



# MUSIC

WILL HARVEY'S

# CONSTRUCTION SET

## TABLE OF CONTENTS

Playing with Music – an Introduction	page 1	Using Cut and Paste to Try Out Rhythms	page 7
Playing the Music Already on Your Disk	page 2	Staffs, Clefs and the Note Indicator	page 7
Controlling Speed, Volume and Sound	page 2	Building Chords to Add Texture to Your Music	page 8
Using Cut and Paste to Create Music	page 2	Variations on a Theme – and Beyond	page 9
Cutting and Pasting Between Songs	page 4	Sharps, Flats and Scales	page 10
Notes and Rests, Dots and Ties	page 4	Keys and How to Change Them	page 10
Mystery Melodies – a Musical Game	page 5	Major and Minor Keys	page 12
Time Signatures and the Beat Counter	page 6	Some Questions and Their Answers	page 12



THE MANUAL

## IMPORTANT INFORMATION

Each time you start up your Music Construction Set program, you will be asked to tell your computer about the equipment you want to use to build and play music. Please turn to the Reference Card inserted in this manual for information about those choices. The Reference Card also contains a list of the music already on your

MCS disk, a quick guide to all your MCS controls and capabilities, a list of keyboard shortcuts you'll want to use as you gain music building experience, and information about how to print your music.

### NOTICE

ELECTRONIC ARTS RESERVES THE RIGHT TO MAKE IMPROVEMENTS IN THE PRODUCT DESCRIBED IN THIS MANUAL AT ANY TIME AND WITHOUT NOTICE.

THIS MANUAL IS COPYRIGHTED, ALL RIGHTS ARE RESERVED. NO PART OF THIS MANUAL MAY BE COPIED, REPRODUCED, TRANSLATED OR REDUCED TO ANY ELECTRONIC MEDIUM OR MACHINE READABLE FORM WITHOUT THE PRIOR WRITTEN CONSENT OF ELECTRONIC ARTS, 2755 CAMPUS DRIVE, SAN MATEO, CALIFORNIA 94403.

ELECTRONIC ARTS MAKES NO WARRANTIES, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS MANUAL OR WITH RESPECT TO THE SOFTWARE DESCRIBED IN THIS MANUAL, ITS QUALITY, PERFORMANCE, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE. THE PROGRAMS ARE PROVIDED "AS IS." ELECTRONIC ARTS MAKES CERTAIN LIMITED WARRANTIES WITH REGARD TO DEFECTIVE RECORDING MEDIA. PLEASE SEE THE ELECTRONIC ARTS LIMITED WARRANTY ENCLOSED WITH THIS PRODUCT.

SOFTWARE © 1983 WILLIAM HARVEY.

MANUAL CONSULTANTS ARTHUR & JEANNE CHANDLER

MANUAL DESIGN BY WILLIAM JAMES GIN.


# MUSIC CONSTRUCTION SET

## PLAYING WITH MUSIC

Welcome to a whole new way to explore and play in the world of music. Music Construction Set turns the building blocks of music (notes, rests, sharps, flats, etc.) into pictures which you can actually grasp and assemble on your computer screen – and your computer will then sing to you whatever you’ve built. More, you can control the speed, volume and sound quality of the playback, experiment with quick changes in the placement of notes, cut measures out and paste them back in someplace else (even into a completely different song!), change keys, print out your compositions onto paper. .. the possibilities are virtually limitless. Best of all the program is as easy to use as pointing and pressing buttons.

The next few pages in this guide tell how you can use some powerful commands (especially including ones called Cut and Paste) along with the music already on your disk to start having fun immediately – **even** if the only thing you know about music right now is what you like to hear.

After that you’ll find a gentle romp through notes and rests and clefs and such – the stuff music is made of – and a look at some advanced tricks to try out. On the back is a picture of the screen with labels; use it whenever you want to know what something is called.

One final note. Don’t let this guide be your only resource. There’s a world full of music out there for you to enter, then push and poke at to see what makes it tick. Books labeled “easy piano” or “big note piano” are good places to start. Then as you gain more music building experience, see the question and answer section at the end of this guide for tips on how to deal with more complicated musical ideas. And through it all, remember this: Though there’s never been a tool like Music Construction Set before, music itself has been around for a long time. Don’t be shy about using the musical artists and craftsmen who have gone before you for inspiration, ideas and guidance as you set out on your own journey to greater musical understanding and enjoyment.


