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PIANO TUNER

PERSONAL DEVELOPMENT

Learn piano tuning, tone generation, and ear training
(ages 16 and up)

by **R.J. Morgan**

Requires: ATARI BASIC Language Cartridge

One ATARI Joystick Controller

Tuning hammer

Damping wedges or felt

Cassette version (1):
(APX-10216)

ATARI 410 Program Recorder
16K RAM

Diskette version (1):
(APX-20216)

ATARI 810 Disk Drive
24K RAM

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Edition A

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Introduction

OVERVIEW

PIANO TUNER features a step-by-step guide to piano tuning, specific tone generation and ear training.

The piano TUNING PROCEDURES takes you through tuning a piano from damping off the strings with wedges to tuning all the strings on the piano.

SINGLE TONE generation allows you to create a specific pitch on the computer. This feature is useful when you've gained experience in tuning, and when you need to tune other instruments.

Use EAR TRAINING to train your ear in hearing beat tones. This skill is essential for piano tuning. This option generates two sounds, and using the joystick, you can increase or decrease the pitch of the second sound until the two are identical.

REQUIRED ACCESSORIES

ATARI BASIC Language Cartridge
One ATARI Joystick Controller

Cassette version

16K RAM
ATARI 410 Program Recorder

Diskette version

24K RAM
ATARI 810 Disk Drive

Tuning hammer
Damping wedges or felt

CONTACTING THE AUTHOR

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SPECIAL TERMS AND NOTATIONS

Pitch

Pitch is the frequency of the sound wave in cycles per second. This program uses the international standard pitch of A440 as its basis for generating sound.

Beat

When two sounds produced together have the same frequency, or pitch, the result is a pure tone. If one sound has a greater pitch, or frequency, the resulting sound increases and then decreases as the two pitches coincide and then move apart. This produces a beating or wavering sound called a "beat tone". The number of beats per second is the mathematical difference in the pitch of the two sounds. For example, a 440 cycle per second (hertz) sound and a 442 sound produces a sound with a two cycle per second beat.

Notation

This program labels the pitches it produces using the letter name of the sound (i.e., A) and its frequency (440 cycles per second) — A440. Whenever necessary, the program truncates the frequency to the nearest integer. For this reason, the frequency may not exactly match the notation in other references, with this exception: the notation for the pitch A — A440, A220, A1760 — is always accurate.

REFERENCES

The author recommends that you read the following book thoroughly before you attempt to tune a piano:

H. Stanton Woodman, How to Tune a Piano, First Edition,
86 pages, Corwood Publishers, 1963.

Getting started

LOADING PIANO TUNER INTO COMPUTER MEMORY

1. Insert the ATARI BASIC Language Cartridge in the cartridge slot of your computer.
2. If you intend to use the EAR TRAINING or SINGLE TONES features, plug your Joystick Controller into the first controller jack of your computer console.

3. If you have the cassette version of PIANO TUNER:

- a. Connect your program recorder to the computer and to a wall outlet.
- b. Turn on your computer and your TV set.
- c. Slide the PIANO TUNER cassette into the program recorder's cassette holder and press REWIND on the recorder until the tape rewinds completely. Then press PLAY.
- d. Type CLOAD on your computer and then press the RETURN key two times. The tape will load into computer memory.
- e. After the tape finishes loading, the word READY will display on your TV screen. Type RUN and press the RETURN key. The program's first display screen will appear on your TV screen.

If you have the diskette version of PIANO TUNER:

- a. Have your computer turned OFF.
- b. Turn on your disk drive.
- c. When the BUSY light goes out, open the disk drive door and insert the PIANO TUNER diskette with the label in the lower right-hand corner nearest to you. Close the door. (Use disk drive one if you have more than one drive.)
- d. Turn on your computer and your TV set. The program will load into computer memory and start automatically.

THE FIRST DISPLAY SCREEN

When the program has loaded into computer memory, you hear Beethoven's "Adieu to the Piano". The following screen displays:

PIANO TUNER

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BY

R J MORGAN

Figure 1 First display screen

Next, the main menu appears:

PIANO TUNER

MAIN MENU

> TUNING PROCEDURES
SINGLE TONES
EAR TRAINING

PRESS SELECT TO MOVE
CURSOR. PRESS START
TO PERFORM OPERATION

Figure 2 Main menu

The "greater than" sign (>) displays as a cursor next to the menu option you're selecting. Press the SELECT key to move it to another option. When the cursor appears next to your choice, press the START key.

At any time, you may press the OPTION key to go back to the main menu.

For step-by-step piano tuning, select TUNING PROCEDURES and press the START key.

To train your ear to hear beat tones and to tune pitches until the beat tones disappear, select EAR TRAINING and press the START key.

This option guides you through the steps in tuning your piano. The following screen displays to help you:

A	A#	B	C	C#	D

START= NEXT STEP; OPTION=MENU

The first step is to dampen with a rubber wedge or felt strip the outer strings of A220 — the A below middle C — and the outer strings of the remaining notes to G# above middle C. Be sure that the center string of these notes can sound freely.

-5-

The program sounds an A#. Tune the center A# string on your piano to match this pitch and then press the RETURN key. Repeat this step for B, middle C, C# and so on through G#.

After you've tuned the center strings, remove the left wedge of the A220. The program sounds an A220 again. Tune the left string and press the RETURN key. Next remove the right wedge, tune the right string and press the RETURN key. Repeat this procedure for the A#, B, C and so on through G#.

