



DVR-310-S & DVR-510H-S Training Guide



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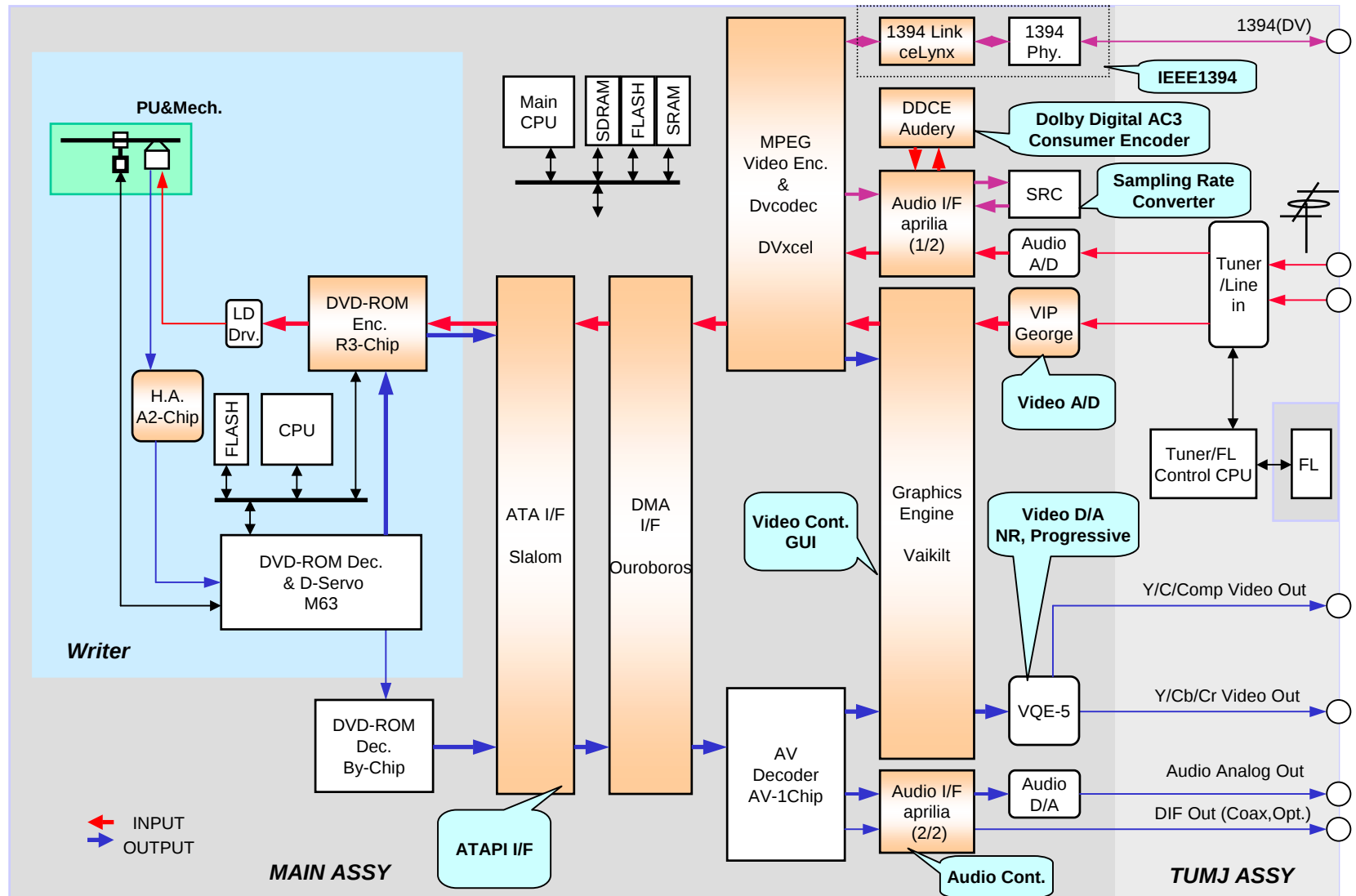


DVR-310-S BLOCK DIAGRAM

Overall Block Diagrams

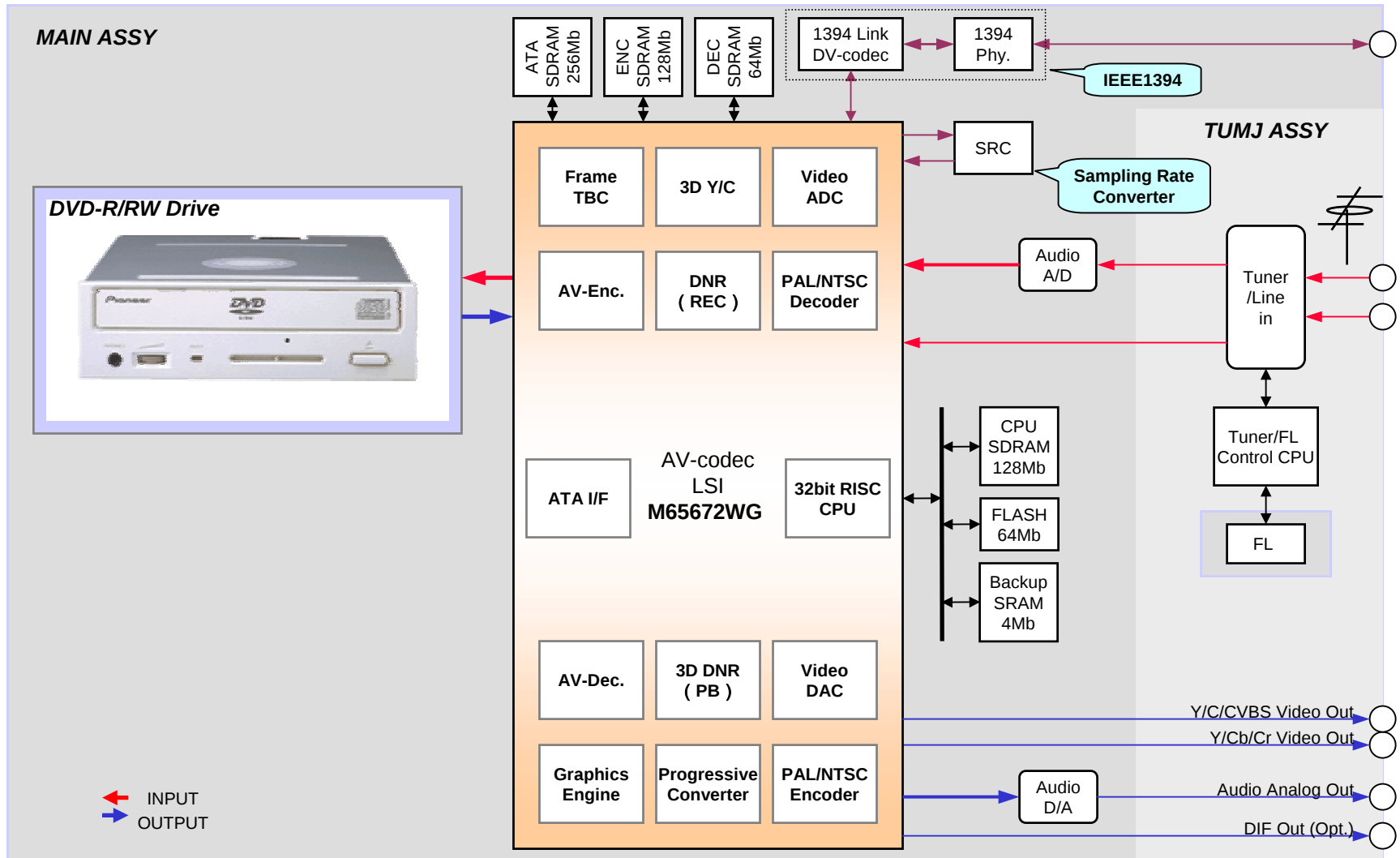
Overall Block Diagram for the last year's model

