

# SERVICE MANUAL

MODEL  
DVD-400

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CAUTION : Before servicing this chassis, read the "PRODUCT SAFETY SERVICE FOR VIDEO PRODUCTS" section on page 2 of this manual.

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# PRODUCT SAFETY SERVICING GUIDELINES FOR VIDEO PRODUCTS

CAUTION: DO NOT ATTEMPT TO MODIFY THIS PRODUCT IN ANY WAY AND NEVER PERFORM CUSTOMIZED INSTALLATIONS WITHOUT MANUFACTURER'S APPROVAL. UNAUTHORIZED MODIFICATIONS WILL NOT ONLY VOID THE WARRANTY, BUT MAY LEAD TO YOUR BEING LIABLE FOR ANY RESULTING PROPERTY DAMAGE OR USER INJURY.

SERVICE WORK SHOULD BE PERFORMED ONLY AFTER YOU ARE THOROUGHLY FAMILIAR WITH ALL OF THE FOLLOWING SAFETY CHECKS AND SERVICING GUIDELINES. TO DO OTHERWISE, INCREASES THE RISK OF POTENTIAL HAZARDS AND INJURY TO THE USER.

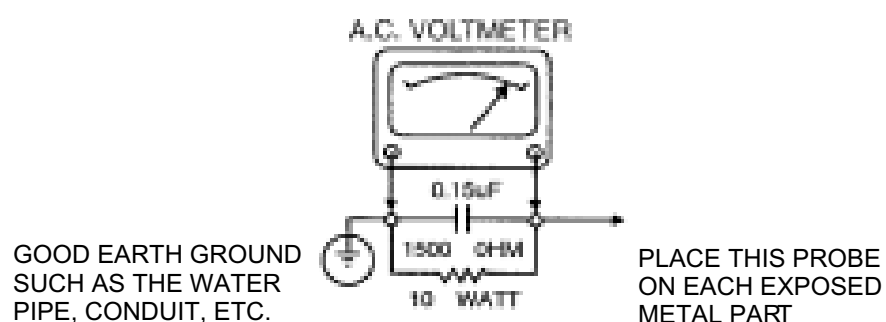
WHILE SERVICING, USE AN ISOLATION TRANSFORMER FOR PROTECTION FROM A.C. LINE SHOCK.

## SAFETY CHECKS

AFTER THE ORIGINAL SERVICE PROBLEM HAS BEEN CORRECTED, A CHECK SHOULD BE MADE OF THE FOLLOWING.

### SUBJECT: FIRE & SHOCK HAZARD

1. BE SURE THAT ALL COMPONENTS ARE POSITIONED IN SUCH A WAY AS TO AVOID POSSIBILITY OF ADJACENT COMPONENT SHORTS. THIS IS ESPECIALLY IMPORTANT ON THOSE MODULES WHICH ARE TRANSPORTED TO AND FROM THE REPAIR SHOP.
2. NEVER RELEASE A REPAIR UNLESS ALL PROTECTIVE DEVICES SUCH AS INSULATORS, BARRIERS, COVERS, SHIELDS, STRAIN RELIEFS, POWER SUPPLY CORDS, AND OTHER HARDWARE HAVE BEEN REINSTALLED PER ORIGINAL DESIGN. BE SURE THAT THE SAFETY PURPOSE OF THE POLARIZED LINE PLUG HAS NOT BEEN DEFEATED.
3. SOLDERING MUST BE INSPECTED TO DISCOVER POSSIBLE COLD SOLDER JOINTS, SOLDER SPLASHES OR SHARP SOLDER POINTS. BE CERTAIN TO REMOVE ALL LOOSE FOREIGN PARTICLES.
4. CHECK FOR PHYSICAL EVIDENCE OF DAMAGE OR DETERIORATION TO PARTS AND COMPONENTS, FOR FRAYED LEADS AND DAMAGED INSULATION (INCLUDING A.C. CORD), AND REPLACE IF NECESSARY FOLLOW ORIGINAL LAYOUT, LEAD LENGTH AND DRESS.
5. NO LEAD OR COMPONENT SHOULD TOUCH A RECEIVING TUBE OR A RESISTOR RATED AT 1 WATT OR MORE. LEAD TENSION AROUND PROTRUDING METAL SURFACES MUST BE AVOIDED.
6. ALL CRITICAL COMPONENTS SUCH AS FUSES, FLAMEPROOF RESISTORS, CAPACITORS, ETC. MUST BE REPLACED WITH EXACT FACTORY TYPES, DO NOT USE REPLACEMENT COMPONENTS OTHER THAN THOSE SPECIFIED OR MAKE UNRECOMMENDED CIRCUIT MODIFICATIONS.
7. AFTER RE-ASSEMBLY OF THE SET, ALWAYS PERFORM AN A.C. LEAKAGE TEST ON ALL EXPOSED METALLIC PARTS OF THE CABINET, (THE CHANNEL SELECTOR KNOB, ANTENNA TERMINALS, HANDLE AND SCREWS) TO BE SURE THE SET IS SAFE TO OPERATE WITHOUT DANGER OF ELECTRICAL SHOCK. DO NOT USE A LINE ISOLATION TRANSFORMER DURING THIS TEST, MAKE SURE TO USE AN A.C. VOLTMETER. HAVING 5000 OHMS PER VOLT OR MORE SENSITIVITY, IN THE FOLLOWING MANNER; CONNECT A 1500 OHMS 10 WATT RESISTOR, PARALLELED BY A .15 MFD. 150V A.C. TYPE CAPACITOR BETWEEN A KNOWN GOOD EARTH GROUND (WATER PIPE, CONDUIT, ETC.) AND THE EXPOSED METALLIC PARTS, ONE AT A TIME. MEASURE THE A.C. VOLTAGE ACROSS THE COMBINATION OF 1500 OHM RESISTOR AND 15 MFD CAPACITOR. REVERSE THE A.C. PLUG AND REPEAT A.C. ANY VOLTAGE MEASUREMENTS FOR EACH EXPOSED METALLIC PART. VOLTAGE MEASURED MUST NOT EXCEED 75 VOLTS R.M.S. THIS CORRESPONDS TO 0.5 MILLIAMPS A.C. ANY VALUE EXCEEDING THIS LIMIT CONSTITUTES A POTENTIAL SHOCK HAZARD AND MUST BE CORRECTED IMMEDIATELY.



### SUBJECT GRAPHIC SYMBOLS



THE LIGHTNING FLASH WITH APOWHEAD SYMBOL. WITHIN AN EQUILATERAL TRIANGLE, IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF UNINSULATED "DANGEROUS VOLTAGE" THAT MAY BE OF SUFFICIENT MAGNITUDE TO CONSTITUTE A RISK OF ELECTRIC SHOCK.



THE EXCLAMATION POINT WITHIN AN EQUILATERAL TRIANGLE IS INTENDED TO ALERT THE SERVICE PERSONNEL TO THE PRESENCE OF IMPORTANT SAFETY INFORMATION IN SERVICE LITERATURE.

### SUBJECT: X-RADIATION

1. BE SURE PROCEDURES AND INSTRUCTIONS TO ALL SERVICE PERSONNEL COVER THE SUBJECT OF X-RADIATION. THE ONLY POTENTIAL SOURCE OF X-RAYS IN CURRENT T.V. RECEIVERS IS THE PICTURE TUBE. HOWEVER, THIS TUBE DOES NOT EMIT X-RAYS WHEN THE HIGH VOLTAGE IS AT THE FACTORY SPECIFIED LEVEL. THE PROPER VALUE IS GIVEN IN THE APPLICABLE SCHEMATIC. OPERATION AT HIGHER VOLTAGES MAY CAUSE A FAILURE OF THE PICTURE TUBE OR HIGH VOLTAGE SUPPLY AND, UNDER CERTAIN CIRCUMSTANCES, MAY PRODUCE RADIATION IN EXCESS OF DESIRABLE LEVELS.
2. ONLY FACTORY SPECIFIED C.R.T ANODE CONNECTORS MUST BE USED. DEGAUSSING SHIELDS ALSO SERVE AS AN X-RAY SHIELD IN COLOR SETS, ALWAYS RE-INSTALL THEM.
3. IT IS ESSENTIAL THAT SERVICE PERSONNEL HAVE AVAILABLE AN ACCURATE AND RELIABLE HIGH VOLTAGE METER. THE CALIBRATION OF THE METER SHOULD BE CHECKED PERIODICALLY AGAINST A REFERENCE STANDARD, SUCH AS THE ONE AVAILABLE AT YOUR DISTRIBUTOR.
4. WHEN THE HIGH VOLTAGE CIRCUITRY IS OPERATING PROPERLY, THERE IS NO POSSIBILITY OF AN X-RADIATION PROBLEM. EVERY TIME A COLOR CHASSIS IS SERVICED, THE BRIGHTNESS SHOULD BE RUN UP AND DOWN WHILE MONITORING THE HIGH VOLTAGE WITH A METER TO BE CERTAIN THAT THE HIGH VOLTAGE DOES NOT EXCEED THE SPECIFIED VALUE AND THAT IT IS REGULATING CORRECTLY. WE SUGGEST THAT YOU AND YOUR SERVICE ORGANIZATION REVIEW TEST PROCEDURES SO THAT VOLTAGE REGULATION IS ALWAYS CHECKED AS A STANDARD SERVICING PROCEDURE AND THAT THE HIGH VOLTAGE READING BE RECORDED ON EACH CUSTOMER'S INVOICE.
5. WHEN TROUBLESHOOTING AND MAKING TEST MEASUREMENTS IN A PRODUCT WITH A PROBLEM OF EXCESSIVE HIGH VOLTAGE AVOID BEING UNNECESSARILY CLOSE TO THE PICTURE TUBE AND THE HIGH VOLTAGE SUPPLY DO NOT OPERATE THE PRODUCT LONGER THAN IT IS NECESSARY TO LOCATE THE CAUSE OF EXCESSIVE VOLTAGE.
6. REFER TO HV. B+ AND SHUTDOWN ADJUSTMENT PROCEDURES DESCRIBED IN THE APPROPRIATE SCHEMATIC AND DIAGRAMS (WHERE USED).

### SUBJECT: IMPLOSION

1. ALL DIRECT VIEWED PICTURE TUBES ARE EQUIPPED WITH AN INTEGRAL IMPLOSION PROTECTION SYSTEM, BUT CARE SHOULD BE TAKEN TO AVOID DAMAGE DURING INSTALLATION, AVOID SCRATCHING THE TUBE. IF SCRATCHED REPLACE IT.
2. USE ONLY RECOMMENDED FACTORY REPLACEMENT TUBES.

### SUBJECT: TIPS ON PROPER INSTALLATION

1. NEVER INSTALL ANY PRODUCT IN A CLOSED-IN RECESS. CUBBYHOLE OR CLOSELY FITTING SHELF SPACE, OVER OR CLOSE TO HEAT DUCT, OR IN THE PATH OF HEATED AIR FLOW.
2. AVOID CONDITIONS OF HIGH HUMIDITY SUCH AS: OUTDOOR PATIO INSTALLATIONS WHERE DEW IS A FACTOR, NEAR STEAM RADIATORS WHERE STEAM LEAKAGE IS A FACTOR, ETC.
3. AVOID PLACEMENT WHERE DRAPERIES MAY OBSTRUCT REAR VENTING. THE CUSTOMER SHOULD ALSO AVOID THE USE OF DECORATIVE SCARVES OR OTHER COVERINGS WHICH MIGHT OBSTRUCT VENTILATION.
4. WALL AND SHELF MOUNTED INSTALLATIONS USING A COMMERCIAL MOUNTING KIT, MUST FOLLOW THE FACTORY APPROVED MOUNTING INSTRUCTIONS. A PRODUCT MOUNTED TO A SHELF OR PLATFORM MUST RETAIN ITS ORIGINAL FEET (OR THE EQUIVALENT THICKNESS IN SPACERS) TO PROVIDE ADEQUATE AIR FLOW ACROSS THE BOTTOM. BOLTS OR SCREWS USED FOR FASTENERS MUST NOT TOUCH ANY PARTS OR WIRING. PERFORM LEAKAGE TEST ON CUSTOMIZED INSTALLATIONS.
5. CAUTION CUSTOMERS AGAINST THE MOUNTING OF A PRODUCT ON SLOPING SHELF OR A TILTED POSITION, UNLESS THE PRODUCT IS PROPERLY SECURED.
6. A PRODUCT ON A ROLL-ABOUT CART SHOULD BE STABLE ON ITS MOUNTING TO THE CART CAUTION THE CUSTOMER ON THE HAZARDS OF TRYING TO ROLL A CART WITH SMALL CASTERS ACROSS THRESHOLDS OR DEEP PILE CARPETS.
7. CAUTION CUSTOMERS AGAINST THE USE OF A CART OR STAND WHICH HAS NOT BEEN LISTED BY UNDERWRITERS LABORATORIES, INC. FOR USE WITH THEIR SPECIFIC MODEL OF TELEVISION RECEIVER OR GENERICALLY APPROVED FOR USE WITH TV'S OF THE SAME OR LARGER SCREEN SIZE.
8. CAUTION CUSTOMERS AGAINST THE USE OF EXTENSION CORDS. EXPLAIN THAT A FOREST OF EXTENSIONS SPROUTING FROM A SINGLE OUTLET CAN LEAD TO DISASTROUS CONSEQUENCES TO HOME AND FAMILY.

