To: DEFCON 26

Date: Aug-12 2018

Check Point SOFTWARE TECHNOLOGIES LTD.

Subject:



What The Fax?!





Check Point Research

Received OK?

WhoAreWe?





Yaniv Balmas

“This should theoretically work”

Security Researcher

Check Point Software Technologies

@ynvb

Eyal Itkin

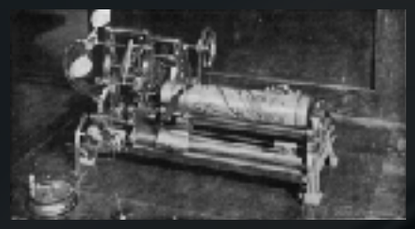
“That’s cool.”

Security Researcher

Check Point Software Technologies

@eyalitkin

FAX History

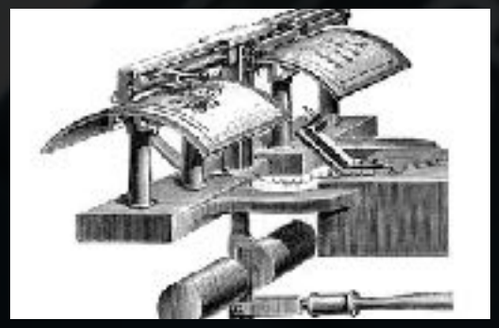


1846

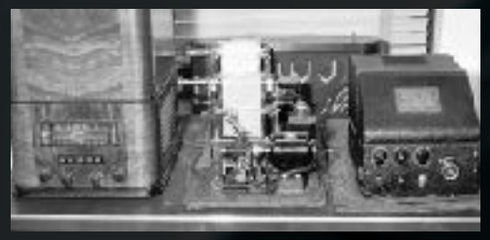
Alexaner Bain Sends An Image Over a Wire



1860



Caselli Invents Machine Similar to Today's FAX



1923

Enter the RadioFAX. Used by Navies

XEROX Introduces the First Commercial FAX Machine



1966



Arpanet

ITU

1980

Group III ITU-T Fax Standards T.30, T.4, T.6

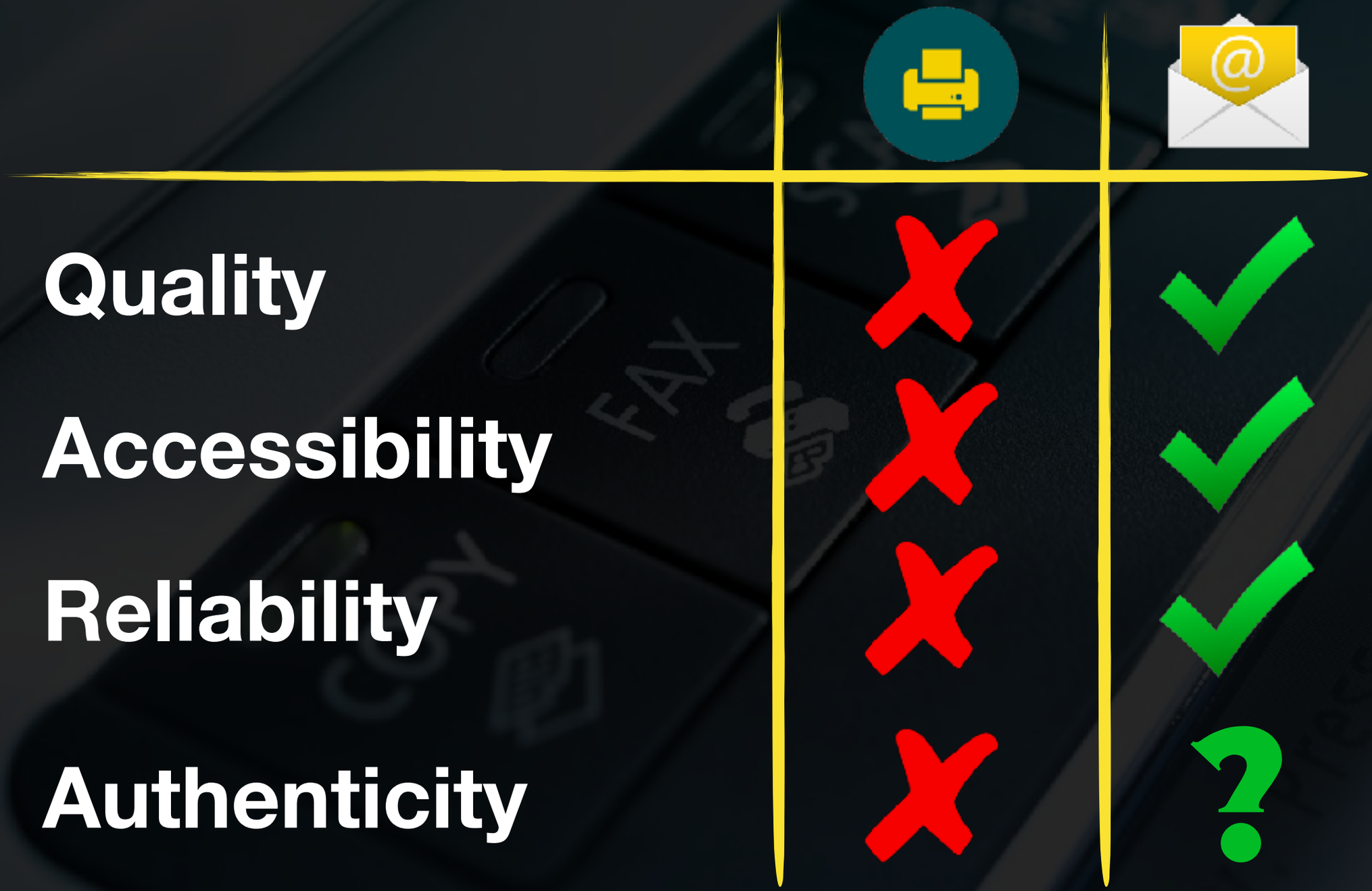
GammaFAX Brings Computers Into FAX Network



1985



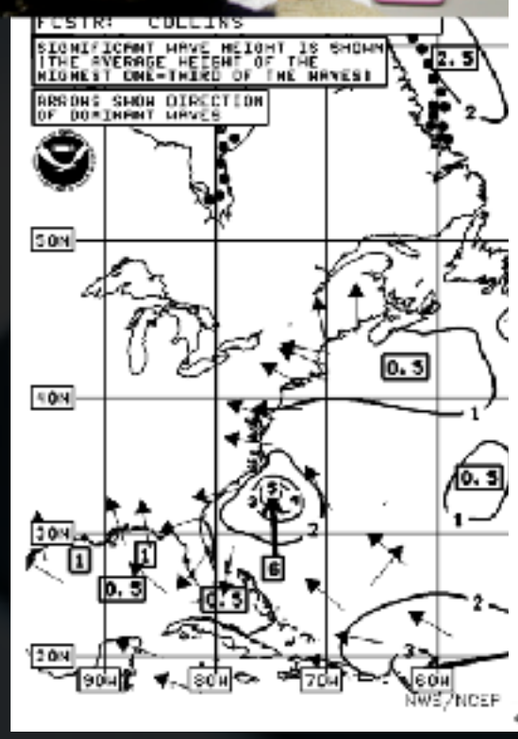
BackToTheFuture

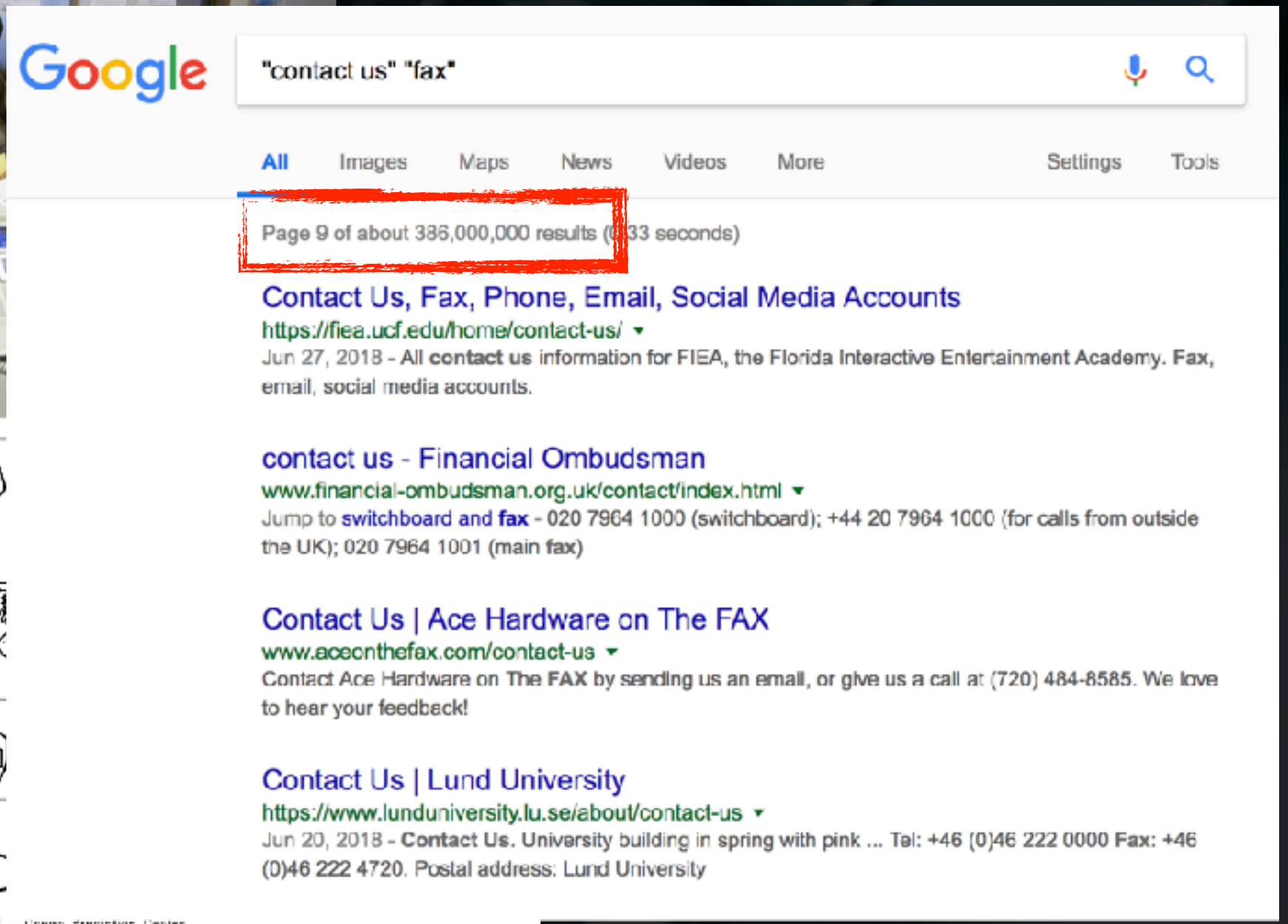


Quality	✗	✓
Accessibility	✗	✓
Reliability	✗	✓
Authenticity	✗	?

