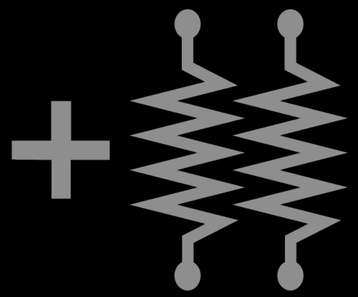
Preserving History with KiCad



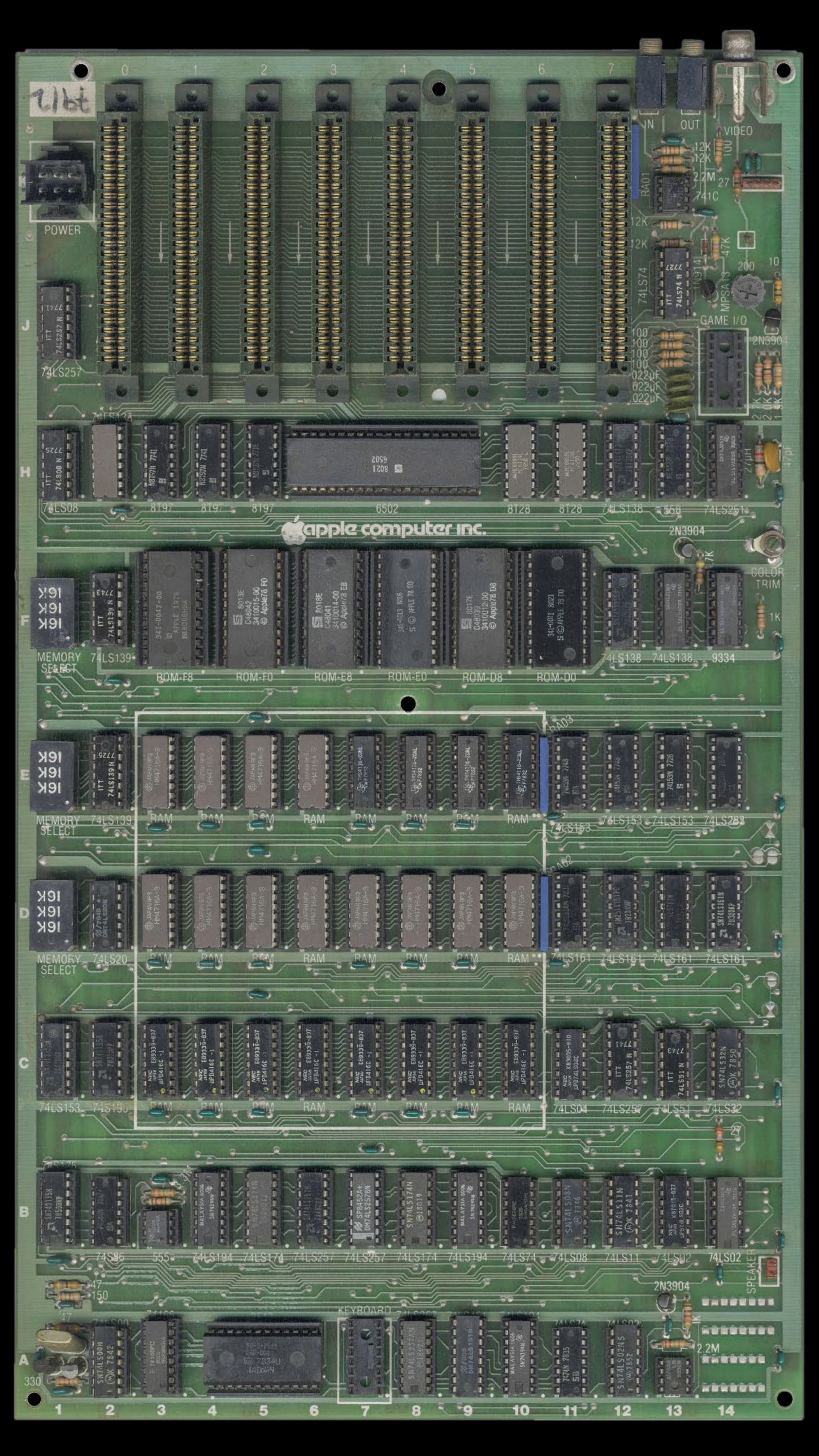
—

BALDENGINEER

Portable Apple II

Use the minimum number of chips necessary for a portable Apple II to run games.
(Okay, Oregon Trail.)

Original Apple II used 88 chips


16k
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74LS08
8T97
6502
8T28
74LS138
74LS251
apple computer inc.
2N3904
COLOR TRIM
MEMORY SELECT
74LS139
ROM-F8
ROM-F0
ROM-E8
ROM-E0
ROM-D8
ROM-D0
74LS153
74LS161
RAM
74LS20
74LS04
74LS32
74LS86
555
74LS194
74LS174
74LS08
74LS11
74LS02
KEYBOARD
SPEAKER
330
2.2M
GAME I/O
MPSA13
74LS74
VIDEO
IN
OUT

The Trinity

The most popular computers for almost a decade.

TRS-80

Radio Shack / Tandy

Apple II

Apple Computer

Commodore 64

CBM

Credit: Wikimedia Commons, Various

Apple IIGS

From Wikipedia, the free encyclopedia

The **Apple IIGS** (styled as **IIgs**), the fifth and most powerful of the Apple II family, is a 16-bit personal computer produced by Apple Computer, Inc. While featuring the Macintosh look and feel, and resolution and color similar to the Commodore Amiga and Atari ST, it remains compatible with earlier Apple II models. The "GS" in the name stands for "Graphics and Sound," referring to its enhanced multimedia hardware, especially its state of the art audio.[1]

The microcomputer is a radical departure from any previous Apple II, with its 65C816 16-bit microprocessor, direct access to megabytes of RAM, and mouse. It was the first computer produced by Apple to use a color graphical user interface (color was introduced on the Macintosh II six months later) and Apple Desktop Bus interface for keyboards, mice, and other input devices. It is the first personal computer to have a wavetable synthesis chip, utilizing technology from Ensoniq.

The IIGS set forth a promising future and evolutionary advancement of the Apple II line, but Apple increasingly focused on the Macintosh platform. The IIGS clock speed was intentionally limited below the maximum for the 65C816 so the system would not outperform the Macintosh.[2] The IIGS outsold all other Apple products, including the Macintosh, during its first year in production.[*citation needed*] Apple ceased IIGS production in December 1992.

Contents [hide]

1 Hardware features
- 1.1 Graphics modes
- 1.2 Audio features
- 1.3 Expansion capabilities
- 1.4 Development and codenames

2 Release
- 2.1 Limited Edition ("Woz"-signed case)
- 2.2 Influence on later computers
- 2.3 Upgrading an Apple IIe

3 Software features
- 3.1 8-bit Apple II compatibility
- 3.2 System Software
  - 3.2.1 Graphical user interface
  - 3.2.2 Extensibility

Apple IIGS

Manufacturer	Apple Computer, Inc.
Release date	September 15, 1986; 32 years ago
Introductory price	US$999 (equivalent to $2,283 in 2018), excluding monitor
Discontinued	December 1992
Operating system	Apple ProDOS Apple GS/OS GNO/ME
CPU	2.8 MHz 65C816
Memory	256 kB or 1 MB (expandable up to 8 MB)
Graphics	VGC 12 bpp palette, 320×200

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Current events
Random article
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Interaction
Help
About Wikipedia
Community portal
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Tools
What links here
Related changes
Upload file
Special pages
Permanent link
Page information
Wikidata item
Cite this page

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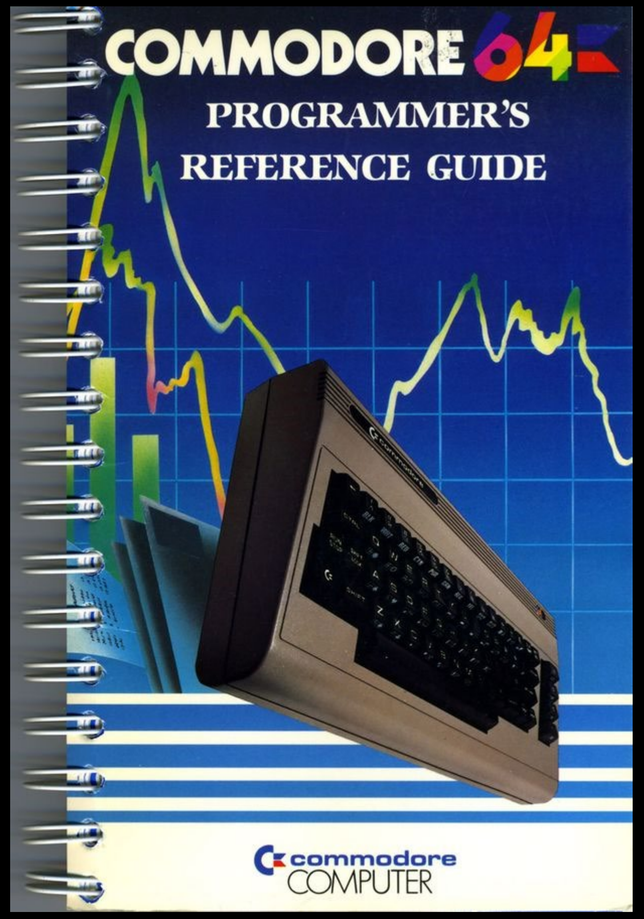
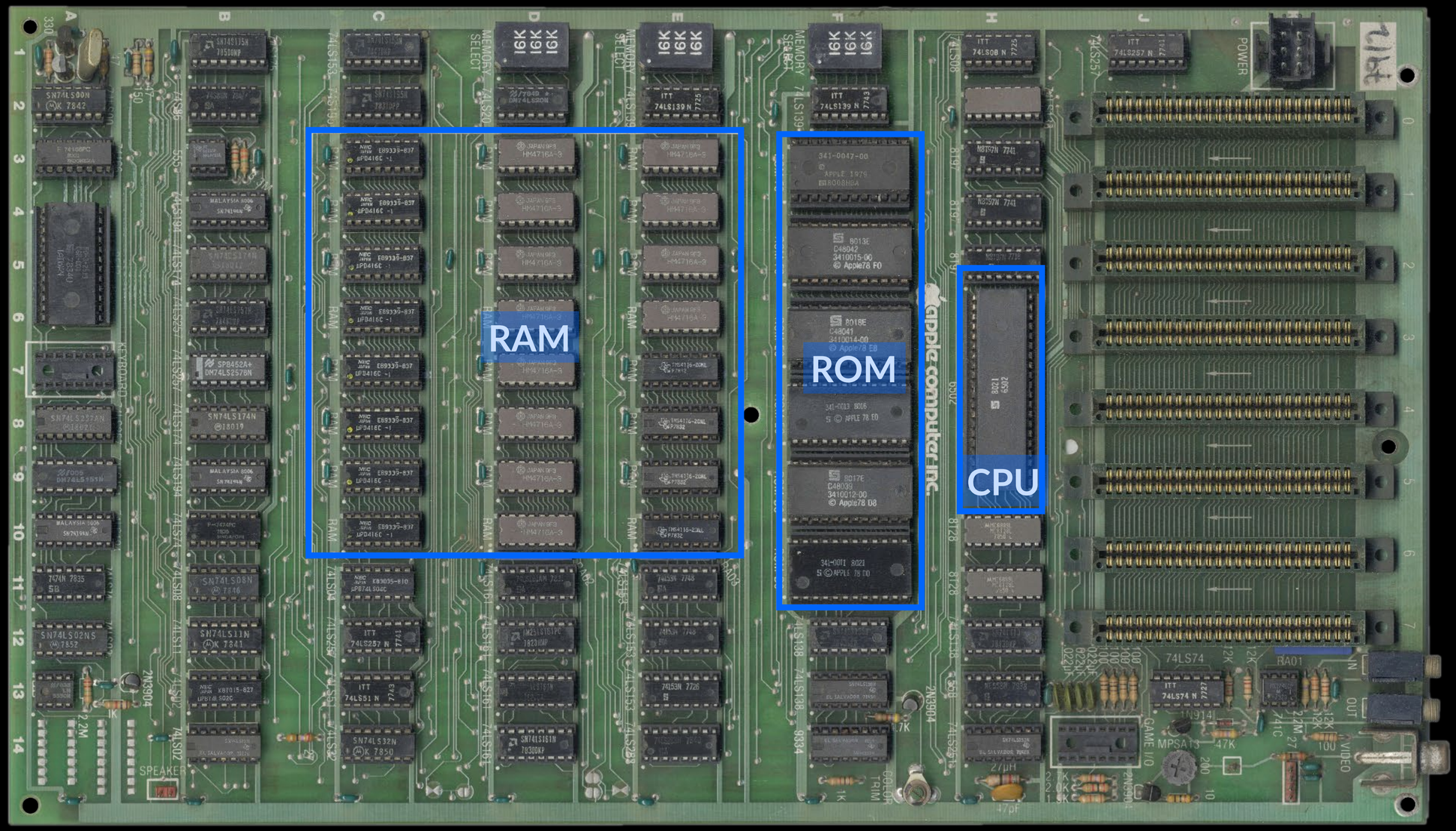
Printable version

