Linux on Dreamcast

Experimenting with embedded Linux on SH4

Hardware specs

- 200MHz Hitachi SH4 (SH7750) CPU
  - 360 MIPS, 1.4 GFLOPS
- PowerVR2 CLX2 graphics (640x480)
- Yamaha AICA SPU w/ ARM7 RISC
- Yamaha 12x GD-ROM

Linux kernel supports

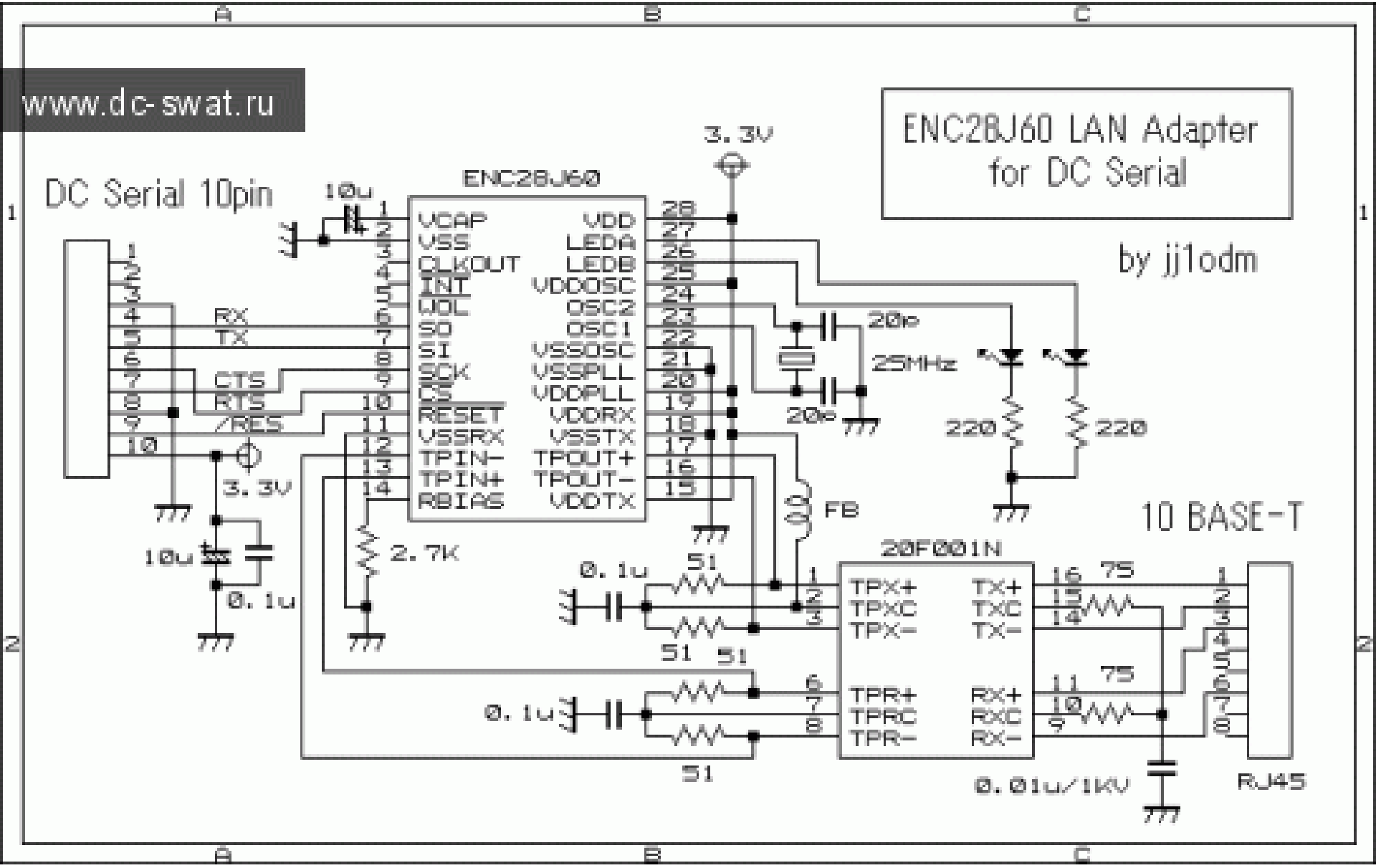
- Keyboard, mouse, joystick over maple (M-BUS) ports
- Modem, LAN over G2 bus (PCI-bridge)
- Read/write VMU via joystick ports
- Serial slave