DVR-7000



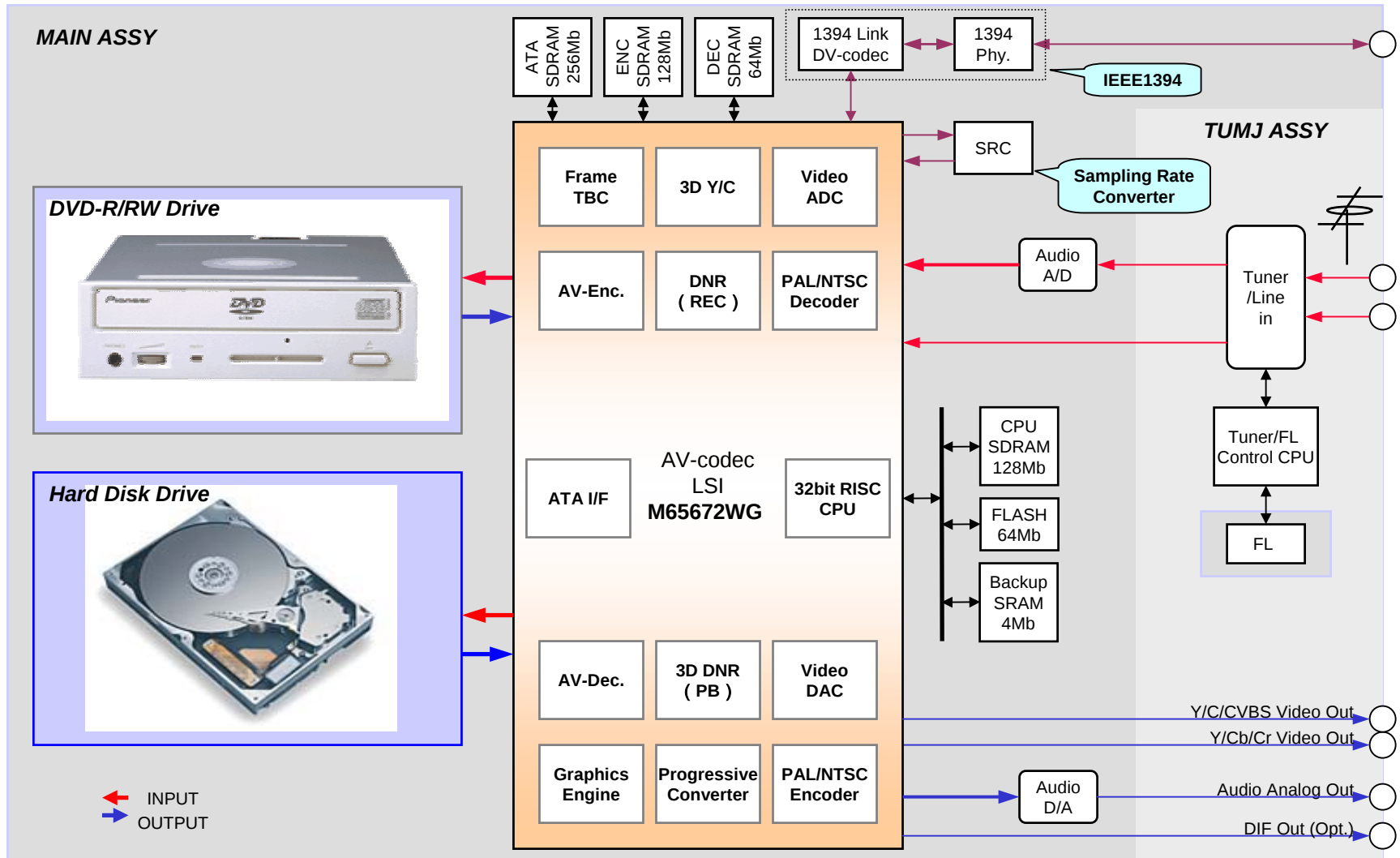
Overall Block Diagram

DVR-310-S



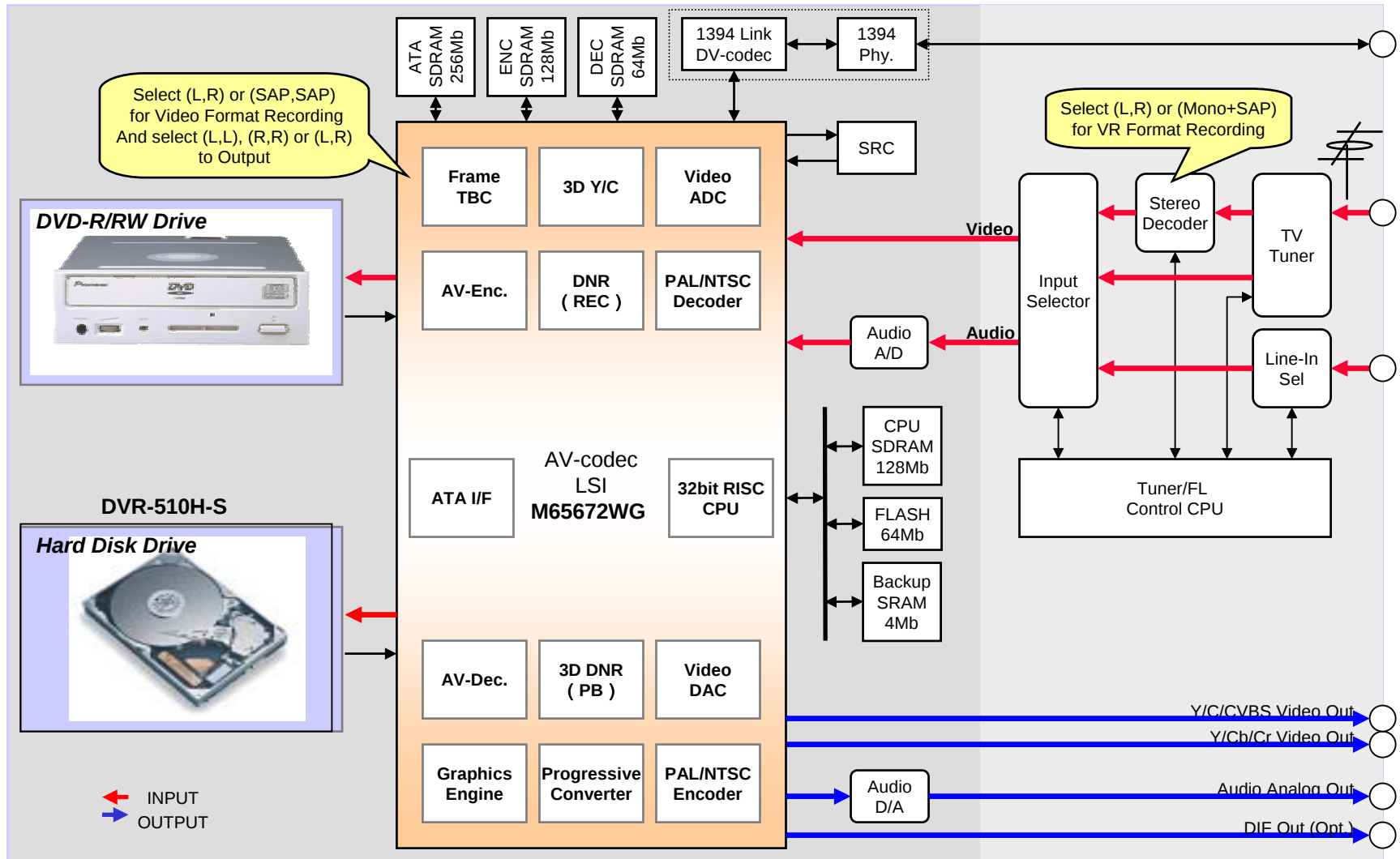
Overall Block Diagram

DVR-510H-S



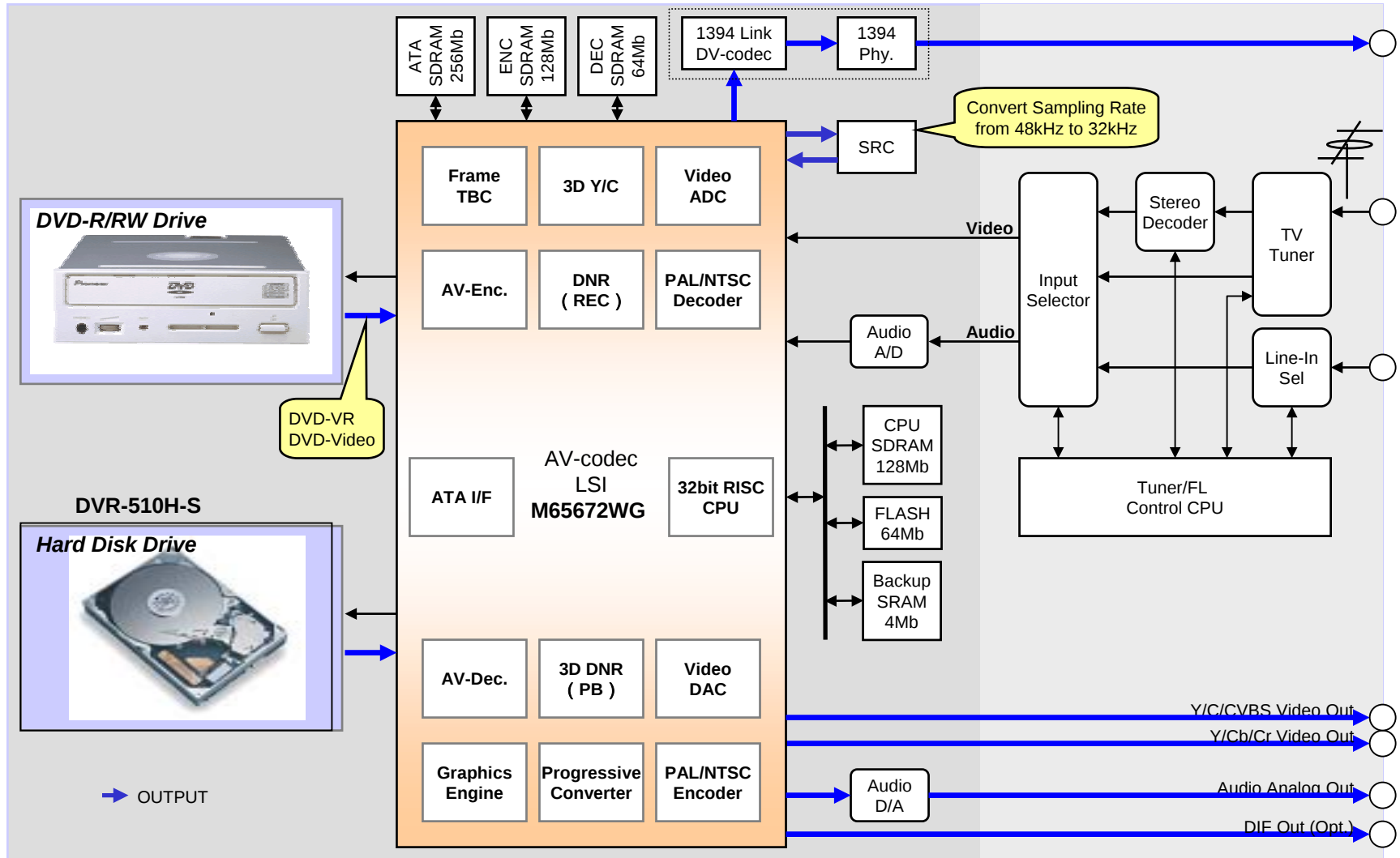
SIGNAL FLOW

Record Tuner/ Line Input (KU)



