FAIRLIGHT
COMPUTER MUSICAL INSTRUMENT

THE STAVEWRITER

F A I R L I G H T

- C M I -

The Stavewriter

OPERATION MANUAL

MAY 1984

by John Hopkins and Darlene Hopkins

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Space after -
Clef= 100

This parameter establishes the amount of space that will be left after a treble, bass, alto, or tenor clef before the beginning of the next symbol. The default value is 100. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
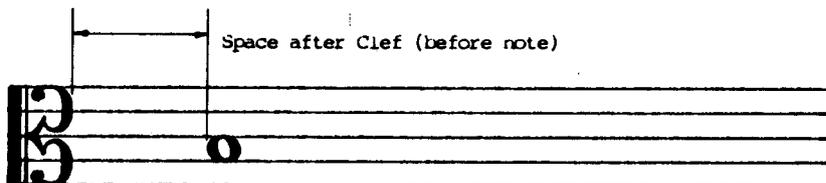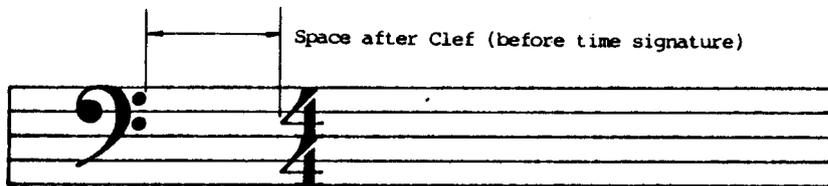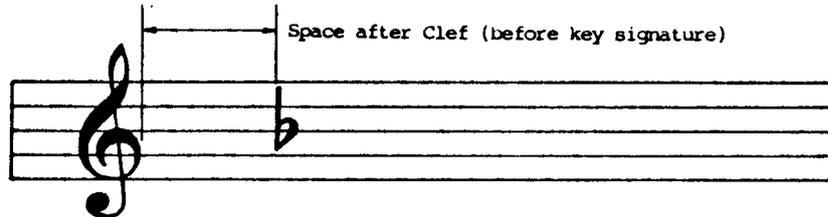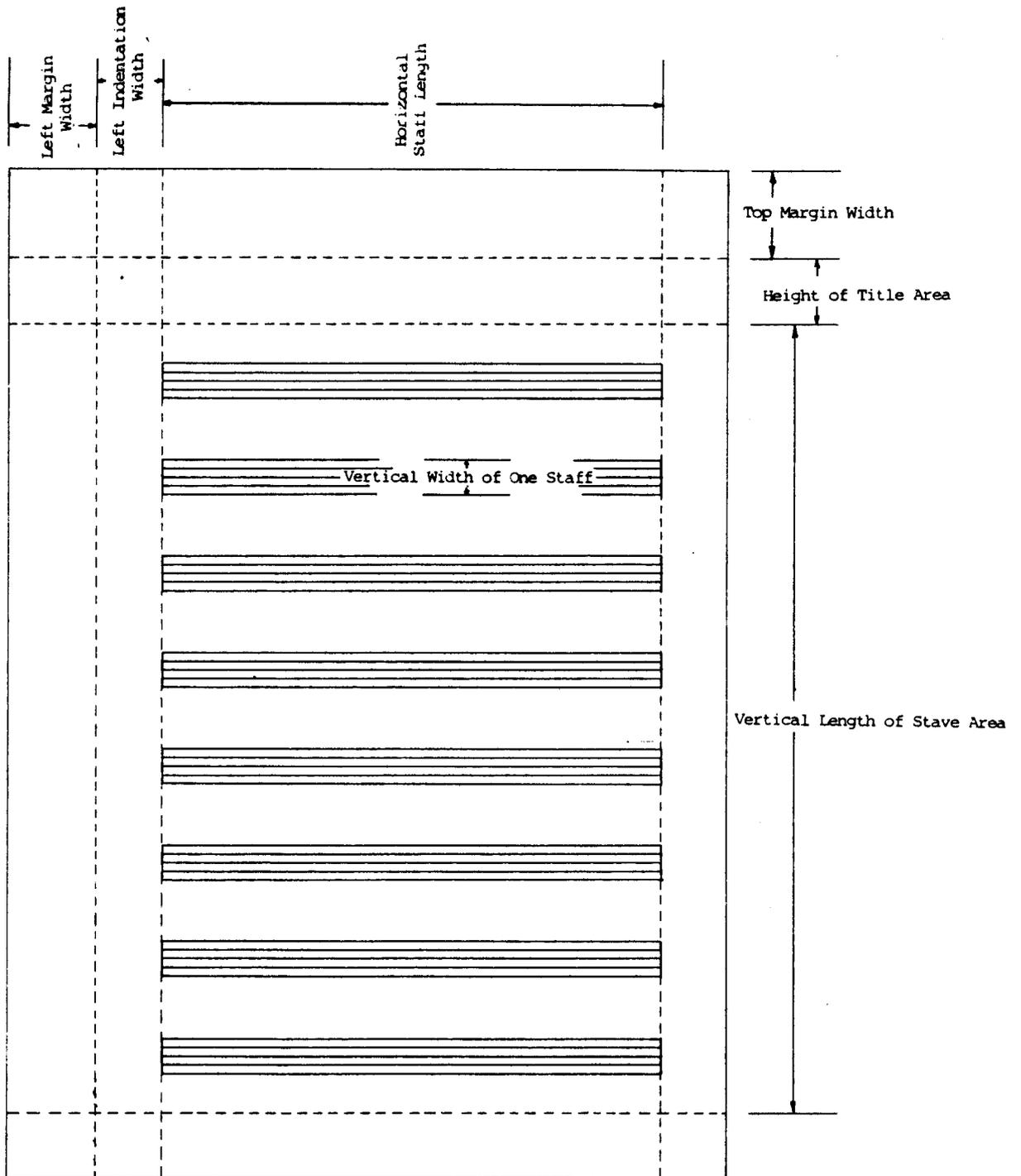

Space after Clef (before key signature)

Space after Clef (before time signature)

Space after Clef (before note)

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View=Normal
Number of Staves on Page=8

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FOREWORD

This manual is a guide to help you learn how to use Stavewriter. If you are ready to plot music immediately and want to read as little of this manual as possible, start reading at THE DIRECT ROUTE, listed in the table of contents. Eventually, though, you should read through the manual in its entirety. Some terms which may be unfamiliar to you are listed in the GLOSSARY. Illustrations are placed next to the text describing them, so there are no figure numbers.

Much of Stavewriter is controlled by answering questions and changing values. Several sections of this manual take you step by step through the questions displayed on the screen and possible answers or values. Questions are printed in bold type, while the explanations of the answers or values are in regular type.

In addition, if you are using MCL, Stavewriter "directives" may be used in MCL piece, part or sequence files. These are described in the section THE STAVEWRITER DIRECTIVES---MCL. Don't think, however, that just because you don't use MCL that you don't need to understand Stavewriter directives. Even when using Page R as input to Stavewriter, you can change values of directives (affecting things like beat grouping, horizontal spacing, transposition, etc.).

Vertical length of staff area (inches)= 14.

This establishes how much of the page in the vertical direction will actually be devoted to the score. The default value is 14. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a real number.

Vertical Length of Staff Area
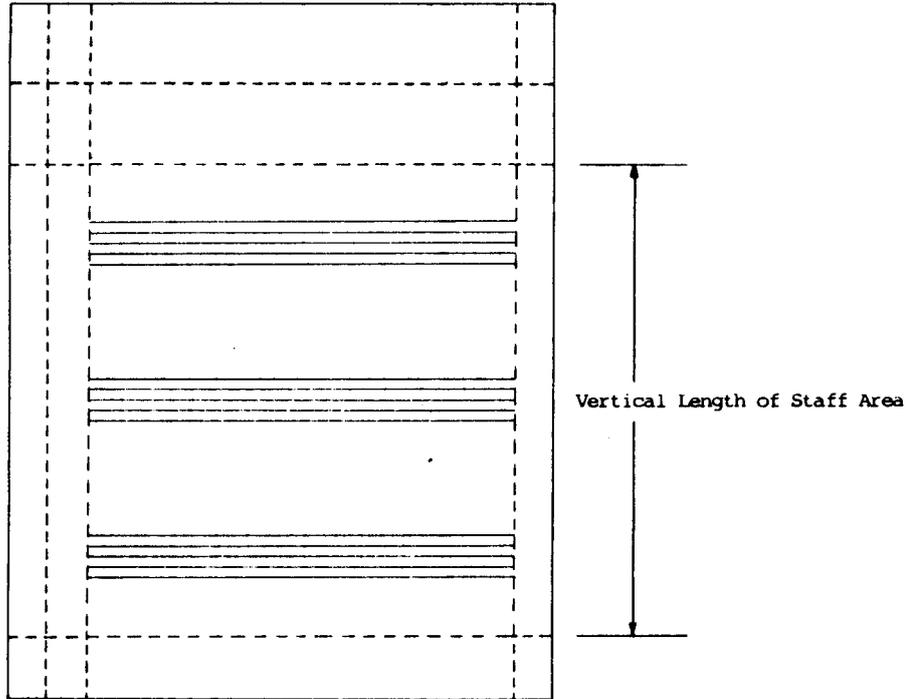
Number of staves on page= 8

This establishes how many staves will be drawn on a page. This parameter, together with the vertical width of one staff and the number of staves on the page, determines the amount of space between the staves and the amount of space above the top staff and below the bottom staff. The default value is 8. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number.

Number of Staves on Page=4

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6   6

AN INTRODUCTION

STAVEWRITER is the music printing system for the Fairlight Computer Musical Instrument Series IIX. In its present release, scores are entered in either the Real-Time Composer (Page R) or the Music Composition Language (MCL). This enables compositions previously composed on the CMI to be plotted, without having to learn a new system for "music printing" entry. Scores are plotted on paper using an Hewlett-Packard 7475A plotter, chosen for its ease of use, high speed, excellent resolution, and moderate cost. The quality of printing so produced is much higher than that obtainable by a dot matrix printer or the CMI screen. Individual parts (Page R or MCL) appear in standard music notation, taking full advantage of the high resolution of the plotter. Working scores (Page R only) appear in a simplified notation, designed for quick plotting and maximum information on a page. The input for any of these options can be read directly from the CMI sounds disk containing either the Page R or MCL composition. The CMI sounds disk is placed in the right-hand drive. The Stavewriter system disk, which is different from the CMI system disk, is placed in the left-hand drive. The CMI system disk is not necessary for running Stavewriter.

Single-part scores of MCL or Page R compositions allow you to specify a number of spacing and page-formatting parameters so that the final result reflects your individual taste and the needs of a particular composition. Convenient defaults are provided so that it is not necessary to specify any of these parameters unless changes in these parameters are desired. These parameters include:

> spacing between various symbols;

> stem length;

> the maximum slant of beams.

In addition to the formatting parameters, there are also Stavewriter directives. A Stavewriter directive gives Stavewriter instructions about handling such items as:

> clef;

> time signature;

The general formatting directives include all of the Stavewriter
directives described in the previous section except the STEP directive
(see page 11) and the parameters that pertain to the placement of the
score on the page. The prompt for a given directive or parameter will
appear on the screen followed by its value. If you are satisfied with
the value, simply press RETURN and the value will be retained. If you
wish to change the value, simply enter the desired value and then
press RETURN and the new value will be inserted.

The first ten directives for which you will be prompted are the
Stavewriter directives, discussed previously. In scoring an MCL file,
you should remember that ANY VALUES ENTERED HERE WILL BE CHANGED BY
ANY FOUND IN A PIECE, PART, OR SEQUENCE FILE. If you are scoring a
Page R composition, this is your only opportunity to set these
directives for the entire composition since there is no way of
embedding Stavewriter directives in a Page R file. Also, since you
will be prompted for specific values, the syntax described in the
earlier discussion of Stavewriter directives does not apply here.
Either upper or lower case characters may be used.

Clef (TREBLE, BASS, TENOR, or ALTO)= TREBLE

This establishes the clef to be used. The default value is "TREBLE".
If you wish to change the value, enter the desired new value and press
RETURN; otherwise, just press RETURN. You must choose one of the four
choices outlined for you in the prompt. (For further discussion of the
CLEF directive, see page 17.)

Proportional spacing between notes
in whole note widths per musical beat= 4.

This establishes the space left after a note according to its
duration. The default value is 4. If you wish to change the value,
enter the desired new value and press RETURN; otherwise, just press
RETURN. The value entered must be a real number (9, 10.5, .2). (For
further discussion of the DISDUR directive, see page 15.)

Minimum spacing between notes
### in whole note widths= 1.

This establishes the minimum space left after a note regardless of its
duration. The default value is 1. If you wish to change the value,
enter the desired new value and press RETURN; otherwise, just press
RETURN. The value entered must be a real number (8, 10.87, .97).
(For further discussion of the MINDIS directive, see page 15.)

A very detailed font was developed for the individual part scores. Original artwork for the treble clef was 26 inches by 9 inches, digitized to a 260-by-90 grid. All the musical symbols were drawn to this scale, so the plotter may draw very smooth-looking curves. Plotter strokes were selected to make the shortest possible paths, maximizing plotter speed while maintaining highest resolution.

The computations performed by the computer for these single-part scores are time consuming. A "normal" page of music could take twenty minutes to an hour. This makes it undesirable to recompute the score for repeated plots. Once the computations for a particular score are done, a file is saved on the Stavewriter system disk that contains the data that is needed to replot the score without further computations.
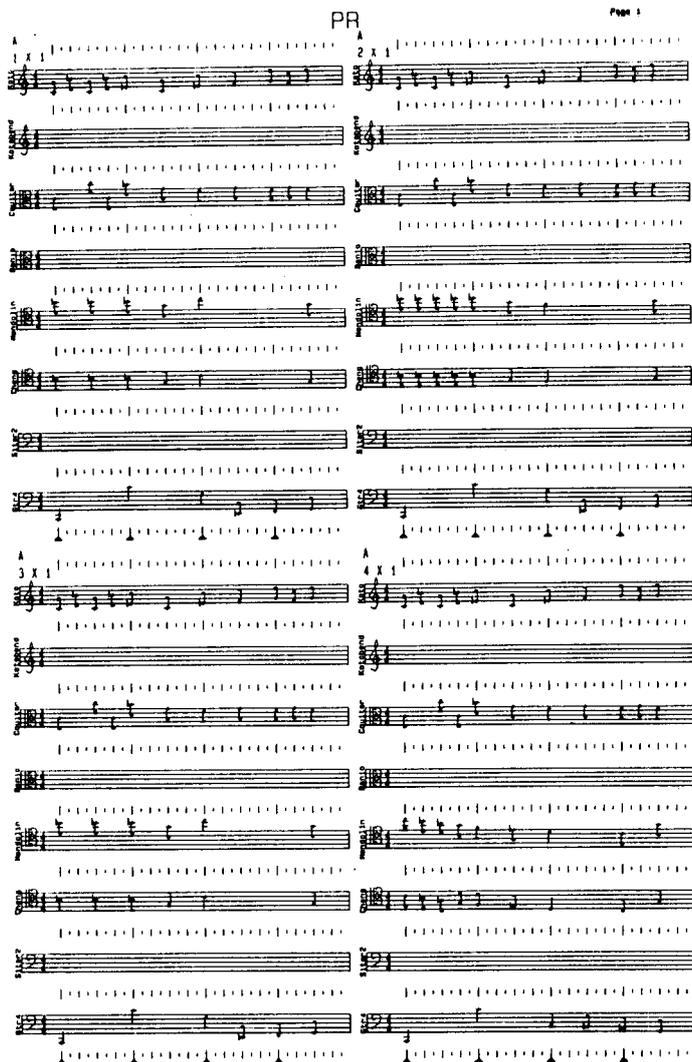
Stavewriter can also provide a working score in simplified notation for a Page R composition. Using Page R for input, the 8 keyboards of a pattern are displayed using similar notation to the Page R screen display. Pitches are also displayed, up to 3 ledger lines above or below the staff. For pitches lying outside this range, the position of the symbol is shifted towards the center of the staff and an appropriate octave symbol is placed near the note head, indicating multiple octave shifts if necessary. An A3 size (metric) or 11 inch by 17 inch (imperial) sheet of paper holds four Page R patterns. Alignment ticks in either triplet or non-triplet resolutions are displayed between the staves, and the count markers are displayed along the bottom of the pattern. Title and stave labels are optional. Even though the format is fixed, there are still some items that you may specify:

a clef for each keyboard;

a label for each keyboard;

a title;

FILE SELECTION

In order to begin, Stavewriter must know which file it is to score. For MCL files, the prompt will appear as follows:

Piece name:

You will need to enter the complete name of the piece file.

The prompt for Page R is:

Page R Filename:

You will need to enter the name of the Page R file that you want to have scored.

Since this option only plots a single part, Stavewriter must also know which part you wish to plot.

For MCL, the prompt will be:

Part name:

and you will need to enter the name of the desired part file.

If you are scoring a Page R file, you will be asked for:

Keyboard number:

All you need to enter is the number of the keyboard (1 through 8) that you wish to have scored.

The next two prompts that will appear will be:

Format file name:
Create new format file or load old one (N or O)?

These pertain to the format files that are saved on the Stavewriter system disk. These files contain the values for the Stavewriter directives and page-formatting parameters.

The format file name is the name that forms the base for the names of the format files and the plot file that are saved on the Stavewriter system disk. If you wish to recall the format files or replot the score from the plot file, these files will be accessed using this format file name.

