## REPRESENTATION

**recip — beat-proportion representation

## DESCRIPTION

The **recip scheme is able to represent durations according to the traditional system of beat-proportions (rather than according to elapsed- or clock-time.) Durations are specified through the use of integer numbers and augmentation dots. With the exception of the value zero, durations are represented by reciprocal numerical values. For example:

| | |
|---|---|
| 0 | breve duration |
| 1 | whole duration |
| 2 | half duration |
| 4 | quarter duration |
| 8 | eighth duration |
| 16 | sixteenth duration |
| 32 | thirty-second duration |
| 64 | sixty-fourth duration |
| etc. | |

*Representations of Duration in* **recip

The number zero (0) is reserved for the *breve* duration (i.e. a duration of twice the length of a whole note). Dotted durations are indicated by adding the period character (.) after the numerical value:

| | |
|---|---|
| 2. | dotted half duration |
| 8.. | doubly-dotted eighth duration |
| etc. | |

*Representation of Dotted Durations in* **recip

Any number of augmentation dots may follow the duration integer.†

Triplet and other irregular durations are represented in a somewhat more arcane, though no less logical fashion. Consider, for example, the quarter-note triplet duration. Three quarter triplets occur in the time of four quarters or one whole duration. If we divide a whole duration ("1") into three equal parts, each part has a duration of one-third. The corresponding reciprocal integer for 1/3 is 3, hence **recip represents a quarter-note triplet

† Notice that the period is used both to indicate Humdrum null tokens and **recip augmentation dots. In parsing **recip spines, there is never any confusion concerning the meaning of the period: as a null token, the period will appear isolated from all other characters (by tabs or carriage returns). As an augmentation dot, the period will always follow a number.

as a "third-note" — 3. Similarly, eighth-note triplets are represented by the integer 6 while sixteenth-note triplets are represented by the integer 12. Eighth-note quintuplets (5 in the time of 4) will be represented by the value 10 (a half duration divided by 5).

In general, the way to determine the ****recip** equivalent of an arbitrary "tuplet" duration is to multiply the number of tuplets by the total duration which they occupy. If 7 notes of equal duration occupy the duration of a whole-note ("1"), then each septuplet is represented by the value 7 (i.e. 1 x 7). A more extreme example is 23 notes in the time of a doubly-dotted quarter. The appropriate ****recip** duration can be found by multiplying 4 by 23 (equals 92) and adding the appropriate augmentation dots. Thus "92.." is the correct ****recip** encoding for a note whose duration is 23 notes in the time of a doubly-dotted quarter.

The ****recip** representation can be used to encode a sequence of time-spans or successive durations. The units are seconds.

Barlines are represented using the "common system" for barlines — see **barlines (2).**

## FILE TYPE

It is recommended that files containing predominantly `**recip` data should be given names with the distinguishing '.rcp' extension.

## SIGNIFIERS

The following table summarizes the ****recip** mappings of signifiers and signifieds.

| | |
|---|---|
| 0-9 | decimal values |
| . | dotted duration; null token |
| = | barlines |
| == | double barline |

*Summary of* ****recip** *Signifiers*

## EXAMPLES

A sample document is given below:

```
!! Gustav Holst
**recip
*M5/4
=1
12
12
12
4
4
8
8
4
=2
*-
```

## PERTINENT COMMANDS

The following Humdrum command accepts ****recip** encoded data as input:

| | |
|---|---|
| **timebase** | reformat ****recip** score with constant time-base |
| **urrhythm** | characterize the rhythmic prototype in a passage |

## TANDEM INTERPRETATIONS

The following tandem interpretations can be used in conjunction with ****recip**:

| | |
|---|---|
| MIDI channel | `*Ch1` |
| meter signatures | `*M6/8` |
| tempo | `*MM96.3` |
| timebase | `*tb32` |

*Tandem interpretations for* ****recip**

## SEE ALSO

**barlines** (2), ****date** (2), ****metpos** (2), ****ordo** (2), ****recip** (2), ****takt** (2), ****time** (2), **timebase** (4), ****URrhythm** (2), **urrhythm** (4), ****Zeit** (2)