# SERVICING PRECAUTIONS

CAUTION : Before servicing the DVD covered by this service data and its supplements and ADDENDUMS, read and follow the *SAFETY PRECAUTIONS NOTE* : if unforeseen circumstances create conflict between the following servicing precautions and any of the safety precautions in this publications, always follow the safety precautions.

*Remember Safety First:*

## General Servicing Precautions

1. Always unplug the DVD AC power cord from the AC power source before:
  - (1) Removing or reinstalling any component, circuit board, module, or any other assembly.
  - (2) Disconnection or reconnecting any internal electrical plug or other electrical connection.
  - (3) Connecting a test substitute in parallel with an electrolytic capacitor

**Caution :** A wrong part substitution or incorrect polarity installation of electrolytic capacitors may result in an explosion hazard.
2. Do not spray chemicals on or near this DVD or any of its assemblies.
3. Unless specified otherwise in this service data, clean electrical contacts by applying an appropriate contact cleaning solution to the contacts with a pipe cleaner, cotton-tipped swab, or comparable soft applicator.  
Unless specified otherwise in this service data, lubrication of contacts is not required.
4. Do not defeat any plug/socket B+ voltage interlocks with wotch instruments covered by this service manual might be equipped.
5. Do not apply AC power to this DVD and/or any of its electrical assemblies unless all solid-state device heat sinks are correctly installed.
6. Always connect test instrument ground lead to the appropriate ground before connection the test instrument positive lead. Always remove the test instrument ground lead last.

## Insulation Checking Procedure

Disconnect the attachment plug from the AC outlet and turn the power on. Connect an insulation resistance meter(500V) to the blades of the attachment plug. The insulation resistance between each blade of the attachment plug and accessible conductive parts (Note 1) should be more than 1M ohm.

**Note 1 :** Accessible Conductive Parts including Metal panels, input terminals, Earphone jacks, etc.

## Electrostatically Sensitive (ES) Devices

Some semiconductor (solid state) devices can be damaged easily by static electricity. Such components commonly are called Electrostatically Sensitive (ES) Devices. Examples of typical ES devices are integrated circuits and some field effect transistors and semiconductor chip components.

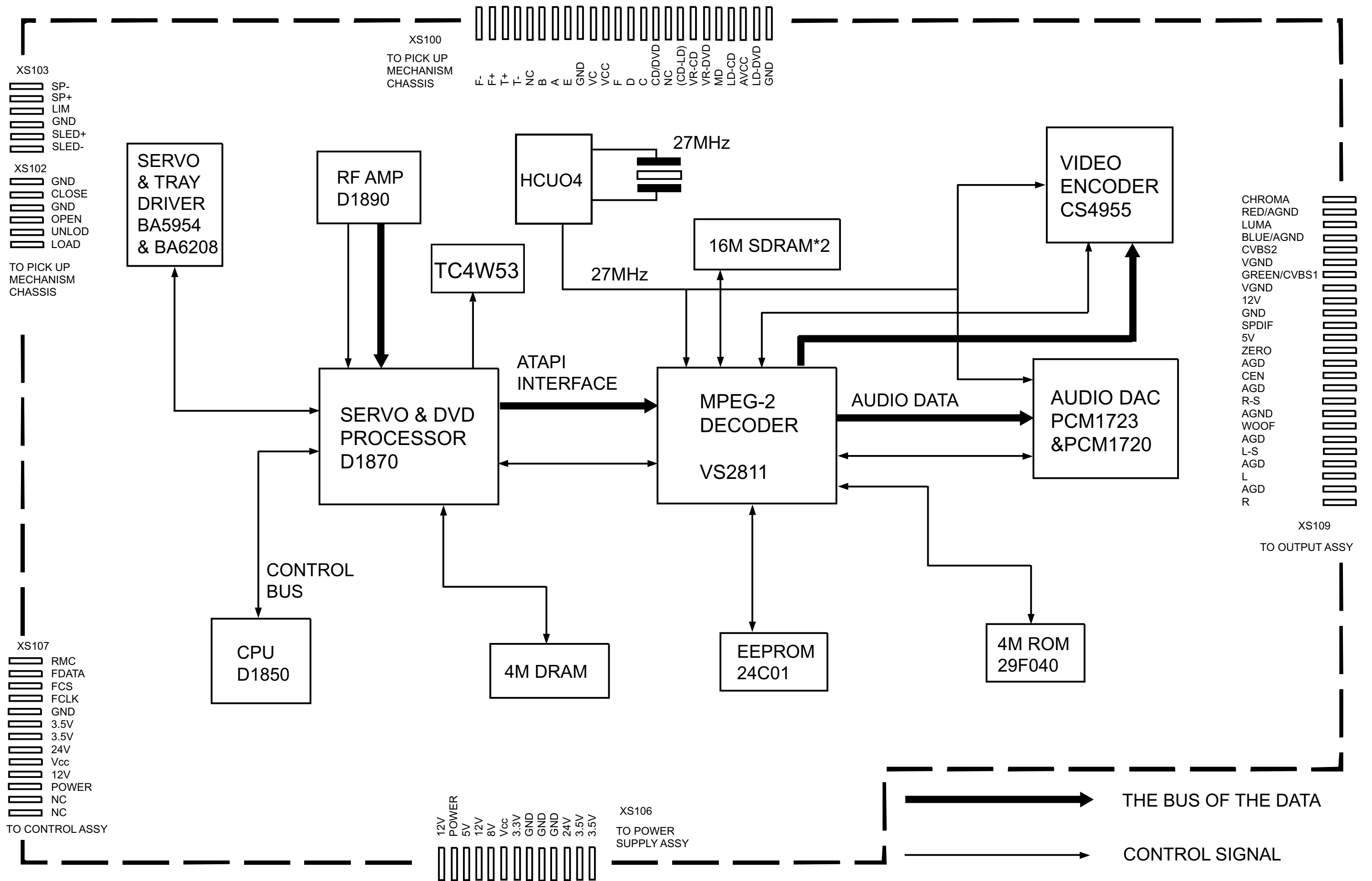
The following techniques should be used to help reduce the incidence of component damage caused by static electricity.

1. Immediately before handling any semiconductor component or semiconductor-equipped assembly, drain off any electrostatic charge on your body by touching a known earth ground. Alternatively, obtain and wear a commercially available discharging wrist strap device, which should be removed for potential shock reasons prior to applying power to the unit under test.
2. After removing an electrical assembly equipped with ES devices, place the assembly on a conductive surface such as aluminum foil, to prevent electrostatic charge buildup or exposure of the assembly.
3. Use only a GROUNDED-tip soldering iron to solder or unsolder ES devices.
4. Use only an anti-static solder removal device. Some solder removal devices not classified a "anti-static" can generate electrical charges sufficient to damage ES devices.
5. Do not use freon-propelled chemicals. These can generate electrical charge sufficient to damage ES devices.
6. Do not remove a replacement ES device from its protective package until immediately before you are ready to install it. (Most replacement ES devices are packaged with leads electrically shorted together by conductive foam, aluminum foil, or comparable conductive material.)
7. Immediately before removing the protective material from the leads of a replacement ES device, touch the protective material to the chassis or circuit assembly into which the device will be installed.

Caution : Be sure no power is applied to the chassis or circuit, and observe all other safety precautions.

8. Minimize bodily motions when handling unpackaged replacement ES devices. (Normally harmless motion such as the brushing together of your clothes fabric or the lifting of your foot from a carpeted floor can generate static electricity sufficient to damage an ES device.)

# OVERALL BLACK DIAGRAM



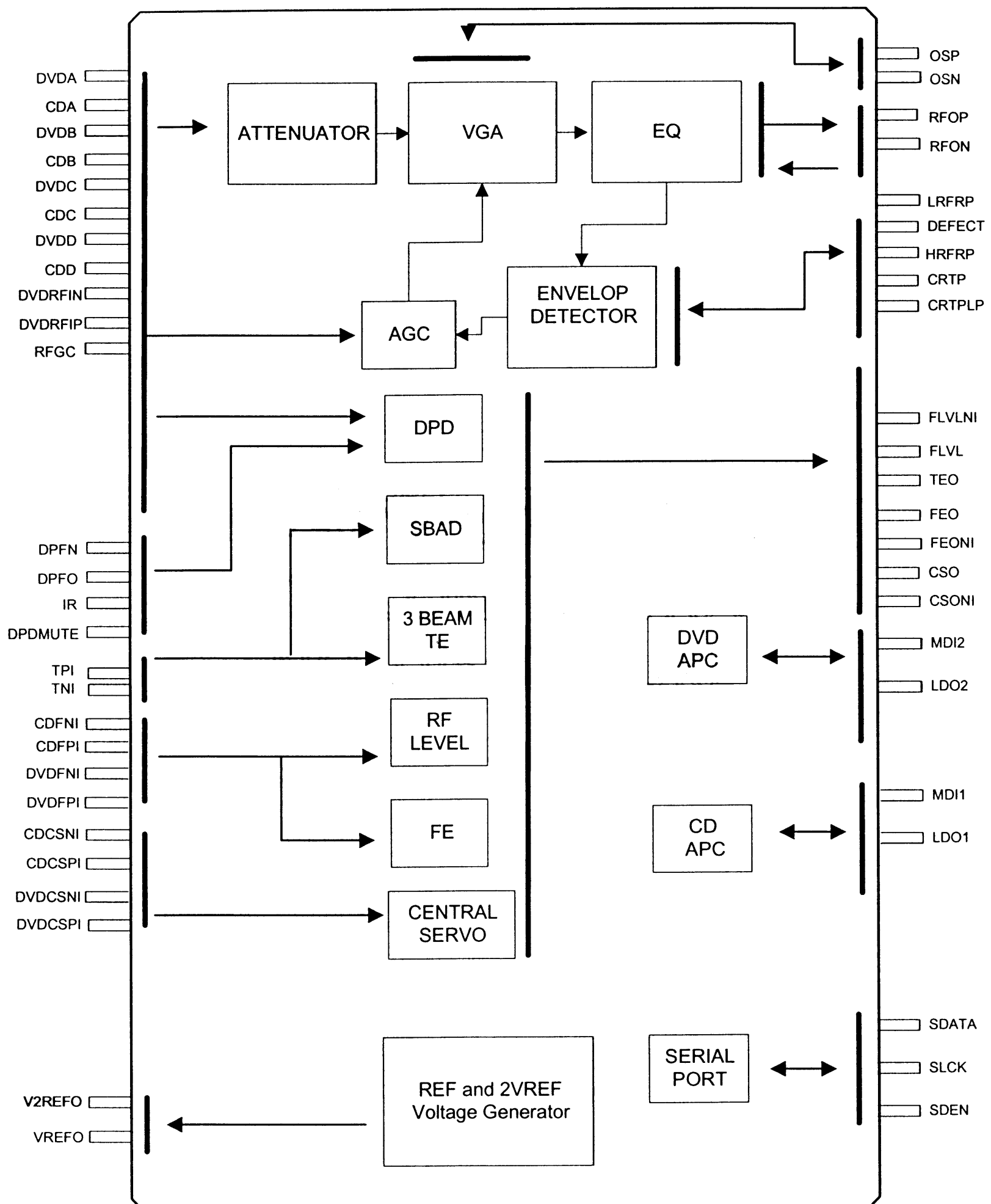
## IC INTRODUCTION

### D1890 PIN ASSIGNMENTS

Pin Numbers	PIN NAME	Type	Description
QFP100 and LQFP100			
RF Flag Interface			
13	DEFECT	Digital Output	Flag of bad data output status
RF SIO interface			
14	SLCK	Digital Input	RF serial clock input
15	SDEN	Digital Input	RF serial data enable
16	SDATA	Digital IO	RF serial data IO
11	RST	Digital input	Reset (active high)
12	XCK16M	Digital input	16.9MHz for verification
RF			
40	DVDA	Analog input	DVD RF signal input A
41	DVDB	Analog Input	DVD RF signal input B
42	DVDC	Analog Input	DVD RF signal input C
43	DVDD	Analog Input	DVD RF signal input D
38	DVDRFIN	Analog Input	DVD RF signal input RFIN
39	DVDRFIP	Analog Input	DVD RF signal input RFIP
53	CDA	Analog Input	CD RF signal input A
54	CDB	Analog Input	CD RF signal input B
55	CDC	Analog Input	CD RF signal input C
56	CDD	Analog Input	CD RF signal input D
61	OSP	Analog	Offset cancellation capacitor connecting
60	OSN	Analog	Offset cancellation capacitor connecting
86	RFOP	Analog output	RF positive output
85	RFON	Analog output	RF negative output
59	RFGC	Analog	RF VGA control
TRACKING ERROR			
88	DPFN	Analog	DPD amplifier negative input
87	DPFO	Analog	DPD amplifier output
23	IR	Analog	DPD reference resister connecting
17	DPDMUTE	Digital input	DPD mute control input
83	TNI	Analog Input	3 beam satellite PD signal input
82	TPI	Analog Input	3 beam satellite PD signal input
97	TEO	Analog Output	Tracking error output
FOCUSING ERROR & RF LEVEL & CENTRAL SERVO SIGNAL			
64	CDFNI	Analog Input	CD focusing error negative input
65	CDFPI	Analog Input	CD focusing error positive input
44	DVDFNI	Analog input	DVD focusing error negative input
45	DVDFPI	Analog input	DVD focusing error positive input
95	FEO	Analog Output	Focusing error output
96	FEONI	Analog Input	Focusing error amplifier negative input
93	FLVL	Analog Output	RF level output