Figure 1
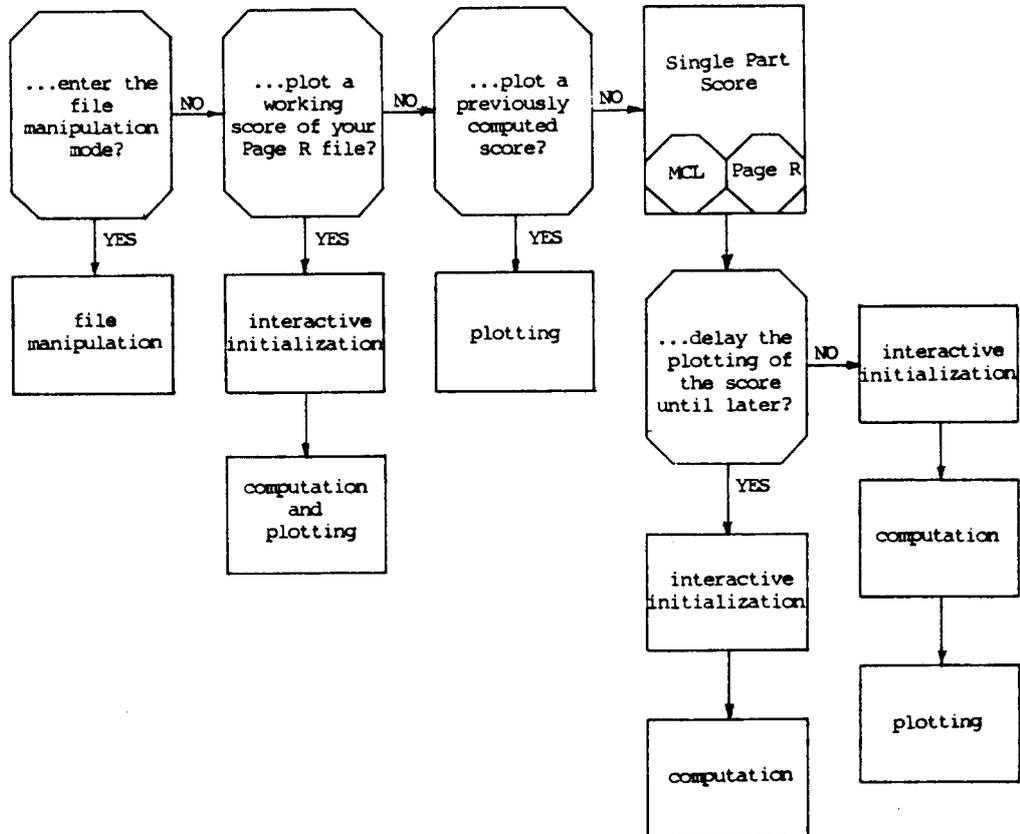
```
Function name:  STEM
Parameters:  <UP>, <DOWN>, or <AUTO>
Example:  $ STEM DOWN $
```

The STEM directive determines the direction of the stems on notes or
chords with stems. If the parameter used is UP, all stems will point
up. If the parameter is DOWN, all stems will point down. If the
parameter is AUTO:

>   stems for notes whose head position falls below the middle
>   line of the staff will point up;
>
>   stems for notes whose head position falls above the middle
>   line of the staff will point down;
>
>   stems for notes whose head position falls on the middle line
>   of the staff will point the same direction as the previous
>   note.

When processing chords, the head position referred to above is the
average head position of all the notes in the chord. The default
directive is "STEM AUTO".

SINGLE PART SCORING—MCL OR PAGE R
    THE DIRECT ROUTE

If you wish to score a single part of a Page R or MCL composition using the default values for the Stavewriter directives and formatting parameters, the following steps should be taken.

1.) Place the Stavewriter system disk in the left-hand drive. Place the CMI sounds disk that contains the composition to be scored in the right-hand drive. Press the RESTART button on the CMI. When the system finishes booting up, you will be in Stavewriter, and the first question will appear on the screen.

2.) The first three questions that will be asked are:

   Do you wish to enter the file manipulation mode?

   Do you wish to plot a working score of your Page R file?

   Do you wish to plot a previously computed score?

   Answer "N" to each of these questions.

3.) The next question:

   Is the file you wish to score a Page R file?

   should be answered "Y" if you wish to score a Page R file. If you wish to score an MCL file, answer "N" once again.

4.) The next question is:

   Do you wish to delay the plotting of the score until later?

   If you want Stavewriter to plot the score immediately after the computations are completed, answer "N" to this question. If you just want to perform the computations now and plot the score later, answer "Y".

5.) You will now be prompted for information regarding selection of the composition to be scored. The prompts will vary depending on whether you are scoring a Page R or an MCL composition.

   If you are scoring an MCL composition, the first prompt will be:

   Piece name:

   Enter the name of the piece file that contains the part you wish to have scored. The next prompt will be:

   Part name:

   Enter the name of the part file that you wish to have scored.

More information is also needed to achieve proper vertical placement of note heads. This includes allowances for instrument parts which must be written out of concert pitch, adjustments to the MCL half step transposition assumptions, clef selection, and true transposition. The following three directives supply this information.

Function name: TRANS
Parameter(s): <Middle C destination pitch>
Example: $ TRANS Bf2 $

The TRANS directive allows the pitches in MCL to be transposed to pitches in a given instrument's key and register. The value, <Middle C destination pitch>, gives the MCL pitch that is heard on an untransposed CMI when middle C of the score is played on the transposed instrument, and is expressed in the form, <Pitch name><Accidental (f, s, or n)><Octave number>. (An untransposed CMI pitch is achieved by playing a voice with all octave, semi-, and fine tuning set to 0. For a mode 4 voice, there should be 1 period per segment in waveform memory. For a mode 1 voice, there should be a large value of harmonic 1. If these conditions are met, then Cn4 on the CMI is concert middle C.) The default directive is "TRANS Cn4", which effectively causes no transposition. Any other pitch specified will cause the half step and scale step intervals between Cn4 and the desired <Middle C destination pitch> to be calculated. These differences are then applied to each succeeding pitch in MCL to calculate the vertical position of the note head. For example, $ TRANS Bf2 $, a TRANS directive that might be used for B flat instruments such as a trumpet, will transpose all MCL pitches up two octaves and a major second. The TRANS directive may be specified only at the beginning of a part.

MCL itself has a transposition function through the default variable "T". However, it only provides for transposition in half steps (or semi-tones). A half step change of 2 upward could transpose an F natural 4 to an F double-sharp 4, a G natural 4, or an A double-flat 4. To clarify this ambiguity, a set of twenty-three vertical position changes versus half step changes are assumed. Half-step change is the distance between two notes in half steps. The half-step changes range from negative eleven through positive eleven (negative for negative "T" values, positive for positive "T" values). The vertical position changes (measured by counting the lines and spaces from the given note to the transposed note) that correspond to half step changes in the range from -11 through 11 are assigned with the next directive.

Once the plotting begins, it will be necessary to change the paper in the plotter after each page is completed.. The message will appear on the screen:

Please change paper and press RETURN.

When this message appears, wait until the plotter finishes plotting and stores the pen in the carousel. Change the paper in the plotter, press RETURN, and the plotting will continue in this manner until the entire score is plotted.

9.) When the plotting is completed, Stavewriter will return to its starting point, ready to score another composition. The following message will appear:

> **If you do not wish to continue using Stavewriter,**
> **remove the Stavewriter system disk from the left-hand drive,**
> **insert the CMI system disk in the left-hand drive,**
> **and press the RESTART button**
> **when the next prompt appears.**

The only way to exit Stavewriter is to follow the instructions given in the message. If you do not want to exit Stavewriter, continue as though beginning a new Stavewriter session. If you wish to score another composition, go back to step 2 above.
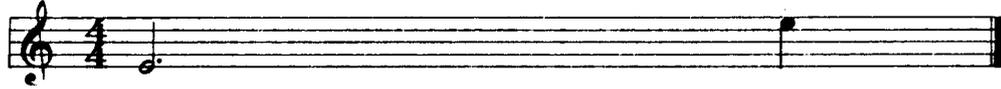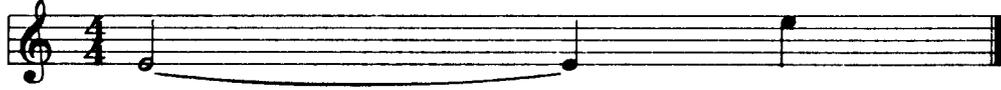
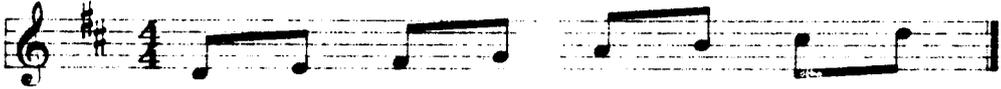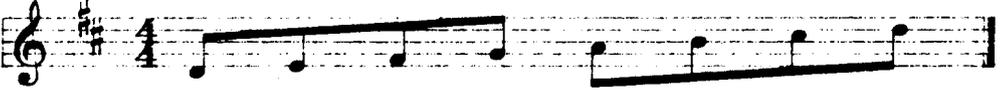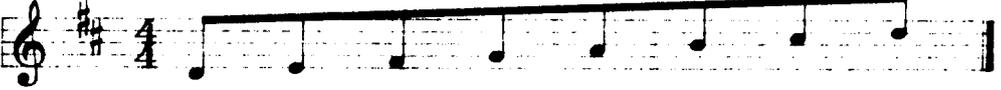A Stavewriter directive is an item that determines certain formatting
instructions. A Stavewriter directive is added to a piece, part, or
sequence file, using the MCL editor of the CMI system (Page C). A
directive may be inserted anywhere a note, chord, or rest might be
found in a sequence file, or on a separate line in piece and part
files. The general form for a directive is a dollar sign ($) followed
by a function name and one or more parameters (i.e., numbers or
names), followed by another dollar sign ($). The function name and
the parameters must be separated by at least one space.

The function names available are:

TIME	BEAT	GROUP
MINDIS	DISDUR	TRANS
STEP	CLEF	STEM

Examples of the syntax for a Stavewriter directive follow:

$ TIME 12 8$
$MINDIS 8 $
$ STEP -11 6 $
$STEM UP$

The three types of MCL files are in a hierarchy—piece on top, part
below, and sequence on the bottom. Any Stavewriter directive which
applies to all the levels may be included at the front of the piece
file. Any directive which applies to a particular part may be
inserted at the beginning of a part file. Any directive which applies
to a particular sequence may be inserted in the part file just before
the sequence file name or at the beginning of the sequence file.
Additionally, any directive which is to take effect in the middle of a
sequence may be inserted in the sequence file. One should note that
once a Stavewriter directive is changed at any level, the directive is
changed at all levels of the MCL hierarchy. The change remains in
effect until the directive is changed again at some other place in the
hierarchy. For example:

> In the part file, the time signature is set by the
> Stavewriter directive, "$ TIME 4 4 $". In the first
> sequence file, it is changed by the directive "$ TIME 3 4
> $". The time signature will remain 3/4 until it is changed
> by another Stavewriter directive, even if you finish the
> first sequence file and return to the part file to process
> the next sequence file.

In other words, there is only one value of a given Stavewriter
directive in effect at any time.

(The terms, "duration items" or "duration symbols", when used below,
refer to notes, chords,and rests.)

Although MCL supplies durations in MCL beats, which are in turn
related to clock ticks, there is no mention in MCL of time signature,
which tells you how many musical beats are in a measure, or the
relationship between musical beats and MCL beats. Also, allowance
needs to be made for horizontal spacing. The following five
directives make the necessary connections.

Function name: TIME
Parameter(s): <Numerator> <Denominator>
Example: $ TIME 3 4 $

The TIME directive establishes the time signature to be used, with
<Numerator> on top and <Denominator> on the bottom. Time signature
<Numerator> and <Denominator> must both be whole numbers, with
<Denominator> being a power of two (1, 2, 4, 8, 16, 32, . . .). If
this directive is encountered anywhere in a part file or one of its
sequences following any duration item, then a time signature change
will result if the next duration item starts at the beginning of a new
measure. The default directive is "TIME 4 4".

Function name: BEAT
Parameter(s): <Clock ticks per musical beat>
Example: $ BEAT 96 $

The BEAT directive specifies the number of "clock ticks" in MCL that
corresponds to one musical beat. This Stavewriter directive is not to
be confused with the MCL default value "B". To calculate clock ticks
per musical beat, multiply the number of MCL beats that correspond to
one musical beat by the MCL default value "B". For example, if B=96,
and the time signature is 4/4, and the MCL duration used to represent
a quarter note is 1/4, then the correct value for BEAT is 96 X 1/4, or
24. Remember that the MCL default value "B" is the number of clock
ticks for an MCL duration of 1, and the Stavewriter directive "BEAT"
is the number of clock ticks per musical beat. This allows any MCL
duration to represent a musical beat. Stavewriter uses total clock
ticks ("B" value X MCL duration) to determine the note's
representation; therefore, the value of "B" may change frequently
without requiring a change in the "BEAT" directive. Continuing the
above example, the text of the MCL file might appear as follows:

```
$ BEAT 24 $
!B=96
C
!B=24
D E F G
!B=48
A B
```

In Stavewriter, the C would be represented as a whole note. The next
four notes, D, E, F, and G, would be scored as quarter notes, and the
final two notes, A and B, would be scored as half notes. This
directive may only be changed at the beginning of a measure. The
quantity, <Clock ticks per musical beat>, is expressed as a whole
number. The default directive is "BEAT 48".

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```
Function name:  GROUP
Parameter(s):   <Beats-1> <Beats-2> . . . <Beats-n>
Example:  $ GROUP 2 1 $
```

The GROUP directive specifies the number of beats in each beat group. A beat group is a number of musical beats that are handled as a group for certain considerations in scoring. Beat groups contribute to the ease with which a score may be read and to the interpretation of rhythmic subdivisions within a measure. For example, a composition with a 6/8 time signature is usually scored using 2 beat groups, each 3 musical beats long. The directive that would indicate this standard beat grouping in Stavewriter is "$ BEAT 3 3 $". Perhaps you wish to deviate from this standard beat grouping to indicate a different interpretation of the rhythmic subdivisions of the measure. You could use the directive "$ GROUP 2 2 2 $" to indicate to Stavewriter that you wanted the composition scored with 3 beat groups in each measure, each 2 beats long. Beat groups are used to determine which notes are beamed together, which duration symbols are selected, and which notes are tied together. Every beat group either begins with a note, rest, or chord, or contains no notes, rests, or chords. Beams only connect notes in the same beat group.

The first parameter is the number of musical beats in the first beat group, the second parameter is the number of musical beats in the second beat group, etc. The number of parameters specified is the number of beat groups. Each parameter must be a whole number, and the sum of the parameters must be equal to the current time signature numerator. For example, if the time signature is 4/4 and the directive "$ GROUP 2 2 $" is encountered, then there are 2 beat groups in each measure, because there are 2 parameters following the function name. The first parameter indicates that there will be 2 musical beats in the first beat group and the second parameter indicates that there will be 2 musical beats in the second beat group also. The directive is valid for the time signature because the sum of the parameters (2+2) is 4, which is the same as the time signature numerator. The directive "$ GROUP 2 3 $" would not be valid because the sum of the parameters (2+3) is 5, which is not equal to the time signature numerator (4). This quantity can only be changed at the beginning of a measure. The default parameter list is the whole number 1, repeated N times, where N is the current time signature numerator, if the current time signature numerator is 20 or less. If the time signature numerator is larger than 20, then the default parameter list for the GROUP directive is the time signature numerator. The following drawings illustrate how the GROUP directive can affect the scoring of a composition. (The first two drawings utilized the same score with the GROUP directive set as indicated above each staff. Similarly, the last four drawings utilized the same score.)

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Function name: MINDIS
Parameter(s): <Distance>
Example: $ MINDIS 5/4 $

The MINDIS directive establishes a minimum horizontal separation
between duration elements. The units here are widths of a whole note.
The above example would mean that the space after every note would at
least be equivalent to the width of 5/4 whole notes. The parameter,
<Distance>, may be represented as a whole number or a fraction with
the numerator and denominator both whole numbers. The default
directive is "MINDIS 1".

Function name: DISDUR
Parameter(s): <Distance per duration>
Example: $ DISDUR 16 $

The DISDUR directive allows adjustment of the amount of horizontal
space left after each duration symbol according to its duration. The
units are whole note widths per musical beat. The above example would
mean that a note representing one musical beat would be followed by
space equivalent to the width of sixteen whole notes. It would also
mean that a note representing two musical beats would be followed by
space equivalent to the width of thirty-two whole notes and a note
representing half of a musical beat would be followed by space
equivalent to eight whole notes. The number may be expressed as a
whole number or a fraction with whole numbers in the numerator and
denominator. The actual amount of space after a duration symbol may
be wider than that specified if the line must be stretched to right-
justify the line or if the correct amount of proportional space is
less than the minimum spacing specified, but it is never smaller. In
any case, the amount of space after a symbol is never less than that
specified by MINDIS (see above). The default directive is "DISDUR 4".

$ DISDUR 4 $.
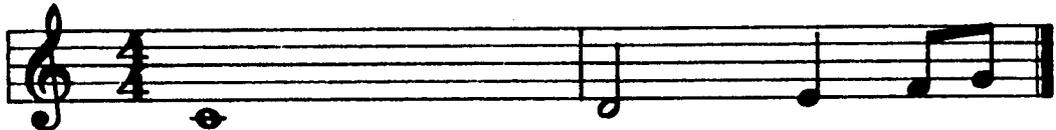
$ DISDUR 1 $

Minimum Horizontal Separation
$ MINDIS 1 $

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If you are scoring a Page R composition, the first prompt will be:

Page R filename:

Enter the name of the Page R file that you wish to have scored. The next prompt will be:

Keyboard number:

Enter the number of the keyboard (1 through 8) that you wish to have scored.

6.) The next prompt that will appear is:

Format file name:

Enter a new format file name that you have not used before. When the next prompt appears:

Create new format file or load old one (N or O)?

enter "N". (If you want to create or load a format file that is more personalized, see the section, "INTERACTIVE INITIALIZATION", on page 19, for further discussion of format files.)

7.) The following message will appear next:

The following options are available to you at this point:
    1.) look at and/or change general formatting directives (GF)
    2.) look at and/or change detailed formatting directives (DF)
    3.) compute and plot score (CS)
Which option do you select (GF,DF,CS)?

Enter "CS".

8.) The following message will appear on the screen:

Computations have begun.
If you are not delaying the plotting of the score,
prepare the plotter while the score is being computed.
Place desired pen in plotter carousel #1.
Put paper size switches at rear of plotter to proper positions.
Power on plotter after setting paper size switches.

The computations for the score are now performed automatically and do not require your further attention until the first page has been plotted. If the plotter is not yet prepared, do so now. See page 63 for instructions on plotter preparation.