## PLAYING THE MUSIC ALREADY ON YOUR DISK

The Reference Card inserted in this guide contains a list of the music which comes ready to play on your MCS disk, plus instructions for how to load and play it. If you haven't already studied the Reference Card to learn how to use the on-screen hand to build and play music, now would be a good time to do so. The words that follow often refer to musical examples: knowing how to operate your basic MCS controls will let you listen to the examples as well as read about them.

## CONTROLLING SPEED, VOLUME AND SOUND QUALITY

**Speed** – Moving the gauge marker up speeds things up, down slows them down.

How fast a piece of music is played can have a dramatic effect on how listeners react to it. The Bach 8th Invention and Bumblebee, for instance, were written at least partly as challenges for student musicians to cut their playing-skill teeth on; the faster they're played the better they sound. On the other hand some pieces need to be slowed down so you can hear the texture of the musical lines weaving together – pieces like the Pachelbel Canon and a little number called Yankee Doodle Dixie you'll learn to create with Cut and Paste in the next section.

**Volume** – Moving the gauge markers up and down decreases and increases the volume; left is for the upper set of lines (called a staff) and right is for the lower one.

You can use the volume controls to help yourself hear and think about the ways two staves of music can work with each other to produce

music you like. Just get any piece you're interested in and alternately turn the staves off and on or up and down, listening after each change to its effect on how the piece sounds. (The Cut and Paste section which starts on the next page also suggests ways to experiment with the effects of mixing musical lines.)

**Sound** – Different gauge settings cause the computer to produce different kinds of sounds. Left controls the top staff and right the bottom.

This control works differently depending on what computer you're using. See the Reference Card inserted in this manual for more details.

## USING CUT AND PASTE TO CREATE MUSIC

The Cut and Paste icons are two of the most versatile and powerful tools in your MCS toolkit. They are great timesavers, letting you take advantage of the way repeated patterns are used in music to reduce the amount of work involved in copying and composing.

**NOTE: IN THIS SECTION YOU WILL USE YOUR MCS TO WRITE A PIECE OF MUSIC. IF YOU THINK YOU MIGHT WANT TO SAVE THE MUSIC YOU'LL WRITE, MAKE SURE YOU HAVE A MUSIC FILES DISK READY BEFORE GOING ON. SEE "SAVING MUSIC" ON THE REFERENCE CARD FOR MORE INFORMATION.**

The easiest way to learn about Cut and Paste is to use them. In the box on page 3 you'll find all you need to write the music for the familiar round, Frere Jacques (called "Are You Sleeping" or "Brother John" in English). A round, remember, is meant to be sung by a group – first someone starts the song off singing "Are you sleeping, are you sleeping?", then as they go on with "Brother

John, brother John,” the next person or group starts at the beginning with “Are you sleeping, are you sleeping?“, etc.



To write the music with your MCS, start by copying the “Are you sleeping” measure into the first blank measure in the top set of lines. (Written music is divided into measures, also called bars, by vertical lines.) Next, turn on the scissors, place them over the measure you just entered and press the 1 key on the keyboard (because you want to pick up 1 measure). The measure will disappear from the screen, but don’t panic; it’s sitting in a buffer and can be brought back with the paste pot. just turn on the paste pot, place it over the measure where you’d like “Are you sleeping” to reappear and press the button on your pointing device (or Return if you’re in Keyboard mode), then press it again to put down the second “Are you sleeping” line you need for the song.

Repeat the above steps for each of the measures in Frere Jacques (using the right arrow to scroll a new blank measure into view each time you need to use the hand to build the next measure). When you finish you should have a song 8 measures long even though you only had to create 4 measures by the one-note-at-a-time method. And now for the really fancy trick. Turn the scissors on, place them at the beginning of

the song and press the 8 key. Presto, all 8 measures are cut into the buffer. Turn on the paste pot and place it at the beginning of the now empty staff and press your pointing device button (or Return, as above) and they’ll reappear. Press it again and another copy of the song will appear, shoving the one already there over to the right to make room.



