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BUILDING ARM-LINUX SOFTFPU CROSSCOMPILER (AMD64/ANDROID)

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I'm trying to build an FPC to will hopefully compile for the Android platform, which is an ARM/Linux platform, currently. The actual devices this runs on do not have an FPU (then again, neither do most Windows Mobile devices but FPC apps run fine).

With prebuilt arm-linux packages for Win32, I get "illegal instruction" on run.

So I decided to try to build my own with `OPT="-Cfsoft"`, on my amd64 ubuntu box, using the arm-eabi-4.2.1 toolchain that comes with the Android source (which is GNU). I tried this with 2.2.2 but couldn't get it compiled (errors in system.pp about unsupported instructions), so now

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I'm trying with 2.3.1 from SVN but still have no luck.

I'm using the compiler created with 'make all' of the same sources.

First, without **Cfsoft**:

```
make crossall CPU_TARGET=arm OS_TARGET=linux
CROSSBINDIR=/home/jorrit/mydroid/prebuilt/linux-
x86/toolchain/arm-eabi-4.2.1/bin/
BINUTILSPREFIX=arm-eabi- FPC=/usr/local/lib/fpc
/2.3.1/ppcx64
```

Resulting in:

```
make[5]: Entering directory `/home/jorrit/fpc/rtl
/linux'
/bin/mkdir -p /home/jorrit/fpc/rtl/units/arm-linux
/home/jorrit/mydroid/prebuilt/linux-x86/toolchain
/arm-eabi-4.2.1/bin//arm-eabi-as -o /home/jorrit
/fpc/rtl/units/arm-linux/prt0.o arm/prt0.as
/home/jorrit/mydroid/prebuilt/linux-x86/toolchain
/arm-eabi-4.2.1/bin//arm-eabi-as -o /home/jorrit
/fpc/rtl/units/arm-linux/dllprt0.o arm/dllprt0.as
/home/jorrit/mydroid/prebuilt/linux-x86/toolchain
/arm-eabi-4.2.1/bin//arm-eabi-as -o /home/jorrit
/fpc/rtl/units/arm-linux/cprt0.o arm/cprt0.as
/home/jorrit/mydroid/prebuilt/linux-x86/toolchain
/arm-eabi-4.2.1/bin//arm-eabi-as -o /home/jorrit
/fpc/rtl/units/arm-linux/gprt0.o arm/gprt0.as
/home/jorrit/mydroid/prebuilt/linux-x86/toolchain
/arm-eabi-4.2.1/bin//arm-eabi-as -o /home/jorrit
/fpc/rtl/units/arm-linux/ucprt0.o arm/ucprt0.as
/home/jorrit/fpc/compiler/ppccrossarm -Ur -Parm
-XParm-eabi- -Xr -XX -CX -Ur -Xs -O2 -n -Fi../inc
-Fi../arm -Fi../unix -Fiarm -FD/home/jorrit
/mydroid/prebuilt/linux-x86/toolchain/arm-eabi-
4.2.1/bin/ -FE. -FU/home/jorrit/fpc/rtl/units
/arm-linux -darm -dRELEASE -Us -Sg system.pp
Fatal: Compilation aborted
An unhandled exception occurred at
$0000000000534C5F :
EAccessViolation : Access violation
$0000000000534C5F
$000000000050A395
$000000000050A783
$0000000000506DAB
$0000000000509CB8
$0000000000539A4A
$0000000000420CAD
```

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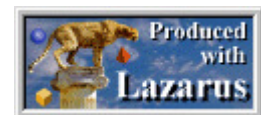
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\$00000000004003D2

```
make[5]: *** [system.ppu] Error 217
make[5]: Leaving directory `/home/jorrit/fpc/rtl
/linux'
```

Notice at this stage it has already built ppcrossarm.

With the **Cfsoft** option, it doesn't get to building ppcrossarm:

```
make crossall CPU_TARGET=arm OS_TARGET=linux
CROSSBINDIR=/home/jorrit/mydroid/prebuilt/linux-
x86/toolchain/arm-eabi-4.2.1/bin/
BINUTILSPREFIX=arm-eabi- FPC=/usr/local/lib/fpc
/2.3.1/ppcx64 OPT="-Cfsoft"
```

Resulting in:

```
make[6]: Entering directory `/home/jorrit/fpc/rtl
/linux'
/bin/mkdir -p /home/jorrit/fpc/rtl/units
/x86_64-linux
as --64 -o /home/jorrit/fpc/rtl/units/x86_64-
linux/prt0.o x86_64/prt0.as
as --64 -o /home/jorrit/fpc/rtl/units/x86_64-
linux/dllprt0.o x86_64/dllprt0.as
as --64 -o /home/jorrit/fpc/rtl/units/x86_64-
linux/cprt0.o x86_64/cprt0.as
as --64 -o /home/jorrit/fpc/rtl/units/x86_64-
linux/gprt0.o x86_64/gprt0.as
/usr/local/lib/fpc/2.3.1/ppcx64 -Ur -Ur -Xs -O2 -n
-Fi../inc -Fi../x86_64 -Fi../unix -Fix86_64 -FE.
-FU/home/jorrit/fpc/rtl/units/x86_64-linux -Cg
-Cfsoft -dx86_64 -dRELEASE -Us -Sg system.pp
system.inc(288,2) Fatal: Internal error 200506041
Fatal: Compilation aborted
make[6]: *** [system.ppu] Error 1
make[6]: Leaving directory `/home/jorrit/fpc/rtl
/linux'
```

system.inc(288,2) in my sources is:

```
{$ifdef SUPPORT_EXTENDED}
operator := (b:real48) e:extended;{$ifdef
SYSTEMINLINE}inline;{$endif}
begin
e:=real2double(b);
end;
{$endif SUPPORT_EXTENDED}
```

I also tried using -uSUPPORT_EXTENDED options, but to no avail.