Pin Numbers	PIN NAME	Type	Description
94	FLVLNI	Analog input	RF level amplifier negative input
69	CDCSNI	Analog input	CD central servo signal negative input
70	CDCSPI	Analog input	CD central servo signal positive input
46	DVDCSNI	Analog input	DVD central servo signal negative input
47	DVDCSPI	Analog input	DVD central servo signal positive input
2	CSO	Analog output	Central servo signal output
3	CSONI	Analog input	Central servo amplifier negative input
ALPC			
80	MDI1	Analog Input	Laser power monitor input
81	LDO1	Analog Output	Laser driver output
51	MDI2	Analog Input	Laser power monitor input
52	LDO2	Analog Output	Laser driver output
RF RIPPLE			
8	CRTP	Analog	RF top envelop filter capacitor connecting
9	CRTPLP	Analog	Defect level filter capacitor connecting
7	HRFRP	Analog output	High frequency RF ripple output
6	LRFPR	Analog output	Low frequency RF ripple output
POWER			
24,25,30,34,62,63	AVDD	Power	RF power
21,22,28,37,57,58	AGND	GND	GND
89,90	SVDD	Power	Servo analog power
98,99	SGND	GND	GND
4,5	VDD	Power	Digital power
18,19	GND	GND	GND
REFERENCE VOLTAGE			
92	VREFO	Analog output	Reference voltage 2.0V
91	V2REFO	Analog output	Reference voltage 4.0V
ALPC TRIMMING			
32	TM1	Analog input	Trimming pin for ALPC1
33	TM2	Analog input	Trimming pin for ALPC1
35	TM3	Analog input	Trimming pin for ALPC2
36	TM4	Analog input	Trimming pin for ALPC2
HIGH SPEED TRACK COUNTING			
1	TRLP	Analog	Low-pass filter capacitor connecting
100	TRLPA	Analog	Low-pass filter capacitor connecting
10	HTRC	Digital output	High speed track counting digital output
FOR MONITOR ONLY			
26	MON	Analog output	
27	MOP	Analog output	
31	VCON	Analog output	
20	HTRCMPH	Digital output	
84	HTE	Analog output	

# D1890 BLOCK DIAGRAM



## D1870 PIN ASSIGNMENTS

Pin Numbers	Pin NAME	Type	Description
RG data PLL interface			
11	PLLVD	Power	Power for data PLL and related analog circuitry.
10	JITFN	Analog Input	The negative input terminal of operation amplifier for RF jitter meter.
9	JITFO	Analog Output	The output terminal of RF jitter meter.
8	PDO	Analog Output	Phase comparator output. Output the phase difference of EFM and Pck4m. Sink or source a constant current to loop filter over this pin when phase difference occurs. Otherwise, this pin is high impedance.
7	IREF	Analog Input	Current reference input. It generates reference current for data PLL. Connect an external 15K resistor to this pin and PLLVSS.
6	LPFN	Analog Input	The negative input terminal of loop filter amplifier.
5	LPFO	Analog Output	The output of loop filter amplifier.
4	LPIN	Analog Input	The input of the low pass filter.
3	LPIO	Analog Output	The output of the low pass filter.
2	PLLVSS	Ground	Ground pin for data PLL and related analog circuitry.
1	VBDPLL	Analog Output	Reference voltage.
176	RFIN	Analog Input	The negative input terminal of RF differential signal.
175	RFIP	Analog Input	The positive input terminal of RF differential signal.
174	RFDSL	Analog Output	RF data slicer level output.
173	SCO	Analog Output	Analog slicer current output.
Signal Amplifier Interface			
172	ADCVDD	Power	Power pin for ADC circuitry.
171	HRFZC	Analog Input	High frequency RF ripple zero crossing input or photo interrupt pulse input.
170	RFRPSLV	Analog Output	RF ripple slice level output.
169	RFP	Analog Input	RF ripple detect input.
168	RFLEVEL	Analog Input	Sub beam add input or RF level input.
167	FEI	Analog Input	Focus error input.
166	TEI	Analog Input	Tracking error input.
165	TEZU	Analog Input	Tracking error zero crossing input.
164	TEZISLV	Analog Input	Tracking error zero crossing low pass input.
163	ADIN	Analog Input	General A/D input.
162	ADCVSS	Ground	Ground pin for ADC circuitry.
Motor and Actuator Drive Interface			
161	PDMVSS	Ground	Ground for PDM Circuitry.
160	PWM2VREF	Analog Input	A reference voltage input for PWM circuitry. The typical value is 4.0V.
159	PWMVREF	Analog Input	A reference voltage input for PWM circuitry. The typical value is 2.0V.
158	PDMVDD	Power	Power for PDM circuitry.
12	FOO	Analog Output	Focus servo output. PDM output of focus servo compensator.
13	TRO	Analog Output	Tracking servo output. PDM output of tracking servo compensator.
14	PWMOUT1	Analog Output	1 st General multi-level PWM output. The number of output levels is set with DSP command. It is used to control step motor.
15	PWMOUT2	Analog Output	2 nd General multi-level PWM output. The number of output level is selected DSP command.
17	DMO	Analog Output	Disk motor control output. PWM output.
18	FMO	Analog Output	Disk motor control. 3-level PWM output. It is used only for DC motor, but it is corporate with the pin PWMOUT1 to control step motor. If the internal DC_FMO is positive, the FMO output lags 90° than PWMOUT1, otherwise the FMO output leads 90° than PWMOUT1.
19	FROPENPW M	Analog Output	Tray open control output. It generates PWM output for TRWMEN <sub>27hRW2</sub> =0 or digital output for TRWMEN <sub>27hRW2</sub> =0.
20	FG	TTL Schmitt Input 50K pull up	Motor Hall sensor input.
22	TRCLOSE	TTL Output	Tray close output. It provides a clock out to the micro controller.
23	ENDM	TTL Output	Enable/disable disk motor. A logical high enables disk motor.
Panel Interface			

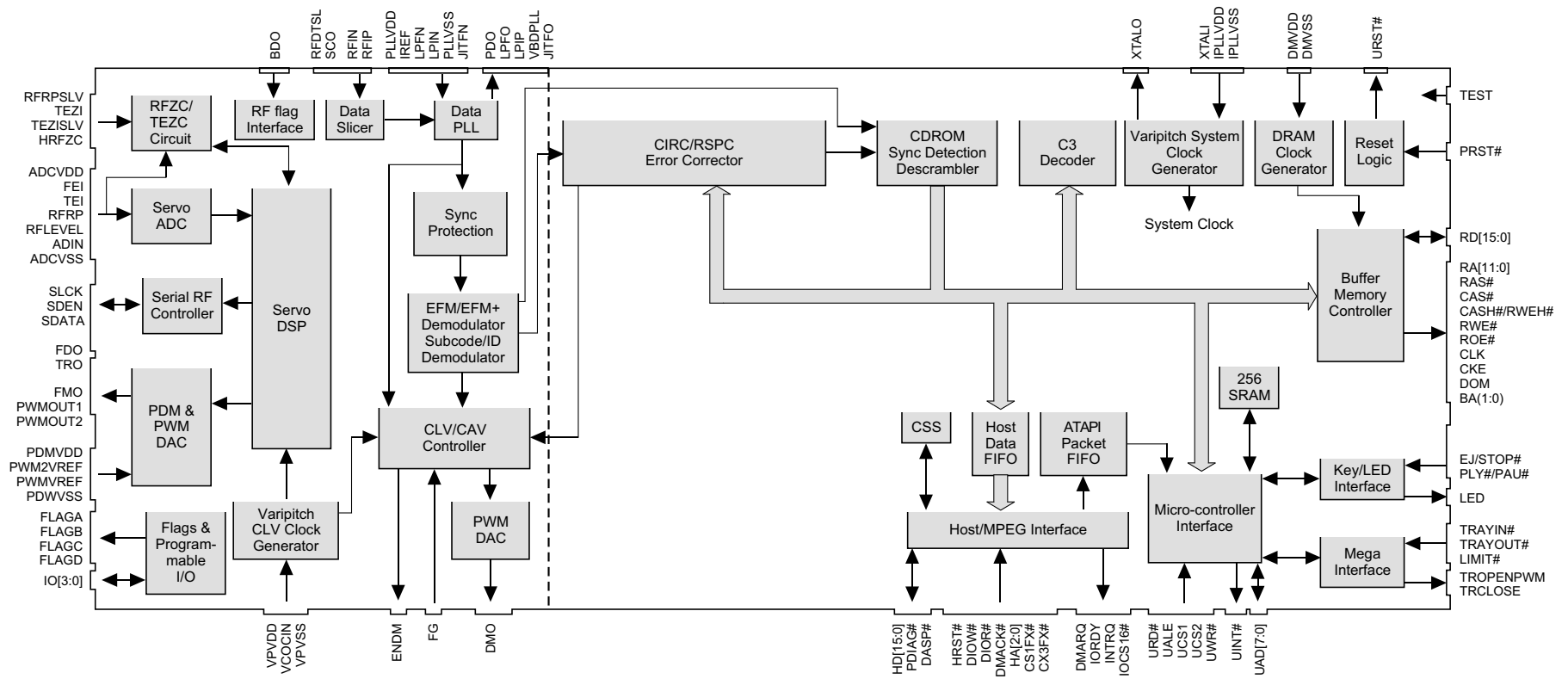


Pin Numbers	Pin NAME	Type	Description
24	LED	TTL Output	LED control output.
25	PLY#/PAU#	TTL Input 50K pull up	Play/pause key input, active low.
26	EJ/STOP#	TTL Input 50K pull up	Eject, stop key input, active low.
27	LIMIT#	TTL Input 50K pull up	Sledge inner limit input, active low.
28	TRAYOUT#	TTL Input 50K pull up	Tray_is_out input. A logical low indicates the tray is out. Feedback flag from tray connector.
29	TRAYIN#	TTL Input 50K pull up	Tray_is_in input. A logical low indicates the tray is in. Feedback flag from tray connector.
Micro controller Interface			
30	URST	TTL Output	Power-on reset output for external devices, active high. If the flash mode is used, the micro controller must be the kind of multiplexed address/data mode and its output pins must be at tri-state. Otherwise, the flash mode cannot be used.
31	UWR#	TTL Schmitt Input 50K pull up	Micro controller write strobe, active low.
32	URD#	TTL Schmitt Input 50K pull up	Micro controller read strobe, active low.
33	UCS1	TTL I/O 50K pull up	For non flash mode cycle: register bank select control 1, input from micro controller. For flash mode cycle: flash ROM address FLASH_ADR14.
34	UCS2	TTL I/O 50K pull up	For non flash mode cycle: register bank select control 2, input from micro controller. For flash mode cycle: flash ROM address FLASH_ADR15.
36	UALE	TTL I/O with Schmitt Input 50K pull up	For non flash mode cycle: address latch enable, high active input from micro controller. For flash mode cycle: address latch enable, high active output to control external 373.
37-43,46	UAD	TTL I/O 50K pull up	For non flash mode cycle: micro control address/data Bus. For flash mode cycle: flash ROM address/data bus. FLASH_ADR[7:0]/FLASH_D[7:0]. The FLASH_ADR[7:0] is latched in the external 373.
47	UINT#	TTL Output Open drain	Micro controller Interrupt, low active.
Crystal Interface & DRAM clock Interface			
44	DMVSS	Ground	Ground pin for DRAM clock circuitry.
45	DMVDD	Power	Power pin for DRAM clock circuitry.
48	XTALI	Input	Crystal input. The working frequency in 33.8688MHz.
49	XTALO	Output	Crystal output.
Memory Interface			
50	DQM	TTL Output	For non flash mode: SDRAM output Mask. For flash mode: flash ROM address FLASH_ADR13.
51	BA1	TTL Output	For non flash mode: SDRAM bank address 1 For flash mode: flash ROM address FLASH_ADR12.
52	BA0	TTL Output	For non flash mode: SDRAM bank address 0 For flash mode: flash ROM address FLASH_ADR11.
53	CKE	TTL Output	For non flash mode: SDRAM clock enable. For flash mode: flash ROM address FLASH_ADR10.
54	CLK	TTL Output	SDRAM clock
55-56	RA[11:10]	TTL Output	For non flash mode: DRAM address bus RA[11:10] For flash mode: flash ROM address FLASH_ADR[9:8]
58-64,66-67,69	RA[9:0]	TTL Output	RAM address bus
70	RAS#	TTL Output	RAM row address strobe, low active
71	ROE#	TTL Output	RAM output enable, low active. It must be pulled with 20K resistor if flash mode is used.