Finally, to complete the round, you need to make copies down in the second set of lines so that they will start after “Are you sleeping” has been played twice in the top set. You begin by putting one rest (like the one pictured in the box)

in each of the first two measures. Rests are just like notes only they mean “this much silence” instead of “this much sound”. (See NOTES AND RESTS to learn how much silence and sound each rest and note stands for.) Next use the paste pot to put down two copies of the song next to the rests. Now, with only two more actions your round will be ready to play: 1) Drag the Bass Clef off the bottom staff (it looks like a backwards C with two dots) and replace it with a Treble Clef (it looks a little like a dollar sign – for more information about clefs and what they do, see page 7); then use the right arrow icon to scroll to the end of the song, and put two rests in at the end of the music in the top staff to make the staffs come out even. (You always want your two staffs to come out even. When you only want to write on one staff, use the top one.) To play your round, turn on Home to get back to the start and then turn on the Piano. To save it for future playing, see Saving Music on the Reference Card.

**NOTE:** The Cut and Paste buffer will allow you to cut up to 9 measures at a time into it – provided the measures don’t have too many notes in them. If you try to cut some number of measures containing more notes than the buffer will hold, you’ll hear a beep and no cutting will take place. If that happens, just try cutting a smaller number of measures until you find a number that will work.

### Cutting and Pasting Between Songs

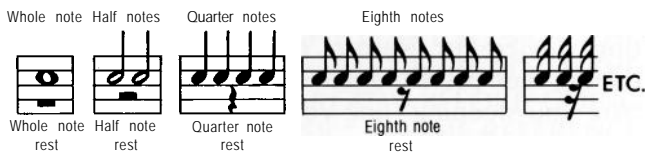
You can also Cut music from one song and Paste it into another, a nice little convenience which can be used with the music already on your MCS disk to get a running start on learning

some music writing techniques. First, here’s a little trick to amaze your friends. Load Dixie from the disk and cut it into the buffer, then load Yankee Doodle and Paste Dixie underneath it. Now play the resulting song, slowing it down some so you can hear how the two melodies work together.

There aren’t very many songs that fit with each other as nicely as Yankee Doodle and Dixie. Still, mixing melodies is one easy way to start a composing session. Then you can play the resulting piece through slowly, listening for the parts you like and doing some trial and error fixing on the parts you don’t. The final piece might not be much like either of the melodies you started with, but who cares as long as it sounds good to you.

### NOTES AND RESTS

Music is made up of alternating sounds and silences. Notes and rests are used to determine how long each sound or silence should last before the next one starts.



In your MCS parts box you have 5 different notes and 5 corresponding rests to work with. The longest, called whole notes and rests, last twice as long as the next longest, called half notes and rests, 4 times as long as the ones after that, called quarter notes and rests, etc. The chart above spells out these relationships.



### Dots and Ties

Sometimes you'll find that you want sounds which can't be described with single notes – sounds that last as long as a half note plus a quarter note, for instance, or a half note plus an eighth note. That's where dots and ties come in. (For rests you don't need dots and ties; you can make silences of any length you like just by stringing the right rests together.)

A dot after a note means "hold this note half again as long", so a dotted half note equals a half note plus a quarter note, a dotted quarter note equals a quarter note plus an eighth note, etc.. A tie means "sound this note and keep going through the value of the next note on this space or line"; thus, a half note tied to an eighth note will produce a continuous tone that will last as long as both notes put together.

**NOTE:** Ties don't actually have to touch the notes they're tying together. They just have to touch the same vertical column as the note or notes they are tying from. (If more than one note exists at the vertical column from which the tie extends, the tie will apply to all of the notes at that column which are followed immediately by a note on the same space or line.) See the question and answer section at the end of this guide for information about how to use ties to write music with three or more voices.

### MYSTERY MELODIES– A MUSICAL GAME

In music, how long the sounds and silences are isn't the only thing that counts of course; the patterns made by how high and low the sounds go is critical too. Still, the patterns made by the length of notes and rests in some songs is so familiar that it's often possible to guess a song just from its rhythm.