BackToTheFuture







BackToTheFuture

Microsoft Office Windows Surface

Microsoft Limited

Microsoft Campus

Thames Valley Park

Reading

Berkshire

RG6 1WG

UNITED KINGDOM

Phone: (+44) 0344 800 2400

Fax: (+44) 0870 60 20 100

BackToTheFuture

Microsoft Office Windows Surface

Microsoft Limited

Microsoft Campus

中國銀行
BANK OF CHINA

HEAD OFFICE
1 FUXINGMEN NEI DAJIE,
BEIJING,
CHINA
SWIFT: BKCHCNBJ
TEL:(86) 010-66596688
FAX:(86) 010-66016871
POST CODE: 100818
WEBSITE:
www.boc.cn,www.bankofchina.com

BEIJING BRANCH
A,C,E KAIHENG CENTER,
2 CHAOYANGMEN NEI DAJIE,
DONGCHENG DISTRICT,
BEIJING,
CHINA
SWIFT: BKCHCNBJ110
TEL:(86) 010-85122288
FAX:(86) 010-85121739
POST CODE: 100010

BackToTheFuture

Microsoft Office Windows Surface

HUMAN RIGHTS WATCH

AMNESTY INTERNATIONAL

Limited

May 18, 2012

President Barack Obama
The White House
1600 Pennsylvania Avenue, NW
Washington, DC 20500

Via facsimile: +1-202-456-2461

ING BRANCH

: KAIHENG CENTER,
AOYANGMEN NEI DAJIE,
DONGCHENG DISTRICT,
BEIJING,
CHINA
SWIFT: BKCHCNBJ110
TEL:(86) 010-85122288
FAX:(86) 010-85121739
POST CODE: 100010

CHINA
SWIFT: BKCHCNBJ
TEL:(86) 010-66596688
FAX:(86) 010-66016871
POST CODE: 100818
WEBSITE:
www.boc.cn,www.bankofchina.com

BackToTheFuture

Forms for Reporting to FDA

SHARE | TWEET | LINKEDIN | PIN IT | EMAIL | PRINT

*** IMPORTANT * You may continue to use Form FDA 3500 (voluntary), Form FDA 3500B (consumer-friendly), and FDA 3500A (mandatory) past the listed**

For use by healthcare professionals, consumers, and patients. Submit the completed form using built-in postage-paid mailer, or fax.

Instructions for Completing Form FDA 3500

Via facsimile.

Reader, or just print the blank form and fill it out by hand. The Voluntary Form FDA 3500 features a postage-paid pre-addressed mailer.

- **Form FDA 3500 - Voluntary Reporting**

  For use by healthcare professionals, consumers, and patients. Submit the completed form using built-in postage-paid mailer, or fax.
  Instructions for Completing Form FDA 3500

Surface

ed

TER,
EI DAJIE,
ICT,

10
288
739

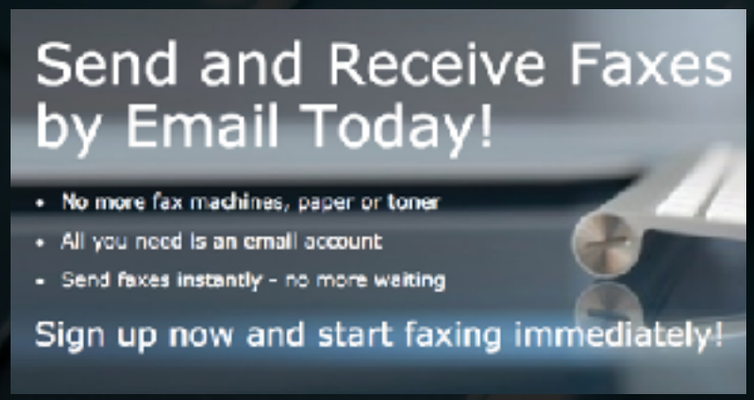
WTF?!

FaxToday

- Modern FAX is no longer a simple “FAX Machines”

- The same old FAX technology is now wrapped inside newer technologies

- ALL-IN-ONE printers are EVERYWHERE





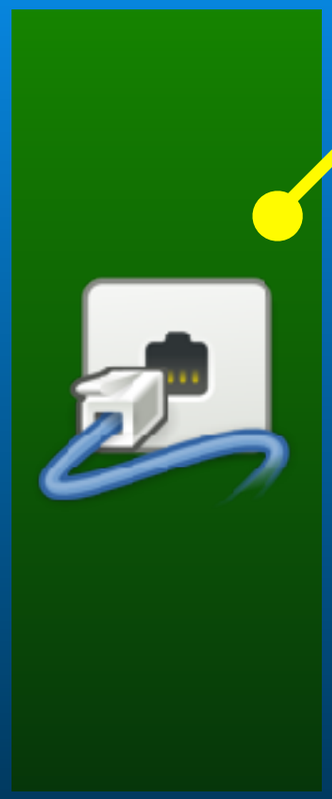


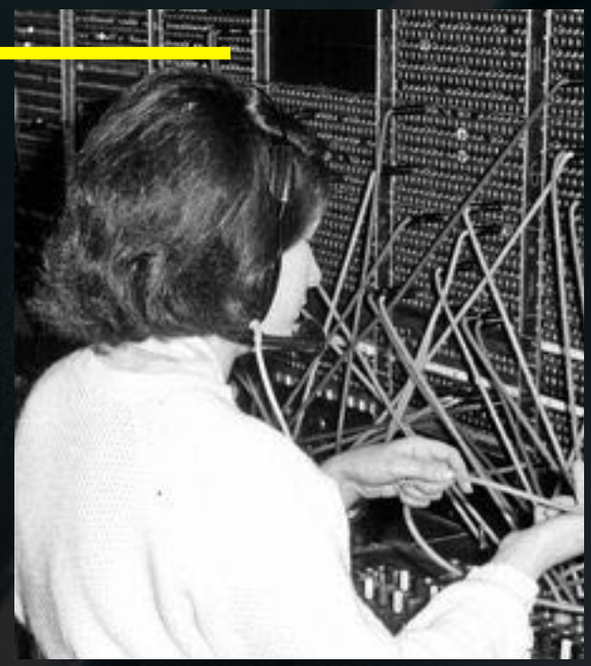
The Security View



ALL-IN-ONE Printers







FAX Attack



FAX Attack





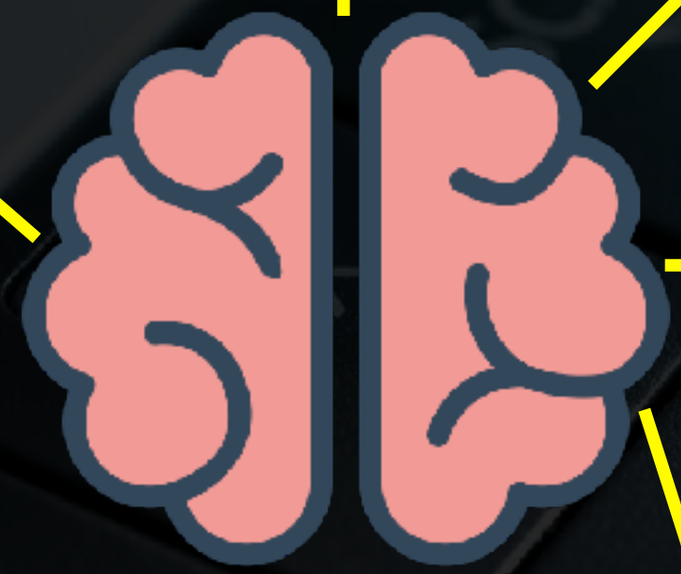




Challenge Accepted

What is the Target?

How can we Debug it?



How to Obtain the Code?

What is The OS?

How Does FAX Even Work?

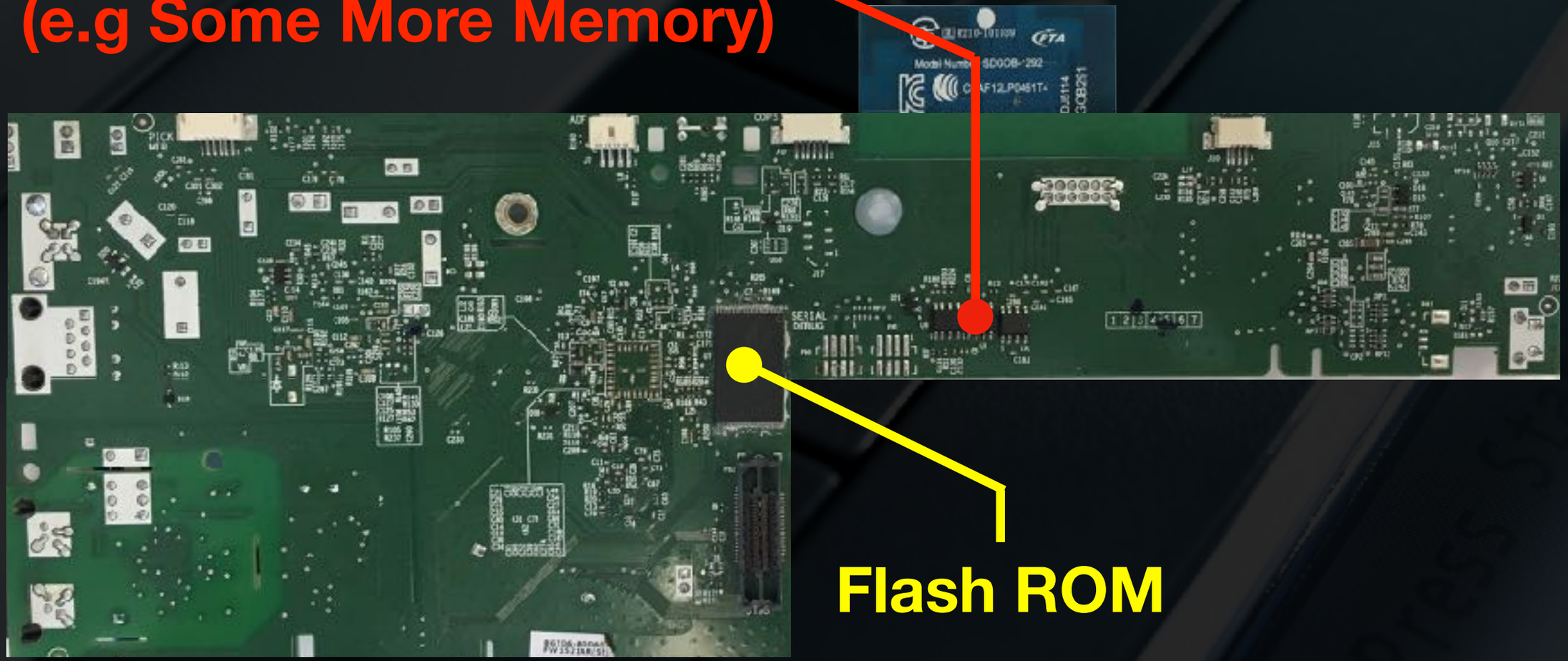
Where to look for vulns?

