Notes on tools

These are some general notes that may be useful when bringing up the software.

General

On MacOSX:

- Obtain and install macports
- `port install screen`, will provide a terminal emulator
- `port install clang-3.3`, will provide C++11 support

On CentOS Linux:

- `yum install devtoolset-1.0`, which will provide GCC 4.7 supporting C++11
- `yum install screen`, which will provide a terminal emulator

COMPILING HINTS

Get and install arm-xilinx-linux-gnueabi via Xilinx version 14.4 or higher Vivado toolset with the SDK

- Uses Code Sourcery cross-compiler for ARM on Xilinx with the LINUX libraries

Get and activate LLVM clang++ compiler for MacOSX 10.8 (Mountain Lion x86_64)

- `port select gcc mp-clang3.3`

Activate GCC g++ 4.7 compiler for Centos Linux 5.8

- `source /opt/centos/devtoolset-1.0/enable` will setup search paths

Be sure to remove any of the following from your environment (they are bad for your sanity):

- `unsetenv GCC_EXEC_PREFIX`
- `unsetenv C_INCLUDE_PATH`

- `unsetenv CPLUS_INCLUDE_PATH`
- `unsetenv LD_LINK_LIBRARY`
- `unsetenv LD_LIBRARY_PATH`
- `unsetenv DYLD_LIBRARY_PATH`

The makefiles provided assume GNU make (aka gmake) version 3.82 or better.

RUNNING HINTS

Connecting via Ethernet and copying via SCP

When zedboard powers up using the default linux image, it provides ftp, telnet and ssh access via TCP address 192.168.1.10.

If you are unable to connect to the ethernet port, you can change it via the UART port using:

```
zynq> `ifconfig eth0 ###.###.###.###`
```

Telnet to the zedboard from the Linux SystemC host and then use netstat on the host system to determine the return address. You will need two terminal windows on the host machine. The following assumes the default TCP/IP # for the ZedBoard (192.168.1.10):

From 1st window

```
    % telnet 192.168.1.10
    / # passwd
    Changing password for root
    New password: S3Cr3t!
    Retype password: S3Cr3t!
    Password for root changed by root
    / # exit  #<<<=== (after step 2 below is completed)
    %
```

From 2nd window

```
% netstat -p TCP | grep 192.168.1.10
Active Internet connections
Proto Recv-Q Send-Q Local Address          Foreign Address      (state)
tcp4       0      0 **192.168.1.12.51080** 192.168.1.10.telnet  ESTABLISHE
tcp4       0      0  192.168.207.242.51071 204.152.18.206.https ESTABLISHE
^C
% scp software.zed root@192.168.1.10:/ #<<<=== copy software onto zedboard
root@192.168.1.10's password: R*****!
software.zed                                          100%   65KB  64.
%
```

Connecting to the USB UART

After connecting the USB UART, 'ls /dev' and look for the TTY representing the zedboard connection. On MacOSX, it is called '/dev/tty.usbmodem14221'. On CentOS, it is called '/dev/ttyACM0'.

Connect to zedboard with `screen DEVICE_PATH 115200`.

- On MacOSX: `screen /dev/tty.usbmodem1a12131 115200`
- On Linux: `screen /dev/tty.