The Mystery Melodies selection on your MCS disk contains ten familiar melodies reduced to the rhythmic core – that is, all the notes are there and in the right order, but they're all on one line or space so they sound only one tone. Your challenge is to figure out what the song is just from the rhythm. Feel free to take advantage of your MCS powers and move the notes up and down as you search for the answers. (The first note in every song is already in the right place, by the way.) If you get stuck and want a little extra help, look at the end of this section for some word clues that might jog your memory. And if you give up altogether or want to check your answer, just scroll through the rests at the end of the selection and you'll find the melody written cor-

rectly. Then scroll on for the next challenge.

If you like the Mystery Melody guessing game, you and your friends can easily make up challenges for each other; just pick any song and copy all the notes on whatever line or space the song begins on. You might also try to see how many different songs you can find with the same rhythmic patterns or with patterns that are the same for the first few measures, etc. It's a game guaranteed to sharpen your ear for the rhythmic patterns that music is built on.

Word clues for Mystery Melodies – 1) Winter 2) Old Radio-TV Theme 3) Children 4) Lady 5) Night; 6) Water 7) Symphony 8) Knock 9) Ceremonial 10) Film

## TIME SIGNATURES AND THE BEAT COUNTER

The Time Signature Control lets you tell the computer how much total sound (notes) and silence (rests) you'll have in each measure of a piece. The Beat Counter counts along as the piece plays and turns to inverse video (black number on white instead of white on black) whenever it finds a measure with more or fewer beats than the time signature calls for.

You have four time signature settings available with your MCS – 2/4, 4/4, 6/8, and 3/4. The bottom number in each case indicates what kind of note or rest is given the value of "one beat" and the top number tells how many beats there will be in each measure. Four (4) stands for quarter note and 8 for eighth note. So 2/4 time means that there are two beats between each vertical staff line, with the quarter note receiving one beat, and 6/8 time means 6 beats in each measure with

the eighth note receiving one beat.

Your MCS Time Signature Control and Beat Counter has two main uses: 1) It tells the computer how to scroll the music so that the scrolling speed will match the playing speed; and 2) it helps you figure out where the error is if the top lines and bottom lines get out of sync with each other as a piece plays. To see these uses in action, load and play the piece called BUGGY. First let it play all the way through, then use Home to go back to the beginning and start it again, and this time watch the Beat Counter carefully. As soon as you see it change from a white number (or green or amber one) on a black background to the other way around, press the space bar to stop the music.

The measure that just finished playing has an extra beat in the bottom staff. Can you find it? (You may need to use the left arrow to scroll the music back a little, depending on how fast you were able to stop it.) It's the third note from the left in the measure. Pull that note out, then try the piece again. This time it should sound just fine all the way to the end.

BUGGY is written in 4/4 time. Watch what happens if you set the Time Signature Control on 2/4 before you play the version you just fixed. The beat counter will turn inverse after the first measure and the scrolling on the screen will quickly get way ahead of what's being played. The music will still sound just fine because all the measures on both top and bottom have the same number of beats in them, but it won't look right because the Time Signature setting no longer matches the way the piece is written.

If you don't care whether the scrolling speed fits what's playing you can ignore the Time

Signature Control and put as many or as few beats in each measure as you like – just as long as you make certain that measures above and below each other have exactly the same number of beats in them.



### Using Cut and Paste to Try Out Rhythms

The selection on your MCS disk called RHYTHM contains several examples of different kinds of bass line rhythms. To try them out with different melodies, just load RHYTHM, listen to the examples, then Cut the one you'd like to try into the Cut and Paste buffer. Next get a melody either by writing one or by loading one already on the disk (like Yankee Doodle for instance). Finally, lay down copies of your rhythm measure with Paste and play your result.

All of the examples in the RHYTHM file that comes on your disk are written in 4/4 time, so be sure you pick melodies with the same time signature to try out against them. If you discover that you like this method of trying out different bass line patterns in combination with different melodies but want to try some other time signatures, just make up rhythm files of your own and save them on your music files disk.

### STAFFS, CLEFS AND THE NOTE INDICATOR

Music is written on groups of lines and spaces called staves. The letter name for each line and space, and how high or low a note placed on each will sound, is determined by a sign called a clef. Pressing P on the keyboard while you point with the hand at a particular line or space will cause the letter name associated with that location to appear next to the word NOTE on the screen. Also you will hear the sound that goes with that letter name.