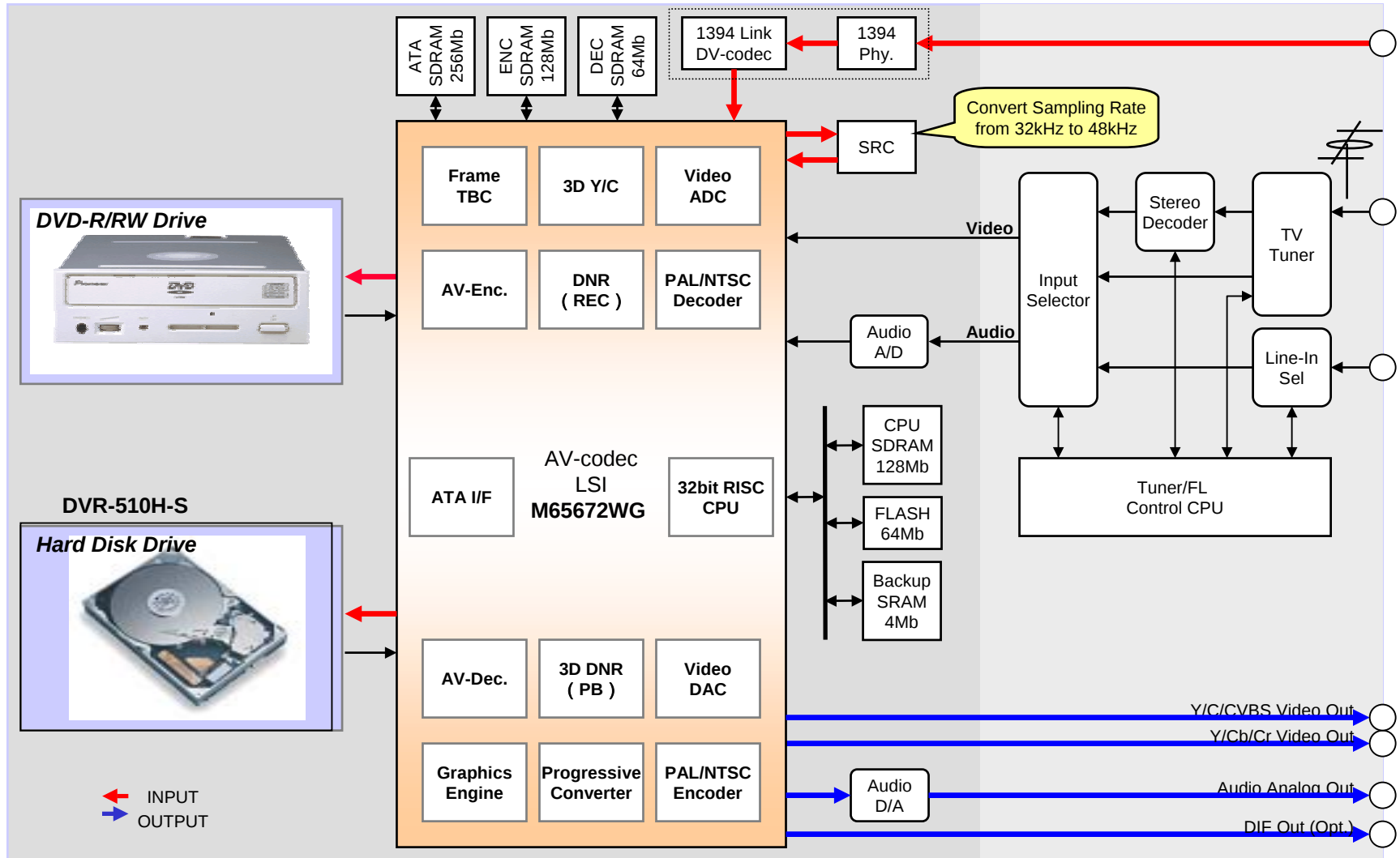
SIGNAL FLOW

Playback



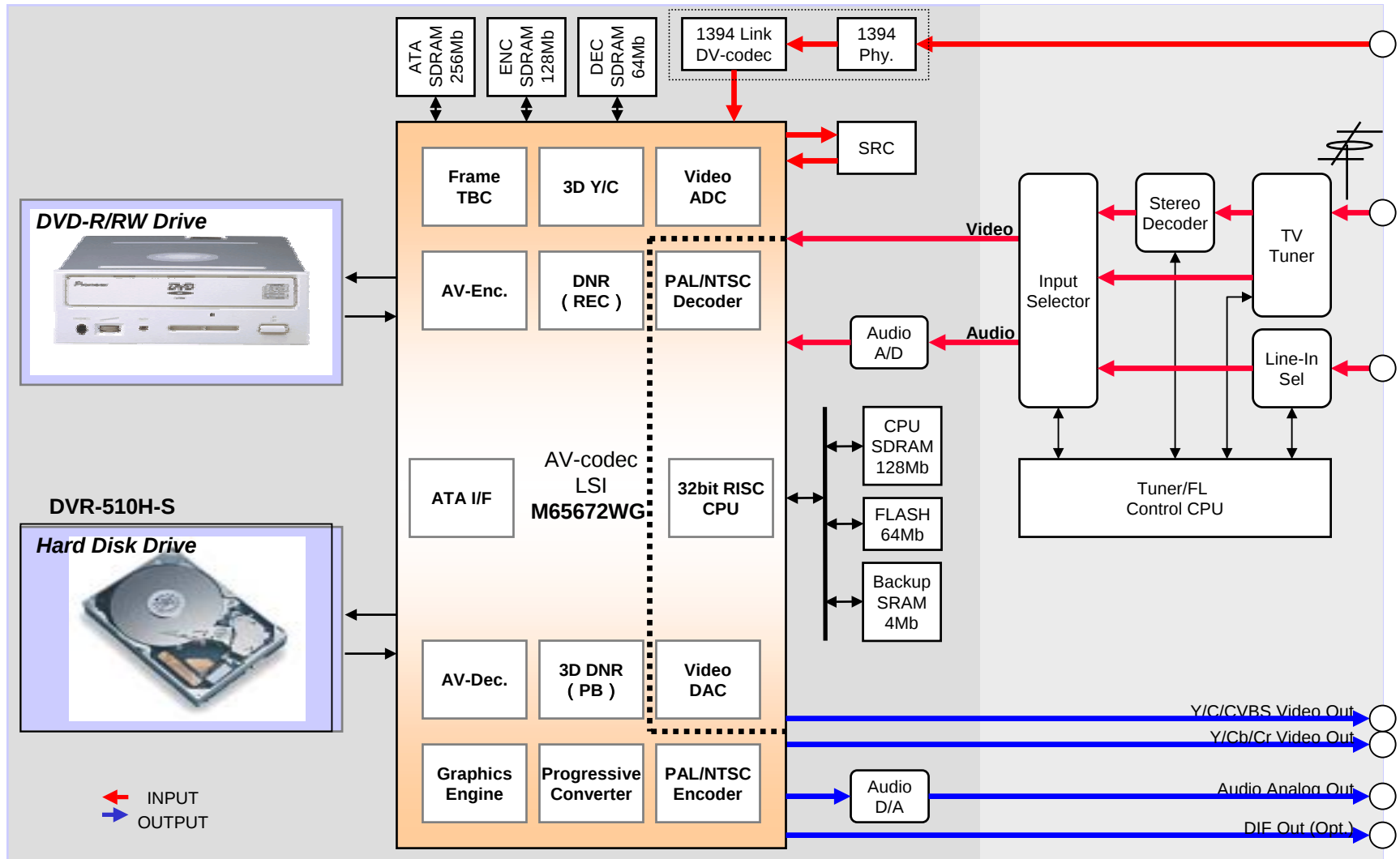
SIGNAL FLOW

Recording Monitor (DV Input)



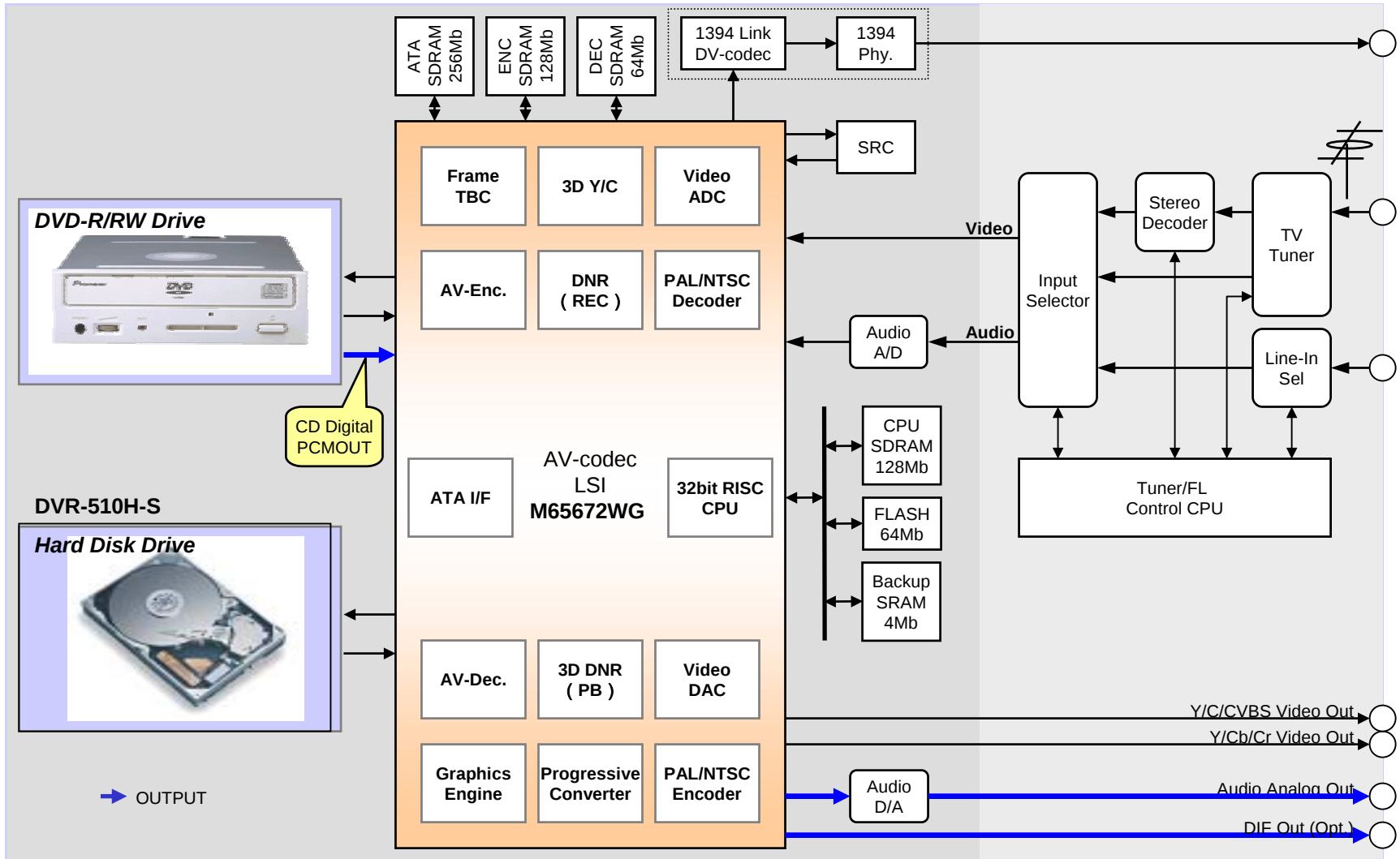
SIGNAL FLOW

Recording Monitor (Tuner/ Line/ DV Input)