AndTheWinnerIs



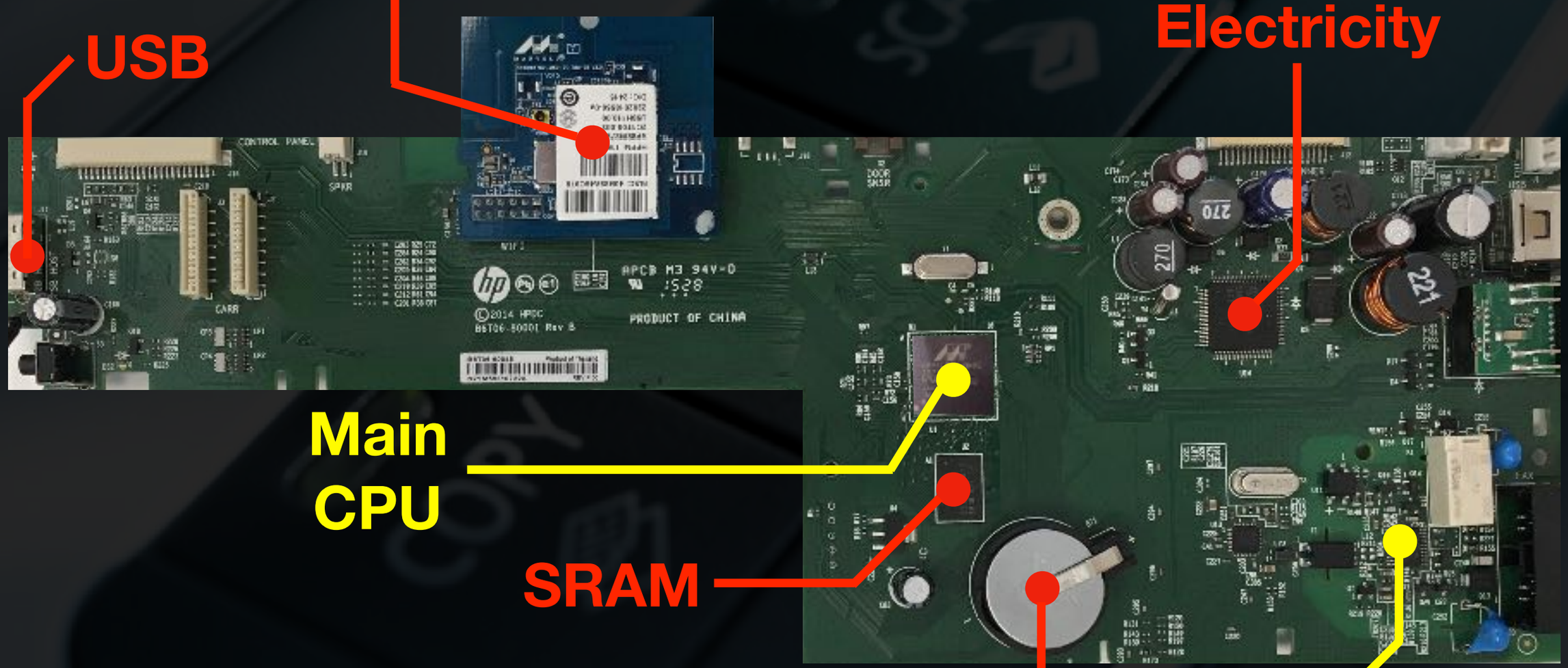
BreakingHW

SRAMs
(e.g Some More Memory)

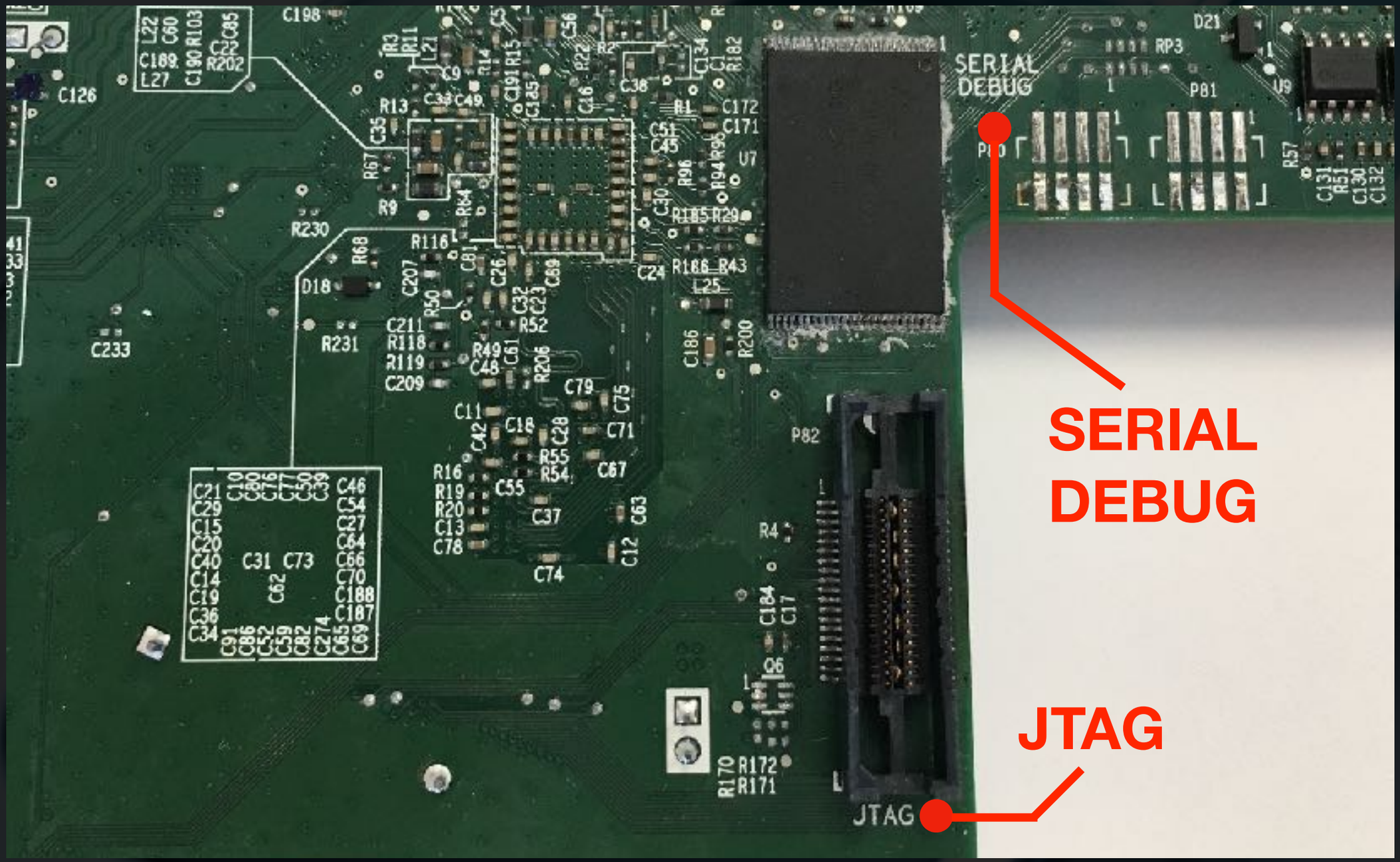


Flash ROM

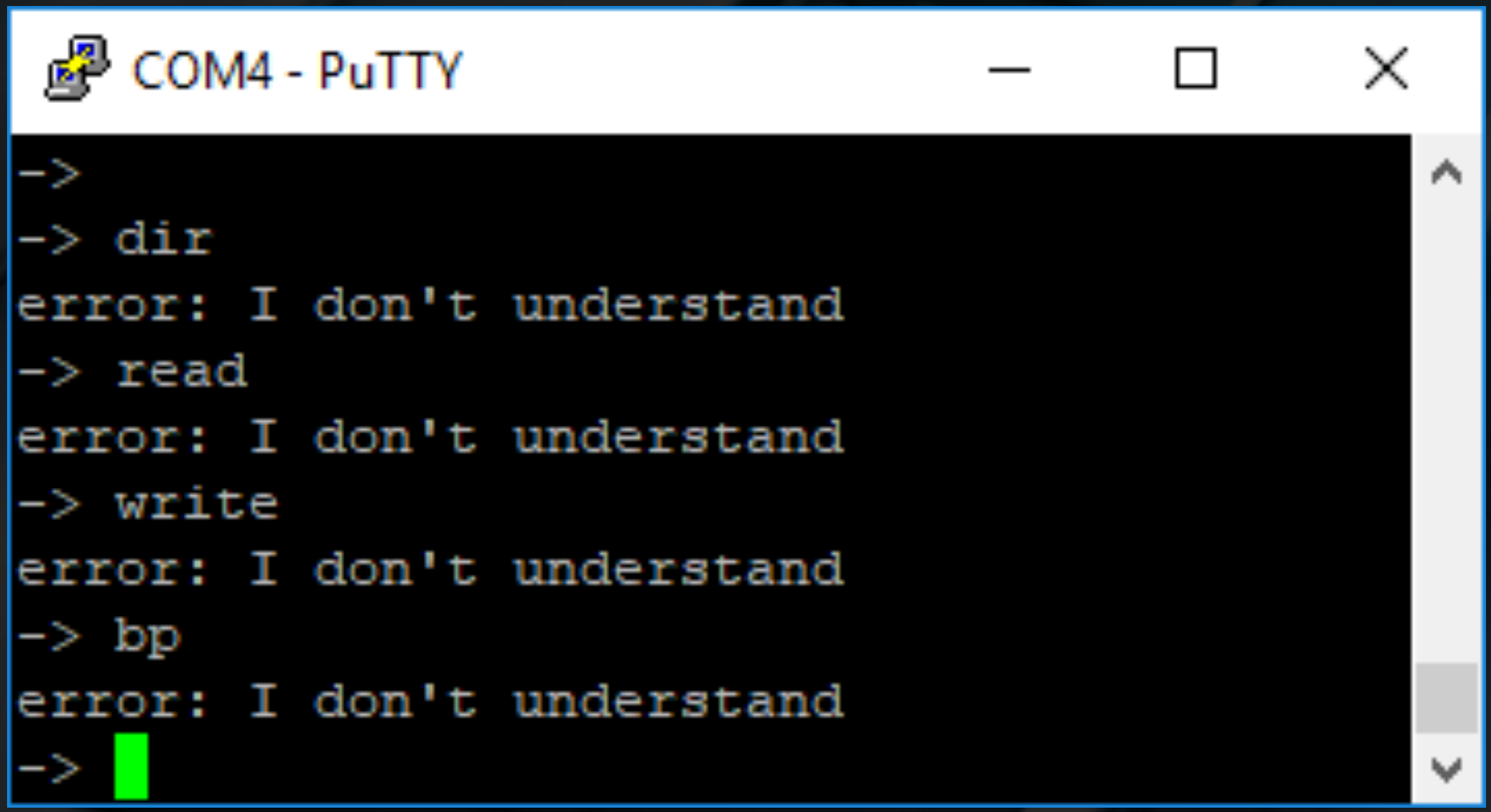
BreakingHW



ShowMeYourFirmware!



TooEasy?