```
Function name:  STEP
Parameter(s):  <Half step change> <Vertical position change>
Example:  $ STEP 9 6 $
```

The STEP directive allows the relationship between MCL transposition
measured in half steps and change of vertical staff position measured
in scale step units to be established and changed, as described in the
above paragraph. The default directives are:

"STEP -11 -6";	"STEP 11 6";
"STEP -10 -6";	"STEP 10 6";
"STEP -9 -5";	"STEP 9 5";
"STEP -8 -5";	"STEP 8 5";
"STEP -7 -4";	"STEP 7 4";
"STEP -6 -4";	"STEP 6 4";
"STEP -5 -3";	"STEP 5 3";
"STEP -4 -2";	"STEP 4 2";
"STEP -3 -2";	"STEP 3 2";
"STEP -2 -1";	"STEP 2 1";
"STEP -1 -1";	"STEP 1 1";

and, "STEP 0 0".

The first number corresponds to a value of "T" in MCL. The second
number tells how many lines/spaces the value of "T" will shift each
note. For example, if T=2 in MCL then:

$ STEP 2 0 $ would change F natural to F double sharp, G
natural to G double sharp;

$ STEP 2 1 $ would change F natural to G natural, G natural
to A natural;

$ STEP 2 2 $ would change F natural to A double flat, G
natural to B double flat; etc.

WARNING: DO NOT USE FRACTIONAL VALUES FOR "T" IN MCL. (For example,
T=-4 is allowed, T=-1/100 is not allowed.)