SIGNAL FLOW

CD playback

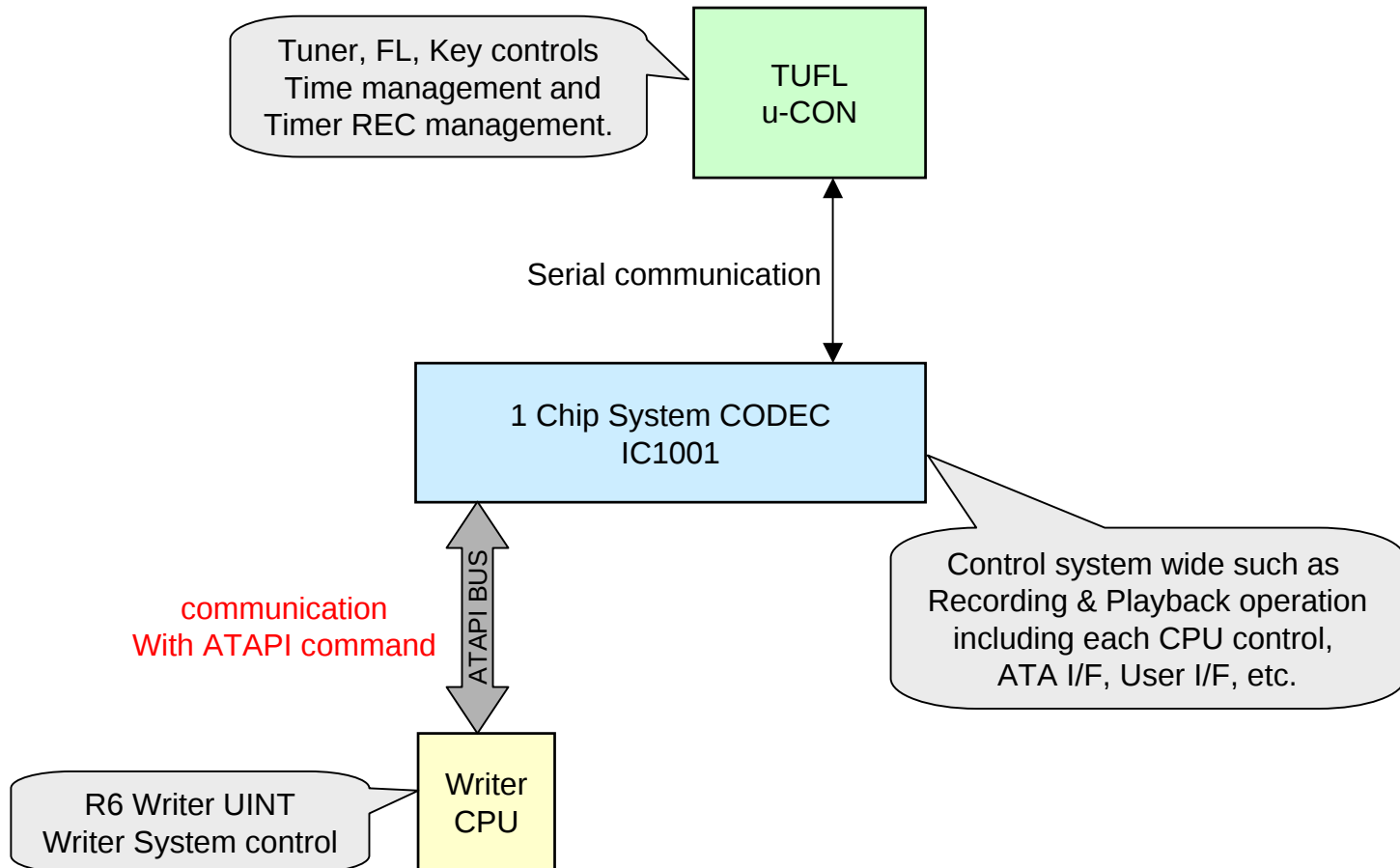


DVR-310-S BLOCK DIAGRAM

CPU Construction

CPU Construction

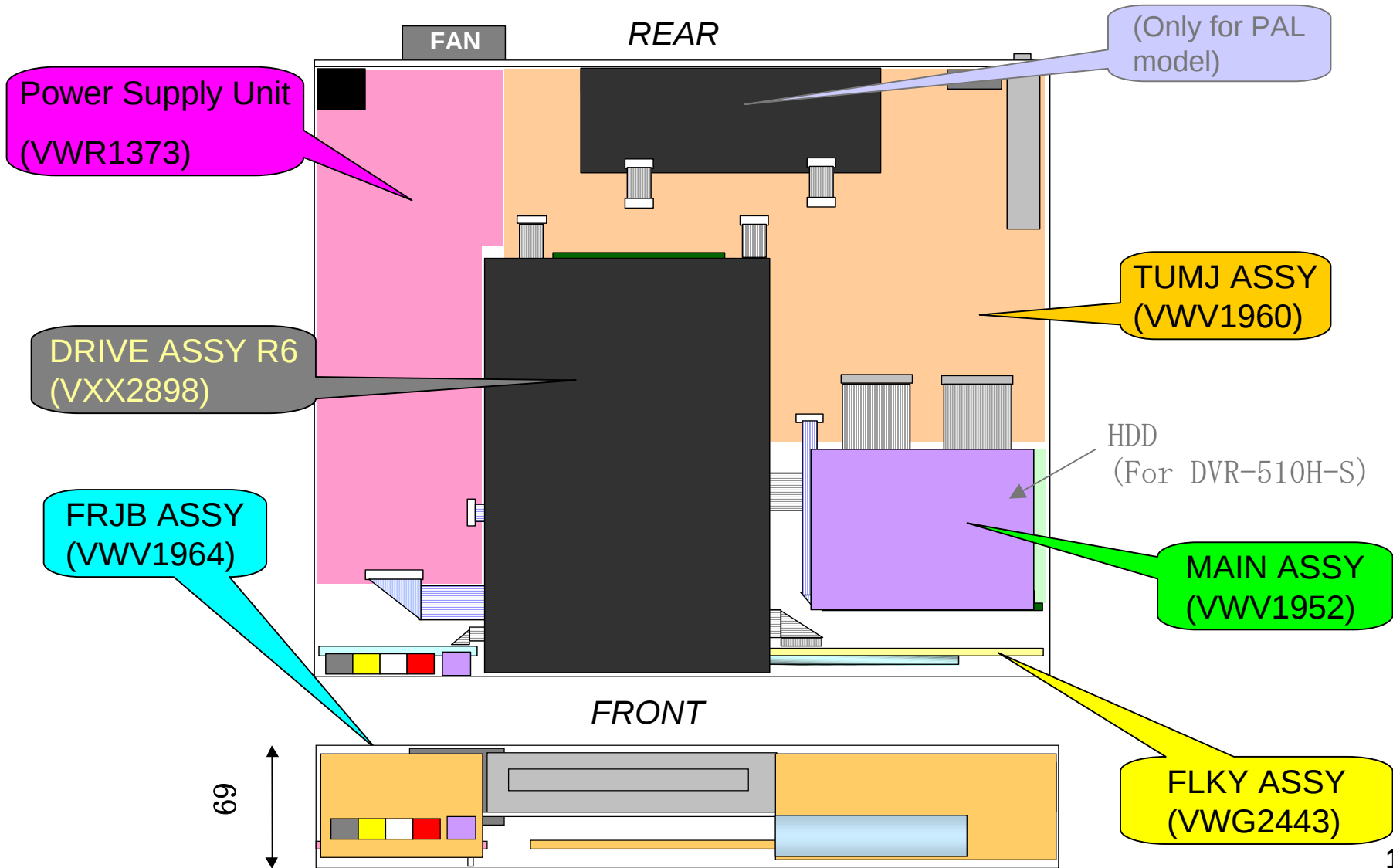
DVR-310-S CPU Control Assignment



DVR-310-S BLOCK DIAGRAM

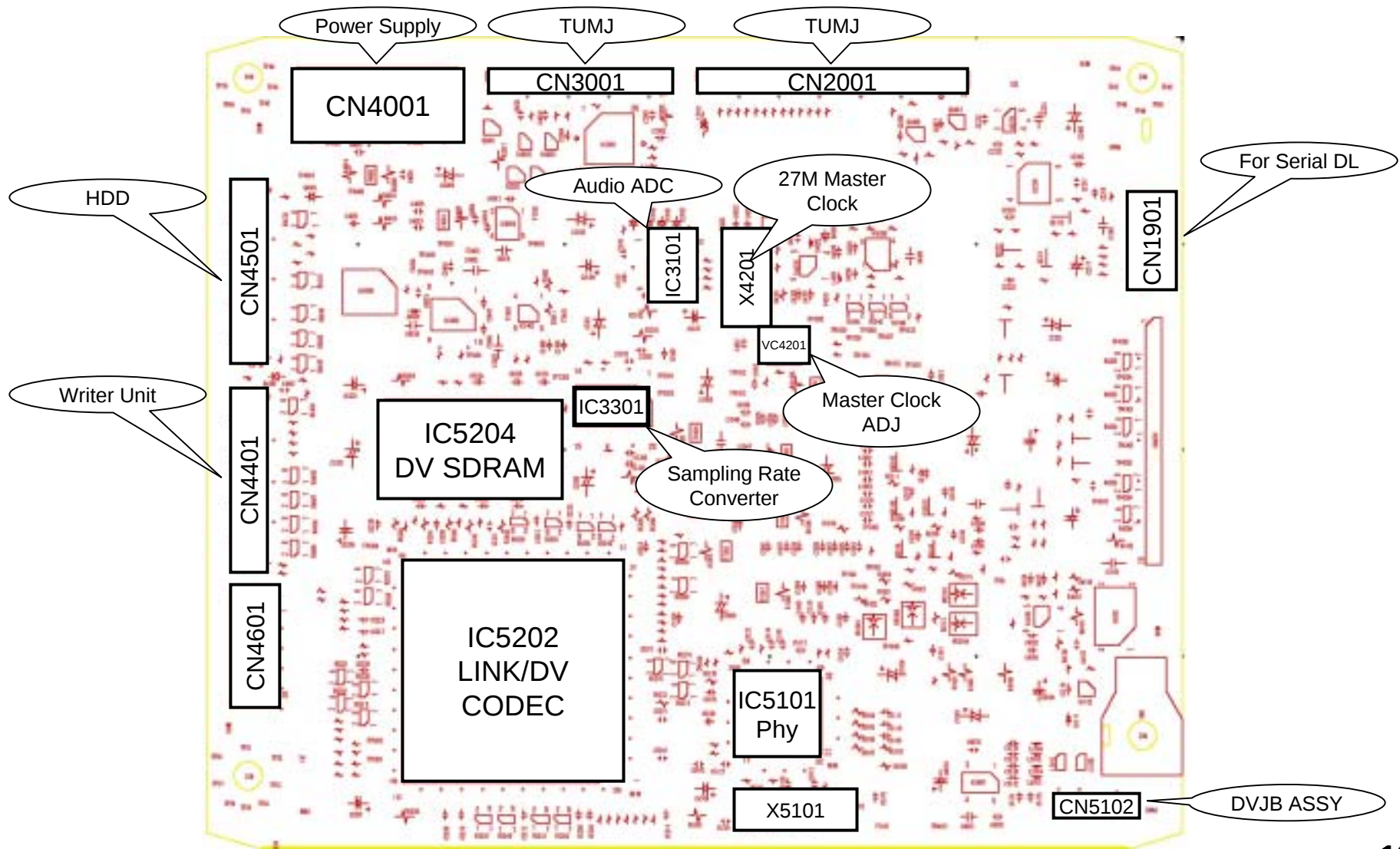
Circuit Board Layout

Circuit Board Layout



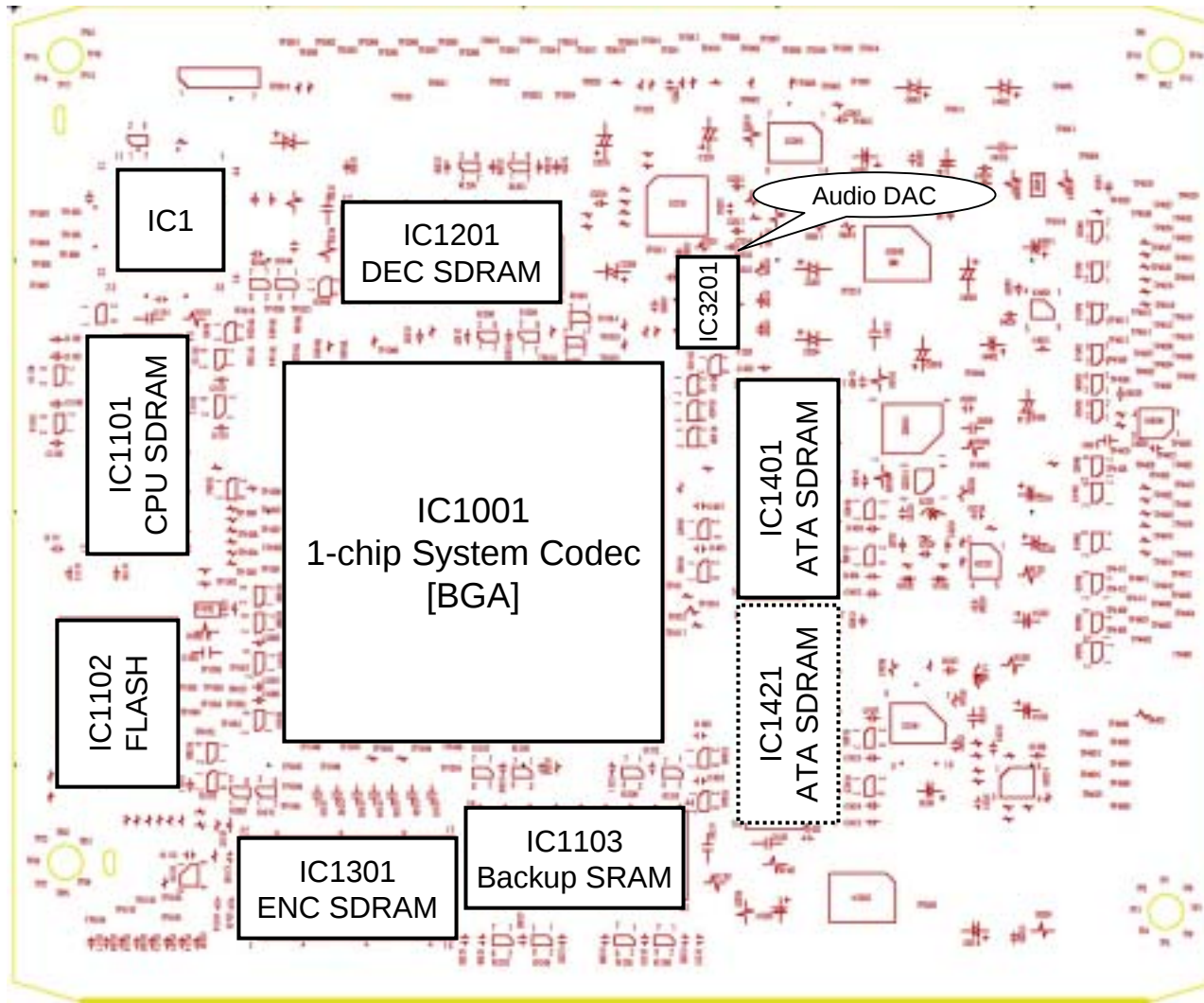
Device Layout

MAIN ASSY (Side A)



Device Layout

MAIN ASSY (Side B)



DVR-310-S BLOCK DIAGRAM

FL Circuit

FL CIRCUIT

Power Supply Distribution

Signal name	Voltage	
FLDC+	DC 5.0V	FL
FLDC-	DV -22V	FL
V-28V	DC -28V	FL Driver
V+5E, V+5FL	DC 5V	FL Driver, Remote Sensor, SWs Continuous power

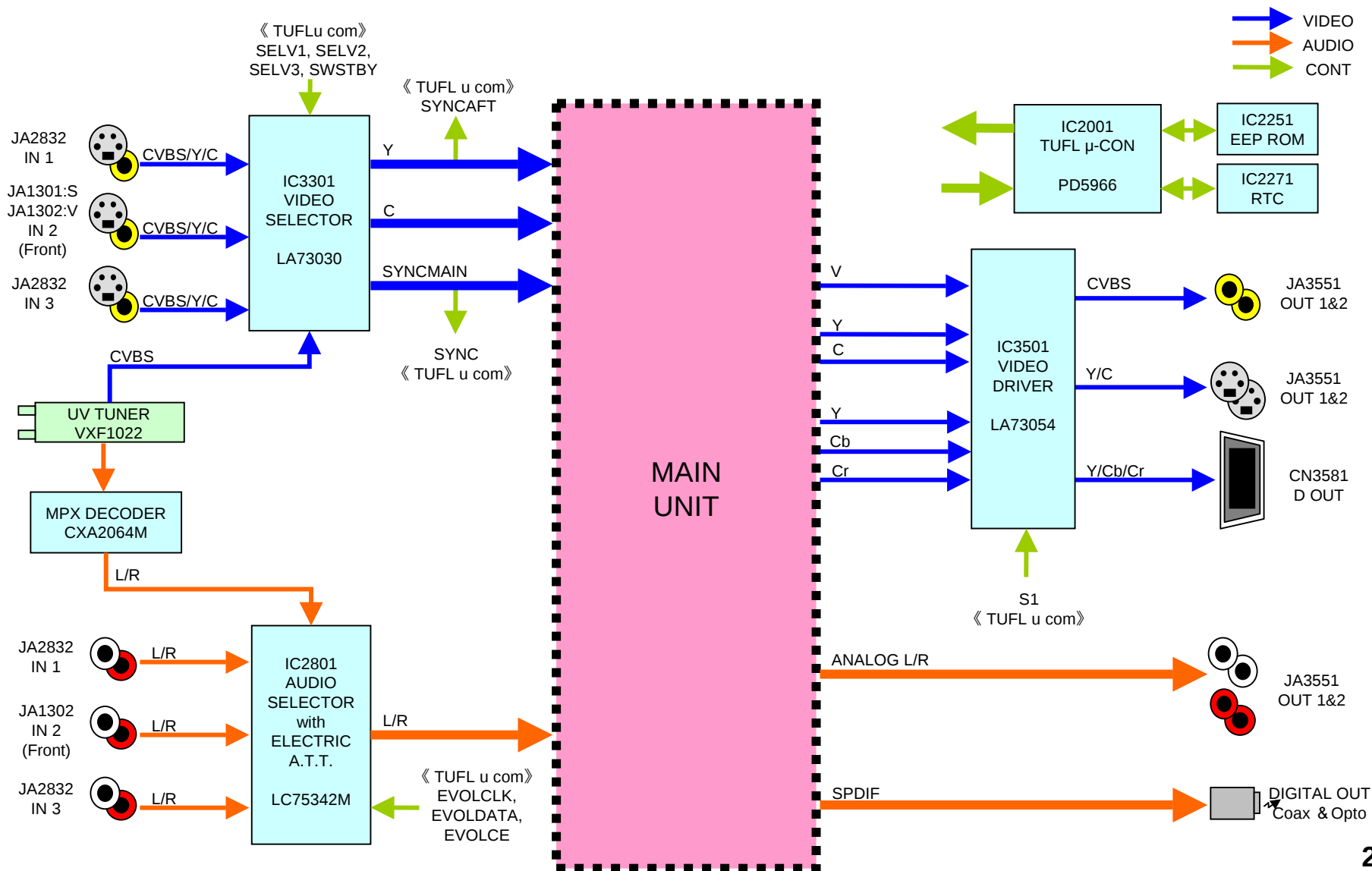
There is
NO FL Dimmer
NO LED (DVR-310-S)
NO JOG.

