```
┌─────────────────────────────────────────┐
│ Description of SCORE parameters,         │
│ and where they might be attached         │
│ in an intermediate file                  │
└─────────────────────────────────────────┘
```

Introduction
==================

In order to convert our page specific I-file data to proper SCORE parameter data, we will need more information than is currently provided. All of the this additional information is available to autoset at the time the linear I-files are being constructed, but autoset does not currently pass it along. I propose to make additions to autoset (renamed autoscr) so that this information is included in the autoscr output. Specifically, wherever new SCORE related information is being provided, it will be appended onto existing records. This will be done by adding the " | " character, followed by a series of statements in the form P3=123.2 P6=12.3 P11=0.121 etc. Only the necessary parameters will be communicated. Parameters will be attached to the relevant records, as noted below.

I. CODE 1 -- NOTES

P2 = staff number, track number

The staff number can only be determined after mskpage has done the page layout. This work must be done by scorecon.

The track number is a new feature. It will be stored in the 10ths decimal digit of P2.

For staves that have only one voice, such as Violin I, there is no need for a track number (it is always 1). In this case, the 10ths decimal will be zero.

For single staves with more than one voice, each voice will be assigned a track number (starting with 1) and autoscr should attempt to assign this number to all CODE-1 items (notes), CODE-2 items (rests), CODE-4 items (long trills without the tr), CODE-5 items (ties and slurs), CODE-7 items (long trills with the tr), CODE-9 items (symbols), and CODE-16 items (text).

The grand staff actually represents one instrument, usually some kind of keyboard. For this reason, tracks are assigned for both the upper and lower staves using one numbering system (starting with 1). It is possible for a track to move between the two staves, but it will always keep the same track number.

In summary: The integer part of P2 cannot be determined by autoscr, but the track number can and should be.

P3 = horizontal position

First of all, we have a compound problem here. Namely: SCORE represents each note head as a separate record in the parameter file, with an entire set of parameters attached to it. The DMUSE I-file format, on the other hand allows a note OBJECT to have more than one note head. Chords, for example are notated as one object, complete with note heads **which might include a horizontal shift**.

In order to construct the correct P3 for each note head, we will need to know the definitive node position of the underlying object to which the note head is attached. The object may have been shifted by autoscr from the definitive node position, and if so, we need to indicate this **in the object record**. Therefore, if the note object has been shifted (GLOBAL_XOFF > 0), this will be communicated in the i-file by appending the statement **P3=<shifted amount, in dots>** to the object record. This will allow scorecon to restore the correct x position of the object and achieve alignment of all simultaneous musical event for this musical node.

As will be discussed later, we also need to provide information about the displacement of the notehead from the definitive node position. This is SCORE's P10 parameter. This could, in theory, be calculated by scorecon from a combination of the P3 value provided above and the local x-shift specified in the notehead sub-object. The problem is that if this shift is generated by exactly one note-thick either to the right or to the left, SCORE wants to know this. Since autoscr is in the best position to know this information, it makes sense for autoscr to try to compute the value of P10 for every notehead, rather than leave this calculation to scorecon.

In summary: P3 shift information should be presented only when it is non-zero. P3 information is passed on by autoscr as a shifted amount (measured in dots)

P4 = vertical position

As in the case for P3 we have the compound note problem. However, the I-file format does specify a unique position of each note head relative to its staff, so that the **scorecon** program should have no trouble constucting a correct P4 for every note head. Grace notes in the I-file format have their own separate object type, which **scorecon** can signify by adding 100 to the P4 parameter (see SCORE ref. manual).

**In summary: P4 need not be computed by autoscr.**

P5 = stem direction, accidentals, and accidental displacement

Again, this is notehead specific information, and autoscr should attached this to each notehead SUBOBJECT record. This parameter is determinant and required, so autoscr needs to do this work. This information is not changed by mskpage.

I think stem direction (by note head) (the 10's digit of P5) is directly available to autoscr. The 1's digit of P5 is any accidental attached to the notehead (also directly available to autoscr). Adding 100 to P5 puts parentheses around the accidental (I'm not sure that autoscr does this yet, if and when it does, this should present no problem. The score manual points out that only the top note of a chord has a stem attached to it, but the length must be right.

In SCORE, adding .25 to P5 moves an accidental to the left by one "thickness." In computing this, the distance is computed relative to the overall chord, (i.e., the "time" position of the chord, not the position of the particular note head. We had a case of this in the WTC1-01 FUGA

Example:
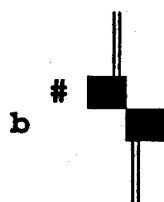
The flat is shifted over by
only .25, even though the note
head was shifted to the right.

Autoscr has a complicated way of determining the x-location of
accidentals. It is dependent on the thickness of the accidentals
themselves, as well as the amount by which various notes have been
shifted. For purposes of converting stage2 data to SCORE, I think
the best we can do is to "roughly" convert autoscr's x position of
accidentals, relative to the P3 of the node, into an "integer"
number of SCORE "thicknesses" and set the P5 paramter accordingly.

In summary: P5 should be computed by autoscr.

P6 = type of notehead.

It would be very handy to indicate the true pitch of a note using
the base 40 system. This would relieve Andreas of the task of
figuring this out based on the position of clefs and accidentals in
a measure. I wonder what would happen in SCORE if fractional values
were attached to the P6 notehead parameter. I propose using the
following base-40 values.

Cff4	161	Dff4	167	Eff4	173	Fff4	178
Cf4	162	Df4	168	Ef4	174	Ff4	179
C4	163	D4	169	E4	175	F4	180
C#4	164	D#4	170	E#4	176	F#4	181
C##4	165	D##4	171	E##4	177	F##4	182

Gff4	184	Aff4	190	Bff4	196
Gf4	185	Af4	191	Bf4	197
G4	186	A4	192	B4	198
G#4	187	A#4	193	B#4	199
G##4	188	A##4	194	B##4	200

Adding 40 to the number raises it by an octave. This system can
represent all two accidental pitches from Cff0 = 3 (four C's below
middle C with frequency = 16 Hz, to B##9 = 400 (essentially two
C's higher than the highest note on the piano with frequency = 64
x 256 = 16384 Hz).

The pitch number would be stored as 1000ths, essentially a three
digit fraction added on to the integer notehead value. This
information is directly read by autoscr and should be passed on
as a P6 parameter for every note head.

**In summery: The integer part of P6 need not be computed by autoscr,
but the fractional part must be attached to the notehead.**

P7 = indicates the note's rhythmic duration, regardless of notehead type.

This information is theoretically contained in the Attribute subobject of the note object. I did not consider the situation where note(head)s of different duration might have been combined into a single object. I suspect that this situation was considered "out of bounds." For the moment, then we will assume that the attribute holds for all note heads in the object.

Note: When a note does not advance the time counter, e.g., grace notes, notes at the end of trills, then P7 should be set to -1.

In summary: P7 need not be computed by autoscr.

P8 = indicates stem length

In SCORE, stem length is a decimal number, where zero indicates a normal length of 3 1/2 staff intervals, and each increment of one lengthens the stem by 1/2 a staff interval. Negative values and decimal fractions are allowed. Adding 100 to P8 puts a slash on a grace note. Autoset must remember to do this. P8 need be computed only for noteheads which have a stem. This would be all single note heads and the "controlling" notehead for chords.

Note: stem length for notes under a beam cannot be known until a beam is set. This means that autoscr can do only a partial job of computing P8 and the **scorecon** program must do the rest. This will impact the order in which things are done.

In summary: P8 can be determined by scorecon. Autoscr has no work to do here.

P9 = indicates the number of augmentation dots and flags connected to a note.