```
Function name:  CLEF
Parameter(s):  <Clef name>
Example:  $ CLEF ALTO $
```

The CLEF directive allows specification of one of four standard clefs.
By including this directive in a sequence file after the beginning of
a part, a change of clef will be performed. One of the following
clefs must be used: TREBLE, BASS, ALTO, or TENOR. The name of the
clef must be in all upper case letters. The default directive is
"CLEF TREBLE".

This range of features is just the beginning. Research is under way
to provide:

inserting text and other musical symbols in standard music
notation format;

extending standard music notation format to conductor's
scores;

combining multiple parts on single and grand staves;

plotting on a plotter with automatic sheet feeding;

printing on a dot matrix printer; and,

displaying the scores on the CMI screen.

Page 6

SINGLE PART SCORING
        INTERACTIVE INITIALIZATION

At the beginning of the Stavewriter session, after you have selected
the single part scoring option, you will be prompted for more
information. This information is of three general types:

        file selection;

        general formatting data and Stavewriter directives;

        detailed formatting data.

File selection information must be supplied. General formatting data,
Stavewriter directives, and detailed formatting data are all given
default values. If desired, these values may be changed.

The initialization process is basically the same for MCL and Page R
compositions, so they will be discussed together here. Differences
between the two will be discussed as needed.

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the desired resolution for alignment markings;

an octave shift for each keyboard.

There are four options for selecting which patterns are plotted:

plot all used patterns from 1 to 255;

plot up to 255 patterns in any order that you select;

plot up to 26 sections in any order that you select; or,

plot the patterns and sections according to the songlist.

Also provided within Stavewriter is an option for doing file
manipulation. Since all formatting files and plotting files are saved
on the Stavewriter system disk, some "housekeeping" will be necessary
periodically.

The selection of the major options of Stavewriter:

single part scoring--MCL or Page R;

replot a previously computed single part score;

Page R working score in simplified notation;

file manipulation;

is handled by a series of questions that can be answered by yes or no.
The diagram in figure 1 illustrates the result of the answer to each
question that will be asked.

If you have not yet created the format files for a particular
composition, you will need to enter a new name (possibly one similar
to the file name of the composition) in response to the first prompt.
Enter "N" when asked if it is an old or new file. This sequence of
entries will cause the system default files to be loaded. Changes can
be made to any of the formatting parameters or Stavewriter directives
as detailed in the sections, "GENERAL FORMATTING DIRECTIVES (GF)" and
"DETAILED FORMATTING DIRECTIVES (DF)". The current values of all
formatting parameters and directives are saved on the Stavewriter
system disk when computations for a score begin. This data is saved
in a new file with the name you specify for "Format file name".

If you have already created the format files for a particular
composition in a previous Stavewriter session, you may load them to
use as they are or to change. Enter the same format file name that
you used when you created the data the first time in response to the
first prompt. Respond with "O" to the second prompt. This sequence
of entries will cause the old format files to be loaded. Then you may
alter any of the values of the formatting parameters or Stavewriter
directives just as you did when the format files were created the
first time. The values as they appear when computations for the score
begin are saved on the Stavewriter system disk. The data is
associated with the "Format file name" that you have entered. Any old
formatting data that was associated with the same "Format file name"
will be destroyed.

At this point, Stavewriter has all the information it needs to score a
single part of your composition. You will now be presented with
options which allow you to tailor the formatting to your
specifications. The prompt which will appear on your screen is:

> The following options are available to you at this point:
> 1.) look at and/or change general formatting directives (GF)
> 2.) look at and/or change detailed formatting directives (DF)
> 3.) compute and plot score (CS)
> Which option do you select (GF,DF,CS)

If you are satisfied with the formatting parameters and Stavewriter
directives as they are, enter "CS" in response to the prompt and
Stavewriter will begin the process of computing and plotting your
score. If you want to change any of the directives or parameters, the
"GF" and "DF" options allow you to do this. The general formatting
directives (GF) include all the Stavewriter directives mentioned in
the previous section except STEP and the formatting details of
positioning the score on the page. The detailed formatting directives
(DF) include STEP and the formatting details of spacing within the
score.

number of clock ticks in a musical beat;

beat grouping;

transposition;

minimum and proportional spacing between notes;

stem direction.

The beat grouping facility allows each measure to be subdivided as desired. For example, a measure with a time signature of 6/8 could be grouped as 2 groups of 3 beats; 3 groups of 2 beats; 4 groups of 1 beat, 2 beats, 2 beats, and 1 beat; etc. In MCL, this can be changed on each measure if desired.

Transposition preserves proper scale-step interval as well as half-step interval. Double sharps and double flats may be used, if desired. Note heads in chords are "flipped" to the other side of the stem, and accidentals are adjusted, if necessary, to avoid overlap. Notes and chords will automatically be tied over beat groups, bar lines, or staves, if necessary.

Both minimum spacing and proportional spacing are used to establish the horizontal positioning of symbols. Minimum spacing keeps some space after a note, no matter how short its duration. Proportional spacing keeps the space after notes, chords, or rests proportional to their duration. When the measures are "stretched" to fill a staff, only the proportional spacing is increased. So, short duration symbols (whose spacing is minimum) remain properly spaced.

Time signatures can have up to 30 beats per measure, with a beat represented by a symbol as small as a 128-th note. Durations can be represented down to a 256-th note.

All of these parameters and directives may be altered interactively at the beginning of the Stavewriter session. In MCL compositions, the directives may also be embedded in the piece, part, or sequence files so that they may change during the course of the song. Parameters and directives entered interactively at the beginning of the session are saved on the Stavewriter system disk under a file name of your choice for later recall.

Neither MCL nor Page R has explicit means of specifying groups of rhythms that subdivide beats in fractions other than 2, although each system allows any note to have an arbitrary duration. Therefore, in order to represent properly any sequence of durations that fall in a measure, Stavewriter checks for "odd" durations--those that have no representation using standard duration symbols alone, such as triplets or quintuplets. If found, that note's symbol, along with all the notes in the same beat group are altered to reflect a proper odd rhythm notation, along with the traditional odd rhythm number and braces.

Number of clock ticks per musical beat= 48

This prompt appears only if you are scoring an MCL composition. It establishes how many clock ticks correspond to one musical beat. The default value is 48. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number (1, 2, 3, 10, 52). (For further discussion of the BEAT directive, see page 12.)

Time signature numerator= 4

This establishes the top number of the time signature and corresponds to the first parameter in the TIME directive. The default value is 4. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number. (For further discussion of the TIME directive, see page 12.)

Time signature denominator= 4

This establishes the bottom number of the time signature and corresponds to the second parameter in the TIME directive. The default value is 4. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number and a power of two (1, 2, 4, 8, 16, 32, . . .). (For further discussion of the TIME directive, see page 12.)

NOTE: If you specify a time signature other than the default time signature, 4/4, make sure the beat grouping values that follow are correct for the desired time signature.

Number of beat groups in measure= 4

This establishes how many beat groups will be in the measure. This is not actually a Stavewriter directive, but it is used in the next directive. The default value is 4. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 1 through 20. (There may be no more than 20 beat groups in a measure.)

Number of beats in beat group N= 1

This establishes the number of musical beats in each beat group. It will prompt you for as many beat groups as the number of beat groups entered previously. The sum of the beats in each beat group must equal the time signature numerator. The default value is 1 beat in each beat group. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number. (For further discussion of the GROUP directive, see page 13.)

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The next four items refer only to Page R compositions. The prompts
will not even appear if you have chosen to plot an MCL composition.

Number of flats or sharps in key signature (0-7)= 0

This establishes the number of flats or sharps in the key signature.
This is the only place you can indicate that you want a key signature
other than C major or A minor. The default value is 0. If you wish
to change the value, enter the desired new value and press RETURN;
otherwise, just press RETURN. The value entered must be a whole
number from 0 through 7.

Flats or sharps in key signature (F or S)= F

This establishes whether the key signature contains flats or sharps
and only appears if the number of flats or sharps in the key signature
is not 0. The default value is "F". If you wish to change the value,
enter the desired new value and press RETURN; otherwise, just press
RETURN. The value entered must be "F" for flats or "S" for sharps.

Preferred accidental before transposition (F or S)= F

This only appears if the number of flats or sharps in the key
signature is 0. In Page R, the value that indicates the pitch of the
note is saved as the number of the key on the CMI. Since one CMI key
may have two possible key names, there is ambiguity as to which key
name might be preferred. For example, key number 1 could be named F
sharp 0 or G flat 0. If you have indicated a key signature that has
flats or sharps in it, then this preference is dictated by the key
signature, but if the key signature has no flats or sharps in it,
specify your preference here. If the accidental preference indicated
is sharps, then the keyname selected for key number 1 would be F sharp
0. If the preference was flats, the name G flat 0 would be selected.
Please note that any transposition that is to be performed will affect
the accidental that finally appears in the score. The default value
is "F". If you wish to change the value, enter the desired new value
and press RETURN; otherwise, just press RETURN. The value entered
must be an "F" for flats or an "S" for sharps.

The remaining items that are included in the general formatting
directives pertain to positioning the score on the page. All of these
appear for both MCL and Page R compositions.

Horizontal staff length (inches)= 9.5

This determines how long each staff will be horizontally. The default
value is 9.5. If you wish to change the value, enter the desired new
value and press RETURN; otherwise, just press RETURN. The value
entered must be a real number (3, 4.5, .875, . . .).

Horizontal Staff Length
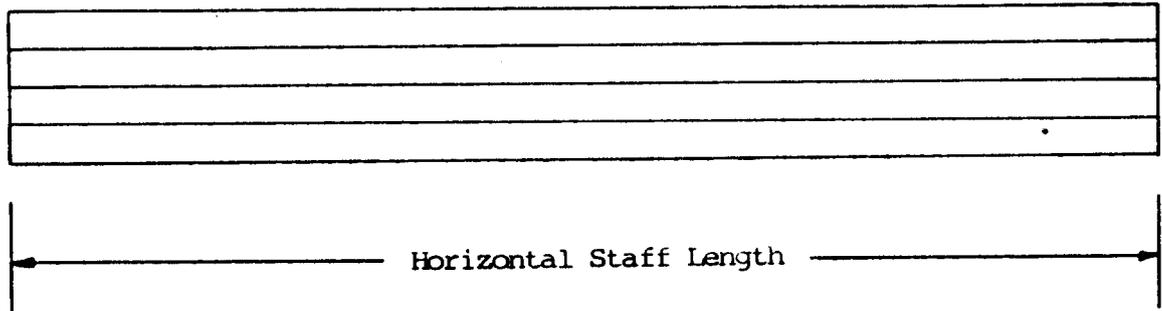
Vertical width of one staff (inches)= .375

This establishes the width of a staff, from the bottom line to the top
line. The default value is .375. If you wish to change the value,
enter the desired new value and press RETURN; otherwise, just press
RETURN. The value entered must be a real number.

Vertical Width of One Staff

Page 27
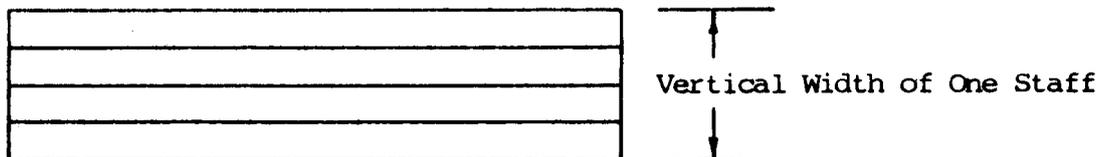
This establishes the orientation of the score on the paper. The Normal orientation uses the longest dimension of the paper as the left side of the paper. The Sideways orientation uses the shortest dimension of the paper as the left side of the paper. The default value is "N". If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be either "N" for normal or "S" for sideways.
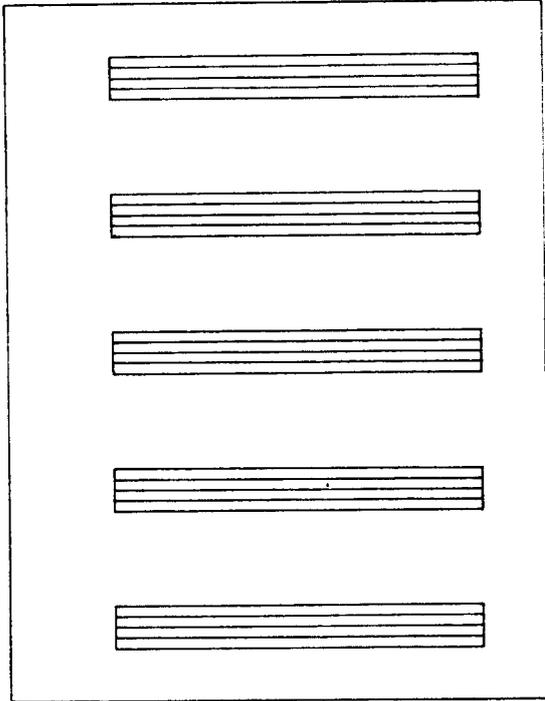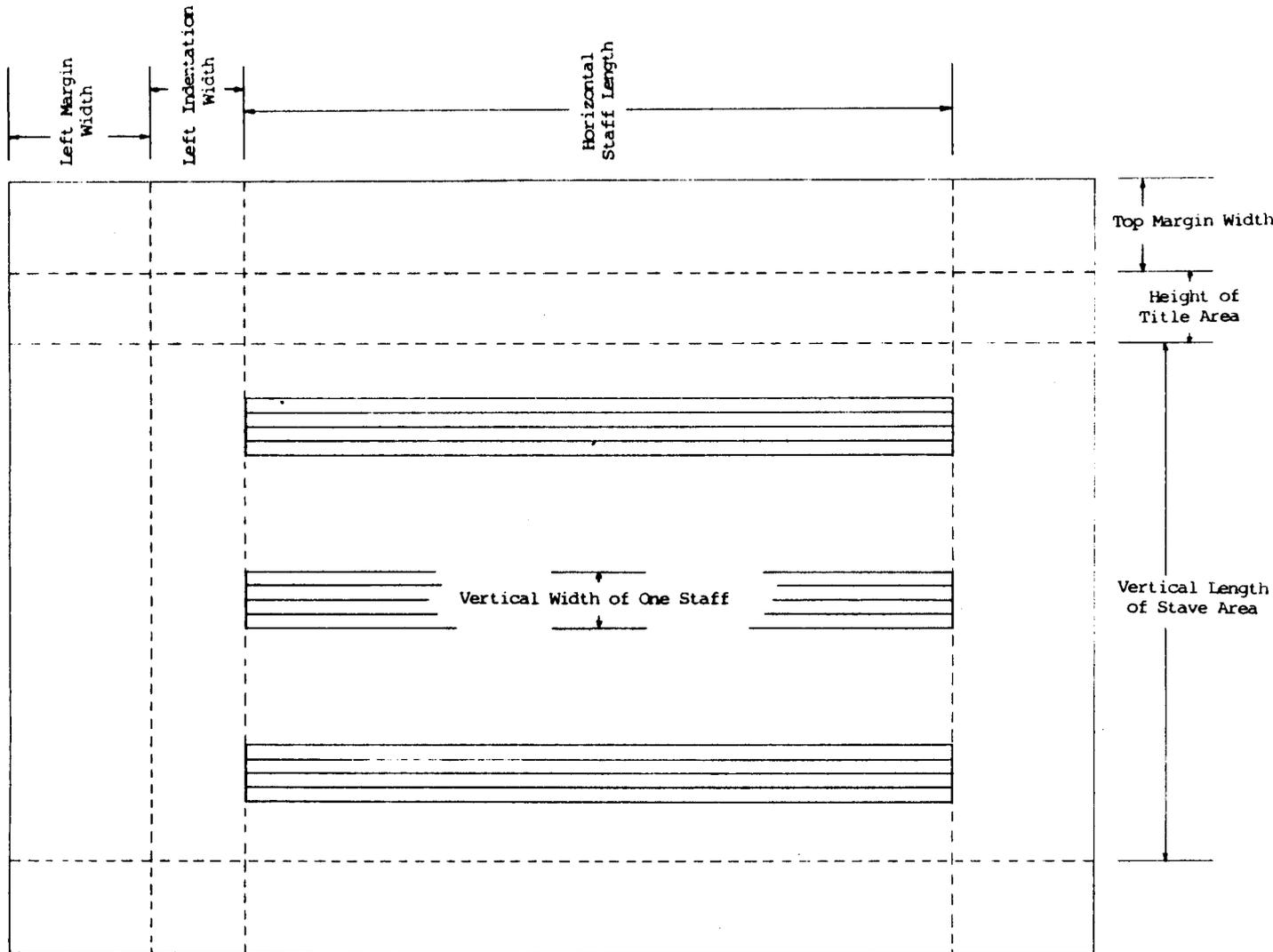
Sideways

Normal
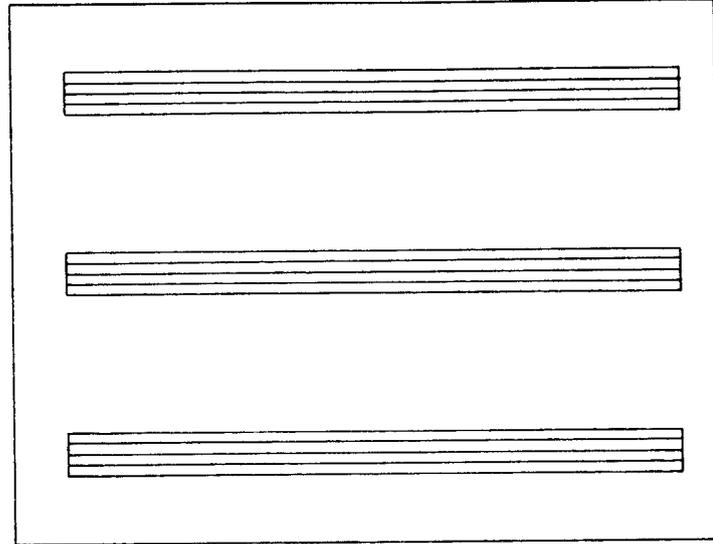
Left margin width (inches)= 1.
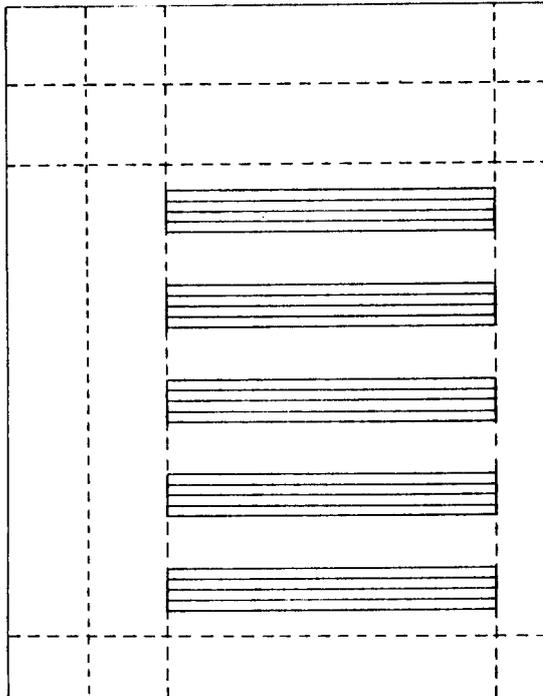
This establishes a margin that will remain blank on the left side of the page for binding purposes, etc. The default value is 1. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a real number.

Left Margin Width

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Figure 3

Left Margin Width

Left Indentation Width

Horizontal Staff Length

Top Margin Width

Height of Title Area

Vertical Width of One Staff

Vertical Length of Stave Area

View=Sideways
Number of Staves on Page=3

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The detailed formatting directives include the Stavewriter directive,
STEP, and the parameters that pertain to the placement of symbols
within the score. You may alter any of these values in the same way
that you altered general formatting directives. The prompt for a
given directive or parameter will appear on the screen followed by the
value that is currently in effect for it. If you are satisfied with
the value, simply press RETURN and the value will be retained. If you
wish to change the value, simply enter the desired value and then
press RETURN and the new value will be inserted.

The units for the formatting parameters have been generalized so that
they are not dependent on staff width. The distance from the bottom
line to the top line of the staff is 144 units. The space between the
lines of the staff is 36 units. All of the formatting parameters
should be entered with these units in mind, unless otherwise
specified.
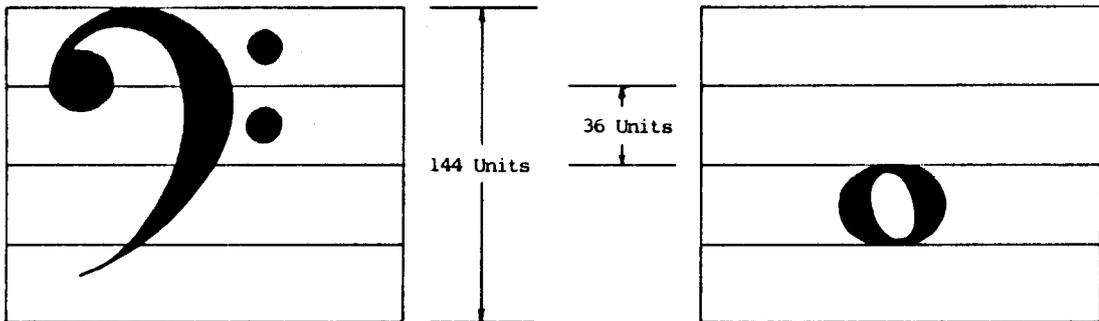
If you are scoring an MCL composition, the first prompt that will
appear is the prompt for the STEP directive. If you are scoring a
Page R file, these prompts will not appear since the STEP directive is
only meaningful in conjunction with the MCL default value "T".

STEP XX= NN

You will be prompted for each half step change from -11 to 11. You
may adjust the scale step change that accompanies each half step
change. The value entered should be a whole number from -32768
through 32767. (For further discussion of the STEP directive and for
a list of the default values, see page 17.)

The following parameters are applicable for both Page R and MCL
scores. They pertain to the spacing between the various symbols that
are elements of the score itself. (Parameters that are related may be
grouped under larger headings.)

Key signature= 100

This parameter establishes the amount of space that will be left after the entire key signature has been plotted before the beginning of the next symbol. The default value is 100. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.


Space after Key Signature (before time signature)

Space after Key Signature (before note)
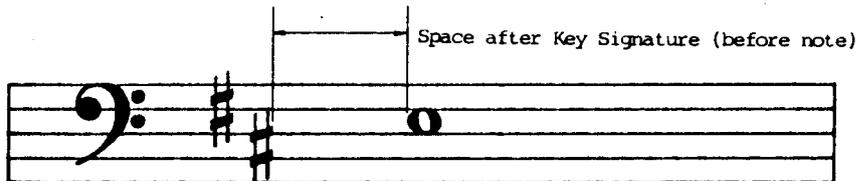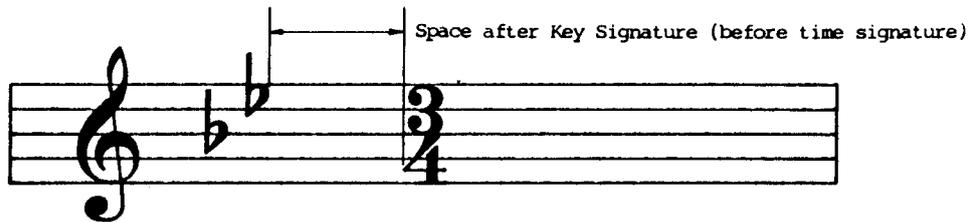
Time signature= 100

This parameter establishes the amount of space that will be left after the time signature has been plotted before the beginning of the next symbol. The default value is 100. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.


Space after Time Signature (before note)

Page 37
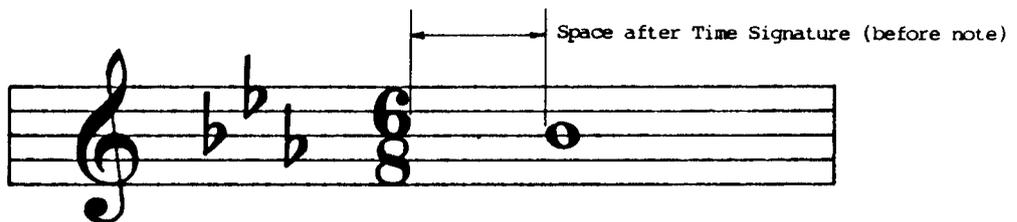
Space between digits -
Time signature= 10

This parameter establishes the amount of space that will be left between the digits of the numerator or denominator of the time signature if the number is more than one digit. For example, if the time signature numerator is 32, this parameter determines the amount of space between the 3 and the 2. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.


Space between Digits - Time Signature
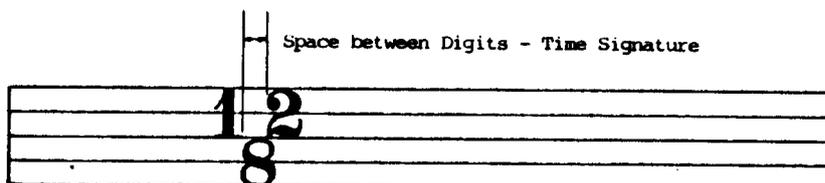
Space after accidental -
Double flat= 10

This parameter establishes the amount of space left after a double flat before the beginning of the next symbol. This would be used in the placement of accidentals within the score. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
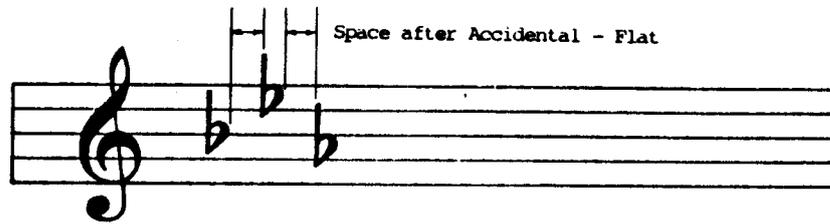

Space after Accidental - Double Flat

Space after Accidental - Double Flat
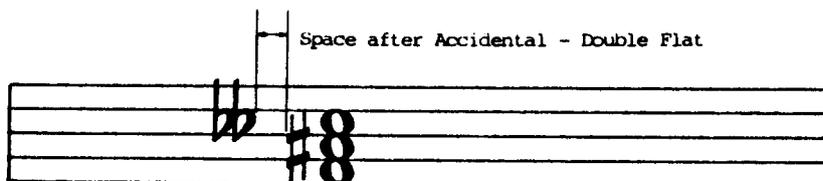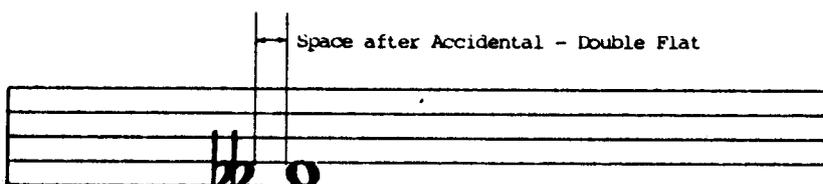
This parameter establishes the amount of space that will be left after a double sharp before the beginning of the next symbol. This would be used in the placement of accidentals within the score. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
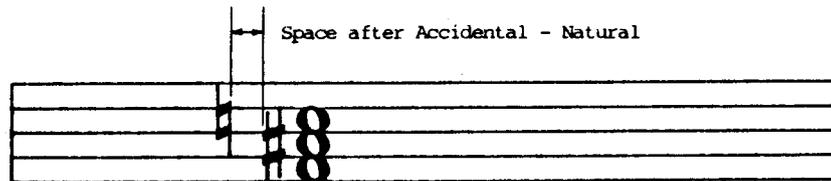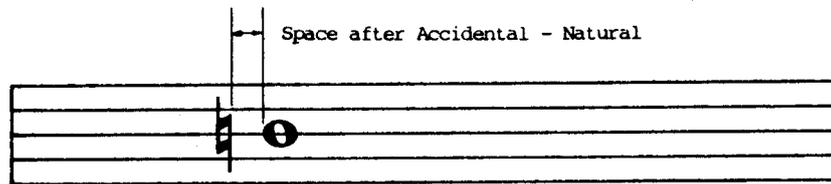
Space after Accidental - Double Sharp

Space after Accidental - Double Sharp
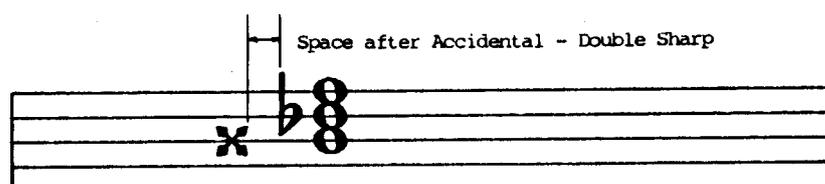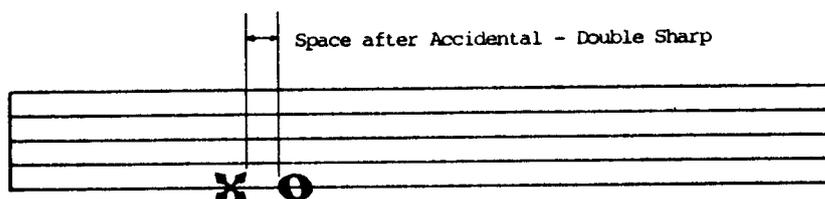
This parameter establishes the amount of space that will be left after a flat before the beginning of the next symbol. This would be used in the placement of accidentals within the score and in the placement of multiple flats in a key signature. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Space after Accidental - Flat

Space after Accidental - Flat

Space after Accidental - Flat
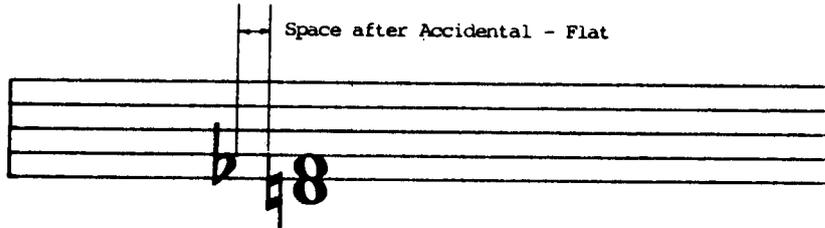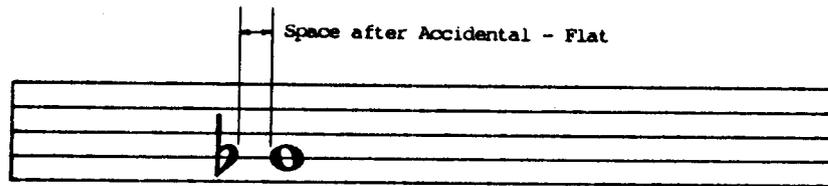
This parameter establishes the amount of space that will be left after a natural before the beginning of the next symbol. This would be used in the placement of accidentals within the score and in the placement of any necessary naturals when plotting a key signature change. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.


Space after Accidental - Natural

Space after Accidental - Natural

Space after Accidental - Natural
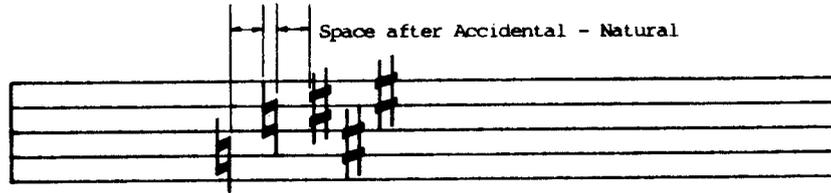
This parameter establishes the amount of space that will be left after a sharp before the beginning of the next symbol. This would be used in placement of accidentals within the score and in placement of multiple sharps in a key signature. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.


Space after Accidental - Sharp

Space after Accidental - Sharp

Space after Accidental - Sharp

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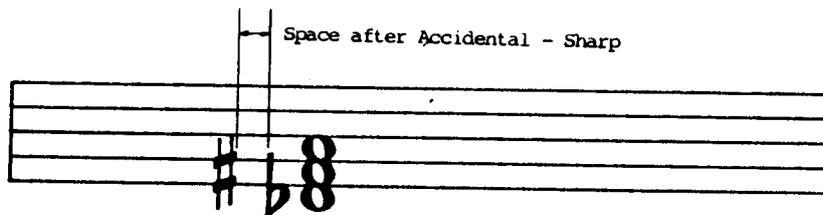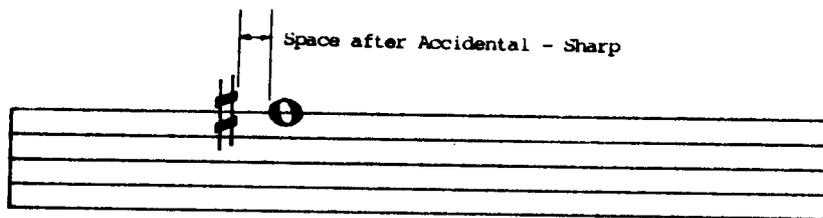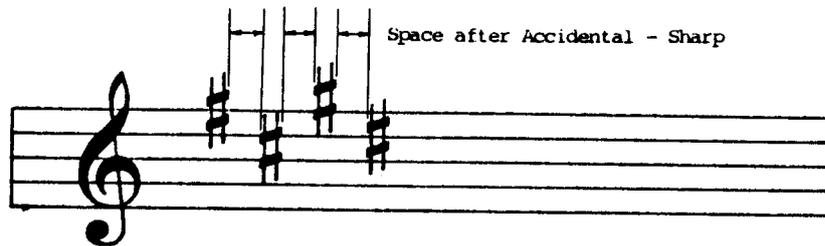
Space before dot, after -
Note= 10

This parameter establishes the amount of space between a note head and the accompanying dot. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Space before Dot - after Note
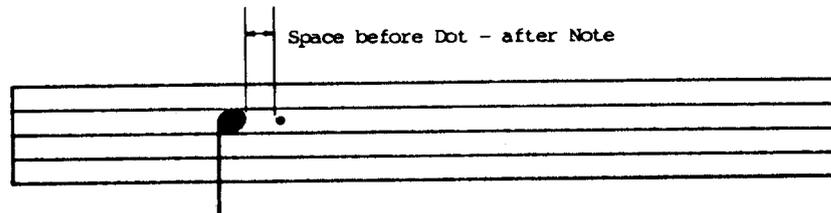
This parameter establishes the amount of space between a rest symbol and the accompanying dot. The default value is 10. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
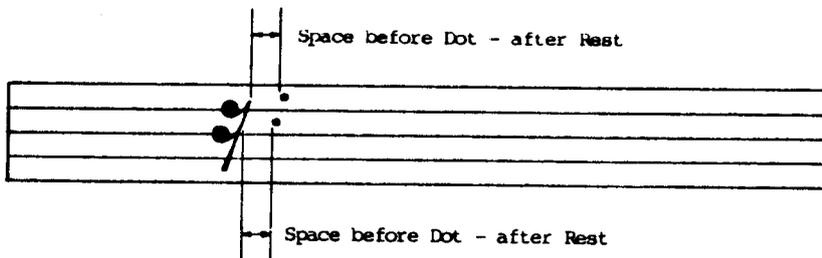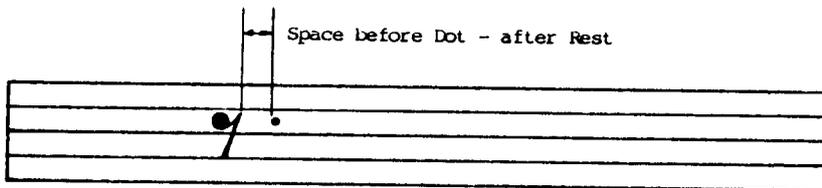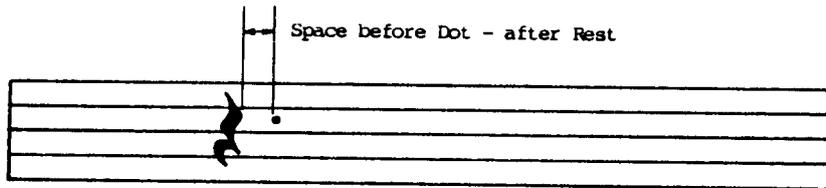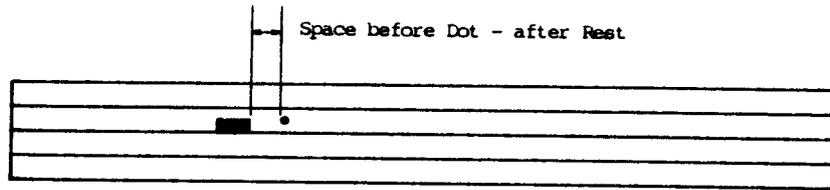

Space before Dot - after Rest

Space before Dot - after Rest

Space before Dot - after Rest

Space before Dot - after Rest

Space before Dot - after Rest

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This parameter establishes the amount of space between the note head and the end of the tie symbol in the horizontal direction. The default value is 5. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Space between Note Head and End of Tie –
Horizontal

Vertical= 27

This parameter establishes the amount of space between the center of the note head and the end of the tie symbol in the vertical direction. The default value is 27. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
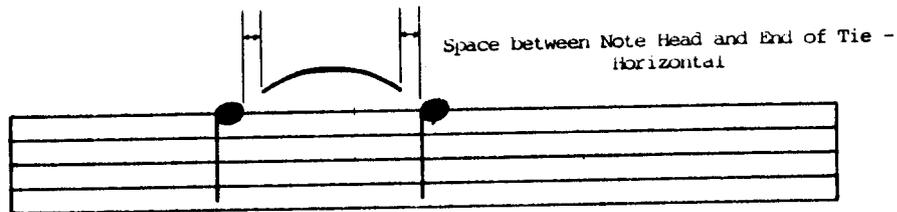
Space between Note Head and End of Tie –
Vertical

### Width of half tie at beginning of line= 50

This parameter establishes the total width of a half tie symbol at the beginning of a line. The default value is 50. If you wish to change the value, enter the new desired value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Width of Half Tie at Beginning of Line

Page 45
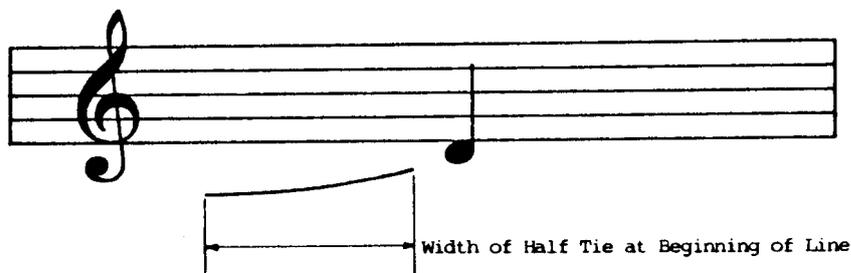
This parameter establishes the amount of space between beams when multiple beams are necessary. The default value is 18. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Space between Beams
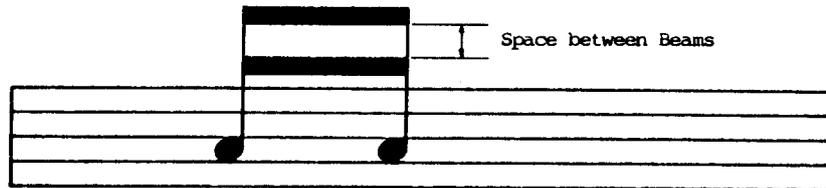
Width of a beam= 18

This parameter establishes the width of an individual beam. The default value is 18. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Width of a Beam

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Maximum rise of beam –
the maximum difference between the
left and right ends of the beam
in number of pitches –
Maximum beam rise= 4

This parameter establishes a maximum amount of slant for any beamed group. If two notes that are quite far apart in terms of pitch need to be beamed together, the slant of the beam could be quite steep if the beam simply follows the slant indicated by the pitches of the notes. In many cases, this could make the beamed group difficult to read. Maximum beam rise governs how steep this slant may be. Note that the units here are not the units referenced earlier. The unit here is the number of pitches. Each line and space of the staff counts as a pitch. The default value is 4. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.
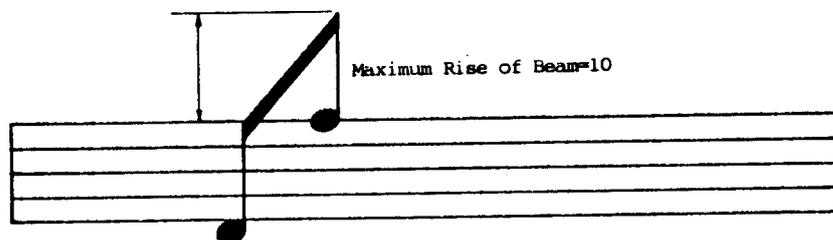

Maximum Rise of Beam=10

Maximum Rise of Beam=5

Exposed stem length -

> or = 2 flags= 100

Exposed stem length is the length of the stem on a note, exclusive of
flags and the distance between the top and bottom notes of a chord.
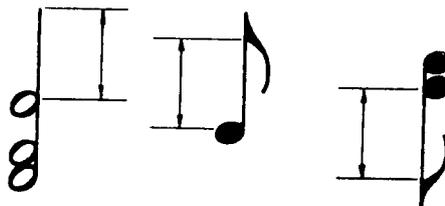This parameter establishes the exposed stem length for sixteenth and
smaller duration notes. The default value is 100. If you wish to
change the value, enter the desired new value and press RETURN;
otherwise, just press RETURN. The value entered must be a whole
number from 0 through 255.

Exposed Stem Length - > or = 2 Flags
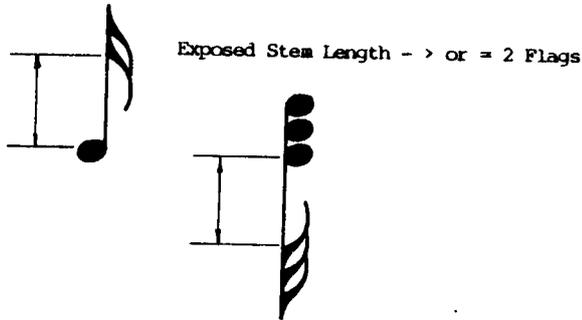
Multiple note heads or < 2 flags= 86

This parameter establishes the exposed stem length for eighth and
larger duration notes, and also for chords. The default value is 86.
If you wish to change the value, enter the desired new value and press
RETURN; otherwise, just press RETURN. The value entered must be a
whole number from 0 through 255.

Exposed Stem Length - Multiple Note Heads or < 2 Flags
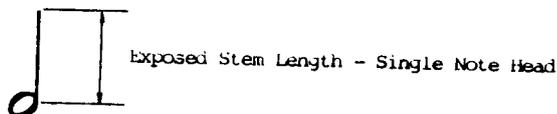
Single note head= 122

This parameter establishes the exposed stem length for quarter and
larger duration notes that are not chords. The default value is 122.
If you wish to change the value, enter the desired new value and press
RETURN; otherwise, just press RETURN. The value entered must be a
whole number from 0 through 255.

Exposed Stem Length - Single Note Head

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(If notes are to be beamed together, this exposed stem length becomes a minimum. The actual exposed stem length may be greater than the value entered here, due to calculations relating to placement of the beam, but it will never be less than the value entered here.)

Space after barline, before -
Beat group= 36

This parameter establishes the amount of space between the bar line and the first note, chord, or rest in the measure. The default value is 36. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number from 0 through 255.

Space after Barline - before Note or Rest
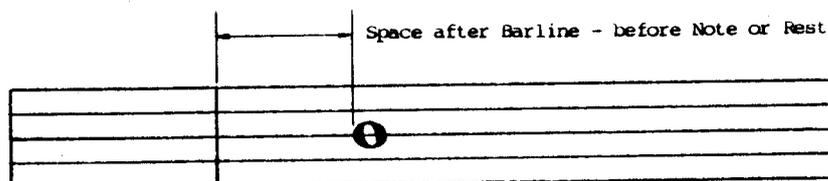
Clef, time or key signature= 36

This parameter establishes the amount of space between the bar line and a treble clef, bass clef, time signature, or key signature. The default value is 36. If you wish to change the value, enter the desired new value and press RETURN; otherwise, just press RETURN. The value entered must be a whole number between 0 and 255.

Space after Barline - before Clef

Space after Barline - before Time Signature

Space after Barline - before Key Signature
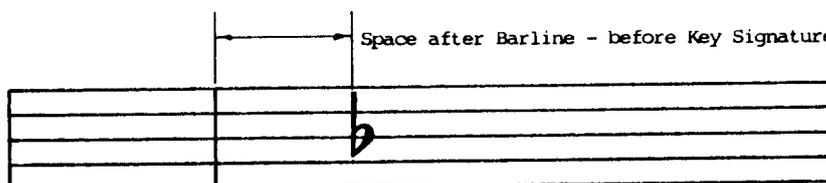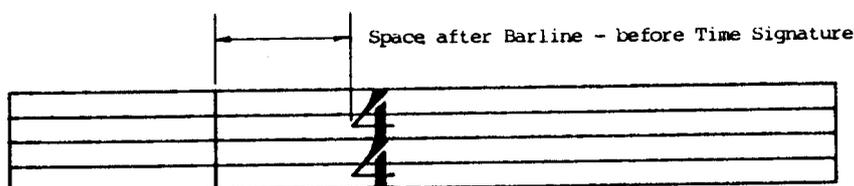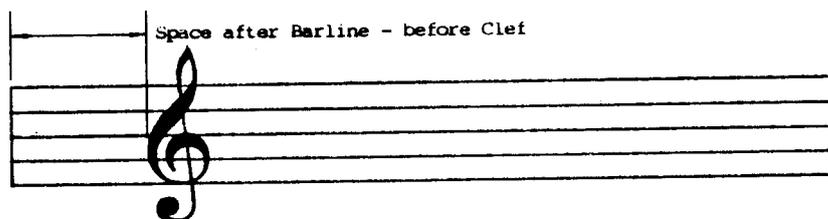
Odd rhythm braces —
Vertical space between number and
nearest note or rest= 40

This parameter determines the vertical placement of the odd rhythm
brace. It establishes the amount of vertical space between the odd
rhythm number and the note that would be closest to the brace. The
default value is 40. If you wish to change the value, enter the
desired new value and press RETURN; otherwise, just press RETURN. The
value must be a whole number from 0 through 255.

Odd Rhythm Braces - Vertical Space
between Number and Nearest Note

Space between end of brace
### and the number= 50

This parameter specifies the amount of space between the end of the
odd rhythm brace where it is broken to insert the number and the
number itself. The default value is 50. If you wish to change the
value, enter the desired new value and press RETURN; otherwise, just
press RETURN. The value entered should be a whole number from 0
through 255.

Odd Rhythm Braces - Space between
End of Brace and the Number
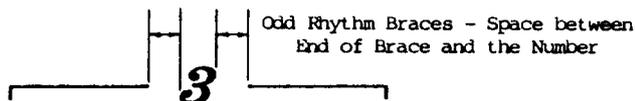
This concludes the detailed formatting directives and parameters. If
you have already adjusted the general formatting directives to your
satisfaction, you should now be ready to compute and plot the score,
by entering the "CS" option. If you would like to display the
parameters and directives again or even change any of their values,
you may enter "GF" or "DF" when the options are displayed. When all
the values are correct, enter "CS" and let the computations begin (see
below).

When you enter the "CS" option, the following message will appear on the screen:

Computations have begun.
If you are not delaying the plotting of the score,
prepare the plotter while the score is being computed.
Place desired pen in plotter carousel #1.
Put paper size switches at rear of plotter to proper positions.
Power on plotter after setting paper size switches.

The computations for the score are now performed automatically and do not require your further attention until the first page has been plotted. The computations performed by the computer for a "normal" page of music may take from twenty minutes to an hour. If the plotter is not yet prepared, do so now. See page 63 for instructions on preparing the plotter.

Once the plotting begins, it will be necessary to change the paper in the plotter after each page is completed. The message will appear on the screen:

Please change paper and press RETURN.

When this message appears, wait until the plotter finishes plotting and stores the pen in the carousel. Change the paper in the plotter, press RETURN, and the plotting will continue in this manner until the entire score is plotted.

When the plotting is completed, you will be returned to the beginning of Stavewriter. The following message will appear:

If you do not wish to continue using Stavewriter,
remove the Stavewriter system disk from the left-hand drive,
insert the CMI system disk in the left-hand drive,
and press the RESTART button
when the next prompt appears.

If you wish to end your use of Stavewriter, follow the instructions given in the message. Otherwise, you may select another option just as you did when you began Stavewriter initially.

If a score has already been computed once, and you are satisfied with the way it looks on the page, then it is not necessary to recompute the score again if you want to plot another copy of it. The plot file has been saved on the Stavewriter system disk and it is a simple matter to replot it.

To get to this option, answer "N" to the first two questions that you are asked at the beginning of Stavewriter. When asked if you want to replot a previously computed score (the third question), just enter "Y". You will then see the following prompt:

Enter the format file name of the score you wish to plot:

The format file name requested here corresponds to the format file name that you entered when you computed the score. Once you have entered this name, it is only a minute or less before the plotting of the score commences, so it is best to have the plotter prepared ahead of time.

Once again, it will be necessary to change the paper in the plotter after each page is completed. The message will appear on the screen:

Please change paper and press RETURN.

When this message appears, wait until the plotter finishes plotting and stores the pen in the carousel. Change the paper in the plotter, press RETURN, and the plotting will continue until the entire score is plotted.

When the plotting is completed, you will be returned to the beginning of Stavewriter. The following message will appear:

**If you do not wish to continue using Stavewriter,
remove the Stavewriter system disk from the left-hand drive,
insert the CMI system disk in the left-hand drive,
and press the RESTART button