MCS gives you two staves and two different clef symbols. Most music uses a treble clef for the top staff and a bass one on the bottom, and your MCS always starts you off with that arrangement. But, as you may have noticed if you've played through all the examples on the MCS disk, you can change things around if you like – even start a staff off with one kind of clef and change to another in mid-piece.

To see what effect the two clef symbols have, move the hand up and down the staff and press the letter P on the keyboard as you come to each new space or line – all the while looking at the Note indicator just to the left of the speed control. Notice that each time you move from space,

to line to space, etc., the tone changes and so does the letter in the Indicator Window.

The letters A through G are used to name the lines and spaces. Putting down a treble clef names the bottom line of the staff E, a bass clef names it C. The rest is alphabetical order – the next space up in treble is F, in bass it's A (after G the cycle always starts again with an A) and each step up produces a higher tone. Lines and spaces with the same letter names produce sounds that blend together perfectly (try it and see/hear for yourself); the distance between them is called an octave.



The area above and below the staves can also be written in, and as you may have noticed, there is some overlap in the in-between area. With a treble clef on top and bass clef on the bottom, the first line below the top staff sounds the same tone as the first line above the bottom staff – middle C it's called, and indeed it lies in the middle of the piano keyboard as well as the middle of the tone range defined by bass and treble clef together.

**NOTE:** If you would like to eliminate the overlap between bass and treble clefs and make use of a full five octave range with your MCS, put a treble clef on top and a bass clef on bottom, then place an octave raiser over the top staff to the left of the double bar. That will raise everything written on that staff one full octave for the whole song. Placing the octave raiser over a measure to

the right of the double bar causes the music to be raised an octave for that measure only – a technique which allows you to enter measures with notes out of the normal range for a staff. (Just enter the whole measure one octave lower than it's written, then place an octave raiser over it.)

## BUILDING CHORDS TO ADD TEXTURE TO YOUR MUSIC

As the music already on your disk shows, with your MCS you can build music in which several notes sound at the same time (check your reference card to see how many your computer can handle). As far as the computer's concerned, there's only one rule: make sure all the notes in a chord (which is what a vertical stack of notes is called) are of the same value, i.e. all quarter notes or half notes, etc. Ignoring that rule will cause the computer to lose count of the beat and to play the notes in surprising sequences.

For your ears, there will be more rules, but they'll depend some on what you like to hear. You shouldn't be afraid to plunge boldly ahead, using your ears and a lot of trial and erroring to discover what you can do to build music with bigger sounds in it. One of the beauties of your MCS is how easy it makes it to write something, play it immediately, change it, then play it again, etc. until you get what you want.

A good starting point for chord building is with what's called "adding thirds". If a note is on a line, the interval between it and a note on the next line above it is called a third. Similarly, the interval from one space to the next is a third. If you simply go through a song and put in extra notes a third above the existing ones, you'll usually like what

you hear. And you can go through again adding occasional thirds above the ones you already put in, taking away some of the others, and just generally messing around until you hear the effect you want.

To develop a more sophisticated sense of how chords work in music, you might find guitar songbooks especially helpful. Such books usually contain the melodies of songs along with the names of the chords the guitarist should play as accompaniment. Your MCS plus one of those books and a chord chart designed to show what notes go in each chord (some books have such charts right in them) can give you a lot of practical insight into how chords and melodies fit together in songs. And if you'd like a more formal understanding, look in your library for an introduction to music theory and use your MCS to build examples you can listen to as you read.

## VARIATIONS ON A THEME – AND BEYOND

Taking a basic melody and altering it as you play is one of the oldest forms of musical invention. When jazz musicians take solos, they are usually playing variations on the melody of whatever song they started with (called the “head”), or on a chord progression implied by the head melody. Many classical pieces are built on the “variations” concept – listen to recordings of Beethoven’s “Diabelli Variations” or Brahms’ “Variations on a Theme by Haydn,” for instance **TURKEY IN THE STRAW** on the MCS disk is an example of a classic tune varied in interesting ways. Study it, then pick out another melody and write your own variations on a theme piece. You can stay close to the original melody or wander

far away from it; but you should remain faithful to the harmonies of the original melody, which are often expressed by the chords in the bass clef.



