

# The `attachfile2` package

Heiko Oberdiek\*

<heiko.oberdiek at googlemail.com>

2019/07/24 v2.9

## Abstract

This package can be used to attach files to a PDF document. It is a further development of Scott Pakin's package `attachfile` for pdfTeX. Apart from bug fixes, package `attachfile2` adds support for dvips, some new options, gets and writes meta information data about the attached files.

## Contents

<b>1</b>	<b>Documentation</b>	<b>2</b>
1.1	Introduction	2
1.1.1	Future development	2
1.2	User interface	3
1.2.1	New options	3
1.2.2	Option <code>color</code>	3
1.2.3	Perl script <code>pdfatfi.pl</code>	4
1.3	Changes to <code>attachfile</code>	4
<b>2</b>	<b>Implementation</b>	<b>5</b>
2.1	Package	5
2.1.1	Loading of packages	5
2.1.2	Value checking	5
2.1.3	Option declarations	7
2.1.4	Option calling	10
2.1.5	Evaluate driver options	10
2.1.6	Evaluate options <code>draft/final</code>	11
2.1.7	Load driver file	12
2.1.8	Graphics	12
2.1.9	Reading the <code>.atfi</code> file	15
2.1.10	Writing the <code>.atfi</code> file	17
2.1.11	Annotation appearance	18
2.2	Drivers	20
2.2.1	pdfTeX	20
2.3	luatex	23
2.3.1	dvips	25
2.3.2	dvipdfmx	33
2.4	Perl script <code>pdfatfi.pl</code>	37
<b>3</b>	<b>Installation</b>	<b>40</b>
3.1	Download	40
3.2	Bundle installation	41
3.3	Package installation	41
3.4	Refresh file name databases	41
3.5	Script installation	41
3.6	Some details for the interested	42

---

\*Please report any issues at <https://github.com/ho-tex/oberdiek/issues>

<b>4</b>	<b>Catalogue</b>	<b>42</b>
<b>5</b>	<b>References</b>	<b>43</b>
<b>6</b>	<b>History</b>	<b>43</b>
	[2005/02/23 v2.0] . . . . .	43
	[2005/10/07 v2.1] . . . . .	43
	[2006/08/17 v2.2] . . . . .	43
	[2007/04/11 v2.3] . . . . .	43
	[2008/07/29 v2.4] . . . . .	43
	[2009/09/25 v2.5] . . . . .	44
	[2010/09/27 v2.6] . . . . .	44
	[2012/04/18 v2.7] . . . . .	44
	[2016/05/16 v2.8] . . . . .	44
	[2019/07/24 v2.9] . . . . .	44
<b>7</b>	<b>Index</b>	<b>44</b>

# 1 Documentation

## 1.1 Introduction

The PDF format ([3]) allows the inclusion of files inside the PDF document. The included files can be bound to an annotation on a page. Or they can be recorded in a sorted list of embedded files. The packages `attachfile` or `attachfile2` follow the first approach, package `embedfile` uses the latter method.

### 1.1.1 Future development

My dream is a large package that merges the features of all these packages mentioned before:

- Files can be attached to a page.
- Files can be attached to the document.
- An easy user interface for simple, common tasks and beginners.
- An interface for the advanced users that want to setup every detail.
- Support of many drivers (pdftex, dvips, dvipdfm, ...).
- ...

However, I have not managed to take the time for this project. Instead:

- First I experimented with package `attachfile`, adding driver support, fixing bugs, .... The result is currently named as `attachfile2`. It uses an external script to get file properties (size, date, checksum, ...).
- In order to avoid an external program for getting basic file properties I provided a patch “EscapeAndOther” for pdfTeX that was accepted for version 1.30.
- Package `embedfile` closes a gap left by the packages for attaching files and allows the embedding of files to the document. Also it makes use of the new primitives of pdfTeX.

Until this future becomes true, I provide the intermediate step `attachfile2` at its current state. There are many things to do:

- Documentation, documentation, ...

- Improving portability of the Perl script `pdfatfi.pl` (Windows, non-GNU, ...).
- Comfortable program for extracting embeddd files.
- Embedding files to the document, see package `embedfile`.
- Additionally use featur of pdfTeX 1.30. With a recent pdfTeX the Perl script step is then obsolete.
- GoToE links.
- Layout of PinPush, especially the tip does not scale well.
- Driver for `dvipsone`, similar to `dvips`, changes:
  - coordinate transformation need to be fixed here, `hdvipson.def` contains:
 

```

/DvipsToPDF { 65781 div } def
/PDFToDvips { 65781 mul } def
          
```
  - Syntax for `\special`: `hdvipson.def` contains both `\special{! #1}` and `\special{headertext= #1}`. Are bothe the same?
- File name conversion, see PDF specification:
 

```

c:\somewhere\foobar.txt → /c/somewhere/foobar.txt
      
```
- Option `scale` for icons?
- Compatibility for plain TeX.
- ToDos for `atfidvips.def`.

## 1.2 User interface

Basically this package `attachfile2` follows the user interface of package `attachfile`, look into its documentation ([1]).

### 1.2.1 New options

- Driver options `dvips`, `pdftex`, `dvipdfmx` and `xetex` that is an alias for `dvipdfmx`.
- Option `driverfallback` specifies a DVI driver if the driver cannot be detected automatically.
- New options `final` and `draft`.
- New option `scale` for scaling the annotation rectangle.
- Options `file` and `nofile` for controlling the generation of the auxiliary file `.atfi`.
- New option `ucfilespec` for file names with characters outside ASCII (PDF 1.7).

### 1.2.2 Option `color`

Package `attachfile`'s option `color` only understands explicit RGB values as three space separated real numbers in the range from 0 to 1.

This package `attachfile2` extends the syntax. The usual color specifications of packages `color` or `xcolor` may be used. The latter one requires that package `xcolor` is loaded. Without package `xcolor` a limited range of explicit color specifications are supported, the color models `rgb` and `gray` (and `cmymk` if package `hyperref`'s option `pdfversion` is set to 1.7 or greater.

Example without package `xcolor`:

```

\documentclass{article}
\usepackage[color={1 0 .5}]{attachfile2}
% Spaces in option values in \usepackage or \documentclass
% must be protected by curly braces. Otherwise LaTeX strips
% the spaces and the package would see `color=10.5'.
% This protection is not necessary for \attachfilesetup.
\attachfilesetup{color=1 0 .5}
\attachfilesetup{color=[rgb]{1,0,.5}}
\attachfilesetup{color=[gray]{.5}}

```

The following example with package `xcolor` shows additional color specifications:

```

\documentclass{article}
\usepackage{xcolor}
\definecolor{attachfilecolor}{cmyk}{.1,.2,.3,.4}
\usepackage{color=red}{attachfile2}
\attachfilesetup{color=red}
\attachfilesetup{color=attachfilecolor}

```

**For experts.** If the color is used in annotations, the color is converted with the help of package `xcolor` to RGB. PDF versions 1.7 or later also understand color models Gray and CMYK. The PDF version is detected if the experimental option `pdfversion` of package `hyperref` is used, example:

```

\documentclass{article}
\usepackage[pdfversion=1.7]{hyperref}
\usepackage{attachfile2}

```

However, currently only driver `pdftex` also supports the actual setting of the PDF version in the output PDF file.

### 1.2.3 Perl script `pdfatfi.pl`

This package also tries to get and add meta information data, such as file size, file date, checksum, .... As package `embedfile` shows the new features of pdfTeX 1.30 are very useful for getting this kind of data. Since version 2.6 these data are used if available.

For older versions of pdfTeX and X<sub>Y</sub>TeX the Perl script `pdfatfi.pl` is provided to get this data. The use of the Perl script is not mandatory. This data can be shown by PDF viewers, but they are not a requirement of the PDF specification.

Package `attachfile2` and the Perl script communicate via an auxiliary file with file extension `.atfi`. The script is used between two L<sup>A</sup>T<sub>E</sub>X runs and updates the auxiliary file, example for `dvips`:

```

latex test
pdfatfi test
latex test
dvips test
ps2pdf test.ps test.pdf

```

## 1.3 Changes to `attachfile`

Some of the changes I can remember:

- Support for `dvips`.
- Support for `dvipdfmx`/X<sub>Y</sub>TeX.
- Setting and filling the `/Param` entry for files (file date, file size, ...).
- Perl script `pdfatfi.pl`.

- New options.
- Bug fixes.
- ...

## 2 Implementation

### 2.1 Package

```

1 <*package>
2 \NeedsTeXFormat{LaTeX2e}
3 \ProvidesPackage{attachfile2}%
4 [2019/07/24 v2.9 Attach files into PDF (HO)]%
```

#### 2.1.1 Loading of packages

```

5 \RequirePackage{ifpdf}[2009/04/10]
6 \RequirePackage{ifxetex}
7 \RequirePackage{ifluatex}[2009/04/10]
8 \RequirePackage{keyval}
9 \RequirePackage{color}
10 \RequirePackage{infwarerr}[2010/04/08]
11 \RequirePackage{ltxcmds}[2010/04/26]
12 \RequirePackage{kvoptions}[2009/07/21]
13 \RequirePackage{pdftexcmds}[2010/04/01]
14 \RequirePackage{pdfescape}[2007/11/11]
```

Package hyperref is needed because of \pdfstringdef.

```

15 \RequirePackage{hyperref}
16 \RequirePackage{hycolor}[2008/07/29]
```

#### 2.1.2 Value checking

\atfi@Match

```

17 \ltx@ifundefined{pdfmatch}{%
18   \def\atfi@Match#1#2#3#4#5{%
19   }{%
20     \def\atfi@Match#1#2#3{%
21       \begingroup
22       \edef\~{\ltx@backslashchar\string~}%
23       \edef\.{\ltx@backslashchar.}%
24       \let\#\ltx@hashchar
25       \edef\{ {\ltx@backslashchar[]}%
26       \edef\$ {\ltx@backslashchar$}%
27       \let\%\ltx@percentchar
28       \edef\& {\ltx@backslashchar&}%
29       \edef\({\ltx@backslashchar(}%
30       \edef\){\ltx@backslashchar)}%
31       \edef\| {\ltx@backslashchar|}%
32       \edef\* {\ltx@backslashchar*}%
33       \edef\+ {\ltx@backslashchar+}%
34       \edef\? {\ltx@backslashchar?}%
35       \edef\{ {\ltx@backslashchar\ltx@leftbracechar}%
36       \edef\} {\ltx@rightbracechar}%
37       \edef\\ {\ltx@backslashchar\ltx@backslashchar}%
38       \edef\~ {\ltx@backslashchar}%
39       \ifcase\pdfmatch#3{#2}{#1} %
40         \endgroup
41         \expandafter\ltx@secondoftwo
42       \or
43         \endgroup
44         \expandafter\ltx@firstoftwo
45       \else
```

```

46   \atfi@Warning{%
47     Internal error: Wrong pattern!\MessageBreak
48     --> #2 <--\MessageBreak
49     Pattern check ignored%
50   }%
51   \endgroup
52   \expandafter\ltx@firstoftwo
53   \fi
54 }%

\atfi@PatToken
55 \def\atfi@PatToken{%
56   [%
57   -% first character
58   !%
59   \#$\%\&'%
60   *\+\.%
61   0-9%
62   A-Z%
63   \_`%
64   a-z%
65   \{\}\|\~%
66   ]+%
67 }%

\atfi@CR
68 \begingroup
69 \lccode64=13 % @
70 \lowercase{\endgroup
71 \def\atfi@CR{@}%
72 }%

\atfi@PatQuotedString
73 \def\atfi@PatQuotedString{%
74   "%
75   ([^"\\ \atfi@CR]|\|.)*%
76   "%
77   }%

78 \ltx@ifpackagelater{ltxcmds}{2010/09/11}{\}{\}%

\atfi@ltx@leftbracechar
79 \begingroup
80 \lccode`0=`{\relax
81 \lowercase{\endgroup
82 \def\ltx@leftbracechar{0}%
83 }%

\ltx@rightbracechar
84 \begingroup
85 \lccode`0=`}\relax
86 \lowercase{\endgroup
87 \def\ltx@rightbracechar{0}%
88   }%

89 }%
90 }

\atfi@Warning
91 \def\atfi@Warning{\PackageWarning{attachfile2}}

```

### 2.1.3 Option declarations

```

92 \SetupKeyvalOptions{%
93   family=AtFi,%
94   prefix=atfi@%
95 }

\atfi@setup

96 \def\atfi@setup{\setkeys{AtFi}}

Options draft and final.
97 \DeclareBoolOption{draft}
98 \DeclareComplementaryOption{final}{draft}

Option mimetype.

\atfi@mimetype

99 \def\atfi@mimetype{}

100 \define@key{AtFi}{mimetype}{%
101   \edef\atfi@mimetype{#1}%
102   \ifx\atfi@mimetype\ltx@empty
103     \else
104       \atfi@Match\atfi@mimetype{%
105         ^ (application|audio|image|model|text|video|x-\atfi@PatToken)%
106         /%
107         ([a-z\-\+\_\.\0-9]+)%
108         (; ?\atfi@PatToken=(\atfi@PatToken|\atfi@PatQuotedString))*$%
109       }{icase}{%
110         \atfi@Warning{%
111           Invalid value `~\atfi@mimetype'\MessageBreak
112           of option `mimetype'.\MessageBreak
113           Value is discarded%
114         }%
115         \let\atfi@mimetype\ltx@empty
116       }%
117     \fi
118   \ifx\atfi@mimetype\ltx@empty
119     \else
120       \EdefEscapeName\atfi@mimetype{\atfi@mimetype}%
121       \edef\atfi@mimetype{/Subtype/\atfi@mimetype}%
122     \fi
123 }

Option icon

124 \define@key{AtFi}{icon}{%
125   \def\atfi@icon{/Name/#1}%
126   \def\atfi@icon@icon{#1}%
127 }
128 \atfi@setup{icon=PushPin}

Option color

129 \define@key{AtFi}{color}{%
130   \HyColor@AttachfileColor{#1}%
131   \atfi@color@tex\atfi@color@inline\atfi@color@annot
132   {attachfile2}{color}%
133 }
134 \atfi@setup{color=1 0.9255 0.7765}

time options timezone and date

\atfi@pad@ii

135 \def\atfi@pad@ii#1{%
136   \ifnum#1>9 %
137     \number#1%

```

```

138 \else
139   0\number#1%
140 \fi%
141 }

atfi@timezone

142 \let\atfi@timezone\ltx@empty

143 \define@key{AtFi}{timezone}{\def\atfi@timezone{#1}}

\atfi@time

144 \edef\atfi@time{\the\time}

\atfi@hours

145 \def\atfi@hours{%
146   \numexpr\dimexpr0.01667\dimexpr\atfi@time sp\relax\relax\relax
147 }

\atfi@minutes

148 \def\atfi@minutes{%
149   \numexpr\atfi@time-60*\atfi@hours\relax
150 }

\atfi@seconds

151 \def\atfi@seconds{0}

\atfi@date

152 \def\atfi@date{%
153   /M(D:\the\year
154     \atfi@pad@ii\month
155     \atfi@pad@ii\day
156     \atfi@pad@ii\atfi@hours
157     \atfi@pad@ii\atfi@minutes
158     \atfi@pad@ii\atfi@seconds
159     \atfi@timezone)%
160 }

161 \define@key{AtFi}{date}{%
162   \EdefEscapeString\atfi@date{#1}%
163   \edef\atfi@date{/M(\atfi@date)}%
164 }

Text options author, description, and subject

\atfi@pdfstringdef

165 \DeclareRobustCommand{\atfi@pdfstringdef}[2]{%
166   \pdfstringdef\atfi@temp@string{#2}%
167   \edef#1{\atfi@temp@string}%
168 }

\atfi@NoValue

169 \def\atfi@NoValue{\NoValue}

\atfi@DefNoValueName

170 \def\atfi@DefNoValueName#1#2#3{%
171   \def#1{#3}%
172   \ifx#1\atfi@NoValue
173     \let#1\ltx@empty
174   \else
175     \atfi@pdfstringdef#1{#1}%
176     \edef#1{/#2(#1)}%
177   \fi
178 }

```



Name for annotation to be used in GoToE actions

`\atfi@annotname`

```
179 \let\atfi@annotname\ltx@empty
180 \define@key{AtFi}{annotname}[\NoValue]{%
181   \atfi@DefNoValueName\atfi@annotname{NM}{#1}%
182 }
```

Option author.