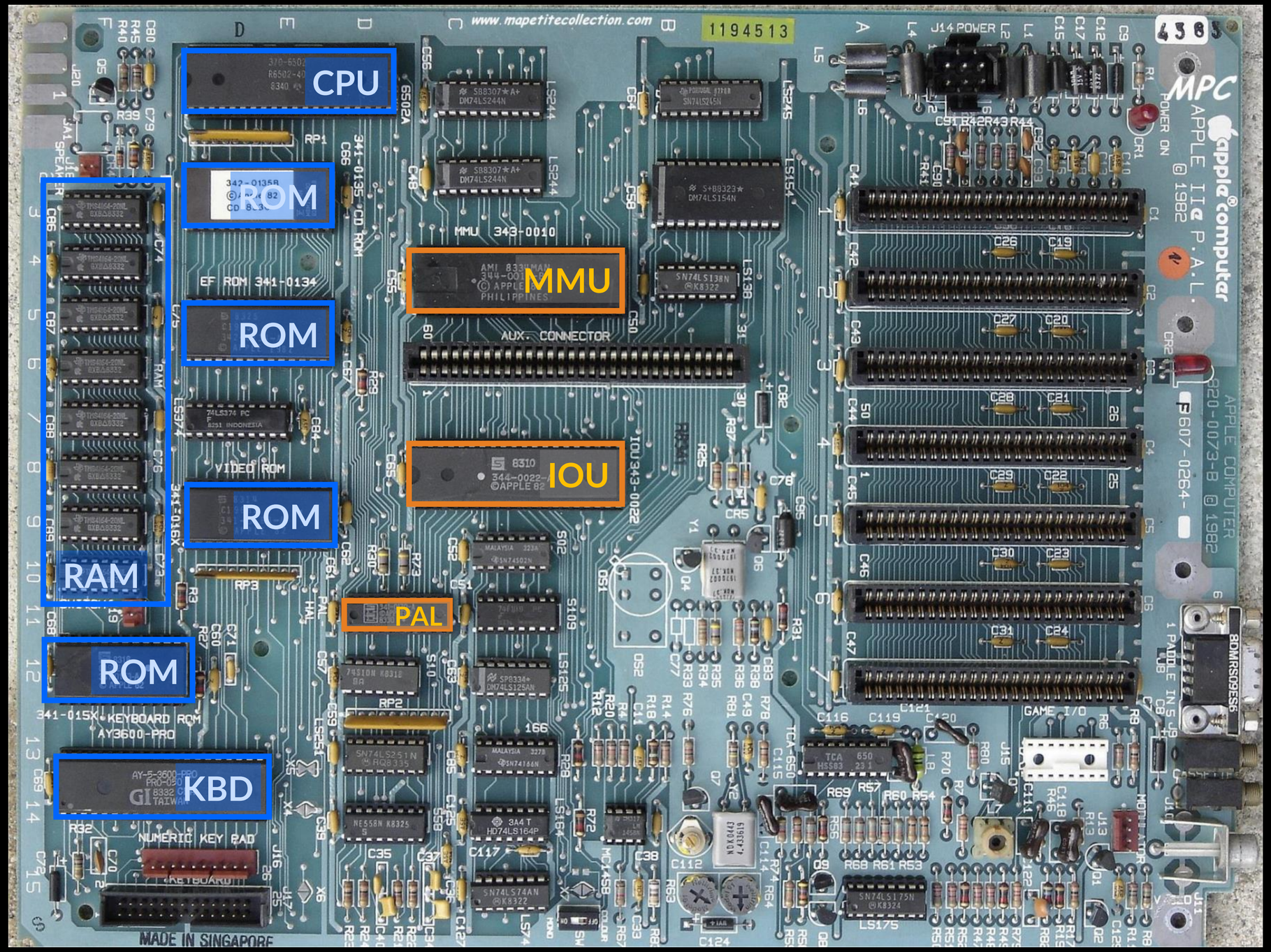
C64 User Manual and Schematic



Source: c64-wiki.com

Apple II




CPU
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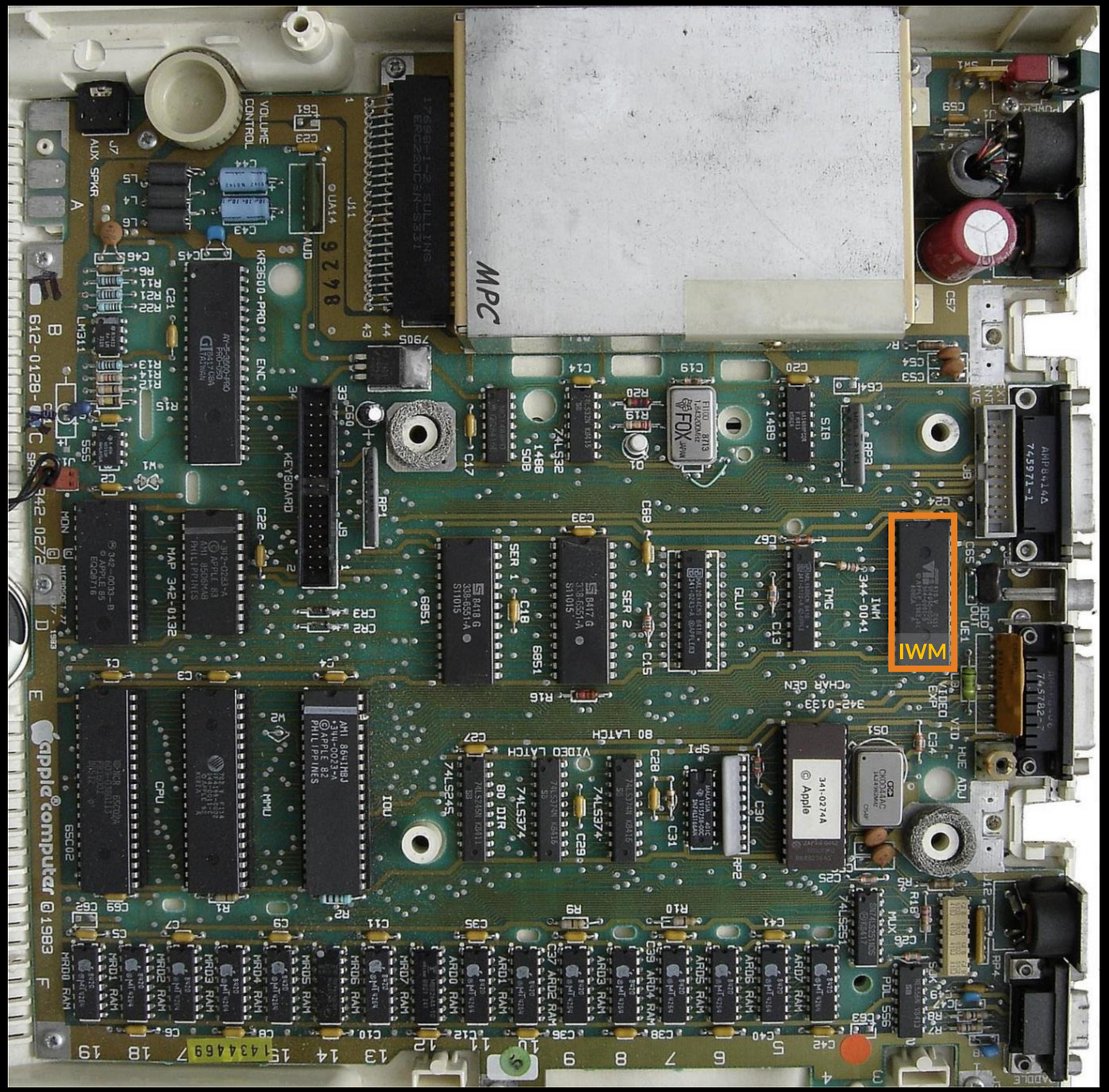
IOU
ROM
PAL
RAM
ROM
KBD
www.mapetitecollection.com
1194513
MMU 343-0010
AUX. CONNECTOR
VIDEO ROM
341-015X-KEYBOARD ROM
AY3600-PRO
NUMERIC KEY PAD
MADE IN SINGAPORE