There are a number of different styles of music on your MCS disk: canon and scherzo, waltz and ragtime, etc. There are books written about all of these musical forms and more, and you should seek them out if you want to read in depth about any given style. But the first requirement is to listen. As you enter pieces into the MCS, exploring the styles and composers you like best, you will become acquainted, note by note, with the personalities of each piece. Then step back and listen to what you've entered, paying special attention to the family resemblance of your ragtime or canon to other pieces like it. Making yourself a part of those families is the secret to writing good music.

## SHARPS, FLATS AND SCALES

In music notation, what you see is not what you get in one very important respect: the lines and spaces are evenly laid out; the sounds they represent are not. If you load SCALES and study it carefully (slow it down if need be) you'll see that the journey from one C to the next has more steps in it than just C to D to E, etc. There are half steps as well, and they are written with symbols called sharps, flats and naturals.

Sharps raise sounds one half step and flats lower them by the same amount. Like the octave raisers, sharps and flats placed to the left of the double bars are in effect for the whole song, those placed to the right of them are in effect only until the end of the measure. Naturals cancel the effect of both sharps and flats; they are useful when you want to change the sound for one note in a measure but not for the others on the same space or line. (Sharps, flats and naturals are also called "accidentals".)

So far so good. But you may also have noticed that in two places in the scale that goes up a half step at a time, there were no sharp notes – between E and F and between B and C. Those tones are just naturally a half step apart, a fact that has a profound effect on your ability to move the starting points for songs up and down the staff. To see/hear what this is all about, load Yankee Doodle then move it up a notch on the staff by following the directions below to transpose it from the key of C to the key of D.

## KEYS AND HOW TO CHANGE THEM

To transpose a song from one key into another, point to the word KEY and hold down your point-

ing device button. (The key names don't scroll through in alphabetical order. Don't let that throw you. Just be patient; what you want will show up eventually, and it will show up again if you miss it the first time.)



When the name of the new key you want appears in the Key Window, let up on the button. The computer will then automatically put in the

correct number of sharps or flats to the left of the double bar and rewrite the song in the new key. (In Keyboard mode Return starts the scrolling and Return again stops it.)

Selecting a key name while the window is clear causes the song to be transposed up the scale, doing so when the window is solid (inverse video) moves the song down. If you try to transpose to a key too high or low for your MCS to handle you'll hear a warning beep and your command will not be carried out. (To see how much transposing range you have available for any given song, find the highest and lowest notes, then use the Note Indicator mode to see how many steps are left in the MCS range above and below those notes. That's how much room you have to transpose in.)

When you gave the command to transpose Yankee Doodle from C, to D the computer wrote two sharps to the left of the double bar, one on F and the other on C, and rewrote all the notes in the song onto the next higher line or space (because D is one line or space higher than C). To see why it put those sharps in, drag them away and listen to the song without them.

The reason your song doesn't sound like Yankee Doodle anymore is that moving all the notes up to the next higher space or line changed some of the relationships between them. The notes that go with the word "doodle" (in the first measure with notes in it) started out as D and E – a whole step apart as far as your ears are concerned. Now they are E and F – a half step apart to your ears. The computer put that sharp on F so that the original whole step relationship between those notes would still exist in the new higher version of the song. Transposing is in general how you retune the staff to play a song higher or

lower than it was first written without destroying the original relationships between the notes.

### Why the Key Names Don't Scroll Through the Window in Alphabetical Order

A staff with no sharps or flats to the left of the double bar is tuned to the key of C – if you start on C and move from line to space to line, etc. up to the next C, the pattern you hear is whole step, whole step, half step, whole step, whole step, whole step, half step (remember the missing half steps between E and F and B and C). When you turn on the Key Change command the first option it will offer you is G. To create the same whole step, whole step, half step etc. pattern beginning with G, you need a sharp on F; everything else stays the same. To create the same pattern starting with D (the next option Key Change offers you) you need two sharps, one on F and one on C. For A, the next option, you need three sharps, and so on.