when the next prompt appears.**

If you wish to end your use of Stavewriter, follow the instructions given in the message. Otherwise, you may select another option just as you did when you began Stavewriter initially.

A Page R working score is designed as an aid to composing in Page R. The format of the score is very similar to the screen display of Page R so that you can alternate between studying the hard copy and screen display easily, but pitches are provided as an aid to remembering the melody line of each keyboard. Four patterns are plotted on each sheet of A3 or B size paper, so that as much information as possible may be presented at once.

There is a short interactive initialization section, followed almost immediately by the commencement of plotting. It would be best to prepare the plotter before beginning the initialization process, since there is little time to do so between the initialization process and the beginning of the plot.

To select this option, enter "N" to the first question that is asked when you begin Stavewriter. Answer "Y" in response to the second question.

After you have selected this option, the prompt will appear on the screen:

What is the name of the Page R file?

Simply enter the name of the Page R file that you wish to have scored in this manner.

The next prompt that will appear on the screen will pertain to the selection of the patterns to be plotted:

There are four plotting options available to you:
1.) Plot all used patterns from 1 to 255;
2.) Plot up to 255 patterns in the order that you specify;
3.) Plot up to 26 sections in the order that you specify; or,
4.) Plot the patterns according to the song list.
    Please select the option by number:

Enter 1, 2, 3, or 4, depending on which pattern selection option you want.

If you choose option 2, the following prompt will appear:

Please enter the numbers of the patterns you want plotted:

In order to specify patterns, the following syntax should be used:

> a hyphen (-) indicates that all patterns between and including the numbers on each side of the hyphen should be plotted;

> a semicolon (;) indicates separation between patterns or ranges of patterns to be plotted.

For example, the following entry:

$$1-5;8-23;7;9;22-29$$

would result in the following 31 patterns being plotted: 1, 2, 3, 4, 5, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 7, 9, 22, 23, 24, 25, 26, 27, 28, and 29. All the numbers entered must be whole numbers and the total number of patterns to be plotted must not exceed 255.

If you chose option 3, the following prompt will appear:

Please enter the names of the sections you want plotted:

Sections to be plotted are specified using the same syntax as patterns to be plotted, except that letters of the alphabet are used instead of whole numbers. For example, the following entry:

A-E;W;X;R-T;L-Q

would result in the following 16 sections being plotted: A, B, C, D, E, W, X, R, S, T, L, M, N, O, P, and Q. The number of sections to be plotted must not exceed 26.

The next prompt deals with the clef that will be printed on each staff (which also determines placement of the pitches on the staff), and appears regardless of the pattern selection option chosen:

You may use any of four clefs on any of the 8 keyboards.
The clefs you may use are:
      1.) Treble;
      2.) Bass;
      3.) Alto; or,
      4.) Tenor.
Please indicate the clef for each keyboard by number.

Clef for keyboard number N:

You will be prompted for the clef for each keyboard. In response to each prompt, simply enter 1, 2, 3, or 4, whichever number corresponds to the desired clef. You must enter a clef for each keyboard.

Next, you will be given the option of shifting all the notes for a given keyboard by octaves. You may shift notes as much as six octaves either up or down. The prompt is:

You may shift the notes on the staves by octaves. (Otherwise,
middle C is key C4).
      To make notes appear an octave higher on the staff, enter 1.
      To make notes appear two octaves lower on the staff, enter -2.
      To leave the notes where they are, enter 0 or RETURN.

Octave shift for keyboard number N:

Simply enter a positive whole number to make notes appear an octave or more higher or a negative whole number to make notes appear an octave or more lower. You may not shift the notes by more than 6 octaves.

Stavewriter will automatically shift notes whose pitches fall outside of a certain range by octaves to bring them within the range that can be clearly plotted in this working score format, and will note this octave shift with a number above or below the note. The octave shift that you specify during the initialization is to prevent this automatic octave shifting for any keyboard whose notes might consistently fall outside of the plotting range, since excessive use of octave notation could be confusing.

The next prompt will be:

In order for the plot to resemble the Page R screen display as closely
as possible, please specify the resolution you used to create
the patterns:
      A.) Resolution without triplets; or,
      B.) Resolution with triplets.
Please specify resolution by letter:

Alignment ticks will be drawn between the staves for the keyboards to
aid in reading the score. Selecting "A" or "B" means that the ticks
drawn on the plot will correspond as closely as possible to the screen
display. Only "A" or "B" is an acceptable response to this prompt.

The last two prompts pertain to labelling on the page and are
optional. The first will say:

You may have a title printed at the top of each page.
If you would like a title, please enter the text you would like,
up to 40 characters. If you do not want a title, just enter RETURN.

      The title is:

If you want a title on each page, enter the desired title. If you do
not want a title, simply press RETURN, as instructed in the prompt.

The next prompt is for labels for each keyboard:

    You may also label the keyboards with voice names, if you wish.
    The labels may be up to 13 characters long. If you do not want a
    label on a keyboard, just enter RETURN.

    Label for keyboard number N:

You will be prompted for each keyboard, so on each keyboard you have
the option of having a label of your choice or no label. For no label
on any given keyboard, enter RETURN for that keyboard. (In order to
not have any labels on any of the keyboards, you must enter RETURN for
each keyboard.)

This completes the initialization phase of the working score. In about sixty seconds, the plotting of your working score will begin. You will have to change the paper in the plotter at the completion of each page. This message will appear on the screen:

Please change paper and press RETURN.

When this message appears, wait until the plotter finishes plotting and stores the pen in the carousel. Change the paper in the plotter, press RETURN, and the plotting will continue in this manner until the entire score is plotted.

Once the entire working score has been plotted, the following message will appear on the screen:

> **If you do not wish to continue using Stavewriter,**
> **remove the Stavewriter system disk from the left-hand drive,**
> **insert the CMI system disk in the left-hand drive,**
> **and press the RESTART button**
> **when the next prompt appears.**

If you wish to exit Stavewriter, follow the instructions given in the message. Otherwise, start again from the beginning and select another Stavewriter option.

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Sections and patterns are identified by labels that are located on the left side above the staff for the first keyboard.

If you select one of the first two pattern selection options, in which individual patterns are specified and plotted, the pattern number appears above the staff for the first keyboard. This will be the only notation that will occur with these options.

If you select one of the last two pattern selection options, in which patterns are selected according to a section list or song list, more information is needed to describe the pattern and its relationship to the other patterns in the section or song list. The pattern number still appears in the same location as it did when one of the first two pattern selection options was selected. However, the number of repetitions of the pattern will also be indicated. It is indicated by an "X" followed by the number of repetitions of the pattern.

Above the notation for the pattern number, you will see the letter name of the section that is being plotted. Since sections can call other sections, this label may be several characters long, to indicate the nesting of the sections. The first character is the first section to be called. The second character indicates a section called from the first section. The third character indicates a section called from the second section, and so on. Of course, when a section ends, its character no longer appears in the "section list". In the case of the song list, if a pattern is called directly from the song list without being included in a section, no section label will appear.

Section Name
Pattern Number
Number of Repetitions

C
8 X 2

Section Names: Section C called by the songlist; Section A called by Section C
Pattern Number: Pattern 1 called by Section A
Number of Repetitions

CA
1 X 4

This note would be played 1 octave lower.

This note would be played 1 octave higher.

CA
2 X 2

The octave notation takes the form of a number that is printed either above or below the note. If the number is printed above the note, it indicates that the note should actually be an octave higher. If the number is printed below the note, it indicates that the note should actually be an octave lower. The number that is plotted is selected according to the notations used in standard scores –

   8 corresponds to 1 octave,
  15 corresponds to 2 octaves,
  22 corresponds to 3 octaves, etc.

As mentioned above, if a pattern is repeated, the number of repetitions is noted beside the pattern number. If a section is repeated, the entire section is reprinted.

When exercising the third pattern selection option, Stavewriter will request a new page at the end of each section, even if there are not yet four patterns printed on the current page. This is to aid in distinguishing between the sections.

The notation for the notes is identical to that used in the Page R display. Time signature and clef are notated in the standard way, although the characters are simplified. Alignment markings and the markings for the counts also correspond to their counterparts in the Page R display.

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THE OUTPUT DEVICE
## THE HEWLETT-PACKARD 7475A PLOTTER

When you receive your new plotter, it will come equipped with a set of manuals, but here is a summary of what you need to know to use the plotter with Stavewriter. The Hewlett-Packard 7475A plotter was selected for use with Stavewriter because of its ease of use, high speed, excellent resolution, and moderate cost. The pen speed while it is plotting is 15 inches/second (38.1 centimeters/second). If the pen is up, moving to a new location the speed is even faster: 20 inches/second (50.8 centimeters per second). The acceleration to these speeds is approximately 2 g's. The resolution of the plotter is .001 inches (.025 millimeters). This resolution is what enables the plotter to draw the musical symbols with such smooth curves.

You should not operate your plotter in an environment where the temperature is colder that 0 degrees Centigrade or hotter than 55 degrees centigrade. However, for storage when the plotter is not operating, a temperature range of -40 degrees Centigrade to 75 degrees Centigrade is allowable.

Below, you will find a diagram showing the location of items you will be using on the plotter.
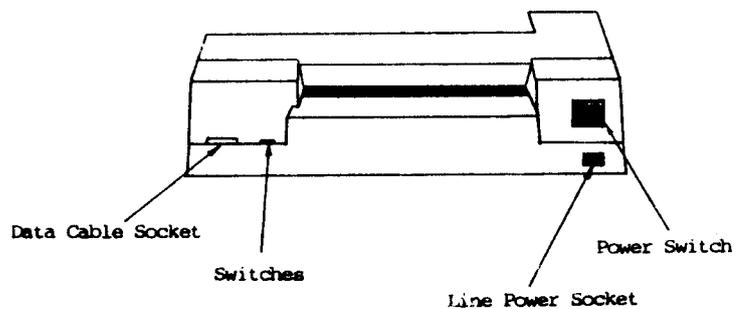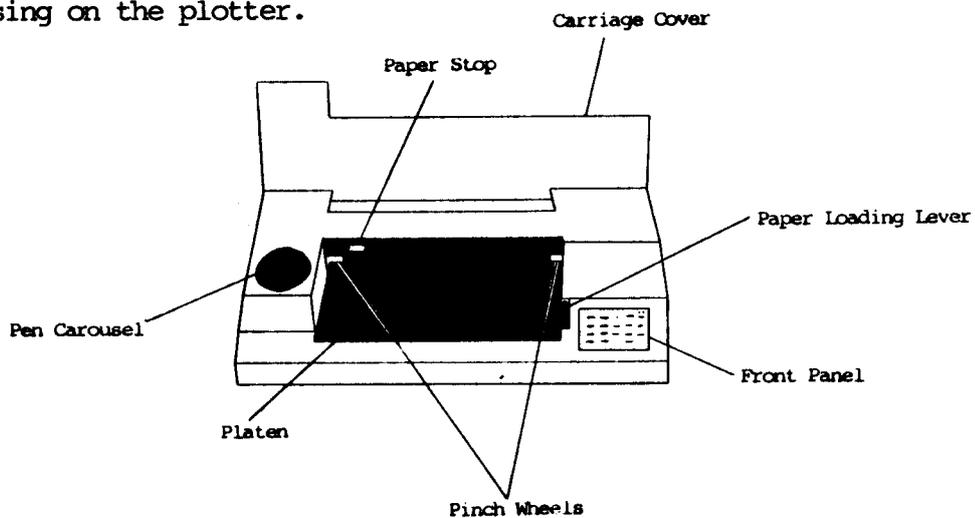
There must be a data cable to connect the plotter to the CMI. On the CMI, it will plug into the printer connector. On the plotter, it plugs into the socket on the back of the plotter on the right side. The label, "RS-232-C/CCITT V.24", is printed on the plotter beside the socket. The cable should be wired as shown in the diagram below.
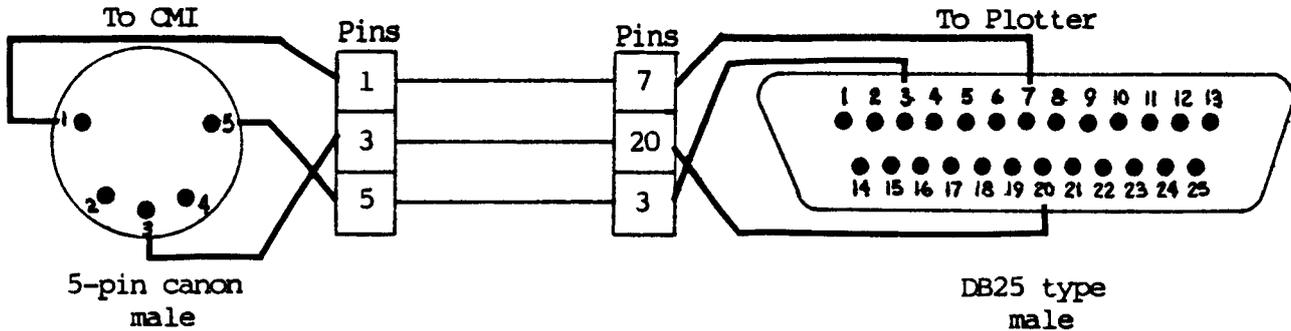
The power cord for the plotter plugs into the line power socket on the back of the plotter on the left side.

On the back of the machine, next to the connector for the data cable, is a block of nine (9) switches. The fourth and fifth switches from the top are set according to the size of the paper you wish to use and will be discussed later. The other switches should be set as shown below. (The raised portion of the switch is indicated by the solid black squares.)

The position of these two switches depends on the paper size.
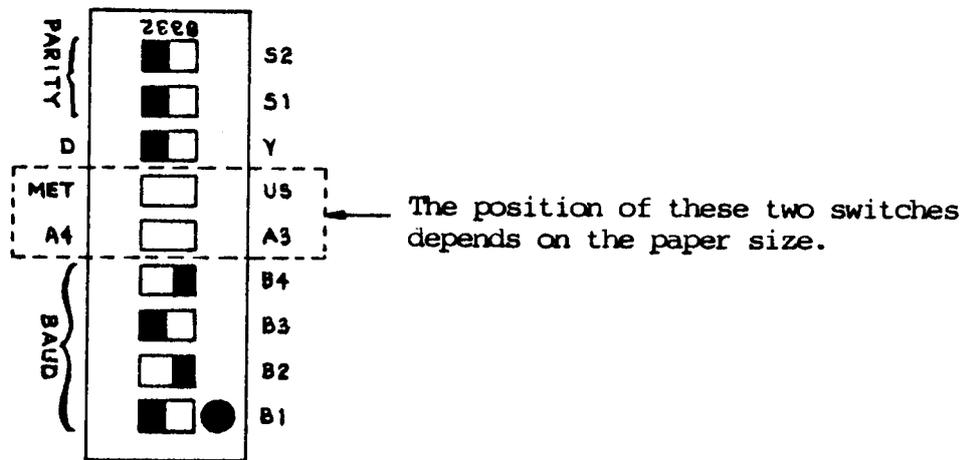
The paper size switches must be set properly before the plotter is turned on. If they are changed after the plotter is turned on, they will have no effect. It is important that they are set properly for the size of paper you are using. For example, if the switches are set for a large piece of paper, and a small piece of paper is inserted in the plotter, the plotter will throw the paper out on the floor during the initialization process and will begin to plot on the platen of the plotter, which is quite damaging to the pen. Below are shown the switch positions for the four standard paper sizes that the plotter will accept:
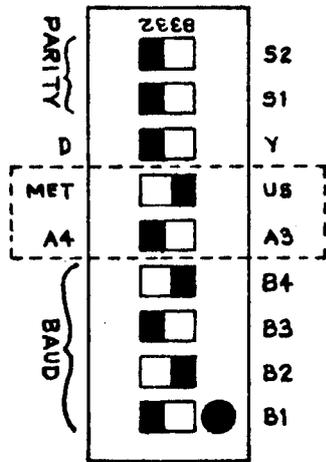
Imperial
Size A
8.5 X 11 inches
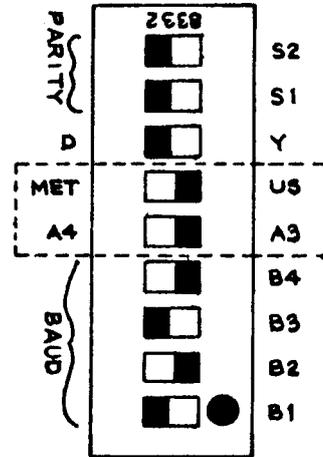
Imperial
Size B
11 X 17 inches
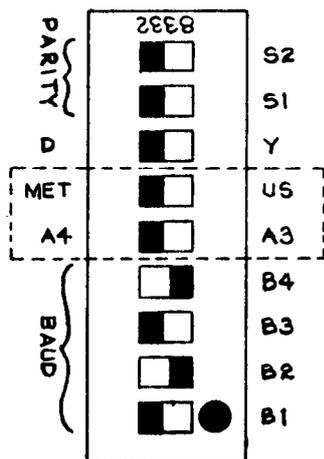
Metric
Size A4
210 X 297 millimeters

Metric
Size A3
297 X 420 millimeters

(The raised portion of the switch is indicated by the solid black square.)

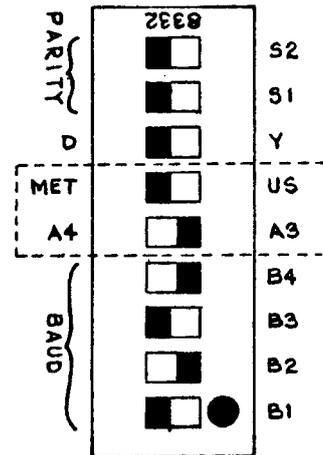Next, you need to insert the paper in the plotter. As you face the plotter, immediately to the right of the black area (which is the platen), there is a black lever, the paper loading lever. Push the lever up, towards the back of the plotter. The error light will come on, but this is just to indicate that there is no paper in the machine. The light will go out when the lever is returned to its original position. Lay the paper on the platen, against the raised ledge on the left side. If you are using the larger sizes of paper, Size B or Size A3, the longest side of the paper is placed against the ledge. If you are using the smaller sizes of paper, Size A or Size A4, then the shorter side of the paper is placed against the ledge. Slide the paper into the plotter, making sure that it is underneath the pinch wheel on each side. Slide the paper into the plotter until it is against the paper stop that appears when the paper loading lever is raised. Hold the paper in this position with one hand, and lower the lever with the other. The pinch wheels on each side hold the paper firmly in place. The paper is positioned in the plotter the same way, no matter which view is selected in the page formatting parameters. The following illustrations show how the paper is positioned in the plotter and the direction that the staves will be drawn for each view on each size of paper.
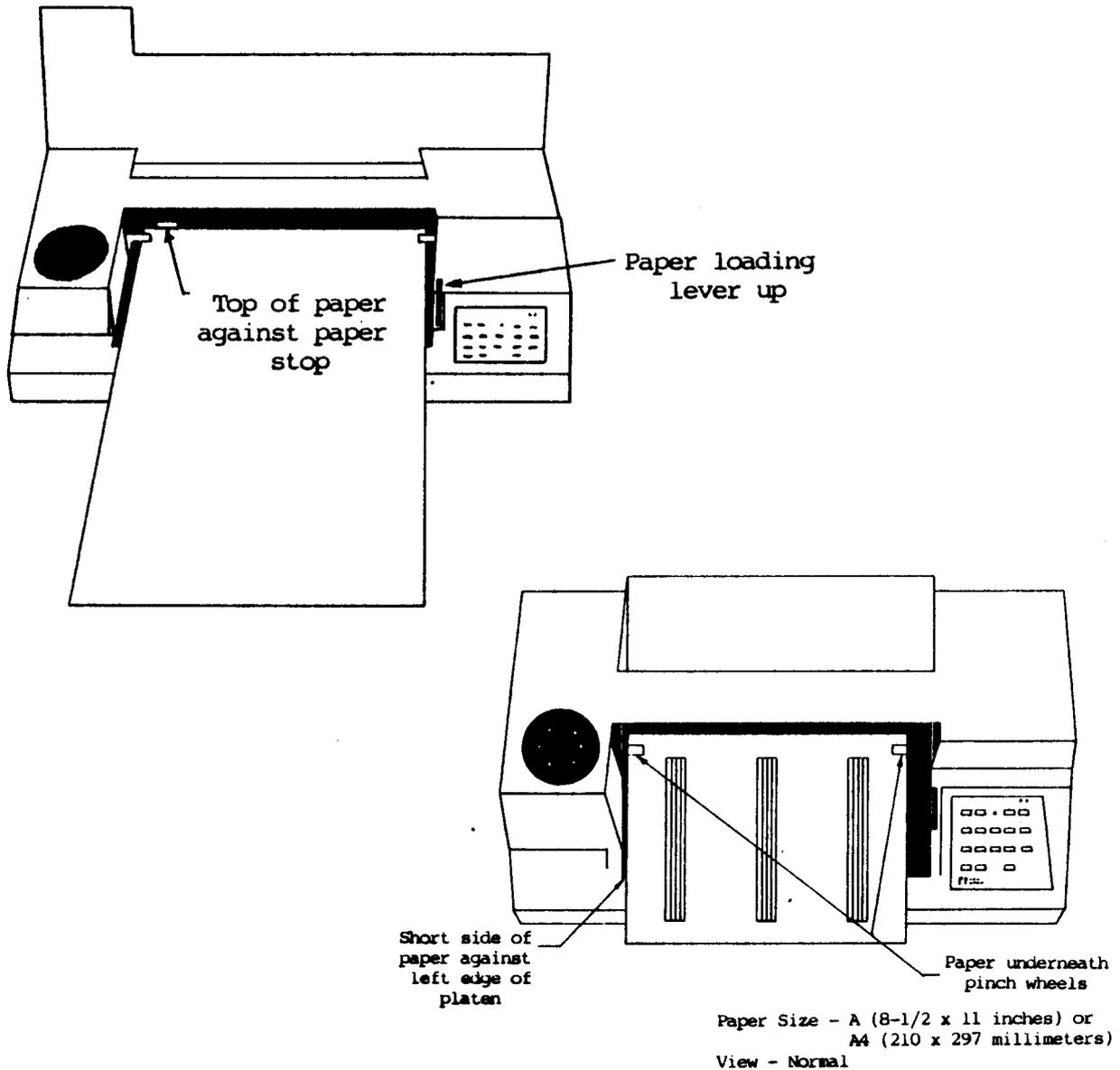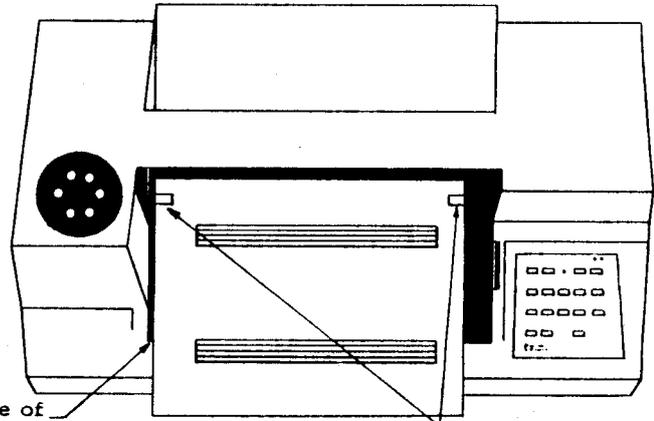
Top of paper against paper stop

Paper loading lever up

Short side of paper against left edge of platen

Paper underneath pinch wheels

Paper Size - A (8-1/2 x 11 inches) or A4 (210 x 297 millimeters)
View - Normal

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Short side of
paper against
left edge of
platen

Paper underneath
pinch wheels

Paper Size - A (8-1/2 x 11 inches) or
A4 (210 x 297 millimeters)
View - Sideways
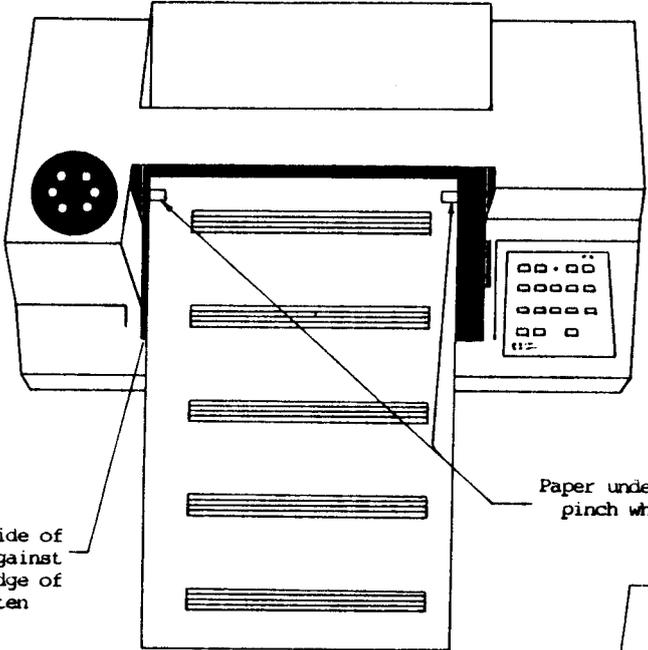
Paper underneath
pinch wheels

Long side of
paper against
left edge of
platen

Paper Size - B (11 x 17 inches) or
A3 (297 x 420 millimeters)
View - Normal
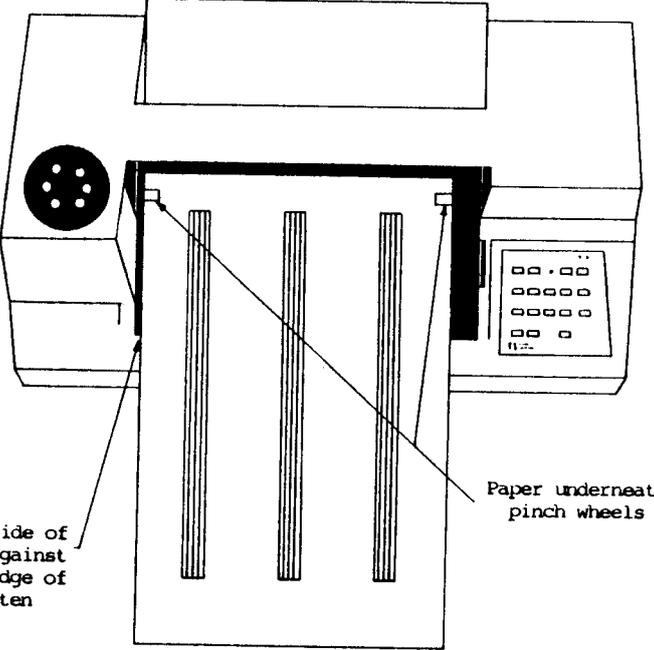
Paper underneath
pinch wheels

Long side of
paper against
left edge of
platen

Paper Size - B (11 x 17 inches) or
A3 (297 x 420 millimeters)
View - Sideways

To remove the paper, raise the paper loading lever and take the paper
out of the plotter.

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To put the pen in the carousel, you must remove the carousel from the
plotter. To do this, lift the smoke-coloured carriage cover and lift
the carousel straight up out of its hole on the left side of the
plotter. Find the niche on the carousel marked "1". This is where
you want to place the pen. Not just any pen should be inserted. This
plotter is designed to accommodate the short body fiber tip pen
manufactured by Hewlett Packard. Do not try to use any other type of
pen in the carousel, since it could damage the carousel or at least
decrease the quality of the score. Take the storage cap off the pen
and put it someplace where you can find it again. Depress the pen-
capping mechanism. Position the collar of the pen just below the
notch labelled "1" and slide the pen straight into the pen-holding
jaws. Then you may release the pen-capping mechanism. Replace the
carousel in the plotter, making sure it is seated properly. (If the
top of the carousel sticks up above the top of the hole so that the
carriage cover does not close, the carousel is not seated properly.)
If the carousel is not seated properly, just turn it until it drops
into place.

Pen collar

Storage cap

Place pen in the notch labelled "1"

Slide pen into pen-holding jaws

Depress pen-capping mechanism

Position pen collar below notch

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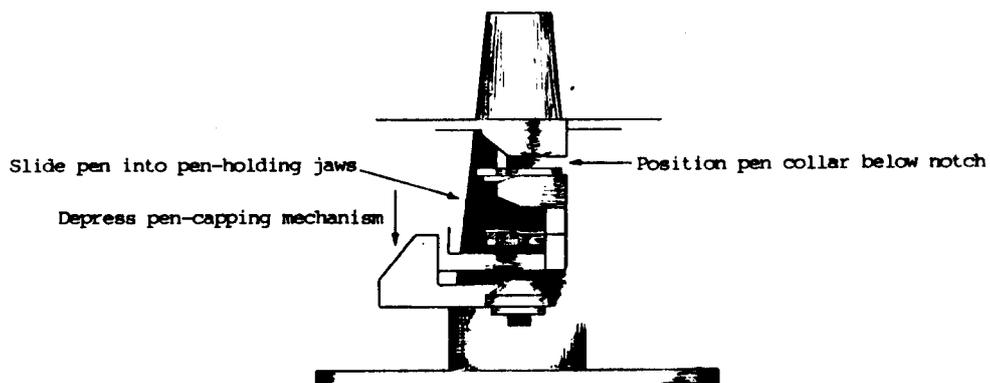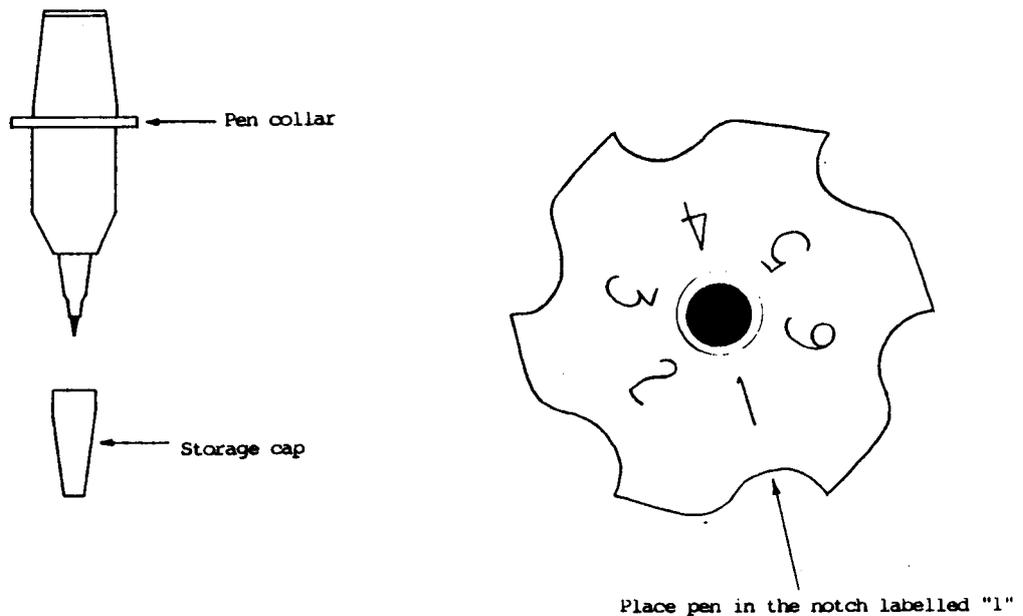
Remove the pen from the carousel in a manner similar to the way you inserted it. Replace the storage cap to extend pen life.

Now you are ready to turn the plotter on. The power switch is located on the back of the plotter on the left above the line power socket. It is a black rocker switch. If a red circle is showing on the top of the switch, the plotter is off.
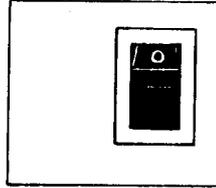
Off

Flip the switch to turn it on. Now it's all up to Stavewriter.

It is possible that the error light could come on while the plotter is plotting. If you were late in preparing or turning on the plotter, then it means that the plotter was not properly initialized and you will probably have to replot the score, using the option of Stavewriter that allows you to replot a previously computed score. Just let Stavewriter run its course and then replot the score.

Another cause of the error light coming on is that the page formatting parameters that you have specified have resulted in a score that is too big for the page and the plotter is having to "plot off the edge of the page." It will continue to plot, but it will cut everything off at the limits that are set within the plotter. The score will have to be recomputed using different page formatting parameters.

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FILE MANIPULATION

The Stavewriter system is distinct from the CMI system and you CANNOT
use the facilities provided on the CMI system disk to backup the
Stavewriter system disk, or to delete files from the Stavewriter
system disk, or even to get a directory listing of the files that are
on the Stavewriter system disk. Since all the format files and plot
files are stored on the Stavewriter system disk, some sort of file
manipulation facility is necessary so that you may continue scoring
compositions even after your first Stavewriter system disk is full.
To enter this file manipulation mode, answer "Y" to the first question
that you are asked when Stavewriter begins:

Do you wish to enter the file manipulation mode?

The next message that appears on the screen will prompt you for your
selection of the file manipulation option:

Do you wish to . . .
   1.)   create a new Stavewriter system disk;
   2.)   delete format and/or plot files from the old system
         disk;
   3.)   see a list of the format and plot files on the old system
         disk;
   4.)   copy format and/or plot files from the old system disk
         to the new system disk;
   5.)   exit the file manipulation mode.
            Please indicate the desired option by number:

Select the option, 1 through 5, which you wish to exercise. In the
following discussion of the above options, any reference to the "old"
or "current" Stavewriter system disk pertains to the Stavewriter
system disk in the left-hand drive. Any reference to the "new"
Stavewriter system disk pertains to a Stavewriter system disk that is
in the right-hand drive.

FILE MANIPULATION
    CREATE A NEW STAVEWRITER SYSTEM DISK

Option 1 creates a new Stavewriter system disk in the right-hand
drive. The disk that is created has all the files on it that are
necessary to run Stavewriter, but contains no user format or plot
files. (User format and plot files may be added to this disk using
option 4 if desired.)

After you select option 1, the following message will appear on the
screen:

        You will be creating a new Stavewriter system disk."
            Your current Stavewriter system disk should be in
                the left-hand drive.
            A blank disk should be inserted in the right-hand drive.
        Press RETURN when you are ready to continue.

Your current Stavewriter system disk should already be in the left-
hand drive anyway, since you are running Stavewriter. The disk that
you insert in the right-hand drive may be any disk that you would
ordinarily use as a CMI sounds disk. Make sure that there is nothing
on the disk in the right-hand drive that you want to save, because any
information already on the disk will be destroyed in the process of
creating a new Stavewriter system disk. When you are sure that the
disks are inserted properly, press RETURN, and the new disk will be
created automatically.

The process of creating a new Stavewriter disk takes approximately 20
minutes, and at times it may seem that not much is happening. Be
assured that the process is continuing and that there is no problem.
When the process is completed, the following message will appear on
the screen:

Your new Stavewriter system disk is now ready.
    If there are any plot files or format files that exist on your old
    Stavewriter system disk that you would like copied onto this new
    Stavewriter system disk, you may do this by selecting option 4
    next.

The same message that appeared when you first entered the file
manipulation mode will now reappear on the screen and you may select
any of the other options that you may wish to exercise.

Option 2 will delete the plot and/or format files of your choice from your old Stavewriter system disk (the Stavewriter system disk in the left-hand drive). You will be asked to specify the format files you want to delete separately from the plot files you want to delete. Before each file is deleted, you will be given one last chance to change you mind about whether you want to delete the file or not. Then the file will be deleted.

When you first enter option 2, you will be given the opportunity to see a directory listing of the format and plot files that are on the old Stavewriter system disk:

Do you wish to see a list of the format and plot files on the current Stavewriter system disk?

Enter "Y" if you want to see the directory listings and "N" if you do not want to see the directory listings. (The process of compiling the directory listings takes a few minutes, so don't think that something has gone wrong.) The files will be listed on the screen, format files first followed by plot files. Before the format files are listed, the heading:

The format files on the current Stavewriter system disk are:

will appear. Similarly, before the plot files are listed, the following heading will appear:

The plot files on the current Stavewriter system disk are:

After listing the files, there will be a pause so that you have time to read the directory entries. When you are ready to continue, enter RETURN.

Now you will be asked to specify which format files you wish to delete:

Which format files do you wish to delete?
   (You will be prompted for one format file name at a time. When you have listed all the files you wish to delete, enter RETURN to end the prompts.)

The prompt for each file will be:

Delete:

After each prompt, enter the file name of the format file you wish to delete (one file name for each prompt). When you have listed all the files you wish to delete, enter RETURN, and you will then be prompted for the plot files you wish to delete:

Which plot files do you wish to delete?
(You will be prompted for one plot file name at a time. When
you have listed all the files you wish to delete, enter RETURN
to end the prompts.)

Once again, the prompt for the file name of each plot file you wish to delete will be:

Delete:

You enter the names of the plot files you wish to delete just as you entered the names of the format files you wished to delete.
Once you have entered the names of all the format and plot files you wish to delete, you will be queried before each one is deleted. The query for format files is:

Do you wish to delete the format file, <FORMAT FILE NAME>?

and the query for plot files is:

Do you wish to delete the plot file, <PLOT FILE NAME>?

Enter "Y" if you really want to delete the file. Enter "N" if you do not want to delete the file after all. If you enter "Y", the file will be deleted.

After all the format and plot files that you specified have been deleted, you will have the opportunity to select one of the other file manipulation options.

FILE MANIPULATION

Option 3 displays a list of all the format files and plot files that exist on the old Stavewriter system disk (the Stavewriter system disk in the left-hand drive).

Stavewriter will require a few minutes to compile the directory entries for you, so don't be concerned if the response is not immediate. After the lists are compiled, the message:

The format files on the current Stavewriter system disk are:

will appear on the screen, followed by a list of all the format files that exist on the Stavewriter system disk. This will be followed by the message:

The plot files on the current Stavewriter system disk are:

Then the list of the plot files that exist on the Stavewriter system disk will appear.

Stavewriter will wait until you have had time to read the entries. Enter RETURN when you are ready to select another file manipulation option.

FILE MANIPULATION
COPY FORMAT AND/OR PLOT FILES FROM THE OLD SYSTEM DISK TO THE NEW
SYSTEM DISK

Option 4 allows you to copy format and/or plot files from one
Stavewriter system disk to another. For instance, you might have just
created a new Stavewriter system disk (which would have no user files
on it) and you might want to add to the new disk one or two format
files that already exist that you use frequently.

When you first enter option 4, you will be given the opportunity to
see a directory listing of the format and plot files that are on the
old Stavewriter system disk:

**Do you wish to see a list of the format and plot files on the
current Stavewriter system disk?**

Enter "Y" if you want to see the directory listings and "N" if you do
not want to see the directory listings. (The process of compiling the
directory listings takes a few minutes, so don't think that something
has gone wrong.) The files will be listed on the screen, format files
first followed by plot files. Before the format files are listed, the
heading:

The format files on the current Stavewriter system disk are:

will appear. Similarly, before the plot files are listed, the
following heading will appear:

The plot files on the current Stavewriter system disk are:

After listing the files, there will be a pause so that you have time
to read the directory entries. When you are ready to continue, enter
RETURN.

Now you will be asked to specify which format files you wish to copy:

Which format files do you wish to copy?
    **(You will be prompted for one format file name at a time. When
    you have listed all the files you wish to copy, enter RETURN
    to end the prompts.)**

The prompt for each file will be:

Copy:

After each prompt, enter the file name of the format file you wish to
copy (one file name for each prompt). When you have listed all the
files you wish to copy, enter RETURN, and you will then be prompted
for the plot files you wish to copy:

Which plot files do you wish to copy?
    **(You will be prompted for one plot file name at a time. When
    you have listed all the files you wish to copy, enter RETURN
    to end the prompts.)**

Once again, the prompt for the file name of each plot file you wish to copy will be:

Copy:

You enter the names of the plot files you wish to copy just as you entered the names of the format files you wished to copy.

Once you have entered all the names of the format and plot files you wish to copy from the Stavewriter system disk in the left-hand drive to the Stavewriter system disk in the right-hand drive, the copying will begin. Allow a few minutes for all the copying to be done, and then you will once again be presented with the file manipulation options.

Option 5 ends the file manipulation mode and returns you to the
beginning of Stavewriter, ready to score your composition. The
message will appear on the screen:

**If you do not wish to continue using Stavewriter,
remove the Stavewriter system disk from the left-hand drive,
insert the CMI system disk in the left-hand drive,
and press the RESTART button
when the next prompt appears.**

If you do not want to continue using Stavewriter, follow the
instructions given in the message. Otherwise, respond appropriately
to the prompt that appears and continue.