DVR-310-S BLOCK DIAGRAM

TUMJ ASSY

AV Signal Flow

TUMJ Assy



TUMJ ASSY

TUNER u-CON etc.

* TUFL u-con

There are 2 type of TUFL u-con IC for DVR-310-S.

- (1) Flash type (It is possible to update the firmware.) [Service mode: F]
- (2) Mask type (Part number label on the IC) [Service mode: M]

TUFL u-con IC may easy to be damaged by electrostatic.

* EEPROM (IC2251)

For backup Tuner data.(Pre-set CH, AFT ON/OFF, Skip CH etc.)

Information about timed recording

Other information(state of Volume, remote control mode and last Input positions (Line/Tuner etc))

* Lithium battery

Life time of battery is approx. 5 years.

Power of RTC and Backup SRAM are supplied by Lithium battery when AC cord is disconnected.

TUMJ ASSY

Check point

[Symptom] No picture of Terrestrial broadcasting

[Point] Check V+5TU.

Check TUON signal, Q3006.

[Symptom] Black squelch at a specific channel

It becomes black squelch on picture when field electric intensity is low.

[Point] Check Field electric intensity.

IC3301 (YOUT) → Q3362 (SYNCAFT) → TUFL μ -CON

Count number of H_SYNC

700/Frame → Detect low field intensity → squelch ON

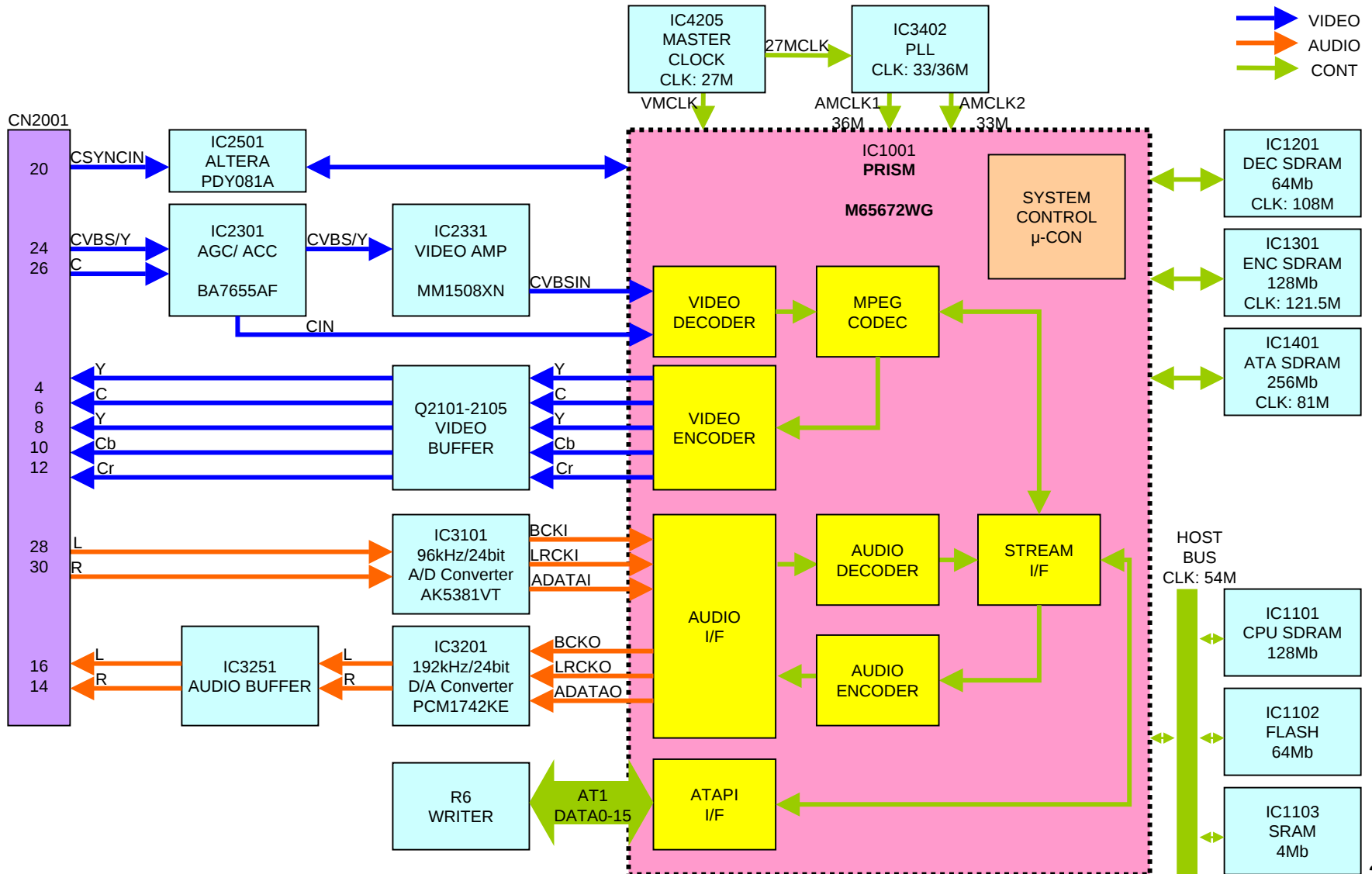
600/Frame → Detect as normal → Squelch OFF

DVR-310-S BLOCK DIAGRAM

MAIN ASSY

MAIN BOARD

Block Diagram



Main Assy

Check Point

[Symptom] No Picture, No Audio

[Point] Check In & Out with Analogue signal of Video and Audio

@CN2001

Video Signal

24pin → V/YIN

26pin → CIN

04pin → Y

06pin → COUT

08pin → Y

10pin → Cb

12pin → Cr

} S/Composite output

} Component Output

Audio Signal

14pin → ARMtoT

16pin → ALMtoT

28pin → LCHIN

30pin → RCHIN

[Symptom] Beat noise on a monitor

[Note] CN4702 of MAIN ASSY is not connected to MHLP Assy properly.

Main Assy

Check Point

[Symptom] Recording NG
[Check point] ENC SDRAM

[Symptom] Playback picture NG
[Check point] DEC SDRAM

[Symptom] It does not work when power is turned on.
[Check point] HOST BUS lines, TUFL μ -CON, PRISM IC

[Symptom] “LSI NG” is appeared on FL display.
[Check point] Check DATA & Address BUS lines for the flowing IC.
* CPU SDRAM (IC1101) , SRAM (IC1103) , ATA SDRAM (IC1401)

[Symptom] “MONITOR” is appeared on FL display.
[Check point] DATA in FLASH ROM may be faulty.
Down load the firmware by PC with interface JIG, or replace Flash ROM IC.
* If this error is appeared, it is not able to use DISC downloading method.

[Symptom] No color on picture
[Check point] Check adjustment of 27MHz Master Clock.

MAIN BOARD

MEMORIZED DATA

CPU SDRAM (IC1101)

The execution area and working area of a program

FLASH ROM (IC1102)

The storing area of a program code and setting information

SRAM (IC1103)

The working area for record,
and the storing area of setting information (backup RAM)

DEC SDRAM (IC1201)

The working area of MPEG playback and OSD/ Thumbnail
(OSD is mainly for Disc Menu creation in Video mode)

ENC SDRAM (IC1301)

The working area of MPEG recording and analog input and output (AVIO) .

ATA SDRAM (IC1401)

The working area of ATA/ OSD2/ Audio TBC
(OSD2 is for all GUI)

ATA SDRAM (IC1421)

This is only for an HDD model
The working area about HDD operation

MAIN BOARD

PRISM LSI Function

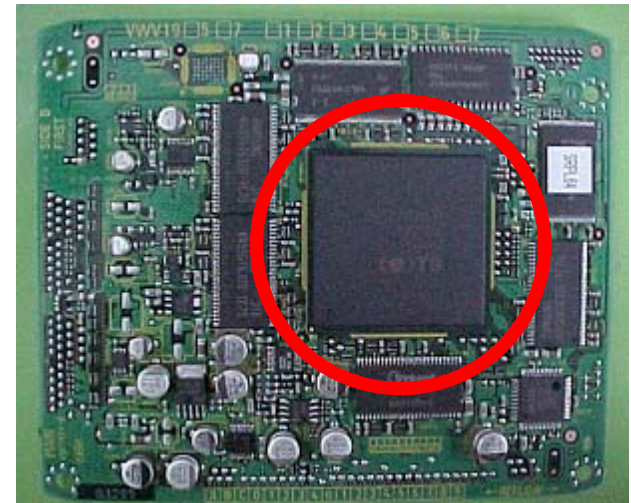
[Functions]

1Chip Codec LSI (M65672WG) (IC1001)

Previous model used 11 LSI's.

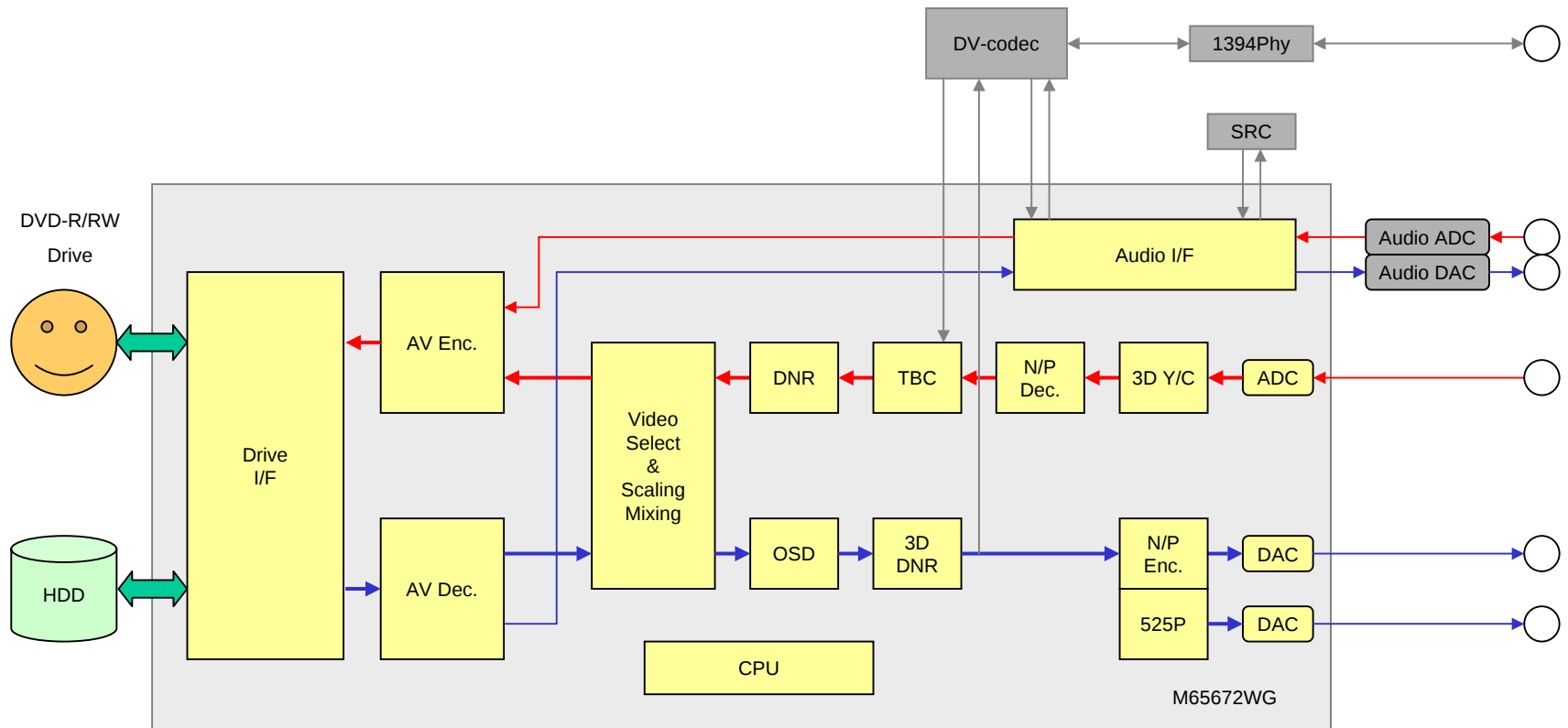
- * 10bit*27MHz(1ch),8bit*27MHz(3ch) Video ADC
- * PAL/NTSC Decoder
- * 3D Y/C Separator
- * Frame TBC
- * 3D DNR
- * MPEG Video Encoder
- * Dolby Digital Consumer Encoder
- * Graphics Engine (OSD, Scaling, Mixing)
- * MPEG Video Decoder
- * Audio Decoder (AC-3, MPEG)
- * PAL/NTSC Encoder
- * 10bit*54MHz(5ch) Video DAC
- * Progressive converter
- * Audio I/F
- * Drive I/F (ATA/ATAPI, 2ch)
- * Main CPU (32bit RISC, 54MHz)