Hit the return key or power cycle. You should see something like:

```
U-Boot 2011.03-dirty (Jul 11 2012 - 16:07:00)

DRAM:  512 MiB
MMC:   SDHCI: 0
Using default environment

In:    serial
Out:   serial
Err:   serial
Net:   zynq_gem
Hit any key to stop autoboot:  3...2...1...0
Copying Linux from SD to RAM...
Device: SDHCI
Manufacturer ID: 12
OEM: 3456
Name: SMI
Tran Speed: 25000000
```

```
Rd Block Len: 512
SD version 1.10
High Capacity: Yes
Capacity: 3967811584
Bus Width: 1-bit
reading zImage

2479640 bytes read
reading devicetree_ramdisk.dtb

5817 bytes read
reading ramdisk8M.image.gz

3694108 bytes read
## Starting application at 0x00008000 ...
Uncompressing Linux... done, booting the kernel.
[0.000000] Booting Linux on physical CPU 0
[0.000000] Linux version 3.3.0-digilent-12.07-zed-beta (tinghui.wang@DIGILENT_
[0.000000] CPU: ARMv7 Processor [413fc090] revision 0 (ARMv7), cr=18c5387d
[0.000000] CPU: PIPT / VIPT nonaliasing data cache, VIPT aliasing instruction
[0.000000] Machine: Xilinx Zynq Platform, model: Xilinx Zynq ZED
[0.000000] bootconsole [earlycon0] enabled
[0.000000] Memory policy: ECC disabled, Data cache writealloc
[0.000000] BUG: mapping for 0xf8f00000 at 0xfe00c000 out of vmalloc space
[0.000000] BUG: mapping for 0xe0000000 at 0xfe000000 out of vmalloc space
[0.000000] BUG: mapping for 0xffff1000 at 0xfe200000 out of vmalloc space
[0.000000] PERCPU: Embedded 7 pages/cpu @c1489000 s5696 r8192 d14784 u32768
[0.000000] Built 1 zonelists in Zone order, mobility grouping on.  Total pages
[0.000000] Kernel command line: console=ttyPS0,115200 root=/dev/ram rw initrd=
[0.000000] PID hash table entries: 2048 (order: 1, 8192 bytes)
[0.000000] Dentry cache hash table entries: 65536 (order: 6, 262144 bytes)
[0.000000] Inode-cache hash table entries: 32768 (order: 5, 131072 bytes)
[0.000000] Memory: 240MB 256MB = 496MB total
[0.000000] Memory: 489856k/489856k available, 34432k reserved, 0K highmem
[0.000000] Virtual kernel memory layout:
[0.000000]     vector  : 0xffff0000 - 0xffff1000   (   4 kB)
[0.000000]     fixmap  : 0xfff00000 - 0xfffe0000   ( 896 kB)
[0.000000]     vmalloc : 0xe0800000 - 0xfd000000   ( 456 MB)
[0.000000]     lowmem  : 0xc0000000 - 0xe0000000   ( 512 MB)
[0.000000]     pkmap   : 0xbfe00000 - 0xc0000000   (   2 MB)
[0.000000]     modules : 0xbf000000 - 0xbfe00000   (  14 MB)
[0.000000]       .text : 0xc0008000 - 0xc042f040   (4253 kB)
```

```
[0.000000]       .init : 0xc0430000 - 0xc0456640   ( 154 kB)
[0.000000]       .data : 0xc0458000 - 0xc0485dc0   ( 184 kB)
[0.000000]        .bss : 0xc0485de4 - 0xc049d734   (  95 kB)
[0.000000] Preemptible hierarchical RCU implementation.
[0.000000]  Verbose stalled-CPUs detection is disabled.
[0.000000] NR_IRQS:128
[0.000000] xlnx,ps7-ttc-1.00.a #0 at 0xe0800000, irq=43
[0.000000] Console: colour dummy device 80x30
[0.000000] Calibrating delay loop... 1594.16 BogoMIPS (lpj=7970816)
[0.090000] pid_max: default: 32768 minimum: 301
[0.090000] Mount-cache hash table entries: 512
[0.090000] CPU: Testing write buffer coherency: ok
[0.090000] CPU0: thread -1, cpu 0, socket 0, mpidr 80000000
[0.100000] smp_twd: clock not found: -2
[0.100000] Calibrating local timer... 399.37MHz.
[0.170000] hw perfevents: enabled with ARMv7 Cortex-A9 PMU driver, 7 counters
[0.170000] Setting up static identity map for 0x2f8d48 - 0x2f8d7c
[0.270000] CPU1: Booted secondary processor
[0.310000] CPU1: thread -1, cpu 1, socket 0, mpidr 80000001
[0.310000] Brought up 2 CPUs
[0.310000] SMP: Total of 2 processors activated (3188.32 BogoMIPS).
[0.320000] devtmpfs: initialized
[0.320000] ------------[ cut here ]------------
[0.320000] WARNING: at arch/arm/mm/dma-mapping.c:198 consistent_init+0x70/0x10
[0.330000] Modules linked in:
[0.330000] [<c0012920>] (unwind_backtrace+0x0/0xe0) from [<c001e924>] (warn_sl
[0.340000] [<c001e924>] (warn_slowpath_common+0x4c/0x64) from [<c001e954>] (wa
[0.350000] [<c001e954>] (warn_slowpath_null+0x18/0x1c) from [<c04345a8>] (cons
[0.360000] [<c04345a8>] (consistent_init+0x70/0x104) from [<c000858c>] (do_one
[0.360000] [<c000858c>] (do_one_initcall+0x90/0x160) from [<c043085c>] (kernel
[0.370000] [<c043085c>] (kernel_init+0x84/0x128) from [<c000dfcc>] (kernel_thr
[0.380000] ---[ end trace 1b75b31a2719ed1c ]---
[0.380000] ------------[ cut here ]------------
[0.390000] WARNING: at arch/arm/mm/dma-mapping.c:198 consistent_init+0x70/0x10
[0.390000] Modules linked in:
[0.390000] [<c0012920>] (unwind_backtrace+0x0/0xe0) from [<c001e924>] (warn_sl
[0.400000] [<c001e924>] (warn_slowpath_common+0x4c/0x64) from [<c001e954>] (wa
[0.410000] [<c001e954>] (warn_slowpath_null+0x18/0x1c) from [<c04345a8>] (cons
[0.420000] [<c04345a8>] (consistent_init+0x70/0x104) from [<c000858c>] (do_one