Apple IIe


PRODOS USER'S DISK
COPYRIGHT APPLE COMPUTER, INC. 1983
YOUR OPTIONS ARE:
T - TUTOR: PRODOS EXPLANATION
F - PRODOS FILER (UTILITIES)
C - DOS <-> PRODOS CONVERSION
S - DISPLAY SLOT ASSIGNMENTS
T - DISPLAY/SET TIME
B - APPLESOFT BASIC
PLEASE SELECT ONE OF THE ABOVE »

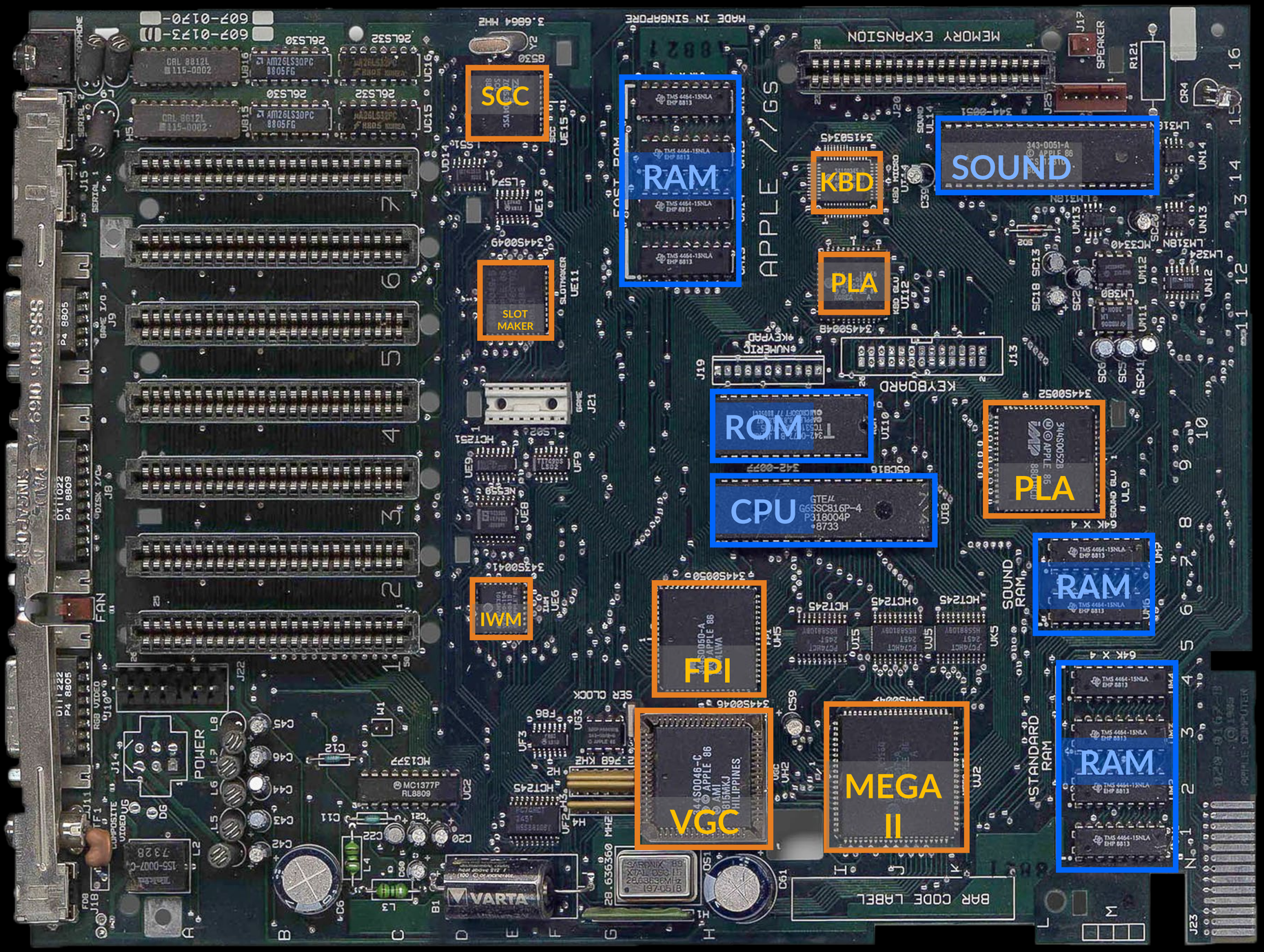
Apple IIc Logic Board

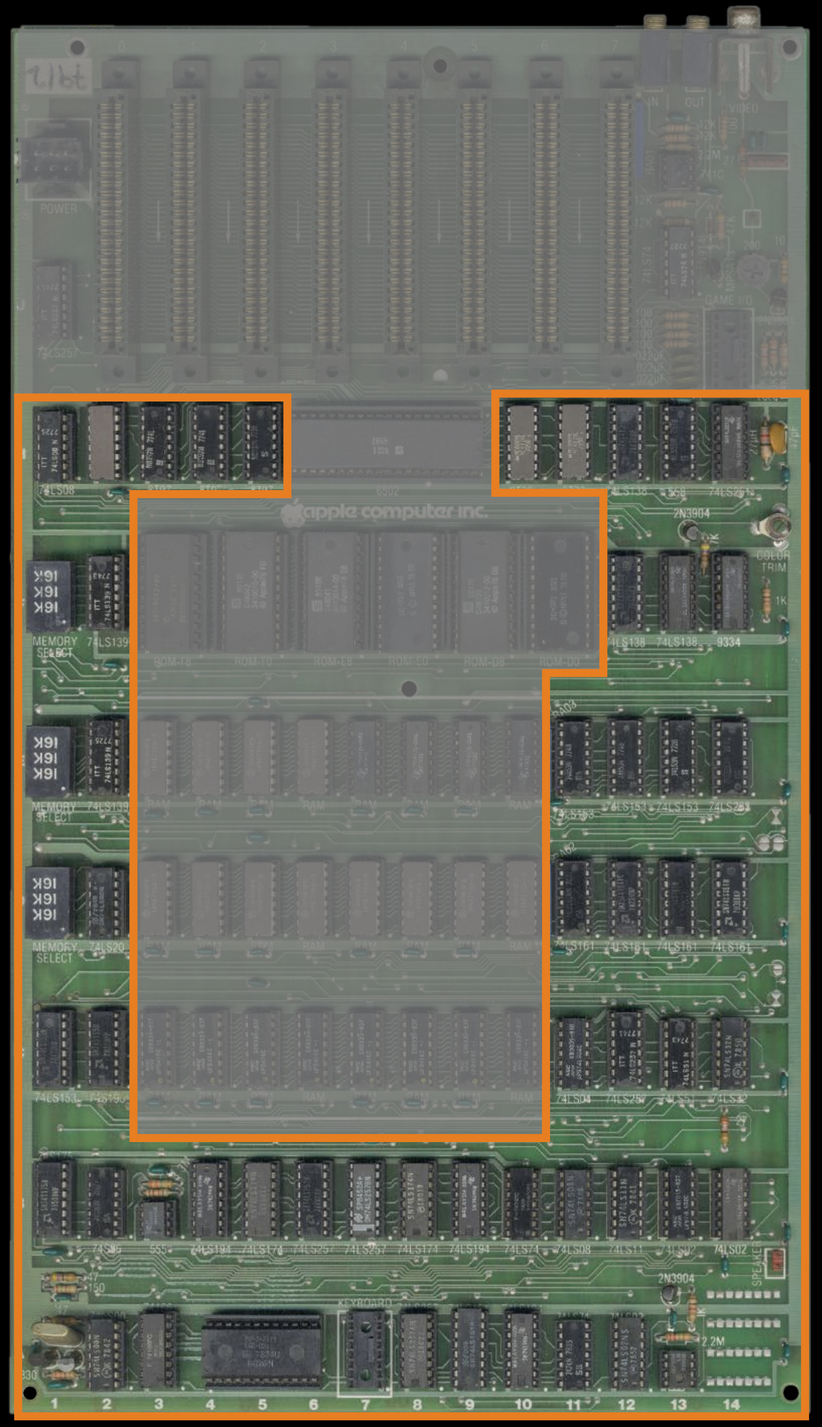


Apple IIgs

16-Bit / 8 MB RAM / 4096 Colors

Apple II Backward Compatibility




apple computer inc.
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2.2M
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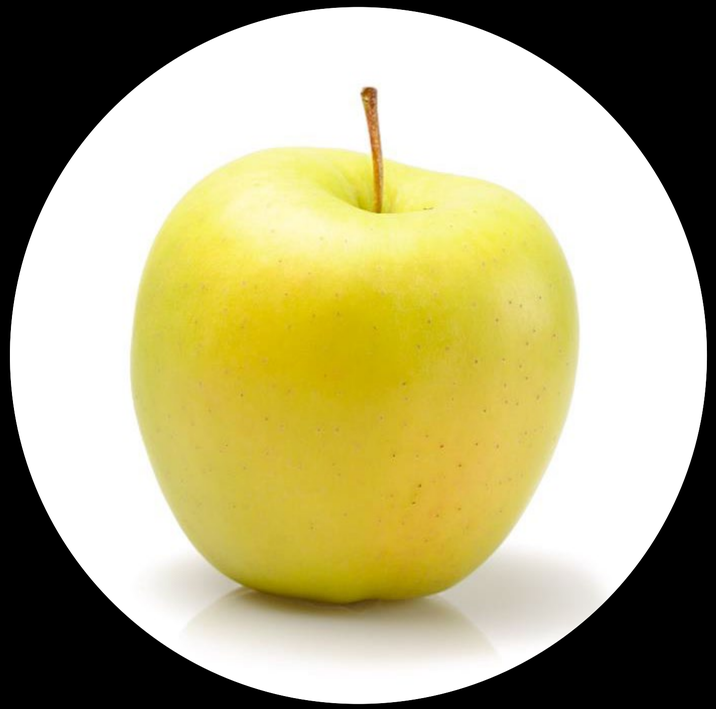