When you've tuned the first octave, the program takes you through the same steps for the octave beginning with A440 - one octave above the octave you just tuned. Tune the remaining octaves on the piano in the order of A110, A880, A55, A1760, and A27.5.

SINGLE TONES

This option allows you to generate any of the 88 possible pitches on a piano. The following screen displays to help you:

INDIVIDUAL TONES Frequency of A

A=	28	55	110	220	440	880	1760	3520
Pitch	String Number							
A	1	13	25	37	49	61	73	85
A#	2	14	26	38	50	62	74	86
B	3	15	27	39	51	63	75	87
C	4	16	28	40M	52	64	76	88
C#	5	17	29	41	53	65	77	
D	6	18	30	42	54	66	78	
D#	7	19	31	43	55	67	79	
E	8	20	32	44	56	68	80	
F	9	21	33	45	57	69	81	
F#	10	22	34	46	58	70	82	
G	11	23	35	47	59	71	83	
G#	12	24	36	48	60	72	84	

40M = Middle C

Up	Joystick moves cursor
Left Right	as shown. Press trigger
Down	to start sound or OPTION
Joystick	for main menu

Figure 4 Single tones display

The menu lists, from left to right, each of the A's labeled with the pitch of that A. Below each A is the note number of each note in the octave beginning with the A. For example, A220 is note 37. A# is 38. B is 39. Middle C is 40. To help you locate the proper octave, middle C displays with an inverse video M.

Use the joystick to select a pitch you want the program to sound. Hold the joystick with the red button in the upper left hand corner. Move the joystick UP (toward the screen, away from you) to move the blinking cursor up the column. Move the joystick UP from the top of the column to return the cursor to the bottom of the previous column. You can't move back past note one. Move the joystick DOWN to move the cursor down the list. As with UP, when you reach the bottom of the column, the cursor advances past note 88. Moving the joystick to the left or right to move the cursor from one column to another.

To sound the pitch of the note under the cursor, press the red joystick button. When you move the joystick, the sound is turned off.

The program sounds the correct pitch. The pitch continues to sound until you select another or until you return to the main menu by pressing the OPTION key.

EAR TRAINING

Ear training allows you to select a pitch; the program selects another pitch at random within fifteen cycles per second of the first pitch. The objective is to use the joystick to increase or decrease the pitch of the second sound until it matches the pitch of the first sound; to tune the pair until they are beatless.

A menu of pitches to select displays at the bottom of the screen:

A A# B C C# D D# E F F# G G#

A blinking cursor displays over the 'A'. By moving the joystick to the left or right, move the cursor until it's over the pitch you wish to select. Press the red joystick button to start the ear training with the pitch you've selected.

The pitch of the first sound displays on the monitor. The program selects another pitch within fifteen cycles per second of that pitch at random, and sounds both.

Moving the joystick UP increases the pitch of the second sound. Moving the joystick DOWN decreases the pitch. Moving the joystick in other directions has no effect.

When you think the pitches match, press the red joystick button. If the pitches are the same (or within one tenth of a cycle per second), the message "PITCHES MATCH!" displays. If the pitches aren't the same, the message "Pitches don't match" appears.

If you get stuck, you can press the START key, and the pitch of the second sound displays briefly.

By listening to the beat tones, you can determine how far apart the two pitches are. The more beats per second, the farther apart the pitches are. Remember that the number of beats per second is the mathematical difference between the two pitches.

To leave the EAR TRAINING option, press the OPTION key.

SPECIAL FUNCTION KEYS

OPTION

Use the OPTION key to leave an option and return to the main menu. Use it whenever the following prompt displays:

Press RETURN = NEXT STEP; OPTION = MENU

SELECT

Use the SELECT key to move the cursor (>) on the main menu. In the TUNING PROCEDURES option, use it to advance from one step to another.

START

Use the START key to start an option that's flagged with the cursor (>) in the main menu.

PROGRAM LIMITATIONS AND WARNINGS

PIANO TUNER and this manual are tools to help you tune a piano. They aren't intended to be an exhaustive reference on the subject, nor are they intended to replace a professional piano technician.



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Review Form

We're interested in your experiences with APX programs and documentation, both favorable and unfavorable. Many of our authors are eager to improve their programs if they know what you want. And, of course, we want to know about any bugs that slipped by us, so that the author can fix them. We also want to

know whether our instructions are meeting your needs. You are our best source for suggesting improvements! Please help us by taking a moment to fill in this review sheet. Fold the sheet in thirds and seal it so that the address on the bottom of the back becomes the envelope front. Thank you for helping us!

1. Name and APX number of program.

2. If you have problems using the program, please describe them here.

3. What do you especially like about this program?

4. What do you think the program's weaknesses are?

5. How can the catalog description be more accurate or comprehensive?

6. On a scale of 1 to 10, 1 being "poor" and 10 being "excellent", please rate the following aspects of this program:

- _____ Easy to use
- _____ User-oriented (e.g., menus, prompts, clear language)
- _____ Enjoyable
- _____ Self-instructive
- _____ Use (non-game programs)
- _____ Imaginative graphics and sound

7. Describe any technical errors you found in the user instructions (please give page numbers).

8. What did you especially like about the user instructions?

9. What revisions or additions would improve these instructions?

10. On a scale of 1 to 10, 1 representing "poor" and 10 representing "excellent", how would you rate the user instructions and why?

11. Other comments about the program or user instructions:

From

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