course. No index is included in the manual, making it very difficult to use as a reference while using the program. The "Quick Reference Card" included with the manual (see Appendix A) has many advanced functions, but does not include beginning functions offered by the program, and does not explain any functions or refer the student to appropriate pages in the manual for an explanation.

Because these beginning functions are inaccessible to students without further explanation, the students are required to master the fundamentals of music without the needed support materials before they use the computer as a musical productivity tool. The integration of technology into the music classroom is artificial: the use of the computer is taught as a separate subject, instead of being used to help the students learn beginning musical concepts. The students were anxious to begin using the computer, and were frustrated by the necessary sequence of learning. They were also frustrated by the cumbersome process of learning how to use The Music Writer, which was made worse by the lack of an index.

Statement of Purpose

The objective of this project was to develop the necessary materials to facilitate the use of <u>The Music Writer</u> in the music theory class of Sacramento High School's Visual and Performing Arts Center. The materials were designed to correct the deficiencies in the program's documentation, and include tutorials that sequentially introduce beginning students to the basic features of the program.

The course is designed to teach skills and techniques in music fundamentals while providing students with practical experience involving the current technological advances in the field. These materials will enable the students to utilize professional level software in their study of basic music theory. Specifically, they will be able to use the program to write a simple diatonic melody, which has been composed as an assignment for the course.

Scope and Delimitations

The new materials produced as a result of this project are for use in the Sacramento High School Visual and Performing Arts Center's beginning music theory course. The program is <u>The Music Writer</u>, produced by Pygraphics. The necessary hardware consists of an Apple //e computer with a monitor, dual disk drive, mouse input device, and printer.

The students in the theory classes are in grades 9 through 12. Although a minimum proficiency at the piano is

recommended, it is not a prerequisite for the class. The class is open to all students, regardless of their involvement in the Visual and Performing Arts Center. Students range from serious music majors to those who are only casually interested in music.

The scope of this project is limited to materials and information necessary to facilitate the use of <u>The Music Writer</u> by high school students for writing a short diatonic melody. This is the smallest meaningful task that the program can effectively be used for, and can serve as an introduction to its use in the classroom.

It is assumed that students using the materials will have been introduced to the computer, and basic music symbols, either as a course prerequisite or as a beginning unit in the course. The basic computer skills that are necessary are: starting the computer, booting the program, accessing different menus, exiting the program, and shutting the computer off. The music symbols necessary are: clefs, time signatures, note and rest values, and bar lines. Using the computer with the basic materials will provide practice with these symbols, and a method of consolidating the knowledge.

The new support materials include tutorial lessons designed to teach how to use the basic functions of <u>The Music Writer</u> for composing a simple melody (see Appendix D), with a chart showing the menu items needed (see Appendix C).

The symbols are labeled, and page numbers included, for efficient use of the manual as a reference. The "Quick Reference Card" (see Appendix A) has been redesigned to include information at a basic level, while omitting more advanced information.

Definition of Terms

The terms defined are limited to those that may be considered unusual or misleading, or are used in a specific way in this project. Standard terms, such as disk drive, time signatures, etc., are not defined.

Boot: To start a computer and/or program.

Computer-assisted instruction (CAI): Any use of the computer in education, if the student is learning from the computer. This includes tutorials, drill and practice, simulation, and games. For the purpose of this project, using the computer as a productivity tool for melodic composition will not be considered CAI.

Documentation: Any printed material that accompanies software. This may include manuals, directions, tutorials, and reference materials.

MIDI: An acronym for Musical Instrument Digital Interface. It is a transmission protocol for digital music information. It is because of the standardization of the digital representation of musical events (note on, note off, etc.) their organization, and transmission sequence that electronic instruments from different manufacturers may be

connected to each other and, more importantly for educational purposes, to a computer. MIDI was developed by several electronic instrument manufacturers in 1982.

Mouse input device: An input device that controls cursor movement when it is rolled around on a flat surface. It is about the size of a cigarette pack, and is so named because the wire that connects it to the computer makes it look like a mouse with a long tail. There is a button on the mouse, which, when pushed, enters information into the computer, in much the same way that the return key functions.