Pin Numbers	Pin NAME	Type	Description
72	RWE#	TTL Output	RAM write enable, low active. When two write enable pins are used, it only for low byte.
73	CASH#/RWEH#	TTL Output	High column address strobe: Write enable High Byte Multi-function pin: low active RAM column address strobe for high byte, when two column address strobe pins are used. Write enable for high byte, when two write enable pins are used.
74	CAS#	TTL Output	World RAM column address strobe: Low column address strobe Multi-function pin: low active RAM column address strobe for a word, when two column address strobe pins are not used. It is used only for low byte, when two column address strobe pins are used.
76-83, 85-87 90-94	RD[15:0]	TTL I/O	RAM data bus
System Clock Interface			
88	IPLLVD	Power	Power pin for system varipitch circuitry.
89	IPLLVSS	Ground	Ground pin for system varipitch circuitry.
Host Interface			
101	DASP#	TTL I/O 50K pull up	Drive active/Slave present This is the time-multiplexed signal that indicates that a device is active, or that slave is present.
102	CS3FX#	TTL Input 50K pull up	Host chip select 2(for 3FXH/37xh) The CX3FX# and CS1FX# are chip select signals from the host used to select the Command Block registers.
103	CS1FX#	TTL Input 50K pull up	Host chip select 1 (for 1Fhx/17xh)
105,108,106	HA[2:0]	TTL Input 50K pull up	Host address bus This is the 3-bit binary coded address asserted by the host to access a register or data port in the device.
107	PDIAG#	TTL I/O 50K pull up	Passed diagnostics
110	IOCS16#	TTL Output Open drain	I/O 16-bit chip select
111	INTRQ	TTL Output	Host interrupt. The MT1368 uses this signal to interrupt the host system.
112	DMACK#	TTL Input 50K pull up	DMA acknowledge. This signal shall be used by the host in response to DMAREQ to initiate DMA transfers.
113	IORDY	TTL Output	I/O channel ready: Ultra DMA ready: Ultra DMA data strobe. This is a multi-function pin. For i/o channel Ready, this signal is negated to extend the host transfer cycle of any register read or write when the device is not able to complete the transfer. For Ultra DMA Ready, this signal is asserted by the device to indicate to the host that the device is ready to receive Ultra DMA data out bursts from the host. For Ultra DMA data strobe, this is the data in strobe signal from device for Ultra DMA data in burst to host.
114	DIOR#	TTL Input 50K pull up	Device I/O read: Ultra DMA ready: Ultra DMA data strobe. This is multi-function pin. For Device I/O Read, this signal is the strobe signal asserted by the host to read device registers or the data port. For Ultra DMA read, this is asserted by the host to indicate to the device that the host is ready to receive Ultra DMA data in burst to host For Ultra DMA data strobe, this signal is the data out strobe signal from the host for an Ultra DMA data out burst.

Pin Numbers	Pin NAME	Type	Description
116	DIOW#	TTL Schmitt Input 50K pull up	Device I/O write: Stop Ultra DMA burst This is multi-function pin. For Device I/O Write, this signal is the strobe signal asserted by the host to write device registers or the data port. For Stop Ultra DMA, this signal shall be negated by host before data is transferred in an Ultra DMA burst and is asserted by host during an Ultra DMA burst to signal the termination of Ultra DMA burst.
117	DMARQ	TTL Output	DMA request. This signal is used for DMA data transfers between host and device and it shall be asserted by the MT1368 when it is ready to transfer data to or from the host. The direction of data transfer is controlled by DIOR# and DIOW#.
118-120,122-126,-128-131,134-137	HD[15:0]	TTL I/O	Host data bus. This is an 8- or 16- bit bi-directional data interface between the host and device; the lower 8 bits are used for 8-bit register transfers. Data transfers are 16-bit wide.
138	HRST#	TTL Schmitt Input 50K pull up	Host reset. This signal is referred to as hardware reset and it is used by host to reset the MT1368.
CLV/CAV Varipitch interface			
140	VPVDD	Power	Power pin for varipitch VCO circuitry.
141	VCOCIN	Analog Input	Connect capacitor for compensator loop filter.
142	VPVSS	Ground	Ground pin for varipitch VCO circuitry.
Miscellaneous			
139	PRST#	TTL Schmitt Input 50K pull up	Power-on reset, low active
143	TEST	TTL Input 50K Pull-Down	Test mode control pin, high active
Lag and Programmable I/O Interface			
145	FLAGD	TTL I/O	Servo DSP flag.
146	FLAGC	TTL I/O	Servo DSP flag.
147	FLAGB	TTL I/O	Servo DSP flag.
148	FLAGA	TTL I/O	Servo DSP flag. The internal flags of servo DSP can be selected to output through FLAGA, FLAGB, FLAGC, and FLAGD pins. To program the selection the micro controller must write FLGMOD register.
150	IO3	TTL I/O 50K pull high	At non-flash mode: programmable I/O or internal non-servo flags output. At flash mode cycle: to monitor DSVSEL to device master or slaver. It is recorded on DEVSEL <sub>102hRW6</sub> .
151	IO2	TTL I/O 50K pull high	At non-flash mode cycle: programmable I/O or internal non-servo flags output. At flash mode cycle: flash ROM address FLASH_ADR16.
152	IO1	TTL I/O	At non-flash mode cycle: programmable I/O or internal non-servo flags output. At flash mode cycle: flash ROM output enable FLASH_OE#.
153	IO0	TTL I/O 50K pull high	At non-flash mode cycle: programmable I/O or internal non-servo flags output. At flash mode cycle: flash ROM write enable FLASH_WR#.
SIO interface & Defect			
154	SDATA	TTL I/O	RF serial data input/output.
155	SDEN	TTL output	RF serial data latch enable
156	SLCK	TTL output	RF serial clock output
157	BDO	TTL Input 50K pull down	Flag of defect data input status
Digital Power & Ground			
57,75,104,144	DVDD3	Power	+3.3V use for Internal digital circuitry and digital output pad
16,65,109,133,100	DVDD	Power	+5V use for Internal digital circuitry and digital output pad
21,35,68,84,115,121,127,133,149,96	DVSS	Ground	Internal digital circuitry and digital output pad.

# D1870 BLOCK DIAGRAM

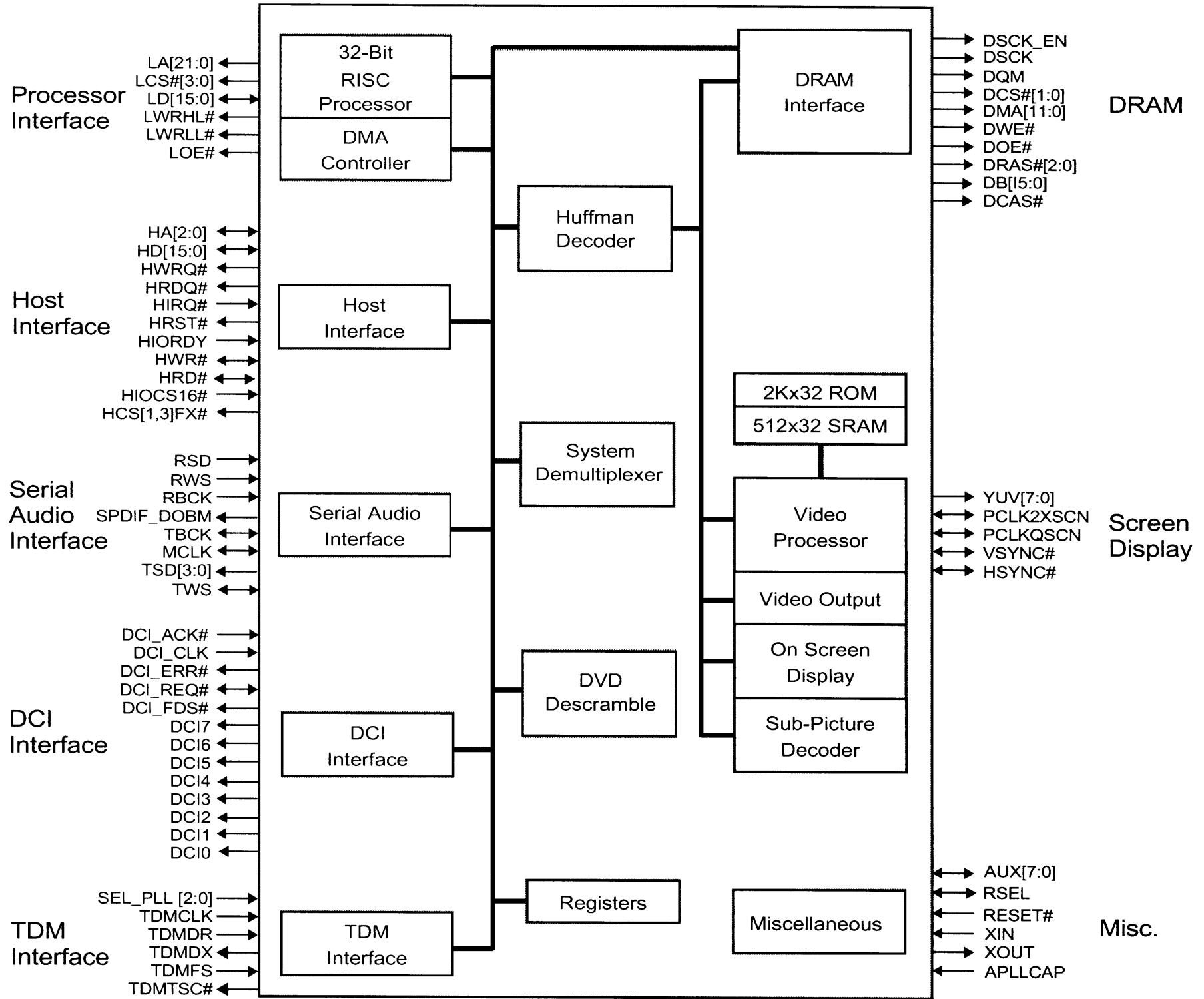


## VS3811 PIN ASSIGNMENTS

Name	Number	I/O	Definition
VCC	1,9,18,27,35,44,51,59,68,75,83,92,99, 104, 111,121,130,139,148,157,164, 172, 183, 193,201	I	3.6 V power supply.
LA[21:0]	23:19,16:10,7:2,207:204	O	Device address output.
VSS	8,17,26,34,43,52,60,67,76,84,91,98,103,112,120,129,138,147,156,163,171, 177,184,192,200,208	I	Ground.
RESET#	24	I	Reset input, active low.
TDMDX RSEL	25	O	TDM transmit data.
		I	ROM Select RSEL Selection 0 16-bit ROM 1 8-bit ROM
TDMDR	28	I	TDM receive data.
TDMCLK	29	I	TDM clock input.
TDMFS	30	I	TDM frame synch.
DMTSC#	31	O	TDM output enable, active low.
TWS	32	O	Audio transmit frame sync.
SEL_PLL[2:0]	33	I	Select Pll1. SEL-PLL2 SEL-PLL0 Clock Output 0 0 2.5*DCLK 0 1 3*DCLK 1 0 3.5*DCLK 1 1 4*DCLK
TSD[3:0]	38,37,36,33	O	Audio transmit serial data port.
MCLK	39	I/O	Audio master clock for audio DAC.
TBCK	40	I/O	Audio transmit bit clock.
SPDIF_DOB M	41	O	S/PDIF (IEC958) Format Output.
RSD	45	I	Audio receive serial data.
RWS	46	I	Audio receive frame synch.
RBCK	47	I	Audio receive bit clock.
APLLCAP	48	I	Analog PLL Capacitor.
XIN	49	I	Crystal input.
XOUT	50	O	Crystal output.
DMA[11:0]	66:61,58:53	O	DRAM address bus.
DCAS#	69	O	Column address strobe, active low.
DOE#	70	O	Output enable, active low.
DSCK_EN		I	Clock Enable, active low.
DWE#	71	O	DRAM write enable, active low.
DRAS[2:0]#	74:72	O	Row address strobe, active low.

Name	Number	I/O	Definition
DB[15:0]	96:93,90:85,82:77	I/O	DRAM data bus.
DCS[1:0]#	97,100	O	SDRAM chip select [1:0], active low
DQM	101	O	Data input/output mask.
DSCK	102	O	Clock to SDRAM.
DCLK	105	I	Clock Input (27 MHz)
YUV[7:0]	115:113,110:106	O	8-bit YUV output.
PCLK2XSCN	116	I/O	2X pixel clock.
PCLKQSCN	117	I/O	Pixel clock.
VSYNCH#	118	I/O	Vertical synch for screen video interface, programmable for rising or falling edge, active low.
HSYNCH#	119	I/O	Horizontal sync for screen video interface, programmable for rising or falling edge, active low.
HD[15:0]	141:140,137:131,128:122	O	Host data bus
HCS1FX#	152	O	Host select 1.
HCS3FX#	153	O	Host select 3.
HIOCS16#	151	I	Device 16-bit data transfer.
HA[2:0]	158,155:154	I/O	Host address bus.
VPP	159	I	Peripheral protection voltage. See App Note 2.
HWR#/DCI_ACK#	149	I,O	Host write/DCI Interface Acknowledge Signal, active low.
HRD#/DCI_CLK	150	O, O	Host read/DCI Interface Clock.
HD[15:0]	141:140,137:131,128:122	I/O	Host data bus.
HWRQ#	142	O	Host write request.
HRDQ#	143	O	Host read request.
HIRQ	144	I/O	Host interrupt.
HRST#	145	O	Host reset.
HIORDY	146	I	Host I/O ready
AUX[7:0]	169:165,162:160	I/O	Auxiliary ports.
LOE#	170	O	Device output enable, active low.
LCS[3:0]#	176:173	O	Chip select [3:0], active low.
LD[15:0]	197:194,191:185,182:178	I/O	Device data bus.
LWRLL#	198	O	Device write enable, active low.
LWRHL#	199	O	Device write enable, active low.
NC	37,38,42,203:202		No Connect pins. Leave open.

