

ConTExT



title : ConTExT User Modules
subtitle : LilyPond Bridge (Music Typesetting)
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This module serves to include LilyPond music directly in the ConT_EXt source, just as METAPOST code can be.

It is supposed to work only with LilyPond's stable version 2.12 and ConT_EXt MkIV i.e. LuaT_EX.

Complete list of options:

option	default	comment
staffsize	14	in pt
indent	0pt	first line indent
time	yes	count time? (i.e. show time signature, set bars, split line)
clef	yes	show clef?
linewidth	<code>\localhsz</code>	
betweensystemspace	54pt	space between systems
height	<code>\textheight</code>	
align	?	default depends on fragment=...
fragment	no	whole staff line or only snippet?
barnumbers	no	show numbers of measures?
showempty	no	drop empty staves?
seriffont	"TeX Gyre Schola"	font for e.g. lyrics
sansfont	"LMSans10"	font for e.g. chords
monofont	"LMTypewriter10"	normally not used
tmpdir	./lilytemp	directory for temporary files
imgdir	./lilypdfs	directory for image files (note PDFs)

Todo list

- Proper support for multipage results.
- Set LilyPond page size to remaining page space.
- Place instrument names in margin.
- Work with existing PDFs on systems where LilyPond isn't installed.

Commented Source

As usual, we use a prefix for buffers, `\getparameters` etc.:

```

1 \writestatus{loading}{LilyPond module}
2 \startmodule[lilypond]
3 \unprotect
4 \definesystemvariable{lily}

```

Define the text snippets to be placed around fragments. Since LilyPond uses similar syntax to TeX, we must do some catcode fiddling.

```

5 \bgroup
6 \catcode`\/=\\@escape
  /catcode`\=/@other
  /catcode`/#=@other
  /catcode`/<=@begingroup
  /catcode`/>=@endgroup
  /catcode`/{=@other

```

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```
/catcode`/}=/@@other
/catcode`/=/@@other
/catcode`/=-/@@letter

7 /gdef/lily!fragmentprefix
  </string^^J
  /string^^J
  {/string^^J
  % ly snippet contents follows:/string^^J
  >

8 /gdef/lily!fragmentsuffix
  </string^^J
  % end ly snippet/string^^J
  }/string^^J
  >

9 /gdef/lily!prefix
  </string^^J
  /string^^J
  #(ly:set-option (quote no-point-and-click))/string^^J
  #(ly:set-option (quote delete-intermediate-files))/string^^J
  /string^^J
  \version "2.12.0"/string^^J
  #(define version-seen? #t)/string^^J
  \layout {/string^^J
  /iflily!showempty/else
  % drop empty staves/string^^J
  \context { \RemoveEmptyStaffContext } % MUST come first/string^^J
  \context { \Score \override VerticalAxisGroup #'remove-first = ##t
  }/string^^J
  /fi
  /string^^J
  /unless/iflily!time
  % switch off time signature (i.e. only one line, no bars)/string^^J
  ragged-last = ##t/string^^J
  \context { \Score timing = ##f }/string^^J
  \context { \Staff \remove "Time_signature_engraver" }/string^^J
  /string^^J
  /fi
  /unless/iflily!barnumbers
  % switch off bar numbers/string^^J
  \context { \Score \remove "Bar_number_engraver" }/string^^J
  /fi
  /string^^J
  /unless/iflily!clef
  % switch off clef sign/string^^J
  \context { \Staff \remove "Clef_engraver" }/string^^J
  /fi
  /string^^J
  #(define fonts
  (make-pango-font-tree
  /@@lilyseriffont/space
  /@@lilyfont/space
  /@@lilymonofont/space
```

```

(/letterslash/space/@@lilystaffsize/space 20))) /string^^J
/string^^J
}/string^^J
\paper {/string^^J
  #(define dump-extents #t)/string^^J
  ragged-right = /iflily!align ##f/else ##t/fi/string^^J
  indent = /withoutpt/the/lily!indent\pt/string^^J
  line-width = /withoutpt/the/lily!linewidth\pt/string^^J
  vsize = /withoutpt/the/lily!vsize\pt/string^^J
  printpagenumber = ##f/string^^J
  oddFooterMarkup=##f/string^^J
  oddHeaderMarkup=##f/string^^J
  bookTitleMarkup = ##f/string^^J
  scoreTitleMarkup = ##f/string^^J
  ragged-bottom=##t/string^^J
  ragged-last-bottom=##t/string^^J
  between-system-padding = #0/string^^J
  between-system-space = /withoutpt/the/lily!betweensystemspace\pt/string^^J
}/string^^J
>

```

10 /egroup

Here, we define our parameters:

```

11 \newdimen\lily!linewidth
\newdimen\lily!vsize
\newdimen\lily!indent
\newdimen\lily!betweensystemspace
\newif\iflily!showempty
\newif\iflily!align
\newif\iflily!clef
\newif\iflily!time
\newif\iflily!barnumbers

```

12 \newcounter\lily!figures

Again, as usual, there is a `\setuplilypond` command that accepts the same parameters as `\lilypond` and `\startlilypond` do in their optional argument.