`\atfi@author`

```
183 \def\atfi@author{}
184 \define@key{AtFi}{author}[\NoValue]{%
185   \atfi@DefNoValueName\atfi@author{T}{#1}%
186 }
```

Option description.

`\atfi@description`

```
187 \def\atfi@description{}
188 \define@key{AtFi}{description}[\NoValue]{%
189   \atfi@DefNoValueName\atfi@description{Contents}{#1}%
190 }
```

Option subject.

`\atfi@subject`

```
191 \def\atfi@subject{}
192 \define@key{AtFi}{subject}[\NoValue]{%
193   \atfi@DefNoValueName\atfi@subject{Subj}{#1}%
194 }
```

Option print.

```
195 \DeclareBoolOption[true]{print}
```

Option zoom.

```
196 \DeclareBoolOption[true]{zoom}
```

Option appearance.

```
197 \DeclareBoolOption[true]{appearance}
```

Option scale.

```
198 \DeclareStringOption[1]{scale}
```

Option ucfilespec.

`\atfi@ucfilespec`

```
199 \def\atfi@ucfilespec{}
200 \define@key{AtFi}{ucfilespec}[1]{%
201   \def\atfi@ucfilespec{#1}%
202   \ifx\atfi@ucfilespec\ltx@empty
203     \else
204       \atfi@pdfstringdef\atfi@ucfilespec{#1}%
205     \fi
206 }
```

Option nofiles.

```
207 \DeclareBoolOption{nofiles}
```

Driver options.

```
208 \let\atfi@driver\ltx@empty
209 \def\atfi@driver@pdftex{pdftex}
210 \def\atfi@driver@luatex{luatex}
211 \def\atfi@driver@dvijs{dvips}
212 \def\atfi@driver@dvijs{dvipdfmx}
```

```

213 \DeclareVoidOption{pdftex}{%
214 \ifpdf
215 \let\atfi@driver\atfi@driver@pdftex
216 \else
217 \let\atfi@driver\ltx@empty
218 \PackageError{attachfile2}{%
219   Wrong driver option `pdftex',\MessageBreak
220   because pdfTeX in PDF mode is not detected%
221 }{\@ehc
222 \fi
223 }
224 \DeclareVoidOption{luatex}{%
225 \let\atfi@driver\atfi@driver@luatex
226 }
227 \DeclareVoidOption{dvips}{%
228 \let\atfi@driver\atfi@driver@dvips
229 }
230 \DeclareVoidOption{dviPDFmx}{%
231 \let\atfi@driver\atfi@driver@dviPDFmx
232 }
233 \DeclareVoidOption{xetex}{%
234 \let\atfi@driver\atfi@driver@dviPDFmx
235 }
236 \DeclareStringOption{driverfallback}

\attachfilesetup
237 \DeclareRobustCommand{\attachfilesetup}[1]{\setkeys{AtFi}{#1}}

238 \DeclareLocalOptions{%
239   annotname,%
240   appearance,%
241   author,%
242   color,%
243   date,%
244   description,%
245   icon,%
246   mimetype,%
247   nofiles,%
248   print,%
249   scale,%
250   subject,%
251   timezone,%
252   ucfilespec,%
253   zoom,%
254 }

```

#### 2.1.4 Option calling

Timezone setting, ...

```

255 \InputIfFileExists{attachfile.cfg}{-}{-}
256 \ProcessKeyvalOptions*

```

\atfi@DisableOption

```

257 \def\atfi@DisableOption{%
258   \DisableKeyvalOption[action=error,package=attachfile2]{AtFi}%
259 }

```

#### 2.1.5 Evaluate driver options

```

260 \ifpdf
261 \ifluatex
262 \let\atfi@driver\atfi@driver@luatex

```

```

263 \else
264 \let\atfi@driver\atfi@driver@pdftex
265 \fi
266 \else
267 \ifxetex
268 \let\atfi@driver\atfi@driver@dvipdfmx
269 \else
270 \ifx\atfi@driver\ltx@empty
271 \ifx\atfi@driverfallback\ltx@empty
272 \else
273 \expandafter\let\expandafter\atfi@driver
274 \csname atfi@driver@\atfi@driverfallback\endcsname
275 \ifx\atfi@driver\atfi@driver@dvi
276 \else
277 \ifx\atfi@driver\atfi@driver@dvipdfmx
278 \else
279 \let\atfi@driver\ltx@empty
280 \PackageWarningNoLine{attachfile2}{%
281 Option `driverfallback' with unsupported\MessageBreak
282 DVI driver (\atfi@driverfallback)%
283 }%
284 \fi
285 \fi
286 \fi
287 \ifx\atfi@driver\ltx@empty
288 \PackageWarningNoLine{attachfile2}{%
289 Driver is not specified,\MessageBreak
290 enforce draft settings%
291 }%
292 \atfi@drafttrue
293 \fi
294 \fi
295 \fi
296 \fi

297 \atfi@DisableOption{pdftex}
298 \atfi@DisableOption{dvips}
299 \atfi@DisableOption{dvipdfmx}
300 \atfi@DisableOption{xetex}
301 \atfi@DisableOption{driverfallback}

```

### 2.1.6 Evaluate options draft/final

\notextattachfile

```

302 \DeclareRobustCommand{\notextattachfile}[2][]{%
303 \begingroup
304 \atfi@setup{#1}%
305 \ifatfi@print
306 \leavevmode
307 \begingroup
308 \HyColor@UseColor\atfi@color@tex
309 #2\strut
310 \endgroup
311 \else
312 \sbox\ltx@zero{#2\strut}%
313 \makebox[\wd0]{}%
314 \fi
315 \endgroup
316 }

317 \atfi@DisableOption{draft}%
318 \atfi@DisableOption{final}%
319 \ifatfi@draft
320 \def\atfi@dummyspin{pushpin}%

```

```

321 \raisebox{-1.25bp}{\parbox[b]{14bp}{24bp}{}}%
322 }%
323 \DeclareRobustCommand{\textattachfile}[3][{}%
324 \notextattachfile[#1]{#3}%
325 }%
326 \DeclareRobustCommand{\noattachfile}[1][{}%
327 \notextattachfile[#1]{\atfi@dummy@pushpin}%
328 }%
329 \DeclareRobustCommand{\attachfile}[2][{}%
330 \noattachfile[#1]%
331 }%
332 \expandafter\endinput
333 \fi

```

### 2.1.7 Load driver file

```
334 \input{\atfi-driver.def}
```

### 2.1.8 Graphics

\atfi@acroGraph@data

```

335 \def\atfi@acroGraph@data{%
336 \atfi@GSAVE
337 0.5 \atfi@SETGRAYFILL
338 1.1133 0 20.7202 18.2754 \atfi@RECTFILL
339 0 \atfi@SETFLAT
340 0.5 \atfi@SETLINEWIDTH
341 4 \atfi@SETMITERLIMIT
342 \atfi@RECTSTROKEFILL{%
343 1 \atfi@SETGRAYFILL
344 }{%
345 0 \atfi@SETGRAYSTROKE
346 }{%
347 0.25 1.6453 20.145 17.7715 %
348 }%
349 0 \atfi@SETGRAYFILL
350 2.7319 4.1367 3.9571 13.8867 \atfi@RECTFILL
351 8.7031 4.1367 3.9571 9.8867 \atfi@RECTFILL
352 14.7471 4.1367 3.9571 11.8867 \atfi@RECTFILL
353 \atfi@color@inline{FILL}%
354 1.689 3.0938 3.9571 13.8867 \atfi@RECTFILL
355 7.6602 3.0938 3.9571 9.8867 \atfi@RECTFILL
356 13.7041 3.0938 3.9571 11.8867 \atfi@RECTFILL
357 \atfi@GRESTORE
358 }

```

\atfi@acroGraph

```

359 \def\atfi@acroGraph{%
360 \raisebox{-1.5bp}{\parbox[b]{20bp}{22bp}{}%
361 \rule{0pt}{0pt}\atfi@literal{\atfi@acroGraph@data}}%
362 }%
363 }

```

\atfi@acroPaperclip@data

```

364 \newcommand{\atfi@acroPaperclip@data}{%
365 \atfi@GSAVE
366 0.75 \atfi@SETGRAYSTROKE
367 0 \atfi@SETFLAT
368 2.5 \atfi@SETLINEWIDTH
369 1 \atfi@SETLINECAP
370 4 \atfi@SETMITERLIMIT
371 1.9619 11.7559 \atfi@MOVETO
372 1.9619 3.3037 1.9619 2.5059 \atfi@CURVETO

```

```

373 1.9619 1.707 4.0947 1.25 \atfi@CURVETOY
374 7.4141 1.25 \atfi@LINETO
375 9.4292 1.8223 9.4292 3.3066 \atfi@CURVETOY
376 9.4292 4.79 9.4292 16.8945 \atfi@CURVETOY
377 9.7852 18.1514 8.481 18.1514 \atfi@CURVETOY
378 7.1768 18.1514 5.1616 18.1514 \atfi@CURVETOY
379 3.8574 17.9209 3.8574 16.8945 \atfi@CURVETOY
380 3.8574 15.8652 3.8574 6.6172 \atfi@CURVETOY
381 4.3325 5.418 5.1025 5.418 \atfi@CURVETOY
382 5.8726 5.418 6.5845 5.418 \atfi@CURVETOY
383 7.6812 5.6455 7.6812 6.4736 \atfi@CURVETOY
384 7.6812 7.3027 7.6812 11.5264 \atfi@CURVETOY
385 \atfi@STROKE
386 0 \atfi@SETGRAYSTROKE
387 1.2495 12.4404 \atfi@MOVETO
388 1.2495 3.9883 1.2495 3.1895 \atfi@CURVETOY
389 1.2495 2.3906 3.3833 1.9326 \atfi@CURVETOY
390 6.7026 1.9326 \atfi@LINETO
391 8.7178 2.5068 8.7178 3.9902 \atfi@CURVETOY
392 8.7178 5.4736 8.7178 17.5781 \atfi@CURVETOY
393 9.0732 18.834 7.769 18.834 \atfi@CURVETOY
394 6.4653 18.834 4.4497 18.834 \atfi@CURVETOY
395 3.146 18.6055 3.146 17.5781 \atfi@CURVETOY
396 3.146 16.5498 3.146 7.3018 \atfi@CURVETOY
397 3.6201 6.1016 4.3911 6.1016 \atfi@CURVETOY
398 5.1611 6.1016 5.873 6.1016 \atfi@CURVETOY
399 6.9692 6.3301 6.9692 7.1572 \atfi@CURVETOY
400 6.9692 7.9863 6.9692 12.21 \atfi@CURVETOY
401 \atfi@STROKE
402 \atfi@color@inline{STROKE}%
403 1 \atfi@SETLINEWIDTH
404 1.2495 12.4404 \atfi@MOVETO
405 1.2495 3.9883 1.2495 3.1895 \atfi@CURVETOY
406 1.2495 2.3906 3.3833 1.9326 \atfi@CURVETOY
407 6.7026 1.9326 \atfi@LINETO
408 8.7178 2.5068 8.7178 3.9902 \atfi@CURVETOY
409 8.7178 5.4736 8.7178 17.5781 \atfi@CURVETOY
410 9.0732 18.834 7.769 18.834 \atfi@CURVETOY
411 6.4653 18.834 4.4497 18.834 \atfi@CURVETOY
412 3.146 18.6055 3.146 17.5781 \atfi@CURVETOY
413 3.146 16.5498 3.146 7.3018 \atfi@CURVETOY
414 3.6201 6.1016 4.3911 6.1016 \atfi@CURVETOY
415 5.1611 6.1016 5.873 6.1016 \atfi@CURVETOY
416 6.9692 6.3301 6.9692 7.1572 \atfi@CURVETOY
417 6.9692 7.9863 6.9692 12.21 \atfi@CURVETOY
418 \atfi@STROKE
419 \atfi@GRESTORE
420 }

```

\atfi@acroPaperclip

```

421 \def\atfi@acroPaperclip{%
422 \raisebox{-1.25bp}{\parbox[b][21bp]{12bp}{%
423 \rule{0pt}{0pt}\atfi@literal{\atfi@acroPaperclip@data}}}%
424 }%
425 }

```

\atfi@acroPushPin@data

```

426 \def\atfi@acroPushPin@data{%
427 \atfi@GSAVE
428 1 \atfi@SETLINEWIDTH
429 1 6 \atfi@MOVETO
430 11 6 \atfi@LINETO
431 11 13 \atfi@LINETO

```

```

432 12 13 \atfi@LINETO
433 14 11 \atfi@LINETO
434 21 11 \atfi@LINETO
435 22 12 \atfi@LINETO
436 23 12 \atfi@LINETO
437 23 2 \atfi@LINETO
438 22 2 \atfi@LINETO
439 21 3 \atfi@LINETO
440 14 3 \atfi@LINETO
441 12 1 \atfi@LINETO
442 11 1 \atfi@LINETO
443 11 6 \atfi@LINETO
444 \atfi@FILLSTROKE{%
445 \atfi@color@inline{FILL}}%
446 }{%
447 0 \atfi@SETGRAYSTROKE
448 }%
449 0.5 \atfi@SETGRAYSTROKE
450 0 7 \atfi@MOVETO
451 10 7 \atfi@LINETO
452 10 8 \atfi@LINETO
453 1 8 \atfi@LINETO
454 \atfi@STROKE
455 1 \atfi@SETGRAYSTROKE
456 12 12 \atfi@MOVETO
457 14 10 \atfi@LINETO
458 22 10 \atfi@LINETO
459 22 11 \atfi@LINETO
460 \atfi@STROKE
461 \atfi@GRESTORE
462 }

```

\atfi@acroPushPin

```

463 \def\atfi@acroPushPin{%
464 \raisebox{-1.25bp}{\parbox[b][14bp]{24bp}}{%
465 \rule{0pt}{0pt}\atfi@literal{\atfi@acroPushPin@data}}%
466 }%
467 }

```

\atfi@acroTag@data

```

468 \def\atfi@acroTag@data{%
469 \atfi@GSAVE
470 0.5 \atfi@SETGRAYFILL
471 10.0542 14.9873 \atfi@MOVETO
472 24.27 14.9873 \atfi@LINETO
473 25.252 14.0059 \atfi@LINETO
474 25.252 1.1455 \atfi@LINETO
475 24.1064 0 \atfi@LINETO
476 9.9609 0 \atfi@LINETO
477 6.0327 6.0088 \atfi@LINETO
478 6.0327 9.002 \atfi@LINETO
479 10.0542 14.9873 \atfi@LINETO
480 9.3994 9.376 \atfi@MOVETO
481 8.5215 9.376 7.8096 8.5596 7.8096 7.5527 \atfi@CURVETO
482 7.8096 6.5449 8.5215 5.7285 9.3994 5.7285 \atfi@CURVETO
483 10.2778 5.7285 10.9897 6.5449 10.9897 7.5527 \atfi@CURVETO
484 10.9897 8.5596 10.2778 9.376 9.3994 9.376 \atfi@CURVETO
485 \atfi@CLOSEPATH
486 \atfi@FILL
487 0 \atfi@SETFLAT
488 0.5 \atfi@SETLINEWIDTH
489 4 \atfi@SETMITERLIMIT
490 1 \atfi@SETLINEJOIN