P9 has two digits left of the decimal. The 10's digit indicates the number of dots following a particular notehead; and the 1's digit indicates the number of flags on the stem, if there is one. This information is available to autoscr, and should be attached to each notehead record. Dots placed below a staff line (as opposed to the normal position above) should be notated by adding 100 to the P9 parameter. Adding 1000 to the parameter will move the dots to the right by one notehead width (in use with chords). Dots that cannot be represented by the above methods must be represented separately by a CODE 9 parameter entry. In this case, the letters CODE-9 followed by its parameters would be appended to the notehead subobject record. All of this must be done by autoscr. Furthermore, SCORE allows for minute displacements of dots to the right (to avoid flags) by tenths to the P9 parameter (each tenth is about the thickness of a dot).

In summary: P9 information should be presented only when it is non-zero.

P10 = displacement of noteheads.

This is an important parameter to get right. It has a directly
relationship to P3. As mentioned in the P3 section above, there
are two situations where DMUSE might offset a notehead from its
normal time position.

Case 1: Two parts on a staff have note heads that compete for the
same time position. To avoid a clash, one of the OBJECTs is shifted.
In this case, the relative shift will be placed in a P3 parameter by
autoscr and attached to the OBJECT.

Case 2: Two noteheads on a single chord may compete for the same
time position. To avoid a clase, one the SUBOBJECT noteheads is
shifted. In this case, the relative shift will be placed in a P3
parameter by autoscr and attached to the SUBOBJECT.

It can happen that both cases occur simultaneously.

Autoset can and must provide this information, but only **scorecon** can
sort it out at run time and compute the correct values of P10 for
each notehead.

P10 can have specific as well as general meaning.

```
P10 =  0   --> no shift
P10 = 10   --> notehead shifted right by exactly one head width
P10 = 20   --> notehead shifted left by exactly one head width
P10 = -9.9 to +9.9 --> notehead shifted by "units" to left or right.
                    one head width = 3 units
```

When computing P10, it is important to use the values of 10 and 20
whenever possible, but not to use them otherwise.

**In summary: P10 information should be presented only when it is
non-zero. P10 information is passed on by autoscr as a SCORE
parameter, not an i-file distance.**

P11 = a whole list of articulations or marks attached to notes.

A partial list of items used by MUSEDATA and their P11 values:

Description	P11	Description	P11
===	===	===	===
flat above note	1	fermata above note	14
sharp above note	2	..	
natural above note	3	mordant above note	17
hat above note	4	wiggle trill above note	18
accent above note	5	..	
tenuto above note	6	tr trill above note	20
staccato above note	7	tr with flat above note	21
hat-staccato above note	8	tr with sharp above note	22
accent-staccato above note	9	tr with natural above note	23
tenuto-staccato above note	10		
down bow	11	fingering - 0 to 5 30 to 35	
up bow	12		

A negative value of P11 will force a mark to the stem side of a note.
P11 must be computed and attached to the notehead SUBOBJECT.

Other marks can be created with CODE-9 items. In this case, the letters CODE-9 followed by its parameters should be appended to the notehead subobject record. All of this must be done by autoscr.

In summary: P11 information should be presented only when it is non-zero.

P12 = indicates which staff the note appears on, relative to P2.

We need to deal with this situation in the case of the grand staff. As mentioned above in the P2 section, the staff numbers cannot be determined until the page is fully made up. However, the relationship of the grand-staff staff lines does not change. The MUSEDATA I-file format posits a second virtual staff below the main, top staff. In SCORE, this is treated as a separate staff.

Here is the trick. This problem is related to the track problem. When dealing with the grand-staff, MUSEDATA indicates for every note the staff on which it is to be typeset. It almost always indicates a track number for each note as well, but not always. Now, as I understand SCORE, SCORE does not like to have musical lines turned on and off inside a measure of a system; it allows for, and indeed expects, the use of invisible rests in a measure to make sure that every musical voice in that measure has the proper number of beats. As I understand it, invisible rests are used on measure by measure basis but need not continue an inactive voice across an entire piece. But how is scorecon to know when to turn them on? Only when track information is available and presented will scorecon know when to include the invisible rests that SCORE requires.

I am beginning to suspect that proper track information may be necessary for proper conversion to score. This, of course, only applies to the case where more than one musical line is present in a part (on a staff).

This is all related to P12 in the following way. In the case of the WTC101-FUGA, it sometimes happens that the tenor voice slips up onto the treble staff. This does not constitute a new voice on the treble staff, nor the discontinuation of a voice on the bass staff. It also happens that notes in this voice jump staves while connected to a beam, which means that the beam jumps staff as well. SCORE can do this only when P12 is used. Also, when P12 is used to put notes to a higher staff, the length of stems and position of beams, ties, and slurs must be recomputed: a tricky task for scorecon.

Somewhere at the beginning of all of this, it must be specified (a) the number of "through" voices, (b) their primary staff locations by number, (c) the number of possible "auxiliary" voices, and (d) their associated staff locations. This way, when a voice jumps staff, the P12 parameter can be set properly, and other appropriate steps taken.

For a more thoroughly worked-out analysis of this problem, see the discussion of invisible rests in the CODE-2, P6 section.

Unfortunately, SCORE does not allow for the staff displacements of rests. These will have to be hoisted on their own, with somewhat unpredictable side effects.

In summary: P12 information should be presented when appropriate.

P13 = displaces marks horizontally

> If marks are horizontally displaced by autoscr, this should
> be noted with a P13 parameter attached to the notehead SUBOBJECT.

In summary: P13 information should be presented when appropriate.

P14 = displaces marks vertically

> If marks are vertically displaced by autoscr, this should
> be noted with a P14 parameter attached to the notehead SUBOBJECT.

In summary: P14 information should be presented when appropriate.

P15 -- P18: These control features not represented in MUSEDATA.

TOTAL SUMMARY FOR CODE-1: NOTES

P2 = staff number, track number:	Autoscr determines track number where appropriate
P3 = horizontal position:	Autoscr determines non-zero P3 shift information (in dots) and attaches this to object record
P4 = vertical position:	P4 need not be computed by autoscr.
P5 = stem direction, accidentals, and accidental displacement	P5 computed by autoscr.
P6 = type of notehead.	Autoscr computes base-40 value of pitch (add notehead type, since you have it)
P7 = note's rhythmic duration	P7 need not be computed by autoscr.
P8 = indicates stem length	P8 determined by autoscr non-beamed notes
P9 = augmentation dots and flags	P9 computed by autoscr.
P10 = displacement of noteheads.	P10 as a **SCORE parameter** computed by autoscr
P11 = articulations and marks attached to notes.	P11 computed by autoscr and attached to appropriate note head
P12 = staff switching	P12 computed by scorecon (as long as track number is attached to note head)
P13 = displaces marks horizontally	P13 information should be presented when appropriate.
P14 = displaces marks vertically	P14 information should be presented when appropriate.

II. CODE 2 -- RESTS

P2 = staff number

> See description of P2 in CODE-1 section

**In summary: The integer part of P2 cannot be determined
by autoscr, but the track number can and should be.**

P3 = horizontal position

SCORE represents each rest as a separate record in the parameter file,
with an entire set of parameters attached to it. In the case of the
P3 parameter, it is possible that the **MUSEDATA rest object** has been
shifted from its "correct" time position. Therefore, the **autoscr**
program must provide two types of P3 information, (1) attached to the
OBJECT record, the amount by which the object has been shifted from
it's nominal x position, and (2) attached to the rest SUBOBJECT
record, any additional amount by which the rest has been shifted.

The mskpage program program can pass this informatin on intact
to the page specific representation, and **scorecon** can do the
work of computing the correct values of P3 for each note head.

**In summary: P3 information should be presented only when it is
non-zero. P3 information is passed on by autoscr as a shifted
amount (measured in dots)**

P4 = vertical position

Rests in SCORE are normally positioned on the third line of the
staff. In this position, P4 is zero. An increment of +1 moves a
rest up 1/2 of a staff unit. Negative values move a rest down.
It should be straight-forward computing a value for P4. This
value, when non-zero, should be attached to the rest SUBOBJECT.
Adding 100 to P4 makes a cue size rest. (see SCORE ref. manual).

In summary: P4 need not be computed by autoscr.