```

13 \def\setuplilypond
  {\bgroup
   \catcode\#=\@other
   \dosingleempty\dosetuplilypond}

```

```

14 \def\dosetuplilypond[#1]%
  {\egroup
   \getparameters[\??lily][#1]}

```

We set the following defaults:

```

15 \setuplilypond
  [staffsize=20,
   indent=0pt,
   betweensystemspace=54pt,

```

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```
time=\v!yes,
clef=\v!yes,
align=?,      % default depends on fragment=...
fragment=\v!no,
barnumbers=\v!no,
showempty=\v!no,
seriffont="TeX Gyre Schola", % LilyPond default font
sansfont="LMSans10",
monofont="LMTypewriter10",
tmpdir={./lilytemp},
imgdir={./lilypdfs}]
```

If you want to know which fonts of your system LilyPond can see with which names, try `lilypond -dshow-available-fonts any`. (The 3rd parameter is necessary, but can be anything.)

There are a lot of restrictions, e.g. no fonts from the T_EX tree (don't know why), only one face per font file etc.

Check if temporary and image directories exist and create them if not:

```
16 \def\tmpdir{\@@lilytmpdir} % for intermediate files
\def\imgdir{\@@lilyimgdir} % for music PDFs

17 \startluacode
    if not lfs.isdir("\tmpdir") then
        logs.report("LilyPond Warn ", "Temporary directory not found, trying
to make '\tmpdir' ")
        lfs.mkdir("\tmpdir")
    end
    if not lfs.isdir("\imgdir") then
        logs.report("LilyPond Warn ", "Image directory not found, trying to
make '\imgdir' ")
        lfs.mkdir("\imgdir")
    end
\stoptluacode
```

`\startlilypond` is a multistage implementation, because end-of-line characters must be treated specially in the `\startlilypond ... \stoptlilypond` range.

```
18 \def\startlilypond
    {\bgroup
     \catcode\#=\@@other
     \dosingleempty\dostartlilypond}

19 \def\dostartlilypond[#1]%
    {\obeylines
     \dodostartlilypond[#1]}

20 \long\def\dodostartlilypond[#1]#2\stoptlilypond
    {\egroup
     \bgroup
```

The default of the `linewidth` parameter is the local `\hspace`.

```

21      \setlocalhszize
        \getparameters[\??lily] [linewidth=\the\localhszize,height=\the\textheight,#1]%
        \lily!linewidth\@@lilylinewidth
        \lily!vsize\@@lilyheight
        \lily!indent\@@lilyindent
        \lily!betweensystemspace\@@lilybetweensystemspace

```

The default of `align` depends on whether we typeset a fragment:

```

22      \doifelse\@@lilyalign\v!yes\lily!aligntrue\lily!alignfalse
        \doif\@@lilyfragment\v!no{\doif\@@lilyalign{?}\lily!aligntrue}%
        \doifelse\@@lilytime\v!yes\lily!timetrue\lily!timefalse
        \doifelse\@@lilybarnumbers\v!yes\lily!barnumberstrue\lily!barnumbersfalse
        \doifelse\@@lilyshowempty\v!yes\lily!showemptytrue\lily!showemptyfalse
        \doifelse\@@lilyclef\v!yes\lily!cleftrue\lily!cleffalse

```

We are using a counter to keep the different LilyPond pieces separate. This allows to typeset them only once, during the first run.

TODO: This won't work any longer once we pass the remaining vertical space to LilyPond.

```

23      \doglobal\increment\lily!figures
        \edef\lily!filename{\bufferprefix lilypond-\lily!figures}%
        \edef\lily!tmpfilename{\tmpdir/\lily!filename.tmp}%
        \edef\lily!img{\imgdir/\lily!filename.pdf}
        \def\obeyedlines{\string^^J}%
        \convertargument#2\to\ascii
        \startexpanded
          \noexpand\setbuffer[\lily!tmpfilename]%
          \lily!prefix
          \letterhash(set-global-staff-size \getvalue{\??lily staffsize})\string^^J%
          \ifdefined\@@lilyfragment\lily!fragmentprefix\fi

```

TODO: Option 'packed'

```

24      \ascii
        \ifdefined\@@lilyfragment\lily!fragmentsuffix\fi
        \noexpand\endbuffer
        \stopexpanded

```

In Lua_T_EX buffers are kept in memory in contrast to older flavours of _T_EX where they're written to a file automatically. We have to require writing to a file explicitly with `\savebuffer`.

```

25      \writestatus{LilyPond}{\lily!filename}
        \startluacode
          buffers.save('\lily!tmpfilename')
          if not lfs.isfile('\lily!tmpfilename') then
            logs.report("LilyPond ERROR", "File '\lily!tmpfilename' was not
written!")
          end

```

Generating a PDF directly previously created always a whole page, so we generate EPS first. In recent versions of LilyPond that gets converted to PDF immediately, but we check for that.