COM4 - PuTTY
->
-> dir
error: I don't understand
-> read
error: I don't understand
-> write
error: I don't understand
-> bp
error: I don't understand
->

FirmwareUpgrade

Index of /pub/

[parent directory]

Name	Size	Date Modified
IPG/		11/22/08, 2:00:00 AM
RPOS/		7/12/16, 3:00:00 AM
all_in_one/		3/6/09, 2:00:00 AM
alphaserver/		11/23/08, 2:00:00 AM
automatic/		6/25/09, 3:00:00 AM
c-products/		10/29/09, 2:00:00 AM
c-storage/		4/26/11, 3:00:00 AM
calculators/		12/15/14, 2:00:00 AM
caps-softpaq/		5/25/18, 5:42:00 AM
catia/		3/6/09, 2:00:00 AM
ctovideo/		11/9/07, 2:00:00 AM
device_manager/		9/1/17, 3:00:00 AM
diag/		11/12/07, 2:00:00 AM
docs/		1/24/17, 2:00:00 AM
dpne/		7/8/09, 3:00:00 AM
enterprise/		9/15/07, 3:00:00 AM
essentials/		9/15/07, 3:00:00 AM
euro/		11/23/08, 2:00:00 AM
extaccel/		1/4/10, 2:00:00 AM
faxes/		9/15/07, 3:00:00 AM
futuresmart/		6/27/11, 3:00:00 AM
graham/		8/31/17, 3:00:00 AM
gsb/		7/7/14, 3:00:00 AM
gsy/		3/6/09, 2:00:00 AM
handheld_computers/		9/15/07, 3:00:00 AM
hp_StoreOnce/		12/8/14, 2:00:00 AM
hp_StoreOnceRMC/		5/5/16, 3:00:00 AM
hp_easytools/		9/30/11, 3:00:00 AM
hpcast/		3/18/08, 2:00:00 AM

How do you upgrade a printer firmware?!



You Print it!

PCL XL Feature Reference Protocol Class 2.1 Supplement

PCL XL Feature Reference Protocol Class 2.1 Supplement

Revision: 1.0
Revision Date: August 9, 2000
Author:
Word for Windows File: xl_ref21.doc

Document Revision History

Rev	Revision Description	Date	Author
1.0	Release	09Aug2000	



You Print it!

PrintingTheFirmware

1B	25	2D	31	32	33	34	35	58	40	50	4A	4C	20	43	4F	.%-12345X@PJL CO
4D	4D	45	4E	54	20	28	6E	75	6C	6C	29	0A	40	50	4A	MMENT (null).@PJ
4C	20	45	4E	54	45	52	20	4C	41	4E	47	55	41	47	45	L ENTER LANGUAGE
3D	46	57	55	50	44	41	54	45	0A	1B	45	54	68	69	73	=FWUPDATE..EThis
20	64	65	76	69	63	65	20	64	6F	65	73	20	6E	6F	74	device does not
20	73	75	70	70	6F	72	74	20	46	57	55	50	44	41	54	support FWUPDAT
45	21	0D	0A	1B	2A	72	74	31	36	33	38	34	73	41	1B	E!...*rt16384sA.
2A	62	31	36	35	34	32	59	1B	2A	62	2B	30	59	1B	2A	*b16542Y.*b+0Y.*
62	31	36	33	38	34	56	53	41	32	37	30	32	30	32	30	b16384VSA2702020
31	45	43	32	45	34	41	30	30	30	38	30	31	30	30	38	1EC2E4A000801008
46	41	35	36	43	32	33	42	30	45	34	36	30	36	41	41	FA56C23B0E4606AA
42	36	38	41	33	33	32	34	42	37	46	34	37	37	31	37	B68A3324B7F47717
42	41	39	33	41	45	39	30	36	33	35	38	46	39	44	37	BA93AE906358F9D7
30	38	31	31	38	46	32	33	32	0A	53	41	32	37	41	32	08118F232.SA27A2
39	43	32	33	32	33	30	31	43	31	39	46	30	41	46	42	9C232301C19F0AFB
44	41	30	35	44	35	37	30	35	31	38	36	44	41	39	37	DA05D5705186DA97
45	39	39	41	45	32	41	44	36	38	41	46	31	43	42	39	E99AE2AD68AF1CB9
45	46	34	42	34	36	41	36	44	43	37	43	46	41	39	41	EF4B46A6DC7CFA9A
30	35	39	39	30	38	39	43	30	44	32	33	0A	53	41	32	059908 9C0D23.SA2

PrintingTheFirmware



NULL Decoder

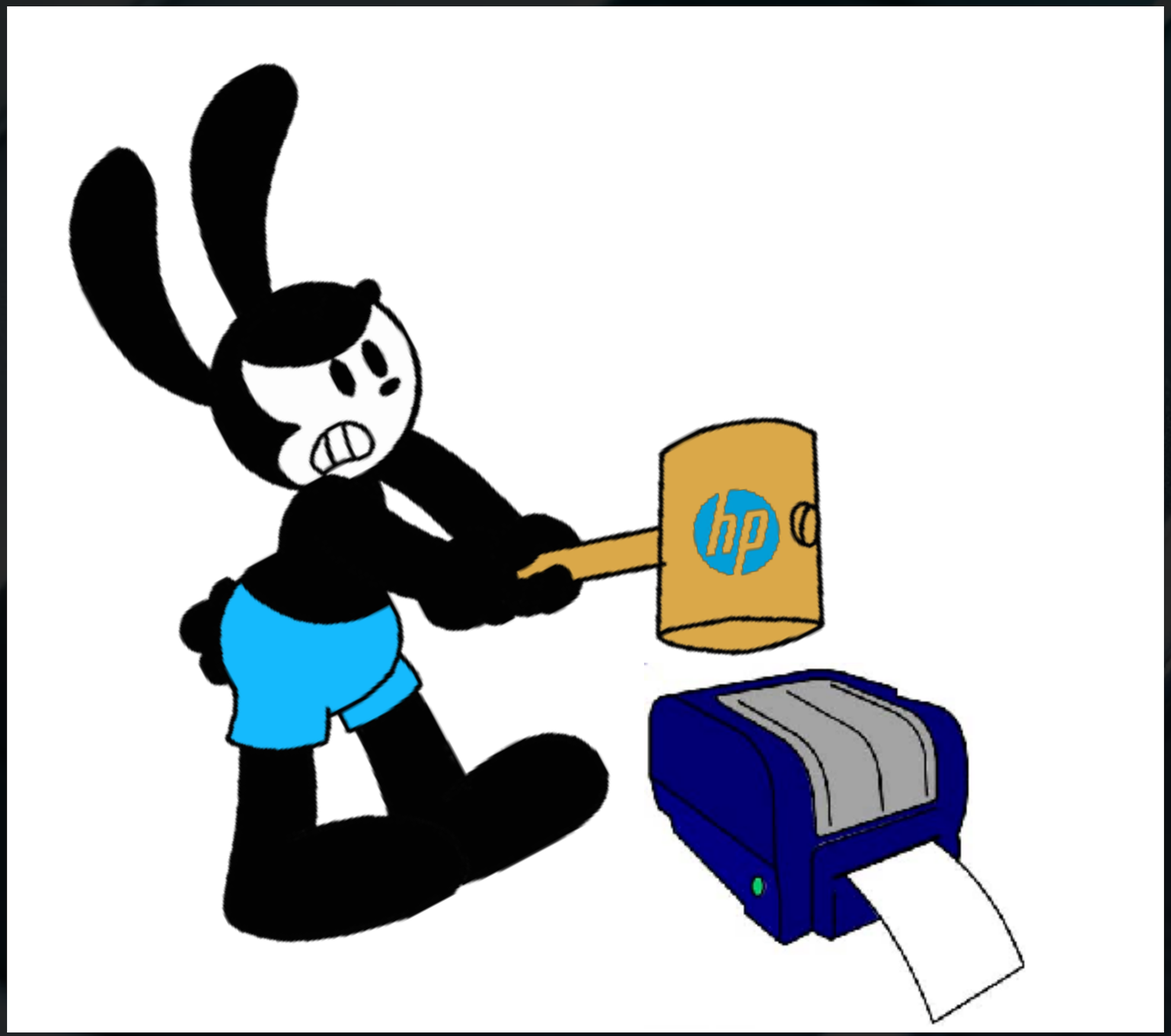
TIFF Decoder



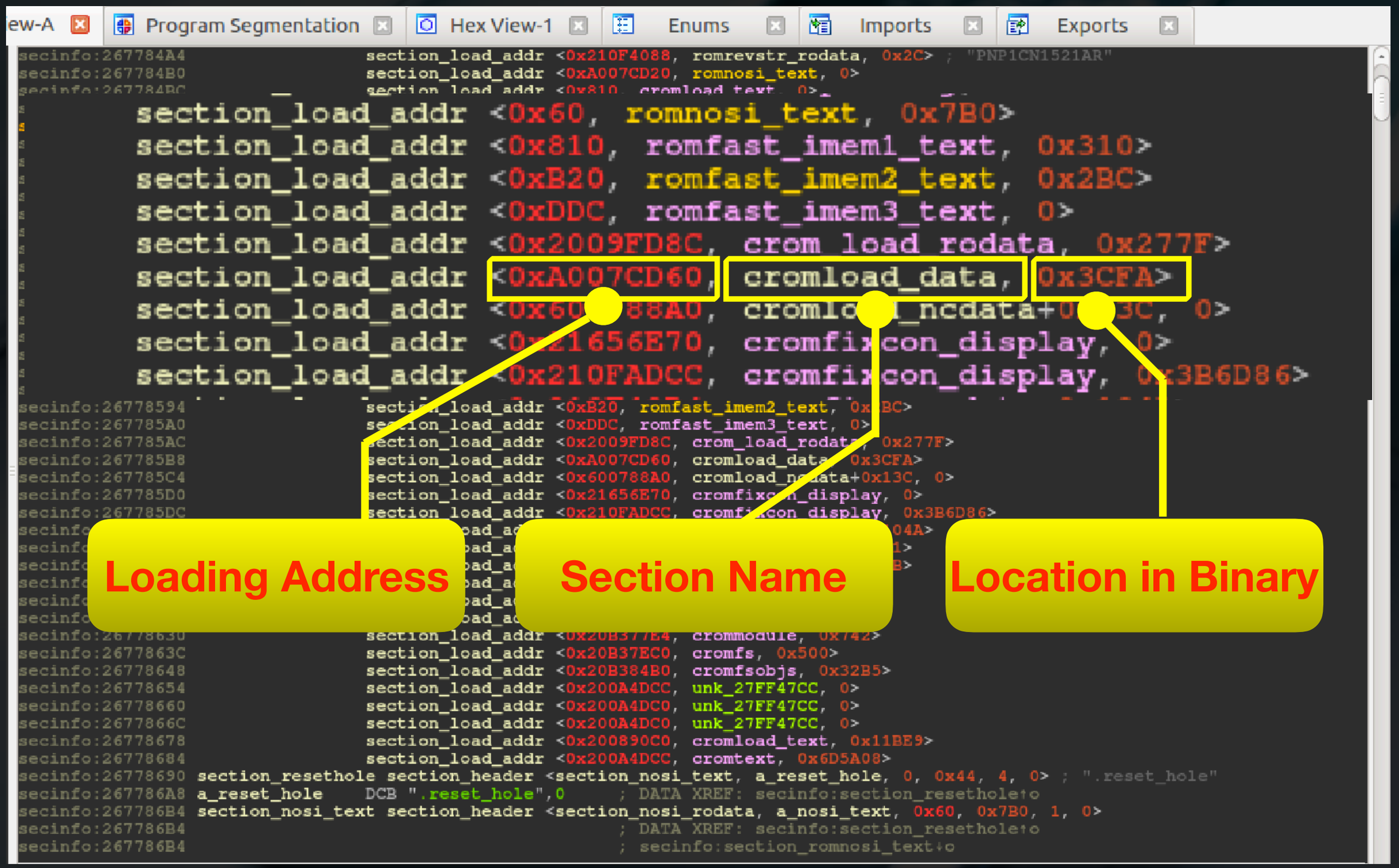


Delta Raw Decoder

When You're a Hammer...