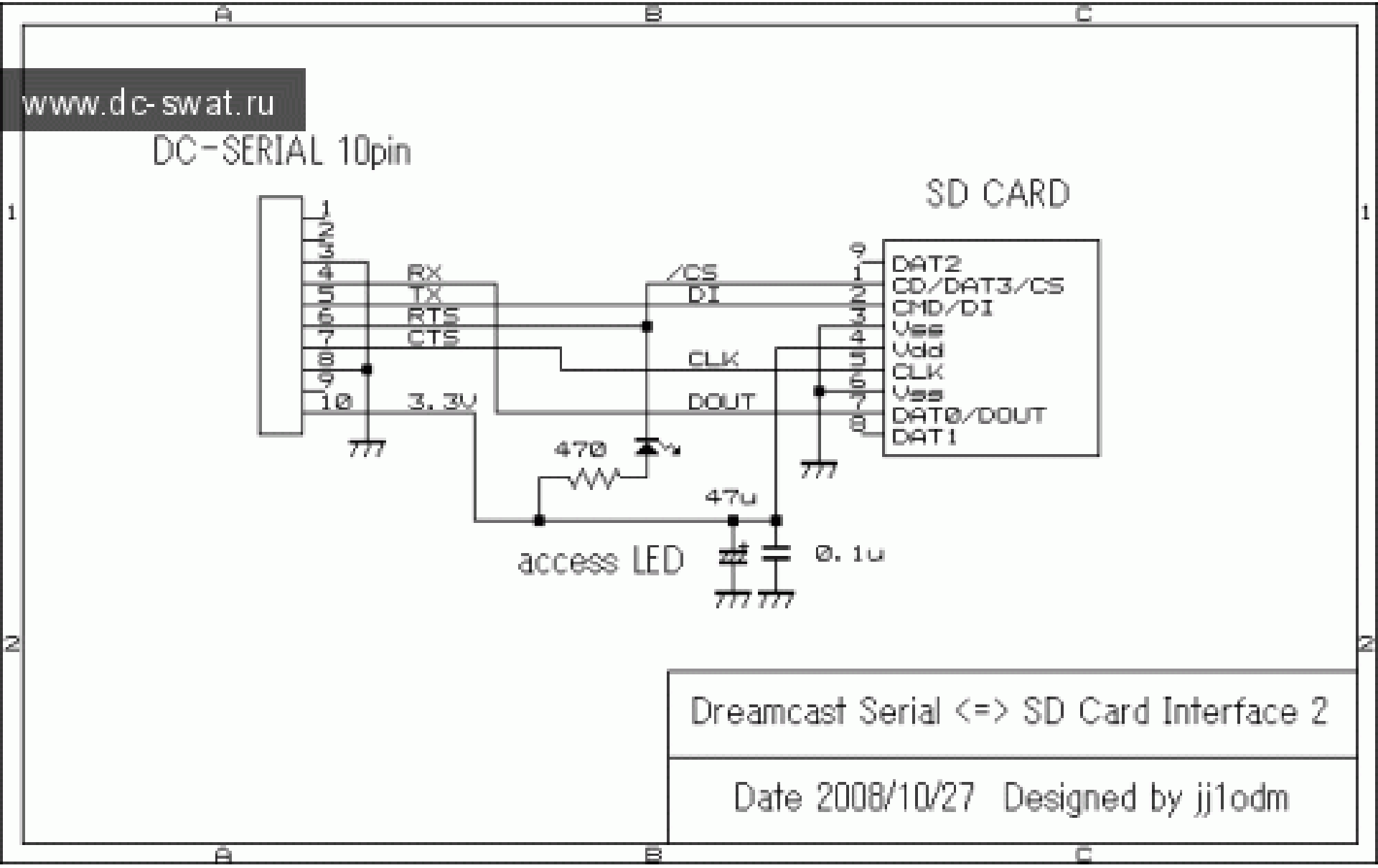
Isn’t Dreamcast … dead?

