

The following document describes a LA capture of ES1370 abnormal behavior. The sound driver stop's and starts DACs 1 & 2 independently. The LA triggers on a bus mastered **write**. Write's should not occur since we don't even use the ADC.

50us

Focus: REQ/GNT's, Trigger, REQ/GNT's after trigger

Both DAC1 & 2 are running at 44100 Samples/s.
Both DAC1 & 2 are set for 16-bit stereo.

Hence DAC1 & 2 need 44100 DWORDS/s.

The ES1370 draws in 8 DWORD per burst.

$8 \text{ DWORDS} / 44100 \text{ DWORD/s} = 181.40 \text{ us} = t1 \text{ (Period)}$

The requests for DAC1 & 2 happen to be fairly close together, this varies since they're never synchronized.

The first of the closely coupled requests is for DAC1.

The trigger is the write in question, it is not a read for DAC2 since DAC2 was "Disabled" (Interrupt/Chip Select Control Register, BIT5) just prior to trigger. Note the lack of the REQ/GNT's after the trigger: DAC2 is in fact stopped.

200ns

Focus: DAC, Trigger

DAC – "11" Both DAC's Enabled, "01" DAC2 Disabled

DAC2 disabled before trigger.

20ns

Focus: Memory write, undocumented register values

The ES1370 performs a bus mastered write Poke(0x00239cec, 0x0023bcc8).

The configuration of the ES1370 undocumented register(s) before the write is:

Page D	
Register offset 0x38 (Base address)	0x00239cac
Register offset 0x3C (Count/Size)	0x001000ff

After:

0x00239cac, 0x001100ff

This register functions as a "Phantom" channel so its effects can be controlled, thankfully.

Speculations/Conclusions:

The ES1370 seems to perform this action when both DAC's are running and when DAC2 gets turned off just prior of it requesting more data. A bogus buffer was set up so this action would have a benign effect and also to see the values written. The data appears to be the contents of the registers located in pages C,D,E, and F. In a 4 hour test, the ES1370 wrote a total of 16 DWORDS and the data was the contents of pages C,D,E,F in order. Continuing overnight, the ES1370 wrote approximately 32 additional DWORDS but it was not in order like the first 16 – more like pages C,C,D,E,C,C,D,E,F, etc.

Solution:

Set up a single bogus DWORD and point the undocumented base address register (Page D, Offset 0x38) to it. Set the undocumented Size/Count register (Page D, Offset 0x3C) to (sizeof(DWORD)/4)-1, or 0x0.

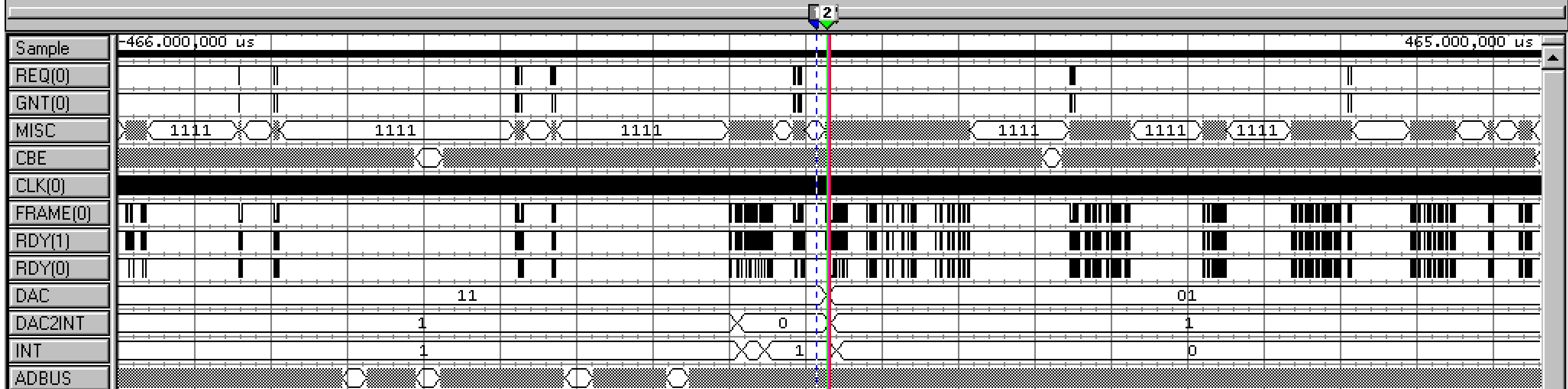
Contact information:

Dave Sharpless
Anchor Games
Dsharpless@anchorgames.com

Time/Div: 50us

C1: -8.3us C2: -1.48us Delta Time: 6.82us

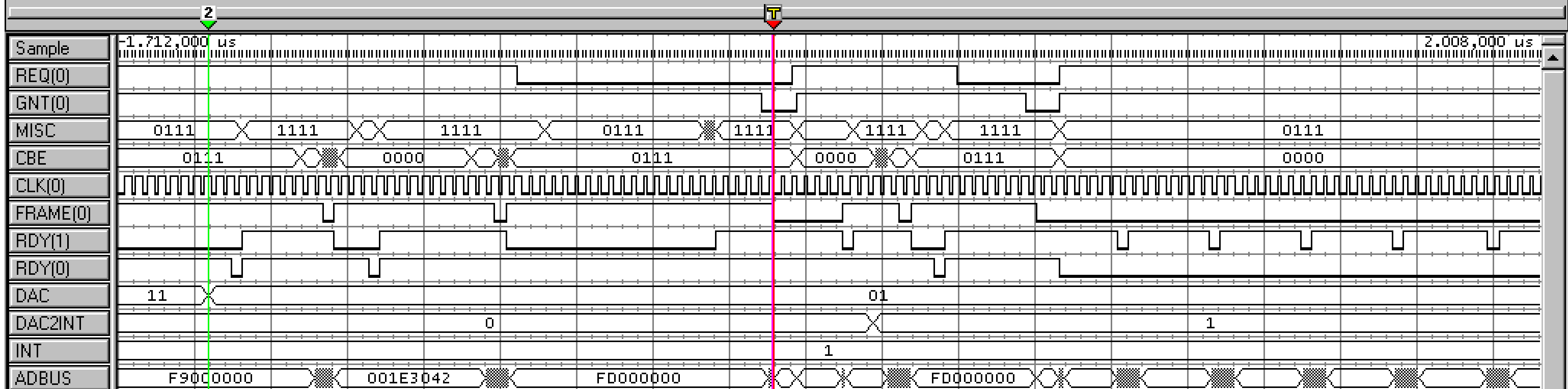
FRAME(0) C1: 1 C2: 1 Delta: 0



Time/Div: 200ns

C1: -8.3us C2: -1.48us Delta Time: 6.82us

FRAME(0) C1: 1 C2: 1 Delta: 0



Time/Div: 20ns

C1: -8.3us C2: -1.133us Delta Time: 7.167us

FRAME(0) C1: 1 C2: 1 Delta: 0