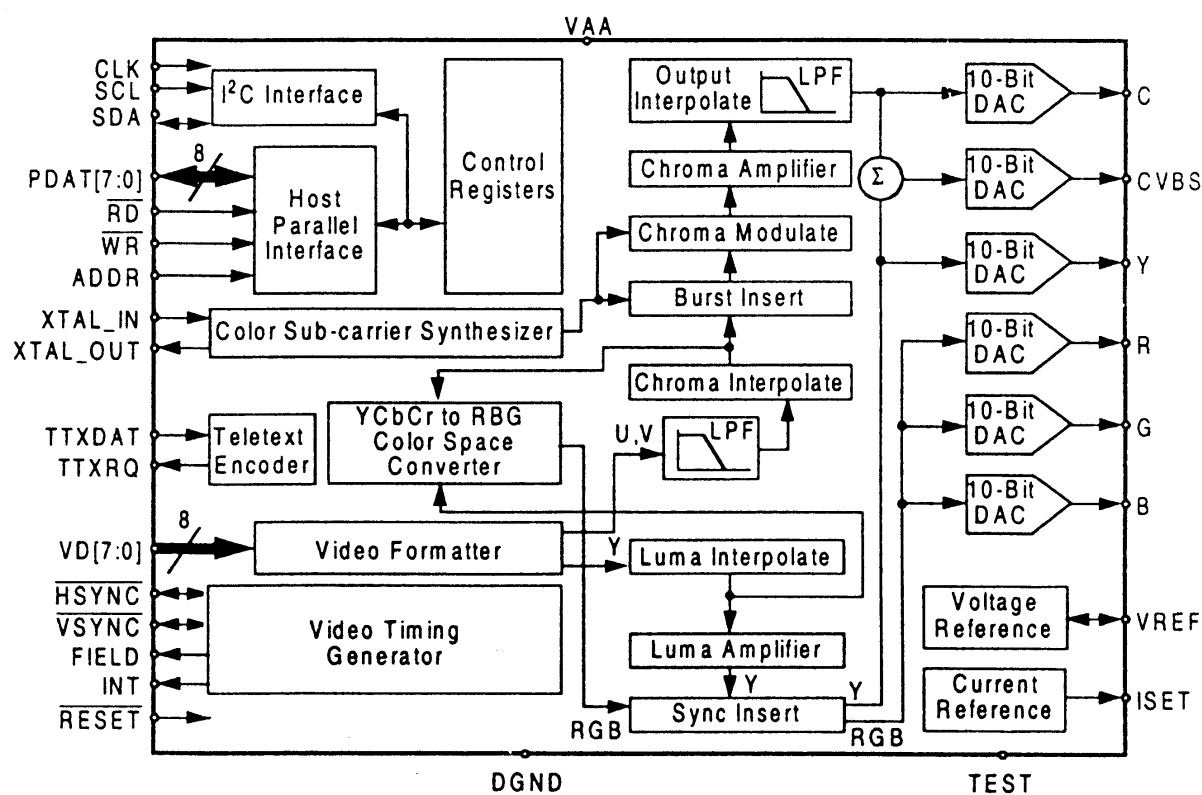
# VS3811 BLOCK DIAGRAM



## CS4955 PIN ASSIGNMENTS

PIN NAME	NUMBER	TYPE	DEFINITION
V[7:0]	8,7,6,5,4,3,2,1	IN	Digital video data inputs
CLK	29	IN	27MHz input clock
PADR	16	IN	Address enable line
XTAL-IN	15	IN	Sub-carrier crystal input
XTAL-OUT	14	OUT	Sub-carrier crystal output
HSYNC/CB	10	I/O	Active low horizontal sync, or composite blank signal
VSYNC	11	I/O	Active low vertical sync
FIELD/CB	9	OUT	Video field ID. Selectable polarity or composite blank
RD	27	IN	Host parallel port read strobe, active low
WR	28	IN	Host parallel port write strobe, active low
PDAT[7:0]	19,20,21,22,23,24,25,26	I/O	Host parallel port/general purpose I/O
SDA	32	I/O	I C data
SCL	33	IN	I C clock input
CVBS	44	CURRENT	Composite video output
Y	48	CURRENT	Luminance analog output
C	47	CURRENT	Chrominance analog output
R	39	CURRENT	Red analog output
G	40	CURRENT	Green analog output
B	43	CURRENT	Blue analog output
VREF	38	I/O	Internal voltage reference output external reference input
SET	37	CURRENT	DAC current set
TTXDAT	30	IN	Teletext data input
TTXRQ	31	OUT	Teletext request output
INT	12	OUT	Interrupt output, active high
RESET	34	IN	Active low master RESET
TEST	13	IN	Test pin. Ground for normal operation
VAA	36,41,46	PS	+5V or +3.3Vsupply(must be same as VDD)
GNDD	18	PS	Ground
VDD	17	PS	+5V or +3.3Vsupply(must be same as VAA)
GNDA	35,42,45	PS	Ground

## CS4955 BLOCK DIAGRAM



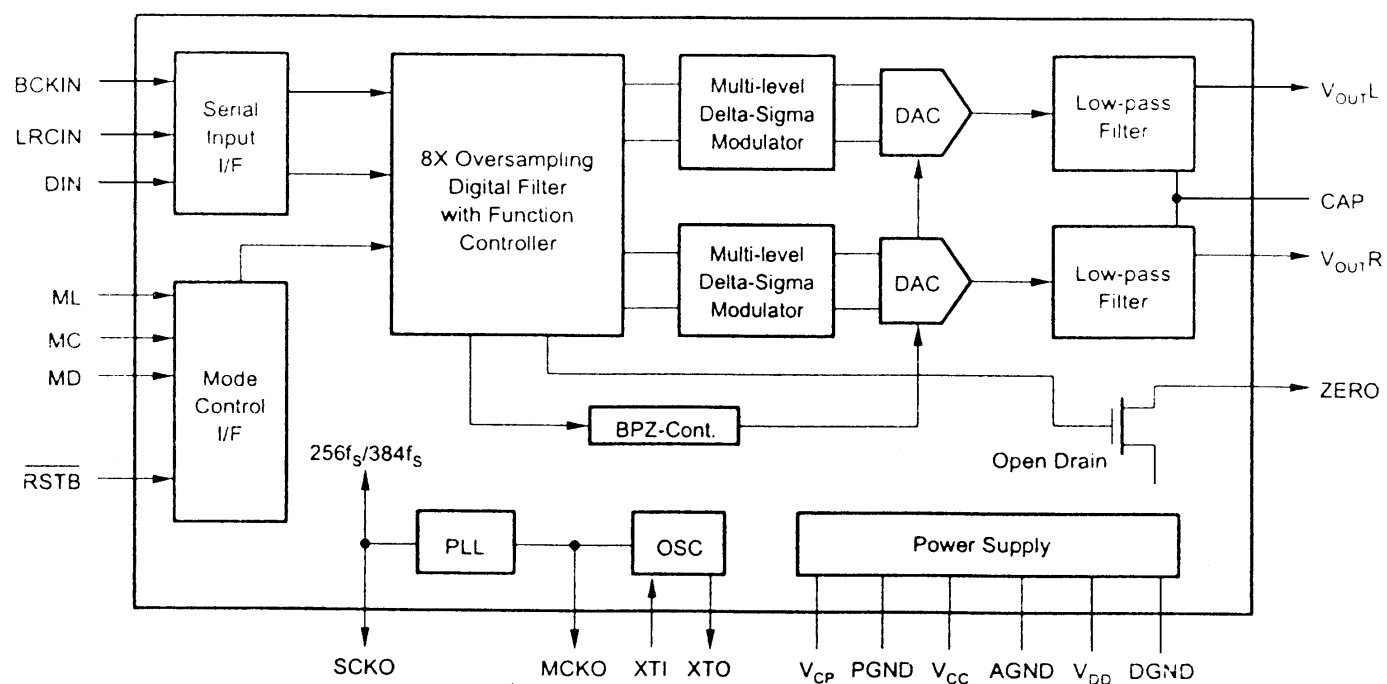


## PCM1723 PIN ASSIGNMENTS

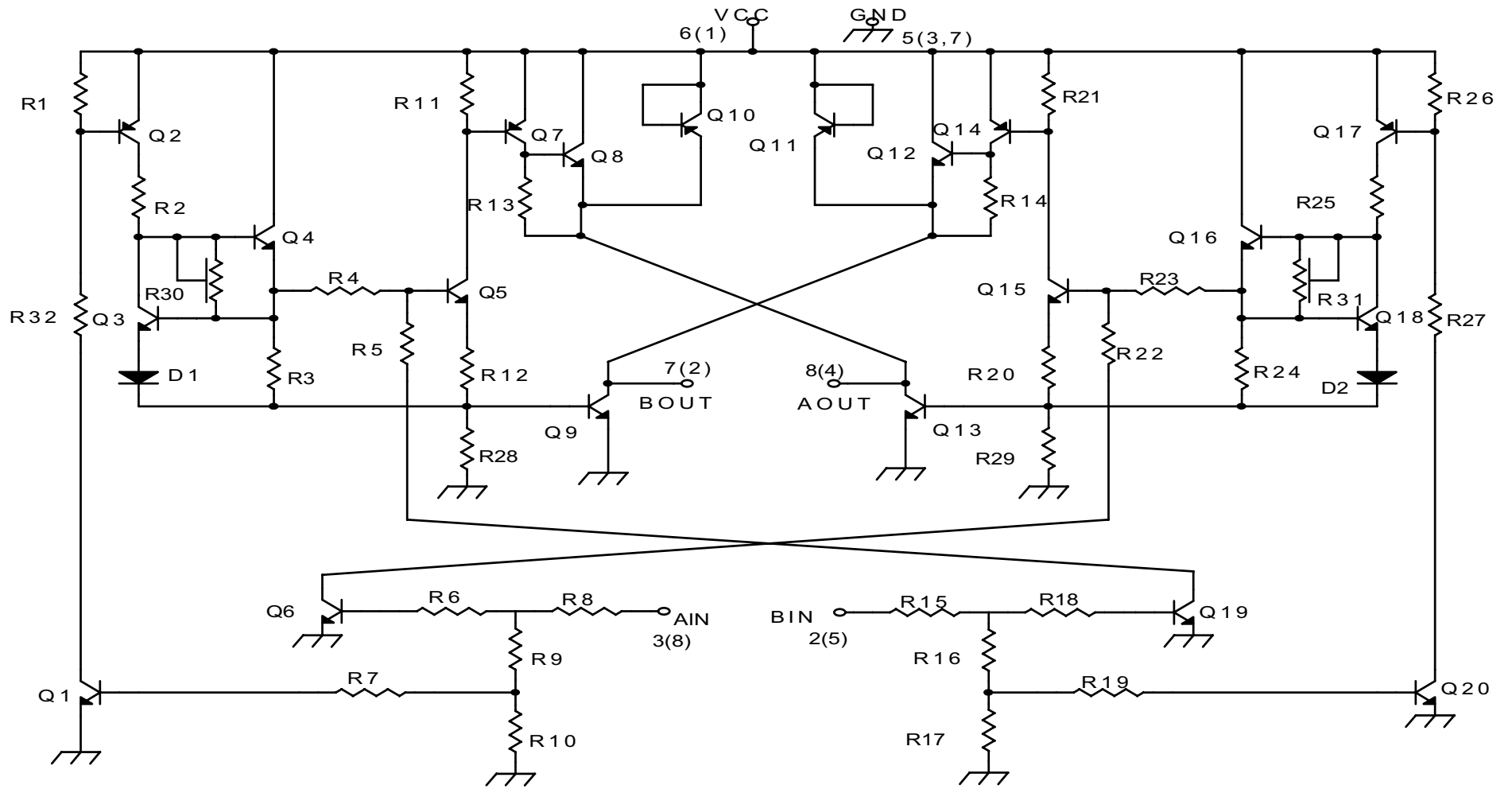
PIN NAME	NUMBER	TYPE	DEFINITION
XTI	1	IN	Master clock input
SCKO	2	OUT	System Clock Out. This output is 256fs or 384fs. System clock generated by the internal PLL.
VCP	3	PWR	PLL Power Supply (+5v)
NC	4	N/A	No connection
MCKO	5	OUT	Buffered clock output of crystal oscillator
ML	6	IN	Latch for serial control data
MC	7	IN	Clock for serial control data
MD	8	IN	Data for serial control
RSTB	9	IN	Reset input. When this pin is low, the digital filters and modulator are held in reset
ZERO	10	OUT	Zero Data Flag. This pin is low when the input data is continuously zero for more than 65.535 cycles of BCKIN
VOUTr	11	OUT	Right Channel Analog Output
AGND	12	GND	Analog Ground
VCC	13	PWR	Analog Power Supply(+5v)
VOUtl	14	OUT	Left Channel Analog Output
CAP	15		Common pin for analog output amplifiers
BCKIN	16	IN	Bit clock for clocking in the audio data
DIN	17	IN	Serial audio data input
LRCIN	18	IN	Left/Right Word Clock. Frequency is equal to fs
NC	19	N/A	No connection
RES	20	N/A	Reserved for factory use, do not connect
VDD	21	PWR	Analog Power Supply(+5v)
DGND	22	GND	Digital Ground
PGND	23	GND	PLL Ground
XTO	24	OUT	Crystal oscillator output

Note:(1)Schmitt trigger input with internal pull-up resistors.  
(2)Schmitt trigger input.