Productivity software: Software designed as a tool for use by professionals to increase productivity. Examples of productivity software include word processors, data bases, spreadsheets, and music programs for printing, editing, recording, etc. Although not designed for educational purposes, these programs may be used in an educational setting if proper care is given to their incorporation. The programs are often so complex, and support materials so poorly designed, that computer stores offer classes in how to use the more common ones (e.g. Word Perfect, dBase III, Lotus 123).

Review of the Literature

The review of the literature contains many references to computers in education. These may be considered valid for the specific field of music education. There are few studies relevant to this project that have concerned music education, specifically.

History of Computers in Education

The use of computers in education began in the late 1950's (Alessi & Trollip, 1985; Chambers & Sprecher, 1983), but it was not until the late 1960's that the usage spread to music applications (Eddins, 1981; Steele & Wills, 1982). During 1970-73, the PLATO system (a large mainframe educational computer system that features a "touch-screen" for easy data entry) was investigated for potential music instruction, and was in full operation at the University of Illinois by 1973 (Eddins, 1981). The University of Delaware began developing the GUIDO system in 1974. Based on PLATO, it featured advanced sound capabilities, and improved instructional quality (Hofstetter, 1981).

The introduction of the microcomputer in the late 1970's has made the wide-spread use of computers in education possible, because of their relatively low cost (Alessi & Trollip, 1985; Bork, 1986; Chambers & Sprecher, 1983; Rosenthal, 1984; Shane, 1985). The development of MIDI (Musical Instrument Digital Interface), a transmission standard for digital music information, has made possible

advanced computer applications in music education (Moog,

1983; Rumery, 1985), such as computer-assisted ear training

using an electronic synthesizer for high quality, variable

sound.

The Uses of Computers in Education

Three types of computer use in education have been

reported by Boyer (1984) and Stewart (1981): learning about

computers, learning from computers, and learning with

computers. Learning about computers includes programming

and computer literacy courses; learning from computers

through the use of tutorial, drill and practice, or

simulation programs is commonly called computer assisted

instruction; learning with computers utilizes the computer

as a tool while the student is engaged in an educating

project (e.g. using music writing software while studying

musical composition).

Some writers (Becker, 1987; Schneiderman, 1984) have

reported that the most prevalent use of computers in

education is learning about them, while others (Fiske, 1983;

Jones, 1975) report that learning from computers is most

prevalent. Unfortunately, many writers state that these are

the least efficacious uses of computers, and that only by

learning with them will we realize the true potential that

they have to offer education (Hill et al., 1988; Olds, 1984;

Papert, 1980; Stewart, 1981; The, 1982b).

Software and Support Materials

Although there have been many reports of the accelerating use of computers in education (Eddins, 1981; Fiske, 1983; Miner, 1983; Naiman, 1987; Osgood, 1987), a shortage of good software has been declared (Bork, 1986; Chambers & Sprecher, 1983; Vaughn, 1977; Wrege & Watt, 1982). Some of the faults are: a lack of sound pedagogy (Dudley-Marling & Owston, 1987; The, 1982a), difficulty in integrating the software into the curriculum (Bonner, 1984; Ediger, 1988; Emmett, 1983), and documentation materials that are either inadequate or non-existent (Dudley-Marling & Owston, 1987; Fawcette, 1983; Marsh, 1984; Rosenberg, 1984; Wrege, 1982).

Jolicoeur & Berger (1988) claim that support materials must be written for most educational software, and Scherer (1986) suggests that documentation should not be written by the programmer, but by someone with expertise in communication.

In the specific field of music education, no major study was found that adequately addressed the above issues, except for the shortage of quality software (Jones, 1975).

Procedures

The support materials created in this project for the use of computers in music education are intended to:

1. Clarify the operation of the program.

2. Help fit the program into the curriculum.

3. Make use, in an educational setting, of software designed as a productivity tool.

The need for support materials for Pygraphic's The Music Writer in the Sacramento High School Visual and Performing Arts Center's beginning music theory class was identified through observation, and discussion with the cooperating music teacher. An action research design was decided to be the most feasible for the project, because of the interactive style of teaching and learning in the Visual and Performing Arts Center, as well as the mutual interests of the student teacher and the cooperating teacher. This design allowed the project to benefit from an informal approach, a great deal of discussion among the teachers and the students, and many revisions.