Sections


Program Segmentation
Hex View-1
Enums
Imports
Exports
section_load_addr <0x60, romnosi_text, 0x7B0>
section_load_addr <0x810, romfast_imem1_text, 0x310>
section_load_addr <0xB20, romfast_imem2_text, 0x2BC>
section_load_addr <0xDDC, romfast_imem3_text, 0>
section_load_addr <0x2009FD8C, crom_load_rodata, 0x277F>
section_load_addr <0xA007CD60, cromload_data, 0x3CFA>
section_load_addr <0x21656E70, cromfixcon_display, 0>
section_load_addr <0x210FADCC, cromfixcon_display, 0x3B6D86>
Loading Address
Section Name
Location in Binary

IDon'tUnderstand

DF	25	34	2E	B9	34	D4	DF	3F	D4	32	2E	32	0B	B3	65
7F	72	72	6F	72	3A	20	49	14	B0	F7	6E	27	74	F1	A0
64	65	72	73	E2	E8	B0	64	32	C0	12	EF	24	E4	20	3C
25	B7	73	3E	0A	2D	E5	4D	69	5A	A0	6E	9F	67	20	52
48	53	47	E4	F3	D1	01	FF	D3	06	D0	02	F2	0F	20	54
EB	47	70	70	E6	58	B2	61	44	F0	B0	FF	A1	46	07	46
0E	F6	4A	20	BF	10	F2	CA	20	E1	68	97	60	2F	FF	01

65	6C	66	FF	20	72	65	63	75	72	73	69	EF	76	65	6C
79	AE	E0	6E	6F	6E	DF	70	6F	73	69	74	FE	30	20	73
F7	69	7A	65	0E	32	76	61	72	69	FF	61	62	6C	65	2D
6C	65	6E	F7	67	74	68	AD	33	00	00	56	4C	39	41	B7
35	9E	21	66	61	69	6D	32	4D	30	97	64	65	6C	72	E0

WhatISThis?!

- Probably a compression algorithm
- A very bad one …
- Some mathematics

Let'sTakeALook

r e c u r s i v e l y
n o n p o s i t s i z
e v a r i a b l e - l e n
g t h V L j p e g .

FF 20 72 66 63 75 72 73 69 EF 76 65 6C 79 AE E0
6E 6F 6E DF 70 6F 73 69 74 FE 30 20 73 F7 69 7A
65 0E 32 76 61 72 69 FF 61 62 6C 65 2D 6C 65 6E
F7 67 74 68 AD 33 00 00 56 4C FF 6A 70 65 67 2E

Let'sTakeALook

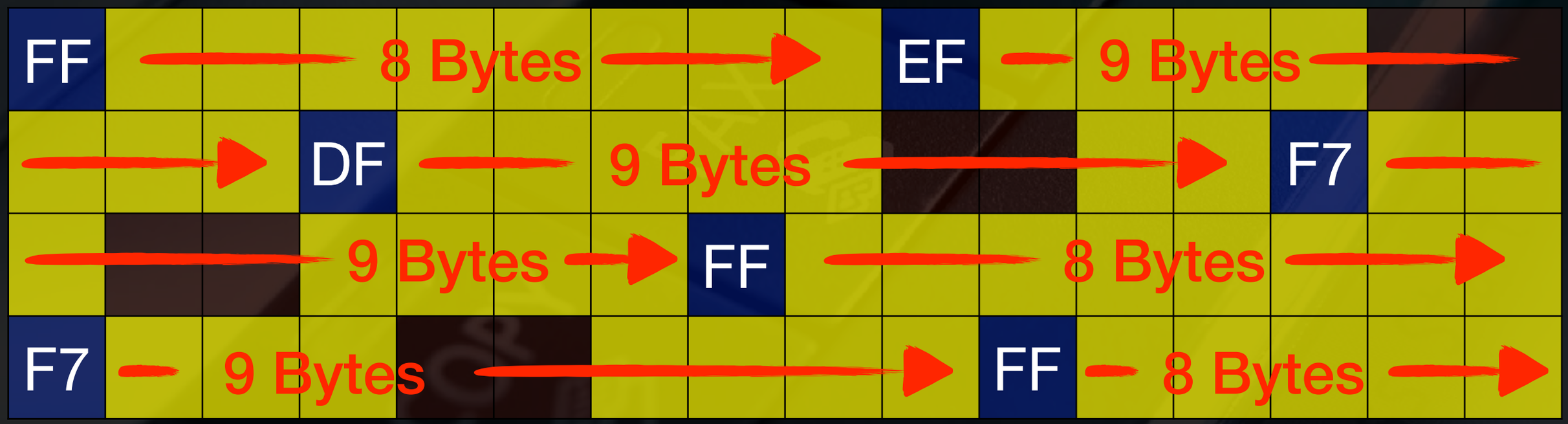
		r	e	c	u	r	s	i		v	e	l	y		
n	o	n		p	o	s	i	t				s		i	z
e			v	a	r	i		a	b	l	e	-	l	e	n
	g	t	h					V	L		j	p	e	g	.

FF	20	72	66	63	75	72	73	69	EF	76	65	6C	79	AE	E0
6E	6F	6E	DF	70	6F	73	69	74	FE	30	20	73	F7	69	7A
65	0E	32	76	61	72	69	FF	61	62	6C	65	2D	6C	65	6E
F7	67	74	68	AD	33	00	00	56	4C	FF	6A	70	65	67	2E

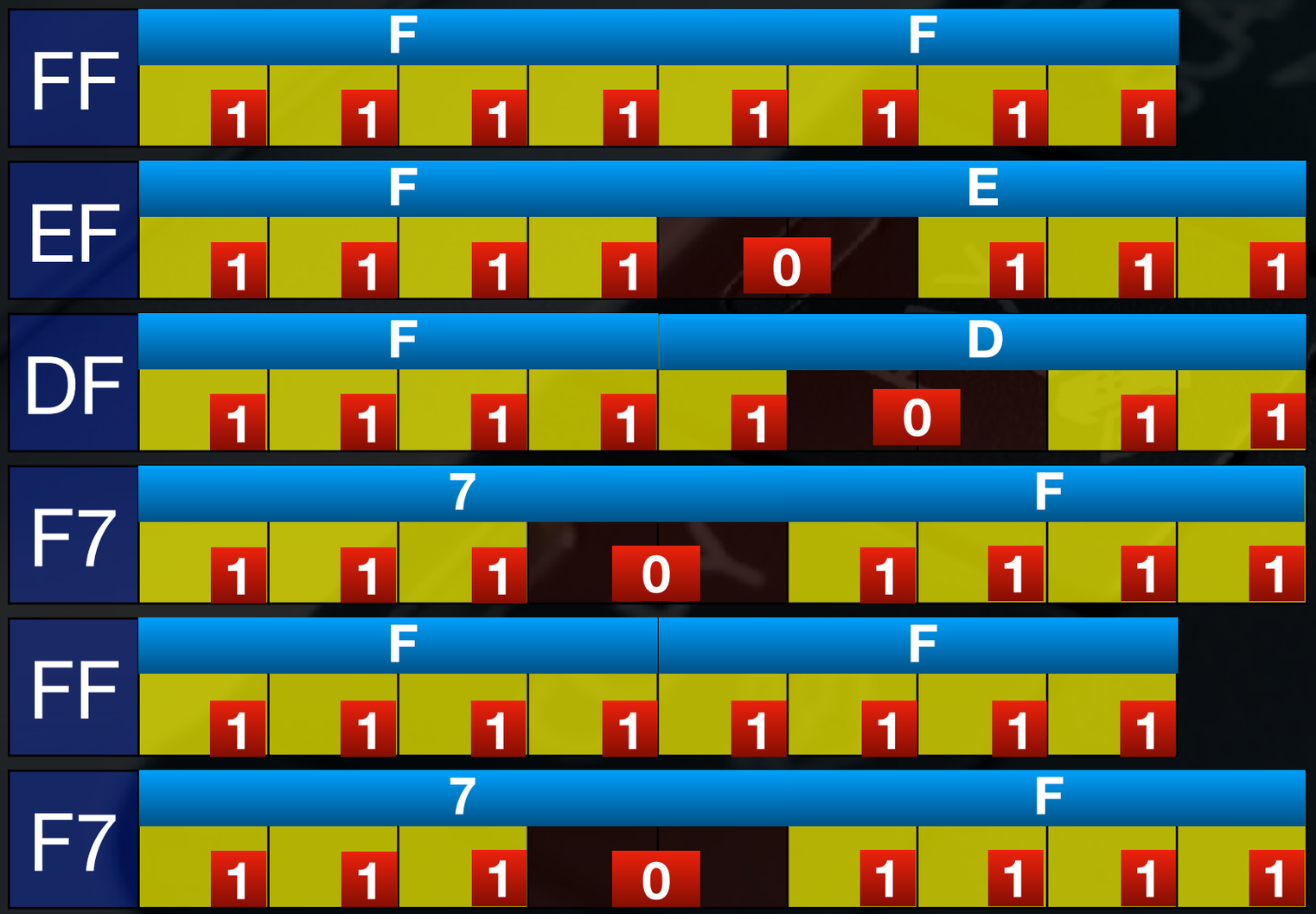
A Pattern?!

FF									EF					AE	E0
			DF						FE	30			F7		
	0E	32					FF								
F7				AD	33					FF					

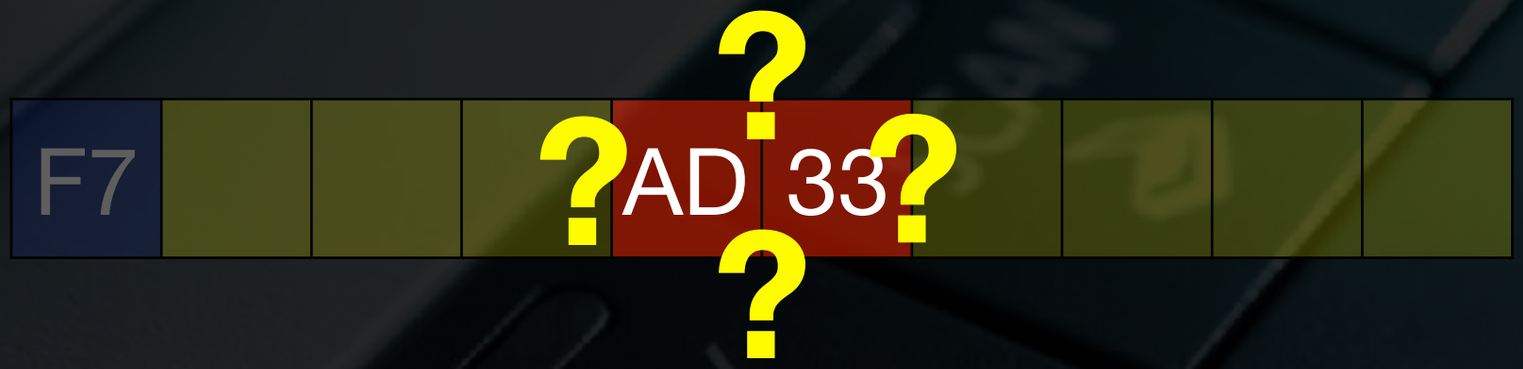
A Pattern?!