Mega-II

VGC

IWM

6502

RAM

ROM

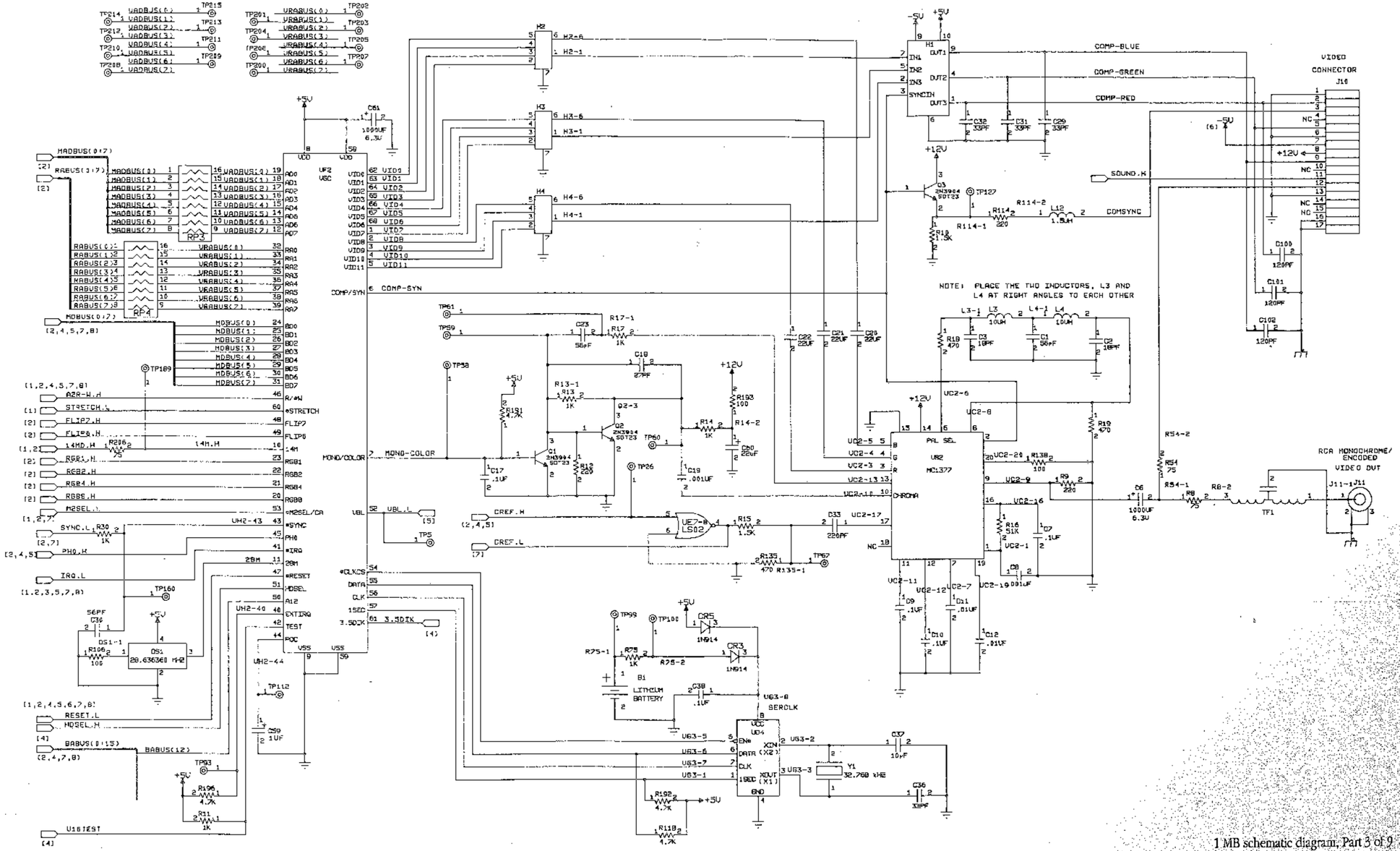
Keyboard

TFT

Gamepad

Why Bother?

Aren’t PDFs Good Enough?

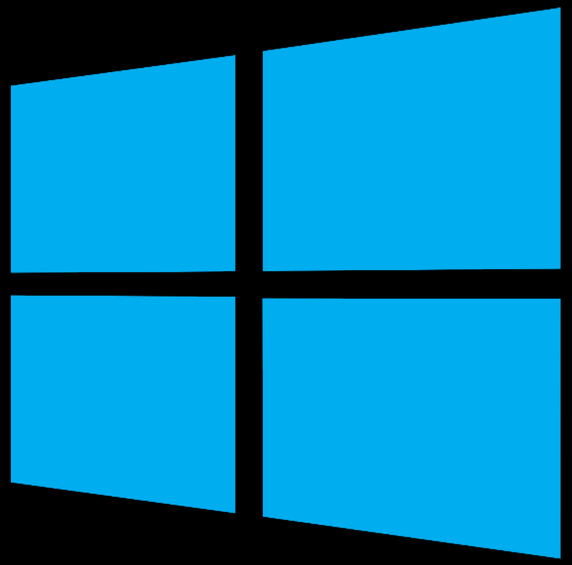


1 MB schematic diagram, Part 3 of 9

Platform Requirements

- ✔ Platform
- ✔ Open File Format
- ✔ Long Term Support
- ✔ Accessible
- ✔ Scripting
- ✔ Autorouter

Cross Platform



Open file format

```
EESchema Schematic File Version 4
LIBS:IIgs Schematic-cache
EELAYER 26 0
EELAYER END
$Descr A3 16535 11693
encoding utf-8
Sheet 5 10
Title ""
Date ""
Rev ""
Comp ""
Comment1 ""
Comment2 ""
Comment3 ""
Comment4 ""
$EndDescr
$Comp
L IIgs-Schematic-rescue:IWM-Apple_IIgs_Symbols-IIgs-Schematic-rescue U?
U 1 1 5BF1F4FE
P 3500 2650
F 0 "U?" H 3500 3978 50  0000 C CNN
F 1 "IWM" H 3500 3887 50  0000 C CNN
F 2 "" H 3250 3400 50  0001 C CNN
F 3 "" H 3250 3400 50  0001 C CNN
    1    3500 2650
    1    0    0    -1
$EndComp
$Comp
L Connector_Generic:Conn_01x21 J?
U 1 1 5BF1F65F
P 7750 2550
F 0 "J?" H 7830 2592 50  0000 L CNN
F 1 "Conn_01x21" H 7830 2501 50  0000 L CNN
```

KiCad

```
<?xml version="1.0" encoding="utf-8"?>
<!DOCTYPE eagle SYSTEM "eagle.dtd">
<eagle version="6.5.0">
<drawing>
<settings>
<setting alwaysvectorfont="no"/>
<setting verticaltext="up"/>
</settings>
<grid distance="0.1" unitdist="inch" unit="inch" style="lines" multiple="1" display=
altunit="inch"/>
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<layer number="1" name="Top" color="4" fill="1" visible="no" active="no"/>
<layer number="16" name="Bottom" color="1" fill="1" visible="no" active="no"/>
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<layer number="19" name="Unrouted" color="6" fill="1" visible="no" active="no"/>
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<layer number="22" name="bPlace" color="7" fill="1" visible="no" active="no"/>
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<layer number="30" name="bStop" color="7" fill="6" visible="no" active="no"/>
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<layer number="35" name="tGlue" color="7" fill="4" visible="no" active="no"/>
<layer number="36" name="bGlue" color="7" fill="5" visible="no" active="no"/>
```
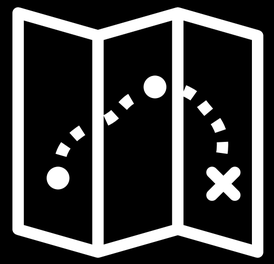
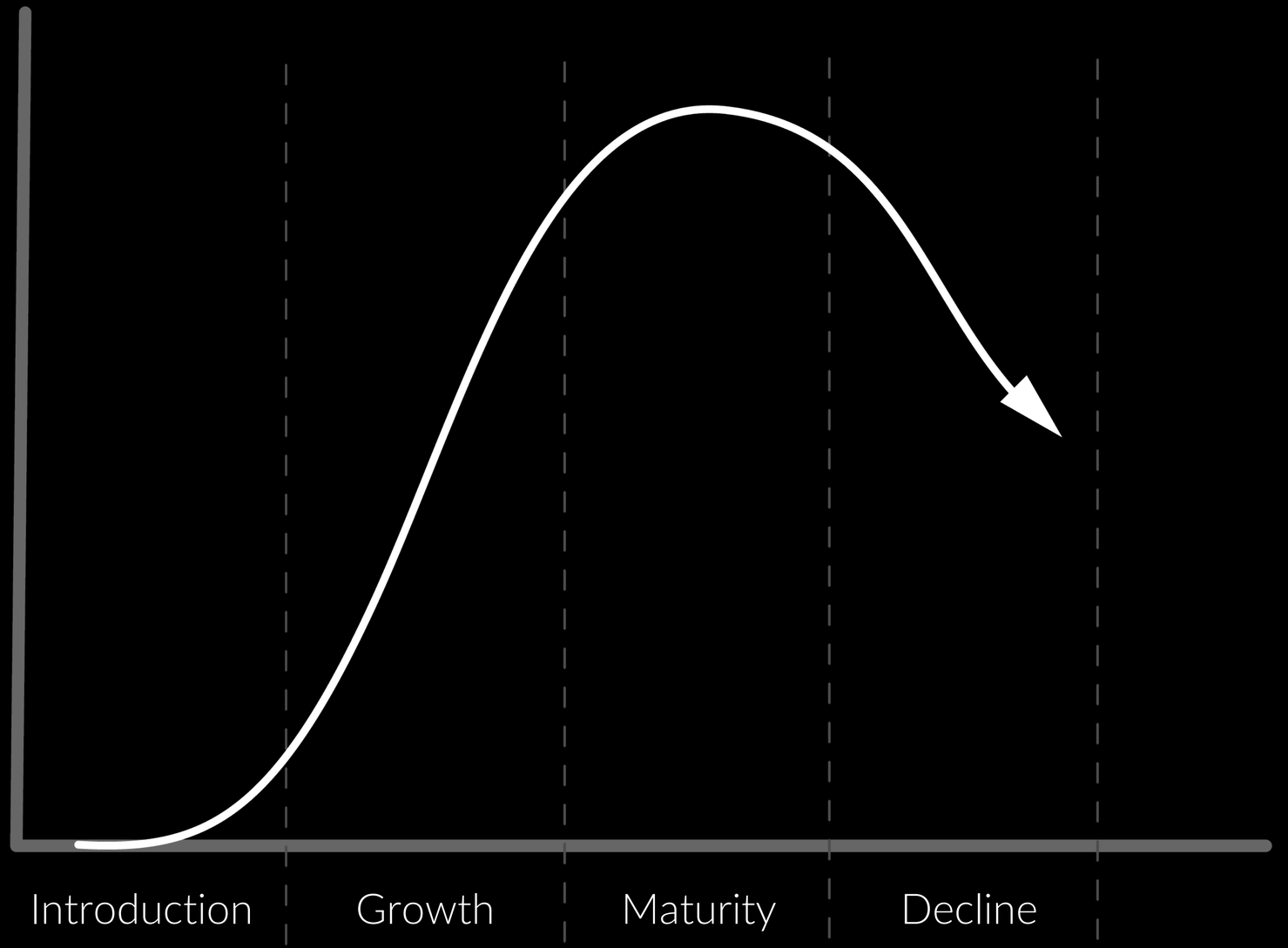

EAGLE

????