## PCM1723 BLOCK DIAGRAM



## BA6208 EQUIVALENT CIRCUIT DIAGRAM

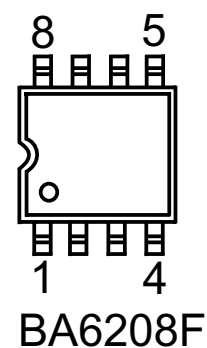
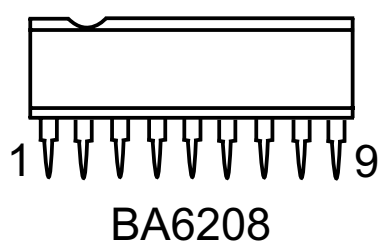


NOTE : Figures in parentheses are for the BA6208F

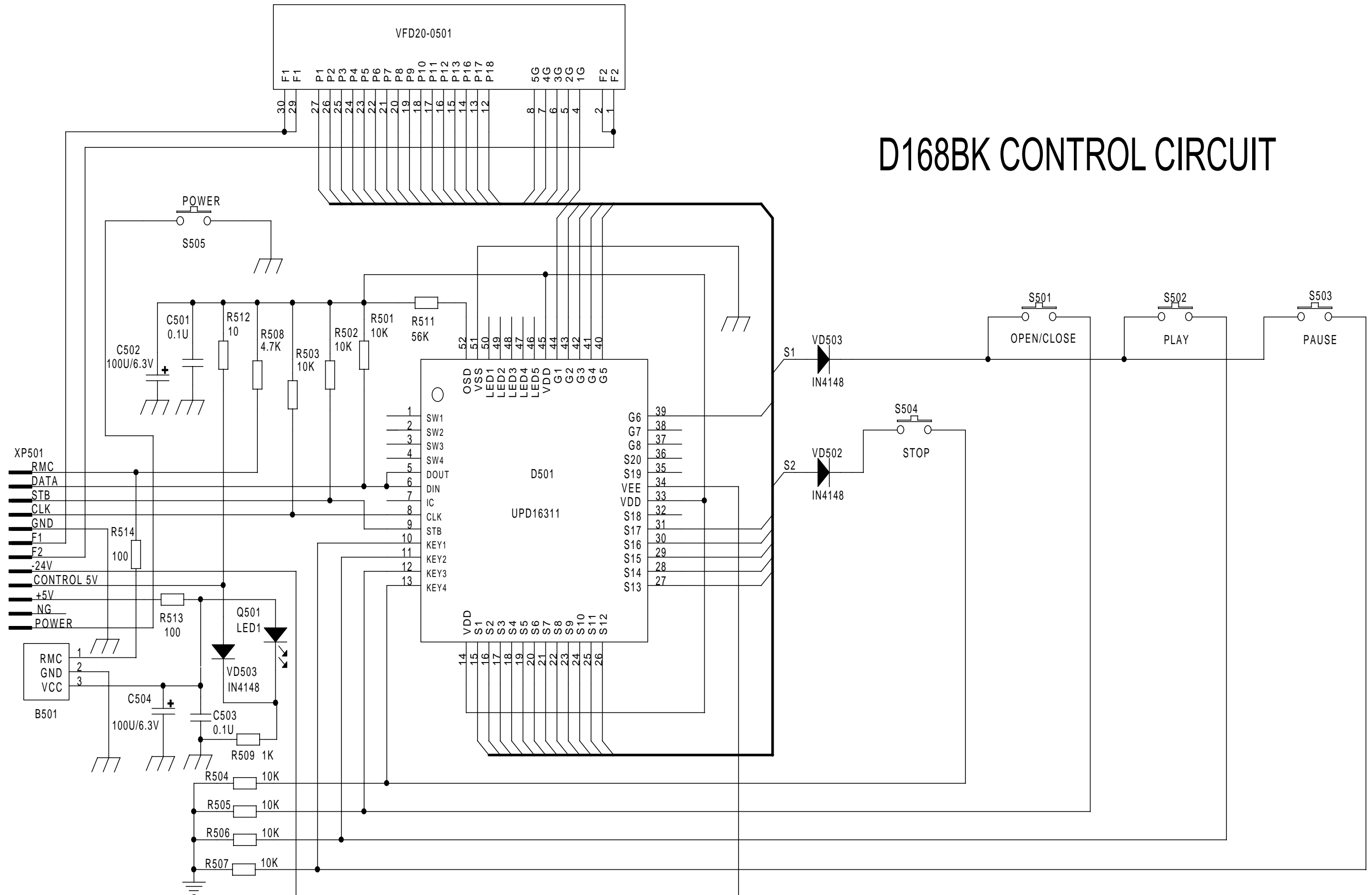
## BA6208 INPUT/OUTPUT TRUTH TABLE

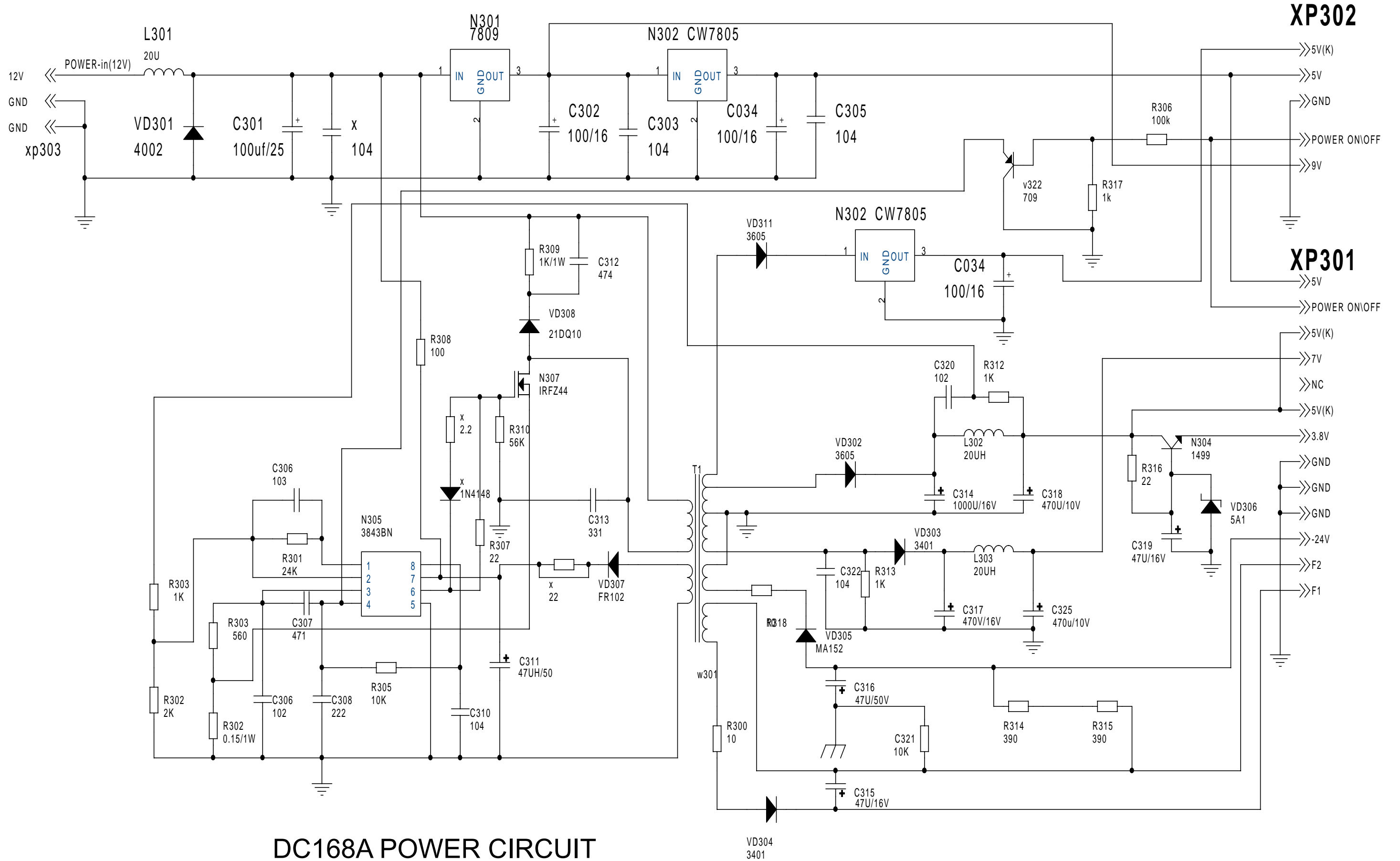
AIN	BIN	AOUT	BOUT
H	L	H	L
L	H	L	H
H	H	L	L
L	L	OPEN	OPEN

## BA6208 EXTERNAL DIMENSIONS

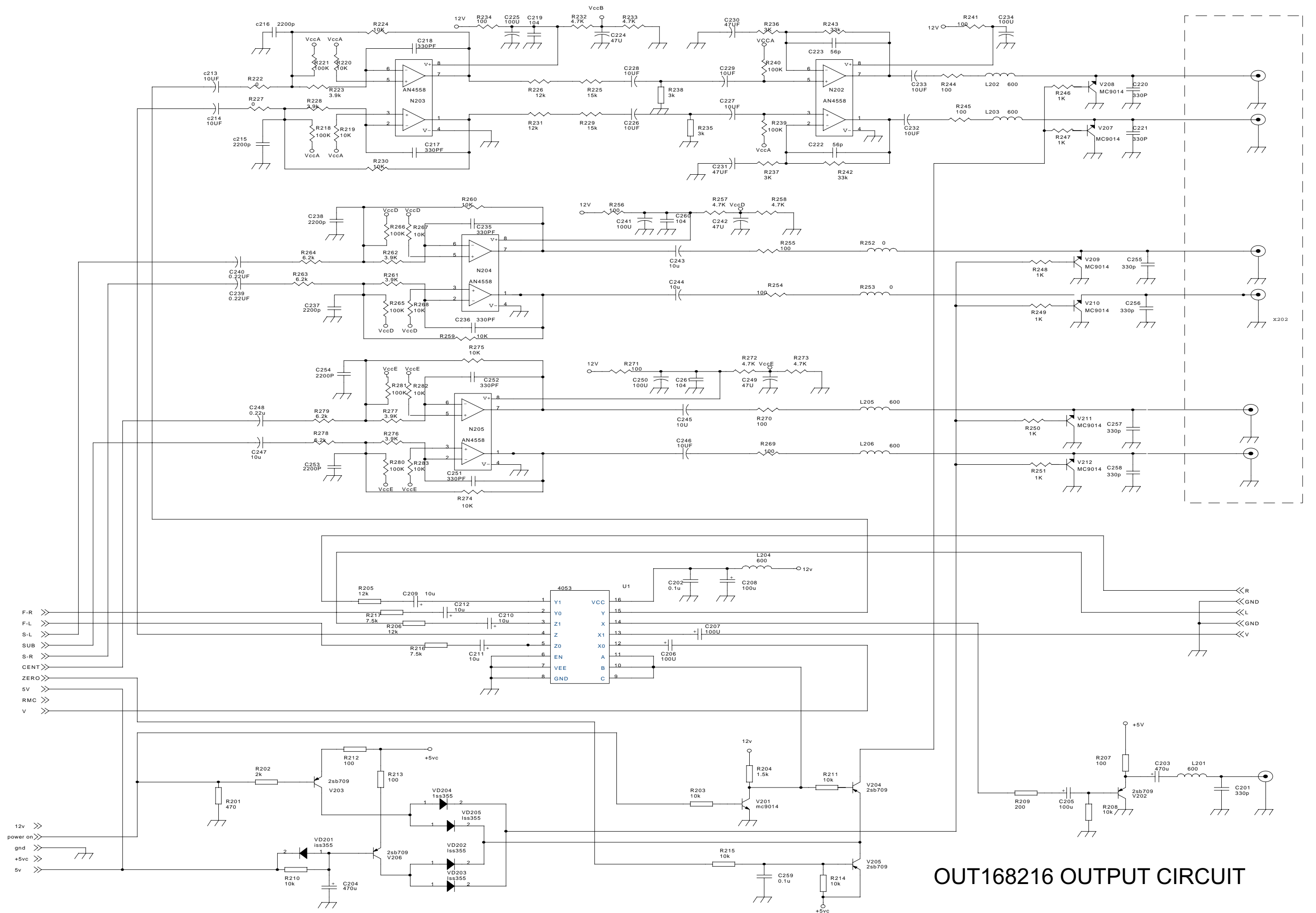


# D168BK CONTROL CIRCUIT

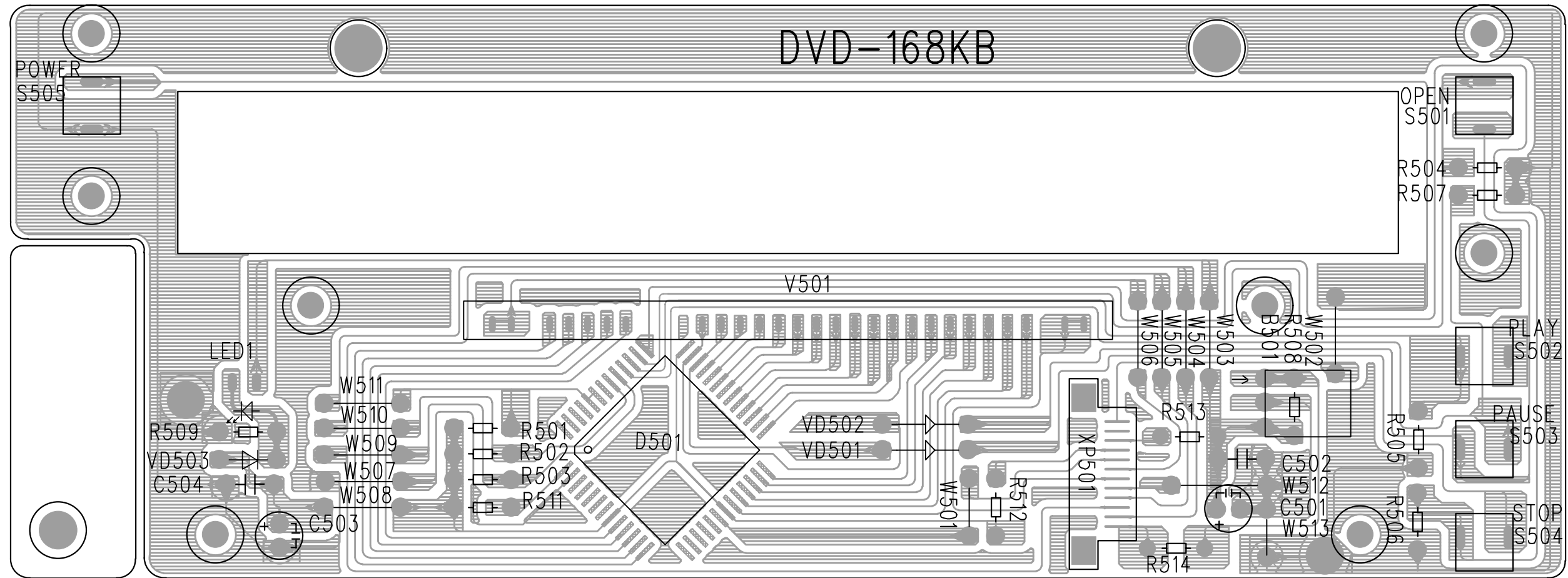




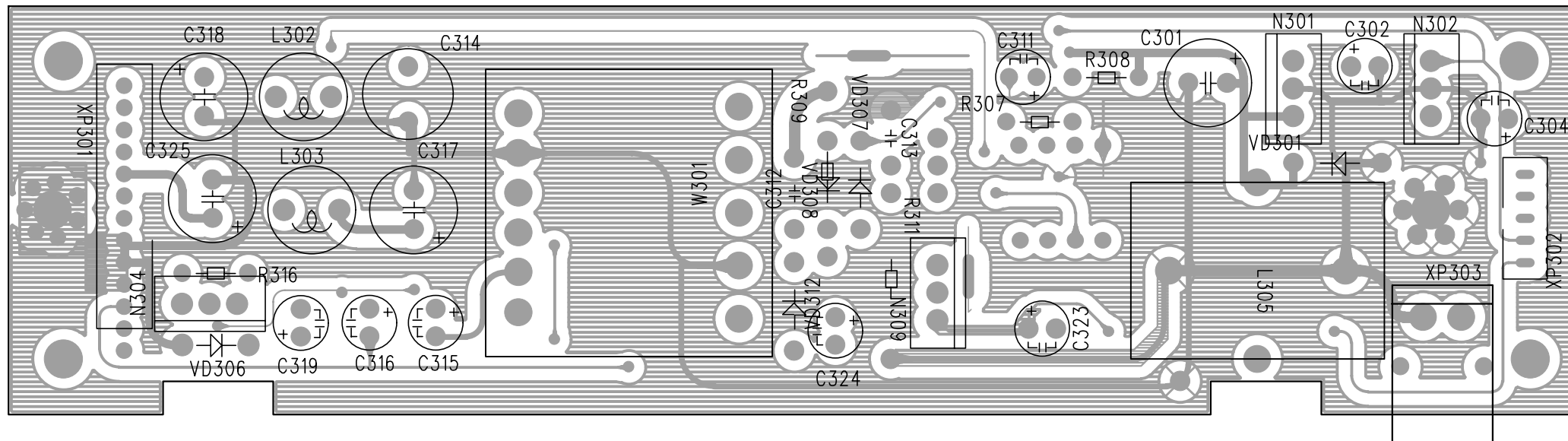
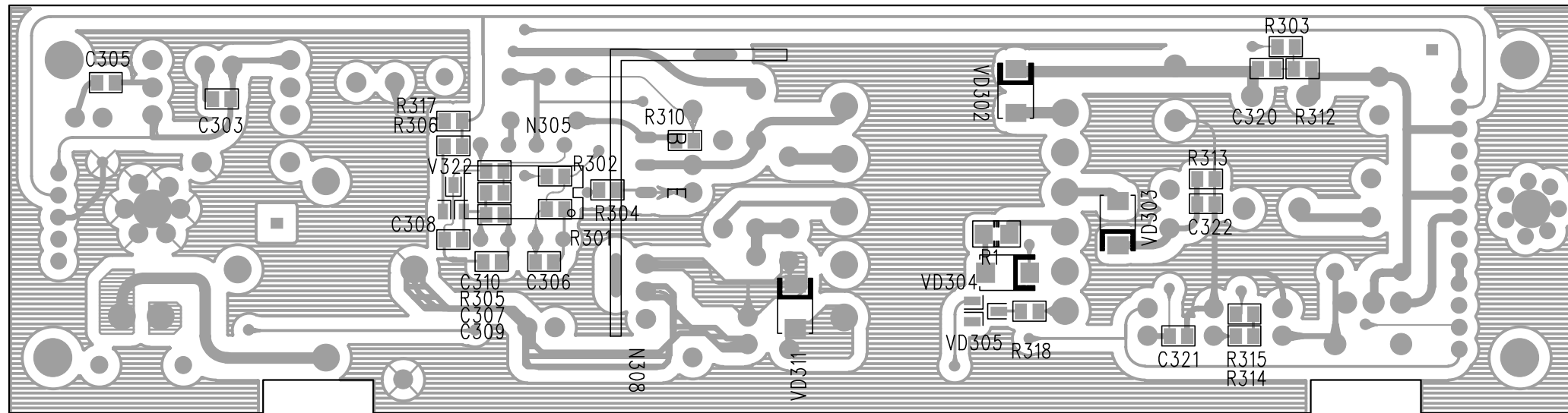
DC168A POWER CIRCUIT



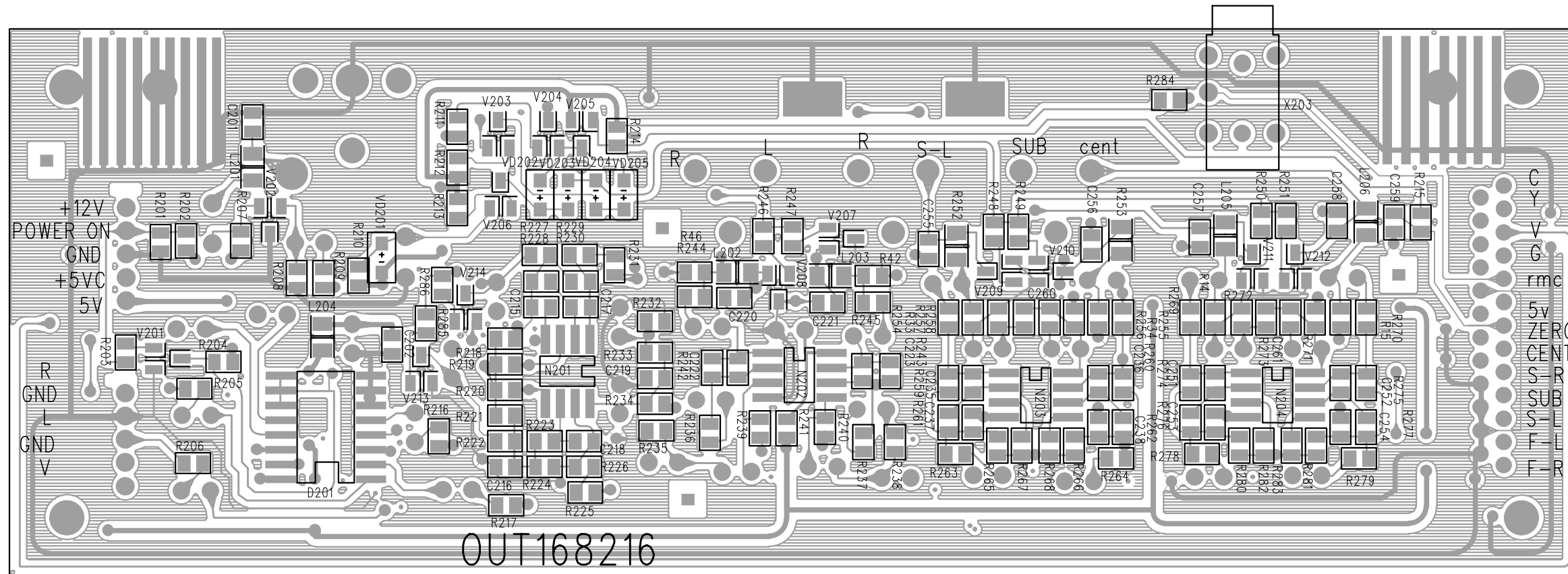
OUT168216 OUTPUT CIRCUIT