```

```

491 8.5107 16.5313 \atfi@MOVETO
492 22.7266 16.5313 \atfi@LINETO
493 23.7085 15.5488 \atfi@LINETO
494 23.7085 2.6895 \atfi@LINETO
495 22.563 1.543 \atfi@LINETO
496 8.4175 1.543 \atfi@LINETO
497 4.4893 7.5527 \atfi@LINETO
498 4.4893 10.5449 \atfi@LINETO
499 8.5107 16.5313 \atfi@LINETO
500 7.856 10.9199 \atfi@MOVETO
501 6.978 10.9199 6.2661 10.1035 6.2661 9.0957 \atfi@CURVETO
502 6.2661 8.0879 6.978 7.2715 7.856 7.2715 \atfi@CURVETO
503 8.7344 7.2715 9.4463 8.0879 9.4463 9.0957 \atfi@CURVETO
504 9.4463 10.1035 8.7344 10.9199 7.856 10.9199 \atfi@CURVETO
505 \atfi@CLOSEPATH
506 \atfi@FILLSTROKE{%
507   \atfi@color@inline{FILL}}%
508 }{%
509   0 \atfi@SETGRAYSTROKE
510 }%
511 1 \atfi@SETLINEWIDTH
512 12.3291 12.2656 \atfi@MOVETO
513 21.1206 12.2656 \atfi@LINETO
514 \atfi@STROKE
515 12.3291 9.1797 \atfi@MOVETO
516 21.1206 9.1797 \atfi@LINETO
517 \atfi@STROKE
518 12.3291 6.1875 \atfi@MOVETO
519 21.1206 6.1875 \atfi@LINETO
520 \atfi@STROKE
521 % 0 \atfi@SETGRAYSTROKE % redundant?
522 0.5 \atfi@SETLINEWIDTH
523 0 9.0488 \atfi@MOVETO
524 6.2661 9.0957 \atfi@LINETO
525 \atfi@STROKE
526 1.4028 5.2148 \atfi@MOVETO
527 1.4028 9.6094 \atfi@LINETO
528 1.6831 10.6387 2.4316 10.6387 \atfi@CURVETO
529 3.6475 10.6387 3.5542 9.0488 \atfi@CURVETO
530 \atfi@STROKE
531 \atfi@GRESTORE
532 }

```

\atfi@acroTag

```

533 \def\atfi@acroTag{%
534   \raisebox{-1.6bp}{\parbox[b]{17bp}{25bp}}{%
535     \rule{0pt}{0pt}\atfi@literal{\atfi@acroTag@data}}}%
536   }%
537 }

```

### 2.1.9 Reading the .atfi file

Commands used in \jobname.atfi:

- attachfile@timezone{<timezone in PDF format>}
- \attachfile@file[
 Size=<size>,
 CreationDate=<date>, % <date> local time without "D:" and timezone
 ModDateTZ=<date+TZ>,
 ModDate=<date>,
 CheckSum=<checksum>
 ]{<filename as hex string>}

\attachfile@timezone

```
538 \def\attachfile@timezone#1{%  
539   \ifx\\#1\\%  
540     % no timezone information given  
541   \else  
542     \def\atfi@timezone{#1}%  
543   \fi  
544 }
```

\attachfile@file

```
545 \newcommand*{\attachfile@file}[2][]{%  
546   \edef\unescapehex\atfi@filename{#2}%  
547   \ifx\atfi@filename\ltx@empty  
548     \PackageError{attachfile2}{Empty file name}\@ehc  
549   \else  
550     \@namedef{atfi@file@\atfi@filename}{#1}%  
551   \fi  
552 }  
  
553 \InputIfFileExists{\jobname.atfi}{-}{-}%  
  
554 \newif\ifatfi@checksum  
555 \define@key{AtFi@file}{Checksum}{%  
556   \atfi@checksumtrue  
557   \edef\atfi@params{\atfi@params/Checksum<#1>}%  
558 }  
  
559 \newif\ifatfi@creationdate  
560 \define@key{AtFi@file}{CreationDateTZ}{%  
561   \ifatfi@creationdate  
562   \else  
563     \atfi@creationdatetrue  
564     \edef\atfi@params{%  
565       \atfi@params  
566       /CreationDate(#1)%  
567     }%  
568   \fi  
569 }  
  
570 \define@key{AtFi@file}{CreationDate}{%  
571   \ifatfi@creationdate  
572   \else  
573     \atfi@creationdatetrue  
574     \edef\atfi@params{%  
575       \atfi@params  
576       /CreationDate(#1\atfi@timezone)%  
577     }%  
578   \fi  
579 }  
  
580 \newif\ifatfi@moddate  
581 \define@key{AtFi@file}{ModDateTZ}{%  
582   \ifatfi@moddate  
583   \else  
584     \atfi@moddatetrue  
585     \edef\atfi@params{%  
586       \atfi@params  
587       /ModDate(#1)%  
588     }%  
589   \fi  
590 }  
  
591 \define@key{AtFi@file}{ModDate}{%  
592   \ifatfi@moddate  
593   \else
```



```

594 \atfi@moddatetrue
595 \edef\atfi@params{%
596 \atfi@params
597 /ModDate(D:#1\atfi@timezone)%
598 }%
599 \fi
600 }

```

\atfi@pdftexdata

```

601 \let\atfi@temp\ltx@one
602 \ltx@ifundefined{pdf@filesize}{%
603 \let\atfi@temp\ltx@zero
604 }{}
605 \ltx@ifundefined{pdf@filemoddate}{%
606 \let\atfi@temp\ltx@zero
607 }{}
608 \ltx@ifundefined{pdf@filemdfivesum}{%
609 \let\atfi@temp\ltx@zero
610 }{}
611 \ifcase\atfi@temp
612 \let\atfi@pdftexdata\ltx@gobble
613 \or
614 \def\atfi@pdftexdata#1{%
615 \edef\atfi@temp{\pdf@filesize{#1}}%
616 \ifx\atfi@temp\ltx@empty
617 \else
618 \setkeys{AtFi@file}{Size=\atfi@temp}%
619 \edef\atfi@temp{\pdf@filemoddate{#1}}%
620 \ifx\atfi@temp\ltx@empty
621 \else
622 \setkeys{AtFi@file}{ModDateTZ=\atfi@temp}%
623 \fi
624 \edef\atfi@temp{\pdf@filemdfivesum{#1}}%
625 \ifx\atfi@temp\ltx@empty
626 \else
627 \setkeys{AtFi@file}{Checksum=\atfi@temp}%
628 \fi
629 \fi
630 }%
631 \fi

```

### 2.1.10 Writing the .atfi file

Respect \nofiles and option nofiles. \nofiles has more weight than option nofiles.

```

632 \if@filesw
633 \else
634 \atfi@nofilestrue
635 \fi
636 \ifatfi@nofiles
637 \PackageInfo{attachfile2}{%
638 File `\'jobname.atfi' will not be written because of\MessageBreak
639 \string\nofiles\space or option `nofiles'%
640 }%

```

\atfi@writefile

```

641 \let\atfi@writefile\ltx@gobble

642 \else

```

\atfi@stream

```

643 \newwrite\atfi@stream

```

```

644 \immediate\openout\atfi@stream=\jobname.atfi\relax
645 \immediate\write\atfi@stream{%
646   \string\attachfile@timezone{\atfi@timezone}%
647 }%

\atfi@writefile

648 \def\atfi@writefile#1{%
649   \begingroup
650   \EdefEscapeHex\atfi@temp{#1}%
651   \immediate\write\atfi@stream{%
652     \string\attachfile@file[
653       \ltx@ifundefined{atfi@file@#1}{\@nameuse{atfi@file@#1}}%
654     ]{\atfi@temp}%
655   }%
656   \endgroup
657 }%

658 \fi
659 \atfi@DisableOption{nofiles}

\atfi@attachfile

660 \def\atfi@attachfile#1#2{%
661   \ltx@ifundefined{atfi@fileobj@#2}{%
662     \atfi@writefile{#2}%
663   }{%
664     % don't need duplicates
665   }%
666   \atfi@setup{#1}%
667   \atfi@embedfile{#2}%
668   \atfi@set@appearance@icon
669   \atfi@flags@to@int
670   \atfi@insert@file@annot{#2}%
671   \endgroup
672 }

```

### 2.1.11 Annotation appearance

```

\atfi@appearancewidth

673 \newlength{\atfi@appearancewidth}

\atfi@appearanceheight

674 \newlength{\atfi@appearanceheight}

\atfi@appearancedepth

675 \newlength{\atfi@appearancedepth}

\atfi@appearancebox

676 \newsavebox{\atfi@appearancebox}

\atfi@set@appearance@icon

677 \def\atfi@set@appearance@icon{%
678   \ltx@ifundefined{atfi@appobj@\atfi@icon@icon}{%
679     \savebox{\atfi@appearancebox}{%
680       \@nameuse{atfi@acro\atfi@icon@icon}%
681     }%
682     \expandafter
683     \xdef\csname atfi@appwidth@\atfi@icon@icon\endcsname{%
684       \the\wd\atfi@appearancebox
685     }%
686     \expandafter
687     \xdef\csname atfi@appheight@\atfi@icon@icon\endcsname{%
688       \the\ht\atfi@appearancebox

```

```

689 }%
690 \expandafter
691 \xdef\csname atfi@appdepth@\atfi@icon@icon\endcsname{%
692   \the\dp\atfi@appearancebox
693 }%
694 \atfi@xform@icon
695 \global\expandafter\let
696   \csname atfi@appobj@\atfi@icon@icon\endcsname
697   \atfi@appearanceobj
698 }{%
699 }%
700 % optimization: \setlength dropped
701 \atfi@appearancewidth=%
702   \@nameuse{atfi@appwidth@\atfi@icon@icon}\relax
703 \atfi@appearanceheight=%
704   \@nameuse{atfi@appheight@\atfi@icon@icon}\relax
705 \atfi@appearancedepth=%
706   \@nameuse{atfi@appdepth@\atfi@icon@icon}\relax
707 \expandafter\let\expandafter\atfi@appearanceobj
708   \csname atfi@appobj@\atfi@icon@icon\endcsname
709 }

```

\atfi@set@appearance

```

710 \def\atfi@set@appearance#1{%
711   \savebox{\atfi@appearancebox}{#1}%
712   \atfi@appearancewidth=\wd\atfi@appearancebox
713   \atfi@appearanceheight=\ht\atfi@appearancebox
714   \atfi@appearancedepth=\dp\atfi@appearancebox
715   \atfi@xform
716 }

```

```

717 \newcounter{atfi@flags}

```

\atfi@flags@to@int

```

718 \DeclareRobustCommand{\atfi@flags@to@int}{%
719   \setcounter{atfi@flags}{0}%
720   \ifatfi@print
721     \addtocounter{atfi@flags}{4}%
722   \fi%
723   \ifatfi@zoom
724     \else
725     \addtocounter{atfi@flags}{8}%
726   \fi%
727 }

```

\atfi@textattachfile

```

728 \def\atfi@textattachfile#1#2{%
729   \endgroup
730   \atfi@textattachfile@i{#1}{#2}%
731 }

```

\atfi@textattachfile@i

```

732 \def\atfi@textattachfile@i#1#2#3{%
733   \ltx@ifundefined{atfi@fileobj@#2}{%
734     \atfi@writefile{#2}%
735   }{%
736     % don't need duplicates
737   }%
738   \atfi@setup{#1}%
739   \atfi@embedfile{#2}%
740   \atfi@set@appearance{%
741     \leavevmode

```

```

742     \begingroup
743     \HyColor@UseColor\atfi@color@tex
744     #3\strut
745     \endgroup
746 }%
747 \atfi@flags@to@int
748 \atfi@insert@file@annot{#2}%
749 \endgroup
750 }

\attachfile
751 \DeclareRobustCommand{\attachfile}[1][]{%
752   \begingroup
753   \let\do\@makeoother
754   \dospecials
755   \catcode`\{=1\relax
756   \catcode`\}=2\relax
757   \atfi@attachfile{#1}%
758 }

\textattachfile
759 \DeclareRobustCommand{\textattachfile}[1][]{%
760   \begingroup
761   \begingroup
762   \let\do\@makeoother
763   \dospecials
764   \catcode`\{=1\relax
765   \catcode`\}=2\relax
766   \atfi@textattachfile{#1}%
767 }

\noattachfile
768 \DeclareRobustCommand{\noattachfile}[1][]{%
769   \begingroup
770   \atfi@setup{#1}%
771   \atfi@set@appearance@icon
772   \ifatfi@print
773     \expandafter
774     \atfi@refxform\csname atfi@appobj@\atfi@icon@icon\endcsname
775   \else
776     \makebox[\atfi@appearancewidth]{}%
777   \fi
778   \endgroup
779 }

780 \</package>

```

## 2.2 Drivers

### 2.2.1 pdfTeX

```

781 \< *pdftex>
782 \NeedsTeXFormat{LaTeX2e}
783 \ProvidesFile{atfi-pdftex.def}%
784 [2019/07/24 v2.9 attachfile2 driver for pdfTeX (HO)]%

```

#### Macros for graphics data

```

\atfi@literal
785 \let\atfi@literal\pdfliteral
786 \def\atfi@GSAVE{q }
787 \def\atfi@GRESTORE{Q }

```

```

788 \def\atfi@SETLINEWIDTH{w }
789 \def\atfi@LINETO{l }
790 \def\atfi@MOVETO{m }
791 \def\atfi@STROKE{S }
792 \def\atfi@FILL{f }
793 % \atfi@FILLSTROKE{<fill color>}{<stroke color>}
794 \def\atfi@FILLSTROKE#1#2{#1#2B }

```

color: uppercase are stroke colors, lowercase non-stroke (fill) colors PS, however, does not different between stroke and not-stroke colors

```

795 \def\atfi@SETRGBCOLORSTROKE{RG }
796 \def\atfi@SETRGBCOLORFILL{rg }
797 \def\atfi@SETGRAYSTROKE{G }
798 \def\atfi@SETGRAYFILL{g }
799 \def\atfi@SETCMYKCOLORSTROKE{K }
800 \def\atfi@SETCMYKCOLORFILL{k }
801 \def\atfi@RECTFILL{re f }
802 \def\atfi@RECTSTROKEFILL#1#2#3{#1#2#3re B }
803 \def\atfi@SETMITERLIMIT{M }
804 \def\atfi@SETFLAT{i }
805 \def\atfi@SETLINECAP{J }
806 \def\atfi@CURVETO{c }
807 \def\atfi@CURVETOv{v }
808 \def\atfi@CURVETOY{y }
809 \def\atfi@CLOSEPATH{h }
810 \def\atfi@SETLINEJOIN{j }

```

## File embedding

```

811 \define@key{AtFi@file}{Size}{%
812   \edef\atfi@params{\atfi@params/Size #1}%
813 }

```

\atfi@embedfile

```

814 \def\atfi@embedfile#1{%
815   \ltx@ifundefined{atfi@fileobj@#1}{%
816     \begingroup
817       \let\atfi@params\ltx@empty
818       \expandafter\let\expandafter\atfi@temp
819         \csname atfi@file@#1\endcsname
820       \ifx\atfi@temp\ltx@empty
821         \let\atfi@temp\relax
822       \fi
823       \ifx\atfi@temp\relax
824         \atfi@pdfTeXdata{#1}%
825       \else
826         \edef\x{%
827           \noexpand\setkeys{AtFi@file}{\@nameuse{atfi@file@#1}}%
828         }%
829         \x
830       \fi
831       \ifx\atfi@params\ltx@empty
832       \else
833         \edef\atfi@params{/Params<<\atfi@params>>}%
834       \fi
835       \immediate\pdfobj stream attr {%
836         /Type/EmbeddedFile%
837         \atfi@mimetype
838         \atfi@params
839       } file {#1}%
840       \expandafter
841       \xdef\csname atfi@fileobj@#1\endcsname{\the\pdfobj}%
842     \endgroup

```

```

843 }{%
844   % file already embedded
845 }%
846 }

```

### Annotation appearance

\atfi@xform input: \atfi@appearancebox, output: \atfi@appearanceobj

```

847 \def\atfi@xform{%
848   \immediate\pdfxform\atfi@appearancebox
849   \edef\atfi@appearanceobj{\the\pdflastxform}%
850 }

```

\atfi@xform@icon

```

851 \let\atfi@xform@icon\atfi@xform

```

\atfi@refxform

```

852 \def\atfi@refxform#1{%
853   \pdfrefxform#1\relax
854 }

```

### File attachment annotation

\atfi@insert@file@annot

```

855 \def\atfi@insert@file@annot#1{%
856   \rule{0pt}{0pt}%
857   \ifatfi@appearance
858     \def\atfi@appearance@dict{%
859       /AP<<%
860         /N \atfi@appearanceobj\space 0 R%
861         /R \atfi@appearanceobj\space 0 R%
862         /D \atfi@appearanceobj\space 0 R%
863       >>%
864     }%
865   \else
866     \let\atfi@appearance@dict\ltx@empty
867   \fi
868   \ltx@ifundefined{atfi@fsobj@#1}{%
869     \begingroup
870     \hypersetup{unicode=false}%
871     \atfi@pdfstringdef\atfi@file{#1}%
872     \immediate\pdfobj{%
873       <<%
874         /Type/Filespec%
875         /F(\atfi@file)%
876         \ifx\atfi@ucfilespec\ltx@empty
877           \else
878             /UF(\atfi@ucfilespec)%
879         \fi
880         /EF<<%
881         /F \@nameuse{atfi@fileobj@#1} 0 R%
882       >>%
883     >>%
884     }%
885     \expandafter\xdef\csname atfi@fsobj@#1\endcsname{%
886       \the\pdflastobj
887     }%
888   \endgroup
889 }{%
890 }%
891 \pdfannot width \atfi@scale\atfi@appearancewidth
892           height \atfi@scale\atfi@appearanceheight