P5 = type of rest

Rest type is determined by autoscr. The following numbers
are used:

REST TYPE	SCORE P5	I-FILE Object Field 3
whole rest	-2	9
half rest	-1	8
quarter rest	0	7
eight rest	1	6
sixteenth rest	2	5
32nd rest	3	4
64th rest	4	3

I believe that field 3 of the I-file rest OBJECT has a
consistant one-to-one relationship with the SCORE P5 parameter.

In summary: P5 need not be calculated by autoscr.

P6 = number of augmentation dots with the rest

If P6 is an integer greater than zero, then this is the number of dots.

If P6 is -1, then this is an invisible rest.

A word about invisible rests: Invisible rests occur in the
MUSEDATA stage2 format in the form of irests, but these place
holders serve a somewhat different function and work slightly
differently than the invisible rests in SCORE. However, there
is an important overlap that should be exploited; namely:

The Line up and Justify (LJ) command exhibits erratic behavior in
SCORE, but the user is in the safe zone if (1) every measure of
every staff contains at least one musical musical track, and (2)
for each measure of a musical piece, every musical track,
regardless of staff number, contains the same number of beats.
Musical tracks may enter and drop out of a piece anytime, so long
as (1) this is done only on measure boundaries, and (2) no staff
is left without at least one musical track.

MUSEDATA requires that the musical pointer be at the end of the
measure when the next measure record is encountered. The number of
tracks in a measure is always at least one more than the number of
backup records, but it can exceed this number when tracks are
combined into chords. Strickly speaking, MUSEDATA does not require
tracks to start and end on measure boundaries.

As stated above, it would be handy to know the primary staff for any
particular track in any particular measure. What autoscr needs to
convey to its output (the non page specific i-files) is: **for each and
every measure, the total number of active tracks in that measure and
the primary staff for each of these tracks**. Looking at the linear
i-file format, the obvious place to include this information is to
append it to the **J B** bar-line record. This information is needed
only when there is more that one track represent in the measure.

What autoscr must do (that is new) is to survey each measure before
it is typeset (it does this anyway) and determine the value of these
new parameters (influenced by the **global information** about which
tracks normally reside on which staves), and convey this to the **J B**
i-file record. I suggest this be done with the following format:

| NTRACKS=# (#,#) (#,#) (#,#) etc.

where for each ordered pair, the first number is the track number,
and the second number is the primary staff for this track.
If this information is not conveyed explicitly, it will be assumed
that NTRACKS=1 and that there is only one staff. For the grand
staff, the information must always be convayed explicitly. Since
the non page specific i-file does not start out with a bar line,
this information must be appended to Line record at the top.

In reference to that **global information** about which tracks normally
reside on which staves, MUSEDATA does not currently represent this
information. There are two ways to deal with this. The first point
to recognize is that while this information is global in nature,
that is it does not change quickly and often, it also is not static
information, that is it may change over the course of a piece. The
WTC-II Prelude 16 is a prime example of this. Therefore, we could
(1) find a way to include this information in print suggestions, or
(2) ask autoscr to survey the entire movement and produce a global
map of the primary staves to which the various tracks should be
attached. At the moment, I favor the second approach.

Autoscr's work is not yet finished. It needs to make a map of all the the tracks in a measure and determine if and where there are time gaps. Obviously the presence of irests will indicate such gaps, but their absence does not necessarily mean that the gaps are not there. For example, two horns on a staff might play in octaves and thus be represented in one set of chords. Rests between these chords would be represented only once, even though two tracks were present. For each place where there is a time gap in a track that is not explicitly represented in the i-file, autoscr needs to insert some kind of indication so that scorecon will know that an invisible rest is needed. How to do this?

Since these time gaps may appear in places where there is otherwise no musical activity (e.g., a track that ends in the middle of a measure, at a position where there is no other musical note or rest), this will call for some kind of object. The obvious choice in the MUSEDATA i-file representation is a Mark. However, SCORE does not recognize Marks; nor are Marks necessarily processed the same way as Rests by the internal workings of autoscr. For the moment, I think the best way to proceed is to **ask autoscr to generate irests as regular rest objects that have a single "silent" K sub-object**. Silence can be achieved by setting the glyph number (Field 4) to zero. We need to make sure that that the presence of such "silent" rests doesn't effect (produce a spurious displacement for) other ligitimate objects.

All of this information can be passed on in-tact to the page specific I-files by the mskpage program. The scorecon program is where the heavy lifting must be done. Scorecon must be trained to recognize when a track has been forced to a secondary staff and to set P2 and P12 properly for notes and rests.

In summary: P6 information should be presented only when it is non-zero.

P7 = indicates the rest's rhythmic duration, regardless of rest type.

This information is theoretically contained in the Attribute subobject of the note object.

Note: When a rest does not advance the time counter, e.g., grace notes, notes at the end of trills, then P7 should be set to -1.

Note2: P7 must be represented to 4 decimal places

In summary: P7 need not be computed by autoscr.

P8 = indicates a number (or fermate) that will appear over the rest

In summary: P6 information should be presented only when it is non-zero.

P9 = used for centering rests

This parameter applies to the centering of whole rests. It is essentially a displacement from P3. P3 for whole rests should be set to the P3 value for all notes at the beginning of a measure.

The mskpage program automatically centers whole rest objects, without saying how far the rest was moved. I believe, therefore that it will be the responsibility of mskpage (not autoscr) to communicate the correct values of P3 and P9 for whole rests.

In keeping with the way P3 and P10 are handled for CODE-1 and CODE-2 items, the amount of the shift will be registered as a value for P9 (not P10).

In summary: P9 information should be presented only when it is non-zero. P9 information is passed on by the paging program as a shifted amount (measured in dots). The scorecon program will have to convert these units into score units.

P10 = horizontal displacement of rests.

There are two ways that autoscr might generate a horizontal offset for a rest: (1) by shifting the object **J R** , or (2) by shifting the rest subobject **K**. It can happen that both cases occur simultaneously.

Autoscr can and must provide this information, but only **scorecon** can sort it out at run time and compute the correct values of P10 for each notehead.

P10 for rests is measured in notehead "units" with a notehead being about 3 notehead units wide.

In summary: P10 information should be presented only when it is non-zero. P10 information is passed on by autoscr as a SCORE parameter, not an i-file distance.

P11 -- P15: These control features not represented in MUSEDATA.

TOTAL SUMMARY FOR CODE-2: RESTS

P2 = staff number, track number:	Autoscr determines track number where appropriate
P3 = horizontal position:	As near as I can tell, autoscr DOES NOT shift rest objects horizontally from their definitive position.
P4 = vertical position:	P4 need not be computed by autoscr.
P5 = type of rest	Already in i-file object record
P6 = augmentation dots and irests	If non-zero, must be determined by autoscr. Irests will generate separate Rest objects.
P7 = rest's rhythmic duration	P7 need not be computed by autoscr.
P8 = number (or fermata)	Can be computed by autoscr
P9 = used for centering rests	Generated by mskpage
P10 = horizontal displacement	Autoscr does not shift rests locally

III. CODE 3 -- CLEFS

P2 = staff number

The staff number can only be determined after mskpage has done the page layout. This work must be done by scorecon. Clefs do not have track numbers assigned to them.

In summary: P2 has only an integer part, which cannot be determined by autoscr.

P3 = horizontal position

Determined by the paging program. P3 computed by scorecon.

P4 = vertical position

This parameter is normally 0. Adding 100 to P4 will make a clef "cue" size. In order to represent some clefs (e.g., Soprano or Baritone clefs), P4 must be used to move the Alto or Bass clefs down. P4 = -4 will move the Alto clef down two staff lines to produce a Soprano clef.

In summary: P4 need not be computed by autoscr.