Each option the Key Change command offers you requires one more accidental than the last one, until a key signature requiring seven accidentals is reached. Then the cycle starts over again with C. A music theorist would say that the computer offers options by scrolling through the circle of fifths – a fact there's room enough to mention here but not to explain. If you're the type who likes to read about such things, you're in for a treat: the libraries are full of interesting books on music theory and your MCS program provides a perfect "now let's see if I understand what that means" testing ground to use as you read.

## MAJOR AND MINOR KEYS

Just one more fact about keys and scales: they come in two flavors, major and minor. Your MCS only shows the name of the major key associated with each key signature. There's also a minor key for each one as the chart below shows. To hear the difference, load Yankee Doodle then use the hand to add the three flats necessary for the key of c minor (to see which flats you need, use Key Change to look at the signature for Eb major). As you can hear when you play it, the intervals are all different (the flats make sure of that) but the song is still recognizable, though it has a completely different feel or flavor to it. For similar experiments involving major and minor keys, use the key signature chart below to find out what accidentals you need to create the effect you want.

## KEY SIGNATURE CHART

C major = a minor	F major = d minor
G major = e minor	Bb major = g minor
D major = b minor	Eb major = c minor
A major = f# minor	Ab major = f minor
E major = c# minor	Db major = bb minor
B major = g# minor	Gb major = eb minor
F# major = d# minor	Cb major = ab minor
C# major = a# minor	

## SOME QUESTIONS AND THEIR ANSWERS

**Q:** Can I write a really long song?

**A:** Your songs can contain up to approximately 700 symbols (notes, sharps, flats, etc.) in each staff, so a song which averages about 10 notes a measure can go for as long as 70 measures.

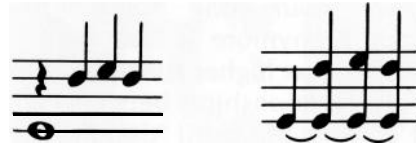
**Q:** It sounds like my MCS plays long songs slower than it plays short ones. Is something wrong?

**A:** No, there's nothing wrong; that's built into the way the program works. Just kick the speed setting up a notch or so higher for the longer songs to get the tempo you want. As you've no doubt noticed, there's speed to burn in the program.

**Q:** I put in a chord made up of eighth notes but the only one the eighth note flag shows up on is the top one. I know the others actually are eighth notes because the flag shows up when I try to drag them away. What gives?

**A:** Your MCS can only play chords composed of notes of the same value, thus it only puts up one example of whatever identifying flag the notes in the chord contain. This keeps you from mistaking two eighth notes stacked closely in a chord for a sixteenth note.

**Q:** I tried copying some music that looks like Example A and it made no sense at all when I tried to play it. What's the matter?



Example A

Example B

**A:** Again, your MCS can only correctly play chords made up of notes of the same value. When it saw the whole note on the bottom and the quarter rest above it in the same column it simply didn't know what to make of them. To copy music written with more than one musical line (called "voice") in the same measure – which

is what that measure is an example of – you must change the whole note into four tied quarter notes as shown in Example B. That will create the same sound as one whole note and let you write in the three quarter notes as part of quarter note chords. The result is a measure with chords the MCS can make sense of but which will produce the same sounds as intended by the original.

This use of ties combined with what might be called the lowest common note denominator in a measure (a half note can become two tied quarter notes or four tied eighth notes depending on what it must play along with, etc.) is a powerful technique. It lets you transcend the two voice limitation of your MCS to create as many voices as your computer can sound simultaneous notes.

Q: I want to copy a song that has groups of notes sort of bundled together with the number 3 written in (see Example C). What does that bundle mean and how do I enter it?



Example C

A: The bundle is called a triplet and it means “play these three eighth notes in the space that would normally be occupied by two” a command beyond the capabilities of your MCS. The best you can do is create an approximation of a triplet by writing one as two dotted sixteenth notes and a regular sixteenth note. If you do the math you’ll find that that comes out to the same value as two eighth notes, so you will in fact be telling the

computer to play three notes in the space normally occupied by two eighth notes, it’s just that the three notes are not all of equal value. You should try different locations for the nondotted sixteenth note to see where you think it works best.