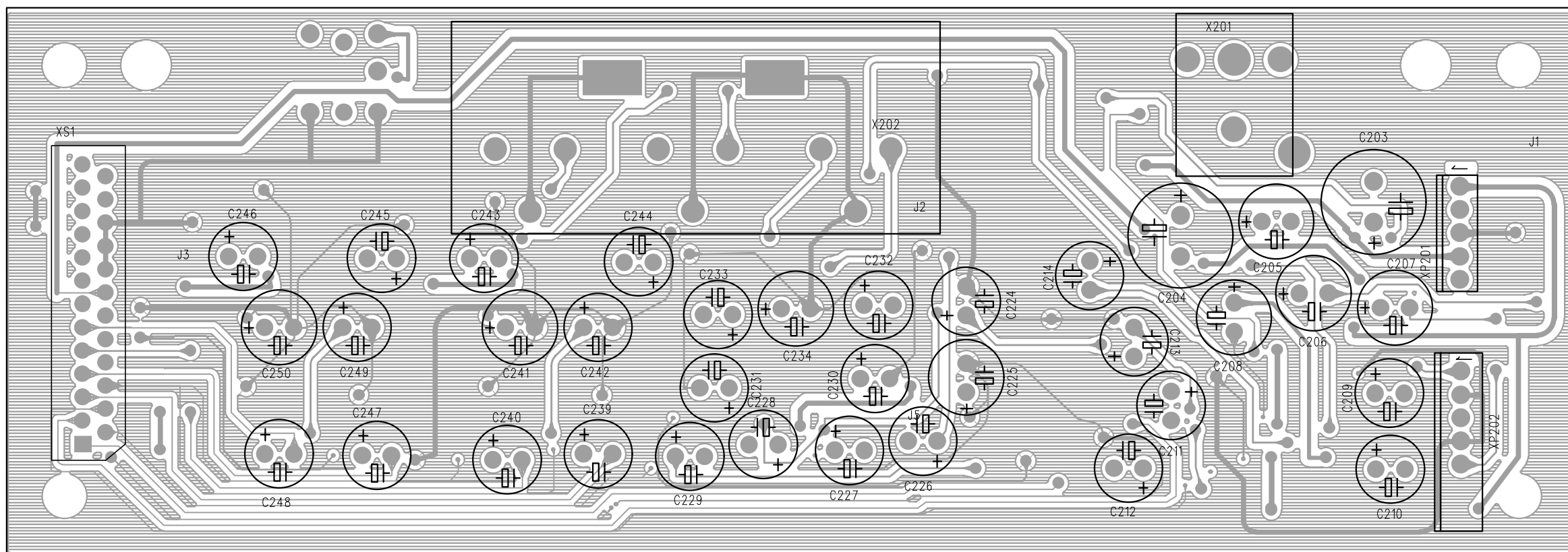
168BK PCB DIAGRAM



DC168A POWER PCB DIAGRAM



OUT168216



OUT168216 OUTPUT DIAGRAM





## ELECTRICAL PARTS LIST

PART No.	PART NAME	QTY
<b>DVD400</b>		
1034	D168BK CONTROL ASS'Y	1
0865	OUT168216 OUTPUT ASS'Y	1
0854	DC168A POWER ASS'Y	1
0866	DSM5016CM DECODER ASS'Y	1
S2295	KHL231BM MECHANISM ASS'Y	1
S1642	OWNER MANUAL	1
S3230	D168 AUDIO CORD	1
S3231	D168 VIDEO CORD	1
S3118	OPEN WIRE	1
S3119	SERVO WIRE	1
S3214	CC-0.5x33x200	1
S3126	CC-1.0x12x150	1
S3216	CC-1.0x25x40	1
S3219b	D168 POWER CORD ASS'Y	1
04003	REMOTE CONTROL ASS'Y	1
S0588	6.2mH INDUCTOR ASS'Y	1
S0676s	RC-168 REMOTE	1
S2701a	BATTERY	2
02006	DVD168B AV INPUT ASS'Y	1