P5 = type of clef

clef types are determined by autoscr. The following numbers are used:

CLEF TYPE	SCORE P5	I-FILE Object Field 3
=============	===========	========================
Treble	0	4 (G-clef on line 4)
Bass	1	22 (F-clef on line 2)
Alto	2	13 (C-clef on line 3)
Tenor	3	14 (C-clef on line 4)
Percussion	4	(not available)
Vocal tenor	.8	34 (transposed treble clef)
Soprano	2(P4=-4)	11 (C-clef on line 1)
Baritone	1(P4=-2)	23 (F-clef on line 3)

I believe that field 3 of the I-file clef OBJECT has a consistant one-to-one relationship with the SCORE P5 and P4 parameters. **In summary: P5 need not be calculated by autoscr.**

P6 -- P7: These control the horizontal and vertical sizes of clefs. For the moment, we will try using the cue size as a stand-in for our clef change size.

TOTAL SUMMARY FOR CODE-3: CLEFS

P2 = staff number (integer)	Depends on page layout; cannot be determined by autoset
P3 = horizontal position	Depends on page layout; cannot be determined by autoset
P4 = vertical position	P4 need not be computed by autoscr.
P5 = type of clef	Leave this also to scorecon

IV. CODE 4 -- LINES AND HAIRPINS

This catagory of SCORE objects must be used to typeset MUSEDATA Wedge superobjects and Long Trill superobjects which do not have a tr associated with them.

P2 = staff number

The staff number can only be determined after the paging program has done the page layout. This work must be done by scorecon.

The track number is a new feature. It will be stored in the 10ths decimal digit of P2. Wedges are not necessarily associated with specific track numbers but long trills are.

For staves that have only one voice, such as Violin I, there is no need for a track number (it is always 1). In this case, the 10ths decimal will be zero.

For single staves with more than one voice, each voice will be assigned a track number (starting with 1) and autoscr should attempt to assign this number to all CODE-1 items (notes), CODE-2 items (rests), CODE-4 items (long trills without the tr), CODE-5 items (ties and slurs), CODE-7 items (long trills with the tr), CODE-9 items (symbols), and CODE-16 items (text).

The grand staff actually represents one instrument, usually some kind of keyboard. For this reason, tracks are assigned for both the upper and lower staves using one numbering system (starting with 1). It is possible for a track to move between the two staves, but it will always keep the same track number.

In summary: The integer part of P2 cannot be determined by autoscr, but the track number in the case of long trills without the tr can and should be.

P3 = left horizontal position of the Wedge

Determined by the paging program. P3 computed by scorecon.

In summary: P3 information computed by scorecon.

P4 = right vertical position of the Wedge

The I-file Wedge record Field 7 provides this information. It should be left to scorecon to convert this to the SCORE P4 parameter

In summary: P4 need not be computed by autoscr.

P5 = must be set to 999 by scorecon

P6 = right horizontal position of the Wedge

Determined by the paging program. P6 computed by scorecon.

In summary: P6 information computed by scorecon.

P7 = spread of Wedge

    The default spread of Wedges in SCORE is 2.3 scale steps. To accept
this default, set P7 = 0 for a crescendo Wedge, and set P7 = -1 for
a decrescendo Wedge. Set P7 to other positive (crescendo) or
negative (decrescendo) numbers to achieve different spreads. The
units are scale steps (1/2 staff line units).

    In summary: P7 should be computed by scorecon.

P8 -- P13: Not used by MUSEDATA Wedges.

P14 and P15 are used to indicate partial Wedges.

    SCORE uses a different technique to produce partial Wedges than does
MUSEDATA. In the MUSEDATA I-file format, the horizontal start and
end of partial Wedges are specified explicitly, as are the vertial
spread at each end. In SCORE, a partial Wedge is treated as a full
Wedge, with partial clipping. To clip the left half of a Wedge
(used for partial crescendo), set P14 = .5 (P15 = 0); to clip the
right half of a Wedge (used for partial decrescendo), set P15 = .5
(P14 = 0). The larger the fraction, the more is clipped. Setting
P15 = .9 would result in a very short decrescendo.

    It is clear from this that to get the proper SCORE parameters
for a partial Wedge, not only P14 and P15 must be calculated,
but P3 and P6 must adjusted from their apparent values as well.
For example, in the following case of a partial crescendo:
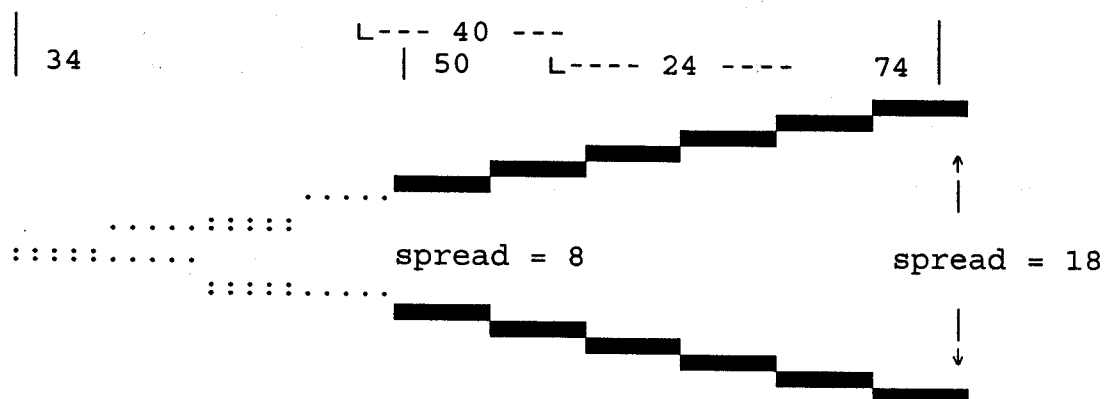
In MUSEDATA: Start = 50, End = 74, start spread = 8, end spread = 18

In SCORE: P3 = 34, P6 = 74, P14 = .4, P15 = 0, P7 = +(18 equivalent)

In summary: For Wedges, all parameters must be computed by scorecon.

TOTAL SUMMARY FOR CODE-4: LINES AND HAIRPINS

This catagory of SCORE objects is used to typeset MUSEDATA superobjects
   of the following types: W = wedges, R = long trills (type II, no tr.),
   and F = figure extensions. We will not convert figure extensions,
   since SCORE does not provide general support for representing and
   printing of figured harmony.

All MUSEDATA superobjects take their position from objects at each end,
   in some cases objects in between (Beams, Slurs). If a superobject
   is to have a track number attached to it, it must get that from the
   objects with which it is associated.

P2 = staff number, (track number)   Depends on page layout; cannot
                                          be determined by autoset
P3 = right horizontal position   Depends on page layout; cannot
P6 = left horizontal position   be determined by autoset

P4 = vertical position   ·   P4 need not be computed by autoscr.

P5 = 999 for hairpins,
   =   0 for trills

P7 = spread of Wedge
   = -1 for trills

P8 -- P13: Features not represented by MUSEDATA

P14 and P15 are used to indicate partial Wedges.

In summary: All CODE-4 parameters must be computed by scorecon.
   Autoscr cannot provide any helpful information beyond what is
   already in the linear I-file.

V. CODE 5 -- SLURS, TIES, TUPLET BRACKETS, and ENDINGS. All of these
        have superobject equivalents in the MUSEDATA I-file representation.

P2 = staff number, track number

   The staff number can only be determined after mskpage has done the
   page layout. This work must be done by scorecon.

   The track number is a new feature. It will be stored in the 10ths
   decimal digit of P2. Ties and tuplet brackets are definitely
   associated with specific track numbers; slurs are problematic in
   this respect, and endings have no track association.

   For staves that have only one voice, such as Violin I, there is no
   need for a track number (it is always 1). In this case, the 10ths
   decimal will be zero.

   For single staves with more than one voice, each voice will be
   assigned a track number (starting with 1) and autoscr should attempt
   to assign this number to all CODE-1 items (notes), CODE-2 items
   (rests), CODE-4 items (long trills without the tr), CODE-5 items
   (ties and slurs), CODE-7 items (long trills with the tr), CODE-9
   items (symbols), and CODE-16 items (text).