Students were consulted about the materials as they were being produced, but the project was completed after they had advanced beyond the level of the tutorials. Their comments helped direct the revisions, and their enthusiasm about the project was reassuring. Several expressed the belief that the materials would, indeed, be a positive addition to the course.

One reference tool, the "Quick Reference Card," is provided with the manual (see Appendix A). It does not explain the choices on menu one, but it does have information about many of the advanced functions of the program.

A preliminary chart was created by combining the "Data File Function Overview" (page 3-2 of The Music Writer manual), which describes the choices on menu one, with menus two through five from the Quick Reference Card. All other information on the Quick Reference Card was omitted, since it concerned more advanced program functions. A description of all of the symbols on menus two through five was added to the preliminary chart.

After discussion with the students and consultation with the cooperating teacher, the preliminary chart was redesigned (see Appendix C), limiting the information to that which is necessary for writing a short diatonic melody. Only appropriate portions of menus one, two, and five were used.

Observation of student difficulties, and discussions with the students and the cooperating teacher, made it clear that the tutorial provided in the manual was too advanced for use in the class, and that several shorter tutorials that focused on different symbols and skills prerequisite to composing a melody would be more helpful (see Appendix D). In this manner, the students could learn about the symbols,

practice them with paper and pencil, and then get more practice with them on the computer. The symbols decided upon were the staff, treble and bass clefs, time signatures, note and rest values, and bar lines. The inclusion of pitch identification was also deemed necessary.

During the summer months, after completion of the student teaching year, the designs of the Quick Reference Card and the tutorials was refined, taking their current shapes. The tutorials were designed flexibly, allowing them to be used with a variety of lesson plans. Each tutorial is preceded by a list of the knowledge and skills needed before attempting the lesson. Objectives for each tutorial were specified; they are listed at the beginning of each tutorial in Appendix D.

Suggestions and Summary

Students need to be taught the basic operation of the computer, including turning on the power, starting the program, using the mouse, etc. Before attempting a tutorial, the prerequisite musical knowledge for that tutorial must also be understood.

The tutorials (Appendix D) in this project are designed so that they may be used flexibly, within any appropriate curriculum. Their purpose is to lead students into the program, and give them practice manipulating the symbols. They may be allowed to manipulate the symbols as they wish, or they may be given a specific assignment, such as "Create a row of alternating treble and bass clefs." They should always be given time to practice with the tutorial, before being given a specific assignment.

The "Quick Reference Card II" (Appendix C) enables a student to see all of the menus in one place, with the page numbers where the symbols are discussed in the manual. Page numbers are given only for the symbols used in the tutorials.

This project attempts to fill two needs identified in the use of computers in education:

1. Support materials are often inadequate.

2. Software integration into the curriculum is difficult.

These needs were seen to exist with the use of Pygraphic's <u>The Music Writer</u> in the Sacramento High School Visual and Performing Arts Center beginning music theory class. If students are to benefit from the manipulation of computers as tools in the learning process, adequate support materials must be available, and a plan must be devised to integrate computer use into the curriculum. The support materials presented in this project were designed to solve these problems.

It is recommended that further tutorials are designed for the intermediate and advanced levels of <u>The Music Writer</u> program. Also, basic musical concepts (e.g. names and values of notes and rests, symbol identification, etc.) could be learned with the assistance of computer assisted instructional software, such as that produced by the Minnesota Educational Computing Consortium (MECC) or Educational Courseware Systems (ECS).

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APPENDIX A

Quick Reference Card

| | MENU 2 | | MENU 3 | | MENU 4 | | MENU 5 |

MENU 2　　　　　MENU 3　　　　　MENU 4　　　　　MENU 5

==

MENU 1 - FILE
V)iew L)oad S)taves R)ename D)elete E)rase C)hange B)ackup X)

MENU 6 - BLOCK
　　C)opy M)ove F)rom disk E)xtract Z)ap S)hift T)ranspose
　　　　　　　I)nvert R)etrograde Q)uantize

MENU 7 - MIDI IN
　　　E)dit Options　R)ecord　D)isplay　Steptime is O)n

MENU 8 - MIDI OUT
　　M)idi-Chanls　V)ol　T)empo　S)taves-plyed　I)nstmnt-key

MENU 9 - AUTO FUNCTIONS
　　　Auto Beaming　Add Beams　Zap Beams　Measure Check
　　　　　　　Measure Count　Staff Move

==

Adjust Pitch-->

Rests　　　　　--> SPACEBAR

Beaming　　　　--> ^B

Stem Change --> ^C

Stem Up　　　　--> <

Stem Down　　　--> >

Delete　　　　 --> DELETE

Rest　　　　　 --> REST

Bar Line　　　 --> TAB

Lock Ledger --> Open Apple

==

APPENDIX B

Preliminary Chart

V)iew......Displays the directory (list of file names)
           currently stored on your data disk.

