Subject: Re: Undocumented 6502 Opcodes
Posted by john on Wed, 13 Mar 1985 21:37:00 GMT
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Article-I.D.: hp-pcd.20000004
Posted: Wed Mar 13 16:37:00 1985
Date-Received: Fri, 15-Mar-85 05:33:22 EST
References:
Organization: Hewlett-Packard - Corvallis, OR
Lines: 16
Nf-ID: #R:aicchi:-37600:hp-pcd:20000004:000:790
Nf-From: hp-pcd!john Mar 11 13:37:00 1985

Subject: Undocumented 6502 Opcodes
Posted by joeloda on Tue, 17 Sep 2013 18:47:13 GMT
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Message-ID:
Date: Wed, 20-Feb-85 22:50:52 EST
Article-I.D.: aicchi.376
Posted: Wed Feb 20 22:50:52 1985
Date-Received: Fri, 22-Feb-85 09:51:42 EST
Distribution: net
Organization: Analysts International Corp; Chicago Branch
Lines: 17

Does anyone out there have a listing of undocumented 6502 opcodes? From talking to several people, I have discovered:

- That these opcodes function differently depending upon the chip manufacturer.

- That some issue of "Compute" magazine had a listing of these at some point in time.

Many thanks in advance; I'll sleep better with one more curiousity satisfied :-).

--
Joe Loda
Analysts International (Chicago Branch)
(312) 882-4673
..!ihnp4!aicchi!joeloda

Subject: Re: Undocumented 6502 Opcodes
Posted by liang on Tue, 17 Sep 2013 18:47:18 GMT
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Message-ID:
Date: Thu, 21-Feb-85 20:30:39 EST
Article-I.D.: cvl.74
Posted: Thu Feb 21 20:30:39 1985
Date-Received: Tue, 26-Feb-85 07:25:46 EST
References:
Distribution: net
Organization: Computer Vision Lab, U. of Maryland, College Park
Lines: 45

> Does anyone out there have a listing of undocumented 6502 opcodes? From
> talking to several people, I have discovered:
>
> - That these opcodes function differently depending upon the chip
> manufacturer.
>
> - That some issue of "Compute" magazine had a listing of these at some
> point in time.
>
> Many thanks in advance; I'll sleep better with one more curiousity
> satisfied :-).
>
> --
> Joe Loda
> Analysts International (Chicago Branch)
> (312) 882-4673
> ..!ihnp4!aicchi!joeloda

There is a back issue of Byte which also mentioned the undocumented opcodes.

The wierdest opcode yet though is one a friend told me about. It may be apochryphal so I think I will disclaim it right off. Supposedly, the original 6502 had an undocumented test instruction (one of the x2H opcodes, I think it was 12H) which would tie up the cpu and run internal checks on the processor such as run through the address/data lines lightning fast, until it was reset or a NMI occurred. Well, this testing had a nasty side effect.... The chips would get so hot doing this that after it was let run for a few hours, the chip would either just fail, or every long once in a while something catastrophic would happen and the chip would start smoking or

actually catch on fire! It was thus descriptively named the HCF (Hold and Catch Fire) instruction. Supposedly, the Source or Compuserve had a 3 part article a few years ago describing this fascinating instruction. Perhaps there is someone on the net who worked on the design of the 6502 and could affirm or deny, once and for all whether the HCF instruction has ever existed or exists.

-eli

--

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Eli Liang ---
University of Maryland Computer Vision Lab, (301) 454-4526
ARPA: liang@cvl, eli@mit-mc, eli@mit-prep CSNET: liang@cvl
UUCP: {seismo,rlgvax,allegra,brl-bmd,nrl-css}!umcp-cs!cvl!liang

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Subject: Re: Undocumented 6502 Opcodes
Posted by cdshaw on Tue, 17 Sep 2013 18:47:19 GMT
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Message-ID:
Date: Sun, 24-Feb-85 06:15:30 EST
Article-I.D.: watrose.7307
Posted: Sun Feb 24 06:15:30 1985
Date-Received: Wed, 27-Feb-85 03:06:04 EST
References:
Reply-To: cdshaw@watrose.UUCP (Chris Shaw)
Distribution: net
Organization: U of Waterloo, Ontario
Lines: 11

The HCF instruction actually did exist in the early version of the Motorola 6800. This "instruction" was undocumented, as well, but I read an article in an ancient BYTE (1978 or so) that documented the undocumented goodies of 6800, and this was one of the instructions.

It doesn't strike me as too likely that HCF could have occurred on 2 processors, and given reputations of all the CPU makers around I would vote Motorola as being most likely to screw up like this.

Chris Shaw

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Subject: Re: Undocumented 6502 Opcodes
Posted by devoz on Wed, 18 Sep 2013 21:18:23 GMT
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Message-ID:
Date: Wed, 27-Feb-85 03:38:46 EST
Article-I.D.: zurton.9
Posted: Wed Feb 27 03:38:46 1985
Date-Received: Sun, 3-Mar-85 05:33:03 EST
Lines: 31
Nf-ID: #R:aicchi:-37600:zurton:5800001:000:1021
Nf-From: zurton!devoz Feb 24 13:05:00 1985

I wouldn't put much stock in a HCF instruction, considering
the VAST number of 6502 based machines.

Think about it. With the amount of "hacking" done on these,
surely large numbers would have accidently executed HCF instructions
and burst into flames. (hee hee hee).

I do support the theory that there may be an instruction, or
types of instructions, that, when executed, causes a Degradation
of the Instruction Set, killing off many instructions, and maiming
others.