Process	: 0.13μm、CMOS6 layer (6Cu)
Gate size	: approx. 400Mil. Gate (exc. memory)
Power supply	: 1.2V for internal, 3.3V for external (5V max)
Package	: 564pin PBGA



MAIN BOARD

Internal Block Diagram for PRIZM LSI



MAIN BOARD

LSI Specification for DV

1. DV CODEC / IEEE1394 Link LSI (IC5202)

Voltage I/O: 3.3V

Internal: 2.5V

Function DV Decode
DV Encode
IEEE1394 Link Layer Control
IEC61883 AV/C Command Control
(The control command sending
function to a DV camcorder etc.)
CPU (For IEEE1394 processing)

3. Audio Sampling Rate Converter (IC3301)

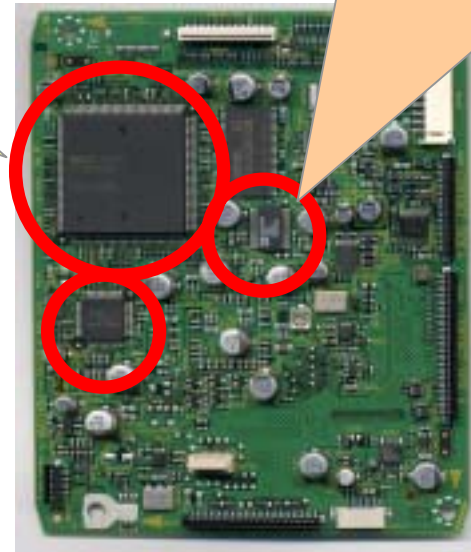
Voltage Only 3.3V

Function the following sampling rates are converted
in order to absorb frequency deflection.
48kHz (DV Clock) → 48kHz (Recorder Clock)
32kHz (DV Clock) → 48kHz (Recorder Clock)

2. IEEE1394 PHY LSI (IC5101)

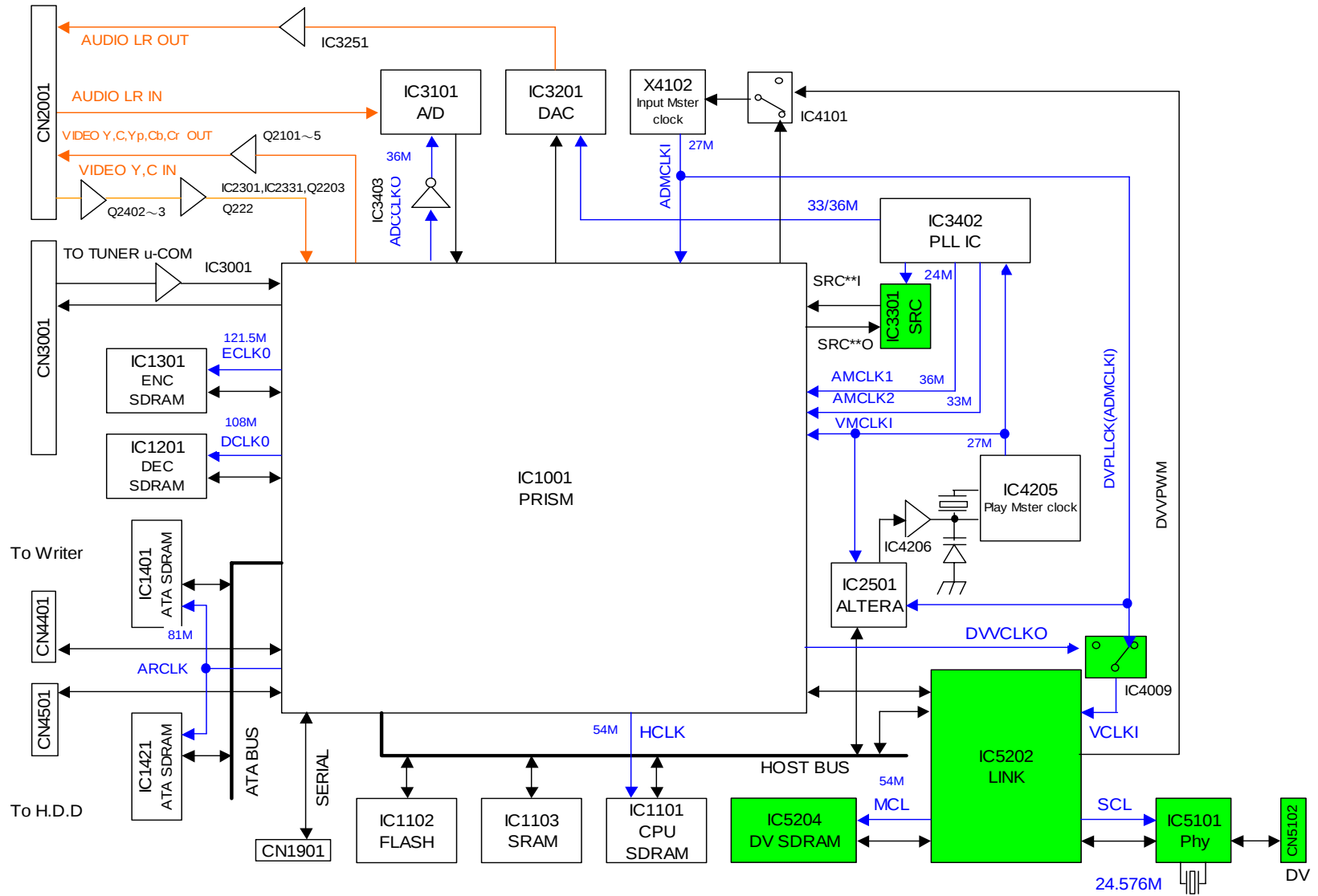
Voltage Only 3.3V

Function IEEE1394 conformity physical layer control LSI
24.576MHz (PLL for IEEE1394)
built-in Crystal oscillation circuit
(Crystal oscillator is external)