```

```

893         depth \atfi@scale\atfi@appearancedepth {%
894 /Subtype/FileAttachment%
895 \atfi@icon
896 \atfi@color@annot
897 \atfi@author
898 \atfi@date
899 \atfi@annotname
900 \atfi@description
901 \atfi@subject
902 \atfi@appearance@dict
903 /F \theatfi@flags
904 /FS \@nameuse{atfi@fsobj@#1} 0 R%
905 }%
906 \rule{0pt}{\atfi@appearanceheight}%
907 \rule[-\atfi@appearancedepth]{0pt}{\atfi@appearancedepth}%
908 \rule{\atfi@appearancewidth}{0pt}%
909 }

910 </pdfTex>

```

## 2.3 luatex

```

911 <*luatex>
912 \NeedsTeXFormat{LaTeX2e}
913 \ProvidesFile{atfi-luatex.def}%
914 [2019/07/24 v2.9 attachfile2 driver for luaTeX (HO)]%
915 \protected\def\atfi@literal {\pdfextension literal}
916 \def\atfi@GSAVE{q }
917 \def\atfi@GRESTORE{Q }
918 \def\atfi@SETLINEWIDTH{w }
919 \def\atfi@LINETO{l }
920 \def\atfi@MOVETO{m }
921 \def\atfi@STROKE{S }
922 \def\atfi@FILL{f }
923 \def\atfi@FILLSTROKE#1#2{#1#2B }
924 \def\atfi@SETRGBCOLORSTROKE{RG }
925 \def\atfi@SETRGBCOLORFILL{rg }
926 \def\atfi@SETGRAYSTROKE{G }
927 \def\atfi@SETGRAYFILL{g }
928 \def\atfi@SETCMYKCOLORSTROKE{K }
929 \def\atfi@SETCMYKCOLORFILL{k }
930 \def\atfi@RECTFILL{re f }
931 \def\atfi@RECTSTROKEFILL#1#2#3{#1#2#3re B }
932 \def\atfi@SETMITERLIMIT{M }
933 \def\atfi@SETFLAT{i }
934 \def\atfi@SETLINECAP{J }
935 \def\atfi@CURVETO{c }
936 \def\atfi@CURVETOY{v }
937 \def\atfi@CURVETOY{y }
938 \def\atfi@CLOSEPATH{h }
939 \def\atfi@SETLINEJOIN{j }
940 \define@key{AtFi@file}{Size}{%
941 \edef\atfi@params{\atfi@params/Size #1}%
942 }
943 \def\atfi@embedfile#1{%
944 \ltx@ifundefined{atfi@fileobj@#1}{%
945 \begingroup
946 \let\atfi@params\ltx@empty
947 \expandafter\let\expandafter\atfi@temp
948 \csname atfi@file@#1\endcsname
949 \ifx\atfi@temp\ltx@empty
950 \let\atfi@temp\relax
951 \fi

```

```

952 \ifx\atfi@temp\relax
953 \atfi@pdfTeXdata{#1}%
954 \else
955 \edef\x{%
956 \noexpand\setkeys{AtFi@file}{\@nameuse{atfi@file@#1}}%
957 }%
958 \x
959 \fi
960 \ifx\atfi@params\ltx@empty
961 \else
962 \edef\atfi@params{/Params<<\atfi@params>>}%
963 \fi
964 \immediate\pdfextension obj stream attr {%
965 /Type/EmbeddedFile%
966 \atfi@mimetype
967 \atfi@params
968 } file {#1}%
969 \expandafter
970 \xdef\csname atfi@fileobj@#1\endcsname{\the\numexpr\pdffeedback las-
tobj\relax}%
971 \endgroup
972 }{%
973 % file already embedded
974 }%
975 }
976 \def\atfi@xform{%
977 \immediate\saveboxresource\atfi@appearancebox
978 \edef\atfi@appearanceobj{\the\lastsavedboxresourceindex}%
979 }
980 \let\atfi@xform@icon\atfi@xform
981 \def\atfi@refxform#1{%
982 \useboxresource#1\relax
983 }
984 \def\atfi@insert@file@annot#1{%
985 \rule{0pt}{0pt}%
986 \ifatfi@appearance
987 \def\atfi@appearance@dict{%
988 /AP<<%
989 /N \atfi@appearanceobj\space 0 R%
990 /R \atfi@appearanceobj\space 0 R%
991 /D \atfi@appearanceobj\space 0 R%
992 >>%
993 }%
994 \else
995 \let\atfi@appearance@dict\ltx@empty
996 \fi
997 \ltx@ifUndefined{atfi@fsobj@#1}{%
998 \begingroup
999 \hypersetup{unicode=false}%
1000 \atfi@pdfstringdef\atfi@file{#1}%
1001 \immediate\pdfextension obj{%
1002 <<%
1003 /Type/Filespec%
1004 /F(\atfi@file)%
1005 \ifx\atfi@ucfilespec\ltx@empty
1006 \else
1007 /UF(\atfi@ucfilespec)%
1008 \fi
1009 /EF<<%
1010 /F \@nameuse{atfi@fileobj@#1} 0 R%
1011 >>%
1012 >>%

```



```

1013 }%
1014 \expandafter\xdef\csname atfi@fsoj@#1\endcsname{%
1015   \the\numexpr\pdffeedback lastobj\relax
1016 }%
1017 \endgroup
1018 }{%
1019 }%
1020 \pdfextension annot width \atfi@scale\atfi@appearancewidth
1021           height \atfi@scale\atfi@appearanceheight
1022           depth \atfi@scale\atfi@appearancedepth {%
1023   /Subtype/FileAttachment%
1024   \atfi@icon
1025   \atfi@color@annot
1026   \atfi@author
1027   \atfi@date
1028   \atfi@annotname
1029   \atfi@description
1030   \atfi@subject
1031   \atfi@appearance@dict
1032   /F \theatfi@flags
1033   /FS \@nameuse{atfi@fsoj@#1} 0 R%
1034 }%
1035 \rule{0pt}{\atfi@appearanceheight}%
1036 \rule[-\atfi@appearancedepth]{0pt}{\atfi@appearancedepth}%
1037 \rule{\atfi@appearancewidth}{0pt}%
1038 }
1039 </\luatex>

```

### 2.3.1 dvips

```

1040 <*dvips>
1041 \NeedsTeXFormat{LaTeX2e}
1042 \ProvidesFile{atfi-dvips.def}%
1043 [2019/07/24 v2.9 attachfile2 driver for dvips (HO)]%

```

#### Macros for graphics data

\atfi@literal

```

1044 \def\atfi@literal#1{%
1045   \special{ps:atfi_dict begin{#1}atfi_?pdfmark end}%
1046 }

```

\atfi@header

```

1047 \def\atfi@header#1{%
1048   \special{! #1}%
1049 }

1050 \atfi@header{%
1051   userdict begin 20 dict dup /atfi_dict exch def end begin%
1052   /atfi_?pdfmark systemdict %
1053   dup/pdfmark known%
1054   {%
1055     /exec get def%
1056   }{%
1057     /pop get def%
1058   } ifelse%
1059   {%
1060     %
1061     % x y width height atfi_re ->
1062     languagelevel 2 ge {%
1063       /atfi_rectfill { rectfill } bind def%
1064       /atfi_rectstroke { rectstroke } bind def%
1065     }{%
1066       /atfi_rect {%

```

```

1067     /atfi_height exch def%
1068     /atfi_width exch def%
1069     /atfi_x exch def%
1070     /atfi_y exch def %
1071     newpath %
1072     atfi_x atfi_y moveto %
1073     atfi_x atfi_width add atfi_y lineto %
1074     atfi_x atfi_width add atfi_y atfi_height add lineto %
1075     atfi_x atfi_y atfi_height add lineto %
1076     closepath%
1077   } bind def%
1078   /atfi_rectfill {%
1079     atfi_rect fill%
1080   } bind def%
1081   /atfi_rectstroke {%
1082     atfi_rect stroke%
1083   } bind def%
1084 } ifelse%
1085 /atfi_curveto_v {%
1086   currentpoint 6 2 roll curveto%
1087 } bind def%
1088 /atfi_curveto_y {%
1089   2 copy curveto%
1090 } bind def%
1091 %
1092 % help macro for atfi_convert_date
1093 /atfi_two {%
1094   dup 10 lt%
1095   {%
1096     1 string cvs %
1097     exch 1 add exch%
1098   }{%
1099     2 string cvs%
1100   } ifelse %
1101   putinterval%
1102 } bind def%
1103 %
1104 % <seconds since 1970-01-01> atfi_convert_date -> (D:...Z)
1105 /atfi_convert_date {%
1106   dup%
1107   /atfi_days exch 3600 idiv 24 idiv def%
1108   % calc date part
1109   /atfi_year 1970 def%
1110   {%
1111     atfi_year 400 mod 0 eq %
1112     atfi_year 100 mod 0 ne %
1113     atfi_year 4 mod 0 eq %
1114     and or%
1115     {366} {365} ifelse %
1116     dup atfi_days lt%
1117     {%
1118       atfi_days exch sub /atfi_days exch def%
1119       /atfi_year atfi_year 1 add def%
1120     }{%
1121       exit%
1122     } ifelse%
1123   } loop%
1124   /atfi_month 1 def%
1125   /atfi_days atfi_days 1 add def %
1126   31 atfi_days lt%
1127   {%
1128     atfi_days 31 sub /atfi_days exch def%

```

```

1129 /atfi_month atfi_month 1 add def %
1130 366 eq {29} {28} ifelse dup atfi_days lt%
1131 {%
1132   atfi_days exch sub /atfi_days exch def%
1133   /atfi_month atfi_month 1 add def %
1134 31 atfi_days lt%
1135 {%
1136   atfi_days 31 sub /atfi_days exch def%
1137   /atfi_month atfi_month 1 add def %
1138 30 atfi_days lt%
1139 {%
1140   atfi_days 30 sub /atfi_days exch def%
1141   /atfi_month atfi_month 1 add def %
1142 31 atfi_days lt%
1143 {%
1144   atfi_days 31 sub /atfi_days exch def%
1145   /atfi_month atfi_month 1 add def %
1146 30 atfi_days lt%
1147 {%
1148   atfi_days 30 sub /atfi_days exch def%
1149   /atfi_month atfi_month 1 add def %
1150 31 atfi_days lt%
1151 {%
1152   atfi_days 31 sub /atfi_days exch def%
1153   /atfi_month atfi_month 1 add def %
1154 31 atfi_days lt%
1155 {%
1156   atfi_days 31 sub /atfi_days exch def%
1157   /atfi_month atfi_month 1 add def %
1158 30 atfi_days lt%
1159 {%
1160   atfi_days 30 sub /atfi_days exch def%
1161   /atfi_month atfi_month 1 add def %
1162 31 atfi_days lt%
1163 {%
1164   atfi_days 31 sub /atfi_days exch def%
1165   /atfi_month atfi_month 1 add def %
1166 30 atfi_days lt%
1167 {%
1168   atfi_days 30 sub /atfi_days exch def%
1169   /atfi_month atfi_month 1 add def %
1170 31 atfi_days lt%
1171 {%
1172   atfi_days 31 sub /atfi_days exch def%
1173   /atfi_month atfi_month 1 add def%
1174 } if%
1175 } if%
1176 } if%
1177 } if%
1178 } if%
1179 } if%
1180 } if%
1181 } if%
1182 } if%
1183 } if%
1184 } { pop } ifelse%
1185 }{ pop } ifelse %
1186 % calc time part
1187 3600 24 mul mod %
1188 dup 3600 idiv dup /atfi_hour exch def %
1189 3600 mul sub %
1190 dup 60 idiv dup /atfi_min exch def %

```

```

1191      60 mul sub %
1192      /atfi_sec exch def%
1193      (D:19700101000000Z)%
1194      dup 2 atfi_year 4 string cvs putinterval %
1195      dup 6 atfi_month atfi_two %
1196      dup 8 atfi_days atfi_two %
1197      dup 10 atfi_hour atfi_two %
1198      dup 12 atfi_min atfi_two %
1199      dup 14 atfi_sec atfi_two%
1200  } bind def %
1201  %
1202  % <filename> atfi_calc_checksum -> /Checksum <checksum>
1203  % or returns nothing, if MD5Encode is not given
1204  false %
1205  languagelevel 2 ge {%
1206    (MD5Encode)%
1207    { pop true or }%
1208    (MD5Encode) length string%
1209    /Filter %
1210    resourceforall%
1211  } if%
1212  {%
1213    /atfi_calc_checksum {%
1214      /atfi_checksum 16 string def%
1215      /atfi_file exch (r) file def%
1216      /atfi_md5sum atfi_checksum /MD5Encode filter def %
1217      % not too efficient to read and write byte by byte,
1218      % using a buffer is probably faster
1219      atfi_size {%
1220        atfi_file read%
1221        {%
1222          atfi_md5sum exch write%
1223        } if%
1224      } repeat %
1225      atfi_md5sum closefile %
1226      atfi_file closefile%
1227      /Checksum atfi_checksum%
1228    } bind def%
1229  }{%
1230    /atfi_calc_checksum { pop } bind def%
1231  } ifelse%
1232  %
1233  /atfi_pttobp { 72.27 div 72 mul } bind def%
1234  /atfi_pdftodvipsx { 72.27 div Resolution mul } bind def%
1235  /atfi_pdftodvipsy { 72.27 div VResolution mul } bind def%
1236  %
1237  } atfi_?pdfmark %
1238  end%
1239 }

1240 \def\atfi@GSAVE{gsave }
1241 \def\atfi@GRESTORE{grestore }
1242 \def\atfi@SETLINEWIDTH{setlinewidth }
1243 \def\atfi@LINETO{lineto }
1244 \def\atfi@MOVETO{moveto }
1245 \def\atfi@STROKE{stroke }
1246 \def\atfi@FILL{fill }
1247 \def\atfi@FILLSTROKE#1#2{gsave #1 fill grestore #2 stroke }
1248 \def\atfi@SETRGBCOLORSTROKE{setrgbcolor }
1249 \def\atfi@SETRGBCOLORFILL{setrgbcolor }
1250 \def\atfi@SETGRAYSTROKE{setgray }
1251 \def\atfi@SETGRAYFILL{setgray }
1252 \def\atfi@SETCMYKCOLORSTROKE{setcmykcolor }

```

```

1253 \def\atfi@SETCMYKCOLORFILL{setcmykcolor }
1254 \def\atfi@RECTFILL{atfi_rectfill }
1255 \def\atfi@RECTSTROKEFILL#1#2#3{%
1256   #3%
1257   #1%
1258   gsave atfi_rectfill grestore %
1259   #2%
1260   #3%
1261   atfi_rectstroke %
1262   #1%
1263 }
1264 \def\atfi@SETMITERLIMIT{setmiterlimit }
1265 \def\atfi@SETFLAT{setflat }
1266 \def\atfi@SETLINECAP{setlinecap }
1267 \def\atfi@CURVETO{curveto }
1268 \def\atfi@CURVETOv{atfi_curveto_v }
1269 \def\atfi@CURVETOy{atfi_curveto_y }
1270 \def\atfi@CLOSEPATH{closepath }
1271 \def\atfi@SETLINEJOIN{setlinejoin }
1272 \newcounter{atfi@obj}
1273 \renewcommand*{\theatfi@obj}{%
1274   {atfi_obj_\number\c@atfi@obj}%
1275 }

```

**File embedding** Most values for Params dictionary found in the .atfi file have priority:

- Recalculation (md5sum, ...) is avoided.
- An external script has more possibilities than programming at PostScript level (operating system, getting the date and time values of the file with correct interpretation.
- Exception: status is called to test file existence, thus we get the value of size for free.

```

1276 \define@key{AtFi@file}{Size}{-}

```

\atfi@embedfile

```

1277 \def\atfi@embedfile#1{%
1278   \ltx@ifundefined{atfi@fileobj@#1}{%
1279     \atfi@pdfstringdef\atfi@psfilename{#1}%
1280     \stepcounter{atfi@obj}%
1281     \expandafter\xdef\csname atfi@fileobj@#1\endcsname{\theatfi@obj}%
1282     \begingroup
1283       \let\atfi@params\ltx@empty
1284       \expandafter\let\expandafter\atfi@temp
1285         \csname atfi@file@#1\endcsname
1286       \ifx\atfi@temp\ltx@empty
1287         \let\atfi@temp\relax
1288       \fi
1289       \ifx\atfi@temp\relax
1290         \atfi@pdftexdata{#1}%
1291       \else
1292         \edef\x{%
1293           \noexpand\setkeys{AtFi@file}{\@nameuse{atfi@file@#1}}%
1294         }%
1295         \x
1296       \fi
1297       \atfi@literal{%
1298         /atfi_filename(\atfi@psfilename)def %
1299         atfi_filename status%
1300       }%

```

ok: file found

save parameters of status command

```
1301      /atfi_created exch def%
1302      /atfi_referenced exch def%
1303      /atfi_size exch def %
1304      pop %
```

drop parameter "pages" (storage space), never needed

ghostscript:

```
created:      stat.st_ctime
referenced:   stat.st_mtime
stat.st_ctime: interpretation depends on operating system:
               * unix: inode change time (not interesting)
               * win32: probably creation time
                 --> /CreationDate
```

```
stat.st_mtime: modification time --> /ModDate
```

time values are seconds since 1970-01-01, GMT

TODO: ghostscript offers "getenv" for getting the value of an environment variable. That could be used to detect windows and setting the /CreationDate entry.