If you program in 6502 you know exactly what I mean.

A sample of Destructive Op Codes:

DHXI - Destroy Half of the X Index register
DHYI - Destroy Half of the Y Index register
AWID - Always Wander Into Decimal mode

There are more. Supposedly during chip testing of the first
few million devices, the original manufacturer wrongly executed
these instructions, limiting the power of the 6502 forever,
or until the 65816 arrives. (Ahhhh, the price of compatibility).

dddddddeeeeeeeevvvvvvvvvooooooooozzzzzzzzzz

Subject: Re: Undocumented 6502 Opcodes
Posted by dudek on Wed, 18 Sep 2013 21:18:24 GMT
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Message-ID:
Date: Mon, 4-Mar-85 13:30:12 EST
Article-I.D.: utai.381
Posted: Mon Mar 4 13:30:12 1985
Date-Received: Mon, 4-Mar-85 14:43:13 EST
References:
Reply-To: dudek@utai.UUCP (Gregory Dudek)
Organization: CSRI, University of Toronto
Lines: 9
Summary:

I tried to execute some of the unused 6502 opcodes and found one that
seems to conform to the described HCF specs. That is, the processor
seems to hang up and doesn't go anywhere until it gets a reset.
  Of course, I didn't let it sit there long enough to find out
if the processor would self-destruct. If anybody is willing to
satisfy our curiosities, the op-code was $12. As noted, the presence
of the HCF instruction may depend on the chip manufacturer. Unfortunately,
I forgot to check who made mine.
  Greg Dudek

Subject: Re: Re: Undocumented 6502 Opcodes
Posted by liang on Wed, 18 Sep 2013 21:18:26 GMT
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Message-ID:
Date: Wed, 6-Mar-85 18:40:22 EST
Article-I.D.: cvl.139
Posted: Wed Mar 6 18:40:22 1985
Date-Received: Sat, 9-Mar-85 19:58:55 EST
References:
Organization: Computer Vision Lab, U. of Maryland, College Park
Lines: 23

> I tried to execute some of the unused 6502 opcodes and found one that
> seems to conform to the described HCF specs. That is, the processor
> seems to hang up and doesn't go anywhere until it gets a reset.
>   Of course, I didn't let it sit there long enough to find out
> if the processor would self-destruct. If anybody is willing to

> satisfy our curiosities, the op-code was $12. As noted, the presence
> of the HCF instruction may depend on the chip manufacturer. Unfortunately,
> I forgot to check who made mine.
>   Greg Dudek

This is the exact instruction which I mentioned in my previous article.
$12. I think that there must be some truth in the HCF instruction for the
6502.

-eli

--

~~~~~~

Eli Liang ---
University of Maryland Computer Vision Lab, (301) 454-4526
ARPA: liang@cvl, liang@lemuria, eli@mit-mc, eli@mit-prep
CSNET: liang@cvl UUCP: {seismo,allegra,brl-bmd}!umcp-cs!cvl!liang

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Subject: Re: Undocumented 6502 Opcodes
Posted by pc on Wed, 18 Sep 2013 21:18:27 GMT
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Message-ID:
Date: Fri, 8-Mar-85 11:46:32 EST
Article-I.D.: unisoft.418
Posted: Fri Mar 8 11:46:32 1985
Date-Received: Mon, 11-Mar-85 06:53:52 EST
References: ,
Organization: UniSoft Corp., Berkeley
Lines: 5

Actually the HCF opcode implements the smiley face operator (:-) :-)

Paul Campbell ucbvax!unisoft!paul

Subject: Re: Re: Undocumented 6502 Opcodes
Posted by john on Wed, 18 Sep 2013 21:18:27 GMT
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Message-ID:
Date: Fri, 8-Mar-85 15:25:50 EST
Article-I.D.: x.421
Posted: Fri Mar 8 15:25:50 1985
Date-Received: Mon, 11-Mar-85 06:57:39 EST
References:
Organization: Charles River Data Systems, Framingham MA
Lines: 14

> $12. I think that there must be some truth in the HCF instruction for the

As I have heard it, the "HCF" instruction which is often found in 6800s and
6502s is intended for QA at the factory: the intent is that you feed the chip
the magic instruction, and watch what happens: it is supposed to count on the
address lines, from 0 to 65535, forever. This [roughly] validates the address
drivers as well as much of the internal logic. Those who have been looking
for the HCF instruction on their favorite micros might watch the address
lines to see if this is true.
--
John Woods, Charles River Data Systems, Framingham MA, (617) 626-1101
...!decvax!frog!john, ...!mit-eddie!jfw, jfw%mit-ccc@MIT-XX.ARPA

Sorry, I don't feel deep right now.

Subject: Re: Re: Undocumented 6502 Opcodes
Posted by Anonymous on Wed, 18 Sep 2013 21:27:46 GMT

Originally posted by: paul&#64unisoft.UUCP (Paul Campbell)

Message-ID:
Date: Sun, 10-Mar-85 15:19:51 EST
Article-I.D.: unisoft.419
Posted: Sun Mar 10 15:19:51 1985
Date-Received: Tue, 12-Mar-85 20:53:25 EST
References: ,
Organization: UniSoft Corp., Berkeley
Lines: 9

Seriously this time .... the 6800 has a similar opcode which is in there for chip testing ... when you execute it the chip goes into a strange mode where its microcode loops cycling its address lines thru the whole address space reading all of memory. The only way of getting out of this is to reset the chip, maybe the HCF instruction is similar?

Paul Campbell ucbvax!unisoft!paul