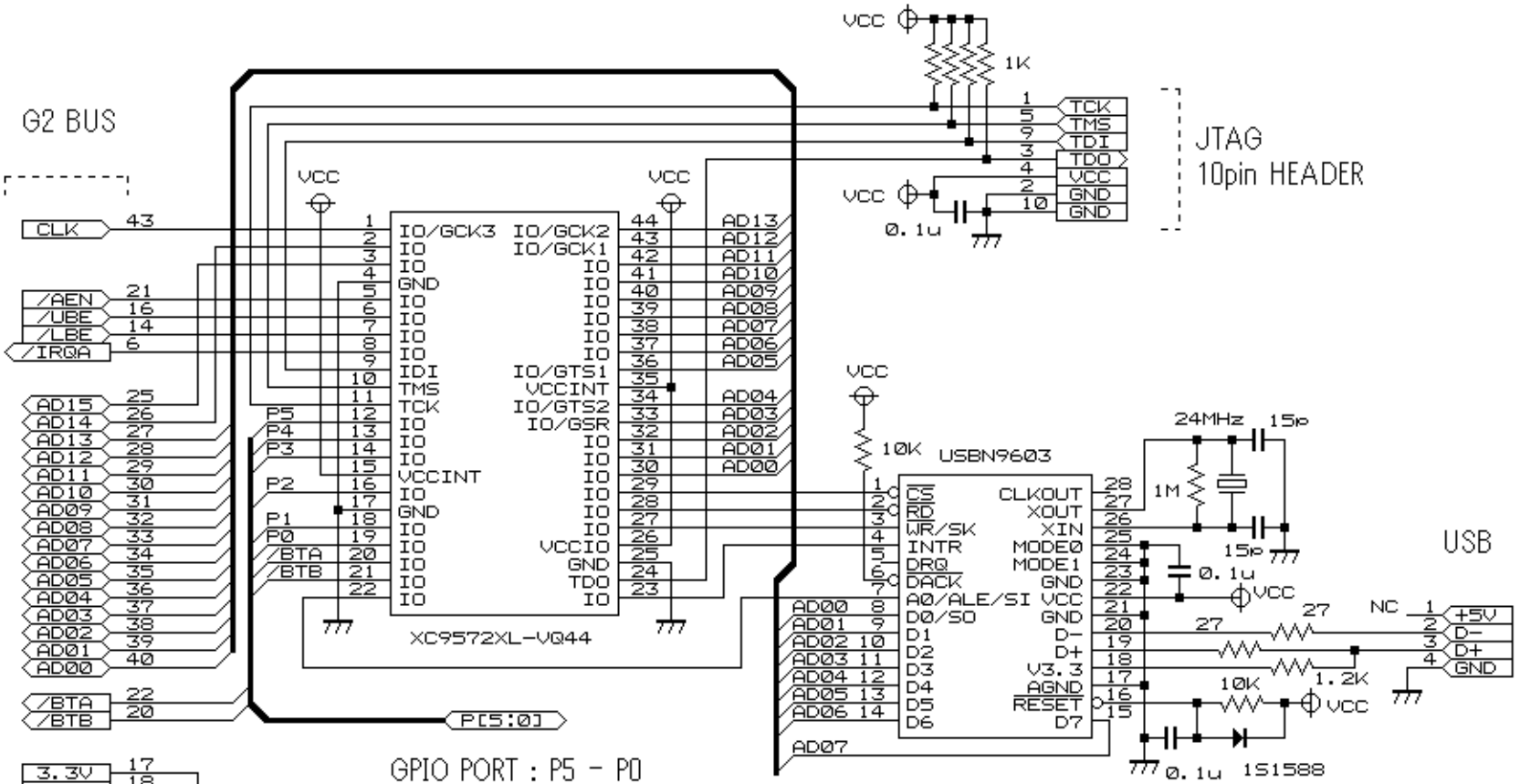
- Active homebrew software and hardware development community.
- FOSS development tools and games.
- Most hardware well documented (serial/bus pin-outs available).
- Homebrew replacement BIOS.
- Linux got Dreamcast-specific updates only 13 days ago (SH4 frequent updates).