FF
8 Bytes
EF
9 Bytes
DF
9 Bytes
F7
9 Bytes
FF
8 Bytes
F7
9 Bytes
FF
8 Bytes

DifferentAngle



TheMissingLink



- Forward / Backward Pointer ✗
- Dictionary ✗
- Sliding Window



Softdisk

Softdisk Library Format

SLIB, or Softdisk LIBrary, compression is a container file format used by Softdisk software to compress various files used by their games, most notably the Commander Keen Dreams series of games, (including Dangerous Dave 3 and Dangerous Dave 4)to store title images used at the beginning of each game. It was created in 1992 by Jim Row.

The data held in the file can be compressed in any one of three ways, uncompressed, LZW and LZH. The compression used is primitive and rather different from later or traditional versions of LZW\LZH. SLIB files were created by the program `SOFTLIB.EXE` and as such any game that uses this format contains various segments of code in common with `SOFTLIB` for the decompression of data.

There is a closely related format, the SHL or Softdisk Help Library format. SHL files contain only a single file. Their header is slightly different, it's file signature is 'CMP1' (CoMPression of 1 file) while that of SLIB files is SLIB. The veracity of both files can be confirmed by checking for a word of value 2 at offset 4 in the file. The actual files have been given a number of extensions; `.CMP` (CoMPressed), `.SHL` (Softdisk Help Library) or the game extension.

The SLIB file can roughly be broken into a number of parts; the header, which contains data about the various data chunks, and the data chunks themselves, each containing a single file. Each chunk also has a short header.

Softdisk Library Format	
Format type	Archive
Max files	65,535
File Allocation Table (FAT)	Beginning
Filenames?	Yes, 8.3
Metadata?	None
Supports compression?	Yes
Supports encryption?	No
Supports subdirectories?	No
Hidden data?	Yes
Games	Commander Keen Dreams Dangerous Dave 3 Dangerous Dave 4

Contents [hide]

1 Header
2 Data Chunks
3 Compression
  3.1 LZW
  3.2 LZH
4 Softlib
5 Data contained in libraries
6 Tools
7 Credits

Header

The file header is found only in SLIB files and is absent in SHL files, which are loaded into memory in their entirety. The SLIB header allows individual data chunks to be loaded inhto memory seperately.

The SLIB header is a variable length header that contains information about how many chunks there are in a file as well as their location in the file and size. It is used by the game to load chunks