The grand staff actually represents one instrument, usually some kind of keyboard. For this reason, tracks are assigned for both the upper and lower staves using one numbering system (starting with 1). It is possible for a track to move between the two staves, but it will always keep the same track number.

In summary: The integer part of P2 cannot be determined by autoscr, but the track number in the case of ties and tuplet brackets can and should be.

P3 = left horizontal position
P6 = right horizontal position

For ties, slurs, and tuplet brackets, the P3 and P6 parameters should correspond exactly to the notes (P3 of the objects) to which they are attached. Only in the case where a tie or slur starts or ends on a Mark will extra work need to be done. If the Mark is at the right side of the page, SCORE uses P6 = 200 to indicate a continuation; if the Mark is on the left, SCORE uses some arbitrary number P3 smaller than P6 (position of the first note). Tuplet brackets do not extend over bar line and consequently do not present this problem.

See discussion of the P3 parameter under the CODE-1 Notes section.

Since it is up to scorecon to compute the final P3 values for all notes and rests, the values of P3 and P6 for CODE-5 items must also be set by scorecon. Autoscr does no work here.
In summary: No work for autoscr on P3 or P6.

P4 = left vertical position
P5 = right vertical position

The values of P4 and P5 must be determined from data in page specific I-files (generated by the paging program)
In summary: No work for autoscr on P4 or P5.

P7 = amount of curvature (expressed in scale steps)

For ties and slurs, the value of P7 will depend on many things, including the value in Field 10 (situation flag) for the Tie superobject, the value in Field 4 (situation flag) for the Slur superobject, the value in Field 9 (adjustment to curvature) for Slurs, and most importantly information about the actual shapes, as gleaned from the tie and slur files.

In short, no work for autoscr, but potentially a lot of work for scorecon.

For tuplets, P7 is the length of the vertical ends. MUSEDATA does not allow this to vary, so in this case P7 should be set to +2 for tips down, and -2 for tips up.

For endings, P7 is the length of the vertical line. MUSEDATA allows for different lengths of the vertical ends, but this is used mostly to differentiate between open and closed endings. SCORE does this with other parameters.

In summary: No work for autoscr on P7.

P8 = differentiates between ties, slurs, tuplet brackets, and endings
P9 = flatness and number that goes with tuplets and endings.

The value of P8 will determine what a CODE-5 actually
represents. P9, the "flattening factor" further modifies
this meaning.

P8	P9	Description
======	======	===
-1	flatness	Slur head to head
-2	"	Tie
-3	"	Tie from dotted note
-4	"	Slur stem to stem
-5	"	Slur note to stem
-6	"	Slur stem to note
1	0	Closed Ending (1st ending)
2	0	Open Ending (2nd ending)
1	2	Closed 2nd Ending
2	3	Open 3rd Ending
3	0	Square broken tuplet with 3 in middle
3	5	Square broken tuplet with 5 in middle
3	-3	Square broken tuplet with space for 1 note
3	-5	Square broken tuplet with space for 2 numbers
-1	2	Slur that is more flat than round
-1	-1	Slur that is very "pointy"

In summary: No work for autoscr on P8 and P9.

Parameters P10 to P18 are detailed below. All of them must
be calculated by scorecon (not autoscr).

P10 = 0 Parameter not used by MUSEDATA.

P11 creates a dotted slur. In summary: No work for autoscr on P11.

P12 = 0 Parameter not used by MUSEDATA.

P13 controls thickness of slur. In summary: No work for
  autoscr on P13.

P14 = 0 Parameter not used by MUSEDATA.

P15 = 0 Parameter not used by MUSEDATA.

P16 = number attached to slur (e.g. for tuplets)

   If the number is positive, then it breaks the slur.
   If the number is negative, then it is "inside" the
   slur.

P17 = 0 Parameter not used by MUSEDATA.

P18 = vertical adjustment to number attached to slur

   If one wants to put a number "outside" a slur rather
   than inside, set P16 = -3 (for triplets) and P18 = 5
   (or -5) to move the 3 to the other side of the slur.

A way to produce a triplet without a slur would be to
set the CODE-5 parameters as follows:

Parameter	Value	Description
P2	staff #	
P3 to P6		According to desired position
P7	1 or -1	1 = above, -1 = below
P8	-1	Slur (or try using tuplet #)
P9..P13	0	Normal or not used
P14	1	Blank slur out
P15	0	(not used)
P16	#	tuplet number
P17,P18	0	(not used)

TOTAL SUMMARY FOR CODE-5: SLURS, TIES, TUPLET BRACKETS, and ENDINGS

This catagory of SCORE objects is used to typeset MUSEDATA superobjects
  of the following types: T = ties, S = slurs and dotted slurs,
  X = tuples and tuple brackets (Type I, nobeam), and E = endings.

All MUSEDATA superobjects take their position from objects at each end,
  in some cases objects in between (Beams, Slurs). If a superobject is
  to have a track number attached to it, it must get that from the
  objects with which it is associated.

P2 = staff number, (track number)   Depends on page layout; cannot be
                                         determined by autoset

P3 = right horizontal position   Depends on page layout; cannot be
P6 = left horizontal position   determined by autoset

P4 = left vertical position   Depends on page layout; cannot be
P5 = right vertical position   determined by autoset

P7 = amount of curvature (slurs and ties)
   = bracket depth (brackets and endings)

P8 = differentiates between ties, slurs, tuplet brackets, and endings

P9 = flatness (ties and slurs)
   = number (tuplets and endings)

P11 creates a dotted tie or slur

P13 = thickness of tie or slur

P16 = number attached to slur (e.g. used for tuplets)

P18 = adjusts vertical placement of number attached to slur

In summary: All CODE-5 parameters must be computed by scorecon.
   Autoscr cannot provide any helpful information beyond what is
   already present in the linear I-file

VI. CODE 6 -- BEAMS and TREMOLANDI (prepare for a nightmare)
these have superobject equivalents in the MUSEDATA I-file
representation.

P2 = staff number

The staff number can only be determined after mskpage has done the
page layout. This work must be done by scorecon.

Beams cannot be assigned a distinctive track number because they might
connect stems with multiple note heads (chords) with multiple tracks.

In summary: The integer part of P2 cannot be determined by autoscr.
The fractional part is 0.

P3 = left horizontal position
P6 = right horizontal position

The P3 and P6 parameters need to correspond exactly to the notes
(P3 of the objects) to which they are attached. See discussion of
the P3 parameter under the CODE-1 Notes section.

Since it is up to scorecon to compute the final P3 values for
all notes and rests, the values of P3 and P6 for CODE-6 items
must also be set by scorecon. Autoscr does no work here.

In summary: No work for autoscr on P3 or P6.

P4 = left vertical position
P5 = right vertical position

Setting the values of P4 and P5 will depend on information generated
by the paging program. autoscr has no role here.

In summary: No work for autoscr on P4 or P5.

P7 = stem direction of the notes attached to the beam.

P7 must always be a two-digit number, XY, where X is either 1 (stem up)
or 2 (stem down), and Y is the number of "primary" beams. If Y = 0,
the beam is a tremulo (number of bar set by P10). If XY is negative,
there is a single note with a repeater (number of repeaters set by P10).

In summary: No work for autoscr on P7.

P8 = indicates a number that is attached to the beam for tuplets.

In summary: No work for autoscr on P8.

P9 = used to displace the endpoint(s) of a beam, without
modifying P3 or P6.

P9 is a three-digit number, XYZ, where X refers to the primary beam,
Y refers to the secondary beam, and Z refers to the tertiary beam.
Each of these digits may take on one of four values, 0,1,2,3 as
follows:

For stem up beams

    0 = no shift of either end
    1 = shift left end one note-head to the left
    2 = shift right end one note-head to the left
    3 = shift both ends one note-head to the left

For stem down beams, the shifts are to the right.

In summary: No work for autoscr on P9.

P10 = creates secondary beams and also creates tremolo beams
P11 = left position of any beams created with P10
P12 = right position of any beams created with P10

If a secondary beam is not the same length as a primary beam, you must use P10, P11 and P12 to create it.