[0.430000] [<c000858c>] (do_one_initcall+0x90/0x160) from [<c043085c>] (kernel
[0.430000] [<c043085c>] (kernel_init+0x84/0x128) from [<c000dfcc>] (kernel_thr
[0.440000] ---[ end trace 1b75b31a2719ed1d ]---
```

```
[0.440000] NET: Registered protocol family 16
[0.460000] L310 cache controller enabled
[0.460000] l2x0: 8 ways, CACHE_ID 0x410000c8, AUX_CTRL 0x72060000, Cache size:
[0.460000] registering platform device 'pl330' id 0
[0.470000] registering platform device 'arm-pmu' id 0
[0.470000]
[0.470000] ################################################
[0.480000] #                                              #
[0.480000] #                Board ZED Init                #
[0.480000] #                                              #
[0.490000] ################################################
[0.490000]
[0.500000] hw-breakpoint: found 5 (+1 reserved) breakpoint and 1 watchpoint re
[0.500000] hw-breakpoint: maximum watchpoint size is 4 bytes.
[0.530000] xslcr xslcr.0: at 0xF8000000 mapped to 0xE0808000
[0.540000] bio: create slab <bio-0> at 0
[0.540000] gpiochip_add: registered GPIOs 0 to 245 on device: xgpiops
[0.540000] xgpiops e000a000.gpio: gpio at 0xe000a000 mapped to 0xe080a000
[0.830000] xusbps-ehci xusbps-ehci.0: USB 2.0 started, EHCI 1.00
[0.830000] hub 1-0:1.0: USB hub found
[0.830000] hub 1-0:1.0: 1 port detected
[0.840000] Initializing USB Mass Storage driver...
[0.840000] usbcore: registered new interface driver usb-storage
[0.850000] USB Mass Storage support registered.
[0.850000] Xilinx PS USB Device Controller driver (Apr 01, 2011)
[0.860000] mousedev: PS/2 mouse device common for all mice
[0.860000] Linux video capture interface: v2.00
[0.870000] gspca_main: v2.14.0 registered
[0.870000] usbcore: registered new interface driver uvcvideo
[0.870000] USB Video Class driver (1.1.1)
[0.880000] WDT OF probe
[0.880000] xwdtps f8005000.swdt: Xilinx Watchdog Timer at 0xe081c000 with time
[0.890000] sdhci: Secure Digital Host Controller Interface driver
[0.890000] sdhci: Copyright(c) Pierre Ossman
[0.900000] sdhci-pltfm: SDHCI platform and OF driver helper
[0.900000] mmc0: Invalid maximum block size, assuming 512 bytes
[0.910000] mmc0: SDHCI controller on e0100000.sdhci [e0100000.sdhci] using ADM
[0.910000] usbcore: registered new interface driver usbhid
[0.920000] usbhid: USB HID core driver
[0.920000] No connectors reported connected with modes
[0.930000] adv7511 0-0039: Failed to add route DAI IN->TMDS
[0.940000] [drm] Cannot find any crtc or sizes - going 1024x768
```

```
[0.940000] drivers/gpu/drm/analog/analog_drm_fbdev.c:analog_drm_fbdev_probe[24
[0.960000] asoc: adv7511 <-> 75c00000.axi-spdif-tx mapping ok
[0.970000] axi-spdif 75c00000.axi-spdif-tx: Failed to set DAI format: -22
[0.970000] Console: switching to colour frame buffer device 128x48
[0.980000] ALSA device list:
[0.980000]   #0: HDMI monitor
[0.980000] TCP cubic registered
[0.980000] NET: Registered protocol family 17
[0.980000] VFP support v0.3: implementor 41 architecture 3 part 30 variant 9 r
[0.980000] Registering SWP/SWPB emulation handler
[0.980000] registered taskstats version 1
[0.980000] drivers/rtc/hctosys.c: unable to open rtc device (rtc0)
[1.000000] mmc0: new high speed SDHC card at address b368
[1.000000] mmcblk0: mmc0:b368 SMI   3.69 GiB
[1.030000]  mmcblk0: p1
[1.030000] fb0:  frame buffer device
[1.030000] drm: registered panic notifier
[1.030000] [drm] Initialized analog_drm 1.0.0 20110530 on minor 0
[1.050000] RAMDISK: gzip image found at block 0
[1.310000] EXT4-fs (ram0): warning: mounting unchecked fs, running e2fsck is r
[1.310000] EXT4-fs (ram0): mounted filesystem without journal. Opts: (null)
[1.320000] VFS: Mounted root (ext4 filesystem) on device 1:0.
[1.320000] Freeing init memory: 152K
Starting rcS...
++ Mounting filesystem
++ Setting up mdev
++ Configure static IP 192.168.1.10
[1.510000] GEM: lp->tx_bd ffdfb000 lp->tx_bd_dma 18fd7000 lp->tx_skb d8ac17c0
[1.520000] GEM: lp->rx_bd ffdfc000 lp->rx_bd_dma 18fd8000 lp->rx_skb d8ac18c0
[1.520000] GEM: MAC 0x00350a00, 0x00002201, 00:0a:35:00:01:22
[1.530000] GEM: phydev d8b87400, phydev->phy_id 0x1410dd1, phydev->addr 0x0
[1.530000] eth0, phy_addr 0x0, phy_id 0x01410dd1
[1.540000] eth0, attach [Marvell 88E1510] phy driver
++ Starting telnet daemon
++ Starting http daemon
++ Starting ftp daemon
++ Starting dropbear (ssh) daemon
++ Starting OLED Display
[1.580000] pmodoled-gpio-spi [zed_oled] SPI Probing
++ Exporting LEDs & SWs
rcS Complete
zynq>
```

```
zynq> [5.540000] eth0: link up (1000/FULL)
zynq> ls
bin/        lib/        lost+found/ proc/       sys/        var/
dev/        licenses/   mnt/        root/       tmp/
etc/        linuxrc@    opt/        sbin/       usr/
mzynq>
```