TODO: how are these values interpreted by other distiller programs?

```
1305      [%
1306      /__objdef \theatfi@obj
1307      /type/stream%
1308      /OBJ pdfmark%
1309      [%
1310      \theatfi@obj
1311      <<%
1312      /Type/EmbeddedFile%
1313      \atfi@mimetype
1314      /Params%
1315      <<%
1316      \atfi@params
1317      %
1318      /Size atfi_size%
1319      %
1320      /product where%
1321      {%
1322      pop %
```

check for ghostscript

```
1323      product (Ghostscript) search%
1324      {%
1325      pop pop pop %
```

ghostscript is running

```
1326      \ifatfi@creationdate
1327      \else
1328      false % TODO: test for windows
1329      {%
1330      /CreationDate atfi_created atfi_convert_date%
1331      } if%
1332      \fi
1333      \ifatfi@moddate
1334      \else
1335      /ModDate atfi_referenced atfi_convert_date%
1336      \fi
1337      } if%
```

look for MD5Encode filter and calculate CheckSum

```
1338      } if %
1339      \ifatfi@checksum
```

```

1340         \else
1341         atfi_filename atfi_calc_checksum%
1342         \fi
1343         >>%
1344         >>%
1345         /PUT pdfmark%
1346         [%
1347         \theatfi@obj
1348         atfi_filename (r) file%
1349         /PUT pdfmark%
1350         [%
1351         \theatfi@obj
1352         /CLOSE pdfmark%
1353     }{%

```

error: file not found  
currently nothing is done

```

1354     } ifelse%
1355     }%
1356 \endgroup
1357 }{%

```

file already embedded

```

1358 }%
1359 }

```

**Annotation appearance** output: \atfi@appearanceobj  
input: \atfi@appearancebox, \atfi@icon@icon

atfi@xfrom@icon

```

1360 \def\atfi@xform@icon{%
1361 \stepcounter{atfi@obj}%
1362 \edef\atfi@appearanceobj{\theatfi@obj}%
1363 \atfi@literal{%
1364 [%
1365 \__objdef \atfi@appearanceobj
1366 /BBox[%
1367 0 %
1368 0 %
1369 \strip@pt\wd\atfi@appearancebox\space atfi_pttobp %
1370 \strip@pt\dimexpr\dp\atfi@appearancebox
1371 +\ht\atfi@appearancebox\relax\space atfi_pttobp%
1372 ]%
1373 /BP pdfmark %
1374 \csname atfi@acro\atfi@icon@icon @data\endcsname
1375 [%
1376 /EP pdfmark%
1377 }%
1378 }

```

\atfi@xform output: \atfi@appearanceobj, input: \atfi@appearancebox

```

1379 \def\atfi@xform{%
1380 \stepcounter{atfi@obj}%
1381 \edef\atfi@appearanceobj{\theatfi@obj}%
1382 \begingroup
1383 \setbox\ltx@zero=\hbox{%
1384 \atfi@literal{%
1385 [%
1386 \__objdef \atfi@appearanceobj
1387 /BBox[%
1388 currentpoint %
1389 \strip@pt\dp\atfi@appearancebox\space sub %
1390 currentpoint %

```

```

1391      exch \strip@pt\wd\atfi@appearancebox\space add %
1392      exch \strip@pt\ht\atfi@appearancebox\space add%
1393    ]%
1394    /BP pdfmark %
1395    gsave %
1396    currentpoint %
1397    2 copy translate %
1398    72.27 Resolution div 72.27 VResolution div neg scale %
1399    exch neg exch neg translate%
1400  }%
1401  \usebox{\atfi@appearancebox}%
1402  \atfi@literal{%
1403    grestore%
1404    [%
1405    /EP pdfmark%
1406  ]%
1407  }%
1408  % do not allocate any space for xobject definition
1409  \dp\ltx@zero=\z@
1410  \ht\ltx@zero=\z@
1411  \wd\ltx@zero=\z@
1412  \mbox{\usebox\ltx@zero}%
1413  \endgroup
1414 }

```

\atfi@refxform

```

1415 \def\atfi@refxform#1{%
1416   \raisebox{-\atfi@appearancedepth}{%
1417     \atfi@literal{%
1418       gsave %
1419       currentpoint translate %
1420       Resolution 72 div VResolution neg 72 div scale%
1421       [#1 /SP pdfmark % hash-ok
1422       grestore%
1423     }%
1424     \makebox[\atfi@appearancewidth]{}%
1425   }%
1426   \rule{0pt}{\atfi@appearanceheight}%
1427 }

```

## File attachment annotation

\atfi@insert@file@annot

```

1428 \def\atfi@insert@file@annot#1{%
1429   \rule{0pt}{0pt}%
1430   \ifatfi@appearance
1431     \def\atfi@appearance@dict{%
1432       /AP<<%
1433       /N \atfi@appearanceobj
1434       /R \atfi@appearanceobj
1435       /D \atfi@appearanceobj
1436     >>%
1437   }%
1438   \else
1439     \let\atfi@appearance@dict\ltx@empty
1440   \fi
1441   \ltx@ifundefined{atfi@fsobj@#1}{%
1442     \stepcounter{atfi@obj}%
1443     \expandafter
1444     \xdef\csname atfi@fsobj@#1\endcsname{\theatfi@obj}%
1445     \begingroup
1446     \hypersetup{unicode=false}%

```



```

1447 \atfi@pdfstringdef\atfi@file{#1}%
1448 \atfi@literal{%
1449 [%
1450 /_objdef \theatfi@obj
1451 /type/dict%
1452 /OBJ pdfmark%
1453 [%
1454 \theatfi@obj
1455 <<%
1456 /Type/Filespec%
1457 /F(\atfi@file)%
1458 \ifx\atfi@ucfilespec\ltx@empty
1459 \else
1460 /UF(\atfi@ucfilespec)%
1461 \fi
1462 /EF<<%
1463 /F \csname atfi@fileobj@#1\endcsname
1464 >>%
1465 >>%
1466 /PUT pdfmark%
1467 }%
1468 \endgroup
1469 }{%
1470 }%
1471 \atfi@literal{%
1472 [%
1473 /Subtype/FileAttachment%
1474 \atfi@icon
1475 \atfi@color@annot
1476 \atfi@author
1477 \atfi@date
1478 \atfi@annotname
1479 \atfi@description
1480 \atfi@subject
1481 \atfi@appearance@dict
1482 /F \theatfi@flags
1483 /FS \csname atfi@fsobj@#1\endcsname
1484 /Rect[%
1485 currentpoint %
1486 \strip@pt\dimexpr\atfi@scale\atfi@appearancedepth\relax
1487 \space atfi__pdftodvipsy add %
1488 currentpoint %
1489 exch %
1490 \strip@pt\dimexpr\atfi@scale\atfi@appearancewidth\relax
1491 \space atfi__pdftodvipsx add %
1492 exch %
1493 \strip@pt\dimexpr\atfi@scale\atfi@appearanceheight\relax
1494 \space atfi__pdftodvipsy sub %
1495 ]%
1496 /ANN pdfmark%
1497 }%
1498 \rule{0pt}{\atfi@appearanceheight}%
1499 \rule[-\atfi@appearancedepth]{0pt}{\atfi@appearancedepth}%
1500 \rule{\atfi@appearancewidth}{0pt}%
1501 }
1502 </dvips>

```

### 2.3.2 dvipdfmx

```

1503 <*dvipdfmx>
1504 \NeedsTeXFormat{LaTeX2e}
1505 \ProvidesFile{atfi-dvipdfmx.def}%

```

**Macros for graphics data****\atfi@special**

```

1507 \def\atfi@special#1{%
1508   \special{pdf:#1}%
1509 }

```

**\atfi@literal**

```

1510 \def\atfi@literal#1{%
1511   \atfi@special{content #1}%
1512 }

1513 \def\atfi@GSAVE{q }
1514 \def\atfi@GRESTORE{Q }
1515 \def\atfi@SETLINEWIDTH{w }
1516 \def\atfi@LINETO{l }
1517 \def\atfi@MOVETO{m }
1518 \def\atfi@STROKE{S }
1519 \def\atfi@FILL{f }
1520 \def\atfi@FILLSTROKE#1#2{#1#2B }
1521 \def\atfi@SETRGBCOLORSTROKE{RG }
1522 \def\atfi@SETRGBCOLORFILL{rg }
1523 \def\atfi@SETGRAYSTROKE{G }
1524 \def\atfi@SETGRAYFILL{g }
1525 \def\atfi@SETCMYKCOLORSTROKE{K }
1526 \def\atfi@SETCMYKCOLORFILL{k }
1527 \def\atfi@RECTFILL{re f }
1528 \def\atfi@RECTSTROKEFILL#1#2#3{#1#2#3re B }
1529 \def\atfi@SETMITERLIMIT{M }
1530 \def\atfi@SETFLAT{i }
1531 \def\atfi@SETLINECAP{J }
1532 \def\atfi@CURVETO{c }
1533 \def\atfi@CURVETOv{v }
1534 \def\atfi@CURVETOY{y }
1535 \def\atfi@CLOSEPATH{h }
1536 \def\atfi@SETLINEJOIN{j }

1537 \newcounter{atfi@obj}
1538 \renewcommand*{\theatfi@obj}{%
1539   @atfi_obj_\number\c@atfi@obj
1540 }

```

**File embedding**

```

1541 \define@key{AtFi@file}{Size}{%
1542   \edef\atfi@params{\atfi@params/Size #1}%
1543 }

```

**\atfi@embedfile**

```

1544 \def\atfi@embedfile#1{%
1545   \ltx@ifundefined{atfi@fileobj@#1}{%
1546     \stepcounter{atfi@obj}%
1547     \begingroup
1548       \let\atfi@params\ltx@empty
1549       \expandafter\let\expandafter\atfi@temp
1550         \csname atfi@file@#1\endcsname
1551       \ifx\atfi@temp\ltx@empty
1552         \let\atfi@temp\relax
1553       \fi
1554       \ifx\atfi@temp\relax
1555         \atfi@pdftexdata{#1}%
1556       \else

```

```

1557 \edef\x{%
1558 \noexpand\setkeys{AtFi@file}{\@nameuse{atfi@file@#1}}%
1559 }%
1560 \x
1561 \fi
1562 \ifx\atfi@params\ltx@empty
1563 \else
1564 \edef\atfi@params{/Params<<\atfi@params>>}%
1565 \fi
1566 \edef\atfi@FILE{#1}%
1567 \filename@parse\atfi@FILE
1568 \ifx\filename@area\ltx@empty
1569 \edef\atfi@FILE{.\atfi@FILE}%
1570 \fi
1571 \EdefEscapeString\atfi@FILE{\atfi@FILE}%
1572 \atfi@special{fstream %
1573 \theatfi@obj
1574 (\atfi@FILE)%
1575 <<%
1576 /Type/EmbeddedFile%
1577 \atfi@mimetype
1578 \atfi@params
1579 >>%
1580 }%
1581 \atfi@special{close \theatfi@obj}%
1582 \expandafter
1583 \xdef\csname atfi@fileobj@#1\endcsname{\theatfi@obj}%
1584 \endgroup
1585 }{%
1586 % file already embedded
1587 }%
1588 }

```

### Annotation appearance

\atfi@xform input: \atfi@appearancebox, output: \atfi@appearanceobj

```

1589 \def\atfi@xform{%
1590 \stepcounter{atfi@obj}%
1591 \smash{%
1592 \rlap{%
1593 \atfi@special{bxobj \theatfi@obj\space
1594 width \the\wd\atfi@appearancebox\space
1595 height \the\ht\atfi@appearancebox\space
1596 depth \the\dp\atfi@appearancebox
1597 }%
1598 \usebox\atfi@appearancebox
1599 \atfi@special{exobj}%
1600 }%
1601 }%
1602 \edef\atfi@appearanceobj{\theatfi@obj}%
1603 }

```

\atfi@xform@icon

```

1604 \let\atfi@xform@icon\atfi@xform

```

\atfi@refxform

```

1605 \def\atfi@refxform#1{%
1606 \leavevmode
1607 \atfi@special{uxobj #1}%
1608 }

```

## File attachment annotation

\atfi@insert@file@annot

```

1609 \def\atfi@insert@file@annot#1{%
1610   \rule{Opt}{Opt}%
1611   \ifatfi@appearance
1612   \def\atfi@appearance@dict{%
1613     /AP<<%
1614     /N \atfi@appearanceobj
1615     /R \atfi@appearanceobj
1616     /D \atfi@appearanceobj
1617     >>%
1618   }%
1619   \else
1620     \let\atfi@appearance@dict\ltx@empty
1621   \fi
1622   \ltx@ifundefined{atfi@fsobj@#1}{%
1623     \begingroup
1624     \ifxetex
1625       \let\atfi@temp\Hy@Warning
1626       \let\Hy@Warning\ltx@gobble
1627     \fi
1628     \hypersetup{unicode=false}%
1629     \ifxetex
1630       \let\Hy@Warning\atfi@temp
1631     \fi
1632     \atfi@pdfstringdef\atfi@file{#1}%
1633     \stepcounter{atfi@obj}%
1634     \atfi@special{obj \theatfi@obj <<%
1635       /Type/Filespec%
1636       /F(\atfi@file)%
1637       \ifx\atfi@ucfilespec\ltx@empty
1638         \else
1639           /UF(\atfi@ucfilespec)%
1640         \fi
1641       /EF<<%
1642       /F \@nameuse{atfi@fileobj@#1}%
1643       >>%
1644       >>%
1645     }%
1646     \expandafter\xdef\csname atfi@fsobj@#1\endcsname{%
1647       \theatfi@obj
1648     }%
1649   \endgroup
1650 }{%
1651 }%
1652 \begingroup
1653   \dimen@=\atfi@scale\atfi@appearancewidth
1654   \edef\atfi@rule{width \the\dimen@}%
1655   \dimen@=\atfi@scale\atfi@appearanceheight
1656   \edef\atfi@rule{\atfi@rule\space height \the\dimen@}%
1657   \dimen@=\atfi@scale\atfi@appearancedepth
1658   \edef\atfi@rule{\atfi@rule\space depth \the\dimen@}%
1659   \atfi@special{ann \atfi@rule
1660     <<%
1661     /Subtype/FileAttachment%
1662     \atfi@icon
1663     \atfi@color@annot
1664     \atfi@author
1665     \atfi@date
1666     \atfi@annotname
1667     \atfi@description
1668     \atfi@subject