```
***********************************************************************
*                                                    *                 *
*                 Directive/Parameter                * Default Value  *
*                                                    *                 *
***********************************************************************
*                                                    *                 *
*         Clef (TREBLE, BASS, TENOR, or ALTO)=  *       TREBLE        *
*                                                    *                 *
*         Proportional spacing between notes         *                 *
*           in whole note widths per musical beat=  *       4.        *
*                                                    *                 *
*              Minimum spacing between notes         *                 *
*                      in whole note widths=  *       1.        *
*                                                    *                 *
*         Number of clock ticks per musical beat=  *       48        *
*                                                    *                 *
*                   Time signature numerator=  *       4        *
*                                                    *                 *
*                 Time signature denominator=  *       4        *
*                                                    *                 *
*              Number of beat groups in measure=  *       4        *
*                                                    *                 *
*         Number of beat groups in beat group N=  *       1        *
*                                                    *                 *
*Transposition pitch -                               *                 *
*   the CMI key that would produce the same pitch   *                 *
*   as the transposed instrument's middle C -       *                 *
*                      Transposition pitch=  *       Cn4       *
*                                                    *                 *
*              Stem direction (UP, DOWN, or AUTO)=  *       AUTO      *
*                                                    *                 *
*  Number of flats or sharps in key signature (0-7)=  *       0       *
*                                                    *                 *
*         Flats or sharps in key signature (F or S)=  *       F       *
*                                                    *                 *
*Preferred accidental before transposition (F or S)=  *       F       *
*                                                    *                 *
*   Note duration tolerance -                        *                 *
*           duration added to a note when needed     *                 *
*           to prevent unwanted rests -              *                 *
*                      Note duration tolerance=  *       1       *
*                                                    *                 *
*              Horizontal staff length (inches)=  *       9.5      *
*                                                    *                 *
*              Vertical width of one staff (inches)=  *       .375     *
*                                                    *                 *
*         Vertical length of staff area (inches)=  *       14.     *
*                                                    *                 *
*                   Number of staves on page=  *       8       *
*                                                    *                 *
*                                                    *                 *
```

APPENDIX A—DEFAULT VALUES OF GENERAL FORMATTING DIRECTIVES
(Continued)