P10 is a two digit number XY, where X indicates the vertical displacement from the primary beam and Y indicates how many additional beams you would like to create. P10 = 12 will create two secondary beams one level below (for stem up) the primary beam.

If P11 = P3, set P11 = -1. If P12 = P6, set P12 = -1.

P13 = creates additional secondary beams
P14 = left position of any beams created with P13
P15 = right position of any beams created with P13

If an additional secondary beam is needed, it can be created using P13, P14 and P15. These function the same way as P10..P12.

Note: If P14 and P15 are not otherwise in use, they may be used to create offsets to P3 and P6 for the primary beam that are different from the offsets created by P9. This is useful if a note is shifted slightly and you want the beam to connect precisely to it--without modifying P3 or P6 (and thus "disconnecting" the beam from its stem).

Making P10 or P13 negative will "flip" a secondary and terciary beam. This is used for beams connecting notes on different stems.

P17 may be used to reduce the thinkness of a beam. This may used of the case of beamed grace notes.

In summary: No work for autoscr for parameters P10 to P17.

TOTAL SUMMARY FOR CODE-6: BEAMS and TREMOLANDI

This catagory of SCORE objects is used to typeset MUSEDATA superobjects
   of the following types: B = beams, including beams with repeaters,
   and X = tuples (Type II, with beams). In addition, a CODE-6 item must
   be used to represent repeaters on a single note. This is NOT a super-
   object in MUSEDATA, and the conversion must be done by autoscr.

All MUSEDATA superobjects take their position from objects at each end,
   in some cases objects in between (Beams, Slurs). If a superobject is
   to have a track number attached to it, it must get that from the
   objects with which it is associated.

P2 = staff number, (track number)   Depends on page layout; cannot be
                                          determined by autoset

P3 = right horizontal position   Depends on page layout; cannot be
P6 = left horizontal position   determined by autoset

P4 = left vertical position   Depends on page layout; cannot be
P5 = right vertical position   determined by autoset

P7 = stem direction and number of primary beams.

P8 = number that is attached to the beam for tuplets.

P9 = displaces the endpoint(s) of a beam
       cause them to line up with displaced notes.

P10 = creates secondary beams and also creates tremolo beams
P11 = left position of any beams created with P10
P12 = right position of any beams created with P10

P13 = creates additional secondary beams
P14 = left position of any beams created with P13
         (also used to displace left end of primary beam)
P15 = right position of any beams created with P13
         (also used to displace right end of primary beam)

P17 = thickness of a beam. Can be used to create
        grace note beams.

In summary: All CODE-6 parameters (with the exception of repeaters
   on single notes) must be computed by scorecon. Autoscr cannot
   provide any helpful information beyond what is already in the
   linear I-file.

VII. CODE 7 -- TRILLS and OTTAVAS. Both of these are superobjects
        in the MUSEDATA I-file format.

P2 = staff number, track number

   The staff number can only be determined after the paging program has
   done the page layout. This work must be done by scorecon.

   The track number is a new feature. It will be stored in the 10ths
   decimal digit of P2. Trills are definitely associated with specific
   track numbers, whereas ottavas apply to staves and any note on them.

For staves that have only one voice, such as Violin I, there is no need for a track number (it is always 1). In this case, the 10ths decimal will be zero.

For single staves with more than one voice, each voice will be assigned a track number (starting with 1) and autoscr should attempt to assign this number to all CODE-1 items (notes), CODE-2 items (rests), CODE-4 items (long trills without the tr), CODE-5 items (ties and slurs), CODE-7 items (long trills with the tr), CODE-9 items (symbols), and CODE-16 items (text).

The grand staff actually represents one instrument, usually some kind of keyboard. For this reason, tracks are assigned for both the upper and lower staves using one numbering system (starting with 1). It is possible for a track to move between the two staves, but it will always keep the same track number.

In summary: The integer part of P2 cannot be determined by autoscr, but the track number in the case of long trills with the tr can and should be.

P3 = left horizontal position

For trills the P3 parameter should correspond exactly to the note (P3 of the objects) to which the trill is attached. Trills that continue onto a successive system must be represented with a CODE-4 item. Ottavas can start and stop anywhere on a stave. See discussion of the P3 parameter under the CODE-1 Notes section.

Since it is up to scorecon to compute the final P3 values for all notes and rests, the value of P3 in the case of long trills with the tr must also be set by scorecon. Autoscr does no work here.
In summary: No work for autoscr on P3.

P4 = vertical position

The vertical position can be determined by scorecon.
In summary: No work for autoscr on P4.

P5 = size

P5 can be set by scorecon, after some experimentation.
In summary: No work for autoscr on P5.

P6 = right horizontal position

P6 can be set by scorecon, after some experimentation.
In summary: No work for autoscr on P6.

P7 = indicates type of symbol. Values that are relevant to the MUSEDATA representation listed below.

P7	Description	P7	Description
0	Trill	-8	Ottava bassa
8	Ottava	15	Quindicesima

P7 can be set by scorecon
In summary: No work for autoscr on P7.

P8 to P12 cover different elements for trills and ottava.

For Trills: For Ottava:

  P8 = accidental over trill   P8 = size of the dashes.
     0 = none
     1 = flat
     2 = sharp
     3 = natural
  P9 = size of the "wave" extension P9 = space between dashes.
    (default is .75)
  P10 = 0   P10 = 0

  P11 = vertical position of the P11 = (not used)
    "wave" (default is 0,
    positive raises the line)
  P12 = (not used)   P12 = bracket height at the end
             of dashes.

  In summary: No work for autoscr on P8 through P12.

TOTAL SUMMARY FOR CODE-7: TRILLS and OTTAVAS

This catagory of SCORE objects is used to typeset MUSEDATA superobjects
 of the following types: V = octave transposition, and R = long trills
 (type I, with tr.).

All MUSEDATA superobjects take their position from objects at each end,
 in some cases objects in between (Beams, Slurs). If a superobject is
 to have a track number attached to it, it must get that from the
 objects with which it is associated.

P2 = staff number, (track number) Depends on page layout; cannot be
              determined by autoscr
P3 = right horizontal position   Depends on page layout; cannot be
P6 = left horizontal position   determined by autosct

P4 = vertical position   Depends on page layout; cannot be
              determined by autoscr
P5 = size

P7 = indicates type of symbol.

P8 = accidental over trill
 = length of the dashes ottava dash line

P9 = size of the trill "wave" extension
 = space between ottava dashes.

P11 = vertical offset of trill "wave"

P12 = bracket height at the end of ottava dashes

In summary: All CODE-7 parameters must be computed by scorecon.
 Autoscr cannot provide any helpful information beyond what is
 already in the non page specific I-file.

VIII. CODE 8 -- STAVES

P2 = staff number

The staff number can only be determined after the paging program has
done the page layout. This work must be done by scorecon.
In summary: P2 has only an integer part, which cannot be determined by
autoscr

P3 = left horizontal position

Set by scorecon. For conversion of MUSEDATA to score, we suggest
using a value of P3 = 15.000 for non-indented staves and 40.000
for indented staves. In summary: No work for autoscr on P3

P4 = vertical position

The vertical position must be determined by scorecon.
P4 for staff no. 1 must be 0. P4 is the measure in scale steps of
the relative vertical position of the staff above the next lower
staff. If P4 = 0, the default space of 10 scale steps is used.
In summary: No work for autoscr on P4.

P5 = staff size.

For conversion the MUSEDATA 14-dot size score, we suggest using P5 = .52
In summary: No work for autoscr on P5.

P6 = right horizontal position

Set by scorecon. For conversion of MUSEDATA to score, we suggest
using a value of P6 = 200.000. In summary: No work for autoscr on P6

P7 = number of lines on the staff.