L)oad......Gets the data from a particular file and displays
           it on the screen for viewing or changing.

N)ew.......Creates a new data file on the data volume.

S)taves....Changes the number or spacing of staves displayed
           on the screen.

R)ename....Changes the name of a file.

D)elete....Permanently removes a file from the data volume.

E)rase.....Erases ALL of the files on a data volume.

C)hange....Changes to another data disk volume.

B)ackup....makes a copy of a file onto the same data volume.

X)it.......Exits the program for linking to another program,
           such as Music Writer Printer program.

MENU 2

Left label			Right label
UN-TIE			TIE
UN-BEAM			BEAM
FORCE STEMS			FORCE STEMS
NO STEM		STM	REVERSE EDIT
		TXT	ADD TEXT
ACCIDENTALS			ACCIDENTALS
NOTE VALUES			NOTE VALUES
			BAR LINE
DOUBLE DOT	••	•	DOT
REST	RST		TUPLET
INDEFINITE PITCH	×	◇	INDEFINITE PITCH
CUE NOTE	CUE	GRC	GRACE NOTE
EXCHANGE	EXC	DEL	DELETE

MENU 3

Left label			Right label
ARTICULATIONS			ARTICULATIONS
BOWINGS			BOWINGS
ORNAMENTS			ORNAMENTS
PERCUSSION MARKS			
	—	LYR	ADD LYRICS
EXCHANGE	EXC	DEL	DELETE

MENU 4

Left label			Right label
DYNAMICS			DYNAMICS
FERMATA			SEGNO
BREATH MARK			ASTERISK
ENDING TIE			CODA
PREVIOUS MEASURE			GRAND PAUSE
REPEAT SIGNS	‖:	:‖	DOUBLE BAR
	·‖	‖·	END BAR
TIME MARKING			REST
ENDING			REHEARSAL MARKER
EXCHANGE	EXC	DEL	DELETE

MENU 5

Left label			Right label
KEY SIGNATURES	E	A	KEY SIGNATURES
	B	D	
	F#	G	
	C#	C	
	Db	F	
	Gb	Bb	
	Cb	Eb	
		Ab	
TIME SIGNATURES	C	₵	TIME SIGNATURE
CLEFS			CLEFS
OCTAVES	8va	8vb	OCTAVES
	15	15	
EXCHANGE	EXC	DEL	DELETE

APPENDIX C

Quick Reference Card II

Menu 1

V)iew......Displays the directory (list of file names)
p. 3-4   currently stored on your data disk.

L)oad......Gets the data from a particular file and displays
p. 3-4   it on the screen for viewing or changing.

N)ew.......Creates a new data file on the data volume.
p. 3-5
S)taves....Changes the number or spacing of staves displayed
            on the screen.

R)ename....Changes the name of a file.

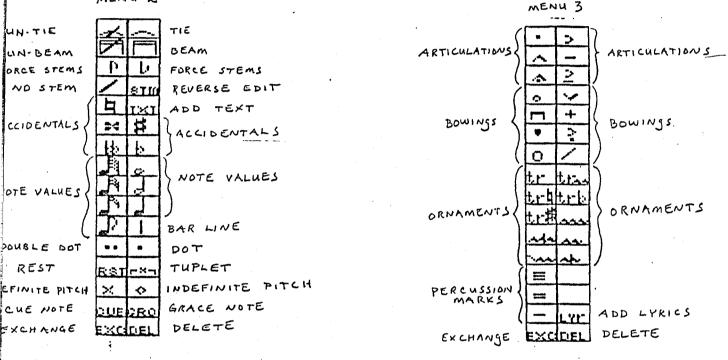D)elete....Permanently removes a file from the data volume.