Q: I’ve discovered that MCS will let me dot sixteenth notes, but now I can’t find the thirty second note I need to finish off the measure. Where is it?

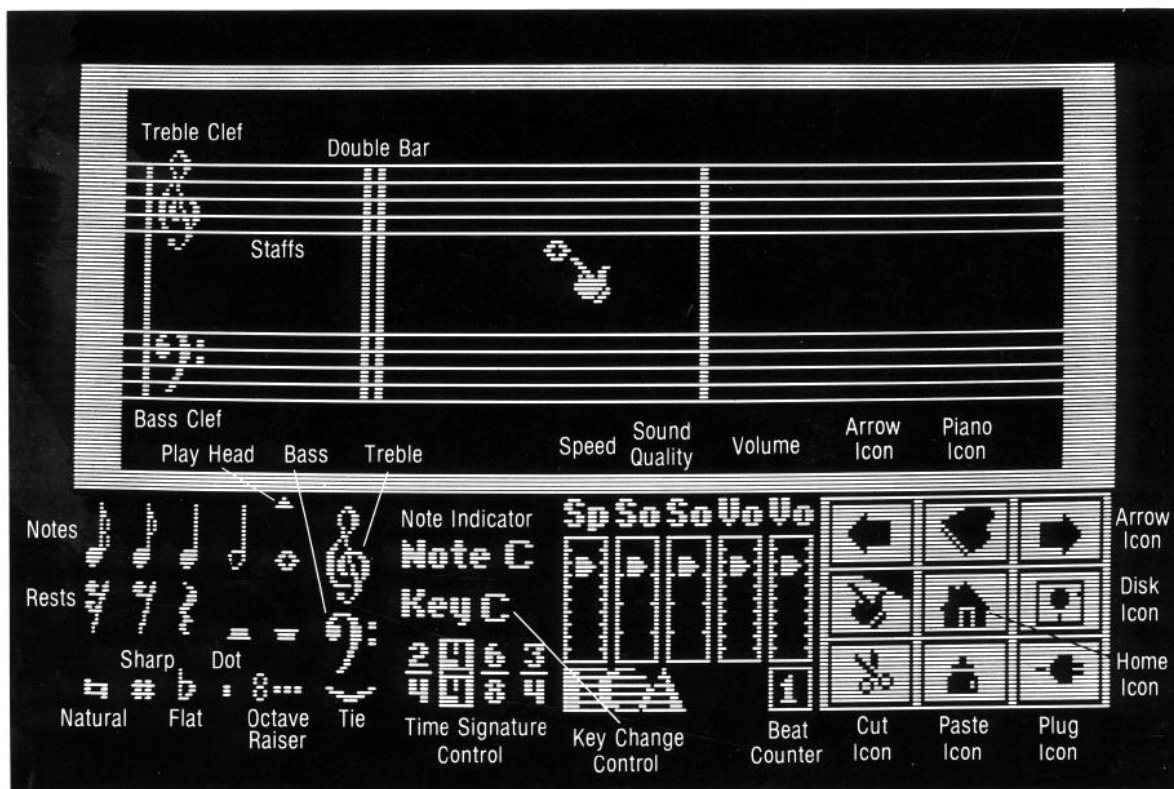
A: It’s in there. There, just wasn’t room for it on the screen. To put down a thirty second note, point where you want it to go and press K on the keyboard. Pressing L will produce a thirty second rest.

Q: What can I do if I want to change keys in the middle of a song? Do I have to put the new key signature in every measure?

A: The answer is yes, but there’s an easy way to do it: just make one measure with the new key signature, then use Cut and Paste to put down as many copies of it as you’ll need for that part of your song.

Q: If I try to put lots of sixteenth notes in a measure, things can get pretty crowded out there, especially if I use any sharps, flats, dots, etc. Any suggestions?

A: If it’s a piece written in 4/4 time, change it to 2/4 so you only have to get half as much in each measure. And if you’re not too particular about how your music looks, don’t worry about it. The computer will play your music correctly even when it looks pretty muddy.



ELECTRONIC ARTS™

2755 CAMPUS DRIVE SAN MATEO, CA 94403 (415) 571-7171