P7 = 0 (default 5) In summary: No work for autoscr on P7

P8 to P12 = 0 (not used in conversion)

TOTAL SUMMARY FOR CODE-8: STAVES

SCORE allows the user to do many things with staves that MUSEDATA does
   not currently represent. The convertion of MUSEDATA to SCORE will
   result in relatively simple SCORE staves, with simple parameters
   relating mainly to position and size. The information necessary to
   do this is developed by the paging program, not autoscr.

P2 = staff number   P5 = staff size.

P3 = left horizontal position   P6 = right horizontal position

P4 = vertical position   P7 = number of lines on the staff.

In summary: All CODE-8 parameters must be computed by scorecon from the
   I-file.

IX. CODE 9 -- SYMBOL LIBRARY

P2 = staff number, track number

The staff number can only be determined after the paging program
has done the page layout. This work must be done by scorecon.

The track number is a new feature. It will be stored in the
10ths decimal digit of P2. Symbols vary in terms of whether or
not they are associated with specific track numbers.

For staves that have only one voice, such as Violin I, there is no
need for a track number (it is always 1). In this case, the 10ths
decimal will be zero.

For single staves with more than one voice, each voice will be
assigned a track number (starting with 1) and autoscr should attempt
to assign this number to all CODE-1 items (notes), CODE-2 items
(rests), CODE-4 items (long trills without the tr), CODE-5 items
(ties and slurs), CODE-7 items (long trills with the tr), CODE-9
items (symbols), and CODE-16 items (text).

The grand staff actually represents one instrument, usually some
kind of keyboard. For this reason, tracks are assigned for both
the upper and lower staves using one numbering system (starting
with 1). It is possible for a track to move between the two
staves, but it will always keep the same track number.

In summary: The integer part of P2 cannot be determined by autoscr,
but the track number in the case of certain symbols can and should
be.

P3 = horizontal position

Set by scorecon. I would think it desireable to link certain symbols
to their related notes or rests by using a common value of P3. For
display reasons, this might not always be possible, and SCORE does not
provide a horizontal shift parameter to accommodate this problem.

In summary: No work for autoscr on P3

P4 = vertical position

The vertical position must be determined by scorecon.

The default P4 setting will vary depending on the symbol.

In summary: No work for autoscr on P4.

P5 = symbol library number.
Here are a list of symbols that are currently in use in MUSEDATA and
might be useful to convert to SCORE.

P5	Symbol		P5	Symbol
====	========	===	====	========
0	G-clef \ These may be required		75	turn
1	F-clef if SCORE's cue size		.	
2	C-clef / clef is the wrong size.		79	espr.
.			80	meno
6	flat		81	piu
7	sharp		.	
8	natural		86	poco
9	flat-flat		.	
10	double sharp		94	run up to trill
.			.	
18	common time		111	decresc.
19	cut time		.	
.			113	rall.
21	hat accent		.	
22	sideways accent		123	fz
23	tenuto		124	s
24	staccato		125	r
25	staccato under hat		126	z
26	staccato under accent		127	rf
.			128	rfz
31	upright fermata		129	sffz
.			.	
34	mordant		140	(flat) in parentheses
35	shake		141	(sharp)
36	stricht		142	(natural)
37	tr		143	(double flat)
.			144	(double sharp)
50	pppp		.	
51	ppp		150	(pppp) in parentheses
52	pp		151	(ppp)
53	p		152	(pp)
54	mp		153	(p)
55	mf		154	(mp)
56	f		155	(m)
57	ff		156	(f)
58	fff		157	(ff)
59	ffff		158	(fff)
60	fp		159	(ffff)
61	sf		160	sff
62	sfz		161	sfff
63	cresc.		162	sfpp
64	dim.		163	sfp
65	rit.		164	sffp
66	pizz.		165	mfpp
67	arco		166	mfp
68	accel.		167	fpp
.			168	ffpp
74	signa sign		169	ffp

The decision to use a CODE-9 symbol will be made by
scorecon, and the value of P5 will chosen at that time.
In summary: No work for autoscr on P5.

P6 = horizontal size
P7 = vertical size

    This depends on the size of SCORE's symbol
    In summary: No work for autoscr on P6 or P7

P8 = thickness

    This depends on the shape of SCORE's symbols
    In summary: No work for autoscr on P8.

P9 = rotation

    We might need this to produce an inverted fermata.
    Rotation is in drgrees. In summary: No work for autoscr on P9.

TOTAL SUMMARY FOR CODE-9: SYMBOL LIBRARY

The SCORE symbol library provides a means (catch-all) for representing
important musical items that, for some reason, cannot be represented
in their proper context. Code-9 items are a "method of last resort,"
because they are essentially detached from other items with which they
function and to which they refer. Exhibit "A" is the <u>natural</u> in the
<u>natural-flat</u> accidental.

Code-9 items are generated as needed, and do not constitute a true
musical catagory of symbols, such as notes, beams, slurs, etc.

Autoscr will need to provide Code-9 information on a case-by-case basis.

P2 = staff number, track number	P6 = horizontal size
P3 = horizontal position	P7 = vertical size
P4 = vertical position	P8 = thickness
P5 = symbol library number.	P9 = rotation

<u>In summary:</u> CODE-9 parameters are provided by autoscr where needed and
where possible. Scorecon may use CODE-9 items to "pick up the slack"
in the conversion process. While this will improve the literal
conversion, it will do little for logical conversion of musical data.

X. CODE 10 -- NUMBERS (Rehearsal Letters)

    Not used in MUSEDATA.

XI. CODE 11 -- USER SYMBOL LIBRARY

    Not used in MUSEDATA.

XII. CODE 12 -- SPECIAL SHAPES

    Not used in MUSEDATA.

XIV. CODE 14 -- BARLINES. BRACES, and BRACKETS

P2 = staff number

    The staff number can only be determined after mskpage has done the page layout. This work must be done by scorecon. Bars do not have track numbers assigned to them.

    In summary: P2 has only an integer part, which cannot be determined by autoscr.

P3 = horizontal position

    Determined by the paging program. P3 computed by scorecon.

P4 = number of staves connected by the barline

    Determined by the paging program. P4 computed by scorecon. In SCORE, bar lines extend upward from the bottom staff on a system. P4 = 0, or P4 = 1 have the same meaning.

    In summary: P4 information computed by scorecon.

P5 = type of barline

P5	MUSEDATA	Description
======	==========	====================
0	1	Normal bar
1	5	Double barline
2	6	Light-heavy barline
3	6 + dots	Repeat barline (right)
4	9 + dots	Repart barline (left)
5		Light-heavy-light + dots (repeat both ways)
6	10 + dots	Heavy-heavy + dots (repeat both ways)
7	3	Dashed barline
8		Brace {
9		Bracket [
10		Subbracket

    Determined by the paging program. P5 computed by scorecon.

P6 = thickness of barline
P7 = horizontal displacement

    In summary: P6 and P7 information computed by scorecon.

P8 = size of dashes for dashed barlines.
P9 = size of the space in dashed barlines.

    In summary: P8 and P9 information computed by scorecon.

P10 and P11 can be used to breakup a barline.

    In summary: P10 and P11 information computed by scorecon.

TOTAL SUMMARY FOR CODE-14: BARLINES. BRACES, and BRACKETS

Barline, Braces and Brackets are closely related to staff lines. It's all part of of what MUSEDATA calls "System construction." One small difference between MUSEDATA and SCORE is that SCORE represents all staves on a page with one numbering system, whereas MUSEDATA treats each system on a page as a separate entity. This has implications for the conversion of barline, brace and bracket imformation from MUSEDATA to SCORE.

The layout of barlines, braces and brackets is entirely page dependent. Autoscr has nothing to add to the process.

P2 = staff number

P3 = horizontal position

P4 = number of staves connected by the barline

P5 = type of barline

P6 = thinkness of barline

P7 = horizontal displacement

P8 = length of dashes for dashed barlines.

P9 = size of the spaces in dashed barlines.

P10 and P11 can be used to breakup a barline.

In summary: CODE-14 parameters are entirely page dependent. Autoscr has nothing to contribute beyond what is already in the linear i-files.