Loading software via FTP

Put the executable from zedboard directory onto the zedboard with ftp as follows:

```
linux % ftp 192.168.1.10
Connected to 192.168.1.10.
220 Operation successful
230 Operation successful
Remote system type is UNIX.
Using binary mode to transfer files.
binary
200 Operation successful
prompt
Interactive mode off.
hash
Hash mark printing on (1024 bytes/hash mark).
pwd
Remote directory: /
ftp> bin
200 Operation successful
ftp> hash
Hash mark printing off.
ftp> hash
Hash mark printing on (1024 bytes/hash mark).
ftp> put software.zed
local: software.zed remote: software.zed
229 EPSV ok (|||57413|)
150 Ok to send data
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################################################
#####################################
226 Operation successful
797917 bytes sent in 00:00 (1.94 MiB/s)
ftp> quit
221 Operation successful
linux %
```

Safe Power off

Be sure to poweroff cleanly:

```
zynq> poweroff
zynq> Starting rcK...
  ++ Stopping OLED Display
[  542.820000] pmodoled-gpio-spi [zed_oled] spi_remove: Device Removed
  ++ Unmounting filesystem
rcK Complete
The system is going down NOW!
Sent SIGTERM to all processes
Sent SIGKILL to all processes
Requesting system poweroff
[  544.940000] System halted.
```