```

```

1669     \atfi@appearance@dict
1670     /F \theatfi@flags
1671     /FS \@nameuse{atfi@fsobj@#1}%
1672     >>%
1673     }%
1674 \endgroup
1675 \rule{0pt}{\atfi@appearanceheight}%
1676 \rule[-\atfi@appearancedepth]{0pt}{\atfi@appearancedepth}%
1677 \rule{\atfi@appearancewidth}{0pt}%
1678 }
1679 </dvipdfmx>

```

## 2.4 Perl script pdfatfi.pl

```

1680 <*pdfatfi>
1681 #!/usr/bin/env perl
1682 use strict;
1683 $^W=1; # turn warning on
1684 #
1685 # pdfatfi.pl
1686 #
1687 # Copyright (C) 2005-2010, 2012 Heiko Oberdiek.
1688 #
1689 # This work may be distributed and/or modified under the
1690 # conditions of the LaTeX Project Public License, either
1691 # version 1.3c of this license or (at your option) any later
1692 # version. This version of this license is in
1693 # http://www.latex-project.org/lppl/lppl-1-3c.txt
1694 # and the latest version of this license is in
1695 # http://www.latex-project.org/lppl.txt
1696 # and version 1.3 or later is part of all distributions of
1697 # LaTeX version 2005/12/01 or later.
1698 #
1699 # This work has the LPPL maintenance status "maintained".
1700 #
1701 # This Current Maintainer of this work is Heiko Oberdiek.
1702 #
1703 # See file "attachfile2.pdf" for a list of files that belong to
1704 # this project.
1705 #
1706 # This file "pdfatfi.pl" may be renamed to "pdfatfi"
1707 # for installation purposes.
1708 #
1709 my $prj      = 'pdfatfi';
1710 my $file     = "$prj.pl";
1711 my $program  = uc($&) if $file =~ /\w+/;
1712 my $version  = "2.9";
1713 my $date     = "2019/07/24";
1714 my $author   = "Heiko Oberdiek";
1715 my $copyright = "Copyright (c) 2005-2010, 2012 by $author.";
1716 #
1717 # History:
1718 # 2005/05/21 v1.0: First release.
1719 # 2006/08/16 v2.2: Included in DTX file of attachfile2.dtx.
1720 # 2010/09/27 v2.6: Keys ModDateTZ and CreationDateTZ added.
1721 # 2016/05/16 v2.8: Option --version added.
1722 # 2019/07/24 v2.9: adapted version to attachfile2 version.
1723 #
1724
1725 use POSIX qw(strftime); # %z is used (GNU)
1726 use Digest::MD5;
1727

```

```

1728 ### program identification
1729 my $title = "$program $version, $date - $copyright\n";
1730
1731 ### error strings
1732 my $Error = "!!! Error: "; # error prefix
1733
1734 ### variables
1735 my $atffile;
1736
1737 ### option variables
1738 my @bool = ("false", "true");
1739 $::opt_help      = 0;
1740 $::opt_quiet     = 0;
1741 $::opt_debug     = 0;
1742 $::opt_verbose   = 0;
1743 $::opt_version   = 0;
1744
1745 my $usage = <<"END_OF_USAGE";
1746 ${title}Syntax: \L$program\E [options] <file[.atfi]>
1747 Function: Help program for LaTeX package "attachfile2".
1748 Options:                                     (defaults:)
1749 --help          print usage
1750 --version       print version number
1751 --(no)quiet     suppress messages          ($bool[$::opt_quiet])
1752 --(no)verbose   verbose printing          ($bool[$::opt_verbose])
1753 --(no)debug     debug informations        ($bool[$::opt_debug])
1754 END_OF_USAGE
1755
1756 ### process options
1757 my @OrgArgv = @ARGV;
1758 use Getopt::Long;
1759 GetOptions(
1760   "help!",
1761   "version!",
1762   "quiet!",
1763   "debug!",
1764   "verbose!",
1765 ) or die $usage;
1766 !$::opt_help or die $usage;
1767 if ($::opt_version) {
1768   print "$prj $date v$version\n";
1769   exit(0);
1770 }
1771 @ARGV == 1 or die "$usage$error Missing jobname!\n";
1772
1773 $::opt_quiet = 0 if $::opt_verbose;
1774
1775 print $title unless $::opt_quiet;
1776
1777 ### get jobname
1778 $atffile = $ARGV[0];
1779 if (!-f $atffile && -f "$atffile.atfi") {
1780   $atffile .= ".atfi";
1781 }
1782 -f $atffile or die "$Error File `'$atffile`' not found!\n";
1783
1784 print "* job file      = $atffile\n" if $::opt_verbose;
1785
1786 if ($::opt_debug) {
1787   print <<"END_DEB";
1788   * OSNAME: $^O
1789   * PERL_VERSION: $]

```

```

1790 * ARGV: @OrgArgv
1791 END_DEB
1792 }
1793
1794 my $tmpfile = $atffile . ".tmp";
1795
1796 my $timezone = strftime "%z", localtime;
1797
1798 sub gettz ($) {
1799     my $time = shift;
1800     my $tz = strftime "%z", localtime($time);
1801     return '' unless $tz;
1802     return 'Z' if $tz eq '+0000';
1803     $tz =~ s/^( [+|-] \d \d ) ( \d \d ) $ / $1 '$2' /;
1804     return $tz;
1805 }
1806
1807 open(IN, $atffile) or die "$Error Cannot open ` $atffile `!\n";
1808 open(OUT, ">$tmpfile") or die "$Error Cannot write ` $tmpfile `!\n";
1809
1810 while(<IN>) {
1811     # timezone
1812     if (s/^(\\attachfile\\@timezone\\{\\}.*(\\})$/$1$timezone$2/) {
1813         print "* timezone      = $timezone\n" if $::opt_verbose;
1814     }
1815
1816     # file entry
1817     if (/^(\\attachfile\\@file\\[\\^\\]*\\)\\{\\.\\.\\}\\$/) {
1818         my $hexfile = $1;
1819         my $file = pack('H*', $hexfile);
1820         my @s = stat($file);
1821         if (@s == 0) {
1822             print "!!! Warning: File ` $file ` not found!\n";
1823         }
1824         else {
1825             my $size = @s[7];
1826             my $mtime = @s[9];
1827             my $ctime = @s[10]; # inode change time
1828
1829             my ($sec, $min, $hour, $mday, $mon, $year) =
1830                 localtime($mtime);
1831             my $moddate = sprintf("%04d%02d%02d%02d%02d",
1832                 $year + 1900, $mon + 1, $mday,
1833                 $hour, $min, $sec);
1834             my $moddatetz = 'D:' . $moddate . gettz($mtime);
1835
1836             # Manual page "perlport" says that "ctime" is creation
1837             # time instead of inode change time for "Win32" and
1838             # "Mac OS", but it is unsupported for "Mac OS X".
1839             my $creationdate = "";
1840             my $creationdatetz = "";
1841             if ($^O eq 'MSWin32') { # cygwin?
1842                 ($sec, $min, $hour, $mday, $mon, $year) =
1843                     localtime($ctime);
1844                 $creationdate = sprintf("%04d%02d%02d%02d%02d",
1845                     $year + 1900, $mon + 1, $mday,
1846                     $hour, $min, $sec);
1847                 $creationdatetz =
1848                     'D:' . $creationdate . gettz($ctime);
1849             }
1850
1851             # md5 checksum

```

```

1852     my $checksum = "";
1853     my $ctx = Digest::MD5->new;
1854     if (open(FILE, $file)) {
1855         $ctx->addfile(*FILE);
1856         $checksum = $ctx->hexdigest;
1857         close(FILE);
1858     }
1859     else {
1860         print "!!! Warning: File `"$file"` cannot be read,"
1861             . " dropping checksum!\n";
1862     }
1863
1864     $__ = "\\attachfile\\@file["
1865         . "ModDateTZ=$moddatetz"
1866         . ",Size=$size"
1867         . ($checksum ? ",Checksum=$checksum" : "")
1868         . ($creationdatetz ?
1869             ",CreationDateTZ=$creationdatetz" :
1870             ($creationdate ?
1871                 ",CreationDate=$creationdate" : ""))
1872         . "]{ $hexfile }\n";
1873     if ($::opt_verbose) {
1874         print "* file entry   = $file\n";
1875         print " size          = $size\n";
1876         print " moddate         = $moddate\n";
1877         print " creationdate    = $creationdate\n"
1878         if $creationdate;
1879         print " checksum       = $checksum\n" if $checksum;
1880     }
1881 }
1882 }
1883
1884 print OUT $__;
1885 }
1886
1887 close(IN);
1888 close(OUT);
1889
1890 unlink($atffile) or die "$Error Cannot delete old `"$atffile"`!\n";
1891 rename $tmpfile, $atffile
1892     or die "$Error Cannot move `"$tmpfile"` to `"$atffile"`!\n";
1893
1894 print "*** ready. ***\n" unless $::opt_quiet;
1895
1896 __END__
1897 </pdfatfi>

```

## 3 Installation

### 3.1 Download

**Package.** This package is available on CTAN<sup>1</sup>:

[CTAN:macros/latex/contrib/oberdiek/attachfile2.dtx](http://ctan.org/macros/latex/contrib/oberdiek/attachfile2.dtx) The source file.

[CTAN:macros/latex/contrib/oberdiek/attachfile2.pdf](http://ctan.org/macros/latex/contrib/oberdiek/attachfile2.pdf) Documentation.

**Bundle.** All the packages of the bundle ‘oberdiek’ are also available in a TDS compliant ZIP archive. There the packages are already unpacked and the documentation files are generated. The files and directories obey the TDS standard.

---

<sup>1</sup><http://ctan.org/pkg/attachfile2>



[CTAN:install/macros/latex/contrib/oberdiek.tds.zip](#)

*TDS* refers to the standard “A Directory Structure for T<sub>E</sub>X Files” ([CTAN:tds/tds.pdf](#)). Directories with `texmf` in their name are usually organized this way.

### 3.2 Bundle installation

**Unpacking.** Unpack the `oberdiek.tds.zip` in the TDS tree (also known as `texmf` tree) of your choice. Example (linux):

```
unzip oberdiek.tds.zip -d ~/texmf
```

**Script installation.** Check the directory `TDS:scripts/oberdiek/` for scripts that need further installation steps. Package `attachfile2` comes with the Perl script `pdfatfi.pl` that should be installed in such a way that it can be called as `pdfatfi`. Example (linux):

```
chmod +x scripts/oberdiek/pdfatfi.pl
cp scripts/oberdiek/pdfatfi.pl /usr/local/bin/
```

### 3.3 Package installation

**Unpacking.** The `.dtx` file is a self-extracting `docstrip` archive. The files are extracted by running the `.dtx` through plain T<sub>E</sub>X:

```
tex attachfile2.dtx
```

**TDS.** Now the different files must be moved into the different directories in your installation TDS tree (also known as `texmf` tree):

```
attachfile2.sty    → tex/latex/oberdiek/attachfile2.sty
atfi-dvips.def     → tex/latex/oberdiek/atfi-dvips.def
atfi-pdftex.def    → tex/latex/oberdiek/atfi-pdftex.def
atfi-dvipdfmx.def  → tex/latex/oberdiek/atfi-dvipdfmx.def
pdfatfi.pl         → scripts/oberdiek/pdfatfi.pl
attachfile2.pdf    → doc/latex/oberdiek/attachfile2.pdf
attachfile2.dtx    → source/latex/oberdiek/attachfile2.dtx
```

If you have a `docstrip.cfg` that configures and enables `docstrip`’s TDS installing feature, then some files can already be in the right place, see the documentation of `docstrip`.

### 3.4 Refresh file name databases

If your T<sub>E</sub>X distribution (teT<sub>E</sub>X, mikT<sub>E</sub>X, ...) relies on file name databases, you must refresh these. For example, teT<sub>E</sub>X users run `texhash` or `mktextlsr`.

### 3.5 Script installation

This package comes with a Perl script `pdfatfi.pl`. Install it somewhere so that it is executed, when it is called as `pdfatfi` on the command line. Example for installing it under Linux:

```
cp pdfatfi.pl /usr/local/bin/pdfatfi
chmod +x /usr/local/bin/pdfatfi
```

### 3.6 Some details for the interested

**Unpacking with L<sup>A</sup>T<sub>E</sub>X.** The .dtx chooses its action depending on the format:

**plain T<sub>E</sub>X:** Run docstrip and extract the files.

**L<sup>A</sup>T<sub>E</sub>X:** Generate the documentation.

If you insist on using L<sup>A</sup>T<sub>E</sub>X for docstrip (really, docstrip does not need L<sup>A</sup>T<sub>E</sub>X), then inform the autodetect routine about your intention:

```
latex \let\install=y\input{attachfile2.dtx}
```

Do not forget to quote the argument according to the demands of your shell.

**Generating the documentation.** You can use both the .dtx or the .drv to generate the documentation. The process can be configured by the configuration file ltxdoc.cfg. For instance, put this line into this file, if you want to have A4 as paper format:

```
\PassOptionsToClass{a4paper}{article}
```

An example follows how to generate the documentation with pdfL<sup>A</sup>T<sub>E</sub>X:

```
pdflatex attachfile2.dtx
makeindex -s gind.ist attachfile2.idx
pdflatex attachfile2.dtx
makeindex -s gind.ist attachfile2.idx
pdflatex attachfile2.dtx
```

## 4 Catalogue

The following XML file can be used as source for the [T<sub>E</sub>X Catalogue](#). The elements `caption` and `description` are imported from the original XML file from the Catalogue. The name of the XML file in the Catalogue is `attachfile2.xml`.

```
1898 <*catalogue>
1899 <?xml version='1.0' encoding='us-ascii'?>
1900 <!DOCTYPE entry SYSTEM 'catalogue.dtd'>
1901 <entry datestamp='$Date$' modifier='$Author$' id='attachfile2'>
1902   <name>attachfile2</name>
1903   <caption>Attach files into PDF.</caption>
1904   <authorref id='auth:oberdiek'/>
1905   <copyright owner='Heiko Oberdiek' year='2005-2010,2012'/>
1906   <license type='lppl1.3'/>
1907   <version number='2.9'/>
1908   <description>
1909     This package can be used to attach files to a PDF document.
1910     It is a further development of Scott Pakin's package
1911     <xref refid='attachfile'>attachfile</xref> for
1912     <xref refid='pdftex'>pdfTeX</xref>. Apart from bug fixes,
1913     this package adds support for dvips,
1914     some new options, and gets and writes meta information data about
1915     the attached files.
1916   <p/>
1917   The package is part of the <xref refid='oberdiek'>oberdiek</xref>
1918   bundle.
1919 </description>
1920 <documentation details='Package documentation'
1921   href='ctan:/macros/latex/contrib/oberdiek/attachfile2.pdf'/>
1922 <ctan file='true' path='/macros/latex/contrib/oberdiek/attachfile2.dtx'/>
1923 <miktex location='oberdiek'/>
1924 <texlive location='oberdiek'/>
1925 <install path='/macros/latex/contrib/oberdiek/oberdiek.tds.zip'/>
1926 </entry>
1927 </catalogue>
```

## 5 References

- [1] Scott Pakin: *The attachfile package*; 2005/02/20 v1.2; [CTAN:macros/latex/contrib/attachfile/](http://ctan.org/ctan/CTAN:macros/latex/contrib/attachfile/).
- [2] Heiko Oberdiek: *The embedfile package*; 2006/08/16 v1.0; [CTAN:macros/latex/contrib/oberdiek/embedfile.pdf](http://ctan.org/ctan/CTAN:macros/latex/contrib/oberdiek/embedfile.pdf).
- [3] Adobe Systems Incorporated: *PDF Reference, Fifth Edition, Version 1.6*, November 2004; [http://partners.adobe.com/public/developer/pdf/index\\_reference.html](http://partners.adobe.com/public/developer/pdf/index_reference.html).
- [4] Network Working Group: RFC 2046, *Multipurpose Internet Mail Extensions (MIME) Part Two: Media Types*, November 1996; <http://www.rfc-editor.org/>.
- [5] IANA (Internet Assigned Numbers Authority): *MIME Media Types*, May 2006; <http://www.iana.org/assignments/media-types/>.

## 6 History

### [2005/02/23 v2.0]

- New options: draft/final.
- New option scale for scaling the annotation rectangle.
- Supported driver options: pdftex, dvips.
- Configuration file ‘attachfile.cfg’ supported.
- Dependency of package calc dropped.
- $\varepsilon$ -TeX (`\numexpr`, `\dimexpr`) used.
- New auxiliary file `\jobname.atfi` to get data unavailable by (pdf)TeX, controlled by `\nofiles` and option `nofiles`.
- Use of package `prokvopt` (never released).