Any help or insights into getting this to build would be much appreciated (or if anyone has bin/ and units/ for arm-linux with softFPU for amd64 or win32 I'll happily take those too :))

On another note, Android uses a non-standard libc ("bionic"), wondering if that could pose any problems.

-- [Jorrit Jongma](#), 10 November 2008 15:46 [\(email\)](#)

ANSWERS:

The standard way of building an armel compiler is to use

```
make all CPU_TARGET=arm OS_TARGET=linux  
OPT=-dFPC_ARMEL
```

-dFPC_ARMEL takes care of everything needed for arm-eabi which seems to be used by android. There are still some issues with calling conventions and alignment but make all works and creates a native working compiler.

The different libc should not affect the basic stuff like the compiler.

-- [Florian Klaempfl](#), 11 November 2008 13:33 [\(email\)](#)

Thanks for the info Florian. However, using that command I'm still getting the AV when compiling.

Tried with 2.3.1 from SVN (updated today as well), 2.2.1 and 2.2.2. Pasted from 2.3.1 compile:

```
/home/jorrit/fpc/compiler/ppcrossarm -Ur -Parm  
-XParm-eabi- -Xr -Ur -Xs -O2 -n -Fi../inc -Fi../arm  
-Fi../unix -Fiarm -FD/home/jorrit/mydroid/prebuilt  
/linux-x86/toolchain/arm-eabi-4.2.1/bin/ -FE.  
-FU/home/jorrit/fpc/rtl/units/arm-linux -darm  
-dRELEASE -Us -Sg system.pp  
Fatal: Compilation aborted  
An unhandled exception occurred at
```

```
$0000000000534B0F :  
EAccessViolation : Access violation  
$0000000000534B0F  
$000000000050A335  
$000000000050A723  
$0000000000506D4B  
$0000000000509C58  
$00000000005398FA  
$0000000000420CAD  
$00000000004003D2
```

Sadly, Android doesn't come with a Windows toolchain. I'll try finding another arm-eabi toolchain that does work on Win32, though, but preferably I'd get this working on my Ubuntu x64 box. If there's anything I can do to help this error get resolved, I'd be happy to try/help.

-- [Jorrit Jongma](#), 11 November 2008 (email)
18:18

Try to build with "OPT=-O- -gl" so we get a stack frame with line info.

-- [Florian Klaempfl](#), 11 November 2008 (email)
18:56

Here's the output of that:

```
/home/jorrit/fpc/compiler/ppcrossarm -Ur -Parm  
-XParm-eabi- -Xr -Ur -Xs -O2 -n -Fi../inc -Fi../arm  
-Fi../unix -Fiarm -FD/home/jorrit/mydroid/prebuilt  
/linux-x86/toolchain/arm-eabi-4.2.1/bin/ -FE.  
-FU/home/jorrit/fpc/rtl/units/arm-linux -darm  
-dRELEASE -Us -Sg system.pp  
Fatal: Compilation aborted  
An unhandled exception occurred at  
$0000000000551DDF :  
EAccessViolation : Access violation  
$0000000000551DDF line 895 of aoptobj.pas  
$0000000000551E3B line 924 of aoptobj.pas  
$0000000000552562 line 1104 of aoptobj.pas  
$0000000000535413 line 217 of aopt.pas  
$00000000005355E9 line 271 of aopt.pas  
$0000000000524C80 line 1089 of psub.pas  
$0000000000525C79 line 1422 of psub.pas  
$0000000000525B90 line 1497 of psub.pas  
$000000000052608D line 1622 of psub.pas  
$000000000052643A line 1710 of psub.pas  
$0000000000522141 line 172 of psub.pas
```

```
$000000000052548E line 1307 of psub.pas
$000000000057B3BE line 1088 of pmodules.pas
$0000000000557CFC line 376 of parser.pas
$0000000000426B65 line 243 of compiler.pas
$00000000004003D2 line 207 of pp.pas
```

-- [Jorrit Jongma](#), 11 November 2008 (email)
19:08

Should be fixed in 12049

-- [Florian Klaempfl](#), 11 November 2008 20:17 (email)

For completeness sake (Google's?), I eventually got it working.

Requirements:

- FPC from SVN (some required updates were made today by Florian)

- binutils-arm-linux-gnueabi package (apt-get), the binutils that come with Android source (at least the version I have) do not work.

'make all' failed on this setup, but what worked was:

```
make all CPU_TARGET=arm OS_TARGET=linux
CROSSBINDIR=/usr/bin BINUTILSPREFIX=arm-linux-
gnueabi- FPC=/usr/local/lib/fpc/2.3.1/ppcx64
OPT="-dFPC_ARMEL -O- -gl" CROSSOPT="-O-
```

compiled helloworld.pp like this:

```
./ppcrossarm -Tlinux -O- -FD/usr/arm-linux-
gnueabi/bin -XParm-linux-gnueabi- helloworld.pp
```

And the result is somewhat working on Android:

<http://www.jongma.org/tmp/android-helloworld.jpg>

Still has some issues, for example the app wont exit, but its a start!

-- [Jorrit Jongma](#), 12 November 2008 00:30 (email)

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