Altium

Long Term Support

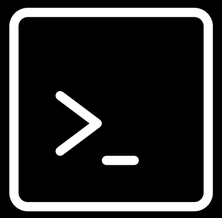




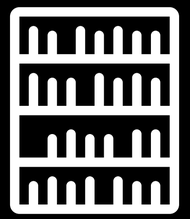
Accessibility

Are others open and willing to collaborate on the platform

Cost



Usability



Capability

Scripting

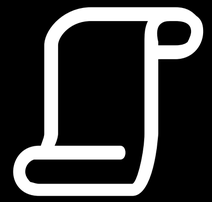
```
output("/tmp/ulp_output.txt","at") {
  if (argc != 5 && argc != 3) {
    dlgMessageBox("Incorrect number of arguments","Ok");
    exit(1);
  }

real width = strtod(argv[1]);
real height = strtod(argv[2]);

real x = 0;
real y = 0;
if (argc >= 4) {
  x = strtod(argv[3]);
  y = strtod(argv[4]);
}

string s = "";
  sprintf(s,"WIRE (%f %f) (%f %f) (%f %f) (%f %f) (%f %f);",
    x+width/2.0,y+height/2.0,
    x+width/2.0,y-height/2.0,
    x-width/2.0,y-height/2.0,
    x-width/2.0,y+height/2.0,
    x+width/2.0,y+height/2.0
  );

exit(s);
}
```

ULP

<

```
from boms_away import sch, datastore
from boms_away import kicad_helpers as kch
from boms_away import export_plugins as export_plugins
from boms_away import plugin_loader

class DBPartSelectorDialog(wx.Dialog):
  def __init__(self, parent, id, title):
    wx.Dialog.__init__(self, parent, id, title)
    self.selection_idx = None
    self.selection_text = None

    vbox = wx.BoxSizer(wx.VERTICAL)
    stline = wx.StaticText(self, 11, 'Please select from the following components')
    vbox.Add(stline, 0, wx.ALIGN_CENTER|wx.TOP)
    self.comp_list = wx.ListBox(self, 331, style=wx.LB_SINGLE)

    vbox.Add(self.comp_list, 1, wx.ALIGN_CENTER_HORIZONTAL | wx.EXPAND)
    self.SetSizer(vbox)
    self.comp_list.Bind(wx.EVT_LISTBOX, self.on_selection, id=wx.ID_ANY)

  def on_selection(self, event):
    self.selection_text = self.comp_list.GetStringSelection()
    self.selection_idx = self.comp_list.GetSelection()
    self.Close()

  def attach_data(self, data):
list(map(self.comp_list.Append, data))
```

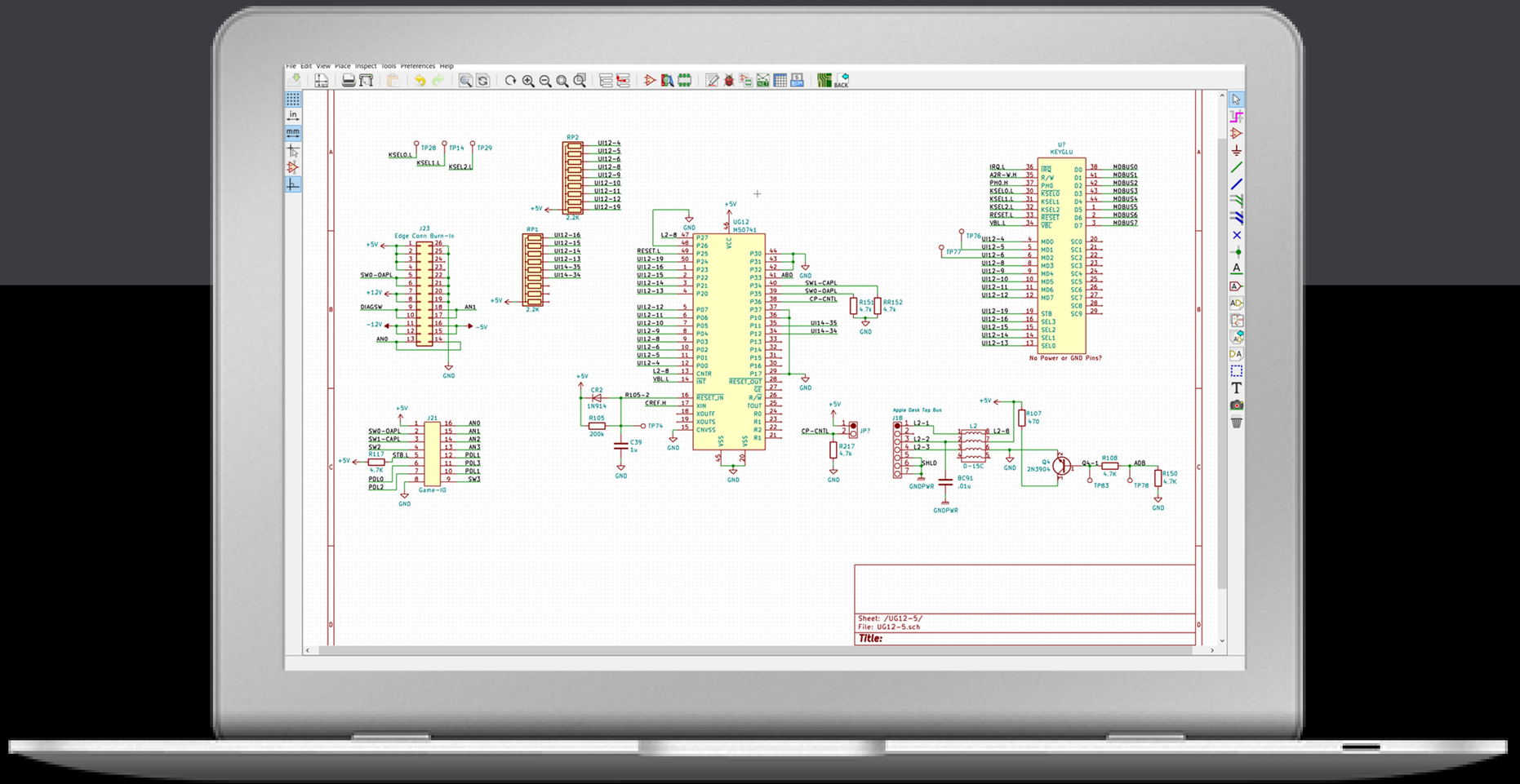
Python



Autorouter

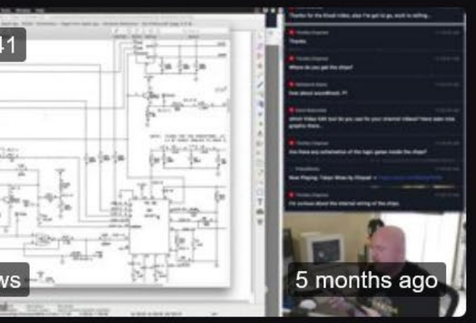
KiCad is Best Option

Spoilers!

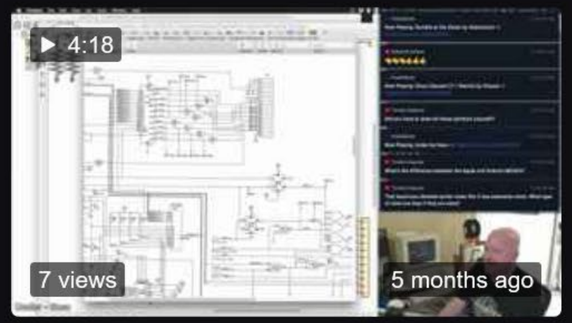


itch.tv/baldengineer/videos

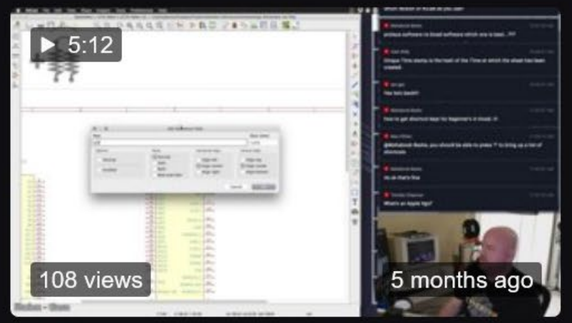
Events | Followers 26 | Following 33



Are Schematics available for Ap…
baldEngineer
Science & Technology



What are the Apple II and Apple …
baldEngineer
Science & Technology



What is the Apple IIgs? Highligh…
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Apple IIgs Schematic in KiCad | …
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Science & Technology

Highlight: ASICs for less than $…
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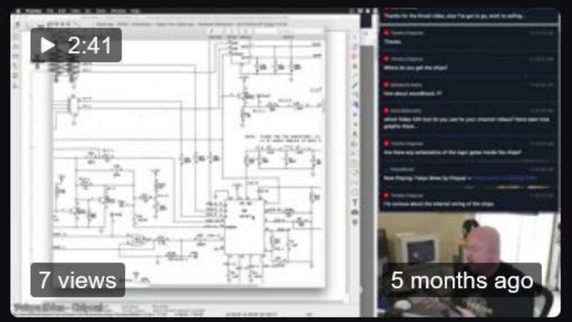
Science & Technology



Are Schematics available for Ap…
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Science & Technology

Live Stream

twitch.tv/baldEngineer
youtube.com/AddOhms

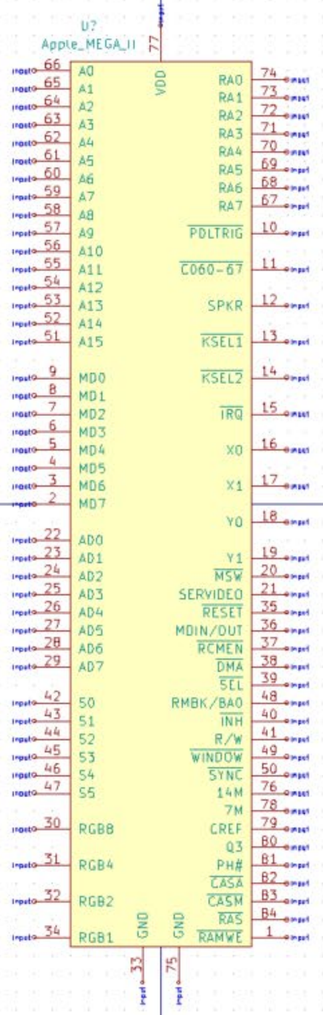
Symbol Library Editor - Apple_IIgs_Symbols (C:/Users/balde/Dropbox/Projects/Golden Delicious/Hardware/Apple_IIgs_Symbols.lib)