Costs of getting involved

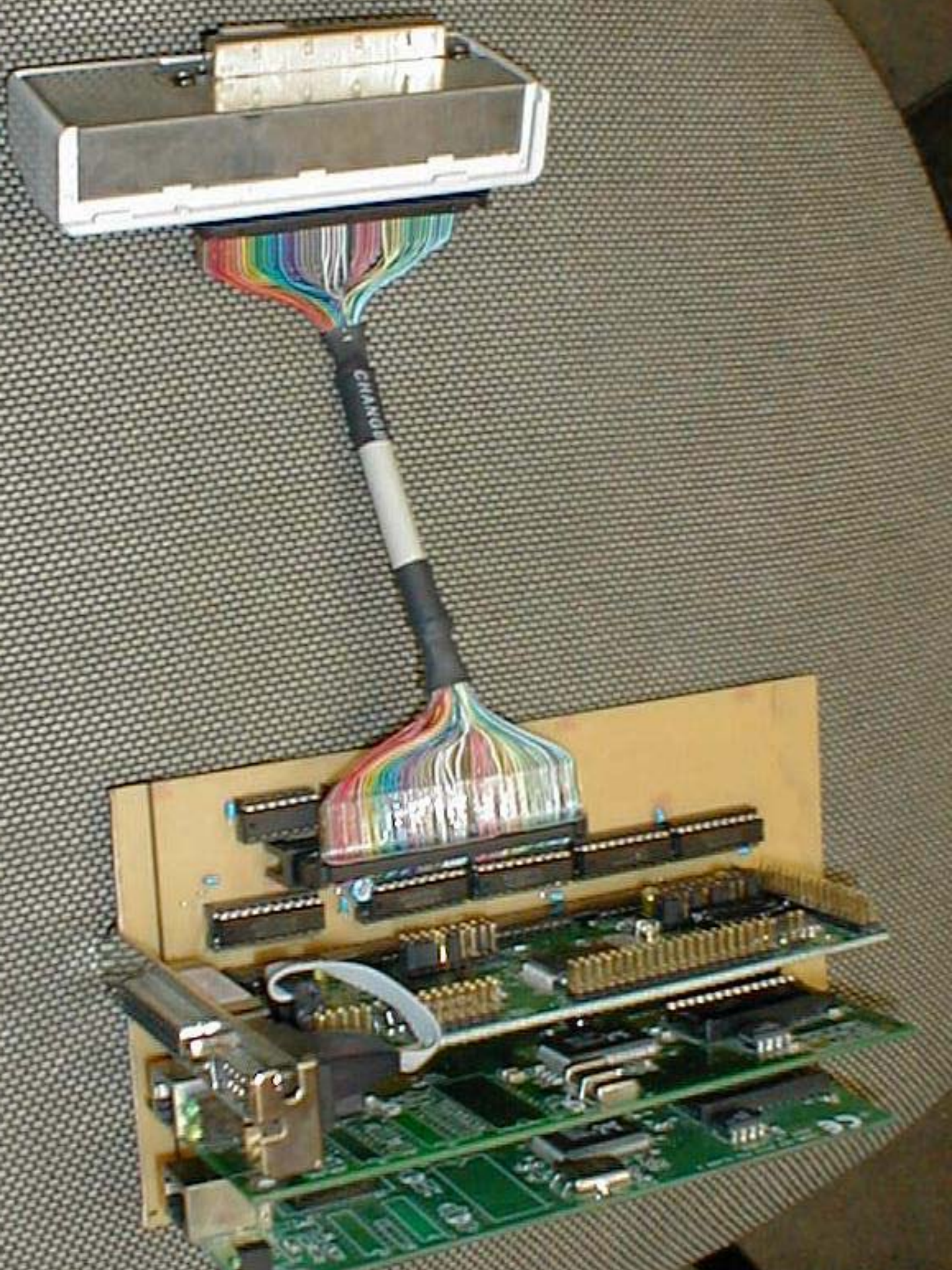
- Widely available on Taobao for 150 yuan or less.
- Optional mouse/keyboard less than 80 yuan, or build your own PS/2 adapter.
- Command over network using open serial Ethernet port.
- Open serial SD card interface built for less than 15 yuan: pre-made for 33 yuan.