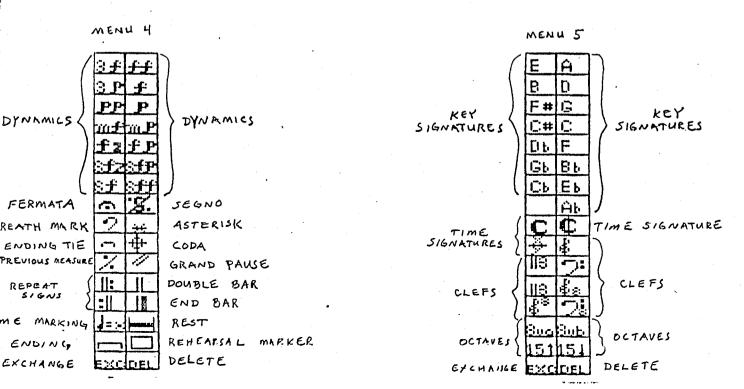E)rase.....Erases ALL of the files on a data volume.

C)hange....Changes to another data disk volume.

B)ackup....makes a copy of a file onto the same data volume.

X)it.......Exits the program for linking to another program,
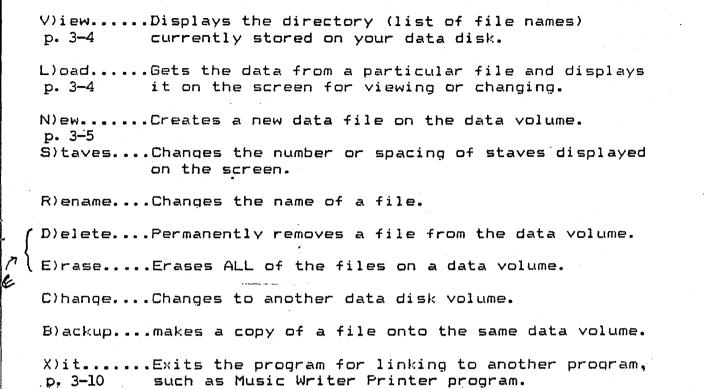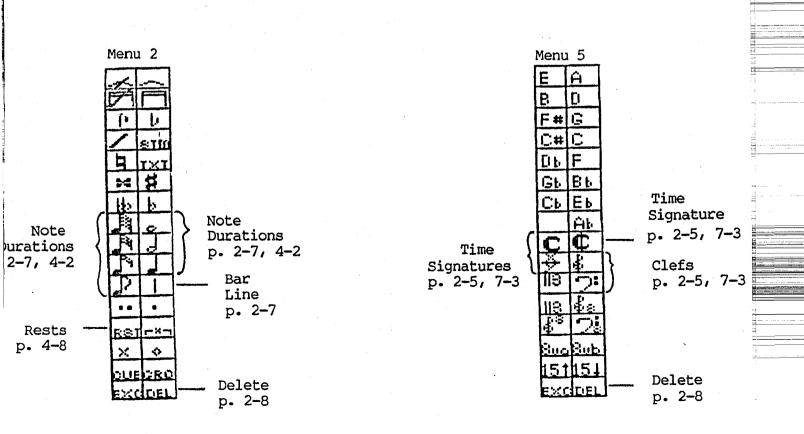.p. 3-10   such as Music Writer Printer program.

Menu 2

Note
Durations
2-7, 4-2

Rests
p. 4-8

Note
Durations
p. 2-7, 4-2

Bar
Line
p. 2-7

Delete
p. 2-8

Menu 5

Time
Signatures
p. 2-5, 7-3

Time
Signature
p. 2-5, 7-3

Clefs
p. 2-5, 7-3

Delete
p. 2-8

APPENDIX D

Tutorial

Lesson 1

Before you begin Lesson 1, you should know how to identify the treble and bass clefs, and time signatures. You should also know how to start the computer, get to menu 1, and exit the program. All key presses are underlined. For example, Press 5 to get to menu #5.

In Lesson 1, you will learn:

A. How to create a new file to practice with.

B. How to select a clef or time signature from menu #5, and place it on the staff.

C. How to delete a symbol from the staff.

D. How to save your new file on the disk.

Once you have reached menu #1:

1. Press N to create a new file.

2. Type the name of the file you are creating. Practice 1, Lesson 1, or Tutorial 1 will work, if you don't have another name. Remember to write the name down, so you don't forget it!