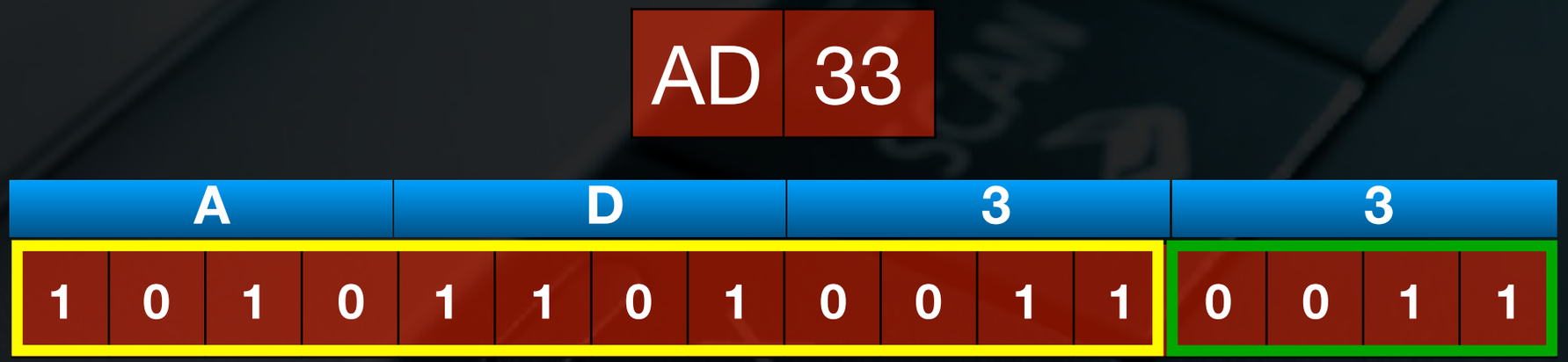
COMMANDER KEEN

in Goodbye, Galaxy

DISTRIBUTED BY
APOGEE

Press
F1
for Help

TheMissingLink



MysterySolved

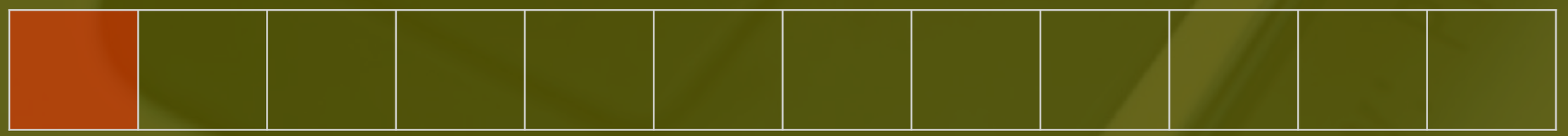
Sliding Window



Input Text

ABCDABEFG

Output Text



MysterySolved

Sliding Window

A																			

Input Text

A B C D A B E F G

Output Text

	A										

MysterySolved

Sliding Window

A	B																		

Input Text

A B C D A B E F G

Output Text

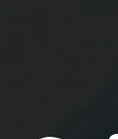
	A	B									

MysterySolved

Sliding Window

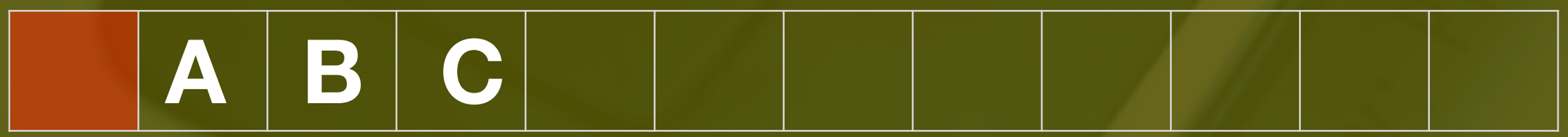


Input Text



A B C D A B E F G

Output Text



MysterySolved

Sliding Window

A	B	C	D																

Input Text

ABCDABEFG

Output Text

	A	B	C	D							

MysterySolved

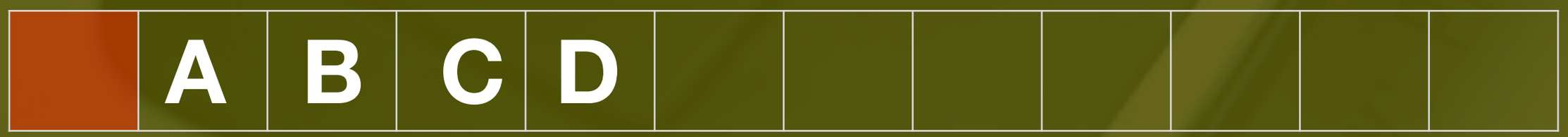
Sliding Window



Input Text

A B C D A B E F G

Output Text



MysterySolved

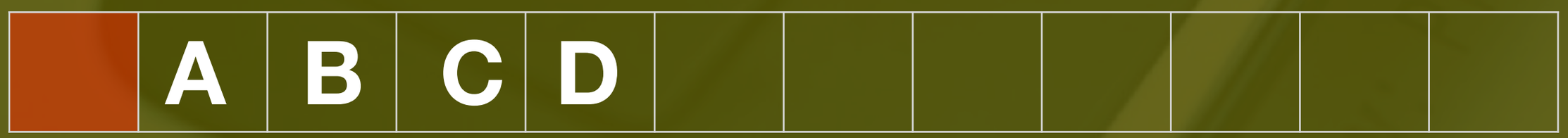
Sliding Window



Input Text

A B C D A B E F G

Output Text



MysterySolved

Sliding Window



Input Text



ABCDABEFG

Output Text



MysterySolved

Sliding Window

A	B	C	D	E														

Input Text



A B C D A B E F G

Output Text

	A	B	C	D	00	02	E				

MysterySolved

Sliding Window

A	B	C	D	E	F														

Input Text



A B C D A B E F G

Output Text

	A	B	C	D	00	02	E	F			

MysterySolved

Sliding Window

A	B	C	D	E	F	G												

Input Text

A B C D A B E F G

Output Text

	A	B	C	D	00	02	E	F	G		

MysterySolved

Sliding Window

A	B	C	D	E	F	G												

Input Text



A B C D A B E F G

Output Text

1	1	1	1	0		1	1	1		
	A	B	C	D	00	02	E	F	G		

MysterySolved

Sliding Window

A	B	C	D	E	F	G												

Input Text



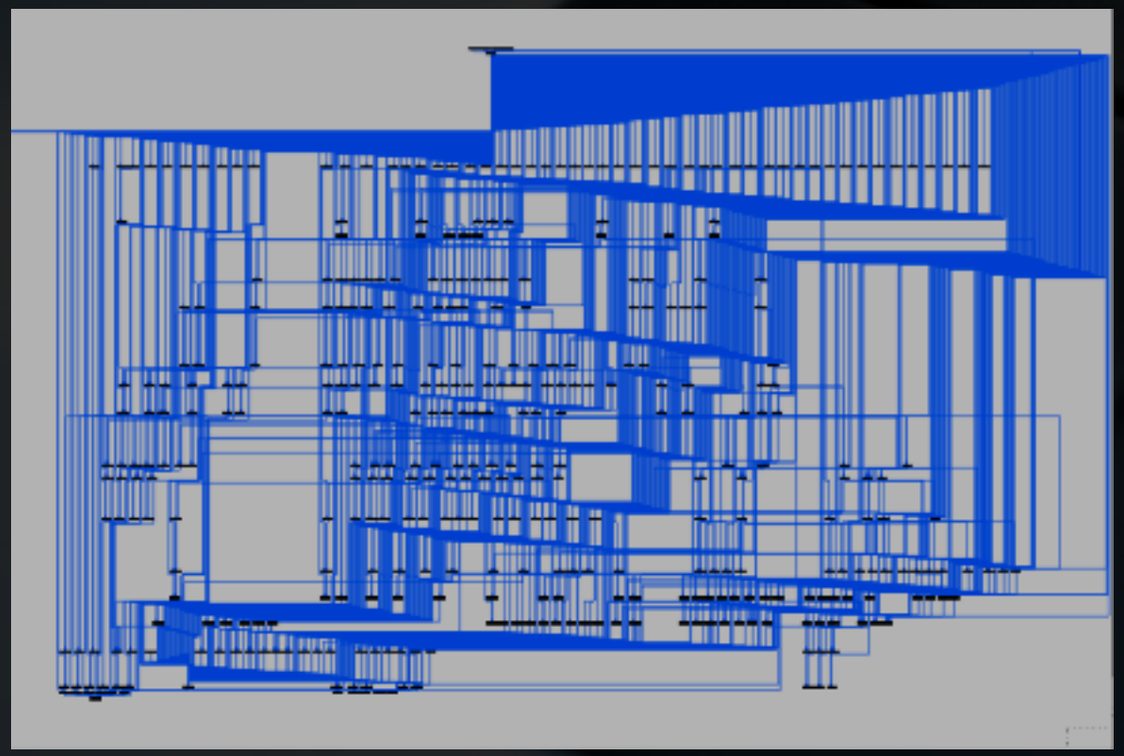
A B C D A B E F G

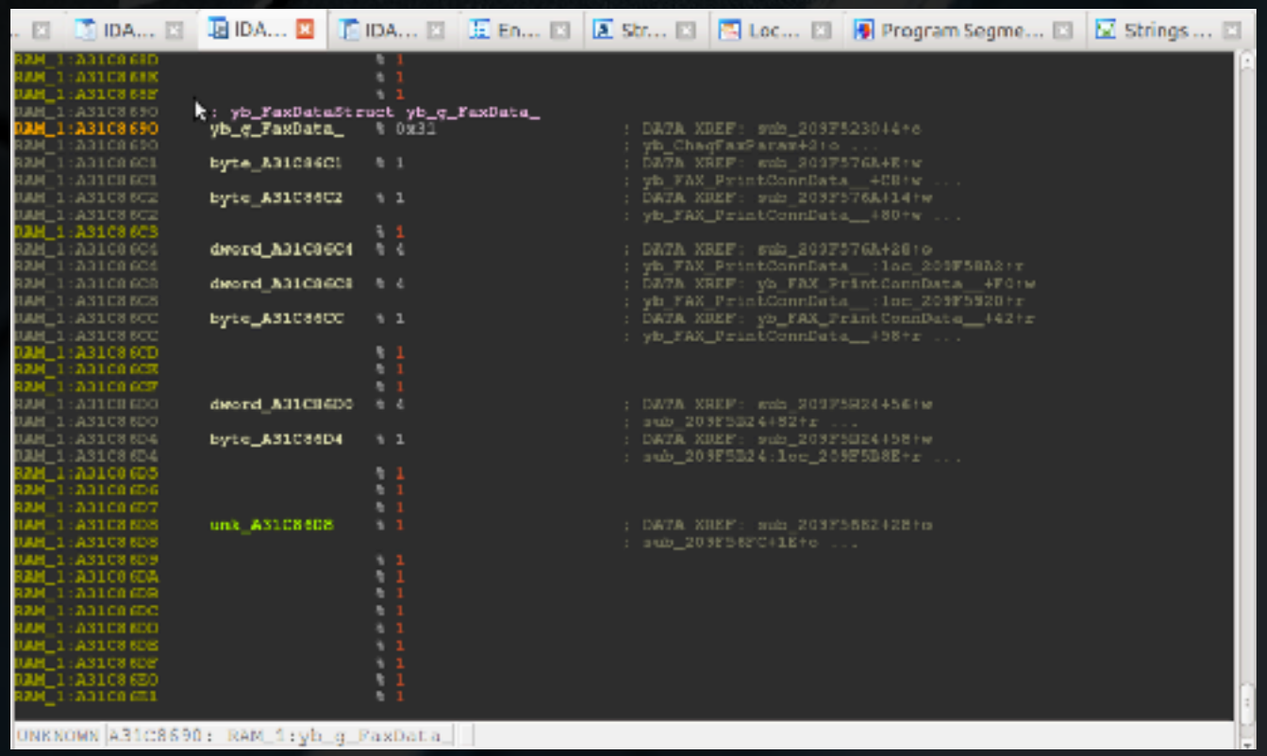
Output Text

EF	A	B	C	D	00	02	E	F	G		

ThePrintingBeast

- 64,709 Functions
- Most of the code not parsed by IDA
- Indirect Calls, Dynamic Tables, BootLoader Functions





MakingSomeSense

ThreadX - ARM9/ Green Hills

Common Libraries

- mDNSResponder
- Spidermonkey
- OpenSSL 1.0.1j (2014)
- gSOAP 2.7
- libpng 1.2.29 (2008)

Tasks

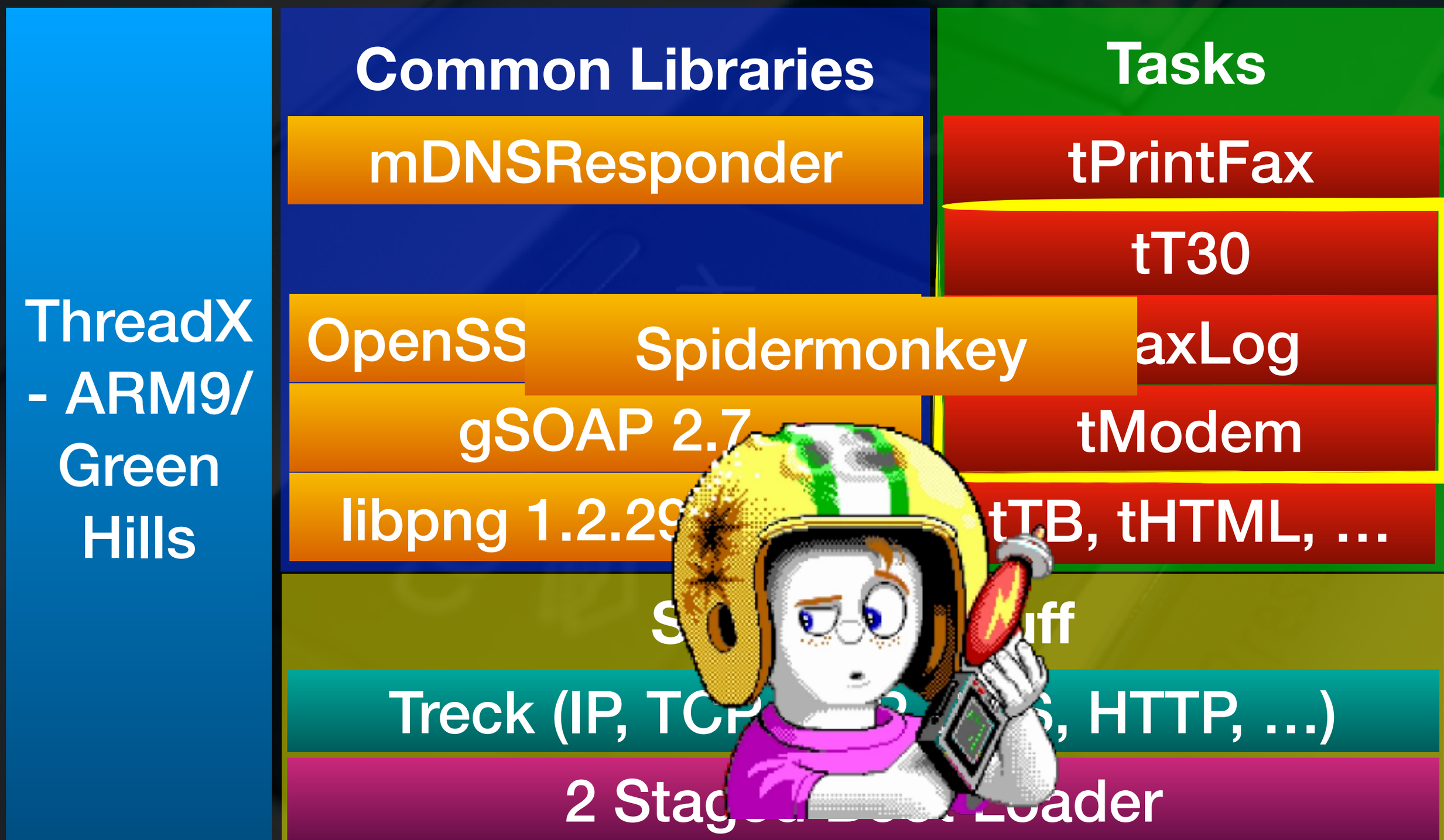
- tPrintFax
- tT30
- tFaxLog
- tModem
- tTB, tHTML, …

System n’ Stuff

Treck (IP, TCP/UDP, DNS, HTTP, …)

2 Staged Boot Loader

MakingSomeSense



JSOnAPrinter?!

- JavaScript is used in a module called PAC.
- PAC - Proxy Auto Configuration
- Used by a URL linking to a JS file in DHCP settings
- Top layer functionality was designed by HP

FakeURL

Pseud... | IDA... | IDA... | IDA... | En... | Str... | Loc... | Program Segme... | Strings ...

```
40    if ( v10 != -98 )
41    {
42      sub_20A05258(v9);
43      sub_20A05258(dword_A2315C38);
44      dword_A2315C38 = -1;
45      return v10;
46    }
47    if ( (v12 - 301) > 2 && v12 != 307 )
48    {
49      sub_20A05258(v9);
50      sub_20A05258(dword_A2315C38);
51      result = -1;
52      dword_A2315C38 = -1;
53      return result;
54    }
55    (*(*dword_A320E290 + 12))(dword_A320E290, v9, "Location", &arg1, 257);
56    if ( yl_strstr(&arg1, "http://") )
57    {
58      yl_strncpy___(&dst, &arg1, 256);
59      sub_20A05258(v9);
60    }
61    else
62    {
63      v11 = YA_strlen(&dst);
64      sub_20B2E484(&dst, &v15, 256 - v11);
65    }
66  }
67  if ( !yl_sub_20A24370(&unk_A320E294, "fakeurl1234.com", "fakeurl1234.com", &a4a) )
68  {
69    if ( a4a )
70    {
71      yl_sub_20A24030(a4a, v5, v6, v7);
72      yl_js_free(a4a);
73      a4a = 0;
74    }
75  }
76  sub_20A05258(v9);
77  return 0;
78}
```

0097F128 yl_sub_20A23DD8:55 (20A23EF4)

Yep...