www.dc-swat.ru
ENC28J60 LAN Adapter
for DC Serial
by jj1odm
DC Serial 10pin
ENC28J60
3.3V
10u
VCAP
VSS
CLKOUT
INT
WOL
SO
SI
SCK
CS
RESET
VSSRX
TPIN-
TPIN+
RBIAS
VDD
LEDA
LEDB
VDDOSC
OSC2
OSC1
VSSOSC
VSSPLL
VDDPLL
VDDRX
VSSTX
TPOUT+
TPOUT-
VDDTX
RX
TX
CTS
RTS
/RES
20p
25MHz
220
220
FB
2.7K
0.1u
51
20F001N
TPX+
TPXC
TPX-
TPR+
TPRC
TPR-
TX+
TXC
TX-
RX+
RXC
RX-
75
0.01u/1KV
RJ45
10 BASE-T


www.dc-swat.ru
DC-SERIAL 10pin
SD CARD
RX
TX
RTS
CTS
3.3V
/CS
DI
CLK
DOUT
DAT2
CD/DAT3/CS
CMD/DI
Vss
Vdd
CLK
Vss
DAT0/DOUT
DAT1
470
47u
0.1u
access LED
Dreamcast Serial <=> SD Card Interface 2
Date 2008/10/27 Designed by jj1odm


G2 BUS
JTAG
10pin HEADER
TCK
TMS
TDI
TDO
VCC
GND
GND
1K
0.1u
CLK
/AEN
/UBE
/LBE
/IRQA
AD15
AD14
AD13
AD12
AD11
AD10
AD09
AD08
AD07
AD06
AD05
AD04
AD03
AD02
AD01
AD00
/BTA
/BTB
P5
P4
P3
P2
P1
P0
IO/GCK3
IO/GCK2
IO/GCK1
IO/GTS1
IO/GTS2
IO/GSR
VCCINT
VCCIO
GND
TDO
IDI
TMS
TCK
XC9572XL-VQ44
P[5:0]
USBN9603
CS
RD
WR/SK
INTR
DRQ
DACK
A0/ALE/SI
D0/SO
D1
D2
D3
D4
D5
D6
D7
CLKOUT
XOUT
XIN
MODE0
MODE1
GND
VCC
D-
D+
V3.3
AGND
RESET
24MHz
15p
1M
10K
1.2K
27
USB
+5V
D-
D+
GND
NC
1S1588
3.3V
47u
GPIO PORT : P5 - P0
(pull-up 10K)
DEVICE ADDRESS: (PHYSICAL ADDRESS 0x1400000x)
USBN9603 DATA REGISTER : 0xB4000000
USBN9603 ADRS REGISTER : 0xB4000002
GPIO PORT REGISTER : 0XB4000001
CONTROL REGISTER : 0xB4000003
CONTROL REGISTER:
BIT7 : IRQ ENABLE (READ/WRITE)
BIT6 : INT (READ)
BIT5-0 : GPIO DIR (READ/WRITE)
GPIO DIR: 1:IN / 0:OUT (init all IN)
G2 BUS <=> USBN9603 INTERFACE 3 FOR DREAMCAST
USBN9603 PARALLEL INTERFACE (mode 0)
version 3:
USBN9603 DATA BUS TO DIRECT G2 BUS
ACCESS TIME CONTROL (use /BTA /BTB)
ADD GPIO PORT (6BIT)
DATE 2006/10/28 DESIGNED BY JJ1ODM


G2USB




I have a
Dreamcast!

Project goals

- Write Linux kernel drivers to support open serial-based SD and Ethernet.
- Create an updated Dreamcast toolchain and LiveCD.
- Build a kernel with compiled in serial-SD support to boot an r+w Linux installation off an SD card.

More information

- Debian on SH4: wiki.debian.org/SH4
- Unofficial DebianSH: tinyurl.com/debiansh
- PowerVR GPU info: powervr.com
- Ready-made SD: xckdiy.taobao.com
- Open homebrew hardware: dc-swat.ru
- SD card hack w/ pictures: tinyurl.com/chinese-dc-forum
- Hacking of G2 bus: tinyurl.com/re-g2-bus