### [2005/10/07 v2.1]

- Option `annotname` for naming annotations (this name can be used for embedded go-to actions).

### [2006/08/17 v2.2]

- Use of package `kvoptions` instead of `prokvopt`.
- DTX framework.
- A little documentation.

### [2007/04/11 v2.3]

- Line ends sanitized.

### [2008/07/29 v2.4]

- Improved color support. Option `color` now understands the usual color specifications if package `xcolor` is loaded.

## [2009/09/25 v2.5]

- New option `ucfilespec` (since PDF 1.7).
- Fix: `hyperref`'s option `unicode` is disabled for file names except for `ucfilespec`.

## [2010/09/27 v2.6]

- Support for `dvipdfmx` added, new option `dvipdfmx` and alias option `xetex`. (Thanks Will Robertson for pointing to `\special{pdf:fstream ...}`).
- New option `driverfallback`.
- All options except driver options are local options, that means they are ignored as global options.
- Some options are disabled after they are used (driver options, `draft`, `final`, `nofiles`).
- Driver files renamed from `atfi<driver>.def` to `atfi-<driver>.def`.
- Bug fix: `\textattachfile` now adds an entry into the `.atfi` file.
- Program `pdfatfi.pl` sets modification and creation time with time zone, because the time zone offset might differ with the file date.

## [2012/04/18 v2.7]

- Program `pdfatfi.pl`: Option version added.

## [2016/05/16 v2.8]

- Documentation updates.

## [2019/07/24 v2.9]

- Added `luatex` driver (UF, issue 69)

## 7 Index

Numbers written in *italic* refer to the page where the corresponding entry is described; numbers underlined refer to the code line of the definition; plain numbers refer to the code lines where the entry is used.

Symbols		1010, 1033, 1293, 1558, 1642, 1671	
\#	24, 59	\l	25
\\$	26	\\	37, 75, 539
\%	27, 59	\{	35, 65, 80, 755, 764
\&	28, 59	\}	36, 65, 85, 756, 765
\(	29	\~	22, 63
\)	30	\\	31, 65
\*	32, 60	\~	38, 65
\+	33, 60, 107	A	
\-	107	\addtocounter	721, 725
\.	23, 60, 107	\atfi@acroGraph	359
\?	34	\atfi@acroGraph@data	335, 361
\@ehc	221, 548	\atfi@acroPaperclip	421
\@makeother	753, 762	\atfi@acroPaperclip@data	364, 423
\@namedef	550	\atfi@acroPushPin	463
\@nameuse	653, 680, 702,	\atfi@acroPushPin@data	426, 465
	704, 706, 827, 881, 904, 956,	\atfi@acroTag	533

<code>\atfi@acroTag@data</code> . . . . .	<a href="#">468</a> , <a href="#">535</a>	<code>\atfi@driver@dvi</code> . . . . .	<a href="#">211</a> , <a href="#">228</a> , <a href="#">275</a>
<code>\atfi@annotname</code> . . . . .	<a href="#">179</a> , <a href="#">181</a> , <a href="#">899</a> , <a href="#">1028</a> , <a href="#">1478</a> , <a href="#">1666</a>	<code>\atfi@driver@luatex</code> . . . . .	<a href="#">210</a> , <a href="#">225</a> , <a href="#">262</a>
<code>\atfi@appearance@dict</code> . . . . .	<a href="#">858</a> , <a href="#">866</a> , <a href="#">902</a> , <a href="#">987</a> , <a href="#">995</a> , <a href="#">1031</a> , <a href="#">1431</a> , <a href="#">1439</a> , <a href="#">1481</a> , <a href="#">1612</a> , <a href="#">1620</a> , <a href="#">1669</a>	<code>\atfi@driver@pdftex</code> . . . . .	<a href="#">209</a> , <a href="#">215</a> , <a href="#">264</a>
<code>\atfi@appearancebox</code> . . . . .	<a href="#">676</a> , <a href="#">679</a> , <a href="#">684</a> , <a href="#">688</a> , <a href="#">692</a> , <a href="#">711</a> , <a href="#">712</a> , <a href="#">713</a> , <a href="#">714</a> , <a href="#">848</a> , <a href="#">977</a> , <a href="#">1369</a> , <a href="#">1370</a> , <a href="#">1371</a> , <a href="#">1389</a> , <a href="#">1391</a> , <a href="#">1392</a> , <a href="#">1401</a> , <a href="#">1594</a> , <a href="#">1595</a> , <a href="#">1596</a> , <a href="#">1598</a>	<code>\atfi@driver@fallback</code> . . . . .	<a href="#">271</a> , <a href="#">274</a> , <a href="#">282</a>
<code>\atfi@appearancedepth</code> . . . . .	<a href="#">675</a> , <a href="#">705</a> , <a href="#">714</a> , <a href="#">893</a> , <a href="#">907</a> , <a href="#">1022</a> , <a href="#">1036</a> , <a href="#">1416</a> , <a href="#">1486</a> , <a href="#">1499</a> , <a href="#">1657</a> , <a href="#">1676</a>	<code>\atfi@dummy@pushpin</code> . . . . .	<a href="#">320</a> , <a href="#">327</a>
<code>\atfi@appearanceheight</code> . . . . .	<a href="#">674</a> , <a href="#">703</a> , <a href="#">713</a> , <a href="#">892</a> , <a href="#">906</a> , <a href="#">1021</a> , <a href="#">1035</a> , <a href="#">1426</a> , <a href="#">1493</a> , <a href="#">1498</a> , <a href="#">1655</a> , <a href="#">1675</a>	<code>\atfi@embedfile</code> . . . . .	<a href="#">667</a> , <a href="#">739</a> , <a href="#">814</a> , <a href="#">943</a> , <a href="#">1277</a> , <a href="#">1544</a>
<code>\atfi@appearanceobj</code> . . . . .	<a href="#">697</a> , <a href="#">707</a> , <a href="#">849</a> , <a href="#">860</a> , <a href="#">861</a> , <a href="#">862</a> , <a href="#">978</a> , <a href="#">989</a> , <a href="#">990</a> , <a href="#">991</a> , <a href="#">1362</a> , <a href="#">1365</a> , <a href="#">1381</a> , <a href="#">1386</a> , <a href="#">1433</a> , <a href="#">1434</a> , <a href="#">1435</a> , <a href="#">1602</a> , <a href="#">1614</a> , <a href="#">1615</a> , <a href="#">1616</a>	<code>\atfi@FILE</code> . . . . .	<a href="#">1566</a> , <a href="#">1567</a> , <a href="#">1569</a> , <a href="#">1571</a> , <a href="#">1574</a>
<code>\atfi@appearancewidth</code> . . . . .	<a href="#">673</a> , <a href="#">701</a> , <a href="#">712</a> , <a href="#">776</a> , <a href="#">891</a> , <a href="#">908</a> , <a href="#">1020</a> , <a href="#">1037</a> , <a href="#">1424</a> , <a href="#">1490</a> , <a href="#">1500</a> , <a href="#">1653</a> , <a href="#">1677</a>	<code>\atfi@file</code> . . . . .	<a href="#">871</a> , <a href="#">875</a> , <a href="#">1000</a> , <a href="#">1004</a> , <a href="#">1447</a> , <a href="#">1457</a> , <a href="#">1632</a> , <a href="#">1636</a>
<code>\atfi@attachfile</code> . . . . .	<a href="#">660</a> , <a href="#">757</a>	<code>\atfi@filename</code> . . . . .	<a href="#">546</a> , <a href="#">547</a> , <a href="#">550</a>
<code>\atfi@author</code> . . . . .	<a href="#">183</a> , <a href="#">185</a> , <a href="#">897</a> , <a href="#">1026</a> , <a href="#">1476</a> , <a href="#">1664</a>	<code>\atfi@FILL</code> . . . . .	<a href="#">486</a> , <a href="#">792</a> , <a href="#">922</a> , <a href="#">1246</a> , <a href="#">1519</a>
<code>\atfi@checksumtrue</code> . . . . .	<a href="#">556</a>	<code>\atfi@FILLSTROKE</code> . . . . .	<a href="#">444</a> , <a href="#">506</a> , <a href="#">793</a> , <a href="#">794</a> , <a href="#">923</a> , <a href="#">1247</a> , <a href="#">1520</a>
<code>\atfi@CLOSEPATH</code> . . . . .	<a href="#">485</a> , <a href="#">505</a> , <a href="#">809</a> , <a href="#">938</a> , <a href="#">1270</a> , <a href="#">1535</a>	<code>\atfi@flags@to@int</code> . . . . .	<a href="#">669</a> , <a href="#">718</a> , <a href="#">747</a>
<code>\atfi@color@annot</code> . . . . .	<a href="#">131</a> , <a href="#">896</a> , <a href="#">1025</a> , <a href="#">1475</a> , <a href="#">1663</a>	<code>\atfi@GRESTORE</code> . . . . .	<a href="#">357</a> , <a href="#">419</a> , <a href="#">461</a> , <a href="#">531</a> , <a href="#">787</a> , <a href="#">917</a> , <a href="#">1241</a> , <a href="#">1514</a>
<code>\atfi@color@inline</code> . . . . .	<a href="#">131</a> , <a href="#">353</a> , <a href="#">402</a> , <a href="#">445</a> , <a href="#">507</a>	<code>\atfi@GSAVE</code> . . . . .	<a href="#">336</a> , <a href="#">365</a> , <a href="#">427</a> , <a href="#">469</a> , <a href="#">786</a> , <a href="#">916</a> , <a href="#">1240</a> , <a href="#">1513</a>
<code>\atfi@color@tex</code> . . . . .	<a href="#">131</a> , <a href="#">308</a> , <a href="#">743</a>	<code>\atfi@header</code> . . . . .	<a href="#">1047</a> , <a href="#">1050</a>
<code>\atfi@CR</code> . . . . .	<a href="#">68</a> , <a href="#">75</a>	<code>\atfi@hours</code> . . . . .	<a href="#">145</a> , <a href="#">149</a> , <a href="#">156</a>
<code>\atfi@creationdatetrue</code> . . . . .	<a href="#">563</a> , <a href="#">573</a>	<code>\atfi@icon</code> . . . . .	<a href="#">125</a> , <a href="#">895</a> , <a href="#">1024</a> , <a href="#">1474</a> , <a href="#">1662</a>
<code>\atfi@CURVETO</code> . . . . .	<a href="#">481</a> , <a href="#">482</a> , <a href="#">483</a> , <a href="#">484</a> , <a href="#">501</a> , <a href="#">502</a> , <a href="#">503</a> , <a href="#">504</a> , <a href="#">806</a> , <a href="#">935</a> , <a href="#">1267</a> , <a href="#">1532</a>	<code>\atfi@icon@icon</code> . . . . .	<a href="#">126</a> , <a href="#">678</a> , <a href="#">680</a> , <a href="#">683</a> , <a href="#">687</a> , <a href="#">691</a> , <a href="#">696</a> , <a href="#">702</a> , <a href="#">704</a> , <a href="#">706</a> , <a href="#">708</a> , <a href="#">774</a> , <a href="#">1374</a>
<code>\atfi@CURVETOY</code> . . . . .	<a href="#">372</a> , <a href="#">375</a> , <a href="#">377</a> , <a href="#">379</a> , <a href="#">381</a> , <a href="#">383</a> , <a href="#">388</a> , <a href="#">391</a> , <a href="#">393</a> , <a href="#">395</a> , <a href="#">397</a> , <a href="#">399</a> , <a href="#">405</a> , <a href="#">408</a> , <a href="#">410</a> , <a href="#">412</a> , <a href="#">414</a> , <a href="#">416</a> , <a href="#">528</a> , <a href="#">807</a> , <a href="#">936</a> , <a href="#">1268</a> , <a href="#">1533</a>	<code>\atfi@insert@file@annot</code> . . . . .	<a href="#">670</a> , <a href="#">748</a> , <a href="#">855</a> , <a href="#">984</a> , <a href="#">1428</a> , <a href="#">1609</a>
<code>\atfi@CURVETOY</code> . . . . .	<a href="#">373</a> , <a href="#">376</a> , <a href="#">378</a> , <a href="#">380</a> , <a href="#">382</a> , <a href="#">384</a> , <a href="#">389</a> , <a href="#">392</a> , <a href="#">394</a> , <a href="#">396</a> , <a href="#">398</a> , <a href="#">400</a> , <a href="#">406</a> , <a href="#">409</a> , <a href="#">411</a> , <a href="#">413</a> , <a href="#">415</a> , <a href="#">417</a> , <a href="#">529</a> , <a href="#">808</a> , <a href="#">937</a> , <a href="#">1269</a> , <a href="#">1534</a>	<code>\atfi@LINETO</code> . . . . .	<a href="#">374</a> , <a href="#">390</a> , <a href="#">407</a> , <a href="#">430</a> , <a href="#">431</a> , <a href="#">432</a> , <a href="#">433</a> , <a href="#">434</a> , <a href="#">435</a> , <a href="#">436</a> , <a href="#">437</a> , <a href="#">438</a> , <a href="#">439</a> , <a href="#">440</a> , <a href="#">441</a> , <a href="#">442</a> , <a href="#">443</a> , <a href="#">451</a> , <a href="#">452</a> , <a href="#">453</a> , <a href="#">457</a> , <a href="#">458</a> , <a href="#">459</a> , <a href="#">472</a> , <a href="#">473</a> , <a href="#">474</a> , <a href="#">475</a> , <a href="#">476</a> , <a href="#">477</a> , <a href="#">478</a> , <a href="#">479</a> , <a href="#">492</a> , <a href="#">493</a> , <a href="#">494</a> , <a href="#">495</a> , <a href="#">496</a> , <a href="#">497</a> , <a href="#">498</a> , <a href="#">499</a> , <a href="#">513</a> , <a href="#">516</a> , <a href="#">519</a> , <a href="#">524</a> , <a href="#">527</a> , <a href="#">789</a> , <a href="#">919</a> , <a href="#">1243</a> , <a href="#">1516</a>
<code>\atfi@date</code> . . . . .	<a href="#">152</a> , <a href="#">162</a> , <a href="#">163</a> , <a href="#">898</a> , <a href="#">1027</a> , <a href="#">1477</a> , <a href="#">1665</a>	<code>\atfi@literal</code> . . . . .	<a href="#">361</a> , <a href="#">423</a> , <a href="#">465</a> , <a href="#">535</a> , <a href="#">785</a> , <a href="#">915</a> , <a href="#">1044</a> , <a href="#">1297</a> , <a href="#">1363</a> , <a href="#">1384</a> , <a href="#">1402</a> , <a href="#">1417</a> , <a href="#">1448</a> , <a href="#">1471</a> , <a href="#">1510</a>
<code>\atfi@DefNoValueName</code> . . . . .	<a href="#">170</a> , <a href="#">181</a> , <a href="#">185</a> , <a href="#">189</a> , <a href="#">193</a>	<code>\atfi@ltx@leftbracechar</code> . . . . .	<a href="#">79</a>
<code>\atfi@description</code> . . . . .	<a href="#">187</a> , <a href="#">189</a> , <a href="#">900</a> , <a href="#">1029</a> , <a href="#">1479</a> , <a href="#">1667</a>	<code>\atfi@Match</code> . . . . .	<a href="#">17</a> , <a href="#">104</a>
<code>\atfi@DisableOption</code> . . . . .	<a href="#">257</a> , <a href="#">297</a> , <a href="#">298</a> , <a href="#">299</a> , <a href="#">300</a> , <a href="#">301</a> , <a href="#">317</a> , <a href="#">318</a> , <a href="#">659</a>	<code>\atfi@mimetype</code> . . . . .	<a href="#">99</a> , <a href="#">101</a> , <a href="#">102</a> , <a href="#">104</a> , <a href="#">111</a> , <a href="#">115</a> , <a href="#">118</a> , <a href="#">120</a> , <a href="#">121</a> , <a href="#">837</a> , <a href="#">966</a> , <a href="#">1313</a> , <a href="#">1577</a>
<code>\atfi@drafttrue</code> . . . . .	<a href="#">292</a>	<code>\atfi@minutes</code> . . . . .	<a href="#">148</a> , <a href="#">157</a>
<code>\atfi@driver</code> . . . . .	<a href="#">208</a> , <a href="#">215</a> , <a href="#">217</a> , <a href="#">225</a> , <a href="#">228</a> , <a href="#">231</a> , <a href="#">234</a> , <a href="#">262</a> , <a href="#">264</a> , <a href="#">268</a> , <a href="#">270</a> , <a href="#">273</a> , <a href="#">275</a> , <a href="#">277</a> , <a href="#">279</a> , <a href="#">287</a> , <a href="#">334</a>	<code>\atfi@moddatetrue</code> . . . . .	<a href="#">584</a> , <a href="#">594</a>
<code>\atfi@driver@dvi</code> . . . . .	<a href="#">212</a> , <a href="#">231</a> , <a href="#">234</a> , <a href="#">268</a> , <a href="#">277</a>	<code>\atfi@MOVETO</code> . . . . .	<a href="#">371</a> , <a href="#">387</a> , <a href="#">404</a> , <a href="#">429</a> , <a href="#">450</a> , <a href="#">456</a> , <a href="#">471</a> , <a href="#">480</a> , <a href="#">491</a> , <a href="#">500</a> , <a href="#">512</a> , <a href="#">515</a> , <a href="#">518</a> , <a href="#">523</a> , <a href="#">526</a> , <a href="#">790</a> , <a href="#">920</a> , <a href="#">1244</a> , <a href="#">1517</a>
		<code>\atfi@nofiletrue</code> . . . . .	<a href="#">634</a>
		<code>\atfi@NoValue</code> . . . . .	<a href="#">169</a> , <a href="#">172</a>
		<code>\atfi@pad@ii</code> . . . . .	<a href="#">135</a> , <a href="#">154</a> , <a href="#">155</a> , <a href="#">156</a> , <a href="#">157</a> , <a href="#">158</a>
		<code>\atfi@params</code> . . . . .	<a href="#">557</a> , <a href="#">564</a> , <a href="#">565</a> , <a href="#">574</a> , <a href="#">575</a> , <a href="#">585</a> , <a href="#">586</a> , <a href="#">595</a> , <a href="#">596</a> , <a href="#">812</a> , <a href="#">817</a> , <a href="#">831</a> , <a href="#">833</a> , <a href="#">838</a> , <a href="#">941</a> , <a href="#">946</a> , <a href="#">960</a> , <a href="#">962</a> , <a href="#">967</a> , <a href="#">1283</a> , <a href="#">1316</a> , <a href="#">1542</a> , <a href="#">1548</a> , <a href="#">1562</a> , <a href="#">1564</a> , <a href="#">1578</a>
		<code>\atfi@PatQuotedString</code> . . . . .	<a href="#">73</a> , <a href="#">108</a>
		<code>\atfi@PatToken</code> . . . . .	<a href="#">55</a> , <a href="#">105</a> , <a href="#">108</a>
		<code>\atfi@pdfstringdef</code> . . . . .	<a href="#">165</a> , <a href="#">175</a> , <a href="#">204</a> , <a href="#">871</a> , <a href="#">1000</a> , <a href="#">1279</a> , <a href="#">1447</a> , <a href="#">1632</a>
		<code>\atfi@pdftexdata</code> . . . . .	<a href="#">601</a> , <a href="#">824</a> , <a href="#">953</a> , <a href="#">1290</a> , <a href="#">1555</a>