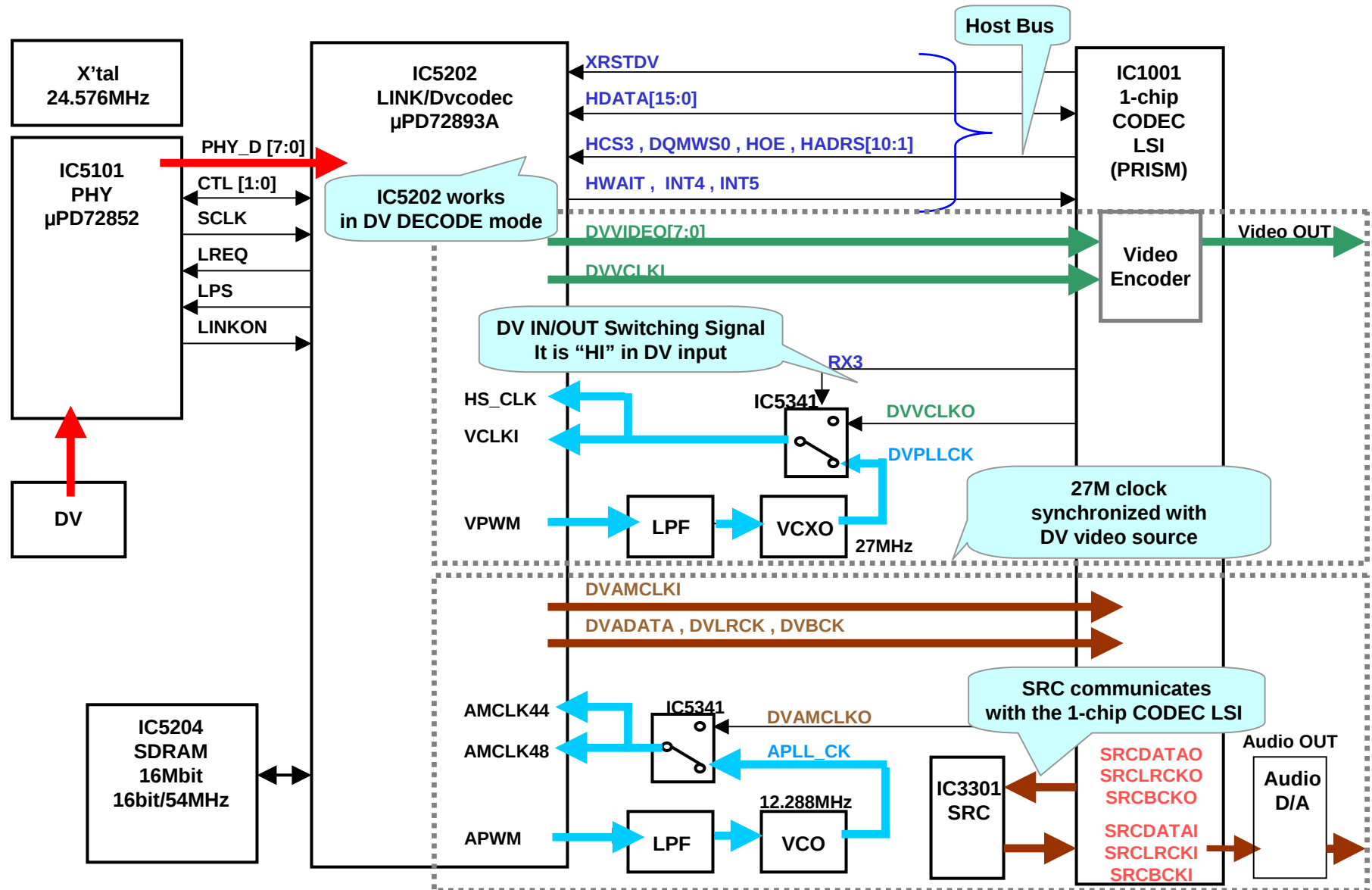
MAIN BOARD

DV Block Diagram



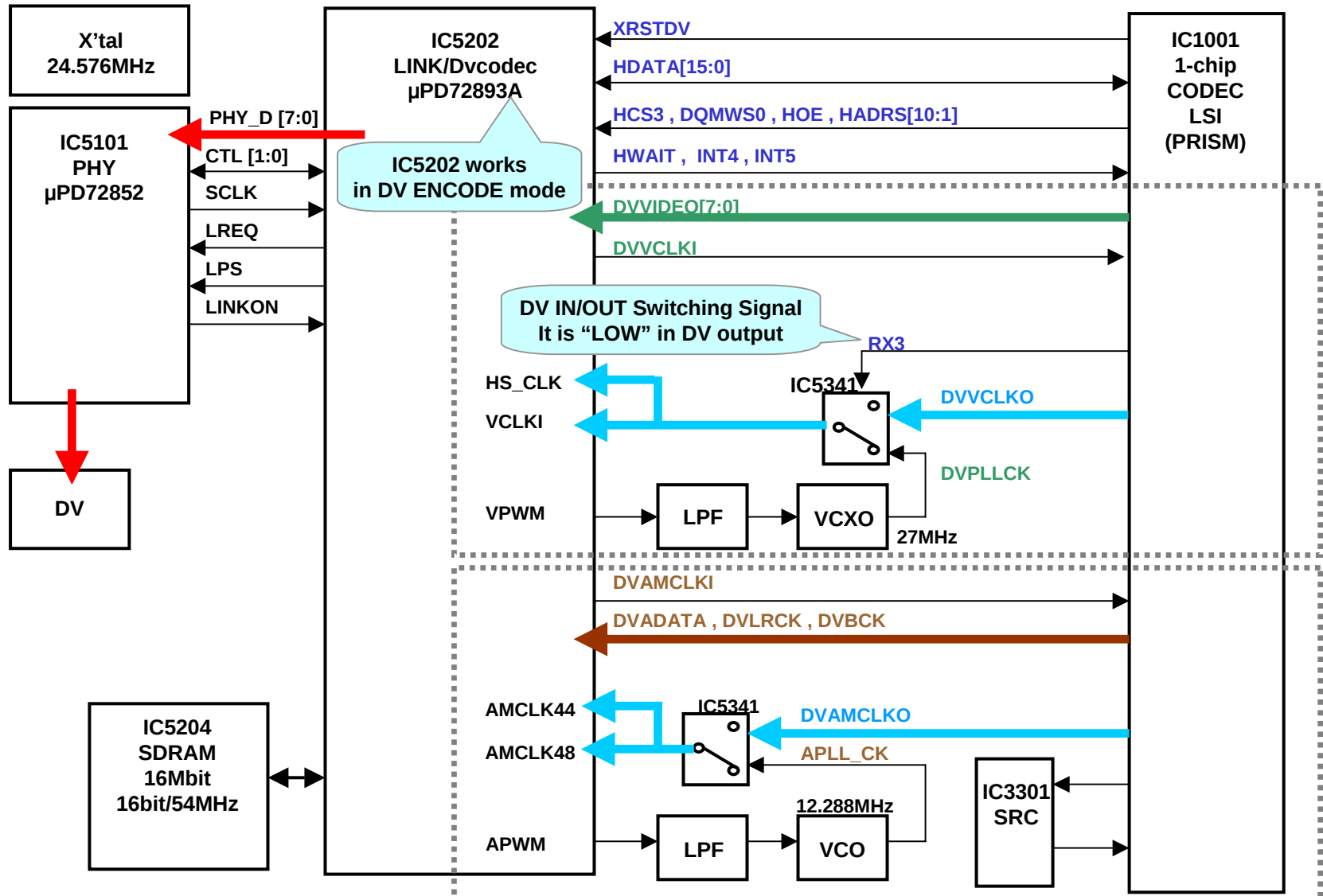
MAIN BOARD

Signal Flow (DV INPUT)



MAIN BOARD

Signal Flow (DV OUTPUT)