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It would be nice, if `-ddelete-intermediate-files` would delete all useless intermediate files. It would be even better, if `mtxrun` wouldn't declare non-existing files as "unchanged". (Is that fixed now?)

Remember: More possible options in `lily.scm`.

```
26      os.execute('mtxrun --ifchanged="\lily!tmpfilename" --exec bin:lilypond
-dbackend=eps -dno-gs-load-fonts -dinclue-eps-fonts -ddelete-intermediate-files
-o"\tmpdir/\lily!filename" "\lily!tmpfilename')
      if not lfs.isfile('\tmpdir/\lily!filename.pdf') then
          os.execute('mtxrun --ifchanged="\tmpdir/\lily!filename.eps"
--exec bin:pstopdf "\tmpdir/\lily!filename.eps')
      end
```

At least on Windows, Lua's `os.rename` won't overwrite existing files, so we need to remove them before.

```
27      if lfs.isfile('\lily!img') and lfs.isfile('\tmpdir/\lily!filename.pdf')
then
          os.remove('\lily!img')
      end
      os.rename('\tmpdir/\lily!filename.pdf', '\lily!img')
\stoptluacode
```

TODO: Get the relevant dimension directly from LilyPond, to place the instrument name into the left margin for short snippets as well. (Is that possible at all?)

If we are not in the middle of some text, we have to check whether LilyPond created an image that is wider than requested: It places the instrument names in the left margin.

```
28      \ifvmode
      \getfiguredimensions[\lily!img]%
      \leavevmode
      \!!dimenb\figurewidth
      \ifdim\!!dimenb>\localhsize
      \!!dimena=\localhsize
      \advance\!!dimena-\!!dimenb
      \noindent\hskip\!!dimena
      \fi
      \fi
      \externalfigure[\lily!img]%
      \egroup}
```

For short snippets, we define an inline alternative to our start/stop pair:

```
29 \def\lilypond      {\dosingleempty\dolilypond}
\def\dolilypond[#1]#2{\startlilypond[#1]#2\stoplilypond}

30 \stopmodule

31 \protect \doifnotmode{demo}{\endinput}
```

End of file.

Here follows a sample. (`context t-lilypond --mode=demo`)


```

32 \starttext

33 \startbuffer[sample]
\subject{Telemann, TWV 40:11}
\startlilypond
  \relative c' {
    \set Staff.instrumentName = flute
    \key fis \minor
    \time 3/4
    \partial 4
    r8 fis'8 | fis4. cis8 a cis | fis, a cis fis a fis |
    b, d fis b d b | eis,, gis cis eis gis b, |
    a fis' gis, fis' cis eis | fis,4 r8
    a' gis fis | e gis, a e' fis cis |
    d fis, gis b e d | cis4 \trill r8
    cis b a | b dis e gis cis, b |
    a e' dis fis b, a | gis4 \trill r8
  }
\stoptlilypond
\stopbuffer

34 The input
\typebuffer[sample]
is typeset as
\getbuffer[sample]

35 \type{\startlilypond} accepts options, as in\crlf
\type{\startlilypond[staffsize=18, linewidth=14cm, indent=5cm, time=no, clef=no]}:
\nobreak
\startlilypond[staffsize=18,linewidth=14cm,indent=5cm,time=no,clef=no]
  \relative c' {
    \key fis \minor
    \time 3/4
    \partial 4
    r8 fis'8 | fis4. cis8 a cis | fis, a cis fis a fis |
    b, d fis b d b | eis,, gis cis eis gis b, |
    a fis' gis, fis' cis eis | fis,4 r8
    a' gis fis | e gis, a e' fis cis |
    d fis, gis b e d | cis4 \trill r8
    cis b a | b dis e gis cis, b |
    a e' dis fis b, a | gis4 \trill r8
  }
\stoptlilypond

36 It is also possible to mix text and music:
\lower 8.2pt\hbox{\lilypond[fragment=true,staffsize=16,time=no,clef=no]{g'}} is a g.

37 TODO: The \type{\lower} in the example above should not be necessary.

38 \subject{Starlight (round)}

39 Here is a sample with lyrics:

```

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```
40 \startlilypond
    <<
    \context Staff = onlyone <<
        \clef treble
        \key a \major
        \time 6/8
        \context Voice = one {
            \relative c'' {
                a4.^{\markup{1.}} e' |
                e8( d cis) b4. |
                e4.^{\markup{2.}} d4 d8 |
                cis( b) a b4 e,8 |
                a4 a8 gis( a) b |
                cis4 cis8 b( cis d) |
                cis( d) e e4 e,8 |
                fis4 fis8 gis4.
                \bar ":@"
            }
        }
    >>
    \lyricsto one \new Lyrics {
        \lyricmode {
            Star -- light, star -- bright,
            first star I see to -- night;
            I wish I may, I wish I might
            have the wish I wish to -- night.
        }
    }
    >>
41 \stoplilypond
42 \stoptext
```