File Edit View Symbol Place Preferences Help

Search

Symbol

- Apple_IIgs_Symbols
  - 26LS30
  - 65SC816
  - 8530L
  - AM26LS32
  - Apple_II_Slot
  - Apple_MEGA_II
  - CYA
  - DOC5503
  - DRAM64KX4
  - Game-IO
  - HCT245
  - HCT254
  - HMS511000
  - IIgs-ROM
  - IIgs_Memory_Connector
  - IWM
  - KEYGLU
  - L-Pack
  - M50741
  - MC1377
  - NE558
  - Slotmaker
  - SOUNDGLU
  - VGC
- Audio
- Battery_Management



Name	Alias	Unit	Body	Type	Description	Key words	Datasheet
Apple_MEGA_II	None	A	Normal	Symbol			

Z 1.97 X -138.43 Y -50.80 dx -138.43 dy -50.80 dist 147.46 mm

Eeschema — IIgs Schematic [/] — C:\Users\balde\Dropbox\Projects\Golden Delicious\Hardware\IIgs Schematic

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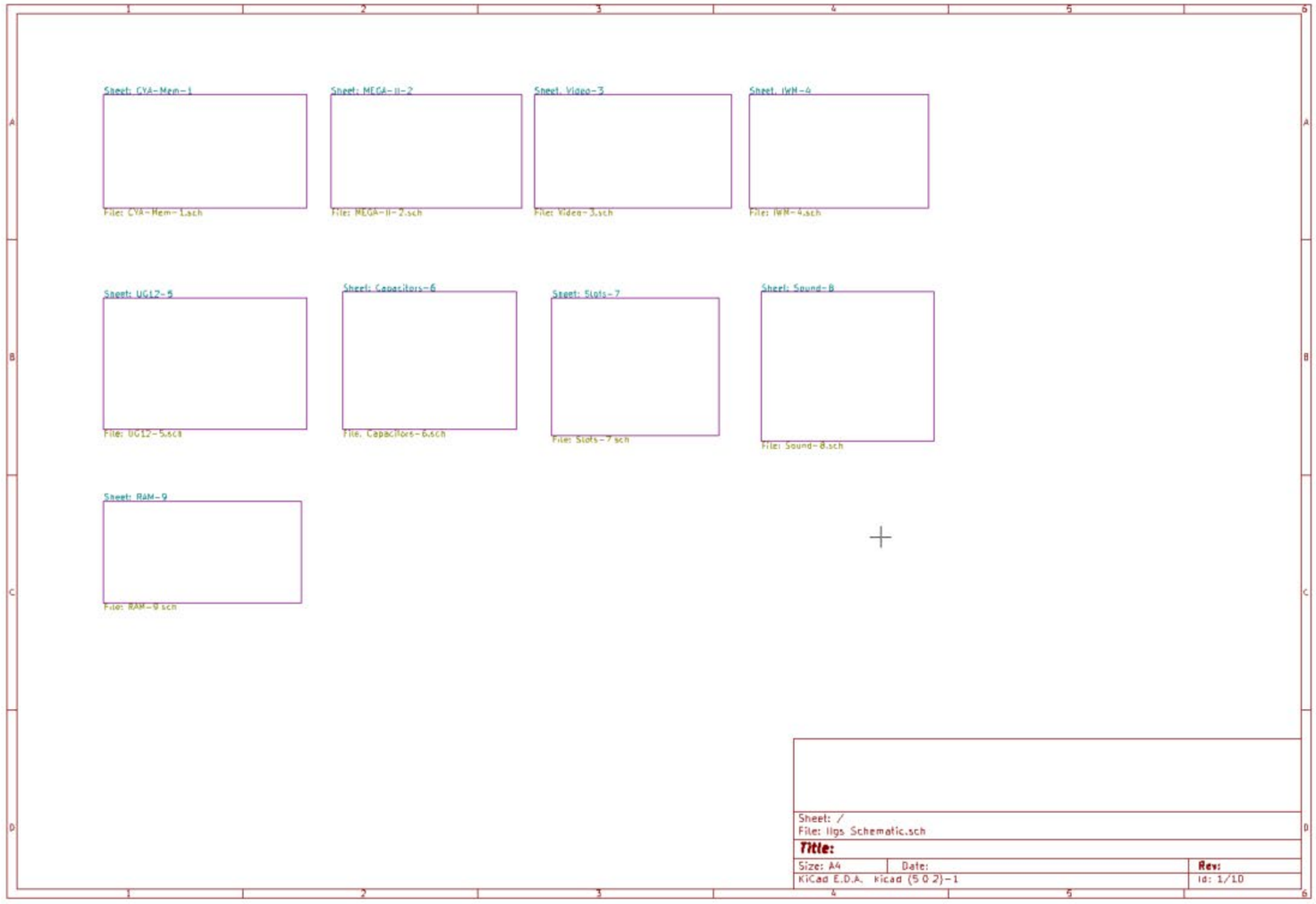
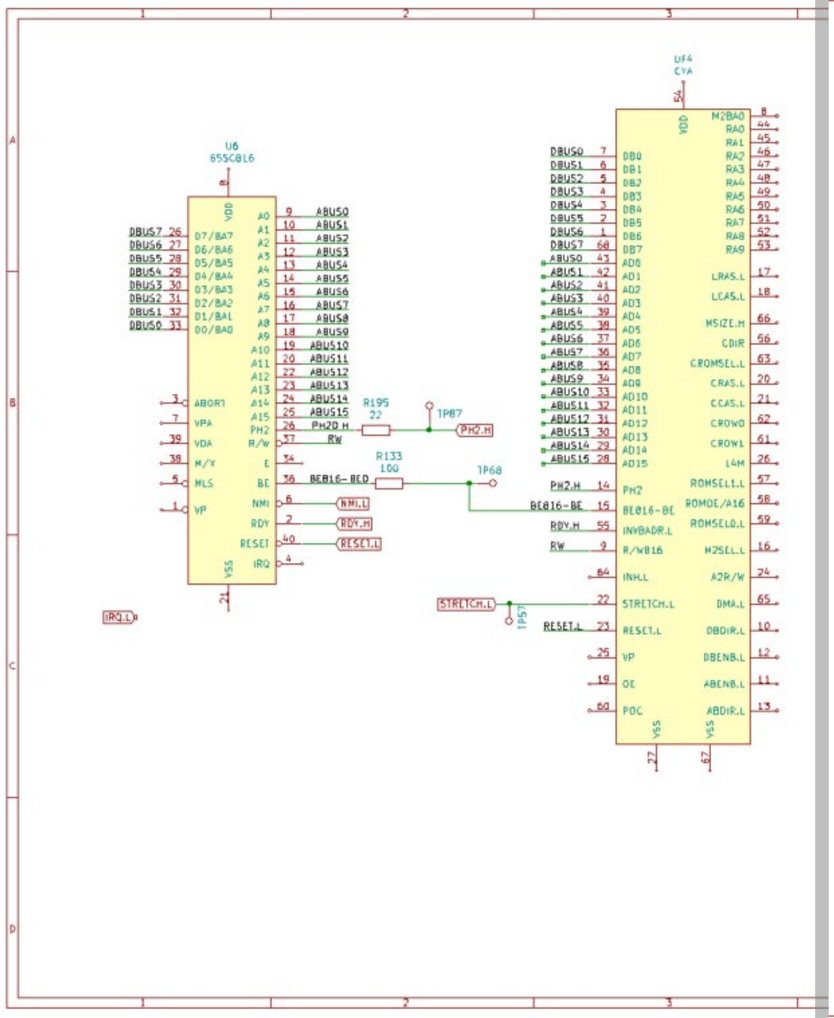