XV. CODE 15 -- IMPORTING POSTSCRIPT PROGRAMS OR FILES

Not used in MUSEDATA.

XVI. CODE 16 -- TEXT

There are several places we will encounter Text items in the conversion of MUSEDATA files to SCORE files.

(1) General text such as titles. These will have to be attached to the top staff, although this is somewhat illogical. Included here are movement names.

(2) Time words, such as Allegro, Andante. These may appear attached to various staves in a score.

(3) Lyrics which tie to the musical notes.

(4) Score does not have a separate code for figured harmony. This will present somewhat of a challenge for convertion, since MUSEDATA handles this is a fully developed manner. This module of the conversion program will probably be one of the last to be written.

P2 = staff number

The staff number can only be determined after mskpage has done the page layout. This work must be done by scorecon. Text does not have music track numbers assigned to it.

In summary: P2 has only an integer part, which cannot be determined by autoscr.

P3 = horizontal position

For General Text, Times words, etc. the value of P3 is page specific and will be determined by mskpage. But in the case of lyrics, (and figured harmony), it will be important to attach text to the related notes via the P3 value. Since this type of text is treated as a subobject of a note (or group of notes), this process has the same set of problems as setting note heads (CODE-1 items). See CODE 1 for treatment of this. In the case of text, P11 is used to create a horizontal offset from P3.

In summary: In the case of lyrics and figured harmony, P3 information is required of the autoscr program. Otherwise, this can be left to scorecon

P4 = vertical position

Determined by the paging program. P4 computed by scorecon.

P5 = space each character occupies

P5 = 0 (default)
Determined by the paging program. P5 computed by scorecon.

P6 = horizontal and vertical size

Determined by the paging program. P6 computed by scorecon.

P7 to P9: Not used in conversion

P10 = size of space character.

Determined by the paging program. P10 computed by scorecon.

P11 = horizontal displacement from the P3 setting.

This will allow us to attach lyrics directly to the P3 of the note heads they go with.

In this case, P11 along with P3 must be computed by autoscr.

In summary: P11 where needed must be computed by autoscr.

P12 to P18 relate to actual text. The workings of these parameters may be learned from studying the .PMX files.

TOTAL SUMMARY FOR CODE-16: TEXT

> There are several places text items are encountered in the conversion
> from MUSEDATA to SCORE, but they fall into two broad catagories:
> Lyrics and General text. The differentiating factor is that lyrics
> are attached to notes, which SCORE will want to move around, whereas
> general text is "free floating."   The SCORE reference manual
> provides a great deal of information on the user interface for
> entering and editing (repositioning) text, but very scant information
> on how the SCORE program interprets the parameters in the parameter
> file. At this time, all we can do is report the type of information
> each parameter represents, but not the requirements for representing
> this information properly. There is a definite need for
> experimentation here.
>
> As far as autoscr is concerned, lyrics are represent as Text sub-objects
> to note objects. The relevant track and horizonal offset data are
> all present in the i-files constructed by autoscr. I suspect the
> remaining work will need to be done by scorecon. General text and
> time words will also have to be converted by scorecon.
>
> P2 = staff number
>
> P3 = horizontal position
>
> P4 = vertical position
>
> P5 = space each character occupies
>
> P6 = horizontal and vertical size
>
> P10 = size of space character.
>
> P11 = horizontal displacement from the P3 setting.
>
> P12 to P18 relate to actual text. We need to study
>   some PMX files to see exactly how these parameters
>   work.
>
> In summary: CODE-16 parameters are still somewhat of a mystery. I
>   believe that autoscr, in its output of linear i-files, is
>   currently providing all necessary information for the representation
>   of lyrics and general text.

XVII. CODE 17 -- KEY SIGNATURES

P2 = staff number

   The staff number can only be determined after the paging program
   has done the page layout. This work must be done by scorecon.
   Clefs do not have track numbers assigned to them.

   In summary: P2 has only an integer part, which cannot be determined
   by autoscr.

P3 = horizontal position

   Determined by mskpage. P3 computed by scorecon.

P4 = vertical position

If one of the four "standard" clefs, Treble, Alto, Tenor, or Bass
governs the staff, then P4 can and should be set to 0. The
parameter P6 will tell SCORE how to arrange the key accidentals
vertically on the staff. If, on the other hand, a non-standard clef
is being employed--in the MUSEDATA representation, the transposed
treble clef would be the most common example, but we might also find
the soprano clef, the mezzo-soprano clef, or the baratone clef--then
P4 cannot be zero, and it will take a special combination of P4 and
P6 to get the layout right.

As near as I can determine, the best values in these cases
are as follows:

Clef	Key	P4	P6
========	=======	======	======
Transposed treble	sharps	0	0
Transposed treble	flats	0	0
Soprano	sharps	1	3
Soprano	flats	1	3
Mezzo-soprano	sharps	-2	2
Mezzo-soprano	flats	2	0
Baratone	sharps	2	3
Baratone	flats	-2	1

Ultimately P4 will be set by scorecon

In summary: P4 information computed by scorecon.

P5 = number of accidentals in key signature

P5 positive is sharps; P5 negative is flats Adding 100 to P5 changes
accidentals (sharps or flats) to naturals

In summary: P5 information computed by scorecon.

P6 = type of clef preceding the key signature

P6	Clef
=======	========
0	Treble
1	Bass
2	Alto
3	Tenor

Adding 100 to P6 changes the accidentals to cue size

In summary: P6 information computed by scorecon.

P7 = amount of space between accidentals in key signature

Default is 1. Try using .8

In summary: P7 information computed by scorecon.

Note: To create other key signatures, we must use
     Multiple CODE-17 items.

TOTAL SUMMARY FOR CODE-17: KEY SIGNATURES

> Key signatures are relatively staight forward. scorecon is the best place to construct the parameters of these items.
>
> P2 = staff number
>
> P3 = horizontal position
>
> P4 = vertical position
>
> P5 = number of accidentals in key signature
>
> P6 = type of clef preceding the key signature
>
> P7 = amount of space between accidentals in key signature
>
> In summary: CODE-17 parameters are well within the reach of scorecon.

XVIII. CODE 18 -- TIME SIGNATURES

P2 = staff number

The staff number can only be determined after the paging program has done the page layout. This work must be done by scorecon. Clefs do not have track numbers assigned to them.

In summary: P2 has only an integer part, which cannot be determined by autoscr.

P3 = horizontal position
P4 = vertical position

In summary: P3 and P4 information computed by scorecon.

P5 = top meter number
P6 = bottom meter number

Special cases: 99,1 = Common Time
                 98,1 = Cut Time
                  0,2 = 2
                  0,3 = 3
                  etc.
In summary: P5 and P6 information computed by scorecon.

P7 = size of time signature (use P7 = 0)

In summary: P7 information computed by scorecon.

P8 = top meter number for second meter
P9 = bottom meter number for second meter

Examples: 4,4 and 3,8   = 4/4 + 3/8
            4,4 and 4,16   = 4/4 + 4/16
            4,4 and 3,0   = 4+3/4
            3,4 and 4,0   = 3+4/4
In summary: P8 and P9 information computed by scorecon.

P10 = adds distance after first of compound meters
   (Not used in conversion. P10 = 0)

P11 = adds space between compound meters
   (Not used in conversion. P11 = 0)

P12 = suppresses the plus (+) between compound meters
   (Not used in conversion. P12 = 0)

P15 = displaces meter horizontally
   (Not used in conversion. P15 = 0)

TOTAL SUMMARY FOR CODE-18: TIME SIGNATURES

Time signatures are relatively staight forward. scorecon is the best
   place to construct the parameters of these items.

P2 = staff number

P3 = horizontal position

P4 = vertical position

P5 = top meter number

P6 = bottom meter number

P7 = size of time signature (use P7 = 0)

P8 = top meter number for second meter

P9 = bottom meter number for second meter

In summary: CODE-18 parameters are well within the reach of scorecon.