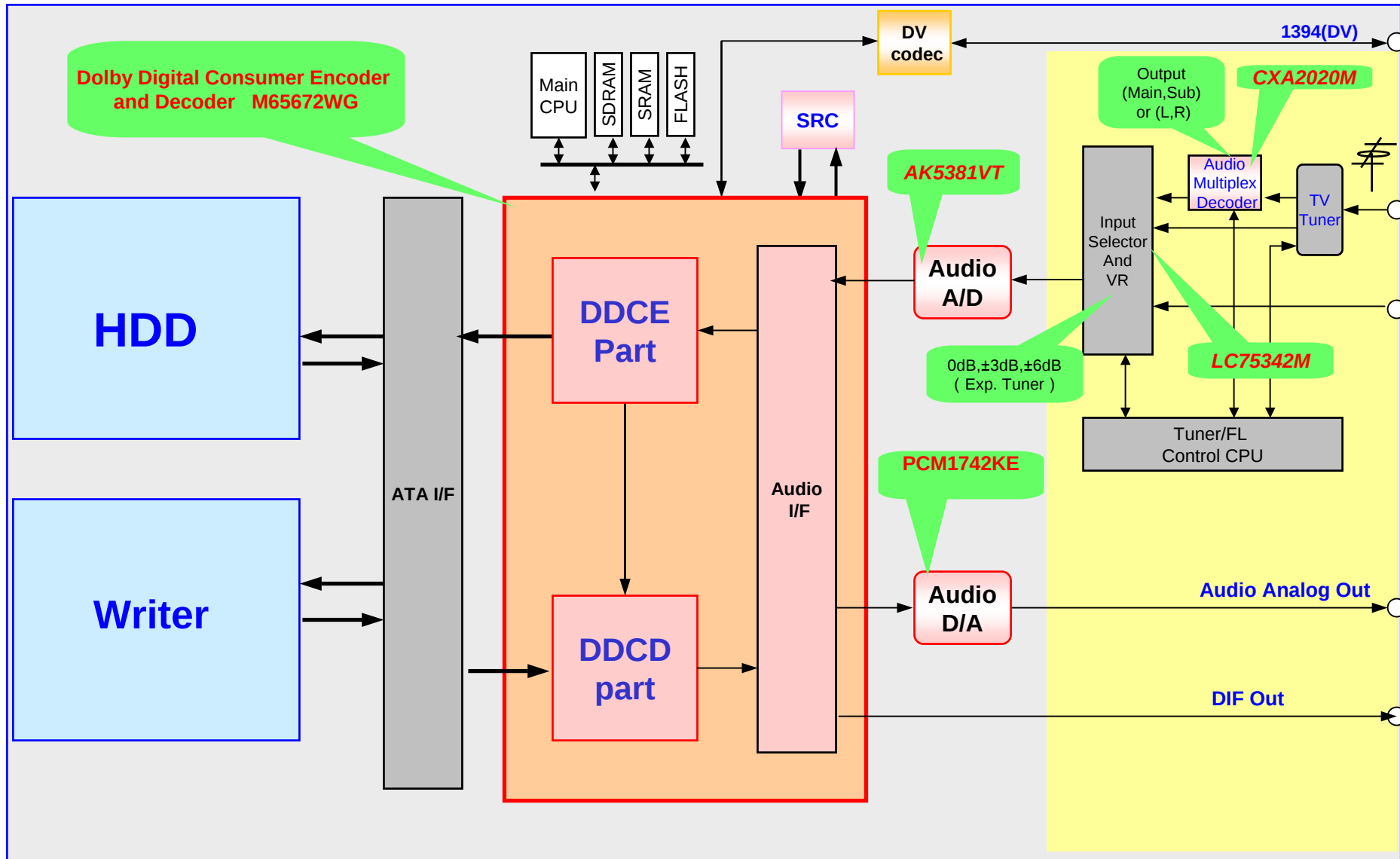


DVR-310-S BLOCK DIAGRAM

Audio Circuits

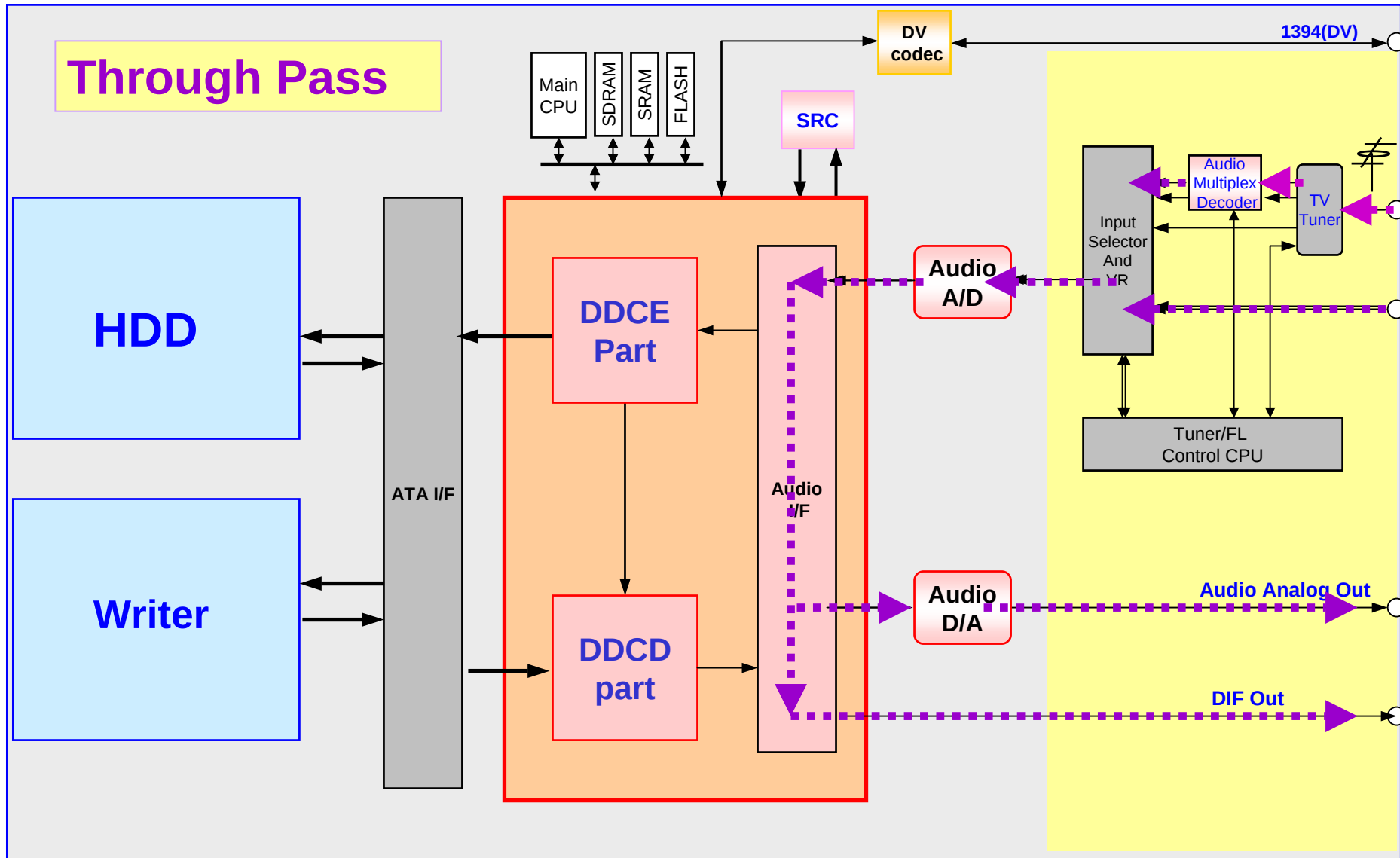
Basic Block

Audio Circuit



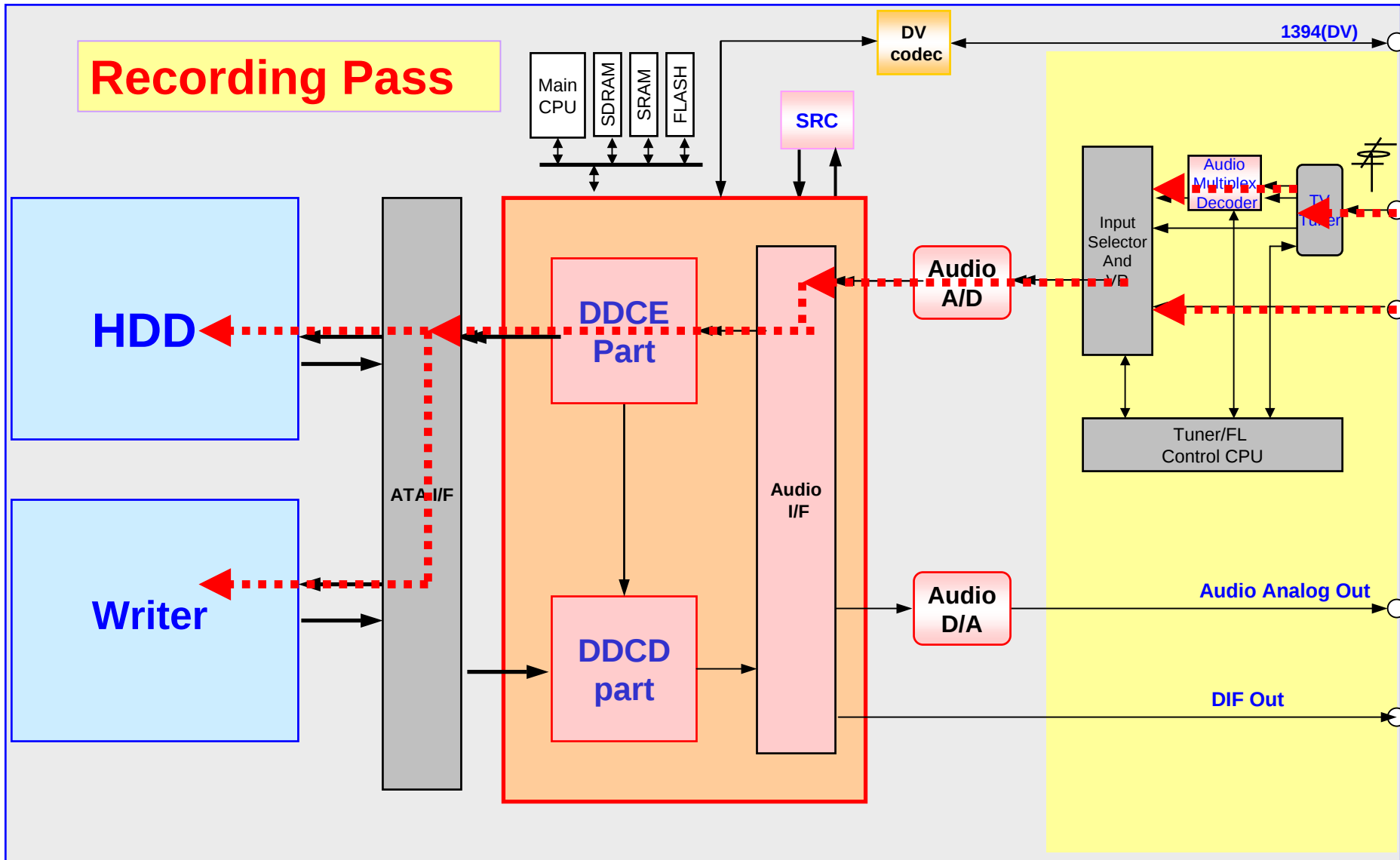
Signal flow

Audio Circuit



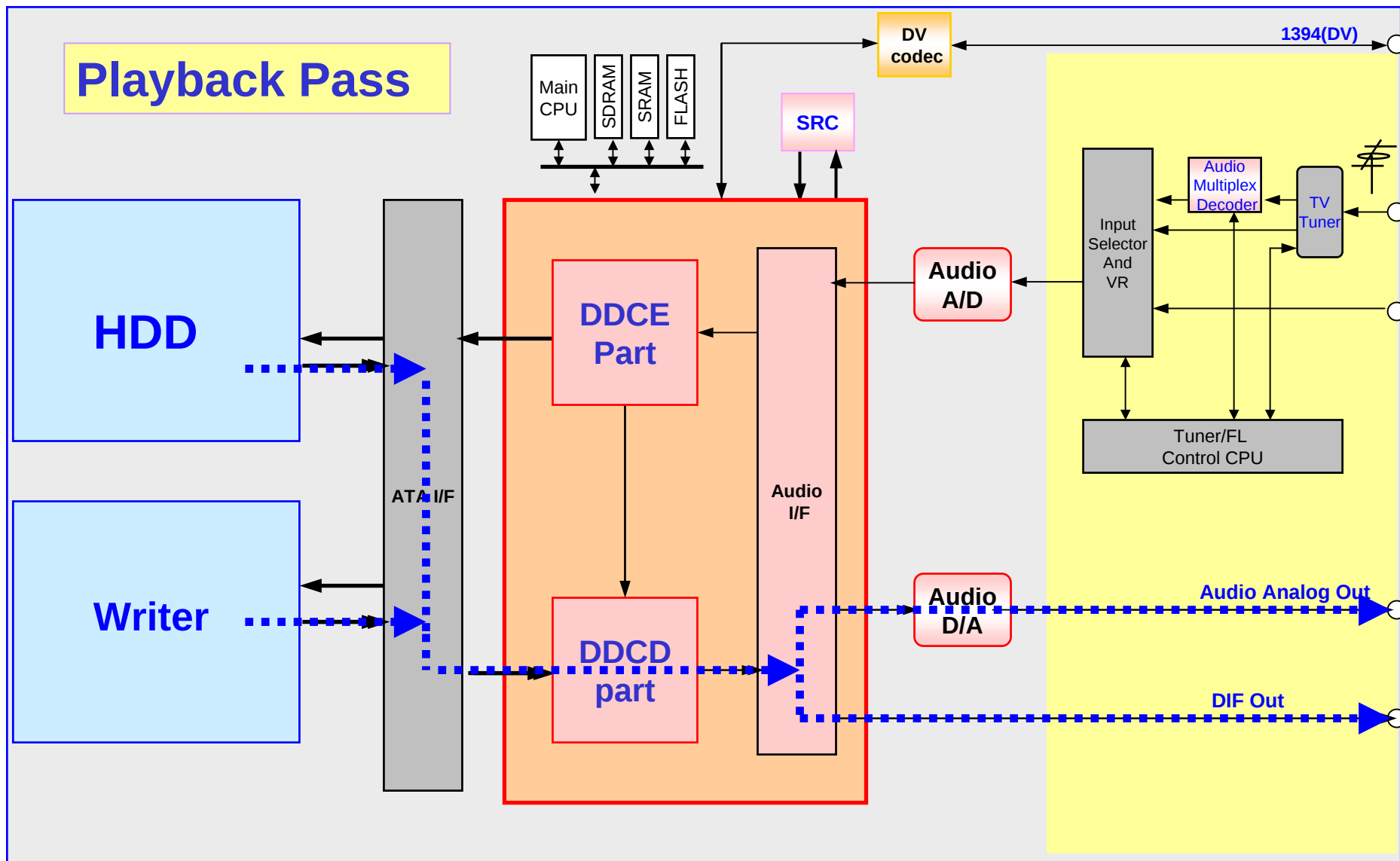
Signal flow

Audio Circuit



Signal flow

Audio Circuit



Audio Circuit

Audio Specification

North America , PX [BTSC+SAP]

Input Source		User Select	Disc Record	HDD
Carrier	Signal		Video Recording	DVD-Video

BTSC	Mono	Don't Care	2/0	2/0
	Stereo			
BTSC+SAP	Mono+SAP	Mono or Stereo	2/0	2/0
	Stereo+SAP			
	Mono+SAP	SAP	1+1	2/0 [#1]
	Stereo+SAP			

Principal Country : U.S.A, CANADA, PX

#1 : Only SAP will record as 2/0mode by User's setting in advance.

DVR-310-S BLOCK DIAGRAM

Power Supply Unit

POWER SUPPLY UNIT

Power supply Assy

[Major Power Supply] (Refer to SM page 20)

* TUMJ

EV+6V → V+3_3E (3.3V)	→ Backup for RTC (RTC)
EV+6V → V+5E (5V)	→ INPUT & Display (FL Driver, F-Key, Remote Sensor)
V+37E (37V)	→ Tuner Module
EV+6V → V+5M (5V)	→ Tuner u com
EV+6V → V+5VI (5V)	→ Video IN (Video Selector)
SW+6V → V+5VO (5V)	→ Video Out (Video Driver)
SW+13 → V+9 (9V)	→ Audio (Audio Selector, MPX decoder)
SW+13 → V+13SW (13V)	→ DC FAN motor

* MAIN

SW+2.4V → V+PRA (1.2V)	→ For PRISM IC
SW+4V → V+3D (3.3V)	→ Digital I/O (SDRAM, SRAM, Flash)
SW+4V → V+3V (3.3V)	→ Digital I/O (PRISM)
SW+6V → V+5A (5V)	→ Audio process line (DAC, ADC)
SW+6V → V+5D (5V)	→ ATAPI BUS line (R6 Writer)
SW+13 → V+12A (12V)	→ Audio Output

POWER SUPPLY UNIT

Check point

[Service] (Refer to SM p46)

Only Fuse on secondary circuit can be replaced for repair.

If other components parts are faulty, replace whole POWER SUPPLY UNIT for safety regulation.

P101 → AEK7050 (3A)

P201, P401, P403, P404 → AEK7067 (2A)

[Note]

CN204 (Yellow) is vacant for DVR-310H.

This connector is used for HDD unit of DVR-510H.

P101→ SW+4V

P201→ SW+2.4V

P401→ EV+6V

P403→ SW+5V → R6 WRITER +5V

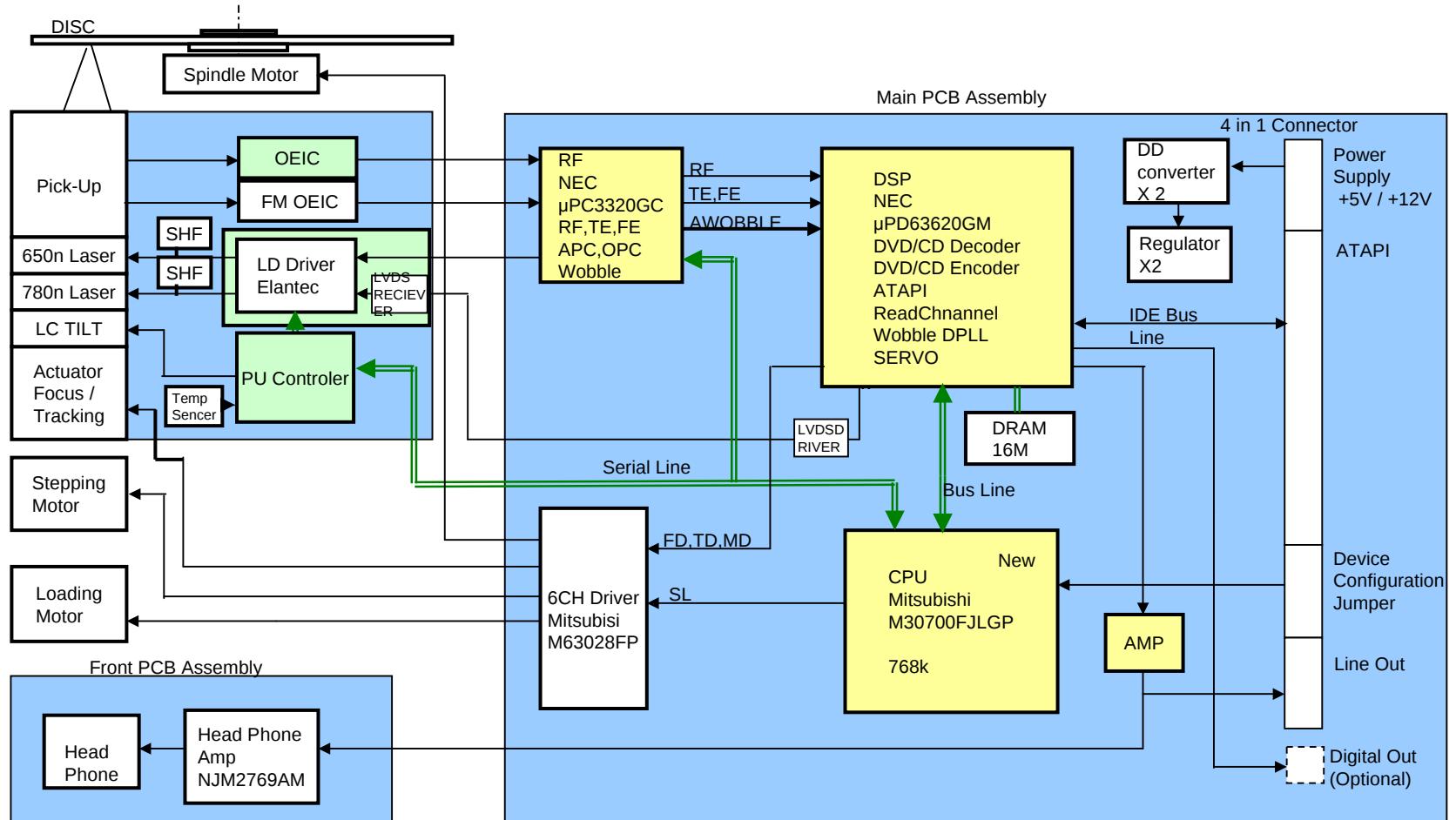
P404→ SW+5V → non

DVR-310-S BLOCK DIAGRAM

DVD-R/RW Writer Unit

Block Diagram for DVD writer

R6 Writer



R6 WRITER UNIT

Basic concept

[Pickup]

- (1) LCD Tilt servo system
- (2) LD driver with Strategy control

[Traverse Mechanism]

- (1) DRA (Dynamic Resonance Absorber) to reduce mechanism vibration.
- (2) Deletion of Tilt mechanism

[Circuits]

- (1) 2 chip S-Combo LSI
- (2) OPC (Optimum Power Control) circuit for X2 RW Disc
- (3) MAIN & FRONT Assy

R6 WRITER UNIT

Check point

[Symptom] Not working for DVD

[Note] Check whether DVD writer is recognized with Test mode. (S/M 60 page)

[Symptom] Reading and writing problem for Discs.

[Check point] Check error rate by service mode.

Check LD(Laser Diode) current by test mode.

(RF level is only for your reference, use to compare with other model.)

Notes

1. Protection by temperature detection (75 degrees C)

Operation: Power OFF

"stopped operation by the temperature rise" on screen