Z 1.46 X 195.60 Y 123.20 dx 195.60 dy 123.20 dist 231.17 mm


U6
65SC816
U14
CYA
R195
22
TP87
PH2.H
R133
100
TP68
BE816-BE
IRQ.L
NMI.L
RDY.H
RESET.L
STRETCH.L
TP57
RW
ABUS0
ABUS1
ABUS2
ABUS3
ABUS4
ABUS5
ABUS6
ABUS7
ABUS8
ABUS9
ABUS10
ABUS11
ABUS12
ABUS13
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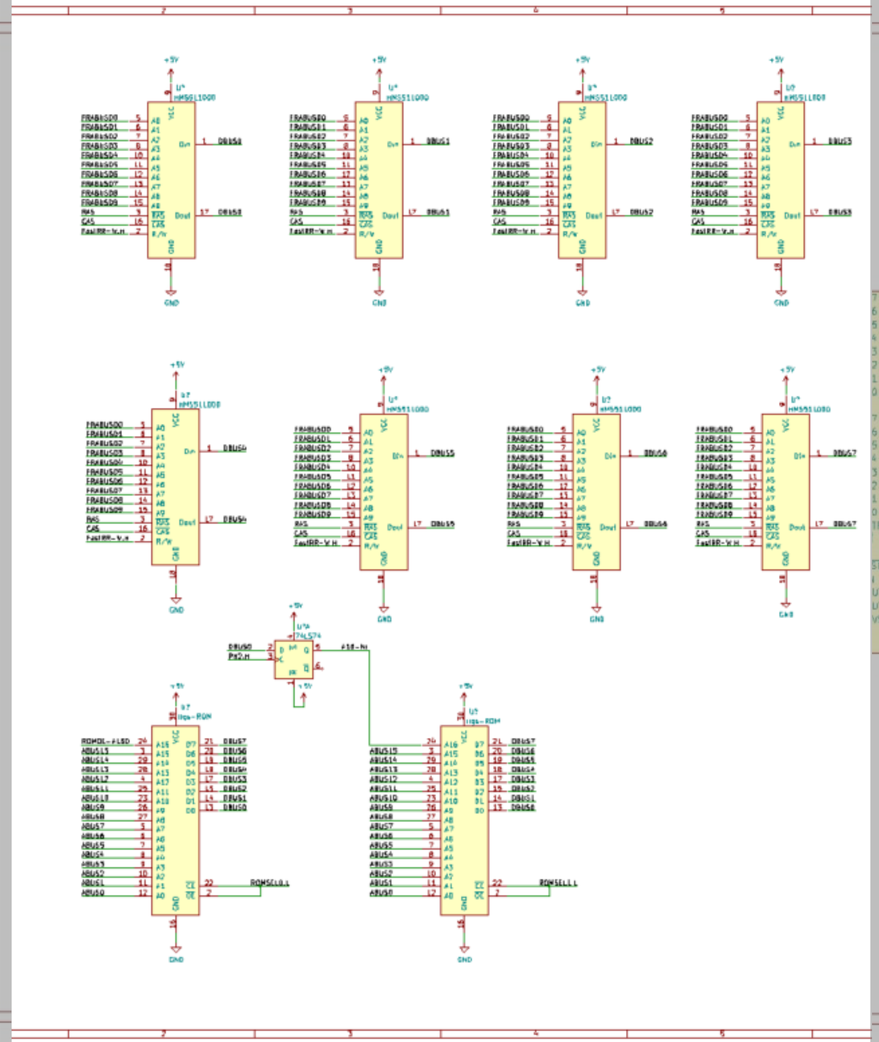
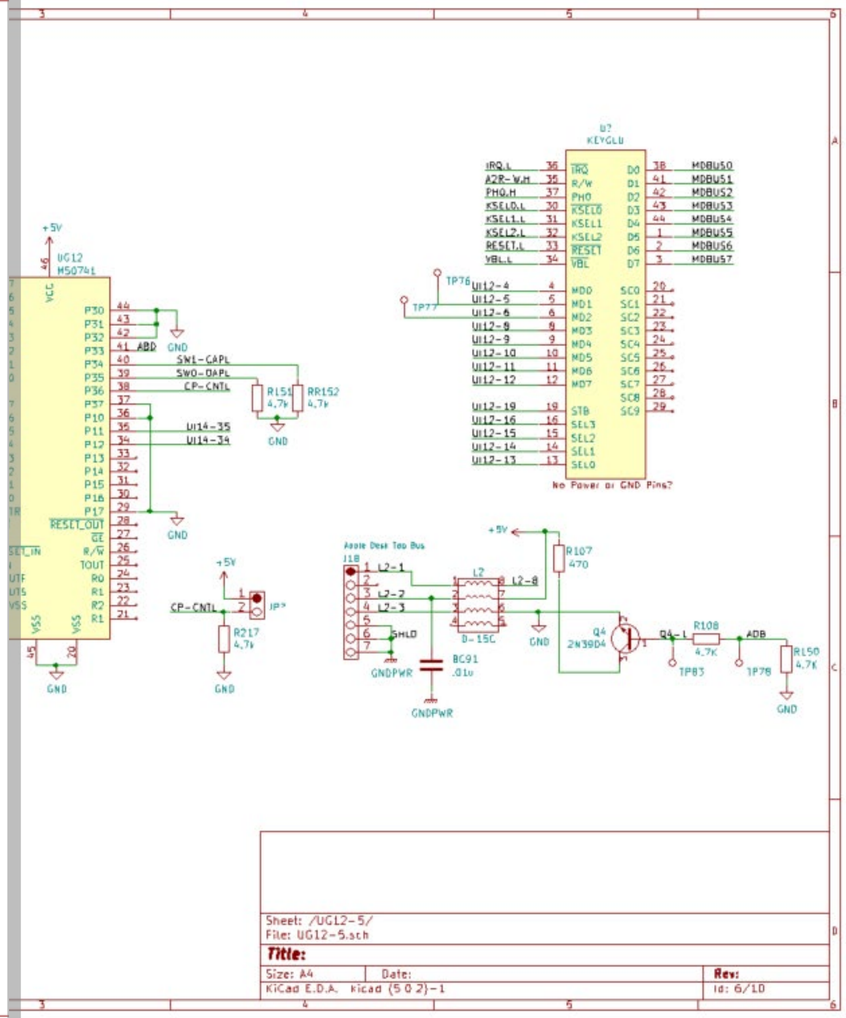
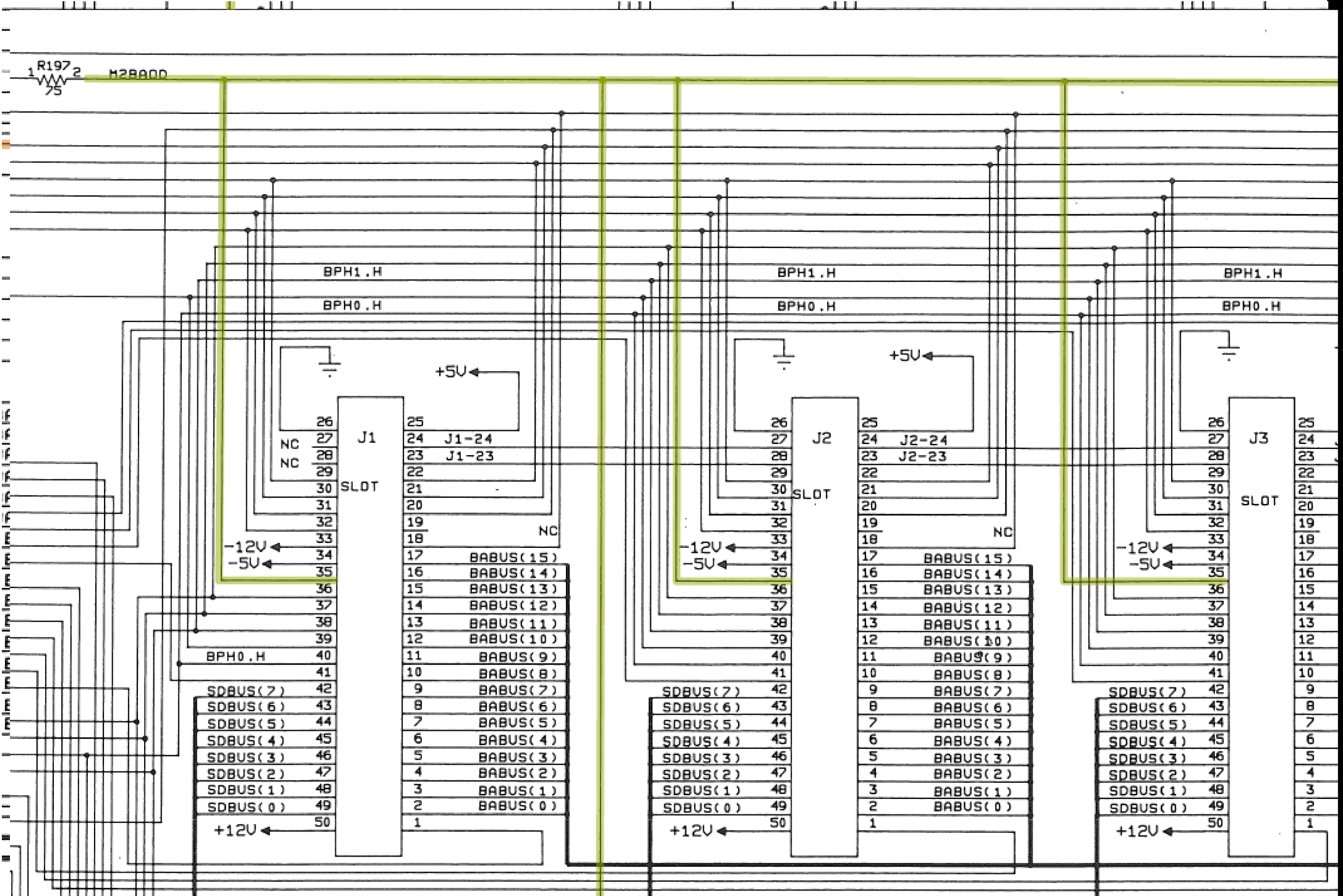
DBUS2
DBUS3
DBUS4
DBUS5
DBUS6
DBUS7


U4
HM5511000
U7
74LS74
U9
U10
ROMSEL0.L
ROMSEL1.L

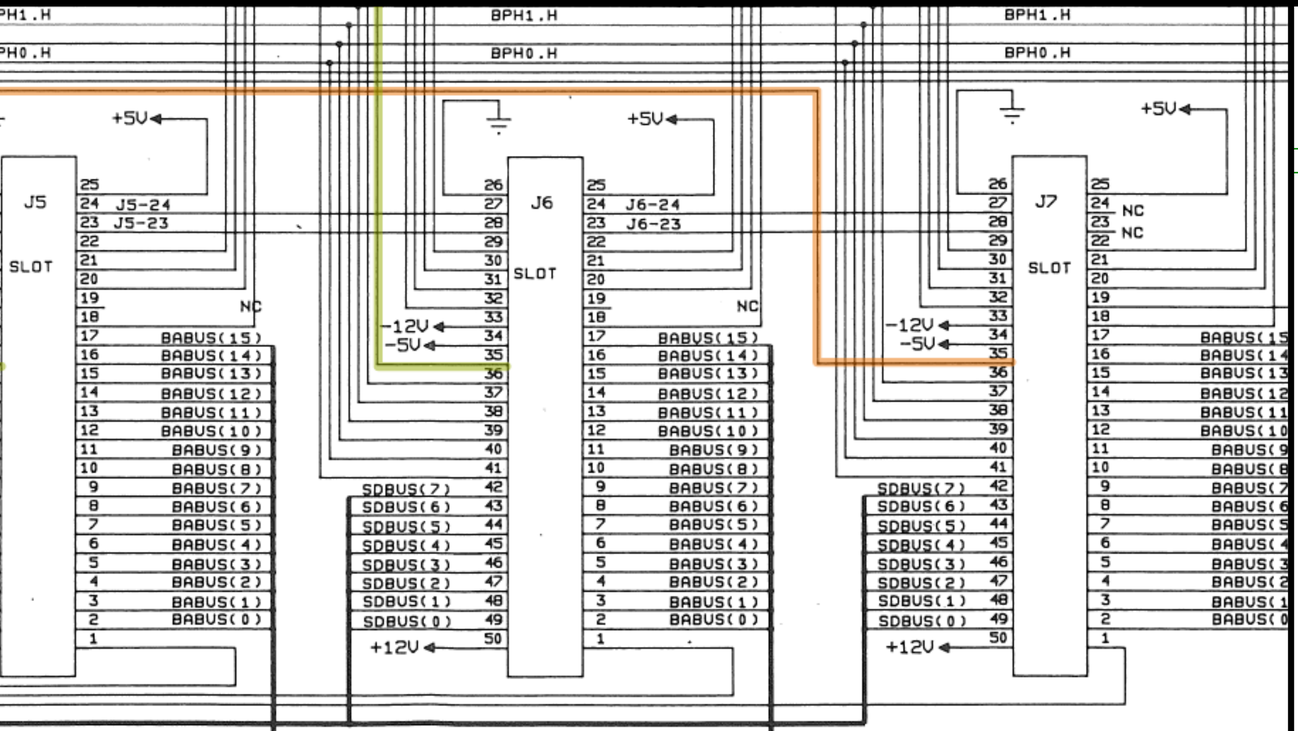

UG12
MS0741
U2
KEYGLU
TP76
TP77
R151
4.7k
RR152
4.7k
CP-CNTL
SW1-CAPL
SW0-OAPL
U14-35
U14-34
R217
4.7k
R107
470
Q4
2N3904
R108
4.7K
R150
4.7K
TP83
TP78
BC91
.01u
GNDPWR
No Power or GND Pins?
Sheet: /UG12-5/
File: UG12-5.sch
Title:
Size: A4
Date:
Rev:
KiCad E.D.A. kicad (5.0.2)-1
Id: 6/10