<code>\atfi@psfilename</code> . . . . .	1279, 1298	<code>\atfi@writefile</code> . . . . .	<u>641</u> , <u>648</u> , 662, 734
<code>\atfi@RECTFILL</code> . . . . .	338, 350, 351, 352, 354, 355, 356, 801, 930, 1254, 1527	<code>\atfi@xform</code> . . . . .	715, 847, 851, 976, 980, <u>1379</u> , <u>1589</u> , 1604
<code>\atfi@RECTSTROKEFILL</code> . . . . .	342, 802, 931, 1255, 1528	<code>\atfi@xform@icon</code> . . . . .	694, <u>851</u> , 980, 1360, <u>1604</u>
<code>\atfi@crefxform</code> . . . . .	774, <u>852</u> , 981, <u>1415</u> , <u>1605</u>	<code>\atfi@xfrom@icon</code> . . . . .	<u>1360</u>
<code>\atfi@rule</code> . . . . .	1654, 1656, 1658, 1659	<code>\attachfile</code> . . . . .	329, <u>751</u>
<code>\atfi@scale</code> . . . . .	891, 892, 893, 1020, 1021, 1022, 1486, 1490, 1493, 1653, 1655, 1657	<code>\attachfile@file</code> . . . . .	<u>545</u> , 652
<code>\atfi@seconds</code> . . . . .	<u>151</u> , 158	<code>\attachfile@timezone</code> . . . . .	<u>538</u> , 646
<code>\atfi@set@appearance</code> . . . . .	<u>710</u> , 740	<code>\attachfilesetup</code> . . . . .	<u>237</u>
<code>\atfi@set@appearance@icon</code> . . . . .	668, <u>677</u> , 771		
<code>\atfi@SETCMYKCOLORFILL</code> . . . . .	800, 929, 1253, 1526		
<code>\atfi@SETCMYKCOLORSTROKE</code> . . . . .	799, 928, 1252, 1525		
<code>\atfi@SETFLAT</code> . . . . .	339, 367, 487, 804, 933, 1265, 1530		
<code>\atfi@SETGRAYFILL</code> . . . . .	337, 343, 349, 470, 798, 927, 1251, 1524		
<code>\atfi@SETGRAYSTROKE</code> . . . . .	345, 366, 386, 447, 449, 455, 509, 521, 797, 926, 1250, 1523		
<code>\atfi@SETLINECAP</code> . . . . .	369, 805, 934, 1266, 1531		
<code>\atfi@SETLINEJOIN</code> . . . . .	490, 810, 939, 1271, 1536		
<code>\atfi@SETLINEWIDTH</code> . . . . .	340, 368, 403, 428, 488, 511, 522, 788, 918, 1242, 1515		
<code>\atfi@SETMITERLIMIT</code> . . . . .	341, 370, 489, 803, 932, 1264, 1529		
<code>\atfi@SETRGBCOLORFILL</code> . . . . .	796, 925, 1249, 1522		
<code>\atfi@SETRGBCOLORSTROKE</code> . . . . .	795, 924, 1248, 1521		
<code>\atfi@setup</code> . . . . .	<u>96</u> , 128, 134, 304, 666, 738, 770		
<code>\atfi@special</code> . . . . .	<u>1507</u> , 1511, 1572, 1581, 1593, 1599, 1607, 1634, 1659		
<code>\atfi@stream</code> . . . . .	<u>643</u> , 644, 645, 651		
<code>\atfi@STROKE</code> . . . . .	385, 401, 418, 454, 460, 514, 517, 520, 525, 530, 791, 921, 1245, 1518		
<code>\atfi@subject</code> . . . . .	<u>191</u> , 193, 901, 1030, 1480, 1668		
<code>\atfi@temp</code> . . . . .	601, 603, 606, 609, 611, 615, 616, 618, 619, 620, 622, 624, 625, 627, 650, 654, 818, 820, 821, 823, 947, 949, 950, 952, 1284, 1286, 1287, 1289, 1549, 1551, 1552, 1554, 1625, 1630		
<code>\atfi@temp@string</code> . . . . .	166, 167		
<code>\atfi@textattachfile</code> . . . . .	<u>728</u> , 766		
<code>\atfi@textattachfile@i</code> . . . . .	<u>730</u> , <u>732</u>		
<code>\atfi@time</code> . . . . .	<u>144</u> , 146, 149		
<code>\atfi@timezone</code> . . . . .	<u>142</u> , 142, 143, 159, 542, 576, 597, 646		
<code>\atfi@ucfilespec</code> . . . . .	<u>199</u> , 201, 202, 204, 876, 878, 1005, 1007, 1458, 1460, 1637, 1639		
<code>\atfi@Warning</code> . . . . .	46, 91, 110		

<code>\hypersetup</code> . . . . .	870, 999, 1446, 1628	<code>\MessageBreak</code> . . . . .	47, 48, 111, 112, 219, 281, 289, 638
<b>I</b>		<code>\month</code> . . . . .	154
<code>\if@files</code> . . . . .	632	<b>N</b>	
<code>\ifatfi@appearance</code> . . . . .	857, 986, 1430, 1611	<code>\NeedsTeXFormat</code> 2, 782, 912, 1041, 1504	
<code>\ifatfi@checksum</code> . . . . .	554, 1339	<code>\newcommand</code> . . . . .	364, 545
<code>\ifatfi@creationdate</code> . . . . .	559, 561, 571, 1326	<code>\newcounter</code> . . . . .	717, 1272, 1537
<code>\ifatfi@draft</code> . . . . .	319	<code>\newif</code> . . . . .	554, 559, 580
<code>\ifatfi@moddate</code> . . . . .	580, 582, 592, 1333	<code>\newlength</code> . . . . .	673, 674, 675
<code>\ifatfi@nofiles</code> . . . . .	636	<code>\newsavebox</code> . . . . .	676
<code>\ifatfi@print</code> . . . . .	305, 720, 772	<code>\newwrite</code> . . . . .	643
<code>\ifatfi@zoom</code> . . . . .	723	<code>\noattachfile</code> . . . . .	326, 330, 768
<code>\ifcase</code> . . . . .	39, 611	<code>\nofiles</code> . . . . .	639
<code>\ifuatex</code> . . . . .	261	<code>\notextattachfile</code> . . . . .	302, 324, 327
<code>\ifnum</code> . . . . .	136	<code>\NoValue</code> . . . . .	169, 180, 184, 188, 192
<code>\ifpdf</code> . . . . .	214, 260	<code>\number</code> . . . . .	137, 139, 1274, 1539
<code>\ifx</code> . . . . .	102, 118, 172, 202, 270, 271, 275, 277, 287, 539, 547, 616, 620, 625, 820, 823, 831, 876, 949, 952, 960, 1005, 1286, 1289, 1458, 1551, 1554, 1562, 1568, 1637	<code>\numexpr</code> . . . . .	146, 149, 970, 1015
<code>\ifxetex</code> . . . . .	267, 1624, 1629	<b>O</b>	
<code>\immediate</code> . . . . .	644, 645, 651, 835, 848, 872, 964, 977, 1001	<code>\openout</code> . . . . .	644
<code>\input</code> . . . . .	334	<b>P</b>	
<code>\InputIfFileExists</code> . . . . .	255, 553	<code>\PackageError</code> . . . . .	218, 548
<b>J</b>		<code>\PackageInfo</code> . . . . .	637
<code>\jobname</code> . . . . .	553, 638, 644	<code>\PackageWarning</code> . . . . .	91
<b>L</b>		<code>\PackageWarningNoLine</code> . . . . .	280, 288
<code>\lastsavedboxresourceindex</code> . . . . .	978	<code>\parbox</code> . . . . .	321, 360, 422, 464, 534
<code>\lccode</code> . . . . .	69, 80, 85	<code>\pdf@filemdfivesum</code> . . . . .	624
<code>\leavevmode</code> . . . . .	306, 741, 1606	<code>\pdf@filemoddate</code> . . . . .	619
<code>\lowercase</code> . . . . .	70, 81, 86	<code>\pdf@filesize</code> . . . . .	615
<code>\ltx@backslashchar</code> . . . . .	22, 23, 25, 26, 29, 30, 31, 32, 33, 34, 35, 37	<code>\pdf@fannot</code> . . . . .	891
<code>\ltx@empty</code> . . . . .	102, 115, 118, 142, 173, 179, 202, 208, 217, 270, 271, 279, 287, 547, 616, 620, 625, 817, 820, 831, 866, 876, 946, 949, 960, 995, 1005, 1283, 1286, 1439, 1458, 1548, 1551, 1562, 1568, 1620, 1637	<code>\pdf@extension</code> . . . . .	915, 964, 1001, 1020
<code>\ltx@firstoftwo</code> . . . . .	44, 52	<code>\pdf@feedback</code> . . . . .	970, 1015
<code>\ltx@gobble</code> . . . . .	612, 641, 1626	<code>\pdf@lastobj</code> . . . . .	841, 886
<code>\ltx@hashchar</code> . . . . .	24	<code>\pdf@lastxform</code> . . . . .	849
<code>\ltx@ifpackagelater</code> . . . . .	78	<code>\pdf@literate</code> . . . . .	785
<code>\ltx@ifUndefined</code> . . . . .	17, 602, 605, 608, 661, 678, 733, 815, 868, 944, 997, 1278, 1441, 1545, 1622	<code>\pdf@match</code> . . . . .	39
<code>\ltx@ifundefined</code> . . . . .	653	<code>\pdf@obj</code> . . . . .	835, 872
<code>\ltx@leftbracechar</code> . . . . .	35, 82	<code>\pdf@refxform</code> . . . . .	853
<code>\ltx@one</code> . . . . .	601	<code>\pdf@stringdef</code> . . . . .	166
<code>\ltx@percentchar</code> . . . . .	27	<code>\pdf@xform</code> . . . . .	848
<code>\ltx@rightbracechar</code> . . . . .	36, 84	<code>\ProcessKeyvalOptions</code> . . . . .	256
<code>\ltx@secondoftwo</code> . . . . .	41	<code>\protected</code> . . . . .	915
<code>\ltx@zero</code> . . . . .	312, 603, 606, 609, 1383, 1409, 1410, 1411, 1412	<code>\ProvidesFile</code> . . . . .	783, 913, 1042, 1505
<b>M</b>		<code>\ProvidesPackage</code> . . . . .	3
<code>\makebox</code> . . . . .	313, 776, 1424	<b>R</b>	
<code>\mbox</code> . . . . .	1412	<code>\raisebox</code> . . . . .	321, 360, 422, 464, 534, 1416
		<code>\renewcommand</code> . . . . .	1273, 1538
		<code>\RequirePackage</code> . . . . .	5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16
		<code>\rlap</code> . . . . .	1592
		<code>\rule</code> . . . . .	361, 423, 465, 535, 856, 906, 907, 908, 985, 1035, 1036, 1037, 1426, 1429, 1498, 1499, 1500, 1610, 1675, 1676, 1677
		<b>S</b>	
		<code>\savebox</code> . . . . .	679, 711
		<code>\saveboxresource</code> . . . . .	977
		<code>\sbox</code> . . . . .	312
		<code>\setbox</code> . . . . .	1383

<code>\setcounter</code> .....	719	<code>\theatfi@obj</code> .....	1273, 1281, 1306,
<code>\setkeys</code> .....	96, 237,		1310, 1347, 1351, 1362, 1381,
	618, 622, 627, 827, 956, 1293, 1558		1444, 1450, 1454, 1538, 1573,
<code>\setlength</code> .....	700		1581, 1583, 1593, 1602, 1634, 1647
<code>\SetupKeyvalOptions</code> .....	92	<code>\time</code> .....	144
<code>\smash</code> .....	1591		
<code>\space</code> .....	639, 860, 861,		<b>U</b>
	862, 989, 990, 991, 1369, 1371,	<code>\usebox</code> .....	1401, 1412, 1598
	1389, 1391, 1392, 1487, 1491,	<code>\useboxresource</code> .....	982
	1494, 1593, 1594, 1595, 1656, 1658		
<code>\special</code> .....	1045, 1048, 1508		<b>W</b>
<code>\stepcounter</code> .....	1280,	<code>\wd</code> 313, 684, 712, 1369, 1391, 1411, 1594	
	1361, 1380, 1442, 1546, 1590, 1633	<code>\write</code> .....	645, 651
<code>\strip@pt</code> .....	1369, 1370,		<b>X</b>
	1389, 1391, 1392, 1486, 1490, 1493	<code>\x</code> .....	826, 829,
<code>\strut</code> .....	309, 312, 744		955, 958, 1292, 1295, 1557, 1560
	<b>T</b>		<b>Y</b>
<code>\textattachfile</code> .....	323, 759	<code>\year</code> .....	153
<code>\the</code> .....	144, 153, 684, 688, 692,		
	841, 849, 886, 970, 978, 1015,		<b>Z</b>
	1594, 1595, 1596, 1654, 1656, 1658	<code>\z@</code> .....	1409, 1410, 1411
<code>\theatfi@flags</code> .....	903, 1032, 1482, 1670		