

*****Draft*****

Hardware Testing Sdram, Bkram, and GPIO

04/10/21

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- bkram(wx) : ORIGIN = 0x00a00000, LENGTH = 0x00002000
- sdram(wx) : ORIGIN = 0x01000000, LENGTH = 0x00800000
- + bkram(wx) : ORIGIN = 0x01400000, LENGTH = 0x00002000
- + sdram(wx) : ORIGIN = 0x02000000, LENGTH = 0x01000000

The goal with the chg below was trying to fix the above in hopes of getting arm-zipload working.

This chg in auto-data/sdramdev.txt

```
-@$NADDR=(1<<(@$THIS.LGMEMSZ-3))  
+@$NADDR=(1<<(@$THIS.LGMEMSZ-2))  
Results in 703 3108 24939 ../NADDR1.txt
```

In several files.

- modified: auto-data/bkram.ld
- modified: auto-data/flashram.ld
- modified: auto-data/sdram.ld
- modified: auto-data/sdram_only.ld
- modified: auto-data/sdramdev.txt
- modified: doc/hardware-testing.odt
- modified: rtl/catzip/builddate.v
- modified: rtl/catzip/main.v
- modified: sim/verilated/main_tb.cpp
- modified: sw/board/board.h
- modified: sw/board/board.ld
- modified: sw/board/boardram.ld
- modified: sw/host/regdefs.h
- modified: sw/host/wr.sh
- modified: sw/host/wr1.sh
- modified: sw/zlib/board.h

Make a copy of the working software to test on RPi3 with Catboard.

```
devel@mypi3-16:~/testbuilds $ rsync -avl catzip-newautofpga mypi3-21:~/
```

```
devel@mypi3-21:~ $ cd catzip-newautofpga/catzip/sw/host
```

Program the FPGA using config_cat

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ sudo config_cat ../../rtl/catzip/catzip.bin
```

GPIO 25 not exported, trying to export...

GPIO 17 not exported, trying to export...

GPIO 22 not exported, trying to export...

OK: SPI driver loaded

Setting GPIO directions

```
out
out
in
Setting output to low
0
Reseting FPGA
0
1
Checking DONE pin
0
Continuing with configuration procedure
263+1 records in
263+1 records out
135100 bytes (135 kB, 132 KiB) copied, 0.0268802 s, 5.0 MB/s
Setting output to high
1
Checking DONE pin
1
Start the software that listens to local port & a remote port.
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ sudo ./arm-netpport
Listening on port 8363
Listening on port 8364
```

Check the date the catzip was created using local software.

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs version
01000014 ( VERSION) : [!..] 20210410
```

Check the date the catzip was created using remote software.

```
devel@mypi3-16:~/testbuilds/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs -n mypi3-21 -p
8363 version
00800014 ( VERSION) : [!..] 20210408
```

The address of both sdram & bkram changed.

```
#define R_BKRAM          0x01400000    // 01400000, wbregs names: RAM
#define R_SDRAM          0x02000000    // 02000000, wbregs names: SDRAM
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ cat wr.sh
#!/bin/bash
./arm-wbregs 33554432 0x55
./arm-wbregs 33554436 0xaa
./arm-wbregs 33554440 0x01
./arm-wbregs 33554444 0x02
./arm-wbregs 33554448 0x00010000
./arm-wbregs 33554452 0x00020000
./arm-wbregs 33554432
./arm-wbregs 33554436
./arm-wbregs 33554440
./arm-wbregs 33554444
```

```
./arm-wbregs 33554448
./arm-wbregs 33554452
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ cat wr1.sh
```

```
#!/bin/bash
```

```
./arm-wbregs 20971520 0x55
./arm-wbregs 20971524 0xaa
./arm-wbregs 20971528 0x01
./arm-wbregs 20971532 0x02
./arm-wbregs 20971536 0x00010000
./arm-wbregs 20971540 0x00020000
./arm-wbregs 20971520
./arm-wbregs 20971524
./arm-wbregs 20971528
./arm-wbregs 20971532
./arm-wbregs 20971536
./arm-wbregs 20971540
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./wr1.sh
```

```
01400000 ( RAM)-> 00000055
01400004 ( )-> 000000aa
01400008 ( )-> 00000001
0140000c ( )-> 00000002
01400010 ( )-> 00010000
01400014 ( )-> 00020000
01400000 ( RAM) : [...U] 00000055
01400004 ( ) : [...] 000000aa
01400008 ( ) : [...] 00000001
0140000c ( ) : [...] 00000002
01400010 ( ) : [...] 00010000
01400014 ( ) : [...] 00020000
```

A program using ./arm-wbregs which is Poke & Peek to the FPGA.

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./wr.sh
```

```
02000000 ( SDRAM)-> 00000055
02000004 ( )-> 000000aa
02000008 ( )-> 00000001
0200000c ( )-> 00000002
02000010 ( )-> 00010000
02000014 ( )-> 00020000
02000000 ( SDRAM) : [...U] 00000055
02000004 ( ) : [...] 000000aa
02000008 ( ) : [...] 00000001
0200000c ( ) : [...] 00000002
02000010 ( ) : [...] 00010000
02000014 ( ) : [...] 00020000
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs 20971520
```

```
01000004 ( ) : [...] 000000aa
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs 20971540
```

```
01000014 ( ) : [...] 00020000
```

```
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs 0x02000000
01000000 ( SDRAM) : [...U] 00000055
devel@mypi3-21:~/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs 0x02000010
01000010 ( ) : [...] 00010000
```

Turns on Led4

```
devel@mypi3-21:~/testbuilds/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs gpio 0x00010001
0080000c ( GPIO)-> 00010001
```

Turns on Led2

```
devel@mypi3-21:~/testbuilds/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs gpio 0x00020002
0080000c ( GPIO)-> 00020002
devel@mypi3-21:~/testbuilds/catzip-newautofpga/catzip/sw/host $ ./arm-wbregs gpio 0x00070000
0080000c ( GPIO)-> 00070000
```



Leds 4 & 2 on.