```
*********************************************************************
*                                                 *           *
*               Directive/Parameter               * Default Value *
*                                                 *           *
*********************************************************************
*                                                 *           *
*          View (N=Normal, S=Sideways)=           *     N     *
*                                                 *           *
*            Left margin width (inches)=          *    1.0    *
*                                                 *           *
*Left indentation width -                         *           *
*     space between left margin and stave area -  *           *
*              Left indentation width (inches)=   *    0.     *
*                                                 *           *
*              Top margin width (inches)=         *    1.0    *
*                                                 *           *
*             Height of title area (inches)=      *    0.     *
*                                                 *           *
* Paper size -                                    *           *
*     Please select one of the following by number: *        *
*              1.)  Size A (8.5 in X 11 in)       *           *
*              2.)  Size B (11 in X 17 in)        *           *
*              3.)  Size A4 (210 mm X 297 mm)     *           *
*              4.)  Size A3 (297 mm X 420 mm)     *           *
*                              Paper size=        *     4     *
*                                                 *           *
*     Pen velocity (.39 inches/second through     *           *
*                   15.00 inches/second)=         *    15.    *
*                                                 *           *
*********************************************************************
```

```
*****************************************************************
*                                           *             *
*             Directive/Parameter           * Default value *
*                                           *             *
*****************************************************************
*                                           *             *
*                         STEP -11= *          -6         *
*                         STEP -10= *          -6         *
*                         STEP  -9= *          -5         *
*                         STEP  -8= *          -5         *
*                         STEP  -7= *          -4         *
*                         STEP  -6= *          -4         *
*                         STEP  -5= *          -3         *
*                         STEP  -4= *          -2         *
*                         STEP  -3= *          -2         *
*                         STEP  -2= *          -1         *
*                         STEP  -1= *          -1         *
*                         STEP   0= *           0         *
*                         STEP   1= *           1         *
*                         STEP   2= *           1         *
*                         STEP   3= *           2         *
*                         STEP   4= *           2         *
*                         STEP   5= *           3         *
*                         STEP   6= *           4         *
*                         STEP   7= *           4         *
*                         STEP   8= *           5         *
*                         STEP   9= *           5         *
*                         STEP  10= *           6         *
*                         STEP  11= *           6         *
*                                           *             *
*             Space after -                 *             *
*                         Clef= *            100         *
*                Key signature= *            100         *
*               Time signature= *            100         *
*                                           *             *
*       Space between digits -              *             *
*               Time signature= *             10         *
*                                           *             *
*       Space after accidental -            *             *
*                  Double flat= *             10         *
*                 Double sharp= *             10         *
*                         Flat= *             10         *
*                      Natural= *             10         *
*                        Sharp= *             10         *
*                                           *             *
*       Space before dot, after -           *             *
*                         Note= *             10         *
*                         Rest= *             10         *
*                                           *             *
*                                           *             *
```

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```
****************************************************************
*                                            *              *
*              Directive/Parameter           * Default value *
*                                            *              *
****************************************************************
*                                            *              *
*    Space between note head and end of tie - *              *
*                              Horizontal=    *       5      *
*                                Vertical=    *      27      *
*       Width of half tie at beginning of line= *     50      *
*                                            *              *
*                    Space between beams=     *      18      *
*                        Width of a beam=     *      18      *
*  Maximum rise of beam -                     *              *
*      the maximum difference between the     *              *
*      left and right ends of the beam        *              *
*      in number of pitches -                 *              *
*                      Maximum beam rise=     *       4      *
*                                            *              *
*          Exposed stem length -             *              *
*                        > or = 2 flags=     *     100      *
*        Multiple note heads or < 2 flags=    *      86      *
*                        Single note head=    *     122      *
*                                            *              *
*        Space after barline, before -       *              *
*                           Beat group=       *      36      *
*            Clef, time or key signature=     *      36      *
*                                            *              *
*  Odd rhythm braces -                        *              *
*      Vertical space between number and      *              *
*                  nearest note or rest=      *      40      *
*          Space between end of brace         *              *
*                        and the number=      *      50      *
*                                            *              *
****************************************************************
```