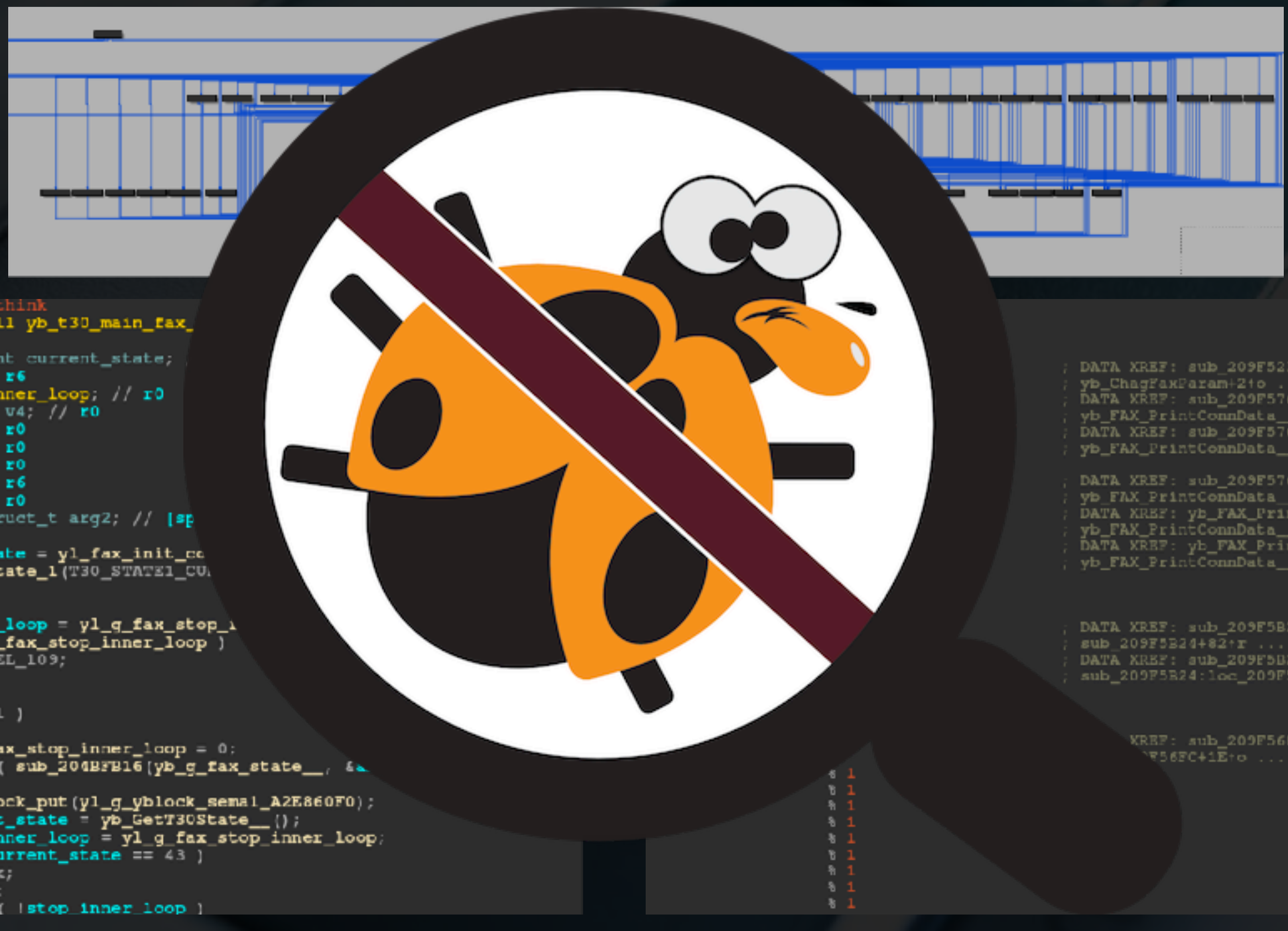
PREMIUM Domains

FOR SALE

T30

- aka “ITU-T Recommendation T.30”
- Procedures for document facsimile transmission in the general switched telephone network
- Defined the “heavy lifting” procedures relevant for all fax sending functionality
- Designed at 1985
- Last update at 2005

DynamicHell



TheUndebuggable

- How do we debug this hostile environment?
- There are no native debugging facilities
- We have no control over the execution flow
- Hardware watch-dog is a serious problem

LuckyBreak

- Luck is a fundamental part of every research project
- At July 19, SENRIO published an exploit dubbed “Devil’s Ivy”
- CVE-2017-9765 - RCE in gSOAP 2.7 - 2.8.47
- And it seems our printer is vulnerable!

Devil's Ivy

```
int __fastcall yl_soap_get_pi(soap_t *soap)
{
  char *s; // r6
  signed int i; // r7
  signed int c_1; // r4
  unsigned int c; // r0
  unsigned __int8 *v6; // r6
  char buf[64]; // [sp+0h] [bp-54h]

  s = buf;
  i = 64;
  while ( 1 )
  {
    c = yl_soap_getchar(soap);
    c_1 = c;
    if ( c == -1 || c == '?' )
      break;
    if ( --i > 0 )
    {
      if ( c < 0x21 )                    // soap_blank(c)
        LOBYTE(c_1) = 0x20;
      *s++ = c_1;
    }
  }
  *s = 0;
  if ( !yb_strcnmp(buf, "xml ", 4) )
  {
    v6 = yl_strstr(buf, " encoding=");
    if ( v6 )
```

Debugging Challenges

- Need to read/write memory
- Need to Execute code
- Create a network tunnel between debugger/debuggee

Debugging Challenges

- We have control over execution flow
- Need to load our own code
- Bypass memory protection
- Embed debugging stub into current firmware

Scout

- We created our own instruction based debugger
- Called - ‘Scout’
- Supports x86, x64, ARM (ARM and Thumb mode)
- Embedded mode for firmware
- Linux kernel mode

How Does A FAX?









How Does A FAX?







PHASE 1	PHASE 2	PHASE 3	PHASE 4
Network Interaction	Probing/ Ranging	Equalizer and Echo Canceller Training	Training Phase



How Does A FAX?









Tunnel

PHASE A	PHASE B	PHASE C	PHASE D
Caller ID	Sender Caps (DIS) Receiver Caps (DTC)	Data Transfer	End of page (EOP) Msg Confirm (MCF)

How Does A FAX?





T.30

PHASE A

PHASE B

PHASE C

PHASE D



HDLC

Tunnel



How Does A FAX?





T.30

PHASE A

PHASE B

PHASE C

PHASE D



HDLC

Tunnel



FAX

How Does A FAX?









TIFF Header

TIFF Body

PHASE A

PHASE B

PHASE C

PHASE D

Tunnel

G.3/G.4

T.30

HDLC

How Does A FAX?





PHASE A

PHASE B

PHASE C

PHASE D

T.30

Color Extension



HDLC

Tunnel



FAX

How Does A FAX?



JPEG Header and Body



PHASE A

PHASE B

PHASE C

PHASE D

T.30

Color Extension



HDLC

Tunnel



Vulnerability

- All the layers we showed can contain possible vulnerabilities.
- The most convenient layer is the application one.
- We started by inspecting the JPEG parsing capabilities.

JPEG

FF	D8	FF	E0	00	10	4A	46	49	46	00	01	02	00	00	64	. . . . . J F I F . . . d
00	64	00	00	FF	C4	0A	02	34	D3	2A	78	80	42	6D	2B	. d . . . . . 4 . * x . Bm+
FF	DA	12	28	2A	6F	2B	81	6A	16	0F	C8	9A	13	FF	D9	. . . (* 0 + . j . . . . .

SOI - Start Of Image

APP0 - Application Specific

- Size
- Data

DHT - Define Huffman Table

- Size
- Data

SOS - Start Of Scan

- Data

EOI - End Of Image



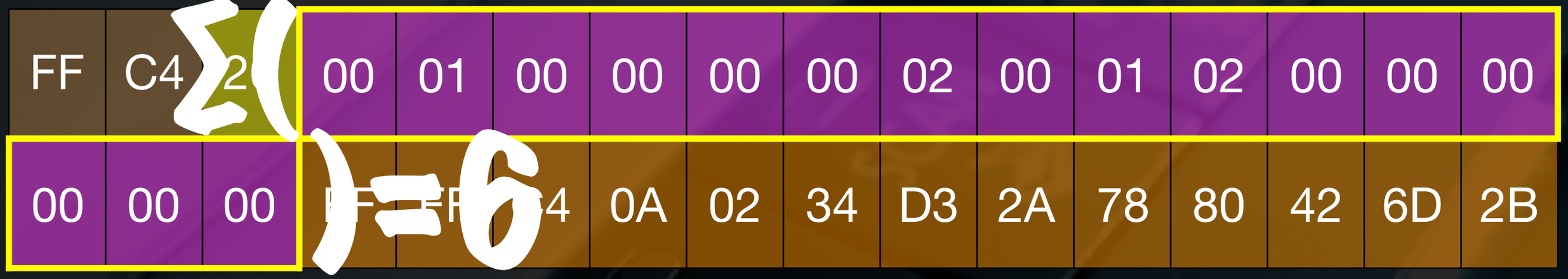
DHT

- Define Huffman Table
- Defines 4X4 comparison matrix for the JPEG Image

FF	C4	20	00	01	00	00	00	00	02	00	01	02	00	00	00
00	00	00	FF	FF	C4	0A	02	34	D3	2A	78	80	42	6D	2B



DHT



- 4X4 Matrix values are summed
- The product is used as a size value for data bytes
- The data bytes are copied into a 256 bytes array located on the stack

DHT

FF	C4	20	00	01	00	00	00	00	02	00	01	02	00	00	00
00	00	00	FF	FF	C4	0A	02	34	D3	2A	78	80	42	6D	2B

6

Stack

256

CanYouSpotIt?

```
v2 = EI_jpg_stream_read_byte_from_file();
v3 = v2 >> 4;
v4 = v2 & 0xF;
accumulated_sum_bound_4096 = 0;
loop_index = 0;
do
{
  read_byte = EI_jpg_stream_read_byte_from_file();
  local_buffer[loop_index] = read_byte;
  accumulated_sum_bound_4096 += read_byte;

  ++loop_index;
}
while ( loop_index <= 15 );
huge_short_minus_19 = huge_short_minus_2 - 17;
if ( huge_short_minus_19 < accumulated_sum_bound_4096 )
  break;
yl_dword_zero    (local_buffer_256, 64);
for ( i = 0; i < accumulated_sum_bound_4096; ++i )
  local_buffer_256[i] = EI_jpg_stream_read_byte_from_file();
huge_short_minus_2 = huge_short_minus_19 - accumulated_sum_bound_4096;
if ( v3 && v3 != 1 || v4 && v4 != 1 )
{
  EI_jpg_set_read_state_opcode(5);
  return;
}
```

DHT

FF	C4	20	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**	**FF**
FF	**FF**	**FF**	FF	FF	C4	0A	02	34	D3	2A	78	80	42	...	2B

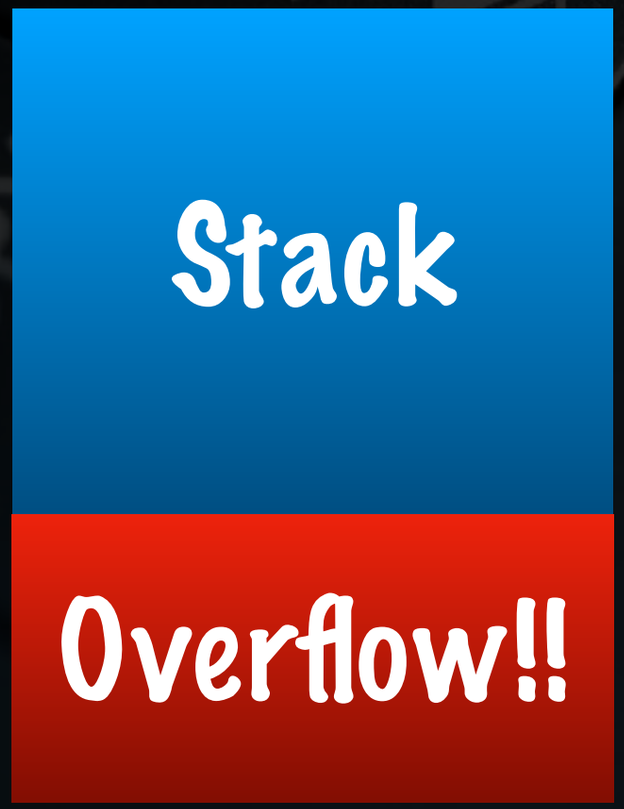
Stack

-256-

DHT

FF	C4	20	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF
FF	FF	FF	FF	FF	C4	0A	02	34	D3	2A	78	80	42	.:.:.	2B	

4000



-256-

ExploitChain

- Trivial stack overflow
- No constraints (“forbidden bytes”)
- ~4,000 user controlled bytes
- The file contains even more information we control…

Demo Time

Conclusions

- PSTN is still a valid attack surface in 2018!
- FAX can be used as a gateway to internal networks
- Old outdated protocols are not good for you…

WhatCanIDo?

- Patch your printers
- Don't connect FAX where not needed
- Segregate your printers from the rest of the network

STOP USING FAX

LittleHelpFromMyFriends



Lior Oppenheim

oppenheim1



Yannay Livneh

Yannayli



Tamir Bahar

tmr232



Yoav Alon

yoavalon



ynvb

Eyalltkin

Check Point
SOFTWARE TECHNOLOGIES LTD.