3. Press 5 to get to menu #5.

4. Select a symbol on the menu by moving the cursor onto the symbol and clicking the mouse button. If you choose the X/Y time signature, follow the directions on the screen to enter the top and bottom numbers.

5. Move the cursor along the staff. Notice that the two vertical dotted lines (the ledger cursor) follow the cursor. When you click the mouse button, the symbol

you have selected from the menu will be placed wherever

the ledger cursor is located.

6. Place a symbol on the staff by clicking the mouse

button.

7. Select another symbol on the menu, and place it on the

staff.

8. To remove a symbol from the staff, select DEL from the

menu.

9. Place the ledger cursor on the symbol you want removed,

and click the mouse button.

10. Practice until you feel comfortable with the process.

11. Press 1 to save your file on the disk.

12. Exit the program.

Lesson 2

Before you begin this lesson, you should complete Lesson 1, and practice until you are comfortable with the skills introduced there.

In Lesson 2 you will learn:

A. How to load a file from the data disk.

B. How to select note durations from menu #2.

C. How to place note durations on the staff.

All key presses are underlined.

Once you have reached menu #1:

1. Press V, to view the names of files on the data disk.

2. Choose the file name that you want.

3. To load the file, press L, type the file name, and press return.

4. Press 2 to get to menu #2.

5. Select a note duration by clicking the mouse button on it.

6. Move the cursor to the staff. The ledger cursor determines the horizontal placement of the note. The solid cursor (square box) determines the vertical placement of the note. Make sure you place the note duration symbol on the correct line or space of the staff, so that the correct pitch will be indicated.

7. You may use the delete (DEL) function to remove notes from the staff.

8. Continue selecting, placing, and deleting notes until you feel comfortable with the process.

9. Press 1 to save your file to the data disk.

10. Exit the program.

Lesson 3

Before you begin this lesson, you should complete
Lesson 2, and practice until you are comfortable with the
skills introduced there.

In Lesson 3 you will learn:

A.   How to select rest durations from menu #2.

B.   How to place those durations on the staff.

Once you have reached menu #1:

1.   Load a file from the data disk, or create a new file.

2.   Press 2 to get to menu #2.

3.   Select a note duration from the menu.

4.   Select RST (rest). This changes the note duration to a
     rest duration. Notice that both the note duration and
     RST are highlighted in the menu.

5.   Place the ledger cursor where you want the rest
     located, and press the mouse button.

6.   Practice selecting different rest values and placing
     them on the staff.

7.   You may use DEL to delete rests.

8.   Save your file on the data disk when you are finished.

9.   Exit the program.

Lesson 4

Before you begin this lesson, you should complete Lesson 3, and practice until you are comfortable with the skills introduced there.

In Lesson 4 you will:

A.   Learn how to select bar lines, and place them on the staff.

B.   Practice with notes, rests, and bar lines.

Once you have reached menu #1:

1.   Load a file from your data disk, or create a new one.

2.   Press 2 to get to menu #2.

3.   Practice selecting notes and rests.   Review Lessons 3 and 4, if necessary.

4.   Select | (bar line).

5.   Place the ledger cursor where you want the bar line, and press the mouse button.

6.   Practice selecting and placing notes, rests, and bar lines.

7.   You may use DEL to delete bar lines.

8.   Save your file on the data disk when you are finished.

9.   Exit the program.

Lesson 5

Before you begin this lesson, you should complete Lesson 4, and practice until you are comfortable with the skills introduced there.

In Lesson 5 you will:

A. Learn how to move from one menu to another.

B. Practice combining all of the symbols that you have learned so far.

Once you have reached menu #1:

1. Load a file from your data disk or create a new file.

2. Select a clef, and place it in its proper place on the staff.

3. Select a time signature, and place it in its proper place on the staff.

4. Remember, you may use DEL to delete any of the symbols.

5. Press 2 to get to menu #2.

6. Select and place notes, rests, and bar lines on the staff. Remember to keep the right number of beats in each measure, according to the time signature.

7. You may use DEL to delete any of the symbols.

8. Continue until you have practiced enough, or until your melody is completed.

9. Press 1 to save your file on the data disk.

10. Exit the program.