REF No.	PART No.	PART NAME
<b>D168BK CONTROL ASS'Y</b>		
R501	G0735	RT13-0.167W-10K±5%
R502	G0735	RT13-0.167W-10K±5%
R503	G0735	RT13-0.167W-10K±5%
R504	G0735	RT13-0.167W-10K±5%
R505	G0735	RT13-0.167W-10K±5%
R506	G0735	RT13-0.167W-10K±5%
R507	G0735	RT13-0.167W-10K±5%
R508	G0728	RT13-0.167W-4.7K±5%
R509	G0719	RT13-0.167W-1K±5%
R511	G0784	RT13-0.167W-56K±5%
R512	G0705	RT13-0.167W-10±5%
R513	G0712	RT13-0.167W-100±5%
R514	G0712	RT13-0.167W-100±5%
<b>CAPACITOR</b>		
C501	a3540	CD11CX-100uF-M-6.3V
C502	a3304	CT4D-2F4-0.1uF-63V-S
C503	a3540	CD11CX-100uF-M-6.3V
C504	a3304	CT4D-2F4-0.1uF-63V-S
<b>TOUCH</b>		
S501	G6434	EVQ21504M(4.5mm)
S502	G6434	EVQ21504M(4.5mm)
S503	G6434	EVQ21504M(4.5mm)
S504	G6434	EVQ21504M(4.5mm)
S505	G6434	EVQ21504M(4.5mm)
<b>OTHER</b>		
B501	a6733	HS0038B RECEIVER
VD501	a5004	IN4148
VD502	a5004	IN4148
VD503	a5004	IN4148
LED	a1500	ø3 RED LED
D501	P4399	PT6311
V501	a6871	VFD-20-0501
XP501	P6569	12FPZ-SM-TF
<b>OUT168216 OUTPUT ASS'Y</b>		
R201	P11008	RC-03K471JT
R202	P11010	RC-03K202JT
R203	P11013	RC-03K103JT
R204	P11051	RC-03K152JT
R205	P11014	RC-03K123JT
R206	P11014	RC-03K123JT
R207	P11006	RC-03K101JT
R208	P11013	RC-03K103JT
R209	P110567	RC-03K201JT

REF No.	PART No.	PART NAME
R210	P11013	RC-03K103JT
R211	P11013	RC-03K103JT
R212	P11006	RC-03K101JT
R213	P11006	RC-03K101JT
R214	P11013	RC-03K103JT
R215	P11013	RC-03K103JT
R216	P11054	RC-03K752JT
R217	P11054	RC-03K752JT
R218	P11019	RC-03K104JT
R219	P11013	RC-03K103JT
R220	P11013	RC-03K103JT
R221	P11019	RC-03K104JT
R222	P11000	RC-03K000JT
R223	P11031	RC-03K392JT
R224	P11013	RC-03K103JT
R225	P11015	RC-03K153JT
R226	P11014	RC-03K123JT
R227	P11000	RC-03K000JT
R228	P11031	RC-03K392JT
R229	P11014	RC-03K123JT
R230	P11013	RC-03K103JT
R231	P11015	RC-03K153JT
R232	P11012	RC-03K472JT
R233	P11012	RC-03K472JT
R234	P11006	RC-03K101JT
R235	P11052	RC-03K302JT
R236	P11052	RC-03K302JT
R237	P11052	RC-03K302JT
R238	P11052	RC-03K302JT
R239	P11019	RC-03K104JT
R240	P11019	RC-03K104JT
R241	P11006	RC-03K101JT
R242	P11017	RC-03K333JT
R243	P11017	RC-03K333JT
R244	P11006	RC-03K101JT
R245	P11006	RC-03K101JT
R246	P11009	RC-03K102JT
R247	P11009	RC-03K102JT
R248	P11009	RC-03K102JT
R249	P11009	RC-03K102JT
R250	P11009	RC-03K102JT
R251	P11009	RC-03K102JT
R252	P11205	0
R253	P11205	0

REF No.	PART No.	PART NAME
R254	P11006	RC-03K101JT
R255	P11006	RC-03K101JT
R256	P11006	RC-03K101JT
R257	P11012	RC-03K472JT
R258	P11012	RC-03K472JT
R259	P11013	RC-03K103JT
R260	P11013	RC-03K103JT
R261	P11031	RC-03K392JT
R262	P11031	RC-03K392JT
R263	P11142	6.2K
R264	P11142	6.2K
R265	P11019	RC-03K104JT
R266	P11019	RC-03K104JT
R267	P11013	RC-03K103JT
R268	P11013	RC-03K103JT
R269	P11006	RC-03K101JT
R270	P11006	RC-03K101JT
R271	P11006	RC-03K101JT
R272	P11012	RC-03K472JT
R273	P11012	RC-03K472JT
R274	P11013	RC-03K103JT
R275	P11013	RC-03K103JT
R276	P11031	RC-03K392JT
R277	P11031	RC-03K392JT
R278	P11142	6.2K
R279	P11142	6.2K
R280	P11019	RC-03K104JT
R281	P11019	RC-03K104JT
R282	P11013	RC-03K103JT
R283	P11013	RC-03K103JT
R284	P11003	RC-03K100JT
CAPACITOR		
C201	P20029	GRM39CH331J50PT
C202	P20015	GRM39F104Z25PT
C203	a3516	CD110X-470uF-M-16V
C204	a3516	CD110X-470uF-M-16V
C205	a3513	CD110-100uF-M-16V
C206	a3513	CD110-100uF-M-16V
C207	a3513	CD110-100uF-M-16V
C208	a3513	CD110-100uF-M-16V
C209	a3509	CD110-10uF-M-16V
C210	a3509	CD110-10uF-M-16V
C211	a3509	CD110-10uF-M-16V
C212	a3509	CD110-10uF-M-16V

REF No.	PART No.	PART NAME
C213	a3509	CD110-10uF-M-16V
C214	a3509	CD110-10uF-M-16V
C215	P20042	GRM39B222K50PT
C216	P20042	GRM39B222K50PT
C217	P20029	GRM39CH331J50PT
C218	P20029	GRM39CH331J50PT
C219	P20015	GRM39F104Z25PT
C220	P20029	GRM39CH331J50PT
C221	P20029	GRM39CH331J50PT
C222	P20037	GRM39CH560J50PT
C223	P20037	GRM39CH560J50PT
C224	a3512	CD110-47uF-M-16V
C225	a3513	CD110X-100uF-M-10V
C226	a3509	CD110-10uF-M-16V
C227	a3509	CD110-10uF-M-16V
C228	a3509	CD110-10uF-M-16V
C229	a3509	CD110-10uF-M-16V
C230	a3512	CD110-47uF-M-16V
C231	a3512	CD110-47uF-M-16V
C232	a3509	CD110-10uF-M-16V
C233	a3509	CD110-10uF-M-16V
C234	a3513	CD110X-100uF-M-10V
C235	P20029	GRM39CH331J50PT
C236	P20029	GRM39CH331J50PT
C237	P20042	GRM39B222K50PT
C238	P20042	GRM39B222K50PT
C239	a3502	CD110-0.22uF-M-16V
C240	a3502	CD110-0.22uF-M-16V
C241	a3513	CD110-100uF-M-16V
C242	a3512	CD110-47uF-M-16V
C243	a3509	CD110-10uF-M-16V
C244	a3509	CD110-10uF-M-16V
C245	a3509	CD110-10uF-M-16V
C246	a3509	CD110-10uF-M-16V
C247	a3509	CD110-10uF-M-16V
C248	a3502	CD110-0.22uF-M-16V
C249	a3512	CD110-47uF-M-16V
C250	a3513	CD110-100uF-M-16V
C251	P20029	GRM39CH331J50PT
C252	P20029	GRM39CH331J50PT
C253	P20042	GRM39B222K50PT
C254	P20042	GRM39B222K50PT
C255	P20029	GRM39CH331J50PT
C256	P20029	GRM39CH331J50PT

REF No.	PART No.	PART NAME
C257	P20029	GRM39CH331J50PT
C258	P20029	GRM39CH331J50PT
C259	P20015	GRM39F104Z25PT
C260	P20015	GRM39F104Z25PT
C261	P20015	GRM39F104Z25PT
INDUCTOR		
L201	P6817	BSZ2012-600T3
L202	P6817	BSZ2012-600T3
L203	P6817	BSZ2012-600T3
L204	P6817	BSZ2012-600T3
L205	P6817	BSZ2012-600T3
L206	P6817	BSZ2012-600T3
DIODE		
VD201	P1200	ISS355TE17
VD202	P1200	ISS355TE17
VD203	P1200	ISS355TE17
VD204	P1200	ISS355TE17
VD205	P1200	ISS355TE17
TRIODE		
V201	P5073a	2SD601AR
V202	P5700	2SB709AR
V203	P5700	2SB709AR
V204	P5700	2SB709AR
V205	P5700	2SB709AR
V206	P5700	2SB709AR
V207	P5073a	2SD601AR
V208	P5073a	2SD601AR
V209	P5073a	2SD601AR
V210	P5073a	2SD601AR
V211	P5073a	2SD601AR
V212	P5073a	2SD601AR
IC		
D201	P4595	BU4053BCF-E2
N201	P4503	NJM4558M
N202	P4503	NJM4558M
N203	P4503	NJM4558M
N204	P4503	NJM4558M
OTHER		
X201	a6982	AV-8.4-4A(YELLOW)
X202	a6999	AV6-8.4-1
X203	a6662	HSJ1715-01110
XP201	a6521	S-5B-PH
XP202	a6521	S-5B-PH
XP203	a6613	FABSE2552

REF No.	PART No.	PART NAME
<b>DC168A POWER ASS'Y</b>		
R301	P11037	RC-03K273JT
R302	P11010	RC-03K202JT
R303	P11009	RC-03K102JT
R304	P11050	RC-03K561JT
R305	P11013	RC-03K103JT
R306	P11013	RC-03K103JT
R307	a0707	RT13-1/16W-22±5%
R308	a0712	RT13-1/16W-100±5%
R309	a0498	RY16-1W-1K±5%
R310	P11039	RC-03K563JT
R311	a0499	RY17-1W-0.1±10%
R312	P11009	RC-03K102JT
R313	P11009	RC-03K102JT
R314	P11130	RC-03K391JT
R315	P11130	RC-03K391JT
R316	a0707	RT13-1/16W-22±5%
R317	P11009	RC-03K102JT
R318	P11000	RC-03K000JT
CAPACITOR		
C301	a3520	CD110X-220uF-M-25V
C302	a3609	CD110X-100uF-M-25V
C303	P20015	GRM39F104Z25PT
C304	a3609	CD110X-100uF-M-25V
C305	P20015	GRM39F104Z25PT
C306	P20012	GRM39B103K50PT
C307	P20008	GRM39B471K50PT
C308	P20009	GRM39B102K50PT
C309	P20009	GRM39B102K50PT
C310	P20015	GRM39F104Z25PT
C311	a3210	CD110X-47uF-M-50V
C312	a2078	CS09Y5V63V224S
C313	a2037	CC1-10B-471K-63V-SL
C314	a3709	CD110X-1000uF-10V±20%
C315	a3210	CD110X-47uF-M-50V
C316	a3210	CD110X-47uF-M-50V
C317	a3709	CD110X-1000uF-10V±20%
C318	a3561	CD110X-470uF-M-10V
C319	a3635	CD110X-47uF-M-16V
C320	P20009	GRM39B102K50PT
C321	P20015	GRM39F104Z25PT
C322	P20015	GRM39F104Z25PT
C323	a3609	CD110X-100uF-M-25V
C324	a3609	CD110X-100uF-M-25V

REF No.	PART No.	PART NAME
C325	a3561	CD110X-470uF-M-10V
TRANSISTOR		
VD301	a5001	IN4002
VD302	P5722	RB060L-40
VD303	P5721	RB160L-40
VD304	P5721	RB160L-40
VD305	P1556	MA152
VD306	a1571	4C3
VD307	a1224	1U08
VD308	a1224	1U08
VD312	a1560	11EFS2
V322	P5700	2SB709AR
IC		
N301	a4714	CW7809
N302	a4571	CW7805
N304	a5063	3DD3852P
N305	a4716	AP3843
N308	a5116	IRF244N
N309	a4571	CW7805
OTHER		
XP301	a6874	B-13B-PH
XP302	a8834	DC168A POWER CORD
XP303	a6975	WII-2AW
L302	a6272	20mH
L303	a6272	20mH
L304	a6994	200uH
W301	a6993	EPC25 TRANSFORMER