Not all Pin 35s are created equal

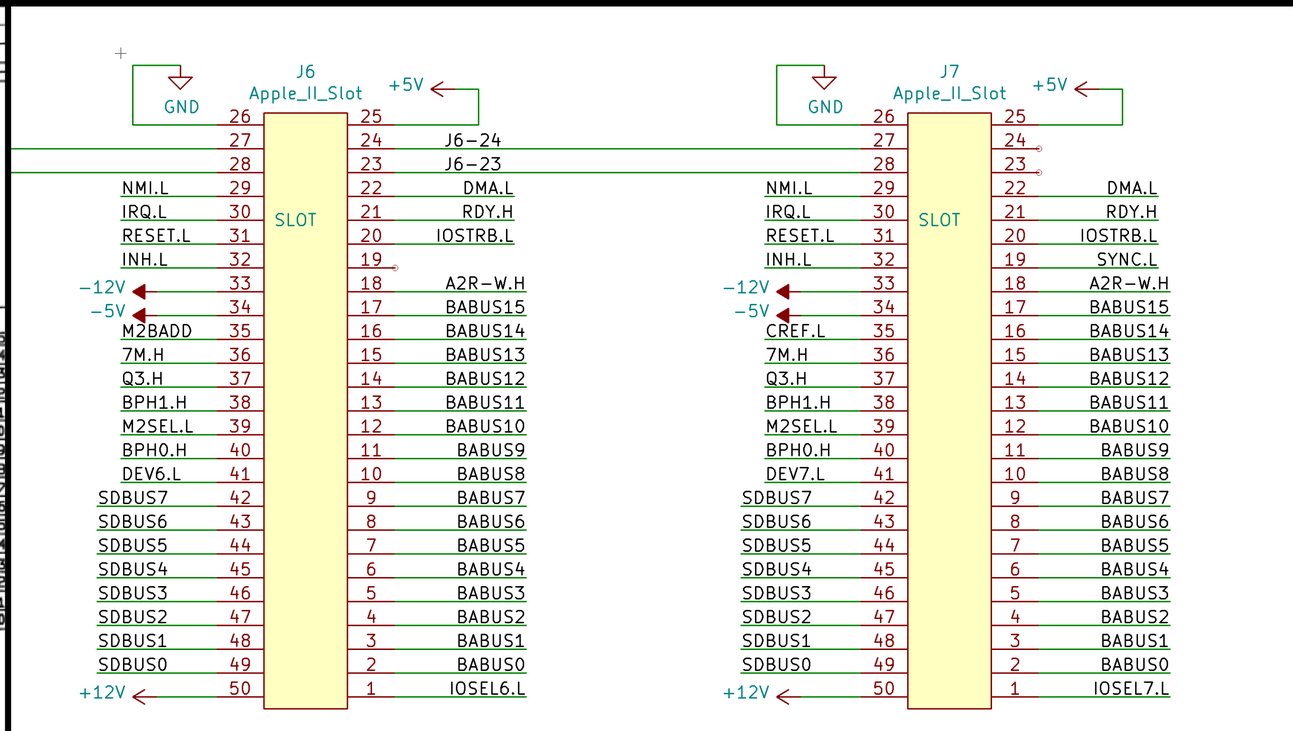
Long Wire

Useful for PDF or static schematics since there is limited search capability. However, it means a lot of manual tracing.



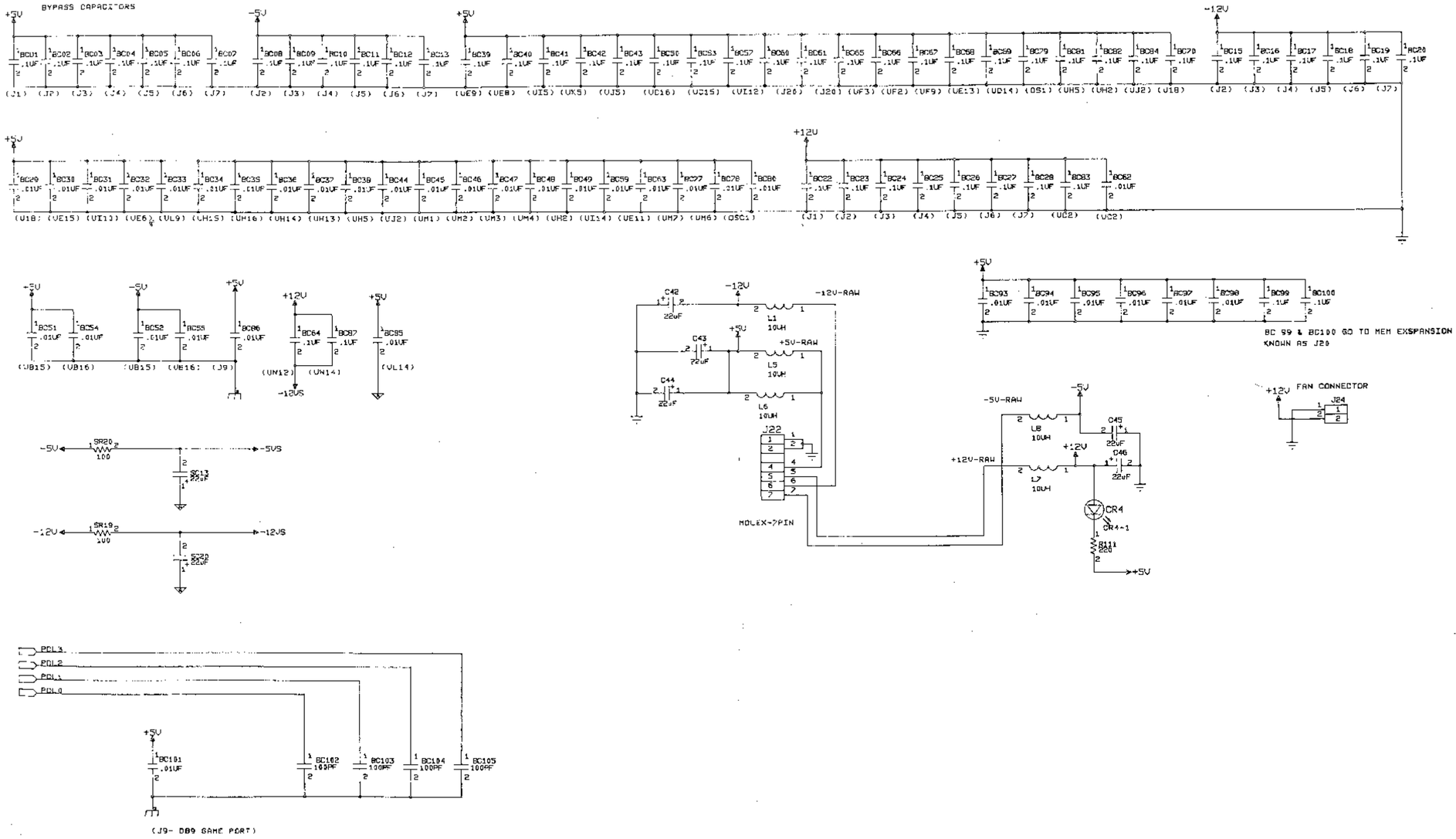
Pin Labels

Cleaner schematic and easier to do automated search. Potential for typos.



How to automate creating decoupling capacitor arrays?

(Reverse) SKIDL?



1 MB schematic diagram, Part 6 of 9

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IIgs Schematic-rescue.dcm	Initial	32 minutes ago
IIgs Schematic-rescue.lib	Initial	32 minutes ago
sym-lib-table	Initial	32 minutes ago

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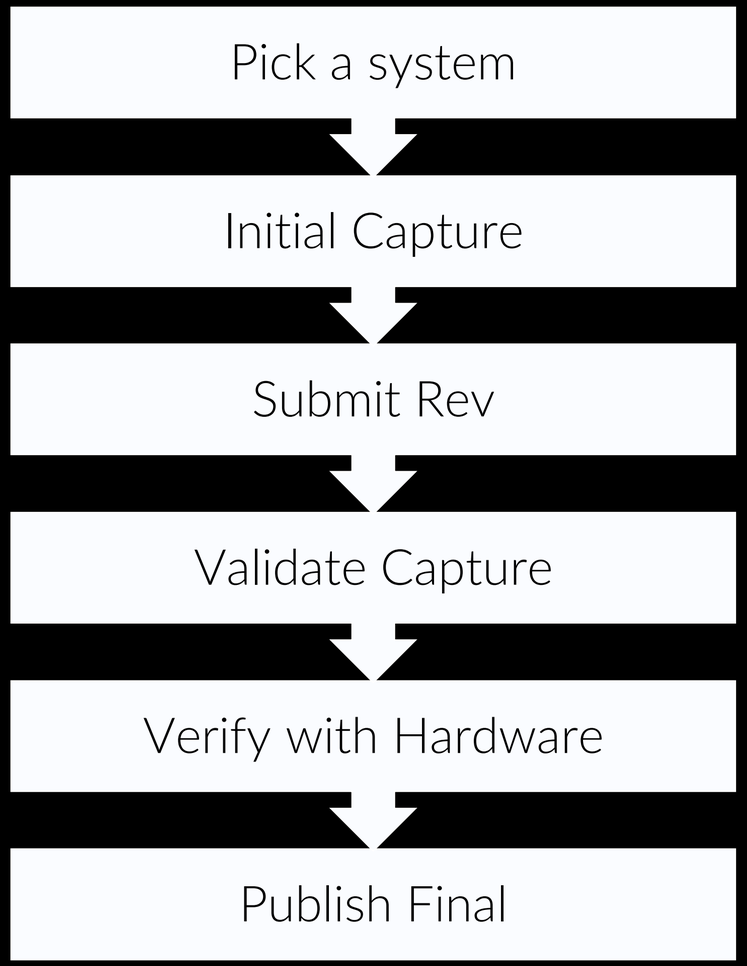
Capacitors-6.sch	Initial	36 minutes ago
IIgs Schematic.kicad_pcb	Initial	36 minutes ago
IIgs Schematic.pro	Initial	36 minutes ago
IIgs Schematic.sch	Initial	36 minutes ago
IWM-4.sch	Initial	36 minutes ago
MEGA-II-2.sch	Initial	36 minutes ago
RAM-9.sch	Initial	36 minutes ago
Slots-7.sch	Initial	36 minutes ago
Sound-8.sch	Initial	36 minutes ago
UG12-5.sch	Initial	36 minutes ago
Video-3.sch	Initial	36 minutes ago

Collaboration



github.com/baldengineer/bit-preserve

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