BEAT GROUP—a number of musical beats that are handled as a group for certain considerations in scoring.

CLOCK TICK—the smallest unit of time in MCL. If B=48 and the MCL duration of a given note is 2, then the number of clock ticks for that note is 2 X 48, which is 96.

DIGIT—a single numeral from 0 through 9. Given the number 132, 1 is a digit, 3 is a digit, and 2 is also a digit.

DIRECTIVE—a piece of information that indicates something needed by Stavewriter to properly plot the score which is not otherwise supplied by the MCL or Page R composition. It may be embedded in the composition in the case of MCL or it may be specified interactively at the beginning of scoring either an MCL or Page R composition.

DURATION ITEMS—notes, rests, or chords.

DURATION SYMBOLS—notes, rests, or chords.

EIGHTH NOTE (OR REST)—quaver.

FONT—all of the definitions for a set of characters.

FORMAT FILE—a file that is saved on the Stavewriter system disk that contains all the formatting data necessary to score a composition. The file name is selected by the user.

FRACTION—<whole number>/<whole number>. The "/" indicates that the first number is to be divided by the second number.

HALF NOTE (OR REST)—minim

HALF STEP—semi-tone. The interval between two adjacent keys on the CMI keyboard.

HALF STEP INTERVAL—the number of half steps between two given notes.

INTEGER—a number without a fractional or decimal component. 5 and 135 are integers. 3/4, 6.8, and 4-2/3 are not integers.

MCL BEAT—an MCL duration of 1. The number of clock ticks per MCL beat is set by the default value "B".

MCL DURATION—the number of MCL beats specified for a given note.

MINIMUM HORIZONTAL SEPARATION—the smallest distance that will occur after any duration symbol (note, rest, or chord) before the next symbol.

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ODD RHYTHM NOTATION--notation used to indicate rhythms that do not conform to the standard values of whole note, half note, quarter note, etc., such as triplets, sextuplets, or quintuplets.

ONE HUNDRED TWENTY-EIGHTH NOTE (OR REST)--a note or rest representing half the duration of a sixty-fourth note or rest.

PARAMETER--the value that accompanies a Stavewriter directive or a data item entered during the initialization procedure that conveys information regarding the plotting of the score.

PLOT FILE--a file saved on the Stavewriter system disk that contains all the data necessary to plot the score without further computations.

PROMPT--a message that appears on the screen that indicates to the user that he is required to respond in some way to the computer.

QUARTER NOTE (OR REST)--crotchet.

REAL NUMBER--a number that may have a decimal component. 15, 3.5, and .75 are real numbers. Note that real numbers do not necessarily have a decimal component.

SCALE STEP INTERVAL--the number of scale steps (A, B, C, D, E, F, G, A, B, C, . . .) between two given notes.

SEMI-TONE--half-step. The interval between two adjacent keys on the CMI keyboard.

SIXTEENTH NOTE (OR REST)--semi-quaver.

SIXTY-FOURTH NOTE (OR REST)--hemi-demi-semi-quaver.

THIRTY-SECOND NOTE (OR REST)--demi-semi-quaver.

TIME SIGNATURE DENOMINATOR--the bottom number of a time signature. This number indicates what kind of note receives one (1) musical beat. It must be a power of two (2). The powers of two and the kind of note to which they correspond are as follows:

1	Whole note (semi-breve)
2	Half note (minim)
4	Quarter note (Crotchet)
8	Eighth note (Quaver)
16	Sixteenth note (Semi-quaver)
32	Thirty-second note (Demi-semi-quaver)
64	Sixty-fourth note (Hemi-demi-semi-quaver)
128	One hundred twenty-eighth note

TIME SIGNATURE NUMERATOR--the top number of a time signature. This number indicates how many musical beats are in each measure.

TRANSPOSITION--the process of changing a composition to a key other than the key in which it was originally written.

TWO HUNDRED FIFTY-SIXTH NOTE (OR REST)--a note or rest representing half the duration of a one hundred twenty-eighth note or rest.

VERTICAL POSITION CHANGE--the number of lines and spaces on the staff between two given notes.

WHOLE NOTE (OR REST)--semi-breve.

WHOLE NUMBER--a number without a fractional or decimal component. 3 and 49 are whole numbers. 3.5, 1/2, and 67-6/7 are not whole numbers.

WORKING SCORE--a score of the eight parts of a Page R composition plotted in simplified notation resembling the Page R screen display.

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